Demidenko Y.E., Otte M. & Noiret P. (dir.) - *Siuren I rock-shelter. From Late Middle Paleolithic and Early Upper Paleolithic to Epi-Paleolithic in Crimea.*
Liège, ERAUL 129, 2012, p. 287-303.

14 - INTER-UNIT AND INTER-LEVEL COMPARISONS OF ASSEMBLAGES FROM THE 1990s UNITS H, G AND F

Yuri E. DEMIDENKO

Introduction

The three archeological Units H, G and F excavated at Siuren I in the 1990s are composed of stratigraphicly distinct *in situ* archeological levels in which the different lithic and bone assemblages were recovered. Detailed analysis and description of the artifacts clearly indicate that the three Units have a twofold archeological subdivision. On one hand, lower Units H and G contain Upper Paleolithic flint assemblages with numerous Aurignacian Dufour bladelets of Dufour sub-type mainly with alternate retouch and completely lack carinated burins. On the other hand, Unit F, stratigraphically above H and G, contains Upper Paleolithic assemblages that are technologically and typologically quite different. They include a different set of Aurignacian microliths – Dufour and pseudo-Dufour microblades of Roc de Combe sub-type with either ventral or dorsal retouch and, at the same time, bladelet narrow-flaked cores/"carinated burins" and carinated burins *sensu stricto* are present. Moreover, Units H and G, aside from the dominance of Aurignacian artifacts, also contain a few, but morphologically characteristic, Middle Paleolithic Micoquian lithic tools, associated shaping and especially reshaping (rejuvenation) elements and bone retouchers, used for intensive secondary treatments of lithic tools, whereas the lithic and bone artifacts from Unit F are Upper Paleolithic Aurignacian only, although this Aurignacian differs from that present in Units H and G.

These basic conclusions are strongly supported by detailed comparative data that establish the inter-Unit artifact differences through the analysis of technological, typological and statistical data.

Moreover, in addition to inter-Unit variability, there is also variability in artifact types within the two sets of Units with respect to the specific levels. First of all, for Units G and F, each of which has four archeological levels, the relative distribution of lithic artifacts in the different levels is significant. In Unit G, almost 50% lithic artifacts and 7 of 8 bone artifacts were found in level Gc1-Cc2. Even more striking is the distribution of artifacts in Unit F in which 91% all lithics come from level Fb1-Fb2, as well as 4 of 5 worked bone artifacts.

Thus, the comparisons needed cannot be short and limited, as even very basic artifact frequency and distribution data immediately show a great degree of variability and which is understandable given varying intensity of human occupation for each level in the two Units throughout the sequence.

Artifact comparisons between Units H and G, and their levels

It is logical to start the analysis with comparisons between the lithic assemblages in Units H and G; no worked bone artifacts were recovered from Unit H. This comparison is critical because Unit H is an entirely new archeological subdivision in the Siuren I chronological sequence as it was not identified during the 1920s excavations.

Despite the relatively small assemblage for Unit H (n= 682), the artifacts include easily identifiable Upper Paleolithic Aurignacian and Middle Paleolithic Micoquian items, suggesting that we were quite lucky to excavate possibly one of the best Unit H find spots in the whole rock-shelter area. Moreover, when we see great similarity between Units H and G, we are able to use the Unit H lithic data for lithic variability analysis of the site's lower stratigraphic sequence, for five actual archeological levels there (*sic!*). It should also be pointed out that various morphological, metric, technological and typological data for each Unit and its level(s) will be also analyzed in detail during comparative studies, providing strong support for industrial summaries of both Units with their specific features.

It is also important to compare the Upper Paleolithic and Middle Paleolithic industrial components in Units H and G through separate studies.

Comparisons of Units H and G: Upper Paleolithic Aurignacian component

To examine the Aurignacian component, all Micoquian tools and blanks were excluded from Aurignacian tool and debitage analyses. This excluded 20 tools (3 – Unit H, 1 – level Gd, 13 – level Gc1-Gc2 and 3 – level Gb1-Gb2) and 20 blanks.

The overall structure of blanks is as follows: 9 complete flakes, 6 fragmented flakes and 5 heavily fragmented unidentifiable pieces. The unidentifiable pieces are all from level Gc1-Gc2, 3 flakes from Unit H, 1 from level Gd, 8 from level Gc1-Gc2 and 3 from level Gb1-Gb2.

Technologically, the Unit H artifacts are very similar to those in Unit G. This is clear by the presence of serial bladelet cores in both assemblages. In particular, the following core type subdivision for Units H and G should be mentioned. The only three morphologically defined Unit H cores are a bladelet "carinated" single-platform core of volumetric character with sub-cylindrical shape (see fig. 1:2, p. 110), a bladelet multiplatform core (see fig. 1:3, p. 110) and a blade/bladelet double-platform core with two bidirectional-adjacent flaking surfaces (see fig. 1:1, p. 110). In Unit G, identical types of serial bladelet cores are also present. For example, level Gd also has a morphologically and metrically identical bladelet "carinated" core (a single-platform one of volumetric character with sub-cylindrical shape) (see fig. 1:2, p. 136). The Unit H blade/bladelet core is similar to two exhausted blade/bladelet cores again from level Gd. The Unit H bladelet multiplatform core is a good example of multiple bladelet reduction carried out on a very good flaking quality nodule/chunk, again reflecting the intention for continuous bladelet reduction throughout the "core history". The latter piece is thus comparable to three bladelet "carinated" double-platform cores in level Gc1-Gc2 (see fig. 1:3-5, p. 136), where more than one bladelet reduction sequence was performed on each. It is also of interest to note that the Unit H cores are very similar to level Gd cores with the presence of only blade/bladelet and bladelet cores with no exhausted flake/blade and/or flake multiplatform cores present in levels Gc1-Gc2 and Gb1-Gb2. Such reduction focused on bladelet production in both Unit H and level Gd may indicate purposeful, limited and very similar primary flaking by Aurignacian human inhabitants at the site during a single occupational episode for each. At the same time, the presence of exhausted flake-blade or flake multiplatform cores in levels Gc1-Gc2 and Gb1-Gb2, and the occurrence of one blade core and two pre-cores in level Gb1-Gb2, suggest broader reduction repertoires applied by the Aurignacian inhabitants of these levels, caused by overall more intensive flint exploitation during occupation, it is highly likely that several occupational episodes are represented by these levels. Levels Gc1-Gc2 and Gb1-Gb2 contain the largest flint assemblages in Units H and G (2332 and 1259 artifacts, respectively); it is thus reasonable to expect greater variability in the occurrence of particular type pieces. The proposed explanation for core variability in Units H and the three lower levels in Unit G is also well supported by the complete absence of any core-like pieces in level Ga, which also has the smallest assemblage in comparisons with the other four subdivisions of Units H and G.

Thus, blade/bladelet and bladelet core reduction in Unit H and level Gd is supplemented by additional bladelet core variability in level Gc1-Gc2, as shown by a series of bladelet "carinated" double-platform cores there, as well as by flake and blade core reduction in levels Gc1-Gc2 and Gb1-Gb2.

The emphasis on bladelet primary reduction and their common features in Units H and G finds is further supported by core maintenance products (CMP) blank and morphology data. First, the presence of even some crested bladelets and microblades is indicative of intensive bladelet *sensu lato* production at the site for the two Units' Aurignacian occupations (see tabl. 3A, p. 141). But, at the same time, contrary to possible expectations suggested by the cores, crested bladelets and microblades occur less in Unit H (13.3% and only bladelets with no microblades) and level Gd (23.6% with equal representation of both bladelets and microblades) than in level Gc1-Gc2 (33.9% - 13 bladelets and 6 microblades), while level Gb1-Gb2 (10.5% with presence of bladelets only) is about the same as for Unit H. Also, level Ga crested piece blank composition is unique for Units H and G with 75% crested bladelets *sensu lato*, again emphasizing its "incomplete" flint artifact representation. Thus, there is not simply a one-way connection between frequencies of bladelet cores and crested bladelet *sensu lato*, which is why consideration of "intensity data" should also be included. Again, the suggested intensity of flint exploitation is the highest for level Gc1-Gc2. Second, it is also important to differentiate between primary, secondary and re-crested crested bladelets *sensu lato*. The presence of primary crested bladelets *sensu lato* is a strong argument for initial and intentional bladelet reduction, meaning that at least some bladelet cores were only used for bladelet production. Primary crested bladelets *sensu lato* are represented by the following proportions in Unit H and the four levels of Unit G: 100% all identifiable items in Unit H, 75% in level Gd, 73.3% in level Gc1-Gc2, 50% in level Gb1-Gb2 and none in level Ga. Therefore, the presence of both serial bladelet cores and primary crested bladelets *sensu lato* attest to strict bladelet production for Aurignacian assemblages in Units H and G. And indeed, looking at the bladelet "carinated" cores (see fig. 1:2, p. 110 and fig. 1:2-5, p. 136), it is hard to imagine that any other sort of reduction could have taken place before the last bladelet stage. At the same time, the occurrence of secondary crested and re-crested bladelets in levels Gd, Gc1-Gc2 and Gb1-Gb2, one secondary crested microblade in level Gc1-Gc2 and two secondary and re-crested microblades in level Ga clearly demonstrates the application of recurrent cresting processes during continuous and intensive bladelet core reduction. Continuing the CMP analysis, the importance of crested blades in Units H and G should be noted. Aside from level Ga with only 25% the crested blades, Unit H and the other Unit G levels show dominating proportions of crested blades among all crested pieces: 73.4% in Unit H, 70.5% in level Gd, 55.4% in level Gc1-Gc2 and 52.7% in level Gb1-Gb2. Recalling the absence of blade cores and the presence of only bladelet and blade/bladelet cores in Unit H and level Gd, it can only be concluded that, in addition to strict bladelet reduction, continuous common blade/bladelet reduction also took place, indicated by the good representation of crested primary and secondary blades. The same also relates to levels Gc1-Gc2 and Gb1-Gb2 where the lesser presence of various crested blades can be explained by increased intensity of bladelet reduction, despite the fact that other reduction strategies were also used. Finally, it is of interest to note the presence of one core tablet on blade in each of the following levels: Unit H, levels Gd and Gb1-Gb2 attesting in our opinion to core with two or more flaking surfaces for blade/bladelet and/or bladelet reduction.

So, both core and CMP data suggest the same basic technological features of primary reduction for Units H and G; their variability can be explained by differences in intensity of flint exploitation.

The Units H and G debitage data follow show a similar pattern. And again, there is no one-way technological connection for them. First, it is worth examining the internal composition of basic debitage types.

Debitage *sensu stricto* (excluding tools and CMP blanks) totaling 1787 artifacts has the following internal structure for Unit H and the four Unit G levels in stratigraphic order from bottom to top:
Flakes - 46.4% - 30.5% - 31.1% - 31.1% - 43.1%;
Blades - 18.4% - 27.1% - 22.5% - 18.1% - 20%;
Bladelets - 25.1% - 29.4% - 32.9% - 29% - 21.5%;
Microblades - 10.1% - 13% - 13.5% - 21.8% - 15.4%.

Adding tools and CMP data to the debitage *sensu lato* indices for a total amount of 2317 items, the entire debitage assemblage structure is as follows:
Flakes - 38.5% - 26.1% - 27.7% - 30.2% - 34.9%;
Blades - 21.6% - 27.7% - 24.3% - 19% - 23.2%;
Bladelets - 25% - 27.2% - 30.5% - 26.2% - 22.1%;
Microblades - 14.9% - 19% - 17.5% - 24.6% - 19.8%.

Comparing the two pairs of statistical data for each of the four debitage classes using debitage *sensu stricto* and *sensu lato* indices, we obtain some very indicative changes, although the certain validity of both samples for any independent studies should be acknowledged. Flake indices decrease for all the five subdivisions, meaning that the added flake-tools and flake-CMPs were very low in comparison to all other blady debitage classes. It is thus reasonable to say that both technologically (for core flaking surface cresting preparation and re-preparation, and core platform radical tablet rejuvenation) and typologically (flake blank selection for tool production), flakes played a minor role: being mostly simple and basic core surface preparation and re-preparation pieces and not intentional blanks. Blade indices, contrary to flakes, increase slightly for a maximum of 3% for all five subdivisions. This clearly demonstrates the importance of CMP on blades for core exploitation, as was shown above, and some blade tool production. Turning to the bladelet indices, a similar pattern is seen to the flake data, decreasing for all but level Ga, but less than 3%. This is explained as follows. The CMP on bladelets are well-represented, while retouched microliths on bladelets are about in 2 ½ and 3 times less common on average (see below) in comparison to the larger number of retouched microliths on microblades. There is thus some balance for bladelet frequencies in the two debitage sets, when CMP increase, bladelet-tools decrease, affecting the final common index of bladelets for debitage *sensu lato*. Finishing with the microblade indices, we see up to 6% increase of indices for microblades in debitage *sensu lato*. Recalling the single presence of crested microblades, such increase mostly occurred because of the addition of many microblade-tools – retouched microliths produced on microblades.

