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Fragmenting the Chieftain : a practice-based study of Early Iron Age Hallstatt C elite burials in the Low Countries

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Title: Fragmenting the Chieftain : a practice-based study of Early Iron Age Hallstatt C elite burials in the Low Countries

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App. CA1 Hallstatt period textile finds from the Netherlands

By K. Grömer

This appendix summarizes the technical data regarding the textiles from Oss-Vorstengraf and Uden-Slabroek as determined by K. Grömer from the Vienna Natural History Museum. She performed an extensive analysis of all material, and while her results are also available as Report Textile Archaeology 2015/7 from the Natural History Museum Vienna they are included here as this Catalogue brings together all the new research into the elite burials. Section C2.7.2 discusses the technical aspects and terminology used in textile analysis. For this research measurements of technical details of the textile were carried out with a DinoLite Digital Microscope. Using the thread diameter, fine structures of the textile and details of patterns and seams could be documented. Fiber analysis was carried out by means of a Scanning Electron Microscope (JEOL, JSM-6610LV) at the Central Research Laboratories, located at the Vienna Natural History Museum. Electron microscopy is applied to study objects down to micro- and even nanometer scale (0.000001 mm) in a structural or analytical way.

CA1.1 Textiles from Oss-Vorstengraf

Textile on Mindelheim sword (OV.06; see Fig. CA1.1)

Description of the find: sword with four kinds of textiles on different parts of the object: There is a coarser tabby OV.06-1 (Textile A) on the side of the handle. The blade is covered by three different fabrics: on the outside coarser tabby OV.06-2 (Textile B), multiple layers of a fine diamond twill OV.06-3 (Textile C) and finer tabby OV.06-4 (Textile D). The strongly destroyed remains on the inner side of the blade might be identified as deriving from the fine diamond twill OV.06-3 (Textile C)

Coarser tabby OV.06-1 (Textile A)

Size: 35 x 15 mm

Color and material: rust-red, material not detected, no sampling possible

Identification warp and weft: no selvage survived

Technical details:	Thread system 1	Thread system 2
Yarn/plied yarn	single yarn	single yarn
Twist direction	z	s
Twist angle	?	?
Thread thickness	0.5 mm	0.4–0.5 mm
Thread count (threads per cm)	5–6	not countable

Weave type: tabby

Surface, seams, hems, patterns: -

Remarks: due to conservation practices, textile destroyed and rubbed-off

Medium fine tabby OV.06-2 (Textile B)

Color and material: rust-red, material not detected, no sampling possible

Size: ca. 7 x 8 mm visible

Identification warp and weft: no selvage survived

Technical details:	Thread system 1	Thread system 2
Yarn/plied yarn	single yarn	single yarn
Twist direction	z	z
Twist angle	20–30°	20–30°
Thread thickness	0.4 mm	0.4 mm
Thread count (threads per cm)	ca. 15	14–15

Weave type: tabby

Surface, seams, hems, patterns: -

Remarks: dense fabric: micro-stratigraphy: weave OV.06-2 between sword blade and diamond twill OV.06-3

Fine diamond twill OV.06-3 (Textile C)

Color and material: rust-red, material not detected, no sampling possible

Size: ca. 85 x 40 mm

Identification warp and weft: no selvage survived

Technical details:	Thread system 1	Thread system 2
Yarn/plied yarn	single yarn	single yarn
Twist direction	s	z
Twist angle	30°	30°
Thread thickness	0.2 mm	0.2 mm
Thread count (threads per cm)	ca. 20–24	ca. 20–24

Weave type: diamond twill, with point repeat in one direction, displacement in the other

Surface, seams, hems, patterns: -

Remarks: multiple layers (more than 6), covering the sword blade on different parts on the out- and inner side, going through one edge; textile on the inner side of the sword very destroyed, but might belong to this fabric. Between sword blade and diamond twill sometimes the tabby OV.06-2 can be seen and on the diamond twill there are fragments of another tabby OV.06-4.

Tab. CA1.1 Technical data textile analysis on Mindelheim sword (OV.06) by K. Grömer.

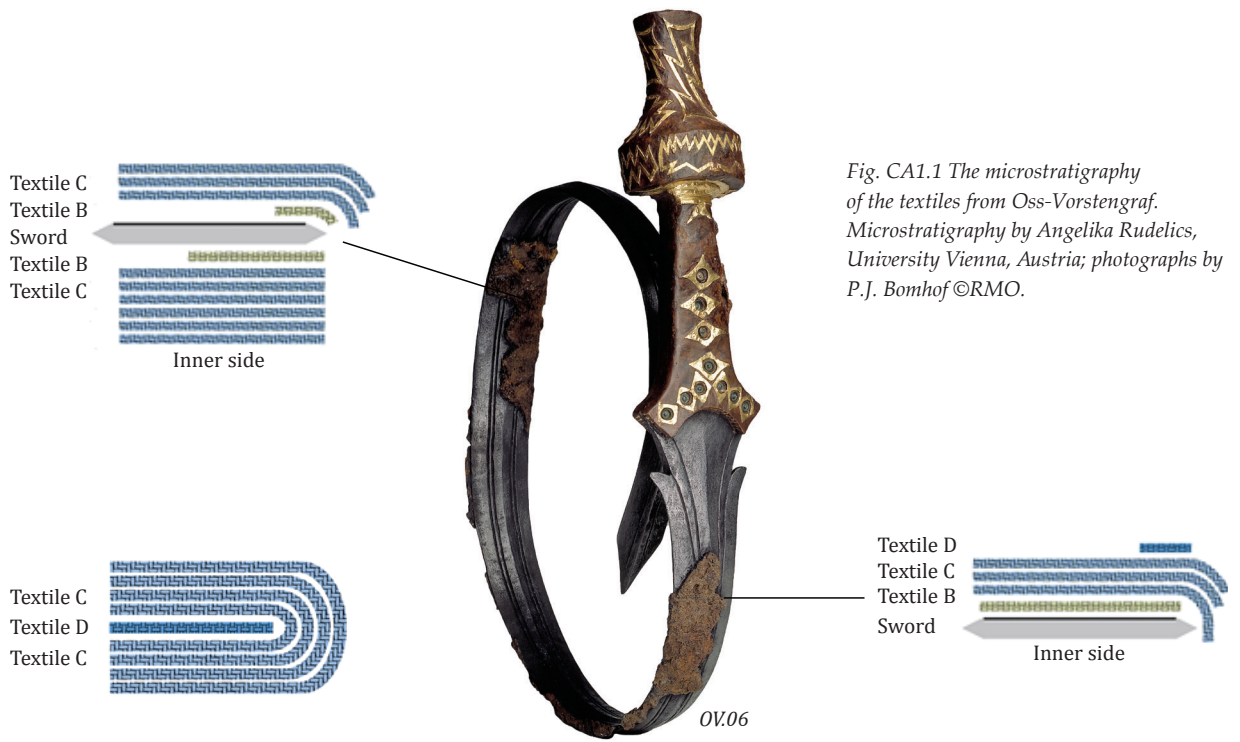
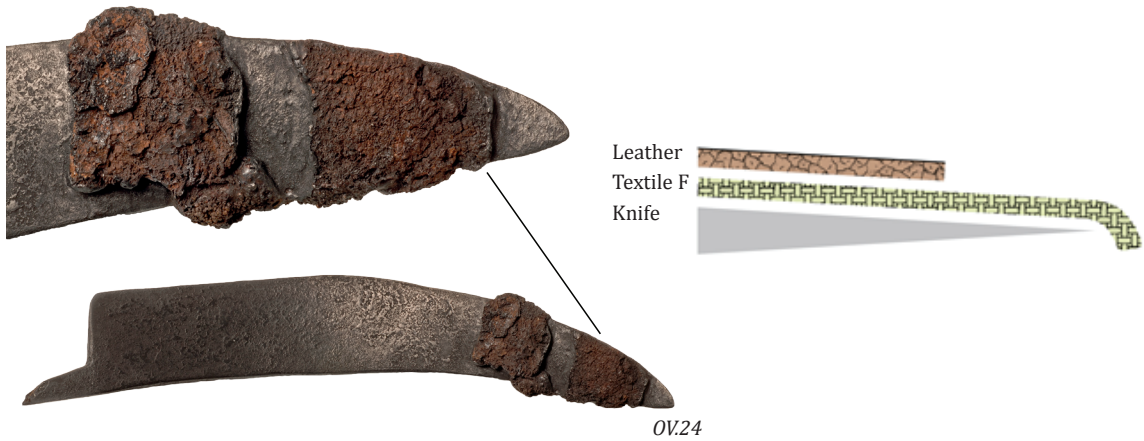


