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).
Liège, ERAUL 126, 2011, p. 209-224.

NADAOUIYEH AÏN ASKAR – ACHEULEAN VARIABILITY IN THE CENTRAL SYRIAN DESERT

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Introduction

The original well at the ancient spring of Nadaouiyeh Aïn Askar (hereafter Nadaouiyeh), located in the very heartlands of Syria (Jagher & Le Tensorer 2011), was probably dug for an outpost of the meharists, the mounted desert police during the French mandate. The well consisted of an open shaft, about 10 metres across, reaching the water table approximately 3 metres below the surface. The well ran dry more than 40 years ago. During the excavations, reaching about 10 metres below the surface, no indication of the water table was observed. The archaeological site of Nadaouiyeh was discovered in 1978 during the first surveys of the French team in the El Kowm area conducted by Jacques Cauvin (Cauvin *et al.* 1979). In 1980 meticulous investigation of the artefacts exposed on the rubble dumps of the old well revealed its interest as a lower Palaeolithic site, which was confirmed by a small sounding in 1982 (Besançon *et al.* 1981; Hours *et al.* 1983). From 1989 to 2003 Nadaouiyeh was investigated by the Institute of Prehistory and Archaeological Science of the University of Basel, in close collaboration with the University of Damascus and the Directorate General of Antiquities and Museums of Syria under the direction of Jean-Marie Le Tensorer and Sultan Muhesen (fig. 1). These excavations revealed a comprehensive, more than 32 m thick, stratigraphy covering particularly the Acheulean period. Actually, the Nadaouiyeh sequence is the most extensive site of the Upper Acheulean in the Levant.

The origin of the site is due to a number of faults dissecting the bedrock, permitting the development of a karstic system. Artesian ground water found its way to the surface at the intersection of two main faults beneath the site that have been detected by geophysical prospection (Turberg 1999). The conjuncture of the two faults enabled the groundwater to erode an extended cave system in the marly limestones of the Upper Cretaceous (Cenoman/Turonian). As the roof of this system weakened, a number of cave-ins occurred successively over time (Jagher 2000). The open sinkholes extended about 40 to 50 metres across, being more than 10 metres deep. Altogether at least seven such events were observed within the excavated area. The hollow structures of the dolinas were perfect sediment traps in an environment generally subject to slow erosion. At the same time as cave-ins created space for sedimentation, older parts of the site were destroyed in the process. The inter-

Figure 1 - The site of Nadaouiyeh Aïn Askar at the begining of the excavations (left) and fifteen years later (right).

laced stratigraphy can be cumulated to a section at least 32 metres high, divided into twelve main stratigraphic stages. Within this column, more than 12 metres of erosions are identifiable. Sedimentation either consists of limnic deposits during periods of a high water table, or comprises detrital run-off from the margins of the sinkholes during drier periods (Rentzel 1998; Pümpin 2003). These often violent erosions substantially enlarged the space of sedimentation. The existence of extended water bodies is confirmed by the nature of the deposits and typical fossils of these environments (Le Tensorer *et al.* 2007). Wind blown deposits and travertines are only of minor importance in the makeup of the deposits.

Within the stratigraphy, 32 distinct Acheulean levels were recognised. Most of them were exposed only on a limited surface. Half of these levels were excavated for less than 5 m² and only nine levels could be investigated for more than 10 m², the largest being 19.5 m², leaving important parts of the site still to explore. The preservation of most of the levels in Nadaouiyeh is surprisingly good. Dislocation of flint artefacts is easily recognised due to the brittleness of the local flint material, being extremely sensitive to mechanical stress. The older levels, particularly, present a perfect preservation of the flakes, with just a little damage occurring during the time of the settlement. Younger levels were more subject to post-depositional weathering. Taphonomic observations on the animal bones associated with the lithics permit a further appraisal of the preservation of the archaeological levels. The perfect conservation of the palaeontological material in many levels, indicates a rapid covering with sediments within a very short time (i.e. almost simultaneously) after the occupants left. In a good number of levels, bones show barely any traces of weathering, an unexpected observation at an open-air site, where bones are subject to rapid decomposition. Such arguments, but also the in situ observations, make it possible to identify at least nine levels truly as living floors.

By means of their stratigraphic position and the general composition of the lithic assemblages, they can be grouped into seven distinct archaeological entities, labelled units Nad-A to F and Nad-T. They all are characterised by an abundance of core tools of all kinds, making it possible for the first time in the Levant to follow in detail the evolution of handaxe traditions. In addition to the Acheulean sequence, evidence of younger occupations is present in the stratigraphy of Nadaouiyeh with traces of Yabrudian, Hummalian and Middle Palaeolithic occupations, as well as faint indications of human presence from the Kebaran, Neolithic and historic periods.

Aside from the presence of water from the springs at Nadaouiyeh, the natural shelter in the depressions of the sinkholes against the constant winds in an open landscape must have been a major attraction for prehistoric peoples. Preliminary palynological studies demonstrated the preponderance of a treeless steppe during the whole period of the Acheulean (Renault-Miskovsky 1998). This reconstruction of a rather dry environment is also supported by palaeontological evidence, with a clear dominance of animals adapted to semi arid ecosystems. Ongoing taphonomic studies clearly identified humans as mostly responsible for the assemblage of animal bones at the site (Reynaud & Morel 2005; Reynaud 2011). In the upper levels, hunting focused on camelids and equids. In the lower levels, gazelles were central in a rather diversified meat procurement comprising also antelopes, wild asses, camelids and exceptionally bovids and even rhinoceros. In some of the lower levels, there is a strong presence of turtle carapaces. Besides the nutritive value also a utilitarian aspects can be considered.

Several attempts of absolute datings at Nadaouiyeh failed, due difficult dosimetry and suitable materials. In order to establish a chronological model only indirect observations are at hand. The key site for the chronology of the lower and middle Palaeolithic in the Levant is the cave of Tabun, where the transition from the Acheulean to the subsequent Yabrudian is approximately dated to 350 000 years BP (Mercier *et al.* 1995; Mercier & Valladas 2003). A further chronological marker can be deduced from the Nadaouiyeh stratigraphy with layer c.7, a clear solifluction flow deposited under periglacial conditions. The phenomenon observed in layer c.7, like similar discoveries in the El Kowm area in Juwal Aïn Zarqa or Qdeïr Aïn Ojbeh, both related to the Acheulean, indicate an important drop of temperatures at these latitudes (35° North) and elevation (465 masl.). For the present model a correlation can be made with MIS 12, one of the most important cold periods during the Pleistocene, culminating at about 435 000 years BP. Palaeontological observations and climatic considerations allow us to assess an age of slightly more than 500 000 years for the presently exposed base of the Nadaouiyeh sequence.

Archaeological Units

The archaeological units in Nadaouiyeh are defined by their position within the stratigraphy, and particularly by their archaeological material (Jagher 2000). At the beginning of the study of the handaxes, about 800 specimens were laid out on a big workbench for a direct comparison, permitting a clear allocation of every archaeological level to a specific unit on formal as well as stylistic arguments. From that point of origin, the corpus of 32 Acheulean levels was divided into seven units.

The approach adopted for the Nadaouiyeh collection refrains from specific typologies using "guide fossils" as chronological or cultural indicators. All the classical methods (e.g. Bordes 1961; Roe 1969) were devised for different requirements and approaches than those adapted for the Middle East. In a more holistic conception, the material of each unit was considered as an entity in its integrity. The intention was not a static and qualitative census of specific types but a general understanding of the inherent variability. Phases, i.e. the different units, are described by their characteristic formal spectra, defined from a statistically sound database.

In the comfortable situation having of a large number of handaxes at hand, it was possible to determine the size of statistically significant samples. Using the example of the extremely rich unit Nad-D (more than 1000 bifacial tools) a modelling of the minimal sample size for the adopted classification was carried out. Randomly selected aliquots were extracted in ten to twelve runs and their results were compared with the expected value of the complete dataset. Samples smaller than 50 objects

presented little stability and showed highly variable formal spectra. Between 50 and 75 pieces, the results become more stable and plausible statements are possible. With above 75 individuals, variability among the samples is strongly reduced and the results are reliable within an acceptable tolerance (Jagher 2005). As was expected, small samples have to be interpreted with caution. Aside from general statements, little can be said about their affinities to other inventories (this is to be kept in mind in particular for not stratified collections). For well-founded evidence permitting reasonable comparisons, the minimal size of samples is significant, and has rarely been considered in the context of the Acheulean.

Classification of Handaxes

Traditional systems for the classification of handaxes, despite their widespread application, are poorly suited to seize the original intentions of the makers of these tools. Most of these classifications are constructed upon more or less theoretical specifications, albeit they are derived from a direct observation of handaxes. Besides, the classical structuring for handaxes is based upon a long-standing tradition, with a number of forms already defined in the nineteenth century. Many of these "types" were considered guide fossils for chronological periods or cultural entities.

One of the basic problems in the description of handaxes depends on the proper way they were produced. Each handaxe is an individual product made from a singular and not standardised blank. Under such prerequisites, an accurate reproduction of a specific form in exactly the same size is hardly possible. Moreover, the constraints the flint knappers came across in the process called for solutions challenging strict formal concepts. Therefore a substantial morphological variability is inherent, defying typological concepts.

