

Studies on the Little Piked Whale from the Coast of Japan

By

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Introduction

The little piked whale, lesser rorqual, or minke, *Balaenoptera acutorostrata*, is called in Japan usually as "Koiwashi-kujira" or "Minku". The direct translation of the former is lesser sei whale and the latter is derived without doubt from the Norwegian minke. It has been hunted in the waters around Japan from the fairly old times by the usual catcher boats, in addition to their main catch of other baleen whales and sperm whale. However, towards the end of the nineteen twenties, some fishermen at Ayukawa, Miyagi prefecture, inaugurated small type whaling to take little piked whale with motor vessel equipped with harpoon-gun, which remained until the war as a modest industry in these localities.

After the end of the war, the situation of foodstuff made whaling of such type a paying industry, and consequently number of vessels engaged had increased with a result of expanded areas of operation and increased catch of the little piked whale. The Fisheries Agency of Japanese Government placed this whaling under its control in 1947 and simultaneously the catch of the little piked whale has been confined only to those motor vessels operated by fishermen, no licence being issued to the large type catcher boat, which hitherto caught some minkes occasionally. The yearly catch is now amounted to about 400 whales, very fewer in number when compared with that in Norway.

The little piked whale has a worldwide distribution, inhabiting both in the Atlantic and the Pacific, ranging northward to arctic and on the south penetrating Ross and other antarctic seas. It has been named *Balaenoptera acutorostrata* Lacépède 1803-1804, however, this name is applied only to the North Atlantic whale, since the Pacific one has been called *Balaenoptera davidsoni* by Scammon in 1872. But, as regards the difference between those two forms, only a few reports have been supplied. Cowan (1939) had studied two specimens from the eastern Pacific externally as well as internally and describes "Should the above differences be substantiated there would be grounds for recognizing *B. davidsoni* as a subspecies of *B. acutorostrata*" though he says

* Fisheries Agency of Japanese Government.

further "but in the light of present knowledge taxonomic recognition of a Pacific species is apparently not justified". Since then no further study on this matter has been carried out by any author.

Recently the little piked whale from the Atlantic has been studied extensively by Jonsgård (1951), based upon the measurements and observations of a great number of whales. But, as regards the little piked whale from the Pacific rather scanty reports such as those by Fry (1935), Matsuura (1936), Cowan (1939), Clifford (1946), Scheffer and Slipp (1948), and Scattergood (1949) has been appeared since Scammon (1872). These accounts are based mainly on one or few more stranded whales or returns from whalers.

We tried to collect as many material of the little piked whale from the western Pacific as we can for these several years. In the light of the present knowledge mentioned above, we feel it is better to publish them now, though they are still very incomplete. So this report should be deemed as preliminary one. Further studies will appear when more measurements or observations be carried out in future.

Sincere thanks are due to the whalers, who assisted us greatly in collecting material as well as in our field work at their land stations.

Material

The material at disposal for the present study is as follows:

1. Whaler's reports, in which particulars are given with respect to each whale treated at land station as to the date and approximate position of taking, the sex of the whale, its length, stomach contents and, if it contains a fetus, the length and sex, if ascertainable, of the fetus. From 1948 to 1954 such particulars have been reported for 2,264 whales, excluding several reports more or less incompletely filled. Among these particulars it is probable that fetus is not always reported correctly. Undoubtedly most of the smallest fetuses have been overlooked. We do not, therefore, pay much attention to the negative information that a fetus was not present. The stomach contents may sometimes have been reported incorrectly, especially as regards krill and copepods, both having been confused. But regarding of the other particulars we are confident that they have been informed in good order, at least on the whole.

2. The samples, such as testes, ovaries or baleen plates forwarded to us by whalers. These samples are rather few in number. In some occasions whalers were requested to measure the weights of testes and ovaries. A few people is deemed to have weighed accurately, though

most of whalers had reported more or less incompletely or nil.

3. Material obtained from the examination of whales treated at land stations by biologists. Body proportions and other scientific observations were carried on only for 23 little piked whales, most of them were examined at Abashiri, a land station facing to the Okhotsk sea, by H. Sakiura, one of the present authors. We are very regret that the material from the examination of whales by biologist is still insufficient at present. It is hoped more material of such nature be collected in future.

External Characters

The little piked whale from the coast of Japan is similar in general appearance and coloration to those reported by other authors for Pacific or Atlantic species, having the very distinct white band across the dorsal surface of the flippers and the yellowish-white baleen plates. Dorsal surface of the body is uniformly black and underparts including most of lower mandible and lower surface of flukes, white. The extension of black pigments on the sides differ individually, most remarkably being noted in the region of shoulder. In some whales pigments in this region extend downward considerably and reaching nearly to the ventro-lateral line (plate 1, upper, plate 2, lower) whereas black area ends at a position not far down from the flippers in some whales (plate 2, upper). The distinct white band on the outer surface of the flipper differs also individually in its broadness. Some has broader band (plate 2, upper) and some narrower (plate 2, lower), but it seems that there is always a slight projection of white area anteriorly, as seen in the whales shown in plate 2. Such projection of white area is not observed from a little piked whale stranded on Florida (Moore and Palmer, 1955. Plate 1). Anterior border of the white band is quite distinct, but posterior one is shading into pale color.

As regards other coloration, Cowan (1939) describes that "on the side of the body in the region touched by the tip of the flexed pectoral there is a large area of blue-gray that extends upward on to the dorso-lateral surface." This coloration occurs also in our specimen, and sometimes very remarkable. In a whale shown in plate 2 (upper), the white area of the belly in the region after flipper extends upward, drawing a curve pointing backward at first and then forward, shading into gray gradually, and finally meets with that on the other side at a point on the dorso-lateral line. It is thought that this marking is a character of the little piked whale.

In addition to this marking, certain pale streaks occur about the

head and shoulders. A similar pale streak reaching backwards from the ear in fin whale is occur also in the little piked whale. Similar streaks are also observed on the both sides of the blowhole.

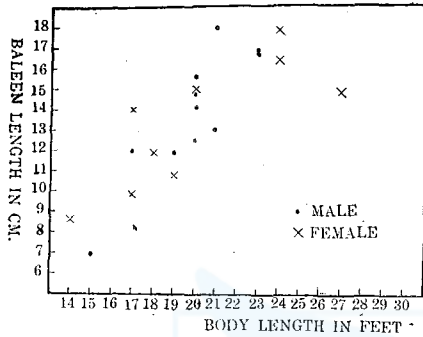


Fig. 1. Relation between length of baleen (in cm) and animal's total length (in feet).

The color of baleen plate is yellowish-white, with a diffuse pinkish area close to the gum, caused by blood pigments. In fig. 1 we have plotted the length of the largest baleen plate against the body length. The relation between length of baleen and animal's total length shows no remarkable difference from that of Atlantic individuals as reported by Jonsgård (1951, figs. 2 and 3).

In 1953 the measurements on the following body proportions were made of 23 animals.

1. Body length, tip of snout to notch of flukes.
2. Lower jaw, projection beyond tip of snout.
3. Tip of snout to blowhole (centre).
4. Tip of snout to angle of gape.
5. Tip of snout to centre of eye.
6. Tip of snout to tip of flipper.
7. Centre of eye to centre of ear.
8. Notch of flukes to posterior emargination of dorsal fin.
9. Width of flukes at insertion.
10. Notch of flukes to centre of anus.
11. Notch of flukes to umbilicus.
12. Notch of flukes to end of ventral grooves.
13. Centre of anus to centre of reproductive aperture.
14. Vertical height of dorsal fin.
15. Length of base of dorsal fin.
16. Flipper, tip to axilla.
17. Flipper, tip to anterior end of lower border.
18. Flipper, greatest width.
19. Head length, condyle to tip of snout.
20. Greatest width of skull.
21. Skull length, condyle to tip of premaxilla.
22. Skull height.
23. Tail flukes, notch to tip.
24. Length of lower jaw.

All of these measurements are listed in the appended table, in cen-

timeter of actual length and for measurements 2 to 24 also expressed in percentages of the animal's total lengths.

In table I, we gave here the maximum and minimum measurements as well as the calculated means for males and females, all expressed as percentages. For the convenience of comparison to those in the Atlantic, we cited in table I also the corresponding figures from Jonsgård (1951). Further, we have plotted in figs. 2-16 each percentages according to body length, as well as ranges and means of Atlantic animals for the sake of comparison on the left side of each figure.

Judged from the above mentioned table and figures, we can safely conclude, in the body proportions of the little piked whale from the coast of Japan, that

1. apart from the measurement 13 (Centre of anus to centre of reproductive aperture), no essential difference is noted between male and female, as in the other baleen whale or little piked whale from the Atlantic, and

2. there is no measurement which separates completely or at least considerably from that from the Atlantic, all of them being overlapped in major parts,

3. but there are some differences, however slightly, between the animals from the Atlantic and Pacific in the following measurements:

- a) Length from tip of snout to centre of eye (fig. 4). This length is nearly the same length of tip of snout to angle of gape. The little piked whale from the coast of Japan has a shorter mouth, though head length itself shows no significant difference (fig. 15).

- b) Tip of snout to tip of flipper (fig. 5). All the measurements for Pacific animals distribute within the range of those for Atlantic, but the means are somewhat shorter for both sexes.

- c) Notch of flukes to posterior emargination of dorsal fin (fig. 7). The Pacific animal has a more posteriorly situated dorsal fin. No measurement does not exceed the mean for the Atlantic.

- d) Centre of anus to centre of reproductive aperture (fig. 11). The Pacific animal shows a shorter distance, especially in female.

- e) Vertical height of dorsal fin (fig. 12). The Pacific animal has a higher dorsal fin.

- f) Flipper, tip to axilla (fig. 13). The Pacific animal has a shorter flipper, though in its width no difference is observed (fig. 14).

- g) Tail flukes, notch to tip (fig. 16). Somewhat higher value is noted in whales from the Pacific.

