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Is it still appropriate to talk about the Gravettian? Data from lithic industries in Western Europe

Damien Pesesse

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Is it still appropriate to talk about the Gravettian? Data from lithic industries in Western Europe

Ist der Begriff des „Gravettien“ noch relevant? Kritische Anmerkungen anhand von Untersuchungen zu lithischen Inventaren aus Westeuropa

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ABSTRACT - There appears to be a general consensus as to the validity of naming all the complexes after the Aurignacian and preceding the Solutrean or the Epigravettian as "Gravettian". However, this term encompasses different assumptions and the definition of the Gravettian varies widely depending on the author, the region or the research theme. For those who study lithic industry, funerary traditions or feminine representations, the limits of the Gravettian are very different. In addition, these data sets all have their own distinct meaning, leading to different interpretations from a geographical or a chronological point of view. It is thus pertinent to question the appropriateness of the term Gravettian to group together all these different complexes. This paper elucidates the validity of this term through the study of lithic technical systems from complexes in Western Europe and particularly in France, where there is an abundance of sites and a widespread diversity. In the article, it is shown that the technical systems in complexes ascribed to the Gravettian are characterized by a marked diversity, and that it makes no sense to interpret this diversity as a representation of a variability within one and the same entity, the Gravettian. Instead, it appears more appropriate to discern features which associate these complexes with the Gravettian in order to gain a better understanding of the underlying historic dynamics. It is important to recall the artificial nature of this taxonomical framework, and thus to focus on defining the inferred correlations between these complexes. At present, apart from the occurrence of Gravettian points in most of the assemblages, no clear evolutionary processes have been demonstrated between the different elements attributed to the Gravettian.

ZUSAMMENFASSUNG - Es besteht ein breiter Konsens darüber, Inventare als „Gravettien“ zu klassifizieren, die nach dem Aurignacien und vor dem Epigravettien oder Solutréen datieren. Die Kriterien für eine Einordnung als Gravettien variieren jedoch je nach Autor, Region und Forschungsthema. Je nachdem, ob Stein- oder Knochengерäte, die weiblichen Darstellungen oder der Grabbruch im Vordergrund der Untersuchungen stehen, variieren die geografischen und chronologischen Abgrenzungen gegen andere Industrien beträchtlich.

Insbesondere in Frankreich hat sich der Terminus des Gravettien spät durchgesetzt, weil die definierenden Elemente dort nur selten vorkommen. Stattdessen wurden eigene Bezeichnungen wie das Bayacien, Fontirobertien, Noaillien, Rayssien, Laugérien oder Protomagdalénien eingeführt. In dem vorliegenden Artikel werden die Ergebnisse von Untersuchungen an Steingeräteinventaren aus Westeuropa und speziell aus Frankreich vorgestellt, bei denen sich zeigt, dass sowohl die typologische Varianz als auch die Bandbreite der Techniken zur Herstellung der Steinwerkzeuge in der Tat sehr vielfältig sind. Diese Vielfalt übersteigt bei weitem solche, die innerhalb und zwischen den anderen Kulturkomplexen des Jungpaläolithikums akzeptiert werden. Im zweiten Teil des Artikels wird eine neue Seriation für Inventare aus Südwestfrankreich und dem Norden der Region Aquitaine vorgestellt. Es stellt sich heraus, dass selbst das Vorliegen von Gravettespitzen variabel ist. Im Übrigen ist die Gravettespitze eine Werkzeugklasse, die sich in mehrere Typen mit unterschiedlichen chronologischen Laufzeiten aufteilt. Weil die Typen nicht dieselben funktionellen Eigenschaften haben, ist die Gravettespitze, wie der Begriff des Gravettien, lediglich auf einem verhältnismäßig hohen Abstraktionsniveau relevant, das vor allem von den Essentialisten akzeptiert wird.

KEYWORDS - Upper Palaeolithic, material culture, technological studies, essentialism
Jungpaläolithikum, materielle Kultur, Steintechnologie, Essentialismus

Introduction

Given the diversity of the various technical features of the Gravettian, it is difficult to grasp a global

understanding of this period. Although certain rare elements are common to some of these sites, each complex remains inimitable. It is hazardous to merely take account of exceptional characteristics, which only

*corresponding author

concern a minority of the sites, given the mass of data available. The gaping breach between the rare common denominators and the overwhelming majority of data that tend to break away, disconnect and thus lead us to question this “Gravettian entity” is constant.

In different contexts, the relevance of this taxonomic classification has been called into question: for the Acheulean (Nicoud 2013), the Mousterian (Shea 2014), the Aurignacian (Clark & Riel-Salvatore 2006a; Goring-Morris & Belfer-Cohen 2006; Teyssandier & Loliolios 2008), the Gravettian (De la Peña Alonso 2009, 2012; Pesesse 2013), or at a less global level of classification for the Belloisian (Valentin 2008; Naudinot 2013 among others). The possibility of calling into question this taxonomic level is thus relatively independent of the chronological periods considered and the type of documentation. It is also part of different intellectual traditions, although the limits of these are not clear (Clark 2002). Some of them call into question preconceptions and the operability of classifications, whereas others question them in hindsight, as in the scope of this publication. Considering the vast quantity of available information, we will only broach this question through the prism of the lithic technical system. The interpretations of these objects highlight the diversity of the criteria used to designate the Gravettian, without having to include other categories of objects.

A historiographical heritage governed the attribution of sites to the Gravettian and the basis of these attributions is thus different depending on the region, the authors and the nature of the archaeological records (De la Peña Alonso 2012). The study of the evolution of lithic objects presents an opportunity to reassess the basis of these attributions. It is therefore reasonable to ask whether it is still appropriate to ascribe all of these assemblages to the Gravettian. In this paper, we question the validity of this term for addressing the evolution of lithic technical systems from complexes in Western Europe and particularly in France, where there are abundant sites and widespread diversity (Fig. 1). We present the marked diversity of technical systems in complexes ascribed to the Gravettian. It is important to recall the artificial nature of this taxonomical framework, and thus to focus on defining the inferred correlations between these complexes.

