

## New Tertiary Mollusca from North Taranaki.

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Plates 73-75.

THE shells described below were collected in north Taranaki by Mr. L. I. Grange during the course of his geological survey of that district. The sediments examined probably belong to the Upper Miocene, and are intermediate between the Awamoan and the Waitotaran, though they no means bridge the gap. The present paper is purely systematic; the stratigraphical and palaeontological results will be discussed later by Mr. Grange. The type specimens are in the collection of the New Zealand Geological Survey.

*Melanopsis waitaraensis* n. sp. (Plate 73, figs. 1, 2.)

Shell large, narrowly fusiform. Spire acute, higher than aperture. Spire-whorls lightly convex, body-whorl not greatly expanded, sub-cylindrical, with rounded sloping shoulder. Suture strongly impressed, bordered below. Sculpture: spire-whorls with about 30, body-whorl with 40 strong rounded ribs with narrower interstices, ribs persist from suture to suture but not across base of body, they curve strongly forward below so that a wide sinus is formed; waved spiral incised lines are seen on lower parts of some whorls and on body-whorl stronger on base, spiral depression on ribs forms border just below suture. Aperture imperfect but like *Melanopsis*. Columella bent forward and inwards, bearing two extremely weak, oblique folds, not always seen.

Height, 75 mm.; diameter, 25 mm. (both estimated).

*Localities*.—1141, coast south side Wai-iti Stream (type); 1133, coast north of Mimi Stream.

This shell is congeneric with *Coptochetus zelandicus* Marshall from Pakaurangi, but has many more ribs. The aperture, so far as seen, is exactly the same as that of *Melanopsis pomahaka* Hutton; therefore the generic position is far removed from *Coptochetus*, which has a smooth convex twisted columella.

*Cerithidea tirangiensis* n. sp. (Plate 73, fig. 3.)

Shell small, with acute spire four times height of aperture. Whorls flattened, body with almost flat base and short neck. Suture deep, bordered above. Sculpture: early whorls with 10, later with 11 strong rather narrowly rounded axial ribs with much wider interstices, reaching to periphery of body-whorl, crossed on spire-whorls by four strong well-spaced spiral threads forming slightly nodulous intersections, basal periphery strongly bicarinate, upper spiral issuing from suture having formed border, axials reach it but do not pass or render nodulous, lower spiral separated by more than its own width, rest of base smooth. Columella slightly arcuate, smooth.

Height, 12.5 mm.; diameter, 4.8 mm.

*Locality*.—1135, Tirangi Stream.

Easily distinguished from *C. bicarinata* (Gray) by small size, straighter ribs, and 4 spirals on spire-whorls; also from *C. subcarinata* Sowerby by the 4 spirals and absence of additional spiral on base.

**Struthiolaria praenuntia** n. sp. (Plate 73, fig. 7.)

Shell large. Spire high, turreted. Whorls bicarinate, with broad sloping shoulder. Body-whorl concave between shoulder and keel, base quickly contracted. Sculpture: spire-whorls with 2 broad cingula, upper at shoulder, lower midway to anterior suture; body-whorl strongly keeled, middle cingulum becoming weaker and finally disappearing; whole surface with sharp, spaced spiral threads. Suture bordered by narrow *rampe* or flattening of whorl. Aperture round. Outer lip thickened and reflexed, bisinuate. Columella concave. Inner lip thin.

Height, 52 mm.; diameter, 32 mm.

*Locality*.—1135, Tirangi Stream.

The persistence of the second cingulum on spire-whorls and even on to body-whorl is a distinctive feature for a shell of the *papulosa* group. In a previous paper the writer (*Trans. N.Z. Inst.*, vol. 55, p. 167) treated this character as catagenetic, and consequently placed the divergence of the *vermis* group from the *papulosa* group well back in the Tertiary. *S. praenuntia*, however, shows that the second cingulum was anagenetic during the Miocene, reaching its maximum for the *papulosa* group in this species. The small *S. nana* described below from the same beds is much like a miniature *S. praenuntia*, but is almost certainly an ancestor of *S. vermis*.

**Struthiolaria nana** n. sp. (Plate 73, fig. 4.)

Shell small. Spire turreted, about as high as aperture; early whorls convex, later ones biangulate with broad slightly rounded sloping shoulder; body-whorl bicarinate with concave shoulder and sides, base quickly contracted. Sculpture: about third whorl 2 cinguli appear, upper on shoulder-angle bearing weak tubercles for a short distance, lower in middle of side, these persist until body-whorl when lower one gets much weaker; another cingulum marks the strong keel of the body-whorl, and base has 5 or 6 very weak ones; whole surface with fine distant spiral threads and microscopic lirae. Suture bordered below by a flattening of whorl. Aperture oval, with a shallow anterior sinus. Outer lip thickened, reflexed, lightly bisinuous. Columella concave, beak curved inwards and forward. Inner lip calloused, definitely limited, thinner and but slightly spread on parietal wall.

Height, 28 mm.; diameter, 17.5 mm.

*Locality*.—1135, Tirangi Stream.

The recent *S. tricarinata* Lesson is closely similar, but *S. nana* can be distinguished by the very fine spiral threads of regular strength over the whole surface. Also the flat border, or *rampe*, below the suture is much narrower than in the Recent species, and the shell is considerably smaller.

**Crepidula haliotoidea** n. sp. (Plate 73, fig. 10.)

Shell of moderate size, oval, strong. Apex raised, coiled inwards and upwards from margin for almost half a whorl, with greatest growth longitudinally. Surface with strong irregular growth ridges, no radial sculpture. Aperture oval, oblique; outer margin thin; inner margin thick, flattened.

Height, 24 mm.; longitudinal diameter, 37 mm.; maximum breadth, 25 mm.

*Locality*.—1135, Tirangi Stream.

The external form of this shell is very like that of *Haliotis virginea* Gmelin, but the apex has not so many whorls and the row of perforations is absent. The basal plate cannot be seen because of the hard matrix in the aperture; but a longitudinal section of it was disclosed on breaking off the side of the shell. The sides of the plate extended about two-thirds the length of the body; but the anterior margin was slightly concave, in the young stage at least, as shown in the broken apex.

*Lippistes pehuensis* n. sp. (Plate 73, figs. 6, 8.)

Shell large, subdiscoidal, inflated, test thin. Spire scarcely projecting, surpassed but not involved by body. Whorls convex; body-whorl increasing rapidly in size, with narrow umbilicus. Suture impressed. Sculpture of about 13 broad very low spirals, absent on umbilical area, and becoming obsolete round aperture, crossed by numerous waved fairly strong growth-ridges. Aperture subcircular, dilated, adhering to parietal wall, with a well-marked sinus well out on lower margin; on early part of body this sinus forms low ridge bounding umbilicus.

Greatest height (= aperture), 29 mm.; total diameter, 34 mm.; diameter of aperture, 29 mm.

*Locality*.—Okoke Road, 60 chains west of Pehu Trig., Upper Waitara Survey District.

*Phalium grangei* n. sp. (Plate 73, fig. 17.)

