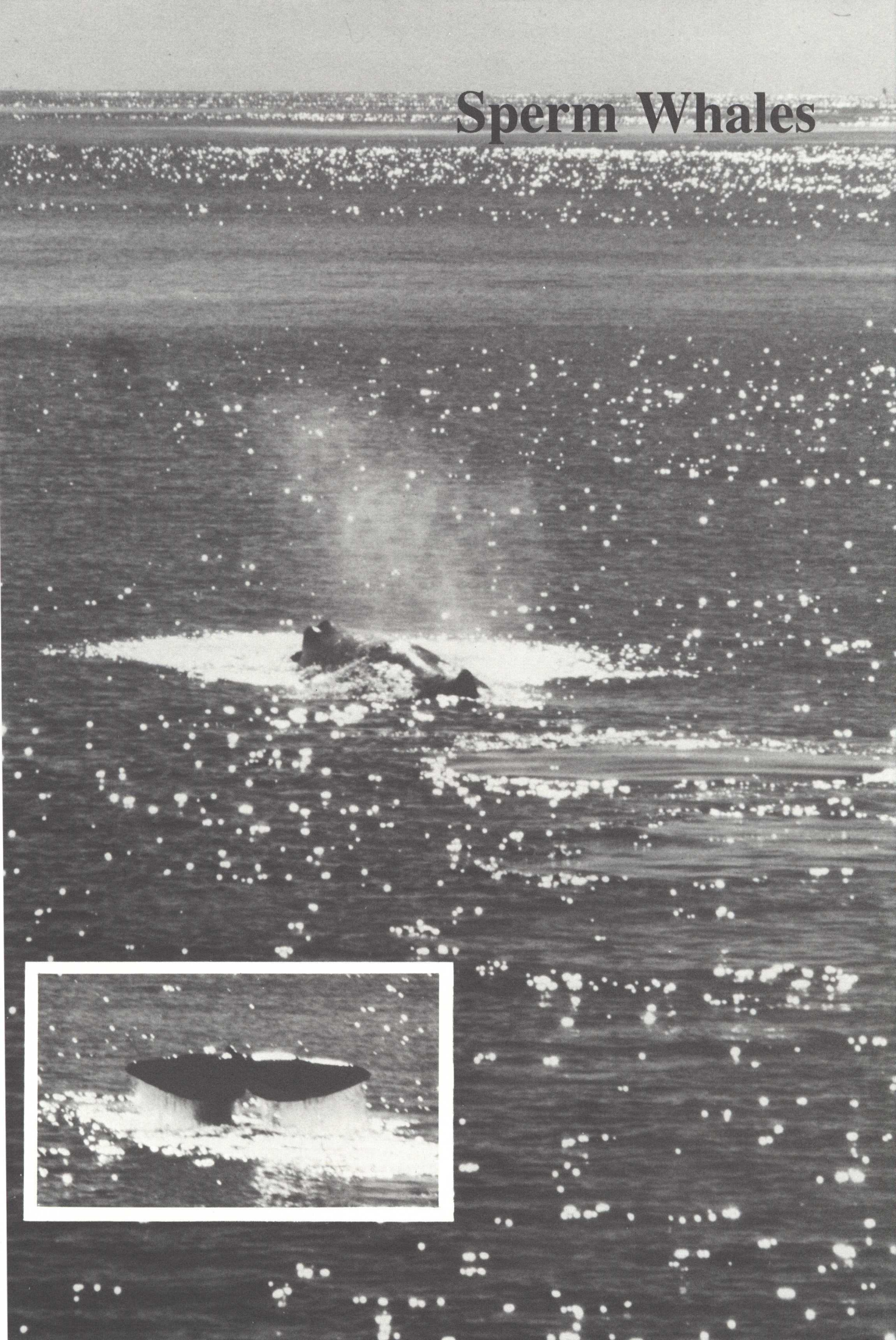
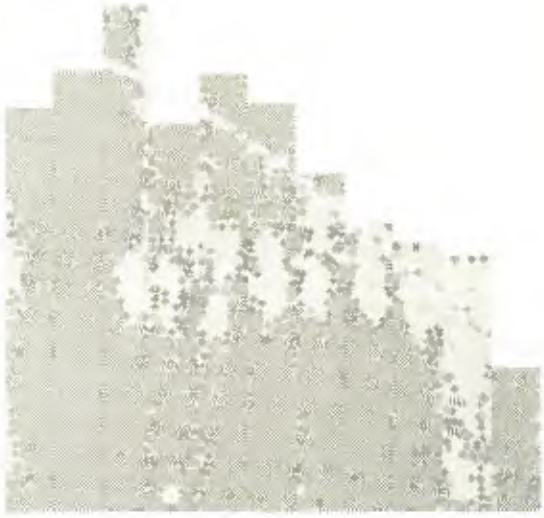
Sperm Whales

