

Genus EULIMELLA Jeffreys.

1847. *Ann. Mag. Nat. Hist.*, vol. 19, p. 311.Type: *Eulima macandrewi* Forbes.

Iredale (*Nautilus*, vol. 24, pp. 52-58; 1910: and again, *Trans. N.Z. Inst.*, vol. 47, p. 461; 1915) has shown that the reference given by Dall and Bartsch, and copied by Suter, is wrong, and that the earliest introduction of the genus-name *Eulimella* was by Jeffreys in the *Ann. Mag. Nat. Hist.*, 1847, for *Eulima macandrewi* Forbes.

Eulimella is not to be regarded as a subgenus of *Pyramidella*, for, as Iredale has pointed out (*Trans. N.Z. Inst.*, vol. 47, p. 461; 1915) the formation of the aperture clearly separates it out, whilst it has a wider geographical range than *Pyramidella*. The same writer (*P.M.S.*, vol. 2, pt. 6, 338; 1915) has drawn attention to the fact that Dall and Bartsch in making *Eulimella* a subgenus of *Pyramidella* have written "Columella folds two." The author (Forbes) wrote "Columella not plicated, straight, or nearly so," and this, Iredale states, appears to have been the opinion of every writer, save Dall and Bartsch, that he has consulted.

In *Eulimella* the protoconch is heterostrophic, helicoid, the shell tall and of many whorls, and the aperture generally more or less subquadrate and with no plait, or only a very low, feeble swelling set on a straight columella. The shell is usually of rather solid build, has no axial ornament other than growth-striae or occasionally low, indistinct growth-plications, and is either spirally unsculptured or has only microscopic striae present.

KEY TO SPECIES OF EULIMELLA.

Shell not less than 4.0 mm. high.

Outlines of shell straight, not convex.

Shell large, very considerably attenuate.

Whorls high, flattish; suture just below periphery;
aperture ovate*alpha*

Shell not so large and not considerably attenuate.

Whorls not regularly increasing.

Later whorls increasing more rapidly than early
ones; suture but little impressed; whorls lightly
convex; columellar fold obsolete; spiral striae
present*levilirata*

Whorls regularly increasing.

Suture well cut in; whorls flattish over centre;
shell thick and solid; a low, wide fold on colu-
mella*deplexa*Suture not cut in; whorls lightly convex; shell
not solid for its size; no fold on columella ..*beta*Outlines of shell not straight, convex, especially over earlier
whorlsWhorls concave, swollen above; spire somewhat gradate
Whorls not concave, not swollen above, and spire not
gradate.*mestayerae*Suture strongly cut in, almost channelled; aperture
subquadrate; whorls convex*limbata*Suture not much incised; aperture subovate; whorls
not so convex*larga*

Shell smaller, less than 4.0 mm. high.

Whorls flat.

Protoconch emergent, rather sharp at summit; suture not distinct; periphery sub-angled	<i>waihoraensis</i>
Protoconch more depressed, bluntly rounded over summit; suture more incised; periphery convex; whorls lightly and broadly concave	<i>coena</i>

Whorls not flat, but convex.

Whorls lightly convex; suture moderately incised; whorls many; apex sharp; aperture rather subquadrate; shell slender	<i>coena</i>
Whorls strongly convex; suture considerably incised; whorls few; apex not sharp; aperture ovate; shell stouter and with axial plications	<i>media</i>

Note.—*E. awamoensis* has not been placed in the above key, as no specimen has been available for examination.

***Eulimella alpha* n.sp.** (Fig. 6).

Shell large, exceedingly attenuate, outlines straight. Post-nuclear whorls 7 remaining (earlier ones decollated), flat to very lightly convex; suture but little impressed. Protoconch missing. Sculpture absent, except for growth-striae, which are sinuous. Body-whorl flattish above, well rounded over periphery, base convex; aperture subovate, angled behind, rounded in front; columella vertical, faintly arcuate, a very low swelling high up at insertion; inner lip callused; basal lip narrowly rounded; outer lip broken.

Height (estimated), 9.0 mm.; width, 1.5 mm.

Locality: Hampden (Bortonian).

Type in Auckland Museum (ex writer's collection).

The large size, very attenuate habit and high whorls between sutures, readily mark this species off from other Neozelanic *Eulimella*.

