

Short notes and reviews

## A subfossil half-mandible of a Grey Seal

P.J.H. van Bree<sup>1</sup> & D.P. Bosscha Erdbrink<sup>2</sup>

<sup>1</sup>Zoological Museum, University of Amsterdam, P.O. Box 94766, 1090 GT Amsterdam,  
The Netherlands; <sup>2</sup>Prinses Marielaan 27, 3743 JA Baarn, The Netherlands

Keywords: Mammalia, Pinnipedia, *Halichoerus grypus*, archeozoology

### Abstract

The fortuitous discovery, in the collections of the National Museum of Natural History at Leiden, of a probably subfossil right half-mandible of a Grey Seal is reported. A short description of the piece is given and it is compared with some other recent, subfossil and fossil material.

While recently checking the collections of the National Museum of Natural History at Leiden for fossil odobenid material, the first author encountered an interesting specimen. It consists of an almost complete right half-mandible (Fig. 1, A, B) of a fairly large seal, still containing three teeth:  $P_3$ ,  $P_4$ , and  $M_1$ . Its colour, 10 YR 6/4 (dull yellow orange, according to the revised Munsell scale; Oyama et al., 1967) and its relatively modest weight, would indicate its subfossil state of conservation. The accompanying labels from the palaeontological collection of the former "Rijksmuseum van Geologie en Mineralogie" at Leiden (now amalgamated with the former "Rijksmuseum van Natuurlijke Historie" into the "Nationale Natuurhistorisch Museum") furnish scanty information. It bears the number (St.) 123418, is booked as *Phoca* spec., and has been collected by dr. W.G.N. van der Sleen at the *terp* (artificial dwelling mound) of Midlum near Harlingen in the province of Friesland (Fig. 2). Recent data on the *terp* can be found in an article by Ufkes (1994). The specimen was donated to the Leiden museum on the seventh of April, 1965 by the Zoological Museum of Amsterdam. Nothing appears to have been recorded regarding its date of collection or its exact stratigraphical location in the mound, so that its true age remains unknown.

When describing the specimen, two small artificially damaged areas should be mentioned first. At a point some 25 mm behind  $M_1$  one may observe a set of two parallel five mm long incisions. They stand at a distance of six mm from each other at the base of the gradual curve from the horizontal into the vertical mandibular ramus.

The cutting marks are clearly of an ancient nature and have been made at right angles to the long axis of the mandible. A second point of damage consists of an almost circular hole with a diameter of some four mm, situated at 23 mm below the tip of the coronoid process. This hole also gives the impression of having been anciently made, perhaps to thread a string or thong through it.

In front the half-mandible ends at the symphyseal plane. Somewhat mesially to the canine alveolus, which has slightly damaged edges, one sees the alveolus for (presumably)  $I_3$ . Alveoli for the first and second incisors cannot be recognized with sufficient certainty. Behind the canine alveolus a single alveolus for  $P_1$  is encountered, in which part of the broken root still lodges. Distally an also single alveolus for  $P_2$  can be observed, behind which follow the present three dental elements that have

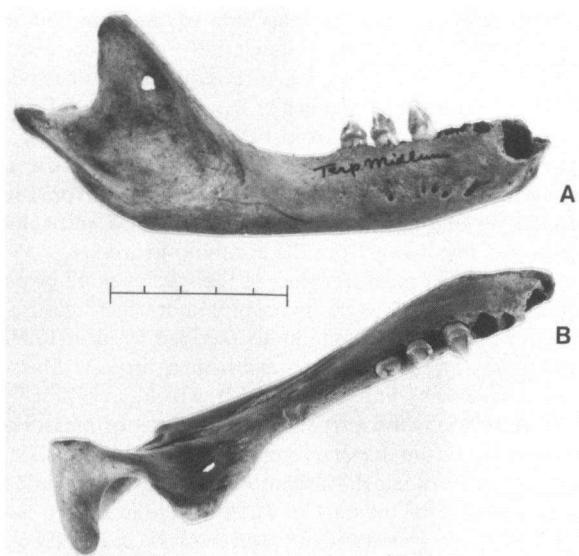


Fig. 1. (A) Vestibular (external) aspect and (B) occlusal aspect of mandible St. 123418.



