# BEAUFORTIA

SERIES OF MISCELLANEOUS PUBLICATIONS

ZOOLOGICAL MUSEUM OF THE UNIVERSITY OF AMSTERDAM

No. 177 Volume 14 July 10, 1968

## On a skull of *Peponocephala electra* (Gray, 1846) (Cetacea, Globicephalinae) from Sénégal

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SOMMAIRE

L'examen d'un crâne, dont les mensurations et les dessins sont donnés dans cet article, trouvé à Niodor, Iles du Saloum, République du Sénégal, en 1966, a permis d'identifier un *Peponocephala electra* (Gray, 1846). Cette espèce, assez mal connue, a été trouvée seulement une ou deux fois dans l'Océan Atlantique.

During Whitsuntide 1966 (May, 29 and 30), Mr. Jean le Tallec, Professeur d'Histoire Naturelle at Dakar, found on a refuse heap near the fishing village Niodor (or Niodior) (13° 52′ N, 16° 44′ W), Iles du Saloum, République du Sénégal, the almost complete skull of a dolphin. This skull he brought home to Dakar, where it was examined recently by one of the authors of his note. When it became clear the skull belonged to a rare species, Mr. le Tallec had the kindness to lend it to the authors for a more detailed study.

The skull could be compared with skulls of the same species, present in the collections of the Zoological Museum of the University of Amsterdam and in the Muséum National d'Histoire Naturelle in Paris. For the permission to study the material in the last mentioned collection the authors are indebted to Prof. J. Anthony of the Laboratoire d'Anatomie Comparée.

As mentioned in the title of this paper, the skull found by Mr. le Tallec belongs to a dolphin of the species *Peponocephala electra* (Gray, 1846); synonyms: *Lagenorhynchus electra* Gray, 1846; *Lagenorhynchus asia* Gray, 1846; *Phocaena pectoralis* Peale, 1848; *Delphinus pectoralis* (Peale, 1848); *Delphinus (Lagenorhynchus) fusiformis* Owen, 1866; *Electra obtusa* Gray, 1868 and *Electra electra* (Gray, 1846). Until recently the species was generally known under the name of *Lagenorhynchus electra*, but a careful study by Nishiwaki & Norris showed the species did not belong to the genus *Lagenorhynchus* and in 1966 they created a new genus, *Peponocephala*, for it.

Received: May 20, 1968

*Peponocephala electra* has already been recorded from the Atlantic Ocean. Goodwin (1945 : 195) published detailed data on a mature, male specimen, caught at 3° 03′ N, 24° 40′ W, on October 10, 1912. Skull and skeleton of this animal are in the collection of the American Museum of Natural History, New York. Now that clear photographs are available of this dolphin, it is remarkable to see how accurate the rough sketch is, which the collector, Robert Cushman Murphy, made of this animal.

Older records of the occurrence of this species in the Atlantic Ocean are rather confused and vague. Van Beneden & Gervais (1880 : 597) in their discussion of the genus *Lagenorhynchus* write: "La côte occidentale d'Afrique possède le *Lagenorhynchus asia* (8), dont la présence a été constatée aux Iles Bissagos, situées dans le Golfe du Guinée; un crâne rapporté des îles Hawaï au Muséum par M. Ballieu, paraît aussi lui appartenir. Cette espèce est un peu plus grande que les autres; nous possédons un crâne (9), dont les dents, plus fines, paraissent avoir été au nombre de $\frac{38}{38}$ ou $\frac{37}{37}$,". In the footnotes they write: "(8) *Lagenorhynchus asia* (Pl. XXXXVI, fig. 6). — *Lag. asia* Gray, Catal., 1866, p. 269. Dents de l'exemplaire de M. Ballieu $\frac{22}{24}$; de notre second exemplaire $\frac{22}{?}$," and "(9) Pl. XXXVI, fig. 6."

True (1889 : 102—103) concludes from this, that three distinct specimens are referred to; according to us this is not right. First of all a mistake has been made in the footnotes of the book of van Beneden & Gervais (loc. cit.). Only one skull of *Lagenorhynchus asia* is illustrated, namely on plate XXXVI, fig. 6. Plate XXXXVI does not exist and plate XLVI represents *Orca gladiator*. We suppose the last line of van Beneden & Gervais simply refers to another skull of a dolphin belonging to the genus *Lagenorhynchus*, which is not *L. asia* in view of the number of teeth mentioned.

