Sightings and possible identity of a bottlenose whale in the tropical Indo-Pacific: Indopacetus pacificus

Article *in* Marine Mammal Science · August 2006

DOI: 10.1111/j.1748-7692.1999.tb00818.x

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MARINE MAMMAL SCIENCE, 15(2):531–549 (April 1999)

SIGHTINGS AND POSSIBLE IDENTITY OF A BOTTLENOSE WHALE IN THE TROPICAL INDO-PACIFIC: *INDOPACETUS PACIFICUS?*

It has been known for more than 30 yr that a large, unidentified species of beaked whale inhabits the tropical waters of the Indian and Pacific oceans. Mörzer Bruyns (1971) reported the first sightings, from the Arabian Sea, which he tentatively identified as Longman's beaked whale, *Indopacetus pacificus* (Moore, 1968) (= *Mesoplodon pacificus* Longman, 1926). He also stated, without elaboration, that a group of "unidentified bottlenose whales" photographed in the central Pacific in 1966 were "almost certainly" *I. pacificus*. (Photographs of these later appeared in Leatherwood *et al.* 1988:92–93; see also below). These identifications have never been verified, however, because *I. pacificus* was, and is, known only from skeletal material; nothing is known of its external features.

Since then there have been numerous other sightings of bottlenose whales

in the tropical Indo-Pacific, but nearly all them have been identified as *Hyperoodon* sp., or, more specifically, *H. planifrons,* the southern bottlenose whale (*e.g.*, Shallenberger 1980, Alling 1986, Balcomb 1987, Miyashita and Balcomb 1988, Wade and Gerrodette 1993, Urbán-R. *et al.* 1994, Gallo-Reynoso and Figueroa-Carranza 1995, Ballance *et al.* 1996, Rudolph *et al.* 1997). Sekiguchi *et al.* (1993) further suggested that these sightings might represent *H. planifrons* on heretofore unknown wintering grounds in the tropics. As a result of these reports, the occurrence of a tropical population of *Hyperoodon*, either as *H. planifrons* or an undescribed form, has over time gained increasing acceptance in the cetacean distribution literature (*e.g.*, Leatherwood and Reeves 1983, Leatherwood *et al.* 1988, Mead 1989*a*, Jefferson *et al.* 1993).

References to tropical records of *Hyperoodon* usually contain a caveat however, partly because there has not been adequate documentation and partly because the two known species in this genus are generally considered to have anti-tropical distributions. The northern bottlenose whale (*H. ampullatus*) occurs only in the cold-to-temperate North Atlantic, and the southern bottlenose whale is known mainly from about 30°S to Antarctica (Jefferson *et al.* 1993). In a recent report of three sightings of bottlenose whales in the tropical Indian Ocean, it was once again suggested that the unidentified whale (hereafter "tropical bottlenose whale") could be *I. pacificus* (Ballance and Pitman 1998). In this note we show that, although superficially similar, the unidentified whale is not referable to *H. planifrons,* or to any other species of beaked whale whose external features are known. We present circumstantial evidence that suggests that it is *I. pacificus*, one of the world's least known living cetaceans.

We compiled records of "bottlenose whales" from tropical and subtropical waters around the world from the following sources: (1) the published literature, (2) sighting records from cetacean survey cruises on file at the Southwest Fisheries Science Center (SWFSC), La Jolla, CA, USA, (3) sighting records from the tuna vessel observer database (TVOD), also on file at SWFSC, (4) sighting records from Japanese cetacean sighting surveys on file at the National Research Institute of Far Seas Fisheries (NRIFSF), Shimizu, Japan, and (5) unpublished notes and photographs by the authors and colleagues. The authors personally observed 12 of 45 (27%) of the sightings reported here; we evaluated records from other sources and used only those that were sufficiently detailed to allow us to conclude that they were tropical bottlenose whales. For the majority of records this meant any sightings identified by experienced observers as either *Hyperoodon* sp. or *H. planifrons* (see Table 1). Table 1 provides details of these sightings; Figure 1 is a plot of the sighting locations.

The tropical bottlenose whale has been described as a "large" beaked whale by all who have seen it, with adult lengths often estimated to be 7–8 m. In the field it appears substantially larger than Cuvier's beaked whale (*Ziphius cavirotris*) or any of the various *Mesoplodon* species. Its body color has been variously described as tan, light brown, acorn brown, gray-brown, or just gray. Some of this variation appears to be age- and sex-related. For example, the lead animal in Figure 2e is pale gray with a dark dorsal fin and a dark area around the base of it. The same pattern is evident in Figure 2b on the third

animal from the top. Both of these animals have linear scars that are probably tooth rake marks which are usually indicative of adult males among beaked whales (Heyning 1984, MacLeod 1998). (The oval scars and white spots on the animals in Figure 2e are probably bite wounds from cookie-cutter sharks, *Isistius* sp.; Jones 1971). Larger animals attending calves usually have no obvious patterning or scarring; they are nondescript brown or gray-brown and are presumably adult females (Fig. 2f, h). Young animals are quite distinctively patterned, however, being darker gray-brown above with a conspicuous pale melon and white sides (Fig. 2a, b, c, f). The light area on the head extends *only* as far back as the posterior crease in the melon, which is coincident with the blowhole (Fig. 2b, c, g). A dark, transverse band separates the pale melon from the white flanks. This band has a small embedded white patch in the area of the ear (Fig. 2a, c, f).