Shell of moderate size, suboval, inflated. Spire low, gradate to sub-conic, under one-third height of aperture. Spire-whorls obtusely angled, with a broad almost flat shoulder; body-whorl with slightly concave shoulder below which it is inflated, base contracting quickly to short twisted neck bearing a conspicuous fasciole separated from constricted base by strong ridge. Sculpture: early whorls eroded, penultimate whorl with about 5 spiral threads on side and 6 on shoulder; interstices wide, each containing a secondary spiral; shoulder-angle with about 20 low blunt knobs; body-whorl with 8 cinguli, top one strongest, bottom five scarcely marked, top three with 12 to 16 rounded knobs, fourth sometimes with a few obscure ones, whole whorl with fine spiral threads. Suture strongly impressed, bordered on body by flattened cord crossed by strong oblique growth-lines. Aperture very deeply and obliquely notched below. Outer lip thickened, much reflexed. Columella somewhat damaged in all specimens but apparently with one strong grooved oblique fold at bottom of columella, above which are a number of wrinkles. Inner lip thin on the parietal wall, thickened below, fitting close to base and fasciole so that ridges of latter show through, and there is no umbilicus.

Height, 43 mm.; diameter, 32 mm.

*Locality*.—1135, Tirangi Stream.

Easily distinguished from other New Zealand species of *Phalium* by the rows of low, rounded knobs, also by the close-fitting inner lip. Many of the shells called by Suter *Galeodea senex* belong to this group, also *Galeodea muricata* (Hector). The strong sculpture was used as the basis of a sub-genus, *Echinophoria* Sacco, but Cossmann does not think the group worth recognition. The shell described above is far removed from *Phalium* s. str., and should be generically separated. The whole family, however, needs revision.

*Cirsotrema angulata* n. sp. (Plate 73, fig. 5.)

Shell small, imperforate, turreted. Spire-whorls bluntly angled slightly below middle; body-whorl with a second keel extending from suture, base flat, with a prominent fasciole. Sculpture of 13 strong spaced rough axial ribs per whorl, interstices with a strong spiral thread following periphery and another weaker one on side of spire-whorls, on body-whorl it is intermediate between periphery and keel, in addition many fine close spiral threads in interstices; base with strong radials formed by continuation of axials. Aperture circular, effuse to left below to form large fasciole.

Height, 9 mm.; diameter, 4 mm.

Locality.—1133, Mimi Stream.

Easily distinguished by angled spire-whorls.

*Euthriofusus tangituensis* n. sp. (Plate 73, fig. 9.)

Shell of moderate size, fusiform. Spire turreted, acute. Whorls, 6 remaining, bluntly angled below the middle with a sloping slightly concave shoulder; body-whorl strongly shouldered, contracted quickly on base to long neck. Sculpture: first two whorls with 12 to 13 axial ribs on sides, not crossing shoulder, these axials soon become obsolete, and are absent on third whorl, appearing again on fourth and persisting till aperture is reached, about 14 on body-whorl where they do not cross base, spiral sculpture of fine threads, 3 fairly prominent on first whorl, second whorl has 1 on angle, 1 on shoulder, and 1 on side with weaker one in each interspace, and 3 or 4 posterior ones on shoulder, on third whorl spirals are almost equal in strength, on fourth and fifth there are 3 prominent threads on rounded periphery, separated by 1-3 fine threads, above and below are equally fine spaced spiral threads; body-whorl with about 13 principal spirals, highest just above periphery, lowest about junction with neck, which bears about 11 weaker threads, interspaces of those on body generally with 3, in one case 5, very fine spaced threads; growth-lines very fine and regular. Aperture oval, produced below into very long straight canal, inclined slightly to left. Outer lip thin, retracted from suture in wide sweeping sinus. Columella with strong fold at junction of canal. Inner lip thin.

Height (estimated), 50 mm.; diameter, 20 mm.

Locality.—1142, 30 chains south-south-west junction of Tangitu Stream and Waitara River.

This species is not connected with *Euthriofusus spinosus* Suter, which is a Turrid related to *Surcula occidentalis* Woods from the Eocene of north-west Peru.

*Vexillum ambulacrum* n. sp. (Plate 73, fig. 11.)

Shell small, fusiform. Spire turreted, equal to aperture and canal in height. Protoconch paucispiral. Whorls flattened, body-whorl straight above but curving strongly below to short neck. Suture bordered below by narrow flat *rampe*. Sculpture: 17 to 19 strong smooth axial ribs with equal or narrower interstices, persisting on spire-whorls but dying out on base of body, also becoming obsolete on nearing aperture; 6 to 8 low flat spiral cords with narrow to linear interstices on sides of whorls and two on *rampe*, spirals do not surmount ribs, being well marked only in interstices; body-whorl with about 25 spirals which are scarcely perceptible on the convexity, but a few on neck are plainly seen. Aperture



FIGS. 1, 2.—*Melanopsis waitaraensis* n. sp. : holotype and paratype.  $\times 1$ .

FIG. 3.—*Cerithiidea tirangiensis* n. sp. : holotype.  $\times 2\frac{1}{2}$ .

FIG. 4.—*Struthiolaria nana* n. sp. : holotype.  $\times 1$ .

FIG. 5.—*Cirsoctrema angulata* n. sp. : holotype.  $\times 5$ .

FIGS. 6, 8.—*Lippistes pehuensis* n. sp. : holotype.  $\times 1$ .

FIG. 7.—*Struthiolaria praenuntia* n. sp. : holotype.  $\times 1$ .

FIG. 9.—*Euthriofusus tangituensis* n. sp. : holotype.  $\times 1$ .

FIG. 10.—*Crepidula haliotoidea* n. sp. : holotype.  $\times 1$ .

FIG. 11.—*Vexillum ambulacrum* n. sp. : holotype.  $\times 4$ .

FIG. 12.—*Vexillum fractum* n. sp. : holotype.  $\times 6$ .

FIGS. 13, 14.—*Streptopelma henchmani* n. sp. : holotype.  $\times 1$ .

FIG. 15.—*Aethocola cliftonensis* n. sp. : holotype.  $\times 1$ .