Fig. 2. Sketch map indicating the location of the Midlum *terp*.

already been mentioned. Of these, the  $P_3$  appears to have a single root while  $M_1$  possesses a double root.  $P_4$  seems to occupy an intermediate position with respect to this feature, because it displays a single root morphology at its lingual side but a double root on the vestibular side. All three unicuspids teeth have crowns which are entirely surrounded by basal cingula, most strongly developed at their lingual sides. Sagittal crests run over each tooth from front to back. In these cristae one encounters accessory cusps at the distal side of  $M_1$ , at the distal and mesial sides of  $P_4$ , and at the mesial side of  $P_3$ . The colour gradation of the dental enamel is almost identical to that of the rest of the subfossil specimen, 10 YR 6/3.

On the vestibular (external) side of the mandibular bone a series of five subequal mental foramina occurs: a slightly larger one below  $P_2$ , three equal-sized ones below  $P_3$ , and a single one below  $P_4$ . An additional foramen is present quite in front below the alveolus for  $I_3$ . The foramen mandibulae is relatively small and situated at the intersection of a line projected backwards from the upper rim of the horizontal ramus, and of a vertically projected line down from the coronoid process.

A number of measurements of the specimen are given in Tables I and II. Also incorporated are the measurements of a fossil half-mandible described by us in 1987, and those of a subfossil specimen from a *terp* near Marssum described by Van Giffen (1913), which, according to Clason (1988) is the *terp* of Ritsuma. A set of measurements taken from thirteen recent Grey Seals in the collection of the Zoological Museum Amsterdam are included as well. Some of the data in Table I were measured according to the procedures advised in Desse et al. (1986), which, in turn, is based on the well-known paper by Von den Driesch (1976). We are, however, not convinced of

the fact that the mandibular measurements of carnivores (Desse et al., op. cit., 116–120) make sense without exception.

A discussion of the Midlum specimen can be brief. The description of the subfossil find from Marssum by Van Giffen might almost have served as a model for that given by us above, with the important difference that his specimen still possessed all its dental elements but for the incisors. The size of the canine alone already indicates that the Marssum jaw belonged to a male, as Van Giffen concluded. Its other measurements only serve to underline this. On the whole they correspond well with those taken by us from the fossil described in 1987, which therefore probably is also a male. General size and dental morphology, following the anatomical arguments selected by Van Giffen (op. cit.: 98–100) from, respectively, De Blainville, Bronn, and Allen, constitute sufficient arguments for a determination of the subfossil from Midlum as a half-mandible of *Halichoerus grypus* (Fabricius, 1791), the Grey Seal. The sexual dimorphism occurring in the Grey Seal, mentioned by us in 1987 would, moreover, account for the possible allocation of the smaller jaw in the Leiden collection to the female sex. Another procedure may nevertheless result in a different conclusion. If the robusticity of a jaw is taken to represent the sex of an individual, an index (see Table I) consisting of  $100 \times$  the mandibular length divided by the height of the horizontal ramus at  $P_3$  (therefore: Desse  $1 \times 100/\text{Desse } 23$ ) expresses this exactly. A series of nine recent male and four female Grey Seals shows that the value of this index lies between 650 and 723.22 for females, and between 535.10 and 632.23 for males. Our subfossil specimen from Midlum has an index of 603.64, which would indicate that it is a (small) male.

The circumstance that the Grey Seal, as a species, was no rarity in prehistoric, protohistoric, and historical times along the Dutch coast, a fact pointed out by Van Bree et al. (1992) and added to by Clason & Zeiler (1993), should again be stressed. This matches the general situation in the countries of northwestern Europe as described by Clark (1946).

