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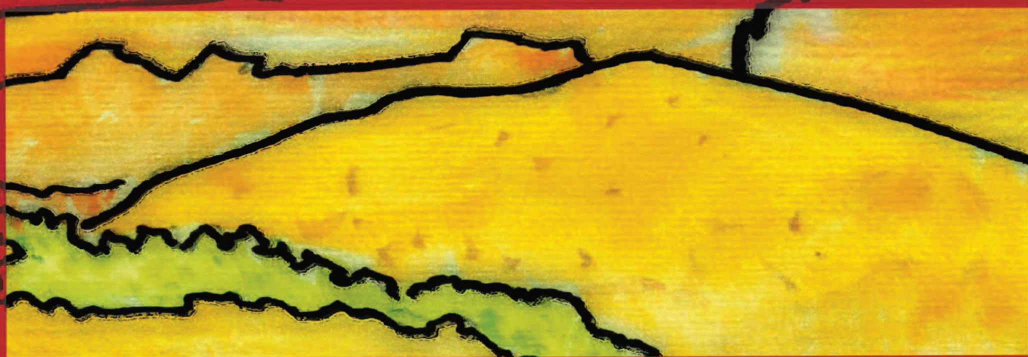

Daniel Schyle and Jürgen Richter (Eds.)

Pleistocene Archaeology of the Petra Area in Jordan

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Pleistocene Archaeology of the Petra Area in Jordan

With contributions by Manuel Bertrams, Thomas C. Hauck, Shumon T. Hussain, Karin Kindermann, Jürgen Richter, Daniel Schyle and Thomas Wolter

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PLEISTOCENE ARCHAEOLOGY OF THE PETRA AREA IN JORDAN

KÖLNER STUDIEN ZUR PRÄHISTORISCHEN ARCHÄOLOGIE

Band 5

Herausgegeben von

Heinz-Werner Dämmer, Jürgen Richter und Andreas Zimmermann

für das

Institut für Ur- und Frühgeschichte der Universität zu Köln

Daniel Schyle and Jürgen Richter (Eds.)

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PREFACE

Since 2009, annual field campaigns led a multidisciplinary "CRC 806" team from Cologne and Aachen to the Wadi Sabra, south of the Nabataean capital of Petra in the Kingdom of Jordan. At the Wadi Sabra, the team found long sediment records, mostly consisting of fluvial and eolian sands deposited between 50,000 and 15,000 years ago. The same time frame covers the transition from the Middle Palaeolithic to the Upper Palaeolithic and the whole of the Upper Palaeolithic era. Modern man had reached the Middle East already much earlier, around 90,000 or 100,000 years ago, though permanent establishment of *Homo sapiens* in the region occurred much later: The current state of research suggests that *Homo sapiens* replaced their predecessors, the Neanderthals, around 45,000 – 40,000 years ago in the region. The anthropological replacement is supposed to be connected with the rise of the Upper Palaeolithic technology, regionally represented by two stages: The first one called the Initial Upper Palaeolithic (IUP) and the second one the Early Ahmarian – both cultural units now attested to by the recent "CRC 806" excavations in the lower Wadi Sabra. By contrast, the subsequent time window (30,000 – 15,000 BP) is better represented than in its lower section, in the upper section of the Wadi Sabra. The latter includes sites attributed to the "Levantine Aurignacian" and "Masraqan" (i.e. Late Ahmarian) and the Epipalaeolithic (Kebaran).

The present volume compiles all the excavation reports from the first project phase (2009 – 2013) thus focusing on the descriptive presentation of all the excavation plans, sections, lithic assemblages, and faunal inventories. Complementary information about the geological setting, the sedimentation history and its interpretation in terms of climate history has already been published separately by Manuel Bertrams.

We would particularly like to thank the Cologne editorial team, Dr. Ursula Tegtmeier (text editing), Lutz Hermsdorf-Knauth (image editing) and Hartwig H. Schluse (cover design). The artefact drawings were provided by Irene Steuer, except for those in Chapter VIII made by Anja Rüschmann. Ahmed Saadallah deserves thanks for translating the Summary into Arabic. English proof reading was done by Karen Schneider and Dr. Wei Chu. Special thanks go to Dr. Werner Schuck (head of the CRC 806 central office) for years of administering the project's staff and budget, all generously financed by the German Research Foundation (DFG).

Cologne, August 2015

Jürgen Richter
series editor

View from Sabra 1 to Sabra 4

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IV THE VEILED MOUSTERIAN:
TRACES OF MIDDLE PALAEOLITHIC PRESENCE IN THE WADI SABRA

Shumon T. Hussain, Jürgen Richter, Daniel Schyle, Karin Kindermann, Thomas Wolter and Thomas C. Hauck

IV.1 INTRODUCTION

The Levantine Pleistocene archaeological record is well-known for its rich Middle Palaeolithic archive with long stratigraphic sequences that often stretch far back in time (BAR-YOSEF 1998; HOVERS 1997; 2009; HOVERS & BELFER-COHEN 2013; SHEA 2013). Moreover, for a long time, this time period was in the focus of research that could potentially shed light on the presumed co-occurrence of Neanderthal populations who derived from Eurasian core areas and anatomically modern human (AMH) groups who left Africa for the first time roughly between 125 and 60 ka calBP (AKAZAWA et al. 1998; SHEA 2003a; 2003b; HOVERS 2006; HERRERA et al. 2009). Accordingly, the Near East can be considered both a nexus of bio-cultural interaction and an important bridge for population movement out of and into Eurasia (BAR-YOSEF 1992; RICHTER et al. 2012). Recent palaeogenetic findings indicate that the geographic position of the region did in fact result in demographic intermingling between Neanderthals and AMH (GREEN et al. 2010; STONEKING & KRAUSE 2011; PRÜFER et al. 2014). Therefore, it is assumed that bilateral influences on the population level must have played a crucial role in shaping the archaeological record of the time. It is thus very likely that the term "Mousterian" masks much variability (cf. SHEA 2014), not only in terms of techno-typological regimes (e.g. HOVERS & BELFER-COHEN 2013), but also in terms of biologically different hominins that produced and exploited these regimes.

It also means that initial attempts of AMH groups to expand their range along the bio- and zoogeographic boundaries of the Saharo-Arabian realm (see HOLT et al. 2013) might be expressed in Middle Palaeolithic signatures and not in Upper Palaeolithic ones as in Western Eurasia (but see TSANOVA et al. 2012; HUBLIN 2014). Such a view, of course, does not exclude the possibility that the first true and successful establishment of AMH in the Levant was accompanied by Upper Palaeolithic technologies. It only implies that the "pioneer phase" of this expansion is unlikely to correlate with these technologies. One way to address the problem is to look for technological trajectories that reveal African affinities and at the same time structure the Middle Palaeolithic record of the Near East internally. All these considerations, however, hinge on the question of behavioural plasticity and its actual link to biological "hardware" (cf. FOLEY & LAHR 1997; SCHICK & TOTH 2013). Considering the complex spatio-demographic dynamics, it is not surprising that there is currently little evidence for a patterning that would underscore a very strong linkage in this regard (but see e.g. WALLACE & SHEA 2006).

The southern Levant, comprising the present-day countries Israel and Jordan, is important in particular for questions of AMH arrival and consolidation in the Near East. The region is topographically bound to both North Africa via the Sinai Peninsula and to Arabia via the Saudi Arabian desert zone. The junction between the arid regions of Saudi Arabia and the southern parts of Jordan along the uplifting Jordan rift valley thus holds a geographical key position in understanding population dynamics and socio-cultural exchange between the Near East and the wider Arabian Peninsula.

Middle Palaeolithic research in southern Jordan has been conducted mainly in the Judayid Basin and the Gebel Qalkha area, represented by the important *in situ* sites of Tor Sabiha and Tor Faraj (HENRY 1995b; 2003; 2011; HENRY et al. 2004; SHEA 2013). Additional archaeological evidence derives from the Wadi Araba and the vicinity of the large Gharandal palaeolake (HENRY et al. 2001) as well as from the Wadi al-Hasa in western-central Jordan (LINDLEY & CLARK 1987; CLARK et al. 1992; COINMAN 2000; FOX 2003; OLSZEWSKI 2008). These sites have yielded rich lithic and faunal records covering a time range from ca. 150 ka to 50 ka calBP (cf. HENRY 1995a; OLSZEWSKI 2008). In terms of stone artefact typology and technology, earlier sites such as Ain Difla in the Wadi Ali tributary drainage of the larger Wadi al-Hasa feature Tabun D-type assemblages, whereas later ones such as Tor Sabiha and Tor Faraj are characterised by Tabun B-type assemblages. Tor Sadaf even extends this chronology with its "transitional" layers (FOX 2000) and therefore constitutes an intimate interface with subsequent Upper Palaeolithic industries in the region. Hence, the wider area can be considered a focus of Middle Palaeolithic settlement with a particular emphasis on its later MIS 4/3 phase.

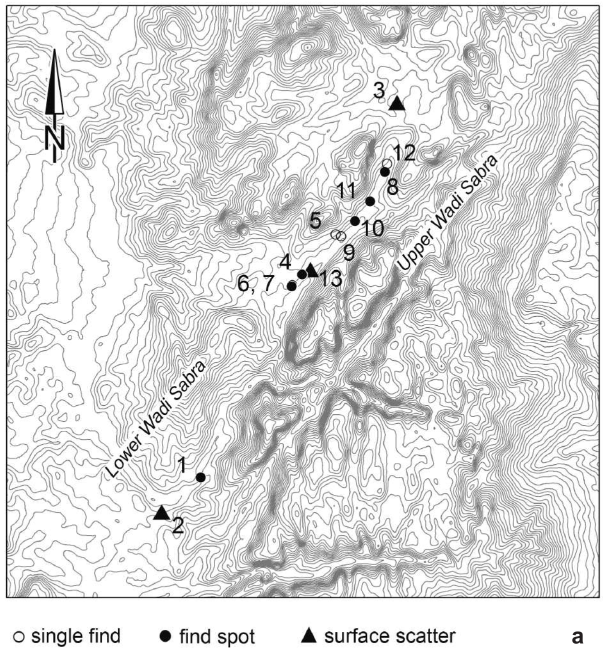
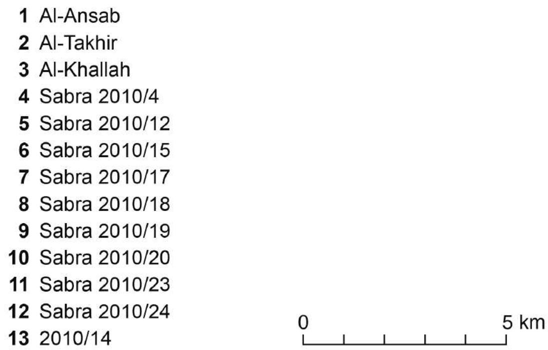
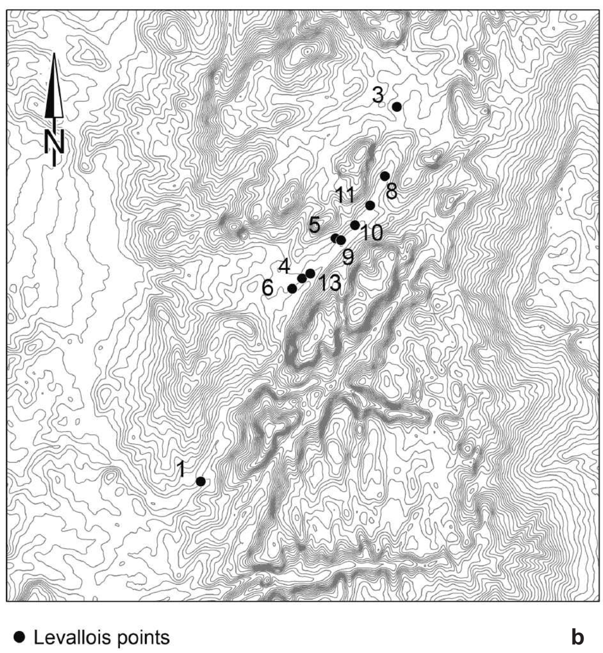
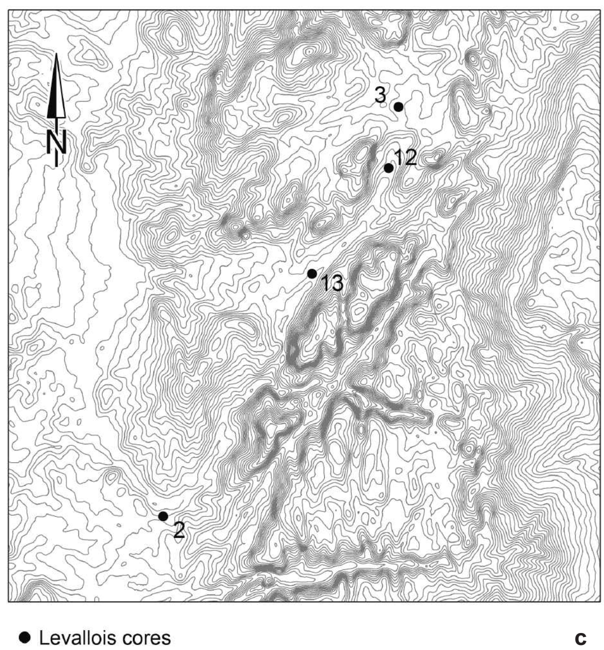


Fig. IV-1 Spatial distribution of Middle Palaeolithic occupation traces in the Wadi Sabra: **a** distribution of Middle Palaeolithic artefact occurrences discussed or mentioned in the text according to occurrence category; **b** distribution of Levallois points in the Wadi Sabra; **c** distribution of Levallois cores in the Wadi Sabra.







Having the generally well-established Middle Palaeolithic record of the region in mind, it is at least noteworthy that our survey efforts between 2009 and 2012 failed to detect any substantial "Mousterian" presence in the Wadi Sabra beyond disperse surface scatters and single find spots (see **Fig. I-14** and **Tab. I-1** in chapter I). Although not a single *in situ* Middle Palaeolithic context has been identified so far, some technological aspects of the discovered surface material are interesting enough to justify a detailed analysis. This chapter thus comprehensively presents the Middle Palaeolithic surface finds that were recovered as a "by-product" from the Wadi Sabra area during the three years of field campaigns that mainly targeted Upper Palaeolithic sites (compare chapter I; e.g. Bertrams et al. 2012; Richter et al. 2012).