In other words, the little piked whale from the coast of Japan has

Table I. Body proportions of
(Expressed as percentages)

Measurements	Males		
	Pacific		
	No.	Range	Mean
1. Body length in cm.	8	582-799	725
2. Lower jaw, projection beyond tip of snout.	5	0.89- 2.51	1.78
3. Tip of snout to blow hole (centre).	8	11.68-13.66	12.79
4. Tip of snout to angle of gape.	4	13.57-19.04	16.10
5. Tip of snout to centre of eye.	8	14.21-18.40	15.89
6. Tip of snout to tip of flipper.	6	37.46-42.20	39.81
7. Centre of eye to centre of ear.	7	4.64- 6.20	5.18
8. Notch of flukes to posterior emargination of dorsal fin.	7	24.27-29.11	26.97
9. Width of flukes at insertion.	6	6.09- 7.41	6.90
10. Notch of flukes to centre of anus.	6	25.43-27.88	26.68
11. Notch of flukes to umbilicus.	5	47.42-49.27	48.04
12. Notch of flukes to end of ventral grooves.	6	46.04-56.97	54.63
13. Centre of anus to centre of reproductive aperture.	7	5.68- 7.68	6.77
14. Vertical height of dorsal fin.	5	3.00- 4.81	4.13
15. Length of base of dorsal fin.	6	6.05-10.14	8.42
16. Flipper, tip to axilla.	3	8.06-10.03	9.12
17. Flipper, tip to anterior end of lower border.	5	11.84-19.65	14.50
18. Flipper, greatest width.	4	3.44- 3.74	3.54
19. Head length, Condyle to tip of snout.	2	22.28-22.68	22.48
20. Greatest width of skull.	2	10.72-12.71	11.72
21. Skull length, Condyle to tip of premaxilla.	—	—	—
22. Skull height.	—	—	—
23. Tail flukes, notch to tip.	5	13.37-15.86	14.33
24. Length of lower jaw.	3	21.13-23.02	21.91

1) Taken from Jonsgård (1951).

2) Tip of snout to the anterior end of the blow hole.

3) Notch of flukes to the nearest part of the anterior margin of the flukes.

Balaenoptera acutorostrata
against body length).

			Females					
Atlantic ¹⁾			Pacific			Atlantic ¹⁾		
No.	Range	Mean	No.	Range	Mean	No.	Range	Mean
24	488-828	658	15	461-857	723	75	480-914	735
13	1.15- 2.45	1.84	11	0.76- 2.51	1.54	21	0.88- 2.41	1.56
20	11.86-14.10 ²⁾	13.01	15	11.71-14.90	13.27	52	10.97-14.85 ²⁾	13.18
—	—	—	10	13.32-18.69	16.06	—	—	—
24	17.05-20.00	18.33	15	13.32-18.59	15.84	75	15.73-19.33	18.05
24	36.87-46.50	43.57	14	39.48-44.50	41.69	73	36.76-46.47	43.43
24	4.91- 6.19	5.55	14	4.66- 5.93	5.37	74	4.64- 6.19	5.50
24	27.76-33.29	29.97	15	23.48-28.86	27.30	73	26.35-32.13	29.29
24	6.46- 8.10 ³⁾	7.03	13	7.05- 8.32	7.45	75	5.81- 7.49 ³⁾	6.77
24	24.75-28.46	26.23	15	23.92-29.28	26.52	75	18.67-30.13	25.99
23	43.31-50.08	46.79	15	42.26-48.37	46.17	74	37.33-52.01	46.00
24	47.73-56.48	52.19	15	45.60-60.47	53.75	74	43.48-58.67	51.54
24	6.00- 8.48	7.27	15	2.11- 3.40	2.74	75	2.71- 4.08	3.41
24	3.33- 4.58	3.94	10	3.15- 4.96	4.22	72	2.93- 4.44	3.60
—	—	—	11	5.86- 8.75	7.36	—	—	—
23	9.00-14.40	10.19	14	7.29-11.42	8.92	75	8.78-12.38	9.99
—	—	—	14	9.41-15.75	12.06	—	—	—
24	3.40- 4.18	3.70	12	3.54- 3.97	3.83	75	3.20- 3.94	3.65
20	20.77-24.80	23.25	4	21.78-22.86	22.52	51	20.54-25.81	22.50
—	—	—	4	10.88-12.77	11.69	—	—	—
—	—	—	1	—	20.39	—	—	—
—	—	—	1	—	6.29	—	—	—
24	13.17-15.36	14.05	13	13.83-16.93	15.30	74	12.00-15.38	13.90
—	—	—	8	20.92-22.59	21.63	—	—	—

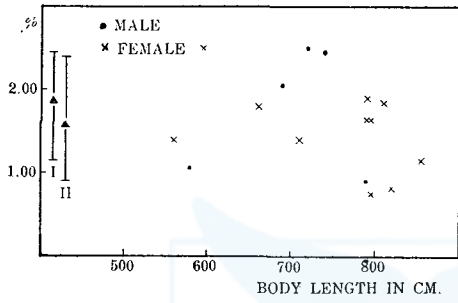


Fig. 2. Lower jaw, projection beyond tip of snout.

- Male
- × Female
- I Range and mean of Atlantic male
- II " " female

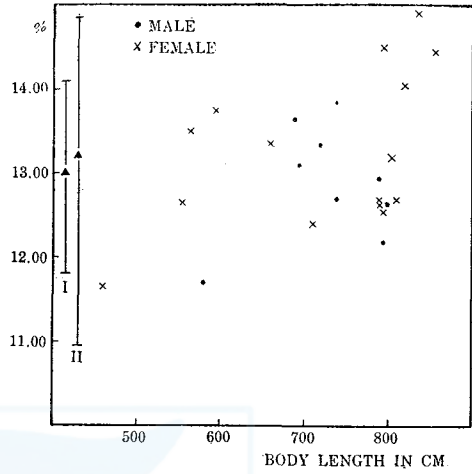


Fig. 3. Tip of snout to blow hole (centre).

- Male
- × Female
- I Range and mean of Atlantic male
- II " " female

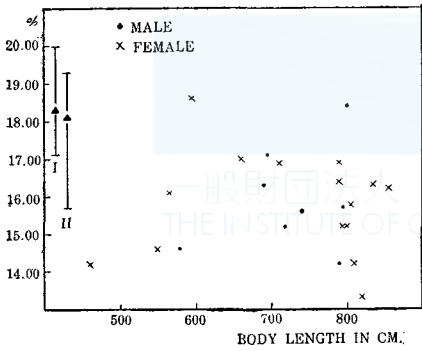


Fig. 4. Tip of snout to centre of eye.

- Male
- × Female
- I Range and mean of Atlantic male
- II " " female

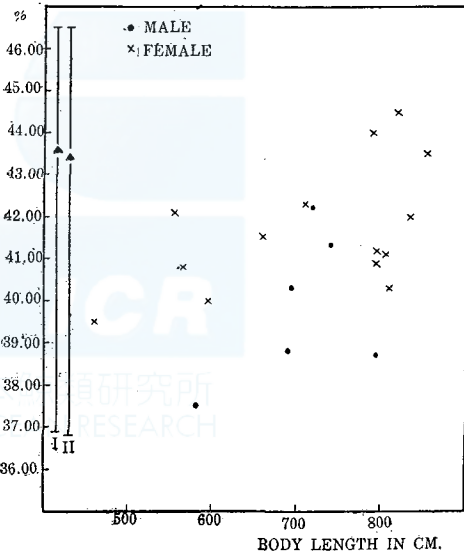


Fig. 5. Tip of snout to tip of flipper.

- Male
- × Female
- I Range and mean of Atlantic male
- II " " female

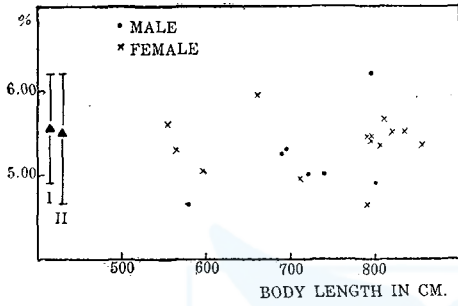


Fig. 6. Centre of eye to centre of ear.
 ● Male
 × Female
 I Range and mean of Atlantic male
 II " " " female

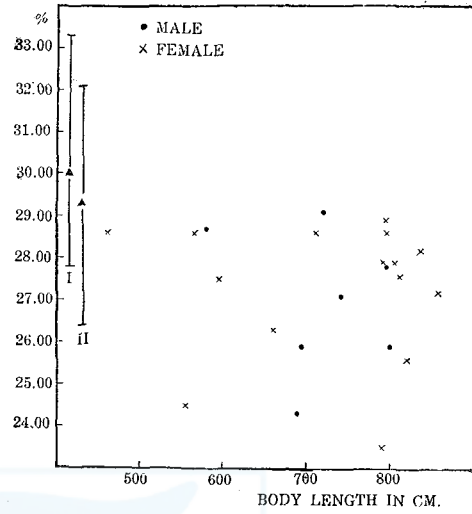


Fig. 7. Notch of flukes to posterior emargination of dorsal fin.
 ● Male
 × Female
 I Range and mean of Atlantic male
 II " " " female

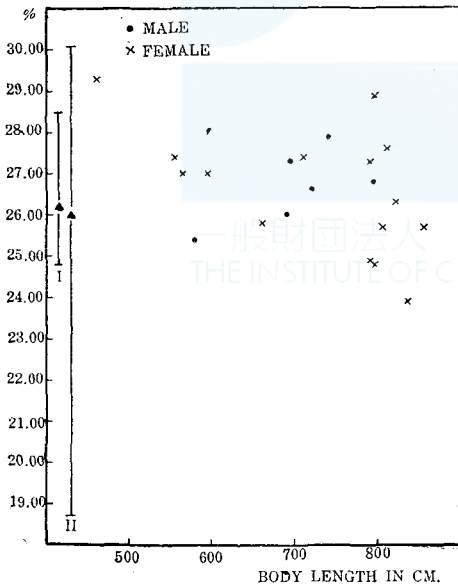


Fig. 8. Notch of flukes to centre of anus.
 ● Male
 × Female
 I Range and mean of Atlantic male
 II " " " female

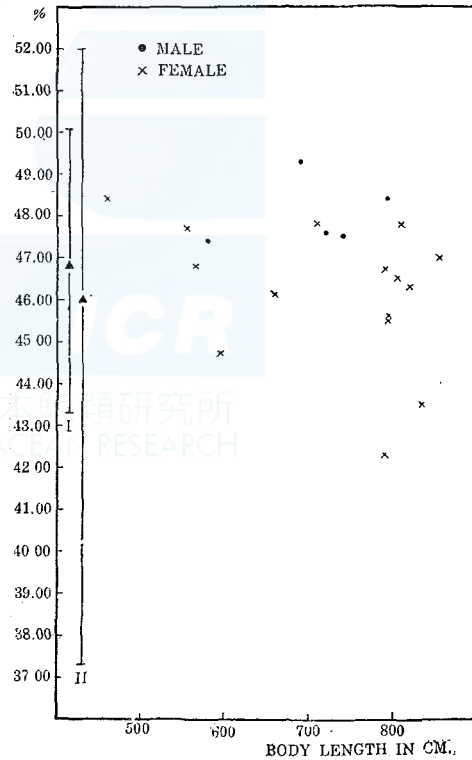


Fig. 9. Notch of flukes to umbilicus.
 ● Male
 × Female
 I Range and mean of Atlantic male
 II " " " female

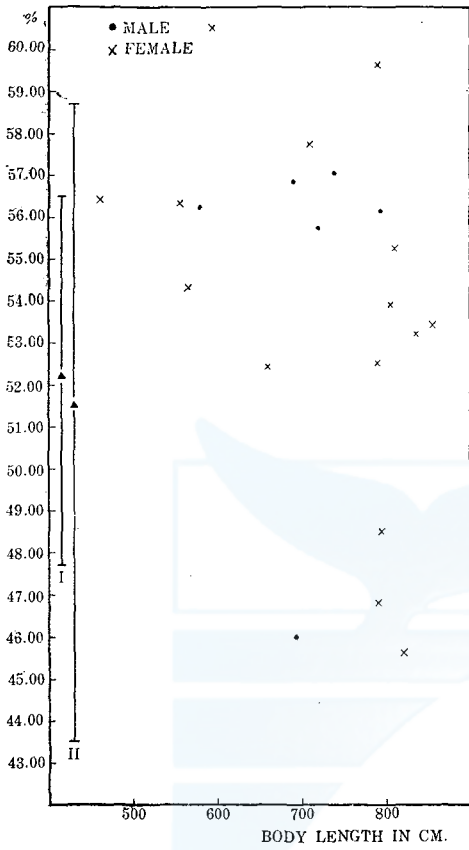


Fig. 10. Notch of flukes to end of ventral grooves.

