

NEW ZEALAND
DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH

BULLETIN 139 (4)

**Biological Results of
The Chatham Islands 1954 Expedition**

PART 4

Marine Mollusca

by R. K. DELL

Sipunculoidea

by S. J. EDMONDS

New Zealand Oceanographic Institute

Memoir No. 7

1960



A portion of the trawl from Station 6 in 220 fm

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FOREWORD

The Chatham Islands 1954 Expedition was organised and led by Prof. G. A. Knox of the Zoology Department of Canterbury University. The expedition was planned to explore the distribution of benthic and pelagic animals between the New Zealand coast and the Chatham Islands over the Chatham Rise, and to investigate the faunal affinities of the Chathams group, which lies in the Sub-tropical Convergence zone.

A substantial grant towards the cost of the expedition was made by the Council for Scientific and Industrial Research on the recommendation of the N.Z. Oceanographic Committee; further financial support was given by Canterbury University, Canterbury Museum, Dominion Museum and Canterbury and Southland Branches of the Royal Society of New Zealand. The expedition was carried out from the M.V. *Alert* under the command of her owner and master, Mr A. J. Black.

The scientific staff was drawn from the following organisations: Canterbury Museum (R. R. Forster); Canterbury University (G. A. Knox, E. W. Dawson, J. R. MacIntyre); Dominion Museum (R. K. Dell, J. M. Moreland); N.Z. Oceanographic Institute (D. M. Garner); Otago University (D. Marshall); Portobello Marine Biological Station (E. J. Batham); Victoria University of Wellington (J. C. Yaldwyn).

Prof. G. A. Knox has been responsible for organisation of the sorting and allocation of material. Type material from the expedition is deposited at Canterbury Museum. Preliminary technical editing of the resulting manuscripts has been carried out by Prof. Knox and Dr D. E. Hurley. Mr M. O'Connor (Information Bureau, D.S.I.R.) has been responsible for final editing.

Further results of the expedition will be published in this series as the examinations of other animal groups are completed.

J. W. BRODIE,
Director,
N.Z. Oceanographic Institute.

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Chatham Island Marine Mollusca based upon the Collections of the Chatham Islands Expedition, 1954

R. K. DELL

Dominion Museum, Wellington

INTRODUCTION

In January and February 1954 the Chatham Island Expedition established 60 marine stations on the Mernoo Bank, Chatham Rise, and on and around the Chatham Islands themselves. A general account of the Expedition has been given by Knox (1957). The writer has already listed and described the mollusca obtained from depths greater than 100 fm (Dell, 1956 B) and a few species were discussed in a separate paper (Dell, 1956 A). The Scaphopod mollusca obtained were listed in a general revision of recent Scaphopoda (Dell, 1957). In the present paper the Chatham Island mollusca obtained from depths less than 100 fm are listed. These do not include the Nudibranchs, which have been handed over to Dr R. L. C. Pilgrim for identification, nor the specimens of *Amphidesma* which were retained by Mr E. W. Dawson. At the same time an attempt has been made to draw up as complete a checklist as possible of the marine mollusca. Such a list of course owes a great deal to the work previously published by Finlay (1929) and the revised and expanded list of Powell (1933).

A full Station List for the expedition was published by Knox (1957). Some 35 stations are listed, either shore collecting stations or those established at depths less than 100 fm. The depth

of 100 fm has been taken as a purely arbitrary figure as in previous works by the writer. The significance of this depth as a borderline between the fauna of the Chathams and their island shelf and the more truly archibenthal fauna will be discussed later.

Prior to 1954 only one shallow water dredging had been obtained from the Chathams, a dredging in 10 fm off Owenga, the mollusca from which were recorded by Powell (1933). The Chatham Island Expedition successfully established 20 stations with dredge or trawl in depths from 1 to 94 fm (in addition to the deep water stations the results of which have already been published). It is significant that although a number of new mollusca can be recorded from these stations, there are very few new species amongst them. The forms peculiar to the Chatham Islands are largely confined to intertidal and shallow water habitats or occur in shallow as well as in deeper water stations.

The opportunity has been taken to re-check the validity of some of the so-called endemic species from the Chatham Islands. There is a tendency once an area has been designated a faunal province to actively search for "subspecies" amongst its fauna and at the same time to accept rather

uncritically previously described endemic forms. In an area like the Chathams from which large collections are not often made, it is advisable from time to time to compare Chatham Island and mainland series. This is particularly necessary since collections of mainland forms have increased considerably since many of the species concerned were described. Such comparisons have shown in a number of cases that the Chathams shells cannot be readily distinguished from mainland forms. It is doubtful if Finlay, at the time he wrote his

report on Chatham Island mollusca, had access to extensive collections from the Cook Strait region. Comparison of Chathams populations with populations from the Wellington area has shown in some cases that there is no measurable difference between them. In a number of other cases such differences as can be consistently indicated are relatively slight. There is, however, a hard core of endemic forms whose significance is discussed later.

LIST OF STATIONS

In the checklist that follows all mollusca known from the Chatham Islands are listed together with a summary of the stations from which material has been recorded. The prefix "C" has been used for all Chatham Island Expedition Stations. Knox (1957) has given a complete Station List. The following summary gives the bare data essential to comprehend the distribution of the species mentioned:

- C.9 Glory Bay, Pitt Island, shore collecting
- C.11 Owenga, shore collecting
- C.13 Owenga, 4–6 fm
- C.14 Hanson Bay, 15 fm
- C.15 Hanson Bay in 30 fm
- C.16 Kaingaroa, shore collecting
- C.17 Kaingaroa, hand net at night
- C.18 Off Cape Pattison in 15 fm
- C.19 Off Cape Young in 25 fm
- C.20 Off Cape Young in 20 fm
- C.21 North of French Reef in 15 fm
- C.22 The Sisters, shore collecting
- C.23 North of the Sisters in 33 fm
- C.24 South of the Sisters in 38 fm
- C.25 Waitangi Wharf, hand net at night
- C.26 Waitangi, shore collecting
- C.27 Petre Bay in 45 fm
- C.28 Petre Bay in 50 fm
- C.29 Petre Bay in 94 fm
- C.30 Petre Bay in 70 fm
- C.31 Petre Bay in 22 fm
- C.32 Petre Bay in 7 fm
- C.33 Te Whanga Lagoon in 1–2 fm
- C.36 Waihere Bay, hand net at night
- C.37 Between South East Island and Pit Island in 30 fm
- C.38 South of Little Mangere Island in 43 fm

- C.39 South East Island, shore collecting
- C.42 Owenga, hand net at night
- C.43 Owenga in 3–4 fm
- C.46 Kaingaroa in 3 fm
- C.47 Kaingaroa, hand net at night
- C.49 Port Hutt, shore collecting

The records given by Powell (1933, p. 182) have also been incorporated with his station numbers as:

- P.1 Waitangi, in shell sand
- P.2 Waitangi, living on or under stones, at low tide
- P.3 Waitangi, living on seaweeds
- P.4 Waitangi, cast up on beach
- P.5 10 fm off Owenga
- P.6 Owenga
- P.7 Port Hutt, cast up on beach
- P.8 Tioriori, cast up on beach
- P.9 Wharekauri, living on or under stones
- P.10 Wharekauri, in shell sand
- P.11 Kaingaroa, in stomachs of blue cod
- P.12 Maunganui, cast up on beach
- P.13 Te Whanga Lagoon
- P.14 Waitangi West
- P.15 Generally distributed

Some material in the Dominion Museum collections has also been recorded. These records are only included if they appear to add something to the known distribution pattern:

- D.1 Dominion Museum, "Chatham Islands"
- D.2 Cod stomachs, Chatham Islands, F. Abernethy
- D.3 Waitangi, Chatham Islands, W. R. B. Oliver, –/12/1909

D.4 Flower Pot, Pitt Island, C. J. Lindsay, 5/2/1957

D.5 Shore of Te Whanga Lagoon, C. J. Lindsay, 11/2/1957

A few species have not been recorded except by Finlay (1929) and these have been marked F.1.

For each species the bathymetric range in fathoms at the Chathams is given in parentheses.

This does not include any records for depths greater than 100 fm, as such records have already been published (Dell, 1956 B). The letters C, N, S, An, E and P refer to the geographical affinities of the species and these are explained on page 156.

The present list details a total of 320 species as compared with 256 recorded by Powell (1933).

CHECKLIST OF CHATHAM ISLAND MARINE MOLLUSCA

- Solemya (Zesolemya) parkinsoni* Smith. C.28, C.29, C.46. (3–94) C.
- Nucula nitidula* A. Adams. C.23, C.24, C.28, C.31, C.38. (0–50) C.
- Nucula hartvigiana* Pfeiffer. C.49, P.1. (0) C.
- Nucula dunedinensis* Finlay. P.1. (0) S.
- Nuculana (Saccella) bellula* (A. Adams). C.28, C.29, C.31, C.38. (22–94) C.
- Barbatia novaezelandiae* Smith. C.14, C.23, C.24, C.31, C.38, C.49, P.6. (0–43) C.
- Acar sandersonae* Powell. C.23, C.38, P.1. (0–43) C.
- Acar sociella* (Brookes). C.9. (0) N.
- Glycymeris (Grandaxinea) laticostata* (O. & G.). C.11, C.20, C.23, C.24, P.6 (0–38) C.
- Glycymeris (Glycymerula) modesta* Angas. P.5. (10) C.
- Austrosarepta harrisonae* (Powell). C.16, C.49, P.5. (0–10) C.
- Cosa filholi* (Bernard). C.23, P.5. (10–33) C.
- Cosa costata* (Bernard). P.1. (0) C.
- Hochstetteria meleagrina* Bernard. C.23, C.24. (33–38) S.
- Hochstetteria modiolus* (Suter). C.16. (0) S.
- Ostrea sinuata charlottae* Finlay. C.23, C.24 (33–38) C.
- Ostrea sinuata sinuata* Lamarck. C.26, P.6 (0) C.
- Saxostrea glomerata* (Gould). C.49. (0) N.
- Pecten novaezelandiae rakiura* Fleming. C.20, P.6. (0–20) S.
- Chlamys celator* Finlay. C.14, C.23, C.24, C.31, D.1, P.6. (0–70) C.
- Chlamys suprasilis* Finlay. D.1, P.6 (0) C.
- Chlamys gemmulata radiata* (Hutton). C.14, C.23, C.24, C.31, D.1, P.6. (0–70) S.
- Chlamys dichroa* (Suter). D.1, P.11. (0) S.
- Chlamys zeelandona* (Hertlein). C.23. (33) C.
- Pallium (Mesopeplum) convexum* (O. & G.). C.15, C.24, D.1, D.2, P.11. (30–38) C.
- Cyclopecten transennus* (Suter). C.16. (0) C.
- Lima zealandica* Sowerby. C.23. (33) C.
- Limatula maoria* Finlay. C.14, C.16, C.20, C.23, C.24, C.28, C.29, C.38, D.1, D.2. (0–94) C.
- Escalima regularis* Powell. C.29. (94) C.
- Monia zelandica* (Gray). C.18, P.12. (0–15) C.
- Mytilus aoteanus* Powell. C.11, C.38, D.5, P.6. (0–43) C.
- Aulacomya maoriana* Iredale. C.9, C.11, C.13, C.16, C.22, C.38, C.39, C.49, P.2. (0–43) C.
- Volsella areolatus* (Gould). C.14, C.18, C.23, C.31, P.4. (15–33) C.
- Volsella fluviatilis* (Hutton). D.5, P.13. (0) C.
- Trichomusculus barbatus* (Reeve). C.9, C.16, C.18, C.24, C.28, P.1. (0–50) C.
- Musculus impactus* (Hermann). C.14, C.18, C.31, P.4. (15–22) C.
- Legrandina turneri* Powell. C.20. (20) S.
- Perrierina insulana* Powell. C.13, C.24, P.5. (0–38) E.
- Perrierina subquadrangula* Dell. C.16, C.23. (0–33) C.
- Gaimardia forsteriana* Finlay. C.13, C.16, C.22, P.8. (0–4) S.
- Kidderia rakiura* Powell. C.13, C.16. (0–4) S.
- Costokidderia costata* (Odhner). C.13, P.1. (0–5) An.
- Cardita aoteana* Finlay. C.14, C.16, C.18, C.20, C.23, C.24, C.28, C.29, C.31, C.38, C.49, D.1, P.14 (0–94) C.
- Venericardia purpurata* (Deshayes). C.15, C.20, C.23, C.24, C.28, C.29, D.1, P.6. (20–94) C.
- Pleuromeris marshalli* (Marwick). C.20, C.23, C.24, C.28, C.29, C.31, C.38, P.5. (20–94) C.
- Verticoproneus mytilus* Hedley. C.16. (0) C.

- Condylocardia crassicosta* Bernard. C.16, C.49, P.1. (0) C.
- Condylocardia concentrica* Bernard. C.16, C.49, P.1. (0) C.
- Condylocardia torquata* Marwick. C.16, P.5. (0–10) E.
- Condylocardia pectinata chathamensis* Powell. C.16, C.49, P.1. (0) S.
- Benthocardiella obliquata chathamensis* Powell. C.16, P.1. (0) E.
- Thyasira peroniana peregrina* Iredale. C.29, C.31. (22–94) C.
- Genaxinus cookianus* Fleming. C.28, C.29, C.31. (22–94) C.
- Divaricella huttoniana* Vanatta. C.15, C.20, C.28, C.29, C.30, C.31, C.38, P.6. (0–94) C.
- Zemysia rakiura* Powell. C.20, C.23, C.24. (20–38) S.
- Zemysia zelandica* (Gray). C.14, C.15, C.16, C.20, C.22, C.23, C.24, C.31, C.32, C.38, P.6. (0–43) C.
- Zemysina striatula* Finlay. C.14, C.18, C.23, C.26, C.38, P.1. (0–43) C.
- Zemysina globus* Finlay. C.15, C.24, C.28, C.38. (30–50) C.
- Lucinoma galatheae* Marwick. C.29. (94) S.
- Melliteryx parva* (Deshayes). C.13, C.16, C.23, C.24, C.38, C.49, P.1. (0–43) C.
- Myllitella vivens pinguis* Marwick. C.12, C.13, C.15, C.16, C.28, C.31, C.32, C.46, P.1. (0–50) E.
- Notolepton sanguineum* (Hutton). C.13, C.16, C.20, C.38, C.49, P.5. (0–43) C.
- Notolepton antipodum* (Filhol). C.16, C.20, C.23, C.24, P.5. (0–38) C.
- Mysella unidentata* (Odhner). C.13, C.16, C.49, P.1. (0–6) C.
- Mysella morioria* Dell. C.16, C.24, C.28. (0–50) E.
- Marikellia rotunda* (Deshayes). C.14, C.16, C.23, C.24, P.1. (0–38) C.
- Rochefortula reniformis* (Suter). C. 11, C.13, C.16, C.24, C.31, C.38, C.49, P.2. (0–43) C.
- Rochefortula decapitata* Powell. C.16, Waitangi, fide Powell. (0) S.
- Lasaea hinemoa* Finlay. C.11, C.16, C.49, P.6. (0) C.
- Lasaea rossiana vexata* Finlay. C.16, C.49. (0) E.
- Arthritica bifurca* (Webster). P.5. (10) C.
- Pachykellia concentrica* Powell. C.16, P.5. (0–10) S.
- Cyamiomacra problematica* Bernard. C.13, C.20, C.23, C.31, C.32, P.5. (4–33) C.
- Dosinia (Phacosoma) maoriana* Oliver. C.15, C.24, P.6. (30–38) C.
- Tawera marionae* Finlay. F.1. S.
- Tawera spissa* (Deshayes). C.15, C.23, C.24, C.29, C.31, C.38, P.7. (22–94) C.
- Chione (Austrovenus) stutchburyi* (Gray). C.11, C.24, C.33, D.5, P.13. (0–38) C.
- Protothaca (Tuangia) crassicosta* (Deshayes). P.6. (0) C.
- Paphirus largilliertii* (Philippi). C.11, C.49, D.3, P.6. (0) C.
- Notirus reflexus* (Gray). C.14, C.18, C.26, C.31, C.43, D.1, D.3, P.4. (0–22) C.
- Tellinella charlottae* (Smith). C.28, C.29, C.30. (50–94). C.
- Tellinella huttoni* (Smith). C.31. (22) C.
- Macomona liliana* Iredale. D.1, P.4. (0) C.
- Zearcopagia disculus* (Deshayes). C.11, C.14, C.16, C.26, P.15. (0–15) C.
- Gari lineolata* (Gray). C.11, C.15, C.31, D.1, P.6. (0–30) C.
- Gari stangeri* (Gray). C.11, C.20, P.6. (0–20) C.
- Soletellina nitida* (Gray) (A. Haylock, 1903) C.
- Soletellina* c.f. *siliqua* Reeve. P.6. (0) –
- Ascitellina urinatoria* (Suter). C.15, C.20, C.23, C.24, C.28, P.5. (10–50) C.
- Cyclomacra tristis* (Reeve). P.13. (0) C.
- Longimacra elongata* (Q. & G.). C.14, C.20, C.23, C.24, P.6. (15–38) C.
- Scalpomacra scalpellum* (Reeve). C.13, C.15, C.20, C.28, C.29, C.31, C.38, P.5. (4–94) C.
- Amphidesma (Taria) subtriangulatum* (Wood). C.13, C.20, C.31, P.12. (0–22) C.
- Amphidesma (Paphies) australe australe* (Gmelin). P.6. (0) C.
- Nemocardium (Pratulium) pulchellum* (Gray). C.15, C.24, C.28, C.29, C.30, C.31, C.38. (22–94) C.
- Notocorbula (Anisocorbula) zelandica* (Q. & G.). C.23, C.24, C.28, P.6. (0–50) C.
- Hiatella australis* (Lamarck). C.14, C.18, C.28, C.29, C.39, C.43, P.4. (0–94) C.
- Panopea smithae* Powell. C.24, Owenga, fide Powell. (0–38) C.
- Anchomasa similis* (Gray). C.43, P.4. (0–4) C.
- Pholadidea tridens* (Gray). C.43. (4) C.
- Offadesma angasi* (Crosse-Fischer). P.7. (0) C.
- Cleidothaerus maorianus* Finlay. D.3, P.6. (0) C.
- Thracia vitrea* (Hutton). C.23, C.28, C.38. (33–50) C.
- Haliris (Setaliris) setosa* (Hedley). C.24, C.28, C.29. (38–94) C.
- Myadora antipodum* Smith. C.29. (94) C.

