The Recent Mollusca of the Chatham Islands

(Most of the material on which this paper is based was collected by the Otago Institute party at the Chathams in the summer of 1924.)

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Plates 38-43.

Collections of shells were early made from this locality, mostly by H. L. Travers. Numerous specimens came into the hands of Captain Hutton, who, in his *Catalogue of the Marine Mollusca of New Zealand*, 1873, was the first to give a connected account of this molluscan fauna. He frequently refers to the Chatham Islands in the distribution of the shells he records, and describes a number of new species which he states occur there alone. This rather scattered list is not substantially altered in the *Manual of New Zealand Mollusca* of 1880, nor in Suter's standard work of the same name (1913), except that the distribution of most species had in the interim been considerably extended, with the result that in the latter work the only two species reported as from this locality alone are the European *Corbula gibba* (which, of course, has no right to appear in any New Zealand list), and *Dentalium opacum* (the identification of which appears to be equally worthless). In contrast to this, some 30 species are noted in the present revision as endemic to the Chathams, and some of these are so characteristic and distinct that only deplorable lumping could merge them with mainland forms. Thus Hutton's statements, fifty years old though they are, have proved substantially correct—a tribute to his good work—and his views on the distribution of many of the Chatham shells were sound. Consideration of these endemic species, and of the relationships of other forms will be dealt with in the summary at the end of this account.

The systematic list itself, which follows, is based as regards order of families and genera, etc., on Hedley's admirable *Check-List of the Mollusca of New South Wales*, 1918, with the necessary emendations noted by Iredale in the *Proc. Linn. Soc. New South Wales*, vol. 49, Pt. 3, pp. 179-278, 1924. As the order is thus often considerably different from that followed in Suter's *Manual*, a page reference is given wherever possible to Suter's description of the species dealt with. Full references and synonymy have, however, in no case been given, as these are in general easily obtained by looking up the single (and most important) reference placed opposite the species name.

As Suter's *Manual* embodies all records previously made, I have taken it as the standard of reference for Chatham Island shells, but I have usually mentioned his records only when the species has not occurred in the collections seen by me.

These collections are from several sources, and comprise shells (a) sent to me by friends from the Chathams, (b) beach shells collected by Messrs. Young, Allan, Marwick, and Martin, members of

the present expedition, (c) taken from rock-pools, and stomachs of cod, by Messrs. Young and Allan (for a list of the latter, see summary at end), (d) in the Otago University Museum, presented by Miss Shand. Although I have thus had much available material, it is unfortunate that so little of it was fresh, the great majority of specimens being badly beach-worn. This has made the work considerably more difficult and liable to error, and has prevented satisfactory identification in several cases. Many more new species could have been described, but it was thought safer to await better material; those here described are mostly the more prominent and characteristic forms. The Chatham minutiae, especially, are quite incompletely known, very little shell-sand being sent to me for sieving. Thus, though the present list is fairly complete as regards the beach shells, and sufficiently emphasises the main features of the fauna, it is still very incomplete, and dredging would add abundantly to the number of small forms recorded.

In this list, all group-names are treated equally as full genera; this is by far the handiest method for future reference, saves much space, and is no inconvenience to those likely to consult the list. Those who prefer to observe the sub-generic and sectional proprieties may reclassify the groups as they wish. Many of the generic names used will be unfamiliar, but a full reference has always been given, and nearly all will be found in two papers by Iredale (1915 and 1924), and one by Finlay (1926) (see bibliography at the end).

To save space, the following contractions have been used throughout this paper:—

T.N.Z.I.—Transactions of the New Zealand Institute.
P.L.S.N.S.W.—Proceedings of the Linnean Society of New South Wales.
P.R.S.Tas.—Proceedings of the Royal Society of Tasmania.
P.M.S.—Proceedings of the Malacological Society (London).
P.Z.S.—Proceedings of the Zoological Society (London).

Types of all new species described, and specimens of all the forms reported on are preserved in my own collection.

Note.—All new names published in my "Further Commentary on New Zealand Molluscan Systematics," and all references to this paper, should be dated 1926. I have several times referred to these in that paper itself as "Finlay, 1927," under the impression that it would not appear till that year, and Marwick in the "Veneridae of New Zealand" has done likewise, but the paper was first issued on December 23rd, 1926, and all novelties in it should bear this date. But the new names in the "Additions to the Recent Molluscan Fauna of New Zealand—No. 2," and in the "New Specific Names for Austral Mollusca," also published in *T.N.Z.I.*, vol. 57, did really, on the other hand, appear in 1927.

Class CEPHALOPODA.
Order DIBRANCHIATA.
Family SPIRULIDAE.

Spirula Lamarck, 1799; *Mem. Soc. H.N., Paris,* p. 80.

Spirula spirula (Linné, 1758). Suter, 1913, p. 1047.
5 specimens.

Family ARGONAUTIDAE.

Argonauta Linné, 1758; *Syst. Nat.*, ed. 10, p. 708.

Argonauta argo Linné, 1758. Suter, 1913, p. 1066.

2 broken specimens. This species is not recorded from Australia, but Iredale has found it at the Kermadecs (*P.M.S.*, vol. 9, p. 72, 1910). It is possible that our forms would be better referred to the variety *pacifica* Dall, 1869 (*Amer. Nat.*, vol. 3 p. 237), characterised by compressed shell and pronounced auricles.

Class AMPHINEURA.
Order LORICATA.

As I understand that Mr. W. R. B. Oliver, of the Dominion Museum, is examining "Chitons" from the Chathams, and as the material forwarded to me was very scanty, I make no remarks on this group. Suter (1913) records nine species from this locality; Iredale (1915) has shown that two of these, *Acanthopleura granulata* Gm. and *Onithochiton semisculptus* Pilsb. should be rejected, and that the names of the others mostly require amendment, so that the list of Loricates recorded from the Chathams at present stands as follows:—

Plaxiphora (*Maorichiton*) *coelata* (Reeve, 1847).
Plaxiphora (*Maorichiton*) *schauinslandi* Thiele, 1909.
Loboplax violaceus (Q. and G., 1835). (Iredale, in *P.M.S.*, vol. 12, p. 101, 1916, has stated that "*Macandrellus* may fall as an absolute synonym of "*Notoplax*," and in *P.L.S., N.S.W.*, vol. 49, pt. 3, p. 214, 1924, uses *Notoplax*. Ashby (*P.M.S.*, vol. 17, p. 16. 1926) uses *Notoplax*, subgenus *Loboplax* Pilsbry, proposed for this species.
Ischnochiton maorianus Iredale, 1914.
Sypharochiton pellisserpentis (Q. and G., 1835).
Sypharochiton sinclairi (Gray, 1843).
Onithochiton neglectus Rochebrune, 1881.

Class GASTEROPODA.
Order DIOTOCARDIA.
Family SCISSURELLIDAE (*vide* Iredale, 1924, p. 215).

Scissurella D'Orbigny, 1823; *Mem. Soc. H.N., Paris*, p. 340.

Scissurella, n. sp.

No true *Scissurella* has yet been reported from any of the provinces of the Maorian Sub-region, but an undescribed species has been known to me for some time from Dunedin Harbour (3 to 60 fathoms), and as a fossil, in the Castlecliff beds. It is related to *S. ornata* May (*P.R.S. Tas. for 1908*, p. 57; Pl. 6, Figs. 4, 5) but has fewer ribs. A second new species from New Zealand is represented by a single specimen picked off a hydrazoan from the Chathams; it differs in having still more ribs than *ornata*, and the fasciole not on the periphery but half-way between it and the suture, the spire is not so flat as in the Mainland form, and the body-whorl more convex. It would, however, be unsafe to describe a species of this genus from a unique example.

Sinezona Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 341.

Sinezona subantarctica var.

Hedley (*Austr. Antarct. Exped.*, vol. 4, pt. 1, *Mollusca*, p. 36, 1916) described *Schismope subantarctica* nov. from a single specimen from a worm tube collected on Macquarie Is. From the Lyall Bay *S. brevis* Hedley and the Otago Peninsula *S. laevigata* Iredale, this differs in obsolence of sculpture; a single specimen from the Chathams generally agrees with Hedley's species, but the sculpture is slightly stronger and there is a slight fasciole behind the perforation which slightly angles the body-whorl. Miss Mestayer (*T.N.Z.I.*, vol. 51, p. 130, 1919) has reported *S. sub-antarctica* from Lyall Bay and 50 fathoms off the Snares; the Snares species is certainly different, while the Lyall Bay form may be the same as the Chatham shell, which I prefer not to describe from one specimen.

Family FISSURELLIDAE.

Tugali Gray, 1843; *Dieff. N.Z.*, vol 2, p. 240.

Tugali suteri (Thiele, 1916). Finlay, 1926, p. 344.

Common; described from the Chathams, and restricted to that region, the related mainland form being subsp. *bascauda* Hedley.

Tugali cf. **elegans** Gray, 1843. Finlay, 1926, p. 344.

One much worn specimen, obviously different from *suteri*, has a trifid sinus-rib and so belongs to the *elegans-parmophoidea* group, but is too damaged to determine accurately. The Oligocene *T. aranea* Marwick (*T.N.Z.I.* vol. 58, p. 474, 1928) from Pitt Island, may be allied.

Montfortula Iredale, 1915; *T.N.Z.I.*, vol. 47, p. 433.

Montfortula chathamensis n. sp. (Figs. 34, 35.)

Shell very similar to *M. conoidea* (Reeve), but less elongate and relatively higher, oblong rather than oval in shape. Ribs less unequal, all rather coarse, the quadruple arrangement of *conoidea* being much less marked. Apex decidedly nearer the front, the anterior slope being almost straight instead of convex. For the name *conoidea* (Reeve) for the common Peronian Australian shell, *vice Hemitoma aspera* (Gould), see Iredale, 1924, p. 216.

Length, 13.5 mm., width, 10.5 mm.; height, 6.5. mm.

Corresponding dimensions for *conoidea*:—13.5; 9.5; 5.5.

Three specimens, the holotype well preserved.

Emarginula Lamarck, 1801; *Syst. An. s. vert.*, p. 69.

Emarginula striatula valentior n. subsp. (Figs. 56, 57.)

Differing from the species in far more robust habit; shell higher and thicker, sculpture coarser; the growth tendency is to produce a shorter shell, more spread out fanwise posteriorly, and less regularly elongated; the apex thus tends to become more centralised and is notably higher. The type of *striatula* Q. and G. was a dredged northern shell, and these, as Suter remarks, are always fragile and thin, small, and with delicate sculpture; he also notes, "the largest specimens I have seen are from the Chatham Islands, and they are fairly solid" (1913, p. 100). The littoral shells are always coarser

in build than the dredged ones, but, apart from this, Chatham and South Is. shells seem to be higher and less elongate than their northern relatives, and it is for them that I form the new subspecies; deep water southern shells may require further separation later.

Length, 21 mm.; width, 15.5 mm.; height, 12 mm.

Corresponding dimensions of an Auckland beach shell here figured (Fig. 58) as the northern expression of *striatula,* 16.5: 11: 6.5.

4 beach-worn, but well preserved shells from the Chathams (including the holotype), and numerous specimens from South Is. beaches.

Two Oligocene forms of the *striatula* type have been described by Marwick (1928, pp. 473, 474) as *E. pittensis* and *galeriformis.*

Incisura Hedley, 1904; *Rec. Austr. Mus.* vol. 5, p. 91.

Incisura lytteltonensis (Smith, 1894). Suter, 1913, p. 98.

One specimen.

Monodilepas Finlay, 1926; *T.N.Z.I.,* vol. 57, p. 343.

Monodilepas skinneri n. sp. (Fig. 59.)

Quite distinct from *monilifera* (Hutt.) in elongated, subrectangular shape, rather crass test, and different sculpture. Sides parallel, ends regularly and subequally rounded; in *monilfera* the sides rather rapidly converge, owing to the marked widening of the shell behind, and attenuation in front. Shell quite solid, interior margin flatly bevelled off. Radial ribs coarse and somewhat indistinct, interstices generally much narrower; distinct reticulation present only just below foramen, elsewhere the concentric ribs are mainly rough corrugations on shell: *monilifera* has distinct thread-like radials (with much wider interspaces) strongly reticulated all over by raised sharp threadlets, concave outwards, distributed discontinuously between the radials. Interior foramen-callus rectangularly oval in shape; a little pointed anteriorly, but otherwise not triangular as in *monilfera.* Keyhole shape of foramen very pronounced from all aspects. Animal much too wide and long for shell.

Length, 21.5 mm.; width, 14 mm.; height, 5 mm.

One animal, with the shell attached, from a fish's stomach, almost fresh. Named after Mr. H. D. Skinner, archaeologist and leader of the Expedition.

Family HALIOTIDAE.

Haliotis Linné, 1758; *Syst. Nat.,* ed. 10, p. 779.

Haliotis iris Martyn, 1784. Suter, 1913, p. 94.
Haliotis australis Gmelin, 1791. *Id.,* p. 93.
Haliotis virginea Gmelin, 1791. *Id.,* p. 95.

All common, especially *australis*; young shells very plentiful. Hopkinson (*P.Z.S.,* 1907, p. 1035) has shown that the correct date of Gmelin's work is 1791, not 1790, as Suter has written throughout the *Manual.*

Family TROCHIDAE.

Coelotrochus Fischer, 1880; *Coq. Viv.*, p. 417.

Coelotrochus huttoni (Cossman, 1918). Finlay, *P.M.S.*, vol. 16, pt. 2, p. 100, 1924.

Four specimens, agreeing absolutely with Otago Heads shells and Castlecliff fossils. I have seen no *tiaratus* (Q. and G.) in the collections sent to me from the Chathams.

Thorista Iredale, 1915; *T.N.Z.I.*, vol 47, p. 436.

Thorista viridis (Gmelin, 1791). Suter, 1913, p. 110.
Common.

Thoristella Iredale, 1915; *T.N.Z.I.*, vol. 47, p. 436.

Thoristella chathamensis (Hutton, 1873). Suter, 1913, p. 107; Finlay, 1926, p. 350.

Common. When Hutton described this species (*Cat. Mar. Moll.*, p. 36), he recorded it from "Chatham Islands only": this is much nearer the truth than the distribution given in the *Manual*, which has already been commented on by Iredale (1915, p. 436). The only other locality from which I have seen specimens that could be reasonably referred to *chathamensis* is Stewart Is. As Suter's diagnosis is a composite one, and Hutton's is sketchy, I present a new description of the essential features:—

Shell wide, not high; base flat. A strong basal keel projects as a rim just above suture on spire-whorls; 7 equal flat spiral cords per whorl, interstices linear. Axials may be quite obsolete, or restricted to coarse crenulations of the infrasutural cord; when fully developed there are about 20 elongated nodular swellings on body-whorl, reaching from suture half-way over whorl, and about 14 low undulations on peripheral keel. Colour-pattern striking, dark-brown or sienna zigzag stripes and dots on an almost white background; the dull green of *oppressa* and *dunedinensis* absent. For some further details, see comparison with *fossilis* Finlay (1927, p. 350).

T. oppressa (Hutton) is recorded by Suter from the Chathams, but is unlikely to occur there, and may be rejected.

Melagraphia Gray, 1847; *P.Z.S.* (*Lond.*), p. 145.

Melagraphia aethiops (Gmelin, 1791). Suter, 1913, p. 116.
Common.

Zediloma Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 352.

Zediloma arida Finlay, 1926 (*coracina* auct., not of Philippi).

See Suter, 1913, p. 114 (as *coracina*), and Finlay, *l.c.*, p. 353. Juvenile shells very common.

Suter has also recorded three other Monodonts from the Chathams, viz., *Zediloma digna* Finlay (as *M. nigerrima*, but not of Gmelin), *Z.* (*Fractarmilla*)*morio* (Philippi), and *Cavodiloma coracina* (Philippi) (as *M. excavata* Ad. and Ang.), but I have seen no specimens of these. For these genera and name-changes, see Finlay, 1926.

Cantharidus Montfort, 1810; *Syst. Conch.*, vol. 2, p. 251.

Cantharidus opalus (Martyn, 1784). Suter, 1913, p. 124.

There seem to be two forms of this shell; one tall and rather narrow, with contracted base, narrow aperture, and straight or but very slightly concave sides; the other squat and wide, with very wide base, large aperture, and strongly-concave sides. The latter form is the only one I have seen from the Chathams, but I have only four adult specimens; juveniles, though very plentiful, cannot be grouped with certainty. The tall form seems to predominate on the mainland, but as I have a squat specimen amongst others from Stewart Is., and another from the North Is., I hesitate to separate these groups definitely till more material indicates the wisdom or error of so doing. It is difficult to state what Suter's record (1913, p. 131) of *Thalotia conica* (Gray) is based on; it must, of course, be rejected.

Micrelenchus Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 355.

Micrelenchus sanguineus (Gray, 1843). Suter, 1913, p. 128.

Micrelenchus tenebrosus (A.Ad., 1853). Suter, 1913, p. 129.

Micrelenchus tenebrosus huttoni (Smith, 1876). Suter, 1913, p. 129.

Micrelenchus dilatatus (Sow., 1870). Suter, 1913, p. 123.

Four examples of the first, one of each of the next two, the last very common. Marwick (*T.N.Z.I.*, vol. 58, p. 475, 1928) has reported *M. rufozona* (A.Ad.) from the Pliocene of Titirangi, but the specimens differ in base, pillar, and growth habit from this North Cookian form, and are nearer *sanguineus*, but have a rounder periphery and more expanded aperture; probably a new species should be erected.

Family TALOPIIDAE nov.

This seems to be needed for the various Minolioid genera such as *Talopia* Gray, 1842, *Minolia* A.Ad, 1860, *Talopena* Iredale, 1918, *Spectamen* Iredale, 1924, *Antisolarium, Conominolia, Zeminolia,* and *Zetela,* all of Finlay, 1926, but not *Ethminolia* Iredale, 1924; of these *Talopia* is the oldest name, and may be taken as the foundation of the Family. *Solariella* Wood, 1842, and *Machaeroplax* Friele, 1877, perhaps belong here, but, being northern groups, may be more closely related to other associations. Thiele has placed these in his subfamily Margaritinae, but Iredale has noted (*Rec. Austr. Mus.*, vol. 14, No. 4, p. 258, 1925) that, as far as Austral species are concerned, this should be termed Stomatellinae, and to the *Euchelus-Stomatella* series the Austral Minolioids show little resemblance.

Antisolarium Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 359.

Antisolarium egenum (Gould, 1849). Suter, 1913, p. 141.

Several specimens.

Family CALLIOSTOMIDAE.

Maurea Oliver, 1926; *Proc. Mal. Soc.*, vol. 17, p. 108.

Maurea tigris (Martyn, 1784). Suter, 1913, p. 148.

3 shells. I can observe no differences in Cookian, Forsterian, and Moriorian specimens.

Maurea cunninghami pagoda (Oliver, 1926). *Proc. Mal. Soc.*, vol. 17, p. 112; also Finlay, *T.N.Z.I.*, vol. 57, p. 485 (as *cunninghami regifica*).

2 typical specimens. The only Tertiary *Maurea* from the Chathams (*finlayi* Marwick; 1928, p. 476) is not related to these two species.

Mucrinops Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 360.

Mucrinops punctulata (Martyn, 1784). Suter, 1913, p. 146.

2 specimens; curiously enough they belong to the typical Cookian form, and not to the Forsterian var. *urbanior*. It is quite possible that the two forms represent stational rather than regional variants, but this may be elucidated later.

Suter's record, following Pilsbry, of *M. spectabile* (A.Ad.) from the Chathams is probably based on an aberrant *punctulatum*.

Family STOMATELLIDAE. (*vide* Finlay, 1926, p. 371.)

Herpetopoma Pilsbry, 1890; *Man. Conch.* (1), vol. 11, p. 430.

Herpetopoma bella (Hutton, 1873). Suter, 1913, p. 149.

Common; type comes from the Chathams; recorded otherwise only from the Cookian region.

Margarella Thiele.

Margarella fulminata (Hutton, 1873). Finlay, 1926, p. 357.

Very abundant, restricted to the Moriorian province, and one of its most characteristic shells. Marwick *T.N.Z.I.*, vol., 58, p. 475, 1928 describes a *Margarella runcinata* from Oligocene beds at Waitangi, but compares it with *decepta* Iredale rather than with *fulminata*; it is imperforate.

Family UMBONIIDAE.

Zethalia Finlay, 1926; *T.N.Z.I.*, vol 57, p. 369.

Zethalia zelandica (A.Ad., 1854). Suter, 1913, p. 171.

3 specimens. Also found in the Pliocene at Titirangi.

Family LIOTIIDAE.

Liotella Iredale, 1915; *T.N.Z.I.*, vol. 47, p. 442.

Liotella n. sp. aff. *polypleura* (Hedley, 1904).

A single specimen, not worth description at present, is closely related to *polypleura*, but has many more axial ribs, and the interstices appear to be striate.

Family TURBINIDAE.

Modelia Gray, 1840 (?).

Modelia granosa (Martyn, 1784). Suter, 1913, p. 163.

Common. Hutton named a young shell from the Chathams *Liotia* (*Arene*) *shandi* (*Cat. Mar. Moll.*, p. 35, 1873) but Moriorian specimens do not seem regionally separable from typical Cookian and and Forsterian forms.

Imperator Montfort, 1810; *Conch. Syst.*, p. 199.

