

# THE GASTROPODS OF THE OLDER TERTIARY OF AUSTRALIA. (PART II.)

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## PLATES II.-X.

[SUPPLEMENT TO PART I.]

*Fusus henicus*, *spec. nov.* Plate vi., fig. 11.

Shell fusiform, with a short spire, ending in a turbinate pullus of one and a half smooth convex whorls.

Whorls, three, excluding the apical one, rather sharply keeled in the one-fourth, obliquely plicated; the plicæ (ten to a whorl) forming blunt wedge-shaped tubercles on the keel.

Surface ornamented with stout subangulated liræ, about seven on the last whorl posterior to the periphery, with occasionally a slender thread in the broader intervening sulci, and by coarse subdistant curvilinear growth-lines.

The last whorl abruptly contracted in a long straight, slender, open beak; base with numerous wrinkled liræ, the interspaces coarsely cancellated.

*Dimensions*.—Length, 25; breadth, 11.5; length of canal and aperture, 18.

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

This species comes near to *F. Aldingensis*, from which it differs by its turbinate pullus, coarser ornament, blunt nodulations, and by the angulation of the whorls being closer to the anterior suture. It has also much resemblance to the young of *Tudicula turbinata*.

*Fusus Gippslandicus*, *Tate*. Figured herewith, Plate iii., fig. 6.

*Fasciolaria fusilla*, *spec. nov.* Plate vi., fig. 12.

Shell ovately fusiform, with a moderately long spire, ending in a prominent bead-like pullus with the apex laterally immersed. Whorls, four, excluding the pullus, flatly convex, spirally lirate, and distantly transversely lined; liræ slender, more or less alternately large and small, about 18 on the penultimate whorl, a little narrower than the intervening sulci.

Last whorl regularly rounded to the gradually contracting base, spirally lirate; columella slightly arcuate with three

strong oblique plaits, the anterior one of which at the junction with the snout, is the largest, and is somewhat decurrent on the relatively short, slightly bent, and open canal.

*Dimensions*.—Length, 42; breadth, 17; length of aperture and canal, 28.

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

This species differs from all those previously described by its rounded whorls without costæ or tubercles, and has no analogue among recent forms.

**Peristernia Murrayana, Tate.** Figured herewith, Plate iv., fig. 4.

**Peristernia pumila, spec. nov.** Plate viii., fig. 4.

Shell fusiform, with a short subscalar spire, ending in a small mamillate apex of one and a half smooth convex whorls.

Whorls four (excluding apical one), a little flattened in front of the suture, with nine stout plications to each whorl; plicæ narrowly rounded, high, elevated into blunt tuberculations at the shoulder. Surface smooth, shining, ornamented with a few distant incised spiral lines.

Last whorl flatly rounded in the middle, where the plicæ fade away, thence abruptly contracted into a very short straight beak. Aperture oval-oblong; outer lip thin, smooth within; columella with three strong oblique folds; canal very short, open, straight, a little reverted at the tip.

*Dimensions*.—Length, 4.75; breadth, 2.25; length of aperture and canal, 2.

*Locality*.—Clayey green sands, Adelaide bore.

By its very short canal this species bears a general resemblance to *P. apicilirata* and *P. actinostephes*, from which it differs in its smooth pullus and tabulate whorls.

**Eburnopsis, gen. nov.**

It is with some diffidence that I establish a new genus for the reception of the following species, which has the general aspect of *Eburna*; but unlike all known species of that genus, it is spirally ribbed and wants the callous structure of the inner lip and umbilical region; moreover, the truncated columella, with its subtuberculated extremity, is unknown in *Eburna*. The generic name indicates its affinity with *Eburna*.

**Eburnopsis aulacæssa, spec. nov.** Plate iv., fig. 3.

Shell ovately globose, spire very short, ending in a moderately large globose pullus.

Ordinary whorls three, narrow, deeply channelled at the suture, the shoulder sharp-edged and strongly defined. Ornamented with moderately elevated, rounded spiral ribs (six on the penultimate whorl), a little narrower than the somewhat concave

furrows; the whole surface strongly and closely wrinkled transversely. Last whorl regularly and moderately convex from the middle to the base, spirally ribbed and sulcated; umbilicus narrow, defined by a rib a little broader than the rest of the ribs, which results from the successive infilling growths of the siphonal notch.

Aperture oval, channelled posteriorly, corresponding with the shoulder of the whorl; outer lip thin, crenulated on the edge, joined to the columella by a callous growth; columella slightly incurved, obliquely truncated and thickened at the front; siphonal notch shallow and narrow.

*Dimensions*.—Length, 14; breadth, 10; height of aperture, 10.

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

*Phos Gregsoni*, *Tate*. Figured herewith, Plate iv., fig. 5.

*Nassa sublirella*, *Tate*. Figured herewith, Plate iv., fig. 2.

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## FAMILY VOLUTIDÆ.

### GENUS LYRIA.

#### SYNOPSIS OF SPECIES.

Costæ, 20, terminating posteriorly in blunt points.

1. *L. harpularia*.

Costæ, 30, terminating posteriorly in small rounded tubercles.

2. *L. gemmata*.

#### *Lyria harpularia*, *Tate*.

Trans. Roy. Soc., S. Aust., 1888, t. 12, fig. 12, without description.

Shell fusiformly ovate, somewhat thin, transversely costate; costæ, about 20, on last whorl, narrow, subacute, slightly flexuous, terminating posteriorly in blunt points on the slightly flattened shoulder; interstices wider than the costæ, transversely and spirally striated. Spire subacute, of six slightly convex whorls terminating in a smooth pullus of one and a half whorls. Aperture elliptical-elongate, outer lip thin, united to the pillar by a thin callus; columella with two prominent anterior folds and numerous transverse rugosities; canal very short, recurved.

*Dimensions*.—Total length, 32; breadth, 17; length of aperture, 22; breadth, 8; height of last whorl, 26.

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

#### *Lyria gemmata*, *spec. nov.* Plate iii., fig. 4.

Similar to *L. harpularia*, but usually narrower and less ventricose with about 30 slender, less flexuous, ribs on the last whorl,

which terminate posteriorly in small beadlike tubercles, and rendered more conspicuous by an ill-defined narrow encircling depression in front of the suture.

*Dimensions*.—Total length, 19; breadth, 9; length of aperture, 13.

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

#### GENUS VOLUTA.

##### SYNOPSIS OF SPECIES.

Nucleus spherical, disproportionately large, columella plaits 3 or 4.

Outer lip expanded, wing-like; whorls tuberculated on the shoulder. 1. *V. Hannafordi*.

Outer lip not expanded; whorls strongly costated.

Costæ, 7 on last whorl, roundly angled.

2. *V. heptagonalis*.

Costæ, 11 on last whorl, sharply angled.

3. *V. alticostata*.

Costæ, 14 on last whorl.

4. *V. Stephensi*.

Nucleus turbinated, crenulated; spire-whorls costated and bearing spinous scales at the shoulder; columella plaits, 4.

Ribs on posterior whorls, about 20 pairs. 5. *V. McDonaldi*.

Ribs on posterior whorls, about 9. 6. *V. uncifera*.

Nucleus papillary, smooth; outer lip winged.

Spire nearly as long as aperture; nucleus small, with an erect tip. 7. *V. macroptera*.

Spire nearly half length of aperture; nucleus large, blunt; whorls medially angulated. 8. *V. Mortonii*.

Nucleus papillary, smooth; outer lip not expanded.

Shell sub-cylindrical; surface finely wrinkled spirally.

Last whorl with 14 inconspicuous transverse nodulations; suture concealed 9. *V. limbata*.

Last whorl with seven transverse tubercles; suture exposed. 10. *V. conoidea*.

Shell oval-oblong to turriculate.

Surface of anterior whorls smooth, without tubercles.

Pullus mamillate, large, its apex laterally immersed. 11. *V. ancilloides*.

Pullus papillary, blunt; apex central.

Spire attenuate, whorls slightly convex, pullus small.

Posterior whorls smooth.

12. *V. McCoyii*.

Posterior whorls tuberculate.

13. *V. protorhysa*.

Spire short, whorls convex, pullus large.

14. *V. polita*.

Pullus subcylindrical, blunt ; apex central.  
 Surface spirally striated or finely ridged, especially on posterior whorls.

15. *V. ellipsoidea*

Pullus acuminate, pointed at the end.

Spire half length of aperture ; posterior whorls spirally lined. 16. *V. capitata*.

Spire less than one-third of the aperture, ornamented with transverse colour-lines.

17. *V. Masoni*.

Surface with spiral threads, at least on the posterior whorls.

Spiral lines on posterior whorls only ; see 7, 11, 15, 16, 26.

Spiral ornament on all the spire whorls.

Outer lip varicosely thickened.

18. *V. crassilabrum*.

Faint longitudinal ridges on last whorl ; pullus rather depressed.

19. *V. linteum*.

Whorls cancellated. 20. *V. cribrosa*.

Whorls costated ; spire turreted.

21. *V. sarissa*.

Surface costulate or costate, without spiral ornament.

Costulæ not prominent ; spire half the length of aperture. 22. *V. lirata*.

Costulæ conspicuous ; spire about one-third length of aperture. 23. *V. costellifera*.

Costated ; spire nearly as long as aperture.

24. *V. pseudolirata*

Surface tuberculated.

Spire elongated, at least one half the length of aperture ; columella plaits, 4.

Last whorl tuberculated, but not costated.

Apex blunt ; tubercles blunt, on anterior whorls only. 25. *V. cathedralis*.

Apex pointed ; tubercles sharp on all the whorls ; fine spiral striæ.

26. *V. payodooides*.

Anterior of last whorl costated.

Tubercles blunt ; aperture a little longer than spire. 27. *V. Tateana*.

Tubercles pointed ; spire about the length of aperture. 28. *V. tabulata*.

Spire short, less than half the length of aperture.

A second row of tubercles at the suture ; pullus small.

Costæ angular, ending in pointed tubercles. 29. *V. antiscalaris*.

Costæ rounded, with obtuse tubercular ends at the shoulder.

30. *V. anticingulata*.

Tubercles on shoulder of whorl only ; pullus large.

Tubercles spinous ; ante-sutural area concave. 31. *V. strophodon*.

Tubercles short, conical ; whorls convex behind. 32. *V. Weldii*.

SPECIES UNCLASSIFIED.

*V. Agnewi*, *Johnston*, Proc. Roy. Soc. Tasmania for 1879, p. 37, non 1888 ; *V. antiscalaris*, *Johnston*, Geol. Tasmania, t. 30, f. 8, 1888. Table Cape.

*V. Allporti*, *Johnston*, op. cit. p. 35, 1880, non 1888. Table Cape.

*V. pellita*, *Johnston*, op. cit., p. 37, 1880 ; id. Geol. Tasm., t. 30, f. 2. Possibly *V. ancilloides* or *V. macroptera*. Table Cape.

*V. stolida*, *Johnston*, op. cit., p. 36, 1880 ; Geol. Tasmania, t. 30, figs. 4-4a. Related to *V. strophodon*. Table Cape.

1. *Voluta Hannafordi*, *McCoy*.

*Reference*.—*Prodromus Pal. Victoria*, Decade I., tab. vi., fig. 1, 1874 ; Decade IV., tab. 37, fig. 1.

*Localities*.—Older beds at Muddy Creek ; clays at Schnapper Point ; Port Fairy, Warrnambool ; and at Fyan's Ford (*McCoy*).

This species is remarkable for its large pullus and winged outer-lip ; the whorls are obtusely angled and nodosely-tuberculate ; the posterior slope of the body whorl is spirally ridged or lined, the front is smooth.

Length, exceeding 150 ; breadth, 90 ; pullus, 12 in diameter.

The only other winged species are *V. macroptera*, *McCoy*, and *V. Mortoni*, *Tate*, which are smooth, or nearly so, with a small pullus.

2. *Voluta heptagonalis*, *spec. nov.* Plate iv., figs. 1 and 7.

Shell narrowly fusiform, with a moderately long scalar spire ending in a large spherical pullus of one and a half smooth whorls, the apex of which is laterally immersed ; the pullus is partitioned off from the spire. Whorls, four, beside the pullus ; the first one convex, spirally lined, and faintly plicate, at first very narrow, but enlarging and developing a shoulder and strong costæ on the next whorl ; the two other spire-whorls angulated in the posterior-third, the area next to the suture being nearly flat or slightly

concave, the anterior portion nearly straight or parallel with the axis.

Surface ornamented with roundly angular axial ribs, which terminate in bluntly angled tubercles at the shoulder; shoulder broadly and deeply undulate between the tubercles. The ribs are seven in number on the body whorl, but increase to about eleven on the posterior whorls. The sculpture on the posterior spire-whorls consists of spiral lines crossed by transverse striae; that on the body-whorl is not accurately known but is apparently limited to transverse lines of growth.

Body-whorl with the ribs strongly developed into thick conical tubercles at the shoulder, fading off to the front at about the middle; base gradually much attenuated. Aperture elongate-ovovate; columella with three strong plications.

*Dimensions*.—Total length, 150; greatest breadth, 62; length of aperture, 95; greatest width, 28; diameter of pullus, 14; height, 13.

*Locality*.—Calciferous sandstone of the River Murray cliffs near Morgan.

**3. *Voluta alticostata*, *spec. nov.* Plate v., fig. 7.**

Shell resembling *V. heptagonalis*, but is proportionately shorter or broader. The ribs are sharply angled, eleven on the body-whorl, increasing to fourteen on the posterior whorls. The sculpture on the posterior whorls consists of crowded spiral lines rendered wavy by the crossing of striae and growth lines; the same sculpturing is present on the posterior slope and shoulder of the body-whorl, but the rest of its surface is smooth; pullus and columella plaits as in *V. heptagonalis*. The pullus was hopelessly shattered by an accident before the execution of the drawing, but it revealed, in the unique specimen, a septum between it and the spire.

*Dimensions*.—Length, without pullus, 90; breadth, 49; length and breadth of aperture, 60 and 21.

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

**4. *Voluta Stephensi*, *Johnston*.**

*Reference*.—Proc. Roy. Soc., Tasmania, for 1879, p. 35 (1880); id., Geology of Tasmania, t. 30, f. 1 (1888).

From an unpublished drawing furnished me by Mr. Johnston, this large species belongs to the same natural group as *V. heptagonalis* and *V. alticostata*, being intermediate in proportions between the two; it is further distinguished by having 14 ribs on the body whorl, increasing to 18 posteriorly, and by the absence or indistinctness of spiral sculpture.

*Dimensions*.—Length, 110; breadth, 55.

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

The two following species may conveniently be included in the Section *Vespertilio*, though they present in their large turbinate pullus of several crenulated whorls a facies peculiarly their own.

**5. *Voluta MacDonaldi*, Tate.** Plate iii., fig. 5.

*Reference*.—Gastropods, Part I., plate xii., fig. 11 (1888).

Shell oval-oblong, with a rather short gradated spire ending in a subcylindrical pullus of four and a half narrow crenulated whorls, the terminal ones depressed.

Whorls three, excluding pullus; the two posterior whorls angulated in the posterior-third, the front parallel with the axis and costated, the posterior area concavely sloping upwards; the costæ terminate at the shoulder in high-vaulted spinous scales; on the first spire-whorl the spines are about 20 in number, and terminate each a pair of costæ.

The body whorl is somewhat ventricose, with a high shoulder, concavely sloping upwards to the suture; the angulation crowned with 16 spinous scales which terminate broad undulations, not ribs, rapidly becoming obsolete. Columella with four distant plaits; outer lip thin. The whole surface is sculptured with striæ and growth-lines; the only spiral-sculpture is confined to the last whorl of the pullus.

The pullus is not sharply separated from the ordinary spire-whorls, as there is a gradual change in the shape and ornament of the whorls; the actual junction being somewhat indicated by a slight eccentricity of the first spire-whorls. Counting from the summit, the first and second whorls are smooth, flatly convex, with a deep suture, almost on a level, though the extreme tip is a little raised; the third whorl is convex, flattened, and strongly crenulated in front of the suture; the crenulations gradually elongate with the increasing angulation, so that the last is conspicuously angulated and costated, but not at all spinously produced; this last whorl is marked moreover with fine spiral ridges.

*Dimensions*.—Total length, 115; breadth, 67; length of aperture, 80; width, 130; height of pullus, 11; greatest width, 13.5.

*Locality*.—Lower beds at Muddy Creek (*H. McDonald*); blue clays at Schnapper Point (*R.T.*).

Until I received the very handsome specimen, herewith figured, from Mr. McDonald, of Hamilton, after whom I am pleased to name the species, I was acquainted with only two very young specimens collected by myself at Schnapper Point, one of which is figured in my Part I., as quoted above.

### 6. *Voluta uncifera*, Tate.

*Reference*.—Gastropods, Part I., plate xii., fig. 10.