● Male
 × Female
 I Range and mean of Atlantic male
 II " " female

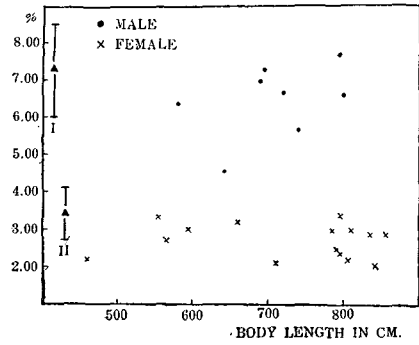


Fig. 11. Centre of anus to centre of reproductive aperture.

● Male
 × Female
 I Range and mean of Atlantic male
 II " " female

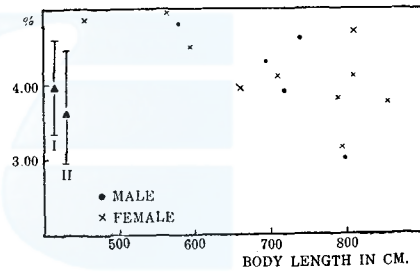


Fig. 12. Vertical height of dorsal fin.

● Male
 × Female
 I Range and mean of Atlantic male
 II " " female

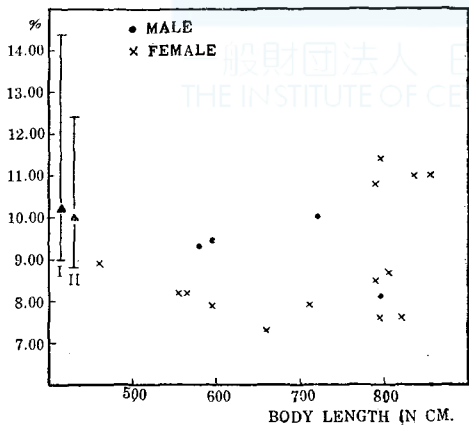


Fig. 13. Flipper, tip to axilla.

● Male
 × Female
 I Range and mean of Atlantic male
 II " " female

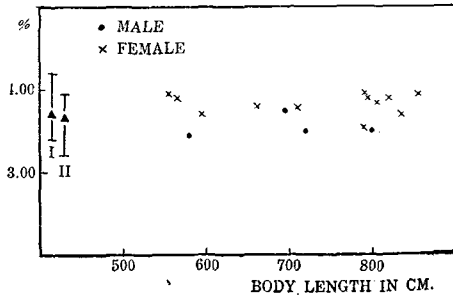


Fig. 14. Flipper, greatest width.

● Male
 × Female
 I Range and mean of Atlantic male
 II " " female

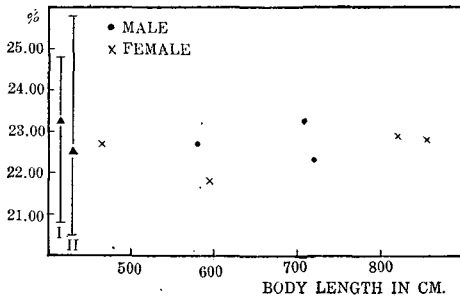


Fig. 15. Head length, condyle to tip of snout

● Male
 × Female
 I Range and mean of Atlantic male
 II " " female

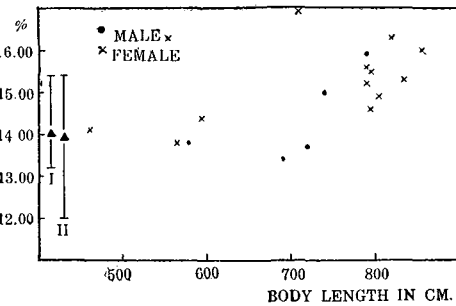


Fig. 16. Tail flukes, notch to tip.

● Male
 × Female
 I Range and mean of Atlantic male
 II " " female

a shorter mouth, a more posteriorly situated, but higher dorsal fin, more shorter flippers, more broader (or longer) tail flukes, and a more posteriorly situated genital aperture. We can not conclude at present whether or not such differences are significant. More material and their

Table II. Body proportions of *Balaenoptera acutorostrata* from Pacific ocean measured by different authors. (Expressed as percentages against body length)

Measurements	Japan	Snohomish river (Scattergood, 1949)	Puget sound (Scattergood, 1949)	Los Angeles (Fry, 1935)	Sooke, B.C. (Cowan, 1939)	Puget sound (Scammon) ¹⁾
Body length in cm	461-857	478	399	318	457	823
Tip of snout to blow-hole (centre)	11.68-14.90	12.50	12.42	12.8	11.11	13.58
Tip of snout to angle of gape.	13.32-19.04	15.96	16.56	16.6	—	—
Tip of snout to centre of eye.	13.32-18.59	16.76	17.20	17.6	16.67	—
Notch of flukes to posterior emargination of dorsal fin.	23.48-29.11	26.86	27.37	30.0	20.00 ²⁾	33.33 ²⁾
Notch of flukes to centre of anus.	23.92-29.52	—	22.93	28.7	26.11	30.86
Vertical height of dorsal fin.	3.00- 4.96	3.72	4.14	—	4.44	3.09
Length of base of dorsal fin.	5.86-10.14	6.12	6.37	—	—	—
Flipper, greatest width	3.44- 3.97	—	—	—	3.61	4.01

1) Quoted from Cowan (1939).
 2) Notch of flukes to dorsal.

statistical treatment are needed in future in order to get to the final conclusion.

We do not think, however, such differences are due to the difference in body length or age. Average body lengths of 24 males and 75 females measured by Jonsgård are 658 and 735 centimeters respectively. The corresponding figures for our specimens are 725 and 723 centimeters.

In table II the measurements of the little piked whales in the Pacific by different authors are given, shown as percentages to the total length. In summarizing in this table, we have converted feet and inches of other authors into centimeters and calculated the percentages of each measurement to the total body length, because they give only actual measurements in feet and inches with a exception of Fry (1935), who shows also percentages in addition to feet and inches in his paper. Scattergood (1949) describes that Clifford (1946)* has also reported body proportion of the little piked whale from the Pacific coast, but we could not able to quote it in this table, because of lacking of his paper. As regards our measurements, we give here only the maximum and minimum values of males and females.

The underlined figures in table II show that these measurements do not fall within the range of our material. Although there are some occasions of such case, all of them show any remarkable difference, except those measurements by Cowan (1939) and Scammon (quoted from Cowan) in the line "Notch of flukes to posterior emargination of dorsal fin." It is quite natural that such difference may occur, since they measured "Notch of flukes to dorsal" instead of "Notch to posterior emargination of dorsal fin". We do not think that there is any significant difference between Scammon's whale and ours, regarding of the position of dorsal fin. But even taking account of the different position measured, Cowan's figure of 20.00 per cent is quite unique, compared with others. Cowan presents photograph of his whale, standing on the head perpendicularly, the tail being hanged upward by wire. Scheffer and Slipp (1948) give also similar photograph of the whale measured by Scattergood. Comparing these two photographs, we can easily conclude that the Cowan's whale is a exceptional one whose dorsal fin situated more posteriorly rather at an unusual position.

Cowan (1939) says that "There is a suggestion that Pacific individuals may be found to differ from Atlantic individuals in the slightly more posteriorly position of the dorsal fin, narrower flukes, and in proportional differences in form of the scapula and sternum. Pacific individuals may have fewer baleen plates, on the other hand the observed dif-

* Carl, G. Clifford, 1946: Sharp-headed Finner Whale stranded at Sydney, Vancouver Island, British Columbia. Murrelet. vol. 27, no. 3.

ference may merely be the result of individual or age variation. Should the above differences be substantiated there would be grounds for recognizing *Balaenoptera davidsoni* as a subspecies of *Balaenoptera acutorostrata* Lacépède, but in the light of present knowledge taxonomic recognition of a Pacific species is apparently not justified”.

It may true, as already stated, that the dorsal fin situated more posteriorly in the little piked whale from the Pacific coast than Atlantic individual, but it may also without doubt that this difference in position is not so great as supposed by Cowan. Judged from our measurement No. 23 (Tail flukes, notch to tip), though we did not measured total spread of tail flukes, it is not probable that Pacific individual have narrower flukes.

As regards the number of baleen plates, also Scattergood (1949) reports that “The number of baleen plates on each side of the jaw in the Pacific specimens has been reported as 270 (Scammon, Tomilin), 231 (Cowan 1939), and 285 (Carl 1946). My two specimens had 256 and 272 plates. It would appear that the Pacific whales have slightly fewer baleen plates than those of the Atlantic.” We have only scanty material on this matter at present, 6 whales having been observed. They are 266, 275, 277, 282, 285, and 295, never exceeding 300. According to Jonsgård (1951), the baleens of the Atlantic minke whale number 270 to 348 (mean: 304) on each side. It is probable, therefore, that the Scattergood’s suggestion that the Pacific whales have slightly fewer baleen plates than those of the Atlantic may true. And we think this fact is linked with the more shorter length of the mouth in the Pacific animals. But these numbers of baleen plates are again overlapping from each other, as other differing characters do.

It is highly probable, therefore, that there would not be grounds for recognizing *Balaenoptera davidsoni* as a subspecies of *B. acutorostrata*, on the contrary to the suggestion by Cowan (1939), though there remains still some doubt in skeletal characters. These differences in external characters should be deemed as differences according to different stocks or racial nature.