Imperator heliotropium (Martyn, 1784). Suter, 1913, p. 166.

One shell, three opercula. Ancestral at the Chathams may be the Oligocene *I. anthropophagus* Marwick (*T.N.Z.I.*, vol. 58, p. 477, 1928).

Cookia Lesson, 1832; *Illust. Zool*, vol. 15.

Cookia sulcata (Martyn, 1784)). Suter, 1913, p. 167.

Not uncommon, especially young shells. These latter seem to correspond exactly to Webster's *Astralium pyramidale* (*T.N.Z.I.*, vol. 37, p. 276, 1905) which Suter places in the synonymy of the subsp. *davisii* Stowe, 1872, for which the earliest name seems to be *Risella kielmansegi* Zelebor, 1866, as I have already pointed out (1926, p. 368).

Families Acmaeidae and Patellidae.

A critical account of these, as regards the Chathams, must be left to some future investigator. Suter has recorded some twelve species of the two Families, but only three were brought to me, and only badly worn beach specimens of these, so it would be absurd to offer any critical notes. The *Acmaeas* recorded by Suter are:—*Patelloida corticata* (Hutton, 1880), *P. perplexa* (Pilsbry, 1891), *Atalacmea fragilis* (Sowerby, 1823), *Conacmea parviconoidea* (Suter, 1907), and *Radiacmea rubiginosa* (Hutton, 1873). I have seen only the latter from this locality; it is common as a dead shell, and was described from here; Oliver (*T.N.Z.I.*, vol. 56, p. 565, 1926) has restricted it to the Chathams, and notes that it is separated by its broader and more elevated shell, more central apex, and more distant ribs from the mainland *inconspicua* (Gray), which, under the synonymic name *cingulata* Hutton, is the orthotype of *Radiacmea* Iredale. *P. perplexa* (Pilsb.) should be rejected from the Neozelanic fauna, and it is very probable that the record of *corticata* is based on beach-worn *rubiginosa*, which is very variable. Marwick has described (*T.N.Z.I.*, vol. 58, p. 473, 1928) an interesting Pliocene form from Titirangi as *Atalacamea elata*; it is probably ancestral to *fragilis*.

Seven species of *Cellana* are recorded by Suter:—*antipoda* (Smith, 1874), *denticulata* (Martyn, 1784), *radians earlii* (Reeve, 1855), *r. affinis* (Reeve, 1855), *r. flava* (Hutton, 1873), *redimiculum* (Reeve, 1854) and *strigilis* (H. and J., 1841). Iredale has given notes on these and other species (1915, pp. 430-432), rejecting *antipoda* as not of Smith, and *affinis* as preoccupied, and uniting *strigilis* and *redimiculum*. However, I have noted (1926, p. 337) that *redimiculum* may be retained for the mainland shells, *macquariensis, terroris,* and *strigilis* (= *illuminata*) being names for Rossian forms. The common Chatham limpet is of this style, and may be united *pro. tem.* with the Forsterian shells as *Nacella redimiculum* (Reeve, 1854). The only other limpet seen from the Chathams is a *Cellana* of the *radians* type, and is perhaps what Pilsbry named *Acmaea chathamensis*; it may be left under this name till a good suite of fresh specimens can be examined.

Order MONOTOCARDIA.
Suborder TAENIOGLOSSA.
Family LITTORINIDAE.

Melarhaphe Menke, 1828; *Synop. Meth. Moll.*, p. 23.

Melarhaphe zelandiae Finlay, 1926. *T.N.Z.I.*, vol. 57, p. 375.
Common; = *mauritiana* Suter (1913, p. 188), not of Lamarck.

Malarhaphe cincta (Q. & G., 1833). Suter, 1913, p. 187.
Eight very young specimens are more regularly acuminate and less inflated than those referred to the previous species, and probably belong here.

Family BEMBICIIDAE.

Kesteven (*Rec. Austr. Mus.*, vol. 4, 1902) showed that *Risella* Gray and *Risellopsis* Kesteven were entitled to group distinction from the Littorinas, and so proposed the Family Risellidae. Hedley has merged this in the Family Littorinidae, but the aperture formation and details of anatomy seem to indicate separation from the *Melarhaphe-Tectarius* association. *Bembicium* Phil. having supplanted *Risella* Gray, the family name therefore becomes *Bembiciidae*.

Risellopsis Kesteven, 1902; *Rec. Aust. Mus.*, vol. 4, No. 7, p. 319.

Risellopsis varia (Hutton, 1873). Suter, 1913, p. 191.
Common.

Risellopsis varia carinata Kesteven, 1902. Suter, 1913, p. 192.
Common. It is doubtful whether it is at all useful to maintain a separate name for the carinate form; as there are all gradations at every locality, the one never occurring without the other. It might be interesting to study the relative abundance of the two forms at different localities.

Family RISSOIDAE.

Haurakia Iredale, 1915; *T.N.Z.I.*, vol. 47, p. 449.

Haurakia hamiltoni (Suter, 1898). Suter, 1913, p. 200.
One specimen. This is typically a Cookian species, but Iredale (*T.N.Z.I.*, vol. 40, p. 393, 1908) has recorded it as found alive in seaweed-washings at Banks Peninsula.

Merelina Iredale, 1915; *l.c.*, p. 449.

Merelina plaga Finlay, 1926. *T.N.Z.I.*, vol. 57, p. 378.
4 specimens, differing at sight from the Lyall Bay *lyalliana* Suter but agreeing well with Snares Is. shells. Marwick (*T.N.Z.I.*, vol. 58, p. 478, 1928) compares his *M. avita* (Oligocene, Pitt Island) with *lyalliana* rather than with *plaga*.

Subonoba Iredale,, 1915; *l.c.*, p. 450.

The forms of this genus, as also many species of *Esta, Notosetia,* and *Dardanula,* cannot be satisfactorily determined until the Suter types are available for study. There are so many new species of them all, and Suter's descriptions are so inadequate and his figures so wretched, that it is an impossibility to identify most of the

forms at present. Of *Subonoba* I have three species from the Chathams, *S.* cf. *fumata* (Suter), *S.* cf. *insculpta* (Murdoch), and *S.* n. sp.; 6 specimens of the second, one of the first and last. The new species is badly worn and not worth description.

Estea Iredale, 1915; *l.c.*, p. 451.

Estea n. sp. aff. **zosterophila** (Webster, 1905).

For reasons just stated I do not describe this, though it is plentiful at the Chathams and in the Forsterian province. It is the southern analogue of the Cookian *zosterophila,* being much larger and more solid.

Estea minor (Suter, 1898). Suter, 1913, p. 211.

Common. I have already stated (*T.N.Z.I.*, vol. 55, p. 487, 1924) that this is a distinct species from *zosterophila.*

Estea n. sp. aff. **minor.**

Not uncommon; larger and wider than *minor,* with a still more capacious aperture.

Estea sp. cf. **subfusca** (Hutton, 1873).

One worn specimen, with the upper part of the spire lost, but evidently with a very high spire, and a small aperture.

The two Pliocene species described by Marwick (*T.N.Z.I.*, vol. 58, p. 478, 1928) as *E. insulana* and *E. subtilicosta* do not seem to be related to the Recent forms.

Austronoba Powell, 1927; *T.N.Z.I.*, vol. 57, p. 541.

Austronoba martini n. sp. (Figs. 12, 13.)

Close to *A. carnosa* (Webster, 1905), but somewhat stronger in build, rather wider, spire relatively shorter, the whorls less convex and the sutures consequently shallower. 12-14 very indistinct axials per whorl on early whorls alone, absent on last two whorls; spirals distinct, especially on lower whorls, about 30 on body-whorl, about 14 on penultimate. Spire 1½ times height of aperture, which is as in *carnosa,* but the peristome is less incomplete, rather thicker, and less effuse below. Colour, sienna or mauve-brown, a narrow white band along the middle of the whorls, and sometimes a second on base; the shells are all beach-worn, so the colour when fresh is probably darker.

Height, 2.7 mm.; diameter, 1 mm.

10 specimens. *Austronoba* does not seem to have been previously reported south of the Cookian Province; it is thus very interesting to find it at the Chathams, as it must have come there from the north. Oliver (*T.N.Z.I.*, vol. 47, p. 519, 1915) has recorded both *Onoba carnosa* and *O. candidissima* (Webster) from the Kermadec Province; I have not seen the latter, but Kermadec specimens of the former evidently represent a new species, being smaller with markedly convex and frequently angled whorls, and strong persistent axials, etc.*

*Since this was written, Powell has described both these as new species, *Austronoba oliveri* and *A. kermadecensis* respectively (*T.N.Z.I.*, vol., 57, p. 542).

Rissoina D'Orbigny. 1840; *Voy. Amer. Mer.*, p. 52.

Rissoina chathamensis (Hutton, 1873). Suter, 1913, p. 220.

Very common, but mostly worn; described from here. Marwick (1928, p. 479) has referred a single Oligocene specimen to this species.

Dardanula Iredale, 1915; *T.N.Z.I.*, vol. 47, p. 452.

Dardanula olivacea (Hutton, 1882). Suter, 1913, p. 225.

Common. The Chatham specimens are divisible into three groups, probably of specific value, but elaboration of this difficult genus must be left for a future occasion.

Family HYDROBIIDAE.

Potamopyrgus Stimpson, 1865; *Am. Journ. Conch.*, vol. 1, p. 53.

Potamopyrgus antipodum zelandiae (Gray, 1843). Suter, 1913, p.. 231.

Not uncommon.

Potamopyrgus badia (Gould, 1848). Suter, 1913, p. 231.

3 specimens. Suter reports *P. corolla* (Gould, 1847) as the only Chatham species, but the three angled and spinous shells I have seen from there are far better referable to *badia* than to *corolla*.

Family CALYPTRAEIDAE.

Zegalerus Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 392.

Zegalerus crater Finlay, 1926, *l.c.*

2 specimens; they are the only Recent specimens I have seen, and I cannot separate them from typical Nukumaruian fossils; both are beach-worn. The species is common in the Pliocene sands at Titirangi (Marwick; *T.N.Z.I.*, vol. 58, p. 480, 1928).

Sigapatella Lesson, 1830; *Zool. Coquille*, vol. 2, p. 389.

Sigapatella novae zelandiae Lesson, 1830. Suter, 1913, p. 285 (as *maculata* Q. and G).

Common.

Family CERITHIIDAE.

Zeacumantus Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 380.

Zeacumantus subcarinatus (Sowerby, 1855). Suter, 1913, p. 239.

Common; includes *tricarinata* (Hutton, 1883), also reported by Suter, but not a distinct form.

Lyroseila n. gen. Type: *Seila chathamensis* Suter, 1908.

Lyroseila chathamensis (Suter, 1908). Suter, 1913, p. 252.

Examination of perfect apices of this species has shown that it cannot be referred to *Hebeseila* Finlay, as I tentatively placed it (*T.N.Z.I.*, vol. 57, pp. 382, 385, 1926), but constitutes a distinct group. The embyro is of three whorls, the first smooth, depressed, and consisting of a blunt, almost Caricelloid point, rapidly developing a median keel and passing into the strongly sculptured next two

whorls; these have, as Suter states (only he considered them as shell-whorls, the protoconch being " of one smooth whorl only"), "2 cinguli, the upper of which is inconspicuous, but the lower one is thick and prominent"; the cinguli pass into the shell proper rather imperceptibly, without any varix, the change being marked only by the bifurcation of the lower rib, so that the following whorls bear three subequal spirals; the whole embryo is slightly wider than the succeeding whorl, so that it interrupts the straight outlines of the spire, and projects as a bluntly-pointed cylinder. This apex differs radically from those of *bulbosa* Suter, and *terebelloides* Hutton, the genotypes of *Hebeseila* and *Notoseila* respectively, and the species itself has a Pliocene ancestor in *S. huttoni* Suter (*N.Z.G.S. Pal. Bull, No. 2,* p. 16, 1915). This differs only in its more convex whorls and deeper sutures, the embryo being exactly the same; no pre-Pliocene member of the group is yet known.

Re-examination of more abundant material does not enable me to separate Recent Cookian and Moriorian specimens of *chathamensis* (I have seen no Forsterian examples, though the type is from Foveaux St.), so I still feel that Suter's *cochleata* (1913, p. 252) should be reduced to a synonym.

Iredale (1915, p. 455) has noted that the specific name *terebelloides* must be credited to Hutton rather than von Martens. He quotes Suter's statement that " Hutton's name has priority by one month," which is not quite correct, the preface to the *Cat. Mar. Moll. N.Z.* being dated May 7th, while that to the *Crit. List.* bears the date October 25th, so that there is more than five months' clear priority. Now Hutton merely reproduces von Martens' description, giving no locality, but saying: " This is the same as my *Cerithium cinctum*" (the type of which, from Stewart Is., is in the Dominion Museum, Wellington). Von Martens in his account merely states that the specimens were sent by Dr. von Muller "with the statement that they came from New Zealand." Now I cannot at present separate northern and southern specimens of *terebelloides,* but it is desirable that a type specimen and locality should be fixed for every species as far as possible. I therefore here nominate Stewart Is. as type locality, and select the type of *C. cinctum* Hutton, 1873, as neotype of *Notoseila terebelloides* (Hutton, 1873).

Family Turritellidae.

Maoricolpus Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 389.

Maoricolpus roseus (Q. & G., 1834). Suter, 1913, p. 270.
8 examples.

Family Lippistidae.

This, as Iredale has indicated (1924, p. 251), replaces Family Trichotropidae.

Trichosirius Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 395.

Trichosirius inornatus chathamensis n. subsp. (Fig. 40.)
Differs from typical shells in being more squat, with more prominent peripheral and basal carinae, the four peripheral spirals

being notably coarser and stronger, the radials also coarser, and the shoulder much less steeply inclined.

Height, 11 mm.; diameter, 8 mm.

7 specimens.

I have further new species of this genus from southern waters, but have seen nothing quite like these Chatham shells.

Family VERMETIDAE.

Vermicularia Lamarck, 1799; *Mem. Soc. H.N. Paris,* p. 78.

Vermicularia sipho (Lamarck, 1818). Suter, 1913, p. 259.

Novastoa Finlay, 1926; *T.N.Z.I.,* vol. 57, p. 386.

Novastoa zelandica (Q. & G., 1834). Suter, 1913, p. 260.

Synonym: *Siphonium lamellosum* Hutton, 1873, Suter, p. 261.

Several masses of irregular shape. One agglomerate consists of some half-dozen specimens having the first few whorls spirally coiled up, the remainder vermiform, more or less irregularly twisted in a moderately straight line; i.e., the shell is identical in growth with Q. and G.'s *Vermetus zelandicus,* though in all other respects it is a typical example of *lamellosum* Hutt. The only diagnostic difference between the two is the presence in the latter species of an operculum, and I think it unsafe to rely solely on this. Suter, following Hutton's original description states that the operculum of *lamellosum* is hemispherical; I cannot understand this, unless Hutton mistook a loose septum for the operculum. Internal septa are very infrequent, they are concave distally, becoming gradually confluent with the walls of the tube anteriorly; longitudinal internal ridges are absent. Operculum shaped, like an everted mushroom; the exterior lightly concave, with a prominent, thickened, and slightly raised inner calcareous disc, surrounded by a wider, outer, quite solid, horny rim; interior with a stalk-like cylindrical, dome-topped pillar, merging in to the calcareous disc, which is coated on the inside with chitin and marked off from the horny rim by a deep circular furrow. The usual beach specimens of *lamellosum* are much worn, and consist of agglomerates of only the early whorls, only occasionally are they found developing long tubes as in the typical *zelandica* form.

Apart from its occurrence at the Chathams, where it seems commoner than elsewhere, this species is apparently purely Cookian in range. It is significant that Suter has recorded *lamellosum* from the Bay of Islands, whence also come the type of *zelandica.*

Magilina Velain, 1877; *Arch. Zool. Exper.,* vol. 6, p. 106.

Magilina sp., probably new.

A single specimen of a vermetid that cannot be referred to any species at present recorded from New Zealand. It is evidently very close to *M. caperata* (Tate and May, 1900) from Tasmania and New South Wales, but I have no actual specimens for comparison. The specimen is too much worn and broken for description, but forms an interesting record as the genus is new to New Zealand.

Siliquaria Bruguière, 1789; *Encycl. Meth.*, vers. 1, p. 15.

Siliquaria weldii Ten.-Woods, 1876. Suter, 1913, p. 264.
One shell.

Family JANTHINDAE.

Janthina Bolten, 1798; *Mus. Bolt.*, p. 75.

Janthina violacea Bolten, 1798. Oliver, 1915, p. 525.
Two small shells.

Janthina exigua Lamarck, 1822. Suter, 1913, p. 299.
7 juvenile shells.

Family SCALIDAE. (*vide* Finlay, 1926, p. 401).

Cirsotrema Mörch, 1852; *Cat. Yoldi*, p. 48.

Cirsotrema zelebori (Dunker, 1866). Suter, 1913, p. 322.
Suter has reported this from the Chathams; I have seen no specimens, but it is certain to occur there. A closely related Oligocene species, *C. chathamensis* has been described by Marwick from Momoe-a-atoa (*T.N.Z.I.* vol. 58, p. 483, 1928).

Family CYMATIIDAE.

Charonia Gistel, 1848; *Naturg. Thier*, p. 170.

Charonia capax Finlay, 1926. *T.N.Z.I.*, vol. 57, p. 397.
This also is not autoptically known to me from this locality, though Suter has recorded it (as *rubicunda* Perry).

Cymatium Bolten, 1798; *Mus. Bolten*, p. 129.

Cymatium spengleri (Perry, 1811). Suter, 1913, p. 308.
Two shells.

Gondwanula Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 399.

Gondwanula tumida (Dunker, 1862). Suter, 1913, p. 309.
4 specimens.

Xenogalea Iredale, 1927; *Rec. Austr. Mus.*, vol. 15, No. 5, p. 339.

Xenogalea collactea, n. sp.

Phalium n. sp. (*labiatum* auct.); Finlay, *T.N.Z.I.*, vol. 57; Pl. 20, Figs. 62, 63; 1926.

Shells of the labiata type (i.e., almost smooth, especially on spire and base, with small and partly closed umbilical opening, and with denticles, not faint furrows, on lower part of outer lip), fairly wide, spire rather short. Colour, pale brownish-grey with lilac tinges, mottled with darker shades of the same, 3-6 narrow indistinct bands of variously-shaped brown spots with white centres, defined on outer lip as four double bands of dark brown, the lowest at canal, outer and inner lips otherwise white. Spiral sculpture absent except on initial whorls, and sometimes a few grooves on base. No shoulder present till last whorl, which develops 5-7 rather coarse nodules extended into very indistinct and irregular low axial plications.

Several oblique raised ridges at inner base of parietal callus, directed forwards.

Height, 69 mm.; diameter, 48 mm.

Holotype and two other specimens from Opotiki, Bay of Plenty.

Xenogalea powelli n. sp.

Phalium n. sp. (*pyrum* auct.); Finlay, *T.N.Z.I.*, vol. 57; Pl. 20, Fig. 64; 1926.

A Cookian deeper water representative of the *pyrum* series. Very similar to *X. finlayi* Iredale, but with a short spire and traces of nodulation on the shoulder. Colour less tawny, more olive in shade; shell less inflated, especially basally.

Height, 73 mm.; diameter, 52 mm.

Holotype from off Whakatane, Bay of Plenty, in 40-50 fathoms; several other specimens from the same locality collected by Mr. A. W. B. Powell, in compliment to whom the species is named.

This is the form erroneously united with *X. finlayi* Iredale (*C. stadialis* Finlay, *non* Hedley; *T.N.Z.I.*, vol. 55, p. 526, 1924); examination of further material shows that the northern and southern shells are distinct.

These two forms were indicated as new species in the paper referred to, but not named, as Iredale's account of the Australian Cassids had not then appeared. Only one New Zealand species (*X. finlayi* n. sp. for *Phalium stadialis* Finlay, *non* Hedley— a wrong determination; *Rec. Austr. Mus.*, vol. 15, p. 342) was, however, provided with a name in his account, so that the names I had previously intended to give to the two other species I figured in the "Further Commentary" are now supplied. *X. collactea* is, as Iredale notes, very close to his *X. insperata* (*l.c.*, pp. 349, 350), but differs in the much coarser and more distant nodules on the last whorl, the more inflated columellar region with a deeper notch above the lowest plait, and the presence of the oblique parietal ridges; it is easily distinguished from the true *labiata*. *X. powelli* is less likely to be confounded with an Australian form, and is only distantly related to *pyrum*.

No shells of the *labiata* type occur at the Chathams, the single specimen from there agreeing exactly with Stewart Is. specimens, which are a little different from typical *powelli*; the exact status of these forms, and the number of species that should be allowed in the Neozelanic area cannot be satisfactorily settled till a larger range of specimens than I have at present is available for examination. Mr. H. D. Skinner picked up another specimen on a Moriori site at Mairangi, near Wharekauri; it was artificially pierced, and had evidently been used for adornment. The sole Tertiary Cassid from the Chathams, *Phalium skinneri* Marwick, is unrelated to the Recent forms, and is made the type of a new group, *Kahua*, by Marwick (1928, p. 482).

Cochlis Bolten, 1798; *Mus. Bolt.*, pt. 2, p. 146.

Cochlis zelandica (Q. & G., 1832). Suter, 1913, p. 289.

