A BEAKED WHALE *MESOPLODON* STRANDED AT ŌISO BEACH, JAPAN

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INTRODUCTION

The 23rd Sept. 1957 was the autumnal equinox. It was a holiday in Japan, so the senior author stayed at home. When he read the newspaper "Mainichi", a paragraph "Whaling on land" caught his eyes. The newspaper said as follows. "At 3 p.m. of the 22nd Sept. a whale dashed to land and wriggled on Ōiso Beach, Sagami Bay, near Tokyo.

Fig. 1. The whale was carried from Ōiso Beach.

About 20 lads, who were playing base-ball on the shore, rushed all together upon the whale. But as the whale, which was about 5 meters long and about 1,500 kg in weight, got rowdy, the lads had to spring up and down into the sea water. Then they gave up to catch it alive, and each of them took a bat and beat to kill the whale. The lads sold the whale to a fishing company in Ōiso, but this company could not manage the huge body and transported it to the Yokohama Central Market". In Japan the whale meat, even though it may belong to the toothed whale, is used for human food. The newspaper said further that "it was a sei whale belonging to the smallest of the whalebone whale and living in the adjacent seas of Japan. This whale had followed perhaps

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migrating sardines so earnestly, that it might have erroneously stranded on the shore". And the newspaper published at the same time a photograph (Fig. 1) taken by Mr. M. Etoh, a student of the Nippon University, dwelling in Ōiso.

The senior author thought seeing this newspaper that the tail flukes shown in the photograph resembled neither those of the sei whale nor of the other whalebone whales, but that the whale might belong to the Ziphioids. Soon he telephoned to the Yokohama Central Market and asked about the whale. They replied that it had no baleens, but only one pair of the teeth on the mandible.

As stranding of a *Ziphius cavirostris* occurred on Kamakura Beach of Sagami Bay last year, the author thought at first it might also be a *Ziphius cavirostris*. This species is seen not so seldom in Japan, but as the Whales Research Institute has yet no specimen of *Ziphius*, he considered that it would anyway be some plus for the Institute to secure the skeleton. So he asked the manager of the market to deliver the remaining body to the Institute.

Fig. 2. The whale mostly deprived of the soft parts was brought to the University of Tokyo.

Before this date, many blue-white dolphins (*Stenella caeruleo-albus*) were captured on the 19th Sept. at Kawana, Shizuoka Prefecture. The senior author went to see them as soon as he was informed of it. From early morning of the 20th Sept. the examination was performed on them and a number of foetuses and newborn dolphins were collected. The collected materials were kept frozen in the store at Kawana. He returned to Tokyo and planned to visit Kawana again using a lorry motor-dray possessed by the Medical Faculty of the University of Tokyo on the 24th Sept. So he telephoned to Professor T. Ogawa and asked to let the lorry go to Kawana around the Yokohama Central Market.

Arriving at the market, the authors found the remains of the beaked whale. These are gathered loosely in a large wooden box, and at a glance of its head they were striken by the thought that it might belong to *Mesoplodon*. The rare whale, *Mesoplodon*, has hitherto been reported from many districts of the world. But in Japan, there has been only one precedent, namely that of Professor T. Ogawa, who reported the *Mesoplodon* caught on the 6th Jan. 1935 at Sotonoura, Miyazaki Prefecture, Kyushu (not in Ōsumi, Kyushu).

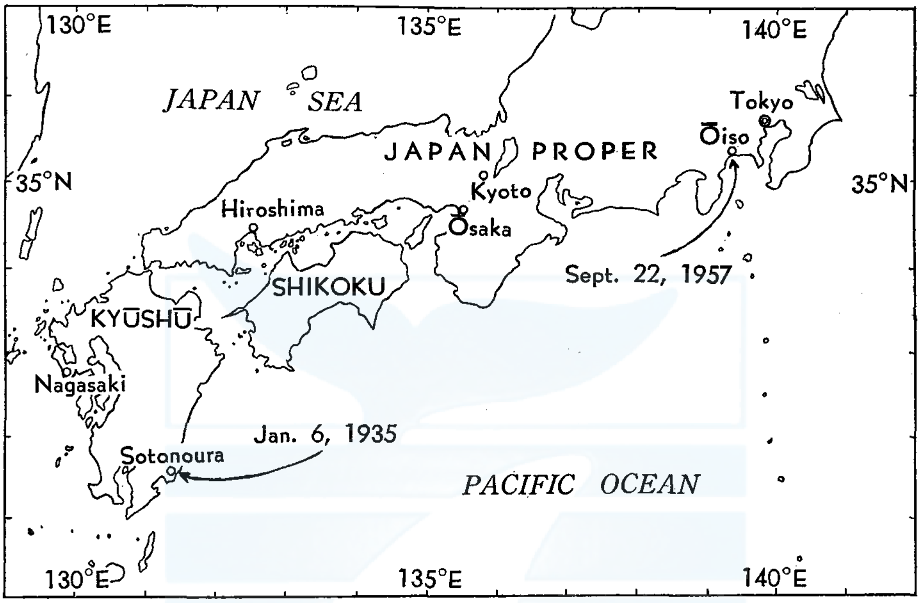


Fig. 3. Location of capture of *Mesoplodon* in Japan.

Therefore this specimen would possibly be the second one. The authors were very much satisfied to have obtained this precious specimen, but they continued the travel further to Kawana to bring home the materials mentioned above of blue-white dolphins and also the head of a false killer whale (*Pseudorca crassidens*). They brought all the materials to the Department of Anatomy, University of Tokyo late in the evening.

ACKNOWLEDGEMENT

The authors are indebted to Yokohama Maru-uwo Co. Ltd. for their kind presenting of the specimen, and thanks are also due to Mr. M. Etoh for lending his negative film of the specimen.

The authors would like to express their sincere thanks to Dr. F. C. Fraser of the British Museum, Dr. R. Kellogg of the United States National Museum, Dr. J. C. Moore of the American Museum of Natural History and Dr. Å. Jonsgård of the Norwegian State Institute for Whale Research.

Dr. Moore kindly discussed for this paper by many letters. Moreover he showed to the authors his manuscript "A beaked whale, from the Bahama Islands, and comments on the distribution of *Mesoplodon densirostris*" and also many photographs of *Mesoplodon* species. Dr. Kellogg let us know his opinion minutely and gave us many valuable photographs for *Mesoplodon* studies. Dr. Fraser also showed his opinion on the distriction between *M. bidens* and the present whale and kindly spent time together with Dr. Omura for photographing *Mesoplodon* specimens preserved in the British Museum. Dr. Jonsgård too offered much kindness for this study. Sincere thanks are also due to Messrs. of the British Council, especially to Mr. W. R. McAlphine, Deputy Representative of this Council in Tokyo, for introducing the authors to Dr. Fraser.

The authorities of the American Museum of Natural History, the Smithonian Institution, the British Museum of Natural History, the Zoological Society of London, the Fisheries Research Board of Canada and Putnam Co. Ltd. were given the permissions for reproduction of the photographs in their publications to us. The authors should be grateful thanks to their courtesies.

The authors are deeply grateful to Dr. I. Amemiya, Dr. T. Ogawa and Dr. H. Omura; they gave a lead in this study.

Particularly Dr. Ogawa examined the present specimen together with the authors and gave agreement for altering the scientific name of the first *Mesoplodon* specimen in Japan.

NOTES ON THE EXTERIOR

The head was covered still with blubber, but was cut off at the V-shaped groove of the throat. So the existence of the V-groove was ascertained but the whole shape of the groove could not be seen. The colour of the body was entirely black, even on the rear sides of flippers and tail flukes. In the photographs taken by Mr. Etoh, some white flecks were observed, but they might represent scars, which usually appear on the whale body. The whole vertebrae were obtained, but unfortunately they were cut by saw instead of separation at the articulations. The tail flukes were cut off from the trunk at the insertion. When the whale body reached the market, both ends of the tail flukes and a little part of its hinder margin near the median line had already been cut away. As shown in Fig. 5, the shape of tail flukes was quite different from the usual cases of whales or dolphins. After careful examination, some slight depression was ascertained at the middle part of the hinder margin of the tail flukes, instead of a notch. At a glance, it seemed rather projected at the middle part.

All of these separated parts were arranged in order on the floor and the outline of the body was measured.

It was very disappointing from the situation mentioned above that the form of the whale body was not really observed. The authors arrived at the Yokohama Market, after the dissection had finished. The left flipper, both scapulae, pelvic bones and some parts of the ribs were lost, as they had been sold with soft parts (fresh meat, blubber, viscera, etc.) utilizable to the consumers.

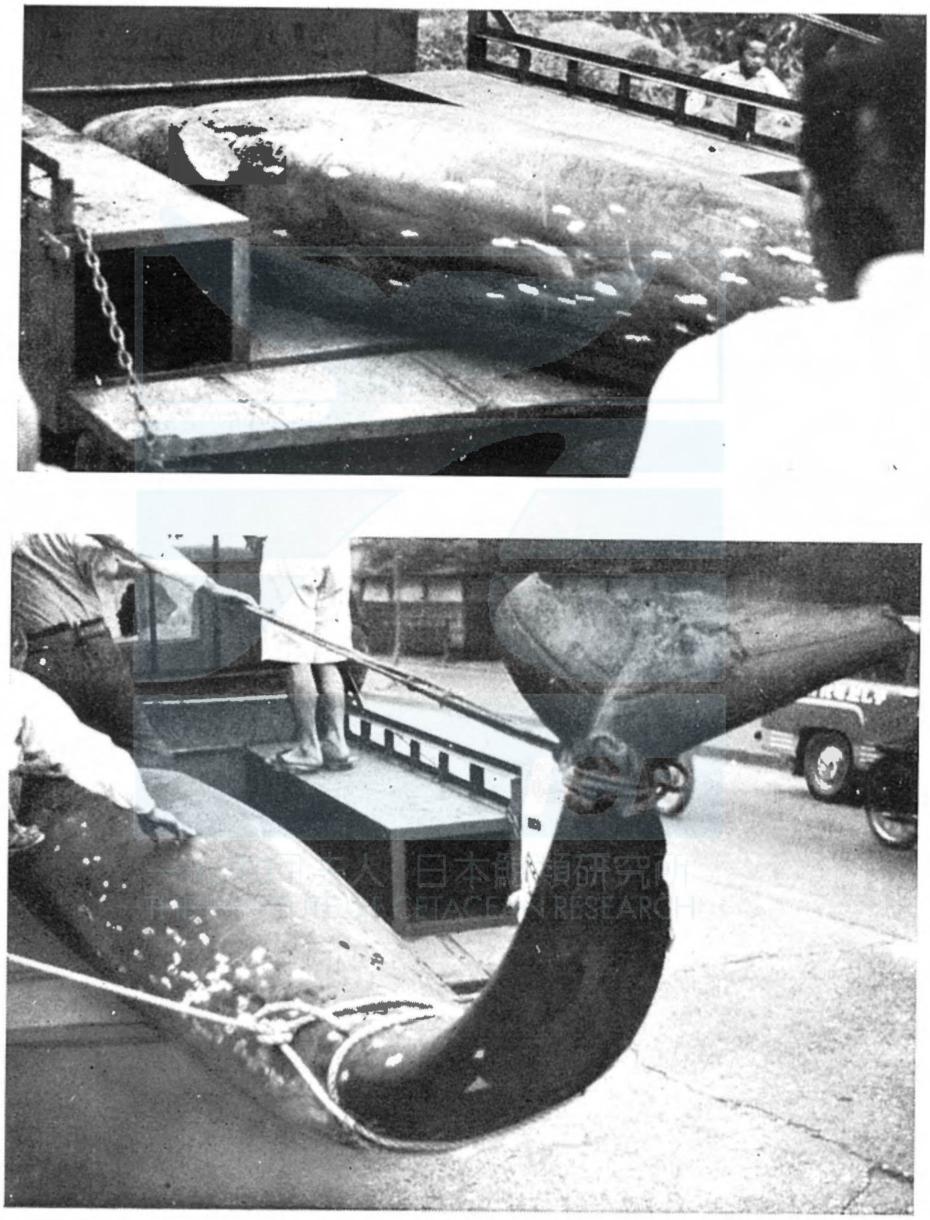


Fig. 4. White scars were observed on the whale body.

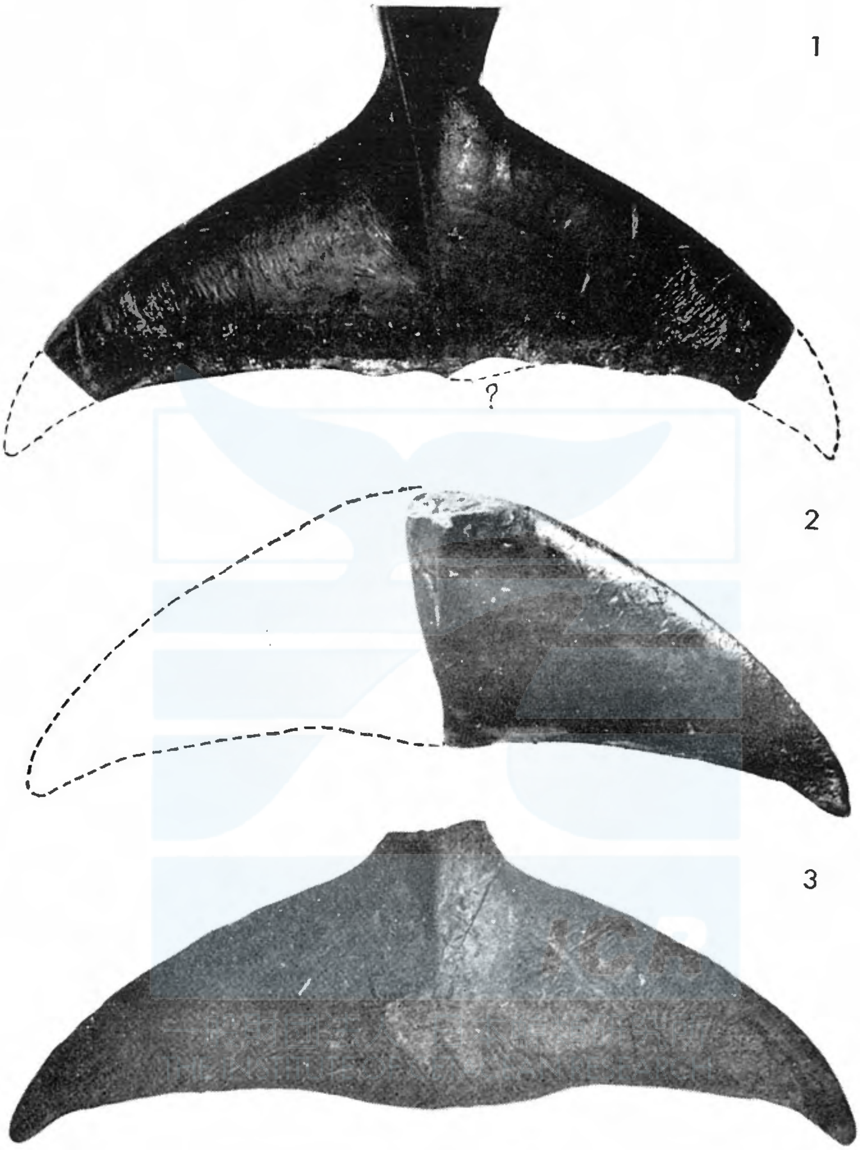


Fig. 5. Tail flukes of the present specimen (upper), compared with the first *Mesoplodon* specimen in Japan (middle) and *M. bidens* (British Museum, lower) (dorsal views).

Some measurements on the exterior, so far as the results could be gained, are given below:

Body length	ca.	472.0 (cm)
Head, occipital condyles to the tip of the snout		80.0
——, greatest width (opposite to the eyes)		43.0
Projection of the lower jaw beyond the snout		2.5
Tip of the lower jaw to the teeth		20.5
Tip of the snout to the angle of gape		40.0
—— to the center of eye		51.0
—— to the blowhole		49.0
Breadth of the blowhole		8.0
Distance between conical apices of both teeth		11.5
Flipper, axilla to the tip		33.0
——, anterior border to the tip		51.0
——, greatest width		13.0
Tail flukes, total breadth	ca.	112.0
——, middle point of the hinder margin to the tip (average)	ca.	57.5
——, minimum distance between the middle point of the hinder margin to the anterior border		42.0

OSTEOLOGY

Skull. Skulls have been measured in various species of *Mesoplodon* by a number of scientists. For the purpose of comparison with those reports, the present authors measured the skull of this specimen as many points as they could determine. The results are given in the next table, and the lateral, dorsal and ventral views of the skull are shown in Plates III and IV. The explanation upon these dimensions and figures will be mentioned later.

Vertebrae. The total number of the vertebrae amounts to 48, with the formula of C: 7, D: 10, L: 10, Ca: 21. This formula is slightly different from precedent reports upon *Mesoplodon*. The first three cervical vertebrae are ankylosed

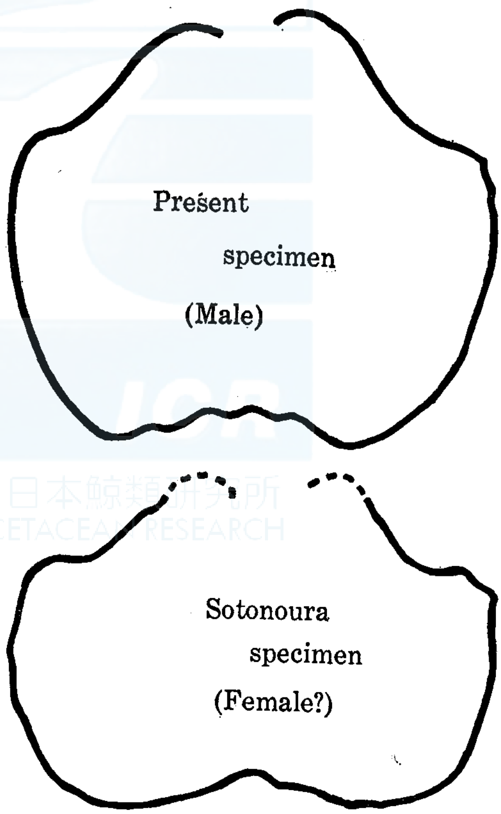


Fig. 6. Outline of the transversely sectioned middle part of the rostrum. Natural size.

