Some notes on the Cetacea of the Irish Atlantic coast / by R.J. Anderson.

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Extrait des Comptes rendus du 6me Congrès intern. de Zoologie.
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Sorti de presse le 25 mai 1905.

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Some Notes on the Cetacea of the Irish Atlantic Coast.

By Prof. R. J. ANDERSON (Galway).

With 4 Plates.

The following Cetaceans were stranded during the last few years: *Balænoptera rostrata, Globiocephalus melas, Grampus griseus (rissoanus), Mesoplodon Hectori* Gray, and *Lagonorhychus.* Several other genera have been met with *Delphis* and *Phocæna,* skeletons of *Orca* (in whole or part), *Megaptera, Balænoptera musculus, Mesoplodon bidens.*

Mesoplodon Hectori Gray, is one of the most interesting that has come to us. A young specimen was stranded some years ago near Galway. We obtained an almost complete skeleton and have it mounted. A second specimen was stranded on one of the Aran Islands last winter, we obtained the head of this latter. The length of the first specimen was $4^{m},25$ and that of the second $6^{m},37$. The girth of the latter at its thickest part $3^{m},64$.

This whale was originally described from a young specimen and thought to be a *Ziphius* because of the pair of small teeth near the apex of the mandible. Sir William Turner showed that the genus *Ziphius* differs from *Mesoplodon* in the characters of the tympanic and nasal bones and the nasopremaxillary region.

Our first specimen did suggest relationships with *Ziphius Cuvieri*[1]. Dr. SCHARFF, however, who examined the drawings and read the description said that the specimen was *Mesoplodon Hectori* Gray. The nasal bones of the larger skull are of the same character as the smaller and separate. So we regard the diagnosis as confirmed. The skull of the second is $1^{m},05$ long, 54 cm. wide behind the rostrum. 47 cm. in height to the occipital summit. The apex of the beak is 68 cm. from the anterior part of the frontals. The skull is very asymmetric. The internarial septum is 295^{mm} from the right side and 225^{mm} from the left side. The premaxillæ bound the nares at thesides. That of the left side is 5 cm. wide at the lower part of the nares, whilst the right is 11 cm. wide at the anterior limit of nares. The walls of the rostral groove are thick, much thicker than in the first found specimen which had thin and brittle outer walls. The vomer presents a hollow surface in the floor of the groove.

The left nasal is much smaller than the right and the internasal suture runs outwards, downwards and forwards.

A groove runs along the outer side of each maxilla for 20 cm. and along the upper margins of the lower jaw for 41 cm.

A large socket is situated on each side of the apex of the lower jaw, each is 18^{mm} from before back by 13^{mm} from side to side, for the two teeth. The teeth are conical or double conical, the fang of each is truncated (see Irish Naturalist, June 1904); both teeth are concealed by the mucous membrane.

The condyles of the occipital bone are 6 mm. apart in front and 76^{mm} behind.

The premaxillæ which reach far back in the middle line of the palate are separated from each other for 110^{mm} by the vomer. The premaxillæ form the apex of the beak also and extend backwards for a distance of 15 cm. (beneath) the maxillæ externally.

The palatines, as was pointed out, reach the middle line behind the vomer. The palato-maxillary suture runs forwards, inwards and backwards, and bounds anteriorly a surface that is 4 cm. broad at the middle line and the same breadth at the bend forwards.

The maxillæ make an acute angle between the palatines. The cranial cavity could not be satisfactorily measured. It appears to be 19 cm. from before back 35 cm. from side to side and $17^{cm},5$ in height.

The skull in the smaller specimen is less asymmetric than the present example, which is half as large again as the first.

The sternum of the first has four pieces separated by three foramina, placed at the joints, the foramina being in the middle line as usual. The

[1] The nasal bones are conjoined in *Ziphius*. There are differences in the tympanic and naso-premaxillary bones.

antero-posterior diameters of these pieces are of one (1) 14 cm. middle line (2). 10 cm. to 4^{cm},7 (3). 8^{cm},5 to 9^{cm},7 (4). The breadths are (1). 14 cm. to 8^{cm},5 (2). 11 cm. to 8^{cm},5 (3). 5^{cm},5 to 13 cm. (4). 18 cm. sides to 5 cm. The lower four cervical vertebræ are free. The skull of the first was figured in the Irish Naturalist. The outline sketch, which appeared in the paper on the Premaxilla in the Berlin Transactions, was figured side by side with a piece of the skull of *Orca gladiator*, which was also cast on the Western Shore.