Summing up these results from both debitage samples, it is certain that all blade-like pieces were intentional products in primary flaking processes for the Aurignacian groups at Siuren I lower cultural bearing sedimentation processes. As already shown and will be shown again below, blades have been used for core maintenance processes and Indicative Upper Paleolithic tool type production, while bladelets and microblades were mainly used in different proportions for to make retouched microliths. These assemblages reflect this twofold pattern in exploitation of blady products. On one hand, strict blade indices alone are rather low for Upper Paleolithic assemblages (ILam = 18.1 – 27.1% for debitage *sensu stricto* and ILam = 19.1-27.8% for debitage *sensu lato* with the respective indices of 18.4% and 21.7% for Unit H and average respective indices of 22.3% and 23.9% for Unit G). On the other hand, adding bladelets and microblades to blades, the final results are very high for joint blade/bladelet *sensu lato* indications – 53.6-69.5% for debitage *sensu stricto* and 62.0-74.0% for debitage *sensu lato* having the respective indices of 53.6 and 62.0% for Unit H and average respective indices of 68.5 and 72.2% for Unit G. Therefore, these Siuren I assemblages are surely blade *sensu lato*-dominated with the following decreasing frequencies of the three debitage classes for all five stratigraphic subdivisions: bladelets – blades – microblades. The lower Unit H blade/bladelet indices are explained by the highest values for flakes and the rather low blade values compared with the respective data for Unit G levels. The most important feature is that the Unit H data are completely within the statistically insignificant range of variability values for all Unit H and G indices, repeatedly showing that this is a single homogeneous Aurignacian complex composed of several artifact assemblages from different occupations of the site. Also, the third place for microblades can be also easily understood from a technological point of view by the obvious rarity of carinated tools: carinated end-scrapers *sensu lato* (including thick shouldered/nosed ones), number only one or two in each stratigraphic subdivision, while carinated burins are entirely absent. The importance of this observation is technologically related to the fact that bladelet cores were mainly the source of bladelets and to a lesser extent, microblades, while typologically defined carinated tools were basically a "core source" of microblades than bladelets. Given these data and technological considerations, it becomes clear why taken separately bladelets and even blades each outnumber microblades in the five stratigraphic subdivisions, except for level Gb1-Gb2 which has more microblades than blades, and also two carinated scrapers *sensu lato*, while levels Gd and Gc1-Gc2 in Unit G have only a single carinated scraper each.

Thus, these comparisons and technological considerations lead to the following basic technological conclusions regarding the Aurignacian finds in the Siuren I lower sequence

Two basic reduction strategies were applied: blade/bladelet and strictly bladelet. The blade/bladelet reduction strategy was based first on reduction of blade cores (a single example of such a core is present in level Gb1-Gb2) with the application of the *lame à crête technique* to detach crested blades and for initial blade removal. Core tablets on flakes were used to rejuvenate the core striking platform during blade reduction. Then, during the main reduction phase and as the core and/or its flaking surface became smaller and/or narrower, primary reduction transformed from blade to blade/bladelet –such cores are found in Unit H, levels Gd and Gc1-Gc2. The second reduction strategy produced only bladelets from rather small flint nodules/chunks. Core exploitation began with removal of crested bladelets (products a smaller variant of the *lame à crête technique*) followed by regular serial bladelet and sometimes microblades. Striking platforms and flaking surfaces were very often convex and wide (actually semicircular) and regularly shaped with additional retouch-like treatment on their intersected edges that caused two things. First, from a strictly typological point of view, the bladelet cores or some of them (the bladelet "carinated" cores) resemble carinated end-scrapers. Therefore, for the present Siuren I Aurignacian bladelet "carinated" core and carinated end-scraper classification (see p. 91-107) morphological and metric boundaries have been established: when a striking platform/"working edge" was wider than bladelet removal length on its flaking surface/"secondary treated working surface", the piece was classified as a carinated end-scraper, and the reverse as a bladelet "carinated" core. But still the bladelet cores and their most indicative variations - bladelet "carinated" single-platform and even double-platform cores, which have two opposed or adjacent flaking surfaces - fit better into the core category because of their very regular bladelet production. Retouch-like treatment of the striking platform was simply abrasion for better control and easier removal of a series of bladelets. Following all these features for the bladelet cores, it becomes more understandable why mostly "on-axis", with slight dominance of "weakly" twisted profiles on rather long and wide rectilineal bladelets *sensu lato* were the products of this reduction strategy. Continuous and multiple bladelet reduction for the strict bladelet cores is again clearly seen by the presence of re-crested bladelets and microblades, core tablets on blades and bladelet "carinated" double-platform cores. At the same time, the Units H and G carinated end-scrapers *sensu lato* are part of this strict bladelet core reduction strategy, but usually with a more limited number of bladelets removed that were also shorter and narrower, actually mostly microblades, which is why they can be technologically considered as initial bladelet cores.

Again, the Unit H Aurignacian finds are a genuine part of technological methods and traits common to the Aurignacian of both Units H and G.

The results of tool and debitage classification and attribute analysis for Units H and G allow us to present a general summary of these data with some limits.

Debitage, by its morphological features, is very consistent with basic core reduction strategies and their technological traits. <u>Flakes</u> from Units H and G do not appear to have been produced as intentional blanks, suggested by their overall small size (most items with length no more than 3 cm – 86% in Unit H and 75.9-79.5% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G), cortex data with the highest ratios of wholly cortical items (11.3% in Unit H, 10.7-14.3% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) and partially cortical items (25% in Unit H, 25-27.9% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) in comparison to all blady debitage classes and especially bladelets and microblades, and great diversity of other attributes showing a complete lack of standardization, as shown by the dominance of expanding and irregular shaped pieces taken together (74.7% in Unit H, 72.6-80.0% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) in association with mainly "off-axis" removal directions (52.7% in Unit H, 50.7% for level Gd and 79.6-81.8% for levels Gc1-Gc2 and Gb1-Gb2 in Unit G) and often with hinged and/or overpassed ("not regular") distal ends (34% in Unit H, 26.3-32% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G).

<u>Blades</u> occupy an intermediate position between flakes and bladetets *sensu lato* and this is understandable because of their initial removal from blade/bladelet cores; nearly a third are partially cortical (34.7% in Unit H, 25.4-30.8% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G). At the same time, the complete absence of wholly cortical items (2% in Unit H and 1.1% for level Gc1-Gc2 in Unit G) is because the decortification of cores was done by flakes, and many items with irregular and expanding shapes (58.1% in Unit H, 28.6-41.1% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) and mainly "off-axis" removal directions (78.1% in Unit H, 65.4-73.5% for levels Gd and Gb1-Gb2, although "on-axis" items completely dominate with 92.8% in level Gc1-Gc2 in Unit G). Hinged and/or overpassed ("not regular") distal ends occur variably, but to a lesser extent than for flakes (27.5% in Unit H, 21.3% for level Gd, 9.1% for level Gc1-Gc2 and 39.3% for level Gb1-Gb2 in Unit G). One more indicative feature of the blades is the significant (34.9% in Unit H, 33.3% for level Gd and 44.2% for level Gb1-Gb2 in Unit G) or dominant (56.8% for level Gc1-Gc2 in Unit G) presence of twisted profiles. Even so, with all the "irregular" blade morphological features, it is necessary to remember one important and common technological blade trait for Aurignacian industries. In contrast to the later Gravettian industries in Europe, for Aurignacian traditions, straight profile and regularly parallel blades were not an objective during core reduction processes as they were not backed by lateral retouching to make composite tools for projectile hunting weapons. Aurignacian blades could be "irregular". At the same time, a great dominance of unidirectional scar pattern (87.8% in Unit H, 76-93.9% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) and mainly trapezoidal and multifaceted profiles at midpoint (65.3% in Unit H, 58-62.3% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) for blades and lateral cortex location for partially cortical items (54.5% in Unit H, 50-62.5% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) evidence their very regular and serial removal. But when we consider bladelets and microblades, we really come to the most intended products of Units H and G reduction strategies.

<u>Bladelets</u> have the following standardized features: a great dominance of pieces with unidirectional scar pattern (88% in Unit H, 79.4-94.7% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G); a low number of partially cortical items (14.9% in Unit H, 10.9-12.5% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) and either the complete absence or a single representation of wholly cortical items; a dominance of parallel and converging shaped pieces with parallel ones dominant in each of the four stratigraphic subdivisions (83.9% in Unit H, 72.7-82.4% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) in association with "on-axis" removal direction (90% in Unit H, 90.3-97.8% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G); an important (41.3% in Unit H) or even a dominant (54.7-67.6% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) position of twisted profiles, although this is correlated with "on-axis" removal direction; a

low number of hinged and/or overpassed ("not regular") distal ends (12.2% in Unit H, 8.8-18.2% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G); prevalence of trapezoidal and multi-faceted profiles at midpoint (56.7% in Unit H, 51.1-56.2% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G); a dominance of the "plain-punctiform-linear" group of butt types (73.1% in Unit H, 69.8-91.1% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) with linear butts the most significant (46.3% in Unit H, 37.4-56.9% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G), as well as a notable absence or a single occurrence of cortical and faceted butts; a dominance of butts with abrasion (79% in Unit H, 79.6-94.1% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G); an average length of 2.7 cm in Unit H and of 2.6-2.8 cm for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G, an average width of 0.9 cm and an average thickness of 0.2 cm for all four stratigraphic subdivisions, while "long" bladelets (more than 3 cm long) have a proportion of a little less than a third of all complete items - 31.5% in Unit H, 25.9-29.4% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G.

Microblades are even more uniform than bladelets are and are described as follows: near exclusive presence of unidirectional scar pattern (96.3% in Unit H, 92.1-94.9% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G); near absence of cortex (none in Unit H and levels Gd and Ga, with only a single occurrence of partially cortical pieces in levels Gc1-Gc2 (4.6%) and Gb1-Gb2 (6.6%); a dominance of converging and parallel shaped pieces with converging ones dominant in three stratigraphic subdivisions, except for level Gb1-Gb2, where bladelet parallel shape dominates (88.8% in Unit H, 86.3-100% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) in association with "on-axis" removal direction for Unit G microblades (83.3-93.6% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) and "off-axis" removal direction for Unit H microblades (88.8%), although this difference with Unit H can be explained by very small sample of microblades with this attribute (n=9) in comparison to Unit G (35-109 pieces); a prevalence of twisted general profiles for Unit G microblades (72.7% in level Gd, 52.8-58.7% in levels Gc1-Gc2 and Gb1-Gb2), while twisted microblades account for only 24% in Unit H; an absence (Unit H) or a rather low number of pieces with hinged and/or overpassed ("not regular") distal ends for Unit G microblades (25% in level Gd, 6.5% in level Gc1-Gc2 and 18.5% in level Gb1-Gb2); prevalence of items with triangular profile at midpoint (74.1% in Unit H, 56.4-64.6% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G) that indicates removal of microblades from intersection ridges of bladelet removal scars on bladelet cores and carinated end-scrapers *sensu lato* flaking surfaces/"secondary treated working surfaces"; excluding crushed butts, there is an absolute dominance of the "plain-punctiform-linear" group of butt types for microblades in the four stratigraphic subdivisions with some internal prevalence of either punctiform butts (Unit H and level Gb1-Gb2) or linear butts (levels Gd and Gc1-Gc2); a very common presence of butts with abrasion (87.5% in Unit H, 92-94.5% for levels Gd, Gc1-Gc2 and Gb1-Gb2 in Unit G); an average length of 1.7 cm in Unit H, 1.6 cm for levels Gc1-Gc2 and Gb1-Gb2 in Unit G, while the only two complete microblades in level Gd are 1.1 and 1.2 cm long, an average width of 0.6 cm in Unit H and of 0.5 cm in the three levels of Unit G with the very notable absence of any piece with width less than 0.4 cm indicating that microblades are rather similar to bladelets in width, an average thickness of 0.1 cm for Unit H, levels Gd and Gc1-Gc2 and 0.2 cm for level Gb1-Gb2 microblades.

