THE OLDEST COMPONENTS: THE PALEOLITHIC AT UMM AL-JIMĀL

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Introduction

I had learned much, prior to my arrival in 1996, about the classical architecture and archaeology of Umm al-Jimāl, but I was surprised to find upon my first visit that the Romans were not the first people to set up residence at the confluence of Wādī az-Zaʻatarī and Wādī Abū al-Kūʻ. All about the surface of the ground in the Roman village area and the surrounding hilltops were scattered numerous chert artifacts. Unfamiliar with Old World lithic technology, I did not recognize the significance of this scattered assemblage of stone tools and debitage until I returned in 1998, this time as supervisor of the field work in the Area R, the Roman-era village (al-Hirrī, SE of Byzantine Umm al-Jimāl). This time, armed with two years of experience in lithic analysis with a North American Cultural Resource Management firm, I set about sampling the lithics, and documented for the first time, the oldest components at Umm al-Jimāl.

Methodology

As part of the investigations of Area R, as the Roman village site was designated, an intensive survey of the area was orchestrated in order to define the limits of the village deposits, map the area, and assess the distribution of diagnostic artifacts that might indicate the breadth of time the village was occupied. The field school students who assisted with the survey were instructed to collect all chert artifacts along with any ceramics or metal objects that comprised the classical assemblage. A datum was established to the southwest of Area R, and a baseline was extended from here straight east 500m just beyond the main scatter of rubble. Transects were placed every 25m along this baseline. Each transect extended around 550m northward across Area R up to a row of modern houses which had been constructed in the last decade along the modern highway that passes between the Roman village and the standing ruins of the Byzantine and early Islamic town. In all, an area of roughly 277,500 sq. m was surveyed. All potsherds, metal items, and non-basalt stones were collected in a 3m wide lane along each transect. All collected material was bagged in 25-meter increments along the south-north transects in order to get a rough idea of artifact distribution. A total of 17 transects were completed resulting in slightly over a 0.4% sample of all surface material in the area.

One of the most significant results of the survey was the first systematic collection and mapping of prehistoric components at Umm al-Jimāl. Upon initial analysis, it became evident that the lithics represented the entire range of Paleolithic periods. All lithic artifacts were superficially analyzed according to artifact type and were placed in the following categories: Shatter, flake, Levallois flake, blade, bladelet, random core, Levallois core, bladelet core, bifacial handaxe, scraper, and burin (see Appendix A for definitions). Each artifact was catalogued by type, provenience, date collected, color, and raw material. Since little work has been done on identifying lithic raw material sources in the area, raw material was catalogued according to its basic type (eg. chert, quartzite, limestone, etc.).

Research Goals and Theoretical Framework

The initial goals of the survey and analysis of the lithic assemblage were simply to identify the cultural affiliation of the lithic component and assess its significance for research into the culture history of Umm al-Jimāl. The potential for deeper theoretical implications, however, were quickly recognized.

The lithic artifacts recovered in the survey reflect the entire range of Paleolithic technologies in the Levant. When compared to the more thoroughly investigated Paleolithic sites in Jordan, the assemblage is small, but the significance lies in the site's position on the landscape. Umm al-Jimāl is perched approximately 5km east of the western edge of al-Ḥarra, the Black Desert; named for the basalt bed rock which was formed as massive lava flows during the upper Tertiary and Quaternary ages. The Black Desert stretches in a broad swath between 50 and 150km wide across eastern Jordan. The basalt represents six major phases of lava flow from the Jabal Druze, a small range of extinct volcanoes in southern Syria (Bender 1974: 107) which loom 50km to the northeast of Umm al-Jimāl. The youngest flows comprise the bedrock at Umm al-Jimāl and date as recently as 65,000 BP. (de Vries 1998: 91).

This basalt, which ranges from 150-300m in thickness (de Vries 1998: 91), covers a plateau of carbonate rocks of Mesozoic age (Bender 1974). No Paleolithic tools manufactured from local basalt were recovered at Umm al-Jimāl. Identifying such tools would be difficult since the classical methods of rough dressing of basalt building stone involved percussion shaping resulting in a preponderance of basalt "flakes" scattered throughout Area R. The local basalt tends to be fairly grainy and porous, however, and it seems unlikely that it would have been utilized for chipped stone tools. Chert-bearing Eocene-Paleocene limestone, which outcrops around 35km to the south and 20km to the northwest of Umm al-Jimāl, represent the closest natural deposits of suitable lithic raw material available to the Paleolithic visitors to the area. Since all chert artifacts found at Umm al-Jimāl must be transported at least 20km from the nearest source of raw material, the lithic assemblage from Area R can provide insights into the curation of tools and mobility of people throughout the Paleolithic.