Although the beak of the tropical bottlenose whale is not as long or as heavy as in *Berardius,* nor as stubby as in *Hyperoodon* (Fig. 3b, c), its length is quite variable. For example, the middle animal in the foreground of Figure 2b is presumably a juvenile (based on the pale melon), and it has a relatively much shorter beak than the presumed adult female in Figure 2g, suggesting ontogenetic changes in beak size. The lower jaw is slightly longer than the upper in presumed adult males (Fig. 2d) and presumed adult females (Fig. 2g, h). No erupted teeth have been observed on the lower jaw of tropical bottlenose whales, nor any telltale patches of stalked barnacles that often attach to exposed teeth of adult male beaked whales (Balcomb 1989; Heyning 1989; Mead 1989*b*; RLP, personal observation).

Although the melon is larger than in *Berardius* and not as large or bulging as in *Hyperoodon* (see Fig. 3b, c), it is also variable. For example, in some animals the melon is only moderately bulbous (Fig. 2g); in other individuals the melon is larger and appears to rise perpendicularly from the beak (Fig. 2a, far right animal).

The blowhole is crescentric, with the ends pointing forward (see fig. 9, 10 in Miyashita and Balcomb 1988); this is characteristic of *Hyperoodon, Mesoplodon, Ziphius,* and *Tasmacetus,* but opposite of the form in *Berardius* (Balcomb 1989).

The dorsal fin is tall, with a long base, typically falcate and pointed. In our experience, it is the largest dorsal fin, both relatively and absolutely, in all the ziphiids. *Z. cavirostris* and all of the *Mesoplodon* species we have seen either alive or from photos typically have small, rather triangular fins (Heyning 1989, Mead 1989*b*). *Berardius* (both species) has a low, rounded dorsal fin, which, relative to body length, is the smallest for all the ziphiids. In our experience, only the two *Hyperoodon* species approach the unidentified whale in overall size of the dorsal fin.

In general shape and coloration the tropical bottlenose whale is very similar to the southern bottlenose whale, as indicated by the fact that nearly every observer in the past 30 yr (including the authors) have identified it as *Hyperoodon* sp. or *H. planifrons* (Table 1). For example, photos of tropical bottlenose whales taken by KCB on the equator in 1966 (Fig. 2a, b) have been used to

Table 1. Sightings of "tropical bottlenose whales" from Indian and Pacific Oceans.

Date	Location[a]	SST °C[b]	School size	Field identification	Comments	Source[c]
11 Aug 1966	00° 164° 46′ W		25–35 (=30)	*Hyperoodon* sp.	Length 7–9 m; associated with *ca.* 50 short-finned pilot whales; Fig. 2 a, b	Leatherwood *et al.* 1988 (KCB)
25 Feb 1977	2° 18′ N 118° 36′ W	28.1	15	*Hyperoodon* sp.	Length 20′–30′; surfaced with beak open; Fig. 2 c	NMFS/SWFSC data (RLP)
25 Sept 1978	4° 37′ N 111° 54′ W	26.1	20	Unidentified beaked whale	"Looked like northern bottlenosed whale"	NMFS/TVOD data
10 May 1979	3° 41′ N 116° 03′ W	28.3	25	Unidentified beaked whale		NMFS/TVOD data
19 Jan 1980	4° 38′ N 98° 05′ W	27.2	4	*Hyperoodon* sp.	Length 25′–30′; with 10 short-finned pilot whales	NMFS/SWFSC data (RLP)
7 Dec 1981	4° 59′ N 83° 29′ W	26.2	1	*Hyperoodon* sp.	Probable identification	NMFS/SWFSC data (RLP)
16 May 1982	00° N 169° 34′ W	28.2	15	*Hyperoodon* sp.	Length 26′; with 10 short-finned pilot whales	J.M. Cotton[d]
11 Apr 1983	9° 28′ N 81° 34′ E		40	*Hyperoodon planifrons?*	Length 7.8 m	Alling 1986
23 Apr 1984	9° 43′ N 80° 52′ E		2	*Hyperoodon planifrons?*		Alling 1986
26 Oct 1984	1° 12′ S 141° 32′ W	24.8	8	*Hyperoodon* (*planifrons?*)	Length 25′–30′; exposed beak and melon on surfacing	RLP unpubl. notes
2 Feb 1985	07° 00′ S 129° 07′ E		3	*Hyperoodon* sp.	Length 7–8 m	Rudolph *et al.* 1997
12 July 1985	22° 08′ N 133° 07′ E	28.8	45	*Hyperoodon*-like	Length 6–7 m; no calves	NRIFSF data
3 July 1986	20° 12′ N 134° 05′ E	30.0	40	*Hyperoodon*-like	Length 5–6.5 m; 5 calves were 4 m each	NRIFSF data
3 July 1986	20° 12′ N 134° 05′ E	30.0	40	*Hyperoodon*-like	Length 5–6.5 m; 5 calves were 4 m each	NRIFSF data

Table 1. Continued.