It is also important to emphasize that Unit H and G bladelets and microblades, based on morphological and metric parameters, represent two very similar products of a single reduction system for their production.

Concluding the debitage characteristics and comparisons, it is seen again all basic similarities for Unit H and Unit G its classes. Some variability on "more twisted"/"less twisted" and "on-axis"/"off-axis" bladelets and microblades in between Unit H and Unit G bladelets and microblades will be once again discussed below during analyzes of "non-geometric microliths".

Also, moving beyond the debitage analysis and starting the tool analysis, it is interesting to look at the different blank selection patterns of flakes, blades, bladelets and microblades for tool production in Units H and G. These are as follows. Flakes: 1.5% in Unit H, 3.0% in level Gd, 6.2% in level Gc1-Gc2, 6.1% in level Gb1-Gb2, 6.7% in level Ga and 4.8% in total for Units H and G together. Blades: 18.7% in Unit H, 13.0% in level Gd, 17.8% in level Gc1-Gc2, 11.9% in level Gb1-Gb2, 30.0% in level Ga and 16.5% in total for Units H and G together. Bladelets: 20.7% in Unit H, 15.1% in level Gd, 14.5% in level Gc1-Gc2, 11.2% in level Gb1-Gb2, 21.1% in level Ga and 14.9% in total for Units H and G together. Microblades: 48.1% in Unit H, 44.6% in level Gd, 38.2% in level Gc1-Gc2, 30.3% in level Gb1-Gb2, 29.4% in level Ga and 38.1% in total for Units H and G together. These tool-blank selection rates clearly show and confirm the observations discussed above that flakes are not the intended products of primary reduction processes for tools and that rather microblades are the most sought products from both core and carinated end-scraper reduction processes at the site. At the same time, blade and bladelet blank selection rates are moderate but similar, again reflecting their different, by tool class production, but similar in numerical importance as was also explained above.

The tool-kits in Unit H and Unit's G 4 levels cannot be considered typologically identical, as they vary in frequencies. Excluding the Middle Paleolithic tools, unidentifiable tool fragments and even non-flint tools, the final total of tools in Units H and G is 392. Among these tools, 62.7% (183 items) come from a single level (Gc1-Gc2), while tool counts for the other levels are as follows: 60 for Unit H, 67 for level Gd, 65 for level Gb1-Gb2 and 17 for level Ga. Using these "restricted" tool accounts, it is also important to recall that "non-geometric microliths" for each of the five tool-kits comprise more than 50%: 43 items/71.7% in Unit H, 49 items/73.1% in level Gd, 117 items/63.9% in level Gc1-Gc2, 46 items/70.8% in level Gb1-Gb2 and 9 items/52.9% in level Ga. The Indicative Upper Paleolithic tool types are thus not very common in each level and show some inter-level differences. Nevertheless, the five tool-kits show several typological similarities that unite them into the same Aurignacian find complex. Regarding the representation of Indicative Upper Paleolithic tool types, the following occurrence of tool classes and types unite the five tool-kits. First, there is representation of simple flat end-scrapers on blades, unretouched blades and on blades with marginal and/or irregular retouch in Unit H and levels Gc1-Gc2 and Ga. The absence of these end-scrapers in levels Gd and Gb1-Gb2 has been "compensated" by a single, for all five tool-kits, end-scraper on retouched flake, while the other two levels contain carinated end-scrapers *sensu lato*, and these are also present in Unit H and level Gc1-Gc2. Excluding a single atypical end-scraper on blade from level Ga, the other end-scrapers from Units H and G include only a double end-scraper on retouched flake in level Gc1-Gc2 and a unilateral/flake end-scraper in level Ga. Thus, it is possible to propose, despite the occurrence of some other end-scraper types, that the most of the end-scrapers are simple flat items on blades, noting here specially the complete absence of end-scrapers on any well-retouched blades, and carinated *sensu lato* items. Second, burins are common, with dominance of truncation/lateral retouch and angle/transverse on natural surface burins over dihedral burins, with a notable absence of any carinated specimens. Variability in burin types throughout the sequence of Units H and G levels is quite interesting. Dihedral burins are completely absent in the three lower stratigraphic subdivisions (Unit H, levels Gd and Gc1-Gc2), while they are present in the two upper stratigraphic subdivisions (levels Gb1-Gb2 and Ga). Moreover, there is just a single dihedral burin among the four burins in level Gb1-Gb2, which also include a double angle, a transverse on lateral preparation and a transverse on natural surface, reflecting the typical occurrence of burin types for the three lower stratigraphic subdivisions, while both burins in level Ga are dihedral. It was not clear whether this pattern indicates a sort of "transitional burin development" into the later Siuren I, Unit F Late/Evolved Aurignacian, with or without numerous dihedral and carinated burins. All other techno-typological features of levels Gb1-Gb2 and Ga are in good accordance with basic Archaic Aurignacian/Aurignacian 0 traits for Upper Paleolithic finds from Units H and G. Other Indicative Upper Paleolithic tool classes are represented sporadically throughout the sequence, but can still be considered good representatives of the tool-kits. Third, truncations (4 items) are known from Unit H, levels Gd and Gc1-Gc2. Aside from one of two truncations on flakes in level Gc1-Gc2, the other three pieces are regular truncated blades, and all four truncations have rather simple scalar steep retouch. Retouched blades (8 items) are known in all levels but level Ga, and they usually have one or two lateral edges with scalar semi-steep retouch. During classification of retouched blades, the only exception is a retouched blade with Aurignacian-like retouch in level Gc1-Gc2 (see fig. 4:11, p. 192). This proximal fragmented piece has bilateral invasive scalar semi-steep retouch, suggesting its Aurignacian affinity. At the same time, the piece does not have true stepped Aurignacian retouch and our definition is therefore a rather conventional one, although the presence of the most heavily retouched blade in level Gc1-Gc2 is also readily understandable given the highest human occupation intensity characteristics for this level within Units H and G. The latter fact also explains why scaled tools (2 items) were only recognized in level Gc1-Gc2 during the 1990s excavations, but there is an additional indication of this tool class in Unit G in level Gb1-Gb2, where a rare composite tool on a flake – scaled tool/burin on concave truncation was recovered. Thus, taking all the Indicative Upper Paleolithic tool types together, we see a homogeneous tool class and type representation throughout the sequence of Units H and G with the only reservation being that dihedral burins are limited to the uppermost levels Gb1-Gb2 and Ga.

"Non-geometric microliths" deserve some special attention as they are much more common in each of the five stratigraphic subdivisions in comparison to the Indicative Upper Paleolithic tool types and they have very characteristic morphological features. Also, the observed morphological variability for unretouched bladelets and microblades throughout Unit H and G requires that the "non-geometric microlith" discussion begins with blank morphology. As a whole, the Units H and G "non-geometric microliths" assemblage is composed of 264 items and the following are the count and frequency data for each of the five stratigraphic subdivisions: 43 specimens/71.7% in Unit H, 49 specimens/73.1% in level Gd, 117 specimens/63.9% in level Gc1-Gc2, 46 specimens/70.8% in level Gb1-Gb2 and 9 specimens/52.9% in level Ga. By the internal composition of blanks used, "non-geometric microliths" are characterized by varying percentages of bladelets and microblades, although some wide microblades may have been bladelets prior to retouch of their lateral edge(s). Bladelets are always well less than half of all microlith blanks, sometimes less than one third of all tools – 18 pieces/41.9% in Unit H, 16 pieces/32.7% in level Gd, 46 pieces/39.3% in level Gc1-Gc2, 13 pieces/28.3% in level Gb1-Gb2 and 4 pieces/44.4%. Microblades, on the contrary, are dominant: 25 pieces/58.1% in Unit H, 33 pieces/67.3% in level Gd, 71 pieces/60.7% in level Gc1-Gc2, 33 pieces/71.7% in level Gb1-Gb2 and 5 pieces/55.6%. The clear prevalence of microblades over bladelets among microlith blanks is also very indicative, particularly for levels Gd and Gb1-Gb2. This microlith blank pattern with a dominance of microblades should be stressed because the opposite is observed for the internal structure of bladelets *sensu lato* with a prevalence of bladelets over microblades in all five stratigraphic subdivisions: Unit H – 67 bladelets (71.3%) and 27 microblades (28.7%), level Gd – 88 bladelets (69.3%) and 39 microblades (30.7%), level Gc1-Gc2 – 266 bladelets (70.9%) and 109 microblades (29.1%), level Gb1-Gb2 – 101 bladelets (57.1%) and 76 microblades (42.9%) and level Ga – 14 bladelets (58.3%) and 10 microblades (41.7%). Thus, comparison of the two retouched and unretouched samples of bladelets *sensu lato* through percentages of bladelets and microblades allows us to postulate a general pattern of selection of microblades and much fewer bladelets for "non-geometric microlith" production. Then, the blank type data is complemented by comparative data on the occurrence of complete and broken pieces for unretouched and retouched bladelets and microblades in each of the five stratigraphic subdivisions. The Unit H unretouched sample has 19 complete bladelets (28.4%) and 48 fragmented bladelets (71.6%), and 3 complete microblades (11.1%) and 24 fragmented microblades (88.9%). The Unit H retouched sample has 3 complete bladelets (16.7%) and 15 fragmented bladelets (83.3%), and 5 complete microblades (20%) and 20 fragmented microblades (80%). The level Gd unretouched sample has 14 complete bladelets (15.9%) and 74 fragmented bladelets (84.1%), and 2 complete microblades (5.1%) and 37 fragmented microblades (94.9%). The level Gd retouched sample has 2 complete bladelets (12.5%) and 14 fragmented bladelets (87.5%), and one complete microblade (3%) and 32 fragmented microblades (97%). The level Gc1-Gc2 unretouched sample has 31 complete bladelets (11.7%) and 235 fragmented bladelets (88.3%), and 8 complete microblades (7.3%) and 101 fragmented microblades (92.7%). The level Gc1-Gc2 retouched sample has no complete bladelets and 46 fragmented bladelets (100%), and 2 complete microblades (2.8%) and 69 fragmented microblades (97.2%). The level Gb1-Gb2 unretouched sample has 17 complete bladelets (16.8%) and 84 fragmented bladelets (83.2%), and 7 complete microblades (9.2%) and 69 fragmented microblades (90.8%). The level Gb1-Gb2 retouched sample has one complete bladelet (7.7%) and 12 fragmented bladelets (92.3%), and no complete microblades and 33 fragmented microblades (100%). The level Ga unretouched sample has no complete bladelets and 14 fragmented bladelets (100%), and one complete microblade (10%) and 9 fragmented microblades (90%). The level Ga retouched sample has one complete bladelet (25%) and 3 fragmented bladelets (75%), and no complete microblades and 5 fragmented microblades (100%). In sum, the comparison of bladelet *sensu lato* condition characteristics for unretouched and retouched bladelets and microblades indicates one very special feature of its selection for tool production: it is clear that there was no special selection of complete bladelets and microblades for microlith production by Aurignacian groups in Units H and G, which is why many deliberately broken specimens were used in production. This clear trend has also an interesting metric and technological meaning. All complete unretouched and retouched bladelets and microblades were measured together and then separately to obtain the following average metric indices. The Unit H samples are as follows: all 29 complete bladelets *sensu lato* are 2.61 cm long, 0.77 cm wide and 0.2 cm thick; 22 only unretouched complete bladelets *sensu lato* are 2.55 cm long, 0.82 cm wide and 0.2 cm thick; 7 only retouched complete bladelets *sensu lato* are 2.81 cm long, 0.66 cm wide and 0.18 cm thick. The Unit G samples taken together for all four levels are as follows: all 87 complete bladelets *sensu lato* are 2.44 cm long, 0.76 cm wide and 0.2 cm thick; 80 only unretouched complete bladelets *sensu lato* are 2.41 cm long, 0.80 cm wide and 0.2 cm thick; 7 only retouched complete bladelets *sensu lato* are 2.84 cm long, 0.65 cm wide and 0.2 cm thick. These mean lengths indicate some selection of the longest complete pieces among bladelets and microblades as blanks for microliths, but differences in width can be explained by the reduction in width by often bilateral and also lateral retouching, while thickness indices are stable for all three bladelets *sensu lato* in Units H and G. Nevertheless, the length differences are not large and do not reach even 0.5 cm, being at any rate under 3 cm. Accordingly, Aurignacian makers and users of Units H and G "non-geometric microliths" did not require longer (more than 3 cm) bladelets *sensu lato* because they knew in advance the length, width and thickness of the blanks needed "non-geometric microlith" production. Accordingly, special reduction methods were used for bladelet and microblade production, most clearly seen in the presence of bladelet "carinated" cores and carinated end-scrapers *sensu lato* as these pieces are characterized by both rather wide striking platforms/"working edges" and non-elongated flaking surfaces/"secondary treated working surfaces". Moreover, the shape and axis removal morphological features of bladelets and microblades further indicate implication of these reduction objects. By shape, there is not just a great dominance of pieces with parallel and converging shapes for both unretouched and retouched bladelets and microblades, but there is especially the prevalence of parallel over converging shape in all levels except level Gb1-Gb2 in Units H and G. In axis removal, the great dominance of "on-axis" bladelets within the debitage samples of Units H and G has been observed. The microblade debitage samples, however, showed this dominance only for Unit G levels, while Unit H microblades were "off-axis". Therefore, it was necessary to look at the morphological features of retouched bladelets and microblades separately. Microliths on bladelets and microblades from all four levels of Unit G again show the great dominance of "on-axis" items (80-100% for each blank type). Unit H also, quite different to the unretouched samples, shows that all retouched bladelets and microblades had an "on-axis" removal direction. Accordingly, it is possible to argue that there was a special selection of parallel and to a lesser degree converging bladelets *sensu lato* with the necessary "on-axis" removal direction. Such selection was again planned in advance for primary core reduction and this explains the presence of serial bladelet "carinated" cores and carinated end-scrapers *sensu lato* in the assemblages. At the same time, the general profiles show the dominance of twisted bladelets (54.7 – 67.6%) and microblades (52.8 – 72.7%) within the debitage samples of three levels in Unit G. Unretouched bladelets *sensu lato* in Unit H show a different pattern: 41.3% twisted bladelets and 24% twisted microblades. Looking at the twisted/non-twisted characteristics retouched bladelets *sensu lato* in Units H and G, the following are obtained. Unit H shows 60% twisted bladelet blanks and 40% twisted microblade blanks. The microlith blanks in the four levels of Unit G demonstrate the occurrence of twisted items of less than 50%: level Gd – 30.8% bladelets and 63.6% microblades, level Gc1-Gc2 – 62.5% bladelets and 42% microblades, level Gb1-Gb2 – 45.5% bladelets and 48.4% microblades, level Ga – 25% bladelets and 50% microblades, that is lower in comparison with just the debitage samples. Thus, it is possible to speak about equal representations and intentions of twisted and non-twisted bladelets *sensu lato* in primary production and microlith manufacture. And here it is important to stress once again the complete dominance of the "on-axis" aspect of all unretouched bladelets and microblades in Unit G and only the representation of "on-axis" retouched bladelets and microblades in Unit H. At first sight, there is a contradiction when we interconnect the two morphological features as twisted bladelets *sensu lato* are usually considered to be "off-axis", which is, for example, exactly the case for the Siuren I, Unit F Dufour and pseudo-Dufour microliths of Roc de Combe sub-type (see below). The Unit H and G bladelets *sensu lato* find, however, an explanation not in a technological sense, but in the way the pieces have been classified. When the present author, with V.P. Chabai, undertook the attribute analyses for the Siuren I artifacts, we applied very strict definitions and approaches, so that even a slightly proximally twisted piece was attributed as such. But data on the absolute dominance of "on-axis" bladelets *sensu lato* easily explains the situation showing actual more non-twisted feature for these specimens. Indeed, the usual occurrence of less than half of twisted microliths in Units H and G evidences this. Again, placing the accent on a not specifically twisted bladelet *sensu lato* intention for "non-geometric microlith" production, we further understand why there are only cores and end-scrapers, from a typological point of view, among the Units H and G carinated pieces and no carinated burins, because the latter were the basic "reduction source" of real twisted and "off-axis" microblades.

