

To be or not to be Aurignacian: the Zagros Upper Paleolithic

■ DEBORAH I. OLSZEWSKI ■ HAROLD L. DIBBLE

ABSTRACT Studies of lithic assemblages from the Upper Paleolithic levels at Warwasi in Iran have identified two occupational phases. The earlier of these is represented by Levels AA-LL, and has been classified as the Early Zagros Aurignacian. Its characteristics include an interesting combination of what appear to be Upper and Middle Paleolithic formal tools, such as carinated endscrapers, burins, Font-Yves points, Dufour bladelets, sidescrapers, and truncated-faceted pieces. About 66% of the tools are on flake blanks, 17% on blade blanks, and 11% on bladelet blanks. The debitage is dominated by flakes, although prismatic blade technology is also present. This assemblage has the potential to be an example of a transitional industry. If so, it may document one sequence of development from a Middle Paleolithic base into the Aurignacian. Overlying this, in Levels P-Z, is a later Upper Paleolithic, which is classified as the Late Zagros Aurignacian. It is during this phase that the assemblage is most typical in its inclusion of characteristic types of the Aurignacian. These consist of numerous examples of carinated burins and Dufour bladelets, as well as carinated endscrapers and a few Font-Yves points. Tools are made about equally on blade (26%), bladelet (34%), and flake blanks (38%). Technologically, this

assemblage is dominated by bladelet debitage, with a slightly greater representation of flake debitage compared to blade debitage. The Late Zagros Aurignacian at Warwasi appears to share broad similarity to assemblages of central Europe, as well as to the Levantine Aurignacian A. No matter how precisely worded, definitions of lithics and lithic assemblages can be fraught with complications. These arise primarily from the fact that we construct discrete categories from forms that most often are a continuum of shape or design, and we initially designate industries as comprising a particular combination of morphology and technology. As research progresses and new assemblages or new analyses are added to our cumulative database, however, our original definitions of types and industries begin to accommodate variations on the original theme. The designation of the Levantine Aurignacian is one example of this process, and we believe that the Zagros Aurignacian represents another. While we might also discuss what this means in terms of the implications of an ever-geographically expanding Aurignacian, such debates are more closely linked to archaeological interpretation rather than to archaeological definition.

Introduction

Paleolithic research in the Zagros Mountains region of Iraq and Iran is best known from the decades spanning the 1920s through the 1960s. A number of important sites were located and excavated, and many of these were published in preliminary fashion. Despite the history of research, however, our understanding of the industries of this area has remained slight compared to the Levant and Europe. This is due to several factors including a shift of research projects away from the Zagros, particularly after the late 1970s, the lack of complete publication of the earlier excavations, and a consequently reduced appreciation of the significance of the archaeological record here. The Zagros Upper Paleolithic, however, provides an important comparative base for early Upper Pleistocene sequences elsewhere and offers insight regarding cultural evolution during the period widely seen as incorporating the transition

from archaic to more modern behavioral sets. In this paper, we describe the Upper Paleolithic lithic assemblages from Warwasi Rockshelter in Iran, and discuss our views on the widespread extent of the Aurignacian as a series of geographical facies.

Examination of the Upper Paleolithic material from Warwasi Rockshelter (Iran) has shown that the industry originally termed the “Baradostian” by Solecki (1958), on the basis of his analysis of material from Shanidar Cave in Iraq, should be renamed the Zagros Aurignacian to reflect the marked similarities between it and other Aurignacian-like industries from Europe and the Levant¹ (Olszewski, 1999, 2001, in press b; Olszewski and Dibble, 1994). The recognition of the Zagros Upper Paleolithic materials as a facies of the Aurignacian is significant for several reasons. First, there is reason to believe that the Early Zagros Aurignacian develops from a local Mousterian foundation. Second, its presence in the Zagros area demonstrates the existence of behavioral sets that result in characteristic Aurignacian lithic typology and technology in a region outside Europe and the Levant, thus extending the known geographical spread of the Aurignacian. Finally, there are major implications for research centered on the appearance of the Aurignacian throughout much of Western Eurasia.

Description of the Warwasi Aurignacian assemblages²

The assemblages from Warwasi (Fig. 1) can be divided into two phases, an Early Zagros Aurignacian (Levels AA-LL) and a Late Zagros Aurignacian (Levels P-Z). These assemblages derive from deposits that are approximately 2,2 m in thickness from a 5,6 m deep excavation trench. They are overlain by about 1,6 m of Epipaleolithic (Zarzian) deposits and underlain by ca.1,8 m of Middle Paleolithic (Zagros Mousterian) deposits.

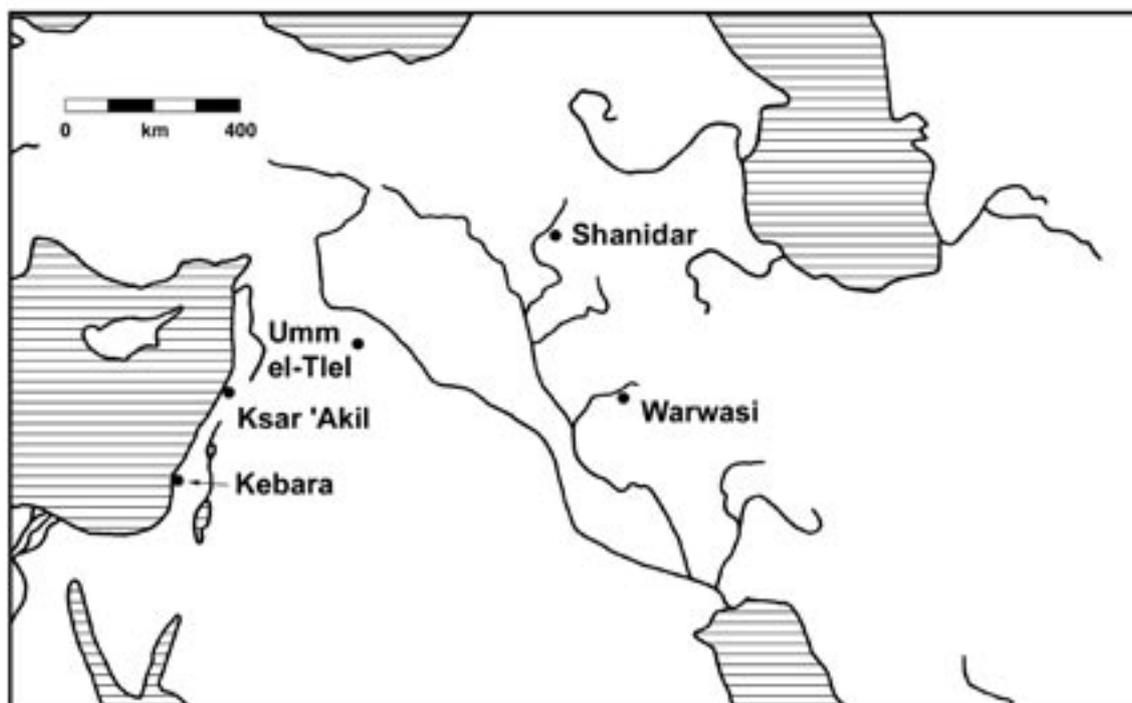


FIG. 1 – Sites with Aurignacian affinities discussed in the text.

The Early Zagros Aurignacian

The Early Zagros Aurignacian contains several features that indicate that it may be a development out of the local Middle Paleolithic. From this standpoint, it could be considered a type of Initial Upper Paleolithic (Olszewski, 2001, in press b), as defined by Levantine researchers such as Marks (1993, p. 15) and Kuhn et al. (1999, p. 506-507). Technologically, the Early Zagros Aurignacian is characterized by a modest frequency (ca.31%) of prismatic blade and bladelet debitage. It also contains laminar flakes that correspond to the Bordian definition of blades (length twice as long as width), which suggests that core reduction here is also characterized by what many would consider a Middle Paleolithic technological strategy. Overall, however, the assemblage is dominated by flake debitage (about 47%) and by cores whose final removals are flakes (ca.80%). Choice of blanks for tools shows that about 28% of tools are manufactured on prismatic blade or bladelets.