Fig. CA1.1 The microstratigraphy of the textiles from Oss-Vorstengraf. Microstratigraphy by Angelika Rudelics, University Vienna, Austria; photographs by P.J. Bomhof ©RMO.



Finer tabby OV.06-4 (Textile D)

Color and material: rust-red, material not detected, no sampling possible

Size: ca. 5 x 5 mm

Identification warp and weft: no selvage survived

Technical details:	Thread system 1	Thread system 2
Yarn/plied yarn	single yarn	single yarn
Twist direction	s	z
Twist angle	30°	30°
Thread thickness	0.3–0.4 mm	0.3–0.4 mm
Thread count (threads per cm)	16	16

Weave type: tabby

Surface, seams, hems, patterns: -

Remarks: this tabby is partly visible as top layer on the diamond twill

Tab. CA1.1 (continued).

Textile on iron knife (OV.24)

Description of the find: iron knife with coarse textile fragments (OV.24-1) on one side of the blade preserved, folding over the edge of the back of the knife. The textile can be identified on two parts of the blade, in one case it is covered by leather (OV.24-2). On old photos (before restoration) the textile was better visible.

Coarse tabby OV.24-1 (Textile F)

Color and material: rust-red, material not detected, no sampling possible

Size: 30 x 26; 30 x 25 mm

Identification warp and weft: no selvage survived

Technical details:	Thread system 1	Thread system 2
Yarn/plied yarn	single yarn	single yarn
Twist direction	s	z
Twist angle	30°	30–40°
Thread thickness	0.6 mm	0.6 mm
Thread count (threads per cm)	12	7

Weave type: tabby

Surface: very dense, slightly ribbed appearance due to different thread counts in warp and weft

Seams, hems, patterns: -

Remarks: Microstratigraphy: the tabby OV.24-1 is directly attached to the knife blade; it is partly covered by leather

Leather (OV.24-2)

The leather is clearly visible, but the type of animal and the type of tanning cannot be identified, because clear identifying characteristics (grain pattern, texture) are missing.

Tab. CA1.2 Technical data textile analysis on iron knife sword (OV.06) by K. Grömer.

Textile on iron rings (OV.16)

Description of the find: pack of iron rings, items strongly restored, but still on 2 rings textiles of two different kinds are visible: on a smaller ring a coarse tabby (OV.16-1) and on the side of the multiple-packed rings a diamond twill in at least 4 layers (OV.16-2).

Coarse tabby OV.16-1 (Textile A)

Color and material: rust-red, material not detected, no sampling possible

Size: 18 x 6 mm

Identification warp and weft: no selvedge survived

Technical details: comparable to OV.06-1 and OV.18

Weave type: tabby

Surface: open weave

Seams, hems, patterns: -

Remarks: surface worn out; on top of the textile a blackish substance visible. It could not be identified clearly, maybe leather or residues from conservation process

Fine diamond twill OV.16-2 (Textile E)

Color and material: rust-red, material not detected, no sampling possible

Size: 36 x 19 mm

Identification warp and weft: no selvedge survived

Technical details:	Thread system 1	Thread system 2
Yarn/plied yarn	single yarn	single yarn
Twist direction	s	z
Twist angle	40–50°	40°
Thread thickness	0.3 mm	0.3–0.4 mm
Thread count (threads per cm)	not countable	not countable

Weave type: diamond twill

Surface, seams, hems, patterns: -

Remarks: folded textile? Poor visibility due to heavy restoration

Tab. CA1.3 Technical data textile analysis on iron rings (OV.16) by K. Grömer.

Textile on iron ring (OV.18)

Description of the find: iron ring with textile on one side, not going around

Coarser tabby OV.18-1 (Textile A)

Color and material: rust-red, no SEM possible

Size: 24 x 7 mm

Identification warp and weft: no selvedge survived

Technical details:	Thread system 1	Thread system 2
Yarn/plied yarn	single yarn	single yarn
Twist direction	s	z
Twist angle	25°	30°
Thread thickness	0.4 mm	0.4–0.5 mm
Thread count (threads per cm)	5–7	ca. 6

Surface: open weave, low cover factor

Seams, hems, patterns: -

Remarks: very destroyed

Tab CA1.4 Technical data textile analysis on iron rings (OV.16) by K. Grömer.

Loose textile (OV.39–42)

Description of the find: box with different textile fragments in decomposed state from the inside of the situla. No exact localization of single elements possible. The content of the box was sorted by different weave types. Those were compared with the weave types identified on the bronze and iron objects from the situla. All weave types except the coarse tabby OV.24-1 (Textile F) from knife could be identified. Here, the descriptions just extend the information given for the bronze objects. Additionally, two more weave types (Textiles G and H) were recognized, which differ from those recorded on the artifacts. Those will be described here in detail.

Textile A There are two loose fragments of this textile identified in box OV.42. They are very small, less than 10 x 10 mm).

Textile B There are two loose fragments of this textile identified in box OV.42, they are single layers, less than 10 x 10 mm.