Date	Location[a]	SST °C[b]	School size	Field identification	Comments	Source[c]
25 July 1986	28° 25′ N 131° 48′ E	29.8	100	*Hyperoodon*-like	2 calves present	NRIFSF data
25 Oct 1986	3° 50′ N 89° 57′ W	26.4	15	*Hyperoodon planifrons*	Length 25′–30′	NMFS/SWFSC data (RLP)
7 July 1987	25° 07′ N 141° 58′ E	27.9	70	*Hyperoodon*-like	Length 6–8 m; associated with 30 short-finned pilot whales	NRIFSF data
8 Sept 1987	14° 41′ N 101° 36′ N	30.6	1	*Hyperoodon* sp.	Length 20′–25′	NMFS/SWFSC data (RLP)
1 Aug 1988	35° 00′ N 177° 06′ E	25	6	*Hyperoodon* (*planifrons?*)	Length at least 6–7 m	R. A. Rowlett[e]
2 Aug 1988	35° 00′ N 172° 21′ E	25	3	*Hyperoodon* (*planifrons?*)	Length 6–7 m	R. A. Rowlett[e]
13 Nov 1989	1° 33′ N 94° 16′ W	25.0	13	*Hyperoodon* (*planifrons?*)	Length 25′+	NMFS/SWFSC data
23 Nov 1989	5° 19′ N 111° 33′ W	26.8	10	*Hyperoodon* sp.	Length 7 m; associated with 90 short-finned pilot whales	NMFS/SWFSC data (RLP)
17 Sept 1990	30° 32′ N 168° 43′ E	28.3	15	*Hyperoodon*-like	Length 7–8 m; no calves	NRIFSF data
17 Sept 1990	30° 32′ N 168° 43′ E	28.3	20	*Hyperoodon*-like	6 calves present	NRIFSF data
14 Sept 1991	34° 41′ N 156° 13′ E	28.4	6	*Hyperoodon*-like	Length 5.5–7 m; 2 calves were 4.5 m	NRIFSF data
18 July 1992	Isla de Guadalupe, Mexico (28° 53′ N 118° 16′ W)	ca. 22.0	3	*Hyperoodon* sp.		Gallo-Reynoso and Figueroa-Carranza 1995
10 Mar 1993	23° 02′ N 109° 18′ W		7	*Hyperoodon* sp.	Pair of humpback whales in the vicinity	Urbán-R. *et al.* 1994.

Table 1. Continued.

Date	Location[a]	SST °C[b]	School size	Field identification	Comments	Source[c]
15 Mar 1993	23° 04′ N 109° 23′ W	23.0	2	*Hyperoodon* sp.	Length 6.3–7 m; possibly same animals as previous sighting	Urbán-R. *et al.* 1994
15 July 1993	Isla de Guadalupe, Mexico, (28° 53′ N 118° 16′ W)	*ca.* 21.0	1	*Hyperoodon* sp.	Associated with 25 bottlenose dolphins	Gallo-Reynoso and Figueroa-Carranza 1995
17 July 1993	Isla de Guadalupe, Mexico (28° 53′ N 118° 16′ W)	*ca.* 21.0	4	*Hyperoodon* sp.	Length of largest 7 m	Gallo-Reynoso and Figueroa-Carranza 1995
18 July 1993	12° 13′ N 116° 47′ W		17	*Hyperoodon* sp.	Length 20′–30′	NMFS/TVOD data
5 Sept 1993	29° 30′ N 133° 19′ E	28.2	64		Length 5–7.5 m; 1 calf was 4 m; Fig. 2 d, e	NRIFSF data
9 Sept 1993	30° 37′ N 131° 24′ E	27.6	6		Length 4.5–7 m; no calves	NRIFSF data
20 Sept 1994	00° 09′ N 91° 32′ W		3	*Hyperoodon* (*planifrons?*)		Merlen 1995, G. Merlen[f]
15 Mar 1995	03° 12′ N 89° 04′ W	28.4	6	*Hyperoodon* sp.	Length 6–7 m; 3 calves 2.5–3.5 m; Risso's dolphins in area; Fig. 2 f, g	PLRB and BJB unpublished data
30 Apr 1995	06° 46′ N 65° 51′ E		2	*Hyperoodon* cf. *planifrons*		Ballance and Pitman 1998 (RLP)
1 May 1995	06° 25′ N 62° 26′ E		35	*Hyperoodon* cf. *planifrons*		Ballance and Pitman 1998 (RLP)
3 May 1995	05° 14′ N 51° 18′ E		8	*Hyperoodon* cf. *planifrons*		Ballance and Pitman 1998 (RLP)

Table 1. Continued.

Date	Location[a]	SST °C[b]	School size	Field identification	Comments	Source[c]
18 Sept 1996	16° 23′ N 122° 46′ E	29.9	8		Length 5.2–5.4 m; 2 calves 4.8 m; 1 calf 3 m	NRIFSF data
22 Sept 1996	24° 13′ N 146° 43′ E	27.5	16		Length 5.2–5.6 m	NRIFSF data
22 Sept 1996	24° 12′ N 146° 43′ E	27.2	36		Length 5.2–5.6 m	NRIFSF data
Unknown; pre-1971	Gulf of Aden (13° 00′ N 49° 00′ E)		?	possibly *Indopacetus pacificus*		Mörzer Bruyns 1971
Unknown; pre-1971	Socotra area (12° 30′ N 54° 00′ E)		?	possibly *Indopacetus pacificus*		Mörzer Bruyns 1971
Unknown	Hawaii (20° 00′ N 157° 45′ W)		?	*Hyperoodon* sp?	Seen and photographed by E. Shallenberger	Shallenberger 1980
Unknown	Philippines (09° 00′ N 124° 00′ E)		?	*Hyperoodon* sp.	Length 6–8 m	Dolar *et al.* 1994

[a] When the exact position is unknown, an estimated position is given in parentheses.
[b] Sea-surface temperature.
[c] NMFS/SWFSC = National Marine Fisheries Service/Southwest Fisheries Science Center; NMFS/TVOD = National Marine Fisheries Service/Tuna Vessel Observer Data; NRIFSF = National Research Institute of Far Seas Fisheries, Shizuoka, Japan.
[d] Personal communication (letter) James M. Cotton, P.O. Box 251, Bayside, CA 95524, 6 April 1990.
[e] Personal communication (letter from Richard A. Rowlett, P.O. Box 7386, Bellevue, WA 98008, 11 Oct. 1997.
[f] Personal communication (e-mail) from Godfrey Merlen, Estación Científica Charles Darwin, Casilla 17-01-3891, Quito, Ecuador, 11 March 1996.