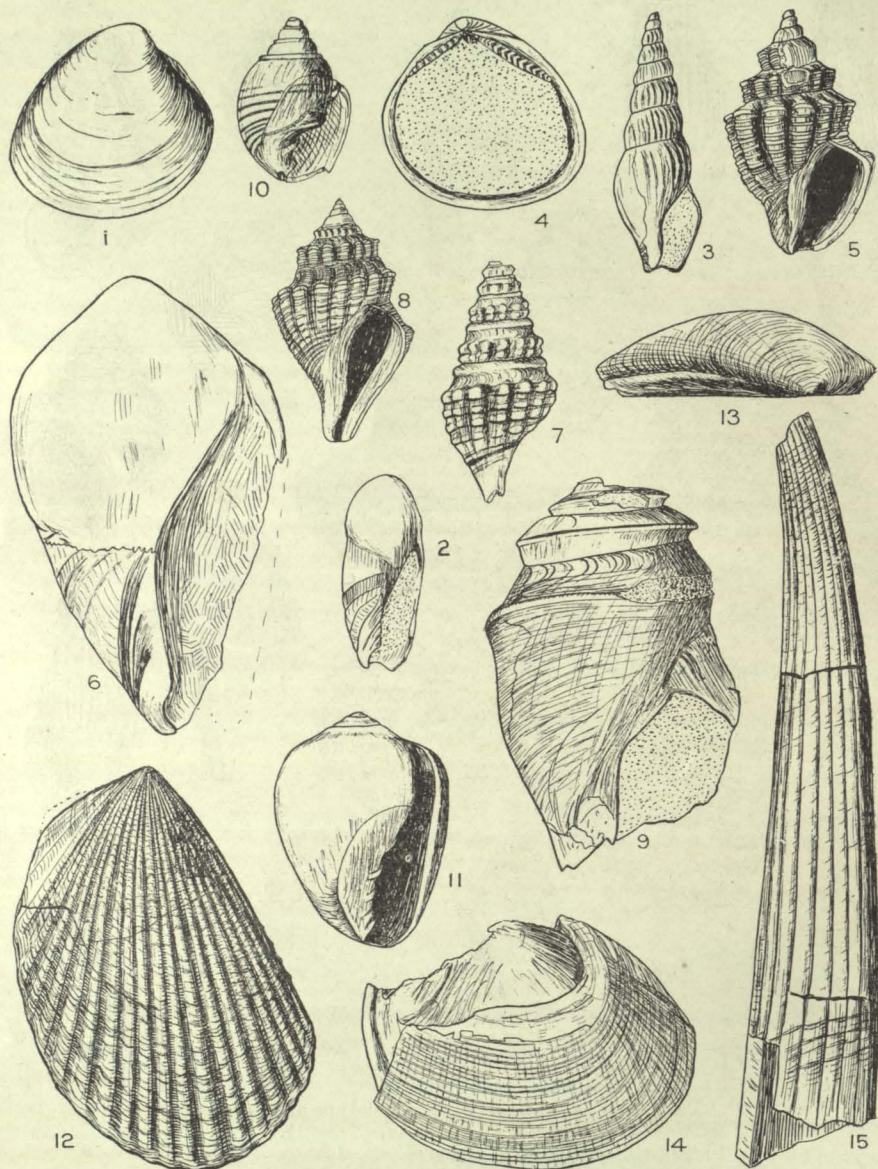
FIG. 16.—*Admete cristata* n. sp. : holotype.  $\times 8$ .

FIG. 17.—*Phalium grangei* n. sp. : holotype.  $\times 1$ .

FIG. 18.—*Cominella hendersoni* n. sp. : holotype.  $\times 1$ .

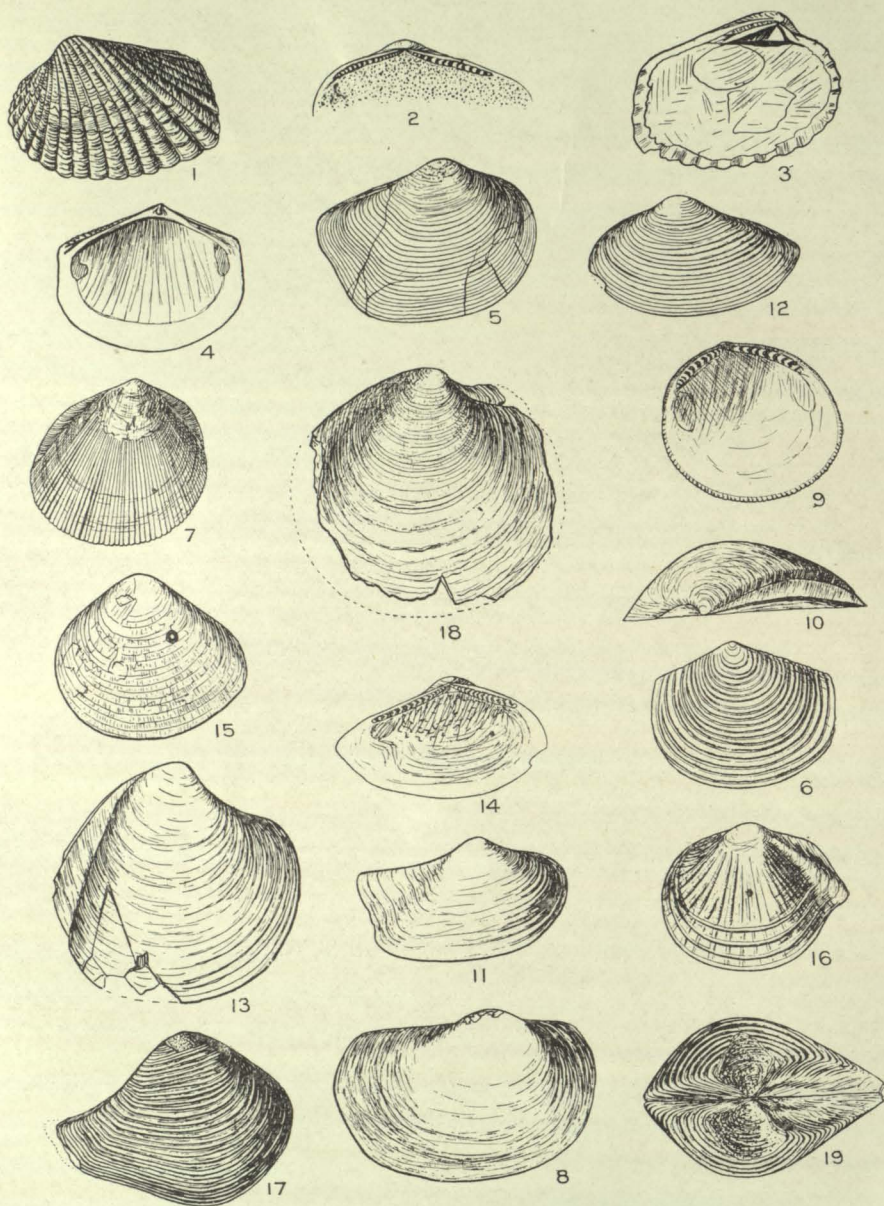
FIG. 19.—*Cominella compacta* n. sp. : holotype.  $\times 1$ .





FIGS. 1, 4.—*Nucula grangei* n. sp. : holotype.  $\times 4$ .  
 FIG. 2.—*Ancilla subhebra* n. sp. : holotype.  $\times 1$ .  
 FIG. 3.—*Terebra omahuensis* n. sp. : holotype.  $\times 1$ .  
 FIG. 5.—*Mangilia taranakiensis* n. sp. : holotype.  $\times 5$ .  
 FIG. 6.—*Ancilla tirangiensis* n. sp. : holotype.  $\times 1$ .  
 FIG. 7.—*Inquisitor asper* n. sp. : holotype.  $\times 2\frac{1}{2}$ .  
 FIG. 8.—*Turricula curtata* n. sp. : holotype.  $\times 1\frac{1}{2}$ .  
 FIG. 9.—*Turricula waitaraensis* n. sp. : holotype.  $\times 1$ .  
 FIG. 10.—*Ringicula torquata* n. sp. : holotype.  $\times 5$ .  
 FIG. 11.—*Marginella whitecliffensis* n. sp. : holotype.  $\times 5$ .  
 FIG. 12.—*Lima watersi* n. sp. : holotype.  $\times 1$ .  
 FIGS. 13, 14.—*Nucula otamaringaensis* n. sp. : paratype and holotype.  $\times 1\frac{1}{2}$ .  
 FIG. 15.—*Dentalium otamaringaensis* n. sp.  $\times 1$ .