Textile C This is the most abundant textile in box OV.42. There are a lot of loose fragments of this textile with quite large lumps of multiple layers. There are four chunks bigger than 35 x 35 mm, with the largest chunk measuring ca. 40 x 50 mm. Some nine fragments are 20 mm long and between 10-20 mm wide, and there are over a dozen smaller chunks. Very few chunks are single or double layers of textile, and most appear to be between 4-8 layers of textile, with one fragment being four layers folded double.

Textile D Tabby that in two cases is attached to a lump of Textile C textile. In one case the Textile D is on Textile C, but the other case shows a single layer of Textile D folded inside several layers of Textile C. This means that Textile D can also be identified as a grave good.

Textile E There are only a few very small fragments of this textile in box OV.42.

Textile G Coarse twill, only very small sample in box OV.42

Textile H Plyed yarn, wrap, band weave, only very small sample in box OV.42

Coarser tabby (Textile A)

Color and material: rust-red and blackish, sample for SEM taken

Size: < 10 x 10 mm (2 fragments)

Technical details: comparable to OV.06-1, OV.16-1 and OV.18

Weave type: tabby

Surface: open weave

Seams, hems, patterns: -

Remarks: some fragments identified

Medium fine tabby (Textile B)

Color and material: rust-red and blackish, sample for SEM taken

Size: < 10 x 10 mm (2 fragments)

Technical details: comparable to OV.06-2

Weave type: tabby

Surface: open weave

Seams, hems, patterns: -

Remarks: -

Fine diamond twill (Textile C)

Some lumps of the weave were separately stored in boxes OV.39–40; more items has been sorted out from box OV.42. Fine diamond twill, folded into multiple layers

Color and material: black to reddish-brown, sample for SEM taken

Size: there are a lot of loose fragments of this textile with quite large lumps of multiple layers. There are four chunks bigger than 35 x 35 mm, with the largest chunk measuring ca. 40 x 50 mm. Some nine fragments are 20 mm long and between 10–20 mm wide, and there are over a dozen smaller chunks.

Technical details: comparable to OV.06-3; but here a thread count of 20–22 in one system; 24–26 in the other recorded

Weave type: diamond twill, with point repeat in one direction, displacement in the other

Surface: surface sometimes very destroyed; different preservation conditions

Seams, hems: in box OV.42 a bigger blackish lump with stitches (overcast-stitch?).

Sewing thread: ca. 0.3 mm sZ-plyed yarn

Stitch distance: 3 mm, regular

Twill structure: diamond twill repeats 15 in one direction, 20 in the other. After Bender Jorgensen 24(?)

Remarks: folded lumps of Textile C, sometimes one layer of Textile D folded (see microstratigraphy)

Very few chunks are single or double layers of textile, and most appear to be between 4–8 layers of textile, with one fragment possibly being a total of 10 layers. One textile chunk is four layers folded double around a single layer of Textile D textile.

Finer tabby (Textile D)

Color and material: dark, sample for SEM taken

Size: unknown (2 fragments, attached to fragments of Textile C)

Technical details: comparable to OV.06-4

Weave type: tabby

Surface: open weave

Seams, hems, patterns: -

Remarks: Textile D in box OV.42 only identified, when still attached to fine diamond twill Textile C, there are 2 lumps of multilayered Textile C with one layer Textile D folded in

Medium fine diamond twill (Textile E)

Color and material: rust-red and blackish, sample for SEM taken

Size: ca. 15 x 15 mm (ev. no. of fragments), several fragments

Technical details: comparable to OV.16-2. Additional identification: thread count ca. 20 threads per cm in warp and weft. No repeat countable, fragments are too small; but it must be more than 10

Weave type: diamond twill with point repeat

Surface: on the better preserved items surface very flat and regular, high quality object

Seams, hems, patterns: -

Remarks: also multilayered, at least 6 layers; maybe it was the bottom textile placed, folded

Coarse twill (Textile G)

Color and material: rust-red and blackish, SEM sample taken

Size: <10 x 10 mm

Identification warp and weft: no selvedge survived

Technical details:	Thread system 1	Thread system 2
Yarn/plied yarn	single yarn	single yarn
Twist direction	z	s
Twist angle	20°	20°
Thread thickness	0.4 mm	0.4–0.5 mm
Thread count (threads per cm)	5–7	ca. 6

Weave type:

Surface: on some fragments the surface is heavily worn; use-wear or caused by degradation process?

Seams, hems, patterns: -

Remarks: threads low twist

Repp (Textile H)

Color and material: rust-red and blackish, SEM sample taken

Size: 5 x 12 mm (2 fragments)

Identification warp and weft: no selvedge, but due to weave structure (repp) it seems feasible to identify the plied yarn as warp

Technical details:	Thread system 1	Thread system 2
Yarn/plied yarn	plied yarn	single yarn
Twist direction	zS	z
Twist angle	20°	20°
Thread thickness	0.8 mm	0.3–0.4 mm
Thread count (threads per cm)	not countable	not countable

Weave type: repp

Surface: -

Seams, hems, patterns: -

Remarks: no selvedge survived, maybe it was a repp band, as comparable finds from Hallstatt demonstrate

Tab. CA1.5 Technical data textile analysis on iron rings (OV.16) by K. Grömer.

CA1.2 Textiles from Uden-Slabroek

Textile on bracelet (US.07)

Description: coarse twill (US.07-1; Textile A) in 2–3 layers on the right bracelet, covered by fragments of a finer twill (US.07-2; Textile B)

Coarse twill (no. US.07-1; Textile A)

Color and material: sheep wool, some kemp; more or less brownish, in oblique light some colours visible (brighter, reddish) and darker. In Microscope bluish threads visible. Dyestuff analysis carried out by N. van Bommel

Size: 2 major pieces (ca. 70 x 30 mm and 40 x 20 mm)

Identification warp and weft: no selvedge survived

Technical details:	Thread system 1	Thread system 2
Yarn/plied yarn	single yarn	single yarn
Twist direction	z	z
Twist angle	30–40°	30–40°
Thread thickness	0.5–0.7 mm	0.6–0.8 mm
Thread count (threads per cm)	9	11

Weave type: 2/2 twill (more than 30 threads countable without point repeat)

Surface: rubbed off and worn out, looks felted inside and outside: maybe from degradation process or use-wear

Seams, hems: -

Patterns: color pattern: different colors in warp and weft visible, especially well seen on the small fragment

Remarks: soft and warm textile, yarns irregularly spun

Finer twill (no. US.07-2; Textile B)

Color and material: sheep wool, brownish

Size: ca. 15 x 15 mm

Identification warp and weft: no selvedge survived

Technical details:	Thread system 1	Thread system 2
Yarn/plied yarn	plied yarn	plied yarn
Twist direction	zS	zS
Twist angle	20°	20°
Thread thickness	0.3–0.4 mm	0.3–0.4 mm
Thread count (threads per cm)	16–18	ca. 16

Weave type: 2/2 twill weave

Surface, seams, hems, patterns: -

Remarks: not well preserved, microstratigraphically over Textile A

Tab. CA1.6 Technical data textile analysis of textiles on large bronze bracelet (US.07) by K. Grömer.

