Introduction

The recently recovered industries from the Ksiecia Jozefa and Piekary sites in the Krakow region demonstrate a “compact” chronological sequence within OIS 3, covering the Late Middle Paleolithic, the transition period, and the Early Upper Paleolithic. The Late Middle Paleolithic is represented by Blade Levallois-Mousterian, Levallois-Mousterian, Mousterian, and Blade Mousterian industries lacking bifacial tools. Assemblages with Upper Paleolithic features are clearly non-Aurignacian and attest to a local Early Upper Paleolithic blade industry (Valladas et al., 2003; Sitlivy et al., 1999b; 2004; Valladas et al., 2003). Artifacts were mostly made from local Jurassic flint on large and medium-sized, oblong, thick nodules of generally good or mediocre quality. Flint outcrops are local, within 1 km of the site, but not directly at the site. This type of flint was used in all of the industries analyzed as well as in the Middle and Upper Paleolithic assemblages in the Zwierzyniec region of Krakow. The artifacts have a fresh state of preservation; altered items are very rare (patina, gloss), apart from abundantly burnt lithic artifacts. Post-depositional damage is absent or very rare. The open-air site of Piekary IIa (Fig. 2) contains three Late Middle Paleolithic occupation horizons (Blade Levallois-Mousterian, Levallois-Mousterian and Blade Mousterian) and one Early Upper Paleolithic occupation horizon (OIS 3; between 60 and 31/26 ka BP) (Valladas et al., 2003; Mercier et al., 2003), which have some common features as well as considerable differences in terms of spatial patterning.

The Ksiecia Jozefa site

Layer III (Lower Complex). This layer represents a high-density occupation, interpreted as a large camp with different activities: the remains of 29 unstructured hearths and highly variable in situ lithic technologies appearing in strictly organized clusters. Many knapping methods were employed: generally non-Levallois flake (mostly polyhedral, accompanied by discoidal, unidirectional and various short reduction sequences of cores on flakes,
including Kombewa and Pucheuil models) (Delagnes, 1996) and some Upper Paleolithic-type blade production (Sitlivy, Zieba, 2006). The tool kit has similar proportions of simple scrapers, notches, and retouched flakes, which were accompanied by raclettes, natural and retouched backed knives, denticulates and rare endscrapers. Retouch is non-invasive, light, and often marginal or of the “raclette” type.

Artifacts (22,362 specimens) were found at the top of Member III-2, which is composed of medium- and coarse-grained sands (Sitlivy et al., 1999b). This is a thin (5 – 10 cm) occupation layer covering about 80 m². The artifact composition (see Table) evidences the debitage aspect of this complex; however, the dominance of small chips (< 2 cm) was also the result of tool retouching and re-sharpening, confirmed by many refitted scrapers, notches, and denticulates. Flint fragments, tested and un-worked nodules, chunks (as raw material reserve), preforms as well as pebble hammerstones (25 specimens) and retouchers are present (0.03 – 0.1 %). Unidentifiable burnt items are extremely abundant (559 specimens or 2.5 % of the entire assemblage). The tool to core ratio is low (2 : 1). The blank to core ratio displays a high level (31 : 1). Thus, the general lithic artifact composition and the large number of refitted production sequences, modifications, and breaks (for terminology see (Cziesla, 1990)) suggest on-site core reduction as well as production and use of tools.
Composition of lithic assemblages from Ksiecia Jozefa (KJ) and Piekary (P) IIa