TABLE 1. SKULL DIMENSIONS OF THE NEW SPECIMEN

		mm	percentage to the length	percentage to the breadth
1.	Total (condylo-basal) length	779	100.0	218.8
2.	Length of rostrum (median)	435	55.8	122.2
3.	Breadth of rostrum at base	151	19.4	42.4
4.	Breadth of rostrum at middle	64	8.2	18.0
5.	Breadth of rostrum at the position just above the teeth	46	5.9	12.9
6.	Breadth of rostrum at the highest point of anterior palatine suture	90	11.6	25.3
7.	Breadth of rostrum between the antorbital notches	205	26.3	57.6
8.	Depth of rostrum at middle	54	6.9	15.2
9.	Depth of rostrum at the position just above the teeth	56	7.2	15.7
10.	Depth of rostrum at the highest point of anterior palatine suture	74	9.5	20.8
11.	Length of premaxilla*	640	82.2	179.8
12.	Breadth of premaxillae at middle of rostrum	47	6.0	13.2
13.	Breadth of premaxillae at expanded proximal ends	150	19.3	42.1
14.	Breadth of premaxillae in front of anterior nares	116	14.9	32.6
15.	Breadth of premaxillae opposite premaxillary foramina	69	8.9	19.4
16.	Breadth of premaxillae opposite maxillary foramina	75	9.6	21.1
17.	Greatest breadth of premaxillae opposite anterior nares	112	14.4	31.5
18.	Least breadth of premaxillae opposite anterior nares	108	13.9	30.3
19.	Least distance between the postero-dorsal margins of the maxillary foramina	89	11.4	25.0
20.	Least distance between the postero-dorsal margins of the premaxillary foramina	36	4.6	10.1
21.	Least distance between the maxillary foramina and premaxillary foramina*	22	2.8	6.2
22.	Distance from posterior border of maxillary foramina to anterior extremity of maxillary protuberance	L: 63 R: 53	8.1 6.8	17.7 14.9
23.	Length of nasal suture line	37	4.7	10.4
24.	Greatest breadth of nasals	52	6.7	14.6
25.	Greatest breadth of superior nares	53	6.8	14.9
26.	Diameter of orifice of posterior nares immediately behind pterygoid processes	115	148.0	32.3
27.	Distance from tip of rostrum to bottom of maxillary notches	L: 473 R: 475	60.7 61.0	132.9 133.4
28.	——— anterior end of vomer	160	20.5	44.9
29.	——— anterior end of presphenoid	L: 370 R: 369	47.5 47.4	103.8 103.7
30.	——— anterior margin of superior nares	578	74.2	162.4
31.	——— nasal vertex	607	77.9	170.5
32.	——— medial suture line of posterior end of pterygoides	554	71.1	155.6
33.	——— line joining antero-lateral processes of maxillaries	463	59.4	130.1

TABLE 1. SKULL DIMENSIONS OF THE NEW SPECIMEN (Cont.)

		mm	percentage to the length	percentage to the breadth
34.	——— occipito-frontal vertex	616	79.1	173.0
35.	——— posterior median end of maxillae on palate	645	828.8	181.2
36.	——— bottom of tubal notch (median)	458	58.8	128.7
37.	——— most anterior point of the palatines	368	47.2	103.4
38.	Length of vomer visible on palate	306	39.3	86.0
39.	Breadth across middle of orbits	334	42.9	93.8
40.	Diameter of orbit (antero-posterior)	L: 115 R: 112	14.8 14.4	32.3 31.5
41.	Greatest breadth across supra-orbital plates of maxillae	316	40.6	88.8
42.	Greatest breadth across post-orbital processes	356	45.7	100.0
43.	Breadth across zygomatic processes	202	25.9	56.7
44.	Breadth across posterior margins of temporal fossae	218	28.0	61.2
45.	Greatest breadth of cranium at parietal region in temporal fosseae	228	29.3	64.0
46.	Length of temporal fossae	L: 109 R: 103	14.0 13.2	30.6 28.9
47.	Depth of temporal fossae	L: 53 R: 52	6.8 6.7	14.9 14.6
48.	Length of tympanic bone	L: 41 R: 42	5.3 5.4	11.5 11.8
49.	Greatest breadth of tympanic bone*	30	3.9	8.4
50.	Breadth of occipital condyles	126	16.2	35.4
51.	Breadth of foramen magnum	47	6.0	13.2
52.	Length of occipital condyle	L: 80 R: 81	10.3 10.4	22.5 22.7
53.	Height, vertex to inferior border of pterygoids	293	37.6	82.3
54.	Length of mandible (median)	665	85.4	186.8
55.	Length of mandibular ramus	L: 666 R: 672	85.5 86.3	187.1 188.8
56.	Distance from anterior end of mandible to coronoid process	625	80.2	175.6
57.	Length of symphysis	184	23.6	51.7
58.	Distance from anterior end of mandible to anterior end of alveolus	L: 180 R: 183	23.1 23.5	50.6 51.4
59.	Distance from anterior end of mandible to posterior end of alveolus	L: 277 R: 282	35.6 36.2	77.8 79.2
60.	Depth of mandible at posterior margin of tooth	L: 90 R: 94	11.6 12.1	25.3 26.4
61.	Depth between angle and coronoid process	L: 121 R: 122	15.5 15.7	34.0 34.3
62.	Minimum depth of mandible between tooth and coronoid process	L: 72 R: 71	9.2 9.1	20.2 19.9
63.	Breadth across mandibular condyles*	328	42.1	92.1
64.	Greatest height of mandible at coronoid process	L: 118 R: 119	15.1 15.3	33.1 33.4
65.	Length of tooth	L: 91 R: 92	11.2 11.6	24.4 25.3
66.	Breadth of tooth (antero-posterior at crown)*	99	12.7	27.8
67.	Breadth of tooth (transverse)*	16	2.1	4.5

* equal on both sides

together at the bodies as well as at the neural arches. And the 4th and the 5th cervical ones are also ankylosed each other.

The spinous precesses of the 2nd, 3rd and 4th lumbar vertebrae show some pathological changes of the bones. Generally in the Cetacea the last rib is not jointed with the corresponding vertebra. As the authors could not attend the dissection of the whale body, they were not certain in determining the last rib. But in other beaked whales the shape of the last rib is usually very short and thick, and is buried in the muscles. The last (10th) rib of this specimen is different from this shape. It is not inconceivable therefore, that the 11th ribs were present but lost in this case. But in the present work according to the number of ribs actually observed, the number of the dorsal vertebrae is counted as 10. Accordingly the number of lumbar vertebae becomes 10. The first caudal vertebra was determined by the existence of the first chevron. The first and second chevrons are separated into halves. All the chevrons are 11 in number and were collected without any damage.

The last 8 of the caudal vertebrae existed in the region of the tail flukes. Dimensions of the vertebrae are shown in Table 2, and the photographs of them are shown in Plate VI. The vertebrae of this specimen compared with the *Mesoplodon densirostris* reported by Raven are given in Fig. 8. Both were aged and of about the same size. The figure shows clearly some difference of the body form. The authors wish to compare further with other species, but they have no data available on hand.

Ribs and sternum. The ribs and the sternum were cut by saw as mentioned above, and some parts of them were lost. Only the first ribs were intactly collected. Dimensions are given below:

Greatest breadth proximally	77 (mm)
Greatest length	317

Of the sternum were obtained only the parts that were jointed with the cartilage of the first rib. So it was difficult to estimate the whole shape and the number of these bones. The ribs and sternum are made of so porous and thick bony substance that they seem to contain plenty of fat. Among 10 pairs of the ribs, the anterior 7 pairs were two-headed. According to previous authors the two-headed ribs of *Mesoplodon* are said usually 8.

It was to regret that detailed measurements could not be achieved, because of loss of too many bones.

Raven showed that one pair of the cervical ribs existed in *M. densirostris*. In the present specimen the epiphyses of all the vertebrae are fused to the diaphyses, which tells evidently for the physical maturity.

TABLE 2. DIMENSIONS OF THE VERTEBRAE (mm)

Number of vertebrae		(1)	(2)	(3)	(4)	(5)	(6)	(7)
C	1st					202		
	2nd	28 (1st–3rd)	48	122	124	178	42	59
	3rd					132		
	4th	26 (4th–5th)	48	79	102	91	42 (4th–5th)	42
	5th		57	74	106	95		44
	6th	14	58	72	117	89	56	48
	7th	18	58	76	145	95	56	55
D	1st	26	54	72	186	105	57	59
	2nd	36	50	62	230	103	59	56
	3rd	47	53	62	248	110	59	55
	4th	54	49	62	272	110	60	53
	5th	62	48	62	291	111	61	48
	6th	67	52	64	307	95	61	46
	7th	74	55	67	307	78	57	45
	8th	81	59	70	313	144	54	44
	9th	86	63	74	328	223	51	39
	10th	93	72	78	331	262	44	34
L	1st	98	75	84	357	296	43	34
	2nd	104	80	84	351*	298**	45	33
	3rd	107	80	87	365*	306	46	33
	4th	116	86	91	871*	307	45	33
	5th	112	81	90	387	307	45	33
	6th	121***	82	90	375	302	39	28
	7th	127	86	90	390	296	28	25
	8th	133	87	92	390	293	23	22
	9th	139	87	95	391	286	19	19
	10th	140	90	93	382**	285	18	17
Ca	1st	141	91	97	377	285	12	15
	2nd	137	90	98	370	279	9	14
	3rd	133	93	100	354	255	8	10
	4th	123	93	99	330	227	8	10
	5th	117	89	99	298	205	8	10
	6th	112	90	95	265	181**	8	10
	7th	105	92	93	235	151	8	9
	8th	100***	92	95	206	123	7	8
	9th	93	92	93	180	99	6	7
	10th	88	92	82	149	85	6	7
	11th	78	93	77	125	78	5	5
	12th	60	83	75	92	75	2	2
	13th	45	69	71	70	74	—	—
	14th	38	55	65	59	68	—	—
	15th	31	46	58	48	62	—	—
	16th	35	42	52	45	56	—	—
	17th	33	55	45	40	51	—	—
	18th	30	27	39	32	45	—	—
	19th	27	22	32	23	36	—	—
	20th	24	16	25	17	28	—	—
	21th	14	12	15	13	15	—	—

C7+D10+L10+Ca21=48

(1)=Length of body at center
(2)=Height of body at front end
(3)=Breadth of body at front end
(4)=Total height from anterior bottom
(5)=Breadth of transverse processes
(6)=Greatest height of neural canal
(7)=Greatest breadth of neural canal

* with some pathological change.
** has some deficit.
*** with scar caused by saw.

The authors thought the possibility of very small cervical ribs, which might have already been fused to the vertebra. But in reality they could not see the cervical ribs at all, as shown in the Fig. 7; no impression of it was attained, in spite of the elaborate examination. There were probably no cervical ribs in this case.

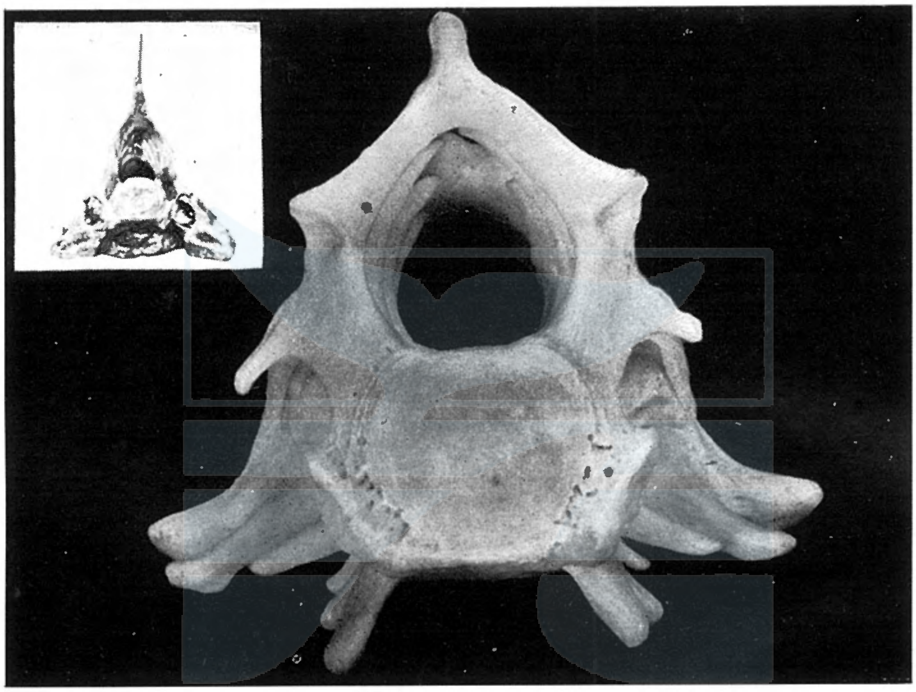


Fig. 7. Cervical vertebrae, caudal view. Upper left is the corresponding picture of *M. densirostris* after Raven.

TABLE 3. DIMENSIONS OF CHEVRON BONES

Number of chevron	Greatest length (antero-posterior)	Greatest breadth (transverse)	Greatest height (supero-inferior)
1. L	41	11	12
R	31*	12	12
2. L	57	18	46
R	52	19	38
3.	78	55	110
4.	107	56	112
5.	106	60	117
6.	99	60	110
7.	92	57	82
8.	85	57	68
9.	81	52	48
10.	69	35	39
11.	30	30	19

* has some deficit.

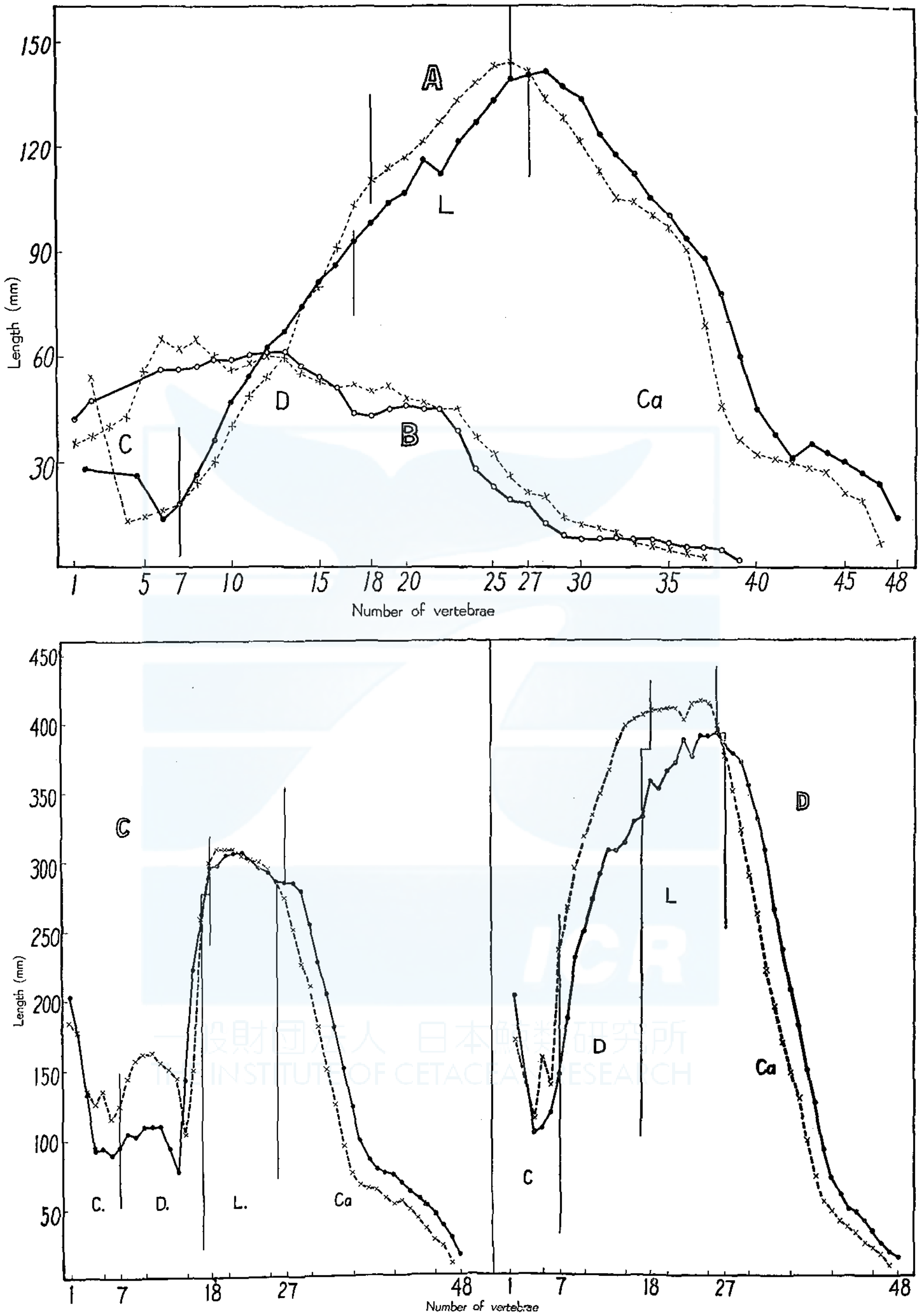


Fig. 8. Dimensions of the vertebrae of *Mesoplodon*. The present specimen compared with the data of Raven.

