# New Species of New Zealand Mollusca from Shallow-water Dredgings.

## PART 2.

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PLATES 87–88.

### CONDYLOCARDIIDAE.

### Genus **Condylocardia** Bernard, 1897.

Type: *C. pauliana* Bernard.

IN reviewing the above genus Dall (1903, p. 1437) wrote—"the hinge-teeth only partially emerging from the nepionic state, so that it is difficult to decide what portion of a continuous lamina shall be called cardinal and what part lateral" and "so that when we consider the very amorphous and undeveloped condition of the laminae in *Condylocardia* the relationship and essential similarity of the apparently diverse hinges is tolerably plain."

In the writer's (1930, p. 533) comparison between *Condylocardia* and his new genus *Benthocardiella* the description of the hinge characters of the former were derived from Suter's (1913, p. 910) account of that genus.

The examination of material suggests that Suter's generic description was based on the New Zealand *crassicosta,* for the hinge characters given do not entirely coincide with those of *pauliana* the genotype or *concentrica* the second New Zealand species.

Suter (*l.c.,*) stated that there were four cardinals in the right valve and two in the left, which certainly is the case in *crassicosta* but not in the genotype, as evidenced by Dall's (1903, p. 1437) description in which the right valve is stated to have two and the left valve three cardinals. In *concentrica* the total of six cardinals for the two valves coincides with the number in *crassicosta* but they are differently arranged, there being three in each valve.

However, this apparent diversity is merely the result of more or less rudimentary additions to an original arrangement of two strong cardinals in each valve, caused by the proximal ends of some of the cardinals becoming reflexed forming short hooked accessory cardinals.

In *crassicosta* the two original cardinals in the right valve are thus duplicated to four but the original two remain unchanged in the left valve, giving the formula.*

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*The formula used in Dall's adaptation of the Steinmann System. L = left valve, R = right valve, r = resilium, the teeth are represented by units and the corresponding sockets by zeros. For any interlocking masses which cannot be classified as teeth the symbol x is employed.

L. 0.010r010.1 = 2 cardinals + 1 lateral.
R. 1.101r101.0 = 1 lateral + 4 cardinals.

In *concentrica* there is the same total of cardinals but their arrangement differs slightly. In the right valve the posterior cardinal only is duplicated while in the left valve the anterior cardinal is duplicated giving the formula.

L. 0.010r101.1 = 3 cardinals + 1 lateral.
R. 1.101r010.0 = 1 lateral + 3 cardinals.

Unfortunately the writer has not seen specimens or figures of *C. pauliana* the genotype but Dall (1903, p. 1437) gave the formula as—

L. 1.10r101.0 = 1 lateral + 3 cardinals.
R. 0.01r010.1 = 2 cardinals + 1 lateral.

The essential features of the *Condylocardia* hinge are the reflexing of the original cardinals into accessory hooked cardinals thereby increasing the number to five or six for the two valves and also the presence of a well developed lateral in each valve.

## Genus **Benthocardiella** Powell, 1930.

Type: *B. pusilla* Powell.

In the writer's description of the type species the anterior marginal tooth of the left valve was referred to as a lateral. Three additional new species have since been found and study of the hinge characters of these in conjunction with those of the genotype shows that all the teeth are better classed as cardinals and that true laterals or even alternate interlocking margins are foreign to the genus.

The only semblance of marginal interlocking is in the feeble thickening of the valve edges towards the apex of the hinge-line in the left valve. The lack of alternation in these margins, the thickened edges both being in the same valve is possibly an endeavour to preserve balance rather than a tendency towards asymmetry, for the cardinals of the left valve are more massive and weightier than those in the right valve where the thickened margins occur. Apart from this the true hinge-teeth exhibit the usual heterodont alternation.

The essential features of the *Benthocardiella* hinge are the presence of three or four cardinals in the left valve and two in the right and also the absence of laterals or even true alternate interlocking margins.