The concept of curation has been examined widely in recent years in order to explore patterns of behavior among prehistoric hunter-gatherers. Mobility is a factor in the lifeways of hunter-gatherer groups whether extant or prehistoric (Kelly 1992). The level of mobility then is a major variable in technology. Hunter-gatherer groups that move about the landscape frequently must have a technology that allows for this type of lifestyle. The technological responses to such high levels of mobility can come in two basic forms. On one hand, the technology can be expedient. In this type of technological organization, raw materials for tools are abundant enough on the landscape that when a tool is needed, the raw material can be expeditiously procured, and the tool can be manufactured, used, and discarded on the spot. The other response is curation. Technology organized in this way emphasizes portability. Tools are produced that are light enough to carry for long distances, have multiple functions, and have long use lives (Odell 1996).

The Levantine hunter-gatherers of the Paleolithic exercised a certain level of mobility as indicated by the presence of chert tools at Umm al-Jimāl, at least 20km from their source. Undoubtedly, then, they faced constraints on their technology as a result, and organized their technology with mobility in mind. By analyzing the types of tools represented in the Umm al-Jimāl assemblage, we can identify diachronic changes in technological organization in response to mobility.

The Paleolithic Chronology at Umm al-Jimāl

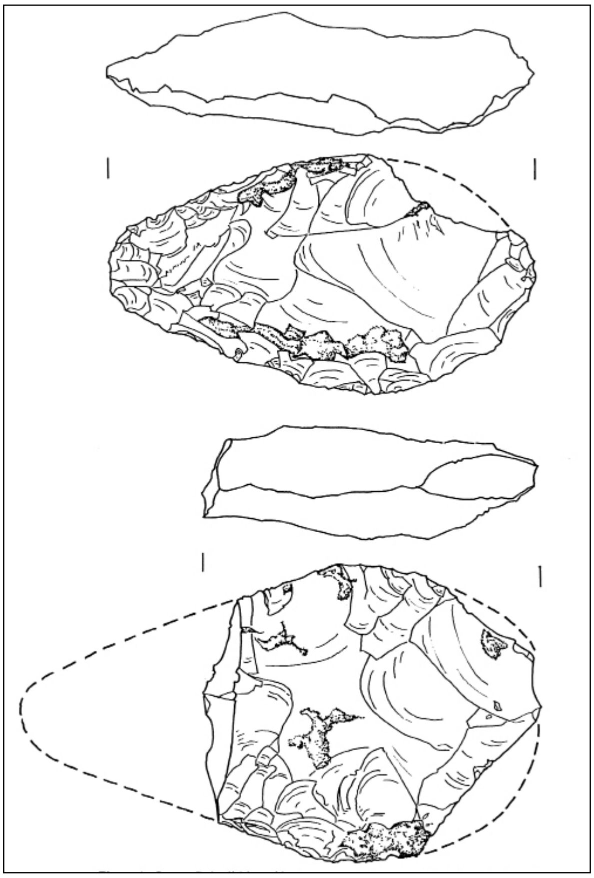
Only a few artifact types can be traced to individual periods in prehistory, and often times there is considerable overlap as certain tools were used in decreasing frequency while use of other tool types slowly increased. Most Old World prehistoric traditions are identified by the *frequencies* of different artifact types instead of the mere presence of certain tools or technologies. Nonetheless, there are a few technologies that are in a general sense widely considered to be *fossiles directeurs* of specific periods, even though they may show up in reduced numbers in earlier or later periods. Only artifacts representative of these more-or-less diagnostic technologies were used in constructing the Paleolithic chronology at Umm al-Jimāl.

Lower Paleolithic

The Lower Paleolithic comprises the earliest evidence for prehistoric humans in the Levant. While stone technology had begun with the Oldowan complex in east Africa by nearly 2.4 million years ago (Johanson and Edgar 1996: 250), evidence for stone tool use by humans in the Levant does not show up until at least 700 millennia later. Only one site of this antiquity has been thoroughly investigated in the Levant. This site, called ʻUbeidiya, is located in the Jordan Valley just south of the Sea of Galilee. The site consists of nearly 150m of lake and river deposits with over 60 individual cultural horizons ranging from a Levantine variety of Oldowan technology to a local variant of the Abbevillian complex, which is characterized by crude bifacial handaxes (Goren-Inbar 1995: 103-106). The strata have been dated by their associated faunal remains and other methods to between 1.2 and 1.4 mya (Goren-Inbar 1995: 97; Johanson and Edgar 1996: 46).