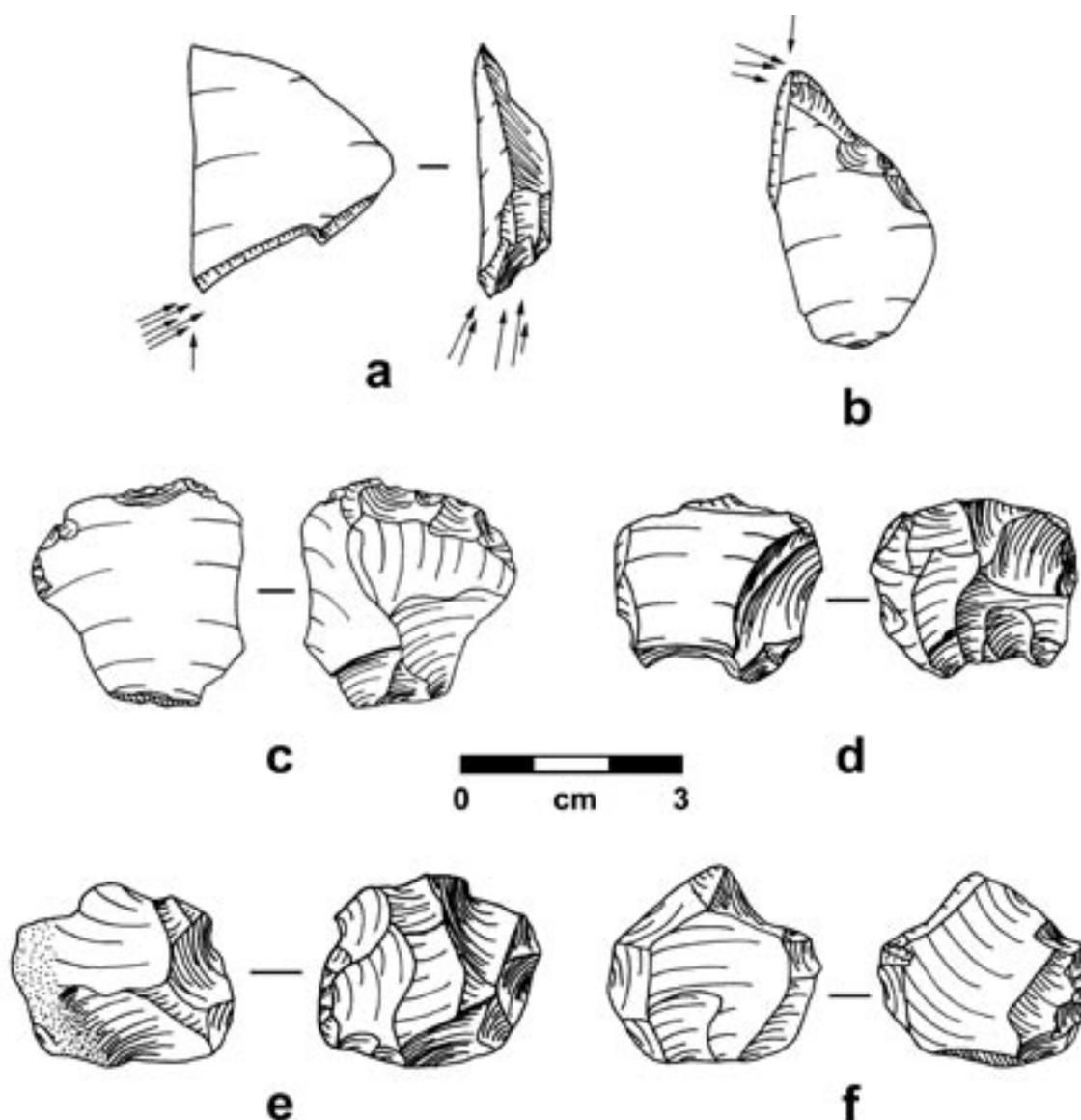


FIG. 2 – Early Zagros Aurignacian at Warwasi: a-b. carinated burins; c-d. truncated faceted; e-f. radial flake cores (drawings by D. I. Olszewski).

Typologically, the Early Zagros Aurignacian includes both Middle and Upper Paleolithic tool types³. This feature is known to occur in some Levantine Initial Upper Paleolithic assemblages, for example, at Kanal in Turkey (Kuhn et al., 1999, p. 514) and Umm el-Tlel in Syria (Bourguignon, 1998, p. 712), but not in other such assemblages, for example, Tor Sadaf in Jordan (Coinman and Fox, 2000) or Boker Tachtit in the Negev (Marks, 1993, p. 8). At Warwasi, representative tools in the Early Zagros Aurignacian consist of a considerable number of sidescrapers (about 24%), as well as low to modest frequencies of carinated endscrapers and carinated burins, Font-Yves points, Dufour bladelets, and truncated-faceted pieces (Figs. 2-3; Table 1).

TABLE 1
Comparison of Early Zagros Aurignacian Tool Types from Warwasi and Bacho Kiro.

	<i>Warwasi Levels AA-LL (n=993)</i>		<i>Bacho Kiro Layer 11* (n=667)</i>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Endscraper				
carinated	16	1,6%	–	–
other	60	6,0%	83	12,4%
Burin				
carinated	5	0,5%	–	–
other	65	6,5%	29	4,4%
Font-Yves/el-Wad Point	13	1,3%		?
Dufour Bladelet	14	1,4%		present
Nongeometric	75	7,6%	13	1,9%
Geometric	3	0,3%	–	–
Special Tool			222	33,3%
sidescraper	242	24,4%		present
truncated-faceted	9	0,9%		?
other	1	0,1%	–	–
Borer	32	3,2%	19	2,8%
Backed Piece	2	0,2%	–	–
Notch-Denticulate	228	23,0%	83	12,4%
Truncation	14	1,4%	29	4,3%
Multiple Tool	23	2,3%	6	0,9%
Retouched Piece	188	18,9%	111	16,6%
Varia	3	0,3%	72	10,8%

* Counts from Bacho Kiro have been estimated from typological descriptions in Kozłowski (1982, 1999).

There are similarities between the Early Zagros Aurignacian at Warwasi and other sites to the west and northwest, including central Europe, although many of these sites have not been described in sufficient quantitative detail to allow itemized comparisons. For example, at Umm el-Tlel in Syria, Levels II base and III 2a are said to contain an “intermediate” industry representing a transition between the Middle and Upper Paleolithic (Boëda and Muhesen, 1993, p. 54-56; Bourguignon, 1998). This assemblage includes Levallois point technology combined with Upper Paleolithic tool types such as burins and endscrapers, as well as several Middle Paleolithic-like sidescrapers and truncated-faceted pieces (Nahr Ibrahim cores), although these latter two tool types are only a small percentage (ca. 6%).

Farther to the northwest, the early Aurignacian-like industry⁴ of Bacho Kiro Layer 11 (Bulgaria), named the Bachokirian (Kozłowski, 1979, 1982, 1999), also has a number of similarities to the Early Zagros Aurignacian at Warwasi. This assemblage yielded a flake-

-dominated industry, with heavily exhausted cores, often with multiple platforms or discoidal in form, and therefore very reminiscent of the majority of cores from Warwasi. There are clear typological similarities as well, with sidescrapers, endscrapers and burins (although not carinated varieties), and a small number of Dufour bladelets. Bacho Kiro also contains examples of Aurignacian blades and nosed endscrapers. Despite certain terminological differences, the industry from Bacho Kiro Layer 11 strongly resembles that from Warwasi Levels AA-LL (see Table 1).

The Late Zagros Aurignacian

The assemblages from Levels P-Z at Warwasi represent the Late Zagros Aurignacian. It is technologically an industry heavily dominated by blades and bladelets (ca. 60% of the debitage)—the majority being bladelets. Tool blanks are overwhelmingly on blades and bladelets (about 60%). This pattern is also present in the cores, which are mainly single platform blade/bladelet (ca. 53%) with an additional component of blade/bladelet opposed platforms cores (nearly 18%). The heavy emphasis on the production of bladelets is also notable because of the presence of numerous examples of carinated burins, as well as some carinated endscrapers (see below), which are likely cores for the manufacture of bladelets (Almeida, 2001; Barton et al., 1996, p. 117-118; Olszewski, in press a).

Typologically, the Late Zagros Aurignacian is unquestionably related to the Aurignacian phenomenon. The tools, for example, contain a moderate quantity of Dufour bladelets, as well as a significant presence of carinated elements (Figs. 4-5; Table 2). The co-occurrence of these two tool types is widely accepted as a marker for Aurignacian assemblages in Europe (see below). The twisted aspect of Dufour bladelets, in fact, is known through experimental work to be related to bladelet removal from tools classified as carinated burins and carinated endscrapers (Almeida, 2001; Lucas, 2001; Schmider and Perpère, 1995). The rarity of Aurignacian markers such as Aurignacian blades in the Warwasi Late Zagros Aurignacian is not unexpected given the variable occurrence of tools such as these in Aurignacian assemblages across Europe and the Levant.

