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Lower Pleistocene Mollusca from Devil's Elbow, Hawke's Bay

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Abstract

The molluscan faunas of two mudstone bands and a sandstone band are listed. The taxonomy of some species is discussed and new species of *Glaphyrina* and *Fusigurale us* are described.

INTRODUCTION

DEVIL'S Elbow is a large bend on the Napier–Wairoa road in hill country about 20 miles north of Napier, Hawke's Bay. The southern leg of the bend, about a mile long, runs across and down a steep hillside, and cuttings expose parts of the limestones and mudstones that form the hill. These belong to the Nukumaruan (Lower Pleistocene) " Petane Series " (McKay, 1887: 200; Kingma, 1959).

Three limestone bands about 20 ft thick crop out towards the top of the hill. Each limestone is underlain by a somewhat thicker mudstone. The mudstone beneath the topmost limestone is richly fossiliferous, containing common *Austrofusus taitae, Baryspira* of *mucronata* type, and *Struthiolaria convexa fossa.* The mudstone below the limestone second from the top is more indurated and contains fewer fossils, although the same species are dominant. The mudstone below the third limestone contains few fossils, and this fauna is not discussed. Strata towards the bottom of the hill are mostly poorly exposed, but at the bottom a soft brown sandstone crops out which contains many species of molluscs, including very abundant *Nucula.*

Four cycles of shell limestone alternating with mudstone or sandstone are exposed at Devil's Elbow, and mudstone exposed on the road just to the north probably represents a fifth cycle. The cycles represent part of the Nukumaruan Stage, are all probably late Nukumaruan in age, and seem to be several microcyclothems equivalent to part or all of the upper Kumeroa Cyclothem B of Southern Hawke's Bay (Vella, 1963: 37).

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The faunas of these beds have never been listed as a whole. They are similar to Nukumaruan faunas at "Shrimpton's", Ngaruroro River, and at Maraekakaho, from which areas several species have been described by Marwick (1924b). Powell (1942) described *Comitas allani* and recorded a few other species of turrids from Devil's Elbow.

During December 1961, P. Vella, P. Van Asch, G. Gibson, and T. Haskell collected material now held by the Geology Department, Victoria University of Wellington, and a year later the writer collected material now in his own collection. The molluscs from these collections are listed below.

FAUNAL LISTS

1. N124f555, mudstone below the top limestone:

Barbatia novaezelandiae (Smith)
Perna canaliculus (Gmelin) (fragments)
Atrina zelandica (Gray)
Chlamys (*Mimachlamys*) *gemmulata* (Reeve)
Promantellum marwicki (Powell)
Patro (*Prismatro*) *undatus* (Hutton)
Ostrea charlottae Finlay
Pleuromeris hectori Powell
Nemocardium (*Pratulum*) *pulchellum* (Gray)
Dosina? (fragments)
Tawera sp. juv.
Maorimactra ordinaria (Smith)
Scalpomactra scalpellum (Reeve)
Zenatia acinaces (Quoy and Giamard)
Notocorbula zelandica (Quoy and Gaimard)
Emarginula striatula (Quoy and Gaimard)
Tugali pliocenica Finlay
Monodilepas monilifera (Hutton)
Calliostoma (*Maurea*) *hodgei* (Hutton)
Ataxocerithium quadricingulatum Finlay
Maoricolpus roseus (Quoy and Giamard)
Zeacolpus vittatus (Hutton)
Zeacolpus (*Stiracolpus*) *waikopiroensis* (Suter)
Zeacolpus (*Stirocolpus*) *uttleyi* Marwick
Cirsotrema zelebori (Dunker)
Sigapatella novaezelandiae Lesson
Struthiolaria (*Pelicaria*) *convexa fossa* Marwick
Taniella planisuturalis (Marwick)
Proxiuber australis (Hutton)
Globisinum drewi (Murdoch)
Poirieria zelandica (Quoy and Gaimard)
Zeatrophon murrayae Fleming
Antizafra pisaniopsis (Hutton)
Penion accipitris (Finlay)
Aeneator marshalli (Murdoch)
Austrofusus taitae (Marwick
Cominella (*Eucominia*) *excoriata* (Finlay)
Cominella (*Cominula*) *hamiltoni* (Hutton)
Glaphyrina marwicki n. sp.
Baryspira (*Baryspira*) *mucronata mucronata* (Sowerby) × *mucronata erica* Olson
Baryspira (*Gracilispira*) *firthi* Olson
Alcithoe (*Alcithoe*) sp. (apices only)
Alcithoe (*Leporemax*) *subgracilis* Marwick
Micantapex murdochi (Finlay)
Comitas allani Powell
Aoteadrillia wanganuiensis (Hutton)
Splendrillia aequistriata (Hutton)
Phenatoma precursor Powell
Neoguraleus (*Fusiguraleus*) *satanicus* n. sp.
Antimelatoma buchanani (Hutton)

