

## Original Study

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# Hunting High and Low: Gravettian Hunting Weapons from Southern Italy to the Russian Plain

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**Abstract:** The current paper aims at describing and analysing the backed tools found in two Early Gravettian sites separated geographically from each other: Grotta Paglicci (layer 23–22) in Italy, and Kostenki 8 (layer II) in Russia. A similarity between the lithic assemblages of the two sites, and other cultural aspects, has been reported by authors over many decades. The analysis of the backed tools has created the opportunity to apply the same methodological approach to verify the resemblance and potential causes for the similarity, and also to address broader considerations on Gravettian hunting strategies and the modalities and timing of the spread of new techniques, whether related to physical movement of people or assimilation of ideas. The perception is that, during the Gravettian period, shared symbolic behaviours and subsistence strategies linked people living in completely different environments with completely different resources, from the temperate regions of southern Italy, to the very cold Russian plains. This point of view cannot be questioned, but it tends to flatten an articulated palimpsest of human generations and to underestimate the very low demographic density of Prehistoric Europe.

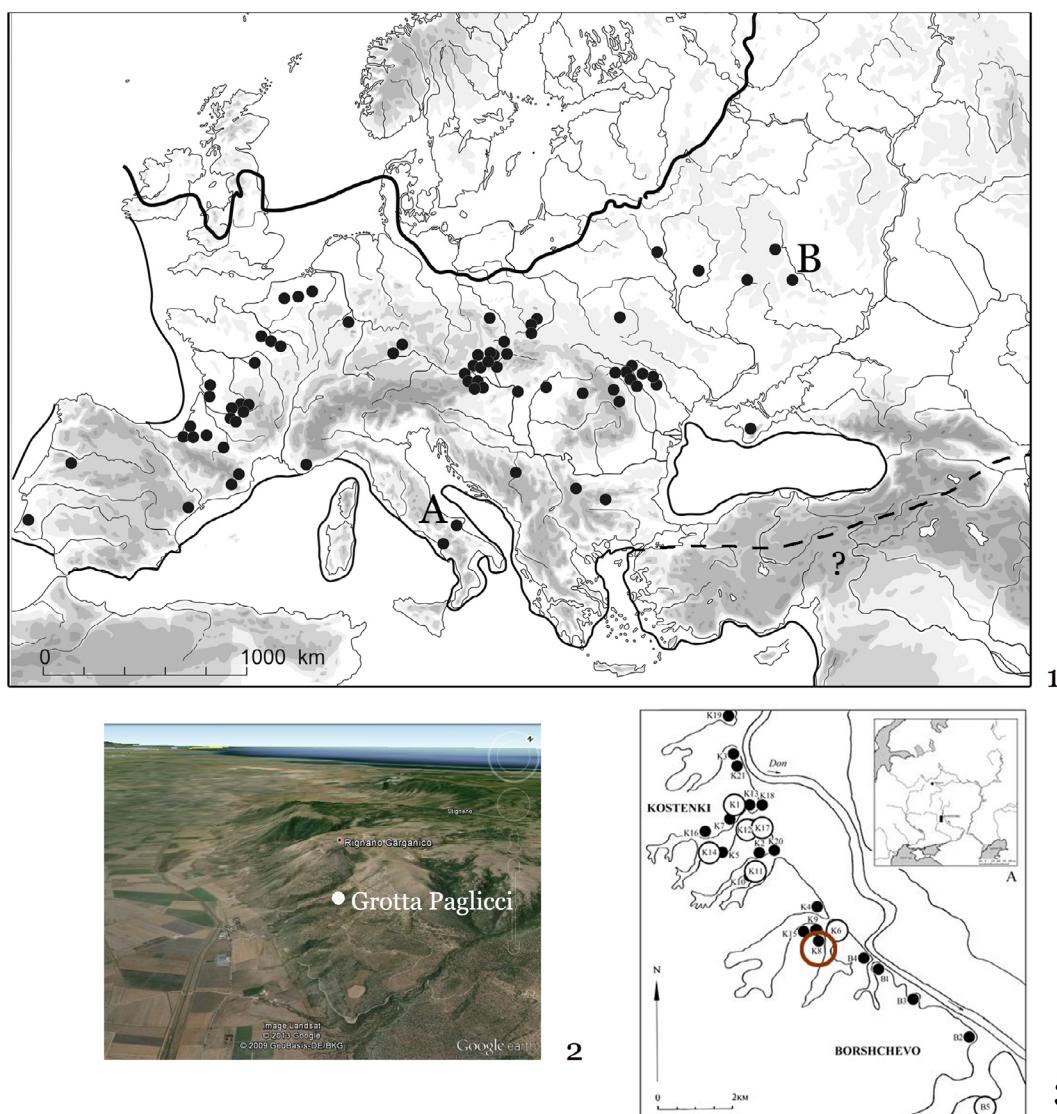
**Keywords:** backed tools, armatures, hunting strategies, Gravettian

## 1 Introduction

The term “Gravettian” is used to define a history of approximately 10,000 years across an immense territory, spreading from Portugal to the Russian plain, and embracing different ecosystems, different populations, changes, contacts, insulation, spread of ideas, synchronic variations, and convergences. The Gravettian is defined as a cultural phase, a technoculture, if we want to use this neologism (Penley & Ross, 1991). It is defined through time (beginning about 30,000 BP), space (Europe – fig. 1.1), stone tools innovations linked to hunting (backed tools), a common symbolic thought as pointed out by burial grave goods, ornaments, and portable art such as the renowned Venus figurines (Palma di Cesnola, 1993; Palma di Cesnola, 1998; Soffer & Praslov, 1993; Djindjian & Bosselin, 1994; Mussi, 2000; Oliva, 2005; Svoboda, 2007; Moreau, 2012; Otte, 2013; Sinitsyn, 2007; Kozłowski, 1986; Kozłowski, 2015).

