

# A PYGMY SPERM WHALE ACCIDENTALLY TAKEN BY DRIFT NET IN THE NORTH PACIFIC

HIDEO OMURA

*Whales Research Institute*

MIKI SHIRAKIHARA

*Shimonoseki-shi, Yamaguchi-ken*

HARUKA ITO

*National Science Museum*

A pygmy sperm whale was accidentally taken by drift net called Omenagashi on 1 December 1981 at a position 34°01'N, 176°17'E, during an experimental fishing operation for tunas.

This whale was frozen on the spot and kept in an ice-chamber of about -20°C until towards the end of March of the following year. Then it was transported to Whales Research Institute for identification of the species. On 6 April 1982 we made observation and dissection of the carcass after melting the body. Dr Toshio Kasuya of the Ocean Research Institute, Dr Nobuyuki Miyazaki of the National Science Museum and Mr Hidehiro Kato of the WRI have cooperated in the works. We are very grateful for all of them.

This whale was a female calf of 1,731 mm in length. It was said that several other whales of the same species were concurrently taken. They were larger than this specimen, but the smallest was selected for the sake of convenience. There remains no record of the number, size and sex of these animals, but presumably included among them the female which was accompanied by the calf.

This whale has a robust body with a small but distinctively shaped head and a narrow tail stock. The tail flukes were cut off on the spot, but they were preserved separately and we could connect them when measuring the body length. The head is conical viewed from above and also conical viewed in profile (Fig. 1). The forehead overhangs noticeably. The lower jaw is small and narrow, and superficially resembles to a shark's jaw. The dorsal fin is small, falcate, and positioned behind midback. The flippers are located well forward on the body.

The color of the body is dark gray on the back, shading to lighter gray on the belly. Between eye and flipper there was present a so-called "bracket mark" or "false gill" on each side of the body (Fig. 2). This mark was first described by Hubbs (1951) and followed several subsequent authors, *e.g.* Caldwell *et al.* (1960), Hale (1963), Roest (1970) and Ross (1979). It appears to be characteristic of the Genus (Ross, 1979).

Yamada (1954) also noted similar mark was present in two *Kogia* taken at Taiji, Japan, and in one specimen obtained from Tamashima, Okayama-ken. This pattern of his specimens, however, different in shape from the "bracket-like"

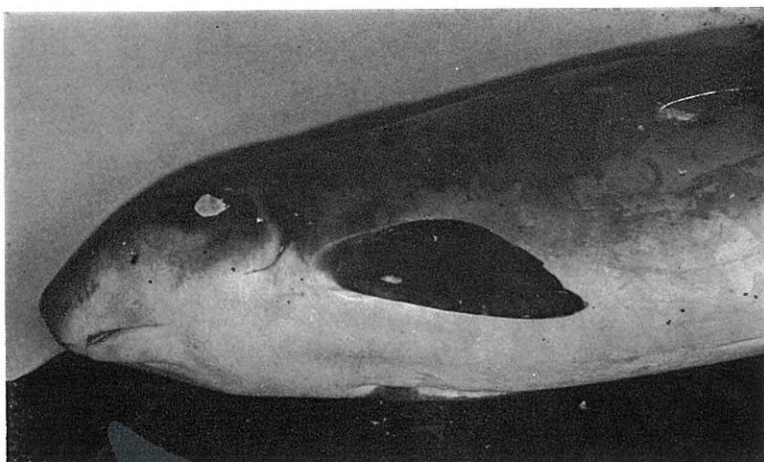


Fig. 1. Obliquely lateral view of head and trunk of the present specimen of the pygmy sperm whale.



Fig. 2. Head of the present specimen, showing the typical "bracket mark" after eye.

mark. The position of this mark is quite similar to those of other specimens, *i.e.* it is located behind the eye and in front of the flipper. This pattern consisted of two processes of the ventral white color upwards into the dorsal black region and both pointing to ear hole, thus forming black island between them.