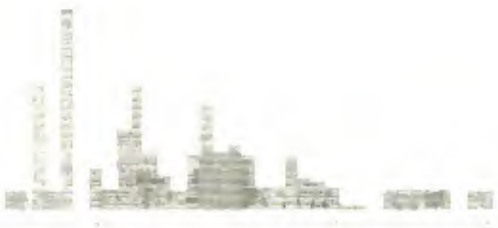


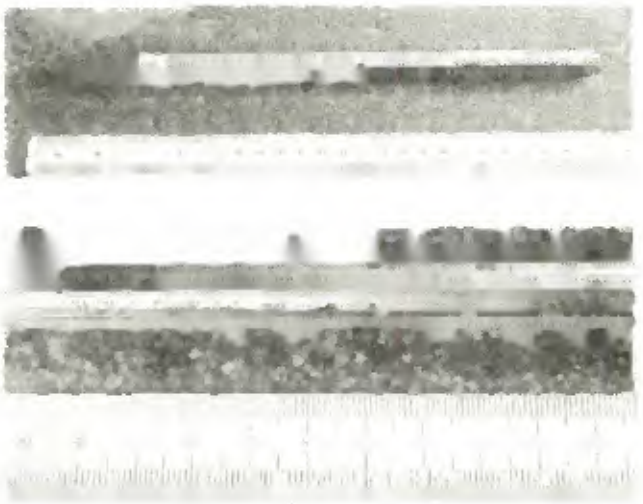
Minke Whales

Other Baleen Whales

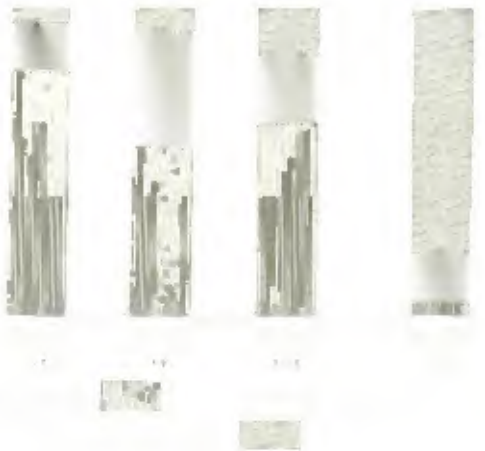


Protected Species





Small Cetaceans



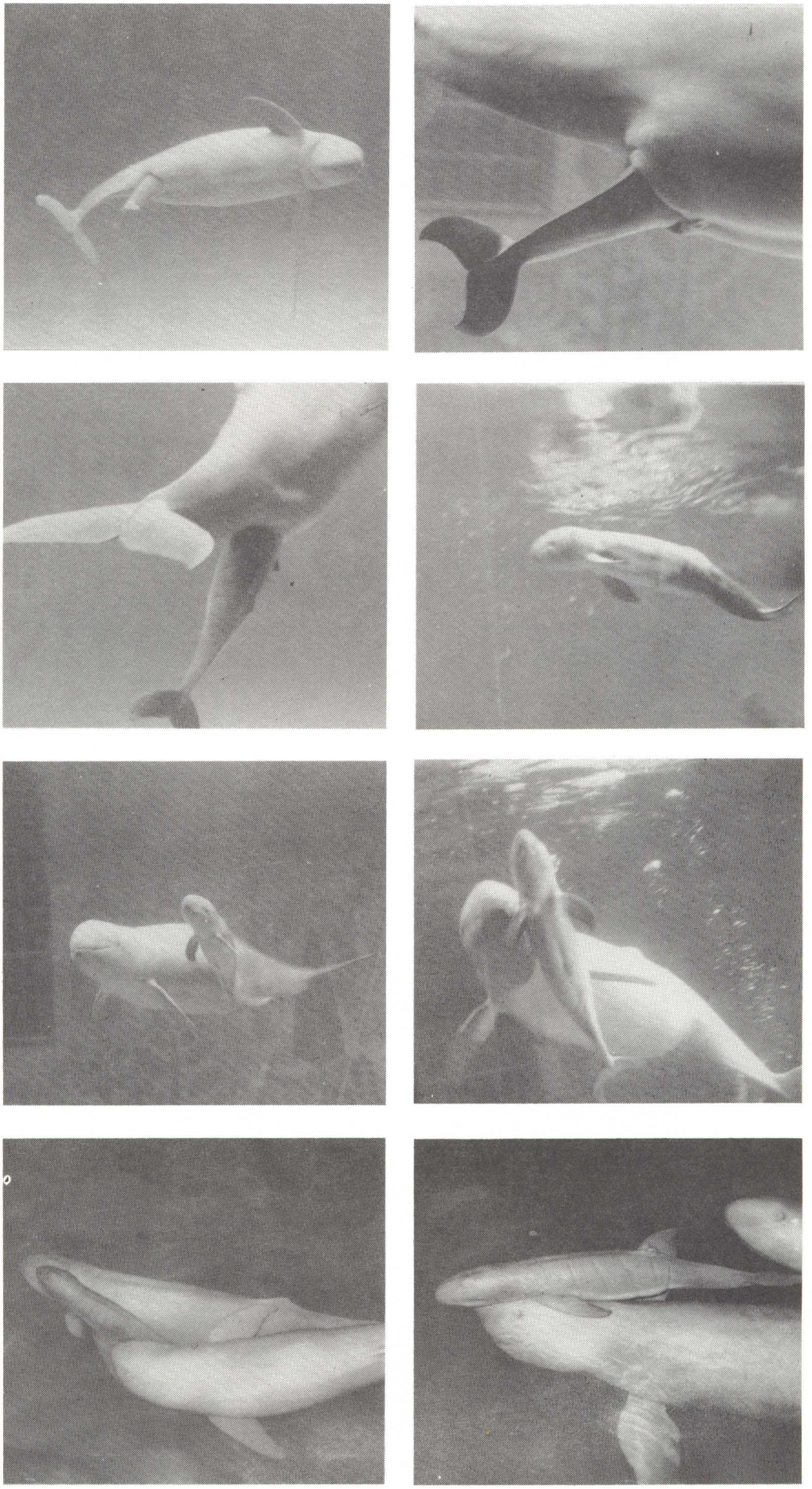


Fig. 5. The live birth of an Irrawaddy River dolphin in captivity. (Photos courtesy of Jaya Ancol Oceanarium).

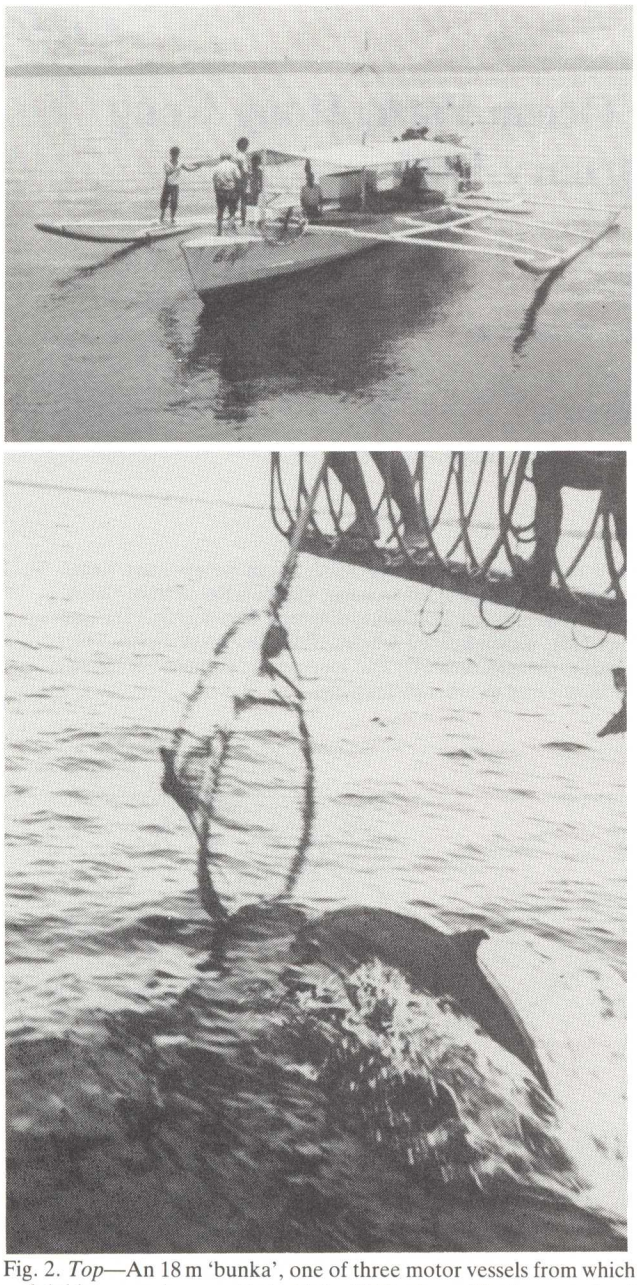


Fig. 2. *Top*—An 18 m 'bunka', one of three motor vessels from which dolphins were hoop-netted off the Philippines. The hoop and net are visible over the port bow. *Bottom*—A Fraser's dolphin, airborne just before the moment of capture (Photos courtesy of Ocean Park).

Melon-headed whales, *Peponocephala electra*

This species was also common in the southern end of Bohol Strait and the northwestern portion of the Mindanao Sea, particularly between Siquijor, Balicosag and Pamilican islands, where they often distributed themselves around the periphery of herds of Fraser's dolphins. Like the Fraser's dolphins, melon-headed whales actively rode the bow-wave (Fig. 3a and b), often proving a nuisance by displacing the preferred Fraser's dolphins during attempted captures.

Other species

A solitary sperm whale, *Physeter macrocephalus,* was encountered daily for about three weeks approximately 1 nautical mile seaward of the entrance to Cebu Harbor.

A small pod of Risso's dolphins, *Grampus griseus,* was observed repeatedly off the northwestern tip of Cebu Island for several weeks.

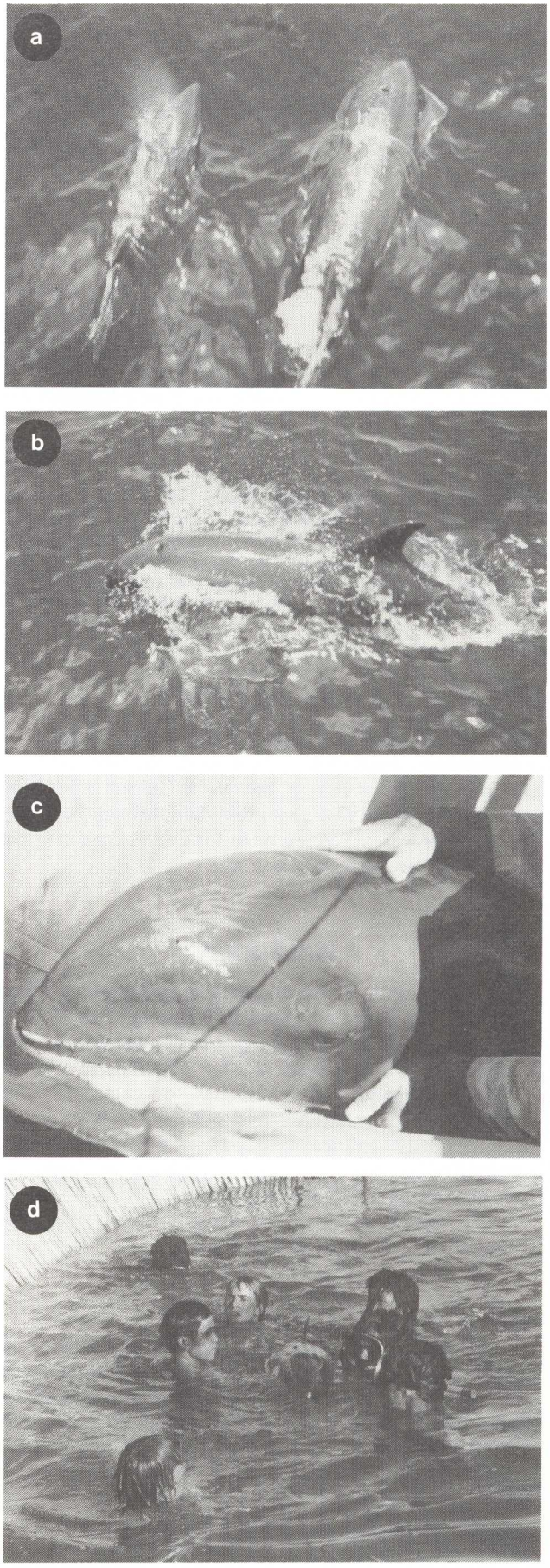


Fig. 3. Melon-headed whales: an adult and calf (a) and a sprinting individual (b), free-swimming, and a captured individual during transport (c) and being introduced into the holding pen (d). (Photos courtesy of Ocean Park).