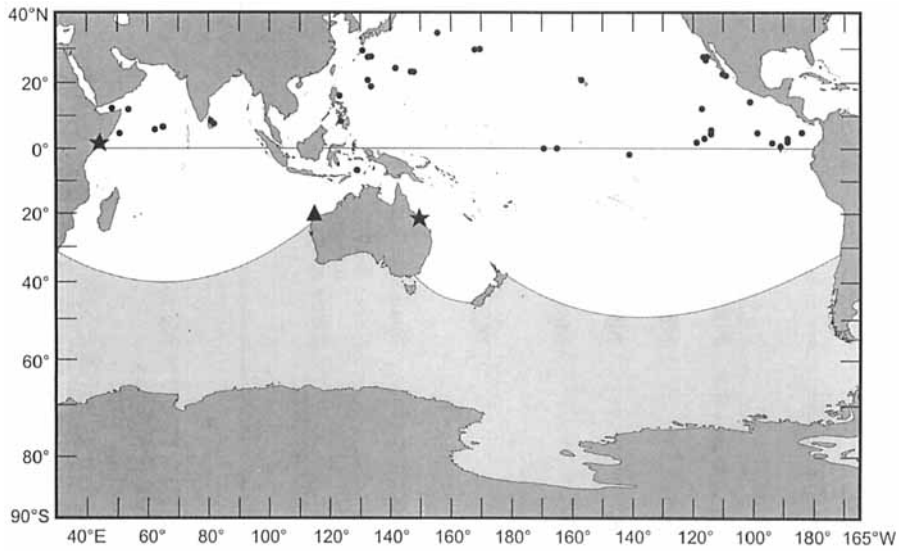


Figure 1. Sightings of tropical bottlenose whales (circles; see Table 1), and locations of beached specimens of *Indopacetus pacificus* (stars). Shaded area at bottom shows known distribution of *Hyperoodon planifrons* (from Mead 1989*a*); also shown is location where type specimen was found (triangle).

depict *H. planifrons* in Brownell (1974) and Balcomb (1987). Both are large, robust ziphiids with prominent dorsal fins, bulbous melons, and conspicuous beaks; both are tan or gray-brown with usually at least some individuals showing a pale melon. But the two forms are clearly separable.

Figure 3 shows three recent photos of *H. planifrons* for comparison. The posterior boundary of the pale melon in *H. planifrons* extends well behind the blowhole, compared with *only* as far back as the blowhole in the tropical bottlenose whale (compare Fig. 2a, b with Fig. 3a). (The location of the blowhole in both species is indicated by a constriction at the rear margin of the melon). An *H. ampullatus* photographed in the North Atlantic (Martin 1990: 107) also shows a pale melon with the posterior border behind the blowhole. Although some *H. planifrons* also have pale melons (presumably younger animals), they also have dark flanks, the same color as the back, unlike the white sides of the tropical bottlenose whale (Fig. 3c). The dark transverse band and white "ear spot" of the tropical bottlenose whale are also absent in *H. planifrons*. Adult male *H. planifrons* at sea often appear almost white, mostly from the accumulated scarring on their bodies (RLP, personal observation). We have never seen or heard of nearly white individuals among tropical bottlenose whales.

The only other beaked whale that we have not mentioned for comparison is Shepherd's beaked whale (*Tasmacetus shepherdi*), but this species can also be ruled out on the basis of color pattern. Information on *T. shepherdi* coloration comes from descriptions and photographs of two recent, fresh strandings of an adult male (6 m) and a juvenile male (3.5 m) in New Zealand.[1] Despite the

age differences in these animals, they had nearly identical color patterns that were distinctive. The dark dorsum in front of the dorsal fin dips down on the sides, forming a large, dark saddle. Just behind the flipper, a band of white from the belly sweeps up onto the side above the level of the eye. Just in front of the flipper, white from the throat arches up to the level of the eye. And between these two light areas a dark band joins the flipper and the dorsal surface. There is no pale melon. Even in the field this pattern would be easily discernable from that of the tropical bottlenose whale. Distribution at sea probably rules out *T. shepherdi* also; Mead (1989*c*) identified its habitat as cold temperate waters of the Southern Ocean, based on the 11 known records at that time, all from south of 30°S.

Tropical bottlenose whales were observed throughout warmer waters of the Pacific and Indian Oceans (Fig. 1). (A recent sighting of unidentified "bottlenose" whales in the Gulf of Mexico suggests a possibility of occurrence in the Atlantic also—Jefferson *et al.* 1993). Although sea-surface temperatures recorded during the sightings ranged from *ca.* 21° to 31°C, 23 out of the 31 (74%) sightings were in water warmer than 26°C (Table 1). This preference for warm water may explain some of the details in the distribution pattern shown in Figure 1. For example, in the eastern Pacific most of the sightings were in the North Equatorial Countercurrent, a warm, transoceanic, eastward flow nominally found between latitudes 3°N and 10°N (Wyrtki 1966). Warm water in the eastern tropical Pacific is constrained by colder equatorward flows from the Northern and Southern hemispheres which may prevent bottlenose whales from ranging as widely latitudinally as they do in the western Pacific. The northernmost records in the eastern Pacific (five sightings off Baja California) were recorded during an El Niño event when warmer-than-normal sea-surface temperatures were recorded off Baja California, Mexico (Gallo-Reynoso and Figueroa-Carranza 1995).

Figure 1 indicates that the geographic ranges of the tropical bottlenose whale and *H. planifrons* may be largely allopatric, perhaps separated by as much as 20°–30° of latitude throughout most of their respective ranges, but too little is known about the distribution of either of these two forms in mid-latitudes of the Southern Hemisphere to draw any firm conclusions at this time.