A: Length of centrum with epiphysis. B: Greatest height of neural canal.
C: Greatest width across transverse processes. D: Greatest height in midline.
C: cervical, D: dorsal, L: lumbar and Ca: caudal vartebrae.
—.—: present specimen. ---×---: *M. densirostris* (after Raven).

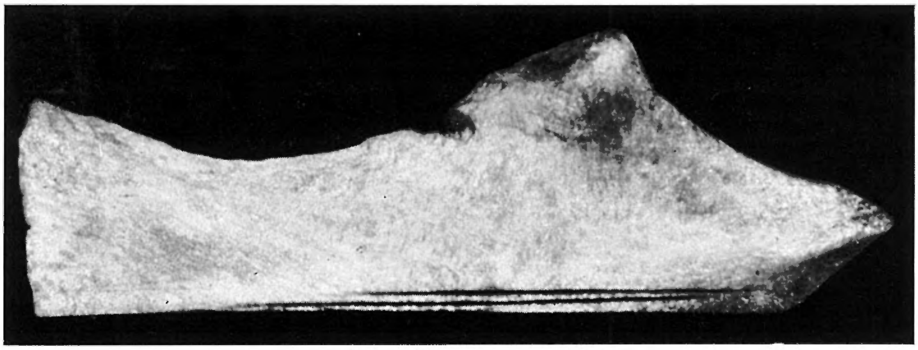


Fig. 9. A part of the 1st sternum.

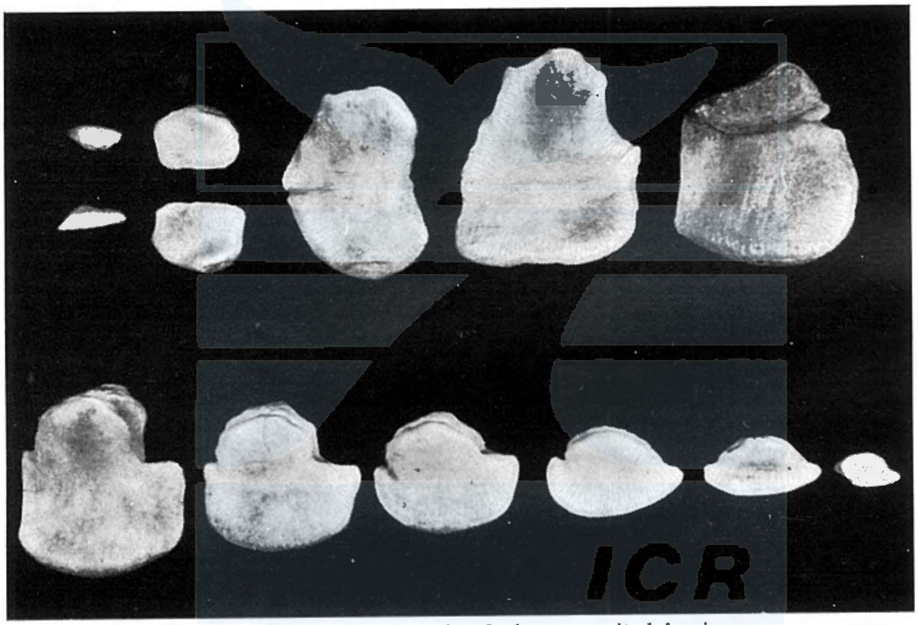


Fig. 10. Chevrons. Anterior 2 show ununited laminae.

TABLE 4. DIMENSIONS OF THE RIGHT PECTORAL LIMB BONES

Length of humerus	129 (mm)
Breadth of humerus at distal end	56
Depth of humerus at distal end	36
Breadth of humerus head	61
Height of humerus head	50
Length of radius	162
Breadth of radius at distal end	49
Depth of radius at distal end	24
Length of ulna	167
Breadth of ulna at distal end	38
Depth of ulna at distal end	19

Pectoral limb. Only the right flipper was examined and its X-ray photograph was taken (Plate IX). Dimensions of the bones of the pectoral limb are given in the above Table 4.

The phalangeal formula including the metacarpals is as follows. I : 1, II : 6, III : 5, IV : 5, V : 3. This formula shows some difference from previous reports upon *Mesoplodon*.

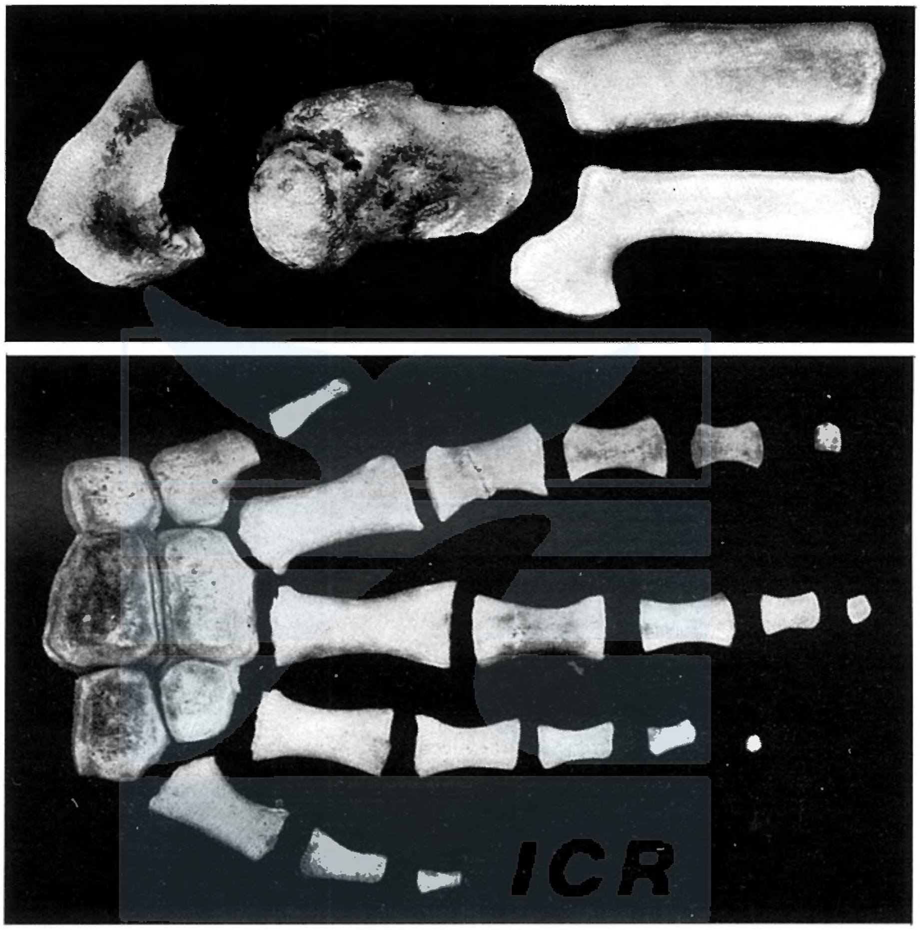


Fig. 11. Bones of the right pectoral limb, dorsal view. Phalanx distalis of II was lost (dissolved?).

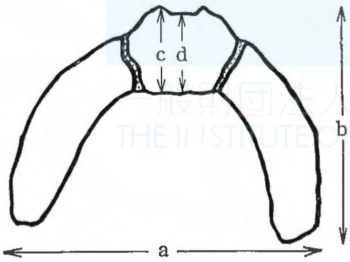
Pelvic bone. The vestiges of the pelvic bones were perhaps sold with the fresh meat, any way were missing, when the authors arrived.

TAXONOMICAL POSITION OF THE PRESENT SPECIMEN

Whales belonging to the *Mesoplodon* have been reported from various parts of the world. At first *Mesoplodon bidens* was found in 1804 by Sowerby. Since then, many species of the *Mesoplodon* have been known. and at present 9 species (*M. mirus*, *M. hectori*, *M. europaeus*,* *M. grayi*, *M. bidens*, *M. layardi*, *M. stejnegeri*, *M. bowdoini* and *M. densirostris*) are commonly known. Dimensions of the skulls and distinctive characters of them (taken from the type specimens as possible) are shown in Tables 5 and 6 respectively. For easy understanding, the photographs (and the figures) are reproduced in the Plates.

Fig. 12. Hyoid bone. Basihyal and thyrohyals are not fused.

DOMINATION OF BASIHYAL, THYROHYALS AND STYLOHYALS



a-176 (mm)
b-130
c- 55
d- 50

The greatest length and breadth of stylohyals

L	163	37 (mm)
R	159	36

Four distinctive character seem to be present in classifying the species of *Mesoplodon*. The first is the relative position of the premaxillary and maxillary foramina. Raven described upon this character as follows. "The relative position of the maxillary to the premaxillary foramen is apparently a constant character in a given species. The conspicuous maxillary foramen which affords an exit for the principal branch of the nervus infraorbitalis is situated close to the lateral border of the premaxillary bone, where the latter is constricted at the base of the rostrum. The premaxillary foramen in *Mesoplodon* is always located at the rostral border of the very slight depression that marks the site of the ventral spiracular, or premaxillary sac. In some species of *Mesoplodon* the premaxillary foramen is in advance of the adjacent maxillary foramen, in other species behind the maxillary foramen. This depends upon the size and shape of the sac". According to the position of these foramina, the species with the premaxillary foramen situated more rostrally than the maxillary foramen must be *M. europaeus* (=*M. gervaisi*), and *M. bidens*. And the present specimen agrees with them in this respect. The species name of *M. europaeus* is used by some scientists as synonym to *M. gervaisi*. The present authors prefer the name *M. europaeus*. *M. pacificus* is taken for a sub-species of *M. mirus*, that is *M. mirus pacificus* in the present work.

The second character is the presence or absence of the lateral basirostral groove, which was especially noticed by Flower. Raven described this character as follows: "Flower used the lateral basirostral groove as an important character in separating the various species of *Mesoplodon* into two groups. This lateral basirostral groove of Flower is synonymous and homologous with the maxillary alveolar groove of less specialized mammals. The species of *Mesoplodon* having this groove frequently retain a number of small peg-like upper teeth. It is also analogous to the alveolar groove in the mandible. Flower described it as a groove at the base of the rostrum, commencing posteriorly in a blind pit below the tubercle of the maxillary, situated in front of the antorbital notch and bounded above and below by sharply defined prominent ridges, both formed by the maxillary".

The lateral basirostral groove was definitely found in *M. grayi* as a deep and conspicuous groove. According to Raven the groove in question is absent in *M. stejnegeri* and *M. bowdoini*. But the present authors are of the opinion that the groove is remarkably present in both of these species. By this instance it becomes evident that the problem on the existence or the absence of the lateral basirostral groove is influenced very much by subjective factor and the individual variation seems to play some part. Anyhow, this groove has been found most clearly in *M. grayi* (=*M. australis*), also in *M. layardi*, then in *M. densirostris*, *M. stejnegeri* and *M. bowdoini*. The present specimen does not show this groove at all. To the species of *Mesoplodon* which do not show the lateral basirostral groove are counted *M. mirus*, *M. hectori* (but instead a prominent ridge is present), *M. europaeus* and *M. bidens* as indicated in Table 6.

TABLE 5. COMPARISONS OF THE SKULL DIMENSIONS

1**	Total (condylo-basal) length
2	Length of rostrum (median)
3	Breadth of rostrum at base
4	Breadth of rostrum at middle
6	Breadth of rostrum at the highest point of anterior palatine suture
7	Breadth of rostrum between the antorbital notches
8	Depth of rostrum at middle
10	Depth of rostrum at the highest point of anterior palatine suture
12	Breadth of premaxillae at middle of rostrum
13	Breadth of premaxillae at expanded proximal ends
15	Breadth of premaxillae opposite premaxillary foramina
16	Breadth of premaxillae opposite maxillary foramina
17	Greatest breadth of premaxillae opposite anterior nares
18	Least breadth of premaxillae opposite anterior nares
19	Least distance between the postero-dorsal margins of the maxillary foramina
22	Distance from posterior border of maxillary foramina to end of maxillary protuberance
23	Length of nasal suture line
25	Greatest breadth of superior nares
26	Diameter of orifice of posterior nares immediately behind pterygoid processes
27	Distance from tip of rostrum to bottom of maxillary notches
30	Distance from tip of rostrum to anterior margin of superior nares
32	Distance from tip of rostrum to median suture line of posterior end of pterygoids
33	Distance from tip of rostrum to line joining antero-lateral processes of maxillaries
35	Distance from tip of rostrum to posterior median end of maxillae on palate
37	Distance from tip of rostrum to most anterior point of the palatines
38	Length of vomer visible on palate
39	Breadth across middle of orbits
40	Diameter of orbit (antero-posterior)
41	Greatest breadth across supra-orbital plates of maxillae
42	Greatest breadth across post-orbital processes
43	Breadth across zygomatic processes
46	Length of temporal fossa L:
	R:
48	Length of tympanic bone
49	Greatest breadth of tympanic bone
50	Breadth of occipital condyles
51	Breadth of foramen magnum
53	Height, vertex to inferior border of pterygoids
54	Length of mandible (median)
55	Length of mandibular ramus L:
	R:
57	Length of symphysis
58	Distance from anterior end of mandible to anterior end of alveolus L:
	R:
60	Depth of mandible at posterior margin of tooth
61	Depth between angle and coronoid process L:
	R:
62	Minimum depth of mandible between tooth and coronoid process
64	Greatest height of mandible at coronoid process L:
	R:
65	Length of tooth L:
	R:
66	Breadth of tooth (antero-posterior at crown)
67	Breadth of tooth (transverse)

* It is not measured at crown.
** Numbers are same with Table 1.

IN VARIOUS KNOWN SPECIES OF *MESOPLODON*

M. mirus (Female) (after Raven)	*M. hectori* (after Flower)	*M. europaeus* (Male) (after Raven)	*M. australis* (after Flower)	*M. grayi* (after Flower)	*M. bidens* (Female) (after Fraser)	*M. bidens* (Male) (after Fraser)	*M. stejnegeri* (after Orr)	*M. bowdoini* (Male) (after Orr)	*M. densirostris* (after Raven)	Sotonoura Specimen (Female?) (after Ogawa)	The present specimen (Male)
(810)	(567)	(765)	(770)	(770)	(758)	(768)	(630)	(806)	(770)	(699)	(779)
100	100	100	100	100	100	100	100	100	100	100	100
—	56.4	—	65.9	66.2	65.4	63.4	51.1	—	—	59.7	55.8
—	—	—	—	—	—	—	18.6	28.9	—	24.5	19.4
7.4	6.5	—	5.7	5.2	5.5	5.5	7.1	7.3	9.1	9.0	8.2
—	—	—	—	15.7	—	—	—	—	—	—	11.6
25.9	23.8	—	24.3	23.5	23.5	24.1	—	—	24.9	27.3	26.3
—	—	—	—	—	4.4	4.8	6.5(+)	12.7	8.6	6.4	6.9
—	—	10.1	—	—	—	—	—	—	—	11.2	9.5
—	—	—	—	—	—	—	—	—	6.5	6.3	6.0
14.6	18.9	—	14.4	13.4	12.1	13.5	—	—	12.2	—	13.9
8.4	—	—	—	—	15.3	16.0	—	—	—	8.4	8.9
17.5	20.6	—	17.7	17.9	—	—	—	—	15.8	—	19.3
—	20.1	—	15.2	14.4	—	—	—	—	—	16.2	14.4
—	—	—	—	—	—	—	—	—	9.1	10.0	9.6
11.4	—	—	—	—	—	—	—	—	6.5	11.3	11.4
7.8	—	—	—	—	—	—	—	—	8.4	17.6	L:12.7, R:12.1
—	—	—	—	—	6.2	6.5	—	—	—	—	4.7
6.9	9.0	7.2	6.8	6.9	—	—	—	8.0	8.7	6.3	6.8
—	—	12.2	—	—	—	—	—	—	—	11.7	14.8
61.2	—	62.7	—	—	—	—	—	61.0	64.3	—	67.7
—	—	71.9	—	—	—	—	78.4	78.5	—	—	74.2
—	—	—	—	—	—	79.2	66.8	76.6	—	75.1	76.8
—	—	56.2	—	—	—	—	—	—	—	—	59.4
—	78.0	—	78.6	80.0	—	—	—	—	—	—	82.8
—	—	48.4	—	—	—	—	—	—	—	—	47.2
20.0	—	—	—	—	—	—	—	—	—	—	39.3
42.6	45.7	—	38.1	36.6	37.2	37.2	43.6	48.6	42.2	28.7	25.9
40.1	41.4	—	36.8	34.8	35.4	35.9	44.1	49.0	42.6	41.5	42.9
—	—	—	—	—	—	—	42.0	—	—	41.6	40.6
—	42.5	48.4	36.1	34.3	—	—	44.0	49.8	—	43.5	45.7
—	—	—	—	—	—	—	12.5	11.8	—	R 14.2	L:14.4, R:14.8
—	—	—	—	—			—	—	—		14.0
—	—	—	—	—	}13.1	}11.5	—	—	—	}16.5	13.2
—	9.5	—	6.4	6.6	—	—	—	—	—	—	L: 5.3, R: 5.4
—	—	—	4.2	4.5	—	—	—	—	—	—	3.9
16.3	16.2	—	12.9	12.3	—	—	15.9	16.2	14.0	15.6	16.2
—	—	—	—	—	5.0	6.5	—	—	—	6.3	6.0
37.2	—	—	—	—	31.9	34.1	41.3	42.6	48.0	39.6	37.6
82.5	—	—	—	—	88.7	88.9	—	—	88.7	85.1	85.4
—			—		—	—	—	—	—	—	85.5
—	}85.4	}86.9	—	}85.7	—	—	—	86.0	—	—	86.3
23.8	26.5	16.3	—	27.8	30.6	34.6	—	—	24.0	18.3	23.6
—	—		—	—	—	—	—	—	—	—	23.1
—	—	}9.6	—	—	—	—	—	18.5	—	—	23.5
—	—	—	—	—	—	—	—	9.1	22.1	L7.3	11.6
—		—	—		—	—	—	—	—	15.9	15.5
—	}14.6	—	—	}13.6	—	—	—	15.6	—	—	15.7
—	—	—	—	—	—	—	—	8.1	—	L7.3	L: 9.1, R: 9.2
	—	—	—	—	—	—	—	—		15.6	15.1
}14.4	—	—	—	—	—	—	—	—	}16.9	—	15.3
—	—	—	—	—			—	—	—	—	11.2
—	—	—	—	—	}12.3	}7.4	—	16.6	—	5.6	11.6
—	—	—	—	—	9.6*	5.3*	—	7.6*	—	6.4*	12.7
—	—	—	—	—	1.6	1.0	—	1.8	—	0.9	2.1

