

# THE REDISCOVERY OF *HELIX GEORGIANA* QUOY AND GAIMARD, 1832 (MOLLUSCA: GASTROPODA) AT PEMBERTON AND THE DISCOVERY OF A RELATED SPECIES IN THE STIRLING RANGE, WESTERN AUSTRALIA.

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## INTRODUCTION

In the year 1826, during its voyage of exploration to "New Holland," the French vessel *Astrolabe*, commanded by J. Dumont-d'Urville, made several landfalls along the southern coast of Australia. Naturalists Jean René Constant Quoy and Joseph Paul Gaimard, who served also as the ship's surgeons, went ashore on these occasions in order to collect zoological material.

Quoy and Gaimard were particularly interested in molluscs and, in the course of the voyage, added many new species, both marine and non-marine, to their collection.

As a result of their efforts and enthusiasm, important elements of our molluscan fauna were described quite early in the period of European settlement. Some species were described personally by the collectors; others were passed on for description by colleagues such as Jean Baptiste Lamarck.

The *Astrolabe* called at only one Western Australian locality—King George Sound—where for several weeks during October, our two naturalists collected with energy, from sea and land, in what is now the Albany district. Their discoveries included land snails, of which four species, including *Helix georgiana*, were subsequently described in the zoological reports of the expedition (Quoy and Gaimard, 1832). Alexander (1916: 126-136) has summarized this episode in the zoological history of Western Australia.

It appears that only a single specimen of *H. georgiana* was collected by Quoy and Gaimard. This shell, the holotype of the species, was fortunately lodged in the collection of the Natural History Museum of Paris, where it has been carefully preserved to this day. Since the initial published record, *H. georgiana* has been discussed, classified and reclassified by many workers (see bibliography). A feature of all of these studies is the absence of any reference to a specimen other than the holotype, and we conclude that until recently the only example of this rare species known to science was that collected by Quoy and Gaimard.

In 1968, acting on a suggestion by Dr. D. L. Serventy, one of us (E.H.S.) forwarded a small sample of land snail shells collected at Pemberton, Western Australia, to the Western Australian Museum. There, one specimen in the sample was tentatively identified as *H. georgiana*. This conclusion was subsequently confirmed at the National Museum of Victoria from comparison of the specimen with photographs of the holotype (Fig. 1, a-c) kindly made available by Professor E. Fischer-Piette of the Paris Museum. The shell from Pemberton (Fig. 1, d-f), considered to be only the second specimen on record, has since been presented to the Western Australian Museum.

## CLASSIFICATION

In past studies, *H. georgiana* has been classified with the Zonitidae (Tryon, 1886) and Endodontidae (Pilsbry, 1894), conceivably because the discoidal shell appears from the illustrations to resemble these groups somewhat. Alexander (1916) and Hedley (1916), probably in consultation, appear to have been the first to associate this species with the genus *Rhytida* Albers.

Iredale (1933) erected the monotypic genus *Oecirhenea* for *H. georgiana*, associating it with *Rhytida*. The shell characters on which Iredale based his genus were "The strongly sculptured base, narrow umbilicus and produced outer lip." Subsequently, in elevating *Oecirhenea* to family rank, Iredale (1939) corrected the reference to strong basal sculpture, but provided no further characters for either genus or family.

We consider that the shell of *H. georgiana* is neither generically nor subgenerically distinctive, and after Solem (1959) we refer it to the paryphantid genus *Rhytida*, subgenus *Strangesta*. The classification which follows is tentative. A more positive evaluation will have to wait upon the collection of a live specimen and examination of the anatomy.

The Paryphantidae are carnivorous snails which occur in Australia, Tasmania, New Zealand, New Caledonia, New Guinea, the Moluccas, Tonga, the Solomon Islands, the Caroline Islands, Samoa, the Seychelles and South Africa.

Pacific islands paryphantids have recently been revised by Solem (1959), who has defined a "Southern Relict Fauna" of land snails, including as major constituents, the Paryphantidae, Endodontidae and Bulimulidae (ibid: 306). The presence in south western Australia of two paryphantid species (see below), together with numerous endodontids and bulimulids (Iredale, 1939) clearly establishes that territory as a major centre for the primitive land snails of the Southern Hemisphere.