Since then no paper deals with this marking of the Japanese specimen. Omura and Takahashi (1981) reported a pygmy sperm whale stranded at Tokaimura, Japan. In this case, however, the carcass was already half-decomposed and no marking was observed. In the present specimen the marking is clearly typical

TABLE 1. BODY PROPORTION OF THE PRESENT SPECIMEN

Measurements	in mm	% of Total length
1. Tip of snout to notch of flukes (Total length)	1,731	100.0
2. Tip of snout to center of eye	215	12.4
3. Tip of snout to ear	283	16.3
4. Center of eye to ear	54	3.1
5. Tip of snout to blowhole	185	10.7
6. Tip of snout to ant. insertion of flipper	360	20.8
7. Tip of snout to ant. insertion of dorsal fin	902	52.1
8. Tip of snout to tip of dorsal fin	1,050	60.7
9. Length of gape	109	6.3
10. Length of blowhole	15	1.0
11. Width of blowhole	42	2.4
12. Length of eye	26	1.5
13. Tip of snout to umbilicus	859	49.6
14. Tip of snout to midpoint of genital slit	1,151	66.5
15. Tip of snout to anus	1,168	67.5
16. Projection of snout beyond lower jaw	69	4.0
17. Half girth on transverse plane at eye	402	23.2
18. Half girth on transverse plane at axilla	505	29.2
19. Half girth on transverse plane at ant. insertion of dorsal fin	556	32.1
20. Half girth on transverse plane at umbilicus	570	32.9
21. Half girth on transverse plane at anus	350	20.2
22. Length of flipper, ant. insertion to tip	275	15.9
23. Length of flipper, axilla to tip	203	11.7
24. Maximum width of flipper	105	6.1
25. Width, base of flipper	123	7.1
26. Height of dorsal fin	67	3.9
27. Length of dorsal fin	166	9.6
28. Width of flukes, tip to tip	444	25.6
29. Notch of flukes to tip, right	228	13.2
30. " " , left	220	12.7
31. Anterior insertion of flukes to notch	183	10.6
32. Anterior insertion of flukes to tip(r)	349	20.2

“ bracket mark ” or “ false gill ” (Fig. 2), but this specimen was obtained from the high seas of the North Pacific and not from the coast of Japan. Yamada's opinion (1954) was that “ kogiids from the Japanese waters differ to a certain extent from those from the American coasts both Pacific and Atlantic.” To our regret since then this has not been proved or disproved yet.

In Table 1 the body proportions of this specimen and in Table 2 the weights of various parts of the body are shown. The dorsal fin starts from about midpoint of the body and its height is 3.9% of the body length, which is in the ranges of the value for *K. breviceps* given by Ross (1979).

This whale was identified as *Kogia breviceps* because there was present no creases on throat, and a falcated dorsal fin was small and situated behind midback as stated above. Further it had 25 small teeth in all on lower jaw and none on upper jaw. Later this was confirmed by examination of the skull.

TABLE 2. BODY AND ORGAN WEIGHTS OF THE PRESENT SPECIMEN

Item	Weight in gr.	% of the total
Muscle	32,795	39.8
Blubber	31,580	38.3
Bones	7,050	8.5
Skull	1,410	
Ribs	1,350	
Vertebrae	3,970	
Others	320	
Internal organs	8,191	9.9
Brain	685	
Heart	840	
Spleen	22	
Lung	1,135	
Stomach	755	
Intestine	1,660	
Liver	2,330	
Kidney	450	
Uterus and ovary	64	
Others	250	
Others	3,845	3.5
Total	82,461	100

Skull and postcranial bones were obtained by boiling the carcass about one month later from the dissection, during which period they were soaked in water. Skull of this specimen is shown in Fig. 3 and mandibles in Fig. 4. The bones which consisted of the skull are very loosely fused each other and very easily be separated. Handley (1966) listed up distinguishing characteristics of *Kogia breviceps* and *K. simus* in his Table 1. The majority of these differences refer to features of the cranium and mandible. The most distinctive cranial characters are the shape of the dorsal sagittal septum and the dorsal cranial fossae. These were confirmed by Ross (1979) who studied a considerable number of specimens. In *K. breviceps* the dorsal sagittal septum near vertex is broad, whereas in *K. simus* it is narrow.

This breadth of the present specimen of a calf is 22 mm, as seen in Table 3. According to Handley (1966) this breadth is 20–38 mm in *K. breviceps*, whereas in *K. simus* it is only 6–14 mm (both in adult specimens). In *K. simus* the dorsal cranial fossa is cupped posteriorly and sub-symmetrical, but in the present specimen each fossa slopes gradually from the dorsal rim of the skull and giving no cupped appearance. These two are the most conspicuous character which separates the two species. We concluded, therefore, that the present specimen is *K. breviceps*.

