DICK STAPERT · MARCEL J.L.T. NIEKUS · LYKKE JOHANSEN

A BIJOU LEAF POINT OF THE MAUERN TYPE FROM VENRAY (THE NETHERLANDS); WITH REMARKS ON THE BONE RETOUCHERS FROM MAUERN

Abstract

This article highlights a special Neanderthal artefact: a Late Middle Palaeolithic leaf point. The piece was found in a field near Venray (prov. Limburg). Without any doubt it is one of the finest Dutch leaf points of the so-called 'Mauern' type, a celebratory treat that we are happy to present to Martin and Elaine in this *Festschrift*. We also briefly describe six bone retouchers from Mauern, which were ^{14}C-dated in Groningen.

Keywords

Leaf points, bone retouchers, Venray, Mauern, Neanderthal migration

THE FINDSPOT

In October 2018, the second author got to know about a beautiful leaf point of late Neanderthals from the outskirts of Venray. The finder was Roy Janssen of that town, who had picked up the artefact some twenty years previously in a field that at the time belonged to his family. This field of ca. 120 m × 60 m is now built over with housing. The coordinates of the centre of the field are: N 51°32'20.5" / E 5°57'59.2" (coordinates on the Dutch ordnance map: X = 195.186 / Y = 394.608). The findspot is on the southeastern brow of the valley of the Loobeek, a small tributary of the river Meuse. On the same edge two handaxes were found: 1. the 'Micoquian' handaxe of Venray, almost 2 km to the northeast, and 2. the cordiform handaxe from 'De Vliezen', some 3.5 km to the southwest (see **Fig. 1**, after: Stapert, 1979). From this we may conclude that the Loobeek was a popular hangout for Neanderthals, during multiple phases of their existence. They evidently were keen to sojourn on the edges of river valleys, including those of the small tributaries of major rivers like the Meuse.

We can observe the same pattern along some other smaller streams in the north of Limburg and the east of the adjacent province of Noord Brabant. Maps of this region (**Fig. 1**) show some Middle-Palaeolithic sites that we know about. Middle-Palaeolithic artefacts have been found also along the watercourses Lactariabeek, Groote Molenbeek (outside the map) and Oostrumsche Beek. Along the Lactariabeek, the handaxe of Overloon; along the Groote Molenbeek, the side-scraper of Blitterswijck; and along the Oostrumsche Beek, the chopping-tool of Oostrum and the two flakes of Hoogriebroek-Schoor (see **Tab. 1** for details of the various Middle Palaeolithic finds).

In fact, the picture in other parts of the country is quite similar. In the province of Drenthe, many Middle Palaeolithic sites have been identified on the edges of valleys including those of the Drentse Aa and the Oostervoortschediep and of their side valleys. The most important among these is the handaxe-rich site at Peest near Assen, the subject of earlier publications (Niekus et al., 2016, 2017).

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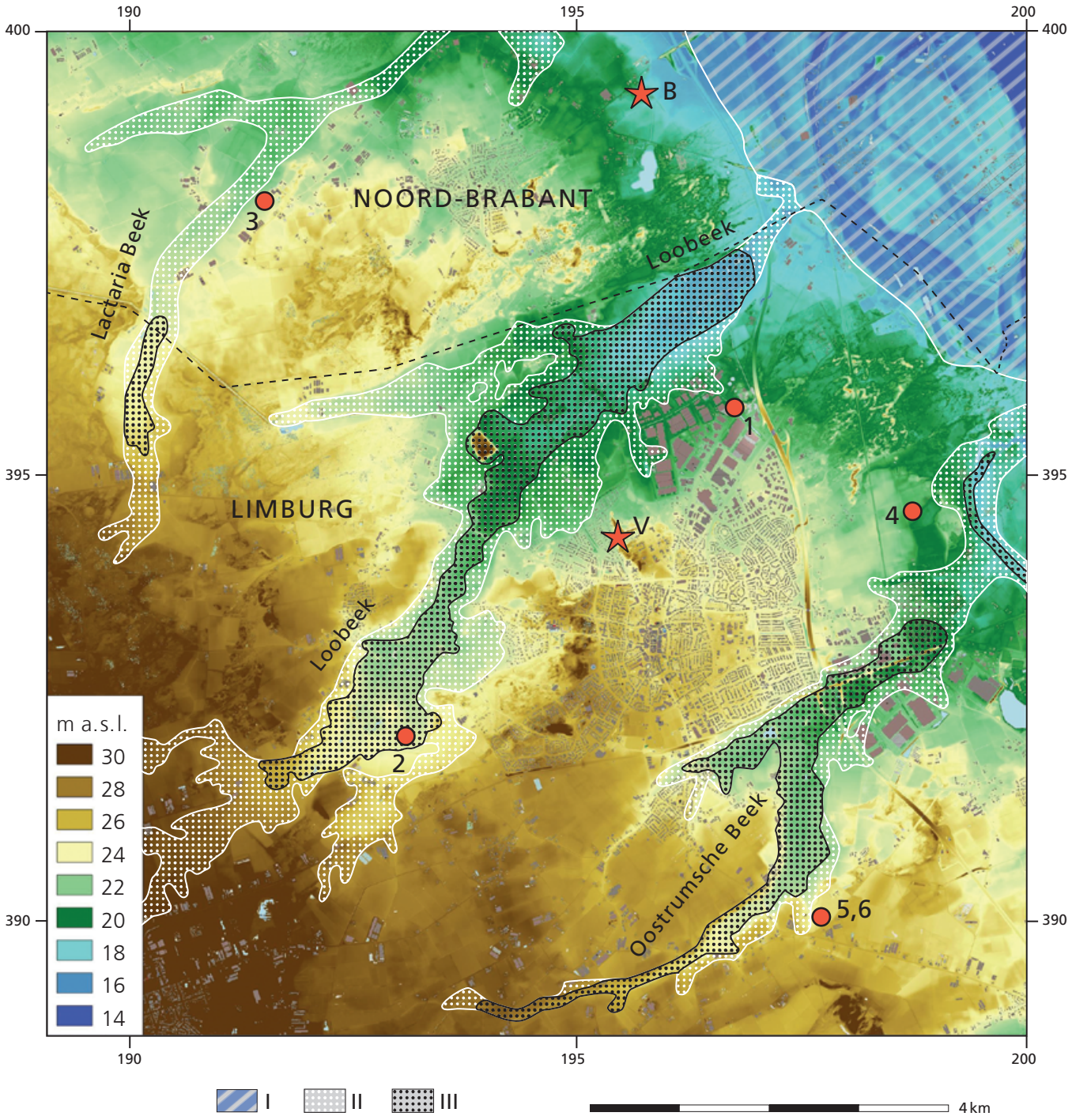


Fig. 1 Map of the region around Venray (the box in **Fig. 5**) with findspots of Middle Palaeolithic artefacts. Map based on 'AHN' relief map (by Jaap Bongers, De Steekproef bv, Zuidhorn) with superimposed geology. **I** deposits of the river Meuse, in the Kreftenheye Formation, dating mostly from the Weichselian (Devensian) glaciation; **II** coversand less than 2 m thick on fluvio-periglacial deposits of the Twente Formation; **III** Holocene peat on fluvio-periglacial deposits of the Twente Formation. Findspots: **V** findspot of the leaf point of Venray; **B** approximate location of the major Middle Palaeolithic concentration of 'De Biesplanken' (finder: W. Hoex). Earlier finds in the vicinity: **1** the handaxe of Venray; **2** the handaxe of 'De Vliezen'; **3** the handaxe of Overloon; **4** the chopping-tool of Oostrum; **5-6** the flakes of Hoogriebroek-Schoor. – (The geological information is based on the geological map of this area, Van den Toorn, 1967; map by Lykke Johansen and Dick Stapert, based on the map in Stapert, 1979).

