

RESEARCH ARTICLE

# The Nubian Levallois technology in central Syria in the context of the Middle–Upper Palaeolithic transitional period and the IUP variability in the Eastern Mediterranean Levant

Yuri E. Demidenko<sup>a</sup> , Jean-Marie Le Tensorer<sup>b</sup> , Vera von Falkenstein-Wirth<sup>c</sup>

*a* – Ferenc Rakoczi II Transcarpathian Hungarian College of Higher Education, 6 Kossuth Square, Berehove 902 00, Ukraine.  
E-mail: [yu.e.demidenko@gmail.com](mailto:yu.e.demidenko@gmail.com)

*b* – Universität Basel, Departement Umweltwissenschaften, IPNA, 145 Spalenring, Basel CH 4055, Switzerland.  
E-mail: [jean-marie.letensorer@unibas.ch](mailto:jean-marie.letensorer@unibas.ch)

*c* – Reservoirstrasse 11, Oberwil CH 4104, Switzerland. E-mail: [vvfalkenstein@bluewin.ch](mailto:vvfalkenstein@bluewin.ch)

**Abstract.** This article focuses on the Nubian Levallois technology first recognized in northeastern Africa in the 1960s. Now, sites of the Middle Stone Age (MSA) Nubian Complex associated with *Homo sapiens* are known to occupy vast areas in northeastern Africa and the Arabian Peninsula. Recently, proper Nubian Levallois technology has been recognized at sites in southern Africa and the southern part of the Eastern Mediterranean Levant as well. Here we report several sites with Nubian Levallois artefacts from central Syria, a Levantine region geographically closer to Arabia than Africa, where such technology had not been identified previously. The analyzed lithic assemblages share the same techno-typological characteristics. Technologically, they feature a newly recognized “developed Nubian Type 2-method, single-platform unidirectional convergent, Jerf Ajla/Qalta-type core” or shortly, “Jerf Ajla/Qalta-type Nubian” cores and method. This method was geared towards the serial production of pointed blades and Levallois points on blades in a single core reduction cycle. This differs from other Nubian core reduction methods, which tend to focus on producing a single pointed flake or Levallois point on a flake in each reduction cycle of a core. Typologically, the investigated Syrian assemblages are dominated by Upper Palaeolithic tool classes and types, especially endscrapers and burins. Besides the lithic data, these assemblages are assumed to be older than 33–36 uncal ka BP measured at the sites Jerf al-Ajla and Umm el-Tlel. We argue that central Syrian assemblages with Nubian methods can be dated to the transitional period between the Middle Palaeolithic or Middle Stone Age and the Upper Palaeolithic, more precisely, to the Initial Upper Palaeolithic (IUP). Thus, the developed character of the Jerf Ajla/Qalta-type Nubian cores does not only adds to the variability of the Nubian Levallois technology but also explains its absence in MSA locations in Africa and Arabia, and its presence in the IUP Levant. Accepting this, we propose the name “Jerf Ajla/Qalta industry” for these particular Nubian-related IUP assemblages and sites in central Syria. In doing so, a second IUP industry is now recognized by us in the Levant, in addition to the Early Emiran, known for its improved Nubian 1 method with opposed-platform cores and a new hunting projectile type, the Emireh point. Both IUP industries appeared in the Levant as a result of *Homo sapiens* migration with different Nubian-related knapping traditions from Africa and Arabia into the neighbouring Eastern Mediterranean Levant. The Early Emiran is considered to be a successful IUP industry in the Levant, as a predecessor of the IUP Late Emiran and Early Upper Palaeolithic (EUP) Early Ahmarian industries. Moreover, parts of the population carrying this industry even spread beyond southwestern Asia to other Eurasian regions, heralded by new IUP and EUP industries there. However, the Jerf Ajla/Qalta industry and its makers did not continue to survive in the Levant.

**Keywords:** Nubian Levallois technology, Initial Upper Palaeolithic

**Cite as** Demidenko, Y. E., Le Tensorer, J.-M., von Falkenstein-Wirth, V. (2023). The Nubian Levallois technology in central Syria in the context of the Middle–Upper Palaeolithic transitional period and the IUP variability in the Eastern Mediterranean Levant. *Litikum – Journal of the Lithic Research Roundtable*, 11, pp. 9–34. <https://doi.org/10.23898/litikuma0035>

**Article history:** Received: 12 December 2023. Accepted: 1 March 2024. Published: 28 March 2024.



The present article is dedicated to the fond memory of Father Francis Hours (1921–1987), a great Levantine prehistorian, who co-directed the Palaeolithic research group in the El-Kowm area in the 1980s and invited one of us (J.-M. Le Tensorer) to join Palaeolithic research in Syria in 1982.

At the end of the 1960s, after “*the work of the Combined Prehistoric Expedition to Egypt and the Sudan ... questions were raised about possible cultural connections between Palestine and the Nile Valley during the Pleistocene. ... The evidence for these connections, however, was often no more than gross typological or technological similarities between assemblage groups and in no case was there a continuously known distribution of any industry from the Levant to North Africa. If these postulated connections were to be verified or rejected, Prehistoric investigations would be necessary in the intervening areas – Northeast Egypt, the Sinai, and the Negev. In fact, this huge area, from the northern Nile to Beer Sheva, was almost a Prehistoric terra incognita.*” (Marks 1976, p. 3)

## 1. Introduction

This paper discusses recently recognized locations in central Syria, Eastern Mediterranean Levant (hereafter: Levant), that contain lithic artefacts related to the Nubian Levallois technology. Nubian sites had never been identified in Syria before. Until now, it was held that bearers of the Nubian lithic technological tradition migrated from Africa only to the southwestern corner of the Asian continent, the southern Levant, through the Nile Delta and the sole land bridge, the Sinai Peninsula. However, locations with Nubian-related finds in Syria were identified during the 2010 field season by a joint Syrian-Swiss Archaeological Mission for Palaeolithic studies in El-Kowm, under the direction of J.-M. Le Tensorer and S. Muhesen, that started as early as 1989. Unfortunately, amid escalating civil conflict in Syria, the Mission was discontinued from the following year (from 2011) up to the present day. The lack of research in this region explains the gaps and biases in our understanding of Nubian-related materials in Syria. In this context, the northern Levantine material presented here is hoped to be a valuable contribution to the much-discussed study of Nubian Levallois technology.

## 2. Northern Africa and the Levant: data for the post-Lower Palaeolithic, Middle Palaeolithic or Middle Stone Age period with a special emphasis on Nubian Levallois technology

The present article’s epigraph succinctly explains why A. E. Marks initiated the “Central Negev Project” to study the southern Levant as early as 1969. After his excavations in Sudan, Marks hoped to find evidence of North African Palaeolithic industries (e.g. Nubian, Khormusan, Halfan, etc.) in the neighbouring Levantine region of the Negev desert. However, in the following 14 years, including his fieldwork completed in 1980, until the publication of the 3rd and last volume of the Negev Book Series in 1983, which summarized the excavations and artefacts of numerous sites, Marks concluded that, among other things, “*the Prehistory of the Central Negev, at least in post-Acheulean times, was a microcosm of the Levant as a whole*” (Marks 1983a, p. xi). He did not mention any direct archaeological connection between the neighbouring Levant and North Africa in the post-Lower Palaeolithic, because he found no Middle Palaeolithic (MP) or Middle Stone Age (MSA) industry present in both regions. This disconnect was indeed striking, considering the absence of any significant natural barrier between the regions, in contrast to the south where the Red Sea separates northeastern Africa from the Arabian Peninsula. We maintain the distinction between the MP and the MSA because MSA artefacts were manufactured by early *Homo sapiens*, and their potential presence in Asia would signal the dispersal of modern humans out of Africa. On the other hand, some Levantine Mousterian industries were produced by “European immigrants”, newcomers to the Levant. The presence of these artefacts in Africa could potentially mark the entry of Neanderthals into the world of *Homo sapiens* in Africa.

One of Marks’ Negev field crew members, H. Crew conducted his PhD research on the then newly discovered Negev Mousterian. To clarify “*the relationship between the Levantine and North African Mousterian Complexes*”, Crew (1975) compared the variability of the Levallois methods represented in the various Levantine Mousterian assemblages to that of North African industries. To this end, “*Mousterian industries from Libya have been examined*”, as well as “*the Middle*

*Palaeolithic industries of the Nile Valley*” including “the Nubian Mousterian (Marks 1968)” (Crew 1975, p. 2). The Nubian Mousterian, characterized as being “between the North African and Levantine Mousterian Complexes” was studied with the specific aim of examining a possible “contact between the Levantine Mousterian and one or both of the other complexes in the period of question (whether by population movement or diffusion)”, noting that “the Levantine Mousterian has to be the eastern donor or recipient” (Crew 1975, p. 160). However, Crew’s study of the artefacts showed that “the Levallois flake methods of the Lybian and Nubian Mousterian complexes [...] are significantly different from those of the Levantine Mousterian” and “examination of the Levallois points and other methods of flake and blade manufacture [...] further supports the divergences between the complexes revealed in the execution of the Levallois flake methods” (Crew 1975, p. 166). Based on this result, “the summation of the evidence [...] argues against any direct relationship between the methods utilized by the Levantine and Libyan Mousterian” and, regarding the Levantine and Nubian Mousterian, “the similarities between the complexes, the length and the amount of dorsal scars, are not significant when judged in relation to the extent of the differences manifested between the methods practiced by the two complexes” (Crew 1975, pp. 171–173). Regarding inter-regional differences and Nubian Levallois technology, Crew observed that “the Nubian cores and the para-Levallois cores defined by the Guichards (1965: 97-99) are found in variable quantities in every Nubian assemblage, but they are lacking in the Levantine Mousterian” (Crew 1975, p. 172). However, the Mousterian assemblage groups of the three regions in question were characterized by the same basic Levallois core reduction methods, and it is unclear what degree of similarity we should expect among them, even if there were cultural connections.

Crew’s approach from the mid-1970s, primarily based on Levantine materials, suggests an absence of any post-Lower Palaeolithic industry encompassing both the Levant and Northern Africa. This observation was later supported by works starting in the 1980s by P. M. Vermeersch and P. Van Peer on North African materials, which noted limited similarities between Levantine and North African industries (e.g., Van Peer 1988; 1992; 1998; Van Peer & Vermeersch 2000; 2007; Vermeersch 2002). As a result, from the MP and MSA archaeological record, the two

geographically neighbouring regions of Africa and Asia appear to belong to two archaeologically distinct worlds.

Before the recent recognition of Nubian technology in Israel (see e.g., Goder-Goldberger *et al.* 2016), major research breakthroughs regarding the “Nubian subject” over the past two decades did not occur in Africa or the Levant. Instead, they took place in the geographically adjacent Arabian Peninsula, where field research by M. Petraglia, H.-P. Uerpmann, A. Delagnes and H. Amirkhanov, as well as ongoing work in Oman, southern Arabia led by J. Rose with the participation of A. E. Marks (e.g., Rose 2006; Rose *et al.* 2011; 2018; Usik *et al.* 2013) contributed significantly to our understanding of the so-called “Nubian Complex”. There has been a long tradition since the 1960s of naming all archaeological industries between the Lower and the Upper Palaeolithic as MP. Consequently, sites with Nubian Levallois technology have usually been gathered under the “MP umbrella” (Rose *et al.* 2018, pp. 53, 54–106), even up to the present day. However, we prefer to name all (!) African and Arabian lithic assemblages in this context as MSA reflect their African and early *Homo sapiens* affinity. Indeed, new anthropological and geochronological studies at Jebel Irhoud have demonstrated the presence of early *Homo sapiens* in Morocco as early as c. 300 thousand years ago, suggesting that “the evolutionary processes behind the emergence of *H. sapiens* involved the whole African continent” (Hublin *et al.* 2017, p. 289). Based on this view, we argue that an exclusive MSA association with early *Homo sapiens* in Africa is justified. On the other hand, we “reserve” MP status for describing archaeological materials associated exclusively with Eurasian Neanderthals.

By distinguishing the MSA *Homo sapiens* from MP Neanderthals, we also fully support the proposal by Rose and colleagues to use the term “Afro-Arabian Nubian Complex” to encompass sites with Nubian Levallois technology in both Africa and Arabia into a single archaeological complex/techno-complex (e.g., Rose *et al.* 2018, p. 55). However, the addition of “MSA” into the term, “Afro-Arabian MSA Nubian Complex”, would further emphasize the African connection of this archaeological phenomenon. In fact, from our perspective, even some Levantine Mousterian assemblages that have traditionally been categorized under the Levant Tabun C-type

Middle Levantine Mousterian industry, such as those identified in northern Arabia (see data in Petraglia *et al.* 2012; Groucutt *et al.* 2015; Hilbert & Crassard 2020), should be designated as an Afro-Arabian MSA industry type with African origins. Indeed, archaeological research in the Arabian Peninsula over the last twenty years has increasingly demonstrated a close archaeological relationship of the region with Africa during the Lower Palaeolithic and the MSA. Therefore, an Afro-Arabian framework for discussing the Lower Palaeolithic and MSA of this region is useful, despite Arabia being categorized as part of Asia under the modern geographic nomenclature. In this context, the various newly discovered and studied sites with Nubian Levallois technology in Arabia are of prime interest to current discussions regarding human dispersal pathways from North Africa into the Levant. Thus, in two ways – through the Nile Valley and Arabia, the Levant was connected to Africa by the Nubian MSA.