IV.2 OCCURRENCES

Altogether, 13 archaeological occurrences that can be attributed to the Middle Palaeolithic were documented dur-

Fig. IV-2 View to the small limestone plateau above the current wadi channel where Al-Takhir is located. (Photo: Shumon T. Hussain)

ing the course of the Wadi Sabra field campaigns (**Fig. IV-1,a; Tab. IV-1**). Most of them are located in the Upper Wadi Sabra. The Middle Palaeolithic occurrences yielded different numbers of artefacts, stretching a spectrum from single find spots, where individual but informative pieces such as Levallois points were documented, over find spots containing two to five lithic specimens, and up to surface scatters covering a greater area and greater artefact numbers. Most of the larger artefact aggregations have produced additional finds from different periods and are in principle not confined to the Middle Palaeolithic material alone. This already indicates the general pattern of Middle Palaeolithic artefact context, which appears to be largely secondary.

Subsequently, a short description for each archaeological occurrence in the Wadi Sabra is given where Middle Palaeolithic traces have been attested (see also chapter I for comparison).

Al-Ansab

The site-complex is located on a huge Pleistocene sediment cone in the Lower Wadi Sabra close to rich raw material outcrops. Beyond its stratified Upper Palaeolithic material (see chapters VI and VII), the site documents an Initial Upper Palaeolithic occupation, as well as sparse evidence for a Middle Palaeolithic presence of hominin groups in the form of small numbers of facetted Levallois debitage and isolated Levallois points.

Al-Takhir

Al-Takhir is a medium-sized surface scatter containing both Lower and Middle Palaeolithic artefacts as well as younger material. The artefacts are located on the ridge of a limestone plateau flanking the main channel of the Lower Wadi Sabra (**Fig. IV-2**). The surface scatter is located immediately on top of a raw material outcrop and testifies to the testing of raw material blocks. Alongside the majority of Middle Palaeolithic Levallois cores, a small subset of chopping tools and bifaces with a Lower Palaeolithic signature was recovered.

Al-Khallah

Al-Khallah (named after a Bedouin wedding place) is a large, deflated surface scatter on the slope of a small wadi that yielded Middle Palaeolithic material (**Fig. IV-3**). It is located on the highest point between Petra and Sabra. The artefacts are spread continuously but in low densities across channel banks and erosional channels. The material is strongly patinated, weathered and rolled and is thus clearly in secondary position.

Fig. IV-3 View to al-Khallah on the slopes of the prominent Bedouin wedding place-hill. (Photo: Manuel Bertrams)

Sabra 2010/4
Middle Palaeolithic artefacts in fresh condition were found in an erosional channel along the slope of a small remnant of Pleistocene wadi deposits. The find spot is located close to the Upper Palaeolithic site complex of Sabra 4 (Palm View 1 and 3) in the Upper Wadi Sabra. The mixture of Middle Palaeolithic and undiagnostic Upper Palaeolithic material indicates the secondary position of most artefacts (compare **Pls. IV-1; IV-2**).

Sabra 2010/12
An isolated Levallois point that was found in the Upper Wadi Sabra.

Sabra 2010/15
The site represents the largest assemblage of a laminar Middle Palaeolithic that has been found across several remnants of Pleistocene sediment cones in the Upper Wadi Sabra. Although erosional channel building indicates the direction of post-depositional sediment and artefact movement, attempts to locate and identify the *in situ* source layer were not successful.

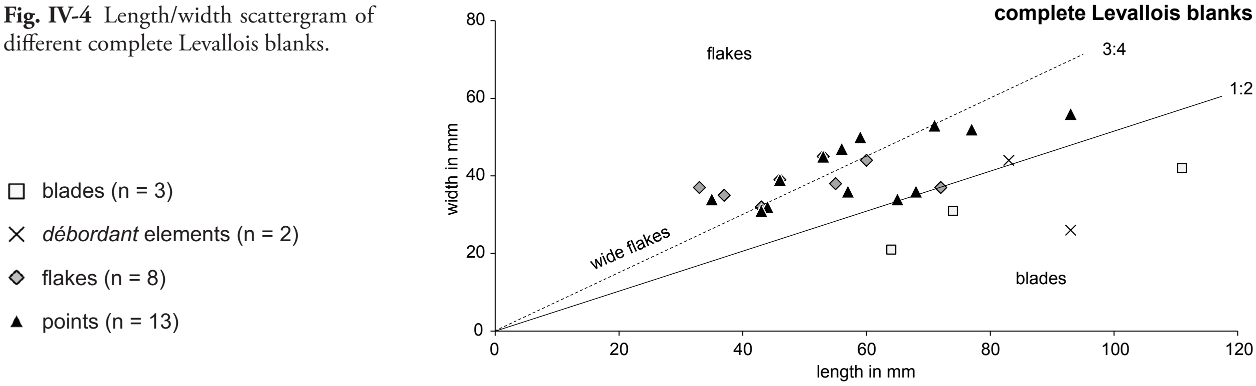
Sabra 2010/17
Isolated Middle Palaeolithic artefacts scattered on the top of slopewash deposits in the Upper Wadi Sabra.

Sabra 2010/18
Isolated Middle Palaeolithic artefacts that were collected from the base of a wadi-deposit remnant close to the main channel of the Upper Wadi Sabra.

Sabra 2010/19
Isolated Middle Palaeolithic artefacts that were found scattered directly on top of Pleistocene wadi deposits.

Sabra 2010/20
Small number of Middle Palaeolithic artefacts that have been collected from the remnant base of wadi deposits close to the main channel of the northern Wadi Sabra.

Fig. IV-4 Length/width scattergram of different complete Levallois blanks.



Sabra 2010/23
Isolated single finds of Middle Palaeolithic signature (two Levallois points and a single overshot *lame débordante*) from the base of a Pleistocene sediment remnant in the Upper Wadi Sabra.

Sabra 2010/24
Middle Palaeolithic single find spot from the main channel of the Upper Wadi Sabra that yielded an expedient Levallois point core.

2010/14
A small series of isolated Middle Palaeolithic artefacts that were found in an erosional channel west of the Sabra spring, very close to the location that was labelled "Sabra N" by SCHYLE & UERPMANN (1988) in their report on the first Neolithic survey in the Wadi Sabra. Alongside Levallois points and typical Levallois debitage, a single unidirectional and hard hammer struck blade with a plain platform might testify to Initial Upper Palaeolithic material in secondary position.

IV.3 THE ARTEFACTS

IV.3.1 Debitage

This section presents and describes the random sample of Levallois blanks recovered during the three-year field project in the Wadi Sabra. Although there is no guarantee that the sample is representative in statistical terms and therefore conveys the overall Middle Palaeolithic variability within Levallois macro-debitage in the catchment area, some general trends can still be documented that reflect already identified spatio-temporal patterning in the wider Levant (see e.g. HENRY 2003; HAUCK 2011a; 2013).

In total, 26 specimens were collected, most of them representing typical Levallois points (**Tab. IV-2**). Although the general sample may be biased towards the recording of Levallois points instead of simple blanks that are often not immediately discernible as "endproducts" in a technological sense, the preponderance of pointed specimens, however, is in good agreement with the general pattern of the overall core architecture (see section IV.3.2).

Moreover, much Levallois-derived debitage from the Wadi Sabra appears to be heavily rolled and weathered as a consequence of post-depositional sediment mobility and fluvial activity and thus provides limited technological information because the directionality of dorsal scars is often hardly decipherable anymore. Most of the flakes, which make up the majority of Levallois blanks, are very likely to be technical flakes, either deriving from core shaping and installation procedures or from core maintenance activities. Only a few specimens are unambiguously identifiable as preferential flakes due to their elaborate platform preparation, for example in the guise of a *chapeau de gendarme* configuration (see **Tab. IV-2**). It is thus clear that not all flakes are preparatory blanks in the strict sense. Elongated, laminar Levallois blanks reveal a comparable signature. Most of them can be classified as *débordant* elements and are associated with Levallois point production. In fact, the entire debitage assemblage exhibits a clearly elongated signature that indicates the technological importance of total lateral cutting edge length and distal pointedness in Levallois blank production (**Fig. IV-4**).

Levallois points

Levallois points can be grouped into two categories: elongated, distally projected specimens that are not yet laminar in the strict sense and short and wide points that tend to be relatively flat (**Fig. IV-4**). Elongated points are significantly heavier, feature thicker platforms and often display pronounced *chapeau de gendarme* preparation (see **Tabs. IV-2; IV-3**). A triangular or sub-triangular outline is a common feature of many Levallois points from the Wadi Sabra sample (cf. **Figs. IV-5 – IV-10**).

Retouch is relatively rare (**Tab. IV-2**) and occurs almost only on the distal part of the pointed blanks (cf. **Figs. IV-5,1; IV-9,2**). The only exception might be significant, representing inverse lateral edge modification on a triangular point with marked *chapeau de gendarme* platform configuration (**Fig. IV-7,2**; see also **Fig. IV-4**).

Nearly all Levallois points from the sample feature the classical unidirectional-convergent dorsal scar pattern (cf. **Figs. IV-5 – IV-10**) that is the technological manifestation of an arranged Y-*arrête* structure of the core's exploitation surface via the successive removal of two elongated *débordant* elements that intersect at the distal part of the core and

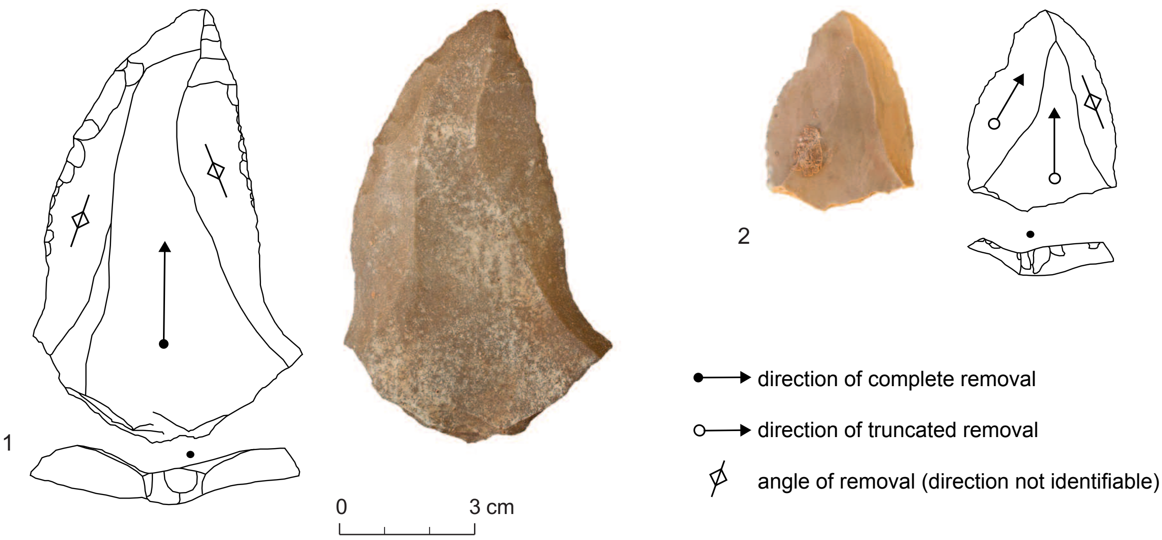


Fig. IV-5 Sabra 2010/15. 1 Elongated Levallois point, *chapeau de gendarme*, distal tip modification; 2 short Levallois point.

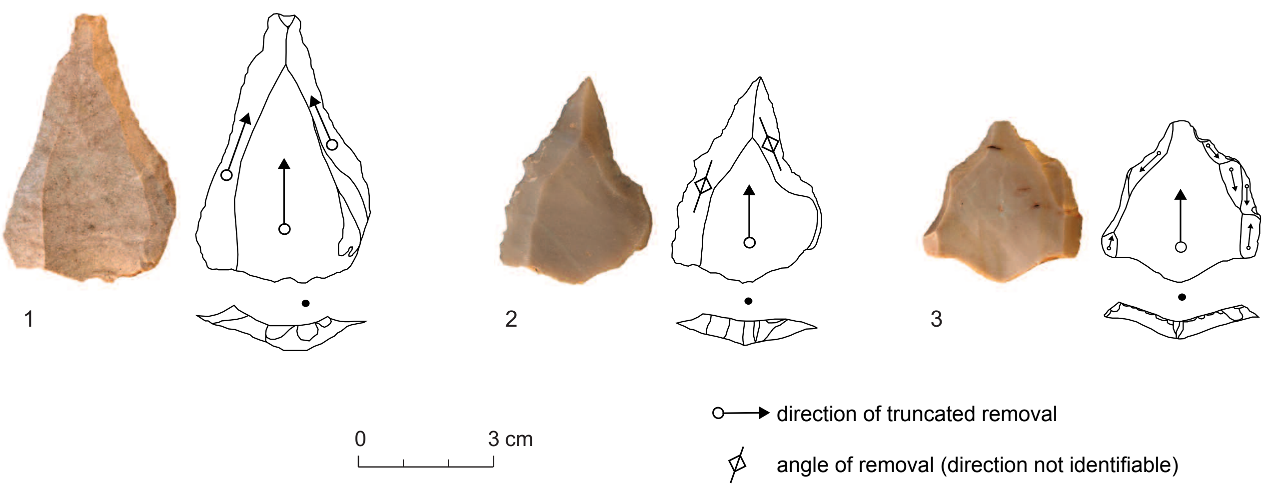
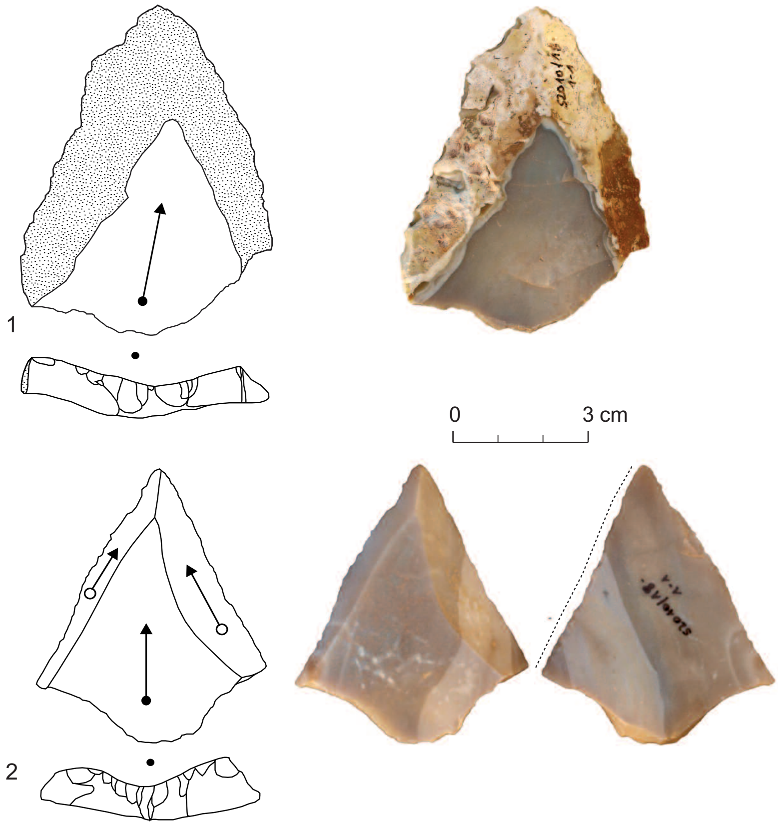


Fig. IV-6 Sabra 2010/12, Sabra 2010/19 and Sabra 2010/20. 1 Elongated Levallois point, sub-triangular, unidirectional-convergent; 2 Levallois point, sub-triangular; 3 Short-wide Levallois point, bidirectional-opposed, *chapeau de gendarme*.

