New Tertiary Mollusca from New Zealand. No. 2.

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UNLESS otherwise indicated the fossils described below have been collected by the writer. He is greatly indebted to Dr H. J. Finlay for assistance in identification, and wishes also to thank Dr W. N. Benson and Dr J. Marwick for the loan of material. In a note at the end of this paper Dr Finlay has compared the Volute faunas of Ardgowan and Target Gully shell-beds, and has discussed some doubtful points relating to certain genera and species of Volutes.

Genus **Trichomusculus** Iredale, 1924.

Type *Modiolaria barbata* Reeve.

Trichomusculus lornensis n. sp. (Fig. 41).

Shell very small, highly inflated, especially anteriorly; beak almost at anterior end, full and strongly curved over; valve angled behind posteriorly from beak, the angle becoming broader and lower towards posterior margin. Dorsal and ventral margins sub-parallel, dorsal one straight, ventral lightly convex over anterior three-quarters and slightly concave at posterior fourth. Posterior dorsal surface (above angle) lightly concave, centre surface of valve flattish. Whole surface covered with concentric striae, some more prominent than others and marking more definite pauses in growth; posterior end covered, from a little in front of the dorso-posterior ridge, with fine radiate riblets, about own width apart and finely crenulating the margin; a few very faint radials immediately under the beak; medium part of shell smooth except for growth lines. Interior not seen as the shell is firmly cemented to a small brachiopod.

Height, 4 mm.; length, 9 mm.; inflation (1 valve), 2·9 mm.

Locality.—Waiarekan tuffs, Lorne, near Oamaru.; outcrop " A " of Marwick. *Trans. N.Z. Inst.*, vol. 56, p. 307; 1926. (Waiarekan).

Type (only specimen) in writer's collection.

Ancestral to *barbata* Reeve, but differs in being more rectangular in outline, not winged posteriorly, fuller at beak and in having length less relative to height. *Barbata* has angulation of valve sharper and its extremity at postero-ventral margin, that of *lornensis* reaching to about the lower third of posterior margin.

This is the first fossil representative of the genus to be recorded from the early Tertiary of New Zealand. *T. barbata* is not uncommon at Castlecliff, but no other occurrence of the genus as a fossil in New Zealand is known to the writer; it is, however, present in the Janjuian of Australia (specimens in the collection of Dr Finlay).

Talabrica nummaria Powell. (Figs. 36, 37).

A description of this shell was originally included in the present paper, but Powell's prior recognition of the species (*Rec. Auck. Inst. Mus.*, vol. 1, No. 2, p. 109; 1931) has made it necessary to suppress the name that had here been given it. This is rather fortunate, for Powell's figures show that the present writer's specimen (also from Nukumaru) is a worn shell and would not have been a good type.

Genus **Semeloidea** Bartrum and Powell, 1928.

Type *S. donaciformis* Bartrum and Powell.

Semeloidea miocenica n. sp. (Fig. 46).

An ancestor of *S. donaciformis*, a Pliocene shell and hitherto the only recorded species of the genus. *Miocenica* is readily separable by reason of its slightly larger size, greater inflation of shell and beak, and fewer and weaker radial corrugations, of which there are three as against five in *donaciformis*; width of grooves less than that of ridges; posterior margin broken away; posterior dorsal margin straight and not arched up; anterior margin relatively higher and more rounded compared with *donaciformis*. In both species the radial sulcations cause marginal crenulations below, but in *miocenica* these are not as pronounced as those of the Kaawa shell, and are wider and shallower. Owing to the fractured state of the shell it has been impossible to remove the matrix to examine the interior.

Height, 6·5 mm.; length, 9·5 mm.; thickness, 2·5 mm.

Locality.—Rifle Butts, Oamaru (Awamoan).

Holotype (single right valve) in writer's collection.

Bartrum and Powell (*Trans. N.Z. Inst.*, vol. 59, p. 158; 1928) located their genus somewhere near *Semele;* but Finlay (*Trans. N.Z. Inst.*, vol. 61, p. 255; 1930) has stated that *Semeloidea* should be included in the Erycinidae.

Genus **Loboplax** Pilsbry, 1893.

Type *Chiton violaceus* Quoy and Gaimard.

Loboplax ashbyi n. sp. (Fig. 45).

The species is represented by a single intermediate valve only. Valve well arched up, its flanks meeting at an angle of about 90°, strongly beaked behind. Tegmentum narrower in front, slightly lobed at each side behind. Jugal tract of dorsal ridge narrow, widening anteriorly and bordered by elongated, flat-topped ridges running in an antero-posterior direction. Latero-pleural areas sculptured by radially disposed, elongated, flat-topped, low granules. Sinus not deep, but right sutural lamina partly broken away. Insertion plate with one slit nearer posterior end. Internally a widely triangular, transverse callus extends across below beak, grooved along its anterior edge, as a surface of articulation for succeeding valve.

Height, 4 mm.; length, 3·5 mm.; width, 5·5 mm.

Locality.—Shell Gully, Chatton, near Gore, Southland (Ototaran).

Type in writer's collection.

The first fossil representative of the genus to be recorded from New Zealand. Differs at sight from the genotype in the high arch of valve, less definitely differentiated and narrow jugal tract, more prominent beak and different shape of tegmentum.

Named in honour of Mr E. Ashby, who has already described *Callochiton chattonensis* from these beds.

Genus **Zeminolia** Finlay, 1926.

Type *Minolia plicatula* Murdoch and Suter.

Zeminolia fossa n. sp. (Figs. 1, 2, 3).

Shell small, orbicular, very widely umbilicate. Spire equal in height to aperture, angle obtuse. Periphery of body-whorl raised into two thin, sharply elevated keels separated by a deep, narrow channel. Several very faint, broad, low spirals on upper convex surface of whorls. Suture deeply channelled; each whorl attached to upper surface of lower and therefore keel of preceding whorl hidden; whorl rising from suture above at 45° and then descending outwards at angle of 90° to keel below as a lightly convex surface. Axial sculpture present as retracted, bluntly rounded ridges beginning on upper angle around channel of suture and dying out towards keel below. The sutural ridge is therefore nodular. On early post-embryonic volutions the axials descend into channel of suture. Axial sculpture not quite so strong on last whorl. Protoconch of one volution, large, bulbous, smooth, its suture deeply excavated even in earliest stages; ending in an expanding well-marked varix. The next phase of development is represented by ¾ of a volution with 5 or 6 coarse spirals about twice own width apart, emerging in the first instance abruptly from aperture of embryo. This is succeeded by the first appearance of 4 or 5 weak axials, followed by rapid axial acceleration. Here only three of the spirals persist, the upper one as a row of weak nodules on axials on flank of sutural channel, but soon becoming obsolete; the second as the strong upper nodular ridge of adult whorls. Base lightly convex, unsculptured, sharply angled around wide, perspective umbilicus, which is spirally lirate within on concave descending portion. Circum-umbilical angle crenulated. Aperture quadrate, interior nacreous.

Height, 2·9 mm.; greatest diameter, 4·5 mm.

Locality.—Greensands about a mile below Wharekuri, left bank of Waitaki River (Ototaran).

Holotype and a very juvenile paratype in writer's collection.

Finlay (*Trans. N.Z. Inst.*, vol. 57, p. 360; 1926) has separated the Neozelanic Minolioids into two series based primarily on embryonic characters. For those with " a tiny inconspicuous embryo " as well as other distinctive shell characters he has provided the genera *Antisolarium* and *Conominolia,* while *Zeminolia* and *Zetela* have a " disproportionately large and bulbous embryo and different umbilicus," that of *Zeminolia* being very wide and perspective. The new

shell has been compared with *M. plicatula* (the genotype) and is referred to *Zeminolia* as an ancestor of *plicatula* on account of its wide umbilicus and closely similar embryonic features. Microscopic examination shows that the smooth embryo of *plicatula* is marked off from the rest of the shell by a varix very similar to that of the shell just described, but less prominent. *Plicatula* differs in having whorls much more rounded, strong, regular, evenly-spaced spirals, very weak, but similarly disposed axials, flat shoulder and suture not channelled. The sculpture of the new species, however, can reasonably be expected to be bridged by connecting links with that of the Recent shell.

Genus **Astræa** Bolten, 1798.

Type *Trochus imperialis* Gmelin = *heliotropium* Martyn.

Astræa stirps n. sp. (Figs. 4, 7, 11).