In an attempt to escape these pitfalls as far as possible, a plain classification scheme was adopted that respects morphological variability better than traditional typologies (Jagher 2000). By direct comparison of the handaxes from all levels combined, a basic grouping has been devised based upon shapes apparent among the present handaxes themselves. The quality of execution, which can be quite different, was only a secondary argument for classification. Finally, seven classes were defined for the classical handaxes and additionally two classes for atypical handaxes (fig. 2):
① elongated handaxes with clearly stretched proportions presenting a well pointed tip,
② the classical drop-shaped forms, comprising the cordiformes and amygdaloïdes outlines,
③ ovate shapes with a well developed tip, i.e., having a clear distinction between base and top,
④ ovate handaxes with a bipolar contour without a clear bottom or top,
⑤ irregular handaxes, i.e., tools with a clearly inferior style in execution than the mainstream of the unit concerned. This relative aspect is more important than the absolute quality. It is obvious that this group presents a rather wide morphological variability,
⑥ triangular handaxes, i.e., tools with a clearly transverse base being manifestly offset from the sides converging into a clear tip,
⑦ miscellaneous shapes of all kinds (among the 1010 true handaxes from a well defined archaeological context, just 5% fall into this class). Originally cleavers were respected for methodical reasons, however the two sole cleavers that were observed among 1010 hand axes s.s., it was decided to abandon this type and to reclassify the respective tools within group 7 (miscellaneous shapes).

In addition to the true handaxes, there are large numbers of bifacial tools among the Nadaouiyeh material that were clearly distinguishable by their morphology. The quality of the workmanship is definitely inferior from that of the handaxes, and in many cases they evoke an impression of being just spontaneously manufactured for some domestic need. In any case, these tools cannot be considered the final state of repeatedly reworked handaxes. The construction of the volume and the façonnage adopted clearly shows that these tools have been conceived as such from the beginning. This is expressed in many cases by a strong influence of the original raw stone on the completed shape. The management of the volume is poor and flaking accidents are frequent. In short, they are implements quickly produced without seeking a precise form beyond a general shape. On the functional side they are complementary to the heavy-duty tools represented by the true handaxes – they can be considered as light-duty tools conceived in a basic manufacturing process with a minimum of effort. These tools are divided by their basic form in two categories:
a: atypical bifaces being clearly elongated artefacts with a more or less clear base and tip, reminiscent of crude handaxes with awkwardly shaped edges and
b: pièces bifaciales rather small tools with a discoidal shape about 5 to 8 cm across, presenting little morphological standardisation. Normally the retouch completely covers their two faces. In many cases, analogous artefacts would be classified as cores. Against this option speaks the general management of the volume, with two equivalent sides, that meet with an angle between 46° and 60° which is not appropriate for a purposeful core (Boëda 1993). In addition, along the equatorial plane there is never any clear preparation of a striking platform. The circumferential rim of these artefacts is clearly designed as a cutting edge and is not subject to the prerequisites of a core preparation.

A further approach to producing small tools, particularly in the younger periods (i.e. Nad-B & T), are small core-like pebble-tool implements clearly smaller than the size of a fist. On small, usually alluvial blocks of flint, a striking platform was created with a single blow, wherefrom some few polymorphous, more or less cortical flakes were struck along one face, in order to create an edge of about 60–70°. Conspicuously the production of flakes is abandoned at the stage when better-structured flakes could be produced. Obviously, the goal was not the flakes but to obtain a cutting edge, completing the respective tool set.

The analysis of the bifacial tools from Nadaouiyeh revealed two complementary strategies of production. On the one hand, there were the handaxes with a proper volume management from a carefully selected raw stone; and on the other hand, un-

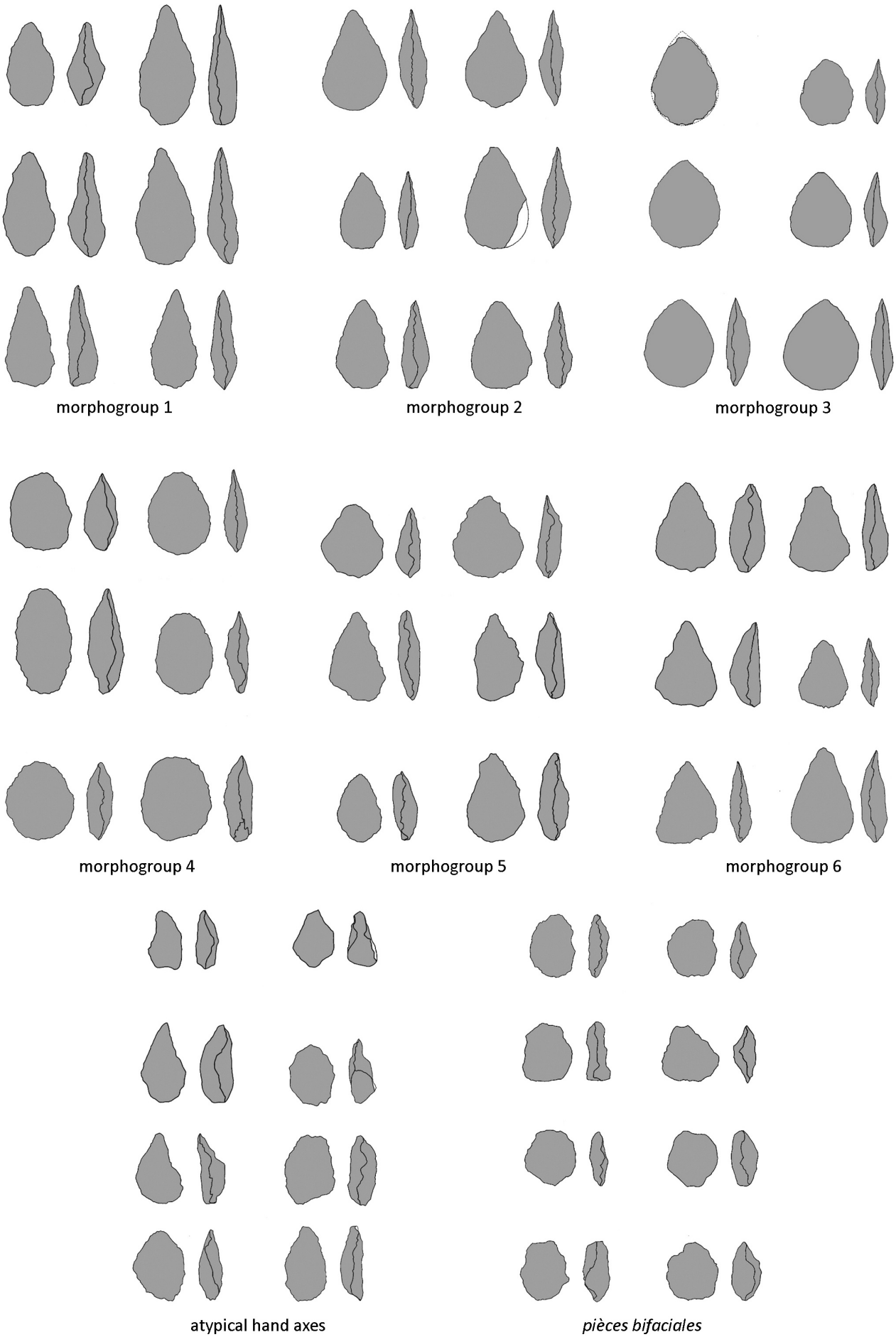

Figure 2 - Shapes of handaxes in the different morphogroups (for definitions see text).

archaeo-logical unit	hand axes										bifacials		total bifaces	retouched flakes	"pebbele" tools	cores
	elongated	cordiform	ovate w. point	ovated	ov. round	ov. paralel edges	ov. convegent	irregular	triangular	miscellaneous	atypical	pièces bifaciales				
Nad-A	0	12	0	4	---	---	---	7	2	0	9	12	**46**	10	4	4
Nad-T	9	10	15	14	---	---	---	2	4	3	4	9	**70**	x	12	13
Nad-B	11	22	1	11	---	---	---	19	15	4	16	29	**128**	17	49	107
B2	*3*	*10*	*0*	*5*	---	---	---	*12*	*9*	*1*	*6*	*13*	***59***	*6*	*22*	*67*
B1	*8*	*12*	*1*	*6*	---	---	---	*7*	*6*	*3*	*10*	*16*	***69***	*11*	*27*	*40*
Nad-C	35	26	3	7	---	---	---	9	2	5	11	49	**147**	17	12	12
Nad-D	20	119	18	(354)	74	152	128	46	10	27	111	305	**1010**	63	4	39
Da	*0*	*31*	*0*	*(44)*	*9*	*26*	*9*	*6*	*1*	*2*	*37*	*96*	***217***	*16*	*0*	*25*
Db	*2*	*14*	*1*	*(32)*	*6*	*19*	*7*	*4*	*0*	*3*	*13*	*36*	***105***	*9*	*1*	*4*
Dc	*3*	*16*	*6*	*(98)*	*21*	*44*	*33*	*11*	*3*	*7*	*22*	*67*	***233***	*19*	*2*	*6*
Dd	*10*	*15*	*5*	*(96)*	*20*	*29*	*47*	*7*	*0*	*9*	*9*	*40*	***191***	*13*	*1*	*3*
Nad-E	46	66	11	11	---	---	---	31	11	12	17	22	**227**	24	4	11
Nad-F	2	28	21	7	---	---	---	4	1	7	2	1	**73**	2	0	2

Figure 3 - Inventory of the hand-axes and retouched tools from Nadaouiyeh Aïn Askar.

pretentious procedures without much preparation on randomly chosen initial blocks, directed to obtain a functional tool with the least effort, i.e., for the production of small tools such as atypical bifaces and pièces bifaciales. Moreover, an even more basic production scheme was applied to produce small, pebble-tool like cutting instruments. The presence in good numbers of such small tools, compared with the handaxes, clearly compensates the rare retouched flakes as light duty tools. In fact, a clearly structured and purposeful production of flakes is almost completely missing in every level of Nadaouiyeh. The comparatively few cores that can actually be designated as such contributed a tiny number of the bulk of flakes.