Around 30,000 years BP we witness a change in the lithic weaponry, a transformation in fixing and launch features led to an increasing performance of hunting weapons. The emphasis in highlighting the changes in the backed tools is partly due to the hegemony of the studies on lithic materials, given that bone points too (albeit often very scarce) undergo to a change in this period: these are flat and with split base not anymore, but thicker, lozangic and apparently more resistant.

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**Figure 1.** 1) Map of the Gravettian distribution in Europe and principal sites (Modified from Kozłowski, 2015) A: Grotta Paglicci, B: Kostenki. 2) Location of Grotta Paglicci (font: Google Earth). 3) Distribution of sites in the Kostenki–Borschchevo area (from Sinitsyn, 2015, p. 163, fig. 1).

The Gravettian period follows the Aurignacian and precedes, in an undefined time, other less characterized and maybe more geographically fragmented cultural phases (Solutrean, Epigravettian, Magdalenian). Chronologically, Central Europe, around the Danubian region (Svoboda, 2007; Moreau, 2012), has been proposed to be the focus of this culture, which would have then spread westward; however, the boundaries and the times of expansion to the east and south are unclear.

This article focuses on the variability of hunting weapons and on the concept of unity of the Gravettian, drawing inspiration from a particular well-known literature similarity between the backed points of two Early Gravettian assemblages which are separated geographically from each other: Grotta Paglicci (level 23–22) in Italy, and Kostenki 8 (layer II) in Russia. The idea to compare the backed tools of the two sites stems from the remarkable semblance between the two Gravettian assemblages, which has been noted by many authors (see Efimenko, 1956; Rogachev et al., 1982; Palma di Cesnola, 1993; Gambassini, 2007; Sinitsyn, 2007; Anikovich et al., 2008). The assemblage of Kostenki 8 has been defined as “Grimaldian” or

“Mediterranean-type Gravettian” (Efimenko, 1960; Sinitsyn, 2007) and Palma di Cesnola (1993) described a cultural affinity generally between Paglicci and Kostenki 8. These are one of the most eastern and one the most southern Gravettian sites; according to Google Maps, the distance between the two is 2,667 km: requiring 514 hours (more or less 3 months) to travel by foot, taking into account a shortcut through the Adriatic plane.

The question for this analysis is: are the backed tools of the two sites really resemble each other? Should this be the case: what is the meaning of this similarity, a proof of contacts between these populations, a proof of the unitary – and so of the existence itself – of the huge cultural area called Gravettian?

## 2 Methodological Approach

The starting premise of this study is that Gravettian backed tools are, with few exceptions, components of hunting weapons, or better armatures designed to enhance spear/arrows to be thrown by hand or with the help of a throwing weapon (bow or spear-thrower) for long-range hunting.

This premise arises from four considerations:

1. We have limited archaeological evidence (mostly recovered in the north eastern Europe) of backed tools mounted in bone shafts (Nuzhniy, 1989; Skakun & Terekhina, 2016);
2. The standardisation in the morphometry of backed tools is very high, denoting a careful ballistic research;
3. Use wear studies, which are able to demonstrate an alternative use for Upper Palaeolithic backed tools, are not sufficiently documented (Lemorini & Rossetti, 1998/1999; Donahue, 1988; Derndarsky, 2003) and do not take into account the notion that arrows can be reused or used in the first phases of evisceration of the preys (Coon, 1971);
4. From a behavioural perspective, hunting is a very serious activity that during the Gravettian does not take place with the first available object: the interchangeability of every stone tools is in this cultural phase is very low, and apart from rare cases (backed tools with atypical morphologies – see Borgia, 2006), an opportunistic use of lithic or bone well standardized tools has never been documented.

The above considerations are valid for the Upper Palaeolithic backed tools.

In the proposed methodological approach, the analysis of this category of instruments is not carried out to create a precise description of the morphologies and their attribution to a type, but rather to identify the *chaîne opératoire* which begins with the aim of tool production and concludes with the abandon of the tool itself after the usage. The analysis is performed in the belief that information regarding the use of prehistoric utensils can be obtained not only from the traces of their use, but also from the method of manufacture (Montoya, 2002; Borgia, 2006; Borgia, 2008). In this view, the study of the backed tools, and therefore the Palaeolithic hunting weapons, should consider every aspect and every possible data obtainable from the archaeological context, from the comparison with other contexts, and from the ethnographic world (fig. 2).

Typological and technological data on backed tools are the foundation: the standardisation features of the retouch are a fundamental element that will give us the first information about the function of the pieces. Moreover, typology offers the opportunity to compare the lithic armatures with the universal language of the retouch description, and can make more evident the functional features of the armatures. The analysis of impact fractures, in this context, is not anymore at the base of every functional evaluations, but it is just a datum that should be considered statistically and only among other data. The classification scheme for the analysis of lithic point impact fractures is based on the position of the two principal types of complementary fracture, “cone” and “bending” (convex/concave, en languette/en plume – Perpère, 2000) which are formed at the moment of impact and tend to have a complementary disposition (fig. 3) (Fischer et al., 1984; Geneste & Plisson, 1989; Soriano, 1998; Perpère, 2000; Borgia, 2008; Duches, 2012, Sano & Oba, 2015).

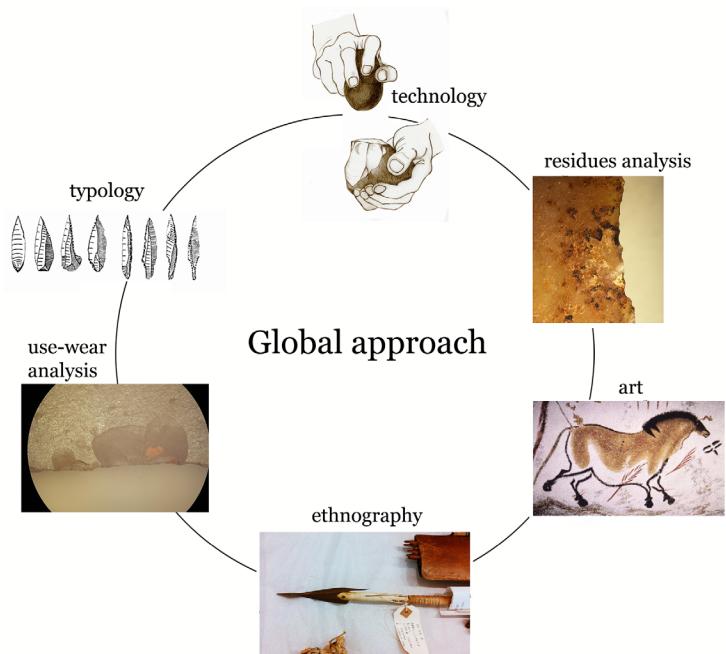


Figure 2. Methodological “global” approach proposed for the analysis of the hunting weapons.