This explanation agrees also with the findings of True (loc.cit.) and of the authors of this note; in the Paris collection only two skulls of *Peponocephala electra (Lagenorhynchus asia)* can be found. One skull from Hawaii (nr A-3044, leg. Ballieu), the other one without any data (nr A-3089) (this is *perhaps* the skull from the Iles Bissagos). True (1889 : 101, 103) mentions that this last skull (in fact only the calvarium) bears the registration number A-3082. This is a mistake; this number has been given to a large skull of *Tursiops truncatus* (called erroneously *Tursiops aduncus* in the Paris catalogue) from "Cap de Bonne Espérance".

In his compilation work on the fauna of Sénégambie, de Rochebrune (1883 : 194) states: "D'après P. Gervais et Van Beneden (loc.cit. p. 597), ce Cétacé habite la côte de Guinée et l'archipel des Bissagos". In the line above this remark, de Rochebrune defines the distribution of *Lagenorhynchus asia* as: "Rare — Toute la côte, du Cap-Blanc au Cap Verga." A rather free way of citing and interpreting a publication.

The locality or localities where the two skulls described by Gray (1846) come from is or are unknown. The third specimen of this species was caught at Hilo Bay, Hawaii (Peale, 1848); the fourth near Madras, India (Owen,

1869). The two skulls enumerated by van Beneden & Gervais (1880) have already been mentioned. Weber (1923) collected in 1899 four calvaria and two lower jaws on the beach near the fishing village Lamakere, on the island of Solor, Indo-Australian Archipelago. Mohr (1923) reported on two specimens caught at Blache Bay, Bismarck Archipelago (near Rabaul); the preserved heads of these two animals were destroyed during World War II. Dammerman (1924) mentions a damaged skull present in the collection of the Buitenzorg Museum (Museum Zoologicum Bogoriense).

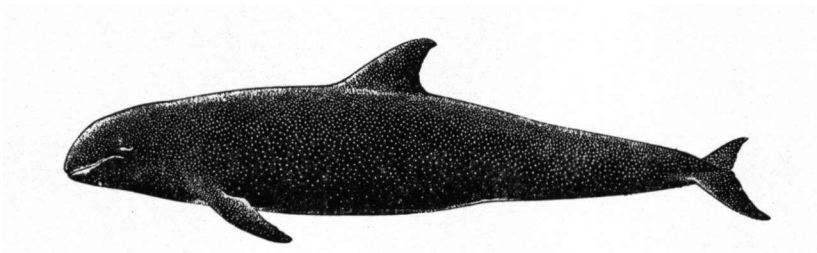

FIG. 1. *Peponocephala electra* (Gray, 1846); after Nishiwaki & Norris, 1966.

Then comes the animal caught in the middle of the Atlantic in 1912 (Goodwin, 1945) followed by the dolphin stranded near Hiratsuka Beach, Japan (Nakajima & Nishiwaki, 1965). A paper on a mass stranding of *Peponocephala electra* on the Australian coast and on material from the island of Gan, Maldive Islands, is in the press (F. C. Fraser & W. H. Dawbin). In 1964 a specimen stranded at Hawaii (Nishiwaki & Norris, 1966), while in 1965 a large number of *Peponocephala electra* were caught in the Surunga Bay, Japan (Nishiwaki & Norris, 1966). A fourth specimen from Hawaii belonging to this species was captured in 1965 (Nishiwaki & Norris, 1966). Recently W. F. J. Mörzer Bruyns (in litteris) reported on a group of about 15 dolphins most probably belonging to the species *Peponocephala electra*. The animals were observed between the Society Islands and the Marquesas Islands (Pacific) on January 18, 1968. In about the same area Captain Mörzer Bruyns saw this species in 1962, 1964 and twice in 1967 too.

From the foregoing data on the localities where *Peponocephala electra* have been caught or found, it becomes clear the species has a world-wide distribution. Roughly we can say, it occurs in tropical and subtropical waters and strandings on the coasts of northern South America and Central America may be expected. We therefore consider the vernacular name "Hawaiian Porpoise" given to this species by Nishiwaki & Norris (loc.cit.) rather unluckily chosen; their second name, "Many-toothed Blackfish", is more appropriate.

According to Goodwin (1945) and Nishiwaki & Norris (1966) specimens of this species have a length of from 169 to 273 cm. The dolphins are almost entirely black or very dark grey, except for light grey areas on the throat and the belly and the white lips (see fig. 1).