The typical formula can be expressed as—

L. 010r1010 = 3 cardinals.
R. x01r010x = 2 cardinals.

A fourth shell of the *Benthocardiella* series affords an interesting example of evolution in hinge characters resulting in the formation of an additional cardinal in the left valve. This is brought about by the reflexing of the proximal end of the posterior cardinal in the left valve. This condition is seen developing as a thickened pad in *orbi-*

*cula* and as a distinct hook in *pusilla*. The formula for this species becomes—

L. 0101r01010 = 4 cardinals.
R. x010rx010x = 2 cardinals.

**Benthocardiella obliquata** n. sp. (Figs. 4, 5 and 6).

Shell minute, thin, semitransparent, dull-white, moderately convex, equivalve; obliquely elongate-oval, anterior end greatly produced. Surface smooth. Valve margins smooth. Prodissoconch large, bounded by a raised rim and produced anteriorly and posteriorly as projecting rounded knobs. The anterior knob is not so conspicuous as the posterior, being partly immersed in the anterior dorsal margin, which latter is broadly arcuate and very slowly descending. Posterior slope steep, sinuous, truncated, falling away suddenly a short distance behind prodissoconch. Truncated portion slightly concave, subangled on joining the broadly arcuate ventral margin. Hinge typical three cardinals in the left valve and two in the right. The posterior cardinal in the left valve however lacks the hooked proximal end which feature is well developed in *pusilla* and *hamatadens* and is present as a slight thickening in *orbicula*. In the left valve there is first a narrow marginal space for the reception of the posterior thickened margin of the right valve, then a moderately long and narrow simple cardinal, followed by a groove which is obscured by the overhanging nature of the cardinal. This groove is for the reception of a short clasping cardinal in the right valve. After the resilium there is a short clasping cardinal, a socket, another cardinal and finally a narrow marginal space for the reception of the anterior thickened margin of the right valve. In the right valve there is first the thickened margin followed by a socket and a clasping cardinal. After the resilium there is another obscured groove for the reception of the anterior clasping cardinal of the left valve, followed by a long cardinal, then a socket and finally the anterior thickened margin.

Length, 1.06 mm.; height, 0.80 mm. (Holotype).

Length, 0.98 mm.; height, 0.74 mm.; thickness (two valves) 0.45 mm. (Paratype).

*Holotype* and paratype presented to Auckland Museum.

*Habitat*, Mangonui Heads in 6-10 fathoms (type). (Mr. W. La Roche, 1922); Tryphena Bay in 6 fathoms, Great Barrier Island (Mr. W. La Roche, 1924).

**Benthocardiella orbicula** n. sp. (Figs. 1, 2 and 3).

Shell minute, thin, semitransparent, dull-white, inflated, globular. Prodissoconch large, central, projecting, marked off by a rim; anterior and posterior knobs present but not prominent. Surface smooth. Valve margins smooth above but weakly crenulated ventrally by a few very feeble radial folds which are confined to the lower third of the shell. Hinge typical, three cardinals in the left valve and two in the right. In the left valve there is first a narrow marginal space for the reception of the posterior thickened margin of the right valve, then a slender cardinal thickened at the

proximal end, followed by a slight groove for the reception of the posterior cardinal in the right valve. After the resilium there is a short thickened clasping cardinal, followed by a socket, a long cardinal and finally the marginal space for the anterior thickened margin of the right valve. In the right valve there is first the slight thickening of the margin above, followed by a long socket and an equally long cardinal, then resilium, followed by an obscured groove occupied by the short clasping cardinal of the left valve; this is followed by a moderately long flexuous lamellate cardinal, then a socket and finally the slight anterior thickening of the valve edge.

Length, 0.98 mm.; height, 0.98 mm. (Holotype).

Length, 1.06 mm.; height, 1.04 mm.; thickness (two valves) 0.67 mm. (Paratype).

*Holotype* presented to Auckland Museum.

*Habitat,* Mangonui Heads in 6-10 fathoms (type). (Mr. W. La Roche, 1922); Awanui or Rangaunu Bay in 12 fathoms. (Mr. W. La Roche, 1922); 38 fathoms off Cuvier Island (Dr. H. J. Finlay); Castlecliff, Upper Pliocene (Dr. H. J. Finlay). The writer is indebted to Dr. H. J. Finlay for the opportunity for examining the Cuvier Island and Castlecliff specimens.