On half a dozen occasions, generally in late afternoon, groups of 200–800 spotted dolphins, *Stenella sp.*, were encountered travelling along the east shore of Cebu Island.

Long-snouted spinner dolphins, *Stenella longirostris*, were seen in August 1974 near Cebu City.

Live captures

Cetaceans were captured with hoop nets (see Ridgway, 1972 and Asper, 1975, for description and Fig. 2 for illustration of capture methods) as they rode bow pressure waves of the M/V *Prince of Cadiz* (an 18 m twin-screw motor launch), a 14 m single-screw tug boat, or an 18 m 'bunka' (a local, double-outrigger canoe) (Fig. 2, top). Once caught, dolphins were transferred to the deck (a foam-lined plywood platform connecting the two hulls) of a twin-hulled bunka with two 40-HP outboard engines which could push the boat to speeds of up to 35 knots. Animals were transported promptly from capture site to chain-link holding pens erected along shore near Cebu City in water up to 6 m deep. Pens were approximately 6 m wide and extended 12 m along shore. During the period March–July 1975 some captured individuals were held in sea-side, above-ground swimming pools, approximately 2 m deep and 8 m in diameter, into which sea water was pumped continuously. Because of delays in completion of facilities at Ocean Park, none of the animals captured in the Philippines was transported to Hong Kong.

Individuals of three species were live-captured and removed (Table 1).

Fraser's dolphin

Sixteen individuals were taken, all in the Camotes Sea and the southern end of Bohol Strait. One of the 16 is illustrated in Leatherwood, Caldwell and Winn (1976: p. 121, Fig. 136). Another is shown in Fig. 4. Six individuals were released within 10 days after capture because they were not eating and were considered poor risks. Six others which were retained beyond the 10 day threshold because they were eating nevertheless died within 14 to 21 days. The remaining four survived an average of about 45 days (range 30 to 100).

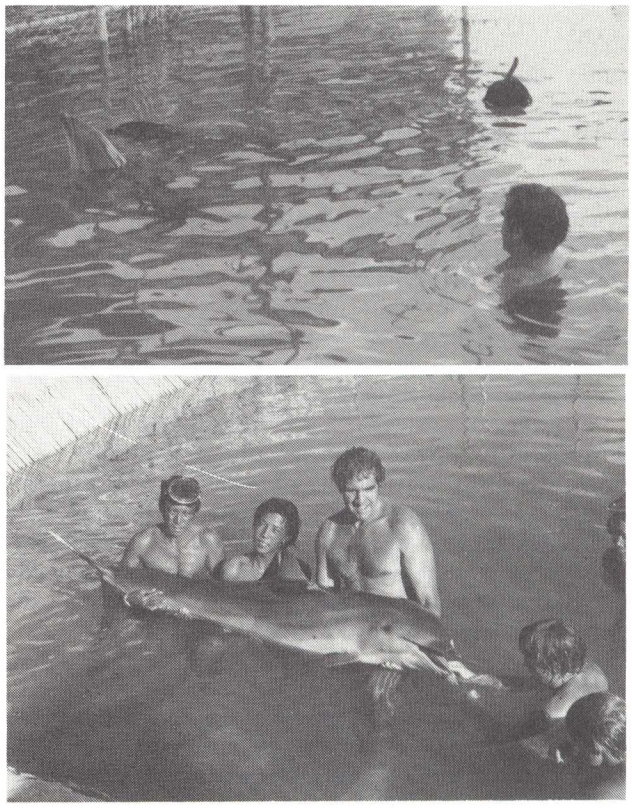


Fig. 4. A Fraser's dolphin being introduced into the holding pen (top) and being force fed (below). (Photos courtesy of Ocean Park).

From their size and habits at sea, one might have predicted that Fraser's dolphins would adapt to captivity; however, although a few individuals were enticed to eat voluntarily during the first few days of captivity, most specimens collected refused to eat voluntarily and had to be force-fed for several days or weeks (Fig. 4b). These dolphins were all maintained in sea pens, where they were subjected to significant changes in depth due to fluctuating tides, and they became visibily distressed during each receding tide. Such stress might be reduced and probability

Table 1

Summary of cetaceans live-captured for Ocean Park, Hong Kong from April 1974 through February 1982.

Species	Capture date	Capture location	Number collected	Sex ratio M/F/?
Fraser's dolphin *Lagenodelphis hosei*	6/74–7/75	Near Cebu, Philippines	16	(0/0/16)
Melon-headed whale *Peponocephala electra*	6/74–7/75	Near Cebu, Philippines	10	(0/0/10)
Long-snouted spinner dolphin *Stenella longirostris*	8/74	Near Cebu, Philippines	1	(0/0/1)
Killer whale *Orcinus orca*	11/76	S.W. Iceland	1	(0/1/0)
Bottlenose dolphin *Tursiops* sp.	11/75	Izu Peninsula, Japan	14	(5/9/0)
	12/76	Taiji, Japan	14	(4/10/0)
	12/77	Taiji, Japan	14	(3/11/0)
	12/78	Saikung, near Hong Kong	1	(0/0/1)
	12/80	Taiji, Japan	4	(0/4/0)
	2/82	Iki Island, Japan	4	(2/2/0)
Tursiops c.f. *T. aduncus*	3/75	Makung, Taiwan	1	(0/0/1)
	1/77	Makung, Taiwan	4	(2/2/0)
	1/78	Makung, Taiwan	9	(6/3/0)
	1/79	Makung, Taiwan	9	(6/3/0)
Short-finned pilot whale *Globicephala macrorhynchus*	1/77	Taiji, Japan	7	(2/5/0)
Totals	6/74–1/82	———	109	(30/50/29)

of successful adaptation significantly increased if Fraser's dolphins were held in deep, constant-depth, enclosed pools rather than in sea pens. However we believe the nervousness and general 'fragility' of this species probably makes it unacceptable for captivity.

Melon-headed whale

Ten individuals of this species were taken, all in the waters between Siquijor, Balicosog and Pamilican islands (Table 1). One of the 10 specimens was illustrated in Leatherwood *et al.* (1976; p. 142, Fig. 156). Another is shown in Figs 3c and d. Four of the whales were released within two weeks; the remaining 6 survived for 30–45 days in a combination of sea pens and above ground pools.

As in previous experience with this species in captivity (Shallenberger, 1981), the melon-headed whales were aggressive when released into the pens. Several handlers were injured when they were hit by a whale's head or raked by its teeth. On one occasion when a handler was swimming in the sea pen a melon-headed whale repeatedly dived to the bottom and surfaced at high speed, striking the swimmer on his abdomen or back.

Long-snouted spinner dolphin

A single individual of this species was taken near Cebu in August 1974 (Fig. 5). Like other spinner dolphins live-captured from the Indoaustralian archipelago (Tas'an and Leatherwood, 1984) this individual proved fragile and survived only a short time. The species was not considered for future collections.

Fig. 5. A long-snouted spinner dolphin, *Stenella longirostris,* taken in Bohol Strait, south of Cebu City, Philippines, in August 1974. (Photo courtesy of Ocean Park).

