

A FOSSIL FAUNULE WITH HOMO FROM A PREHISTORIC SITE ALONG THE MEUSE IN THE NETHERLANDS.

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Introduction.

During the construction of a bridge in a local road to the North of Maastricht (province of Limburg, Netherlands) near the Beatrix harbour along the river Meuse, a pit of 14×7 metres extension at the base had to be dug in the year 1962 for the laying of foundations. This pit, situated along the small Geul river (a tributary of the Meuse) in the village of Bunde, was kept dry by continuous pumping.

A number of amateur archaeologists and geologists succeeded in collecting a number of fossil bone fragments by carefully searching at the bottom of the pit and in the dump of dugout material. The most spectacular of these finds is formed by part of a fossil human skull cap. A description of this interesting specimen will follow at a later date. The present paper has been written with the intention of providing additional information about the accompanying faunal elements, in so far as these may be thought to contain some ecological data for the human find.

The human skull cap is, at present, in the collection of the Foundation Regional Museum at Elsloo (province of Limburg). The other specimens, and a piece of fossil wood, are in the collection of Drs. J. H. van der Linden at Maastricht, whom I have to thank here for bringing the existence of these finds to my attention (through the intermediary of the Director of the Natural History Museum at Maastricht, Abbé Dr. E. M. Kruytzer), and for allowing me to give a short description of some of the most interesting specimens.

Finally I would like to thank Professor Dr. L. D. Brongersma, Dr. D. A. Hooyer and Père Dr. A. M. Hussen from the Rijksmuseum van Natuurlijke Historie at Leyden, and Drs. G. Kortembout van der Sluys,

from the Rijksmuseum voor Geologie en Mineralogie at Leyden, for their valued assistance with regard to taxinomial questions, and for their help with the determination of some of the fossil bone fragments.

Situation and particulars of the site.

The geological situation at the Bunde locality consists of a fairly thick deposit of loess with a maximum thickness of about 4½ to 7 metres, on top of deltaic deposits of clay and some sand, brought there by the Geul river. These delta deposits, which show a variable thickness (2½ to 3½ metres), in their turn rest upon river deposits of the Meuse, which consist of sand, clay, and rough gravel intermingled with some larger blocks of stone. The Geul river valley, coming from the East at this place, stands more or less at right angles to the streambed of the Meuse (which runs from South to North).

The stratigraphical particulars which may be deduced from the profile at the site are somewhat meagre. It may be said that the loess in question, which forms part of the present surface also, should be called the "young" loess, and to all probability that it has been deposited during the last part of the last glaciation (Pannekoek et al., 1956, Zonneveld, 1947), during the last part therefore of what has been termed the Tubantian (in the Netherlands) by Florshütz and van der Vlerk (1950). Accordingly, this loess has a yellowish colour and a fairly high lime content; there are small lime-concretions in it (Van Doormaal, 1945). The local river deposits of the Geul and the Meuse, which lie below this loessic cover, may be either older, or contemporaneous, allowing for the supposition that the flow of water through the upper Pleistocene course of the Geul very probably has not been seriously impeded during the cold conditions of the last part of the Pleistocene. Although there is no particular reason (no clear indications pointing in this direction have been observed) to think that this has happened, there may always be a chance also that part of the total thickness of the loess deposit has been caused by cryoturbational activities, which would have caused a downward movement of loess from some of the hills more to the East.

As a result of these considerations the age of the fossil remains may be cautiously accepted as being uppermost Pleistocene.

Remarks and description.

The faunule contains the following mammals and birds:

Alces alce (L.)

Bos sp. div. (2 different types are present, a comparatively small one and a rather large one, in the absence of decisive characters it may be tentatively suggested that the one might be *Bos taurus brachyceros* (Owen), and the other *Bos primigenius* Bojanus).

Capreolus capreolus (L.)

Castor fiber L.

Cervus elaphus L.

Equus caballus L. (2 different types are present, one a not very heavy horse with moderately hypsodont teeth and the other one having a rather stocky appearance).

Ovis cf. *ammon* L., subsp.

Saiga tatarica L.

Sus scrofa L.

Ursus arctos L.

