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The False Killer Whale, *Pseudorca crassidens* (OWEN, 1846); A Summary of Information Available Through 1988

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1.0. Abstract

Over 600 sources were consulted for information on the false killer whale, *Pseudorca crassidens*, including: published and unpublished documents; our own data files and journals; files of the U.S. National Marine Fisheries Service (NMFS), Southwest Fisheries Center, and Inter-American Tropical Tuna Commission, specifically from tuna-boat observer programs and research cruises, 1967 through 1988; the NMFS Platforms of Opportunity Program (POP); the U. S. National Museum, Smithsonian Institution, Marine Mammal Events Program; The Stranded Whale and Dolphin Program of British Columbia (Baird et al., 1988); data of the United Nations Environment Programme, Nairobi, collected in Sri Lanka, 1983-1986 for the Sri Lankan National Aquatic Resources Agency (NARA) and in the possession of Oceans Unlimited; and files of various colleagues. The purpose was to review the current status of knowledge of false killer whales and to make that information available, both in a synoptic treatment and in an annotated bibliography, so that it can be considered in evaluating permit applications and planning future research. All aspects of the species' biology, abundance and distribution are summarized, with emphasis on population status and probable effects of removals.

Although early workers distinguished between a northern and a southern form and one recent worker proposed a subspecies, only one species of the false killer whale (*Pseudorca crassidens*) is currently recognized worldwide. It is known by many different common names, including the general "blackfish". The genus was first described by Reinhardt in 1862, the species by Owen in 1846.

Individuals reach about 6.1 m (males) or 5.6 m (females) in length and at least 1360 kg. They are black with a light region on the belly and occasionally on the sides of the head. The flippers (distinctly humped on the leading edge), teeth (7-12 per jaw and circular in cross-section) and tympanic bullae (atrophied ventral keel with no bilateral compression) are diagnostic. Additional features (number of teeth, and their distribution in the jaw, proximal extension of the premaxillae, various aspects of body shape, particularly slimness of dorsal fin and proportions, and some aspects of behavior) separate them from the other "blackfish". The dorsal fin and facial characteristics appear to vary individually such that they may be useful tools in photoidentification studies. This will be aided by scarring from various sources, including cookie cutter sharks.

Most aspects of body shape and coloration are unremarkable, but non-functional accessory grooves are found distal to the mammary grooves. The skull is massive with a short broad rostrum where length is at least 1.5 times its width, with width increasing with age. Asymmetrical (most often to the right) in young animals, the skull is reported by some to tend towards symmetry in adults; by others to not vary by age and sex. Dentine growth layer groups are a broad dark layer and a thin light layer. Teeth of males are larger than those of females of comparable age. Vertebral counts are 7C; 9-11T; 9-13L; 16-26Ca. Up to 7 cervicals are fused, limiting turning of the head. In old animals fusion may continue to the first thoracic vertebrae. Phalangeal formulae also vary.

False killer whales have one of the largest continuous ranges among the cetaceans, being found at all latitudes between limits of cold temperate waters. They are known reliably from at least the following latitudinal limits: Southern - southern South Africa, 42°40'S off south central Argentina, Selkirk Island and southwestern Chile, southern New Zealand, southern Tasmania and southwestern Australia. Northern - Norway, the Faroes, Maryland, British Columbia and Tsugaru Channel, Japan. Though they appear most abundant in pelagic areas, they are known to remain in shallow coastal waters, even enclosed bays, for protracted periods. They have been seen in water 9°-30.8°C. Movements (possibly long distance latitudinal and/or shoreward migrations) have been equated with migrations of fishes, squid or warm water masses.

There is little information on separate "stocks" though animals found off Japan may have different skull characteristics than those from other areas and Atlantic and Southern African animals

may differ from Pacific animals, judging by skull differences. Population estimates are not yet available, but the largest numbers of records are from the eastern tropical Pacific and western North Pacific (and adjacent waters off Japan, Korea and China). Records are most numerous for the eastern tropical Pacific. NMFS has concluded that "eastern Pacific populations are probably within the range of Optimum Sustainable Populations (OSP)". They are considered "common" around Japan where they are most abundant regionally during Feb-April inshore migrations of mackerel. The species is not uncommon off Queensland, Australia, and is apparently abundant in many parts of the Indian Ocean, where it interferes with fisheries. Judging from the high incidence of mass strandings, false killer whales are not uncommon around the British Isles, primarily off the Atlantic coasts.

Normal body temperature is 36.0-37.2°C (average = 36.6°C), pulse rate 80 beats/min. Hematological values are basically similar to those of other delphinids. Other aspects of the species' anatomy and physiology appear unremarkable.

Pregnancy is generally but not always in the left horn. Gestation is believed to be 15.5 to 15.7 months. Calves, born head first, are 1.5 to 2.1 m long. Mating and calving may well be year round but peak numbers of births have been noted in spring and summer. Females are anestrous in winter and polyestrous at all other times. Pure bred and hybrid calves have been born in captivity; judging from such success, these are prime candidates for a corrected concerted capture-breeding program. Lactation lasts from 18-24 months. Lengths of obligatory and facultative nursing are not known. Growth is fast for one year then slows rapidly.

Age/length at sexual maturity have been estimated as 8-14 yrs and 13-15' or 3.7 m (males) and 8-14 yrs and 12-14' or 3.7 (females). Ovulation may be spontaneous.

Sex ratios in wild populations appear to be skewed towards females, perhaps related to polygynous habits.

A gross annual reproduction rate of 5 to 6 percent has been calculated. Longevity is at least 41 years. Some captive animals are alive after 23 and 15 years.

The species contains the typical cetacean diploid chromosome number (2n=44) but is more karyotypically conservative than the killer whale. Allele frequencies are not different from other cetaceans, suggesting recent divergence times.

Free ranging false killer whales occur in groups of up to 1000 (perhaps more) often in association with other cetaceans. They do attack and prey on some small cetaceans so not all such associations may be benign. They also eat a wide variety of fishes and squids, feeding individually or in cooperating groups. Daily consumption has been estimated t 4.7 percent per day, 40-50 Kcal/kg/day. They are capable of swimming at least 32 km/hr and probably diving to over 500 m.

False killer whales adapt well to captivity and are easily trained. They show a high degree of inventiveness and are rated among the best candidates for learning research and show tasks. Naturally stranded animals have not fared well when removed to captivity; however, individuals from drives do well, if taken from areas without major disease problems (e.g. hepatitis).

They produce a wide variety of sounds, some used for echolocation, others presumably for communication. Produced sounds and hearing range to 100-115 KHz.

The species is widely exploited, directly in harpoon and/or drive fisheries in the Caribbean, Japan and Indonesia but incidentally in many areas. Individuals have been live-captured off California, Japan, Hawaii, northern Australia and Israel for research/public display. In many places, they interfere with longline and hook-and-line sport fisheries, killing fish and damaging gear. Losses may amount to $30 million per year in some fisheries. Species most often taken are tuna, yellowtail and mackerel.

Disease conditions noted include pathological aberrations in bones (hand and spine), pneumonia and gastric ulcers. An animal stranded in British Columbia had the highest levels of mercury yet reported in a cetacean (728 ppm in the liver).

Predators probably include killer whales and sharks. Parasites, including nematodes, acanthocephalares, trematodes, cyamids, and other crustaceans, may be a factor in some deaths. Mass strandings are not uncommon, sometimes with bottlenose dolphins. Attempts to "rescue" such strandings have met with limited success. For humanitarian reasons, such "rescue" attempts should be reevaluated.

2.0. Introduction

This document presents results of our efforts to summarize what was known, through calendar year 1988, about false killer whales, *Pseudorca crassidens*. The exercise was prompted by recent comments, in response to applications for permits to capture false killer whales in U.S. waters or import them from abroad for display or scientific research at U. S. institutions, that there was insufficient information to assess the likely impact of removals on populations of this species. It was our view that there was considerably more information available on false killer whales than was generally recognized, but that much of it is anecdotal and widely scattered throughout the published and unpublished literature. Our goal has been to make that information more widely available, both in a synoptic treatment and in an annotated bibliography, so that it can be considered in evaluating permit applications and planning future research. In this latter regard, we have outlined some research which might be undertaken to answer some of the more pressing questions which still remain about this species' biology and conservation.

The contents of this report have been or are being used as the complete or partial basis for four papers submitted to refereed journals or edited volumes of collected papers (Leatherwood et al., 1989; Baird et al., in prep.; Miller and Odell, in press; and Scott et al., in prep. - see Appendix 1). We will welcome readers' corrections and additions to this review.

3.0. Materials and Methods

Using various professional abstract services, our own libraries and institutional libraries available to us, we assembled all documents we could identify which we knew or thought contained information on false killer whales. Literature Cited sections of those documents provided leads to additional sources. Once accumulation of publications was complete, all documents were read and annotated. Information in them was sorted by topics corresponding roughly to those outlined in the "Mammalian Species" accounts of the American Society of Mammalogists, which was used as an approximate model for this document. There is, however, no literature cited section per se in this summary because about all

references cited in the text are included in the Annotated Bibliography (Appendix 1), along with references not cited. The few exceptions, references cited for illustrative or comparative purposes which do not contain information on false killer whales, are cited in their entirety in the body of the text. (Copies of all references listed in Appendix I are in the library of the senior author).

In addition to published information, we considered unpublished data from the following sources: our own data files and journals; files of the U.S. National Marine Fisheries Service (NMFS), Southwest Fisheries Center, and Inter-American Tropical Tuna Commission, specifically from tuna boat observer programs and research cruises, 1967 through 1988; the NMFS Platforms of Opportunity Program (POP): the U. S. National Museum, Smithsonian Institution, Marine Mammal Events Program; The Stranded Whale and Dolphin Program of British Columbia (Baird et al., 1988); data of the United Nations Environment Programme, Nairobi, collected in Sri Lanka, 1983-1986 for the Sri Lankan National Aquatic Resources Agency (NARA) and in the possession of Oceans Unlimited; and files of various colleagues, each identified in the appropriate locations in text and tables.

Records of sightings, strandings and collections were tabulated by major geographical/oceanographic region (Table 1). These were plotted (Figure 1) and then considered in light of summarized distributions from areas not well represented in literature in English, particularly east Asia, from Malaysia, Borneo and the Philippines northward to Japan and the Peoples Republic of China, Korea and Japan.

For the data from the eastern Pacific, in particular, we followed Scott and Chivers (1989) in examining patterns of distribution, herd size, interspecific associations and some aspects of behavior. In some subject areas, all we could do was compile the information, as there was insufficient data to draw any inferences or conclusions. In others, however, we not only tabulated the information, but attempted to combine work of all contributors to surmise what we could, reasonably, about the species' biology and conservation. The process is not complete. We will continue our studies of this species. In addition, we hope this compilation will encourage other students to undertake their own studies. Towards that end, we have outlined some important research we feel should be undertaken.

4.0. Results and Discussion

4.1. Taxonomy and Nomenclature

The science of naming and assigning cetaceans to taxonomic groups is not without controversy. Relationships of a given species to other species, based on osteological, biochemical or

other factors, are often difficult to detect, quantify or interpret with certainty. In the case of the false killer whale, there is no evidence to suggest that there is more than one species, *Pseudorca crassidens*. The one subspecies proposed in recent history, *P. c. meridionalis* (Deraniyagala, 1945b) is regarded as a *nomen nudem* presented without adequate justification; so it is generally ignored. Concerning cetacean taxonomy on an even more fundamental level, it may be appropriate to question the current bases for separations among some genera and species of cetaceans currently regarded as distinct, given that hybrids have been born in captivity to crosses of bottlenose dolphins, *Tursiops* spp., with *Pseudorca crassidens*, rough-toothed dolphins, *Steno bredanensis*, pilot whales, *Globicephala* spp. and Risso's dolphins, *Grampus griseus*. In this latter case, there is also an account of a hybrid form from a stranding at Blacksod Bay (Fraser, F.C. 1940. Three anomalous dolphins from Blacksod Bay, Ireland. Proc. Royal Irish Acad. 45B(17):413-455.) The discussion below (sections 4.1.1 - 4.1.4) assumes there is a single, valid species (ISIS No. 53014110020060010O1 - Honacki et al., 1982) and reviews the history of its description, naming and assignment.

4.1.1. Genus

Pseudorca Reinhardt, 1862:151. Type locality Denmark

Order Cetacea, Suborder Odontoceti, Superfamily Delphinoidea, Family Delphinidae. The genus *Pseudorca* has been placed in the subfamily Orcininae by several workers. This taxon is not entirely stable in its membership, because in addition to *Pseudorca*, it may include *Orcinus*, *Globicephala*, *Orcaella*, and *Feresa* (Slijper, 1936; Fraser and Purves, 1960; Mead, 1975;) or just *Orcinus* (Kasuya, 1973; Heyning and Dahlheim, 1988).

4.1.2. Species

Pseudorca crassidens (Owen, 1846)
False Killer Whale

Phocaena crassidens Owen, 1846:516. holotype, subfossil skull, type locality Linconshire Fens, near Stanford, England.

Orca crassidens Gray, 1846:34.

Orca meridionalis Flower, 1864:420. Type locality Tasmania.

Orca destructor Cope, 1866:293. Type locality Paita, Peru.

Globicephalus grayi Burmeister, 1869:367. Type locality South America.

Pseudorca? mediterranea Giglioli, 1882: . Type locality Mediterranean.

4.1.3. Subspecies or Races

Flower, based on adult skeletons, proposed and later abandoned "the specific distinction of the southern form from the northern form of this animal" (Hector 1885). The proposed subspecies *P. c. meridionalis*, the Southern or IndoPacific false killer whale, (Deraniyagala, 1945a,b) has been rejected. Therefore, no subspecies are recognized in *P. crassidens*.

4.1.4. Common Names

Other common names for the false killer whale include *la pseudorque* (French); *oki gondo* (= onan) *kujira*, *okikono*, *oiokui*, *kyuri-gondo*, *schachi-modoki* (Japanese); *orca falsa* (Spanish); *malaya* or *chorhaya kosatka* (Russian); *false spekkhogger* (Norwegian); *halvspaekhugger* (= *halvspack huggare*) (Danish); *zwarte zwaardwalvis*, *zwarte schijnorka* (Dutch); *komadwa* (Singhalese); *kleiner morder*, *dickzachniger butzkopf* (German); *temu blaa* (Indonesian); *pseudorca*, *mongoose* - in St. Vincent (English). In English, many species of small to mid-sized odontocetes, including false killer whales, are known by the collective term "blackfish". The original description (Owen, 1846) dubbed the animal "thick-toothed grampus". Especially in older records in English by whalers and adventurers, false killer whales were doubtless often listed among the "grampuses", a generic group which also include at least Risso's dolphin and killer whales.

4.2. Diagnosis

The false killer whale is a small whale, ranging in length from about 1.5 m at birth up to 6.1 m as adults (Leatherwood et al., 1976; Youren 1986). These whales have a small head with a well developed melon that overhangs the tip of the upper jaw (Ross, 1984). The body is long and slender, and the head is narrow and gently tapered from the area of the blowhole forward. The color is largely black dorsally and laterally but an anchor-shaped region of varying extent and intensity is found on the belly. The shape of the flippers is diagnostic, with a broad hump on the front margin near the middle, and a slight concavity at the distal extremity (Leatherwood et al., 1976; Purves and Pilleri, 1978).

The teeth are large, and are distinguished by the circular shape in cross-section, rather than the elliptical shape in cross-section seen in the killer whale, *Orcinus orca* (Fraser, 1948). The dentinal formula is 7 to 11 teeth in each side of the upper jaws and 7 to 12 in each side of the mandibles (Purves and Pilleri, 1978; Ross, 1984).

The false killer whale is distinguishable from the melon-headed whale, *Pepenocephala electra*, by the former's fewer number of teeth and the latter's white lips and white to bright gray

chevron patch, which extends from the throat to the genitals on the ventrum (Best and Shaughnessy, 1981). The false killer whale is distinguishable from the pygmy killer whale, *Feresa attenuata*, by the fact than the former's teeth, occupy the entire rostrum, and its premaxillae are not expanded proximally (Best, 1966). It is distinguishable from both these species by its larger size and dorsal fin, which is differently shaped, smaller proportional to body size and located more caudally than that of either of the other two (Best, 1966; Bryden et al., 1977; Best and Shaughnessy, 1981). It is distinguished from the pilot whale (*Globicephala* sp.) by its rounded head, not so bulbous as that of the pilot whale, and the fact that its dorsal fin is positioned more centrally and is shaped more like that of a bottlenose dolphin (Norris and Prescott, 1961). Gaskin (1971) suggests that its "plunging" swimming motion distinguishes it from the other "blackfish" even at a mile or more. We have noted that it often makes rapid changes of direction and "pin-wheels" when feeding, looking very like feeding bottlenose dolphins when doing so (Leatherwood, S. 1975. Some observations of feeding behavior of bottle-nosed dolphins (*Tursiops truncatus*) in the Northern Gulf of Mexico and (*Tursiops* c.f. *Tursiops gilli*) off Southern California, Baja California and ????, Mexico. Marine Fisheries REview 37(9):10-16.

The length of the tympanic bulla ranges from 47.7 mm to 50.5 mm, with an atrophied ventral keel, and no bilateral compression (Kasuya, 1973), and is diagnostic for the species. The pterygoid bones are nearly in contact, the intermaxillae are of equal breadth throughout (Dammerman, 1924).

4.3. General Characters

4.3.1. External Appearance, Size and Body Proportions

Maximum recorded length is 6.1 m in the male and 5.06 m in the female (Leatherwood and Reeves, 1983; Perrin and Reilly, 1986). Exact weights of full-grown animals are difficult to obtain and estimates vary. Leatherwood et al. (1982) note that the maximum weight is at least 1,360 kg. Morzer Bruyns (1971) states that males may weigh up to 2,170 kg, and females up to 1,100 kg. Using a weight/length predictive equation presented by Odell et al. (1980: Weight(kg) = 2.16×10^{-4} Length(cm)$^{2.437}$) we calculated a maximum weight from the maximum reported length of 6.01 m of 1,278 kg. However, the accuracy of this equation may be low due to a small sample size (n=4), or other biases, used in its formulation (Odell et al., 1980).

The dorsal fin is from 17.8-40.6 cm tall and falcate, and its tip varies from pointed to rounded. The height is about 8 percent of the body length (Tomilin, 1967). Reports of the positioning of the dorsal fin, in relation to the midpoint of the back, vary from very slightly in front (Fraser, 1948), at, or slightly behind the

midpoint (Tomilin, 1967). Tomilin (1967) states that the dorsal fin is more anteriorly located in males than in females and in older animals of both sexes, which could account for the range of positional reports. Peacock et al. (1936) noted wide variation in the shape of the dorsal fin between individuals and presented sketches clearly indicating such differences could be used to distinguish among individuals. This has also been noted more recently by Odell et al. (1979) and others.

There is no demarcation between the head and beak. Slight sexual dimorphism in the external appearance of the head has been reported (Mead, 1975), with the overhang of the melon over the upper jaw in the male being greater than in the female. Porter (1977) noted that of the 30 false killer whales involved in a stranding in Florida, all were identifiable by highly individual facial characteristics and expressions.

The flipper has a typical delphinid external shape, being longer than wide, distally narrow and pointed, and slightly convex (Gihr et al., 1982) except that the leading edge is characterized by a diagnostic hump in the upper ½ (Leatherwood and Reeves, 1983). Among males, flippers may measure 55 cm in length, with a maximum width of 44 cm (Purves and Pilleri, 1978). Flippers are about ten percent of the body length (Barnard, 1954; Fraser, 1966). Dawson (1985) notes that the tailstock is strongly keeled. The flukes are indistinguishable from those of most other delphinids. However, Nishiwaki and Hung-Chia (1961) did describe an anomalous animal in which the tail fluke notch was replaced by a flap of skin. Non-functional accessory grooves are found distal to the mammary grooves (Comrie and Adam, 1938).

4.3.2. Coloration

The color is black on the dorsal surface, sides of the body, dorsal fin, pectoral flippers and tail flukes (Fraser, 1936). There is occasionally an area of light grey on the sides of the head (Leatherwood and Reeves, 1983). There is also a blaze of grey, varying from indistinct to nearly white, on the ventral surface, occurring as an approximately anchor shaped patch beginning beneath the head and extending posteriorly between the flippers (Richard, 1936; Norris and Prescott, 1961). Occasionally, the light area extends to the genital slit. The lips internally are white or cream colored (Hinton in Purves and Pilleri, 1978). Coloration may already contain all elements at a very early stage of development, as evidenced by the advanced pigmentation of a 64.7 cm embryo (Tomilin, 1957). Fraser (1948) notes that the black coloration is occasionally marked by sparsely-scattered white star-shaped scar marks. These marks may be attributed to the cookie-cutter shark (*Isistius brasiliensis*); the healing of wounds and formation of these scars from stranded individuals has been noted (Porter, 1977; Warneke, 1983a).

4.3.3. Skull and Skeleton

The skull is massive with a short, broad rostrum, whose length is at least 1.5 times its width, and which increases in width with age (Elliot, 1901; Tomilin, 1957, 1967). The rostral portion of the intermaxillaries are truncated at the distal end (Elliot, 1901). The intermaxillaries are rugose in front (Gray, 1846) and have developed laterally, occupying 60 percent of the rostrum's width (Tomilin, 1957). Pilleri (1987) notes the presence of two ossa postinterparietalia in the fetus, but not in the adults. The meckelian ossicle is present in this species (Flower, 1866; Purves and Pilleri, 1978) on the anterior margin of the narial aperture, and although not functionally significant, is morphologically important (Caves, 1987). The total length of the adult skull exceeds 500 mm (Glass, 1973).

Various methods have been used to measure the degree of asymmetry in the cetacean skull (Purves and Pilleri, 1978). Yamada (1956) notes that the fronto-maxillary area becomes less distorted, ie. more symmetrical, with age, with 53 percent of fully-grown individuals symmetrical. Yamada also notes that of all animals of all ages 52 percent had distortion to the right, 18.2 percent had distortion to the left and 29.8 percent were symmetrical. Purves and Pilleri (1978), using different measures of asymmetry, note that the degree of asymmetry is about equal in the two sexes and does not change with age. Ness (1967) used linear measurements to characterize asymmetry and skew of the false killer whale skull and compare it to those of several odontocetes, and noted that the asymmetry of the nares is similar to other delphinids. Ness used 33 skulls from the same sample of 77 skulls from Dornoch Firth examined by Yamada and noted that all had leftward deviation of the nasal prominence.

Although the number of teeth varies (see Diagnosis) the typical dental formula appears to be 8-9 teeth in each upper jaw and 9-10 in each mandible (Smithers, 1938; Purves and Pilleri, 1978). The numbers from left and right sides are not always the same. The roots of the teeth are almost cylindrical in cross-section, and may be up to 3/4" (approx. 1.8 cm) in diameter at the gum line (Fraser, 1948). Dentinal growth layer groups are a broad dark layer and a thin light layer (Baird et al., 1989). Extensive wear on the teeth can occur, including lingual undercutting. Such wear implies that false killer whales are capable of making small lateral and palinal jaw movements, related to the action of breaking up large prey (Ross, 1984). At equivalent ages, the size of teeth in the male are larger than those of the female (Purves and Pilleri, 1978). Since this difference is present even from at least two years of age, regardless of a size difference between the sexes, it can be considered a secondary sexual characteristic (Purves and Pilleri, 1978).

The skeleton is described by Tomilin (1967). Vertebral counts are 7 cervical, 9-11 thoracic, 9-13 lumbar and 16-26 caudal, totalling 47-52 (Paulus, 1963; Purves and Pilleri, 1978). From 103 skeletons examined by Purves and Pilleri (1978) 82.5 percent had total vertebral counts of 48-50. Various degrees of fusion of the cervical vertebrae occur (Gray, 1864; Yamada, 1956), with the result that false killer whales cannot turn their heads (Evans and Awbrey, in press). In one study of 82 skeletons the majority (67 percent) had the first six cervical vertebrae fused, an additional 23.8 percent had the first five fused, and the remaining 12.2 percent had all seven fused (Yamada, 1956). Yamada notes however that there is some evidence for an increase in the number of vertebrae fused with age. In old individuals the first thoracic vertebra is sometimes fused with the cervical mass (Purves and Pilleri, 1978).

There are 9-12 rib pairs, with 10 the usual number, 6 of which are bicipital. When the 11th and 12th pairs are present they are floating (Purves and Pilleri, 1978). Unequal numbers of ribs on each side have been reported (Yamada, 1956). Four pairs of ribs attach directly to the sternum (Arvy and Pilleri, 1977). The sternum has four segments (Yamada, 1956) which fuse to different degrees with age. Of 82 examined by Yamada the segments of 48.8 percent were all separate, 37.8 percent had the first two segments fused, 8.5 percent had the first three segments fused, and the remaining 4.9 percent had all segments fused. Wang (1984) notes that the length of the lumbar vertebrae is greater than the width, allowing for insertion of muscle, believed to accelerate swimming speed. The skeleton of the hand shows a great deal of variability (Gihr et al., 1982), with a wide range in phalangeal formula: I 0 to 1, II 4 to 8, III 4 to 6, IV 1 to 3, V 0 to 2. The most common phalangeal formula from a sample of 93 flippers is I 0, II 6, III 4, IV 2, V 1 (Gihr et al., 1982). The variability of the hand skeleton is not correlated with variability in other parts of the skeleton.

4.4. Distribution, Habitat, Migration, Abundance, Stock Identity and Legal Status

4.4.1. Introduction

The false killer whale has been reported from all tropical, sub-tropical, and warm temperate seas. Most records are listed by region in Table 1. Nishiwaki (1977) reports that in the Southern Hemisphere they also inhabit "temperate - cold waters" but do not migrate south of the Antarctic convergence. In the Indian Ocean they are restricted to waters north of 50°S (Nishiwaki, 1984). As a monotypic species occurring on both sides of the equator, basically in tropical waters, but overlapping with temperate forms, false killer whales have one of the largest continuous ranges among the cetaceans (Davies, 1963). Except in areas where there are or have been major programs resulting in significant amounts of

searching effort (notably the eastern Pacific), or where it is taken in fisheries, the species is best known from stranding records. In most areas where there have been strandings there also have been sighting nearby. However, one must be cautious in inferring normal range from strandings alone as stranding events may represent animals which are sick - and thus behaving anomalously - or have drifted from a long way off. The U. S. Department of Commerce (1978) notes that this whale is "uncommon throughout its range". However, the significant number of recent sightings in major surveys of extensive oceanic areas (notably the eastern tropical Pacific and west central Indian Oceans) and the relative frequency of strandings support the contention that the apparent rarity of the false killer whale could probably be accounted for by its pelagic habits.

We have discussed distribution by major ocean basins, with separate consideration for eastern and western shores. In the case of the IndoAustralian archipelago, it is clear that the boundaries are artificial and records from that region also apply to the western Pacific and the eastern Indian oceans. We have accepted almost all published records as confirmed, except in a few cases where the records are obviously erroneous.

Most authors note that false killer whales frequent open ocean, deep water areas. Several recent observers have reported false killer whales remaining in enclosed shallow water areas for extended periods in the eastern north Pacific (Osborne et al., 1988).

Occurrences have been reported in water temperatures ranging from 9°C to 30.8°C (Stacey and Baird, 1988; Beadon, 1989, pers. comm.; Miyazaki and Wada, 1978). Water temperatures most often frequented are generally in the higher half of the range, reported by some as over 16°C (Kasuya, 1975), and greater than 20°C (Morzer Bruyns, 1971). Bellision (1966) included the false killer whale among the cetaceans commonly occurring in Antarctic waters. However, given the water temperature preferences considered elsewhere, we consider it highly unlikely that they occur in Antarctic water as far south as the Antarctic convergence, let alone the Antarctic.

Tomilin (1957) suggests that inshore movements are occasionally associated with those of cuttlefishes. Kellogg (1940) equated their movements inshore to shoreward flooding of warm ocean currents. Van Beneden (1889) reports long distance movements where a school of false killer whales followed a ship for 1,000 miles, from Brazil to the English Channel. Nishiwaki (1967) also reports a group following a tuna boat for more than 1,000 miles.

Mizue and Yoshida (1961) reported that some skull proportions - notably breadth of the rostrum, length and width of the mandible - are different off Japan than "in other sea areas". Anonymous

(1980b) indicated that there was insufficient information to distinguish stocks in the eastern Pacific. Ross (undated) has examined skulls and notes that preliminary analysis supports previous data suggesting that the skulls of Atlantic and southern African animals are broader than those of western Pacific animals. Judging from the positions of southernmost records along both coasts of South America one would postulate that south west Atlantic and south east Pacific populations are isolated.

In the United States, false killer whales are "managed" under the Marine Mammal Protection Act of 1972; international trade is regulated by their listing on Appendix II of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora).

4.4.2. Eastern Pacific

Clark (1945) reported that false killer whales occur in the Bering Sea, but did not present documentation. We consider the possibility of their presence in the Bering Sea unlikely. A sighting report exists from above 60°N, in Prince William Sound, Alaska (C.O. Matkin in Leatherwood et al., 1982), but it is not well documented. There are five records from British Columbia (Baird et al., 1989; Stacey and Baird, 1988) and two from Washington State (Scheffer and Slipp, 1948; Osborne et al., 1988). There are more records in waters from Oregon to California (Lindsay, 1964; Brown et al. 1966; Mitchell, 1965; Sullivan and Houck, 1979; Scott et al., in prep.). Mitchell (1965) documents two mass strandings in the northeastern Pacific. A record presented by Norris and Prescott (1961) of a school of about 300 animals off southern California tentatively identified as false killer whales has been subsequently rejected by some authors, as the reported size of the animals was too small.

There have been numerous sightings and some strandings off Mexico. Miller (1920) discussed a stranding in 1888 at Pitchulinque Harbor, near La Paz, in the Sea of Cortez, and other Mexican records are presented for 150 km south of Acapulco (Lonnberg, 1936) and in the Sea of Cortez at San Jose Island (Van Gelder, 1960) and Espiritu Santo Island (Mitchell 1965). Reynoso and Bracho (1985) list false killer whales as occurring in all Pacific zones of Mexico. According to Hoz Zavala and del Carmen Colmenero (1984) the species is not legally protected in Mexico and its status is undetermined. More recently, 1981-1985, the species represented just about one percent of all cetaceans seen during surveys in the Sea of Cortez (Aguayo et al., 1986). Perryman et al. (1979) found false killer whales in the same oceanographic areas as the other small cetaceans observed in the eastern tropical Pacific and suggested they respond to similar environmental features.

An early specimen (*Orca destructor*, Cope 1866) was from Paita, Peru, and both Mitchell (1965) and Leatherwood et al. (1982) report Peru as the southern end of the range. Oliver-Schneider (1946) reports a record from Chile, but we were not able to confirm this record. Cardenas et al. (1986) cite records from Selkirk Island, Juan Fernandez archipelago. However, based on the known northern range, and since the Chilean coast receives south-flowing warm-water currents, at least in summer, it is quite conceivable that false killer whales occasionally range to the southern part of Chile. Within this broad range, there are many published records.

Numerous authors (e.g. Fiscus, 1977; Shallenberger, 1981; Patterson and Alverson, 1986; Tomich, 1986) document the occurrence of false killer whales off Hawaii. Shallenberger (1981) notes they are found near all of the Hawaiian Islands, in shallow water as well as deep, and in the channels between the islands. There are no estimates of numbers off Hawaii.

They are also reported from the Galapagos Islands (Beebe, 1924, in Comrie and Adam, 1938; Donovan, 1984; Whitehead, 1986), Peru (Leatherwood et al., 1982; Mitchell, 1965) and other widespread localities off central and northwestern South America, including pelagic areas and offshore islands (e.g. Holt, 1984; see Donovan, 1984; Scott et al., in prep. for review).

The largest number of records available from any area world-wide are from the eastern tropical Pacific (Figure 2). Through records obtained by observes of the National Marine Fisheries Service and the Inter-American Tropical Tuna Commission a total of 241 sightings with herd size noted have been reported (Scott et al., in prep.). Some of these records have been reported elsewhere (e.g. Barham, 1977; Souter and Broadhead, 1977; Alverson, 1981; Perrin and Oliver, 1982; Holt, 1983, 1984; Patterson and Alverson, 1986) (Figure 1). All are treated in detail by Scott et al. (in prep.) and summarized herein (see Figure 1). From these records it appears that their distribution may be contiguous across the Pacific. Herd size and interspecific associations from the eastern tropical Pacific (from Scott et al., in prep.) are discussed in their respective sections.

Northern extralimital records in the eastern Pacific have been during the late spring and summer. However, a lack of quantification of effort during other seasons makes it impossible to determine if these movements are positively correlated with warm water temperatures or other oceanographic factors. Wells et al. (1989) reporting on northern extensions of bottlenose dolphins (*Tursiops truncatus*) along the California coast noted that sightings during the early 1980's involved a number of species with warm-water affinities, including the false killer whale. Shallenberger (1981) reported that movements of false killer whales around the

Hawaiian Islands were related to movements of yellowfin tuna (*Thunnus albacares*) and other prey species.

There is no information on stock differentiation of this species but despite this and the relatively poor data available through 1980, a working group of the NMFS concluded that the eastern Pacific populations were probably within the range of OSP (Anonymous, 1980b). Based on reports from Japanese fishermen and whalers in the North Pacific, Nishiwaki (1966) surmised they were most abundant in the southeastern region, the eastern tropical Pacific (see Scott et al., in prep.).

4.4.3. Western Pacific

In the western Pacific, records exist in the south from Southern Tasmania (Nicol, 1987), the Tasman Sea and both coasts of New Zealand as far south as Otago Peninsula (Dawbin, 1974; Baker, 1983) and various islands of the Southwestern South Pacific (Dawbin, 1974). In the North, they are known from the South and East China seas (Peilie, 1985; Cawthorn, 1984; Zhou et al., 1982; Nishiwaki, 1967), the Sea of Japan, where it occurs in small numbers (Sleptsov, 1961a) and both coasts of Japan as far north as Tsugaru Channel (Nishiwaki, 1967). Ohsumi (1972) indicates they occur in all regions around Japan and are considered common in many areas. Miyashita (1986) reported that during extensive surveys all around Japan, 20°-45°N, 130°-155°E, there were eight sightings in winter (Jan - Mar) and 12 in summer (June - Oct), more than killer whales and pilot whales in winter and more than the northern form of the pilot whale in summer. He does not plot locations of sightings. Although the fishery for yellowtail off Iki Island, Japan is year-round, kills of false killer whales associated with this fishery have been primarily from February through April (Kasuya, 1985), possibly suggesting a seasonal movement into the area. Kasuya (1971) notes that in the winter, false killer whales reportedly migrate in the coastal waters near the north and west coasts of Kyushu, Japan. Off China, they are recorded from the Zhejiang Province (Zhuge, 1982) in the south Huanghai Sea and at widespread localities along the coast of the mainland and islands (Zhou, 1982). In 1957 one was shot 30 km up the Qiantang River.

4.4.4. Indo-Australian Archipelago

False killer whales are found throughout the Indo-Australian Archipelago. Tasmania appears to be "on the southern edge of the distribution ... as indicated by the periodic presence of and sporadic stranding distribution of animals around Tasmania" (Nicol, 1987). Nevertheless, sightings and strandings in this area have not been infrequent during the 160 years for which records are available (e.g. Nicol and Croome, 1988; Guiler, 1978), especially given the remoteness of the region and the probable low coverage. Although there were no strandings from 1976-1987, they represented

6.1 percent of all strandings and 18.2 percent of all stranded animals prior to March 1976. Records have been most frequent in June and December. It is of interest in considering the species' southern limits to note that one of the earliest specimens, described by Flower in 1865 and assigned to *Orca meridionalis*, apparently was from Tasmania (Flower and Gearson, 1884). Hale (1944) and Aitken (1971) report on a stranding in the austral Spring (October) 1944 in St. Vincent Gulf, southwestern Australia. Mell (1988) summarizes three strandings from Southwestern Australia, in 1964, 1981 and 1988, and Phillips (1988) gives details of a group stranded in Saint Vincent Gulf, near Adelaide, in October, 1944. Phillips (1988) reports on a mass stranding at Crowdy Head, New South Wales in mid-austral winter.

Dawbin (1974) includes false killer whales in his list of cetacean species taken by dolphin hunters at Malaita, in the Solomon Islands. And one of us has photographs from Laughlin Islands of false killer whales seen off the south shore in July 1986 and records of observations from off Rabaul, New Britain in May 1987 (Leatherwood, 1987, field journal).

From these southern and eastern limits, records extend northward and westward along the Queensland coast, where Bryden (1978) reports that they are commonly seen, especially off North Queensland, and throughout the island chains to the northern shores of the South China Sea, the Gulf of Thailand, and the Strait of Malacca (Leatherwood, 1987). There are widespread records along the shores of the western Indonesian Islands (Morzer Bruyns, 1969), including the whaling communities of Lamalera and Lamakera, where hunters see and probably take some of these animals (Hembree, 1979; Leatherwood et al., 1988).

4.4.5. Indian Ocean

Leatherwood et al. (1989) present all records of false killer whales in the Indian Ocean Sanctuary, which includes the entire Indian Ocean north of 55°S and west of 130°E as well as the segment of the Indo-Australian Archipelago south and west of the intersection of the equator and 130°E. Mitchell (1975) reported that the species was found throughout the Indian Ocean. In general, carefully documented records are far more numerous from coastal areas, representing strandings or sightings from short-range vessels. However, records presented by Sivasubramaniam (1965) of predation on tuna from longlines show that "killer whales" occur at all seasons in all pelagic areas above about 30° which were examined. Because of lack of confidence in identifications in these sightings, ambiguity in the published report about what species was meant and the tendency of false killer whales, like killer whales, to steal fish from longlines (see section 4.9.3.), Leatherwood et al. (1989) concluded that some of these records were probably of false killer whales. The

following discussion assumes that is the case.

4.4.5.1. Eastern Indian Ocean, including Bay of Bengal

A group stranded at Doubtful Island Bay, southwestern Australia in May 1964. To our knowledge, this is the southeasternmost record in the Indian Ocean. There are additional records from the Australian coast near Adelaide (Phillips, 1988). Subsistence hunters at Lamalera, Lembata, in southern Indonesia, reported seeing 70 individuals during a 1979 IUCN research project there (Hembree, 1980) and have encountered the species before and since (L. Carey, 1987, pers. com.). They likely take individuals whenever possible (Hembree, 1987, pers. comm.). Morzer Bruyns (1969) plotted three records at sea off northwestern Australia, three off southern Java, one at about 6°30'N, 88°E in the southern Bay of Bengal and a handful of strandings and sightings from Sri Lanka.

Various authors provided additional records from the Bay of BEngal, near Madras, Sri Lanka and southern India (Alling, 1983, 1986; Leatherwood et al., 1984, 1989; Prematunga et al., 1985, 1989; Thiagarajan et al., 1984). The seasonal distribution of all the available records, at least one each quarter and one each of eight months, indicates false killer whales are not simply occasional visitors to the Bay of Bengal and northeastern Indian Ocean. Shortage of records elsewhere is most likely simply an artifact of low effort.

4.4.5.2. Western Indian Ocean, including Arabian Gulf, Persian Gulf, Gulf of Oman, Gulf of Aquaba, Gulf of the Suez, Red Sea and Gulf of Aden.

Occurrence of false killer whales is documented all around the coastal rim of the western Indian Ocean, from southern India (Pillay, 1926; Silas and Pillay, 1960) to southern South Africa (Barnard, 1954; Gambell et al., 1974), including Pakistan (de Silva, 1983; Rizvi, 1989), the entrance to the Persian Gulf, Bahrain, Oman and Yemen (Al-Robaae, 1974; Harwood, 1980; Leatherwood et al., 1989; Gallagher, 1989; Salm and Papastavrou, 1989), the Red Sea (Leatherwood et al., 1989; Beadon, 1989), Djibouti (Robineau and Rose, 1984), the Gulf of Aden and Somalia (Puccetti, 1986; Leatherwood et al, 1989; Small and Small, 1989), the Seychelles (IWC, 1981a; Keller et al., 1984); Kenya, Tanzania, Mozambique, the Comores and Madagascar (Morzer Bruyns, 1969; Leatherwood et al., 1989). The species also occurs in widespread pelagic regions (Sivasubramaniam, 1965; Leatherwood et al., 1989).

4.4.6. Eastern Atlantic, Including Mediterranean Sea, North Sea and Baltic Sea

In the eastern Atlantic they have been recorded from as far as Norway (Evans, 1987) and waters north of the British Isles (to

nearly 60 degrees) (Bayed et al., 1968), south to South Africa (Reinhardt, 1866; Fraser, 1936). Strandings are not uncommon all the way to the tip of South Africa (Barnard, 1954; Best, 1966).

From a review of published records through 1977, Aguayo (1978) concluded that false killer whales pass east of Denmark and enter the Baltic only rarely. He found that in the last century only one herd could be documented for certain as having entered the area, and members of it stranded and were reported widely. In this century, there are only two records from the Baltic, one each of strandings in 1920 (Mathiasson, 1960) and 1934 (Jagerskiold, 1935).

We are aware of only two confirmed records from the tropical eastern Atlantic (van Bree, 1972; Purves and Pilleri, 1978), more likely reflecting low levels of effort in tropical areas than absence of the species in those areas.

Bayed and Beaubrun (1987) and Casinos and Vericad (1976) report that false killer whales occur off Gibralter and the Mediterranean, especially off the Spanish and Moroccan coasts. Other authors (reviewed in Casinos and Vericad, 1976 and Duguy et al., 1983) document their presence off Spain, France and Italy and as far into the Mediterranean as at least Baltim, Egypt, in the Nile Delta (Massif, 1956; Paulus, 1963). Duguy et al. (1983) conclude, however, that its occurrence in the Mediterranean is "unusual".

In the eastern Atlantic proper, false killer whales do not appear uncommon around the British Isles, as they have stranded there frequently and at all seasons, especially in Scotland and England (Gray, 1864; Fraser, 1934, 1936, 1946, 1966; van Heel, 1962, and Evans, 1987, for review). For example, according to Mathews (1980), F.C. Fraser reported 18 strandings of this species along the British coast alone, 1913-1966. Sightings of live animals from the British Isles have been primarily off the Atlantic coasts (Evans, 1987). Pods are present but not common along Germany, Denmark, Holland and western France (Duguy and Robineau, 1973, 1982b).

4.4.7. Western Atlantic, Including Caribbean Sea and Gulf of Mexico

In the western Atlantic they have been reported from 170 miles east of Maryland (Schevill and Watkins, 1962) and both near and on shore at Cape Hatteras, North Carolina, (Brimley, 1937; CETAP, 1982; Caldwell et al., 1971; Miller, 1920; Hershkovitz, 1966) south at least to 42°40'S, in Argentina (Daciuk, 1974; Langguth, 1977). During extensive surveys of U.S. waters, Cape Hatteras northward, Nov. 1978-Jan. 1982, there was only one sighting of seven animals southeast of Cape Hatteras, less than one percent of all odontocete and small whale sightings (Winn, 1982). A skull at the American Museum of Natural History collected on the "Northeast coast

(probably Davis Strait)", off Baffin Island, listed by True (1889), and subsequently reported by some authors as the northernmost record, is unsubstantiated (Miller, 1920). Similarly, claims that false killer whales are abundant in Antarctic waters (Bellision, 1966) are unsubstantiated (Nishiwaki (1967) indicates they do not migrate south of the Antarctic convergence). However, within the broad range of the western Atlantic for which there is adequate documentation, records of this species are widespread and numerous. Mead (1979) reported a total of 15 records from Atlantic and Gulf Coasts of the U.S. and suggests there were more, as many early records were probably mis-identified as pilot whales. Records are most numerous for Florida (e.g. Bullis and Moore, 1956; Caldwell and Caldwell, 1974; and Caldwell et al., 1970) dating from at least 1920 (Moore, 1953). Referring to populations in the Gulf of Mexico, Caldwell and Caldwell (1974) reported their belief that the population(s) was stable and the species not endangered. False killer whales are listed as occurring off Texas (Schmidly and Melcher, 1974) and represented 0.2 percent of the total number of cetaceans stranded on the Texas coast (Fernandez and Tarpley, 1987).

For waters of the Caribbean and Gulf of Mexico, Miller (1920) reported the first record from Venezuela, in 1883. More recent records from that coast are presented in Castellanos and Casinos (1982), Evans et al. (1979) and Notarbartolla di Sciara (1980, unpublished). Other records are reported from Cojimar, near Havana, Cuba (Aguayo, 1954), near the island of Tobago (Morzer Bruyns, 1968). Reynoso and Bracho (1985) noted that they occur throughout Zone IV of Atlantic Mexico, Texas border to the Yucatan.

4.5. Fossil Record

Kellogg (1928) reports that fossils are known from the Upper Pliocene (Sicilian) from Europe and Japan. Vivas (1975) reports that false killer whales have existed since the Miocene. A sub-fossil skeleton from England in 1846 formed the basis of the false killer whales description by Owen (1946).

4.6. Anatomy and Physiology

Slijper (1966) summarizes what was known about functional morphology of the reproductive system in this and other cetacean species. He notes distinguishing characteristics of this species: males: uterus masculinus, an inconspicuous tube with one or two laminae of consistent micro-structure; only smooth muscle fiber reported for the retractor muscle of the penis; large numbers of fat cells in the erectile tissue of the penis, acting as shock absorbers; a large number of helicine arteries in the corpus cavernosum, perhaps because of the similarity in function to the vascular type of erectile tissue found in primates, carnivores and perissodactyls. Females: one to three ovulations either simultaneously or at least close together in time (Comrie and Adam,

1938). The corpus luteum graviditatis may protrude far out of the ovary and be connected with it by a stalk (Comrie and Adam, 1938).

The anatomy of the facial structure, described by Mead (1975), follows typical delphinid form and is most similar to that of the bottlenose dolphin. There is a moderate degree of sexual dimorphism in the forehead, with pre-melon connective tissue farther forward in males than in females. Slijper (1961b) noted a well-marked center of motility in the anal region, evidenced by a shift upward of the mammalian processes. The skin does not differ in any major respect from that of other cetaceans (Purves and Pilleri, 1978). Sokolov (1973) noted that the skin from one specimen was 9.2 mm thick on the head and 10.3 mm thick on the tail. In the epidermis, pigment is intense in the area of the caudal peduncle and fairly weak on the head (Sokolov, 1973). Blubber from a 14' animal of unknown sex yielded ten gallons of oil (Reinhardt, 1862). Whittow et al., (1974) noted that in a captive animal the deep body temperature ranged from 36.0°C to 37.2°C according to activity levels and was similar to that recorded from other odontocete cetaceans. The mean body temperature was 36.6°C (n=83). Pulse rate from a stranded individual was in the vicinity of 80 beats/minute (Warneke, 1983a).

Odell et al. (1979) report that hematological values are similar to other small cetaceans. McFarland (1971) notes that the absorption maxima for visual pigments in the false killer whale are similar to those of other delphinids and concludes that the distinctive distributions of the false killer whale pigments represents a visual adaptation to an oceanic environment. Silas et al. (1984) present biochemical analysis of muscle, liver and blood. Slijper (1961a) reported that the ductus arteriosis closed more slowly in this species than in other delphinids. Some organ weights are given by Sullivan and Houck (1979). Virtually nothing appears to have been reported about enzymes. Malvin and Vander (1967) note that there is 2.6 ng/ml angiotensin equivalent in the plasma, presumably produced in the kidney, which is similar to values obtained from other cetaceans (Arvy, 1971).

4.7. Ontogeny and Reproduction

4.7.1. Gestation

Gestation was formerly estimated as 12 to 17 months. However, more recent, and presumably more precise, figures range from 15.5 to 15.7 months (Purves and Pilleri, 1978; Perrin and Reilly, 1984; Kasuya, 1975). During pregnancy and at birth, contrary to the case in many delphinids, the fetus is normally in a head first presentation (Peacock et al., 1936; Slijper, 1949). Twins have not been reported and are only rarely reported in cetaceans (Slijper, 1949).

