Publication: Parkinson,P.G. 1971: The subfossil species of Albers (Mollusca: Paryphantidae). *J. R. SOC. N.Z.*: 1(1):1-6

Project coordinators: Raphael Didham & Stephen Pawson

Content scanning, OCR and cleanup by: Carl Wardhaugh, Katherine Wilson, Stephanie Kaefer, Chris Coleman, Muriele Rabone, Miriam Hall and James Aulsford

Interface and database developed by: Mike Cochrane & Mark Fuglestad

Project funded by: TFBIS (Terrestrial and Freshwater Biodiversity Information System)

(The pages of the publication follow this cover sheet)

Journal of the Royal Society of New Zealand, 1971, Vol. 1, No. 1, pp. 1–6, 14 figs.

The Subfossil Species of *Rhytida* Albers (Mollusca : Paryphantidae)

P. PARKINSON

University of Auckland

[*Received by the Editor, 3 September 1970*]

Abstract

THE known subfossil forms of *Rhytida* Albers, 1850 are discussed and all are shown to be conspecific with living taxa: *R. spelaea* Powell, 1933 is synonymised with *R. greenwoodi* (Gray, 1850); *R. yaldwyni* Dell, 1955 is synonymised with *Wainuia urnula urnula* (Pfeiffer, 1855); *R. hadfieldi* Powell, 1949 is synonymised with *R. oconnori* Powell, 1946 and *R. duplicata vivens* Powell, 1946 is synonymised with *R. duplicata duplicata* Suter, 1904.

INTRODUCTION

TWENTY-ONE taxa in the genus *Rhytida* are currently recognised as New Zealand endemics. The taxonomic arrangement of these is unsatisfactory, but before a thorough revision of the group can be carried out, much work on the soft part anatomy must be done. Shell variability is high and it appears that shell characters, in some cases, are insufficiently constant to warrant taxonomic recognition. When shell form is considered with anatomy we may acquire a more natural system of classification within the genus. The described species and subspecies fall into a number of natural groups, but these have been described from shell form alone and their taxonomic significance cannot be resolved until fresh animal material is examined.

At present the genus contains four taxa known wholly from subfossil material. The purpose of this paper is to discuss the relationship of these subfossils to the living members of the genus. The height index (shell height divided by major diameter) is used to compare shell forms in *R. duplicata* (s.l.), and on a population basis the mean major diameter of old specimens (those showing a descending peristome) is related to variation in the same species.

The evidence presented shows that the subfossil forms are not distinguishable from living species.