Occurrence and Migration

The catch reports from the whalers from 1948 to 1954 are tabulated in table III, which should not taken as a complete catch statistics, because such reports on which sex or body length are filled more or less incompletely have been omitted. But such instances are few and we are confident that this table gives an idea concerning the occurrence and abundance of the little piked whale in the waters adjacent to Japan. As seen in fig. 17, which shows actual catch position of each

whale taken in the years 1953 and 1954, we have divided the grounds in the coastal waters of Japan into 6 major areas. The catch of the little piked whale in each area is not spread out to a wide ground, but more or less concentrating, usually having one concentration in each area. The little piked whale comes very near to the coast, and never taken in off shore seas over 100 nautical miles. In the Area II the catch is almost exclusively limited within comparatively narrow bay, called Wakasawan. Also in Area I the catch has been carried on

Table III. Catch records of Little Piked Whale from the Coast of Japan. (1948-1954).

Years	Sex	Areas						Total	Sex ratio	
		I	II	III	IV	V	VI			
1948	Male	56	—	—	27	58	—	1) 143	53.96	
	Female	38	—	—	53	31	—		122	46.04
	Total	94	—	—	80	89	—		265	
1949	Male	19	—	—	11	61	—	91	49.73	
	Female	30	—	—	31	31	—		92	50.27
	Total	49	—	—	42	92	—		183	
1950	Male	8	2	13	15	59	42	2) 141	60.26	
	Female	9	3	0	34	27	19		3) 93	39.74
	Total	17	5	13	49	86	61			234
1951	Male	9	54	6	14	87	8	4) 179		53.59
	Female	13	27	2	70	41	2		155	46.41
	Total	22	81	8	84	128	10			334
1952	Male	25	122	8	19	89	1	264		54.55
	Female	19	22	0	96	81	2		220	45.45
	Total	44	144	8	115	170	3			484
1953	Male	35	55	36	27	75	9	237		58.66
	Female	17	30	4	55	57	4		167	41.34
	Total	52	85	40	82	132	13			404
1954	Male	22	13	32	57	22	25	5) 171		47.50
	Female	16	11	4	123	22	12		6) 189	52.50
	Total	38	24	36	180	44	37			360
Total	Male	174	246	95	170	451	85	7) 1,226		
	Female	142	93	10	462	290	39		7) 1,038	
	Total	316	339	105	632	741	124			2,264
	Sex ratio									
	Male	55.06	72.57	90.48	26.90	60.86	68.55	54.15		
	Female	44.94	27.43	9.52	73.10	39.14	31.45	45.85		

1) Includes 2 little piked whales taken in other area (south side of Honshu & Shikoku)

2) " 2 " " " "

3) " 1 " " " "

4) " 1 " " " "

5) " 1 " " " "

6) " 5 " " " "

7) " 2 " " " "

within the narrow waters along the coast, most of them having been taken within 3 nautical miles from the shore.

As seen from table III, the highest catch was attained in Area V (North-east coast of Honshu) during these 7 years, and next to it in Area IV (Okhotsk Sea). Regarding of other areas the catches are the order of Areas II, I, VI, III, but the catches in these areas are very fewer than in other two areas. Before the war some little piked whales were taken also in the Yellow Sea, coast of Korea, and Kuril Island's waters, as reported by Matsuura (1936), and especially in the south-east coast of Korea motor-vessels equipped with harpoon gun had been operating until the end of the war with successful results. Of

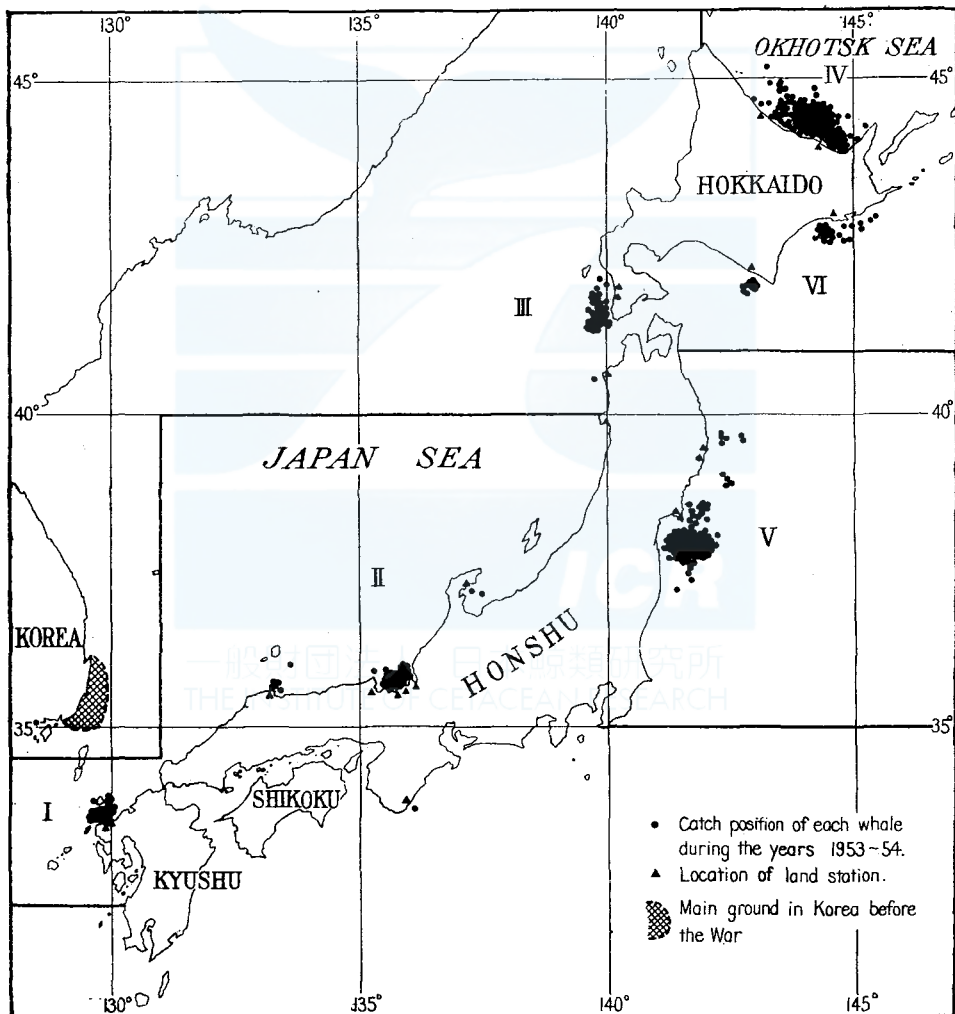


Fig. 17. Whaling Ground for the Little Piked whale around Japan.

such whaling we have no information now.

In the south coast of Honshu and Shikoku a very few whales are taken, total catch in these seven years being amounted only 7 whales.

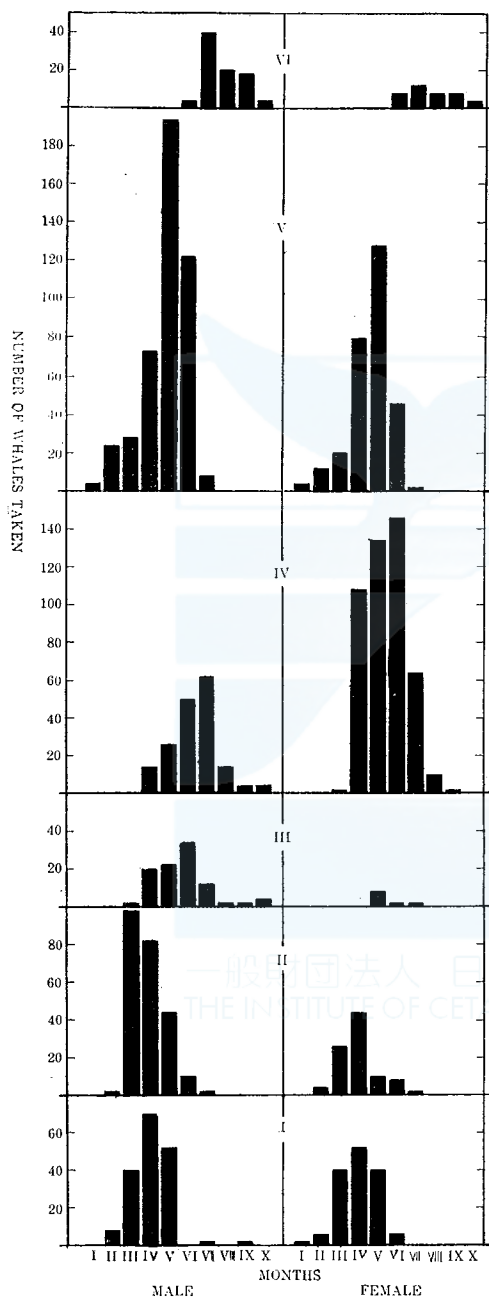


Fig. 18. Monthly catch of little piked whale in each area. (1948-54)

Several small type catcher boats have been operating in these waters too, for the purpose of taking small sized toothed whales, accordingly we think only few little piked whales will travel in these regions of the sea. A little piked whale was caught by a fish trap net in Suruga bay towards the end of November 1955 and was kept in captivity over one month. A note on this whale is published by Messrs. Nemoto and Kimura elsewhere in the present issue.

The sex ratio of the little piked whale taken in the waters adjacent to Japan is shown in table III. A slightly more males are taken as a whole than femals, percentages for males and females being about 54 and 46 per cent respectively. In Area IV, the northernmost ground, this ratio of sex is quite striking, about 27 per cent males and 73 per cent females. In other areas, on the contrary, males occupy a preponderant part of the catch over females, especially in Areas II, III, V, and VI. This fact will suggests that the little piked whale migrate in segregated groups, such as males and females.

In fig. 18 the monthly catch of the little piked whale is shown according to each area and sex in actual numbers of

whales taken. This figure does not show the true status on the occurrence of the little piked whale in the waters around Japan, because the catch of this species of whale has been restricted within 6 months of February to the end of July since 1952, though there was no restriction of season in the previous years. In strict speaking, therefore, the catch reports should be treated here dividing into two groups, one prior to 1952 and the other later years, but because the catch itself has not been so great as in Norway we treated those reports as a whole, from which we believe, still a general conception regarding of the occurrence or movement be gained. We give the actual number of whales taken in this figure, instead of percentages, in order to show the abundance of whales too, but separately according to both sexes in each area.

As shown in fig. 18 the main catch of the little piked whale is attained as a whole in a period from April to July. Some whales are also taken in August and September. These whales were taken in the seasons prior 1952. The main seasons for respective areas are March to May (Areas I and II), April to July (Areas III and IV), April to June (Area V). and July to September (Area VI).

We are confident that the histograms in fig. 18 reflect the occurrence of the little piked whale in the waters around Japan with some exceptions. There are some possibilities in Areas IV and VI that some more whales are taken in the months August, September, and October, if the catch is permitted also in these months. On the other hand we think that such catch may never be so great as to exceed the peaks shown in these histograms.