The somewhat dated geological map of the region around Venray (Van den Toorn, 1967) indicates the following for the leaf-point findspot: coversand thinner than 2 m on fluvio-periglacial deposits of the 'Twente Formation'. Nowadays the former Twente Formation is subsumed under the Boxtel Formation (within which no fewer than nine 'deposit parcels' are distinguished; De Mulder et al., 2003: 346-350). The findspot lies close to a small area where Van den Toorn's map indicates less than 2 m of coversand on peat of the 'Asten Formation'. This peat dates from the Eemian (Ipswichian) interglacial (nowadays the former Asten Formation is part of the 'Woudenberg Formation'; see De Mulder et al., 2003). At the findspot of the Venray handaxe, Eemian peat was found at a depth of 210-250 m, which at any rate suggests that this handaxe dates from after the Eemian interglacial (Stapert, 1979: 116).
On the opposite bank of the Loobeek lies an important Middle Palaeolithic site, known as 'De Biesplanken', discovered by Mr Willem Hoex of Venray. This site lies not far from the southern edge of the Meuse valley, and in a somewhat different geological context from the above-mentioned sites on the brows of tributary valleys. According to the 1967 map, the Biesplanken site lies in an area with coversand less than 2 m thick on gravelly deposits of the 'Veghel Formation C': Meuse deposits of the final phase of the Saale (Wolstonian) glaciation. Nowadays the former 'Veghel Formation' is subsumed under the 'Beegden Formation' (De Mulder et al., 2003). So far, we have been able to examine 37 finds from the Biesplanken site; notable among them are a Mousterian point, a bifacial Quina scraper and some other scrapers, a Levallois core and at least one blade (Stapert and Johansen, 2019). It is a Late Middle Palaeolithic site from which we expect to see more splendid finds in the future.

THE VENRAY LEAF POINT

This is a complete, virtually undamaged leaf point of the 'Mauern' type (**Fig. 2**). It has two pointed ends, being a so-called bi-point or double-point. Mauern leaf points are bifacially worked, thin implements, with mostly two pointed ends, but sometimes just one. Use-wear analysis has shown them to have been used mainly as spearheads. Some dimensions of this piece: length: 5.8 cm (a very small piece of one of the tips is missing, but no more than 1 mm; the original length would have been 5.9 cm); width: 3.2 cm; maximum thickness: 0.8 cm (roughly midway along its length). Its weight is 12.8 g. The thickness index (100 × thick-

Findspots	geomorphological setting	object(s)	finder	Fig. 1	references
Biesplanken	south edge of Meuse valley	Middle-Pal. cluster	W. Hoex (Venray)	B	pers. comm.
Blitterswijck	east bank of Groote Molenbeek	side-scraper	G. van Ass (Venray)	outside the map	1, 2
De Vliezen	east bank of Loobeek	cordiform handaxe	J. van Meyel (Venray)	2	1, 2
Hoogriebroek-Schoor a & b	east bank of Oostrumsche Beek	flakes	a: J. Arts (Hoogriebroek); b: B.A.M. Kruysen (Venray)	5, 6	a: 1, 2; b: 2
Oostrum	west bank of Oostrumsche Beek	chopping-tool	B.A.M. Kruysen (Venray)	4	1, 2
Overloon	east bank of Lactariabeek	amygdaloid handaxe	E.J. Winter (Sonnega)	3	2, 3
Venray	east bank of Loobeek	Micoquian handaxe	P. Berg (Venray)	1	2
Venray	east bank of Loobeek	'Mauern' leaf point	R. Janssen (Venray)	V	this article

Tab. 1 Some Middle Palaeolithic findspots in the vicinity of Venray. References: 1 Van Haaren, 1968; 2 Stapert, 1979; 3 Dijkstra and Van der Lee, 1978.

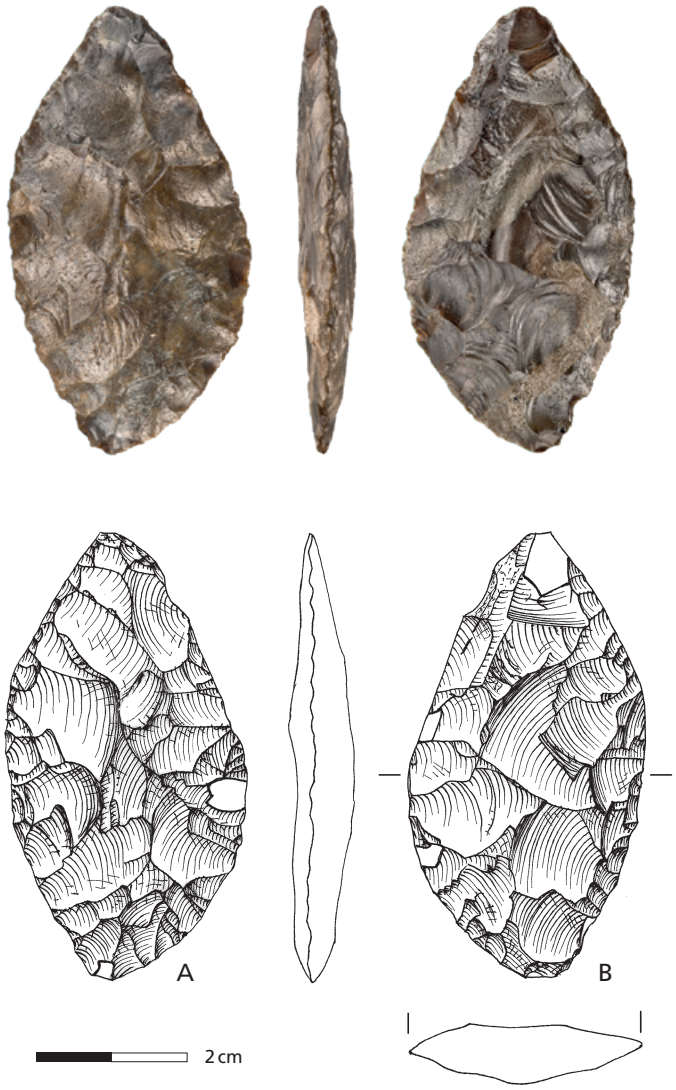


Fig. 2 The 'Mauern' leaf point of Venray. Key to the artefact drawings: blank: recent damage; irregular stippling or cross-hatching: cortex or other ancient surfaces, including primary frost split faces; open circle: point of percussion no longer present. – (Photo: Frans de Vries [Toon-Beeld, Oosterwolde]; drawing: Lykke Johansen).

ness divided by length) is 13.6, on the basis of the reconstructed length of 5.9 cm. The Venray leaf point is the smallest bifacial leaf point known from the Netherlands, at least among the (more-or-less) successful and also (more-or-less) complete specimens (cf. **Tab. 2**). The specimens from the Leusderheide and Eindhoven, very similar in shape, have lengths of 6.8 and 8.8 cm, respectively; the reconstructed length of the bi-point of Emmerschans (A) is 7.7 cm. The last-named still is the relatively thinnest Dutch leaf point, with a thickness index of 10.4.

The Venray leaf point was very skilfully made, by means of 'soft percussion', i. e., with a percussion tool of bone, antler or wood. The flaking scars are very shallow and mostly extend up to or just beyond the centreline of the point. Face B, close to the tip, on the left, still retains a small area of cortex, as well as what presumably is a remnant of an ancient surface. Otherwise both faces are entirely worked. Face B has on average somewhat larger scars than face A, which appears to be more intricately finished. In combination with the

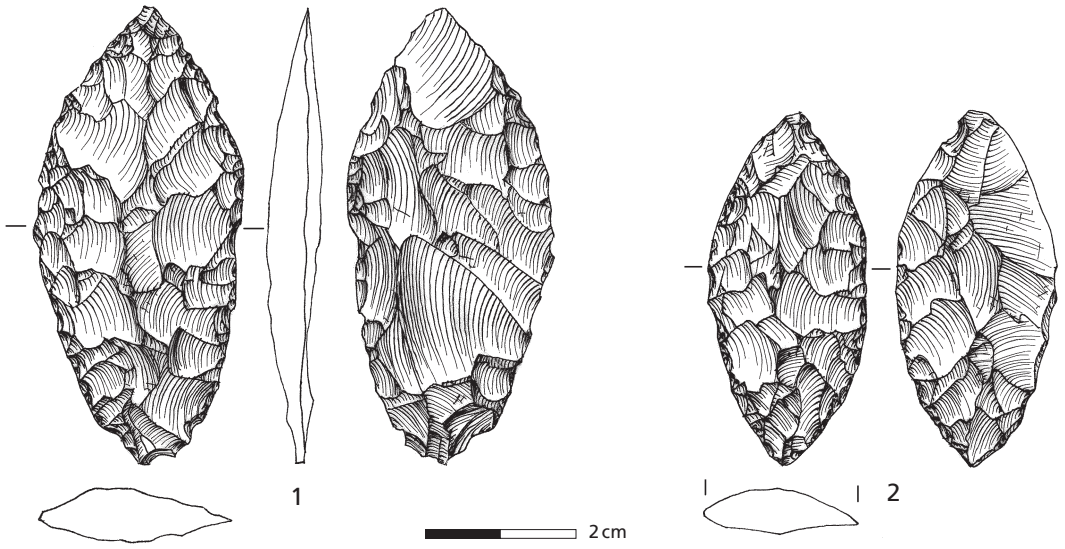


Fig. 3 Two small, bifacial leaf points from Mauern. The smaller has a maximum length of 4.7 cm. – (Drawings: Lykke Johansen, after Bohmers, 1951).

