Yabroud II – Layer 4

A new dataset and chaîne opératoire reconstruction for the early Upper Palaeolithic

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The Yabroud II Layer 4 dataset is available as Excel-Sheet at *dx.doi.org/10.5880/SFB806.6*

Introduction

This article presents preliminary results of a techno-typological analysis of the lithic artefact assemblage of Yabroud rock-shelter II – Layer 4. This assemblage is part of a much larger collection of lithic artefacts and bone tools excavated at different localities in Yabroud by Alfred Rust between 1930 and 1933. The Yabroud collection is housed at the Institute of Prehistoric Archaeology of Cologne University, Germany. During the winter term 2013, we analysed the Layer 4 assemblage in the frame of an introductory course to lithic technology.

The rock-shelter II of Yabroud is one of several concavities that are located along the northern rim of the Skifta dry valley in Syria where 60km northeast of Damascus, the Ouadi Skifta cuts into the Eocene limestone plateau of Central Syria at 1400 m.a.s.l. (Fig. 1).

Fig. 1: *Map of the Skifta dry valley showing the location of the Yabroud rock-shelter sites (Image from Google Earth).*

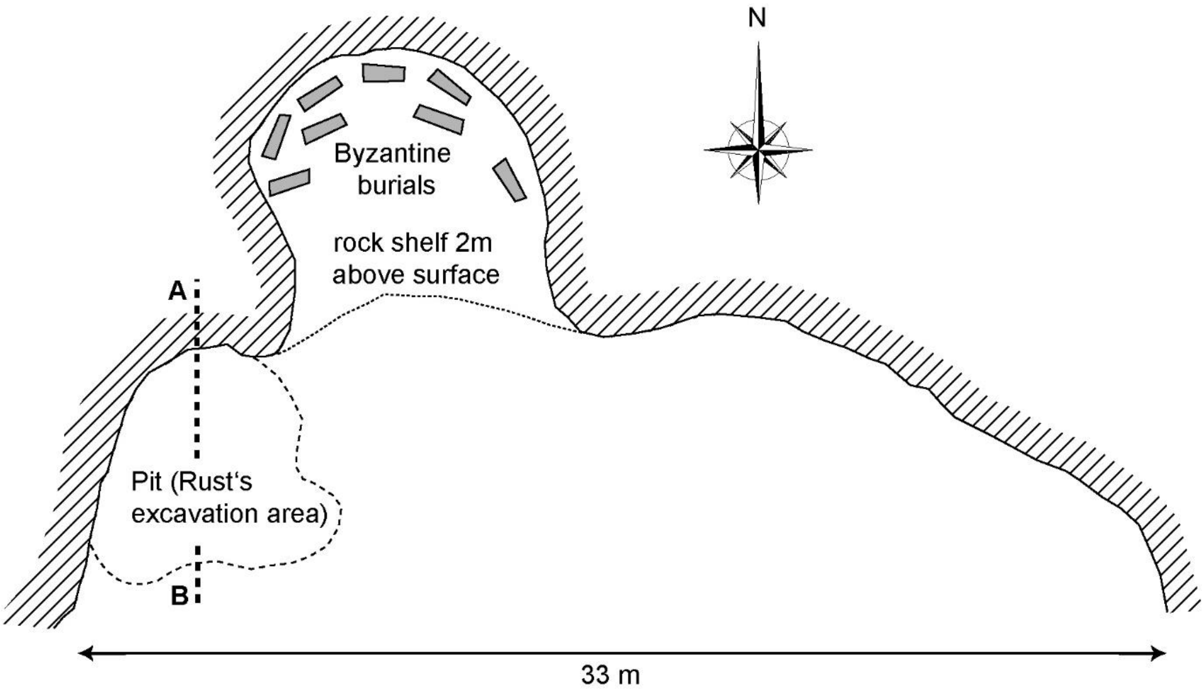

Fig. 2: *Yabroud rock-shelter II showing the back wall and Rust's former excavation area as seen in 1964 by the Columbia University archaeological project. Section A-B is shown in Fig. 2. (Redrawn after Solecki & Solecki 1966, Fig. 21).*