<table>
<thead>
<tr>
<th>Artifacts</th>
<th>KJ III</th>
<th>KJ II</th>
<th>KJ I</th>
<th>P IIa 7c</th>
<th>P IIa 7b</th>
<th>P IIa 7a</th>
<th>P IIa 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Chunks</td>
<td>9</td>
<td>0.04</td>
<td>1</td>
<td>48.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fragments</td>
<td>174</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pebbles</td>
<td>131</td>
<td>0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal fragments</td>
<td>18</td>
<td>0.08</td>
<td>2</td>
<td>29.2</td>
<td>3</td>
<td>38</td>
<td>17</td>
</tr>
<tr>
<td>Debris</td>
<td>85</td>
<td>0.4</td>
<td>14</td>
<td>0.65</td>
<td>1</td>
<td>1.5</td>
<td>47</td>
</tr>
<tr>
<td>Burnt fragments</td>
<td>559</td>
<td>2.5</td>
<td></td>
<td></td>
<td>2.1</td>
<td>1</td>
<td>5.4</td>
</tr>
<tr>
<td>Tested blocks</td>
<td>14</td>
<td>0.06</td>
<td></td>
<td></td>
<td>1</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>Preforms</td>
<td>8</td>
<td>0.03</td>
<td></td>
<td></td>
<td>1</td>
<td>0.6</td>
<td>0.2</td>
</tr>
<tr>
<td>Cores</td>
<td>257</td>
<td>1.1</td>
<td>13</td>
<td>0.6</td>
<td>2</td>
<td>2.9</td>
<td>7</td>
</tr>
<tr>
<td>Chips (&lt;2cm)</td>
<td>12544</td>
<td>56.1</td>
<td>1571</td>
<td>71.8</td>
<td>10</td>
<td>14.7</td>
<td>8</td>
</tr>
<tr>
<td>Flakes</td>
<td>7521</td>
<td>33.6</td>
<td>241</td>
<td>11</td>
<td>34</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>Blades</td>
<td>421</td>
<td>1.9</td>
<td>275</td>
<td>12.6</td>
<td>15</td>
<td>22</td>
<td>15</td>
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<tr>
<td>Bladelets</td>
<td>45</td>
<td>0.2</td>
<td>49</td>
<td>2.2</td>
<td>2</td>
<td>1.2</td>
<td>9</td>
</tr>
<tr>
<td>Blanks fragments</td>
<td>14</td>
<td>0.65</td>
<td>1</td>
<td>1.5</td>
<td>11</td>
<td>1.6</td>
<td>11</td>
</tr>
<tr>
<td>Burin spalls</td>
<td>4</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.9</td>
</tr>
<tr>
<td>Hammerstones</td>
<td>25</td>
<td>0.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Pebble retouchers</td>
<td>9</td>
<td>0.04</td>
<td>5</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retouched tools</td>
<td>538</td>
<td>2.4</td>
<td>7</td>
<td>0.3</td>
<td>3</td>
<td>4.4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>0.3</td>
<td></td>
<td></td>
<td>17</td>
<td>0.3</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>567</td>
<td>99.9</td>
<td></td>
<td></td>
<td>567</td>
<td>99.9</td>
<td>1494</td>
</tr>
<tr>
<td></td>
<td>1442</td>
<td>99.9</td>
<td></td>
<td></td>
<td>1442</td>
<td>99.9</td>
<td></td>
</tr>
</tbody>
</table>

**Fig. 3.** Cortical flake and blade presence. Ksiecia Jozefa (KJ) and Piekary (P) IIa.

Full cortical and semi-cortical flakes (> 50% cortex) are as abundant as blades: 64 and 55% (with respect to all removals), contrary to other industries (Fig. 3). Naturally backed blades are twice as frequent as backed flakes (42 vs. 18%) and much more numerous in comparison with cortical blades (contrasting with equivalent proportions of cortical, semi-cortical and naturally backed flakes). Flakes and blades without cortex are much less common (36 and 45%).

Material was dispersed across the entire excavated living-floor forming separate dense scatters (Fig. 4). Higher artifact density was recorded in the southern part.
of the excavated area. Several flint-knapping areas have been recorded, varying in size, density, composition, and type of activity (debitage, tool production posts, raw material reserve, burnt artifact clusters, combinations of these types of accumulations). Intact production areas with dense accumulation of chips and various refitted reduction sequences are common. Large concentrations of burnt stones were associated with hearths or were localized around them. Isolated burnt artifacts also show long distance connections with hearths. Traces of ash and charcoal are common across the excavated area.

The hearth shape (round, oval) and dimensions (with a diameter of about 50 – 70 cm) are more or less constant with distinct boundaries. No dominant orientation can be recognized which could be used to document their in situ position. However, another type of structure is represented by a larger charcoal zone without clear-cut boundaries (with a diameter of more than 100 cm). These ashy zones could comprise several small hearths. The thickness of these hearths varies from 1 – 2 to 5 – 7 cm (Fig. 5, 6). Three types of hearths have been distinguished according to their fill: (1) containing exclusively burnt
lithic remnants; (2) filled mostly by fresh flint material, with heated, burnt, and fresh artifacts also occurring around the hearth’s periphery; (3) “sterile” small round hearths with few unburnt remnants inside, surrounded by flint material.