FIGS. 1, 3.—*Venericardia wrutiensis* n. sp. : holotype.  $\times 1$ .  
 FIGS. 2, 5.—*Neilo waitaraensis* n. sp. : holotype.  $\times 4$ .  
 FIGS. 4, 6.—*Myrtaea (Eulopia) papatikiensis* n. sp. : holotype.  $\times 4$ .  
 FIGS. 7, 9.—*Nucula ruatakiensis* n. sp. : holotype.  $\times 4$ .  
 FIG. 8.—*Malletia (Minormalletia) tenera* n. sp. : holotype.  $\times 5$ .  
 FIGS. 10, 13.—*Thyasira planata* n. sp. : holotype.  $\times 3$ .  
 FIG. 11.—*Neilo sublaevis* n. sp. : holotype.  $\times 1$ .  
 FIGS. 12, 14.—*Nuculana ellisi* n. sp. : holotype.  $\times 2$ .  
 FIG. 15.—*Leptomya simplex* n. sp. : holotype.  $\times 5$ .  
 FIG. 16.—*Zealeda mutabilis* n. sp. : holotype.  $\times 10$ .  
 FIGS. 17, 19.—*Nuculana onairoensis* n. sp. : holotype.  $\times 3$ .  
 FIG. 18.—*Lucinida tirangiensis* n. sp. : holotype.  $\times 1$ .





elongate, oval, produced below into short fairly wide canal not notched anteriorly. Outer lip thin, straight. Columella straight, with 4 oblique folds decreasing in strength anteriorly. Inner lip thin.

Height, 9 mm., diameter, 4.5 mm.

*Locality*.—1135, Tirangi Stream.

*Vexillum fractum* n. sp. (Plate 73, fig. 12.)

Shell small, broadly fusiform. Spire turreted, about equal in height to aperture. Whorls strongly angled, with high narrow shoulder and vertical sides; body-whorl similar above, rounded off on base and contracting quickly to short neck. Sculpture: about 16 weak axial ribs, which are gathered into strong beads on shoulder-angle and become obsolete on base; strong moniliform spiral follows shoulder-angle, otherwise spirals are obsolete. Aperture long and narrow, not notched below. Columella with 4 oblique folds.

Height, 6 mm.; diameter, 3 mm.

*Locality*.—1133, Mimi Stream.

*Streptopelma henchmani* n. sp. (Plate 73, figs. 13, 14.)

Shell rather small, fusiform. Spire conical, about half height of aperture and canal. Whorls five, almost flat on spire, sometimes slightly concave and sometimes slightly convex; body-whorl plump, contracting rapidly to fairly long and slender neck, which is slightly recurved, has sharp edges and no fasciole. Suture impressed. Sculpture: numerous spiral threads separated by interspaces of about twice the width, about 8 spirals on the penultimate whorl and about 22 on body, probably more on neck, which is weathered in type specimen; first three whorls have each from 18 to 20 short axials which become obsolete. Aperture ovate, channelled above, and produced below into moderate canal which is bent slightly to left and backwards and not notched. Outer lip crenate with sharp edge, thickened within, and with 2 denticles near canal; viewed laterally lip has broad sinus above and is then prominently lobed, inner lip with thin callus, which has a number of small tubercles (not always present) towards base. Columella short and straight with weak fold at its junction with canal.

Height, 30 mm.; diameter, 16 mm.

*Localities*: 1134 (type), coast 20 chains north of shelly conglomerate a little north of mouth of Papatiki Stream, Waitara Survey District; 1133, coast from Mimi Stream north for one mile, Waitara Survey District; Huiroa bore (between 4,550 ft. and 4,760 ft.), ten miles north-east of Stratford.

The genus *Streptopelma* Cossmann (1901) is based on an Australian Tertiary shell, *Peristernia lintea* Tate, which much resembles the New Zealand species, being more slender, with a higher spire and with the outer lip having the crenulations set farther back from the edge. Another New Zealand species is *Siphonalia orbita* Hutton, a larger shell with very strong spirals.

*Aethocola cliftonensis* n. sp. (Plate 73, fig. 15.)

Shell rather small, broadly fusiform. Spire gradate, about two-thirds height of aperture and canal. Whorls 5, strongly shouldered and rising on to preceding whorl; body-whorl rapidly contracting to short strongly

twisted neck which has well-marked fasciole bounded above by projecting ridge. Suture undulating, impressed, deeply bordered below. Sculpture: from 15 to 17 strong axial ribs which are weaker on shoulder and die out on base of body-whorl, these are crossed by strong spirals with wide interspaces; the concave shoulder bears from 5 to 7 close spiral threads and on spire-whorls about 4 strong threads below these; body-whorl with about 11 strong spirals. Aperture ovate, channelled above, produced below into short wide strongly twisted canal, deeply notched at base. Outer lip thin, straight. Inner lip lightly calloused. Columella straight, smooth.

Height, 22 mm.; diameter, 15 mm.

*Localities*.—1116 (type), coast 10 chains north of Mangapuketea Stream, Mimi Survey District (L. I. Grange); 1144, Okoke Road, 60 chains west of Pehu Trig, Upper Waitara Survey District; 1136, Mangare Road deviation to head of Mangaone Stream, 5 chains west of tunnel, Upper Waitara Survey District; Huiroa bore (between 4,550 ft. and 4,760 ft.), ten miles north-east of Stratford.

This shell is perhaps nearest to *Aethocola robinsoni* (Zittel) and *Aethocola zitteli* (Suter). Good specimens of these species from the type locality, Nelson, have not been seen, but the material available justifies the separation of *A. cliftonensis*. The shape is different from either because of the concave shoulder and the deeply bordered suture.

***Cominella compacta* n. sp. (Plate 73, fig. 19.)**

Shell of moderate size, broadly fusiform, strong. Spire about two-thirds height of aperture. Protoconch tectiform, of 2 smooth whorls with large nucleus. Post-embryonic whorls  $4\frac{1}{2}$ , early ones convex, later with long sloping concave shoulder below which they are convex; body-whorl fairly quickly contracted below shoulder-angle to prominent raised fasciole which is bounded above by sharp ridge. Suture slightly undulating. Sculpture: 11 to 12 rounded knobs on blunt shoulder-angle, on first post-embryonic whorl represented by axials reaching from suture to suture; there are obsolete spiral cords, but so weak that they cannot be numbered. Aperture ovate, channelled above, produced below into short widely-open canal which obliquely truncates columella and is deeply and widely notched anteriorly. Outer lip thin, lightly sinuous, smooth. Columella arcuate, smooth. Inner lip thin, extending down along edge of canal.