Textile on bracelet set (US.08; see Fig. CA1.2)

Description: coarse twill (No. US.08-1; **Textile A**) in layers, covered by fragments of a finer twill (US.08-2; **Textile B**). Here leather (No. US.08-3) could be detected above **Textile B**.

Coarser twill (no. US.08-1; Textile A)

Color and material: brownish

Size: 3 larger fragments: ca. 30 x 15mm; ca. 35 x 20 mm; ca. 45 x 20mm

Technical details: comparable to US.07-1

Weave type: 2/2 pointed twill (unlike to no. US.07-1 here the point repeats could be detected)

Surface: very decomposed state

Seams, hems, patterns: -

Remarks: bigger parts of the textile survived, sometimes more layers (2–3)

Finer twill (no. US.08-2; Textile B)

Color and material: brownish

Size: -

Technical details: comparable to US.07-2

Weave type: 2/2 twill

Surface: very decomposed state

Seams, hems, patterns: -

Remarks: the textile is poorly visible

Leather (no. US.08-3)

Surface visible and texture, no grain could be identified, therefore no animal type determinable

Tab. CA1.7 Technical data textile analysis of textiles on bronze bracelet set (US.08) by K. Grömer.

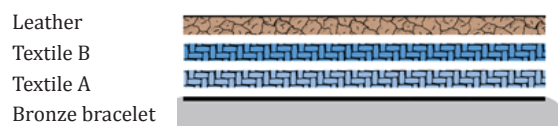


Fig. CA1.2 The microstratigraphy of the bracelet set (US.08; left) and the bracelets in excavation at Restauratieatelier Restaura (right). Microstratigraphy by Angelika Rudelics, University Vienna, Austria; photograph by Restauratieatelier Restaura, Haalen.

Textile on anklet (US.09)

Description: layers of coarse twill (**Textile A**) with a pattern visible on bronze anklet

Coarser twill (US.09-1; Textile A)

Color and material: brownish and light

Size: four larger fragments (ca. 65 x 45 mm; 35 x 30; 50 x 15 mm; 40 x 20 mm) and roughly a dozen fragments smaller than 20 x 20 mm

Technical details: comparable to US.07-1 and US.08-1

Weave type: 2/2 pointed twill; point repeat on the smaller one: repeat after more than 20 threads

Surface: very well preserved, under oblique light even the pattern is visible

Seams, hems: -

Patterns: pattern countable: from left to right: 6 dark threads, 8 light threads, 8 dark, 2 light; from top to bottom: 4 dark threads, 8 light, 8 dark. Maybe it was a regular checkered pattern of alternating 8 dark and 8 light threads in warp and weft. After the dyestuff analysis red and blue dyestuffs could be detected. It was a pattern in bright red and blue block checks

Remarks: folded textile, two layers at least; bigger parts of the textile survived, sometimes more layers (2–3 layers)

Tab. CA1.8 Technical data textile analysis on bronze anklet (US.09) by K. Grömer.

App. CA2 Chieftain's grave of Oss through three restorations

The restoration history of the Chieftain's grave of Oss is described in this appendix. Any comments made by Holwerda (1934) or Modderman (1964) regarding specific objects are directly quoted. Their comments, combined with those made by Kempkens and Lupak (1993a), are needed to understand how the physical appearance, and our understanding, of the artifacts have changed through time. This information was needed to clarify the mistakes that were made in the numbering of artifacts following the last restoration (see Section C3.1 and C26.2). The inventory numbers of the National Museum of Antiquities in Leiden (RMO) given are those as they appear on the physical objects today. Objects that have been renumbered also have their previous inventory number listed. A '2011' number therefore refers to the current number, while a '1964' number refers to the number an object had prior to the 1992/'93 restoration.

CA2.1 Explanation of the categories

No.: Gives the unique number used in this dissertation.

RMO inventory number: Gives the individual Museum inventory number of the object(s).

Object description: Gives a short description of the object(s), see also Section C26.2.

Inventaris boek 1933: Describes the object(s) listed under that number in the inventory book of the Dutch National Museum of Antiquities from 1933, quoted in the original Dutch (©RMO).

Holwerda (1934): Quotes how Holwerda described an object in his article "*Een vroeg Gallisch vorstengraf bij Oss (N.B)*". Figures mentioned are those in Holwerda (1934).

Modderman (1964): Quotes how Modderman described an object in his article "*The Chieftain's grave of Oss reconsidered*". Figures mentioned are those in Modderman (1964). Includes my own comments regarding numbering problems.

Kempkens and Lupak (1993a): Summarizes how Kempkens and Lupak treated an object during the 1992/'93 restoration. Information listed here is ©RMO.

Object no. Description	RMO inv. no.	Inventaris boek 1933	Holwerda (1934)	Modderman (1964)	Kempens and Lupak (1993a)
		"De nummers 2–11 gevonden binnen de bronzen urn nr 1 te zamen met verbrande beenderen, en met de volgende voorwerpen, die ten deele bij de reeds genoemde nummers behooren."			Note: in this column only the structural changes to these objects are summarized, the technical terminology of the different restoration processes has been left out.
Human remains					
OV01 Cremated remains (and burned animal bone)	k 1933/7.21	"Grote massa grof verbrande beenderen, waaronder mogelijk ook dierenbeenderen."		See Modderman 1964, 57 for more information regarding the research done on the cremation remains by J. Huizinga	
Bronze vessel					
OV02 Bronze bucket	k 1933/7.1	"Urn van geslagen brons, uiterst dunwandig, bestaande uit zeer vele stukken. De deelen waren met koperen spijkertjes aan elkaar bevestigd. De rand is scherp geprofileerd, de schouder geribd. Aan wand en wand zijn de overblijfselen van met spijkertjes eraan genagelde ooren herkenbaar. Vgl. Von Sackens, das Grabfeld von Hallstatt, Taf xx, 1 en 2. Het geheel, thans op een gipsen vorm bevestigd, vormde de bekleding van een houten tonvormige urn, waarvan afkomstig is:"	"Zoo bleek mij de bronzen urn een typische situla te zijn waarvan slechts een deel van den bovenrand verdwenen was. Deze bronzen situla was gemaakt uit twee trapeziumvormige stukken bronsblik en een afzonderlijken bodem, door nagels aan elkaar bevestigd. Ze was 50 cm hoog en voorzien geweest van twee bandvormige ooren van bronsblik, welke boven aan den rand bevestigd onder het schoudergedeelte eveneens door nagels aan den vaaswand geklonken waren." (Holwerda 1934, 39)	"The situla (k 1933/7.1) was made of three bronze sheets, held together by rivets. These rivets have small knobs on the inside, and must therefore have been beaten flat from the outside. The bottom of the situla is not flat but concave. On the shoulder just under the vertical rim, two ridges are found. Unfortunately, the rim is in a bad state of preservation, the greater part being missing, which is also true of the handles. The handles were mounted where the two bronze sheets forming the wall are joined. The lower attachment of one of the handles is still present and measures about 125 mm. The handle itself must have been much smaller but probably more than 30 mm. Traces of vertical lines show that they were decorated. The upper part of the handles was attached by two rivets to the inside of the rim, an extra small square piece of sheet-bronze was placed on the outside of the rim. The only remaining upper attachment of one of the handles has a decoration composed of two sizes of dots." (Modderman 1964, 58)	During a previous restoration a plaster model was made on the inside of the bucket. It was heavily corroded and brittle. The entire thing is covered in a crusty layer and affected by bronze rot. There are fractures throughout and the bucket is heavily distorted. Parts of the rim, body and bottom of the bucket are missing. The crusty layer and the old plaster model were removed. Loose fragments were refitted and missing pieces reconstructed. The entire surface of the bucket was covered in a layer of polyester reinforced with glass fiber (Kempkens/Lupak 1993a, 1–1.20).
OV03 Bronze plate fragments from the bucket. -One rim piece with lead. -One possible handle piece with decoration?	k 1933/7.12a	"Kleine stukjes geslagen brons, waarschijnlijk horende bij nr 1."			
OV04 Multiple bronze plate fragments from the bucket. And: -Fragments with possible decoration (handle?) -Rivet? -Bone fragment	k 1933/7.12b	"Kleine stukjes geslagen brons, waarschijnlijk horende bij nr 1."			
OV05 Fragments of bronze plate, many	k 1933/7.20b				