***Eulimella beta* n.sp.** (Fig. 15).

Shell of moderate size, elongate-conic, outlines straight. Post-nuclear whorls $5\frac{1}{2}$ remaining (earlier ones decollated), lightly convex and a little bulging below; suture only a little incised. Protoconch missing. Sculpture absent, and growth-lines not evident. Body-whorl, flattish above, strongly convex over periphery, lightly convex on base; aperture broadly ovate, angled behind, widely rounded in front; columella short, stout, straight, vertical and with no plait; inner lip not callused; basal lip broadly rounded; outer lip straight.

Height (estimated), 5.8 mm.; width, 1.45 mm.

Locality: Hampden (Bortonian).

Type in Auckland Museum (ex writer's collection).

A smaller and stouter species than *alpha* with whorls a little more convex and much less high, and aperture shorter and broader.

***Eulimella levilirata* Murdoch and Suter.** (Fig. 10).

1906. *Eulimella levilirata* Murdoch and Suter, *Trans. N.Z. Inst.*, vol. 38, p. 296, pl. 25, fig. 38.

1906. *Pyramidella (Syrnola) tenuiplicata* Murdoch and Suter, *Trans. N.Z. Inst.*, vol. 38, p. 296, pl. 25, fig. 39; Suter, *Man. N.Z. Moll.*, p. 332, pl. 16, fig. 12, 1913.

1913. *Pyramidella (Eulimella) levilirata* Murdoch and Suter. Suter, *Man. N.Z. Moll.*, p. 329, pl. 16, fig. 8 (Atlas).

The figure in the Manual is unsatisfactory, for it shows the whorls too convex and makes the shell too slender. Actually the later whorls of the holotype increase more rapidly than the earlier few, giving a pencil-point aspect to the summit. The embryo is large and heavy, and its lateral nucleus is small and entirely free of first adult volution. The suture should not be described as "well" impressed; it is very little cut in. This species is rather variable in width of spire. In some specimens only the first two adult whorls are narrow, disproportionate increase in width beginning early, whilst in others there are three or four narrow whorls before rapid increase begins. Again, in some shells that otherwise cannot be distinguished from the type, the outline is practically straight and the increase in whorl-width proportionate throughout. Juvenile specimens often appear very slender and narrow, and from them one may be apt to estimate inaccurately the character of the adult outline, and possibly regard them as a distinct species, if the typical nature of the growth of whorls is overlooked.

Height, 4.2 mm.; width, 1.4 mm. (holotype).

Localities: Off Great Barrier Island, in 110 fathoms (type); Orua Bay, Manukau Harbour; Hen and Chickens Islands, in 25 fathoms; Cuvier Island, in 38 fathoms; off Otago Heads in 70 fathoms; off Oamaru, in 50 fathoms; Castlecliff, Wanganui (Castlecliffian); Nukumarū (Nukumaruan); Takapau.

Type in Dominion Museum, Wellington.

Suter's dimensions are frequently inaccurate. In the Manual he gives the height of the holotype as 6.0 mm.

Pyramidella (Syrnola) tenuiplicata Murdoch and Suter is to be included in the synonymy of this species. Finlay (*Trans. N.Z. Inst.*, vol. 57, p. 405; 1926) suggested that *tenuiplicata* be neglected in the meantime, as the type is a decorticated apical fragment, and not sufficient to render the species determinable. Examination of the specimen, however, shows it to be a *Eulimella*, for there is no plait. The apex and early whorls are inseparable from those of *E. levilirata* Murdoch and Suter, from the same locality, and one has no hesitation in uniting these two forms. Corrosion around the sutures of *tenuiplicata* has altered the true appearance of the shell, but, when this is allowed for, the specimen is seen without doubt to be nothing but a juvenile *levilirata*. These two species are described by Murdoch and Suter on the same page, but *levilirata* has place preference, so that the name *tenuiplicata* must be suppressed.

***Eulimella deplexa* Hutton. (Fig. 2).**

1884. *Eulimella deplexa* Hutton, *Trans. N.Z. Inst.*, vol. 17, p. 318.

1893. *Eulimella deplexa* Hutton, *Macleay Mem. Vol.*, Plioc. Moll., p. 56, pl. 7, fig. 45.

1915. *Pyramidella (Eulimella) deplexa* Hutton. Suter, *N.Z.G.S. Pal. Bull.*, no. 3, p. 14.

Hutton's type is not an adult shell. Specimens of *deplexa* from Nukumarū and from the Pliocene beds of Hawkes Bay show that the species grows to a much larger size, and that there are microscopic striae between sutures as well as on the base.