A brief comparison with Aurignacian facies elsewhere in Western Eurasia highlights the remarkable similarity of the Warwasi Levels P-Z assemblages to these manifestations of the Aurignacian, and exemplifies why the Warwasi materials have been classified as a Zagros Aurignacian facies.

In central and eastern Europe, Hahn (1970, 1972, 1977) has identified two Aurignacian variants. The “ordinary” Aurignacian is composed of endscrapers (including carinates), burins, sidescrapers, sharpened (pointed) blades, notches and denticulates, and rare Dufour bladelets. This industry is similar to the industry from Shanidar Cave Level C and may also resemble the earlier Aurignacian from Warwasi. The other central European variant, the “Krems” Aurignacian, is composed of many bladelets and retouched bladelets, including some Font-Yves and Krems points and numerous Dufour bladelets, carinated scrapers, and burins. This variant bears some resemblance to the later Aurignacian of the Zagros. Since the Krems Aurignacian appears to be found exclusively in open-air situations in central and eastern Europe, there may be an activity separation between the two facies, which may also be a factor underlying assemblage variability in the Zagros. Additionally, Kozłowski (1979) has postulated the coexistence of two early Aurignacian-like variants in the central European area. In this case, there are burin and carinate scraper rich assemblages in Moravia contrasted with the Bachokirian, which is rich in various retouched blades and yields a few retouched bladelets.

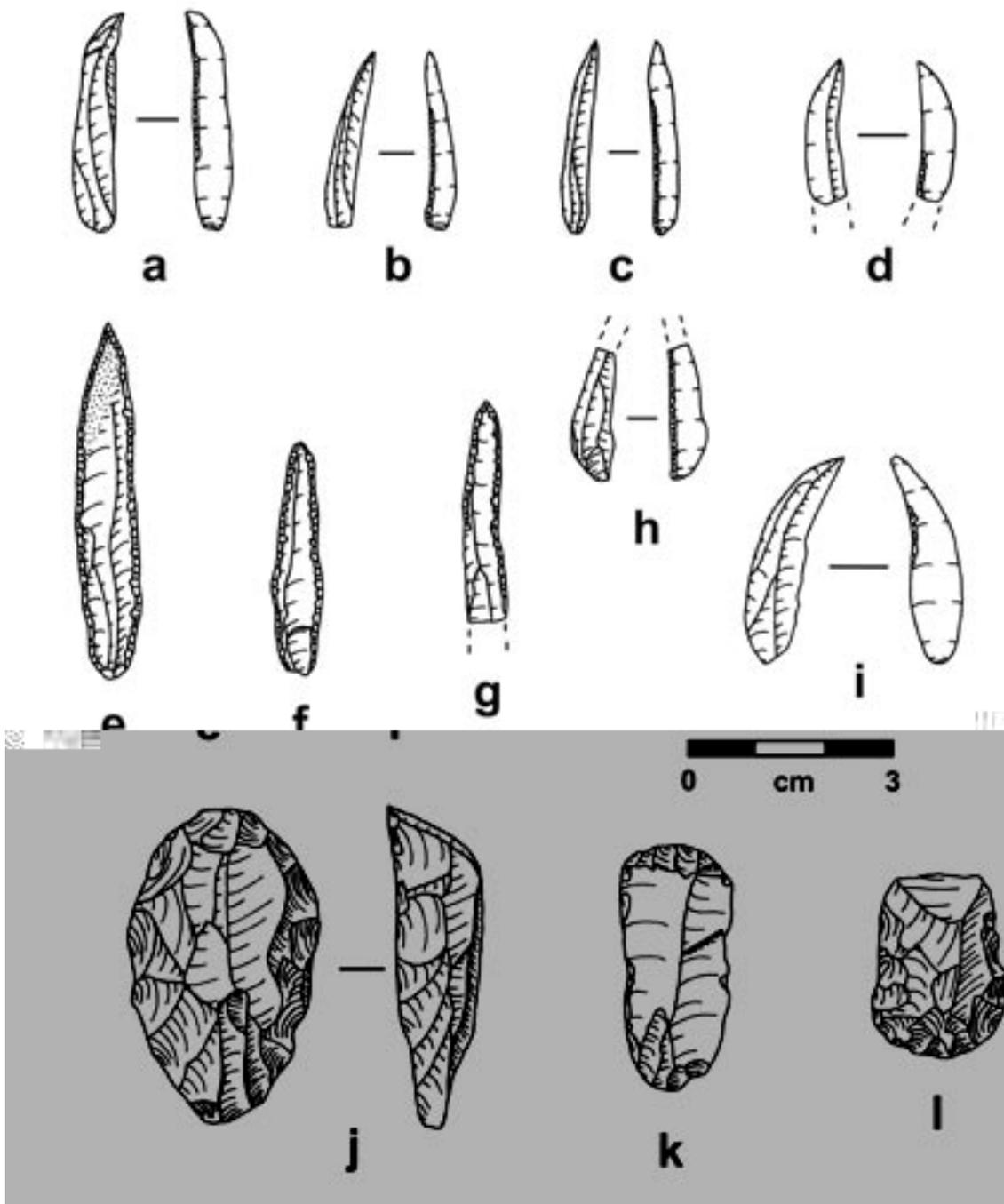


FIG. 5 – Late Zagros Aurignacian at Warwasi: a-d, h-i. Dufour bladelets; e-g. Font-Yves points; j. flake endscraper; k-l. blade endscrapers (drawings by D. I. Olszewski).

Somewhat geographically nearer to the Zagros are sites of the Levantine Aurignacian. Some of these are technologically different from the Warwasi Aurignacian, in part because the Levantine Aurignacian was “redefined” in the early 1980s as containing a flake-based debitage, with tools made equally on blades and flakes (Belfer-Cohen and Bar-Yosef, 1999, p. 127; Gilead, 1981; Marks, 1981). This follows the description of the Levantine Aurignacian B, defined on the basis of the sequence at Ksar Akil (Bar-Yosef and Belfer-Cohen 1996, p. 143). Of some note is the fact that that this manifestation of the Aurignacian in the Levant is identified as “not necessarily identical with the European Aurignacian where the frequencies of Aurignacian blades, Dufour bladelets and Font-Yves or Krems points (similar to el-Wad points) are much higher.” (Bar-Yosef and Belfer-Cohen, 1996, p. 143). Perhaps most

importantly, its technological basis is quite distinct from the European Aurignacian which is highly laminar. In this regard, the materials from Warwasi are far more similar to the European Aurignacian than are those of the Levantine Aurignacian B.

Some Levantine Aurignacian sites, however, do have assemblages with a closer resemblance to the Warwasi materials. The site of Umm el-Tlel, in the el-Kowm Basin in Syria, for example, is described as a Levantine Aurignacian consisting of nucleiform burins, carinated burins, various endscrapers, Dufour bladelets, and a few Aurignacian blades (at the base of the Aurignacian deposits), as well as a laminar technology (Molist and Cauvin 1990, p. 59), and are compared to the Tixier excavations at Ksar Akil (Layers 10B to 10H or phase V). Further details of additional excavations at Umm el-Tlel are given in Boëda and Muhesen (1993), Ploux (1998), and Soriano (1998). The Umm el-Tlel Aurignacian is quite similar to that from Warwasi.

Of considerable interest is the Levantine Aurignacian A, described as a blade-based industry with an Aurignacian typology (Besançon et al., 1975-1977, p. 32-33). It is found at Ksar Akil, Levels XIII-XI (Bergman, 1987, p. 145) and Kebara Units I-II (Bar-Yosef and Belfer-Cohen, 1996, p. 143). While some of the details of tool types differ from those of the Warwasi Aurignacian, such as the presence of shouldered/nosed scrapers (2%) and the relative rarity of Dufour bladelets⁵ at Ksar Akil, the overall typological configuration is similar to both Umm el-Tlel and to Warwasi (see Table 2). Interestingly, the Levantine Aurignacian A is burin-dominated rather than scraper-dominated and, in the case of Ksar Akil, the carinated elements are even more prevalent than in the Zagros region. Technologically, using debitage figures from Ksar Akil (Bergman, 1987, p. 121-125), the industry has 59% blade/bladelet representation, which mirrors that of Warwasi at 60% (Olszewski, 2001, p. 82). Additionally, in the Ksar Akil assemblage from Layers XIII-XI, there are no bone or antler tools (Bergman, 1987, p. 121-125).

