MICHAEL BOLUS

THE LITHIC ASSEMBLAGE OF "ANDERNACH 2" FROM THE LATE PALAEOLITHIC LEVELS ON THE MARTINSBERG IN ANDERNACH, RHINELAND-PALATINATE (EXCAVATIONS 1979-1983)

Abstract

During excavations in the years 1979-1983, the site of Andernach 2 in the German central Rhineland produced two find layers: an older one dating to the Magdalenian period with extensive settlement structures and an overlying Late Palaeolithic one with a rather loose find scatter that can be assigned to the *Federmessergruppen*. This article concentrates on the lithic artefacts of this late Palaeolithic find layer, which has an age of ~ 14-13 ka cal BP, and dates into the Allerød interstadial. 13 different raw materials or raw material varieties could be distinguished, whereby the vast majority of the pieces are made of different flints and quartzites. In the tool spectrum, artefacts with blunt backs dominate by far, i. e., backed points and backed knives. Short end-scrapers are also well represented. The burins are usually not worked very carefully. Truncated tools, splintered pieces, non-blunted tips and laterally retouched pieces also occur.

Keywords

Backed points, backed bladelets, short end-scrapers, *Federmessergruppen*, lithic raw materials

INTRODUCTION

The following text is largely based on a heavily revised, unpublished version of the author's Master's thesis, which focused on the Late Palaeolithic artefact inventory of the 1979-1983 excavations on the Martinsberg in Andernach and was submitted to the University of Cologne in 1984 (Bolus, 1984). Martin Street analysed the faunal material from these excavations as part of his PhD on the Late Upper Palaeolithic, Late Palaeolithic and Mesolithic faunal inventories in the northern Rhineland which was submitted to the University of Birmingham (Street, 1993). However, since neither the lithic nor the faunal material from the 1979-1983 excavations – in which Martin Street participated as field technician (**Fig. 1**) – were published comprehensively but were only considered within the context of thematic overviews, and despite the time lag since the submission of my Master's thesis, this *Festschrift* provides a wonderful opportunity to finally present the results of the lithic analysis. The main focus of this contribution will be the retouched forms, which will be illustrated in their entirety.

In recent decades, countless new works on the Late Palaeolithic have appeared in Germany and abroad, and new Late Palaeolithic finds and features have been excavated on the Martinsberg itself (excavations 1994-1996), studied by Jan Kegler as part of another Master's thesis at the University of Cologne (Kegler, 1999, 2002). However, contextualization of the Andernach-Martinsberg finds in light of the extensive new research and the results obtained over the last few years is not intended here, and more recent literature has only been considered on occasion.

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SITE LOCATION

The Neuwied Basin, together with the Maifeld and the Pellenz to the west, forms a geomorphological basin of about 20 km × 30 km in the centre of the Middle Rhine region in Rhineland-Palatinate. The town of Andernach lies on the north-eastern edge of the basin, on the left side of the Rhine, just before the so-called Andernach Gate (*Andernacher Pforte*), with the town of Neuwied in sight on the opposite bank (cf. Bolus, 1992). Both towns are widely known through Prehistoric research on the two significant and well-comparable Magdalenian sites of Martinsberg (Andernach) and Gönnersdorf (district of Neuwied-Feldkirchen) (in summary: Bosinski, 2008). The Martinsberg in Andernach also provided the remains of a younger occupation, attributed to the Late Palaeolithic *Federmessergruppen* (curved-backed point industries). The lithic material from this upper level at the Martinsberg is the subject of this article. The material has good parallels to the nearby *Federmesser* site in the Neuwied district of Niederbieber (Bolus, 1992; Baales, 2003; Gelhausen, 2011).

Fig. 1 Martin Street, in 1982, during photographic documentation of the excavations at the site of Andernach-Martinsberg. – (Photo: M. Bolus).

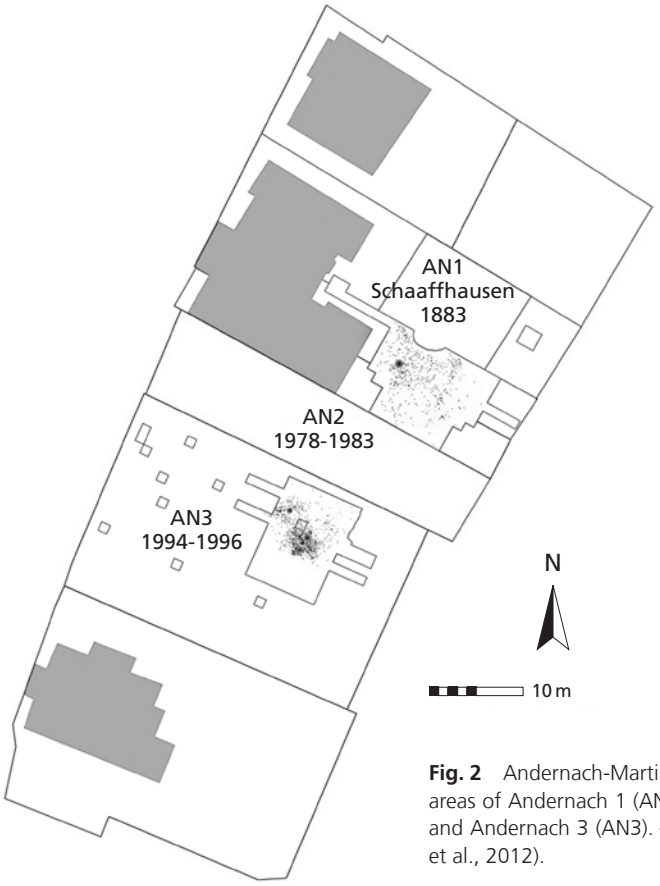


Fig. 2 Andernach-Martinsberg. The excavation areas of Andernach 1 (AN1), Andernach 2 (AN2) and Andernach 3 (AN3). – (Modified from Street et al., 2012).

RESEARCH HISTORY

In the following, the research history of the Martinsberg site is only considered to the extent that is relevant for the Late Palaeolithic finds. The Martinsberg site was discovered at the beginning of February 1883 through the extraction of pumice from the Laacher See eruption, some 13,000 years ago.

Immediately after being notified by Constantin Koenen, the Bonn anthropology professor Hermann Schaaffhausen initiated an excavation at the Martinsberg (Schaaffhausen, 1888), during which he unearthed the assemblage "Andernach 1" (most of which is now stored in the LVR-LandesMuseum Bonn), which mostly consists of Magdalenian finds, but which further includes seven (Late Palaeolithic) backed points that were, however, not referred to as such. Hans Hofer first associated backed points with the Andernach site in 1941 (Hofer, 1941: 25, Fig. 2, 28.30). However, the backed points he referred to did not come from Schaaffhausen's excavations, but belong to the small series of so-called *Neuwieder Federmesser*, comprising some 20 backed artefacts and three blades. These artefacts were made from a chocolate-coloured flint which is not known from the wider region, and purchased by the Neuwied Regional Museum (*Kreismuseum*) at an auction in Düsseldorf in 1912. Being unaware of this, the backed points (especially the *Neuwieder Federmesser*) led Hermann Schwabedissen in his fundamental work on the *Federmessergruppen* in the north-western European lowlands (Schwabedissen, 1954) to link his Rissen group (i. e., *Rissener Gruppe*), into which he placed the Andernach-Martinsberg finds, with the Magdalenian, since the rest of the assemblage – namely the types of burins, end-scrapers and the bone and antler industry – are clearly of Magdalenian character. In their restudy of the material from Schaaffhausen's excavation, Gerhard Bosinski and Joachim Hahn were able to prove that the *Neuwieder Federmesser* were not part of the Martinsberg assemblage (Bosinski and