Height, 3.0 mm.; width, 1.0 mm. (holotype). Corresponding dimensions of a Nukumarū shell: 4.1 mm.; 1.2 mm.

Localities: Wanganui, Pliocene (type); Nukumarū (Nukumaruan); Maraekakaho, Kereru, Hawkes Bay (Nukumaruan).

Type in Canterbury Museum, Christchurch.

Eulimella mestayerae (Marwick). (Fig. 4).

1931. *Syrnola mestayerae* Marwick, *N.Z.G.S. Pal. Bull.*, no. 13, p. 105, fig. 193.

The surface of the holotype is corroded so that any minute sculpture may have been obliterated. The shell is partly embedded in matrix, and the features of the heterostrophic embryo are therefore indeterminate. The concave, staged whorls are distinctive.

Height, 6.6 mm.; width, 2.1 mm. (holotype).

Localities: N.Z.G.S. locs. 1295 (type), and 1319, Gisborne District, Ihungia Series (Hutchinsonian).

Type in collection of N.Z. Geological Survey, Wellington.

The figure is a reproduction of Dr Marwick's illustration.

Eulimella limbata Suter. (Fig. 8).

1907. *Pyramidella (Eulimella) limbata* Suter, *Trans. N.Z. Inst.*, vol. 40, p. 362, pl. 28, fig. 5.

1913. *Pyramidella (Eulimella) limbata* Suter, *Man. N.Z. Moll.*, p. 330, pl. 16, fig. 9 (Atlas).

The type is a poor specimen with the apex decollated and the surface rubbed smooth, so that it is impossible to tell whether fine sculpture was originally present. Good specimens, however, have excessively fine microscopic striae between sutures and on base.

Suter's drawing is not a good representation of his type. It shows the whorls too flat and does not convey the convex outline over the summit-whorls, which is a constant specific character.

Height: 4.5 mm.; width, 1.5 mm. (holotype).

Localities: Bay of Islands (type); Orua Bay, Manukau Harbour; Takapuna Beach, Auckland; Dunedin Harbour; off Otago Heads, in 40 fathoms (one shell, which may have been washed down).

Type in Wanganui Museum.

Eulimella larga n.sp. (Fig. 11).

Shell of moderate size, elongate-conic, outlines convex. Post-nuclear whorls $8\frac{1}{2}$ in number, earlier ones flat, later ones flat above and a little bulging and overhanging below; suture not greatly impressed. Protoconch heterostrophic, of about 2 volutions; very low helicoid lateral nucleus, small, central. Sculpture absent, but some indefinite spiral striae on last whorl of one specimen. Body-whorl flattish above, periphery strongly convex (sub-angled in immature shells), base lightly convex; aperture subovate, angled behind, narrowly rounded in front and rather drawn round to axis of shell; columella straight, about vertical, a low, almost obsolete fold high up near insertion; parieto-columellar junction differentiated; inner lip not callused; basal lip narrowly rounded and drawn down; outer lip about straight.

Height, 5.5 mm.; width, 1.5 mm. (holotype).

Localities: Rifle Butts (type); shell-bed, Target Gully; Awamoan Creek; Pukeuri; Ardgowan shell-bed. All the above are Awamoan horizons around Oamaru. Also Chatton, near Gore, Southland (Ototaran); and Mt. Harris and Sutherlands (Awamoan horizons in South Canterbury).

Type in Auckland Museum (ex writer's collection).

Has the convex outline of *limbata*, but not the deep, almost channelled suture of that species. Differs also from *limbata* in apertural shape and in shape of whorl.

Eulimella waihoraensis (Marwick). (Fig. 9).

1931. *Syrnola waihoraensis* Marwick, *N.Z.G.S. Pal. Bull.*, no. 13, p. 106, fig. 195.

The heterostrophic embryo is coiled in a very low helicoid spiral, the lateral nucleus small and central. There is no plait.

Height, 3.8 mm.; width, 1.1 mm. (holotype).

Localities: N.Z.G.S. loc. 1293, Gisborne District, Ihungia Series (Hutchinsonian); Clifden, Southland, band 6A (Hutchinsonian).

Type in collection of N.Z. Geological Survey, Wellington.

Eulimella coxi n.sp. (Fig. 1).