ʻUbeidiya represents the earliest forays by human ancestors out of Africa. These people are widely accepted to have been *Homo erectus* (Copeland 1998: 5), although no fossils directly attributable to this species have been recovered in the Levant. *Homo erectus* fossils in East Asia and southeast Europe, however, indicate that they must have passed through the Levantine corridor (Bar-Yosef 1987). A new date on *Homo erectus* bones from Java, as well as recent discoveries at the site of Dmanisi in eastern Georgia, indicate that this initial exodus took place over 1.8 mya (Johanson and Edgar 1996: 46). The Dmanisi remains probably represent the earliest hominids that passed through the Levant. These have been recently classified based on skeletal morphology as *Homo ergaster* (www.dmanisi.org), the African ancestor of *Homo erectus*.

By around 350,000 years ago, stone technology in the Levant had been refined into the Achuelean techno-complex dominated by well-made bifacial handaxes, cleavers, and picks. It is this technology which is first represented at Umm al-Jimāl where two such handaxes were recovered (**Fig. 1**). Both are distinctly ovoid and are manufactured from the same type of heavily patinated pale yellowish brown (10YR 6/2) chert with pale brown (5YR 5/2) horizontal bands and patches of chalky very pale brown (10YR 8/3) to reddish yellow (7.5YR 7/6) cortex. One handaxe measures 125.1 mm in length with a maximum width of 72 mm, although more recent flaking of



1. Lower Paleolithic artifacts recovered from Area R. Acheulean handaxes.

the handaxe near the thick end, as indicated by non-patinated flake scars, has removed a portion of the widest part of the artifact. The other handaxe has been broken roughly in half in more recent times based on the differential patina on the break. The original specimen probably measured around 159 mm in length and was 87.7 mm wide.

The handaxe was probably a fairly versatile tool. Use wear studies have indicated that handaxes were used for a broad range of activities including cutting, chopping, crushing, and digging (Keely 1980). Handaxes may have also functioned as cores for the removal of sharp irregular flakes which could have served as efficient tools for more precise cutting (Kelly 1988: 719). In this way, Acheulean handaxes were efficient curated tools. They were fairly light and compact, had multiple uses, and could be resharpened through bifacial retouched if they became dull or damaged. Both bifaces were probably discarded in Area R by their Lower

Paleolithic owners. The smaller of the two has fairly steep edges characterized by multiple step fractures. This probably indicates that the handaxe had served as a core on several occasions for the removal of sharp cutting flakes. When the edges of the biface became too steep to remove flakes of sufficient size, the handaxe was discarded. Multiple uses of this specimen are hinted at by the edge damage. In particular, a long flake extending down one face from the pointed end of the tool resembles an impact fracture, probably produced during some sort of heavy chopping activity.

The cause for disposal of the other handaxe is more difficult to determine. The breaking in half of this specimen seems to have taken place well after its initial discard based on the differential patina. Large flake scars at the wide end, however, seem to have resulted from flaking during the tools original use life. These flake scars disrupt the regular outline of the tool and probably rendered it inefficient for chopping activity along that edge.

