

# ***Dating aurochs from the Early Holocene in Germany and Luxembourg***

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# Paleogenetics of *Bos primigenius* and *Bos Taurus*



European Research Council  
Established by the European Commission

Decoding domesticate DNA in archaeological  
bone and manuscripts

**Amelie Scheu, Joachim Burger  
(University of Mainz),  
Daniel Bradley et al. (University of Dublin)**

# Searching for the Genome of the Mesolithic Aurochs

Cattle have been domesticated in the Near East and came with neolithic farmers into Europe



## Questions:

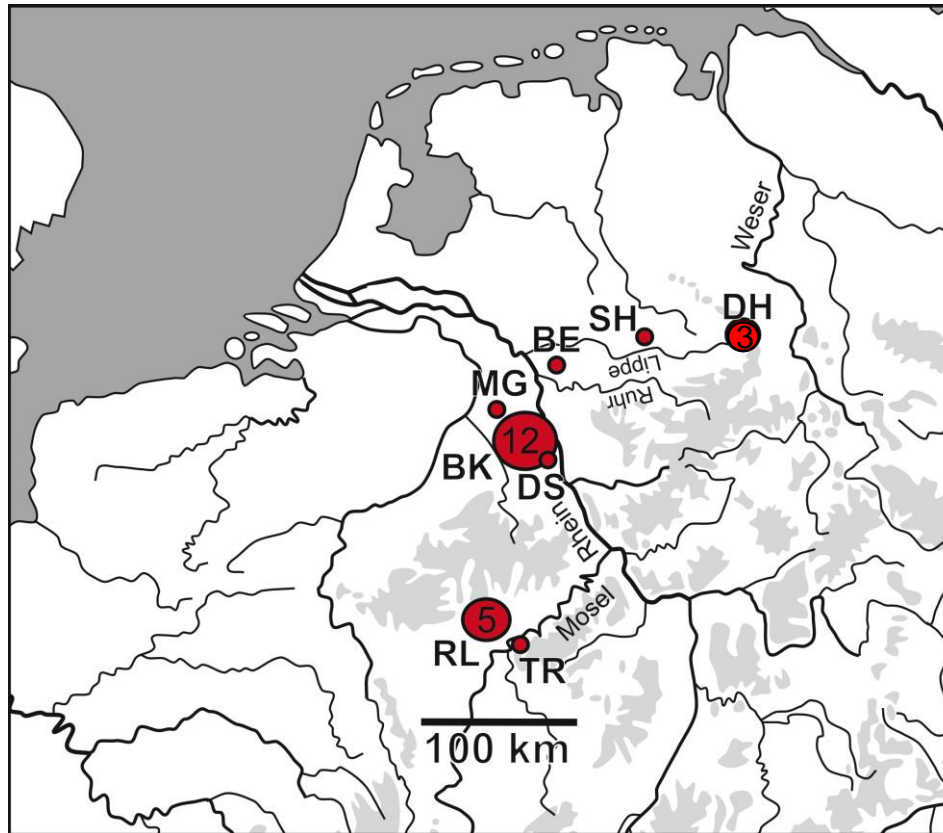
1. Took European Aurochs part in the development of the European domesticated cattle?
2. Were there an intermixture of both ?
3. If so, where and when did this intermixture happen?