- Myadora subrostrata* Smith. C.15, C.20, C.23, C.24, C.28, C.29, C.38. (20–94) C.
- Fissidentalium zelandicum* (Sowerby). C.28, C.29, C.30. (50–94) C.
- Dentalium (Antalis) suteri* Emerson. C.15, C.28, C.29, C.30, C.31, C.38. (22–94) S.
- Scissurella prendrevillei* Powell. P.5. (0) E.
- Schismope laqueus* Finlay. C.16, C.23, P.5. (0–33) C.
- Scissurona rosea* (Hedley). C.16, P.1. (0) C.
- Sinezona brevis* (Hedley). P.5. (10) C.
- Sinezona cf. antarctica* (Hedley). F.1. An.
- Sinezona laevigata* (Iredale). C.13, C.16, P.1. (0–5) C.
- Sinezona pauperata* Powell. P.5. (10) E.
- Incisura lytteltonensis* (Smith). C.11, C.16, P.1. (0) C.
- Tugali suteri* Thiele. C.16, C.26, C.49, P.1. (0) C.
- Tugali cf. elegans* Gray. C.14, C.23, C.24. (15–38)
- Montfortula chathamensis* Finlay. C.9, C.11, C.16, C.22. (0) E.
- Emarginula striatula* (Q. & G.). C.14, C.16, C.23, C.24, C.28, C.31, C.38, C.49, P.14. (0–50) C.
- Monodilepas skinneri* Finlay. C.11, C.14, C.16, C.38, P.6. (0–43) E.
- Haliotis iris* Gmelin. C.9, C.49, P.15. (0) C.
- Haliotis australis* Gmelin. C.9, C.16, D.4, P.15. (0) C.
- Haliotis virginea morioria* Powell. C.11, C.14, C.16, C.18, C.26, P.15. (0–15) E.
- Trochus huttoni* Cossmann. F.1.
- Trochus (Thorista) viridis* (Gmelin). C.11, C.16, C.26, P.15. (0) C.
- Thoristella chathamensis chathamensis* (Hutton). C.9, C.13, C.16, C.24, C.38, C.49, P.15. (0–43) E.
- Melagraphia aethiops* (Gmelin). C.9, C.16, C.49, D.4, P.2. (0) C.
- Zediloma arida* Finlay. C.9, C.16, C.49, P.2. (0) C.
- Zediloma digna* Finlay. C.9, P.2. (0) C.
- Cantharidus opalus cannoni* Powell. C.11, C.16, P.15. (0) E.
- Micrelenchus caelatus morioria* Powell. C.11, C.13, C.14, C.20, C.24, C.31, C.38, P.5. (0–43) E.
- Micrelenchus tenebrosus tenebrosus* (A. Adams). F.1. C.
- Micrelenchus tenebrosus huttoni* (Smith). F.1. C.
- Micrelenchus dilatatus* (Sowerby). C.11, C.16, C.46, C.49, P.15. (0–3) C.
- Maurea tigris chathamensis* (Dell). Mangare Id., type, C.11, C.49. (0) E.
- Maurea cunninghami pagoda* Oliver. F.1. C.
- Maurea punctulata stewartiana* Oliver. C.11, C.14, C.26, C.29, P.6. (0–94) S.
- Maurea punctulata ampla* Powell, fide Powell. S.
- Maurea pellucida morioria* Powell. C.30. (0–70) E.
- Herpetopoma bella* (Hutton). C.9, C.16, C.49, P.2. (0) C.
- Herpetopoma larochei alacerrima* Dell. C.24. (38) C.
- Margarella fulminata* (Hutton). C.11, C.12, C.16, P.15. (0) E.
- Zethalia zelandica* (A. Adams). F.1. (0) C.
- Antisolarium egenum* (Gould). C.11, C.13, C.20, C.21, C.28, C.29, C.31, C.32, C.38, P.5. (0–94) C.
- Liotella polypleura* (Hedley). C.11, C.16, P.1. (0) C.
- Cyclostrema owengaensis* (Powell). C.13, P.5. (5–10). E.
- Zalipais lissa* (Suter). P.1. (0) C.
- Brookula (Aequispirella) finlayi* Powell. C.16, P.5. (0–10) N.
- Dolicrossea vesca* Finlay. C.16, C.32, P.1. (0–7) C.
- Orbitestella hinemoa* Mestayer. P.1. (0) S.
- Orbitestella toreuma* Powell. C.16, C.23, P.1. (0–33) N.
- Elachorbis subtatei* (Suter). C.13, C.28. (4–50) C.
- Lodderia eumorpha cookiana* (Dell). C.23. (33) C.
- Cirsonella densilirata* Suter. C.23, C.24. (33–38) S.
- Modelia granosa* (Martyn). C.11, C.14, C.16, C.18, C.26, C.43, C.49, D.4, P.15 (0–15) C.
- Argalista fluctuata* (Hutton). C.11, C.23, C.24, C.38, P.1. (0–38) C.
- Astraea heliotropium* (Martyn). C.18, C.24, P.6. (0–38) C.
- Cookia sulcata* (Gmelin). C.16, D.4, P.15. (0) C.
- Radiacmea inconspicua* (Gray). C.11, C.13, C.16, C.26, C.38, C.46, P.15. (0–43) C.
- Notoacmea (Conacmea) parviconoidea* (Suter). P.4. C.
- Cellana strigilis chathamensis* (Pilsbry). C.9, C.11, C.16, C.26, C.49, D.4, P.15. (0) E.
- Melarhappe oliveri* Finlay. C.9, C.16, C.26, C.49, P.15. (0) C.
- Melarhappe cincta* (Q. & G.). C.9, C.22, D.3, P.15. (0) C.
- Macquariella aucklandica* Powell. C.11, C.13, C.16, C.32, C.38, P.1. (0–43) S.

- Zelaxitas micra* Finlay. C.11, C.16, P.1. (0) C.
Zelaxitas cystophora Finlay. C.11, (0) C.
Zelaxitas fordlandica Fleming. C.16. (0) S.
Risellopsis varia (Hutton). C.9, C.12, C.13, C.16, C.22, C.26, C.38, P.15. (0–43) C.
Haurakia hamiltoni (Suter). C.16, C.32, P.1. (0–7) C.
Notosetia neozelanicus (Suter). C.20, C.23, C.38, P.1. (0–43) S.
Notosetia infecta (Suter). C.16, C.38, P.1. (0–43) C.
Notosetia verecunda (Suter). P.1. (0) S.
Notosetia lampra (Suter). P.5. (10) C.
Notosetia lubrica (Suter). P.5. (10) S.
Notosetia atomaria Powell. C.38, P.1. (0–43) E.
Notosetia exaltata Powell. C.24, P.5. (10–38) E.
Estea minor (Suter). C.16, C.38, C.49, P.2. (0–43) C.
Estea rekohuana Powell. C.13, C.16, C.32, C.38, C.49, P.2. (0–43) S.
Estea guesti Powell. C.13, C.16, C.32, C.38, C.49, P.1. (0–43) E.
Estea porrecta Powell. C.13, C.15, C.20, C.23, C.38, P.1. (0–43) E.
Estea morioria Powell. P.5. (10) E.
Estea cf. insulana Marwick. P.5. (10).
Estea gracilispira Powell. C.16, C.23, P.5. (0–33) E.
Estea impressa (Hutton). C.38, P.5. (10–43) C.
Linemeranaclurgi Powell. C.20, C.23, C.38, P.5. (10–43) An.
Larochella alta Powell. C.16, P.5. (0–10) C.
Merelina maoriana Powell. C.13, C.16, C.31, C.32, C.38, P.1. (0–43) C.
Merelina waitangiensis Powell. P.1. (0) E.
Anabathron foliatum (Suter). C.16, P.5. (0–10) S.
Brookesena succincta (Suter). C.16. (0) S.
Scrobs hedleyi (Suter). C.16, C.49, P.2. (0) C.
Austronoba martini Finlay. C.11, C.13, C.16, C.32, C.38, C.49, P.2. (0–43) E.
Subonoba fumata (Suter). C.16, P.1. (0) C.
Subonoba morioria Powell. C.13, C.16, P.1. (0–6) E.
Subonoba cf. paucicostata Powell. P.1. (0).
Subonoba inornata Powell. C.16, P.2. (0) E.
Dardanula olivacea (Hutton). C.11, C.13, C.16, C.32, C.38, C.49, P.2. (0–43) C.
Dardanula limbata (Hutton). C.49, P.1. (0) C.
Dardanula roseola (Iredale). C.23, C.38, C.49, P.5. (0–43) C.
Skenella pfefferi Suter. C.11, P.3. (0) C.
Rissoina chathamensis (Hutton). C.9, C.11, C.16, C.38, C.49, P.1. (0–43) C.
Omalogyra fusca Suter. C.11. (0) C.
Neojanacus perplexus Suter. C.15, C.28, C.29. (30–94) C.
Capulus calcareus Suter. C.29. (94) C.
Zegalerus tenuis (Gray). C.28, C.29. (50–94) C.
Zegalerus crater Finlay. F.1. E.
Sigapatella novaezelandiae (Lesson). C.13, C.16, C.31, C.38, C.49, P.15. (0–43) C.
Zeacumantus subcarinatus (Sowerby). C.11, C.16, C.49, P.15. (0) C.
Lyroseila chathamensis (Suter). C.16, C.23, C.49, P.1. (0–33) C.
Alipta crenistria (Suter). C.37. (30) C.
Notosinister (Teretriphora) huttoni Suter. P.5. (10) C.
Maoricolpus roseus (Q. & G.). C.11, C.14, C.16, C.23, C.49, P.15. (0–33) C.
Zeacolpus (Stiracolpus) knoxi Marwick. C.15, C.20, C.28, C.29. (20–94) E.
Caecum digitulum Hedley. C.16, P.2. (0) C.
Novastoa lamellosa (Hutton). C.16, C.49, P.4. (0) C.
Serpulorbis zelandicus (Q. & G.). C.49, P.4. (0) C.
Pyxipoma weldii (Ten. Woods). F.1. (0) N.
Trichosirius inornatus chathamensis Finlay. C.15, D.1, P.1. (0–30) E.
Cabestana spengleri (Perry). C.11, D.1, P.4. (0) C.
Cabestana waterhousei segregata Powell. P.6. (0) N.
Argobuccinum tumidum (Dunker). C.11, C.23, C.24, D.1, P.6. (0–38) C.
Fusitriton laudandus Finlay. C.29. (94) C.
Xenophalium (Xenogalea) powelli Finlay. P.10. (0) N.
Xenophalium (Xenogalea) finlayi Powell. C.29. (94) S.
Tanea zelandica (Q. & G.). C.11, C.14, C.28, C.29, C.30, C.31, C.38, C.49, P.6. (0–94) C.
Uberella vitrea (Hutton). C.12, C.15, C.20, C.23, C.28, C.29, C.32, P.1. (0–94) S.
Ellatrivia memorata Finlay. F.1. N.
Janthina janthina L., D.1. (P)
Janthina exigua Lamarck. D.1, P.1. (P).
Cirsotrema (Tioria) forresti Dell. C.29. (94) C.
Balcis archeyi Finlay. C.13, C.16, P.1. (0–6) E.
Buccinulum waitangiensis Powell. C.9, C.11, C.26, C.49, P.1. (0) E.
Buccinulum pallidum Finlay. C.49. (0) C.
Buccinulum (Evarnula) characteristica (Finlay). C.11, C.14, C.16, P.15. (0–15) E.

- Buccinulum (Evarnula) marwicki* Finlay. C.16, C.26, P.15. (0) S.
- Buccinulum (Euthrena) bicincta* (Hutton). C.9, C.11, C.14, C.16, C.26, C.49, P.15. (0–15) E.
- Austrofusius chathamensis* Finlay. C.11, C.49, P.6. (0) C.
- Austrofusius glans* Bolten. C.11, C.28, C.29, C.30, C.31, C.38. (0–94) C.
- Penion chathamensis* Powell. Kaingaroa. E.
- Cominella maculosa* (Martyn). C.9, C.11, C.16, C.26, C.49, P.15. (0) C.
- Cominella (Acominia) adspersa* Bruguiere. C.11, C.43, C.49, P.15. (0–4) C.
- Cominella (Cominista) glandiformis* (Reeve). C.33, P.6. (0) C.
- Cominella (Eucominia) iredalei* (Finlay). C.11, C.14, P.6. (0–15) E.
- Cominella (Eucominia) ellisoni consobrina* Powell. P.6. (0) E.
- Fax mirabilis nuptialis* Dell. C.29. (94) C.
- Proximitra banksi* Dell. C.29. (94) C.
- Austrorimitra rubiginosa* (Hutton). C.11, C.14, C.16, C.49, P.15. (0–15) S.
- Zemitrella finlayi* Powell. C.13, C.16, C.23, C.32, C.49, P.1. (0–33) E.
- Paxula subantarctica* (Suter). P.15. An.
- Paxula allani* Finlay. C.16, C.49, P.15. (0) E.
- Macrozafra subabnormis saxatilis* (Murdoch). C.49, P.1. (0) C.
- Liratilia conquisita chathamensis* Dell. C.23, C.24. (33–38) E.
- Poirieria zelandica* (Q. & G.). C.28, C.30, P.6. (0–70) C.
- Zeatrophon ambiguus* (Philippi). C.11, C.24, C.49, P.6 (0–38) C.
- Zeatrophon caudatinus* Finlay. C.28, C.29. (50–94) N.
- Xymene plebejus* (Hutton). F.1. C.
- Axymene traversi traversi* (Hutton). C.11, C.14, C.16, C.26, C.38, C.49, P.15. (0–43) E.
- Terefundus (Minortrophon) crassiliratus* (Suter). C.16, C.20. (0–20) S.
- Haustrum haustorium* (Gmelin). C.9, C.16, C.26, C.49, D.4, P.2. (0) C.
- Neothais scalaris* (Menke). P.6. (0) C.
- Lepsithais squamatus* (Hutton). C.11, C.16, C.22, C.26, P.6. (0) C.
- Lepsiella scobina scobina* (Q. & G.). C.9, C.16, P.6. (0) C.
- Lepsiella scobina albomarginata* (Deshayes). C.11, C.26. (0) S.
- Marginella (Glabella) pygmaea* Sowerby. P.1. (0) C.
- Marginella (Volvarina) albescens* Hutton. C.23, C.24. (33–38) S.
- Marginella (Volvarinella) aoteana* Powell. C.23, P.2. (0–33) C.
- Marginella (Volvarinella) cairoma* Brookes. C.16, C.32, P.2. (0–7) C.
- Pachymelon (Palomelon) wilsonae* Powell. P.6. (0) An.
- Antiguraleus otagoensis* Powell. C.29. (94) C.
- Neoguraleus murdochi* (Finlay). C.16, C.49. (0) C.
- Liracraea otakauica* Powell. C.28. (50) S.
- Liracraea odhneri* Powell. C.49 (0) C.
- Phenatoma novaezelandiae* (Reeve). C.28. (50) C.
- Cavolina telemus* (L.). C.30 (70) P.
- Odostomia vaga* Laws. C.11, C.16. (0) C.
- Odostomia incidata* Suter. C.11, C.15, C.28, C.29. (0–94) N.
- Odostomia cryptodon* Suter (fide Laws). C.
- Agatha georgiana* (Hutton). C.29. (94) C.
- Gumina dolichostoma* (Suter). C.13, C.20, C.23. (4–33) C.
- Linopyrga rugata* (Hutton). C.11, C.13, C.16, C.28, C.38. (0–50) C.
- Besla waitangiensis* Laws. C.16. (0) E.
- Siogamaia morioria* Laws. C.13, C.49. (0–6) E.
- Graphis blanda* (Finlay). P.5. (10) C.
- Chemnitzia campbellica* Odhner. C.16, C.20, C.49. (0–20) S.
- Chemnitzia owenga* Laws. C.31. (0–22) E.
- Chemnitzia mitis* Laws (fide laws). (10) N.
- Striarcana cryptolira* Laws. C.13, C.16, D.1. (0) C.
- Turbonilla moorei* Laws. C.28, C.29. (50–94) S.
- Retusa oruaciensis* (Webster). C.13, C.16, C.23, C.28, C.38, P.1. (0–50) C.
- Cylichnina striata* (Hutton). C.16, C.20, C.32, P.1. (0–20) C.
- Philine constricta* Murdoch and Suter. C.29, P.5. (10–94) C.
- Aplysia brunnea* (Hutton). F.1. C.
- Bouvieria aurantiaca* (Risso). P.2. (0) C.
- Bouvieria ornata* (Cheeseman). P.6. (0) N.
- Ctenodoris flabellifera* (Cheeseman). P.2 (0) N.
- Fiona pinnata* (Escholtz) (fide Suter). C.
- Marinula chathamensis* Finlay. C.9, C.49, P.1. (0) E.
- Leuconopsis obsoleta* (Hutton). C.9, C.11, C.16, P.2. (0) C.
- Siphonaria zelandica* Q. & G. C.9, C.16, C.22, C.26, C.39, C.49, P.15. (0) C.