The second specimen is that of the skull (lower jaw was wanting) of *Grampus griseus*, which was stranded near the city of Galway the young offspring seem to have got on shore first and the dam afterwards. We were not able to get the entire animal and the skull wants the mandible.

Prof. Thompson got what remained of the young specimen.

The skull is 6 cm. long, 33 cm. wide at the broadest part.

The premaxillæ are 35^{cm},5 left, 35 cm. right long from front to back and reach to the tip of the beak, each has a foramen one quarter of an inch in diameter at its apex and other foramina further back.

There are no teeth in the upper jaw. A groove reaches along each side of the upper jaw for a distance of 115^{mm} from the apex. The intermaxillæ show for 6 cm. in the middle line of the palate. The posterior end of the palatine surface formed by these bones is pointed. The maxillæ reach back far between the palatines reaching almost to the pterygoids.

The vomer does not appear between the maxillæ in any part of the palate.

The palatine of the right side does not seem to reach the middle line. The difficulty of determining the condition is due to anchylosis. The obliteration of the pterygopalatine suture on the other side renders the exact boundary lines of the bones where they touch difficult to follow. The pterygoids meet mesially behind the palatines.

The occipital condyles are 63^{mm} apart behind and 2 cm. apart in front.

The intermaxillary groove has the vomer lining its floor. It is 3 cm. deep behind and 1 cm. in front. The breadth is 17^{mm} in front and 7^{mm} behind.

The left nasal is rather more than half the breadth of the right one. The breadth of the right Intermaxilla is 6 cm. and of the left 4^{cm},5 at anterior part of superior nares.

The cranial cavity is 16^{cm},5 from before back, 23^{cm},5 from side to side, and 16^{cm},5 from above down [1]. The premaxillæ shut out almost completely the maxillæ from the superior narial orifice. The grey *Grampus* approaches *globiocephalus* in the shape of the skull but in the edentulous

[1] Dimensions of brain cavity in a large skull of *Hyperoodon* 23^{cm},5 long × 17^{cm},5 high × 33 cm. wide.

condition of the upper jaw resembles *Mesoplodon Hectori* in which the only teeth present at the apex of the lower jaw are concealed by mucous membrane. The lower jaw has usually 2—6 teeth on each side in front. An adult specimen of this Cetacean has never been stranded, before the present example, in Ireland, so far as one is guided by records, a somewhat uncertain criterion. Small groups have been noted from elsewhere.

Globiocephalus melas Trail. is somewhat rare on the West Coast of Ireland although a shoal of 300 were killed on the Coast of Kerry in 1844. There are several records of their visiting other parts of Ireland. I formed one of a shooting party that tried to get some specimens from a group that visited the North and North East of Ireland some years ago. One was secured for dissection and some interesting points noted in connection with the peritoneum. The specimen now noted for comparison was evidently a stray member of a school which had wandered away from the place where the herd was being hunted. It had received a spear thrust, or an harpoon wound in the side a few feet in front of the tail. It was $6^{m},41$ long, greyish white in colour. The colour was due to a thin pellicle of epidermis which came away leaving the skin black beneath. The globular projecting fat—formed forehead overhung the duck—like beak more than the drawing of Murie's typical specimen would suggest. Seven teeth only appeared on each side. There are however ten sockets in the skull. An edentulous condition seems common in old specimens, sockets, however, appeared after the skull had been cleaned, on each side of the upper jaw and eight sockets on each side of the lower jaw.

The maxillæ bound the narial openings as Owen pointed out, and this takes place anteriorly.

The intermaxillary bones form the apex of the upper jaw, but show only for a short distance in the anterior part of the palate. Widening gradually as they are traced back in the palate, the measure across is $5^{cm},3$ ($2^{cm},6$). This is opposite the second tooth, farther back the surface gets rapidly narrow and the intermaxillary bones do not show beyond a point 8 cm. behind the apex of the jaw. It is very different on the upper surface where these bones form plates that lie on the maxillæ.

The teeth in the upper jaw are set in distinct cup-like cases which appear as if inserted in the upper jaw. The lining ossific deposit in the lower jaw rises only a short distance round the teeth at the base and does not stand out from the bone as happens in the upper jaw. This tendency to extension of the ossification suggests a step toward the formation of composite teeth.