Fig. IV-7 Sabra 2010/18. 1 Atypical Levallois point, sub-triangular, cortical, chapeau de gendarme; 2 Levallois point, triangular, unidirectional-convergent, *chapeau de gendarme*, inverse lateral edge modification.

- direction of complete removal
- direction of truncated removal
- cortical surface
- retouched edge



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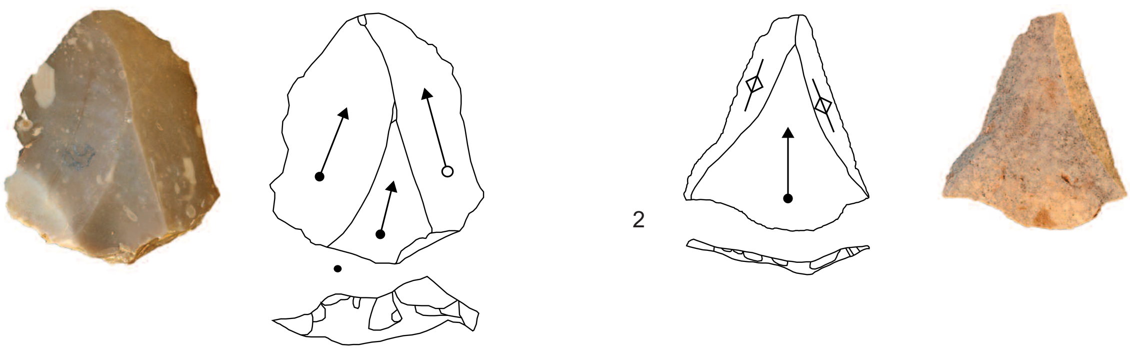

- direction of complete removal
- direction of truncated removal
- angle of removal (direction not identifiable)
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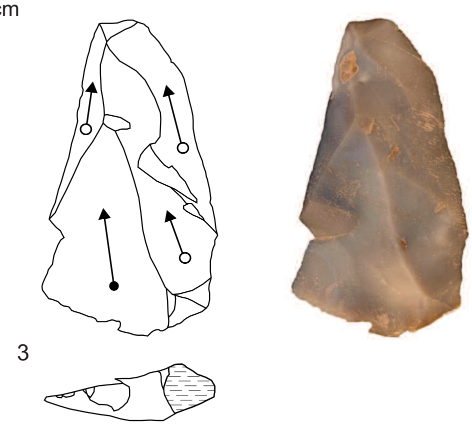

Fig. IV-8 Al-Khallah and Sabra 2010/23. 1 Atypical, wide-short Levallois point, unidirectional-convergent; 2 Levallois point, triangular, flat; 3 atypical, elongated Levallois point, unidirectional-convergent, plain platform.

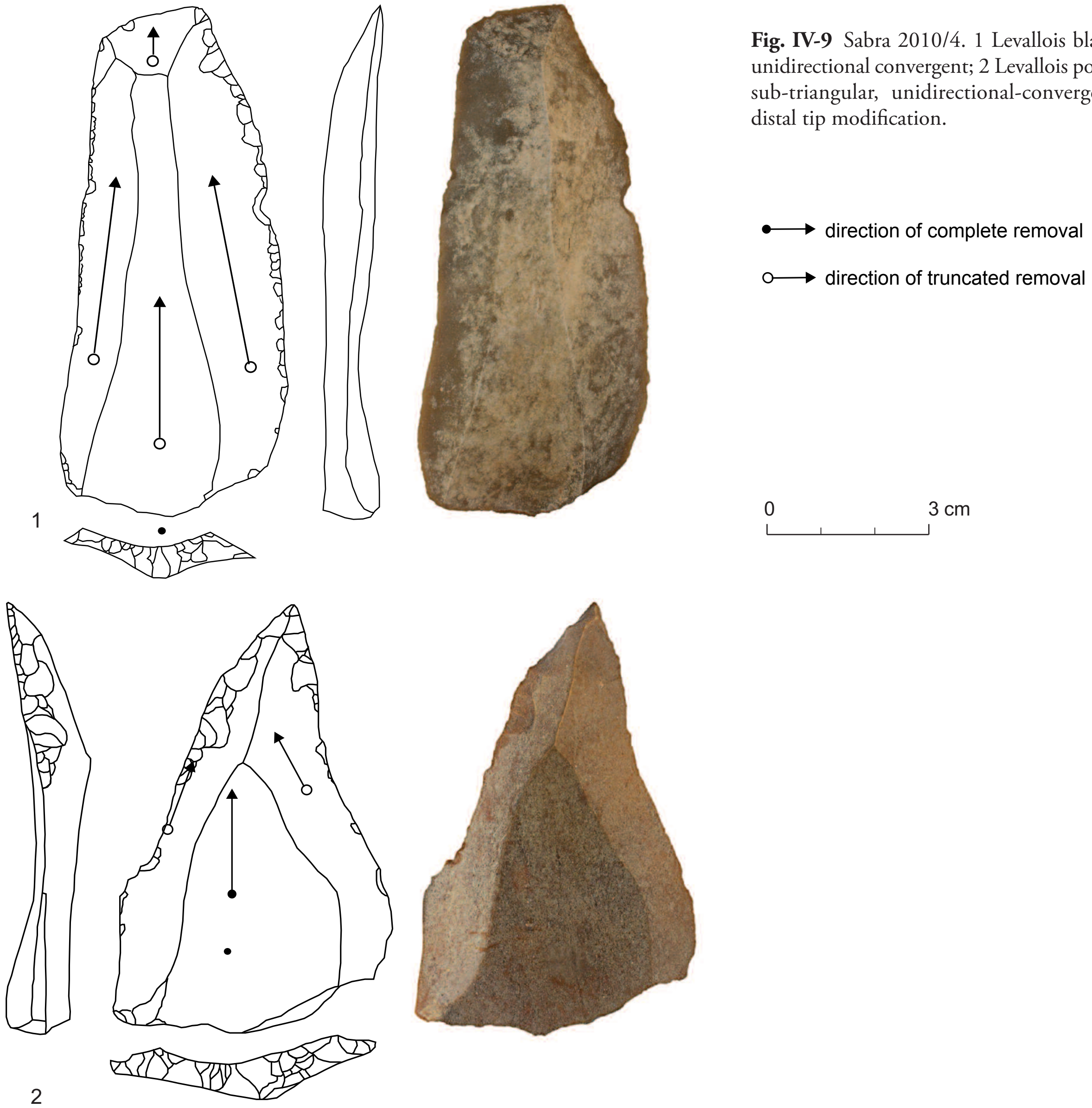

Fig. IV-9 Sabra 2010/4. 1 Levallois blade, unidirectional convergent; 2 Levallois point, sub-triangular, unidirectional-convergent, distal tip modification.

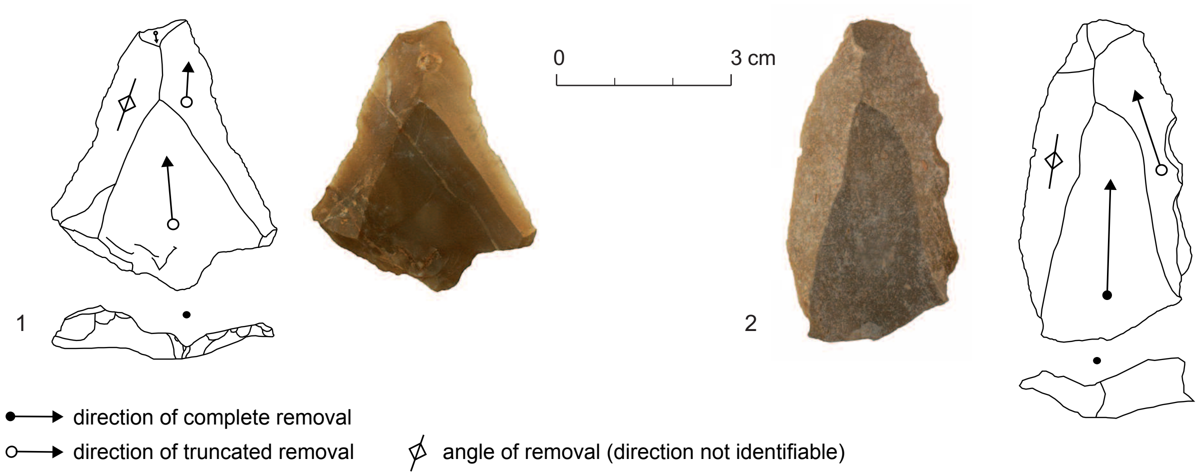

Fig. IV-10 2010/14. 1 Levallois point, triangular, *chapeau de gendarme*; 2 atypical, elongated Levallois point, dihedral platform.

create a guiding ridge. Only one specimen evidences opposed convexity creation and thus a bidirectional dorsal scar pattern (**Fig. IV-6,3**). This is particularly surprising in the face of several Levallois point cores that exhibit opposed-divergent preparation of the distal convexities for point production (see section IV.3.2). Finally, one single Levallois point testifies of an expedient and straightforward blank extraction mode that seems to be guided by natural and close to triangular nodule shape alone. The specimen documents one almost identical, but preceding triangular point detachment on its dorsal face that is otherwise covered with cortex (**Fig. IV-7,1**).

IV.3.2 Cores

This section presents and describes all recovered Middle Palaeolithic cores in detail. It aims to provide an overview of the technological choices and decisions that Middle Palaeolithic hominins actually made consciously in order to overcome raw material obstacles or unconsciously while expressing their socio-cultural heritage. Although this analytical distinction is of course tentative at best, it is a helpful starting point to discuss different technological layers of intentionality that characterise the technological systems in place.

In total, 13 cores can be unambiguously attributed to a Middle Palaeolithic technological substratum (**Tab. XV-4; Figs. IV-11 – IV-23**). The vast majority of these cores feature Levallois point production, at least at the very end of the reduction biography. While all specimens mirror a technological Levallois architecture, unidirectional-convergent point production is by far the dominant modality, whereas cores directed to the detachment of Levallois flakes and blades are clearly underrepresented (**Tab. IV-5**). Levallois flake production is accompanied by centripetal concepts and features both preferential and recurrent methods (see again **Tab. IV-4**). Levallois blade production on the other hand, is more standardised and only occurs in the guise of unidirectional-recurrent core configurations.

Interestingly, in the Wadi Sabra, Levallois cores seem to be clustered in a few occurrences only, whereas the majority of their products, in this case Levallois points, is widely scattered in the landscape (compare section IV.3.1 and **Fig. IV-1,b.c**). The best illustration for this general pattern is the confined surface scatter of Al-Takhir in the Lower Wadi Sabra where, although close to 70 % of all cores originate from here, not a single primary product has been retrieved. It is difficult, however, to assess whether this inverse relationship really reflects hominin induced land-use patterns or is merely the result of geomorphological processes that considerably altered the entire "wadiscape" and likely eroded much of the older than MIS 3 material (compare chapters II and III).

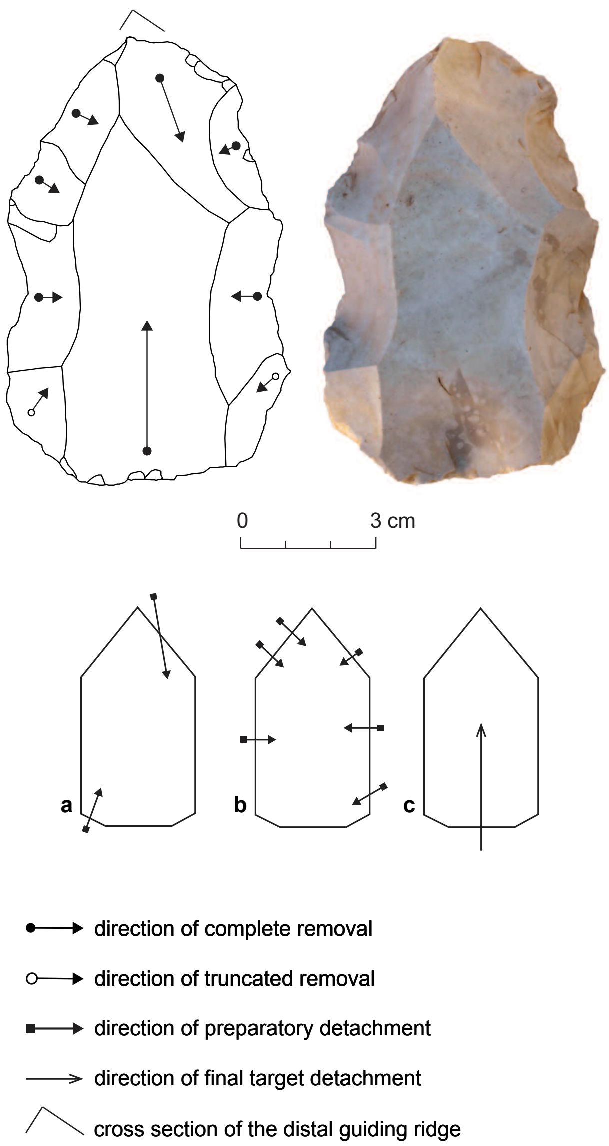

Fig. IV-11 Al-Khallah. Levallois core specimen 2009_1.