The Acheulean of Nadaouiyeh Aïn Askar

One of the striking characteristics of the Nadaouiyeh site is the tremendous number of handaxes discovered. Fourteen field seasons eventually produced 12 415 bifacial tools, of which 9941 were handaxes strictly speaking. 10 331 bifacials have been discovered in layers where the archaeological context was completely modified by geological phenomena (e.g. erosions and cave-ins). The overwhelming majority of these artefacts (8060 pieces) come from one single layer, the already mentioned solifluction flow c.7. This layer, a perfect marker within the Nadaouiyeh stratigraphy, extends all over the investigated sectors of the site. The excavation of that layer, covering 53 m², permits us to estimate the numbers of bifacials contained in c.7 at about 75 000 to 80 000 pieces, of which at least 60 000 are true handaxes, making Nadaouiyeh one of the richest of all Acheulean sites. From this wealth, however, only 2084 bifacial tools were discovered within a clear archaeological context that can be declared in situ in the proper sense.

In all the archaeological units at Nadaouiyeh, bifacially worked tools dominate by far over retouched flakes (fig. 3). The latter are proportionally so rare that they can be considered just a secondary phenomenon. The rareness of flake tools is confirmed by the perfect state of preservation of the flakes in most levels, making easy the proper identification of retouched edges. In levels where edge damage is high, particular attention was given to potentially retouched flakes. In case of doubt, edge modification like that was not classified as manmade. The strong dominance of core tools is a particular trait of all Acheulean units in Nadaouiyeh. To a lesser extent, this is also the case for the Acheulean everywhere in the Middle East.

This is also demonstrated by the comparatively small numbers of cores within the Nadaouiyeh material, where a systematic and well-standardised production of flakes never occurred. Clearly structured target flakes cannot be discerned in any of the archaeological units. As far as the negative on the cores show, their products are virtually the same as those originating from the manufacture of atypical bifaces, pièces bifacials, and the chopping-tool like implements. A structured débitage in the sense of the Levallois technique or its antecessors is completely absent from all Acheulean levels in Nadaouiyeh. However, there is a somewhat more important production of irregular flakes in the younger levels, produced from poorly structured cores using a rather opportunistic strategy.

The flake material from all archaeological units in Nadaouiyeh clearly demonstrates that most of the preparation of handaxes and other bifacial tools occurred outside the site. Preparation flakes from the initial shaping are extremely rare and are in no proportion with the tools present. Obviously handaxes and

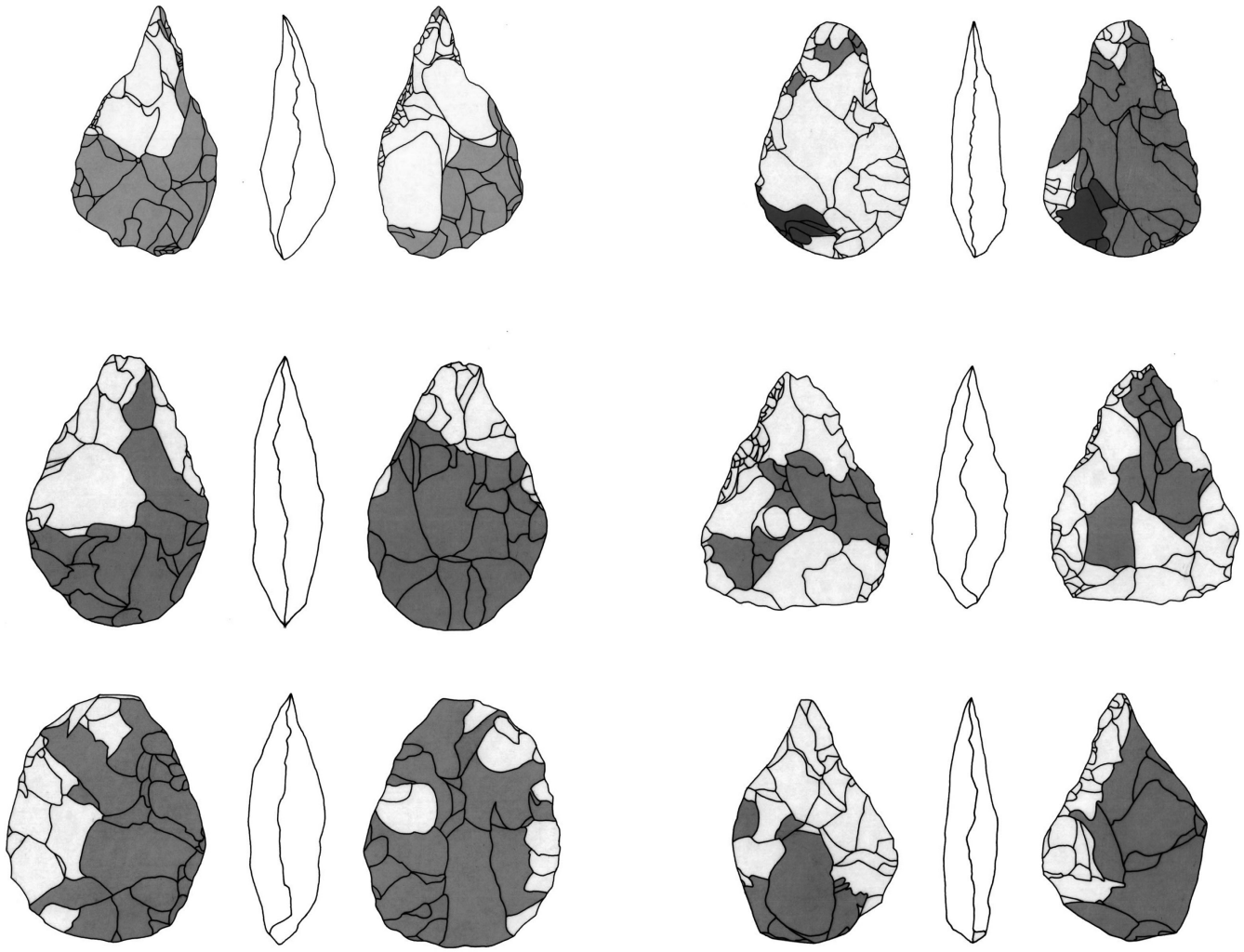

Figure 4 - Handaxes with double patina (scale 1:3).

many of the associated bifacial tools were at least prepared, if not completely elaborated, elsewhere, probably next to the outcrops of the raw material. In any case, the overwhelming majority of the handaxes arrived already as functional tools on the site. The large numbers of flakes clearly assignable to handaxes are evidence of transformation and reshaping rather than the waste of primary production. Suitable raw material is available in first-grade quality, in blocs of up 20–30 cm, from the late Palaeocene deposits within 6 kilometres from Nadaouiyeh. However, circulation patterns are impossible to reconstruct, as apart from just handful of bifacials, all are made from the same Palaeocene flint that is available along the Southern Palmyride range over a distance of more than 200 km. Over this huge area, the material is virtually all the same and macroscopically it is impossible to recognize its precise provenance. Hence, "local" and "exogenous" materials cannot be distinguished in the archaeological record.

Another striking aspect of the Nadaouiyeh handaxes, but also those from other late Acheulean sites in the El Kowm area, is their rather small size. Compared with other areas in the Middle East, the El Kowm handaxes are rather small: 75% of all the handaxes found in a controlled archaeological context in Nadaouiyeh are shorter than 10 cm and just 6% are longer than 12 cm. The restricted size is a deliberate choice of the manufacturers as the raw material available in the El Kowm area is not the constricting factor.

A secondary reshaping of handaxes can be identified directly on tools with double patina (fig. 4): 6% of the handaxes as well as other bifacial tools show traces of a more or less extended secondary reworking. These secondary modifications may involve just an overhaul of the cutting edges, but in many cases the initial shape has been completely transformed. Mostly, the quality of the secondary retouch is equivalent to that of the primary state. In exceptional circumstances, even a third generation of negatives can be discerned. The question of a regular reshaping and recycling of handaxes is difficult to assess from the bifacial tools alone, as most of them present a uniform patina and the morphology of possible secondary retouch is not decisive. Reworking of handaxes can also be perceptible by its direct waste. Particularly in the older levels (i.e. unit Nad-D-F), where the handaxes present an outstanding quality of refinement, flakes from these tools are easily recognised from ordinary débitage. Handaxes in these levels underwent a substantial transformation, as is demonstrated by a large number of equivalent flakes. These are not the primary waste of initial manufacturing, but issued from finished and clearly functional tools. They clearly

show that handaxes were regularly recycled. To what extent the original shape was transformed on the individual tool, and to what extent it happened to the whole of handaxes is difficult to evaluate. In the younger stages of the Acheulean (i.e. Nad-C, B & T) this differentiation is hardly possible, as the quality of refinement of the handaxes diminishes and flakes from a potential reshaping are barely distinguishable from ordinary flaking débitage.