Two young examples only known, which exhibit the general character of equally sized specimens of *V. McDonaldi*, but the specific differences are—the whorls of the pullus are all convex and feebly tubercular ridged; the body whorl is more attenuated, and has only about nine spinous scales on the angulation which terminate less defined costæ.

*Dimensions* of an example of six and a half whorls, including the apical ones:—Length, 34; width, 20; length of aperture, 22; width of pullus, 10.

*Locality*.—Calciferous sandstone of the River Murray Cliffs, near Morgan (R.T.).

### 7. *Voluta macroptera*, McCoy.

*Reference*.—Proc. Pal. Victoria, Decade I., tab. viii., figs. 1—4 (1874).

This species is fusiform, attaining to a length of about 150 mills.; the spire is moderately elongate, and consists of flatly convex whorls terminated by a relatively small papillary pullus, the extreme tip of which is erect; the whorls are smooth, except the two posterior ones, which are spirally striated or lined. At the adult stage the outer lip becomes dilated into a very large thin-edged, triangular, flattened wing.

*Localities*.—Bird rock, Geelong (McCoy; J. B. Wilson !); calciferous sandstone of the River Murray Cliffs, near Morgan (R. T.); Table Cape (Hobart Mus. !).

### 8. *Voluta Mortoni*, spec. nov. Pl. ix, figs. 1 and 2.

Shell fusiform, with a short spire of subangular whorls terminating in a relatively large, smooth, blunt pullus, the top of which is laterally immersed.

Whorls three and a half, excluding the pullus, the first half turn of the spire almost concealed, thence the revolutions rapidly enlarge to the somewhat ventricose body-whorl. The outer lip of the body-whorl is dilated into a large, thin-edged, flattened wing; its outer margin broadly convex, its posterior margin slightly concave running up to the angulation of the penultimate whorl.

The two posterior whorls are microscopically striated between a few distant raised lines; otherwise the shell is marked only with fine lines of growth.

Columella with two plaits, almost concealed from view.

*Dimensions* of a nearly adult shell (fig. 1).—Total length, 65; breadth, 32; length of aperture, 44; diameter of pullus, 5.

*Localities*.—Lower beds at Muddy Creek (J. Dennant); Table Cape (Hobart Mus. !)

I know of only two specimens which I have figured. Fig. 1 represents a perfect shell just about to develop the wing; fig. 2 wants the pullus and the basal part of the body-whorl, the angular body-and spire-whorls of which are similar to those of the other specimen, and therefore I think it not unreasonable to view the two as individuals at different stages of growth of the same species.

This species is named in honour to Mr. Alexander Morton, of Hobart Museum.

*V. Mortoni* is evidently closely allied to *V. macroptera*, but it is distinguished from it by its shorter spire, different pullus, and angulated whorls.

#### 9. *Voluta limbata*, Tate.

*Reference*.—Gastropods part I., plate xiii., fig. 8 (1888).

Shell oblong and sub-cylindrical, spirally and transversely striate; spire short, terminated by a rounded pullus; columella with four well-developed plaits, increasing in size from the base backwards. Sutures and spire-whorls concealed by the free horizontal foliaceous expansion of the posterior margin of the preceding whorls. Last whorl faintly angled at the periphery, which is also defined by about ten inconspicuous angular nodosites. The spire-whorls and posterior part of the last whorl sculptured with delicate wavy lamellæ crossed by transverse folds and striæ; the spiral ornament is the stronger, but on the anterior area of the body-whorl, the transverse lines and folds are alone conspicuous, as the spiral striæ are obsolete, or visible only by the aid of a magnifier.

*Dimensions*.—Length, 32.5; width, 15; length of aperture, 27.5.

*Locality*.—Blue clays at Schnapper Point (R.T.)

This species and the next belong to the Section *Voluto-conus*, uniquely represented by *V. coniformis* (Cox), inhabiting the north-west coast of Australia, from which they differ in the angulated periphery, more or less nodulose; and this species by the retroflexed posterior margin of the whorls.

#### 10. *Voluta conoidea*, Tate.

*Reference*.—Gastropod's part I., plate xiii., fig. 9 (1888).

Shell coniform, with a short spire, ending in a moderately mammillate pullus of three and a half turns, the last half turn sometimes crenulated. The first and second spire-whorls almost wholly embraced; the penultimate whorl is broadly depressed near the middle line, and slightly varicose over the posterior suture; the last whorl is faintly angled at the periphery, which is also defined by seven transversely elongate nodosites, posterior to which is a slightly concavely depressed zone. Outer lip sharp, slightly inflected in the middle. Columella with four well-

developed plaits, and a small posterior one. Surface sculptured as in *V. limbata*.

*Dimensions*.—Length, 44; breadth 21; length of aperture, 35.  
*Locality*.—Lower beds at Muddy Creek (R.T.)

11. *Voluta ancilloides*, *spec. nov.* Plate iii., fig. 7.

Shell fusiformly oval-oblong, with a moderately elevated spire of four slightly convex whorls ending in a rather large sub-globose pullus of one and a half turns, the extreme tip of which is sub-laterally immersed. Posterior whorls sculptured with spiral fine threads and striae, and rather close-set slender striae of growth.

Body-whorl hardly narrowed at the base. Aperture narrowly oblong, narrowed above, broad at the front; outer lip nearly parallel with the axis, slightly thickened; pillar slightly incurved to the broad siphonal notch; columella with three prominent, rather approximate, narrow, moderately oblique plaits.

*Dimensions*.—Length, 75; breadth, 28; length of aperture, 47; diameter of pullus, 8; height, 6.

*Localities*.—Calciferous sandstone, River Murray cliffs near Morgan (R.T.); lower beds at Muddy Creek (R.T.); blue clays at Schnapper Point (R.T.); Table Cape (*Hobart Mus.*!).

This species has the general appearance of the young *V. macroptera*, but the pullus is different, and the outer lip is not arcuate as in that shell.

12. *Voluta McCoyi*, *Tenison Woods*. Plate ii., fig. 2.

*Reference*.—Proc. Roy. Soc., Tasmania, for 1876, p. 95 (1877); *V. Agnewi*, Johnston, Geol. Tasm., t. 30, f. 9, 1888 (non 1880).

Shell lanceolate-ovate, thin; whorls smooth, shining, striate with growth lines, slightly convex, but not regularly so, being slightly ventricose at the anterior suture and a little depressed towards the posterior one. Pullus small, blunt, smooth, papillary; the tip central, depressed, but not immersed. Columella plaits, four, thin, elevated, the posterior one small; outer lip thin, but perceptibly thickened.

*Dimensions*.—Length, 40; breadth, 16; length of aperture, 25.

*Localities*.—Table Cape (*T. Woods*), common in the lower beds at Muddy Creek and in the blue clays at Schnapper Point (R. T.).

13. *Voluta protorhysa*, *spec. nov.* Plate ii., figs. 6a—b.

Shell narrowly lanceolate-ovate, thin, with a small, low, depressed, blunt pullus. Whorls six and a half excluding pullus; the three and a half posterior ones longitudinally costated; the costæ on the first one and a half turns are slender, angular, and numerous; on the next turn they are stouter, few, and tuberculately enlarged in the posterior-third; and on the last half-turn

they finally fade away. The anterior whorls are flatly convex, smooth, but with striae of growth.

Outer lip thin, columella with four oblique, thin, high plaits.

*Dimensions*.—Length, 39; breadth, 13; length of aperture 22.

*Locality*.—Clayey green sands, Adelaide bore.

This species has much affinity with *V. McCoyii*, but apart from the ornate apical whorls, it is distinguished by its narrower outline and flatter whorls.

**14. *Voluta polita*, *spec. nov.* Plate ii., fig. 7.**

Shell similar to *V. McCoyii*, smooth and highly polished, but it is proportionately broader, the whorls more convex, and the pullus is larger, though similar. The columella plaits are five, lamellar, very high, somewhat expanded, incrassated, and reflexed outwardly.

*Dimensions*.—Length, 29; breadth, 13.5; length of aperture, 19.5.

*Locality*.—Lower beds at Muddy Creek.

**15. *Voluta ellipsoidea*, *Tate*.**

*Reference*.—Gastropods, Part I., plate xiii., fig. 4. [Present description has reference to a larger and perfect specimen, which has been subsequently acquired.]

Shell narrow, fusiformly oval; spire elongate, pullus subcylindrical of three and a half smooth ivory-white whorls, separated by a deeply impressed suture; the tip is central, hardly rising above the level of the succeeding turn.

Whorls four, the first one much narrower than the preceding whorl, flat, the rest of the spire whorls very slightly convex, finely sculptured with spiral and transverse striae.

Last whorl elongate and very little tumid, hardly attenuated at the base. Aperture narrowly oblong, roundly angled behind with a wide open canal, a little bent to the right and reverted at the front. Outer lip sharp, a little insinuate at the suture, nearly parallel to the axis, slightly incurved medially, patulous at the point. Inner lip slightly convex medially, a little twisted and bent back in front, with four stout distant oblique plaits.

*Dimensions*.—Length, 62; width, 23; length of aperture, 42; width, 7; height of pullus, 6; breadth, 6.

*Locality*.—Lower beds at Muddy Creek.

**16. *Voluta capitata*, *spec. nov.* Plate ii., figs. 3a-b.**

Shell fusiform-oval, thick, with a moderately long acuminate spire, ending in a smooth conic pullus of five turns, middle whorls of pullus much wider than the rest, the last whorl much narrowed, suture impressed; first two whorls channelled at the suture with an acute shoulder, the tip is exsert.

Whorls three, excluding the pullus, slightly convex and a little tumid medially; spirally lined and transversely striate, conspicuously so on the posterior whorl.

Last whorl elongated, a little tumid, hardly attenuated at the base. Aperture elongate-oval, angled behind, with a wide open canal a little bent to the right, and slightly reverted at the front. Outer lip thick within, but bevelled to a sharp edge, a little insinuated and slightly ascending at the suture, slightly ecurved medially, patulous at the point. Inner lip nearly straight, with four stout oblique plaits.

*Dimensions*.—Length, 61.5; breadth, 24; length of aperture, 43; width, 10; length of pullus, 6; width, 4.5.

*Locality*.—Well-sinking, Murray Desert.

This species has some affinity with *V. Pacifica* and other members of the section *Alcithoe*; but has not the outer lip proper to them; from *V. Pacifica*, which it resembles most in shape, it differs by its smooth flattish whorls.

17. *Voluta Masoni*, spec. nov. Plate iii., fig. 9.

Shell obconic, solid, smooth, polished; whitish, with transverse close-set, narrow, slightly undulose, chestnut lines. Last whorl roundly angled at the periphery; spire very short, acuminate conical, ending in a small, smooth, broadly conical pullus of four whorls. Columella with four well-developed plaits, and sometimes with an inconspicuous posterior one.

*Dimensions*.—Length, 58; width, 29; length of last whorl, 51; of aperture, 49.

*Locality*.—Upper beds at Muddy Creek.

This species belongs to the peculiarly Australian Section *Amoria*, amongst which it resembles *V. Turneri* and *V. undulata*, having the shape rather of the latter, and the coloration of the former; it is, however, distinguished from both by the abrupt peripheral inflation and the acuminate spire.

By the kindness of Mr. S. Mason, the proprietor of the land on which the chief fossiliferous deposits of Muddy Creek are found, I am in possession of the interesting volute which has served for the foregoing description. It is with much pleasure I associate Mr. Mason's name with his discovery, more particularly also because of his hospitality and assistance rendered to all visitors in search of fossils.

18. *Voluta crassilabrum*, spec. nov. Plate iii., fig. 2a—c.

Shell small, thick, oval; pullus small, of two smooth convex whorls.

Whorls three, excluding pullus, slightly convex excepting the penultimate, which is somewhat tumid; suture concealed by a narrow sutural band. Surface ornamented with close-set, narrow,

depressed, wavy threads, separated by linear interspaces (about 25 on penultimate whorl); a few indistinct undulations cross the whorls. Last whorl very slightly convex, a little attenuated and concavely depressed at the base, varicosely thickened behind the aperture. Aperture elongate-oval, narrowed at the ends; canal narrow, open, a little bent to the left and upturned at the front. Outer lip ascending a little at the suture, slightly arcuate, the edge blunt. Columella a little twisted at the front with four stout, oblique plaits, the second being the stoutest and the two posterior ones the smallest.

*Dimensions.*—Total length, 9; breadth, 4; length of aperture, 6.

*Locality.*—Lower beds at Muddy Creek.

19. *Voluta lintea*, *spec. nov.* Plate iii., figs. 1a—b.

Shell fusiform, narrow, thick; pullus of two and a half whorls, blunt and smooth at the top, the last half turn with slender costæ.

Whorls three and a half, rather flat, faintly depressed medially, with an impressed suture. Surface ornamented with numerous slender, wavy threads, a little narrower than the interspaces. Last whorl slightly convex, gradually attenuated to the moderately long straight canal; the posterior half with about eight angular ridges, which are faintly traceable from the suture to the base, but are more conspicuous at the periphery. Aperture elongate-oval; columella with four equi-distant and nearly equal plaits.

*Dimensions.*—Length, 26; breadth, 10.5; length of aperture, 17.

*Locality.*—Calciferous sandstones of the River Murray Cliffs, near Morgan.

20. *Voluta cribrosa*, *spec. nov.* Plate iii., fig. 8.!

Shell fusiform, with a moderately long spire; pullus conical of two and a half whorls, ending in an erect tip; last half turn narrow, flat, but slightly angulated and flattened at the suture.

Whorls, three, slightly convex, more depressed behind than in front; ornamented with acute spiral threads (about 15 on the penultimate whorl), slightly crenulated, the interspaces about four times wider, crossed by curved, distant, slender, angular liræ. Columella with equal and equi-distant plaits.

*Dimensions.*—Length, 34; length of aperture, 20.

*Locality.*—Turritella-clays, Blanche Point, Aldinga Bay.

21. *Voluta sarissa*, *spec. nov.* Plate ii., figs. 1a—b.

Shell fusiformly turreted, moderately stout; pullus of three and a half to four whorls, conoidal-cylindric, smooth, the middle whorl the highest and widest, the tip is exsert.

Whorls six (excluding the pullus), flatly convex, ornamented

with spiral threads and angular costæ. The three posterior whorls are a little concavely depressed in the posterior-third; the rounded spiral threads (about twelve on the first whorl), which are about as wide as the interspaces, increase in number with the revolution of the spire. On the fourth and fifth whorls, adjacent to the anterior suture, the threads are reduced to striæ; and on the body-whorl the anterior half is smooth, or nearly so.

The costæ begin to appear on the front half of the second posterior-whorl, and on the three anterior whorls have attained to stoutish, wedge-shaped, slightly curved angular ridges, which are continued in subdued strength to the anterior suture, but do not reach the posterior one.

Last whorl with about nine transversely elongate costæ on the periphery, not much attenuated to the broadish open canal which is bent to the right and slightly reverted. Aperture elongate-oval, narrow; the outer lip straight medially (the last whorl being flattened between the anterior tubercle and the lip), hardly ascending but slightly insinuate at the suture, patulous at the front. Columella nearly straight to the slightly incurved tip; with five equi-distant plaits, the first and fifth of which are smaller than the others.

*Dimensions*.—Length, 77; breadth, 22; length of aperture, 49.

*Localities*.—Calciferous sandstone, River Murray cliffs, near Morgan; lower beds at Muddy Creek.

**22. *Voluta lirata*, Johnston. Plate ii., fig. 4.**

*Reference*.—Proc. Roy. Soc., Tasmania, for 1879, p. 37, 1880; *V. Allporti*, Johnston, Geol. Tasm., t. 30, fig. 10 (1888), non 1880.

Shell ovately fusiform, rather thin, smooth, shining. Pullus broadly conical, of four smooth, flattish whorls, with an impressed suture.

Whorls three and a half, excluding pullus, moderately convex at the anterior-third; ornamented with curved, slender, rather angular costæ, crowded on the posterior whorl; and sculptured transversely with very fine lines of growth.

Last whorl a little ventricose at the periphery (where the costulæ are only conspicuous), gradually tapering to the broadish front. Aperture elongate-oval, much longer than the spire; outer lip bevelled to a thin edge, a little emarginate and ascending at the suture, almost straight medially, patulous at the front; canal short, open, turned to the right, hardly reverted; columella arcuate towards the front, with four equi-distant, equal, oblique plaits.

*Dimensions of largest example*.—Length, 69; breadth, 27; length of aperture, 50; height of pullus, 5; breadth, 5.5.

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

Authentic specimens of this species I have not seen, but the shell which I have figured under the name agrees with the diagnosis and dimensions given of the type.

**23. *Voluta costellifera*, *spec. nov.* Plate ii., fig. 8.**

This species differs from *V. lirata* by its shorter spire, more ventricose body whorl, and stronger ribs.

*Dimensions*.—Length, 61; breadth, 29; length of aperture, 47.  
*Locality*.—Lower beds at Muddy Creek.

**24. *Voluta pseudo-lirata*, *Tate*.**

*Reference*.—Gastropods, Part I., plate xiii., fig. 6.

