

Some Remarks on a Mass Stranding of Sperm Whales, *Physeter macrocephalus* Linnaeus, 1758, near Gisborne, New Zealand, on March 18, 1970

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Residents of the area, for almost 50 years, have never known a mass stranding on the Okitu Beach (at the foot of the Wainui Hill on State Highway Nr. 35) three miles east of Gisborne, nor have they witnessed an electric storm so violent as that which occurred just prior to the stranding of the first Sperm Whale, a few minutes before 5 a. m. on 18th March 1970. The centre of the storm was located two or three miles seaward of the stranding area and started at 2.30' a. m., continuing until 4.30 a. m.. The flashes were so vivid that the sea and headland were visible for periods of up to 15 minutes duration.

The first animal to strand was the largest bull, which charged towards the beach at a great speed, skidding along the sand as buoyancy was lost. The remainder of the herd were milling around and swimming back and forth about 400 yards (about 365 meter) off-shore. Some ten minutes elapsed before a group of seven animals followed the example of the bull and charged the beach 500 yards to the north of the first one. This group consisted of two fairly large bulls and 5 large cows, one very heavy in calf. The stranding continued on a pattern of a few animals every few minutes, but each group to the north of the preceeding one until at 6.35 a. m. the last of the herd charged the beach over a semi-submerged reef, three quarters of a mile north of the first Sperm Whale stranded. This last group consisted of 22 animals, including a cow and newly born calf (8'1" long), 2 cows heavy in calf, another cow with a 15 ft. calf and also a large bull.

The last stranded Sperm Whales were packed so tightly together that walking among them proved a problem. The reason for the south to north stranding has not yet been solved, as the sea bed at this point gives no indication why this should occur. In all, the herd consisted of 13 males and 46 females (including calves). Two animals were under 20 feet, 15 from 20 to 30 feet, 38 from 30 to 40 feet and 4 animals over 40 feet (see fig. 3 and table). The smallest animal was 8 ft. 1" and the largest one 41 ft. 9". The greatest girth of this last animal was 23 ft. 4".

BEST (1969), after study of 858 pairs of testes, comes to the conclusion that puberty in the male Sperm Whale occurs at a body length of 39 to 40 feet (11.89 to 12.19 m) but that sexual maturity is only attained at 45 to 46 feet (13.72 to 14.02 m). This author, by combining the results of the studies by NISHIWAKI, HIBIYA and OHSUMI (1958), OHSUMI (1966) and his own data, supposes that about 50 per cent of male Sperm Whales have left the female herds at an age of about 18 years and at a length of just under 40 feet (12.19 m). If we accept the conclusions of BEST, it seems that in the mass stranding of Sperm Whales near Gisborne only juvenile and maturing males were present and no fullgrown bulls.

For female Sperm Whales, BEST (1968) has found that the first sexually mature ones have a length of 27 feet (8.23 m) and that 100 per cent of the females are sexually mature at a length of 33 feet (10.06 m). By using the data of BEST (1968,

Individual length and sex of 59 Sperm Whales stranded near Gisborne, New Zealand, 18th March 1970
The specimens marked with an asterisk (*) without erupted teeth