In what follows, each single Levallois core will be described and discussed individually. The taxonomy includes the site name first, followed by the year of recovery and complemented by the unique "Core-ID". Each technological description is supplemented by a technical and if necessary also a schematic representation (**Figs. IV-11 – IV-23**).

Core Al-Khallah 2009_1

Targeted blanks are elongated Levallois points. Special technological emphasis lies on the construction of the distal guiding ridge that predetermines the pointed nature of the

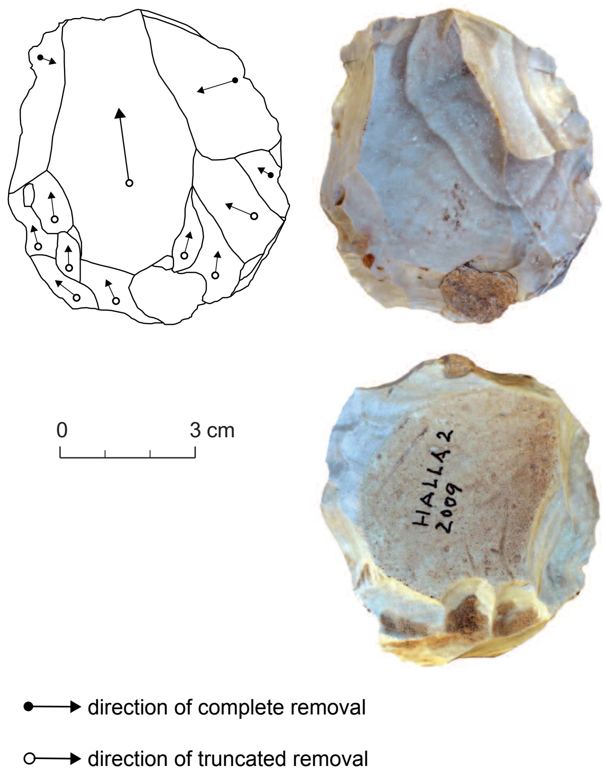

Fig. IV-12 Al-Khallah. Levallois core specimen 2009_2.

elongated blanks. Outline and general shape of the retrieved blanks are controlled by a well-defined pitched outline of the reduction surface (**Fig. IV-11**). Lateral and distal convexities that guide the unidirectional detachment of desired Levallois points are well-arranged and systematically established. The general modality of installing these convexities is centripetal preparation. There is no natural surface or cortex left on the two hierarchically arranged surfaces, supporting the "constructed" nature of the core. Although blanks are obtained via surface exploitation, the reduction surface is fairly bulged out and lateral-centripetal preparation quite invasive and steep. Even though the primary production of Levallois points is unidirectional-preferential, control of blank shape is complemented by a second, opposed auxiliary striking platform at the distal part of the core. Preparation therefore includes a bidirectional component. Moreover, the distal platform angle is acute and the cross-section of the distal ridge that is supported by this auxiliary platform is semi-steep.

Scar pattern analysis reveals that bidirectional lateral shaping first established the initial Y-*arrête* structure of the main exploitation surface. This was essentially achieved by removing two *débordant* blades oblique to the main horizontal axis of detachment from two opposed platforms. In a second step, centripetal shaping ensured a high degree of shape control by reinforcing the already laid out convexities before final detachment of the desired Levallois point occurred. Thus, the reduction modality is unidirectional-preferential with bidirectional-centripetal preparation.

Core Al-Khallah 2009_2

Ambiguous technological organisation: The core was discarded due to an *outrepassé* removal that could not have been handled. The original structure and technological modality of the core is hardly visible anymore, since considerable reshape procedures are documented on both surfaces. The general scar pattern along with the circular outline of the specimen, however, indicates the presence of an original centripetal-preferential organisation (**Fig. IV-12**). The core seems to have been finally abandoned as two oblique-centripetal removals that intended to re-construct the Y-*arrête* structure of the reduction surface as well as the distal guiding ridge by mere intersection failed to achieve that goal.

Core Al-Takhir 2010_3

Targeted blanks are elongated Levallois points. Clear hierarchy between reduction surface and core back, the latter both retaining natural surfaces of the original raw material nodule and displaying minimal preparation. Special importance was paid to the installation of a distal guiding ridge that ensures the pointedness of primary blanks. General Levallois point production is unidirectional-preferential; the presence of a second auxiliary opposed platform only fulfils preparatory needs. Control of the blank outline is supported by a pitched core shape that foreshadows the elongated nature of retrieved blanks (**Fig. IV-13**). Dimensions of the core and the last blank scar are close to laminar. The specimen is fairly massive and not as flat as most of the other cores. The angle between the horizontal axis of primary point detachment and lateral preparation scars is comparatively steep. The cross-section of the distal ridge is oblique to semi-steep and the opposed, distal platform angle is acute.

The internal chronology of the preparatory scars shows that the core was initially set up by opposed-divergent laminar removals that established a Y-*arrête* structure. These removals are essentially *lames débordantes* that created the lateral convexities. The left-sided orthogonal flake-based preparation is a direct reflection of this procedure's failure. Lateral convexities are thus finally established by orthogonal-centripetal removals.

Core Al-Takhir 2010_4

Targeted blanks are Levallois points. Preparatory means aimed at the production of a Y-*arrête* scar-structure creating a distal guiding ridge that controlled the pointed nature of

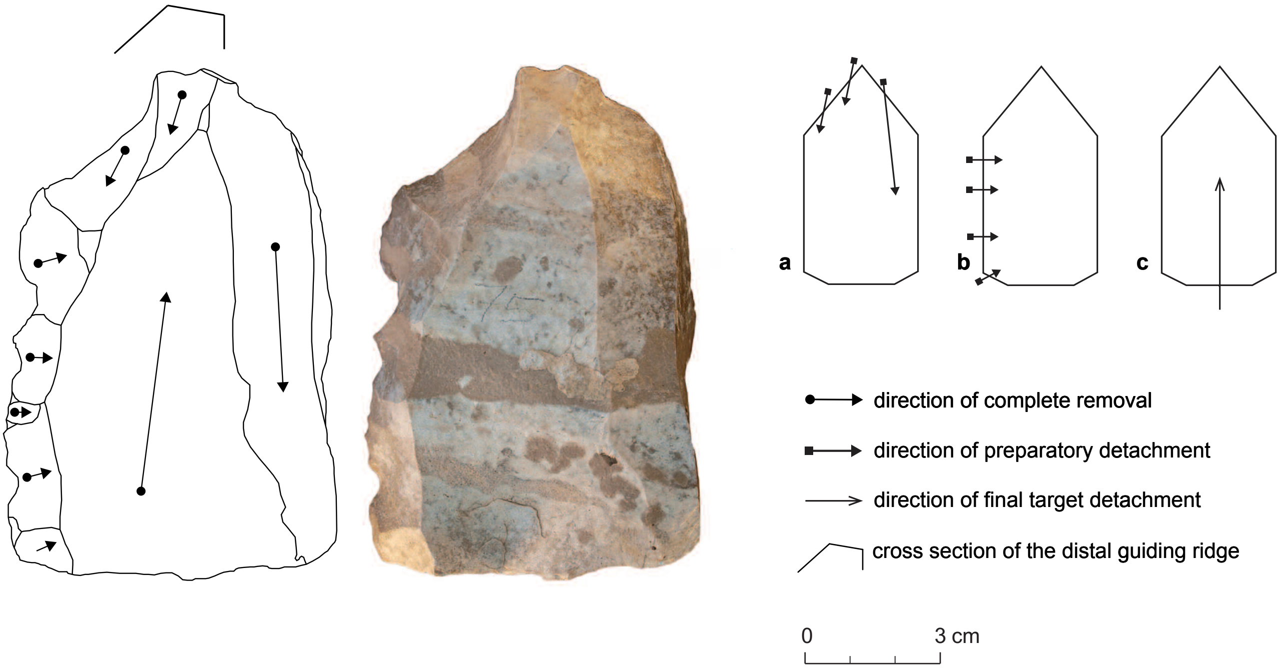

Fig. IV-13 Al-Takhir. Levallois core specimen 2010_3.

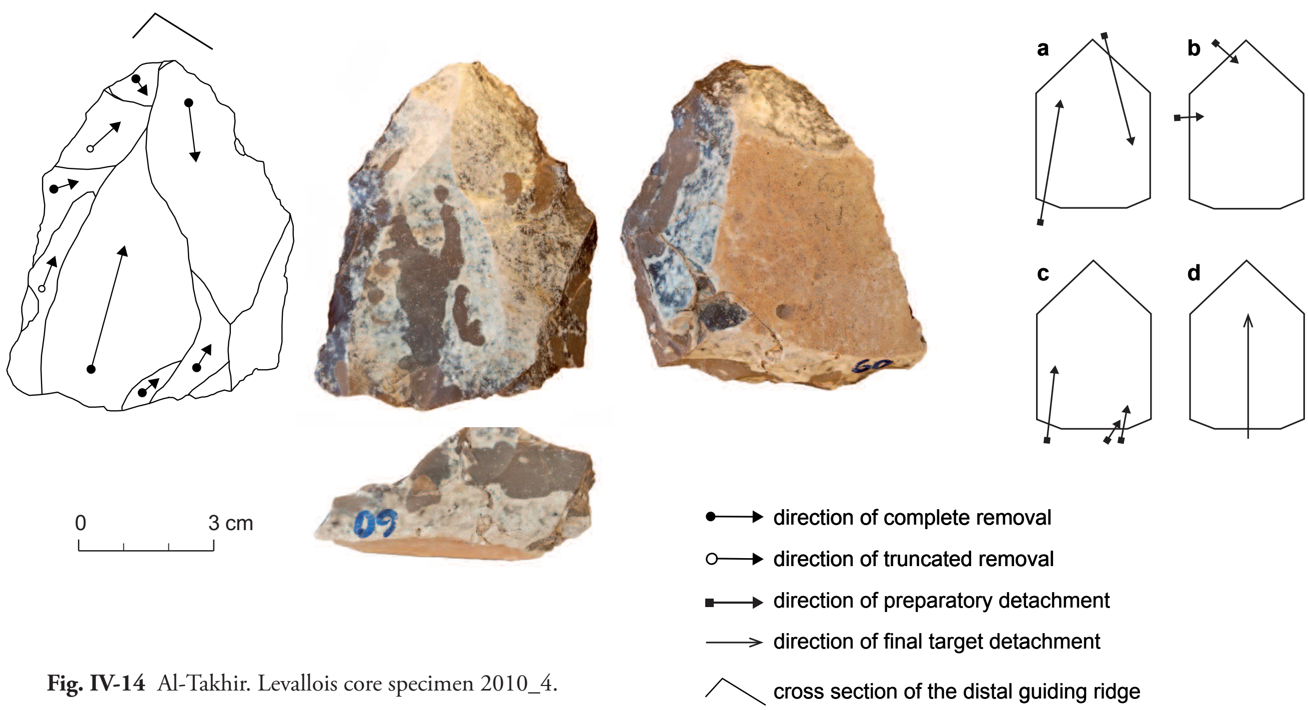

Fig. IV-14 Al-Takhir. Levallois core specimen 2010_4.

primary blanks. Core shape is cordiform and the core back retains a considerable amount of cortex and is thus minimally prepared (**Fig. IV-14**). The overarching core concept is unidirectional-preferential. The distal guiding ridge, however, is in part created by an additional auxiliary platform opposed to the main striking face. The angle of this auxiliary, distal platform is semi-acute and the cross-section of the distal guiding ridge is semi-steep.

A triangular scar pattern on the exploitation surface was initially established by bidirectional-oblique shaping of the

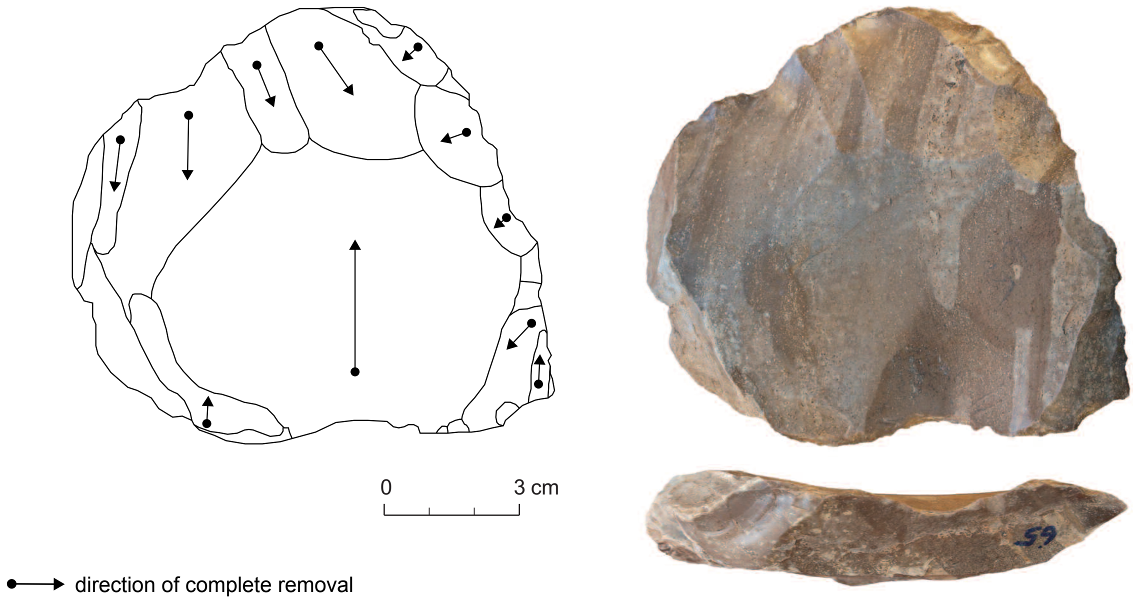

Fig. IV-15 Al-Takhir. Levallois core specimen 2010_5.

lateral core parts. Technologically, this Y-*arrête* structure of the reduction surface was achieved by the detachment of two opposed *débordant* blades. In a second step, preparation orthogonal to the main extraction axis supplemented the creation of the lateral core convexities. Minimal corrective procedures were then applied in parallel to the main extraction axis before the final Levallois point was ultimately detached.

