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Dedicated to Professor Dr. H. Engel

Note on an echinoid from Gough Island, South Atlantic

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ABSTRACT

Five specimens of the echinoid, *Pseudechinus novaeamsterdamiae* (Döderlein, 1906), are here recorded from Gough Island. Some other species of the genus are discussed and numerical data on these and the Gough Island specimens have been tabulated.

It is with great pleasure that I dedicate this short paper to Professor Dr. H. Engel on the occasion of his seventieth birthday. The specimens concerned were collected by Dr. Martin Holdgate during the Gough Island Survey of 1956.

Pseudechinus novaeamsterdamiae (Döderlein)

Notechinus magellanicus var. *novae-amsterdamiae* Döderlein, 1906: 227—230, pl. xxviii figs. 3, 4, pl. xlvii fig. 5.

Notechinus magellanicus var. *neu-amsterdami*, Koehler, 1908: 616.

?*Pseudechinus* (*Notechinus*) *Sancti-Pauli* Dollfus, 1946: 159—172, figs. 1—16, pls. iii, iv.

Locality. — Dell Rocks, Gough Island; March 29th., 1956. 5 specimens.

All five specimens are similar in size with horizontal diameters of 26—31 mm. The type-material of *Pseudechinus novaeamsterdamiae* from New Amsterdam Island in the southern Indian Ocean includes specimens with diameters from 22 to 34 mm. Some numerical details of the Gough Island specimens are given in the table together with other data given by Döderlein, Mortensen and Dollfus for some examples of *P. magellanicus*, *marionis*, *novaeamsterdamiae*, *novaezealandiae* and *sanctipauli* and my own measurements of specimens in the British Museum collections of *magellanicus* and *marionis*, most of the latter collected by the "Challenger" off Marion and Prince Edward Islands and rightly suspected by Mortensen (1936) to be referable to *marionis*. However, not all the "Challenger" specimens were retained in London, those from stations 145 (Prince Edward Island, 310—315 fathoms) and 147 (west of the Crozet Islands, 1600 fathoms) not being traceable.

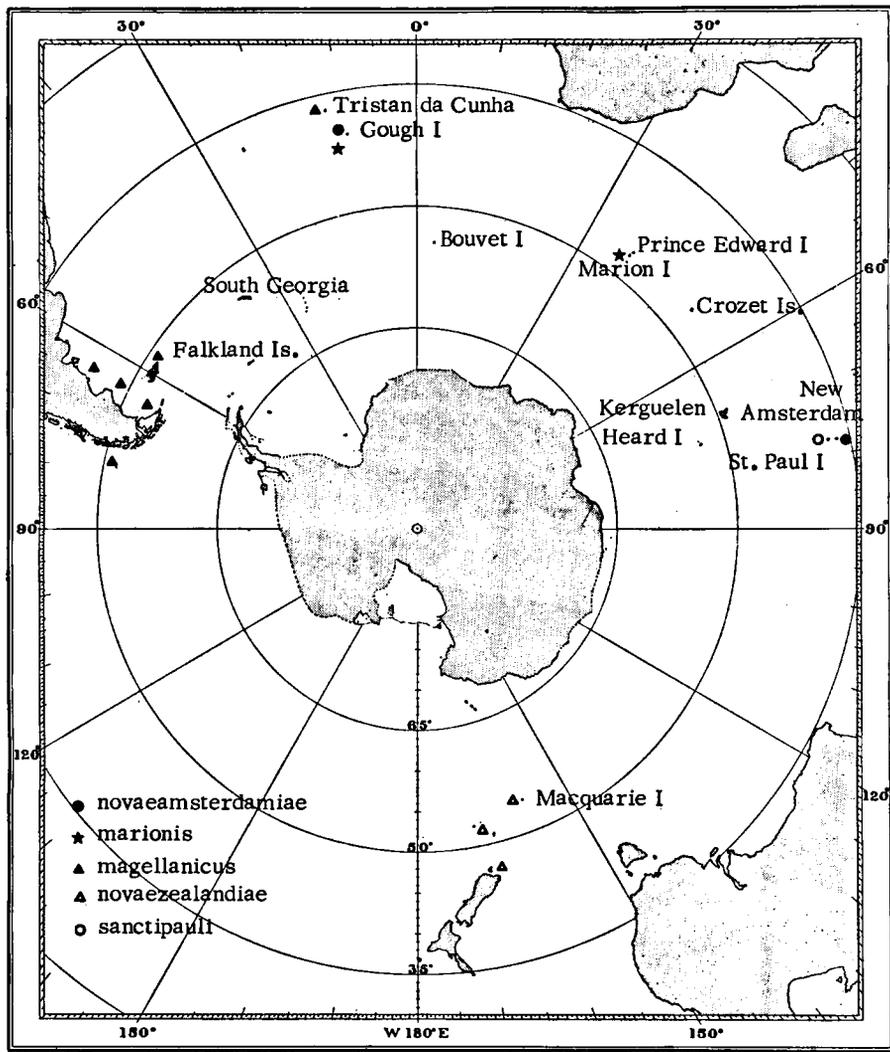
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TABLE I. Data on various specimens of *Pseudechinus*