- Siphonaria cookiana* Suter. C.16, C.49, P.15 (0) C.
- Siphonaria australis* Q. & G. C.16. (0) C.
- Gadinia nivea* Hutton. C.9, C.11, C.16, C.26, C.39, P.2. (0) C.
- Onchidella nigricans* (Q. & G.). P.2. (0) C.
- Icoplax chathamensis* n.sp. C.14, C.16, C.18. (0–15) E.
- Maorichiton schauinslandi* (Thiele). C.16, C.26, C.39, P.2. (0) E.
- Diaphoroplax biramosa* (Q. & G.). C.22, C.26, P.15. (0) C.
- Notoplax violacea* (Q. & G.). C.26, C.49, P.15. (0) C.
- Craspedochiton rubiginosus* (Hutton). C.24. (38) C.
- Cryptoconchus porosus* (Burrow). C.26, P.15. (0). C.
- Ischnochiton maorianus* Iredale. C.11, C.26, C.49, P.13 (0) C.
- Sypharochiton pelliserpentis* (Q. & G.). C.9, C.22, C.26, C.49, D.4, P.15. (0) C.
- Onithochiton neglectus* Rochebrunc. C.11, C.26, C.39, C.43, C.49, P.15. (0–4) C.
- Spirula spirula* L. P.4. P.
- Sepioloidea pacifica* (Kirk). C.25, C.
- Nototodarus sloanei sloanei* (Gray). C.22. C.
- Argonauta argo* L. F.1. P.
- Argonauta nodosa* Solander. C.49, P.15. P.
- Octopus maorum* (Hutton). C.16, P.4. (0) C.
- Robsonella australis* (Hoyle). C.23. (33) C.

The nudibranchs obtained by the expedition were sent to Dr R. L. C. Pilgrim for identification and report. For the sake of completeness the writer can record that *Archidoris wellingtonensis* (Abraham), *Rostanga rubicunda* (Cheeseman) and *Glossodoris aureomarginata* (Cheeseman) were identified in the field.

SYSTEMATICS

Kidderia rakiura Powell, 1939

1939 *Kidderia rakiura* Powell, Rec. Auck. Inst. Mus. 2: 223, pl. 48, fig. 1.

Chatham Island shells can be matched with Stewart Island topotypes which are rather variable in outline.

Myllitella vivens pinguis Marwick, 1928

1928 *Myllitella pinguis* Marwick, Trans. N.Z. Inst. 58: 467, figs. 68, 69, 70.

This species was first described as a Pliocene fossil from Titirangi, Chatham Islands. Finlay (1928, p. 274) recorded the recent Chatham Island form under this name, listing a number of differences between this and the mainland *M. vivens* Finlay. The only one of these differences which seems constant is the stronger hinge in *pinguis* and this would seem to separate the two at all times. The strength and spacing of the ornamentation seem rather variable in both forms. The Chatham Island form seems best classed as a subspecies of *vivens*.

Panopea smithae Powell, 1950

1950 *Panopea smithae* Powell, Rec. Auck. Inst. Mus. 4: 78.

When Powell differentiated the two living species of *Panopea* from New Zealand he recorded *smithae* from Owenga, Chatham Islands. Finlay's

specimen of "*Panopea zelandica*" from the Chathams proves to be *smithae* and this was the only species collected by the Chatham Island Expedition. The records of *P. zelandica* Q. & G. from the Chathams should therefore be replaced by *smithae* Powell.

Corbula haastiana Hutton, 1878

1878 *Corbula haastiana* Hutton, J. de Conch. 26: 44.

1913 *Corbula gibba* Olivi; Suter, Man. N.Z. Moll. p. 1008.

1928 *Corbula haastiana* Hutton; Finlay, Trans. N.Z. Inst. 59: 281.

The specimen upon which Finlay's record of *haastiana* from the Chathams is based was apparently ex Canterbury Museum. From a similar specimen Hutton described *haastiana*. Dr A. W. B. Powell and the writer recently examined the specimen in the Finlay Collection in the Auckland Museum, comparing it specifically with specimens of *Corbula gibba* Olivi from the Mediterranean. It agrees in every particular except that the left valve is somewhat distorted. It is certain that these records originate from a misplaced label or some other accident to a lot of Mediterranean *C. gibba* in the early Canterbury Museum collections. The record should be expunged from the Chathams fauna.

Montfortula chathamensis Finlay, 1928

1928 *Montfortula chathamensis* Finlay, Trans. N.Z. Inst. 59: 235, figs. 34, 35.

The Chatham Islands Expedition collected this species alive and thus dispelled any final uncertainty about the true provenance of this species. Specimens were found living under stones resting on sand in mid-tidal pools at Glory Bay, Pitt Island and at Owenga and other live specimens were collected on the Sisters. This check on the fact that *Montfortula* lives at the Chathams is particularly gratifying since the true position of the only other species recorded from New Zealand, *Montfortula lyallensis* Mestayer, is still in doubt. The type of this latter species came from beach drift at Lyall Bay and no other specimens have been recorded in the literature. However, in the Dominion Museum collections, two other specimens have come to light, one labelled "Muritai, Wellington", and the other amongst a small collection labelled "Wellington Harbour, in 7-8 fm". Although the original description of *lyallensis* clearly distinguished it from the Australian *M. conoidea* (Reeve) by the uneven development of the ribs, comparison of specimens shows that shells of this type do occur amongst Australian populations and one of the other "New Zealand" shells is much more like typical Australian shells. The three "New Zealand" shells as a group cannot be adequately separated from the Australian *M. conoidea*.

It is a little early to be completely certain that a *Montfortula* does not occur rarely in the vicinity of Wellington, but intensive intertidal collecting and dredging in Wellington Harbour and Cook Strait over the last ten years has not brought another specimen to light.

It is probable that the three records all date from the same period and are due either to the accidental dumping of Australian shells in the area, to accidental mixing of specimens or labels, or the whole situation may have developed as the result of a deliberate hoax.

Emarginula striatula Q. & G. 1834

1834 *Emarginula striatula* Q. & G. Voyage d'Astrolabe, Zoology 3: 332, pl. 48, figs. 21, 22.

1913 *Emarginula striatula* Q. & G. Suter, Man. N.Z. Moll. p. 98, pl. 8, fig. 5.

1928 *Emarginula striatula valentior* Finlay, Trans. N.Z. Inst. 59: 235, figs. 56, 57.

The subspecies *valentior* was erected by Finlay for the Chatham Island and South Island shells. The main points of difference from the nominate form were given as more robust habit, shell higher and thicker with coarser sculpture, a shorter shell, more spread out posteriorly with the apex more centralised and notably higher. Much more extensive collections of *Emarginula* are now available from a range of depths and covering a very wide geographical area. These samples show a great range of variation, variation which the writer believes is mainly ecological in origin. Powell in his most recent Checklist (1957, p. 85) has simply listed *striatula* = *valentior* Finlay. This course the writer would also adopt. Measurements for a few representative samples are given below to show the main range of variation. A small series from *Discovery II* Station 2772 on the Discovery Bank in 140 m (77 fm) are unique as regards New Zealand examples in having the apex curved backward beyond the posterior margin of the aperture. There is only one complete adult shell but a number of broken examples and a series of juveniles show that this feature is fairly constant. Better series may show that this represents a new form but some deeper water mainland shells approach it fairly closely.

In drawing up comparisons of populations three Indices have been calculated: Height Index (the height expressed as a percentage of the length); Apex Index (the distance from the apex to the anterior end expressed as a percentage of the length); and the Width Index (the width expressed as a percentage of the length).

RANGES OF HEIGHT, APEX AND WIDTH INDICES FOR 7 SAMPLES OF *Emarginula* (MEANS IN PARENTHESES)

LOCALITY (No. of specimens in parentheses)	HEIGHT INDEX	APEX INDEX	WIDTH INDEX
Chathams (13)	41-57 (48)	67-88 (74)	65-88 (73)
Mernoo Bank (5)	36-53 (45)	58-70 (65)	71-75 (73)
North Auckland (5)	40-55 (46)	63-77 (70)	66-76 (72)
Codfish Island (3)	40-45 (43)	58-70 (65)	71-75 (73)
Discovery Bank (1)	53	105	62
Cook Strait in 75 fathoms (4)	40-66 (52)	70-81 (78)	67-73 (69)
Cook Strait in c. 150 fathoms (4)	46-57 (52)	69-86 (79)	73-82 (77)

Tugali suteri Thiele, 1916

- 1916 *Emarginula (Tugalia) suteri* Thiele. Conch. Cab. Bd. 2. Abth. 4a: 165, pl. 12, figs. 17, 18.
- 1917 *Tugalia bascauda* Hedley, Proc. Linn. Soc. N.S.W. 41: 698, pl. 42, fig. 47.
- 1927 *Tugali suteri* Thiele; Finlay, Trans. N.Z. Inst. 57: 346.
- 1927 *Tugali suteri bascauda* Hedley; Finlay, Trans. N.Z. Inst. 57: 346.

The two names listed above were proposed independently by Thiele and Hedley. Thiele described *suteri* from the Chatham Islands while Hedley designated Wellington as the type locality for his *bascauda*. Finlay (1927, p. 344) noted these facts but stated that the two forms were distinct. Later (p. 346) he listed *bascauda* as a subspecies of *suteri*. Finlay stated "the Moriorian form regionally differs from the mainland shell in greater elongation, generally more parallel sides and squarely, not narrowly rounded anterior end". This basis for differentiation seems to have been generally accepted since. Critical examination of large numbers of shells from the Chathams and from the mainland shows that these distinctions cannot be sustained. Hedley's name must therefore fall into the synonymy of *suteri* Thiele.

Tugali cf. elegans Gray, 1843

A shell tentatively compared with *elegans* was recorded from the Chathams by Finlay (1928, p. 235). A number of specimens were obtained by the Chatham Island Expedition. Unfortunately the systematics of the mainland form requires revision and the true identity of the Chathams form cannot be properly determined until such revision is carried out. Some of the Chatham Island specimens are very close to *elegans* but some seem closer to an as yet undescribed deep water form known from Cook Strait to Otago. The much more representative collections now available show that Finlay's statement of the problem (1927, pp. 344-5) is an over-simplification. The various forms seem much more variable than has been indicated in the past and not only geographic, but also bathymetric and ecological variation will have to be taken into account. In addition the exact identity of *elegans* must be fixed. In the meantime the Chathams form is best treated as above.

Localities

C.I.E. Sta. 14, off Hanson Bay in 15 fm; Sta. 23, off Sisters in 33 fm; Sta. 24, in 38 fm.

Maurea punctulata stewartiana (Oliver, 1926)

- 1926 *Callistoma (Mauriella) punctulatum stewartianum* Oliver, Proc. Mal. Soc. 17: 109.

In 1950 the writer indicated (Dell, 1950, p. 47) that the Chatham Island form of *punctulata* possibly represented a new subspecies. Much additional material from the South Island has shown that the Chathams shells cannot be separated from *M. punctulata stewartiana* (Oliver) (= *urbanior* Finlay).

Radiacmea inconspicua Gray, 1843

- 1843 *Patella inconspicua* Gray, in Dieffenbach, Travels in New Zealand 2: 244.
- 1873 *Fissurella rubiginosa* Hutton, Cat. Mar. Moll. N.Z. p. 42.
- 1883 *Acmaea cingulata* Hutton, N.Z. J. Sci. 1: 477.
- 1913 *Acmaea cingulata* Hutton; Suter, Man. N.Z. Moll. p. 63.
- 1913 *Acmaea rubiginosa* (Hutton); Suter, Man. N.Z. Moll. p. 65.
- 1926 *Radiacmea inconspicua inconspicua* (Gray); Oliver, Trans. N.Z. Inst. 56: 565.
- 1926 *Radiacmea inconspicua rubiginosa* (Hutton); Oliver, Trans. N.Z. Inst. 56: 565.

The relationships of the shells described as *inconspicua* Gray and *rubiginosa* Hutton have always been difficult to decide. Suter (1913) recorded *rubiginosa* from the Chathams (type locality) and *inconspicua* (as *cingulata* Hutton) from the mainland only. Oliver restricted *rubiginosa* to the Chathams and placed it as a subspecies of *inconspicua* (Gray), stating, "This subspecies differs from the New Zealand form in its broader outline, more central apex, more elevated form and more prominent ribs." In the diagnoses of the two forms he indicated that *inconspicua* had more ribs than *rubiginosa*.

Counts of the number of ribs on series of comparable size from the Chathams and the Cook Strait area show that there is little evidence to bear out the difference:

In ten shells from Kaingaroa, Chatham Islands, the number of principal ribs ranges from 15 to 24 (mean 19) and ten shells from Houghton Bay, Cook Strait, have from 17 to 21 (mean 18). Some large shells from the mainland add many additional ribs by interpolation. Chathams shells do not seem to grow to this large size, but there are shells with comparable rib development.

The other differences cited by Oliver do not seem to be consistent. There is very considerable variation in shell proportions and in the relative position of the apex in populations both from the

mainland and from the Chathams. It would be very difficult, if not impossible, to distinguish populations of the two forms.

Cellana strigilis chathamensis (Pilsbry, 1891)

- 1891 *Acmaea chathamensis* Pilsbry, Man. Conch. (1st Ser.) 13: 56, pl. 35, figs. 43–46.
1933 *Cellana chathamensis* (Pilsbry); Powell, Rec. Auck. Inst. Mus. 1: 196, pl. 36, figs. 1–4.
1955 *Cellana strigilis chathamensis* (Pilsbry); Powell, Cape. Exped. Ser. Bull. 15: 70.

As Powell has noted, this is the only Cellanid represented at the Chathams. In shape it is very like *strigilis redimiculum* (Reeve) and some adults are very close to the Subantarctic *strigilis strigilis* (H. & J.) in general appearance. Powell's technique (1955, p. 66) for using juvenile colour patterns as viewed by transmitted light in separating forms of *Cellana* has supplied an additional check on relationships in this group. Juvenile colour patterns in *chathamensis* are rather variable. Some are like that figured by Powell for *strigilis redimiculum*, others lack the anastomosing dark lines and may have the dark radial lines rather variably disposed. Some have a colour pattern very similar to that shown by *C. strigilis bollonsi* Powell from the Antipodes. It would not be surprising if the *Cellana* populations at the Chathams were subjected to a mixture of elements.

Cellana strigilis chathamensis is common on rocky coastlines throughout the Chathams, often extending from high tide mark almost to low tide mark neaps.

Estea rekohuana Powell, 1933

- 1933 *Estea rekohuana* Powell, Rec. Aust. Inst. Mus. 1: 199, pl. 35, fig. 9.
1955 *Estea rekohuana* Powell, Cape Exped. Ser. Bull. 15: 84.

This species, originally described from the Chatham Islands and considered endemic, has been recorded by Powell from the Auckland and Antipodes Islands. It also occurs quite commonly at Stewart Island.

Magilina sp. Finlay, 1928

- 1928 *Magilina* sp. probably new. Finlay, Trans. N.Z. Inst. 59: 45.

The specimen upon which Finlay based this record consists of a battered few whorls of coiled tube which could as well be a worm tube as a vermetid. The name should be removed from checklists of the New Zealand fauna. If better specimens are obtained it can be considered anew.

Genus **Buccinulum**

The Chatham Island Expedition collections of *Buccinulum* are the best collection of living shells yet made of this genus from the Chathams. Additional collections of live shells have not made the elucidation of the species present at all easier.

Finlay (1928) recorded the following forms from the Chathams:

- Buccinulum lineum* (Martyn)
Buccinulum pallidum Finlay
Chathamina characteristica Finlay
Evarnula marwicki Finlay
Euthrena strebeli (Suter)
Euthrena bicincta (Hutton)

Amongst the paratypes of *characteristica* he included a wide form like the type and also a narrow form approaching *lineum* in general proportions. He does not mention this difference in shape specifically but since he illustrated two paratypes, one of each type, and gave measurements for both, he was evidently putting on record his belief that this form was variable as regards comparative width of the shell.

Powell (1929) in a general revision of *Buccinulum* listed the following, synonymising *Chathamina* Finlay with *Evarnula* Finlay and treating both *Evarnula* and *Euthrena* as subgenera:

- Buccinulum lineum* (Martyn)
Buccinulum pallidum Finlay.
B. (Evarnula) characteristica (Finlay).
B. (Evarnula) marwicki marwicki (Finlay)
B. (Euthrena) bicinctum (Hutton)

He also (1929, p. 81) commented upon the apparent variability of *bicinctum*, some specimens being typically banded, some with traces of banding and some uniformly dark and others pale buff or light brown.

In Powell's treatment of the Chatham Island molluscan fauna (1933) he listed the same five species but described the forms previously recorded as *lineum* as a new species, *waitangiensis*. This species, based on material from Waitangi Beach, was diagnosed as being proportionately wider than *lineum* with the colour lines always fewer than in *lineum*.

Collections made by the Chatham Island Expedition bear out the extreme variability of *bicinctum* both as regards size and colour pattern.