Globisinum drewi is not known Recent from less than 40 fathoms (Dell, 1956: 173). The small number of pelecypods, the occurence of *Aeneator* and *Glaphyrina,* and the comparatively large turrid fauna are compatible with this depth, and deposition is therefore thought to have been at about 40 or 50 fathoms. The most common fossils are, in order of abundance, *Austrofusus, Baryspira,* and *Pelicaria.*

2. N124f556, mudstone below the second limestone from the top of the hill:

Modiolus huttoni Suter (fragments)
Chlamys (*Mimachlamys*) *gemmulata* (Reeve)
Patro (*Prismatro*) *undatus* (Hutton)
Ostrea charlottae Finlay
Dosina? (fragments)
Notocallista (*Striacallista*) *multistriata* (Quoy and Gaimard)
Zenatia acinaces (Quoy and Giamard)
Anchomasa similis (Gray) (fragment)
Offadesma angasi (Crosse and Fischer)
Monodilepas monilifera (Hutton)
Maoricolpus roseus (Quoy and Gaimard)
Zeacolpus vittatus (Hutton)
Zeacolpus (*Stiracolpus*) *uttleyi* Marwick
Struthiolaria (*Pelicaria*) *convexa* aff. *fossa* Marwick
Proxiuber australis (Hutton)
Taniella planisuturalis (Marwick)
Globisinum drewi (Murdoch)
Zeatrophon ambiguus (Philippi)
Xymene drewi (Hutton) (juv.)
Aeneator marshalli (Murdoch)
Austrofusus taitae (Marwick)
Cominella (*Eucominia*) *elegantula verrucosa* (Finlay)
Baryspira (*Baryspira*) *mucronata mucronata* (Sowerby) × *mucronata erica* Olson
Baryspira (*Gracilispira*) *firthi* Olson
Baryspira (*Pinguispira*) *depressa opima* Marwick
Alcithoe (*Leporemax*) *subgracilis* Marwick
Aoteadrilla wanganuiensis (Hutton)
Neoguraleus (*Fusiguraleus*) *satanicus* n. sp.
Antimelatoma buchanani (Hutton)

All species are much less common in this bed than in the higher mudstone, the only common one being *Pelicaria,* although the same three species are dominant. The depths of deposition seem to have been about the same.

3. N124f557, the brown sandstone at the bottom of the hill:

Nucula nitidula A. Adams
Glycymeris (*Glycymerula*) *modesta* (Angas)
Dosinia (*Austrodosinia*) *anus* (Philippi)
Angulus gaimardi (Iredale)
Angulus spenceri (Suter)
Mactra discors Gray
Spisula aequilateralis (Deshayes)
Trochus (*Coelotrochus*) *tiaratus* Quoy and Gaimard
Zeacumantus lutulentus (Kiener)
Zeacolpus (*Stiracolpus*) sp.
Sigapatella novaezelandie Lesson
Zegalerus tenuis (Gray)
Maoricrypta (*Zeacrypta*) *monoxyla* (Lesson)
Zeatrophon ambiguus (Philippi)
Xymene drewi (Hutton)
Buccinulum (*Euthrena*) cf. *wairarapaensis* Powell
Austrofusus taitae (Marwick)
Baryspira (*Pinguispira*) *depressa opima* Marwick
Marginella sp.
Alcithoe lutea Marwick
Neoguraleus cf. *sinclairi* (Gillies)
Aoteadrilla cf. *wanganuiensis* (Hutton)
Pervicacia tristis (Deshayes)
Odostomia sp.

In this fauna there are many hundreds of specimens of *Nucula,* of which about half have both valves intact. The only other common and well preserved shells are of *Xymene.* All other species are represented by a few worn and usually broken shells.

Xymene is an active carnivorous gastropod favouring hard-bottom estuarine conditions. It is common today on and around stones on the mud flats in Porirua Harbour. The Devil's Elbow specimens have probably been washed into the area from a nearby estuary. The single specimen of *Zeacumantus* also suggests a nearby estuary. Several other genera such as *Austrodosinia, Angulus, Mactra,* and *Spisula,* are found only in shallow water off exposed sandy beaches. Much of the bed is current-bedded, indicating a depth of deposition within the range of waves or strong currents. The abundance of *Nucula* and *Xymene* compared with the larger shells probably indicates size sorting by the waves or currents. Therefore, it is thought that this sandstone was deposited in very shallow water off an ocean beach near the mouth of a shallow harbour.

The following 5 species have been reported previously from Devil's Elbow, but were not found in the collections studied by the writer: *Pleuromeris paucicostata* Laws (Laws, 1940: 48), *Elachorbis unicarina* Laws (Laws, 1940: 49), *Antiguraleus deceptus* Powell (Powell, 1942: 147), *Odostomia turneri* Laws (Laws, 1939: 202), and *Odostomia zecorpulenta* Laws (Laws, 1939: 199). The strata from which these were collected were not specified, but probably all came from the uppermost mudstone.