TABLE I. Dimensions (all in mm) of calvaria of *Peponocephala electra*. The specimens ZMA 8022 to ZMA 8025 are from the island of Solor (Weber, 1923).

| | Sénégal | Paris A-3044 | Paris A-3089 | ZMA 8022 | ZMA 8023 | ZMA 8024 | ZMA 8025 |
|---|---|---|---|---|---|---|---|
| Total length of skull (mm) | 448 | 451 | 456 | 457 | 428 | 459 | 417 |
| Rostrum length | 240 | 244 | 253 | 246 | 232 | 246 | 127 |
| Rostrum, basal width | 139 | 129 | 138 | 134 | 128 | 138 | 127 |
| Rostrum, width 60 mm anterior to base | 109 | 109 | 117 | 106 | 100 | 110 | — |
| Rostrum, width at its middle | 93 | — | 99 | 79 | 72 | 88 | — |
| Breadth across pre-orbital angles of supra-orbital processes | 234 | 228 | 247 | 234 | 228 | 246 | 221 |
| Breadth across post-orbital angles of supra-orbital processes | 255 | 251 | 262 | 245 | 241 | 260 | 231 |
| Zygomatic width | 252 | 245 | 263 | 247 | 240 | 255 | — |
| Width of braincase across parientals | 190 | 185 | 201 | — | ±174 | — | — |
| Maximum width of premaxillae | 93 | 92 | 108 | 91 | 84 | 93 | 85 |
| Length upper toothrow (right side) | 162 | 176 | 180 | — | 169 | 188 | — |
| Length upper toothrow (left side) | 171 | 174 | 183 | — | 164 | 187 | — |
| Length temporal fossa | 94 | 77 | 87 | — | 66 | — | — |
| Height temporal fossa | 67 | 58 | 70 | — | 51 | — | — |
| Number of alveoli | 24—24 | 22—23 | 23—24 | 22—? | 19—21 | 20—24 | ?—? |

TABLE II. Dimensions of calvaria of *Peponocephala electra* in terms of percentages of the total lengths of the calvaria.

| | Sénégal | Paris A-3044 | Paris A-3089 | ZMA 8022 | ZMA 8023 | ZMA 8024 | ZMA 8025 | range | mean |
|---|---|---|---|---|---|---|---|---|---|
| Total length of skull | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | |
| Rostrum length | 53.6 | 54.1 | 55.5 | 53.8 | 54.2 | 53.6 | 54.4 | 53.6—55.5 | 54.2 |
| Rostrum, basal width | 31.0 | 28.6 | 30.3 | 29.3 | 29.9 | 30.0 | 30.4 | 28.6—31.0 | 29.9 |
| Rostrum, width 60 mm anterior to base | 24.3 | 24.2 | 25.7 | 23.2 | 23.4 | 23.9 | — | 23.2—25.7 | 24.1 |
| Rostrum, width at its middle | 20.7 | — | 21.4 | 17.3 | 16.8 | 19.2 | — | 16.8—21.4 | 19.1 |
| Breadth across pre-orbital angles of supra-orbital processes | 52.2 | 50.6 | 54.2 | 51.2 | 53.3 | 53.6 | 53.0 | 50.6—54.2 | 52.6 |
| Breadth across post-orbital angles of supra-orbital processes | 56.9 | 55.7 | 57.4 | 53.6 | 56.3 | 56.6 | 55.4 | 53.6—57.4 | 56.0 |
| Zygomatic width | 56.2 | 54.3 | 57.6 | 54.0 | 56.0 | 55.6 | — | 54.0—57.6 | 55.6 |
| Width braincase across parientals | 42.4 | 41.0 | 44.0 | — | ± 40.7 | — | — | 40.7—44.0 | 42.0 |
| Maximum width of premaxillae | 20.8 | 20.4 | 23.6 | 19.9 | 19.6 | 20.3 | 20.4 | 19.6—23.6 | 20.7 |
| Length upper toothrow (right side) | 36.1 | 39.0 | 39.5 | — | 39.5 | 40.9 | — | 36.1—40.9 | 39.0 |
| Length upper toothrow (left side) | 38.1 | 38.6 | 40.1 | — | 38.3 | 40.7 | — | 38.1—40.7 | 39.2 |
| Length temporal fossa | 21.0 | 17.1 | 19.0 | — | 15.4 | — | — | 15.4—21.0 | 18.1 |
| Height temporal fossa | 14.9 | 12.9 | 15.3 | — | 11.9 | — | — | 11.9—15.3 | 13.7 |

Rather small black-coloured dolphins looking like young Pilot Whales (*Globicephala macrorhyncha*) were seen more than once in southern Sénégal waters. Although now a skull of *Peponocephala electra* has been found, it may not be concluded the sight records concern only this species. *Pseudorca crassidens* and *Feresa attenuata* may occur also in the same region. A skull of the last mentioned species has already been found (Cadenat, 1958; Fraser, 1960).