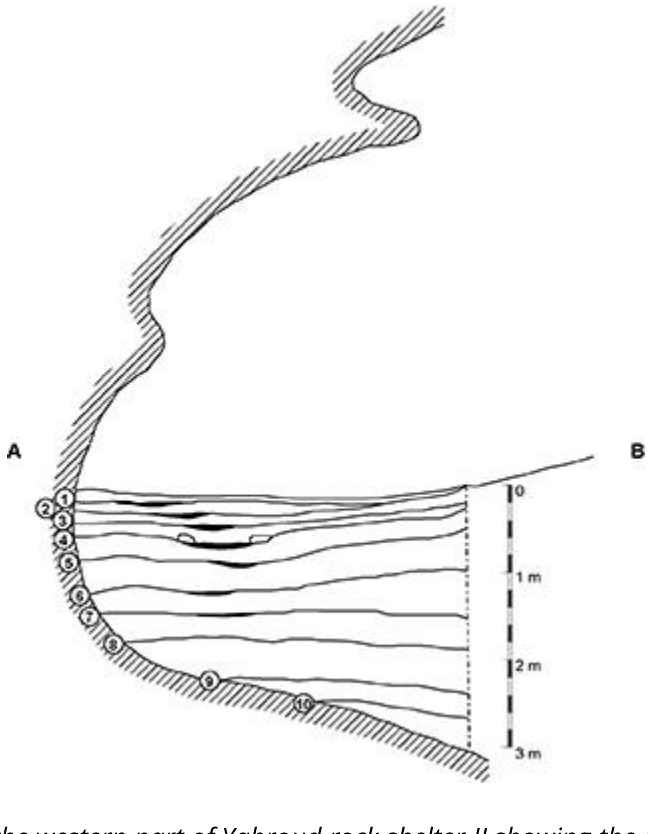

Fig. 3: *Cross section in the western part of Yabroud rock shelter II showing the archaeological sequence excavated by Rust. The black shaded areas mark fireplaces. (Redrawn after Rust 1950, Plate 75).*

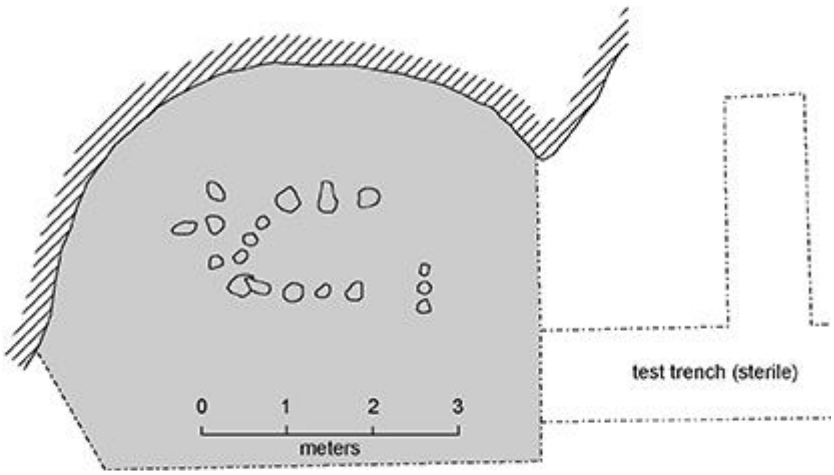

Fig. 4: *Surface map of Rust's excavation area and adjacent test trenches. The stone circle delimiting a fireplace in Layer 4 is shown in the centre of the excavated surface. (Redrawn after Rust 1950, Plate 75).*

Yabroud Rock-Shelter II:

Rock-shelter II opens to the southeast (Fig. 2). The shelter was used as a gravesite in Byzantine times and tombs had been cut into the back wall behind the drip-line. Rust excavated a 4x5m area in the western part of the shelter that still contained undisturbed deposits. Rust asserted that his excavation area reached the main occupation area of rock-shelter II as only sporadic Palaeolithic finds appeared in an adjoining test trench across the main hall. Several small test pits dug between 1964-1965 confirmed this assertion (Solecki & Solecki 1966).

The sedimentological sequence is 3m thick and in the lower part, shows a succession of coarse-grained sediment layers with large limestone debris (layers 10 to 7) (Fig. 3). At ca. 1 m below surface, the sediments are getting finer. This change in sediments is tentatively correlated with a technological change from the Middle to Upper Palaeolithic (Pastoors et al. 2008). All of the deposits contain repeated human activities inside the shelter as evidenced by a high density of lithic artefacts and ash concentrations.

The cultural sequence covers Middle Palaeolithic assemblages from Layers 10 to 7, followed by a possible "transitional" assemblage in Layer 6 (Pastoors et al. 2008). The Upper Palaeolithic ranges from Layers 5 to 1. Originally, Rust attributed the upper sequence to different stages of the Aurignacian (Rust 1950). With growing knowledge of the Levantine Upper Palaeolithic and its complexity, opinions of how to correlate the Yabroud II sequence with different phases of the Levantine Upper Palaeolithic diverged (Schyle 1992; Belfer-Cohen & Goring-Morris 2003; Kuhn 2003; Bretzke & Conard 2012). While Layer 5 is of clear Ahmarian type, the correlation of Layer 4 with any of the known Upper Palaeolithic complexes is still a matter of debate. Some researchers classify this assemblage as Early Ahmarian (Schyle 1992; Kuhn 2003) while others believe that it belongs to the Levantine Aurignacian (Belfer-Cohen & Goring-Morris 2003). In fact, Layer 4 contains Ahmarian elements (e.g. dominance of blades/bladelets, presence of El Wad points) as well as Aurignacian features (presence of carinated pieces, high number of twisted blades/bladelets). In this respect, the techno-typological profile of Yabroud II Layer 4 matches Ksar Akil Phase 3 which is found sandwiched between two typical Ahmarian phases (Phases 2 and 4) (Williams and Bergman 2010).