In all, 29 hearths were localized which subsequently have been organized into five main concentrations: (1) the northern cluster (squares L2, L1, K3, K2, K1, II): small compact hearths without artifacts; (2) the central cluster (squares K-1, K-2, I-1, H0, H-1, G0): mostly large composite eroded (washed away) hearths with exclusively burnt flints; (3) the western cluster (squares E0, D1, C1, B1): several small oval hearths lacking burnt material. Mostly fresh and few burnt artifacts found within the hearth’s periphery; (4) the eastern cluster (squares N-5, M-5, M-4, L-4, L-3, K-3): diverse types of hearths, including larger ones with mixed (burnt and fresh) fill (see Fig. 5, 7, a) as well as small sterile hearths; (5) the southern cluster (squares G-4, F-4, G-5, F-5, E-5, G-6, F-6, E-6, F-7, E-7): sterile small hearths with surrounding unburnt flint (Fig. 7, b); except for one large hearth comprising both burnt and fresh material.

It would appear that several models of hearth function were employed: (a) after extinguishing a fire, knapping activity took place on the same spot (hearth contains fresh artifacts); (b) hearths functioned simultaneously with flaking activities (hearth of different types); (c) hearths were installed in the knapping area after finalization of certain activities (abundant burnt material).

Different degrees of burning flint artifacts were also recorded: (1) heated artifacts, complete, without fractures, visible negatives and ridges; slight alteration concerning only color (reddish spots); (2) artifact disintegration in large fragments and their dispersal due to sudden heat (e.g., throwing of the flint into the fire); numerous reconstructed burnt pieces (often retouched tools) with rather long refitting lines (about 1 m); clear changing of color (whitish, grayish); (3) considerable changing of color, contrasting network of internal cracks; complete or partial heating (often unifacial) resulting in abundant “fire chips” (e.g., several concentrations yielded 2557 chips from which nearly half were heated and burnt; moreover, most of them (79%) belong to the category of “fire chips”). Cracked fire debris remained in place and disintegrated during excavation. Burnt artifact surfaces are morphologically illegible. This kind of alteration is due to the long gradual heating of flint (hearth installation on flint remnants).

In the central cluster of hearths, the lithic fill and nearby material around the hearths reflect contacts with high temperature. Burnt artifacts display all these levels of heating, which may confirm the long function of these hearths.

As for the horizontal distribution of cores, three main concentrations are visible: in squares G-1 / F-1; F-6 / G-6, and M-4 / -5. Most of them, as well as tools, show even spatial patterning except in several areas (squares I-4, I-5, H-4 and H-5) (Fig. 8). Refitted cores and tools form clusters, the density of which depends on reduced flint mass. Short and medium connection lines of more than 300 reconstructed blocks were recorded. Very long scattering and flints with a long life-history occurred only rarely and relate mostly to isolated artifacts rather than whole refitted units. An in situ technological order of the refitted cores is common as well as a number of tools, which were surprisingly abandoned in place along with debris, and could moreover be fitted with the original core.

Spatial, technological, typological, and attribute analyses and refitting make it possible to propose a general model of raw material exploitation (Fig. 9). Raw material was transported to the site in the form of large nodules and chunks (between 1 and 5 kg), which are much bigger than the cores and refitted blocks found at the settlement, and large primary flakes (approx. 500 g). Local flint was reduced, except one used blade made from exotic matte white Jurassic flint from the Sikorniki area. It appears that imported local flint was tested on the site: tested blocks, precores on nodules. Different stages of core reduction were distinguished: cortex removal, or initial direct reduction, or preliminary shaping, exploitation, rejuvenation and, finally, exhaustion.
as well as discard of cores in different technological phases. Numerous precores contrast with abundant heavily exhausted cores (from nodules of several kg to micro-cores, e.g., only 13 g). Cores on nodules and on flakes were reduced by means of very different flaking strategies. Cores on nodules and fragments represent all stages of reduction. Reconstructed nodules often include several independent cores with their own technological “life.” Some exhausted and full debitage cores were used as tools. Some cores on flakes have similar reduction patterns (even with less mass than nodules): from initialization (often Kombewa cores) to exhaustion and transformation into tools, showing a long reduction chain. Others exhibit a short reduction pattern.

Core exploitation resulted in flakes and some blades as well as in waste. Blanks, often without strict selection, were used directly (partly retouched flakes and blades) or were modified by careful retouch into tools. However, large primary cortical flakes were usually transformed into cores and sidescrapers as well as naturally backed or débordant blanks into backed knives and some other implements. On the other hand, many raclettes were produced on small ordinary flakes and surprisingly on large flakes and blades (including cortical), which contradict the traditional definition of this tool type. A significant number of in situ produced blanks, mostly flakes, were again reduced as second-generation cores. Retouched tools were also used and re-sharpened on the site and/or broken during rejuvenation and finally again reduced as cores (Kombewa pattern). The considerable amount of refitting shows complete on-site raw material exploitation: production phases and use (e.g., blocks without missing pieces, including good quality blanks and retouched tools).