Shell fusiformly cylindrical, rather thin. Pullus dome-shaped of two smooth whorls.

Whorls five, excluding the pullus, slightly convex or subangulated medially; posterior whorl ornamented with slender, angular, crowded costæ, which become fewer and stouter with the increasing revolution of the spire, there being 14 on the last whorl.

Last whorl hardly tapering to the broadish front; aperture elliptical, not much longer than the spire; outer lip thin, slightly curved medially, patulous at the front; canal short, broad, open, a little bent to the right and reverted. Columella nearly straight, with four oblique plaits, the anterior one the smallest.

*Dimensions*.—Length, 62; breadth, 19; length of aperture, 35; diameter of pullus, 5.

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

This species has the general character of *V. lirata*, but differs in shape and in the well-developed costæ; being somewhat intermediate between that species and *V. sarissa*, though differing from the latter by its pullus and the absence of spiral sculpture.

**25. *Voluta cathedralis*, *Tate*.**

*Reference*.—Gastropods, Part I., plate xiii., fig. 10.

Shell fusiformly cylindrical; pullus dome-shaped of two and a half smooth whorls. Whorls four and a half, excluding the pullus; the two posterior whorls nearly flat, spirally lined; the rest of the whorls very slightly convex and tuberculated in the middle-line, the posterior slope spirally lined, the anterior slope smooth; there are about 10 small transverse wedge-shaped tubercles on the penultimate whorl.

Last whorl narrow-oblong, tubercles about seven, the last one-third plain; transversely striated all over and spirally striated next to the suture. Aperture elliptical; outer lip thin, nearly

straight medially, thence slightly expanding to the hardly contracted broad, short, open canal. Columella nearly straight, with four oblique slender plaits, the anterior one of which is the smallest.

*Dimensions*.—Length, 46.5; breadth, 14; aperture, 25.5.

*Locality*.—Lower beds at Muddy Creek.

This species is closely related to *V. pseudo-lirata*, but is distinguished by the spiral sculpture and the reduction of the costæ to tubercles.

#### 26. *Voluta pagodoides*, Tate.

*Reference*.—Gastropods, part I., plate xiii., fig. 7.

Has the general form of *V. cathedralis*, but all the whorls, six, except the pullus, are medially sub-angulated and spinosely tuberculated on the keel; the apex is sub-acute of one and a half small, narrow-rounded whorls. The sculpture consists of fine, spiral, wavy striae, which are somewhat obsolete on the middle of the last whorl. Body-whorl more attenuated towards the base, which is bent and reverted. Columella with four sub-equal, equidistant, rather slender plaits.

*Dimensions*.—Length, 51; breadth, 16; length of aperture, 28.

*Localities*.—Turritella-clays, Blanche Point, Aldinga; clayey-green-sands, Adelaide bore; Turritella-grits, Ardrossan.

#### 27. *Voluta Tateana*, Johnston. Plate ii, fig. 5.

*Reference*.—Proc. Royal Society Tasmania for 1879, p. 37 (1880); id. Geology Tasmania, t. 30, figs 3—3a.

Shell broadly lanceolate, fusiform, with a moderate high acute spire, ending in a small sharp pullus of two smooth turns. Whorls six, with regular sigmoid ribs which become somewhat obsolete towards the posterior suture, and towards the base of the body-whorl, but are raised into distinctly angled tubercles on the anterior-third of the whorl (12 on the last whorl); outer lip simple; columella nearly straight, with four stout oblique plaits.

*Dimensions*.—Length, 70; breadth, 20; length of aperture, 40.

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

This species closely resembles *V. Kreusleræ*, Angas, of South Australian waters, but the spire is more acute.

#### 28. *Voluta tabulata*, Tate.

*Reference*.—Gastropods, Part I., plate xiii., fig. 3.

Shell fusiform, with a rather short spire, ending in a moderately large pullus of two and a half whorls, the last half whorl costulate.

Whorls three and a half to four, excluding pullus, angulated ante-medially, costated in front of the keel, and sharply tuber-

culated on the angulation. The sculpture consists only of fine growth lines.

Last whorl with ten curved, angular, or broadly angular ribs, which are raised into sharp pointed tubercles on the keel ; costæ becoming obsolete towards the base ; base somewhat narrowly and abruptly contracted behind the very broad, short canal. Outer lip with a blunt margin, slightly emarginate behind, and ascending to the keel of the penultimate whorl. Columella nearly straight medially, ecurved at the extremity with four stoutish, equi-distant plaits.

*Dimensions*.—Length, 36 ; breadth, 17 ; length of aperture, 26 ; diameter of pullus, 2.5.

*Locality*.—Well-sinking, Murray Desert.

**29. *Voluta antiscalaris*, McCoy.**

*Reference*.—Prod. Pal. of Victoria, Dec. 1, tab. 6, fig. 5, 1874.

Shell ovately fusiform, with a short or moderately long spire ; pullus small, swollen of one and a half turns.

Spire whorls angularly convex, with a row of tubercles in front of suture and a second on the angulation ; the latter terminate angular ribs ; the two rows are separated by a rather wide concave space.

Last whorl with a variable number, about 15, of angular, slightly sigmoid ribs, extending less than half way to the base, each ending in a sharp conical tubercle on the angulation ; there is a second smaller row at the suture, separated by a concave space.

Outer lip thickened at the edge and crenulated towards the front. Columella with about five plaits, the first and fifth small ; sometimes a sixth plait is interposed.

The species shows some variation in the length of the spire ; the short-spired variety has a more ventricose body-whorl ; also in the spiral sculpture, being in some individuals obsolete, except at the base of the body-whorl.

*Dimensions* of a moderate - sized specimen.—Length, 39 ; breadth, 18.5 ; length of aperture, 29.

*Localities*.—Fyans Ford ; Schnapper Point ! (McCoy) ; lower beds at Muddy Creek ; calciferous sandstones, River Murray cliffs.

This species closely resembles *V. scalaris*, Sow., from the Middle Eocene of Hampshire, but is especially distinguished by its obtuse, not acute, pullus.

**30. *Voluta anti-cingulata*, McCoy.**

*Reference*.—Prod. Pal. of Victoria ; Dec. 1, tab. 6, figs. 2-4. *Synonym* :—*V. antiscalaris*, Johnston, Geol. Tasmania, t. 30, figs. 5-5b.

This species has the general character of *V. antiscalaris*, with rather more ventricose whorls, the costæ end with obtuse tubercular ends separated from a row of conoidal tubercles at the suture by a deep, narrow, spiral constriction.

*Dimensions*.—Length, 50; breadth, 22; length of aperture, 39.

*Localities*.—Bird Rock (McCoy), and Spring Creek, near Geelong (J. B. Wilson!); well-sinking, Murray Desert; Table Cape (R. M. Johnston!).

This species stands in the same relation to the European *V. cingulata* as *V. antiscalaris* does to *V. scalaris*.

31. *Voluta strophodon*, McCoy.

*References*.—Prod. Pal. Victoria, Decade iv., tab. 37, figs. 2-4 (1876). *V. Weldii* (pars.), Johnston, Geol. Tasm., t. 30, fig. 7 (1888).

Shell varying from ovate with a moderate spire to conoidal with a very short spire; pullus large hemispheric to sub-cylindrical of four smooth slightly convex whorls. Ordinary whorls, with a row of spines crowning the shoulder, which is medial in the long-spined form, and at the suture in the conoidal variety; the area behind the tubercles smooth and concave; the spines on the body-whorl terminate ribs, which become obsolete at about half way to the front. Columella with four very large thick plaits, and often with a blunt protuberance posteriorly.

*Dimensions* of the long-spined form.—Length, 40; breadth, 20; length of aperture, 31; of the conoidal variety: length, 38; width inside spines, 23.5; length of aperture, 32.5.

*Localities*.—Fyans Ford, Moolap, Schnapper Point!, and lower beds at Muddy Creek! (McCoy); calciferous sandstones, River Murray cliffs, near Morgan!; well-sinkings, Murray Desert; Table Cape (R. M. Johnston).

If the extreme forms delineated by McCoy, figs. 2 and 4, *op. cit.*, belong to the same species, with which view I am inclined to concur, then *V. strophodon* is a more variable species than *V. antiscalaris*, both of which are exceptional in the genus. As pointed out by McCoy, the ordinary form of *V. strophodon* presents some resemblance to *V. spinosa*, Lamk.; but the resemblance of the conoidal variety to *V. athleta*, Solander, is even greater. These two species of the European Eocene are readily distinguished by the small conical pullus and by the one or two prominent columella-folds succeeded by two or three indistinct ones.

32. *Voluta Weldii*, Tenison Woods.

*Reference*.—Proc. Roy. Soc., Tasmania, for 1875, p. 24, tab. 1, fig. 2 (1875); Johnston, Geol. Tasm., t. 30, figs. 6—6b (non 7), 1888.

This species is closely related to *V. strophodon*, but the whorls are convex, without costæ, with sharp-edged tubercles at the angle. Tenison Woods compares it to *V. depressa*, Lamk., from which it differs by the same characters which separate the Australian species from their European analogues.

*Dimensions*.—Length, 46; breadth, 22.

*Localities*.—Table Cape (Hobart Mus. !); lower beds at Muddy Creek; River Murray Cliffs near Morgan.

### GENUS MITRA.

#### SYNOPSIS OF SPECIES.

Shell mitriform, striate or spirally grooved. [EU-MITRA.]

Spirally grooved and punctured.

Spire elongated; grooves, 6; plaits, 5.

1. *M. alokiza.*

Spire conically fusiform; plaits, 4.

2. *M. Dennanti.*

Finely longitudinally striate, and more or less reticulate.

Spire elongated, narrow; 1 large, 2 small plaits.

3. *M. dictua.*

Shell broader; 1 columella plait. 4. *M. uniplica.*

Fusiformly-conic; body whorl varicosely thickened; 4 plaits. 5. *M. varicosa.*

Shell somewhat columbelliform, smooth. [STRIGATELLA.]

Shell broad; outer lip crenate; 4 plaits.

6. *M. atypha.*

Shell narrower; outer lip smooth; 4 plaits.

7. *M. complanata.*

An ante-sutural rib; outer lip lirate; 5 plaits.

8. *M. ligata.*

Shell fusiform, spirally ridged and transversely striate. [CANCILLA.]

Aperture two-thirds the total length of shell, pullus small.

9. *M. othona.*

Aperture nearly one-half; pullus large.

10. *M. atractoides.*

Shell fusiform, spirally and transversely ribbed; aperture with a callosity at the posterior angle. [ZIERLIANA.]

11. *M. escharoides.*

Shell fusiform, costated, abruptly contracted to a beak. [COSTELLARIA.]

Whorls convex or flat.

Spiral threads many. 12. *M. leptalea.*

Spiral ribs few, granulose: spire somewhat scalar.

13. *M. euglypha.*

No spiral ornament.

14. *M. exilis.*

Whorls subangulated medially, without spiral ornament.

15. *M. paucicostata*.

Shell fusiform, costated, gradually attenuated to a beak.

Shell large, ribs curved ; an ante-sutural thread.

16. *M. terebraformis*.

Shell small, with clathrate ornament. 17. *M. clathurella*.

Shell fusiform, spirally ridged ; posterior whorls costate or plicate.

Whorls with slender plicæ.

Shell narrow, whorls regularly convex.

18. *M. biornata*.

Shell broader, whorls flattened and crenulate at suture.

19. *M. subcrenularis*.

Whorls with stout subtuberculose costæ.

20. *M. citharelloides*.

Shell fusiform, smooth or striated, not spirally ridged ; posterior whorls costate. [PUSIO.]

Shell ovate, costæ thick. 21. *M. sordida*.

Shell narrow, costæ angular. 22. *M. semilavis*.

Shell conoidal.

Spire short and broad, last whorl subangulated and tuberculose-costate. 23. *M. cassida*.

Spire narrower, last whorl rounded and spirally lirate.

24. *M. conoidalis*.

#### SPECIES UNFIGURED AND UNCLASSED.

*Mitra anticoronata*, *R. M. Johnston*, Proc. Roy. Soc. Tasmania for 1879 [1880], p. 34.

#### SPURIOUS SPECIES.

*Mitra daphnelloides*, *T. Woods*, is transferred to *Pleurotomidae*.

*Mitra coarctata*, *T. Woods*, represents an immature example of *Marginella Winteri*, Tate.

*Thala marginata*, *T. Woods*, is transferred to *Pleurotomidae*.

1. *Mitra alokiza*, *Tenison Woods*. Plate iv., fig. 8.

Reference.—Proc. Lin. Soc., N.S. Wales, t. 3, fig. 7, p. 8, 1879.

Shell rather thin, shining, narrowly fusiform ; spire longer than the aperture, ending in a pullus of two small, narrow, rounded whorls. Whorls nine, excluding the apical ones, nearly flat, suture conspicuously margined anteriorly ; regularly and distantly spirally grooved ; grooves elegantly and closely punctated ; first and second whorls slenderly costated. There are about seven very narrow grooves on the penultimate whorl, whilst a very slender one is interposed between the posterior one and the suture.

Last whorl subangulated in an alignment with the posterior

angle of the aperture, thence gradually attenuated; spirally grooved throughout.

Aperture narrowly elliptic; lip sharp; columella with five plaits, increasing in size from the front.

*Dimensions*.—Length, 55.5; breadth, 13; height of last whorl, 26.5.

*Locality*.—Lower beds at Muddy Creek.

The species was established on juvenile examples, which I have traced up to the moderately large specimen herein figured. The figure of the type does not correctly represent the shape, being much too broad.

**2. *Mitra Dennanti*, *spec. nov.* Plate iii., fig. 3.**

Shell moderately stout, fusiform-biconic; spire short, ending in a blunt apiculate point; pullus of four whorls, the anterior one large, much embracing the next, the last turn very small sub-globose.

Ordinary whorls four, convex, separated by a narrow shallow channelled suture, with a rounded appressed shoulder, regularly spirally grooved; about twelve grooves on the penultimate whorl, crossed by close-set striæ, which produce the appearance of linear oblong punctures in the grooves.

Last whorl somewhat ventricose, the median portion smooth or spirally striated; posteriorly and anteriorly spirally grooved, and neatly punctated.

Aperture elongate-oval, outer lip thin; columella with four plaits, the posterior one the largest.

*Dimensions*.—Length, 33; breadth, 16; length of aperture, 22. The corresponding measures of a very large specimen are 47, 20, and 30.

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

**3. *Mitra dictua*, *Tenison Woods*. Plate iv., fig. 9.**

*Reference*.—Proc. Lin. Soc., N.S. Wales, plate iii., fig. 7, p. 8, 1879.

Shell rather thin, elongate-fusiform; spire longer than the aperture, ending in a conoid pullus of three smooth, slightly convex, regularly increasing turns.

Whorls eight, excluding the pullus, nearly flat, separated by a linear impressed suture, the anterior ones by a narrow channelled suture with a rounded shoulder. The first and second have thick costæ and spiral linear grooves, the next three are spirally grooved and obscurely punctated, the whole surface crossed by raised curved threads; thence the spiral grooves gradually merge into threads or striæ.

Last whorl with a few slender striæ at the shoulder, spirally

ridged at the base, medially with conspicuous transverse sigmoid striae; somewhat abruptly attenuated below the middle line.

Aperture ovate, outer lip thin; columella with two inconspicuous anterior plaits, and a large posterior one.

*Dimensions*.—Length, 40; breadth, 13; length of aperture, 20.

*Localities*.—Lower beds at Muddy Creek; and in well sinking, Murray Desert; Table Cape!

The figured example of which the dimensions are given is from the Murray Desert; in size it very much exceeds the type specimen from Muddy Creek, which is an immature shell, and whilst the representation of it gives the right proportions, yet it does not show the slight flattening at the suture; intermediate examples occur at the latter locality.

**4. *Mitra uniplica*, *spec. nov.* Plate iv., fig. 12.**

Differs from the foregoing by its more convex whorls more shouldered at the suture, wider body-whorl, which is less attenuated anteriorly, and by its single columella plait.

*Dimensions* of specimen, wanting posterior part of spire, of five whorls; length, 49; width, 17; length of aperture, 26.

*Locality*.—Blue clays at Schnapper Point.

**5. *Mitra varicosa*, *spec. nov.* Plate v., fig. 1.**

Shell stout, fusiformly conic, of seven whorls, ending in a small papillary pullus. Ordinary whorls slightly convex, a little ventricose behind anterior suture, and inconspicuously depressed in the posterior-third; transversely closely wrinkled and striate, crossed by fine distant equal liræ, about 12 on the penultimate whorl.

Last whorl varicosely dilated at the commencement and at about the middle; columella with four strong plaits, and two on the posterior part of the aperture.

*Dimensions*.—Length, 24; width, 10; length of aperture, 13.

*Locality*.—Clayey-green-sands, Adelaide bore.