Indeed, studies of the Gravettian have systematically been faced with the same problem as significant differences between the assemblages were recognized very early on. How was it possible to assess and explain this diversity? Replies to this question have varied widely. One of the responses to this problem is the Perigordian model (Peyrony 1933, 1936, 1946). Generally speaking, in different European regions, assemblages were ascribed to the Gravettian because

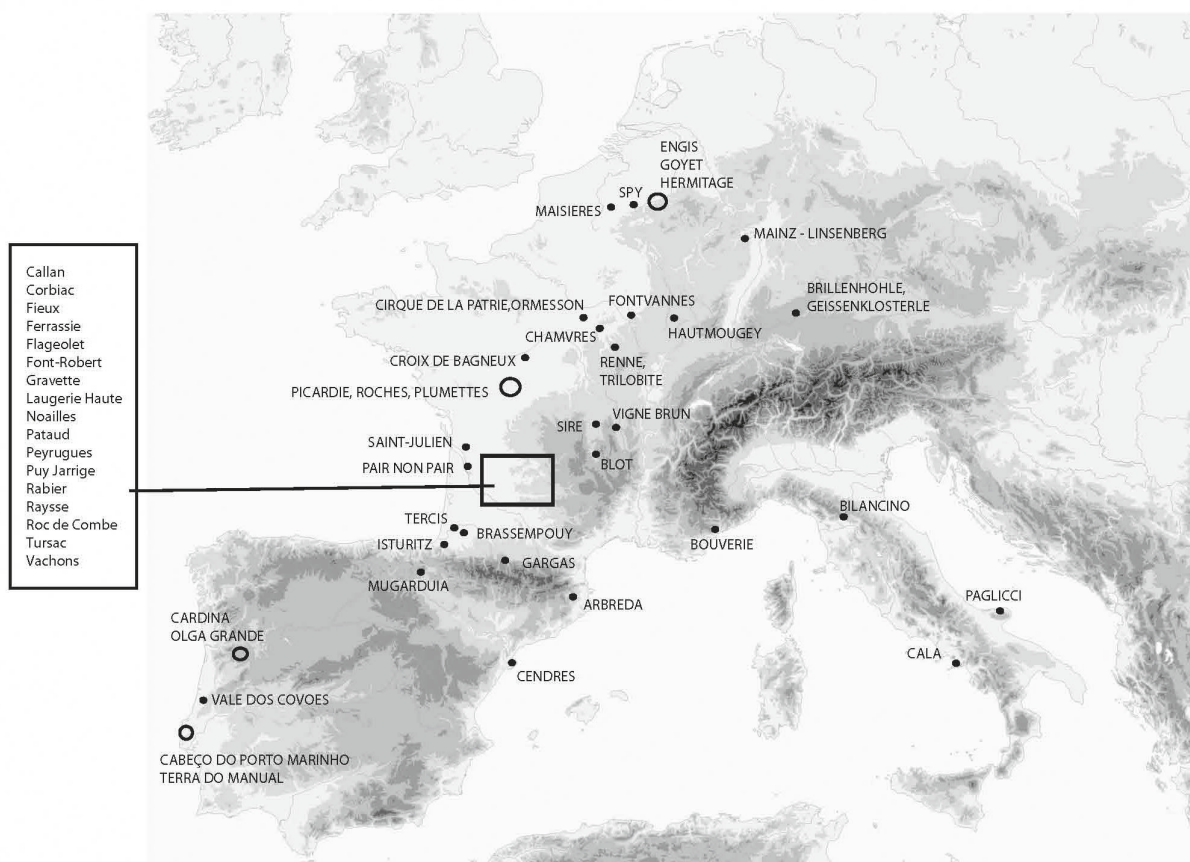


Fig. 1. Sites mentioned.

Abb. 1. Im Text erwähnte Fundplätze.

they were different from underlying Aurignacian assemblages and not because they presented their own perceptible characteristics. This diversity was later considered to be the manifestation of a polymorphism, a branching out (Sonneville-Bordes 1958), than an expression of different functional features (Rigaud 1988).

The persisting trend was to look for common traits in iconographic themes, spatial organization and funerary rites, whereas, paradoxically, lithic industry was considered to be a recurrent barrier to establishing any kind of monolithic image of this period on a wider scale. Indeed, the term "Gravettian" was suggested in 1938 (Garrod 1938), but was not widely used in France until the 1980s. Until the early 1990s, the terms "Gravettian" and "Perigordian" could coexist in the same publication (Delporte 1991). Some authors also played a central role in the diffusion of the French Gravettian terminology as they contributed to finding analogies among lithic industries in Europe (Otte 1981; Otte & Kozłowski 1982; Kozłowski 1989, 1991). Half a century was thus required to ratify the existence of the Gravettian. However harsh it may appear, it is irrefutable that this critical view of the recognition of the Gravettian between the 1930s and the 1980s is based on the archaeological record. And the underlying question remains unanswered: how can the diversity of the technical systems attributed to the Gravettian be explained? The development of technological studies in recent years has emphasized the importance of this question (Klaric 2003, 2007; Aubry et al. 2007; Klaric et al. 2009). The demonstration of this diversity is one of the main focuses of lithic analyses (e.g. Nuzhnyi 2009; Marreiros & Bicho 2013; Touzé et al. 2016; Wilczyński 2016).

Indeed, the wide geographical distribution and the duration of the Gravettian clearly reveal an implicit degree of abstraction in the use of this term and partly explain the development of a regionally based terminology. Moreover, the definition and the boundaries of this phenomenon vary, sometimes considerably, depending on the authors and the themes considered. At times, certain complexes from the Russian plain, such as the Sungirian or the Gorodsovian, are included in the Gravettian because of their funerary practices (Henry-Gambier 2008), and at others, the feminine statuettes from Malta are used to incorporate the banks of Lake Baikal in this supra-entity (Simonet 2014).

These differences reveal diverse research perspectives and different ways of addressing this complex. The Gravettian is either considered as a uniting cultural phenomenon with inherent fluctuations reflecting the "polymorphism" of human groups (Otte 2013), or else as an artificial analytical framework (De la Peña Alonso 2012), within which variations and characteristics need to be defined. Two distinctive approaches are thus demarcated, giving rise to different research aims and analytic levels, which tend

either to seek out common elements or else to emphasize distinctive criteria. These two perspectives also induce nuances in the interpretation of dating divergences, which are made to coincide with the regional context, and in the analysis of differences between archaeological complexes. In this way, as far as the lithic material is concerned, the presence of Gravettian points may justify regrouping all these entities under a single banner. However, when in-depth analyses involving the comparison of different sets of artefacts are carried out, the situation becomes a lot more complex. These industries are not all perfectly aligned behind the Gravettian point. The presence of this tool cannot feasibly link all these complexes together in a single "Gravettian cultural unit".

Various denominations have thus progressively emerged to account for a degree of alleged coherence between assemblages in certain western European regions: Protomagdalenian (Peyrony & Peyrony 1938), Bayacian (Lacorre 1960), Maisierian (Campbell 1980), Fontirobertian (Delporte 1983), Noaillian (David 1985), Rayssian (Bosselin & Djindjian 1994), Laugerie (Bosselin & Djindjian 1994) as well as in Central and Eastern Europe. It is important to point out that the meaning of these appellations varies greatly among those authors. At this level of observation, lithic industry therefore played a preponderant role in the identification of these entities.

