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The "Waᶜshah method": an original laminar debitage from Ḥaḍramawt, Yemen

Rémy Crassard

Summary
The discovery of several surface sites revealed the existence of an original type of lithic industry, unknown until now in Yemen, and in the rest of South Arabia. This type of debitage, called the "Waᶜshah method" is a method of laminar debitage (blade production). We announced this discovery in a former PSAS paper (Crassard & Bodu 2004), and here we develop the definition of this type of debitage in the light of recent analyses.

Keywords: lithic technology, laminar debitage, Wādī Waᶜshah, Ḥaḍramawt, Yemen

General definition and context of discovery

During surveys made by two archaeological projects, one in Wādī Waᶜshah (French Archaeological Mission in Jawf-Ḥaḍramawt — HDOR Project, directed by M. Mouton and A. Benoist) and another in Wādī Ṣanā (Roots of Agriculture in Southern Arabia — RASA Project, directed by J. McCorriston, R. Oches, and ᶜA. bin ᶜAqil), several surface sites were discovered with a new type of laminar debitage (blade production) made on local flint or chert. The discovery of a debitage modality of preferential blades constitutes a rare example of predetermined laminar debitage in the Arabian Peninsula. Sites with laminar debitage on naviform cores are known in Qatar but they are due to technical import from Levantine human groups (Inizan 1988). This type of debitage has never been found in any region of Yemen.

The debitage identified in Wādī Waᶜshah seems to be particular to South Arabia, without obvious contribution from abroad, either from East Africa, the Levant, or other areas of the Arabian Peninsula. We will name this type of debitage the "Waᶜshah method". The Waᶜshah method allows the production of pointed blades by a unidirectional laminar debitage (Fig. 1).



Figure 1. *An example of a Waᶜshah core (from Wādī Waᶜshah).*

At least ten sites in Wādī Waᶜshah and two (possibly three) sites in Wādī Ṣanā revealed a Waᶜshah industry with homogeneous characteristics (Fig. 2). In Wādī Waᶜshah, sites are especially concentrated in a 1 km perimeter, east of site HDOR 538. These geographical data, however, indicate only the surveyed zone, while this corpus could, most probably, be increased if the survey area was widened. Wādī Ṣanā also delivered some Waᶜshah debitage sites, always at the tops of the plateaus, but from surface sites, sometimes mixed with Levallois industries on axial cores with a flat debitage surface.