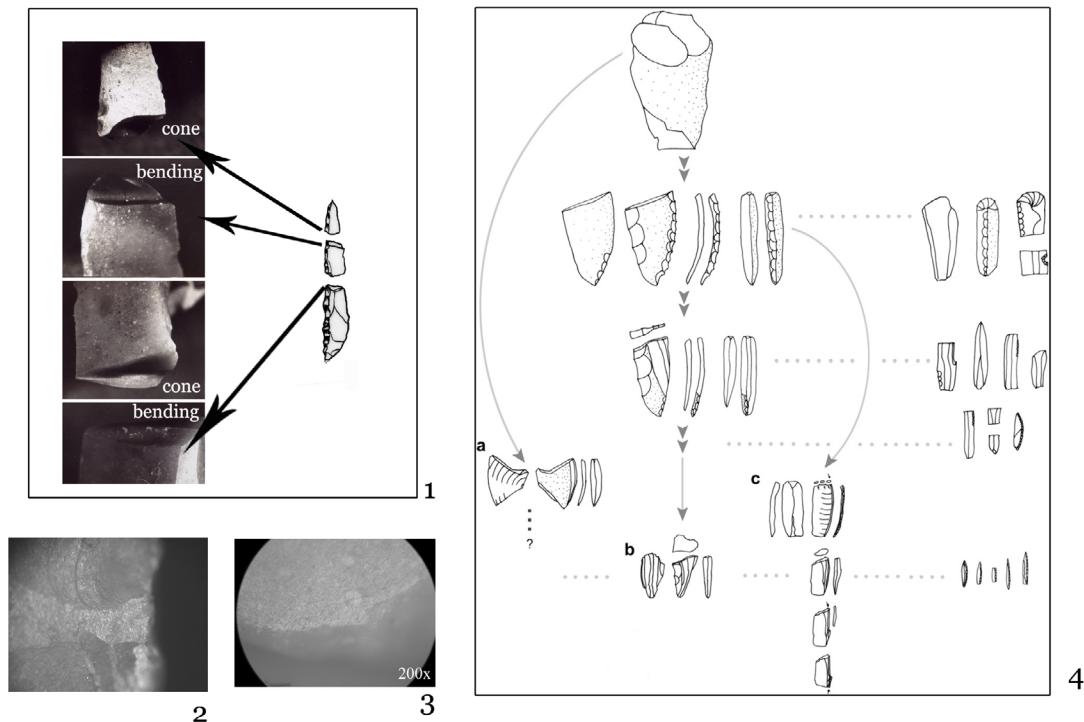


Figure 3. 1) Mutual position of bending and cone fracture after an impact (Borgia, 2006), a:cone/languette; b: bending/plume. 2) Microwear on the lateral edge of an experimental point hafted laterally (Borgia, 2008). 3) Microwear on the proximal part of an archaeological backed point. 4) *Chaîne opératoire* of Paglicci layer 23 (Wierer, 2013, fig. 31, p. 245), a: small blades on thick preparation flakes, b: integrated blade-bladelets production c: bladelet production on thick blanks (burin cores).

Use wear analysis, also at low magnification, can be extremely important to identify recurrent traces due to the hafting or to distinguish armatures from tools used with a completely different purpose; there are, however, many criticism in the use of this methodology, mainly based on a terminology not shared by all scholars and a consequent confusion that was generated (Rots & Plisson, 2014; Coppe & Rots, 2017).

In this approach the study of hunting weapons is therefore 'global': the lithic armatures cannot be separated from all the other aspects of the same context (the rest of the lithic assemblage, the bone tools, environmental data, faunal remains, and artistic objects) and from all possible knowledge on the past and modern hunting techniques.

### 3 The Archeological Cases

#### 3.1 Grotta Paglicci Layers 23–22

Layers 23 and 22 are part of the very rich Upper Palaeolithic series of Paglicci cave (Rignano Garganico, Foggia, Italy). These layers are dated between  $28,100 \pm 400$  BP (layer 23 A) and  $26,800 \pm 300$  BP uncalibrated (layer 22B – Palma di Cesnola, 2005) and have been culturally attributed to the most ancient phase of the Italian Gravettian, called "with backed tools" (Palma di Cesnola, 1993) assimilable to the "*Gravettien indifferencie*" proposed by Georges Laplace (1966). Coeval Italian assemblages are Riparo Mochi layer D levels f3.6 (Laplace, 1978), Grotta del Broion, Rio Secco (De Stefani et al., 2005; Talamo et al., 2014) and, in southern Italy, Grotta della Cala layer Beta II (Boscato et al., 1997), as well as Grotta della Calanca layer B (Bachechi & Revedin, 1993). All of the materials coming from the layer 23 and 22 of the cave were stored at the University of Siena (Italy), Department of Physical Sciences, Earth and Environment.

In regards to the faunal remains, the dominant evidence for mammals are aurochs (*Bos primigenius*) and horses (*Equus ferus*). Another highly represented animal is the ibex, even if its presence is linked to climatic fluctuations (Boscato, 2007).