We conclude, therefore, that the little piked whales migrate into the waters around Japan early in the spring from the south, most frequently staying in the spring (in southern grounds) and summer (in northern grounds), and leave in the autumn to the south. We conclude further that there are two different stocks in the waters around Japan, the one in the waters west of Honshu (Japan sea) and the other in the east coast of Honshu. The former migrates to the north in the spring in the order of Areas I, II, III, and finally enters into Area IV (Okhotsk sea), where-in staying during the summer, and then travels back to the south following the similar route, but in the offing in the autumn. The latter stock immigrates in Area V early in the spring, staying there during the spring, and going north into Area VI. It is probable that this stock of east side goes father north along the coast of Kuril Islands until east coast of Kamchatka (Bering sea), because the fact that also in these waters the little piked whale occur has been established by other authors (see Scattergood, 1949).

In table IV the body length of the little piked whales taken in the

Table IV. Body Length Frequency of Little Piked Whale from the Coast of Japan (1948-54).

Body Length in Feet	Actual number			Per cent		
	Male	Female	Total	Male	Female	Total
12	2	5	7	0.16	0.48	0.31
13	4	9	13	0.32	0.86	0.57
14	14	16	30	1.14	1.54	1.33
15	37	46	83	3.01	4.43	3.67
16	41	43	84	3.34	4.14	3.71
17	56	43	99	4.56	4.14	4.37
18	81	79	160	6.60	7.61	7.07
19	62	48	110	5.05	4.63	4.86
20	78	87	165	6.36	8.38	7.29
21	70	72	142	5.70	6.93	6.27
22	63	45	108	5.13	4.33	4.77
23	115	54	169	9.38	5.20	7.46
24	178	64	242	14.51	6.16	10.69
25	207	87	294	16.88	8.38	12.99
26	135	136	271	11.01	13.10	11.97
27	64	114	178	5.22	10.98	7.86
28	14	65	79	1.14	6.26	3.49
29	5	23	28	0.40	2.21	1.24
30	0	2	2	0	0.19	0.09
Total	1,226	1,038	2,264			
Average length	22.31	22.35	22.33			

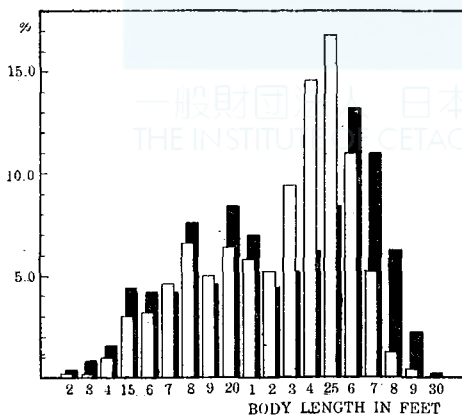


Fig. 19. Body length frequency of little piked whale from the coast of Japan (1948-54).

consecutive seven years ending 1954 are shown in actual numbers as well as in percentages. Fig. 19 shows the body length frequencies based on table IV. As seen from the table and figure the smallest and biggest animals taken are 12 (male and female) and 30 (female) feet respectively. According to Harmer (1927), Fraser (1934), and Stephenson (1951) the biggest animal from the Atlantic ocean attains a body length of over 30 feet. However, of the

99 whales examined by Jonsgård (1951) the largest is a female of 914 cm (29 feet 11 inches). Accordingly we suppose that there may occur no substantial difference in length between the animals from the two oceans, if the body length is measured correctly, in a straight line parallel with the whale's body from the tip of the snout to the notch between the tail flukes. No whale of exceeding 30 feet in length has been reported from the Pacific.

As shown in fig. 19 the body length frequencies in males and females draw bimodal curves, having their maxima at 18 and 25 feet in males, and at 20 and 26 feet in females. The lower maxima in both sexes denote apparently immature groups and the higher mature. These maxima are higher in females by 1-2 feet than males. The biggest female is 30 feet, whereas 29 feet in male. Thus, in the little piked whale female is bigger than male by one or two feet.

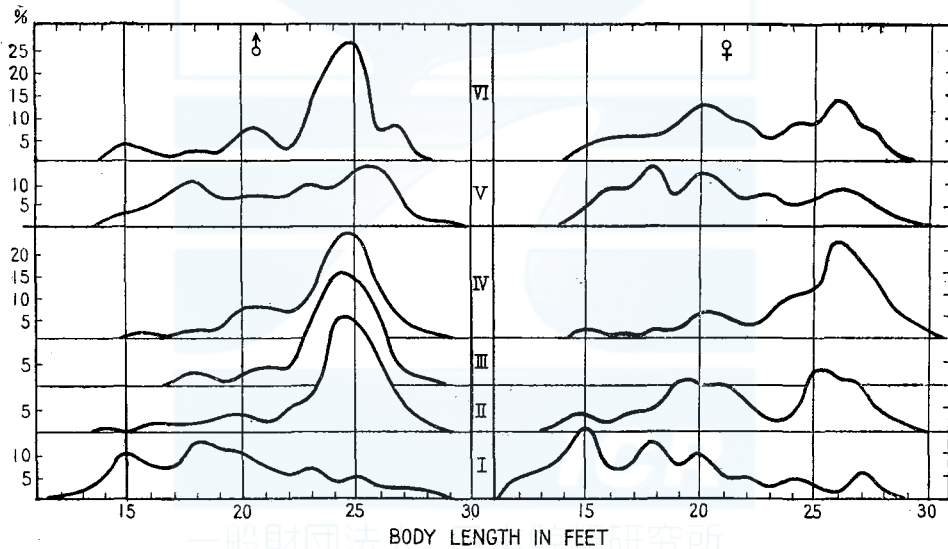


Fig. 20. Body length frequencies shown as percentages of total catch in each area (1948-54).

In fig. 20 the frequency-curves of body length in different areas are shown. At a glance we see that these curves resemble to those given by Jonsgård (1951, fig. 7) for Norwegian minke. In the waters around Japan too, there are certain characteristic differences with regard to the size of the animals according to the areas. In Area I the catches were dominated by immature animals of about 20 feet or more shorter, having their peaks at 15 and 18 feet, both in males and females. In Area II the catch was consisted chiefly by mature animals of 24 and 25 feet in males, whereas in females there noted two peaks, one at about

20 feet (adolescent) and the other at 25-27 feet (full grown). In Area III the curve for males resemble to those in Area II. We can not draw any curve for females in this area, because the catch of females in these seven years account only ten whales. The catches in Area IV were strongly dominated by mature animals both in males and females, having their maxima at 24-25 feet in males and at 26 feet in females. However, there are also second maxima at 21-22 feet (adolescent) both in males and females.

In Area V the catches were consisted of both immature and mature animals, but more immature whales were contained in the catch of females. These frequency-curves in Area VI are similar to those in Area II, both in males and females.

The immature whales of about 15 feet in length, which dominate the catch in Area I, are deemed without doubt to those who have been weaned quite recently. As already stated elsewhere in this report, we are confident that there are two stocks of the little piked whales in the waters around Japan, one in the west coast of Honshu and the other in the east. Since there is no group of small immature animals of about 15 feet in the catch of Area V, we think that such whales remain more southern waters in the eastern stock. And since there is no such grounds for the eastern stock which correspond to Areas III and IV, where the catches are strongly dominated by mature males and females, it is highly probable that mature animals, more females than males, travel farther north, beyond Area VI, to the seas of high latitude and probably along the coast of Kuril Islands and Kamchatka.

We conclude, therefore, that the little piked whales immigrate to the waters around Japan in segregated groups, such as immature animals, mature males and mature females, and that the immature animals, especially males, remain in the southern waters and only mature animals and a part of adolescent whales travel to the northern feeding grounds.

With regards to the whaling in Korea nothing has been reported since the termination of the war. However, a considerable number of the little piked whales were taken before the war in the ground on the south-east coast, which is shown in fig. 17. It is suggested, in the light of the present knowledge, that the catch in this ground also be dominated by immature animals. Matsuura (1936) reports size distribution of the little piked whale in Yellow sea, in which no whale below 20 feet is contained. We think, however, the figures in his report are not the true reflection of the stock there, because these whales were taken by usual whaling catchers for larger species. It is quite natural for such catchers to avoid the taking of small whales of less than 20 feet.

As regards the southern limit of migration, we have no scientific evidence at present. Some whalers say that the little piked whale has been observed rather frequently in the waters near Okinawa. This information may throw some light to this problem.

Food

As to the food of the little piked whale from the Atlantic ocean Stephenson (1951) states that "off the English coast, the captured whales had been feeding on herring and mackerel." Jonsgård (1951) also describes that "in Nowegian coastal waters different species of fish play a greater role as food for the minke whale." Thus it seems that fish is the most favorable food for the little piked whale. However, Jonsgård continues further "we think it may be safely concluded that the minke whale in high Arctic waters feeds mainly on krill, in this case *Thysanoessa inermis*. Even in the cases where a mixed diet was found, krill formed the major part of the content, which seems to suggest that the herring, capelin, or small cod found together with the krill have been feeding on the same krill swarms as the whale and have been taken, therefore, more or less, accidentally."

In the coastal waters of Japan krill plays more or less a greater role as food for the little piked whale, especially in Area IV, the northernmost ground in the Okhotsk sea.

In table V the reports from the whalers for 1953 and 1954 as to the food of the little piked whale are tabulated. There may be some cases where the kind of food has been miss-identified. However, we think that such cases may occur rather in few occasions where the food concerns not with commercial fish.

As seen from this table the instances where krill is eaten are most numerous. However, we are not confident as to the "krill" (in Japanese Ami) reported by whalers means always euphausiids. Since there is no Japanese word corresponding to Norwegian "røpdaaten," copepods are often reported as Ami (krill). Of the 17 whales, investigated by us of their stomach contents at Abashiri (Area IV) in 1953, 3 were empty, 5 were with krill (mostly in rich), 2 were with krill and some fish bones, 2 were with copepods, 2 were with mixed diet of krill and copepods, and rest 3 with fish. Of the 3 whales which had fish in their stomach, each one instance of Alaska pollack (*Theragra chalcogramma*) and sand lance (*Ammodytes personatus*) have been observed. The rest was the mixed diet of the both species.

Also in Area I, southernmost ground, the little piked whale feeds in some extent on krill. In spring krill swarms in these waters and

Tableh V. Stomach contents of Little Piked Whale from the Coast of Japan.