TABLE 2

Comparison of Zagros Aurignacian tool types from Warwasi and Shanidar with the Levantine Aurignacian A at Ksar Akil.

	Warwasi Levels P-Z (n=1,148)		Shanidar Cave Layer C* (n=271)		Ksar Akil Layers XIII-XI* (n=1,925)	
	N	%	N	%	N	%
Endscraper	86	7,5%	37	13,6%	313	16,3%
Burin	120	10,4%	47	17,3%	593	30,8%
Carinated Element**	143	12,5%	38	14,0%	435	22,6%
Font-Yves/el-Wad Point	13	1,1%	8	3,0%	205	10,6%
Dufour Bladelet	161	14,0%	1	0,4%	10	0,5%
Nongeometric	154	13,4%	5	1,8%	42	2,2%
Geometric	2	0,2%	1	0,4%	–	–
Special Tool						
sidescraper	49	4,3%	30	11,1%	–	–
Aurignacian blade	–	–	10	3,7%	5	0,3%
other	7	0,6%	6	2,2%	–	–
Borer	23	2,0%	2	0,7%	–	–
Backed Piece	12	1,0%	2	0,7%	64	3,3%
Notch-Denticulate	193	16,8%	34	12,5%	47	2,4%
Truncation	23	2,0%	2	0,7%	97	5,0%
Multiple Tool	16	1,4%	34	12,5%	114	5,9%
Retouched Piece	136	11,8%	5	1,8%	?	?
Varia	10	0,9%	9	3,3%	–	–

* Counts from Shanidar have been estimated from typological descriptions in Solecki (1958). Data from Ksar Akil is from Bergman (1987, p. 121-126).

** These are combined carinated burins and carinated endscrapers because the Ksar Akil data is presented in this form.

Issues surrounding the appellation of “Zagros Aurignacian”

At the conference for which this article was written, several issues became clear regarding our attribution of the Upper Paleolithic materials from Warwasi to a facies of the Aurignacian. We will turn our attention to these and, in the process, try to show that most of the objections being raised have serious flaws, and in some cases the arguments are more personal than intellectual; indeed, in some cases criteria that others insist be applied to our assemblages are not those which they themselves apply to their assemblages! To us, of course, the most important thing is to have a definition of the Aurignacian (and its variants) that can be applied consistently and unambiguously.

One issue that arose relates to how the lithic assemblages were recovered from the site of Warwasi. The charge that has been leveled is that Bruce Howe, who supervised the excavation of Warwasi for Robert Braidwood in 1960 (Braidwood et al., 1961, p. 2008), was “taught” to excavate by Dorothy Garrod and therefore his results are suspect because he used arbitrary levels. We find such statements completely without merit for a number of reasons:

- To begin with, unlike some of Garrod’s arbitrary levels at various Levantine sites, which exceeded a meter in thickness, Howe’s excavation levels did not exceed 10 cm in thickness. He applied this methodology because visibly distinct natural strata were not present in the rockshelter. While excavation in arbitrary levels always retains the possibility that some mixing between discrete assemblages occurred in deposits that are immediately adjacent to one another, the extent to which this occurred at Warwasi appears to be minimal.
- Unlike Garrod, who is known to have been selective in what she retained from excavated materials, Howe saved everything from the Warwasi excavations, including quite small pieces (<20 mm). The lithic assemblages from this site are therefore quite excellent in terms of representativeness of tools, cores, and debitage components.
- Certainly, Howe had worked previously with Garrod in the Balkans in the 1930s (Garrod et al., 1939). Even if this means he was “taught” by her, then on the basis that Garrod’s excavation methodology left something to be desired, which was the undertone at the conference on this issue, we would have to discard all information and collections from every site she worked on throughout Western Eurasia in order to apply this standard “fairly” to all. In fact, this “standard” would mean that work on any of the old collections would be futile, and research such as that by Marks and Williams (this volume), using in part the Ewing excavations at Ksar Akil, would have to be thrown out as tainted by inappropriate excavation methodology. We, however, do not advocate such an extreme view, having ourselves successfully worked with many older collections in which we took excavation/excavator biases into account in designing research problems.
- Finally, we find it ironic that Garrod’s work in the Levant makes her practically a “goddess” of Paleolithic research there⁶, but that her influence (on Howe) for the Zagros is considered a major disadvantage by some.

The second issue raised during the conference concerns whether the lithic elements/assemblages described for Warwasi can be called Aurignacian. While this theme constitutes discussions and descriptions in the various sections of this paper, we would like to address some of the broader aspects of this issue here.

First of all, we do take exception to the notion that we have based our assessment of the Warwasi assemblages as an Aurignacian facies solely on the presence of carinated elements. We acknowledge Bar-Yosef's (2002, p. 372) recent statement that carination can be found in a variety of different industries and across time, but we have never said that carination alone is what makes the Warwasi Upper Paleolithic a facies of the Aurignacian. Anyone who has read our published work carefully (Olszewski 1999, 2001; Olszewski and Dibble, 1994), and the descriptions provided at the beginning of this paper, can see this clearly.

Second, there are many recent works we could quote about aspects of the Western European Aurignacian and many of the papers in this volume describe characteristics of what constitutes an Aurignacian lithic typology (e.g., Bordes, Conard, Lucas) and technology(ies) (e.g., Bon). We provide two here as a guide to some of what is seen as important in untested Aurignacian contexts:

“Bladelet production is the technological innovation most constant to the emergence of the Aurignacian.....with the Aurignacian develops a systematic production of bladelets from carinate pieces....It has been established that the carinated pieces were cores specific to the production of the twisted bladelets necessary for the manufacture of the «Dufour bladelets» characteristic of the Aurignacian culture” (Rigaud, 2001, p. 117-118).

“The Aurignacian is well known for its richness in bone points, but less so for its numerous microliths. These bladelets, Dufour bladelets in particular..., represent the cultural marker for the Aurignacian...” (Lucas, 2001, p. 99).

At the same time, we also agree with the following statement of Bar-Yosef (2002, p. 372):

“As the definition of this entity was based on a particular suite of stone tools in France, it is expected that not all types will be available wherever the bearers of this industry went. The question is, what is the minimal number of types required to label an assemblage as Aurignacian? The current literature does not provide a detailed definition....the presence of the Levantine Aurignacian...is based on the assemblages that contain carinated nosed scrapers, Dufour bladelets, bone and antler objects (with split based points), and deer-teeth pendants.”

These remarks as to the principal characteristics of the Aurignacian bring us to the third issue, namely that of organic materials. In particular, we refer to the presence of bone points (split-based in the Early Aurignacian, other forms in later phases) and perforated deer canines as defining elements for this “culture.” It is our impression that these aspects of the Aurignacian have been recently gathering momentum as required “fossile directeurs,” yet there are considerations which in some cases could obviate the usefulness of this element as crucial to the definition of the Aurignacian. The most important of these has to do with the availability of the medium on which the points were made.

One aspect of this problem was recently addressed by Bernaldo de Quirós et al. (2001). They note that “bone” points are often made of antler. The supply of antler, therefore, is a critical consideration. In an assessment of the contrast between the French and Spanish Aurignacian in quantity of “bone” points, for example, Bernaldo de Quirós et al. (2001, p. 27) observe that the great abundance of points in France is likely due to the fact that reindeer antler is the primary organic resource available for points here (both male and female reindeer shed antlers, and their shed patterns result in year-round availability). In Spain, on the

other hand, there are no reindeer, so that red deer antler is used (only males shed antler, and thus antler is less available overall, and restricted seasonally).

We suggest that antler availability is a key consideration. It likely explains why “bone” points are relatively rare in the Levantine Aurignacian (Bar-Yosef and Belfer-Cohen, 1996; Belfer-Cohen and Bar-Yosef, 1981, p. 30-34), as the available antler would be from deer⁷ (limited to males) and deer would be few in number due to the geographical restriction of the Mediterranean forest zone during much of the Pleistocene.