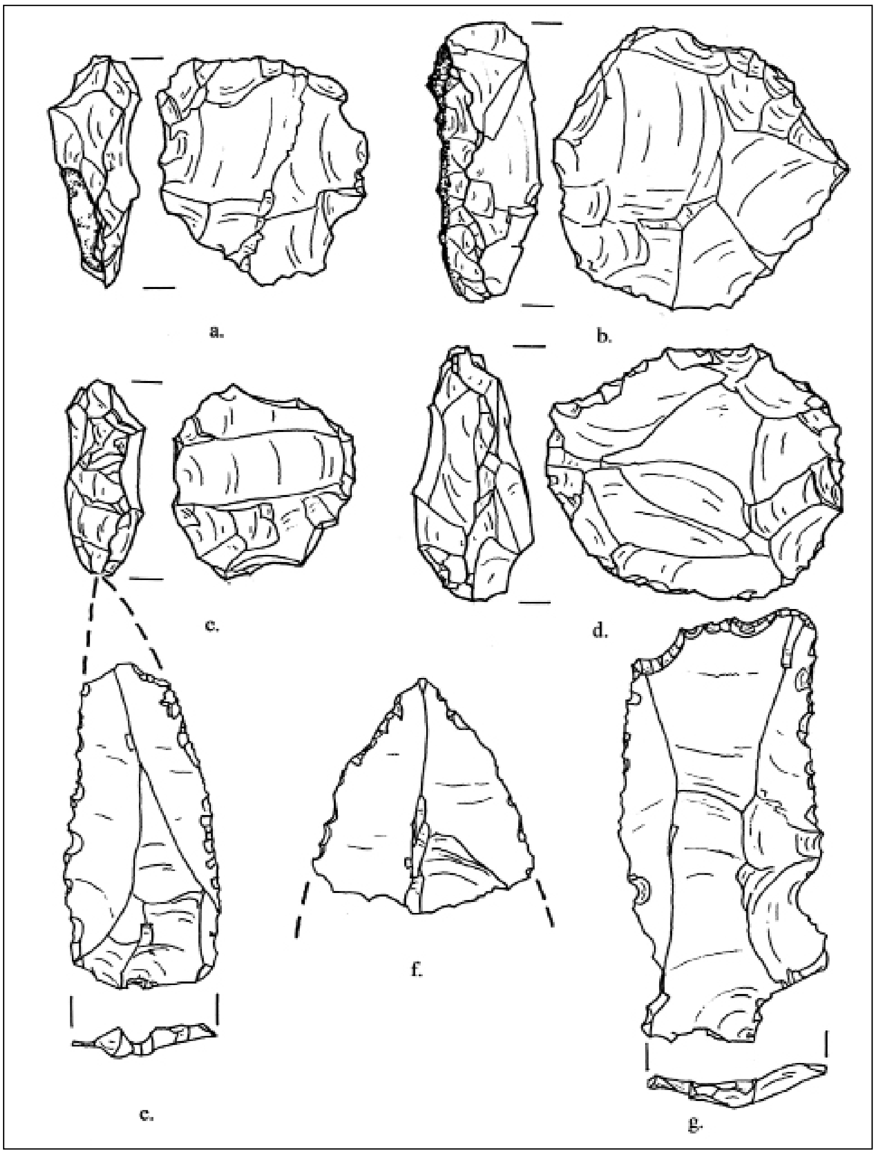
The dates of the Lower Paleolithic component at Umm al-Jimāl are difficult to determine since both diagnostic artifacts were recovered from surface contexts which were heavily disturbed beginning in classical times. If the bedrock in the area can in fact be dated to 65,000 BP., this would provide a *terminus post quem* for the earliest use of the site by humans, but this does not seem to be the case since the Acheulean techno-complex only lasted until about 128,000 BP in the Levant (Goren-Inbar 1995: 93).

Recent work in the vicinity of Jāwā near the center of the basalt plateau has demonstrated that cave speleothems were in an active state of development at certain times throughout the Pleistocene (Frumkin *et al*. 2008). Since relatively wet conditions are required for water to permeate bedrock cracks and deposit sufficient calcite to form flow stone in caves, this indicates periods of wetter conditions during the Paleolithic. Three periods of speleothem growth were documented dating to 250,000-240,000 BP, 230,000-220,000 BP, and 80,000-70,000 BP. The former two wet periods occurred during the Lower Paleolithic and suggest that human migrations into the Huaran may have occurred during these intervals when water and resulting plant and animal resources would have been more plentiful. The latter date occurred toward the later part of the Middle Paleolithic which is also represented at Umm al-Jimāl.

Middle Paleolithic

The Middle Paleolithic is characterized by the Mousterian techno-complex, which is represented by artifacts produced through the Levallois technique. In Europe, this technology is associated with *Homo neanderthalensis*. Neandertal remains have been well-documented throughout the Levant. This group is similar in skeletal morphology to the classic European Neandertals, and their material culture is very similar. In addition to Neandertals, some of the earliest true *Homo sapiens* (Johanson and Edgar 1995: 239) -- occasionally referred to as "Proto-Cro-Magnon" -- are also found in the region (Bar-Yosef 1995: 114). Both populations utilized the Levallois technique which persisted from around 200,000 to 40,000 years ago, thus overlapping for several millennia with earlier Lower Paleolithic traditions (Johanson and Edgar 1996: 256).