### 3. Central Syria and its sites with Nubian Levallois technology

#### 3.1. Central Syria and its geographical setting

All the sites with Nubian Levallois technology discussed in this article are situated in two regions of central Syria: Palmyra and El-Kowm. Separated by ca. 90 km, these two regions are considered oases in the Syrian desert, “*which is the northern extension of the Arabian desert*”, and often referred to in the Arabic world as “*Badiet esh Sham, steppes of the north*” (Schroeder 1969, pp. 28–29). Both the Palmyra and El-Kowm oases are plateaus that belong to the northern part of the Syrian desert, within the “*Syrian interior steppe desert*” (Richter *et al.* 2001: 33). Geographical and environmental characteristics of these two oasis plateaus are well-described in the archaeological literature (e.g., Schroeder 1969; Jagher & Le Tensorer 2011; Jagher *et al.* 2015). They are located in the very centre of the modern state of Syria, between the Euphrates River and the desert highlands north of Damascus. Sitting in the heartland of the Fertile Crescent (Fig. 1), they occupy morphologically different landscapes within a short distance, featuring ecologically diverse hinterlands such as hills and cuestas, alluvial plains, *sabkha* areas and dry wadis. The two regions are characterized by perennial springs, waterholes, numerous sources

of good-quality cherts and natural valley passages. These features make the oases’ plateaus attractive to both humans and various ungulates. In a broad context, central Syria served as an important transitory passage between the northern lowlands near the Euphrates River and the Arabian Desert. Therefore, it is not surprising that central Syria, especially the El-Kowm region, contains a rich Palaeolithic record spanning from the Lower Palaeolithic up to the Epipalaeolithic. In this study, in addition to many traditionally defined Palaeolithic industries and their associated types in the Levant, we also propose to include a unified Nubian-related industry in the Palaeolithic record of the northern Levant.

#### 3.2. Approach for identifying archaeological sites with Nubian Levallois technology

Before discussing Syrian Nubian technology, we outline the methods used to identify sites with Nubian Levallois technology during the 2010 field season in Syria. These methods were discussed in the field by J.-M. Le Tensorer, Th. Hauck and Yu.E. Demidenko (who was invited to join the project in Syria by Le Tensorer and Hauck). The methodology was based on observations made on numerous archaeological finds from the El-Kowm area (central Syria), which were recovered by a Syrian-Swiss Archaeological Mission. One of the primary goals of the collaboration was to examine lithics recovered at the Hummal site, which had been under systematic investigations by the Archaeological Mission since 1997. Additionally, finds from the Nadaouiyeh Aïn Askar site, excavated by the Archaeological Mission in 1989–2003, were also assessed. The joint research effort in 2010 led Demidenko, the “Ukrainian newcomer to Syria”, to conclude that the El-Kowm area represents a sort of “Palaeolithic paradise”. Based on his considerable prior research experience in Levantine Stone Age archaeology, he concurred with his University of Basel colleagues’ opinion that the region is “*a key area for the Palaeolithic of the Levant in central Syria*” (Jagher & Le Tensorer 2011, p. 197). In particular, the region boasts a rich and *in situ* (!) industrial-chronological sequence from the Lower Palaeolithic up to the Epipalaeolithic (see Le Tensorer *et al.* 2001; 2007; 2011; Jagher *et al.* 2015). In addition to the above-noted and some other (e.g., Umm el-Tlel) *in situ* Palaeolithic sites, the research team also visited a

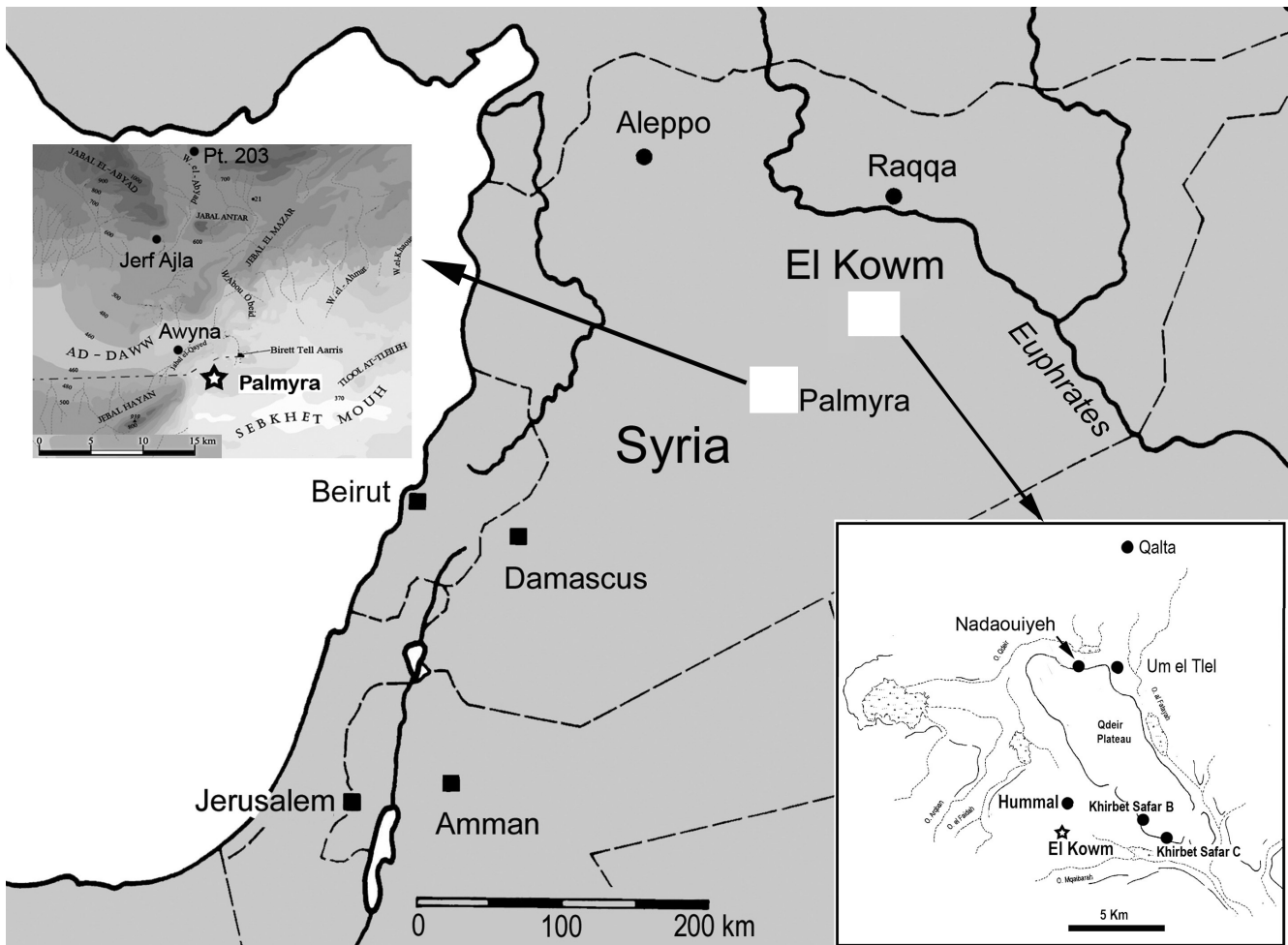
few Palaeolithic surface locations, with either MP or UP lithic scatters, as well as some rich surface primary flint outcrops and patchy flint sources (e.g. so-called Qdeir “flint fields”) in El-Kowm. Among the surface locations visited, the site “Qalta” (also known as #28 among the identified Palaeolithic sites in El-Kowm) and its lithic artefacts have been known for a long time but are still considered to have an “enigmatic character”. The lithics from this particular location totalled more than 1,000 items, with at least a quarter of them being core-like pieces. An examination of the Qalta lithics has led Demidenko to suggest that the assemblage is indeed unusual for the Levantine Palaeolithic, with no known industrial comparisons in the regional Palaeolithic record. At the same time, the lithic set appeared to be techno-typologically homogeneous, with only a few post-Palaeolithic “intrusive” additions. We remember what Demidenko told J.-M. Le Tensorer in El-Kowm about the Qalta artefacts: “it smells of Africa”. Why was this non-Levantine suggestion proposed? It was primarily because of the following Qalta lithic features.

The most characteristic and unique feature of the Qalta assemblage is its cores, which have already been named “Qalta-type cores”. They have triangular or convergent shapes, with faceted main wide striking platforms, and two lateral supplementary striking platforms from which short and steep flakes were detached to maintain the convexity of the cores’ flaking surface. The flaking surface mostly exhibits several elongated, blade-like removal negatives originating from the main striking platform. In addition to the specific core type, the Qalta assemblage also features the presence of many blade elements the debitage (including bladelets) and some UP tool types. Because the edges of lithic artefacts were often abraded due to their exposure on the surface, it is not always straightforward to recognize true tools from pieces with simple retouch-like scars on their lateral edges. A preliminary review of the El-Kowm Palaeolithic after a survey conducted in 1980 includes a two-page discussion on the Qalta locus and its findings with one illustration (Besançon *et al.* 1981, pp. 51, 53, Fig. 9), the only published data on Qalta until now. According to the text, the site features the peculiar core type, now proposed to be called “Qalta-type core”, serial blades, bladelets, and proper endscrapers. Sidescrapers were also noted, which is why the

publication associated the site with the Middle–Upper Palaeolithic Transition period. The article concludes that lithic materials similar to those at the Qalta loci are known from Jerf al-Ajla Cave, specifically layer Brown 1, located in the Palmyra area, ca. 120 km from El-Kowm. In addition, two more surface find spots with Qalta-like lithics in El-Kowm were also noted but never published in detail. Thus, the Qalta loci do not appear to be “solitary places” with such specific finds.

The Qalta-type core reminded Demidenko of the North African Nubian and Halfan industries’ cores from Sudan and Egypt. He had studied these African artefacts intensively at Southern Methodist University (Dallas, USA) in the 1990s, with the support of A. E. Marks and F. Wendorf, investigators of the respective sites in Africa (e.g., Wendorf 1968). To Demidenko, the Qalta-type core represents a combination of Nubian and Halfan core elements, with the dominating Nubian features being a triangular or convergent shape, a well-faceted main wide striking platform, and two lateral supplementary platforms. Meanwhile, Halfan characteristics were thought to be represented by a series of blade-like removals from core flaking surfaces, although these blades on the Qalta-type cores were detached as primary products rather than being used to supplement core shaping, as in the African industry. These observations, along with the fact that the Qalta-type core was unknown in the Levantine Palaeolithic record, led Demidenko to suspect an African technological association with the Qalta-type core. However, the main difficulty in further detailing the Qalta-type core in 2010 in Syria was the inability to access and view relevant publications on Nubian and Halfan assemblages. Instead, the preliminary observations were based on what Demidenko could recall from the last time he observed the African artefacts, which was 14 years ago in 1996.

After returning to Kyiv (Ukraine) following the 2010 field season in Syria, Demidenko contacted Ph. Van Peer (Leuven, Belgium) to seek his opinion on the “African impression” of the Qalta-type core. Based on illustrations of several Qalta-type cores, Van Peer concurred that the Qalta cores indeed resemble Nubian cores. After further consulting reference literature on Nubian Levallois technology in both Africa and Arabia, Demidenko believed that his initial “African smell test” of the Qalta-type cores in Syria was



**Figure 1.** Map showing the location of the El-Kowm and Palmyra areas in Syria. A: The El-Kowm area with the location of the mentioned sites. B: The Palmyra region map with the location of the mentioned sites.

substantiated by existing empirical data. The Qalta-type core appears to be representing a developed Nubian core type designed to produce not a single Levallois point or triangular flake as in classic Nubian cores but rather a series of blade removals per core reduction cycle. Moreover, based on published data concerning the excavated lithic artefacts from layer Brown 1 of Jerf al-Ajla Cave, it was recognized that the Qalta-type core was also present in this assemblage, although these cores were designated as the “Jerf Ajla core type” in the late 1960s (Schroeder 1969; Richter *et al.* 2001). Similar to Qalta, definitive UP tool classes are also present in the Jerf al-Ajla assemblage. Notably, the two typological names, “Qalta-type core” and “Jerf Ajla core type”, assigned to the same core type identified at two spatially disparate locations, separated by a distance of ca. 120 km, indicate that previous researchers (the French team in the early 1980s and H. B. Schroeder in the late 1960s) also recognized that this core form was hitherto unknown in Levantine Palaeolithic

assemblages and warranted a new classification. Thermoluminescence (TL) dating of Jerf al-Ajla placing it around 33 000 BP, aligning with the MP to UP transitional period, the “developed” characteristics of Nubian cores, and the presence of UP tools. More recently, additional MP-UP transitional assemblages with lithic features resembling those at Qalta were identified at the Umm el-Tlel site and a couple of surface locations in the late 1990s and early 2000s by a Syrian-French archaeological team in El-Kowm, led by E. Boëda and H. Al-Sakhel (Boëda & Bonilauri 2006).

In sum, it appears that there are at least seven locations in Palmyra and El-Kowm, and even in the areas between them (Fig. 1, 1a, 1b), which exhibit similar basic yet specific techno-typological features in their lithic artefacts. These features are possibly related to the MP to UP transitional period, and thereby it should not come as a surprise to find a specific “developed” Nubian core type in these regions. Previous studies examining the Qalta/Jerf Ajla-like materials in

central Syria either focused on classifying these materials as types or paid a special emphasis on bladelets. They took these different approaches instead of recognizing these assemblages as representative of African, or as we would now say Afro-Arabian IUP Nubian. This difference in approach can likely be attributed to the fact that these researchers had never encountered Nubian materials from Africa, particularly those with characteristic cores. Consequently, they did not associate the unusual materials in central Syria with an African affinity.

We had planned to analyze the lithics from Qalta and Jerf al-Ajla Cave at the Palmyra Archaeological Museum, including, Hummalian lithic materials that were still on exhibition in the museum in 2010. Unfortunately, we had to cancel our research in Syria due to the ongoing war in the country. This interruption means that our Nubian research project in central Syria was on halt right at the very beginning of the collaboration. As a result, the data presented in this article is limited to information about the presence and characteristics of various lithic types, as well as our impressions of each location and assemblage. However, despite their rudimentary nature, we believe the information presented here is valuable for serving as a foundation for future Palaeolithic research in central Syria, which we hope will resume soon.