As with most cetaceans, pregnancy generally occurs in the left

uterine horn (Slijper, 1949), although instances of a fetus lying in the right horn has been reported (Comrie and Adam, 1938).

4.7.2. Length at Birth

Length-at-birth estimates range from 1.5 to 2.1 m (Leatherwood et al., 1976). Fetuses of 1.6 - 1.83 have been reported (Tomilin, 1957; Scott and Green, 1975; Fraser, 1948). The largest fetus and smallest neonates in a sample of 943 taken in Iki Island drive fishery were 170 to 179 cm; mean neonatal length was estimated to be 175 cm (Kasuya, 1985). One healthy calf bred and born in captivity was estimated, from comparison with its mother, to have been 5' (1.52 m) long and 100 lbs at birth. Smithers (1938) reported a sucking calf of 1.57m. The length of the umbilical cord of a 110 cm fetus was reported as 0.6 m (Peacock et al., 1936).

4.7.3. Calving Season

The calving, and thus presumably breeding, season extends at least over several months (Scott and Green, 1975; Fraser, 1948), and may be year-round (Ross, 1984; Miller and Odell, in press). Mizue and Yoshida (1961) reported many fetuses, all about 80 cm long, in females killed in the Goto Islands. It is of interest that the pure bred and the hybrid calves (both fathered by the same male) born at Sea Life Park in Hawaii were born in May and two hybrids born at Kamogawa Sea World arrived in May (successful birth) and July (aborted near term) (Nishiwaki and Tobayama, 1981, 1982).

4.7.4. Lactation and Weaning

Lactation has been estimated to last from 18 months to two years (Purves and Pilleri, 1978; Perrin and Reilly, 1984).

4.7.5. Captive born calves

At Kamogawa Sea World, Japan, a false killer whale impregnated bottlenose dolphins five times - three resulted in aborted fetuses, one in an aborted near term calf and one in the live birth of a calf which lived for 277 days (Nishiwaki and Tobayama, 1981, 1982).

4.7.6. Growth

There is little published information on growth. Anonymous (1987 or 1988) reported that a captive-born false killer whale calf grew in its first year from 5' and 100 lbs to 6' and 400 lbs. Brown et al. (1966) documented growth of a captive female from 11'3" and 825 lbs to 12'5" and 1,100 lbs in just under 22 months. Maximum size is reported as 6.1 m for males, 5.06 m for females (Leatherwood and Reeves, 1983; Perrin and Reilly, 1986).

4.7.7. Age/Size at Sexual Maturity

Age at sexual maturity in both sexes has been estimated as between eight and 14 years, length at 13-15 ft for males, 12-14 ft for females (Purves and Pilleri, 1978). Sexual maturity is reached at lengths of 3.5 m or more in the female and 3.7 m or more in the male (Perrin and Reilly, 1986). Description of the female reproductive system and corpora lutea has been made by Comrie and Adam (1938), who state that one ovum is shed at a time. Ovaries of the smallest adult females in a stranding were 7-10 cm (Comrie and Adams, 1938). [A description of the male reproductive system is made by Slijper (1966)]. Minimum weight of a mature testis is about 1,700 g, according to Perrin and Reilly (1986). Maximum testis weight has been reported at 8,200 g (Odell et al., 1979). Ovulation rate has been estimated at about once per year (Purves and Pilleri, 1978), while Harrison (1969) and Harrison et al. (1972) conclude that ovulation may be spontaneous. One female had been in captivity for 21 years when she gave birth to a calf (Anonymous, 1987 or 1988).

4.7.8. Sex Ratios

Fraser (1948) reported that the sex ratio from stranded schools is approximately equal. We have calculated sex ratios from combining numbers from six published sources of the sex ratios in complete samples or presumably random subsamples from stranded or captured herds (Peacock et al., 1936, 28 males, 34 females; Porter, 1977, 13 males, 17 females; Yamada, 1956, 42 males, 50 females; Kasuya and Izumizawa, 1981, 68 males, 104 females; IWC 1983c, 22 males, 41 females; Warnake, 1983a, 31 males, 39 females) as .72:1 (204 males:284 females, n=489). Although the sample size for this calculation is small, all six sources show the same trend of more females than males. Marsh and Kasuya (1986) note that they are presumably polygynous.

4.7.9. Reproductive Cycle

The false killer whale is polyestrous except in winter, when it is anestrous (Asdell, 1964). Marsh and Kasuya (1986) suggest that there is a post-reproductive period for the females.

4.7.10. Gross Annual Reproductive Rates

The only estimate of gross annual reproductive rate is from Japan, calculated at 5 to 6 percent (Kasuya, 1985), probably close to the natural mortality rate, but this was from a small sample and may not be representative.

4.7.11. Longevity

No estimates of longevity have been presented. Using dentine and cementum growth layer groups, Marsh and Kasuya (1986) reported individuals with over 41 growth layer groups. However, absolute

calibration of the deposition rate of growth layer groups has not been determined. Average longevity in captivity has been reported as seven years (Cornell et al., 1982), but all animals considered in the sample were alive at the time of the writing; later estimates from the same sample suggest an average captive mortality of over 8.3 years (Evans and Wolfson, 198_). At least one individual in Hawaii has been in captivity for over 23 years, another over 15 years.

4.7.12. Genetics

The false killer whale has the typical cetacean diploid chromosome number 2n=44 (Kulu, 1972). Hybrids with bottlenose dolphins have been born in captivity in Japan and Hawaii (Nishiwaki and Tobayama, 1982; Sylvestre and Tasaka, 1985). The Japanese hybrid lived 277 days, and the Hawaiian hybrid was still alive at three and a half years of age at the time of this writing. These hybrids exhibit characters of both parents. For example, the Hawaiian hybrid weighed only about 35 lbs. at birth, compared to about 100 lbs for a captive-bred and -born false killer whale, and had 66 moderately large teeth, exactly in the middle between the parents (which had 44 and 88). Casinos (1984) discusses whether evolutive taxonomy or phylogenetic systematics provides a better explanation for such intergeneric hybridization in toothed whales.

The false killer whale is more karyotypically conservative than the killer whale (Duffield, 1986). R-band karyotypes have been prepared by Duffield et al. (1988). There are hemoglobin polymorphisms, distinct to this species, which are detectable by electrophoresis (Duffield et al., 1988). Shimura and Numachi (1987) concluded, from comparison of allele frequencies at 19 gene loci, examined with starch gel electrophoresis, that the globicephalids (including false killer whales) were not significantly different from other delphinids, suggesting relatively recent divergence times.

4.8. Ecology and Behavior

4.8.1. Herd Size

Reports of herd size have been made by a variety of authors. Cummings and Fish (1971) report that false killer whales can occur in groups of 1000 or more. From a large data base (n=195 records) of pure schools in the eastern tropical Pacific (Scott et al., in prep.) note that the mean herd size was 20 individuals, the median was 8 and the range was 1-600. The median of 8 individuals probably best represents the typical herd size, as it is less influenced by a few reports of very large groups. Kasuya (1971) notes a mean group size of 55 off Japan (n=6, range 2-200).

The maximum group size reported in a stranding is of 835 individuals off Argentina (Caillet-Bois, 1948). However, as in many records where extensive documentation is not presented, the exact number of individuals involved in the stranding is unclear, as Langguth (1977) quotes a local newspaper at the time as giving a total of 1,200 animals, and Marelli (1953) was only able to account for 123 animals. Ross (1984) notes that group size from 14 mass strandings averaged 180 individuals with a range from 50-835. Scott et al. (in prep.) report a median group size in the eastern tropical Pacific of 8 (mean = 20, range 1-600).

4.8.2. Interspecific Associations

4.8.2.1. In Free-ranging Animals

Purves and Pilleri (1978) note that false killer whales are often seen in the company of tuna, on which they are known to prey. False killer whales have been reported in the company of ten other species of cetaceans. As some of these reports are clearly of predation, interspecific associations are dealt with both in this section and, when clear signs of predation are present, under feeding habits. Of 241 records from the eastern tropical Pacific Scott et al. (in prep.) report mixed species association, not including obvious predation, on 15 (6.2 percent) occasions. In comparison, Pacific white-sided dolphins were noted in mixed species groups in 52 percent of sightings in one study (Black, N. 1988. The behavior of the Pacific white-sided dolphin (*Lagenorhynchus obliquidens*) in the Monterey Bay area, California. Abstract of the American Cetacean Society Third Biennial Conference and Symposium, Monterey, CA. Nov. 11-13/88). The false killer whale has been reported traveling most often in company with bottlenose dolphins (Mizue and Yoshida, 1961; Tsutsumi et al., 1961; Mizue et al., 1969; Souter and Broadhead, 1978; Zhou et al., 1982; Scott and Chivers, 1989; Scott et al., in prep.). Tsutsumi et al. (1961) note that mixed herds with bottlenose dolphins occur off Japan only during the winter months (the so-called feeding migrations) as mixed feeding aggregations, but not during the summer (the so-called breeding migrations). Leatherwood et al. (1984), Scott et al. (in prep.), and Watson (1981) report false killer whales in association with Risso's dolphins (*Grampus griseus*). Leatherwood et al. (1984) and Miyazaki and Wada (1978) report associations with spotted dolphins (*Stenella attenuata*). Souter and Broadhead (1978) and Scott et al. (in prep.) report sightings with short-finned pilot whales, *Globicephala macrorhynchus*, in the Pacific. Baker et al. (1979) report associations with humpback whales (*Megaptera novaengliae*) in Hawaii. Minasian et al. (1987) show a photograph of false killer whales travelling with a rough-toothed dolphin, *Steno bredanensis*; a mixed herd of false killer whales, rough-toothed and bottlenose dolphins has also been reported in the eastern tropical Pacific (Scott et al., in prep.). However, in light of the predatory accounts on both small and large cetaceans reported in the next section it is not possible to evaluate the above reported associations as positively non-aggressive, as is commonly reported in many other species of cetacea. Some speculation also exists as to whether the numerous tooth rakes observed on humpback whales can be attributed entirely to killer whales, as false killer whales are more abundant in the humpback's Hawaiian wintering grounds (Tomich, 1986), and predation on humpbacks has been reported (Hoyt, 1983).

Minasian et al. (1987) report that false killer whales are friendly and curious and often approach divers under water. While

such approaches may, indeed, be curious, false killer whales have been reported to be aggressive towards humans in captivity and are known to prey on other cetaceans.

4.8.2.2. In Captive Animals

Captive false killer whales have been housed with a wide variety of other odontocete species (e.g. common dolphins, pilot whales, Pacific white-sided dolphins, bottlenose dolphins and spinner dolphins - Brown et al., 1966 and Sylvestre and Tasaka, 1985; we are aware also of instances in which they have been housed with spotted and rough-toothed dolphins and beluga whales). Brown et al. (1966) reported that the female at Marineland of California had little interest in the relatively sluggish pilot whale, but played with the more active dolphins. They also describe intergeneric sexual behavior, involving in one case intromission between a male pilot whale, and a female false killer whale. Sexual activities also included homosexual play with a spinner dolphin, as is now known to be common among delphinids.

Brown et al. (1966) describe in detail a captive false killer whale female's attentiveness during the birth of a common dolphin. It is the widespread practice among those writing about odontocete cetaceans to interpret such actions as "epimyletic" behavior and to accept it as evidence of cooperation and mutual support among the participants. However, recent observations of bottlenose dolphins in a captive breeding program at Sea World, Inc., suggest that often such actions represent attempts by males or females without calves to "steal" the calf from its mother. When such have been successful, the survival potential of the calf has suffered. In light of this and the known predation by false killer whales on other delphinids, indeed other cetaceans, as well, one must interpret interactions among false killer whales and other cetaceans carefully. Aggression towards humans has occasionally been observed in captivity to the extent that it was dangerous to enter the tank (Norris 1969).

4.8.3. Feeding Habits

Prey recorded primarily includes squid and fish (Table 2), although in most cases where prey items are listed, even in those instances where stomach contents have been examined, it is difficult or impossible to determine if species found are direct prey of false killer whales or the prey of other species eaten by false killer whales. Off the Spanish Mediterranean coast, they were seen feeding on "cephalopods" (Pilleri, 1967). Squid are reported in stomachs of animals from wide-spread localities, but neither genus nor species are provided; so, the partial listing in Table 4.8.3.1. may be incomplete. Many reports of fish in stomach contents also fail to identify genus or species of the food item. Perryman and Foster (1980) and Scott et al. (in prep.) reported on

false killer whales taking small dolphins of the genera *Stenella* and *Delphinus*, and there is one report of predation on a humpback whale calf (Hoyt, 1983). Scott et al. (in prep.) also report a possible chase of Fraser's dolphins, *Lagenodelphis hosei*, in the eastern tropical Pacific. The importance of small delphinids as a routine staple in the diet has been questioned, as reports by Perryman and Foster are of animals involved in purse-seine tuna operations in the eastern tropical Pacific. When involved in this type of fishing, small delphinids are very probably more susceptible to predation than at other times. Observations reported by Scott et al. (in prep.) describe chases or predation by false killer whales on spotted, spinner and common dolphins, and probably on Fraser's dolphins as well. Such observations indicate that this may be more prevalent, and possibly more important, than previously thought. Perryman and Foster (1980) also note that this predation occurs prior to encirclement of the dolphins by purse-seine nets, as well as after let-down of the nets. Scott et al. (in prep.) note that dolphins in nets have reacted to the presence of false killer whales when they are still half a mile distant. Of 241 sightings in the eastern tropical Pacific at least 24 (ten percent) indicated that false killer whales were chasing or preying on small dolphins. Although this seems like a small percentage, it is likely higher than the observed proportion of killer whale predation on other marine mammals in most areas around the world. In all of 241 sightings, predation on species other than cetaceans was noted for false killer whales only once, but biases related to ease of observing interactions with dolphins associated with purse-seining, and with the depth of fish prey and difficulties in observing predation on fish from the surface, could account for this discrepancy.

Pilleri (1967) saw animals regurgitating and re-eating pieces of white flesh that may have been pieces of dolphin thrown overboard earlier. Playbacks of distress signals of a wounded dolphin elicited approaches to the sound source (Pilleri, 1967). Shallenberger (1981) reported that false killer whales discard tails, gills and entrails of fish.

Connor and Norris (1982) report food sharing observed in the wild. Norris and Mohl (1983) speculate as to the possibility of prey debilitation by sound, as observations have been made in the wild on individuals feeding on some fish, while other immobile, but apparently uninjured fish were observed nearby. Evans and Awbrey (1986) state that false killer whales feed during both day and night. Norris and Shilt (1987) have proposed that the threat of predation by false killer whales on smaller dolphins is responsible for maintaining large group sizes of the dolphins at night. Alverson (1981) reported that the presence of false killer whales caused a school of skipjack to disperse and scatter.

Tsutsumi et al. (1961) report that food volume in stomach

contents is highest in winter months, when they are in association with feeding congregations of bottlenose dolphins. They also report a shift from mackerel to squid at this time. Sergeant (1969) calculated a mean daily feeding rate of a captive animal as 4.7 percent of its total body weight; Morzer Bruyns (1971) states that they eat up to 70 lbs of squid and fish a day. Van Dyke and Ridgway (1977) note that a 454 kg adult consumes an average of 40 KCal/kg/day, and a 363 kg juvenile consumes an average of 50 KCal/kg/day.

4.8.4. Behavior and Learning

4.8.4.1. In Free-ranging Animals

False killer whales readily approach ships and bowride (Leatherwood et al., 1976), the only "blackfish" to frequently do so. They are known to leap clear of the water, characteristically turning on the side and flexing, to reenter the water with a huge splash (Leatherwood et al., 1982). Swimming speed has been reported at 15-20 mph (28-32 kmh) (Lane, 1953; Gunter, 1943; Brown et al., 1966). Wang (1984) concluded that the relatively greater length than width of the lumbar vertebrae increases swimming speed. In our experience, the false killer whales have been the most "dolphin-like" of the mid-sized cetaceans in their movements - quick accelerations, sustained high speeds, and very quick changes of direction (see Leatherwood and Reeves, 1983; Leatherwood et al., 1988).

Cummings and Fish (1971) noted that based on feeding habits false killer whales may dive to at least 500 m, but there appear to have been no scientific studies on their diving behavior or actual depth of diving. Protective behavior - adults protecting a calf - has been reported (Pilleri and Knuckey, 1968).

4.8.4.2. In Captive Animals

The false killer whale takes well to captivity and has been held in oceanariums in Japan, Australia (Cawthorn and Gaskin, 1984), Israel (Beadon, in press), Hawaii and both the east and west coasts of the continental United States. They appear to readily feed almost immediately after being introduced to captivity after capture, or from rescue of stranded individuals. Breeding in captivity has produced viable offspring. Behavior in captivity has been reported by a number of researchers (Brown et al., 1966; Defran and Pryor, 1980; Defran et al., 1985; Shultz et al., 1987). Simple ethograms (Defran et al., 1985; Shultz et al., 1987) indicated captive animals mostly swam singly or in synchrony with tank mates, and spent only nine percent of the time or less in "affiliative" behaviors.

Defran and Pryor (1980) surveyed researchers and trainers of captive animals to compare behavior between captive species. False

killer whales were rated as the most aggressive captive species of those reported, as well as very playful, curious and manipulative. Pryor (1973) recounted an instance of a false killer whale pinning to the wall of its pool a trainer who had been teasing it. Norris (1967) reported aggression to the extent that it became dangerous to enter the tank. Brown et al. (1966) note that false killer whales are more easily tamed and trained than many other species of cetacean in captivity and readily learned by observation tricks performed by their tank mates. Pryor (1981) reported instances of false killer whales "testing" a trainer's criteria for earning a fish reward. Defran and Pryor's survey results showed that false killer whales are rated high for both observational learning and imitative behaviors.

4.8.5. Acoustics

Norris and Prescott (1961) reported that wild animals produce loud squeaks, heard over 50 ft. away, and a drawn-out high squeak of constant pitch. Brown et al. (1966) reported that in air, sounds from a free-ranging herd were harsh and piercing and could be heard 150-200 yards away. Underwater sounds have been described by Schevill and Watkins (1962), Norris (1966, 1968), Mizue et al. (1969), Cummings and Fish (1971) and Kamminga and van Velden (1987). They are observed to emit intense, broad band, relatively long duration clicks not unlike those of bottlenose dolphins (Norris, 1966). Their "echolocation" clicks (not at the time experimentally demonstrated to be echolocation) had a strong directionality (Norris, 1968). Poulter (1968) listed as calls of false killer whales' sounds he described as "clicks, squeals, cries, squawks, rasps and whistles", believed used for communication and echolocation. Cummings and Fish (1971) described two types of sounds: true whistles, usually 3-12 kHz, single frequency sounds, 0.5 to 1.0 sec long; and clicks, 100 Hz to 100 kHz, a few milliseconds long, with variable repetition rates. By contrast, Kaminga and Van Velden (1987) reported sounds with a dominant frequency around 28 kHz, lasting 60-75 msec and having a wave form similar to sounds of bottlenose dolphins, long sustained click trains, a whistle of 8 kHz and occasional 2 component clicks around 100 kHz. Thomas et al. (1982) show sonograms recorded through a towed acoustic array, demonstrating the usefulness of the system in censuses of this species.

Thomas et al. (1987; 1988a, b; see also, Anonymous, 1983, and Evans and Awbrey, 198_) presented an underwater audiogram indicating hearing from 2 to 115 kHz, a peak sensitivity range between 32 kHz and 70 kHz, corresponding with peak frequencies of echolocation pulses. They also experimentally demonstrated the use of echolocation in the detection of objects. In trials, a captive animal could detect the presence or absence of a 7.5 cm diameter water-filled steel sphere behind a visually opaque, acoustically transparent screen. They reported the range of most sensitive hearing to correspond with the peak frequency of

echolocation pulses.

Watkins (1980) stated that a species' size gradient (*Tursiops*, *Pseudorca*, *Globicephala*, *Orcinus*) roughly matches the increasing low frequency emphasis in the clicks of mammals recorded at sea. Busnel and Dziedzic (1968) report that vocalizations may be used for inter-individual communication and as grouping signals. Norris and Mohl (1983) include this species among those postulated to be able to debilitate prey by sound, citing instances of feeding on mahimahi while other fish lay immobile but apparently uninjured nearby.

Ferraro et al. (1983) reported using sophisticated acoustical equipment to analyze and synthesize vocalizations of false killer whales; the results have not been reported.

4.9. Exploitation and Fisheries Interactions

4.9.1. Direct

Hector (1872) recounted how natives and settlers in New Zealand in the 1800's made use of stranded cetaceans, including false killer whales. According to Morzer Bruyns (1971), false killer whales were taken in ancient times in the Arabian sea for ivory, which was traded across Asia, Alaska and Canada to Indians of North America.

Gaskin (1967, 1968) indicated that false killer whales were of no interest to standard whaling operations in New Zealand, a statement which is generally true for most areas. [Japanese small-type whalers reportedly take one occasionally (Miyazaki, 1983)]. However, they are the object of some drive-and harpoon-fisheries (e.g. IWC 1982a, 1983a, 1983b, 1984, 1987b)and have been captured alive for research or public display (e.g. Jones, 1970; Shallenberger, 1981; Kasuya et al., 1984).

4.9.1.1. Harpoon and Drive Fisheries

Elliot (1904) reports these whales to be inoffensive and gentle and easy to drive ashore because of their tendency to blindly follow the leader. This tendency is an important contributing factor in mass strandings and has been capitalized upon for long-lived drive fisheries for human food in the Solomon Islands (Dawbin, 1974) and Shizuoka, Wakajama, Nagasaki and Yamaguchi prefectures, Japan (Mizue and Yoshida, 1961; Ohsumi, 1972; Kasuya, 1981, 1985; Nishiwaki, 1982; IWC, 1982a, 1983). In this latter area, they are among the common harvest for human consumption by the drive fishery and hand harpoon fisheries of Kyushu and in the Goto Islands (Nishiwaki, 1982). For example, 1272 were killed in Japan, 1976-1981, by drive fisheries (Miyazaki, 1983). Also, false killer whales were among herds of odontocetes

driven ashore and killed in the Iki Island area of Japan to reduce perceived competition with commercial fisheries (IWC, 1980; Kasuya and Izumisawa, 1981; Kasuya, 1985). For example, there were 251 among the 1000 animals killed at Iki on 23 February 1977 (Nishiwaki and Kasuya, 1977). The killing continued for several years after 1979, as experiments with kill^I whale sounds, speed boats and other methods had no effect (IWC, 1980). According to the Nature Conservation Council of Great Britain, the killing did not have much effect on the problem of declining takes of fish in the fishery, leading to the conclusion that factors other than predation and interference by dolphins (and whales) were also important in the dynamics of the fishery (Anonymous, 1980a).

They are among the species taken by harpoon in fisheries in the West Indies, especially St. Vincent (Caldwell et al, 1971); 24 were landed 1967-1974. Some are taken intentionally (method unreported) in Chinese fisheries off Taiwan (Peilie, 1985; Zhou et al., 1982). They are among species appearing in the fish market in Taija, Japan (Miyazaki, 1980); 102 were taken by harpoon in all of Japan 1976-1981 (Miyazaki, 1983). Though no landings have been reported, false killer whales are pursued by harpoon fishermen off Dondra and Mirissa, Sri Lanka, for use as bait or human food (Leatherwood, unpublished data).

4.9.1.2. Live-Capture

Richard (1936) reported that false killer whales had been captured for scientific study and successfully maintained in captivity. Early captures were attempted by harpooning (Norris and Prescott, 1961), later ones by breakaway hoopnets (Reeves and Leatherwood, 1984). Small numbers have been taken alive for display or research in the following locations:
USA - Brown et al.(1966) describe the collection of a female off San Pedro, 10 October 1963; Reeves and Leatherwood (1984) update records, referring to Norris and Prescott (1961), Brown et al, (1966), Pryor (1975) and Shallenberger (1981).

According to this last author, at least ten were live captured off Hawaii between 1963 and 1981. A male taken in 1976 lived slightly more than two years. Anonymous (1987 or 1988) reported that the parents of a calf bred and born in captivity at Sea Life Park, in Hawaii, had been in captivity for 15 years ^I5 ft. male) and false killer whales partially stranded in a shallow bay off Florida reacted to the presence of a passing shark with a flurry of horizontal and vertical tail movements which clouded the water with sand and did not cease until the shark left. Presumably the whales were particularly vulnerable to attack due to the stranding situation. Since the probability of survival is generally very low for stranded animals (see below), with or without human intervention, attacks by sharks on stranded animals could be incidental to mortality. Scavenging by sharks on stranded individuals has been noted (Warneke, 1983a).

Parasites known from the false killer whale are reported in Table 3. Internal parasites may be a factor in mortality, (see Strandings) whereas external parasites are less likely to affect the health of animals, but are included here for convenience. Changes in the bony tissues of the middle ear caused by parasitic infestation are common (Yamada, 1956). The barnacle *Xenobalanus* can be found on the trailing edge of the flippers, tail flukes, dorsal fin, and the ridge of the tail stock (Richard, 1936; Caldwell et al., 1971b). Cyamids have also been reported (Richard, 1936; Bowman, 1955). Best (198_) reported that the parasite load in animals stranded in South Africa in 1981 was "normal" and not, apparently, a factor in the stranding.

4.10.2. Strandings

As strandings, particularly mass strandings, are such a common and yet largely unfathomable occurrence in this species, and one which attracts such attention when it occurs, the phenomena of stranding deserve special attention.

Mass and single strandings have been reported from widespread localities (Fraser, 1936; Mitchell, 1965; Caldwell and Caldwell, 1970: Odell et al., 1980; Sergeant, 1982; Ross, 1984; Baird et al., 1989). A wide variety of causes have been put forth to explain these occurrences, and it is probable that many of these factors work in concert in each individual stranding event. Nearly 50 years ago, it was noted that strandings occurred on jagged rocks and sand beaches when the animals were trapped by a falling tide in channels cut off from the open sea by sand banks, as well as on broad, unobstructed sandy shores (Kellogg and Whitmore, 1957). Fraser (1936) has suggested that the mass strandings in Scotland were associated with inshore migrations of large numbers of cephalopods. Degeneration of the eighth cranial nerve due to trematode invasion of the inner ear have been postulated as a factor in mass strandings in Japan (Morimitsu et al., 1987). Klinowska (1985) suggests that live strandings are mistakes made by animals attempting to use geomagnetic topography for orientation. Early authors suggested that travelling whales that strand were attempting to find prehistoric straits or passages to other areas (Green, 1945). Many authors attempt to correlate strandings with oceanographic or meteorological factors. Strandings of solitary individuals may most likely be in response to sickness. However, mass strandings, involving entire herds, including animals which appear to be healthy, are more complex and difficult to explain (Leatherwood et al., 1983).

Stranding in association with bottlenose dolphins has been reported (Mizue et al., 1969). Herd size in mass strandings is generally larger than that observed at sea, suggesting that herds involved in mass strandings are composed of several small groups that have joined together for a purpose, such as the exploitation of abundant prey (Ross, 1984). The largest number of individuals reported from a stranding was of 835 individuals on the coast of Argentina (Caillet-Bois, 1948). Mitchell (1975b) notes that mass strandings may significantly affect the level of local populations. Strandings may be more prevalent than reported, as many early records, and even some today, may be mistakenly reported as pilot whales (Mead, 1974).

There have been an increasing number of attempts to "rescue" live stranded cetaceans, including, perhaps especially, false killer whales. Almost all have met with failure as animals released have generally restranded (Odell et al., 1979; 1980). Although Odell et al. (1979, 1980) found that in a group of 29 stranded in Florida, blood indicators of stress were no higher than

those noted as "normal" for other small cetaceans, Geraci and St. Aubin (J. Geraci and G. St. Aubin. 1987. Cetacean mass strandings: a study into stress and shock. Seventh Biennial Conference on the Biology of Marine Mammals, December 5-9, 1987, Miami, FL., Abstracts:25) found that levels of these indicators were so high in most pilot whale mass strandings that probability of survival was very low. Therefore, it can be argued, "rescue" attempts by individuals other than veterinarians familiar with treatment of cetaceans and stress are contra-indicated, ill advised and even inhumane except in a few instances where strandings are detected and interrupted early. Warneke (1983a) notes that the electrolyte balance of stranded individuals is likely seriously disrupted due to dehydration, diarrhea and the accumulation of body fluid within skin blisters.

Victims of some mass strandings have been removed to captivity, however, their survivorship has been very poor. For example, a female survivor of a Florida stranding in January 1970 was removed to Marineland of Florida but survived only two days (Caldwell et al., 1970). Odell et al. (1980) report on four females removed from a stranding in Florida to captivity. Monitoring of blood values indicated their deteriorating condition over three weeks from the stress of stranding, with increased serum calcium and lactic acid dehydrogenase levels, and decreased levels of alkaline phosphatase, generally indicators of impending death. Warneke (1983a) notes that mortality in a stranded school was higher for adults and calves than subadults, and that males succumbed more readily than females.

5.0. Recommendations for Research

We offer the following general suggestions for research approaches/programs to address questions important to permit applications, or successful capture and successful maintenance and handling in captivity:

• Satellite tagging of one or more individuals would allow for determination of short and long-term movements, depths of dive, and diurnal cycles. Norris et al. (1974) used a harness affixed to a captive animal to apply a radio transmitter. Leatherwood (unpublished data) has built transmitter saddles and attachment kits for killer whales which could be applied to this species.

• A photo-identification study would allow for determination of local population size and movements, identify reproductive intervals etc. This could possibly be undertaken off the Hawaiian Islands, where they are not uncommon in accessible nearshore areas. Two stages should be undertaken; a) accumulation of all photos already available and comparison to see if there are repeat individuals, and b) new photo-identification efforts, in which there are saturation studies around the islands on several days to maximize sightings and photographs. Intensive observer cooperation

around all islands will be necessary. Such a study will be most beneficial if undertaken for at least several consecutive years.

• Blood samples should be obtained from captive and stranded individuals for biochemical analysis, to detect subspecies, population or race differences. A quick response team should be formed to make concerted attempts to collect stranded animals alive and to rehabilitate them.

• Museum specimens (skulls) for which there are sufficient data on location, sex, length, etc. should be examined and a meristics study should be undertaken to address the question of differences by area (eg. following Walker, W.A., S. Leatherwood, K.R. Goodrich, W.F. Perrin, and R.K. Stroud. 1986. Geographical variation and biology of the Pacific white-sided dolphin, *Lagenorhynchus obliquidens*, in the north-eastern Pacific. Pages 441-465 in Research on Dolphins. Edited by M.M Bryden and R. Harrison. Oxford University Press).

• All data available from captive animals should be collected and examined to define hormone cycles and other details of reproductive readiness, leading towards captive breeding programs.

• Tapes of vocalizations from as many areas as possible should be obtained and analyzed for regional "stock" or "population" differences, following work done for killer whales.

• Teeth should be obtained for study of deposition intervals (with captures) and variability by site and rings/layer. This will determine longevity, in the wild and in captivity, and eliminate unsupported speculation.

• Research with animals currently in captivity should be accelerated and published promptly to demonstrate the species is being studied.

• Determination of length/weight relationships (after Odell et al., 1980, but with a sufficient sample size) could be made by canvassing all institutions world-wide for length and weight data.

6.0. Acknowledgements

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Table 1.

Records of Pseudorca crassidens worldwide; includes records from the annotated bibliography, Robin Baird's list, and Jim Mead's list.

LOCATION	DATE	EVENT	# ANIMALS	LOCATION OF SPECIMEN	REFERENCE
INDIAN OCEAN CETACEAN SANTUARY					
Natal	-	sighting	1		32
Natal	-	sighting	30		32
Pazhikara, N of Cape Comorin	-	stranding	2		Silas & Pillay (1960)
Ceylon	-	stranding	3 schools		23
Somali Coast	-	stranding	1	skull, Univ. of Florence Zoology Museum	30
Moratuwa	1890	stranding	1		2
Moratuwa	1891	capture	1		Pearson (1931)
Trivandrium	Feb 1902	stranding	1		38
Trivandrium	after Feb 1902	stranding	2		38
Travancore, India 8°41'N, 76°57'E	1903 or prior	stranding	1		Ferguson and Lydekker (1903)
Port Alfred	Apr 1910	stranding	1	skull (now missing)	74
Trivandrum	prior to 1911	in. capture	2		Dawson, F.W. (1911); 201
Velanai Is., Kayts	3 Aug 1929	stranding	167	2 skeletons, 12 skulls, Colombo Museum	Pearson (1931), 23
N of Zanzibar	2 Dec 1933	stranding	54		Anonymous (1934); 111; 191
Mathur	10 Nov 1934	stranding	97		23
Godavaya	30 Sep 1939	stranding	1	skull, Colombo Museum	23
Port Prime	5 Oct 1944	stranding	appr. 250	cranium, 2 teeth; S. Australia Mus. M2179	229, 243
Chempianpattu	28 Jan 1954	sighting	1		Santerre and Santerre (1983)
*7°2'N 82°2'E	7 Mar 1954	sighting	30		377
* off Sunda Strait	1 Aug 1959	sighting	2 (poss. id)		377
East London	1 Jun 1961	stranding	1	Skull: Port Elizabeth Museum, ELM 780	74
Gulf of Oman * 23°5'N 59°5'E	16 Jan 1961	sighting	30		377
Gulf of Oman * 24°5'N 58°2'E	16 Jan 1961	sighting	20		377
Gulf of Oman * 23°7'N 59°5'E	28 Feb 1961	sighting	2		377
Arabian Sea * 10°2'N 53°8'E	3 May 1961	sighting	3		377
Arabian Sea * 23°1'N 64°E	28 Feb 1961	sighting	40		377
Arabian Sea * 19°7'N 64°E	1 Mar 1961	sighting	10		377
Arabian Sea * 09°N 63°5'E	9 Mar 1961	sighting	6		377
Gulf of Aden * 11°8'N 43°5'E	12 May 1961	sighting	4		377
Gulf of Aden * 12°5'N 44°7'E	5 Mar 1961	sighting	1		377

* 06°N 87°4'E	5 Mar 1961	sighting	5		377
34°22'S 119°33'E (Doubtful Is.; A)	May 1964	stranding	34		117
Kariega River Mouth	13 Nov 1965	stranding	1	photograph: Port Elizabeth Museum	74
* 28°N 49°6'E	4 Mar 1966	sighting	40+		377
* 11°8'S 40°6'E	26 Mar 1966	sighting	30+		377
* 16°S 40°E	26 Mar 1966	sighting	100+		377
* 18°5'S 116°E	31 Jan 1967	sighting	35		377
* 21°7S 113°5'E	1 Feb 1967	sighting	10		377
* 11°7'S 42°9'E	20 Oct 1967	sighting	1		377
* 29°2'S 32°2'E	24 Oct 1967	sighting	6		377
34°34'S 31°43'E	8 Feb 1971	sighting	30		74
34°34'S 31°43'E	8 Feb 1971	harpooned	1	skeleton: S.A. Mus., Cape Town, SAM 36320	74
31°59'S 31°21'E	12 Feb 1971	sighting	1		74
29°56'S 32°00'E; Natal	2 Feb 1973	sighting	6		74, 33
33°58'S 28°07'E; Natal	9 Feb 1973	sighting	2		74, 33
34°08'S 27°21'E; Natal	10 Feb 1973	sighting	50		74, 33
Dowha 40 km S of Kuwait	1974 or prior	stranding	-	skeleton; Nat. Hist. Museum of Kuwait	Al-Robaae (1974); 197
Karachi, Pakistan	1974	record	1	Ein Shams University, Cairo	190
31°37'S 31°05'E	9 Jan 1974	sighting	10	skull, no lower jaw, Pilleri, #571	197
Puthiappa, near Calicut	28 Jul 1975	stranding	1	skeleton	74
Gulf of Mannar	18 Oct 1975	stranding	1		25
Fortescue Bay	Jun 1976	stranding		skull	25
Port Blair, Andamans	27 Jul 1976	in. capture	2		25
Cape St. Francis	pre 1977	stranded	1	mandible, 5 teeth: PEM 1520/63	74
Bushmans River Mouth	Jul 1977 ;	stranded	1	skull: Port Elizabeth Museum, PEM 1520/76	74
Masireh, Gulf of Oman (2031.5857)	1 Aug 1977	record	-	Nat. Hist. Museum of Oman, BM 1980.795	163
11 km SE of Lamalera	31 Jul 1979	sighting	appr. 70		67
Seychelles	Jun 1979-May 1980	sighting	5		349
Gulf of Aquaba	1980-1981	sighting	10		164
Gulf of Aquaba	1980-1981	capture	1 (of above)		164
12°N, 73°E (Kiltan Is.)	14 Dec 1980	sighting	5		85
-	6 Dec 1980	sighting	appr. 5		85
Red Sea	1980-1981	sighting	11		4
20°54'S, 115°22'E (Barrow Is.; A)	Jul 1981	stranding	40		117
19.31N 38.53E	15 Dec 81	sighting			34
12.11N 44.09E	30 Dec 81	sighting	possible id		34
NE of Sri Lanka	Apr 1982	sighting	-		28
11.51N 72.56E	2 Aug 82	sighting	possible id		34
10.25N 75.27E	2 Oct 82	sighting	possible id		34
Kuria Muria, G. of Oman (1730.5558)	1 Oct 1982	record	-	Natural History Museum of Oman, ONHM 64	163
Sri Lanka	Jan - Apr 1983	sighting	2 schools of 3-8		29
NE of Sri Lanka	16 Apr 1983	sighting	25-30		3, 28
07.38N 82.01E	2 Jun 83	sighting	probable id		34
Trincomalee	10 Oct 1983	fishery kill	skull		35

09.28N 81.34E	4 Nov 83	sighting			34
Trincomalee	4 Apr 1984	fishery kill			36
Trincomalee	Jan 1984-Apr 1985	bycatch	7-8		39
34°19'S, 115°10'E (Flinders Bay, Augusta; A)	30 Jul 1986	stranding	114		117
Ghubra, Gulf of Oman (2336.5824)	1 Apr 1987	record	-	Natural History Museum of Oman, ONHM 689	163
Africa:					
Kaiser's Beach	1920-1930	stranding	1	rostrum, mandibles, teeth: PEM 1514/69	74
Klipdrift	pre 1970	stranding	1	skull, 3 vertebrae: PEM 1515/22	74
MEDITERRANEAN:					
Gulf of St. Tropez	22 Jun 1787	stranding	>100		173
unknown	1831	donation	1	mounted skeleton	338
Camogli (Genes)	2 Feb 1893	stranding	1	skin and skeleton; Museum de Genes	173; Vinciguerra (1925-28)
Catona, Jonian Sea	1925	killed	1		72
Catona beach, Calabre, Detroit de Messine	Apr 1926	stranding	1	skull; Museum de Pise	173
Port-de-Bouc	Nov 1928	capture	1	skeleton; Musee de Marseille	
Malaga	Jul 1930	stranding	1		173; Morales (1932)
Marbella	Aug 1930	-			49
Majorca	16 Mar 1943	capture	1		49
I'lle du Levant	Aug 1951;	stranding	1		173
Baltim, Egypt	1956	record	1	left maxillary, Museum, Zoology Dept.,	
d'Elme (W. Pyrenees)	Jun 1857	stranding	1		173; Beneden and Gervais
10 mi off Gibralter	3 Sep 1966	sighting	appr. 15		49
Palerme, Sicily	7 May 1868	stranding	1	skeleton; Museum de Florence	173
38°5'N 15°5'E	Jul 78-Oct 81	in. capture	2		70
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Cambridgeshire fens	1846	sub-fossil	1		Owen; 17
Bay of Kiel	24 Nov 1861	sighting	appr. 100		Reinhardt (1866); 135; 144
Bay of Kiel	24 Nov 1861	attacked	30		Reinhardt (1866); 131; 135
Bay of Kiel	24 Nov 1861	killed	1	University of Kiel	Reingardt (1866); 131; 135
Limhamn, Oresund, SW	1861/62	record			Lilljeborg (1874); 141
Ystad, SW	1862	record			Lilljeborg (1874); 141
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Heilingenhafen, WG	1862	record			Japha (1908); 141
Nakskov, Lolland, DE	1862?	record			Bondesen (1951); 141
Asnaes, Sealand Is., DE	14 Aug 1862	stranding	1		126
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Middelfart, Funen Is., DE	May 1862	stranding	1		126
coast, HO	-	capture	1		Van Diense (1946); 144
Varberg, HO	1920	record			Mathiasson (1960); 141
North Scotland	Oct 1927	stranding	appr. 50		12
Dornoch Firth, Scotland	21 Oct 1927	stranding	127	skeletons; Brit. Mus. Nat. Hist., London	17; 230; 112
Banff	27 Oct 1927	stranding	1 (from above 127)		230
Tarbot Ness	7 Nov 1927	stranding	1 (from above 127)		230
Vinga Is.	1934	record			Jagerskiold (1935); 141
Donna Nook, Lincolnshire	16 Nov 1935	stranding	11		231
Hornsea, Yorkshire	18 Nov 1935	stranding	1		231
Wootton Creek, Norfolk, England	18 Nov 1935	stranding	8		231
Kinkell, Fife, Scotland	27 Nov 1935	stranding	7		231
Barry Sands, Forfar, Cornoustie, Scotland	27 Nov 1935	stranding	41	reproductive systems, ovaries	108, 231
Ferryden, near Montrose, Angus	27 Nov 1935	stranding	1		231
Belhaven Sands, near Dunbar, East Lothian	28 Nov 1935	stranding	1		231
Tynnigham, near E. Lothian, Scotland	28 Nov 1935	stranding	1		Fraser (1946); 111
Donna Nook, Lincolnshire	16 Nov 1935	stranding	1		231
Donna Nook, Lincolnshire	2 Dec 1935	stranding	1		231
Berwick	3 Dec 1935	stranding	1		231
Beal, Northumberland	5 Dec 1935	stranding	1		231
Port Edgar, Linlithgowshire	10 Dec 1935	stranding	1		231
Ymeuden, Denmark	28 Nov 1935	stranding	2		231
Thames gravel; 40' below surface	Nov 1937	fossil	1	caudal vertebrae; Scotland Yard Museum	231
Thames Gravel	Nov 1937	record	1	vertebra; Scotland Yard Museum	231
57°53'N, 07°29'E	21 Jul 1966	sighting	6-8 school (possible id)		253

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Aves Is.; 12°05'N	1883	stranding	1	skull	61; 106; Miller (1920)
St. Vincent	-	capture	1		61; Caldwell et al. (1971)
"at sea"	-	sighting	-		61
Cojimar, Cuba; 23°08'N	-		skeleton		Aguayo (1954); 106
Cojimar	-	sighting	school; poss. id		285
115 mi E of Tobago	18 Apr 1966	2 sightings	6, 2		Morzer Bruyns (1969); 194;275
St. Vincent	12 Feb 1969	killed	5		146; 194
St. Vincent	9 Mar 1969	killed	3	teeth; Caldwells (SV-3-PC)	146; 194
St. Vincent	7 Dec 1969	killed	7		146; 194
St. Vincent	10 Sep 1970	killed	2	skulls; Caldwells (SV-1-PC, SV-2-PC)	146; 194
St. Vincent	Apr 1971	killed	1		146
St. Vincent	May 1972	killed	1		146

St. Vincent	Oct 1972	killed	1		146
St. Vincent	Jul 1973	killed	1		146
St. Vincent	Nov 1973	killed	3		146
San Juan de los Cayos, Venezuela	1975-1976	capture	1		Castellanos y Casinos (1982)
SE of Cayo Borracha	Jul 1979	sighting	group of 40		275

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33°N, 79°5'W	-	sightings			279
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26°15' 80°06'; Deerfield	< 5 May 1922	stranding	1		Bullis & Moore (1956), 180
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off Miami Beach, 25°45'N 80°03'	1930's	sighting	school		106, 180
Cape Hatteras, NC	5 July 1935	shot	1	skull, ribs, vertebrae: N.C. State Museum	98, 103
Hatteras Inlet, NC	17 Apr 1936	-	-	skull, partial skeleton	338
Jupiter Light, 26°57'N	15 Mar 1936	sighting	1	photographs	Donnelley (1937), 180
NE of Hatteras					
* 36°2'N 74°6'W	20 Jun 1961	sighting	1		377
170 mi E of Maryland	Aug 1962	recording	-	tapes	99
Pompano Beach, FL	4 Nov 1965	stranding	1	photos, cast	107
* 70 mi E of Tobago Is.	18 Apr 1966	sighting	6+2		377
N coast of Cuba					
* 22°5'N 77°8' W	17 Aug 1966	sighting	5		377
5 mi N of Ponce de Leon Inlet, FL	15 Dec 1969	stranding	1	head, photos: Marineland of Florida	107
Ft. Pierce, FL	11 Jan 1970	stranding	150-175	2 heads; Field Mus. of Nat. Hist., Chicago	
				head, 2 carcasses; Univ. S. Florida, Tampa	
				head; Crandon Park Zoo, Miami	107
Ft. Pierce, FL	14 Jan 1970	stranding	1		81
24°45.6'N 81°33.4'W	18-19 Jul 1972	stranding	19		79
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Loggerhead Key, Dry Tortugas	25 Jul 1976	stranding	30		79, 95
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Cape Sable, Everglades	28 Aug 1976	stranding	17 - 20	decomposed carcasses; skulls kept	79, 95
OCS, SE of Cape Hatteras	30 Aug 1980	sighting	group of 7		240
Mayport, Duval, FL	30 Jan 1982	stranding	1	photo	338
49°27'N 124°41'W	3 May 1987	stranding	1	skeleton, BCPM# 16149	13, 14

