

A stone wrist-guard with traces of copper rivets from Speuld-Speulderveld (mun. of Ermelo, prov. of Gelderland, NL)

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1. Introduction

Generally speaking, in publications about the Bell Beaker Culture discussing non-flint stone artefacts most attention goes to wrist-guards. Some of these works are exclusively dedicated to bracers, as this artefact type is also called, like the ones by Czebreszuk (2000), Fokkens *et al.* (2008), Turek (2015) and Woodward and Hunter (2011). Whereas these treatises are of a comprehensive, extensive or synthesising nature, the present paper has the character of a note. Here, the central issue is ‘simply’ a stone bracer or wrist-guard from the Speulderveld near Speuld (mun. of Ermelo, prov. of Gelderland) in the central Netherlands, more specifically the Veluwe region (Fig. 1). An examination of this item with the help of a portable X-ray Fluorescence (pXRF) device has yielded such remarkable outcomes that they justify publication. These findings show both the necessity and potential of using scientific methods in archaeology. In other words, the results attest that macroscopic examination on its own is too limited a tool to reconstruct the past, thus underlining the saying “There is more in it than meets the eye”.

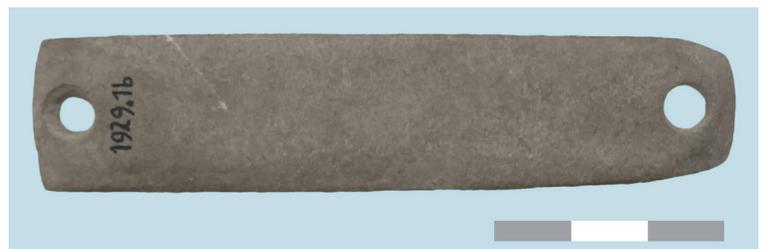


Fig. 1 – Stone wrist-guard from a barrow at Speuld-Speulderveld, mun. of Ermelo (the Netherlands). Scale in cm. Collection Museum Nairac, Barneveld.

2. Circumstances of find, archaeological context and present-day collection

Together with a bell beaker (Fig. 2), the wrist-guard under discussion was recovered from a barrow by the amateur archaeologist H. Westendorp (Modderman, 1962-1963: 17). These items are assumed to come from the same grave (*ibidem*). Such typical grave inventories, consisting of a bell beaker and a stone wrist-guard have been encountered twice during professional excavations in the centre part of the Netherlands. One of those, stems from the central grave belonging to the first construction period of a barrow at Maarsbergen (mun. of Utrechtse Heuvelrug) in the province of Utrecht (Lanting & van der Waals, 1971: 118-119, 122, figs 13-15 and pls XIV-XVII). The second example comes from a levelled barrow (no. V) at Nijmegen-Castra terrain (mun. of Nijmegen) in the province of Gelderland (Louwe Kooijmans, 1973: 96-101, 103, 105, figs 7, 8a and 9).

The Speulderveld items were purchased by the National Museum of Antiquities (Dutch: Rijksmuseum van Oudheden) at Leiden and resold to the Museum Nairac (located in Barneveld, the Netherlands). There, the wrist-guard and bell beaker are kept under the inventory number 1929 1b and 1929 1a respectively.



Fig. 2 – Bell Beaker from a barrow at Speuld-Speulderveld, mun. of Ermelo (the Netherlands), supposedly coming from the same burial as the wrist-guard depicted in Fig. 1. Scale in cm. Collection Museum Nairac, Barneveld.

3. Description and typology of the wrist-guard

The wrist-guard in question is made of a grey siltstone (foliated metapelite) rich in mica (macroscopic determination); the provenance of the raw material is unknown. The object has a length of 9.2 cm, a maximum width of 2.2 cm and a greatest thickness of 0.7 cm. Its weight is 27.2 g. The cross-section can be described as plano-convex. The flat face displays significantly more shine than the convex one (*vide infra* for an interpretation of this difference). Apart from tapering towards one of the short ends, the long sides are practically straight. Each of the short ends has been perforated. Both holes are hourglass-shaped in cross-section.