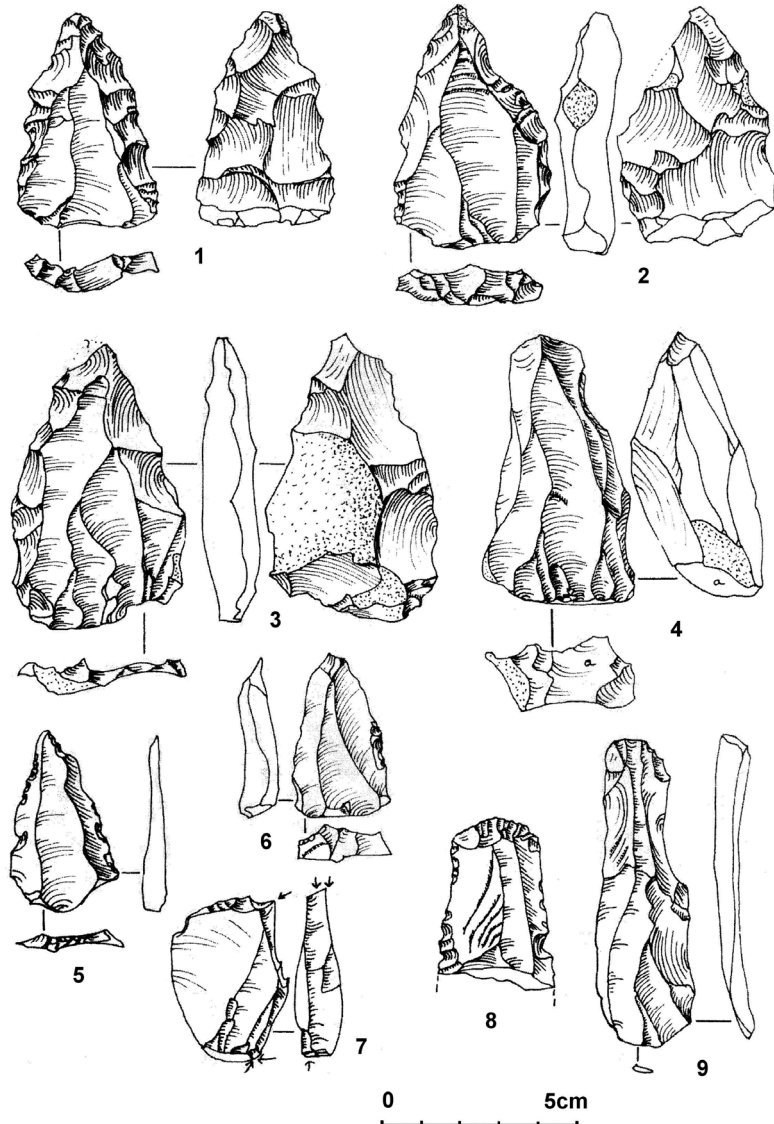
### 3.3. Sites with Nubian-related finds: basic site data and lithic artefact characteristics

#### 3.3.1. The Qalta site and its finds

The site (**Fig. 1a**) was discovered by a team of Palaeolithic archaeologists headed by L. Copeland and F. Hours in 1980. Following the advice of J. Cauvin, the founder and director of the French Permanent Mission in El-Kowm town, the team carried out an intensive and successful survey to find Stone Age sites in the El-Kowm area and quickly published a report in the following year (Besançon *et al.* 1981). The survey identified a total of 51 sites in the area. In the following twenty years, the Syrian-Swiss Archaeological Mission conducted further intensive surveys in 1985 and 1989–2001. As a result of these cumulative efforts, a total of 186 Stone Age sites and surface locations have been recorded in El-Kowm (Le Tensorer *et al.* 2001, p. 101). Among the 51 sites identified in 1980,

three were described as “*un peu énigmatiques*” (Besançon *et al.* 1981, p. 51): Qalta (site #28), Khirbet Safar B (site #20), and Khirbet Safar C (site #35). Of the three enigmatic sites, which are all surface find spots, only Qalta were described more extensively in the report. Qalta appears to be the northernmost site found in the El-Kowm area at that time, it lay ca. 5–6 km from the sites of Nadaouiyeh Aïn Askar and Umm el-Tlel, and ca. 15 km north of the Hummal site (Besançon *et al.* 1981, Fig. 1 on p. 35). The site consisted of a 130×30-m surface artefact concentration, located on a slope in a hilly area with “*affleurement de silex*” (Besançon *et al.* 1981, Fig. 1 on p. 35). As such, the Qalta assemblage is likely associated with on-site lithic workshop knapping activities. Erosion of Pleistocene deposits was identified at the locality, which explains why no *in situ* artefact-bearing sediments were preserved there.

The Qalta lithic assemblage collected by the French archaeologists in 1980, stored at the El-Kowm French mission founded by Cauvin, can be briefly summarized based on the 1981 publication (Besançon *et al.* 1981, pp. 51, 53). The assemblage consists of 856 lithic items, of which 251 were classified as cores (29.3%), 536 as blades and flakes (62.6%), and 69 as tools (8.1%). The absence of chips is probably related to the secondary position of the assemblage, impacted by long-term erosion. The cores were subdivided into two basic groups each characterized by a significant reduction in variety. The first group is represented by cores having a triangular shape and a primary flaking surface for the production of points and blades (**Fig. 2: 1–3**). These cores, measuring mainly 5–8 cm in length and 3–6 cm in width, feature a radial or centripetal preparation pattern on the triangular flaking surface, a faceted striking platform and a non-volumetric reduction. These traits firmly place the cores in the MP “*tradition levallois*” category. The second group consists of various discoidal and rectangular cores discarded at different stages in the reduction sequence, with an overall size of 3.5–5.0 cm. The primary debitage products from these cores cannot be recognized. Some of the cores in this second group contain elements of a prismatic bidirectional core (**Fig. 2.4**), including a triangular shape resembling those of the first core group. However, these cores lack the prepared striking platform and hence cannot be regarded as a sub-type of the first group. Among the



**Figure 2.** The Qalta location, El-Kowm area, central Syria, the 1980 lithic assemblage. 1–3: developed Nubian 2-method Jerf Ajla/Qalta-type cores. 4: a UP prismatic bidirectional core. 5–6: Levallois points. 7: dihedral angle burin. 8–9: endscrapers. Artefact illustrations modified after Besançon et al. 1981, Fig. 9.

debitage pieces, a few points resemble Levallois points with faceted butts (Fig. 2.5–6). Finally, the assemblage demonstrates a wide spectrum of tool classes in varying proportions: endscrapers (23.18%) (Fig. 2.8–9); burins (20.78%), mostly dihedral angled types (Fig. 2.7); denticulates and notches (13.03%); sidescrapers (8.69%); pointed pieces or “*pieces apointées*” and borers (5.79% each). Together, these tools make up 77.26% of the tool component of the assemblage. The remaining tools are blades and flakes with some retouch, which may have been grouped as debitage by the French researchers.

In sum, the authors of the 1981 article concluded the Qalta assemblage as unusual. On the one hand, the core reduction pattern and blank types have a basic MP character, though some of their features are uncharacteristic of the MP. On the other hand, ca. 70% of the tools

correspond to UP types. Respectively, it was suggested that Qalta and a few other sites in central Syria might be associated with an as yet unrecognized transitional facies between the MP and the UP (Besançon et al. 1981, p. 53).

The proportion of UP tool classes in the Qalta assemblage was possibly underestimated in the 1981 publication. First, a large proportion of the tool assemblage, including the denticulates and notches (ca. 13%), and the unspecified retouched pieces (over 20%), may represent simple edge-damaged blanks. Removing these elements from the tool assemblage would increase the overall frequency and proportion of the UP tool types. Second, MP tool classes, specifically sidescrapers, were not only less frequent than endscrapers and burins taken separately but were also not illustrated at all, which raises questions about the reliability of at least some of the data. On the



**Figure 3.** The Qalta location, El-Kowm area, central Syria. Photos of the loci in 1993 taken by J.-M. Le Tensorer and R. Jagher.

contrary, UP tool classes, particularly endscrapers and burins, not only are the most frequent but are also illustrated with proper examples (**Fig 2.7–9**). Thus, we suspect that the tool component of the 1981 Qalta assemblage is composed largely, if not completely, of UP tool classes. Returning to core reduction and debitage data, the Qalta-type cores truly demonstrate features that are beyond the characteristics of known traditional Nubian cores. In particular, instead of a reduction sequence focusing on the preferential flaking of singular triangular flakes or Levallois points, a pattern well documented across Afro-Arabian Nubian sites, the Qalta-type cores were designed to produce a series of elongated triangular blades in each reduction cycle. Overall, the typological and technological features of the Qalta assemblage indicate to us not an MP but rather an MSA industrial affinity with UP characteristics in retouched tool forms.

In the following section, we provide additional details on the cores and debitage of an artefact collection recovered by the Syrian-Swiss Archaeological Mission at Qalta, because the 1981 article did not describe or illustrate any triangular blades, which had been the primary product of the Qalta-type cores.

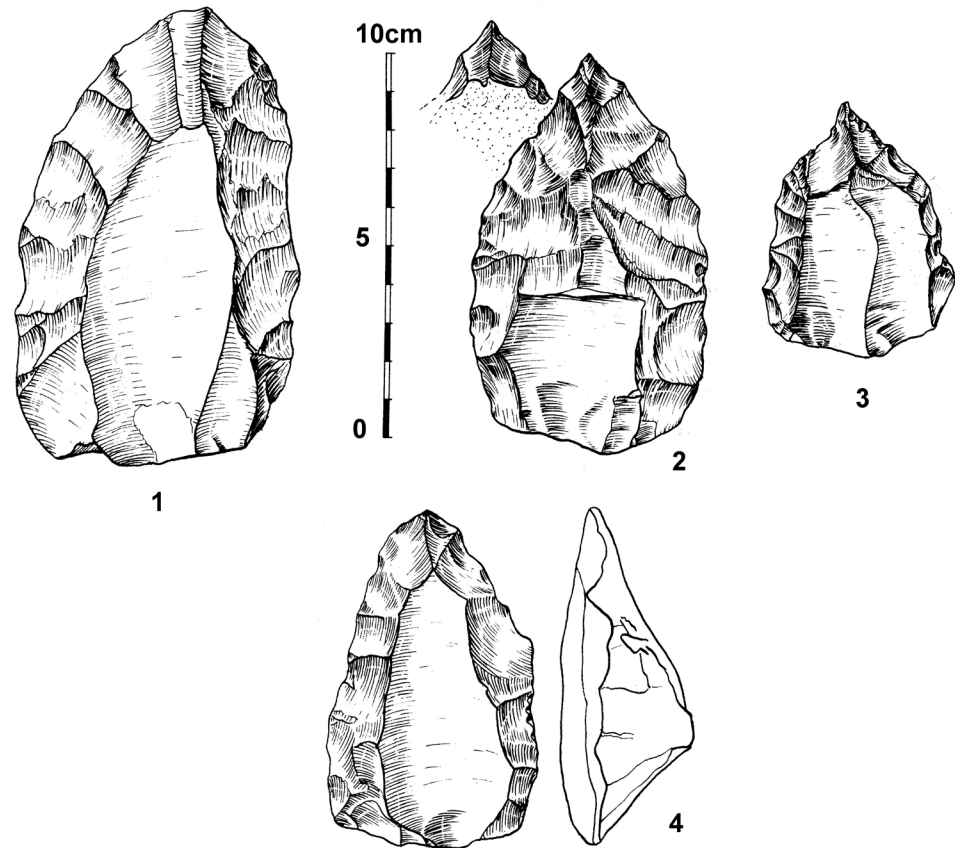
The Syrian-Swiss team conducted field studies in Qalta in 1989 and 1990 (**Fig. 3**). In addition to collecting a new surface lithic assemblage, the researchers also excavated sondages to examine the depositional profile. The results of the test excavation confirmed the absence of *in situ* archaeological layer(s) at the locality. The

artefacts collected during the 1989–1990 field seasons were not published. However, one of us (V. von Falkenstein-Wirth) partially inventoried the assemblage between 1993 and 2006 and, one of the University of Basel team members, A. Sanson, photographed many artefacts from the collection in 2009 in Syria. As a result, there is an inventory list and some high-quality photographs of the artefact collection.

The 1989–1990 Qalta collection that has so far been inventoried contains 631 lithics, which can be classified into three basic artefact categories:

- *Cores*: 388 pieces (55.8%). The most numerous type is the Qalta-type core ( $n=353$ ), besides, 15 UP prismatic cores, 6 bladelet cores and 14 uncharacteristic cores are encountered;
- *Debitage*: 209 pieces (30.0%), 195 blades and 14 bladelets;
- *Tools*: 99 pieces (14.2%), 38 endscrapers, 8 atypical endscrapers, 13 retouched blades, 7 burins, 3 borers, 16 sidescrapers, 6 points, 6 Levallois points and flakes, 2 denticulates.

The dominance of cores among the inventoried items is due to the workshop nature of the site and the presently incomplete inventory of flakes in the assemblage. During his visit to Syria, Demidenko estimated the entire Qalta 1989–1990 assemblage to be over 1,000 lithic items. If this estimate is correct and the remaining uninventoried artefacts are mostly flakes, there could be no less than 400 flakes in the overall assemblage collection. Keeping in mind the workshop nature of the site and the presence of numerous cores with varying



**Figure 4.** Nubian 2-method cores in MSA sites in Sudan. 1–2, 4: Site 420; 3: Brinikol. Artefact illustrations modified after Guichard & Guichard 1965, Fig. 22–23.

degrees of (re)preparation and reduction, the approximation of 400 flakes in the assemblage may still be a minimal estimate. Regardless, if we recalculate the artefact proportions by including this additional estimate of 400 flakes, the debitage sample would increase up to 609 specimens, and the three major artefact categories would be of the following shares: 35.4% for cores, 55.6% for debitage, and 9.0% for tools. This adjusted artefact category representation for the 1989–1990 assemblage corresponds well to the data of the 1980 assemblage, with a maximum deviation of c. 7% (also keeping in mind the absence of chips in both assemblage collections). As a result, we believe that the two Qalta collections exhibit similar primary (core) and secondary (tool) lithic treatments. These processes can be briefly summarized as follows. Lithic production was probably aimed at preparing and reducing Qalta-type cores to detach as many elongated triangular blades as possible. These blanks were then mostly “exported” from the workshop to other places, probably “living sites”, such as Umm el-Tlel (see below).

Here, we will describe the cores, debitage and tools of the 1989–1990 Qalta assemblage collection in more detail. Our analysis is constrained by the

available data recorded on these artefacts, which is limited to dimensional attributes.