The largest specimen the writer has seen comes from Owenga and is just under 40 mm in length. A population from Port Hutt is very dark with the dark bands showing through in most specimens, the largest specimen being about 18 mm in length. A large series from Kaingaroa is uniformly pale in colour with some showing the dark bands very strongly, some with them only weakly developed and some perfectly plain. This series is between 12 and 15 mm in length. If this range of variation is represented within one biological species, and it seems most probable that it is, then it would seem high time that some named species complexes within the genus should be re-examined from this viewpoint. This would seem particularly necessary for Stewart Island, where the presently accepted nomenclature does not adequately mirror what actually occurs in nature.

Of the other species recorded from the Chathams *B. pallidum* Finlay does not appear to be important biologically. The other three species recorded, *waitangiensis*, *characteristica* and *marwicki*, all appear to intergrade although supposedly two subgenera are represented. Firstly study of a series of *waitangiensis* does not bear out Powell's contention that this species always has fewer spiral colour markings than *lineum*. In quite a number of cases it has more and in some cases the canal is oblique to the left and recurved at the tip so that it approaches the subgenus *Evarnula* and indeed is coming very close to *multilineum* Powell. This form is, however, connected to Finlay's narrow form of *characteristica* which in turn intergrades with "typical" *characteristica*. Nor is it always easy to distinguish some forms of *characteristica* from Chatham Island specimens of *marwicki*. It is obvious that before these problems can be solved much more field work must be carried out on the Chathams and many more studies on a population basis carried out on the mainland. It is probable that repeated invasions of *Buccinulum* stock from the mainland are preventing a clear-cut speciation pattern to develop. In the meantime the species will be accepted in this broad sense for record purposes, while recognising that specific limits are hard to define.

Cominella (Acominia) Finlay

Cominella (Acominia) adpersa Brug has usually been divided into three subspecies. Powell (1957, p. 105) lists the nominate form from the Aupourian and Cookian, *adpersa melo* from the

Aupourian and *adpersa nimia* Finlay from the Moriorian. The species *adpersa* has never been considered critically as a group of subspecies. The species is a very plastic one responding markedly to differences in ecological conditions. The status of both *melo* and *nimia* as possible geographical subspecies depends very largely upon the degree of variation present in the nominate form. It is not intended to study this fully at the present time, but it is necessary to study the relationship between the Chatham Island populations (the subspecies *nimia* Finlay) and the mainland shells.

Finlay claimed (1928, pp. 254-5) that the Chatham Island shells could be separated from mainland examples by the prominent, wide spire, a half to three quarters the height of the aperture, by the shape of the 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°, the angulation remaining submedial and very prominent on the body whorl. In addition the last whorl is much elongated with a higher aperture and better developed umbilicus.

The Chathams populations do seem fairly consistent amongst themselves but they do not differ very markedly from some mainland populations, especially some from the vicinity of Cook Strait. When these populations are carefully compared the relative height of the aperture appears to be the only possible difference and measurement shows that this difference is very slight. If the height of the aperture is expressed as a percentage of total height a comparative aperture index is obtained. For ten specimens from Owenga, Chatham Islands, these indices ranged from 58 to 67 (mean 62.5), while for ten specimens from the Wellington area these ranged from 58 to 64 (mean 61.6). These indices do not indicate very great distinctions between the two forms. Certainly it would be very difficult to distinguish populations. The writer believes that as a result of such comparisons the Chatham Island subspecies *nimia* Finlay cannot be sustained.

Eucominia iredalei Finlay, 1928

1928 *Eucominia iredalei* Finlay, Trans. N.Z. Inst. V. 59: 255. Figs. 15, 16.

It is not easy to draw specific limits amongst the forms of *Eucominia*. There is either very wide variation amongst populations or there are more numerous species and subspecies than we have recognised previously. There appear to be two

forms at the Chathams within the *iredalei* complex, in addition to *ellisoni consobrina* Powell. The wide typical form is common in the shell bed at Owenga but the only live specimens obtained by the Chatham Island Expedition (at Station 14) are much narrower shells although agreeing with *iredalei* in sculptural details. A similar situation seems to occur amongst *Eucominia nodicincta* (von Martens) from the Auckland Islands, a specimen collected by the writer from the debris on Derry Castle Reef, Enderby Island, being much narrower than the typical form. It is probable that these narrow forms represent another line of development altogether but the material is still rather meagre and until better collections of live shells from the Chathams are available it is impossible to determine if the wider typical form is extinct.

	Height (mm)	Width (mm)
Shell bed, Owenga	52.2	32.0
” ” ”	53.7	31.3
” ” ”	53.5	29.4
” ” ”	45.0	27.4
Station 14	46.3	25.3
” ”	34.5	18.8

Lepsithais squamatus (Hutton, 1878)

- 1878 *Polytropa squamata* Hutton, J. de Conchyl. 26: 19.
 1913 *Trophon squamatus* Hutton; Suter, Man. N.Z. Moll. p. 409, pl. 19, fig. 3.
 1927 *Lepsiella squamata* Hutton; Finlay, Trans. N.Z. Inst. 57: 421.
 1929 *Lepsithais squamata* Hutton; Finlay, Trans. N.Z. Inst. 59: 258.
 1929 *Lepsithais youngi* Finlay, Trans. N.Z. Inst. 59: 259.

There is still some doubt (Powell, 1955, pp. 106–7) as to the specific limits of *squamatus* Hutton and *lacunosus* (Bruguiere). It is highly probable that only one variable species is present on the mainland. It is quite certain, however, that Finlay's *youngi* from the Chathams cannot be distinguished from *squamatus*. Finlay stated of *youngi*, "Shell related to *squamata* (Hutton) but very much larger and more solid, even rivalling *lacunosa* in size." From this it is certain that Finlay had only small specimens of *squamata* to compare with his Chathams shells. Specimens of *squamata* up to 36 mm in length from the Wellington area match comparably sized specimens from the Chathams completely, and specimens from Stewart Island are indistinguishable from the larger Chathams shells. The Chathams form appears to grow a little larger while retaining the

characters of *squamatus* but the difference is not even of subspecific value.

Paxula sp.

- 1928 *Paxula* n.sp. aff. *leptalea* (Suter); Finlay, Trans. N.Z. Inst. 59: 256.

Finlay recorded a form as showing affinity with *leptalea*. Powell (1923, pl. 36, fig. 5) has figured the type of *leptalea* and the Chathams shells prove to be much more elongate. No specimens in good condition are available and it seems best to leave this form in the meantime until the group can be revised for the whole of New Zealand.

Pachymelon (Palomelon) wilsonae Powell, 1933

- 1933 *Pachymelon (Palomelon) wilsonae* Powell, Rec. Auck. Inst. Mus. 1: 204, pl. 36, fig. 18.

This species was described from a well preserved dead shell and a fragment cast ashore at Owenga. Powell has subsequently (1955, p. 111) recorded it also from Enderby Island, Auckland Islands. It was not taken by the Chatham Island Expedition but is probably a deep water form.

Icoplax chathamensis n. sp. Fig. 1

Shell of medium size, depressed. Girdle narrow, set with microscopic close packed scales, colour salmon pink with irregular transverse sutural bands of cream. Anterior valve rounded, tegmentum ornamented with low, rounded, nodulous bosses arranged in 10 irregular rows, the rows marked off by shallow incised grooves which are set with very distinct, minute dark eyes. Articulation with 8 short slits. Intermediate valves narrow, jugum smooth, central area sculptured with about 6 rather indistinct grooves, longer and better marked towards the lateral margins, becoming very indistinct towards the centre. Lateral areas with two rows of low nodules, the space between them set with minute eyes. Sutural laminae broad, subtriangular. Posterior valve small, no true umbo, posterior edge channelled by a row of nodules near the posterior margin, a row of eyes in the channel. Sutural laminae broad, the sinus area filled by a wide subsidiary plate. Articulation entire. Colour pinkish, with irregular darker markings, the nodules white.

Holotype

(M.12814), a disarticulated specimen in the Dominion Museum; a dried paratype in Canterbury Museum.

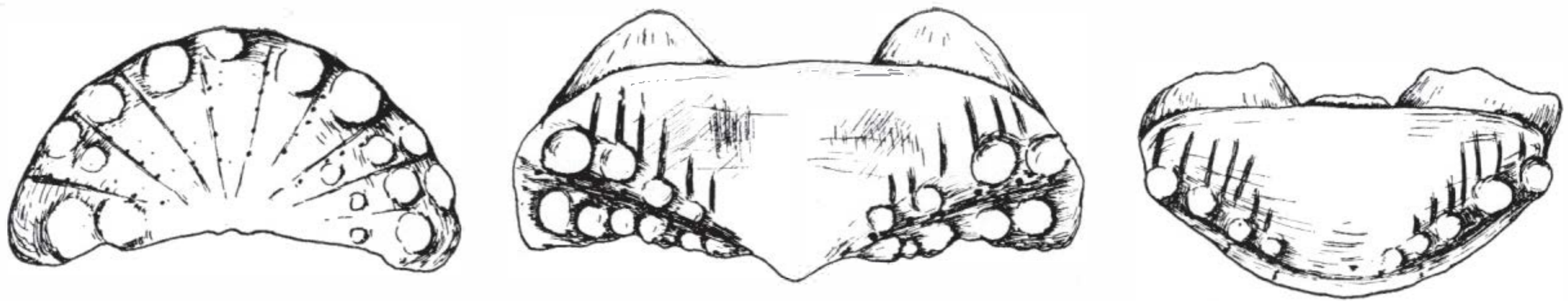


Fig. 1: Disarticulated valves of holotype of *Icoplax chathamensis* n.sp.

Locality

Chatham Island Expedition Sta. 18, 43°41'S., 176°48'E., off Cape Pattison, Chatham Islands in 15 fm (type); Chatham Island Expedition Sta. 14, 44°00'S., 176°21'W., Hanson Bay, Chatham Islands in 15 fm; Chatham Island Expedition Sta. 16, shell sand, Kaingaroa, Chatham Islands (a

single intermediate valve).

This new species differs from all known New Zealand forms in the pronounced nodular sculpture on the anterior and posterior valves and on the lateral area of the intermediate valves and in the nature of the longitudinal sculpture on the central areas of the intermediate valves.

DISCUSSION

The Owenga Shell Bed

Just north of Owenga, and in the extreme southern extremity of Hanson Bay, there is a large deposit of bleached white mollusc shells. This has been a favoured collecting ground for visiting expeditions and much of the Chatham Island material extant in New Zealand museums and collections has obviously been obtained there. There are strong grounds for suspecting that this deposit is in part a Pleistocene one. Unfortunately this possibility was not fully realised until the expedition returned to New Zealand and a more detailed examination is necessary to determine the point. At the upper levels of the bed, the shells occur buried in consolidated sand. The shells in best condition in the bed occur high up on the beach at high water mark storms. The condition of the shells deteriorates from high water storms down to the lower limits of the bank. The majority of the shells present are bleached white, the most commonly represented species being *Austrofuscus chathamensis*, *Cominella (Eucominia) iredalei* and *Lepsithais squa-*

matus. *Eucominia iredalei* was obtained at only two other localities at the Chathams and only three specimens were obtained, typical *Austrofuscus chathamensis* was very rare elsewhere as was *Lepsithais squamatus*. None of these species was obtained elsewhere at Owenga, and certainly *Lepsithais* would have been collected had it been present. Very thick specimens of *Gari stangeri* and *Gari lineolata* were obtained quite unlike the usual thinner shells obtained elsewhere at the Chathams. It was also from this shell bed that Powell described *Cominella (Eucominia) ellisoni consobrina* which has not been collected elsewhere. The above are all arguments in favour of the deposit being at least sub-recent in origin. As would be expected, live shells are also cast up on the shell bed and paired valves of *Amphidesma* and *Aulacomya maoriana* still retaining the periostracum are common. Closer investigation is necessary to be certain of this matter, but at least in the meantime species known only from the Owenga shell bed should not automatically be considered to be living shells at the Chathams.

THE SPECIES ENDEMIC TO THE CHATHAM ISLANDS

As a result of the present work, the following species are now believed to be endemic to the Chatham Islands:

Perrierina insulana Powell
Condylocardia torquata Marwick
Benthocardiella obliquata chathamensis
Powell
Myllitella vivens pinguis Marwick
Lasaea rossiana vexata Finlay
Mysella morioria Dell
Scissurella prendrevillei Powell
Sinezona pauperata Powell
Montfortula chathamensis Finlay
Monodilepas skinneri Finlay
Haliotis virginea morioria Powell
Thoristella chathamensis chathamensis
(Hutton)
Cantharidus opalus cannoni Powell
Micrelenchus caelatus morioria Powell
Maurea tigris chathamensis Dell
Maurea pellucida morioria Powell
Margarella fulminata (Hutton)
Cyclostrema owengaensis (Powell)
Cellana strigilis chathamensis Pilsbry
Notosetia atomaria Powell
Notosetia exaltata Powell
Estea guesti Powell
Estea porrecta Powell
Estea morioria Powell
Estea gracilispira Powell
Merelina waitangiensis Powell
Austronoba martini Finlay
Subonoba morioria Powell
Subonoba inornata Powell

Zegalerus crater Finlay
Zeacolpus (Stiracolpus) knoxi Marwick
Trichosirius inornata chathamensis Finlay
Balcis archeyi Finlay
Buccinulum waitangiensis Powell
Buccinulum (Evarnula) characteristica Finlay
Buccinulum (Euthrena) bicinctum (Hutton)
Cominella (Eucominia) iredalei Finlay
Cominella (Eucominia) ellisoni consobrina
Powell
Penion chathamensis Powell
Zemitrella finlayi Powell
Paxula allani Finlay
Liratilia conquisita chathamensis Dell
Axymene traversi traversi (Hutton)
Marinula chathamensis Finlay
Besla waitangiensis Laws
Siogamaia morioria Laws
Chemnitzia owenga Laws
Icoplax chathamensis Dell
Maorichiton schauinslandi (Thiele)

Of these 49 endemic species, 26 are known only from depths less than 10 fathoms while 47 are recorded only from depths less than 50 fathoms. It is thus obvious that the endemic element in the Chathams molluscan fauna is largely confined to shallow water. Thirteen of the endemic forms are regional subspecies of mainland polytypic species. It is probable that if more was known of the distribution and relationships of some of the smaller forms this number would be increased. Of these 13 polytypic species 10 are widely distributed throughout New Zealand while three are confined to predominantly southern waters.

THE RELATIONSHIPS OF THE CHATHAM MOLLUSCA

Both Finlay (1929) and Powell (1933) have discussed the relationships of the molluscan fauna of the Chathams. Both based these conclusions upon those species, "that either occupy restricted areas on the mainland or, in the case of endemics, are most closely allied to such mainland species". Powell (1933, p. 182) states quite definitely that only 80 species of the listed fauna of 256 had been considered in this analysis. He concluded,

"The approximate equality in numbers of the marine species that definitely show either Northern or Southern origin, as noted by Finlay (1928, p. 285) remains about the same." Subsequent writers on the Chathams fauna generally have tended to interpret this as a definite statement that the Chathams mollusca have been derived in more or less equal part from the north and the south. Analyses of the relationships of a fauna will

always be partially subjective but it seems to the writer that no clear position is given by an analysis of one-third of a fauna with no consideration to the remaining two-thirds. As a different basis for analysis the fauna of the central part of New Zealand, around Cook Strait, has been taken as a norm. If a species occurs in the Cook Strait area (in a fairly wide sense) it has been marked with 'C' in the checklist of the fauna. N, S and An indicate that the species is found elsewhere only in the north, south (Otago and Stewart Island) or the Subantarctic Islands respectively. E indicates an endemic form and a few pelagic species are marked P.

An analysis of the fauna carried out in this way shows that of the 320 species here recorded no less than 204 also occur in the Cook Strait area, 6 are pelagic and 49 are endemic. Only 13 are confined elsewhere to the north while 38 occur in the south with 5 in the Subantarctic Islands. Such an analysis provides a very different faunal picture. The Cook Strait species can in turn be divided into forms with northern and southern affinities but this does not invalidate the conclusion that the Chatham Island mollusca are overwhelmingly similar to Cook Strait forms. The resemblance was exceptionally clearly seen in the field particularly at the deeper water stations. The marked endemic Chatham mollusca are largely intertidal or minute forms but dredge hauls from 20 to 80 fathoms looked essentially the same as hauls from comparable depths in Cook Strait.

The writer has already (Dell, 1956 B, p. 187) commented on the possibility of some shelf forms being derived from an archibenthal reservoir and this trend can be observed at the Chathams. At Station 29 in 94 fathoms a number of typically archibenthal forms were obtained. Of these perhaps *Lucinoma galathea*, *Escalima regularis*, *Cirsotrema (Tioria) forresti*, *Fusitriton laudandus*, *Proximitra banksi* and *Fax mirabilis nuptialis* are in process of colonising the island shelf at the Chathams. As on the mainland there does seem to be a very definite faunal break about the 100-fathom line so that while a specifically Chatham Island fauna occurs on the shelf and intertidally, this changes fairly abruptly into a widely distributed archibenthal molluscan fauna below 100 fathoms.

The Chatham Island molluscan fauna is obviously a restricted one, as is very apparent in the field. The present Checklist for example lists a number of species which are common on the

mainland but are only recorded as rare shells from the Chathams. Examples are: *Nucula hartvigiana*, *Glycymeris modesta*, *Ostrea sinuata*, *Saxostrea glomerata*, *Lima zelandica*, *Monia zelandica*, *Mytilus aoteanus*, *Protothaca crassica*, *Paphirus largilliertii*, *Macomona liliana*, *Maetra rudis*, *Anchomasa similis*, *Pholadidea tridens*, *Offadesma angasi*, *Notoacmea parviconoidea* and *Neothais scalaris*.