However, it is important to keep this recycling in mind when considering classification of bifaces. Observations on the Nadaouiyeh material point to a basic relationship: the thicker the section, the lesser the potential for reshaping. There is no reason to assume the actually present shapes had been discarded as exhausted to their makers. The presence of double patinated bifaces alludes to other possible processes, as the local Palaeocene flint of brown and black colour is prone to a fast patination. Within just one year, a notable weathering is visible on freshly flaked flint, as could be observed on knapping experiments carried out during fieldwork. From these observations it can be concluded that there was a rather short time between the "abandonment" and reshaping of double patinated handaxes. In this light it can be imagined that these tools were deliberately left in place, to be ready for use another time.

Secondary transformations on the distal edge of handaxes are limited to just one archaeological unit (Nad-D), where broad oval shapes dominate. Out of 221 handaxes with tranchet blows, 216 were discovered in the six levels of unit Nad-D. About one-third of the handaxes of this unit feature on one or both sides the scars of single or repeated tranchet blows (fig. 5). The associated "backed" flakes are present in according numbers. The resulting cutting edges are rather polymorphous, being more or less convex and with a quite different extension along the distal end of the tool. In about half of the cases tranchet blows appear on one and both sides of the handaxe. Repeated resharpening is observed only in 15% of the cases. However, negatives left by the tranchet blow, tend to be rather invasive, often removing all information about the previous condition. The cutting edges produced by this technique are extremely acute. It is surprising that none of them shows macroscopically clear traces of use wear. They are all in an almost pristine state with just occasional damage from trampling or corresponding mechanisms. There is a strong correlation of tranchet blow and shape of the affected handaxes: more than 80% of the tranchet blows appear on handaxes with broad proportions, i.e., an ovate outline, that make about 60% of the handaxes from this cultural unit. Homologous artefacts are regularly observed in the Acheulean of the Levant and beyond. They always occur as isolated phenomena and are rather infrequent. From the Azraq oasis in Jordan however, such artefacts are reported in substantial numbers (Copeland 1989 a-d; Rollefson *et al.* 2006), where they were labelled "Azraq-cleavers". However, the Azraq and Nadaouiyeh artefacts do not fall within the classical definition of the cleaver or hachereau (Tixier 1956), but are better designated as hachereau biface (Bordes 1961). At Azraq as well as Nadaouiyeh, these "cleavers" are clearly derived by a secondary transformation from a particular shape of ordinary handaxes. It is surprising how methodically this scheme has been followed in both sites, sharing strong common traits beyond this aspect.

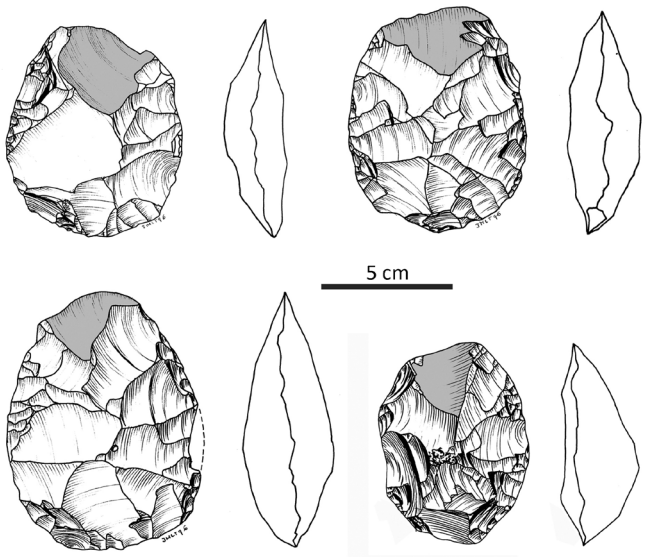

Figure 5 - Handaxes from unit Nad-D with tranchet blows (shaded negatives), drawing J.-M. Le Tensorer.

One of the amazing observations in the Nadaouiyeh material is the presence of the most refined and perfectly executed handaxes in the oldest levels, belying classical schemes based on traditional evolutionary ideas. It has to be acknowledged that for previous chronological models no direct stratigraphic control was at hand. As a general trend, a gradual disintegration of workmanship and standardisation can be observed throughout the Nadaouiyeh stratigraphy. It is not a simple matter of "decadence" but rather a question of liberty and effectiveness in the implementation of a given problem, inventing new solutions beyond the exact reproduction of cultural templates in a slavish way.

Acheulean Evolution in Nadaouiyeh Aïn Askar

The fragmentary and incomplete state of the geological and archaeological sequences preserved in the stratigraphy in Nadaouiyeh has to be kept in mind when considering the evolution of the Acheulean. In the stratigraphy, many hiatuses and gaps are clearly visible. In fact, over the periods, time is only intermittently recorded in the sediments. Hence, the history of the Acheulean, despite the rich information, is incompletely chronicled. Periods with a high resolution over short periods alternate with phases with no or just sporadic sedimentation. Overlooking the nearly 200 000 or so years spanning from the lowest Acheulean levels to the beginnings of the Yabrudian, most of that time went by unrecorded in the Nadaouiyeh stratigraphy. Such observations, that are present throughout the sequence, have to be kept in mind while drawing conclusions.

The evolution of the Acheulean in Nadaouiyeh is marked by a number of abrupt and profound changes that are unevenly spaced in time. What happened in between these breaks remains a puzzle and is difficult to reconstruct. Nevertheless, even the fragmentary information available offers, for the first time in the Levant, an idea of what really happened in the course of the late Acheulean of this area, even as the full history is yet to be revealed. The changes visible in the stratigraphy of Nadaouiyeh

from one cultural unit to the next are not a regular progression, but present radical changes from one stage to the next. These alterations have to be seen in respect of long chronological intervals and a changing environment in the course of the middle Pleistocene. The relationship between these different human groups resides rather on a general common base and mutually shared concepts than on a cultural continuity in the proper sense.

Without the possibility to compare the cultural evolution model of Nadaouiyeh with other sites, it would be premature to declare it as the standard for the upper Acheulean in the Levant. Nevertheless, Nadaouiyeh is a unique reference for a better understanding of the upper Acheulean in the Middle East and its complex history. In the following, a short recapitulation from the oldest to the youngest archaeological units is presented (fig. 6).

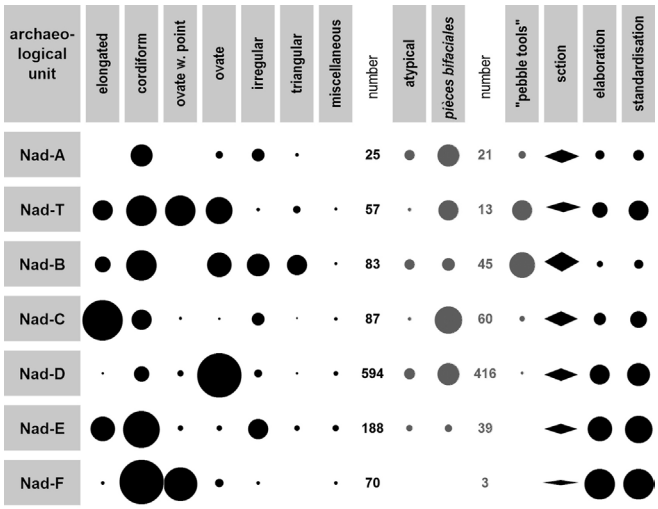

Figure 6 - Formal spectra of core-tools from the different units of Nadaouiyeh (size of dots according to the respective percentage).

Unit Nad-X

The oldest archaeological unit present at Nadaouiyeh consists of some handaxes, distinguished by their particular shapes and appearance from the amalgamated material in layer c.7 (the solifluction level described above). They are rather large handaxes (by Nadaouiyeh standards), with elongated contours and massive sections. They are manufactured in a quite uniform mode with surprisingly few and coarse retouches. This singular style in Nadaouiyeh evokes strongly the style typical of the Middle Acheulean of the Levant. Although stratigraphical confirmation is still pending, these particular handaxes clearly belong to the oldest period known from Nadaouiyeh. It can clearly be associated with the middle Acheulean of the Levant.

Unit Nad-F

The earliest period excavated in situ is characterised by an exceptionally high standard in the elaboration of the handaxes. All these tools present an astonishing evenness and perfection in shape and symmetry, exceeding by far pure functionality (Le Tensorer 2006). The standardisation of the handicraft is also expressed by an extremely low morphological variability, presenting a remarkable monotony of shapes. The highly aesthetical aspect of the handaxes and their outstanding workmanship is never again achieved in the following younger units. The identification of such an "evolved" production of handaxes in a definitely early period (just over half a million years old) is one of the big surprises of the excavations at Nadaouiyeh.

Unit Nad-E

Compared with the preceding period, the quality of elaboration of the handaxes diminishes, as well as the general sense of harmony of shapes. For the first time in Nadaouiyeh, a well-developed formal diversity is observed. There are two basic shapes with a strong formal standardisation and with a uniform and high standard of elaboration. In contrast to this, a good proportion among the handaxes are conceived and realised in a much more liberal way. This is particularly well expressed by a high percentage of irregular handaxes. Compared with its precursor, unit Nad-E presents several important changes: the monotony of the fabrication style decreases whereas formal variability clearly increases in favour of a more versatile system. The formal spectrum shows several clearly defined classes (fig. 7) that were produced each on in its appropriate way.