Johnstone Strait	22 Jun 1987	sighting	1		14
Ucluelet, BC	28 Jul 1987	stranding	1		13, 14
ATLANTIC, NORTHEAST:					
Sao Miguel, near Acores	25 Aug 1911	capture	2	skeletons; Mus. Oceanographique de Monaco	238
Llanmadoc					
Glamorgan County	8 May 1934	stranding	21	2 skulls; Nat. Mus. of Wales (34.318 1/2)	168; 231
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Carmarthen County	30 May 1934	stranding	1 (ass. w/ above 21)		231
Llanelly					
Carmarthen County	19 May 1934	stranding	1 (ass. w/ above 21)		
Burry Point					
Carmarthen County	7 May 1934	stranding	2 (ass. w/ above 21)		231
Porto de Sines					
(Portugal)	9 Sep 1935	stranding	1 (probable id)		Nobre (1935); 173
SW of Ireland					
* 50.2°N 16°4'W	7 Jul 1961	sighting	1+1		377
Gulf of Cadiz					
* 36°8'N 08°4'W	23 Jul 1965	sighting	6		377
* off Galita Is, Tunesia	30 Nov 1955	sighting	3		377
ATLANTIC, TROPICAL EAST:					
off Liberia					
04°8'N 11°4'W	8 Nov 1961	sighting	30		377
off Portuguese Guinae					
13°5'N 17°5W	8 Jun 1963	sighting	20		377
Assini, Ivory Coast	-		found specimen		131
Assini, Ivory Coast	Mar 1970	stranding	1	skeleton, teeth	174
ATLANTIC, SOUTHWEST:					
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Argentina,				skull; Museu Provincial de Ciencias Naturales	
42°40'S 64°59'W		record	-	y Oceanografico de Puerto Madryn	Daciuk (1974); 169
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Argentina,					
38°00'S 57°33'W		record	1	skull; M.A.C.N. #98c	169
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35°01'S, 54°52'W	-	record	1	Montevideo (MNHN 1.330)	169
Costa de Arauco	-	stranding	1	skull	Schneider (1946); 208
-		stranding	-	skeleton; Museo de La Plata	
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-	Aug 1946	stranding	-	skull; M.A.C.N. #54.108	169
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Argentina	17 Oct 1946	stranding	835		16; 169
Uruguay	1955	record	1	skull; private collection	169
Buenos Aires	1968 or prior	record	1	skull	Burmeister (1868, 1869)
Rio de Janiero	1968-1984	record(s)	-		355
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Brasil, 32°58'S, 52°54'W	Aug 1975	record	1	skull & skeleton; Museo Oceanigrafico de Rio Grande (#27)	Castello & Gianuca (in press)
Brasil, 32°38'S, 52°26'W	Nov 1975	record	1	skull; Oceanographic Museum of	338
Sarita, Brasil	1 Dec 1981	stranding	1	Photos, skull collected (RP 557)	278
Barra del Chuy; 1.5km SW of Arroyo Chuy	1 Jul 1982 - 30 Jun 1983	stranding	1	Rio Grande (# 31)	Castello & Gianuca (in press)
ATLANTIC, SOUTHEAST:					
Kommetje	Dec 1928	stranding	108	1 skeleton, S.A. Museum	12; 192
Cape of Good Hope	1929	stranding	120		229
Mamre; Darling Division	19 Nov 1935	stranding	200-300		111; 192; 226
St. Helena Bay	27 Dec 1936	stranding	58		12; Smithers (1938); 111
off SW Africa 26°2'S 12°E	28 Nov 1956	sighting	-		377
near Walker Bay	19 Aug 1958	stranding	4		111
St. Helena Bay	19 Aug 1981	stranding	group of 61-65		242, 338, 345
southwest Africa	Jun 1979-May 1980	stranding	1		350
southwest Africa	Jun 1980;May 1981	stranding	1		348
GULF OF MEXICO:					
Flower Garden Reef	1961	harpooned	1	skeleton, Houston Museum of Nat. Sci.	55
25°30'N 89°15'W	30 Apr 1955	in. capture	1	head: Am. Mus. of Nat. Hist. (AMNH 169488)	56, 106
26°30'N 89°15'W	30 Apr 1955	sighting	2		106
29°03'N 87°51'W	28 Apr 1986	sighting	8		338
Mule Key, FL	Jun 1986	stranding	>28		338
Ft. Myers Beach, FL	2 Jun 1986	stranding	27		338
Snipe Point, FL	5 Jun 1986	stranding	at least 12		338
12 mi SE of Sabine Pass	3 Jan 1987	stranding	1		162
Crystal Beach, Galveston	9 Jan 1987	stranding	1		162
Marsh Island, LA	2- Jan 1987	stranding	>6		338
PACIFIC, SOUTHWEST:					
Solomon Islands	-	-	-	teeth, skulls; dolphin hunters	280
Gulf of Carpenteria	-	live captures	-	oceanaria	280
Tasmania	18--	-	-		338
Adventure Bay	1868	stranding	-	4 specimens; various English museums, 1 spec.; Tasmanian Museum	Scott and Lord (1920); 380

Lyall Bay; NZ	18 Jan 1870	stranding	1	skull: Dominium Museum	Hector (1973); Oliver (1922)
Chatham Islands; NZ	Mar 1906	stranding	100		Oliver (1922)
Chatham Islands; NZ	1932	stranding	32		Dom. Mus. strand. file; 87
Awatere River; NZ	May 1933	stranding	1		Dom. Mus. strand. file; 87
Napier; NZ	17 Jun 1936	stranding	29		Dom. Mus. strand. file; 87
Stanley	30 May 1936	stranding	21		Pearson (1936); 380
Stanley	May-Jun 1936	stranding	60 (part of above?)		Scott (1942); 380
Stanley	28 Jul or Oct 1937	stranding	80-100		Scott (1942); 113; 380
Batanta Is., Indonesia	Aug 1938	-	-		338
Opoutama; NZ	8 Apr 1943	stranding	1		Dom. Mus. strand. file; 87
Opoutama, NZ	20 Apr 1943	-	-		228
Eaglehawk Neck	Dec 1946		-	Tasmanium Museum	113
Fanny's Bay; T	Oct 1957				127
Seal Bay, King Island; T	Sep 1958		50		127
Hawke Bay, NZ	May 1961?	-	-	cranium; Napier Museum	338
Warrington; NZ	23 Jul 1962	stranding	19		Marine Dept. str. file; 87
37°S 174°W	8 Mar 1965	sighting	10		377
Mahia Beach, NZ	9 June 1969	stranding	7		338
Townsville, N. Queensland	1964-1972	in.: shark net	1		203
Manawatu Beach, NZ	1970	stranding	1	2/3 skull	338
Marrawah, West Point, T	Feb 1972	stranding	-		338
Black River Beach; T	Jun 1974	stranding	172	specimen in U.S. Nat. Mus., #STR02124	Baker (1983); 124; 127; 132
Perkins Island; T	16 June 1974	stranding	43		113; 127
Thursday Island	1975	live capture	1	Marineland of Australia	257
Manakau Harbour; NZ	1 Apr 1978	stranding	253		154
New Zealand	4 Dec 1979	sighting	4		352
Chatham Is.	23 Feb 1980	stranding	1		352
146°E-170°W, 12°S-54°S	Feb 1981	sighting	10		347
Arafura, Timor seas	1981 - 1985	in take	1		161
Victoria; A	Jan 1983	stranding	87		124
32°50'S, 152°42'E (Crowdy Head, New South Wales)	Jun 1985	stranding	appr. 62	heads, skeletal materials; Australian Mus.	124; 314

Australia/New Zealand/Tasmania:

Treachery Beach; A	1980	stranding	66		Loader (1981); 124
Friendly Beach	Jun 1963			skull	113
Friendly Beach	Nov 1964		> 50	skull	113
-	-	strandings	27	27 skulls, 25 gonads; Australian Museum	159

PACIFIC, NORTHWEST AND FAR EAST:

25°30'N, 120°E (Pingtan Is.)	-	-	-		Fujian Institute of Fishery Science, 1960; 339
Goto Island	-	kill	many		248
Rebun Is., Japan;					

45°20'N, 141°E	12th cent.	fossil	-		228
Korea Strait	26 Feb 1910	-	-	skull, jaws w/o teeth	338
E of Shikotan	17 Aug 1951	sighting	8		60
Yekateriny	26 Aug 1951		4		60
157°12'E 42°21'N	14 Sep 1953		6		60
36°50'N, 122°30'E					
(Shidao)	fall 1955	stranding	30		Wang, Z. et al. (1965)
Keelung, Formosa	11 Mar 1957	kill	1		120
30°20'N, 120°20'E					
(Mouth of Qiantang R.)	Jun 1957	kill	3		Zhejiang Museum; 339
39°50'N, 124°20'E					
(Dandong)	1958, 1961	kill	several		Wang, P. (1979)
39°N, 122°50'E					
(Xiaohao Is.)	16 Nov 1959	kill	2		Wang, P. (1979)
39°40'N, 121°20'E					
(Changxing Is.)	19 Jul 1960	kill	3		Wang, P. (1979)
Pacific coast, Japan	1960-1971	sightings	6 groups of 2-200		115
39°N, 122°40'E					
(Zhangzi, Xiaohao Is.)	8 Jun-5 Jul 1960	kill	6		Wang, P. (1979)
Jiangsu	31 May 1963	kill	1		Wang, Z. et al. (1965)
35°N, 119°30'E					
(Lianyungang)	21 Jun 1963	kill	1		Nanjing University; 339
36°N, 120°30'E					
(Qingdao)	8 Jun 1964	kill	2		Wang, Z. (1980)
Iki Is., Japan	1965	kill	2		195
39°N, 121°10'E (Lushun)	1965	kill	several		Wang, P. (1979)
36°50'N, 122°20'E					
(Shidao)	Aug 1965	kill	1		Wang, Z. (1980)
Iki Is., Japan	1968	kill	1		195
N. Kyushu, Japan	1968	kill	4		195
37°40'N, 122°10'E					
(Weihi)	Aug 1968	kill	1		Wang, Z. (1980)
Iki Is., Japan	1971	kill	5		195
Iki Is., Japan	1971	kill	2		195
37°20'N, 119°10'E					
(Yangjiao Gol)	21 Oct 1973	kill	1		Wang, Z. (1980)
32°N, 121°50'E (Lusi)	May 1974	kill	1		Nanjing Normal College; 339
Japan	1976-1981	in & direct	1,407		140
Iki Is., Japan	1976-1982	kill	943		195
Iki Is.	23 Feb 1977	kill	251		327
Goto Is., Japan	1978	kill	27		195
Tsushima Is., Japan	1978	kill	69		195
Tsushima Is., Japan	1978	kill	77		195
37°10'N, 119°50'E					
(Yexian)	17 Oct 1978	stranding	1		Wang, Z. (1980)
Wakayama, Japan	1979	kill	339		351
Huangai Sea, China	1979	kill	13		322
34°30'N, 124°30'E					
(South Huang-hai Sea)	17 Dec 1979	kill	at least 4		Nanjing Normal College; 339

Okinawa, Japan	1980	kill	5		346
Nagasaki, Japan	1980	kill	371		346
Kyoto, Japan	1980	kill	1		346
Japan	1981	in. take	1		139
Japan	1981	kill	7-37		139
Okinawa, Japan	1981	kill	7 (of above 7-37)		344
Kyoto, Japan	1981	kill	1 (of above 7-37)		344
Wakayama	1982	kill	1		341
Gulf of Tonkin	1983	capture	-		77
Shizuoka, Japan	1985	kill	43		158; 379
Nagasaki, Japan	1985-1986	kill	84		379
Taichung Harbor, China	11 Jan 1986	stranding	1		266

PACIFIC, EASTERN TROPICAL:

Paita, Peru	1866	-	1	skull: Nat. Mus. of Nat. Hist. 3672	82; 118
Galapagos Islands	29 Aug 1923	-	6 skeletons	skull w/o teeth, cervical vertebrae	Beebe (1924); 108; 338
16°45'N	1 Apr 1934	-	1	photograph	Lonnberg (1936); 82; 106
off Hawaii	1963-1981	live-captured	at least ten		Shallenberger (1981); 135
21°3'N 138°7'W	28 Mar 1964	sighting	5		377
15°N 161°W	24 Mar 1964	sighting	10		377
Hawaii	Apr-May 1964	sighting	50		377
Hawaii	Apr-May 1964	capture	1		377
06°N 168°W	18 Sep 1965	sighting	10		377
off Hawaii	1967	sighting	-		306
off Waianae, Oahu	22 Aug 1967	stranding	-	skeleton	338
Pokai Bay, Oahu	1967	capture	1		196
W coast of Golfo Nuevo	1971	stranding	1	skull; Museo Provincial de Ciencias Naturales y Oceanografico, Puerto Madryn.	110
E tropical Pacific	Jan-Feb 1974	sighting	1 sighting		200
15°38'N 96°33'W	27 Jan 1974	sighting	group of 23		V. Culina; 336
9°07'S 140°38'W	6 Nov 1974	sighting	school		255
7°30'N 154°30'W	14 Sep 1975	sighting	group of 6		V. Culina; 336
11°30'N 152°10'W	19 Sep 1975	sighting	group of 20-25		V. Culina; 336
0°10'N 162°40'W	24 Sep 1975	sighting	approx. 50		V. Culina; 336
04°52'N 138°35'E	27 Jan 1976	sighting	10-20	one shot and lost	73
02°37'S 153°01'E	6 Mar 1976	sighting	20-30		73
S of Equator	Jan-Feb 1977	sighting	3 sightings		234
N of Equator	Jan-Feb 1977	sighting	1 sighting		234
Hawaiian waters	Feb 1977	sightings			264
6°44'N 102°10'W	8 Feb 1977	sighting	5		71
7°21'N 101°57'W	8 Feb 1977	sighting	5		71
21°49'N 159°06'W; Kauai Channel	19 Feb 1977	sighting	group of 15		271
N of Equator	Oct-Nov 1977	sighting	1 sighting		234
S of Equator	Oct-Nov 1977	sighting	2 sightings		234
00.26S, 146.08E	15 Nov 1977	sighting	group of about 10		249

01.18N, 135.15E	25 Feb 1978	sighting	group of about 32			249
01.18N, 146.58E	11 Mar 1978	sighting	group of about 100			249
02.02S, 148.18E	12 Mar 1978	sighting	group of about 50			249
5°N 87°W	6 Sep 1978	sightings	two groups of 1-2			258
14°N, 100°W	May 1979	sighting	7			9
Kaneohi MCAS, Oahu	19 Oct 1979	stranding	1	skull, parasites		338
10°-15°N 95°-100°W	1980	in. take	1			138
off Hawaii	1980	sighting	-			306
Mokapu Pen., Oahu	21 Oct 1980	stranding	-			Shallenberger (1981); 148
Costa Rica	17 Mar 1981	sighting	25			20, 21
Costa Rica	13 Mar 1981	sighting	52			21
Costa Rica	21 Mar 1981	sighting	19			21
2°-5°S and 90°-98°W	Nov-Dec 1982	sighting	5 herds, 3-6 animals each			136
6°N 127°W	Nov-Dec 1982	sighting	3 herds, 1-20 animals each			136
19°26'N, 156°02'W	23 Jul 1983	sighting	group of 8-20			68
.5km E of CG light beacon	28 Dec 1983	stranding	1	photos	338	
2°4'S, 91°2'E	Feb-Apr 1985	sighting	group of nine			265
-	1985-1986	sighting	1 herd of 50			160
Kaneohe, Oahu	25 Sep 1986	stranding	1	skull; NMNH	338	

PACIFIC, NORTHEAST:

24°05'N (Pitchilinque Bay, Baja)	1888	-	skeletal remains	skull		Miller (1920); 57
Puget Sound, WA	16 May 1937	shot	1	skull, teeth; Wash. State Museum #12515		57
24°30'N (Espiritu Santu Is, Baja)	14 Feb 1940		skeletal remains	skull; LACM (LACM M1794)		
San Nicolas Is.	1940, 1949	stranding	4 skulls	LA County Museum (LACM 8457-8460)		129
San Jose Is., Baja	28 Apr 1957		skeletal remains	2 skulls; Am Mus of Nat Hist, AMNG 180609, 180610		62; 82
off Pt. Sur	1958	sighting	several			155
36°04'N, 122°07'W	13 Mar 1958	sighting	2			89
33°31'N (near Santa Catalina)	1 Dec 1959	sighting	appr. 300; possible id			Norris and Prescott (1961)
San Nicolas Is.	15 Apr 1960		2 skulls	LACM M1703, LACM M1702		
off Humboldt Bay	1961	sighting	several			155
off Humboldt Bay 40°47'N, 124°41'W	8 Apr 1961	sighting	2			89
4 mi off Palos Verde	10 Oct 1963	sighting	appr. 300			105
4 mi off Palos Verde	10 Oct 1963	capture	1	Marineland of the Pacific		105
San Jose Is., Baja	27 Jun 1964		2 skulls	Cal. Acad. of Sciences (CAS-RB 249, 250)		Lindsay (1964)
Partida Norte Is., Baja	28 Apr 1966	stranding	-	part skull		338
Crescent City, Del Norte County	Sep 1966	stranding	1	skull, mandible; HSU 2673		193
21mi SW Santa Barbara	20 Sep 1970	sighting	12			336
Monterey, CA	Sep 1974	stranding	1			338
Pt. Loma Light, CA	30 Jan 1976	sighting	group			336

Prince William Sound, AK	Jul 1976	sighting	1		Leatherwood et al. 1982,
28°21'N 115°34'W	29 Jan 1977	sighting	group of 30		L. Hobbs; 336
near Monterey Bay	1982	sighting	group	filmed	155
44°23.5'N 124°5.5'W	15 May 1984	stranding	1		336
off Pt. Vincente	Oct 1985	sighting	-		155
Puget Sound, WA	3 May-2 Jul 1987	sighting	at least 13		14; Osborne et al. 1988
Puget Sound, WA	4 May 1987	sighting	15 - same as above		338
49°27'N 124°41'W	3 May 1987	stranding	1	BCPM 16149	14; 336
Case Inlet, WA	5 May 1987	stranding	1		338
Puget Sound, WA	5 May 1987	stranding	1		14; Osborne et al. 1988
48°59'N 125°19'W	21 Jul 1988	sighting	1		Stacey & Baird (1988); 336

* Reference #377 - Morzer Bruyns (1969)

Table 2. Prey items recorded from false killer whales.

For this report, we have listed genus and species names as presented by the authors, with no attempts to update taxonomic changes.

Type	Source
Squid	
Oregoniateuthis sp.	Ross, 1984
Todarodes sp.	Ross, 1984
Phasmatopsis sp.	Ross, 1984
Gonatopsis borealis or *Berryteuthis magister*	Baird et al., 1989
"cuttlefish"	Deraniyagala, 1945b
Fish	
Cod (*Gadus callarias*)	Peacock et al., 1936
Bonito (*Sarda lineolata*)	Brown et al., 1966
Mahimahi (*Coryphaena hippurus*)	Brown et al., 1966
Yellowtail (*Pseudosciaena* sp.)	Kasuya, 1985
Perch (*Lateolabrax japonicus*)	Kasuya, 1985
Rays or skates	Schevill, 1967
Yellowfin tuna (*Thunnus albacares*)	Shallenberger, 1981
Salmon (*Oncorhynchus* sp.)	Baird et al., 1989
Catfish (*Tachysurus* sp.)	Silas et al., 1984
Barracuda	Silas et al., 1984
Caragnid fish	Silas et al., 1984
Mackerel	Tsutsumi et al., 1961
Sardine	Evans and Awbrey, 1986
Amberjack	Bullis and Moore, 1956
Mammals	
Common dolphin (*Delphinus delphis*)	Perryman and Foster, 1980
Spotted dolphin (*Stenella attenuata*)	" "
Spinner dolphin (*Stenella longirostris*)	" "
Humpback whale (*Megaptera novaeangliae*)	Hoyt, 1983

Table 3. Parasites recorded from false killer whales.

Only a single source is given, even if recorded by several authors.

Type	Source
Nematodes	
Anisakis simplex	Zam et al., 1971
Anisakis typica	Zam et al., 1971
Sternus auditivus	Zam et al., 1971
Sternurus globicephlus	Odell et al., 1980
Acanthocephalans	
Bolbosoma capitatum	Fraser, 1936
Trematodes	
Orthosplanchnus elongatus	Zam et al., 1971
Nasitrema attenuata	Neiland et al., 1970
Nasitrema globicephalae	Neiland et al., 1970
Nasitrema gondo	Morimitsu et al., 1987
Ectoparasites	
Cyamidae (Amphipoda)	
Syncyamus pseudorcae	Bowman, 1955
Isocyamus delphini	Bowman, 1955
Crustacea	
Xenobalanus globicipitus	Caldwell et al., 1971b

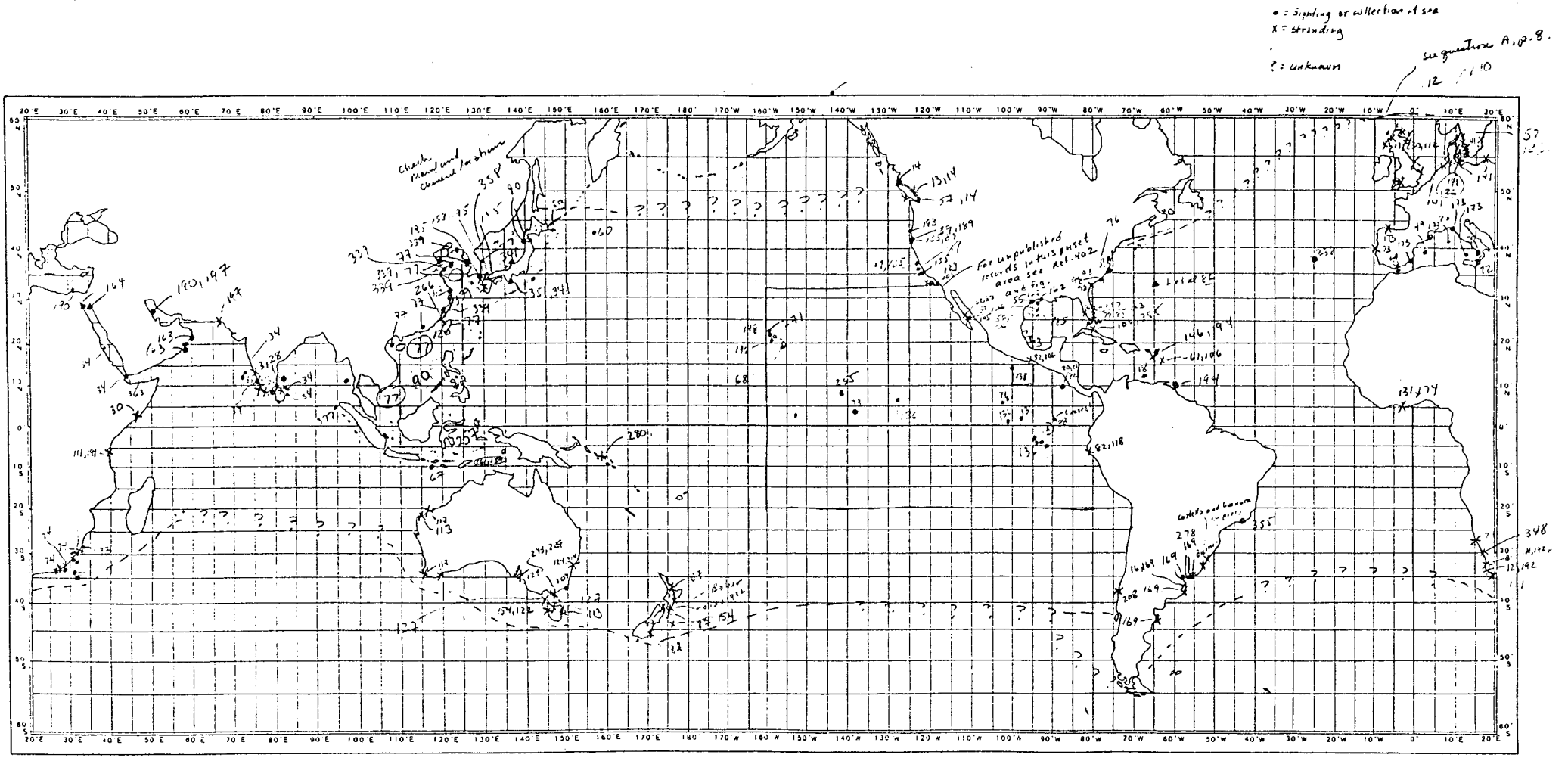

Figure 1. Worldwide distribution of False killer whales. Symbols and shaded areas indicate localities and regions documented in the literature. Dotted lines indicate probable boundaries between oceanic and coastal forms.

Figure 1.

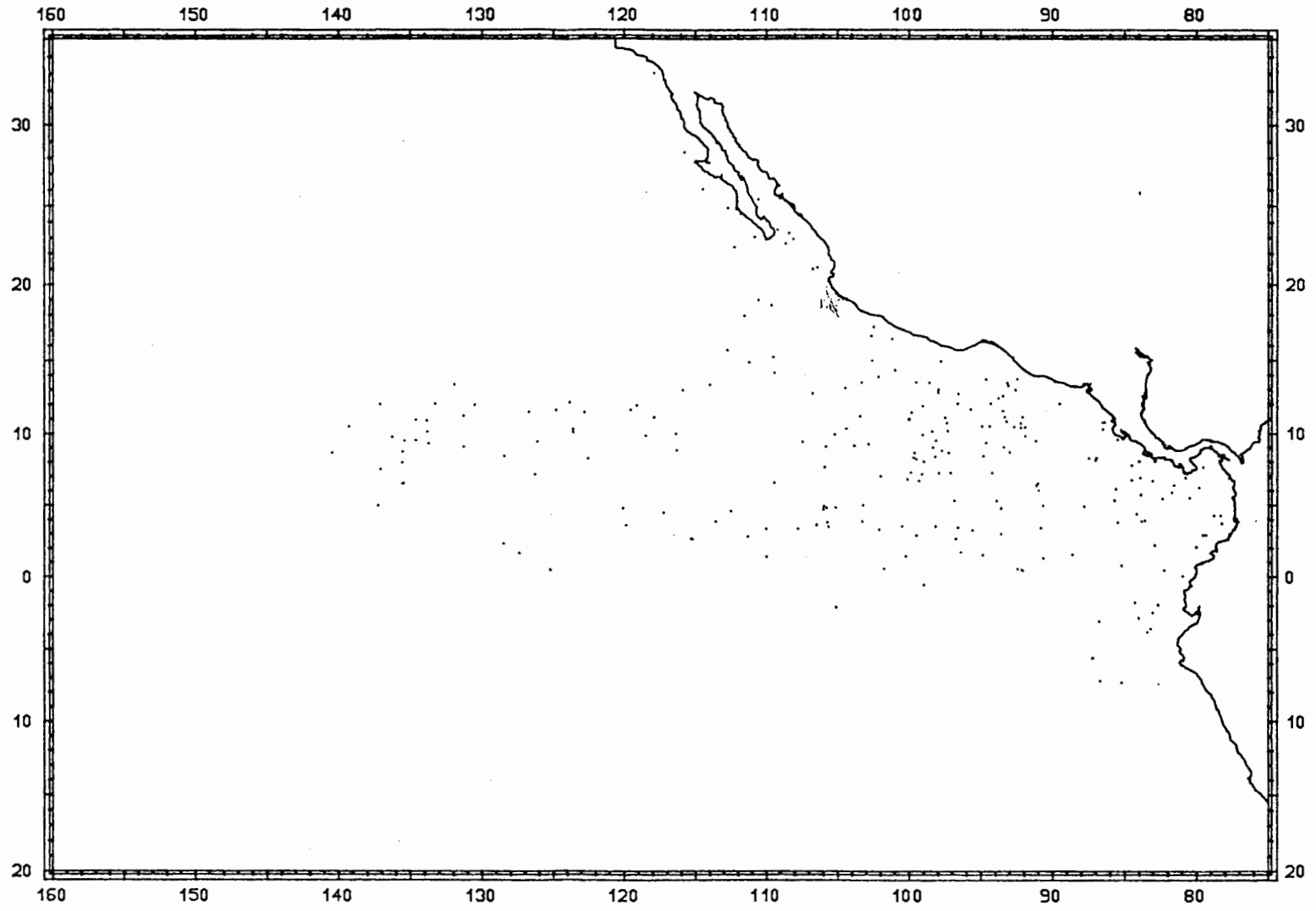

Figure —.
Sightings of false killer whales reported to the NMFS and IATTC by observers aboard fishing and research vessels in the Eastern Tropical Pacific purse seine fishery for yellowfin tuna. Some of these have been previously published (Bertram, 1977; Alverson 1821; Perrin and others 1982; Hunt 1983, 1984; Patterson and Alverson, 1966) see Fig 1).

Pseudorca sightings
NMFS: IATTC data
1972 - 1987
n: 240

Figure 2.

Appendix 1. Annotated Bibliography

Appendix I

Annotated Bibliography

D.M. McDonald, S. Leatherwood, R.W. Baird and M.D. Scott

This bibliography contains citations for books, pamphlets, scientific journal articles, popular articles, contract reports and unpublished manuscripts we were able to locate which contain information on the false killer whale, *Pseudorca crassidens*. It was prepared from publications (and their reference lists) already in our possession and from additional citations located through the San Diego State University search of Biological Abstracts from 1978-1988. The core of entries from these sources was supplemented with entries from the libraries of William F. Perrin, Victor B. Scheffer, Randall R. Reeves, Hubbs Marine Research Center, Scripps Institution of Oceanography, the Inter-American Tropical Tuna Commission, the National Museum of Natural History, Smithsonian Institution, the International Whaling Commission, Oceans Unlimited and the National Marine Fisheries Service (Both the Southwest Fisheries Center and the National Marine Mammal Laboratory).

All documents in English were read. Those containing original data or significant compilations were annotated. Many which referred to this species contained no new information; these are indicated by a + following the citation number, and are not annotated. Publications cited by other authors which were not found are indicated by an * following the citation number. Some foreign language publications known to refer to false killer whales were translated and annotated as described above; others were either not translated or contained insufficient information to warrant annotation, and are indicated by the language designation in parenthesis following the reference and the absence of an annotation.

We have included all bibliographic information available to us for each reference. Annotations vary in detail, as the purpose of this exercise was to locate and summarize available information on the identity and status of populations of false killer whales and on some aspects of the species' biology.

Although annotations are presented as accurately as possible, we suggest using the bibliography as a guide to consultation of original references to ensure accuracy of wording and interpretation.

368. Abel, G.R. and S. Leatherwood. 1985. Live-captures of cetaceans off Taiwan and western Australia 1978-1981. Rep. int. Whal. Commn 35:429-430.

False killer whales were not among species taken in years reported; however, there are plans to capture false killer whales for Australian oceanaria.

141. Aguayo, A.L. 1978. Smaller cetaceans in the Baltic Sea. Rep. int. Whal. Commn 28:131-146.

Review of literature containing records of small cetaceans in the Baltic Sea. All information either summarized therein or already cited by original authors, including: Bondesen (1951), Jagerskiold (1935), Japha (1908), Lepiksaar (1966), Lilljeborg (1874), Malm (1871), Mathiasson (1960), Mitchell (1975b), Mobius (1862, 1873), Morzer Bruyns (1969), Nybelin (1939) and Reinhardt (1862, 1866). Suggests that in the last century only one herd is known to have entered the Baltic, and that members of that herd stranded on the coasts of Germany, Denmark and Sweden.

285. Aguayo, C.G. 1954. Notas sobre cetaceos de aguas Cubanas. Circulars del Museo y Biblioteca de Zoologia de la Habana, Cuba 13(351):1125-1126.

Don Felipe Poey refers to a herd of dolphins seen in Cojimar that were similar to animals of the genus Phocaena, but Don Carlos de la Torre considered them to be *Pseudorca crassidens*.

382. Aguayo, L., J.U. Anelio, R. Sanchez and L. Rojas B. 1986. Diversity and distribution of the cetaceans in the Golfo de California, Mexico. XI Reunion Internacional Sobre Mamiferos Marinos; 2,3,4,5, y 6 de Abril de 1986, Guaymas, Sonora, Mexico:5. (Abstract.)

Report of spatial and seasonal distribution of cetacean species in the Golfo de California from 1981 to 1985. Waters were searched totally or partially during 31 oceanographic cruises. Of 40,397 odontocetes sighted, 0.75% were false killer whales. [No details on locations - Eds.]

100. Ainley, D.G., G.W. Page, L.T. Jones, L.E. Stenzel, and R.L. LeValley. 1980. Beached Marine Birds and Mammals of the North American West Coast: A Manual for their Census and Identification. Contract No. 14-16-001-77027. Fish and Wildlife Service, Biological Services Program. FWS/OBS-80-03. 207 pp.

Identification key for beached marine mammals and birds that have occurred in marine waters from the Bering Strait, Alaska, along the

North American coast south to Cabo San Lucas, Baja California. Includes false killer whale.

243. Aitken, P.F. 1971. Whales from the coast of South Australia. Trans. R. Soc. S. Aug. 95(2):95-103.

Stranding on eastern side of St. Vincent Gulf, southwestern Australia, 5 Oct 1944. Main body of herd, about 200 whales, stranded at Port Prime. About 50 stranded 2.5 km north. Isolated individuals were found over a 30 km area between Port Parham and Port Gawler. Erroneously identified as *Globicephala melaena*, but correctly identified later (Hale, 1945; 1959). Cranium with two teeth in South Australian Museum (M2179).

302. Allen. 1939. Checklist of African mammals. Bull. Mus. Comp. Zool. Harvard 83:1-763.

Pseudorca Reinhardt, *Phocaena crassidens* Owen, *Orca meridionalis* Flower, *Orca destructor* Cope, *Globicephalus grayi* Burmeister.

101. Allen, J.F. 1977. Dolphin reproduction in oceanaria in Australasia and Indonesia. U.S. Dept. of Comm., National Technical Information Service PB-273 673. 105 pp.

Report on reproductive information obtained from oceanaria in Australasia, Indonesia and other locations. Includes data on false killer whales.
22 Mar 1977: Ola died at Sea Life Park in Hawaii. Male, 330 cm, 286 kg. Left testicle 14x2 cm, 100 gm; right 14x2, 140 gm.

36. Alling, A. 1985. Small cetacean entanglement: a case study of the incidental entrapment of cetaceans in Sri Lanka's gillnet fishery. Document SC/37/SM5 presented to the IWC Scientific Committee, Bournemouth, England. 8 pp. (unpublished)

A study of the small cetacean fishery in Sri Lanka was carried out Mar 1982 - Dec 1984. One female false killer whale, 304.8 cm, was seen at the fish-landing site at Trincomalee on 4 Apr 1984, accidentally taken in a pelagic gillnet. Tooth count: LU(9), LL(10).

4. Alling, G., J. Gordon, N. Rotton and H. Whitehead. 1982. WWF-Netherlands Indian Ocean Sperm Whale Study 1981-1982 Interim Report. March. Document SC/34/ Presented to the IWC Scientific Committee. Cambridge, England. 5 pp.

During the November 1981 - March 1982 cruise of the SRV *Tulip*, the Indian Ocean Sperm Whale study, 11 false killer whales with estimated lengths of 2.4 m to 5.4 m were seen together in the Red Sea. Many were scarred around the dorsal fins. Water depth was

1,450 m; surface water temperature was 29.0°C.

29. Alling, A., J. Gordon, M. Rice and H. Whitehead. 1983. WWF/IUCN Indian Ocean sperm whale project, 1983 Interim report. World Wildlife Fund, Zeist, the Netherlands. 29 pp.

Surveys were conducted aboard the 10 m SRV *Tulip* in waters off northeastern Sri Lanka (near Trincomalee) 20 Jan - 24 Apr 1983. False killer whales were seen twice. Group sizes 3, 8. Water depths were over 1,100 m, surface water temperatures 26.0°C, 29.0°C.

34. Alling, A. 1986. Records of odontocetes in the northern Indian Ocean (1981-1982) and off the coast of Sri Lanka (1982-1984). Bombay Nat. Hist. Society 83(2):376-394.

Surveys were conducted from the SRV *Tulip* in the northwest Indian Ocean from 29 November 1981 - 12 February 1982. False killer whales were seen two to six times off Oman and India and in the Red Sea in depths greater than 300 m. Mean group size was six. Locations of the sightings were: 15 Dec 81, 19°31'N 38°53'E; 30 Dec 81, 12°11'N 44°09'E (possible id); 2 Aug 82, 11°51'N 72°56'E (possible id); 2 Oct 82, 10°25'N 75°27'E (possible id); 2 June 83, 07°38'N 82°01'E (probable id); 4 Nov 83, 09°28'N 81°34'E

635.* Al-Robaae, K. 1971. False killer whale *Pseudorca crassidens*: a new record for Arab Gulf. Bulletin Iraq Natural History Museum (University Baghdad) 5(1):31-34.

443.* Al-Robaae, K. 1974. *Tursiops aduncus* bottle nose dolphin: a new record for Arab Gulf; with notes on Cetacea of the region. Bull. Basrah Nat. Hist. Mus. 1:7-14.

See notations under Pilleri and Gihr (1969) - citation No. 197.

255. Alverson, F. 1981. Sea Treasure Cruise, 10/15 - 12/10, 1974. San Diego, Living Marine Resources. (Unpublished).

6 Nov 1974: herd of false killer whales seen at 9.07S, 140.38W. Scattered a school of skipjack.

540.+ Anderson, S. and J. K. Jones, Jr. (eds.) 1967. Recent mammals of the world, a synopsis of families. Amer. Soc. of Mammal. 291-324.

541.+ Anonymous. ?. The Audubon Society Field Guide to North American Fishes, Whales and Dolphins. Alfred A. Knopf, New York. 847 pp.

167. Anonymous. 1930. News and views. Nature 126(3188):892.

Mass strandings have occurred near Kayts, Ceylon (1929), Dornoch Firth, Scotland and Cape Town, South Africa. The Ceylon stranding is mentioned in the Report of the Colombo Museum for 1929, but only as a record of the preparation of 12 skulls and two complete skeletons.

191. Anonymous. 1934. A window on the world: news item of the week. Stranding of false killers near Zanzibar. Illustr. London News. 3-II-1934.

Brief newspaper account with photos of a false killer whale stranding at Zanzibar, 2 Dec 1934.

32. Anonymous. 1969. Report on the whale marking cruise of the "Edwin Cook" (W18) off the coast of Natal. 11 August-1 September 1969. International Whaling Commission. (Unpublished).

During the whale marking cruise of the Edwin Cook, 11 August - 1 September 1969, off the Natal coast, false killer whales were seen twice, one group of 30 and one solitary individual.

542.+ Anonymous. 1973a et seq. Administration of the marine mammal protection act of 1972. NMFS/NOAA. Federal Register.

33. Anonymous. 1973b. Report of the whale marking cruise of the "Pieter Molenaar" off the coasts of Natal and the eastern Cape 1-21 Feb. 1973. International Whaling Commission. (Unpublished).

During the whale marking cruise of the Pieter Molenaar, 1 - 21 Feb 1973, off the coasts of Natal and the Eastern Cape, false killer whales were seen three times: 2 Feb 1973 - group of 6; 9 Feb 1973 - group of 2; 10 Feb 1973 - group of 50.

543.+ Anonymous. 1978. Mammals in the seas. FOA Fisheries Series No. 5(1):264.

153. Anonymous. 1980a. A world review of the Cetacea. Nature Conserv. Coun. Great Britain: 268-272.

1978: Japanese local government officials authorized the killing of large numbers of false killer whales and bottlenose dolphins at Iki Island, in response to perceived competition with local fishermen for seasonally available mackerel. It did not have much effect on the problem. Similar killing occurred in 1980.
The Pacific tuna long-line fishery suffers from predation by false killer whales and dolphins. In some years, 5% of the catch, representing $25,000,000 to $30,000,000, is lost.

235. Anonymous. 1980b. A report based on the workshop on stock assessment and incidental take of marine mammals involved in

commercial fishing operations, Jan. 30-31 and Feb. 1, 1979. 99pp + 1 app.

Summarizes knowledge of false killer whales. States that there is no information on stock differentiation. Ranges in all temperate and tropical seas. Usually found in large herds, which can be several miles wide and composed of several groups. According to Shallenberger (in prep at the time of this paper; published in 1981), movements are often related to movements of yellowfin tuna and other prey. States that species is uncommon throughout most of its range, and it is difficult to estimate population sizes due to its pelagic existence and apparently random movements. Hawaiian longline fishermen claim they take yellowfin tuna from set lines; as many as thirty 50-100 kg tuna have been lost in one day. Although definite statements regarding optimum sustainable population levels (OSP) cannot be made due to lack of data, it is probable that the population is within the range of OSP.

277. Anonymous. 1980c. The marine observers' log. Whales, dolphins and blackfish. Marine Observer 50:108-111.

Report of a sighting by Captain P.J. Clark of the SS *Botany Bay* of six false killer whales 27 August 1979 at 29°39'S, 101°35'E. (McBrearty comments "original description...based on a subfossil skeleton which was found in the Lincolnshire fens in 1843. The first 'live animal' was not taken until 1861 when a large school was attacked by fishermen in the Bay of Kiel..."

102. Anonymous. 1987. Sea Life Park's two most famous babies and a brief history of their interesting families. Sea Life Park, Hawaii. 2 pp.

I'anui Hhai - Male, approximately 15 ft, 2000 lbs., in captivity 15 years. Makapu'u - Female, over 12 ft, 1800 lbs., in captivity since 1965. Makana Makamae - male calf, son of above animals, born 1 May 1986. First false killer whale bred and born in captivity. 5 ft, 100 lbs at birth; 6 ft, 400 lbs at one year. Mother remains close to the calf. Kekaimalu - female cross between male false killer whale and female bottlenose dolphin, born 15 May 1985. Estimated 66 teeth (mom 88, dad 44). 35 lbs at birth, 350 lbs at two years. Dark in color, wide body and large teeth. Profile is a blend of two species with a short tapering rostrum.

2. Antonelle, H.H., L. Lodi and M. Borobia. 1986. Avistagens de Cetaceos no perìodo de 1980 À 1985 no litoral da Paraìba, Brasil. P. 27 *In* 2: Reunião de Trabalho di Especialistas em Mamìferos Aquáticos da América do Sul. Resumas. 4 a 8 de Agosto di 1986 Rio de Janeiro - Brasil. 56pp. (Abstract.) (In Italian.)

False killer whales were sighted.

411. Aoyama, T. and E. Kozasa. 1972. The stock assessment of dolphins and ??. Bulletin of the Seikai Regional Fisheries Research Laboratory 42:?? (In Japanese.) [Translation incomplete - all available information noted - Eds.]

544.+ Appy, R.G. 1974. The air sinus flukes, genus (Trematoda: Nasitrematidae), in porpoises from the eastern Pacific. Thesis presented to the Department of Biology. California State University, Long Beach.

324. Arvy, L. 1971. The enzymes of Cetacea. Inv. on Cet. 3:302-314.

Cites Malvin and Vander (1967), who report that the false killer whale has 2.6 ng/ml angiotensine equivalent in the kidney.

319. Arvy, L. and G. Pilleri. 1976. Cetacean umbilical cord; studies of the umbilical cord of two Platanistoidea: *Platanista gangetica* and *Pontoporia blainvillei*. Inv. on Cet. 7:91-103.

Cites Peacock et al. (1936), who report that an umbilical cord in a false killer whale was 0.60 m.

321. Arvy, L. and G. Pilleri. 1977. The sternum in Cetacea. Inv. on Cet. 8:123-148.

There are four pairs of ribs attached directly to the sternum.

301. Asdell, S.A. 1964. Patterns of Mammalian Reproduction, Second Edition. Cornell University Press, Ithaca, New York. (section p. 416.)

The false killer whale is polyestrous except in winter, when it is anestrous. One ovum is shed at a time (Comrie and Adam, 1938).

234. Au, D.W.K., W.L. Perryman and W.F. Perrin. 1979. Dolphin distribution and the relationship to environmental features in the Eastern Tropical Pacific. La Jolla, SWFC/NOAA Admin. Rep. No. LJ-79-43. 59 pp.

Various sources, including Southwest Fisheries Center files, containing data from research cruises of the *David Starr Jordan*, the *Townsend Cromwell* and other vessels were consulted for information on dolphin distribution in the eastern tropical Pacific. Delphinid sightings from the *Jordan*, east of 120°W and south of 10°N, during 1977 include the following seven records of false killer whales: Jan-Feb (3 S of Equator, 1 N), Oct-Nov (2 S of Equator, 1 N).

183. Baird, R.W. 1987. A new mammalian species for Canada, the false killer whale (*Pseudorca crassidens*). The Victoria Naturalist

44(2):7.

Reports same information as in Baird et al. (1988). An individual false killer whale was seen in shallow inlet for 11 days after being returned to the water from Ucluelet.

13. Baird, R.W., K.M. Langelier and P.J. Stacey. 1988. Stranded whale and dolphin program of B.C. - 1987 report. B.C. Vet. Med. Assoc. Wildlife Vet. Rep. 1(1):9-12.

Reports same information as in Baird et al. (1987, 1989), but with more detail. The Stranded Whale and Dolphin Program of British Columbia reported the first Canadian records of false killer whales: one male stranded on Denman Island on 3 May 1987; one male stranded in Ucluelet on 28 Jul 1987. The first was estimated by tooth sectioning to be at least 26 years old, had severe osteoarthritis in the atlanto-occipital and radio-humeral joints and exhibited a high accumulation of pesticides and heavy metals. It was measured and photographed, teeth and the skeleton were collected, stomach contents were analyzed and tissue samples were taken for toxicology. The other, a juvenile, was measured, photographed, and returned to the water.

14. Baird, R.W., K.M. Langelier and P.J. Stacey. 1989. First records of false killer whales (*Pseudorca crassidens*) in Canada. Canadian Field-Naturalist 103. [In Press at time of review - Eds.]

Reports same information as in Baird et al (1987, 1988) but with more detail. The stranding of an adult male false killer whale (*Pseudorca crassidens*) on Denman Island, British Columbia (49°27'N, 124°41'W), on 3 May 1987, was the first record for Canada. A post mortem examination was performed, body and cranial measurements were taken and the skeleton was deposited in the collection of the Royal British Columbia Museum (BCPM 16149). Total length was 462 cm. The stomach contained small numbers of parasites (*Anasakis* sp.), salmon (*Oncorhynchus* sp.) and squid (either *Berryteuthis magister* or *Gonatopsis borealis*). Osteological evidence and tooth dentine-layer counts (26 growth layer groups) indicated advanced age. Tooth count: LU(8), LL(8), RU(8), RL(9). There were very high levels of mercury in the liver (728 ppm wet weight) and DDE in the blubber (1,400 ppm wet weight). A group of at least 12 other false killer whales remained in the inshore waters of Puget Sound, Washington, from 3 May 1987 to 2 Jul 1987; one of them stranded and died. A single individual was photographed in Johnstone Strait, B.C. on 22 Jun 1987, and another false killer whale live-stranded in Ucluelet, B.C. on 28 Jul 1987, and was returned to the water.

336. Baird, R.W., S. Leatherwood and P.J. Stacey. In prep. *Pseudorca crassidens*. Mammalian Species.

Review of status of knowledge of the species, including context and content, diagnosis, general characters, distribution, fossil record, form, function, ontogeny and reproduction, ecology, behavior, genetics (prepared largely from this bibliography).

262. Baker, A.N. 1972. New Zealand whales and dolphins. Tuatara 20(1):96 pp.

Original version of identification guide subsequently revised in 1983 - see Baker (1983) - citation No. 445.

445. Baker, A.N. 1983. Whales and Dolphins of Australia and New Zealand An Identification Guide. Victoria University Press, Wellington, New Zealand. 133 pp.

Revised edition of Baker (1972) - citation No. 262.
The false killer whale is described, and distribution and strandings are mentioned. Reaches about 5.5 m in length in Australasian waters. It is found in all temperate and tropical seas and often travels in groups of several hundred. It is known from South Australia, western Australia and Queensland. Strandings mentioned include one of 231 animals at Manukau, New Zealand (Mar 1978) and 172 at Black River Beach, Tasmania (Jun 1974). The Tasmania stranding involved pregnant females with fetuses of 1.2 - 1.6 m in length, indicating a winter breeding season in that region.

232. Baker, C.S., P.H. Forestell, R.C. Antinoja and L.M. Herman. 1979. Interactions of the Hawaiian humpback whale, *Megaptera novaeangliae*, with the right whale, *Balaena glacialis*, and odontocete cetaceans. Third Biennial Conf. of the Biology of Marine Mammals. Seattle, WA. (Abstract.)

False killer whales have been observed associating with humpback whales, *Megaptera novaeangliae*, off Hawaii.

354. Bannister, J.L. 1977. Incidental catches of small cetacea off Australia. Rep. int. Whal. Commn 27:506.

Off New South Wales, cetacean entrapment in shark nets is rare (average of one is killed every 2 years), but off Queensland, the average is higher; 13, possibly including false killer whales, were reported from one area in one year.

71. Barham, E. 1977. Aerial survey trip report, January-June 1977. Dept. of Comm. NOAA/SWFC. 73 pp.

During aerial surveys off the west coast of Mexico, Central and northwestern South America, Jan - Jun 1977, there were two sightings of false killer whales: 8 Feb 1977, 6°44'N 102°10'W

five animals; 8 Feb 1977, 7°21'N 101°57'W five animals.

12. Barnard, K.H. 1954. A guide book to South African whales and dolphins. South African Museum Cape Town. Guide No. 4. 33 pp.

Guidebook with the following descriptions and stranding records of false killer whales: The snout overhangs the point of the lower jaw in males. Males grow up to 19 ft in length, cows to 16 1/2 feet. The flippers are pointed, and about 1/10 of the total body length. There are 8 - 11 conical teeth with circular sockets on each side in both jaws.
"Notable mass strandings occurred in North Scotland in Oct 1927, about 50 examples; east coast of England and Scotland in Nov-Dec 1935, altogether 70-80 examples; a large number near Zanzibar in 1933." Strandings recorded on the Cape coast include: 1) over 100 animals at Kommetje on the west coast of the Cape Peninsula in Dec 1928; 2) 200-300 at "Sea Spray" on the Darling Division coast in Nov 1935 and 3) 58 near the mouth of the Berg River in St. Helena Bay in Dec 1936. The skeleton exhibited at the South African Museum in Cape Town is from the Kommetje stranding.