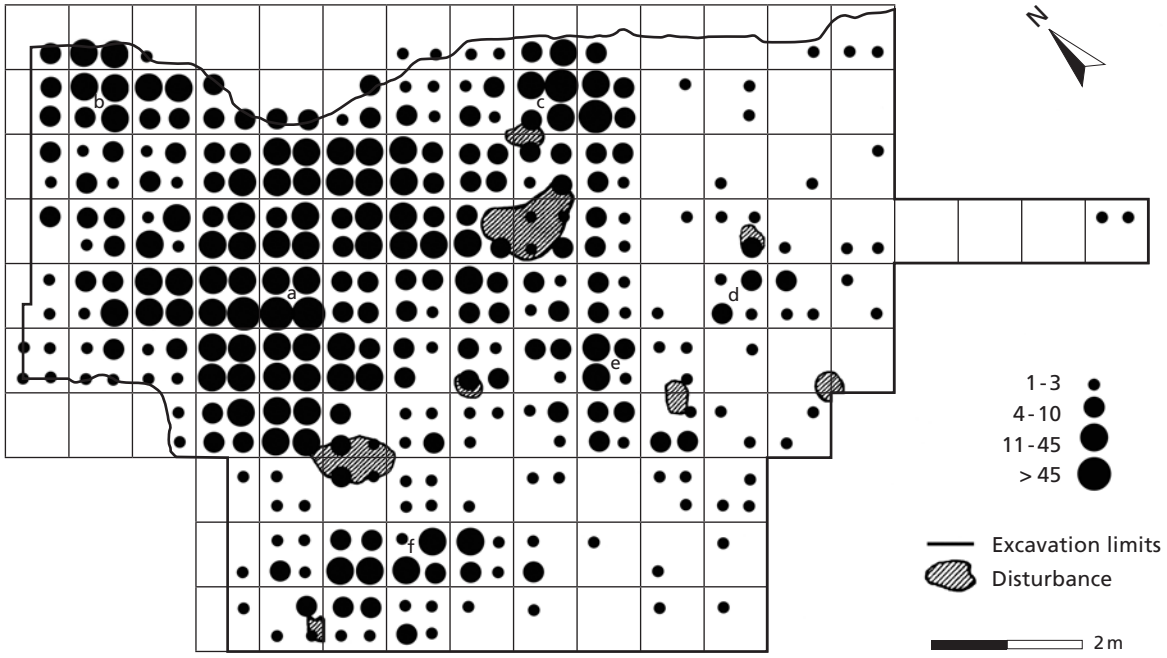


Fig. 3 Andernach-Martinsberg, Late Palaeolithic find horizon of Andernach 2: Distribution of all lithic artefacts (**a-f** concentrations within the general distribution). – (Modified from Bolus, 1991; basic plan drawn by W. Willingstorfer).

Hahn, 1972). The Late Palaeolithic types that remained part of Schaaffhausen's inventory were the seven backed points mentioned above.

New research under the direction of Stephan Veil shed new light on the backed point problem, and it became clear that the seven specimens of the 1883 excavation do not belong to the Magdalenian, but to a younger, Late Palaeolithic find layer. In 1977 Stephan Veil began preliminary investigations with coring on the Martinsberg, during which Late Glacial sediments were found. A preliminary, two-week exploratory follow-up excavation in 1978 also provided Late Glacial sediments, including layers of Allerød age buried below the Laacher See pumice, as well as a number of unclassified but probably Upper Palaeolithic finds (Veil, 1977/1978). A small excavation carried out in 1979 and situated further to the southwest partially uncovered a Magdalenian artefact concentration and additional finds of probably more recent age, including a short end-scraper (**Fig. 7: 13**), which gave a first concrete indication of the presence of a Late Palaeolithic find horizon atop of the main – Magdalenian – occupation layer (Veil, 1979). The succeeding excavations of the years 1981-1983 (Veil, 1982, 1984) provided the final proof of a separate, Late Palaeolithic occupation that produced lithic artefacts, animal bones, charcoal and latent features. With this discovery the seven backed points found in 1883 appear in a new light and can most likely be associated with this Late Palaeolithic occupation of the Martinsberg. The fact that the excavation area of 1979-1983 (Andernach 2) (**Fig. 2**) is directly adjacent to Schaaffhausen's excavation is evidenced not only by the trench boundary of 1883 – recognized as a disturbance during the new excavations (**Fig. 3**) – but also by a number of refits linking artefacts and bones from the new excavations with finds from Schaaffhausen's field work (Bolus and Street, 1985). In the years 1981-1983 an area southwest of the continuous excavation was examined by a number of small *sondage* squares. One of these squares (square 20/64) proved to be very rich in finds. The excavations of 1994-1996 (Andernach 3) should show that it lies on the northern edge of another find concentration (Kegler, 2002; cf. Veil, 1982) (**Fig. 2**).

ARCHAEOLOGICAL HORIZONS AND DATING

As mentioned above, the Palaeolithic site on the Martinsberg in Andernach has provided two culturally and chronologically clearly distinguishable find horizons: an upper archaeological layer of Late Palaeolithic age that dates between ca. 14,000 and 13,000 cal BP into the Late Glacial Allerød interstadial lies atop of a Magdalenian settlement horizon, very rich in finds, dated to ca. 15,600 cal BP (Stevens et al., 2009). The Magdalenian level, on the other hand, deposited on a Mid-Pleistocene basalt lava stream, which is crossed by several elongated crevices that may have likely formed when the lava cooled (cf. Veil, 1982). The Late Palaeolithic horizon is characterized by its relatively sparse distribution of finds, which mainly consists of knapped lithic artefacts (**Fig. 3**) and the remains of the hunted prey. In addition, quartz, fish remains and charcoal were among the archaeological finds. There is minor evidence of finds being relocated from the lower layer upwards, and less often from the upper layer downwards. Such relocation processes can be explained, among other things, by settlement activities, bioturbation by animals and plants as well as by freezing and thawing processes.

THE LATE PALAEOLITHIC LITHIC ASSEMBLAGE OF ANDERNACH 2

On the basis of various criteria such as stratigraphic position, raw material, techno-typological aspects and refits, a total of 2,793 stone artefacts from the 1979-1983 excavations (including some *sondages*) were recognized as Late Palaeolithic. 1,377 of these artefacts measure ≥ 1 cm, 1,416 artefacts are small-scale debitage (< 1 cm, but > 3 mm). The total weight of the Late Palaeolithic lithic assemblage from Andernach 2 is 2,126 grams. Their spatial distribution covers practically the entire excavated area, but shows six more or less distinct concentrations (**Fig. 3: a-f**), with the main distribution being in the north-western and central

Raw material	Weight [g]	Portion of the total weight [%]	Number [n]	Portion of the total assemblage [%]	≥ 1 cm [n]	Portion [%]	< 1 cm [n]	Portion [%]
R1	199	9.4	64	2.3	56	87.5	8	12.5
R2	131	6.2	259	9.3	98	37.8	161	62.2
R3	589	27.7	1,020	36.5	463	45.4	557	54.6
R4	20	0.9	7	0.3	6	85.7	1	14.3
R5	114	5.4	193	6.9	71	36.8	122	63.2
R6	226	10.6	245	8.8	136	55.5	109	44.5
R7	395	18.6	388	13.9	190	49.0	198	51.0
R8	134	6.3	217	7.8	118	54.4	99	45.6
R9	99	4.7	69	2.5	58	84.1	11	15.9
R10	78	3.7	146	5.2	70	48.0	76	52.0
R11	81	3.8	111	4.0	67	60.4	44	39.6
R12	43	2.0	57	2.0	29	50.9	28	49.1
R13	17	0.8	17	0.6	15	88.2	2	11.8
Total	2,126		2,793		1,377		1,416	

Tab. 1 Andernach-Martinsberg, Late Palaeolithic find horizon: Lithic raw materials from Andernach 2 after amounts and weight relative to the size of the total assemblage. For the characterisation of the raw materials and raw material variants R1-R13, see the text.