SYSTEMATICS

Family FISSURELLIDAE

Genus MONODILEPAS Finlay, 1927

Type species (original designation) *Lucapina monilifera* Hutton, 1873, Lower Pleistocene to Recent, New Zealand.

Keen (1960: 1230) synonymised *Monodilepas* with *Diodora* Gray, 1821. This appeared to be reasonable on examination of figures of various species of *Diodora,* as the 2 genera are similar in shape, sculpture and shape of the apical perforation. However, closer study of specimens and diagnoses showed that *Monodilepas* has a complete muscle scar, while genera of the Subfamily Diodorinae have an interior gap in the muscle scar. Also, the animal of *Diodora* fits inside the shell, whereas the shell of *Monodilepas* is only about half the length of the animal and sits well forward as a plate covering part of the dorsal surface of the visceral hump, as in many Fissurelline genera. For animals of the same size the respiratory perforation in *Monodilepas* is therefore larger in proportion to the length of the shell than in *Diodora.* There appears to be much convergence of shell characters in the Fissurellidae, and it is considered that the above differences warrant separtation of the 2 genera.

Monodilepas is a small group known only from New Zealand, consisting of 1 undescribed species in the Lower Miocene Altonian Stage (Dell, 1953: 145), 1 subspecies ranging from the Nukumaruan Stage to Recent (*monilifera monilifera*), and 5 forms restricted to the Recent (*monilifera skinneri* Finlay, *monilifera cookiana* Dell, *diemenensis* Finlay, *otagoensis* Finlay, and *carnleyensis* Powell). All the species are closely related.

Finlay (1927: 343) considered that *Monodilepas* was close to the Australian Recent genera *Amblychilepas, Sophismalepas* (synonymised with *Amblychilepas* by Keen, 1960), and *Cosmetalepas,* which are placed in the Fissurellinae by Keen. Dell (1953: 145) showed that on animal and shell characters, particularly the radula, *Monodilepas* is very close to *Cosmetalepas,* the shells differing somewhat in sculpture. The apparent posterior truncation of the internal callus around the perforation would seem to place *Monodilepas* in the Diodorinae, but this character is not found to be constant in the genus. *Monodilepas diemenensis* tends to have an oval or irregularly hexagonal callus Dell (1953: 150). It appears that there is no actual narrowing of the callus in normal specimens of this genus, and that the various shapes are produced by extensions of the callus at various points, usually anteriorly and postero-laterally. In the Devil's Elbow specimen of *M. monilifera* described below the extensions are very slight and the callus is nearly oval. In the writer's opinion little importance can be attached to the shape of the callus in *Monodilepas,* and the genus is more satisfactorily included with the Australian genera mentioned above in the Subfamily Fissurellinae.

Monodilepas monilifera (Hutton, 1873)

1873. *Lucapina monilifera* Hutton, Cat. Mar. Moll.: 42.

1893. *Megatebennus monilifera* (Hutton). Hutton, MacLeay Mem. Vol.: 72, Pl. 8, fig. 76.

1913. *Fissuridea monilifera* (Hutton). Suter, Man. N.Z. Moll.: 105, Pl. 8, fig. 8.

1927. *Monodilepas monilifera* (Hutton). Finlay, Trans. N.Z. Inst. 57: 343.

Dell (1953: 148, 149) gave the measurements of 8 fossil specimens of *monilifera,* noting that fossils are often larger than known Recent specimens, and due to this have relatively smaller perforations and more numerous radials. His largest specimen was 28.5mm long. One very large, slightly damaged specimen from the upper mudstone at Devil's Elbow agrees well with Dell's description of the large fossil shells.

DIMENSIONS: Length, 34.10mm; width, 23mm (estimated); height, 9.25mm; length of perforation, 8.0mm; anterior end to perforation, 15.15mm.

It is interesting to see that Dell records this species from the Foveaux Strait area only. At Devil's Elbow it occurs with *Zeacolpus* (*Stiracolpus*) *waikopiroensis* (Suter), which Marwick (1957: 26) considers to indicate warm-water conditions. The assemblage of fossils in the Hawke's Bay Nukumaruan is significantly different from Nukumaruan assemblages elsewhere. It has no close parallel in New Zealand at the present day, and probably represents a relatively warm-water fauna. *M. monilifera* was therefore presumably able to tolerate fairly warm water in Nukumaruan times. It is probably the ancestor of all the modern species, and appears to have become restricted to colder waters in Foveaux Strait during speciation.

The specimen from the second mudstone is a fragment of an average sized shell.

