

Carnivora from Salland

A last word from D.P. Bosscha Erdbrink

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Summary

"Fossil carnivora from Salland" is dedicated to the late Dr. D.P. Bosscha Erdbrink and describes the carnivore fossils suction dredged since 1998 at the location De Hogeboek in the Province Overijssel in the Netherlands. The private Brewer collection contains among others, fossils from wolf and /or dog, cave hyena, cave lion and brown bear. Since the collection originates solely from the Hogeboek site and J.G. Brewer is the only licensed collector, attempts of statistical nature reveal a ratio "others to carnivores" of 100 : 1. As was concluded in earlier publications, the fossils can be ascribed to late Eemian or early Weichselian.

Samenvatting

De " Fossiele carnivoren van Salland" is geschreven ter nagedachtenis aan en als blijk van waardering voor de bijdragen van wijlen Dr. D.P. Bosscha Erdbrink aan *Cranium* en de *Werkgroep Pleistocene Zoogdieren*. Vondsten, sinds 1998 uit de zandwinning Hogeboek bij Raalte (Ov.), worden hier beschreven. Deze fossielen uit de collectie Brewer omvatten: wolf c.q. hond, de grottenhyena, de grottenleeuw en de bruine beer. Omdat de vondsten afkomstig zijn van één en dezelfde locatie en Brewer de enige verzamelaar is, is in een poging tot een uitspraak van statistische aard geconcludeerd dat de verhouding fossiele zoodieren vondsten "andere fossiele zoogdieren tot carnivoren" uitkomt op 100:1. In eerdere publicaties was al aangetoond dat het hier gaat om materiaal uit het late Eemien en het vroege Weichselien.



Dr. D.P. Bosscha Erdbrink

July 2, 2004 my uncle Dirk Pieter Bosscha Erdbrink passed away. It had been agreed between us that the carnivores found at the location Hogebroek would deserve special attention. In the process of sorting his scientific papers I found the beginnings of a manuscript which the present authors have completed below. Charlie Schouwenburg, co author, and others, described Bosscha Erdbrink as a pioneer, especially in the early days of this Journal. With his rare gift of the written scientific word he assisted many amateur "paleontologists" in their first attempts to publish. In *Cranium* you will find numerous publications of his hand.

As a boy he had the privilege to meet the famous priest paleontologist Pierre Teilhard de Chardin in Java (Indonesia). Later, they met once more in France. I am sure he was also greatly motivated when he met Abbé Breuil, the foremost authority on Paleolithic cave art, during his study in Leiden. In March 1953 he took his degree cum laude producing a nearly 600 pages- rich thesis. The manuscript: "A review of fossil and recent bears of the old world" is still used as reference in many papers. Prof. Dr. G.H.R. von Koenigswald presented him. During his scientific career he produced more than 100 major publications.

Introduction

In an earlier publication (Bosscha Erdbrink *et al.*, 2001), particulars have been related of the site: a sandpit known as the Hogebroek. Sand and gravel is being pumped up from below the groundwater-table by a suction dredger. Due to Provincial regulations it is not allowed to dredge deeper than 20 meters below the actual ground level. This exploitation started about 1998 and will proceed for many years to come. The fossil bones and bone fragments were regularly collected and stored in the private Brewer collection in Raalte. The material collected originated from a particular level of clay lenses defined by Raymond van der Ham *et al.* (2008) as the late Eemian pollen zone E5b of the Carpinus phase in the Zutphen Member of the Kreftenheye Formation (de Mulder *et al.* 2003) as well as from later sediments. These clay lenses are found 10 to 14 meters below ground level.

The abundantly present remains of different herbivores, mainly Cervidae and Bovidae quite naturally indicate an attraction for numerous and varied carnivores that existed there during a number of short upper Weichselian warm periods (particularly, the Oerel and Glinde (Moershoofd), the Hengelo and the Denekamp interstadials, all within 51.000 to 32.000 years BP). The Brewer collection contains bear remains (*Ursus spelaeus* and /or *Ursus arctos*), lion (*Panthera leo spelaea*), hyenas (*Crocota crocota spelaea*) and wolves (*Canis lupus* spp.). As such the variety of fossil remains found does not differ from similar sites in the area, (van Uum 2003). In this case however the material in the collection is numerous, more than 2000 identified specimens, all collected within an area of a few acres. Together with the fossil bone material fossilized wood, seeds and other plant remains were collected by J.G. Brewer, (van der Ham *et al.*, Stone *et al.*). Smaller carnivores (foxes and badgers), must have been present too, but the only indication found so far consists of a fragment of a right femur (HB 117) with evident traces of having been scraped internally by the incisors of a

small carnivore with a pointed muzzle.