The lithic assemblage is very rich, consisting in 2000 retouched tools (of which 1191 represented by backed tools) and thousands of non-retouched elements and production wastes. The raw material is a flint of outstanding quality, sources for which are available at a short distance from the cave (Wierer, 2013). Bladelets used for the armatures are the result of two modes of exploitation: the first is the progressive reduction of cores for blades, ending up in the production of bladelets. The second is the use of flakes, "burin-cores" to extract a limited number of bladelets (fig. 3.4; Borgia et al., 2011; Wierer, 2013).

The backed points are considerably variable in length (16 mm to 72 mm) whilst width (5 mm) and thickness (2–3 mm) appear homogeneous (fig. 4.1). The longitudinal profile is rectilinear or slightly concave.

There are 80 intact pieces, which consists of only 6% of the assemblage. Mesial fragments number 342 (representing a quarter of the backed tools), a portion of which is certainly formed by elements broken on purpose (lateral elements, see fig. 5.1b).

The backed retouch is quite homogeneous in the pieces of Paglicci and a secondary flat inverse retouch is often visible on the base. Two morphologies of backed points can be identified, both of which can have a truncated base (fig. 5.2c):

1. bipoints with a non-retouched (cutting) edge and a section in the shape of a right-angled triangle. In these pieces it is hard to distinguish a (functional) distal or proximal part. Nonetheless is sometimes noticeable a proximal part (base), which feature can be to less pointed (more rounded) and with flat inverse retouch (fig. 5.2a);
2. double backed points (less frequent), without cutting edge and with a section in the shape of an equilateral triangle. Impact fractures are indeed more frequent among these elements, highlighting the possibility that those last points were hafted as apical/projectiles (fig. 5.2b).



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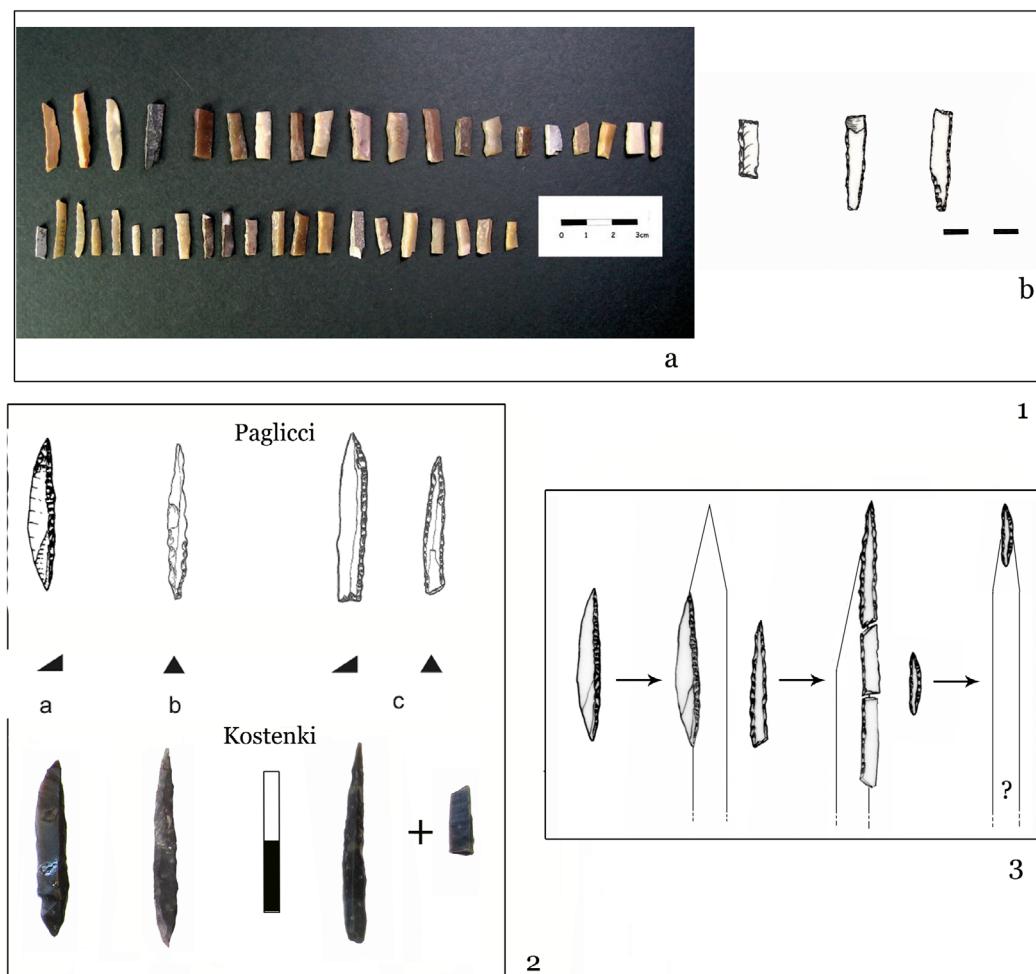


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**Figure 4.** Backed points of 1) Grotta Paglicci (layer 22f – ph. V. Borgia) and 2) Kostenki 8 (layer II – ph. V. Borgia).

Microwear analysis has shown wear traces on 15% of the entire points. Polish and linear features are generally very feeble and not diagnostic. These are located exclusively on the lateral not retouched edges, or on the basal part of some truncated points (fig. 3.2, Borgia, 2006).

Another morphology of armature are the rectangular backed blades, obtained by means of fractures, which have always been mistaken for fractured pieces. These are intentional tools, as shown by some piece where the transversal fracture is retouched (Borgia, 2006; fig. 5.1b).



**Figure 5.** 1) Paglicci rectangular (lateral) pieces: a) fractured and b) entire pieces; as demonstrated by the retouch on transversal edges, these are intentional tools. 2) Paglicci and Kostenki assimilable morphologies: a) bipoint with rectilinear backed edge and convex not retouched edge; b) double backed bipoint and equilateral triangle section; c) points with one or both backed edges with truncated base. 3) Hypothesis of different hafting for the different armatures of Paglicci (Borgia, 2008).