Concluding with the metric and morphological features for "non-geometric microliths", keeping in mind the same data for unretouched bladelets and microblades, it is already possible to propose some hypotheses regarding the use of microliths. It is a common belief (e.g. Rigaud 1993) that Archaic Aurignacian/Aurignacian 0 Dufour microliths of Dufour sub-type with mainly alternate retouch served as lateral component inserts for projectile points and no use-wear studies contradict this idea. Here it is again worth noting the basic features of microliths – "on-axis" removal direction, non-twisted or "weakly" twisted, mainly flat and incurvate medial general profiles, parallel shape and small size, the majority being between 1.5 and 3 cm. Therefore, mounting of Dufour microliths probably involved inserting them into wooden spearheads with a specific adhesive material, as no Archaic Aurignacian/Aurignacian 0 bone/antler points are slotted for microlith insertion. Moreover, the presence of a few Krems points with bilateral alternate or dorsal retouch and some Dufour microliths with converging shape may indicate their location on spearheads' tips or close to it, although it might be also possible that the latter two groups were used as arrowheads, if we are able to prove the existence of bow usage by Archaic Aurignacian/Aurignacian 0 humans. At any rate, a few microliths from Units H and G do in fact show traces of some projectile damage. Two Dufour microliths (a bladelet and a microblade) with alternate retouch from Unit H (see fig. 3:4, p. 127) and level Gb1-Gb2 (see fig. 7:11, p. 201) have clear projectile damage scars at their distal ends. In Level Gc1-Gc2, some Dufour bladelets and microblades with alternate retouch have separate lateral ventral facet damage (see fig. 5:8-9, 11-12, 14, 17, 22, 29, p. 195), originating after a spearhead/an arrowhead came into contact with a hard material (e.g., a hunted animal's thick bone) and its inserts clashed one into another.

Finally, the Units H and G microlith retouch types, angles and extent characteristics should be considered for determination of their basic features and variability.

For retouch types, there is an absolute dominance of microscalar and micro-stepped retouch types taken together – 83.1-93.4%, and marginal retouch occurs only in low percentages – 6.6-16.9%. Along with this, Unit H microliths show a slight prevalence of micro-stepped retouch (45%), while Units G microliths are characterized by some prevalence of micro-scalar retouch (71.3% in level Gd, 48% in level Gc1-Gc2, 51.9% in level Gb1-Gb2, 66.7% in level Ga). Principally, there is not much difference in between micro-scalar and micro-stepped retouch as both can be considered "heavy retouch types" for microlith treatment and, moreover, they are again joined by their clear dominant position on the right edge on the ventral face for Dufour microliths with alternate retouch.

For angle types, while abrupt retouch is absent or represented by single artifacts (1.2% in Unit H and 2.0% in level Gc1-Gc2), semi-abrupt retouch angle is quite common – 66.3% in Unit H, 78.3% in level Gd, 67.6% in level Gc1-Gc2, 81.8% in level Gb1-Gb2 and 86.7% in level Ga. Accordingly, a flat retouch angle played a subordinate role in microlith production – 13.3-32.5%.

For retouch extent, microliths have continuous retouch that is always well over half of all secondary treated edges – 70% in Unit H, 64.4% in level Gd, 69.6% in level Gc1-Gc2, 73% in level Gb1-Gb2 and 80% in level Ga. A subordinate position is occupied by partial retouch – 22.5% in Unit H, 24.1% in level Gd, 23.5% in level Gc1-Gc2, 23% in level Gb1-Gb2 and 20% in level Ga. Finally, discontinuous retouch is either absent for a small microlith sample of level Ga or occurs in rather rare cases – 7.5% in Unit H, 11.5% in level Gd, 6.9% in level Gc1-Gc2 and 4% in level Gb1-Gb2.

Summing up the three retouch types for microliths, there is a dominance of microliths with continuous semi-abrupt micro-scalar and/or micro-stepped retouch. It is probable that microliths were mounted into wooden spearheads and/or arrowheads (?) with an adhesive material, where such "heavily" retouched lateral edges served for better attachment.

Also, the observed variability for microliths from each stratigraphic subdivision in Units H and G falls within a normal deviation range for basically a single microlith set. This means that the Unit H and G Upper Paleolithic sequence has no significant internal differences for such an important tool class as "non-geometric microliths", which is true for microliths from the sequence's lowermost (Unit H) and uppermost (level Ga) subdivisions.

The Siuren I, Units H and G Upper Paleolithic tool-kits are finally completed by "Neutral" tool types (here actually only notched pieces) and Retouched Pieces with marginal and/or irregular retouch. Most of these specimens are produced on blades and even when on flakes, they usually do not exhibit any specific Middle Paleolithic morphological features, from techno-typological points of view, except for a single retouched flake from Unit H assumed to be a probable unfinished Middle Paleolithic unifacial scraper. Regarding the occurrence of these two tool groups throughout the Units H and G sequence, their proportion to overall tool numbers in each of four stratigraphic subdivisions can be seen, except for level Ga which lacks notched pieces, probably due to the poor tool representation there (only 17 specimens).

Thus, the morphological, metric, technological and typological data for Units H and G Upper Paleolithic flint artifacts reflect a single industrially homogeneous find complex, termed by the present author in a series of publications as Early Aurignacian of Krems-Dufour type, stressing the common very similar industrial nature of such assemblages in Western Europe, as well as some assemblages in Central Europe and, finally, even in Eastern Europe, postulating their Pan-European character. Of course, any previously used names for such assemblages can be used as synonyms (e.g. Aurignacian 0/Archaic Aurignacian/Protoaurignacian with Dufour bladelets of Dufour sub-type) and these have actually been used in different chapters of the present book.

Finally, non-flint artifacts from the Unit G level sequence with Upper Paleolithic artifacts are discussed: 6 bone tools (points and an awl) and 5 shell beads of fresh water river mollusk – *Theodoxus transversalis* (2 pieces), terrestrial snails – *Helix lucorum* *taurica* and *Helicella dejecta* and fossil marine mollusk – *Apporhais pes pelicani* (see p. 73-78 and p. 79-90). Touching on the subject of bone tool presence in the different levels of Unit G, it is again readily understandable why 5 of 6 are from level Gc1-Gc2; this is the most representative level in Unit G for all find classes, again reflecting the most intensive human occupation. Also, the Unit G bone tools (various flat points and a shouldered awl) represent a homogeneous set of pieces from both typological and technological points of view. Among the shell beads, the most important piece is the *Apporhais pes pelicani* marine mollusk. First, it corresponds well with the same *Apporhais pes pelicani* shell beads found during the 1920s Lower layer and, second, because it is from level Ga, the poorest in finds and the uppermost level for the entire sequence of Units H and G. Thus, with this *Apporhais pes pelicani* shell bead finally ends a story on the possibility of some variability for level Ga compared to the other levels, discussed several times before in this chapter. The only visible and significant difference of level Ga in comparison to the other Unit G levels is the presence of two dihedral burins, but nothing else. Moreover, the presence of another dihedral burin in level Gb1-Gb2, with the same traits as the Units H and G Early Aurignacian of Krems-Dufour type/ Archaic Aurignacian industry, reduces the significance of the presence of dihedral burins in level Ga to zero.

The final subject uniting the Units H and G Upper Paleolithic Aurignacian assemblages is the raw materials used. Using statistical data on gray and colored flints in all five stratigraphic subdivisions (see tabl. 16, p. 131 and tabl. 50, p. 207), it is seen that gray flints play a dominant role, while colored flint are also significant (25-33%). Recalling that very few examples of colored flint were found in Aurignacian assemblages from overlying Unit F, the Units H and G assemblages indeed form a homogeneous and distinct Aurignacian industry at the site.

Units H and G Middle Paleolithic Micoquian component comparisons

The Siuren I Middle Paleolithic industrial component will be discussed in detail in a separate chapter (see MP component meaning…") and therefore we will only consider here some basic inter-Unit and inter-level comparisons, which prove that the same Micoquian industry is present in all four stratigraphic subdivisions with Middle Paleolithic finds.