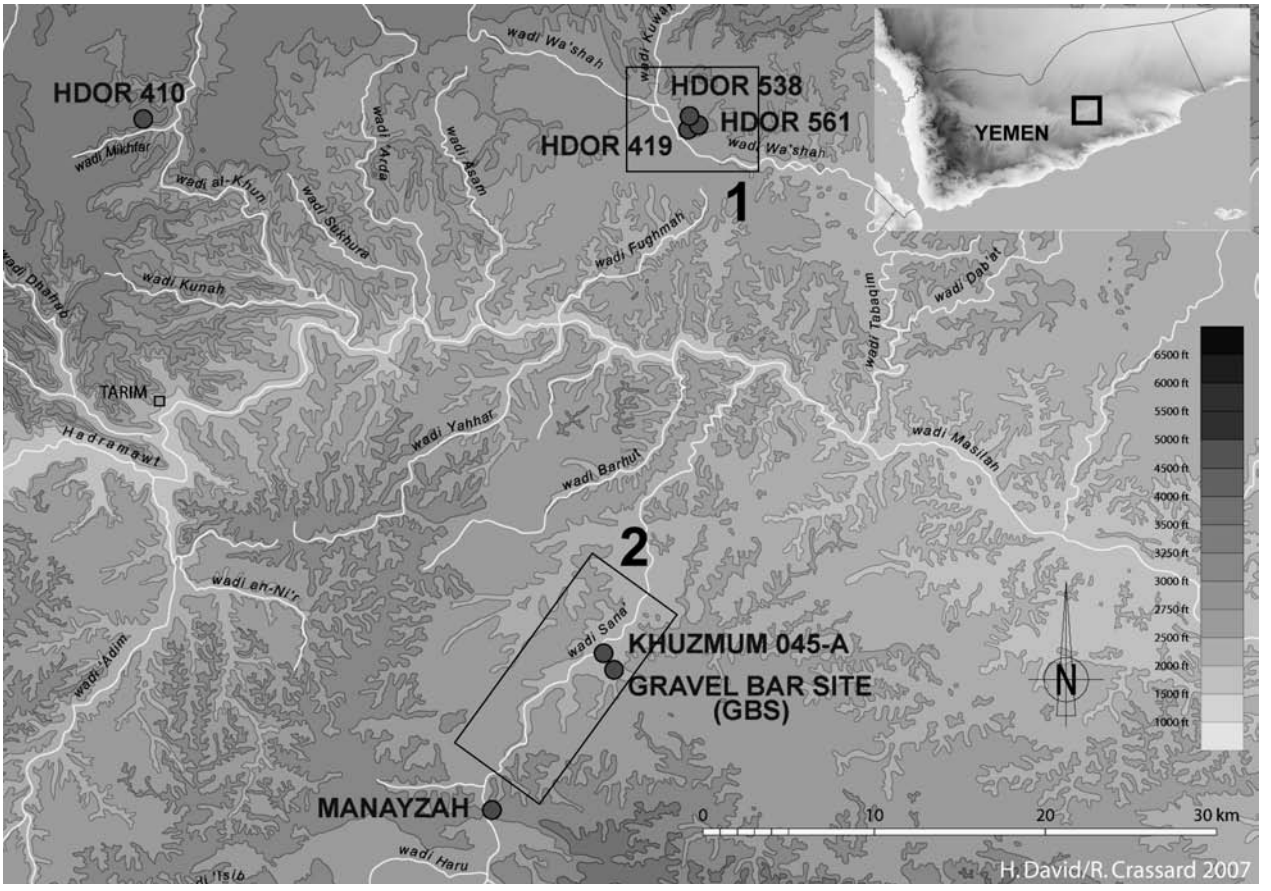


Figure 2. *Places of research in Ḥaḍramawt, with the names of major Early/Mid-Holocene sites: 1. Wādī Waᶜshah region (French Archaeological Mission in Jawf-Ḥaḍramawt); 2. Wādī Ṣanā region (RASA Project).*

The Waᶜshah method

We describe here a "typical" technical scheme of Waᶜshah debitage, by describing the various phases and the knapper's behaviour according to what we could observe on the archaeological artefacts. We suppose that this method of debitage has a strong chronological value, even if our understanding is still at a preliminary stage, considering the relatively low number of discovered sites (Figs 3 and 4).

phase 1

The raw material is chosen from strictly local sources, and favours naturally globular flint blocks, but the use of thick tabular flat blocks is attested. From a striking platform on a non-cortical natural surface, or after the creation of a striking platform by a transversal flake removal if a natural surface is not available, a first cortical blade is extracted (Fig. 5/1). The Waᶜshah method is carried out from a single striking platform, minimally prepared by a light abrasion of the impact zone. Blade extraction is thus only done in a unidirectional way, from a semi-turning volumetric exploitation (and not facial) on a narrow side of the core (Fig. 6).

phase 2

A first lateral blade is extracted, often semi-cortical, with a preference for plunging (*outrepassées*) blades. A second lateral blade, at the other side of the central debitage zone is obtained with the same aim of making a plunged removal (Fig. 5/2–5). The creation of guiding arrises is the goal of these preparation blades. Arrises will then be followed by the knapping shock wave. They form a strong dihedral angle on the core's surface. Therefore, the negatives' convergence of the two previous blades makes the third blank pointed.

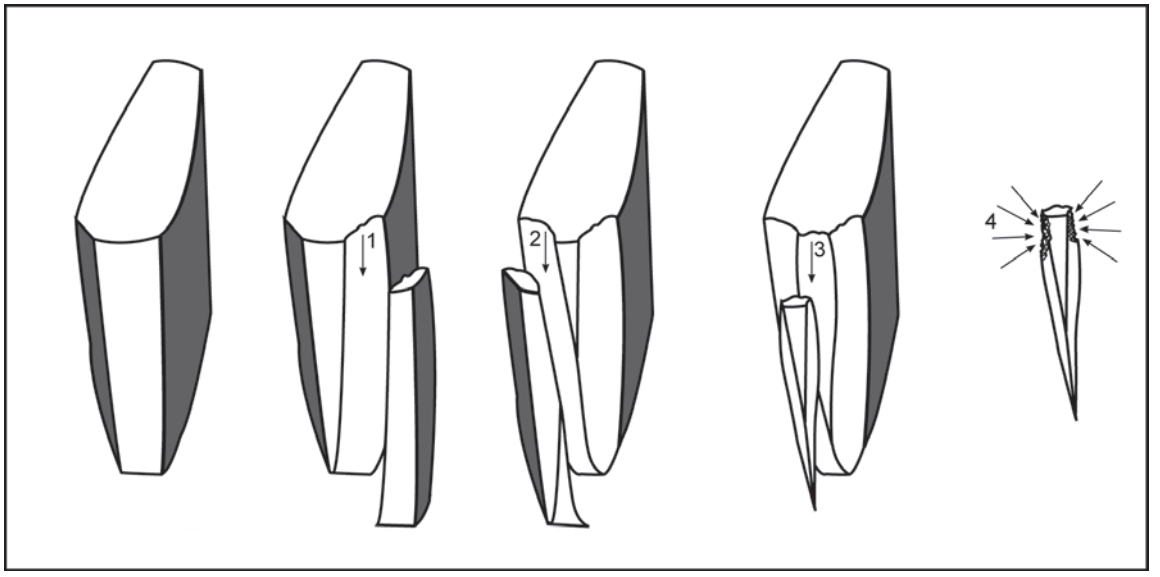


Figure 3. *A unidirectional method of predetermined pointed blades, called the "Waᶜshah method"; a first stage aims to create an acute-angled striking platform, a second one (arrows 1 and 2) prepares the pointed blade extraction (3) which comes during a third stage, before being retouched in its proximal part (4).*