Despite being widespread throughout the tropical Indo-Pacific, the tropical bottlenose whale is nevertheless a rare species. For example, the SWFSC of the U.S. National Marine Fisheries Service conducted ten cetacean survey cruises in the eastern tropical Pacific from 1986 to 1990 comprising approximately 600 sea days and staffed by experienced observers. During those cruises only four sightings were recorded (Wade and Gerrodette 1993). Similarly, in the western Pacific, the Japanese Government conducted 22 cetacean survey cruises between 1986 and 1990 comprising 1,200 sea days (Miyashita 1993) and only five sightings were recorded (Table 1).

Sightings were recorded during every month except June (Table 1), indicating the whale is resident in the tropics. Mean herd size was 18.5 individuals (n = 41, SD = 21.7, range 1–100), although it was significantly larger in

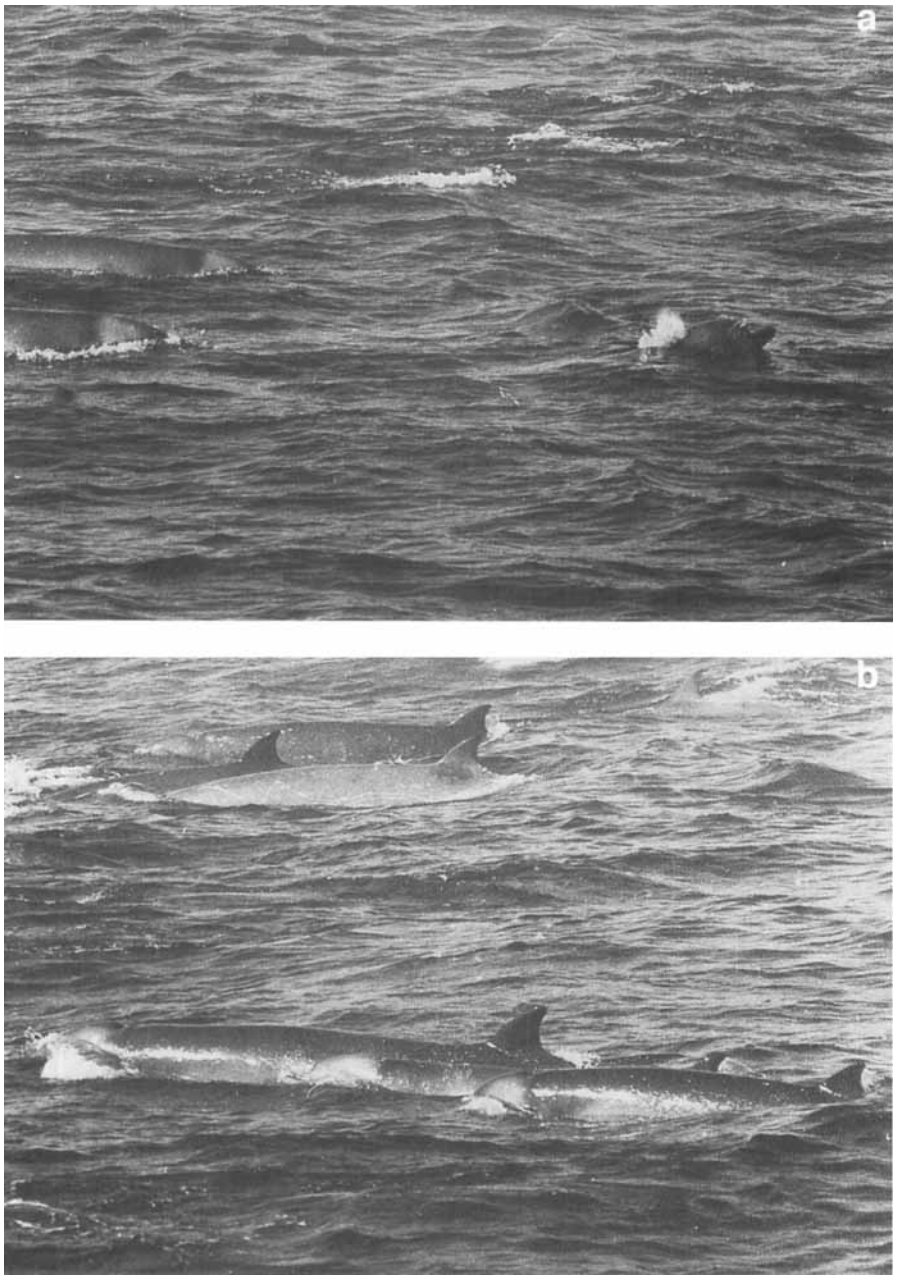
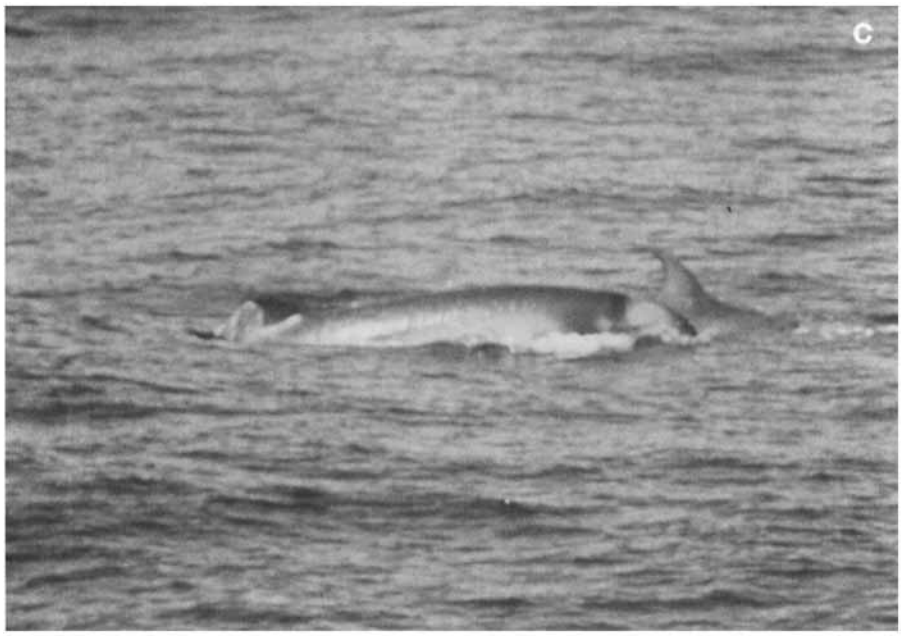