Circus cf. *aeruginosus* (L.), the marsh-harrier

Corvus frugilegus frugilegus L., the rook

Grus grus L., the blue heron.

Of this list the (?) Marco Polo sheep (*Ovis* cf. *ammon* L., subsp.), the Saiga "antelope", and, as far as I know, at least two of the three birds, the marsh-harrier and the rook, are the first records of their species among the fossil forms known from our country.

According to their state of preservation (light yellow colour, comparatively light weight), a number of the fossil bone fragments have evidently become fossilized in the loess, whereas most of the material, which shows a dark brown or blue colour and has a heavy weight, comes from the fluviatile deposit immediately below.

When the minimum number of individual specimens, which results from a careful comparison of the determined bone fragments and from the calculation of the possibilities that several of

these fragments may have formed part of one animal, is considered, the following list results. In this, the first number refers to specimens which have become fossil in fluviatile surroundings, the second to those which come from the loess.

| | |
|---|-------|
| <i>Alces alce</i> (L.) | 1 + 0 |
| <i>Bos</i> sp. (small) | 2 + 0 |
| <i>Bos</i> sp. (large) | 1 + 0 |
| <i>C. capreolus</i> (L.) | 4 + 1 |
| <i>Castor fiber</i> L. | 1 + 0 |
| <i>C. elaphus</i> L. | 5 + 2 |
| <i>E. caballus</i> L. | |
| (stocky type) | 2 + 1 |
| <i>E. caballus</i> L. | |
| (lighter type) | 1 + 1 |
| <i>Homo sapiens</i> L. | 1 + 0 |
| <i>Ovis</i> cf. <i>ammon</i> L., subsp. | 1 + 0 |
| <i>Saiga tatarica</i> L. | 1 + 0 |
| <i>Sus scrofa</i> L. | 2 + 2 |
| <i>Ursus arctos</i> L. | 1 + 0 |
| <i>Circus</i> cf. | |
| <i>aeruginosus</i> (L.) | 1 + 0 |
| <i>Corvus</i> f. <i>frugilegus</i> L. | 1 + 0 |
| <i>Grus grus</i> L. | 2 + 0 |

Total 27 + 7 = 34 animals.

From this enumeration one may perhaps conclude that the supposition, which was already made in this paper, that the fluviatile deposit of the Geul river, and the "young" loess, or at least its lower part, are probably contemporaneous, receives additional strength. It may be noted that such animals as the roe, the red deer, and the boar, usually seen as typical representatives of wooded country, occur among the loess specimens, whereas representatives of a steppe-like environment such as the Saiga, and to a lesser extent perhaps the lighter type of wild horse, and the wild sheep, are found here among the animals from the fluviatile sediments. That the small Geul river has certainly not streamed through a totally denuded country at the time when these fossils were living animals, is attested by a large piece of fossilized wood, probably of *Taxus* sp., collected by Drs. van der Linden from the delta deposits of the Geul at the Bunde site.

Some particulars about a few of the rarer specimens among the fossil fragments have to be mentioned.

Saiga tatarica L.

Two fossil remains of this animal have been collected: a complete tibia of the left side, numbered (by Drs. van der Linden) B 53, and a small fragment of the ilium with part of the acetabulum, also of the left side, numbered B 62. Both show the typical conservation of fossils from the fluviatile deposits (i.e. brown or blue, and heavily fossilized). They have been figured here as photograph 1. Comparison with the skeletons of three specimens of recent *Saiga* "antelopes" in the collection of the Rijksmuseum



1. *Saiga tatarica* L.

Upper: tibia sin., exterior lateral aspect. $\pm 5/13$ nat. size.
 Second: tibia sin., interior lateral aspect. $\pm 5/13$ nat. size.
 Third: fragment of os innominatum sin., exterior aspect. \pm natural size.
 Lowest: fragment of os innominatum sin., interior aspect. \pm natural size; note supra-acetabular fossa at the lower left edge of the bone.