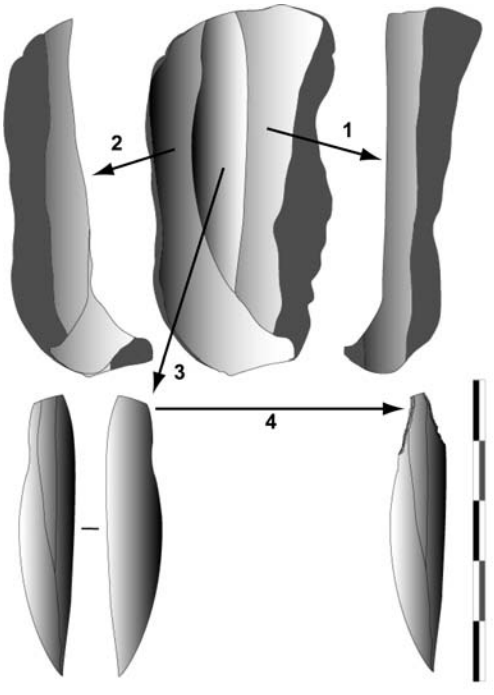


Figure 4. *A unidirectional method of predetermined pointed blades, called the "Waᶜshah method"; a theoretical reconstruction from an archaeological core.*

phase 3

The pointed blade is extracted then retouched in its proximal part on both sides by short, semi-abrupt to abrupt and direct, sometimes bifacial removals. The blade blank thus becomes a tool that we propose to call the "Waᶜshah point" (see Fig. 8; Crassard & Bodu 2004: 77).

Some possible following phases are the repetition of phases 2 and 3, if the knapper needs to do so. In fact, few archaeological cores have been strongly exploited. It reveals production of a standardized blank, but not necessarily expecting mass production of these pointed blades, while cores are not exploited to their maximum resources.

Non-pointed blades, sometimes very well made, are abandoned raw (non-retouched). They are called "second intention" blades (Fig. 7). Many of these blades are present on Waᶜshah debitage sites. A detailed analysis made on characteristic pieces indicates the intended production of pointed blades, which additionally creates a huge amount of laminar waste pieces (debris). The most distinctive are the resharpening (or rejuvenation) removals that are used to restart a debitage sequence. These removals attest to recurrent debitage production. Some of them clearly show the negatives of previous Waᶜshah point blanks (Fig. 5/5). Because the second intention blades are