The Middle Paleolithic artifacts from Umm al-Jimāl consist of considerable evidence for use of the Levallois technique. Seven cores are demonstrably prepared as radial Levallois cores. These are made from a variety of cherts including dark yellowish brown (10YR 4/2) varieties and a yellowish gray (5Y 8/1) chert with moderate red (5Y 5/4) horizontal bands. Most of the cores are so heavily patinated that determination of the original color of the chert is impossible. The cores can be grouped into two categories by size (**Fig. 2**). The large category ranges from 50 to 59.4 mm in diameter (mean 50.92 mm) and between 62 and 97.4g in weight (mean 75.53g). The smaller category ranges from 29.5 to 45.3 mm in diameter and from 17.2 to 29.1g in weight with a mean diameter of 36.16 mm and a men weight of 22.23g. Despite the range of sizes, all of the cores seem to have been used to exhaustion. The largest core seems to have been unintentionally broken in half during use, ending its use life. The next two smaller cores could have still produced small flakes, but these would have been of insufficient size to be used to any great extent. The small class of cores represents the fullest extent of possible reduction using the Levallois technique. When compared to Leval-



2. Middle Paleolithic artifacts from Area R. Small radial Levallois cores (a,c), larger radial Levallois cores (b,d), Levallois points (e,f), heavily-utilized Levallois flake (g).

lois cores from other sites in the Levant, these cores are anomalously small (Nancy Coinman, personal communication April 2001). This may indicate that Umm al-Jimāl was near the limits of penetration by Middle Paleolithic people up the wadi into the Black Desert. Indeed, Middle Paleolithic sites are few and far between in al-Ḥarra (Betts 1998). Elsewhere in the Levant, the Middle Paleolithic archaeological record seems to reflect a settlement pattern consisting of semi-sedentary base camps surrounded by special purpose logistical sites (Potter 1993). Umm al-Jimāl may represent one such logistical site at the outer margins of a Middle Paleolithic collecting radius.

The Middle Paleolithic component at Umm al-Jimāl is also represented by a handful of Levallois flakes and points. The assemblage probably includes many more than were classified, but millennia of weathering and trampling has eroded or broken the diagnostic faceted platforms that herald the Levallois technique. Seven tools have been identified with faceted platforms. These include two Levallois points, four utilized Levallois flakes, and one Levallois flake retouched into a side-scraper. The cherts used for the tools are similar to those represented by the cores. All of the tools bear evidence of being heavily curated, including retouch along the edges.

Upper Paleolithic

By around 45,000 years ago (Gilead 1995: 129), new lithic technologies dominated by the production of long parallel-sided blades were emerging. This marks the beginning of the Upper Paleolithic period. Only a scattered handful of human remains dating to this time have been found in the Levant, but based on finds in Europe, Neandertals may have persisted into this period, living side by side with anatomically-modern humans employing similar adaptive strategies (Gilead 1995). Much of the evidence for the Upper Paleolithic in Jordan comes from sites along the shores of dry Pleistocene lakes and marshes such as those of the Wādī al-Ḥasā area east of the Dead Sea (Coinman 1998).

Upper Paleolithic assemblages in the Levant have been divided into two basic types based on the frequencies of different artifact types. On the one hand, the Ahmarian is characterized by well-made blades which were retouched into a variety of tools including backed cutting implements and long narrow projectile points (Coinman 1998: 40). This technology is thought to have evolved from local Mousterian traditions (Gilead 1995: 130).

The other technology is referred to as the Levantine Aurignacian, based on its similarity to the Upper Paleolithic Aurignacian tradition of Europe. Indeed, it has been proposed that the Levantine Aurignacian was a result of an influx of European Upper Paleolithic people into the Levant around 40,000 years ago (Gilead 1998: 130). The Levantine Aurignacian differs from the Ahmarian in the greater frequency of scrapers and burins in the former (Coinman 1998: 40), possibly reflecting a greater emphasis on hide and bone working.