Core Al-Takhir 2010_5

Targeted blanks are Levallois flakes. The comparatively flat cross-section of the core opens up the possibility that the core-blank was originally a large flake whose ventral convexity was opportunistically exploited for controlled flake extraction. Accordingly, the shape of the core is close to circular, the length being almost identical to the width (**Fig. IV-15**). Original preparation of the targeted flake is obscured by subsequent removals, but it is very likely that it was actually accompanied by little preparatory effort. The discarded state of the core reflects the attempt to restore the exhausted convexity of the exploitation surface by centripetal removals. Thus, the documented core concept is best understood as opportunistic, centripetal-preferential.

Core Al-Takhir 2010_6

Targeted blanks are Levallois flakes. The specimen displays the typical "tortoise" configuration of preparation and exploitation surface. Contrasting most other cores, the mode of primary product extraction was not preferential, but recurrent and thus aimed at the production of multiple desired blanks within one preparatory cycle. The core outline is almost perfectly circular and the critical convexities well-defined and prepared (**Fig. IV-16**). Main preparation modality is centripetal, although distal convexity restoration seems to be semi-perpendicular to perpendicular. Hence,

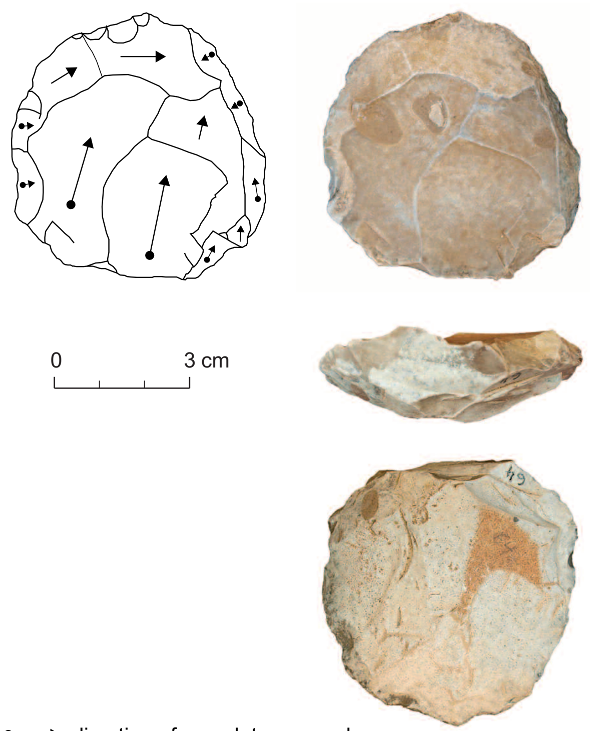

Fig. IV-16 Al-Takhir. Levallois core specimen 2010_6.

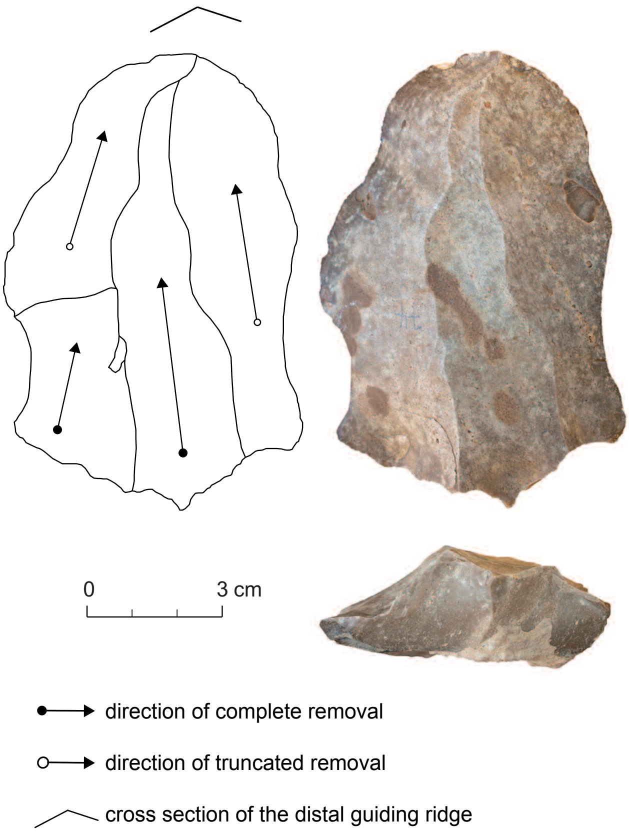

Fig. IV-17 Al-Takhir. Levallois core specimen 2010_7.

the Levallois flake extraction mode is unidirectional-recurrent, whereas the preparatory mode is best understood as perpendicular-centripetal.

Core Al-Takhir 2010_7

Although different interpretations of the discard state of this specimen are possible, the simplest one acknowledges the lack of a clearly "constructed" distal guiding ridge (**Fig. IV-17**). In this regard, there is no hierarchical structure between the different blank scars on the exploitation surface. The sub-pitched shape of the core, however, testifies of the intention of generating pointed, elongated blanks. Targeted blanks are thus Levallois blades. The transition between preferential and recurrent Levallois is fluent at this point. Despite the lack of any preparatory indication for the hierarchical exceptionality of the central blank on the reduction surface, the remnants of a *chapeau de gendarme* preparation of the striking platform yet speak in favour of the central blank's special position within the reduction sequence. In principle, the overarching exploitation mode is fairly pragmatic and core back preparation therefore almost non-existent. Once again, it is tempting to interpret the general layout of this piece as reflecting straightforward exploitation of a large, elongated flake with preparation of the striking platform only. From this perspective, the core is best understood as a vehicle of pointed Levallois blade production in a unidirectional-recurrent fashion.

Core Al-Takhir 2010_8

Targeted blanks are Levallois blades or elongated Levallois flakes. The structure of the exploitation surface underscores a non-hierarchical, aligned and close to parallel blank extraction systematic (**Fig. IV-18**). While both reduction surface and core back lack any traces of convexity installation and/or maintenance, the striking platform is roughly prepared. As a result, reduction surface extremities and core back are still covered by cortex or naturally rolled surfaces. In this regard, the overarching core configuration argues for a pragmatic exploitation of a medium-sized wadi pebble. The primary mode of blank detachment is unidirectional-recurrent, although the primary products are comparatively small-sized. Contrasting most other core systematics, distal shape control was not an important technological issue.

Core Al-Takhir 2010_9

Targeted blanks are Levallois points. Although the distal guiding ridge is prominent enough to be an integral technological feature of the overarching core configuration, the mode of creating it is comparatively simple. Two *lames débordantes* struck from a slightly oblique angle to each

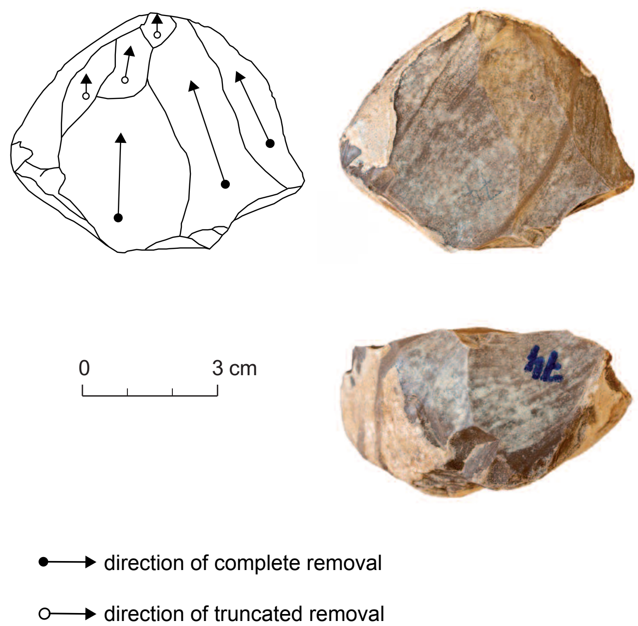

Fig. IV-18 Al-Takhir. Levallois core specimen 2010_8.

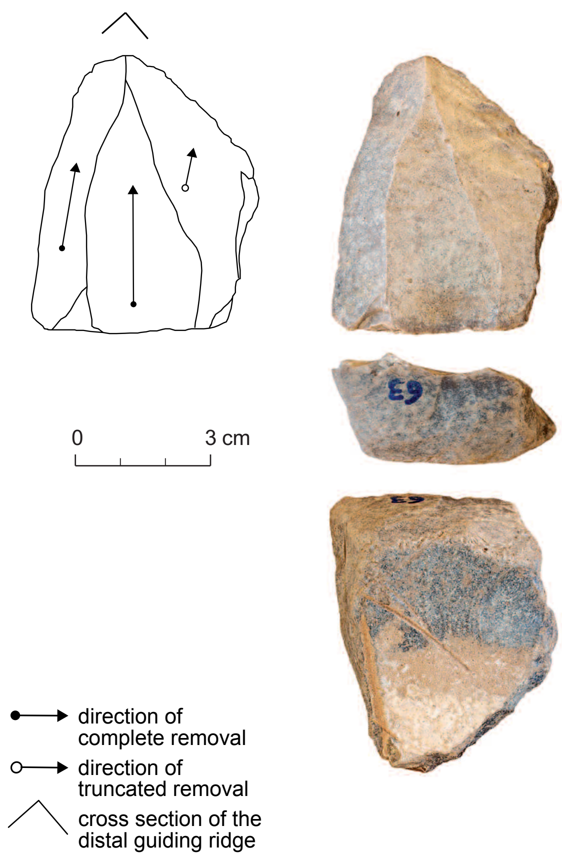

Fig. IV-19 Al-Takhir. Levallois core specimen 2010_9.

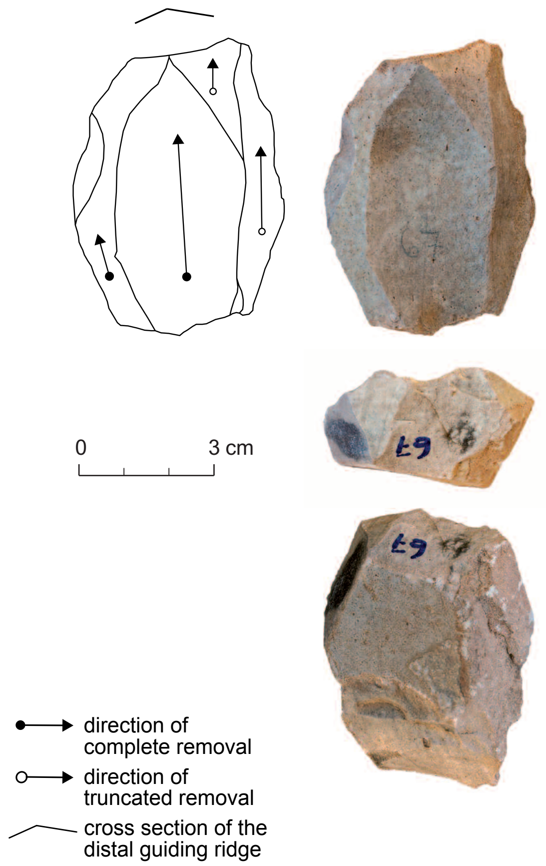

Fig. IV-20 Al-Takhir. Levallois core specimen 2010_10.

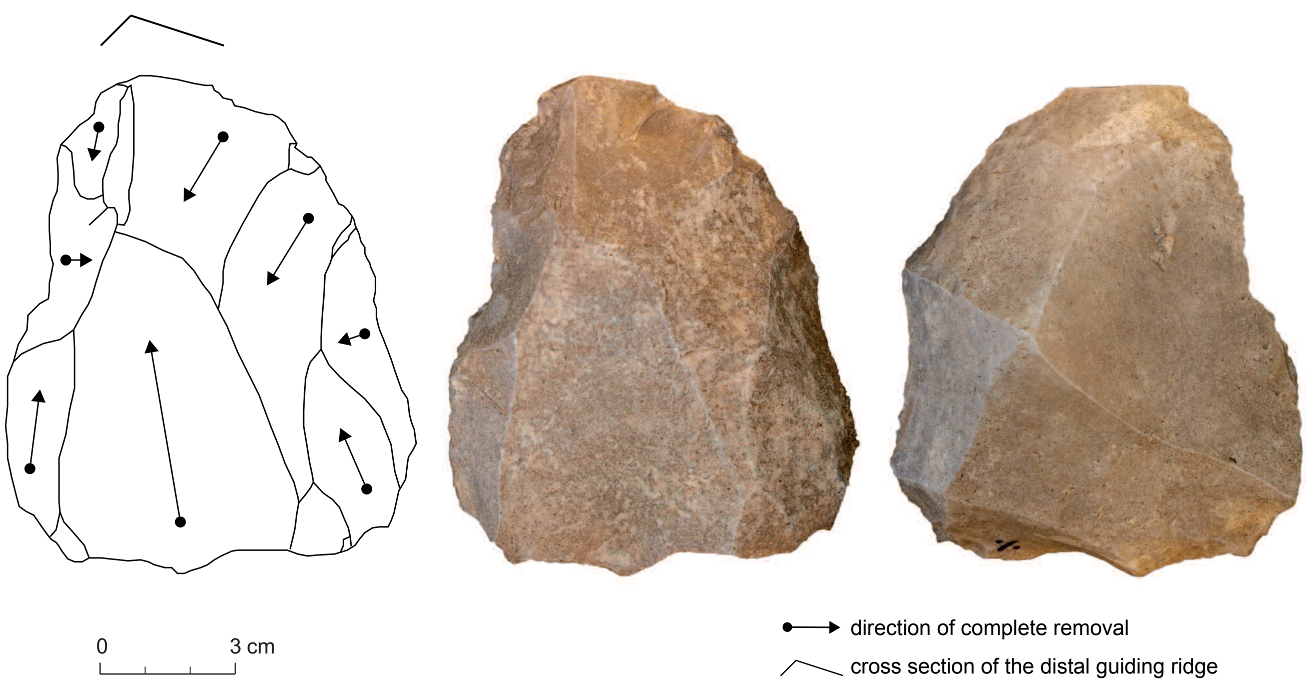

Fig. IV-21 Al-Takhir. Levallois core specimen 2010_11.

other establish the distal ridge. The resulting Levallois point is flat and slightly elongated. The core's outline is pitched and both core back and natural striking platform are minimally prepared (**Fig. IV-19**). To conclude, the core systematic is unidirectional-preferential and directed to the production of pointed blanks.