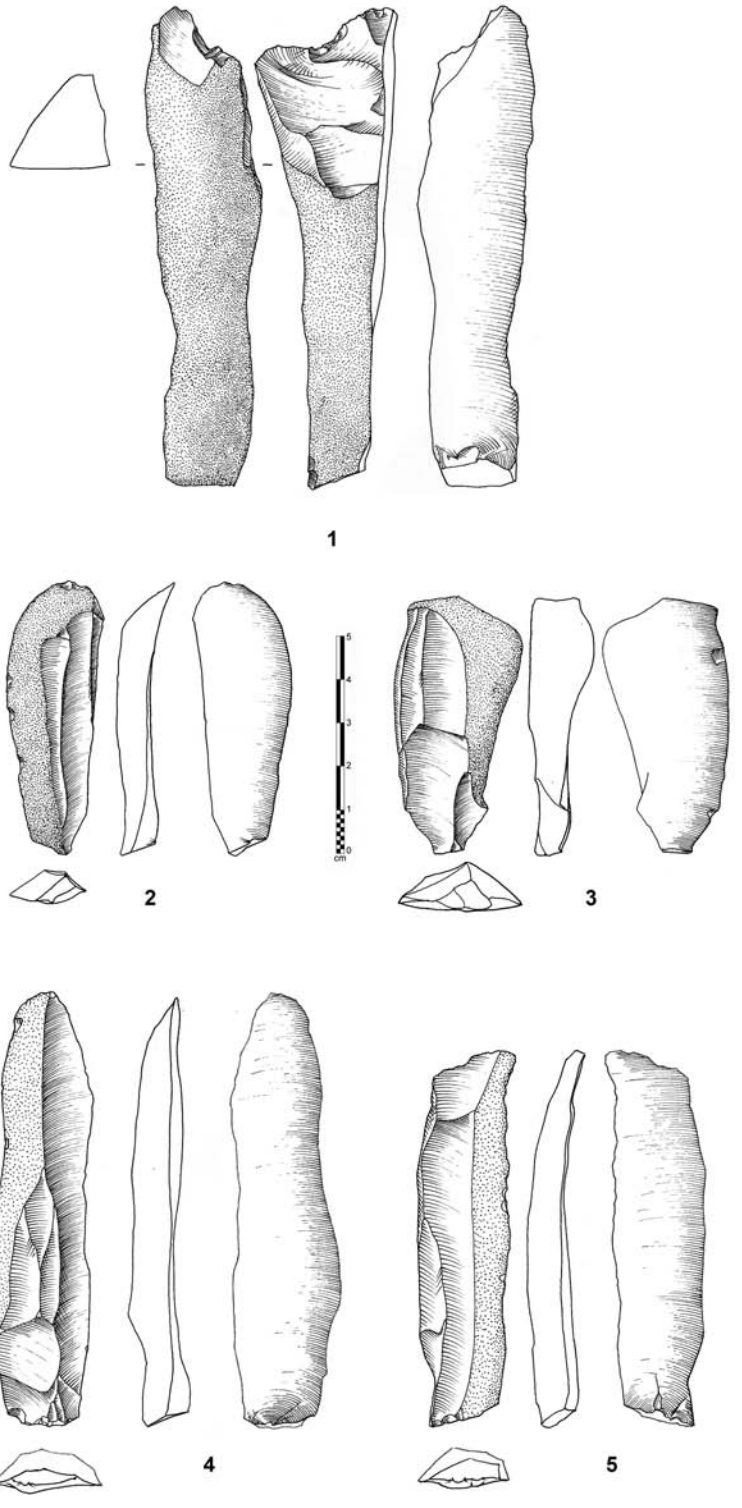


Figure 5. *Waᶜshah debitage: 1. cortical blade (HDOR 571 site). 2–5. semi-cortical blades (HDOR 538 site). (Drawings by J. Espagne).*

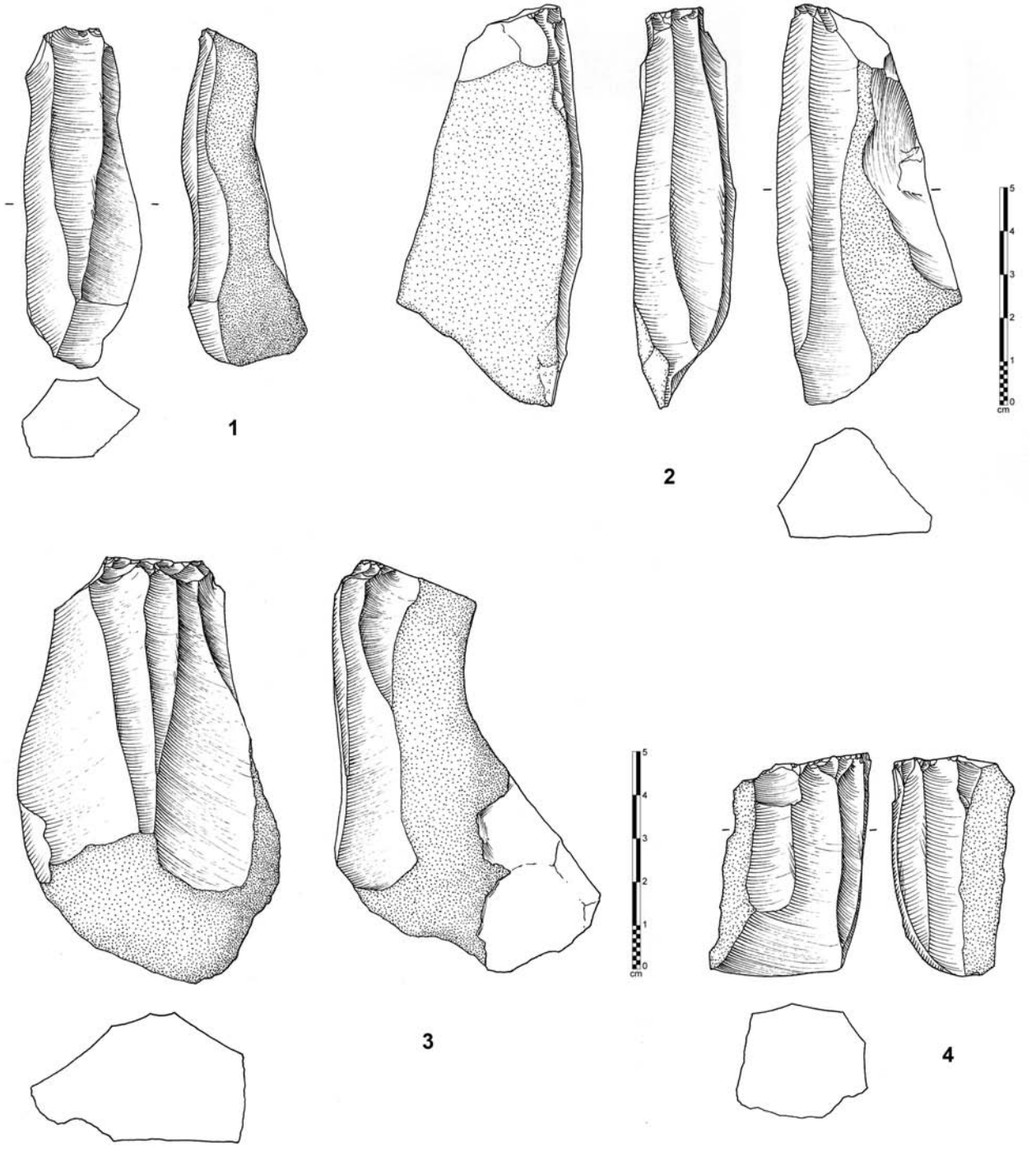


Figure 6. *Waᶜshah cores: 1. from HDOR 538. 2. from HDOR 571. 3. from HDOR 567. 4. from HDOR 565. (Drawings by J. Espagne).*