Yet these distinctions were mainly based on several tool categories considered to be emblematic, without necessarily taking into account all of the technological characteristics of the assemblages. For a long time, the presence of a Noailles burin ratified the attribution of a complex to the Noaillian, that of a Font-Robert point to the Fontirobertian. But is it pertinent to base attributions on these criteria alone? Can we classify as Fontirobertian an assemblage with a fragment of a point in the same way as an assemblage with a hundred points?

The diversity of lithic technical systems is thus evident from a geographical point of view, from south Portugal to the Don Valley. This diversity is also visible from a diachronic viewpoint, but the subdivision of this period reveals a lot of areas of uncertainty. In France, this subdivision is mainly based on the presence of *fossiles directeurs*, most of which are lithic artefacts. However, these markers belong to very diverse records *a posteriori*: tools linked to working diverse materials (Noailles burin: Aranguren & Revedin 2001; Kildéa & Lang 2011; Morala 2011), projectiles (*fléchettes*: Perpère 1992), cores (Raysse burin: Klaric et al. 2002), tools with unknown (and possibly multi) functions (Font-Robert point). These different functions, statuses, aims, add to the heterogeneity of this seriation and explain why our understanding remained limited for so long. The comparative elements used until recently were difficult to compare, and thus led towards dead ends. For

example, the Raysse burin did not replace the Noailles burin as the former has been demonstrated to be a bladelet core, unlike the latter which is actually a real tool (see reference above and Djindjian & Bosselin 1994 versus Klaric 2003 for a review of this debate).

It is therefore interesting to observe how recently developed systemic approaches influence our understanding of the Gravettian and our interpretation of its different components. They also allow us to verify the validity of supposedly specific Gravettian characteristics. First of all, we will assess whether the production modes and raw material economy attributed to the Gravettian are really original. We will then tackle the role of Gravettian points and other projectiles in these complexes. Lastly, we will examine how arguments issued from the analysis of the lithic technical system are used to warrant (or not) a Gravettian designation, depending on the contexts. As the current state of research makes it impossible to provide a full, coherent and nuanced overview of lithic technical traditions, we will also present the breaches in our knowledge, which open up new avenues of research.

Are technical systems a binding aspect of the Gravettian?

Although typological differences tended to distinguish and separate Gravettian components (the facies), it was tempting to believe that studies concerning production modes would tend to reduce those gaps. Indeed, since the excavation of Corbiac, the predominant vision regarding the perception of blade production at that time was that the Gravettian was characterized by bipolar core debitage (Bordes 1968). This allowed the partisans of the Perigordian, led by F. Bordes, to reinforce the sought-after links between the Châtelperronian and the Gravettian. The systemic studies initiated during the 1990s (notably Lhomme & Connet 1992; Dartiguepeyrou 1995; Le Licon & Jesset 1996; Nespoulet 1996; Klaric 1999; Lang & Seara 1999; Le Mené 1999; without forgetting Chadelle 1983) and expanded during the 2000s (Lucas 2000; Digan 2001; Klaric 2003; Primault 2003; Foucher 2004; Pottier 2005; Leoz 2007; Pesesse 2008a; Simonet 2009), soon brought about the deconstruction of this other myth (Noiret 2011).

Today, the extreme diversity of the modes of production employed during the Gravettian is clear at all levels of the *chaîne opératoire*. The preparation of blocks can be total, partial or slight. Exploitation concerns wide or very narrow laminar surfaces, laterally well-defined or progressively invading the sides, sometimes making it possible to change surfaces during the course of production. Debitage is conducted in a unipolar way using different methods, notably by exploiting secant, successive or simultaneous surfaces. In the same way, when two opposed

striking platforms guide the production process, they can be preferential or equivalent, bipolar with alternating rapid or slow striking platforms... These processes vary considerably.

Moreover, this diversity is demonstrated in different ways from one assemblage to another. During certain phases of the Gravettian, production follows a highly specific sequence of actions. In this way, blade debitage during the Raysse burin phase only displays slight variation, in specific geological contexts (Klaric 2003). In complexes with Noailles burins, the situation is very different; several technical solutions are simultaneously developed for blade and laminar flake production (Klaric 2003, 2007; Pottier 2005; Simonet 2009). This diversity is also apparent in the choice of hammerstones: exclusive production with soft mineral or soft organic hammers, change of hammers for longer debitage sequences, use of different hammers for the same purpose (Nespoulet 1996; Digan 2001; Klaric 2003; Pesesse 2008a; Simonet 2009). This diversity of technical solutions is developed in the same way for bladelet production. It is thus difficult to discern binding elements in production modes and modalities. An extremely wide range of technical solutions is used at all levels of lithic production. Beyond the idea that the Gravette point should be the common goal for most of the industries, the technical modus differs widely. Therefore, there is no single Gravettian lithic technical system.

This ability to develop several technical responses to achieve the same purpose is recurrent throughout the Gravettian. A certain "flexibility" has been documented on a number of occasions as regards the processing of mineral or hard animal materials (Goutas 2004a, 2004b; Guillermin 2006; Pesesse 2008a; Simonet 2011b). This variety of expertise and knowledge of operating systems appears to play an important role in explaining the wide diversity of technical systems and their repeated evolution throughout time.

As far as overall objectives are concerned, a tendency towards lighter and straighter products has frequently been emphasized, even before the development of technological studies. But this is neither specific nor common to all the so-called Gravettian complexes. This objective is often correlated to the production of Gravettian points, organized differently depending on the number of projectiles. Indeed, a plurality of objectives can induce dissociation from production in different *chaînes opératoires*.

When projectiles are large in size, they can be included in the dominant laminar process, thereby channeling technical options. However, they do not necessarily represent specialized operative schemas, as they are not the unique aim of production. Other blanks for other tool types are produced simultaneously. In this case, they are made on the most calibrated pieces, often extracted from the centre of the laminar debitage surface.

Sometimes, the *chaîne opératoire* focuses on the elaboration of small projectiles, and is thus specialized. The production of small projectiles, even if they are the product of original schemas, often uses sub-products from a generally laminar *chaîne opératoire*. These differences in terms of schemas do not necessarily represent a total autonomy as far as the different spheres of activities are concerned. In several cases, the distinction between blade and bladelet does not appear relevant for transcribing the varied intentions (Klaric et al. 2009; Pesesse 2008a; Simonet 2009). Thus, a multitude of solutions can explain how these projectiles are integrated.

A Gravettian lithic economy?

These differences in production organization can reflect diverse ways of managing mineral resources. Different correlations are perceptible between raw materials and operative schemas, depending on the case in hand. For example, at les Fieux, the diverse objectives are imputed to specific raw materials (Chalard et al. 2006; Guillermin 2008), whereas at la Vigne Brun, different outcrops were exploited using identical operative schemas (Pesesse 2008a).