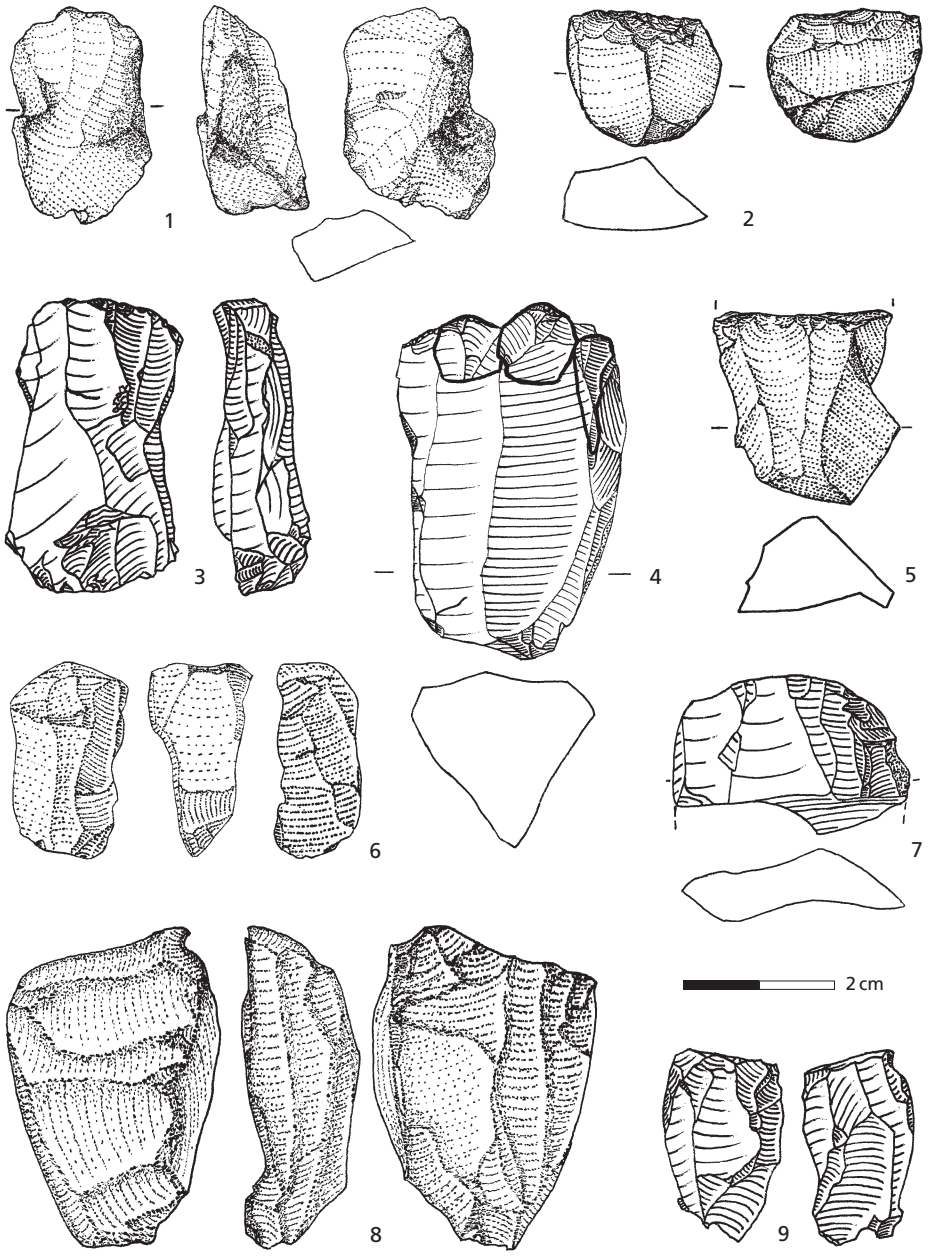


Fig. 4 Andernach-Martinsberg, Late Palaeolithic find horizon: Selection of cores from Andernach 2. – (Line drawings: G. Rutkowski).

part of the area (Fig. 3). Reference should be made to spatial analysis of these finds by Dick Stapert and Martin Street (Stapert and Street, 1997) with regard to the potential existence of a dwelling structure. Since the density of Late Palaeolithic finds directly at the disturbance along the edge of Schaaffhausen's excavation is still relatively high, while only a few of his finds may be attributed to the upper occupation horizon, it can be assumed that a not inconsiderable proportion of Late Palaeolithic finds were lost in 1883.
Detailed studies of the horizontal and vertical distribution of finds, including the frequencies of the different raw materials, seem to reveal two to three different consecutive and brief phases of occupation within the Allerød settlement that followed shortly after each other (Bolus, 1984). New dating results appear to be in support of these data (Stevens et al., 2009).

Lithic raw materials

A total of 13 different raw materials or raw material varieties have been distinguished in the Late Palaeolithic material of the Martinsberg:

- Pebble slate (i. e., *Kieselschiefer*: Raw material R1)
- Coarse-grained grey quartzite with larger quartz inclusions (Raw material R2)
- Light grey to light brown fine-grained tertiary quartzite ("fresh water quartzite"), partly with rounded quartz inclusions (i. e., *Süßwasserquarzit*: Raw material R3)
- silicious limestone (i. e., *Verkieselter Kalk*: Raw material R4)
- brown silicate tuff with black bands (Raw material R5)
- Chalcedony (Raw material R6)
- Greenish opaque Meuse gravel flint with reddish and bluish areas (Raw material R7)
- Greenish eluvial Meuse flint with diffuse bright spots (Raw material R8)
- Grey-blackish Meuse flint of the "Vetschau" type with chalk cortex (Raw material R9)
- Black Meuse flint with chalk cortex (Raw material R10)
- Meuse "egg" flint nodules (i. e., *Maaseifeuerstein*: Raw material R11)
- Beige silica Oolites (i. e., *Kieseloolith*: Raw material R12)
- Baltic flint (Raw material R13)

Some of these raw materials (pebble slate R1, silicious limestone R4, and tertiary quartzite R3) could be found in the vicinity of the site itself or at short distances, while others had to be procured from 50 km (chalcedony R6, some flint varieties?) or 75 km (silica tuff R5?); others from up to 100 km away or more (other flint varieties): For details on the individual raw materials and their origins, see Floss (Floss, 1994: 271-283). Represented with 1,020 pieces, the light grey fine-grained tertiary quartzite (R3) dominates with a percentage of ~ 36 % of the total inventory. In contrast to this, the next frequent raw materials, the greenish opaque Meuse gravel flint (R7: 388 pieces, ~ 14 % of the inventory) and the coarse-grained grey quartzite (R2: 259 pieces, almost 9 % of the inventory) fall significantly. Weights and percentages of all raw materials are listed in Table 1.

Blank production, knapping technique and assemblage composition

The Late Palaeolithic inventory of the Martinsberg Andernach 2 assemblage comprises 17 cores and core fragments (**Fig. 4**), made of a total of seven raw material varieties, without any of them showing particular dominance. However, it is noteworthy that only four cores (i. e., 23.5 % of the cores) consist of coarse-grained grey quartzite, which accounts for only 9.3 % of all artefacts, and two cores (11.8 % of the cores) are made of silica tuff, which is represented in the total inventory with only 6.9 % of all artefacts. Eight cores and core fragments were reduced along a single surface, seven on two and two cores display more than two surfaces exploited for the production of blanks. Intensive core preparation, as is the case in the Magdalenian, is missing from the Andernach 2 Late Palaeolithic.

In addition to the cores, the assemblage contains 119 complete and 455 fragments (with medial fragments predominating, followed by proximal and finally distal fragments) of blades and bladelets that are in most cases not very elaborately produced, applying almost exclusively hard percussion. Only a few blades of relative high quality that form part of a refitted sequence, are made of light grey tertiary quartzite, and seem to have been produced by direct soft percussion. The remaining artefacts are made up of flakes and small-

Tool type	Number	Portion of tool assemblage [%]
Backed point	28	19.45
Backed bladelet	27	18.75
End-scraper	23	15.97
Burin	22	15.28
Truncation	9	6.25
Other pointed tool	7	4.86
Splintered piece	7	4.86
Assorted modified artefacts	21	14.58
Total	**144**	

Tab. 2 Andernach-Martinsberg, Late Palaeolithic find horizon. Spectrum of tool types in Andernach 2.

Tool type	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13
Backed point	1	1	9	-	-	3	5	3	4	-	-	1	1
Backed bladelet	-	3	10	-	1	1	5	3	1	-	-	-	3
End-scraper	-	2	3	-	*	2	10	2	-	-	-	-	4
Burin	1	1	6	-	*	5	6	*	1	2	-	*	*
Truncation	-	1	-	-	-	-	2	1	1	2	1	-	1
Other pointed tool	-	1	2	-	-	-	-	1	-	2	-	-	1
Splintered piece	-	-	1	-	-	*?	*?	1	1	2	2	-	-
Assorted modified artefacts	2	1	4	-	1	2	4	1	2	1	3	-	-
Total	**4**	**10**	**35**	**-**	**2**	**13**	**32**	**12**	**10**	**9**	**6**	**1**	**10**

Tab. 3 Andernach-Martinsberg, Late Palaeolithic find horizon. Raw material spectrum of tools and tool spectrum of raw materials in Andernach 2. For the characterisation of the raw materials and raw material variants R1-R13, see the text. * tool-type only indirectly evidenced by production waste debitage.

sized debitage. Cortical flakes are numerous, with proportions varying from raw material to raw material. However, the coarse-grained grey quartzite and the light grey tertiary quartzite do not naturally display cortical surfaces, as they are layered materials that have been naturally broken into angular slabs and plates. In addition, it is difficult to determine the cortex portion of the silicate tuff and the chalcedony, since their cortical areas cannot always be reliably distinguished from fracture surfaces within the material.