**6. *Mitra atypha*, *spec. nov.* Plate iv., fig. 6.**

Shell stout, narrow-ovate, blunt at each end; whorls six, smooth, slightly convex. Aperture oval, outer lip lirate within, columella with four approximate plaits.

*Dimensions*.—Length, 10; breadth, 4.5; length of aperture, 5.5.

*Locality*.—Upper beds at Muddy Creek.

**7. *Mitra complanata*, *spec. nov.* Plate v., fig. 12.**

Shell rather thin, elongate-ovate, with a blunt apex, and rather attenuated at the front; whorls six, smooth, shining, slightly convex. Aperture narrow-elliptical; outer lip sharp, smooth within; columella with four distant plaits.

*Dimensions*.—Length, 8; breadth, 3.5; length of aperture, 5.  
*Locality*.—Clayey-green-sands, Adelaide bore.

8. *Mitra ligata*, *spec. nov.* Plate v., fig. 4.

Shell rather thin, elongate-ovate, attenuated at each end; whorls seven, smooth, shining, very slightly convex, perceptibly constricted in front of the anterior suture, giving rise to the appearance of a spiral rib margining the suture. Aperture narrow-elliptical; outer lip sharp, lirate within; columella with five plaits.

*Dimensions*.—Length, 7; breadth, 3; length of aperture, 4.

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

9. *Mitra othona*, *Tenison Woods*. Plate iv., fig. 10.

*Reference*.—Proc. Lin. Soc., N. S. Wales.

A small biconic shell, pointed at both ends, apex blunt of two and a half smooth whorls. Ordinary whorls separated by an impressed suture, sculptured with spiral threads which are more or less granulose, especially on the posterior part of spire, by transverse liræ or slender costæ. Last whorl lirate and transversely striate; columella with four well-developed plaits.

*Dimensions*.—Length, 12; breadth, 5; length of aperture, 8.

*Locality*.—Lower beds at Muddy Creek.

10. *Mitra atractoides*, *spec. nov.* Plate iv., fig. 11.

Shell narrowly fusiform-biconic, with a moderately elevated spire, ending in a blunt conoidal pullus of four smooth turns. Whorls five, excluding pullus, slightly convex, with a linear suture, sculptured with raised spiral threads and tessellated by curved transverse threads. Last whorl, with cancellate ornament, a little ventricose in front of suture, medially attenuated, but slightly dilated at the front.

Aperture very narrow; outer lip thin, smooth within, medially ecurved; columella nearly straight, with four plaits, the anterior one small.

*Dimensions*.—Length, 21; breadth, 7; length of aperture, 12.

*Locality*.—Lower beds at Muddy Creek.

This species has a resemblance to *M. othona*, but differs by its long spire, sub-cylindric pullus, and by certain details of its ornamentation.

11. *Mitra escharoides*, *spec. nov.* Plate v., figs 8a—b.

Shell stout, narrow-fusiform, ending in a sub-cylindric pullus of two smooth whorls. Whorls six, excluding pullus, slightly convex; sculptured with broad, flat, transverse ribs, and by narrower spiral ones, which include between them large, roundly ob-

long depressions; there are eight rows of punctures on the penultimate whorl.

Last whorl a little sloping to the suture, but slightly attenuated to the bent and reverted short beak. Aperture narrow, oval-oblong, with a spiral callosity at the posterior angle; outer lip thin, slightly ecurved medially, stoutly lirate within; columella with four thick approximate plaits, increasing in size from the front.

*Dimensions*.—Length, 17; width, 5; length of aperture, 8.

*Locality*.—Lower beds at Muddy Creek.

**12. *Mitra leptalea*, spec. nov.** Plate v., fig. 3.

Shell turriculate, ending in a large sub-globose pullus with the tip laterally immersed. Whorls seven, excluding pullus, nearly flat, suture impressed; ornamented with numerous straight, slender, sub-acute transverse ribs closely and neatly striate in between, and crossed by fine, somewhat inequi-distant and unequal spiral threads (about 15 on penultimate whorls). Last whorl ovate-oblong; abruptly attenuated to a long beak, which is encircled by thick ribs, the posterior one subgranose. The posterior half of the whorl is slenderly costated and spirally lined, and is bounded anteriorly by a narrow belt devoid of spiral threads, and defined above and below by a slight angulation.

Aperture narrow-ovate, prolonged into a long beak, a little effuse anteriorly and slightly reverted; outer lip thin, smooth within; columella with four plaits.

*Dimensions*.—Length, 16; breadth, 5; length of aperture, 7.

*Locality*.—Lower beds at Muddy Creek.

**13. *Mitra euglypha*, spec. nov.** Plate v., fig. 13.

Shell broadly turriculate, ending in a subcylindric pullus of two and a half smooth turns. Whorls six, excluding pullus, convex, slightly depressed over the posterior suture; ornamented with numerous thick transverse ribs, which are crossed by stout spiral threads, about six on penultimate whorl, producing nodulations more or less distinct on the costæ.

Last whorl oblong-ovate, abruptly attenuated to a short stout beak, ornamented with slightly sigmoid costæ, which are more or less nodulated by the intersection of broader spiral liræ.

Aperture oblong-ovate, obtusely-angular behind; outer lip thin, lirate within; columella with four stout approximate plaits,

*Dimensions*.—Length, 15; breadth, 5.5; length of aperture, 7.

*Locality*.—Gippsland (W. H. Gregson!).

**14. *Mitra exilis*, spec. nov.** Plate viii., fig. 5.

Shell small, slender, turriculate, ending in a relatively large mamillate pullus of two smooth turns. The other whorls four, convex, with a very narrow oblique slope to the posterior suture,

the shoulder defined by a thick spiral rib, ornamented by very thick, angularly rounded, straight ribs (about 15 on the penultimate whorl), separated by very much narrower interspaces. Aperture oval-oblong, squarely rounded behind, abruptly contracted to a somewhat short and slender beak. Outer lip thin, smooth within ; columella with three or four plaits.

*Dimensions.*—Length, 5·5; breadth, 1·75; length of aperture, 2.

*Locality.*—Lower beds at Muddy Creek.

15. *Mitra paucicostata*, *spec. nov.* Plate v., fig. 2.

Shell turriculate, ending in a relatively large pullus of two smooth convex turns, the top laterally immersed.

Whorls four and a half, excluding pullus, medially subangulated, ornamented with slightly bent angular costæ, which are subtuberculated on the spiral keel and at each suture (15 on penultimate whorl) ; interspaces faintly striated transversely.

Last whorl oblong, abruptly attenuated to a short, broad, reverted beak, which is spirally ridged ; flatly rounded at the suture, ornamented with acute costæ, a slightly tuberculate antesutural keel, and two approximate tubercular ridges in an alignment with posterior angle of the aperture. Outer lip thin, roundly insinuated at the suture ; internally lirate ; columella with four stout approximate plaits.

*Dimensions.*—Length, 8·5; breadth, 4·5; length of aperture, 4.

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

16. *Mitra terebræformis*, *spec. nov.* Plate v., fig. 5.

Shell fusiformly elongate, smooth, shining, ending in a stout high pullus of two turns, the first very small. Whorls six and a half, excluding pullus, nearly flat, ornamented by much curved angular plications, separated by very much broader shallow depressions ; the posterior suture margined by a narrow band, defined by a thread-like keel.

Last whorl gradually attenuated into a short, broad, upturned beak, the curved costæ becoming obsolete in front of the middle line ; the beak is spirally ridged.

Aperture ovate, angular behind ; outer lip thin, smooth within ; columella with four approximate plaits.

*Dimensions.*—Length, 16; breadth, 5; length of aperture, 7.

*Locality.*—Upper beds at Muddy Creek.

The shape, the curved costæ, and the antesutural band recall some of the leading characteristics of *Terebra*, and separate this species from all others of the genus, recent and fossil.

17. *Mitra clathurella*, *spec. nov.* Plate viii., fig. 8.

Shell small, fusiformly ovate, with a short obtuse pullus. Whorls four, excluding pullus, convex, margined and concavely depressed at the posterior suture; ornamented with rather slender oblique costæ (about 20 on the penultimate whorl), fine transverse striae, and spiral threads, anterior to the antesutural depression (six on the penultimate whorl).

Last whorl with slender costæ, tessellated by spiral threads, the inter-depressions finely transversely striate.

Aperture narrow-oblong, contracted in front to a short broadish, bent, and slightly reverted beak. Outer lip slightly ascending on the penultimate whorl, slightly emarginate at the suture, smooth within; columella with four rather distant transverse plaits.

*Dimensions.* — Length, 6; breadth, 2.75; length of aperture, 4.

*Locality.* — Lower beds at Muddy Creek.

This species has much the aspect of a *Clathurella*.

18. *Mitra biornata*, *spec. nov.* Plate v., fig. 10.

Shell rather thin, narrow-fusiform, ending in a blunt pullus of one and a half smooth turns. Whorls, five, excluding pullus, convex, separated by an impressed suture; sculptured with slender, flat, spiral threads, and transversely finely striated, the three posterior whorls transversely plicate; there are about 18 spiral threads on the penultimate whorl.

Aperture narrow-oval, contracted into a short wide beak; outer lip thin, crenately wrinkled at the front, lirate within; columella with five plaits, the two posterior and larger ones biplicate.

*Dimensions.* — Length, 10.5; breadth, 3.5; length of aperture, 5.

*Locality.* — Lower beds at Muddy Creek.

19. *Mitra subcrenularis*, *spec. nov.* Plate v., fig. 6.

Shell rather thin, broadly fusiform, ending in a blunt papillary pullus of two and a half smooth turns. Whorls, five, excluding pullus, nearly flat, and slightly flattened at the anterior suture; sculptured with linear spiral grooves, and on the posterior whorls with transverse plications, which end posteriorly in granular crenatures.

Last whorl somewhat ventricose behind, spirally lirate, but the costæ are obsolete, or reduced to mere crenulations at the suture. Base rapidly attenuated in a short narrow beak. Outer lip thin, smooth within; columella with four distant plaits.

*Dimensions.* — Length, 11; breadth, 4.5; length of aperture, 6.5.

*Locality.* — Clayey-green-sands, Adelaide bore.

20. *Mitra citharelloides*, *spec. nov.* Plate v., fig. 11.

Shell narrow, ovately fusiform, ending in a moderately wide and large pullus of two convex turns. Ordinary whorls four and a half, convex, more sloping to, and slightly depressed at, the posterior suture; sculptured with fine, close spiral threads, about 20 on penultimate whorl, and ornamented with broad, rounded costæ, which end subtuberculately at the posterior-third (ten on the penultimate whorl).

Last whorl gradually attenuated to the short, slightly reverted beak, spirally lirate throughout, and wrinkled transversely, the costæ entirely absent, or with one or two obsolete ones at the hinder part. Aperture narrow-oval; outer lip smooth within; columella with two slender plaits, situated at about the middle.

*Dimensions*.—Length, 9.5; breadth, 3.5; length of aperture, 5.

*Localities*.—Turritella-marls, Blanche Point, Aldinga Bay; clayey-green-sands, Adelaide bore.

This species has much the aspect of some species of *Cithara*, but there is no trace of a sutural notch.

21. *Mitra sordida*, *spec. nov.* Plate vi., fig. 6.

Shell small, stout, oval-oblong, blunt at both ends; whorls five, convex, smooth, ornamented with thick curved costæ (ten on penultimate whorl). Last whorl oblong, hardly attenuated at the front; the posterior-half with five costæ, the anterior-half smooth; base spirally striate.

Aperture narrow-oval; outer lip thin, much arched, slightly insinuate at the suture; stoutly lirate within; columella with four stout plaits.

*Dimensions*.—Length, 6.5; breadth, 3; length of aperture, 4.

*Locality*.—Upper and lower beds at Muddy Creek.

22. *Mitra semilævis*, *spec. nov.* Plate v., fig. 9.

Shell minute, narrowly oval-oblong, with a large, blunt apex. Ordinary whorls three, slightly convex, a little margined at the anterior suture, ornamented with curved sub-angular costæ, which are thicker at the anterior suture, and a few spiral striæ posteriorly; there are twelve costæ on the posterior whorl.

Last whorl attenuated into a longish, slightly reverted beak; faintly spirally striate next the suture, transversely wrinkled in the posterior half-turn. Aperture narrow oval; outer lip lirate within; columella with four stout plaits, which are continued as spiral ridges around the beak.

*Dimensions*.—Length, 5.5; breadth, 2; length of aperture, 3.

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

23. *Mitra cassida*, *spec. nov.* Plate vi., fig. 5.

Shell small, stout, biconic, with a very short, somewhat acuminate spire, ending in a relatively large papillary pullus. Ordinary spire whorls convex, ornamented with slender costæ.

Last whorl ventricose posteriorly, abruptly sloping to the suture, and rapidly attenuated to the front; the shoulder of the whorl ornamented with transverse sub-tuberculose ridges.

Aperture narrow-elliptic; outer lip thin, smooth; columella with four plaits.

*Dimensions*.—Length, 7; breadth, 4; length of aperture, 5.5.

*Locality*.—Upper beds at Muddy Creek.

24. *Mitra conoidalis*, *spec. nov.* Plate x., figs. 2a—b.

Shell small, stout, biconic, with a short regularly conic spire, ending in a relatively large depressed pullus; ordinary spire whorls nearly flat, sloping more rapidly to the anterior suture, and slightly margined at the posterior suture; ornamented by slender costæ and a few spiral engraved lines.

Last whorl oblong, rather abruptly attenuated at the base, flatly rounded over the suture; with a few revolving threads at the shoulder and at the base, the median portion transversely striate.

Aperture narrow-elliptic; outer lip thin, smooth; columella with four plaits.

*Dimensions*.—Length, 7; breadth, 3.5; length of aperture, 5.5.

*Locality*.—Lower beds at Muddy Creek.

## FAMILY OLIVIDÆ.

## GENUS OLIVA.

It is not possible to separate conchologically *Olivella* from *Oliva*, as the only difference between them is the longer or shorter spire, which is by no means an absolute measure, though it is not improbable that the following species may belong to the former genus.

## SYNOPSIS OF SPECIES.

Length more than three times the breadth.

1. *O. angustata*.

Length less than three times the breadth.

Shell narrower; spire longer.

2. *O. Adelaidæ*.

Shell wider; spire shorter.

3. *O. nymphalis*.

1. *Oliva angustata*, *spec. nov.* Plate viii., figs. 7a—b.

Shell narrowly elongate-ovate, shining; spire acuminate, of six whorls; suture excavated; aperture narrow, longer than the spire; columella twisted with five or six anterior spiral grooves.

*Dimensions*.—Length, 18.5; breadth, 5.5; length of aperture,

11.5 ; breadth of aperture at front, 2. Imperfect specimens have a length of 25 mills.

*Locality*.—Lower beds at Muddy Creek.

A very much more slender shell, with a longer spire, than *O. australis*, Duclos.

**2. *Oliva Adelaidæ*, *spec. nov.* Plate viii., fig. 6.**

Shell elongate-ovate, shining ; spire bluntly acuminate, of four whorls, channelled at the suture ; aperture longer than the spire ; outer lip slightly arched, truncate at the base ; columella slightly twisted and plicate anteriorly.

*Dimensions*.—Length, 10.5 ; breadth, 4 ; length of aperture, 6.

*Locality*.—Clayey-green sands, Adelaide-bore.

This fossil has the general appearance of *O. pardalis* and *O. leucozona*, of New South Wales, but it is proportionately stouter, the apex is blunt, and the aperture is longer and narrower at the front. The relative dimensions respectively of *O. Adelaidæ* and *O. pardalis* are—Length, 10 and 10 ; breadth, 3.8 and 3.3 ; length of aperture, 6.3 and 6.5.

**3. *Oliva nymphalis*, *spec. nov.* Plate viii., fig. 7.**

Shell acuminate-oblong, with a moderate exsert spire, ending in a small subglobose tip ; whorls five, narrowly channelled at the suture.

Very much like *O. nivea*, Gmelin, but it is more ventricose, wider, and not so deeply grooved at the suture ; it also resembles *O. triticea*, Duclos, but has a shorter spire.

*Dimensions*.—Length, 10 ; breadth, 4.5 ; length of aperture, 6.5.

*Localities*.—Bairnsdale, Jemmy's Point, and Cunningham, Gippsland (*W. H. Gregson*!) ; upper beds at Muddy Creek (*J. Dennant*!).

**GENUS ANCILLARIA.**

**SYNOPSIS OF SPECIES.**

Enamel of spire spirally ridged.

Spire acuminate ; apex pointed ; broadly depressed at suture.

1. *A. oryctea*.

Spire cylindrical ; apex papillary. 2. *A. papillata*.

Spire subscalar. 3. *A. subgradata*.

Enamel of spire without spiral ridges.

Spire tumid ; shell subcylindrical. 4. *A. hebera*.

Spire tapering.

Non-callous surface of shell conspicuously spirally striated.

5. *A. subampliata*.

Non-callous surface plain or obscurely spirally striated.