Unit Nad-D

Between unit Nad-E and its successor, Nad-D, a profound shift occurred in the spectrum of handaxes, which completely changed. Instead of elongated and pointed shapes, handaxes with ovate contours and blunt tips dominate by nearly two-thirds of the inventory. These broad handaxes have in common a frequent application of tranchet blows at their distal end. The preference for discoid and oval shapes among bifacial tools is also expressed by a surprisingly high number of pièces bifaciales. These clearly differ by their rather flimsy way of production from corresponding shapes of handaxes. Over all, drop shaped handaxes are rather rare, as are all other forms defined for Nadaouiyeh. Due to the general care given to the manufacture of handaxes, atypical bifaces are comparatively rare.

The geological layers containing archaeological unit Nad-D represent a stratigraphy of just 80–90 cm, which is interrupted repeatedly by discontinuities and erosions. Geoarchaeological investigations demonstrate a rather rapid sedimentation (Rentzel 1998; Pümpin 2003) within a few millennia. The hypothesis tending to a much longer period is against the geological and taphonomic observations. Of the six archaeological levels located within this section of the stratigraphy, four produced statistically sufficient inventories permitting a close study of cultural change within a short spell in terms of lower Palaeolithic archaeology. The four sub-units, labelled Da from the top to Dd at the base, display close affinities. The quality of the façonnage is surprisingly homogenous throughout all sub-units. However, distinctions comprise conceptual aspects in the making of bifacial tools, disclosing a clearly structured dynamism rarely seen in the lower Palaeolithic.

Following the evolution of bifacial tools within archaeological unit Nad-D, deep changes become apparent: in a linear evolution along regular steps, different shapes were replaced little by

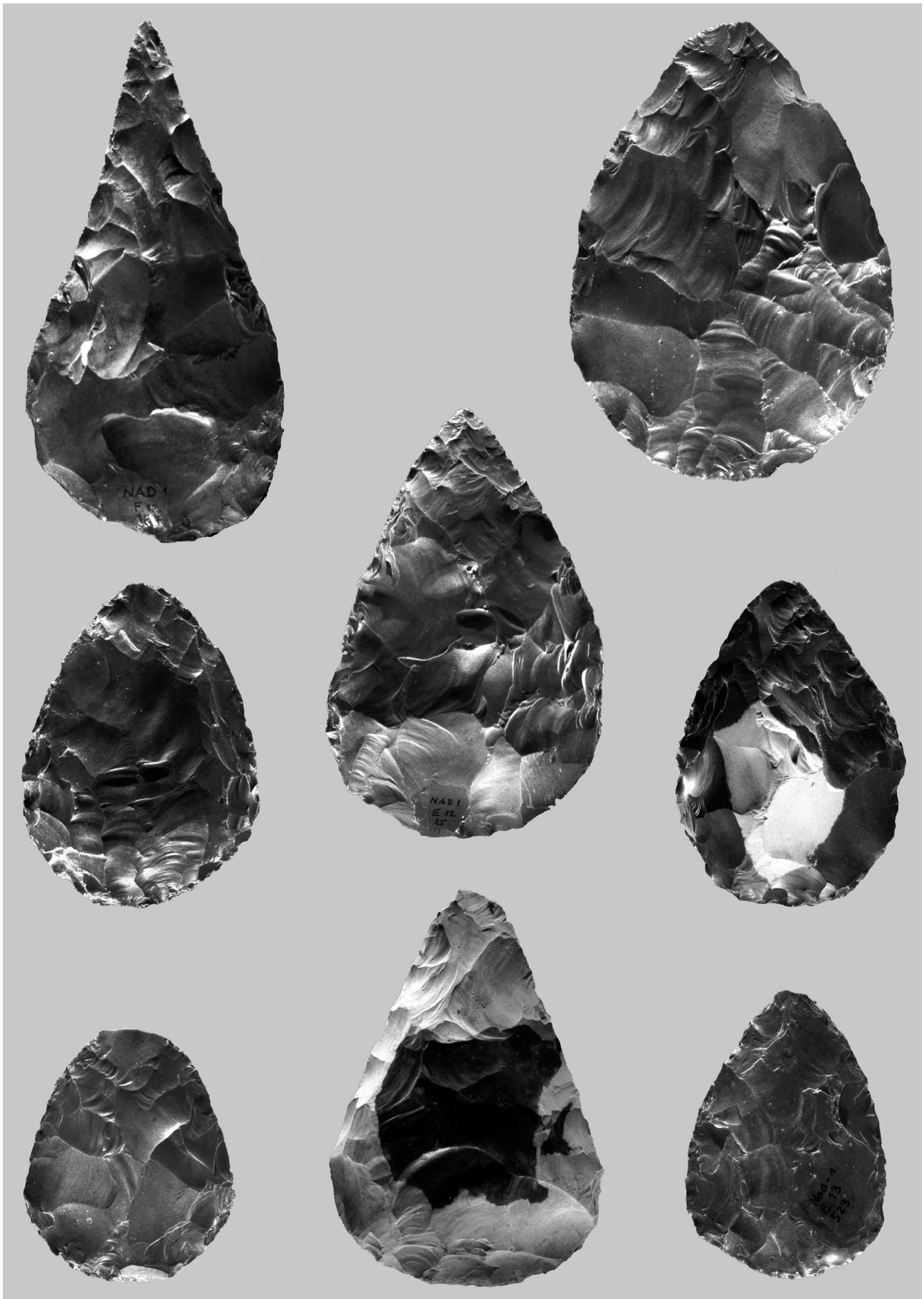

Figure 7 - Selection of handaxes from Nadaouiyeh Aïn Askar; scale half actual size (photo E. Jagher).

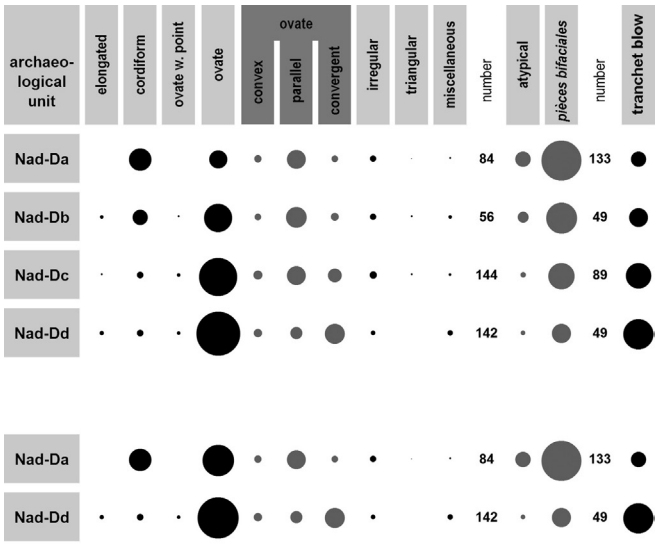

Figure 8 - Formal variation within Unit Nad-D (size of dots according to the respective percentage).

little (fig. 8). This concerns particularly ovate handaxes, which were replaced by drop shaped types. However, the accumulated proportion of both remains stable in the course of time (Dd 89%, Dc 82%, Db 79%, and Da 78%). Within the group of ovate handaxes, there is a replacement of convergent outlines in favour of parallel edges and rectangular shapes. At the same time, there is a sharp drop of tranchet blows on handaxes (Dd 50%, Dc 42%, Db 31% and Da 28%). From the early to the late period of Nad-D, pièces bifaciales make a steady appearance, rising from 26% in sub-unit Dd up to 61% in Da. All other forms of handaxes play just a minor part.

These changes proceed in a consistent way with a gradual exchange of specific elements. An evolution occurs comprising not only morphological aspects but also concepts concerning the tool set in its integrity. The difference between the initial and final state is so pronounced that without the intermediate stages it would be difficult to establish a clear, linear link. These changes are even more surprising as they occur within quite a short period. Palaeontological data show no significant change in the environment throughout unit Nad-D nor is there a shift in subsistence. Therefore, other mechanisms are responsible for the changes observed within Nad-D, but they elude a sound interpretation.

Unit Nad-C

At first glance unit Nad-C recalls to some extent unit Nad-E, an impression supported by the dominance of elongated handaxes, an affinity becoming easily apparent. However, the way handaxes were manufactured in unit Nad-C is completely different, with more massive and many plano-convex sections completely alien to its older counterpart. The dominant elongated shapes are achieved with more or less straight edges against clearly convex ones in Nad-E. The strong standardisation of proportions in top view among amygdaloids present in Nad-E is lacking in Nad-C. In contrast, the exceptionally well calibrated pièces bifaciales are numerous and represent one-third of the tools.

The differences between the two units Nad-E and C are too important to admit an inherent relationship. The strongly defined shapes of unit Nad-E are no longer present. The number of dominant shapes in Nad-C is much more restricted with a clear preference for elongated outlines, which are rare among all other units except to some extent in Nad-E.

Unit Nad-B

Between units Nad-C and Nad-B there is an important hiatus, when extensive erosion (i.e. the solifluction flow of layer c.7) completely modified the topography of the site. The subsequent period of intermittent deposition preserved the materials of the archaeological unit Nad-B in at least 15 separate levels. The bulk of the artefacts presented in this paper are limited to four main levels.