At first view, considering only flint tools, which total 20 specimens from Unit H (3 pieces), level Gd (1 piece), level Gc1-Gc2 (13 pieces) and level Gb1-Gb2 (3 pieces), it is difficult to imagine the same tool type representations in each of the four stratigraphic subdivisions. On the other hand, this has been observed for unifacial tools. Each stratigraphic subdivision has quite indicative Crimean Micoquian Tradition unifacial tool types – various convergent and *déjeté* forms with some additional thinning elements, and the latter elements also occur for a transversal denticulate in level Gb1-Gb2, a transversal scraper in Unit H and 2 double scrapers in levels Gb1-Gb2 and Gc1-Gc2. Moreover, a heightened presence of all convergently shaped unifacial tools (scrapers and points) in both level Gc1-Gc2 which has the most tools (7 pieces among all 11 identifiable tools – 63.6%) and the entire Unit H and G tool-kit (10 pieces of the 18 identifiable tools – 55.6%), along with specific forms including a small point with basal ventral thinning from level Gd and a low value of identifiable bifacial tools (2 pieces of the 18 identifiable tools – 11.1%), also point to an attribution to the Kiik-Koba industry type for the Siuren I Micoquian finds (Demidenko 2000). Also, a series of waste from production and rejuvenation of Middle Paleolithic tools (totaling 23 items) is represented in each of the four stratigraphic subdivisions as well: 7 in Unit H, 4 in level Gd, 8 in level Gc1-Gc2 and 4 in level Gb1-Gb2. These are again very typical Crimean Micoquian Tradition pieces: bifacial shaping and thinning flakes, resharpening flakes of bifacial and unifacial convergent tools' tips, a "Janus/Kombewa" chip on basal ventral thinning of a unifacial tool and some simple retouch flakes. Their high frequency in relation to tool frequency also corresponds well with the Kiik-Koba industry type assemblage data from Buran-Kaya III Grotto, layer B and Kiik-Koba Grotto, Upper layer. Some specific data on Middle Paleolithic tool treatment waste pieces allow us to postulate the existence of bifacial tool treatment and rejuvenation processes for Unit H although no bifacial tool, even broken, were found there. Accordingly, adding three bifacial tools and a bifacial thinning flake from level Gc1-Gc2, there are objective arguments for two of the four stratigraphic subdivisions of bifacial tool treatment and retreatment processes performed by Micoquian groups at Siuren I. Finally, the occurrence of two bone retouchers in level Gc1-Gc2 (see p. 79-90) corresponds well to the assumed most intensive Micoquian flint treatment exploitation processes on unifacial and bifacial tool multiple reductions for this level.

All in all, it is now clear that the Units H and G Upper Paleolithic and Middle Paleolithic industrial components, coming from respectively five and four stratigraphic subdivisions, are homogeneous and represent the Early Aurignacian of Krems-Dufour industry type and the Kiik-Koba industry type of Crimean Micoquian Tradition.

Unit F artifact data in comparison to Aurignacian artifacts from Units H and G

The Unit F inter-level comparisons of lithic artifact data have been already presented in another chapter (see p. 213-279) and will not be specifically presented again here. This is also because the Unit F assemblage is archeologically homogeneous representing a single Upper Paleolithic industry of Late/Evolved Aurignacian of Krems-Dufour industry type. This chapter thus presents basic morphological, metric, technological and typological data for Unit F and compares them directly with the Early Aurignacian of Krems-Dufour industry type in Units H and G. It should be noted that the four Unit F archeological levels (stratigraphically, from bottom to top – Fc, Fb1-Fb2, Fa3 and Fa1-Fa2) are very different from the Unit G levels, since 91.1% the lithics come from only one level: Fb1-Fb2. Therefore, given the similar techno-typological characteristics for all four levels, some special emphasis will be mostly done for level Fb1-Fb2.

Technologically, primary reduction in Unit F is based on almost exclusive exploitation of bladelet cores with no strict blade cores and just a single blade/bladelet core, considering a series of 4 flake/bladelet multiplatform exhausted cores as the final product of multiply reshaped and reduced bladelet cores. Among the bladelet cores (11 items), "regular" (3 items) and "carinated" (8 items) types have been defined. All of the bladelet "regular" cores are double-platform pieces of non-volumetric character with rectangular shape. The cores differ by reduction system, being bidirectional, bidirectional-adjacent or bidirectional-alternate. Taking these into consideration and adding the non-volumetric nature of their final reduction stages, as well as the known typical volumetric reduction for such cores, it is possible to argue that these three particular cores do in fact represent the very last stages of primary use, when any possibility for bladelet removals has been realized, explaining why they have such rather unusual morphological characteristics. Bladelet "carinated" cores were subdivided into three groups: "carinated" items (4 pieces), "advanced carinated" and, finally, new for all Siuren I Aurignacian materials, bladelet narrow flaked single-platform cores/"carinated burins" (3 items). Five bladelet "carinated" cores include four single-platform and one double-platform of volumetric character. Despite the fact that they can be considered as typical "carinated" cores, four of them also have a specific feature that differentiates them from the Units H and G bladelet "carinated" cores – offset platform morphology in plane and twisted removal scars on flaking surfaces. The latter "carinated" cores and a bladelet pre-core, similar to carinated burins, are pieces with wider than usually typologically defined for the flaking surfaces of carinated cores; this is why they have been defined through the twofold core/tool definition. Along with this, they are also characterized by offset platform morphology in plane and twisted removal scars on flaking surfaces. Thus, the Unit F bladelet "carinated" cores in very general terms are similar to those from Units H and G as both served for intensive bladelet reduction. At the same time, they differ in platform morphology in plane, and removal scars on flaking surfaces being either semicircular or even once offset with no, however, twisted scars. Therefore, they technologically served for the production of morphologically different bladelets specific to the two Siuren I Aurignacian assemblages.

The distinctiveness of the Unit F bladelet core reduction processes are confirmed by structures and types of core maintenance products (CMP). First, there is a significant dominance of crested bladelets and microblades over crested blades in the most informative level Fb1-Fb2 – 75 versus 28 pieces, while Units H and G crested pieces, aside from the incomplete sample from level Ga, have always demonstrated the reverse – prevalence of crested blades over crested bladelets *sensu lato* pointing out the more intensive bladelet *sensu lato* reduction at the site during Unit F Aurignacian occupations. The Units H and G crested pieces have been reasonably interpreted above as indicating two basic reduction strategies: blade/bladelet and strictly bladelet. Here, for Unit F, we also can suggest the presence of some blade/bladelet reduction with an initial removal of a crested blade for subsequent serial blade and then bladelet processes. But looking at the level Fb1-Fb2 internal structure of crested blades (4 primary, 7 re-crested, 11 secondary and 6 unidentifiable) with a rather minor role of primary elements among them, it is only possible to argue a subordinate role of crested blades and some blades removed within blade/bladelet reduction processes that themselves were not very common in the entire "primary reduction activity package" of this assemblage. Accordingly, the basic role in core reduction processes was occupied by a strict bladelet reduction strategy with some variations. The data from level Fb1-Fb2 on crested bladelets (12 primary, 3 re-crested, 14 secondary and 10 unidentifiable items) and crested microblades (20 primary, 6 re-crested, 5 secondary and 5 unidentifiable items) firmly confirm the major role of the true "crested blade technique" in its bladelet variant for bladelet core reduction processes from the very beginning of primary flaking with removal of primary crested bladelets *sensu lato*. It is also worth noting the dominance of twisted general profiles for the primary crested bladelets *sensu lato*. Moreover, the occurrence of some re-crested bladelets and microblades also supports continuous bladelet *sensu lato* reduction throughout core exploitations. Examining another CMP – core tablets –, there is another striking example of technological differences between Unit F and Units H and G. For core tablets from the latter units, single core tablets on blades were found for three stratigraphic subdivisions, while core tablets on flakes were extremely dominant. Not the opposite but still a significantly different situation with core tablets is observed in Unit F, where in 3 of 4 levels (Fb1-Fb2, Fa3 and Fa1-Fa2), these CMP pieces have been identified. Level Fb1-Fb2 CMPs contain 12 core tablets on flakes, 11 core tablets on blades and even a single core tablet on bladelet. Level Fa3 CMPs are characterized by 9 core tablets on flakes and 2 core tablets on blades. The only 2 core tablets in level Fa1-Fa2 are on blades. And what do core tablets on flakes and blades mean in a technological sense? As was already stressed during the Unit F core morphological descriptions, typical bladelet "carinated" cores show by their wide and narrow striking platform characteristics that they were rejuvenated by core tablets on flakes, but for bladelet narrow flaked single-platform cores/"carinated cores", we see that the thickness of striking platforms is always more than twice as width, indicating for plain platforms their rejuvenation through the removal of core tablets on blades. The same characteristics are also known for typologically strictly defined carinated cores and we have to admit removal of some of the core tablets on blades and, probably, a single core tablet on bladelet from carinated burins as well. This is especially true for level Fb1-Fb2, where for 11 core tablets on blades there are only 3 bladelet narrow flaked single-platform cores/"carinated cores". Indeed, technologically, the reduction process occurred as follows: first a narrow and long striking platform was created and from it a few bladelets and mostly microblades were subsequently serially removed; then, after a core tablet on blade was removed for platform rejuvenation, it was possible to continue reduction. Thus, considering the Unit F debitage data, it should be kept in mind that the great dominance of bladelets *sensu lato* and particularly of microblades is correctly explained by the significant degree of carinated tool reduction processes.

Coordinating the Unit F core and CMP data, good technological correlations are observed between them. At the same time, the observed Unit F basic core reduction technologies are strikingly different from the Aurignacian ones of Units H and G.

Debitage data further confirm these specific features of bladelet cores and CMPs in Unit F. All of the detailed debitage data will be based on the sample from level Fb1-Fb2, which has the most intensive indications for on-site flint exploitation.

At the same time, it is important to note very briefly the debitage data for the other three levels in Unit F. The lowermost level Fc has the smallest sample of debitage among the four levels – 36 items for debitage *sensu stricto* with no CMPs and tool blanks and 44 items for debitage *sensu lato* including such pieces. Therefore, it is reasonable to simply exclude this level's debitage sample, although one important comment should be made. By its internal structure, the level Fc blady debitage is similar to level Fb1-Fb2 debitage with the following pieces in decreasing frequency: microblades – bladelets – blades. Such a pattern in the former level may also be due to the small sample size. The two other debitage samples from levels Fa3 and Fa1-Fa2 are statistically more significant with two pairs of debitage samples for them in the following order. Level Fa3 debitage *sensu stricto* sample of 192 items is as follows: 32.8% flakes, 15.6% blades, 28.7% bladelets and 22.9% microblades, while the debitage *sensu lato* sample in 233 items contains 33.5% flakes, 19.3% blades, 26.2% bladelets and 21% microblades. Level Fa1-Fa1 debitage pairs are similar to level Fa3: flakes – 39.6% and 38.7%, blades – 12.3% and 15.3%, bladelets – 30.2% and 29.9%, microblades – 17.9% and 16.1% for debitage *sensu stricto* with 106 items and for debitage sensu lato with 124 items, respectively. In spite of some index differences, there is a clear inner structure for debitage classes, where flakes occupy the main position with about one third of all pieces, while blady debitage demonstrates the following decreasing frequency: bladelets – microblades – blades. Accordingly, we see that by blady debitage data, assemblages from Unit F levels are also different from the respective Aurignacian debitage data for Units H and G. Level Fb1-Fb2 is characterized by microblade – bladelet – blade inner structures, whereas levels Fa3 and Fa1-Fa2 show bladelet – microblade – blade in decreasing frequencies. At the same time, the bladelet – blade – microblade inner blady debitage structures for Units H and G 4 stratigraphic subdivisions should be recalled. What can these twofold structures mean? Considering the technological and typological data, the answers are clear. Blady debitage from levels Fa3 and Fa1-Fa2 levels with bladelet – microblade – blade decreasing in order of representation shows more microblades because of the presence in the former level of a bladelet pre-core, a bladelet "carinated" core and a carinated burin, and in the latter level a flake/bladelet multi-platform core, a thick shouldered end-scraper (a carinated end-scraper *sensu lato*) and a carinated burin. Also, we know that the flint exploitation processes were not very intensive in the area excavated in the 1990s for these two levels and, accordingly, little bladelet *sensu stricto* reduction took place, while it is highly likely that carinated tools contributed more microblades. At the same time, the low percentages of blades are perhaps connected to non-intensive initial core reduction events, during which mainly blades were struck off, while the significant percentages of flakes is related to core preparation and/or re-preparation processes. The importance of the debitage inner structures for levels Fc, Fa3 and Fa1-Fa2 lies in its comparison to the debitage data for the subdivisions of Units H and G. It is obvious that they are not similar to one another and, therefore, represent technologically different Aurignacian find complexes.