Inspection of the whole collection for carnivore indentations gave a poor yield of affected bone material. Since the whole collection consists of fossil bones and fragments from only one location, the size of the different populations in relation to one another can only be speculated upon. In relative quantities the amount of carnivorous material in relation to the total collection up to now amassed (since 1998) thus proves to be very small indeed (approx. 1: 100).

Description and identification

Brown bear (*Ursus arctos*)

The bear fossils found comprise a left mandible with canine, HB115, two humeri, HB418 and HB1650, a left ulna, HB69 and a third cervical vertebra, HB1919 (see fig. 1).

The assumption that cave bear finds were extremely scarce in the lowlands and brown bear characteristics of the mandible and the almost complete ulna are evident, made us decide to determine the material as *Ursus arctos*.

The damage to the mandible is extensive. Only one damaged canine is in place. The mandible is fractured at the level of the second true molar leaving a diagonal fracture face. A breakage at the upper side leaves a clear view of the of the root marks. The damaged alveolus around the canine makes it impossible to determine if a first premolar was present. The jawline characteristics are those of a brown bear. The symphysis was not fused so we may assume this specimen to be a young adult. The length of the jaw is 178 mm, the height behind the canine (diastema) is 66.0 mm. The canine measures 27- by 22 mm.

The humerus, HB1650, was found in two fragments. These show different weatherings but fit perfectly. Both ends were damaged during the dredging operation. The total length is 298 mm, the width of the diaphysis is 38.0 mm.