van Natuurlijke Historie at Leyden showed that there exists an almost complete resemblance, not only with respect to the morphological characters, but even as to the measurements, between the fossil remnants and the middle one (in size) of the three Leyden specimens. There is scarcely room for doubt that one has to do with the *Saiga* here, as both morphology and size of other Artiodactyl bones which might be compared with the fossils (for instance of roe deer, sheep, or goats) are somewhat different. The following measurements of the fossil tibia may be mentioned:

| | |
|--|---------|
| Maximum length (from the intercondylar eminence to the tip of the medial malleolus) | 189 mm |
| Minimum lateral width (at approximately 52 mm above the medial malleolus) | 11,4 mm |
| Minimum anteroposterior width at the same place | 8,8 mm |
| Maximum anteroposterior width at the proximal part, from the most prominent portion of the anterior crest over the condylar faceted area | 36,4 mm |
| Maximum lateral width at the proximal articulation (at right angles to the former measurement) | 35,8 mm |
| Lateral width at the articulation for the astragalus | 23,9 mm |
| Anterioposterior width at the same place | 13,5 mm |

There appears to be a fairly large variation in size among individuals of *Saiga tatarica* L.; Cornwall (1956, p. 169) for instance mentions a length of 222 mm for a tibia of a *Saiga*. This difference in size may partly be the result of sexual dimorphism, which exists in this species without doubt, as was recently remarked (with regard to the size of the teeth) by Terzèa (1963, p. 266). However, the form of the bone, and especially its slender appearance in combination with the graceful curve of the anterior crest, make it impossible to mistake it for a tibia of *Ovis*, *Capra*, or *Capreolus*.

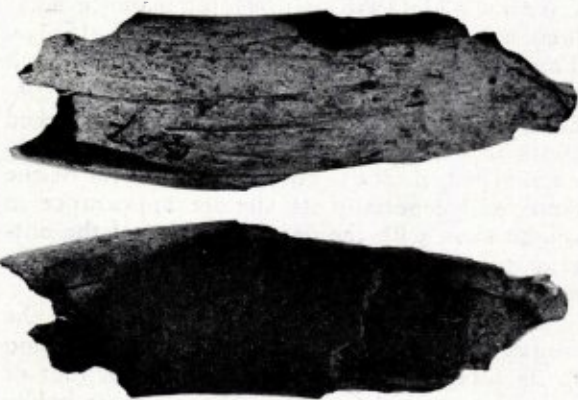
Only two measurements can be given of the fragment of an os innominatum, which, owing to its form, also makes confusion with that of other Artiodactyl animals extremely improbable:

| | |
|--|--------|
| Maximum diameter (approximately) of the acetabulum | 19 mm |
| Narrowest diameter of the neck of the ilium, at a distance of about 19,7 mm above the acetabulum | 9,5 mm |

A supra-acetabular fossa is present. This bone, as well as the tibia, appears to have belonged to (a) fully adult individual(s), as no traces of yet imperfectly joined epiphyses or still separate bones of the os innominatum are to be seen.

Ovis cf. ammon L., subsp. (fig. 2).

A small portion of a left horn-core, with the number B 57, forms the only identifiable remnant of this animal. It shows the blue-brown colour of the fluviatile fossils. Its section is rounded triangular at the base, but more lozenge-shaped to sub-circular further away. A very small fragment of the skull, i.e. to the front of the horn-core, still adheres to it. Nowhere is there any trace of the characteristic antero-lateral keel which is present in the genus *Capra*. On the upper half of the posterior face of the horn-core fragment a shallow depression, which runs parallel to the longitudinal axis of the core, may be rather felt than seen. This particular character was found by me to be present also on the horn-cores of an *Ovis ammon ammon* (L.) in the collection of the Rijksmuseum van Natuurlijke Historie at Leyden, but not on the cores of the other subspecies of wild sheep in



2. *Ovis cf. ammon* L. subsp.

Upper: left horn-core (fragment), frontal aspect, with very small remnant of skull bone at the extreme right side of the piece (including a nutritional foramen). Lower: left horn-core (fragment), posterior aspect, with typical shallow depression along the axis of the core (see text). 5/7 nat. size.

that collection. However, the dimensions of the fossil fragment are very much less than in this recent *Ovis ammon ammon*, almost half that of the recent wild sheep. This forms the reason why it is thought that a more thorough determination of the fossil piece as to its subspecific nature is thought to be inadvisable. The more prudent way is perhaps to give, as a determination, the name *Ovis cf. ammon* L., subsp. Two dimensions may be mentioned:

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|--|---------|
| Antero-posterior diameter of horn-core, approximately 40 mm above the proximal border (where the skull begins) | 30,9 mm |
| Lateral diameter of same, at right angles to the former measurement and at the same place | 20,4 mm |

Circus cf. aeruginosus (L.) (fig. 3a, 4a).