Materials and Methods:

Fig. 5: *Bone point of Yabroud II Layer 4.*

The Yabroud II – Layer 4 collection is housed at the University of Cologne and contains 882 flint artefacts, 16 mollusc shells, five bone points, two hematite rocks and 1 piece of bitumen. Except for the high frequency of edge-damage recorded on blades and flakes, the lithic artefacts are generally well preserved. There are very few examples of post-excavation breakages. Approximately one third of the lithic artefacts are burnt and can therefore be related to a fireplace that Rust mentions in his monograph (Rust 1950, 84; and see Fig. 4).

The Yabroud II – Layer 4 collection

882 Lithic artefacts
2 Hematites
1 Bitumen?
4 *Dentalia* fragments
12 Shells of different land snail species

Most if not all of the land snails are probably Holocene intrusions into the Palaeolithic layer. Among the lithic assemblage, two limestone slabs and one metamorphic rock are likely autochthonous clasts.

The lithic assemblage

Concerning the flaked assemblage, the clear dominance of blades, bladelets, and blade core maintenance products (core tablets, crested items) suggests that the main objective of the Palaeolithic knappers was to obtain elongated blanks (Tab. 1). Even considering a certain excavation bias in the débitage assemblage, it is safe to say that blades and bladelets were the most desired blanks in the early Upper Palaeolithic of Layer 4. Accordingly, blade and bladelet cores are the most frequent types in the core assemblage.

Categories	**N**	**%**	**% (with main group)**
Blades	386	43.8	40.8
Microblades	24	2.7	3.0
Bladelets	82	9.3	10.2
Burin Spalls	16	1.8	2.0
Flakes	63	7.1	7.8
Primary Crested Blades	60	6.8	7.5
Secondary Crested Blades	59	6.7	7.3
Primary Crested Flakes	3	0.3	0.4
Core Tablets	30	3.4	3.7
Core Trimming Elements	66	7.5	8.2
Shatter	12	1.4	1.5
Indeterminate	3	0.3	0.4
Blade / Bladelet Cores	63	7.1	80.8
Flake Cores	10	1.1	12.8
Core Fragments	3	0.3	3.8
Pebbles	2	0.2	2.6
Total	882	100	

Tab. 1: *The Yabroud II – Layer 4 lithic artefact assemblage.*

As a result of coarse excavation techniques, small bladelets and microblades are likely underrepresented (Fig. 6). This especially concerns items smaller than 40mm in length.

The toolkit (N=246) is dominated by endscrapers (30,5%) the majority of which are normal flat types (Tab. 2 and Fig. 7). Only four exhibit lateral retouch on one or two edges.

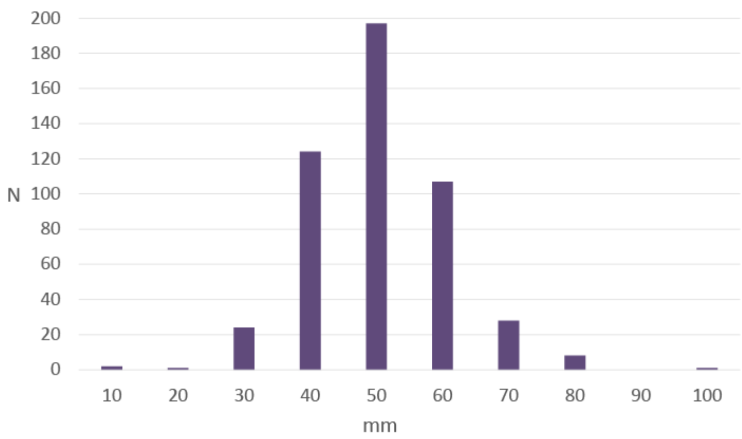

Fig. 6: *Length distribution of blades, bladelets and microblades in Layer 4.*

Fig. 7: *Endscraper on thick blade.*

Aurignacian artifact forms are rare with only three carinated endscrapers, three shouldered endscrapers and two thick and steep endscrapers (Definition of tool types follows Hahn 1977). Mostly large and thick blades were modified into endscrapers. Exceptionally, there are four waste cores showing scalar retouch on the platform edge. Endscrapers are followed by burins in number (Tab. 2). Here the carinated burin type is most frequent (N=28), including one double carinated burin and one Vachons type burin (Fig. 8 and 9). The remainders are mostly on retouched truncation (N=12) or on snap (N=5).