Now let us consider the debitage data from the basic Unit F level – level Fb1-Fb2, again starting with their inner structures. Debitage *sensu stricto* with total quantity of 1883 items is composed of 22.5% flakes, 5.9% blades, 19.0% bladelets and 52.6% microblades (see tabl. 3B, p. 225).

Debitage *sensu lato*, having 2174 items, has the following inner structure: 22.5% flakes, 8.6% blades, 18.6% bladelets and 50.3% microblades.

Comparing the two pairs of debitage class indices, we see no differences for flakes and bladelets, while the blade index became almost 1.5 times higher for debitage *sensu lato*, however still below 10%. The microblade index became slightly lower for debitage *sensu lato*. The blade index change occurred because of equally significant addition of blade-tools and blade-CMP to "simple blades" (68.5%), such that the actual number of 111 blades within debitage *sensu stricto* became 187 blades for debitage *sensu lato*. At the same time, the number of microblade-tools was almost twice as high in comparison to microblade-CMPs, but the addition to 991 microblades in debitage *sensu stricto* was in total only 102 items (10.3%), so that the respective microblade index for debitage *sensu lato* was only somewhat lowered.

The observed index variability is important as it shows the definite significance of blades for this assemblage. Indeed, at first sight, with 5.9% and 8.6% indices (ILam) within both the debitage *sensu stricto* and *sensu lato* samples for level Fb1-Fb2, blades might be seen as rare pieces. Such a suggestion may be further supported by another strong argument when we compare these indices with the blade indices in debitage samples for levels Fa3 (ILam = 15.6% and 19.3%) and Fa1-Fa2 (ILam = 12.3% and 15.3%) that are more than two times higher. Therefore, our accent on blade-tools and blade-CMPs is correct for showing both the importance of tools on blades and CMPs on blades with their indices within the debitage *sensu lato* sample – ILam (for tool-blanks) being 19.8% and 20.9%, respectively. A similar tendency is also observed for blade debitage from levels Fa3 and Fa1-Fa2. Thus, despite the high dominance of bladelets (more than twice as blades – 404 *versus* 187 items) and especially microblades (more than five times as blades – 1093 *versus* 187 items) within the debitage *sensu lato* sample in level Fb1-Fb2, it is not reasonable to claim any significant blade absence. These Siuren I, Unit F blade role considerations are of real importance for some arguments for flake-oriented true classical Aurignacian assemblages in the Levant (e.g. Bergman 1987; Williams 2006), such as Ksar Akil rock-shelter, levels VIII and VII (Lebanon) and Hayonim Cave, layer D (Israel). But it should be taken into consideration that not all debitage pieces, especially small ones (bladelets and especially microblades) were systematically recovered during the 1930s and 1940s Ksar Akil rock-shelter excavations and also, similar to Siuren I, Unit F, for Hayonim tool-kits where several tools were made on blades (see Bar-Yosef & Belfer-Cohen 1996). It is also worth separately counting the Unit F blady debitage classes for increased understanding of the complete role of blades, bladelets and microblades, as has been done for Units H and G. The following data are in this way obtained:

The joint blade/bladelet *sensu lato* indications for all four Unit F levels are as follows – 60.4 – 77.5% for debitage *sensu stricto*

(Fc – 66.7%, Fb1-Fb2 – 77.5%, Fa3 – 67.2%, Fa1-Fa2 – 60.4%) and 61.3 – 77.5% for debitage *sensu lato* (Fc – 63.6%, Fb1-Fb2 – 77.5%, Fa3 – 66.5%, Fa1-Fa2 – 61.3%). Thus, as is the case with blade/bladelet *sensu lato* indices for Units H and G, the Unit F levels' assemblages are blade *sensu lato* dominated with two decreasing frequency patterns of the three debitage classes for three levels: bladelets – microblades – blades in levels Fa3 and Fa1-Fa2 and microblades – bladelets – blades in level Fb1-Fb2.

Then, it is possible to evaluate the technological roles of different debitage classes for the Unit F assemblages, placing special emphasis on the level Fb1-Fb2 materials as the most indicative and with the most intensive bladelet *sensu lato* reduction, and excluding from the analyses the small and controversial sample from level Fc.

Flakes, as for Aurignacian materials from Units H and G, were not technologically desired products in any of the four Unit F levels, taking into consideration their overall small size (a significant dominance of specimens with length no more than 3 cm – 90.1% in level Fb1-Fb2, 81.1% in level Fa3 and 69.6% in level Fa1-Fa2), cortex data with a few wholly cortical specimens (5.4% in level Fb1-Fb2, 4.8% in level Fa3 and none in level Fa1-Fa2) and, at the same time, with the highest ratios of partially cortical specimens (25.5% in level Fb1-Fb2, 39.6% in level Fa3 and 38.1% in level Fa1-Fa2) in comparison to all the blady debitage classes and especially to bladelets and microblades. The great diversity of their other attribute characteristics shows the complete lack of standardization, mentioning here only the great dominance of expanding and irregular shaped pieces taken together (67.8% in level Fb1-Fb2, 75.9% in level Fa3 and 83.4% in level Fa1-Fa2) in association with mainly "off-axis" removal direction (82.8% in level Fb1-Fb2, 76.4% in level Fa3 and 74.3% in level Fa1-Fa2). At the same time, the good numerical representation of flakes in the three assemblages (22.5-39.6% in debitage *sensu stricto* and 22.5-38.7% in debitage *sensu lato* samples) explains their metric and morphological "instabilities". As is seen in the Aurignacian assemblages of Units H and G, flakes played a major role in preparation and especially re-preparation of cores and carinated pieces during multiple bladelet *sensu lato* reduction phases. Moreover, their technological re-preparation role was even more significant in the Unit F assemblages than for the Aurignacian materials from Units H and G, as bladelet narrow flaked single-platform cores/"carinated burins" and carinated burins themselves required smaller and wider detached re-preparation pieces (flakes) rather than more elongated and narrow pieces (blades), except for CMPs, and these reduction objects are missing in Units H and G.

Blades can be only characterized for level Fb1-Fb2, recalling the rather poor blade samples from the rest of the Unit F levels. Wholly cortical blades are absent not only in level Fb1-Fb2, but also all other levels in Unit F, while partially cortical blades compose 23.4% of the blades in level Fb1-Fb2 and laterally cortex items are dominant – 81.8%. These cortex data are similar for blades and flakes in the Unit F assemblages. Expanding and irregular shapes for blades in level Fb1-Fb2 are represented by a moderate number only (20.2% together), while blades with parallel (59.6%) and converging (20.2%) shapes dominate, with "on-axis" removal direction (80%). Also, blades are mainly with unidirectional (70%) and fairly common unidirectional-crossed (20%) scar patterns, and with twisted general profiles (64.8%), but with trapezoidal and multifaceted profiles at midpoint (49.5%) and, at the same time, rare hinged and overpassed profiles at distal end (7%). Thus, the basic blade features are quite interesting. On one hand, their removal is regular and systematic, according to the majority of features. On the other hand, rather important roles of partially cortical pieces, unidirectional-crossed scar pattern and a less dominant position of trapezoidal and multifaceted profiles at midpoint definitely point out both preparation (cortex data) and re-preparation (the other features discussed) for blades during core reduction processes. Also, a majority of "on-axis" blades does not always indicate continuous reduction of blades and then microblades, as the latter are characterized by non-dominant but common "off-axis" items. Thus, core reduction processes for these two debitage classes were well separated one from another and the role of carinated tools again becomes evident for microblades. Finally, some patterns in blades are also explained by the certain intention of Siuren I, Unit F Aurignacian people to produce blades as blanks for tools. All in all, the blades are in an intermediate position for the Aurignacian flintknappers – they were intended blanks for some future tools and, at the same time, played a significant supplementary role in core reduction processes. The Unit F blades have some similarities to blades from Units H and G.

Bladelets are even more interesting to analyze from typological and technological points of view and keeping in mind the obvious importance of bladelets in the Units H and G assemblages. Yes, bladelets are more than twice as common as blades in level Fb1-Fb2 but they again, like blades, seem to be at first sight not the most desired end products of core reduction processes because of the 77 "non-geometric microliths" from Unit F, only 7 are on bladelets (9.1%). If we additionally exclude a bladelet with dorsal retouch at distal end (level Fa1-Fa2) and 3 truncated bladelets (level Fb1-Fb2), the laterally retouched microlith sample (71 specimens) also with a microblade with lateral dorsal micro-notch and a truncated microblade (level Fb1-Fb2) will have only 3 pseudo-Dufour bladelets with lateral dorsal retouch in level Fb1-Fb2 (4.2%). Contrary to these data, "non-geometric microliths" on bladelets in four stratigraphic subdivisions of Units H and G range from 28.3 to 41.9%. Accordingly, bladelets do not appear to be blanks intended for microlith production in Unit F, or for any other tool class or type. But why are there so many of them and why are their metric and morphological features so standardized? Let us, first, look at the features. So, bladelets of level Fb1-Fb2 can be characterized as follows: a dominance of unidirectional (76.6%) and a moderate number of unidirectional-crossed (15.6%) scar patterns; a low number of partially cortical items (8.1%) and the complete absence of wholly cortical items; a dominance of parallel and converging shaped pieces with near-equal representation – 41.3% parallel and 37.5% converging; a minor prevalence of "on-axis" pieces (53%) over "off-axis" (47%); an abundance of items with twisted general profiles (73.2%); a medium number of items with hinged and/or overpassed ("not regular") distal ends (18.2%); prevalence of items with trapezoidal (43.3%), triangular (31.6%), and rare multifaceted (16.7%) profiles at midpoint; a dominance, but not absolute, of "plain-punctiform-linear" group of butt types (65.4%) with the most significant role among them of linear type (49.4%), as well as with a notable presence of many crushed butts (31.6%); an absolute dominance of butts with abrasion (95.2%); an average length of 2.3 cm, an average width of 0.9 cm and an average thickness of 0.2 cm, whereas so indicative "long" bladelets (more than 3 cm long) compose only 8.4% with no one of them reaching length of 4.5 cm. By most of these features, the level Fb1-Fb2 bladelets are similar to bladelets from Units H and G, noting only their somewhat shorter length (2.3 cm versus 2.6-2.8 cm), more "off-axis" and twisted characteristics. But being similar to Units H and G, the Unit F bladelets were still almost never used for tool production. Therefore, the bladelet problem decision might be found through both examination of level Fb1-Fb2 microblade data and some specific technological and/or typological considerations. First, there is the very indicative numerical correlation between microblades and bladelets in the level Fb1-Fb2 debitage *sensu lato* sample: 1093 items versus 404 items, or 2.7:1. Second, very few microblades were retouched – only 70 items of all 1163 pieces, or just 6.0%. Thus, we need to take a closer look at microblade features.

Microblades from level Fb1-Fb2 are characterized by the following features: near-total occurrence of items with unidirectional scar pattern (95.7%); only a single partially cortical piece (3.1%); dominance of parallel (55.2%) and many converging (36%) shaped pieces in association of "on-axis" (59.6%) and "off-axis" (40.4%) removal directions; significant dominance of twisted general profiles (76.9%); low number of hinged (8.7%) and only a few overpassed (0.7%) ("not regular") distal ends; prevalence of specimens with trapezoidal (45.1%) and triangular (43.9%) profiles at midpoint, although multifaceted type is rare (7.5%), where the former is an objective indication of systematic microblade removal; a dominance of "plain-punctiform-linear" butt types (59.7%) with most linear (47.4%) not taking into account many crushed butts (37.4%); most of the pieces with butt abrasion (96.3%); an average length of 1.4 cm with the longest complete item 3.4 cm long, an average width of 0.5 cm with the important presence of many pieces with width of 0.2-0.4 cm (41.5%), an average thickness of 0.1 cm. As a result, making direct comparisons between observed bladelet and microblade features, we come to the following quite surprising observations. They are similar to one another in all morphological features (*sic!*) except, of course, metric parameters. So, it is first needed to take a look at some technological aspects that might relate to bladelet and microblade production. Both have been flaked from bladelet cores, including "carinated" ones, and also typologically defined carinated tools, especially carinated burins. Along with this, level Fb1-Fb2 microblades are also a little different from Units H and G microblades in their profile at midpoint: the former ones have ca. 45% trapezoidal profiles and 7.5% multifaceted profiles (the direct evidence on the microblade systematical and continuous reduction) while the latter are mostly triangular profiles – 56.4-74% with, respectively, significantly less representation of trapezoidal and multifaceted profiles. Such difference is again understandable due to the absence of carinated burins and a smaller number of carinated end-scrapers *sensu lato* (including thick shouldered/nosed ones) in Units H and G tool-kits. Accordingly, level Fb1-Fb2 bladelet *sensu lato* primary reduction was much more directed toward production of microblades, while bladelets played much more significant role for the Aurignacian of Units H and G. Thus, by all technological means, the true desired position of microblades in flint exploitation processes for level Fb1-Fb2 Aurignacian groups is evident.