With the exception of the Baltic flint, refits were made for all raw materials. In 20.4 % of the refits, the refitted items were found less than 0.5 m apart. By far the most common, in 56.8 % of cases, refitted items were between 0.5 m and 1.9 m apart. Distances between 2.0 m and 4.0 m are represented with 11.8 % and distances > 4 m with 10.1 % between refitted artefacts.

Most frequently artefacts made of opaque Meuse gravel flint were refitted. A cobble of this material could be refitted to more than 50 %, whereby many cortical preparation flakes were also involved, so that this cobble was probably complete when it reached the site, where reduction begun. Considering the large number of artefacts, only relatively few refits could be established between artefacts made of the light grey tertiary quartzite. The refit rate in the latter material is almost only a quarter of that of the opaque Meuse gravel flint. But in one area of the excavation, several comparably 'good' blades found near each other almost represent on the spot serial blade production.

The modified forms and their production debris

Here, all blanks that have been intentionally modified by humans after their removal from the core are ascribed as "modified forms". For this classification it is irrelevant, whether this modification was caused from percussion (i. e., as is the case with "splintered pieces") or from retouch. However, here, only artefacts in which the modification resulted in the formation of a functional end or of a functional edge are considered. Following this definition, 144 tools or tool fragments (**Tab. 2**) with a total of 155 functional ends/edges were identified in the Andernach 2 Late Palaeolithic assemblage. This corresponds to a tool share of 5.2 % in relation to the total inventory and a proportion of 10.5 % in relation to the pieces of at least 1 cm size.

Backed points

Particularly characteristic and decisive for the cultural assignment to the Late Glacial *Federmessergruppen* are 28 backed points (19.5 % of all tools; **Fig. 5**). These are bladelets or narrow blades with a bluntly backed longitudinal edge and a clear tip. In the case of medial and proximal fragments of such backed tools, it is sometimes difficult – sometimes even impossible – to decide whether it is a fragment of a backed bladelet or of a backed point. Here, only those specimens are classified as backed points for which this assignment can be clearly and reasonably argued. Raw material variability is quite high for the backed points: the backed points of the Andernach 2 assemblage were made from nine of the 13 raw material varieties present at the site (**Tab. 3**), with nine specimens made of the most frequent material, i. e., light grey tertiary quartzite, and with five specimens made of the next frequent material, i. e., opaque Meuse flint. A total of 18 backed points display a clearly convex back, so they are to be addressed as typical *Federmesser* (i. e., pen-knife points). Six backed points have a slightly curved back. In one complete specimen and in two fragments, the most curved part of the back is located in the upper part of the point; in another complete specimen in the middle and in an additional fragment approximately in the lower part of the point. Four backed points, including three fragments, have a straight back. However, two of these fragments could also be fragments of curved-backed points. Nine backed points are complete, in eight cases they are proximal or distal and in three they are medial fragments. If the point is oriented to the top, 17 backed points are retouched at the left lateral edge and eleven on the right. Two specimens are retouched bi-laterally in their distal parts; both display slight basal retouch. In 22 cases the retouched functional end was located at the blank's distal end, compared to six pointed proximal ends. Three backed points display fracturing at the tip (once on the dorsal surface, twice on the ventral surface), which may have been caused from use as projectiles (Fischer et al., 1984). Two of these pieces are very small distal fragments, and it is quite likely that the pieces broke off during use. Complementary to this picture, just such a distal end is missing from another backed point, which displays a burin scar-like facet on the upper part of the backing, similar to those R. N. E. Barton and C. A. Bergman (1982) were able to document for artefacts that were used as projectiles. In terms of their size, the backed points of the Martinsberg Andernach 2 assemblage display an astonishing range of variations. The shortest complete piece is only 2.1 cm long, while the longest complete specimen measures 5.2 cm. With a width of only 0.6 cm the shortest complete backed point is also the narrowest. This is contrasted by a 2.2 cm wide point which is fragmentary in its length. The complete backed points have a length-width ratio of ~ 3:1, which indicates a certain degree of standardization. Surprisingly, the five complete backed points from the Schaaffhausen collection also fit to these proportions. Worth mentioning is a backed point made of eluvial Meuse flint, which is composed of three refitting fragments (**Fig. 5: 25**). This specimen also represents the longest complete backed point of the inventory. After the distal tip had been broken of (probably

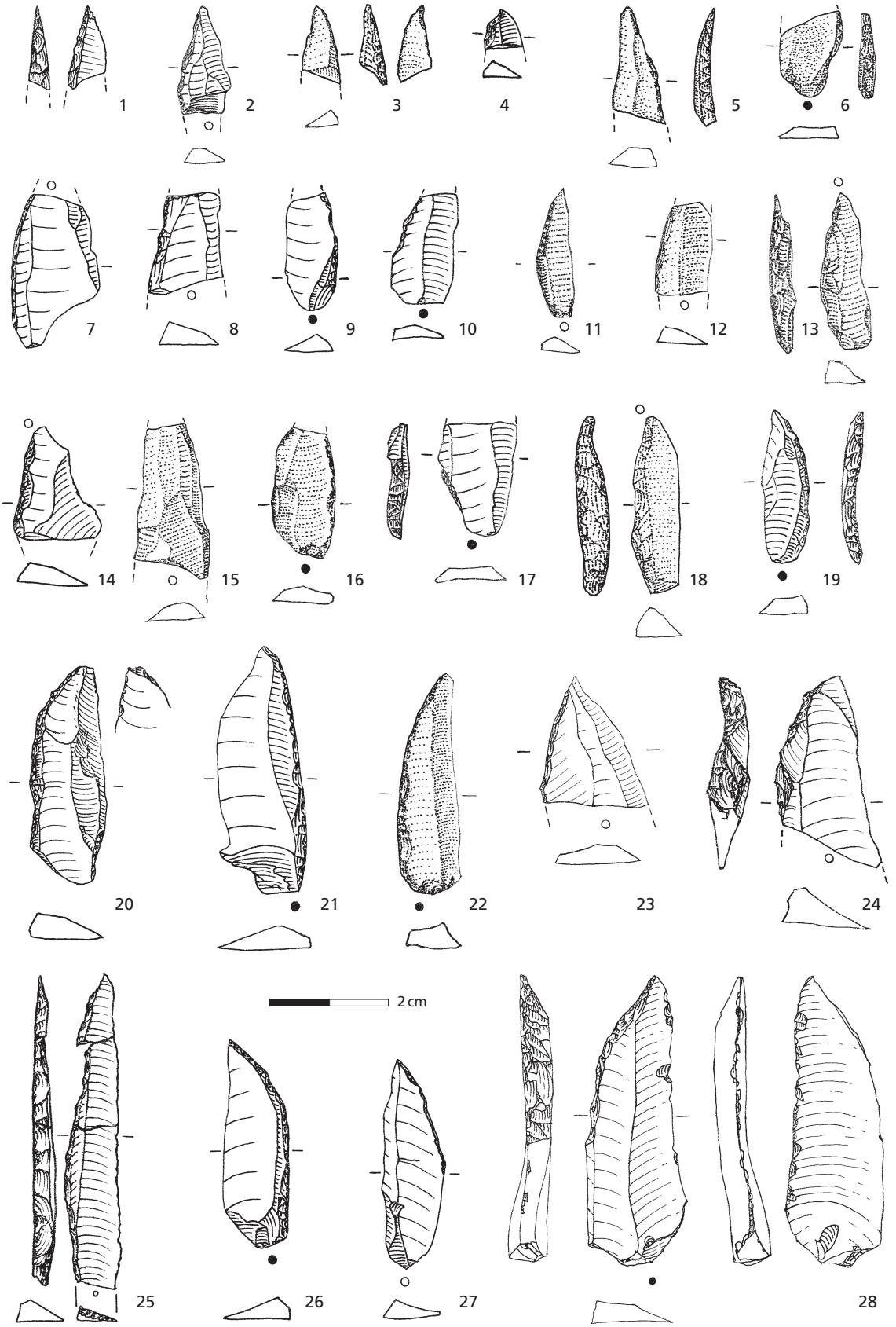


Fig. 5 Andernach-Martinsberg, Late Palaeolithic find horizon: Backed points from Andernach 2. – (Line drawings: G. Rutkowski).

during use) an attempt was made to create a new tip by retouch. Probably during this effort, the piece was broken right through the middle and was therefore discarded.