A few specimens. A related Tertiary form at the Chathams is *C. pittensis* Marwick (see *T.N.Z.I.*, vol. 58, p. 481, 1928).

Uberella n. gen. Type: *Natica vitrea* Hutton.

Uberella vitrea (Hutton, 1873). Marwick, *T.N.Z.I.*, vol. 55, p. 570, 1924.

One specimen, but also reported by Suter, 1913, p. 291 (as *amphialus* Watson). This locality seems to be the northern limit of the range of this typically Forsterian and Rossian species.

I would temporarily place under this genus all the species referred by Marwick (*l.c.*) to *Euspira,* though the assemblage is not homogeneous, *vitrea* and *pseudovitrea* (Finlay) disagreeing with *lateapertus* Marwick, and this again with *fyfei* Marwick. Marwick, following Dall, has used *Euspira* Agassiz, 1842, instead of *Lunatia* Gray, 1847, but both these writers seem to have overlooked the investigation of this question by Harris in 1897, where a totally different result is arrived at. Dall's opinion (quoted by Marwick, that *Euspira,* introduced by Agassiz in 1842, and typified by *N. labellata* Lamk., should displace *Lunatia* Gray, 1847, typified by *Natica ampullaria* Lamk.), was announced earlier than given by Marwick, viz., in *Bull. Mus. Comp. Zool.,* vol. 43, No. 6, p. 334, 1908; but at that place no type was selected, it being merely mentioned that the first species was *N. glaucinoides* Sow. = *N. labellata* Lk. At the reference given by Marwick (*U.S. Geol. Surv., Prof. Pap., 59,* p. 87, 1909) this is definitely given as the type of *Euspira.* Harris, however, had a dozen years earlier (*Cat. Tert. Moll. B.M.*, Pt. 1, p. 264, 1897) nominated *A. sigaretina* Lk. as the type, and this must displace Dall's selection; moreover, Harris showed that the date of introduction of *Euspira* was 1837 (*Sow. Min. Conch. Grossbr.*, pp. 14, 16), (1838, according to Sherborn; *Index Anim.* 1801-1850, pt. 10, p. 2250), and that a heterogeneous collection of species was there named in connection with it. Harris's action makes *Euspira* s. str. absolutely equivalent to *Ampullina* Bowdich, 1822 (*Elem. Conch.*, 1, p. 31; Pl. 9, f. 2, no species name). This is said to be the first Latin introduction of the latter name, which was used again two years later, in a different sense, by Blainville (*Dict. Sci. Nat.*, p. 235). Thus the name *Ampullina* can be given its usual interpretation only if it be decided that a genus can rest on an unnamed, doubtfully determinable figure (Dall in 1909, *l.c.*, suggests that it is possibly *A. depressa* Lk., *non* Sow., and adopts this as the type of the genus in place of *A. sigaretina*). It is a moot point whether *Ampullina* Bowdich should not be regarded as indeterminable, and in this case would have to be replaced by *Euspira* Desor and Agassiz—it may be noted that Sherborn does not record *Ampullina* Bowdich as a valid name, though Blainville's and Deshayes's uses are duly entered—, but whatever the conclusion in this case, it disposes of *Euspira* in connection with Austral mollusca, as we have no *Ampullines.* There are many recognisable groups of *Uber* (Hedley has noted that at least three may be allowed for tropical Queensland forms, *Uber* s. str., *Mamilla* Schumacher, and *Mamillaria* Swainson, of which *Naticina* Guilding is an exact synonym), and *Lunatia* Gray—which should apparently be brought into usage again—does not seem strictly applicable to the New Zealand " Espiras." Harris, in discussing Australian Tertiary species (*l.c.*, p. 260) has included three species in *Lunatia,* but each of these represents a different group. Therefore, from consideration of

all these points, I select the best known and the most aberrant New Zealand "*Euspira*" as type of a new genus *Uberella;* it will probably be wisest to include all the other New Zealand members of the group under this name until more comparative material allows further separation to be made.

Family LAMELLARIIDAE.

Lamellaria Montagu, 1815; *Trans. Linn. Soc.,* vol. 11, p. 11.

Lamellaria ophione Gray, 1850. Suter, 1913, p. 294.

A specimen of this species in the Otago University Museum has the locality "Chatham Is." attached to it.

Family CYPRAEIDAE.

Triviella Jousseaume, 1884; *Bull. Soc. Z. Fr.,* vol. 9, p. 98.

Triviella memorata Finlay, 1926; *T.N.Z.I.,* vol., 57, p. 396.

Two specimens. Marwick (*T.N.Z.I.,* vol. 58, p. 482, 1928) compares his *T. flora* (Oligocene, Pitt. Is.) with the Mainland Pliocene *T. zelandica* Kirk rather than with *memorata.*

Suborder STENOGLOSSA.

Family OLIVIDAE.

Baryspira Fischer, 1883; *Man. de Conch.,* fasc. 6, p. 600.

Suter (1913, p. 451) has reported *B. australis* (Sow., 1830) from the Chathams, but I have seen no specimens.

Family MARGINELLIDAE.

Marginella Lamarck, 1799; *Mem. Soc. H.N.,* Paris, p. 70.

Marginella allporti (?) Ten.-Woods, 1876. Suter, 1913, p. 459.

One damaged specimen. I am not in a position to state whether this species has been rightly identified from New Zealand, but it is highly doubtful.

Suter reports only *M. pygmaea* Sow. from the Chathams; this species has not occurred to me.

Family TURRIDAE.

Phenatoma Finlay, 1924; *T.N.Z.I.,* vol. 55, p. 515.

Phenatoma novaezelandiae (Reeve, 1843). Suter, 1913, p. 477.

Phenatoma zelandica (E. A. Smith, 1877). Suter, 1913, p. 491 (as *cheesemani*).

Both these species are reported by Suter from the Chathams; I have seen neither from here, but they have a wide distribution in both main Islands.

Phenatoma decessor Marwick (*T.N.Z.I.,* vol. 58, p. 491, 1928), from the Oligocene of Pitt. Is., is noted by its author as directly ancestral to *P. novaezelandiae*; apart from this, the Tertiary Turrids at the Chathams are altogether different from those in the Recent fauna.

Guraleus Hedley, 1918; *P.L.S., N.S.W.*, vol. 51, Suppl., p. M 81.

Guraleus sp.

Suter records both *dictyota* (Hutton) and *sinclairi* (Smith). Specimens are common, though usually worn, and seem to represent but one species, but a full discussion of the generic and specific name to be used would take up much space and is reserved to appear in an account of all these forms now in preparation, where it will be more in keeping.

Zenepos n. subgen. of *Nepotilla* Hedley, 1918.
Type: *Daphnella totolirata* Suter.

Zenepos totolirata (Suter, 1908). Suter, 1913, p. 511.

One specimen; also reported by Suter; a not uncommon Forsterian form, but I doubt the Whangaroa record.

This group-name is proposed for Nepotillas more slender than the type, with numerous spiral cords rather than keels, a less exserted apex, and especially with only a slight sinus at the shoulder. *Nepotilla* s. str. has a very deep *Veprecula*-like sinus, with long parallel margins and is represented in Australia by such forms as *bathentoma* (Verco), *lamellosa* (Sow.), and *triseriata* (Verco), while in *Zenepos* may be included the New Zealand species *lacunosa* (Hutton) and probably *chariessa* (Suter), and the Australian *mimica* (Sow.) and *minuta* (Ten.-Woods).

Family Buccinulidae nov.

This seems necessary to cover the Austral genera *Buccinulum* Swainson, 1837 (= *Evarne* H. & A.Ad., 1853), *Dennantia* Tate 1888, *Euthrena* Iredale, 1918, *Tasmeuthria* Iredale, 1925, *Evarnula* Finlay, 1926, and *Chathamina* nov. (*v.i.*). As a subfamily may be ranked Siphonaliinae nov., covering *Siphonalia* A.Ad., 1863, *Austrosipho* Cossmann, 1906, *Verconella* Iredale, 1914, *Berylsma* Iredale, 1924, *Glaphyrina* Finlay, 1926, *Aeneator* Finlay, 1926, *Pomahakia* Finlay, 1927, *Pittella* Marwick, 1928, and Ellicea Finlay, 1928 (in Marwick, 1928), proposed for *Siphonalia orbita* Hutton, 1885 (*T.N.Z.I.*, vol. 17, p. 326); Marwick has recently (*T.N.Z.I.*, vol. 56, p. 321, 1926) referred this species and *Streptopelma henchmani* Marwick to *Streptopelma* Cossmann, judging by the resemblance of figures; this likeness is purely superficial, and actual specimens show so many differences that I doubt their inclusion in the same Family. The Family Neptuniidae covers a large suite of Boreal forms; to this, under the name Chrysodomidae, Cossmann and Suter have referred the Neozelanic forms, but it seems better to select a distinct family name for the large number of southern genera, rather similar *inter se* that centre around the New Zealand *Buccinulum*. "Euthrias" have been referred to several families, and in any case *Buccinulum* has long priority over *Euthria* Gray, 1850.

In regard to the New Zealand members, it would be out of place here to give a full account, with keys for separation of genera and species, but I have prepared this, and hope to give it elsewhere at an early date. Therefore I merely deal briefly in the present paper, with the means for separating the Chatham "*Euthrias.*"

Euthrena may be always separated from *Buccinulum* and its allies, *Chathamina* and *Evarnula*, by its protoconch, which is small, with a minute smooth portion, early weakly axially ribbed, with a conspicuous brephic stage of coarse reticulation; if this is lost or worn, the next best feature is the inner lip callus, which is vertical for less than half of its length. The three other genera have a large embryo, of several smooth whorls, showing more or less axial acceleration, but never a reticulate stage; and the inner lip callus is vertical for usually much more than half of its length. As *Chathamina* is now first proposed, a comparative diagnosis of these three groups is necessary.

Buccinulum Swainson (= *Evarne* H. & A.Ad.):—Includes *linea* (Martyn), *pallidum* n. sp., and *sufflatum* Finlay (1926, p. 416). Axials small and numerous, confined to first three whorls.

Chathamina n. subgen. of *Buccinulum*:—Type: *Tritonidea fusco-zonata* Suter, 1908. Includes also *characteristica* n. sp., and the fossil *T. compacta** and its allied new species. Generally more squat than *Buccinulum*, wider and more solid; outer lip especially very thick, and with a heavy varix just before it; axials rather stout and prominent, generally persistent over all whorls; pillar more suddenly bent; teeth of outer lip inclined to be stouter, shorter, and fewer.

Evarnula Finlay:—Includes the fossil *striata* (Hutton), a new Recent deep water species, and *marwicki* n. sp. Spire rather elate; outer lip thin and sharp, rapidly thickening internally, but without a distinct varix; axials moderately prominent and numerous, persistent up to, and often also on, last whorl; teeth of outer lip not prominent, usually only subobsolete lirae; aperture less heavily armed with denticles than in the last two groups, there being rarely more than 2-3 at inflection of canal, but the lowest always very prominent, almost as in *Dennantia*; canal much more strongly flexed to left, and with a much stronger fasciole; strong spiral sculpture predominant; whorls more medially convex and better separated than in *Buccinulum* and *Chathamina*.

Subfamily BUCCINULINAE.

Buccinulum Swainson, 1837; *Cat. Foreign Shells Man. Nat. Hist. Soc.*, p. 81.

Buccinulum lineum (Martyn, 1784). (Fig. 6.) Suter, 1913, p. 375.

Six specimens. The fact that this lives together with *pallidum* and *characteristica* is indication of the distinctness of these species, though, of course, hybrids are to be expected. *Pallidum* probably reaches its extreme northern limit here, *characteristica* is possibly restricted but may occur in the North Is. also (see below), while *linea* is typically a common Cookian species, but Forsterian stragglers are occasionally found; I have one from as far south as Taieri Beach, but I doubt its occurrence in the Rossian province.

Buccinulum pallidum n. sp. (Figs. 3, 4, 5).

Shell exactly like *B. linea* in formation of whorls and aperture, but more elate, with a taller spire, and a weakly sub-margined suture.

**N.Z. Geol. Surv. Pal. Bull., No. 5*, p. 35, 1917.

Colour uniformly light brownish-yellow to almost white (some worn shells show broad darker patches), the prominent purplish bands of *linea* are completely absent, bands when present being irregular and but slightly darker than rest of shell.

Height, 37 mm.; diameter, 16 mm. (type).

Holotype from Stewart Is.; 9 specimens from the Chathams; 1 specimen from Lyttelton Harbour, the type locality of *B. sufflatum* Finlay, but that species differs constantly in inflation and stronger spiral sculpture.

Chathamina new subgenus. Type: *Tritonidea fuscozonata* Suter.

Chathamina characteristica n. sp. (Figs. 29, 30, 31).

Very similar to *B. linea* in habit and style of painting, but more solid, inclined to be squat, the last whorl wide and swollen. Outer lip crass, pushed out by a broad swollen varix just behind it. Aperture tending to be heavily armed with denticles, especially on inner lip, where they are usually present over whole of its length. Canal more strongly twisted, and more flexed to left than in *linea*; this feature serves to separate immature shells of the two species, but very young specimens are not placeable with certainty.

Height, 34 mm.; diameter, 19 mm. (type). Corresponding dimensions of figured paratypes, 35 x 20 mm., and 39 x 18 mm.

This is one of the commonest and most characteristic Chatham Is. shells. I have also one specimen reputed to be from the North Is.; apart from this doubtful record, I have not yet seen it outside the Chathams.

Evarnula Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 415.

Evarnula marwicki n. sp. (Figs. 7, 8, 9).

Shell large, with strong axial and moderate spiral sculpture. Embryo as in *B. linea*. 7 shell-whorls, sub-shouldered a little above middle, slightly concave on shoulder, convex below. Suture strongly margined by a heavy cord. Spiral sculpture same style as in *striata* (Hutton), but main cords broader and secondaries weaker; 15-17 main spirals on body-whorl. Axial sculpture predominant, 13-14 axials on penultimate whorl, subobsolete on last whorl. Aperture reminiscent of *Clava*, pyriform, medially inflated, produced below into a rather long beak, twisted back and well to the left. Outer lip sharp and thin, rapidly thickened inside, but without a marked varix, tending to throw downwards and be most inflated anteriorly. Whole aperture very lightly armed, teeth on outer lip being thin and weak, more like short lirae; seldom more than 2-3 not prominent denticles at base of inner lip, and a parietal tubercle.

Height, 52 mm.; diameter, 24 mm. (type). Corresponding dimensions of figured paratype from Stewart Is., 38 x 18 mm.

The holotype and one other specimen (figured) from Warrington, near Dunedin; 5 good specimens from Stewart Is.; numerous more or less worn shells from the Chathams.

The name of Dr. Marwick, Palaeontologist to the Expedition, is attached to this species.

Euthrena Iredale, 1918; *Proc. Mal. Soc.*, vol. 13 p. 34.

Euthrena strebeli (Suter, 1908). Suter, 1913, p. 378.

Fairly common. The distinctness of this form is not beyond doubt, *vittata, littorinoides,* and *strebeli* all seem to intergrade somewhat on the mainland, and investigation of specific values in this genus must be left for another occasion. I have, however, used *strebeli* for a number of Chatham shells, evidently not *bicinctus,* of a uniformly dull colour, and very solid habit; I have identical shells from Dunedin Harbour (the type locality of *strebeli*) and other Forsterian localities. It may be noted, however, that Reeve's figure of the type of his *littorinoides* (*Conch. Icon.*, vol. 3, Pl. 12, f. 94) looks as much like *strebeli* as it does the form commonly accepted as *littorinoides.*

Euthrena bicincta (Hutton, 1873). *Cat. Mar. Moll.*, p. 10. (Figs. 10, 11).

Hutton rightly described this species from "Chatham Islands only." It is one of the most characteristic of the Chatham shells, and its conspicuous colour pattern renders it very striking. It seems to be restricted to the Moriorian province; occasionally a North Is. specimen turns up with much the same painting, but is always about half the size, and on comparison is easily seen to be an atypical form of *vittata,* occurring with it, though but rarely. At the size of the largest *vittata, bicincta* always has an unformed outer lip, and is evidently immature; it grows as large as *strebeli,* and has a characteristic facies which is difficult to describe. Very common at the Chathams.

Family BUCCINIDAE.

Austrofusus Kobelt, 1881; Kuster's *Conch. Cab.*, p. 127.

Austrofusus chathamensis n. sp. (Figs. 60, 61, 62, 63).

Distinguished from the typical Cookian *glans* (Bolten) by obsolescence of keels, crowded axial ribs, and especially the persistence of the latter on shoulder. 21-25 axials on penultimate whorl, strong from suture to suture on all spire-whorls, being but little thinner on shoulder, hardly nodulous on periphery, interstices 1½-2 times width of ribs, obsolete on body-whorl, being replaced by very numerous ribs of about same strength as spirals, forming a coarse but neat and even reticulation. Perpheral keel becoming almost obsolete on body-whorl, which is usually subregularly convex, lower keel absent. In *glans* there are 16-18 axials on penultimate whorl, merely indicated on shoulder, strong on lower half, prominently nodular on periphery and at lower suture, interstices 2-4 times as wide, rarely obsolete on body-whorl, and, if so, not replaced by coarse reticulation; keels very rarely obsolete, both upper and lower, and frequently a third still lower, being well defined.

Height, 54 mm.; diameter, 28 mm. (type). Corresponding dimensions of figured paratype, 59 x 33 mm.

Rather common as beach-worn shells at the Chathams; no fresh specimens seen.

This is a rather puzzling form. The characters of the Chatham shells appear constant, and they stand out at once when placed beside

North Is. specimens of *glans.* Occasionally Mainland forms are found with subobsolete keels and numerous axials, but I have seen none with ribs strongly developed on the shoulder, or with quite the aspect of *chathamensis.* In the Upper Pliocene beds at Castlecliff, however, *Austrofusus* is very common, and apparently very variable, all gradations occurring between forms with 12 distant prickly axials per whorl, and shells with twice as many cramped and blunt ribs. Some would urge that this is sufficient reason for admitting but one species, but the Recent regional forms (*glans, agrestior* Finlay* and *chathamensis* nov.) seem so well differentiated, that I prefer to regard the Castlecliff shells as in process of evolution, and would artificially separate them into three groups, *glans, chathamensis,* and some intermediate or hybrid juveniles. Oliver has treated the Kermadec Is. Cellanas somewhat similarly (*T.N.Z.I.,* vol. 47, p. 511, 1915).

Hutton also observed the different aspect presented by the Chatham shells, and referred them (*Cat. Mar. Moll.,* p. 11, 1873) to *Buccinum tritom* Lesson, 1841 (*Rev. Zool.,* p. 37). That species, however seems to be based on an old Mainland specimen, and such, as I have stated, may at first sight resemble *chathamensis,* but lack the strong shoulder ribs, etc.; it appears to be correctly treated as a synonym of *glans,*† as is also Hutton's " var. B" (*loc. cit.*). This is described as having "Body-whorl with 12 nodular transverse ribs, which do not reach to the suture; small — Cook Strait." It is possible that what I have called *glans* from Castlecliff may later deserve separation, as the tubercles and ribs are generally stouter, but this may be passed over at present.

Austrofusus glans agrestior Finlay, 1927. *T.N.Z.I.,* vol. 57, p. 486.

Of 21 specimens of *Austrofusus* from the Chatham Is., all but one were uniform in character, and referable to *chathamensis.* This one stood out at sight, having strong keels, 15 very prominent peripheral nodules per whorl, no ribs on the shoulder, sculpture nowhere obsolete, and a different shape. Though not fully grown (41 mm. x 25 mm.) it agrees exactly with the type of the Forsterian regional variety *agrestior,* and is without hesitation referred to this form.

Cominella Gray, 1850; *Fig. Moll. Anim.,* vol 4, p. 72.

Cominella maculosa (Martyn, 1784). Suter, 1913, p. 387.

Numerous specimens, the best preserved being from the stomachs of cod.

Acominia Finlay, 1926; *T.N.Z.I.,* vol. 56, p. 240.

Acominia adspersa nimia n. subsp. (Figs. 17, 18).

Differs from typical Cookian examples in larger size, more solid shell, and especially shape and elongation of last whorl. There is

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**vide infra.*

†That is, if it is really Neozelanic. Suter includes it in the synonymy of *Siphonalia nodosa* (Mart.) (*Manual,* p. 368), referring to Hutton's *Cat. Mar. Moll.* of 1873, but it should be noted that in 1884 Hutton (*T.N.Z.I.,* vol. 16, p. 228, footnote) stated that the species " Inhabits Peru," and dismissed it from our fauna. There is, however, no mention made of this name in Dall's summary of the Peruvian fauna published in 1909 (*Proc. U.S. Nat. Mus.,* vol. 37, pp. 147-294).

no tendency for the spire to be short and concave and the body-whorl cylindrical, as is so often the case in Mainland specimens. Juvenile shells are not easily separable from typical *adspersa,* but as growth proceeds a characteristic aspect is developed. The spire remains prominent and wide, ½-¾ height of aperture, and the sides are very much straighter than in *adspersa*; this is due to different shape of whorls, which are not convexly turgid, but develop a blunt subangulation at the lower suture, the long shoulder sloping almost straight at an angle of about 60; this angulation remains submedial and very prominent on the body-whorl, a feature not shown by *adspersa.* The last whorl is also much elongated, this produces a higher and larger aperture, and is especially seen in the long descending fasciole. The umbilicus is better developed.