360. Bayed, A. and P.C. Beaubrun. 1987. The marine mammals of Morocco preliminary inventory. Mammalia 51(3):437-446.

From observations carried out in the Atlantic and Mediterranean seas and in the Gibraltar Strait, false killer whales are known to occur along the Moroccan coast.

164. Beadon, J. In Press. Cetaceans seen and caught in the Gulf of Aquaba and the Gulf of Suez, 15 September 1980 through 1 September 1981. *In* S. Leatherwood and G. Donovan (eds.). Cetaceans and cetacean research in the Indian Ocean Sanctuary. Nairobi. UNEP.

During regular boat searches 15 Sep 1980 through 1 Sep 1981, false killer whales were sighted only once. One male was tracked from the Gulf of Suez around Ras Muhammad into the Gulf Aquaba and then captured by hoop net from a herd of nine others with which it joined. It was held at the Tel Aviv dolphinarium until its death.

447.* Beebe, W. 1924. Galapagos World's End.

See notation under Comrie and Adam (1938) - citation No. 108.

251. Bellision, N.B. 1966. Fauna marina Antarctica. Republica Argentina Secretaria de Marina, Servicio de Hidrografia Naval, Publico H. 907. Buenos Aires. 91 pp.

False killer whales are among the cetaceans listed as commonly occurring in Antarctic waters [No data are presented and the

conclusion is, in our opinion, unwarranted - Eds]. A brief description is given.

448.* Beltrami, G. 1943. Sur la denture d'un *Orcinus orca* du Museum de Marseille. Bull. Mus. Hist. nat. Marseille 3(1):22-27.

449.* Beneden, P. van. 1889. Pp. 460-483 *In* Histoire naturelle des Cetaces des mers d'Europe. Bruxelles.

See notation under Tomilin (1962) - citation No. 144.

450.* Beneden, P. van and P. Gervais. 1868-1880. Osteographie des cetaces vivants et fossiles, comprenant la description et l'iconographie du squelette et du systeme dentaire de ces animaux, ainsi que des documents relatifs a leur histoire naturelle. Paris. 634 pp. pl. LXIV.

False killer whales are included on pp. 548-550, pl. 50, 53, fig. 2 and 3, pl. 64 and fig. 3.

318. Berzin, A.A. and L.P. Vlasova. 1982. Fauna of the Cetacea Cyamidae (Amphipoda) of the world ocean. Inv. on Cet. 13:149-164.

(Bowman, T.E., 1955): new genus *Syncyamus* for the new species *Syncyamus pseudorcae* from a false killer whale caught in Mexican waters.

212. Best, P.B. 1966. Cetacea. Part 4 *In* J. Meester (ed.). Preliminary identification manual for African mammals. Smithsonian Inst. 19 pp. in Part 4.

Distinguishes the false killer whale from the pygmy killer whale, *Feresa attenuata* as follows: the former is larger (up to 19'), its teeth occupy entire rostrum and its premaxillae are not expanded proximally.

545.+ Best, P.B. 1970. Records of the pygmy killer whale, *Feresa attenuata*, from southern Africa, with notes on behaviour in captivity. Ann. S. Afr. Mus. 57(1):13.

404. Best, P.B. 1971. Order Cetacea. Part 7. Pp. 7-1 through 7-11 *In* J. Meester and H. W. Setzer (eds.). The Mammals of Africa. An Identification Manual. Washington, D.C. Smithsonian Institution. ISBN-0-87474-116-5.

Repeats information in Best (1966).

242. Best, P.B. 198*. Whales: why do they strand? African Wildlife 36(3):96-101.

Account of 19 Aug 1981 false killer whale stranding in St. Helena Bay. Many teeth were taken by sightseers, as in the 1928 Kommetje and the 1936 St. Helena Bay strandings, preventing accurate tooth counts. Stranding was on the same stretch of beach as that in 1936. The 1981 group was part of a larger group, the survivors of which moved off after the stranding. The site looks like a natural trap, near the bottom of a hook-shaped bay with a gently sloping beach and an off-shore reef. There was one pregnant female and seven possible calves. The only food remains were a few hard squid parts. Intestinal parasite load was normal, and almost all animals had flukes and/or nematodes within air sinuses in the head, including some around the inner ears. Describes the 1928 Kommetje, the 1976 Pine Island and Dry Tortugas, Florida, and the 1936 St. Helena Bay strandings.

66. Best, P.B. and P.D. Shaughnessy. 1981. First record of the melon-headed whale *Peponocephala electra* from South Africa. Ann. S. Afr. Mus. 83(3):33-47 + 7 figs, 4 tables.

Stranding record of the melon-headed whale *Peponocephala electra*. It is compared to the false killer whale, which often has a white throat chevron-genital patch pattern.

192. Birkby, C. 1935. Two hundred false killers hurl themselves ashore. The Illustrated London News: 1124-1125.

Newspaper account, with photos, of a 19 Nov 1935 stranding of about 200 false killer whales on the South African Coast, Darling District. They stranded on a rocky coast, rushing the shore once and turning away, then rushing it again and stranding. All stomachs examined were empty. Most of the cows had calved a short time before death, but there were no newborn among the strandings. "In the last three weeks there have been about 11 records of stranding on our East Coast, involving some 60 False Killers". Stranding of 108 animals at Kommetje is mentioned. The whales had been in the water for some time before stranding. The water was very murky with sand that had been stirred up by a furious "southeaster", perhaps irritating the whales' mouths or blow-holes and causing them to strand.

451.* Boltovskoy, E. 1971. Masas de agua (caracteristica, distribucion, movimientos) en la superficie del Atlantico sudoeste, segun indicadores biologicos-foraminiferos. Armada Argentina, Serv. Hidrog. Naval, Publ. H. 643. 99 pp.

452.* Bondesen, P. 1951. Danmark Franger Hvaler. Natur og Museum. 10 pp. Arhus.

298. Bostic, D.L. 1975. A Natural History Guide to the Pacific Coast and North Central Baja California and Adjacent Islands.

Biological Educational Expeditions, Vista, CA. 184 pp.

Physical description and brief account of distribution of false killer whales. States that false killer whales are a deep water, oceanic species occurring in temperate and tropical waters from Washington to Mexico in the Pacific. Stomach contents examinations indicate a diet of primarily squid and fish. Calves are 5-7 ft at birth.

93. Bowman, T.E. 1955. A new genus and species of whale-louse (Amphipoda: Cyamidae) from the false killer whale. Bull. Marine Sci. Gulf and Caribbean 5(4):315-320.

Two cyamid parasites are reported from a false killer whale taken 30 Apr 1955 at 26°30'N, 89°15'W (see Bullis and Moore, 1956) - *Syncyamus pseudorcae*, the most specialized cyamid yet discovered, and *Isocyamus delphinii*.

253. Boyde, A., S.G. Brown and S.J. Jones. 1968. Sightings of cetacea during the 1966 Trans-Atlantic Yacht Race. Norsk Hvalfangst-Tidende 2:29-35.

21 Jul 1966: sighting of a group of 6-8 "30 whales", tentatively identified as false killer whales, 57.53N, 07.29E., by T.E. Rothe on the sailing yacht *Kirsten*.

218. Bree, P.J.H. van. 1971. On *Globicephala sieboldii* Gray, 1846, and other species of pilot whales (notes on Cetacea, Delphinoidea III). Beaufortia 249(19):79-87.

Gray (1871) recognized three species within the genus *Globicephalus*, now *Globicephala*; *G. svineval* (=*melaena*), *G. grayi* (=*Pseudorca crassidens*), and *G. macrorhynchus*.

174. Bree, P.J.H. van. 1972. Sur la presence de *Pseudorca crassidens* (Owen, 1846) (Cetacea, *Globicephalinae*) au large des cotes d'Afrique occidentale. Bull. Inst. fr. Afr. noire 34 ser A (1):212-218. (In French).

Describes project University of Amsterdam in conjunction with the Ministry of Animal Production of the Ivory Coast, Mar 1970: False killer whale stranded at d'Assini, near Ivory Coast/Ghana border. Skull and teeth, obtained in March, are described and measurements are given.

61. Bree, P.J.H. van. 1975. Preliminary list of the cetaceans of the Southern Caribbean. Studies on the Fauna of Curaçao and other Caribbean Islands XLVIII(160):79-87.

There was a sighting at sea in the southern Caribbean, a stranding

at one of the Islas Las Aves (Miller, 1920), and a single capture near St. Vincent (Caldwell et al., 1971a).

270. Bree, P.J.H. van. 1977. On former and recent strandings of cetaceans on the coast of the Netherlands. Sonderdruck aus Z. F. Saugetierkunde Bd. 42(2):101-107.

(van Deinse, 1946): two false killer whale strandings on the coast of the Netherlands from 1931-1936.

624.+ Bree, P.J.H. van. and J. Cadenat. 1968. On a skull of *Peponocephala electra* (Gray, 1846) (Cetacea, *Globicephalinae*) from Senegal. Beaufortia 177(14):193-202.

103. Brimley, H.H. 1937. The false killer whale on the North Carolina coast. J. Mammal. 18(1):71-73.

5 Jul 1935: injured whale was seen close inshore 1/2 mile east of the inlet near Hatteras, N. Carolina (35°10'N - Bullis and Moore, 1956). The observers shot the animal but were unable to move it above the high-water mark. Total length approximately 18 ft. Photos were taken, and the skull (except for lower mandibles and teeth), 5 ribs and 32 vertebrae (including the 7 fused cervicals) were saved at the North Carolina State Museum. The skull had eight tooth sockets on either side.
1918: four were found on the shore of Biscayne Bay, FL (no ref.)
prior to 5 May 1922: one stranded near Hillsboro Lighthouse, near Deerfield, FL (26°15'N - Bullis and Moore, 1956)

453.* Brimley, C.S. 1946. Mammals of North Carolina. Installments No. 17 and 18. Carolina Tips 9(1):2 and 9(2):6.

104. Brown, S.G. 1975. Relation between stranding mortality and population abundance of smaller cetacea in the northeast Atlantic Ocean. J. Fish. Res. Board Can. 32(7):1095-1099.

Four British Coast strandings between 1913 and 1972: 1923-1932 - one; 1933-1942 - three.

454.* Brown, D.H. and K.S. Norris. 1956. Observations of captive and wild cetaceans. J. Mammal. 37(3):311-326.

105. Brown, D.H., D.K. Caldwell and M.C. Caldwell. 1966. Observations on the behavior of wild and captive false killer whales, with notes on associated behavior of other genera of captive delphinids. Contributions in Science (L.A.C.M.) 95:1-32.

10 Oct 1963: diffuse herd of about 300 (including numerous groups of 2-6 animals) seen approximately 4 miles SW of Long Point lighthouse, Palos Verdes Peninsula, near Los Angeles, CA. Herd was

spread over an area about 1/2 x 2 miles. Swimming speed was at least 10 knots. Many lobtailed, many vocalized and could be heard 150-200 yards away. Sounds were piercing, harsh and quite consistent. Size varied from 5 - 18 ft. They were observed to eat bonito (*Sarda lineolata* Girard). When one animals was snared, some members of its group stayed close to it and rubbed their bodies on the rope securing it, until it was brought alongside the F/V *Geronimo*, whereupon they abandoned it. The rest of the animals continued to feed.

The captured animal was a subadult female, 11'3" long and 825 lb, with double twin mammary slits. Her behavior is described in detail, including descriptions of feeding, interactions with other tank-mates, protective behavior, intergeneric homosexual behavior and learning.

Growth was noted: 4 Nov 1963 - 825 lbs, 11'3"; 31 Aug 1965 - 12'5:, 1,100 lbs; she had eaten 30,650 lbs of fish.

"Blackfish" reported stealing fish from lines of fishermen in the northeastern Gulf of Mexico were probably false killer whales. See also notation under Shallenberger (1981) - citation No. 58.

257. Bryden, M.M. 1978. Whales and whaling in Queensland waters. Proc. R. Soc. Qd. 88:v-xviii, pls 1-3.

False killer whales occur here and a few skulls have been found. Verbal reports are fairly common, especially around northern Queensland. A young female was captured near Thursday Island in 1975 for Marineland of Australia.

607.+ Bryden, M.M. and R.J. Harrison. 1986. Gonads and reporduction. Pp. 149-159 *In* M.M. Bryden and R. Harrison (eds.). Research on Dolphins. Clarendon Press, Oxford. 478 pp.

96. Bryden, M.M., R.J. Harrison and R.J. Lear. 1977. Some aspects of the biology of *Peponocephala electra* (Cetacea: Delphinidae) I. General and reproductive biology. Aust. J. Mar. Freshwater Res. 28:703-15.

The false killer whale, *Pseudorca crassidens*, is distinguished from the melon-headed whale, *Peponocephala electra*, by the former's fewer number of teeth, and from both the melon-headed whale and the pygmy killer whale, *Feresa attenuata*, by its larger maximum size, and by shape and more caudal position of its dorsal fin.

106. Bullis, H.R. and J.C. Moore. 1956. Two occurrences of false killer whales and a summary of American records. Amer. Mus. Novitates, 1756:1-5.

30 Apr 1955: two false killer whales were observed in the Gulf of Mexico, 26°30'N, 89°15'W, by an exploratory fishing vessel. One was about 15'. One, a female, became entangled in the tuna long-line fishing gear. It was shot, measured (421 cm TL) and its head sent to the American Museum of Natural History (AMNH 169488). Tooth wear indicated that it was an adult. Its stomach contained three large squid beaks and some squid fragments.
1930's: 12' female was harpooned from a school swimming over Amberjack Hole, about 1/2 mile off Miami Beach, 25°45'N. It had two and one-half amberjacks in its stomach. A life-size model was cast of its body.
(Miller, 1920): reported a false killer whale from the Aves Islands in the Caribbean Sea off Venezuela 12°05'N, from 1883. A skull was collected.
(Aguayo, 1954): skeleton from Cojimar, east of Havana, Cuba, 23°08'N.
(Peacock et al., 1936): reported 27 specimens, females up to 15'7".
(Donnelley, 1937): photographs of false killer whales at Jupiter Light, Florida, 26°57'N on 15 Mar 1936.
(Moore, 1953): record from Miami Beach, FL, 25°44'N; skull collected.
(Miller, 1920): record from Pichilingue Bay, Baja California, 24°05'N, from 1888. A skull was collected. Record from Princeton, FL, 25°33'N, from 1918. Skull collected.
(Lonnberg, 1936): 1 Apr 1934; record from Acapulco, Mexico, 16°45'N. Photographs were taken.
(Burmeister, 1869): record from Samborombon Bay, Argentina, 36°00'S.

455.* Burmeister, H. 1868. On *Globicephalus grayi* nov. spec. Annals Mag. Nat. Hist. 1, 4ser., 52-54.

See notations under Langguth (1977) - citation No. 169, and Pilleri and Arvy (1981) - citation No. 181.

456.* Burmeister, G.? 1869. Descripcion de cuatro especies de Delphinides. An. Mus. Pub. Buenos Aires 1(9):367-445.

See notations under Bullis and Moore (1956) - citation No. 106, and Langguth (1977) - citation No. 169.

457.* Burmeister, H. 1872. On my so-called *Globiocephalus grayi*. Annals Mag. Nat. Hist. 10, 4th ser., 51-54.

See notations under Pilleri and Arvy (1981) - citation No. 181.

458.* Bureau of Land Management. 1975. Marine Mammals. Pp. 407-445 *In* Final environmental statement proposed 1975 outer continental shelf oil and gas general lease sale offshore southern California. Vol. 1 of 5. U.S. Dept. of Interior.

Pages 415-416 include information on the distribution, study area sightings and life history of false killer whales. Mentions that there is no information on the current population size of this cetacean but that it is assumed to exist in considerable abundance.

156. Busnel, R.-G. and A. Dziedzic. 1968. Caracteristiques physiques des signaux acoustiques de *Pseudorca crassidens* Owen (Cetace Odontocete). Mammalia 32(1):1-5. (In French, with an English summary)

Acoustical signals of the false killer whale were recorded in the western Mediterranean sea and analyzed. Five types of whistled signals in the frequency range of 3-11 kHz were determined and classified in decreasing order. The herd's behavior and the configuration of the signals indicate that they are used for interindividual communication and grouping signals; some are very similar to those of *Globicephala melaena*. Also briefly described are signals similar to those other delphinids use in echolocation. Main characteristics of the false killer whale's signals are their shortness and an energetic concentration between 8 and 12 kHz.

459.* Cabrera, A. 1914. Fauna Iberica. Mamiferos. 441 pp.

460.* Cabrera, A. 1946. Las falsas orcas de Mar del Plata. Cienc. Investig. 2(12):505-509.

461.* Cabrera, A. 1960. Order Cetacea. Catalogo de los mamiferos de America del Sur. II (Sirenia - Perissodactyla - Artiodactyla - Lagomorpha - Rodentia - Cetacea.) Ciencias Zoológicas 4(2):603-625. (In Spanish.)

History of the species name. South American records include reports from the coasts of Peru (1866), Venezuela (1833), and province of Buenos Aires, Argentina (1868, 1946). No references are mentioned.

630. Cabrera, A. and J. Yepes. [Date unknown]. Historia Natural Ediar * Mamiferos Sud-Americanos (Vida, Costumbres y Descripcion). Compañia Argentina de Editores (ed.). Soc. de Resp. Ltda., Buenos Aires. 370 pp. (In Spanish.)

Physical description, brief history of the species name. South American records: bahia de Samborombón, Buenos Aires and Paita, Perú.

412. Cadenat, J. 1956. A propos de cachalot. Notes Africaines 71:82-93. (In French.)

462.* Caillet-Bois, T. 1948. Las pseudorcas de Mar del Plata. Rev. Geogr. Americana, año 15, 28(172):5-10.

See notations under Ellis (1982a) - citation No. 16, and Langguth (1987) - citation No. 169.

463.* Caldwell, D.K. and D.H. Brown. 1964. Tooth wear as a correlate of described feeding behaviour by the killer whale with notes on a captive specimen. Bull. Soc. Calif. Acad. Sci. 63(3):128-140.

See notations under Ross (1984) - citation No. 74.

464.* Caldwell, M.C. and D.K. Caldwell. 1966. Epimeletic (care-giving) behavior in Cetacea. *In* K.S. Norris (ed.). Whales, dolphins and porpoises. Proc. 1st Intl. Symp. on Cetacean Res., Univ. Calif. Press.

546.+ Caldwell, D.K. and M.C. Caldwell. 1970. Dolphin. Collier's Encyclopedia Vol. 8:322-327.

547.+ Caldwell, D.K. and M.C. Caldwell. 1971a. Dolphins and Porpoises - from romance to research. Toothed Whales in Eastern North Pacific and Arctic Waters. Pacific Search Press, Seattle.

548.+ Caldwell, D.K. and M.C. Caldwell. 1971b. Porpoise fisheries in the southern Caribbean - present utilizations and future potentials. ?:195-206.

465.* Caldwell, D.K. and M.C. Caldwell. 1973. Marine mammals of the eastern Gulf of Mexico. Pp. III-1-1-8 *In* J.I. Jones, R.E. Ring, M.O. Rinkel and R.E. Smith (eds.). A summary of knowledge of the eastern Gulf of Mexico. The State Univ. System Florida, Institute of Oceanography, Gainsville.

See notations under Schmidly and Shane (1973) - citation No. 56.

279. Caldwell, D.K. and M.C. Caldwell. 1974. Marine mammals from the southeastern United States coast: Cape Hatteras to Cape Canaveral. Pp. 704-772 *In* M.H. Roberts, Jr. and others (eds.). A Socio-Economic Environmental Baseline Summary for the South Atlantic Region Between Cape Hatteras, North Carolina and Cape Canaveral, Florida. Vol. III. Chemical and Biochemical Oceanography. Prepared for the Bureau of Land Management under Contract No. EQ4AC007.

States that false killer whale populations are believed to be stable and the species not endangered. Map of records at the following approximate locations: 35°2'N, 75°6'W; 33°N, 79°5'W; 32°N, 81°8'W; 29°2'N, 80°9'W.

146. Caldwell, D.K. and M.C. Caldwell. 1975. Dolphin and small

whale fisheries of the Caribbean and West Indies: occurrence, history and catch statistics with special reference to the lesser Antillean Island of St. Vincent. J. Fish. Res. Board Can. 32(7):1105-1110.

Small harpoon fisheries in the West Indies, especially St. Vincent, take false killer whales and other cetaceans for human consumption. From 1967 - 1974, 24 false killer whales were landed at the port in St. Vincent.

52. Caldwell, D.K. and M.C. Caldwell. 1983. A field guide to marine mammals of the southeastern United States and Caribbean Basin. National Marine Fisheries Service, Miami. 44 pp.

Brief description of morphology, pigmentation and tooth formula. In contrast to other prior descriptions of behavior, these authors state that false killer whales frequently jump clear of the water. They are ferocious feeders and may steal large fish from commercial and sport fishing lines.

98. Caldwell, D.K. and F.B. Golley. 1965. Marine mammals from the coast of Georgia to Cape Hatteras. Journal of the Elisha Mitchell Scientific Society 81(1):24-31.

1930: skull, with lower jaw, was uncovered on Typee Island, Chatham County, Georgia. Specimen is with the Oemler family on Wilmington Island.
1927: South Carolina, skull in Charleston Museum (27.97),
5 Jul 1935: one was killed and washed ashore near Cape Hatteras. Skull and some ribs and vertebrae were sent to North Carolina State Museum.

107. Caldwell, D.K., M.C. Caldwell and C.M. Walker. 1970. Mass and individual strandings of false killer whales, *Pseudorca crassidens*, in Florida. J. Mammal. 51(3):634-636.

11 Jan 1970: 150-175 stranded near Ft. Pierce, FL. Some lived over 24 hours. Repeated efforts to drag animals back to the water only resulted in restrandings. Lengths ranged from 12-15 ft, with males averaging 2-3 ft longer than females. Head and two carcasses were collected for study at University of South Florida, Tampa, and two heads were obtained for the Field Museum of Natural History in Chicago. One head was sent to the Crandon Park Zoo, Miami.
4 Nov 1965: one adult male stranded at Pompano Beach, FL, and was kept alive for a short time at Ocean World in Ft. Lauderdale, where photographs are on file and a cast is on exhibit.
15 Dec 1969: one adult male stranded 5 miles north of Ponce de Leon Inlet, near Daytona beach. Its head and photographs were retained at Marineland of Florida.

12 Jan 1970: a surviving female from above stranding was taken to

Marineland of Florida, where she lived for two days without eating. Autopsy indicated recent parturition.

194. Caldwell, D.K., M.C. Caldwell, W.F. Rathjen and J.R. Sullivan. 1971a. Cetaceans from the Lesser Antillean Island of St. Vincent. Fish. Bull. 69(2):303-312.

Lists cetaceans collected and observed during a "blackfish" or pilot whale fishery around the Lesser Antillean island of St. Vincent. False killer whale records: 10 Sep 1970 - two taken, male and female. Skulls with the Caldwells (SV-1-PC, SV-2-PC); 9 Mar 1969 - three taken. The Caldwells have a few teeth (SV-3-PC); 12 Feb 1969 - five taken; 7 Dec 1969 - seven taken.
Mentions other records near St. Vincent; Aves Island (Miller, 1920); Tobago (Morzer Bruyns, 1968).

51. Caldwell, D.K., M.C. Caldwell and S.G. Zam. 1971b. A preliminary report on some ectoparasites and nasal-sac parasites from small odontocete cetaceans from Florida and Georgia. (published with Defense Documentation Center) Marineland Research Laboratory Technical Report Number 5. 7 pp.

Specimens of the barnacle species *Xenobalanus globicipitus* were attached to the trailing edges of the flippers, flukes and dorsal fin, and occasionally on the dorsal ridge of the tail stock, on one of two stranded animals examined from NE Florida, near Ponce de Leon Inlet, near Daytona Beach.

631. Carcelles, A. 1948. Los cetáceos en las aguas argentinas. Argentina Austral año XX - número 208. Buenos Aires. (In Spanish.)

Este delfínido es el que apareció en cantidad hace dos años in Mar del Plata. The Museo de Buenos Aires exhibits a skeleton that measures 5.20 m long, skull with eight teeth on each upper mandible, nine left lower and eight right lower.

585. Cárdenas, J.C., M.E. Stutzin S., J.A. Oporto B., C. Cabello C. and D. Torres N. 1986. Manual de identificacion de cetaceos Chilenos. World Wildlife Fund/Comite Nacional Pro Defensa de la Fauna y Flora (Chile). Proyecto WH-445 "Cetaceos - Chile". 102 pp. (In Spanish.)

Physical description, dental formula, brief account of distribution. Chilean records: Isla A. Selkirk, archipiélago Juan Fernández.

549.+ Carus, J.V. 1893. Prodromus Faunae Mediterraneae sive Descriptio Animalium Maris Mediterranei Incolarum quam comparata silva rerum quatenus innotuit adiectis locis et

nominibus vulgaribus eorumque auctoribus in commodum Zoologorum. Vol. II, Pars III., Veretebrata. E. Schweizerbartsche Verlagshandlung (E. Koch), Stuttgart.

551.+ Casinos, A. 1980. Los cetaceos del Mediterraneo. Mundo Cientifico 2(16):714-724.

246. Casinos, A. 1984. A propos de l'hybridation intergenerique chez les petits cetaces. ICES working paper, 2 pp. . (unpublished)

Discusses whether evolutive taxonomy or phylogenetic systematics provides a better explanation for intergeneric hybridization in toothed whales. Specifically mentions false killer whale x bottlenose dolphin (*Pseudorca crassidens* x *Tursiops truncatus*) cross.

275. Casinos, A. 1986. La fauna de cetaceos del Caribe sudoriental. Pp. 42-56 *In* Actas de la Primera Reunion de Trabajo de Expertos en Mamiferos Acuaticos de America del Sur (25 al 29 de Junio de 1984). .

Lists false killer whale records. In addition to sightings previously documented, records mentioned include:
Jul 1979 - group of 40 southeast of Cayo Borracha; (Castellanos and Casinos, 1982) - one captured in San Juan de los Cayos, Estado de Falcon, Venezuela, 1975-1976; (Castellanos, in litt.) - one stranded in the Estado de Sucre, Venezuela.

550.+ Casinos, A. and S. Filella. 1975. Primer recull anual (1973) de la comissio de cetologia de la Institucio Catalana D'Historia Natural. But. Inst. Cat. Hist. Nat. 39 (Sec. Zool.,1):5-26.

49. Casinos, A. and J.-R. Vericad. 1976. The cetaceans of the Spanish coasts: a survey. Mammalia 40(2):267-287.

Survey of Mediterranean cetacean records. Records of false killer whales:
August 1930, Marbella (Malaga). No details.
3 Sep 1966, 10 miles off coast between Gibraltar and Marbella; school of about 15 sighted.
16 Mar 1943, Palma de Mallorca (Majorca); taken false killer whale, total length 441 cm, weight 750 kg. Black, lower part of body discolored. Tooth count: LU(8), LL(9), RU(8), RL(9).

466.* Castellanos, H.G. and A. Casinos. 1982. -. Publ. Dept. Zool. Barcelona 7:91-93.

See notation under Casinos (1986) - citation No. 275.

467.* Castello, H.P. and N.M. Gianuca. 1976. Echouage de faux-

orques, *Pseudorca crassidens* (Owen, 1846), sur les cotes l'Etat de Rio Grande do Sul, Bresil. Mammalia 40(4):683-684.

See notations under Langguth (1979) - citation No. 169, and Purves and Pilleri (1978) - citation No. 131.

326. Cave, A.J.E. 1987. The meckelian ossicle of the Odontocete cranium. Inv. on Cet. 20:178-191.

Discusses the meckelian ossicle in the false killer whale and other species.

552.+ Cawthorne, M. 1983. Whale strandings emergency procedures. *In* L. Botham (ed.). Catch 83. New Zealand Ministry of Agriculture and Fisheries.

342. Cawthorn, M.W. 1984. New Zealand progress report on cetacean research May 1982 to May 1983. Rep. int. Whal. Commn 34:213-215.

Includes whale sightings, mostly in the area from 146°-170°W and from 12°-54°S, but also including some from outside the southwest Pacific region. Following are false killer whale sightings: Oct 1982 (14), Dec 1982 (20), Jan 1983 (40).

137. Cawthorn, M.W. and D.E. Gaskin. 1984. Small cetaceans held in captivity in Australia and New Zealand. Rep. int. Whal. Commn 34:613-614.

Reports one captive false killer whale in Queensland, Australia.

48. Clark, A. H. 1945. Animal life of Aleutian Islands. Smithsonian War Background Studies 21:48-54, 75-76.

False killer whales are reported to occur in the Bering Sea. [No details are presented and the supposition is, in our opinion, unwarranted - Eds.].

553.+ Clarke, R. 1981. Whales and dolphins of the Azores and their exploitation. Rep. int. Whal. Commn 31:607-615.

554.+ Coffey, D.J. Dolphins, whales and porpoises. 1977. Macmillan Publ., London. 223 pp.

46. Collet, A. 1981. Biologie du Dauphin commun *Delphinus delphis* L. en Atlantique Nord-Est. These presentee a L'Universite de Poitiers. 156 pp. (In French).

636. Collet, A. and R. Duguy. 1987. French research on cetaceans. Pages 41-44 *In* J.W. Broekema and C. Smeenk (eds.). The European Cetacean Society Report of the 1987 Meeting

Hirtshals, Denmark 26-28 Jan 1987.

Notes two false killer whale strandings in France, one in 1948 and one in 1951.

108. Comrie, L.C. and A.B. Adam. 1938. The female reproductive system and corpora lutea of the false killer whale, *Pseudorca crassidens* Owen. Trans. R. Soc Edinb. 59:521-32.

Nov 1935: 41 stranded at Buddon Ness in the Tay estuary, Forfar, Cornoustie, Scotland. Female reproductive systems and ovaries taken from fetuses and adults are described in detail. Four sexually mature females ranged from 425-450 cm. The smallest of these contained a 109 cm fetus.
(Beebe, 1924): six skeletons were found on the shores of the Galapagos Archipelago.
(West, 1935): a male fetus was taken from a female stranded in Wales.
Also, see notation under Sergeant (1962) - citation No. 210.

555.+ Cope, E.D. 1866. Third contribution to the history of the Balaenidae and Delphinidae. Proc. Acad. Nat. Sci. Philadelphia:293-300.

556.+ Corbet, G.B. 1969. The Identification of British Mammals, Second Edition. The Trustees of the British Museum (Natural History), London. 46 pp.

273. Cornell, L.H. and E.D. Asper. 1976. Further investigation into appropriate cryogenic marking processes for marine mammals. Contract Report for Fiscal Year 1976, Marine Mammal Commission Contract #MM6AC003. 65pp.

Techniques for cryogenically marking marine mammals are evaluated. Includes figure of a 14-day old mark on a false killer whale showing necrosis of marking site tissue.

166. Cornell, L.H. and E.D. Asper. 1981. A census of captive marine mammals in North America. Mammals in the Seas, FAO Vol 3:137-155. (Originally presented at FAO Marine Mammal Consultation Meeting in Bergen, Norway, in August - September 1976.

193 institutions were contacted between 1 July and 20 August 1976; all replied. 97 were classified as zoos with or without aquaria or aquaria principally concerned with displaying marine mammals. There were two false killer whales in aquaria/oceanaria. Both had been in captivity prior to 1972; average longevity has been eight years.

91. Cornell, L.H., E.D. Asper and D.A. Duffield. 1982. Census

up-date: captive marine mammals in North America. Inter. Zoo. Yearbook 22:227-232.

During 1976 and 1979 censuses, there were two false killer whales in North American facilities, average longevity in captivity seven years.

109. Cowley, L.F. 1944. The skull of the false killer dolphin, *Pseudorca crassidens* (Owen). Proc. Zool. Soc. London 114:382-387.

(Matheson and Cowley, 1934): a school stranded on Gower, Glamorganshire, South Wales, in 1934. Two skulls and a fetus were obtained; the skulls are described in detail.
The two skulls, an adult male and a female fetus, are at the National Museum of Wales, Cardiff, specimen number 34.318 1/2. Adult's body length was 12'10", fetus was taken from a 14' female. Both animals had tooth formulas: LU(8), LL(10), RU(8), RL(10), although those of the fetus had not erupted. [It was not stated how the maturity of the "adult male" was determined - Eds.]

557.+ Cuervo, A., J. Hernandez and A. Cadena. 1986. Lista actualizada de los mamiferos de Colombia, anotaciones sobre su distribucion. Caldasia 15(71-75):471-501.

47. Cummings, W.C. and J.F. Fish. 1971. A synopsis of marine animal underwater sounds in eight geographic areas. San Diego, Naval Undersea Center (NUC) Spec. Rep. 94 pp.

False killer whales make both true whistles and clicks. Many of the whistles (usually from 3-12 kHz) are nearly single frequency sounds, with little change in pitch over the 0.5 to 1 sec duration. Clicks are a few msec long with energy from 100 Hz to 100 kHz. Repetition rates may vary over long duration but are regular for short intervals.
False killer whales can occur in herds of 1000 or more. Based on feeding habits, they may dive to about 500 m, but there have been no scientific studies of their diving behavior. "Jumping or breaching is uncommon."

413. Cuni, L.A. 1918. Contribucion al estudio de los mamiferos, ??. Memorias de la Iedad Cubana de Historia Natural "Felipe Poey", Volumen III, 1917-1918:??-??. (In Spanish.)

110. Daciuk, J. 1974. Notas faunisticas y biocologicas de peninsula valdes y Patagonia. XII. Mamiferos colectados y observados en la Peninsula Valdes y zona litoral de Los Golfos San Jose y Nuevo (Provincia de chubut, Republica Argentina). Physis. Sec. C. Buenos Aires 33(86):23-39.

1971: one false killer whale stranded on the west coast of the Golfo Nuevo, near El Doradillo Beach (42°40'S, 64°59'W). Its skull

is at the Museo Provincial de Ciencias Naturales y Oceanografico, Puerto Madryn.

558.+ Dailey, M.D. 1974. Marine mammals. Pp. 12-1 through 12-37 *In* A summary of knowledge of the Southern California Coastal Zone and Offshore Areas. Prepared for Southern California Ocean Studies Consortium, Contract No. 08550-CT4-1.

282. Dammerman, K.W. 1924. On Globicephala and some other Delphinidae from the Indo-Australian Archipelago. Extrait de Treubia V(4):339-352.

Key to species. False killer whale pterygoid bones nearly in contact; intermaxillae of equal breadth throughout.

468.+Daugherty, A.E. 1965. Marine mammals of California. Sacramento: Calif. Dept. Fish and Game. 87 pp.

Same information as in Daugherty (1966 and 1979).

559.+ Daugherty, A.E. 1966. Marine mammals of California. Dept. of Fish and Game, Sacramento, CA. First Edition.

Same information as in Daugherty (1965 and 1979).

216. Daugherty, A.E. 1979. Marine mammals of California. Sacramento: Calif. Dept. Fish and Game. (Third Revision). 61 pp.

Description and brief account of distribution in both the Atlantic and the Pacific Oceans. In the Pacific, it ranges from Puget Sound, WA to Acapulco, Mexico. Newborn calves are reportedly about 6 ft. in length.

333. Davies, J.L. 1963. The antitropical factor in Cetacean speciation. Evolution 17(1):107-116.

Review of the nature of antitropical distribution ("discontinuous distribution on either side of the equator") in the Cetacea. Includes false killer whales on list of monotypic genera which are basically tropical, but extend their range to overlap the range of temperate forms, giving them the largest continuous range of all the Cetacea.

560.+ Davies, J.L. 1963. The whales and seals of Tasmania. Tasmanian Mus. and Art Gallery. 29 pp.

280. Dawbin, W.H. 1974. Cetacea of the South Western Pacific Ocean. FAO/ACMRR, La Jolla.

Mentions records from southwest Pacific. False killer whales have

been captured for oceanaria from a vessel operating in the Gulf of Carpenteria. Teeth and skulls from dolphin hunters in the Solomon Islands indicate that it has been captured in the drive fisheries in this area.

314. Dawbin, W.H. 1986. Marine mammal research by the Australian Museum. Pp. 51-52 *In* P.D. Shaughnessy (ed.). Report of CSIRO Marine Mammal Workshop. CSIRO Division of Wildlife and Rangelands Research Technical Memorandum No. 26, December 1986.

At the Australian Museum, there are heads and skeletal materials from 27 of the false killer whales stranded at Crowdy Head in 1985. Gonads from 25 of the whales showed that of the 12 males, two were immature and ten mature; of 13 females, two were immature and 11 mature. Of these 11, three were pregnant, two possibly lactating, two approaching ovulation and five "resting". [Lengths were not stated - Eds.]

469.* Dawson, F.M. 1911. Report for the Trivandrum Museum for the years A.D. 1904-1909 :2-3.

See notation under Kuthalingam and Venkaturamanujam (1981) - citation No. 8, and Jones (1976) - citation No. 201.

75.+ Dawson, S. 1985. The New Zealand Whale and Dolphin Digest. The Official Project Jonah Guidebook. Brick Row Publishing. 130 pp.

24. De Bruin, G.H.P. 1972. Stranded whales. Loris 12(5):247-298.

Describes cetacean strandings and possible causes. "Out of a group of 167 *Pseudorca* that stranded themselves at Kayts some of them gave birth to young." [probably in Aug. 1929, date fide Deraniyagala 1945a - Eds.]

199. Defran, R.H. and K. Pryor. 1980. The behavior and training of cetaceans in captivity. Pp. 319-362 *In*: L.M. Herman (ed.). Cetacean behavior: Mechanisms and Processes. John Wiley and Sons, Inc., New York. 463 pp.

Behavior and trainability of various species of captive cetaceans are reviewed. New data presented are based on surveys of cetacean trainers and researchers. False killer whales were among the most manipulative, playful and curious of all cetaceans held in captivity, and were as easy or easier to train than bottlenose dolphins.
(Pryor, 1973): a young false killer whale cooperated with a bottlenose dolphin to remove a partition between them. The same false killer whale pinned to the tank wall for several minutes a diver who had been teasing it.

(Norris, 1967): some individuals become sufficiently aggressive in captivity that trainers cannot enter the tank.

183. Defran, R.H., W.A. Williams, W. Mauer, A. Marootian, M. Taylor, M. Martin and D. Dowe. 1985. The behavior of *Pseudorca crassidens*, *Globicephala macrorhynchus* and *Lagenorhynchus obliquidens* in captivity - a comparative analysis. *In* Sixth Biennial Conf. Biol. Mar. Mamm. Vancouver, B.C., Canada, November 22-26, 1985 Abstracts.

Ethograms were constructed on three species of cetaceans after 90 hours of observation on each. False killer whale: 47% time spent swimming, 40% swimming in unison, 9% in affiliative behaviors.

386. Deinse, A.B. van. 1946. Recente Cetacea van Nederland van 1931 tot en met 1944. Zoologische Ededeelingen Gegeven Door Het Rijksmuseum van Natuurlijke Historie Te Leiden 26, 139-210. (In Dutch.)

See notations under van Bree (1977) - citation No. 270, and Tomilin (1967) - citation No. 144.

292. Dekeyser, P.L. 1955. Ordre des cetaces. Chapitre VI *In* Les Mammiferes de L'Afrique Noire Francaise, Initiations Africaines I. Second Edition. I.F.A.N., Dakar. (In French.)

Brief physical description of the false killer whale.

308. Delyamure, S.L. 1961. The necessity for a thorough and systematic investigation of commercial sea mammal parasites. Pp. 39-56 *In* Sea Mammal Ecology and Trade - USSR -. U.S. Department of Commerce, Office of Technical Services, Joint Publications Research Service, Washington. [Translation of article originally published in Russian as Pp. 222-232 *In* Ye. N. Pavlovskiy and S. Ye. Kleynenberg (eds.). Trudy Soveschaniya po ekologii i promyslu morskikh mlekopitayushchikh. (Proceedings of the Conference on Sea Mammal Ecology and Trade). Proceedings of Conferences of the Ichthyology Committee, USSR Academy of Sciences, Moscow, 1961 Vol. 12.]

Lists one of the parasites found in false killer whales in the Okhotsk Sea. [The name was unreadable in the copy we had available - Eds.]

23. Deraniyagala, P. 1945a. Some southern temperate zone snakes, birds and whales that enter the Ceylon area. Spolia Zeylanica. Vol. 29, Part 1. 83 pp.

False killer whale strandings around Ceylon (Sri Lanka):

3 Aug 1929. 167 stranded at Kayts.
10 Nov 1934, 97 stranded at Muthur, Ceylon.
30 Sep 1939, one stranded at Godavaya in the southern province; its skull is in the Colombo Museum. The author lists this animal as *Pseudorca crassidens meridionalis* Flower (Southern false killer whale).

31. Deraniyagala, P. 1945b. Some odontoceti from Ceylon. Spolia Zeylanica 24(2):113-120.

The author distinguishes "the Indo-Pacific false killer whale", *Pseudorca crassidens meridionalis*, from the "forma typica", by its more convex snout and color. He describes it as having: an overshot, subconical snout, strongly convex in front of the blow hole; an oblique gape ending anterior to eye; tongue with fimbriate margin; blowhole slightly anterior to vertical plane through eye which is set in a lateral prominence with two folds above and below it; body elongate; a strongly compressed tail with a strong dorsal ridge; the flipper located at about its own length behind gape and narrowing suddenly near its tip, which is curved anteriorly; dorsal fin falcate at approximately mid-back, but its position is somewhat variable; the fluke lobes so close together that the caudal notch is indistinguishable; two umbilical grooves on each side, one longer than the other; slate black in color, with a gray chest.

Males reach about 16 ft, females about 9 ft.

The blow appears as simultaneous mist and spray, and the sound is audible for about 100 m.

Strandings - each of the three times false killer whales have stranded on the Ceylon coast (See Derinayagala 1945a), local fishermen repeatedly towed the animals out to sea, but they always restranded. All stranded animals were in good condition and unaffected by parasites. Stomachs of individuals that died 4-8 days after stranding contained "cuttlefish" beaks.

There is a detailed account of the 10 Nov 1934 stranding, along with measurements of three whales. Sexes were not identified and total lengths were not given.

332. Di Natale, A. 1979. Project Cetacea annual report I) 1978-1979. Mem. Biol. Mar. Ocean 9(1):1-23. (In Italian.)

Project studied biology, ecology, and ethology of several species and discussed conservation strategies. False killer whales occur in the Italian seas; there is one record from Catture.

70. Di Natale, A. and A. Mangano. 1981. Memorie di biologia marina e di ocenaografia. Mem. Biol. Mar. Ocean, XI. Suppl. Spec.:49 pp.

Report of "Project Cetacea":
During the period Jul 1978 to Oct 1981, there is one record of two false killer whales being caught by drifting long lines off the northeast coast of the southern tip of Italy, approximately 38°5'N 15°5'E.

72. Di Natale, A. and A. Mangano. 1983. Killer whale, *Orcinus orca* (Linnaeus) and false killer whale, *Pseudorca crassidens* Owen, in the Italian seas. Rapp P.-V. Reun. Ciesm. 28(5):181-182.

Records of false killer whales from Italy:
A specimen was killed and photographed in 1925 near Catona in the Jonian Sea (Calabrian coast).

470.* Donnelley, T. 1937. Hooking a killer whale. Pleasure 1(1):40-41.

See notation under Bullis and Moore (1956) - citation No. 106.

208. Donoso-Barros, R. 1975. Contribucion al conocimiento de los cetaceos vivientes y fosiles del territorio de Chile. Gayana Instituto de Biologia, Universidad de Concepcion Chile. Zoologia No. 36. 127 pp. (In Spanish.)

Documents living and fossil cetaceans from Chile. Lists historical records of cetaceans now considered to be false killer whales: 1846, *Phocaena crassidens* Owen, Lincolnshire Fens; 1865, *Orca meridionalis* Flower, Tasmania; 1866, *Orca destructor* Cope, Payta, Peru; 1867, *Globicephalus grayi* Burmeister, Buenos Aires; 1882, *Pseudorca? mediterranea* Giglioli, Mediterranean. There are few records from the coast of South America. The only well documented account from the Chilean coast is that in Oliver-Schneider (1946) of a skull from a stranding in Trauco, Llico, Costa de Arauco.

136. Donovan, G.P. 1984. Small cetaceans seen during the IWC/IDCR research cruise in the eastern tropical Pacific, and in particular off Peru. Rep. int. Whal. Commn 34:561-567.

Sighting data for IWC/IDCR research programme for Bryde's whales in the eastern tropical Pacific, 12 Nov - 11 Dec 1982. Eight herds of P. crass were seen, five between 2°N-6°S, 95°-101°W and three around 6°N, 127°S. Sightings were of 1-20 animals (plotted in Fig 2D).

111. Dudok Van Heel, W.H. 1962. Sound and cetacea. Neth. J. Sea Res. 1(4):407-507.

Theories are presented regarding causes of mass stranding in cetaceans. Those that specifically mention false killer whales include:
(Green, 1945): they are trying to find a prehistoric strait.
(Fraser, 1936): the inflow of Atlantic water into the North Sea

since 1930 might have brought them into the shallows of the eastern coasts of England and Scotland. He also suggests that pelagic species easily strand when close to shore.

Strandings mentioned in the paper include:
(Deraniyagala, 1945a): 10 Nov 1934, 97 stranded near the 4th ferry from Trincomalee to Batticola, Muthur Estuary, Koddiyar Bay, Ceylon (Sri Lanka).
(Fraser, 1934): 21 Oct 1927, 127 stranded between Edderton and Bonar Bridge, Dornoch Firth, Sutherlandshire, Scotland.
(Anonymous, 1934): 2 Dec 1933, 54 stranded on Mtoni beach, north of Zanzibar.
(Matheson and Cowley, 1934): 6 May 1934, group of 21 stranded on the northeast side of Whiteford Point near Llanmadoc, Clamorgan, Wales; 7 May 1934, group of 2 stranded at Burry Port, Carmarthen, Wales
(Birkby, 1935): 19 Nov 1935, 200-300 stranded at The Grotto near Mamre, Darling District, South Africa. These animals came ashore at a run, making determined efforts to strand themselves.
(Fraser, 1946): 16 Nov 1935, group of 11 stranded 2° NNW of Donna Nook, Lincolnshire, Norfolk, England; 16 Nov 1935, group of 8 stranded at Wootton Creek near King's Lynn, Norfolk, England; 27 Nov 1935, 7 stranded near Kinkell, Fife, Scotland; 27 Nov 1935, 41 stranded at Barry Sands, Forfar, Scotland; 28 Nov 1935, one stranded at Belhaven Sands near Dunbar, East Lothian, Scotland; 28 Nov 1935, one stranded at Tynnigham near Dunbar, East Lothian, Scotland.
(Pearson, 1936): Jun 1936, a herd stranded at Stanley, northwestern Tasmania.
(Smithers, 1938): 27 Dec 1936: 58 stranded at St. Helena Bay, near the mouth of the Berg River, South Africa.
(Talbot, pers. comm. 1960): 19 Aug 1958, group of 4 stranded at Die Kelders S of Stanford Cove, Walker Bay, South Africa, on an offshore bank in 2 fathoms.

330. Duffield, D. 1986. *Orcinus orca*: taxonomy, evolution, cytogenetics and population structure. Pp. 19-33 *In* Kirkevold, B.C. and J.S. Lockard (eds.). Behavioral Biology of Killer Whales. Alan R. Liss, Inc., New York. 457 pp.

The false killer whale is more karyotypically conservative than but closely related anatomically to the killer whale *Orcinus orca*.

304. Duffield, D.A., J. Chamberlin-Lea, J. Sweeney, D.K. Odell, E.D. Asper and W.G. Gilmartin. 1988. Use of corneal cell culture for r-band chromosome studies on stranded cetaceans. Draft manuscript.

R-band karyotypes were prepared for specimens of four cetacean species including the false killer whale; descriptions and figures are given.