Family STRUTHIOLARIIDAE

Genus STRUTHIOLARIA Lamarck, 1812

Subgenus PELICARIA Gray, 1857

Struthiolaria (Pelicaria) convexa fossa Marwick, 1924. Pl. 2, figs. 15–17

1924. *S. fossa.* Marwick, Trans. N.Z. Inst. 55: 189, Pl. 15, figs. 8, 9.

The type series of *fossa,* from Shrimpton's, is a varied assemblage. The holotype differs from all other specimens seen by the writer in having numerous fine spiral ridges over the base and between the cinguli. One of the paratypes, a larger shell with a well-marked basal angulation, closely matches the form common in the upper

mudstone at Devil's Elbow. Fifteen specimens were collected. In all these shells the cinguli are narrow and low and the interspaces are broad with few threads. There are about ten rather widely spaced threads on the base.

The form in the second mudstone at Devil's Elbow is probably an ecotype of *fossa,* dwarfed and squat, with rounded base and low cinguli, but having the deeply channelled suture typical of *fossa.* The cinguli are wide, as in *S. media* and *S. acuminata,* and almost as low as in *convexa convexa.* As *fossa* itself is so variable, the form is not named.

Collections made by the writer at many localities in Central Hawke's Bay show that most faunas in this area have a form of *Pelicaria* somewhere in between those described as *fossa* and *convexa,* usually with a few specimens approaching both typical forms. To the writer's knowledge, faunas having typical *convexa* alone are known only from Northern Wairarapa and Southern Hawke's Bay, and faunas with *fossa* alone are known only from Hawke's Bay north of Napier. The Central Hawke's Bay populations are considered to be hybrids. This would explain Marwick's (1924a: 189) statement: "a close connection exists between *S. fossa* and *S. convexa*; both occur in the same district and in the same formation."

Morton (1950: 456) showed that embryos of *Pelicaria* are fully developed in the incubatory pouch of the female, "and are liberated as tiny replicas of the adult which at once take on a benthic existence." The lack of a planktonic stage in the life cycle explains the great variation in species of this genus in both Recent and fossil populations.

After the beginning of Nukumaruan time the Hawke's Bay sea was cut off from Wairarapa by the Mount Bruce ridge (Vella, 1963: 37), which would keep separate cool water flowing into the Wairarapa basin from the south and warm (? Notonectian) current flowing into Hawke's Bay from the west over what is now the southern part of the Ruahine Range—i.e., through Manawatu Strait (Fleming, 1962: 85). This explains the southern limit of the distribution of *convexa.* The northern limit of the range of *fossa* is not known.

Since the relationships of the two forms seem so close, and since hybridisation appears to take place, it seems best to treat *fossa* and *convexa* as polytypic forms. The name *convexa* has page priority over *fossa* and as there is no other means of determining priority *convexa* is here considered the nominate form.