**Benthocardiella hamatadens** n. sp. (Figs. 7, 8 and 9).

Shell minute, solid, dull-white, semitransparent; moderately convex, equivalve, obliquely-ovate, anterior end produced. Surface smooth, showing faint concentric growth-lines only. Valve margins smooth. Prodissoconch large, erect, bounded by a rim and produced anteriorly and posteriorly into swollen upturned knobs. Anterior and posterior dorsal slopes steep, narrowly rounded anteriorly and broadly rounded posteriorly on reaching the convex ventral margin. Hinge-plate massive, with four cardinals in the left valve and two in the right. In the left valve there is first a narrow marginal space for the accommodation of the posterior thickened margin of the right valve, then a short strong oblique cardinal separated by an almost vertical socket from another short stout cardinal. Both cardinals are more or less connected by being fused above near the margin of the valve, the second one being a duplication caused by the reflexing of the original cardinal as explained in another part of this paper. After the resilium there is space for the reception of an obscure interlocking plate in the right valve, then a long stout cardinal bordering lower edge of hinge-plate, followed by an equally long socket, another long thin lamellate cardinal parallel to the anterior margin and finally the narrow marginal space for the accommodation of the anterior thickened margin of the right valve. In the right valve there is first a thickening of the valve edge towards the apex followed by a short oblique socket, then a large stumpy almost vertical cardinal, followed by a small almost vertical socket. After the resilium there is first an inconspicuous interlocking plate followed by a long narrow socket at lower edge of hinge-plate, followed by an equally long lamellate cardinal, then another long narrow socket and finally a slight thicken-

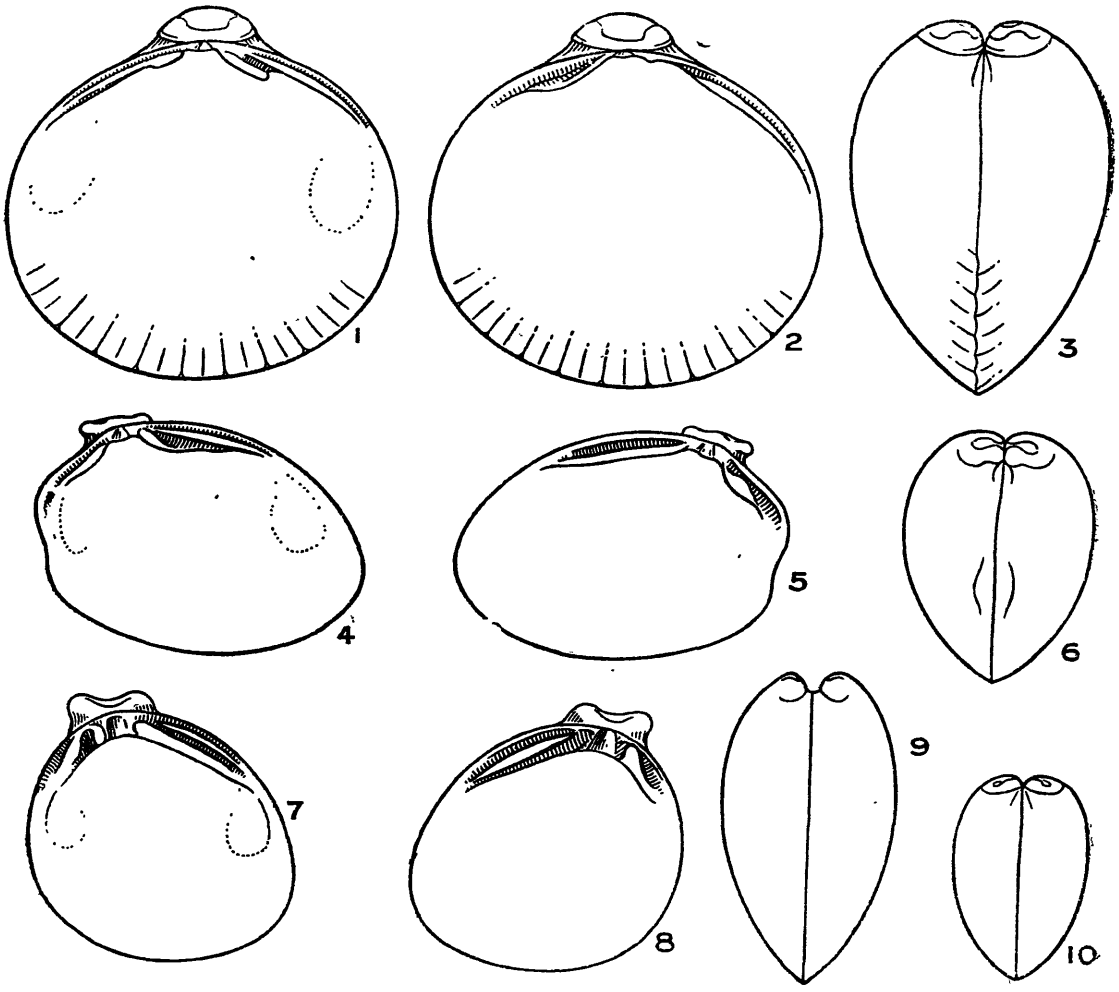
ing of the anterior margin. There are two subequal adductor-scars situated as in the typical species.

