

ON THREE ODONTOCETE SKULLS FROM HEARD ISLAND

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ABSTRACT

Two crania and a rostrum were recovered from Heard Island by the 1985 Australian National Antarctic Expedition to that island. The specimens were assigned to three species, two of which, *Globicephala melaena* and *Mesoplodon layardi*, are confirmed other than by sighting reports as occurring in Antarctic Seas. The third species, *Phocaena spinipinnis*, of which cranial measurements are given, was previously known only from coastal South American waters and is shown to have a much wider distribution than hitherto suspected.

INTRODUCTION

Heard Island (Lat. 53°S, Long. 73° 30' E) is infrequently visited but served as a base for an Australian National Antarctic Expedition which camped on the island from October to November, 1985. Three cetacean skulls were brought back from the island by the party and these were the first collection, albeit small, of whale material from the island.

THE SPECIMENS

Pilot whale, Globicephala melaena (L.)

A complete cranium with some minor damage to the ventral surface was recovered from an entire skeleton stranded on the northern face of the Spit on the eastern extremity of the island. The carcass was estimated to have been stranded for less than a year. Another skeleton, possibly of the same species, was stranded 500 metres distant on the same beach but the skull was missing. Both carcasses had been exposed for an apparently similar period and much of the external covering remained. The cranium was full of brain tissue when collected. The baso-condylar length was 62.7 cm.

The cranium was identified from photographs in the collection of one of us (E. R. G.) which had previously been assigned to this species by Dr P. H. van Bree.

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According to Watson (1981) pilot whales have been sighted by whaling expeditions as far south as the Antarctic Convergence but they were not listed by Parker (1978) or Brownell (1974) as occurring in Antarctic Seas. However, *Globicephala* has been sighted at sea in these waters, a school of at least 6 individuals being sighted by one of us (E.R.G.) in Lat. 60° 08'S, Long. 90° 10'E on 23 Jan. 1980 and a large group of 75 individuals was sighted in 60° 44'S, 55° 51'W by the "Polar Star" (Hanson and Erickson, 1985). These two authors quote a personal communication from P. Best to the effect that over 1750 of these whales were sighted south of 60°S by five I.W.C. cruises. All of these reports are to the south of Heard Island.

Mercer (1975) noted that the northern form of *Globicephala melaena* penetrated into Arctic waters during the summer period in pursuit of squid and it would seem likely that a similar seasonal migration into Antarctic waters takes place.

The record from Heard Island represents the first confirmation by skeletal evidence that pilot whales occur south of the Antarctic Convergence.

The cranium has been lodged in the Tasmanian Museum, Reg. No. A1409.

Strap-toothed Whale, Mesoplodon layardi (Gray)

The material consisted only of the rostrum of which about 1 cm was missing from the distal end (Fig. 1). The right maxilla was intact but the left was broken on both the posterior and post-lateral borders. The internal nares were intact but all of the posterior cranium, including the vertex, was missing. The ventral surface of the posterior rostrum was extensively damaged with all of the ventral bones either absent or reduced by erosion. No mandibles, teeth, jugal arch or otic bones were found.

The rostrum was dry and clearly had been ashore for many years.

The asymmetry of the nasals clearly assigned the rostrum to the Fam. Ziphiidae and the arrangement of the antorbital notch, maxillary tubercle and the premaxillary and maxillary foramina indicated that the specimen could be assigned to *Mesoplodon layardi*. The steps in this identification are intended to be published elsewhere by the senior author.

The firm sutures indicated that the specimen was derived from an adult whale.