Naturally, production organization also responds to the fragmentation of *chaînes opératoires* in space and therefore in time. Raw materials may be transported as finished products or partially prepared blocks, and these two possibilities can be associated in the same assemblage. In the cases mentioned above, it is not so much the distance of the outcrops that conditions the way the resources are brought to the site, but rather production objectives (Chalard et al. 2006; Guillermin 2008) as well as the time factor (Pesesse 2008a). Indeed, the level of raw material depletion is not necessarily correlated to the distance separating the outcrop from the site.

This shows that neither outcrop distances nor transport modes can *a priori* be considered as factors limiting mobility. Moreover, it is possible to describe the impact of an unfavourable outcrop context on production methods (Klaric 2009), or raw material management in some cases, but also to demonstrate that it has little or no influence in others (Klaric et al. 2009). In this way, the considerable distance from raw material sources may explain the use of *percussion posée* at Cardina 1 in Portugal for microlithic production (Aubry et al. 2007); whereas large flakes, some of which were produced over 300 km from flint sources, were discarded at the site of Blot, which does not appear to be economical, considering the context (Masson 1981; Klaric et al. 2009; Surmely & Hays 2011). Actually, it seems clear that many solutions were developed during the "Gravettian" (Delvigne 2016). On this basis, it is problematic to identify a single "Gravettian lithic economy".

For a long time, increased mobility was considered to be part of Gravettian identity (Feblot-Augustins 1997).

However, nothing indicates that mobility was higher for the Gravettian, compared to the Aurignacian, Solutrean or Magdalenian. In some respects, notably the microlithic nature of Aurignacian production, this aspect could have been overlooked in assemblages due to insufficient sieving or an inadequate understanding of Aurignacian technical objectives. However, other historiographic and methodological factors must be taken into account (Feblot-Augustins 2009). At present, it is no longer reasonable to attribute increased mobility to the Gravettian. In the case of many other Upper Palaeolithic assemblages, the exploitation of distant sources is documented when observation conditions and the geological context allow for such observations (see Masson 1981; Scheer 1993, 2000; Surmely et al. 1998; Primault 2003; Aubry et al. 2004; Floss & Kieselbach 2004; Foucher 2004; Foucher & San Juan 2006; Negrino & Starnini 2006; Surmely & Hays 2011; Delvigne 2016).

It is still premature to gauge how the economy is reflected in the subcomplexes currently being defined. Differences in procurement modalities may emerge between Noaillian assemblages in the Pyrenees (Foucher 2004; Simonet 2009), in the Cher (Kildéa & Lang 2011) or Central Italy (Aranguren & Revedin 2008; Aranguren et al. 2015), but may also overlap with specific outcrop contexts. However, this avenue of research is promising (Calvo et al. 2016). Data from the final Gravettian in Portugal raise the same questions (Zilhão 1997; Aubry 2009).

Gravettian points

In lithic assemblages, the status of this point varies significantly from a quantitative and qualitative viewpoint. The Gravettian point is very well-represented in certain contexts and rare or even absent in others, such as le Callan (Morala 2011), Saint-Julien (Airvaux & Bouchet 2001), la Picardie (Klaric 2003), the Bayacian level of la Gravette (Lacorre 1960; Pesesse 2008b), Maisières-Canal (Otte 1976, 1979), or layer 18 from Peyrugues (Guillermin 2011). However, at different stages of Gravettian chronology, the importance of this point is reaffirmed in major assemblages: the upper levels of la Gravette (Lacorre 1960), Isturitz (Simonet 2011b) or Corbiac (Bordes 1970; Kozłowski & Lenoir 1988). Nonetheless, these three complexes are from ancient excavations and the proportion of points has undoubtedly been overestimated, as the sieving of the previously excavated sediments from Isturitz Cave has shown (Simonet 2009, 2011b). The presence of this point, even on an occasional basis, still represents a shared heritage between the three sites, which persists on different time scales depending on the region.

The Gravettian point is perceived as the emblematic tool of the Gravettian although it is not confined to this context. Moreover, it would be more pertinent to consider the "Gravettian point", not as a

single tool but rather as a class of tools, consisting of several "Gravettian points" (Fig. 2). Indeed, the corpuses of points are not identical. Their typological attribution is based on the shared presence of a back and sometimes complementary retouch on one or both ends.

First and foremost, these differences are linked to the production mode of the blank. The blank does not present the same profile if it is issued from convergent unipolar or rapidly alternating bipolar debitage. Both will be mainly rectilinear, but one can have a slight proximal curve compensating the absence of tabular longitudinal convexity, whereas another can present a double "S" profile (Gallet 1998), depending on an alternating use of the striking platform. As the production of rectilinear blanks is restrictive from a mechanical viewpoint, each of the developed techniques has an impact on tool morphology.

Other differences in blank transformation emerge, which cannot be solely imputed to production modes. These concern global tool conception, and therefore the layout of active tool parts, transformation techniques and the nature of retouch. One of the differences noted early on in production is the lateralization of the tool. The Gravette back is produced with very different proportions on the right or left side of the blank. During the early Gravettian phase, the back is predominantly on the right-hand side (Bricker 1995), whereas during the middle or more recent phases, it is on either side in equivalent proportions (Bricker 1995; Nespoulet 1996). The use of percussion, compression (*sensu* F. Bordes) and pressure flaking has been identified; these techniques were applied to one or both sides of the blank in order to delineate an abrupt facet (Klaric 2003). In some cases, this greatly reduced the width of the blank (Klaric 2003); in others, it had a more corrective role. The transformation of the back thus impacts global tool morphology and functionality.

Indeed, the functional properties of the point result from the relationship of the tool axis to the blank axis. It is for this reason that the fabrication of a Gravettian point often begins with retouch on the ends, followed by the transformation of the back beginning at each extremity before total backing (Kozłowski & Lenoir 1988; Pesesse 2008a; Simonet 2011a). Several methods enable us to define the tool point either axially or laterally in relation to the blank axis. For example, an abrupt continuous back, invasive (Christensen & Valentin 2004) and parallel to the blank axis results in a point with a lateral extremity; a progressively decreasing back defines an axial point. In the same way, the use of partly apical intersecting retouch reshapes the apex of the tool in relation to the axis of the blank, but entails a higher risk of fracture (Krukowski microburin "accident"). This positioning of the back thus determines tool manufacture and the position of the binding and active tool parts. In this way, the back could be recti-

linear to slightly curved, depending on the technique.