Length, 0.87 mm.; height, 0.91 mm. (Holotype).

Length, 0.89 mm.; height, 0.91 mm.; thickness (two valves) 0.56 mm. (Paratype).

*Holotype* presented to Auckland Museum.

*Habitat,* Mangonui Heads in 6-10 fathoms. (Mr. W. La Roche, 1922).




FIGS. 1, 2 & 3.—*Benthocardiella orbicula* n. sp. (holotype).
FIGS. 4, 5 & 6.—*Benthocardiella obliquata* n. sp. (holotype).
FIGS. 7, 8 & 9.—*Benthocardiella hamatadens* n. sp. (holotype).
FIG. 10.—*Benthocardiella pusilla* Powell, 1930 (paratype).

LIOTIIDAE.

Genus **Lodderena** Iredale, 1924.

Type: *Liotia minima* Ten.-Woods.

**Lodderena formosa** n. sp. (Figs. 11 and 12).

Shell very small, almost flat above, tricarinate, widely umbilicated. Whorls 2¾, very rapidly increasing, including protoconch of 1½ smooth, almost flat whorls. Post-nuclear whorls sculptured with fine, close, spiral lirae, about twenty on the upper surface. There are three prominent spiral keels visible from the front, the uppermost bounding the almost flat upper surface, the lowest marking off the base, and the third situated at the periphery midway between the other two. On the upper surface there are two additional spiral ribs intermediate in strength, between the lirae and the keels. On the base, also, there are two of these intermediate spiral ribs, one bordering the umbilicus and the other nearer to the lowest keel. The whole shell is crossed by inconspicuous transverse sculpture which is suppressed for most of its course, being confined to strong crenulations at the sutures and edge of umbilicus and to beading on the keels and spiral ribs. Suture deeply channelled, partly bridged by the crenulations caused by the transverse sculpture. Umbilicus with a crenulated border, deep, vertical-sided, about one-quarter major diameter of base. Aperture heavily varied. Peristome as a smooth continuous inner ring. Colour dull-white (all dead shells).

Major diameter 1.4 mm.; minimum diameter 1 mm.; height 0.75 mm. (holotype).

*Holotype* presented to Auckland Museum, paratypes in author's collection and collection of Mr. W. La Roche.

*Habitat,* Mangonui Heads in 6-10 fathoms (type). (Mr. W. La Roche, 1922); 6-10 fathoms, western coast, Great Barrier Island. (Mr. W. La Roche, 1924); Maro Tiri (Chicken Island), in shell-sand at low tide. (Mr. R. A. Falla, December 1923).

This species is closely allied to the genotype which differs mainly in the absence of the three strong keels.

**Lodderena nana** n. sp. (Figs. 13 and 14).

Shell minute, spire very little raised, tricarinate and widely umbilicated. Whorls 2¾ rapidly increasing, including protoconch of 1½ smooth slightly convex whorls. Post-nuclear whorls with three prominent spiral keels visible from the front and situated as in the preceding species. These keels are very prominent over most of the body-whorl but gradually become obsolete towards the outer lip. The whole shell is crossed by transverse sculpture which, as in the preceding species, is mostly suppressed, being confined to strong crenulations at suture and margin of umbilicus and to beading on the keels, with the exception of the latter part of the body-whorls where axial riblets continue uninterrupted right across the whorl from upper suture to umbilicus. These axials have a tendency to merge, causing fewer and stronger crenulations at the suture, which is deeply channelled as in *formosa.* Umbilicus with a strongly crenulated border, deep, about one-fifth

major diameter of base. Aperture circular, strengthened by a wide lamellate-varix, conspicuous from the front and below but not from above. Peristome continuous with a smooth inner rim. Colour dull-white (all dead shells).

Major diameter 0.72 mm.; minimum diameter 0.58 mm.; height 0.46 mm. (holotype).

*Holotype* presented to Auckland Museum, paratypes in author's collection and collection of Mr. W. La Roche.

*Habitat,* Mangonui Heads in 6-10 fathoms. (Dredged by Mr. W. La Roche, 1922).

This species differs from *formosa* in its smaller adult size, absence of the fine spiral lirae and in the presence of stronger radials, not suppressed over the latter part of body-whorl.

ORBITESTELLIDAE.

Genus **Orbitestella** Iredale, 1917.

Type: *Cyclostrema bastowi* Gatliff.