Height, 70 mm.; diameter, 43 mm.

8 adults and several young shells.

Cominista Finlay, 1926; *T.N.Z.I.*, vol. 56, p. 240.

Cominista glandiformis (Reeve, 1847). Suter, 1913, p. 384 (as *lurida*).

5 specimens.

Eucominia Finlay, 1926; *T.N.Z.I.*, vol. 56, p. 239.

Eucominia iredalei n. sp. (Figs. 15, 16).

Shell derived from *E. nassoides* (Reeve), and with same style of sculpture, but far more massive, twice as large, and relatively almost twice as wide. The whole shell is of a squat and bulky formation, the body-whorl and aperture being especially capacious. Spire lower than aperture. Suture a little less sloping than in *nassoides.* Axial sculpture as in *nassoides,* but spirals weaker and more numerous, so that the axials are distinctly less tuberculate. Stronger sub-sinus in outer lip, but weaker denticles within. Wider fasciole. Still larger embryo.

Height, 53 mm.; diameter, 31 mm. Corresponding dimensions of figured paratype, an extreme form as regards width, 46 x 31 mm.

Chatham Islands only; 11 specimens. This is Hutton's "var. B" of *Buccinum zelandicum* Reeve (*Cat. Mar. Moll.*, p. 14, 1873). The true habitat and status of the latter species do not seem as yet to have been recognized, but it is certainly not Neozelanic, and looks like a true *Buccinum.* Suter (1913, p. 389) has stated that " This subantarctic species is very variable. The Chatham Is. specimens are generally large and more inflated, and Hutton separated them in 1873 as var. B. The *C. nodicincta* v. Mts. is most likely this variety, but shells nearly approaching it occur also in Foveaux St." I am unable to agree with this, and have not so far found it variable; if all the specimens are lumped together, there is certainly a very wide range of differences shown, but the important point is that forms from the same regional locality or depth are practically constant, and there are evidently numerous well-defined races which ought all to be recognised. Examination of Reeve's excellent figure shows that the Stewart Is. form (Fig. 14) is typical and therefore the true *nassoides*; I have similar shells from Chalky Inlet and as far north as Dunedin, so that the species is characteristically Forsterian. In deep water in the same region occurs a benthal relative, quite distinct

in habit; a second benthal form occurs north of Oamaru. Another quite distinct form occurs off the Snares Is.; this will take the name *nodicincta* v. Mts., and does not, as Suter reports, occur in Foveaux St. The Campbell Is. form I have not seen, but it is probably again distinct and has been named *Buccinum veneris* by Filhol (*Compt. Rend.*, vol. 91, p. 1094, 1880). As regards fossils, the nearest relative to *nassoides* is *E. elegantula verrucosa* Finlay,* which is quite close, but is smaller, has fewer axials on early whorls, and weaker spiral sculpture; *elegantula* itself is similar in habit to the Oamaru deep water form, but differs in amount of sculpture. Reduction of axials is carried still further in the older members such as *E. excoriata* Finlay. Dr. Marwick has described (*T.N.Z.I.*, vol. 58, pp. 486, 487, 1928) two Tertiary species from the Chatham Islands *E. bauckei* (Lower Miocene) being noted as directly ancestral to *elegantula* Finlay, and *E. ellisoni* (Middle Pliocene) as related to *nassoides*; the latter species while retaining the high spire of *nassoides*, has begun to show the inflation and size characteristic of *iredalei*.

Named after my good friend Mr. Tom Iredale, of the Australian Museum, Sydney.

Family Mitridae.

Austromitra Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 410.

Austromitra rubiginosa (Hutton, 1873). Suter, 1913, p. 366.

Common. The type is from the Chathams, but the species seems widely distributed. The single Oligocene species, *A. plicifera* Marwick (1928, p. 485) is not related.

Family Pyrenidae.

Zemitrella Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 431.

Zemitrella choava (Reeve, 1859). Suter, 1913, p. 431.

2 specimens, one of them corresponding to Suter's var. *e*. This species is at present used as a dumping-ground for *Zemitrellas* that cannot be allocated to any other described species, and I am not at all certain of the identification of the Chatham specimens, but a revision of the group must be left for another time. Marwick (1928, p. 488) has doubtfully identified a single specimen from Titirangi as this species.

Paxula Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 430.

Paxula n. sp. aff. *leptalea* (Suter, 1908).

The Chatham specimens, which are common, are all more or less worn, but probably identical with South Island shells which differ a little from the Rossian *leptalea*. It will therefore be better to take a Forsterian specimen as type, but for various reasons I think description is better withheld till the group can be treated as a whole.

Paxula sp. cf. **subantarctica** (Suter, 1908).

9 specimens are smaller and more slender than the preceding species, and may be provisionally referred here.

T.N.Z.I., vol. 56, p. 241, 1926.

Paxula allani n. sp. (Figs. 38, 39).

Like *leptalea* in shape, but more elate, and with a higher spire. The specimens are all worn, and spiral sculpture on the whorls cannot be distinguished, but there are rather stout spiral cords over most of the base, more especially round the neck of the canal. The most characteristic feature of the species is the strong axial sculpture, which is obsolete in all other species of the genus so far described. The penultimate whorl bears 16 stout axials extending from suture to suture on all whorls, and across body-whorl and almost all the base; the ribs are broadly rounded and have subequal interstices. This gives it somewhat the appearance of a *Zafrina,* such as *subabnormis,* but the strong spiral sculpture is lacking, and the aperture, of course, is totally different, that of *Paxula* being highly characteristic.

Height, 6 mm.; diameter, 2.5 mm. Corresponding dimensions of a larger worn specimen, 8 x 3 mm.

Not uncommon, and apparently restricted to this locality. Named after Mr. R. S. Allan, Geologist to the Expedition.

Macrozafra Finlay, 1926; *T.N.Z.I.,* vol. 57, p. 431.

Macrozafra subabnormis saxatilis (Murdoch, 1905). *T.N.Z.I.,* vol. 37, p. 225.

9 specimens, all typically *saxatilis,* and not like Lyall Bay *subabnormis.* The differences between the two forms are slight, but as far as I have seen appear to be constant.

Family MURICIDAE.

Zeatrophon Finlay, 1926; *T.N.Z.I.,* vol. 57, p. 424.

Zeatrophon ambiguus (Philippi, 1844). Suter, 1913, p. 405.

2 specimens. Ancestral at the Chathams is the Nukumaruan *Z. mutabilis* Marwick (*T.N.Z.I.,* vol. 58, p. 488, 1928).

Xymene Iredale, 1915; *T.N.Z.I.,* vol. 47, p. 471.

Xymene plebejus (Hutton, 1873). Suter, 1913, p. 416.

5 specimens.

Axymene Finlay, 1926; *T.N.Z.I.,* vol. 57, p. 424.

Axymene traversi (Hutton, 1873). *Cat. Mar. Moll.,* p. 9. (Figs. 19, 20).

Common. I have shown (1926, p. 415) that this name has been wrongly interpreted by Suter. Although the species is very close to *corticatus* (Hutton), the name is worth retention, as the Chatham shells reach a much larger size, are wider, and have the ribs rather strongly tubercular on the periphery; the form seems to be restricted to the locality, as Hutton thought when he described it.

"*Trophon paivae*" and "*Trophon inferus*" are also recorded by Suter from the Chathams, but may be dismissed.

Family THAIDIDAE.

Lepsia Hutton, 1883; *T.N.Z.I.*, vol. 16, p. 222.

Lepsia haustrum (Martyn, 1784). Suter, 1913, p. 422.

A dozen specimens. This species does not seem to come much further south than Banks Peninsula. For reversion to *Lepsia*, vice *Haustrum* Perry, see Finlay, 1926, p. 427.

Neothais Iredale, 1912 (em.); *Proc. Mal. Soc.* (*Lond.*), vol. 10, p. 223.

Neothais scalaris (Menke, 1829). Suter, 1913, p. 423 (as *succincta*).

One specimen, of the "*textiliosa*" form. This is predominantly a Cookian shell, only just crossing Cook Strait as far as the main islands are concerned.

Lepsithais n. gen. Type: *Polytropa squamata* Hutton, 1878.

This is instituted to contain the strongly squamose Lepsiellas having two main spiral cords on the spire-whorls (with a third weak one present or absent above them), and eight regular thick spirals on the body-whorl, smooth except for the axial lamellation; axial ribs, if present, are numerous (12-16), weakly developed, and not spinose. True *Lepsiella* (type: *P. scobina* Q. & G.), in contrast to this, has only one very strong medial keel on the spire-whorls, and two distant strong keels on the body-whorl (the type has often a third lower keel as strong as the others, and, in its southern form *albomarginata*, may have all the keels on the last whorl obsolete); axial ribs are strong when present, sparse (9-10), and produced into thick, more or less spinose nodules on periphery; the whole surface is covered with minute laciniate frills instead of regular axial lamellae. *Lepsiella* includes *scobina* (Q. and G.), *albomarginata* (Desh.), *rutila* (Suter), *botanica* Hedley, and *reticulata* (Blainv.), the last two being Australian. *Lepsithais* will cover *squamata* (Hutton), *lacunosa* (Brug.), *patens* (H. & J.), *youngi* n. sp. (*vide infra*), *vinosa* (Lk.), *aurea* (Hedley), and *propinqua* (Ten.-Woods), the last three again being Australian; they are on the whole larger than *Lepsiella*, *lacunosa* and especially *youngi* being much larger. The embryo of both these groups is paucispiral and rather tall, rather loosely coiled, the whorls somewhat globose and smooth, thus agreeing with the European *lapillus*, and differing radically from that of *Neothais* and *Agnewia*, which is sinusigerous, horny, sharply conic, polygyrate, swollen at its base, and set somewhat obliquely on the shell. I have not yet seen a perfect apex of *Buccinum lacunosum* Bruguiere, but all the shell features ally it to this series rather than to the *scalaris-succincta* association, which shows a different aperture. I have already noted (1926, p. 421) that *patens* and *squamata* are better referred to Thaididae than to Muricidae until the radular characters are reinvestigated; the series *patens, squamata, youngi* and *lacunosa* is so compact (and has even been thought by some to intergrade, though this needs investigation) that considerable evidence must be adduced before their dissociation can be agreed to. The Australian

members show axial sculpture; in the New Zealand shells this has become obsolete, except occasionally on the earliest whorls. *Adelaidae* is aberrant in having developed a very heavily thickened outer lip, like a *Morula*.

Lepsithais youngi n. sp. (Figs. 32, 33).

Shell related to *squamata* (Hutton), but very much larger and more solid, even rivalling *lacunosa* in size. The spiral cords are stronger and more projecting, quite like those of the Sydney *succincta*; they are more evenly distributed over the surface of the shell, and the interstices are notably wider (broader than the ribs instead of narrower). Axial laminations are rude and uneven, more distant and irregular. Columella stouter. Embryo as described for the genus.

Height, 53 mm.; diameter, 33 mm. (type).

This is what Suter has recorded (1913, p. 426) as *Thais striata* (Martyn) from the Chathams, but the affinity is undoubtedly rather with *squamata*; large examples may have been mistaken for the *succincta* form of *N. scalaris*, but the details of the aperture (especially the columellar characters) and protoconch separate it at once.

Named after Mr. Maxwell Young, Marine Biologist to the Expedition.

Lepsiella Iredale, 1912; *Proc Mal Soc.* (Lond.), vol. 10, p. 223.

Lepsiella scobina (Q. & G. 1833). Suter, 1913, p. 426.

Six examples, all, curiously enough, absolutely typical, and not referable to the Forsterian *albomarginata*. This recalls my record of typical *scobina* from one restricted locality in Dunedin harbour (*T.N.Z.I.*, vol. 55, p. 518, 1924).

Suborder PULMONATA.
Family ELLOBIIDAE.

Marinula King, 1835; *Zool. Journ.*, vol. 5, p. 343.

Marinula chathamensis n. sp. (Figs. 36, 37).

Differs from *filholi* in less compact whorling, *filholi* simulating a squat *Pupa*, while *chathamensis* has the last whorl more disproportionate and expanded on a slope as in *Limnaea*. The aperture is relatively considerably larger, quite like that of *Limnaea* or *Myxas* (= *Amphipeplea olim*) (apart, of course, from the teeth), the inner lip being excavated far further into the body-whorl, and the whole opening being more pear-shaped and less vertically compressed. Teeth slighter, the notch between the upper two being relatively larger and wider than in *filholi*.

Height, 7 mm.; diameter, 4 mm.

Two examples. Apparently a very distinct regional form.

Leuconopsis Hutton, 1884; *T.N.Z.I.*, vol. 16, p. 213.

Leuconopsis obsoleta (Hutton, 1878). Suter, 1913, p. 593.

One example.

Family ONCHIDIIDAE.

Onchidella Gray, 1850; *Fig. Moll. An.*, vol. 4, p. 117.

Onchidella flavescens Wissel, 1904. Suter, 1913, p. 810.

Onchidella nigricans (Q. & G., 1832). Suter, 1913, p. 810.

Onchidella patelloides (Q. & G., 1832). Suter, 1913, p. 810.

Suter reports these three species from the Chathams; no specimens were brought to me. Of the three, the last two are distributed in both main islands, but *flavescens* is otherwise reported only from North Auckland.

Family SIPHONARIIDAE.

Siphonaria Sowerby, 1824; *Gen. Shells*, fasc. 21, f. 22.

Siphonaria zelandica Q. & G., 1833. Suter, 1913, p. 600.

Common.

Gadinia Gray, 1824; *Philos. Mag.*, vol. 63, p. 274.

Gadinia nivea Hutton, 1878. Suter, 1913, p. 603.

9 specimens. This includes *Hipponyx hexagonus*, also recorded by Suter, but rejected by Powell (*Journ. Sci. and Tech.*, vol. 6, p. 282, 1924).

Suborder OPISTHOBRANCHIATA.
Family PYRAMIDELLIDAE.

Odostomia Fleming, 1813; *Edinb. Encycl.*, vol. 7, p. 76.

The identification of the Recent species of this genus in New Zealand is impracticable until the Suter types are available, as most of them are so poorly figured. Two species have occurred to me in the Chatham material.

Gumina n. gen. Type: *Odostomia dolichostoma* Suter, 1908.

This shell differs in its capacious aperture, disproportionate body-whorl, position of plait, and curiously set nucleus from all the other New Zealand species, nor have I seen anything like it from Australia.

Gumina dolichostoma (Suter, 1908). Suter, 1913, p. 336.

One specimen. This is a very curious record, as I know of the species from only three other localities, Auckland (Suter's type), Doubtless Bay, and Awanui Heads—all typically Cookian.

Pyrgulina A.Ad., 1863; *Journ. Linn. Soc.*, vol. 7, p. 4.

Pyrgulina rugata (Hutton, 1886). Suter, 1913, p. 344.

5 examples.

Turbonilla Risso, 1826; *Hist. Nat. Eur. Merid.*, p. 224.

Turbonilla zelandica (Hutton, 1873). Suter, 1913, p. 332.

2 specimens.

Turbonilla n. sp.

One apical fragment, with coarser sculpture than *zelandica*.

Family STROMBIFORMIDAE.

Eulima Risso, 1826; *Hist. Nat. Eur. Merid.*, p. 123.

Eulima archeyi n. sp.

Small, subulate, perfectly straight, semi-transparent, polished. Milky-white outer layer, watery in appearance, where this is worn off. A few discontinuous very inconspicuous varices on the right side. Spire 3-4 times height of aperture. Embryo globular, obtuse. Whorls 9, regularly increasing, almost flat, bulging a little near lower suture, base strongly convex. Suture submargined by a more opaque band. Aperture shortly and broadly pyriform, somewhat effuse below. Outer and basal lips rather strongly convex. Columella and inner lip vertical, slightly separated from base, but not forming an umbilicus.

Height, 4.3 mm.; diameter, 1.5 mm.

Two examples. This seems close to *E. titahica* Suter (1913, p. 349), a species I have not seen, but apparently differs in its straight and rather higher spire.

Named after Mr. Gilbert Archey, Curator of the Auckland Museum.

Family ARCHITECTONICIDAE.

Philippia Gray, 1847; *Proc. Zool. Soc.* (*Lond.*), p. 146.

Philippia lutea (Lamarck, 1822). Suter, 1913, p. 316.

Reported by Suter; I have seen no specimens from the Chathams.

Family CAVOLINIDAE.

Cavolina Abildgaard, 1791; *Skr. Nat. Selsk.*, vol. 1, pt. 2, p. 175.

Cavolina telemus (Linné, 1758). Suter, 1913, p. 55.

Two examples.

Family TETHYDAE.

Tethys Linné, 1758; *Syst. Nat.*, ed. 10, p. 653.

Tethys brunnea (Hutton, 1875). Suter, 1913, p. 545.

One specimen, captured alive by Mr. M. Young. The shell agrees well enough with the figure and description, except that it is rather convex, and the left upper margin is almost straight and but little excavated. Shape, however, cannot be relied on too much in membranaceous shells, and I have a North Island shell which is but little convex, agrees still better with *brunnea*, but still has a straight upper margin.

Tethys n. sp. (?) aff. **tryoni** (Meinertzhagen, 1880), Suter, 1913 p. 545.

Six specimens, the largest measuring about 55 x 40 mm., differ from the preceding in greater elongation, acuminate base, little inflation, and generally different shape. The shape is somewhat that of *tryoni*, but there seems to be no right auricle, the left upper margin is not nearly so long and oblique, the base is distinctly narrowed

and subangled, there is certainly an inner calcareous layer (though it is very thin and fragile, falling to pieces on drying), and radial striation is quite prominently present. I feel fairly certain that a new species is represented, but careful comparisons with actual specimens and, if possible, anatomical investigation, are needed in this genus before separation is attempted; too many vague species of *Tethys* have already been described.

Family PLEUROBRANCHIDAE.

Bouvieria Vayssiere, 1896; *Journ. de Conch,* vol. 44, p. 116.

Bouvieria aurantiacus (Risso, 1818). Suter, 1913, p. 551.

Suter, on the authority of Schauinsland, reports this from the Chathams; I have not seen it.

Suborder NUDIBRANCHIATA.
Family FIONIDAE.

Fiona Forbes and Hanley, 1851; *Hist. Brit. Moll.,* vol. 3, p. x, note.

Fiona pinnata (Eschscholtz, 1831). Suter, 1913, p. 586 (as *marina*).

The remark made on the last species applies to this one also.

Class SCAPHOPODA.
Family DENTALIIDAE.

Fissidentalium Fischer, 1885; *Man. de Conch.,* p. 894.

Fissidentalium zelandicum (Sowerby, 1860). Suter, 1913, p. 819.

One very much worn specimen. Suter reports only *Dentalium opacum* Sow. from the Chathams, but that species seems to be a very vague one, and improbably from New Zealand. The New Zealand members as a whole are very badly in need of revision, and in the meantime it seems best to recognize only one large Recent species, *zelandicum.* I have examined the single specimen in the Canterbury Museum which is the basis of the sole record of *opacum* from New Zealand; it is worn smooth and eroded to a mere fraction of its original thickness. It cannot possibly be identified and should have been thrown away.

Class PELECYPODA.
Order PRIONODESMACEA.
Family NUCULIDAE.

Nucula Lamarck, 1799; *Mem. Soc. N.H., Paris,* p. 87.

Nucula nitidula A. Adams, 1856. Suter, 1913, p. 833.

2 specimens.

Nucula dunedinensis n. sp. (Figs. 1, 2, 43, 44.)

Shell very small, like a *Pronucula,* but with typical hinge; concentric sculpture strong, radial very weak. Ventricose, triangularly

ovate, light greyish-brown. Beaks at posterior third, inconspicuous. Anterior end rather bluntly rounded, the dorsal margin with a slight medial bulge; posterior end somewhat produced and subangled; basal margin flatly convex. Lunule and escutcheon both wide, especially the former, but indistinctly indicated. In sculpture a miniature replica of *Tawera subsulcata* (Sut.), i.e., with strong concentric ribs, regular medially, but a little anastomosing at sides, ridge of ribs nearer umbo, interstices narrower; lower surface of ribs slightly frilled by close and fine radials, more distinct at sides. Margins crenulated. Resilium pit strong, not much oblique, hinge with about nine anterior and six posterior teeth, decreasing regularly towards, and meeting under, umbo. Interior smooth and nacreous, but little of sculpture visible in adult shells. Characteristic of the species is a thickened radial ridge extending internally from umbo for a short distance towards centre of base, usually accompanied externally by one or two short irregular radial furrows immediately below nepionic shell.

Length, 2 mm.; height, 1.8 mm.; diameter, 1.1. mm.

Locality: Dunedin Harbour, dredged in 3 fathoms (type); Chatham Is., one perfect specimen.

The single Chatham specimen has the infra-nepionic furrows so well developed that the sculpture of *Acila* is simulated over that area; this, however, may not be constant.

The species is similar to *N. hartvigiana* Pf. in its strong concentric sculpture (though the ribs are relatively a little higher and stronger, and the interstices wider), but differs in small size, shape, etc. Distinct regional forms of this species occur in the North Island and at the Subantarctic Islands.

Family ARCIDAE.

Barbatia Gray, 1847; *P.Z.S. Lond.*, pt. 15, p. 197.