Various typologies have been devised for stone wrist-guards. A diagram from Fokkens *et al.* (2008) is reproduced here as figure 3 as it summarises in a useful way the typological classification by Sangmeister (1974), Atkinson (cited by Clarke 1970, 1: 260, 2: 570) and Smith (2006). In the Sangmeister system the Speulderveld wrist-guard is closest to type G, whereas it shows most similarities to type B1 in the Atkinson typology. According to Smith's classification system, the object would be labelled as '2Spc', for it possesses two holes (2), a more or less straight-sided shape in plan (S) and a plano-convex cross-section (pc).

4. Dating

The distribution in time of stone wrist-guards from the Netherlands appears to be confined to the Late Neolithic Bell Beaker Culture¹. In absolute chronological terms it concerns the period of c. 2400-1900 BC (Lanting & van der Plicht, 1999/2000, 2001/2002). The current Dutch archaeological record does not allow for a further chronological clarification of the Speulderveld wrist-guard. This is partly due to the fact that at present only two ¹⁴C-dates are available for this artefact type (Lanting & van der Plicht, 1999/2000: Chapter 4.14, with further references).

1 A stone wrist-guard from an Early Iron Age burial (grave 3B) at Sittard-Hoogveld in the Dutch province of Limburg, which was discovered during a professional excavation, should be taken as an example of re-use of an originally Late Neolithic artefact (see for more information with respect to this find Tol, 2000). A similar find in the Netherlands was possibly made by chance (probably during sand digging) near Losser, province of Overijssel (Lanting, 2007/2008: 304 and fig. 100c). An Iron Age urn discovered in 1914 is said to have contained apart from cremation remains a stone wrist-guard, a stone ball and a flint knife.

Neither can the bell beaker that upon finding accompanied the wrist-guard in question be considered evidence of high chronological resolution. The state of affairs is such that there is no consensus about the chronological meaning of the bell beaker variety in the Netherlands and neither is their typology completely agreed upon (see e.g. Drenth & Harmsen, 2013: 223-224 and fig. 7; Drenth & Hogestijn, s.d. [2007]; Lanting, 2007/2008). In their ground-breaking and still frequently used typology from 1955, van der Waals and Glasbergen (p. 25) have labelled the Speulderveld vessel as a bell beaker of the Veluwe type. Their argument is its shape. But its decoration scheme is, as they rightly notice, similar to the one on the 2lc type bell beakers. That means that the ornamentation consists of three zones: one on the neck of the vessel, a second one encircling its greatest circumference (*i.e.* the belly) and the third zone just above its base (*ibidem*, 23-24). Such a mixture of typological features raises of course the question whether, in the classification of Dutch bell beakers, shape should prevail over decoration scheme.