Ancestral to *heliotropium* Martyn. A large, conic shell carrying prominent spines along sutures of all post-nuclear whorls and around periphery of body-whorl, which has a strong keel that expands at intervals of about an inch into heavy, rounded, obliquely costate spines. These originate as an overfolding of the shell substance in the direction of growth. From the rear of the folds the large, hollow spines protrude, directed forwards, proximally resting on upper part of whorl below, but distally free, and at least an inch in length on penultimate whorl. The overfolded part runs forward as far as the root of the next spine and then obliquely towards suture above, so that the sculpture is in sections and an apparently new set of spirals emerges from beneath each fold. *Heliotropium* has 18 spines on body-whorl; the new species 8 or 9. The sculpture consists of spirals in two series, both trending obliquely at a low angle across whorls. The primary spirals (8 or 9 per whorl) are granular, not scaly as in *heliotropium,* the granules spaced about their diameter apart, the spirals separated by interstices equal to their own width. The earlier whorls have primaries only, but on the ante-penultimate whorl secondary spirals first appear in the interstices, emerging abruptly from beneath one of the folds; at first one and later two. On penultimate whorl the width of interstices becomes greater than that of the primaries, and the secondaries are now three in number. The primaries are becoming weaker, less regular, wavy, and their granules weak and often spaced more widely, while the secondary sculpture is a good deal more noticeable. This is but a transition stage, for on the body-whorl the primaries are almost obsolete, the whole surface now sculptured by wavy, closely nodular secondaries. Whorls fairly evenly convex, flattened above; but those of *heliotropium* are more shouldered. *Heliotropium* has a wide, perspective umbilicus; but the new species has the umbilicus partly covered by reflection of inner lip. Convex outer zone of base with 5 or 6 low, wide, faintly nodular spirals, interstices and spirals alike covered by secondaries; inner excavated zone descending to umbilicus strongly grooved by about 12 sharp, obliquely raised, curved ridges which represent earlier growth-reflections of inner lip. Height of spire greater than that of aperture. Protoconch missing. Operculum (young and

adult ones from band 6B, Clifden) similar to that of a Pliocene specimen of *heliotropium* from Castlecliff; oval, with excentric nucleus; outside smooth. Flaking around edges of adult specimen shows up minute, flexuous, divaricating spirals crossing growth lines at right angles; a well-marked ridge near to and concentric with outer margin of inside of operculum. (Fig. 5).

Height, 67 mm.; width, 75 mm.; height of spire, 37 mm.

Locality.—Clifden, Southland. Collected from bed B on left bank of river, equivalent to the basal beds of band 7 on right bank (Hutchinsonian).

Type (collected by Mr F. J. Turner) in writer's collection. Two paratypes from band 6A in collection of Dr H. J. Finlay.

This is the second fossil species of *Astræa* from New Zealand, its companion, *A. bicarinata* Suter (*N.Z. Geol. Surv. Pal. Bull.* No. 5, p. 6; 1917) being a Miocene shell from the shell-bed at the base of the Pareora beds, Trelissick Basin, Canterbury. In contrast with *A. stirps* it is a smaller shell with a bicarinate body-whorl and less evident fine lirae between the coarser sculpture.

A. hudsoniana (Jonston) from the Table Cape beds of Tasmania, seems to be intermediate between *heliotropium* and the species just described. It agrees with the former in general shell form, in having numerous spines and open umbilicus, but comes closer to the new species by reason of the granular character of its spiral sculpture. In the topotype examined, however, one of the spirals on the base and another on the upper surface of the last whorl, are distinctly scaly.

A large specimen of *A. heliotropium* from the Pliocene beds at Castlecliff, Wanganui, is figured for comparison (Figs. 9, 12).

Genus **Notoacmea** Oliver, 1915.

Type *Patelloida pileopsis* Quoy and Gaimard.

Subgenus **Parvacmea** Oilver, 1915.

Type *A. daedala* Suter.

Notoacmea (Parvacmea) chattonensis n. sp. (Fig. 47).

Shell very small, oval, elevated, apex at about anterior fifth. Sculpture of numerous fine, closely beaded radials (preserved only on posterior). Microscopic incremental lines present. Anterior slope concave immediately below apex, thereafter straight; posterior slope lightly convex, flatter on top behind apex; margin sharp; radials faintly traceable within.

Height, 1 mm.; length, 1·8 mm.; width, 1 mm. (Holotype).

Locality.—Shell Gully, Chatton, near Gore, Southland (Ototaran).

Type and a number of paratypes in writer's collection.

Distinguished from *P. nukumaruensis* Oliver, the only other Tertiary species, by its concave anterior slope, presence of definite radial sculpture and smaller size.

This record and that of *Loboplax ashbyi* described above emphasize further the shallow water facies of the Chatton deposits.

Genus **Cheilea** Modeer, 1793.

*Type *Patella equestris* Linné.

Cheilea plumea n. sp. (Figs. 34, 35).

Shell small, fragile, almost circular in outline, elevated at apex; posterior slope convex at first, flatter towards margin; anterior end concave immediately below apex, thereafter faintly convex; apex very near anterior, prominent and curved over. Surface covered with fine, flexuous growth-lines, some of which towards margins are strong concentric ridges. Fine, wavy radial striae over whole surface, on the average about own width apart. Distally these striae are not so regularly radial, but cross the successive growth sections obliquely and at varying angles for each section. Margin smooth internally, but deceptively rudely crenate when viewed dorsally. Internal appendage long, regularly convex in front, not spread widely; each lateral horn of appendage traversed externally and medially by a low, rounded ridge, becoming obsolete towards distal end of convex stem of appendage.

Height, 4 mm.; diameter (approximate), 12 mm.

Locality.—New road cutting about half a mile behind racecourse, Clifden, Southland. The equivalent of horizon 7C (of the beds on the river).

Type (sole specimen) in writer's collection. Collected by Mr F. J. Turner.

This adds another genus to the fauna of New Zealand. It has, however, been recorded from Australia by Hedley (*P.L.N.S.W.*, 48, pt. 3, p. 309; 1923), who has discussed the Austral form under the name *Cheilea undulata* Bolten. It has not been recorded as a fossil from Australia or from Java by Martin, but has been found in the Miocene of Jamaica by Woodring. No Recent specimen has been available for comparison, but it is improbable that the Hutchinsonian species here described is the same as a Recent form. It is very interesting to find this definitely tropical genus turning up in the Tertiary of New Zealand.

Genus **Oniscidia** Swainson, 1840.

Type *O. cancellatum* Sowerby.

Oniscidia finlayi n. sp. (Figs. 6, 10, 13).

Shell of moderate size, spire low, angled at about 90°, and $\frac{1}{5}$ length of shell. Protoconch (Fig. 44) pointed, of $2\frac{1}{2}$ to 3 smooth convex turns, nucleus minute; earliest sculpture consists of distant axials extending across whole width of whorl; later post-embryonic whorls angled above middle, axials dying out on the concave shoulder before reaching suture above; suture undulating over fairly strong, sharp axials, placed about twice own width apart; 3 to 4 low, wide spirals on shoulder; one strong one below periphery giving rise to a

*See Woodring, *Carnegie Inst. Wash. Pub.* No. 385, p. 374; 1928.

second row of nodules where it crosses the axials. Eleven strong, flat spiral cords on body-whorl, nodulating the axials, of which there are 11 also. Whole surface covered by fine, vertically raised axial lamellae, indicating growth stages, on shoulder antecurrent towards suture, and about 2 per mm. on the flat-floored interaxial spaces, but densely packed together on axials themselves. Aperture long, oblique; angled behind; interior canal short, open, fairly wide. Outer lip very thick, reflected; 4 strong, evenly spaced denticles along middle third of its length. Inner lip as a heavy callus spread widely over body-whorl and almost on to dorsal surface on neck of canal; but soon rapidly descending over fasciole to end in a sharp beak. About 10 unevenly spaced denticles on pillar, almost outside aperture, and indications of a second fainter row above and behind. Callus of inner lip merges posteriorly into thickened outer lip; but junction is channelled by a canal extending from angle within the aperture. The mass of callus here stands free of whorl and ascends to level of plane of suture of penultimate whorl.

Height (holotype), 40 mm.; spire, 8 mm.; diameter, 25 mm.

Locality.—Clifden, Southland. Holotype from left bank of river, bed " C " equivalent to base of 7 on right bank (Hutchinsonian). Two paratypes (one in collection of Dr H. J. Finlay) from horizon 6B (Hutchinsonian).

Holotype and a fragmentary paratype in writer's collection.

Powell and Bartrum (*Trans. N.Z. Inst.*, vol. 60, p. 428; 1929) were the first to record this genus in the fauna of New Zealand by describing *Morum (Oniscidia) harpaformis*, a member of their very interesting Tertiary (Hutchinsonian) molluscan fauna from Oneroa, Waiheke Island. The present shell is so obviously distinct from the Waiheke one that comparison is unnecessary. The type of *Morum* is *M. oniscus* Gmelin, and the Clifden shells agree better with *M. cancellatum* Sby, the type of *Oniscidia*. *O. finlayi* looks very like the figure of *Morum domingense* Sow. (*U.S. Nat. Mus. Bull.* 90, p. 85; Pl. 12, Fig. 28; 1915), from the Oligocene of Florida; the sculpture is almost a replica, but the aperture seems much narrower, and moreover Dall places the American shell in the section *Herculea* Hanley (G.-T.: *M. ponderosum* Hanley), characterised by a deep posterior notch to the aperture.

This again is a tropical genus, quite foreign to New Zealand's present climate.

Named in honour of Dr H. J. Finlay, of Dunedin.

Genus **Euspinacassis** Finlay, 1926.

Type *E. pollens* Finlay.

Euspinacassis emilyae n. sp. (Figs. 14, 15).

Shell fairly large, not of heavy build for its size, spire whorls with a row of tubercles at angle somewhat above middle; body-whorl with 4 rows of tubercles, those of the lowest row very weak and soon becoming obsolete towards outer lip; 11 in topmost row.