The measurements of the skull of this specimen are shown in Table 3. In this table the measurement numbers are the same to those used by Ross (1979). From these measurements, excepting above stated, no definite conclusion will be drawn at present and further collection of material is needed. There are rather wide range of variation in measurements presented by Ross (1979).

The seven cervical vertebrae are ankylosed into a single unit (Fig. 5), but the



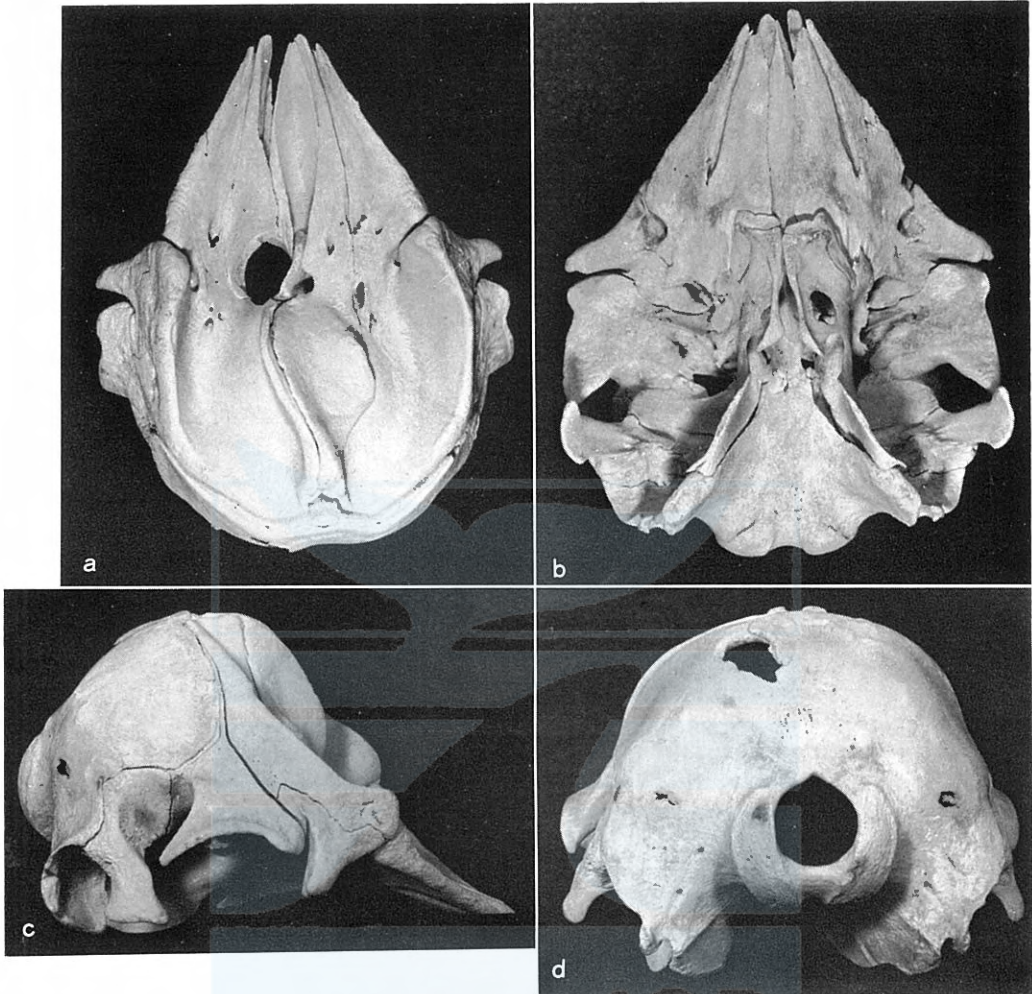


Fig. 3. Skull of the present specimen.

- a. Dorsal view.      b. Ventral view.  
c. Lateral view.      d. Posterior view.

posterior epiphysis of the seventh vertebra is not fused to its centrum. In other vertebrae all of the epiphyses were not fused to their centra. In all there are 52 vertebrae and the formula is C7, D12, L9, Ca24, Total 52 (Fig. 6). The dorsal or thoracic vertebrae are the vertebrae which are accompanied rib. The lumbar vertebrae have no relationship with a rib and the last lumbar is separated from the first caudal by absence of chevron bone at its ventro-posterior end. In all 14 chevron bones were present, and in each of them the right and left laminae were fused into a mass. Measurements of vertebrae are shown in Table 4 and their photograph in Fig. 6.