Some of these species are known only from one or two specimens from the Chathams. In addition such families as the Veneridae, Tellinidae and Mactridae, which are large shells, common on the mainland with many representatives, are poorly represented on the Chathams. Many common characteristic mainland species are missing altogether. The most noteworthy of these are: *Mytilus canaliculus* (Martyn), *Modiolus neozelanicus* (Iredale), *Maetra discors* (Gray), *Spisula aequilateralis* (Deshayes), *Dosinia* (all species except *maoriana* Oliver), *Dosinula zelandica* (Gray), *Notocallista multistriata* (Sowerby), *Angulus gaimardi* (Iredale), *Lepetomya retiaria retiaria* (Hutton), *Myadora striata* (Q. & G.), *Scutus breviculus* (Blainville), *Patelloida* spp., *Notoacmea* spp., *Lunella smaragda* (Martyn), *Struthiolaria* spp., *Maoricrypta* spp., *Baryspira* spp., *Alcithoe* spp., *Benhamina obliquata* (Sowerby), *Amaurochiton glaucus* (Gray), *Xenophalium* (any common form).

There are a number of species which were recorded by Finlay but do not appear to have been collected since. These are: *Sinezona* cf. *antarctica*, *Trochus huttoni*, *Micrelenchus tenebrosus tenebrosus*, *Micrelenchus tenebrosus huttoni*, *Maurea cunninghami pagoda*, *Zethalia zelandica*, *Zegalerus crater*, *Pyxipoma weldii*, *Ellatrivia memorata* and *Xymene plebejus*.

It is probable that some at least of these are forms which only occasionally reach the Chathams from the mainland and whose occurrence will therefore be sporadic. There is some evidence that there are fluctuations in the relative abundance of species on the Chathams. Powell (1933) recorded *Cantharidus opalus cannoni* as common throughout at the Chathams. The Chatham Islands 1954 Expedition found this a very rare shell indeed. Conversely *Montfortula chathamensis* seems to have been commoner in 1954 than it was in 1933. Fluctuations in the abundance of individual species may well occur and it also

appears probable that odd specimens of mainland species will crop up on the Chathams from time to time so that any faunal list will be subject to emendation. These remarks may apply to some of the species from Finlay's account which are listed above. To supply a factual basis for such discussions any future investigators in the area should search carefully for these forms.

In 1925 Finlay proposed the name Moriorian Province for the Chatham Islands as a division of the Maorian Sub-Region. The proportion of endemic species, and the peculiar characteristics of the Chathams molluscan fauna due to the elements missing as much as to those present makes the province as distinct as any in the New Zealand region.

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Sipunculids from New Zealand and the Chatham Islands

By S. J. EDMONDS,

Department of Zoology, University of Adelaide,
Adelaide, S. Australia

INTRODUCTION

In 1956 Mr G. A. Knox (Canterbury University, New Zealand) sent me about 30 sipunculids for identification. They were collected by him during the Chatham Islands Expedition of 1954 (Knox, 1957). In 1957 I received about 80 additional specimens from the Portobello Marine Biological Station of the University of Otago; the Dominion Museum, Wellington; the Canterbury Museum, Christchurch, and the Otago Museum, Dunedin. As the species collected at Chatham Islands proved to be the same as those found in New Zealand, I have identified all the specimens under the title of "Sipunculids from New Zealand and the Chatham Islands".

A number of sipunculids have been reported previously from New Zealand. Baird (1868) described *Sipunculus aeneus*, Hutton (1879) described *Sipunculus lutulentus* and *Phascolosoma annulatum* and Benham (1904) described *Dendrostomum huttoni*, *Phascolosoma novae-zealandiae* and *Sipunculus maoricus*. Augener (1903) reported *Dendrostomum signifer* and *Physcosoma scolops* var. *mossambicense* and Fischer (1914) identified *D. signifer* and *P. scolops* var. *tasmaniense*. Benham (1911) reported *Sipunculus nudus*, *Physcosoma scolops* and *Aspidosiphon truncatus* from the Kermadec Is.

Baird's description of *S. aeneus* and Hutton's description of *S. lutulentus* are rather inadequate by present day standards and it is difficult to say into which of the more modern genera they should be placed. Benham (1903) considered that the two species were "species inquirendae". The type of *S. aeneus*, however, is in the British Museum (Natural History), London, and has, consequently, not been available for re-examination in Australia. The type of *S. lutulentus*, according to Benham (1903), is lost.

The nomenclature and the system of classification used in this paper is that of Fisher (1952). He showed that the well-known term *Physcosoma* of Selenka and others is untenable and must be replaced by *Phascolosoma* Leuckart. The *Phascolosoma* of numerous authors (but not Leuckart) is replaced by *Golfingia* Lankester. Fisher's nomenclature has been adopted by Stephen (1954), Wesenberg-Lund (1954) and Edmonds (1956).

The fact that four of six sipunculids identified in this paper are known to occur in southern and eastern Australia indicates that the sipunculidan fauna of New Zealand and southern and eastern Australia are related.

LIST OF SPECIES

Xenosiphon mundanum (Selenka, de Man and Bülow): New Zealand.

Phascolosoma annulatum Hutton: New Zealand and Chatham Is.

Golfingia novae-zealandiae (Benham): New Zealand and Chatham Is.

Golfingia cantabriensis n.sp.: New Zealand.

Dendrostomum huttoni Benham: New Zealand and Chatham Is.

Dendrostomum fuscum n.sp.: New Zealand.

SYSTEMATICS

Genus *Xenosiphon* Fisher

Xenosiphon mundanum (Selenka, de Man & Bülow) (Pl. 1)

Sipunculus mundanus Selenka, de Man & Bülow, 1883. Fischer, 1922.

Sipunculus maoricus Benham, 1904.

Xenosiphon mundanum (Selenka, de Man & Bülow). Fisher, 1954; Edmonds, 1955.

Material

5 specimens.

Localities

Tauroa Pt., near Cape Maria Van Diemen (2 specimens from the Otago Museum). 3 specimens labelled "*Siphonostoma maoricus*" from Otago Museum, no locality given.

Description

The collection from New Zealand contained five specimens of *X. mundanum*, a species well known in Australia. *X. mundanum* has recently been redescribed by Fischer (1954) and Edmonds (1955). The specimens from New Zealand are 12–21 cm long and 7–14 mm wide. The trunk is divided into numerous small rectangular areas by the longitudinal and circular musculature. The longitudinal muscles are grouped into 27–29 bundles. The introvert is about 1 cm long and is covered with numerous triangular lappets. The posterior extremity of the trunk is swollen and rounded into a small terminal knob.

Systematic Position

Sipunculus maoricus was described by Benham (1904) from Tauroa Pt. His specimens were about 11.6 cm long and 10 mm wide. The introvert was short and about 12 mm long and the body wall was divided into small rectangular areas by the longitudinal and circular muscles. "Tubercles" (lappets?) were present on the introvert. There were 27 longitudinal muscles. Four retractors arose at about the same level, the dorsal pair spanning 4 longitudinal muscles and the ventral 3. Edmonds (1955, p. 87) in his descrip-

tion of *X. mundanum* says that "there are 27–30 longitudinal muscles which seldom anastomose" and again "four retractors arise from about the same level, the ventral pair from muscles 2–4 and the dorsal from 7–10". The resemblances between *X. mundanum* and *S. maoricus* are very close and it seems likely that the two species are synonymous, especially as Benham's specimens were also found at Tauroa Point.

Diagnosis

A long and cylindrical species resembling *Sipunculus*. Trunk divided into numerous, small rectangular areas by the longitudinal and circular muscles. 27–30 longitudinal muscles. Introvert short and covered with numerous triangular lappets. 4 retractor muscles arise at the same level and 2 short, ribbon-like protractor muscles arise from the dorsal surface of the introvert near the brain and are fastened to the anterior body wall. Anal aperture 1–2 cm in front of the nephridial opening. Rectum long and closely attached to the body wall. A small caecum present. Nephridia short. Posterior extremity of trunk often swollen into a smooth rounded knob with a small pore posteriorly.

Type Locality

Port Jackson, New South Wales, Australia.

Type Specimen

Natural History Museum, London.

Distribution

Cape Maria van Diemen, New Zealand, South-west and eastern Australia.

Genus *Phascolosoma* Leuckart

Phascolosoma annulatum Hutton (figs. 1–2, pl. 2)

Phascolosoma annulata Hutton, 1879.

Physcosoma annulatum (Hutton). Benham, 1903.

Physcosoma scolops var. *mossambicense* Augener, 1903.

Physcosoma scolops var. *tasmaniense* (Fischer). Edmonds, 1956.

Localities

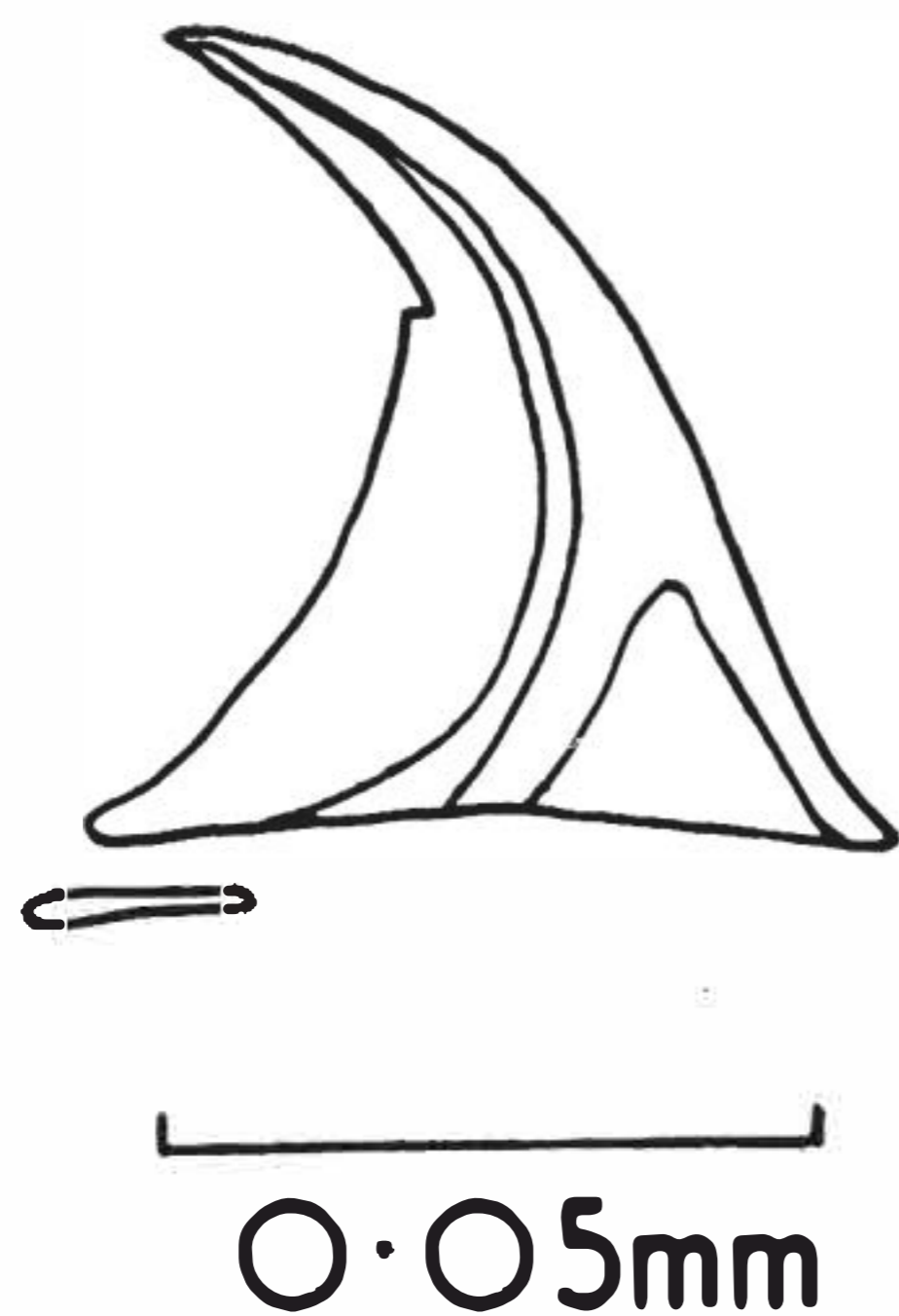
Chatham Is. (18 specimens): Sta. 3, Mernoo Bank (61 fm); Sta. 6, Chatham Rise (220 fm); Sta. 14, Hanson Bay (15 fm); Sta. 16, Kaingaroa (shore collecting); Sta. 18, off Cape Pattison (15 fm); Sta. 44, N.E. of Kaingaroa (120–25 fm); Sta. 50, Port Hutt (3–5 fm).

New Zealand (21 specimens): Foveaux St. coll. E. Smith); Portobello; Port Levy and Menzies Bay, Banks Peninsula (coll. G. A. Knox); Otago Harbour and Otago Peninsula (coll. W. B. Oliver).

Stewart Is. (10 specimens): Halfmoon Bay coll. G. A. Knox); Outer Pegasus (coll. R. A. Falla); Sealers Bay and Easy Cove (coll. R. K. Dell).

Description

The animals are sometimes cylindrical and sometimes bottle or flask-shaped. The posterior extremity is usually bluntly pointed. The trunk is 1.8–4.5 cm long and its maximum width is 5–11 mm. The introvert is about $\frac{1}{2}$ to $\frac{3}{4}$ the length of the trunk and 2–3 mm wide. Preserved specimens are brown, pink or grey in colour but numerous dark papillae show up on the trunk and introvert. The papillae, which are largest and densest on the body surface at the base of the introvert and at the posterior extremity of the trunk, are made up of numerous large polygonal plates. Some brownish polygonal plates are also scattered on the surface of the body between the



Figs. 1–2: *Phascolosoma annulatum* Hutton.

Fig. 1 – introvert hook

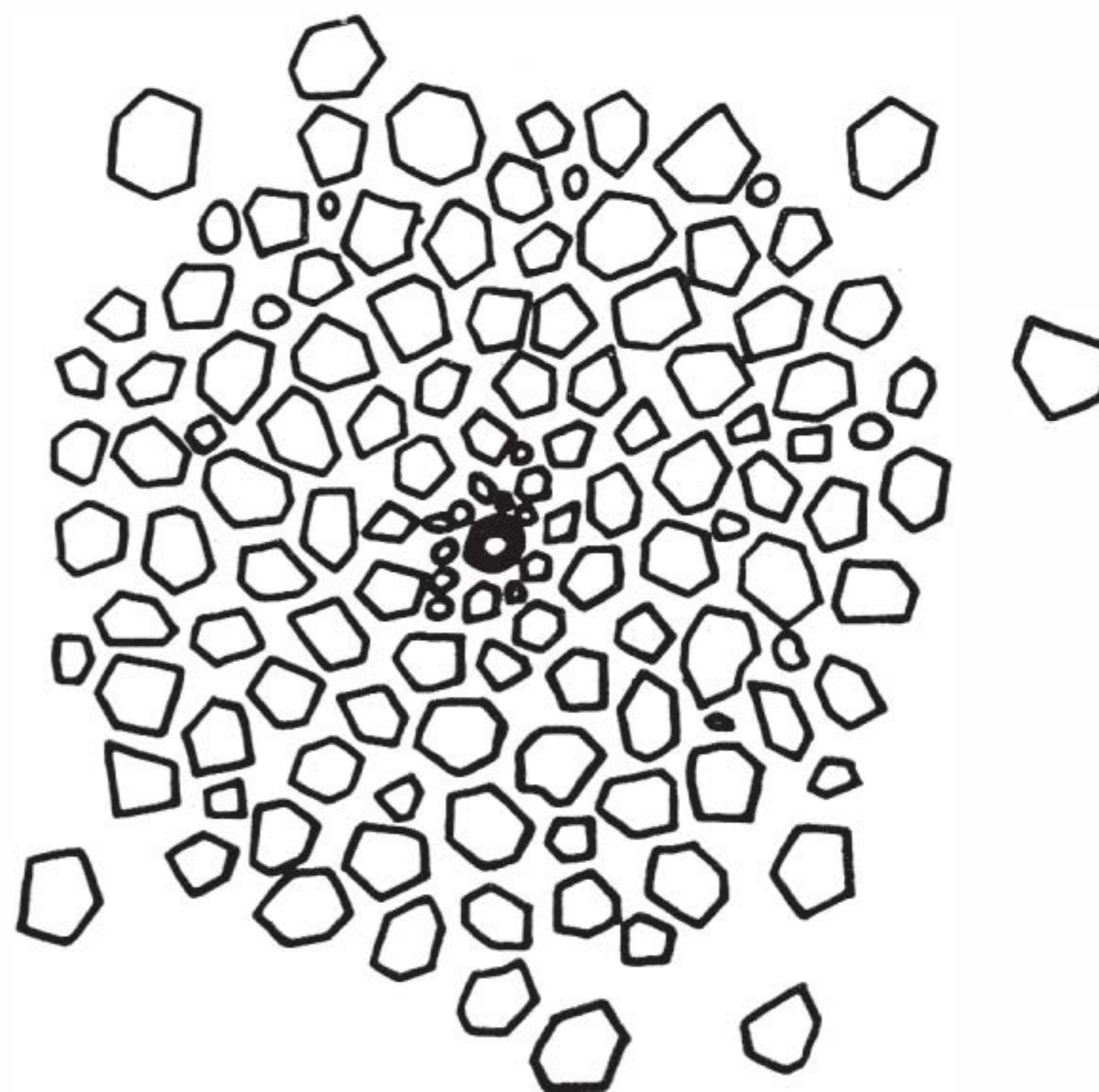


Fig. 2 – papilla from base of trunk

papillae. This condition is shown by Augener (1903, fig. 21), Fischer (1914, fig. 4) and Edmonds (1955, fig. 6). The papillae on the trunk tend to be hemispherical in shape but those on the introvert are more conical. The dorsal surface of the introvert of most specimens bears 1–3 pigmented bands. The banding, however, is not as noticeable as that found on the specimens from South Australia and Tasmania (Edmonds, 1956).