Object no. Description	RMO inv. no.	Inventaris boek 1933	Holwerda (1934)	Modderman (1964)	Kempkens and Lupak (1993a)
Weaponry					
OV/06 Mindelheim sword	k 1933/7.3	"Rond gebogen ijzeren zwaard, gevonden in nr. 1. De houten knop was versierd met bladgouden, bliksemvormige ornamenten. Onder den knop sporen van wollen weefsel op het gevest, dat verder versierd is aan de breede zijden met opgelegde, ruitvormige, gouden versieringen, die tevens aanwezig zijn op het eensgezins boogvormig, verbrede ondergedeelte van het gevest. Waarschijnlijk was het gehele gevest oorspronkelijk bedekt met hout of been, het welk met bronzen spijkertjes door de uitgespaarde gaatjes midden in de gouden ruitjes op het ijzer bevestigd was. Vgl Von Sacken, Tafel V, 1 en 2."	"Binnen langs den wand van den emmer kwamen zes ijzerfragmenten voor den dag, die aan elkaar bleken te passen en te zamen een zeer sterk verroest, ongeveer 90 cm lang, krom gebogen Halstattzwaard bleken te vormen van het bekende groote type. Het gevest was met doek bekleed geweest, waarvan nog de sporen aanwezig waren. Midden over het gevest en onder aan in een boogje langs zijn rand waren aan beide zijden een aantal kleine ruitvormig uitgesneden stukjes goudblik met bronzen pennetjes bevestigd geweest. Deze ruitjes waren in het midden rond uitgesneden en waarschijnlijk aangevuld geweest met eenige stof die geheel vergaan was. Ook de knop moet uit vergankelijk materiaal vervaardigd zijn geweest. Hij was echter geheel bezet geweest met zigzag- en bliksemvormige ornamentjes uit goudblik gesneden en uit de ligging en aansluiting dezer ornamentjes onderling liet zich nog de vorm van den knop opmaken en restoreeren, gelijk onze afbeelding" (Holwerda 1934, 40).	"The sword (k 1933/7.3; fig 2) with its decorations of gold leaf is well known because the find lay outside the plaster distribution area. The present knob on the hilt is a plaster restoration to which the decoration has been attached. Mr. Versloot measured the decayed material showing the original form, and according to him the greatest error is at most a few millimeters. The knob was probably made of wood, whereas the hilt proper may have been of wood or bone. The drawing gives the decoration in detail. Gold leaf is to be found on all sides of the knob. The gold shows incisions in some places. The lozenge-shaped figures on the hilt show a circular opening containing a round, hollow piece of bronze. On the edge of the hilt and the blade very small triangles of gold are found, placed at right angles to the surface of the blade. The blade itself had a central, broad rib with a minor one on each side (see cross-section in Fig. 2). The central rib can be followed to within a few mm. of the very point of the sword; its width is constant over the whole length." (Modderman 1964, 58)	During a previous restoration breaks were repaired. The blade of the sword was covered in a thick layer of iron oxide. The crusty layer was hard and grainy. It was heavily corroded. The hilt with gold inlay was also covered with iron oxide. In certain places the gold inlay was distorted and had come loose. Parts are missing. Wood and textile remains had survived on the sword. The crusty layer was removed. The old repairs of the fractures were undone, reinforced and reattached. During this process the 'new' tip (7.8) of the sword (the fragment that Holwerda and Modderman had interpreted as belonging to another sword/knife) was refitted onto the sword. Some missing pieces were reconstructed. The missing pieces of gold inlay on the hilt were replaced (Kempkens/Lupak 1993a, 2-2.14).
OV/07 Gold fragments from hilt including six triangles	k 1933/7.13	"Stukjes bladgoud, deelen van de knopversiering van nr 3."	-	-	-
OV/08 Lead and tin (?) fragments	k 1933/7.14	"Kleine stukjes been (?), waarop de gouden versierselen gelegd waren van nr 3."	-	-	The fragments were heavily corroded, brittle and fragile. Certain pieces are distorted and the surface was damaged. The fragments were impregnated with epoxy but otherwise left untreated (Kempkens/Lupak 1993a, 22).
Horse-gear					
OV/09 Iron horse-bit. On the hinged part of the bit there is a bronze fragment, possibly one of the 'legs' of a sheet-knob	k 1933/7.10h	-	-	"One [of the two iron cheek-snaffles discovered by Mr. Ypey] was found near the axe (10h). [...] Both are incomplete." (Modderman 1964, 60)	The horse-bit was broken into several pieces. It was covered with a thick crusty layer. The separate components rusted onto each other and were hollow and fragile. The whole thing is fragmentary and there are pieces missing. The loose fragments were restored and the missing fragments reconstructed. It was cleaned and made movable again. On the hinged part of the bit there is a bronze fragment, possibly one of the 'pins' of a sheet-knob (Kempkens/Lupak 1993a, 7-7.3).