The palatines meet in the middle line of the palate and separate the pterygoids from one another on the palate surface and from the median line.

The reptilian characters of the teeth and lower jaw, — the position of

the occipital condyles and the condition of the premaxillæ, which present an appearance somewhat like the palatine portion of the vomer in some Crocodilia, and have a position like that of the dumb—bell bone in *Ornithorhynchus*—may be here alluded to. FLOWER mentioned that the external bony nares of the Elephant, especially the young Elephant, were in position like similar openings in Cetacea. A comparison of the *Mesoplodon* and Cetacean skulls seems to bear out the suggestions of FLOWER and others that Cetacea and Sirenia are related to the Ungulates or rather to the Elephantine group, « albeit very far back » (LYDEKKER). The formation and mucous membrane of the mouth and the edentalous jaws suggest a resemblance to the Bovidæ. The large cerebral cavity reminds one of the cranial cavity in Proboscidea[1]. The anterior nares look up and are far back in the proboscidean and this holds decidedly for *Mesoplodon*. The rostrum is greatly developed in the latter (in the adult state). In the Elephant and Dugong however this structure, though short, is thick and solid and gets always a special description. The incisor teeth demand a larger supporting bone mass, and it is possible that the disappearance of these teeth may nave led to elongation of the snout by a bony deposit. The figures given of a fossil Elephantine skull preserved in the Museum d'Histoire naturelle at Paris seem to show that some ancient proboscidean groups had trunks intermediate in size between Elephants and Tapirs and one of these which had two tusks in the lower jaw may be taken as one of the nearest relatives, in the Elephantine group, to the ancestors of *Mesoplodon*. It is probable (possible) that the factors that produced the primitive form of trunk in an Elephant produced a cylindrical rostral groove in a *Mesoplodon*. The miniature tusks in the lower jaw of the latter look like the shrunken tusks in lower jaw of *Deinotherium*. The Dugong seems more closely connected with the parentage of the Elephant[2]. The incisors, premaxillæ, aborted nasals, and rostrum all point to relationships with Elephants and whales, besides the placentation, the position of Mammæ and the succession of the molar teeth high up, in the forms. The premaxillæ in these three groups reach high up, (the frontals in Dugongs or Elephants), and the maxillæ although less, massive in *Mesoplodon* for want of teeth are in *Orca* and *Globiocephalus* strong, whilst in the latter the extension of the tooth cases upwards or downwards shows how a composite tooth may lead to separate and smaller teeth. The large maxillæ in the Proboscideans (Elephants) are due to the formation and extension of the great composite molars. This leads to a shrinkage of the alisphenoids and indirectly to shortening of the parietals, below and in front, for the squamosals

[1] KÜKENTHALS brain weights of Cetacea may be compared with that of Elephant.

[2] WOODWARD and ANDREWS.

reach the frontals. If at an early period the osteoblasts transferred their action to the beak, the shrinking teeth could supply the lime salts. The flattening out of the premaxillæ and the manufacture of the rostral cylinder, follow naturally from the altered conditions. The appearance of the vomer in the palate and in the floor of the rostral cylinder is significant in pointing to a still earlier reptilian connection.

The following is the letter announcing the arrival of the *Mesoplodon*.

Dear Sir. A large fish covered with a kind of hairy fur, is reported to be washed ashore at South Aran, its dimensions are length $6^{m},56$, girth $3^{m},75$, will you please inform me of its name and oblige ».

Two Species of *M. bidens (Ziphius Sowerbyi)* were found on the west Coast of Ireland many years ago.

An account of the skull of *Mesoplodon Layardi* is given by Sir William Turner[1] who refers to the observations of Sir William Flower, Dr Hector, Prof. Moseley and Dr. von Haast. The measurements of the skull in some specimens are given and compared with those of a *Ziphius* of New Zealand and one from Shetland and the skull in *Mesoplodon Sowerbyi*. The length of the adult *Mesoplodon Layardi* examined was $1^{m},028$, that of the skull of the young specimen $0^{m},635$. The descriptions had reference to one complete skull and a part of a skeleton, a skull with out the lower jaw and a rostrum. The skull figured is so like the skulls in the Galway Museum, that one can have little difficulty in recognising the relationship. The descriptive particulars given concerning the adult skull correspond in their main feature with those which have been noted with regard to *Mesoplodon Hectori* Gray. Sir William Turner mentions that in the absence of a knowledge of the sex of the individual, it is impossible to draw conclusions with reference to the specific value of the teeth, and has pointed out the generic value of the tympanic bone in enabling one to distinguish between *Ziphius* and *Mesoplodon*.