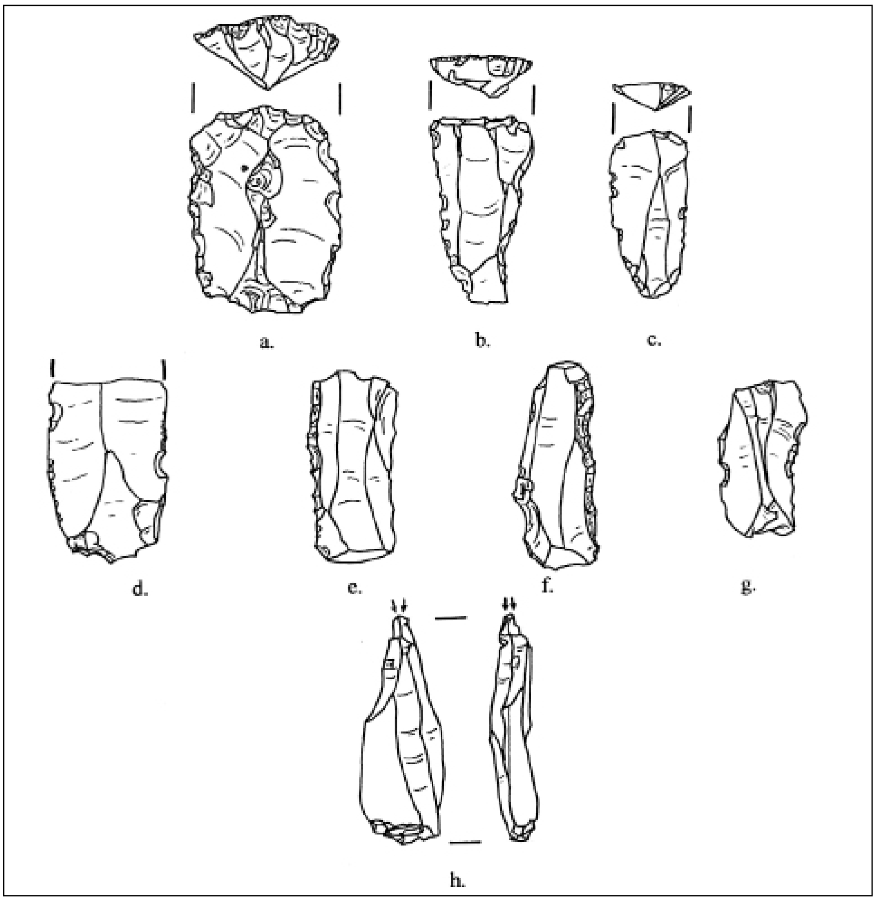
It is tempting to attribute each of the two different Upper Paleolithic traditions in the Levant to different hominids given the probable coexistence of Neandertals and anatomically modern humans there, but archaeologists have been loathe to do so. Rarely are explanations that simple. The very existence of two separate traditions is not without question, and the lack of good radiometric dates from this time complicates the problem (Coinman 1998: 56).

The Upper Paleolithic at Umm al-Jimāl is represented by a number of blades and blade fragment as well as scrapers of various types. Only one artifact can potentially be assigned to one of the two traditions, namely a nosed end-scraper, a tool commonly associated with Aurignacian tool kits (Coinman 1998: 40). This artifact is manufactured from coarse opaque chert with pale yellowish brown (10YR 6/2) and very pale orange (10Yr 8/2) bands and exhibits steep scalar retouch. The blades also exhibit heavy use-wear and retouch. At least 26 blades and blade fragments were recovered. These were manufactured from a broad variety of cherts including light yellowish brown (10YR 6/4), dusky brown (5YR 2/2), and pale brown (5YR 5/2) varieties. Three endscrapers manufactured from blades were also recovered. Only one of these, however, exhibits extensive retouch (**Fig. 3**). One polyhedral burin can also be included with the Upper Paleolithic component (Figure 3). The burin is manufactured from pale brown (5YR 5/2) chert with grayish orange pink (5YR 7/2) mottles. The working edge has been rounded off with use, probably prompting the discard of the tool. Curiously, no blade cores were recovered. Although relying on negative evidence is a faux pas, this may indicate that blade cores were too large to be efficiently transported on long collecting forays. Upper Paleolithic hunter-gatherers may have instead tooled up with a supply of ready-made blades at their base camp prior to mobile excursions. These blades could in turn be manufactured into a variety of tools as the need arose.

Epipaleolithic

The size of blades decreased through time, culminating in the bladelet technologies that dominated the Epipaleolithic period beginning around 20,000 BP. and lasting until around 10,000 years ago (Goring-Morris 1995: 141). Anatomically modern *Homo sapiens* had emerged by this time as the only living hominids. Widespread variation of lithic assemblages during this period has led to the identification of numerous Epipaleolithic cultural complexes in the Levant (Byrd 1998). In the desert of northern Jordan, only one of these dominated throughout much of the Epipaleolithic.