Callosity of spire coarsely granulose. 6. *A. lanceolata.*  
 Callosity of spire smooth, or nearly so. 7. *A. ligata.*  
 Spire subcylindrical, obtuse. 7. *A. ligata.*  
 Spire pyramidal, acute. 8. *A. semilaevis.*  
 Elongate fusiform; aperture about half total length. 8. *A. semilaevis.*  
 Aperture about two-thirds total length. 9. *A. pseud-australis.*

1. *Ancillaria orycta*, spec. nov. Plate x., fig. 5.

Shell stout, ovately fusiform; spire acuminate, with an acute tip, spirally ridged; last whorl rather ventricose, margined at the suture by a rather broad callous band, concavely and deeply depressed.

In shape and sculpture similar to *A. marginata*, but the apex is acutely pointed, and the whorls are broadly and deeply furrowed at the suture.

*Dimensions* of a large specimen:—Length, 23; breadth, 12; length of aperture, 14.

*Localities*.—Oyster-banks, Aldinga Cliffs; Jemmy's Point and Cunningham, Gippsland (*W. H. Gregson*!); ferruginous sand-rock, Cheltenham, Victoria.

2. *Ancillaria papillata*, spec. nov. Plate vii., fig. 4.

Shell solid, cylindrically oblong; spire pyramidal acuminate and mucronate, ending in a small blunt exsert pullus; the callous growth on the spire smooth, shining, microscopically granular, and sculptured with narrow, sharply rounded, spiral ridges of unequal size, the larger with two or three smaller ones interposed. Aperture a little more than half the total length.

*Dimensions* (mean).—Length, 25; breadth, 9.25; length of aperture, 14.

*Locality*.—Upper beds at Muddy Creek.

3. *Ancillaria subgradata*, spec. nov. Plate vii., fig. 8.

Shell thin, broadly fusiform, with a moderately long gradated spire ending in a small, smooth, swollen pullus; whorls rather ventricose, angulated near the posterior suture; the revolution of the suture marked by a raised thread.

This species recalls the recent Australian *A. cingulata*, but it has a much shorter spire, and the whorls are more sharply angled.

*Dimensions*.—Length, 29; breadth, 12.5; length of aperture, 15.

*Locality*.—Clayey green-sands Adelaide-bore.

14. *Ancillaria hebera*, Hutton. Plate vii., fig. 5.

*Reference*.—Catalogue Tertiary Moll. of N. Zealand, p. 6, 1873.

*Synonym*.—*A. mucronata*, Johnston, Geol. Tasmania, t. 31, f. 12, 1880.

Shell rather thin, cylindrical; spire short, thick, and bluntly rounded at the end; the callosity of the spire broader than the body-whorl, spirally constricted at the suture, coarsely granulose.

*Dimensions* (mean).—Length, 22.5; breadth, 9.25; length of aperture, 13.75.

*Localities*.—Calciferous sandstones of the River Murray Cliffs near Morgan; lower beds at Muddy Creek; Table Cape (Johnston!); also in the Oamaru and Pareora systems in New Zealand.

The identification of the Australian specimens results from a comparison with an authentic example from New Zealand.

This species comes nearest to *A. olivula*, of the Paris basin, but the callosity is larger, gibbous, and granulated in our fossil.

5. *Ancillaria subampliata*, spec. nov. Plate vii., fig. 3.

Shell thin, fusiformly oblong, rather narrow, with an acuminate, subturreted spire, ending obtusely in a moderately large pullus of three smooth slightly convex whorls; callosity of spire spirally striated.

Body-whorl sculptured with revolving and longitudinal striae; basal grooves wanting.

Aperture inflated anteriorly; columella hardly twisted, with slender plaits.

*Dimensions*.—Length, 34; breadth, 13; length of aperture, 24.

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

This species has the form of *A. ampla*, Gmelin, but the spire is different in outline, and the surface of the body whorl is sculptured.

6. *Ancillaria lanceolata*, spec. nov. Plate vii., fig. 2.

Shell moderately stout, narrow, cylindrical; spire pyramidal, acuminate contracted at the apex, thickly covered with a coarsely granulated enamel. Somewhat intermediate between *A. hebera* and *A. pseud-australis*.

*Dimensions* (mean).—Length, 33.5; breadth, 10.75; length of aperture, 19.5.

*Locality*.—Lower beds at Muddy Creek.

17. *Ancillaria ligata*, spec. nov. Plate vii., fig. 6.

Shell small, oblong-cylindrical; spire sub-cylindrical, blunt, covered with a thin enamel; constricted at the suture and

bounded behind by a narrow flat band. In young specimens the callous growth occupies a broad zone around the anterior suture, leaving a dark coloured narrow belt at the posterior suture.

*Dimensions*.—Length, 19; breadth, 6; length of aperture, 9.

*Localities*.—Turritella-clays at Blanche Point, Aldinga; clayey green-sands, Adelaide-bore.

This resembles *A. semilævis*, T. Woods, but has a blunt apex, and is more strongly angled at the suture.

#### 8. *Ancillaria semilævis*, *Tenison Woods*.

*Reference*.—Proc. Linnean Soc., N.S. Wales, 1879, p. 229, tab. 20, fig. 7.

A slender elongately fusiform shell, with the aperture less than half the total length; spire acuminately pointed, slightly angled at the sutures; callosity of spire minutely granular.

*Dimensions*.—Length, 19; breadth, 6; length of aperture, 9.

*Localities*.—Lower beds at Muddy Creek; River Murray Cliffs; Schnapper Point.

#### 9. *Ancillaria pseud-australis*, *spec. nov.* Plate vii., fig. 1.

Shell stout, fusiformly ovate; spire pyramidal acuminate, a little constricted anteriorly, thence tapering to a small mamillary pullus. Callus of spire obscurely spirally lined and minutely granulated.

Last whorl slightly ventricose, tumid in front of the suture. The two basal grooves each ending in a denticle on the outer lip. Columella twisted, with thin plaits.

*Dimensions* of a moderately sized specimen:—Length, 47; breadth, 19; length of aperture, 26.5.

*Localities*.—Lower beds at Muddy Creek; River Murray Cliffs, near Morgan; well-sinkings, Murray Desert; blue clays, Schnapper Point.

This species has been referred to the living species *A. australis* and *A. mucronata*; from the former it is more markedly distinct. The Tasmanian conchologists believe that the latter species was founded on a fossil from Table Cape, but Sowerby's and Reeve's illustrations indicate a highly coloured and therefore presumably a living shell, and in my opinion a different shell from the fossil, which may be distinguished by its longer and constrictedly acuminate spire.

*A. pseud-australis* is not unlike *A. buccinoides* of the European Eocene, which is, however, less ventricose.

The unique specimen from a well-sinking in the Murray desert, represented by fig. 13, plate vi., is provisionally referred to *A. pseud-australis* as an obtuse variety resembling *A. obtusa* from Cape of Good Hope. Detached spires similar to that of this

variety, attaining to a diameter of 31 mills., occur in the River Murray Cliffs, but the perfect shell is yet unknown.

### GENUS HARPA.

#### SYNOPSIS OF SPECIES.

Whorls rounded at the shoulder.

Pullus turbinate ; lamellæ thin, elevated, about 50 on last whorl. 1. *H. lamellifera*.

Whorls angulated or sub-angulated at the shoulder.

Whorls sulcated around suture ; lamellæ thin, about 40 on last whorl. 2. *H. sulcosa*.

Spire whorls sub-quadratae ; strongly ribbed spirally and axially ; spire more than half length of aperture.

3. *H. spirata*.

Whorls upward-sloping to posterior suture.

Spire whorls roundly angled.

Spire less than one-fifth length of aperture ; ribs on last whorl, 12, conspicuously lirate above and below angulation of last whorl.

4. *H. cassinoides*.

Spire less than one-third length of aperture.

Pullus papillary, nucleus small, lateral ; outer lip slightly expanded.

Lamellæ on last whorl about 20, transversely striate ; no liræ

5. *H. abbreviata*

Lamellæ on last whorl about 25, lirate and transversely striate.

6. *H. tenuis*.

Pullus large, hemispheric.

Lamellæ about 25 on last whorl ; outer lip thickened. 7. *H. pulligera*.

Spire whorls bicarinate at periphery, costæ and liræ distant and prominent. 8. *H. clathrata*.

#### 1. *Harpa lamellifera*, spec. nov. Plate vi., fig. 2.

Shell ovate, ventricose ; spire very short, ending in a moderately large turbinatae pullus of two smooth rounded whorls, the last half turn almost concealed. Ordinary whorls, two and a half, convex ; ornamented with thin elevated lamellæ, about 50 on the last whorl ; interspaces finely transversely striate and spirally lined. Aperture lunate ; outer lip not thickened, sigmoidally curved coincident with the lamellæ.

*Dimensions*.—Length, 29 ; breadth, 19 ; length of aperture, 24 ; width, 10.

*Locality*.—Lower beds at Muddy Creek.

2. *Harpa sulcosa*, *spec. nov.* Plate vi., fig. 10.

Shell ovate, ventricose; spire short, scalar, ending in a large pullus of two smooth turns, the last turn subglobose, with the tip laterally immersed. Ordinary whorls, two and a half, flatly channelled at the suture; ornamented with thin subdepressed lamellæ, about 40 on the last whorl, which terminate at the shoulder in small vaulted scales; interspaces indistinctly striate, and inconspicuously distantly spirally lined. The flat or slightly concave posterior area of the whorls spirally striated and traversed by the depressed lamellæ.

Aperture lunate, truncated posteriorly corresponding with the sutural depression; outer lip not thickened, sigmoidally curved.

*Dimensions*.—Length, 19; breadth, 11.5; length of aperture, 15.

*Locality*.—Lower beds at Muddy Creek.

3. *Harpa spirata*, *spec. nov.* Plate vi., fig. 3.

Shell oval-oblong, with a high subscalar spire, ending in a hemispheric pullus. Ordinary whorls, three and a half, bluntly angled in front of the suture, the posterior area flat or slightly sloping upwards. Ornamented with stout depressed lamellæ, about 30 on last whorl, and distant spiral ribs about three on penultimate whorl; interspaces between the lamellæ finely transversely striate.

Aperture oval-oblong; outer lip thickened and reflected.

*Dimensions*.—Length, 35; breadth, 22; length of aperture, 25.

*Locality*.—Blue clays at Schnapper Point.

4. *Harpa cassinooides*, *spec. nov.* Plate vi., fig. 4

Shell stout, biconic, with a very short somewhat acuminate spire ending in a small papillary pullus of two turns.

Ordinary spire-whorls two, medially angled, with a slight concave posterior area; ornamented with distant ribs which rise into blunt tubercles on the angulation.

Last whorl oval, ventricose, flatly rounded over the suture, and rapidly attenuated at the base; periphery with three equal and equidistant liræ; axial ribs twelve, subangular, sigmoid, somewhat elevated into blunt tubercles on the peripheral liræ.

Aperture lunate; outer lip ascending on the penultimate whorl, very much thickened and somewhat patulously spreading.

*Dimensions*.—Length, 28; breadth, 23; length of aperture, 27.

*Locality*.—Well-sinking, Murray Desert.

5. *Harpa abbreviata*, *spec. nov.* Plate vi., fig. 7.

Shell thin, narrow-oval, with a short spire ending in a moderate sized blunt apex. Ordinary spire-whorls two, subangulated medially, with two spiral threads at the periphery, and ornamented by rather distant, hardly raised lamellæ.

Last whorl oval-oblong, somewhat ventricose, flatly rounded over the suture; ornamented with about twenty, thin, hardly elevated lamellæ; interspaces axially striated.

Aperture oval-oblong; outer lip ascending to periphery of penultimate whorl, somewhat patulously expanded, especially at the two ends.

*Dimensions.*—Length, 27; breadth, 17; length of aperture, 24.  
*Locality.*—Lower beds at Muddy Creek.

**6. *Harpa tenuis*, *spec. nov.* Plate vi., fig. 1.**

Shell thin, oval, with a rather short spire, ending in a rather large blunt apex. Ordinary spire-whorls two, convex, but with an ill-defined ante-medial angulation; ornamented with thin, slightly elevated lamellæ, and transversely interstriated.

Last whorl oval, slightly ventricose over the suture; ornamented with about 25 thin, slightly elevated lamellæ, which develope vaulted pointed scales on the shoulder, and with distant, not prominent, flat spiral threads, which are more conspicuous on the base in the form of wrinkled corrugations.

*Dimensions.*—Length, 36; breadth, 23; length of aperture, 29.  
*Locality.*—Lower beds at Muddy Creek.

**7. *Harpa pulligera*, *spec. nov.* Plate vi., fig. 9.**

Shell thin, oval, with a rather short spire, ending in a very large hemispheric pullus, with the tip laterally immersed; the second turn of the pullus almost concealed by the first ordinary whorl. Ordinary whorls one and a half, subangulated; ornamented with thin, slightly elevated lamellæ, which are vaulted on the angulation.

Last whorl oval-oblong, somewhat ventricose over the suture, ornamented with about 25 thin, slightly elevated lamellæ, which are raised into vaulted scales on the shoulder; the interspaces with coarse axial striae; base spirally wrinkled.

Aperture narrow-oval; outer lip slightly ascending on the penultimate whorl, its margin much thickened.

*Dimensions.*—Length, 50; breadth, 30; length of aperture, 42; diameter of pullus, 4·5.

*Locality.*—Blue clays at Schnapper Point.

**8. *Harpa clathrata*, *spec. nov.* Plate vi., fig. 8.**

Shell moderately stout, narrow-oval, with a short spire ending in a moderately sized papillary pullus. Ordinary spire-whorls two, angulated medially, and with a strong thread between the angulation and the anterior suture, and ornamented with distant thin angular costæ, the interspaces with a few transverse wrinkles of growth.

Last whorl oval, somewhat ventricose and flatly rounded over

the suture, attenuated at the base; ornamented with about 18 angular costæ, and about 20 equal and equi-distant broad flat liræ, but narrower than the interspaces; the whole surface with conspicuous wrinkles of growth.

*Dimensions.*—Length, 36; breadth, 21; length of aperture, 30.

*Locality.*—Calciferous sandstones, River Murray cliffs, near Morgan.

FAMILY CANCELLARIDÆ.

GENUS CANCELLARIA.

SYNOPSIS OF THE SPECIES.

Shell umbilicated.

Whorls lirate and costulated, deeply channelled at the suture; widely umbilicated. 1. *C. calculata.*

Whorls lirate, costæ broad, widely channelled; narrowly umbilicated. 2. *C. laticostata.*

Whorls spirally ribbed, fenestrated by fine threads; suture not channelled; widely umbilicated. 3. *C. alveolata.*

Shell imperforate.

Whorls variced.

Suture channelled; strongly lirate.

Interspaces between spiral ribs finely striate.

4. *C. epidromiformis.*

Interspaces with a strong thread.

5. *C. exaltata.*

Suture not channelled; finely lirate.

6. *C. varieifera.*

Whorls not variced.

Whorls squarely shouldered.

Whorls more or less tessellated; shell oval.

Liræ on last whorl more than 10; posterior area with a spiral thread.

7. *C. gradata.*

Liræ on last whorl about 10.

8. *C. ptychotropis.*

Whorls strongly costated; spire turreted.

9. *C. turriculata.*

Whorls rounded.

Shell oval.

Costæ well developed, roundly angular, extending to base of last whorl.

10. *C. Wannonensis.*

Costæ rounded, thick, on medial portion of last whorl only. 11. *C. semicostata.*

Lirate without costæ.

12. *C. modestina.*

Shell turricate.

Penultimate whorl subangulate with sub-tuberclose costæ and 4 liræ.

Last whorl with about 20 liræ; penultimate whorl with 10 costæ.

13. *C. Etheridgei.*

Last whorl with 10 liræ; penultimate whorl with 12 costæ; finely striated transversely. 14. *C. caperata.*

Penultimate whorl convex with slender costæ, and 7 to 10 liræ.

Costæ nodosely crenulate; last whorl rather ventricose.

15. *C. capillata.*

Costæ arcuate, thin; liræ fewer.

16. *C. micra.*

1. *Cancellaria calvulata*, *spec. nov.* Plate ix., fig. 3.

Shell ovately ventricose, rather thin; spire moderate, turbinated, ending in an eccentric pullus of one and a half smooth swollen whorls. Whorls three, excluding pullus, very convex, separated by a rather narrow and deep channelled suture, the shoulder rounded. Sculptured with rounded spiral ribs alternately large and small (about fifteen on penultimate whorl), with obscure transversely oblique plications (about twenty on penultimate whorl), which crenulate the liræ, and with close-set transverse thread-like striæ.

Aperture ovate, sharply angled at the front; outer lip thin, a little spreading, crenulate on the edge, and strongly and closely ribbed within; columella oblique with three plaits; umbilicus moderately wide and deep.

*Dimensions.*—Length, 16; breadth, 12; length of aperture, 10; diameter of umbilicus, 2.