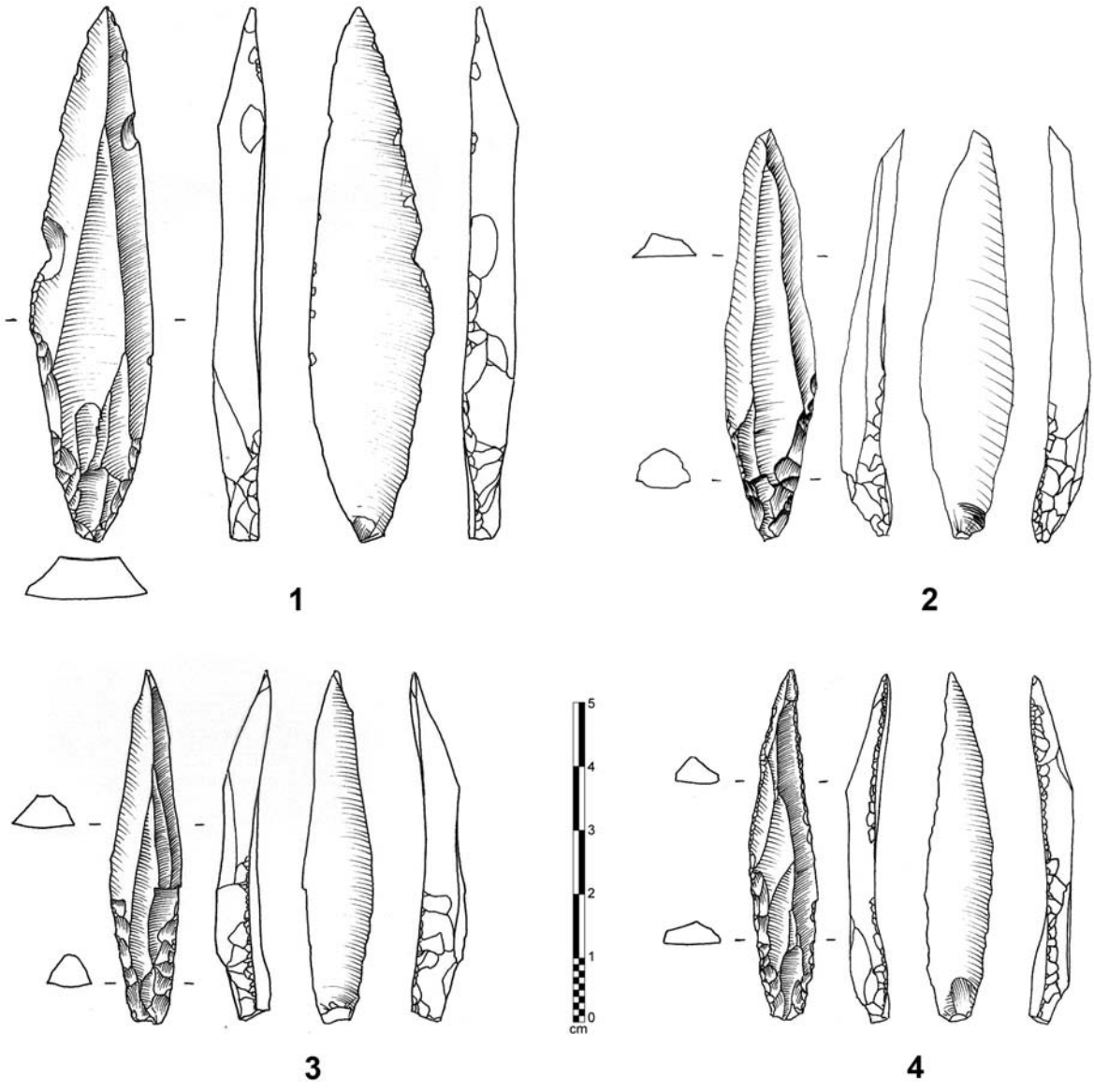


Figure 7. *Waᶜshah debitage, "second intention" blades: 1–4. from HDOR 565. 5–6. from HDOR 538. (Drawings by J. Espagne).*

found in large quantities, considering the near-absence of the pointed blades in debitage areas, the production of non-pointed blades does not seem to be deliberate.