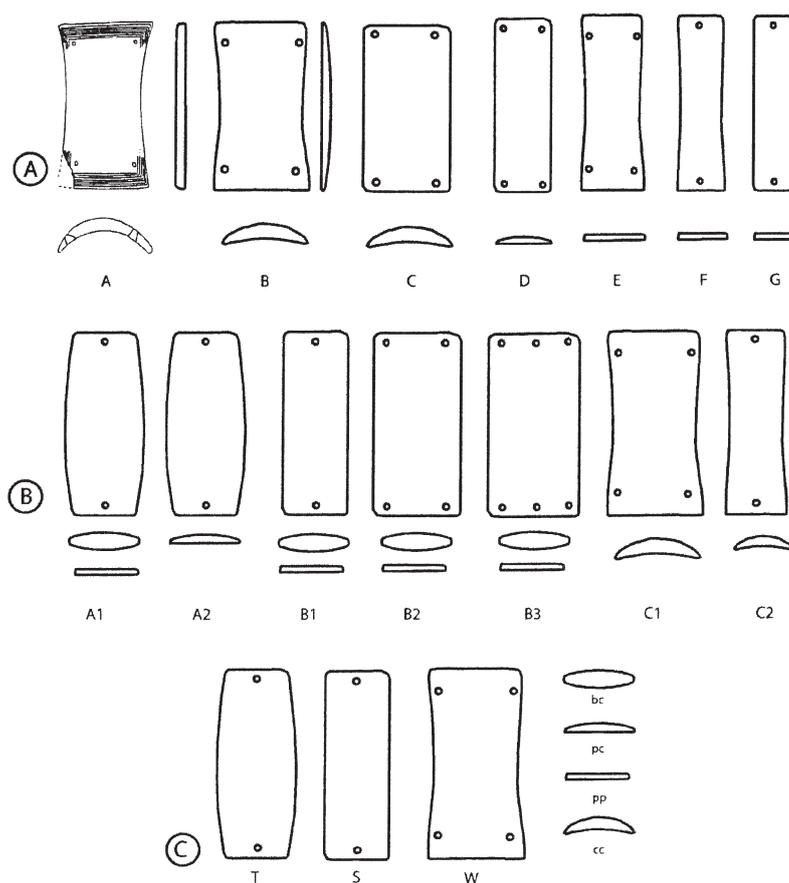


Fig. 3 – Classification systems of stone wrist-guards as summarised by Fokkens *et al.*, 2008. The typologies are from top (A) to bottom (C) by Sangmeister (1974), Atkinson (cited in Clarke, 1970) and Smith (2006) respectively. The latter classification uses a coding system referring to the (estimated) number of perforations, the shape in plan and the shape in cross-sections. A waisted wrist-guard with four perforations and a plano-convex cross-section would be typified as ‘4Wpc’.

5. The pXRF analyses

In addition to the introductory remarks above, a Thermo Scientific Niton XI3t was deployed as the device to conduct the pXRF analyses of the Speulderveld wrist-guard. Six measurements were taken in mining mode, each for a duration of 110 seconds. These measurements were evenly distributed over the stone artefact, since for the upper as well as the lower face the two perforations and their immediate surroundings and the central area were analysed.

Table 1 shows the results of the pXRF measurements. Most striking is the amount of copper traces encountered in and directly around both holes, especially since the Cu values observed for the centre of the faces are significantly lower. A microscopic examination reinforces the presence of green-coloured copper particles on both short ends, as illustrated by figure 4.

The pXRF results strongly indicate that the wrist-guard was originally, *i.e.* at Bell Beaker times, fastened with copper rivets. No indication of tin

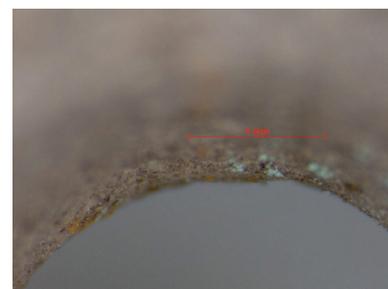


Fig. 4 – Copper particles in one of the perforations of the Speulderveld wrist-guard as discerned by microscopic examination. Scale in mm.

Analysis Number	Position measurement	SiO ₂	CaO	P ₂ O ₅	K ₂ O	Al ₂ O ₃	TiO ₂	Fe ₂ O ₃	Sum
		%	%	%	%	%	%	%	%
1257	body convex face	95	0.089	0.738	1.27	2.56	0.665	0.898	101
1258	perforation convex face	85	0.206	0.475	1.26	4.47	0.536	0.635	92
1259	perforation flat face	79	0.118	0.583	1.24	4.16	0.670	0.651	87
1260	perforation convex face opp.	79	0.256	0.374	1.10	3.95	0.572	0.918	86
1261	perforation flat side opp.	85	0.102	0.833	1.16	3.36	0.867	1.08	93
1262	body flat face	97	0.088	0.452	0.933	1.28	1.16	0.763	102

		Zn	Cu	Zr	Sr	Rb
		ppm	ppm	ppm	ppm	ppm
1257	body convex face	60	< 18	585	19	48
1258	perforation convex face	174	107	684	21	51
1259	perforation flat face	270	231	633	21	57
1260	perforation convex face opp.	117	71	500	18	46
1261	perforation flat face opp	262	268	861	22	54
1262	body flat face	68	<21	968	20	45

Tab. 1 – Results of the pXRF analyses.