Figure 2. Photographs of tropical bottlenose whales from eastern, central and western Pacific: (a—b) 11 August 1966, 00°N, 164°46′W; photos by K.C. Balcomb; (c) 25 February 1977, 2°18′N, 118°36′W; photo by R.L. Pitman; (d—e) 5 September 1993, 29°30′N, 133°19′E, photos by S. Noji; (f—h) 15 March 1995, 3°12′N, 89°04′W; photos by B.J. Brennan (f and g) and F. Nicklin (h).



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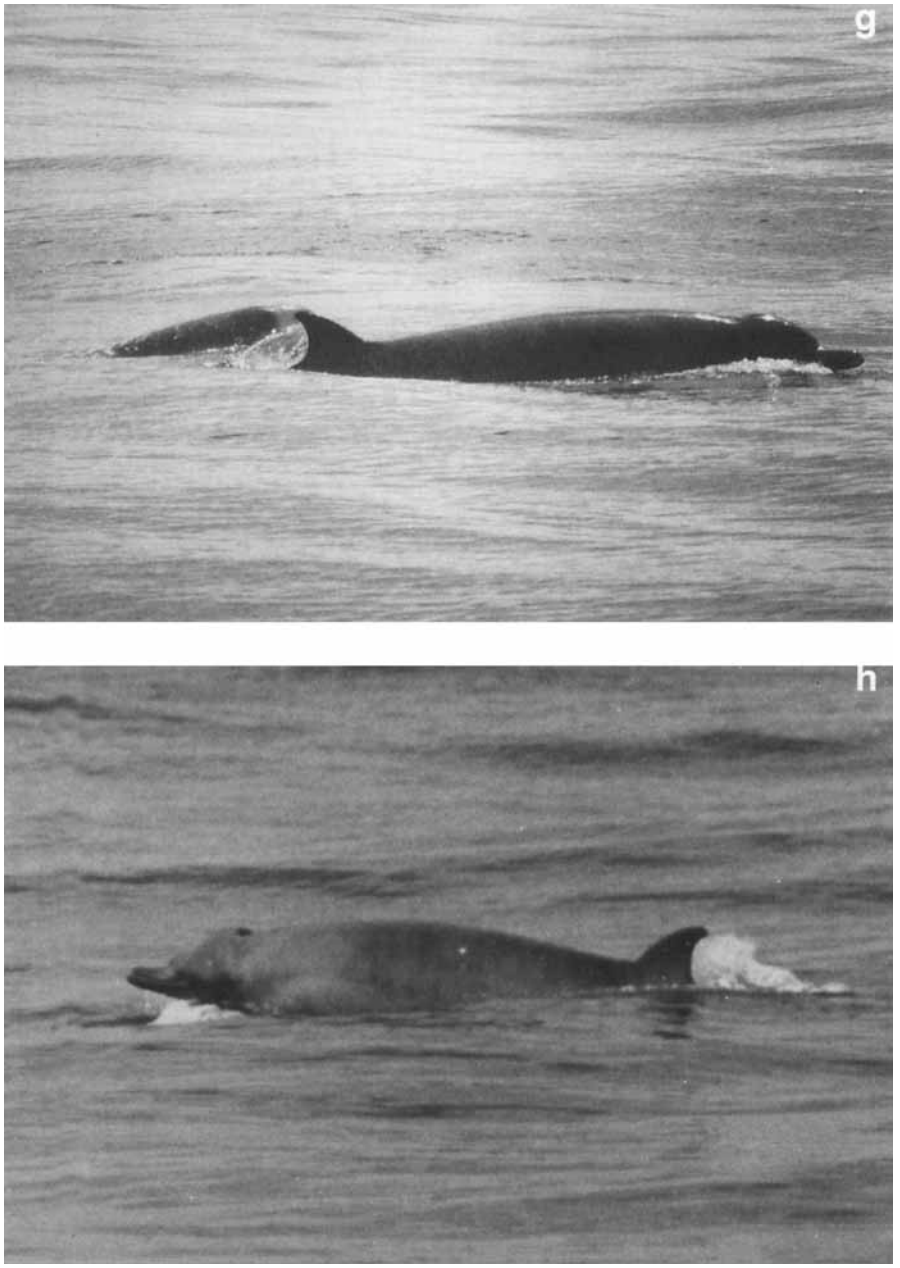