### 3.2 Kostenki 8 layer II

The site of Kostenki 8 (Tel'manskaia) is located on the side of the river Don, in the Voronezh region (fig. 1). The area of Kostenki–Borshchevo include 26 Upper Palaeolithic sites (fig. 1.3) representing an extremely important Palaeolithic area.

This site contains five cultural layers (Rogachev, 1951). The latest radiocarbon dates for layer II is  $27,670 \pm 270$  14C BP uncalibrated (OxA-30198; Reynolds, 2014; Sinitsyn & Hoffecker, 2006).

The assemblage has been described as Early Gravettian (Djindjian et al., 1999; Otte & Noiret, 2002; Sinitsyn, 2007; Moreau, 2010) or “Gravettoid” (Anikovich et al., 2008 cited in Reynolds, 2014). Local comparisons for the assembly of layer II are absent and this horizon is by now the most ancient evidence of Gravettian in Eastern Europe (Sinitsyn, 2015).

Faunal remains include animals exploited for food, such as auroch, horse, mammoth, reindeer, woolly rhino, red deer, megaloceros, various birds and fish, and also other animals for their fur, as hares, arctic fox and wolves (Vereshchagin & Kuzmina, 1977, p. 104, cited in Reynolds, 2014).

The lithic assemblage is stored at the Institute for the History of the Material Culture of Saint Petersburg, and partly at the Kustkamera Museum of Anthropology and Ethnography. The assemblage consists of

around 23,000 pieces, of which 2100 are retouched (Litovcheko, 1969; Praslov & Rogachev, 1982). About 900 backed bladelets have been counted in a study of the original assemblage from the 1937–1964 excavations (Litovchenko, 1969 cited in Sinitsyn 2015). The lithic assemblage comprises all types of Upper Palaeolithic including a very large numbers (around 500) of burins/burins cores.

The cores number 20, both unipolar and bipolar (Sinitsyn, 2015; Anikovich et al., 2008, p. 130 cited in Reynolds, 2014). This number of cores does not take into account the huge number of burin-cores, without any doubt largely used to produce bladelets for backed tools.

A part of burins shows clear preparation platform and multiple removal scars and the blanks have the characteristic 90 angle to one or more faces meeting the ventral face (Reynolds 2014, p. 131). In addition, a huge number of not retouched burin spalls have been found.

The raw material used to manufacture backed tools, and for the whole assemblage, is a fine quality flint. It is not clear where the raw material procurement occurred, but the large size of most of the tools (not backed tools), and the incredible richness of the assemblage, lead us to think that the supply of the raw material did not constitute a problem. Among the backed points (fig. 4.2), the intact pieces are numerous (19%) and proximal fragments (36%) are dominant on distal fragments (19%) (Reynolds, 2014, p. 119), as noted in many Gravettian complexes, though not at Paglicci, where distal fragments (27.2%) are dominant over proximal (16.6% see Borgia, 2008). It is important to highlight that in both sites the majority of material is represented by bipoints; to distinguish between proximal and distal fragments is therefore very difficult and the data are indicative. Mesial fragments are 12% of the assemblage (Reynolds, 2014), a part of which shows standardized dimensions, leading us to think about a category of rectangular lateral elements (fig. 5.1). The variability amongst the backed points dimension is very high (from 13 mm to 47 mm) while width (4 mm) and thickness (2–3 mm) are more controlled (Reynolds, 2014). The points are mainly bi-pointed, but a difference between apex and base of the tool is sometimes recognizable.

Regarding the morphology of the armatures, the variability present in Kostenki can be described as follow:

1. bipoints with the backed edge opposite to a not retouched (cutting) edge and section of right-angled triangle (fig. 5.2a). Often a base is very well recognizable in these pieces, and a recurrent type has the retouch of the base, direct or inverse, forming a 45 degrees angle with the backed edge (fig. 6.1);
2. bipoints with a section of equilateral triangle. The width of these tools can be very small, to the point of reaching a needle-like shape. The base can be truncated (fig. 5.2b, c);
3. very small and narrow points (nanogravettes) clearly obtained from burin spalls;
4. rectangular pieces with standardized dimensions.

## 4 Results

The backed tools of two Gravettian complexes of Grotta Paglicci (layer 23–22) and Kostenki 8 (layer II) shows a series of similarities and differences summarized in the table below (table 1).

The main issue rising from the comparison of the two assemblages is the technological provenance of the backed tools, as in Kostenki 8 an extensive technological study is missing and the number of cores is scarce. We can confirm that at both sites there are at least two ways of production of the bladelets subsequently retouched, but certainly in Kostenki the use of burin like cores is more extensive.