Despite being located at a flint outcrop area, most of the Qalta cores ( $n=353$ ) are relatively small, not one specimen is longer than 8 cm, the majority are 4.0–5.9 cm long ( $n=261$ , 73.9%). The Qalta-type cores fall into the following length intervals: 3.0–3.9 cm ( $n=14$ , 4.0%); 4.0–4.9 cm ( $n=104$ , 29.5%); 5.0–5.9 cm ( $n=157$ , 44.5%); 6.0–6.9 cm ( $n=68$ , 19.2%); 7.0–7.9 cm ( $n=10$ , 2.8%). The six bladelet cores have a narrower size range, their length varies between 4.0 and 5.9 cm. Possibly, medium-sized flint pieces were deliberately selected for a separate bladelet reduction. The majority of the 15 UP “prismatic cores” also fall into the 4.0–5.9-cm length interval (4.0–4.9 cm –  $n=1$ , 6.7%; 5.0–5.9 cm –  $n=11$ , 73.3%), although a few longer items are also present: 6.0–6.9 cm ( $n=2$ , 13.3%) and a single core that is 9.0 cm long (6.7%).

The core length data suggest that the cores became shorter through continued reduction conducted mostly on-site. This hypothesis has to be verified by more data on cores in the future. However, the length of blade blanks and point tools probably approximate the length of the cores from which they were detached. The 82 complete

blades in the assemblage can be classified by length as follows: 3.0–3.9 cm (n= 9, 11.0%); 4.0–4.9 cm (n=27, 32.9%); 5.0–5.9 cm (n=27, 32.9%); 6.0–6.9 cm (n=13, 15.9%); 7.0–7.9 cm (n=4, 4.9%). Two blades are longer than these, they are 8.0 cm and 10.4 cm (1.2% each). Although the 4.0–5.9 cm size range is dominant among blades with 65.8%, it is less pronounced than the corresponding 73.9% among Qalta-type cores within the same length interval. Moreover, 7.0 cm or longer blades (7.3%) are more frequent than the cores in the same size category (2.8%). Regarding the points, all six artefacts were made on blades, and they are usually longer than unretouched blades: 4.0–4.9 cm (n=1, 16.7%); 5.0–5.9 cm (n=2, 33.3%); 6.0–6.9 cm (n=3, 50.0%). Thus, there appears to be some empirical support for a trend where the cores are generally shorter than the blade products that were detached from them.

Finally, of the 14 bladelets in the collection, two are crested with a triangular profile at midpoint. These crested pieces have lengths of 5.0 and 6.0 cm respectively, matching the lengths of the bladelet cores, all of which fall within the 4.0–5.9 cm interval. The remaining “regular” bladelets have lengths of 3.0–3.9 cm (n=5, 41.7%), 4.0–4.9 cm (n=6, 50.0%), and 5.0–5.9 cm (n=1, 8.3%), the longest piece is 5.0 cm. Bladelet production was probably distinct from the Qalta-type core reduction at the site, and likely began with the detachment of a crested bladelet, followed by the removal of a series of bladelets from specially prepared bladelet cores.

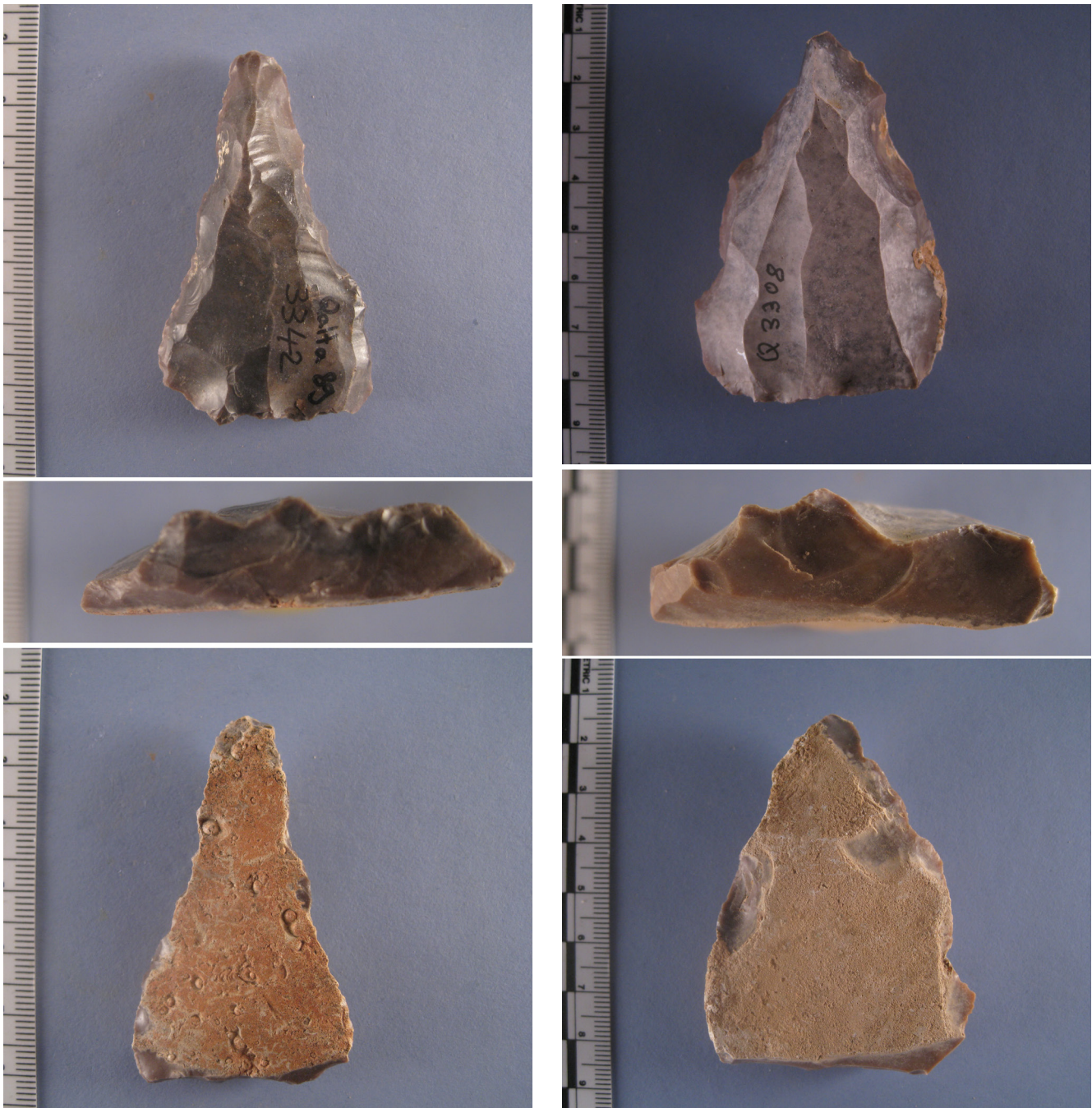
Concerning the “*lamelle à crête technique*” for bladelet core reduction, there is currently no evidence that the same “*lame à crête technique*” was applied during the initial reduction phases of the Qalta-type cores. From a technological point of view, the technique does not appear to be suited for the preparation of the flaking surfaces on this core type. If crested blades are found in the future associated with Qalta-type cores, it would suggest a reduction sequence more technologically similar to genuine UP prismatic and bladelet core reduction.

Based on the Qalta core and debitage data presented, our current position regarding the relationship between the Qalta-type and Nubian cores is the following. The Qalta-type core is a kind of Nubian 2-method core, the latter of which was first recognized in the mid-1960s in assemblages from Sudan characterized today as

MSA (see Guichard & Guichard 1965; Fig. 4.1–4), but with further technical development.

Initially, we considered describing the Qalta-type core by combining features of both Nubian 1 and 2 method cores. However, we found that this approach does not adequately capture the core type’s essential characteristics. In Syria, the core type (Fig. 5–8) typically exhibits a few, if any, removal negatives coming from the core’s distal end. When present, these removals tend to be small and short (resembling the size of chips), as are the serial abrupt or semi-abrupt removals of the two lateral supplementary platforms. Distal preparation thus constitutes only a small part of the overall core preparation process while in the Nubian 1 method, it is part of the definition (Guichard & Guichard 1965, pp. 68–69). Rather, it is the centripetal preparation of the entire core that results in the triangular shape and the convexity of the flaking surfaces. In our opinion, the use of the “*lame à crête technique*” in this centripetal preparation is unlikely.

Regarding the so-called preferred products, Qalta-type cores depart from proper African Nubian 2 cores. Some Qalta-type cores resemble proper Nubian 2 cores in bearing only a single removal negative of a Levallois point, and there are indeed a few Levallois points in the Qalta assemblage (as illustrated in Besançon *et al.* 1981 Fig. 2.5–6). However, the majority of the Qalta-type cores exhibit a series of blade removal negatives that originate from the wide, faceted striking platform on the flaking surface. These elongated triangular blades with convergent dorsal scar patterns and faceted butts were recognized as such only in 2010 by Demidenko in the assemblage (Fig. 9). Thus, we recognize a special Qalta-type Nubian 2 method, in which elongated pointed blades were detached from single-platform unidirectional convergent cores. The production pattern of these blade points can be considered “developed”, as it typically involves the removal of not one but a series of predetermined points during each reduction cycle. Another aspect of the Qalta-type core reduction is that the centripetal preparation process typically involves the removal of small preparation flakes from the distal end of the core, while a unidirectional-convergent reduction pattern is generally used to detach debitage products, which mainly consists of pointed blades or blade points and a few Levallois points *sensu stricto*. In summary, all



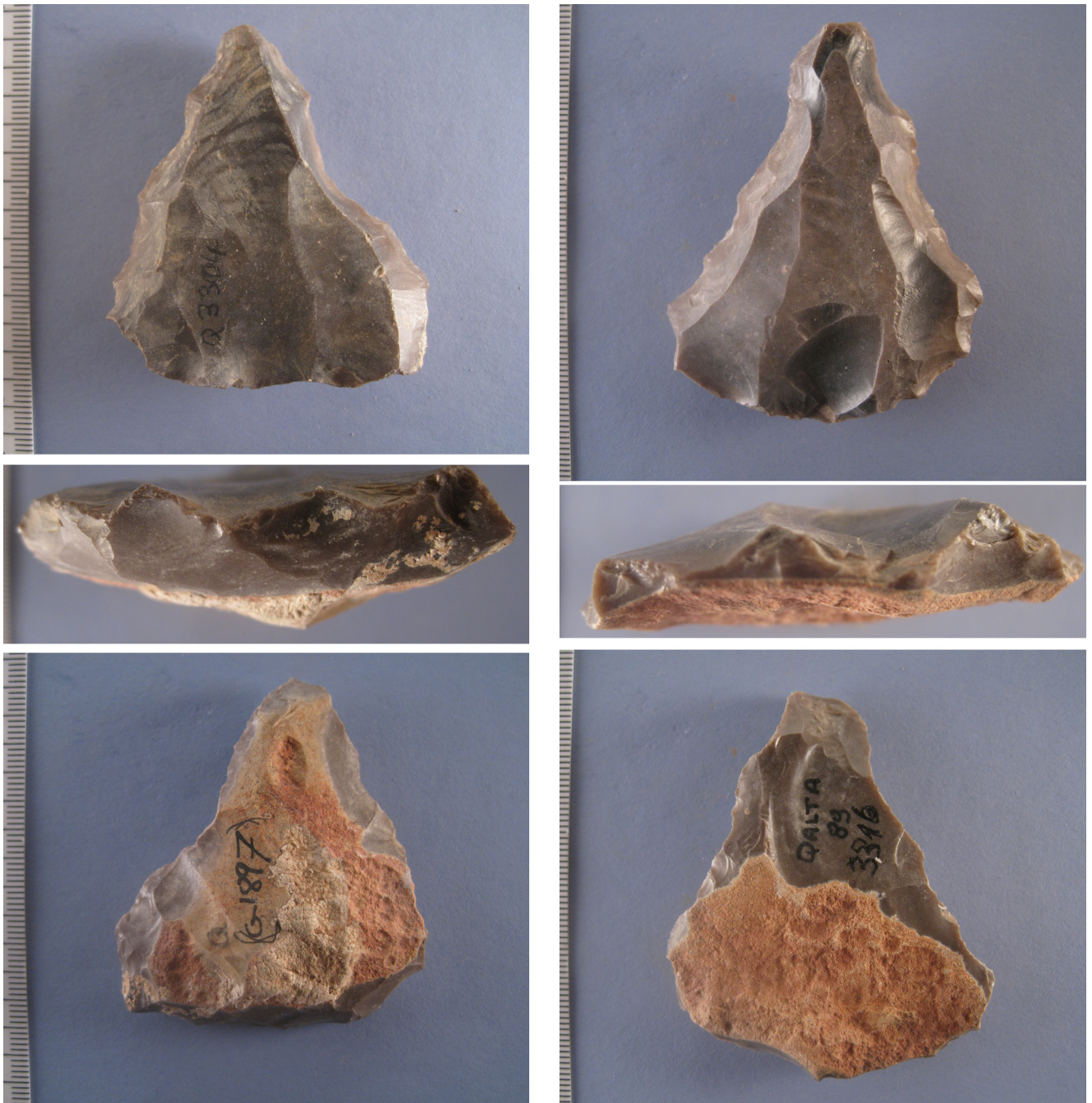
**Figure 5 (left).** The Qalta location, El-Kowm area, central Syria, the 1989–1990 lithic assemblage. Developed Nubian 2-method Jerf Ajla/Qalta-type core, # 3342. L: 5.7 cm, W: 3.3 cm, T: 1.0 cm. Photos: A. Sanson.

**Figure 6 (right).** The Qalta location, El-Kowm area, central Syria, the 1989–1990 lithic assemblage. Developed Nubian 2-method Jerf Ajla/Qalta-type core, # 3308. L: 6.6 cm, W: 4.8 cm, T: 2.0 cm. Photos: A. Sanson.

aspects of the Qalta core and debitage data point towards MSA (Nubian Levallois) rather than MP (Levallois proper) technological features, with developmental trends towards characteristics associated with the IUP.