presence of a spot of cortex on face B, this might indicate that the point was made from a flake and that face B was the dorsal surface. In cross-section, the point is slightly plano-convex. Face B is fairly flat; face A, slightly convex (see the drawn cross section). Face A may well be the ventral surface of a flake, but this cannot be ascertained because of the total-surface working. The angles of the cutting edges are sharp, around 40 degrees. The outline of the Venray leaf point is slightly asymmetrical. This is not uncommon in Mauern leaf points; among the mostly beautifully finished specimens from the type-site near Mauern, too, there are asymmetrical ones (see Bohmers, 1951). This is unlikely to be a typologically relevant phenomenon. Manufacturing a symmetrical leaf point just happens to be quite difficult. Once the piece has become rather small in the course of production, one has to stop at some point, even if the shape still is less than perfect. Despite this asymmetry, it is not hard to tell which is the tip and which the base of this leaf point. The angle at which the edges meet is ca. 60 degrees at the tip and ca. 80 degrees at the base (see the drawing, **Fig. 2**). At a few (sub-) recent damaged spots on both edges and at the tip and base, it can be seen that the original flint was grey-brown. Small fossil inclusions are visible, but no distinct bryozoans (remains of moss animalcules that characterise flint of northern provenance). Hence the flint probably was of southern provenance. The flint is of a fine-grained texture, with pale patches and bands of a slightly coarser texture. Distinct windgloss with 'fine pitting' is evident on both faces (Stapert, 1976a); on face B this is somewhat more developed than on face A. The leaf point therefore must have spent a considerable length of time on the surface during a cold period. Most probably this was the Upper Pleniglacial of the final glaciation, the Weichselian (Devensian). No scratches or pressure cones were observed. The edges and ribs display slight rounding (due to solution processes in the soil, not to rolling in a riverbed), a little less so on face B than on face A. Maybe the piece has a brown patina (though the flint itself has a brownish colour), with a cast of white patina that appears slightly more developed on face B.

While this piece from Venray may be the smallest (successful) bifacial leaf point in the Netherlands, at Mauern an even smaller one was found which up to a point resembles the one from Venray, with a length of just 4.7 cm (**Fig. 3**, after: Bohmers, 1951: Taf. 26, no. 3). The Mauern leaf points can be divided by their lengths into three size classes: small, medium-sized and very large (**Fig. 4**; after Stapert, 2007; on the basis

of data from Bohmers, 1951 and Zotz, 1955). The 18 complete leaf points from Mauern in a histogram divide into two groups: small points with lengths between 4.5 cm and 8 cm, and medium-sized ones between 9 cm and 13 cm long. A third group, comprising 'giant' leaf points with lengths of ca. 20 cm or more, is represented by a single fragment (illustrated in Stapert, 2007: Fig. 1; after: Bohmers, 1951).

Another important leaf-point site in Germany is Ranis 2 (Hülle, 1977). Here, too, we see a comparable subdivision into three size classes. A few leaf points from Ranis 2 with lengths of around 20 cm are proper showpieces (one of them is shown in Stapert, 2007: Fig. 2). It is unclear whether, and if so to what extent the two most numerous groups of leaf points (the small and medium-sized) of Mauern and Ranis 2 differed in function. It should be noted that some of the medium-sized leaf points of Mauern, like the 'giant' leaf points, are splendidly worked artefacts (see also: Bosinski, 1967: 56). Some of these implements almost are true pieces of art! Such remarkable beauty is not, on the whole, observed among the small leaf points, which therefore must have been (primarily) functional items. The small ones, and the bulk of the medium-sized ones without doubt served as spearheads. The more-or-less complete bifacial leaf points from the Netherlands whose lengths we know or can reasonably assess, are between 5.9 and 8.8 cm long (**Tab. 2**). This means that they match the group of 'small leaf points' that we know from Mauern and Ranis 2. In part, the absence of larger leaf points in the Netherlands may be due to the lack of suitable raw materials (which *were* present at Mauern and Ranis). Indeed, the leaf point of Venray, although the smallest in the Netherlands, is also among the finest. In this respect it is comparable to the also beautifully made leaf points

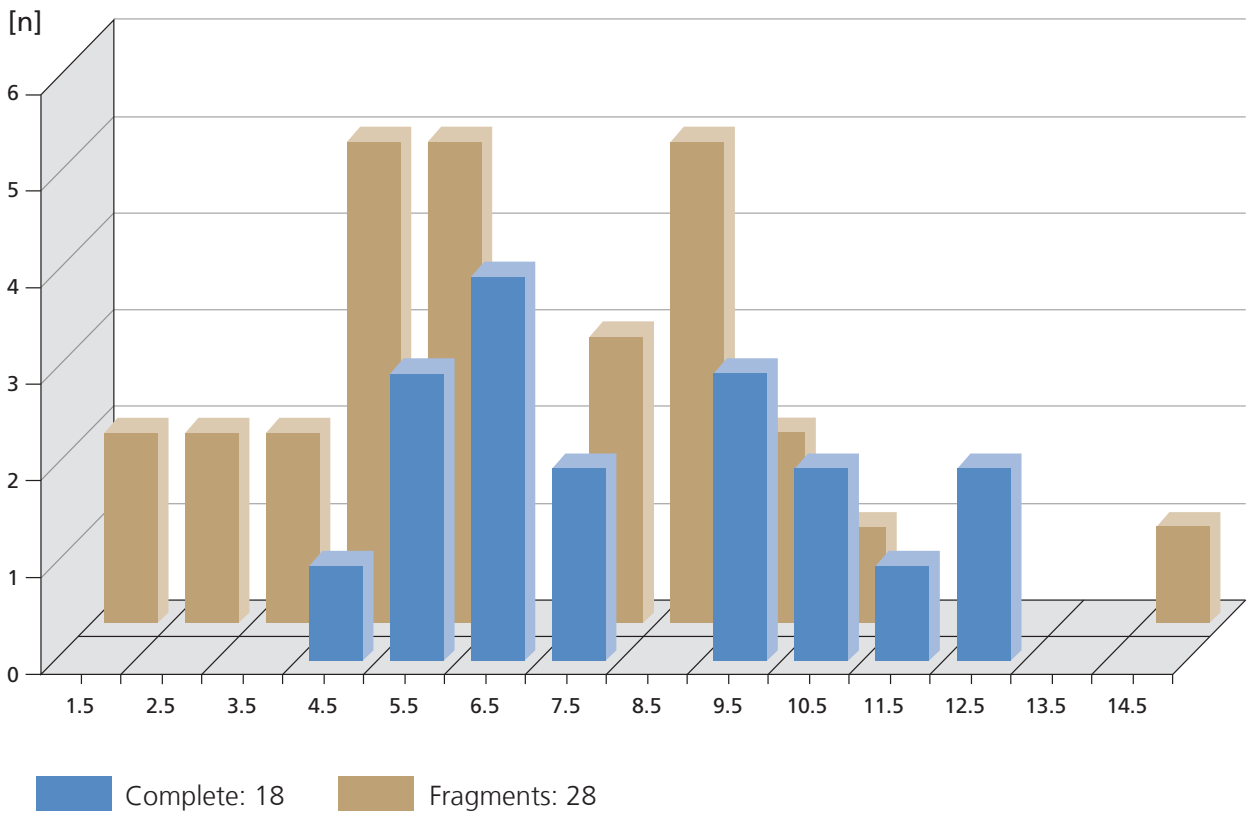


Fig. 4 Lengths (in cm: 1.1-2.0, 2.1-3.0, etc.) of leaf points from Mauern (based on Bohmers, 1951 and Zotz, 1955). Some unfinished items were excluded. Among the complete specimens two groups can be distinguished: smaller and larger pieces. A fragment with a length of 14.6 cm points to the existence of a third category: 'giant leaf points'. – (Graph: Dick Stapert and Lykke Johansen).