*Locality.*—Blue clays at Schnapper Point.

By its rounded whorls and ornament it differs from all living species of the Section *Trigonostoma*, but has much resemblance to *C. expidea*, of the Piedmontese Pliocene, from which it differs by its more exsert spire, narrow channel, and the more numerous transverse plications.

2. *Cancellaria laticostata*, *Tenison Woods.*

*Reference.*—Proc. Lin. Soc., N.S. Wales, vol. iv., tab. 2, fig. 8, p. 17; 1879.

A small ovate shell, spire obtusely turreted, whorls separated by a deep channel, broadly ribbed (10 on last whorl), decussate. Aperture entire, angular; outer lip simple, ribbed within; col-

mella with two stout plaits, umbilicus narrow and deep. Length, 6; breadth, 3.5.

*Locality.*—Lower beds at Muddy Creek!

*C. laticostata* may be regarded as a diminutive *C. haemastoma*, Sowerby, from the Galapagos Islands, but has a little longer spire and broader plications.

The species name is preoccupied by Kuster for a recent shell, which is probably *C. sinensis*, Reeve, a variety of *C. asperella*, Lamarck, but under the circumstances it is not desirable to substitute another name for our fossil.

**3. *Cancellaria alveolata*, spec. nov.** Plate x., fig. 7. a-b.

Shell small, thin, ovate-ventricose; spire short, turbinate ending in a small blunt pullus of one and a half smooth depressed turns.

Whorls three and a half, moderately convex, separated by a linear channelled suture; equally and equidistantly lirate, five on the penultimate whorl, the posterior one margining the suture; liræ rounded, depressed, about equal in width to the interspaces, which are roundly pitted by the intercrossing of slender sigmoid threads. Aperture ovately oblong, angularly rounded at the front, but not channelled; outer lip varicosely thickened, the edge inflected and crenulated, smooth within, slightly insinuate at the suture; peristome entire; columella arched, obscurely one-plicate. Perhaps not a *Cancellaria*.

*Dimensions.*—Length, 4.5; breadth, 3; length of aperture, 3.

*Locality.*—Lower beds at Muddy Creek.

**4. *Cancellaria epidromiformis*, spec. nov.** Plate viii., fig. 9.

Shell thick, ovately elongate, with a sub-turreted spire ending in a small obtuse apex of one and a half turns. Whorls five, excluding pullus, convex, narrowly and deeply excavated at the suture, the shoulder rounded and coronated; varices four, at irregular intervals; ornamented with slender, oblique, subacute costæ (about 24 on penultimate whorl) and spiral liræ (about five on penultimate whorl), bluntly tuberculose or granulose at the junctions; interspaces between the liræ with about four or five threads, minutely granular or scaly produced by close-set longitudinal striae.

Aperture oblong; outer lip varicosely thickened, plicate within; columella lip expanded, columella with three stout plaits; body-wall with a stout spiral ridge and a few carunculations.

*Dimensions.*—Length, 20; breadth, 10; length of aperture, 10.

*Locality.*—Lower beds at Muddy Creek.

**5. *Cancellaria exaltata*, spec. nov.** Plate viii., fig. 10.

Shell like *C. epidromiformis*, but rather narrower, with the sutural channel less defined, and with certain differences of orna-

mentation. The costæ are acute, slightly curved, about 16 on penultimate whorl, and about five sharp spiral liræ which serrulate the costæ ; the interspaces between the liræ with one to three stout threads ; the whole surface with longitudinal threads or coarse striæ, which do not produce so fine and close sculpturing on the spiral threads as in the allied species.

*Dimensions.*—Length, 19·5 ; breadth, 8·5 ; length of aperture, 9.

*Locality.*—Blue clays at Schnapper Point.

This species recalls *C. macrospira* of the China Seas, but is not so elongate, with a narrower channelled suture and strong costæ ; moreover, the recent species is semi-pellucid, and has a minute umbilicus.

#### 6. *Cancellaria varicifera*, Tenison Woods.

*Reference.*—Proc. Lin. Soc., N.S. Wales, vol. 3, tab. 21, f. 12, p. 231, 1878.

Shell ovate, spire elevated, subacute, variced, solid, ending in a small smooth pullus of  $1\frac{1}{2}$  turns. Whorls five, convex, longitudinally costated, costæ slender, arched (about 20 on penultimate whorl), and regularly lirate (about 15 on penultimate whorl) ; distantly cancellated by longitudinal stout striæ. Outer lip thin, lirate within ; columella triplicate.

*Dimensions.*—Length, 19 ; breadth, 9 ; length of aperture, 7.

*Localities.*—Lower beds at Muddy Creek ; River Murray Cliffs ; blue clays at Schnapper Point.

This is the antipodean analogue of *C. evulsa*, Solander, of the European Eocene, differing only by its much finer ornament, and by the liræ within the outer lip.

#### 7. *Cancellaria gradata*, spec. nov. Plate x., fig. 12.

Shell thin, broadly ovate, carinate, with a moderately long, acute, scalar spire, ending in a small pullus of one and a half very convex turns.

Whorls four and a half, excluding pullus, flattened above, angulated in the posterior one-third, of regular increase ; the last whorl is large and ventricose, with an elongated convex base and a very small broad beak. Suture impressed. Anterior portion of whorls tessellated by acute spiral ridges (six on the penultimate) and more slender, straight transverse threads, producing very small acute tubercles at the intersections ; the oblong depressed interspaces transversely striated.

The keel is serrately crenulated ; the posterior area with a median spiral thread, arched transverse striæ, and oblique plications, which become obsolete before reaching the suture.

Aperture quadrately oval, angulated at the keel and at the base of the pillar. Outer lip crenulated on the thin edge, lirate within.

Columella with a slight twist at the front, and with three distinct folds above it.

*Dimensions*.—Length, 13.5; breadth, 7; length of aperture, 7.

*Localities*.—Lower beds at Muddy Creek. Calciferous sandstone, River Murray Cliffs, near Morgan.

**8. *Cancellaria ptychotropis*, spec. nov. Plate ix, fig. 5.**

Shell broadly ovate, similar to *C. gradata*, but the spiral liræ and transverse threads are fewer and more distant, and the posterior area of the whorls is without a spiral thread, whilst the liræ are simply crenulated and not tuberculated.

*Dimensions*.—Length, 6.25; breadth, 3.5; length of aperture, 3.5.

*Locality*.—Turritella-clays at Blanche Point, Aldinga Bay.

**9. *Cancellaria turriculata*, spec. nov. Plate x, fig. 14.**

Shell oval-turreted, carinate, rising in high narrow steps, ending in a broad, blunt, conical pullus. Whorls four, excluding pullus, narrowly flattened above, of regular increase; ornamented with sub-acute, distant, slightly curved costæ (about 11 on the penultimate), which are tuberculately thickened at the keel, and with slender spiral threads in front of the keel (about six on penultimate whorl).

Last whorl narrow, with an elongate convex obtuse base; costate and lirate; aperture elliptical, roundly angled at the keel; columella with two small plaits.

*Dimensions*.—Length, 5.75; breadth, 2.5; length of aperture, 2.

*Localities*.—Turritella-clays, Blanche Point, Aldinga Bay; clayey green-sands, Adelaide-bore.

**10. *Cancellaria Wannonesis*, spec. nov. Plate viii., fig. 11.**

Shell stout, fusiformly ovate, ventricose; spire sharply acuminate, ending in a sub-cylindric pullus of two and a half turns. Whorls 4, excluding pullus, flatly convex posteriorly, then regularly rounded to the front; strongly ribbed and spirally lirate.

Last whorl with about 10 to 12, narrowly rounded, elevated, obliquely arched ribs, most prominently elevated in the median portion of the whorl, becoming obsolete at the front; costæ serrately crenulated by numerous spiral angular liræ, alternately large and small; the liræ somewhat rugulose on the edge by the crossing of transverse striæ and folds of growth.

Aperture broadly ovate, rounded behind and rather truncated in front; outer lip arcuate, somewhat effuse anteriorly, its edge sharp and obscurely crenulate. Columella nearly straight, with three plaits, the posterior of which is the stoutest; in senile examples a fourth plait is interposed between the second and

third, and a few ridges appear on the columella-callus which is thinly spread over the umbilical region.

*Dimensions*.—Length, 29; breadth, 17; length of aperture, 20; width, 9.

*Localities*.—One of the commonest fossils in the upper beds at Muddy Creek; Jemmy's Point, Gippsland Lakes (*W. H. Gregson!*)

Has some resemblance to a small group of recent species gathering around *C. ventricosa*, Hinds, and *C. candida*, Sowerby.

**11. *Cancellaria semicostata*, *spec. nov.* Plate x., fig. 3.**

Shell minute, stout, oval; whorls three and a half; spire-whorls very convex; penultimate whorl with ten thick rounded costæ, evanescent at the posterior suture. Last whorl not so ventricose as the penultimate, the first half turn with thick costæ on the median portion, becoming obsolete with the revolution of the whorl.

Aperture oval, rounded at each end; outer lip thin, smooth within; inner lip defined by a small chink behind the pillar; columella, with a slight effuse base and two thick hardly elevated plaits above.

*Dimensions*.—Length, 3; breadth, 2; length of aperture, 2.

*Locality*.—Lower beds at Muddy Creek.

Doubtlessly an immature shell, but differs from the posterior whorls of any associated species.

**12. *Cancellaria modestina*, *spec. nov.* Plate ix., fig. 4.**

Shell stout, oblong-ovate; spire short, with an obtuse apex. Ordinary whorls three, slightly convex, a little depressed at the posterior suture; spirally grooved, and transversely obsoletely ridged, not plicate. There are about ten flatly rounded liræ, separated by linear grooves on the penultimate whorl; rudely cancellated by the obsolete transverse threads.

Aperture ovate; outer lip thin-edged, lirate within; columella with three moderately stout plaits.

*Dimensions*.—Length, 12; breadth, 7; length of aperture, 7.5.

*Locality*.—Upper beds at Muddy Creek.

Bears a close resemblance to *C. purpuriformis*, Valenciennes, which has obsolete plications and stouter columella-plaits.

**13. *Cancellaria Etheridgei*, *Johnston*. Plate ix., fig. 6.**

*Reference*.—Proc. Roy. Soc., Tasmania, for 1879.

Shell turricate; whorls five, convex, slightly angled posteriorly, distinctly ribbed on posterior whorls, crossed by five angular liræ, which are obsolete nodose at the intersections. Last whorl lirate, except on the narrow posterior slope; ribbed for about a half turn; the ribs gradually become less distinct with the revolution of the whorl, and on the last half turn are obsolete.

Aperture ovate; outer lip arched, thin edged, with about five strongly spiral ribs within; columella incurved, with two plaits situated high up.

*Dimensions*.—Length, 7; breadth, 3; length of aperture, 2.5.  
*Locality*.—Table Cape (*R. M. Johnston!*).

**14. *Cancellaria caperata*, *spec. nov.* Plate ix., fig. 7.**

Shell small, stout, elongate-oval, ending in an obtuse pullus of one and a half smooth subglobose turns.

Whorls three and a half, excluding pullus, convex, sloping more rapidly to the posterior suture. Ornamented with rounded, depressed costæ, and with spiral threads in front of the angulation, forming crenate-nodosities at the intersection, conspicuously so on the posterior thread; the whole surface finely transversely striated; penultimate whorl with three strong spiral threads and a slender one at the anterior suture. Last whorl with about ten spiral liræ, costæ inconspicuous. Aperture oblong, rounded at each end, peritreme entire; outer lip strongly lirate within; columella with three transverse plaits.

*Dimensions*.—Length, 5; breadth, 2.5; length of aperture, 2.  
*Locality*.—Blue clays, Schnapper Point.

**15. *Cancellaria capillata*, *spec. nov.* Plate x., fig. 10.**

Shell small, stout, elongate-oval, apex obtuse; whorls six, convex, lirate and slenderly costated. The spiral liræ increase in number from four on the first ordinary whorl to ten on the penultimate whorl; and produce slight nodose-crenulations on the costæ.

Last whorl more ventricose than the preceding one, somewhat varicosely dilated here and there; spirally lirate all over, costæ obsolete.

Aperture oblong, peritreme continuous; outer lip, lirate within; columella with two small transverse plaits.

*Dimensions*.—Length, 6; breadth, 3; length of aperture, 2.5.  
*Locality*.—Lower beds at Muddy Creek.

**16. *Cancellaria micra*, *spec. nov.* Plate x., fig. 8.**

Resembles *C. capillata*, but the costæ are much arcuate and thin, the spiral threads fewer (seven on the penultimate whorl), the whorls a little flattened posteriorly, and the outer lip is smooth within.

*Dimensions*.—Length, 3.5; breadth, 1.75; length of aperture, 1.5.

*Locality*.—Clayey green-sands, Adelaide-bore.

## FAMILY TEREBRIDÆ.

## GENUS TEREBRA.

## SYNOPSIS OF THE SPECIES.

:Shell with a smooth band in front of suture, defined by a sulcus.  
 1. *T. platyspira.*

:Shell with a tuberculate or plicate band in front of suture, defined by a constriction.  
 A double row of nodulations on posterior half of whorl.  
 The rows of nodulations separated by a sculptured area.  
 2. *T. catenifera.*  
 The rows of nodulations contiguous.  
 3. *T. subcatenifera.*  
 Transversely plicate on posterior whorls; anterior ones smooth.  
 4. *T. mitrellaformis.*  
 Whorls varicosely costated.  
 5. *T. crassa.*  
 Costæ bent, subnodulose.  
 6. *T. geniculata.*  
 Transversely plicate throughout.  
 Narrowly cylindrical; pullus large, sub-globose.  
 7. *T. mutica.*  
 Broadly pyramidal; plicæ stout.  
 8. *T. subspectabilis.*  
 Narrowly pyramidal; plicæ slender; pullus cylindric.  
 11. *T. additoides.*

:Shell without an ante-sutural band on the anterior whorls.  
 Transversely striated or wrinkled.  
 Posterior whorls flat; spire regular.  
 9. *T. simplex.*  
 Posterior whorls sub-angulated; spire acuminate.  
 10. *T. angulosa.*  
 Slenderly costated.  
 Anterior whorls sloping to the posterior suture.  
 11. *T. additoides.*  
 Whorls flat; ribs obsolete on anterior whorls.  
 12. *T. leptospira.*  
 Whorls convex, coronated at the suture.  
 13. *T. convexiuscula.*

## SPURIOUS SPECIES.

'*Terebra scalaris*, *Tate*, is transferred to *Cerithiopsis*.

1. *Terebra platyspira*, *Tate*. Plate viii., fig. 12.

*Reference*.—Southern Science Record, January, 1886, p. 6.

Shell narrow-elongate, of many flat whorls of slow increase, terminating in a relatively large papillary pullus of two turns; the first turn of the pullus subglobose, with the tip reverted and immersed, much broader than the next two or three whorls.

Ordinary whorls flat, separated by a slightly excavated suture, and having a linear spiral sulcus at the posterior-fourth; ornamented with transverse curvilinear flat ridges or wrinkles, and a few spiral flat threads medially and linear grooves near the anterior suture; the spiral ornament is only conspicuously developed on the anterior whorls of larger examples. The first five spire-whorls faintly costated.

*Dimensions*.—of figured specimen of 25 whorls:—Length, 47; width of last whorl, 6. The largest examples attain to 60 mills. in length.

*Locality*.—Lower beds at Muddy Creek.

This is very distinct from any living species.

**2. *Terebra catenifera*, Tate.** Plate viii., fig. 14.

*Reference*.—Southern Science Record, January, 1886, p. 5.

Shell pyramidal, elongate, of many polished whorls, ending in a papillary pullus of two rather large, smooth, convex turns.

Whorls convexly flattened, slightly overlapping; double banded and nodulose in front of the suture, the posterior band rather the broader, and separated by a shallow sulcus, in the centre of which winds a subangular ridge defined by linear grooves; about twenty pairs of nodulations on the penultimate whorl; anterior half of each whorl distantly and superficially spirally ridged; the whole surface arcuately striated by lines of growth; base spirally ridged and transversely wrinkled.

*Dimensions*.—Length of 17 whorls, 38; breadth of last whorl, 7.

*Locality*.—A common fossil in the upper beds at Muddy Creek.

It has much resemblance to the Japanese species, *T. serotina*, Adams & Reeve.

**3. *Terebra subcatenifera*, spec. nov.\***

Shell similar to *T. catenifera*, but the double row of nodulations, which are very much larger, are separated by a linear furrow; the anterior half of each whorl is sculptured with four equidistant spiral grooves separated by much wider flat ridges; a more or less distinct transverse angular ridge is decurrent from each tubercle of the anterior row to the anterior suture.

*Dimensions*.—Length of 15 whorls, 25; width of last whorl, 5.5.

*Localities*.—Cunningham and Jemmy's Point, Gippsland (W. H. Gregson').