THE SYSTEMATIC STATUS OF THE SUBFOSSIL TAXA

Rhytida spelaea Powell, 1933

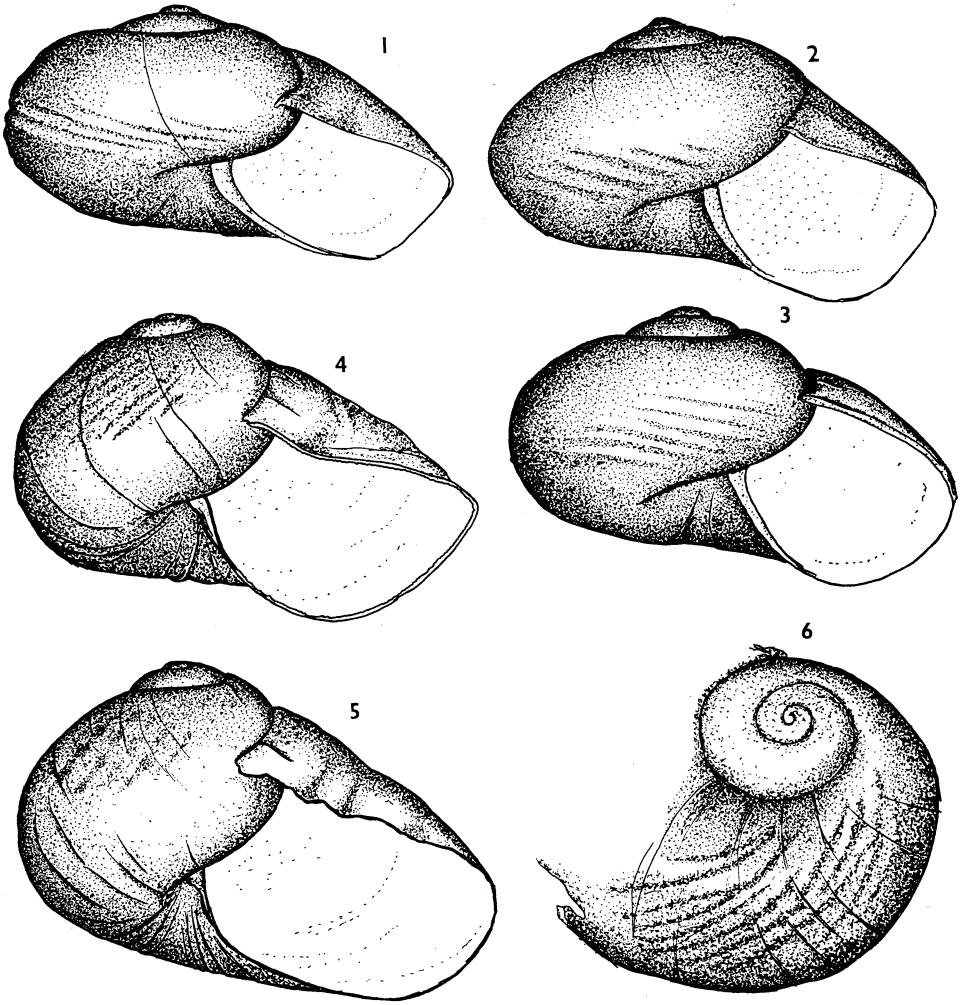
Powell (1933) described *Rhytida spelaea* from sand dunes south of Cape Kidnappers, Hawke Bay, and distinguished it from *R. greenwoodi* (Gray) on the basis of its more inflated shape, non-descending peristome and rounded, instead of flattened, base.

The three type specimens are bleached and have no periostracum. The holotype (M1752), a paratype (M23680), and topotypes (M16287) are deposited in the Dominion Museum, Wellington. A further paratype is deposited in the Auckland War Memorial Museum. The holotype is not a typical specimen; its peripheral corrugations are more strongly developed than are those of the other specimens.

Mr C. Templar of Hamilton has two shells of a subfossil *Rhytida* collected from sand dunes at Raglan. These are not distinguishable from *R. spelaea* in shell contour, but have the typical *greenwoodi* character of a dark colour patch in the umbilicus. I have similar shells from Waiheke Island.

Rhytida greenwoodi is a widely dispersed species, and is found over most of the North Island south of Auckland, on some offshore islands, and in Nelson and Marlborough in the South Island. Forms living around limestone tend to be limy and depressed, as at Nelson and Kawhia, whereas those of insular or coastal habitats are thin-shelled and rotund, as at Cuvier Island.

Dell (1954: 145) has shown that in *Paryphanta busbyi* (Gray) the compact, "inflated" condition of the shell is related to the availability of water and lime in the habitat. Coastal specimens and those from dry scrub were found to be more elevated than those from damp areas. The inflated shape of *Rhytida* can also be traced by inference to a condition of growth imposed by the environment.



FIGS. 1–3.—*Rhytida greenwoodi.* Fig. 1, specimen from Raukumara Range; Fig. 2, specimen from Waiheke Island; Fig. 3, Paratype of *R. spelaea.*

FIGS. 4–6.—*Wainuia urnula.* Fig. 4, specimen from Rimutaka Range; Fig. 5, holotype of *Rhytida yaldwyni;* Fig. 6, sculpture of a paratype of *R. yaldwyni.*

The descending peristome is a convenient guide to shell maturity in the Paryphantidae, but it is usually more marked in specimens from damp environments. It is present in some of the *R. spelaea* topotypes, but is absent in the type material.