	Horizontal diameter (h.d.) (mm)	Apical system % of h.d.	Peristome % of h.d.	No. of adamb. plates	Suranal plate ringed* (+ or —)	Longest spines (mm)
<i>novaeamsterdamiae</i>						
Gough I Survey	31	20	35	30	—	9.5
Syntype (Död.)	29	21	32	28	—	7.0
Gough I. Survey	28	23	38	27	—	
" " "	28	20	30	28	—	9.0
" " "	27	20	39	28	—	
" " "	26	23	36.5	27	—	9.0
Syntype (Död.)	25	22	36	26		7.5
" "	22.5	22	36	26		7.5
Range	22—31	20—23	30—39			
<i>sanctipauli</i>						
Syntype (Dollfus)	40	20	30	29—30	—	
" "	37	19	31	31—32		
" "	26	15	33	25—26		
Range	26—40	15—20	30—33			
<i>magellanicus</i>						
Swed. S-P.E. (Mtsn.)	38	32	29	25—26	—	
" " "	37	32	27	24—25		
" " "	36	33	28	24—25		
Dt. T-s.E. (Död.)	34	27	30	25		
Swed. S-P.E. (Mtsn.)	30.5	33	31	21		
" " "	25	28	32	20—21		
Dt. T-s.E. (Död.)	25	28	35	21		
B.M. Argentina	24	33	36	17	—	11.0
" "	23	31	34	17	—	12.5
" "	23	33	38	18	—	c. 10
" "	23	29	33	17—18	—	11.0
" Falkland-Mag.	23	30	37	18	—	6.0
" " "	22	30	36	18—19	—	6.5
Dt. T-s.E. (Död.)	22	26	36	21		
Range	22—38	26—33	27—38			
<i>novaezealandiae</i>						
Syntype (Mtsn.)	40	17.5	30	33—34		
" "	32	17	35.5	30—31		
" "	24	25	40	22		
Range	24—40	17—25	30—40			
<i>marionis</i>						
B.M. "Chall."	26	25	33	25	+	c. 7
Syntype (Mtsn.)	25	30	36	20—21	+	< 10
B.M. "Chall."	23	24	34	21	+	c. 7
Syntype (Mtsn.)	22	31	39	20—21		
B.M. "Chall."	20	26	35	21	(+)	6.0
Syntype (Mtsn.)	21.5	28	37	19—20		
" (A.M.C.)	21	26	35	19—20	(+)	4.0
" "	20	29	40	21	+	4.5
" (Mtsn.)	19	34	37	18—19		
" (A.M.C.)	18	29	39	19	(+)	5.0
" "	11	33	44	14	+	3.0
"Disc." Gough I.	10	30	40	14	(+)	3.5
Range	10—26	24—34	33—44			

*) The sign (+) signifies that the suranal is partially ringed by small plates.



The remaining "Challenger" specimens throw some light on the range of variation of *P. marionis*, two of them with horizontal diameters of 18 and 20 mm having the suranal plate not completely ringed by smaller plates, whereas in the type-material Mortensen noted that this condition is usual from a size of about 14 mm diameter. Also the largest "Challenger" specimen (h.d. 26 mm) has as many as 25 ambulacral plates in each series, although the number does not exceed 21 in the others. Finally the coloration in spirit appears to be a little deeper in the "Challenger" specimens, most of them being distinctly pale green aborally and on the basal parts of the spines, although one has a pink tinge especially on the periproct.

The Gough Island specimens have the colour even deeper, one being purplish with the spine tips paling to white as in *Pseudechinus albocinctus*; the others are brownish in colour. The denuded test is dull brown or olive aborally, contrasting with the white pore areas. Döderlein described the type-material of *P. novaeamsterdamiae* as grey-violet with the spines red or brownish and the denuded pore zones paler, which seems very similar to the present material.

The identification of these Gough Island specimens as *P. novaeamsterdamiae* rather than *marionis*, which would have been more probable geographically, is forced on me by their relatively smaller apical areas, the greater number of ambulacral plates and the absence of a ring of plates around the suranal on the periproct, as well as by the deeper coloration (though the last may be of less significance). The first two characters also distinguish the specimens from *P. magellanicus*.