The Waᶜshah points

Discoveries

Six Waᶜshah points have been found (Fig. 8), including two in a totally isolated context. Although the discovered points are scarce in number it seems that they were produced in large quantities, judging from the abundance of Waᶜshah cores. In fact, 201 blade cores, essentially resulting from Waᶜshah debitage, were discovered on the HDOR 538 site, where systematic surface collecting was undertaken. The associated products were also collected in their totality: cortical and semi-cortical blades, blades from various stages of debitage etc., with a total of 1128 pieces. Debitage is exclusively unidirectional. Neither crest preparation, nor convexity reinstallation by opposed

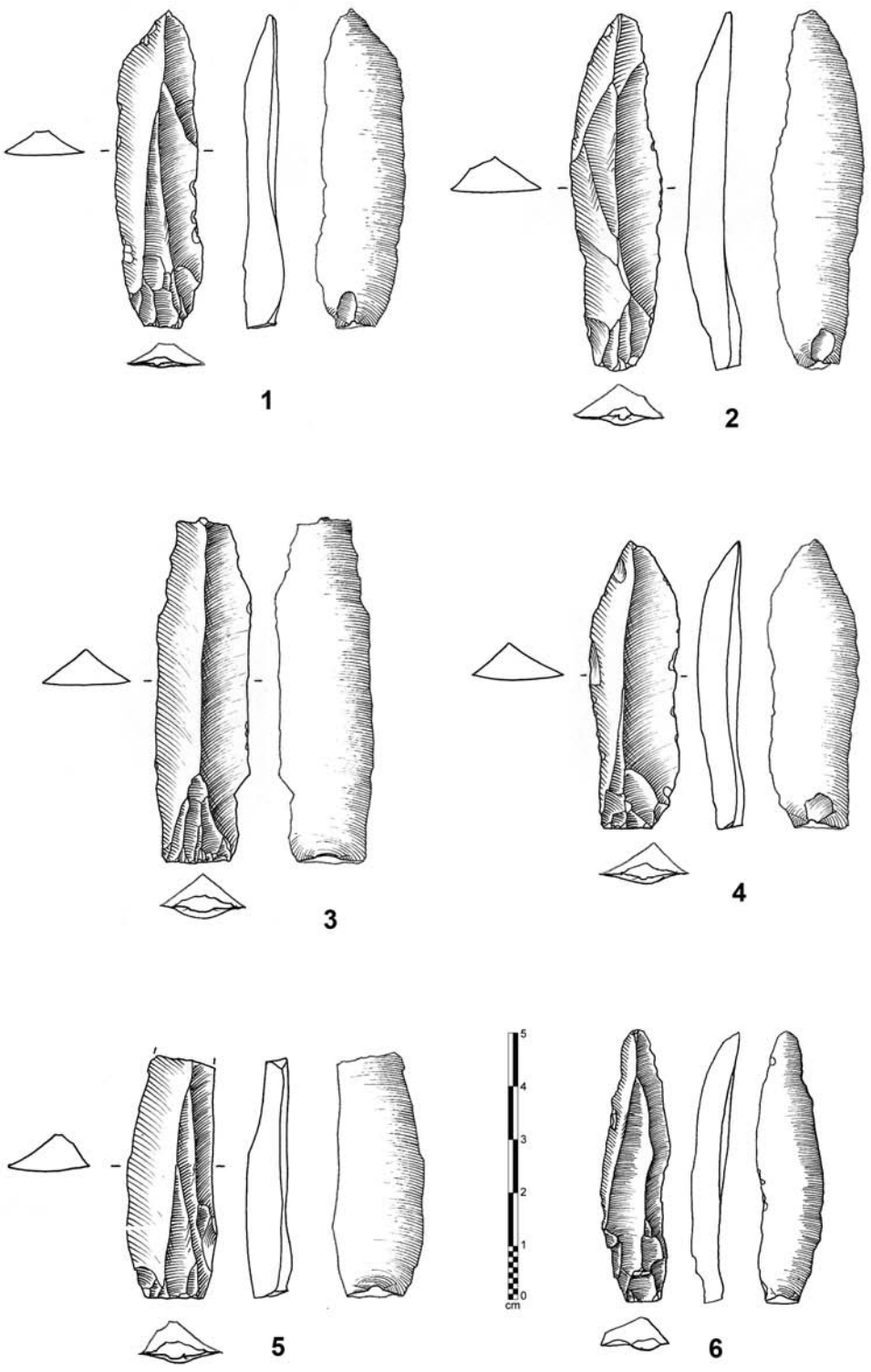


Figure 8. *Waᶜshah points from HDOR 538.*
(Drawings by J. Espagne [1, 3 and 4], and R. Crassard [2]).

Point # / Condition	Site	Length	Max. width	Max. thickness
28 / Entire	HDOR 538 (-24)	51	11	7
29 / Entire	HDOR 538 (-24)	84	20	8
30 / Base-medial	Top of hill upon HDOR 566	54	16	7
31 / Entire	HDOR 538 (36B)	55	13	5
42 / Entire	HDOR 538 (2C)	64	14	7
43 / Entire	Hill upon HDOR 538	58	16	7
	Mean	61	15	7

Table 1. *Waᶜshah points dimensions (in millimetres).*

Site	Length	Width
HDOR 538 49D	51	17
HDOR 571	79	12
HDOR 538 43A	49	16
HDOR 538 47D	64	12
HDOR 561 Sd4niv3	44	15
HDOR 571	67	12
HDOR 565	45	7
HDOR 567	50	8
RASA 2004-166-1	63	17
RASA 2004-166-1	38	9
Mean	55	13

Table 2. *Dimensions observed on negatives of final pointed blades on Waᶜshah cores.*

or orthogonal removals has been observed. Pointed blades are only obtained by preparing adequate convexities thanks to *débordant* and plunging blades, during a semi-turning debitage modality centred on the extraction zone of the predefined final blade.