TABLE 6. A LIST OF SKULL AND MANDIBULAR CHARACTERS

Genus	*Mesoplodon*				
Species		*M. mirus* True, 1913.	*M. hectori* Gray, 1871	*M. europeaus* Gervais, 1852.	*M. grayi* Von Haast, 1876.
Synonym (or sub-species)		*M. mirus mirus* *M. mirus pacificus*	*Berardius arnuxi* *M. knoxi*	*M. gervaisi* Deslongchamps, 1866	*M. australis* *M. haasti*
Type locality		Beaufort Harbor, Carteret County, N.C., U.S.A.	Titai Bay, New Zealand.	English Channel.	Chatham Islands (east of New Zealand), New Zealand, Australia.
Approximate distribution		Ireland, Outer Hebrides; North Carolina north to Nova Scotia.		Also New Jersey, Florida, New York, Long Island, U.S.A.	A specimen stranded in Holland.
Vertebral formula	C7+D9-10+L10-11+Ca19-20=46 to 48. Atlas and axis fused, sometimes also third.	C7+D10+L11+Ca18=46 (Raven)		C7+D9+L11+Ca20=47 (Raven). C7+D10+L10+Ca20=47 (True, Raven). first three of C. ankylosed.	C7+D10+L11+Ca20=48: grayi (Flower). C7+D9+L11+Ca20=47: australis (Flower).
Ribs	Eight ribs two headed. Sternum of four or five pieces.				
Phalangeal formula	I: 1, II: 6, III: 6, IV: 3, V: 2 (Beddord) I: 2, II: 4, III: 4, IV: 3, V: 2 (Raven)	I: 2, II: 4, III: 4, IV: 3, V: 2 (Raven)		I: 2, II: 6 or 7, III: 6, IV: 4(+1?), V: 4 (True) I: 2, II: 5, III: 5, IV: 4, V: 3 (Raven).	
Premaxillary foramina situated to maxillary foramina		in level or caudal	on a level	markedly rostral (Raven)	caudal
Lateral basirostral groove		absent	absent (but a prominent ridge instead)	absent (but a prominent ridge instead)	present deep and conspicuous
Position of mandibular teeth	Single pair of larger or smaller functional teeth in lower jaw, embedded in mandible at or near middle.		not compressed	at middle of mandibular symphysis (opposite symphysis)	near hinder edge of mandibular symphysis
Shape of the teeth				compressed	*M. haasti* is only known from a rostrum and a mandible. But the peculier formed (triangular with a conical point) and large size of teeth seem to mark it out. This tooth has very close resemblance to present new from.
Mental foramen		single	multiple		
Rostrum		very elongated, shallow and margined, with a prominent flange.	broad at base	broad at base	narrow at base
Other characters	Skull with mesoethmoid ossified; the nasals are sunk between the upper ends of the premaxillae. Size: moderate = 15 – 17 feet.	When total length of skull of adult over one meter, in habits the Pacific Ocean. ... *M. mirus pacificus*, against *M. mirus mirus*.	Distance from occipital condyle to premaxillary foramen about equal to greatest width of skull.		*M. australis* of Flower is same as M. hectori in part (Beddard). Mr. H. O. Forbes seeks to unite with *M. grayi*, Haast, Sir W. Flower's species, *M. australis* and *M. haasti*. In *M. australis* the palatines lie altogether outside the pterygoids.

ON THE VARIOUS SPECIES OF *MESOPLODON*

M. bidens Sowerby, 1804.	*M. layardi* Gray, 1865.	*M. stejnegeri* True, 1885.	*M. bowdoini* Andrews, 1908.	*M. densirostris* Blainville, 1817.	Present specimen
Z. sowerbiensis *sowerbyi* *Aodon dalei* *Delphinus micropterus*	*Callidon guntheri* *Dolichodon traversii* *floweri*			*M. seychellensis*	
Coast of Elginshire, Scotland.	Cape of Good Hope.	Bering Island, Commander Islands, Bering Sea.	New Brigton Beach, Canterbury Province, New Zealand.	Unknown.	Ōiso Beach, Sagami Bay, near Tokyo, Japan.
Recorded from France, British Isles, Holland, Belgium, Germany, Norway, Sweden, Italy, and off eastern U.S.A.	New Zealand, Australia, South Africa, the Falkland Islands.	Bering Island off Eastern Siberia and coast of Oregon, U.S.A.	New Zealand north to eastern North Pacific (near La Jolla).	Madeira, Eastern United States north to Canada, South Africa, Seychelles off East Africa, Lord Howe Island (east of Australia).	
C7+D10+L10+Ca19 =46 (Van Beneden). C7+D10+L9+Ca20 =46 (〃).	C7+D10+L10+Ca19 =46 (Haast).			C7+D11+L8+Ca21 =47 (Raven). C7+D10+L11+Ca18 =46 (Andrews). C7+D10+L11+Ca17 =45 (van Beneden & Gervais).	C7+D10+L10+Ca21 =48
					Number of two-headed ribs are 7.
I: 1, II: 6 or 5, III: 5 or 6, IV: 4 or 5, V: 3 or 4 (True) I: 0, II: 6, III: 5, IV: 3, V: 2 (metacarpa exclude, Kükenthal)			I: 0, II: 4, III: 3, IV: 3, V: 2 (metacarpa exclude, Andrews)		I: 1, II: 6, III: 5, IV: 5, V: 3. (I: 1, II: 5 (+1?), III: 5, IV: 5, V: 4, Ogawa: the first *Mesoplodon* specimen in Japan)
on a level (Beddard) markedly rostral (Raven)	on the same level on a level	in level or caudal (one behind the other)	in level or caudal	caudal or in level	markedly rostral
absent	absence (Flower) present shallow and inconspicurous (slightly developed) (Raven)	absent (Raven) present	absent (Raven) present	present (Beddard) shallow and inconspicarous	absent
near hinder edge of mandibular symphysis (situated caudal to symphysis)	near hinder edge of mandibular symphysis	situated entirely behind the symphysis symphysis is short	symphysis is short	Tooth with vertical apex, near hinder edge of mandibular symphysis. (like as *M. stejnegeri*).	Situated entirely behind the symphysis.
compressed 1/3.5	very large, The singular growth of the strap-shaped teeth finally grow round the jaw.	hardly compressed >1/7 very large	compressed 1/3–1/4 very large	compressed, 1/2–1/3 very large	hardly compressed, over 1/6 teeth profile is closely resembled to leaf shape of ginkgo tree.
	single		single	multiple	single
broad at base	narrow at base vertical height less than width at middle			narrow at base, vertical height greater than width at middle.	breadth of rostrum at base: moderate. (34.7% of rostal length).
	Maxillary protuberance and ridge scarcely distinguishable.	Distance from occipital condyle to premaxillary foramen much less than greatest width of skull. An unusually large brain case (half the length of the skull).	Maxillary protuberance and ridge very pronounced. Distance from occipital condyle to premaxillary foramen much less than greatest width of skull.		The epiphyses of the vertebrae were fully ankylosed their centrum. The extent of cöossification of the presphenoid and the vomer occupied relatively large space in the mesirostrum.

The third character to be considered is the position, where the teeth are situated in the mandible. This character is perhaps more important. A single pair of teeth are situated at the tip of mandible in *M. mirus* as in *Ziphius cavirostris*. In *M. hectori* the teeth are located close to the apex of the mandible. In *M. europaeus* the teeth stand at the place opposite to the mandibular symphysis, while *M. grayi* has the teeth near the hinder edge of the symphysis.

Forbes tried to unite with *M. grayi*, Haast (Sir W. Flower's species), *M. australis* and *M. haasti*. Of *M. haasti*, however, only a rostrum and a mandible are known. So some difficulty lies in taking it for an independent species. But it should be mentioned here especially that the peculiar form (triangular with a conical point) and the large size of the tooth seem to mark it out. Consulting Flower's figure, the lateral view of its tooth resembles closely the present specimen. The premaxillary foramen of *M. haasti* is situated more caudally than the maxillary foramen in the latter. This relative position of the foramina is the most remarkable difference between *M. haasti* and the present specimen.

In *M. layardi* the teeth are situated near the higher edge of the mandibular symphysis, and grow finally strap-shaped around the upper jaw. In *M. bidens* and *M. bowdoini* the teeth are connected to the hinder edge of the mandibular symphysis.

In the present specimen the teeth are situated posterior to the symphysis, similarly to the case in *M. stejnegeri*. But from the location of the teeth, these four, *M. bidens*, *M. bowdoini*, *M. stejnegeri* and the present specimen, are difficult to discriminate from each other. In *M. densirostris* the teeth with vertical apex are situated entirely caudal to the mandibular symphysis.

The fourth character is the shape of the teeth. This problem hitherto has not aroused much discussion. The form of the dentine may be more useful than the whole shape of the teeth for separation of the species. However, it is impossible that one peels off their cement from the teeth, even though on one side of the specimen. From these considerations, the ratio between the transverse thickness and the antero-posterior breadth at the place of insertion into the mandibular alveole gives an important key for this problem. The directions, in which the root of the teeth was formed and the coronal apex of the teeth was pointing, show the way, in which the layer of the odontoblasts retreated in the formation of the teeth. Therefore, the directions of the root and the apex of the teeth can be useful in determining the species. There remain only two, *M. bidens* and the present specimen, which are adequate for the first three characters mentioned above (from the first to the third).

Hereby, the fourth character comes necessarily into special consideration. About the teeth of other species, Table 6 is given, but the explanation is omitted for the purpose of avoiding confusion. In *M. bidens*, the ratio of thickness to antero-posterior breadth of the teeth seems to be 1 : 3.5 and the root of the teeth is directed extremely forewards. On the other hand, in the present specimen the ratio of thickness to antero-posterior breadth of the teeth is 1 : 6 and the rounded root of the teeth is directed slightly forewards. From this point of view no species has ever been known, which shows the teeth of a shape analogous to the present specimen.

Fraser sent recently to the senior author a suggestion upon the present specimen that, "I am quite certain that *M. bidens* is not concerned". Fraser and Moore suggested from the photographs, that the present specimen might be *M. stejnegeri* or *M. bowdoini*. However, the present authors think the premaxillary foramina in *M. stejnegeri* or *M. bowdoini* seem to be situated on a level equal or more caudal to the maxillary foramina, and in the present specimen this relation is quite reverse. Raven concluded the absence of the lateral basirostral groove in *M. stejnegeri* and *M. bowdoini*, but the present authors can see this groove though vaguely in some photographs of these species. The present specimen does not show this groove at all.

Kellogg suggested, perhaps justly, that "The presence or absence of a lateral basirostral groove may possibly be an age character in some forms". He said also on the teeth of a *M. stejnegeri* specimen that was found in 1927 on Egg Island, that "The root is expanded anteriorly and posteriorly and resembled the tooth from the Sagami Bay specimen". Considering these suggestions and moreover comparing the dimensions of the skull, the authors can not identify the present specimen to any one of the previously known species. Kellogg suggested further to the senior author, that "all of the specimens of *Mesoplodon* that I have examined present interesting problems and it would appear that the diagnostic characteristics of some of the species have not as yet been determined with any degree of certainty. As yet, a sufficiently adequate series of specimens is not available to determine the limits of variation". The present authors take this important suggestion deeply into heart. On the steps of classification of the genus *Mesoplodon*, however, because the present specimen shows some characters, which have been thought worthy of separation of the species, it might be better recognized as an independent species also.

The present authors devised with their confidence a key for differentiating the species of *Mesoplodon* based on the distinctive characters mentioned above. The key is shown in Table 7.

TABLE 7. KEY TO THE SPECIES OF *MESOPLODON* BASED ON DISTINCTIVE CHARACTERS OF SKULL AND MANDIBLE

1_1 Premaxillary foramina in level or caudal to maxillary foramina	
2_1 Lateral basirostral groove present	
3_1 Lateral basirostral groove deep and conspicuous	*M. grayi*
3_2 Lateral basirostral groove shallow and inconspicuous	
4_1 Mandibular symphysis moderate; tooth situated caudal to angle of mandible; tooth pointed backward; tooth compressed in the rate of $^1/_2 \sim {}^1/_3$	*M. densirostris*
4_2 Mandibular symphysis short; tooth situated near angle of mandible; tooth pointed forward	
5_1 Tooth compressed in the rate of $^1/_3 \sim {}^1/_4$ between its thickness (transverse) and breadth (antero-posterior) at crown	*M. bowdoini*
5_2 Tooth hardly compressed in the rate of ca. $^1/_7$ between its thickness (transverse) and breadth (antero-posterior) at crown	*M. stejnegeri*
2_2 Lateral basirostral groove absent; tooth not compressed, situated at or near tip of mandible	
6_1 Distance from occipial condyle to premaxillary foramen about equal to greatest width of skull; mental foramen multiple	*M. hectori*
6_2 Distance from occipital condyle to premaxillary foramen much less than greatest width of skull; mental foramen single	*M. mirus*
7_1 Total length of skull of adult under one meter, inhabits Atlantic	*M. mirus mirus*
7_2 Total length of skull of adult over one meter, inhabits Pacific	*M. mirus pacificus*
1_2 Premaxillary foramina rostral to maxillary foramina	
8_1 Lateral basirostral groove present; vertical height of rostrum less than its width	*M. layardi*
8_2 Lateral basirostral goove absent	
9_1 Tooth situated opposite symphysis	*M. europaeus*
9_2 Tooth situated caudal to symphysis	
10_1 Tooth compressed in the rate of $^1/_3 \sim {}^1/_4$ between its thickness (transverse) and breadth (antero-posterior) at crown	*M. bidens*
10_2 Tooth hardly compressed in the rate of ca. $^1/_7$ between its thickness (transverse) and breadth (anteroposterior) at crown	*M. ginkgodens*

The authors ventured to settle a new species for this specimen and nominated it as *Mesoplodon ginkgodens*. This species name is chosen from the fact that the lateral view of the teeth of the present specimen resembles closely the shape of a leaf of the ginkgo tree (*Ginkgo biloba* LINNAEUS). Ginkgo tree is very common in Japan; it is cultivated for the handsome foliage. Its correct Japanese name is ginkyo or ichō. But it was introduced to the scientific world of Europe under the perhaps mistaken nomination of Ginkgo. The name Ginkgo is now commonly used in English language and scientific circles, so the authors were obliged to adopt the rather false ginkgo against the correct ginkyo.

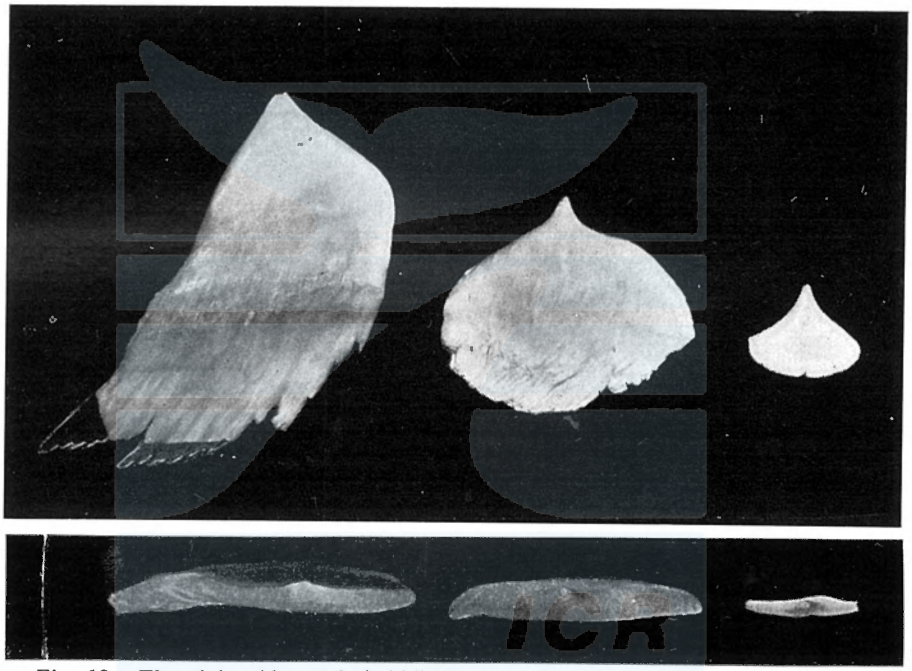


Fig. 13. The right side tooth (middle) compared with *M. stejnegeri* (left) and the first *Mesoplodon* specimen in Japan (right).