Mr. Moseleys notes are given. One animal had « large tusks » in the lower jaw. The density of the bone in the second specimen is referred to, the first specimen measured 5^{m} — $5^{m},625$ and the second seems to have been $5^{m},62$. Both specimens were from the cape of Good Hope, a third much smaller $42^{cm},7$ came from the East Falkland Islands. A previously found skull had been described by Dr. Gray and Prof. Owen. Skeletons are mentioned from New Zealand. All the *Mesoplodon Layardi* species are southern.

The mesorostral bone was absent in the third specimen of the first lot because the specimen was immature the lengths given for the mature and young specimens of *Mesoplodon Layardi* correspond (at least the for-

[1] W. Turner. *Report on the Bones of Cetacea collected during the voyage of HMS Chalenger*. London, 1880.

mer) to the length of *Mesoplodon Hectori* Gray. One small *Mesoplodon Hectori*, was rather longer than the smaller one of M. Layard. The beak of the adult *Mesoplodon Layardi,* was very much larger than that of the young specimen (twice the Size). The mesorostral bone was fused to the premaxillæ, near their tips in the adult, so that it was not possible to indicate the amount of the beak apex that was formed by the premaxillæ. The premaxillæ formed the beak in the young specimen. I give the condition with the premaxillæ and mesorostral bone united in *Mesoplodon Hectori*. In *Mesoplodon Layardi* (juv) an elongated mesorostral furrow was seen and a bar of cartilage, in this furrow, which disappeared after maceration, the eburnated bone takes its place afterwards, but no mesorostral bone seems to exist in the young. The growth of this bone is associated with elongation of the beak, this bone becomes fused with the vomer, the maxillæ are more spongy. The surface of section through the beak is compared to a heraldic lozenge, the inferior angle of which was rounded. The vomer appears between the pterygoids. In *Mesoplodon Layardi* the two pterygoids articulated with each other mesially for $10^{cm},2$ from the base of each plate in the adult skull, but these diverged and allowed first the vomer, and then the two superior maxillaries, to appear between them. In the younger skull the mesial articulation, between the two pterygoids was more complete, for the pterygoid intervened at the anterior part. (Turner. *Report on Cetacea of Challenger*).

The extracted tooth in *Mesoplodon Layardi* presented an alveolar end that was jagged at the border and closed. The length of the extracted tooth was $35^{cm},8$, $16^{cm},5$ of which had been included in the alveolus. In *Mesoplodon Hectori* the teeth were short, conical, and concealed beneath the mucous membrane. The pulp cavity existed beneath the proximal end of each small tusk—like tooth. Enamel, dentine and cement were found in the teeth of *Layardi*. Sections of the teeth of Hector's *Mesoplodon* were not examined. In the quotation given by Prof. Turner it will be seen that the teeth are referred to as tusks. A figure of the jaw is given by the courtesy of Prof. Weldon of the Oxford University Museum. Sir W. Turner described the teeth in the Challenger Rep.

In giving an estimate of the value of the parietal when comparing Mammalian groups it may be well to mention that Meckel who examined several fœtal skulls says that the condition usual prevailed in the fœtal Dolphin, a fœtal Narwhal and a fœtal Whale and the parietals are separated by the interparietal where the former bones approximate. The parietals in the Elephant resemble apparently those of the fœtal Cetacea rather than those of the adult, and comparison of the bones in *Platanista* with the parietals in a young Elephant is suggestive[1]. The points

[1] Krause's Festschrift. Internat. Monatssch., Band XXI.

that have been made by Andrews seem to show that the *Sirenia* have several characters that suggest an approximation to the Proboscidian type. The abdominal testes, zonary placentation, non deciduate placentation, Pectoral mammæ, bifid apex of the heart, usual absence of foramen in lower end of humerus, similarity in form of molar teeth etc. and the teeth being pushed forwards in advancing age (Summary by Lydekker in Knowledge). The recent investigations in the early tertiary Proboscidia seem to show a nearer approach of the Proboscidia to the Cetacea than many thought. The lower jaw of *Tetrabelodon* as figured by Woodward in Knowledge is much more like that of *Mesoplodon Hectori* than is the jaw of other Elephants. But the great capacity of the skull cavity seems to point also to an alliance of earlier types, although one can never expect to prove an absolute affinity. The great size of the brain in the Elephants and in the Whales also is not without significance.