Refitting and artifact composition displays employment of two production strategies: economical and wasteful. The wasteful pattern is characterized by abundant debris produced during core reduction and careless use of raw materials. Cores were abandoned after technological mistakes, apparently due to natural inclusions and fractures, but very often without any obvious reason during the full debitage stage. Immediate ad hoc short-term use of blanks and quick abandon was also confirmed for some tool categories. The economical strategy for raw material treatment differs greatly. Nodules were often divided into several parts, each of them then reduced in their own manner (independent methods) and even with the appearance of natural defects, the flaking sequence was long, often complicated and resulted in heavily reduced cores. Many debitage products in these reconstructed blocks were retouched or used as the next generation of cores – cores-on-flakes. It also occurred that at the final stage, the core was accidentally broken; however, both fragments were continuously reduced to the maximum. Small fragments and flakes were also used as micro-cores. On the other hand, Dibble’s schema of tool reduction was not attested to in this industry. One can find tool re-sharpening without any change in their typological

![Fig. 9. A model of raw material exploitation. Ksiecia Jozefa layer III.](image-url)
status; tools with multiple working edges are scarce or absent. Debitage based on cores on flakes has often been explained in the context of raw material economy (see, e.g., (Bernard-Guelle, Porraz, 2001)). Frequent reduction of flakes by various methods (cores on flakes, preforms) can hardly be explained by raw material stress in the Krakow area (containing rich local outcrops of flint) and not always by the opportunism of debitage in order to pass quickly to the full flaking stage (Ibid.). The reasons for flake reduction on this site are thus rather complex.

All this data show the complicated, non-trivial character of raw material exploitation, technological behavior, and site function in comparison with other Middle Paleolithic occupations known in the region. A comment made on the Maastricht-Belvedere site J, “it is easier, in fact, to determine what the flint technology does not look like” (Roebroeks et al., 1997), can also be applied in the case of the Ksiecia Jozefa, layer III patterns.

Layer II (Middle Complex). A small debitage area of a larger settlement (?) or more probably a limited short-term workshop with remains of hearths and a dense flint concentration was discovered in Member III-1 (silty sands). This assemblage consists of 2189 artifacts. The flint industry exhibits blade production (Ilam = 57.3) by several methods of the Upper Paleolithic style: crest installation, frequent systematic rejuvenation of the striking platform, mostly bidirectional exploitation of narrow cores on nodules and flakes, and volumetric prismatic cores (Siltivy et al., 1999b; 2004). Non-speciﬁc isolated types are present (with a lack of endscrapers and burins). The tool kit is small (only 7 items) and represented by retouched flakes and a blade, a notched tool, a pièce esquillée, a borer, and a scraper fragment. There are neither characteristic Middle Paleolithic nor Aurignacian tools, contrasting with exclusive blade production.

Most archaeological remains were localized in a small zone of about 6 m²; the rest of the excavated area (80 m²) yielded only isolated flint artifacts (Fig. 10). Spatially demonstrates that tools occupied the western part, whereas cores were found in the central and eastern areas of this cluster. An intact production area, with a high-density accumulation of chips and small waste, evidences blade production activity, which took place next to the hearth (Fig. 11, 12).

The composition of the artifact assemblage (see Table) conﬁrms the debitage aspect of this complex. Chips constitute the largest category (> 72 %) among all the assemblages studied in this region; blades and bladelets are in the second position. The tool to core ratio is very low (0.5 : 1). The blank to core
ratio displays a high level (44 : 1), although the blade to core ratio is 26 : 1. The blade to core ratio supports a high intensity of core reduction. The lithic assemblage composition and refitting suggest on-site core reduction. Unlike layer III and many other workshops of this region, unworked and tested nodules, fragments of raw material, and preforms are absent as well as other remains like resharpening flakes and burin spalls. Interestingly, among numerous debitage products with developed bulbs and 13 reduced cores (6 were refitted), only five small abraded pebbles were recorded and not a single hammerstone. However, hard stone percussion was often used. Together with faceting of core platforms (IFl = 30, IFs = 24.2) they are the only Middle Paleolithic technological traits in this industry. Non-cortical flakes are dominant (> 55%); the small number of full cortical and semi-cortical flakes and blades (47 and 5 specimens, respectively) and their low ratio to cores (4 : 1) do not confirm on-site decortication of many cores. Refitting indicates only two cases of in situ cortex removal and on-site reduction of rather small nodules. Primary and ordinary flakes (241 specimens), together with refitted sequences, exhibit primarily the “flake character” of the preparation stage. Numerous naturally backed blades were used to maintain the debitage surface. Blade debitage is mostly represented by incomplete blanks (about 90 % in contrast to 63 % in layer III) or by irregular blades. On the other hand, cores retain blade and bladelet scars with regular shape. In one case, a core from rare flint of good quality was not conjoined with any recovered pieces from a large area of about 80 m². Debitage products (including deliberately made blanks) from this type of flint are scarce in this assemblage. This core was minimally prepared outside the excavated area; target blades are absent. These facts, as well as partially reconstructed cores with missing pieces and a high chip/shatter component, could evidence specialized production of blades and bladelets, modification of some blanks into tools, and their exportation.