It is a very difficult problem to classify the whales of the genus *Mesoplodon* into species, because of the scarcity of them caught or found, examined and exactly reported. Somebody will in the future, several years or several ten years later, adjust the various species of *Mesoplodon*. But at present, there seems to be no other means than to take the present specimen for a new species from the distinctive characters. The authors designate the present specimen which stranded on Ōiso Beach, Sagami Bay, near Tokyo, as the type specimen of *Mesoplodon ginkgodens*. The skeleton, though incomplete, will be preserved at the National Science Museum in Tokyo, where also the first *Mesoplodon* specimen in Japan is preserved.

POSITION OF THE FIRST SPECIMEN OF *MESOPLODON* FROM JAPAN

The first specimen of *Mesoplodon* from Japan was reported in 1935 by Ogawa at the annual meeting of the Japanese zoological society. At that time he was puzzled to decide the species name of that *Mesoplodon*, and though it showed characters not completely corresponding to any of the known species, he ventured to identify it to *M. densirostris* rather than to *M. bidens*. But his opinion was not so conclusive, because of insufficiency of the references. It was taken by N. Kuroda in his "List of the Japanese Mammals" (1938) with the new Japanese name "Oogiha-kujira". Kuroda did not examine himself the specimen, but only recorded it in his catalogue.

The senior author revised at this occasion this first specimen, and he could read also the Raven's article "On the structure of *M. densirostris*, a rare beaked whale". The senior author already stated this specimen as *M. bidens* in "A List of Marine Mammals found in the Seas adjacent to Japan" (in Japanese, 1957). This specimen has been preserved in the National Science Museum of Tokyo. For detailed examination it was borrowed for a while to the Department of Anatomy, Faculty of Medicine, University of Tokyo.

From the key mentioned above upon the species of *Mesoplodon*, this (first) specimen may also belong to *M. ginkgodens*, equally as the present (second) specimen. Indeed, four distinctive characters are coincident between the first and the second specimen. The premaxillary foramina are situated evidently rostral to the maxillary foramina as shown in Plate. At that time Ogawa recognized this relation rightly, but he did not take this character so seriously, and attached importance rather to the position of the teeth on the mandible.

The position of the teeth is very much similar to that in *M. densirostris*. But the shape of the teeth is quite different. The teeth of the first specimen resemble very much a leaf of the ginkgo tree, as Ogawa justly said. The ratio of thickness to antero-posterior breadth of the teeth is thinner in the first specimen than in the second. This difference will be explained by assumption that the first specimen was a younger individual and perhaps a female. After all, the present authors would identify the first specimen neither to *M. densirostris* nor to *M. bidens*.

But some doubtful points remain when the two specimens are compared. The length of the skull is larger in the second specimen than in the first, but the length of the rostrum is larger in the latter than in the former. It is considered in *Mesoplodon* that the body length of the female is generally larger than the same-aged male. The first specimen was estimated as a young individual and probably as female. On the contrary, the second specimen is an old full-grown male. Moreover, it is to consider that the rostrum of the first specimen had been broken before Ogawa found it.

By synthetizing various points of view, the authors are of the opinion that the first specimen might belong to the same species as the present specimen, viz. *Mesoplodon ginkgodens*.

SUMMARY

1. A beaked whale that belongs to the genus *Mesoplodon* was stranded on the 22nd Sept. 1957 at Ōiso Beach, Sagami Bay, near Tokyo.

2. The whole shape of the body could not be examined, as it had been cut. The colour of the body was entirely black, even on the rear sides of flippers and tail flukes.

3. Skull, vertebral column and chevrons were collected in the complete set, but ribs and sternum were cut by saw, and some parts of them were lost. The right flipper without scapula was obtained. Pelvic bones were lost. Vertebral formula is ; C : 7+D : 10+L : 10+Ca : 21=48. 8 caudal vertebrae were contained in the tail flukes. Phalangeal formula is ; I : 1, II : 6, III : 5, IV : 5, V : 3.

4. Four distinctive characters are taken into special consideration in classifying the species of *Mesoplodon*. The first is the relative position between the premaxillary and the maxillary foramina. The second is the presence or absence of the basirostral groove. The third is the position of the teeth on the mandible. The fourth is the shape of the teeth. Considering these characters and comparing the dimensions of the skull with those of the known species, the authors could not identify the present specimen to any one of previously reported species.

5. A key to the species of this genus was summarized basing on the distinctive characters above mentioned. And the authors concluded to settle for this specimen a new species and nominated as *Mesoplodon ginkgodens*.

6. The first specimen of *Mesoplodon* from Japan was reported by Ogawa and said as *M. densirostris*. It was examined again in the present work. After all this first specimen belongs neither to *M. densirostris* nor to *M. bidens*, but perhaps to the same species as the present specimen, viz. *Mesoplodon ginkgodens*.

7. The authors designate the present specimen which was taken from Ōiso Beach of Sagami Bay as the type specimen of *Mesoplodon ginkgodens*. It will be preserved at the National Science Museum in Tokyo, where also the first *Mesoplodon* specimen in Japan is preserved.

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EXPLANATION OF THE PLATES

PLATE I

Dorsal, lateral and ventral views (top to bottom) of head of *Mesoplodon* from Ōiso Beach.

PLATE II

Front views of head and skull of *Mesoplodon* from Ōiso Beach.

PLATE III

Skull of *Mesoplodon* from Ōiso Beach with mandible attached; lateral, dorsal, anterior and posterior views (top to bottom).

PLATE IV

Lateral, dorsal and ventral views (top to bottom) of skull of *Mesoplodon* from Ōiso Beach.

PLATE V

Lateral, dorsal and reversed lateral views of mandible of *Mesoplodon* from Ōiso Beach.

PLATE VI

Lateral views of vertebrae of *Mesoplodon* from Ōiso Beach; cervicals and thoracics, lumbars, caudals 1–7, and caudals 8–21 (top to bottom). Vertebral formula is C7+D10+L10+Ca21=48.

PLATE VII

Cranial, dorsal and caudal views (top to bottom) of cervical vertebrae of *Mesoplodon* from Ōiso Beach; from left to right 1–4, 5–6 and 7th of cervicals.

PLATE VIII

Medial view of left and right sides vertebral ribs of *Mesoplodon* from Ōiso Beach.

PLATE IX

Dorsal view, X-ray photograph and ventral view of right flipper of *Mesoplodon* from Ōiso Beach. Phalangeal formula is I: 1, II: 6, III: 5, IV: 5, V: 3.

PLATE X

Dorsal, caudal, lateral and ventral views of left tooth of *Mesoplodon* from Ōiso Beach (natural size).

PLATE XI

Dorsal, caudal, lateral and ventral views of right tooth of *Mesoplodon* from Ōiso Beach (natural size).

PLATE XII

Skulls of various species of *Mesoplodon*; dorsal views.

Fig. 1. *M. mirus* (from Raven H.D.: Amer. Mus. Nov., No. 905, 1937).
Fig. 2. *M. hectori* (from Flower, W.H.: Trans. Zool. Soc. London, X, part 11, 1878).
Fig. 3. *M. europaeus* (from Raven H.C.: Amer. Mus. Nov., No. 905, 1937).
Fig. 4. *M. grayi* (from Flower, W.H.: Trans. Zool. Soc. London, X, part 11, 1878).
Fig. 5. *M. bidens* (No. 1727, Mus. Comp. Zoology, Harvard College; Courtesy of Smithsonian Institution).
Fig. 7. *M. stejnegeri* (No. 21112, USNM; Courtesy of Smithsonian Institution).
Fig. 8. *M. bowdoinis* (No. 31756, AMNH.; Courtesy of American Museum of Natural History).
Fig. 9. *M. densirostris* (from Raven, H.C.: Bul. AMNH., Vol. 80, 1942).
Fig. 10. *M. ginkgodens* (the present specimen).
Fig. 11. *M. ginkgodens* (the first specimen of *Mesoplodon* from Japan, Ogawa, T.: Arb. Anat. Inst. Kaiserl. Japan. Univ. Sendai, Heft 21, 1938).

PLATE XIII

Skulls of various species of *Mesoplodon*; lateral views.

Fig. 1. *M. mirus* (The specimen of Hatteras Island Beach, North Carolina; Courtesy of Smithsonian Institution).
Fig. 2. *M. hectori* (from Flower, W.H.: Trans. Zool. Soc. London, X, part 11, 1878).
Fig. 3. *M. europaeus* (No. 23346, USNM.: Courtesy of Smithsonian Institution).
Fig. 4. *M. grayi* (=*M. australis*: from Flower, W.H.: Trans. Zool. Soc. London, X, part 11, 1878).
Fig. 5. *M. bidens* (No. 1727, Mus. Comp. Zoology, Harvard College; Courtesy of Smithsonian Institution).
Fig. 6. *M. layardi* (*Ziphius Layardii*; from Gray, J.E.; Cat. Seals, Whales, Brit. Mus. 1866).
Fig. 7. *M. stejnegeri* (No. 143132, USNM.; Courtesy of Smithsonian Institution).
Fig. 8. *M. bowdoini* (No. 31758, AMNH.; Courtesy of American Museum of Natural History).
Fig. 9. *M. densirostris* (from Raven, H.C.: Bul. AMNH., Vol. 80, 1942).
Fig. 10. *M. ginkgodens* (the present specimen).
Fig. 11. *M. ginkgodens* (from Ogawa, T.: Arb. Anat. Inst. Kaiserl. Japan. Univ. Sendai, Heft 21, 1938).

PLATE XIV

Mandibles of various species of *Mesoplodon*; lateral views.

Fig. 1. *M. mirus* (from Norman, J.R. and Fraser, F.C.: Giant Fishes, Whales and Dolphins, 1937; Courtesy of the authors and Putnam & Co. Ltd.)
Fig. 2. *M. hectori* (from Norman. J.R. and Fraser, F.C.: Giant Fishes, Whales and Dolphins, 1937; Courtesy of the authors and Putnam & Co. Ltd.)
Fig. 3. *M. europaeus* (from Norman, J.R. and Fraser, F.C.: Giant Fishes, Whales and Dolphins, 1937; Courtesy of the authors and Putnam & Co. Ltd.)
Fig. 4. *M. grayi* (from Flower, W.H.: Trans. Zool. Soc. London, X, part 11, 1878).

Fig. 5. *M. bidens* (from Norman, J.R. and Fraser, F.C.: Giant Fishes, Whales and Dolphins, 1937; Courtesy of the authors and Putnam & Co. Ltd..)

Fig. 6. *M. layardi* (from Norman, J.R. and Fraser, F.C.: Giant Fishes, Whales and Dolphins, 1937; Courtesy of the authors and Putnam & Co. Ltd.)

Fig. 7. *M. stejnegeri* (No. 143132, USNM.; Courtesy of Smithsonian Institution).

Fig. 8. *M. bowdoini* (No. 31759, AMNH.; Courtesy of American Museum of Natural History.)

Fig. 9. *M. densiroitris* (from Raven, H.C.: Bul. AMNH., Vol. 80, 1942).

Fig. 10. *M. ginkgodens* (the present specimen).

PLATE XV

Mandibles of various species of *Mesoplodon*; dorsal views.

Fig. 1. *M. mirus* (from Raven, H.C.; Amer. Mus. Nov., No. 905, 1937).

Fig. 3. *M. europaeus* (No. 23346, USNM.; Courtesy of Smithsonian Institution).

Fig. 5. *M. bidens* (No. 1727, Mus. Comp. Zoology, Harvard College; Courtesy of Smithsonian Institution).

Fig. 5'. *M. bidens* (from Sergeant. D.E. and Fisher. H.D.: J. Fish. Res. Bd. Canada, Vol. 14, No. 1, 1957; Courtesy of Fisheries Research Board of Canada).

Fig. 8. *M. bowdoini* (No. 31757, AMNH.; Courtesy of American Museum of Natural History.)

Fig. 9. *M. densirostris* (male) (from Raven, H.C.: Bul. AMNH. Vol. 80, 1942).

Fig. 9'. *M. densirostris* (female) (from Raven, H.C.: Bul. AMNH. Vol. 80, 1942).

Fig. 10. *M. ginkgodens* (the present specimen).

Fig. 11. *M. ginkgodens* (from Ogawa, T.: Arb. Anat. Inst. Kaiserl. Japan. Univ. Sendai, Heft 21, 1938).

PLATE XVI

Skulls of various species of *Mesoplodon* with mandibles attached; lateral views.

Fig. 1. *M. mirus* (from Raven, H.C.: Amer. Mus. Nov., No. 905, 1937).

Fig. 3. *M. europaeus* (from Raven, H.C.: Amr. Mus. Nov., No. 905, 1937).

Fig. 4. *M. grayi* (from Flower, W.H.: Trans. Zool. Soc. London, X, part 11, 1878).

Fig. 5. *M. bidens* (from Sergeant, D.E. and Fisher, H.D.: J. Fish. Res. Bd. Canada, Vol. 14, No. 1. 1957; Courtesy of Fisheries Research Board of Canada.)

Fig. 6. *M. layardi* (from Norman, J.R. and Fraser, F.C.: Giant Fishes, Whales and Dolphins, 1937; Courtesy of the authors & Putnam Co. Ltd.)

Fig. 7. *M. haasti* (=*M. grayi*) Dorsal view of a part of skull, lateral view of a part of skull and left mandible (top to bottom). (from Flower, W.C.: Trans. Zool. Soc. London, X, part 11, 1878).

Fig. 10. *M. ginkgodens* (the present specimen).

PLATE XVII

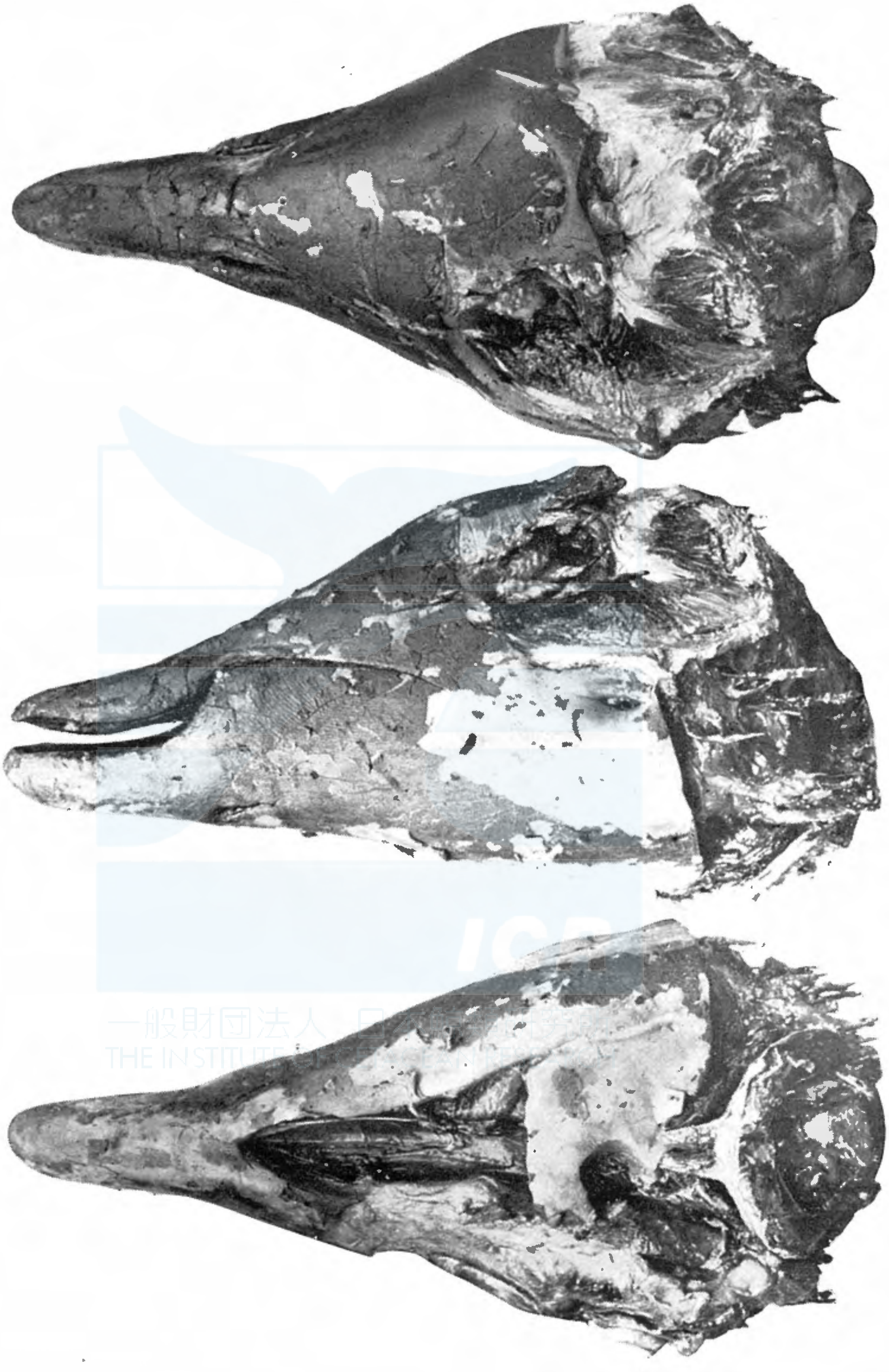
Teeth of three species of *Mesoplodon*.