Tools of the 1989–1990 assemblage are arguably less informative compared to those in the 1980 collection. Among the 99 tools identified in the 1989–1990 assemblage, endscrapers make up the majority. However, if we entertain the possibility

that some of the tools are, in fact, edge-damaged pieces, the proportion of endscrapers in the overall tool assemblage of Qalta would be even more, exceeding 50%. Based on the photos of the pointed blades or blade points in the collection (**Fig. 9.1–3**), this kind of edge damage may be present in great proportions in the assemblage. Taking a more conservative approach, we may exclude the 8 atypical endscrapers, 13 blades with some retouch, 6 points, 6 Levallois points



**Figure 7 (left).** The Qalta location, El-Kowm area, central Syria, the 1989–1990 lithic assemblage. Developed Nubian 2-method Jerf Ajla/Qalta-type core, # 3304. L: 5.7 cm, W: 5.0 cm, T: 1.6 cm. Photos: A. Sanson.

**Figure 8 (right).** The Qalta location, El-Kowm area, central Syria, the 1989–1990 lithic assemblage. Developed Nubian 2-method Jerf Ajla/Qalta-type core, # 3316. L: 6.1 cm, W: 5.0 cm, T: 1.3 cm. Photos: A. Sanson.

and flakes, and 2 denticulates from the tool kit. Likewise, we must exercise caution in assessing the authenticity of some of the 16 sidescrapers and 6 points. With this “tool hygiene” approach, the dominance of UP tool types in the 1989–1990 assemblage becomes evident, mirroring the composition of the 1980 collection. Considering the limited spatial distribution of the lithic artefacts collected from the site, Qalta appears to be a rare example of a Palaeolithic surface find

spot characterized by numerous finds that upon examination, are industrially homogeneous.

By summing up the techno-typological features of the Qalta lithic artefacts, we are inclined to underline the IUP characteristics of the assemblage with “industrial roots” within the MSA.



**Figure 9.** The Qalta location, El-Kowm area, central Syria, the 1989–1990 lithic assemblage. Pointed blade or laminar point, the “desired debitage product” detached from developed Nubian 2-method Jerf Ajla/Qalta-type core # 3091. L: 3.6 cm, W: 1.5 cm, T: 0.7 cm. Photos: A. Sanson.

### 3.3.2. The Jerf al-Ajla Cave and its Qalta-like finds

This specific karstic site is of paramount importance in the present study because it is the only known and published *in situ* site in central Syria related to the discussion of Nubian-related locations. Jerf al-Ajla Cave is located ca. 10 km northwest of the oasis town of Palmyra/Tadmor, situated at the southern flanks of “*the Jebel M’qeita in Paleogene limestone bedrock*” that “*contains flint deposits of exceptional quality throughout the region*” (Richter *et al.* 2001, p. 33) (Fig. 10). The cave also has a “[...] wide [...] view to the south and southwest overlooking the plain of Feif el-Mazra’ah” (Schroeder 1969, p. 48). This multi-layered Palaeolithic cave site was initially recognized and excavated by C. Coon in 1955, revealing a Pleistocene sedimentary deposit of ca. 6 m in thickness containing artefacts from the Lower Palaeolithic up to the UP (Coon 1957). Unfortunately, the relatively small cave (ca. 40 m<sup>2</sup> for the sheltered area) was completely excavated by Coon and his local Syrian workers in around three weeks. At that time, Coon defined five Pleistocene geological layers at the site, referred to “soils”, each of which was no less than 1m thick (Schroeder 1969, Fig. 8). Only a small portion of the numerous Palaeolithic-related finds recovered during the excavation were preserved for analysis; this included, 4,962 of ca. 68,000 lithic artefacts

and 526 of 5,668 animal bone remains (Schroeder 1969, p. 19).

In 1965, 10 years after Coon’s original excavation, archaeological research at Jerf al-Ajla Cave was continued by B. Schroeder as part of his PhD project. The resulting study culminated in Schroeder’s doctoral thesis, which he defended in 1969. Schroeder carried out a one-square-meter excavation at the front of the cave (Richter *et al.* 2001, Fig. 2). The excavation revealed the entire sedimentary sequence as identified by Coon, although the lowest sediments did not contain lithic artefacts. Schroeder reinterpreted Coon’s five stratigraphic “soils” into eight “depositional units”, consisting of 14 layers (Fig. 11) (Schroeder 1969, Fig. 9–10; Julig *et al.* 1999, Fig. 5; Richter *et al.* 2001, Fig. 3). The last archaeological investigation of the cave to date were carried out in 1995 and 1996 by Schroeder with a group of absolute dating specialists to apply thermoluminescence analysis to Pleistocene sediments at the site (Julig *et al.* 1999; Richter *et al.* 2001). At that time, seven more square meters were excavated to expose the upper part of the sedimentary sequence on the cave’s terrace further down the southern slope (Richter *et al.* 2001, Fig. 2). In total, for the entire archaeological sequence at Jerf al-Ajla, Schroeder analyzed almost 5 000 lithics. These artefacts include those recovered by Coon’s 1955 excavations, stored at the archaeological museums of Palmyra and Damascus, as well as 3 337 lithics recovered from his own 1965 excavation (Schroeder 1969, pp. 20–21). For the most recent 1995–1996 excavations, it is unclear how many artefacts were recovered from the site, as the publication only included percentage data for some artefact categories and types (Richter *et al.* 2001, Fig. 2).

For this paper and our interest in Qalta-related artefacts, we focus on the lithic finds from the upper sedimentary layers at Jerf al-Ajla Cave. Despite having seemingly intact sediments, determining the association between the recovered artefacts and the artefact-bearing sedimentary deposits is not straightforward. The Nubian-related artefacts were recognized by Schroeder in Coon’s layer “Brown 1”, which corresponds to Schroeder’s layers C and B, with a combined thickness of ca. 1.3 m. Schroeder defined the Jerf Ajla-type core based on 15 specimens (Fig. 12: 1–4) of the 68 he identified as Levallois cores in layer “Brown 1”. Schroeder

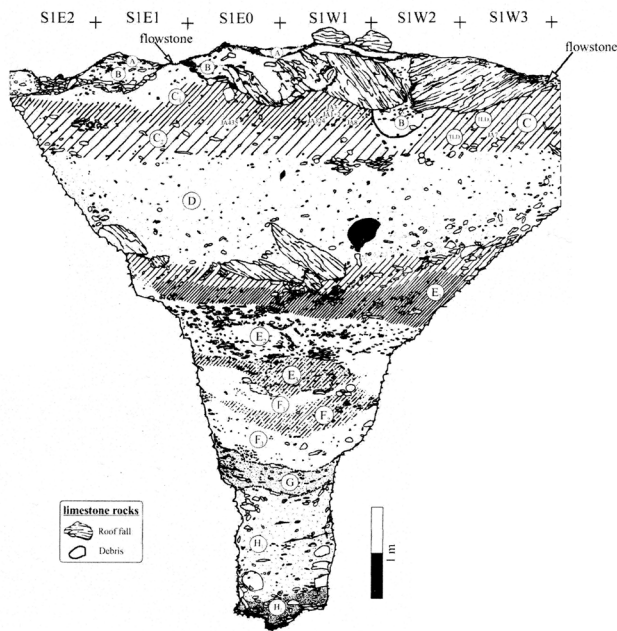
(1969, pp. 221–222) defined the new core type as having: “a triangular outline with a striking platform along the short side; lateral margins which are deeply indented by a series of more-or-less abrupt notches; a trapezoidal cross-section; a boat-shaped long section; bipolar removal scar on their flaking surface”. Schroeder further noted that “frequently, the reverse surface [of the core type] is flattened by the removal of several flat, broad flakes across it from one of the abruptly prepared margins” [...with...] “the striking platforms exhibit preparation” and “examples of this [core] type can be seen in Figure 48: 2, 49, 50, 51, 62: 1” (Schroeder 1969, pp. 221–222). In addition, Schroeder described the debitage products associated with the Jerf Ajla-type core: “it is this type of core that undoubtedly yielded many of the regular Levallois blades found in this layer (Figure 54: 5, 6, 7, 8 and 10)” (Schroeder 1969, p. 222) (**Fig. 10.5–9**). After the most recent 1995–1996 excavations, he further refined his formulation of the Jerf Ajla-type core, describing the artefacts as having: “... flat, triangular-shaped surfaces which converge from wide platforms. They typically show notched and denticulated margins that have been shaped by the removal of a series of wide semi-abrupt flakes from transversally flat, longitudinally convex retouched undersides. It should be noted also that longitudinally the undersides slope gradually toward the striking platform and distal ends of the core, indicating that they serve as platforms for the removal of bidirectional flakes in the preparation of the flaking surfaces of the cores” (Richter et al. 2001, p. 38). Note that the core illustrations used in the 2001 publication are the same as those used in his 1969 PhD dissertation.

Concerning the preparation of Jerf Ajla-type cores, while Schroeder noted a general bidirectional reduction pattern on the cores, his most recent published description highlighted a centripetal preparation of the cores’ flaking surfaces. Indeed, as with the Qalta-type cores, the Jerf Ajla-type cores appear to show a bidirectional preparation pattern, but closer examination suggests a centripetal preparation pattern produced by removals from two lateral supplementary striking platforms and a few chip-like detachments from the cores’ distal end. Certainly, what can be confusing here is the overall triangular or converging shape of the cores, which can make their flaking surfaces appear to have a bidirectional preparation due to the presence of distal removals. Here, it is



**Figure 10.** Jerf al-Ajla Cave, Palmyra area, central Syria. Various views of the cave, its terrace and the surrounding areas Photos: F. Wegmueller, Yu. E. Demidenko and M. Al Najjar in 2010 in Syria.

important not to confuse a centripetal dorsal scar pattern with a seemingly bidirectional one for the production of pointed blades or blade points, which typically have faceted butts in association with the Jerf Ajla-type cores (**Fig. 12.5–9**). Thus, the two sites’, Qalta and Jerf al-Ajla, share a single core type that we prefer to name the Jerf Ajla/



**Figure 11.** Jerf al-Ajla Cave, Palmyra area, central Syria. The cave's stratigraphy was established by Schroeder as such in the 1960s (Schroeder 1969, Fig. 9–10) and then clarified in the 1990s (Richter et al. 2001, Fig. 3). The stratigraphy was described in the following way: “Lower Palaeolithic layers: G and H (Yabroudian ?); Middle Palaeolithic layers: F to D (Levantine Mousterian), C (Late Mousterian); Middle/Upper Palaeolithic: B (mixed); Upper Palaeolithic: A” (Richter et al. 2001, Fig. 3, 34).

Qalta-type core. This core type, within the broader archaeological context, represents a developed Nubian 2-method, single-platform unidirectional convergent, Jerf Ajla/Qalta-type core. Its primary aim is to produce a series of pointed blades or Levallois points on blades during each reduction cycle.

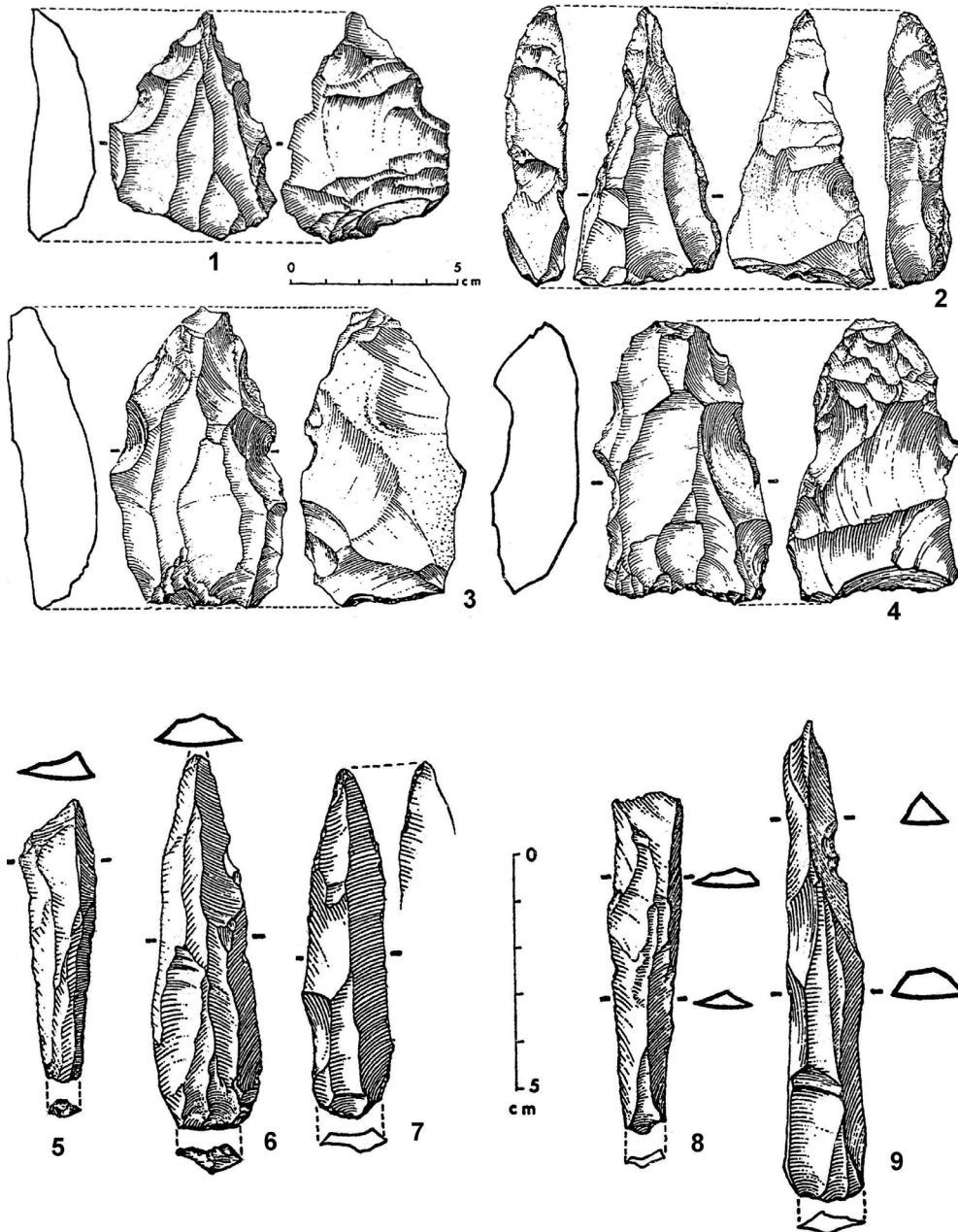
However, the Qalta-like artefacts found at Jerf al-Ajla Cave do not appear to constitute a single industrially homogeneous assemblage within the site's upper artefact-bearing sediments. On the one hand, Schroeder repeatedly noted the presence of UP elements in layers Brown 1/B and C, including even some Aurignacian types of prismatic blade and bladelet cores, endscrapers and burins (e.g. “steep core-endscrapers”). Based on this observation, he remarked the UP types were “replacing the side-scrapers as the dominant retouched tool class for the first time” in the site's archaeological sequence (Schroeder 1969, p. 223). The dominant presence of UP tools in the upper artefact-bearing deposits at Jerf al-Ajla aligns with the previously mentioned IUP tools from the Qalta surface locus. However, the occurrence of Aurignacian-type lithics at Jerf al-Ajla *per contra*

should be regarded as a later, intrusive Early UP component for the site.