Object no. Description	RMO inv. no.	Inventaris boek 1933	Holwerda (1934)	Modderman (1964)	Kempkens and Lupak (1993a)
OV/10 Iron horse-bit. On the left ring and the right fastening eye there are bronze fragments, possibly 'pins' from sheet-knobs	k 1933/7.10i	-	-	"One [of the two iron cheek-snaffles discovered by Mr. Ypey] was found [...] in a separate lump (loi). Both are incomplete." (Modderman 1964, 60).	The whole thing was covered in a thick layer of corrosion. The separate pieces rusted onto each other and the entire thing is fragmented. It is hollow and fragile, and there were pieces missing from the bit. These loose pieces were restored onto the bit and missing pieces were reconstructed. The whole thing was cleaned and made movable again. On the left ring and the right fastening eye there are sheet fragments, possibly 'pins' from sheet-knobs (Kempkens/Lupak 1993a, 6-6.3).
OV/11 Bronze hemispherical sheet-knobs, 12x	k 1933/7.4a-1	"Een achtal ronde knopjes, hol, oorspronkelijk bestemd als beslag, bestemd als beslag, waarschijnlijk van de houten zwaardschede"	"[Aan de kling van het zwaard waren op verschillende plaatsen nog de fragmenten van een houtenschede vastgehecht], terwijl een achtal kleine ronde knopjes van brons, ongeveer als v. Sacken .J. XVIII 7 e. v. v. waarschijnlijk tot beslag van deze hadden gediend" (Holwerda 1934, 40).	"Eight small, hemispherical, bronze 'buttons' were found in the urn. They must have been attached to some leather object, because each of them has two points resembling those of a staple." (Modderman 1964, 58)	The sheet-knobs were covered with a layer of oxide. They were corroded, brittle, fragile and affected by bronze rot. Some sheet-knobs are missing fragments. The sheet-knobs were stabilized and cleaned. There are 15 in total (three are corroded onto rings) (Kempkens/Lupak 1993a, 21-21.1).
OV/12 Bronze tubular cross-shaped object	k 1933/7.7	"Bronzen kruis met vier horizontale armen en één naar onderen gericht armpje, alle met verdikte einden. Bij het midden zijn de horizontale armen aan de bovenzijde weer kruisvormig uitgesneden. Het geheel heeft klaarblijkelijk aan ijzer vast gezeten, zoodat een enkele der armen, die oorspronkelijk alle hol waren, met ijzerroest gedicht is. Vgl. Sacken, taf XVIII, 15."	"Een kruisvormig sierstukje van brons als von Sacken.L. XVIII 15" (Holwerda 1934, 40).	"To the same group of bronzes [decoration on a horse's harness] we may assign the remarkable tubular cross-shaped object." (Modderman 1964, 58)	The object was covered with a layer of iron oxide and had been affected by bronze rot. Some fragments were missing. The object was stabilized, the missing pieces reconstructed and cleaned (Kempkens/Lupak 1993a, 20-20.2).
OV/13 Bronze <i>Turtulus</i>	k 1933/7.18	"Rond bronzen voorwerp, plat, met verhevenheid in het midden."	-	"A heavily corroded and distorted object of bronze [which must have served as decoration on a horse's harness]." (Modderman 1964, 58)	The object is heavily corroded, brittle and fragile. It is covered in a layer of iron oxide crust, and affected by bronze rot. The object is heavily distorted and fragments are missing. It was probably burned. The object was stabilized, the missing pieces reconstructed and cleaned (Kempkens/Lupak 1993a, 18-18.1).
OV/14 Fragmented circular bronze object which has a proflation, likely harness decoration. In 1964 this had no. k 1933/7.18.	k 1933/7.20c	-	-	"Half of a circular object which has a proflation (fig. 2). No explanation can be offered to its function." (Modderman 1964, 58)	A large part of this object is missing. The remaining piece is covered with a crusty layer. The object was stabilized and cleaned (Kempkens/Lupak 1993a, 19-19.1).
OV/15 Bronze rings, 3x	k 1933/7.5	"Een drietal bronzen ringen, massief, waaraan ijzer is gesmolten."	"Drie kleine massieve bronzen ringen" (Holwerda 1934, 40).	"Three heavy bronze rings belong to the equipment. We are unable to suggest any explanation of their function." (Modderman 1964, 58)	The rings were covered with a layer of iron oxide and affected by bronze rot. The rings were stabilized and cleaned (Kempkens/Lupak 1993a, 16-16.1)

Object no. Description	RMO inv. no.	Inventaris boek 1933	Holwerda (1934)	Modderman (1964)	Kempens and Lupak (1993a)
OV/16 2011: Mass of 10 iron rings, an iron rod with flattened end & 2 bronze sheet-knobs. On the outer 2 rings textile remains have survived. On a fragment of one of the rings an impression of the sword hilt with gold inlay survives. Fragments of two iron objects. 1964: A bent piece of rounded iron with a knob at one end, in 1993 this piece was refitted onto one of the cheek-pieces	k 1933/7.10j	-	-	2011-7.10j: "Probably belonging to the harness are a number of iron rings the different sizes of which are shown in a drawing (Fig. 4). Of numbers A, E, G, and H only one was found, whereas numbers B, C, D, and F each occurred twice. Number E is somewhat unusual because it varies in width from 0.5 - cm. on one side to 0.3/0.4 cm. on the other." (Modderman 1964, 61). 1964-7.10j: "A bent piece of rounded iron with a knob at one end (10j) was found near the socketed axe. We are sure that it is not part of the reconstructed cheek-shafile (10j) because it is impossible to join them." (Modderman 1964, 60).	2011-7.10j: The iron ring fragments were rusted onto a horse-bit. The ring fragments were brittle and fragile. The whole thing was covered in corrosion and for the most part hollow. Pieces were missing. The iron bit and knife were removed. Loose pieces were restored onto the rings and the gaps filled in. The entire thing was cleaned (Kempkens/Lupak 1993a, 3-3.3). 1964-7.10j: refitted onto one of the horse-bits.
OV/17 2011: Iron ring. Fragment was attached to knife (7.9 most likely) 1964: A piece of iron cheek-piece	k 1933/7.10k	-	-	1964-7.10k: "It consists of a rounded rod with a knob and two rectangular openings. It is impossible to explain this piece as part of the horsebit (10h), because the size of the rectangular eyes is different." (Modderman 1964, 60)	The iron ring survived in fragments on the knife (7.9). It was corroded, hollow and fragile. The fragment was cleaned and the ring reconstructed (Kempkens/Lupak 1993a, 5-5.1).
OV/18 2011: Iron ring from loose fragments, with textile remains 1964: Part of a toggle (7.10), which now has no. k 1933/7.10e	k 1933/7.10l	-	-	1964-7.10l: "A comparable piece [tok 1933/7.10k] is the rod with knob and only one eye, which is bigger than the eyes in the other." (Modderman 1964, 60) This object now has no. k 1933/7.10e.	The iron ring was reconstructed from several loose fragments. It was heavily corroded, hollow, fragile and incomplete. The gaps were filled in and it was cleaned. Textile remains survive on the ring (Kempkens/Lupak 1993a, 4).
OV/19 2011: Iron ring fragments, 2x 1964: Iron knob belonging to a cheek-piece	k 1933/7.10m	-	-	1964-7.10m: "A stray knob [that] cannot be placed with any certainty." (Modderman 1964, 60)	This knob was restored onto a cheek-piece
OV/20 -Iron or ring fragments with part of a bronze sheet-knob rusted on -4 corroded fragments of hollow iron rod/ring, one piece with textile remains. -Miscellaneous iron fragments	k 1933/7.20a	"Een massa aaneengeeroest ijzer, waaronder ook aangeeroeste stukjes brons."			
Yoke and wagon components					
OV/21 Bronze yoke rosettes, 2x	k 1933/7.6	"Een tweetal plaatjes van ellipsvorm, aan de onderzijde hol, aan de kleinere bovenzijde eveneens verdiept. In het midden een klein rond gaatje. Deze plaatjes hebben waarschijnlijk gediend als beslagstukken en de holte aan de bovenzijde zal gevuld zijn geweest met een of andere vergankelijke stof, hout of been bijvoorbeeld. Met beide stukken is ijzerroest verbonden, doch zonder herkenbare vorm."	"Twee ovale schaafvormig verdiepte bronzen plaatjes, van mij onbekende bestemming" (Holwerda 1934, 40).	"Two elliptical plates of bronze must have served as decoration on a horse's harness." (Modderman 1964, 58)	The yoke rosettes were covered with a crusty layer and affected by bronze rot. The yoke rosettes were stabilized and cleaned (Kempkens/Lupak 1993a, 17-17.1)