ICELAND

In July 1978 Ocean Park acquired a 3 m female killer whale, *Orcinus orca*. The whale was captured off Western Iceland in November 1976 and maintained between capture and transport to Hong Kong at Hafnarfjördhur, Iceland (1 month), Harderwijk Aquarium, in the Netherlands (8 months), and Windsor Safari Park, in England (9 months). At present, the whale, which was 4.1 m long on 1 December 1982, is housed in the main tank complex and performs daily in the whale and dolphin show. The tank complex consists of a kidney-shaped show tank (maximum dimensions approx. 50 m long, 11 m wide and 6 m deep) with adjoining holding pens. On one end of the main tank is a pair of oval pools approx. 13 m long, 8 m wide and 6 m deep, connected to one another and to the main tank by gates approx. 1.2 m wide × 1.6 m deep. On the other end are three interconnected oval pools approx. 11 m in diameter and 2.6 m deep, two of which are also connected to the show pool.

JAPAN

Izu Peninsula

In late 1975 a base of operations was established on the Izu Peninsula south of Kamogawa Sea World. In that area dolphins are driven ashore from distances of 18 km or farther by the traditional method known as 'okomi'. Once the driven dolphins are within the harbor they are enclosed by seine-net into an area of approximately 3,000 m^2. In November 1975, fourteen bottlenose dolphins, *Turiops* sp. were selected from a drive and transported by plane to Hong Kong. The group included 9 females and 5 males, ranging from 2.28 to 3.05 m in length.

Taiji

From late November through early December 1976, 1977 and 1980, a base of operations was established in the harbor at Taiji village. At that time of the year the villagers traditionally drive dolphins into the harbor from distances of 5 km or less and enclose them by nets in an approximately 3000 m^2 area. Bottlenose dolphins, *Tursiops* sp. were selected from the drives as follows: 1976, 10 females and four males, ranging in size from about 2 m to 3.5 m (seven of the 14 died within 12 months); 1977, 11 females and three males, all between about 2 m and about 2.9 m long; 1980 four females between 2.1 and 2.9 m long.

From the 1977 drives at Taiji, aquarium staff also selected two male and five female short-finned pilot whales, *Globicephala macrorhynchus,* and sent them to Hong Kong. All individuals were 2.1–3 m long. Transport and initial adaptation of the animals taken in 1977 are described in Hammond (1977).

Iki Island

Annually, villages at Iki Island hold a now well-known drive of dolphins and small whales to combat perceived competition between themselves and the cetaceans for valuable and diminished food resources. Habitually the dolphins have been killed and sold for food or ground into fertilizer. In February 1982 Ocean Park selected four bottlenose dolphins, *Tursiops* sp. from the drive and transported them back to Hong Kong. The group included a 252 cm female and males 200, 250 and 280 cm long.

HONG KONG

Ocean Park has made no attempts to search for or capture cetaceans near Hong Kong and has housed only a single animal from that area. In December 1978 fishermen at Saikung, a village about 100 nm south of Hong Kong in the People's Republic of China, notified Ocean Park that a dolphin had entangled in their nets. The animal, an approximately 70 kg bottlenose dolphin, *Tursiops* sp. was transported to Hong Kong, where it lived only briefly. From experience, Ocean Park personnel are aware of dolphins of 5 other species that occur near Hong Kong.

Specimens of the Indopacific humpbacked dolphin, *Sousa chinensis,* known locally as the white Chinese dolphin, are often seen near Hong Kong in the months between about June and October. During these months in 1980 and 1981 an adult and calf were observed regularly in

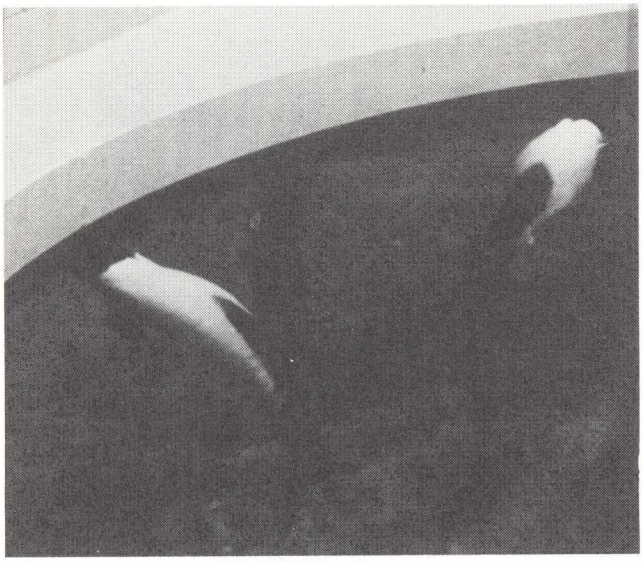


Fig. 3. Among cetaceans imported into the United States were these *Cephalorhynchus commersonii,* confiscated *en route* from Argentina to Japan, December 1978, and transferred to Mystic Marinelife Aquarium, Mystic, Connecticut (photo by J. G. Mead, US National Museum).

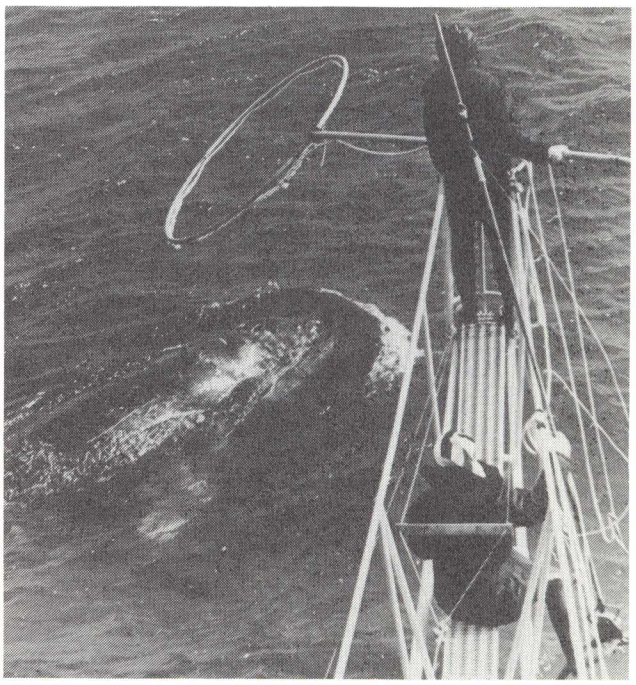


Fig. 4. The breakaway hoop used to capture 2 young gray whales, *Eschrichtius robustus,* off Baja California. (Photo courtesy of Sea World, Inc.).

bredanensis) retrieved from a Hawaiian beach in 1976 had survived for more than six years as of 1 January 1983 (see below). Although we do not know details, a bottlenose dolphin reportedly taken from a beach on the Florida Panhandle in 1965 lived at the Gulfarium until 1978 (NMFS, unpubl. data).

SYSTEMATIC REVIEW

Gray whale, *Eschrichtius robustus*

Two calves have been captured in the breeding lagoons off western Baja California and taken to holding facilities in southern California (Fig. 4). The limited experience with this species indicates that calves can adapt to captive conditions, but their size and daily food consumption create obvious problems for long-term maintenance (Evans, 1974).

Minke whale, *Balaenoptera acutorostrata*

An unsuccessful attempt was made to bring a newborn calf into captivity in southern California during the late 1950s (Norris and Prescott, 1961). The animal had been lassoed by the tail and hoisted aboard a research vessel as it swam aimlessly near Catalina Island. This is the only such attempt in North American waters of which we are aware.

Narwhal, *Monodon monoceros*

Efforts were made by the New York Aquarium and the Vancouver Public Aquarium to bring this Arctic species into captivity, but with little success (Newman, 1970a). An orphaned calf taken at Grise Fiord lived several weeks at the New York Aquarium in 1969 (Anon., 1969a and b), and six specimens—a young male from Grise Fiord plus two adult females and three calves from Koluktoo Bay—were transported to the Vancouver Public Aquarium in 1970 (Newman, 1970b, 1971). One of these animals survived for four months.

White whale or beluga, *Delphinapterus leucas*

All white whales that have been live-captured and maintained in captivity have been taken in Alaska, the St Lawrence River (and Gulf), or Hudson Bay, as far as we know. The history of the white whale live-capture fishery dates to the early 1860s. Although there is a miscellaneous body of literature referring to white whales in captivity, there has been no comprehensive attempt to summarize available information and to estimate the total numbers taken live for captive maintenance. We have tabulated known live-capture records in Appendix 1 but have no illusions about this being a complete list. Referring to two aquariums in New York, one on Broadway and the other at Coney Island, Mather (1899) stated:

> At both places we had many white whales at different times, for the management would keep whales penned up on the St Lawrence River to replace those which died, and would never show more than two at a time . . . . It would never do to have the public know that they were common during the summer in the St Lawrence, and when one was getting weak another would be sent down, and the public supposed that the same pair was on exhibition all the time.