Family BUCCINULIDAE

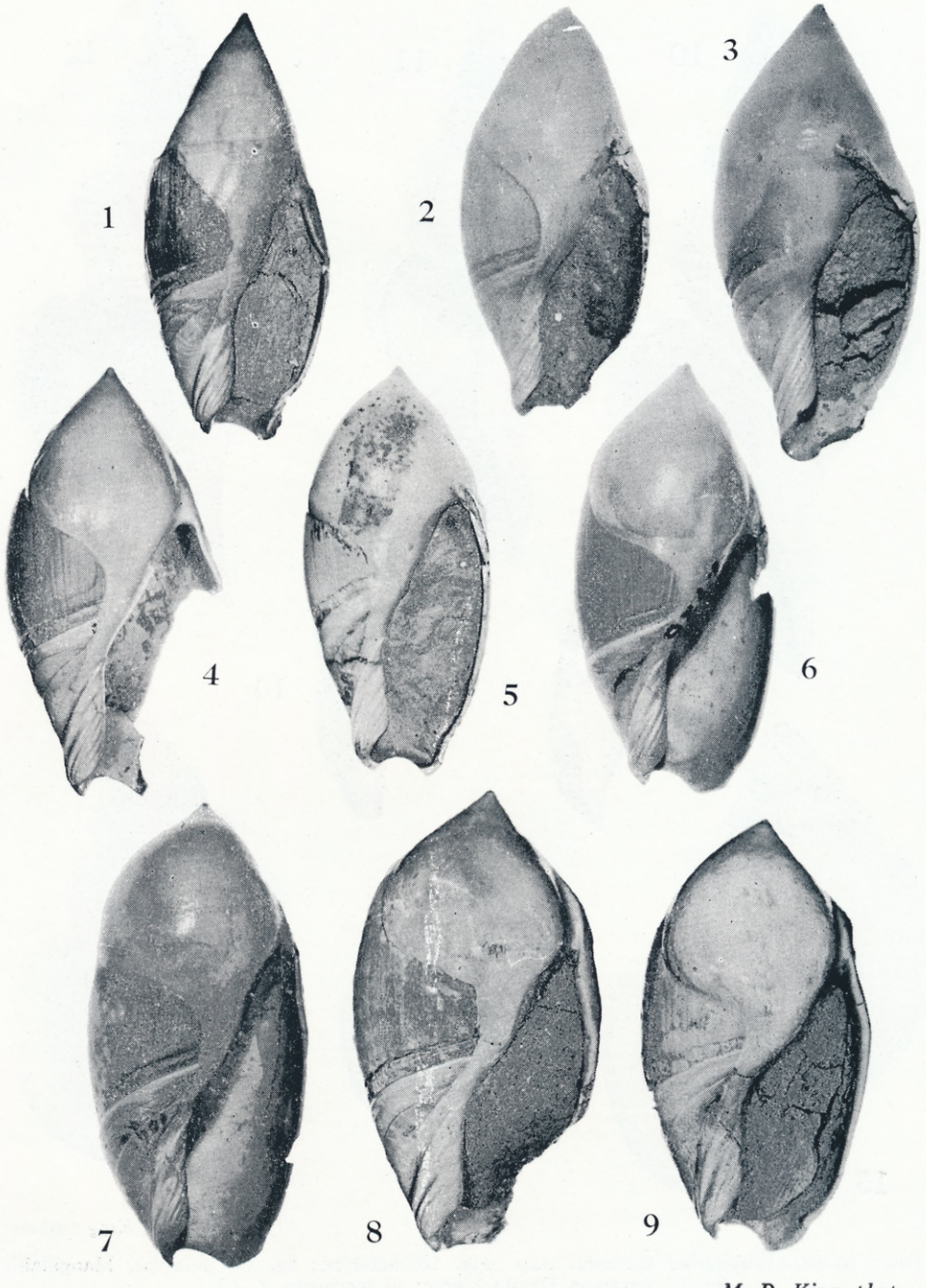
Genus PENION Fischer, 1884

Penion accipitris (Finlay, 1930)

1930. *Verconella accipitris.* Finlay, Trans. N.Z. Inst. 61: 68.

P. accipitris was described from Okauawa Stream, Hawke's Bay, and recorded also from the Maraekakaho–Kereru road (which passes over Okauawa Stream) and "Hawke's Bay, several Nukumaruan localities". However, it was not figured, and the writer has not seen the type, which is in the Finlay collection in the Auckland Museum (Powell, 1941: 257).

The common form of *Penion* in Hawke's Bay agrees in all respects with Finlay's description of *accipitris* except that some specimens are rather broader with a markedly concave shoulder. Specimens were collected by the writer from: *Struthiolaria frazeri* shellbed, 10 chains up Okauawa Stream from junction with Mangatahi River, 5 specimens (topotypes ?); Okauawa Stream, 1 chain up from Mangatahi River, 1 specimen; cliffs of Mangatahi River 50 yards upstream and 50 yards downstream from mouth of Okauawa Stream, 5 specimens and 2 juveniles; high cliffs of Kikowhero Stream at end of Omapere Road, 2 specimens; upper mudstone, Devil's Elbow, 2 fragmentary specimens with coarser spirals than the others.