## *Main goals of the palaeogenetic project:*

1. Reconstruction the complete genome of the European Aurochs for the first time.

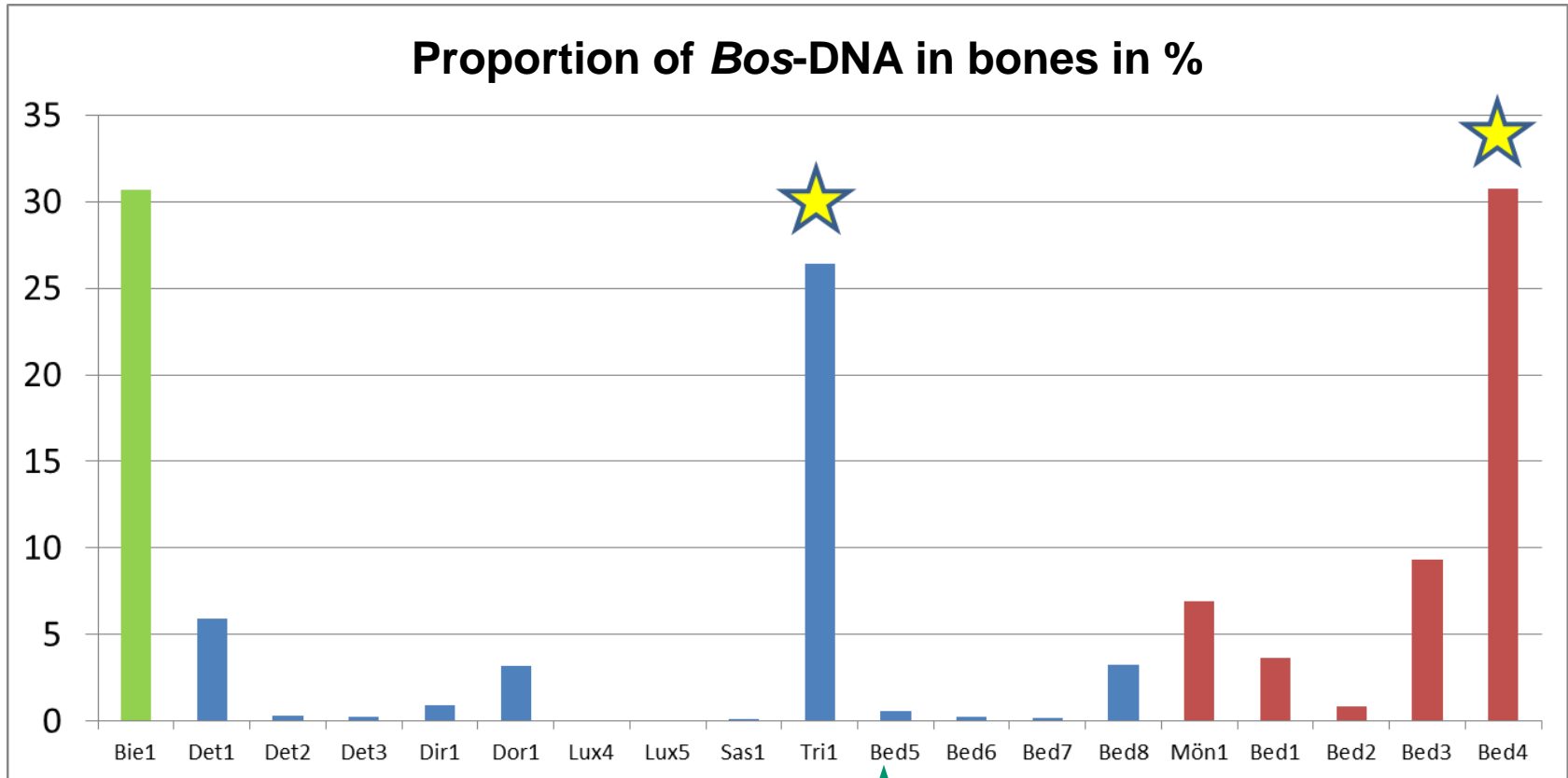
2. Localisation and Quantification of possible intermixture between Aurochs and cattle in Europe

# Mesolithic and Neolithic Sites with Aurochs Remains in Western Germany and Luxembourg



DH = Detmold-Heidenoldendorf; SH = Sassenberg-Hilgenbrink;  
BE = Bottrop-Emschertal; MG = Mönchengladbach-Geneicken;  
BK = Bedburg-Königshoven; DS = Dormagen-Straberg;  
RL = Reuland „Loschbour“; TR = Trier-Brüderkrankenhaus

Before the expensive sequencing of the genetic information is conducted, a screening of the aDNA-material is carried out and the proportion of the aDNA of *Bos primigenius* is measured.