Fig. 8: *Multiple burin on large blade.*

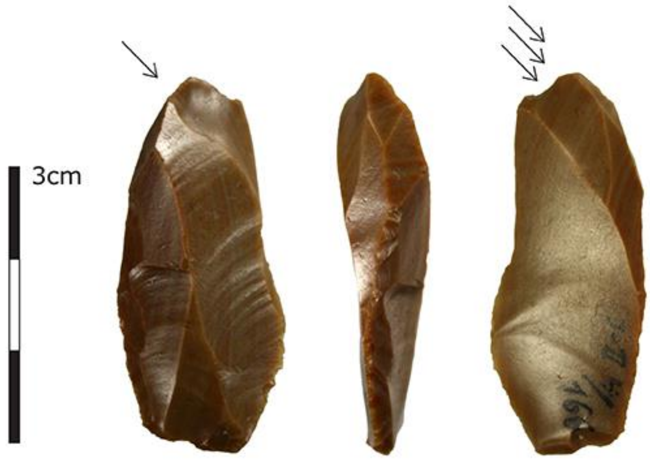

Fig. 9: *Flat, carinated burin.*

A significant amount of tools exhibit only marginal retouch and are classified as “retouched pieces.” In this case, modification was applied to reshape parts of the edge. Typical for Layer 4 are also truncated blades and bladelets. Composite tools are mostly a combination of endscrapers, burins or truncations. A less numerous but particular tool type is the El Wad point—an equivalent of the Krems point in the European Aurignacian (Fig. 10).

Fig. 10: *An El Wad point.*

Tools	N	%
Endscrapers	75	30.5
Burins	67	27.2
Retouched Pieces	46	18.7
Endretouched Blades	25	10.2
Composite Tools	13	5.3
El Wad Points	6	2.4
Notched Pieces	6	2.4
Denticulates	2	0.8
Splintered Pieces	2	0.8
Borer	1	0.4
Backed Bladelet	1	0.4
Sidescraper	2	0.8
Total	246	100

Tab. 2: *Tool type frequencies.*

Results

The strategies of core reduction in and around the Yabroud II rock-shelter were driven by two different concepts:
1) the production of blades/bladelets and
2) the removal of flakes from flake cores

Both concepts used the same raw material spectrum. Raw materials were collected principally if not exclusively in the sites' vicinity at secondary outcrops, namely alluvial formations or deflation surfaces. The pebbles are mostly small, rounded and exhibit heavily rolled surfaces with frequent traces of thermal weathering. It is possible that a small fraction of the tools arrived at Yabroud as finished implements made on allochthonous raw material, and hence, probably belonged to the personal gear of incoming individuals (At least two small re-sharpening flakes illustrate the curation of tools). Altogether, raw material availability and transport were not major constraints to the technological system. Due to the collection bias (selection of diagnostic blanks, cores and tools), it is not possible to draw a precise picture of raw material logistics prior to on-site core reduction. The low number of cortical pieces could either be the result of 1) Rust's excavation bias or 2) cores being initialized at the raw material outcrops away from the rock-shelter. Either way, core reduction at Yabroud generally demonstrates the entire sequence of blank production, starting with large blades or flakes and ending in small bladelets or micro-flakes.

The intensity of raw material consumption is nicely reflected in the bladelet and micro-blade cores for which mostly thick blanks, such as crested blades or cortical flakes were recycled. From a typological perspective, these cores constitute the group of carinated pieces that include carinated scrapers, carinated burins, and thick endscrapers. It is possible that the core blanks' double function (core preparation, then bladelet core) was anticipated right from the beginning among some if not all of these recycled blanks. Furthermore, some burin spalls indicate the intention to exploit dull, retouched tools edges for the removal of bladelets. Some double patinated tools further show raw material recycling.

All these different strategies of raw material use are expressed through several specific *chaînes opératoires*. Following flint pebble collection and transport, blank production and tool manufacture took place at the shelter. Especially the spectrum of core types tells us about the different kinds of reductions strategies that will be briefly described in the following. They show that the diversity of blank types found in the Yabroud II - Layer 4 assemblage is matched by the diversity of core types. This implies that each of the different kinds of flint pebbles was purposefully chosen for specific blank form production.

Chaînes opératoires

To obtain blades and bladelets, the knappers followed different core reduction strategies dictated by the original form of the raw material unit. These are mostly small, rounded flint pebbles. We distinguish four main chaînes opératoires (COP) of which two served for blade and bladelet production on flint pebbles, one served for microblade production on carinated pieces and one relates to flake production (Tab. 3). All COPs are somehow interrelated in different ways. First, it is technically possible to switch from COP 1 to COP 2. Second, the production of flakes was done either separately (COP 4) or sometimes at the final stage of the blade production process when the remaining cores were exploited opportunistically before discard. And third, the raw material units involved in COP 3 stem from the other three blank production strategies.