The rounded base of *spelaea,* like the inflated profile and the peristome, is an environmentally determined condition.

The criteria on which *R. spelaea* was erected are ecotypic characters and this species is best regarded as a form of *R. greenwoodi.* Accordingly *R. spelaea* Powell, 1933 is placed in synonymy with *R. greenwoodi* (Gray, 1850).

Shell profile variation in *R. greenwoodi* is illustrated in Figs. 1–3.

Rhytida yaldwyni Dell, 1955

R. yaldwyni was described from cave deposits at Waewaepa and at Ruakokopatuna (Dell, 1955: 135). The peaked apex and narrow umbilicus distinguish it immediately from all other species of *Rhytida. R. greenwoodi* is the only other species of the genus in the vicinity of the above two localities.

R. yaldwyni has all the shell characters of a *Wainuia* Powell and none of those usually associated with a *Rhytida.* Examination of the holotype (M5720) and paratypes (M5721) all in the Dominion Museum, Wellington, has confirmed my suspicion that *R. yaldwyni* is a species of *Wainuia.* I removed the periostracum from a shell of *Wainuia urnula* (Pfeiffer), collected in the Rimutaka Range, by soaking the shell in caustic potash solution. The denuded shell was complete and quite substantial enough for subfossil preservation in cave deposits. The Rimutaka shell is rather thinner than the *yaldwyni* specimens, but as the latter were from a limestone area and the Rimutaka Range is of wacke, some difference in shell thickness is to be expected.

R. yaldwyni is known from very few specimens and is not distinct from *Wainuia urnula* specimens without periostracum. *R. yaldwyni* Dell, 1955 is here synonymised with *Wainuia urnula urnula* (Pfeiffer, 1855). The holotype of *R. yaldwyni* and a typical specimen of *Wainuia urnula* are figured (Figs. 4 and 5).