The outline drawings made from *Mesoplodon* and *Orca* are in Irish Natur. 1900.

The photographs were made by Dr. White of the Royal College of Surgeons Museum, Dublin, Miss M. K. Andrews of Belfast, Mr. Robinson of Oxford by permission of Prof. Weldon and Mr. Sloan Mills of Galway.

Prof. Ray Lankester of London, formerly of Oxford who is quoted by Turner, has helped me to get a photograph of *Ziphius cavirostrus*, which may make this paper more complete.

I am indebted to the writings of the gentlemen named in this paper.

Prof. Turner says[1] : In *Mesoplodon Layardi* the sphenoid takes but a very small part in the formation of the temporal fossa. The parietal forms the greater part of its floor and in the young skull could be foll owed as a distinct bone situated between the supra occipital and the frontal to the vertex, where it was united by synostosis to its fellow. In the adult, though the outline of the parietal in the temporal fossa could be readily seen, no part could be traced beyond the fossa to the vertex, for it was overlapped by the growth of the supra occipital, so that only the thin edge of the frontal bone appeared in the interval between the supra occipital and the superior-maxillary. The vertex part of the frontal articulated in *M. Layardi* as in *M. Sowerby* with the maxillæ, premaxillæ and nasals anteriorly. The frontal formed the roof of the orbit and had a large post frontal and a small prefrontal process. The malar consisted anteriorly of a flattened piece which articulated with the superior maxillæ and lachrymal, a posterior zygomatic bar that reached beneath the orbit and articulated with the zygomatic part of the temporal. The lachrymal articulated with the preorbital part of frontal, the superior maxillary and the malar in *M. Layardi* and *M. Sowerby*.

[1] Challenger Report, p. 9.

The tympanic is bilobed in *Mesoplodon Layardi* and not in *Ziphius*. (*Delphis* and *Berardius* have the same).

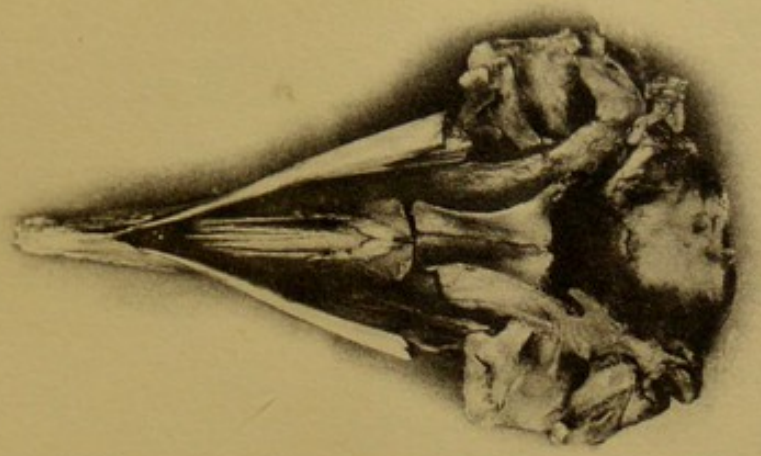
	Longest diameter of petrous	breadth
In *Ziphius Cavirosta*	$6^{cm},2$	$3^{cm},5$
Adult *Mesoplodon Layardi*	$4^{cm},5$	$3^{cm},2$

Internal meatus of petrous, single in young *Mesoplodon*, divided into two in adult *Mesoplodon* and *Ziphius*.

In *Mesoplodon* petrous, mastoid and tympanic differentiated but mastoid and tympanic fused, and separated by a constriction.

EXPLANATION OF PLATE I

Fig. 1. *Mesoplodon hectori* Skull. Lower surface.
Fig. 2. » » » Lateral surface.
Fig. 3. » » » Upper surface.