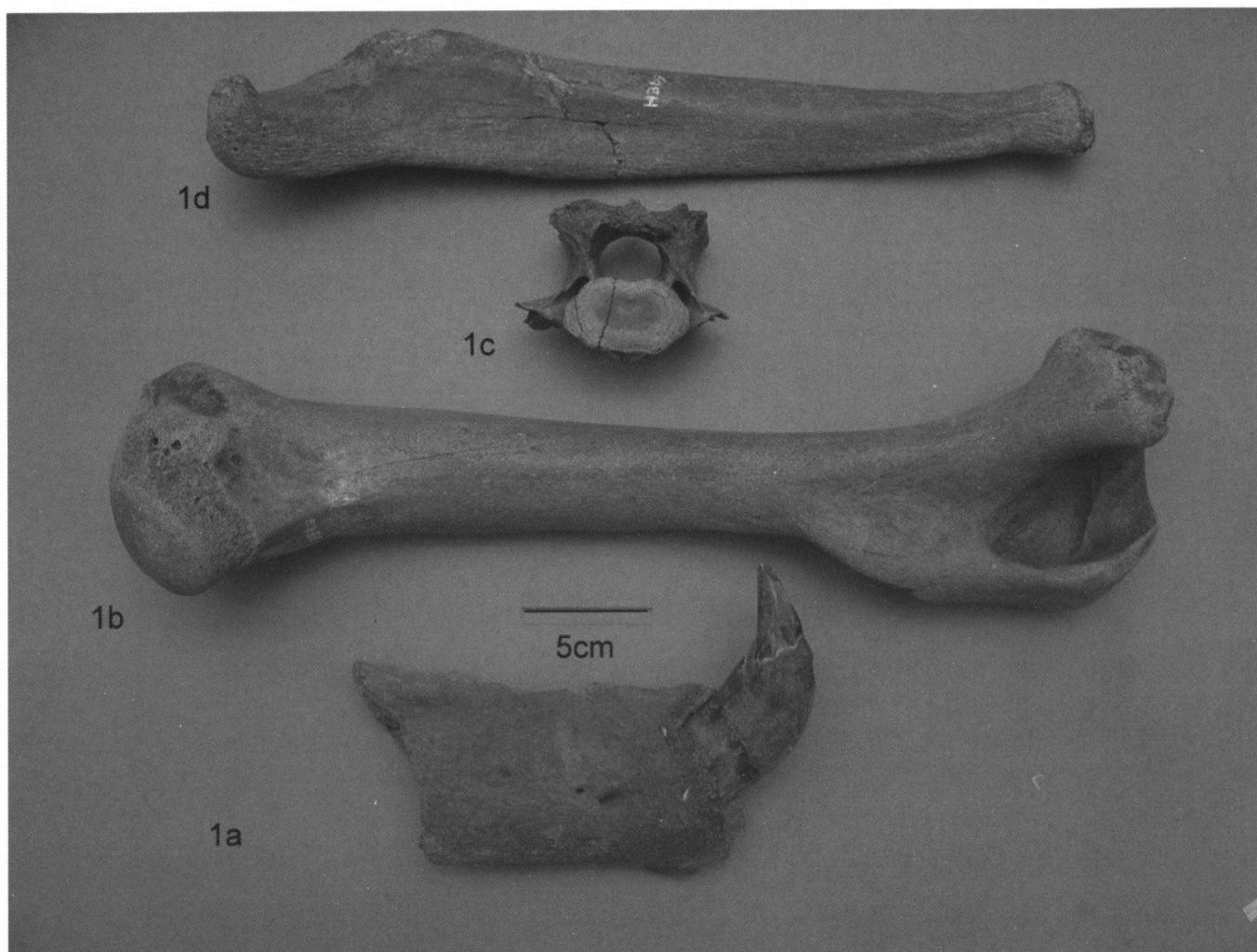


Fig. 1: *Ursus arctos*, elements, a) left mandible with canine, the jawline characteristic for brown bear; b) left humerus, almost complete; c) third cervical vertebra with cracks due to an earlier dry up; d) left ulna, from a juvenile animal, slightly damaged.

Fig. 1: *Ursus arctos*, a) linker onderkaak met hoektand, de kaaklijn is karakteristiek voor bruine beer. b) linker humerus, bijna compleet. c) derde halswervel, gescheurd tijdens een eerder droogproces; d) linker ulna, van een juveniel dier, licht beschadigd.

Humerus HB418 was found blocking the entrance of the suction dredge and came out almost complete. Only relative small damage can be detected. However the two proximal tuberosities, the greater and the smaller, are partly missing. The total length is 385 mm, proximal width is 80.0 mm, distal width 114.0 mm and halfway width 38.0 mm. Humerus HB2053 represents a juvenile brown bear, both ends are damaged. Length: 166 mm and halfway width 31.0 mm.

Ulna HB69, also from a juvenile animal, misses the distal part of the epiphysis. The fossil bone was found in two pieces and refitted perfectly but was lightly damaged by the dredging process. Length: 361 mm.

The third cervical vertebra lost its extremities and shows old cracks due to a dry up in the past. The length of the corpus is 44.0 mm. The total height is 65.0 mm.

Cave Lion (*Panthera leo spelaea*)

The specimens found from the cave lion are a right humerus, HB116, a left ulna, HB 1757, a left astragalus, HB1798, the first cervical vertebra (atlas), HB1760, the 3rd cervical vertebra, HB 1795, a 1st lumbal vertebra, HB481, a 6th lumbal vertebra, HB 1794 and a 7th cervical vertebra, HB 297 (see fig. 2). The humerus was fractured in the past halfway the diaphysis and its distal part is damaged. Length 187 mm.

The ulna is weathered and has a break at the distal end just above the articular facet allowing a measurement of 316 mm.

The astragalus is partly damaged by tumbling action in the past, the extremities thus are incomplete. Length overall measures 65.1 mm, width 51.0 mm.

The atlas is complete apart from both transverse extremities. Compared to the other carnivorous specimen this part is well preserved. It measures 81.0 mm along the articular facets, the cranial