On the other hand, Schroeder paid special attention to the presence of certain morphological peculiarities among the Levallois points recovered from Jerf al-Ajla:

“Some Levallois points exhibit wide platforms associated with classic *chapeaux de gendarme*. It is significant that Layer C at Jerf al-Ajla has yielded examples of distinctive points, which are similar to Umm el-Tlel point types 1 (fig. 6.1-6.4) and 4 (fig. 6.5.-6.8) described for the “Intermediate” layers (Iibase' and III2a') at Umm elTlel64. Point type 1 is a Levallois point, which has a series of bladelets (type 4) removed from the dorsal surface before the points were removed from the core. As a Late Mousterian technique for thinning proximal ends of Levallois points Umm el-Tlel points might be seen as a regional variation of the *Emireh point*” (Richter et al. 2001, p. 38).

Here, the absence of comparative examples of such Levallois points at the Qalta site supports our interpretation that these artefacts represent “intrusive elements” at Jerf al-Ajla. Specifically, the short Levallois points with “*chapeau de gendarme*” butts are a well-known feature of the Late Levantine Mousterian of Tabun-B type found across the entire Eastern Mediterranean Levant. The type has also been identified within MP and MSA sequences at key sites in El-Kowm, Umm el-Tlel, level complexes V and VI (e.g., Boëda & Muhesen 1993, pp. 57–59, Fig. 19, 25–28), and in Hummal, in the HM-A1 industry from levels 5a1, 5AI–5AVI (e.g., Hauck 2013, pp. 141–142, Fig. 146–148). The other Levallois points, “similar to Umm el-Tlel point types 1” (see also Fig. 11.6), differ from the Mousterian examples mentioned above and are instead associated with what Boëda and colleagues referred to as the “Intermediate Palaeolithic” in facies 3, levels III 2a' and II base' at Umm el-Tlel (e.g., Boëda & Muhesen 1993, pp. 54–56, Fig. 11, 14–18; Boëda & Bonilauri 2006, pp. 77–81, Fig. 3–6), which has been dated to ca. 34.5 and 36.0 uncal ka BP based on <sup>14</sup>C and TL dates (on samples from level III 2a') (see Richter et al. 2001, Tab. 1). For us, this latter type of Levallois point belongs to the Late Emiran IUP industry (e.g., Boker Tachtit, layer 4; Ksar Akil rockshelter, levels XXIII–XXI; Antelias cave, layers VII–V; Abu Halka rockshelter, layers IVf–IVe; Üçağizli cave, layers I–F– *sensu* Demidenko 2013), which later



**Figure 12.** Layer Brown 1 in Jerf al-Ajla Cave, Palmyra area, central Syria. 1–4: Cores defined by B. Schroeder as “Jerf Ajla” cores. 5–9: Blades defined by B. Schroeder as “regular Levallois blades” detached from “Jerf Ajla” cores. Artefact illustrations modified after Schroeder 1969, Fig. 48–50, 54.

developed into the Early Ahmarian of Early Upper Palaeolithic (EUP).

In summary, the lithic artefacts recovered from layers Brown 1/B and C at Jerf al-Ajla, with a combined thickness of ca. 1.4 m (Fig. 11), represent at least four (!) industrial components. These four industries, outlined in geochronological order from the bottom to the top of the sequence, are Late Levantine Mousterian, IUP Nubian, IUP Late Emiran, and EUP Aurignacian.

Shifting our attention now to the lithic artefacts excavated from the 1.4-m thick deposits below layers Brown 1/B and C, specifically from Coon’s layer Yellow 1 or Schroeder’s layer D (Fig. 11), the assemblage is dominated by materials with

typical MSA features associated with industries traditionally known as the Early Levantine Mousterian or Hummalian. Additionally, there are also some items related to both the Late Levantine Mousterian and the IUP Nubian.

Given the complex industrial-lithological picture for the upper and middle parts of the artefact-bearing sediments at Jerf al-Ajla Cave, it is not surprising that the TL dates for layer C, obtained in 1995–1996 at the cave’s terrace and published in 2001, are regarded by us with caution. Of the eight TL dates, a mean value was calculated to ca. 33 ka BP based on “the resulting TL ages for the heated flint samples from Jerf al-Ajla range from 29 to 38 ka (table 6)” (Richter *et al.*

2001, p. 42). However, D. Richter remarked that the dispersion of dates “... lacks significant outliers and shows no groupings within the age distribution. Neither the sample positions within the sediment nor the distances of samples to the points of dosimetry indicate any inconsistency in the dating results. The contamination with younger archaeological material is very unlikely, due to the presence of the flowstone above the sampled areas” (Richter et al. 2001, p. 43). Indeed, the age estimate range of 38–29 ka is not large, but it can only be accepted as absolute dates derived from stratigraphically and industrially homogeneous samples of heated flint artefacts.

The dating situation at Jerf al-Ajla is not a homogeneous case. In addition to the previously mentioned Late Levantine Mousterian, IUP Nubian, Late Emiran of IUP, and Aurignacian of EUP archaeological components in layer C in Jerf al-Ajla, which can be placed within the dating range, there are also Epipalaeolithic finds in layer B. Layer B, which is above layer C, is unevenly distributed and pockets of it sometimes appears to extend into layer C (Fig. 11). Artefacts from layer B are mixed including both Aurignacian and Epipalaeolithic finds. Thus, the boundary between layers B and C cannot be easily distinguished, and layer C contains elements from layer B (Aurignacian) and *vice versa*. As such, we argue that the youngest TL date of ca. 28 ka, which is also the only age estimate younger than 30 ka, should be associated with the Aurignacian.

Moreover, according to Schroeder’s cave stratigraphy profile (Richter et al. 2001, Fig. 3), layer C itself is composed of two lithological layers, C1 and C2. Of the seven illustrated heated flints in the profile, six pieces came from the upper lithological layer C1, while only a single piece originated from the lower lithological layer C2 (Fig. 11). However, both TL dosimeters in the profile were placed only within the lower lithological layer C2 (Fig. 11). Upon closer examination of Schroeder’s stratigraphy, using “below datum cm” criteria for all eight dated heated flints (Richter et al. 2001, Tab. 3), it becomes evident that there is no consistent age-depth relationship, although the only dated sample from the lower layer C2, sample JA-7, produced an age estimate of ca. 34.3 ka BP. All in all, when dealing with Jerf al-Ajla Cave materials, there appears to be some mixing in the site stratigraphy and archaeological finds, including the dated TL flint samples. Therefore, the mean TL date ca. 33 ka

BP should be considered as a *terminus ante quem* or minimum absolute date for the mixed layer C in Jerf al-Ajla.

In summary, Jerf al-Ajla Cave contains the same Nubian archaeological component as the Qalta site. However, there are some basic differences between the cave and the surface find spot. Qalta demonstrates an industrially homogeneous set of Nubian finds with no absolute age estimation. Jerf al-Ajla Cave, from the excavated context, shows the presence of Nubian artefacts within the upper artefact-bearing sediments, which are dated by TL to be no later than 33 ka BP. These Nubian artefacts were found in the upper find-bearing sediments with other lithic elements associated with the Late Levantine Mousterian, the IUP Late Emiran, and the EUP Aurignacian. Thus, quantitative evaluation is currently not possible for these Nubian artefacts. Besides, the assemblage from layers Brown 1/B and C in Jerf al-Ajla Cave, which was previously considered to be peculiar yet industrially homogeneous (e.g., Schroeder 1969; Leder 2018), is an industrially heterogeneous “archaeological package”. This view aligns with the suggestion from some earlier researchers that the Qalta-like materials in layer Brown 1 of Jerf al-Ajla contain multi-industrial features: “...contient un assemblage bizarre, avec des types habituellement incompatibles, comme un burin caréné plan, caractéristique de l’Aurignacien du Levant, ainsi que des éclats et des pointes levallois. Le niveau Brown 1 est épais d’un mètre et demi. Peut-être représente-t-il plusieurs unités archéologiques, avec du Paléolithique moyen final, un niveau de transition, et du Paléolithique supérieur” (Besançon et al. 1981, p. 53). Finally, considering the similar morphological and technological features of both the Qalta-type and Jerf Ajla-type cores found at the two discussed archaeological sites in central Syria, it is proposed to name them “developed Nubian 2-method, single-platform unidirectional convergent, Jerf Ajla/Qalta-type core”, giving precedence to Jerf al-Ajla as the site where this distinctive core type was first recognized by B. Schroeder in the late 1960s.

In the remainder of this section, we describe five additional Nubian-related sites in central Syria. Due to the limited available published information, only summaries are provided for these sites.

### 3.3.3. Khirbet Safar B (site #20) and Khirbet Safar C (site #35) in the El-Kowm area

The two surface locations were discovered during the same 1980 field survey campaign in the El-Kowm region when the Qalta locus was found. In contrast to Qalta, which is situated in the northern part of the region, these two surface find spots were identified in the south, a few kilometres to the east of El-Kowm town (**Fig. 1a**). The lithics found in these two locations were only briefly described in a single paragraph, with no accompanying illustrations or artefact quantity data (Besançon *et al.* 1981, p. 53). It was noted that the two lithic assemblages exhibited similarities to the Qalta debitage (e.g. small-sized blades) and tools (the presence of sidescrapers, endscrapers, burins and borers), as well as artefact patina (light-brown colour with “*lustre d’éolisation*”). However, it was emphasized that statistical comparisons were impossible, implying that the number of artefacts at these sites may have been limited. Despite sharing several Qalta-like features, it was also pointed out that there was a nearly total absence of Qalta-type cores at the two localities, with only a single triangular core found at Khirbet Safar C and two “*disques*” at Khirbet Safar B. In the 1981 article, it was suggested that these two loci might represent short-term camps (“*haltes temporaires*”) of the makers of Qalta-like artefacts in the El-Kowm area. The absence of Qalta-type cores at the two sites may be attributed to their larger distance from high-quality raw material areas than the Qalta site. In summary, Khirbet Safar B and C demonstrate potential for the recognition of Qalta-like Nubian materials, but as of now, this remains unverified.

### 3.3.4. Umm el-Tlel and other sites in the El-Kowm and Palmyra areas with facies 4 Qalta material from the so-called “Intermediate Palaeolithic” period

The Umm el-Tlel site, along with the Hummal site, represent the best-known industrial-chronological record for the MP and the MSA in the El-Kowm area. However, in contrast to the Hummal site, Umm el-Tlel includes almost the entire known Levantine UP sequence (see Ploux & Soriano 2003). The site is particularly noteworthy for materials directly related to the transitional period between the MP and the UP,

as well as the IUP and EUP industries. The Umm el-Tlel sequence unequivocally contains the Late Emiran IUP industry within the *in situ* levels of III 2a’ and II base’, with absolute dates placing level III 2a’ at ca. 34.5 and 36 uncal ka BP. On the other hand, in addition to this so-called facies 3 of “*Intermediate Palaeolithic*”, three more facies were defined within this industrially unclear depositional unit. A particular focus was placed on identifying these facies through the analysis of bladelets and the various technological methods used for their production (Boëda & Bonilauri 2006). The industrial status of facies 1 and 2 are based exclusively on bladelet data is challenging, especially considering the absence of any published materials related to them for over the past 15 years. The proposed basic similarities and differences among the four facies do not contribute much to our understanding of their technology:

“*These four facies exhibit the following similarities: 1. the endscrapers and burins are the dominant types of retouched tools; 2. tools of these two categories are manufactured using laminar blanks; 3. blades are the primary predetermined product. At the same time, these facies differ in: 1. the nature of the blade production strategy, which differ from one facies to another; 2. the presence or absence of an associated Levallois reduction strategy; 3. the presence or absence of several Middle Palaeolithic type tools; 4. the presence or absence of bladelet production; 5. the presence or absence of elongated Levallois points*” (Boëda & Bonilauri 2006, p. 76).

Facies 4 was described as the “Qalta” facies (“Qalta” reflects the more Syrian way of pronunciation and writing, although the French archaeologists in 1980 initially called the site type “Qalta”). Facies 4 was said to be composed of materials originated from “*the sites of Qalta (surface site) (Besançon et al. 1981), of Jerf al-Ajla (in situ) (Coon 1957, Schroeder 1969), of Awyna (in situ) (Ifpo Expedition 2004, dir. Boëda E.), point 203 (Ifpo Expedition 2004, dir. Boëda E.) and of Umm el-Tlel (outside of the stratigraphy)*” (Boëda & Bonilauri 2006, p. 76). Accordingly, we believe that assemblages described by this facies must bear some features of Nubian core technology by definition, following our criteria for the Qalta site and Jerf al-Ajla Cave.