Paryphantids have a thin shell, usually composed of conehin and deficient in calcium carbonate. Shells are always wider than high and range in size from a few to about 80 millimetres diameter. The pharyngeal mass is large, very muscular and capable of great distension, permitting the accommodation of relatively large prey, which is held by the well developed, lance-like teeth of the radula. There is no jaw.

Iredale (1938) lists 37 nominal species of paryphantids from all Australian states except the Northern Territory. Most are reported from localities in eastern Australia, from Tasmania to northern Queensland. They are found in a variety of habitats, from dense rain forests to exposed sea cliffs. One of us (B.J.S.) is at present revising the Australian species.

### Family PARYPHANTIDAE

#### Genus RHYTIDA Albers, 1860

*Oecirhenea* Iredale, 1933. *Ree. Aust. Mus.*, 19: 48.

Type species *Helix greenwoodi* Gray

Subgenus STRANGESTA Iredale, 1933

Type species *Helix leichardti* Cox.

*Rhytida* (*Strangesta*) *georgiana* (Quoy and Gaimard)

*Helix georgiana* Quoy and Gaimard, 1832. *Voyage de découvertes de l'Astrolabe . . . .*, Paris. Zoologie 2 : 129, supplementary atlas 1 : pl. 10, figs. 26-30.

*Helix georgiana* Quoy and Gaimard. Lamarck, 1838, *Histoire naturelle des Animaux sans vertèbres*, 2nd edn., Paris 8 : 107.

*Helix georgiana* Quoy and Gaimard. Pfeiffer, 1847, *Monographia Helicorum viventium*, Lipsiae, 1 : 65.

- Helix georgiana* Quoy and Gaimard. Férussac and Deshayes, 1850, *Histoire naturelle . . . des Mollusques terrestres et fluviatiles . . .*, Paris, 1 : 88, pl. 84, figs. 3, 4.
- Helix georgiana* Quoy and Gaimard. Cox, 1868, *A Monograph of Australian Land Shells*, Sydney, p. 28, pl. 19, figs. 1, 1a, 1b.
- Zonites (Hyalinia) georgiana* Quoy and Gaimard. Tryon, 1886, *Manual of Conchology*, (2) 2 : 168, pl. 52, figs. 94-96.
- Flammulina (Thalassohelix) georgiana* Quoy and Gaimard. Pilsbry, 1894, *Manual of Conchology (Tyron)*, (2) 9 : 14. (List compiled by C. Hedley.)
- Vitrea georgiana* Quoy and Gaimard. Smith, 1895, *Proc. malac. Soc. Lond.*, 1 : 87.
- Flammulina (Thalassohelix) georgiana* Quoy and Gaimard. Cox, 1909, *An alphabetical list of Australian land shells*, Pt. 1, p. 32.
- Rhytida georgiana* Quoy and Gaimard. Alexander, 1916, *J. Roy. Soc. W. Aust.*, 1 : 131, 147.
- Rhytida georgiana* Quoy and Gaimard. Hedley, 1916, *J. Roy. Soc. W. Aust.*, 1 : 220.
- Oxylchilus cellarius* (Müller) (error). Thiele, 1930, *Die Fauna Süd-West Australiens*, 5 : 588.
- Occirhenea georgiana* Quoy and Gaimard. Iredale, 1933, *Rec. Aust. Mus.*, 19 : 48.
- Occirhenea georgiana* Quoy and Gaimard. Iredale, 1938, *Aust. Zool.*, 9 : 120.
- Occirhenea georgiana* Quoy and Gaimard. Iredale, 1939, *J. Roy. Soc. W. Aust.*, 25 : 73-74, 85, pl. 5, figs. 22, 22a. Also published as *Rec. W. Aust. Mus.*, 2 : 73-74, 85, pl. 5, figs. 22, 22a.

**Description of holotype** (original text). "*Helix, testa orbiculari, translucida et fragili, desuper valde striata, flava; anfractibus quaternis, ultimo cylindraceo; apertura ampla, subcircinata; labro tenui.*"

The authors further state, "Cette petite Hélice, qui a beaucoup de rapports avec la *Nitidula* de Stouder, est orbiculaire, arrondie en dessus, avec des stries profondes et serrées qu'on ne voit bien qu'à la loupe. Le dernier tour de spire est presque cylindrique, fort grand, évidé par l'évasement de l'ombilic, ce qui rend cette coquille comme concave en dessous. L'ouverture est presque orbiculaire, à péristome simple. L'épiderme très-serré est de couleur blonde, comme tout le têt, qui de plus est fragile et translucide.