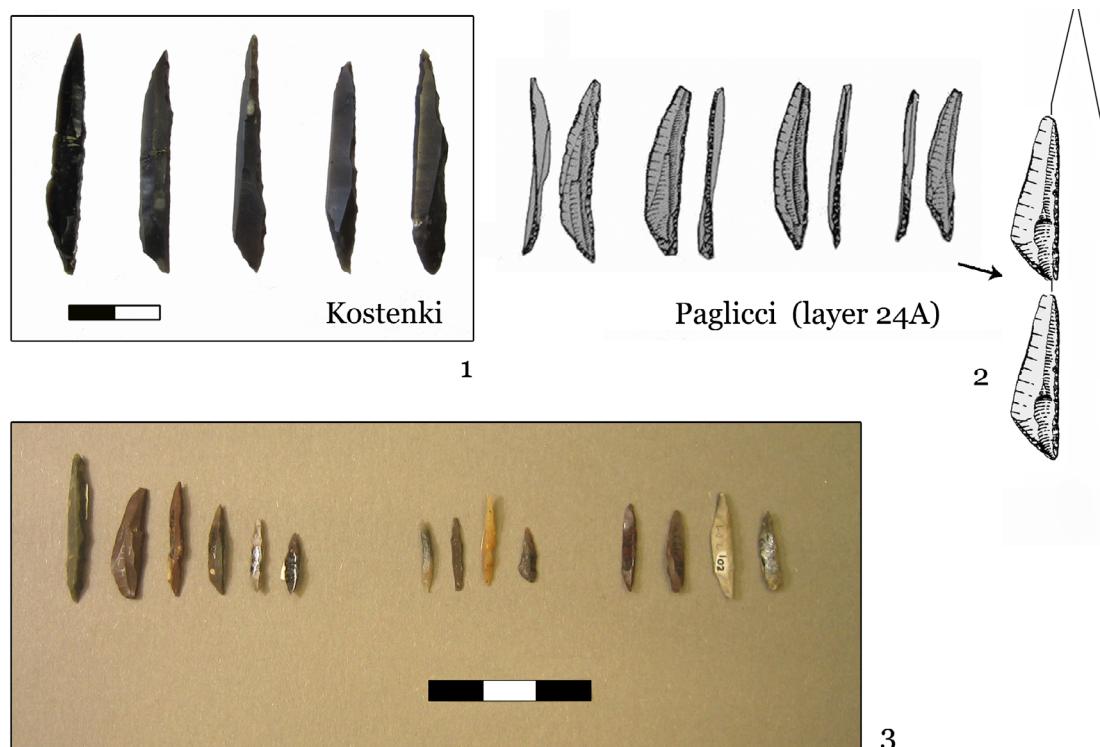
A number of armatures morphologies, like the points with non-retouched edge, the bipoints with or without truncated base, and the rectangular pieces, are totally assimilable in the two sites (fig. 7). In Kostenki the retouch is often more opportunistic and not well finished, and largeness of the pieces is smaller. A very common morphology of points (fig. 6.1) has a 45° angled base and recalls the Aurignacian marginal backed bladelets of Grotta Paglicci layer 24A1 (fig. 6.2; Borgia, 2008).

In Kostenki the backed tools variety is surely richer, including very narrow nanogravettes not common in Grotta Paglicci (but, interestingly, in a more recent Italian Gravettian site, Grotta della Cala (fig. 6.3, see Borgia & Wierer, 2005) dated  $25,720 \pm 240$  uncalibrated, and located on the opposite slope of Apennines than Paglicci).

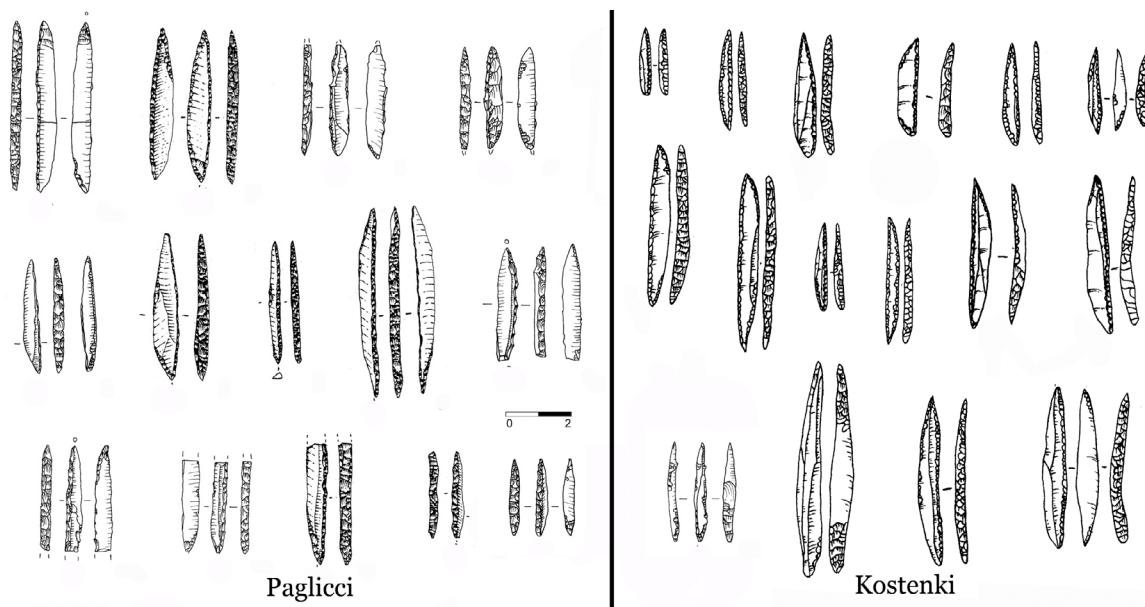
**Table 1.** Comparison between the backed tools of Paglicci (23–22) and Kostenki 8 (II).

Paglicci	Similarities	Kostenki
Local procurement	Good quality raw material	Procurement not known
Bifurcation of the <i>chaînes opératoires</i> for the production of bladelets	At least two different <i>chaînes opératoires</i> for the production of the blanks	Insufficient data Massive use of burin like cores
	Rectilinear profile of the blanks (Paglicci 66.5% Kostenki 70%)	
Backed points larger	Variability in dimension (length)	Backed points more narrow
Backed edge more standardized	Backed retouch and secondary retouch of every kind, opportunistic use of every single surface.	Backed edge not always well finished. Angled base.
Less variability	Overlapping typologies of backed tools	More variability (needle like points, small dimension microliths)
	Rectangular pieces	

Data on use-wear are scarce (for Paglicci, see Borgia, 2006), or inexistent (for Kostenki). The study of the impact fractures on the backed armatures of Paglicci (Borgia, 2006) did not allow any clear conclusion: a high percentage (from 30 to 40%) of fragments have fractures that can be related to impact (cone fractures on the proximal part of apical fragments or bending fracture on the distal part of proximal fragments), but these fractures can be also the result of post-depositional events and we are not able to say that 30–40% of the armatures were actually used. Impact fractures on Upper Palaeolithic armatures are, after all, a very debated question, (Rots & Plisson, 2014, Coppe & Rots, 2017).