In any assessment of the true impact of live-capture activities, it would be necessary to account for such animals held in reserve (also see Lee, 1878) as well as those which died in temporary holding facilities (Heyland and Hay, 1976) or *en route* to their final destination.

Prior to the late 1950s most white whales were taken in the St Lawrence River, mainly at Ile-aux-Coudres (Appendix 1). The proximity of suitable transportation and the existence of a white whale weir fishery dating to the early 1700s (see Reeves and Mitchell, in press) made this area a natural source of supply. Between 1958 and 1970 whales were caught at various sites, but since the early 1970s virtually all live-captured white whales have come from the Churchill and Seal Rivers in western Hudson Bay (Gewalt, 1970; Anon., 1979) (see Fig. 5).

Rough-toothed dolphin, *Steno bredanensis*

This species has only been taken and maintained in Hawaii (Pryor, 1975; Shallenberger, 1981). At least 23 have been taken since 1963; of these, five escaped or were released

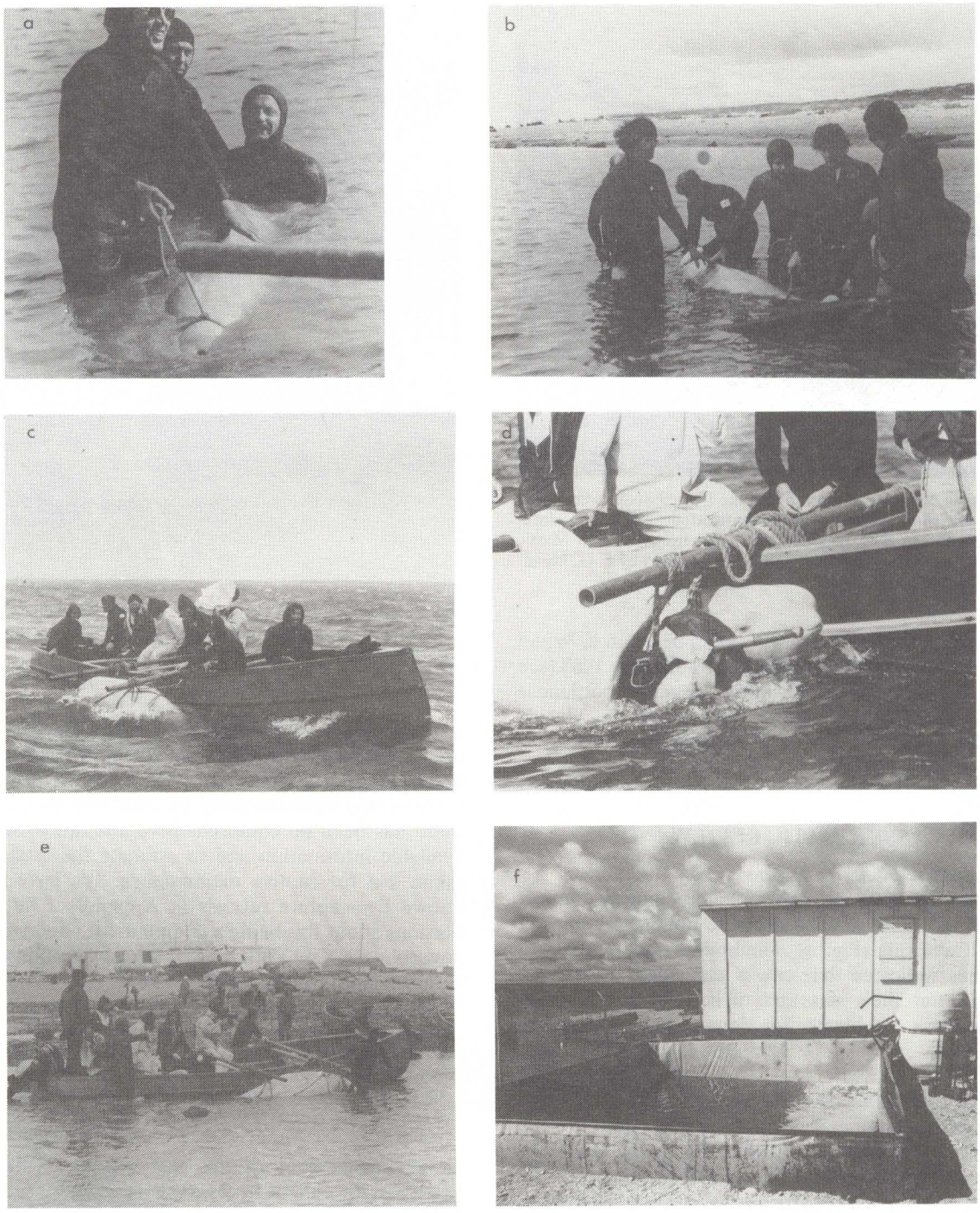


Fig. 5. Most white whales live-captured since the late 1960s have been taken from the Churchill River, Manitoba. They are captured by a diver with a hand-held lasso (a), loaded into a stretcher (b), transported across the river (c and d) to facilities on the southeast shore (e) where they are held in temporary pools (f) until transport to final destinations (photos July 1970, courtesy NOSC).

(Shallenberger, 1981, Tables 6, 7). Since 1973, Sea Life Park has had four specimens, two of which were released within less than a week of capture, one of which died after about five months, and one of which was recovered after stranding in 1976 (Fig. 2). The last of these remained alive and in 'good' health as of 31 December 1982.

Melon-headed whale, *Peponocephala electra*

The first recorded live-captures in US waters were in 1978, when two females were taken in Pokai Bay, Hawaii, for Sea Life Park (see Fig. 2) (Shallenberger, 1981, referred to *three* captive females at Sea Life Park). 'In captivity they can be quite aggressive and must be handled carefully' (Shallenberger, 1981, p. 47). One individual survived for nearly 17 months.

Pygmy killer whale, *Feresa attenuata*

Three specimens have been live-captured and held for short periods at Sea Life Park, Hawaii (Shallenberger, 1981) (see Fig. 2). They proved aggressive and did not adapt well (Pryor *et al.*, 1965; Pryor, 1975). A specimen recovered live from a Florida beach was taken to the Wometco Miami Seaquarium but died shortly after arrival (Caldwell and Caldwell, 1975).

False killer whale, *Pseudorca crassidens*

These animals have been uncommon in captivity in North America. In the past, they were caught and maintained in southern California (Norris and Prescott, 1961; Brown *et al.*, 1966) and Hawaii (Brown *et al.*, 1966; Pryor, 1975). According to Shallenberger (1981), at least ten false killer whales were live-captured off Hawaii between 1963 and 1981. A male was taken off Hawaii in 1976 (see Fig. 2); it died after somewhat more than two years.

Killer whale, *Orcinus orca*

The fishery for this valuable display animal has centered on inshore regions of northwest Washington and southwest British Columbia (Bigg and Wolman, 1975). Although there is some disagreement about exactly how many were permanently removed from the wild between 1962 and 1973 (see Asper and Cornell, 1977), the total through March 1976 appears to have been about 66. Bigg and Wolman's (1975) data indicate that approximately as many females as males were taken (28 and 30, respectively, in an incomplete sample).

Because of public pressure against original excesses in the fishery, much less live-capture activity has occurred in Washington and British Columbia since 1972. Hoyt (1981, Appendix 6) made a useful accounting of killer whales taken by live-capture worldwide from 1961 to 1980. Only three whales are listed as having been taken in US waters since March 1973. One of these was 'stranded and/or attempting to strand' at Ocean City, Washington (Asper and Cornell, 1977). The other two were part of six captured off Olympia, Washington; all six were released alive.

In August 1973, four killer whales were live-captured in Pedder Bay, British Columbia (Asper and Cornell, 1977; Hoyt, 1981). One of these was radiotagged and released 2½ months later; the other three later died. Two more individuals from a group of seven caught in Pedder Bay in August 1975 were retained. One died in captivity; the other was alive at Marineland of Ontario as of September 1980 (Hoyt, 1981, Appendix 6). Thus, a total of six killer whales were permanently removed from the wild by the North American live-capture fishery between 1973 and 1980.