Rhytida oconnori Powell, 1946

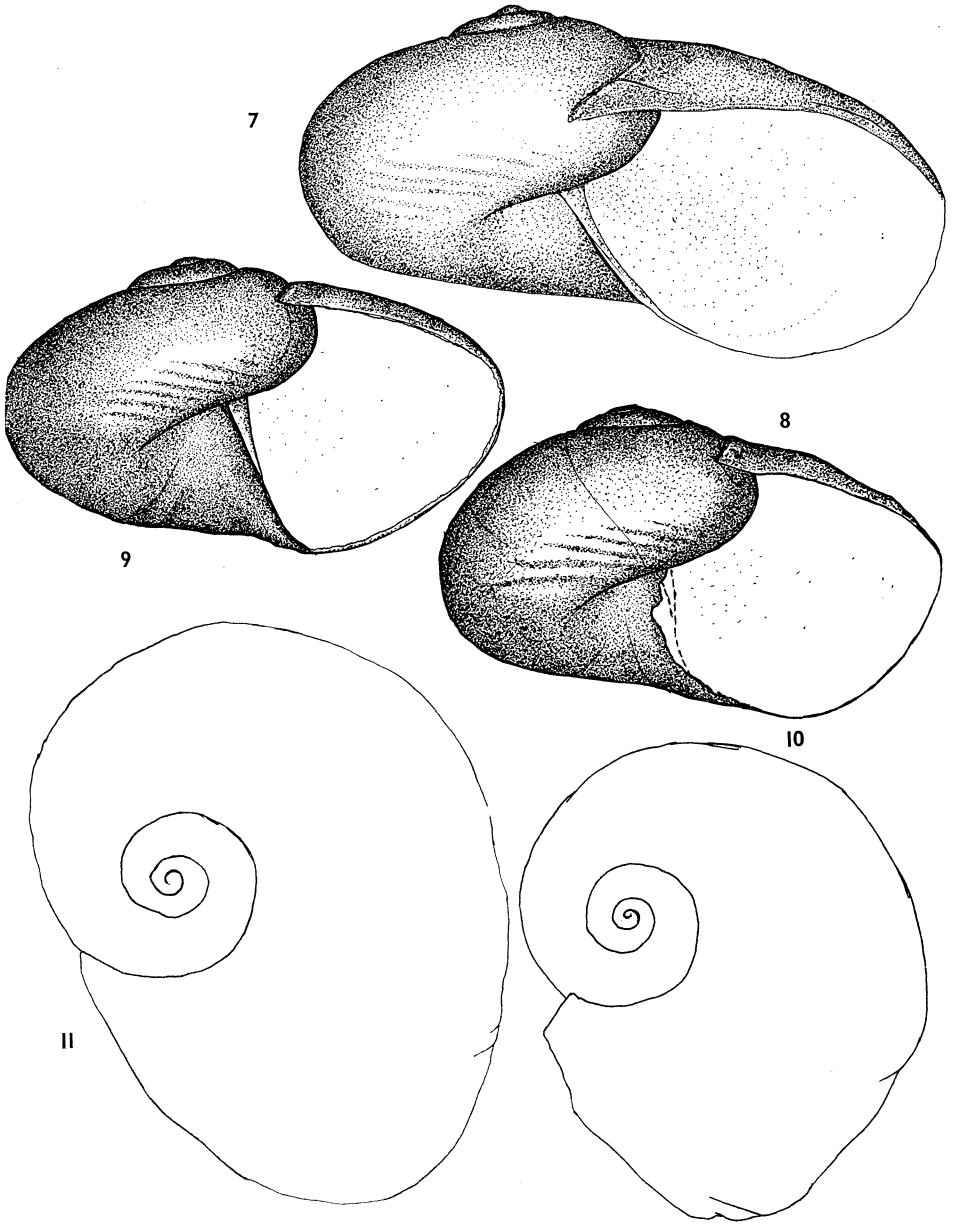
R. oconnori Powell, 1946 is a large subfossil species from Nelson. It has a distinctive though nearly obliterated microsculpture of fine radial lines crossed by more distant spiral striae, a feature it shares with *R. patula* Hutton. The presence of peripheral corrugations also relates *oconnori* and *patula. R. oconnori* is undoubtedly very closely related to *R. patula,* but the two are distinguished by size and by whorl acceleration. All of the *oconnori* type material is obviously juvenile, with sharp and non-descending peristomes.

Examination of the type material of *R. oconnori* has confirmed my opinion that it represents the subfossil condition of the recent species *R. hadfieldi* Powell, 1949. *R. hadfieldi* shares the distinctive microsculpture of *patula* and *oconnori* but is distinguishable from the former in dimensions and coiling. The close relationship of *patula* and *hadfieldi* is supported by the morphology of the genitalia.

A paratype of *R. oconnori* and a topotype of *R. hadfieldi,* of the same dimensions are figured (Figs. 8 and 9). Suture outlines are given (Figs. 10 and 11) and it can be seen that these match very closely. The other paratype of *oconnori* is distorted and the holotype is very small. As there are no valid distinguishing characters, *R. hadfieldi* Powell, 1949 is here considered a synonym of *R. oconnori* Powell, 1946.

Rhytida duplicata Suter, 1904

In describing *Rhytida duplicata vivens* in 1946, Powell noted: "The only difference between the subfossil type and the recent subspecies is the constant smaller size of the latter". I have calculated the mean major diameter on populations of adult *R. duplicata* (s.l.) together with height indices in order to examine the constancy of shell sizes and shape. The results of these calculations are given in



FIGS. 7–11.—*Rhytida oconnori.* Fig. 1, adult topotype of *R. hadfieldi;* Fig. 8, paratype of *R. oconnori;* Fig. 9, topotype of *R. hadfieldi* of same size as paratype of Fig. 8; Fig. 10, suture outline of paratype; Fig. 11, suture outline of adult *R. hadfieldi* topotype.