No.	Females		Males	
		No.		No.
1*	15 ft 4"	24	33 ft 6"	1021.08 cm
2*	21 ft 5"	25	34 ft 2"	1041.40 cm
3*	23 ft 3"	26	34 ft 9"	1059.18 cm
4*	25 ft 2"	27	35 ft	1066.80 cm
5*	25 ft 5"	28	35 ft 4"	1076.96 cm
6*	27 ft 1"	29	35 ft 5"	1079.50 cm
7*	27 ft 4"	30	35 ft 5"	1079.50 cm
8*	28 ft 3"	31	36 ft	1097.28 cm
9*	28 ft 5"	32	36 ft 4"	1107.44 cm
10	28 ft 10"	33	36 ft 5"	1109.98 cm
11	29 ft 4"	34	36 ft 7"	1115.06 cm
12*	31 ft 1"	35	36 ft 8"	1117.60 cm
13	31 ft 4"	36	36 ft 9"	1120.14 cm
14	31 ft 5"	37	36 ft 10"	1122.68 cm
15	31 ft 5"	38	37 ft 3"	1135.38 cm
16	32 ft 1"	39	37 ft	1127.76 cm
17	32 ft 3"	40	37 ft 9"	1150.62 cm
18	32 ft 4"	41	39 ft	1188.72 cm
19	32 ft 4"	42	39 ft 3"	1196.34 cm
20	32 ft 4"	43	39 ft 5"	1201.42 cm
21	32 ft 8"	44	40 ft	1219.20 cm
22	32 ft 9"	45	40 ft 4"	1229.36 cm
23	33 ft	46	41 ft 9"	1272.54 cm
				246.38 cm
			8 ft 1"	244.22 cm
			24 ft 5"	800.10 cm
			26 ft 3"	817.88 cm
			26 ft 10"	828.04 cm
			27 ft 2"	995.68 cm
			32 ft 8"	1074.42 cm
			35 ft 3"	1122.68 cm
			36 ft 10"	1117.60 cm
			36 ft 8"	1120.14 cm
			36 ft 9"	1140.46 cm
			37 ft 5"	1198.88 cm
			39 ft 4"	1231.90 cm
			40 ft 5"	

table I) we can estimate the numbers and percentages of sexually immature and mature female Sperm Whales in the Gisborne herd. We then obtain: 10 sexually immature specimens (21.7%) and 36 sexually mature ones (78.3%). If we add the males we come to the conclusion the whole herd contained 23 juvenile specimens (39%) and 36 sexually mature animals (61%).

Although for lack of time no detailed counts could be made, in general the males displayed a mean of 50 mandibular teeth and the females 34 teeth, although, especially in the case of the females, more teeth could have been concealed by the gums. Irrespective of sex, no animal under 25 feet in length showed any teeth, although buds were present even in the youngest calf. The topmost skin covering these buds was very soft and could easily be brushed off by moderate pressure of a finger. In fig. 3 the Sperm Whales without visible mandibular teeth are indicated. Our data on the eruption of teeth and body length are in accordance with those published by CLARKE, AGUAYO and PALIZA (1968). These authors, after counting the teeth in post-natal Sperm Whales (1,277 males and 947 females) from Chile and Perú, come to the conclusion that the functional teeth in the lower jaw begin to erupt when males are between 6.8 and 8.6 m long (22 and 28 ft.) and females are between 7.5 and 9.5 m (25 and 31 ft.), and that the mean body length at which they erupt is almost the same in both sexes, being 7.9 m (26 ft.) for males and 8.2 m (27 ft.) for females. In the Gisborne animals the largest teeth protruded $1\frac{1}{8}$ " (54 mm) above the gums and at the gum level were $3\frac{3}{4}$ " (95 mm) in circumference.

One Sperm Whale only, a very old female, showed any sign of disease, which resembled a severe kind of eczema; the skin around the eyes, mouth, vent and mam-



Fig. 1. Ten Sperm Whales, still alive two hours after their stranding. Photo published by kind permission of the Gisborne Herald



Fig. 2. Some of the Sperm Whales of the mass stranding near Gisborne after being pushed above the high water line. Photo published by kind permission of the Gisborne Herald

mary slits showed the worst signs of infection. The condition of this animal was very poor and gave the impression that it would not survive very long. All the remainder were in excellent health. With the exception of three animals, which had scraped along the reef in their mad rush to the shore, none, showed any sign of recent injury. One specimen had at some time lost 18" (45.7 cm) off a tail fluke and another 9" (22.8 cm) off a flipper, but these injuries had healed perfectly and the skin had rejuvenated to the same lustre as that on the entire animal.