Conditions during the Pleistocene did not favor a Mediterranean forest for the Zagros region where Warwasi is located (at least, not after the Middle Paleolithic occupation here). We believe that the lack of “bone” points here can be explained at least in part by the fact that there were no deer present during the Upper Paleolithic (Turnbull, 1975, p. 145) and thus no antler available for point manufacture⁸. Nor were there gazelle present to provide horn cores. In a similar vein, perforated deer teeth would also be limited to whether or not this species was in the area.

Finally, there is always the question of adequate conditions for the preservation of organics, including bone and antler. The faunal assemblage from Warwasi, for example, consists primarily of teeth. This suggests that preservation of bone is poor, and that under these conditions, even if rare “bone” points had been present at the site, it is unlikely that they would have survived. The Levantine Aurignacian at Umm el-Tlel in Syria, an open air site, also lacks organics and thus has no “bone” points (Ploux, 1998, p. 30).

A last issue that developed at the conference involves suggestions by some that the Warwasi materials are somehow related to the Gravettian/Eastern Gravettian tradition⁹. We find this to be somewhat far afield for the following reasons:

- There are virtually no typological similarities between the Warwasi Upper Paleolithic tools and those of the Gravettian. Gravettian assemblages are characterized by Font Robert points (stemmed points), Gravette points (backed points), microgravette points (backed bladelet points), an elaborate burin typology including Noailles burins and Rayesse burins, and microdenticultates (Djindjian, 1999, p. 315; Oliva, 1999, p. 222-225; Svoboda et al., 1996, p. 140-143). These are not the tool forms characteristic of the assemblages from Warwasi.
- While there are sometimes a small number of carinated elements in Gravettian/Eastern Gravettian assemblages from which bladelets are struck, the majority of bladelet production is from regular forms of bladelet cores (Rigaud, 1996, p. 259; Svoboda et al., 1999, p. 203). This does not match the materials from Warwasi technologically, which have a considerable amount of bladelet production from carinated elements.

“To be or not to be Aurignacian”: the nature of Aurignacian variability

It is common knowledge that there is a great deal of variability in what are considered reputable Aurignacian industries (Clark and Riel-Salvatore, 2003). As everyone recognizes, variability leading to phase or facies designations is at least partly a function of geography and of time. In the case of organic assemblages, it can also be linked to antler availability and to preservation conditions at specific sites. It is interesting to see what different researchers have to say in describing Aurignacian assemblages from different areas.

In speaking of Thèmes in Northeast France, for example, Bernardini et al. (1997, p. 40) state:

“La présence de burins carénés et busqués associés à des grattoirs carénés et à museau, incite donc à placer cette série dans le techno-complexe aurignacien. Enfin, l’absence totale de pièces à retouche latérale aurignacienne, qui semblent caractéristiques de l’Aurignacien ancien... plaiderait pour une phase évoluée.”

Referring to Arcy-sur-Cure, Schmider and Perpère (1977, p. 7-8) say that:

“L’appartenance de cet ensemble à l’Aurignacien se manifeste nettement par la présence des outils marqueurs de cette culture, en particulier les lamelles Dufour et les grattoirs et burins carénés. Toutefois, la composition quantitative de cet outillage, en fait un assemblage original par rapport aux séries considérées de l’Aurignacien...”

In the Périgord, Rigaud (1999, p. 328-329) points out that:

*“...with the Aurignacian appears an important bladelet production, in certain Aurignacian technocomplexes linked to the abundance of ‘carinated’ forms and certain busked burins....The earliest Aurignacian industries in the Périgord are characterized by an abundance of objects with a scalar retouch, the so-called ‘Aurignacian retouch’ (generally blades and endscrapers on blades), that become much rarer, even absent, in later industries. The carinated and thick-nosed carinated scrapers are present in variable proportions as are the Dufour bladelets; blade and bladelet production is abundant. These industries comprise the *early Aurignacian* in the Périgord.....the industries that follow it have a different equilibrium: thick endscrapers (carinated and thick-nosed) become more abundant, busked burins are present in variable proportions, and pieces with an ‘Aurignacian retouch’ become rarer....We have proposed to include these industries in a ‘middle Aurignacian’...”*

And speaking generally of the Aurignacian, Djindjian (1999, p. 315) notes that:

“Aurignacian industries are based on blade and bladelet debitage. Aurignacian assemblages are characterized by endscrapers more numerous than burins, numerous retouched blades, denticulates, notches, sidescrapers and splintered pieces; carinated and shouldered thick endscrapers, busked and carinated burins, and Dufour bladelets are correlated with temperate oscillations....”

For the Near East, Belfer-Cohen and Bar-Yosef (1996, p. 143-144) say the following:

“The lithic assemblages of the “Levantine Aurignacian B” consist of numerous carinated and nosed scrapers and fewer retouched pieces or blades when compared to the “Levantine Aurignacian A”...Thus the “Levantine Aurignacian B” is considered by some scholars as representative of the “true” Aurignacian tradition....In sum, the Levantine Aurignacian, as originally defined at the London conference in 1969....is characterized by the presence of carinated and nosed scrapers with flakes outnumbering the blades in the debitage, yet present in equal numbers among the tool blanks...”

Bergman (1987, p. 144-145), in describing the Levantine Aurignacian A from Ksar Akil states that:

“Unretouched blade/lets are the most numerous class of debitage...and the flaking technology...is characterised by a predominance of twisted profiles. All three assemblages are primarily composed of scrapers, carinated tools and burins; retouched blade/lets and el-Wad points are present in smaller numbers and tend to be twisted in profile....At the same time a developed blade/let technology is not regarded as a feature of industries currently classified as Aurignacian in the south....In effect, what we have in levels XIII-XI is a blade based technology with a strong Aurignacian typology.”

It is clear that assemblages from the Zagros¹¹ encompass the majority of features associated with early Upper Paleolithic industries from the neighboring regions of central Europe and the Levant, including both the characteristic types and technologies of the Aurignacian techno-complex and the nature of inter-assemblage variability of these regions (Olszewski and Dibble, 1994; Olszewski, 1999, 2001, in press b). These similarities are most clearly seen in the presence of the index fossils of those industries, namely carinate scrapers and burins, Font-Yves points, and Dufour bladelets, as well as bladelet production from both carinated and single platform cores. Therefore, the differences between the Zagros assemblages and other Aurignacian assemblages are not as pronounced as often cited in the literature (Hours et al., 1973; Garrod, 1957) or by some of our colleagues at this conference. Such differences as do exist may reflect both a local continuity and adaptations particular to this region.

While the Zagros Upper Paleolithic lacks clear intra-region differentiation as seen in Europe and the Levant, there are two points to be kept in mind. First, very few Zagros sites have been excavated (and reported in detail), and there are virtually no excavated open-air sites. Second, although data are few, there is a similar nature to the industrial variability in the Zagros in terms of endscrapers and burins on the one hand, and blade/bladelet tools on the other. This is the contrast seen, for example, between Shanidar Cave C and all of the Aurignacian from Warwasi, and between Warwasi and the Khorramabad sites. Contra Bar-Yosef (2000, p. 137), there is no indication from the Shanidar Cave C drawings or tool counts that the materials from Shanidar Cave C are most similar to the Levantine Ahmarian rather than to the Zagros Aurignacian. The drawings and the typology from Shanidar Cave C, which has numerous carinated elements, a modest representation of sidescrapers, and few retouched bladelets (see Table 2), in fact, suggest quite the opposite. This can easily be seen when one considers that the Levantine Ahmarian has few carinates, but does have numerous examples of el-Wad points in its early phase and Ouchtata bladelets in its late phase. These types of bladelet tools are extremely rare at Shanidar Cave C, as well as in the Zagros region as a whole.

As we stated at the beginning of this paper, the recognition of an Aurignacian variant in the Zagros has major implications not only for our understanding of the culture history of the Zagros but also for our understanding of the prehistory of both Europe and the Near East regarding the origin and spread of the Aurignacian. Research to date in Europe and the Levant generally considers the Aurignacian there as being allocthonous (e.g., Bar-Yosef, 1998; Bergman, 1988; Bocquet-Appel and Demars, 2000; Kozłowski, 1988; d’Errico et al., 1998; Mel-

The question of whether or not a transition took place from the Zagros Mousterian to the Zagros Aurignacian cannot be resolved definitively with the available data, although there are Middle Paleolithic technological and typological elements present in the Early Zagros Aurignacian. Typologically, these include sidescrapers, truncated-facetted pieces, and small radial cores (Baumler and Speth, 1993; Dibble, 1984; Dibble and Holdaway, 1990, 1993; Solecki and Solecki, 1993). Additionally, the diminutive and flake-based technology of the Early Zagros Aurignacian at Warwasi follows a general trend seen in the Zagros Mousterian at that site (Dibble and Holdaway, 1993). Finally, an emphasis on heavily retouched pieces characterizes both the Mousterian and Aurignacian assemblages at Warwasi; such heavy reduction and utilization is typical of the Aurignacian of western Eurasia in general. In fact, no clear industrial break is seen in the Warwasi sequence, which originally led to the erroneous inclusion of some of the earliest Zagros Aurignacian levels in an earlier report on the Mousterian levels (Dibble and Holdaway, 1990).