Tubercles project vertically and show tendency to be laterally compressed. Whole surface covered by close spiral cords, the last six on the base (below last row of nodules) more regular and prominent and ornamented with spiral lines. Spire about half the height of the aperture. Spire whorls lightly concave both above and below the angle; a distinct concavity between tubercles in first two rows on body-whorl. Suture slightly undulating over hidden row of tubercles, appressed and margined below by a narrow swollen band. Outer lip thickened, reflexed, and carrying 8 or 9 denticles within, distinct in front, but becoming faint posteriorly. Inner lip spread as a wide and thick callus (not as thick as that of *muricata* Hector) almost completely covering nodules and reaching on to shoulder between tubercles of top row. Callus plate sunken over umbilicus, but rising anteriorly to surmount the low, rounded ridge on the fasciole. In *muricata* the callus plate is flat. Pillar with 3 or 4 small, irregular plaits below. Fasciole almost completely covered ventrally. A sharp keel behind separates it from the wide, deep groove leading to the umbilicus. In *E. muricata,* as the pillar is more erect and its base a good deal more twisted, the fasciole is relatively wider when seen laterally and the groove behind much narrower. Further, in the Pakaurangi Point species this groove widens posteriorly, whereas in the new species the channel becomes slightly narrower towards the umbilicus.

Height, 55 mm.; diameter, 36 mm.

Locality.—Ardgowan shell-bed, Oamaru (Awamoan).

Type in writer's collection.

Finlay (*Trans. N.Z. Inst.,* vol. 56, p. 231; 1926) provided a new genus, *Euspinacassis,* to include *pollens* Finlay, *muricata* Hector, and *grangei* Marwick; to these must be added *E. multinodosa,* since described by Powell (*Trans. N.Z. Inst.,* vol. 59, p. 634; 1929). In the same paper (p. 636) Powell discussed the generic position of *grangei* Marwick, and for reasons advanced preferred to locate this shell in *Xenophalium*; but Dr Finlay and Dr Marwick consider that for the present it is better left in *Euspinacassis.*

A topotype of *E. muricata* (Hector) is figured for comparison (Fig. 16).

Named in honour of my mother.

Genus **Magnatica** Marwick, 1924.

Type *Polinices planispirus* Suter.

Magnatica powelli n. sp. (Figs. 38, 39).

Shell large, ovate; spire very low, whorls four; suture tangential; growth-lines sinuous above, but soon straighten out; faint spiral lines and bands of varying width, low and flat, over whole whorl; funicle almost obsolete; umbilical thread distant; umbilicus bounded by a distinct angulation arising below and sweeping around to enter umbilicus below parietal callus.

Height, 39 mm.; diameter, 40 mm. (Holotype).

Locality.—Ardgowan shell-bed, Oamaru (Awamoan).

Type and several paratypes in writer's collection.

Very close to *planispira* (Suter), but with less elevated spire and later whorls embracing earlier ones a good deal more. *Planispira* is typically a taller, less oblique shell with body-whorl much less convex above periphery. This greater fullness of the body-whorl between the plane of the suture and a parallel plane passing through the top of the umbilicus readily distinguishes the Ardgowan shells from *planispira.* For comparison of the two species, see Figs. 39, 40.

The low, flat spire of *powelli* separates it at sight from *fons* Finlay.

Finlay (*Trans. N.Z. Inst.,* vol. 61, p. 59; 1930) has pointed out the differences in umbilical characters between *Magnatica* and *Spelaenacca.*

Named after Mr A. W. B. Powell, of Auckland.

Genus **Metamelon** Marwick, 1926.

Type *Miomelon clifdenensis* Finlay.

Metamelon prominima n. sp. (Fig. 25).

Shell small, elongately narrowly ovate; spire about $\frac{5}{8}$ height of aperture, outlines straight, conic; nucleus missing; whorls about $4\frac{1}{2}$; periphery very slightly below middle, outline faintly convex below; shoulder straight towards suture, lightly depressed immediately above periphery; body-whorl regularly convex below periphery, but outline straight towards fasciole, which is strong and raised. Body-whorl smooth; spire whorls, though partially decorticated, show faint closely spaced axials, extending over whole whorl and retracted below. Close spiral striae present on last two whorls. Aperture long and narrow; anterior canal wide, notch only moderate; outer lip thin, sinuous, sharp; inner lip spread moderately; columella with 5 plaits, the strongest being second from behind, all oblique, but anterior plaits progressively more oblique than those behind.

Height, 38 mm.; diameter, 12·5 mm.

Locality.—Ardgowan shell-bed, Oamaru (Awamoan).

Type in writer's collection.

M. minima Marwick has probably been derived from this species by a further straightening out of shoulder and suppression of axial sculpture.

Metamelon informis n. sp. (Fig. 26).

Shell rather small, thick and solid for its size; spire just over half height of aperture; apex and earliest whorls missing; shoulder first appears on antepenultimate whorl, more excavated than in *reverta,* but not so deep as in *clifdenensis;* periphery nearly two-thirds above lower suture. Axials fairly strong, persisting from suture to suture, though not so well marked on shoulder, slightly nodular on periphery, widely spaced (set twice own width apart);

axials 10 on body-whorl as against about 16 in *reverta*; they extend halfway from periphery to fasciole as quite distinct ridges, but die out quite early in *reverta*. Aperture well notched in front; columella plaits 4, more horizontal behind.

Height, 46 mm. (approx.); diameter, 17 mm.

Locality.—Ardgowan shell-bed, Oamaru (Awamoan).

Type (unique) in writer's collection.

Obviously developed from *reverta* by decrease in number, but increase in prominence of axials.

Metamelon patruelis n. sp. (Figs. 17, 18).

Shell rather small, light of build, spire two-thirds height of aperture, conic, nucleus smooth and with high spike. Post-embryonic whorls 4½. First whorl below nucleus with almost vertical, flat sides; succeeding whorls lightly convex; a slight sub-sutural depression arises on third whorl, and on next and later ones forms a concave shoulder; the periphery somewhat above middle of whorl. Axial sculpture not prominent; practically absent from body-whorl of holotype except for faint indications of low nodules on periphery, but seen more distinctly on a paratype; axials of early whorls (16 in number) blunt, only faintly nodular, extending across the whole whorl; growth lines flexed posteriorly. Body-whorl convex below shoulder, contracting late but rapidly, constricted before reaching the fairly strong fasciole. Aperture deeply notched anteriorly; inner lip moderately spread over whorl; columella with 5 plaits, topmost horizontal, others becoming progressively more oblique below.

Height, 47 mm.; diameter, 18 mm.

Locality.—Ardgowan shell-bed, Oamaru (Awamoan).

Type and several paratypes in writer's collection.

This species has affinities with *inermis* (Finlay) on the one hand, and with *reverta* (Finlay) on the other. Its weak development of axial sculpture relates it to the former. It agrees very closely in outline and build with *reverta*, but differs in having axials less developed, fewer in number, and not persisting as prominent nodules on last whorl.

Genus **Spinomelon** Marwick, 1926.

Type *Lapparia parki* Suter.

Spinomelon henryi n. sp. (Figs. 22, 23).

Shell large, solid. Spire turreted, a little less in height than aperture. Early whorls convex, but they soon develop a shoulder which later becomes concave and prominent. Whorls angled at middle; axials numerous, curved, twice own width apart, 16 on later whorls and about 20 on earlier ones; axials thin, narrow, extending from suture to suture of earlier whorls and there not nodular; nodules first develop on antepenultimate whorl and become progressively more prominent; with the appearance of nodules the shoulder becomes

more excavated and the axials crossing it weak, almost obsolete on shoulder of last whorl. Axials of body-whorl die out at about a third of the distance from angle to anterior end. Body-whorl cylindrical behind, later contracting slowly to neck. Outer lip broken away; inner lip as a thick pad ridged along outer border, at first descending obliquely from posterior angle of aperture and then vertically down and over fasciole to beak; columella with 5 thick folds more horizontal posteriorly; aperture long and probably moderately wide. Apex missing.

Height, 107 mm.; diameter, 35 mm.

Locality.—Clifden, Southland, horizon 6B (Hutchinsonian).

Type and juvenile paratype in writer's collection.

Named in honour of my father, Dr C. H. Laws, of Auckland.

Spinomelon otaioensis n. sp.

The material on which this species is founded consists of one shell, of which the lower half of the body-whorl is missing. The axial sculpture aud shape of whorls is almost a replica of that of the preceding species, except that the axials are fewer in number, more widely spaced, and perhaps somewhat sharper, and the nodulations appear a little earlier. On the shoulder the axials are more nearly vertical, whereas those of *henryi* are a good deal more oblique (antecurrent upwards). *Otaioensis* looks adult, and therefore is a smaller species and of lighter build than the Clifden one. Axials 15; *henryi* (same stage) 20. Apex of two smooth turns, nucleus caricelloid.

Height, 70 mm.; width, 25 mm. (dimensions estimated).

Locality.—Blue Cliffs, South Canterbury, blue sandy clays above limestone (Hutchinsonian).

Type in writer's collection.

The above two species are apparently allied to *A. residua* Finlay (see note by Dr Finlay at end of this paper) in their possession of numerous, narrow axials reaching across whole width of spire whorls, but obsolete on shoulder of later part of last whorl, though they differ in that the later whorls are most prominently angled. *A. whakinoensis* Marwick, a Pliocene species, is a less slender shell with a wide body-whorl and a very strong fasciole; it has the whorls angled above and not at the middle, and a thinner but wider callus to inner lip.

They are apparently on a different line of Spinomelon from the group centred about *S. parki* (Suter), and are distinctive in the great number of axials sharply nodulated at periphery, well excavated shoulder and angulated whorls. They are obviously congeneric, and bear strong resemblance in many respects to *Alcithoe,* but the caricelloid nucleus of *otaioensis* has made it necessary to locate them in *Spinomelon.*

As the Blue Cliffs shell was collected after this paper had been completed, a figure will be included in the next of this series.

Genus **Alcithoe** H. and A. Adams, 1858.

Type *Buccinum arabicum* Martyn.