Therefore, 66 retouched microblades deserve some special morphological comparisons with the already analyzed 991 unretouched ones for level Fb1-Fb2. Morphologically identifiable retouched microblades are as follows: 100% pieces with unidirectional scar pattern; 71.4% parallel, 26.6% converging and 2% (a single piece) expanding shapes; 33.9% "on-axis" and 66.1% "off-axis" removal directions; 92.2% twisted general profiles; 100% feathering distal ends; 40% triangular, 52.3% trapezoidal and 7.7% multifaceted profiles at midpoint; a great dominance of linear butts – 86.1%; 100% butts with abrasion. Among these morphological features, only three attributes differ in comparison with unretouched microblades: retouched microblades have only feathering distal ends, and are considerably more "off-axis" and twisted. Moreover, as noted during the level Fb1-Fb2 "non-geometric microlith" analysis, all "off-axis" microblades have only twisted general profiles. At the same time, by metrics, the 66 retouched microblades are not much different from the unretouched ones. On average, 10 complete pieces are 1.7 cm long, 0.5 cm wide and 0.15 cm thick, and thus slightly longer when compared with unretouched microblades (1.4 cm long on average). The length data might be used to argue that longer microblades were selected for tool production, but this is not true. First, there is no retouched microblade longer 2.7 cm while such longer complete items are known among the unretouched microblades. Second, the retouched microblades vary greatly in length from 0.8 and 1.0 cm long to 2.7 cm long with most pieces in between these extremes. Thus, the size is not a factor for selection of microblades for tool retouching. As a consequence, selection of microblades for microlith production is made mainly choosing "off-axis" and, at the same time, necessarily twisted pieces, as well as feathered distal ends. When we again examine the selection rate for microblades involved in retouching processes, we should probably not take into account too seriously "on-axis" microblades. There are indeed 57.4% "on-axis" microblades (594 pieces) among all 1093 microblades in level Fb1-Fb2 assemblage. But only 21 of them have been retouched (3.5%), while of 441 "off-axis" microblades (42.6% all identifiable by these feature microblades) 41 have been retouched (9.3%). Therefore, the latter index seems to be the more pertinent for microblade selection for microlith production. All in all, the observed microblade features are quite different from those from Units H and G ("weakly" twisted and "on-axis") that may be related to their use as projectile point components, but attached in a different way there.

Concluding consideration of the debitage data, clearly understanding the great role of microblades in level Fb1-Fb2 primary reduction processes, there is one stricter objective data set to evaluate the importance of each of four debitage classes in the assemblages of Unit F –tool selection rates. Flakes: 6.3% in level Fc, 5.1% in level Fb1-Fb2, 6.4% in level Fa3, 6.3% in level Fa1-Fa2 and 5.4% in total for Unit F flakes. Blades: 10% in level Fc, 19.8% in level Fb1-Fb2, 8.9% in level Fa3, 10.5% in level Fa1-Fa2 and 16.9% in total for Unit F blades. Bladelets: 0% in level Fc, 1.5% in level Fb1-Fb2, 0% in level Fa3, 2.7% in level Fa1-Fa2 and 1.4% in total for Unit F bladelets. Microblades: 10% in level Fc, 6% in level Fb1-Fb2, 4.1% in level Fa3, 5% in level Fa1-Fa2 and 6% in total for Unit F microblades. Taking into consideration these statistical data, we come up with the rather surprising conclusion that blades were the most common debitage class for tool production, although it should not be forgotten that of all 37 tools on blades, 21 pieces (56.7%) are blades with marginal and/or irregular retouch. Then, flakes and microblades are similarly weakly represented among tools and again for the flake tool-blank sample of 25 items, 15 flakes (60%) are just pieces with marginal and/or irregular retouch. Finally, bladelets randomly occur only in levels Fb1-Fb1 and Fa1-Fa2 where there are just a few examples.

Thus, it is possible to interpret the tool-blank selection debitage data as indicating a complex picture for the level Fb1-Fb2 assemblage where each debitage class was needed to some extent for tool production such that all of the four classes are rather well represented among the debitage.

At the same time, coming back to levels Fa3 and Fa1-Fa2 debitage data and especially for the inner structure of blady debitage with the following decreasing frequency order of the three classes (bladelets – microblades – blades), while the level Fb1-Fb2 data are different (microblades – bladelets – blades), it is possible to discuss variability in the intensity of flint exploitation at the site for two pairs of Unit F levels, where the most intensive exploitation is recorded for level Fb1-Fb2. Moreover, such a suggestion finds strong support when recalling the complex multi-occupational structure of level Fb1-Fb2. Indeed, sub-level Fb1 contains 1810 flint artifacts (only 26.2% the whole flint assemblage of 6900 items for the level). Such the low frequency of flints in sublevel Fb1 is in good correspondence with the sub-level Fb2 stratigraphic data where sub-level Fb2 is much more grayish in color in comparison to sub-level Fb1 due to a significantly higher quantity of ash, charcoal and burnt bones and, more importantly, all the special features of the level occur in sub-level Fb2: 3 ashy clusters, 3 fireplaces, 3 hearths and 2 pits all pointing to a significantly higher intensity and longer duration of human occupations. Taking these human intensity occupation indices along with overall flint artifact numbers and dominance of either bladelets or microblades within the three blady debitage classes, we come to the conclusion that the same Late/Evolved Aurignacian assemblages in Unit F vary to some extent technologically depending upon intensity of human occupation. This conclusion may have far-reaching implications. When a Late/Evolved Aurignacian archeological level occurs at a site with no evidence for high intensity of human occupation (e.g., a low number of artifacts and near-absence of any special features within the level), it might have a bladelet – microblade – blade debitage inner structure for blady pieces with respectively a few retouched microliths as observed for levels Fa3, Fa1-Fa2 and sub-level Fb1. On the other hand, such a level with evidence of much higher intensity of occupation, such as sub-level Fb2 or the entire level Fb1-Fb2 taken together, might have a microblade – bladelet – blade debitage inner structure for blady specimens and also a significantly higher amount of retouched microliths. The former case, by the way, can be already proposed for the Late/Evolved Aurignacian levels at Mitoc-Malu Galben (Eastern Rumania) with mainly workshop characteristics for serial short-term human occupations (see Otte *et al.* 2007), explaining why bladelets dominate and retouched microliths are completely absent.

Regarding the Unit F levels' tool-kits compositions and basic typological features, it is easy again to emphasize their similarities, since their common characteristics have been already noted during their detailed descriptions (see p. 213-279).

Taking the Indicative Upper Paleolithic tools from levels Fb1-Fb2, Fa3 and Fa1-Fa2 (absent in level Fc), a rather consistent tool type representation can be seen. Simple flat end-scrapers (on 3 blades and an elongated flake) are represented in levels Fa3 and Fb1-Fb2. Absence of such end-scrapers in level Fa1-Fa2 is "compensated" by 2 characteristic Aurignacian items there (a thick shouldered and a flat shouldered end-scraper) that are the only end-scrapers in the level. At the same time, a thick shouldered end-scraper and a flat shouldered end-scraper also occur in level Fb1-Fb2 whereas a simple flat end-scraper in level Fa3 is the only one present there. Having such an end-scraper type representation in the three Unit F levels, it is seen that they actually complement one another. The other end-scrapers in level Fb1-Fb2 are a circular, an ogival, and 2 carinated items where the two latter pieces have Aurignacian characteristics for the end-scrapers in Unit F. At the same time, the Unit F end-scraper types, being similar to Units H and G end-scrapers by representation of carinated *sensu lato* pieces, contain one new important type – flat shouldered endscrapers in levels Fa1-Fa2 and Fb1-Fb2. Burin types present in Unit F are even more different from those in Units H and G by the dominant position of dihedral and carinated items. Both of these burin types are well represented in levels Fa3 and Fb1-Fb2, while one of only two burins in level Fa1-Fa2 is carinated. The only two composite tools in Unit F (a simple end-scraper/dihedral burin and a simple end-scraper/carinated (busked) burin), found in level Fb1-Fb2, once again confirm the typical occurrence of simple end-scrapers, dihedral and carinated burins in these tool-kits. Other Unit F Indicative Upper Paleolithic tool types are only represented by single finds of truncations on blades in levels Fa1-Fa2 and Fb1-Fb2, and they also occur in Unit H and levels Gc1-Gc2 and Gd of Unit G. There are also, however, other Indicative Upper Paleolithic tool class representations between Units F, G and H. There were no scaled tools or well retouched blades, including those with Aurignacian-like retouch, in Unit F, but they are known in Units H and G. Thus, by both tool class and type representation, the Unit F Indicative Upper Paleolithic tools are quite different from those in Units H and G, so that these tools can be used to conclude that two different Aurignacian industries are present at Siuren I.

Unit F "non-geometric" microliths further strengthen the differences between the two Aurignacian industries. Excluding truncated pieces, a bladelet with dorsal retouch at distal end, a microblade with lateral dorsal micro-notch and microblades with fine abrupt retouch from the Unit F non-geometric microliths, the majority is composed of Dufour (26 specimens) and pseudo-Dufour (27 specimens) items of Roc de Combe subtype with either ventral or dorsal marginal lateral retouch and mostly "off-axis" and twisted. Other microliths are mostly marginally retouched Dufour microblades with alternate retouch (9 specimens) and pseudo-Dufour microblades with bilateral dorsal retouch (6 specimens) again with dominant "off-axis" and twisted morphological features. It is also worth noting a few representations of bladelet blanks among the 68 retouched microliths – only 3 pseudo-Dufour bladelets with dorsal retouch (4.4%), while the remaining 65 items are microblades. Seventy-eight retouched edges of the 68 microliths are also characterized by the following retouch types, angles and extent data. By retouch types, the predominant position of marginal retouch is clear (61.6%), a moderate number with micro-scalar retouch (33.3%) and only a few edges with stepped retouch (5.1%). By retouch angles, semi-abrupt retouched edges are quite dominant (80.8%), with the minor presence of some flat retouched edges (17.9%) and a single abruptly retouched edge (1.3%). By retouch extent characteristics, continuous retouch dominates (57.7%) followed by partial retouch (38.5%), while discontinuous retouch is poorly represented (3.8%). Taking the three retouched edge characteristics together, we come up with the dominance of retouched edges with continuous semi-abrupt marginal retouch (32.1%), partial semi-abrupt marginal retouch (16.7%) and continuous semi-abrupt micro-scalar retouch (14.1%). Now comparing the Unit F Roc de Combe sub-type microliths with the Dufour sub-type microliths from Units H and G, their morphological and typological differences are quite obvious, noting only here the dominance of items with continuous semi-abrupt but micro-scalar and micro-stepped retouch for the Dufour sub-type microliths from Units H and G.