The distal part of a left tibia of the marsh-harrier, also showing the typical conservation of a fossil from the fluviatile deposits, matches the comparable bone in a complete mounted recent skeleton in the Leyden collection point for point, so that there can be no doubt as to its identity. The fossil fragment, which has a length of 64,3 mm, still possesses the distal condyli. Measured over these eminences the bone has a maximal transverse width of 11,6 mm, and (measured over each of the separate two condyli) an anteroposterior width of 7,3 mm (5,2 mm between the two condyli). The piece has been numbered BM 3.

Corvus frugilegus frugilegus L. (fig. 3b, 4b).

This species is represented by a proximal fragment of the fused first, second and third metacarpals of the right side. The fossil, which bears the number BM 21, has a blue to grey colour with yellow spots, indicating that its origin may either have been in the fluviatile or in the loessic deposits. The clearly visible elliptical depression on one side, near the point of fusion of the metacarpals, makes it difficult to mistake this fossil fragment for anything else but a rook, as a careful comparison with mounted skeletons of different recent members of the crow family in the Leyden collection showed. The following two measurements may be given,



3a. Anterior aspect of tibia sin. of the marsh-harrier.
3b. Anterior aspect of the proximal fragment of fused metacarpals 1, 2 and 3 (dext.) of the rook. $\pm 5/8$ natural size.



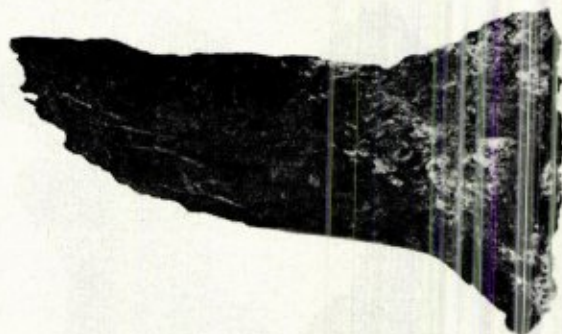
4a. Posterior aspect of tibia sin. of the marsh-harrier
4b. Posterior aspect of the proximal fragment of fused metacarpals 1, 2 and 3 (dext.) of the rook. $\pm 3/5$ natural size.

both taken at the proximal end where the three bones are fused:

| | |
|--|---------|
| Diameter of the fossil fragment at right angles to the imagined wing of the bird | 4,6 mm |
| Diameter at the same place, parallel to the wing | 10,1 mm |

Ursus arctos L.

This species, represented by a very small dark blue fossil fragment (which indicates its fluvial origin) of the proximal posterior part of a right femur, bearing the number BM 18, shows part (36 mm in length) of a ridge which runs from the posterior side of the great trochanter towards the lesser trochanter. Its robust nature (photograph 5), and a comparison of this part of this bone in a recent specimen in the Leyden collection, form the reason for its determination as *Ursus arctos* L. Because of its fragmentary nature it appears better to give no measurements of the specimen.



5. Small fragment of proximal posterior part of femur dext. of *Ursus arctos* L. $6/5$ natural size.

Castor fiber L.

The beaver, represented by a complete fossil femur of the left side of a fairly young specimen (the epiphyses are wanting), numbered B 61, has been found among the fossils having a fluvial origin, as seems to be natural. The peculiar form of this bone (photograph 6) leaves no room for doubt. With respect to this find, a recording of a fossil beaver from the Scheldt estuary by Hooyer (1960) may be cited here. There, as in the present case, a left femur was found, and Hooyer mentions the fact that complete ankylosis appears to occur late in life among beavers (if at all). The fossil bone from Bunde is very slightly smaller than that described by Hooyer:

| | |
|---|---------|
| Total length, measured from between head and great trochanter to the center of the distal extremity, in the find from Bunde | 81,2 mm |
| The same measurement in the specimen from the Scheldt estuary, approx. | 93 mm |

There is no appreciable difference with respect to the morphological features. With this find, one more is added to the "surprisingly few Pleistocene records of *Castor fiber* in this country apart from the Tegelen clay" (Hooyer, op. cit., p. 44).