According to tool morphology, several layout solutions are possible: axial, axial-lateral or strictly lateral. As well as demonstrating its role in hunting, recording the stress axis indicates that this point is not just the penetrating end of a composite projectile but that its cutting edge can also be used for lacerating functions (Cattelain & Perpère 1993; Soriano 1998; O'Farrell 1996, 2004; Perpère 2000; Borgia 2008; Borgia et al. 2011; Pesesse 2008a; Simonet 2009; Araujo Igreja 2011). These two solutions, which are sometimes present in the same complex, are regrouped in this way under the "Gravettian point" label. This tool class thus includes pieces with diverse functional properties. The characterization of the mode(s) of propulsion and the utilized methods of assembly, still need to be developed. This will undoubtedly make it possible to explain some of the morphological diversity of this tool category.

The solutions developed in methods of production and transformation enable us to define Gravettian points with distinctive characters. These transformations can be sufficiently clear-cut and recurrent to define specific types, such as the Vachons point (Fig. 2: a & b), characterized by symmetrically delineated edges (Simonet 2011b). During the early Gravettian, consistent parameters allow us to distinguish a singular Gravettian point (Fig. 2: r), with a convex edge opposite a rectilinear edge (Pesesse 2011). Other types could probably emerge, even though identical methods were used at different stages of the Gravettian chronology. Indeed, the morphological variability visible in an assemblage, or between several corpuses, does not mask the existence of underlying norms which appear to be strongly regionally or chronologically rooted. In this way, points from several sites, like Mugardua Sur (Fig. 2: n & o), Arbreda (Fig. 2: g & h), Blot (Fig. 2: e & f), display original characteristics. For some of them, it is legitimate to ask why they are still classified in this category of tools. Are they Gravettian points because the site falls within the theoretical Gravettian chronology? Indeed, chronological attributions may govern typological attributions just as typological attributions may determine attributions to the Gravettian in certain contexts.

Other projectiles

The Gravettian point is not the only projectile (Figs. 3 & 4). A whole panoply of tools was developed: backed bladelets, truncated or bi-truncated backed bladelets, points with a truncated base and a straight or convex back, angular backed points (Simonet 2009), diverse shouldered points, Font-Robert points (Bardon et al. 1906), Maisières points (Otte & Noiret 2007; Pesesse & Flas 2011), alternating backed points (Pesesse 2006), Tursac points (Delporte 1958), flechettes (Lacorre 1933), backed flechettes and asymmetrical flechettes (Pesesse 2008b), Picardie

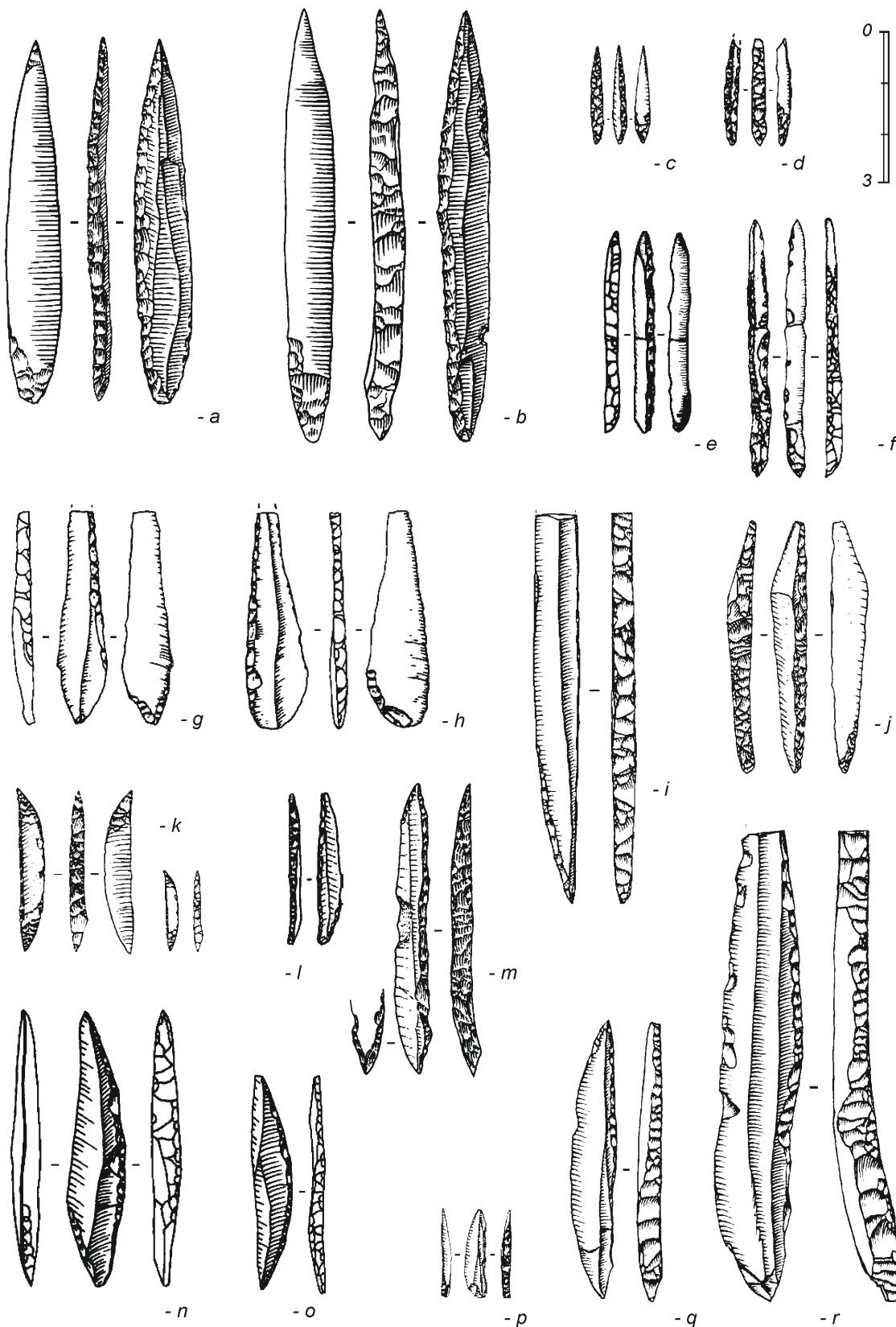


Fig. 2. Gravette points and backed points: a, b: Isturitz, coll. Saint-Périer, level IV; c, d: Vale dos Covoes, 3; e, f: Le Blot, middle complex; g, h: Arbreda; i, q, r: La Gravette, i and r: red layer, q: black layer; j: Cirque de la Patrie; k: Plumettes, level B, zone B; l, m: Paglicci, layers 22, 23; n, o: Mugarduia Sur; p: Vigne Brun, unit OP10 (a, b: Simonet 2009; c, d: Klaric et al. 1999; e, f, j: Klaric 2003; g, h: Villaverde et al. 2008; i, p, q, r: Pesesse 2008a; k: Primault 2003; l, m: Palma di Cesnola 2006; n, o: Barandiaran et al. 2007).