The dimensions of the skull found near Niodor, Sénégal, are given in the tables I to III. For comparison the dimensions of the skulls present in the Amsterdam and Paris collections are also published. The calvaria in the first mentioned collection are rather damaged. The braincases were smashed to obtain the brains for food. The mandibles, registered separatey, probably

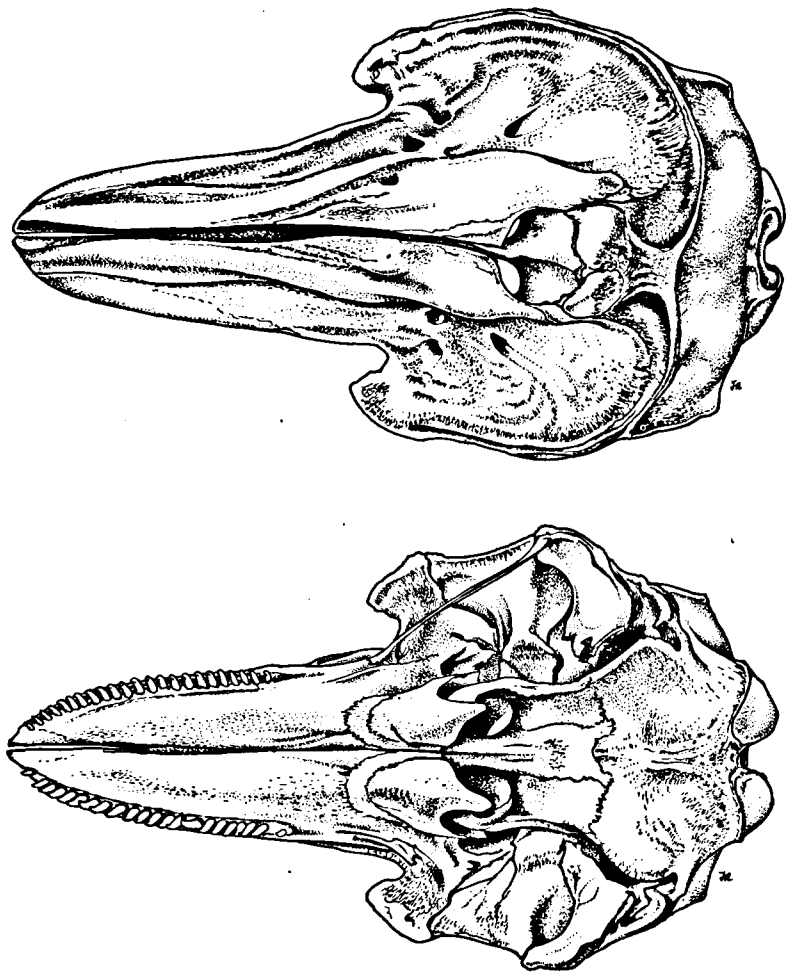

FIG. 2. Calvarium of the Sénégal specimen of *Peponocephala electra*. Jos Ruting del.

belong together; it is, however, unknown to which calvarium they belong. In this paper the term calvarium is used, sensu Duerst (1926 : 231), viz. skull without mandibles. It is remarkable to note how small the differences are between the measurements of the seven skulls coming from widely separated localities (see table II in particular).

We can add little to the description of the skull of *Peponocephala electra (Lagenorhynchus asia)* as given by Gray (1846 : 35—36) and True (1889 : 173—174). True writes: "Mesethmoid cartilage ossified in front of the nares