Findspots	Length [mm]	Width [mm]	Thickness [mm]	Th/L index	Weight [g]	References
A. Bifacial leaf points						
Venray	59*	32	8	13.6	12.8	this article
Maasvlakte 2	60*	37	12	20.0	28.0	4
Leusderheide	68	36	12	17.6	27.1	10, 11
Eeserveld	70*	35	9	12.9	20.7	9
Emmerschans (A)	77*	36	8	10.4	-	2, 5, 10
De Krim	81	33	13	16.0	-	2, 10
central Netherlands (?)	84	34	9	10.7	28.8	12
Eindhoven	88	44	13	14.8	-	6, 10
B. Leaf-point-like implements						
Eersel (*Faustkeilblatt*?)	119	64	21	17.6	147.1	7
Banholt (Quina side-scraper?)	100	58	19	19.0	87.0	17
C. Bifacial or unifacial leaf point						
Den Bosch	38**	35**	9**	-	14.0**	16
D. Certain or probable unifacial leaf points						
Aardjesberg	40**	21**	10**	-	-	8, 10
Maasvlakte 2	36**	30**	11**	-	12.2**	4
E. Possibly unfinished leaf points or failed attempts by learner flintknappers						
Zeijen-Oost (A)	73	45	16	21.9	-	10
Zeijen-Oost (B)	79	46	16	20.3	59.2	15
Woldberg	63	34	16	25.4	-	9
Zuidlaren	50	38	16	32.0	-	1, 3
Emmerschans (B)	72	44	16	22.2	-	2, 5
Balloo	67**	52	17	-	-	10
Emmen-Roswinkelerweg	46	40	10	21.7	19.4	5
Onna	48**	65**	10**	-	-	9
Meppel	96	57	17	17.7	88.0	1
Ameland	90*	45	16	17.8	57.2	13, 14

Tab. 2 Leaf points, leaf-point-like implements and possibly uncompleted leaf points or failed efforts by apprentice flintknappers. References: **1** Beuker et al., 2007; **2** Beuker and Niekus, 1994; **3** Johansen and Stapert, 2012; **4** Niekus et al., 2021; **5** Niekus et al., 2019; **6** Roebroeks, 1986; **7** Stapert, 1976b; **8** Stapert, 1992; **9** Stapert et al., 2008; **10** Stapert et al., 2007; **11** Stapert et al., 1993; **12** Stapert and Johansen, 2008; **13** Stapert et al., 2013a; **14** Stapert et al., 2013b; **15** Stapert et al., 2015; **16** Verpoorte, 2016; **17** Wouters, 1980a. * estimated complete dimensions; ** dimensions of fragments. Th/L index: 100 × thickness divided by length.

of Emmerschans (A) and Eeserveld. It is well-made but also functional – not an exceptional 'showpiece' like those from Mauern and Ranis 2; for this it is too small and also too thick.

A measure for the craftsmanship is the 'thickness index' mentioned above (100 x thickness divided by length). The larger a leaf point, the harder it is for the knapper to get it this thin along its full length. The Venray leaf point has a thickness index of 13.6, which is respectable but not astounding. The leaf points from Eeserveld and Emmerschans (A) both have lower scores: 12.9 and 10.4, respectively. The Emmerschans leaf point thereby holds the Dutch record in terms of this index. But even thinner pieces occur at Mauern and Ranis. At Ranis 2 the range is 5.7 to 15.9, with an average of 9.7. The Mauern leaf points have an average thickness index of 10.8 (range: 6.8-15.9). The eight more-or-less complete bifacial leaf points from the Netherlands (**Tab. 2**) have an average thickness index of 14.5 (range 10.4-20.0). That the values here

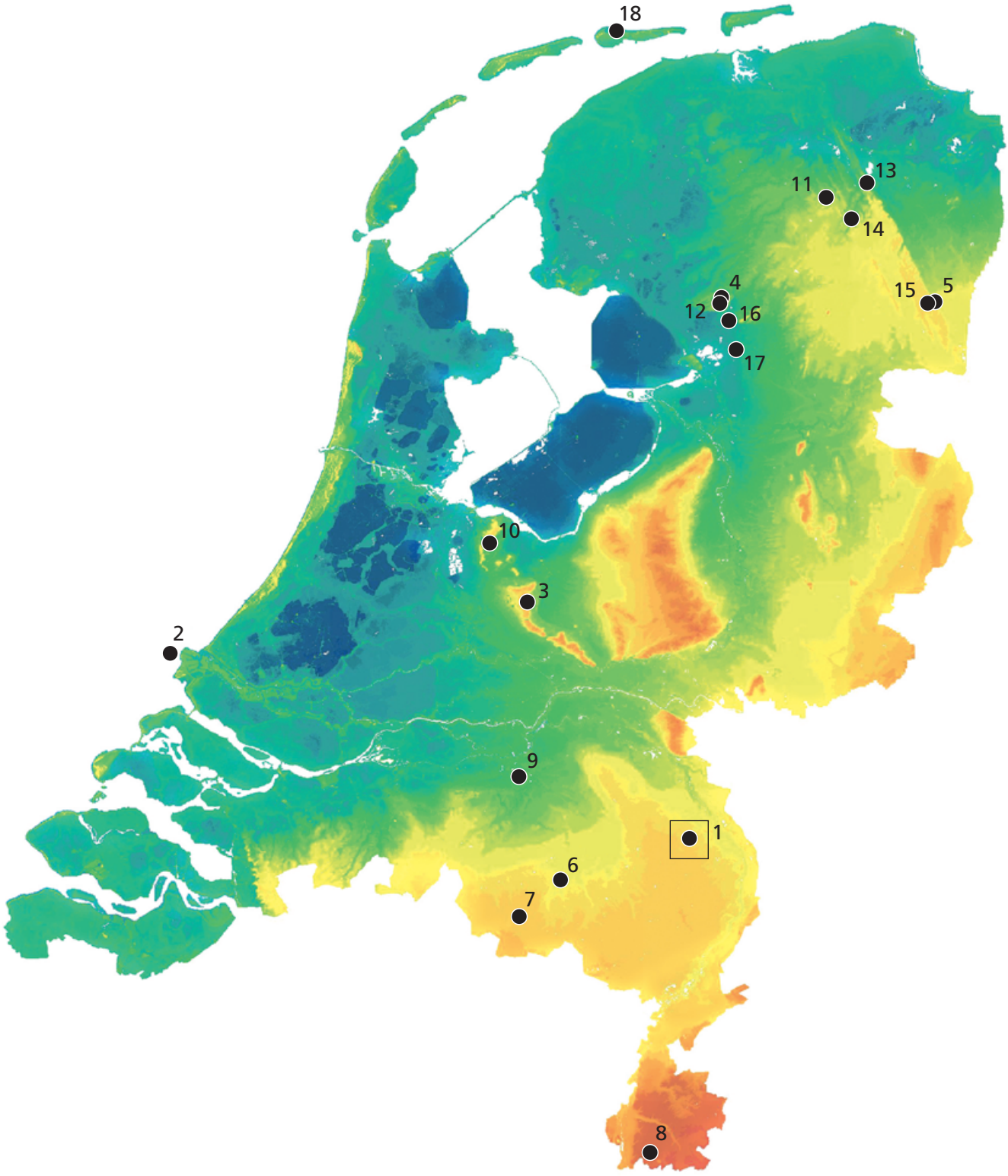


Fig. 5 'AHN' relief map showing the findspots of leaf points, leaf-point-like implements and possible unfinished leaf points in the Netherlands. Findspots: **1** Venray; **2** Maasvlakte 2; **3** Leusderheide; **4** Eeserveld; **5** Emmerschans; **6** Eindhoven; **7** Eersel; **8** Banholt; **9** Den Bosch; **10** Aardjesberg; **11** Zeijen-Oost; **12** Woldberg; **13** Zuidlaren; **14** Balloo; **15** Emmen-Roswinkelerweg; **16** Onna; **17** Meppel; **18** Ameland. The area around Venray is shown in a box (see **Fig. 1**). The finds from De Krim and 'central Netherlands' are not marked on the map because their original findspots are unknown. – (Map: Jaap Bongers [De Steekproef bv, Zuidhorn]).

are significantly higher than at Mauern and Ranis may be due to the often poor quality of the then available raw material in what is now the Netherlands.