Barbatia novaezelandiae Smith, 1915. Suter, *N.Z.G.S. Pal. Bull., No. 5*, p. 82, 1917.

2 specimens.

Glycimeris da Costa, 1778; *Brit. Conch.*, p. 168.

Glycimeris laticostata (Q. & G., 1835). Suter, 1913, p. 851.

Numerous examples. The species existed there also in the Pliocene, and had an ancestral relative, *G. traversi* (Hutton), in the Oligocene (see Marwick, *T.N.Z.I.*, vol. 58, p. 442, 1928).

Family PHILOBRYIDAE.

Hochstetteria Velain, 1878; *Archiv Zool. Exper. Generale*, vol. 6, p. 129.

Hochstetteria meleagrina Bernard, 1896. Suter, 1913, p. 859 (as *Philobrya*).

This is reported by Suter, on Professor H. B. Kirk's authority, from the Chatham Is., "in roots of *Macrocystis*"; it has not occurred to me.

Family OSTREIDAE.

Ostrea Linné, 1758; *Syst. Nat.*, ed. 10, p. 696.

Ostrea sinuata Lamk., 1819. Iredale, 1924, p. 191.

Numerous examples.

The number of species of New Zealand oysters and the correct names for them has always been a disputed point, and no finality has yet been obtained. Hutton gave one opinion in his *Catalogue* of 1873, and altered it in his *Manual* of 1880. Suter gives a quite different account in his own *Manual* of 1913. Later (*N.Z.G.S. Pal. Bull., No. 5,* p. 86, 1917), in a note on *Eostrea* Ihering, he re-groups the species and proposes the name *Anodontostrea* for forms without dorsal marginal crenations; to place this name on a more scientific basis I here nominate his first species, *O. angasi* Sow. as the type species. Oliver then followed with a discussion (*Proc. Mal. Soc.*, vol. 15, pt. 4, p. 182, 1923) as to the validity of some of the species admitted by Suter; the six Recent forms given by him in the *Manual* are reduced to four by Oliver, *reniformis* Sow. being dismissed as probably indeterminable and certainly not Neozelanic, and the Dunedin rock-oyster (Suter's *tatei*) being synonymised with *angasi* Sow. Marwick (*Rep. A.A.A.S.*, vol. 16, p. 324, 1924) continued the reduction of species by rejecting the records of two Australian Tertiary forms, *arenicola* Tate and *manubriata* Tate. This tendency, indeed, had been forecasted by Suter, who remarked (1913, p. 892) that "extended observations . . . may lead to a reduction of species." The latest comment on New Zealand oysters comes from Iredale (1924, p. 192) who, noting that *O. virescens* Angas, 1867, having supplanted the name *angasi* Sow., 1871, in Australia, must in turn give way to the still earlier *O. sinuata* Lamk., 1819, remarks that "The Neozelanic species known by the latter name (*angasi*) seems to be a distinct species."

It is my proposal here to try to simplify matters still further. The presence or absence of marginal crenulations, far from being of sectional importance, as Suter always held, is, I submit, so variable and inconstant as to be valueless in most cases to separate even species. Chapman (*P.R.S. Vict.*, vol. 35, N.S., p. 3, 1922) notes that *O. ingens* Zitt., referred by Suter to *Anodontostrea*, often has distinctly crenate margins. Cossmann (*Rev. Crit. Pal.*, 1918, p, 26), in reviewing Suter's proposal of this section, remarks, "mais cette distinction est bien fragile et ne justifie pas l'adoption d'un nouveau nom." My own experience leads me to suspect that even *O. corrugata* auct. (not of Hutton),* kept separate by all writers so far, is not

*Dr. Marwick writes to me regarding this species: "The shells usually called *O. corrugata* are not this species. Indeed, I have not seen a duplicate of the type, which seems to be quite distinct from *O. angasi*. Its locality is certainly not Shakespeare Cliff as given by Hutton. It is from a beach outcrop, and may be from the coastline between Wanganui and Hawera." The specific name, however, cannot be maintained, as there is a prior *Ostrea corrugata* Brocchi, 1814 (*Conch. Subap.*, p. 670); I therefore re-name Hutton's New Zealand shell *Ostrea fococarens* nom. nov. It has an upper valve like *sinuata*, a large area of attachment, and an erect lower valve with many ribs, 33 at least; it reaches a size between *hefferdi* (v.a.) and *sinuata*, and was evidently a rock form. *O. corrugata* Nomland, 1917, an American species, has been discussed by Hanna (*Proc. Cal. Acad. Sci.*, vol. 13, No. 7, p. 174).

satisfactorily separable from *angasi* Sow., whether one takes Recent forms or Pliocene fossils. With this proviso, which I think reasonable until anatomical investigations can settle the matter definitely, I am also unable at present to see differential characters between New Zealand and Australian specimens. Hutton's name *O. lutaria* (*C.M.M.*, p. 84, 1873) would be available for New Zealand shells, were they to prove distinct. The name *O. tatei* Suter must be dismissed altogether from New Zealand lists; it can be construed only as a substitute name for *O. hippopus* Tate, *non* Lamarck; although Suter described a New Zealand Recent specimen under this name at its introduction, and referred to a figure of it, the "Atlas" was not then published, and a complication is thus avoided; the letters "n.n." after the name, taken in conjunction with the line that follows, indicate definitely that the name *tatei* must be restricted to the Australian Eocene species. Even in this category it is of doubtful standing, for Tate had long ago (*Trans. Roy. Soc. S.A.*, vol. 23, p. 268, 1889) noted the preoccupation of his name, but did not re-name the unique specimen, as he considered it " an individual monstrosity of *Gryphaea tarda.*" If this is really so, the name *Notostrea tatei* (Suter) will take precedence of my *N. lubra* (v.a.) for the Australian form, but Tate's figure shows a shell very unlike *tarda*. In spite of Oliver's pronouncement (*v.a.*), I think that the difference in habitat requires that the Dunedin rock-oyster and the Stewart Island mud-oyster be kept specifically apart. The shells are recognizably different, much more so than many of the fossil species; so, as the name *tatei* is inadmissable, I now give the name *Ostrea hefferdi* n. sp. to the New Zealand form described and figured by Suter (*Man. Moll.*, p. 889, 1913; Pl. 57, f. 4). For reasons stated in the "Further Commentary" (Finlay, 1926, p. 353), I select as neotype a specimen in my collection from Dunedin Harbour; the specific name is given in compliment to Mr. Hefferd, Director of New Zealand Fisheries.

I have not had very many Australian specimens of *sinuata* for comparison, and it is possible that differential characters may be observable in the upper valve, but till long suites from both sides can be examined I prefer to unite *virescens* Angas, *angasi* Sow., *lutaria* Hutton, and *corrugata* auct., not of Hutton, under the one name, *sinuata* Lamk. (not to be confounded with *sinuosa* Gmelin, 1791).

As the oysters of New Zealand have suffered so many vicissitudes, I append a list of the species at present admitted to our fauna, and a suggested revised grouping of these species:—

Ostrea s. str.—*sinuata* Lamk., *hefferdi* Finlay, *fococarens* Finlay, and *O. charlottae* n. sp. for *"O. hyotis"* Suter, *Man. N.Z. Moll.*, p. 889; Pl. 57, Fig. 2; not of Linné. The introduction of this name into Austral lists is due to Tate, who doubtfully referred to it an Australian Middle Tertiary form; Suter continued this bad usage by so identifying New Zealand Recent shells from Queen Charlotte Sound. Tate himself expunged the name from Australian lists in 1899 (*Trans. Roy. Soc. S.A.*, vol. 23, p. 268) as soon as he saw true specimens of *hyotis*, and I now do the same for New Zealand. The species is distinct from *sinuata*, and seems more constant in habit than most oysters, it is not uncommon in 60 fathoms off Otago Heads. As holotype of my species I choose a specimen in my collection from

Queen Charlotte Sound (Figs. 25, 26). The three Oligocene Chatham species, *cannoni, waitangiensis,* and *arcula,* all of Marwick (*T.N.Z.I.,* vol. 58, p. 462, 1928), may also be referred here.

Gigantostrea Sacco, 1897—*wullerstorfi* Zittel,† *mackayi* Suter,‡ and *wollastoni* Finlay (*incurva* Hutton,† preoccupied, see *T.N.Z.I.,* vol. 57, p. 528, 1927).

Crassostrea Sacco, 1897—*ingens* Zitt.,* and *nelsoniana* Zitt. The type localities (and their ages) of these two species are not the same, so both names may be retained in the meantime. Chapman (*P.R.S. Vict.,* vol. 35, N.S., p. 2, 1922) has synonymized them and included also *O. hatcheri* Ortmann, when recording *ingens* from the Australian Tertiary, but it is likely that both his identifications and those of Hatcher and Ortmann as regards South American records of Zittel's species are incorrect; typical *ingens* seems to be Pliocene (Marwick, *in litt.*), while the Australian and American shells are Miocene or older.

Lopha Bolten, 1798—*glomerata* Gould (*cucullata* auct., *v.i.*), *gudexi* Suter,‡ and *pahiensis* n. sp. for "*O. gudexi*" Marshall and Murdoch; *T.N.Z.I.,* vol. 53, p. 77, 1921; Pl. 15, Fig. 1; not of Suter. The two fossils are somewhat different in type from the Recent shell, which has not long (geologically) been a member of the fauna, but all may be included in *Lopha* (=*Alectryonia*) for the present.

Notostrea Finlay, 1928 (in Marwick, 1928, p. 432),— proposed for *Ostrea subdentata* Hutton* (*Cat. Tert. Moll.,* p. 34, 1873). This curious little oyster will not fall into any of the above groups, and presents a facies all its own. Only the type, a left valve, was known to Hutton and Suter, but I have four topotypes representing complete specimens and the other valve. The latter is rather flat, small, thick, deeply excavated for the animal cavity, with a very broad bevelled flange forming the margins; for some distance on each side of the umbo there is a wide sunken space in this flange finely but strongly corrugate-granulose; the muscle scar is tiny, high up, and well to the side ($\frac{2}{3}$—$\frac{3}{4}$ of height and width). The left valve is concave, much smaller than the right, fitting tightly into the body cavity and not overlapping on the bevel, the umbo bent backwards so that the beaks are wide apart in the closed shell and show the full extent of the short hinge and ligament pit. Only concentric sculpture is present, the right valve almost smooth except for growth lines, the left valve with rather strong and broad lamellae. Suter, because of the crenulated margins, placed the species in *Eostrea* Ihering, which he later (*N.Z.G.S. Pal. Bull. No. 5,* p. 86, 1917) decided was a synonym of *Ostrea* s. str., where he therefore left it; by no stretch of imagination, however, can it be regarded as congeneric with the British *O. edulis,* the genotype. Cossmann (*Rev. Crit. Pal.* No. 20, p. 10, 1916) in his review of Suter's work remarks that the reason for the use of *Eostrea* for the species is not indicated, " n'est ce pas *Liostrea* Douv.?" This, however, is a Cretaceous genus (type: *O. sublamellosa* Dkr.) with subequal valves and fine radiating striae;

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*N.Z.G.S. *Pal. Bull. No. 2,* p. 46, 1914.
† " " " *No. 3,* p. 53, 1915.
‡ " " " *No. 5,* p. 71, 1917.

the subgenus *Ostreinella* Cossmann (type: *O. neglecta* Micht.; Miocene) is just as inapplicable, having also subequal, fragile valves. In all characters except curvature, however, *O. subdentata* seems closely related to *Gryphaea tarda* Hutton (see Marwick, *T.N.Z.I.*, vol. 58, p. 462, 1928) a species that has previously seemed without allies. Cossmann, at the reference above given, mentions that the generic name *Liogryphaea* Fischer ought more properly to have been used, *Gryphaea* Lk. being based on the Recent *G. angulata* Lk., and thus practically synonymous with *Ostrea.* But, according to Dall (*Trans. Wag. Free Inst.*, vol. 3, pt. 4, p. 673, 1898), *Gryphaea* was introduced by Lamarck in 1801 with nine species, three of which, including *G. angulata,* were *nomina nuda.* This, therefore, cannot be the type. He goes on, "As Lamarck selected no type, the type must be sought from the first reviser. This was Bosc, in the following year, who cites the described species, and figures as an example the *G. arcuata,* which he refers to the *Anomia gryphus* of Linné." This *G. arcuata* is close to, if not identical with *G. incurva* Sow., of the Liassic. Nevertheless, the mere citing or even figuring of an example of a genus is not held by the rules to be the definite selection of a type, and it would seem that this problem still needs investigation as to who first definitely and legally named a type for *Gryphaea* from amongst the valid species. Cossmann and Peyrot (*Conch. Neogen. de L'Aquit.* vol. 2, pt. 2, p. 389, 1914) treat *Crassostrea* as merely a divison of the true *Gryphaea,* and state (l.c., p. 376) that "*Liogryphaea* abondant dans le Jurassique, et remplacé dans le Crétacique et le Tertiaire par *Pycnodonta* qui y ressemble beaucoup." It is evident that neither *Gryphaea* nor *Liogryphaea* can be used for *tarda,* which is an Oligocene species; *Pycnodonta* is somewhat like it, but has a large muscle scar, placed low down, and a rather different hinge; it is unlikely that *tarda* is closely related to these northern stocks, and for the present it seems best to refer it also, in spite of its curvature, to *Notostrea.* It is known that the *Gryphaea* form has arisen at different times in the Mesozoic from different stocks of oysters (see, for example, Trueman in *Geol. Mag.*, 1922, p. 256), so that the resemblance of *tarda* to such Cretaceous forms as *vesicularis* Lk. is probably purely fortuitous. Further separation can be effected later if the discovery of allies of *subdentata* and *tarda* shows that two stocks are represented. The Australian Tertiary shells referred, with doubt, by Tate (*Trans. Roy. Soc. S.A.*, vol. 8, p. 98, 1886) and Harris (*Cat. Tert. Moll. B.M.*, p. 302, 1897) to *tarda* are a distinct species, specimens in my collection showing that the posterior lobation is higher up and starts nearer the umbo, attaining its maximum medially instead of near the base as in *tarda*; the surface is rather more rugose and knobby, and the hinge crenulations apparently stronger. For the Great Australian Bight specimen figured by Tate (*Trans. Roy. Soc. S.A.*, vol. 8; Pl. 6, Figs. 2 a, b) I have therefore supplied the new name *Notostrea lubra* (in Marwick, 1928, p. 432).

If *O. sinuata* Lk. is ever regarded, on anatomical or other grounds, as generically separable from *O. edulis* L., Suter's name *Anodontostrea* will be available for it and the other Austral forms referred to *Ostrea* s. str.

Lopha Bolten, 1798; *Mus. Bolten.*, pt. 2, p. 168.

Lopha glomerata (Gould, 1850). Suter, 1913, p. 891.

5 examples. This is a remarkable occurrence; Suter gives the range of the species as "Northern part of the North Island," and Hutton (*Mon. N.Z. Moll.*, p. 175, 1880) gives it as from "Auckland; not found further south." This species, *Lepsiella scobina*, and a few others, form a curious and distinct Cookian element in the Chatham fauna.

As regards the specific name, Iredale (1924, p. 192) has shown that *cucullata* Born does not apply to the Austral species, so that Gould's *glomerata*, described from New Zealand, may be resumed for the Auckland rock-oyster.

Family PECTINIDAE.

Notovola Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 451.

Notovola novaezelandiae (Reeve, 1852). Iredale, 1924, p. 193.

4 mutilated valves, which show no subspecific variation from the Mainland shells.

Chlamys Bolten, 1798; *Mus. Bolten.*, pt. 2, p. 161.

Chlamys celator n. sp. (Figs. 49, 50).

Shell very similar to *C. zelandiae* (Gray), but much larger, and with stronger, more prickly ribs; living in sponges. There are somewhere about a dozen main ribs on each valve; those of the right valve double, and separating into two or three near margin; those of the left valve single, and thus apparently more distant. More or less regular primary, secondary, and tertiary interstitial riblets, in decreasing order of prominence, are present; this arrangement is better marked on left valve, the interstitial ribs on right valve being finer and more or less equal. All ribs, especially main ones, studded with sharp, high, narrowly spout-like scales. This sculpture is just that of *zelandiae* much exaggerated. The shell, too, has much the same style of build, but is notably less elongated, the dorsal margins sloping less steeply and spreading outwards lower down. Shell rather more inflated, and still ruder in growth-habit than *zelandiae*, *i.e.*, there are frequent kinks in the shell, the convexity and the outline of basal margin are highly irregular. This feature is characteristic of the *zelandiae* as opposed to the *radiatus* forms. Apparently normally living in sponges, every fresh specimen seen being totally incrusted with them; never found attached to rocks on the littoral.

Length, 40 mm.; height, 43 mm.

Locality: Stewart Is. (type; common); South Island beaches; Chatham Is., common.

This is Suter's "subsp. *gemmulatus*" of *C. zelandiae*, but not, as Iredale has noted (1915, p. 486), *gemmulatus* Reeve. His description is not very good, but his figure and localities show that he had this form in mind. Whether it is really the Forsterian regional representative of the Cookian *zelandiae*, I am uncertain, so I have taken the safest course of describing it as a distinct species; it is unquestionably closely allied in habit and sculpture, but the habitat is notably different, while, on the other hand, there *is* another species in the south that lives under rocks and on roots of seaweed, just as

zelandiae does in the north. This form is distinct from both the others and is described below as *C. suprasilis* n. sp. The two new species are both found fossil in the Upper Pliocene beds at Castlecliff, but true *zelandiae* is not. A specimen of *zelandiae* (from Motutapu Island, under stones at low water) is here illustrated (Fig. 51) for comparison with *celator*. *C. zelandiae* (Gray) and *C. grangei* Murdoch, 1924, should be added to the list of New Zealand *Chlamys* given by Marwick (*T.N.Z.I.*, vol. 58, p. 453, 1928), these two species being inadvertently omitted.

Chlamys suprasilis n. sp. (Figs. 52, 53, 54, 55).

At first sight merely a worn *celator*, but the scaling is different. Shell almost exactly like *celator* in habit and style of sculpture, but relatively a little wider and more compressed vertically, the basal margin being less convex and shorter, and the dorsal margins meeting at a wider angle. Both valves less convex, especially the right, which, in its early stages is generally flattish or even concave. Typically, spinous sculpture is obsolete over most of the shell, the strong main ribs (double in the right valve) present as in *celator*, but with only one fairly strong interstitial riblet, and all ribs and interstices perfectly smooth and polished, as if secondary sculpture had been heavily erased. This stage may last over the whole shell; more frequently there are a few sparse scales towards the lower margin, or the smooth area may cease suddenly and give way to a spinose surface just as in *celator*; occasionally spinose sculpture may be developed over most or all of the surface. The scales, however, are of a different style, not close, high, and narrowly spout-like, situated on sharply angular ribs, but rather distant, low, broadly subtubular, and placed on wide, rounded ribs. The ears of both species are spinose, but the same difference in the scales is observable.

Length, 33 mm.; height, 33 mm.

Locality: Port Chalmers, near Dunedin (type and others, from rubbish scraped from the bottom of a ship which had been in dock for several years); Dowling Bay, Dunedin Harbour, attached to stones at low water mark; Taieri Beach; Chatham Is., not uncommon. Fossil at Castlecliff.

It is often difficult to assign beach-worn valves to *celator* or *suprasilis* with certainty, but fresh specimens are easily separated.

In colour the two new species show the same variation as is seen in *zelandiae*; it has not been thought worth while to detail it.

Chlamys radiatus (Hutton, 1873). Suter, 1913, p. 877.

15 valves, agreeing exactly with topotypes, but without their characteristic reddish tint, pale-coloured like northern examples. This stock is represented in Oligocene beds at the Chathams by *C. chathamensis* (Hutton) and *C. seymouri* Marwick (*T.N.Z.I.*, vol. 58, pp. 456, 457, 1928).

The triangular triple ribbing on the upper part of the valves of *radiatus* is so characteristic that the species can hardly be mistaken.

Chlamys dichrous Suter, 1909. Suter, 1913, p. 875.

8 valves. This species has been difficult to identify satisfactorily, and does not appear to be well known. It seems to intergrade by

stages with *radiatus*, nevertheless, the extremes are so distinct that the name is worth retaining. It is just possible that the form represents a hybrid between *radiatus* and *celator*, it always occurs where these two species are plentiful, but is much rarer, and I have not seen it when either of the other two are absent. It differs from *radiatus* mainly in development of sculpture, which approaches that of *celator*. The main ribs become increasingly instead of decreasingly prominent anteriorly, so that at the margin there are still some 20 strong ribs, bordered closely on each side by lateral riblets, and with still weaker riblets developed for a short distance in the interstices, instead of about 80 subequal fine ribs as in *radiatus*. There is the same triple arrangement on the early part of the valves as in the latter species, but the lateral riblets do not separate far from nor reach the size of the main ribs. A superficial likeness to *celator* is thus developed, but the triple ribbing is different in detail, and the scaling very much finer, closer, and lower, and the whole ornament is seen on inspection to be that of *radiatus* rather than of *zelandiae*; this is more quickly apparent on the right valve, where the double ribbing of *zelandiae* and *celator* is absent in *dichrous* and *radiatus*. Occasionally the ribs are thin and distant, and the species is then very like the fossil *chathamensis* (Hutton); Suter has compared the two, and states that the latter has no ctenolium or byssal notch—this is quite wrong. *C. oamarutica* Murdoch (*T.N.Z.I.*, vol. 55, p. 158, 1924) is another allied fossil species from the Mainland, while two other Oligocene Chatham species *C. mercuria* Marw. and *C. titirangiensis* Marw. (*T.N.Z.I.*, vol. 58, pp. 457, 458, 1928) are perhaps related. Iredale (*Rec. Austr. Mus.*, vol. 14, No. 4, p. 252, 1925) has described *C. famigerator* nov. which he compares with *dichrous*, but the peculiar sculpture which he takes as characteristic of the latter species (scales only on every third or fourth rib in left valve, others smooth) is the exception rather than the rule; I have seen only one valve that showed it, scales being generally present on all ribs, though every third or fourth may have them a little stronger—this, however, also occurs sometimes in *celator*.