233. Duffield, D., M. Sparkes, R. Sparkes, E. Asper and L. Cornell. 1979. Physiological differences of polymorphic hemoglobins in the Cetacea. Third Biennial Conf. of the Biology of Marine Mammals. Seattle, WA. Abstract p. 15.

Polymorphic hemoglobins of various cetaceans are briefly discussed. Hemoglobin polymorphisms are demonstrated by electrophoresis; in the false killer whale they are detectible as discrete differences in the relative proportions of electrophoretic moieties common to all individuals of the species.

561.+ Duguy, R. 1974. Contribution a l'etude des mammiferes marins de la cote nord-oest Afrique. Rev. Trav. Inst. Peches marit., 39(3):321-332.

562. Duguy, R. 1978. Les Cetaces du bassin occidental de la Mediterranee. Observatoire de la Mer. Bull. 3:38-41. (In French.)

43. Duguy, de R. 1983. Les cetaces des cotes de France. Ann. de la Societe des Sci. Nat. de la Charente. 112 pp. (In French.)

Records of sightings from France: There have only been two reports; both from the Mediterranean. The first was south of the western Pyrenees; the second did not indicate a precise location but a specimen is preserved in the Museum of Lille collection. There have been only two new observations since 1901, one from the Port-de-Bouc (Bouches-du-Rhone) in 1948, and one from Levant (Var) in 1951.

563.+ Duguy, R. 1983. Repartition et frequence des cetaces sur les cotes de France. ICES working paper C.M. 1983/N:5.

471.* Duguy, R. and J.-L. Cyrus. 1976. Catalogue des Mammiferes marins conserves au Museum de Marseille. Bull. Mus. Hist. nat. Marseille 36:37-39.

45. Duguy, R. and R. Defretin. 1979. Catalogue des collections de mammiferes marins du Musee d'Histoire Naturelle de Lille. Ann. Soc. Sci. nat. Charente-Maritime 6(6):475-481. (In French).

Mounted skeleton of a false killer whale in the Musee D'Histoire Naturelle de Lille: Sex unknown, 410 cm total length. Specimen is from the Mediterranean. Tooth count: LU(10), LL(8), RU(9), RL(8).

172. Duguy, R. and D. Robineau. 1973. Cétacés et phoques des côtes de France guide d'identification. Annales de la Societe des Sciences Naturelles de la Charente-Maritime. (Supplément, juin 1973). 93 pp.

Brief, general description of morphology, pigmentation, distribution and tooth formula. Considered rare along the coast of France; there have been only four pods reported from this area, all in the Mediterranean.

42. Duguy, R., A. Casinos, A. Di Natale, S. Filella, F. Ktari-Chakroun, R. Lloze and D. Marchessaux. 1979. Repartition et frequence des Mammiferes marins en Mediterranee Rapport de synthese du groupe de travail sur Mammiferes marins. C.I.E.S.M. Metting of Timis. 6 pp. (In French).

44. Duguy, R., J. Besson, A. Casinos, A. Di Natale, S. Filella, A. Raduan, J. Raga and D. Viale. 1982a. L'Impact des activities humaines sur les cetaces de la Mediterranee occidentale. C.I.E.S.M. Monaco. 2-11 Decembre 1982. 5 pp. (In French).

False killer whales are relatively rare in the Mediterranean, so they are rarely taken.

171. Duguy, R. and D. Robineau. 1982b. Guide des Mammiferes marins d'Europe. Delachaux & Niestle S.A. (ed.). 200 pp. (In French.)

Morphological description of males and females, teeth and tooth formulae and pigmentation. Distribution: Mediterranean strandings have been reported from the coasts of Spain, France and Italy; rare in the North Sea; has been found on the coasts of Holland, Germany, Denmark, and in the Baltic Sea. The most northern observations are strandings on the west coast of Scotland. The only stranding mentioned on the Atlantic coast of continental Europe was from Portugal. Mention of biology, behavior and identification at sea.

245. Duguy, R., A. Casinos, A. Di Natale, S. Filella, F. Ktari-Chakroun, R. Lloze and D. Marchessaux. 1983. Repartition et frequence des mammiferes marins en Mediterranee. Rapp. Comm. int. Mer Medit. 28(5):223-230. (In French).

The false killer whale is known in this area from very rare observations; there are 3 old records from France, more recently in Spain (Malaga and Mallorca), near the coast of Sicily, and on the Egyptian coast in the Nile delta. Observations at sea in the area next to Gibraltar show that this species penetrates into the Mediterranean, but its occurrence there is unusual.

415. Duguy, R. and D. Robineau, Eds. 1986. *Lagenodelphis hosei*, Fraser 1956. Draft prepared for "Handbuch der Saaugetiere Europas, Vol. 6 (Marine Mammals)". Aula-Verlag, Wiesbaden (FRG). (In French.)

564.+ Dupuy, A.R. and J. Maigret. 1976. Les Mammiferes marins des

cotes du Senegal. 1. Bilan des observations signalees entre 1960 et 1976. Bulletin de l'I.F.A.N. T. 38, ser A, no. 4:921-928.

367.* Edmunds, S.J. 1987. A note on the occurrence of *Bolbosoma capitatum* Linstow 1880 Acanthocephala from a false killer whale stranded on the coast of western Australia. Rec. West. Aust. Mus. 13(2):317-318.

565.+ Ellerman, J.R. and T.C.S. Morrison-Scott. 1966. Checklist of palaearctic and Indian mammals 1758 to 1946. British Museum (Nat. Hist.) Second Edition. 810 pp.

566.+ Ellerman, J.R., T.C.S. Morrison-Scott, and R.W. Hayman. [Date unknown]. Southern African Mammals 1758-1951: A Reclassification. British Museum, London. 363 pp.

287. Elliot, D.G. 1901. Synopsis of the mammals of North America and the adjacent seas. Columbian Field Museum Zoological Series, Vol. II, Publ. #45. 471 pp.

Skull description, notes on morphology, distribution.

165. Elliot, D.G. 1904. The land and sea mammals of middle America and the West Indies. Zool. Series Part 1. Vol. IV. 51-51 p.

Description of the false killer whale, with skull measurements. States that they are inoffensive and gentle and can easily be driven ashore due to their tendency to blindly follow a leader. Flesh is reported to be palatable. They yield little oil.

16. Ellis, R. 1982a. Marine mammals. Whalewatcher. 26 pp.

Brief general description. In 1946, 835 Pseudorca stranded at Mar del Plata, Argentina; this was the largest recorded stranding for any cetacean (Caillet-Bois, 1948). The skull is similar to that of the killer whale, hence its name. (The author also states, incorrectly, that teeth of the two species are similar - Eds.)

157. Ellis, R. 1982b. Dolphins and Porpoises. Alfred A. Knopf, New York. 270 pp.

On Pp. 149-165, detailed description of the false killer whale, including sighting and stranding records, behavioral observations, distribution, feeding, records in captivity.
(Prescott, 1981): Swifty, a captive false killer whale, learned tricks taught other cetaceans by watching and mimicking. She learned a backflip this way, and spontaneously performed it. She also "took over" for a pilot whale, Bubbles, who after the opening performance refused to participate in the show. Swifty swam over

to Bubbles' position and accepted all the cues for her performance. More than half the behaviors had never been performed by or asked of Swifty.
There were 43 taken in Japan (direct take) in 1985.

567.+ Engelsma, F.J. 1987. Observations on a wild bottlenose dolphin while recording sonar sounds. Seventh Biennial Conf. Biol. Mar. Mamm. Miami, Fl. Abstract p. 19.

41. Evans, P.G.H. 1976. Guide to identification of cetaceans in British waters, a key to whales, dolphins and porpoises. The Mammal Society. 13 pp.

The dorsal fin is approximately mid-length of the body, medium height, with the point of the fin almost upright and very little curve in its anterior edge.

371.+ Evans, P.G.H. 1980. Cetaceans in British waters. Mammal Rev. 10(1):1-52.

Contains no information not also in Evans (1976 and/or 1987a,b).

15. Evans, P.G.H. 1987a. The Natural History of Whales and Dolphins. Oxford. Facts on File. 343 pp.

At maturity, false killer whales are 4.5-5.5m, males larger than females. They are black in color with a blaze of gray varying from indistinct to nearly white on the belly between the flippers, which are narrow and tapered and broadly humped near the middle of the front margin. There may be light gray areas on the sides of the face. The body is long and slender with a small, slender, tapered head and an underslung jaw. The dorsal fin, just behind the midpoint of the back, is tall and sickle-shaped, varying from rounded to sharply pointed.
They are found in offshore waters of tropical and warm temperate Pacific, Atlantic and Indian oceans, ranging from Japan to Alaska (rarely north of southern California) south to New Zealand and Peru in the Pacific, and from Maryland and Norway (though rare north of SW British approaches) to northern Argentina and south of the tip of southern Africa in the Atlantic; and from the Red Sea south to the southern tip of South Africa and New Zealand in the Indian Ocean. Population size unknown.

313. Evans, P.G.H. 1987b. Cetaceans in U.K. waters. *In* Broekema, J.W. and C. Smeenk (eds.). The European Cetacean Society Report of the 1987 Meeting Hirtshals, Denmark. ECS Newsletter no. 1:45-46.

The false killer whale is one of the rarer species that has been sighted in U.K. waters since 1965; it has been seen primarily off the Atlantic coast.

40. Evans, W.E. and F.T. Awbrey. In Press. Natural history aspects of marine mammal echolocation: feeding strategies and habitat. Pp. 521-534 *In* P.E. Nachtigall (ed.). Animal Sonar Systems. NATÓ ASI Series Vol. 156. Plenum Press, New York. 851 pp.

Experimental verification of echolocation and measurement or re-measurement of hearing has been accomplished for the false killer whale, and it can detect the presence or absence of a 7.5 cm diameter water-filled steel sphere behind a visually opaque, acoustically transparent screen (Thomas et al., 1986).

False killer whales feed during both day and night, mainly on fast-swimming schooling fish like sardines, small tunas and mackerel. The cervical vertebrae are fused; so, they cannot turn their heads.

405. Evans, W.E. and D.A. Duffield. 1983. Living cetaceans on display: their impact on public awareness. WA/SP/CZ. 9pp.

Updates census data indicating that by 1983 only one of two false killer whales alive in 1981 (Cornell and Asper, 1981) still survived. Average longevity was over seven years.

256. Evans, W.E., J.R. Jehl, Jr. and F.H. Wolfson. 1979. Current studies on distribution and abundance of cetaceans in Venezuela. Working Paper #13. (Unpublished.)

The authors state that they have established the presence of false killer whales in waters off Venezuela, but no records are presented.

568.+ Farenc, P. 1982. Les cetaces en Mediteranee. These pour le Doctorat Veterinaire (Diplome d'Etat) Presentee et soutenue publiquement en 1982 devant l'Universite Paul Sabatier de Toulouse. Ecole Natinale Veterinaire de Toulouse.

472.* Ferguson, H.S. and R. Lydekker. 1903-1904. On two cetaceans from Travancore. J. Bombay Nat. Hist. Soc. 15:38-41.

See notation under Pilleri and Gihr (1969) - citation No. 428.

185. Fernandez, S. and R. Tarpley. 1987. Cetacean strandings along the Texas coast. Seventh Biennial Conf. Biol. Mar. Mamm. Miami, Fl. Abstracts:22.

From October 1980 through May 1987, the Texas Marine Mammal Stranding Network documented a total of 501 cetacean strandings, including 1 false killer whale, which represented 0.2% of the total number of cetaceans stranded on the Texas coast.

237. Ferrarro, R.F., M.P. Spencer and J. Klepper. 1983. The collaboration of a digital signal processing facility and a cetacean society for whale and dolphin vocal analysis. Fifth Biennial Conference on the Biology of Marine Mammals, November 27-December 1, 1983, Boston, Massachusetts, Abstracts.

The Institute of Applied Physiology and Medicine is collaborating with the Moclips Cetological Society in a facility currently involved with hydrophone comparisons, environmentalized electronic design, high speed digital data acquisition and real time color spectral analysis and synthesis of cetacean vocalizations, including those of the false killer whale.

473.* Ferreira-Vaz, R. 1969. Fauna conservacion y recursos. Ed. Nuestra Tierra, Montevideo. 60 pp.

See notation under Pilleri (1977) - citation No. 320.

177. Filella, S. and J. Xampeny. 1974. La comision de cetologia en el seno de la Institucio Catalana d'Historia Natural. Imm. y Ciencia 7(1):30. (In French.)

271. Fiscus, C.H. 1977. Trip report: voyage to Laysan Island, February-March 1977. A part of the joint NMFS-FWS 1977 monk seal (*Monachus schauinslandi*) research program.

During a voyage from Honolulu to Laysan Island and return, there was one sighting of 15 false killer whales: 19 Feb 1977, 21.49N, 159.06W, in the Kauai Channel.

259. Fiscus, C.H. 1979. Interactions of marine mammals and Pacific hake. Marine Fisheries Review 41(10):1-9.

False killer whales occur within the Pacific hake range (northeastern north Pacific), but there are no estimates of their population sizes and it is not known whether they prey on hake.

89. Fiscus, C.H. and K. Niggol. 1965. Observations of cetaceans off California, Oregon and Washington. U.S. Fish and Wildlife Service, Fisheries Special Scientific Report No. 498: 27 pp.

Cetaceans were observed from survey vessels operating off the west coast of the US between Cortes Bank, CA and Cape Flattery, WA during winter/spring of 58-61. Records of false killer whales: 13 Mar 1958, 2 seen 18 miles SW of Point Sur, (36°04'N, 122°07'W); 8 Apr 1961, 2 seen 20 miles W of Humboldt Bay (40°47'N, 124°41'W).

387. Flower, W.H. 1864. On a new species of grampus (*Orca meridionalis*) from Tasmania. Proc. Zool. Soc. London:420-426.

Two skulls donated to the Museum of the Royal College of Surgeons

by Mr. W.L. Crowther were examined. They resembled a skull found in Lincolnshire and described by Professor Owen under the name *Phocaena crassidens*. The skulls are measured, diagrammed and described in detail. Skull and body descriptions are compared to those of other specimens of various names, including *Orca crassidens* and *Pseudorca crassidens;* the author finally suggests that it is a new species and names it *Orca (Pseudorca?) meridionalis*.

388. Flower, W.H. 1865. Note on *Pseudorca meridionalis*. Proc. Zool. Soc. London:470-471.

The physical description of the animals mentioned in Flower (1864) actually applied to an animal of the genus *Globicephalus*. The author agrees with Professor Reinhardt that *Pseudorca* is a distinctly characterized genus intermediate between *Grampus* and *Orca*. The skulls previously described should probably be classified as *Pseudorca crassidens*.

307. Flower, W.H. 1883. On the characters and divisions of the family *Delphinidae*. Proc. Zool. Soc. 32:466-513.

Description of body and skeleton. Geographical notes, records of Lincolnshire Fen fossil, strandings described by Reinhardt and skulls from Tasmania.

474.* Flower, W.H. and J.G. Gearson. 1884. Class Mammalia, other than man. Part 2 *In* W.H. Flower (ed.). Catalogue of the Specimens Illustrating the Osteology and Dentition of Vertebrated Animals, Recent and Extinct Contained in the Museum of the Royal College of Surgeons, Royal College of Surgeons, London.

See notation under Nicol (1986) - citation No. 315.

230. Fraser, F.C. 1934. Report on Cetacea stranded on the British coasts from 1927-1932. Brit. Mus. (Nat. Hist.). No. 11. 41 pp.

Reports of false killer whale strandings include the Dornoch Firth, Scotland (Sutherland County) stranding, and two subsequent strandings that the author assumes were animals from the Dornoch stranding which had been washed back out to sea and redeposited on shore, one at Banff on 27 Nov 1927 and one (17'6") at Tarbot Ness on 7 Nov 1927. A 14'2 1/2" cast was made of one of the Dornoch Firth animals.

389. Fraser, F.C. 1936. Recent strandings of the false killer whale, *Pseudorca crassidens*, with special reference to those found at Donna Nook, Lincolnshire. Scottish Naturalist July-August,

1936:105-114.

Account of false killer whale strandings worldwide. Suggests that reports of stranded "black fish, *Globicephala*", were actually false killer whales. Strandings mentioned include: 9 Sep 1935, one, Baia de Sines, Portugal (originally reported by Nobre as *Globicephala melaena*, but photographs showed them to be false killer whales); Oct 1927, Dornoch Firth; May 1934, Glamorgan; 16 Oct 1935, Donna Nook, Lincolnshire, 11 animals; 18 Oct 1934, Wootton Creek, King's Lynn, Norfolk, 8 animals; 18 Oct 1935, Hornsea, Yorkshire, 1 animal; 27 Oct 1935, Carnoustie, Forfarshire, 41 animals; 27 Oct 1935, Ferryden, Montrose, Angus, 1 animal; 27 Oct 1935, Kinkell, Fifeshire, 7 animals; 28 Oct 1935, Belhaven, East Lothian, 2 animals; 2 Dec 1935, Donna Nook, Lincolnshire, 1 animal; 3 Dec 1935, Berwick, Northumberland, 1 animal; 5 Dec 1935, Beal, Northumberland, 1 animal; 10 Dec 1935, Port Edgar, South Queensferry, Linlithgowshire, 1 animal. Roughly equal proportions of males and females. Tooth formulae described from Donna Nook specimens. Parasitic worms were not abundant except for one large male whose gut was heavily infested with the Echinorhynch *Bolbosoma capitatum*. Reproductive organs of nine of the Donna Nook specimens were examined and results are included in a table.

231. Fraser, F.C. 1946. Report on cetacea stranded on the British coasts from 1933-1937. Brit. Mus. (Nat. Hist.) 12:56 pp. + 7 maps.

Reports of false killer whales include measurements of animals stranded at Carmarthen, Glamorgan, Lincolnshire, Norfolk, Yorkshire and Forfar Counties in 1934 and 1935. Dutch coast strandings are mentioned. In Nov 1937, a caudal vertebra was unearthed in the Thames Gravel 40-50' below the surface on the site of the New Scotland Yard extension, and was deposited in the Scotland Yard Museum. Strandings are documented in Table 1 of this publication.

149. Fraser, F.C. 1948. Part II Whales and dolphins. Pp. 203-375 *In* J.R. Norman and F.C. Fraser (eds.). Giant fishes, whales and dolphins. Putnum Press, London. 376 pp.

Information on false killer whales include physical description, stranding records (listed elsewhere in this bibliography with original sources), behavior, feeding habits, size range of fetuses taken from strandings. All information previously cited (e.g., in Fraser 1936, 1946).

569.+ Fraser, F.C. 1955. The dolphin family. Zoo Life 10(3):74-78.

17. Fraser, F.C. 1966. Guide for the Identification and reporting of stranded whales, dolphins and porpoises on the British coasts. The British Museum, (Natural History) London.

Edition 3. 34 pp. (Published in five editions - 1949, 1953, 1966, 1969, 1976; information for this species is essentially identical in all editions.)

The flippers of the false killer whale are about 1/10 of the body length, distinguishing it from the pilot whale in which the proportion is 1/5. There are 9-11 teeth in each side of each jaw, with a base diameter of up to one inch, circular in cross-section. The false killer whale was originally described by Sir Richard Owen from a sub-fossil found in the Cambridgeshire fens in 1846. The first records from Britain were from 1927, when a school of about 150 stranded in the Dornoch Firth, Sutherlandshire, Scotland. Smaller numbers were subsequently reported stranding in 1934 and 1935.

573.+ Fraser, F.C. 1971. Scientific value of the 'Fishes Royal'. The Times. January 23, 1971.

631. Fraser, F.C. 1977. Royal fishes: the importance of the dolphin. Pp. 1-44 *In* R.J. Harrison (ed.). Functional Anatomy of Marine Mammals. Volume 3. Academic Press, London, New York, San Francisco. 428 pp.

Discusses human interest in cetaceans from early history to the present, and discusses the benefit to cetologists of the "royal prerogative" where whales and dolphins are concerned, including rights to specimens. Includes stranding records of British cetaceans; all those mentioned for the false killer whale are included elsewhere in this bibliography with original sources. Mentions that The Whale Hall in the British Museum (Natural History) includes casts of animals that have stranded on the British coast, including one of a false killer whale.

475. Fraser, F.C. and P.E. Purves. 1960. Hearing in cetaceans: evolution of the accessory air sacs and the structure and function of the outer and middle ear in recent cetaceans. Bull. Brit. Mus. (Nat. Hist.) 7(1):1-140, plates 1-53.

An in-depth treatment of anatomy, physiology and capabilities of hearing in cetaceans, including some information on false killer whales.

476.* Fujian Institute of Fishery Science. 1960. Findings report of the dolphins from the coastal waters of Fujian Province. In Chinese.

163. Gallagher, M. In Press. List of cetacean specimens at the Natural History Museum of Oman. *In* S. Leatherwood and G. Donovan (eds.). Cetaceans and cetacean research in the Indian Ocean Sanctuary. Nairobi. UNEP.

Catalogues cetacean specimens from Oman and Bahrain at the Natural History Museum of Oman. Three false killer whale records; 1 Aug 1977, 1 Oct 1982, 4 Apr 1987.

26. Gamage, A.C. 1984. A survey of literature on natural history of marine mammals of the Indian Ocean. National Aquatic Resources Agency. Colombo. (unpublished annotated bibliography).

(Silas and Pillay, 1960): Two false killer whales, male and female, stranded at Pozhikara, north of Cape Comorin, India. Gamage states that this paper gives various body measurements.

400. Garrood, J.R. 1924. Two skeletons of the cetacean *Pseudorca crassidens* from Thorney Fen. Proceedings of the Zoological Society of London:177-193.

Lists past records of false killer whales and describes two new skeletons dug up towards the end of 1921 on Bassenhally Moor, a part of the Cambridgeshire fens between Whittlesea and Thorney. Length was about 14 feet. Includes detailed descriptions of all bones, tooth formulae.

88. Gaskin, D.E. 1967. The whaling potential of the New Zealand Sub-region. N.Z. Mar. Fish. Tech. Rept. No. 16. 28 pp.

False killer whales are of no interest to standard whaling operations in New Zealand.

87. Gaskin, D.E. 1968. The New Zealand Cetacea. Fish. Res. Bull. No. 1:91.

Biology and distribution of cetaceans around New Zealand are discussed.
(Norris and Prescott, 1961): a herd of about 300 animals, varying in length from 5 to 10 ft., was seen off the coast of California in 1959.
(Norman and Fraser, 1937): can attain lengths of 18 ft.
New Zealand strandings:
18 Jan 1870: one animal in Lyall Bay, skull is in the Dominion Museum (Hector, 1973b; Oliver, 1922a,b).
Mar 1906: group of 100 on the Chatham Islands (Oliver, 1922a,b).
1932: one animal on the Chatham Islands (Dom. Mus. stranding file).
May 1933: one animal on the Awatere River (Dom. Mus. str. file).
17 Jun 1936: 29 animals, males and females, at Napier (Dom. Mus. str. file).
8 Apr 1943: one animal at Opoutama (Dom. Mus. str. file).
23 Jul 1962: group of 19 animals, males and females, at Warrington (Marine Dept. stranding file).

215. Gaskin, D.E. 1971. Distribution of beaked whales (Cetacea: Ziphiidae) off southern New Zealand. New Zealand Jour. of Mar. Freshwater Res. 5(2):318-325.

The blackish color, bulbous beakless head and "plunging" swimming motion of the false killer whale are characteristic and distinguishable at distances of even a mile or more.

574.+ Gaskin, D.E. 1976. The evolution, zoogeography and ecology of Cetacea. H. Barnes (ed.). Oceanogr. Mar. Biol. Ann. Rev. 14:247-346.

355. Geise, L. and M. Borobia. 1988. On the occurrence of cetaceans along the coast of the state of Rio de Janeiro Brazil between 1968 and 1984. Rev. Bras. Zool. 4(4):341-346. (Abstract.)

Summary of newspaper archives and personal observations of cetaceans along the coast of Rio de Janiero 1968-1984. Most of the sightings took place in August. False killer whales were observed.

477.* Gervais, P. 1849. Zoologie et paleontologie francaises (animaux vertebres) ou nouvelles recherches sur les animaux vivants et fossiles de la France. Paris, Bertrand.

478.* Gervais, P. 1849. Zoologie et paleontologie francaises (animaux vertebres) ou nouvelles recherches sur les animaux vivants et fossiles de la France, vol. 1, Cahier 21, p. 161, vol. 2, explan. for pl. 20, figs. 10-11 (page not numbered), 1858-52.

479.* Gervais, P. 1872. Analyses d'ouvrages et memoires. J. de Zoologie:67-70.

331. Gibson, D.I. and E.A. Harris. 1979. The helminth-parasites of cetaceans in the collection of the British Museum (Natural History). Inv. on Cet. 10:309-330.

Parasites found in false killer whales: *Anasakis simplex*, *Bolbosoma capitatum*.

174. Giglioli, H. 1882. Note intorno un nuovo Cetaceo nel Mediterraneo da riferirsi probabilmente al genere *Pseudorca*. Zool. Anzeiger 5(112):268-289. (In Italian.)

112. Gihr, M., C. Kraus and G. Pilleri. 1982. The manus of *Pseudorca crassidens* (Owen): a study of variability. Inv. on Cet. 13:101-124.

Flippers were obtained from a school of 127 animals that stranded

in the Dornoch Firth in 1927. 213 flippers from animals from several months to 24 years of age were analyzed, including one from a 42 cm fetus. Detailed descriptions are given.
Most of the skeletal material from this stranding was acquired for the British Museum of Natural History, London.

244. Gilbertson, C. [Date undetermined]. Management of captive marine mammals. (unpublished.)

Covers various aspects of management of captive marine mammals. States that stress associated with performance has been associated with vomiting and gastric ulcers in the false killer whale; these symptoms disappeared when the animals were given a rest (Kang, I., 1981 pers. comm.)

480.* Gill, F. 1936. Rep. South African Mus. for 1935. p. 10.

481.* Gilmore, R.M. 1951. The whaling industry. Whales, dolphins and porpoises. Pp. 680-715 *In* D.K. Tressler and J. McW. Lemon (eds.). Marine products of commerce. Reinhold, New York.

See notation under Mitchell (1975a) - citation No. 83.

19. Glass, B.P. 1973. A key to the skulls of North American Mammals. Second Edition. p. 36.

Total length of the adult skull exceeds 500m. Other diagnostic features are presented in synoptic form.

575.+ Graves, W. 1976. The imperiled giants. National Geographic 150(6):722-751.

284. Gray, J.E. 1846. On the cetaceous animals. No. 3 *In* Vol. 1 of The Zoology of the Voyage of H.M.S. Erebus & Terror, Under the Command of Captain Sir James Clark Ross during the years 1839 to 1843. E.W. Janson, London. Pp. 13-53 + 30 (37?) plates.

Description of the Lincolnshire Killer, *Orca crassidens*:
Phocaena crassidens, Owen, Brit. Fossil Mam. 516, f. 213, 216, 214. Intermaxillaries rugose in front. Teeth 10/10, large, conical, rather acute (all but the front lower false), near to the preortibal notch. Lower jaw very depressed and broad in front at the symphysis. Inhab. Fens of Lincolnshire, Fossil, Mus. Stamford (now Mus. Col. Surg.). Includes skull measurements and description.

18. Gray, J.E. 1864. On the cetacea which been observed in the seas surrounding the British Islands. Zoological Society of London. Proceedings:195-248.

Descriptions, records, and documented specimens of cetaceans from seas around the British Isles.
Orca crassidens. Lincolnshire Killer.
Phocaena crassidens, Owen, Brit. Fossil Mamm. 516, f. 213, 214, 216, skull and united cervical vertebrae.
Orca crassidens, Gray, Zool, E. & T. 33; Cat. Cetac. 94.
Pseudorca crassidens, Reinhardt, Danish Transactions, fig.
Hab. North Sea, in herds. Lincolnshire (*Owen*); cervical vertebrae anchylosed (Owen, f. 214).

288. Gray, J.E. 1870. On the geographical distribution of the Cetacea. Ann. and Mag. N. Hist. Ser. 4. Vol. vi:387-394.

Brief comments on distribution.

576.+ Gray, J.E. 1873. Catalogue of the whales and dolphins (Cetacea) inhabiting or incidentally visiting the seas surrounding the British Isles. The Zoologist, Second Series Vol 8. John Van Voorst, London.

577.+ Gray, J.E. 1874. Cetacea of the North Sea and the Baltic. Ann. and Mag. N. Hist. Ser 4, 8(78):29.

482.* Green. 1945.

See notation under van Heel (1962) - citation No. 111.

188. Greenwood, A.G. and D.C. Taylor. 1979. Odontocete parasites-some new host records. Aquatic Mammals 7(1):23-25.

Describes cetacean parasites. (Neiland et al., 1970): The trematode *Nasitrema attenuata* is known to occur in the false killer whale.

416. Grzimek, B. 1987. Grzimeks Enzyklopadie Saugetiere. Sonderdruck. Kindler Verlag GmbH, Muschen. Band 4:311-438. (In German).

113. Guiler, E.R. 1978. Whale strandings in Tasmania with notes on some seal reports. Pap. Proc. Roy. Soc. Tasmania 112:189-213.

Summary of false killer whale strandings in Tasmania; (Scott and Lord, 1920) - Adventure Bay; (Pearson, 1936) - 30 May 1936, Stanley, over 100 animals; (Scott, 1942) - 28 Jul 1937, Stanley; (Tasmanian Museum files) - Dec 1946, Eaglehawk Neck, specimen in the Tasmanian Museum; (Scott and Greene, 1975) - Oct 1957, Fanny's Bay, Piper River; Sep 1958, 50 animals in Seal Bay, King Island; Jun 1963, Friendly Beach, skull recovered; Nov 1964, Friendly Beach, over 50 animals, skull recovered; 18 June 1974, 43 animals

stranded at Perkins Island; (B. Knight, pers. comm.) - Jun 1976, stranding in Fortescue Bay, skull recovered; skull of unknown origin is in the Cygnet Area school; Feb 1977, Fortescue Bay.

483.* Gunter, G. 1943. The swimming speed of the bottlenose dolphin. J. Mammal. 14:521.

See notation under Slijper (1961b) - citation No. 225.

484.* Gunter, G. 1954. Mammals of the Gulf of Mexico. Fish. Bull. Fish. and Wildlife Serv. U.S. Dept. Interior. 89(55):543-551.

578.+ Gusey, W.F. 1976. The fish and wildlife resources of the Middle Atlantic Bight. Environmental Affairs, Shell Oil Company, Houston Texas.

229. Hale, H.M. 1944. A stranded school of whales. Public Service Review. Vol. LI(10):12-14.

Account of a stranding of whales identified as *Globicephala ventricosus*, but includes photos showing them to be false killer whales: 5 Oct 1944, about 200 stranded at Port Prime, in St. Vincent Gulf, about 30 miles north of Adelaide. Other strandings mentioned include: 1929, 120 false killer whales were seen floundering in the shallow surf at Cape Peninsula, South Africa before stranding. Includes some information on biology and some morphological descriptions.

485.* Hale, H.M. 1945. A stranded school of whales. S. Aust. Nat. 23(1):15-17.

486.* Hale, H.M. 1959. The pygmy sperm whale of South Australian Coasts, Part II. Rec. S. Aust. Mus. 13(3):333-338.

300. Hall, E.R. and K.R. Kelson. 1959. The Mammals of North America. Volume II. The Ronald Press Company, New York. 1500 pp.

Physical description, habits, range, stranding records (all previously cited), and ventral diagram of skull of U.S.N.M. #218360, stranded near Princeton, Florida.

390. Hall, E.R. 1981. The Mammals of North America. Volume II, Second Edition. John Wiley and Sons, Inc. New York.

Physical description, ventral diagram of same skull as in Hall and Kelson (1959). 1846. *Phocaena crassidens* Owen; 1862. *Pseudorca crassidens*, Reinhardt; 1865. *Orca meridionalis* Flower; 1866. *Orca destructor* Cope; 1868. *Globicephala grayi* Burmeister; 1882. *Pseudorca? mediterranea* Giglioli.
Gives reference, type locality for above accounts. Lists

strandings, all previously cited.

114. Hall, N.R. and R.D. Schimpff. 1979. Neuropathology in relation to strandings. Pp. 236-242 *In* J.B. Geraci and D.J. St. Aubin (eds.). Biology of Marine Mammals: Insights Through Strandings. Final Rep., U.S. Marine Mammal Commission contract MM7AC020. Rep. #MMC-77/13. NTIS# PB293890. 343 pp.

The brains from various stranded cetaceans were autopsied, including those from two mass strandings of false killer whales in Florida in 1976, one from Sanibel Island and one from Loggerhead Key.
The two animals that were taken to Sea World, Florida, after stranding near Captiva Island had *Stenurus* sp. in the middle ear cavities, but no evidence of parasitic infiltration in the brain. The large male from the Loggerhead Key stranding had numerous parasites along the bony canals ensheafing the auditory nerves, but there was no evidence that they had penetrated to the central nervous system. This animal had difficulty breathing.
Several of the Loggerhead Key animals were observed vomiting.

579.+ Hammond, P.S. 1981. Natural mortality of dolphins. Pp. 43-55 *In* P.S. Hammond (ed.). Report on the workshop on tuna-dolphin interactions, Managua, Nicaragua, April 6-10, 1981.

406. Hammond, P.S. and J.L. Laake. 1979. Estimates of the relative density of schools for nine species of marine mammals in the eastern tropical pacific. LaJolla. Inter-American Tropical Tuna Commission internal reports. 36 pp. (unpublished.)

False killer whales were seen by NMFS and IATTC observers 1974-1978 and part of 1979. However, in a preliminary analysis, they were treated for density calculations along with other species in a "small whale aggregate", so no estimate is made specifically for this species.

291. Handley, C.O., Jr. and C.P. Patton. 1947. Order Cetacea. Pp. 196-206 *In* Wild Mammals of Virginia. Commonwealth of Virginia, Commission of Game and Inland Fisheries, Virginia.

Key to order Cetacea. Brief description, distribution and habitat.

357. Hanekom, N., P. Joubert and P. Kenyon. 1987. New bird and mammal records for the Tsitsikamma Coastal National Park, South Africa. Koedoe 0(30):168-170.

580.+ Harmer, S.F. 1927. Report on cetacea stranded on the British coasts from 1913 to 1926. British Mus. (Nat. Hist) No. 10:91.

179. Harmer, S.F. 1931. The false killer dolphin. Nature, London 127:60.

Records of strandings in Ceylon, Lincolnshire, Bay of Kiel, Danish islands, Tasmania, Florida, Argentina, Baja California, Chatham Islands, Dornoch Firth, Cape Town and Cambridgeshire Fens. Does not consider this species rare.

219. Harrison, R.J. 1949. Observations on the female reproductive organs of the ca'aing whale *Globiocephala melaena* Traill. Jour. Anat. 83(3):238-257.

The female reproductive organs of the pilot whale *Globiocephala melaena* Traill are described and compared to those of the false killer whale described by Comrie and Adam (1938).

289. Harrison, R.J. 1965. Marine Mammals. Hutchinson & Co. Ltd., London. 192 pp.

Physical description.

312. Harvey, J.T. and D.L. Stein. 1986. The state of scientific information relating to the biology and ecology of the Gorda Ridge study area, Northeast Pacific Ocean: Nekton. Final Report submitted to Oregon Department of Geology and Mineral Industries and the Living Resources Subgroup, Gorda Ridge Task Force, Contract No. 63-630-8501, Open-File Report 0-86-7.

States that the false killer whale has not been recorded in this area. Brief notes (no original data) on reproduction and feeding.

85. Harwood, J. 1980. Observations of cetaceans in the Arabian Sea, November-December 1980. Cambridge. Sea Mammal Research Unit. 8 pp. (unpublished)

Observations of cetaceans during the November-December 1980 voyage of the sailing ship SOHAR across the Arabian Sea:
14 Dec 1980, a group of five false killer whales was seen close to the island of Kiltan, 12°N, 73°E.
6 Dec 1980: at least five were observed associated with a long row of floating organic debris which stretched from horizon to horizon.

86. Harwood, J. 1983. Interactions between marine mammals and fisheries. Adv. Applied Biology 8:189-214.

False killer whales are implicated in the removal of fish from long lines in Hawaii (Mate, 1980) and off the coast of Japan in the area of northern Kyushu (Kasuya and Izumizawa, 1981).

134. Harwood, M.B., K.J. McNamara and G.R.V. Anderson. 1984. Incidental catch of small cetaceans in a gillnet fishery in

Northern Australian waters. Rep. int. Whal. Commn 34:555-559.

False killer whales have been caught in Northern Australian waters as bycatch by the Taiwanese gillnet fishery for shark, tuna and mackerel.

161. Harwood, M.B. and D. Hembree. 1987. Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. Rep. int. Whal. Commn 37:363-367.

Of 319 cetaceans captured during observed sets in the Arafura and Timor Seas (northern Australia) during June 1981 to December 1985, only one was a false killer whale.

487.* Hay, O.P. 1902. Bibliography and catalogue of the fossil vertebrata of North America. Bull. 179, U.S. Geol. Surv., Dept. Interior:596.

Record of the type specimen. See notation under Langguth (1977) - citation No. 169.

488.* Hector, J. 1873. Notes on the whales and dolphins of the New Zealand seas. Ann. Mag. Nat. Hist., ser. 4, 11:104-112.

See notation under Gaskin (1968) - citation No. 87.

281. Hector, J. 1885. Notes on the dolphins of the New Zealand seas. Transactions and Proceedings of the New Zealand Institute 1884, Vol XVII.

"Professor Flower states that further examination of a complete series of adult skeletons has led him to abandon the specific distinction of the southern from the northern form of this animal."

290. Hector, J. and J.E. Gray. 1873. Notes on the whales and dolphins of the New Zealand seas. Ann. Mag. Nat. Hist.:104-112.

Brief reference to the skull.

203. Heinsohn, G.E. 1976. Incidental net captures of small cetaceans off Townsville, North Queensland, Australia. Draft. Bergen, Norway. ACMRR/MMII/14. 2 pp.

Incidental shark net captures of small cetaceans off Townsville, north Queensland, Australia, between Aug 1964 and Jun 1972, are described. There was one specimen which was possibly a false killer whale (4.6 m).

407. Hershkovitz, P. 1966. Catalog of living whales. U.S. Natl. Mus. Bull. 246. Smithsonian Inst. 259 pp.

Taxonomic account, including history of nomenclature.

274. Heyning, J.E. 1986. Comparative facial anatomy of beaked whales (Ziphiidae) and a systematic revision among the families of extant Odontoceti. Dissertation presented to University of California, Los Angeles.

Briefly mentions facial anatomy of the false killer whale; melon does not extend posteriorly into the right nasal plug.

634. Heyning, J.E. and M.E. Dahlheim. 1988. Orcinus orca. Mammalian Species No. 304:1-9.

Describes characteristics distinguishing false killer whales from killer whales.

489.* Hinton, M.A.C. 1928. Stranded whales at Dornoch Firth. Nat. Hist. Mag. (1):131.

175. Hirosaki, Y., M. Honda and T. Kinuta. 1981. On the three hybrids between *Tursiops truncatus* and *Grampus griseus* (1) their parents and external measurements. (In Japanese.)

21. Holt, R.S. Feb. 1983. Report of porpoise experiment testing detection of on-track schools (pet dots) March 7-April 5, 1981. NOAA/NMFS 27. 80 pp.

Mar - Apr 1981: Experimental aerial surveys off the coast of Costa Rica resulted in three sightings of false killer whales. Estimated herd sizes were 52 on 13 Mar, 25 on 17 Mar and 19 on 21 Mar.

20. Holt, R.S. 1984. Testing the validity of line transect theory to estimate density of dolphin schools. SWFC Admin. Rep. LJ-84-31. 8 pp.

Mar - Apr 1981: Aerial surveys were conducted from a Beech AT11 aircraft with a nose cone off the coast of Liberia, Costa Rica. 25 false killer whales were reported seen.

252. Honacki, J.H., K.E. Kinman and J.W. Koeppl. 1982. Mammal Species of the World - A Taxonomic and Geographic Reference. Allen Press, Inc. and The Association of Systematics Collections, Lawrence, Kansas. 694 pp.

Lists *Pseudorca* Reinhardt, 1862; protected status CITES - Appendix II as Order Cetacea; ISIS number 53014110020060000000 and *Pseudorca crassidens* (Owen, 1846); protected status CITES - Appendix II as Order Cetacea; ISIS number 53014110020060010001.

383. Hotta, H., H. Mako, K. Okada and U. Yamada. 1969. On the

stomach contents of dolphins and porpoises off Kyushu. Bull. Seikai Reg. Fish. Res. Lab. (Nagasaki) 37:71-85.

From Dec 1967 to Mar 1969, stomach contents of dolphins and porpoises caught off Kyushu were examined. False killer whales were comparatively common. (In Japanese with English summary; no details on false killer whales in English.)

581.+ Howell, A.B. Aquatic mammals their adaptions to life in the water. Dover Publ., New York. 338 pp.

22. Howorth, P.C. 1985. Whales dolphins-porpoises of the Pacific. KC Publications, Las Vegas. 42 pp.

Illustrated, describes cetaceans of the Pacific, including false killer whales: have been kept in captivity and can be trained to perform tricks; photo of two jumping over a wire at Sea Life Park in Hawaii. They feed on fish and squid.

176. Hoyt, E. 1983. Great winged whales: combat and courtship rites among humpbacks, the ocean's not-so-gentle giants. Equinox 10:25-47.

Reports observations by G. Ellis of humpback charging through a group of false killer whales, causing them to scatter; also reports of an attack by false killer whales on a humpback calf in Hawaiian waters.

152. Hoyt, E. 1984. The Whale Watcher's Handbook. Madison Press Books. 208 pp.

False killer whales off Hawaii were recently seen attacking and killing a humpback whale calf.

247. Hoz Zavala, E.E. and C.L. del Carmen Colmenero. 1984. Estado actual de los mamiferos marinos en Mexico. IX Reunion Internacional para el Estudio de Los Mamiferos Marinos, 29, 30 y 31 de marzo de 1984.

False killer whales are listed as occurring from Isla San Jose to south of Baja California; Acapulco, Guerrero. They are not legally protected in Mexico, and the species' status is undetermined.

417. Imaizumi, Y. 1958. Collection of the marine mammal in Japanese museums. ???? 25(5-6):1-9. (In Japanese.)

299. Iredale, T. and E.le G. Troughton. 1934. A check-list of the mammals recorded from Australia. The Australian Museum, Sydney, Memoir VI.

Genus Pseudorca Reinhardt, 1862:

1862. *Pseudorca* Reinhardt, Overs. Danske Videns. Selsk. Forh. (Kjob.), p. 151. Haplotype, *Phocaena crassidens* Owen.
1871. *Neoorca* Gray, Suppl. Cat. Seals Whales Brit. Mus., p. 80. Haplotype, *Orca meridionalis* Flower.

582.+ IWC. 1979. Report of the sub-committee on small cetaceans. Annex H. Rep. int. Whal. Commn 29:88.

353. IWC. 1980. Report of the Sub-Committee on small cetaceans. Annex I. Rep. int. Whal. Commn 30:111-128.

False killer whales and bottlenose dolphins have moved into the Iki Island area and do extensive damage by eating bait and hooked fish and damaging fishing gear. Killer whale sounds, speed boats and other methods tried in 1979 had no effect. Small whales, probably including false killer whales, conflict with tuna long-line fisheries some years, damaging up to 5% of the catch, a loss to fishermen of about $25-30,000,000, although sometimes two or three years pass without damage.

349. IWC. 1981a. Republic of Seychelles progress report on cetacean research June 1979 - May 1980. Rep. int. Whal. Commn 31:215.

Aerial surveys and logbooks of American whalers operating in the Indian Ocean: false killer whales: 4 adults, 1 calf sighted near Seychelles up to 18 May 1980.

350. IWC. 1981b. South Africa progress report on cetacean research June 1979 - May 1980. Rep. int. Whal. Commn 31:217-218.

Jun 1979-May 1980: One female false killer whale stranded on the coast of South Africa (west of Mossel Bay) or Southwest Africa/Namibia.

351. IWC. 1981c. Japan progress report on cetacean research June 1979 - May 1980. Rep. int. Whal. Commn 31:195-200.

Catch of false killer whales by local fisheries in 1979: drive fishery, Wakayama (339).

352. IWC. 1981d. New Zealand progress report on cetacean research June 1979 - May 1980. Rep. int. Whal. Commn 31:201-203.

4 Dec 1979: four false killer whales were seen.
23 Feb 1980: Kaingaroa Hbr., Chatham Islands, one stranded, 4.90m.

346. IWC. 1982a. Japan progress report on cetacean research June 1980 to May 1981. Rep. int. Whal. Commn 32:179-183.

Catch of false killer whales by local fisheries in 1980: hand harpoon, Okinawa (5); drive fishery, Nagasaki (351); fixed net, Kyoto (1); fixed net, Nagasaki (20).

347. IWC. 1982b. New Zealand progress report on cetacean research May 1980 to May 1981. Rep. int. Whal. Commn 32:189-195.

Feb 1981: ten false killer whales were seen in New Zealand waters, 146°E to 170°W, and 12°S to 54°S.

348. IWC. 1982c. South Africa progress report on cetacean research June 1980 to May 1981. Rep. int. Whal. Commn 32:207-211.

Jun 1980-May 1981: One male false killer whale stranded on the coast of South Africa (west of Mossel Bay) or Southwest Africa/Namibia.

139. IWC. 1983a. Report of the Scientific Committee, Annex H (Small Cetaceans). Rep. int. Whal. Commn 33:152-170.

1981 catch of small cetaceans: false killer whales, 1 incidental, 7-37 direct by Japan.

344. IWC. 1983b. Japan progress report on cetacean research June 1981 to May 1982. Rep. int. Whal. Commn 33:213-220.

Catch of false killer whales by local fisheries in 1981: false killer whales, hand harpoon, Okinawa prefecture (7); fixed net in Kyoto prefecture (1).

345. IWC. 1983c. South Africa progress report on cetacean research June 1981 to May 1982. Rep. int. Whal. Commn 33:249-250.

19 Aug 1981: southwest Africa, 65 false killer whales stranded, including 22 males, 41 females, 2 unknowns.

341. IWC. 1984. Japan progress report on cetacean research June 1982 to May 1983. Rep. int. Whal. Commn 34:203-209.

One false killer whale was caught by drive fishery in the Wakayama prefecture in 1982.

159. IWC. 1987a. Australia. Progress report on cetacean research, June 1985 to May 1986. Rep. int. Whal. Commn 37:159-165.

The Australian Museum has skulls from 27 stranded false killer whales, and the gonads from 25.

379. IWC. 1987b. Japan. Progress report on cetacean research,

June 1985 to April 1986. Rep. int. Whal. Commn 37:172-175.

Japanese catch of false killer whales by local fisheries in 1985/86 includes: drive, Shizuoka (43); drive, Nagasaki (84).

160. IWC. 1987c. United States. Progress report on cetacean research, June 1985 to May 1986. Rep. int. Whal. Commn 37:183-190.

Marine mammal sightings recorded from 46 trips made by U.S. tropical Pacific tuna purse seiners included one sighting of 50 false killer whales.

158. IWC. 1987d. Report to the sub-committee on small cetaceans. Annex H. Rep. int. Whal. Commn 37:121-128.

False killer whales were incidentally caught in gillnets in northern Australia waters during the period from June 1981 to December 1985; no numbers were reported.

9. Jackson, T.D. 1980. Trip report: porpoise population aerial survey of the Eastern Tropical Pacific Ocean January 22 - April 25, 1979. SWFC Admin. Rep. No. LJ-80-1. 74 pp.

During the National Marine Fisheries Service 1979 Eastern Tropical Pacific Dolphin Survey, aerial surveys resulted in one sighting of seven false killer whales at approximately 14°N, 100°W (off west coast of Mexico) in May 1979.

338. Jagerskiold, L.A. 1935. Berattelse rorande Goteborgs Muser Zoologiska avdelning for ar 1934. Pp. 6-21 *In* Goteborgs Museum Arstryck 1935. 83 pp.