Core Al-Takhir 2010_10
Targeted blanks are Levallois points. The core features a subrectangular outline and displays a minimally prepared striking platform and an almost native core back covered with cortex (**Fig. IV-20**). The distal ridge is nearly missing and only constructed by an oblique cross-section created by several *débordant* elements at this part. Preparation is thus unidirectional parallel to sub-parallel. The primary blank extraction modality is hence unidirectional-preferential.

Core Al-Takhir 2010_11
Targeted blanks are Levallois points. The specimen is one of the best prepared ones, featuring both a well-defined centripetal-radial core back preparation and an elaborate construction of guiding convexities on the exploitation surface. Having a sub-cordiform outline, the core displays an oblique distal guiding ridge that is located slightly off-axis (**Fig. IV-21**). The primary mode of blank extraction is unidirectional-preferential, but a secondary opposed platform complemented the main direction of blank production as supportive ingredient that helps to establish the distal ridge. Bidirectional shaping is the main modality of core installation. Perpendicular-orthogonal preparation thus only occurs when the achieved convexities are not sufficient enough. In sum, Levallois point detachment modality is unidirectional-preferential, while the dominant preparatory mode is bidirectional-recurrent.

Core Sabra 2010/24_12
Targeted blanks are Levallois points. These blanks are triangular and display a wider proximal base. Accordingly, the core's outline is also triangular (**Fig. IV-22**). In general terms, the specimen is minimally prepared and likely represents a roughly truncated raw material nodule. It is thus not surprising that the core back is completely covered with cortex. Two bidirectional-divergent *débordant* elements create the Y-*arrête* structure of the exploitation surface. The controlled detachment of the central Levallois blank is further ensured by a roughly prepared striking surface. From this perspective, it is quite clear that the actual reduction depth of this specimen is rather short, and it was discarded after one single Levallois point detachment. Hence, the core's primary blank production modality can be characterised as unidirectional-preferential, whereas its preparatory mode is fairly pragmatic and alternating bidirectional.

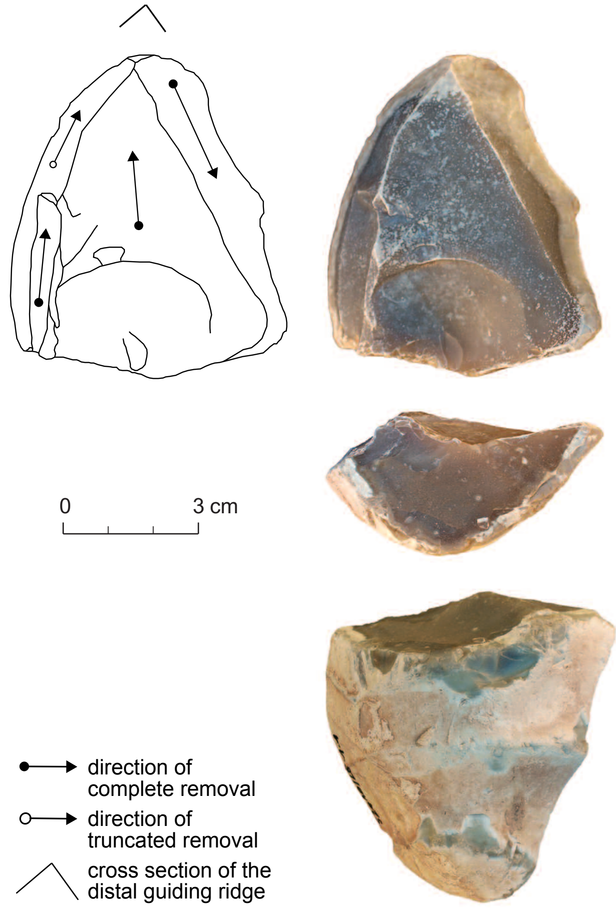

Fig. IV-22 Sabra 2010/24. Levallois core specimen 2010_12.

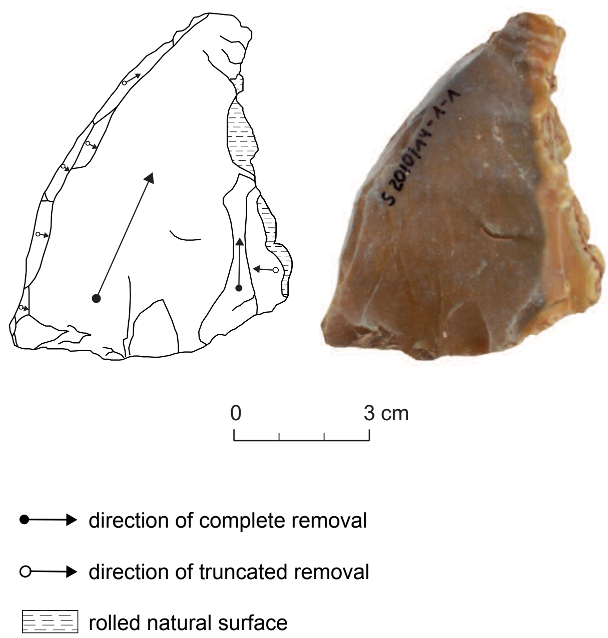

Fig. IV-23 2010/14. Levallois core specimen 2010_13.

Core 2010/14_13
Targeted blanks are Levallois points. The blanks are slightly elongated and triangular to convergent. The overall configuration and shape of the core indicates that the piece was collected from the wadi catchment area because of its naturally close to triangular shape and was exploited immediately after marginal preparatory gestures (**Fig. IV-23**). As a result, the entire core back is covered with natural and heavily rolled surfaces. Altogether, the primary blank production modality is unidirectional-preferential. Preparatory efforts are minimal and mostly perpendicular-orthogonal to the main axis of blank extraction. The core was discarded after successfully retrieving one single Levallois point.

IV.4 DISCUSSION

The first thing to remember is the survey, and thus the potentially palimpsest-character of the Wadi Sabra material presented so far. This means that the spatio-temporal association of the artefacts is *a priori* questionable. The following discussion builds upon the assumption that although these issues have always to be kept in mind, it is still possible to discern some general technological trends that give a rough estimation of the timeframe we are most likely dealing with. The homogeneity of the sample is reason enough to be treated and discussed as a whole. Issues that will be addressed are the potential chronology of the recovered Middle Palaeolithic material, its association with AMH arrival in and passage through the Levant and its spatial organisation within the Wadi Sabra catchment area.

IV.4.1 Chronology

The overall spectrum of the documented Levallois points from the Wadi Sabra bears general resemblance with well excavated assemblages in the region, in particular with those from Tor Faraj and Tor Sabiha (Henry 1995b; 2003; 2011; Groucutt 2014). In the wider Levant, the assemblage as a whole is comparable with the upper assemblage of Hummal in Central Syria (Hauck 2011a; 2011b; 2013). An integral element of this web of relationships is the general blank layout in terms of prepared outline and preparation technology. The mentioned assemblages all share a well-developed component of relatively flat, wide and short Levallois points. The points tend to approximate triangular outlines very closely and exhibit well-prepared platforms, often *chapeau de gendarme*, which allow for controlled detachment. Moreover, the overall proclivity of and focus on unidirectional-preferential point production that is also reflected in the Wadi Sabra core component is another common feature. The vast majority of Levallois points from Middle Palaeolithic sites in southern Jordan feature unidirectional-convergent scar patterns that reveal a fairly homogeneous and formal point production modality (see Demidenko & Usik 2003; Groucutt 2014, Fig. 13). The same pattern is documented within the Levallois point component of the Wadi Sabra.

All of these sites occupy a chronological position in the later part of the Levantine Mousterian and fall in a timeframe roughly between 150 and 50 ka calBP (cf. Henry 1995a; 1995b; 2003; Hauck 2013; Groucutt 2014). Given the obvious affinities to these assemblages outlined above, it is very probable that most of the identified occurrences in the Wadi Sabra that bear Middle Palaeolithic artefacts belong at least to the greater context of a developed Marine Isotopic Stage (MIS) 4/3 Mousterian settlement system in the Levantine corridor. Techno-typologically, these assemblages can be attributed to Tabun B-type Mousterian (see Bar-Yosef 1994; compare also Shea 2013, Tab. 4.4), although we need to be cautious with such claims because recent assessments of the compositional integrity of the traditional Levantine Mousterian facies point to a continuum between Tabun B and Tabun C-type assemblages (e.g. Hovers 2009; Hovers & Belfer-Cohen 2013). Culley et al. (2013) even suggest abandoning the dichotomy altogether and favour speaking of Tabun B/C instead. The important and persisting point, however, seems to be that later Mousterian assemblages tend to produce larger numbers of well-defined and pointed Levallois blanks that are embedded in a highly standardised production scheme. Even if a Tabun B *sensu stricto* classification of the material thus seems to be unwarrantedly optimistic, a later Mousterian origin *sensu lato* is arguably well-supported by the formal and technological characteristics of both Levallois blanks and cores.

The range of core exploitation modalities, for example, broadly encourages a later Mousterian designation of the survey material. Comparable to other traditional Tabun B-type assemblages (cf. Bar-Yosef 1994; Bisson et al. 2006; Shea 2013, 110f.), the Middle Palaeolithic core signature from the Wadi Sabra clearly reflects a dominant orientation toward the production of Levallois points, prominently features unidirectional-preferential as well as unidirectional-recurrent blank extraction systems, and displays a focus on unidirectional-convergent preparation modalities. The relationship between core setup and blank properties is well-defined and therefore highly standardised in the aforementioned sense.

The technological proclivity to generate well-defined and controlled pointed blank-shapes can be understood as an expression of hunting reliability and versatility (*sensu* Bleed 1986; Bamford & Bleed 1997) in the later part of the Levantine Mousterian. This would corroborate the view that some aspects and peculiarities of later Middle Palaeolithic technologies in the Near East are likely associated with a stronger focus on hunting-related subsistence activities and maybe even with hunting specialisation (cf. Speth & Clark 2006; Shea 2006).

Additional indication for a late MIS 4 or early MIS 3 background of the Wadi Sabra survey material might be constituted by the appearance of regular and continuous inverse edge modification of Levallois points. This particular retouch mode is believed to denote a distinct socio-cultural dimension of Levallois point and wider tool "architecture" in the southern Levant including the sites from southern Jordan as well as those from the Wadi al-Hasa and the Central Negev (Henry 1992; 2011). One single specimen displaying this particular retouch cannot substantiate this attribution of course. Assemblages that belong to this "stylistic" group regularly feature 40–50 % of inverse retouch in their tool kit.

IV.4.2 Modern humans in the Levant

The question of biological attribution of different techno-typological regimes or even time-windows is the big question in current palaeoanthropological discourse of the later Pleistocene in the Near East and is ultimately difficult to assess (cf. Shea 2003; 2013, 81f.; Bisson et al. 2006; Hovers 2009). There are, however, some chronological anchor points that allow for a better organisation of the problem at hand. The fossil record documents the first unambiguous presence of AMH groups between 130 ka and 80 ka calBP at the sites of Skhul and Qafzeh in Israel. A very influential position argued repeatedly that the entire fossil record actually demonstrates an alternating chrono-taxonomic structure, showing that initial AMH groups were replaced on a larger geographic scale by Neanderthal population by 70 ka calBP at the latest (Tchernov 1992; Rak 1993; Shea 2001). Evidence comes from Amud, Kebara and Dederiyeh, where Neanderthal fossils dated between 70 ka and 50 ka calBP were found (cf. Shea 2003b; Bisson et al. 2006). It is generally agreed that the first "fully" developed Upper Palaeolithic entity, the Early Ahmarian, is again associated with AMHs (Bergman & Stringer 1989; Douka et al. 2013). Recent dates for the female Neanderthal individual from Tabun which push back Neanderthal presence in the region until about 120 ka calBP (Grün & Stringer 2000, 610), however, blur the contours of such superficial spatio-demographic patterns. Recently reported uranium-thorium dates for an AMH partial calvaria from the Manot Cave (Israel) between 40 and 70 ka calBP are in good agreement with a more complex scenario of hominid interaction in the region (Hershkovitz et al. 2015).

On the basis of the fossil attribution of Middle Palaeolithic assemblages from the Levant, Wallace & Shea (2006) have argued that land-use related core organisation might reflect an important difference between AMH and Neanderthal populations (see also Liebermann & Shea 1994). While "secure" AMH assemblages produce significantly higher numbers of formalised cores, Neanderthal-associated assemblages exhibit higher numbers of expedient cores. If this can be used as a first simple proxy for bio-cultural classification, Wadi Sabra cores would point to an organisational signature typical for AMH-related settlement systems – although tentative at best. It should be clear that the general finding needs to be treated with extreme caution and might be significantly biased by the contingent preservation of Neanderthal and AMH fossils in the wider Levant. The pattern might represent to a lesser extent bio-culturally induced differences, for example, than ecologically rooted ones given that AMH fossils have only been found so far in the coastal Mediterranean woodland part of the wider Levant.