COP	Goal	Raw material units	Degree of core maintenance	Length of reduction sequence	Blank types
1	Blades, Bladelets, (Flakes)	Small, flat-rounded pebbles	Low (platform rejuvenation)	Short	Mostly straight or curved blades
2	Blades, Bladelets, Microblades, (Flakes)	Large, globular pebbles	High (platform rejuvenation, cresting, core back)	Long	Mostly curved and/or twisted blades and straight bladelets
3	Bladelets, Microblades	Blanks, tools	Low ("carination")	Short [burins] and long [thick scrapers, car. scrapers]	Curved and/or twisted bladelets
4	Flakes	Small, globular pebbles	High (platform rejuvenation, flaking surface preparation)	Short	Short rounded or quadrangular flakes

Tab. 3: *The four principal chaînes opératoires (COP) of blank production in Yabroud II – Layer 4.*

COP1: Blade / bladelet cores made on flat rounded or tabular-shaped pebbles

Blank production followed the longitudinal axis of oblong flat pebbles. Core preparation was at a minimum whereby only the striking platform was regularly rejuvenated by core tablets once opened. The lateral sides of the cores were left unprepared and consisted of the outer pebble surface / neocortex. Depending on the original size and volume of the flint pebble, we can distinguish two variants of this blade production process (Fig. 11):

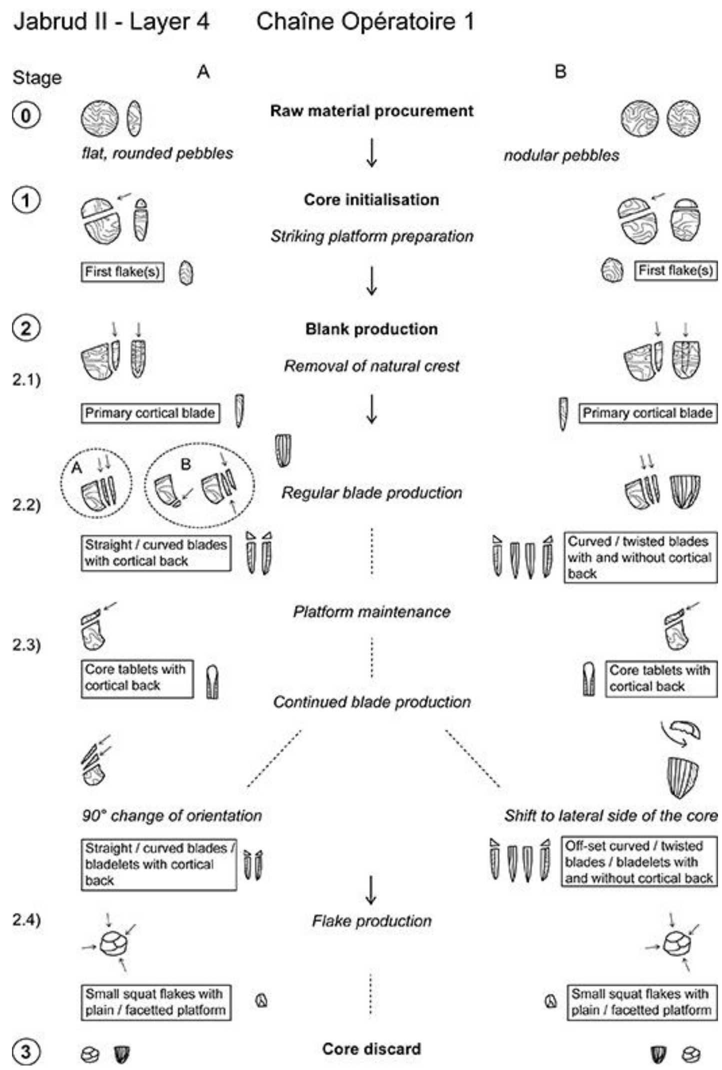

Fig. 11: *Chaîne opératoire 1 – Blade/bladelet production.*

Very flat pebbles were continuously exploited from front to back along their narrow part (Fig. 12).

All the ensuing blades therefore have a steep cortical back and can therefore be considered as naturally backed knives (Fig. 13).

Blade production either followed a unidirectional pattern using a single platform or a bidirectional pattern (Fig. 11, 2.2 A+B). In the latter case, the opposed platform sometimes served a preparative function (i.e. distal convexity maintenance) whereas in others, it was used for blade production. In an advanced stage of the reduction process, the flint knapper sometimes decided to use the previous flaking surface as a future striking platform by rotating the core 90° and exploiting the longest remaining axes (Fig. 13).

Globular pebbles were initially exploited along their narrowest axes. With ongoing blade production, the flaking surface was then extended over one of the core's lateral parts. Due to the necessity to maintain a certain degree of surface convexity, many of the blades were struck offset resulting in a twisted longitudinal section. Naturally backed blades are less common compared to variant A) as the flaking surface is much broader.

Provided that the exploited blade / bladelet core retained enough volume, it was sometimes transformed into a simple flake core in the final stage of the reduction process. Flakes were struck in an opportunistic manner from the remaining waste core without any core preparation until it was finally discarded.