As is evident from Hoyt's table, marine parks in North America and elsewhere have increasingly come to depend on Iceland to supply killer whales for display and research. NMFS records indicate that ten killer whales have been imported from Iceland into the US between 1976 and 1981 (Table 3).

Long-finned pilot whale, *Globicephala melaena*

Two stranded specimens have been taken from east coast beaches and placed in holding tanks for short periods since 1973. Prior to 1973 'several' animals were live-captured off New England (R. L. Brownell, pers. comm.).

Short-finned pilot whale, *Globicephala macrorhynchus*

This has long been a popular display animal (Gilmore, 1962; Brown *et al.*, 1966; Norris, 1974; Walker, 1975). Twenty individuals were taken in Hawaiian waters between 1963 and 1972 (Shallenberger, 1981), but all collecting activities since 1973 have taken place off southern California (see Fig. 6). Of 17 individuals taken, ten (59%) were females.

Fig. 6. Pilot whales are live-captured by means of a breakaway hoop net on a long-handle deployed from a 'swordfish plank' manoeuvered over the surfacing whale (photo off San Clemente Island, California, April 1974 by S. Leatherwood).

White-beaked dolphin, *Lagenorhynchus albirostris*

This species had not been maintained in captivity until March 1983, when five females were netted off Newfoundland and taken to the Mystic Marinelife Aquarium in Mystic, Connecticut.

Atlantic white-sided dolphin, *Lagenorhynchus acutus*

There has been no direct live-capture of this species. However, several specimens salvaged from beaches where they had stranded have been held for short periods at the New England Aquarium in Boston.

Pacific white-sided dolphin, *Lagenorhynchus obliquidens*

This species adapts relatively well to captivity and is readily available off the California coast (Brown and Norris, 1956; Norris and Prescott, 1961; Brown *et al.*, 1966; Walker, 1975; Leatherwood and Walker, 1982). Of the 28 Pacific white-sided dolphins caught from 1973 to 1982, all but three were taken in the Southern California Bight, principally near San Diego. The other three were taken in the vicinity of Santa Cruz, California. Females comprised 71% of the total catch.

Atlantic bottlenose dolphin, *Tursiops truncatus*

In terms of the number of animals removed from the wild in North American waters, the bottlenose dolphin is by far the most important and frequently caught cetacean. In an earlier review paper (Leatherwood and Reeves, 1982, Table 18.6), we listed known catches of bottlenose dolphins in Florida between 1967 and 1973, using data from the Florida Department of Natural Resources. We also listed the number of bottlenose dolphins taken under MMPA permits between 1 January 1973 and 30 December 1979, with their average and total monetary values, by year (Leatherwood and Reeves, 1982, Table 18.7), and we estimated takes in Florida prior to 1967 and all other areas of North America from 1938 through 1980 (Leatherwood and Reeves, 1982, Table 18.8). Our estimate of more than 1,500 as the total number of bottlenose dolphins removed from the wild off the US, Mexico and the Bahamas before 20 March 1980 was considered conservative. (Note that the total of catches listed in Table 18.8, 1,324–1,361, is 254

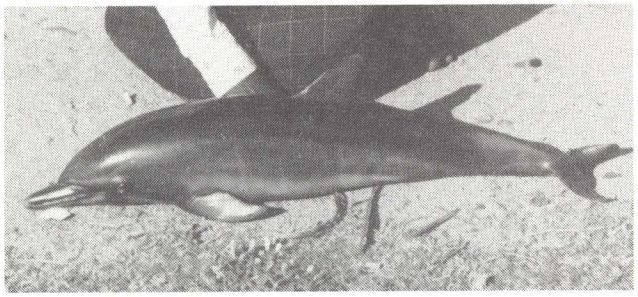


Fig. 4. A spinner dolphin, *Stenella longirostris,* accidentally killed in a gill net off Tangalle, Sri Lanka. (Photo C. Peters).

vessel. On 2 July 1981 4–6 slow moving Risso's dolphins were observed about 4 nautical miles east of Malé attol in over 600 m of water.

Two species of dolphins were positively identified. Bottlenose dolphins were encountered frequently both in the Maldives and near Sri Lanka. In both places groups usually consisted of 2–3 individuals, though single animals and groups of over 10 were seen. Specific locations of four sightings in the Maldives noted in the field journal are shown in Fig. 2. They consist of groups seen east of Felidu Channel (in 200–500 m), off Mirafura, Malé atoll (200–500 m), inside Farukolu, Miladummadula attol (10 m), and west of Gallandu Channel (400 m). Other groups not noted were encountered both inside and outside the attols. One group, a pod of 5–6 seen 23 May 1981 in Felidu Channel, was associated with the pilot whales discussed above and was also feeding around the FAD. Although specific details of sightings off Sri Lanka were not recorded in detail, bottlenose dolphins were seen frequently in all areas in which cruises were conducted (Fig. 3).

Spinner dolphins were encountered in the Maldives (Fig. 2) and near Sri Lanka (Fig. 3). In both areas groups often contained an estimated 500 individuals or more. Most of those seen closely had a tripartite colour pattern (see Perrin, 1970). Many were seen 'spinning' and bow-riding. In the Maldives spinners appeared to spend night hours inside the attols, depart for open sea about dawn, and re-enter the attols through the deeper channels about dusk. Four records noted in field journals consisted of two sightings in Gallandu Channel (water depths 200–500 m and 120 m), at Goadu, Miladummadula attol (water depth 10 m) and just inside the reef at the north end of South Malé atoll (water depth 6 m). Off southwestern Sri Lanka spinner dolphins were seen frequently around FADs and other fishing activity, usually in water greater than 500 m deep. A fisherman from the town of Tangalle incidentally captured a juvenile in his gill net (Fig. 4). He and other fishermen reported it was common for this species to be taken accidentally by gillnet fishermen off southern and southwestern Sri Lanka (see Alling, 1984).

Vessel Survey—Trincomalee

The vessel survey of Trincomalee Harbour and Koddiyar Bay, Sri Lanka, covered at least 35 km of survey track under conditions of wind force 1 (45%), 2 (40%), and 3 (15%) and excellent visibility. The survey resulted in non-duplicate sightings of the following minimum numbers of groups and individuals: blue whale (9 groups, 16 individuals, Fig. 5), Bryde's whale, *Balaenoptera edeni,* (1,1), sperm whale (1,1), spinner dolphin (1,125–150), spotted dolphin (1,25) and unidentified balaenopterid (6,9). Whales in these last sightings were most probably blue whales (Fig. 3).