Height, 31 mm.; diameter, 20 mm.

*Locality*.—Tirangi Stream.

The type has been squeezed somewhat out of shape and so appears wider than it was originally.

***Cominella hendersoni* n. sp. (Plate 73, fig. 18.)**

Shell moderate size, broadly cylindrical. Spire conic, low. Protoconch small. First post-embryonic whorls regularly convex, later ones with flattened sides, and high shoulder embracing the previous whorls; body-whorl subcylindrical, shoulder irregularly curved over to suture, contracted quickly below to huge prominent fasciole, which is sometimes deeply umbilicated, sometimes not at all. Sculpture: early whorls with from 10 to 12 rounded axial ribs and numerous spiral threads; axials soon disappear and afterwards growth of whorls is so irregular that spirals are obscured. Suture irregular, on body-whorl filled with broad callus which occupies most of shoulder. Aperture oval, anterior produced into short

obliquely twisted canal, deeply notched at extremity; posterior filled with thick callus, on outer side of which is shallow groove. Outer lip broken in all specimens but apparently thin and convex, separated from penultimate whorl by wide sutural callus. Columella concave, obliquely truncated below, where it bounds the short curved canal. Inner lip rather thick, definitely bounded in fasciolar region.

Height, 24 mm.; diameter, 21 mm. (small specimen).

*Locality*.—1135, Tirangi Stream.

A highly gerontic development of the *Cominella maculata* type. There is considerable variation in the amount of gerontism displayed; some specimens show little embracing and are oval in shape, in others the body-whorl almost conceals the spire and the shape is subcylindrical. Distinguished from *C. ridicula* Finlay by much greater breadth, thicker callus, and less flattened sides.

“ *Admete* ” *cristata* n. sp. (Plate 73, fig. 16.)

Shell very small, ovate. Spire turreted, equal to aperture in height. Protoconch of about 4 smooth tectiform whorls, nucleus extremely small, first two whorls almost planorbid. Post-embryonic whorls nearly 3, biangulate on spire; body with convex contracting base not produced into neck. Sculpture of 14–16 sharp narrow well-spaced axial ribs, mostly becoming obsolete on base but one or two persist, strong moniliform spiral cord just below suture, forming upper angle, weaker thread on lower angle and another on side of spire-whorls, 4 additional ones on base. Aperture angled above, not notched below. Outer lip thin, straight, strongly retracted from suture. Columella short with strong twist but no plaits.

Height, 4 mm.; diameter, 2.5 mm.

*Locality*.—1125, coast between Waikiekie and Mangapuketea Streams.

This shell is not an *Admete*, as shown by the protoconch and the absence of columellar plaits. A new generic division appears to be required for its reception; but, as the single specimen may not be an adult, it is advisable to wait for more specimens.

*Ancilla* (*Baryspira*) *subhebera* n. sp. (Plate 74, fig. 2.)

Shell small, cylindrical. Spire about two-thirds height of aperture, buried in thick blunt callus which descends well on to body-whorl. Sides of body slightly convex; spine-bearing groove at bottom of smooth area well separated from calloused basal limb, leaving relatively wide depression. Basal limb with a narrow but well-marked median groove, separated by another deep groove from beak. Aperture long and narrow, tapering gradually above, deeply notched below. Outer lip retracted above to join apical callus, with short spike opposite spiral groove. Columella slightly concave, widening below rather quickly to form obliquely truncated beak with 1 strong groove above and 3 weak ones below. Inner lip narrow along most of its length, but callus extends upwards and then spreads out slightly below line of apical callus, reaching almost 180° from outer lip and up to apex, and forming rather thick rounded pad.

Height, 25 mm.; diameter, 10 mm.

*Locality*.—1135, Tirangi Stream.

Differs from *A. hebera* (Hutton) in the great development of the apertural callus, also in its larger size. The spread of this callus resembles that of *A. tatei* Marwick from the lower beds, Muddy Creek, but is carried still farther.



**Ancilla (Baryspira) tirangiensis** n. sp. (Plate 74, fig. 6.)

Shell large, heavy, subcylindrical. Spire up to one-third height of aperture, low-conical to dome-shaped. Spire-whorls covered with heavy callus which descends over angle of shoulder of body-whorl. Smooth band relatively narrow, bounded below by wide depressed band, the raised ridge between this and fasciole of anterior notch is also wide, and is bounded below by well-marked broad shallow sulcus. Aperture inclined, hastate, deeply and broadly notched below, channelled above, channel extending a considerable distance across spire-callus. Outer lip retreating above, with short spike at bottom of smooth area. Columella short, concave, twisted strongly forward below and expanding into broad beak which has single broad longitudinal sulcus bounded on outside by narrow ridge, this in turn is separated from basal limb by broad rather deep groove. Inner lip spreading as thick callus-pad on parietal wall, and extending across smooth area reaches back of shell and almost up to spire, its outline circular.

Height, 59 mm. ; diameter, 35 mm.

*Locality*.—1135, Tirangi.

Differs from *A. robusta* Marwick in the much greater development of the parietal callus.

**Marginella whitecliffensis** n. sp. (Plate 74, fig. 11.)

Shell small, broadly oval, strong. Spire low, conic. Whorls 4, including protoconch which is flatly domed; spire-whorls flat to slightly concave; body-whorl strongly convex with flattened shoulder. Sutures noticeably impressed. Surface smooth and shining, with weak growth-ridges. Aperture long and narrow, widening below, rounded at extremity and emarginate. Outer lip not ascending, with strong varix tapering to sharp edge, smooth within, with fairly deep sinus on shoulder. Columella with 4 strong folds, three lower ones oblique, upper well separated, transverse. Inner lip thick, with well-defined outer edge, separated along its lower portion by shallow depression from weak basal limb formed by anterior border of aperture.

Height, 6 mm. ; diameter, 4.5 mm.

*Locality*.—1129, White Cliffs.

**Turricula waitaraensis** n. sp. (Plate 74, fig. 9.)

Shell large, fusiform. Spire pagodiform, over half height of aperture and canal. Whorls strongly angled, with broad gently sloping shoulder and contracted sides; body-whorl with shoulder much steeper, angulation still strong and projecting, below this body tapers very slowly, then more quickly; anterior end broken. Sculpture: weak spiral threads with wide interstices each containing a secondary spiral, on spire-whorls and upper part of body spirals are scarcely discernible, angle furnished with strong cord, growth-lines also almost absent so that sinus on shoulder not always clearly marked. Suture plain. Aperture large, angled above. Outer lip thin, deeply notched above, the sinus having a long outer side and short inner one, apex rounded, one-third across shoulder from suture. Inner lip thinly calloused.

Height (estimated), 65 mm. ; diameter, 33 mm.

*Locality*.—1148, Mangare Road, half a mile south of big tunnel, Upper Waitara Survey District. Generic location provisional (see remarks under *Mangilia taranakiensis*).