It seems that the problem of the number of vertebrae has not been cleared

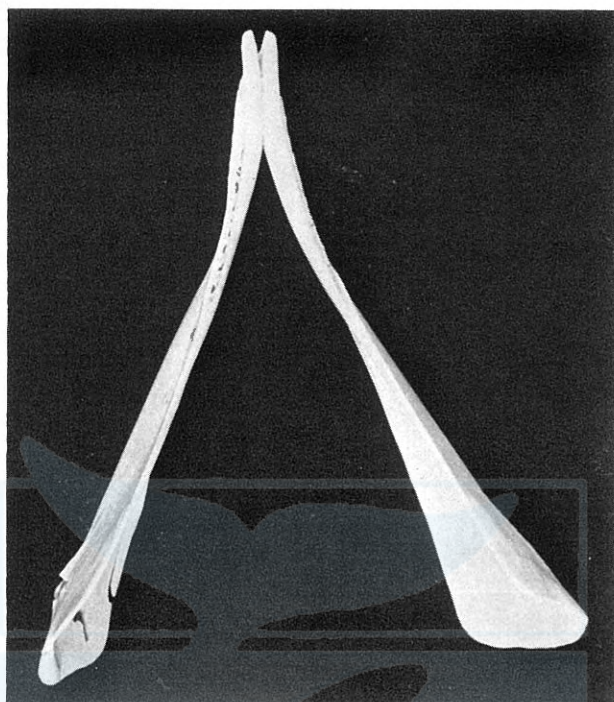


Fig. 4. Mandibles of the present specimen.

TABLE 3. SKULL MEASUREMENTS OF THE PRESENT SPECIMEN

Measurements	in mm	% of Total length
1. Total (condylobasal) length	247	100
2. Rostrum length*	96	38.8
3. Rostrum, basal width*	102	41.3
4. Rostrum, width at its middle*	84	34.0
5. Breadth across pre-orbital angles of supra-orbital processes	190	76.9
6. Breadth across post-orbital processes	196	79.3
7. Zygomatic width	197	79.8
8. Height to vertex	151	61.1
9. Width of vertex	22	9.0
10. Width of supra-occipital at narrowest part between posterior margins of temporal fossae	153	62.3
11. Tip rostrum - left naris	106	42.9
12. Height of ventral border of foramen magnum	46	18.6
15. Width outer margins occipital condyles	64	25.5
16. Tip rostrum - hind margin pterygoids	142	57.5
17. Length of mandible	201	81.4
20. Height mandible at coronoid	51	20.6
21. Length mandibular symphysis	31	12.6
24. Height dorsal border of foramen magnum to vertex	67	27.1

\* Measured ventrally.



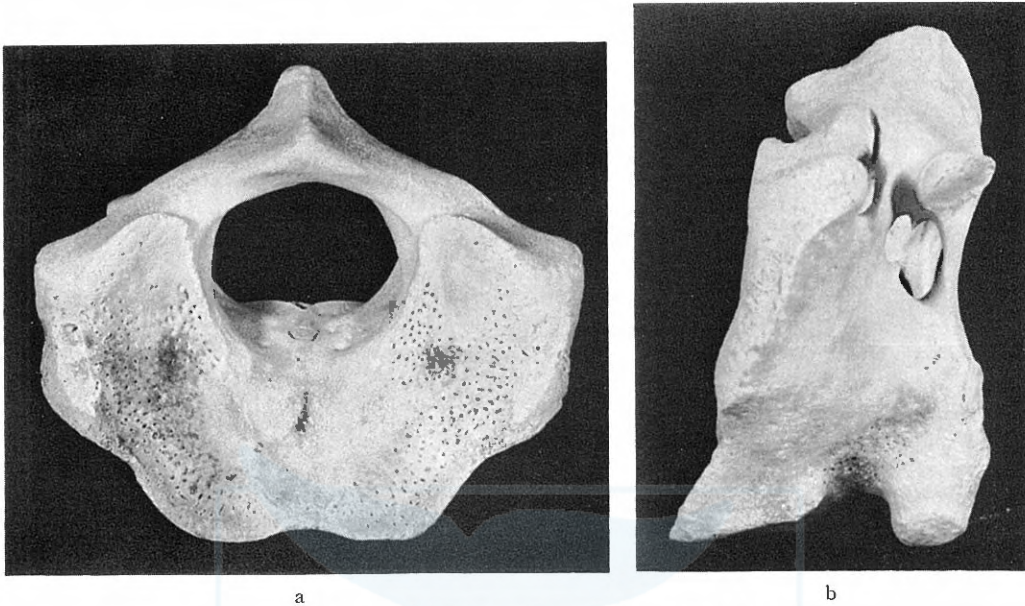


Fig. 5. Cervical vertebrae of the present specimen.  
a. Anterior view. b. Lateral view.