The bones of the beak were strongly sutured with no space between the dorsal surfaces of the premaxillaries and the maxillaries. The mesorostral groove was filled by osseous material which was believed to be a feature of the male (Besharse, 1971). However, Moore (1960) had earlier noted that the groove filled more slowly in females than in males and he suggested that this was also an age related factor. To some extent this view was supported by the findings of McCann (1965) who observed that the groove was filled with replacing bone formed by the transformation of the mesethmoid cartilage, commencing at the proximal end. He found that there was some sexual dimorphism in that the groove in females often is irregular and not completely

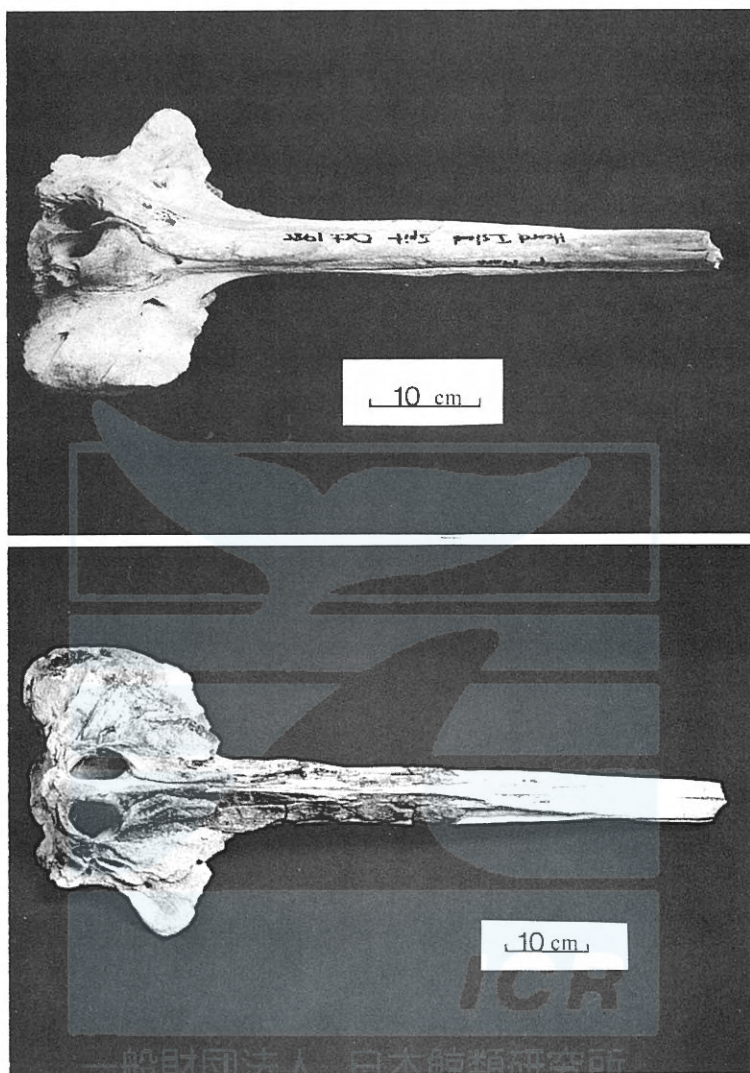


Fig. 1. Dorsal (top) and ventral (bottom) views of the skull of *Mesoplodon layardi* from Heard Is., 1985.

filled whereas in the male the filling is of a highly compacted, ivory-like bone often rising above the dorsal surface of the premaxillae.

It would appear that the skull from Heard Is. is that of a male.

DISTRIBUTION OF *MESOPLODON LAYARDI*

This species has a wide southern hemisphere cool temperate distribution being known from circumpolar regions including South America and the