Notwithstanding that an abrupt break does not seem to occur between the Mousterian and Aurignacian of this one site, an obviously important consideration in postulating the Zagros as a place of origin for the Aurignacian concerns the absolute chronology. Most of the existing dates for the Zagros Aurignacian from Shanidar and Yafteh are not as early as the earliest dates so far obtained for the Aurignacian from western Europe (Bischoff et al., 1989; d'Errico et al., 1998; Mellars, 1999; Cabrera and Bischoff, 1989) or for Bacho Kiro Level II in central Europe (Kozłowski, 1979, 1999). However, it must be remembered that the dates for the Zagros industries were obtained forty years ago and thus may not be directly comparable to those obtained more recently with other methods. Efforts are being made to obtain new dates from samples from Warwasi.

Concluding remarks

Throughout the course of the Paleolithic in the Zagros, similarities to European industries of this time range are more pronounced than are similarities to the industries of the Levant, particularly the widely accepted "Levantine Aurignacian B". In part this reflects a convergence of adaptive responses to conditions in similar terrains within the Zagros and various European areas. It may also suggest that there are fewer contacts between the ancient groups of the diverse regions of the Middle East than might otherwise have been expected. The Zagros appears to exemplify another instance of the development of early Upper Paleolithic industries from an underlying Mousterian base. These have Aurignacian affinities which become more developed in character through time, and they fit within the pattern of heterogeneity that typifies the many facies of the Aurignacian in western Eurasia. The Upper Paleolithic industry from the Zagros region is interesting, therefore, not only as a response to a variety of local factors, but also because it provides comparative data that can be used to help clarify assemblage patterns seen in other areas. The Zagros Aurignacian offers one example of the need for Paleolithic archaeologists to broaden their perspectives to an inter-regional level in order to better interpret local variability. In this light, it is hoped that this discussion will be of interest to those working on similar problems.

Acknowledgments

Research on the Warwasi Upper Paleolithic was made possible with funding to Deborah Olszewski from the American Philosophical Society.

NOTES

- ¹ In particular, its close resemblance to the Levantine Aurignacian A of Ksar Akil and Umm el-Tlel, including the lack of organic technology, for whatever reasons, at all three sites.
- ² See the next sections of the paper for the reasoning underlying this designation as Aurignacian.
- ³ Assemblages containing both MSA and LSA tool types have been argued in the African context to show continuity of development (McBrearty and Brooks, 2000, p. 490-491).
- ⁴ Rigaud (2001, p. 117; this volume) concludes that Bacho Kiro Layer II is not a form of the archaic Aurignacian, but simply a heavily exhausted industry.
- ⁵ The rarity of small objects such as bladelets could be due to the recovery methods used during the Ewing excavations of 1937-1938, which are the basis of Azory and Bergman's (Bergman, 1987) analysis.
- ⁶ "...it is still amazing to observe the insight of Garrod when she first defined the chrono-stratigraphy of the Levantine Upper Palaeolithic sequence.....She provided the 'building blocks' of the study of Levantine prehistory which are still used today." (Belfer-Cohen and Bar-Yosef, 1999, p. 130-132).
- ⁷ Some bi-points at Hayonim Cave are made on gazelle horn cores or bone splinters (Belfer-Cohen and Bar-Yosef, 1981, p. 31).
- ⁸ Larger mammalian fauna is restricted to *Equus hemionus*, *Capra aegagrus*, *Ovis orientalis*, and *Bos primigenius*.
- ⁹ Pavlovian is another term used for the central European materials (e.g., Oliva, 1999).
- ¹⁰ In the majority of the literature, the Zagros assemblages have been called Baradostian primarily because although Solecki (1958) recognized the Aurignacian affinity of his materials from the 1951 and 1953 excavations at Shanidar Cave (Layer C), he followed the advice of Dorothy Garrod in naming his early Upper Paleolithic industry after the Baradost Mountains (part of the Zagros chain) in which Shanidar Cave is situated. Other Upper Paleolithic sites in the region include Pa Sangar, Yafteh, Ghar-i-Kar, and Gar Arjeneh (Braidwood and Howe, 1960; Hole and Flannery, 1967; Smith, 1986; Young and Smith, 1966).
- ¹¹ We do not necessarily contend that there is only "one" origin area for the Aurignacian. It is quite probable, in fact, that local continuities are more the rule than the exception, e.g., see Arrizabalaga et al. (2003) for an example demonstrating continuity from the Chatelperronian to Proto-Aurignacian to Aurignacian in Spain.

REFERENCES

- ALMEIDA, F. (2001) - Cores, tools, or both? Methodological consideration for the study of carinated lithic elements: the Portuguese case. In HAYS, M. A.; THACKER, P. T., eds. - *Questioning the answers: resolving fundamental problems of the Early Upper Paleolithic*. Oxford: British Archaeological Reports International Series 1005, p. 91-97.
- ARRIZABALAGA, A.; ALTUNA, J.; ARESO, P.; ELORZA, M.; GARCÍA, M.; IRIARTE, M. J.; MARIEZKURRENA, K.; MUJICA, J.; PEMÁN, E.; TARRIÑO, A.; URIZ, A.; VIERA, L.; STRAUS, L. G. (2003) - The Initial Upper Paleolithic in Northern Iberia: new evidence from Labeko Koba. *Current Anthropology*. Chicago, IL. 44:3, p. 413-421.
- BAR-YOSEF, O. (1998) - On the nature of transitions: the Middle to Upper Palaeolithic and the Neolithic revolution. *Cambridge Archaeological Journal*. Cambridge. 8:2, p. 141-163.
- BAR-YOSEF, O. (2000) - The Middle and Early Upper Paleolithic in Southwest Asia and neighboring regions. In BAR-YOSEF, O.; PILBEAM, D., eds. - *The geography of Neandertals and modern humans in Europe and the Greater Mediterranean*. Cambridge, MA: Peabody Museum of Archaeology and Ethnology (Peabody Museum Bulletin; 8), p. 107-156.
- BAR-YOSEF, O. (2002) - The Upper Paleolithic revolution. *Annual Review of Anthropology*. Palo Alto, CA. 31, p. 363-393.
- BAR-YOSEF, O.; BELFER-COHEN, A. (1996) - Another Look at the Levantine Aurignacian. In DI CESNOLA, A. P.; MONTET-WHITE, A.; VALOCH, K., eds. - *The Upper Palaeolithic (6) – Colloquia XI-XII (13th Congress, International Union of Prehistoric and Protohistoric Sciences, Forlì, 1996)*. Forlì: A.B.A.C.O., p. 139-150.
- BAUMLER, M.; SPETH, J. (1993) - A Middle Paleolithic assemblage from Kunji Cave, Iran. In OLSZEWSKI, D. I.; DIBBLE, H. L., eds. - *The Paleolithic Prehistory of the Zagros-Taurus*. Philadelphia, PA: The University Museum, p. 1-74.
- BARTON, C. M.; OLSZEWSKI, D. I.; COINMAN, N. R. (1996) - Beyond the graver: reconsidering burin function. *Journal of Field Archaeology*. Boston, MA. 23, p. 111-125.
- BELFER-COHEN, A.; BAR-YOSEF, O. (1981) - The Aurignacian at Hayonim Cave. *Paléorient*. Paris. 7:2, p. 19-42.
- BELFER-COHEN, A.; BAR-YOSEF, O. (1999) - The Levantine Aurignacian: 60 years of research. In DAVIES, W.; CHARLES, R., eds. - *Dorothy Garrod and the progress of the Palaeolithic. Studies in the prehistoric archaeology of the Near East and Europe*. Oxford: Oxbow, p. 118-134.