Dimensions

The size of the pointed blades is variable. The dimensions observed on the recovered Waᶜshah points are from 51 to 84 mm long (Table 1). Measures of the final pointed blades' negatives on the laminar cores augment the morpho-metrical corpus (Table 2), at least for the pieces' length and width, even if one cannot confirm that all of the final pointed blades were blanks for Waᶜshah points. According to the observation of eight cores, the final product has a mean length of 56 mm and a mean width of 12 mm. It is then possible to propose a "silhouette-type" (Fig. 9).

Comparisons

Thirteen points on laminar blanks are displayed in the regional museum of Sayʾūn (Crassard 2007, ii: fig. A-275). Their provenance is not known with precision, as it is only known that they come from the northern region of the Ḥaḍramawt plateaus. Two other similar pieces come from the al-ᶜAbr area, west of Ḥaḍramawt.

In addition, H. Amirkhanov has published a drawing of a typical Waᶜshah point (1997: 109–111, fig. 39/5). It comes from Wādī Ḥabak in Mahrah governorate, close to the Ḥabarūt site, on the border with Oman. The author makes only a summary typological description of it. It is 6.1 cm long, 1.1 cm wide, and retouched along 2 cm of the base on both edges. Amirkhanov considers this type of point not very important in the general lithic tools corpus found in the area. He adds that, because of the simplicity with which it was retouched, this point is a unique case in the sets of points on flakes. He finally interprets it as an arrowhead. No mention of a laminar predetermination is proposed, or any particular technical scheme which would allow placing this type of point in a broader technological context. The observation of the lithic drawing leads us to conclude the presence of the Waᶜshah method at least until the eastern limit of the Mahrah region. It is until now the only known example of a typical Waᶜshah point coming from outside the Wādī Waᶜshah area.

Discussion: chronology and perspectives

A Pleistocene date?

The originality of the Waᶜshah method raises the question of its place within the technical traditions of Arabia. It indeed represents an example, unique in the Arabian Peninsula, of a sophisticated and predetermined laminar debitage, except for one imported into Qatar (Inizan 1988). Because of this peculiarity, this debitage type does not find any regional technical pattern of comparison. Moreover, the Waᶜshah method has never been discovered in a context delivering an unquestionable date.

Two factors point to Pleistocene characteristics: (i) this method is very close in its debitage conception to

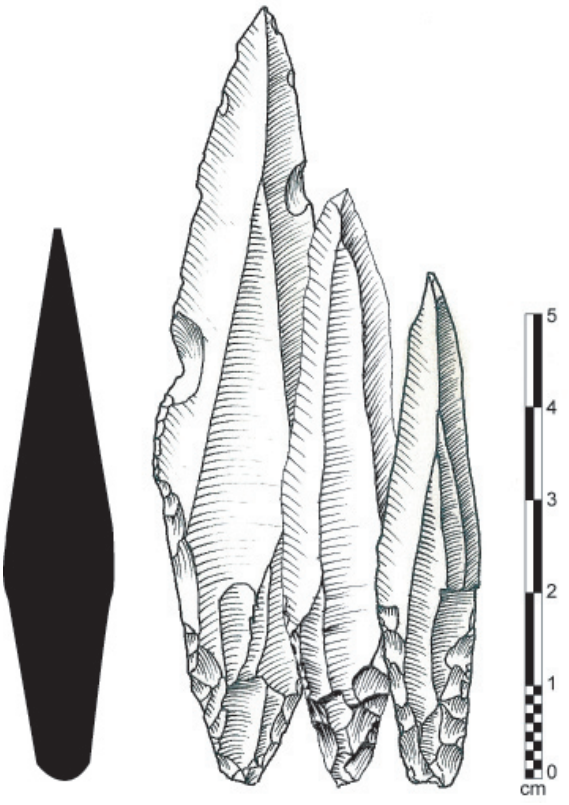


Figure 9. *The Waᶜshah point; the silhouette-type (shaded) is deduced from the mean dimensions; the technical drawings represent one exceptional example of a long point and two others with more common dimensions.*

the production of so-called "classical" Levallois points, characterized by the preparation of unidirectional lateral convergent removals; and (ii) the use of a laminar volumetric structure refers directly to an Upper Palaeolithic-like conceptualization known in Europe and the Levant. However, no dated Upper Palaeolithic site has been discovered up to now in Yemen, whereas Levallois industries from Ḥaḍramawt are quite clearly associated with the Pleistocene (Crassard, forthcoming).