Shell small, elongate-conic, outlines very faintly convex. Post-nuclear whorl $7\frac{1}{2}$ in number, flat but with a very faint, wide sulcate zone around centre; suture weak, very little impressed. Protoconch heterostrophic, as a whole more immersed than is usual; the lateral nucleus small, central and about one-half sunken in succeeding adult volution. Spiral sculpture is present in the form of microscopic striations. Body-whorl faintly concave above, expanded and sharply convex at periphery, lightly convex on base; aperture subrhomboidal, angled behind, rounded in front; columella straight, vertical, a very light swelling seen inside only when outer lip is broken back; inner lip lightly callused; basal lip rounded; outer lip straight.

Height: 3.7 mm.; width, 1.0 mm. (holotype).

Locality: White Rock River, South Canterbury (Awamoan).

Type in Auckland Museum (ex writer's collection).

This species stands closest to *waihoraensis* (Marwick), which, however, has more emergent and narrower protoconch, straight outline with much narrower spire over early adult whorls, and no light concavity on whorl.

Named in honour of Mr L. R. Cox, M.A., of the British Museum of Natural History, London.

Eulimella coena Webster. (Fig. 7).

1904. *Eulimella coena* Webster, *Trans. N.Z. Inst.*, vol. 37, p. 279, pl. 10, fig. 11.

1913. *Pyramidella (Eulimella) coena* Webster. Suter, *Man. N.Z. Moll.*, p. 329, pl. 16, fig. 7 (Atlas).

The holotype is an immature shell. Suter's figure is that of a mis-shapen shell that cannot be identified with the type. Webster's