*Inquisitor asper* n. sp. (Plate 74, fig. 7.)

Shell small, fusiform. Spire rather higher than aperture and canal. Whorls angled above middle with concave steep shoulder, straight sides; body contracted rather quickly on base to somewhat short neck. Sculpture: strong rounded axial ribs, 12 on spire-whorls and 13 on body, they cease abruptly at periphery of shoulder, forming rounded nodules, but extend anteriorly across body-whorl well below line of suture; spire-whorls with broad double spiral on shoulder-angle and a narrower one close below; on body are 4 more spirals, upper 3 strong with slightly wider interstices; where spirals cross ribs they are raised into low nodules, ribs do not extend down to lowest two spirals, which are therefore plain. Suture strongly bordered below. Aperture oval, produced below into a rather short canal. Outer lip thin, with a fairly deep and narrowly rounded sinus in the middle of the shoulder, convex below.

Height, 14 mm. (estimated); diameter, 6 mm.

*Locality*.—Okoke Road, 60 chains west of Pehu Trig., Upper Waitara Survey District.

Distinguished from *I. wanganuiensis* (Hutton) and *I. chordata* (Sut.) by the anterior extension of ribs on body-whorl, also by the arrangement of the spirals.

*Turricula curtata* n. sp. (Plate 74, fig. 8.)

Shell of moderate size, broadly fusiform. Spire turreted, two-thirds height of aperture and canal. Whorls strongly angled, with broad slightly concave almost horizontal shoulder and straight sides; body with shoulder quite strongly concave and sloping, below which it contracts quickly with a slight convexity to a short gently-twisted canal. Sculpture of 16 rounded axial ribs per whorl, weakening below but extending well down body, practically stopping above at periphery of shoulder and giving an appearance of tuberculation; whole surface with rather flattened strong spirals, 4 or 5 on sides of spire-whorls and about 8 weaker ones on shoulder, body with 9 or 10 on shoulder and about 20 or 22 below, upper 8 with wide interstices each containing secondary thread; all spirals and interstices crossed by fine regular well-marked growth-striae. Aperture oval, channelled above, produced below into rather short twisted canal not notched at base. Outer lip thin, with a broad arcuate sinus extending from suture to periphery, below which it is regularly convex. Columella smooth. Inner lip calloused, not definitely limited.

Height, 20.5 mm.; diameter, 12 mm.

*Locality*.—1141, coast for one mile south of Wai-iti Stream, Mimi Survey District.

Generic location provisional (see remarks under next species).

*Mangilia taranakiensis* n. sp. (Plate 74, fig. 5.)

Shell small, broadly fusiform. Spire turreted, equal in height to aperture and canal. Protoconch fairly large, of about 2 smooth turbinate whorls. Post-embryonic whorls about  $4\frac{1}{2}$ , on spire sharply angled above middle with broad almost flat shoulder; body-whorl also strongly shouldered, contracted below rather quickly then straightening out to short slightly twisted neck bearing well-marked fasciole. Sculpture: 12 to 14 strong axial ribs which stop suddenly at periphery, forming short sharp tubercles, they weaken as they extend across base of body but reach almost

to fasciole; spire-whorls have 2 or 3 spiral cords on sides and 1 on periphery, body-whorl has 14 cords from angle to fasciole, 3 weaker ones to outer half of shoulder and 3 very weak ones on fasciole; growth-lines not well marked until near aperture. Aperture oval, angled above, produced below into short broad sloping canal rather deeply notched at base. Outer lip thin, retracted from suture to periphery thence very slightly convex. Columella smooth, short, strongly bent at junction with canal. Inner lip rather thick, forming with fasciole shallow groove.

Height, 6 mm.; diameter, 4 mm.

*Locality*.—1134, Papatiki Stream.

With the exception of *Inquisitor asper*, the generic location of the Turridae described above is quite provisional. New genera seem to be required; but Mr. H. J. Finlay is at present investigating the family, and so will be able to speak more authoritatively on the matter.

*Terebra omahuensis* n. sp. (Plate 74, fig. 3.)

Shell of moderate size, subulate. Spire of 8 convex whorls; body-whorl regularly rounded, contracting quickly to short neck bearing strong fasciole bounded by ridge. Sculpture: 20 to 24 rather weak irregular convex axial ribs with slightly narrower interstices, very weak on base of body, interstices with scattered indications of spiral threads. Aperture oval with broad, short, deeply-notched anterior canal.

Height, 22 mm.; diameter, 7 mm.

*Locality*.—1126, coast from Tongaporutu River to Omaha Trig.

Distinguished from *T. tristis* Desh. by having half as many more, and weaker, axial ribs.

*Ringicula torquata* n. sp. (Plate 74, fig. 10.)

Shell small, ovate. Spire turreted, over half height of aperture. Protoconch of about 2 smooth whorls with flattened and tilted apex. Spire-whorls convex; body-whorl inflated, with very quickly contracted base. Suture impressed, bordered. Sculpture: a strong smooth spiral cord borders suture below; spire-whorls and upper part of body almost smooth, with indications of fine spiral lines; lower part of body with 8 or 9 incised spiral grooves with wide interspaces, the former pitted by growth-ridges; upper grooves very weak and blending with smooth space. Outer lip broken, so apertural characters not clear. Columella has 2 strong narrow well-spaced folds, lower one stronger. Inner lip forming thick pad on parietal wall and bearing another fairly strong fold; much of upper part of lip broken, so full development not seen.

Height, 4 mm.; diameter, 2.5 mm.

*Locality*.—1134, Papatiki Stream.

Easily distinguished by the strongly-bordered impressed suture.

*Dentalium otamaringaensis* n. sp. (Plate 74, fig. 15.)

Shell large and strong, tapering rather quickly. Posterior end curved gently; anterior end almost straight. Sculpture: 20 to 24 strong longitudinal ribs narrower than interstices at posterior end but broadening with age until they are from 2 mm. to 3 mm. across at anterior end, and have linear interstices; whole surface with extremely fine secondary longitudinal threads, they are crossed by microscopic concrescent growth-lines on anterior, but in youth these are much stronger and make the shell



rugose. Aperture oblique; cross-section of shell at first circular, later compressed laterally to a trifling extent.

Length, 97 mm. (imperfect); diameter of anterior, 18 mm.

*Locality*.—1146, mouth of Waiau Stream east to Otamaringa Pa, Waitara Survey District.

The ribs are much broader and fewer in number than those of *D. solidum* Hutton.

*Nucula ruatakiensis* n. sp. (Plate 75, figs. 7, 9.)

Shell small, thin, subcircular, moderately inflated. Beaks low, broad, slightly behind middle. Posterior and lower margins regularly arcuate; anterior narrowly convex. Lunule long and broad. Escutcheon fairly large, projecting somewhat, bounded by shallow groove. Sculpture: fine rounded radial ribs, 9 per millimetre, crossed by numerous concentric growth-stages; these radials not developed on escutcheon or on anterior area, place being taken by much finer divaricate striae, about 18 per millimetre. Hinge narrow, with 12 slightly sagittate anterior teeth and 11 short straight posterior ones; resilifer broken but apparently small. Valve-margins crenate, corresponding to radials (*i.e.*, extremely fine in hinge region, coarser in ventral region).