Object no. Description	RMO inv. no.	Inventaris boek 1933	Holwerda (1934)	Modderman (1964)	Kempens and Lupak (1993a)
OV22 2011 k 1933/7.10e: iron toggle, described in 1964 as an iron rod. In 1964 this object had no. k 1933/7.10l. 1964 k 1933/7.10e: iron square razor with 2011 no. k 1933/7.8	k 1933/7.10e	-	-	2011-7.10e: "[...] rod with knob and only one eye, which is bigger than the eyes in the other [cheek-snaffles] (fig. 3, 101)." (Modderman 1964, 60). In 1964 this object had no. k 1933/7.10l. 1964-7.10e: "The other [knife] is in three parts: it has a straight back and a curved cutting edge. (Fig. 3, 10e)." (Modderman 1964, 59). This object now has now has no. k 1933/7.8.	2011-7.10e: The toggle was covered with a thick crusty layer and was brittle and hollow. The crusty layer was removed and the hollow spaces filled in (Kempkens/Lupak 1993a, 10-10.1). 1964-7.10e: The razor survived only in fragments, which were covered in a crusty layer. The fragments were refitted and the missing pieces reconstructed (Kempkens/Lupak 1993a, 12-12.1).
OV23 Iron toggle	k 1933/7.10f	-	-	"Unexplainable as to its function is an iron rod with a rounded cross-section. No further details are available." (Modderman 1964, 60)	The toggle fragment was covered with a thick crusty layer and was brittle and hollow. The crusty layer was removed and the hollow spaces filled in. The missing piece was reconstructed (Kempkens/Lupak 1993a, 10-10.1).
Tools					
OV24 Iron knife with leather and textile remains adhered	k 1933/7.9	"Onderste punt van een dergelijk dolkje, bedekt met wollen stof"	1964: "Het andere [fragment van dolken of kleine zwaarden] ook puntig doch eensneedig en met een verdikten rug" (Holwerda 1934, 40).	"The other is a knife with a sharp edge and a blunt back on the straight side." (Modderman 1964, 59)	The present day knife with no. k 1933/7.9 has been reconstructed from Modderman's k 1933/7.9 and k 1933/7.10c. The two pieces were corroded, hollow and fragile. There were fragments missing, also the tip of the tang is missing. The pieces were refit and the missing fragments reconstructed. The whole thing was cleaned, while preserving the textile and leather remains on the knife. (Kempkens/Lupak 1993a, 8-8.3).
OV25 Iron socketed axe	k 1933/7.10g	-	-	"The iron objects never before described include a very simple iron socketed axe with a more or less circular mouth. A cross-section through the middle of the object could not be drawn with sufficient exactitude because of its position between the other objects." (Modderman 1964, 59-60)	The axe was covered with a crusty layer, distorted in places and cracked. The iron was heavily corroded and brittle. One corner of the cutting edge was missing. The crusty layer was removed and the breaks repaired. The missing corner was reconstructed. (Kempkens/Lupak 1993a, 9-9.1)
OV26 (Whet)stone(?)	k 1933/7.11	"Platte wetsteen, puntig toeloopend."	"Slijpsteentje" (Holwerda 1934, 40).	"A whetstone" (Modderman 1964, 61).	The whetstone was partially covered with iron oxide and broken. The break was repaired and the whetstone was cleaned (Kempkens/Lupak 1993a, 23-23.1).

Object no. Description	RMO inv. no.	Inventaris boek 1933	Holwerda (1934)	Modderman (1964)	Kempens and Lupak (1993a)
Personal appearance					
OV/27 2011: Iron razor (?) (in 1964/1992 this object had no. k.1933/7.10e) 1964: tip of the Mindelheim sword (k.1933/7.3), interpreted at the time as a separate sword	k.1933/7.8	1964-7-8: "Sterk geroest, puntig ijzeren voorwerp, waarschijnlijk een deel van een dolkje. Blijkbaar is dit voorwerp met wollen stof bekleed geweest."	1964k.1933/7.8: "[...] groote fragmenten van dolken of kleine zwaarden, het ééne lang en puntig als van een antennezwaard" (Holwerda 1934, 40).	2011. k.1933/7.8: "The other [knife] is in three parts; it has a straight back and a curved cutting edge. (Fig. 3, 10e)." (Modderman 1964, 59) 1964. k.1933/7.8: "One of them is certainly a dagger with cutting edges on both sides (k.1933/7.8)." (Modderman 1964, 59) In 1992 this object was restored onto the Mindelheim sword k.1933/7.3 as the tip.	1964 k.1933/7.10e: The razor survived only in fragments, which were covered in a crusty layer. The fragments were refitted and the missing pieces reconstructed (Kempkens/Lupak 1993a, 12-12.1)
OV/28 Iron razor	k.1933/7.10d	-	-	"One [of the knives] has a curved back and a straight cutting edge (Fig. 3; Id). Only one small part is hidden between some other objects, and a broken line indicates this." (Modderman 1964, 59)	The knife was in, and rusted onto, the clump of iron rings. It was heavily corroded, hollow and fragile. The knife was broken, covered in a crusty layer and a piece was missing. The knife was cleaned and repaired (Kempkens/Lupak 1993a, 11).
OV/27 Bronze & iron <i>Bombenkopf</i> pin In 1964 this object had no. k.1933/7.10a	k.1933/7.10b	-	-	1964. k.1933/7.10b: "Two objects of bronzeplate require attention. They consist of two separate cones joined by an iron pin. The find provides hardly any indication as to the object to which these cones belonged, although a dress-pin seems most probable." (Modderman 1964, 58-59)	The pin only survives in fragments. It was heavily corroded, brittle and fragile. The missing parts of the Kopf were reconstructed and the whole thing was cleaned (Kempkens/Lupak 1993a, 14-14.1).
OV/28 Bronze & iron <i>Bombenkopf</i> pin In 1964 this object had no. k.1933/7.10b	k.1933/7.10c	-	-	"Two objects of bronzeplate require attention. They consist of two separate cones joined by an iron pin. The find provides hardly any indication as to the object to which these cones belonged, although a dress-pin seems most probable." (Modderman 1964, 58-59). Ypey in the rusty mass of iron] has a tang protruding in a straight line from the back of the blade (Fig. 3, 10c). In the drawing the maximum possible length of this tang is given, as derived from its situation among the other objects. The length of the blade could not be traced." (Modderman 1964, 59)	The pin was rusted onto the axe. It was heavily corroded, hollow and fragile. A fragment of the Kopf part of the pin was missing, as is most of the pin. The missing parts of the Kopf were reconstructed and the whole thing was cleaned (Kempkens/Lupak 1993a, 13-13.1).
OV/29 Bronze & iron <i>Bombenkopf</i> pin Received no. k.1933/7.10c after 1992/93 restoration	k.1933/7.10a	-	-	-	This pin was 'discovered' rusted onto the knife (7.9) during the restoration process. It is the only one to survive intact. It was covered with a layer of aanslag, heavily corroded, hollow and fragile. The whole thing was cleaned, and a bronze rod was inserted into the pin as reinforcement (Kempkens/Lupak 1993a, 15-15.2)