Documents a stranding in 1934 at Vinga Island, southwest of Goteborg in the Baltic Sea.

316. James, P.S.B.R. and R.S. Lal Mohan. 1987. The marine mammals of India. Marine Fisheries Information Service, Technical and Extension Series 71:1-13.

General description. 30-50 false killer whales taken annually in tuna long line fisheries in the Pacific. Identification key. In India, recorded from Cape Comorin, Tiruchendur, Madras, Trivandrum, Pozhikara and Calicut.

490.* Japanese Fisheries Agency (ed.). 1968. Report of the basic survey in search of countermeasures of the damage by dolphins on the fisheries in western Japan. Tokyo. (In Japanese.)

491.* Japha, A. 1908. Zusammenstellung der in der Ostsee bisher beobachteten Wale. Schrift. d. Physik-okonom. Ges. zu

Konigsberg 49:119-89.

266. Jeng, A. 1986a. One whale's story. (Unidentified Chinese journal):27-29.

Account of a false killer whale that entered Taichung harbor on 11 Jan 1986, and efforts made to save it. (see Jeng, 1986b; citation No. 267).

267. Jeng, A. 1986b. Whales in brief. (Unidentified Chinese journal):30-31.

Whale that entered Taichung harbor was 5 m long, 1000 kg. Stranded and died six days later on a beach 10 miles north. It had a scar on its snout.

10. Johnson, S.W. 1979. An annotated catalog of published and unpublished sources of data on populations, life history, and ecology of coastal marine mammals of California. NMFS, SWFC Admin. Rep. LJ-79-1. 159 pp.

An annotated bibliography. False killer whale references include: (Comrie, L.C. and A.B. Adam, 1938): 41 stranded in Scotland in 1935. Corpora lutea were examined.

283. Jones, M.L. 1970. History of marine mammals in captivity with notes on their longevity. Proceedings of the Seventh Annual Conference on Biological Sonar and Diving Mammals:81-89.

False killer whales in captivity: Sea Life Park in 1965, 5 at Shimonoseki Aquarium 31 March 1970

11. Jones, J.K. Jr., D.C. Carter, H.H. Genoways, R.S. Hoffman, D.W. Rice and C. Jones. 1986. Revised checklist of North American mammals north of Mexico, 1986. Texas Tech. Univ. 17 pp.

The false killer whale is included on checklist.

201. Jones, S. 1976. Dolphins and porpoises caught in seines along the coast of India. Bergen, Norway, ACMRR/MM/EC/17. 3 pp.

Describes incidental capture of cetaceans in seine nets along the coasts of India, Pakistan and Bangladesh. Reportedly there is "no regular fishery for dolphins and porpoises in the Indian region." (Dawson, 1911): 2 young false killer whales, male and female, were caught in a shore seine near Trivandrum during the first decade of this century.

492.* Kamminga, C. and H. Wiersman. 1981. Investigations on

cetacean sonar II. Acoustic similarities and differences in odontocete sonar signals. Aquat. Mamm. 8:41-62.

358. Kamminga, C. and J.G. van Velden. 1987. Investigations on cetacean sonar VIII; sonar signals of *Pseudorca crassidens* in comparison with *Tursiops truncatus*. Aquat. Mamm. 13(2):43-50. (Abstract.)

Describes sounds as recorded in captivity. Time duration, dominant frequency and signal bandwidth are investigated. False killer whale: a few cycles of a dominant frequency around 28kHz, 60-75 microseconds, similar in waveform to bottlenose dolphin. Long sustained click trains during approach and stationary inspection of hydrophone, sometimes accompanied by whistle of 8 kHz. Occasional two-component sonar clicks with a frequency around 100 kHz.

115. Kasuya, T. 1971. Consideration of distribution and migration of toothed whales off the Pacific coast of Japan based upon aerial sighting records. Sci. Rep. Whales Res. Inst. 23:37-60.

In the winter, false killer whales reportedly migrate in the coastal waters near the north and west coasts of Kyushu, Japan. Out of six groups of false killer whales sighted from Japanese whaling ships off the Pacific coast of Japan, 1960-1971, mean herd size was 55, range 2-200.

391. Kasuya, T. 1973. Systematic consideration of recent toothed whales based on the morphology of tympano-periotic bone. Sci. Rep. Whales Res. Inst. 25:1-103.

Detailed description of the tympanic bulla and periotic arc in false killer whales. Tympanic bulla: 47.7mm-50.5mm; periotic arc 42.8mm-49.0mm. Tympanic bulla of this size with no bilateral compression is found only in this species. Based on measurements of this bone, false killer whales are phenotypically closest to the narwhal, *Monodon monoceros*.

228. Kasuya, T. 1975. Past occurrence of *Globicephala melaena* in the western north Pacific. Sci. Rep. Whales Res. Inst. 27:95-110.

Describes past occurrence of *Globicephala melaena* and other cetaceans from skull and bone fragments excavated at the northern Sea of Japan, and relates it to modern Japanese whaling statistics. In Japanese accounts of cetaceans, "Onan" equals "Okigondo", which indicates the false killer whale, *Pseudorca crassidens*. Bone fragments of false killer whales (along with other species) were excavated from upper strata (probable date 12th century) of the Kabukai A-site on the east coast of Rebun Island (45°20'N, 141°E). All of

the author's sightings of false killer whales have occurred in water over 16°C.

418. Kasuya, T. 1981a. A guide to distinguishing characteristics of the dolphin species found in the neighboring water of Japan. Japanese Government, Department of Fisheries. (In Japanese.)

419. Kasuya, T. 1981b. Identification manual for coastal dolphins of Japan. ???? 7:41 pp. (In Japanese.)

269. Kasuya, T. 1981c. Abstract of the Report for the Toyota Foundation 27 November 1981.

Purpose of study was to clarify the background of the dolphin-fishery conflict in Japan and to conduct an ecological study of dolphins killed. Lists gross reproductive rate of false killer whales to be 4-6%, probably close to natural mortality rate. Among false killer whales, Pacific white-sided dolphins, (*L. obliquidens*), bottlenose dolphins, (*T. truncatus*), and Risso's dolphins, (*G. griseus*), false killer whales may consume the most yellowtail.

195. Kasuya, T. 1985. The fishery-dolphin conflict in the Iki Island area of Japan. Pp. 253-272 *In* J.R. Beddington, R. Beverton and D.M. Lavigne (eds.). Marine Mammals and Fisheries. George Allen & Unwin, London.

Description of the fishery-dolphin conflict around Iki Island, Japan. Relates account of drive-fishery for dolphins. Gives history of small cetacean catch in the area with specific areas and numbers. 943 false killer whales were killed by the drive fishery on Iki Island between Mar 1977 and Feb 1982. Reproductive status is given. Gestation is estimated at 15-16 months, gross annual reproductive rate at 5-6%. The largest fetuses and smallest neonates were in the range of 170-179 cm; mean neonatal length was estimated at 175 cm. Stomach contents are described and weights given. Stomachs of four of five weaned false killer whales examined contained the remains of yellowtail.

260. Kasuya, T. and Y. Izumizawa. 1980. The fishery-dolphin conflict in the Iki Island, Japan area. Presented to the Marine Mammal Commission, Order No. MM1533791-7.

Contains essentially the same information as #195 (Kasuya, 1985). Includes relationship between body length and testis weight for 1979 season, body length frequency for 1979 and 1980 seasons and specimens collected from animals killed at Katsumoto in 1979 and 1980.

493.* Kasuya, T. and H. Marsh. 1984. Life history and reproductive biology of the short-finned pilot whale,

Globicephala macrorhynchus, off the Pacific coast of Japan. Rep. int. Whal. Commn (Spec. Issue 6):259-310.

343. Kasuya, T., T. Tobayama and S. Matsui. 1984. Review of the live-capture of small cetaceans in Japan. Rep. int. Whal. Commn 34:597-602.

False killer whales caught live for aquariums in Japan: 26 Jul 1977: 1 incidentally captured in Wada and sent to aquarium; 27 Jul 1977: 1 incidentally captured in Kawazu and sent to aquarium; 1978: 424 taken by fishery at Katsumoto; 3 of these were taken live and sent to aquaria. No direct catches by aquaria or fishermen chartered by aquaria.

334. Kellogg, R. 1925. Two fossil Physeteroid whales from California. Pp. 1-34 *In* Additions to the Tertiary History of the Pelagic Mammals on the Pacific Coast of North America. Contributions to Palaeontology from the Carnegie Institution of Washington. Carnegie Institution of Washington, Washington. 120 pp. + 13 plates.

(Winge, 1921): the genus *Hoplocetus* of Gervais includes those fossil physeteroids having teeth coated with enamel in the upper jaws. *Hoplocetus crassidens* (Gervais, 1848-52) is the type species (Hay, 1902), and was based upon two teeth, 111 mm and 121 mm long, obtained from the "falun" of Romans in the Department of Drome, France. They are slightly curved and are characterized by excessive thickness of the cement and the well-marked constriction of the base of the crown, probably indicative of old age.

335. Kellogg, R. 1928. The history of whales - their adaptation to life in the water. Quart. Review Biol. 3(1):29-76.

The false killer whale, *Pseudorca crassidens*, is known from the Upper Pliocene (Sicilian) from Europe and Japan.

227. Kellogg, R. 1940. Whales, giants of the sea. Natl. Geogr. Mag. 67(1):35-90.

General account of whales and dolphins, includes some biology and distribution of various species, whaling, color plates. Relates the sporadic appearance of the false killer whale in inshore waters to the flooding shoreward of warm ocean currents, which influence the distribution of fish and other sea life on which the whales feed.

226. Kellogg, R. and F.C. Whitmore, Jr. 1957. Marine mammals. Pp. 1223-1225 *In* J. Hedgepeth (ed.). Treatise on Marine Ecology and Paleoecology. Vol. 1. Geo. Soc. America. Memoir 67.

General account of marine mammals and their habitats, including migration routes of whales and cetacean strandings. A school of at least 200 false killer whales stranded on jagged rocks and sandy beaches of South Africa when trapped by a falling tide in channels cut off from the open sea by sand banks, but other herds have stranded on unobstructed beaches.

584.+ Kenney, R.D. and H.E. Winn. 1986. Cetacean high-use habitats of the Northeast United States Continental Shelf. Fishery Bulletin 84(2):345-357.

7. Klinowska, M. 1985. Cetacean live stranding sites relate to geomagnetic topography. Aquat. Mamm. 11(1):27-32.

It is suggested that live strandings are exclusively mistakes made by animals attempting to use geomagnetic topography for orientation. Offshore cetacean species live strand much more frequently then inshore; false killer whales comprise 67% of live strandings reported from the British Isles.

27. Kulu, D.D. 1972. Evolution and cytogenics. Pp. 503-527 *In* S.H. Ridgway (ed.). Mammals of the Sea: Biology and Medicine. Illinois. Thomas Company.

Typical cetacean diploid chromosome number, 2n=44.

184. Kuthalingam, M.D.K. 1985. Abundance and distribution of the marine mammals of the Indian Ocean. *In* Sixth Biennial Conf. Bio. Mar. Mamm. British Columbia, Canada Abstracts.

Abstract mentions that the paper describes abundance and distribution of cetaceans stranded on the coasts of the Indian seas from 1948-1984, and that false killer whales are especially focused. No details are provided in abstract.

8. Kuthalingam, M.D.K. and K. Venkataramanujam. 1981. A review on the stranding and occurrence of cetaceans along the Indian coasts with notes on their reproductive biology. Symp. on Cetacean Reprod. Nov. 28-30, 1981, La Jolla, Calif. Paper No. 39. 20 pp. (Abstract published on p. 479 *In* W.F. Perrin, R.L. Brownell, Jr. and D.P.DeMaster (eds.). 1984. Reproduction in whales, dolphins and porpoises. Rep. int. Whal. Commn (Spec. Issue 6):495pp.)

False killer whales are oceanic with a cosmopolitan distribution. (Dawson, 1911): reported occurrence from the Trivandrum coast; (Silas and Pillay, 1960): a male (27.9m) and female (37.5m) stranded at Pozhikara, north of Cape Comorin; (Derinayagala, 1945a,b): three schools stranded on the Ceylon (Sri Lankan) coast.

494.* Lahille, F. 1908. Nota sobre un delfin (*Tursiops gephyreus* Lah.). Anal. Mus. Nac. Buenos Aires 3(9):347-365.

572. Lal Mohan, R.S., K.V. Somasekharan Nair and P. Ramadoss. 1984. Mar. Fish. Infor. Ser. T&E Ser. 55:15.

28 Jul 1975 - fishermen of Puthiappa (5 km north of Calicut, India) saw a 423 cm false killer whale strand live, dragged it to a ½ x 50 x 20 m tidepool and left it, where it died after two hours. Measurements, dental formula are given. Stomach contained partially digested catfish, *Tachysurus* sp. Results of biochemical analysis of blood, muscle and liver are given.

495.* Lane, F.W. 1953. Speed of dolphins. J. Mammal. 24:293.

See notation under Slijper (1961b) - citation No. 225.

408. Langelier, K.N., P.J. Stacey, R.W. Baird and R. Marchetti. 1988. 1987 Cetacean strandings in British Columbia. Pp. 79-82 *In* Proceedings Joint Conference of the American Association of Zoo Veterinarians and American Assn. of Wildl. Vet. Nov 6-10, 1988. Toronto.

Repeats information from Baird et al. (In Press) - citation No. 14.

169. Langguth, A. 1977. Notas sobre falsa orca *Pseudorca crassidens* (Owen) en el Atlantico sudoccidental. Rev. Mus. Argent. Cient. Nat. 13. (Zool.) 12(6):60-68. (In Spanish.)

Describes distribution of false killer whales, lists records from the southwest Atlantic (coast of South America) and lists museums and museum numbers of collected specimens. Gives detailed skull measurements. Records mentioned:
- El Doradillo, near Puerto Madryn on the coast of Golfo Nuevo, Prov. de Chubut, Argentina, 42°40'S, 64°59'W. The skull is conserved in the Provincial Museum of Natural Science and Oceanography of Puerto Madryn (Daciuk, 1974).

- Near the Mayor Bruatovich, coast of the Province of Buenos Aires. A skull is preserved in the National Sciences Museum of Argentina (M.A.C.N. # 25.137)

- Mar del Plata, province of Buenos Aires, 38°00'S, 57°33'W. A skull (M.A.C.N. #98c) collected by Rogelio Lopez. Furthermore another skull and complete postcranial skeleton on exhibition in the M.A.C.N., #54.108, carry the date August 1946, which was before the famous mass stranding of 835 individuals reported by Caillet-Bois (1948). According to Caillet-Bois (1948), the skeleton of a specimen from this stranding was sent to the Museum de La Plata.

- Bahia de Samborombon, province of Buenos Aires. The skull is

described and drawn in a figure by Burmeister (1968, 1969). The specimen, typical of what the author refers to as "*Pseudorca grayi* (Burmeister)", appears to be lost.

- Rio de la Plata, in front of Punta Zolessi, coast of Dpto. Maldonado, Uruguay, 34°51'S, 55°19'W. The skull without mandibles is conserved en the Dpto. de Zoologia Vertebrados, Facultad de Humanidades y Ciencias, Montivideo, #ZVC 1.183. This specimen was collected by the Ing. Carlos R. Fernandez in 1974 in the Rio de la Plata river bed, approximately 200 - 300 m from the coast, in 8 m of depth on a sandy bottom.

- Isla de Lobos, Atlantic Ocean, 35°01'S, 54°52'W. The skull is conserved in the National Museum of Natural History of Montevideo (# MNHN 1.330) This specimen was erroneously identified as a killer whale, *Orcinus orca*, in the list by Ximenez et al. (1972).

- Cabo Polonio, on the oceanic coast of Dpto. de Rocha, Uruguay. The skull was collected around the year 1955 by Sr. Serafin Cordero, who has it in his possession.

- Beach near the Farola de Verga, 32°58'S, 52°54'W, State of Rio Grande del Sur, Brasil. The skull and postcranial skeleton collected on August 1975 are conserved in the Oceanographic Museum of Rio Grande, state of Rio Grande del Sur (#27) (Castello and Gianuca, In Press).

- 20 km N of the Sarita lighthouse, 32°38'S, 52°26'W, state of Rio Grande del Sur, Brasil. The skull collected on November 1975 is conserved in the Oceanographic Museum of Rio Grande (# 31) (Castello and Gianuca, In Press).

95. Leahy, T.W. 1977. The mystery of the beached mammals. NOAA 7(2):4-8.

22 Jul 1976: five false killer whales beached on sandbars in Pine Island Sound at upper Captiva Island near Fort Myers. Rescue teams tried to free them, keeping them moving in the shallow water and rubbing grease on their bodies. One died; no food was found in the stomach and intestines, but both organs examined had parasites; preliminary findings were similar to those from a group of spinner dolphins (*Stenella longirostris*) found dead about 50 miles further north a few weeks previously. The other four were taken to Sea World. All died from internal problems; they were heavily parasitized, and all had lungworms.

25-26 Jul 1976: 30 stranded at Loggerhead Key, Dry Tortugas. Rescuers successfully returned all but one to the sea where they were reported to be swimming east toward the Atlantic Ocean. The one that died was the largest male in the group. Its brain was examined and found to be in excellent condition. Hundreds of inch-

long parasitic worms were found in its ear canals, but at the time it was not thought that there was enough organic damage to have caused the stranding. Each whale was tagged and photographed and documentation of dorsal fins was made. 80-90 blood samples were arranged, and tissue samples taken of the one that died.
The rescue was only successful after all the animals had been turned and were heading out. As long as one of the group remained, the others would not leave.

Aug 1976: group of 17 found stranded, dead, at Cape Sable in the Everglades National Park, southwest Florida (they had been dead a few weeks). One or two of these animals were positively identified by photographs from all three places.

3. Leatherwood, S., C.B. Peters, R. Santerre, M. Santerre and J.T. Clarke. 1984. Observations of cetaceans in the northern Indian Ocean Sanctuary, November 1980 - May 1983. Rep. int. Whal. Commn 34:509-520.

Cetaceans occurring in the Northern Indian Ocean Sanctuary were inventoried by interviews and aerial and vessel observations conducted from November 1980 through April 1983. False killer whales were recorded in waters around Sri Lanka and the Maldives. On 16 Apr 1983, there was one sighting of 27 individuals northeast of Sri Lanka, in close association with 200-250 spotted dolphins (*Stenella attenuata*) and about 150 Risso's dolphins (*Grampus griseus*), as well as numerous birds and a school of large fish.

Most locals from Penang, Malaysia do not eat dolphin meat and fishermen do not deliberately pursue them. However, unidentified dolphins, all dark with a dorsal fin and long snout, are sometimes taken accidentally in gill nets seaward of Penang Island.

337. Leatherwood, S., R.R. Reeves, W.F. Perrin and W.E. Evans. 1982. Whales, dolphins and porpoises of the eastern North Pacific and adjacent Arctic waters - a guide to their identification. NOAA Tech. Rep. NMFS CIRC-444. 243 pp. Republished under same title, only slightly revised, 1988 by Dover Books, Inc., New York, 245 pp. and in Spanish 1988 by Comision Interamericana del Atun Tropical, Informe Especial No. 6. 245 pp.

Describes species, summarizes basic biology, distinguishes from other "blackfish" with which it might be confused and describes distribution in eastern Pacific as extending from Aleutians and Prince William Sound to Chile but more abundant in offshore tropical and warm temperate waters. Statements from literature on distribution and abundance southern California south to Chile supplemented by some unpublished data.

132. Leatherwood, S. 1986. Whales, dolphins and porpoises of the

Indian Ocean Cetacean Sanctuary - a summary of available information. San Diego, Hubbs Marine Research Center Tech. Rpt. No. 87-197. 207pp.

Summarizes all available records, published and unpublished, of sightings, strandings, fisheries bycatches and museum specimens of false killer whales from the Indian Ocean. Includes 11 sightings, ten stranding events, 11 fisheries bycatches, from Port Blair, Andaman Islands (1) and Trincomalee, Sri Lanka (10), and 11 museum specimens.
(Santerre and Santerre, 1983): 28 Jan 1954: one animal off Chempianpattu, Sri Lanka (Jaffna).
Specimen of Black River Beach stranding at U.S. National Museum, #STR02124.

409. Leatherwood, S., D. McDonald, W.P. Prematunga, P. Girton, D. McBrearty and A. Ilangakoon. In Press. Records of the "blackfish" (killer, false killer, pilot, pygmy killer and melon headed whales) in the Indian Ocean Sanctuary, 1772-1986. *In* S. Leatherwood and G.P. Donovan (eds.). Cetaceans and Cetacean Research in the Indian Ocean Sanctuary. Nairobi. UNEP.

Summarizes and discusses all records of false killer whales in the Indian Ocean Sanctuary (IOS) 1890-1986. Reports that false killer whales are known widely in the IOS from individual and mass strandings and an increasing number of sightings. Specimens are taken in gillnets (Andaman Islands and Sri Lanka) and probably in harpoon fisheries (Sri Lanka and Lamalera). Suggests they are among the cetaceans, all reported by Sivasubramanium (1965) as "killer whales:, interfering with tuna long-line fisheries all across the tropical to warm temperate Indian Ocean.

496.* Lepiksaar, J. 1966. Zahnwalfunde in Schweden. Bijdragen tot de Dierkunde 36:3-16.

6. Leung, Y. 1967. An illustrated key to the species of whale-lice (Amphipoda, Cyamidae), Ectoparasites of cetacea, with a guide to the literature. Crustaceana 12:279-291.

This paper lists *Syncyamus pseudorcae* and *Isocyamus delphini* as parasites occurring on false killer whales.

369. Li, Y. 1983. The tongue of the Baiji *Lipotes vexillifer*. Acta Zool. Sin. 29(1):35-41.

The tongue of the baiji, *L. vexillifer* is described in detail and compared to that of the false killer whale, among others.

170. Lichter, A. and A. Hooper. 1983. Guia para el reconocimiento de cetáceaos del mar Argentino. Fundacion vida Silvestre

Argentina. 96 pp. (In Spanish.)

Includes physical description, records from Argentina (previously cited in document #169), tooth formulae, number of vertebrae.

497.* Lilljeborg, W. 1874. Ordningen Cete, Linne 1758. Hvaldjur. Pp. 886-1056 *In* Daggdjuren Uppsala. 1088 pp.

498.* Loader, R. 1981. Why do they strand? Simply Living 13:27-32.

See notation under Phillips (1988) - citation No. 124.

154. Lockley, R.M. 1979. Whales, dolphins and porpoises. W.W. Norton & Co. New York. 200 pp.

Details are given on stranding at Manakau Harbor, Aukland, New Zealand, 1 April 1978. Animals were 3.6-5.4m. Despite attempts to refloat animals, at least 253 of a larger original number restranded and died.

250. Longman, H.A. 1926. New records of Cetacea, with a list of Queensland species. Memoirs of the Queensland Museum VIII(III). 278 pp.

Mr. J.H. Stevens, Inspector of Fisheries, presented a skull with lower jaw (J. 937) to the museum in 1913. Location of collection was reportedly near Townsville, Queensland.

499.* Lonnberg, E. 1936. Nagra ord om Halvspackhuggaren, *Pseudorca crassidens* Owen. Fauna och Flora 31:87.

1 Apr 1934, record from Acapulco, Mexico, 16°45'N. Photographs were taken. See notations under Bullis and Moore (1956) - citation No. 106, and Mitchell (1965) - citation No. 82.

396. McBrearty, D.A., M.A. Message and G.A. King. 1986. Observations on small cetaceans in the north-east Atlantic Ocean and the Mediterranean Sea: 1978-1982. Pp. 225-249 *In* M.M. Bryden and R. Harrison (eds.). Research on Dolphins. Clarendon Press, Oxford.

Reports of cetacean sightings were received from members of the Royal and Merchant Navies, Trinity House personnel, fishermen and private yachtsmen from 1978-1982. A total of 12 false killer whale sightings were reported, five from the northeast Atlantic and seven from the Mediterranean, involving 58 animals. The four northernmost sightings were in water with a mean surface temperature of 14°C-18°C. The Mediterranean sightings occurred in summer when the August mean surface temperature is 24°C. Chart shows breakdown of sightings per month, but no date or year.

196. McFarland, W.N. 1971. Cetacean visual pigments. Vision Res. Pergamon Press. Vol. 11:1065-1076.

Describes visual pigments for ten cetacean species, including one false killer whale caught off Pokai Bay, Oahu, Hawaii, in 1967.

500.* McManus, T.J., J.E. Wapstra, E.R. Guiler, B.L. Munday and D.L. Obendorf. 1984. Cetacean strandings in Tasmania from February 1978 to May 1983. Pap. Proc. R. Soc. Tasm. 118:117-135, plates 1-5.

See notation under Nicol and Croome (1988) - citation No. 307.

340. McNamara, K.J. 1984. Australia progress report on cetacean research June 1982 to May 1983. Rep. int. Whal. Commn 34:183-187.

Incidental catch in a shark/tuna/mackerel gillnet fishery in northern Australian waters from Jun 1981 to Mar 1983 is estimated to have been 4,662 +/- 1,403, including bottlenose dolphin, *Tursiops truncatus*, spotted dolphin, *Stenella longirostris*, spinner dolphin, *S. attenuata*, and false killer whale, *Pseudorca crassidens*.

501.* McNamara, K. 1986. Saving the whales. Landscope 2:3-16.

See notation under Phillips (1988) - citation No. 124.

420. Maigret, J. 1981. Rapports entre les cetaces et la peche thoniere dans L'Atlantique tropical oriental. Notes Africaines 0(171):77-??. (In French.)

422. Makaki, Y. and H. Kato. 1979. The result of a survey of small cetaceans from western equatorial Pacific, Timorsea, Arfara, Indian ???. ???? (In Japanese.)

294. Malbrant, R. and A. Maclatchy. 1949. Faune de L'Equateur Africain Francais, Tome II Mammiferes. *In* P. Lechevalier, ed. Encyclopedie Biologique. Paris. (In French.)

Key to genera, brief description, brief summary of distribution.

421.* Malm, A.W. 1871. Hvaldjur - I Sveriges Museer, År 1869. P.A. Norsfedt & Soner, Stockholm. (In Swedish.)

502.* Malvin, R.L. and A.J. Vander. 1967. Plasma renin activity in marine teleosts and cetacea. Amer. J. Physiol. 213:1582-1584.

308. Mann, G. 1958. Clave de determinacion para las especies de mamiferos silvestres de Chile. Investigaciones Zoologicas

Chilenas 4:89-104.

Key to species.

586.+ Marchessaux, D. 1980. A review of the current knowledge of the cetaceans in the Eastern Mediterranean Sea. Vie Marine 2:59-66.

178. Marchessaux, D. and R. Duguy. 1978. Note preliminaire sur les Cetaces de la Mediterranee orientale. XXVI Congres-Assemblee pleniere Antalya, 24 Novembre-2 Decembre 1978. (In French.)

587.+ Marcuzzi, G. and G. Pilleri. 1971. On the zoogeography of cetacea. Inv. on Cet. Vol. III, Part I:101-170.

588.+ Marelli, C.A. 1924. Elenco Sistematica de la Fauna de la Provincia de Buenos Aires (Procordados y Vertebrados). Talleres Graficos Argentinos - L.J. Rosso Y Cia, Buenos Aires. 682 pp + 7 indices.

239. Marelli, C.A. 1953. Documentos iconigraficos sobre cetaceos de las costa Argentinas. Ann. Nahuel Huapi 3:133-143. (In Spanish.)

Notes on occurrence and natural history of "Falsa orca, Delfin blanco, Delfín de Barard and Tursión".

207. Margolis, L. and M.D. Dailey. 1972. Revised annotated list of parasites from sea mammals caught off the west coast of North America. NOAA Tech. Rept. NMFS SSRF-647. 23 pp.

Listed parasites of false killer whales include the trematodes *Nasitrema attenuata* and *Nasitrema globicephalae*.

392. Marsh, H. and T. Kasuya. 1986. Evidence for reproductive senescence in female cetaceans. Rep. int. Whal. Commn (Spec. Issue 8):57-74.

Review of information on changes in the age-specific ovulation rate, corpora-specific pregnancy rate and age-specific pregnancy rate in various species of mysticetes and odontocetes, including false killer whales. Cites references with information on pregnancy and lactation rates in false killer whales. Kasuya (unpublished) studied 67 mature females; of the 12 females over 41 years old, none were pregnant, indicating the presence of post reproductive females.
The authors suggest that the removal of an entire herd may not rapidly change the reproductive rate of the remaining herds, and that the population reproductive rate may respond more rapidly to selective cropping from many herds (Kasuya and Marsh, 1984). They

do not recommend selective cropping of old females because of their possible accumulated "cultural" information and experience, which may improve survival of other members of the population.

589.+ Maser, C., B.R. Mate, J.F. Franklin and C.T. Dyrness. 1981. Natural history of Oregon coast mammals. U.S. Dept. of Agric. Gen. Tech. Rept. PNW-133. 496 pp.

503.* Massuti. 1943. Un raro delfinido pescado en la bahia de Palma de Mallorca: *Pseudorca crassidens* (Owen). Bol. R. Soc. Esp. Hist. Nat. 41:360-361.

504.* Mate, B.R. (ed.) 1980. Workshop on marine mammals-fisheries interactions in the north-eastern Pacific. Report to the Marine Mammal Commission MMC-78/09. 48 pp.

See notation under Harwood (1983) - citation No. 86.

168. Matheson, C. and L.F. Cowley. 1934. *Pseudorca crassidens* (Owen) on the Glamorgan coast. Nature, London 133:870.

6 May 1934: 21 false killer whales stranded at Whiteford Sands, Llanmadoc, on the Gower coast of Glamorgan. Some material was collected for the National Museum of Wales, Cardiff. Another specimen was reported later some distance away, but the authors did not examine it. Other strandings referred to: Dec 1928 near Cape Town, South Africa; Aug 1929 near Kayts, Ceylon (Sri Lanka).

213. Mathews, L.H. 1980. Appreciations of the scientific work of Francis C. Fraser CBE, FRS 1903-1978. J. Zool., Lond. 190:441-446.

Summary of the life work of Francis C. Fraser, who reported, among his other work, 18 strandings of the false killer whale, *Pseudorca crassidens*, along the British coast from 1913 - 1966.

401. Mathiasson, S. 1960. Faunistisk nytt fran Goteborgs Naturhistoriska Museum 1959, pp. 11-20. Goteborgs Museum Arstryck 1960. 76 pp.

Documents a stranding in 1920 in Vorborg, Holland.

206. Mead, J.G. 1975. Anatomy of the external nasal passages and facial complex in the Delphinidae (Mammalia: Cetacea). Smithsonian Contribution to Zoology 207:1-72.

The anatomy of the external nasal passages and facial complex is described in various cetaceans. An adult male and female false killer whale were dissected. Facial structures was similar to that of the bottlenose dolphin. There was a moderate degree of sexual dimorphism in the shape and size of the forehead, with the fatty

connective tissue anterior to the melon extending further anteriorly in the male than in the female. No difference could be seen in the melon.

116. Mead, J.G. 1979. An analysis of cetacean strandings along the eastern coast of the United States. Pp. 54-68 *In* J.B. Geraci and D.J. St. Aubin (eds.). Biology of Marine Mammals: Insights Through Strandings. Final Rep., U.S. Marine Mammal Commission contract MM7AC020. Rep. #MMC-77/13. NTIS# PB293890. 343 pp.

Reports a total of 15 records (no details or references) of false killer whale strandings along the Atlantic and Gulf coasts of the U.S., four involved live individuals and three were mass strandings. Suggests that many early records of pilot whales, *Globicephala macrorhynchus* probably actually represent strandings of false killer whales, *Pseudorca crassidens*.

590.+ Meester, J.A.J., I.L. Rautenbach, N.J. Dippenaar, and C.M. Baker. 1986. Classification of Southern African mammals. Transvaal Museum Monograph No. 5. Transvaal Museum, Pretoria.

117. Mell, D.J. 1988. An operational perspective of the rescue of false killer whales (*Pseudorca crassidens*) stranded at Augusta in July 1986. Pp. 42-57 *In* M.L. Augee (ed.). Marine Mammals of Australasia Field Biology and Captive Management. The Royal Soc. of New South Wales.

Southwest Australia records:
30 Jul 1986: group of 114 stranded on Dukes Head Beach, Flinders Bay, Augusta, (34°19'S, 115°10'E), spread over a 200 m area. Two large whales broke away from the herd that was milling just beyond the surf, and sped ashore. Seconds later, a third followed, and in the next 15 minutes the rest stranded. 96 were returned to the sea using trucks and boats to transport them and surfboards to coax them out to sea. Many tried to restrand during the first few days of the rescue operation. One small dead whale was supported by other whales all night, and whales "assisted" volunteers in supporting another whale. A total of 18 died. Two aborted fetuses, 2-5m in length, while stranded. Behavior is described in detail.
May 1964: Doubtful Island Bay, 34°22'S, 119°33'E, 34 stranded and died.
Jul 1981: Barrow Island, 20°54'S, 115°22'E, 40 stranded and died.

118. Miller, G.S., Jr. 1920. American records of whales of the genus *Pseudorca*. Proc. U.S. Nat. Mus. 57(2311):205-207.

Compares skulls of false killer whales from various areas and gives

stranding records.
Skulls in the National Museum of Natural History: Paita, Peru - 3679; Lower California - 23282; Venezuela - 20932; Florida - 218360; Northeast coast (probably Davis Strait) - 11320; No history - 219325.

591.+ Miller, G.S., Jr. and R. Kellogg. 1955. List of North American recent mammals. United States National Museum Bulletin 205:954pp.

155. Miller, K.W. and V.B. Scheffer. 1986. False killer whale. Pp. 149-151 *In* D. Haley (ed.). Marine mammals. Second Edition. Pacific Search Press, Seattle. 295 pp.

Physical description, mentioning the "anchor-shaped" gray patch on ventral side between the flippers; also mentions that some individuals have light gray coloration on each side of the head. Summarizes data on species in the northeastern Pacific and adjacent Arctic waters.
Records of occurrence include:
(Steve Leatherwood; no bibliographic citation) - west coast of United States and Mexico, Prince William Sound, Alaska, Olympia, Washington, Guadalupe Island, outside the San Benitos Islands, off west coast of Baja California;
(no reference) - Gulf of California, around Hawaiian Islands, eastern tropical Pacific tuna fishing grounds, Point Sur (1958), Humboldt Bay (1961), Santa Catalina Island (1959), Palos Verdes peninsula (1963), pelagic waters between Monterey Bay and Avila Beach (1982), off the Patten Escarpment near Sixtymile Band (late summer and fall between 1976-1982), off Point Vincente (Oct 1985). Feeds on snapper (*Lutjanus*), amberjack (*Seriola llandei*) (sic), bonito (*Sarda chiliensis*), mahi mahi (*Coryphaena*), dolphins and squid (remains of three 15-20 lb. squid were found in the stomach of a false killer whale entangled in a tuna longline in the Gulf of Mexico). Brief notes on behavior, vocalizations, echolocation capabilities, reproduction [all previously cited records, included in this bibliography with original authors - Eds].

592.+ Minasian, S.M. and K.C. Balcomb III. 1984. The world's whales. Smithsonian Books. 224 pp.

151. Minasian, S.M., K.C. Balcomb, III and L. Foster. 1987. The whales of Hawaii. San Francisco, Marine Mammal Fund. 97 pp.

Gestation is reported to be between 12 and 15.5 mos. and lactation is estimated to last 18 mos. Can swim 15 knots. Shows photograph of false killer whales with a rough-toothed dolphin *Steno bredanensis*.

82. Mitchell, E. 1965. Evidence for mass stranding of the false killer whale (*Pseudorca crassidens*) in the eastern north Pacific Ocean. Norsk Hvalfangst-Tidende (8):172-177.

1866, Paita, Peru, skull;
Pichilinque Bay, Baja California, skull described by Miller in 1920.
1934, 150 km south of Acapulco, photograph of the intact animal published in Lonnberg, 1936.
(Stager and Reeder, 1951) - 1940, 1949, four skulls were found on San Nicolas Island, California, 33°15'N, at LA County Museum (LACM 8457-8460).
(Van Gelder, 1960) - two skulls were found 28 Apr 1957 on San Jose Island, Baja California, 25°00'N. Skulls are in the American Museum of Natural History (AMNG 180609, 180610).
(Norris and Prescott, 1961) - 1 Dec 1959, 33°31'N near Santa Catalina, CA, sighting of a large group thought to be false killer whales.
(Lindsay, 1964) - Two skulls were collected from Isla San Jose, Baja California, 25°00'N, on 27 Jun 1964 (California Academy of Sciences collection, CAS-RB 249, 250). Being from the same area as the Van Gelder skulls and in the same state of preservation, these may have been part of the same group.
(Brown, in litt., 1964) - Marineland of the Pacific captured a female and had maintained it successfully for some months as of Mitchell's writing.
14 Feb 1940, skull was found on Espiritu Santo Island, Baja California, 24°30'N; it is in LACM (LACM M1794).
15 Apr 1960, cranial fragments were recovered from San Nicolas Island (LACM M1703). Another skull (LACM M1702) found near LACM M1703 was pieced together from the south coast of San Nicolas Island. Both skulls are similar to the Stager and Reeder series (same state of preservation, same area, same range of measurements); they may have belonged to the same group of whales. Ribs and vertebrae were exposed but not collected.
(Moore, J.C., in litt. 1962): there are false killer whale specimens in the American Museum of Natural History from the Galapagos Islands; these are identified as *Orcinus rectipinna* or *Grampus rectipinna*, but are actually false killer whales.
These records suggest two mass strandings occurred in the eastern North Pacific, one of six or more animals prior to 1940 on San Nicolas Island, and one of four or more animals prior to 1957 on San Jose Island.

83. Mitchell, E. 1975a. Porpoise, dolphin and small whale fisheries of the world, status and problems. Species Survival Commission, International Union for the Conservation of Nature. Monograph 3:129.

(Nishiwaki, 1966; Mizue et al., 1970; Ohsumi, 1972): false killer whales cause much damage to the tuna long line fishery.
(Caldwell et al., 1971a): it is sometimes taken in the St. Vincent fishery in the Atlantic.
(Gilmore, 1951): it is mainly fished in the Pacific

(Richard, 1936a): it has been captured for scientific study and successfully maintained in captivity.
Notes that the species is directly or incidentally exploited at apparently low levels but does not appear to be of much commercial interest or other use.

81. Mitchell, E. (Ed.). 1975b. Review of biology and fisheries for smaller cetaceans. Report of the meeting on smaller cetaceans, Montreal April 1-11, 1974, Subcommittee on Small Cetaceans, Scientific Committee, IWC. J. Fish. Res. Board Can. 32:889-983.

Summary of false killer whale information:
(Comrie and Adam, 1938): Ovaries were taken from four sexually mature females ranging in length from 425 to 450 cm. The 425 cm animal contained a 109 cm fetus.
False killer whales damage fish on long-lines worldwide.
14 Jan 1970: 430 cm female stranded at Ft. Pierce, Florida.
11 Jan 1970: mass stranding near Ft. Pierce. Animals were towed offshore and subsequently washed back.
(Nishiwaki, M., unpublished data): about 30-50 per year are accidentally taken in Pacific long line fisheries.

119. Miyashita, T. 1986. Abundance of some Globicephalid cetaceans in the adjacent waters of Japan. IWC/SC/38/SM17. 18 pp.

The Japan Fisheries Agency conducted whale sighting vessel surveys in the western North Pacific from 1982 through 1985. There were eight sightings of false killer whales in winter months (Jan - Mar) and 12 in summer months (Jun - Oct).

359. Miyazaki, N. 1980. Catch records of cetaceans off the coast of the Kii Peninsula Japan. Mem. Natl. Sci. Mus. (Tokyo) 0(12):69-82.

False killer whales are among the species represented from the daily fisherman's record of the fisherman's cooperative union at Taiji.

73. Miyazaki, N. and S. Wada. 1978. Observation on Cetacea during whale marking cruise in the Western Tropical Pacific, 1976. Sci. Rep. Whales Res. Inst. 30:179-195.

During a whale marking cruise in the western tropical Pacific in 1976, false killer whales were seen twice:
27 Jan 1976: group of 10 - 20 with a herd of about 10 -20 spotted dolphins, *Stenella attenuata*, at 04°52'N, 138°35'E. Sea surface temperature was 29.1°C. One subadult was shot and killed with a shotgun (to collect biological information), but the carcass was lost at sea. This group was composed of several subgroups of 2 -

3 animals, with a distance between subgroups of 10 - 50 m.
6 Mar 1976: group of 20-30, including several females with calves, at 02°37'S, 153°01'E. Sea surface temperature was 30.8°C.

140. Miyazaki, N. 1983. Catch statistics of small cetaceans taken in Japanese waters. Rep. int. Whal. Commn 33:621-631.

False killer whales caught (commercially and incidentally) in Japanese waters 1976-1981: 1272 by driving, 102 by harpoon, 1 by small-type whaling and 32 incidentally by set net.

248. Mizue, K. and K. Yoshida. 1961. Studies on the little toothed whales in the West Sea area of Kyusyu-VII; about *Pseudorca crassidens* caught at Arikawa in Goto Is. Nagasaki Pref. Bull. Fac. Fish. Nagasaki Univ. 11:39-48, pls. 18-21. (In Japanese.)

Many false killer whales and bottlenose dolphins, *Tursiops* sp., were caught at Arikawa Bay in the Goto Islands. Detailed descriptions and measurements are given and compared to those of other areas. Stomachs contained mostly squid, indicating that this group was part of a feeding migration rather than breeding migration. There were many fetuses about 80 cm in length.

133. Mizue, K., A. Takemura and K. Nakasai. 1969. Studies on the little toothed whales in the West Sea area of Kyushu -XVI. Underwater sound of the false killer whale. Bull. Fac. Fish. Nagasaki Univ. 28:19-29.

Underwater vocalizations of false killer whales were recorded at sea between Iki Island and Tsushima Island, NW of Kyushu in Japan, and at the Shimonoseki Aquarium, where false killer whales have been kept since 1960. (Mizue and Yoshida, 1961): false killer whales often mix with the bottlenose dolphin (*Tursiops gilli*), and sometimes strand with them.
They often steal tuna from long lines.
See notations under Mitchell (1975a) - citation No. 83, and Purves and Pilleri (1978) - citation No. 131.

506.* Möbius. 1862. Brief uber die Strandung von *Pseudorca*. Der Zool. Garten 3:39. (In German.)

See notation under Pilleri and Arvy (1981) - citation No. 181.

423.* Möbius, K. 1873. Ueber zwei gestreifte Delphine (*Grampus griseus* Cev.) aus der Nordsee und über die in der Kieler Bucht beobachteten Cetacean. Schriften des Naturwiss Vereins für Schleswig-Holstein 1:1-5. (In German.)

See notation under Aguayo (1978) - citation No. 141.

356. Morimitsu, T., T. Nagai, M. Ide, H. Kawano, A. Naichuu, M. Koono and A. Ishii. 1987. Mass stranding of odontoceti caused by parasitogenic eighth cranial neuropathy. J. Wildl. Dis. 23(4):586-590. (Abstract.)

Hearing organs were examined from 5 of 125 false killer whales mass stranded in 1986. Numerous trematodes (*Nasitrema gondo*) were found in the tympanic cavities. Severe degeneration of the eighth cranial nerve, many trematode eggs in nervous and surrounding tissues. Parasitogenic eighth neuropathy is proposed as cause of mass stranding of the Odontoceti.

180. Moore, J.C. 1953. Distribution of marine mammals to Florida waters. Amer. Midl. Nat. 49(1):117-158.

Cites records of false killer whales from Florida waters since 1920 (all previously published and discussed). Relates account of fishermen who baited a hook with a 2 1/2' bonita; a false killer whale took the bait, broke the line, and breached near the boat.

377. Morzer Bruyns, W.F.J. 1969. Sight records and notes on the false killer whale *Pseudorca crassidens*. Saugetierk. Mitt. 17(4):351-356.

Review of known records, additional records of sightings by the author during cruises. Sightings included in Table 1 of this publication. Includes description, behavior, distribution, habitat.

150. Morzer Bruyns, W.F.J. 1971. Field Guide of Whales and Dolphins. C.A. Meese, Amsterdam. 258 pp.

Males grow to 6.1 m and 2170 kg, females to 4.6 m and 1100 kg.
They eat 70 lbs squid and fish per day.
They were hunted in the Arabian sea in ancient times for ivory, which was traded across Asia, Alaska and Canada to the Indians.

381. Murray, A. 1866. The Geographic Distribution of Mammals. Day and Son, Limited, London:i-xvi, 420 pp, maps.

Historic distribution of *Phocaena crassidens* Owen, with list of different names and type specimens.

84. Nakajima, M. 1971.

False killer whales have been successfully kept in aquariums in Japan; in 1971 they were kept at eight different aquariums.

593.+ Nayman, J. 1978. Whales, dolphins and man. Hamlyn Publish. 128 pp.

217. Neiland, K.A., D.W. Rice and B.L. Holden. 1970. Helminths of marine mammals, I. genus Nasitrema, air sinus flukes of delphinid cetacea. J. Parasit. 56(2):305-316.

Descriptions of marine mammal parasites. Specimens of *Nasitrema globicephalae* were found in the pterygoid air sinuses of a false killer whale. 27 specimens of *Nasitrema attenuata* were taken from one false killer whale.

376. Ness, A.R. 1967. A measure of asymmetry of the skulls of odontocete whales. J. Zool., Lond. 153:209-221.

Linnear measurements were made of the skulls of several genera. False killer whale is among those described, from a stranding at Dornoch Firth. Assymetry and skew are measured, compared and plotted.

315. Nicol, D.J. 1986. Human interest in the Tasmanian cetacean fauna. Center for Environmental Studies, University of Tasmania, Research Report No. 26. 13 pp + 1 app.

Report from the Whale Stranding Research Programme at the CES. (Flower and Gearson, 1884): include false killer whales in their catalogue of vertebrate specimens held in the Museum of the Royal College of Surgeons, London. This is the first Tasmanian report of this species (although it may not have come from Tasmania). They also state that one specimen was presented by Dr. Crowther to the British Museum (Natural History) and one to Cambridge University in about 1866.

380. Nicol, D.J. 1987. A review and update of the Tasmanian cetacean stranding record to the end of February 1986. University of Tasmania Environmental Studies Working Paper 21.

Catalogues Tasmanian cetacean strandings. Points out that there have been no false killer whale strandings in Tasmania since 1976. False killer whales represented 6.1% of all strandings and 18.2% of the total number of stranded animals to March 1976. Nine strandings were mass strandings. Limited data indicate some seasonality, with peak numbers in June and a lesser peak in December.

307. Nicol, D.J. and R.L. Croome. 1988. Trends in the Tasmanian cetacean stranding record. Pp. 59-70 *In* M.L. Augee (ed.). Marine Mammals of Australasia, Field Biology and Captive Management. Royal Zool. Soc. NSW, Sydney. 140 pp.

Stranding records over the past 160 years (through February 1986) are summarized. References are from Tasmanian scientific papers (Scott, 1942; Guiler, 1978; McManus et al., 1984), minor papers and newspaper articles. There were 13 strandings of false killer

whales, nine of which were mass strandings, representing approximately 548 animals. (No details on numbers or dates).

594.+ Nishiwaki, M. ****. Current marine mammal research in Japan. Univ. of the Ryukyus. 5 pp.

424. Nishiwaki, M. 1957. A list of marine mammals found in the seas adjacent to Japan. [Journal name unknown - Eds.] 3:149-156. (In Japanese.)

595.+ Nishiwaki, M. 1963. Taxonomical consideration of genera of *Delphinidae*. Sci. Rep. Whales Res. Inst. No. 17:93-103.

92. Nishiwaki, M. 1966. Distribution and migration of marine mammals in the North Pacific area. Bull. of the Ocean Res. Inst. Univ. of Tokyo 1.

They cause great damage to tuna fisheries. In the West Pacific, false killer whales occur, in herds of hundreds or thousands, North as far as Tsugaru Channel and in the Sea of Japan, East China Sea and South China Sea. In the North Pacific, the population is densest in the southeast.