Abb. 2. Gravettespitzen und Rückenmesser. a, b - Isturitz, Sammlung Saint-Périer, Niveau IV; c, d - Vale dos Covoes, 3: UE6; e, f - Le Blot, mittleres Ensemble; g, h - Arbreda; i, q, r - La Gravette, i, r: rote Schicht, q: schwarze Schicht; j - Cirque de la Patrie; k - Plumettes, Niveau B, Bereich B; l, m - Paglicci, Schichten 22, 23; n, o - Mugarduia Sur; p - Vigne Brun, Einheit OP10 (a, b: Simonet 2009; c, d: Klaric et al. 1999; e, f, j: Klaric 2003; g, h: Villaverde et al. 2008; i, p, q, r: Pesesse 2008a; k: Primault 2003; l, m: Palma di Cesnola 2006; n, o: Barandiaran et al. 2007).

bladelets (Klaric et al. 2002), bladelets with marginal retouch (Klaric 2003; Simonet 2009), etc.

Among these tools, some just display one variation from the reference model, like the obliquity of the back, the presence of a basal truncation or a second opposed back. This conceptual parallel is underlined by the fact that they are still often lateralized or still made in the same way as Gravettian points. On the other hand, others, like the Picardie bladelets, are morphologically and technically different from Gravettian points (Klaric 2006). But the distinction between the different projectile categories, including Gravettian points, within a complex is not always easy, given the variability of certain types and the convergence of functional objectives between pieces with distinctive typological characteristics.

It is also important to note that most of these projectiles come in very different sizes and that they can be up to three times longer than the smallest specimens in the same complex (Simonet 2009). This indicates a relationship between the processing of certain projectiles and Gravettian points.

Therefore, we can acknowledge on one hand, an ability to vary existing models, and on the other, an ability to produce projectiles with distinctive properties, which result from original operating standards. Some of these characterize a Gravettian complex, like the Maisières point, whereas others persist during different phases, like bladelets with bi-truncated backs.

Some of these pieces were probably, and in certain cases definitely, used as projectiles. However, without an accurate understanding of assembling methods, it is difficult to grasp the complementarity of these projectiles – both among themselves and with Gravettian points. This potentially informative question would enable us to gain a better understanding of the choices made in weaponry. In the same way, relationships between typological changes, projectiles in hard animal materials, hunted species and acquisition modes have not yet been assessed in a comprehensive manner. Indeed, very few sites have been studied using a global approach up until now, such as Isturitz (Lacarrière et al. 2011; Normand et al. 2012), Les Bossats (Lacarrière et al. 2015) or layer 2 of Pataud (Nespoulet et al. 2013).

On what basis can the Gravettian be seriated?

The lithic technical system underwent profound reorganizations several times during the chronological and spatial interval known as the Gravettian. These evolutions occur on different timescales depending on the aspects considered. The fact that certain technical traits were maintained is opposed to a “fixist” approach to technical systems. For example, toolkit modifications do not necessarily follow changes in

operative modes. This is the case for the Gravettian point, produced following different operative schemas, but also for *fléchettes*, Font-Robert points and bi-truncated bladelets. Once the morphological characteristics of a tool display variation, this same tool can be made on similar blanks issued from very different operative schemas (Pesesse 2011). According to perspectives and study objectives, there are thus several ways of seriating the Gravettian, depending on whether we take account of production modes or the toolkit.

Other phenomena must also be considered in order to address the seriation of these industries. Each Gravettian phase (or complex) does not yield a comparable quantity of sites. In this way, only one site is attributed to the Bayacian (Pesesse 2008b), four complexes are assigned to the Protomagdalenian (Guillermin 2011, although this number is about to change pending the publications of recent excavations), whereas Noailles burins have been identified at about one hundred sites (Touzé 2012). These figures do not indicate the quality of the documentation. Out of fifty-four assemblages alleged to have yielded Raysse burins, only twenty-two sites contained authenticated tools, of which only ten present satisfactory observation conditions (Klaric 2003, 2007). But it is difficult, for the time being, to relate a high number of sites to the length of the occurrence, to demographic questions, to the existence of favourable preservation conditions or to regional historiographic differences. In addition, many sites are temporarily excluded from current divisions (like Les Bossats, Bodu et al. 2011). In spite of the presence of Gravette points, some sites exhibit no clear features allowing us to ascribe them to one or the other sub-phases yet described. However, they point to a much more detailed seriation than that which is currently used.

The current seriation of the Gravettian in the southwest of France, based solely on lithic industries and archaeological sequences, can be summarized as follows:

- Bayacian: Bayacian level of La Gravette,
- Early Gravettian: upper levels of La Gravette, Pataud c. 5, La Vigne Brun, le Sire c. 3a,
- Gravettian with Font-Robert points or Fontirobertian: La Ferrassie, Les Vachons c. 3,
- Gravettian with Noailles burins or Noaillian: Gargas, Isturitz c. 4, Pataud c. 4 lower,
- Gravettian with Raysse burins or Rayssian: La Picardie, Pataud c. 4 upper,
- Recent Gravettians: Peyrugues c. 20 et c. 22, Pataud c. 3,
- Protomagdalenian or final Gravettian: Pataud c. 2, Laugerie c. 36-38/F (East), Peyrugues c. 18.

This seriation is only valid for the southwest of France, mostly in north Aquitaine, where archaeological sequences abound. But even in this region, the chronology is not perfectly defined. No sequence clearly indicates if the Font-Robert points are anterior

or posterior to the early Gravettian of La Gravette. The absence of reliable radiometric dates and the fact that this site was excavated a long time ago do not bring a clear answer to this question. This sequence is thus a mere proposal or overview, which we hope will be provisional. We do not yet have a comparable number of dates for these complexes. In the north of Aquitaine, for the first three phases, a single complex has been dated: c. 5 of Pataud, which is related to the early Gravettian (Higham et al. 2011). As for the phases with the Noailles burins, Raysse burins and recent Gravettian, the dates do not enable us to distinguish these recent complexes (Klaric 2007, 2013). Therefore, the current seriation does not correspond to a chronology *sensu* Dunnell (1970) and the dates do not enable us to establish the chronology of the episodes at this level of resolution.

In the rest of the country, the situation is a lot more confused. In several regions, the archaeological sequences are different from those cited above in north Aquitaine. But these zones have not benefitted from comparable research or do not have a satisfactory sedimentary record, making it impossible to accurately establish Gravettian traditions and to observe their evolution in detail in distinctive geographic areas. Only the more obvious, and thus the more caricatured aspects of the succession of industries and the extension of the complexes can be perceived.