Height, 5.1 mm.; length, 5.5 mm.; diameter (one valve), 1.6 mm.

*Locality*.—1141, coast for one mile south of Wai-iti Stream, Mimi Survey District.

This species does not seem to be closely related to any other New Zealand one so far described.

*Nucula otamaringaensis* n. sp. (Plate 74, figs. 13, 14.)

Shell very large, oval, inflated. Beaks incurved, approximate and directed strongly backward, situated about posterior fourth. Anterior dorsal margin long, slightly convex, descending gradually to somewhat narrow anterior margin; posterior margin regularly convex. Lunule well defined by broad shallow groove bounding outside of a low narrow ridge. Escutcheon deeply sunk below umbones. Sculpture: fine fairly regular concentric ridges crossed by equally fine radials, on anterior area concentric sculpture becomes obsolete and radial element prevails. Hinge not seen. Valve-margins bevelled, smooth.

Height, 23 mm.; length, 29 mm.; thickness (one valve), 10 mm.

*Localities*.—1146, mouth of Waiau Stream east to Otamaringa Pa, Waitara Survey District; 1148, Mangare Road, south of big tunnel, Upper Waitara Survey District.

*Nucula grangei* n. sp. (Plate 74, figs. 1, 4.)

Shell small, rounded triangular, inflated, strong. Umbo at posterior third broad and high. Anterior end somewhat narrowly rounded, with curved descending dorsal margin; posterior end subangled. Lunule broad, flattened, not well defined. Escutcheon bounded by broad low ridge, within which it is concave but then raised into high pouting margin. Surface practically smooth, with a few obsolete concentric ridges. Hinge broad, with about 12 posterior and 14 anterior teeth. Valve-margins smooth.

Height, 6 mm.; length, 6.5 mm.; diameter (one valve), 2 mm.

*Locality*.—1125, coast between Waikiekie and Mangapuketea Stream, Mimi Survey District.

*Nuculana ellisi* n. sp. (Plate 75, figs. 12, 14.)

Shell large, suboval, thick and strong. Umbo broad and high, slightly in front of middle. Anterior end long, narrowly rounded; posterior end drawn out to a narrow, oblique, bluntly-truncated end. Lunule large, slightly concave, defined by absence of concentric sculpture. Escutcheon also large and not crossed by concentric ribbing, bounded by low rounded ridge which extends to posterior extremity of shell, and traversed by low median ridge. Sculpture: sharply bevelled close concentric ridges, 3 to  $3\frac{1}{2}$  per millimetre, anastomosing on posterior. Hinge strong, with 12 anterior and about 14 posterior chevroned teeth, resilifer broadly triangular. Pallial sinus shallow.

Height, 8 mm.; length, 14 mm.; diameter (one valve), 3.5 mm.

*Locality*.—1127, Waikie Stream.

*Nuculana onairoensis* n. sp. (Plate 75, figs. 17, 19.)

Shell fairly large, greatly inflated, test thin. Beaks broad and high, slightly in front of middle. Anterior end somewhat narrowly convex; posterior tapering rapidly to sharp beak slightly upturned. Lunule not marked off. Escutcheon very broad, concave, bounded by rounded ridge and with another broad rounded median ridge, between this and umbo valve-margin raised into prominent convexity. Sculpture of strong regular bevelled concentric ridges, about 5 per millimetre, becoming weak in lunular region and on crossing ridges bounding escutcheon. Interior not seen.

Height, 8 mm.; length, 11.5 mm.; diameter (one valve), 3.5 mm.

*Locality*.—1146, mouth of Waiau Stream east to Otamaringa Pa, Waitara Survey District.

*Zealeda mutabilis* n. sp. (Plate 75, fig. 16.)

Shell minute, suboval, inflated. Umbo median, broad and low. Anterior end regularly convex; posterior end with a projecting humped proboscis suddenly contracted below to a regularly rounded ventral margin; a high rounded ridge runs from extremity of proboscis to umbo. Sculpture: up to almost 1 mm. diameter shell has only microscopic concentric lines, but from there to within 0.6 mm. of margin there are relatively strong wrinkle-like radials, 10 on each side of almost smooth central part, which has about 5 obsolete radials, when new ribs appear they do so suddenly, causing prominent divergencies, and giving a divaricate appearance to sculpture; on outer 0.6 mm. of diameter are 4 strong concentric folds interrupting the radials, which, however, appear, though much weakened, in interstices of folds.

Height, 1.8 mm.; length, 2.5 mm.; diameter (one valve), 0.75 mm.

*Locality*.—1125, between Waikie and Mangapuketea Streams.

Distinguished from *Z. hamata* Marwick by the smaller size, concentric ridges towards margin, and radials on posterior.

I am indebted to Mr. B. B. Woodward for information by letter that Dr. W. H. Dall considers *Zealeda* synonymous with his *Spinula*. The American shell has not such a peculiarly humped proboscis, nor any radial sculpture, and is many times larger; therefore close relationship seems unlikely.

*Malletia* (Minormalletia) *tenera* n. sp. (Plate 75, fig. 8.)

Shell small, broadly oval, thin, fragile. Umbo broad and low, between middle and anterior third. Anterior end rounded; ventral margin broadly

convex; posterior produced, broadly and rather roundly truncated with a straight dorsal margin. Surface smooth and polished, but a lens shows very weak fairly regular spaced concentric ridges. Hinge narrow, armed with numerous extremely fine taxodont teeth.

Height, 5 mm.; length, 7 mm.; diameter (one valve), 1 mm.

*Locality*.—1127, Waikie Stream, Mimi Survey District.

The test is so fragile that a successful excavation of the hinge could not be made. A paratype shows some of the teeth, but not the region under the umbo.

*Neilo waitaraensis* n. sp. (Plate 75, figs. 2, 5.)

Shell small, suboval. Umbo low and broad, slightly in front of middle. Anterior end rather narrowly rounded; ventral margin broadly convex; posterior end produced, broadly truncated, with a straight slightly descending dorsal margin. Neither lunule nor escutcheon well defined, latter sometimes with low central ridge. Posterior area concave. Sculpture of regular fine close concentric ridges with bevelled sides and sharp summits. Hinge with about 16 taxodont teeth on each side. No resilifer.

Height, 6 mm.; length, 8 mm.; diameter (one valve), 2.5 mm.

*Locality*.—1142, 30 chains south-south-west from junction of Tangitu with Waitara River.

*Neilo sublaevis* n. sp. (Plate 75, fig. 11.)

Shell of moderate size to large, sub-oblong. Umbo about anterior third, broad, rather low. Anterior end somewhat narrowly convex; posterior end produced, broad, obliquely truncated at extremity; dorsal margin long, straight, horizontal; rounded ridge runs from umbo to posterior end of ventral margin bounding prominent concave posterior area. Lunule very long and narrow. Escutcheon also long and narrow, deeply sunk, and furnished with a sharp median ridge. Surface almost smooth but with obsolete concentric ridges getting stronger on anterior end.