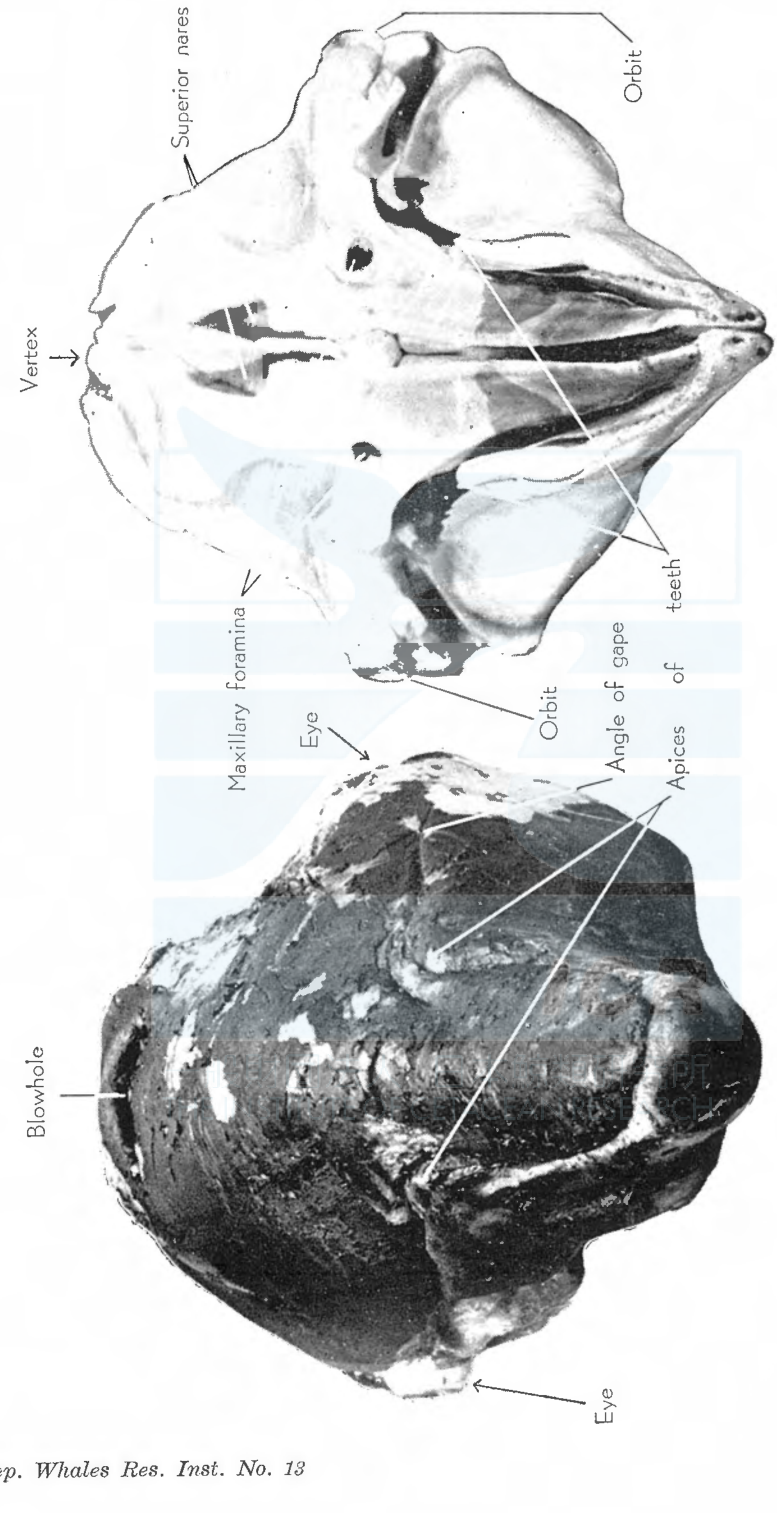
Fig. 5. *M. bidens* (from Fraser. F.C.: Rept. Brit. Mus. Nat. Hist., No. 11, 1934) A.: male of 14 ft. 6 inch, B.: female of 15 ft. 6 inch; Courtesy of British Museum of Natural History).

Fig. 7. *M. stejnegeri* (No. 143132, USNM.; Courtesy of Smithsonian Institution).

Fig. 9. *M. densirostris* (No. 143910, AMNH.; Courtesy of American Museum of Natural History).

Fig. 9'. *M. densirostris* (from Raven, H.C.: Bul. AMNH., Vol. 80, 1937 upper: male, lower: female. A.: lateral views, B.: caudal views).

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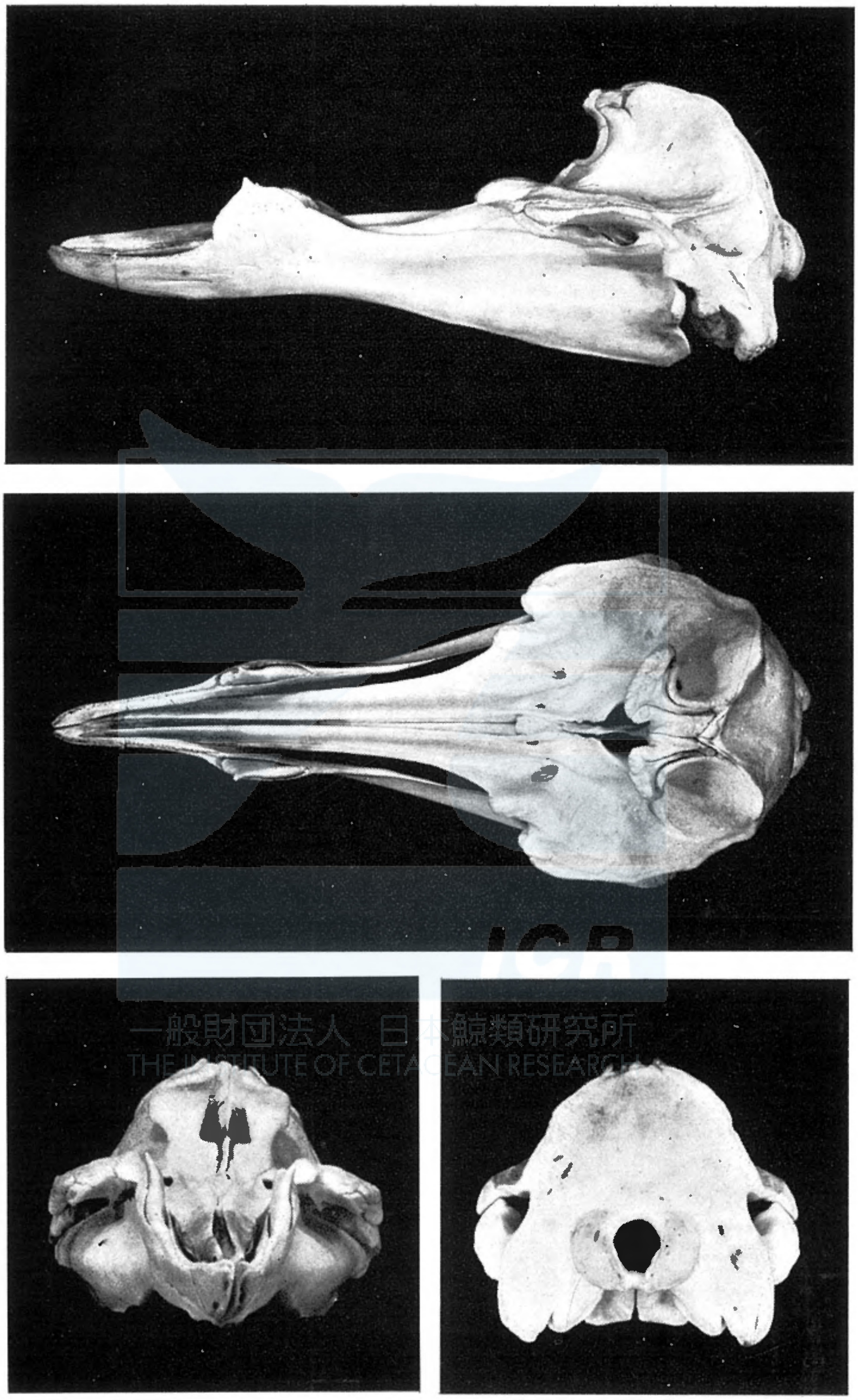