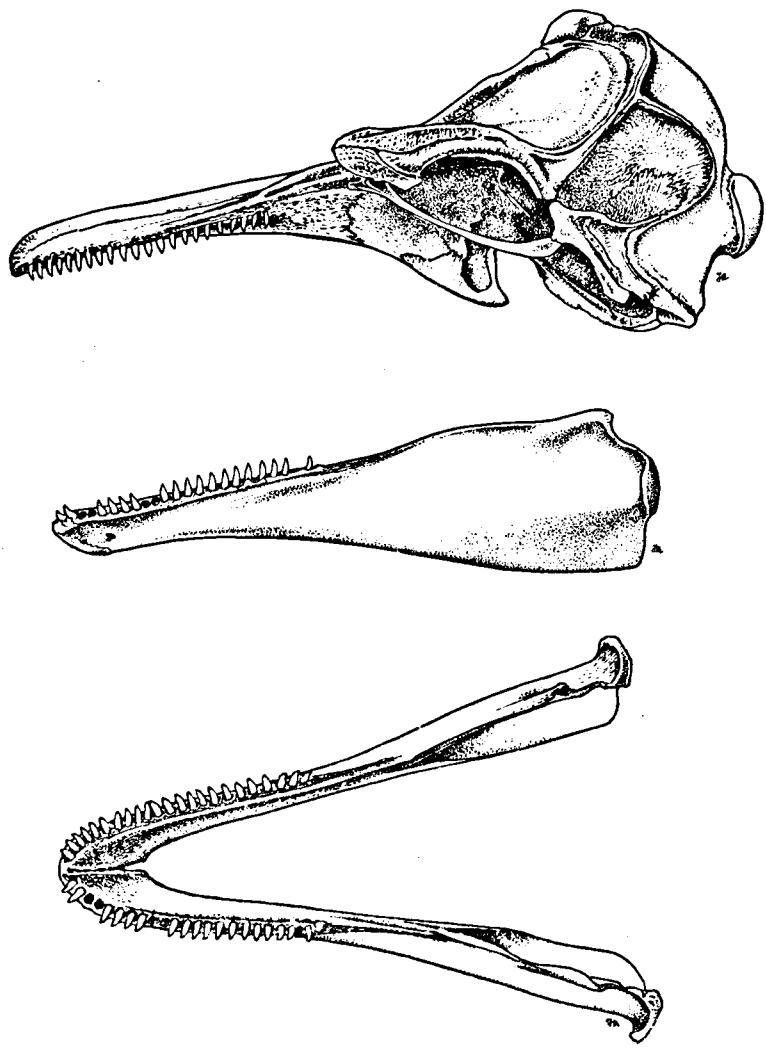

FIG. 3. Calvarium and mandibles of *Peponocephala electra* from Sénégal. Jos Ruting del.

to a point anterior to the maxillary notches, forming part of the superior surface of the skull". However, this ossification is not found in every skull of *Peponocephala electra*. Our skull from Sénégal does not show it, but in the skull ZMA 8023 this ossification went so far the sutures between the ossified mesethmoid and the premaxillae have disappeared over a certain distance. We have the impression this ossification is related to the age of the animals. All the skulls seen by us belong to full-grown dolphins in view of the ridges (small crests) on top of the skulls near the sutures between the frontals and the supra-occipitals. This ridge has not yet been formed on the skull of a young specimen of *Peponocephala electra* stranded at Kahuhu, Hawaii, on June 27, 1964 (see plate V in Nishiwaki & Norris, 1966).

Since not so many drawings or photographs of skulls of *Peponocephala electra* are known, we thought it useful to publish the drawings of our Sénégal skull (figs. 2 to 3).

As indicated in the title of this paper, we consider *Peponocephala electra* as belonging to the subfamily Globicephalinae. Although Gill in 1872 used for the first time the name of this subfamily, it was Slijper (1936 : 556), who gave a clear definition of this subfamily in describing the synonymous subfamily

TABLE III. Dimensions of mandibles of *Peponocephala electra*.

| | Sénégal | Paris A-3044 | ZMA 8026 | ZMA 8027 |
|---|---|---|---|---|
| Length mandible . . . . . | 360 | 370 | 364 | — |
| Length mandible in % of total length of skull . . . . . | 80.4 | 82.0 | — | — |
| Height mandible at coronoid . . . | 90 | 89 | 81 | — |
| Height mandible at coronoid in % of total length of skull . . . . . | 20.0 | 19.7 | — | — |
| Length of lower toothrow (right side) | 169 | 177 | 175 | — |
| Length of lower toothrow (right side) in % of total length of skull . . | 37.7 | 39.2 | — | — |
| Length of lower toothrow (left side) | 169 | 171 | — | 170 |
| Length of lower toothrow (left side) in % of total length of skull . . . | 37.7 | 37.9 | — | — |
| Number of alveoli . . . . . | 23—23 | 22—24 | 23— | —24 |

Orcinae. To this subfamily (see also Fraser & Purves, 1960) belong the following genera: *Orcinus* Fitzinger, 1860, *Pseudorca* Reinhardt, 1862, *Orcaella* Gray, 1866, *Globicephala* Lesson, 1828, *Feresa* Gray, 1870 and *Peponocephala* Nishiwaki & Norris, 1966.

To terminate these notes the authors want to thank most sincerely again Mr. Jean le Tallec for enabling them to study the skull he found. The first author gratefully acknowledges also the financial aid he received from the Royal Netherlands Academy of Sciences (Melchior Treub Fonds), making it possible to study skulls of Cetacea in Sénégal.

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