- BERGMAN, C. A. (1987) - *Ksar Akil, Lebanon. A technological and typological analysis of the later Palaeolithic levels of Ksar Akil. Volume II: levels XIII-VI.* Oxford: British Archaeological Reports International Series 329.
- BERGMAN, C. A. (1988) - The Upper Palaeolithic of the Levant. *Paléorient*. Paris. 14:2, p. 223-227.
- BERNALDO DE QUIRÓS, F.; CABRERA, V.; LLORET, M.; PIKE-TAY, A. (2001) - New kids on the block? Some comments on the Middle-Upper Paleolithic transition in Cantabrian Spain. In HAYES, M. A.; THACKER, P. T., eds. - *Questioning the answers: re-solving fundamental problems of the Early Upper Paleolithic.* Oxford: British Archaeological Reports International Series 1005, p. 27-38.
- BERNARDINI, O.; BROU, L.; THÉVENIN, A. (1997) - Le gisement paléolithique supérieur de Thèmes, commune de Cézay (Yonne). Note préliminaire. In *Le Paléolithique supérieur de l'Est de la France: de l'Aurignacien à l'Ahrensbourgien. Actes du colloque interrégional sur le Paléolithique supérieur de Chaumont, 17-18 septembre 1994.* Reims: Société Archéologique Champenoise (Mémoire de la Société Archéologique Champenoise; 13), p. 37-49.
- BESANÇON, J.; COPELAND, L.; HOURS, F. (1975-1977) - Tableaux de préhistoire libanaise. *Paléorient*. Paris. 3, p. 5-45.
- BISCHOFF, J. L.; SOLER, N.; MAROTO, J.; JULIÀ, R. (1989) - Abrupt Mousterian/Aurignacian Boundary at c. 40 ka bp: accelerator ¹⁴C dates from l'Abreda Cave (Catalunya, Spain). *Journal of Archaeological Science*. London. 16, p. 563-576.
- BOCQUET-APPEL, J.-P.; DEMARS, P. Y. (2000) - Neanderthal contraction and modern human colonization of Europe. *Antiquity*. Cambridge. 74, p. 544-552.
- BOËDA, E.; MUHESEN, S. (1993) - Umm El Tlel (El Kowm, Syrie): étude préliminaire des industries lithiques du Paléolithique Moyen et Supérieur. *Cahiers de l'Euphrate*. Paris. 7, p. 47-91.
- BOURGUIGNON, L. (1998) - Les industries du Paléolithique intermédiaire d'Umm el Tlell: nouveaux éléments pour le passage entre Paléolithique Moyen et Supérieur. In OTTE, M., ed. - *Préhistoire d'Anatolie. Genèse des Deux Mondes. Volume II.* Liège: Université (Études et Recherches Archéologiques de l'Université de Liège-ERAUL; 85), p. 709-730.
- BRAIDWOOD, R. J.; HOWE, B. (1960) - *Prehistoric investigations in Iraqi Kurdistan.* Chicago: University (Oriental Institute of the University of Chicago, Studies in Ancient Oriental Civilization; 31).
- BRAIDWOOD, R. J.; HOWE, B.; REED, C. A. (1961) - The Iranian Prehistoric Project. *Science*. New York, NY. 133, p. 2008-2010.
- CABRERA V.; BISCHOFF, V.; BISCHOFF, J. L. (1989) - Accelerator ¹⁴C ages for Basal Aurignacian at El Castillo (Spain). *Journal of Archaeological Science*. London. 16, p. 577-584.
- CLARK, G. A.; RIEL-SALVATORE, J. (2003) - *What's in a name? An empirical review of the West Eurasian Aurignacian.* Paper presented at the 12th Paleoanthropology Society Meetings, April 22-23, Tempe, AZ.
- COINMAN, N. R.; FOX, J. R. (2000) - Tor Sadaf (WHNBS 8): the transition to the Upper Paleolithic. In COINMAN, N. R., ed. - *The Archaeology of the Wadi al-Hasa, West-Central Jordan, Vol. 2: excavations and research at Middle, Upper and Epipaleolithic sites.* Tempe, AZ: Arizona State University (Anthropological Research Papers; 52), p. 123-142.
- D'ERRICO, F.; ZILHÃO, J.; JULIEN, M.; BAFFIER, D.; PELEGRIN, J. (1998) - Neanderthal acculturation in Western Europe? A critical review of the evidence and its interpretation. *Current Anthropology*. Chicago, IL. 39 (supplement), p. S1-S44.
- DIBBLE, H. L. (1984) - The Mousterian Industry from Bisitun Cave (Iran). *Paléorient*. Paris. 10, p. 23-34.
- DIBBLE, H. L.; HOLDAWAY, S. (1990) - Le Paléolithique moyen de l'abri sous roche de Warwasi et ses relations avec le Moustérien du Levant. *L'Anthropologie*. Paris. 94:4, p. 619-642.
- DIBBLE, H. L.; HOLDAWAY, S. (1993) - The Middle Paleolithic industries of Warwasi. In OLSZEWSKI, D. I.; DIBBLE, H. L., eds. - *The Paleolithic Prehistory of the Zagros-Taurus.* Philadelphia, PA: The University Museum, p. 75-100.
- DJINDJIAN, F. (1999) - The Mid Upper Palaeolithic (30,000 to 20,000 bp) in France. In ROEBROEKS, W.; MUSSI, M.; SVOBODA, J.; FENNEMA, K., eds. - *Hunters of the Golden Age. The Mid Upper Palaeolithic of Eurasia 30,000 – 20,000 BP.* Leiden: Leiden University (Analecta Praehistorica Leidensia; 31), p. 313-324.
- GARROD, D. A. E. (1957) - Notes sur le Paléolithique supérieur du Moyen Orient. *Bulletin de la Société Préhistorique Française*. Paris. 54:7-8, p. 439-446.
- GARROD, D. A. E.; HOWE, B.; GAUL, J. H. (1939) - Excavation in the Cave of Bacho Kiro, North-East Bulgaria. *Bulletin of the American School of Prehistoric Research*. Cambridge, MA. 15, p. 46-70.
- GILEAD, I. (1981) - Upper Paleolithic tool assemblages from the Negev and Sinai. In CAUVIN, J.; SANLAVILLE, P., eds. - *Préhistoire du Levant: chronologie et organisation de l'espace depuis les origines jusqu'au VI^e millénaire. Colloques Internationaux du CNRS, 10-14 juin Lyon, Maison de l'Orient.* Paris: Centre National de la Recherche Scientifique, p. 331-342.
- HAHN, J. (1970) - Recherches sur l'Aurignacien en Europe Centrale et Orientale. *L'Anthropologie*. Paris. 74, p. 195-220.
- HAHN, J. (1972) - Das Aurignacien in Mittel- und Osteuropa. *Acta Praehistorica et Archaeologica*. Berlin. 3, p. 77-107.