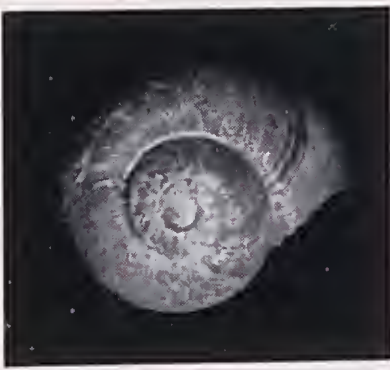
Cette espèce habite le port du Roi-Georges, à la Nouvelle-Hollande. Nous n'en connaissons point l'animal."

**Type locality:** "Le port du Roi-Georges, à la Nouvelle-Hollande = King George Sound, Western Australia.

Strictly speaking, King George Sound is a marine locality, and although frequently employed in older zoological records as a synonym for the Albany district, its continued usage in that context for a non-marine animal is inappropriate. We therefore redefine the type locality of *R. (S.) georgiana* as Albany district, Western Australia.

**Dimensions of holotype** (mm): Major diameter, 10.5; minor diameter, 9.0; height 5.7.

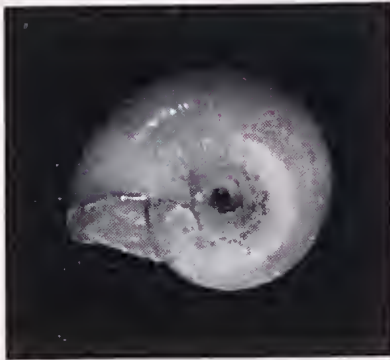
**Location of holotype:** Le Muséum National d'Historie Naturelle, Paris.



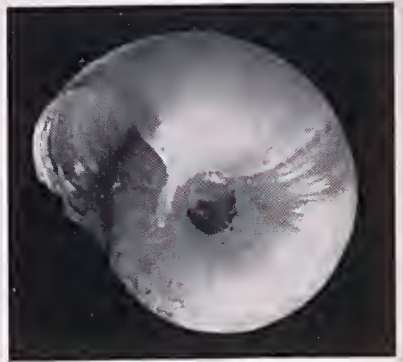
1(a)



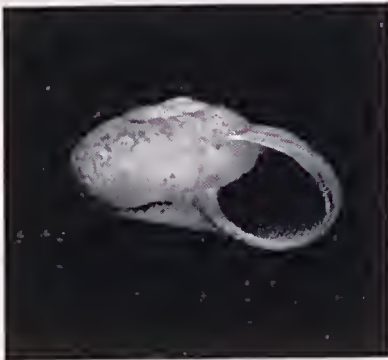
1(d)



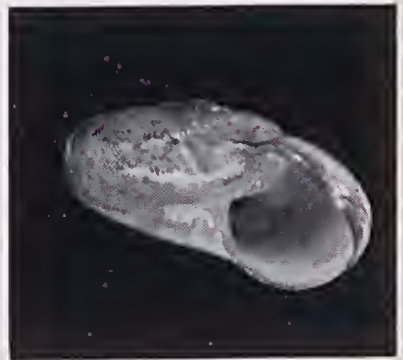
1(b)



1(e)



1(c)



1(f)

Fig. 1—*Rhytida* (*Strangesta*) *georgiana*—Albany specimen on left (x3), Pemberton specimen on right (x5½).

	Holotype	Pemberton Shell
Facing aperture	(a)	(d)
From above	(b)	(e)
From below	(c)	(f)

## THE PEMBERTON SPECIMEN

### Description

Shell of 2.7 whorls, small, discoidal, thin, translucent; protoconch of 1.5 whorls, mainly smooth but with close, radial, subsutural threads; apex low, whorls slightly convex, rapidly enlarging, last whorl expanded; aperture large, subireular, descending; outer lip thin, prosocline; sutures impressed; base concave, umbilicus wide, deep, visible to the top; columella short, oblique, reflected above; upper portion of the shell sculptured with fine, close, transverse-colabral costae, occasionally anastomosing and continuing a little below the periphery of the whorl; base polished, sculpture reduced and consisting of fine, obscure radial threads, continuing into the umbilicus, crossed by a few microscopic, spiral striae; periostracum yellow, with faint pale yellow and golden arcs on the upper surface.