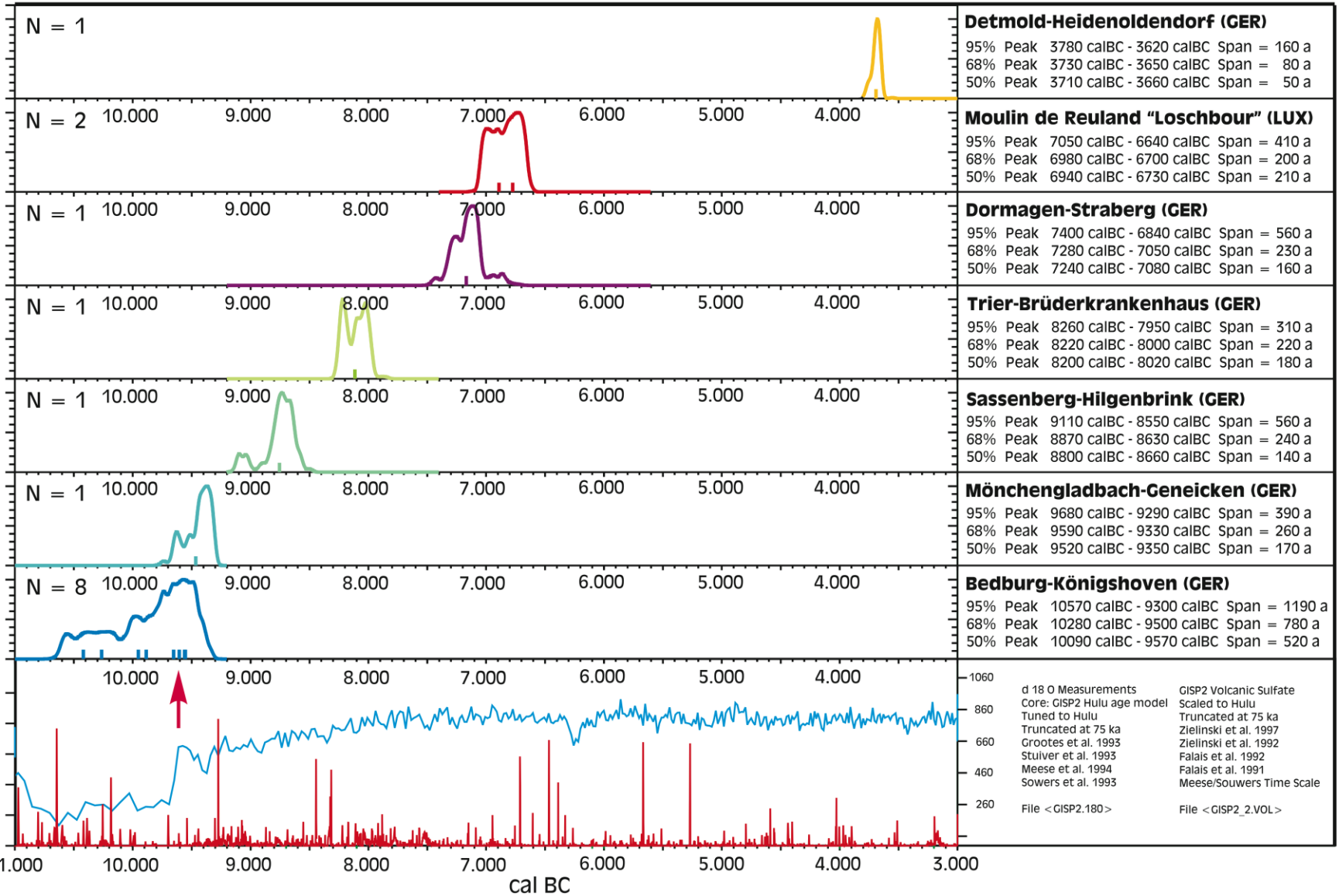
Recent cattle after AMS  
Longbones or teeth  
Pars petrosae



Suitable for reconstruction of the aurochs-genome (2/19)