Dichrous is, as a rule, less expanded laterally and inclined to be of more convex and irregular growth than *radiatus*. To aid in identification of the species, figures of Chatham specimens are here presented (Figs. 45, 46, 47, 48).

It may be noted that Suter described the species from specimens found in the stomach of a blue cod caught at Stewart Is.; all the Chatham specimens were also obtained from cods' stomachs, so it appears to be a regular constituent of their food.

Pallium Schumacher, 1817; *Essai Nouv. Syst.*

Pallium convexus (Q. & G., 1835). Suter, 1913, p. 879.

17 valves. Closely related in the Oligocene of Momoe-a-toa is *P. dendyi* (Hutton) (Marwick, *T.N.Z.I.*, vol. 58, p. 458, 1928).

Family LIMIDAE.

Limatula Wood, 1839; *Ann. Mag. Nat. Hist.*, vol. 3, p. 260.

Limatula maoria Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 454.

11 valves, of slightly larger size than usual, but otherwise typical. In lineage at the Chathams is the Oligocene *L. morioria* Marwick

(*T.N.Z.I.*, vol. 58, p. 461, 1928), while *maoria* itself lived there in Pliocene times.

Family ANOMIIDAE.

Monia Gray, 1850; *Proc. Zool. Soc.*, 1849, p. 121.

Monia zelandica (Gray, 1843). Suter, 1913, p. 845.

5 examples. *Monia furcilla* Marwick (*T.N.Z. I.*, vol. 58, p. 444, 1928) is compared by its author rather to *M. furcata* (Hutton).

Family MYTILIDAE.

Mytilus Linné, 1758; *Syst. Nat.*, ed. 10, p. 704.

Mytilus "planulatus Lamk., 1819." Oliver, *Proc. Mal. Soc.* vol. 15, p. 181, 1923.

One large complete specimen. Iredale has noted (1924, p. 195) that the use of this name for New Zealand shells should be reconsidered. As it has not yet been settled whether the Peronian *obscurus* Dkr. can be satisfactorily separated from the West Australian *planulatus*, and which of the two is nearer to the New Zealand form and as no Australian examples are available to me for actual comparison, it is best to postpone rejection of the name selected by Oliver until a stable substitute can be found.

Aulacomya Moerch, 1853; *Cat. Conch. Yoldi*, pt. 2, p. 53.

Aulacomya maoriana (Iredale, 1915). *T.N.Z.I.*, vol. 47, p. 484.

A few shells. Also present in the Pliocene of Titirangi (Marwick, 1928, p. 444) while a related form, *A. willetsi* Marwick, occurs in the Oligocene.

Modiolus Lamk., 1799; *Mem. Soc. N.H. Paris*, p. 87.

Modiolus areolatus Gould, 1850. Hedley, *P.L.S., N.S.W.*, vol. 48, p. 302, 1923.

Common. This is Suter's *M. australis* Gray (1913, p. 867), a name rejected by Hedley as practically indeterminable, and not applicable to a southern form.

Modiolus fluviatilis (Hutton, 1878). Suter, 1913, p. 867.

Many examples. The species was described from this locality, and I have not been able to match Chatham specimens with any from the Mainland. I have not seen North Island shells, but South Island specimens—which would be the most likely to agree— are constantly heavier in build, more tumid, with a stronger umbonal carina, and much higher and more swollen beaks. I am inclined to think that the latter represent a new species, and that *fluviatilis* is restricted to the Chathams. This discrepancy in purely Neozelanic forms is sufficient evidence for rejecting Oliver's proposal (*Proc. Mal. Soc.*, vol. 15, p. 181, 1923) to replace Hutton's name by *confusus* (Angas, 1871) provided for a Sydney species. *Fluviatilis* is common at the Chathams, at the mouth of the Waipapa River, in company with *Potamopyrgus*, and many of the specimens are notably fragile and deficient in lime, recalling the condition of *Austrovenus stutchburyi* in the Lagoon.

Trichomusculus Iredale, 1924; *P.L.S., N.S.W.*, vol. 49, pt. 3, p. 196.

Trichomusculus barbatus (Reeve, 1858). Suter, 1913, p. 868.
4 specimens.

Musculus Bolten, 1798; *Mus. Bolten.*, p. 156.

Musculus impactus (Hermann, 1782). Suter, 1913, p. 869.
Common.

Family GAIMARDIIDAE.

Gaimardia Gould, 1852; *U.S. Expl. Exped.*, vol. 12, p. 459.

Galmardia forsteriana Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 456.
4 specimens. The allied genus *Neogaimardia* Odhner was not found in the recent collections but Marwick has reported a Pliocene species from the Chathams (*N. elegantula*; *T.N.Z.I.*, vol. 58, p. 463, 1928).

Costokidderia Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 457.

Costokidderia costata (Odhner, 1924). *Pap. Mort. Pacific Exped.*, No. 19, p. 68.

One example. I am still unable to separate Taieri Beach examples from topotypes of Odhner's species, the sculpture and shape agreeing exactly, while *lyallensis* and *pedica* (both of Finlay., *loc. cit.*) differ at sight in the notably narrower interstices between the ribs. This leads to an apparently anomalous distribution, *costata* ranging from Auckland Is. to Chatham Is., while the distinct *pedica* occurs in between at the Snares. All the examples of *costata*, however, come from extremely littoral situations, while the Snares shells are from 50 fathoms, so it is probable that bathymetric rather than regional forms are represented, and that shells gathered from littoral seaweeds at the Snares would agree with *costata*. The single Chatham specimen agrees fairly well with Taieri Beach examples, but further material might quite possibly indicate a distinct regional form.

Order ANOMALODESMACEA.
Family MYOCHAMIDAE.

Myadora Gray, 1840; *Ann. Mag. Nat. Hist.*, p. 306.

Myadora boltoni Smith, 1880. Suter, 1913, p. 1027.
Reported by Suter; I have not seen it.

Family CLEIDOTHAERIDAE.

Cleidothaerus Stutchbury, 1830; *Zool. Journ.*, vol. 5, p. 97.

Cleidothaerus maorianus Finlay, 1926. *T.N.Z.I.*, vol. 57, p. 474.
One worn example; otherwise reported only from the Cookian region.

Order TELEODESMACEA.
Family CARDITIDAE.

Cardita Bruguière, 1792; *Ency. Meth.*, vers. 2, p. 401.

Cardita aoteana Finlay, 1926; *T.N.Z.I.*, vol., 57, p. 459.
Common. A closely related Tertiary form at the Chathams is *C. northcrofti* Marwick from the Oligocene of Whenuataru peninsula (see *T.N.Z.I.*, vol. 58, p. 464, 1928).

Venericardia Lamk., 1801; *Syst. An. s. vert.*, p. 123.

Venericardia purpurata (Desh., 1854). Suter, 1913, p. 905.
4 valves. *V. beata* and *nuntia* from Oligocene beds, and *V. martini* from the Pliocene (all of Marwick; see *T.N.Z.I.*, vol. 58, pp. 465, 466, 1928) represent this species in the Tertiary Chatham faunas.

Family CONDYLOCARDIIDAE.

Condylocardia Bernard, 1896; *Bull. Mus. d'Hist. Nat., Paris*, vol. 2, p. 195.

Condylocardia crassicosta Bernard, 1896. Suter, 1913, p. 911.
One example. The species described by Marwick from the Pliocene of Titirangi (*C. torquata*; *T.N.Z.I.*, vol. 58, p. 466, 1928) is of quite a different style.

Family LUCINIDAE.

Divaricella von Martens, 1880; *Beitr. Meersf. Mauritius*, p. 321.

Divaricella cumingi (Ad. & Ang., 1863). Suter, 1913, p. 913.
9 valves.

Family UNGULINIDAE.

This is Family Diplodontidae of American, Australian, and New Zealand writers. The name is due originally to Dall, but in his list of genera comprising the family he includes *Ungulina* Daudin, 1802, which is much the oldest generic name of those admitted. Cossmann and Peyrot (*Conch. Neogen. l'Aquitane*, tome 1, pt. 3, p. 617, 1912), Harris (*Cat. Tert. Moll. B.M.*, pt. 1, p. 375, 1897), Newton (*Brit. Olig. and Eocene Moll.*, p. 47, 1891), Stolickza (*Cret. Pelec., Pal. Indica*, vol. 3, p. 259, 1871), and others seem, therefore, to be more correct in using the family name Ungulinidae proposed by H. & A. Adams in 1857 (*Gen. Rec. Moll.*, vol. 2, p. 470).

Zemysia Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 462.

Zemysia zelandica (Gray, 1835). Suter, 1913, p. 917.
One worn valve. Common in the Pliocene (Marwick, 1928, 467).

Zemysina Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 462.

Zemysina striatula Finlay, 1926; *l.c.*, p. 462.
5 complete shells, all juvenile, but apparently less inflated than usual.

Family ERYCINIDAE.

Melliteryx Iredale, 1924; *P.L.S., N.S.W.*, vol. 49, pt. 3, p. 207.

Melliteryx parva (Desh., 1856). Suter, 1913, p. 922.
One valve.

Myllitella Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 464.

Myllitella pinguis Marwick, 1928. *T.N.Z.I.*, vol. 58, p. 467, 1928.
Common in shell sand. I cannot separate the Recent specimens from the Titirangi Pliocene fossils.

The species differs from the Recent Cookian *M. vivens* Finlay (1926, p. 464) in larger size, rather stronger shell, sloping dorsal sides meeting at a distinct angle (instead of running almost straight across under the beak), and relatively much more solid hinge, the laterals being especially strong and projecting considerably into the valves as in *Lasaea*; the ornamentation seems slightly finer.

Notolepton Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 463.

Notolepton sanguineum (Hutton, 1883). Suter, 1913, p. 925.
Not uncommon.

Mysella Angas, 1877; *Proc. Zool. Soc. Lond.*, p. 176.

Mysella unidentata (Odhner, 1924). *Pap. Mort. Pacific Exped.* No. 19, p. 76.
6 complete specimens. This is Suter's *"Rochfortia donaciformis."*

Rochefortula Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 465.

Rochefortula reniformis (Suter, 1908). Suter, 1913, p. 931.
2 examples.

Family KELLYIDAE.

Kellya Turton, 1822, emended; *Dithyra Brit.*, p. 56.

Kellya suborbicularis (Montagu, 1804). Suter, 1913, p. 923.
3 valves.

Family LASAEIDAE.

Cossmann and Peyrot (*Conch. Neogen. l'Aquitane*, Tome 1, pt. 3, p. 543, 1912) have decided to adopt Gray's family name for the Lasaeas, and this has been followed by Odhner (1924, p. 78).

Lasaea Brown, 1827; *Ill. Conch. Gt. Britain*, Explan. pl. 20, f. 18.

Lasaea hinemoa n. sp. (Figs. 27, 28).
Shell close to *L. australis* (Lamk.), but smaller. Darker coloured, entirely dark reddish or reddish-brown instead of largely whitish. A little less elongate and more regularly quadrilaterally oval, the dorsal margina forming an almost straight line under the beaks; in *australis* the posterior dorsal margin slopes suddenly down at the

umbo to meet anterior dorsal margin. *Australis* also has a tendency, not shown in *hinemoa* to become subtriangulate, and develop an anterior bluntly angled rostrum; this is more prominent still in *scalaris* Phil. *Hinemoa* has no sculpture beyond very fine concentric rugae; *australis* has in addition minute irregular radial scratches.

Length, 3.7 mm.; height, 2.9. mm. (the type is a large example; most shells are not much more than half this size).

Locality: Riverton, Southland, on seaweeds (type); a common Forsterian shell, but not reported north of Banks Peninsula. Chatham Is., several valves.

This is the "*Lasaea miliaris*" of Suter, not of Philippi. Suter's description is not very useful, and his figure is wretched.

Lasaea rossiana n. sp.

This is proposed for the Macquarie Island shell figured by Hedley in the *Mollusca Austral. Antarctic Exped.*, p. 33, Pl. 4, Figs. 42-44, 1916, and identified by him as *L. consanguinea* Smith. Kerguelan topotypes of that species, however, though closely similar in shape and general appearance are rather more elongate and distinctly more inequilateral, with less prominent beaks. *Consanguinea* has the appearance of a strong slope to the anterior end, as if it had been pulled from that direction. Moreover, the hinge of *rossiana,* well figured by Hedley, is altogether more massive and disproportionate to the size of the shell than that of *consanguinea,* which is much more like *australis* in this respect. Both *rossiana* and *consanguinea* have only fine concentric rugae for sculpture.

I have this species also from the Auckland Is., where it is rather common as a beach shell, and is probably what Suter recorded from there as *miliaris.*

Odhner's records of "*Lasaea minutissima*" (1924, p. 78) refer to a mixture of several species. Probably he had no true *minutissima* at all, his Stewart Is. shells will be *L. hinemoa,* and his subantarctic specimens mostly *rossiana.*

This species is not itself found at the Chathams, but I have named it here in order to describe by comparison a very similar form which does occur there.

Lasaea rossiana vexata n. subsp. (Figs. 41, 42).

Extremely close to the preceding, and at first sight identical. The posterior dorsal margin, however, as in *L. australis* drops down under the umbo to meet the anterior dorsal margin; in *rossiana* the line of the margin is more continuous. Translucent white, the hinge reddish; *rossiana* is brownish or red. Differs constantly in having fine wrinkles and punctures besides the concentric striae. It is practically on this last feature that I give the Chatham shells a distinct name; all the valves from there show it, while I have not been able to see it on any of a large series of *rossiana.* The shells are distinct from *L. neozelanica* Suter (which also has wrinkles) and are evidently the same as those Suter identified as *L. scalaris* Phil. (Suter, 1913, p. 928) from Taumaki and Stewart Islands—the latter species is a totally distinct form and does not occur in New Zealand.

Length, 2.4 mm.; height, 1.9 mm.

7 valves from the Chathams.

Family KELLIELLIDAE.

Cyamiomactra Bernard, 1897; *Bull. Mus. Hist. Nat.*, p. 311.

Cyamiomactra problematica Bernard, 1897. Suter, 1913, p. 899.

2 valves.

Family SPHAERIIDAE.

Sphaerium Scopoli, 1777; *Intra. ad Hist. Nat.*, p. 397.

Sphaerium novaezelandiae Deshayes, 1853. Suter, 1913, p. 934.

Reported by Suter on Professor Kirk's authority; it is not in my collections.

Family VENERIDAE.
Subfamily DOSINIINAE.

Phacosoma Jukes-Brown, 1912; *Proc. Mal. Soc.*, vol. 10, pt. 2.

Phacosoma maoriana (Oliver, 1923). *Proc. Mal. Soc.*, vol. 15, p. 188.

3 valves. The only other localities recorded for this species are Lyall Bay and Nelson, so that it seems to have come from the north, and its occurrence at the Chathams is of interest.

Phacosoma subrosea (Gray, 1853). Suter, 1913, p. 979.

Reported by Suter; no specimens have occurred to me. The record may be based on a specimen of *maoriana*, which is apparently not so rare at the Chathams as elsewhere, but it is quite likely that *subrosea* does occur there. *P. wanganuiensis* Marwick, an ancestral form, is reported from the Pliocene of Titirangi (Marwick, 1928, p. 469.

Kereia Marwick, 1927; *T.N.Z.I.*, vol. 57, p. 583.

Kereia greyi (Zittel, 1864). Suter, 1913, p. 980.

Recorded by Suter, but the record needs confirmation. A related new species (*K. chathamensis*) is described from the Oligocene by Marwick (1928, p. 469).

Subfamily VENERINAE.

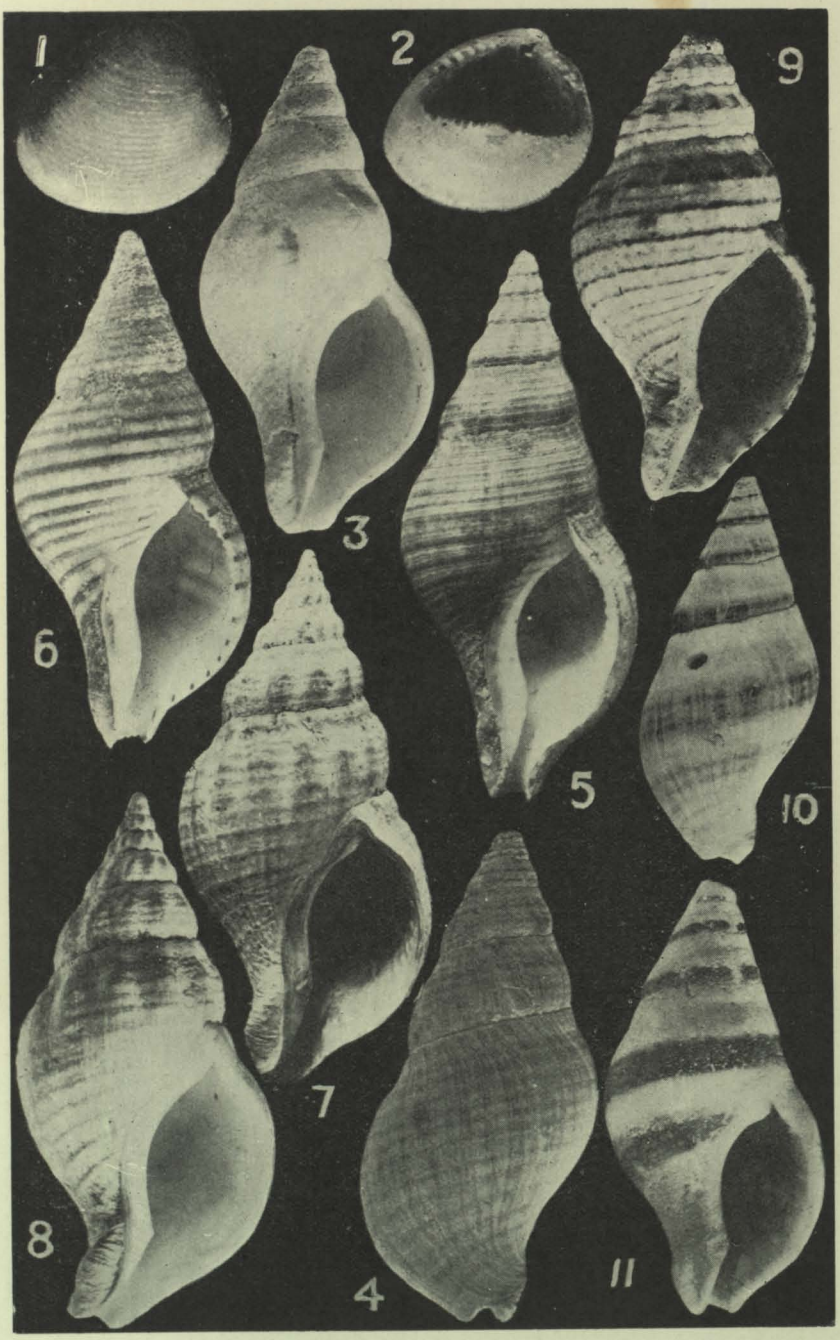
Dosinula Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 470.

Dosinula zelandica (Gray, 1835). Suter, 1913, p. 985 (as *Cytherea oblonga*).

Reported by Suter; I have not seen it.