Apart from these more or less rare finds among the comparatively few bones found at Bunde, something remains to be recorded which, in itself, proves that this local accumulation, probably having had a lens-like body with a

6. *Castor fiber* L.

Left: External of femur sin. of a fairly young (?) specimen. 15/16 natural size.

Right: Internal aspect of femur sin. of the same specimen. 15/16 natural size.

circumference not much more than 7×7 metres, is not solely due to natural causes. The human skull cap only indicates the presence of *Homo sapiens* L. in either an active or in a passive role. Many of the bone fragments, however, very clearly show signs of having been cut and used, as there are distinct indications of wear along the cutting edges of several bone fragments. The complete material of the faunule, consisting of 84 determinable fragments or specimens (the human skull cap included), contains 11 bone fragments with clearly visible signs of having been worked upon. If the determined bone fragments are arranged according to the approximated age of the individual specimens, it is seen that 12 of the 84 belong to young or very young animals; out of the total minimum of 34 different individual specimens which together form the fossil faunule, this minimum number for young or very young spe-

cimens is 9, to which a number of 1 or 2 should be added for the minimum number of very aged individuals.

All this, the signs of cutting and working on the bones, and the rather high number of young and very old individuals (which are more easily captured, the young ones being more tasty also), may point to the supposition that Man has played an active part in causing the accumulation of debris which forms the described faunule.

Photograph 7 shows two bone fragments which have been intentionally cut or broken. Number B 41 is part of the shaft of a right humerus of *Equus*, which has been cut off at its distal part and shows signs of polish through wear, perhaps as a scoop-like instrument. B 42 is the distal part of the shaft of a tibia of the right side of a rather heavy red deer. Here also the oblique edge along which the shaft has been cut or broken, at its proximal side, shows distinct signs of wear. A curious bone fragment, figured on photograph 8, is number B 40, the proximal end of a left tibia of a horse, with a clearly scoop-like cut at its distal end. The bone is yellowish and has probably come from the loessic part of the deposits. The interior portion, and the spongiosa of the bone have been eliminated; it is hollowed out almost completely. As a result this piece forms a receptacle which may be closed with any kind of stopper, the whole slightly resembling a bottle. At the time of finding this

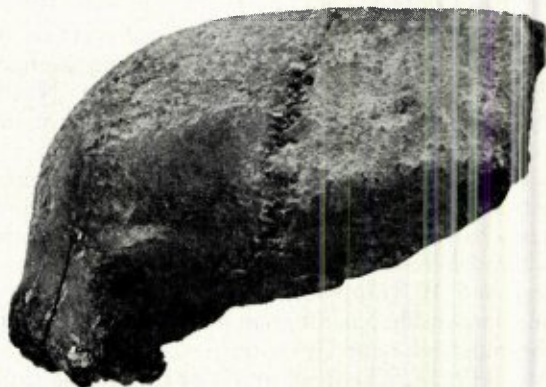


7. Upper: Intentionally cut fragment of shaft of humerus dext. of *Equus* sp. 1/2 natural size.

Lower: Intentionally cut scoop-like fragment of tibia dext. of *Cervus elaphus* L. $\pm 5/11$ nat. size.



8a. Proximal end of left tibia of *Equus* sp. with indications of cutting at one end, for use as a honey-bottle. 7/16 natural size.
 8b. Other aspect of the same piece 7/16 nat. size.
 Photogr. by Mr. G. Jansen.



9. Skull cap of *Homo sapiens* L. from Bunde. Norma lateralis. $\pm 1/2$ natural size.
 Photogr. by Mr. G. Jansen.



10. Skull cap of *Homo sapiens* L. from Bunde. Norma verticalis. 1/2 natural size.
 Photogr. by Mr. G. Jansen.

tibia-"bottle" was partly filled with whitish talcum-like lumps and -powder. Analysis of this material, for which I am much indebted to Drs. W. A. G. Veen of the Institute of Human Biology at Utrecht, was no easy task. It appeared to be an organic, fatty substance with a melting point approximately at 65° C. It could easily be saponified. To all probability it consists of a mixture of organic wax-like substances, of which beeswax forms the major part. From this, the conclusion that the hunters at Bunde have collected honey and stored it in hollowed-out bones, might appear to be justified.