Worth noting is the presence of at least three cores (Al-Khallah 2009_1, Al-Takhir 2010_3 and Al-Takhir 2010_4) that fall under the category of core concepts with Nubian affinity. Nubian cores that feature either opposed-divergent preparation of the distal guiding ridge, orthogonal-perpendicular preparation of the critical convexities or a combination of both are believed to manifest a discrete succession of AMH dispersal events from Northeast Africa around 100 ka calBP (e.g. Crassard 2009; Olszewski et al. 2010; Crassard & Thiébaut 2011; Rose et al. 2011; Beyin 2013; Usik et al. 2013; Crassard & Hilbert 2013). Nubian-type cores were first comprehensively described in Sudan (Guichard & Guichard 1965; Marks 1968) and Egypt (Van Peer 1992a; 1992b; Wendorf et al. 1994; Van Peer et al. 1996). In this regard they are a candidate for a technological phenomenon that links the north-eastern part of Africa, bearing only *Homo sapiens* fossils so far, with Arabia and the southern Levant. Assessing the ultimate relevance of Nubian core technology in the greater picture of AMH expansion, however, is generally obscured by varying definitions of Nubian core characteristics and the problem that presence/absence statements are not sufficient to address the issue. If Nubian core architecture really reflects AMH dispersal and is conceptualised as distinct from other preferential point production methods within a Levallois system, then it has to be demonstrated that there is a continuous pan-African distribution of rigidly distinct Nubian cores that is decoupled from similar ecological settings. To the knowledge of the authors, this has never been convincingly done.

The problems are manifold. In general, there is a strong "double standard" at work that tends to re-cast single Nubian-like cores (e.g., from the Sinai Peninsula – Eddy & Wendorf 1999; Rose et al. 2011, or the Hadramawt region in Central Yemen – Crassard 2009; Rose et al. 2011; Crassard & Hilbert 2013) that practically connect better described assemblages (in this case Northern Africa – Van Peer 1992a; 1992b; Van Peer & Vermeersch 2000, and Dhofar in Oman – Rose et al. 2011; Usik et al 2013), along hypothetical dispersal routes and thereby often mask the fact that spatially adjacent non-Nubian Middle Palaeolithic assemblages also contain small numbers of Nubian-like cores. This illustrates at least three interconnected problems: First, single pieces or assemblages that are designated as belonging to the greater Nubian Complex are often not examined in person by the classifying scholars, and are only accepted as "real" Nubian cores because they match the currently influential background assumptions which, in turn, stem from much more general considerations or even other scientific fields. In the case of the often proclaimed "southern dispersal route" along the Red and Arabian Sea (Rose 2004; Rose et al. 2011; Beyin 2013), coastal dispersal is assumed to be the more likely or even the "default" scenario on more general grounds, and genetic findings are invoked to back this view (e.g., with Fernandes et al. 2006; Fernandes 2009), although they only indicate the biogeographical connection between North-Africa and Southern Arabia for floral and faunal communities. This connection is by no means exceptional; biogeographical and eco-climatic windows in the critical timeframe between 120 and 60 ka calBP are also documented along the Levantine corridor (e.g. Lahr & Foley 1998; Vaks et al. 2007; Frumkin et al. 2011; Harcourt 2012, 48–51; Boivin et al. 2013).

On these grounds, genetic background information heavily biases the rigidity with which individual cores are examined. The often cited pieces from the Sinai Peninsula, for example, in reality only represent single surface finds that lack any well-defined archaeological context (Eddy & Wendorf 1999) and are technologically no more similar to Nubian cores from Egypt or Oman than selected individual pieces from the Wadi Sabra (Al-Khallah 2009_1, Al-Takhir 2010_3 and Al-Takhir 2010_4) and other Levantine Mousterian collections. This leads directly to the second problem: The identification of Nubian technology at a site or region is not a simple question of presence/absence because opposed-divergent or orthogonal-perpendicular preparation modalities of preferential Levallois point cores are often a feasible option of point pre-determination even if they are not the dominant or habitual way to arrange such cores. This means that situational problem-solving can result in a comparable technological signature. In general terms, the overarching preparation pattern that is believed to characterise Nubian core technology therefore only represents the mere lateral spectrum of preferential Levallois point production as long as it is not shown to have a systemic and assemblage-wide character. This is also the reason why a precise and rigid definition of Nubian core preparation is necessary if this particular technological peculiarity shall remain meaningful in any way. Usik et al. (2013) recently made an attempt to offer such a definition. On the basis of lithic survey material from Dhofar (Oman), they suggest that true Nubian core technology is primarily characterised by a technological emphasis on the creation of a prominent distal ridge that controls the pointedness of the final blank. As a result, the distal guiding ridge is not only prepared in the typical Nubian-way, but also exhibits a semi-steep to steep cross-section as well as an almost acute distal platform angle if prepared in an opposed-divergent mode. The preferred core shape is pitched or cordiform to guide the production of elongated points. Moreover, the *débordant* removals that create the necessary lateral convexities are often struck rather obliquely/steeply in relation to the main horizontal axis of preferential point detachment. This indicates that the "Nubian method" might be slightly different from ordinary Levallois methods that typically feature comparatively flat "surface exploitation" (cf. Boëda 1993). Additionally, in a Nubian system, the final blank's pointed tip lies nearly perfectly within the striking axis. Although the survey sample from the Wadi Sabra lacks Levallois blanks that are clearly derived from a Nubian system, the three Nubian-like cores are very similar to an ideal Nubian core as proposed by Usik et al. (2013). Whether this is an indication of early AMH presence in the Levant or not, can only be discussed on more solid grounds when the technological characteristics indentified so far for Nubian core technology are consistently and rigidly applied in synthetic studies. We are convinced, however, that certain superficial patterns that circulate within the literature in this regard will prove to be the result of artificial boundaries that do not find correlation in Palaeolithic reality. The principle rejection of Nubian technologies in the Levant might be such a case (compare Rose et al. 2011). Given the geographical key position of southern Jordan in relation to Arabia where several Nubian "findscapes" have been reported recently (cf. Crassard & Hilbert 2013), it is nevertheless possible that the glimpse into Nubian core technology visible in the Wadi Sabra actually constitutes the northernmost extension of a "Nubian technological dispositif". If this scenario is favoured, it could also mean that the respective material from the Petra region in southern Jordan might fall somewhere into MIS 5 (see Rose et al. 2011) and would thus extend the Middle Palaeolithic chronology of the Wadi Sabra further back in time – although a chronological interpretation is not the only option to interpret this scenario and rests to date on very fragile grounds. We would therefore not be very surprised to see both the spatial and chronological extent of the "Nubian phenomenon" considerably broadened in the upcoming years.

IV.4.3 Settlement dynamics

The spatial pattern of archaeological occurrences and finds with a Middle Palaeolithic signature from the Wadi Sabra catchment area suggests a sparse and largely off-site presence of hominin groups. Although most of the sediment potentially bearing material from this period is already eroded (compare chapter II), the spatial relationship of Levallois points and Levallois cores (compare **Fig. IV-1,b.c**) is improbable to have resulted from related geomorphological processes alone. Strikingly, the preferential Levallois end-products rarely co-occur with their associated cores and are much more scattered throughout the entire "wadiscape". On the other hand, Levallois cores in general and Levallois point cores in particular are strongly clustered and are found only in three of the 13 documented occurrences. Moreover, there is a broad discrepancy between the Upper and the Lower Wadi Sabra. Most of the Middle Palaeolithic occurrences are located in the northern part, but the majority of these surface scatters and find spots are limited in artefact numbers and largely contain Levallois debitage. Over 70 % of the cores, by contrast, originate from Al-Takhir in the southern part of the Wadi Sabra close to rich raw material outcrops. This distributional discrepancy between the north and the south might have two dimensions: Firstly, the northern part of the Wadi appears to have been geomorphologically altered to a lesser degree than the southern part since MIS 3. Secondly, the distribution of critical resources in the Wadi might be reflected in this two-fold pattern. Preliminary information points to a much better water availability and therefore to a potentially denser vegetation cover in the northern Wadi Sabra due to the presence of a large aquiferous system in this area, whereas medium to high quality raw material outcrops are lacking there and can only be found in the south (Hannah Parow-Souchon, personal communication). Given that vegetation attracts certain prey species, this pattern might be the reflection of Middle Palaeolithic groups that targeted certain animals in the northern Wadi Sabra, manifested by the occurrence of widely distributed Levallois points, while producing these projectile points mostly close to primary raw material sources in the south. From this perspective, the overall spatial fingerprint of the Middle Palaeolithic is consistent with short-term occupational events that have the character of hunting excursions.

On the basis of data from Tor Faraj and Tor Sabiha as well as from surveys in the wider area, Henry (1994; compare also Henry 1995b; 2011) has argued that two types of sites or "camps" can be distinguished from at least 70 ka calBP onwards: long-term and ephemeral. Ephemeral camps are believed to occur on higher elevations (mean-value: 1300 m above sea level), whereas long-term occupations are associated with lower elevations (mean-value 900 m above sea level). Henry (1994; 1995b; 2011) has interpreted these finding as the manifestation of different mobility modalities within a seasonal cycle and consequently infers a transhumance-like settlement system for the late Levantine Mousterian with long-term, iterative and often stratified sites during the winter term, and ephemeral and rarely re-visited occurrences during the summer. Somewhat surprisingly, all discussed occurrences from the Wadi Sabra fall within the range of Henry's long-term occupations (mean-value 800 m above sea level, standard deviation: 98 m), although the archaeological signature clearly indicates an ephemeral character of these occupational events that are maximally to be interpreted as small-scale camps for hunting tasks. It should be clear, however, that these results should be seen within the regional context of the greater Petra area and are therefore not directly comparable to the absolute values from the Ras en Naqb area.

On a regional scale, the sample is a typical representative of the inland, interior Levantine Mousterian that yields significantly more formal cores than coastal or ecotone sites (see Wallace & Shea 2006). Wallace & Shea (2006) have suggested that this pattern might reflect greater residential stability within coastal and Mediterranean woodland environments in comparison to the drier interior parts of the Levant. This perspective would support higher occupational plasticity and seasonal sensitivity of land-use systems during the Middle Palaeolithic of southern Jordan. Although the preponderance of formal, mostly preferential Levallois cores might be explainable in part by sampling bias, it is in good accordance with other lines of evidence that place the sample into a later Levantine Mousterian with comparatively high residential mobility (compare also Liebermann & Shea 1994).

IV.5 CONCLUSION

The main results of the analysis demonstrate the well-established nature of the Levantine Middle Palaeolithic record that allows scholars to classify carefully documented surface samples even in the lack of stratified sites. In this regard, the Levallois Mousterian material from the Wadi Sabra most likely represents short-term, probably seasonal, hunting-related occupational events in the later MIS 4 and early MIS 3. With its technological focus on preferential Levallois point cores that are generally prepared in an unidirectional-convergent manner alongside small numbers of preferential and recurrent Levallois flake as well as recurrent-parallel Levallois blade production, it is best attributed to the later Tabun B-type assemblage group *sensu lato*. Frequently occurring wide, short and comparatively flat, but elaborately prepared Levallois points complement the picture and place the sample alongside assemblages from Tor Faraj and Tor Sabiha in southern Jordan or Hummal in Central Syria. Minor regional peculiarities underscore the high degree of fit with Late Mousterian technologies on a large geographic scale as well as with the later Middle Palaeolithic of the southern Levant on a smaller scale.

If not too heavily biased due to geomorphological processes that appear to have re-modelled the entire wadi channel at least since MIS 3, the Middle Palaeolithic material seems to conserve a land-use related pattern that highlights the importance of differently distributed, but highly critical resources: Vegetation and fauna on the one hand and water on the other hand. From this perspective, the material represents a small section of already documented patterns of settlement organisation in the Middle Palaeolithic of the southern Levant on both a regional and seasonal scale.

The most contested issue remains the question of an AMH techno-typological signature in the Wadi Sabra material that is somehow related to the initial arrival of *Homo sapiens* in and passage through the Near East. In general, the survey material is not more informative in this regard than other better defined and well-stratified archives from the wider Levant. The careful inspection of some aspects of the core technology, however, reveal a strong affinity to Nubian core architecture known from North-Africa and southern Arabia for a small portion of the recorded Levallois point cores. These observations might be read in a two-fold way: On the one hand – if the inherent problems outlined above are considered subordinate – it might show that southern Jordan actually constituted a bridge between Africa, Arabia and Europe but was initially (MIS 5 or earlier) not crossed and only "touched" by populations that carried an African-derived technological heritage. On the other hand, it might indicate that the dichotomy between a pan-African signature of AMH groups with associated Nubian technology and a Levantine Mousterian record that lacks this technology in a qualitative way is no longer tenable and too superficial to reflect anything meaningful in the past. The latter would advise more caution, particularly in the face of a hardly maintainable direct link between technological expression and biological equipment.

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Site ID	Site name	Occurrence type
1	Al-Ansab	find spot
2	Al-Takhir	surface scatter
3	Al-Khallah	surface scatter
4	Sabra 2010/4	find spot
5	Sabra 2010/12	single find
6	Sabra 2010/15	find spot
7	Sabra 2010/17	find spot
8	Sabra 2010/18	find spot
9	Sabra 2010/19	single find
10	Sabra 2010/20	find spot
11	Sabra 2010/23	find spot
12	Sabra 2010/24	single find
13	2010/14	surface scatter

Tab. IV-1 List of the analysed Middle Palaeolithic surface assemblages and single finds mapped in **Figure IV-1**.