yet for *K. breviceps* and *K. simus*. Both Handley (1966) and Ross (1979) discussed nothing on this matter, though this might be an essential character to separate the two species. Ogawa (1936-37, 1939), Hale (1947, 1959) and Yamada (1954) counted the number of vertebrae of genus *Kogia*. These are compared with the calculation of the present specimen in Table 5.

As seen in Table 5 the smallest number of vertebrae is 52 and the largest 57. In Ogawa's specimen (1939) and present specimen the total number of vertebrae is 52. Ogawa identified this specimen as *Kogia breviceps*. This is supported by photograph of the skull (Fig. 2 of his thesis). The dorsal sagittal septum near vertex is broad and the dorsal cranial fossa is not cupped posteriorly. The present specimen is without doubt *K. breviceps*, as stated already. Yamada (1954) made no distinction of the species of his specimens. Omura and Takahashi (1981), however, conjectured his specimen Nos. 1, 3, and 4 to be *K. simus* and Nos. 2, 5, and 6 to be *K. breviceps*. Hale's specimen (1959) (young male) was possibly *K. simus*, because he described that the falcate dorsal fin is much larger and commences slightly anterior to the middle of the total length of the animal.

As to the Ogawa's specimen (1936-37) (his No. 2 specimen) he identified this specimen to be *K. breviceps*, but he described that according to Mr Arai who collected the specimen there were present longitudinal wrinkles near the lower lip. This explanation in Japanese is not clear, but if this means the creases on throat it is possible that this specimen was in fact a *K. simus* (Leatherwood *et al.*, 1982). Yamada's No. 5 specimen was judged from his photograph in which the dorsal sagittal septum near vertex seems broad, but dorsal cranial fossa seems to have