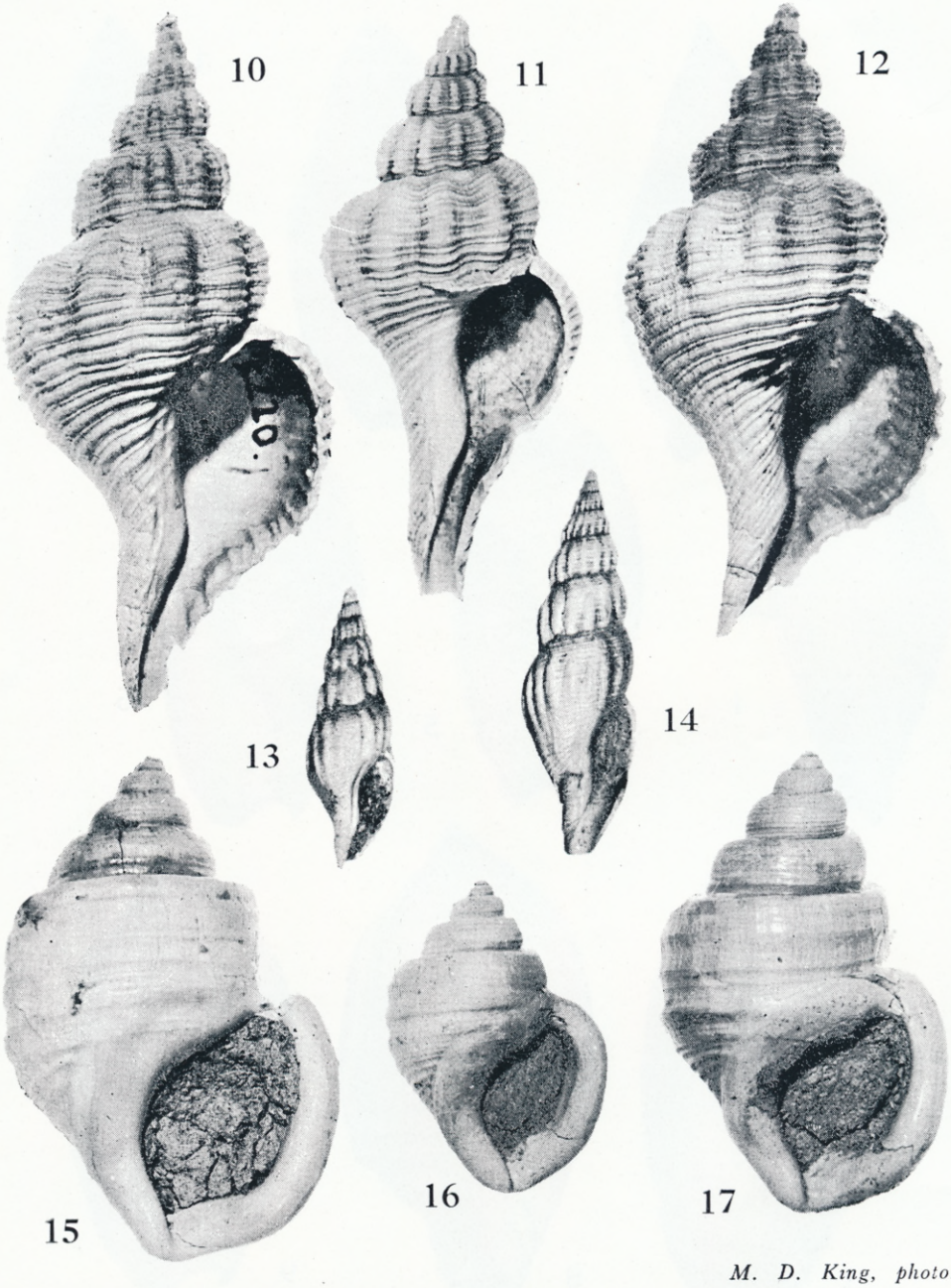


M. D. King, photo.

(All figures approximately × 1.2)

FIGS. 1–7.—*Baryspira (B.) mucronata mucronata* (Sowerby) x *mucronata erica* Olson, upper mudstone, Devil's Elbow.

FIGS. 8, 9.—*Baryspira (B.) mucronata erica* Olson, topotypes.



M. D. King, photo.

FIGS. 10–12.—*Glaphyrina marwicki* n.sp. Fig. 10, holotype; fig. 11, paratype, Mangatahi; fig. 12, paratype, Devil's Elbow; all specimens × 2.3.

FIGS. 13, 14.—*Neoguraleus (Fusiguraleus) satanicus* n.sp. Fig. 13, paratype; fig. 14, holotype; both specimens × 4.0.

FIGS. 15, 17.—*Struthiolaria (Pelicaria) convexa fossa* Marwick, upper mudstone, Devil's Elbow. Both specimens × 1.4.

FIG. 16.—*Struthiolaria (Pelicaria) convexa* aff. *fossa* Marwick, second to top mudstone, Devil's Elbow; × 1.4.

In addition, a specimen of a form similar to *hiatulus* (Powell, 1947) was collected loose in the bed of Okauawa Stream, and a fragmentary specimen of a form very similar to *ormesi* (Powell, 1927) was collected from the cliffs opposite the Esk Bridge, Petane.

The interrelationships of *allani* (Finlay, 1930), *falsus* (Finlay, 1930), *accipitris*, and *hiatulus* are not clear. These, particularly the Devil's Elbow form, are also related to *editus* (Powell, 1934).

Family FASCIOLARIIDAE

Genus GLAPHYRINA Finlay, 1927

Type species (original designation): *Fusus vulpicolor* Sowerby.

Glaphyrina marwicki n.sp. Pl. 2, figs. 10-12

Shell of moderate size, strongly sculptured. Protoconch larger than in *vulpicolor* but otherwise typical, of 2 smooth, rather irregular unicarinate whorls, followed by 1 whorl with brephic sculpture of strong close axial ribs. Post-brephic whorls 5¼, very strongly convex, with suture deeply impressed and shoulder of penultimate and body whorls almost horizontal. Shoulder concave, with lower spirals than on rest of whorl, and a single large rib bordering the undulating suture. Spire a little shorter than height of aperture plus canal. All post-brephic whorls sculptured with primary spiral ribs, 7 on penultimate whorl and about 18 on body whorl, base and canal. Interstitial spiral threads developing on second post-brephic whorl and becoming almost as strong as the primary spirals over the body whorl, where still finer threads are developed in some interspaces. Primary spirals becoming weaker over base and upper part of canal, all spirals of equal strength over lower part of canal. High broadly-rounded axial folds with equal interspaces, numbering 10 on both penultimate and body whorls, extend from suture to suture on the spire whorls and to just below the periphery on the body whorl; many fine axial growth lines cross the spirals and cause a microscopic nodulation, which is more pronounced in the interspaces of the axial folds. Canal open, curving slightly to the right, short for the genus, with no fasciole. Outer lip slightly thickened, with about 20 internal lirae arranged in pairs and threes (regularly paired on the largest paratype), extending back inside the shell for 6 to 8mm. Inner lip a thin glaze over the parietal wall, with a low callus pad near the slightly developed posterior canal.