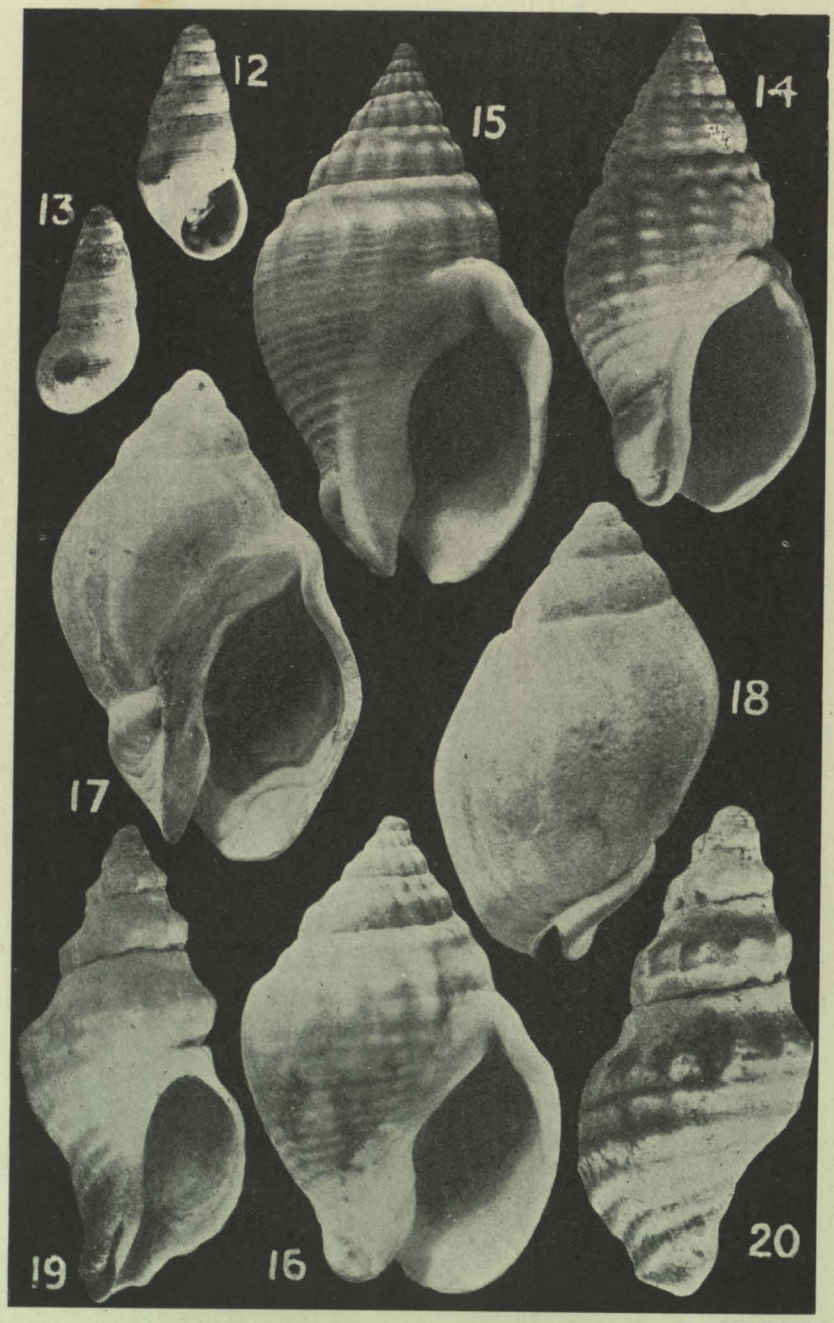
Tawera Marwick, 1927; *T.N.Z.I.*, vol. 57, p. 613.

Recent specimens of this genus in New Zealand are very difficult to classify. No agreement has yet been reached as to whether there is only one very variable species, *mesodesma* (Q. & G.), or several forms. *C. spissa* (Desh.) is allowed specific rank by some, not even varietal by others. The occurrence of still another apparently recognizable form in deep water off Otago Heads further complicates the problem. It may prove necessary to lump the lot together under one name, but I have adopted in the meantime a separation into three

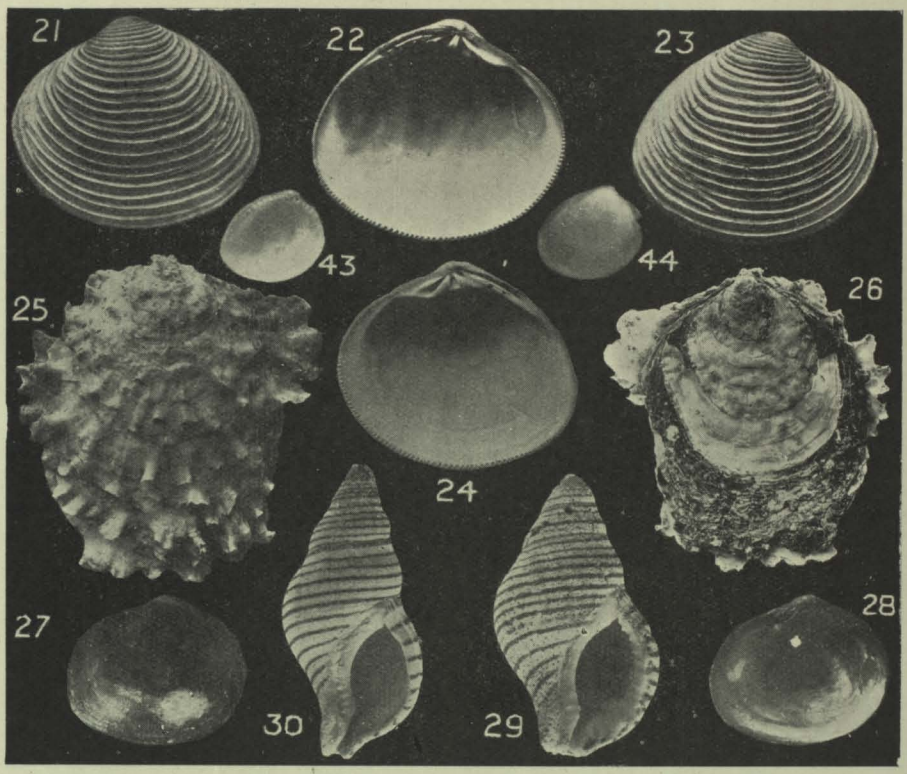


FIGS. 1-2.—*Nucula dunedinensis* n. sp.: holotype. × 15.
FIGS. 3-4.—*Buccinulum pallidum* n. sp.: Chatham Is. shells. × 2.
FIG. 5.—*Buccinulum pallidum* n. sp.: holotype. × 2.
FIG. 6.—*Buccinulum lineum* (Martyn): Milford specimen. × 2.
FIG. 7.—*Evarnula marwicki* n. sp.: holotype. × 1½.
FIG. 8.—*Evarnula marwicki* n. sp.: paratype, Warrington. × 2.
FIG. 9.—*Evarnula marwicki* n. sp.: Chatham Is. specimen. × 2.
FIGS. 10-11.—*Euthrena bicincta* (Hutton): topotypes. × 2.

Face p. 276.



FIGS. 12-13.—*Austronoba martini* n. sp.: holotype. × 15.
FIG. 14.—*Eucominia nassoides* (Reeve): topotype. × 2.
FIGS. 15-16.—*Eucominia iredalei* n. sp.: holotype (f. 15) and paratype. × 1½.
FIGS. 17-18.—*Acominia adspersa nimia* n. subsp.: holotype (f. 17) and paratype. × 1.
FIGS. 19-20.—*Axymene traversi* (Hutton): topotypes. × 4.



FIGS. 21-22-23-24.—*Tawera marionae* n. sp.: holotype. × 1.
FIGS. 25-26.—*Ostrea charlottae* n. sp.: holotype. × ⅜.
FIGS. 27-28.—*Lasaea hinemoa* n. sp.: holotype. × 6.
FIGS. 29-30.—*Chathamina characteristica* n. sp.: paratypes. × 1.
FIGS. 43-44.—*Nucula dunedinensis* n. sp.: paratype. × 5½.

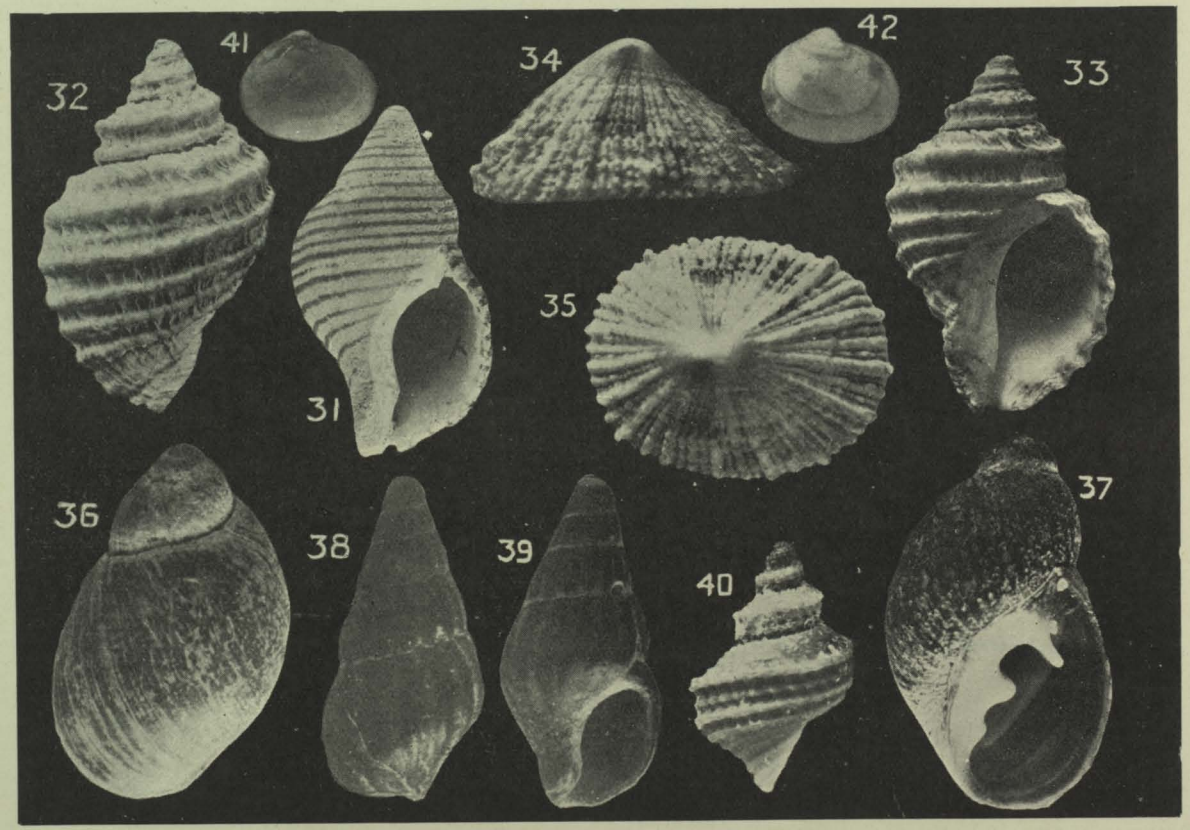
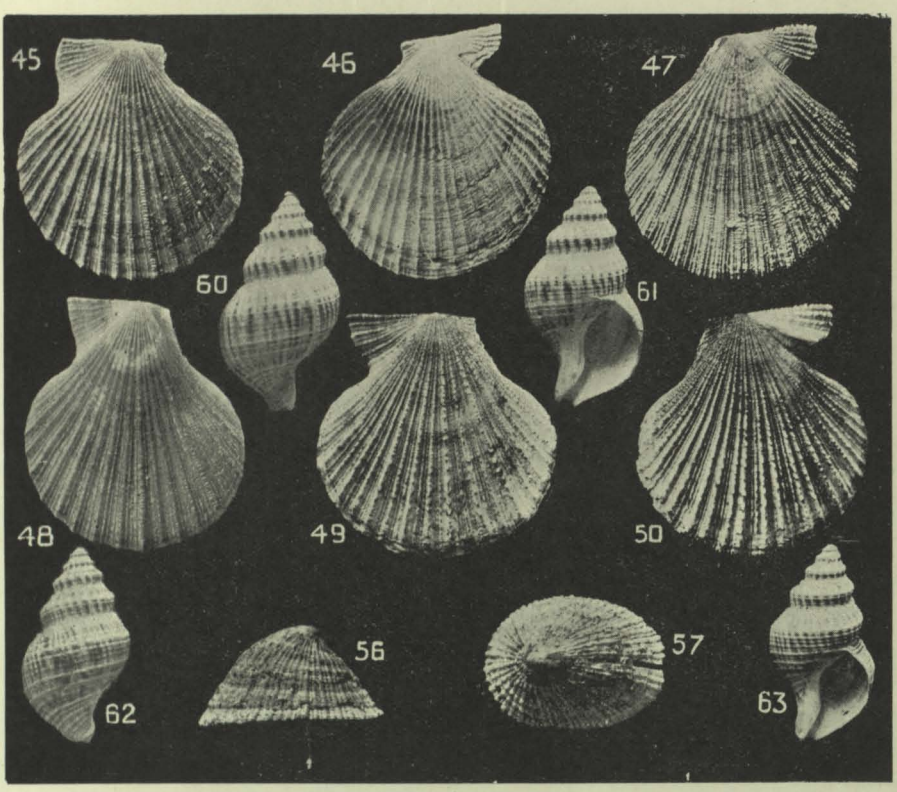


FIG. 31.—*Chathamina characteristica* n. sp.: holotype. × 1.
FIGS. 32-33.—*Lepsithais youngi* n. sp.: holotype. × ¾.
FIGS. 34-35.—*Montfortula chathamensis* n. sp.: holotype. × 2½.
FIGS. 36-37.—*Marinula chathamensis* n. sp.: holotype. × 5½.
FIGS. 38-39.—*Paxula allani* n. sp.: holotype. × 5½.
FIG. 40.—*Trichosirius inornatus chathamensis* n. subsp.: holotype. × 2½.
FIGS. 41-42.—*Lasaea rossiana vexata* n. sp. and subsp.: holotype. × 5½.



FIGS. 43-44.—See two plates back.

FIGS. 45-46-47-48.—*Chlamys dichrous* Suter: Chatham Is. specimens. × 1.

FIGS. 49-50.—*Chlamys celator* n. sp.: holotype. × ¾.

FIGS. 56-57.—*Emarginula striatula valentior* n. subsp.: holotype. × 1.

FIGS. 60-61-62-63.—*Austrofusus chathamensis* n. sp.: holotype (62, 63) and paratype. × ½.

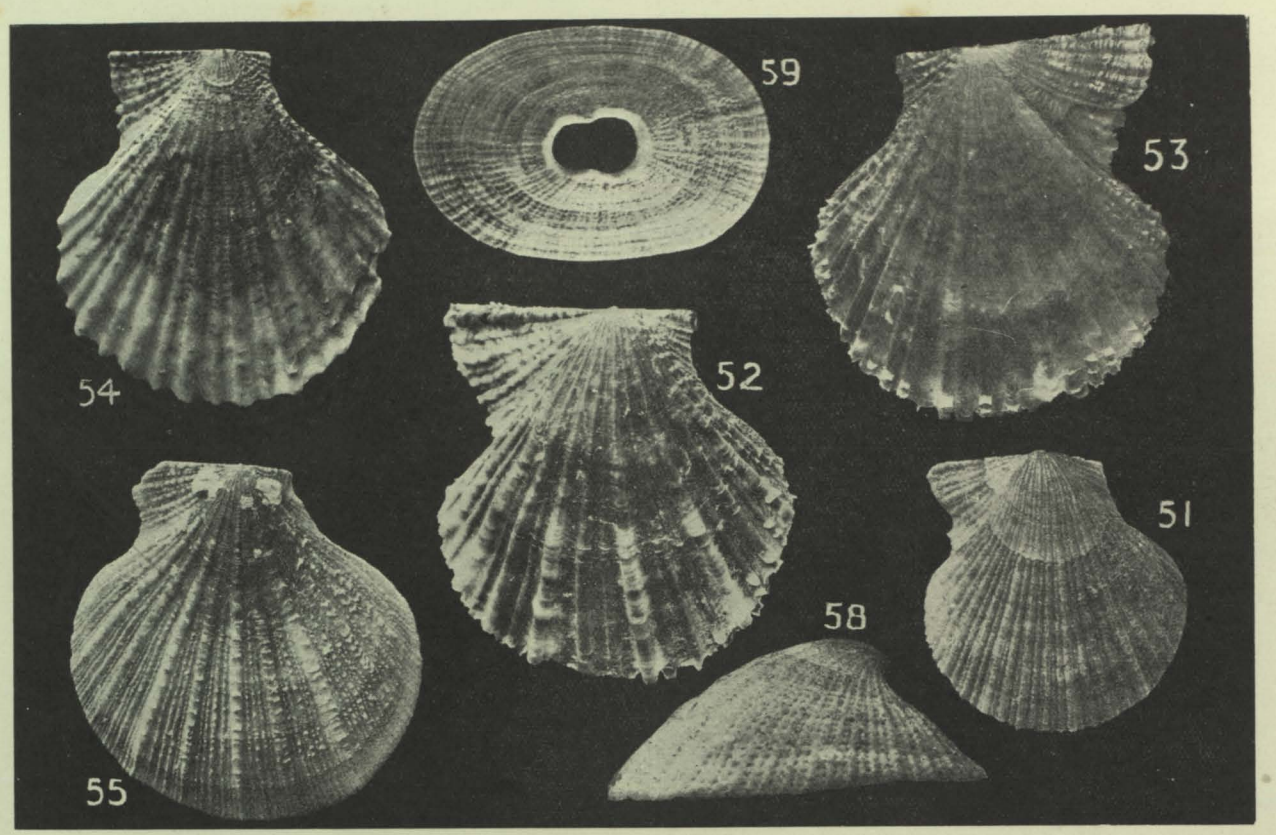


FIG. 51.—*Chlamys zelandiae* (Gray): Motutapu Is. specimen. × ¾
FIGS. 52-53.—*Chlamys suprasilis* n. sp.: holotype. × 1.
FIG. 54.—*Chlamys suprasilis* n. sp.: Taieri Beach specimen. × ¾.
FIG. 55.—*Chlamys suprasilis* n. sp.: Chatham Is. specimen. × ¾.
FIG. 58.—*Emarginula striatula* Q. & G.: Auckland specimen. × 2.
FIG. 59.—*Monodilepas skinneri* n. sp.: holotype. × 1½.

N.B.—The magnifications on this plate are greater than indicated.

nominal "species," all of which occur at the Chathams. This particular matter will probably always remain a personal one, and its solution dependent on the inclinations of the worker; I am myself very reluctant to merge names so long as there is any possibility of their being useful to cover distinguishable forms. The two mid-Pliocene species of this group, *T. subsulcata* (Suter) and *T. marthae* Marwick (the latter from the Chathams, see *T.N.Z.I.*, vol. 58, p. 471, 1928), are easily separable from the Recent forms by their long ligament pit, equal to or greater than half the length from beaks to posterior extremity in the fossils much less than half the distance in the living shells.

Key to the Recent forms:—

(a) Beaks prominent, inflated and largely overtopping hinge; lunule wide and rather short, concave; shell subtriangular, very gibbous; posterior dorsal area swollen, not hidden from the front by any expansion of the margins; 9-11 concentric ribs per cm. in centre of valve; hinge solid and teeth rather long. ..... *T. spissa.*

(b) Beaks inconspicuous; lunule narrow and long, distinctly convex, and usually a little raised; shell subtriangularly ovate, rather compressed; posterior dorsal area inconspicuous, hidden from the front by the high, subangled, slightly winged and expanded margin; 10-10½ concentric ribs per cm. in centre of valve; hinge rather weak and teeth short ..... *T. marionae.*

(c) Beaks usually inconspicuous; lunule narrow and long, lightly convex, and usually but little raised; shell elongate oval, moderately inflated; posterior dorsal area usually weak, but never hidden by expanded margins; 13-15 concentric ribs per cm. in centre of valve, radial sculpture practically obsolete (radial scratches and grooves are usually rather prominent in the other two forms); hinge narrow, teeth short. ..... *T. mesodesma.*

Tawera marionae n. sp. (Figs. 21, 22, 23, 24).

Differs from *mesodesma* (Q. & G.) in larger size; relatively higher, less elongate, more trigonally ovate shell; much coarser sculpture, the concentric ribs (10-10½ per cm. in centre of valve) thick, adpressed, sharply edged behind and flattened down in front, interstices half to whole width of ribs, radial sculpture generally well marked as irregular scratches and grooves, more prominent posteriorly. The concentric ribs very often do not exactly follow the growth lines and are truncated by them towards the anterior and posterior sides; this feature is often very marked between one rest period and another, the ribs taking quite different directions and producing a strikingly uneven effect; the ribs sometimes anastomose at the anterior end and at both ends become lamellose near the margins; the coarse sculpture continues almost up to the prodissoconch. Beaks not quite at anterior third low and inconspicuous. Anterior margin sloping at about 40 degrees only a little interrupted by the lightly convex lunule. Posterior margin with a bulge just past the end of the hinge where it is expanded and forms a slight wing which from the front hides almost all the escutcheon and

posterior dorsal area. Ligament pit less than half distance from beaks to posterior end. Generally much darker coloured than *mesodesma,* greyish-brown, very rarely with zigzag colour stripes, usually completely white inside, but sometimes with small patches of violet. Hinge narrow, the teeth rather low and widely divergent, but well forward; right anterior cardinal sublaminar, nearly parallel to margin; median rather stout, triangularly elevated, sloping well forwards, a deep narrow groove near its hinder edge; posterior not large, pointing at pallial sinus, bifid: left anterior strong, thin and sharp under umbo, much stouter below, not subparallel to margin; median small, moderately thick, bifid; posterior very small, lamellar, not reaching the curve in the hinge line.

Height, 28 mm.; length, 33 mm.; width (2 valves), 16 mm.

Locality: Off Otago Heads in 60 fathoms (type and many others) and 20 fathoms. Chatham Is., two complete specimens and three valves.

Tawera spissa (Desh., 1835). Suter, 1913, p. 991 (as *C. crassa*).

One typical specimen.

Tawera mesodesma (Q. & G.). Suter, 1913, p. 991.

Two valves, one with extremely fine concentric sculpture.

Austrovenus Finlay, 1926; *T.N.Z.I.,* vol. 57, p. 470.

Austrovenus stuchburyi (Gray, 1828). Suter, 1913, p. 987.

5 specimens. I have been told that in the Great Lagoon at the Chatham Islands this species is very stunted, owing to the brackish water habitat, and develops only a very thin and fragile shell. Unfortunately no such specimens were collected for me.