In unit Nad-B a nearly complete abandonment of any standardisation can be observed. Compared with the older units, the "archaic" appearance of the handaxes is stunning. Nevertheless, there are clear groupings and central themes in this material. Retouch, with some rare exceptions, is crude and rather schematically executed. As a result, their sections are the most massive of all units.

Within unit Nad-B there is a considerable proliferation of small tools which make up about half of the inventory. As in other units, there is a substantial proportion of atypical handaxes and pièces bifaciales and as a new "invention" the small core-like pebble-tools. These simple implements represent one quarter of all tools.

The apparently primitive trait expressed by poor standardisation and simple manufacture, however, simplifies the making of handaxes as the requirements of quality of the raw stones and their preparation diminishes considerably. A good number of the raw blocks, particularly for smaller tools, were collected from alluvial deposits, a resource only exceptionally exploited in older units. The ease with which the tools were manufactured in unit Nad-B displays a resourceful reduction to the essential with the least effort. A few rare exceptions from that basic scheme demonstrate conclusively that the people of unit Nad-B had the ability to produce exquisitely elaborated handaxes.

Unit Nad-T

Unit Nad-T, discovered at the very end of the excavations in one single level, completes the lower Palaeolithic sequence of Nadaouiyeh. Contrary to unit Nad-B, there is again a clear homogeneity among the handaxes concerning execution and shapes. There is a definite archetype clearly dominating. With these handaxes the maximum width is located well above the base, resulting in rather an oval shape. Consistently they feature a clear base and tip. Other shapes are rather rare. Overall, standardisation is poorly developed and morphological variation is considerable. Pièces bifaciales are still present in good numbers, whereas atypical bifaces occur rarely. Small tools made on little blocks such as true and core-like chopping-tools occur in a substantial proportion.

Due to taphonomic processes, the flint material of unit Nad-T is rather poorly preserved, and a reasonable appreciation of the flakes is strongly handicapped. However, the few cores do not show any trace of a well-structured débitage. Façonnage is still the predominant scheme, and unit Nad-T fits well into the Acheulean concepts observed in Nadaouiyeh.

Unit Nad-A

The most recent Acheulean unit discovered in Nadaouiyeh is definitely located above the Yabrudian and Hummalian occupations by its stratigraphic position. It is undeniably contemporaneous to the early Levalloiso-Mousterian. Its analysis is hampered by a rather limited number of handaxes, permitting us to draw general outlines only. Handaxes are of rather small dimensions with clearly thinner sections than the older units Nad-T and B. Small tools are limited to atypical bifaces and pièces bifaciales whereas the nucleus-like chopping-tools completely disappear. Retouched flakes are still as rare as in all the older Acheulean units. Despite a substantial number of cores, a deliberate production of flakes is absent. All cores are exploited in a simplistic and opportunistic way.

The existence of a typical Acheulean tradition with a clear predominance of a façonnage concept, with no or very few retouched flakes, contemporaneous with the Levalloiso-Mousterian was one of astonishing discoveries in Nadaouiyeh. Until now, this unique observation all over the Middle East is difficult to explain. Is it an isolated manifestation of something rare or was it part of a much more widespread but underestimated phenomenon? The late Acheulean facies described in the coastal regions of Syria could reflect such a phenomenon (Copeland & Hours 1979; Muhesen 1985). As all these sites are open-air discoveries, the stratigraphic context is lost.

The Acheulean in the El Kowm Area

Today a total of 31 "Acheulean" sites of greatly varying nature and significance are known in the El Kowm area (Le Tensorer & Hours 1989; Le Tensorer *et al.* 2001). In fact this perfectly mirrors the general situation of the Acheulean in the Middle East. Handaxes, considered a guide fossil for this era, by their robustness withstand strong taphonomic processes well. Even in a heavily battered state handaxes remain recognisable as such, and apparent sites are easily identified (Villa 1983). Hence, so-called "Acheulean sites" are reduced to the sole presence of handaxes. In fact more than three-quarters of the eligible "sites" produced just two or three handaxes (fig. 9), evoking the question of how many (diagnostic) artefacts make a site? If one looks at the numbers of handaxes discovered in excavated, truly Acheulean sites, handaxes always occur in substantial numbers. For a true site of that period, they can be expected by the dozens. In this light, isolated handaxes become as undiagnostic as a single swallow making a summer. In fact, the question has to be asked, how many of these sites are really what they are presumed to be?

In fact, handaxes are not the exclusive privilege of the Acheulean. Such tools were also produced to some extent during the Yabrudian, and there is no clear morphological differentiation between Acheulean and Yabrudian handaxes. Actually, isolated discoveries, besides rare exceptions perhaps, cannot be attributed for sure to a specific cultural background. As in controlled conditions Acheulean handaxes always appear in good numbers, stray finds of such artefacts conspicuously contrast to that principle.

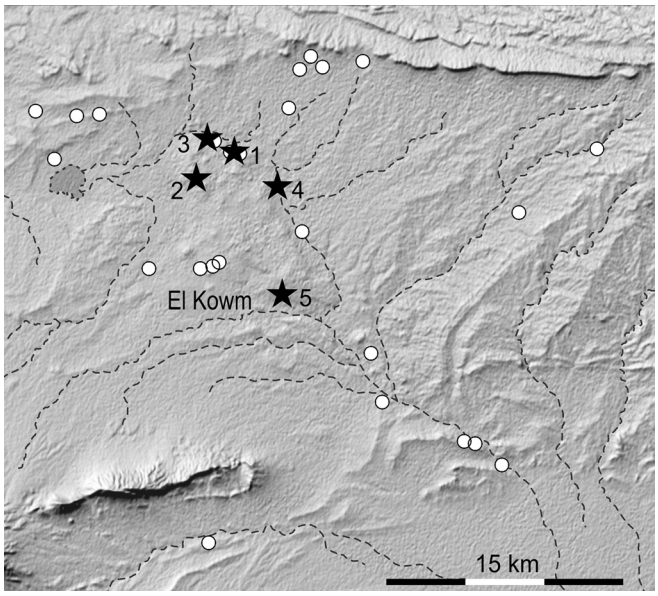

Figure 9 - Distribution of "Acheulean" sites in the El Kowm area. White dots locate discoveries with isolated handaxes (n<6); asteriks indicate true Acheulean sites where more than 30 hand axes were found. Sites mentionend in the text: 1 Nadaouiyeh, 2 Qdeïr South, 3 Qdeïr Aïn Ojbeh, 4 Juwal Aïn Zarqa, 5 Meirah. Multiple levels from Nadaouiyeh are not mapped.

Throughout the El Kowm area, rich Acheulean sites, having produced handaxes in substantial numbers, exist at five locations. Four of them have been subject to excavations. Besides the site of Nadaouiyeh, with more than 12 000 handaxes, there are in decreasing order: Qdeïr Aïn Ojbeh (597 bifaces), Juwal Aïn Zarqa (101 bifaces) – both investigated by the Institute of Prehistory and Science in Archaeology (IPSA) of the University of Basel – and El Meïrah with 78 bifacial tools (Boëda *et al.* 2004). From the fifth site (Qdeïr-South) 35 handaxes are known from a preliminary surface survey by the IPSA team.

With the exception of El Meïrah, dating to the Middle Acheulean, all the other discoveries correlate with an Upper Acheulean sensu Nadaouiyeh. The two excavated sites of Juwal Aïn Zarqa and Qdeïr Aïn Ojbeh were obviously affected by the same geochronological event corresponding to the solifluction flow observed in Nadaouiyeh. In fact, this observation is consistent with the archaeological evidence from both sites, showing strong affinities with units D and E from Nadaouiyeh, both clearly older than the mentioned solifluction flow. This event, happening most probably during MIS 12, must seriously have affected the whole region, obliterating most of the ancient surfaces. All earlier settlements not protected by a substantial sedimentation have been affected and largely disappeared from the archaeological record.

The Handaxe Phenomenon in the Levant

In the Levant and worldwide, the handaxe is one of the most fascinating artefacts of prehistory (López Junquera 1982). In Europe, "handaxes" played a major role in the authentication of prehistoric humans. The first discoveries date back to 1679 when John Conyers unearthed the first known handaxe together with elephant bones in Britain (Capitan 1901). Even before the recognition of "antediluvian man", handaxes were identified as manmade tools of great age. In 1797, John Frere declared for the famous Hoxne handaxe belonging to "a very remote period indeed". In the nineteenth century, handaxes were the keystones for the acceptance of the antiquity of the human race (Boucher de Perthes 1846; de Mortillet 1883). Since this time, handaxes have become an icon of the Palaeolithic, particularly for its beginnings. It was deeply imprinted in the minds of scientists well into the twentieth century, attributing a deep but one-sided interest to these tools declaring them of particular importance. However, the perception of handaxes by prehistoric people assuredly was different from that of prehistorians.

Considering the lower Palaeolithic of the Middle East, there is a wealth of publications reflecting a long-standing research tradition. There are several hundred Acheulean sites reported from that area, suggesting an extremely rich legacy of that period. Many local and regional syntheses have tried more or less successfully to structure this phase. Although there is an impressive number of papers dealing with the lower Palaeolithic in the Levant, clear information about that period is modest. Well excavated and documented sites producing substantial numbers of artefacts are rare, and stratified sites with multiple occupations from different periods of the lower Palaeolithic are scarce. Available data from the few excavated Acheulean sites does not make it possible to establish an unambiguous chronological and cultural framework valid for the whole Levant. Besides the Nadaouiyeh stratigraphy, only in the cave of Umm Qatafa has an analogous succession of varied Acheulean levels been excavated (Neuville 1931, 1951). For all other sites information is limited. A further pending issue is chronology, as for all late lower Palaeolithic sites there are no precise datings.