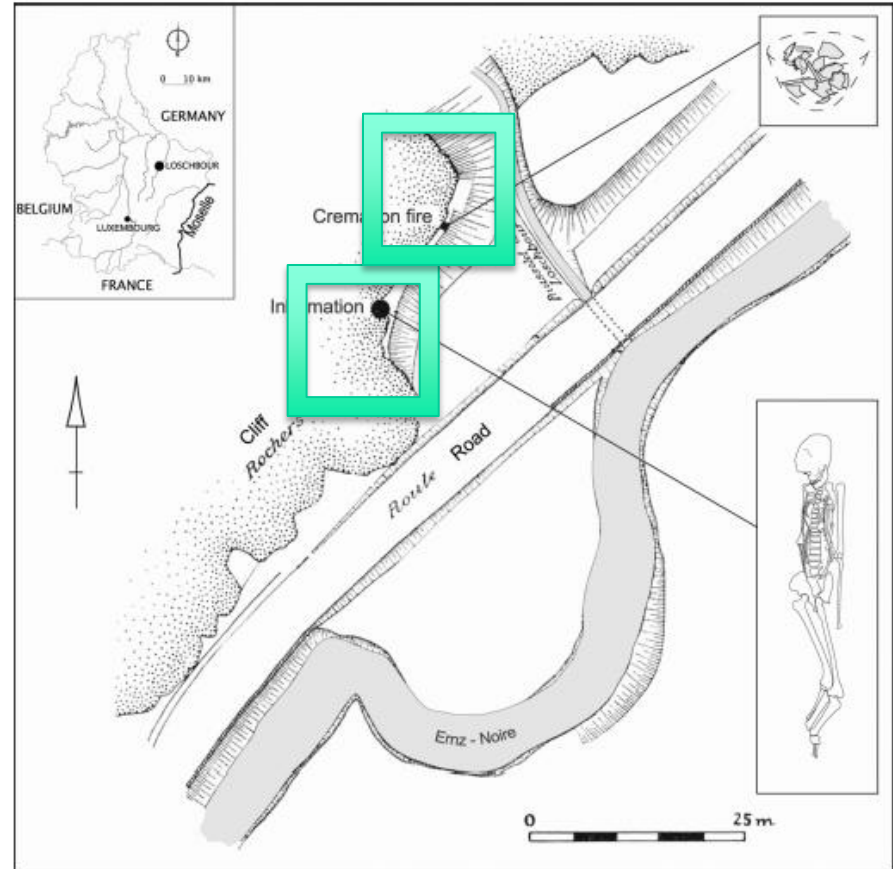
# Dating Aurochs

CalPal Version March 2007



— Early Praeboreal — Late Praeboreal — Early Boreal — Middle Boreal — Late Boreal — Subboreal