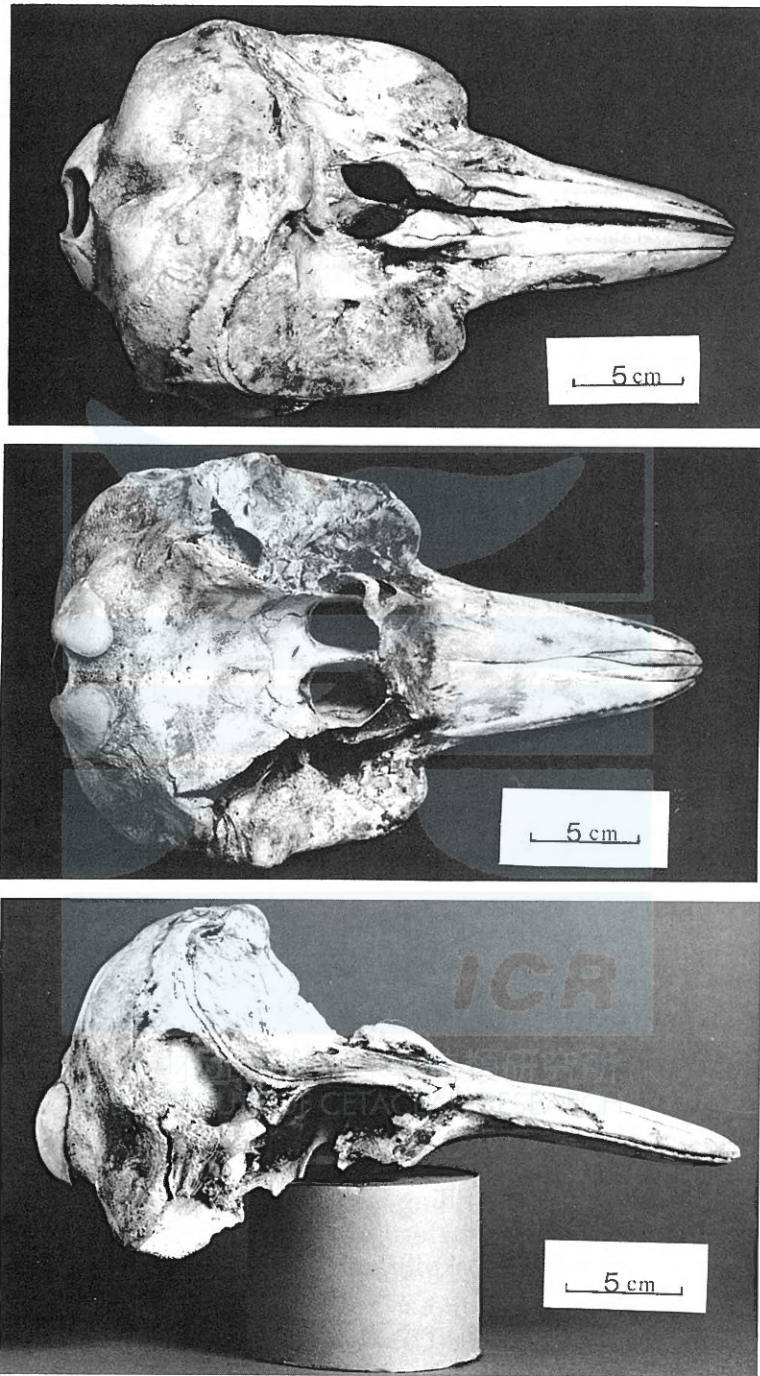


Fig. 2. Dorsal (top), ventral (middle) and lateral (bottom) views of the skull of *Phocaena spinipinnis*, Heard Is., 1985.

Falkland Is (Bruyns, 1971; Rice, 1977) and Tierra del Fuego (Goodall, 1978). It is relatively common in New Zealand (Gaskin, 1972). The Australian records were reviewed by Dixon (1980) and a breeding population occurs in or close to Tasmanian waters (Guiler, 1984). The species has been sighted by whaling fleets as far south as the Antarctic Convergence (Watson, 1981), but it was not listed as living in Antarctic Seas by Brownell (1974), nor do there appear to be any records of this whale from the Antarctic Peninsula or the associated islands.

The present record from Heard Is. is the first report of this species from south of the Antarctic Convergence and also is the first time that the genus *Mesoplodon* has been recorded from Antarctic Seas.

The specimen has been deposited in the Tasmanian Museum, Reg. No. A1410.