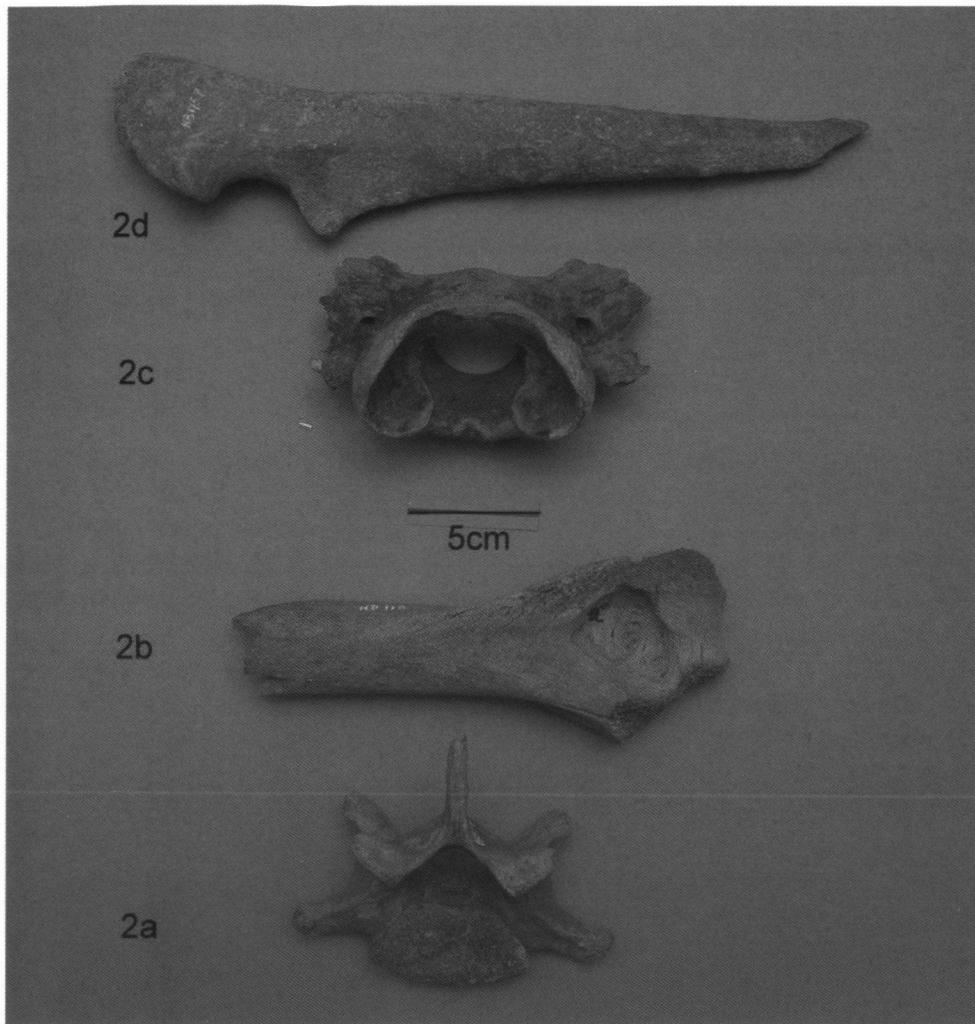


Fig. 2: *Panthera leo spelaea*, elements, a) seventh cervical vertebra, b) fractured humerus, c) almost complete atlas, d) weathered ulna with repaired fracture.

Fig. 2: *Panthera leo spelaea*; a) zevende halswervel; b) fragment van een humerus; c) bijna complete atlas; d) verweerde ulna met gerepareerde breuk.

articular width is 76 mm., the caudal articular width 82.0 mm. Height 62.0 mm.

The third cervical vertebra is from a juvenile animal, both articular facets are lacking and the specimen shows overall damage. The corpus length is 60.0 mm and the total height is 62.0 mm.

All extremities of the first lumbar vertebra are damaged and the specimen shows signs of weathering. The lack of articular facets in this case also points to a juvenile. The length of the corpus is 45.0mm and the total height measures 85.0 mm.

The sixth lumbar vertebra is damaged by the suction dredger and shows an oddly shaped wear on the frontal part of the corpus. No articular facets could be detected on the remains of the fossil indicating a juvenile character of the lion. The length of the corpus is 59.0 mm. Total height 91.0 mm.

The seventh cervical vertebra from a juvenile animal is slightly damaged. Both articular facets are missing. Length of the corpus is 22 mm., height of the corpus 34 mm. Its total height, including the spine is 98 mm.

Cave hyena (*Crocota crocuta spelaea*)

A coprolite, HB 190, a right and a left ulna, HB 1033 and HB 659 respectively, were found (see fig. 3). In the coprolite, 53 mm long, small bone fragments can be traced. The right ulna is a fragment from the diaphysis, it is missing the upper side of the articular facet proximally as well as the lower side at the distal thus allowing measurement. Length 176 mm. The left ulna lacks the distal articular facet and measures 252 mm in length.

Wolf/dog (*Canis* sp.)

This animal is represented in the collection by a right femur, HB737. The femur lacks the caput and has suffered from plant root damage. Length 230 mm., corresponding width of the diaphysis 17.1 mm. Its total height is 113 mm.