Application of various analyses documents the specialized workshop character of this occupation: several (?) short visits with intensive blade core reduction in a limited knapping zone. The general structure of this assemblage demonstrates mostly off-site testing of raw material, the cortex removal stage and the shaping of some cores. Large flakes were imported to the site in order to use them as narrow-faced bladebladelet cores.

Core reduction was aimed at production of good quality medium-sized and small, narrow blades (rarely > 100 mm), including bladelets, and some tool manufacturing. These products are more elongated and less massive than blades from the underlying complex III. Cores (several are exhausted and one is burnt), technical pieces (crests, tablets), debitage waste, few complete bladesbladelets (10.5 % and mostly irregular) as well as rare, non-expressive tools were abandoned on site.

Final blanks were exported together with some retouched tools; pebble tools for hard percussion were also not left behind (Fig. 13).

**Layer I (Upper Complex).** Artifacts came from the lower and middle parts of Series II (silty muds). Layer I is not rich, but many artifacts were localized in the northern part of the trench (Fig. 14). Cores

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**Fig. 13.** A model of raw material exploitation. Ksiecia Jozefa layer II.
The composition of the artifact assemblage is similar throughout these layers; it is characterized by the dominance of debitage products and a low frequency of tools and cores (see Table). The low rate of chips in all Piekary assemblages can partially be explained by post-depositional processes; however, their progressive increase in frequency from layer 7c to 6 could have been induced by human activity. Inter-assemblage comparison confirms that the tool to core ratio is low at all sites of the Krakow region – 2 : 1 and less (the lowest were recorded in the low-density occupations in Piekary IIa layer 7c and in Ksiecia Jozefa layer I: periphery or ephemeral sites). On the other hand, the blank to core ratio (with the exception of these two cases) is high: up to 55.5 : 1, the highest rate in Piekary IIa layer 6. Blade debitage was intensive in both Early Upper Paleolithic complexes (Piekary IIa layer 6 and Ksiecia Jozefa layer II): 27.5 : 1 and 26 : 1, respectively, and contrasts with the Blade Mousterian in Piekary IIa layer 7a where blade productivity was very low (7 : 1). Thus, core flaking (flake/blade or only blade production) was common for all the analyzed inventories. All Piekary assemblages document the absence of a raw material reserve on the site; few tested nodules were found, differing significantly from Ksiecia Jozefa layer III. Generally, the Piekary complexes fit the category of a campsite-workshop with less complete processes for raw material exploitation in comparison with Ksiecia Jozefa, layer III. Also, the workshop character is less pronounced in Piekary IIa layer 6 (presence of engraved pieces of hematite, more common and definite Upper Paleolithic tool types) than in the specialized blade/bladelet workshop with occasional ad hoc tools in Ksiecia Jozefa layer II.

The Piekary IIa site

New investigations at the Piekary area document several pre-leptolithic blade episodes in the sequence of site IIa in the period between 61 and 35/33 ka BP (Sitlivy et al., 1999a; 2004; Valladas et al., 2003; Mercier et al., 2003; Kalicki, Budek, 2004). The lower part of the Piekary IIa sequence yielded four human occupation horizons attributed to Blade Levallois-Mousterian (layer 7c), Levallois-Mousterian (layer 7b), Blade Mousterian (layer 7a), and local non-Aurignacian Early Upper Paleolithic (layer 6) industries lacking bifacial tools (Sitlivy, Zieba, Sobczyk, 2006; Sitlivy, Zieba, 2006).