Alcithoe separabilis n. sp. (Fig. 24).

Shell of moderate size. Spire conic, about three-fifths height of aperture. Nucleus scaphelloid and of 2½ smooth turns; 5½ post-embryonic whorls, earliest lightly convex, axially costate, the costae narrow, about twice own width apart, and reaching from suture to suture. Later whorls slightly angled about middle, and shoulder a little excavated on last two. Axials begin to develop nodules at periphery on antepenultimate whorl. Nodules become laterally compressed and sharp on later part of body-whorl; 12 axials on body-whorl, 14 on spire whorls; almost obsolete on shoulder of last whorl, extending below periphery and dying out about one-third of distance towards anterior end. Aperture long, narrow, sides parallel; outer lip broken away; inner lip a thin glaze spread fairly widely over whorl; columella with 5 plaits as thin, sharply raised lamellae, spaced equally and all parallel, decreasing in strength from second anterior one; anterior canal wide; fasciole sunken. Spiral striation over whole surface with a number of spiral bands below shoulder of last whorl.

Height, 80 mm.; width, 31 mm.

Locality.—Ardgowan shell-bed, Oamaru (Awamoan).

Type in writer's collection.

Allied to *A. lepida* Marwick from the same locality, from which it is distinguished, however, by greater size, excavated shoulders to later whorls, more swollen body-whorl and greater excavation of base, much more widely spread inner lip, and the nature and arrangements of the pillar plaits.

Genus **Falsicolus** Finlay, 1930.

Type *Fusinus kaiparaensis* Suter.

Falsicolus corrugatus (Marshall). (Fig. 28).

1918. *Fusinus corrugatus* Marshall, *Trans. N.Z. Inst.*, vol. 50, p. 264, pl. 22, figs. 9, 10.

Through the courtesy of Dr J. Marwick, the writer has been able to examine the material on which this species was founded, consisting of two shells, both figured, but neither designated as type at the time of description. The more complete though somewhat smaller specimen figured by Marshall (*Trans. N.Z. Inst.*, vol. 50, pl. 22, fig. 10; 1918) is therefore now selected as lectotype; it is refigured here (Fig. 28) for ease of comparison with a new, closely allied species to be described below.

Finlay (*Trans. N.Z. Inst.*, vol. 61, p. 261; 1930) has revised the New Zealand shells that have been referred to the genus *Fusinus*. In the absence of material he hesitated to make a definite location of this species; but stated that it seemed to resemble *Fusus dictyotis* Tate from the Balcombian of Australia, which has a true *Colus* protoconch, and for this reason he placed it for the time being in *Colus s. l.*

Examination of the type material, however, shows that *corrugatus* has not the paucispiral, globose apex of *Colus* (Fig. 43), but a polygyrate, pointed protoconch (Fig. 42), so that it falls into *Falsicolus* Finlay, and the name *Colus* now disappears from New Zealand lists.

Falsicolus inurbanus n. sp. (Figs. 27, 29).

Close to *corrugatus* at first sight, if one judges by Dr Marshall's figure and description, but comparison with the types shows *corrugatus* to be more slender, and to have fewer axials and more equal keels on spire whorls. The Pakaurangi shells look adult, and therefore the species is smaller than the Clifden one here described. Protoconch missing; 10 rounded axials on body-whorl (7 in *corrugatus*). The arrangement of the cords on the shoulder provides the best means of separating the two species. *Corrugatus* has two of the five shoulder cords stronger, the strong and weak alternating with one another; but those of the new species (5 or 6 in number) are equal and all moderately strong. In both species the spirals are a good deal coarser below the periphery and thicken in surmounting the axials, while the peripheral cord itself becomes compressed on the axials to form tubercles, which are flatter and more prominent in the Clifden shells. Below peripheral cord of *corrugatus* there are about 12 thick cords with an interstitial fine spiral between each pair; 10 thick cords (in places scaly) in the new species with intervening weaker ones; but the fifth and seventh below periphery of last whorl are almost obsolete, so that the sixth stands out as a well marked ridge separating the two wide spiral channels, caused by suppression of the cords on either side. Aperture angled behind and drawn out anteriorly into a moderately long canal. Outer lip broken; inner lip as a thick callus over excavation below body-whorl, its outer edge standing clear of whorl; callus reaching suture above.

Height (holotype), 44 mm.; of aperture plus canal, 25 mm.; width, 23 mm.

Locality.—Clifden, Southland. Holotype from horizon 6B (Hutchinsonian); two paratypes from left side of river, bed A = 6C (Hutchinsonian).

Type in writer's collection.

Falsicolus semilevigatus n. sp. (Fig. 33).

A large, tall-spired, relatively narrow shell intermediate between *F. eoaffinis* Finlay and *F. excellens* Finlay; but the height and angle of the spire, weaker and closer spiral sculpture, and less prominent peripheral tubercles show that it is more nearly related to the former. In his generic diagnosis, Finlay states that there are two series of species based on axial sculpture, one in which there is " a progressive development of heavy axial knobs on periphery "; another showing a " progressive obsolescence of axial sculpture, the later whorls having only spirals." Probably the two series are intimately related. The present shell has affinities with those of the first series, for the first five whorls are entirely devoid of axials and are smoothly rounded

in outline. The axial sculpture, which appears towards the end of antepenultimate whorl, produces only low, faint corrugations not reaching either suture; but the whorls now become angled and the periphery set with low blunt tubercles about their own width apart and 11 per whorl. Whole surface covered with fine, regular spirals, 13 on shoulder, 7 below periphery; below shoulder on spire whorls and over entire surface of body-whorl spirals stronger and about twice their own width apart; interstitial threadlets here and there developed, seen best below shoulder of last whorl. Suture strongly clasping, especially on last whorl, which descends vertically from suture to shoulder. Whorls lightly excavated on shoulder, straight below, but on body-whorl shoulder is distinctly angled just below suture. Inner lip spread with a thin glaze; outer lip dentate from beginning of canal to angulation at periphery. Aperture deeply and narrowly channelled behind.

Height of spire, 35 mm.; of aperture, 24 mm.; width, 31 mm.

Locality.—Ardgowan shell-bed, Oamaru (Awamoan).

Type (single specimen) in writer's collection.

Although this genus is not uncommon at Clifden, the present species seems to be the first recorded from the Awamoan beds at Oamaru, the Fusinids already found there belonging to *Coluzea*.

Genus **Clifdenia** n. gen.

Type *Clifdenia turneri* Laws.

A large, handsome, volute-like member of the Mitridae, with a long, tapering spire; body-whorl swelling rapidly below suture, but soon narrowing off towards anterior. Whorls more convex than is typical of the large Mitras; suture slightly clasping; columella long, straight, oblique, with four plaits well within aperture, posterior two prominent, anterior one indicated by slight swelling on pillar; outer lip thick and showing tendency to reflection; inner lip spread widely in volute-like fashion by shining callus, sweeping from posterior angle of aperture well out across whorl and then vertically down over fasciole, as in *Spinomelon*. Aperture longer than spire (not typical in *Mitra*), thus further giving the shell at first sight the appearance of a Volute. Whole surface covered by fine, dense, sinuous growth-striae retracted above and slightly antecurrent below on spire whorls. Towards anterior of body-whorl, growth-striae sweep laterally to cross fasciole much as in *Alcithoe*. Shell without sculpture except for a few faint spirals just below suture on lightly concave part of whorls.

Clifdenia turneri n. sp. (Figs. 30, 31, 32).

Whorls convex but straighter below periphery, which is high, about a quarter of the distance from upper suture; body-whorl considerably swollen. About 6 faintly raised spirals just below suture, 1 to 1½ times their own width apart. Outer lip well retracted behind in conformity with the backward sweep of the growth-striae. See also generic characters above.

Height, 152 mm.; width, 45 mm.; height of spire, 66 mm.

Locality.—Clifden, Southland, horizon 6B (Hutchinsonian).

Holotype (unique) in writer's collection.

This shell dwarfs all hitherto recorded Neozelanic members of the Mitridae, being as large as the tropical Mitrarias. It is distinctive in its peculiarly Volutid general appearance. The decrease in size of the pillar plaits anteriorly demonstrates its Mitrid relationships, and as the combination of characters given above in the generic diagnosis renders it impossible to include it naturally in any of our existing genera, the new genus, *Clifdenia,* has been created for it.

The large Recent Mitras mostly have a deep posterior notch and altogether different facies. The large, slender Tertiary forms with long canals are usually characterised by predominating spiral ridges (as in *Tiara* Swainson) ; the Australian and New Zealand early Tertiary *Diplomitra* Finlay has somewhat the same smooth surface, but is much smaller, has fewer pillar plaits, and has a true Mitrid, not Volutid, habit.

Apical fragments of a related species from the greensands at Wharekuri are in the collections of Dr Finlay and of the writer.

Named in honour of its discoverer, Mr F. J. Turner, M.Sc., of the University of Otago.

Genus **Cominella** H. and A. Adams, 1853.

Type *Buccinum maculosum* Gmelin.

Subgenus **Acominia** Finlay, 1926.

Type *Buccinum adspersum* Bruguière.

Cominella (Acominia) kereruensis n. sp. (Figs. 19, 20).