The Geometric Kebaran techno-complex is characterized by a high frequency of geometric microliths, retouched fragments of bladelets which were reworked into various shapes in-

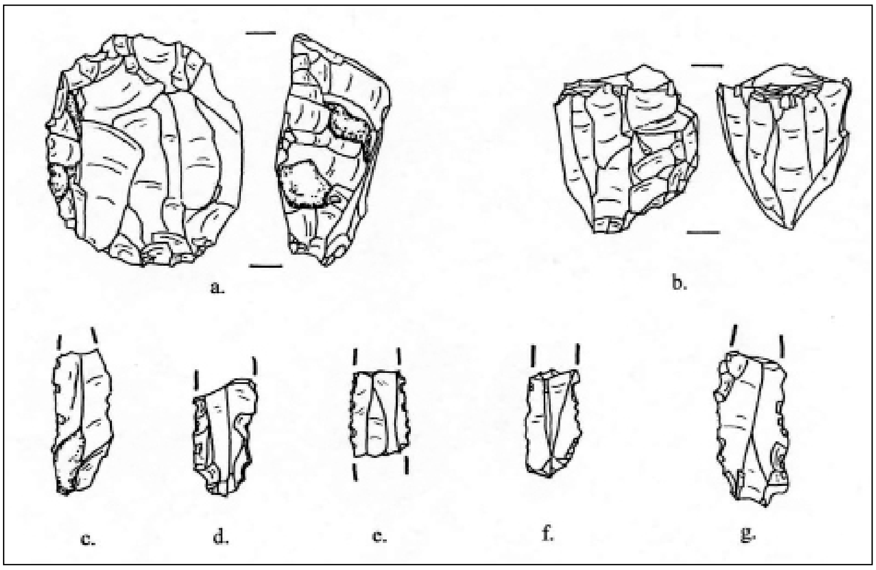


3. Upper Paleolithic artifacts recovered from Area R. Endscrapers on blades (a-c), large blade proximal fragment (d), retouched blade (e), utilized blades (f,g), polyhedral burin (h).

cluding triangles, trapezoids, rectangles, and lunates, presumably to be hafted into bone or wood in the manufacture of composite tools. Geometric Kebaran sites have a wide distribution over Israel, Jordan, Syria, and Lebanon. These sites often include evidence of non-standardized flimsy dwellings with hearths and stone storage features. Only two burials have been found that can be attributed to this culture, and both yielded grave goods consisting of stone grinding tools (Goring-Morris 1995: 156). Geometric Kebaran sites in al-Ḥarra consist of a handful of small campsites near reliable seasonal water supplies (Betts 1998: 6). These are usually composed of sparse scatters of lithics, including backed and truncated bladelets and occasionally cores and knapping debris (Betts 1998: 11). This is precisely the nature of the Epipaleolithic component at Umm al-Jimāl. Bladelet technology persisted into the Late Epipaleolithic with the Natufian culture, which holds the distinction of being the first semi-sedentary farmers in the Near East (Valla 1995).

Twenty-one bladelets and bladelet fragments were recovered in the survey of Area R (**Fig. 4**). They are manufactured from many of the aforementioned cherts and generally exhibit far less patina than the lithics from previous periods. All are fragmented to a certain extent, and some may have been intentionally truncated. Only five of the bladelets exhibit any significant retouch, and all of these have heavy patina and probably represent earlier blades which have been worked down to widths less than 12mm. However, all of the bladelets do exhibit use wear; on many, the wear is extensive.

Of greater interest than the bladelets are three exhausted bladelet cores that were recovered just to the southeast of the Roman village. The largest of the three is composed of hacky white (10YR 8/1) chert with gray (10YR 5/1) mottles. It has a single platform and weighs 70g. The second largest (**Fig. 4**) is an opposed platform core manufactured from grayish red (5R 4/2) chert with a moderate orange pink (5YR 8/4) patina and weighs 37.2g. The smallest (**Fig.**



4. *Epipaleolithic artifacts recovered from Area R. Opposed platform bladelet core (a), bi-polar bladelet core (b), utilized bladelets (c-g).*

4) is a dainty bipolar bladelet core made from high quality pale yellowish brown (10YR 6/2) to grayish red (10R 4/2) chert. It weighs only 22.1g. and has a heavily step-fractured lip. Also of interest is a core trimming element from a bladelet core manufactured from the same raw material as the smallest of the three cores. A few of the bladelets are composed from this same material as well as the reddish chert of the second smallest core.

The Epipaleolithic component represents resurgence in the curation of cores, probably facilitated by their small size. Raw material seems to have been carefully conserved, and only discarded once the cores were exhausted and the bladelets were broken or became too nicked or dulled from use to be efficient tools.