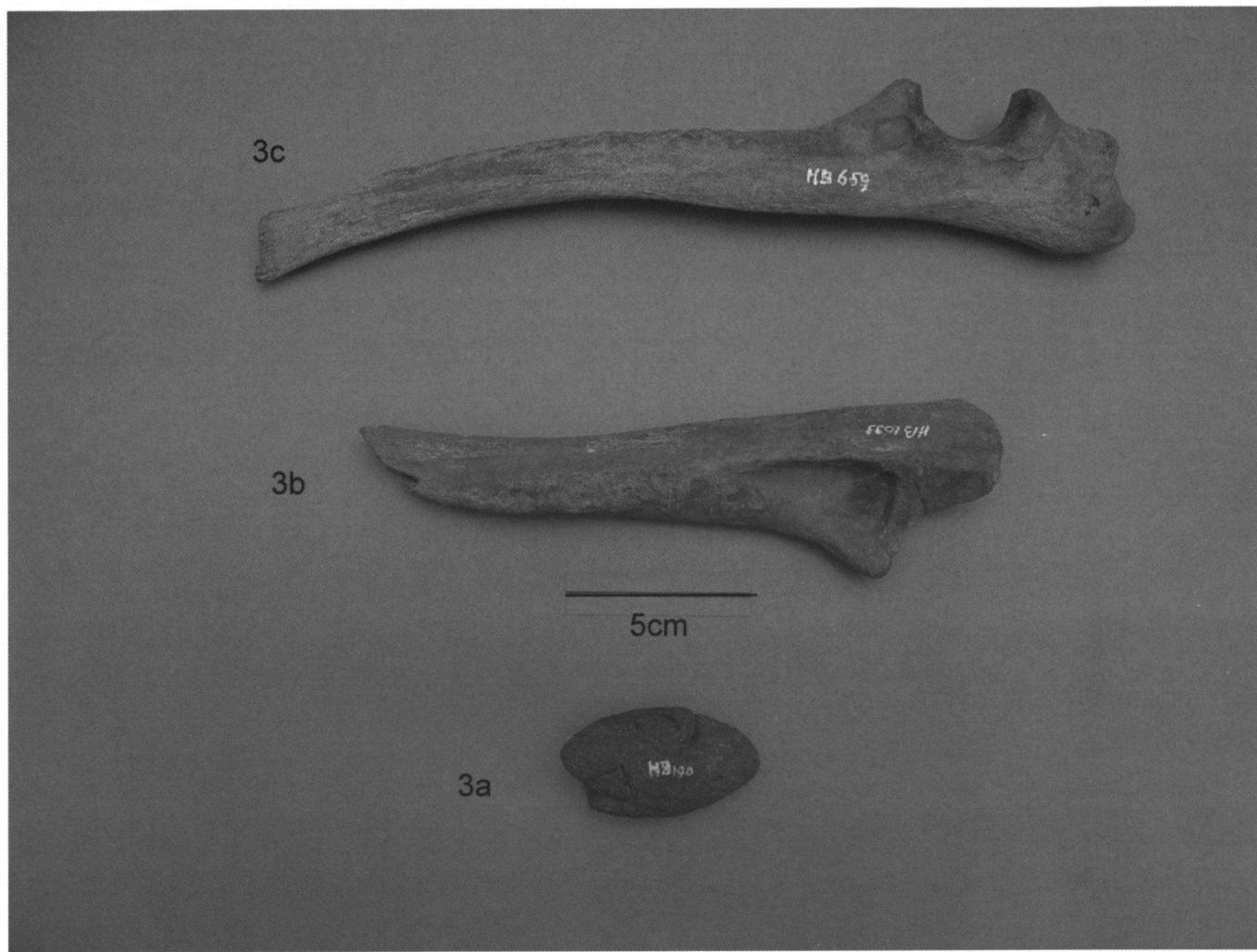


Fig. 3: *Crocuta crocuta spelaea*, elements, a) coprolite with small fragments of bone material; b) fragment of a right ulna; c) left ulna fractured just above the articular facet.

Fig. 3: *Crocuta crocuta spelaea*, a) coproliet met kleine botfragmenten; b) fragment van een rechter ulna; c) linker ulna, net boven het gewrichtsvlak gebroken.



Fig. 4: *Canis sp.* Element, right femur without caput and with plant root damage.

Fig. 4: *Canis sp.* Rechter femur zonder caput en wortelbeschadiging.

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