OTHER LEAF POINTS IN THE NETHERLANDS

Table 2 (see also Fig. 5) lists 23 leaf points or leaf-point-like implements from the Netherlands, including unfinished ones and what probably are failed attempts by apprentice knappers (Figs. 6-7). The literature, however, mentions several further Dutch 'leaf points'. Some of these we have been able to examine, but in our opinion they are not Middle Palaeolithic leaf points. They are:

1. 'Venlo' (mentioned by Van der Lee, 2006). This piece was at one time exhibited in the Limburgs Museum at Venlo, but since it was a find from the isle of Texel it is nowadays on display at 'Ecomare' in Texel. In our opinion it is a not quite completed 'flint sickle' of the Bronze Age, definitely not a Middle Palaeolithic artefact.
2. Gerhegge or Neer-Boshei, Leudal valley near Roermond; finder: D. Beeren (see Wouters, 1980b). This piece is kept at the regional museum at Asselt, and we were granted permission to examine it microscopically at Groningen University. We do not believe it to be a Middle Palaeolithic flint, but a bifacially retouched, dagger-like tool of the Late Neolithic or Early Bronze Age. Possibly it is an unfinished piece.
3. Kessel; finder: W. Vossen (see Wouters, 1980b). This is a tool on a flake; the percussion bulb and a remnant of the striking platform are still partially present. The finder and Leo Verhart (of the Limburgs Museum) kindly allowed us to personally examine it. In our view it is a semimanufactured point-like implement of the Neolithic or the Bronze Age, but definitely not a Middle Palaeolithic tool; apart from a slight gloss patina, its surfaces have remained virtually fresh.

Unfortunately, there are several other pieces that we have been unable to inspect.

1. 'Eersel PA-3' (Fonteyn and Wouters, 1995/1996). This piece reportedly consists of quartzite – an unusual material for a leaf point.
2. Nunhem (Metsemakers and Wouters, 1993). This piece is said to come from the Leudal valley; the picture suggests that it might be a *blattförmiger Schaber*.
3. Hazeldonk-Noord (Peeters, 1989). The brief description does not rule out that this may be a Neolithic tool; despite several requests, we have not succeeded in examining the piece ourselves.
4. Sint Geertruid 'SG.15' (coll. W. Roebroeks-Janssens: see Wouters, 1980a). The item is described as a handaxe fragment, but the drawing suggests that it might in fact be part of an unfinished Mauern leaf point. We still hope for permission to examine this piece at some future date.

Recently (mid March 2021) the second author identified a preform of a 'Mauern' type leaf point in the collection of Mr Francois van Wessel (Tegelen). The preform was found in 2019 during dredging for a harbour at Grubbenvorst, approximately 15 km to the south of Venray (Fig. 5: 1). This piece, as well as a small handaxe and a few other finds from the same location, will be studied in the near future.

Table 2 shows that the Dutch finds include quite a few probable practice pieces of learner knappers. This is hardly surprising: in the Middle Palaeolithic, leaf points were technically the hardest tools to create. Indeed, it is interesting to note that also within the Mauern assemblage we spotted some pieces that we believe to be (more or less successful) practice pieces by apprentice knappers (see Fig. 8; after Johansen and Stapert, 2012).

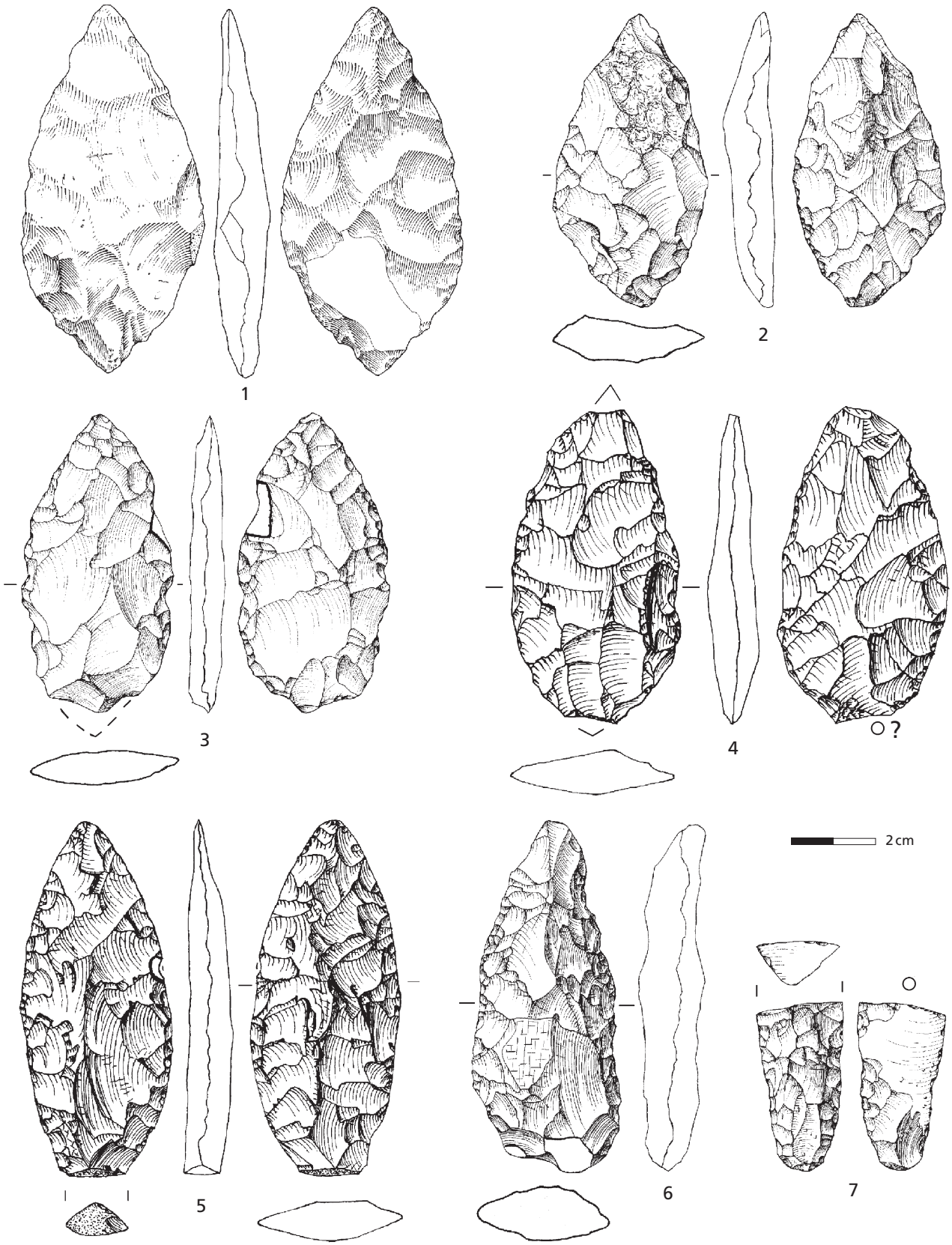
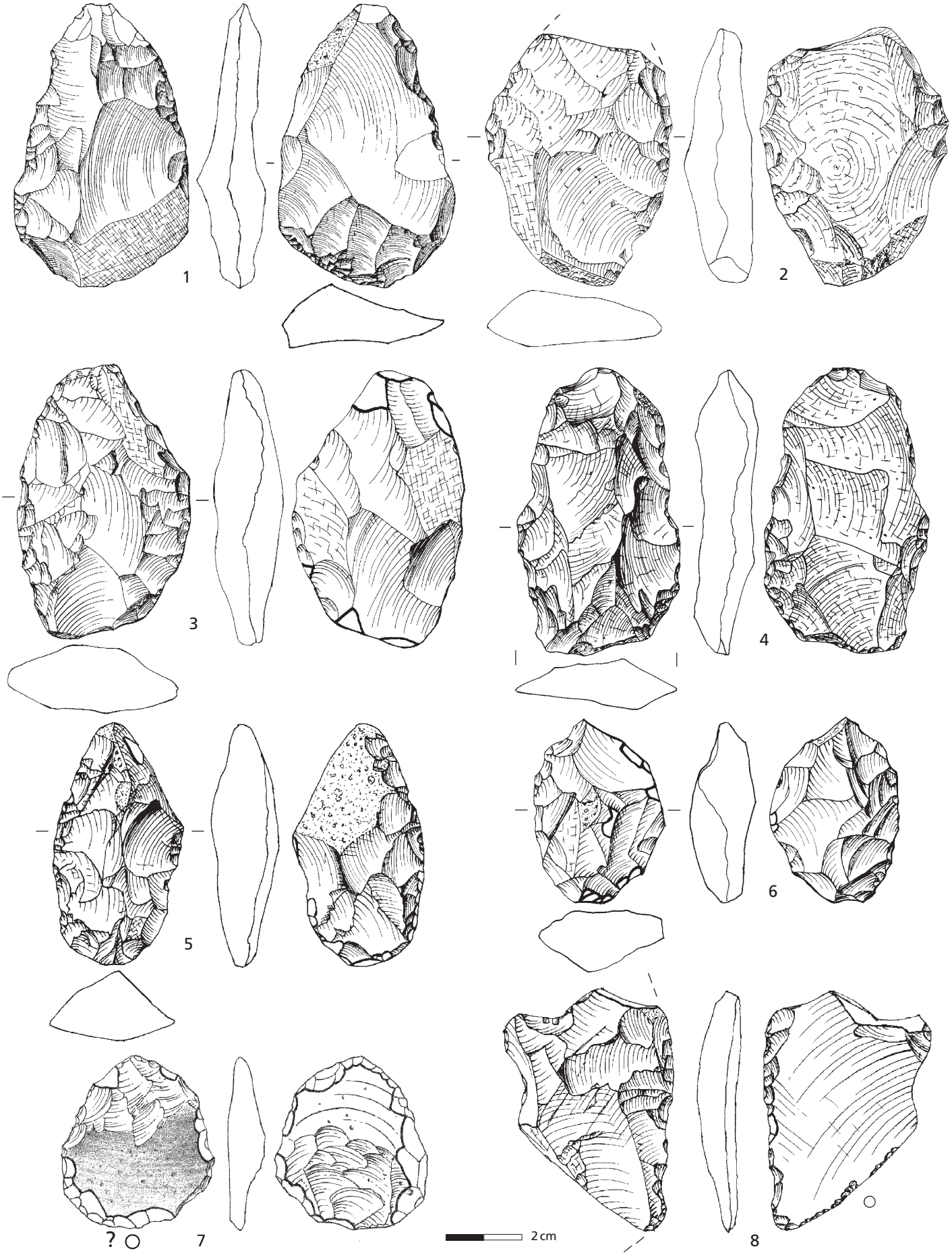