Ancestral to the Recent *adspersum,* which it resembles quite closely. A dozen or so specimens were collected, and these show even a wider range of variation in strength of fasciole development than does the Recent shell. The heaping up of the body-whorl posteriorly, so well shown in the adults of *errata* Finlay and of *ridicula* Finlay, occurs sporadically in the adults of both *adspersum* and the new species, though not to so marked a degree, whilst on the other hand in several specimens the body-whorl attains its greatest width halfway between suture and anterior end, somewhat as in the subspecies *nimia* Finlay, from Chatham Islands. Regular nodules may persist on to the penultimate whorl or become obsolete as early as the third post-embryonic whorl. A large series of shells of *A. adspersum,* from Takapuna, Auckland, shows a similar but not quite so marked variability in the incidence of nodular cessation.

The following separative characters serve to distinguish *kereruensis* from the Recent genotype. In the former there are fewer axials per whorl (11 on antepenultimate whorl as against 13 to 14 in *adspersum*) ; axials larger and more nodular, not persisting so definitely to suture below; spiral cords separated by grooves equal to or greater than own width (grooves much narrower than cords in *adspersum*) ; channel behind fasciole weakly developed so that body-whorl is less contracted in front and outline is almost straight below periphery.

Height (holotype), 57 mm.; width, 33 mm.; height of aperture, 34 mm.

Locality.—Kereru, Hawke's Bay (Nukumaruan).

Holotype and several paratypes in writer's collection.

C. facinerosa Bartrum and Powell (Pliocene beds at Kaawa Creek) is a smaller, more strongly inflated shell, not so tall, spire much shorter (½ height of aperture plus canal). It has more prominent spiral cinguli on body-whorl, and apparently lacks the axial sculpture of *kereruensis.*

C. hendersoni Marwick, from North Taranaki, is a good deal more squat, the last whorl considerably embracing earlier ones so that spire appears very low; but Dr Marwick remarks (*Trans. N.Z. Inst.*, vol. 56, p. 323; 1926) that this feature is subject to considerable variation. It has a more prominent fasciole.

Genus **Eucominia** Finlay, 1926.

Type *Buccinum nassoides* Reeve.

Eucominia marshalli n. sp. (Fig. 21).

Shell fairly small, axially costate and finely spirally striated. Spire elevated, greater than height of aperture. Apex moderately large, dome-shaped, of about 2 volutions; axials represented by large, blunt nodules around periphery, not definitely extending to either suture, obsolete over most of body-whorl, 9 on penultimate whorl; interstices about twice width of axials; regular spiral lines over whole surface, visible mainly as colour bands, not as raised cords; about 24 on body-whorl, 12 to 14 on penultimate whorl; whorls bluntly angular at about upper third; shoulder concave, whorls lightly convex below; suture distinct, whorls clasping. Aperture sharply angled behind and deeply notched anteriorly; outer lip thin, sharp, sinuous; inner lip as a slightly raised callus; pillar arched above, straight below; columella groove present. Fasciole prominent.

Height, 19 mm.; diameter, 9·5 mm.

Locality.—Blue Cliffs, South Canterbury; sandy clays above limestone (Hutchinsonian).

Type (the only specimen) in writer's collection.

The fewer and blunter axials at once distinguish this species from *elegantula* Finlay. *Ellisoni* Marwick, from Chatham Islands, is a larger shell lacking the nodules and with a broad subsutural swelling, while *bauckei* Marwick, also from Chatham Islands, has early whorls a good deal more sharply angled, ribs strong and persisting from suture to suture. The Awamoan *intermedia* (Suter) is a larger shell with flatter whorls, weaker nodules and raised spiral sculpture. *E. nana* Finlay, which is perhaps the nearest relative, is characterised by numerous definitely raised spirals and sharper axials, which are more elevated and more numerous (12 per whorl); and has whorls much more clasping at suture.

Collected by Dr P. Marshall.

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NOTE ON THE ARDGOWAN VOLUTES.

By DR H. J. FINLAY.

The collections made by Mr Laws at the Ardgowan shell-bed have proved very interesting. Apart from several new species, he has obtained numerous new records of known forms in this locality, including some rare shells previously known only from the type or a couple of specimens. It has thus been possible to settle several debated points; Mr Laws will remark on some of these in future papers, and for the present attention is drawn merely to the Volute fauna of this bed. Previously, only four species were known from here; Mr Laws has now brought the total up to 14, many of the

species being known only from here and the Target Gully shell-bed, while a few others occur elsewhere in the Awamoan, but not so far at Target Gully. A tabular comparison of the Volutes of these two shell-beds is interesting as showing the very close similarity between them and the remarkable number of species at this horizon (mostly limited to it). The present grand total of 21 species is far greater than in any other single zone in New Zealand, and runs very close to the number known from the Balcombian of Muddy Creek and Balcombe Bay in Australia (about 23). Another zone of the Awamoan (the united localities of Awamoa, Pukeuri, Rifle Butts, and Mount Harris) yields 19 species, while the Clifden beds (several zones) are probably third with a total of 14.

In the following table the relative abundance of the species is shown by giving the actual number of specimens collected by Mr Laws and myself, while an asterisk against a number indicates that the type is from that locality.

Species.	Target G.	Ardgowan.	Other Occurrences.
1. *Teremelon cognata* (Finlay)	*6		Pareora (J. M.).
2. *Pachymelon amoriaformis* Marwick	*1	1	Mount Harris.
3. *Pachymelon firmá* Marwick	*2		
4. „ *murdochi* Marwick	1		*Awamoa, Pukeuri.
5. *Metamelon revcrta* (Finlay)	*2	8	
6. „ *patruelis* Laws ..		*4	
7. „ *informis* Laws ..		*1	
8. „ *prominima* Laws		*3	
9. *Spinomelon parki* (Suter) ..		4	*Pareora, Mount Harris. Callaghan's Hill (J. M.).
10. „ *bonitens* (Finlay)	1	1	*Otiake.
11. „ *aff. henryi* Laws		1	
12. *Alcithoe cylindrica* Marwick	*2	1	
13. „ cf. *wekaensis* Marwick		2	
14. *Alcithoe familiaris* Marwick		1	*Mount Harris.
15. „ *compressa* Marwick	*4		
16. „ *armigera* Marwick		*1	
17. „ *separabilis* Laws ..	3	*2	
18. „ *lepida* Marwick ..	1	*12	
19. „ *neglecta* Marwick ..	*1		
20. „ *finlayi* Marwick ..	*12+ many juveniles		
21. „ *scopi* Marwick ..	*1		

The examination of this additional material enables me to clear up a few doubtful points and to correct one or two errors, as follows:

Genus *Metamelon*.—The numerous species of *Metamelon* in the Awamoan form a quite compact little group, springing no doubt from the smooth *inermis* from Otiake. The number of pillar plaits is variable, and there may be four or five in any species. Evidently narrow limits must be set for discrimination of species, the distinctive characters being the build of shell, shape of whorls, and especially the development of axials. In this way the Ardgowan shells fall easily into four species—*reverta* (Finlay); *patruelis* Laws, between

reverta and *inermis* in development of axials and shoulder; *informis* Laws, developed from *reverta* by reduction of axials; *prominima* Laws, foreshadowing *minima* Marwick, which seems to end the line. *M. minima* is apparently not a primitive form as Marwick thought, but a degenerate one, since it occurs only in later beds than *prominima*, which is halfway between it and *inermis* in shell features.

Genus *Spinomelon*.—The form, sculpture, and apex of the species Laws has described as *Spinomelon henryi* and *S. otaioensis indicate* close relationship with a Wharekuri n. sp., an Ardgowan shell, and my *Alcithoe residua* from Otiake. The last-named species was left "incertae sedis" by Marwick, but was referred by me definitely to *Spinomelon* as a somewhat aberrant line (*Trans. N.Z. Inst.*, vol. 61, p. 253; 1930) and a corresponding exception was noted to the normal apex of the genus. There are several lines in *Alcithoe*, and this group of species shows strong resemblance to some of them, but the protoconch of *otaioensis* is definitely that of *Spinomelon*, and seems to justify my reference to that genus. *Residua, otaioensis henryi*, and *whakinoensis* may be regarded as the nucleus of a line of *Spinomelon* from which sprang, in part at least, *Alcithoe*.

Spinomelon benitens (Finlay).—There is confusion in regard to this species. A large and beautiful shell which I obtained at Target Gully was recorded by Marwick as *parki* (*Trans. N.Z. Inst.*, vol. 56, p. 284; 1926), but differed considerably from all Mount Harris specimens in its smoothness, having the axials absent on the last 1½ whorls and elsewhere more distant and knob-like, with the shoulder weaker. Apart from its solid shell it agreed with the type of *benitens* from Otiake. Mr Laws has now collected at Ardgowan not only true *parki* (which I have not seen from Target Gully), but also a specimen similar to my Target Gully shell, which corresponds very closely with the type of *benitens*. The species, then, has a range from Waitakian to lowest Awamoan, and is closely allied to but much smoother than *parki*, which is not so variable as Marwick thought. An error I have myself made was the union of *Pachymelon waitakiensis* Marwick with *benitens* (*Trans. N.Z. Inst.*, vol. 61, p. 252; 1930). My topotype certainly has a remarkable resemblance both to Marwick's figure and to the type of *benitens*, but has the apical whorls missing; better specimens collected at Wharekuri by Mr Laws demonstrate that *waitakiensis* is apparently a very large *Teremelon* ancestral to *tumidior* Finlay; the exceptional size obscured this relationship before. Another error to which I must confess was the statement made at the same time that *Alcithoe turrita* Suter from Blue Cliffs is a *Spinomelon*. Mr Laws has since collected many specimens of Volutes from that locality, and his collection shows that the *Spinomelon* common there, while distinct from *parki* as I held, is not the real *turrita*, which was correctly placed by Marwick in *Alcithoe* s. l.