# Moulin de Reuland „Loschbour“ Heffingen, Luxembourg

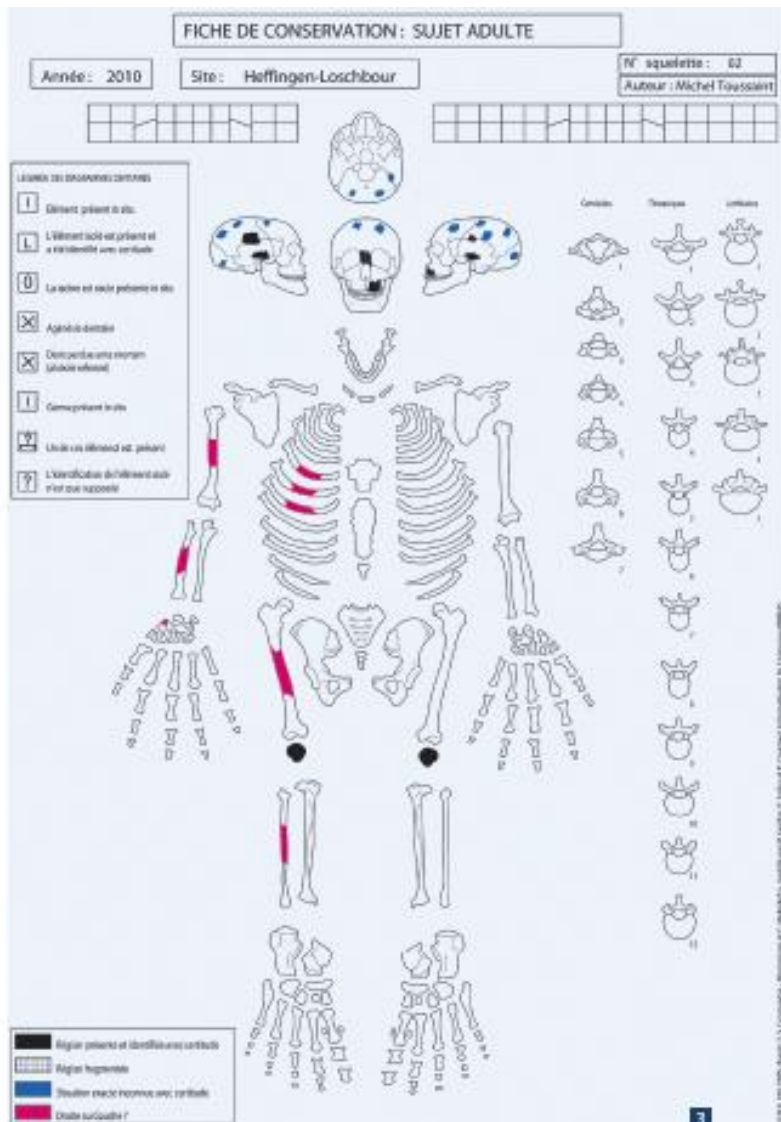


**Excavation in 1935 by the archaeological amateur Nicolas Till. The excavations finds were first published by Marcel Heuertz, conservator at the Musée d'Histoire naturelle of Luxembourg.**

# Loschbour

**Michel Toussaint working on the material from the cremation burial of a female, found in the storerooms of the Musées de l'Etat some years ago.**

**Toussaint et al. 2009;  
Toussaint et al. 2012**