**Orbitestella toreuma** n. sp. (Figs. 16 and 17).

Shell minute, opaque, solid, discoidal, widely umbilicate. Whorls 3 biangled by two prominent spiral keels. Protoconch exceedingly small, of one smooth slightly keeled whorl. Periphery high, formed by upper keel. Lower keel of lesser diameter giving roughly, a flattened pentagonal outline to the shell, in vertical cross section. Umbilicus wide, perspective, about one-third major diameter. Spire slightly sunken. The whole shell crossed by numerous strong rounded axial costae, nodulous where they cross the spiral keels, and anastomosing towards the sutures, forming swollen nodulous sutural bands above and below. Axial costae obliquely retractive between the two keels and convexly arcuate on base. Interstices of ribs crowded with inconspicuous exceedingly fine spiral striae. Aperture subquadrate. Peristome discontinuous thin, overhanging above.. Colour pale-buff.

Major diameter 0.74 mm.; minimum diameter 0.64 mm.; height 0.27 mm. (holotype).

*Habitat,* Awanui or Rangaunu Bay, in 12 fathoms (Mr. W. La Roche, 1922); Mangonui in 6-10 fathoms (type) (Mr. W. La Roche, 1922).

This makes the second species of the genus to be described from New Zealand seas.

RISSOIDAE.

Genus **Scrobs** Watson, 1886.

Type. *Scrobs jacksoni* (Brazier) (=*badia* Watson).

Subgenus **Nannoscrobs** Finlay (1926). 1927.

Type. *Amphithalamus hedleyi* Suter.

**Scrobs (Nannoscrobs) rugulosa** n. sp. (Fig. 19).

Shell minute, solid, broadly-ovate. Whorls 3½ including low dome-shaped protoconch of 1½ convex whorls, minutely stippled

with very numerous exceedingly fine granules arranged in closely spaced linear series. Post-nuclear whorls sculptured with fine inconspicuous anastomosing spiral wrinkle-striae, slightly more prominent over base. Suture impressed, submargined by a moderately wide flat band bordered below by a faint ridge. Spire less than height of aperture. Aperture oblique-oval, much thickened and separated from the body-whorl by a broad elongated crescentic depression. Peristome continuous within. Outer lip continuing over depression and joining up body-whorl with a thickened laminated callosity. Colour dull-pink paler towards suture, base and aperture dull-white.

Height 0.98 mm.; diameter 0.69 mm. (holotype).

*Holotype* presented to Auckland Museum, paratypes in author's collection.

*Habitat*, Tryphena Bay in 5-6 fathoms, Great Barrier Island. (Dredged A. W. B. P., 1924).

This species is nearest related to *S. ovata* (Powell, 1927), from which it differs by being more broadly ovate with a shorter spire, more broadly submargined at suture and by the absence of basal spiral grooves and the presence of distinct but faint general post-nuclear sculpture of faint anastomosing spiral wrinkles.

Finlay's genus *Nannoscrobs* is here used subgenerically, as the species described above together with *ovata* are certainly related to *hedleyi* the type of the group, as shown by the style of aperture. However, another small New Zealand species, *elongata* Powell (1927) has an aperture more like that of *Scrobs scrobiculata* (Watson, 1886), while *semen* (Odhner, 1924) presents still another type of aperture. None of these groups are very divergent from typical *Scrobs* so far as shell features go, so it would seem necessary to resort to radula characters before discussing generic values.

Genus **Notosetia** Iredale, 1915.

Type: *Barleeia neozelanica* Suter.

**Notosetia unicarinata** n. sp. (Fig. 18).

Shell minute, solid, roughly ovate, perforate, carinated by a single strong spiral ridge. Spire a little taller than height of aperture. Whorls 4 including a large smooth protoconch of 1½ whorls, flattened on the top and somewhat oblique. Post-nuclear whorls smooth, traversed by a single strong rounded spiral ridge carinating the periphery. This is situated at about the middle on the spire-whorls. Suture impressed. Body-whorl below peripheral keel and base, evenly convex. Aperture subcircular. Peristome discontinuous but connected across parietal wall by a slight callosity. Outer lip simple, slightly thickened but not varied or internally duplicated, slightly angled above by the termination of the peripheral carina. Lower part of inner lip and basal lip evenly rounded, the former separated from the base by a small crescentic cavity. Colour dull-white.

Height 1.19 mm.; diameter 0.59 mm.( holotype).

*Holotype* presented to Auckland Museum, paratype in author's collection.

*Habitat,* Tryphena Bay in 5-6 fathoms, Great Barrier Island. (Dredged A. W. B. P., 1924).