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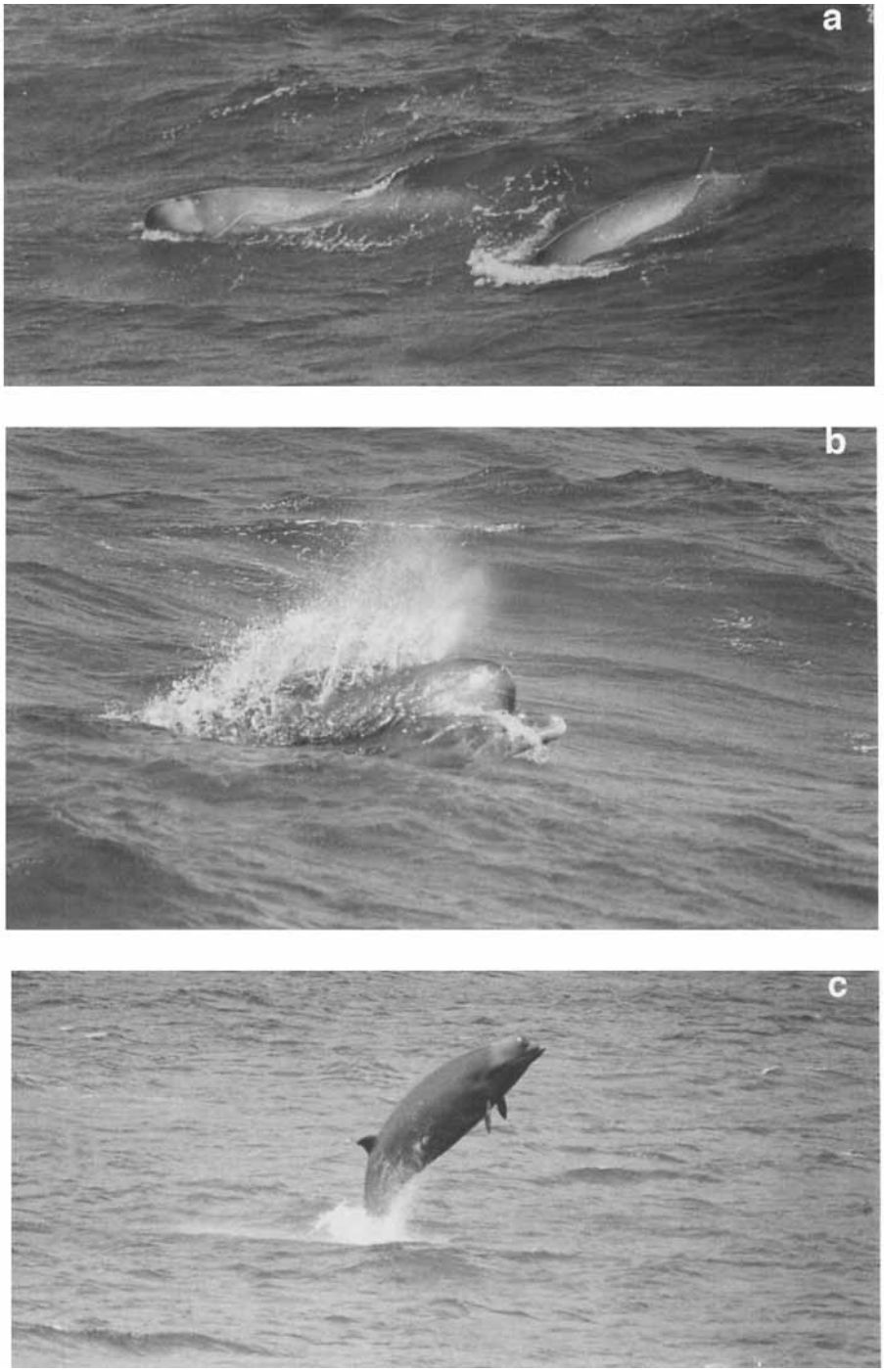

Figure 3. Southern bottlenose whale, *Hyperoodon planifrons*: (a) 25 February 1996, 57°27′S, 155°57′W; photo by K. Matsuoka; (b) 30 December 1996, 33°18′S, 34°46′E; photo by R.L. Pitman; (c) 13 December 1996, 32°40′S, 44°31′E; photo by R.L. Pitman.

the western Pacific (mean = 29.2 individuals; n = 15 herds west of 180°), than in the eastern Pacific (mean = 8.6; n = 17 herds east of 120°W; t = 2.54, P = 0.023).

Tropical bottlenose whales were associated with short-finned pilot whales (*Globicephala macrorhynchus*) on five occasions (11% of total sightings) and once with a school of bottlenose dolphins (*Tursiops truncatus*) (Table 1). They were also observed once in the vicinity of a pair of humpback whales (*Megaptera novaeangliae*) and once near a school of Risso's dolphins (*Grampus griseus*), although in both these cases the two species may not have been directly associated.

When traveling at the surface they are aggressive swimmers, often bringing the beak and melon up out of the water as they move about in tight schools. The blow is fairly conspicuous (see Leatherwood *et al.* 1988:93), being low and bushy and reminiscent of that of a pilot whale, except larger. At least one observer reported a forward-canted blow, similar to that of *H. planifrons* (see Fig. 3b). Breaching behavior was noted on several occasions. For example, Gallo-Reynoso and Figueroa-Carranza (1995) observed one individual breach continuously with four bottlenose dolphins for ten minutes. They also reported individual dive times of 18 and 25 min.

Based on the discussion above, the tropical bottlenose whale cannot be referred to any known species of ziphiid, or more specifically, to any known bottlenose whale (*i.e.*, *Berardius* spp. or *Hyperoodon* spp.). We conclude, therefore, that it is either an undescribed species, perhaps of the genus *Hyperoodon*, or *Indopacetus pacificus*. Here we will discuss why we think it may be the latter.