Ecological considerations.

Finally, a picture emerges of the probable situation at the time when the deposit of Bunde was formed:

At the confluence of the small river Geul with the Meuse some nomadic hunters may have had a seasonal camping emplacement at the edge of the water or on a sandspit, from where, during summer, the surrounding countryside provided their food. Summer as a season is indicated by the rather high percentage of captured young animals. The country very probably

consisted of steppe-like rolling hills with only strips of wooded areas along the rivers in the shallow valleys which intersected the region. At the time, during the uppermost Pleistocene, the climate must have been of a continental type. During dry periods dust storms must have raged over the hills, while the "young" loess was deposited.

No clearly identifiable stone tools have, up till now, been encountered, but the high percen-

tage of red deer bones suggests connections of the hunters of Bunde with the post-Magdalenian Maglemosian industries further to the North (Koerhuisbeek and the Hengelo harbour in the province of Overijssel, Netherlands).

This suggested connection receives additional justification from the remarkable likeness which exists between the human skull cap from Bunde, pictured here in the photographs 9 (norma lateralis) and 10 (norma verticalis) and, especially, the comparable part of skull number C 1 from the Koerhuisbeek near Deventer described by Vallois (1943). The description of the Bunde skull cap will show that the specimen has reached an individual age of approximately 30 to 40 years, and, as in the case of the individual to which belonged skull C 1 from the Koerhuisbeek, probably was a male.

It should perhaps be stated here that two of the fossil human skulls found at Elst (roughly halfway between Bunde and Koerhuisbeek) and mentioned by van der Vlerk (1956) possess many morphological points of resemblance with the Koerhuisbeek skulls and with the Bunde skull cap. Elst may well be another point of occurrence of Maglemosian Man in our country.

Summary.

An uppermost Pleistocene faunule is described from a construction site in a road at Bunde (province of Limburg, Netherlands). This faunule accompanies a part of a fossil human skull cap and provides interesting ecological data. Two new mammals and two birds are added to the list of fossil species of the Pleistocene in the Netherlands.

Samenvatting.

Bij graafwerkzaamheden ten behoeve van de aanleg van een brug in een nieuwe weg nabij de Beatrixhaven in de gemeente Bunde, ten N. van Maastricht, werd een gedeelte van een fossiele menselijke schedelkap gevonden. Tegelijkertijd werd nog een aantal andere fossiele beenderen en fragmenten daarvan verzameld; het artikel geeft hiervan een kort overzicht en een beschrijving van enkele zeldzame vondsten, die er deel van bleken uit te maken. Een en ander verschaft inlichtingen omtrent klimaat en omge-

ving ten tijde van het vormen van de afzetting, vermoedelijk in het bovenste Pleistoceen en gelijktijdig met de afzetting der z.g. jonge löss. Twee zoogdieren en twee vogels, nieuw voor de lijst van uit het Pleistoceen in Nederland bekende dieren, worden beschreven: de Saiga (*S. tatarica* L.), een wild schaap dat affiniteiten vertoont met het Marco Polo schaap (*Ovis cf. ammon* L., subsp.), de bruine kiekendief (*Circus cf. aeruginosus* (L.)), en de roek (*Corvus frugilegus* L.). Een aanaal der beenderfragmenten vertoont duidelijke sporen van bewerking door de mens.

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FORAMINIFERA FROM THE CRETACEOUS OF SOUTH-LIMBURG, NETHERLANDS. LXXXV.

The Tuffeau de Cibly in the quarry Curfs, Houthem, the Canal Albert near Vroenhoven, Belgium, and the mine-shaft Maurits III, near Geleen.

by J. HOFKER

As already stated many times, above the hard ground with holes at the top of the Md, Maastricht Tuff Chalk, in drill-holes, mine shafts, in