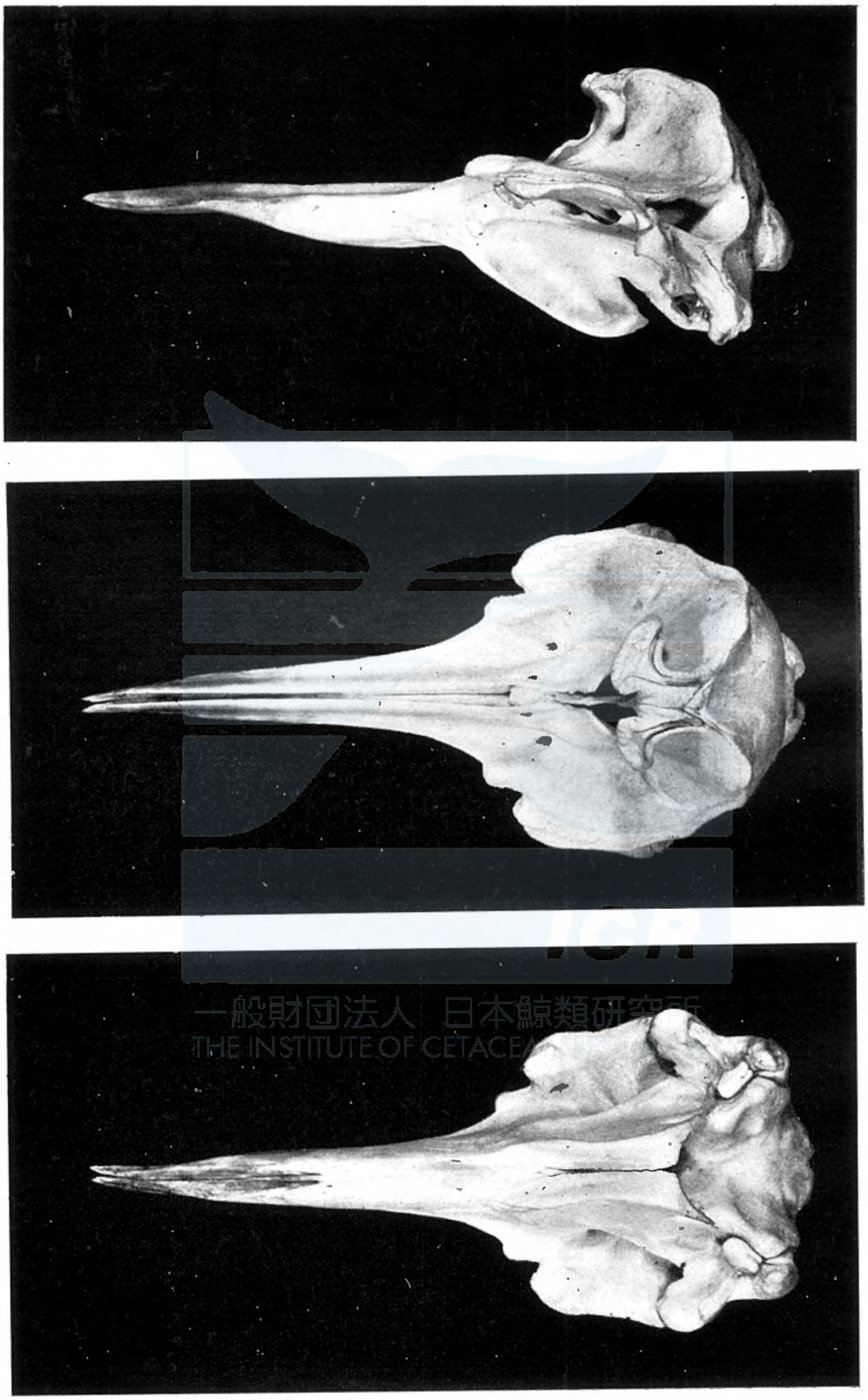

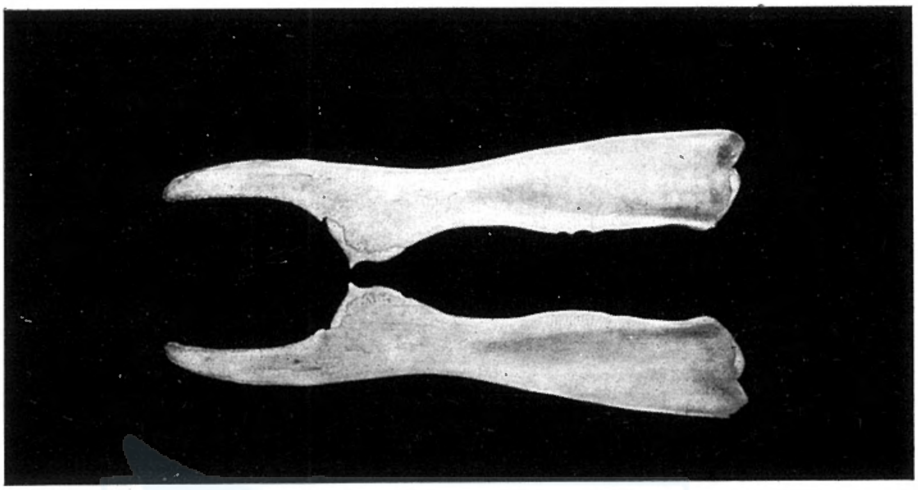

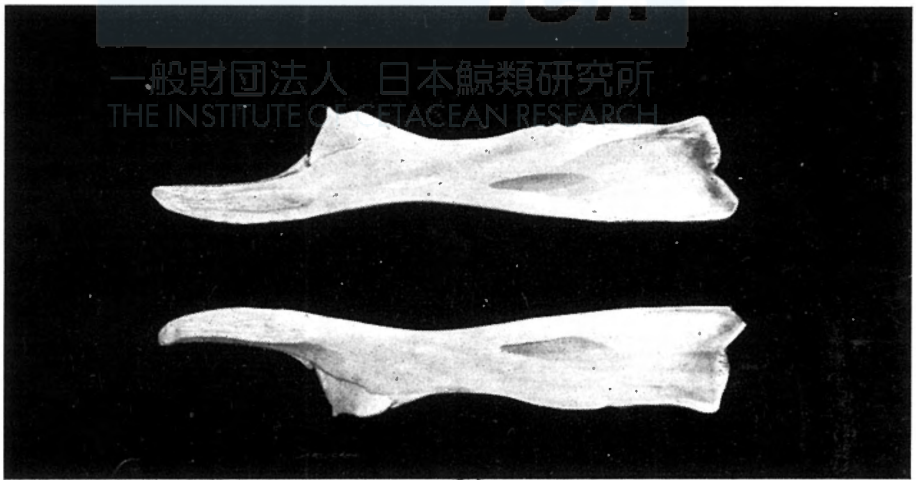

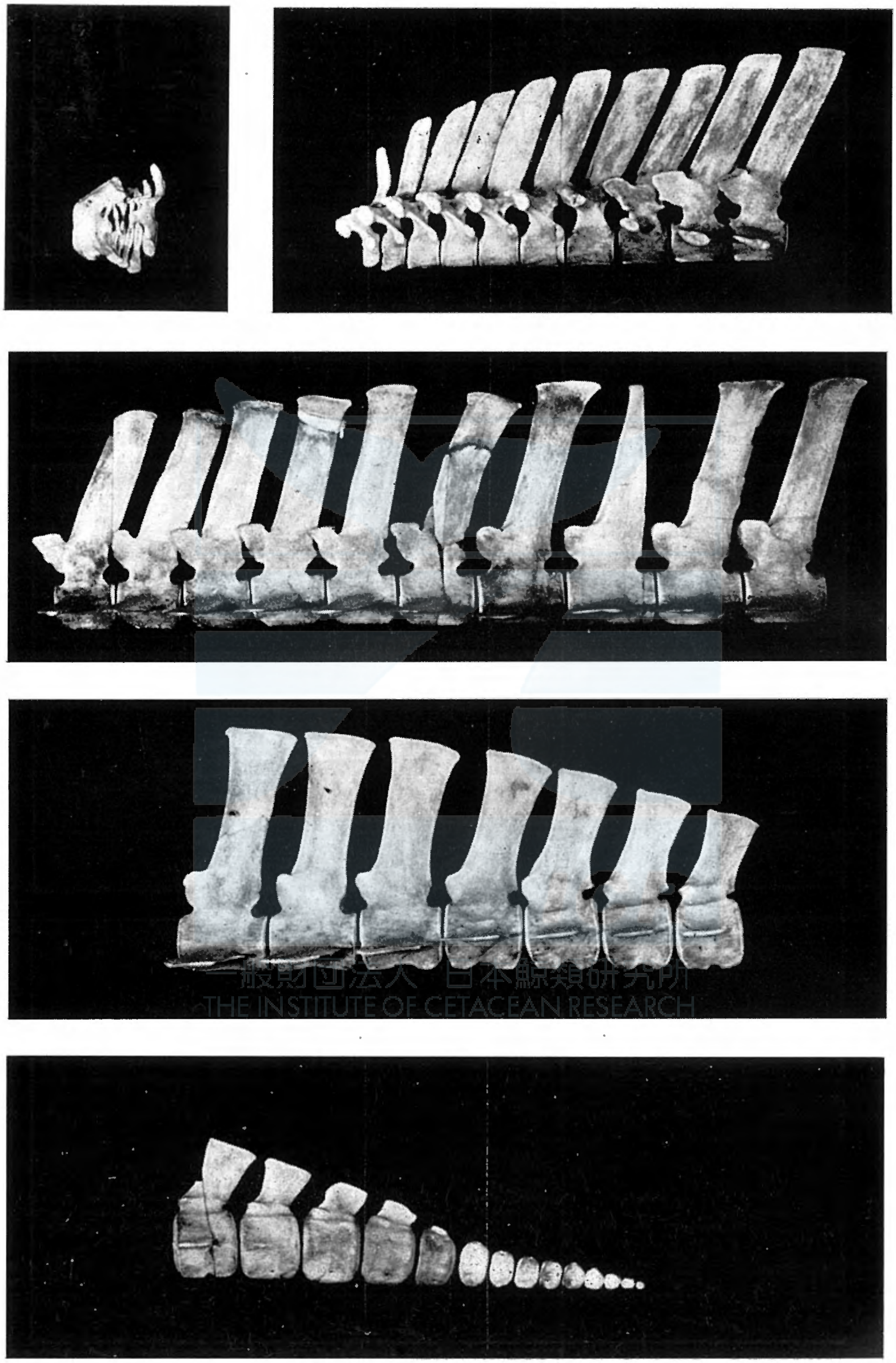

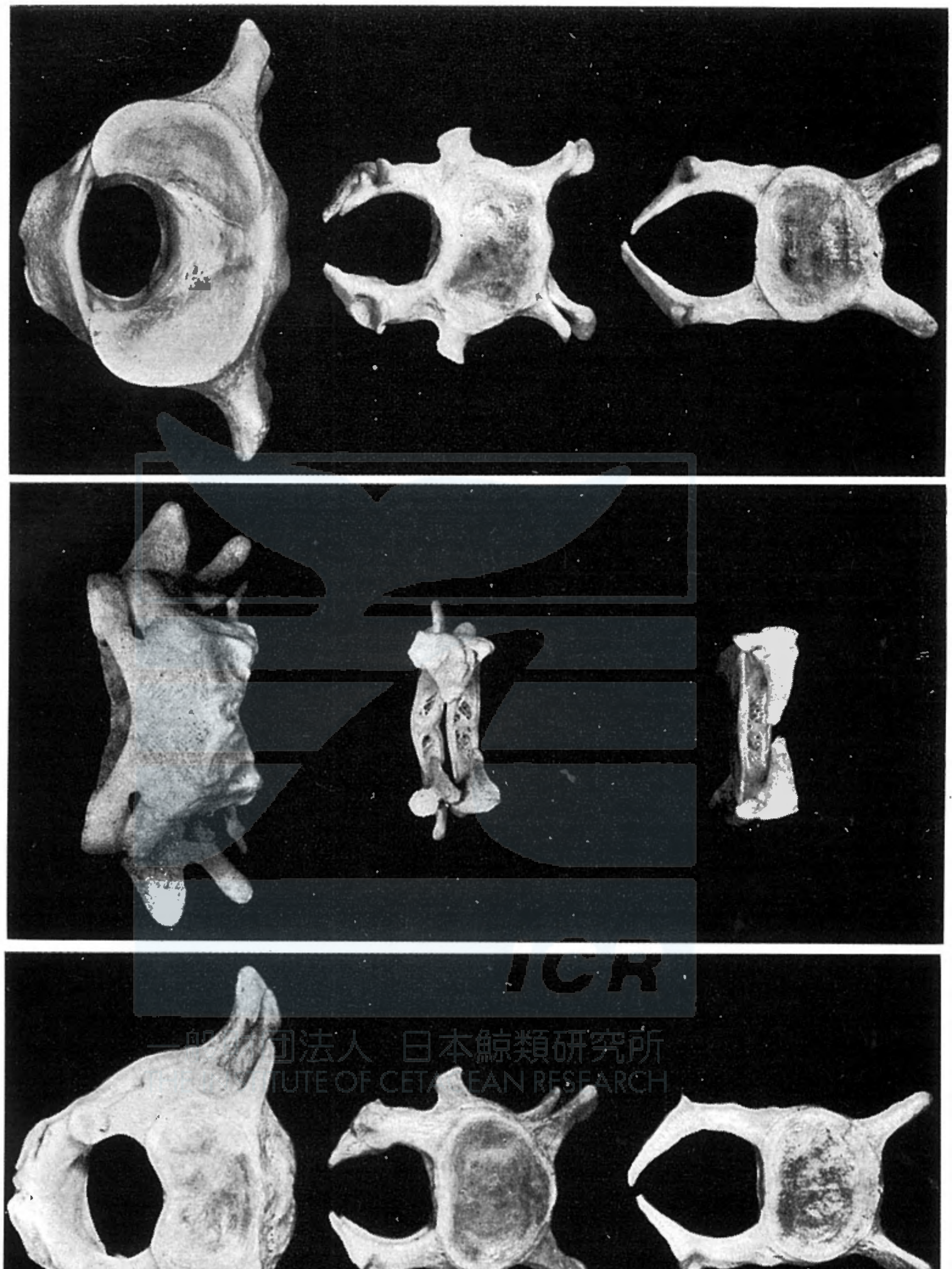

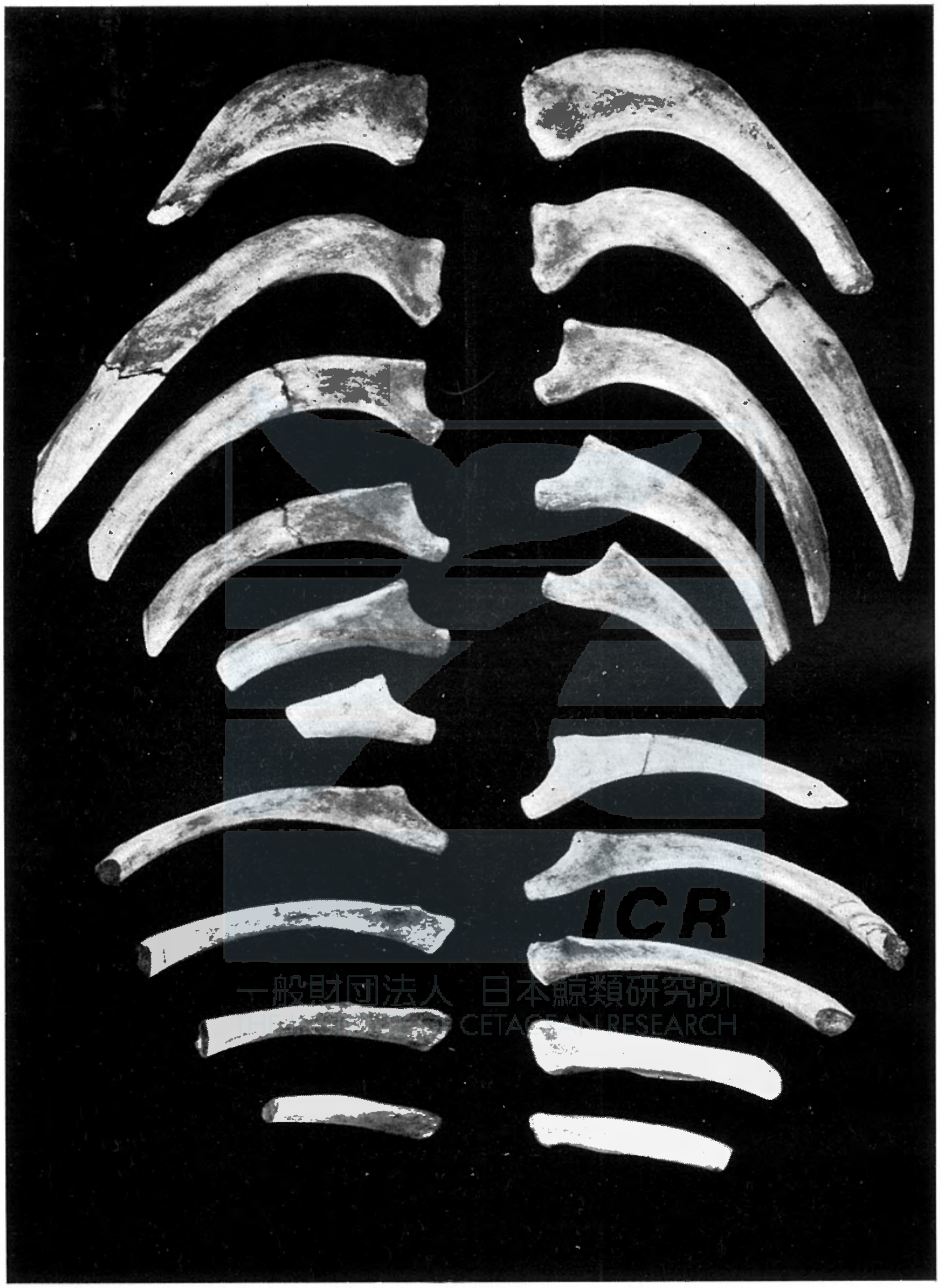
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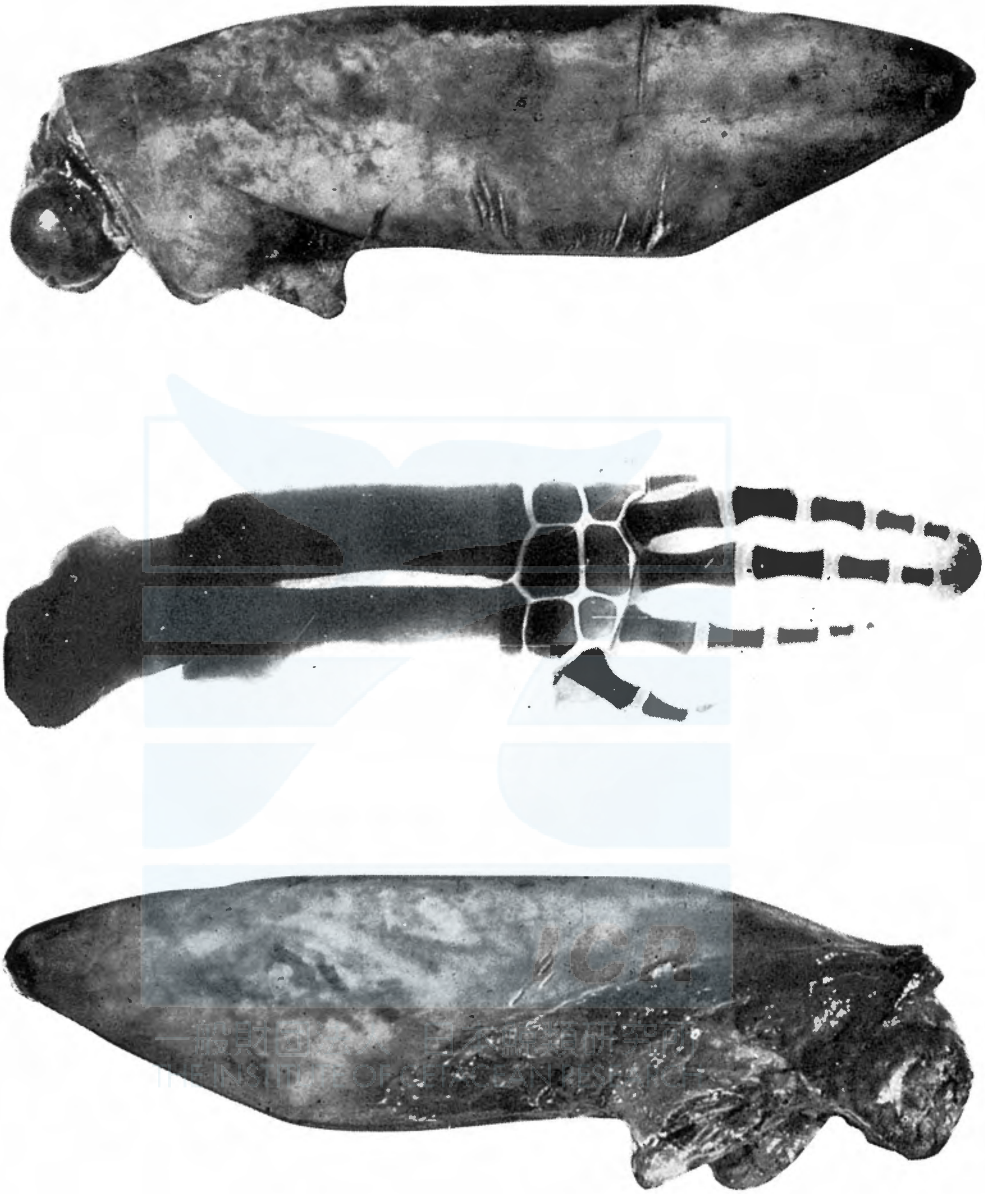