Backed bladelets

In addition to the 28 backed points, 27 backed bladelets and fragments of bladelets were identified (18.8 % of all tools; **Fig. 6**). Their raw material spectrum is similarly variable as for the backed points, as eight different raw material varieties are represented amongst the backed bladelets (**Tab. 3**). Again, the light grey tertiary quartzite dominates by far with ten pieces alone, followed here by the opaque Meuse gravel flint with five examples. Two backed bladelets display bi-lateral longitudinal retouch; all other pieces are simple backed bladelets; end-retouched specimens do not occur. In two cases, burin spalls had been backed. The blank is

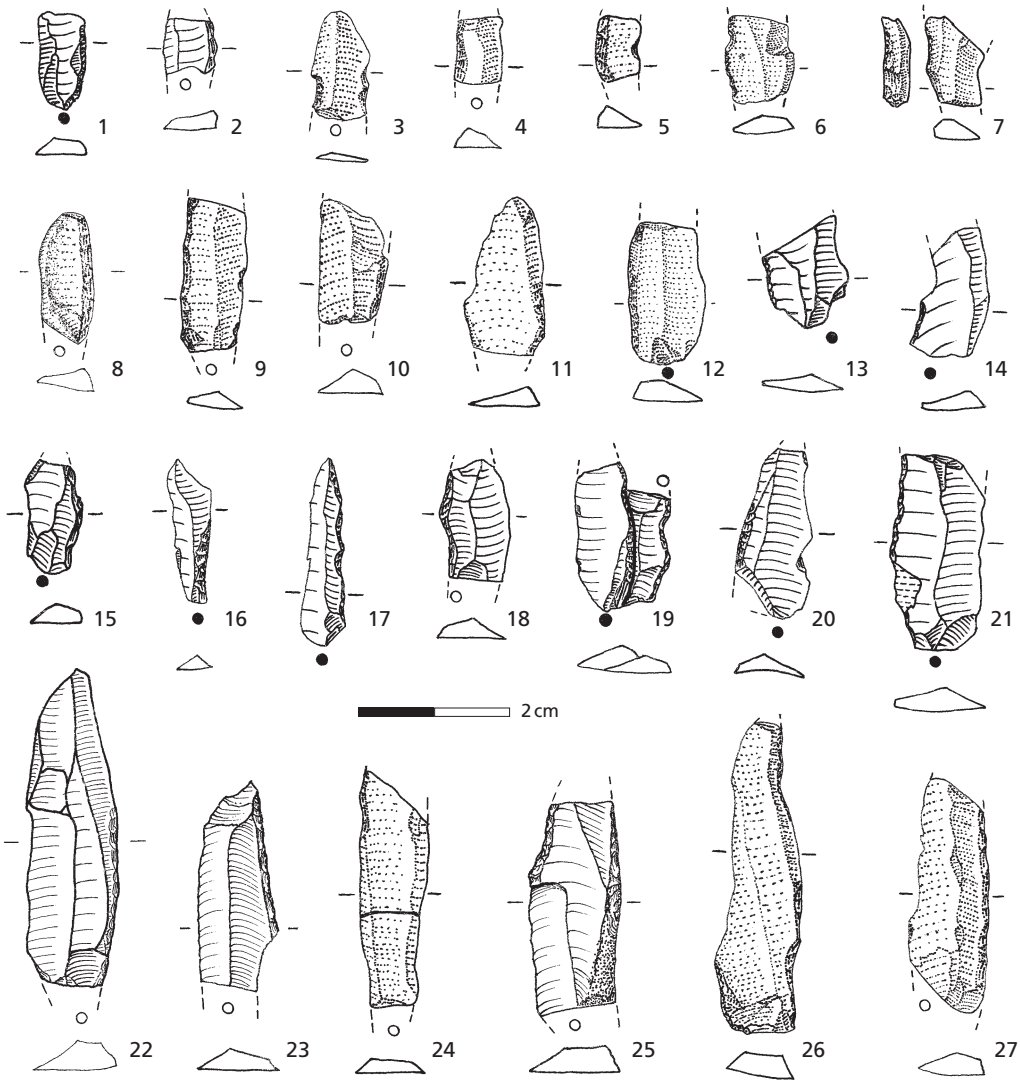


Fig. 6 Andernach-Martinsberg, Late Palaeolithic find horizon: Backed bladelets from Andernach 2. – (Line drawings: G. Rutkowski).

completely preserved on just three backed bladelets. Ten pieces are medial fragments; with nine pieces, proximal fragments are almost as common. Distal fragments, on the other hand, are rarer, with only five pieces.