Burmeister's porpoise, Phocaena spinipinnis Burmeister

The genus *Phocaena* until recently was represented in southern waters by two species, *P. spinipinnis* (Burmeister) and *P. dioptrica* Lahille. The latter species has recently been moved into the new genus *Australophocaena*

TABLE 1. CERTAIN SKULL MEASUREMENTS OF *AUSTRALOPHOCAENA DIOPTRICA*, *P. SPINIPINNIS* AND THE SKULL FROM HEARD ISLAND

	<i>A. dioptrica</i> (Baker, 1977)	<i>P. spinipinnis</i> Norris and Macfarland, 1958	Heard Is. skull
Cranio-basal length	310	273	303
Max. height	155	—	163
Pre-orbital width	162		164
Zygomatic width	180	168	169
Max. width	180	—	169
Parietal width	157	—	156
Rostral length	117	152	162
width at base	84	83	82
middle	51		51
$\frac{3}{4}$ length	51		38
height at middle	15		24
Width premax. at middle	29		31
Height premax. at middle	3.5		5
Length of fused premax.	open	open	open
to ant. margin of nares	165		159
to vertex of nasals	221		235
of temporal fossa	61		42
Height of temporal fossa	58		39
Length of upper l. toothrow	81	79	71
upper r. toothrow	82		79
Ratio width to length of rostrum	0.727	0.517	0.513
width of skull to length		0.560	0.550

(Barnes, 1985). A good comparison of these two species is given by Norris and McFarland (1958) together with details of two northern hemisphere species, *P. sinus* Norris and McFarland and *P. phocaena* (L.).

The specimen was relatively fresh and in our opinion the porpoise had been stranded within the prior 12 months.

The skull was complete except for the absence of teeth and mandibles and some minor damage in the palatine and otic regions. The jugal arches were absent.

The skull is identified as belonging to *Phocaena spinipinnis* Burmeister. This identification is based on a comparison of the specimen with photographs in Norris and McFarland (1958) which showed good agreement in the features of the skull and the arrangement of the sutures (Fig. 2).

The measurements of the skull show that this was a large individual (Table 1) and this fact, combined with the complete closure of all the sutures, indicates that the animal was an adult.

Although the skull was larger than that described by Norris and McFarland, the ratio of rostral width : rostral length (0.513) is similar to that found by those two authors (0.517) as is the ratio of skull length : skull width (0.55 compared to 0.560). These ratios are different from those found for *P. sinus* (0.630 and 0.637 respectively) and for *P. phocaena* (0.470 and 0.537). The rostral proportions for *A. dioptrica* are 0.737.

The number of alveoli in the upper jaw of the Heard Is. specimen was 14 on the left side and 13 on the right which is similar to that for *P. spinipinnis* whereas *A. dioptrica* and *P. sinus* have a total of 45 and 46 alveoli respectively.

DISTRIBUTION OF BURMEISTER'S PORPOISE

Burmeister's Porpoise has hitherto been known only from the southern Atlantic and Pacific coasts of South America (Praderi, 1971), extending as far as Uruguay (Pilleri and Gahr, 1972, 1975). The presence of the cold waters on the western side of the continent enables the species to range as far as Peru where one was found in a fish market at Chimbote (Clarke, 1962). Watson (1981) believed it possible that substantial numbers of this so-called rare porpoise were sold every year in the 100,000 kg or more of dolphin meat which passes annually through the fish markets.

No records have come to our attention of the presence of this species around the Antarctic Peninsula.

This record is evidence of a wider distribution of this species than its previously known limits. The porpoise must be able to undertake oceanic trips and it must be able to make penetrations into Antarctic waters, at least to the extent of crossing the Antarctic Convergence.

This is not the only South American "coastal" porpoise which has been found on Antarctic or Sub-Antarctic islands. The spectacled porpoise, *Australophocaena dioptrica* (Lahille), has been discovered in comparatively

recent years to occur in the Auckland Islands (Baker, 1977) and at Macquarie Island (Fordyce, Mattlin and Dixon, 1984). Neither of these localities are south of the Convergence. This species may have been seen at sea near New Zealand (Cawthorn, 1977) as well as at the Kerguelen Islands (Frost and Best, 1976).

We suggest that a similar distribution could eventually be found for *Phocaena spinipinnis*.

The cranium has been lodged in the Tasmanian Museum, Reg. No. A1411.

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