# Loschbour

**Gravegoods from the burials of Loschbour found during the excavations in 1935.**



# Loschbour AMS-datings



**Aurochs, juvenil:**  
**6891 ± 115 calBC**



**Beaver: 7380 ± 77 calBC**  
*Brou 2011*



**Aurochs, adult:**  
**6741 ± 67 calBC**



**Cremation, female:**  
**6889 ± 107 calBC**  
*Toussaint et al. 2012*

A dating from 2 aurochs-  
ribs  
associate them with the  
inhumation: **5985 ± 47**  
calBC

*Le Brun et al. 2005*

?



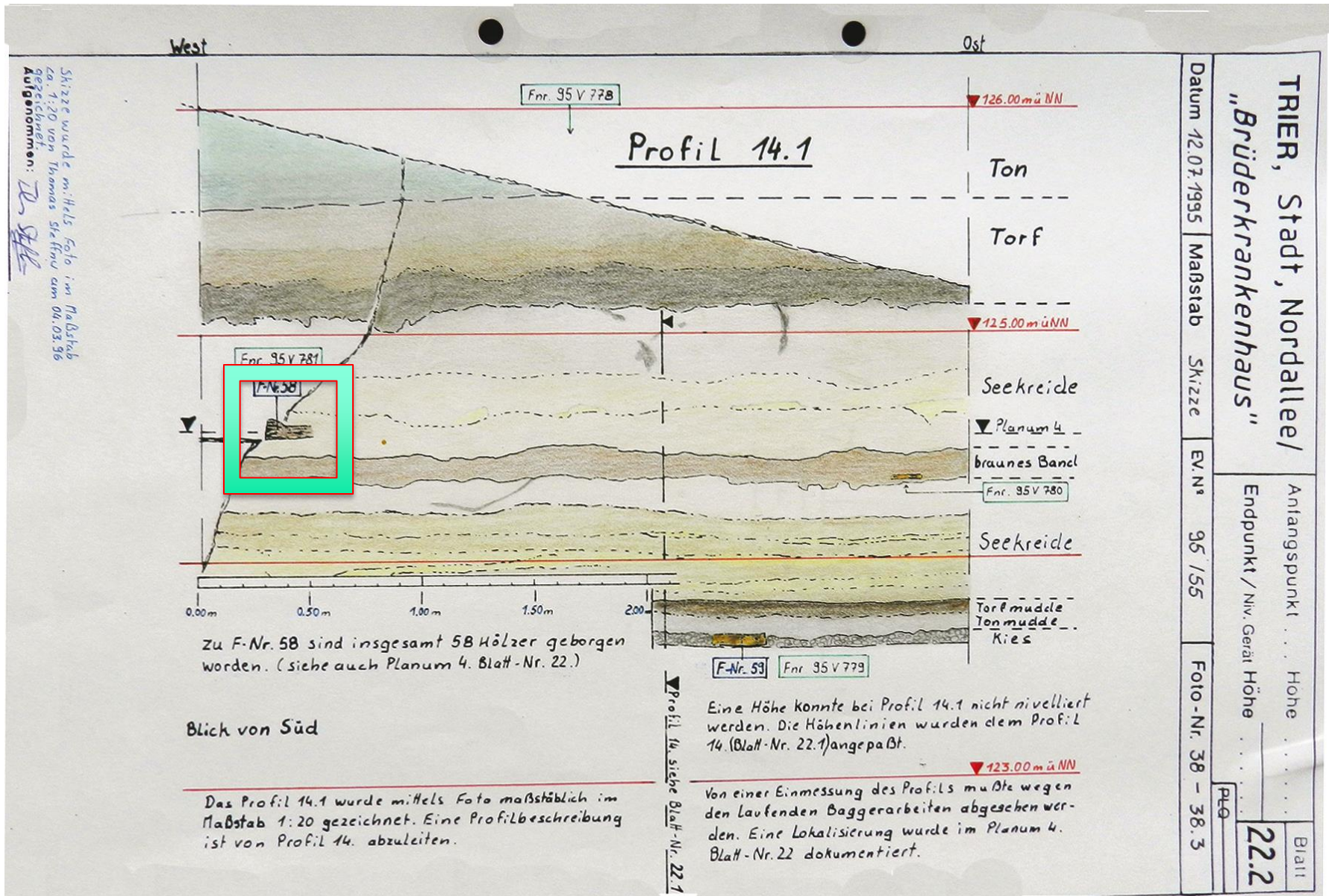
**Inhumation, male:**  
**6094 ± 65 calBC**  
**5988 ± 48 calBC**