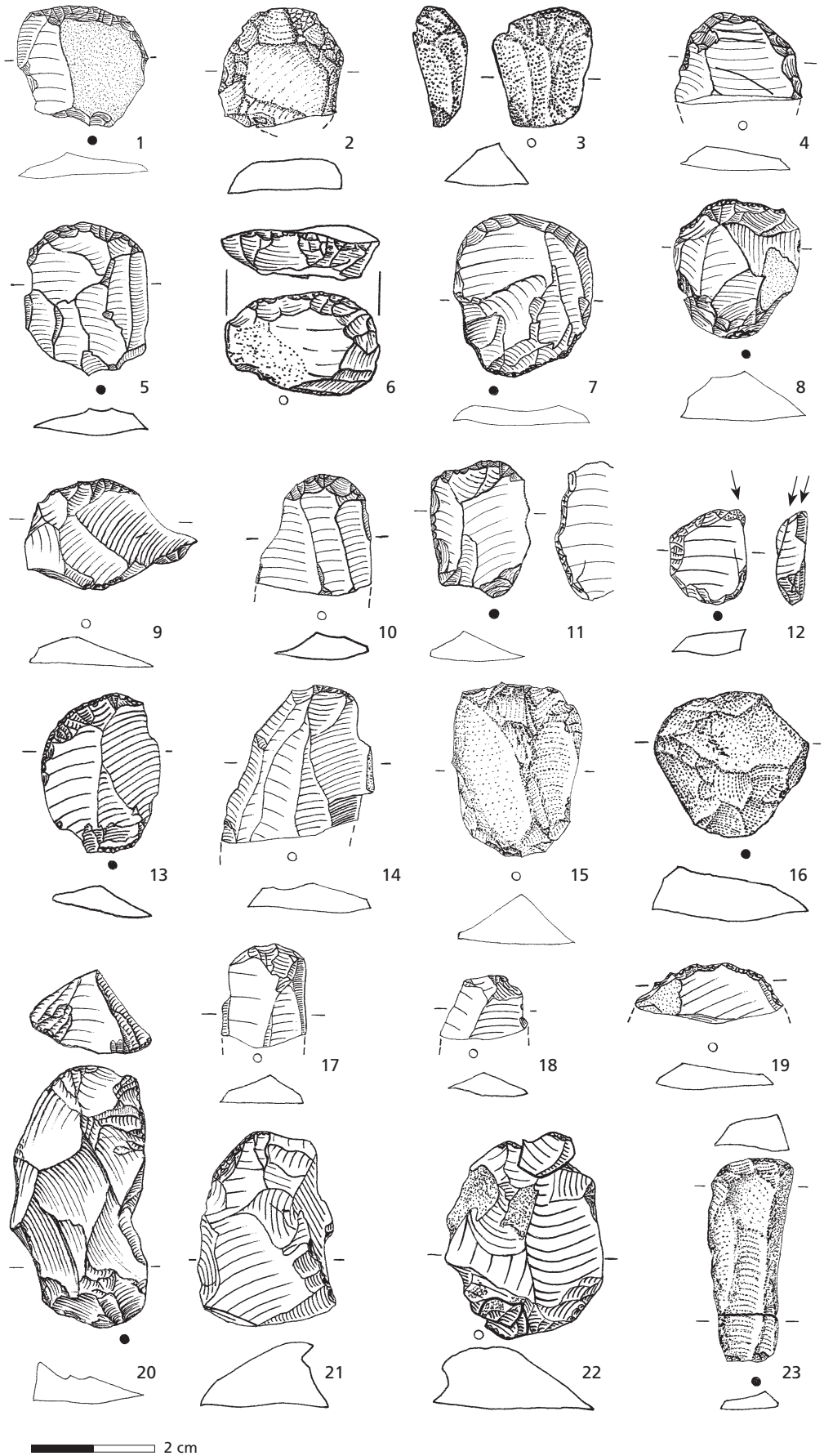
End-scrapers

End-scrapers, i. e., tools with at least one more or less convex retouched end perpendicular to the blank's longitudinal axis, are represented in Andernach with 23 pieces (16.0 % of all tools; **Fig. 7**); they display a total of 26 functional ends, i. e., end-scraper caps. In contrast to the backed tools, only six raw material varieties are represented in end-scrapers (**Tab. 3**). Ten end-scrapers are made of opaque Meuse flint, while – unlike the backed tools – the light grey tertiary quartzite is represented only three times. Instead, Baltic flint is represented in the scrapers with four specimens. As expected, the end-scrapers were made almost exclusively on flakes, represented by 22 pieces, outnumbering the single specimen made on a blade. Twelve end-scrapers are complete, eleven are broken. All end-scrapers are retouched at the blank's distal end, two double scrapers additionally at the proximal end; one scraper is retouched along its entire perimeter. Nine specimens display light edge retouch. A small simple end-scraper displays a kind of burin scar at its distal end; this specimen may be classified as a combined tool (**Fig. 7: 12**). It is the only such item in the entire Late Palaeolithic inventory of Andernach 2. A size comparison of the lengths and widths of the complete end-scrapers shows that most pieces have a length-width ratio of ~ 1:1 (i. e., the end-scrapers are "short"). Such short end-scrapers are typical of inventories of the *Federmessergruppen*. A complete end-scraper made on a core tablet (**Fig. 7: 20**) is almost twice as long as wide. Similar proportions also apply to the single blade end-scraper (**Fig. 7: 23**). The broken end-scrapers are usually slightly wider than long.
In addition to the end-scrapers, 166 chips were identified that relate to the retouch of end-scraper caps. However, the actual number is likely to be even higher. In the case of a double end-scraper made of opaque Meuse gravel flint, it was possible to fit three retouching chips, found in the immediate vicinity, onto the tool (**Fig. 7: 22**). In this case, we can assume that the piece was also made or at least sharpened at the place of use and then abandoned. In contrast to this, some retouching chips of end-scraper caps from silicated tuff prove the production or re-sharpening of at least one end-scraper on the site, whereas no end-scraper made of this raw material was found.

Burins

Burins did not seem to play a major role in the Late Palaeolithic of the Martinsberg, as is often the case with comparable sites. The 22 pieces found in the Andernach 2 assemblage (15.3 % of all tools; **Fig. 8**) are almost all manufactured in a non-elaborate manner. Here, too, the raw material spectrum is somewhat less variable than with the backed tools, but in some raw material varieties burins are evidenced indirectly by burin spalls (**Tab. 3**). Among the six raw materials used for burins, light grey tertiary quartzite and opaque Meuse gravel flint dominate with six specimens each, followed by five burins made from chalcedony. Overall, it does not appear that a single raw material has been given as much preference for burins as for other tool classes. In the case of two burins made of opaque Meuse gravel flint, onto which the spalls could be

Fig. 7 Andernach-Martinsberg, Late Palaeolithic find horizon: End-scrapers from Andernach 2. – (Line drawings: G. Rutkowski, D. Apel and E. Turner).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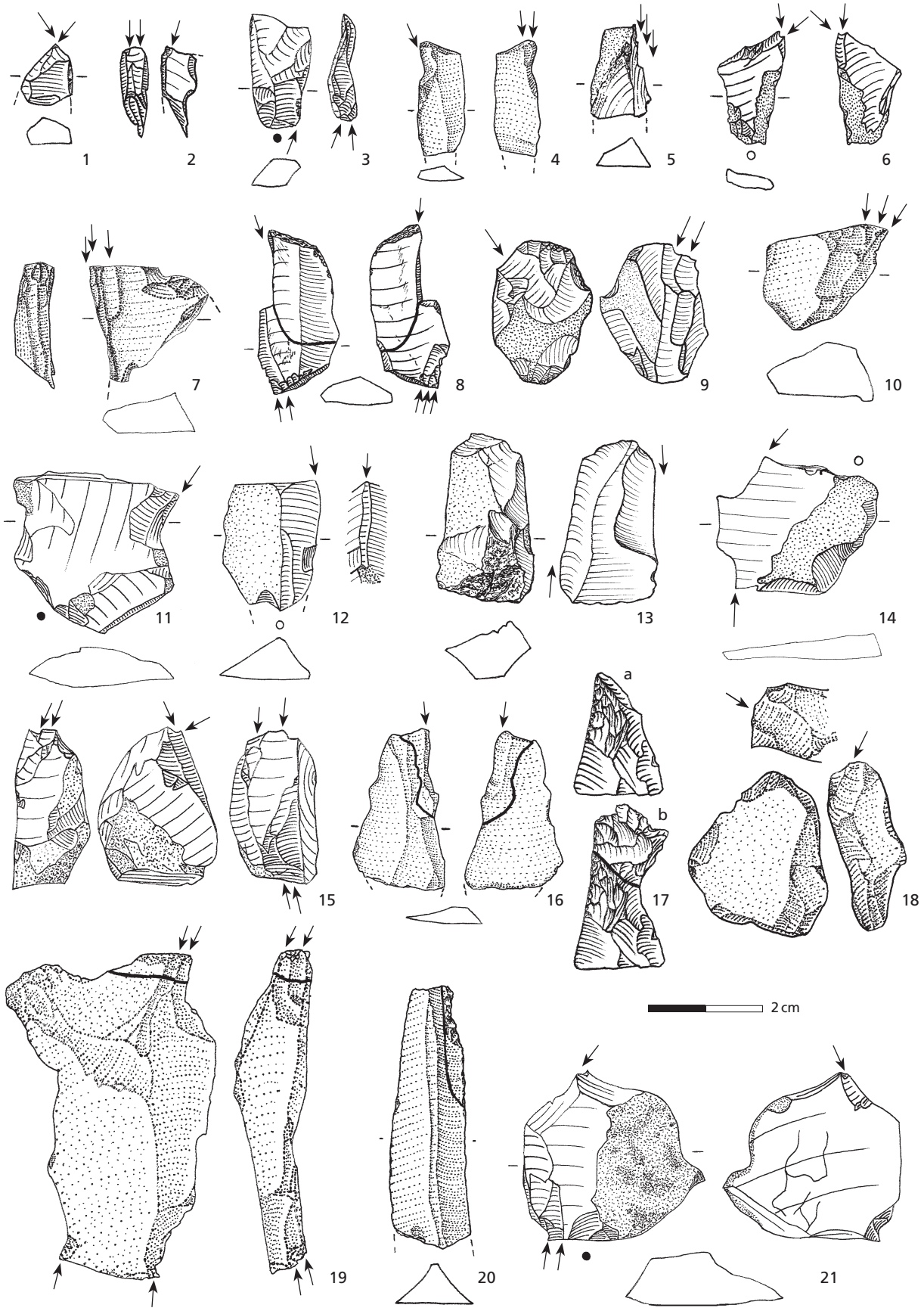

Fig. 8 Andernach-Martinsberg, Late Palaeolithic find horizon: Burins from Andernach 2. – (Line drawings: G. Rutkowski).

refitted, the spalls lay in one case directly next to the tool, and in the other almost 6 m away. In two burins made of light grey tertiary quartzite to which burin spalls have been refitted, the tool and the waste were each less than 1 m apart. Remarkable is the concentration of five burins (22.7 % of all burins) within the *sondage* square 20/64 mentioned above. Among them were some of the most carefully worked burins from the entire assemblage.