Despite the rich heritage attributed to the lower Palaeolithic in the Levant, the question of the Acheulean is difficult to apprehend (Muhesen & Jagher 2011). First of all there is a widespread confusion in terminology. The expression "Acheulean" may express a chronological term or be a cultural attribution in a strict or a wide sense, or even allude to technological and typological approaches. In many cases, just the presence of the archetype of the handaxe was sufficient for an attribution to the Acheulean. Hence, numerous isolated discoveries labelled "Acheulean" contribute to a severe overestimation of that period, comprising prehistoric manifestations of diverse nature. Indeed the term "Acheulean" comprises an inconsistent entity suggesting a shared identity.

Handaxes as Cultural Traits

In a basic attempt to differentiate the Acheulean from its successors, the fundamental composition of 64 statistically sufficient inventories (i.e., at least 100 retouched artefacts) of the Acheulean and post-Acheulean from the Levant have been tested for their basic differences, i.e., the relation of handaxes versus retouched flakes. Chronologically this corpus has been divided into Acheulean and "Yabrudian" and associated occupations or roughly the periods of MIS 13–11 (528-364 ka) and MIS 10-8 (363-242 ka) (in the following, the term "Yabrudian" is used as a chronological entity). In a clear trend, the percentage of handaxes definitely separates the two periods (fig. 10). In a surprising observation already made for the Nadaouiyeh units, handaxes clearly dominate the Acheulean inventories, whereas the Yabrudian and contemporaneous collections exhibit a contrary trend, with a clear dominance of retouched flakes and a sharp drop of handaxes. Moreover, these results clearly confirm that the Nadaouiyeh materials, with their extremely low proportion of retouched flakes, contrary to the original apprehension, fall well within the mainstream of the Upper Acheulean.

For a better understanding, these observations were compared with the contemporaneous periods in Western Europe. The area of Western Europe, in this case comprising mainly southern Britain and France and bordering countries, was chosen as a reference, as most concepts and approaches concerning the prehistory in the Levant are based to a large extent on research done in these areas. During the same periods as defined for the Levant, in Western Europe a completely different history emerges. At the same time when handaxes flourish in the Levant, in Europe they occur in surprisingly low numbers and never dominate the spectrum of retouched tools, with some rare exceptions (fig. 10). In the subsequent period, contempo-

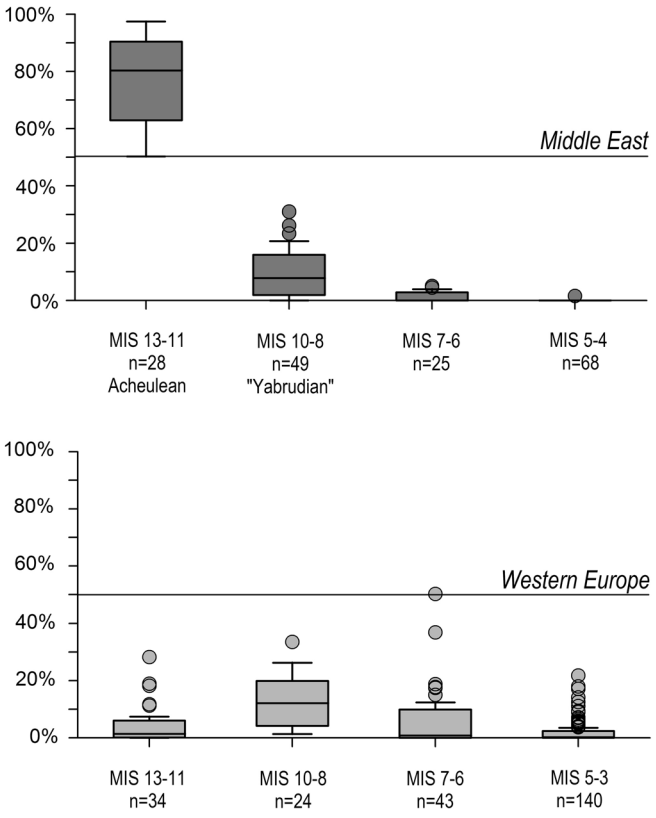

Figure 10 - Evolution of the handaxe-index (handaxes in percent of all retouched artefacts) in the Levant (top) and Western Europe (bottom).

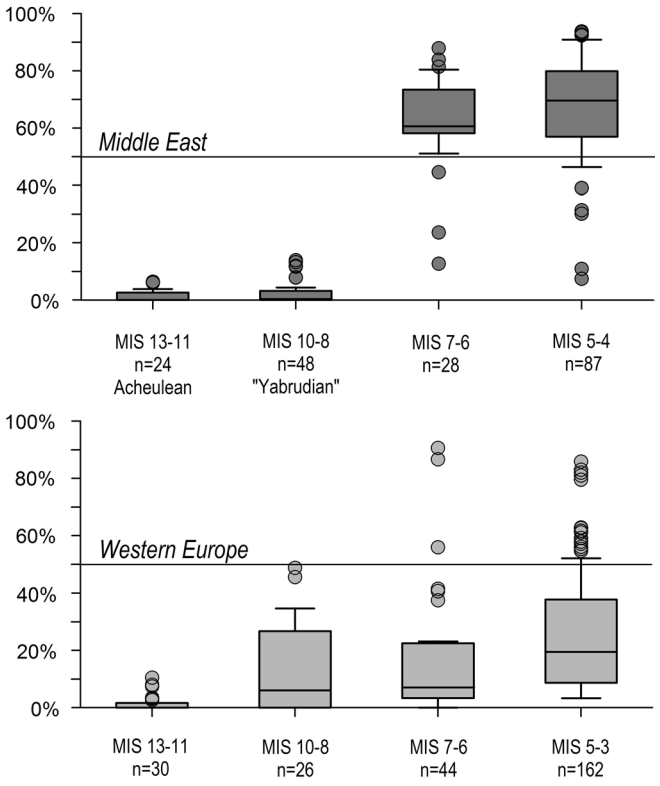

Figure 11 - Development of the Levallois technique (i.e. Levallois flakes vs. retouched artefacts) in the Levant (top) and Western Europe according to published data (bottom).

raneous to the Yabrudian in the Levant, the percentage of handaxes is identical with just somewhat smaller values in Europe. If this evolution is followed throughout the middle Palaeolithic, in the Levant handaxes virtually disappear from the archaeological record, whereas in Europe they persist in a low but steady numbers.

The unexpectedly low values for handaxes in Europe do not fall within the prevalent conception of the Acheulean, originally defined in northern France and southern Britain, and for long called the "age of handaxes". If considering this apparent antagonism, it rapidly becomes evident that the cherished old cliché is wrong. In fact, when the first Prehistoric periods were defined in the nineteenth century, scholars relied on materials produced by antiquarians rather than scientific excavations. Hence, the Acheulean in its traditional essence does not exist, a misapprehension that biased scientific perception well into the twentieth century and continues to some extent until today. Under this aspect, the new results from the Levant stand out, partially confirming traditional reasoning in an unexpected way. A further appreciation and the discussion of the consequences would go beyond the scope of this paper.

The Question of the Levallois

Another hotly debated issue is the relation of the Acheulean and the Levallois technique. In Syria, the presence of a "late Acheulean" associated with a clearly Levallois production is not demonstrated. A personal reappraisal of the Defaïan discoveries from Tulul Defai (Copeland & Hours 1993), a key site for this issue in Syria, showed the presence of a series of handaxes as well of incontestable Levallois cores, both in good numbers, but in each with a clearly different patina. Alleged Levallois cores from Acheulean sites are labelled atypical in many cases. Corresponding artefacts fall rather into the category of the pièces bifaciales that can easily be confounded with well-structured cores. "Levallois-like" flakes in an Acheulean context are not a proof for that specific technique. Particularly in sites where handaxes with a high refinement were regularly reshaped, trimming flakes may look deceptively like the presumed original (Copeland 1995). This observation is fully confirmed by the older Nadaouiyeh materials.

Even when taking published data about Levallois production in the Acheulean as such, an interesting scheme emerges. For a general comparison, the basic relation of Levallois flakes versus retouched tools was computed, again with a limit of at least 100 artefacts in the respective material (fig. 11). As in Europe, the Levallois component in the Levant during the MIS 13-11 is low, with somewhat higher values, most probably due to reshaping activities of handaxes. In the subsequent Yabrudian period, in the Levant a low Levallois percentage prevails.

In short, cultural evolution in the Levant and Western Europe shows strong inherent discrepancies. Whereas in Europe the general evolution from the upper Middle Pleistocene to the Upper Pleistocene seemed to have progressed at a regular pace, in the Middle East several distinct ruptures become evident. The first is a strong ebbing of handaxes in favour of retouched flakes from the Acheulean to the Yabrudian-complex and their complete disappearance later on. The second is the massive appearance of the Levallois technique and its dominant prevalence since the beginning of middle Palaeolithic i.e. after the Yabrudian period. In contrast, in Western Europe comparable changes do not occur, but a steady progression within a relatively broad mainstream can be observed. The reasons for the cultural ruptures in the Levant are difficult to explain. The chronological resolution of archaeological sites is still too poor to be linked directly with climatic events. However, the question arises why such ruptures are not present in Europe, much more exposed to the effects of climatic fluctuations during the Pleistocene?