Alcithoe wekaensis Marwick.—The two Ardgowan specimens are very close, undoubtedly the same type of shell, but the nodules on the body-whorl are further apart and are fewer. Since only one specimen of *wekaensis* is known, and the Ardgowan shells are not too well preserved, it is likely that the differences are not specific. This

species at first sight closely simulates such high-spired forms as *detrita* Marwick, but the very swollen pillar with numerous plaits set on the swelling, instead of only 4 (and a weak fifth) hardly disturbing the normal course of the columella, indicate much more certain affinity with such species as *cylindrica* Marwick, in spite of the difference in shape.

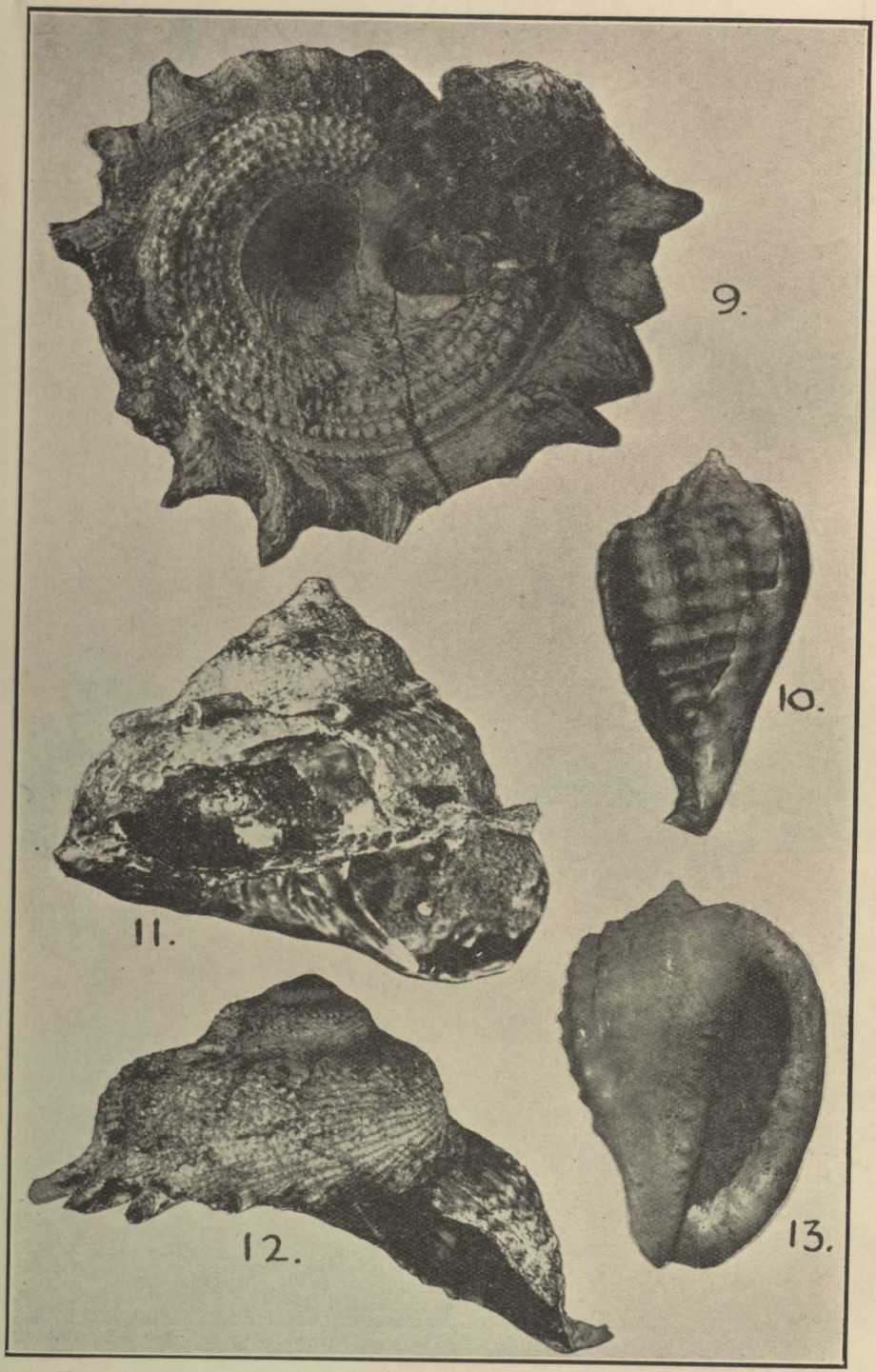
Alcithoe familiaris Marwick.—Marwick compared this species (known then only from the unique type, with the lower part of the body-whorl missing) with the Recent *arabica,* but commented on the different pillar plaits. The Ardgowan specimen collected by Mr Laws agrees exactly with the type, but is more complete, and shows that this species is not of the *arabica* style with long body-whorl and aperture, but is relatively short for so large a species. It also shows quite clearly that it is a direct ancestor of *A. lutea* Marwick (and probably *A. transformis*), having an identical build, columella, and development of sculpture, but much stronger spines on last whorl. The four rather low pillar plaits (with a weak fifth) are quite different in style from those of the *wekaensis-cylindrica* line.

Alcithoe neglecta Marwick.—This is a good species. There is one other specimen from Target Gully (in my collection) besides the type, but no others are yet known; it is close to *lepida,* but shorter. *Lepida* is not uncommon at Ardgowan, but rare at Target Gully; I have one fragment and there are two in the Geological Survey collection, which Marwick took for juveniles of *cylindrica.* Juveniles of the large species are exceedingly uncommon at almost any locality; they apparently live in a different station. *A. finlayi* Marwick is an exception to this; juveniles are plentiful at Target Gully.

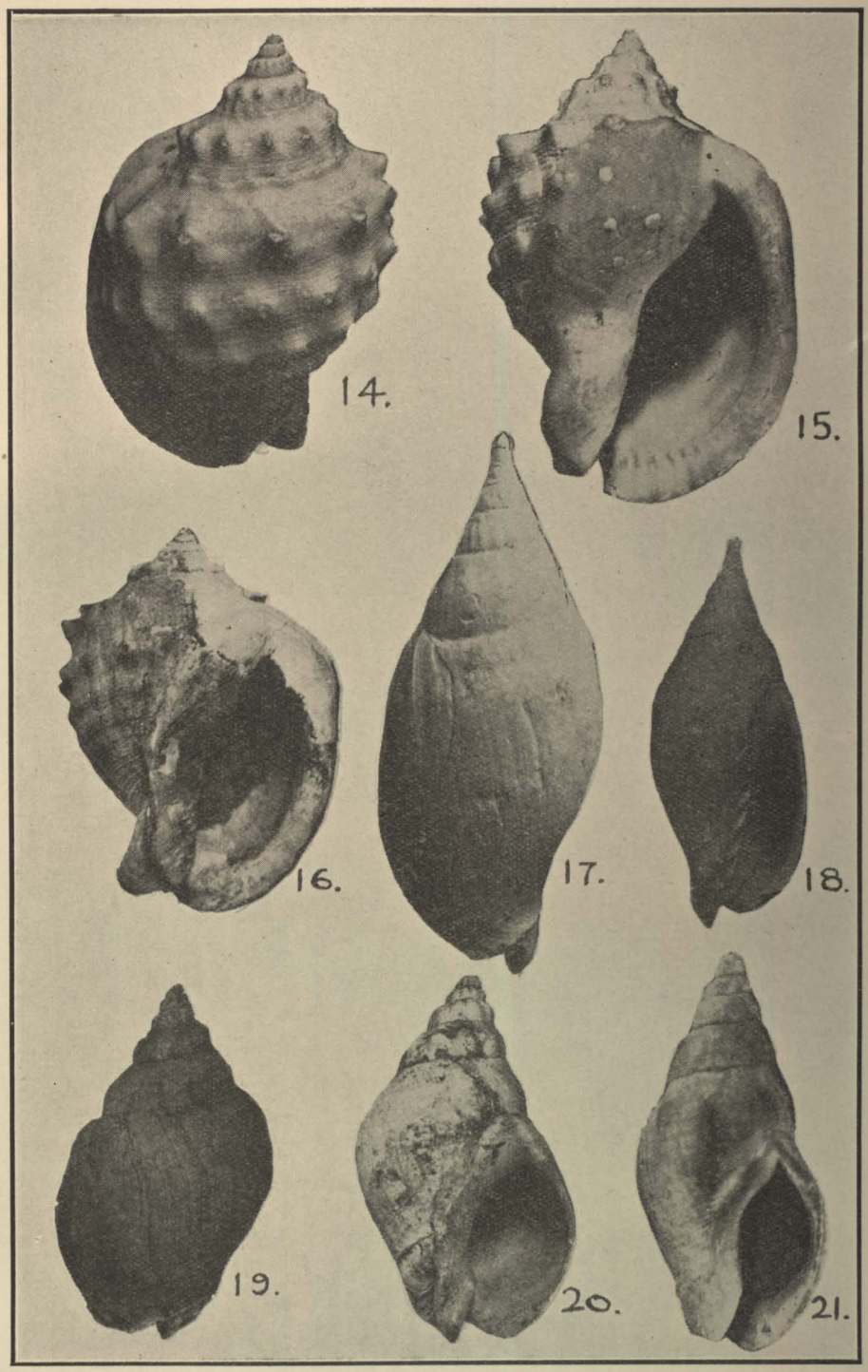
Alcithoe scopi Marwick. This is also a good species. The type is unique, but I have a closely related n. sp. from the Rifle Butts, showing the same type of apex, shell, and sculpture. The species of this group (*lepida, neglecta, reflexa, scopi,* and *separabilis*) need very careful examination and comparison for discrimination; one or two more still need description.