A total of 20 fragmented burins is contrasted with only two complete ones. In three cases, the modification was applied to cores (the difficulty in clearly distinguishing between core burins and bladelet cores is only mentioned here). In 16 cases, flakes served as burin blanks, in two cases blades and in one a bladelet. A total of 17 burins display a single functional end only; four are double burins, one is a triple burin. In total 29 functional burin ends are present, if the burin modification on the short end-scraper mentioned above (**Fig. 7: 12**) is also taken into account. In 15 specimens the modifications typical for burins are located at the distal tool ends and in eleven cases at their proximal ends. No decision can be made in three cases. In contrast to the end-scrapers, the high proportion of modified proximal ends is noticeable. This is usually the thickest part of a flake. This end of a blank displays the bulb of percussion and is highly unsuitable for transformation by retouch into an end-scraper cap. For the production of a burin, however, directing the burin blow to the thicker proximal end just makes sense, because it could create a reasonably wide working edge. In 15 cases, a breakage surface, in three cases a terminal retouch and in two cases a different burin scar or a natural surface served as a platform from which the burin spall was struck. Other burin platforms (e. g., knapped surfaces or end-scraper caps) occur seven times. In the entire assemblage there is only one typical dihedral burin. Fifteen times the modification was generated by a single stroke only, in four cases the tools display two burin scars, and in ten specimens three or more scars per functional end. Marginal lateral retouch occurs only in two burins, in one case on the ventral surface. On average, the length-width ratio for burins is slightly higher than for the end-scrapers, i. e., slightly more elongated blanks were selected for the production of burins than were for end-scrapers. In addition to the burins, 108 burin spalls of their production (including 42 primary burin spalls) were identified. Refits between burins and burin spalls have already been briefly discussed; in addition, two burin spalls from fine-grained tertiary quartzite that were found near each other have been refitted.

Truncations

In contrast to the convex retouched end-scraper caps, truncations refer to tools that are modified at their narrow proximal or distal ends by straight or slightly concave retouch which lies usually oblique to the longitudinal axis of the blank. Nine artefacts from the Andernach 2 assemblage meet these criteria (6.3 % of all tools; **Fig. 9: 15-23**). Compared to the relatively small number of pieces, it is somewhat surprising that they are made of seven different raw material varieties, which are almost exclusively non-local materials (**Tab. 3**). Two blades, two bladelets and five flakes served as blanks. Eight truncations are located at the distal, one at the proximal end. Whether (some of the) truncations may have served as half-fabricates for the production of other tools, for example of burins, cannot be decided and will therefore not to be discussed further here.

Other pointed tools

In addition to the backed points, seven pointedly retouched artefacts that lack back blunting (4.9 % of all tools; **Fig. 9: 1-7**) are part of the Late Palaeolithic Andernach 2 assemblage. Some of these items were

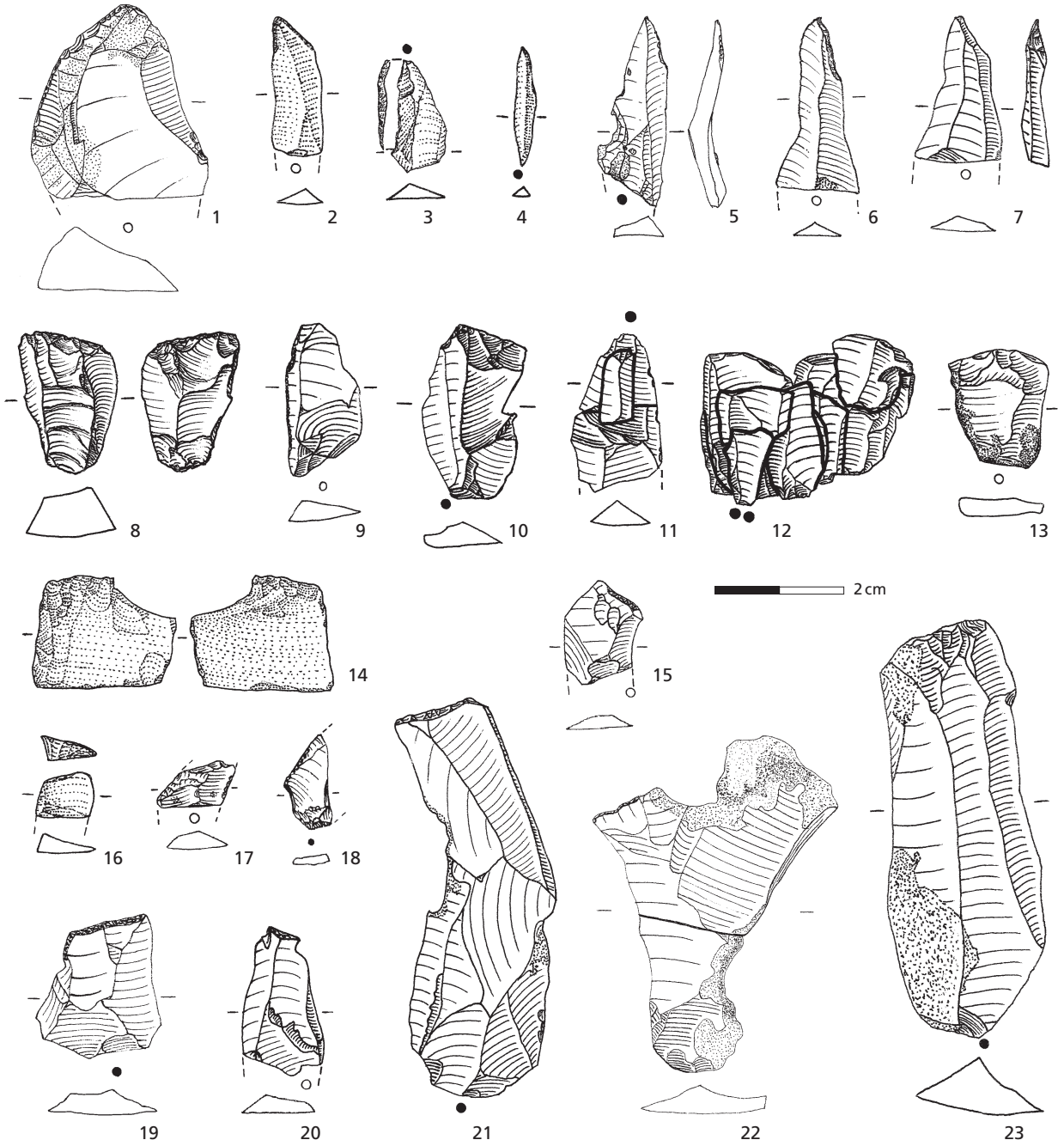

Fig. 9 Andernach-Martinsberg, Late Palaeolithic find horizon: **1-7** other pointed tools; **8-14** splintered pieces; **15-23** truncations from Andernach 2. – (Line drawings: G. Rutkowski).

retouched similarly to truncated pieces, but should be discussed separately, since they show some similarities with simple points from Mesolithic contexts. Raw material preferences were not observed (**Tab. 3**). Bladelets and narrow blades, and in one case a flake, served as blanks. The retouch by which the tip was generated is always found on only one lateral edge at the end of the blank and can be straight, convex or concave. Typologically, these items cannot be characterized as perforators, which are, moreover, missing from the Martinsberg Late Palaeolithic.