**Figure 6.** 1) Kostenki recurrent backed points with rectilinear backed edge opposite to a not retouched edge and angled base (ph. V. Borgia). 2) Aurignacian marginal backed bladelets from Paglicci layer 24 A1 with angled base (Palma di Cesnola, 2005 the radiometric date of layer 24A1 is  $29,300 \pm 600$  BP uncal.) and hypothesis of hafting for these tools (Borgia & Ranaldo, 2009). 3) Small backed points of Grotta della Cala, layer GL11 dated  $25720 \pm 240$  (OxA-6264 – ph. V. Borgia).



**Figure 7.** Backed points of Paglicci (Palma di Cesnola, 2005) and Kostenki 8 (Sinitsyn, 2015).

As for microwear, some polish has been detected on the materials from Paglicci; while the tools of Kostenki have not been analysed, but in both cases the conservation of the materials all together in small bags prevents us from considering any polish with confidence.

Apart from lithic tools, other data from the two sites are comparable.

Bone tools are very rare in both the assemblages. In Paglicci only 6 bone tools have been found in layers 23 and 22, including 3 (only one entire) defined as “needles” for their thinness (Borgia et al., 2016, fig.6, n.3). It is very unlikely that the above mentioned bone artefacts could be used as projectile points. In Kostenki 8 layer II osseous tools are rare, but include at least one ivory point, potentially used for a hunting purpose (Sinitsyn, 2012, p. 1349, fig. 7, n.7).

Ornaments and art objects are scarce in both the assemblages in analysis (Sinitsyn, 2012), although the artistic heritage of Paglicci cave and the other sites of Kostenki in general is very rich.

## 5 Discussion and Conclusions

The comparison between the backed tools of two coeval complexes which show a series of affinities is an excellent opportunity to 1) implement a global approach for the study of prehistoric societies, and 2) discuss on the methodologies of comparing materials.

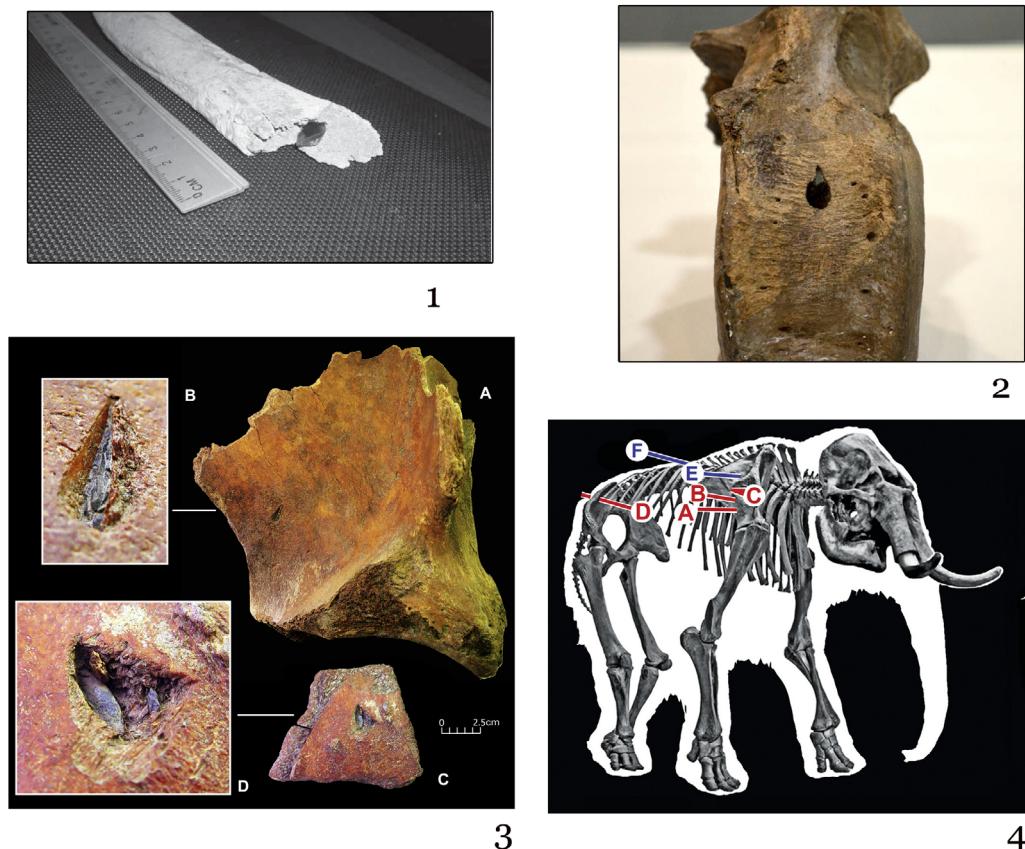
The similar backed points of Grotta Paglicci (layer 23–22) and Kostenki 8 (layer II) have been highlighted by multiple authors (Efimenko, 1956; Rogachev et al., 1982; Palma di Cesnola, 1993; Gambassini, 2007; Synitsin, 2007; Anikovich, 2005; Reynolds, 2014).

More generally, a cultural affinity between the two sites has been proposed (Gambassini, 2007), based on the backed tools, the presence of some Kostenki knives in Paglicci (now questioned – Klaric et al., 2015), the study on the DNA on one of the Paglicci burial (the young woman presents some characteristics that are more frequent in the Near East and Caucasus area rather than in the Western European area, see Caramelli et al., 2003) and in general on the artistic production.

A recent study on DNA (Posth et al., 2016) confirms that Gravettian people, from Kostenki to Pavlov to Paglicci, shared the same genetic heritage. We do not know to what extent, but certainly these populations shared a technological knowledge, hunting strategies, funerary practices (use of lithic grave goods, animal bones, ochre, ornaments), art and symbolic expressions.

The challenge is to find the extent and the boundaries of this community. Differences between the site of Paglicci and the one of Kostenki 8 are countless: Paglicci is a cave, close to the sea, the climate was always moderately tempered, hunted animals were aurochs and horses of the valley, ibex of the mountain behind the cave. Kostenki 8 is an open air site, close to a river, temperatures were surely very rigid, hunted animals were, amongst others, mammoths.