Grey Seals give birth on land and young seals stay there for at least three weeks during which period they are nursed. It is therefore rather easy to kill young seals and their mothers. On the island of Hesselø in the Kattegat between Denmark and Sweden, most probably the site of a large breeding colony of Grey Seals, wooden clubs have been found that were used by prehistoric men to kill seals (Møhl, 1970). Harpoons were furthermore used, and also nets were set up into which the seals were driven; a method still used in the Netherlands on the former island of Rottum at the beginning of the nineteenth century ('t Hart et al., 1995).

As a result of excessive hunting the Grey Seal disappeared from the coasts of continental western Europe except for some small colonies around Brittany (Van Bree,

**Table I.** Mandibular measurements (in mm) and data of two subfossil, one fossil, and thirteen recent Grey Seals, and their respective robusticity indices. D. = Desse et al. (1986; table on page 117); ZMA = Zoological Museum Amsterdam.

Coll. no.	Mandibular length (D. no. 1)	Height of vertical ramus (D. no. 21)	Horizontal width of processus condyloideus	Height of horizontal ramus at $P_3$ (D. no. 23)	Height at $P_1$	Mandibular angle (on inner side)	Individual age (in years)	Sex	Robusticity index [(D. 1/D. 23) × 100]
St. 123418	166	69.7	32.5	27.5	25	126°	–	♂?	603.64
Marssum	± 160	–	–	32	34	± 135°	–	♂	500
St. 137941	183	> 91	± 30	34	28	127°	–	♂?	538.24
ZMA 2744	184.2	78.5	39.4	30.0	28.1	–	9–10	♂	614
ZMA 14.514	184.4	72.3	32.4	30.2	27.0	–	5–6	♂	610.60
ZMA 14.538	191.1	87.5	42.2	35.2	34.6	–	8–9	♂	542.90
ZMA 20.159	207.5	97.4	47.0	38.3	36.5	–	–	♂	541.78
ZMA 20.209	162.5	66.8	31.7	28.8	27.0	–	–	♂	564.24
ZMA 20.363	153.0	61.1	28.2	24.2	20.8	–	–	♂	632.23
ZMA 15.986	181.4	90.2	39.7	33.9	32.2	–	–	♂	535.10
ZMA 11.655	180.5	95.8	35.5	30.6	24.7	–	7–8	♂	589.87
ZMA not reg.	184.3	84.4	37.7	31.1	30.5	–	y. ad.	♂	592.61
ZMA 668	162.0	68.0	31.4	22.4	23.2	–	15–17	♀	723.22
ZMA 19.293	145.0	60.0	26.8	21.8	19.4	–	–	♀	665.14
ZMA 23.310	145.6	52.4	27.9	22.4	18.6	–	–	♀	650
ZMA 24.717	166.2	70.0	30.5	25.2	20.6	–	lact.	♀	659.52

**Table II.** Dental measurements (in mm) of one fossil and two subfossil Grey Seals (x = alveolar measurement).

	St. 123418	St. 137941	Marssum (Van Giffen, 1913)
C <sub>inf</sub> mesio-distal	10.6*	13.3*	10.4
C <sub>inf</sub> vestibular-lingual	14.0*	12.2*	12
P <sub>1</sub> mesio-distal	5.3*	6.6*	6
P <sub>1</sub> vestibular-lingual	6.7*	6.8*	5
P <sub>2</sub> mesio-distal	8.2*	10.1*	8
P <sub>2</sub> vestibular-lingual	7.6*	9.3*	6.4
P <sub>3</sub> mesio-distal	8.0	8.8	9.4
P <sub>3</sub> vestibular-lingual	6.8	6.0	7
P <sub>4</sub> mesio-distal	8.2	9.9*	9.3
P <sub>4</sub> vestibular-lingual	6.4	8.0*	6.8
M <sub>1</sub> mesio-distal	8.8	–	9.8
M <sub>1</sub> vestibular-lingual	6.2	–	6.4

1972). It became rather rare around Great Britain and Ireland. But protective laws (in the United Kingdom the Grey Seal Protection Acts of 1914 and 1932, see Nigel Bonner, 1982) changed the situation and nowadays new breeding colonies appear in many places. In the Netherlands there is at present a breeding colony of Grey Seals on the high-lying tidal flat named "Richel" near the island of Terschelling. In the spring of 1994, 245 Grey Seals

were counted there, 25 of which were born during the preceding winter.