FIGS. 1, 2, 3.—*Zeminolia fossa* n. sp. Holotype, × 8.
FIGS. 4, 7.—*Astræa stirps* n. sp. Holotype, × 0.8.
FIG. 5.—Operculum of *Astræa stirps*, band 6B, Clifden, × 3.
FIG. 6.—*Oniscidia finlayi* n. sp. Holotype, × 1.3.
FIG. 8.—Operculum of *A. heliotropium* Martyn, Castlecliff (Pliocene), × 3.

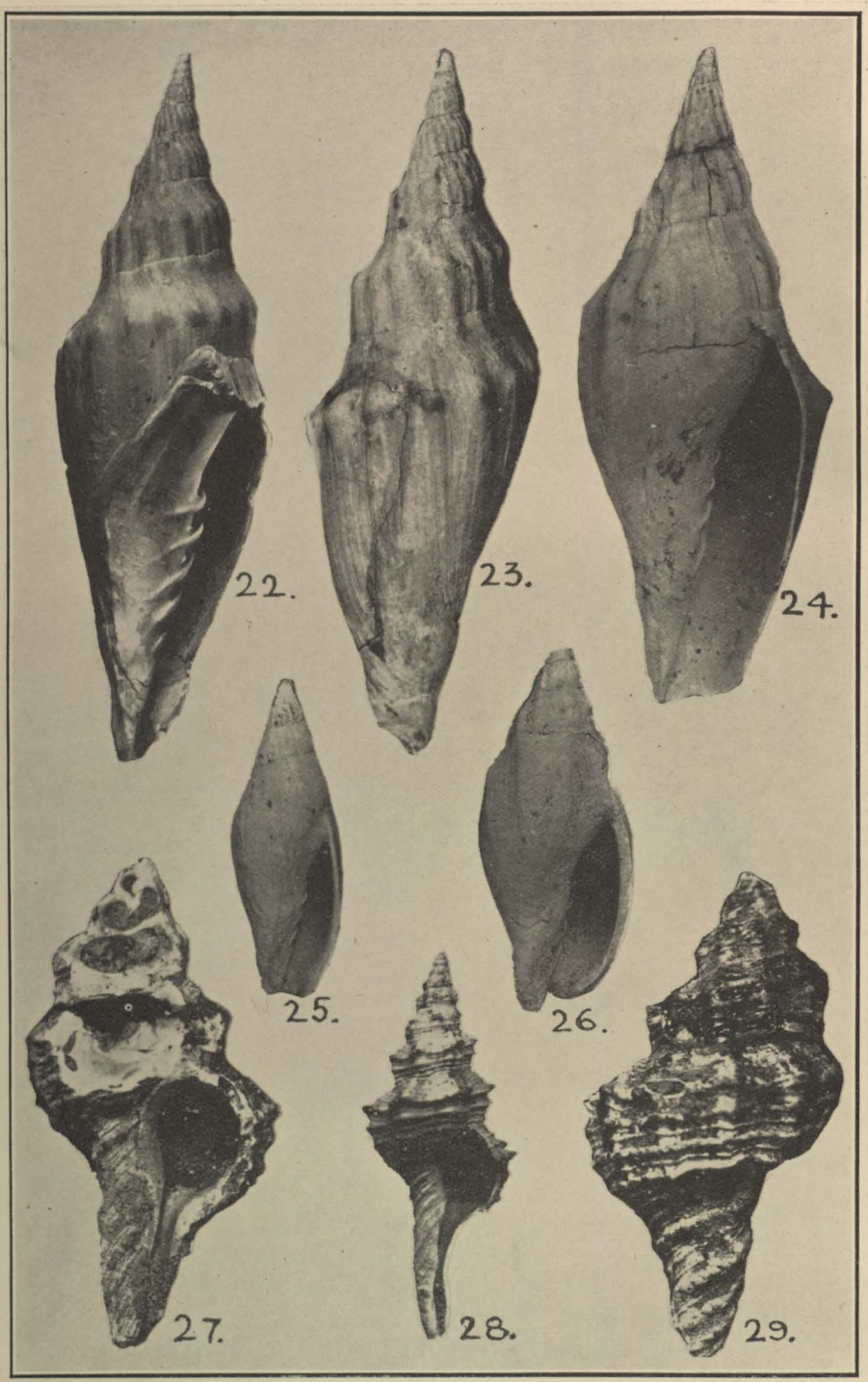
Face p. 202.]



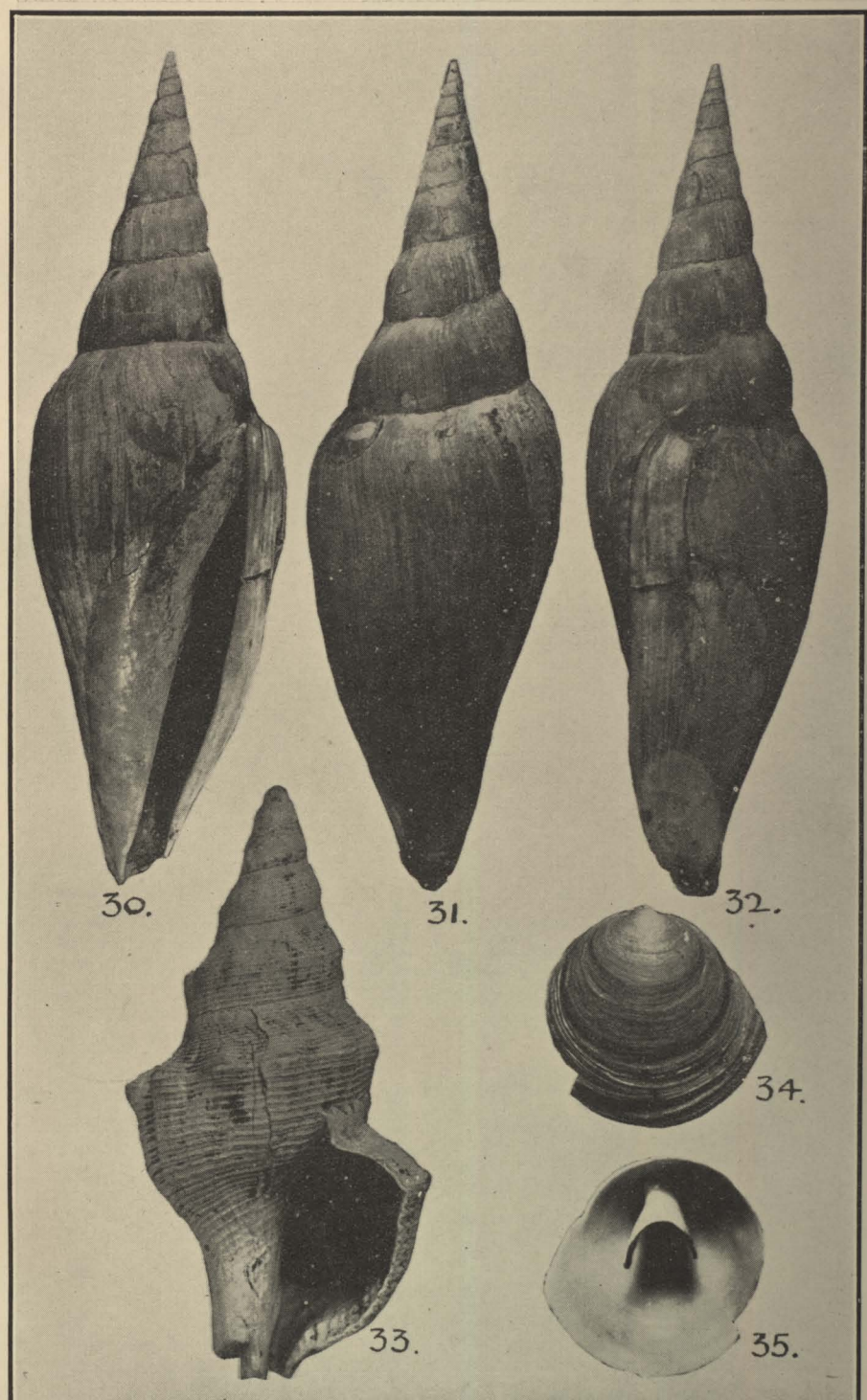
FIGS. 9, 12.—*Astræa heliotropium* Martyn, Castlecliff (Pliocene), × 1.
FIGS. 10, 13.—*Oniscidia finlayi* n. sp. Holotype, × 1.3.
FIG. 11.—*Astræa stirps* n. sp. Holotype, × 0.8.