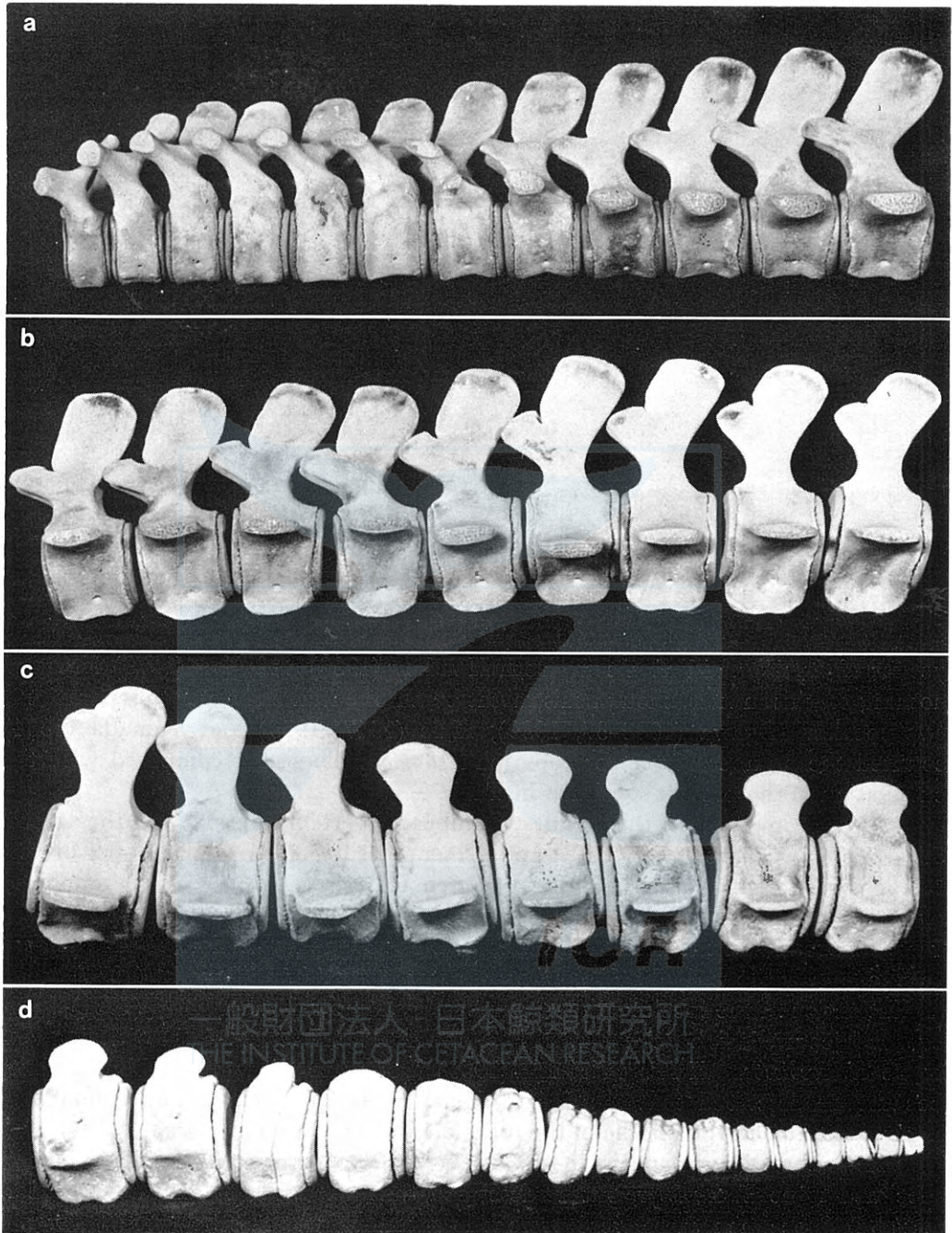


Fig. 6. Vertebrae of the present specimen.  
 a. 1-12 dorsal vertebrae.      b. 1-9 lumbar vertebrae.  
 c. 1-8 caudal vertebrae.      d. 9-24 caudal vertebrae.



TABLE 4. MEASUREMENTS OF VERTEBRAE OF THE PRESENT SPECIMEN (IN MM)

Serial No.	Vertebral No.	Greatest breadth	Greatest height	Centrum			Note
				Breadth	Height	Length	
1	C1	82	74	44 (posterior)	29	35 (inferior)	all fused into a mass, but posterior epiphysis of No. 7 is not fused to centra.
2	2						
3	3						
4	4						
5	5						
6	6	73	60	35	27	18	
7	7						
8	D1			(anterior)			
9	2	70	69	38	27	20	
10	3	66	73	29	28	23	
11	4	61	76	29	28	25	
12	5	58	78	29	27	26	
13	6	56	79	29	27	27	
14	7	54	81	30	27	28	
15	8	67	81	34	28	29	
16	9	73	83	37	28	29	
17	10	77	85	38	29	30	
18	11	78	87	38	31	31	
19	12	80	87	38	31	31	
20	L1	81	90	41	34	32	
21	2	81	91	41	39	33	
22	3	81	93	43	42	34	
23	4	82	93	43	39	34	
24	5	83	94	43	42	35	
25	6	85	95	42	43	35	
26	7	86	95	42	45	36	
27	8	89	93	42	45	36	
28	9	86	92	43	46	35	
29	Ca 1	84	80	43	43	35	
30	2	82	74	43	39	35	
31	3	78	71	43	40	34	
32	4	74	64	41	39	33	
33	5	66	61	40	37	33	
34	6	60	59	39	37	31	
35	7	55	55	39	37	31	
36	8	49	52	38	36	29	
37	9	43	49	36	36	28	
38	10	38	45	36	35	28	
39	11	—	40	35	33	25	
40	12	—	38	33	33	25	
41	13	—	30	31	30	23	
42	14	—	28	30	27	19	
43	15	—	—	27	22	16	
44	16	—	—	26	20	12	anterior epiphysis missing
45	17	—	—	24	16	12	
46	18	—	—	22	15	12	
47	19	—	—	19	14	12	
48	20	—	—	18	12	11	
49	21	—	—	16	10	10	
50	22	—	—	14	9	9	
51	23	—	—	12	7	8	
52	24	—	—	11	6	6	both epiphyses missing

TABLE 5. NUMBER OF VERTEBRAE IN GENUS *KOGIA* COUNTED BY VARIOUS AUTHORS

Author	C	D	L	Ca	Total	Remarks
Ogawa (1936-37)	7	13	9	27	56*	<i>simus?</i>
Ogawa (1939)	7	12	10	23	52	<i>breviceps</i>
Hale (1947)	7	13	9	26	55	?
Yamada (1954)						
No. 3	7	13	12	25	57	<i>simus</i>
No. 4	7	13	11	26	57	<i>simus</i>
No. 5	7	13	10	27	57*	<i>simus?</i>
No. 6	7	12	11	24	54	<i>breviceps</i>
Hale (1959)	7	14	10	26	57	<i>simus</i>
Present	7	12	9	24	52	<i>breviceps</i>

\* See text.