The short end opposite to the one labelled with the inventory number is referred to by ‘opp.’

was found in the analyses. The zinc content is just as high as the copper content. Also those two elements are highly correlated ($r^2 = 0.96$). Brass is very unlikely for the Bell Beaker Culture, so the question arises what the reason for this high zinc signal could be. A possible cause is that the object was recently exhibited on brass wires. The museum does not have any record of this, however. The microscopic image reveals moreover that the most likely copper phase is copper carbonate (malachite or azurite) which is very difficult to form under dry, museum-like conditions. It can, however, be formed easily while wearing copper objects, due to the influence of moisture like human sweat (Borkow & Gabbay, 2009).

Zinc is commonly associated with copper ores and especially in non-refined native copper (e.g. Harrison, 1974: 104). During the Bell Beaker period some metal objects were (probably) fabricated from native copper, causing a relative surface enrichment of zinc (Nienhuis et al., 2017). Subsequently this zinc is scavenged by the copper corrosion product such as copper carbonates malachite or azurite. There is another argument to assume that the wrist-guard was originally copper-riveted. In cold fabrication rivets are much more easily made of pure copper than bronze (Hook, 2007). It can be expected that the trace metal and zinc content of not alloyed copper was higher than for bronze, as another melting event is needed for the latter, reducing the amount of volatile metals such as zinc, arsenic and antimony (Tylecote et al., 1977).

On what kind of material the wrist-guard under discussion was fastened with copper rivets, remains to be seen, but leather and textile seem to be two reasonable candidates. From its gleamy appearance it transpires that the flat face of the stone object constantly made contact with this unknown material. The matt, convex face of the wrist-guard appears therefore to have been the front face. This is also indicated by the pXRF analyses. The convex face has higher Al₂O₃, K₂O and Fe₂O₃ values indicating a higher mica and clay mineral content than on the flat side of the object. Mica's and clay minerals become easier detached from the surface than the silt and sand particles during wear. This is also reaffirmed by the high Zr content on the flat side, indicating that the zircon mineral grains are more firmly attached in the fabric of the stone.

The idea that the Speulderveld item was originally copper-riveted is substantiated by several stone wrist-guards of the Bell Beaker Culture from Great Britain. One of those discoveries is a four-holed specimen from Borrowstone (Aberdeenshire) in Scotland (Hunter, in: Woodward & Hunter, 2011: 70; Woodward & Hunter, 2011: 152). Three of the perforations contain the remains of bronze rivets. Most likely a two-holed wrist-guard from Sittingbourne (Kent, England) was once also bronze- or copper-riveted, because such metal traces were observed on the walls of both perforations (Hunter, in: Woodward & Hunter, 2011: 70 and fig. 5.8h; Woodward & Hunter, 2011: 137). A final corroboration are items from Barnack (Cambridgeshire, England), Culduthel Mains (Inverness-shire (Highland), Scotland) and Kelleythorpe (East Yorkshire, East Riding, England; Hunter, in: Woodward & Hunter, 2011: 70, figs 5.8g and 5.9c; Woodward & Hunter, 2011: 135, 138 and 148). These wrist-guards are covered with golden caps on the outer surface of the perforations. This implies another kind of fastening of the objects than by thronging, as noted by Hunter (in: Woodward & Hunter, 2011: 70). He suggested a more rigid attachment by rivets instead.

6. Final remarks

As shown by the aforementioned studies there is an ongoing discussion about the function of wrist-guards in Bell Beaker times. Many present-day scholars like Czebreszuk (2000) and Turek (2015) still favour the traditional interpretation as equipment for archery, in particular an artefact to protect the arm against the sting of the bowstring. The latter also stresses the role of wrist-guards as symbols of male power and prestige. Alternatively, Hunter *et al.* (in: Woodward & Hunter, 2011: 124; see also Appendix 10.1) suggest a possible link with the art of falconry, although this is thought only to hold for a portion of the stone artefacts under discussion. According to Wallis (2014) this idea does not stand the test of scrutiny. In a lithic study about Copper and Bronze Age southeast Iberia, Delgado Raack and Risch (2008: 243) come to the conclusion that wrist-guards were possibly used as sharpening stones, most likely for metal artefacts. Metal residues have, however, been rarely encountered and only a perforated 'plaque' from Mallorca is referred to as a positive example (*ibidem*, with a further reference).