DIMENSIONS: Height, 39.55mm; diameter, 19.80mm (holotype); height, 36.15mm; diameter, 18.35mm (figd. paratype, Devil's Elbow); height, 28.30mm; diameter, 12mm (estimated) (paratype, Devil's Elbow); height, 22.20mm; diameter, 11.25mm (paratype, Devil's Elbow); height, 33.15mm; diameter, 16mm (estimated) (figd. paratype, Mangatahi); height, 32.85mm; diameter, 16.40mm (paratype Mangatahi); height, 28.0mm; diameter, 14.50mm (paratype, Mangatahi).

HOLOTYPE (reg. no. TM3798), figured paratype (reg. no. TM3799), and paratype in collection of New Zealand Geological Survey; figured paratype (reg. no. Apf43) in collection of Geology Department, Victoria University of Wellington; paratype in collection of Dominion Museum, Wellington; 3 paratypes in writer's collection.

LOCALITIES: N124f555, upper mudstone at Devil's Elbow, Napier–Wairoa road, A. G. Beu, December, 1963 (figured paratype); and A. G. Beu, Easter, 1964 (small paratype); GS2220, N124f426, Devil's Elbow, Dr J. Marwick, 1925 (holotype and paratype); GS1105, N134f501, "lower part of section at horse trough, Mangatahi River, new road to Kereru from Maraekakaho", Dr G. H. Uttley, 1922 (figured paratype); cliffs opposite Esk Bridge, Petane, A. G. Beu, Easter, 1964 (paratype, spire only); Mangatahi River, cliffs at mouth of Okauawa Stream (= GS1094, ?GS1105), A. G. Beu, March, 1964 (2 paratypes); juvenile, probably this species, Saddle Road, north of Manawatu Gorge, M. D. Hall, 1963—all of Nukumaruan age.

This species is near to the Recent *G. plicata* Powell, 1929, differing in the taller spire, more convex whorls, fine axial threads, and thickened lirate outer lip. The taller spire and more convex whorls are characters in common with *G. vulpicolor, vulpicolor annectens* Powell, 1934, and *vulpicolor progenitor* Finlay, 1927, and the species may be ancestral to these and *plicata*. The thickened lirate outer lip is a character of *Taron* mentioned by Powell (1929: 97) as not occurring in *Glaphyrina,* and suggests earlier derivation of *Taron* and *Glaphyrina* from a common stock.

The specimens in the Geological Survey collection from Devil's Elbow were separated out by Dr J. Marwick as a new species but were not described.

Glaphyrina problematica (Fleming, 1943)

1943. *"Aeneator" problematicus.* Fleming, Trans. R.S.N.Z. 73 (3): 200, Pl. 30, fig. 26.

This species was described from GS2314, Takapau S.D. (Waitotaran). The holotype (the only known specimen) closely resembles *G. marwicki* n.sp. Apart from the specimen being much smaller and probably immature, the spiral threads are stronger and much fewer in number than in *marwicki* and the axial folds are more prominent. Also, the columella bears 3 small oblique denticles, a feature otherwise unknown in *Glaphyrina.* The protoconch and brephic whorl are missing, so that the generic position must remain in doubt until further specimens are collected, but *problematica* is probably directly ancestral to *Glaphyrina marwicki.*

Family OLIVIDAE

Genus BARYSPIRA Fischer, 1883

Subgenus BARYSPIRA *sensu stricto*

Baryspira (Baryspira) mucronata (Sowerby, 1830)

1830. *Ancillaria mucronata.* Sowerby, Spec. Conch. 1: 8.

1956. *B. (B.) mucronata* (Sby.). Olson, N.Z.G.S. Pal. Bull. 24: 12, Pl. 2, figs. 1–3 (full synonymy given).

1956. *B. (B.) gladiolaria.* Olson, N.Z.G.S. Pal. Bull. 24: 13, Pl. 2, figs. 4, 5.

Baryspira (Baryspira) mucronata mucronata (Sowerby, 1830)

The nominate subspecies is the common Waitotaran to Recent form of *Baryspira* s.s. over the whole of New Zealand. Two typical specimens were collected from the upper mudstone at Devil's Elbow, but other specimens from this locality grade into *erica* Olson as noted below.