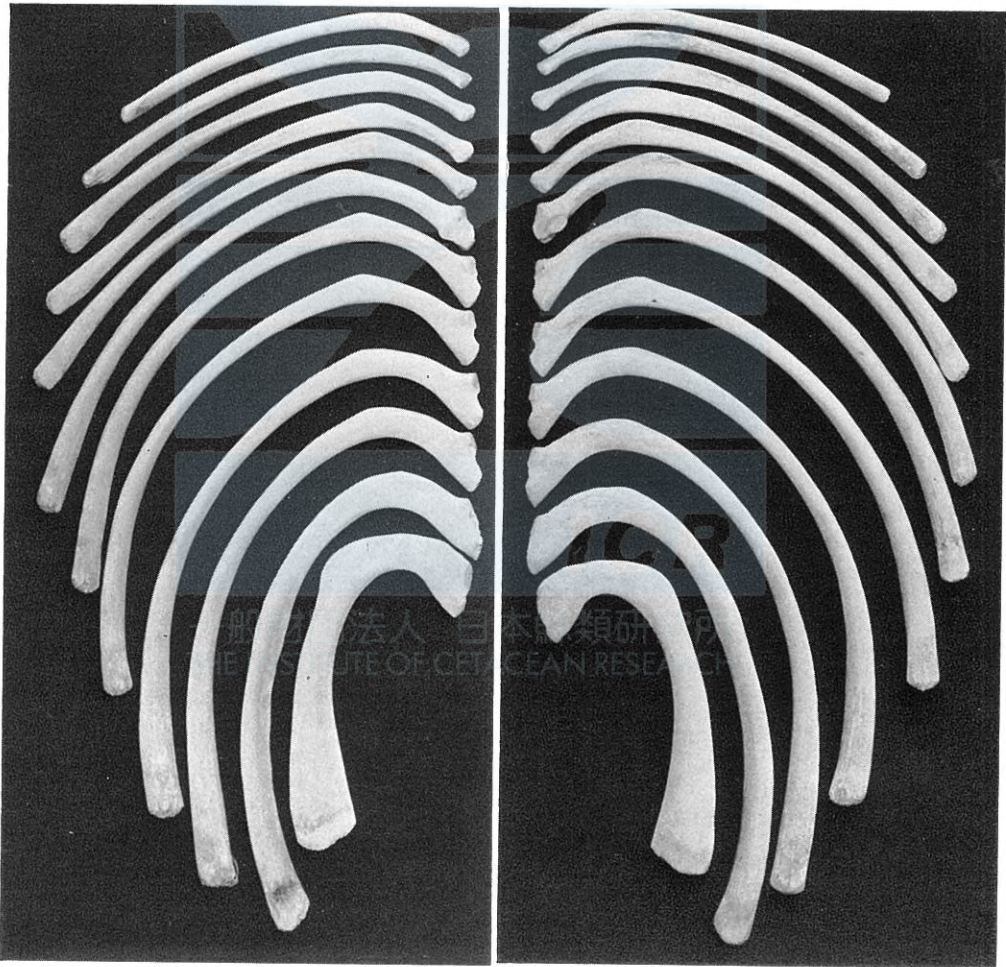


Fig. 7. Ribs of the present specimen.

TABLE 6. LENGTH OF THE RIBS OF THE PRESENT SPECIMEN (IN MM)

No.	Right*	Left*
1	131	137
2	194	197
3	215	217
4	222	235
5	230	224
6	234	223
7	224	226
8	217	212
9	201	202
10	192	192
11	178	179
12	157	159

Measured in straight line.

\* In which 7 ribs are double headed.

cupped appearance.

From the above it will be concluded that the total number of vertebrae would be 52–54 in *K. breviceps* and 55–57 in *K. simus*, pending further studies in future with more samples.

In the present specimen 12 pairs of ribs are present (Fig. 7). Their straight lengths are shown in Table 6.

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