This shell is related to *simplex* (Powell, 1927), which was erroneously ascribed to *Lironoba* by prejudice of the spiral keel. Both these shells are better placed in *Notosetia* on account of the simple apertures, not variced or internally duplicated. The species *simplex* differs from *unicarinata* in being more elongated and in the absence of an umbilical cavity.

Genus **Rissopsis** Garrett, 1873.

Type: **R. typica** Garrett.

**Rissopsis expansa** n. sp. (Figs. 20 and 21).

Shell minute, thin, semitransparent. Spire tall, almost twice height of aperture. Apex bluntly rounded. Whorls five, including visible portion of heterostrophe protoconch which is not marked off from post-nuclear whorls. The initial whorl of the protoconch is immersed by the volution of the succeeding whorl. Outlines of spire-whorls slightly convex. Body-whorl and base evenly rounded. Surface smooth and glossy. Aperture expanded, oblique, rhomboidal, protractive below. Peristome discontinuous, slightly thickened but not variced. Outer lip convexly arcuate, protractive and projecting at a broad angle from the body-whorl, sub-angled above and broadly rounded below. Inner lip as a connecting callus across parietal whorl, resolving below into a slightly sinuous, rounded and thickened columella, free from the base and merged into the rounded basal lip. Suture impressed, strongly false-margined below by the effect of the coiling and semitransparency of the shell. Colour pale-buff.

Height 1.45 mm.; diameter 0.7 mm. (holotype).

*Holotype* in author's collection, paratypes in collection of Mr. W. La Roche.

*Habitat,* Mangonui Heads in 6-10 fathoms. (Dredged by Mr. W. La Roche, 1922).

The genotype of *Rissopsis* is from "Viti and Samoa Isles" and is described as being a delicately transparent shell of 10 mm. in length, having a thin sinuous and expanded peristome.

*Expansa* is provisionally located in *Rissopsis* for want of a better location.

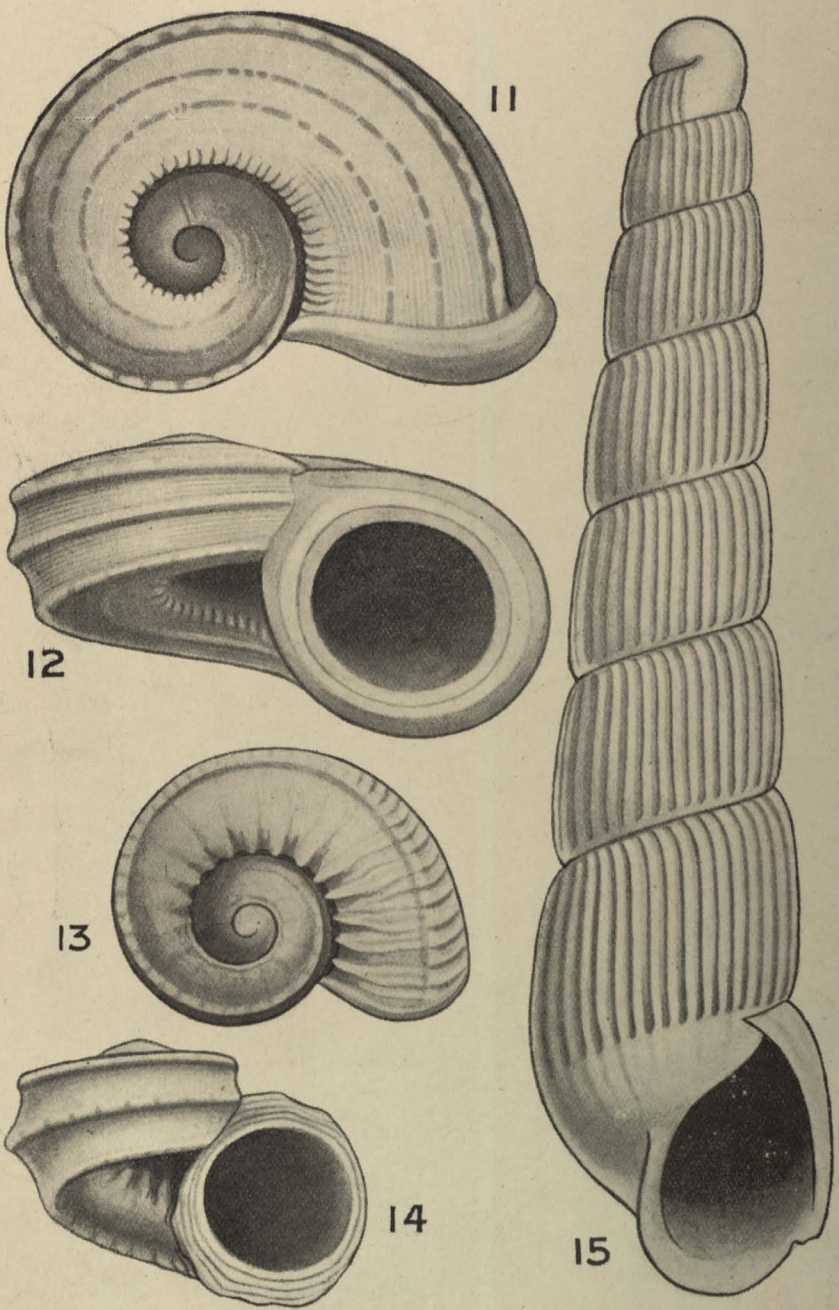
Finlay (this volume, p. 58) has already introduced *Rissopsis* into the New Zealand fauna for the reception of two Tertiary species.