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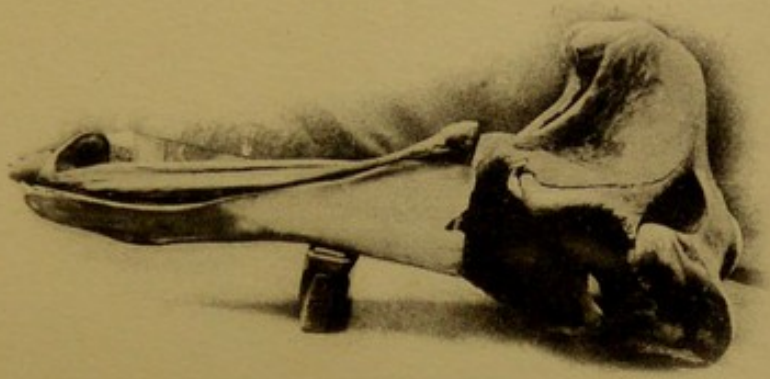

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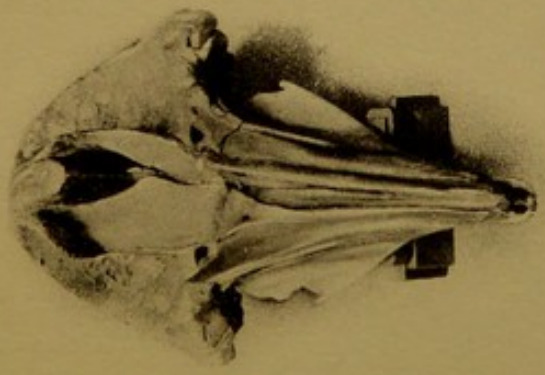

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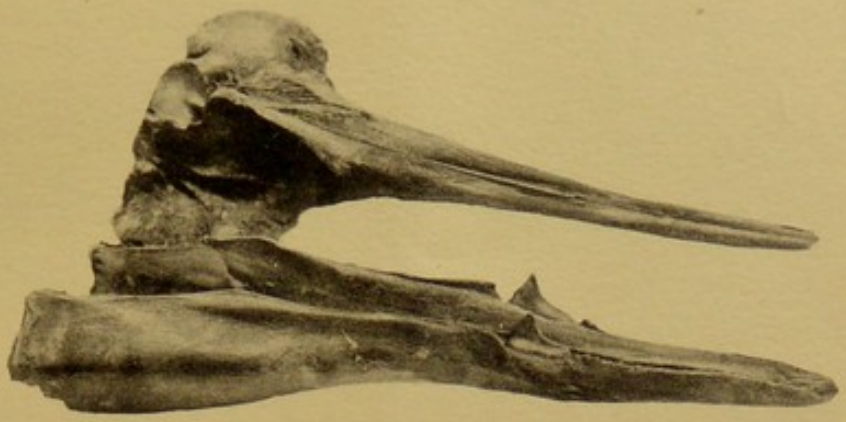
CETACEA

EXPLANATION OF PLATE II

Fig. 1. *Mesoplodon bidens*. Skull. Lower surface and mandible (palate) (Nat. mus.).
Fig. 2. » » » Upper surface showing nasals (Nat. mus.).
Fig. 3. *Mesoplodon Sowerbyi (bidens)* adult. Skull Lateral view.



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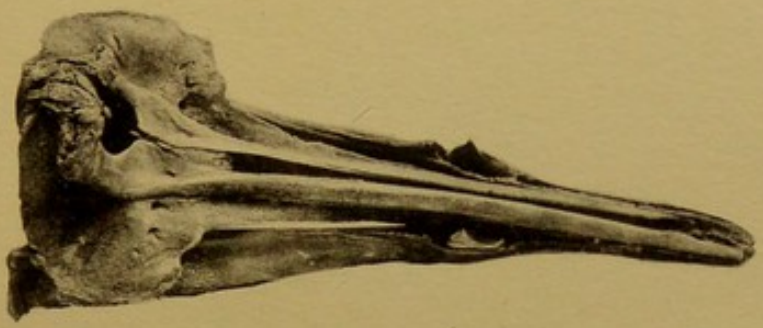