Subfamily PAPHIINAE nov.

This group, usually called Tapetinae, seems more homogeneous and distinct than any other major group of the Venerids. In New Zealand it includes the following genera:—*Paphia* Bolten, 1798 (subgenus *Callistotapes* Sacco, 1900), *Gomphina* Moerch, 1853 (subgenus *Gomphinella* Marwick, 1927), *Protothaca* Dall, 1902 (subgenus *Tuangia* Marwick, 1927), *Notopaphia* Oliver, 1923, *Eumarcia* Iredale, 1925 (with subgenus *Atamarcia* Marwick, 1927), *Paphirus* Finlay, 1927, *Irona* Finlay, 1927, and *Cyclorismina* Marwick, 1927. If a group name is used, it must be derived from *Paphia* rather than from *Tapes* Megerle, 1811, the former having thirteen years priority.

Tuangia Marwick, 1927; *T.N.Z.I.,* vol. 57, p. 623.

Tuangia crassicosta (Desh., 1835). Suter, 1913, p. 996 (as *P. costata*)

1 valve.

Paphirus Finlay, 1926; *T.N.Z.I.,* vol. 57, p. 471.

Paphirus largillierti (Phil., 1847). Suter, 1913, p. 995 (as *P. intermedia*).

4 valves. Common at Titirangi (Pliocene).

Notirus nom. nov. for *Irona* Finlay, 1926 (*T.N.Z.I.,* vol. 57, p. 471), *non Ironus* Bastian, 1865 (*Trans. Linn. Soc. Lond.,* vol. 25. p. 103).

Notirus reflexus (Gray, 1843). Suter, 1913, p. 998.

Not uncommon.

Family TELLINIDAE.

Macomona Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 466.

Macomona liliana (Iredale, 1915). Suter, 1913, p. 948 (as *T. deltoidalis*).

There is a specimen of this shell reputed to have come from the Chatham Islands in the Otago University Museum.

Zearcopagia Finlay, 1926; *T.N.Z.I.*, vol. 57, p. 466.

Zearcopagia disculus (Desh., 1855). Suter, 1913, p. 951.
Rather common.

Family GARIDAE.

Gari Schumacher, 1817; *Essai. Nouv. Syst.*, p. 44.

Gari lineolata (Gray, 1835). Suter, 1913, p. 1002.

Not uncommon. The only species reported from the Tertiary by Marwick (1928, p. 472) is *G. stangeri* (Gray), which is common in the Pliocene.

Soletellina Blainville, 1824; *Dict. Sci. Nat.*, vol. 32, p. 350.

Soletellina sp cf. *siliqua* Reeve.

8 valves, all more or less worn. They seem to differ from my northern and southern specimens of *siliqua* in larger size and more uniformly elongate oval shape, the dorsal and basal margins being subparallel, and the posterior end not narrowly acuminate; the beaks are almost median; a characteristic feature is that the anterior dorsal margin and the nymph form a continuous, almost straight line. I have seen no shells quite the same from the mainland, and a new species is possibly represented, for the Chatham shells differ quite as much from both *nitida* and *siliqua* as these two from each other. As, however, species of this genus are somewhat variable, the specific characters of neither *nitida* nor *siliqua* being so well defined that they are easily separable, and as there are already other names (e.g., *S. nitens* Tryon) proposed for New Zealand specimens, so that ample material is necessary for a revision of the species, it is better to withhold nomination at present.

Family MACTRIDAE.

Longimactra new genus. Type: *Mactra elongata* Q. & G.

Longimactra elongata (Q. & G., 1835). Suter, 1913, p. 965.

One valve. This species is not a *Mactra*, as Suter has placed it, since it has no shelly ridge separating the ligament from the chondrophore. Woodring (Miocene Molluscs from Bowden, Jamaica, *Carn. Inst., Pub. No. 366*, p. 184, 1925) remarks that, "The absence of a ridge between the ligament area and chondrophore is the most char-

acteristic feature of the genus *Spisula.*" Hutton's final location of this species in *Hemimactra* (*P.L.S., N.S.W.*, vol. 9, p. 518) was therefore nearer the truth. The species, however, is not much like any other *Spisula,* and has been variously located in *Mactra, Spisula, Standella, Hemimactra,* and *Mulinia.* The characteristic very elongate form, colour scheme of spots and dashes, deep sinus, huge muscle scars, and horizontally extended hinge are best expressed by locating the form in a new genus. Two further new genera seem to be required for New Zealand Mactroids:—*Scalpomactra* Finlay, 1928 (in Marwick, 1928, p. 432), proposed for *Mactra scalpellum* Reeve, and MAORIMACTRA n. gen. for *Mactra ordinaria* Smith.; both these have a long line of Tertiary ancestors in New Zealand. *Scalpomactra,* like *Longimactra,* has been wrongly referred to the Mactrinae; it is a Spisuloid genus, the ligament being extremely minute and difficult to discern but certainly not separated off by any shelly process; the differences in hinge and growth stages prevent the reference of *scalpellum* to *Longimactra* with which it superficially agrees in elongate shell. *Maorimactra,* on the other hand has been just as erroneously associated with *Spisula,* it has a prominent shelly plate separating the ligament from the resilium and is truly Mactroid, even as Smith originally thought; the very small size, characteristic *Corbula*-like contour, and hinge are the most decided generic features.

Scalpomactra Finlay, 1928. Type: *Mactra scalpellum* Reeve.

Scalpomactra scalpellum (Reeve, 1854). Suter, 1913, p. 963.

3 large and perfect examples taken from fishes' stomachs. These show distinctly the curious shape of the resilium; a stoutish, obliquely placed, isosceles triangle below, produced above into a long narrow spike, curved to the front, to the top of this the minute ligament is united for nearly all its length. The lateral teeth are not grooved internally. Marwick obtained fragments of this species from the Pliocene beds (1928, p. 469).

Family AMPHIDESMATIDAE.

Taria Gray, 1853; *Ann. Mag. Nat. Hist.,* ser. 2, vol. 11, p. 44.

Taria subtriangulata (Wood, 1828). Finlay, 1926. p. 467.

One valve. Oliver (1923, p. 187) states that shells from the Chathams "are almost invariably of the broad-angled thin form," and that " the angle formed by the dorsal and posterior sides varies through several degrees." I have not a range of specimens to determine the amount of variability of the Chathams, but the single valve sent me is distinctly of the northern type, solid, elongate, with very short and bicarinate posterior side, and thus referable to *subtriangulata* (Wood). It would be very interesting if the broad, triangularly ovate, unicarinate *forsteriana* Finlay were to occur at the Chathams also as this would prove the two forms absolutely distinct, instead of only regional relatives. Till evidence is forthcoming, however, it seems best to admit only *subtriangulata* to the Chatham

fauna. Marwick (*T.N.Z.I.*, vol. 58, p. 468, 1928) has compared his *Amphidesma porrectum* (Pliocene, Titirangi) with *subtriangulatum*.

Paphies Lesson, 1831; *Zool. Voy. "Coquille,"* vol. 2, pt. 1, p. 424.

Paphies australis (Gmelin, 1791). Suter, 1913, p. 960.

Reported by Suter; no specimens were sent me.

Family CORBULIDAE.

Corbula Bruguiére, 1797; *Ency. Meth.* (*Tabl. Vers.*), Pl. 230.

Corbula haastiana Hutton, 1878. Suter, 1913, p. 1011.

One perfect specimen, identified by Suter (1913, p. 1008) as *Corbula gibba* (Olivi). In spite of Suter's declarations to the contrary, I believe that the sole specimen of his "*gibba*" is the same species as the unique right valve of *haastiana* Hutton, which I think is an abnormal one. Some accident or disease has caused a deep pit to be formed under the umbo, and the hinge is much distorted in consequence, the cardinal tooth being absent or broken away. This has also affected the growth of the shell, the anterior end being considerably produced downwards, while the posterior truncation is very short, the beaks being actually nearer the posterior end. Otherwise, in sculpture, epidermis, general appearance, etc., the two shells are identical and specifically are very close to the Tertiary forms grouped around *C. pumila* Hutton (see Suter, *N.Z.G.S. Pal. Bull. No. 3*, p. 60, 1915). As a species, *haastiana* could easily be a direct descendant of *pumila*. The Chatham Is. specimen, on which the record of *gibba* is based, does not agree with any of the figures of this European form given by Forbes and Hanley, H. & A. Adams, Reeve, Cossmann, etc., being too elongate, and the right valve apparently different in shape and sculpture. I have already (*T.N.Z.I.*, vol. 57, p. 472, 1926) rejected this record of *gibba*, on the assumption that if Suter's shell was really *gibba* it was not Neozelanic, while if it was from New Zealand it was not *C. gibba*; but now that I have examined and carefully compared the actual specimens of "*gibba*" and *haastiana*, I think that the locality of the former is quite likely to be correct, especially when one bears in mind the previous existence here of closely allied Tertiary forms. The state of preservation of the specimen, which is not at all worn, and has the dried animal inside, is rather against its being a Chatham beach shell, but it may have come from a fish stomach. On the whole, therefore, it seems best to regard it at present as a more normal development of the species *haastiana* Hutton, and descended from the Tertiary *pumila* Hutton.

Aloidis Megerle, 1811; *Ges. Nat. Fr. Berlin*, Mag. 5, No. 1, p. 67.

Aloidis zelandica Q. & G., 1835. Suter, 1913, p. 1010.

2 valves. A related species from the Tertiary of Whenuataru Peninsula is *C. howesi* Marwick (*T.N.Z.I.*, vol. 58, p. 472, 1928).

Family SAXICAVIDAE.

Saxicava Bellevue, 1802; *Journ. Phys.*, vol. 54, p. 5.

Saxicava australis (Lamk., 1818). Suter, 1913, p. 1012 (as *S. arctica*).
8 valves.

Panope Menard, 1807; *Mem. Nouv. Genre Coq. Biv.*, p. 31.

Panope zelandica (Q. & G., 1835). Suter, 1913, p. 1013.
1 valve.

The new generic and specific names proposed in this paper are as follows:—

Montfortula chathamensis n. sp.
Emarginula striatula valentior n. subsp.
Monodilepas skinneri n. sp.
Austronoba martini n. sp.
Lyroseila n. gen. for *Seila chathamensis* Suter.
Trichosirius inornatus chathamensis n. subsp.
Xenogalea collactea n. sp.
Xenogalea powelli n. sp.
Uberella n. gen. for *Natica vitrea* Hutton.
Zenepos n. subgen. for *Daphnella totolirata* Suter.
**Ellicea* Finlay for *Siphonalia orbita* Hutton.
Chathamina n. subgen. for *Tritonidea fuscozonata* Suter.
Chathamina characteristica n. sp.
Buccinulum pallidum n. sp.
Evarnula marwicki n. sp.
Austrofusus chathamensis n. sp.
Acominia adspersa nimia n. subsp.
Eucominia iredalei n. sp.
Paxula allani n. sp.
Lepsithais n. gen. for *Polytropa squamata* Hutton.
Lepsithais youngi n. sp.
Marinula chathamensis n. sp.
Gumina n. gen. for *Odostomia dolichostoma* Suter.
Eulima archeyi n. sp.
Nucula dunedinensis n. sp.
Ostrea charlottae n. sp.
Ostrea hefferdi n. sp.
Ostrea fococarens nom. nov. for *O. corrugata* Hutton, *non* Brocchi.
**Notostrea* Finlay for *Ostrea subdentata* Suter.
**Notostrea lubra* Finlay for *Gryphaea tarda* Tate, *non* Hutton.
Lopha pahiensis n. sp. for *Ostrea gudexi* M. & M., *non* Suter.
Chlamys celator n. sp.
Chlamys suprasilis n. sp.
Lasaea hinemoa n. sp.
Lasaea rossiana n. sp.
Lasaea rossiana vexata n. subsp.

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*To avoid priority confusion these four new names have already been formally proposed in a preliminary note to Dr. Marwick's paper on the Chatham Is. Tertiary Mollusca (*T.N.Z.I.*, vol. 58, p. 432, 1928), but are included here for sake of completeness.

Tawera marionae n. sp.
Notirus nom. nov. for *Irona* Finlay, *non Ironus* Bastian.
Longimactra n. gen. for *Mactra elongata* Q. & G.
**Scalpomactra* Finlay for *Mactra scalpellum* Reeve.
Maorimactra n. gen. for *Mactra ordinaria* Smith.

The following new Family or Subfamily names are also indicated:—

Family TALOPHIDAE nov.
Family BEMBICIIDAE nov., to replace Risellidae.
Family BUCCINULIDAE nov.
Subfamily SIPHONALIINAE nov.
Subfamily PAPHIINAE nov., to replace Tapetinae.

Of the 202 species now recorded from the Chathams, 112 are more or less universally distributed throughout the Maorian Sub-Region, 31 are of distinct Forsterian affinities, 28 have closer allies in the Cookian region than elsewhere, and 31 seem at present to be endemic. All forms whose distribution is not well known, or regarding which I have any doubt, have been placed amongst the 112 in making this census, so that the other figures can be taken as fairly representing the proportionate influence of other regions on the molluscan fauna of the Chathams. The Forsterian influence is, however, more predominant than the actual figures show; of the 28 North Island forms, only four (*Triviella memorata, Macrozafra subabnormis saxatilis, Gumina dolichostoma,* and *Lopha glomerata*) are really restricted regional forms, while the 31 species of South Island affinities include many highly characteristic Forsterian shells, such as *Thoristella chathamensis, Maurea cunninghami pagoda, Uberella vitrea, Buccinulum pallidum, Evarnula marwicki, Austrofusus glans agrestior, Nucula dunedinensis, Chlamys celator, C. suprasilis, Gaimardia forsteriana, Costokidderia costata, Mysella unidentata, Lasaea hinemoa,* and *L. rossiana vexata.* Of the 31 endemic forms, the most notable and characteristic are: *Plaxiphora schauinslandi, Monodilepas skinneri, Margarella fulminata, Chathamina characteristica, Euthrena bicincta, Austrofusus chathamensis, Eucominia iredalei, Paxula allani,* and *Lepsithais youngi.* It is worthy of note that many of the Chatham shells are larger, stouter, and of heavier build than their Mainland relatives, e.g., *Acominia adspersa nimia, Monodilepas skinneri, Euthrena* spp., *Eucominia iredalei, Axymene traversi, Lepsithais youngi,* etc.; the reason for this is obscure, unless it has to do with the prevalent heavy weather and stormy seas in that region. It is also noteworthy that no Volutes seem to occur in either the Recent or the Pliocene fauna, though one (*Waihaoia* (*Pachymelon*) *renwicki* Marwick, see *T.N.Z.I.*, vol. 58, p. 488, 1928) is found in the Oligocene beds there; the apparent absence of *Alcithoe arabica* and *gracilis* is remarkable. Similarly, in the family Buccinulidae while the subfamily Buccinulinae is strongly represented in the Recent fauna by four genera (*Buccinulum, Chathamina, Evarnula,* and *Euthrena*) with six species, four of them being amongst the commonest Chatham shells, it is wanting in the Tertiary; conversely the subfamily Siphonaliinae, represented in the Oligocene by *Verconella asper* Marw. and *Pittella valida* Marw. (*l.c.*, pp. 485, 486),

has no Recent or Pliocene members, the absence of *Verconella adusta* and *mandarina* being again remarkable; but most of these are shore shells, which may account for their absence. The whole Recent Molluscan fauna of the Chathams, however, seems independent of the Tertiary faunas; the most characteristic shells now inhabiting its shores are not represented in the Pliocene beds (which are of shallow water facies, and therefore the most likely to contain these forms, if present), the only endemic Recent species which are also found fossil there being *Mylitella pinguis* and *Zegalerus crater*. Although a few forms (*Venericardia purpurata, Taria subtriangulata, Tawera marionae, Eucominia iredalei,* and *Zeatrophon ambiguus*) have more or less closely allied representatives (*V. martini, T. porrecta, T. marthae, E. ellisoni,* and *Z. mutabilis,* all of Marwick, see *T.N.Z.I.*, vol. 58) in the Pliocene fauna of Titirangi, there is little reason for believing the lineage direct; the ancestors of the Recent species are more probably Mainland fossils — in several cases this is demonstrably so. The converse is not quite so evident; many of the Pliocene species are, of course, identical with the Recent forms, and there is a general generic agreement (*Eumarcia plana* and *Glycimeris waipipiensis* are unrepresented in the Recent fauna, but this is also the case on the mainland, where these species again occur in Pliocene beds of the same horizon); but even if it is admitted that the Pliocene fauna may have lived on in the same locality, it is plain that the Quaternary period has witnessed notable additions, both generic and specific.

Consideration of all the above facts leads one inevitably to believe that the Recent Molluscan fauna of the Chatham Islands is *not* a remnant or evolution of the Tertiary faunas found there, but a re-population from the Mainland, in post-Pliocene times, but yet long enough ago for charasteristic regional species and subspecies to have evolved. Every one of the endemic species can be regarded as lately evolved from a Mainland form or its direct ancestor; the two genera *Montfortula* and *Magilina* which are now first reported as constituents of the Maorian Recent fauna are certain to be discovered also on the Mainland. The case of *Austrofusus chathamensis* may be considered in this connection. It is now apparently restricted to the Chathams, but I have noted (*antea*) that it seems to occur fossil on the Mainland in the Castlecliff Upper Pliocene beds, where the genus shows great variation and seems to be evolving distinct forms. These apparently reached the Chathams after the Pliocene (no *Austrofusus* has so far occurred in any of the Chatham Tertiary beds) and the *chathamensis* form alone survived in that locality, while the *glans* form developed solely in the Cookian region, and gave rise to its Forsterian representative *glans agrestior*; this apparently was later also carried to the Chathams, from the South.

A census of the present fauna seems to indicate that the active factor in this re-population has been ocean currents, acting from both North and South, but predominantly from the latter. The great cold-water current that sweeps south of Australia, over the Tasman Sea, round the southern extremity of New Zealand and Stewart Island, and up the east coast, finds the Chathams then directly in its path, and must be responsible for the larger part of its present

molluscan fauna. Most of the remainder has probably been brought by that branch of the warmer Notonectian current which, after sweeping down the east coast of Australia and also across the Tasman Sea, strikes up the west coast of the South Island and then divides somewhere in the North Cookian region, the branch that concerns us then returning south through Cook Strait, and disappearing in the direction of the Chathams. An insignificant residue may have remained or evolved from the Pliocene fauna of the Chathams.

A complete list of the endemic shells (so far as yet known) is as follows. Species whose derivation seems evidently from the north are marked "N," those from the south "S"; the approximate equality in number of these two still further indicates the heterogeneous nature of the Chatham Island Recent molluscan fauna:—

Maorichiton schauinslandi (Thiele). S.
Scissurella n. sp. S.
Sinezona subantarctica var. S.
Tugali suteri (Thiele). N.
Montfortula chathamensis Finlay. N.
Monodilepas skinneri Finlay. S.
Margarella fulminata (Huton). S.
Liotella n. sp.
Radiacmea rubiginosa (Hutton)
Cellana chathamensis (Pils.).
Estea n. sp. aff. *minor* (Suter). S (?).
Estea sp. cf. *subfusca* (Suter). S.
Austronoba martini Finlay. N.
Trichosirius chathamensis Finlay.
Zegalerus crater Finlay. N (?).
Magilina n. sp.
Chathamina characteristica Finlay. N.
Euthrena bicincta (Hutton). S (?).
Austrofusus chathamensis Finlay. N.
Acominia nimia Finlay. N.
Eucominia iredalei Finlay. S.
Paxula allani Finlay. S.
Axymene traversi (Hutton).
Lepsithais youngi Finlay. S.
Marinula chathamensis Finlay.
Eulima archeyi Finlay. N.
Tethys n. sp. (?). N.
Modiolus fluviatilis (Hutton).
Myllitella pinguis Marwick. N.
Soletellina n. sp. (?).

30 species; 10 of northern affinities, 11 of southern, 9 doubtful.

This list of endemic forms, heterogeneous in origin though they may be, is sufficient to give the Chatham Islands the status of a distinct faunal region. Accordingly, I have elsewhere (*Verbeek Mem.* Birthday Vol., p. 168, 1925) proposed for this region the name Moriorian Province, as a division of the Maorian Sub-Region. This is also geologically (*vide* Allan, *N.Z. Journ. Sci. and Tech.*, vol. 7, pp. 290-294, 1925) necessary, while the palaeontological evidence (*vide* Marwick, *T.N.Z.I.*, vol. 58, pp. 432-506) of the peculiarity of the Tertiary faunas is further justification.

The following forms were taken by Mr. R. S. Allan from the stomachs of cod during the fishing season:—

Monodilepas skinneri, Haliotis australis, Cominella maculosa, Chlamys celator, C. suprasilis, C. radiatus, C. dichrous, Pallium convexus, Limatula maoria, and *Paphies australis.*

In conclusion, I wish to thank the Otago and Canterbury Institutes for the opportunity of studying this interesting fauna, and

especially all those members of the expedition who so kindly made this possible by giving up valuable time from their own labours to collect the shells for me. To Messrs. Young and Allan, and Dr. Marwick, I am especially indebted for information and observations which, owing to my own inability to join the party, I would otherwise have lacked entirely; any merits the present account may have are due to the efforts and forethought of these and other members of the Expedition.

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