PYRAMIDELLIDAE.

Genus **Eulimella** Jeffreys, 1847.

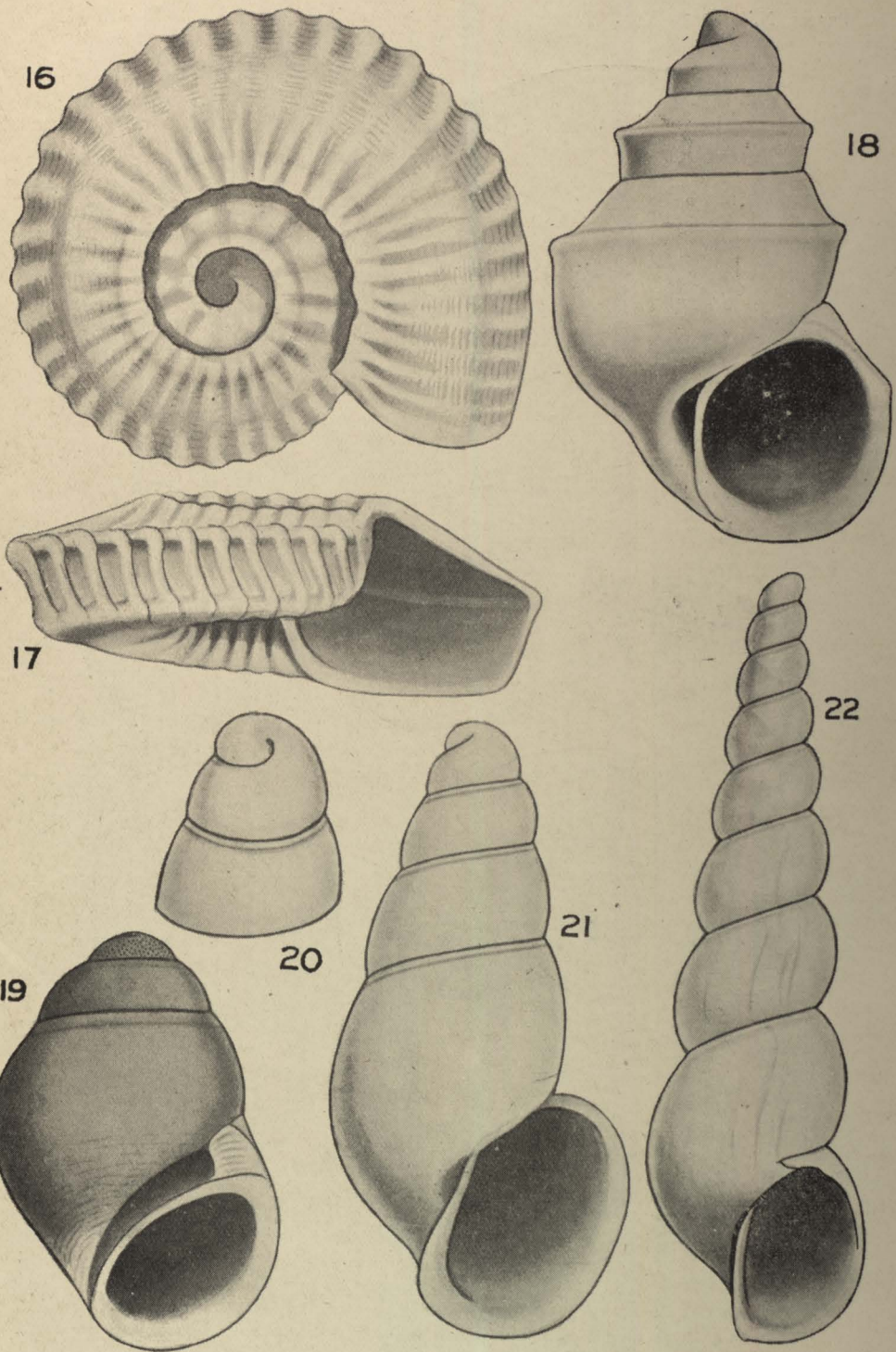
**Eulimella larochei** n. sp. (Fig. 22).