I. pacificus is known only from two skulls; it has never been described in the flesh, alive or dead. It is, however, assumed to be larger than any known species of *Mesoplodon*. Based on the length of the type skull, Longman (1926) estimated a body length of "at least" 25 feet (7.6 m). Reyes *et al.* (1995) regressed body length against zygomatic width (in mm not cm as misprinted in their paper[2]) for 63 specimens of 12 species of *Mesoplodon*. Using their resulting equation, we calculated that the type specimen of *I. pacificus* (probably an adult male; Moore 1968) would have been 7.0 m long and the second specimen (probably an immature animal from Somalia; Moore 1972) 6.4 m. By comparison, the largest *Mesoplodon* (*M. layardii*) recorded was 6.15 m long (Mead 1989*b*). **The maximum length reported for** *H. planifrons* is 7.45 m for females and 6.94 m for males (Mead 1989*a*).

I. pacificus has a single pair of erupted teeth in the tips of the lower jaws, presumably only in mature males (Moore 1968). Among all beaked whales (except *Berardius* spp.) only mature males have teeth that erupt. They apparently use them for intraspecific aggression (Heyning 1984, MacLeod 1998). As a result, adult males are often identifiable from adult females and younger animals by their extensive scarring. In addition, the "tusks" of different species of beaked whales erupt at different, species-specific locations on the lower jaw, with the result that different species leave different scar patterns (McCann 1974). For example, species with teeth located near the middle of the gape leave parallel tracks quite far apart or often leave only single tracks; species

with apical teeth more often leave parallel tracks that are close together (see Balcomb 1989, fig. 6). The parallel scar tracks evident on the lightest upper animal in Figure 2b appear to be very narrow, consistent with being made by an animal with apical teeth. Assuming that those scars were made by a conspecific, it appears that the tropical bottlenose whale may have apical teeth as in *I. pacificus*.

In summary, about all that is currently known about *I. pacificus* is that it is large, it occurs in tropical waters of the western Indian and western Pacific oceans, and it has apical teeth. These also seem to be features of the tropical bottlenose whale. Although the evidence is largely circumstantial, we suggest that they may be the same species. We cannot, however, rule out the possibility that the unidentified whale is a species unknown to science, especially given that most of the new species of cetaceans described in the last century have been beaked whales (Ralls and Brownell 1991). The issue will not be resolved until a specimen becomes available.

The question arises as to how so large a marine mammal, either as *I. pacificus* or as an undescribed species, has almost completely escaped the attention of zoologists for so long. Two explanations seem likely.

First, there is a matter of zoogeography. Fraser's dolphin (*Lagenodelphis hosei*), for example, was not described until 1956, from a beached skull collected in Sarawak in 1895. It was not identified in the flesh until the early 1970s when it was discovered in several places around the world almost simultaneously (Perrin *et al.* 1973). *L. hosei* is now known to be a fairly common resident in tropical waters around the world but with an apparent preference for deep offshore waters (Perrin *et al.* 1989; RLP, personal observation). But tropical waters are often adjacent to land masses where there are few if any cetologists and in waters where up until recently there has been little or no pelagic survey work conducted (Perrin *et al.* 1989). Our findings indicate that the tropical bottlenose whale inhabits the same pelagic habitat and much of the same geographic range as *L. hosei* (with the possible exception of the Atlantic Ocean), but the tropical bottlenose whale is a considerably rarer species. For example, RLP has seen *L. hosei* at sea more than 50 times in all three major oceans in school sizes that average almost 400 individuals (Wade and Gerrodette 1993). During the same cruises he observed tropical bottlenose whales only 10 times in groups averaging 9.9 individuals. There appear to be fewer groups of tropical bottlenose whales to encounter at sea and many fewer individuals overall to strand on beaches. Little wonder practically nothing is known about this species.

The second explanation for the obscurity of this animal may be historical. *I. pacificus* is a large beaked whale of unknown physical description that has for decades been known (or at least suspected) to inhabit the tropical Indo-Pacific. Although Mörzer Bruyns (1971), without any supporting evidence, suggested that the tropical bottlenose whale was *I. pacificus*, no one else has come to the same conclusion since then. We believe the reason for this is twofold. First, because of a strong physical resemblance, the tropical bottlenose whale has, over the years, been repeatedly identified as *H. planifrons* (or *Hy-*

peroodon sp.), although this identification has roused some suspicions because the two forms seemed to have disjunct distributions (*e.g.*, Leatherwood *et al.* 1988, Mead 1989*a*, Jefferson *et al.* 1993:87). The second reason relates to the prevailing opinion among cetacean taxonomists that *I. pacificus* is probably a large species of *Mesoplodon* (*e.g.*, Mead 1989*b*). To our knowledge, no experienced cetacean observer who has ever seen the tropical bottlenose whale has suggested that it might be a *Mesoplodon*. Furthermore, our Figure 2a also appears in Leatherwood *et al.* (1988:93) as an unidentified bottlenose whale, *Hyperoodon* sp., and no one to our knowledge has ever suggested that the animals in those photographs are a species of *Mesoplodon.* Therefore, when field observers attempted to identify the tropical bottlenose whale, because of its putative affinities with *Mesoplodon* spp., *I. pacificus* was not considered a candidate. We think that all of these factors (rarity, similarity to *H. planifrons*, possibly mistaken inclusion within *Mesoplodon*, and remote distribution) have probably contributed to this species going unrecognized for so long.

Finally, for whatever species this turns out to be, as a common name that might help eliminate some confusion about its identity in the future, we suggest that it continue to be called "tropical bottlenose whale" (Leatherwood *et al.* 1988:93).

Acknowledgments

We are grateful to J. M. Cotton, G. Merlen, and A. Van Helden for use of their unpublished data; we also thank K. Matsuoka, F. Nicklin, and S. Noji for use of their photos. The following people provided helpful comments on earlier drafts of this paper: L. T. Ballance, P. B. Best, R. L. Brownell, Jr., A. Van Helden, J. E. Heyning, S. Leatherwood, J. G. Mead, D. Rice, and K. Van Waerebeek.

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