Table I. The mean height index lies constantly within the range 0.59–0.61 and it is evident that shape cannot be used to separate the subspecies. In the table three fairly distinctive groups of populations can be seen. In these groups size seems to be correlated with the geological age of the specimens.

The oldest shells, from Cape Maria van Diemen, dug from consolidated dunes are largest. Subfossils from Tom Bowling Bay and Waikuku Beach, found in loose sand are next in size. It is not certain whether they were washed or wind blasted

TABLE I.—Measurements and height indices of subfossil and Recent specimens of *Rhytida duplicata.*

POPULATION	N	Mean D'meter	95% Con. Lim.	Mean H.I.
S.E. Cape Maria van Diemen *A.M. 28554 (Subfossil)	11	28.63	1.46	0.60
Cape Maria van Diemen A.M. 25775 (Subfossil)	5	29.34	1.27	0.60
Cape Maria van Diemen M. (Subfossil)	14	29.42	1.18	0.62
Cape Maria van Diemen A.M. 29587 (Subfossil)	4	27.00 —31.80	—	0.55 —0.62
Sum. Cape Maria van Diemen specimens. (*duplicata* s.s.)	34	29.25	3.96	0.60
Tom Bowling Bay M. 5482 (Subfossil)	4	23.80 —28.50	—	0.50 —0.66
Tom Bowling Dunes N.Z./f. 622 (Subfossil)	4	23.00 —25.40	—	0.62 —0.70
S.W. Tom Bowling Bay N.Z./f. 624 (Subfossil)	16	24.99	1.03	0.62
Tom Bowling Bay A.M. 25795 (Subfossil)	3	24.50 —28.60	—	0.51 —0.55
Tom Bowling Dunes N.Z./f. 623 (Subfossil)	33	25.97	4.04	0.60
Waikuku Beach N.Z./f. 621 (Subfossil)	8	26.89	1.35	0.58
Sum. Tom Bowling and Waikuku specimens	68	25.79	4.04	0.61
Whareana A.M. 27285 (Recent)	3	23.30 —23.80	—	0.60 —0.68
Unuwhao A.M. 25799 (Recent)	2	21.80 22.60	—	0.60 0.61
Unuwhao M. (Recent)	11	21.87	1.69	0.60
Cape Reinga M. 17615 (Recent)	12	21.23	0.55	0.59
Te Huka, near Tom Bowling Bay A.M. 27373 (Recent)	2	19.00 20.60	—	0.61 0.61
½-mile North of Kahuronaki (Recent)	4	20.60 —22.20	—	0.50 —0.57
Unuwhao 800′ (Recent)	5	22.84	1.09	0.62
West of Pandora (Recent)	4	19.00 —22.20	—	0.50 —0.72
Near North Cape Lighthouse (Recent)	6	24.45	1.14	0.60
½-mile South of Whaekaura (Recent)	4	20.60 —24.60	—	0.51 —0.61
Sum. All 'recent' speciments (" *vivens* " s.s.)	53	22.07	3.79	0.59