Dollfus (1946) described a new nominal species, *P. sanctipauli*, from fifteen specimens taken at the island of Saint Paul, less than 100 kilometres south of Amsterdam Island. He gave many figures of this (though some are of characters of no proven taxonomic significance, such as the shapes of the ophi-cephalous and triphyllous pedicellariae) but unfortunately included measurements of only four specimens, all but one of which are larger than the types of *novaeamsterdamiae* and *marionis*. The range of variation in the proportions of the different parts and in the numbers of plates is therefore incompletely known. It is clear that *P. sanctipauli* resembles the types of *P. novaeamsterdamiae* and also these specimens from Gough Island in having the apical system relatively small (up to only 20% of the horizontal diameter according to Dollfus), the coronal plates numerous and the suranal plate not ringed by smaller ones. All these characters serve to distinguish it from *marionis* and the first two also from *magellanicus*. Dollfus distinguished *sanctipauli* from *novaeamsterdamiae* by the even smaller apical system, the smaller tubercles and spines, which have a slightly different arrangement, and by the shapes of the globiferous and tridentate pedicellariae. He also thought that the tubercles of *marionis* are relatively larger than those of *sanctipauli*, but a comparison of his photographs with a partly denuded syntype of *marionis* shows that if anything the reverse is the case; in comparing his photographs again with Döderlein's of *novaeamsterdamiae*, the difference in proportions of tubercles and spines does not seem to me to be significant. As for pedicellariae, both Döderlein and Mortensen only illustrated the valves of the tridentate pedicellariae of *P. novaeamsterdamiae* and *marionis* respectively in oblique or side view so that the real shape of the blade cannot be made out. A preparation of pedicellariae from a syntype of *marionis* shows that the valves may be as spatulate as in *sanctipauli* though their shape is a little variable, some being slightly narrower. Also the globiferous pedicellariae of *marionis* do not have marked shoulders, which Dollfus assumed to be present judging from another oblique drawing of Mortensen's (designed to show the terminal teeth rather than the shape of the whole valve), this being another character supposed to distinguish *sanctipauli* from *marionis*. In Döderlein's figure of the large

globiferous pedicellariae of *P. novaeamsterdamiae* (pl. xlvii), figure 5a shows a valve with the narrow part of the blade distinctly longer than the wide basal part, as Dollfus showed is the case in *sanctipauli*, although in Döderlein's figs. 5b and 5c the blades are relatively snorter.

One further nominal species of *Pseudechinus* should be included in this comparison, namely *P. novaezealandiae* (Mortensen, 1922) from the southern end of New Zealand and the off-lying subantarctic islands. At the time that he described this species, Mortensen (1922: 159) commented that he was inclined to consider *novaeamsterdamiae* as a species separate from *P. magellanicus* since it occupies a position intermediate between it and *P. novaezealandiae*, sharing with the latter the relatively small apical area and the more numerous ambulacral and interambulacral plates in comparison with *magellanicus*. Nevertheless, in his monograph (1943) he still included *novaeamsterdamiae* with the rank of a variety of *magellanicus*, though repeating his proviso.

Although the red or brown coloration is shared by *magellanicus* and *novaeamsterdamiae*, the difference in the relative size of the apical system and the number of coronal plates, as indicated in the table, is such that I consider there to be ample justification for treating *novaeamsterdamiae* as a species distinct from *magellanicus* and with greater morphological affinities with *P. novaezealandiae*, from which it differs primarily in the red or brown colour as opposed to green. I am dubious whether *P. sanctipauli* is specifically distinguishable from *novaeamsterdamiae* but much more numerical information is needed before the ranges of variation of the species of *Pseudechinus* can be properly appreciated.

The present record re-establishes *P. novaeamsterdamiae* in the fauna list for Gough Island. Although Koehler recorded it (with a different spelling) from 100 fathoms (183 metres) near the island in 1908 ("Scotia" collections), Mortensen (1943) said that it is 'fairly certain' that Koehler's material is referable to *P. marionis*, which he himself was then recording from a 'Discovery' station off Gough Island at a somewhat similar depth (102—141 metres). Although the largest "Discovery" specimen has the h.d. only 10 mm I can confirm its identification as *marionis*. Unfortunately I have been unable to see the "Scotia" specimens, which were equally small, but I think that such a careful worker as Koehler would at least have commented on any colour difference from the types of *novaeamsterdamiae* if they were in reality *P. marionis**). The specimens of *Pseudechinus* from Tristan da Cunha, which Mortensen (1941) referred to *P. magellanicus*, also merit re-examination; I suspect that they will prove to be referable to *novaeamsterdamiae*.

Clearly, much remains to be discovered about the geographical and morphological limits of the species of this genus.

*) After Completion of this paper I received these specimens on loan from Edinburgh. There are three, the largest having h.d. only 10 mm; it is denuded and has the test marked with green and red, the red predominating (though the two intact specimens show no sign of red colour, only pale green). However, the apical system is about 30% of the h.d. and the peristome 45%, both proportions beyond the expected range for *novaeamsterdamiae* but agreeing with *marionis*.

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