The assemblage from this layer is more abundant. Spatial organization shows a generally even horizontal distribution of artifacts and two concentrations in sector XXII (Fig. 15, b). The first cluster is located in
the southern and southeastern parts of this trench (rows 9 and 10). The second smaller locus was found to the north in squares G4 and F4. Levallois products were found across the entire area. Tools occurred inside both concentrations, while cores tended to be located on the cluster edges.

**Layer 7a.** The industry from this layer is the densest with an even distribution of artifacts (Fig. 15, c). In trench XXII, two clusters with flint material were distinguished: the first one in the southwestern sector (squares H10 and I10) and the second one in the northwestern sector (squares H1 – J1). Apart from some tool concentrations in H – I 9 – 10 in trench XXII, core and tool clusters are absent.

From trench to trench, the Piekary sites display differences in the horizontal distribution of the industries across the layers. The most striking change in the spatial distribution pattern during the Middle Paleolithic can be seen in layer 7a. Morawski’s excavations and trench XX/1998 (Sitlivy et al., 1999a) show the predominance of flake debitage of the Middle Paleolithic type (with fewer Levallois features than in layer 7b) over blade production of the Upper Paleolithic type. However, trench XXII/2000 mostly yielded evidence of blade production, particularly blade cores and their by-products in the same stratigraphic position (i.e. in layer 7a) while only Middle Paleolithic tools were found in these trenches. It appears that different knapping activities were carried out in the two zones: mostly discoidal reduction in trench XX, resulting in small *débordant* flakes without the corresponding cores, while blade production was dominant in trench XXII.

**Fig. 15.** Horizontal distribution of artifacts (black dots), cores (squares), and tools (triangles) (each square represents 1 m²). Piekary IIa, layer 7c (a), 7b (b), and 7a (c).
All blade cores, except for the one from trench XX, were found in trench XXII, as well as most of the blade reduction by-products.

Layer 6. The spatial distribution of artifacts in layer 6 partially follows the direction of solifluction along the slope (especially in the larger trench XXII), approximately aligned with the N – S axis. Several small concentrations of lithics, including cores and tools, were identified in the northern and central parts of trench XXII (Fig. 16).

Trench XX is smaller and its structure concerning the spatial distribution of artifacts is less observable. Moreover, artifacts have lower density in comparison with the other excavated areas. In trench XX, tools and cores form two clearly separated zones, while in trench XXII, the cluster in squares E3 and F3 includes both artifact categories. In another part of trench XXII, cores occurred with other flints, whereas tools tend to be found near the margins of concentrations.

In sum, taking into consideration the post-depositional processes, it is difficult to confirm in situ spatial organization of artifacts or their transportation due to solifluction. However, it should be stressed that artifacts are “fresh” (sometimes with a light patina) and refitting is possible, both of broken pieces and due to technological reconstruction.

Conclusions

A comparison of the seven Late Middle Paleolithic and Early Upper Paleolithic occupations from two sites demonstrates differences in the level of site preservation, their function, spatial organization, raw material exploitation, intra-site settlement structure, and human behavior. The small, “compact” (several (?) short-term visits) specialized blade workshop with clear-cut boundaries and exclusively short-distance refitting lines and hearth remains in layer II contrasts with the vast high-density, but strictly organized, settlement in layer III of Ksiecia Jozefa, with complex spatial organization, technological conceptual schemes, and behavioral patterns. Various flint-knapping activities and intensive fire use, repeated visits over short and longer time-spans (dominance of short and medium distances of refitting lines together with some artifacts with a long history) took place. From the point of view of spatial organization, human occupations in Piekary Ila are less “pronounced” (also due to post-depositional effects) and can tell only a very small part of the “story.” Nevertheless, two independent technologies were spatially separated in layer 7a: exclusive flake (mostly discoidal) as opposed to non-Levallois blade production. Generally, they correspond to sites with debitage activity (destroyed camp-workshops) outside of immediate raw material sources.

Acknowledgments

This research was made with financial aid of several grants:
(1) Fonds National de la Recherche Scientifique (F.N.R.S, l’Unité de Recherches EVEH – Université de Liège);
(2) Services du Premier Ministre, Affaires Scientifiques, Techniques et Culturelles (No. MO/38/003) and Belgian Science Policy (No. MO/38/010) (Brussels);
(4) Polish Committee for Scientific Research – general funding provided to the Institute of Archaeology – Jagiellonian University.

We would like to thank Dr. Rebecca Miller for assistance in editing this text and reviewers for helpful comments.
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Received January 19, 2007.