Area	Kind of Food	1953	1954
I	Krill (or Copepods)	29	5
	Fish, Sand lance (<i>Ammodytes personatus</i>)	4	6
	Fish, Iwashi ¹⁾	12	15
	Other fishes	1	—
II	Krill (or Copepods)	62	12
	Fish, Sand lance	9	3
	Fish, Iwashi ¹⁾	3	2
	Krill (or Copepods)+Fish, Sand lance	2	1
	Squid	1	—
III	Krill (or Copepods)	2	2
	Fish, Iwashi ¹⁾	2	—
	Fish, Hokke (<i>Pleurogrammus azonus</i>)	34	30
	Squid	1	—
IV	Krill (or Copepods)	44	119
	Fish, Sand lance	13	16
	Fish, Iwashi ¹⁾	1	5
	Fish, Alaska pollack (<i>Theragra chalcogramma</i>)	12	12
	Fish, Cod (<i>Gadus macrocephalus</i>)	1	—
	Small fish, not identified	2	—
	Krill (or Copepods)+Fish, Sand lance	4	13
	Krill (or Copepods)+Fish, Alaska pollack	3	2
	Krill (or Copepods)+Fish, Herring	—	1
	Fish, Sand lance+Fish, Iwashi ¹⁾	1	—
	Fish, Sand lance+Fish, Alaska pollack	1	—
	Fish, Saury pike (<i>Cololabis saira</i>)+Squid	—	1
V	Krill (or Copepods)	79	10
	Fish, Sand lance	27	23
	Fish, Iwashi ¹⁾	12	3
	Fish, Mackerel	—	2
	Small fish, not identified	3	—
	Squid	2	—
VI	Krill (or Copepods)	—	14
	Fish, Iwashi ¹⁾	—	16
	Fish, Alaska pollack	9	—
	Fish, Cod	4	—

1) Collective name of sardine (*Sardinops melanosticta*), anchovy (*Engraulis japonica*), and round herring (*Etrumeus micropus*). But mostly anchovy in these cases.

are taken by fishermen by nets of fine meshes for human consumption. The Tsukudani, a kind of conserved food cooked with sugar and soy

beans souse, of krill is a traditional food in Japan. According to whalers in the year more krill abundant, more whales come to these waters.

Among fishes found in the stomach of the little piked whales, sand lance plays a greater role, particularly in Area V. Large fish of this species of about 15 cm or more in length are present in good quantity in the stomach. The little piked whale in this area comes very near to shore pursuing this fish, and it is not very seldom that the whale be taken by fish trap net.

Most of the fish reported as Iwashi are thought to belong to anchovy (*Engaulis japonica*), though there are few records of Oba-Iwashi, which means full-grown sardine (*Sardinops melanosticta*). It is noted that Hokke (*Pleurogrammus azonus*) is reported only from Area III, but this fact coincides well with the abundance of this fish in these waters.

In Areas IV and VI also Alaska pollack (*Theragra chalcogramma*), cod (*Gadus macrocephalus*), or herring (*Clupea pallasii*) have been recorded besides above mentioned kinds of fish. Squids too are eaten, though in few occasions, by the little piked whales.

Reproduction and Growth

Of the 13 whales examined by us of their ovaries, 5 were immature and 8 were registered as mature, having one or more corpora lutea of pregnancy or ovulation in their ovaries. The largest immature whale was 709 cm (23'3") in length and had a ripening follicle of 8 mm diameter in its ovaries. Among the whales examined by us the greatest diameter of Graafian follicle was recorded as 15 mm in the little piked whale. The smallest mature whale was 788 cm (25'10") in length, but this whale contained one functional corpus luteum (fetus not present) and 12 corpora albicantia in its ovaries. In fig. 21 the relation between body length and number of corpora lutea are shown, and from this figure it is clear that females of 26 feet in length or more larger are all mature. But we can not conclude at what body length the female little piked whale reaches sexual maturity in average from this figure alone, because we have no data concerning 24 or 25 feet. We have investigated, therefore, the records of 111 fetuses obtained during the years 1948 to 1954. Instances of pregnancy according to their respective body lengths are as follows :

Body length	Instances of pregnancy
23 feet	2
24 "	2
25 "	7
26 "	44
27 "	28
28 "	20
29 "	6
30 "	2

As seen from the above the smallest pregnant female is 23 feet. Matsuura (1936) reports 8 records of pregnant females from the waters adjacent to Japan, and amongst them the whales of 23 Shaku (1 Shaku = 0.99421 foot) are the smallest. But such instances are deemed rather few, though we have no negative evidence, except one examined by us as already mentioned. Jonsgård (1951) describes that sexual maturity

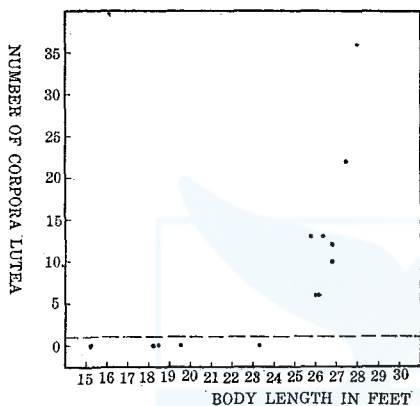


Fig. 21. Relation between number of corpora lutea and the length of female little piked whale.

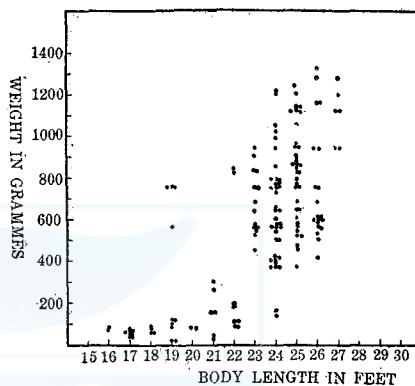


Fig. 22. Relation between weight of testis and the length of male little piked whale.

is attained at length of about 24 feet in the female for the whale from the Norwegian waters. We may conclude that the average body length at which sexual maturity is attained is about 24 feet in the female little piked whale from the coast of Japan, not differing from the figure established for the whale from the Atlantic ocean.

We have plotted the weights of testes against the corresponding body lengths in fig. 22. There are two groups roughly, the one being less than 200 grams and the other heavier than 300 grams. Evidently the former represents immature group, and the latter mature. The smallest mature male is 19 feet long, and the largest immature may 24 feet. Males of 23 feet long and over are evidently mature. Jonsgård (1951) reports that one pair of testes weighing more than 225 gr. seem to be mature. Since weight of each testis is plotted in fig. 22, our weight should be doubled in order to compare roughly to that given by Jonsgård. Individual weight less than 200 gr. in fig. 22 seem to be slightly heavier than those reported by Jonsgård. We are not confident that our measurements are always correct in critical point, because these data have been supplied mainly from the whalers, not having measured by us. Jonsgård states that the male attain sexual maturity at a length of about 22 feet, 2 feet smaller than the female. There are 4 whales in

fig. 22 which registered at 22 feet (each dot denotes the weight of each testis instead of one pair of testes). One is obviously mature, two are apparently immature, and the rest one is very doubtful whether or not mature. We think that the average body length at which sexual maturity is attained in male is 22 or 23 feet for the little piked whale from the coast of Japan.

In fig. 23 body lengths of fetuses are plotted according to their

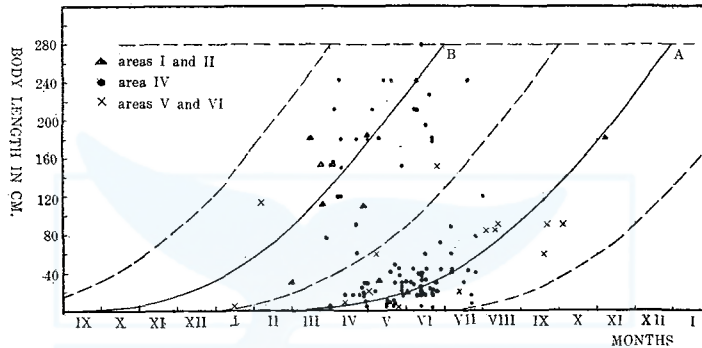


Fig. 23. Length of fetuses and months of their occurrence in waters around Japan, showing the approximate rate of growth.

- ▲ areas I and II
- area IV
- × areas V and VI

respective dates. This material has been obtained during the period from 1948 to 1954. The records of fetuses thus obtained are confined almostly within 5 months from March to July, because of the restriction of the period of taking imposed on whaling. We added here, therefore, the records reported by Matsuura (1936), in the days of no such restriction.

As seen from fig. 23 there are roughly two groups of fetuses even in the same period, the one is smaller and the other bigger. The line A is a supposed growth curve for the smaller group of the fetuses. The body length at which the birth takes place is supposed at 280 cm. We think this supposition may correct in the light of the present knowledge. According to the line A most of pairing take place at the end of February or beginning of March, and most whales give birth to their calves at the end of December or beginning of January, having the period of conception of about 10 months. This curve coincide fairly well with the growth curve of fetuses given by Stephenson (1951) for the little piked whale from the Atlantic ocean, if we shift the line A a month earlier.

But, as seen in this figure there present another group of fetuses,

the bigger, far apart from the line A. The occurrence of such fetuses from the coast of Japan has already been shown by Matsuura (1936, fig. 4) and Stephenson (1951, fig. 14), though no details are discussed in their reports. We have examined 8 mature females at Abashiri (Area IV) from 13th to 16th June 1953, in which 6 were pregnant. The other two had contained functional corpus luteum in their ovaries, but no fetus was present. It was ascertained after careful observation, cutting open through their uterine cornua. No resting whale was observed. The biggest fetus has been recorded as 279 cm (9'2") and was deemed as just before parturition. The smallest one was at the early stage of pregnancy and the sex of the fetus could not be determined. It is apparent that the 2 whales which contained no fetus were just after ovulation, and may be at a very early stage of pregnancy or in pairing. Thus, we have observed a biggest fetus of just before parturition, a very small one, and two cases of very early stage of pregnancy or in pairing within a very short period of five days, even in the northernmost ground.

The line B is drawn parallel to the line A with an interval of six months. Hatched lines were drawn also parallel to those solid lines, but with an interval of three months. Apparently the line B denotes the average growth curve for the fetuses of another group, the bigger. Pairing and parturition, in this case, take place at about Aug.-Sept. and June-July respectively.

It is apparent that the period of pairing is of long duration in both cases. Jonsgård (1951) reports for the little piked whale from the Atlantic that the pairing-season must be of rather long duration from about January to the end of May. Since the little piked whale from the coast of Japan has two seasons of pairing within 12 months and each one lasts for long period, pairing may occur actually throughout the whole year. Stephenson (1951) describes as to the little piked whale from the Atlantic that the sizes of young stranded whales suggest that birth can occur at any season of a year. His opinion has not been justified by Jonsgård, but our material suggests that it may be applied to the whales from the coast of Japan.

It is clear, as stated above, that the little piked whale from the coast of Japan has two seasons of pairing, but it is hardly thought that these facts are based upon different habits of breeding between the two stocks, namely eastern and western stocks of Honshu. We have plotted with different symbols in fig. 23 the fetuses from different areas. Same symbols are seen in both groups A and B, presenting a negative evidence.