Fig. 6 Some leaf points from the Netherlands (nos. 1-6 'Mauern' type, 7 Jerzmanowice type): **1** Eindhoven; **2** Leusderheide; **3** Emmerschans (A); **4** Eeserveld; **5** central Netherlands (?); **6** De Krim; **7** Aardjesberg. See **Tab. 2** for references and **Fig. 5** for the location of the findspots. – (Drawings: Lykke Johansen).

Fig. 7 Some uncompleted leaf points or failed efforts probably made by apprentice flintknappers: **1** Emmerschans (B); **2** Balloo; **3** Zeijen-Oost (A); **4** Zeijen-Oost (B); **5** Woldberg; **6** Zuidlaren; **7** Emmen-Roswinkelerweg; **8** Onna. See **Tab. 2** for references and **Fig. 6** for the location of the findspots. – (Drawings: Lykke Johansen [nos. 1-6, 8] and H.R. Roelink [RUG/GIA, Groningen Institute of Archaeology]).


1
2
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? ○
7
2 cm
8

Probably practice pieces by learners also occur at the somewhat younger site of Beedings in West Sussex (pers. comm. by the late Roger Jacobi to Stapert), which we shall return to below.

Table 2 also includes two or three 'unifacial leaf points' from the Netherlands. These were made from substantial blades, ventrally mostly worked with shallow retouch. The retouches, especially those at the proximal and distal ends, afforded the blades a straight lateral profile: an important feature in spearheads. Jacobi (2007) dubbed such leaf points on blades 'blade points'. They were made by the latest Neanderthals in northern and western Europe, not long before they went extinct. We call such leaf points 'Jerzmanowice leaf points', after the site of Jerzmanowice (the Nietoperzowa Cave) in Poland, where in 1961 they were first described by Chmielewski. He suggested that the tradition characterised by such leaf points be named 'Jerzmanowician', and we see no reason to do otherwise (*contra* e. g., Flas, 2011).

A 'GREAT WESTWARD MIGRATION'?

There are good reasons for assuming that in northern and western Europe this was the last Neanderthal 'culture'. Datings of this tradition fall around 36,000 ^{14}C BP in the radiocarbon chronology (uncalibrated: ^{14}C uncal. BP). Quite recently, such dates have been obtained from direct datings of multiple skeletal remains of Neanderthals excavated in the famous cave of Spy; comparable datings are known from Britain (see e. g., Jacobi et al., 2006; Jacobi, 2007; Semal et al., 2009; Crevecoeur et al., 2010). Possibly this tradition was just a short-lived one, maybe lasting no more than one or two thousand years. At Spy more than ten unifacial leaf points were recovered, perhaps as many as 25 if re-used fragments are included (Pirson et al., 2011; Rougier and Semal, 2013). The major site of Beedings in Sussex was already mentioned; here no fewer than 43 Jerzmanowice leaf points were recovered, most of them broken (Jacobi, 2007). In the Netherlands one certain find of this type is known, a fragment found on the Aardjesberg hill (Fig. 6: 7; Stapert, 1992; Stapert et al., 2007), as well as one or two possible further fragments (Maasvlakte 2, Den Bosch?).

It is an appealing hypothesis that the Neanderthals performed a 'Great Westward Migration' – away from the expanding Cro-Magnons, who even before 40,000 ^{14}C uncal. BP started spreading across Europe from

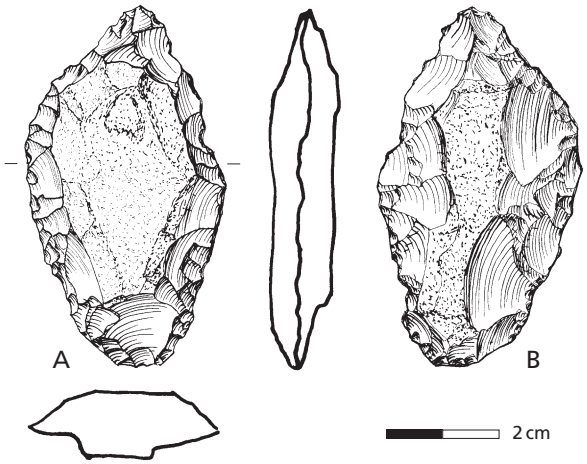

Fig. 8 A failed preform of a leaf point from Mauern, excavated by A. Bohmers. The point displays poor knapping skill, e. g., many steps. Drawing by Lykke Johansen. – (After Bohmers, 1951).