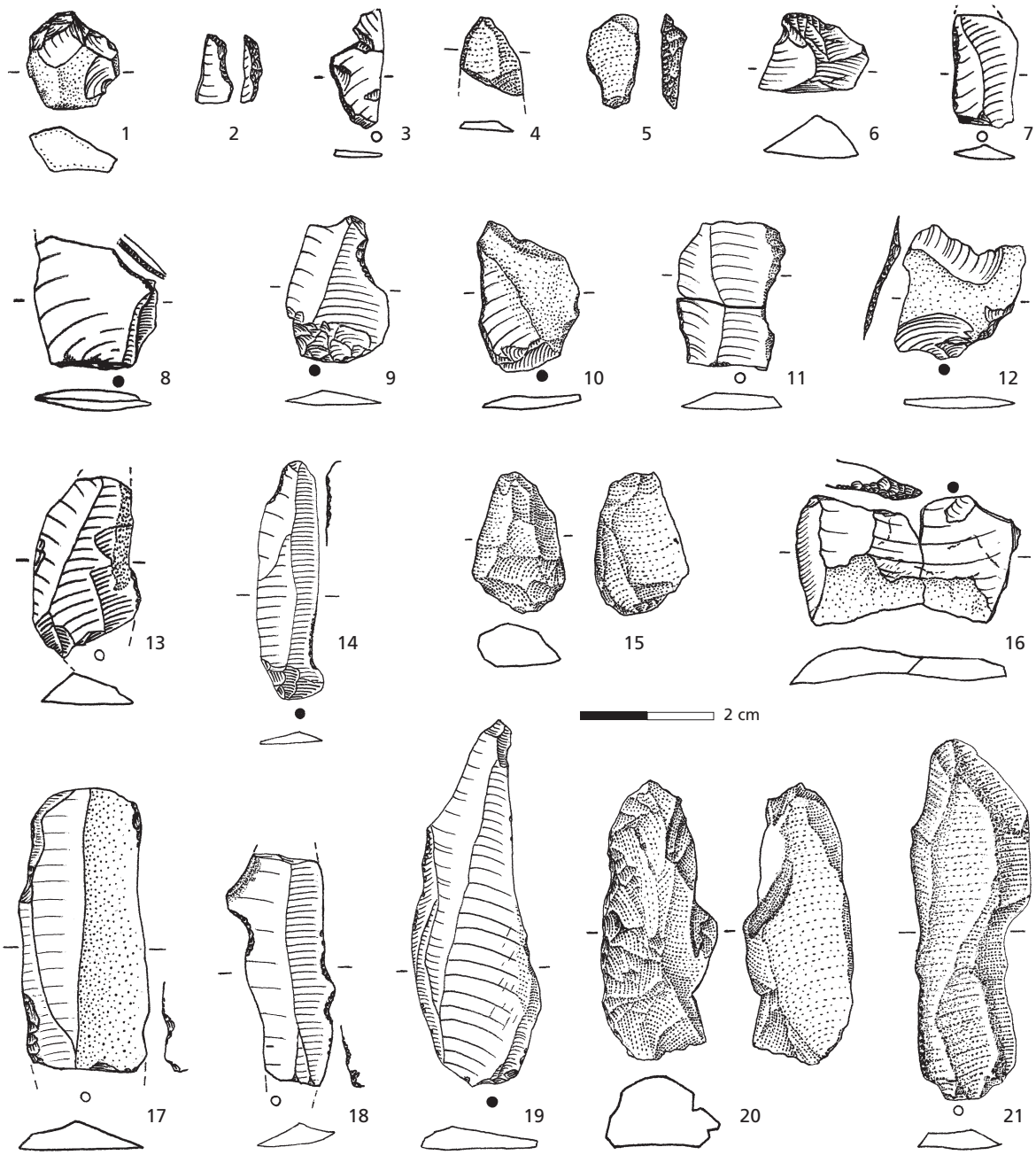

Fig. 10 Andernach-Martinsberg, Late Palaeolithic find horizon: Retouched flakes and blades and other modified artefacts from Andernach 2. – (Line drawings: G. Rutkowski).

Splintered pieces

Splintered pieces, i. e., chisel-like used artefacts, which – depending on the intensity of use – are more or less strongly fractured on their dorsal and/or ventral surfaces, only play a minor role in the Late Palaeolithic inventory, with just seven specimens presented in the assemblage (4.9 % of all tools; **Fig. 9: 8-14**). Similar to the truncations, however, it is interesting to note that five different raw material varieties are represented,

namely four flint varieties and one type of quartzite (**Tab. 3**). In five cases, the typical splintering is on flakes, in two cases on blades. With five splintered pieces, dorsal and ventral surfaces are splintered, with two pieces it is only the dorsal surface.
In addition to the splintered pieces, a total of 27 characteristic splintering chips could be identified with some certainty. Such splinter chips could be refitted onto two splintered pieces made of Meuse gravel flint.

Retouched flakes and blades and other modified artefacts

A final group comprises tools that cannot be assigned to any of the tool types described thus far. These are (often partially) laterally retouched blades and bladelets, retouched flakes and tool fragments that cannot be classified further. With 21 pieces, 14.6 % of all tools fall into this category (**Fig. 10**). According to the lack of homogeneity in this group, the raw material spectrum is also wide: only three of the 13 raw material varieties are not represented (**Tab. 3**). Because of their low uniformity, these tools will not be discussed further.

Raw material spectrum of tools and tool spectrum of raw materials

Finally, to conclude these considerations, it can be said that the raw material spectrum of the tools or the tool spectrum of the raw materials reveals some clear preferences (**Tab. 3**). This is especially true for the backed tools, which are more often made of light grey tertiary quartzite, while this raw material plays only a minor role amongst end-scrapers. The latter are mainly made of various flint varieties, especially from opaque Meuse gravel flint; truncations were even made exclusively from flint varieties. Otherwise, it can be noted that by far the most common raw materials, i. e., the light grey tertiary quartzite and the opaque Meuse gravel flint, also supplied most tools with 35 and 32 specimens respectively.

OTHER LATE PALAEOLITHIC FINDS

In addition to the knapped lithic artefacts, the Late Palaeolithic horizon of the Martinsberg in Andernach was distinguished above all by a scatter of faunal remains, in most cases probably the remains of hunted prey (Street, 1993). In addition, in the course of the analysis of all quartz pebbles and fragments, a number of these pieces could almost certainly be identified as belonging to the Late Palaeolithic horizon (own unpublished data). Since almost all of these quartz fragments are reddened, most of them are interpreted to be fragments of so-called cooking stones and not constructional elements of hearths. However, the presence of fireplaces can be reconstructed by heat-altered materials as burnt artefacts, burnt bone, charcoal and reddened quartzes, with occasional overlapping concentrations. The few special finds from the Late Palaeolithic inventory comprise a retoucher made of claystone, a grooved grinding stone (arrow shaft smoother; Bolus, 2012) made of sandstone found in the immediate vicinity of the retoucher, the fragment of a possible bone awl (Baales and Street, 1996) and a red deer incisor decorated at its root with scored lines (Baales and Street, 1996).

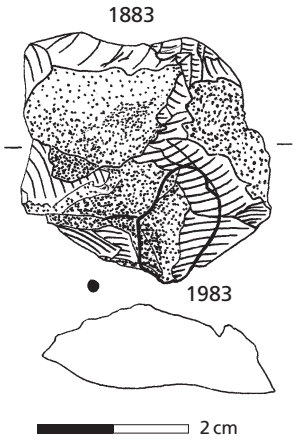

Fig. 11 Andernach-Martinsberg, Late Palaeolithic find horizon: Refit of a small flake from the 1983 excavation onto a larger flake from the 1883 excavae tion, connecting Andernach 2 with Andernach 1. – (Line drawing: G. Rutkowski).

CONCLUSIONS

The lithic artefacts from the Late Palaeolithic horizon of the Martinsberg in Andernach (Andernach 2: excavations 1979-1983) represent a typical inventory of the *Federmessergruppen* that date into the Late Glacial Allerød interstadial. Of the total of 13 raw materials or raw material varieties, some could be obtained within the nearer region of the site, whereas others were procured at distances of 50-75 km, and a few others at even greater distance of just over 100 km. The refitting of a flake from the excavation in 1983 onto a flake from Schaaffhausen's 1883 collection (**Fig. 11**) shows that the disturbance at the northeast boundary of the 1979-1983 excavation area is indeed identical to the southwestern limit of Schaffhausen's 1883 trench, and that Hermann Schaaffhausen probably found a Late Palaeolithic layer in addition to the Magdalenian remains without being aware of it. The technological analysis of the knapped lithic material shows that hardly any core preparation was used in advance of blank extraction, and that the production of high-quality blades was of insignificant relevance. The spectrum of retouched forms is dominated by backed points and bladelets which comprise almost half of the total tool inventory, followed by (often short) end-scrapers and usually poorly worked burins. A hearth, which probably belongs to the oldest phase of the Late Palaeolithic occupation of the site, can be recognized as a latent feature (see black dot in **Fig. 2**). All in all, a typical picture for Late Palaeolithic sites emerges at the Martinsberg: not a settlement site inhabited over a long period of time, but rather a place of several repetitive short-term (hunting?) occupations. For the uture, it would be desirable to comprehensively present all categories of finds of this important site together, including those materials from the 1994-1996 excavations.

PERSONAL CLOSING REMARKS

For the two colleagues and friends honoured with this *Festschrift*, I wish all the best and continued successful research in their retirement. Martin and Elaine were the first I met when I joined the excavations at Andernach in 1981, when they greeted me with a hearty dinner upon my arrival in our accommodation in the former Gönnersdorf dig house. During the coming years, and after moving to the hunting lodge in Neuwied-Monrepos and during my fieldwork at the site of Niederbieber, I was always able to enjoy Martin and Elaine's warm hospitality. At this point, I would like once again to extend to both of them my gratitude in all its forms.

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Michael Bolus
Heidelberg Academy of Sciences and Humanities
Research Center 'The Role of Culture in Early Expansions of Humans' (ROCEEH)
at the University of Tübingen
Hölderlinstr. 12
D - 72024 Tübingen
michael.bolus@uni-tuebingen.de