Object no. Description	RMO inv. no.	Inventaris boek 1933	Holwerda (1934)	Modderman (1964)	Kempens and Lupak (1993a)
Other					
OV/33 Wood fragments, 10x, of which 9x with carved grooves	k 1933/7.15	"Stukjes hout van de zwaardscheide, diep ingekeerde versieringen."	"Aan de kling van het zwaard waren op verschillende plaatsen nog de fragmenten van een houtenschede vastgehecht" (Holwerda 1934, 40).	"Extremely interesting are some small fragments of carved wooden object (k 1933/7.15"; fig. 6). The carving was done at right angles to the grain of the wood. Since the carved ridges are not all of the same width, the object may have been bowl-shaped. I but this is all that can be said about its identity." (Modderman 1964, 61)	The fragments are soft and fragile. Two pieces that fit together were refitted (Kempkens and Lupak 1993, 30).
OV/33 Wood fragments, 4x	k 1933/7.15b	-	-	-	The object was brittle, soft and covered with iron oxide.
OV/34 Worked bone object, fragment	k 1933/7.17b	-	-	-	The object was cleaned (Kempkens/ Lupak 1993a, 25).
OV/35 Worked bone object, fragment	k 1933/7.17c	-	-	-	The object was brittle, soft and covered with iron oxide. The object was cleaned (Kempkens/ Lupak 1993a, 25).
OV/36 Worked bone object, fragment	k 1933/7.17a	"Twee bewerkte stukjes been."	-	"Two small pieces of worked bone. It is impossible to determine the use of these objects." (Modderman 1964, 61)	The object was brittle and covered with iron oxide. The object was cleaned (Kempkens/ Lupak 1993a, 24).
OV/37 Leather fragments, 2x, one with a bronze stud (?)	k 1933/7.16	"Stukje leder, rond gebogen."	-	"Some pieces of leather of which it is impossible to determine the use." (Modderman 1964, 61)	The leather fragment was broken in four pieces and soft and fragile. The fragments were refitted and cleaned (Kempkens/Lupak 1993a, 28).
OV/38 Leather fragments					
OV/39 Textile fragments, 5x	k 1933/7.19a	"Veel stukken wollen stof"	"Geringe resten van een weefsel, waarschijnlijk een kleedingstuk." (Holwerda 1934, 40)	"Type was so kind as to give us some information concern- ing the determination of the textiles. Near the tip of the iron sword, a fragment of plain weave is found. Per square centimeter, to every 7 S-spun threads about 10 Z-spun ones are found. On the big knife a fragment of another type of plain weave has been preserved by iron-rust. Per cm2 about 19 Z-spun to 8 S-spun threads were counted (see fig. 3). Along the right edge of the dagger bits of fine twill weave are found. Many layers of other cloth in a bad state of preservation give us some more information. Most of it is twill weave. In Fig. 3 below the principle of this type of weaving is given. Per square cm, 25 Z-spun to 19 S-spun threads were counted. Some layers of plain weave could be identified, the count showing per cm2 about 16 Z-spun to 10 S-spun threads. All in all, three different plain-woven textiles, and at least one twill weave have been determined so far." (Modderman 1964, 61)	The textile is extremely brittle. It was left untreated (Kempkens/Lupak 1993a, 27).
OV/40 Textile fragments, 3x	k 1933/7.19b				The textile is extremely brittle. It was left untreated (Kempkens/Lupak 1993a, 27).
OV/41 Textile fragments, 2x	k 1933/7.19c				The textile is extremely brittle. It was re-enforced with paraloid but otherwise left untreated (Kempkens/ Lupak 1993a, 26).

Object no. Description	RMO inv. no.	Inventaris boek 1933	Holwerda (1934)	Modderman (1964)	Kempens and Lupak (1993a)
OV/42 Textile and charcoal fragments, many	k 1933/7.19d				Not seen by Kempkens and Lupak
OV/43 Bone fragments, 6x	k 1933/7.17d	-	-	-	-
Not in use anymore	k 1933/7.10	"Ondefinieerbare stukken aaneengesmolten ijzer en brons."	-	In 1964 the following objects were uncovered in this corroded lump of iron and bronze: k 1933/7.10a Bombenkopf pin k 1933/7.10b Bombenkopf pin k 1933/7.10c tang end of an iron knife k 1933/7.10d iron knife (razor) k 1933/7.10e iron knife (razor) k 1933/7.10f iron rod (toggle) k 1933/7.10g iron socketed axe k 1933/7.10h iron horse-bit k 1933/7.10i iron cheek-snaffle k 1933/7.10j mass of iron rings k 1933/7.10k iron cheek-snaffle k 1933/7.10l part of an iron toggle k 1933/7.10m iron knob from a cheek-snaffle	
Not in use anymore.	k 1933/7.10n	-	-	"A stray eye (10n) most likely belongs to cheek-snaffle 10i!" (Modderman 1964, 60)	This eye was restored onto a cheek-piece

Tab CA2.1 Inventory Chieftain's grave of Oss through three restorations.