In this way, the Pyrenees sites have only yielded complexes ascribed to the Gravettian with Noailles burins (Foucher 2005; Foucher et al. 2008). Only the cave of Isturitz and the open-air site of Tercis contain occupations attributed to a recent Gravettian phase (Simonet 2009). In the southeast, apart from the presence of complexes with Noailles burins, the archaeological sequence is also different (Onorati & Combier 1998; Bazile 2007). As for the east of France, data are particularly scarce. Renewed interest in the Paris basin now makes it possible to establish a link between the various occupations (Klaric 2013).

This seriation has not yet been directly compared to results of studies of industries in bone, antler and ivory, where the various corpuses are even more problematic. Nonetheless, the data acquired define a complementary grid for elaborating a chronological framework. Indeed, certain processes developed at the beginning of the Gravettian persist throughout this period, like double grooved debitage, which is widespread during the Gravettian (Goutas 2003, 2004a, 2009, 2016). However, in the different Gravettian components, this process does not have the same status, which indicates concomitant variations in these two technical subsystems (Goutas 2013). Gravettian seriation could thus be reviewed by integrating this other disciplinary field (Goutas 2013). However, a lot remains to be done in order to interpret the existence of several timescales in the evolution of the equipment.

When does the Gravettian begin?

The question of the Gravettian nature of industries is particularly relevant for the traditions attributed to the beginning of this chronological period.

In north-western Europe, Belgium and the south of Great Britain, the first Gravettian is called the Maisierian. It is an original industry chiefly known from the Maisières-Canal site (Otte 1976, 1979), characterized by the bipolar production of heavy stone blanks. These are transformed into stemmed points, some of which are similar to Font-Robert points from the French Gravettian, and into Maisieres points (Fig. 3: e). As there are no Gravettian points, this complex is attributed to the Gravettian mainly on the basis of these stemmed points and because in France and Germany they are associated with Gravette points. The question concerning the attribution of this site to the Gravettian has been raised on several occasions (Campbell 1980; Dewez 1989; Pesesse & Flas 2011).

In France, the period separating the Aurignacian from the Gravettian appears to be marked by the development of industries distinguished on the basis of axial lithic projectiles: the Font-Yves point complex and the Bayacian (Pesesse 2010a). These two categories of points are produced from rather similar specialized operative schemas. The later complex is associated with the Gravettian, not so much because of its characteristics, but because it contains *fléchettes* (Fig. 3: d), those emblematic Bayacian tools, in later industries. An analogy could be drawn with southern Italy where the lithic projectile is more visible in earlier traditions than in the industries locally considered as Gravettian (Palma di Cesnola 1998), although this hypothesis is not unanimously accepted (Borgia et al. 2011).

The notion of a less marked rupture between the Aurignacian and the Gravettian has also been advanced for Aitzbitarte III (Rios-Garaizar et al. 2012).

The Maisierian and the Bayacian are not considered to be Gravettian on account of their specific characteristics, but on account of the presence of traits specific to their later phases, in particular the presence of Gravette points. They are thus Gravettian by default because they are not Aurignacian, or by anticipation because they are on the way to becoming Gravettian. Therefore, only a teleological vision (like Pesesse 2010a) places earlier complexes in the Gravettian.

In other regions, namely in Mediterranean Spain or in Portugal, sites attributed to the early stages of the Gravettian are rare (De la Peña Alonso 2009). In Portugal, leaching phenomena in karstic contexts partly explain the absence of a sedimentary record for the beginning of this period (Aubry et al. 2007).