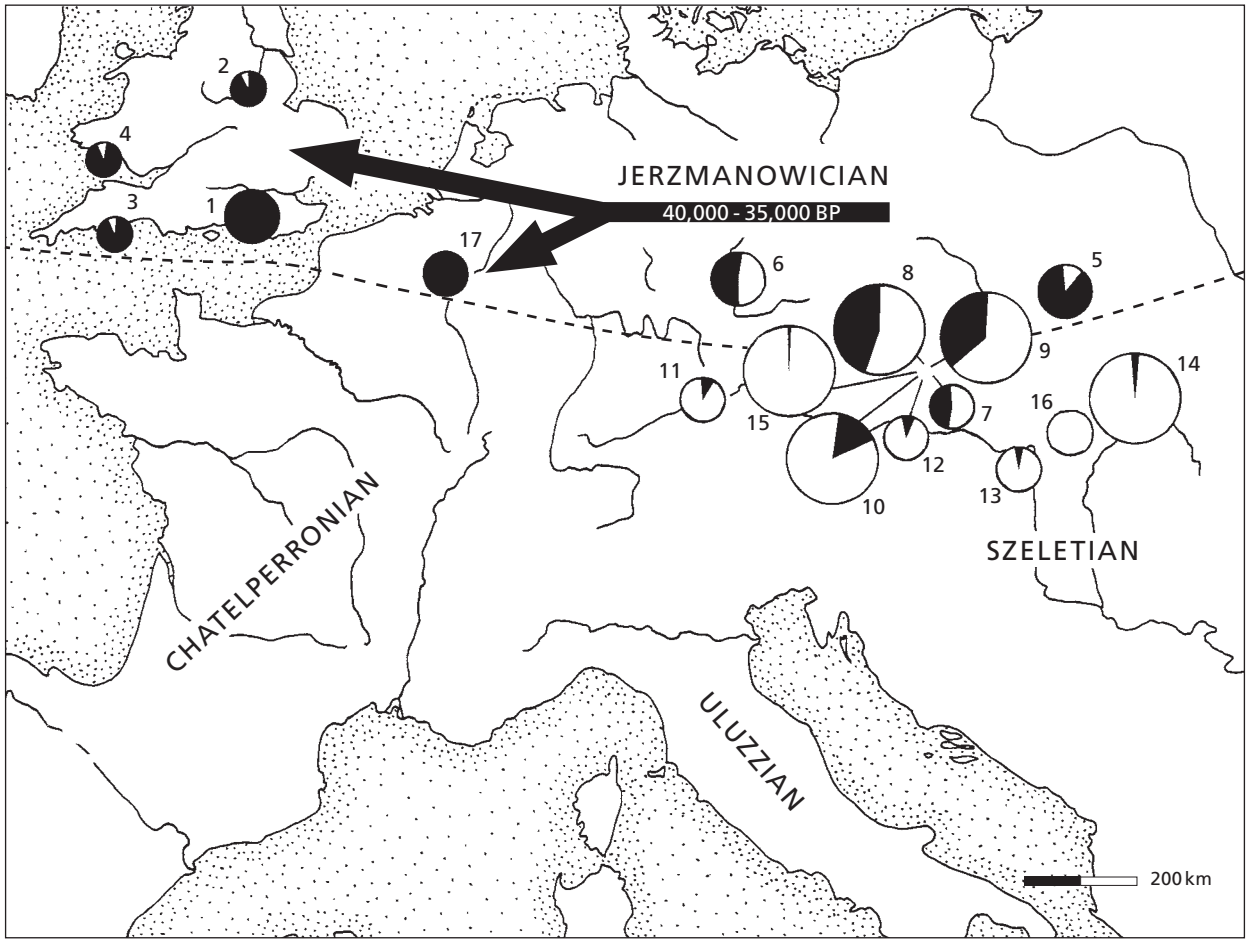

Fig. 9 Map showing selected findspots of the Leaf-point Group in central and northern Europe. Sites where Jerzmanowice leaf points predominate are labelled Jerzmanowician; sites with a predominance of bifacial leaf points, Szeletian (in the broad sense). The pie charts show the proportions of the two types: black: unifacial, blank: bifacial. The diameters of the pie charts roughly reflect the total number of leaf points per site. All English sites with over 10 leaf points; elsewhere a selection of sites with over 20 leaf points each (based on Allsworth-Jones, 1986, various publications by Jacobi (e. g., Jacobi, 1990, 2007) and other sources). The arrows illustrate the proposed Great Westward Migration of the last Neanderthals across the continent – away from the expanding Cro-Magnon territory. Findspots: **1** Beedings (Pulborough); **2** Robin Hood; **3** Kent's Cavern; **4** Paviland; **5** Jerzmanowice (Nietoperzowa); **6** Ranis (2) Ilsenhöhle; **7** Zelesice; **8** Lisen; **9** Ondratice (1, 3-7); **10** Neslovice; **11** Mauern; **12** Orechov (1); **13** Jankovich; **14** Szeleta (3-7); **15** Jerezany (1 and 2); **16** Balla (2); **17** Spy. – (Map: Dick Stapert and Lykke Johansen).

the southeast (for this hypothesis see Stapert, 2007). **Figure 9** is an illustration of this presumed Westward Migration, based on the assumption that Jerzmanowice points on average appeared later than the Mauern points. It is of interest to note that at Mauern five or six unifacial leaf points were present, in addition to 44 bifacial ones. The map in **Figure 9** seems to suggest that the Neanderthals were trying to avoid the Cro-Magnons by fleeing to the north and especially the west. One reason for believing that the users of leaf points (first bifacial, then unifacial ones) in southern England were migrants, is the fact that there was no local cultural substrate for these types. However, such a background *was* present in central Europe: in the Micoquian (*Keilmessergruppen*), leaf points or leaf-point-like tools had by then been produced for thousands of years. Although we now know through DNA analysis that the two (sub-) species interbred, this does not rule out violent confrontations. The possible causes or combinations of causes of the extinction of Neanderthals around 35,000 ^{14}C uncal. BP have since long been the subject of debate, on which the final word has not yet been spoken.

Fig. 10 The bone retoucher from Empel (prov. of Noord Brabant; see Stapert, 1977, 1981). It is a lengthwise split fragment of a long bone (probably a shinbone) of a large ungulate, with four clusters of 'stigmata' that derive from its use as a percussion tool in flintworking. Experiments have shown it to have been used by a left-handed Neanderthal. Length 11.2 cm; weight 92 g. – (Photo: Frans de Vries [Toonbeeld, Oosterwolde]).

BONE RETOUCHERS FROM MAUERN

Middle Palaeolithic leaf points were created by 'direct soft percussion', i. e., without a punch. No pressure flaking was applied, as often was the case in later Stone-Age (and Bronze-Age) periods. The flints were not heated prior to working to improve their workability, as was done with (part of) the leaf points of the Solutrean ca. 20,000 years ago (Bordes, 1969), and possibly also with some bifacial tools of later periods. Nonetheless the Neanderthals managed to create amazing leaf points while using only direct percussion. As said before, there are exceptionally fine and indeed very large leaf points which can hardly have been functional. They are true display pieces, demonstrating the makers' great skill as flint workers, and it has been suggested that these showpieces of the late Neanderthals were their equivalent of 'art' (Stapert, 2007: 17). As percussion tools, the Neanderthals used mostly bone hammers, made from long bones of large animals. These generally were ungulates, but the knappers were not too particular in this respect: even parts of Neanderthal bones (!) might be used (at Goyet; see Rougier et al., 2016). The finest Dutch example of such a bone percussion tool is from a suction-dredged gravel pit beside the Meuse, at Empel (**Fig. 10**; after Stapert, 1977, 1981). A remarkable aspect is that this tool had been used by a left-handed Neanderthal. Various kinds of research have shown that around 10 % of Neanderthals – like ourselves – were left-handed. Bone retouchers like this piece were without doubt used for producing a variety of tools: not just leaf points, but for instance also side-scrapers and handaxes. Although they were not always noted earlier by archaeologists (for instance, Lewis Binford in 1981 mistakenly described them as bones gnawed by hyenas, wolves, dogs, etc.), hundreds of such implements are now known, not just from Middle Palaeolithic, but also from Upper and Late Palaeolithic contexts. A couple of years ago, 2018 saw the appearance of an important book on

Fig. 11 The six bone retouchers from Mauern. No. 1951.804.A shows gnawing marks at the base. – (Drawings: Lykke Johansen).

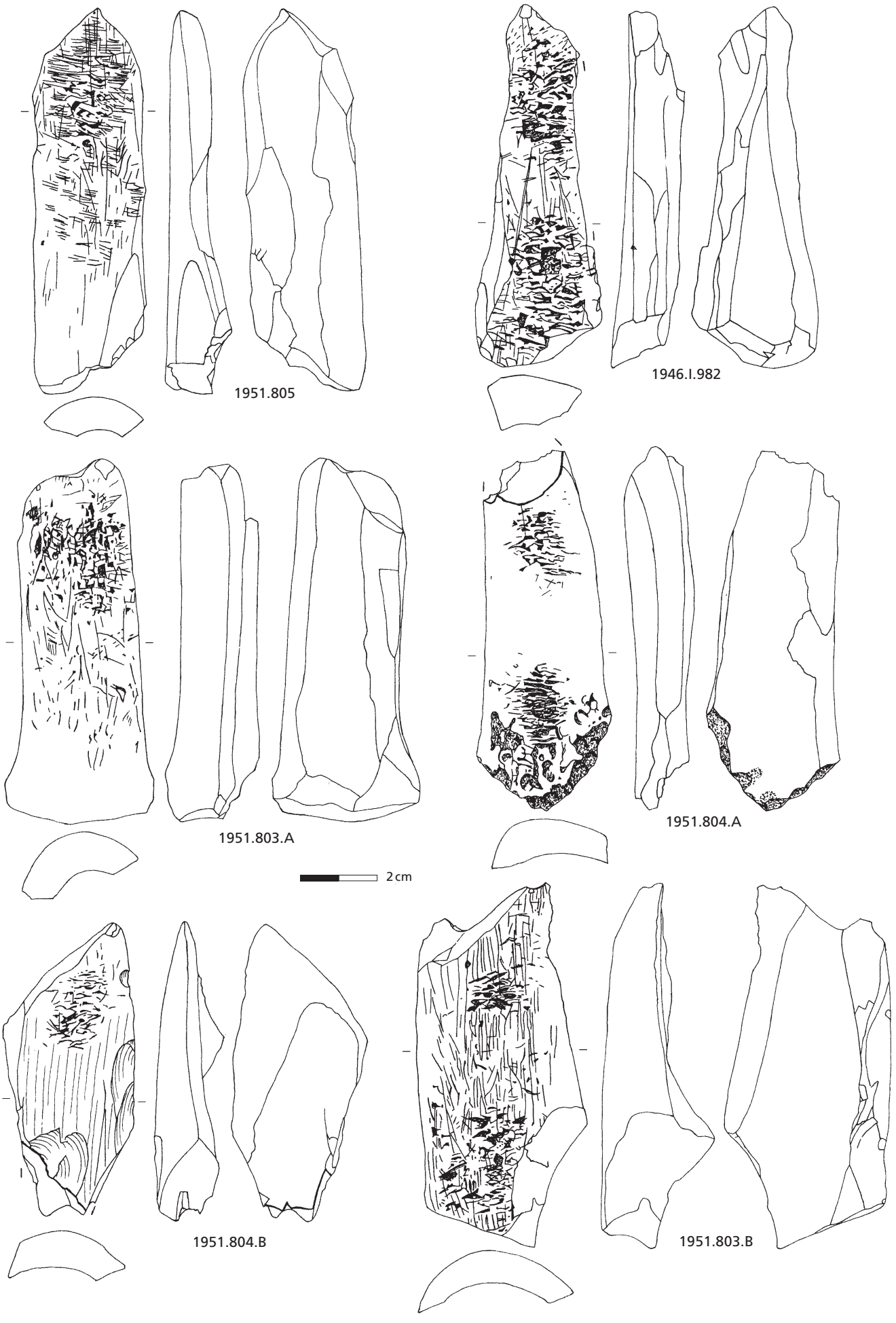
1951.805
1946.I.982
1951.803.A
1951.804.A
2 cm
1951.804.B
1951.803.B