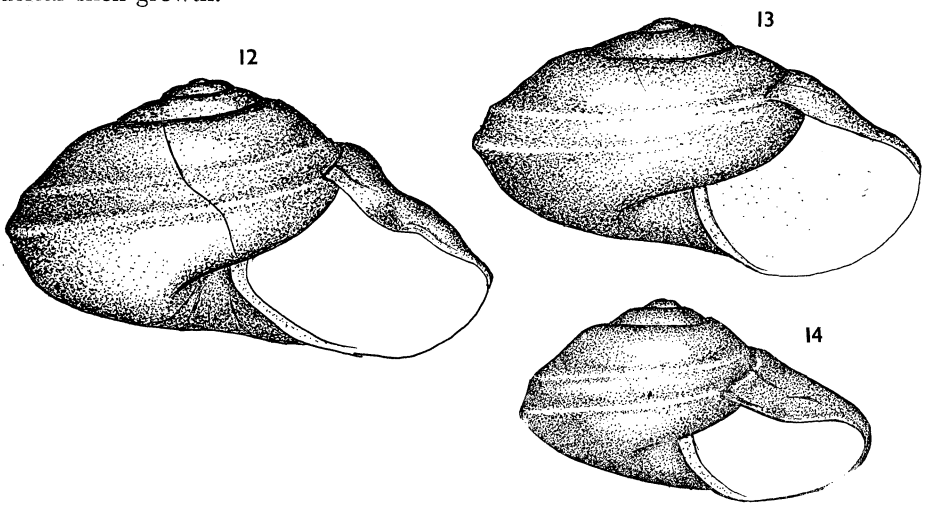
* A.M.=Auckland Museum; M.=Dominion Museum and N.Z./f.=Auckland University Geology Department collections respectively.

out of consolidated dunes or even if they did originate from consolidated dunes, but it does seem that they have not always been preserved in the loose sand in which they were found. Traces of consolidated sand and humus found in some shells suggest that these shells are more recent than the Cape Maria van Diemen specimens.

The recent shells (subspecies *vivens*) are smaller, although only one of the specimens examined was adult at less than 19.0mm in diameter. Powell's specimens were not larger than 18.5mm in diameter.

The nature of subspecies *vivens* is quite clear as that name can be properly applied only to living shells. The subspecies *duplicata* must strictly refer to the Cape Maria van Diemen subfossils. In museum collections the Tom Bowling Bay specimens have been attributed to both subspecies by different collectors. The whorl numbers given by Powell in his diagnosis of *vivens* are not useful as criteria on which to separate the subspecies. The protoconch is often calcined, worn or

distorted and this makes it impossible to determine the initial direction of post-nuclear shell growth.



FIGS. 12–14.—*Rhytida duplicata.* Fig. 12, specimen from Cape Maria van Diemen (subfossil); FIG. 13, specimen from Tom Bowling Bay (subfossil); Fig. 14, specimen from Unuwhao (recent).

I consider, therefore that the *Rhytida duplicata* complex is best regarded as a single species which has undergone a clinal reduction in size, and I do not propose to differentiate the size groups taxonomically. Accordingly *Rhytida duplicata vivens* Powell, 1946 is placed in synonymy with *R. duplicata duplicata* Suter, 1904.

THE SUBFOSSIL OCCURRENCE OF RHYTIDA

Rhytida is found subfossil in most places where limestone outcrops, caves or sand dunes occur within its range. Species which have been found in subfossil condition are: *R. duplicata; R. dunniae; R. greenwoodi; R. stephenensis; R. oconnori; R. meesoni; R. australis.*

ACKNOWLEDGMENTS

I thank the following institutions for assistance in the preparation of this paper: The Dominion Museum, Wellington; The Auckland War Memorial Museum; The Geology and Zoology Departments, University of Auckland; and many private collectors for supplying materials.

I am especially grateful to Mr J. P. Allen and to Mr F. M. Climo and Dr R. K. Dell for their constructive criticism of the manuscript.

LITERATURE CITED

DELL, R. K., 1955. Some New Zealand Subfossil Land Mollusca. *Dom. Mus. Rec. Zool.*, 2(3): 135.

———— 1955. A contribution to the study of Rates of Growth in *Paryphanta busbyi* (Gray) Mollusca, Pulmonata. *Dom. Mus. Rec. Zool.*, 2(3): 145.

POWELL, A. W. B., 1933. Two New Land Snails from New Zealand. *Proc. Malac. Soc. Lond.*, 20: 191–4.

PHILIP PARKINSON,
Department of Botany,
University of Auckland,
Auckland,
New Zealand.