90. Nishiwaki, M. 1967. Distribution and migration of marine mammals of the North Pacific area. Ocean Res. Inst. U. of Tokyo. 11th Pac. Sci. Cong. Symp. No. 4:1-49.

False killer whales occur south of Tsugaru Channel, in the Sea of Japan, the East China Sea and the South China Sea. One group reportedly followed a tuna boat for more than 1,000 miles.

507. Nishiwaki, M. 1972. General biology. Pp. 3-204 *In* S.H. Ridgway (ed.). Mammals of the Sea. Charles C. Thomas, Springfield, Ill. 812 pp.

Skeletal characteristics: cross sections of teeth circular, six cervical vertebrae fused. Description of morphology, dental formula, food. Brief notes on reproduction, behavior, captivity, distribution. Lists parasites (included elsewhere in this bibliography with original authors.

596.+ Nishiwaki, M. 1975. On the catch of the striped dolphin (*Stenella coeruleoalba*) in Japan. Advisory Committee on Marine Resources Research ACMRR/MM/EC/30.

5. Nishiwaki, M. 1977. Distribution of toothed whales in the Antarctic Ocean. Pp. 783-791 *In* G.A. Llano (ed.). Proc. third SCAR Symp. on Antar. Bio.

Describes the false killer whale as a small Odontocete species that inhabits tropical, temperate-warm and temperate-cold waters of the

Southern Hemisphere, but does not migrate south of the Antarctic Convergence.

329. Nishiwaki, M. 1982. On the catch of the striped dolphin, *Stenella coeruleoalba*, in Japan. Pp. 39-44 *In* Mammals in the Seas, Volume 4, Small Cetaceans, Seals, Sirenians and Otters. FAO Fisheries Series 4(5):39-44.

False killer whales are among the common harvest for human consumption by drive fishery and hand harpoon on the northwestern coast of Kyushu and in the islands of Goto.

204. Nishiwaki, M. 1984. Significance of 55° in the "Indian Ocean Sanctuary of Whales" in relation to the distribution of marine mammals. Memoirs of Natl. Inst. of Polar Research. Proc. of Sixth Symp. on Polar Biol. Spec. Issue 32:122-129.

Marine mammal distribution is examined to help determine if the Indian Ocean Sanctuary of Whales should be extended as far as Antarctica over 55°S. False killer whales are listed as being warmer water inhabitants, found in latitudes lower than 55°S.

120. Nishiwaki, M. and Y. Hung-Chia. 1961. A curiously tailed dolphin caught in Formosa. Norsk Hvalfangst-Tidende 12:507-512.

11 Mar 1957: a dolphin was observed in a fish market in Keelung, Formosa, that resembled a false killer whale. Measurements are given and compared to those of other false killer whale specimens. The tail has a projection of skin where the notch should be. The authors suggested that the tail flukes are underdeveloped.
Isolated specimens of this species are caught by pelagic tuna fishermen in the Indian Ocean and near the Celebes, and frequently appear in the fish markets of Japan.

327. Nishiwaki, M. and T. Kasuya. 1977. Investigation on the incident of killing dolphins at Iki-Island.

Account of the 23 Feb 1977 killing of about 1,000 dolphins at Iki Island. 251 false killer whales were killed. Sightings records around Iki Island from Nov 1967 to Mar 1969 by the Fisheries Agency included 11% false killer whales and pilot whales, *Globicephala macrorhyncus*.

53. Nishiwaki, M. and T. Tobayama. 1981. Hybrids between *Pseudorca crassidens* and *Tursiops truncatus gilli*. P. 481 *In* W.F. Perrin, R.L. Brownell and D. Demaster (eds). Reproduction in whales, dolphins and porpoises. Rep. int. Whal. Commn (Spec. issue 6). 495 pp.

A hybrid of a *Pseudorca crassidens* (male) and a *Tursiops truncatus gilli* (female)

was born on 3 May 1981 at Kamogawa Sea World. The situation of the pool, the relation between the mother dolphin and males of various species and the growthand death of the particular individual were studied. On 6 Jul 1981 in the same pool, another *T. truncatus gilli* aborted a near-term calf fathered by the same male.

121. Nishiwaki, M. and T. Tobayama. 1982. Morphological study on the hybrid between *Tursiops* and *Pseudorca*. Sci. Rep. Whales Res. Inst. 34:109-121.

3 May 1981: A hybrid female calf was born to a *Tursiops truncatus gilli* female and *Pseudorca crassidens* male and Kamogawa Sea World. She died of acute pneumonia after 277 days; the different blood types of the parents may have been a factor. D. Duffield conducted chromosome studies. This hybrid is compared to three other hybrid fetuses (same cross) aborted at Kamogawa Sea World.

508.* Nobre, A. 1935. Fauna Marinha de Portugal, I, Vertebrado. p. 13-16, *Globicephalus melas*, fig. 46, 47, 48.

393. Nores, C. and M.C. Perez. 1982. Mass strandings of cetaceans on the northern coast of Spain. Mem. Mus. Mar (Zool.) 2(21):2. (Abstract.)

22 Oct 1795: a herd of 400-500 animals, probably false killer whales, stranded on the arbeyal beach in Gijon, Spain.

570. J.R. Norman and F.C. Fraser (eds.). Giant fishes, whales and dolphins. Putnum Press, London. 376 pp.

For annotation see Fraser, F.C., 1948.

221. Norris, K.S. 1967a. Some observations on the migration and orientation of marine mammals. Pp. 101-125 *In* R. M. Storm (ed.). Animal Orientation and Navigation. Proceedings of the Twenty Seventh Annual Biology Colloquium, May 6-7, 1966. Oregon State Univ. Press, Corvallis. 134 pp.

Orientation and migration are described, including possible orientation mechanisms. The false killer whale emits intense, broad-band, relatively long-duration clicks similar to those of the bottlenose dolphin, which seems to use these clicks when the animal needs information about general positions of objects in its path.

65. Norris, K.S. 1967b. Aggressive behavior in cetacea. Pp. 225-241 *In* C.D. Clemente and D.B. Lindsley (eds.). Aggression and Defense: Natural Mechanisms and Social Patterns. Proceedings of the Fifth Conference on Brain Function, November 1965. Brain Function, Vol. 5. Berkeley Univ. of Calif. Press.

Aggression has occasionally been observed in captive false killer whales to the extent that it was dangerous to enter the tank.

220. Norris, K.S. 1968. The evolution of acoustic mechanisms in odontocete cetaceans. Pp. 297-324 *In* E. T. Drake (ed.). Evolution and Environment. New Haven, Yale Univ. Press.

Describes various acoustic mechanisms in cetaceans. Indicates that there is strong directionality in the echolocation clicks of the false killer whale (as well as other listed species).

597.+ Norris, K.S. and T.P. Dohl. ****. A review of the structure and functions of cetacean schools. Final Report to U.S. Dept. of Commerce, contract no,. 03-4-208-54.

142. Norris, K.S., W.E. Evans and G.C. Ray. 1974. New tagging and tracking methods for the study of marine mammal biology and migration. Pp. 395-408 *In* W.E. Schevill (ed.). The Whale Problem, a Status Report. Cambridge, Harvard Univ. Press. 419 pp.

Radio transmitters have been fitted to a false killer whale using a pectoral harness that fit around the chest and was prevented from moving by the pectoral flippers.

306. Norris, K.S. and B. Mohl. 1983. Can odontocetes debilitate prey with sound? The American Naturalist 122(1):85-104.

Describes snout structure and methods of grasping prey. Describes observations of false killer whales feeding on mahi mahi off Hawaii in 1963 and 1980; in both cases, whales were feeding on some fish while other fish lay immobile but apparently uninjured nearby.

97. Norris, K.S. and J.H. Prescott. 1961. Observations on Pacific cetaceans of Californian and Mexican waters. Univ. of California Publ. 63(4):291-402 + plates 27-41, 12 figs.

1 Dec 1959: a group of about 300 animals tentatively identified as false killer whales was sighted traveling at abut 6 knots 3 miles northwest of the west end of Santa Catalina Island, California. The group covered an area two miles x 1/2 mile. Sizes of animals ranged from 5 ft to slightly over 10 ft. Many had babies. The group consisted of many subgroups of 4-6 animals travelling very close together. Many were jumping, some breaching and falling back on the side. Several lobtailed. They were not frightened of the Marineland vessel, and swam within 15 ft of it for several seconds at a time until one was harpooned, whereupon they immediately swam away. They constantly produced loud squeaks, heard from over 50 ft away. One type of call was noted to consist of a drawn out high squeak of constant pitch.

One of the largest animals was harpooned from a skiff alongside the Marineland collecting vessel. After a few hours of struggling it finally escaped, but was inspected closely enough for probable identification. It had a medium-gray blaze starting at the ventral tip of the lower jaw and spreading to form a broad shield-shaped mark between the pectorals, narrowing and finally disappearing along the mid-ventral line, 2 or 3 ft posterior of the pectoral flippers.
(Richard, 1936): two males were taken near San Miguel, Azores had a gray blaze on the ventral surface.

They are distinguished from pilot whales by their smaller and more triangular dorsal fins, which have a moderately hooked posterior contour, and resemble bottlenose dolphins, *Tursiops gilli*. The head is not so bulbous as that of pilot whales.

444. Norris, K.S. and C.R. Schilt. 1987. Cooperative societies in three-dimensional space: on the origins of aggregations, flocks, and schools, with specieal reference to dolphin and fish. Ethology and Sociobiology 9:149-179.

The authors propose that the threat of predation by false killer whales on smaller dolphins is responsible for maintaining large group sizes of the dolphins at night.

322. Northridge, S. and G. Pilleri. 1986. A review of human impact on small cetaceans. Inv. on Cet. 8:221-261.

Distribution, direct and incidental take. (Zhou et al. 1982): 13 individuals were caught from a mixed school of a hundred dolphins in 1979 in the south Huanghai Sea by Chinese coastal boats. Other records previously cited are also mentioned.

311. Notorbartolo di Sciara, G. 1986. Manuale del Cetonauta. Edizioni del Cormorano, Milano. 72 pp. (In Italian.)

General description, color, brief natural history, notes on species with which it may be confused.

509.* Nybelin, O. 1939. Naturhistoriska Museet Zoologisk a avdelning Berattelse for ar 1938. Pp. 9-28 *In* Goteborgs Museum Arstryck 1939. 188 pp.

510.* Oba, T. and H. Ohyi (editors). In Press. The Kabukai sites, Part 1. Studies on Okhotsk Culture, Vol. 3. Univ. of Tokyo Press. Tokyo. (In Japanese).

511* Odell, D. and E. Asper. 1977. A summary of information derived from a mass stranding of *P. crassidens* in Florida, 1976. Marine Mammals Stranding Workshop, Athens, Ga., 10-12 August,

1977. p. 20-21. U.S. Marine Mammal Commission contract MM7AC020. (Abstract.)

79. Odell, D.K., E.D. Asper, J. Baucom and L.H. Cornell. 1979. A summary of information derived from the recurrent mass stranding of a herd of false killer whales, *Pseudorca crassidens* (Cetacea: Delphinidae). Pp. 207-222 *In* J.B. Geraci and D.J. St. Aubin (eds.). Biology of Marine Mammals: Insights Through Strandings. Final Rep., U.S. Marine Mammal Commission contract MM7AC020. Rep. #MMC-77/13. NTIS# PB293890.

22 Jul 1976: a group of at least 29 entered shallow water on the southwest coast of Florida. One female died, four females were captured after stranding and later died, and 24 were returned to the sea. On 5 Jul a group of 30 stranded on Loggerhead Key, Dry Tortugas, about 325 km south of the first site. Some of the animals were identified as belonging to the first group, based on dorsal fin photographs. One of the Loggerhead Key animals died, and the rest were forced back to sea. On 2 Aug, three shark-eaten carcasses were found floating 2 km off Cape Sable, Everglades National Park, about 190 km east-northeast of Dry Tortugas. On 28 Aug, 20 very decomposed carcasses were found in the same area, and the skulls recovered. Six animals were necropsied, and body measurements, organ weights and reproductive data recorded. Blood data taken from 34 animals indicated stress but were, in general, comparable to normal values for other small cetaceans. The cause of the strandings was not determined.

The animals taken into captivity appeared to adapt fairly quickly, feeding on squid, mackerel and herring immediately after their arrival at Sea World. They ate well, often from hand, and did not object to being handled. Swimming patterns were normal. However, all died within 3 1/2 weeks, apparently of pneumonia.

Necropsies of six of the animals revealed extensive parasitism. There were abundant acanthocephalan worms in the small intestine, and varying degrees of infestation by nematodes in the lungs, pterygoid sinus complex, liver flukes, and stomach nematodes. The smallest animal did not have nematodes in the pterygoid sinus. No cestode plerocercoid cysts were found in the blubber of any of the animals.

(Caldwell et al., 1970): group of 150-175 stranded near Ft. Pierce in Jan 1970. No biological data were collected.
(Dr. Gordon Hubbell, pers. comm. 1977): 18-19 Jul 1972 on Sawyer Key on the Gulf of Mexico side, about 35 km northeast of Key West, 24°45.6'N and 81°33.4'W, a group of 19 stranded. Total length measurements taken; they include 460 cm, 320 cm male, 376 cm female, 427 cm female.

80. Odell, D.K., E.D. Asper and L.H. Cornell. 1980. A recurrent

mass stranding of the false killer whale, *Pseudorca crassidens*, in Florida. Fish. Bull. 78(1):171-177.

Contain basically the same information as Odell et al. (1979) - citation No. 79; reports the same incident.

598.+ Ogawa, T. 1937. List of the Odontoceti in Japan. Annual Report of the Work, No. 122, June, 1937, Saito Ho-on Kai.

425. Ogawa, T. 1938. Studien uber die Zahnwale in Japan, insbesondere uber die vier bei uns bisher unbekannten Gattungen *Tursiops*, *Steno*, *Pseudorca* and *Mesoplodon*. Arbeit. a. d. Anatom. Inst. d. Kaiserl. - Papanisch. Univ. Z., Sendai 21:173-218, 14 pl. (In German.)

78. Ohsumi, S. 1972. Catch of marine mammals, mainly small cetaceans, by local fisheries along the coast of Japan. Bull. Fish. Res. Lab. Shimizu 7:137-166.

False killer whales are occasionally caught by local drive fisheries in Japan, and this species is one of the objects of the drive fishery in Shizuoka, Wakayama, Nagasaki and Yamaguchi prefectures (catch differs by locality). They occur in all regions around Japan and are considered common in many areas.
Also, see notations under Mitchell (1975a) - citation No. 83.

426. Ohsumi, S. 1981. Marine mammals and fisheries. Suisan Shiryo Shikiho 7:3-4. (In Japanese.)

296. Oliver, W.R.B. 1922a. A review of the Cetacea of the New Zealand seas. Proc. Zool. Soc. Lond. 1922:557-85.

Brief statement of range, listing/discussion of previously cited stranding records.

293. Oliver, W.R.B. 1922b. The whales and dolphins of New Zealand. N.Z. Jl. Sci. Technol. 5:129-41.

Brief description of Tasmanian blackfish (*Pseudorca crassidens*).

410. Oliver-Schneider, C. 1946. Catalogo de los Mamiferos de la provincia de Concepcion. Bol. Soc. Biol. Concepcion. 21:67-83.

Report of the southernmost record of false killer whales in the eastern Pacific, that of a skull of an animal stranded at Tranco, Llico, Costa de Arauce, Chile.

599.+ Oriordan, C.E. 1982. Marine fauna notes from the National Museum of Ireland 8. Ir. Nat. J. 20(12):551-553.

600.+ Orr, R.T. 1972. Marine mammals of California. Univ. of Calif. Press. Calf. Nat. Hist. Guides 29. 64 pp.

512.* Osborne, R., J. Calambokidis and E.M. Dorsey. 1988. A guide to marine mammals of greater Puget Sound. Island Publishers, Anacortes, WA. 191 pp.

513.* Owen, 1846. A history of British fossil mammals and birds. Fossil, Lincoln, England:516.

68. Patterson, P. and F. Alverson. 1986. Summary of spotted, spinner, unidentified and other identified porpoise sightings reported by commercial tuna vessels fishing in the tropical central and western Pacific Ocean. SWFC/NOAA. Admin. Rep. LJ-86-06C. 24 pp.

23 Jul 1983: group of 8-20 false killer whales was seen heading south, 19°26'N, 156°02'W; reported by a tuna vessel. They passed within 100 yards of the ship.

173. Paulus, M. 1963. Etude osteographique et osteometrique sur un pseudorque (*Pseudorca crassidens* Owen, 1846) capture au large de Port-de-Bouc (Bouchesdu-Rhone) en Novembre 1948 (Collection du Museum de Marseille). Bull. Mus. Hist. nat. Marseille 23:29-67. (In French).

Osteological examination and report of a false killer whale captured off the coast of France, at Port-de-Bouc, Bouches-du-Rhone, in November 1948. Vertebral column: cervical (7), thoracic (9-11), lumbar (9-13), caudal (16-23); total (47-51). The specimen is part of the collection of the Museum of Marseilles. Lists records of strandings and captures from 22 Jun 1787 to 1951.

375. Peacock, A.D., L. Comrie and F. Greenshields. 1936. The false killer stranded in the Tay Estuary. Scottish Naturalist 220:93-104.

Preliminary observations of 41 false killer whales stranded at Buddon Ness, Tay Estuary, Nov 1935, on a gradually sloping, sandy beach. 31 of the group stranded 1/2 mile E of Buddon lighthouse, 8 about 1 mile round the point near Carnoustie, 2 more farther along the coast. Measurements are given of some of the animals and compared to specimens from other strandings (Kinkell, Belhaven, Port Edgar, Donna Nook). Two pregnant females (14', 14'1"), four had a uterine plug (14'2", 14'7", 14'8", 15'7"), one was lactating (14'4"). This indicates that females are sexually mature before full growth is attained. Detailed information on teeth is given; two fetuses were collected and described.

37. Pearson, J. 1931. A note on false killer whale, *Pseudorca crassidens*, (Owen). Spolia Zeylanica 16(2):199-204.

History, distribution, body length measurements, detailed account of the skeleton dealing separately with vertebral column and girdle. Three photographic plates.
Stranding: 167 false killer whales 6' - 15' in length, stranded on the island of Velanai in Aug 1929. Two skeletons, 12 skulls were recovered for the Colombo Museum. Several females aborted fetuses before dying.

122. Pearson, J. 1936. The whales and dolphins of Tasmania Pt. 1. External characters and habits. Pap. and Proc. R. Soc. Tasm. 1935, (17 August 1986):163-192.

Jun 1936: a school stranded near Stanley, Tasmania. Measurements were taken of three males (varying from 279 - 465 cm) and two females (251 and 267 cm). Other body measurements are given.

77. Peilie, W. 1985. Distribution of cetaceans in Chinese waters. SWFC/NOAA Admin. rep. LJ-85-24. W.F. Perrin (ed.) Translated by C.H. Perrin.

Reports of false killer whales from China: occurs in Liao Dong and Lai Zhou gulfs, on the Hai Iang Dao fishing ground of the Yellow Sea, and on the Ian Wuei, Sh Dao and Lien Qien Sh fishing grounds. They are most often seen between June and August and October to November. Over ten strandings have been reported from Fu and Gien counties of Liao Nien Province, Dong Gou, I County of Shan Dong Province, and Sh Dao. They have often been found on the Da Sha fishing ground of the southern Yellow Sea, and the Lu S and Hai Zhou Gulf fishing grounds in large groups from April to June; captures have also been made there. They have been seen on the Zhou Shan and Wuen Tai fishing grounds of the East China Sea between April and September and often at Ping Tang of Fu Jian Province and Taiwan Strait. They have been captured at Ji Long and Gao Xueng, Taiwan.
1983: Gulf of Tonkin, capture.

138. Perrin, W.F. and C.W. Oliver. 1982. Time/area distribution and composition of the incidental kill of dolphins and small whales in the U.S. purse-seine fishery for tuna in the Eastern Tropical Pacific, 1979-80. Rep. int. Whal. Commn 32:429-444.

One false killer whale was killed in 1980 in the US Purse-seine fishery for tuna in the eastern tropical Pacific.

123. Perrin, W.F. and S.B. Reilly. 1984. Reproductive parameters of dolphins and small whales of the family Delphinidae. Rep. int. Whal. Commn (Special Issue 6):97-133.

Huggett and Widds/Laws statistical methods are used to estimate a 15.5 month gestation time for the false killer whale. Lengths at birth are listed as 193 cm [average of many specimens (Purves and

Pilleri, 1978) and 160 cm (qualitative inference from a few specimens (Ross, 1979)].

69. Perryman, W.L. and T.C. Foster. 1980. Preliminary report on predation by small whales, mainly the false killer whale *Pseudorca crassidens*, on dolphins (*Stenella* spp. and *Delphinus delphis)* in the Eastern Tropical Pacific. SWFC/NOAA Admin. Rep. LJ-80-05. 9 pp.

Logs from observers aboard tuna purse seiners noted aggressive interactions between toothed whales and dolphins. The false killer whale was the one most often seen chasing or attacking dolphins during fishing operations. Of the 22 interactions in which the animals were identified, 19 appeared to be false killer whales.
Cruise #429: false killer whales and dolphins passed within 100 m of the ship. The false killer whales were apparently herding the porpoise, then cut out a small section which they attacked.
In one instance, a skipper had a herd of dolphins in position to set the net when a group of 20-25 false killer whales swam into the center of the school, scattering the dolphins.
In several cases, false killer whales have attacked dolphins as they were being released from tuna nets. Five log reports described false killer whales surrounding the net and chasing or attacking the dolphins that were released. In one case, observers saw a whale knock a porpoise out of the water. One observer saw a whale "come clear of the water with a full grown porpoise crossways in its mouth, still struggling".

601.+ Phillips, W.W.A. 1984. Manual of the mammals of Sri Lanka. Part III. Wildlife and Nature Protection Society of Sri Lanka. 389 pp.

124. Phillips, S.S. 1988. Observations on a mass stranding of *Pseudorca crassidens* at Crowdy Head, New South Wales. Pp. 33-41 *In* M.L. Auge (ed.). Marine mammals of Australia Field Biology and captive management. 140 pp.

Jun 1985: a group of approximately 62 stranded at Crowdy Head, New South Wales, 32°50'S, 152°42'E, covering a 1 km area. 33 were rescued in three days. Initially the whales seemed disoriented and tried to turn back towards the shore, but rescuers used boats and surfboards to keep them turned toward the sea. Eventually all turned toward the sea and swam off.
(Baker, 1983): Apr 1978, 231 stranded at Manakau Harbour, New Zealand. Jun 1974, 172 stranded a Black River Beach, Tasmania.
(Loader, 1981): 1980, 66 stranded at Treachery Beach, New South Wales.
(R. Warneke, pers. comm.): 87 stranded between Petrel Point and Island Point, Victoria in January 1983.
(McNamara, 1986, Mell, 1988): 1986, 114 stranded at Augusta, Western Australia.

602.+ Pigg, J. and W.C. Cummings. 1968. Notes from the literature concerning cetaceans of the Bay of Bengal and the Indian Ocean. Draft.

603.+ Pike, G.C. and I.B. MacAskie. 1969. Marine mammals of British Columbia. Fish. Res. Board of Canada. Bull. No. 171. 54 pp.

38. Pillay, R.S.N. 1926. List of cetaceans taken in Travancore from 1902-1925. Bombay Nat. Hist. Soc. Journal 31:815-817.

A 16'10" false killer whale stranded on the Trivandrum beach in Feb 1902. Subsequently, two immature false killer whales, 11'10" and 10'9 1/2", stranded at Trivandrum. Adults stranded at Rajakamangalum and Tengapatam.

427. Pilleri, G. 1967a. Du comportement de quelques cetaces en Mediterranee occidentale. Extrait de Vie et Milieu, Serie A: Biologie marine. Tome XVIII - Fascicule 2 - A:355-373. (In French.)

395. Pilleri, G. 1967b. Behaviour of *Pseudorca crassidens* (Owen) off the Spanish Mediterranean coast. Rev. suisse zool. 74:679-683.

A herd of about 15 false killer whales, including males, females and calves, was seen off the coast of Spain between Gibraltar and Marbella and followed until dusk. They spouted every 20-30 seconds and swam at 6-8 knots. When the vessel approached a calf it was immediately flanked on both sides by adults. Vomiting and reswallowing of flesh were observed.

320. Pilleri, G. 1977. Note on the geographic distribution of cetaceans in the Uruguayan coastal waters. Inv. on Cet. 8:89-94.

(Ferreira-Vaz, R. 1969): The false killer whale occurs in Uruguayan waters.

325. Pilleri, G. 1987. Os interparietale and post-interparietal ossicles in a fetus of *Pseudorca crassidens* (Cetacea, Delphinidae). Inv. on Cet. 20:36-39.

Description of the false killer whale skull and its development.

428. Pilleri, G. und M. Gihr. 1969. Das zentralnervensystem der zahnund bartenwale. Revue Suisse de Zoologie 76(50):995-1037 + 8 tafels. (In German.)

197. Pilleri, G. and M. Gihr. 1976. Record of *Pseudorca crassidens* off

Karachi. Inv. on Cet. 7:205-207.

Describes records of false killer whales off Karachi, India. Authors found skull (without lower jaw) at Kinger Duo. Detailed skull measurements are given.
(Ferguson and Lydekker, 1903): specimen from waters of Travancore, India. Includes skull measurements.
(Al-Robaae, 1974): stranding at Dowha, near Kuwait. Skeleton my be at Natural History Museum of Kuwait.

328. Pilleri, G., M. Gihr and C. Kraus. 1983. Near field, interference, far field and rostrum structure in the echolocation system of Cetaceans. Inv. on Cet. 15:11-119.

False killer whale references: coupling surface is between 14-46 cm^2, yielding a near field length between about 3.5 and 9.6 cm for a frequency of 120 kHz and a wavelength of 1.2 cm. It has no pterygoschisis (= closed pterygoid). It has a very directional frontal emission field. Detailed measurements and calculations of near field, total beam width, etc. are presented.

429. Pilleri, G. and J. Knuckey. 1968. Das verhalten einiger Delphinidae im Westlichen Mittelmeer. Estratto dagli atti del Museu Civico di Storia Naturale - Vol. XXVI - Fasc. 3, N. 4. (In German.)

394. Pilleri, G. and J. Knuckey. 1968. The behavior of some Delphinidae (*Delphinus delphis, Stenella styx, Tursiops truncatus, Globicephala malaena, Grampus griseus* and *Pseudorca crassidens*) in the western Mediterranean. Atti Mus Civico Storia Natur Trieste 26(2/3):31-76.

Observations on behavior were made during two expeditions in the western Mediterranean. No mention of false killer whales is made in the abstract.

305. Pilleri, G. and J. Knuckey. 1969. Behaviour patterns of some Delphinidae observed in the western Mediterranean. Z. tierpsychol 26:48-72.

False killer whales are seldom seen in Mediterranean, and when they are the herds are usually small (Pilleri, 1967b; Pilleri and Gihr, 1967). They seldom come spontaneously to bow ride but will swim around the boat and can be followed if their speed is not too high. Protective behavior was seen in 1967; whenever the yacht approached a calf, several females immediately swam over it. Other behaviors are described.

181. Pilleri, G. and L. Arvy. 1981. The precursors in Cetology from Guillaume Rondelet to John Anderson. Inv. on Cet.

12:204-210, 222-229.

A history of various cetologists and their contributions. References of false killer whales include:
A skull found off the coast of Buenos Aires described by Burmeister (1968, 1972) as *Globicephalus grayi* was later identified by Paul Gervais as *Pseudorca crassidens*.
Contains Owens' original description of a false killer whale. Describes Bay of Kiel incident in which a group of false killer whales was attacked by fishermen and driven into Kiel Harbour, where a 16' female was killed. The specimen was exhibited and purchased for the anatomical collection of the University of Kiel. A brief description was published by Mobius (1862).
Hermann Burmeister (1807-1892) (and the description of the south American cetaceans: Described a skull of *Globicephalus grayi* in 1868 and in 1872; Paul Gervais ascertained that the skull was actually of *Pseudorca crassidens*.
Sir Richard Owen (1804-1892) and his contributions to Cetology: first described *Pseudorca crassidens;* named it *Phocaena crassidens*.

125. Porter, J.W. 1977. *Pseudorca* stranding. Oceans 10(4):8-16.

25-27 Jul 1976: Dry Tortugas stranding. Only the large (18 ft) male that died showed evidence of serious wounds. He was bleeding slowly from his right ear, and lay on his side with his blowhole occasionally submerged. About 1/4 of the others had a few circular cuts on their bodies thought to be bites of the cookie-cutter shark, *Istiophorus*. The bites exposed to the sun became large and festered and progressively sensitive.
Two different whales responded to the author's snorkeling near them by lifting him on their backs and carrying him toward shore. They did not exhibit this behavior when he did not have the snorkel. Detailed descriptions of behaviors and vocalizations are given. Each whale was identifiable by highly individualistic facial characteristics and expressions.

303. Poulter, T.C. 1968. Marine mammals. Chapter 17 *In* T.A Seobeck (ed.). Animal Communication. Indiana Univ. Press, Bloomington. 686 pp.

The author presents information from a number of unpublished sources as well as Dudock van Heel (1962); false killer whales produce echolocation and communication signals of clicks, squeals, cries, squawks, rasps, whistles, etc. Many of the calls attributed to "blackfish" may contain false killer whale calls but have not been studied enough to positively identify them.

278. Praderi, R. 1985. Incidental mortality of dolphins (*Pontoporia blainvillei*) in Uruguay. National Geographic Society Research Reports 21:395-403.

From 1 Jul 1982 - 30 Jun 1983, one adult male false killer whale, 4.0 m, stranded on the beach of Barra del Chuy 1.5 km SW of the mouth of the Arroyo Chuy. Photos taken and skull collected (RP 557).

39. Prematunga, W.P., A. Alling and S. Leatherwood. 1985. Species composition of small cetacean bycatches in gillnets off Trincomalee, Sri Lanka, January 1984 through April 1985. Document SC/37/SM9, IWC Scientific Committee, Bournemouth, U.K.

Jan 1984 - Apr 1985: small cetacean bycatch by drift gillnets off Trincomalee was monitored. False killer whales were taken in all quarters except the fall, with greater relative frequency than might have been expected based on visual surveys. One 600 kg female killed on 5 Aug had a 12 kg fetus. A total of 7 or 8 false killer whales was caught (2% of 398 total small cetaceans caught).
Jan 1984 - Apr 1985 gillnet: .02 x 398 total.
Mar 1982, Jan - May 1983, Feb - Apr 1984 visual:.01 x 72 total (from Alling, 1986).
Jan - May 1984, Jan - Apr 1985 gillnet (to correspond with visual months): .02 x 286 total.

514.* Prescott, J.W. 1981. Clever Hans: Training the trainers, or the potential for misinterpreting the results of dolphin research. Pp. 130-136 *In*: T.A. Seobeck and R. Rosenthal (eds.). The Clever Hans Phenomenon: Communication with Horses, Whales, Apes, and People. Ann. N.Y. Acad. Sci. 364.

See notation under Ellis (1982b) - citation No. 157.

605.+ Pryor, K. ****. Reinforcement training as interspecies communication. Pp. 253-260 *In* ****.

276. Pryor, K. 1973. Behavior and learning in porpoises and whales. Naturwissenschaften 60:412-420.

A SCUBA diver at Sea Life park who had been teasing a young false killer whale was required to work with the animal one day; it pinned him to the bottom of the tank for several minutes before responding to its trainer's call. There are occasional instances by humans being bitten by false killer whales and other captive marine mammals.

202. Pryor, K. 1981. Why porpoise trainers are not dolphin lovers: real and false communication in the operant setting. Ann. of N.Y. Acad. of Sci. 364:137-143.

Discusses cetacean behavior and reputation for high intelligence and communicative abilities in terms of the operant conditioning

captive cetaceans receive during training. Describes false killer whale "testing" of trainer's criteria for earning a fish reward.

94. Pryor, K. and R.H. Defran. 1977. Social behavior in captivity: ethograms on eleven species of cetaceans. Proc. Sec. Conf. on the Biol. of Mar. Mamm. San Diego, Calif. 12-15 December 1977:66. (Abstract.)

In a survey of trainers given a list of various behaviors and asked to rank species familiar to them on frequency of the behaviors, false killer whales ranked high in aggression, manipulative behavior, play and innovativeness.

604.+ Pryor, K. and I. Kang. 1987. Male alliances in schools of spotted dolphins (*Stenella attenuata*) in the Eastern Tropical Pacific. (Unpublished.)

30. Puccetti, M.L.A. 1986. Some uncommon odontocetes from Somaliland. Intl. Therid Congress, Calgary. Abst. No. 0038.

A young false killer whale stranded at Garad, south of Mogadishu, along the Somali coast; the skull (without mandible) was collected and sent to the Zoology Museum, University of Florence.

131. Purves, P.E. and G. Pilleri. 1978. The functional anatomy and general biology of *Pseudorca crassidens* (Owen) with a review of the hydrodynamics and acoustics in Cetacea. Inv. on Cet. 9:67-231.

History of the species is described. Detailed anatomy and general biology of false killer whales are described after examining a school of 127 whales stranded in the Dornoch Firth in 1927. 99 of the skeletons are in the Natural History Museum in England.
Their analyses indicate that males and females reach sexual maturity at 8-12 years, and at about 13-15 ' and 12 - 14', respectively. The smallest pregnant female was 14'0" and had a 1"2" fetus. One 14"5" female was accompanied by a 7"11" calf.
False killer whales are frequently seen in association with tuna and are known to prey on tuna on long lines and in free swimming shoals.
The reported 1969 stranding in Florida of sperm whales actually were false killer whales.
24 Nov 1961: a large herd of false killer whales entered the Bay of Kiel. Thirty were attacked and driven into the harbor, where one was killed. It was purchased for the anatomical collection of the University of Kiel.
There is no important commercial fishery of false killer whales.
(Mizue and Yoshida, 1961): small herd stranded at Arikawa in Goto Island.
(Pilleri, 1967a,b): 1966, small herd was sighted feeding on cephalopods off the Spanish coast between Gibraltar and Marbella.

(Van Bree, 1970, pers. comm.): found a specimen at Assini on the Ivory Coast, West Africa. mass stranding on North Island, New Zealand.
(Pilleri and Gihr, 1977): one record from Karachi, Pakistan.
(Castello and Gianuca (1976): one record from Rio Grande do Sul, Brazil.

76. Reeves, R.R. 1976. North Carolina cetaceans. Wildlife in North Carolina XL(8):4-6.

False killer whales occur, or have occurred at some time, in North Carolina waters.

135. Reeves, R.R. and S. Leatherwood. 1984. Live-capture fisheries for cetaceans in USA and Canadian waters, 1973-1982. Rep. int. Whal. Commn 34:497-507.

(Shallenberger, 1981): at least ten were live-captured off Hawaii from 1963-1981.

515.* Reiger, G. 1975. Dolphin sacred, porpoise profane. Audubon 77(1):2-29.

370.+ Reimchen, T. 1980. Sightings of Risso's dolphins *Grampus griseus* off Queen Charlotte Islands, British Columbia, Canada. Murrelet 61(1):44-45.

364. Reiner, F. and R. Santos. 1984. On the occurrence of the false killer whale *Pseudorca crassidens* (Owen, 1846), in the waters of Azores (Cetacea, Delphinidae). Mem. Mus. Mar. Ser. Zool. 3(26):1-7.

(Richard, 1936): 25 Aug 1911, two males were captured near Sao Miguel Island during the oceanographic expedition of Prince Albert of Monaco.
Aug 1982, a false killer whale carcass was found on the island of Pico (28°15'N, 38°22.5'W); skull was recovered and is at the Museu do Mar (M-233-82). Description of the skull with detailed measurements and photos.

516.* Reinhardt, J. 1862. Om en for den Danske Fauna ny Delphinart (*Pseudorca crassidens* Owen). Oversigt over d. Kongl. Dansk. Vetenskab. Selsk. Forhande, Nov., 1862:103-52.

See notation under Tomilin (1967) - citation No. 144.

126. Reinhardt, J. 1866. *Pseudorca crassidens*, a cetacean hitherto unknown in the Danish fauna. Pp. 189-218 *In* W.H. Flower (ed.). Recent memoirs on the Cetacea. Ray Society London. 312 pp. (Translation of Reinhardt, 1962).

Describes records of false killer whale strandings on the Danish coast; gives descriptions of the whales and detailed measurements of skulls, skeletons and bodies.
14 Aug 1862: Asneas, Sealand Is., stranding of one false killer whale reported by onlookers to be a 19' female.
Jun 1862: 14' false killer whale of unknown sex stranded at Refsnaes, Sealand Is. Blubber was removed and yielded ten gallons of oil.
May 1862: male, about 14", stranded at Middlefart, Funen Is. Tooth wear indicated a "rather old" animal.
24 Nov 1861: a large group of false killer whales entered the Bay of Kiel. Fishermen separated about 30 from the group and killed a pregnant 16' female.

263. Reynoso, J.P.G. and L.R. Bracho. 1985. Nombres cientificos y comunes de los mamiferos marinos de Mexico. An. Inst. Biol. Univ. Nal. Auton. Mex. 56(1985), Ser. Zool. (3):1043-1056. (In Spanish.)

False killer whales occur in all zones of Pacific Mexico, and in Zone IV of the Atlantic (Texas border to Yucatan).

214. Rice, D. (1963) **

Chart showing classification of cetaceans in relation to increasing specialization of the air sinus system. Detailed description of the false killer whale skull and air sinus system.

606.+ Rice, D.W. 1967. Cetaceans. Pp. 291-324 *In* S. Anderson and J. Knox Jones, Jr. (eds.). Recent Mammals of the World. Ronald Press.

264. Rice, D.W. and A.A. Wolman. 1978. Humpback whale census in Hawaiian waters - February 1977. Pp. 45-53 *In* K.S. Norris and R.R. Reeves (eds.). Report on a workshop on problems related to humpback whales (*Megaptera novaeangliae*) in Hawaii. Final Report to U.S. Marine Mammal Commission in Fulfillment of Contract MM7AC018. Report No. MMC-77/03. 90 pp.

False killer whales were observed in Hawaiian waters in February 1977, but were not seen to associate with humpbacks.

517.* Richard, J. 1936a. Documents sur les cetaces et pinnipedes. Resultats des Campagnes Scientifiques, Monaco. Fascicule XCIV in Resultats des Campagnes Scientifiques Accomplies sur son Yacht par Albert 1er, Prince Souverain de Monaco. 72 pp. + 8 plates.

Also, see notation under Mitchell (1975a) - citation No. 83.

238. Richard, J. 1936b. Notes sur les cetaces et les pinnipedes. Pp. 34-71 *In* J. Richard (ed.). Documents sur les cetaces et pinnipedes. Resultats des Campagnes Scientifiques, Monaco. Fascicule XCIV in Resultats des Campagnes Scientifiques Accomplies sur son Yacht par Albert 1er, Prince Souverain de Monaco. (In French.)

25 Aug 1911: two males were captured near Sao Miguel, Acores, Stn. 3142. They were black with grayish bellies somewhat similar to *Globicephala*. The stomachs contained numerous remains of large fish, most notably the vertebrae of tuna ("ou d'espadon?"), with the beaks of cephalopods possibly provided by the eaten fish. One of the false killer whales was hung up by its tail and vomited a substance containing "chair (French)" and bones. Measurements are given of these specimens.

310. Richmond, V. 1983. False killer whale. Australian Natural History 21(2):43-47.

General description, mention of Jul 1976 stranding of 30 false killer whales in Florida.

295. Roberts, A. 1951. The Mammals of South Africa. Trustees of "The Mammals of South Africa" Book Fund.

Brief description, distribution and habits. List of names.

608.+ Roberts, J.C., R.C. Boice, R.L. Brownell Jr. and D.H. Brown. 1969. Spontaneous atherosclerosis in Pacific toothed and baleen whales. Pp. 151-155 *In* J.C. Roberts and R. Strauss (eds.). Comparative Atherosclerosis. Harper and Row, New York. 426 pp.

363. Robineau, D. and J.M. Rose. 1984. The cetaceans of Djibouti; review of the existing knowledge on the cetaceans of the Red Sea and the Gulf of Aden. Bull. Mus. Natl. Hist. Nat. Sect. A Zool. Biol. Ecol. Anim. 6(1):219-249.

False killer whales are among the cetaceans identified in Djibouti, although not commonly seen.

518.* Robson, F. 1984. Strandings ways to save whales. The Science Press [PTY] Ltd., Johannesburg. 124 pp.

609.+ Ross, G.J.B. 1979. Distribution of small cetaceans on the South-east coast of southern Africa. South African Journal of Science 75:563. (Abstract)

519.* Ross, G.J.B. 1979. The smaller cetaceans of the south east coast of Southern Africa. PhD. Thesis. Univ. of Port Elizabeth. 415 pp.

See notation under Perrin and Reilly (1984) - citation No. 123.

241. Ross, G.J.B. ****. Studies on Australian cetaceans. Draft. 9 pp. (unpublished)

Cetacean material from 24 Australian organizations was examined for taxonomic purposes. Preliminary analysis of skull measurements of the false killer whale supports previous data suggesting that skulls of Atlantic and southern African animals are broader than those of the western Pacific animals.

74. Ross, G.J.B. 1984. The smaller cetaceans of the southeast coast of southern Africa. Ann. Cape Prov. Mus. 15(2):173-410.

Catalogue of stranding records on the SE coast of southern Africa:
Apr 1910: Port Alfred. Skull is registered in the Port Elizabeth Museum but is missing.
1920-1930: Kaiser's Beach. Total length 450 cm. Rostrum, mandibles and teeth are in the Port Elizabeth Museum (PEM 1514/69).
1 Jun 1961: East London. Skull is in the Port Elizabeth Museum (ELM 780).
13 Nov 1965: Kariega River Mouth; photograph in the Port Elizabeth Museum files.
pre 1970: Klipdrift. The skull and three vertebrae are in the Port Elizabeth Museum (PEM 1515/22).
8 Feb 1971: 34°34'S, 31°43'E; male, total length 358 cm, weight 372 kg. Harpooned from a herd of 30 animals. The entire skeleton is in the South Africa Museum in Cape Town (SAM 36320).
pre 1977: Cape St. Francis. Part of the mandible and five teeth are in the Port Elizabeth Museum (PEM 1520/63).
Jul 1977: Bushmans River Mouth. Total length 167 cm. The skull is in the Port Elizabeth Museum (PEM 1520/76). Detailed measurements are given.

Sighting records are from the Indian Ocean Sanctuary (1969, 1971, 1972, 1973), and Gambell et al. (1975):
8 Feb 1971: group of 30, one was harpooned and its skeleton is in the South Africa Museum. 34°34'S, 31°43'E.
12 Feb 1971: one animal, 31°59'S, 31°21'E
2 Feb 1973: group of six, 29°56'S, 32°00'E
9 Feb 1973: group of two, 33°58'S, 28°07'E
10 Feb 1973: group of 50, 34°08'S, 27°21'E
9 Jan 1974: group of ten, 31°37'S, 31°05'E.

Skull measurements of adults from the Atlantic, southern Africa, Pakistan, and New Zealand show very similar proportions (van Bree, 1972; True, 1889; Pilleri and Gihr, 1976). Detailed skull measurements are given.

Dorsal fin height is about 8% of body length. It is set more anteriorly in males than in females and in older animals of both

sexes (Tomilin, 1967). The skull is massive with a short, broad rostrum which increases in width with age (Tomilin, 1967). The premaxillaries are truncate anteriorly, narrow proximally, and expanded distally, with subparallel lateral margins. "The mandibles are robust and thickened proximally, unlike those of *Globicephala* in which the bone in this region is normally thin."

There are detailed descriptions of teeth from two juveniles.

Available data suggest a length at birth of 1.6 m. Smithers (1938) reported a sucking calf of 1.57 m. Fetuses of 1.6, 1.63, and 1.83 m have been recorded (Tomilin, 1967; Scott and Green, 1975; Norman and Fraser, 1948). Females reach sexual maturity at 3.6 m or more (Tomilin, 1957; Scott and Green, 1975), and calving season probably extends over several months (Scott and Green, 1975; Norman and Fraser, 1948). Sex ratio is reported to be approximately equal in stranded schools (Norman and Fraser, 1948).

They are known (from beaks found in stomachs) to eat several species of cephalopods as well as salmonids and gadids. Fraser (1936) suggested that the mass strandings in Scotland were associated with inshore migrations of large numbers of cephalopods. Wear patterns on the teeth imply that false killer whales are capable of making the small lateral and palinal jaw movements made by killer whales as well as vertical movements (Caldwell and Brown, 1964), but these movements are probably infrequent. Caldwell and Brown (1964) related this form of tooth wear to the violent feeding actions associated with breaking up large prey.

Mass strandings ranged from 50 - 835 (average 180) animals for 14 recorded strandings (Barnard, 1954; Tomilin, 1957; Caldwell et al., 1970; Aitken, 1971; Scott and Green, 1975). Herds sighted at sea are usually much smaller, normally containing fewer than 50 animals and often fewer than 20 (table 54 in text; Fiscus and Niggol, 1965; Pilleri and Knuckey, 1969; Morzer Bruyns, 1969). This suggests that herds that strand may be composed of smaller groups that joined together, possibly to exploit locally abundant, migrating populations of prey species.

There have been three mass strandings on the west coast of southern Africa (Barnard, 1954). Stranding records for the southeast coast involve single animals. Sighting records are all made offshore in the Agulhas current. The limited data for this region do not indicate seasonality for the species, and indicate that false killer whales occur sporadically here.

It readily approaches and bowrides ships.

397. Ryan, T. 1985. Crossed cetaceans. Oceans 18(6):50.

Report on the false killer whale-bottlenose dolphin hybrid born 15

May 1985. This was the first dolphin hybrid birth in the United States and, at the time, the only one of its kind in captivity.

610.+ Saayman, G.S. and C.K. Tayler. 1971. Responses to man of captive and free-ranging cetaceans. *In* P.J. Smith and P.G. Landsberg (eds.). Paralogia: Proceedings of the First and Second South African Symposia for Underwater Sciences.

317. Salinas, M.A. and L.F. Bourillon. 1988. Taxonomia, diversidad y distribucion de los cetaceos de la Bahia de Banderas, Mexico. Tesis Profesional, Universidad Nacional Autonoma de Mexico, Facultad de Ciencias, Departmento de Biologia. 211 pp. (In Spanish).

History and meaning of the name false killer whale, external morphology, skull characteristics with diagrams, detailed distribution, Mexican records.

1. Santerre, M.T. and R.M. Santerre. 1983. Cetaceans in Sri Lankan waters: A review of scientific literature. Symp. on Mar. Mam. of the Indian Ocean 22-25 Feb 1983. NARA/SMMI025. 23 pp. + 2 tables + 13 appendices.

(Pearson, 1931): 167 false killer whales stranded on the island of Velanai in Aug 1929. 2 skeletons and 12 skulls were recovered. Several females aborted fetuses before dying. One specimen was captured at Moratuwa in 1891.
(Deraniyagala, 1945): Nov 1934, 97 false killer whales stranded at Mutur. Sep 1939, one stranded at Godavaya in the southern province. Repeated attempts to tow the animal out to sea failed, as it continually returned. Deraniyagala listed these animals as a smaller subspecies, but Watson (1981) reported that no subspecies was recognized.
(Leatherwood and Clarke, 1983): false killer whales were seen northeast of Sri Lanka at a depth of 1,000 in Apr 1982.

612.+ Scheffer, V.B. 1971. False killer whales. P. 16 *In* Toothed whales in Eastern Tropical Pacific and Arctic waters. Pacific Search.

611.+ Scheffer, V.B. and D.W. Rice. 1963. A list of marine mammals of the world. U.S. Fish and Wildlife Service. Special Scientific Rep. Fisheries No. 431. 12 pp.