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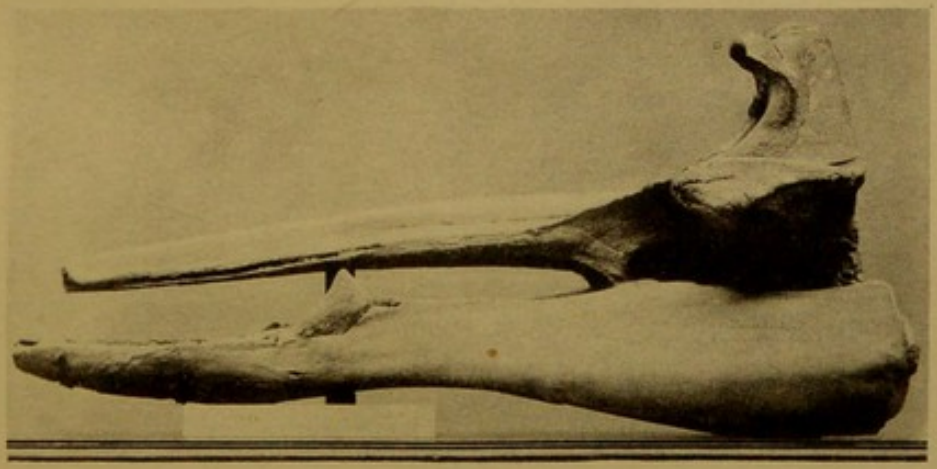

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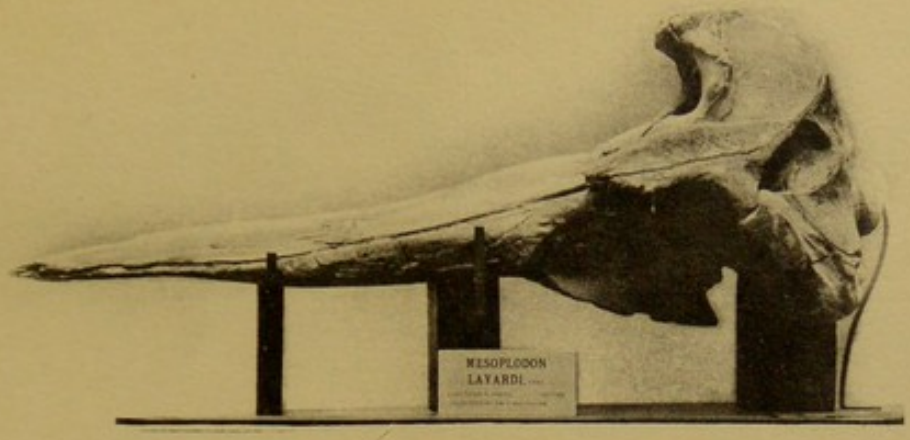
CETACEA

EXPLANATION OF PLATE III

Fig. 1. *Mesoplodon Layardi* Skull. Lateral view. (Oxon).
Fig. 2. » » » Lower surface.
Fig. 3. » » Mandible.



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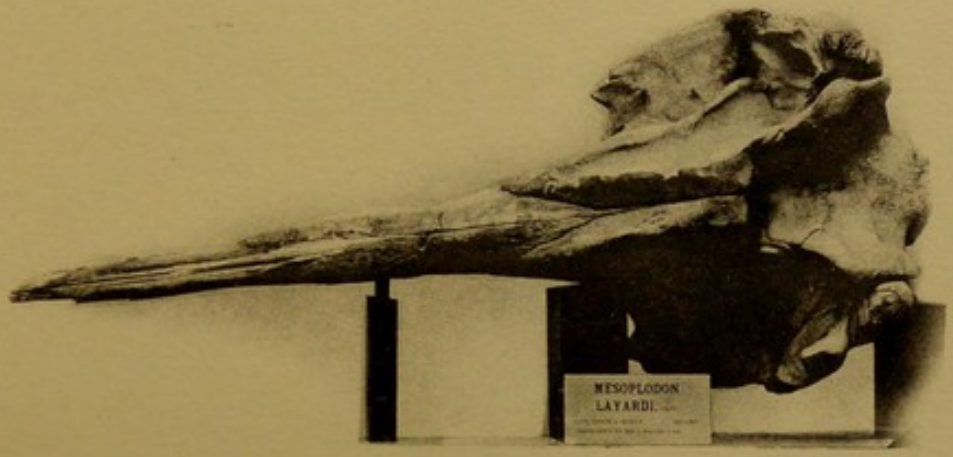