**Dimensions (mm):** Major diameter, 7.0; minor diameter, 5.8; height, 3.5.

**Location of specimen:** Western Australian Museum, number 435-70.

**Locality of collection.** The town of Pemberton (latitude 30° 28'S, longitude 116° 01'E) is situated in the lower south west of Western Australia, within forest dominated by the Karri tree (*Eucalyptus diversicolor* F. Muell). Gardner (1944) describes the Karri forest, characterizing it as "a type of temperate rain forest." The dependence of Karri forest on high rainfall is outlined by Churehill (1968).

The mean annual rainfall at Pemberton is 1298 mm, of which 280 mm (22%) fall during the six driest months, November to April. Gentili (1948) presents data on temperature, evapo-transpiration and rainfall for Western Australia, indicating that the lower south-west experiences normal mean temperatures below 22°C for twelve months of the year, and below 18°C for nine months of the year. Potential evaporation in the lower south-west ranges from about 110 mm in January to about 30 mm in July. A hygrostatic index of 60 (or more) prevails in the region and delimits the Karri forest (ibid: 122).

In brief, Karri is associated with comparatively moderate temperatures, high humidity and a dry season of short duration and low intensity.

The Geological Map of Western Australia (1966), published by the Mines Department, indicates that the Pemberton district is underlain by pre-Cambrian crystalline rocks with zones of high grade metamorphism, migmatite and gneiss. Harris (1966: 51) states that "Karri soils generally are acidic in reaction, with textures varying from fine sands to sandy loams derived from underlying granitic rocks."

The specimen of *R. (S.) georgiana* was collected during May, 1955 (by E.H.S.) at a locality on the north western side of Pemberton townsite, between the Youth Camp and the adjacent town swimming pool on a dammed tributary of Lefroy Brook. Originally the area would very probably have been a stand of pure Karri with a dense mesophytic understorey, but considerable modification has taken place.

Some of the native trees remain but much ground has been cleared for buildings and open space, and there has been some replanting of non-indigenous trees. However the environs of the stream and the hillside along its north western (right) bank retain original vegetation which, apart from some blackberry infestation, is substantially unaltered.

At the time of collection, the weather was cool, fine and cloudy, with humid conditions well established. Snails were found on the damp, shaded walls of a brick toilet building (since demolished) adjacent to the Youth Camp. The sample (all living specimens) comprised one *R. (S.) georgiana*, one *Helicarion castaneus* (Pfeiffer) and a series of *Oxychilus*, probably *O. allarius* (Müller), which is an introduced zonitid. All of these species possess small, thin, brown shells, which in the aggregate are not readily distinguishable. At the time they were not compared closely, and remained unidentified until 1968.

It is noteworthy that Quoy and Gaimard also collected *H. castaneus* while at Albany (Iredale, 1939: 45), "vivant sous les arbres, loin de l'eau douce." *H. castaneus* is the only helicarionid snail at present known to occur in south western Western Australia, and like *R. (S.) georgiana* is

rarely seen. The only specimens in the collection of the Western Australian Museum are two shells from "Geographe Bay," presented by the Australian Museum in 1940. No other specimens are known to us.

In January and May, 1969 and March, 1970, one of us (G.W.K.) spent many hours collecting at Pemberton around the Youth Camp swimming pool and trout hatchery in an attempt to obtain further specimens of the present species and to ascertain the associated mollusc fauna. Modified and unmodified habitats were examined during both wet and dry weather. Special attention was paid to the undersides of stones and logs, to leaf and bark litter, the undersides of bark and moss on tree boles, the crevices of stumps, mosses and other green vegetation, and the margins of the water course.

On each occasion, the only molluscs located were *Oxychilus* sp. and several species of limacid slugs, none of which is indigenous to Australia. The introduced molluscs were found to be abundant throughout the area in both modified and unmodified habitats. The failure to locate a single additional specimen of a native snail suggests that these have recently declined in numbers, possibly as a result of the establishment of the non-indigenous forms at Pemberton.