Baryspira (Baryspira) mucronata erica Olsen, 1956. Pl. 1, figs. 8, 9

1956. *B. (B.) erica.* Olson, N.Z.G.S. Pal. Bull. 24: 13, Pl. 2, figs. 6, 7.

At some Hautawan and Nukumaruan localities in Central Wairarapa to Central Hawke's Bay, this subspecies replaces *mucronata mucronata,* generally with a few shells in each population approaching *mucronata. B. m. erica* is the only form occurring at the type locality, Mangatahi River, where the writer collected a series of 16 specimens, in which the development of the spire callus varies only slightly.

Baryspira (Baryspira) mucronata mucronata (Sby.) x **mucronata erica** Olson. Pl. 1, figs. 1-7

Twenty-eight specimens were collected from the upper mudstone at Devil's Elbow. A few shells have the spire callus almost as pronounced as in the Mangatahi specimens, and the specimens form a perfect gradation between *mucronata* and *erica*. These forms are either hybridising geographic subspecies or evolving chrono-subspecies. The former is thought to be more likely.

Included in the Devil's Elbow series are specimens similar to the Nukumaruan shells from Onga Onga Road, Waipukurau, which Olson (1956: 14) made the holotype and paratype of the new species *gladiolaria*. Olson's specimens are therefore considered to be *mucronata–erica* hybrids, and the name *gladiolaria* is regarded as a synonym of *mucronata*. The Kaawa Creek specimens may be a separable form, but if so must bear a new name.

Subgenus GRACILISPIRA Olson, 1956

Baryspira (Gracilispira) firthi Olson, 1956

1956. *B. (G.) firthi.* Olson, N.Z.G.S. Pal. Bull. 24: 26, Pl. 6, figs. 16–18.

The specimens from Devil's Elbow appear to be *firthi,* but large examples have 2 or 3 pronounced calluses at the tip of the spire. The calluses are always formed in the same way, there being a thick callus projecting above the apex on the ventral surface and a similar one or 2 smaller ones on the dorsal surface, so that there is a groove running over the top of the spire. The spire has straight or slightly concave sides. All spire calluses tend to be more developed, as does the groove running up from the posterior canal. This is probably the senile form of *firthi.* Small specimens are indistinguishable from *novaezelandiae* (Sowerby, 1859) and as there appear to be 2 distinct size ranges both species may be present.

DIMENSIONS: Height, 27.50mm; diameter, 12.40mm (largest specimen).

Family TURRIDAE

Genus COMITAS Finlay, 1927

Comitas allani Powell, 1942

1942. *C. allani.* Powell, Bull. Auck. Inst. Mus. 2: 59, Pl. 10, fig. 6.

A single large specimen of this species was collected by the writer from the upper mudstone, which is most probably the type locality.

DIMENSIONS: Height, 33.20mm; diameter, 11.25mm.

Genus NEOGURALEUS Powell, 1939

Subgenus FUSIGURALEUS Powell, 1942

Type species (original designation): *Clathurella leptosoma* Hutton.

Neoguraleus (Fusiguraleus) satanicus n.sp. Pl. 2, figs. 13, 14

Shell large for the genus, narrowly fusiform, with a slight shoulder high on the whorl. Axial ribs 16 on penultimate whorl, 15 on body whorl, high and broadly rounded, slightly oblique, sinuated at the shoulder in conformity with the sinus, dying out on the base. Interspaces equal to the axials in width. Spiral sculpture consisting of regularly spaced major

spiral lirae over the whole teleoconch, about 30 on body whorl base and canal, and 11 on penultimate whorl; on penultimate and body whorls and upper part of base there are interstitial spiral lirae of about half the width of the major ones, with grooves of about the width of the interstitial spirals between all spiral ribs. The 2 major spirals just above the periphery are a little broader than the others, and the upper of these forms a very slight rounded shoulder. Spire attenuated, slightly convex, 1½ times height of aperture plus canal. Canal long, twisted rather strongly but very high up. Aperture, sinus, and protoconch typical.

DIMENSIONS: Height, 13.0mm; diameter, 3.95mm (holotype); height, 9.35mm; diameter, 3.25mm (paratype).

HOLOTYPE in collection of Geology Department, Victoria University of Wellington (reg. no. Af44); single paratype in collection of New Zealand Geological Survey.

LOCALITIES: N124f555, upper (type) and N124f556, second to top mudstone beds at Devil's Elbow, Napier–Wairoa road.

This is the youngest described member of the subgenus. The subgenus was recorded by Powell (1942: 169) from the Waitakian to the Awamoan, with *satus* (Laws, 1936) in the Opoitian and Waipipian. The subgenus is represented by specimens of younger age than Waipipian in the New Zealand Geological Survey collections. *N. satanicus* is related to *major* Powell, 1942, an Awamoan species, and appears to belong to Series 2 of Powell (1942: 140).

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