**4. *Terebra mitrellæformis*, Tate.** Plate ix., fig. 10.

*Reference*.—Southern Science Record, January, 1886, p. 7.

Shell cylindrically subulate, polished; whorls convex; upper whorls distinctly costated, interrupted near the suture by a

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\*A figure is postponed to Part III.

narrow sulcus, otherwise smooth. The plications are slightly arcuate and attenuated above and below; becoming almost obsolete on the anterior whorls.

*Dimensions*.—Eight whorls in a length of 9 mill.; breadth of last whorl, 2·5.

*Locality*.—Oyster-beds of the Upper Aldinga Series, Aldinga Bay.

The specific name of this fossil indicates its resemblance to *Mitrella* of the Columbellidæ; amongst species of which it comes near to *M. Lincolensis*, but apart from the different characters of the aperture, the fossil shell is more slender than juvenile specimens of the living *Mitrella*. In respect to shape and ornament *T. mitrellaformis* would seem to approach to *T. nana*, Deshayes, inhabiting off the mouth of the Indus, but that species is without a sutural band.

**5. *Terebra crassa*, Tate.** Plate ix., fig. 10.

*Reference*.—Southern Science Record, January, 1886, p. 7.

Shell subcylindrical, whorls flatly convex, slightly flattened at the suture, ornamented with thick costæ separated by narrow angular interspaces, and interrupted at the posterior-third by a narrow and deep sulcus. There are about 20 costæ on the last whorl.

*Dimensions*.—About 10 whorls in a length of 17 mills.; breadth of last whorl, 4·5.

*Locality*.—Oyster beds of the Upper Aldinga Series, Aldinga Bay, South Australia.

This species bears a resemblance to some varieties of *T. dislocata* (Say), but it is narrower and more coarsely ornamented.

**6. *Terebra geniculata*, Tate.** Plate ix., fig. 8.

*Reference*.—Southern Science Record, January, 1886, p. 6.

Shell cylindrical, many-whorled, polished; pullus subacute of three small convex turns; whorls convex or subangulate; constricted around the posterior part, between which and the suture there is a row of tubercles (about twelve on the last whorl); the rest of the whorl is ornamented with distant varicose ribs, the interstices being spirally striated and faintly marked with lines of growth.

The ribs are stout, subcompressed, and abruptly bent and subnodose on the angle of the whorl; they are confluent with and equal in number to the tuberculations on the band next the suture.

*Dimensions*.—Length of 13 whorls, 12; breadth of last whorl, 3.

*Locality*.—Upper beds at Muddy Creek.

The narrow tuberculose band and the geniculate varicose costæ distinguish this species.

7. *Terebra mutica*, *spec. nov.* Plate x., fig. 1.

Shell small, narrowly cylindrical, ending in a relatively large subglobose pullus of one and a half turns. Ordinary whorls six and a half, flatly convex, separated by an impressed suture, transversely plicate.

Plicæ stout, slightly arched, subnodulose near the suture, interrupted in the posterior-third or so by a broad shallow constriction, there are about 20 on the penultimate whorl; axial furrows obscurely longitudinally striated; base smooth.

This species has some resemblance to the young of *T. additoides*, but is much narrower, has more plications and a different pullus.

*Dimensions*.—Length, 7; breadth of last whorl, 1.75.

*Locality*.—Lower beds at Muddy Creek.

8. *Terebra subspectabilis*, *spec. nov.* Plate ix., fig. 11.

Shell stout, rather broadly pyramidal, apex obtuse, of one and a half turns. Ordinary whorls seven, flatly convex, suture linear, transversely plicate. Plicæ stout, subangular, nearly straight, interrupted in the posterior-third by a very broad shallow constriction there are about twenty on the penultimate whorl; base obscurely spirally wrinkled.

This species differs from *T. mutica* by its shape, and from *T. additoides* by being broader, and by its stout plicæ, different pullus, and antesutural constriction.

*Dimensions*.—Length, 18; breadth of last whorl, 5.

*Locality*.—Upper beds at Muddy Creek.

9. *Terebra simplex*, *Tenison Woods*.

*Reference*.—Proc. Roy. Soc., Tasmania, for 1875, p. 21, tab. 1, fig. 1.

This species has the general form of *T. maculata*, Linnæus, but the whorls are slightly shouldered and strongly arcuately wrinkled transversely; the posterior whorls have straight, distant, angular plications. There is no infra-sutural groove, though the anterior whorls of large examples show a faint depression in the posterior-third.

*Dimensions* of largest examples of 15 whorls:—Length, 70; breadth of last whorl, 15 millimetres.

*Localities*.—Table Cape, Tasmania (*T. Woods*); lower beds at Muddy Creek, Hamilton, Victoria (*R. T.*).

The specific name given to this fossil is preoccupied by a Californian shell described by P. Carpenter; but as that "is very probably a minor variety of *T. variegata* (Gray)," Tryon, there is no need to apply a new designation.

10. *Terebra angulosa*, *spec. nov.* Plate viii., fig. 13.

Shell stout, pyramidal, with a somewhat acuminate spire ending in a papillary pullus of two turns, the extreme tip of which is sub-erect.

The three anterior whorls are flatly convex, faintly obliquely plicate; the next four whorls sub-angulate in the posterior-third, stoutly wrinkled transversely; the anterior whorls are a little swollen over the suture and obscurely depressed in the posterior-third, sigmoidally flatly wrinkled and striated transversely, and neatly and closely striated spirally.

*Dimensions.*—Length of 14 whorls, 53; breadth of last whorl, 12.

*Locality.*—Well-sinking, Murray Desert.

The shape of the whorls and the outline of the spire, if they prove constant, distinguish this species from *T. simplex*.

11. *Terebra additoides*, *Tenison Woods*.

*Reference.*—Proc. Roy. Soc. Tasmania for 1876, p. 95.

The pullus is sub-cylindrical and consists of about four narrow convex whorls. The posterior of the ordinary whorls have a narrow ante-sutural band, whilst the anterior ones are sub-angulated coincident with the constriction, all are plicated; the plicæ are very narrow, acute, slightly bent, sub-nodulose near the suture of the posterior whorls or on the angulation of the anterior ones; the interspaces between the plicæ are finely and closely reticulated.

*Dimensions* of specimen having 13 whorls:—Length, 24; breadth of last whorl, 5.

*Localities.*—Table Cape (*T. Woods* and *R. M. Johnston!*); River Murray Cliffs near Morgan.

The specific name indicates its affinity with *T. addita*, Deshayes.

12. *Terebra leptospira*, *spec. nov.* Plate viii., figs. 15a-b.

Shell slender, elongate, of many narrow whorls of slow increase, ending in a pyramidal pullus of four rapidly diminishing rounded turns.

Ordinary whorls flat, the posterior ones with straight, slender, angular plications; diminishing to stout oblique wrinkles on the anterior whorls, which are slightly depressed at the posterior one-third.

*Dimensions.*—Length of 17 whorls, 27; breadth of last whorl, 4.

*Locality.*—Lower beds at Muddy Creek.

13. *Terebra convexiuscula*, *spec. nov.* Plate x., fig. 4.

Shell narrowly pyramidal; whorls convex; suture distinct; transversely plicate; plicæ curved, thick, subangular, coronated at the suture, about 30 on the last whorl.

*Dimensions.*—Length of 9 whorls, 6; breadth of last whorl, 15.

*Locality.*—Upper beds at Muddy Creek.

## FAMILY CASSIDIDÆ.

## GENUS CASSIS.

## SYNOPSIS OF SPECIES.

Shell oblong-ovate, 12 tubercles in each row in front of the last varix; posterior slope of last whorl precipitous; suture margined with granulose-crenulations. 1. *C. exigua*.

Shell ovate, 9 tubercles in each row, posterior slope concavely sloping upwards, distantly wrinkled at the suture.

2. *C. textilis*.

## SPECIES EXCLUDED.

*C. sufflata*, *Tenison Woods*, is transferred to *Semicassis*.

1. *Cassis exigua*, *Tenison Woods*. Plate vii., fig. 13.

Reference.—*Proc. Lin. Soc., N.S. Wales*, vol. iv., p. 17, tab. 2, fig. 7 (1879).

Shell stout, oblong-ovate, ventricose, with a very short conic spire, ending in a small pullus of one and a half smooth swollen turns, with the tip reverted and immersed. Whorls five, excluding pullus, variced at successive intervals of about two-thirds of a whorl, the first whorl transversely corrugate and spirally striate; sutures granulately marginate.

Last whorl with a very high back, somewhat precipitous over the suture; bearing on the angle a row of 12 compressed sharp-pointed tubercles, and on the medial portion two other rows equidistantly placed, but of smaller size, a fourth inconspicuous row is developed on the adult shell. Base somewhat cancellated.

Aperture narrow, sinuously curved at each end; outer lip flattened, inflected, and slightly reflected, plicately dentate. Inner lip widely spreading, projecting behind as a thin plate, and terminated by the varix, over which it projects. Columella strongly dentately wrinkled throughout, as well as the anterior portion of the callous-covering.

Dimensions.—Length, 40; breadth of last whorl, 30; height, 27; length of aperture, 37; but attains to a length of 52.

Locality.—Lower beds at Muddy Creek.

It is hardly possible to recognise in the shell, which I have figured, an adult example of the very juvenile specimen which is the author's type of the species; but I have had that under examination, and have been able readily to trace it through a long series of graduating specimens.

In its adult state the species closely resembles *C. fimbriata*, recent in Southern Australia, from which it differs particularly by the spiral sculpture.

**[2. *Cassis textilis*, Tate. Plate vii., fig. 11.**

Reference.—Trans. Roy. Soc. South Australia, vol. v., p. 45, 1882.

Shell stout, ovate, ventricose, with a short conic spire ending in a small sub-globose pullus, the tip reverted and immersed. Whorls five, excluding pullus, with varices at successive intervals of about two-thirds of a whorl, ornamented with numerous spiral threads crossed by folds of growth, wrinkled at the suture. Last whorl bearing on the superior angle a row of nine nodular tubercles, and on the medial portion two other rows equi-distantly placed, the tubercles of which are smaller, much more so are those of the anterior row. Posterior area concavely sloping backward to the suture.

Outer lip thickened, margin plain. Columellar callus dentate; columella very tortuous beneath the callus, canal recurved.

Dimensions.—Length, 45; breadth of last whorl, 32; height, 29; length of aperture, 31.

Localities.—Calcareous sandstones of the River Murray cliffs near Morgan; sand-rock, Cheltenham, Port Philip Bay. Casts presumably of this species occur in the oyster banks at Adelaide and Aldinga: in the crystalline limestone of the Bunda Cliffs of the Great Australian Bight; in the raggy limestones at Mannum on the River Murray.

This species differs in shape from the recent *C. fimbriata* and its fossil representative *C. exigua* by being more ventricose and by its longer spire. Its spiral ornamentation and triple row of tubercles further distinguish it from *C. fimbriata*.

### GENUS SEMICASSIS.

#### SYNOPSIS OF SPECIES.

Aperture not exceeding two-thirds of total length; surface of whorls spirally and longitudinally sculptured.

Whorls sub-angulate, with cancellate sculpture.

1. *S. transenna*.

Whorls convex, longitudinally costate, and spirally ribbed.

2. *S. subgranosa*.

Aperture at least two-thirds of total length; last whorl lirate or ribbed, not cancellate.

Last whorl spirally ribbed on posterior area.

3. *S. Muelleri*.

Last whorl spirally ribbed all over, three nodulose ribs.

4. *S. trinodosia*.

Last whorl costated.

5. *S. radiata*.

#### SPECIES UNFIGURED.

*S. sufflata*, Tenison Woods (Cassis), Proc. Roy. Soc., Tasmania, for 1867, p. 21 (1879). Table Cape.

1. *Semicassis transenna*, *spec. nov.* Plate viii., fig. 2.

Shell thin, ovate, ventricose, contracted at the base; spire moderately produced, broadly conical, ending in a very small pullus of two and a half smooth, narrow, convex whorls.

Whorls four, excluding the pullus, subangulated in the posterior-third, slightly margined in front of the suture, with raised spiral threads cancellated by fine transverse equidistant threads. The spiral threads are about twelve on the penultimate whorl, the one on the angulation being the most prominent, those on the posterior slope (about five or six) being more slender than the anterior ones. The cancellation is obscure on the median portion of the last whorl, and the base is spirally flatly ridged only.

Aperture oval-oblong, obtuse behind, rounded in front; outer lip thickened, hardly ascending on the penultimate whorl; margin plain or obscurely dentately ridged. Columella-expansion erect, smooth; pillar twisted with a few slender oblique plaits.

*Dimensions*.—Length, 28; breadth, 17; length of aperture, 19.

*Localities*.—Lower beds at Muddy Creek; blue clays at Schnapper Point; calciferous sandstones, River Murray Cliffs near Morgan (*R. T.*); Table Cape (*R. M. Johnston!*).

This highly sculptured shell has no analogue in living creation; it is very common at Muddy Creek, and exhibits very slight variability.

2. *Semicassis subgranosa*, *spec. nov.* Plate vii., fig. 10.

Shell ovate, somewhat contracted at the base; spire acuminate, moderately elevated, ending in a conical pullus of three smooth convex whorls.

Whorls four, excluding pullus, moderately convex, margined at the anterior suture and bounded by an ante-sutural, concavely depressed, narrow zone. The first whorl finely lirate; the second and third encircled with about seven rows of granules which are on slightly oblique transverse folds; penultimate whorl with close-set oblique rounded costæ which are cut into granulose-crenatures by seven or eight encircling sulci.

Last whorl somewhat ventricose, sculptured with oblique costæ, which fade away at less than half way to the base, and encircling sulci which produce granulose-crenatures on the costæ, more conspicuously so on the first two costæ anterior to the sutural depression; the marginal band obscurely granulose. Aperture concealed in the only known specimen.

*Dimensions*.—Length, 55; breadth, 34; length of aperture, 37.

*Locality*.—Hard raggy-limestones, Edithburgh, Yorke's Peninsula.

This species has the shape of *S. semigranosa*, but differs by the

greater development of costæ and the less defined granular ornament, and by the last whorl being conspicuously spirally sulcated throughout.

**3. Semicassis Muelleri, spec. nov., Plate vii., fig. 9.**

Shell rather thin, globosely inflated; spire short, ending in a small pullus of one and a half, smooth, slightly swollen whorls.

Whorls four, excepting pullus, separated by an impressed suture, roundly angled medially, spirally ribbed; the posterior whorls with about four spiral ribs, tessellated by transverse threads; penultimate whorl with a stout medial ridge, two behind, one at the posterior suture, and two or three in front. The ribs are rounded, unequally disposed, incised by rather distant oblique threads.

Last whorl ventricose, with a round shoulder, posterior to which are five spiral ribs, the medial one the strongest, the posterior one margining the suture; the ribs are crossed by sharp threads which crenulate them, but on the middle of the whorl are obsolete or continued as striæ; base with a few encircling depressed ribs.

Aperture ovately lunate; outer lip plain, reflected; columella nearly straight, medially thickened, twisted and obliquely truncated at the end, with about ten slender revolving plaits, expanded over the umbilical region.

*Dimensions.*—Length, 25; breadth, 20; length of aperture, 18.

*Locality.*—Upper beds at Muddy Creek.

This species, which resembles in miniature *S. nivea*, Brazier, but has a different ornament, is dedicated to Baron Sir F. von Mueller as a public mark of recognition of his contributions to the phytology of the Australian Tertiary Period.

**4. Semicassis trinodosa, spec. nov. Plate vii., fig. 12.**

Shell globosely ovate, spire short, acuminate, ending in a small conical pullus of three smooth convex whorls.

Whorls four, excluding pullus, convex, with depressed spiral ridges and narrower sulci.

Last whorl ventricose, contracted at the base, sculptured with flatly rounded spiral ridges, and ornamented with three rows of tubercles, one on the rounded shoulder of the whorl, the third at about half way to the front, the second about midway between. The tubercles on the posterior row are the largest, smaller in size on the medial row, and somewhat inconspicuous on the anterior row.

Aperture lunate; outer lip very much thickened and slightly reflexed, ascending to the middle of penultimate whorl; margin smooth, except a few obscure denticles at the front; columella somewhat patulous, smooth, dentately ridged on the margin.

*Dimensions*.—Length, 30; breadth, 21; length of aperture, 25.  
*Locality*.—Bairnsdale, Gippsland (*W. H. Gregson!*).

This fossil shell has the shape of *S. abbreviata*, Lamarck, recent on the west coast of Tropical America, from which it differs by the three subdistant rows of tubercles and its smooth inner lip.

5. *Semicassis radiata*, *spec nov.* Plate viii., fig. 3.

Shell globosely ovate, spire of moderate length, acuminate, ending in a small pullus of one and a half smooth convex whorls.

Whorls four, excluding pullus, convex, but interrupted by a broadish concave depression in front of the marginal rib at the anterior suture.

Posterior whorls ornamented by straight, rather crowded, slender costæ, which terminate behind at the ante-sutural depression.