Limited collecting at some other densely vegetated localities within about 15 kilometres of Pemberton has produced snails referred to the following genera (identifications by G.W.K.): *Austrosuccinea* Iredale, 1937 (Succineidae), *Pernagera* Iredale, 1933, *Liniiodiscus* Iredale, 1937 and *Auuoselix* Iredale, 1939 (all Endodontidae), and *Bothriembryon* Pilsbry, 1894 (Bulimulidae). However, very little collecting of land snails has been carried out in the district up to the present time. Introduced molluscs are recorded only from the townsite of Pemberton and the bushland immediately adjacent.

#### A SUSPECTED SECOND PARYPHANTID SNAIL FROM WESTERN AUSTRALIA

The opportunity is here taken of reporting the collection by Dr. B. R. Wilson of a single, living specimen of a suspected paryphantid, somewhat similar in appearance to *R. (S.) georgiana*. There are however sufficient differences in the shell characters to indicate that this is a distinct and probably undescribed species. More specimens are required before a full study can be undertaken. The specimen was collected in the Stirling Range National Park, with the permission of the National Parks Board of Western Australia, and is now in the collection of the Western Australian Museum, number 2295-69.

#### SUMMARY

A second specimen of *Helix georgiana* Quoy and Gaimard has been collected at Pemberton, Western Australia. A tentative classification is proposed within the family Paryphantidae. An additional snail, considered to be an undescribed species of paryphantid, has been collected in the Stirling Range, Western Australia.

#### ACKNOWLEDGEMENTS

We thank Professor E. Fischer-Piette of the Muséum National d'Histoire Naturelle, Paris, for providing photographs and dimensions of the holotype of *Helix georgiana*; Mr. E. Rotherham, Royal Institute of Technology, Melbourne, for photographing the specimen from Pemberton; Dr. B. R. Wilson, Western Australian Museum, for making the specimens available for study; and Mrs. H. Merrifield, Western Australian Museum, for assistance with the bibliography of *R. (S.) georgiana*.

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### POSSIBLE NEST OF NIGHT PARROT IN THE PILBARA, W.A.

By N. L. IVES, Applecross

On 14 July, 1970 I found what could have been a nest of the Night Parrot (*Geopsittacus occidentalis*), 10 miles north-east of Balfour Downs homestead (Lat. 22° 45'S., Long. 121°E.) The nest was in a dormant tussock of spinifex (*Triodia*), about four feet in diameter and three feet high. The nest-chamber was reached by a tunnel about three inches in diameter. Starting at ground level on the edge of the tussock, the tunnel at first ascended slightly where the spinifex stems were densest. Towards the centre of the tussock the tunnel descended to ground level and terminated in a chamber about ten inches in diameter. The floor of the chamber was actually on the ground, which was scraped to a depth of half an inch and densely lined with terminal sections of spinifex leaves (or spines) about five inches long. Similar leaves lined the floor of the tunnel but more sparsely and arranged longitudinally. These spinifex leaves were well frayed and clearly had been chewed from a tussock, but not the one in which the nest was built, for I could find no sign of cutting.

The nest was evidently still being built or just completed. Though the soil was fairly hard here, the comings and goings of the bird(s) were well indicated by the freshly incised surface at the approach to the tunnel. Apart from the lining mentioned above, there was nothing in the chamber (i.e. no feathers, droppings or shell fragments).

The nest tussock was one of the largest of the spinifex growing in the immediate vicinity. Generally the spinifex here was small, but towards the creek (where this one was located) the tussocks were moderately large. Apart from the small gums along the creek the prevailing vegetation was spinifex with scattered shrubs.

No Night Parrots were seen here, nor were any feathers found at nearby waters (pools in the creek, and troughs at windmills). Though all the vegetation was quite dormant, growth could soon be expected because of good rains a fortnight earlier. Indeed numerous Crimson Chats had already invaded the area. Very likely the same rains had stimulated the Night Parrots to build.

At about 10 a.m. on the following day, 60 miles to the north-east, we flushed four birds, presumably Night Parrots. My brother and I were each driving a vehicle cross-country from the old Rabbit-Proof Fence east-