The positively identified blue whales were relatively

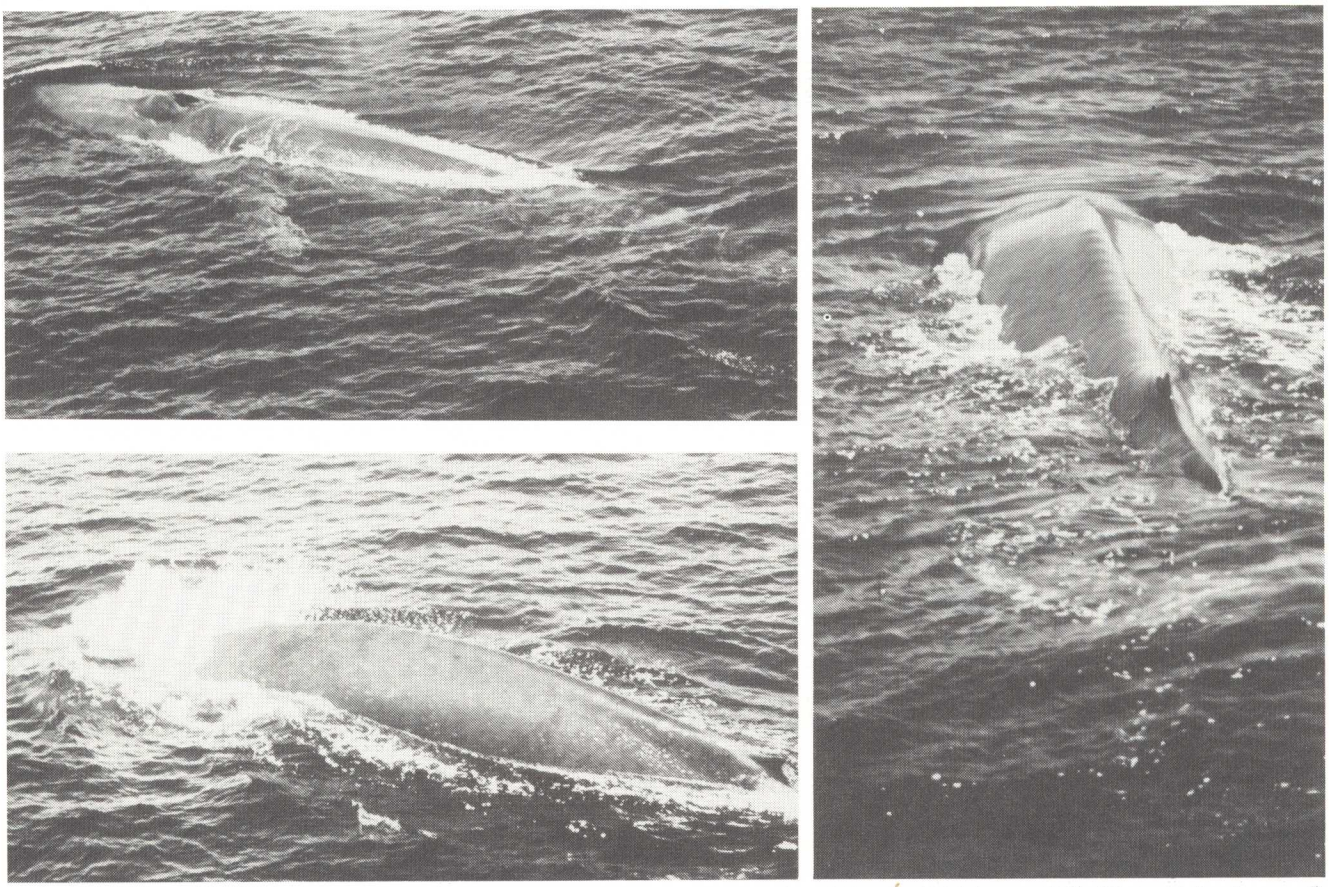


Fig. 5. Three views of a blue whale, *Balaenoptera musculus,* off Foul Point, Trincomalee, Sri Lanka, 28 February 1983. (Photos S. Leatherwood).

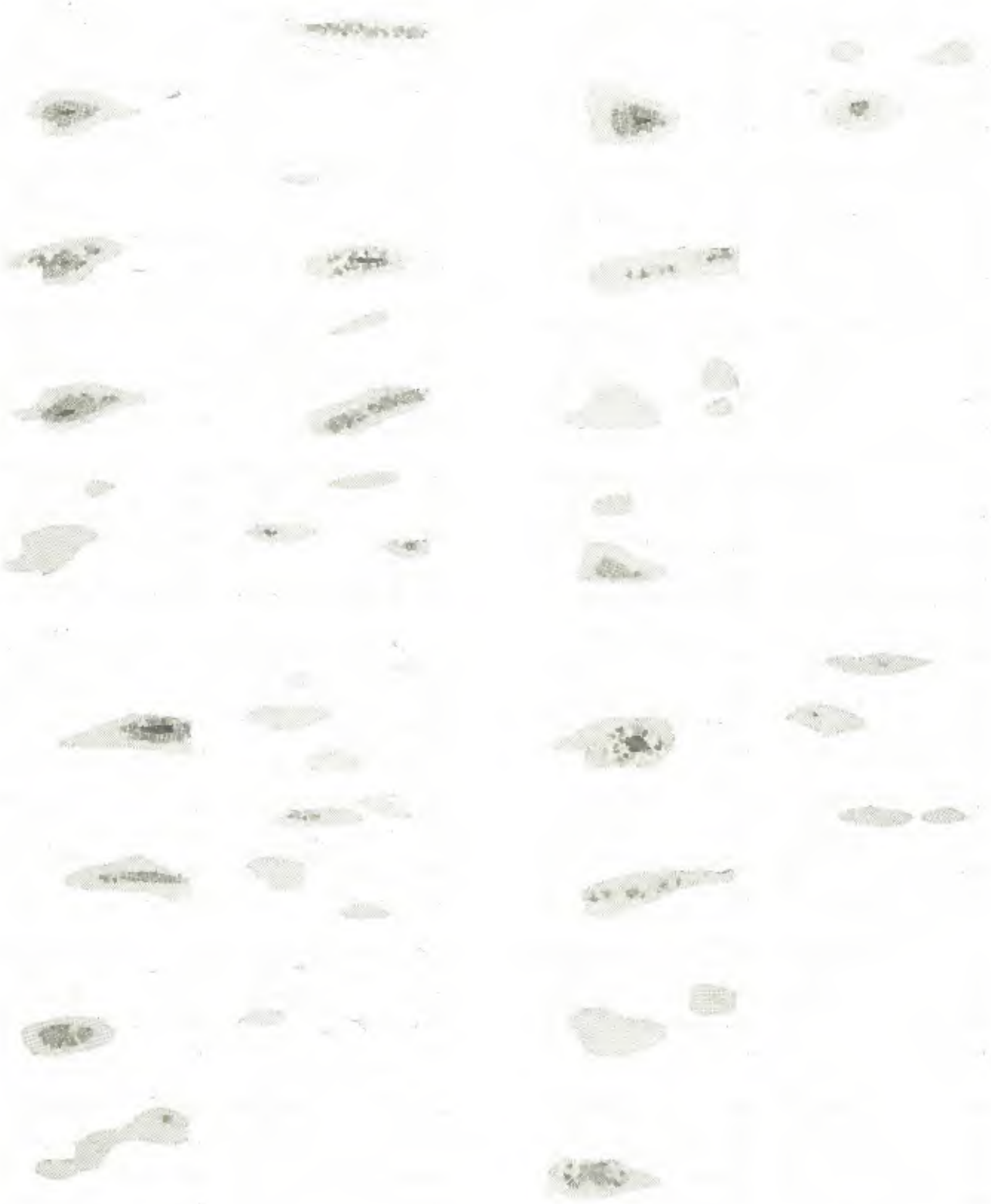
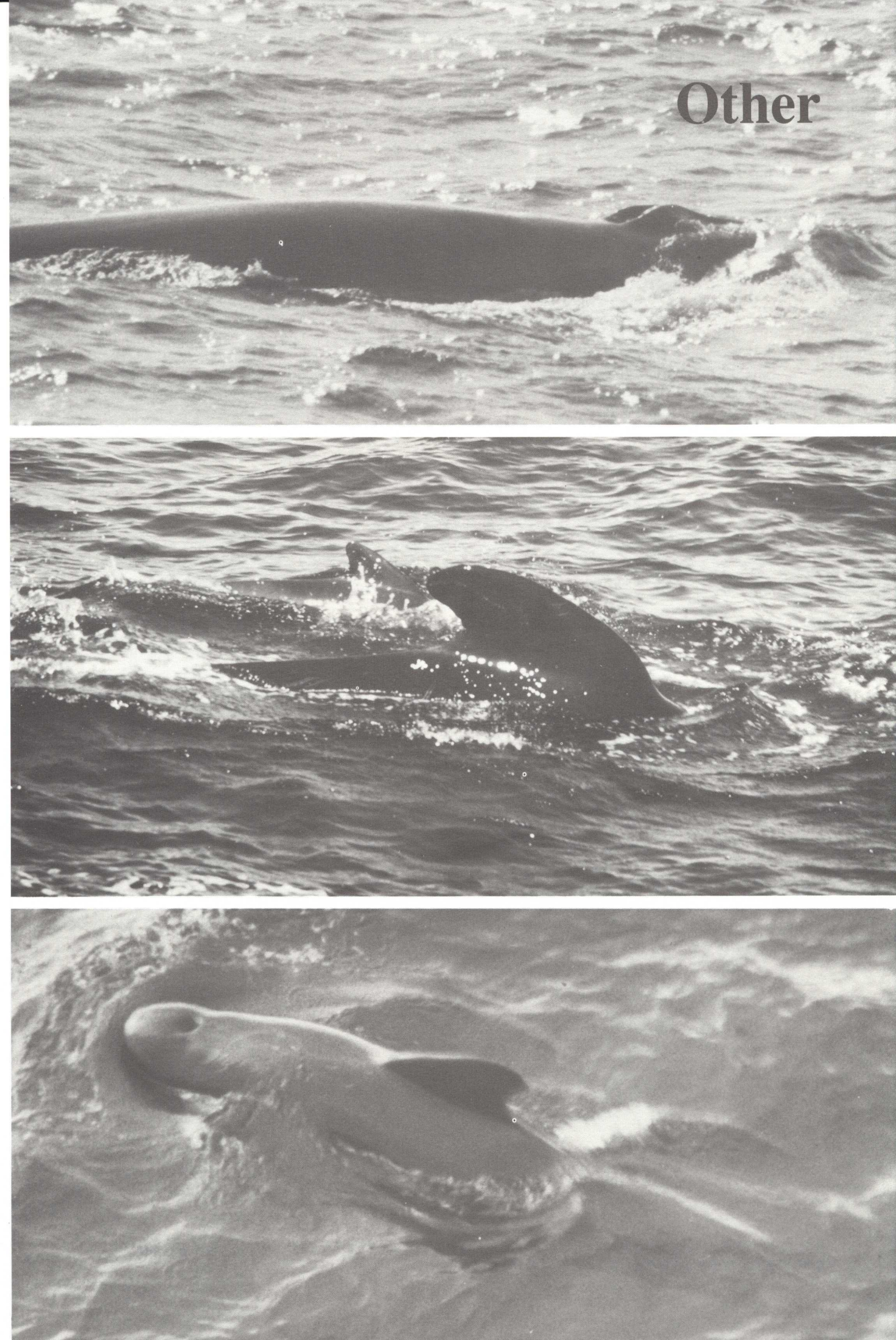