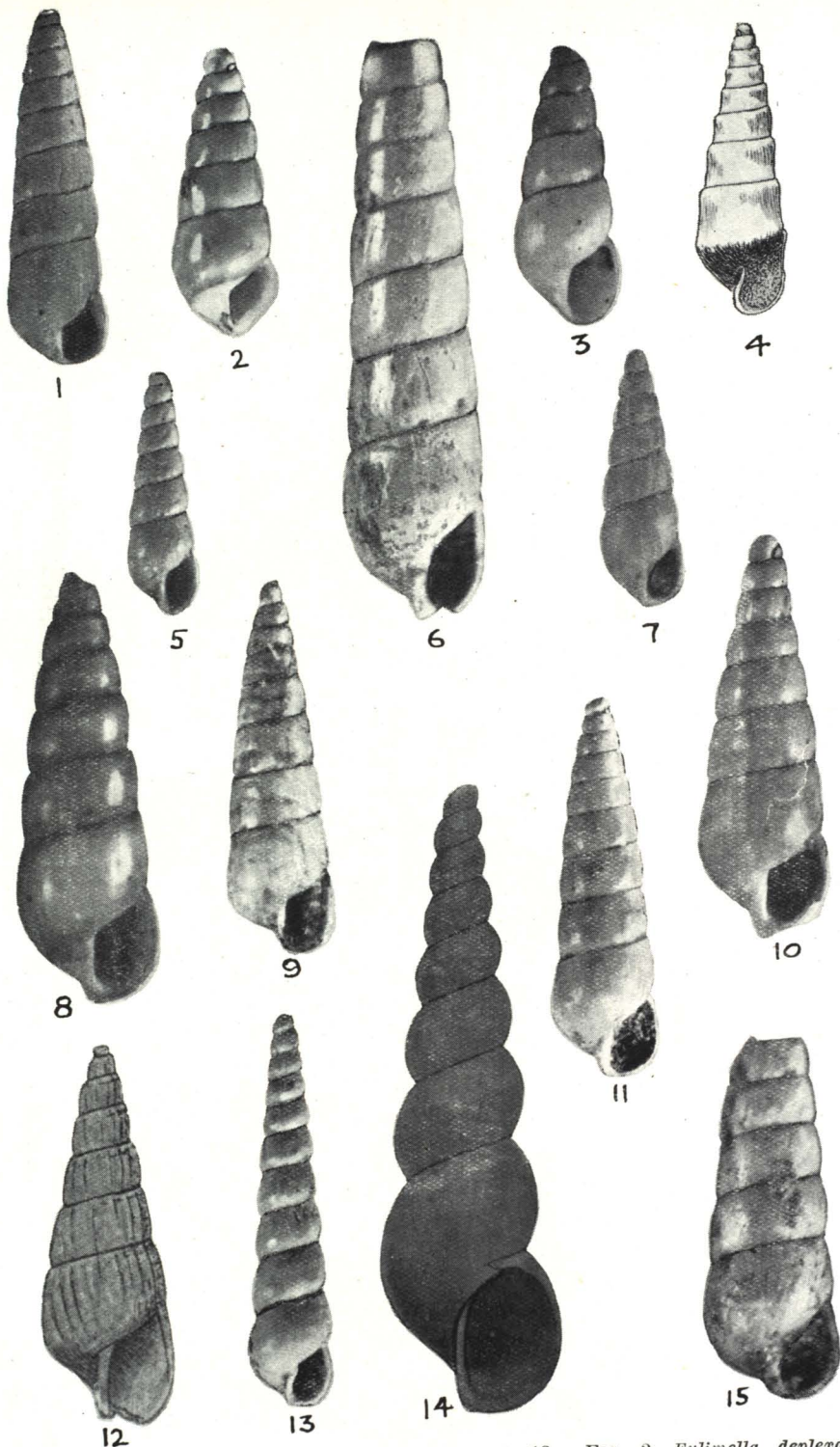
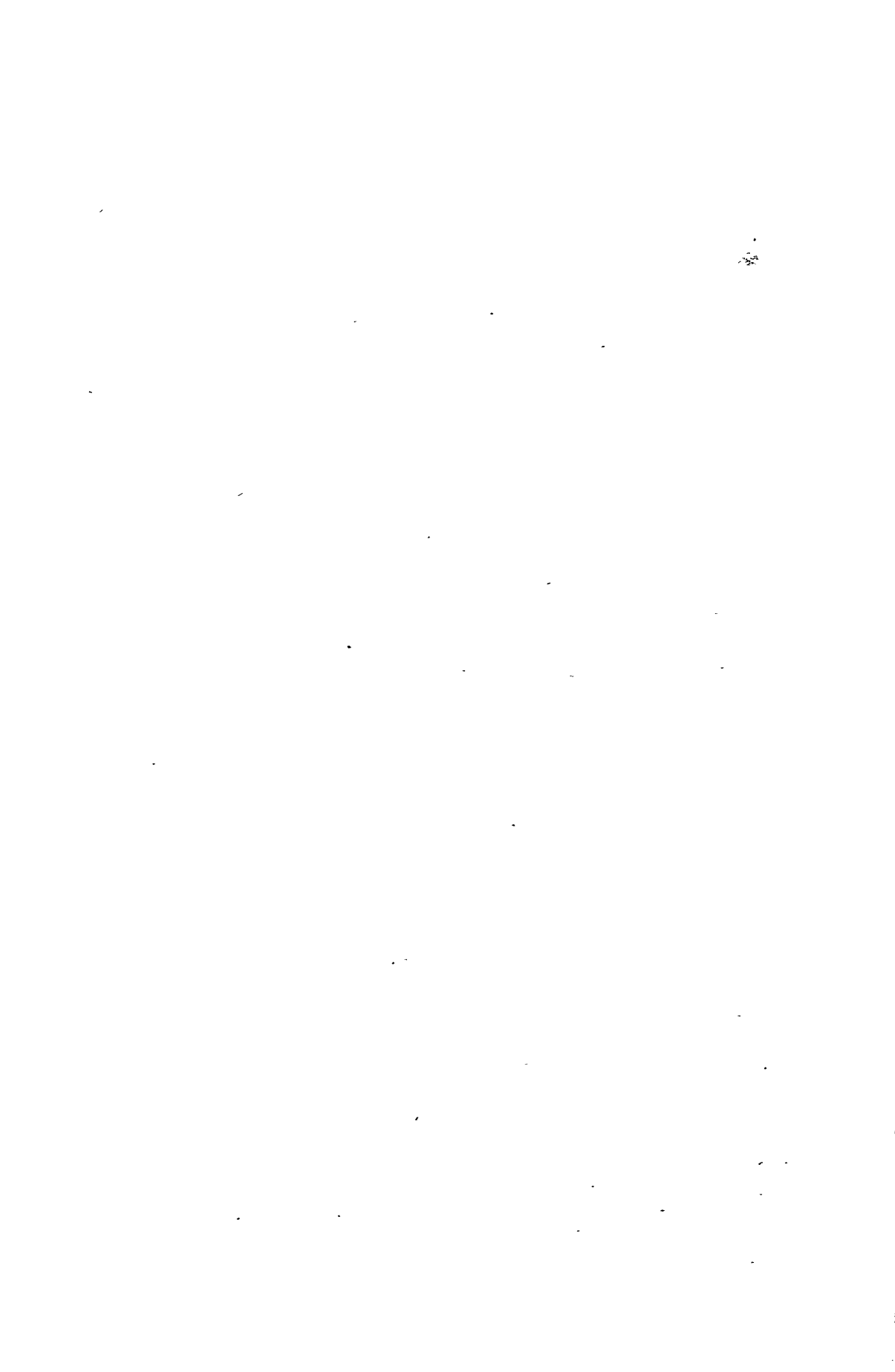