The longitudinal muscles are grouped into about 20 anastomosing bundles which are seldom visible externally. The introvert bears a number of rows (some of which are incomplete) of light to dark-brown hooks. The maximum number of complete rows was 28. The size and shape of the hook resembles that of *P. scolops*. There are about 25–30 short finger-like tentacles.

There are 4 retractors. A stout dorsal pair arises from the body wall in the posterior third of the animal from muscles 2–5 (1–5) and a more slender, ventral pair more anteriorly from muscles 4–6 (3–4) (2–5) (3–6). The intestine is fixed to a spindle muscle which is attached to the body wall anteriorly and posteriorly. There are 2 fastening muscles to the alimentary canal; one arises from between the retractors and joins the intestine near its first whorl and the other, a shorter one, arises from near the right retractor and runs to the last whorl of the intestine. There is no intestinal caecum. Two nephridia arise at about the level of the anal aperture and reach to the base of the dorsal retractors. They are attached to the body wall for about a third of their length.

Two eyespots are visible in some specimens. Eggs with a maximum diameter of 0.12 mm are found in some animals. There is a poorly developed contractile vessel.

Systematic Position and Diagnosis

These specimens seem identical with those described by Fischer (1914) as *P. scolops* var. *tasmaniense*, by Augener (1903) as *P. scolops* var. *mossambicense*, Edmonds (1956) as *P. tasmaniense* and Hutton (1879) as *P. annulatum*. Hutton's name, however, takes precedence.

The distinguishing features are the structure of the papillae and the appearance of small polygonal plates on the body wall between the papillae.

Superficially *P. annulatum* resembles *P. noduliferum* Stimpson which is found along the coast of New South Wales, Australia (Edmonds, 1956), *P. agassizii* Keferstein from the Pacific coast of North and South America and *P. japonicum* Selenka from Japan. It differs from *P. noduliferum* and *P. agassizii* in the structure of its papillae, and from *P. japonicum* which possesses a caecum (Fischer, 1952, p. 429).

Distribution

New Zealand; Stewart Is.; Chatham Is.; South Australia; Victoria and Tasmania.

Genus *Golfingia* Lankester

Golfingia Lankester, 1885. Fisher, 1952, p. 389

Golfingia novae-zealandiae (Benham) (fig.3, pl. 3)

Phascolosoma novae-zealandiae Benham, 1904.

Material

2 specimens.

Localities

East Otago, "trawled in weed bed" (coll. Portobello Marine Biol. Sta.); Sta. 3, Mernoo Bank (41 fm), Chatham Is.

Description

The two specimens differ considerably in size. The trunk of the specimen from New Zealand is 14 cm long and its maximum width is 10–12 mm. The corresponding measurements of the one from Chatham Is. are 2.5 cm and 5 mm. The posterior region of the body narrows and the extremity is sharply pointed. One specimen in the preserved state is pink and the other white. The introvert of the larger specimen is partly retracted and about 7 cm long and 2–3 mm wide. The introvert is browner or darker in colour than the trunk. The trunk and the introvert, although they appear smooth, are covered with numerous small papillae. The papillae or "tubercles" (Benham)

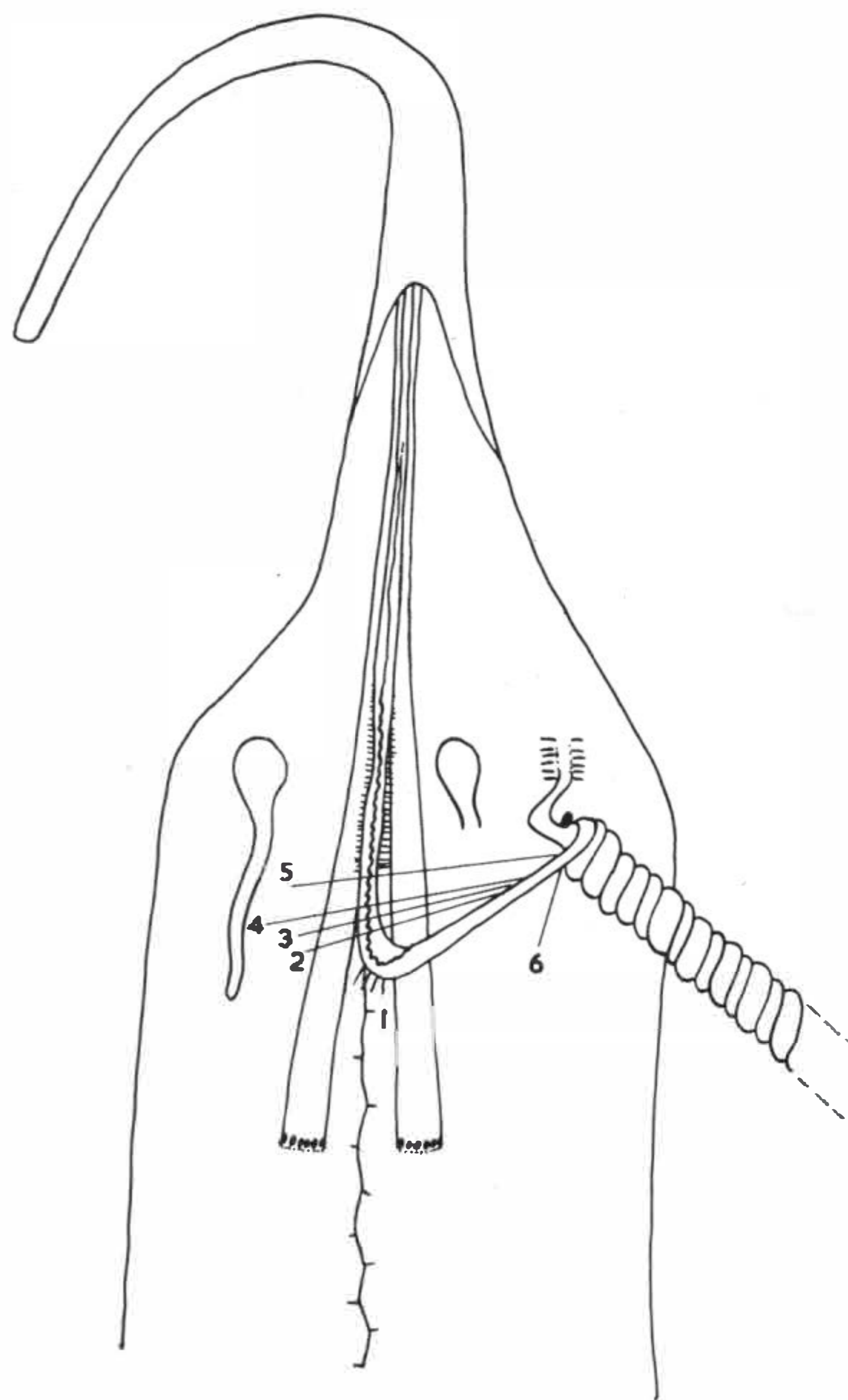


Fig. 3: *Golfingia novae-zealandiae* (Benham)

are "circular in plan and ovoid in elevation with a narrowed base at the point of attachment." Those at the base of the trunk are about 0.08 mm in diameter and 0.12 mm tall. The introvert does not bear hooks. There is a crown of numerous, fine, white, thread-like tentacles. The body wall of the two specimens is rather thick. Internally it is white and glistening and oblique muscular striations are noticeable.

Two stout retractor muscles arise in the anterior third of the trunk and the oesophagus is fixed to them by fine mesenteries. The gonads are situated at the base of the retractors. The intestine consists of about 20 double coils that are attached to a spindle muscle, which is not fixed to the body wall posteriorly. There are a number of fastening muscles. F₁ attaches the lowest loop of the oesophagus to the body wall. F₂, F₃, F₄, and F₅ arise near the left retractor. F₂ is fixed to the upward loop of the oesophagus and F₃, F₄ and F₅

to the last whorl of the intestine. The rectum is short and there is a post-intestinal caecum. The dorsal contractile vessel lies along the dorsal surface of the oesophagus and lacks villi. The nephridia are short and free and open at about the same level as the anus. *G. eremita* (Sars) is an allied species.

Diagnosis

Body long and subcylindrical, narrowing posteriorly to a sharp point. Species may attain a considerable size. Introvert narrow, devoid of spines and about half the length of the trunk. Tentacles numerous and thread-like. Two stout retractor muscles arising from the anterior third of the body. Numerous (7) intestinal fasteners. Spindle muscle not attached posteriorly. Post-intestinal caecum. Nephridia short, free and open at about the same level as the anus. Contractile vessel without villi.

Distribution

New Zealand and Chatham Is.

***Golfingia cantabriensis* n.sp. (fig. 4)**

Material

1 specimen.

Locality

Heathcote Estuary, Banks Peninsula, New Zealand.

Description

The specimen is long and cylindrical and the body wall is rather thick. The longitudinal musculature is continuous and not divided into separate bundles. The trunk is 8 cm long and 7-10 mm wide. The introvert is completely retracted and in this condition is about 2.5 cm long. The body wall, which at first sight seems smooth, is scattered with small, dark, elliptical papillae. The dissected introvert shows that there are a number of stout finger-like tentacles but no introvert hooks.

There are 4 retractor muscles. Two stout ones arise close to the ventral nerve cord in the mid-body region and 2 more slender ones much more dorsally and anteriorly. Two nephridia which hang free in the body cavity arise just anterior to the anal aperture. The alimentary canal is very long and consists of about 90 double spirals which hang free in the coelome. The spindle muscle is not attached posteriorly. There are two fasteners to the intestine, one arising near the left dorsal retractor and ending on the oesophagus, and the

other arising near the right dorsal retractor and ending near the last whorl of the intestine. There is a well-developed, dorsal contractile vessel without villi. There is a short rectum and a wing-muscle but no intestinal caecum.

This species is close to *G. margaritacea* (Sars) which is said to be a bipolar species (Stephen, 1941, p. 253) and "most probably cosmopolitan" (Wesenberg-Lund, 1954, p. 200). The fixing muscles of the New Zealand specimen are different from those of *G. margaritacea*. Consequently it is regarded as a new species.

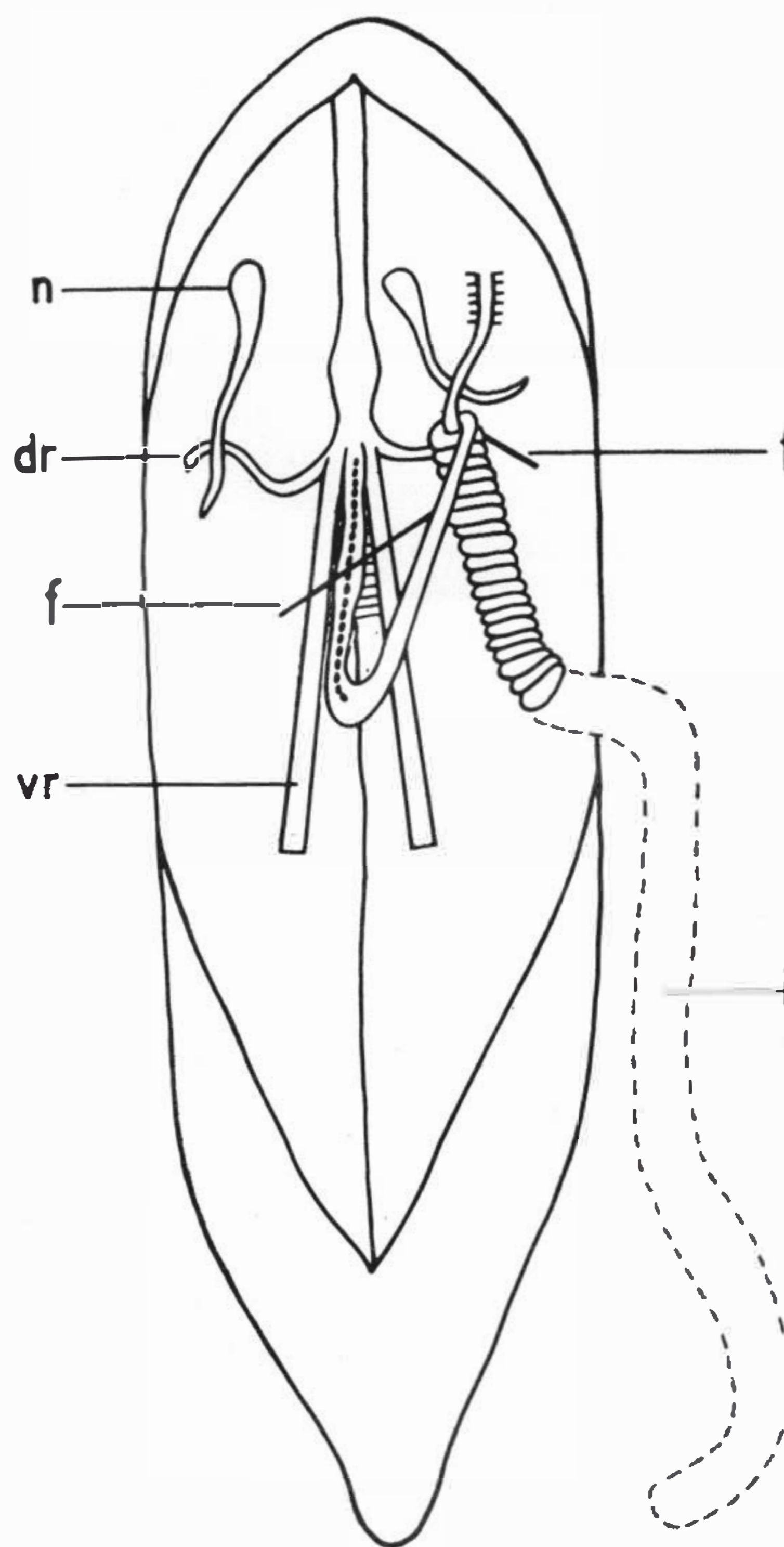


Fig. 4: *Golfingia cantabriensis* n.sp.
dr, dorsal retractor; f, fastener; i, intestine; n, nephridium; vr, ventral retractor.

Diagnosis

Trunk cylindrical and introvert probably about 1/3 the length of the trunk. Introvert with numerous short finger-like tentacles but without hooks. Longitudinal musculature continuous. Numerous, small elliptical papillae on the body wall. Four retractors which arise at different levels. Two nephridia which arise just anterior to the anal aperture hang free in the body-cavity. Intestine of about 90 double spirals. Spindle muscle not attached posteriorly. Contractile vessel without villi and no intestinal caecum.

Type Locality

Heathcote Estuary, Banks Peninsula.

Type Locality

Canterbury Museum, New Zealand.

Genus *Dendrostomum* Grube

Dendrostomum Grube, 1859. Fisher, 1952

Dendrostomum huttoni Benham (figs. 5–6, pl. 3)

Dendrostoma huttoni Benham, 1904.

Dendrostoma signifer Selenka, de Man & Bülow, 1883 (in part). Augener, 1903; Fischer, 1914.

Material

20 specimens

Localities

Chatham Is. (12 specimens): Sta. 16, Kaingaroa (shore collecting); Sta. 50, Port Hutt (3–5 fm.).