It goes without saying that because of its limited size the present study does not settle the debate about the wrist-guard usage. Nonetheless, it transpires that the Speulderveld specimen was not used for (re-)sharpening metal artefacts. If so, it is to be expected that the pXRF measurements of the central part of the object would have yielded strong evidence of (alloyed) copper like in the case of the perforations, which they have not.

The archaeological context from which the item under consideration was derived, a barrow, also sheds light on the meaning of the wrist-guard. These circumstances are indicative of a high rather than a low social status, at least when energy expenditure is regarded an indicator. Generally much more effort and time will have been invested into the erection of a burial mound than the energy gone into the construction of a flat grave, *i.e.* an interment in a grave pit not covered by a barrow. Noteworthy is moreover that stone wrist-guards from the Netherlands are as grave gifts mainly or even exclusively known from barrows (Drenth, 2014). The Speulderveld instance is thus consistent with the overall picture. This general pattern reinforces the concept of wrist-guards having been symbols of power and prestige. All the more since within a funerary context, metal (copper and gold) has until now also predominantly or even solely come to light in barrow graves (*ibidem*). It is therefore hardly daring to claim that a copper-riveted wrist-guard like the putative specimen from Speulderveld was a prestigious item or a high status indicator. These metal rivets were presumably adornment meant to reinforce or increase the social status of the wrist-guard's owner.

Lastly and not unimportantly, from the differences in gloss between the upper and lower face follows that the Speulderveld wrist-guard was not an object entering the grave in mint condition. To put it differently, the deceased appears to have been interred with a used item. Furthermore, the wrist-guard seems to have been dismantled, that is stripped of its copper rivets, before the conclusion of the interment.

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Abstract

The present paper discusses the analyses of a stone two-holed wrist-guard with the help of a portable X-ray Fluorescence (pXRF) device. Given the find circumstances, this object of the Late Neolithic Bell Beaker Culture (c. 2400-1900 BC) is in all likelihood part of a grave inventory. The wrist-guard was recovered, together with a bell beaker, by an amateur archaeologist from a barrow in the central Netherlands. The findspot is located at Speuld-Speulderveld in the province of Gelderland. The pXRF analyses and a microscopic examination show that the walls of both perforations are partially covered by traces of copper. This suggests the fastening of the object with copper rivets on some kind of material. Presumably these rivets adorned the wrist-guard at Bell Beaker times to reinforce or increase the owner's social status.

Keywords: Speuld-Speulderveld, municipality of Ermelo, prov. of Gelderland, the Netherlands, stone wrist-guards, Bell Beaker Culture, barrow, pXRF analyses, copper rivets.

Samenvatting

Een polsbeschermer uit Speuld-Speulderveld (prov. Gelderland, Nederland) is met behulp van een *portable X-ray Fluorescence* (pXRF)-apparaat geanalyseerd. Dit stenen voorwerp, dat toebehoort aan de laat-neolithische Klokbekercultuur (ca. 2400-1900 v.Chr.), is samen met een klokbeker door een amateur-archeoloog gevonden in een grafheuvel. Een duiding van deze vondsten als grafinventaris ligt daarom voor de hand. Het pXRF-onderzoek en microscopisch onderzoek leren dat op de wanden van de beide doorboringen in de polsbeschermer koperresten kleven. Zij zijn een sterke aanwijzing dat de polsbeschermer tijdens de Bekerperiode door middel van metalen klinknagels bevestigd was op een of andere materiaal. Deze wijze van bevestiging was, zo is het vermoeden, niet alleen functioneel. De klinknagels waren vermoedelijk tevens bedoeld om de sociale status die de bezitter van de polsbeschermer had te benadrukken of te verhogen.

Trefwoorden: Speuld-Speulderveld, gemeente Ermelo, prov. Gelderland, Nederland, stenen polsbeschermer, Klokbekercultuur, grafheuvel, pXRF-onderzoek, koperen klinknagels.

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