FIG. 1—*Eulimella cori* n.sp.; holotype. $\times 13$. FIG. 2—*Eulimella deplexa* Hutton; holotype. $\times 13$. FIG. 3—*Eulimella media* Hutton; holotype. $\times 13$. FIG. 4—*Eulimella mestayerae* (Marwick); holotype. FIG. 5—*Terelimella hutchinsoniana* n.gen. n.sp.; holotype. $\times 13$. FIG. 6—*Eulimella alpha* n.sp.; holotype. $\times 13$. FIG. 7—*Eulimella coena* Webster; holotype. $\times 13$. FIG. 8—*Eulimella limbata* Suter; holotype. $\times 13$. FIG. 9—*Eulimella waihoraensis* (Marwick); holotype. $\times 13$. FIG. 10—*Eulimella levilrata* Murdoch and Suter; holotype. $\times 13$. FIG. 11—*Eulimella larga* n.sp.; holotype. $\times 9.4$. FIG. 12—*Eulimella avamoacensis* Marshall and Murdoch; holotype. $\times 7.1$. FIG. 13—*Terelimella ototarana* n.gen. n.sp.; holotype. $\times 13$. FIG. 14—*Terelimella larochi* (Powell); holotype. $\times 38$. FIG. 15—*Eulimella beta* n.sp.; holotype. $\times 13$.

To face page 56.



original figure is a much more accurate one, though it does not represent the shell as sufficiently slender, and shows the suture with a margin, which actually is not present.

The type is worn and the surface is badly rubbed. Good topotypes show microscopic striae and scratches between sutures and on base.

Height, 2.7 mm.; width, 0.9 mm. (holotype).

Locality: Takapuna, Auckland.

Type in War Memorial Museum, Auckland.

***Eulimella media* Hutton. (Fig. 3).**

1884. *Eulima media* Hutton, *Trans. N.Z. Inst.*, vol. 17, p. 318, pl. 18, fig. 13.

1893. *Eulima* (?) *media* Hutton, *Macleay Mem. Vol.*, Plioc. Moll., p. 56, pl. 7, fig. 43.

1915. *Pyramidella (Eulimella) media* (Hutton). Suter, *N.Z.G.S. Pal. Bull.*, no. 3, p. 15.

The type and an immature paratype are the only specimens the writer has seen. The species is quite distinctive. It has a large blunt embryo, strongly convex whorls, and deep suture. It is unusual in the possession of low axial plications, especially visible towards the summits of the whorls. Microscopic striae are present between sutures and on base.

Suter (*loc. cit.*, p. 15) stated that this species stands very close to *levilirata* Murdoch and Suter. Actually it stands no nearer to *levilirata* than to any of the other Neozelanic species, and it does not seem to come particularly close to any of them.

Height, 3.0 mm.; width, 1.0 mm. (holotype).

Locality: Wanganui (Castlecliffian).

Type in Canterbury Museum, Christchurch.

***Eulimella awamoensis* Marshall and Murdoch (Fig. 12.)**

1921. *Eulimella awamoensis* Marshall and Murdoch, *Trans. N.Z. Inst.*, vol. 53, p. 83, pl. 19, fig. 4.

No specimens have been studied during this revision. The holotype cannot at present be traced, and no *Eulimella* from Awamoan and other Awamoan horizons correspond to Marshall and Murdoch's figure and description. The figure does not show the "channelled" sutures of the description. The presence of feeble axial riblets seems to be distinctive, as this has been found in no other species, save *media* Hutton, which is a very different style of shell, however.

Height, 7.0 mm.; width, 2.25 mm.

Locality: Awamoan, Oamaru (Awamoan).

Marshall and Murdoch state that in general form their species is near *E. limbata*. This does not seem to be so, at least judging by their figure. *Limbata* has not the straight outline nor the sub-angulation of periphery, and the suture is different.

The figure is a reproduction of Marshall and Murdoch's illustration.