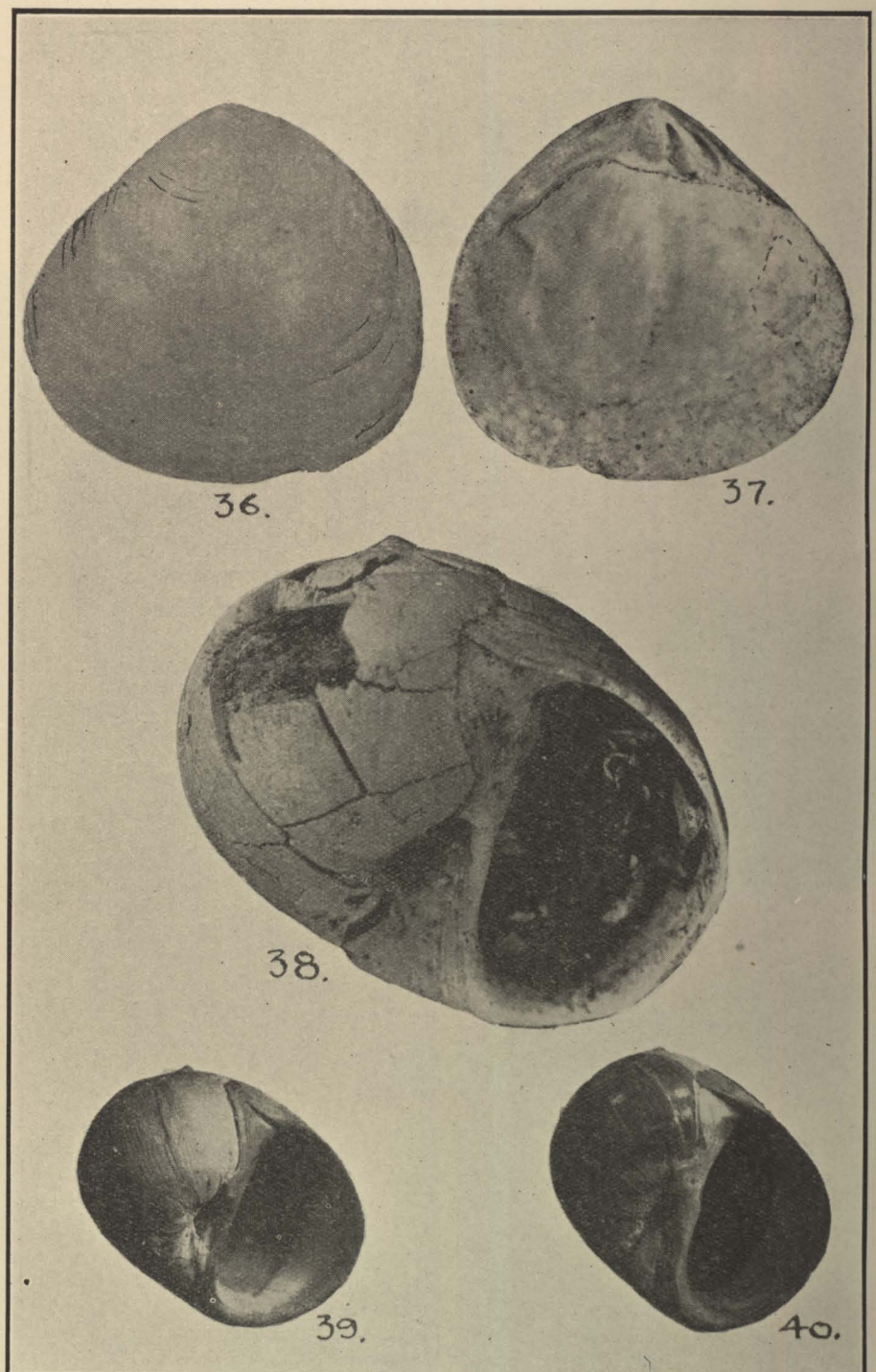
FIGS. 14, 15.—*Euspinacassis emilyae* n. sp. Holotype, Fig. 15 × 1.1.
FIG. 16.—*Euspinacassis muricata* (Hector), Pakaurangi Point, × 1.1.
FIGS. 17, 18.—*Metamelon patruelis* n. sp. Holotype, Fig. 18 × 1.1.
FIG. 20.—*Cominella (Acominia) kereruensis* n. sp. Holotype, × 0.8.
FIG. 19.—*Cominella (Acominia) kereruensis* n. sp. Paratype, × 0.9.
FIG. 21.—*Eucominia marshalli* n. sp. Holotype, × 3.



FIGS. 22, 23.—*Spinomelon henryi* n. sp. Holotype, × 0.9.
FIG. 24.—*Alcithoe separabilis* n. sp. Holotype, × 1.1.
FIG. 25.—*Metamelon prominima* n. sp. Holotype, × 1.
FIG. 26.—*Metamelon informis* n. sp. Holotype, × 1.
FIGS. 27, 29.—*Falsicolus inurbanus* n. sp. Holotype, × 1.3.
FIG. 28.—*Falsicolus corrugatus* (Marshall). Lectotype, × 2.8.



FIGS. 30, 31, 32.—*Clifdenia turneri* n. gen. n. sp. Holotype, × 0.7.
FIG. 33.—*Falsicolus semilevigatus* n. sp. Holotype, × 1.2.
FIGS. 34, 35.—*Cheilea plumea* n. sp. Holotype, × 2.5.



FIGS. 36, 37.—*Talabrica nummaria* Powell. Topotype, × 2.9.
FIG. 38.—*Magnatica powelli* n. sp. Paratype, × 1.3.
FIG. 39.—*Magnatica powelli* n. sp. Holotype, × 0.8.
FIG. 40.—*Magnatica planispira* (Suter), Wharekuri greensand, × 0.8.

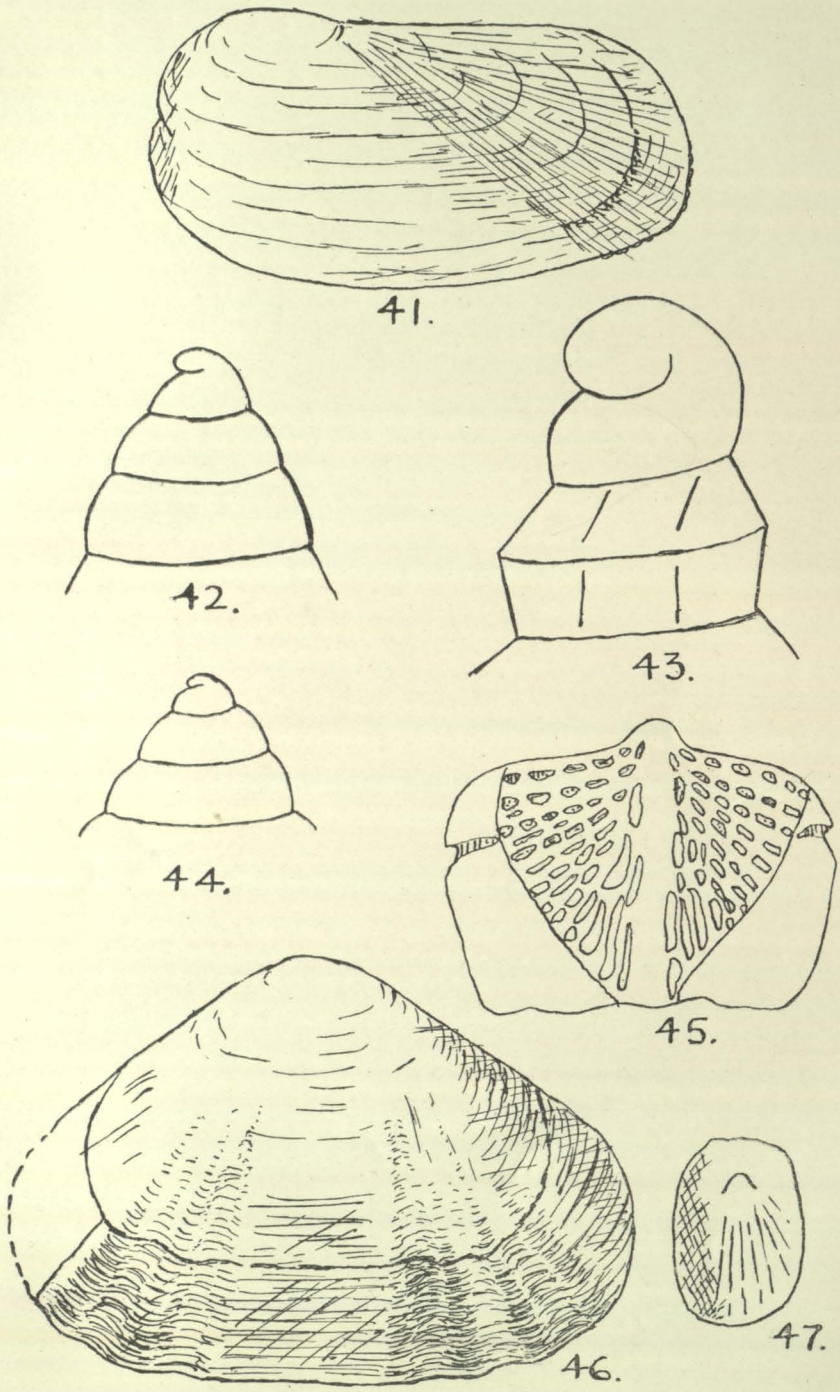


FIG. 41.—*Trichomusculus lornensis* n. sp. Holotype, × 7.7.
FIG. 42.—Protoconch of *Falsicolus corrugatus* (Marshall).
FIG. 43.—Protoconch of *Fusus dictyotis* Tate.
FIG. 44.—Protoconch of *Oniscidia finlayi* n. sp., band 6B, Clifden.
FIG. 45.—*Loboplax ashbyi* n. sp. Holotype, × 9.
FIG. 46.—*Semeloidea miocenica* n. sp. Holotype, × 9.
FIG. 47.—*Notoacmea (Parvacmea) chattonensis* n. sp. Holotype, × 17.