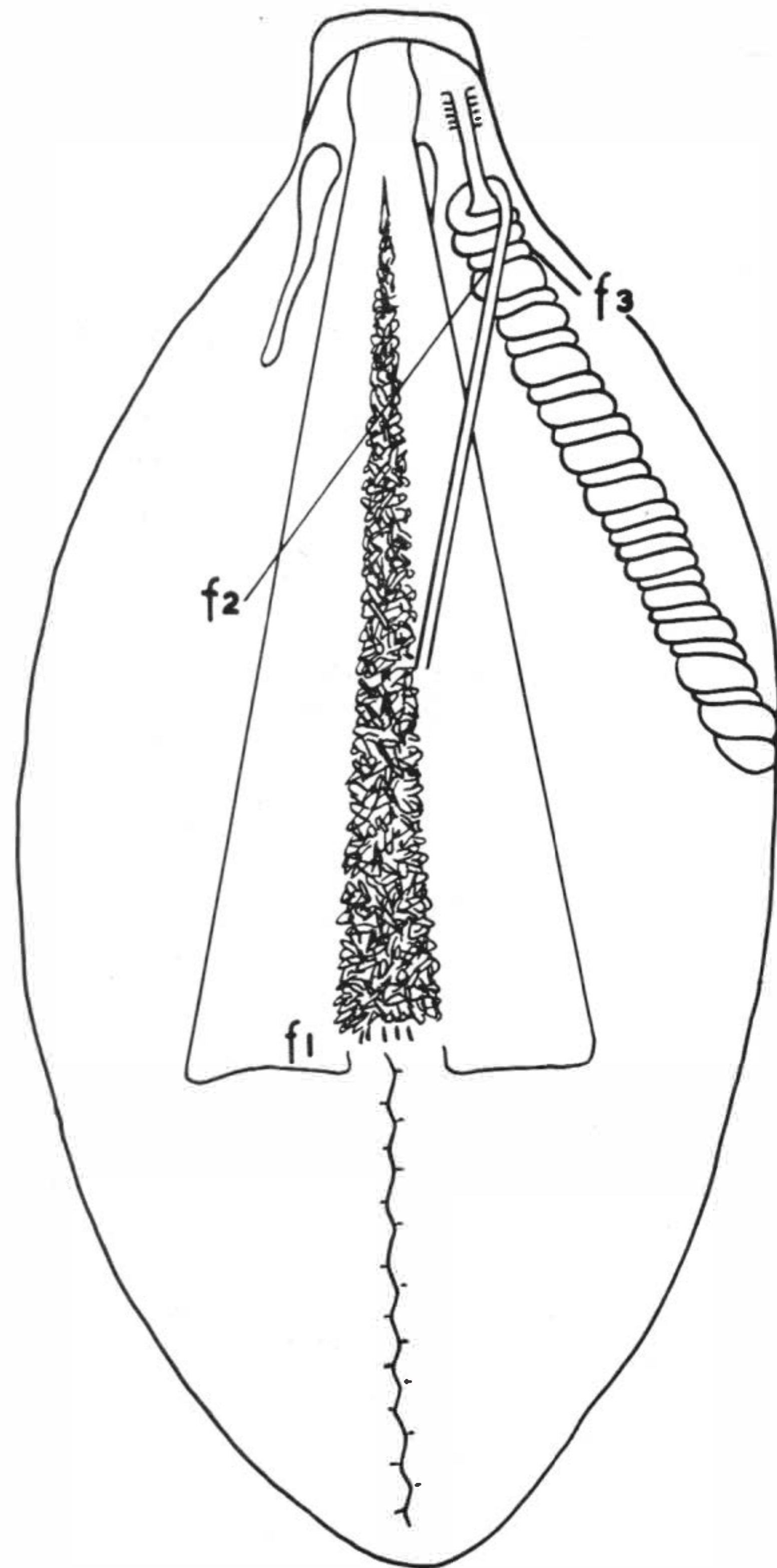
New Zealand (6 specimens): Menzies Bank and Port Levy, Banks Peninsula (coll. G. A. Knox); Stewart Is. (2 specimens, coll. G. A. Knox).

Description

This species has been regarded by some workers (Selenka *et al.*, 1883; Fischer, 1914; Augener, 1903) as an armed variety of *D. signifer*. The specimens are pear or flask shaped, rather stout and bluntly pointed at their posterior extremity. Most tend to curve slightly so that their ventral side is slightly shorter than the dorsal. The colour of preserved specimens may be straw, pink or brown. The trunk varies in length from 1–4.5 cm and its maximum width is 4–8 mm. The introvert is short and about 4–7 mm long. The body wall is thick and the skin appears to be smooth. At the posterior extremity of the trunk, however, it is wrinkled. Closer examination of the skin shows that it is covered with very small, pale, rounded papillae about 0.05 mm tall and

0.05 mm in diameter. The tentacles arise from 4 primary stems and are not flecked brown. The introvert bears on its anterior surface a few, scattered, dark brown, irregularly directed hooks. The base of the hook is circular and about 0.10–0.13 mm in diameter. The hook itself is about 0.09–0.15 mm long. It is stout and rather blunt.

The internal anatomy is like that of *D. signifer*. There are 2 stout retractors which arise in the posterior half of the trunk. The oesophagus is



Figs. 5–6: *Dendrostomum huttoni* Benham.

Fig. 5 dissected specimen: f 1, 2, 3, fasteners.

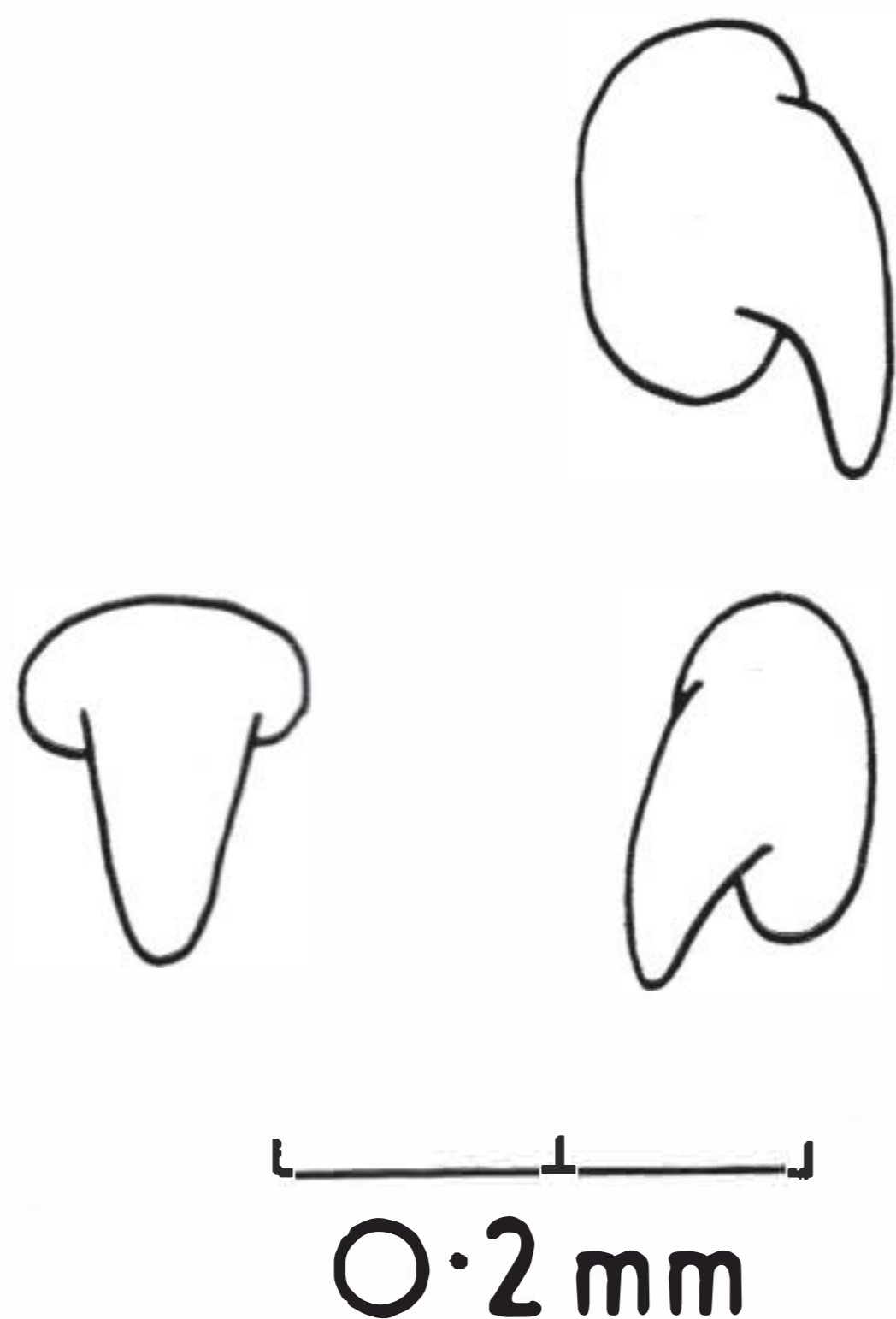


Fig. 6 – introvert hooks

fastened to the retractors by a thin sheet of tissue. A dorsal contractile vessel with numerous, prominent branching villi extends to the base of the retractors. The intestinal spiral is firmly and closely wound round a stout spindle muscle which hangs free in the coelome. There is a short rectum and a post-intestinal caecum. There are at least 2 and usually 3 fixing muscles. F_1 (which may be a group of fine strands) fixes the lower limit of the oesophagus to the body wall, F_2 fixes the intestine near its first whorl, and F_3 fixes the last whorl of the intestine. F_2 could not be found in some specimens. The nephridia are free, short and attached to the body wall just posterior to the anal aperture. Two eye spots can be seen in some specimens and eggs about 0.2 mm in diameter were found in others.

Systematic Position and Diagnosis

This species is closely allied to *D. signifer* Selenka *et al.* but differs in that dark-brown, rather blunt, irregularly directed hooks are scattered on the anterior region of the introvert. All the specimens examined, which were collected from widely separated localities, bore hooks. It seems reasonable, therefore, to regard the hooks as a character of these specimens and the species as different from *D. signifer*. It is likely that the specimens described from Sydney by Selenka *et al.* (1883) and from New Zealand and Tasmania by Augener (1903) and Fischer (1914) are *D.*

huttoni. Some specimens from Rottneest Is., Western Australia, in the possession of the author seem indistinguishable from these New Zealand specimens.

Distribution

New Zealand, Stewart Is. and Chatham Is. In Australia: Tasmania and New South Wales.

***Dendrostomum fuscum* n.sp. (figs. 7–8, pl. 3)**

Material

140 specimens.

Localities

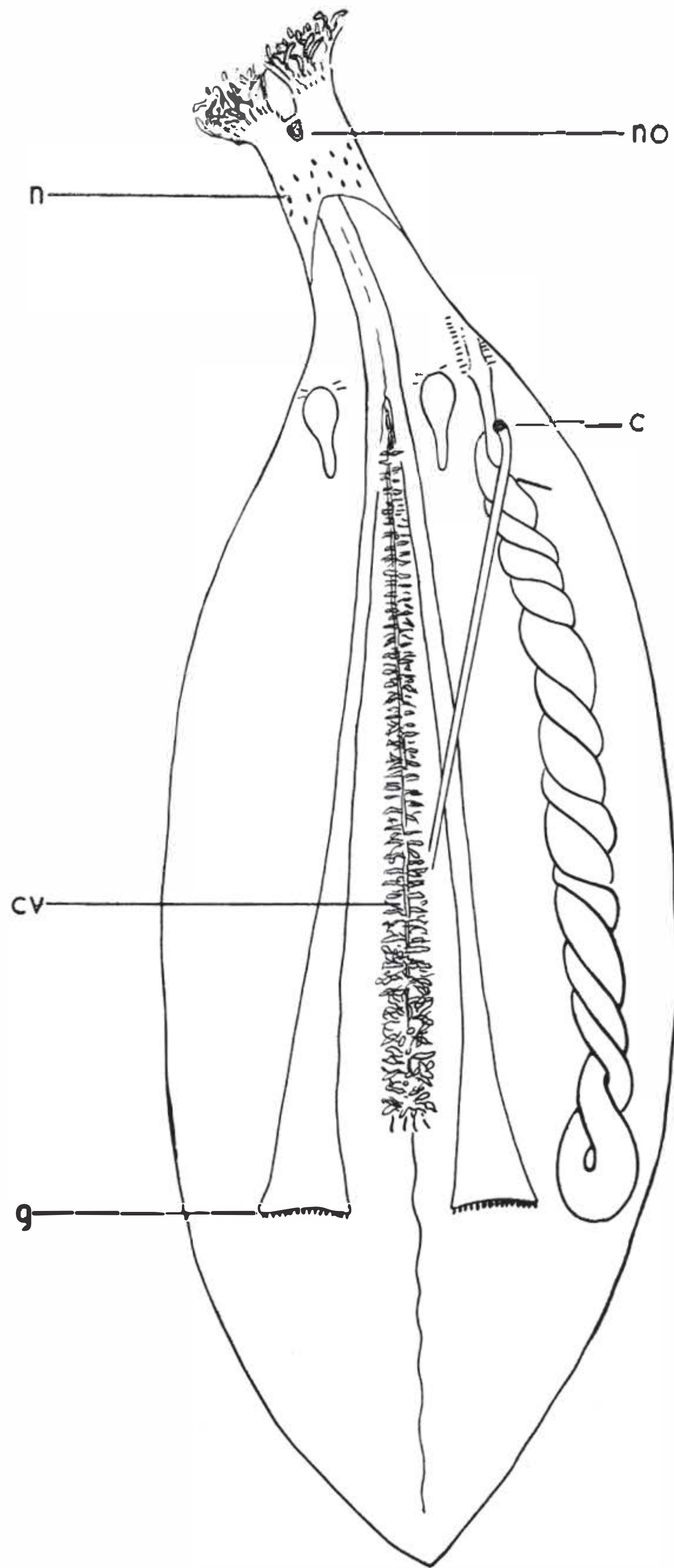
New Zealand (12 specimens): Kapowairua, Spirit Bay (coll. W. R. Oliver); Waiheke Is. (coll. G. Chamberlain); South Australia: Proper Bay, Port Lincoln.

Description

This species is smaller but comparatively more elongate and slender than *D. signifer* and *D. huttoni*. The trunk is light brown or straw coloured and the body wall thin. The base of the introvert and the anterior region of the introvert are dark brown or brownish-purple in colour. On the body are numerous, very small, circular, pale-coloured papillae which are largest and most prominent at the base of the introvert and the posterior extremity of the trunk. In some specimens the skin at the base of the introvert and posterior region of the body is furrowed into numerous square or rectangular areas. The trunk is 1.3–2.2 cm long and its maximum width is 2–4 mm. The introvert is short, 1.5–3.5 mm long and much narrower than the trunk. The anterior region of the introvert bears a number of scattered, almost black, rather blunt hooks which resemble those of *D. huttoni* in shape and size. The tentacles, which are dendritic, arise from 4 primary stems although on account of their method of subdivision they sometimes appear to arise from 5–8 stems. In most but not all specimens the anterior extremities of the tentacles are flecked brown or brownish-purple. There is a prominent, brown coloured, triangular shaped nuchal organ at the anterior tip of the introvert on the dorsal surface and in two specimens eye spots can be seen.

Two retractors arise from the posterior half of the animal. Their base is wide but the retractors themselves are more slender than those of *D. signifer* and *D. huttoni*. The oesophagus runs between the retractors to a point near their base

and then loops up as in *D. signifer*. There is a contractile vessel with well developed villi, which, however, are fewer in number and much simpler than those of *D. signifer* and *D. huttoni*. Those



Figs. 7-8: *Dendrostomum fuscum* n.sp.

Fig. 7 - dissected specimen: c, caecum; cv, villi of contractile vessel; g, gonads; h, hooks; no, nuchal organ.

at the base of the oesophagus branch to some extent. The intestinal spiral is loose and irregularly wound and consists of about 6-8 double coils. The most distal loop is usually very loosely wound. The spindle muscle arises from the rectum and there is a small intestinal caecum. The nephridia are short, swollen near their external opening and free. They open posteriorly to the anus and about 5-8 strands of muscle appear transversally just anterior to the nephridiopore. The gonads lie at the base of the retractors and eggs about 0.2 mm in diameter were found in the body cavity of some specimens.

Systematic Position

This species is allied to *D. huttoni* (Benham) and *D. minor* Ikeda. It differs from the former in shape and colour. It possesses a nuchal organ, slenderer retractor muscles, a less elaborate system of villi and a loosely wound intestine of few coils. It differs from *D. minor* in the structure of its hooks and papillae, in the method of attachment of its oesophagus and in the arrangement of its villi.

Diagnosis

Small and slender, light brown in colour except at the base of the introvert and the anterior region of the introvert which are brown-purple. Tentacles flecked brown. Dark coloured hooks scattered on the anterior region of the introvert. Two retractors; contractile vessel with prominent villi. Loosely coiled intestine of few spirals and an intestinal caecum. 1-2 fixing muscles. Spindle muscle arises from rectum but not fixed posteriorly. Nephridia short, free and swollen near their external opening. Prominent nuchal organ.

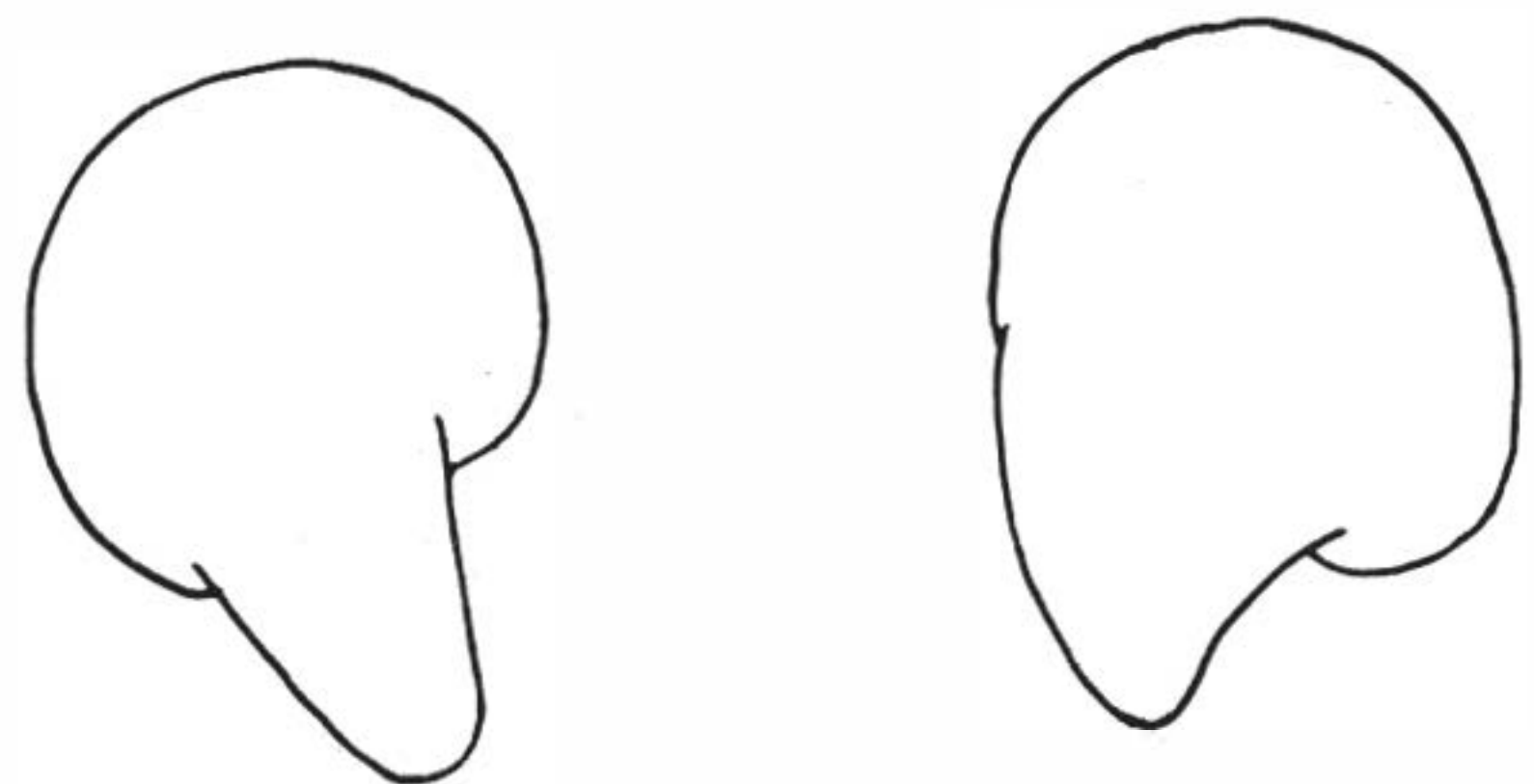


Fig. 8 - introvert hooks

Type Locality

Proper Bay, Port Lincoln, South Australia.
Specimens found burrowing in consolidated calcareous deposits at mid-tide level.