As there was no possible chance of getting these Sperm Whales back to sea (even supposing they would stay in the water and would not strand again), they were, at the request of the Marine Department, put out of their misery; this being done by lancing and severing the jugular vein. The Ministry of Works then buried them in a mass grave in the sand dunes above high water mark. For the sake of the inhabitants (the stranding took place about three miles from Gisborne) the Sperm Whales were disposed off as quick as possible and so there was no time to study them at leisure, although this would have been most useful.

GILMORE (1959) and DUDOK VAN HEEL (1962) have tried to find an explanation for the occurrence of mass strandings in Cetacea. According to them three factors (acting alone or in combination) may cause mass strandings. They are:

1. Through failure to receive due warning or by misleading information from their sonar system.
2. A sensitive nervous system which may cause panic and a blind response to the misleading sonar information.

3. Non adaptation to shallow water and a strong social cohesion may add to the results of bringing disaster to groups of individuals of pelagic species of whales.

The present authors accept the mentioned theory. However, they believe it useful to underline that also external influences may act on the second factor. They come to this conclusion after studying the last three mass strandings of whales on the "Hawke's Bay — Poverty Bay" coast of New Zealand (southeastern part of North Island). The first one was of 97 Pilot Whales (*Globicephala melaena*) at Opoutama on 3-IV-1966, the second stranding was of 7 False Killer Whales (*Pseudorca crassidens*) and 3 Pygmy Sperm Whales (*Kogia breviceps*) at Mahia Beach on 9-VI-1969 and the third one the mass stranding of Sperm Whales discussed here. These three mass strandings were all preceded by violent electric storms and/or very sudden meteorological changes. We believe that especially electric storms may have a noxious influence on the nervous system in general and on the sonar system in particular with as a result panic and — due to strong social cohesion — mass stranding. Although much less evident, it seems that also other unusual natural phenomena may lead to mass strandings. For instance, if one reads the eye-witness accounts of the mass stranding of 38 Pilot Whales near St. Annaland in the Netherlands' province of Zeeland on 9-IV-1825, one gets the impression that just prior to the stranding a light sea-quake took place.

The stranding of Sperm Whales before 1938 are reviewed in detail by BOSCHMA (1938). The mass strandings are enumerated by GILMORE (1959) and by DUDOK VAN HEEL (1962); for New Zealand, GASKIN (1968) gives a long list of strandings of



Fig. 3. Length distribution (in length classes of 0.5 m) of 59 Sperm Whales from a mass stranding near Gisborne on March 18, 1970

Sperm Whales. Of particular interest is the mass stranding in that country near Muriwai on July 4, 1958 of 13 females from 16 to 39 feet long. GILMORE (loc. cit.) divides the mass strandings of Sperm Whales into harem herds of mixed sexes and ages, and male herds. The Gisborne stranding is to be considered a stranding of a harem herd, like the ones at the mouth of the river Elbe, Germany (3—XII—1723), near Audierne in Brittany (13/14—III—1784), near Kaipara, New Zealand (1895), near Dargaville, New Zealand (11—III—1918) and the stranding already mentioned near Muriwai (4—VII—1958). Whether the mass stranding of 10 Sperm Whales at Mervy Beach, Australia (X—1968) also belongs to this category is not known to us by lack of particulars.

Summary

Notes are published on a mass stranding of Sperm Whales near Gisborne, New Zealand, on 18—III—1970 and data on the sex and size distribution of the animals are given. The stranding was one of a harem herd without a fullgrown bull.

Zusammenfassung

Einzelheiten über eine Massenstrandung von Pottwalen in der Nähe von Gisborne, Neu Seeland, am 18. 3. 1970 werden mitgeteilt, weiterhin Daten über das Geschlechtsverhältnis und über die Körpergröße. Die Massenstrandung war die einer Haremsherde ohne einen voll ausgewachsenen Bullen.

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