But these different features for the Unit F microliths also reflect their different use than that of the Units H and G microliths, as suggested during their specific descriptions above. There is general agreement that Roc de Combe sub-type microliths were also used as component inserts for projectile points with, however, no single universally recognized way for their mounting onto projectile points. Lateral mounting, like that put forward for the Siuren I, Units H and G Dufour sub-type microliths, seems to be very unlikely for the following two reasons. First, given their "off-axis" and twisted morphological features, it is difficult to visualize how the Unit F Dufour and pseudo-Dufour microliths of Roc de Combe sub-type could be laterally mounted onto projectile points. Second, these Unit F microliths do not have any specific lateral facet damage traces like that observed on Unit H and level Gc1-Gc2 microliths. Accordingly, another means of attachment must have existed. A new hypothesis for this question is proposed here. A colleague of the present author, Paleolithic archeologist and geologist Reid Ferring (USA), has suggested that I examine Southern African historical San Bushmen arrows with stone and/or glass inserts published by J. Desmond Clark (1975-1977) that reminded Ferring of the Siuren I, Unit F microliths. Based on Clark's article, as well as the original publication of A.J.H. Goodwin (1945), used by Clark in the 1970s for analyses of the Bushmen bows and arrows, it is indeed possible to suggest the Bushmen's technique of arrow production for the Siuren I Roc de Combe microliths. So, the Bushmen were making so-called first type of composite arrows recognized by Goodwin as follows:

"Arrows with stone (later glass) segments or microliths mounted with mastic on a foreshaft of wood or bone. The tapered, torpedo-shaped foreshaft is ca. 230 mm long and ca. 10 mm in maximum diameter and is mounted directly into the reed shaft (fig. 1:4 and plate 1)" (Clark 1975-1977:130). Descriptions of the particular "segments or microliths" are the most important for our analysis. Goodwin, describing the pieces produced by "a member of the Cape Bushman tribes at the home of Miss Lloyd and Dr. Bleek at Mowbray, Cape Town" in 1878 to show other people the very traditional Bushmen way of their fabrication from a bottle glass, although previously a quartz crystal was used, and their attachment to arrowheads, underlined their characteristics: "the glass tips, mounted at the forward end of the foreshaft, consists of a pair of flaked slivers of bottle glass. These roughly resemble single crescents" and "X-ray photographs have been taken of several specimens" of arrowheads and they "show that the tip of a wooden foreshaft comes to within 0.6 cms. of the extreme tip of the wax bedding in each instance" and "this end is covered with wax, pressed out to a rough ivy-leaf shape, and the glass slivers (the microliths – Yu. D.) are set into the shoulders of the leaf to a depth not exceeding 0.15 cms." which is why the microliths were "somewhat precarious, and in use would certainly have fallen away from the wax, and have lodged themselves in the skin of the animal" (Goodwin 1945:429, 433-434). It is also interesting to see how "segments or microliths" were produced and inserted into an arrowhead. "The fragments of glass have been flaked, not merely shattered, and each shows a bulb of percussion at the hinder end, and one or two cleavages on the opposite face. This is unlike the true microlithic technique, in which the bulb of percussion is generally discarded. The edge lying embedded in the wax is worked with tiny facets" (Goodwin 1945:434). Finally, the dimensions and morphology of "segments or microliths" is important to examine. Goodwin's dimension data of the pair of microliths he described are as follows: length – 1.31 and 1.30 cm, width – 0.38 and 0.5 cm, thickness – 0.17 and 0.19 cm (Goodwin 1945:434, fig. 2A on p. 443). Clark (1975-1977) has added to Goodwin's data several more similar 19th century Bushmen arrows with wooden foreshafts with a pair of stone/glass "segments or microliths" either still intact or which had left their impressions there. Clark's data confirms all of Goodwin's observations for these arrowheads. What is important is that Clark contributed additional information on the microliths' retouch characteristics, their mounting into a mastic and also their dimensions. The retouch is characterized to be only on lateral edges of a microlith, which is never pointed – "fine, normal, unidirectional backing while the cutting edge also shows evidence of fine nibbling and retouch or more probably of utilization or damage on both faces" and "the exposed upper tip of the blunted back" was "pressed into the mastic" (Clark 1975-1977:135). Accordingly, the retouch was a lateral marginal one and the microlith was positioned into mastic by its retouched edge. Also, microliths were always mounted into mastic at an "oblique angle" making "an effective triangular cutting edge" for an arrowhead (Clark 1975-1977:135). The microliths themselves or their impressions have the following dimension ranges: length – 8.5-17.4 mm, width – 3-5 mm, thickness – 0.8-2 mm, according to the Clark's measurements (Clark 1975-1977:135-136). It is also possible to add here, analyzing Goodwin's and Clark's descriptions, that retouch was mainly located on one lateral edge of each microliths (see fig. 1; Goodwin 1945: fig. 2A on p. 443; Clark 1975-1977:fig. 1:4 on p. 131 and Plates I – V on pp. 129, 133, 137-139). Having such rather detailed descriptions, illustrations and photos of the Bushmen arrows, it is now possible to say that their stone/glass microliths are not really backed segments and, on the contrary, are very similar to the Siuren I, Unit F Roc de Combe sub-type microliths. Indeed, both of them are usually "off-axis", twisted and small (no more than 1.7 cm long for the Bushmen ones and average 1.7 cm long for the Siuren I ones, with no retouched piece longer 2.7 cm; and narrow – 0.3-0.5 cm for the Bushmen items and 0.5 cm on average for the Siuren I retouched microliths), with mainly fine marginal retouch on one lateral edge either on dorsal or ventral surface – the Siuren I pseudo-Dufour and Dufour microliths (see fig. 4B, p. 270). It is also very important to note their right-sided usual "off-axis" orientation for the following reasons. First, the pseudo-Dufour items with dorsal retouch are positioned on the left sides of Bushmen arrowheads and Dufour items with ventral retouch on the right. Second, the right-sided very dominant "off-axis" orientation for the microliths might also indicate microlith primary reduction by right-handed humans, both Siuren I Aurignacian *Homo sapiens* ca. 30,000 years BP and South African Bushmen in 19th century. Of course, these proposals require additional analyses, but it is important to note them now. Finally, the Siuren I retouched microliths, if they are broken (62 incomplete pieces in level Fb1-Fb2), are mostly proximal parts (38 pieces/61.3%) which may indirectly indicate total breakage of the distal tip due to projectile damage, keeping in mind the very thin distal tips of the microliths, which is why any partial spall scars from spin-off projectile damage is hard to imagine instead of them being just completely broken instead in such projectile damage cases. There is also one more very important general observation by Clark regarding the Bushmen arrows and their inserts. He suggested the appearance of a bow and such arrows with pairs of microlithic inserts much earlier than the 19th century Bushmen examples, tracing back similar microlith existence for even Stone Age assemblages as old as 17,000 years BP (Clark 1975-1977:142-145). He also provided some precise information about Bushmen bows with which the arrows were used. The 18th century oldest known proper Bushmen bows were "all short segment" ones and with no composite elements (Clark 1975-1977:142). Clark also mentioned "traditional preferences of San or Pygmies for short (c. 60 cm) bows with a weight (pull) of c. 20 lbs, and arrows also about 60 cm long" (Clark 1975-1977:146). The bow data mean that there were no particular difficulties in making such simple bows which, however, enabled the Bushmen to "hit a mark, some with unerring certainty, from 50 to 100 paces" (Clark 1975-1977:142). Finally, it is also needed to cite below a final observation by Clark about the effectiveness of bow and arrow use. "The description of the San arrow indicates that it is a very ingenious but not a particularly strong but impressive-looking piece of equipment for use against large game over any but a very short distance. It is, however, the use of poison that turns these arrows into very formidable weapons" (Clark 1975-1977:141). All in all, the considering South African San Bushmen "a non-reversible arrow with reed shaft, presumably fletched, and with bone or wooden foreshaft tipped with "microliths" set in mastic and set directly into the distal end of the reed" (Clark 1975-1977:142) is also possible to imagine in use with a simple bow by Siuren I Late/Evolved Aurignacian humans, given identical morphological and metric characteristics for the microlith inserts.

Finally, to finish with the rest of the Unit F flint tools, it is needed to mention very briefly the presence of 2 notched tools and a denticulated tool on flakes (so-called "Neutral" tool types) only in level Fb1-Fb2 and 45 retouched pieces for all of Unit F (2 in level Fc, 36 in level Fb1-Fb2, 6 in level Fa3 and 1 in level Fa1-Fa2) with similar representation of blade (23 items) and flake (22 items) blanks, although blades (21 items) dominate over flakes (15 items) in level Fb1-Fb2.

The non-flint artifacts from Unit F are represented by 2 bone ovoid in section points, 2 debitage pieces from bone tool production and a pendant on polar fox canine which are, except for one debitage piece from level Fa1-Fa2, from level Fb1-Fb2 (see p. 79-90); and 4 recognized shell beads are the following: one of marine mollusk species (*Gibbula maga albida*) and three of fresh water river mollusk species (*Theodoxus fluviatilis*, *Theodoxus transversalis* and *Lithoglyphus naticoides*) (see p. 73-79). And again, as is the case with nearly all of the other basic artifact classes and/or types, even these Unit F few pieces are very different from the respective items in Unit G where bone tools are usually flat in section and among the shell beads only *Theodoxus transversalis* occurs, while the other shell beads were produced using different mollusk species.

Thus, comparing the Unit F Aurignacian artifacts with the Aurignacian artifacts from Units H and G, we see a different industry that while still Aurignacian, like that from Units H and G, shows at the same time the appearance of definite even more "developed" Aurignacian typological features (e.g., carinated burins and their technological variant as bladelet narrow flaked cores/"carinated burins" that actually together with bladelet "carinated" cores and carinated end-scrapers *sensu lato* represent the entire set of Aurignacian carinated pieces) than is the case for the Units H and G Aurignacian industry. Also, the detailed data on both unretouched bladelets and microblades, and non-geometric microliths from the two Siuren I Aurignacian industries allowed us not only to differentiate the industries, determine the reasons for a number of differences between the two Aurignacian industries. These are briefly summarized below to conclude this chapter.

Concluding remarks

Taking all of the microlith data into consideration, the complete techno-typological view of the Unit F Aurignacian assemblages becomes increasingly understandable. Knowing in advance how Roc de Combe sub-type Dufour and pseudo-Dufour microliths with either ventral or dorsal lateral retouch would be used, the Siuren I, Unit F Aurignacian humans also knew exactly what morphological and metric features the microliths should have. Accordingly, special technological methods for their purposeful serial production have been applied, mainly based on reduction of carinated end-scrapers *sensu lato* (including thick shouldered/nosed ones), bladelet narrow flaked cores/"carinated burins" and strictly speaking carinated burins, causing the detachment of many "off-axis", twisted and narrow microblades from these technologically, primary flaking objects (cores)/typologically, formal carinated tools. This is why the technological and typological features of the Unit F assemblages, and especially the one from level Fb1-Fb2 with the largest assemblage and flint exploitation indications and with the most dominant microblade sample among all Unit F levels, represent such a distinct Aurignacian industry. On the other hand, the Aurignacian assemblages from Units H and G with completely different and dominant Dufour sub-type microliths with alternate lateral retouch ("on-axis", "weakly" twisted and non-twisted wider microblades and a significant portion of bladelets) have been technologically needed in reduction from typologically definable cores and especially their bladelet "carinated" type with rather wide striking platforms and flaking surfaces and, at the same time, relatively short length parameters leading to serial production of bladelets and microblades with these features and no more than 3 cm long. Accordingly, the typologically definable carinated end-scrapers *sensu lato* (including thick shouldered/nosed ones) are present in a lesser number for some purely microblade reduction, while carinated burins do not occur there at all. It is worth repeating: all of the features of the Units H and G Aurignacian assemblages are connected to a certain need for specific microliths for projectile hunting weapons, possibly including bow and arrow, but in a very different way than assumed for Unit F Aurignacian humans.

Thus, the two different Aurignacian industries at Siuren I, varying in their techno-typological features, were indeed very much connected to the different uses of microliths as components (with either lateral or distal tip positions) of projectile points and production. Such the flint primary and secondary reduction features, dependent on different hunting weapon applications for different Aurignacian humans, led to the composition of two different Aurignacian industries, from our archeological points of view. By these hunting weapon aspects, the Siuren I Aurignacian industries are very different from any Middle Paleolithic industries where there is no such hunting weapon need reflected in their flint assemblages. On the other hand, these Siuren I, like other Old World Aurignacian industries, are very much like other Upper Paleolithic industries (e.g., Gravettian, Epigravettian, Solutrean) where most of the techno-typological features are again connected to use and, accordingly, production of flint hunting equipment. Therefore, the clear observed techno-typological patterns of flint exploitation strategies in the Siuren I Aurignacian industries, depending on flint hunting weapons, "open the door" to further studies aimed at understanding industrial variability in the Aurignacian *sensu lato* as will be certainly the case for some Central European Aurignacian assemblages (e.g., Breitenbach, Senftenberg and Alberndorf I in Germany and Austria) and some Eastern European Epi-Aurignacian assemblages (e.g., Sagaidak I, Anetovka I, Muralovka and Zolotovka I in the southern regions of Ukraine and Russia) which have mostly or only dorsally and marginally non-twisted and "on-axis" retouched microliths and no carinated burins.