Type Specimen

Australian Museum, Sydney.

Distribution

New Zealand and South Australia.

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PLATE 1

Xenosiphon mundanum (Selenka)

(p. 160)

PLATE 1

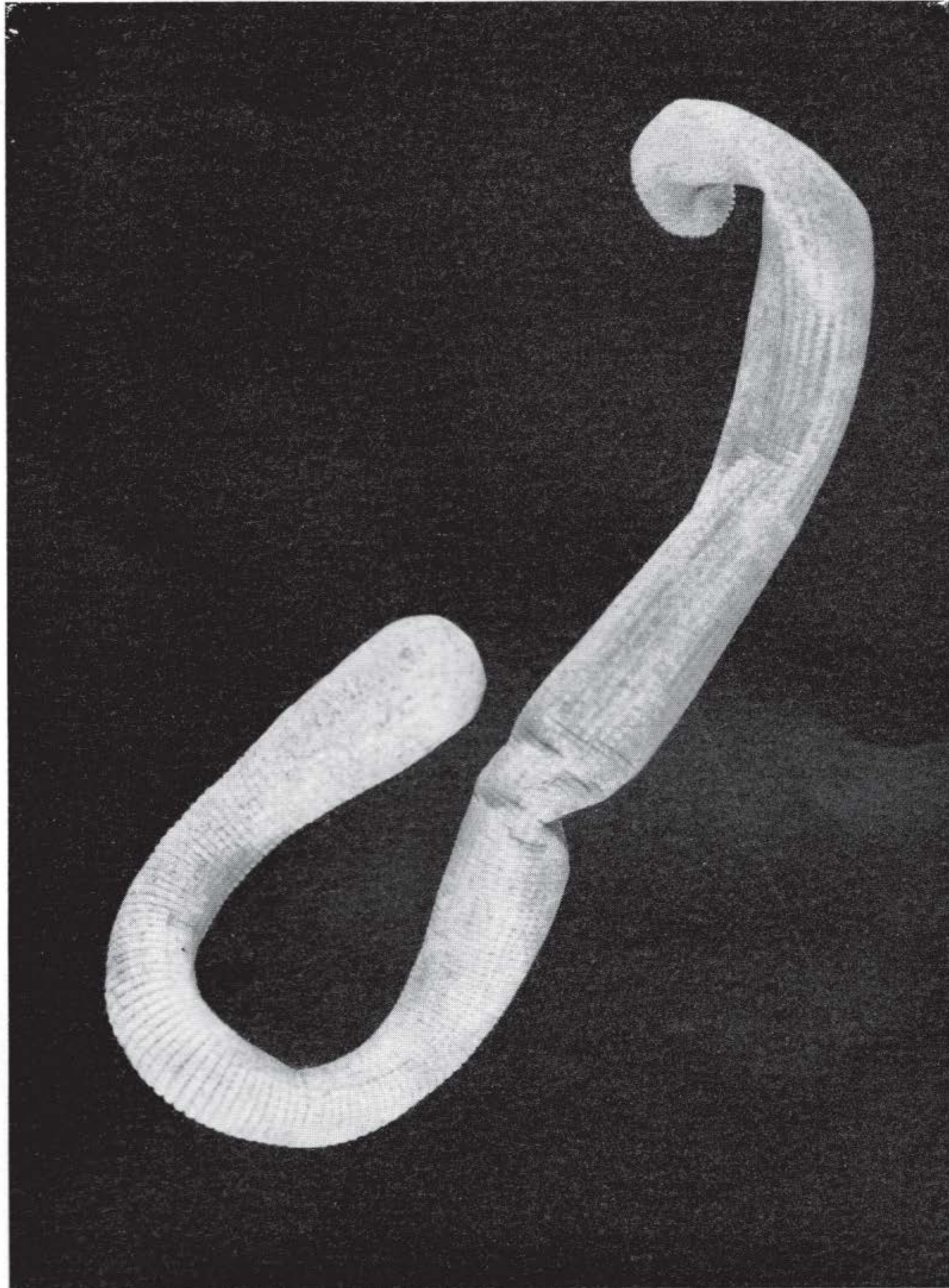


Photo: H. O'Kane

PLATE 2

Phascolosoma annulatum (Hutton)

(p. 160)

PLATE 2

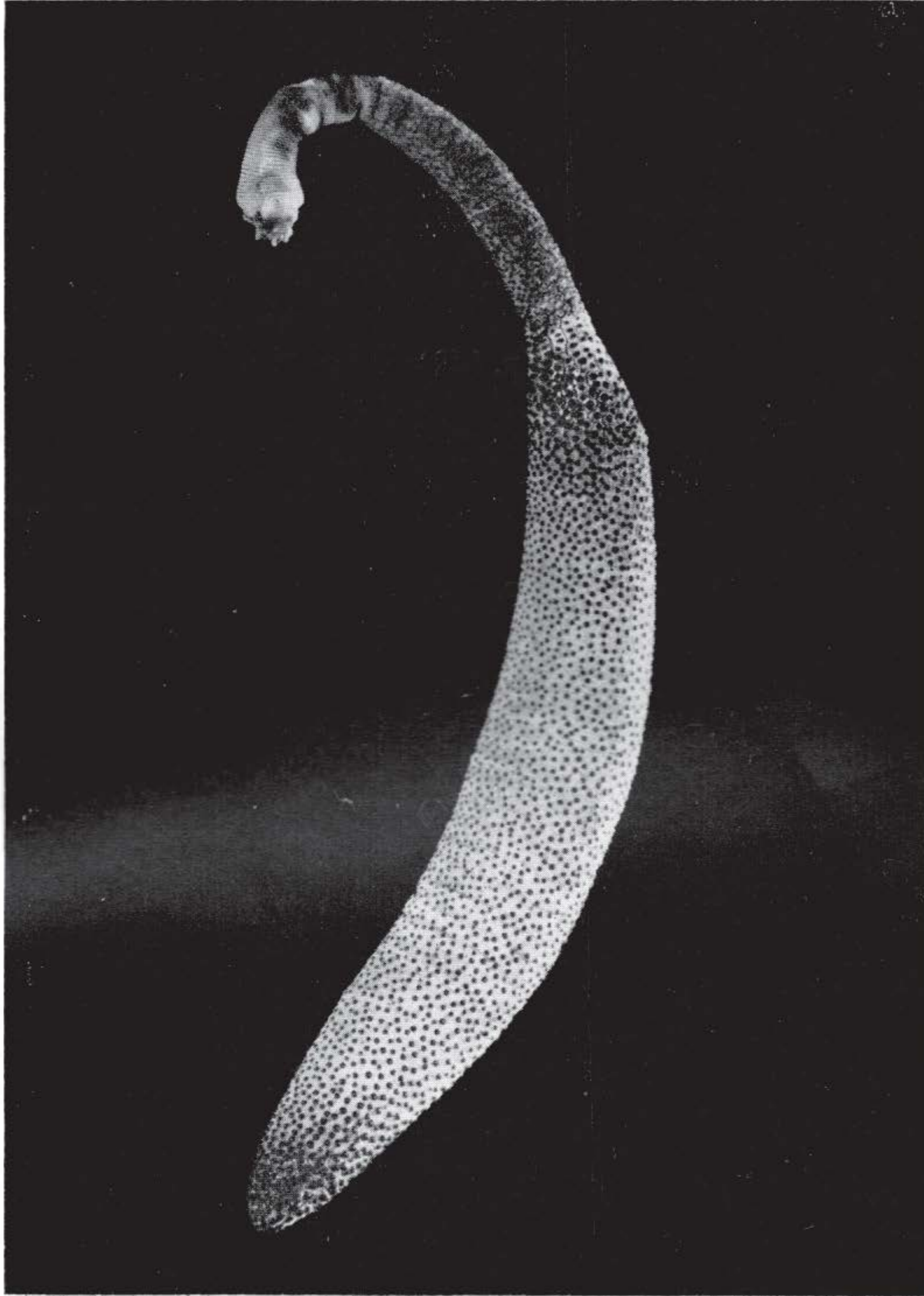


Photo: H. O'Kane

PLATE 3

Top left:

Golfingia novae-zealandiae (Benham)

(p. 162)

Top right:

Dendrostomum fuscum n.sp.

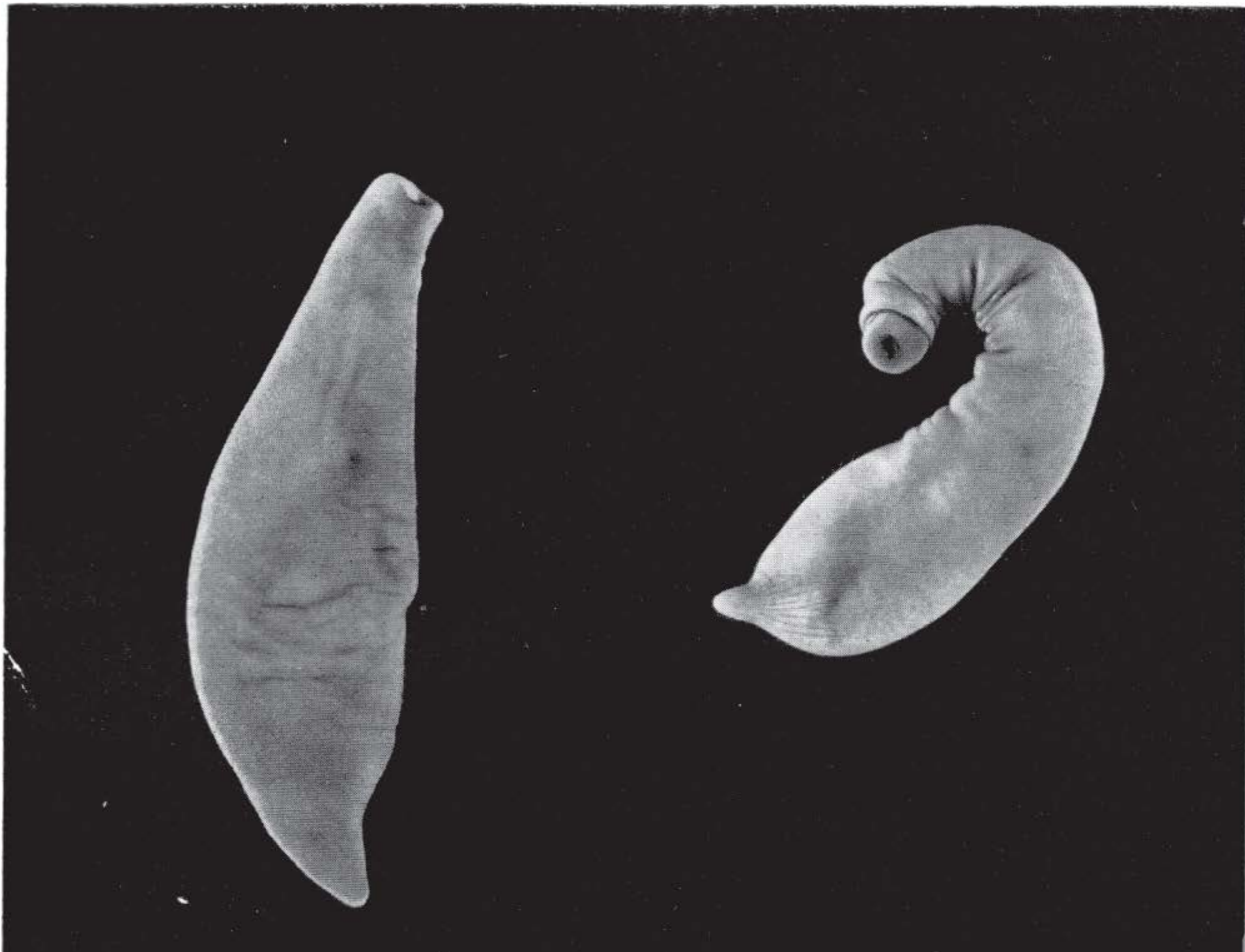
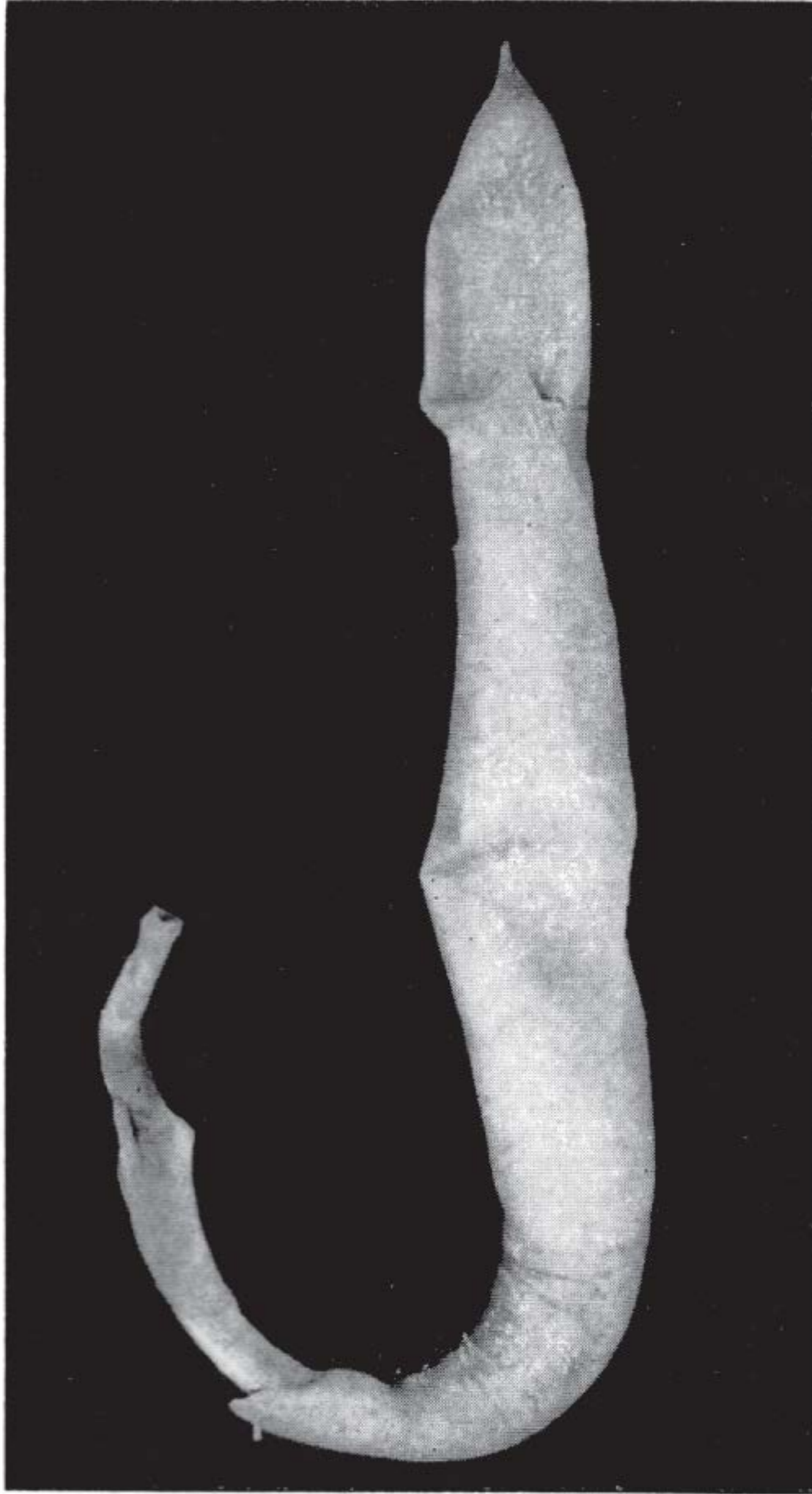
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Bottom:

Dendrostomum huttoni Benham

(p. 164)

PLATE 3



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