Based on the data published in 2006, there is, however, a basic problem with our current techno-typological understanding of the facies

4 Qalta artefacts. Artefacts associated with this facies were described in a general manner without any specific data provided for any particular site. Additionally, all three illustrations featuring artefacts from facies 4 were derived from Qalta (Boëda & Bonilauri 2006, Fig. 9–11). The focus on bladelet variation again hinders a comprehensive understanding of these materials as a unified industrial unit. Three core types were identified for the reduction of various bladelets: “cores producing small straight or twisted bladelets; cores producing straight bladelets of varying dimensions, and cores producing large bladelets” (Boëda & Bonilauri 2006, p. 83). If we take a closer look at modern bladelet-related technological studies, the three core types can be summarized as follows: the first type appears to be a multifaceted burin-core with some potentially carinated ones among them (Boëda & Bonilauri 2006, Fig. 10.1). However, in both the 1980 and 1989–1990 Qalta assemblages described earlier, no multifaceted or carinated burin-cores were found. They were not recognized among the Nubian-related finds in Jerf al-Ajla Cave. Therefore, the presence of multifaceted and carinated burin-cores presents an issue characterizing facies 4, though it was noted that they differ from “Aurignacian bladelet production” (Boëda & Bonilauri 2006, p. 83). The second core type was prepared on lithic natural objects, unlike the burin-cores mentioned above that were prepared on debitage pieces. The two illustrated examples of this core type (Boëda & Bonilauri 2006, Fig. 11.1–2) are blade/bladelet cores, but they do not show clearly intentional bladelet reduction, which may explain why some detached bladelets were of “varying dimensions / dissimilar size”. The third core type again displays blade/bladelet core reduction (Boëda & Bonilauri 2006, Fig. 11.1–2) without a distinct bladelet reduction. In other words, as a whole, the second and third core types were likely associated with the production of a few bladelets in a mainly blade-oriented reduction sequence, yet there was no mentioning any Jerf Ajla/Qalta-type cores in the 2006 article focused on bladelet technology. Thus, although no Nubian core types are demonstrated from sites with Qaltan facies 4, they are probably present. It is especially unfortunate for three assemblages that were investigated by Boëda’s team: from the Awyna *in situ* site, point 203 and the Umm el-Tlel non-stratified finds. These sites

have never been described with any statistical and industrial data since then.

#### 4. Concluding considerations: overall importance of locations with Nubian-related lithic assemblages in central Syria and variability of IUP origins in the Levant

The data presented about seven Palaeolithic locations in the Palmyra and El-Kowm areas of central Syria, allow us to propose a few suggestions regarding their significance in the Palaeolithic of the arid part of the northern Levant.

Most importantly, after the initial recognition of the unusual Levantine Palaeolithic Jerf Ajla/Qalta-type cores in the late 1960s from Jerf al-Ajla Cave and the early 1980s from the Qalta surface loci, the two type sites remain the most described and analyzed in central Syria in terms of lithic techno-typology. Since 2010, with our assignment of this core type to the Nubian Levallois technology, these sites have gained more scientific importance in understanding the spread of Afro-Arabian *Homo sapiens* communities into neighbouring Asian territories from north-eastern Africa and Arabia, which involves changes in primary and secondary treatment of lithic implements. The presence of five more locations discovered in the same region, namely Khirbet Safar B, Khirbet Safar C, Umm el-Tlel, point 203 and the Awyna *in situ* site, carries two significant implications. First, the limited data of these sites allow us to hypothesize a single industry with Nubian Levallois technology connected to the MP or MSA to UP transitional period in central Syria, and the absence of other industrially distinct Nubian-related materials in this part of the Levant. If this is the case, this industry may represent a single move of humans from Afro-Arabian regions into central Syria that from the perspective of lithic technology, occurred only once. Second, there are promising prospects for future Nubian-related Palaeolithic investigations in central Syria, aiming to enhance our better understanding of existing lithic assemblages, and excavations in *in situ* locations, including a terrace in front of Jerf al-Ajla Cave. Additionally, new surveys in central Syria may lead to the discovery of more locations with Nubian-related artefacts.

The most intriguing aspect of Nubian Levallois technology in central Syrian locations is the

presented “developed Nubian 2-method, single-platform unidirectional convergent, Jerf Ajla/Qalta-type core”. These cores are designed for the primary production of a series of pointed blades or Levallois points on blades during one core reduction cycle. This core type differs from all other known Nubian cores from MSA Nubian assemblages in north-eastern Africa and Arabia, which typically aim at the detachment of a single pointed flake or Levallois point on flake during each core reduction cycle. However, what adds complexity to the new Nubian core type in central Syria is the occurrence, and even dominance, of typical UP endscrapers and burins in the tool component of the Qalta and Jerf al-Ajla assemblages. This suggests a UP “typological accent” with an age probably older than 33–36 uncal ka BP measured in Jerf al-Ajla and Umm el-Tlel. This leads us to argue for a relationship between the Nubian locations in central Syria and the transitional period between the MP or MSA and the UP, particularly the IUP. Therefore, the so-called “developed” character of Nubian 2-method, single-platform unidirectional convergent, Jerf Ajla/Qalta-type cores not only adds to the variability of Nubian Levallois technology. Besides, it helps to explain the absence of these cores from MSA locations in Africa and Arabia and their presence in the IUP Levant. Accepting this, we propose naming this particular Nubian-related set of sites and assemblages in central Syria as the IUP Jerf Ajla/Qalta industry. Thus, we now identify two IUP industries in the Levant.

Traditionally, the beginning of the IUP in the Levant is associated with the Early Emiran industry, with roots in the late MSA of Africa and Arabia (see recent summaries of sites and lithic artefact data in Marks & Rose 2014; Rose & Marks 2014). This industry is characterized by a distinct tool type known as the Emireh point with bifacial basal thinning, first defined in scientific terms by D. Garrod in the early 1950s (Garrod 1951, p. 124). However, it was not until the 1980s excavations of the Boker Tachtit open-air site and the finds from its *in situ* archaeological levels 1 to 3 in the Negev, Israel (Marks 1983b; Marks & Kaufman 1983; Volkman 1989) that the Emireh point gained its “*fossile directeur*” typological status of the Early Emiran. It was also linked technologically to a specific opposed-platform core type that produced mainly laminar Levallois points with a bidirectional dorsal scar pattern, serving as

blanks for the manufacture of Emireh points (Volkman & Kaufman 1983). The significance of this Early Emiran opposed-platform core type is sometimes overlooked but, from our point of view, its appearance marked a key innovation that contributed to the formation of the entire IUP Early Emiran lithic artefact treatment tradition.

Regarding the origin of the IUP Early Emiran (e.g., Marks 1983b; Bar-Yosef 2000; 2002; Rose & Marks 2014), we currently suggest that some late MSA *Homo sapiens* from Africa and Arabia moved into the neighbouring Eastern Mediterranean Levant, forming, for the first time, a developed and lasting IUP industry there. They brought with them the Nubian 1-method Levallois pointed core technology with single-platform unidirectional convergent cores to the Levant. However, there was a radical development in core technology allowing the alternate use of the two opposed platforms as main striking platforms, instead of adhering to a strict order found in the Nubian 1-method core typical for the MSA. The latter usually had a permanent configuration of one main and one supplementary striking platform. With this technological development, the newly formed IUP industry could produce more Levallois bidirectional points with predetermined elongated blade proportions from each opposed-platform core, than the typical Afro-Arabian Nubian technology (see refitting data in Volkman 1989; Škrdla 2003; Usik *et al.* 2013).

The improved Nubian 1 core technology, now with the use of opposed-platform cores, likely led to the appearance of a new hunting projectile type known as the Emireh point. These techno-typological changes allowed the IUP Afro-Arabian *Homo sapiens* to undergo a rapid “artefact evolution” from the established Early Emiran to the IUP Late Emiran, which in turn evolved locally into the EUP Early Ahmarian (Marks & Ferring 1988). This transition occurred over just a few thousand years between ca. 50 and 45–42 ka cal BP (see absolute dates in Barzilai *et al.* 2016). Moreover, a portion of the Afro-Arabian IUP Early Emiran moved beyond the Levant, spreading throughout vast territories of Eurasia. This geographical range stretched from East-Central Europe in the west to Mongolia and northern China in East Asia. However, neither the Late Emiran nor its industrial successor, the EUP Early Ahmarian, is known outside of their industrial homeland, the Eastern Mediterranean

Levant. The same can be said for all other IUP and EUP industrial successors of the Early Emiran in all other regions of Eurasia where Early Emiran human groups penetrated. Consequently, a clear pattern emerges: there was a rapid spread of Early Emiran humans across many regions in Eurasia, followed by localized persistence of the industries that succeeded the IUP tradition.

Returning to the central Syrian IUP locations with Nubian-related lithic assemblages, it is possible to make a brief comparison between them and the IUP Early Emiran. The appearance of developed Nubian 2-method, single-platform unidirectional convergent, Jerf Ajla/Qalta-type cores can be explained in a similar way to what was suggested for the Early Emiran. Different groups of late MSA Afro-Abarian *Homo sapiens* moved into the Levant, giving rise to a new Nubian 2-method core type that allowed the production of a series of pointed blades. These blanks were then used to manufacture points with minimal additional retouching. Accordingly, we hypothesize at least two archaeologically visible cases of *Homo sapiens* dispersal into the Levant, originating from the Afro-Arabian homeland with a Nubian archaeological context.

In summary, the two proposed waves of Afro-Arabian *Homo sapiens* dispersal, each with Nubian-related lithic traditions, into the neighbouring territories of the Levant led to the emergence of two archaeologically distinct IUP industries – Early Emiran and Jerf Ajla/Qalta. The former industry, with its human populations, had achieved remarkable success, giving rise to the subsequent IUP Late Emiran and EUP Early Ahmarian industries in the Levant. Additionally, a part of this population then dispersed widely beyond the Middle East into Eurasia, where they originated further IUP and EUP industries. However, the IUP Jerf Ajla/Qalta industry and its makers disappeared, as evidenced by the absence of any IUP and EUP industries in the Levant and beyond that can be archaeologically connected to it. The disappearance of the Jerf Ajla/Qalta industry and the lack of success of its makers may be connected to the absence of a specialized hunting projectile point similar to the Emireh point used by Early Emirans. Nevertheless, the presence of the two IUP industries in the Levant offers a valuable case study regarding adaptive success associated with lithic traditions over time. Moreover, from our perspective, the

study of the failed IUP industry is particularly interesting, as it can provide insights into the factors behind its archaeological demise. Finally, by analyzing the artefacts associated with the two IUP industries, we gain a glimpse into the human groups responsible for producing these diverse lithics and their respective “fates in Prehistory”, which remains a fundamental aim of Palaeolithic archaeology.

## Acknowledgements

The investigations of the Syrian-Swiss research team were only made possible by the generous support and grants of the official bodies of Syria. In the first place, our thanks go to her Excellency Mrs Dr Najah Al Attar, Vice President of the Syrian Arab Republic, who always supported and encouraged our work. At the same time, we benefited from the efficient and harmonious cooperation of the Directorate General of Antiquities and Museums of Syria and the Swiss Department of Foreign Affairs. Thanks to grants from the Swiss National Science Foundation, the Tell Arida Foundation, the Freiwillige Akademische Gesellschaft Basel, the University of Basel and private sponsors, among them the Foundation Isaac Dreyfus-Bernheim and the Swiss-Liechtenstein Foundation for Archaeological Research Abroad (SLSA), we have been able to carry out our research in the El-Kowm area. We are deeply grateful for their help. Last but not least we deeply thank Sam C. Lin (Wollongong, Australia) and Attila Király for their great work in editing the English of our article. At the same time, only we are responsible for the data and ideas expressed in the article, and any shortcomings in them.

## References

- Bar-Yosef, O. (2000). The Middle and Early Upper Palaeolithic in Southwest Asia and neighboring regions. In: O. Bar-Yosef & D. Pilbeam (eds.). *The Geography of Neandertals and Modern Humans in Europe and the Greater Mediterranean*, Cambridge: Harvard University, pp. 107–156.
- Bar-Yosef, O. (2002). The Upper Palaeolithic Revolution. *Annual Review of Anthropology*, 31, pp. 63–93. <https://doi.org/10.1146/annurev.anthro.31.040402.085416>