Last whorl ventricose, contracted at the base, and concavely depressed in front of the suture, from which it is separated by a nodosely-crenulated band; ante-sutural zone with three or four spiral threads. Median portion ornamented with angular, slightly elevated, moderately curved costæ (about 24); at first slender and crowded, but become stronger and more widely separated with the revolution of the whorl, and are absent in the last-fourth. The costæ are interrupted on the shoulder by three inconspicuous angulations; otherwise the surface anterior to the sutural zone is without spiral ornament, except some obscure lines at the base.

Aperture ovate; outer lip thickened, margin plain, slightly ascending on the penultimate whorl. Columella convex, its surface without granulations, with fine slender revolving plaits; a small tubercle at the posterior angle of the aperture.

*Dimensions*.—Length, 23; breadth, 15; length of aperture, 18.

*Locality*.—In a well sinking, Murray Desert.

This species approaches the nodulate variety of *S. torquata*, Reeve, recent in temperate waters of Australia; but it differs by its finer ornamentation, more developed costæ, shorter spire, more tumid body whorl, by the presence of slender threads on the ante-sutural band, and by its smooth outer lip.

GENUS *CASSIDARIA*.

SYNOPSIS OF SPECIES.

Whorls sharply gradated, unequally and distantly lirate; keels on body whorl with crenate tubercles.	1. <i>C. gradata</i> .
Whorls angular, regularly lirate; keels on body whorl with transverse tubercles; less ventricose.	2. <i>C. Wilsoni</i> .

1. *Cassidaria gradata*, *spec. nov.* Plate viii., fig. 1.

Shell thin, shining, pyramidal ovate, with a moderately elongated scalar spire, ending in a small subacute pullus of one and a half turns. Ordinary whorls five; first whorl slightly convex, lirate; the succeeding whorls rapidly increasing to the sharply gradated outline of the penultimate whorl. The angulation is medial, and cut into sharp serratures, which terminate oblique obscure ridges proceeding from the suture; surface sculptured with raised truncate threads, inequidistant and unequal, separated by broad flat interspaces, from three to five above and below the serrated keel; the threads rendered obscurely granulose-crenate by transverse growth lines.

Some specimens show an angular spiral ridge at the anterior suture, but is variable in the degree of its development.

Last whorl with from four to five spiral keels on the median portion; the posterior one, at the angulation, with angular nodulations (about 20), the others are angular or somewhat truncated, and bear sharp tubercles, diminishing in size towards the front; interspaces concavely depressed with a few spiral threads and transverse distant striae.

Base of whorl with spiral ridges; canal long, nearly closed, abruptly bent and reverted.

Aperture oblong; outer lip thickened with two or three elongate denticles at the front; inner lip corrugated.

*Dimensions*.—Length, 40; breadth, 30; length of aperture to the canal, 25.

*Localities*.—Lower beds at Muddy Creek; calciferous-sandstones, River Murray Cliffs; blue clays at Schnapper Point.

2. *Cassidaria Wilsoni*, *spec. nov.* Plate vii., fig. 14.

Whorls sub-gradated, margined at the suture; medially angular, cancellated. Last whorl with four obtuse ridges, bearing small transversely elongated tubercles (about 30), becoming increasingly inconspicuous anteriorly; whole surface sculptured with fine equi-distant spiral threads and regular growth lines, the posterior slope being neatly and conspicuously fenestrated.

*Dimensions*.—Length, 27; breadth, 17; length of aperture to canal, 19.

*Locality*.—Spring Creek, near Geelong (*J. B. Wilson!*).

## FAMILY STROMBIDÆ.

## GENUS STRUTHIOLARIA.

1. *Struthiolaria lirata*, *spec. nov.* Plate x., fig. 11.

Shell turbinately oval, sub-globose; whorls four and a half, those of the spire moderately convex; ornamented by strong, equi-distant, depressed liræ, becoming more slender posteriorly;

a little narrower than the flat intervening sulci ; liræ about ten to twelve on the penultimate whorl.

Last whorl sub-quadrately rounded, shortly and broadly attenuated at the base ; equi-distantly lirate, with a thread and a few striæ in the interstitial spaces, obscurely marked with sigmoidal transverse striæ.

Aperture quadrately oval ; outer lip much thickened ; siphonal notch very short and narrow, not interrupting the outer rim of the lip.

*Dimensions*.—Length, 15.5; breadth, 12; length of aperture, 9.

*Locality*.—Jemmy's Point, Gippsland Lakes (*W. H. Gregson!*)

The well-rounded whorls, not sulcated at the suture, and the simple lirate sculpture distinguish this species from all known congeneric forms either recent or fossil ; this is the first record of the genus as a constituent of the Cainozoic fauna of Australia.

#### GENUS PELICARIA.

Of this genus, allied to *Struthiolaria*, having its head-quarters in the seas of New Zealand, only two species are known, namely, *P. scutulata* (Martyn), which inhabits the coast of New South Wales, and *S. mirabilis* (Smith), of the Kerguelen Islands. *Pelicaria* differs from *Struthiolaria*, chiefly in the enamel-covered spire of the adult shell, and the thin sinuous outer lip. The two fossil species, now to be described, do not differ in any striking manner from *P. scutulata*, but both are less turreted.

#### SYNOPSIS OF SPECIES.

Spire whorls roundly angled, with clathrate ornament.

1. *P. clathrata*.

Spire whorls angled and nodulose ; sulcate at suture.

2. *P. coronata*.

#### *Pelicaria clathrata*, Tate. Plate x., fig. 9.

*Reference*.—Southern Science Record, January, 1885, p. 2.

Shell ovate, spire acuminate, whorls six convex, suture linear or slightly impressed. Surface ornamented with numerous lamelliciform rugæ, becoming confluent by twos and threes or more at the anterior-third to form ridges, and by spiral threads about ten in number. Last whorl quadrata, depressed in the medial part, with a row of small acute nodulations at the shoulder, and a thickened ridge at the periphery ; ornamented with sigmoidal lamelliform rugæ and lines of growth which are cancellated by numerous longitudinal ridges. Callus-enamel spreading over the columella and body-whorl for two-thirds of its length and over-lapping on the penultimate whorl.

*Dimensions*.—Length and breadth of shell, 28 and 22, of aperture, 16 and 8.

*Locality*.—Bairnsdale, Gippsland (*W. H. Gregson!*).

**Pelicaria coronata, Tate.** Plate x., figs. 6 and 13.

*Reference*.—Southern Science Record, January, 1885, p. 2.

Shell ovate, spire acute, whorls eight, angled, suture channelled. Surface ornamented with transverse striae and spiral ridges, and a row of small nodulations on the angle of the whorl. Last whorl sub-quadrata, slightly depressed in the middle line; angle without nodulations and separated from the suture by a broad and deep groove. Callus-enamel spreading over the whole of the body-whorl and the anterior-half of the penultimate whorl.

*Dimensions*.—Length and breadth of shell, 45 and 32; of aperture 23 and 14.

*Localities*.—Upper beds at Muddy Creek (*J. Dennant*); Gippsland beds at Cunningham, Jemmy's Point, and Reeve's River (*W. H. Gregson!*); well-sinking, Murray Desert (*R. T.*).

Of the two fossil species, *P. coronata* makes the nearest approach to *P. scutulata*, but it has a shorter spire, nodulate rather than crenate on the keel, whilst the canaliculate suture of the body-whorl is very distinctive.

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### EXPLANATION OF PLATES II. TO X.

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

#### PLATE II.

1. *Voluta sarissa, Tate.* Muddy Creek. *a.* Perfect shell; *b*, apex enlarged.
2. *Voluta McCoyii, Woods.* Muddy Creek.
3. *Voluta capitata, Tate.* Murray Desert. *a*, Dorsal aspect of entire shell; *b*, apex enlarged.
4. *Voluta lirata, Johnston.* Muddy Creek.
5. *Voluta Tateana, Johnston.* Table Cape.
6. *Voluta protcrhysa, Tate.* Adelaide. *a*, Ventral aspect of mature shell; *b*, posterior portion of spire enlarged.
7. *Voluta polita, Tate.* Muddy Creek. Slightly enlarged.
8. *Voluta costellifera, Tate.* Muddy Creek.

#### PLATE III.

1. *Voluta lineata, Tate.* River Murray Cliffs. *a*, Slightly enlarged; *b*, magnified view of ornament.
2. *Voluta crassilabrum, Tate.* Muddy Creek. *a* and *b*, Dorsal and ventral aspects slightly enlarged; *c*, magnified view of ornament.
3. *Mitra Dennanti, Tate.* Muddy Creek.
4. *Lyria gemmata, Tate.* Muddy Creek. Very slightly enlarged.

5. *Voluta McDonaldi*, *Tate*. Muddy Creek. An adult shell slightly reduced.
6. *Fusus Gippslandicus*, *Tate*. Bairnsdale.
7. *Voluta ancilloides*, *Tate*. Schnapper Point.
8. *Voluta cribrosa*, *Tate*. Aldinga.
9. *Voluta Masoni*, *Tate*. Muddy Creek.

## PLATE IV.

1. *Voluta heptagonalis*, *Tate*. River Murray Cliffs. Apical portion of spire.
2. *Nassa sublirella*, *Tate*. Muddy Creek. Enlarged.
3. *Eburnopsis aulacocessa*, *Tate*. Muddy Creek. Enlarged.
4. *Peristernia Murrayana*, *Tate*. River Murray Cliffs. Very slightly enlarged.
5. *Phos Gregsoni*, *Tate*. Gippsland. Enlarged.
6. *Mitra atypa*, *Tate*. Muddy Creek. Enlarged.
7. *Voluta heptagonalis*, *Tate*. Reduced to two-thirds.
8. *Mitra alokiza*, *Woods*. Muddy Creek.
9. *Mitra dictua*, *Woods*. Murray Desert.
10. *Mitra othona*, *Woods*. Muddy Creek. Enlarged.
11. *Mitra atractoides*, *Tate*. Muddy Creek. Enlarged.
12. *Mitra uniplica*, *Tate*. Schnapper Point.

## PLATE V.

1. *Mitra varicosa*, *Tate*. Adelaide. Slightly enlarged.
2. *Mitra paucicostata*, *Tate*. Muddy Creek. Enlarged.
3. *Mitra leptalea*, *Tate*. Muddy Creek. Enlarged.
4. *Mitra ligata*, *Tate*. Schnapper Point. Much enlarged.
5. *Mitra terebriformis*, *Tate*. Muddy Creek. Enlarged.
6. *Mitra subcrenularis*, *Tate*. Adelaide. Enlarged.
7. *Voluta alticostata*, *Tate*. Muddy Creek.
8. *Mitra escharoides*, *Tate*. Muddy Creek. *a*, Enlarged; *b*, sculpture much enlarged.
9. *Mitra semilævis*, *Tate*. Muddy Creek. Much enlarged.
10. *Mitra biornata*, *Tate*. Muddy Creek. Enlarged.
11. *Mitra citharelloides*, *Tate*. Aldinga. Enlarged.
12. *Mitra complanata*, *Tate*. Adelaide. Enlarged.
13. *Mitra euglypha*, *Tate*. Gippsland. Enlarged.

## PLATE VI.

1. *Harpa tenuis*, *Tate*. Muddy Creek.
2. *Harpa lamellifera*, *Tate*. Muddy Creek.
3. *Harpa spirata*, *Tate*. Schnapper Point.
4. *Harpa cassinoides*, *Tate*. Murray Desert.
5. *Mitra cassida*, *Tate*. Muddy Creek. Enlarged.
6. *Mitra sordida*, *Tate*. Muddy Creek. Enlarged.
7. *Harpa abbreviata*, *Tate*. Muddy Creek.
8. *Harpa clathrata*, *Tate*. River Murray Cliffs.
9. *Harpa pulligera*, *Tate*. Schnapper Point.
10. *Harpa sulcosa*, *Tate*. Muddy Creek. Slightly enlarged.
11. *Fusus henicus*, *Tate*. Muddy Creek. Slightly enlarged.
12. *Fasciolaria fusilla*, *Tate*. Muddy Creek.
13. *Ancillaria pseud-australis*, *Tate*. Senile example. Murray Desert.

## PLATE VII.

1. *Ancillaria pseud-australis*, *Tate*. Muddy Creek.
2. *Ancillaria lanceolata*, *Tate*. Muddy Creek.
3. *Ancillaria subampliata*, *Tate*. Muddy Creek.

4. *Ancillaria papillata*, *Tate*. Muddy Creek.
5. *Ancillaria hebera*, *Hutton*. River Murray Cliffs.
6. *Ancillaria ligata*, *Tate*. Adelaide.
7. *Oliva nymphalis*, *Tate*. Gippsland.
8. *Ancillaria subgradata*, *Tate*. Adelaide.
9. *Semicassis Muelleri*, *Tate*. Muddy Creek.
10. *Semicassis subgranosa*, *Tate*. Edithburg.
11. *Cassis textilis*, *Tate*. River Murray Cliffs.
12. *Semicassis trinodosa*, *Tate*. Gippsland.
13. *Cassis exigua*, *Woods*. Muddy Creek.
14. *Cassidaria Wilsoni*, *Tate*. Spring Creek.

## PLATE VIII.

1. *Cassidaria gradata*, *Tate*. Schnapper Point.
2. *Semicassis transenna*, *Tate*. Muddy Creek.
3. *Semicassis radiata*, *Tate*. Murray Desert.
4. *Peristernia pumila*, *Tate*. Adelaide. Much enlarged.
5. *Mitra exilis*, *Tate*. Muddy Creek. Much enlarged.
6. *Oliva Adelaidensis*, *Tate*. Adelaide. Enlarged.
7. *Oliva angustata*, *Tate*. Muddy Creek. *a*, Natural size; *b*, apex much enlarged.
8. *Mitra clathurella*, *Tate*. Muddy Creek. Much enlarged.
9. *Cancellaria epidromiformis*, *Tate*. Muddy Creek. Enlarged.
10. *Cancellaria exaltata*, *Tate*. Schnapper Point. Enlarged.
11. *Cancellaria Wannonensis*, *Tate*. Muddy Creek.
12. *Terebra platyspira*, *Tate*. Muddy Creek.
13. *Terebra angulosa*, *Tate*. Murray Desert.
14. *Terebra catenifera*, *Tate*. Muddy Creek. Enlarged about one and a half diameters.
15. *Terebra leptospira*, *Tate*. Muddy Creek. *a*, Enlarged about two diameters; *b*, apex very much enlarged.

## PLATE IX.

1. *Voluta Mortoni*, *Tate*. Young shell. Table Cape.
2. *Voluta Mortoni*, *Tate*. Fragment of adult; half natural size. Muddy Creek.
3. *Cancellaria calvulata*, *Tate*. Schnapper Point. Enlarged about two diameters.
4. *Cancellaria modestina*, *Tate*. Muddy Creek. Enlarged nearly three diameters.
5. *Cancellaria ptychotropis*, *Tate*. Aldinga. Enlarged about four diameters.
6. *Cancellaria Etheridgei*, *Johnston*. Table Cape. Enlarged about five diameters.
7. *Cancellaria caperata*, *Tate*. Schnapper Point. Enlarged about six diameters.
8. *Terebra geniculata*, *Tate*. Muddy Creek. Enlarged about four diameters.
9. *Terebra crassa*, *Tate*. Aldinga. Enlarged about two diameters.
10. *Terebra mitrellæformis*, *Tate*. Aldinga. Enlarged about three diameters.
11. *Terebra subspectabilis*, *Tate*. Muddy Creek. Enlarged about two diameters.

## PLATE X.

1. *Terebra mutica*, *Tate*. Muddy Creek. Enlarged about four diameters.
2. *Mitra conoidalis*, *Tate*. Muddy Creek. *a* and *b*, Dorsal and ventral aspects. Enlarged about three diameters.
3. *Cancellaria semicostata*, *Tate*. Muddy Creek. Enlarged about six diameters.

4. *Terebra convexiuscula*, *Tate*. Muddy Creek. Enlarged four diameters.
5. *Ancillaria orycta*, *Tate*. Gippsland. Slightly enlarged.
6. *Pelicaria coronata*, *Tate*. Muddy Creek. Ventral aspect.
7. *Cancellaria?* *alveolata*, *Tate*. Muddy Creek. Enlarged about four diameters.
8. *Cancellaria micra*, *Tate*. Adelaide-bore. Enlarged about five diameters.
9. *Pelicaria clathrata*, *Tate*. Gippsland.
10. *Cancellaria capillata*, *Tate*. Muddy Creek. Enlarged about three diameters.
11. *Struthiolaria lirata*, *Tate*. Gippsland. Enlarged about two diameters.
12. *Cancellaria gradata*, *Tate*. Muddy Creek. Enlarged two diameters.
13. *Pelicaria coronata*, *Tate*. Dorsal aspect. Muddy Creek.
14. *Cancellaria turriculata*, *Tate*. Aldinga. Enlarged about five diameters.



