# Trier-Brüderkrankenhaus



**Mesolithic Aurochs metatarsus  
found 1995  
during large construction works in  
the Citycenter of Trier. Rescue  
excavation  
by Harwig Löhr and a technician  
from the  
Rheinisches Landesmuseum Trier.**

# Trier-Brüderkrankenhaus

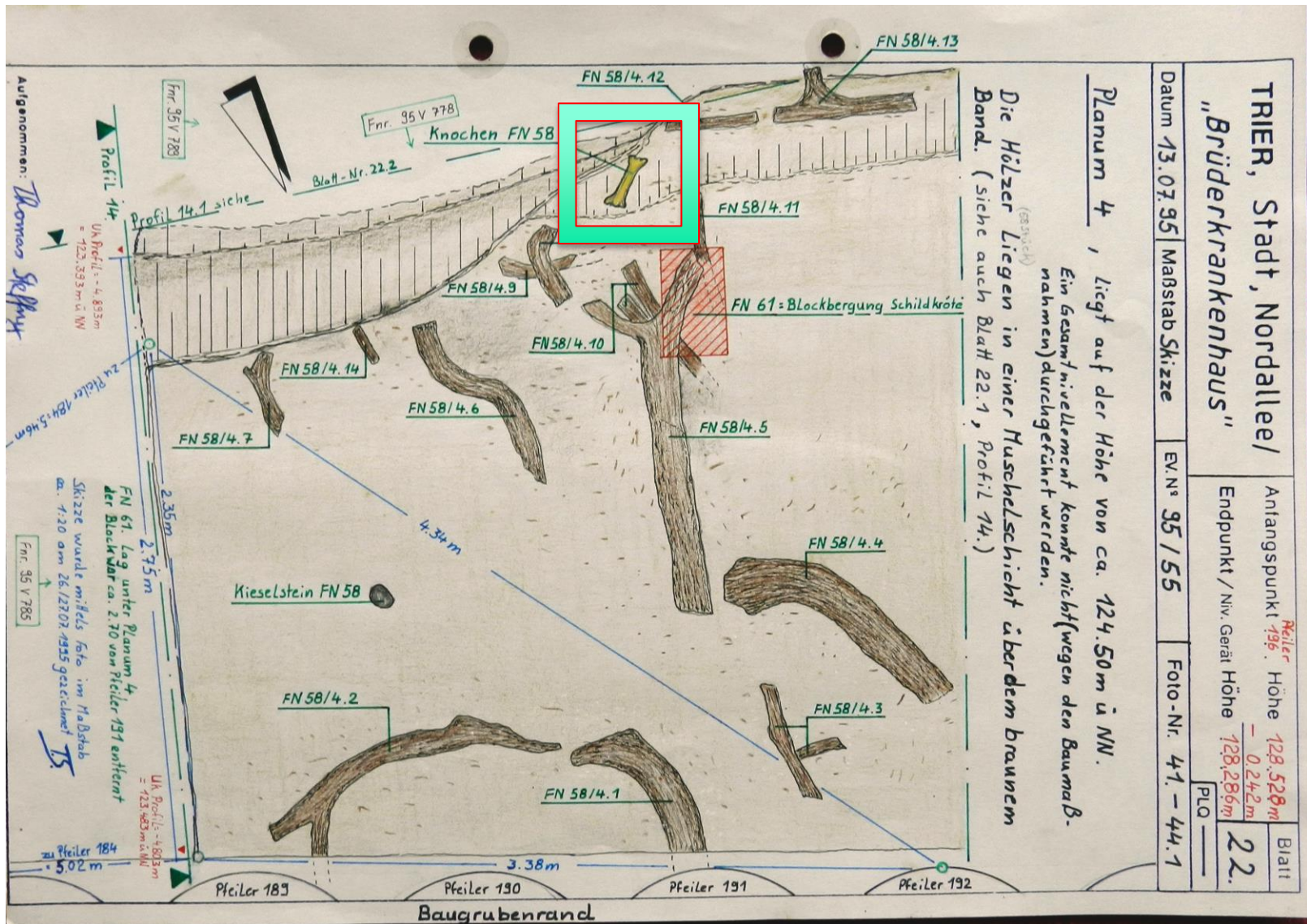


Skizze wurde mittels Foto im Maßstab 1:20 von Thomas Steffny am 04.03.96 aufgenommen: T. Steffny

Datum 12.07.1995		Maßstab Skizze		EV-Nr. 95/155		Foto-Nr. 38 - 38.3	
TRIER, Stadt, Nordallee/ "Brüderkrankenhaus"				Anfangspunkt .. Höhe ..			
Endpunkt / Niv. Gerät Höhe ..				Blatt 22.2			

The Metatarsus was found in a lacustrine chalk, which was covered by peat (Section sketch).

# Trier-Brüderkrankenhaus



Position of the metatarsus in a lacustrine chalk, (Surface sketch), covered by peat with several tree trunks and branches.