Fig. 12 One of the bone retouchers from Mauern: No. 1946.I.982. – (Photo: Gert van Oortmerssen [RUG/GIA, Groningen Institute of Archaeology]).

bone technology in general and bone retouchers in particular (Hutson et al., 2018), which contains a lot of useful information.

The Mauern site was excavated by A. Bohmers in 1937-1939 for '*Das Ahnenerbe*'. Later investigators of the site included L.F. Zotz (1955, 1959) and W. von Koenigswald et al. (1974). Bohmers published his findings after the war, in the first issue of *Palaeohistoria*, the journal of the (then) Biological-Archaeological Institute of Groningen University (Bohmers, 1951). Recently the archaeologist/historian Arnold Carmiggelt published an extensive book on Bohmers' life and work, including the Mauern episode (Carmiggelt, 2019). Until recently, a small 'study collection' of some 50 items from Mauern was kept at the (present) Groningen Institute of Archaeology, including five leaf points and one bone retoucher (see Carmiggelt and Stapert, 2009; Stapert et al., 2010). In 2009 the first author and Carmiggelt re-united this collection with the rest of the excavated material in the *Archäologische Staatssammlung* in Munich. It transpired that five more bone retouchers were kept there, and we were granted permission to study these at Groningen (Stapert et al., 2010). Some information about the six pieces from Mauern (**Figs. 11-12**) can be found in **Table 3**. The five more-or-less complete specimens are on average 10.4 cm long and weigh on average 48.3 g. In general, the blanks are parts of long bones split lengthwise. Bone retouchers are very suitable for the purpose of dating, because it is certain that they belong to animals butchered by Neanderthals. Bone retouchers are especially useful in contexts such as caves, where many bones ended up without any human agency.

This at any rate applies to the majority of the bones recovered at Mauern, according to W. von Koenigswald (von Koenigswald et al., 1974). Moreover, it is only in a fresh condition that bones could have served as percussion tools (Martin, 1907-1910). This is underlined by the presence of fine, lengthwise scratches on three or four of the six studied bone retouchers from Mauern. These scratches precede their use as retouchers, and can be attributed to the bones being scraped to remove the periosteum.

The radiocarbon analyses of the six Mauern specimens were published by Van der Plicht (2012); they proved disappointing, probably because of contamination, which despite our best efforts could not in all cases be removed. One of the dates is clearly much too young: 20,490 ^{14}C uncal. BP. Moreover, this retoucher (no 1951.803.A) is of the lateral type (see Taute, 1965), a type that occurs especially in Upper/Late Palaeolithic contexts. The Gravettian level at Mauern produced radiocarbon dates of ca. 29,000 ^{14}C uncal. BP (von Koenigswald et al., 1974), still much older than 1951.803.A. According to Van der Plicht (2012), the oldest date

No.	species	anatomical part	lab.-nr.	^{14}C date [BP]	± [BP]	remarks
1951.804.B	cf. *Bos primigenius*	femur	GrA 46189	35,410	+280/-250	Fragment. Fine longitudinal scratches from bone-scraping.
1951.805	*Bos primigenius*	femur	GrA 46190	30,030	160	Besides stigmata from use as a retoucher, also small clusters of cut-marks.
1946.I.982	cf. *Bos primigenius*	cf. tibia	GrA 44676	36,180	+260/-240 *	From Cave A. Part of the Groningen 'Study collection'.
			GrA 46289	31,670	+350/-310	
1951.804.A	?	?	GrA 46186	37,150	+300/-270	With secondary gnawing marks.
1951.803.B	*Bos primigenius*	femur	GrA 46185	32,370	+200/-180	Used by a left-handed person. Fine longitudinal scratches.
1951.803.A	*Equus* sp.	metacarpal	Gra 46184	20,490	90	Lateral retoucher. Fine longitudinal scratches.

Tab. 3 Six bone retouchers from Mauern. Zoological determinations by R.J. Kosters and W. Prummel (RUG/GIA, Groningen Institute of Archaeology). Radiocarbon dates after Van der Plicht (2012: Tab. 1). – * unreliable radiocarbon date.

(of no 1946.I.982, which was dated twice) is unreliable (36,180 +260/-240 ^{14}C uncal. BP: GrA 44676). In fact, the present authors believe only one date to be a reasonable estimation of the true radiocarbon age of the leaf-point period: 37,150 +300/-270 ^{14}C uncal. BP (GrA 46186). It would make Mauern at least 1000 years older than Spy, which is not unreasonable. Van der Plicht (2012: 146) thinks that all dates are too young, partly because he believes that the retouchers date from the Micoquian. In our opinion, however, it is more likely that the majority date from the leaf-point period.

As for lateralisation, there is one specimen with clear left inclinations of the stigmata; most others are either unclear or show inclinations that are slightly to the right. So it seems that one of the users was left-handed. The bone retouchers of Mauern are fascinating tools in their own right, and certainly merit further study.

SUMMARY AND CONCLUSION

A beautiful bifacial leaf point of the 'Mauern' type is described and illustrated (**Fig. 2**). It was found some 20 years ago near Venray in the southern Netherlands by Roy Janssen, near his home. With its length of about 5.9 cm, it is the smallest successfully worked leaf point of this type found in the Netherlands so far. However, some failed preforms of leaf points, which were probably made by learners of the art of flintworking, are even smaller. The smallest piece in that group is the object from the Roswinkelerweg in Emmen: it measures only 4.6 cm (see **Tab. 2**). At the type-site of Mauern, the smallest bifacial leaf point – which is well-made – has a maximum length of 4.7 cm (illustrated in **Fig. 3**, after Bohmers, 1951).

We assume that this and other Dutch leaf points were made by members of one of the last groups of Neanderthals in northern Europe. Leaf points such as the specimen from Venray most probably served as spearheads. They were created by direct percussion, using bone retouchers. At least six of such bone percussion tools are known from Mauern, which are discussed briefly in the latter part of this paper. These tools were ^{14}C-dated in Groningen (Van der Plicht, 2012).

Many bifacial leaf points are very beautiful tools, and bear witness to the great flintworking skills of the Neanderthals. Elsewhere, for example at Mauern and Ranis 2, exceptional specimens are known – very large

and very thin – which can hardly have been functional as spearheads; they probably served as 'prestige' objects. Such pieces are as yet unknown in the Netherlands, probably because no suitable raw materials for their creation were available here.

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Dick Stapert
Independent researcher
Ossewei 6
NL - 9751 SC Haren
d.stapert@planet.nl

Marcel J.L.Th. Niekus
Stichting STONE/Foundation for Stone Age Research in the Netherlands
Acacialaan 51
NL - 9741 KW Groningen
and
Leiden University
Faculty of Archaeology
P.O. Box 9515
NL - 2300 RA Leiden
marcelniekus@gmail.com and
m.j.l.t.niekus@arch.leidenuniv.nl

Lykke Johansen
Archaeological Drawings and Analyses
Ossewei 6
NL - 9751 SC Haren
lykke.johansen.hn@gmail.com