We want to express our gratitude to the authorities of the National Museum of Natural History at Leiden for permission to describe this interesting subfossil specimen. Mrs Ph. van der Sande's aid in textual matters is gratefully acknowledged. Photographers and draughtsmen of the Optical Processing department of the Faculty of Biology, Utrecht University, who provided the illustrations, should receive our thanks, as always.

## References

- Bree, P.J.H. van, 1972. On a luxation of the skull-atlas joint and consecutive ankylosis in a Grey Seal, *Halichoerus grypus* (Fabricius, 1791), with notes on other Grey Seals from the Netherlands. *Zool. Meded.*, 47 (25): 331–336, 2 pls.
- Bree, P.J.H. van & D.P. Bosscha Erdbrink, 1987. Fossil Phocidae in some Dutch collections (Mammalia, Carnivora). *Beaufortia*, 37 (3): 43–66, pls. I–V.
- Bree, P.J.H. van, E.J. Vedder & L. 't Hart, 1992. Terug van weggeweest. De grijze zeehond in Nederland. *Zoogdier*, 3 (4): 11–15.
- Clark, J.G.D., 1946. Seal-hunting in the Stone Age of north-western Europe: a study in economic prehistory. *Proc. prehist. Soc.*, 12 (2): 12–48.

- Clason, A.T., 1988. De Grijze Zeehond, *Halichoerus grypus*. In: M. Bierma, A.T. Clason, E. Kramer & G.J. de Langen (eds.), *Terpen en wierden in het Fries-Groningse kustgebied*: 234–239 (Wolters, Noordhoff/Forsten, Groningen).
- Clason, A.T. & J.T. Zeiler, 1993. De grijze zeehond in Nederland: een aanvulling. *Zoogdier*, 4 (2): 33.
- Desse, J., L. Chaix & N. Desse-Berset, 1986. "Ostéo". Base-réseau de données ostéométriques pour l'archéozoologie. Centre de Recherches Archéologiques du C.N.R.S., Notes et monographies techniques, 20: 1–161 (Editions du CNRS, Paris).
- Driesch, A. von den, 1976. A guide to the measurement of animal bones from archaeological sites. Peabody Mus. Bull., 1: 1–137.
- Giffen, A.E. van, 1913. Die Fauna der Wurten. Onderzoeken verricht in het Zoölogisch Laboratorium der Rijksuniversiteit Groningen, 3: 1–167, pls. 1–IX (Ph.D. thesis; E.J. Brill, Leiden).
- Hart, L. 't, E.J. Vedder & P.J.H. van Bree, 1995. Wanneer werd de Grijze Zeehond, *Halichoerus grypus* (Fabricius, 1791) in Nederland uitgeroeid? *Zoogdier*, in press.
- Møhl, U., 1970. Fangstdydrene ved de Danske strande: den zoologiske baggrund for harpunerne. KUML (Årbog for Tysk Arkæologiske Selskab), 1970: 297–329.
- Nigel Bonner, W., 1982. Seals and man – A study of interactions: i–xii, 1–170 (Washington Sea Grant Publication [Univ. of Washington Press], Seattle & London).
- Oyama, M., H. Takehara & Y. Ooi, 1967. Revised standard soil color charts: 1–12, pls. 1–17 (Tokyo).
- Ufkes, A., 1994. Nieuwe gegevens betreffende de muntvondst van Midlum van 1925. *Palaeohistoria (Acta et Communicationes Instituti Bio-Archaeologicci Universitatis Groninganae)*, 33/34 (1991/1992): 229–309.

Received: 9 June 1994