Shell small, tapering, many-whorled, thin and semitransparent. Whorls 9 including small smooth globose heterostrophe protoconch, with the initial whorl partly immersed by the next volution. The protoconch is not clearly marked off from the post-nuclear whorls.




FIGS. 11 & 12.—*Lodderena formosa* n. sp. (holotype).
FIGS. 13 & 14.—*Lodderena nana* n. sp. (holotype).
FIG. 15.—*Turbonilla* (*Chemnitzia*) *aotcana* n. sp. (holotype).

*Face p. 544.*




FIGS. 16 & 17.—*Orbitestella toreuma* n. sp. (holotype).
FIG. 18.—*Notosetia unicarinata* n. sp. (holotype).
FIG. 19.—*Scrobs* (*Nannoscrobs*) *rugulosa* n. sp. (holotype).
FIGS. 20 & 21.—*Rissopsis expansa* n. sp. (holotype).
FIG. 22.—*Eulimella larochei* n. sp. (holotype).

Spire tall, over three times height of aperture. Outline of spire-whorls, body-whorl and base strongly and evenly convex. Suture impressed, distinct, very narrowly submargined. Colour transparent-whitish. Surface smooth and glossy, showing faint protractively-arcuate growth lines. Aperture vertical, subovate, sides almost parallel. Outer and basal lips simple, sharp, protractive. Columella slightly thickened, straight and vertical, merged above into a thin parietal callus.

Height 2.17 mm.; diameter 0.54 mm. (holotype).

*Holotype* presented to Auckland Museum, paratypes in author's collection.

*Habitat,* Mangonui Heads in 6-10 fathoms (type) (Mr. W. La Roche, 1922); Tryphena Bay in 5-6 fathoms, Great Barrier Island (A. W. B. P., 1924).; Awanui or Rangaunu Bay in 12 fathoms (Mr. W. La Roche, 1922).

This shell differs from the other New Zealand species in its strongly convex whorls. Judging from figures *Eulimella micra* Petterd and *E. coacta* of May not Watson, both Tasmanian species, have similar strongly convex whorls and are probably related. Also the South African *E. fulgens* Thiele (1925) from off Agulhas Bank in 126 metres is a similarly shaped shell.

Genus **Turbonilla** Risso, 1826.

Type: *Turbonilla typica* Dall and Bartsch (=*T. plicata* Risso, 1826).

Subgenus **Chemnitzia** D'Orbigny, 1839.

Type: *Melania campanellae* Philippi.

**Turbonilla (Chemnitzia) acteana** n. sp. (Fig. 15).

Shell small, subulate, opaque, white and shining. Whorls 8½, regularly increasing, including heterostrophe protoconch of 1½ globose whorls with a lateral nucleus. Outline of spire almost flat, whorls only slightly convex. Suture impressed. Post-nuclear sculpture consisting of numerous closely spaced rounded flexuous axial riblets with subequal interspaces. These are lightly chanelled, finishing abruptly just above lower suture on spire and body-whorls, and not extending over the base. The axial ribs are slightly concavely arcuate above but almost straight below, and number about 40 on the body-whorl. Suture impressed. Base rounded, smooth with the exception of a few subobsolete corrugations proceeding from the axial ribs. Aperture subvertical, elongately oval, angled above and narrowly rounded below. Peristome discontinuous, thin and sharp. Columella obliquely-arcuate, merged above into a thin parietal callosity. Colour dull-white.

Height 2.8 mm.; diameter 0.7 mm. (holotype).

*Holotype* presented to Auckland Museum, by Mr. W. La Roche.

*Habitat,* western coast, Great Barrier Island in 6-10 fathoms. (Mr. W. La Roche, 1924).

The almost flat outline of the whorls and closely spaced axials make this species quite distinctive.

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