Site name	Individual number	Blank type	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)	Platform type	Max. platform depth (mm)	*chapeau de gandarme*-platform	Modification
Al-Khallah	1	Point	53	45	14	27.6	facetted, primary	12	-	-
Al-Khallah	1	Flake	53	45	15	35.3	facetted, primary	12	yes	-
Al-Khallah	2	Flake	60	44	9	25.9	facetted, primary	9	-	-
Al-Khallah	3	Flake	33	37	8	10.9	facetted, primary and secondary	6	yes	-
Al-Khallah	4	Elongated flake	43	32	11	12	facetted, primary	7	-	-
Sabra 2010/4	1	Point	77	52	9	27.6	facetted, primary	9	-	bilaterally pointed
Sabra 2010/4	2	Blade	111	42	11	57.3	facetted, primary	7	-	right sided towards to distal part
Sabra 2010/12	1	Point	57	36	6	9.2	facetted, primary	6	-	-
Sabra 2010/15	1	Point	93	56	10	46.9	facetted, secondary	9	yes	bilaterally pointed
Sabra 2010/15	2	Point	43	31	7	9.8	facetted, primary	6	-	-
Sabra 2010/15	3	Lateral elongated flake	72	37	8	11.7	facetted, primary	8	-	-
Sabra 2010/15	4	*Débordant* element	93	26	8	11.5	facetted, primary	7	-	-
Sabra 2010/15	5	Blade	64	21	11	7.7	facetted, primary	11	-	-
Sabra 2010/18	1	Point	71	53	12	43.8	facetted, primary	8	yes	-
Sabra 2010/18	2	Point	59	50	13	29.7	facetted primary	12	yes	inverse right sided
Sabra 2010/19	1	Point	44	32	7	6.3	facetted, primary	6	-	-
Sabra 2010/20	1	Point	35	34	5	5.1	facetted, secondary	4	yes	-
Sabra 2010/20	2	*Débordant* element	83	44	10	21.2	dihedral, secondary	10	-	-
Sabra 2010/23	1	Point	46	39	5	7.3	facetted, primary	3	-	-
Sabra 2010/23	2	Point	68	36	13	22.1	plain	11	-	-
2010/14	1	Blade	74	31	8	16.4	dihedral, secondary	6	-	-
2010/14	2	Flake (*eclat débordant*?)	55	38	10	24.2	facetted, secondary	6	-	-
2010/14	3	Preparation flake	37	35	9	10	facetted, primary and secondary	9	-	-
2010/14	4	Preparation flake	46	39	9	13.3	facetted, primary and secondary	7	-	-
2010/14	5	Point	56	47	7	13.9	facetted, secondary	8	yes	-
2010/14	6	Point	65	34	10	21.4	dihedral, secondary	9	-	-

Tab. IV-2 Attributes of the complete Levallois blanks analysed in this study.

	Wide Levallois points				Elongated Levallois points			
	Length	Width	Thickness	Weight	Length	Width	Thickness	Weight
minimum	35	34	5	5.1	43	31	6	6.3
average	49.8	43	8.8	16.7	64.8	41.3	9.3	23.4
SD	8.6	5.8	3.9	10.2	15.7	9.8	2.3	14.5
median	53	45	7	13.9	66.5	36	9.5	21.8
maximum	59	50	14	29.7	93	56	13	46.9
sample size	**5**				**8**			

Tab. IV-3 Basic metric statistics (in mm) and weight statistics (in g) of wide and elongated Levallois points (wide are those that fall within the 3:4 length/width range, compare **Fig. IV-4**).

Core ID	Site name	Concept	Targeted blanks	Shape	Length (mm)	Width (mm)	Cross-section distal ridge*	Distal platform angle*
1	Al-Khallah 1	Nubian 1/2	Levallois points	pitched	81	52	semi-steep	acute
2	Al-Khallah 2	centripetal-preferential	Levallois points	circular	58	52	-	-
3	Al-Takhir	Nubian 1/2	Levallois points	pitched	102	65	oblique/ semi-steep	acute
4	Al-Takhir	Nubian 1/2	Levallois points	cordiform	74	59	semi-steep	semi-acute
5	Al-Takhir	centripetal-preferential	Levallois flakes	circular	88	95	-	-
6	Al-Takhir	centripetal-recurrent	Levallois flakes	circular	65	65	-	-
7	Al-Takhir	unidirectional-recurrent	Levallois blades	sub-pitched	96	62	-	-
8	Al-Takhir	unidirectional-recurrent	Levallois blades	sub-circular	49	62	-	-
9	Al-Takhir	unidirectional-preferential	Levallois points	pitched	60	46	-	-
10	Al-Takhir	unidirectional-preferential	Levallois points	sub-rectangular	58	49	-	-
11	Al-Takhir	mixed-preferential	Levallois points	sub-cordiform	100	82	-	-
12	Sabra 2010/24	bidirectional-preferential	Levallois points	triangular	58	59	-	-
13	2010/14	unidirectional-preferential	Levallois points	triangular	69	55	-	-

* only recorded for Nubian-like cores (see chapter I.4).

Tab. IV-4 Attributes of the Levallois cores analysed in this study (definitions for shape, cross-section distal ridge and distal platform angle have been taken from Usik et al. 2013).

Targeted blanks	Cores (n)	Percentage
Levallois points	9	69 %
Levallois flakes	2	15 %
Levallois blades	2	15 %
total	**13**	**100 %**

Tab. IV-5 Percentage of target Levallois blank types represented on the last core state.

Plate IV-1 Sabra 2010/4 (Middle Palaeolithic).

1 Levallois point [1-3-1];

2 Dihedral burin on retouched blade with large plain platform [1-3-2].

Scale 1:1

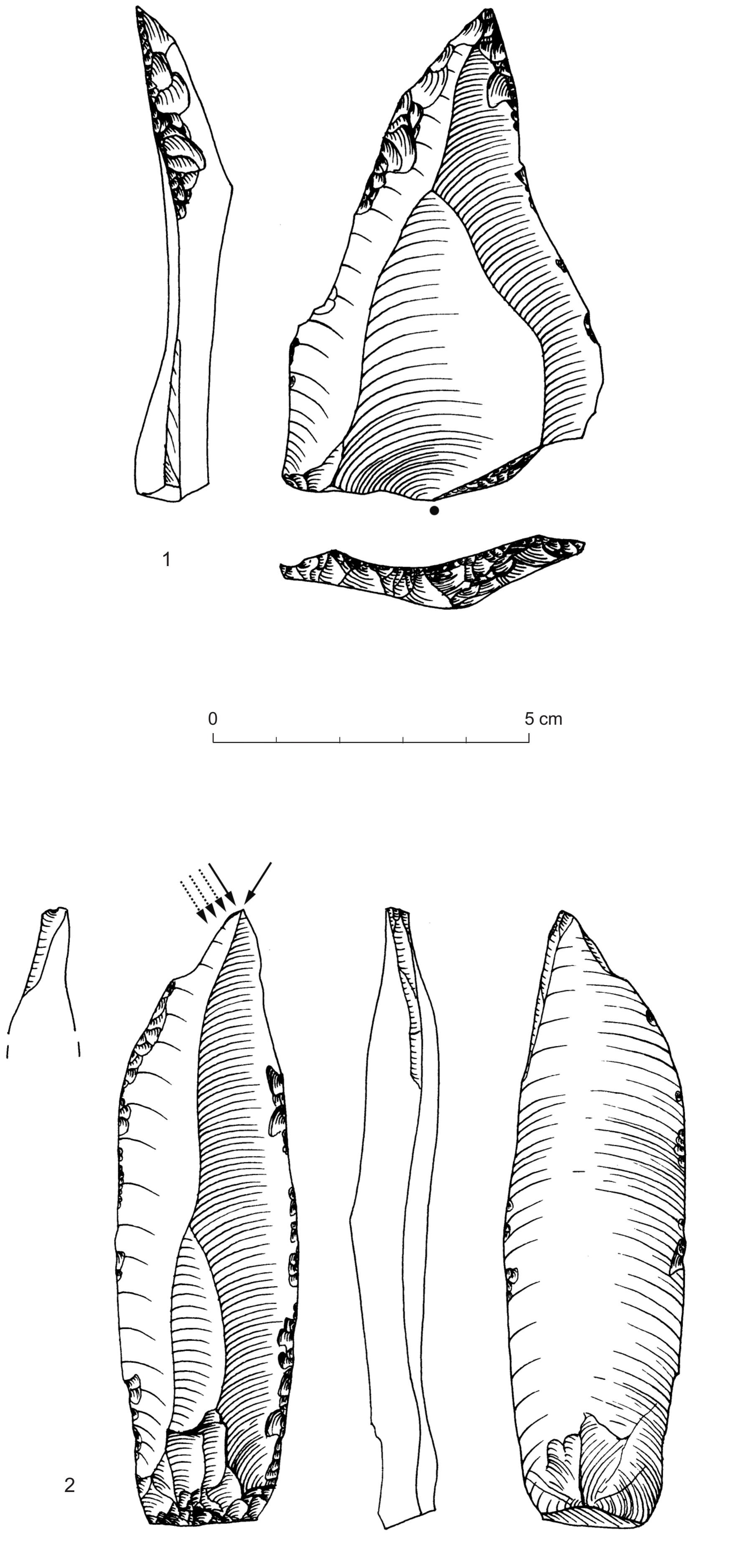
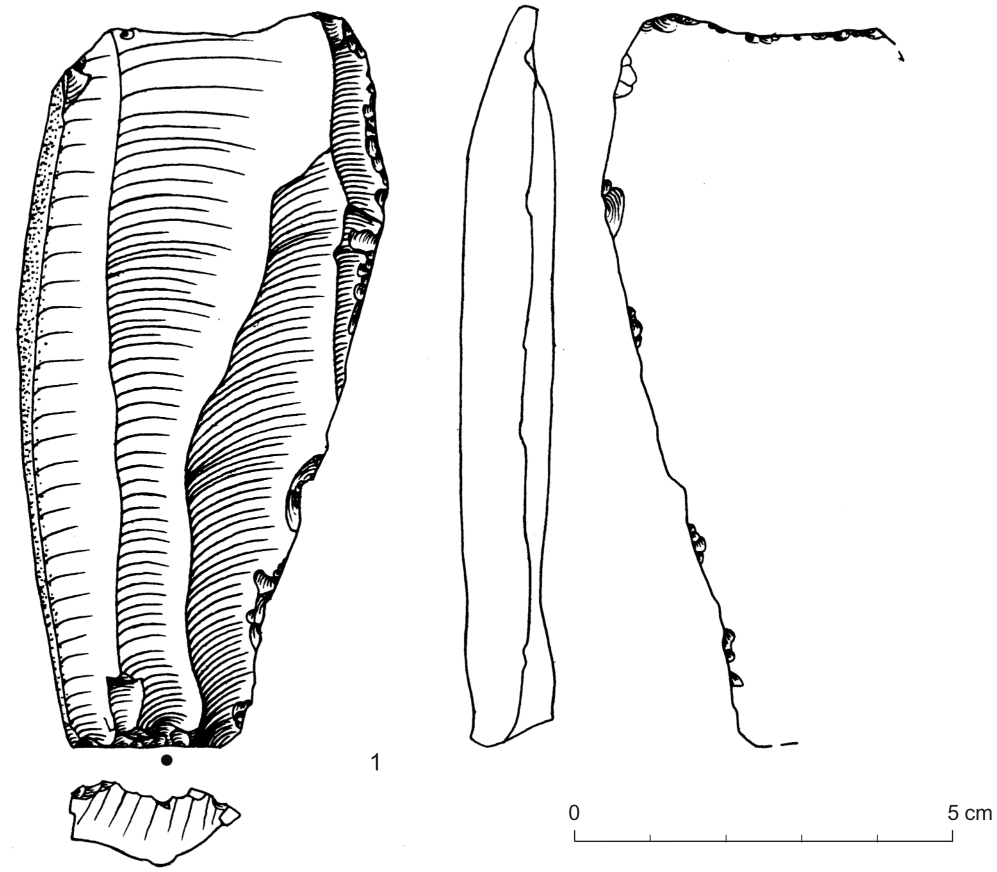

1
0
5 cm
2

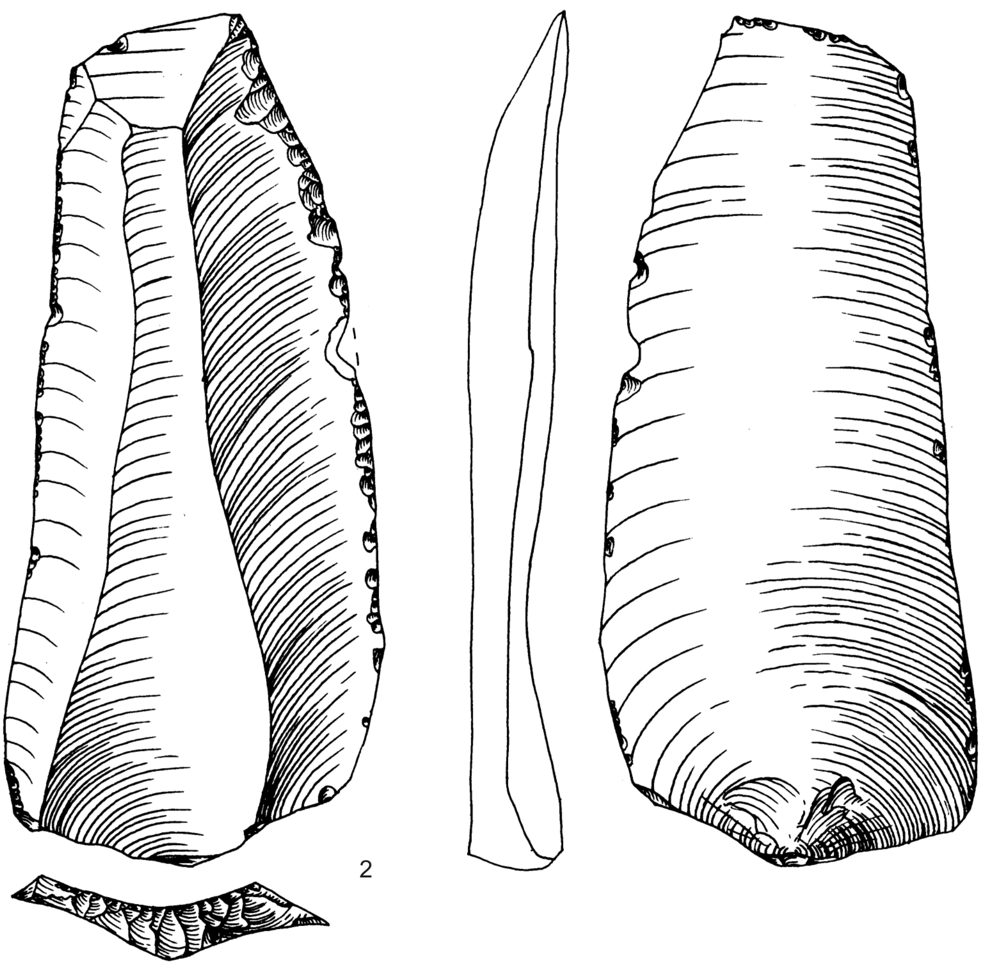
Plate IV-2 Sabra 2010/4 (Middle Palaeolithic).

1 Retouched blade with large plain platform [1-3-3];

2 Retouched Levallois blade with facetted platform [1-3-4].

Scale 1:1


1
0
5 cm


2