Seeing in the Waᶜshah type of laminar debitage a technical manifestation datable to an Upper Palaeolithic phase (or even simply to the Pleistocene) is, however, premature: it is difficult to give a chronological assignation to this technique alone. Indeed, the laminar concept, and its innumerable variants throughout the world, is neither characteristic of a given period nor of an exclusive geographical area.

A Holocene date?

The greatest number of artefacts with Waᶜshah debitage indications was discovered on the surface site HDOR 538. Numerous foliate bifacial pieces and Holocene arrowheads were discovered there, with Waᶜshah cores and blades. A detailed study of the site revealed, by a spatial repartition analysis and the observation of the patinas (Crassard 2007: 171–186), that these two types of industries (bifacial and laminar) were certainly not synchronous.

Moreover, the discovery of a Waᶜshah core in one of the oldest layers of HDOR 561 (2007: 187–193) would attest contemporaneity or anteriority of the Waᶜshah method with some of the products typical of the Early/Mid-Holocene (bifacial shaping and pressure technique). The lack of data on the exact nature of the sedimentary deposition on this site prevents, however, reconstruction of a precise chronological frame. Indeed, HDOR 561's deposits most probably underwent significant erosion because of the flows coming from the plateau and gully erosion resulting from it. A Holocene dating is however very probable, since one date has been obtained on terrestrial shell. This date is 9045 ± 54 BP (8294–8239 cal BC [1] — laboratory ref. AA64371), but calibration is uncertain, due to the sampled material. A preliminary recalibration is nevertheless estimated at around 7300–6800 BC (2007: 191–192).

A Holocene date for the Waᶜshah method is partly confirmed by the presence in layer 6 in HDOR 419 of a blade, which could be a laminar waste of a Waᶜshah debitage sequence (Crassard & Bodu 2004: fig. 5/10). This layer has not been absolutely dated, but a layer just above, layer 5, gave radiocarbon dates between 7272 ± 120 BP and 6931 ± 48 BP, i.e. between 6242 and 5743 cal BC [1]. (1) A Holocene dating of the Waᶜshah method thus seems more probable than a Pleistocene one, but must still be viewed with caution.

The use of indirect percussion? A technical and chronological hypothesis that remains to be tested

The observation of butts and percussion bulbs on certain pointed or not pointed blades evokes a possible use of indirect percussion, i.e. using a punch made of vegetal or animal material between striking platform and hammerstone.

Butts are most of the time plain, canted, and with a light abrasion, and present a rather acute angle, supporting impact with punch. The point of impact is often relatively

far away from the core's edge and bulb scar is common, whereas the bulb's negative is well marked. These peculiarities are not exclusive to indirect percussion and can be also associated with hard percussion.

The standardization of known points (and of the supposed points from negatives on cores) however reinforces the assumption of indirect percussion use. Experimental studies to come will be devoted to the observation and comparison of the marks with archaeological pieces. If debitage by indirect percussion is confirmed, then the Waᶜshah debitage can be assigned a Holocene date, use of this technique not being known during the Pleistocene anywhere in the world.

Conclusions

The frequent occurrence of the technical scheme found on many cores throughout the studied micro-region in Wādī Waᶜshah, as well as the standardization of the points, underline the predetermination of the process and comprise a strong technical marker. Still little documented, the Waᶜshah method is only clearly evident in eastern Ḥaḍramawt (Wādī Waᶜshah and Wādī Ṣanā).

Waᶜshah laminar debitage finds its originality in the apparent simplicity of execution and in the very exclusive search for a pointed blank type. The technical scheme, however, suggests an advanced control of flint knapping. It is also remarkable by its presence in Arabia, as Arabian assemblages very seldom reveal laminar industries. Indeed, for a long time it was thought that there were no laminar industries in the Peninsula apart from those of external origin, as found in Qatar. It is significant that we now have knowledge of the Waᶜshah technical scheme, but its precise chronological frame remains unclear. Many questions around the Waᶜshah method thus remain open. At all events, the description of this method allows the application of comparative criteria to future discoveries.

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Notes

[1] All dates were obtained by the University of Arizona AMS Facility on samples preliminarily prepared by J-F. Saliège (CNRS, Paris); see Crassard 2007: 194–202. Six dates were obtained from layer 5 and are listed below (Table 3).

Designation	Sample	d^{13}C	Lab. ref.	age ^{14}C BP	Calib. Age 1ŋ BC
HDOR 419 A13 Niv 5	Charcoal	-25,6	AA64360	6931 ± 48	5872- 5743
HDOR 419 A13 Niv 5	Charcoal	-23,4	AA64359	7017 ± 52	5982- 5845
HDOR 419 A13 Niv 5	Charcoal	-25,2	AA64362	7042 ± 53	5990- 5844
HDOR 419 A14 Niv 5	Charcoal	-25,70	AA64364	7086 ± 50	6016- 5910
HDOR 419 A13 Niv 5	Charcoal	-22,12	AA64363	7169 ± 52	6071- 5995
HDOR 419 A13 Niv 5	Charcoal	-25,38	AA64361	7270 ±120	6242- 6014

Table 3. *Radiocarbon dates from site HDOR 419.*

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