Fig. 12: *Narrow blade core with cortical back.*

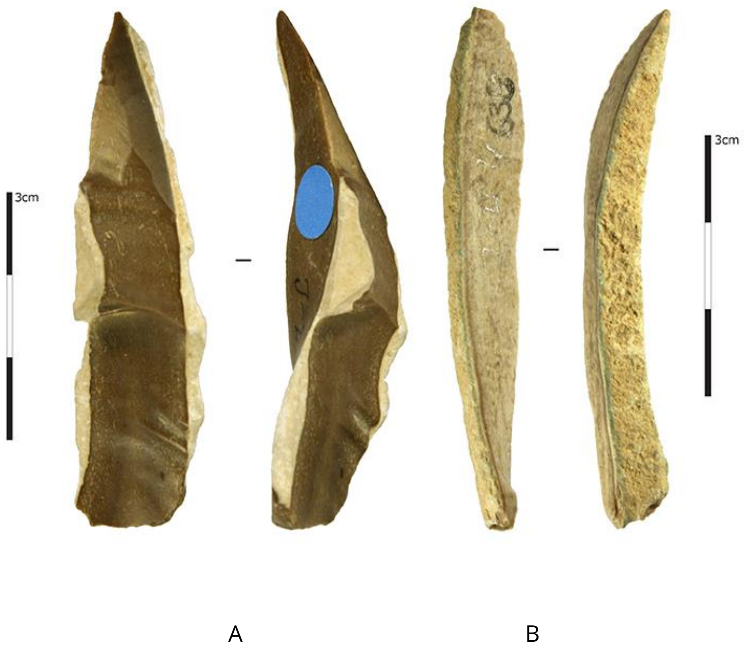

Fig. 13: *Blades from Yabroud II – Layer 4.*

Fig. 14: *Narrow blade core with unprepared back.*

COP2: Blade/bladelet cores made on globular pebbles

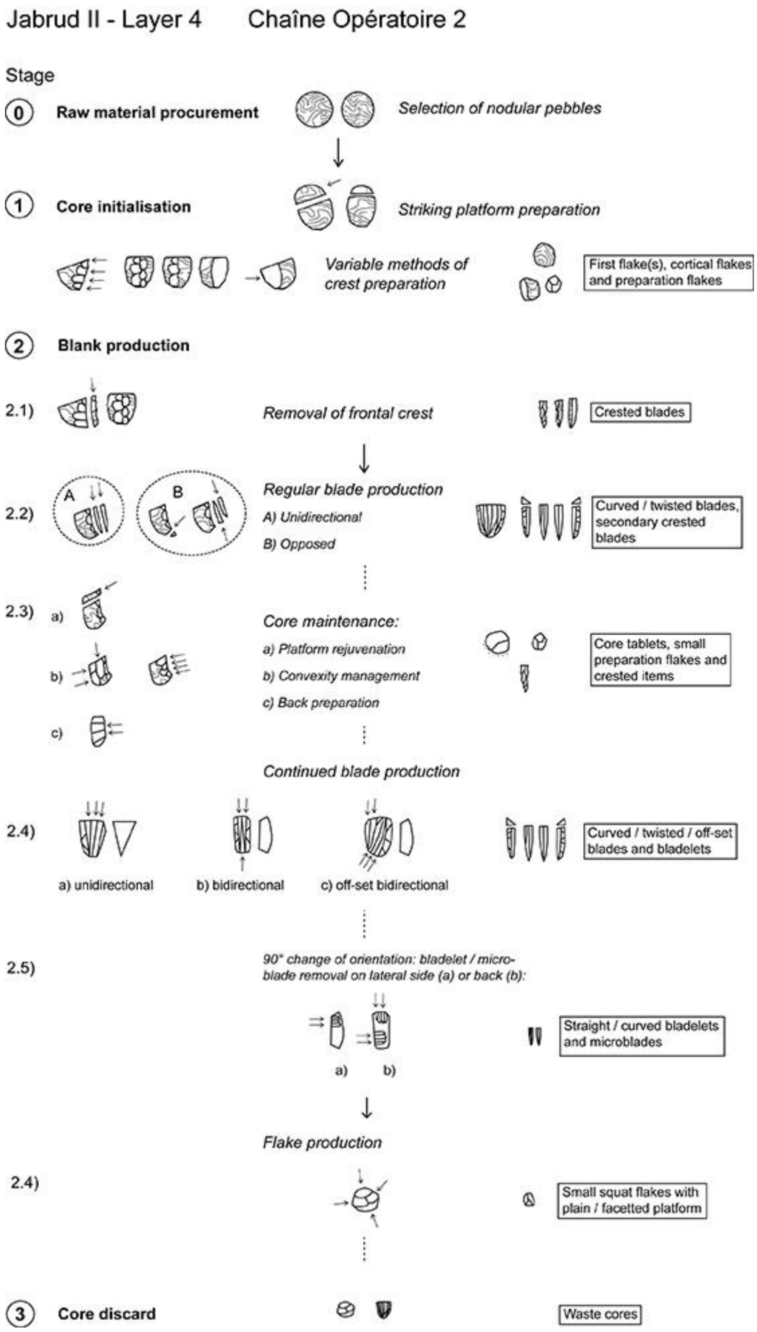

Fig. 15: *Chaîne opératoire 2 – Blade/bladelet production.*

This core reduction strategy is more complex than the one described in Section 3.1.1 as it entails more operative units and a higher degree of core maintenance (Fig. 15). Due to the high mass of flint removed from most of the cores, it is difficult to reconstruct the pebbles' original volume and morphology.