The presence/absence of mammoths is a circumstance to be discussed. So far, we are not able to determine whether dedicated weapons were used for the hunting of mammoths. For the hunting of such enormous animals wooden spears or traps could have been used, of which we have no records. The ivory points could have been used for mammoth hunting, it seems logical, but there is no direct evidence of mammoth hunted in this way. Hunting of mammoths using weapons armed with lithic armatures is conversely attested at least in three cases (fig. 8). At the site of Kostenki 1 (Nuzhny, 2016) a mammoth rib has been found with a fragmented flint point stuck on it (fig. 8.1). The point is bigger than the average Gravettian backed tools, the largeness being 16 mm. Backed points with those dimensions are very rare in the Mediterranean Gravettian. In Lugovskoe (Siberia – Zenin et al., 2006), part of a backed point is stuck in a vertebra (fig. 8.2). The damaged vertebra was dated directly and has an AMS age of  $13,465 \pm 50$  BP (Zenin et al., 2006). The point is embedded deeply, suggesting the use of a throwing weapon. Finally, in another Siberian site, Yana (Nikolskiy & Pitulko, 2013), a fragment of a flat convex siltstone, most likely a point (1.5 cm long, 0.15 mm cross section) was embedded in the right scapula of a mammoth, and, in another right scapula, fragments of another flat-convex point (1.1 cm long .0.5 cross section) were found with bone fragments (fig. 8.3). After all, an active hunting of mammoths has been proved by several indirect evidences (among the other Baryshnikov et al., 1999; Germonpré et al., 2008; Kufel-Diakowska et al., 2016), and indeed lithic armatures were used to kill those animals.



**Figure 8.** Examples of lithic points embedded in mammoth bones: 1) Kostenki 1 (Nuzhny et al., 2014), Lugovskoe (Zenin et al., 2006), Yana (Nikolskiy & Pitulko, 2013). Location of the injuries on the mammoth skeleton (modified from Nikolskiy & Pitulko, 2013).

Nonetheless we do not see substantial differences in the arsenal of Paglicci and Kostenki (excluding the ivory point/points). In the two sites lithic tools for “domestic” use (Tartar et al., 2006) have the same typologies, with minor differences in the production methods, raw materials, morphologies and percentages.

Are the backed point similar in the two sites? Yes, in some case these are identical (fig. 7).

Is this due to a technological version of “convergent evolution”? No, why should we call in this way something that is just the same thing? Still, it is perhaps necessary to see the question from another point of view. Are backed tools the right indicator to demonstrate that different groups belong to the same culture? Or, if we go over: “Can *any* discipline determine regional trends reflecting the ethno-linguistic and genetic diversity of these populations?” (Vanhaeren & d’Errico, 2006).

First of all, it is necessary to point out that in the Gravettian age people produced the same lithic instruments and they have also proved cultural contacts (similar beliefs, lithic and bone technology, art, and maybe language) in the long distance, but with this statement we are flattening together thousands of years: single horizons, as for example Paglicci layer 23, do not contain all the information on the Gravettian culture; in that layer there are not art objects nor burials. There are different aspects, therefore, that can be contrasted: “culture is more than the sum of its components” (Sinitzyn, 2013). Apparently in Kostenki there is a wider range of lithic armatures compared to Paglicci, linked maybe to different weapons. This bigger arsenal can be due to a higher demographic density, or a range of different preys (which is demonstrated from the faunal remains). Within this arsenal, most of the lithic points are identical to the ones of Paglicci.

One might conclude that similar weapons seem to be adapted to hunt different animals in different environments, underlining a certain adaptability of the hunting strategies. The fact that similar weapons have been used in such varied ecosystems does nothing but highlight that boundaries of people sharing a “Gravettian” culture were very large and did include the two sites.

To try to give an explanation of such observation, the demography should be indeed more considered in the studies on prehistoric populations. Recent studies (above all: Maier et al., 2016) stated that in the Gravettian period the density of population in Europe ranged from 2,7 to 0,1 persons per 100km<sup>2</sup>. Considering Europe 10.000.000 km<sup>2</sup> (without subtracting the inaccessible parts covered with ice), from 20,000 to 270,000 people were living in Europe. This means that the inhabitants of a small town were spread in the whole Europe. This datum should lead us to reconsider our concept of spread of ideas in such an empty territory, reevaluating possibly the physical contacts between people.

After all, even without considering the possibility of intermediate/exchange settlements between the two sites, the 2.700 km that separate Paglicci from Kostenki are not an unbridgeable distance. The Pacific Crest Trail, in the USA, is a long path of 4,500 km and trekkers usually complete it in one year. Even considering a lack of understanding of the Palaeolithic palimpsests, all data suggest homogeneity in the Gravettian age.

New genetics data (Seguin-Orlando et al., 2014; Fu et al., 2013) suggest continuity in the European population in the Early upper Palaeolithic: from 37,000 years BP all the European individuals share ancestry with present day individuals of Europe and the massive movements of people in Europe providing genes previously thought are not anymore considered as a real scenario. Data advance the existence of a metapopulation in Europe, exchanging genes (and culture) with each other.

Many questions remain open, and the complexity of the Gravettian could not be examined in its entirety within the limited size of this short article. Certainly we have to bear in mind that

*treating NASTIES (Named stone tool industries=Gravettian) as proxies from meaningful groupings of humans requires one to assume that the relationship between prehistoric social identities and material cultures was less complex and variable than what we see in the world around us today, in history, and in the more recent prehistoric past* (Shea, 2014).

In the near future, the application of archaeological science methodologies as isotopes analysis and proteomics on bone tools and faunal remains, data on human and animal DNA, data on the circulation of raw materials (geochemical source of materials) and on the reconstruction of the hunting strategies through the analysis of residues, will certainly open new hypotheses and new bases for a better informed debate.

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