- Barzilai, O., Hershkovitz, I. & Marder, O. (2016). The Early Upper Palaeolithic period at Manot Cave, Western Galilee, Israel. *Journal of Human Evolution*, 31(1–2), pp. 85–100.
- Besançon J., Copeland L., Hours F., Muhesen S. & Sanlaville P. (1981). Le paléolithique d'El-Kowm. Rapport préliminaire. *Paléorient* 7(1), pp. 33–55. <https://doi.org/10.3406/paleo.1981.4286>
- Boëda, E. & Muhesen, S. (1993). Umm el-Tlel (El-Kowm, Syrie): étude préliminaire des industries lithiques du Paléolithique moyen et supérieur; campagne 1991–1992. *Cahiers de l'Euphrate*, 7, pp. 47–91.
- Boëda, E. & Bonilauri, S. (2006). The Intermediate Palaeolithic: the first bladelet production 40,000 years ago. *Anthropologie*, 44(1), pp. 75–92.
- Coon, C. S. (1957). *The seven caves*. New York: Knopf.
- Crew, H. (1975). *An evaluation of the variability of the Levallois method: its implications for the internal and external relationships of the Levantine Mousterian*, PhD dissertation, University of California.
- Demidenko, Yu. E. (2013). Initial UP within Early UP context in Eurasia: more than 30 years' long personal journey. Paper presented at "Considering the Initial Upper Palaeolithic" Leipzig workshop, 16–18 December 2013.
- Garrod, D. A. E. (1951). A transitional industry from the base of the Upper Palaeolithic in Palestine and Syria. *Journal of the Royal Anthropological Institute*, 81, pp. 121–129. <https://doi.org/10.2307/2844019>
- Goder-Goldberger, M., Gubenko, N. & Hovers, E. (2016). "Diffusion with modifications": Nubian assemblages in the central Negev highlands of Israel and their implications for Middle Palaeolithic inter-regional interactions. *Quaternary International*, 408, pp. 121–139. <https://doi.org/10.1016/j.quaint.2016.02.008>
- Groucutt, H. S., Shipton, C., Alsharekh, A., Jennings, R., Scerri, M. L. & Petraglia, M. D. (2015). Late Pleistocene lakeshore settlement in northern Arabia: Middle Palaeolithic technology from Jebel Katefeh, Jubbah. *Quaternary International*, 382, pp. 215–236. <https://doi.org/10.1016/j.quaint.2014.12.001>
- Guichard, J. & Guichard, G. (1965). The Early and Middle Palaeolithic of Nubia: a preliminary report. In: F. Wendorf (ed.). *Contributions to the Prehistory of Nubia*, Dallas: Fort Burgwin Research Center and Southern Methodist University Press, pp. 57–116.
- Hauck, T. C. (2013). *The Mousterian sequence of Hummal (Syria)* (Kölner Studien zur Prähistorischen Archäologie, vol. 5). Köln: Verlag Marie Leidorf, Rahden.
- Hilbert, Y. H. & Crassard, R. (2020). Middle and Late Pleistocene lithic technology from the region of Dumat al-Jandal, northern Saudi Arabia. In: K. Bretzke, R. Crassard & Y. H. Hilbert (eds.). *Stone Tools of Prehistoric Arabia* (Supplement to Volume 50 of the Proceedings of the Seminar for Arabian Studies). Oxford: Archaeopress, pp. 27–42.
- Hublin, J.-J., Ben-Ncer, A., Bailey, S. E., Freidline, S. E., Neubauer, S., Skinner, M. M., Bergmann, I., Le Cabec, A., Benazzi, S., Harvati, K. & Gunz, P. (2017). New fossils from Jebel Irhoud, Morocco and the pan-African origin of *Homo sapiens*. *Nature*, 546, pp. 289–292. <https://doi.org/10.1038/nature22336>
- Jagher, R. & Le Tensorer, J.-M. (2011). El-Kowm, a key area for the Palaeolithic of the Levant in central Syria. In: J.-M. Le Tensorer, R. Jagher & M. Otte (eds.). *The Lower and Middle Palaeolithic in the Middle East and neighbouring regions, Basel Symposium May 8–10 2008* (ERAUL 126). Liège: Université de Liège, pp. 197–208.
- Jagher, R., Elsuede, H. & Le Tensorer, J.-M. (2015). El-Kowm Oasis, Human Settlement in the Syrian Desert During the Pleistocene. *L'Anthropologie*, 119, pp. 542–580. <https://doi.org/10.1016/j.anthro.2015.10.003>
- Julig, P. J. & Long, D. G. F., Schroeder, H. B., Rink, W. J., Richter, D. & Schwarcz H. P. (1999). Geoarchaeology and New Research at Jerf al-Ajla Cave, Syria. *Geoarchaeology*, 14(8), pp. 821–848. [https://doi.org/10.1002/\(SICI\)1520-6548\(199912\)14:8<821::AID-GEA7>3.0.CO;2-D](https://doi.org/10.1002/(SICI)1520-6548(199912)14:8<821::AID-GEA7>3.0.CO;2-D)
- Leder, D. (2013). *Technological and Typological change at the Middle to Upper Palaeolithic boundary in Lebanon*. PhD dissertation, University of Cologne.
- Leder, D. (2018). Lithic Variability and Techno-Economy of the Initial Upper Palaeolithic in the Levant. *International Journal of Archaeology*, 6(1), pp. 23–36. <https://doi.org/10.11648/j.ija.20180601.14>
- Le Tensorer, J.-M., Jagher, R. & Muhesen, S. (2001). Palaeolithic settlement dynamics in the El-Kowm Basin. In: N. Conard (ed.). *Settlement*

- Dynamics of the Middle Palaeolithic and Middle Stone Age*. Tübingen: Kerns Verlag, pp. 101–122.
- Le Tensorer, J.-M., Jagher, R., Rentzel, P., Hauck, T., Ismail-Meyer, K., Pümpin, C. & Wojtczak, D. (2007). Long-term site formation processes at the natural springs Nadaouiyeh and Hummal in the El-Kowm Oasis, central Syria. *Geoarchaeology*, 22, pp. 621–640. <https://doi.org/10.1002/gea.20177>
- Le Tensorer, J.-M., von Falkenstein, V., Le Tensorer, H. & Muhesen, S. (2011). Hummal: A very long Palaeolithic sequence in the steppe of central Syria – Considerations on Lower Palaeolithic and the beginning of Middle Palaeolithic. In: J.-M. Le Tensorer, R. Jagher & M. Otte (eds.). *The Lower and Middle Palaeolithic in the Middle East and neighbouring regions, Basel Symposium May 8–10 2008* (ERAUL 126). Liège: Université de Liège, pp. 235–248.
- Marks, A. E. (1968). The Mousterian industries of Nubia. In: F. Wendorf (ed.). *The Prehistory of Nubia*. Dallas: Fort Burgwin Research Center and Southern Methodist University Press, pp. 194–314.
- Marks, A. E. (1976). Introduction. In: A. E. Marks (ed.). *Prehistory and Paleoenvironments in the Central Negev, Israel, Vol. I*. Dallas: Department of Anthropology, SMU, pp. 3–7. [https://doi.org/10.1007/978-94-017-6788-0\\_1](https://doi.org/10.1007/978-94-017-6788-0_1)
- Marks, A. E. (1983a). Introduction. The Central Negev project: 1969-1983. In: A. E. Marks (ed.). *Prehistory and Paleoenvironments in the Central Negev, Israel, Vol. III*, Dallas: Department of Anthropology, Southern Methodist University, pp. ix–xv.
- Marks, A. E. (1983b). The Middle to Upper Palaeolithic transition in the Levant. In: F. Wendorf & A. E. Close (eds.). *Advances in World Archaeology, vol. 2*, New York: Academic Press, pp. 51–98.
- Marks, A. E. & Kaufman, D. (1983). Boker Tachtit: The Artefacts. In: A. E. Marks (ed.). *Prehistory and Paleoenvironments in the Central Negev, Israel, Vol. III, the Avdat/Aqev Area, Part 3*. Dallas: Department of Anthropology, Southern Methodist University, pp. 69–126.
- Marks, A. E. & Ferring, C. R. (1988). The Early Upper Palaeolithic of the Levant. In: J. F. Hoffecker (ed.). *The Early Upper Palaeolithic: evidence from Europe and the Near East* (BAR International Series 437). Oxford: Archaeopress, pp. 43–72.
- Marks, A. E. & Rose, J. I. (2014). A century of research into the origins of the Upper Palaeolithic in the Levant. In: M. Otte & F. Le Brun-Ricalens (eds.). *Modes of contact and mobility during the Eurasian Palaeolithic* (ERAUL 140 & ArcheoLogiques 5). Liege & Luxembourg: University of Liege, pp. 27–93.
- Petraglia, M. D., Alsharekh, A., Breeze, P., Clarkson, C., Crassard, R., Drake, N. A., Groucutt, H. S., Jennings, R., Parker, A. G., Parton, A., Roberts, R. G., Shipton, C., Matheson, C., al-Omari, A. & Veall M-A. (2012). Hominin dispersal in the Nefud Desert and Middle Palaeolithic settlement along the Jubbah palaeolake, northern Arabia. *PLoS ONE*, 7(11), e49840. <https://doi.org/10.1371/journal.pone.0049840>
- Ploux, S. & Soriano, S. (2003). Umm el-Tlel, une séquence du Paléolithique supérieur en Syrie centrale. *Industries lithiques et chronologie culturelle. Paléorient*, 29(2), pp. 5–34. <https://doi.org/10.3406/paleo.2003.4763>
- Richter, D., Schroeder, H. B., Rink, W. J., Julig, P. J. & Schwarcz, H. P. (2001). The Middle to Upper Palaeolithic transition in the Levant and new thermoluminescence dates for a late Mousterian assemblage from Jerf al-Ajla Cave (Syria). *Paléorient*, 27, pp. 29–46. <https://doi.org/10.3406/paleo.2001.4730>
- Rose, J. I. (2006). *Among Arabian sands: defining the Palaeolithic of southern Arabia*. PhD dissertation, Southern Methodist University.
- Rose, J. I., Usik, V. I., Marks, A. E., Hilbert, Y. H., Galletti, C. S., Parton, A., Geiling, J.-M., Cerný, V., Morely, M. W. & Roberts, R. G. (2011). The Nubian Complex of Dhofar, Oman: an African Middle Stone Age industry in southern Arabia. *PLoS One*, 6(11), e28239. <https://doi.org/10.1371/journal.pone.0028239>
- Rose, J. I. & Marks, A. E. (2014). “Out of Arabia” and the Middle-Upper Palaeolithic transition in the southern Levant. *Quartär*, 61, pp. 49–85.
- Rose, J. I., Hilbert, Y. H., Marks, A. E. & Usik, V. I. (2018). *The first peoples of Oman. Palaeolithic archaeology of the Nejd plateau*, Muscat: Ministry of Heritage and Culture Sultanate of Oman. <https://doi.org/10.2307/j.ctvndv6nj>
- Schroeder, H. B. (1969). *The lithic industries from Jerf 'Ajla and their bearing on the problem of a Middle to Upper Palaeolithic transition*, PhD dissertation, Columbia University.

- Škrdla, P. (2003). Comparison of Boker Tachtit and Stránská skála MP/UP Transitional Industries. *Journal of the Israel Prehistoric Society*, 33, pp. 33–69.
- Usik, V. I., Rose, J. I., Hilbert, Y. H., Van Peer, P. & Marks, A. E. (2013). Nubian Complex reduction strategies in Dhofar, southern Oman. *Quaternary International*, 300, pp. 244–266. <https://doi.org/10.1016/j.quaint.2012.08.2111>
- Van Peer, P. (1988). *A model for studying the variability of Levallois technology and its application to the Middle Palaeolithic of Northern Africa*. PhD dissertation, Katholieke Universiteit Leuven.
- Van Peer, P. (1992). *The Levallois Reduction Strategy* (Monographs in World Archaeology). Madison: Prehistory Press.
- Van Peer, P. (1998). The Nile corridor and the out-of-Africa model. *Current Anthropology*, 39, pp. 117–140. <https://doi.org/10.1086/204692>
- Van Peer, P. (2007). Refitting of reduction sequences, formal classification systems and Middle Palaeolithic individuals at work. In: U. Schurmans & M. De Bie (eds.). *Fitting rocks: Lithic refitting examined* (British Archaeological Reports International Series 1596). Oxford: Archaeopress, pp. 91–104.
- Van Peer, P. & Vermeersch, P. M. (2000). The Nubian Complex and the dispersal of modern humans in North Africa. In: L. Krzyzaniak, K. Kroeper & M. Kobusiewicz (eds.). *Recent Research into the Stone Age of Northeastern Africa* (Studies in African Archaeology 7). Poznan: Poznan Archaeological Museum, pp. 47–60.
- Van Peer, P. & Vermeersch, P. M. (2007). The place of northeast Africa in the early history of modern humans: new data and interpretations on the Middle Stone Age. In: P. Mellars, K. Boyle, O. Bar-Yosef, & C. Stringer (eds.). *Rethinking the Human Revolution*, Cambridge: McDonald Institute for Archaeological Research, pp. 187–198.
- Vermeersch, P. M. (ed.) (2002). *Palaeolithic quarrying sites in Upper and Middle Egypt* (Egyptian Prehistory Monographs 4). Leuven: Leuven University Press.
- Volkman, P. (1989). *Boker Tachtit: the technological shift from the Middle to the Upper Palaeolithic in the Central Negev, Israel*. Ph.D. dissertation, Southern Methodist University.
- Volkman, P. & Kaufman, D. (1983). A reassessment of the Emireh point as a possible type fossil

for the technological shift from the Middle to the Upper Palaeolithic in the Levant. In: E. Trinkaus (ed.). *The Mousterian Legacy* (BAR International Series 167). Oxford: Archaeopress, pp. 631–644.

Wendorf, F. (ed.) (1968). *The Prehistory of Nubia*. Dallas: Fort Burgwin Research Center and Southern Methodist University Press.

## Postscriptum

When the article was about ready for submission, one of us (Demidenko) decided to look at Dirk Leder's 2013 PhD dissertation to see precisely Leder's position on the industrial integrity of lithic artefacts excavated from layers Brown 1/B and C at Jerf al-Ajla (Leder 2013, p. 209; see also Leder 2018, p. 32). It was done so late because, first, Demidenko does not agree with any of his ideas (!) on the “many ways of transition from the MP to UP in the Levant” and the “Bokerian, Ksar Akilian, Emiran, Jerf Ajilian, Middle Palaeolithic Renaissance” also proposed by him. Second, Leder has never seen personally either Jerf Ajla or proper Nubian lithic artefacts found in Africa or Arabia. However, the check ended in an unexpected result. On one hand, the respective artefact set was considered a homogeneous industrial character still having several “lithic production systems”. On the other hand, Leder, using only published data, shortly wrote about the same Nubian attribution for Jerf Ajla/Qalta-type cores that Demidenko suggested, too. Such surprising observations deserve direct citation, especially given the relatively restricted publicity of Leder's dissertation:

*“The lithic production system in B&C was rather varied. One major reduction strategy was recurrent parallel and recurrent convergent flaking on along-axis cores aiming for blades and elongated points (15-20%). A particular core type within this concept group is the so-called Jerf Ajila core that makes up 5-10% of the entire core assemblage (compare Schroeder 1969; Richter et al. 2001). This core type produced blades and points in a recurrent manner and is of roughly triangular shape. The particular trait of this type is an intense core preparation originating from the core margins onto the core's upper side. Such treatment is comparable to Nubian 2 cores the only difference being that Jerf Ajila cores were geared towards recurrent parallel and convergent exploitation rather than a preferential convergent one*

(compare e.g. Marks 1968, Van Peer et al. 2007, Rose et al. 2011, Usik et al. 2013). ... A similar industry that also produced Jerf Ajila cores and is dominated by endscrapers and burins can be seen in Qalta site in El-Kowm basin and possibly in Khirbet Safar B&C in the same area (Bescançon et al. 1981, 51-53, figs. 9-10)" (Leder 2013, p. 209).

He also mentions more Qalta-like materials defined in central Syria by Boëda & Bonilauri 2006 (Leder 2013, p. 210).

## Statements

**Data availability statement.** The datasets generated during and analyzed in the current study are available from the authors at reasonable request. The paper has been compiled mostly by Yuri E. Demidenko in Kyiv during the current Russian war in Ukraine.

**Conflict of Interest.** The authors declare no conflict of interest.

**Funding statement.** The authors received no financial support for the research and the publication of this article.

**Copyright statement.** This is an open access article distributed under the terms of a Creative Commons Attribution-NonCommercial-ShareAlike International Public License (CC BY-NC-SA 4.0). You are free to copy and redistribute the material in any medium or format, and transform the material, under the following terms: You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may not use the material for commercial purposes. If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. © ⓘ Ⓝ Ⓢ Ⓟ