Like in COP1, the first step was to create a platform. Then a guiding ridge for future blade production had to be set up. This was achieved either by striking one or two large cortical flakes from the lateral side of the pebble or by removing small alternating flakes to form a crest. Blade production was then initiated by removing the crest. Subsequent blades still retain traces of the primary crest preparation. Core reduction followed either a unidirectional or bidirectional pattern after the creation of a second striking platform. In contrast to COP1, cores were regularly maintained during blade production through several preparation steps. Striking platform rejuvenation was achieved by the removal of core tablets. The maintenance of necessary lateral and distal convexities required the removal of flakes on the edge of the core. This can be done parallel to the main flaking axis or perpendicular to it. This preparation step sometimes involved the preparation of the core's back to use it as a striking platform for the lateral preparation flakes. When the flaking surface became too flat, a complete or partial crest was set up again.

Blade production continued in different ways by either using one platform (unidirectional pattern), by using two opposed platforms at the same time (bidirectional pattern), or by using two platforms alternatingly, thereby extending the flaking surface asymmetrically (Fig. 16). The latter patterns involved the production of twisted offset blades. The large number of twisted blades (N = 169; 44% of all blades) shows that this kind of core reduction technique was systematically applied (Fig. 17).

A

B

Fig. 16: *Typical blade cores of chaîne opératoire 2 (COP2) showing traces of the convexity management on lateral edge and on the back.*

With decreasing core volume, blade production shifted to bladelet production. Bladelets were either obtained by the same patterns described above or by a 90° rotation of the core to open a new flaking surface on one of the extremities, on the lateral edge of the core or on its back. A few curved or straight bladelets or microblades were then obtained on the new flaking surfaces. Although we have no clear evidence in the material record, it is nevertheless possible that some of the COP2 blade/bladelet cores were finally reduced opportunistically to gain small flakes.

COP3: Bladelet/micro-blade production on carinated core types

Thick blades, flakes or worn tools were recycled into bladelet or microblade cores by exploiting their thickest part and using a lateral edge as a guiding ridge (Fig. 18). The cores-on-flakes thereby ended up as carinated burins. Another exploitation strategy extends over the width of the blank by removing small bladelets at one extremity. The corresponding cores are typologically carinated endscrapers or thick and steep endscrapers. Determining reduction intensity without refittings is difficult but at least in case of the burin type cores the production phase was certainly short with the removal of only a few bladelets.