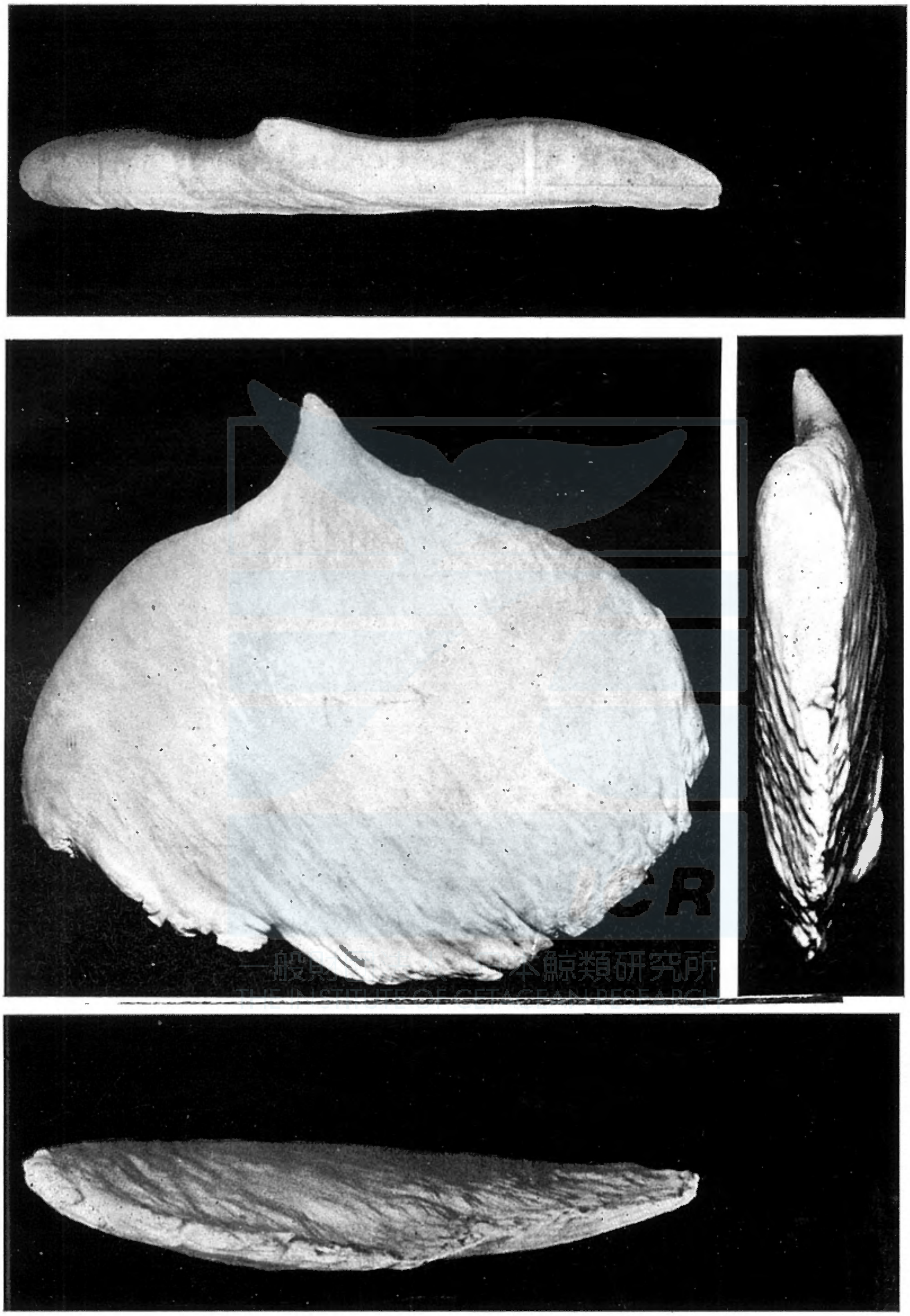

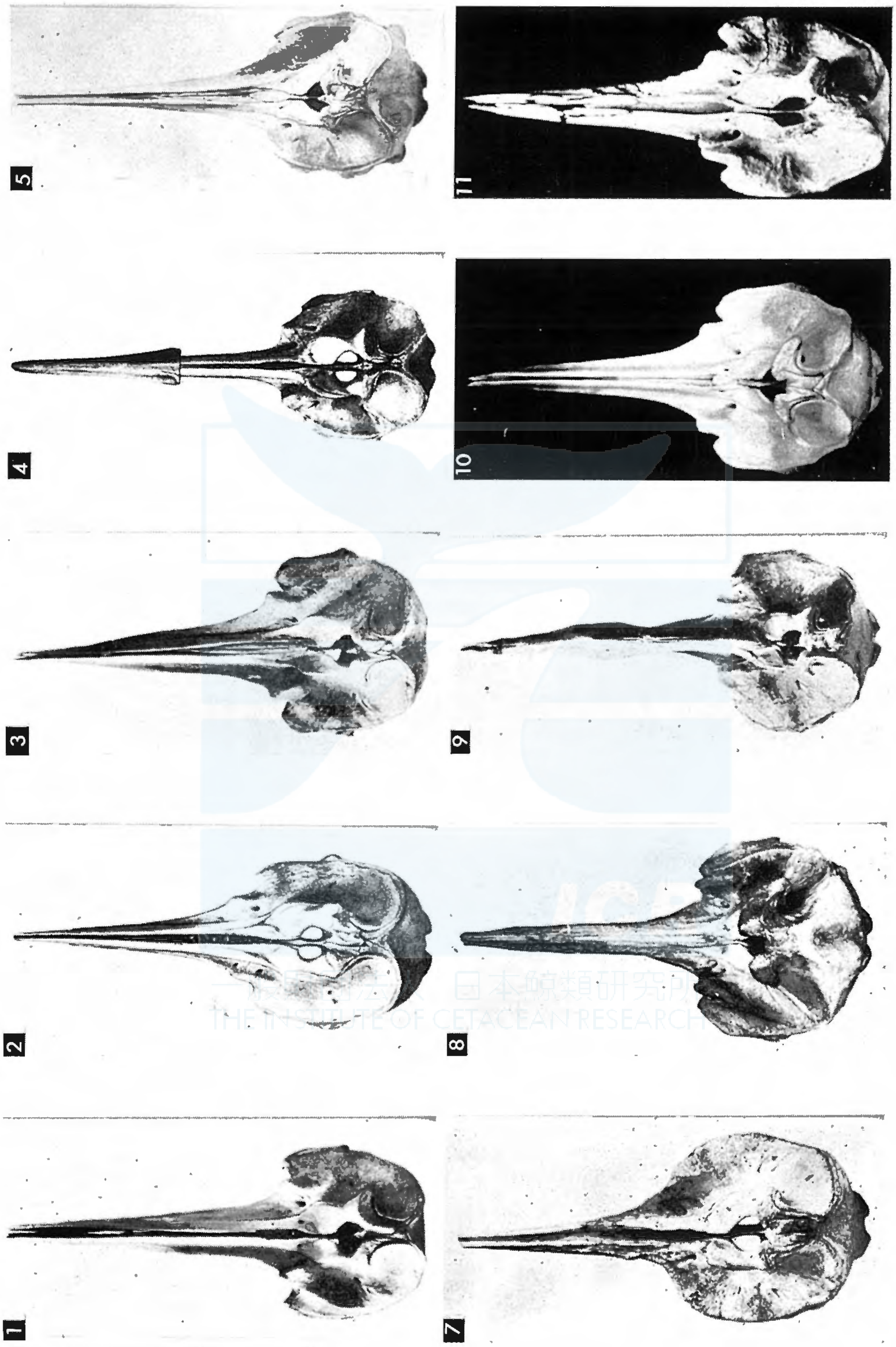

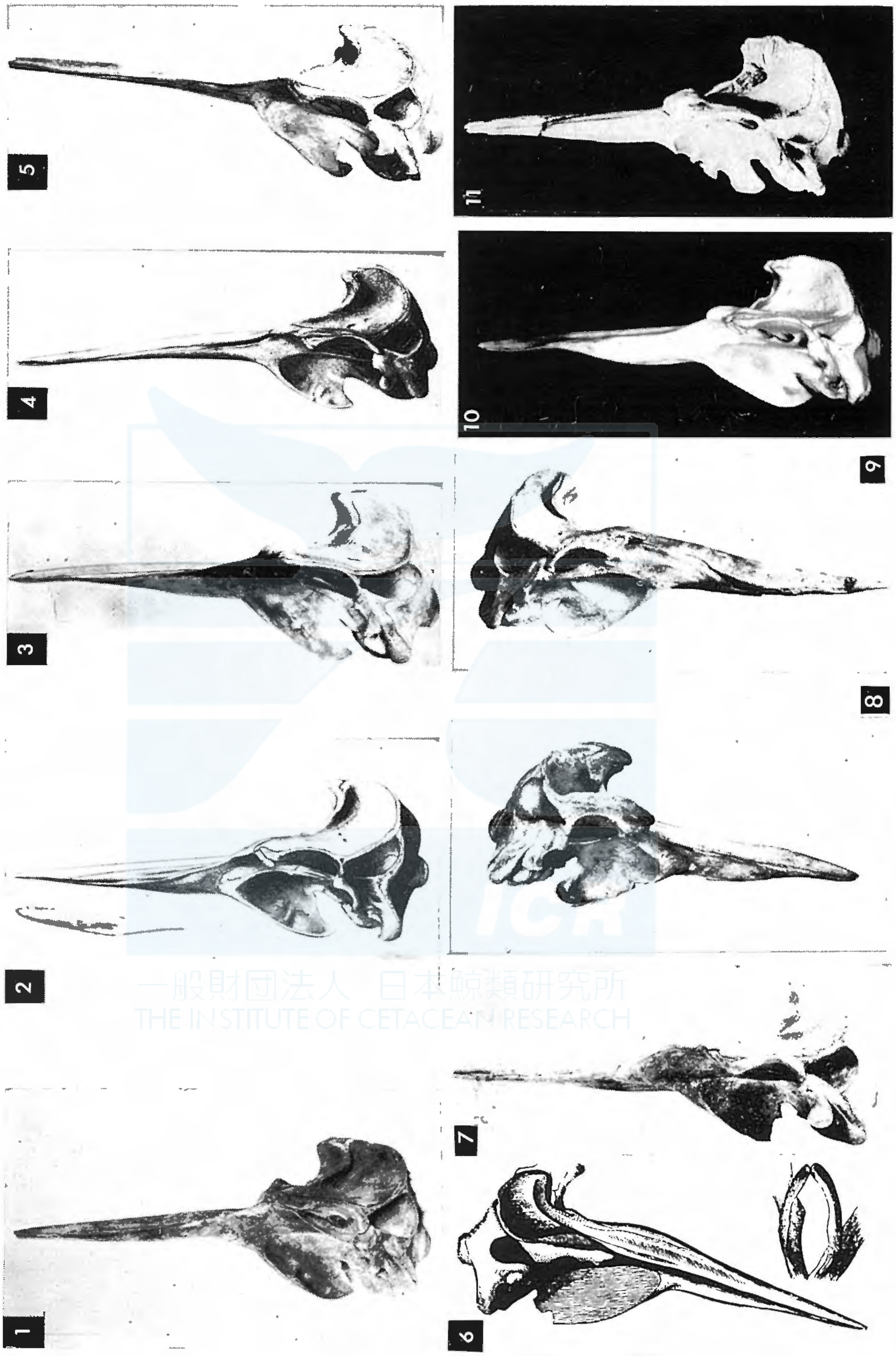
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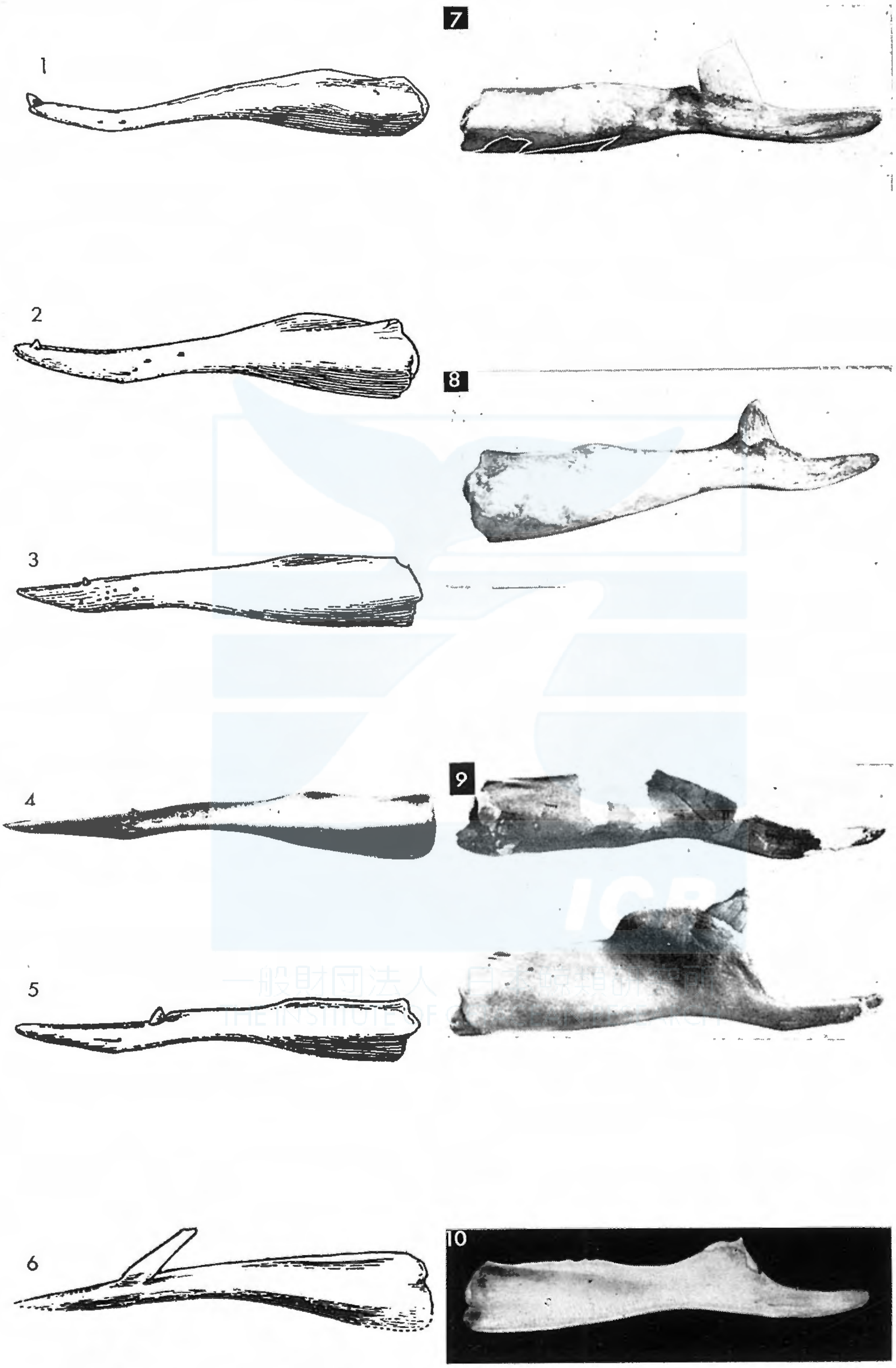
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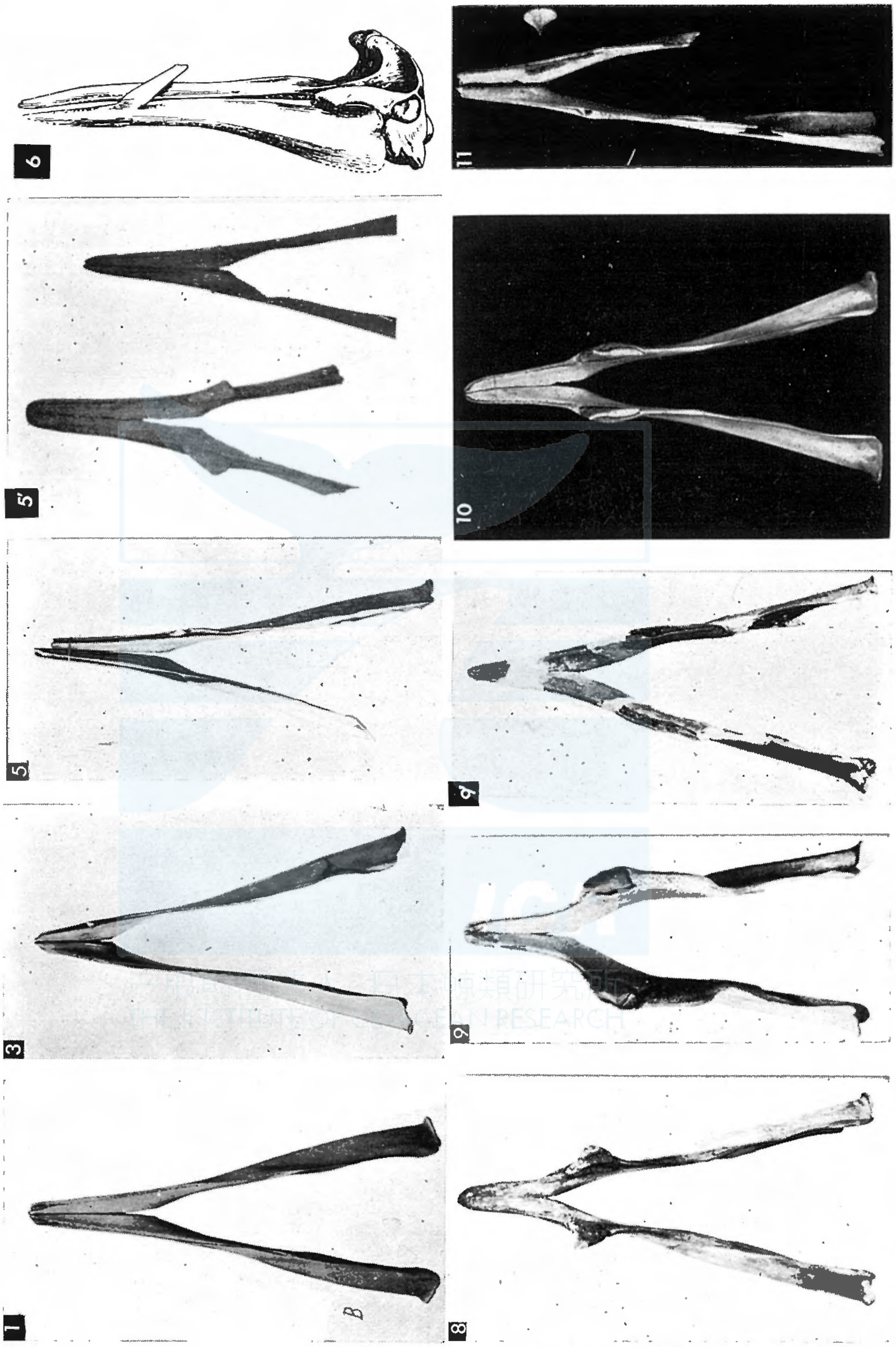
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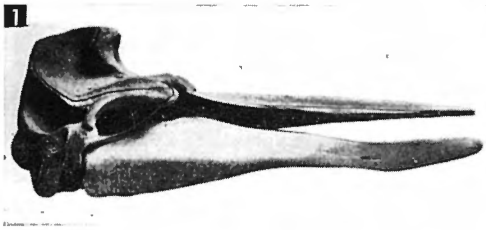

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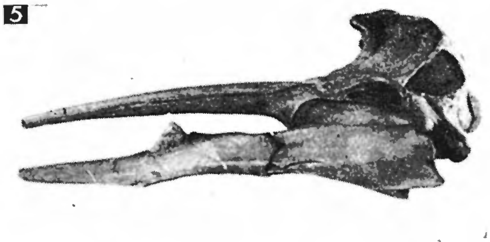

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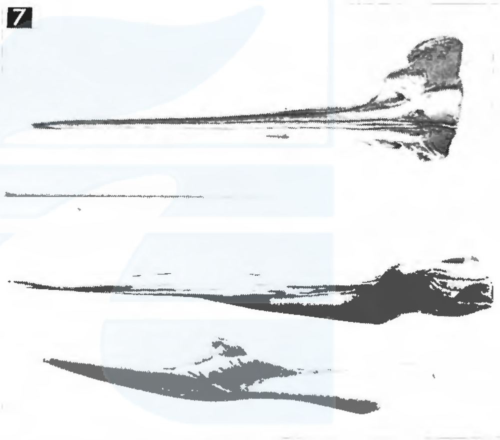

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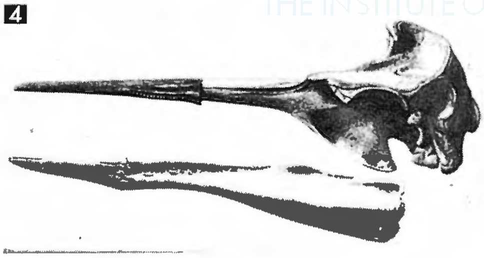

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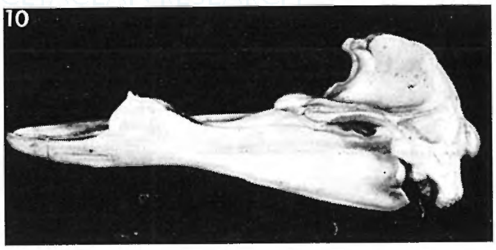


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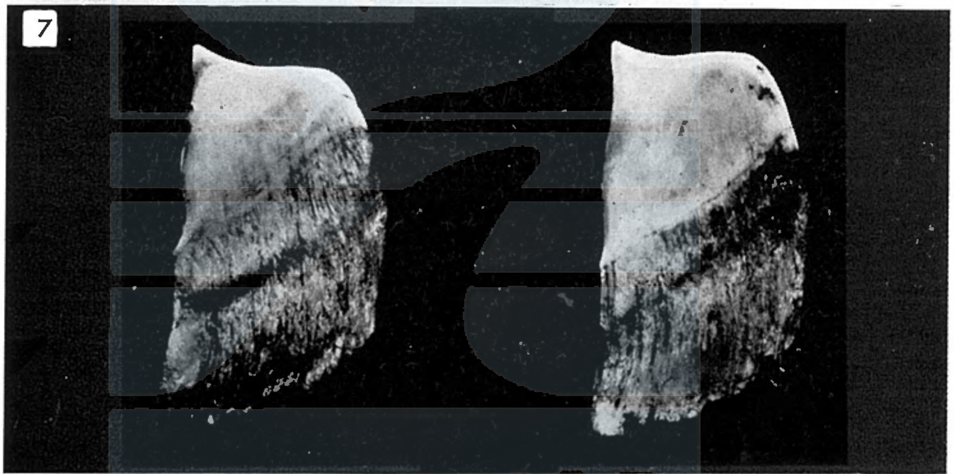
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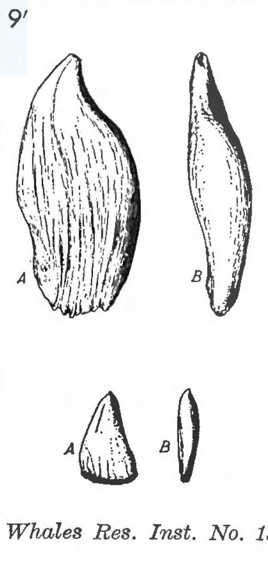
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