- HAHN, J. (1977) - *Aurignacien, das ältere Jungpaläolithikum im Mittel- und Osteuropa*. Köln-Wien: Böhlau (Fundamenta; 9).
- HOLE, F.; FLANNERY, K. (1967) - The Prehistory of Southwestern Iran: a preliminary report. *Proceedings of the Prehistoric Society*. London. 33, p. 151-206.
- HOURS, F.; COPELAND, L.; AURENCHE, O. (1973) - Les industries paléolithiques du Proche-Orient, essai de corrélation. *L'Anthropologie*. Paris. 77:3-4, 5-6, p. 229-280, p. 437-496.
- KOZŁOWSKI, J. K. (1979) - Le Bachokien: la plus ancienne industrie du Paléolithique supérieur en Europe. In KOZŁOWSKI, J. K., ed. - *Middle and early Upper Palaeolithic in Balkans*. Kraków: Uniwersytet Jagielloński, p. 77-99.
- KOZŁOWSKI, J. K. (1982) - *Excavation in Bacho Kiro Cave (Bulgaria): final report*. Warszawa: Państwowe Wydawnictwo Naukowe.
- KOZŁOWSKI, J. K. (1988) - Transition from the Middle to the Early Paleolithic in Central Europe and the Balkans. In HOFFECKER, J.; WOLF, C. A., eds. - *The Early Upper Paleolithic*. Oxford: British Archaeological Reports International Series 437, p. 193-236.
- KOZŁOWSKI, J. K. (1999) - The evolution of the Balkan Aurignacian. In DAVIES, W.; CHARLES, R., eds. - *Dorothy Garrod and the progress of the Palaeolithic. Studies in the prehistoric archaeology of the Near East and Europe*. Oxford: Oxbow Books, p. 97-117.
- KUHN, S. L.; STINER, M. C.; GÜLEÇ, E. (1999) - Initial Upper Paleolithic in South-Central Turkey and its regional context: a preliminary report. *Antiquity*. Cambridge. 73:281, p. 505-517.
- LUCAS, G. (2001) - The origin of Dufour bladelet torsion. In HAYS, M. A.; THACKER, P. T., eds. - *Questioning the answers: resolving fundamental problems of the Early Upper Paleolithic*. Oxford: British Archaeological Reports International Series 1005, p. 99-107.
- MARKS, A. E. (1981) - The Upper Paleolithic of the Levant. In CAUVIN, J.; SANLAVILLE, P., eds. - *Préhistoire du Levant: chronologie et organisation de l'espace depuis les origines jusqu'au VI^e millénaire. Colloques Internationaux du CNRS, 10-14 juin Lyon, Maison de l'Orient*. Paris: Centre National de la Recherche Scientifique, p. 369-372.
- MARKS, A. E. (1993) - The Early Upper Paleolithic: the view from the Levant. In KNECHT, H.; PIKE-TAY, A.; WHITE, R., eds. - *Before Lascaux: the complex record of the Early Upper Paleolithic*. Boca Raton, FL: CRC Press, p. 5-22.
- MCBREARTY, S.; BROOKS, A. S. (2000) - The revolution that wasn't: a new interpretation of the origin of modern human behavior. *Journal of Human Evolution*. London. 39, p. 453-563.
- MELLARS, P. (1998) - Comment on Neanderthal acculturation in Western Europe? A critical review of the evidence and its interpretation. *Current Anthropology*. Chicago, IL. 39 (supplement), p. S25-S26.
- MELLARS, P. (1999) - The Neanderthal problem continued. *Current Anthropology*. Chicago, IL. 40:3, p. 341-350.
- MOLIST, M.; CAUVIN, M.-C. (1990) - Une nouvelle sequence stratifiée pour la prehistoire en Syrie semi-desertique. *Paléorient*. Paris. 16:2, p. 55-63.
- OLIVA, M. (1999) - Some thoughts on Pavlovian adaptations and their alternatives. In ROEBROEKS, W.; MUSSI, M.; SVOBODA, J.; FENNEMA, K., eds. - *Hunters of the Golden Age. The Mid Upper Palaeolithic of Eurasia 30,000 – 20,000 BP*. Leiden: University (Analecta Praehistorica Leidensia; 31), p. 219-227.
- OLSZEWSKI, D. I. (1999) - The Early Upper Palaeolithic in the Zagros mountains. In DAVIES, W.; CHARLES, R., eds. - *Dorothy Garrod and the progress of the Palaeolithic. Studies in the prehistoric archaeology of the Near East and Europe*. Oxford: Oxbow Books, p. 167-180.
- OLSZEWSKI, D. I. (2001) - Ruminations on the Early Upper Paleolithic and a consideration of the Zagros Aurignacian. In HAYS, M. A.; THACKER, P. T., eds. - *Questioning the answers: resolving fundamental problems of the Early Upper Paleolithic*. Oxford: British Archaeological Reports International Series 1005, p. 79-89.
- OLSZEWSKI, D. I. (in press a) - Carinated tools, cores, and mobility: the Zagros Aurignacian example. In MCPHERRON, S. P., ed. - *Tools or cores? The identification and study of alternative core technology in lithic assemblages*. Newcastle: Cambridge Scholars Press.
- OLSZEWSKI, D. I. (in press b) - Issues in the development of the Early Upper Paleolithic and a "transitional" industry from the Zagros Region. In RIEL-SALVATORE, J.; CLARK, G. A., eds. - *Transitional industries in Europe and Western Asia*.
- OLSZEWSKI, D. I.; DIBBLE, H. L. (1994) - The Zagros Aurignacian. *Current Anthropology*. Chicago, IL. 35, p. 68-75.
- PLOUX, S. (1998) - Le Paléolithique supérieur d'Umm el Tlel (Bassin d'el Kowm, Syrie): observations préliminaires. *Cahiers de l'Euphrate*. Paris. 8, p. 27-54.
- RIGAUD, J. -P. (1996) - L'origine du Gravettien dans le Sud de la France. In DI CESNOLA, A. P.; MONTET-WHITE, A.; VALOCH, K., eds. - *The Upper Palaeolithic (6) – Colloquia XI-XII (13th Congress, International Union of Prehistoric and Protohistoric Sciences, Forlì, 1996)*, A.B.A.C.O, Forlì, p. 257-262.

- RIGAUD, J. -P. (1999) - Human adaptation to the climatic deterioration of the last Pleniglacial in Southwestern France (30,000 – 20,000 bp). In ROEBROEKS, W.; MUSSI, M.; SVOBODA, J.; FENNEMA, K., eds. - *Hunters of the Golden Age. The Mid Upper Palaeolithic of Eurasia 30,000 – 20,000 BP*. Leiden: University (Analecta Praehistorica Leidensia; 31), p. 325-336.
- RIGAUD, J. -P. (2001) - Discussion. In HAYS, M. A.; THACKER, P. T., eds. - *Questioning the answers: resolving fundamental problems of the Early Upper Paleolithic*. Oxford: British Archaeological Reports International Series 1005, p. 117-119.
- SCHMIDER, B.; PERPÈRE, M. (1995) - Production et utilisation des lamelles dans l'Aurignacien de la Grotte du Renne à Arcy-sur-Cure. In PAUTRAT, Y., ed. - *Paléolithique supérieur et Epipaléolithique dans le Nord-Est de la France*. Dijon: Direction Régionale des Affaires Culturelles, p. 4-10.
- SCHMIDER, B.; PERPÈRE, M. (1997) - Données nouvelles sur l'Aurignacien d'Arcy-sur-Cure (fouilles André Leroi-Gourhan). In THÉVENIN, A.; VILLES, A., eds. - *Le Paléolithique Supérieur de l'Est de la France: de l'Aurignacien à l'Ahrensbourgien. Actes du Colloque Interrégional sur le Paléolithique*. Reims: Chaumont, 17-18 Octobre 1994, p. 5-13.
- SMITH, P. E. L. (1986) - *Paleolithic archaeology In Iran*. Philadelphia, PA: The University Museum (The American Institute of Iranian Studies Monographs; 1).
- SOLECKI, R. S. (1958) - *The Baradostian industry and the Upper Palaeolithic in the Near East*. Ph. D. Dissertation, Columbia University. Ann Arbor, MI: University Microfilms International.
- SOLECKI, R. S.; SOLECKI, R. L. (1993) - The pointed tools from the Mousterian occupations of Shanidar Cave, Northern Iraq. In OLSZEWSKI, D. I.; DIBBLE, H. L., eds. - *The Paleolithic Prehistory of the Zagros-Taurus*. Philadelphia, PA: The University Museum, p. 119-146.
- SORIANO, S. (1998) - La production de lamelles torsées dans les niveaux du Paléolithique Supérieur Ancien d'Umm el Tlel (Syrie). Exploration théorique et expérimentale de ses modalités. In OTTE, M., ed. - *Préhistoire d'Anatolie. Genèse des deux mondes. Volume II*. Liège: Université (Études et Recherches Archéologiques de l'Université de Liège-ERAUL; 85), p. 731-748.
- SVOBODA, J.; KLÍMA, B.; JAROŠOVÁ, L.; ŠKRDLA, P. (1999) - The Gravettian in Moravia: climate, behaviour and technological complexity. In ROEBROEKS, W.; MUSSI, M.; SVOBODA, J.; FENNEMA, K., eds. - *Hunters of the Golden Age. The Mid Upper Palaeolithic of Eurasia 30,000 – 20,000 BP*. Leiden: University (Analecta Praehistorica Leidensia; 31), p. 197-217.
- SVOBODA, J.; LOŽEK, V.; VLČEK, E. (1996) - *Hunters between East and West. The Paleolithic of Moravia*. New York, NY: Plenum Press.
- TURNBULL, P. F. (1975) - The mammalian fauna of Warwasi Rock Shelter, West-Central Iran. *Fieldiana Geology*. Chicago, IL. 33:8, p. 141-156.
- YOUNG JR., T. C.; SMITH, P. E. L. (1966) - Research in the Prehistory of Central Western Iran. *Science*. New York, NY. 153, p. 386-391.