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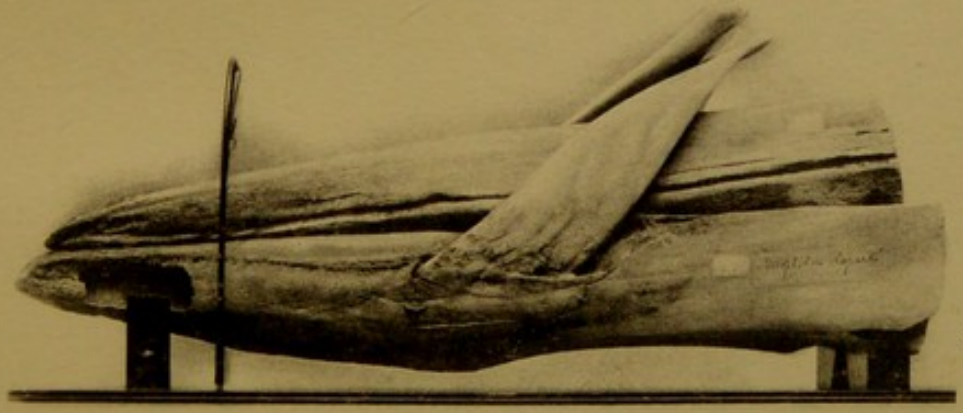

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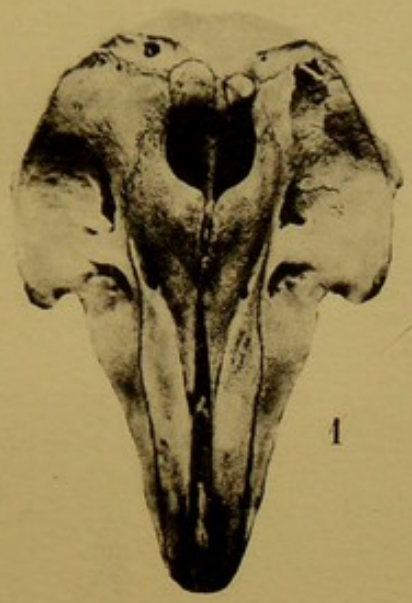
CETAÇEA

EXPLANATION OF PLATE IV

Fig. 1. *Grampus griseus* Skull. Upper surface.
Fig. 2. » » » Lower surface.
Fig. 3. *Phocæna (Globicephalus) melas*. Skull Upper surface.
Fig. 4. » » » » Lower surface.



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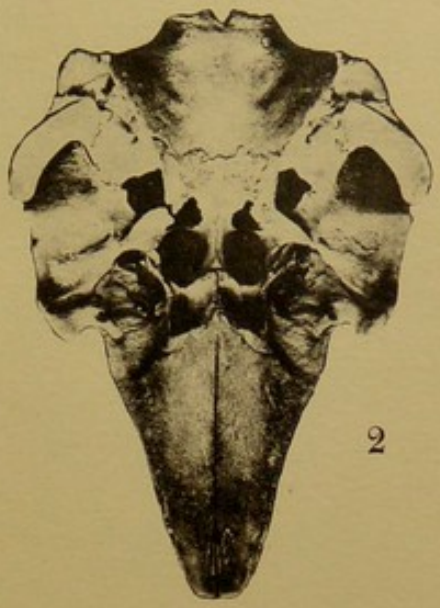

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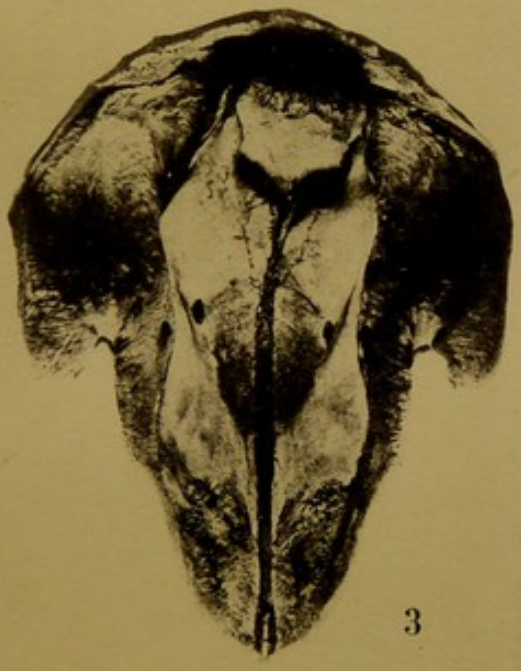

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CETACEA