# Trier- Brüderkranken- haus

AMS-dating

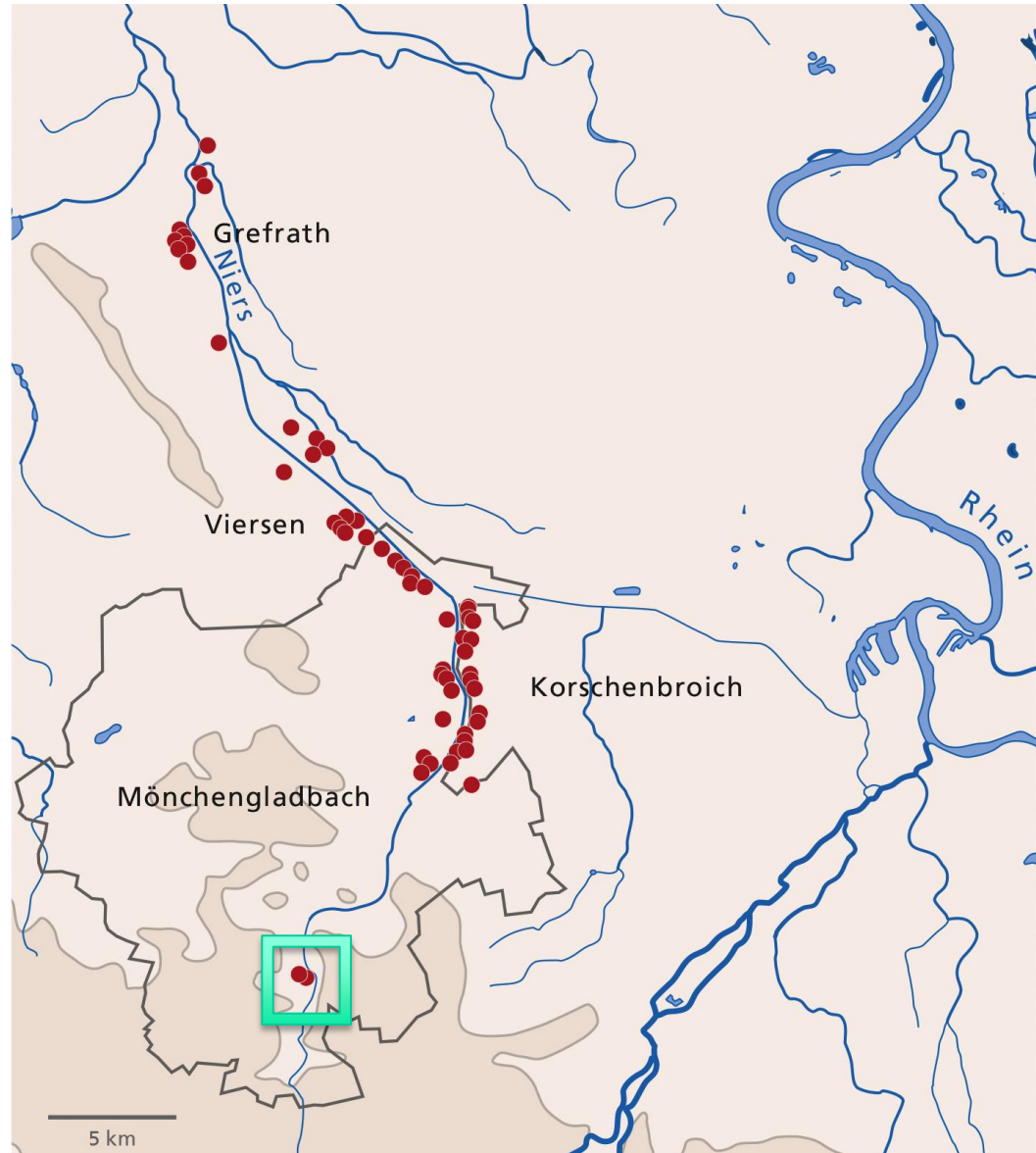
8116 ± 104 calBC



© Photos by Christina Kohnen, Cologne

# Mönchengladbach-Geneicken

**Position of sites in MG-Geneicken (green square) in the Niers valley, where lots of Mesolithic surface sites (red dots) are already known. Map from Heinen 2014.**



# Mönchengladbach-Geneicken

**Mesolithic channel of the Niers with the Early Mesolithic sites, found in rescue-excavations during construction work for the Niers-watermanagement.**

**Excavations by Martin Heinen from Artemus GmbH, Frechen.**





# Mönchengladbach-Geneicken



Photo from  
Heinen 2014.

**Remains of one female Aurochs in situ. The archaeozoological examination is done by Michael Baales.**

# Mönchengladbach-Geneicken

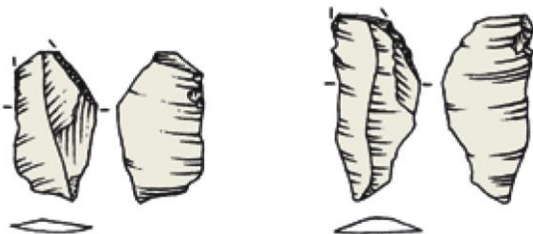
**AMS-dating  
of the Aurochs-  
pars petrosa:**

**9468 ± 124 calBC**

**AMS-dating of  
unknown organic  
material from a  
rib:**

**9246 ± 38 calBC**

Photo and  
Graphs from  
Heinen 2014.



**Two simple micro-points were found  
underneath the mandible. The tips  
were broken.**

# Provisional Résuméée

- 1. Two out of 19 Bos-remains (Trier-Brüderkrankenhaus and Ind. 4 from Bedburg-Königshoven) are suitable for the reconstruction of the complete genome of the European Aurochs so far. (Some specimens are still under examination).**
- 2. The AMS-datings of two Aurochs-teeth reveal new insights into the history of the burials of Loschbour.**
- 3. The datings for Mönchengladbach-Geneicken and Bedburg-Königshoven place the sites into the Early Praeboreal just at the beginning of the Holocene.**
- 4. Thank a lot to all colleagues, who provided samples and valuable information...**

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