Genus *TERELIMELLA* n.gen.Type (o.d.): *Terelimella ototarana* n.sp.

The name *Terelimella* is for a compact little assemblage consisting of two mid-Tertiary fossils and two Recent species. Of the fossil species one is Ototaran in age and the other Hutchinsonian.

The general ensemble of shell features at once sets these species apart from other Eulimellids. The chief group-characters are the very exsert, erect protoconch of a single heterostrophic turn with large, excentric lateral nucleus; the acicular habit and distinct sutures.

KEY TO SPECIES OF *TERELIMELLA*.*

Shell small but not minute.

Shell extremely attenuate, needle-like; whorls lightly convex; weak plait present; protoconch not sharply rounded at summit

ototarana

Shell not so attenuate nor so needle-like; whorls flat above, bulging and overhanging below; no fold on columella; protoconch sharply rounded over summit

hutchinsoniana

Shell minute.

Whorls distinctly convex, evenly rounded; suture strongly cut in; apex small; columella straight

*larochiei****Terelimella ototarana* n.sp.** (Fig. 13).

Shell very small, slender and exceedingly attenuate, outlines straight. Post-nuclear whorls 9, similar in shape to those of *hutchinsoniana* n.sp., but not quite so flat above and the anterior bulge more prominent, so that whorls overhang suture more; suture a little more impressed. Protoconch very high, exsert, sharply convex at summit and of one volution; nucleus large, excentric, a little immersed. Sculpture of extremely faint, close microscopic striae and a fine incised line sub-margining suture of upper whorls of spire. Body-whorl strongly convex; aperture ovate, widely angled behind, rounded in front; columella set vertically arcuate, a low, rounded fold above giving it sinuosity, but in some specimens it is practically straight and the fold less obvious; parieto-columellar junction well differentiated; inner lip not callused; basal lip rounded; outer lip very lightly convex.

Height, 4.0 mm.; width, 0.8 mm. (holotype).

Locality: Chatton, near Gore, Southland (Ototaran).

Type in Auckland Museum (ex writer's collection).

The much more attenuate form, more bulging and overhanging whorls, and presence of low fold on the columella distinguish this species from *hutchinsoniana*.

***Terelimella hutchinsoniana* n.sp.** (Fig. 5).

Shell very small, slender and considerably attenuate, outlines straight. Post-nuclear whorls 6 in number, flat above, descending obliquely exactly from suture, rapidly convex (or sub-angled) below overhanging suture; suture but little impressed. Protoconch hetero-

* *Eulimella aupouria* Powell, described since preparation of the manuscript of the present paper, is not included in the key.

strophic, high, exsert, sharply convex (not evenly rounded) at summit and of one volution; nucleus large, excentric, a little immersed. Sculpture absent, except for a faint microscopic incised line as a sub-margin to suture. Body-whorl flattish above, convex over periphery, lightly convex on base, which rapidly retreats to axis of shell; aperture ovate, angled behind, rather narrowly rounded in front; columella straight, vertical, its base a little expanded, no plait; parieto-columellar junction sub-angled and well differentiated; basal lip narrowly rounded; inner lip not callused; outer lip straight.

Height, 2.5 mm.; width, 0.75 mm. (holotype).

Locality: Clifden, Southland, band 6A (Hutchinsonian).

Type in Auckland Museum (ex writer's collection).

Terelimella larochei (Powell). (Fig. 14).

.930. *Eulimella larochei* Powell, *Trans. N.Z. Inst.*, vol. 61, p. 544, pl. 87, fig. 22.

This is a much smaller shell than either of its fossil relatives, and has the whorls more strongly and evenly convex and not bulging low down, slightly sinuous growth-striae, and less attenuate spire.

Height, 2.17 mm.; width, 0.54 mm. (holotype).

Localities: Mongonui Head, in 6–10 fathoms (type); Tryphena Bay, Great Barrier Island, in 5–6 fathoms; Awanui, in 12 fathoms; Castlecliff (Pliocene).

Type in collection of Mr A. W. B. Powell, Auckland.

The figure is a reproduction of Powell's illustration.

Terelimella aupouria (Powell).

1937. *Eulimella aupouria* Powell, *Discovery Reports*, vol. 15, p. 210, pl. 54, fig. 9.

This minute species was taken in 92 m. off Three Kings Islands.

Height, 2.25 mm.; width, 0.58 mm. (holotype).

Type in British Museum of Natural History, London.