Plate I. Baird's beaked whales, August 1983, 35°33′N, 141°22′E. (Photo by R. Kanno.)

Plate II. Small-type whaling vessels used in the Baird's beaked whale fishery. (Photos by T. Kasuya.)


Other


Minke Whale/
Ageing Workshop

Table 1

Species	Area or stock	% earplugs readable (i.e. satisfactory age count)
Fin	Antarctic	80.0
	N. Pacific	65.0
	Canadian Atlantic	69.0
	Iceland	65.0 (79–86.0—Lockyer and Brown, 1979)
Sei	Antarctic	76.0 (93.0 after bleaching—Lockyer, 1974)
	W. Indian Ocean	75.0
	N. Pacific	63.0
	Iceland	72.0 (66–80.0—Lockyer and Martin, 1983)
Minke	Antarctic	33.0 (35–80.0—Kato, SC/A83/AW9)
	N. Atlantic	
	1. Canada	*ca*19–41.0—small sample (Mitchell and Kozicki, 1975)
	2. W. Greenland	<20.0 approx. (from Larsen and Kapel, 1983)
	S. Africa	51.5—(Best, 1982)
Bryde's	S. Africa	60–67.0 (Best, 1977)
Gray	California	45–60.0 (Rice and Wolman, 1971)

whales followed by N. Pacific and then N. Atlantic fin stocks. Earplugs from sei whales have generally been regarded as slightly less readable that from fin, although readability varies greatly by stock or geographical region within species (IWC, 1974). Recently, Lockyer (1982) investigated anatomical characteristics of fin whale earplugs from different geographical regions in the North Atlantic, and found some statistically significant differences which could affect readability, and also hinted at stock differences.

Earplugs from minke whales have generally been reported as exceedingly difficult to interpret, with many irregularities of formation of laminae (IWC, 1974).

The findings on readability of earplugs, shown below in Table 1 are mainly from the Report of the Meeting on Age Determination in Baleen Whales (IWC, 1974), supplemented by more recent information.

We may conclude that age counts from earplugs are likely to be most reliable and representative of the population/catch age-structure in fin and sei whales, and least in minke whales. Additionally, many authors comment that readability may vary from year to year, depending partly on the skill of the person collecting the earplugs, and also that male earplugs from all species and stocks appear consistently more readable than those of females, sometimes significantly so.

17. DETERMINATION OF AGE AT SEXUAL MATURITY, t_m, FROM EARPLUGS

Until now, this Annex has discussed only the possibility of using earplugs for determination of total age. In Section 3, it was pointed out that there frequently appeared to be a difference in lamina formation both in spacing, regularity, and colour intensity between the juvenile and adult growth zones. Lockyer (1982) indicated differences in colour between juvenile and adult fin whale earplugs, the former consistently being paler; she also noted other characteristic differences between juvenile and adult earplugs such as usual presence of minor laminae in the former (Lockyer, 1972; 1982).

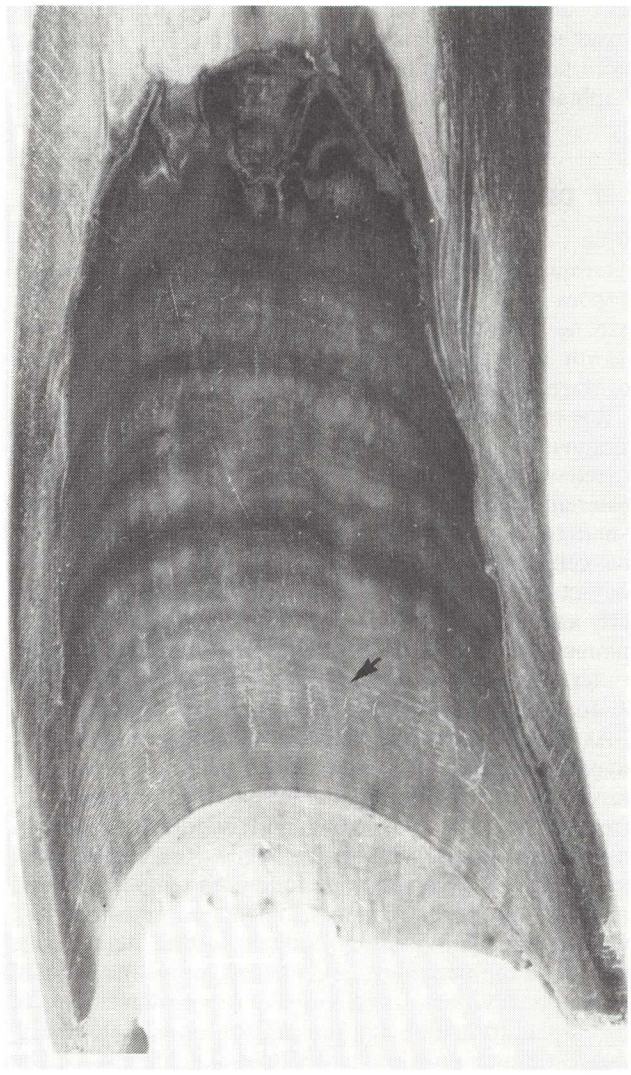
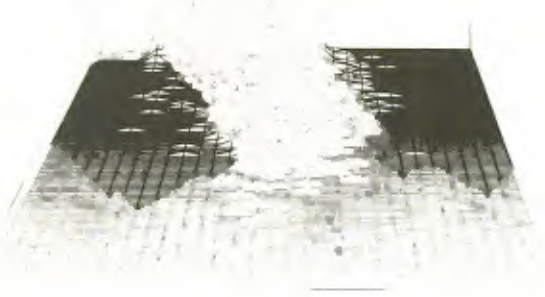


Fig. 1. Earplug core of the fin whale, cut to expose all growth layers. The transition phase is indicated.

Lockyer (1972) observed that in Southern Hemisphere fin whales, there was a distinct zone in the earplug core where laminae between (and including) the zone and the neonatal line were apparently immature phase growth layers, and between (but excluding) the zone and the germinative epithelium related to the mature phase growth layers. Fig. 1 shows this zone which is termed the *transition phase*, in a fin whale earplug. This transition phase, when checked against predicted ages at sexual maturity, found by deducting age after maturity calculated from ovarian corpora counts × ovulation rate, was in good agreement. Lockyer also found that immature animals never displayed a transition phase, and whilst over 96% of older mature female fin earplugs had a transition phase, only *ca* 19% of pubertal and recently mature females had such a character. Similar findings were obtained for male fin whales.

7.1 Presence and validity of a transition phase in different stocks and species

The transition phase was later described in earplugs of sei whales from the Southern Hemisphere (Lockyer, 1974). There was correlation of presence of a transition phase with maturity. However, the correlation was not absolute,



Resumé Section

This section includes Resumés of those papers presented to the Scientific Committee but not published in this volume. They are provided for information only and do not constitute publication; and as such should not be cited in papers without consultation with authors. Copies of the full papers are available at cost price from the IWC Secretariat.

Common dolphin off the coast of Spain, September 1981.
Photograph by G. Donovan.