Height, 15.5 mm.; length, 27 mm.; diameter (one valve), 6 mm. (Some specimens are 40 mm. in length.)

*Locality*.—1125, coast between Waikie and Mangapuketea Streams, Mimi Survey District.

Easily distinguished from *N. australis* by the almost smooth surface, less attenuated shape, much deeper escutcheon, &c. *Neilo* has generally been placed as a subgenus of *Malletia*, but the different shape, equal development of anterior and posterior teeth, and short pallial sinus justify full generic rank.

*Lima watersi* n. sp. (Plate 74, fig. 12.)

Shell of moderate size, little inflated, oblique. Sculpture: 22 low rounded ribs with interstices equal or wider, ribs flattening out towards margin, growth-lines weak except towards margin, ribs bear scattered scars where probably spines were attached. Submargin deep, with only 1 or 2 weak radials, and well-marked growth-lines. Ears narrow. Ligamental area somewhat narrow and high, with a pit occupying one-third its area.

Height, 49 mm.; length, 42 mm.; diameter (one valve), 10 mm

*Locality*.—1139, Uruti.



*Venericardia urutiensis* n. sp. (Plate 75, figs. 1, 3.)

Shell of moderate size, suboblong. Beaks at anterior fourth. Dorsal margin long, straight, gently descending; posterior end obliquely truncated; ventral margin broadly curved, ascending more quickly in front to meet the regular convex anterior margin. Lunule lanceolate, impressed. No escutcheon. Sculpture: 24 radials narrow in front and on posterior area, broad and rounded on centre of disc, with narrow interstices. Left valve with a strong triangular cardinal under the umbo and a long straight high posterior cardinal parallel to the ligament. Right valve with a long strong triangular oblique median cardinal; anterior cardinal low, separated from lunule by a shallow groove; posterior cardinal long and narrow. Nymphs also long and narrow. Valve margins crenulated.

Height, 20 mm.; length, 28 mm.; diameter (one valve), 8 mm.

*Locality*.—1139, Quarry, Uruti, one mile west of post-office.

The ribs of the holotype are smooth, but this is probably due to imperfect preservation, for topotypes show fairly high rounded ribs with close nodules on anterior of shell, central ribs with the nodules degenerated into irregular growth-ridges.

*Lucinida tirangiensis* n. sp. (Plate 75, fig. 18.)

Shell large, circular, winged posteriorly, moderately inflated, rather thin. Lunule narrowly lanceolate, in front of it a depressed expanded wing, somewhat variable in size. Sculpture: up to 15 mm. diameter, regular narrow concentric ridges, about 2 per millimetre, the interstices of well-preserved specimens with fine radial threads separated by wide interspaces; later sculpture is of irregular growth-lines generally well separated and often showing radials. Hinge not exposed in any of the specimens. Valve-margins smooth.

Height, 32 mm.; length, 33 mm.; diameter (one valve), 9 mm.

*Locality*.—1135, Tirangi Stream.

Closely related to *L. dispar* (Hutton), but distinguished by its larger size, close regular spirals on a considerable part of disc, and coarser more separated radials.

*Myrtaea (Eulopia) papatikiensis* n. sp. (Plate 75, figs. 4, 6.)

Shell small, suboval, little inflated. Umbo almost central. Anterior dorsal margin straight, descending gradually; anterior end vertical, rounded below; ventral margin broadly convex; posterior margin similar in shape to anterior but slightly longer. Lunule long, very narrow, sunken. Escutcheon also long and narrow, bounded by rugose ridge. Sculpture of sharp well-spaced concentric ridges, 4 per millimetre; interspaces with microscopic somewhat irregular radial threads. Hinge of left valve with 2 small cardinal teeth, and a distant posterior and anterior lateral, latter stronger. Right valve with a median cardinal and a distant posterior lateral, anterior broken but probably stronger. Adductor impressions rather small: anterior broadly rounded above, constricted slightly in middle, then contracted quickly and finally tapering narrowly to pallial line; posterior scar oval. Pallial line is broad in type, but this may be due to peeling of inner layer of shell.

Height, 6 mm.; length, 5 mm.; diameter (one valve), 1 mm.

*Locality*.—1134, Papatiki Stream.

*Thyasira planata* n. sp. (Plate 75, figs. 10, 13.)

Shell small, suborbicular. Umbo at anterior third. Anterior end concave above, narrowly rounded below; posterior end winged; a strong furrow with convex anterior side proceeding from umbo to lower part of posterior margin, another with an angular anterior margin runs from umbo to upper part of posterior margin. Lunule large, sunken, lanceolate, well defined. Sculpture of obsolete irregular concentric ridges and folds, whole surface with regular, sharp, close, microscopic growth-lines. Interior not seen.

Height, 9 mm.; length, 10 mm.; diameter (one valve), 3.5 mm.

*Locality*.—1127, Waikiekie Stream.

Distinguished from *T. flexuosa* by well-defined lunule, sharper posterior ridges, and less inflation.

*Leptomya simplex* n. sp. (Plate 75, fig. 15.)

Shell small, ovate, thin. Umbo median, inconspicuous. Anterior end regularly convex; dorsal margin descending; posterior end tapering to obliquely and roundly truncated extremity. Sculpture of narrow distant concentric low lamellae, interspaces crowded with fine radial threads.

Height, 7 mm.; length, 9 mm.; thickness (one valve), 1.5 mm.

*Locality*.—1125, coast between Waikiekie and Mangapuketea Streams.

Distinguished from *L. perconfusa* Iredale by the greater height compared with length, and the absence of a posterior ventral sinus.

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## Geology of Upper Waitotara Valley, Taranaki.

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DURING September, 1923, the writer spent a week at Ngamatapouri and Kapara, in the Waitotara Valley, and partly explored the geologically unknown area lying between the coastal strip west of Wanganui examined by Marshall and Murdoch (1920 and 1921) and the Tongaporutu-Ohura Subdivision (see *N.Z. Geol. Surv. 17th Ann. Rep.*, Parl. Paper C.-2c, pp. 3, 7-8, 1923). Ngamatapouri Township, in the centre of the district, is about twenty-two miles north-east of Patea.

The writer is indebted to the Geological Survey for the determination of the fossils he collected, and also for permission to examine Professor James Park's collection from the Wanganui River, made in 1887. He also wishes to acknowledge the assistance given by Messrs. J. R. Annabell and G. H. Sexton, of Ngamatapouri, and Mr. G. Mee, of Kapara. Mr. G. E. Harris kindly drew the accompanying sketch-map.

Most observers in Taranaki have noted the accordant heights of the ridges. Up-stream from Ngamatapouri the main ridges range between 1,400 ft. and 1,700 ft. above sea-level. They are probably the inter-stream upland spaces of a mature surface, into which the drainage-channels have entrenched deeply. At the junction of Mangawhio Road with Waitotara Valley Road the river is approximately 60 ft. above sea-level, and at Te Rere-o-Haupa Waterfall, some twelve miles farther up the valley,