Conclusion

The Epipaleolithic did not represent the last use of lithic technologies at Umm al-Jimāl. However, unlike the center of the basalt plateau to the east where occupants of the Chalcolithic-Bronze Age city of Jāwā developed advanced rainwater diversion and collection systems by the 4th millennium BC (Helms 1981), the area around Umm al-Jimāl seems to have been largely unoccupied until the Early Roman period when advances in engineering allowed for exploitation of runoff for maintaining a permanent water supply (de Vries 1998: 93). Prior to this, mobile groups passing through would be forced to depend on water seasonally pooled in wadi systems (Betts 1998: 2). While there is evidence for periods of greater humidity throughout the Paleolithic (Henry 1982: 42; Frumkin *et al*. 2008), the wadis of the Black Desert may never have been perennial streams. Once human groups in the area became sedentary, the scant water supply at Umm al-Jimāl could not support a permanent settlement.

Upon the return of humans to Umm al-Jimāl after a hiatus of nearly ten millennia, the working of siliceous stone resumed on the site, thanks to Roman tinder flint use. Roughly worked chunks of raw chert were encountered in small amounts during excavation of Roman refuse deposits among the classical walls of Area R. Undoubtedly, some Paleolithic tools were gathered and exploited for this purpose. Flake scars cut through the patina on many of the specimens indicating reworking at a far later time than that of the original discard of the artifacts. The lack of fresh flake scars on most of the specimens, however, makes it unlikely that all of the artifacts were brought to the site by later occupants.

Various occupants of al-Ḥarra never gave up the mobile lifestyle. Neolithic groups ranged throughout the area exploiting gazelle herds with the help of an extensive system of massive walled traps (“kites”) (Betts 1998: 6). These Paleo-Bedouin of the seventh through fifth millennia BC were the likely ancestors of the Safaitic Bedouin who roamed the deserts of Jordan during the Roman occupation of Umm al-Jimāl (Helms 1982). A certain amount of stone tool use may have persisted among these mobile peoples throughout this time and even to the modern day. The modern Bedouin occupants of Umm al-Jimāl will occasionally still strike sharp flakes off any available chunk of flint when an expedient cutting tool is needed. This was demonstrated to me by Umm al-Jimāl resident Muaffaq Haza in 1998 when he readily picked up a chunk of flint in the ruins and struck flakes from it stating that local shepherds used this technique if they needed an expedient knife. In this way, the Paleolithic foragers of the remote past solved the transport-cost quandary for their descendents, for the tools they left behind provided the generations of the future with ample locally available raw material for their own stone tool industries.

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APPENDIX A

Shatter: angular and blocky lithic debris that results from non-intentional breakage during the lithic reduction process. Shatter does not exhibit a bulb of percussion or distinct striking platform.

Flake: debitage, complete specimens of which exhibit a bulb of percussion and a striking platform.

Levallois flake: a distinct type of flake produced in the Levallois reduction process in which flakes are struck from a bifacially-worked core resulting in flakes with numerous multidirectional flake scars on the dorsal surface and heavily faceted platforms representing the prepared edge of the bifacial core.

Blade: a type of flake that is distinguished by being at least twice as long as it is wide.

Bladelet: small blades which are less than 12 mm in width.

Random core: a piece of stone from which flakes were removed without any observable pattern.

Levallois core: a distinctive type of core which was prepared bifacially in order to facilitate the removal of flakes of a desired shape. Some of these cores were prepared radially in order to remove flakes with a roughly circular outline and numerous flake scars on the dorsal surface which converge near the center of the dorsal surface resulting in the thickest part of the flake there. Others were worked unidirectionally with the goal of forming flake scars which converged at one end of the surface of the core. Flakes struck from a core prepared in such a way would be triangular in shape and could be retouched to form Levallois points which could be used as rough tips for spears.

Bladelet core: a core from which bladelets were removed, typically through indirect percussion or pressure flaking. Bladelet cores can have a single platform or multiple.

Bifacial handaxe: a bifacially-worked implement that is typically egg-shaped in outline.

Scraper: retouched unifacial tool with a steep working edge which was probably used for dressing hides or other such activities. Scrapers are generally classified as either endscrapers or side-scrapers depending on which edge of the flake was retouched.

Burin: tool exhibiting one or more narrow chisel-like edges made by either snapping a flake or by removing a spall with a head-on strike at the edge of a flake. Burins formed by the removal of two adjacent spalls are called dihedral burins while those formed by the removal of multiple spalls are polyhedral. The chisel edge of a burin is effective in scoring bone or antler.

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