We conclude, therefore, that the ovulation takes place at least twice a year in the little piked whale from the coast of Japan, the first ovulation mostly in Feb.-Mar. and the second mostly in Aug.-Sept. with

an interval of six months, and impregnation may occur in both cases.

We have calculated the numbers of individuals belonging to both groups with a result that the ratio of A-group to B is roughly 2 to 1. But, we should remind here the fact that a great number of small fetuses, which belong to A-group in the period of whaling permitted, may have been overlooked. Accordingly we conclude further that females get impregnated mostly at the first ovulation, having its peak in February and March, and those females who had not been impregnated at the first ovulation may have fetuses at the second ovulation, 6 months later from the first.

In any case, it may probable that mature female gives birth a young within more shorter time than 24 months, which is thought generally be applied to other baleen whales. This is suggested by our examination of ovaries, however few in number. Of the 8 mature females, no resting whale was observed. Jonsgård (1951) states that paucity of resting females in the material leads to the conclusion that the majority of mature females bring forth a young one once a year for the little piked whale in the Norwegian waters. His conclusion may be applied also for the whale from the coast of Japan, but slightly changed. Namely, in the little piked whale from the coast of Japan mature females mostly bring forth a calf once a year, but there are some cases where they give birth to their young after an interval of 18 months from the previous parturition.

The material at our disposal can yield only a small amount of information about the growth after birth. It is seen from fig. 20 that there are peaks in the body length frequency curves in respective areas roughly at 15, 18, 20-21, 23, and 24-25 (male) or 25-26 (female) feet. The small whales of about 15 feet in length are probable to have weaned recently. These constitute the 0-year class, or about half a year old. From 15 feet upwards the intervals of successive peaks are 2-3 feet. Two or three feet growth is hardly taken as an annual growth for the little piked whale, comparing with more rapid growth, about 6 feet within 6 months, in the period prior half a year old is attained, and in the light of the present knowledge that birth may occur also in summer. We may ascribe, therefore the second group of about 18 feet long to the I-year, class, or a year old, and the third group of about 20-21 feet in length also to the I-year class, but actually one and a half year old. In this way, the fourth group of about 23 feet may be deemed as II-year class of about 2 year old. The groups of 24-25 feet in males and 25-26 feet in females are apparently consisted of mature animals, and may be of different ages, older than 2 years old. Sexual maturity may be attained at an age of 2 years. This assumption coincides well

to that of Jonsgård (1951) for the little piked whale from the Atlantic ocean. There may be no remarkable difference in growth or age between the animals from the different two oceans. But of course, more evidence is needed before this can be regarded as firmly established.

Summary

1. The little piked whale from the coast of Japan has been studied using material obtained from the biological examinations of whales treated at land station as well as the information supplied by the whalers during the years 1948 to 1954.

2. The little piked whale from the coast of Japan has a shorter mouth, a more posteriorly situated, but higher dorsal fin, more shorter flippers, more broader tail flukes, and a more posteriorly situated genital aperture than the whale from the Atlantic ocean. The Pacific whale has slightly fewer baleen plates than that from the Atlantic. We think, however, that these differences in external characters should be deemed as differences according to different stocks or racial nature, because such measurements from both oceans are overlapping in major parts. The grounds for recognizing *Balaenoptera davidsoni* as a subspecies of *B. acutorostrata* have not been justified from the external characters.

3. It is thought that there are two different stocks of the little piked whale in the waters around Japan, the one to the waters west of Honshu (Japan sea) and the other in the east coast of Honshu. Both stocks migrate into the waters around Japan early in the spring from the south, most frequently staying in the spring (in southern grounds) and summer (in northern grounds), and leave in the autumn to the south.

4. The little piked whale immigrates to the waters around Japan in segregated groups, such as immature animals, mature males and mature females. The immature animals, especially males, remain in the southern waters. Only mature animals, dominated by females, and a part of adolescent whales travel to the northern feeding grounds of high latitude.

5. The little piked whale from the coast of Japan feeds on krill or copepods as well as various kinds of fish. Among fish sand lance (*Ammodytes personatus*) and anchovy (*Engraulis japonica*) play a greater role.

6. The sexual maturity is thought to be attained at a body length of 24 feet in female and 22-23 feet in male, and at an age of 2 years in both sexes.

7. The ovulation takes place at least twice a year in the little

piked whale from the coast of Japan, the first ovulation mostly in Feb.-Mar. and the second mostly in Aug.-Sept. with an interval of six months. Most mature females get impregnated at the first ovulation and those females who had not been impregnated at the first ovulation may have fetuses at the second ovulation.

8. The period of pairing is of long duration and may occur throughout the whole year. The gestation is supposed to last about 10 months.

Most of the mature females may bring forth a calf once a year, but there are some cases where they give birth to their young after an interval of 18 months from the previous parturition.

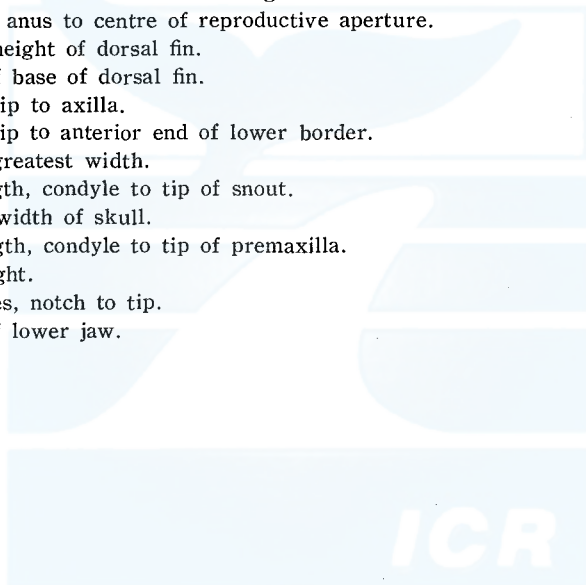
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Appendix Table

Measurements of Body Proportions.

1. Total length.
2. Lower jaw, projection beyond tip of snout.
3. Tip of snout to blowhole (centre).
4. Tip of snout to angle of gape.
5. Tip of snout to centre of eye.
6. Tip of snout to tip of flipper.
7. Centre of eye to centre of ear.
8. Notch of flukes to posterior emargination of dorsal fin.
9. Width of flukes at insertion.
10. Notch of flukes to centre of anus.
11. Notch of flukes to umbilicus.
12. Notch of flukes to end of ventral grooves.
13. Centre of anus to centre of reproductive aperture.
14. Vertical height of dorsal fin.
15. Length of base of dorsal fin.
16. Flipper, tip to axilla.
17. Flipper, tip to anterior end of lower border.
18. Flipper, greatest width.
19. Head length, condyle to tip of snout.
20. Greatest width of skull.
21. Skull length, condyle to tip of premaxilla.
22. Skull height.
23. Tail flukes, notch to tip.
24. Length of lower jaw.



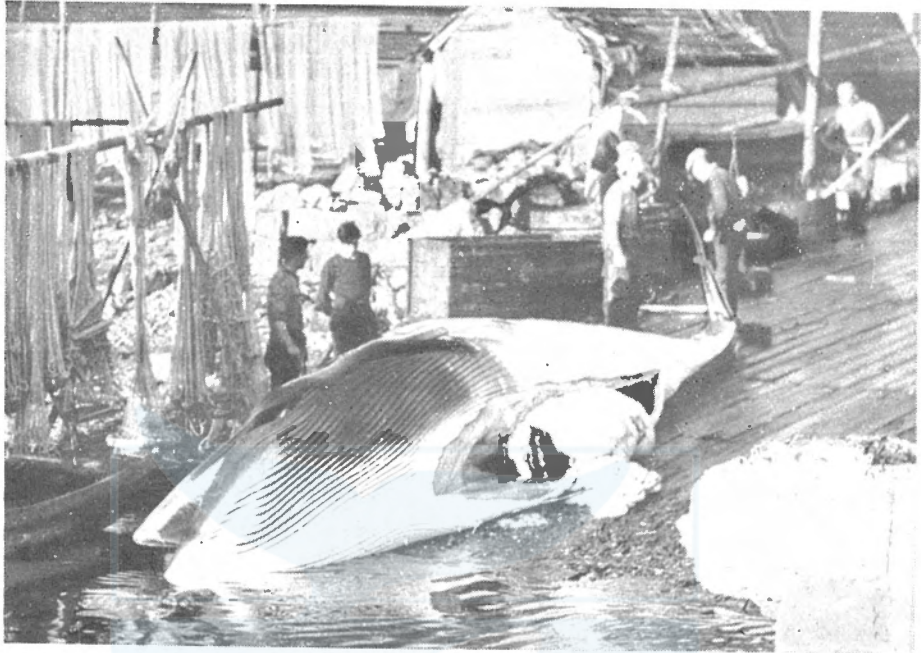
Body Proportions of Little Piked
upper figures:
lower figures:

No.	Date, killed	Land station	Sex	Measure-									
				1	2	3	4	5	6	7	8	9	10
1	12 Jun. 1953	Abashiri	M	582	6	68	79	85	218	27	167	42	148
					1.03	11.68	13.57	14.60	37.46	4.64	28.69	7.22	25.43
2	24 Jul. 1953	Kushiro	"	688	14	94	131	112	267	36	167	51	179
					2.03	13.66	19.04	16.28	38.81	5.23	24.27	7.41	26.02
3	21 Jul. 1953	Abashiri	"	695	—	91	—	119	280	37	180	—	190
					—	13.09	—	17.12	40.29	5.32	25.90	—	27.34
4	13 Jun. 1953	"	"	718	18	96	128	109	303	36	209	48	191
					2.51	13.37	17.83	15.18	42.20	5.01	29.11	6.69	26.60
5	15 Jun. 1953	"	"	739	18	94	103	115	306	37	200	52	206
					2.44	12.72	13.94	15.56	41.41	5.01	27.06	7.04	27.88
6	16 Jun. 1953	"	"	788	7	102	—	112	—	—	—	48	—
					0.89	12.94	—	14.21	—	—	—	6.09	—
7	22 Jun. 1953	Ayukawa	"	794	—	97	—	125	307	43	221	55	213
					—	12.22	—	15.74	38.67	6.20	27.83	6.93	26.83
8	18 Jul. 1953	Kushiro	"	799	—	101	—	147	—	39	207	—	—
					—	12.64	—	18.40	—	4.88	25.91	—	—
9	23 Jun. 1953	Ayukawa	F	461	—	54	—	66	182	—	132	33	135
					—	11.71	—	14.32	39.48	—	28.63	7.16	29.28
10	24 Jul. 1953	Kushiro	"	554	—	70	—	84	233	31	136	45	152
					—	12.64	—	15.16	42.06	5.59	24.54	8.12	27.44
11	12 Jun. 1953	Abashiri	"	564	8	76	79	91	230	30	161	42	152
					1.42	13.48	14.01	16.13	40.78	5.32	28.55	7.45	26.95
12	10 Jun. 1953	"	"	597	15	82	94	111	239	30	164	43	155
					2.51	13.74	15.75	18.59	40.03	5.03	27.47	7.20	25.96
13	24 Jul. 1953	Kushiro	"	658	12	88	123	112	273	39	173	—	170
					1.82	13.37	18.69	17.02	41.49	5.93	26.29	—	25.83
14	14 Jun. 1953	Abashiri	"	709	10	88	118	120	300	35	203	59	194
					1.41	12.41	16.64	16.93	42.31	4.94	28.63	8.32	27.36
15	13 Jun. 1953	"	"	788	15	100	133	133	336	43	185	63	215
					1.90	12.69	16.88	16.88	44.04	5.46	23.48	7.99	27.28
16	16 Jun. 1953	"	"	791	13	100	—	130	—	43	221	57	197
					1.64	12.64	—	16.43	—	5.44	27.94	7.21	24.91
17	14 Jun. 1953	"	"	794	6	115	121	121	327	37	227	56	197
					0.76	14.48	15.24	15.24	41.18	4.66	28.59	7.05	24.81
18	16 Jun. 1953	"	"	797	13	100	—	121	326	43	230	57	230
					1.63	12.55	—	15.18	40.90	5.40	28.86	7.15	28.86
19	16 Jun. 1953	"	"	803	—	106	150	127	330	43	224	61	206
					—	13.20	18.68	15.82	41.10	5.35	27.90	7.60	25.65
20	15 Jun. 1953	"	"	812	15	103	—	115	327	46	224	—	224
					1.85	12.68	—	14.16	40.27	5.67	27.59	—	27.59
21	14 Jun. 1953	"	"	818	7	115	109	109	364	45	209	60	215
					0.86	14.06	13.32	13.32	44.50	5.50	25.55	7.33	26.28
22	15 Jun. 1953	"	"	836	—	117	130	136	351	46	236	60	200
					—	14.90	15.51	16.27	41.99	5.50	28.23	7.18	23.92
23	13 Jun. 1953	"	"	857	10	124	136	139	373	46	233	61	230
					1.17	14.47	15.87	16.22	43.52	5.37	27.19	7.12	25.67

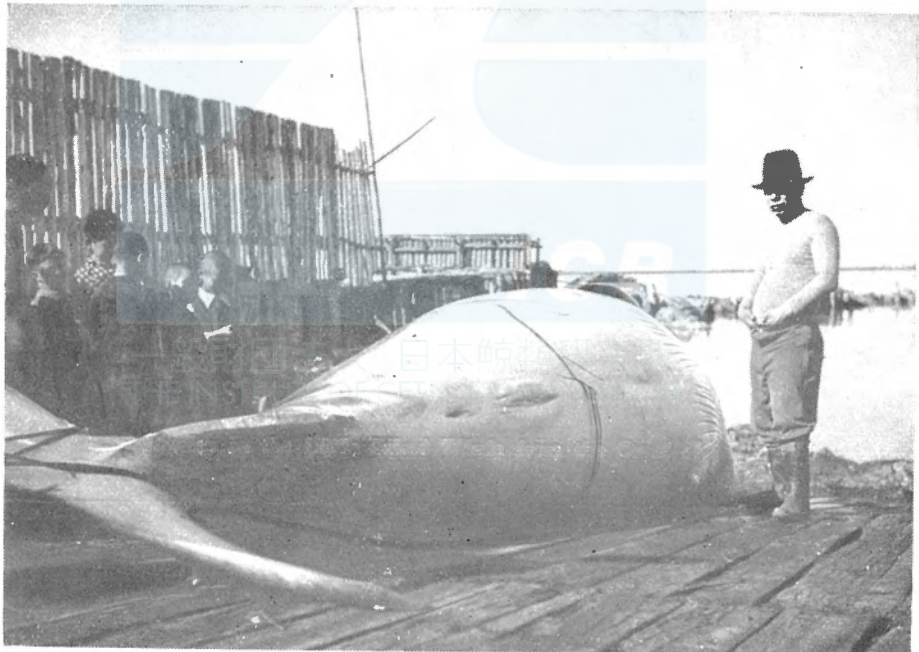
Whale from the Coast of Japan.
length in centimeters.
percentage against body length.

ments

11	12	13	14	15	16	17	18	19	20	21	22	23	24
276	327	37	28	48	54	77	20	132	74	—	—	80	123
47.42	56.19	6.36	4.81	8.25	9.28	13.23	3.44	22.68	12.71	—	—	13.75	21.13
339	391	48	—	—	—	—	—	—	—	—	—	92	—
49.27	56.83	6.98	—	—	—	—	—	—	—	—	—	13.37	—
—	320	51	30	66	—	106	26	—	—	—	—	—	160
—	46.04	7.34	4.32	9.50	—	15.25	3.74	—	—	—	—	—	23.02
342	400	48	28	57	72	90	25	160	77	—	—	98	155
47.63	55.71	6.69	3.90	7.94	10.03	12.53	3.48	22.28	10.72	—	—	13.65	21.59
351	421	42	34	64	—	—	—	—	—	—	—	111	—
47.50	56.97	5.68	4.60	8.66	—	—	—	—	—	—	—	15.02	—
—	—	—	—	—	—	—	—	—	—	—	—	125	—
—	—	—	—	—	—	—	—	—	—	—	—	15.86	—
384	445	61	—	48	64	94	—	—	—	—	—	—	—
48.36	56.05	7.68	—	6.05	8.06	11.84	—	—	—	—	—	—	—
—	—	53	24	81	—	157	28	—	—	—	—	—	—
—	—	6.63	3.00	10.14	—	19.65	3.50	—	—	—	—	—	—
223	260	10	—	27	41	67	—	—	51	94	29	65	100
48.37	56.40	2.17	—	5.86	8.89	14.53	—	—	11.06	20.39	6.29	14.10	21.69
264	312	18	27	45	50	61	22	—	—	—	—	90	—
47.67	56.32	3.25	4.87	8.12	8.20	11.01	3.97	—	—	—	—	16.25	—
264	306	15	28	43	46	65	22	128	72	—	—	78	118
46.81	54.26	2.66	4.96	7.62	8.16	11.52	3.90	22.70	12.77	—	—	13.83	20.92
267	361	18	27	45	58	71	22	130	72	—	—	86	125
44.72	60.47	3.01	4.52	7.54	7.92	11.89	3.69	21.78	12.06	—	—	14.41	20.94
303	345	21	28	45	48	70	25	—	—	—	—	—	—
46.05	52.43	3.19	4.26	6.84	7.29	10.64	3.79	—	—	—	—	—	—
339	409	15	29	49	56	68	27	—	—	—	—	120	155
47.81	57.68	2.11	4.09	6.91	7.90	9.59	3.81	—	—	—	—	16.93	21.86
333	470	20	—	—	85	92	31	—	—	—	—	120	178
42.26	59.64	2.54	—	—	10.79	11.67	3.93	—	—	—	—	15.23	22.59
369	415	24	30	55	67	94	28	—	—	—	—	123	—
46.65	52.47	3.03	3.79	6.95	8.47	11.88	3.54	—	—	—	—	15.55	—
361	385	27	25	48	60	88	—	—	—	—	—	123	—
45.47	48.49	3.40	3.15	6.05	7.56	11.08	—	—	—	—	—	15.49	—
363	373	19	—	—	91	102	31	—	—	—	—	116	—
45.55	46.80	2.38	—	—	11.42	12.80	3.89	—	—	—	—	14.55	—
373	433	18	33	67	70	99	31	—	—	—	—	120	—
46.45	53.92	2.24	4.11	8.34	8.72	12.33	3.86	—	—	—	—	14.94	—
388	448	24	38	65	—	—	—	—	—	—	—	—	—
47.78	55.17	2.96	4.68	8.00	—	—	—	—	—	—	—	—	—
379	373	19	—	—	62	77	32	187	89	—	—	133	182
46.33	45.60	2.32	—	—	7.58	9.41	3.91	22.86	10.88	—	—	16.26	22.25
364	445	24	—	—	92	123	31	—	—	—	—	128	177
43.54	53.23	2.87	—	—	11.00	14.71	3.71	—	—	—	—	15.31	21.17
403	458	25	32	75	94	135	34	195	—	—	—	137	185
47.02	53.44	2.92	3.73	8.75	10.97	15.75	3.97	22.75	—	—	—	15.99	21.59



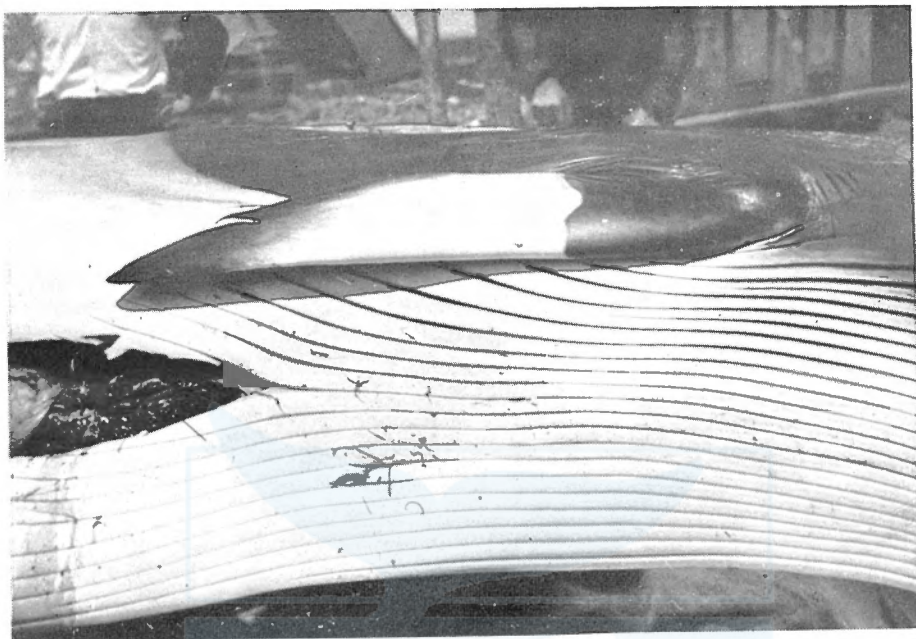
(Photo by Sakiura)



(Photo by Sakiura)

Plate I.

Ventral view of the little piked whale from the coast of Japan. At Abashiri land station in Hokkaido.



(Photo by Sakiura)



(Photo by Sakiura)

Plate II.

White band on the outer surface of the flipper of the little piked whale. Upper, broader band. Lower, narrower band. At Abashiri land station in Hokkaido.



(Photo by Sakiura)

Plate III.

A fetus of the little piked whale. 279 cm. male. At Abashiri land station.

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