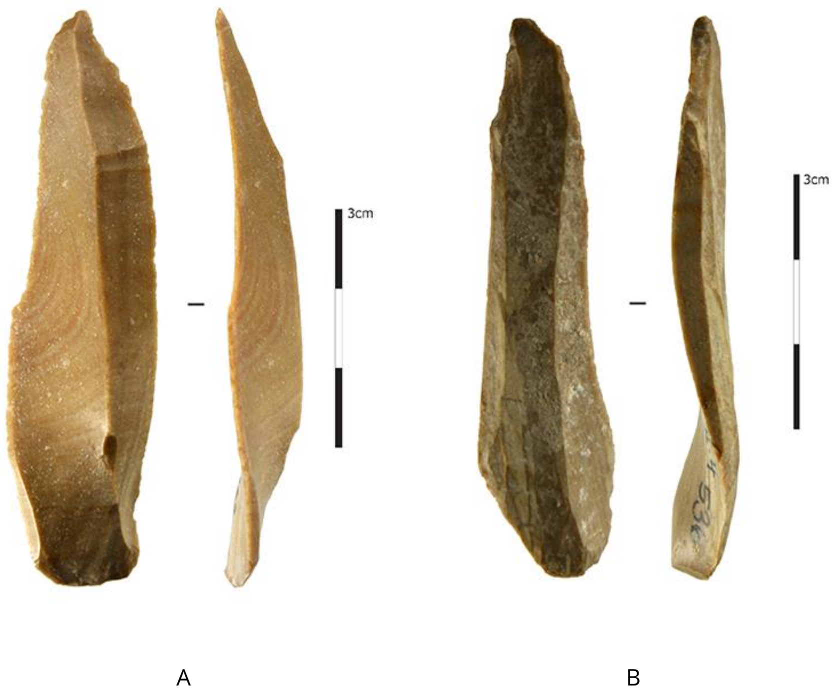

Fig. 17: *Twisted blades from Yabrud II – Layer 4.*

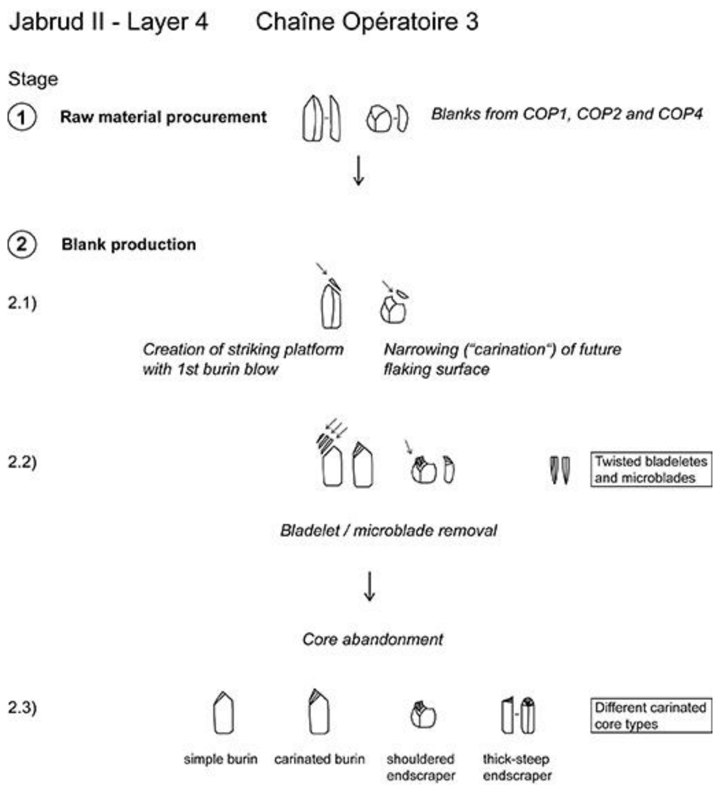

Fig. 18: *Chaîne opératoire 3 – Blade/bladelet production on carinated pieces.*

COP4: Flake production

Specialized flake production on flake cores only played a minor role in the blank production process in Jabrud II - Layer 4. The 10 flake cores are in an advanced state of reduction and most if not all were used as blade cores in previous reduction stages. Coupled with a low effort of core preparation, the flakes were struck from cores in a centripetal, bidirectional or alternating manner. Thereby, the blow was frequently set on plain striking platforms. Flakes were produced by the use of a hard or soft hammer (Fig. 19). In total, 63 flakes were counted as blanks, of which about 50% were modified into tools (mostly endscrapers, burins and retouched pieces). This shows that flakes were the preferred blanks for the manufacture of endscrapers and burins.

Fig. 19: *Endscraper-on-flake produced with a hard hammer.*

References

Belfer-Cohen, A. & A.N. Goring-Morris, 2003. Current issues in Levantine Upper Palaeolithic research. In. Goring-Morris, A.N. & Belfer-Cohen, A. (Eds.), More than meets the eye. Studies on Upper Palaeolithic diversity in the Near East. Oxford: 1–12.

Bretzke, K. & N.J. Conard, 2012. Evaluating morphological variability in lithic assemblages using 3D models of stone artifacts. Journal of Archaeological Science 39: 3741–3749.

Hahn, J., 1977. Aurignacien, das ältere Jungpaläolithikum in Mittel- und Osteuropa. Fundamenta/Reihe A, Köln.

Kuhn, L.S., Stiner, M.C., Kerry, K.W. & G. Erksin, 2003. The early Upper Palaeolithic at Ücagizli Cave (Hatay, Turkey). In: Goring-Morris, A.N. & Belfer-Cohen, A. (Eds.), More than meets the eye. Studies on Upper Paleolithic diversity in the Near East. Oxford: 106–117.

Pastoors, A., G.-C. Weniger & J.F. Kegler, 2008. The Middle-Upper Palaeolithic transition at Yabroud II (Syria). A re-evaluation of the lithic material from the Rust excavation. Paléorient 34: 47–65.

Rust, A., 1950. Die Höhlenfunde von Jabrud (Syrien). Neumünster.

Schyle, D., 1992. Near Eastern Upper Paleolithic cultural stratigraphy. Wiesbaden.

Solecki, R.S. & R.L. Solecki, 1966. New data from Yabroud, Syria. Preliminary report of the Columbia University archaeological investigations. Les Annales Archéologiques Arabes Syriennes 16: 121–153.

Williams, J.K. & C.A. Bergman, 2010. Upper Paleolithic levels XIII-VI (A and B) from the 1937-1938 and 1947-1948 Boston College excavations and the Levantine Aurignacian at Ksar Akil, Lebanon. Paléorient 36: 117–161.

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