Conclusions

The excavations in Nadaouiyeh Aïn Askar permit to recognise a surprisingly dynamic history of the Upper Acheulean between about 525 and 350 ka ago. Seven distinct stages succeeding each other show profound and complex changes within a definite theme, concentrated on core tools and the façonnage method of production. For the first time in the Levant it was possible to discern distinct multiple cultural stages within the Upper Acheulean in a clear stratigraphic setting. At present, seven distinct Upper Acheulean archaeological units are known from the Nadaouiyeh site, whose base is not yet explored.

Each unit stands out as a clear and individual cultural entity with little in common with its ancestors or successors, except for the mentioned mainstream of core tools. In the course of time, there is no "logical" evolution perceptible in the sense of a steady and linear change from a starting base to a final stage.

The observed changes concern technological, morphological, stylistic, as well as conceptual aspects. They occur individually or in combinations that are not in chronological order. Expected evolutions, for example, such as a steady flattening of sections, are discontinued by opposed tends (fig. 12). Cherished archaeological concepts for instance such as an evolution from primitive beginnings to an elaborate termination, have been belied, as the most refined handaxes were discovered at the base of the stratigraphy with the "crude" ones in the upper part of it.

In the past, Acheulean variability has been understood as a chronological phenomenon. The traditional concepts of understanding the Acheulean were hampered by the lack of stratigraphic control. Nevertheless, the Acheulean was already perceived as a dynamic period with several distinct groups (Muhesen 1985).

The example of unit Nad-D, with a particularly high chronological resolution, showed that profound changes are possible within the same cultural unit in a surprisingly short period, without any apparent interference such as environmental changes or a fundamental shift in subsistence. This surprising variability throughout the Upper Acheulean in Nadaouiyeh is striking evidence of a remarkable vitality of the handaxe traditions in the Levant. This conclusion is in stong opposition to conventional concepts considering the Acheulean as a more or less inert cultural period, with little progress in the course of time. The Nadaouiyeh example demonstrates the Levantine Acheulean to be as dynamic and versatile as much younger periods of the region.

A fundamental discovery within the Nadaouiyeh sequence is the observation that during the whole period of the handaxe traditions, no conceptual change at all of basic technological approach is discernible. During all that time, handaxes and their derivatives (i.e. all the variants of the core tool family) are produced in the façonnage concept. During the whole term of the Acheulean in Nadaouiyeh, intentional production of flakes in whatever method took place on an extremely low level. Consequently retouched flakes are rare and only accessory in the tool set. Despite this technological inertia, the bifacial concept is widely diversified, resulting in surprising solutions.

The study of the Nadaouiyeh handaxes demonstrated that morphological and metric analysis are possible on a general level only. Each handaxe is an individual product made from a singular and unstandardised blank. An accurate reproduction of a specific shape in exactly the same size is hardly possible. Consequently, a considerable variability is inherent, a fact rarely considered in studies of handaxes. In order to characterize such collections clearly, basic statistical requirements have to be met. The extremely rich levels in Nadaouiyeh permitted us to establish a minimal base for a statistical approach, in order to distinguish Acheulean units beyond qualitative statements, something rarely respected in sites of that period. Even in units with an evident standardisation, variability remains significant, due to the basic constraints of how handaxes were produced.

The Nadaouiyeh stratigraphy and its unique succession of handaxe traditions is an important showcase for the Upper Acheu-

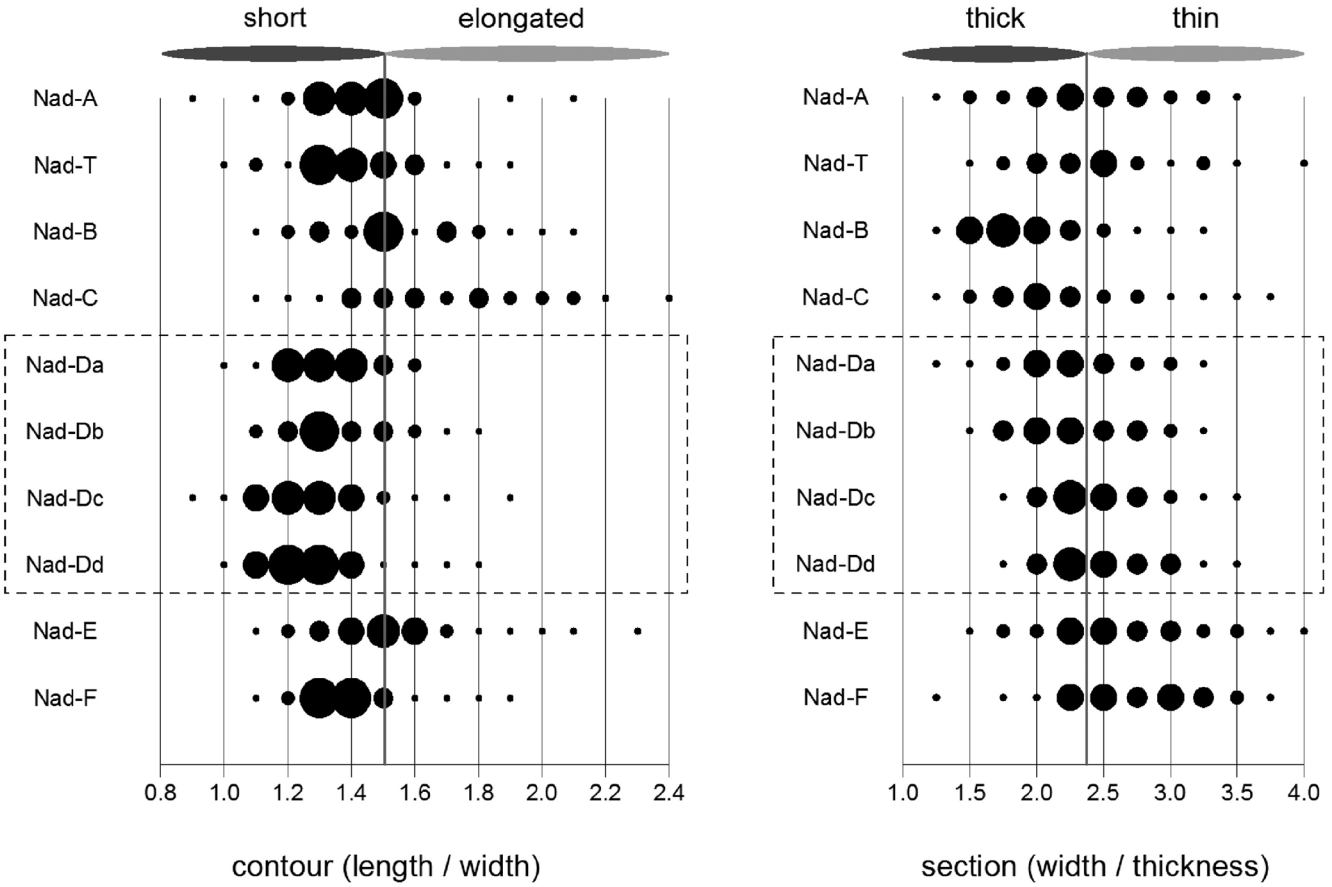

Figure 12 - Comparision of change in the proportions of the contour and section throughout the Nadayouiyeh Aïn Askar sequence.

lean of the Levant. However, the Nadaouiyeh sequence is far from being complete, and Acheulean variability could have been even wider than one might imagine. As there is just one single example of that history, it would be treacherous to declare it the sole reference to tell the story. Other sites, confirming and extending the Nadaouiyeh results, are essential in order to complete the picture of the Upper Acheulean.

When comparing the well-documented periods of the Acheulean (in the cultural sense) between the Levant and Europe, approximately in the time of MIS 13–10 (about 525–350 ka), drastic differences become apparent. In the Middle East, handaxes and core tools always prevail in a strong majority with flake tools being a sort of minor accessory. In Europe, the situation is inversed, with a strong predominance of flake tools and surprisingly few handaxes. The Levantine Acheulean is consistent with the classical cliché of a tradition rich in handaxes, to which the situation in Western Europe is strangely opposed (at least concerning conventional concepts). Due to the scarcity of information about the handaxe phenomenon during the middle Pleistocene in Eastern Europe, it is difficult to trace a limit between the European and Levantine realm. In subsequent periods, affinities between the two regions become more visible. About 350 ka ago, handaxes lose their popularity in the Levant ceding their dominance to different concepts, favouring smaller and more versatile tools. In this phase Europe and the Middle East converge in a surprising way. Whether it is a congruent phenomenon or if a cultural exchange really took place and, if so, in which direction, remains to be decided. With the onset of MIS 7 (roughly 250 ka ago), another break occurred in the Levant. With the arrival of the Levallois production scheme, handaxes disappear almost completely from the archaeological record of the Middle East. Again, a profound discrepancy during the whole period of the Middle Palaeolithic separates the Levant from its contemporaneous cousins in Europe. The strong and steady prevalence of the Levallois production concepts in the Levant is the clear hallmark of that period along the eastern shores of the Mediterranean. In such an environment the comeback of a strongly "Acheulean influenced" technological tradition, such as the Epi-Acheulean from unit Nad-A from Nadaouiyeh, was rather a surprise. Obviously, somewhere within the precincts of the Levant, archaic concepts survived with people who were not attached to the prevailing Levantine mainstream.

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