57. Scheffer, V.B. and J.W. Slipp. 1948. The whales and dolphins of Washington state with a key to the cetaceans of the west coast of North America. American Midland Naturalist 39(2):259-334.

Skeletal remains were found near La Paz, lower California, in 1888.

On 16 May 1937, a false killer whale was killed at the southern end of Puget Sound (48°25'N - Bullis and Moore, 1956). There were old rifle and shotgun wounds on its back. The whale entered the ship channel, where it was chased by two men in a small power boat until it stranded on a mud bank, at which point they shot it through the brain. Carcass was photographed. Total length 17'2"; maximum girth 6'10"; blubber thickness 3", weight 902 kg. Stomach contained a "solid gallon of pinworms" and salmon vertebrae and ribs. The skull and some teeth are in the Washington State Museum (12515).

236. Schevill, W.E. 1967. Personal communication from William E. Schevill. Pp. 35-36 *In* Anonymous. Conference on the Shark - Porpoise Relationship, Washington D.C., November 9, 1965; The American Institute of Biological Sciences.

Notes on records of cetaceans preying on sharks. "Rays or skates turn up as occasional items in the diet of ... *Pseudorca crassidens*..."

99. Schevill, W.E. and W.A. Watkins. 1962. Whale and porpoise voices. A phonograph record. Woods Hole Oceanographic Institution, Woods Hole, Mass. 24 pp. Phonograph disk.

Aug 1962: Sonogram is shown of a false killer whale recorded in the open sea about 170 miles east of Maryland. It shows a characteristic nearly single-frequency squeal along with some variable frequency squeals ranging from 4,000 - 8,000 cps, and a few clicks.

430. Schlegel, H. 1851. Abhandlungen aus dem Gebiete der Zoologie und Vergleichenden Anatomie. A. Arnz and Comp., Leiden. (In German.)

613.+ Schmidly, D.J. 1981. Marine mammals of the southeastern United States coast and the Gulf of Mexico. FWS/OBS - 80/41. 158 pp.

520.* Schmidly, D.J. and B.A. Walker. 1974. Annotated checklist and key to the cetaceans of Texas waters. Southwest. Nat. 18: 453-464.

55. Schmidly, D.J. and B.A. Melcher. 1974. Dolphins of Texas. Texas Parks and Wildlife 32(3):18.

False killer whales "frequently leap clear of the water".
Breeding occurs year round.
Not known from the immediate Texas area, but one was harpooned near the Flower Garden reefs, 120 miles southeast of Galveston, in 1961. Its complete skeleton is deposited at the Houston Museum of Natural Science.

56. Schmidly, D.J. and S.H. Shane. 1978. A biological assessment of the cetacean fauna of the Texas coast. U.S. Marine Mammal Commission. Final Rep. No. MMC-74/05. 38 pp.

The false killer whale skeleton at the Houston Museum has 43 vertebrae. Color photos of this animal are available; there are no white bands on the lips or in the anal region.
(Bullis and Moore, 1956): There is a record from the central Gulf of a specimen captured by the U.S. Fish and Wildlife Service's commercial fisheries exploratory vessel, the M/V *Oregon*, on 30 Apr 1955 at 25°30'N and 89°15'W.
(Caldwell and Caldwell, 1973): three probable sightings from the eastern Gulf of Mexico off the Florida coast.

431. Schultz, W. 1970. Uber das vorkommen von walen in der nord und ostsee (Ordn. Cetacea). Zool. Anzeiger 185(3/4):172-264. (In German.)

521.* Scott, E.O.G. 1942. Records of Tasmanian cetacea: No. 1. Notes on various strandings at or near Stanley, North Western Tasmania. Rec. Queen Vict. Mus. 1:27-49.

See notation under Nicol and Croome (1988) - citation No. 307.

268. Scott, M.D. and S.J. Chivers. In Press. Distribution and herd structure of bottlenose dolphins in the eastern Pacific Ocean. *In* S. Leatherwood and R.R. Reeves (eds.). The Bottlenose Dolphin; Recent Progress in Research. San Diego. Academic Press.

Notes that false killer whales are found in the eastern tropical Pacific associated with bottlenose dolphins (<5% of all sightings of the latter species). Speculates that the large size of bottlenose dolphins, relative to dolphins of the genus *Stenella*, for example, prevents the false killer whales from preying on them.

402. Scott, M.D., R.W. Baird and S. Leatherwood. In prep. Distribution, abundance, herd structure and behavior of the false killer whale (*Pseudorca crassidens*) in the eastern Pacific Ocean.

127. Scott, E.O.G. and R.H. Green. 1975. Recent whale strandings in northern Tasmania. Papers Proc. Roy. Soc. Tasmania 109:91-96.

Tasmanian records:
early Jun 1974: Black River Beach, NW Tasmania; 170-172 false killer whales stranded in two main groups. One group covered a 100 m length of beach, a smaller group was more compact and about 400 m away. Detailed body measurements are given.
mid Jun 1974: west Perkins Island; probable identification; 43

animals stranded.
Oct 1957: one at Fanny's Bay near Piper River heads.
Sep 1958: 50 at Seal Bay, King Island.
Also see notations under Guiler (1978) - citation No. 113, and Ross (1984) - citation No. 74.

522.* Scott, H.H. and C.E. Lord. 1920. Studies of Tasmanian Cetacea, part 1 (*Orca gladiator*, *Pseudorca crassidens*, *Globicephalus melas*). Papers Proc. Roy. Soc. Tasmania 1919:1-17.

See notation under Guiler (1978) - citation No. 113.

615.+ Sergeant, D.E. ****. Mass strandings in relation to population ecology of Odontocete cetaceans. Draft for IWC symposium on cetaceans.

See notation under Sergeant (1982) - citation No. 365.

286. Sergeant, D.E. 1959. On the evolution of life histories in the Delphinidae. *In* Populations of the Sea. 3. Evolution and Adaptation in the Sea.

Brief random notes. Includes table with suggested evolutionary sequence among the Delphinidae, modified after Winge (1942), with average tooth numbers (40 for false killer whales).

210. Sergeant, D.E. 1962. The biology of the pilot whale or pothead whale *Globicephala melaena* (Traill) in Newfoundland waters. Fish. Res. Board Can. 132:84.

Biology of *Globicephala melaena* is discussed in detail and compared with that of other cetaceans.
(Comrie and Adam, 1938): occasional presence has been noted of three equal-sized corpora albicantia in the same false killer whale specimen, indicating three simultaneous ovulations.

205. Sergeant, D.E. 1969. Feeding rates of Cetacea. FiskDir. Skr. Ser. HavUnders. 15:246-258.

Daily food consumption of captive cetaceans is determined from aquarium records of body weights and food weights, in an attempt to estimate feeding rates of other whales. Mean daily feeding rate for the false killer whale was calculated at 4.7% of body weight.

614.+ Sergeant, D.E. 1981a. Mass strandings of odontocetes as a population phenomenon. Fourth Biennial Conf. Bio. Mar. Mamm. San Francisco, Ca. (Abstract.)

See notation under Sergeant (1982) - citation No. 365.

54. Sergeant, D.E. 1981b. Patterns of life histories in

Delphinidae. Abstract No. 47. Cetacean reproduction: Estimating parameters for stock assessment and management. La Jolla, Ca. Nov 28 -Dec 7, 1981. 48 p. (Abstract.)

Members of the subfamily Orcininae display true sociality which appears to be achieved by a long delay in attainment of male sexual maturity together with an absence of aggression by adult males and females towards adolescent animals of both sexes.

365. Sergeant, D.E. 1982. Mass strandings of toothed whales Odontoceti as a population phenomenon. Sci. Rep. Whales Res. Inst. Tokyo 0(34):1-48. (Abstract.)

False killer whales, *Pseudorca crassidens*, like *Globicephala* sp., mass strand in herds containing all sizes of both sexes. Compares mass strandings of various species.

58. Shallenberger, E.W. 1981. The status of Hawaiian cetaceans. Final report to U.S. Marine Mammal Commission in fulfillment of contract MM7AC028. Report No. MMC-77-23. NTIS No. PB82-109398. ii + 79 pp.

False killer whales are found most frequently in tropical and subtropical waters. They are found near all of the main Hawaiian Islands and in the channels between the islands. They can be found in water less than 100 fathoms and over 1,000 fathoms deep. Distribution appears to be related to prey concentration.
They frequently bow ride. In Hawaiian waters they often travel in broad bands up to several miles wide. Brown et al. (1966) report a similar spatial distribution, and theorize that this is a technique for finding food.
They are known to eat squid, mahi mahi (*Coryphaena hippurus*), and yellowfin tuna (*Thunnus albacares*).
(Brown et al. 1966): False killer whales in several areas steal fish of various species from fishermen.
Hawaiian false killer whales frequently steal tuna of up to 70 lbs and sometimes take larger fish.
Hawaiian population size is unknown, but they normally travel in pods of 100 or less that move rapidly from place to place.

616.+ Sheldrick, M.C. 1976. Trends in the strandings of Cetacea on the British coasts 1913-72. Mammal Rev. 6(1):15-23.

128. Sheldrick, M.C. 1979. Cetacean strandings along the coasts of the British Isles 1913-1977. Unpublished?

1923-1927: three
1933-1942: fifteen

361. Shimura, E. and K.I. Numachi. 1987. Genetic variability and differentiation in the toothed whales. Sci. Rep. Whales Res.

Inst. Tokyo 38:141-164. (Abstract.)

Genetic variability of 12 species of toothed whales, mainly from the sea around Japan, was examined by starch-gel electrophoresis at 19 genetic loi encoding enzymes.

186. Shultz, G.M., R.H. Defran, W.A. Williams and A. Scarvoci-Preston. 1987. Ethograms and activity budgets on *P. crassidens*, *G. macrorhyncus* and *L. obliquidens*. Seventh Biennial Conf. Bio. Mar. Mamm. Miami, Fl. (Abstract.)

Ethograms were constructed for three species of cetaceans. The false killer whale, *Pseudorca crassidens*, was observed for 16 20-minute sessions: 71% of session time was spent swimming, 9.8% floating, 30% in unison forms of swimming and floating.

374. Siciliano, S. 1985. Exploracao economica e conservacao de mamiferos marinos do litoral sul-sudeste do Brasil. Monografia de bacharelado apre sentada ao Instituto de Biologia da Universidade do Estado do Rio de Janeiro. (In Spanish?) Portugese

617.+ Siefeld, K., W.C. Venegas and A.G. Azize. 1977. Notes on the state of marine mammals in Chile. Apdo. Anal. Inst. Patagonia 8:297-315.

67. Silalahi, I.S. 1979. Project observation and research on the cetaceans fishery of Lembata, Indonesia. WWF/IUCN. Glauds, Switzerland.

31 Jul 1979: widely scattered pod of 70 false killer whales was seen moving east 11 km SSE of Lamalera, size range 4-5m. Local name: temu blaa.

442. Silas, E.G. and C.K. Pillay. 1960. The stranding of two false killer whales *Pseudorca crassidens* (Owen) at Pozhikara, North of Cape Comorin. J. Mar. Biol. Ass. India. 2:168-271.

Various measurements of one male and one female false killer whale are given. Distribution is said to be cosmopolitan. Previous strandings, constituting herds are mentioned. It is suggested that stranding of false killer whales may be caused by changes in the distribution of the water masses and consequently the alteration of the distribution of the animals on which they feed. Species characteristics of false killer whales are noted. Two text plates are included.

25. Silas, E.G., P.P. Pallai, A.A. Jayaprakash and M.A. Pillai. 1984. Focus on small scale fisheries: drift gillnet fishery off Cochin, 1981 and 1982. Mar. Fish. Infor. Ser. T&E Ser., No. 55:1-17.

28 Jul 28, 1975: Fishermen in Puthiappa (a fishing village 5 km north of Calicut) saw a stranded whale at 3:30 pm. They dragged it ashore and left it in a 1/2 x 50 x 20 m tidepool, where it died after about two hours. The carcass was buried for later removal of the skeleton. Detailed body measurements are given as well as the results of biochemical analysis of the muscle, liver and blood. The stomach contained the remains of catfish (*Tachysurus* sp.). Total body length was 423 cm. Sex not stated; length of genital slit 30 cm.

18 Oct 1975: A false killer whale was seen struggling near Rameswaram in the Gulf of Mannar and was towed to shore, but died on the way. This animal was a male with a tooth count of: UR(8), UL(8), LR(10), LL(11). The front five pairs of teeth in each jaw were blunt. Detailed body measurements are given. Total body length 384 cm.

27 Jul 1976: Two false killer whales were caught in a gill net set off Maduban near Port Blair, Andamans, by a mechanized fishing vessel belonging to the Andaman and Nicobar Administration. One escaped while being towed ashore. This is the first false killer whale record from the Andaman Sea. The head of a barracuda and tail of a Carangid fish were found semidigested in the stomach. Detailed body measurements are given. Total body length was 396 cm. Sex not stated.

618.+ Simmons, J.V. 1976. Selection of cetacea for biosystem applications. Kaneohe, Hawaii. Unpublished?

523.* Simpson, G.G., A. Roe y R.C. Lewontin. 1960. Quantitative Zoology. New York. 440 pp.

372. Sivaprakasam, T.E. 1980. Unusual occurrence of the common dolphin *Delphinus delphis* in longline catches at Port Blair Andamans India. J. Bombay Nat. Hist. Soc. 77(2):320-321.

583. Sivasubramaniam, K. 1965. Predation of tuna longline catches in the Indian Ocean, by killer-whales and sharks. Fisheries Research Station, Ceylon 17(2):221-236. (Date on volume 1965; date on first page of manuscript 1964.)

Summarizes the extensive damage done to longline fisheries in the Indian Ocean by sharks and "killer-whales". In addition to killer whales, *Orcinus orca*, this latter group most likely includes at least one other species, the false killer whale, and perhaps other small "blackfish", as well [Ed. notes from conversations with author; see notations under Leatherwood et al., in press - citation No. 409]. Overall "killer whales" were sighted on 0.4 percent of the total operations in 1955 increasing to 9.6 percent in 1963. Whales and whale groups "followed" boats for days. When they are involved

with a fishing operation they take an average of 55 percent to 100 percent of the catch.

59. Sleptsov, M.M. 1961a. Distribution of cetaceans in the Sea of Japan. U.S. Naval Oceanographic Office. Trans. No. 1463. Trudy Instituta. Morfologii Zhivotnykh 34:93-110.

Occasionally occurs in the Sea of Japan in small numbers.

60. Sleptsov, M.M. 1961b. Observations of small cetaceans in Far East Seas and NW Pacific. U.S. Naval Oceanographic Office. Trans. No. 1435. Trudy Instituta. Morfologii Zhivotnykh 34:136-143.

Observations from aboard a whaling vessel in the Far Eastern seas and Northwest Pacific:
17 Aug 1951: group of 8, 300-40 miles east of Shikotan.
26 Aug 1951: group of 4 near proliv Yekateriny.
14 Sep 1953: group of 6 at 157°12'E, 42°21'N, together with sauries and squid.
The false killer whale usually moves at a speed of 9 mph but can swim over 12 mph.

432. Slijper, E.J. 1938. Vergleichend mikroskipisch - anatomische untersuchungen uber das corpus cavernosum penis der cetaceen. Extrait des Archives Neerlandaises de Zoologie, tome III supplement:205-218. (In German.)

524.* Slijper, E.J. 1939. *Pseudorca crassidens* (Owen), ein beiträg zur vergleichenden Anatomie der Cetacean. Zool. Mededeeling Rijksmuseun Nat. Hist. Leiden 21:241-366.

See notation under Slijper (1966) - citation No. 223.

209. Slijper, E.J. 1949. On some phenomena concerning pregnancy and parturition of the Cetacea. Bijdragen tot de Dierkunde 28:416-448.

Gives reproductive information of various species of cetaceans, including positions of uterus horn and ovaries containing corpus luteum (left vs right side of body), length of animals vs number of corpora albicantia in the ovaries, length and presentation of fetus, length of umbilical cord.

433. Slijper, E.J. 1958. Das verhalten der wale (Cetacea). Ch. 14 *In* Handbuch der Zoologie, Eine Naturgeschichte der Stamme des Tierreiches. Walter de Gruyter & Co., Berlin. (In German.)

224. Slijper, E.J. 1961a. Foramen ovale and ductus arteriosus botalli in aquatic mammals. Mammalia 5:528-570.

Based on a small amount of data, anatomical closure of the ductus arteriosus seems more retarded in the false killer whale than in most of the *Delphinidae*, in which closure begins half-way through the suckling period and is completely closed at the age of sexual maturity.

225. Slijper, E.J. 1961b. Locomotion and locomotory organs in whales and dolphins (Cetacea). Symp. Zool. Soc. Lond. No. 5:77-94.

Present status of knowledge of locomotion and locomotory organs in whales and dolphins. The false killer whale can maintain speeds of 15-20 mph for "a fairly long time" (Lane, 1953; Gunter, 1943). The presence of a well-marked center of mobility in the anal region is shown by a shifting upward of the mammillary processes in the posterior lumbar and anterior caudal regions.

619.+ Slijper, E.J. 1962. Whales and dolphins. Riesen Des Meeres. 170 pp.

223. Slijper, E.J. 1966. Functional morphology of the reproductive system in Cetacea. Pp. 277-319 *In* Kenneth S. Norris (ed.) Whales, Dolphins, and Porpoises. Univ. of Calif. Press.

Female and male reproductive systems are described in detail, and distinguishing features of various species are given. The author describes the uterus masculinus (Slijper, 1939), penis and retractor penis muscle, and corpus luteum graviditatis (Comrie and Adam, 1938) are specifically described for the false killer whale.

200. Smith, T. 1974. Estimates of porpoise population sizes in the Eastern Tropical Pacific, based on an aerial survey done in early 1974. Draft. SWFC Rept. No. LJ-74-38. 49 pp.

Aerial surveys were flown in late Jan and early Feb, 1974 as part of a program to evaluate the impact of tuna seining activities on porpoise stocks in the eastern tropical Pacific Ocean. There was one sighting of false killer whales in 17 flights.

525.* Smithers, R.H.N. 1938. Notes on the stranding of a school of *Pseudorca crassidens* at Berg River Mouth, 27/12/36. Trans. Roy. Soc. S. Afr. 25:403-411.

See notation under van Heel (1962) - citation No. 111.

261. Sokolov, V.E. 1973. Structure of the skin cover in some cetacea. Pp. 102-118 *In* Chapskii, K.K. and V.E. Sokolov (eds.). Morphology and ecology of marine mammals, seals, dolphins, porpoises. John Wiley & Sons, Inc., New York. 232

pp.

Skin structure is described from a young false killer whale caught in the southern part of the Pacific.

249. Souter, D. and G. Broadhead. 1978. Purse-seine fishing for yellowfin and skipjack in the southern waters of the central and western Pacific, *Jeanette C.* charter. Pacific Tuna Development Foundation Technical Bulletin Number 2. 77 pp.

Appendix 7 lists marine mammal sightings. False killer whales:
15 Nov 1977: 00.26S, 146.08E; group of about ten with bottlenose dolphins, *Tursiops truncatus*, and pilot whales, *Globicephala* sp. One jumped eight times.
25 Feb 1978: 01.18N, 135.15E; group of about 32 in tight crescent formation with two unidentified porpoise.
11 Mar 1978: 01.18N, 146.58E; group of about 100, with two neonates. Head slapping, lob tailing, breaching.
12 Mar 1978: 02.02S, 148.18E; group of about 50, spread out.

323. Stacey, P.J. and R.W. Baird. 1988. Status of the false killer whale, *Pseudorca crassidens*, in Canada. Contract Report to the Committee on the Status of Endangered Wildlife in Canada.

Repeats records from Baird et al. (1989) and one new record, Barkley Sound, July 1988.

129. Stager, K.E. and W.G. Reeder. 1951. Occurrence of the false killer whale, *Pseudorca*, on the California coast. Bull. Southern California Acad. Sci. 50:14-20, pls. 6-10.

Specimens in the Los Angeles County Museum:
document four skulls and many ribs and vertebrae (including cervicals) from San Nicolas Island 1940 through 1949. Specimen numbers LACM 8457, 8458, 8459, 8460.

526.* Stanley. 1936.

527.* Stanley. 1937.

505.* Stevenson, J.C. (ed.) 1975. Jour. Fish. Res. Bd. Can. 32(7):875-1242.

528.* Steytler, J.W. and H. Davis. 1929. A South African mystery of the sea. Ill. London News, March 2, 367.

258. Stuntz, W.E. and T.B. Shay. 1978. Porpoise behavior in the eastern tropical Pacific Ocean. Cruise Report of R/V *Regina Maris Expeditions* #9 and #10, 1 August - 1 October 1978. The Ocean Research and Education Society, Inc. Boston, Mass.

During a cruise from Puntarenas, Costa Rica, to the Galapagos, false killer whales were seen twice, group sizes 1-2, near 5N, 87W, 6 Sep.

193. Sullivan, R.M. and W.J. Houck. 1979. Sightings and strandings of cetaceans from northern California. J. Mammal. 60(4):828-833.

Sightings and strandings of cetaceans from northern California since 1965. Contains Fiscus and Niggol (1965) account of sightings off Humbolt Bay, and record of a live stranding at Crescent City. Attempts to tow the animal out to sea failed. Measurements and organ weights are given.

632. Sweeney, J.C., G. Migaki, P.M. Vainik and R.H. Conklin. 1976. Systemic mycosis in marine mammals. J. Am. Vet. Med. Assn. 169:946-948.

Fungus isolated from a false killer whale: *Nocardia asteroides*.

189. Sylvestre, J.-P. and S. Tasaka. 1985. On the intergeneric hybrids in cetaceans. V.J.A. Manton (ed.). Aquat. Mammals 11(3):101-108.

Documents intergeneric hybrids in cetaceans. False killer whale hybrids:
- 29 Jan 1980; 74 cm female stillborn (sp. No. KSW-55). Mother Slim, a *T. truncatus gilli*, 289 cm., father Leo, a *P. crassidens*, 409 cm. Two copulations recorded; August and October 1979. Both in captivity 10 years.
- 30 Apr 1981; 116 cm male stillborn (KSW-56). Mother a *T. truncatus gilli*, 284 cm, in captivity 5 years. Father a false killer whale. Copulation April 1980.
- 3 May 1981; female (KSW-57) newborn, lived 276 days. Mother Slim, father Leo. Copulation Apr-June 1980. Growth and behavior are described. Skeleton is preserved in the Kamogawa Sea World collection.
- 7 Jul 1981; 121.5 cm male stillborn. Mother a *T. truncatus gilli*, 278 cm. 10 years in captivity. Father Leo. Copulation July 1980. Measurements and physical descriptions are given, teeth and vertebral formulae are described.

434. Tangerini, P. 1986. Interazioni fra cetacei ed attivita di pesca. Gli spiaggiamenti dei etaei sulle coste italiane. Atti del I°Convegno Nzionale sui Cetacei organizzato dall'Adriatic Sea World Riccione 18, 19, 20 ottobre 1985. (In Italian.)

162. Tarpley, R. (Director). 1988. Texas Marine Mammal Stranding Network record files (unpublished).

The Texas Marine Mammal Stranding Network records include two recent false killer whale strandings representing the first reported strandings of this species in Texas:
3 Jan 1987: Fresh carcass in excellent condition of a female, 399 cm, 12 miles SE of Sabine Pass, Texas. Record C376.
9 Jan 1987: Decomposed carcass of a female, 422 cm, pregnant, Crystal Beach, Galveston, Texas.

620.+ Tavolga, W.N. 1965. Review of marine bio-acoustics, state of the art: 1964. Technical report NAVTRADEVCEN 1212-1.

621.+ Teixeira, A.M.A.P. 1979. Marine mammals of the Portuguese coast. Sonderdruck aus A.F. Saugertierkunde Bd. 44(4):221-238.

571. Thiagarajan, R., P. Nammalwar and K.M.S. Ameer Hamsa. 1984. Stranding of *Pseudorca crassidens* at Rameswaram, Gulf of Mannar. Mar. Fish. Infor. Ser. T&E Ser. 55:16.

18 Oct 1975 - a false killer whale was seen struggling near Rameswaram in the Gulf of Mannar; it died as it was being towed to shore. Morphometric measurements are listed. Total length was 384 cm. Includes brief physical description of false killer whales.

187. Thomas, J., N. Chun, W. Au and K. Pugh. 1988. Underwater audiogram of a false killer whale. J. Acoust. Soc. Am. 84(3):936-940.

A false killer whale at Sea Life Park in Hawaii was trained for an underwater hearing test. Auditory thresholds were measured from 2 kHz to 115 kHz. Below 64 kHz, hearing sensitivities were similar to those of the beluga, *Delphinapterus leucas*, and the bottlenose dolphin, *Tursiops truncatus*. Above 64 kHz, sensitivity decreased rapidly about 150 dB per octave. Animal was most sensitive from 32 kHz to 70 kHz, corresponding with the peak frequency of echolocation pulses.

147. Thomas, J.A., S.R. Fisher and L.M. Ferm. 1982. Preliminary results on marine mammal detection using a towed acoustic array in the Eastern Tropical Pacific. San Diego, Hubbs Sea World Research Institute Tech. Rep. No. 82-144. 10 pp.

The utility of a towed acoustic array was tested by comparing acoustic detection of animals with sighting records. False killer whales were among the species identified acoustically. Sonograms are shown.

529.* Thomas, J., S.R. Fisher, E. Yohe, A. Garver, J. Spafford and J. Peterson. 1986. Experimental verification of the echolocation abilities of a false killer whale *Pseudorca*

crassidens. San Diego, Hubbs Marine Research Institute Tech. Rep. No. 86-197.

See notation under Evans and Awbrey (In Press) - citation No. 40.

398. Thomas, J., M. Stoermer, C. Bowers, L. Anderson and A. Garver. In Press. Detection abilities and signal characteristics of echolocating false killer whales (*Pseudorca crassidens*). *In* P.E. Nachtigall (ed.). Animal Sonar Systems. NATO ASI Series Vol. 156. Plenum Press, New York. 851 pp.

An experiment was conducted to demonstrate echolocation abilities in a male subadult false killer whale at Sea World in San Diego. Experiment is described. Target was a 7.62cm diameter, hollow, water-filled stainless-steel sphere suspended with monofilament line. Detection performance varied between 90 and 95% correct for target range from 1-4m and was inconsistent at 6m. Abilities are compared to those of bottlenose dolphins. The false killer whale generally produced midfrequency echolocation pulses, but seemed to be able to change peak frequency and bandwidth.

143. Tomich, P.Q. 1969. Mammals in Hawaii, A Synopsis and Notational Bibliography. Bernice P. Bishop Museum Special Publication 57. Bishop Museum Press, Honolulu. 238 pp.

General statement of range. Two females were captured off the Hawaiian Islands and were in good health in May, 1966 at Sea Life Park, Oahu.

148. Tomich, P.Q. 1986. Mammals in Hawaii, a synopsis and notational bibliography. Second Edition. Bishop Museum Special Publication 76. Bishop Museum Press, Honolulu. 375 pp.

Information mostly from Shallenberger (1981): stranding at Mokapu Peninsula, Oahu, 21 Oct 1980. Eats squid, fish, larger tuna. Discards tails, gills and entrails.
Description, summary of range, feeding techniques. Found near all the main islands of Hawaii in shallows as well as deep water.

435. Tomilin, A.G. 1951. Determination of cetaceans from behavior and external characters. Publ. Moscow Society for Exploration of Nature. (In Russian.)

911. Tomilin, A.G. 1957. Adaptive types in the order Cetacea (the problem of an ecological classification of Cetacea. Zoologicheskii Zhurnal. 1954. 33(3):677-692. Distributed by Fish. Res. Board Can. Translation Series No. 95. G.C. Pike (ed.).

Description of various cetacean adaptations. In the false killer

whale, the number of teeth is reduced to 10-13 pairs, and reduction is more pronounced in the upper than in the lower jaws. The intermaxillary bones have developed laterally, occupying at least 3/5 of the rostrum's width. The rostrum's length is at least 1.5 times its width.

144. Tomilin, A.G. 1967. Cetacea. Mammals of the U.S.S.R. and adjacent countries Vol. 9. Israel Program for Sci. Translations, Jerusalem. 717 pp. (Translation of work originally published in Russian in 1957.)

Detailed body measurements, skull descriptions and measurements are given; feeding, behavior and reproduction are discussed. The animal from Zealand, Denmark (Reinhardt, 1862), was 596 cm.
(Van Deinse, 1946): A 528 cm male was caught at the coast of Holland
False killer whales become sexually mature at 3.6-4.2 m.
From the Firth of Tay (Scotland) stranding:
smallest embryo was 64.7 cm and had advanced pigmentation.
largest embryo was 117 cm, and the cow was 429.5 cm
a 284 cm cow was obviously immature (Comrie and Adams, 1938)
an almost full-term fetus was 160 cm, in a cow of 427 cm (Cowley, 1944).
Ovaries of adult females were 7-10 cm. Approximate age of four females with 5, 7, 8 and 9 corpora albicantia in both ovaries was 7.5 - 12 years (Comrie and Adams, 1938)
(van Beneden, 1889): a herd of false killer whales followed a ship from Brazil to the English Channel in 1861.
An intestinal parasite *Bolbosoma capitatum* has been found in the false killer whale.

436. Tomino, G. 1953. Rinvenimento de uni Globicephala sul lido di Castelporziano (Roma). Bolletino di Zoologia 21:13-16 + pl 1-2. (In Italian.)

297. Trouessart, E.L. 1904-1905. Catalogus Mammalium Tam Viventium Quam Fossilium. R. Friedlander & Sohn, Berlin.

"*P. crassidens*, Owen - (6129); Elliot, Field Columb. Mus., II, 1901, p. 23, pl.6, f.2; Lydekk., Journ Bombay Soc., XV, 1903, p. 40, pl. A. *crassidens foss.*, - (6129). Pleistoc. I. Britannia."

622.+ True, F.W. 1883. Suggestions to the keepers of the U.S. Lifesaving Stations, light-houses, and light-ships, and to other observers, relative to the means of collecting and preserving specimens of whales and porpoises. Report of Commissioner of Fish and Fisheries. 1159-1182 pp.

530.* True, F.W. 1889. A review of the family Delpinidae. Bull. U.S. Nat. Mus. 36:1-191.

130. True, F.W. 1889. Contributions to the natural history of the cetaceans a review of the family Delphinidae. Bull. U.S. natl. Mus. (36):1-191.

Describes skulls of four false killer whales from the Royal College of Surgeons: 2984, 2985, 2986, 2987. He compares and notes differences. Detailed skull measurements are given.

254. Tsutsumi, T., Z. Kamimura and K. Mizue. 1961. Studies on the little toothed whales in the West Sea areas of Kyusyu - V. About the food of the little toothed whales. Bulletin of the Faculty of Fisheries, Nagasaki University 11:19-28. (In Japanese.)

English summary. Food of species including false killer whales caught in the West Sea Area of Kyusyu and at the coastal sea of Yamaguti pref. were investigated. Only squid were found in the false killer whale stomachs. During the feeding migration, false killer whales are always found (and caught) in the company of bottlenose dolphins, *Tursiops* spp., but during breeding migration these species do not occur together. False killer whales live in large shoals. Apparently, they seem to change food preference to mackerel during breeding (p.24 - graph). Quantity of food found in the stomach increases with decreased water temperature, and is highest in January and February. "In culture one animal, mean body length 330 cm, takes 12.2 kg in every bay, but the quantity of food has been restricted to some extent."

437. Uchida, S. 1985. Study on the little toothed whales in the waters adjacent to the Okinawa Archipelago, Japan. Expo. Memor. Manage. Found., Okinawa. 36 pp. (In Japanese.)

623.+ UNEP. 1985. Marine mammals: global plan of action. UNEP Regional Seas Reports and Studies No. 55. 115 pp.

414. U.S. Dept. of Commerce. 1978. Report of the Secretary of Commerce on Administration of the Marine Mammal Protection Act of 1972. Annual report, April 1, 1977 to March 31, 1978. Prepared by NOAA/NMFS. 183 pp.

Page 152 briefly discusses the overall distribution, abundance and general biology of false killer whales. Notes that this whale is uncommon throughout most of its range.

222. Van Dyke, D and S.H. Ridgway. 1977?. Diets for marine mammals. *In* M. Rechcigal, Jr. (ed.) Handbook of Nutrition and Food.

Quantitative estimates are presented of various nutrients consumed by selected marine mammals. An 454 kg adult *Pseudorca* consumes an average of 40 KCal/kg, and a 363 kg juvenile consumes an average

of 50 KCal/kg (estimated weights).

62. Van Gelder, R.G. 1960. Results of the Puritan-American Museum of Natural History Expedition to western Mexico 10. Marine mammals from the coasts of Baja California and the Tres Marias Islands, Mexico. Amer. Mus. Nat. Hist. No. 1992:27.

The weathered crania of two false killer whales were found on the beach at Amortajada Bay, San Jose Island, Baja California, on 28 Apr 1957. Some skull measurements are given.
See further notation under Mitchell (1965) - citation No. 82.

625.+ van Waerebeek, K., J.C. Reyes, and B.A. Luscombe. 1987. Datos sobre la distribucion de cetaceos menores en el mar Peruano. (unpublished).

531.* Vinciguerra, D. 1926. Due rari cetacei di Liguria. Annali Mus. Civic. Storia Naturale. Genova, 52:232-236.

438. Vinciguerra, D. 1927. Due rari Cetacei di Liguria (*Ziphius cavirostris*, Cuv. e *Pseudorca crassidens*, Owen). Estratto dagli Annali del Museo Civico di Storia Naturale di Genova Vol. LII 8 Gennaio:232-236. (In Italian.)

63. Vives, M.V. 1975. Origen y evolucion de los cetaceos. Immersion y Ciencia No. 8-9.

False killer whales have existed since the Miocene.

532.* Wang, P. 1979. A survey of the small and middle Odontocetes from the Huanghai Sea and Bohai Sea. Dongwuxue Zazhi 2:31-34. (In Chinese.)

See notation under Zhou et al. (1982) - citation No. 334.

533.* Wang, Z. 1980. False killer whales from the coastal waters of Shandong Province. Dongwuxue Zazhi 4:31-33. In Chinese.

See notation under Zhou et al. (1982) - citation No. 334.

362. Wang, Z. 1984. The skeleton of the false killer whale *Pseudorca crassidens* from the China Sea. Acta Zool. Sin. 30(3):286-294. (Abstract).

Skeleton of false killer whale is described in detail. Mentions that the shape of the lumbar vertebra, length greater than width, allows for insertion of more muscle which is believed to accelerate swimming speed.

534.* Wang, Z., G. Shi, and J. Li. 1965. False killer whales from Chinese coastal waters. Dongwuxue Zazhi 2:65-66. (In

Chinese.)

See notation under Zhou et al. (1982) - citation No. 334.

439. Wang, P. 1979. A survey of medium and small sizes toothed whales in the Po-Hai and Yellow Sea. Zoological Magazine 0(2):31-??. (In Chinese.)

440. Wang, P. 1984. Distribution of cetaceans in the Chinese waters. Chinese Journal of Zoology 0(6). (In Chinese.)

633. Warneke, R.W. 1983a. Report of a stranding of 87 false killer whales, *Pseudorca crassidens* at the Croajingolong National Park, East Gippsland, January 1983. Arthur Rylan Institute for Environmental Research. Australia. (Unpublished.)

Detailed account of false killer whale stranding, 18 Jan 1983, also mentioned in Warneke 1983b.

309. Warneke, R. 1983b. Whales - Whale stranding - accident or design? Australian Natural History 21(2):43-47.

Description and theories on strandings, synopsis of strandings in Victoria and Tasmania with descriptions of coastline and offshore areas, guidelines to follow when encountering a stranding. Record of a false killer whale stranding 18 Jan 1983: 87 animals over 6 km of beach in the Croajingalong National Park, eastern Victoria.

190. Wassif, K. 1956. *Pseudorca crassidens* Owen from Mediterranean shores of Egypt. J. Mammal. 37(3):456.

Describes false killer whale skull fragment found two miles north of Baltim on Lake Burullus, Fouadiya Province, Mediterranean coast of Egypt.

64. Watkins, W.A. 1980. Click sounds from animals at sea. Pp. 291-297 *In* R.-G. Busnel and J.F. Fish (eds.). Animal Sonar Systems. Plenum Publishing Corporation.

"Apparently, a species size gradient (*Tursiops, Pseudorca, Globicephala, Orcinus*) roughly matches the increasing low frequency (or decreasing high frequency) emphasis in the clicks of mammals recorded at sea."

145. Watson, L. 1981. Sea Guide to Whales of the World. E.P. Dutton. 302 pp.

Sizes average 5.4 m, max 6 m, 2,200 kg for males; 4.6 m, max 5.4 m, 1,100 kg for females. Calves average 1.5 m and 80 kg at birth. They reach sexual maturity between the ages of 8 and 12. Gestation is known to last slightly over 15 months.
They readily bow-ride small ships (large ships are probably too

fast), and are often seen leaping in the wake of larger ships.

403. Wells, R.S., L.J. Hansen, A. Baldridge, T.P. Dohl, D.L. Kelley and R.H. Defran. 1989. Northward extension of the range of bottlenose dolphins along the California coast. *In* S. Leatherwood and R.R. Reeves (eds.). The Bottlenose Dolphin; Recent Progress in Research. Academic Press. San Diego.

Reporting on northward extension of bottlenose dolphin during the early 1980's involving sightings of a number of species with warm water affinities, including false killer whales.

535.* West, C.M. 1935. Journ. Anat. Vol. lxix, p. 145.

See notation under Comrie and Adam (1938) - citation No. 138.

35. Whitehead, H., P. Gilligan, C. Smyth, L. Weilgart and C. Converse. 1983. WWF/IUCN Indian Ocean Sperm Whale Project, Interim Report, Oct.-Dec. 1983.

The skull of a false killer whale was taken from a Trincomalee fish market on 10 Oct 83 by members of the *Tulip* crew for confirmation of identification and zoological interest. Photos were also taken, and the specimen was recorded in a Cetacean Data Record.

265. Whitehead, H. 1986. Other species of cetacea. Pp. 40-41 *In* H. Whitehead (ed.). Sperm whales off the Galapagos Islands, February-April 1985. Report to Green Island Foundation.

There was one sighting of nine false killer whales, water depth 3,000 m, approximately 2.4°S, 91.2°E.

536.* Whiteside, S. 1985a. Report on the rescue of thirty-eight stranded *Pseudorca crassidens* (False killer whales) at Crowdy Head, 24-26 June, 1985. Project Jonah, Victoria.

537.* Whiteside, S. 1985b. How the whales were saved. Habitat (Australia) 13:22-23.

626.+ Whiteside, S.M. 1987. Rescues of stranded whales in Australia. Seventh Biennial Conf. Biol. Mar. Mamm. Miami, Fl. (Abstract.)

399. Whittow, G.C. 1974. How hot is a whale? Sea Frontiers 20(4):228-232.

A male false killer whale at Sea Life Park, Oahu, Hawaii, was fed a pill containing a transmitter that sent out a radio signal which varied with the temperature of the pill. Body temperature was monitored for 56 hours while the whale was free swimming and continuing his normal activities. The same technique was used to

measure temperature of a pilot whale and a killer whale, and temperatures were compared. Killer whale: 37.1°C-38.0°C; pilot whale: 36.4°C-37.2°C; false killer whale: 36.0°C-37.2°C.

198. Whittow, G.C., I.F.C. Hampton, D.T. Matsuura, C.A. Ohata, R.M. Smith and J.F. Allen. 1974. General notes: body temperature of three species of whales. Jour. Mamm. 55(3):653-656.

Body temperatures of pilot whales, *Globicephala scammoni*, killer whales, *Orcinus orca*, and false killer whales, *Pseudorca crassidens*, were determined using a radio "pill" hidden in fish and fed to the animals. Mean temperature for the false killer whale was 36.6°C (83 measurements), range 36.0-37.2°C.

240. Winn, H.E. 1982. A characterization of marine mammals and turtles in the Mid - and North Atlantic areas of the U.S. Outer Continental Shelf. Final Report of the Cetacean and Turtle Assessment Program. Prepared for U.S. Dept. of the Interior under contract No. AA551-CT8-48.

During the period from 1 Nov 1978 to 28 Jan 1982, the Cetacean and Turtle Assessment Program surveyed over 250,000 miles of trackline by aircraft and ship and tabulated opportunistic data contributed by a number of sources. For false killer whales, there was only one reported sighting of seven adults, 30 Aug 1980, during the three year period along the Outer Continental Shelf edge, southeast of Cape Hatteras. This sighting represented less than 1% of all odontocete and of all small whale sightings.

538.* Winge, H. 1942. Review of the interrelationships of the whales (Cetacea), translated by G.S. Miller Jr. *In* H. Winge (ed.). The interrelationships of the mammalian genera, 3:222-302.

182. Wolfson, F.H. 1985. False killers. HMRI Currents 31:10.

Briefly describes distribution. Describes an 8 month experiment on a male false killer whale in which echolocation abilities were demonstrated using a visually opaque, acoustically transparent screen, and targets at varying distances from the animal. The animal's behavior and sounds are described.

177. Xampeny, S.F. and J. Xampeny. 1974. La comision de cetologia en seno de la Institucio Catalana d'Historia Natural. Inmersion y Ciencia. No. 7. 30 pp. (In French.)

441. Ximenez, A., A. Langguth y R. Praderi. 1972. Lista sistematica de los mamiferos del Uruguay. Anal. Mus. Nac. Hist. Nat. Montevideo. 2.a Serie 7(5). 51 pp. (In Spanish.)

History of the species. False killer whales are rarely seen near

the coast of Uruguay. Several specimens are in Argentinian museums. One specimen: Cabo Polonio, Depto. de Rocha, Océano Atlántico (34°24'30"S - 53°46'45"W), Col. S. Cordero.
[One specimen from Isla de Lobos (35°01'S, 54°52'W) in the National Museum of Natural History of Montevideo No. MNHN - 1.330, is incorrectly listed here as a killer whale, *Orcinus orca*. It is, if fact, a false killer whale. See notation under Langguth (1977) - citation No. 169.]

384. Yablokov, A.V. 1958. The cetaceans dental structure and type of teeth. ???? (2):37-48. (In Russian, English summary.)

Divides all odontoceti into one of three groups according to tooth structure. False killer whales mentioned in Russian on chart with dental formulas.

385. Yablokov, A.V. 1969. Types of colour of the cetacea. Fish. Res. Bd. Can. Trans. Ser. no. 1239. 28 pp. (English translation of article originally published as 1963. O typakh okraski kitoobraznykh. Byulleten Moskovskogo Obshchestva Ispytatelei Prirody. Otdel Biologicheskii 68(6):27-41.)

Divides cetaceans into three major groups based on color characteristics. False killer whales are included in the group with right whales, blue whales, some beaked whales, white whales, narwhals and sperm whales (whales which are uniform or nearly uniform in color). The ecological importance of color in cetaceans is discussed.

627. Yablokov, A.V., V.M. Bel'kovich and V.I. Borisov. 1974a. Whales and dolphins, Part I. Kity I Del'finy. Report No. JPRS 62150-1. 244 pp. (In Russian.)

628. Yablokov, A.V., V.M. Bel'kovich and V.I. Borisov. 1974b. Whales and dolphins, Part II. Kity I Del'finy. Russian. Report No. JPRS 62150-2:245-318. (In Russian.)

373. Yamada, M. 1956. An analysis in mass osteology of the false killer whale, *Pseudorca crassidens* (Owen) Part 1. Okajimas Folia Anat Jap. 28:453-63.

90 skeletons from the Oct 1927 Dornoch Firth mass stranding were examined for this study. Original records of sex indicate 42 (45.6%) male and 50 (54.4%) female. This is similar to a 1935 British stranding of 62 animals, in which 28 (45.1%) were male and 34 (54.9%) female (Peacock et al., 1936). The skeletons are described in detail.

539.* Yamaguchi, Y. 1964. On the predation of tuna longline catches by the smaller toothed whales (Sachi) Maguro Gyogyg (Tuna fishing) 27:59-73. (Trans. by T. Otsu, NMFS, Hawaii,

June 1972).

272. Youren, S. 1986. On the cetacea in the Yellow Sea and Pohai Sea. Draft. (Abstract).

Information was obtained from specimens and data collected during 1963-1984. Body lengths of false killer whales were 3.65-6.10 m, and maximum weight was 710 kg, which is currently the greatest one in weight in these seas.

50. Zam, S.G., D.K. Caldwell and M.C. Caldwell. 1971. Some endoparasites from small odontocete cetaceans collected in Florida and Georgia. Cetology 2:1-11.

Parasites of false killer whales:
Anisakis typica free in the forestomach in one of two examined. Northeastern Florida, near Ponce de Leon Inlet near Daytona Beach.
Anisakis symplex was free in the forestomach of one of two examined. The animal was from near Ft. Pierce, Florida.
Stenurus auditivus Hsu and Hoeppli, free in the air sinus of the head near the left internal ear of one examined. From northeastern Florida near Ponce de Leon Inlet near New Smyrna Beach.
Orthosplanchnus elongatus Ozaki free in the hepatico-pancreatic duct in one of two examined. There was no histopathological evidence for this infestation in the liver or pancreatic tissue of the host. The animal was found in northeastern Florida near Ponce de Leon Inlet near New Smyrna Beach.

629. Zemskogo (?), V.A. 1980. Atjiac. (In Russian.)

339. Zhou, K., W. Qian, and Y. Li. 1982. *Pseudorca crassidens* from the coastal waters of China. Inv. on Cet. 13:263-269.

Distribution and records are described. Detailed measurements, vertebral formulas, photos of external body and x-rays of flippers; information from the following sources:
17 Dec 1979: 13 false killer whales, *Pseudorca crassidens*, and bottlenose dolphins, *Tursiops truncatus*, were caught from a mixed school of a hundred dolphins in the Sough Huanghai Sea by the Ningbo Marine Fishery Company; four of each was acquired by the Department of Biology, Nanjing Normal college.
1976 ("6 years ago"): abandoned skull without braincase, taken by net at the end of May, 1974, in the Lusi Fishing Ground of the South Huanghai Sea.
1957: one shot at Qibao, ner Hangzhou City, 30 km up the Qiantang River. Skull at the Zhejiang Museum.
undescribed skeleton from Lianyungang, Jiangsu Province, by Prof Yuan Chuanmi of the Nanjing University.
Other stranding and capture records off the coast of China:
(Wang, P. 1979): 1958, 1961: several, 39°50'N, 124°20'E (Dandong);

19 Jul 1960: 3, 39°40'N, 121°20'E (Changxing Is.); 16 Nov 1959: 2, 39°N, 122°50'E (Xiaohao Is.); 8 Jun - 5 Jul 1960: 6, 39°N, 122°40'E (Zhangzi Is. and Xiaohao Is.); 1965, several, 39°N, 121°10'E (Lushun).
(Wang, Z. 1980): Aug 1968: 1, 37°40'N, 122°10'E (Weihi); 21 Oct 1973: 1, 37°20'N, 119°10'E (Yangjiao Gol); 17 Oct 1978: 1, stranded, 37°10'N, 119°50'E (Yexian); Aug 1965: 1, 36°50'N, 122°20'E (Shidao); 8 Jun 1964: 2, 36°N, 120°30'E (Qingdao).
(Wang, Z. et al. 1965): fall 1955: 30 stranded, 36°50'N, 122°30'E (Shidao); 31 May 1963: 1, Jiangsu.
Nanjing University: 21 Jun 1963: 1, 35°N, 119°30'E (Lianyungang).
Nanjing Normal College: 17 Dec 1979: 4, 34°30'N, 124°30'E (South Huang-hai Sea); May 1974: 1, 32°N, 121°50'E (Lusi).
Zhejiang Museum: Jun 1957: 3, 30°20'N, 120°20'E (Mouth of Qiantang River).
Fujian Institute of Fishery Science: 1960: 25°30'N, 120°E (Pingtan Is.).

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False killer whales are among the new species recorded in the Zhejiang Province.