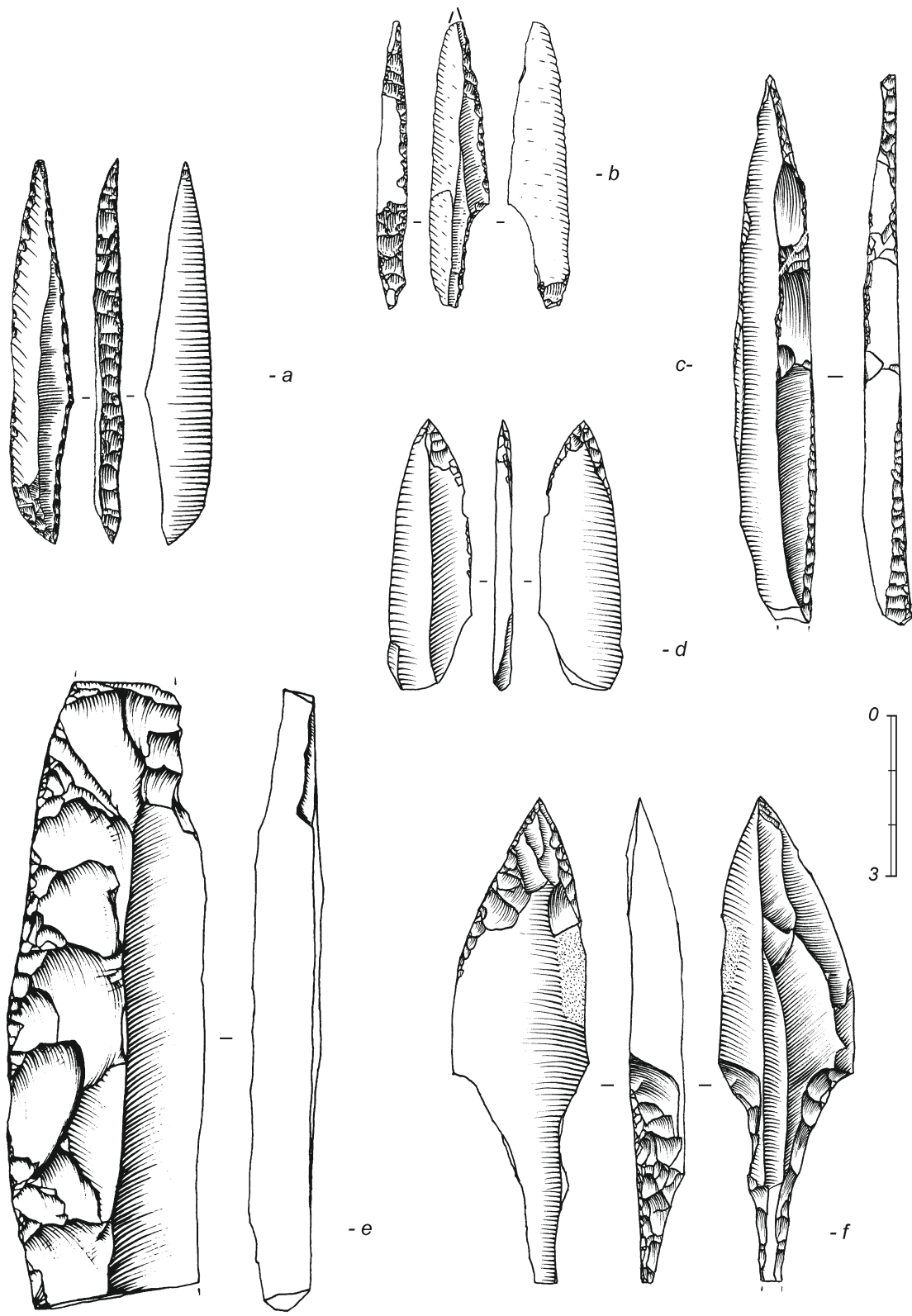


Fig. 3. Points: a: Angular backed point, Isturitz, coll. Passemard, level C; b: Shouldered point, Brassempouy, Chantier I, layer D; c: Tursac point, Abri du Facteur, level 15; d: Fléchette, La Gravette, Bayacian level; e: Maisières point, Maisières-Canal; f: Font-Robert point, Pair-non-Pair, level 7 (a: Simonet 2009; b: Klaric 2003; c, d, f: Pesesse 2008a; e: Pesesse & Flas, 2011).

Abb. 3. Spitzen: a - geknickte Rückenspitze, Isturitz, Sammlung Passemard, Niveau C; b - Kerbspitze, Brassempouy, Grabung I, Schicht D; c - Tursac-Spitze, Abri Facteur, Niveau 15; d - Fléchette, La Gravette, Niveau Bayacien; e - Maisières-Spitze, Maisières-Kanal; f - Font-Robert-Spitze, Pair-non-Pair, Niveau 7 (a: Simonet 2009; b: Klaric 2003; c, d, f: Pesesse 2008a; e: Pesesse & Flas 2011).

The early Gravettian

The earliest Gravettian horizon was identified in the upper levels of la Gravette (Lacorre 1960). The presence of a toolkit with abundant and varied backed tools, dominated by well-made Gravettian points (Fig. 2: q & r) is indeed an effective point of comparison. The quality of the unipolar debitage also underlines the characteristics of this industry. In particular, the production of large Gravettian points using an offset schema ensures the quality and the cutting edge of the future tool (Pesesse 2008a, 2011). These complexes display several common parameters: raw material management, production processes and shared objectives. A coherent technical entity thus emerges, encompassing PuyJarrige, la Vigne Brun (Pesesse 2011), probably layer 5 of abri Pataud (Bricker 1995; Leoz 2007) and the upper complex from Sire (Surmely et al. 2011; Surmely & Ballut 2011). The analysis of the technical system enables us to reconsider anterior attributions based on the toolkit (Bosselin & Djindjian 1994; Djindjian & Bosselin 1994), as some of these sites were attributed to the Bayacian, to the non-differentiated Gravettian, to the Fontirobertian and to the Laugerian (Pesesse 2011). In its strictest definition, this would be "the Gravettian".

Several probing similarities can be sought in complexes from the Swabian Alps (Geissenklösterle, Brillenhöhle: Conard & Moreau 2004; Moreau 2010, 2012 & Hohle Fels: Taller & Conard 2016) and in southern Italy (Paglicci 23 & la Cala: Boscato et al. 1997; Borgia et al. 2011; Wierer 2013). These assemblages transcribe similar technical conventions and diverse projectile solutions, which embody a shared tradition.

The Gravettian with Font-Robert points or the Fontirobertian?

It is possible that industries with Font-Robert points occur after the early Gravettian phase, although their position in the French sequence is not well known. They are distinctive in that they exploit wide cores with two opposed striking platforms in order to ensure that the products conform to intended size and shape (Le Mené 1999; Pesesse 2010b). These axially hafted points (Fig. 3: f) are thus a pivotal element of lithic production. Gravettian points appear to have been produced simultaneously at la Ferrassie (Le Mené 1999), but not at Saint-Julien (Airvaux & Bouchet 2001). The role of Gravettian points in assemblages with abundant Font-Robert points has thus not yet been perfectly defined. At the Ferrassie Grand Abri, considerable post-depositional reworking must be taken into account in order to understand this industry (Texier 2006).

For many scholars (including Otte 1979; Kozłowski & Kozłowski 1981; Djindjian & Bosselin 1994), the origin of the Font-Robert point must be sought in northern

Europe, in the Maisières-Canal industry, which would have influenced the technical traditions of southern population. These points have mainly been found in neighbouring north European countries (Germany, Belgium, Luxemburg), and very few in southern regions (Palma di Cesnola & Bietti 1983; Arrizabalaga & Iriarte-Chapusso 2011; Colonge et al. 2015).

As the quality and the coherence of assemblages bearing Font-Robert points are not well-defined, it is still premature to differentiate this complex using a specific term - Fontirobertian - as this would ratify the existence of a well-defined "technical tradition" (according to Valentin 2008). Indeed, different visions emerge depending on whether we only retain the presence of points or if we take account of the whole technical system, as these points can come from very different technical contexts (Le Mené 1999; Pesesse 2011; Touzé 2015; Touzé et al. 2016).

The Gravettian with Noailles burins or the Noaillian

As its name indicates, the presence of a category of original tools (often abundant and identified a long time ago) has been a key factor in distinguishing these industries from the main "Gravettian" complex (David & Bricker 1987). The burin de Noailles was all the more noteworthy in that Gravettian points are very rare in these complexes. This point was produced according to certain standards with, in particular, a quest for axial symmetry and, at times, inverse retouch on the ends, defining in this way the Vachons point (Simonet 2011b) (Fig. 2: a & b). However, this retouch is neither necessary, nor exclusive to these points. In these assemblages, microlithic backed projectiles or those with marginal retouch (Fig. 4: l) are preponderant (Klaric 2003; Simonet 2011a, 2011b). Several partly imbricated *chaînes opératoires* are developed in order to supply the different tool categories: blade production (unipolar, alternating unipolar, bipolar), laminar blades, flakes (Dartiguepeyrou 1995; Klaric 2003; Foucher 2004; Pottier 2005; Simonet 2009; Kildea & Lang 2011). The blanks used for Noailles burins also come from these *chaînes opératoires*.

The coherence of this phase of the Gravettian has been widely studied and projected over an extensive geographical area: in the Pyrenees, in Aquitaine, in the south of the Paris basin and the western part of Italy. Similar technical solutions in different parts of several of these regions have been brought to light (Foucher & San Juan 2006, 2008), thereby ratifying the use of the term Noaillian for grouping these complexes.

But these Noailles burins are not present in all western European complexes during this period. Their absence from Mediterranean Spain is attributed to a localized development of the Gravettian before the Noaillian (Fullola et al. 2007). The necessity to transpose the French sequence has also been

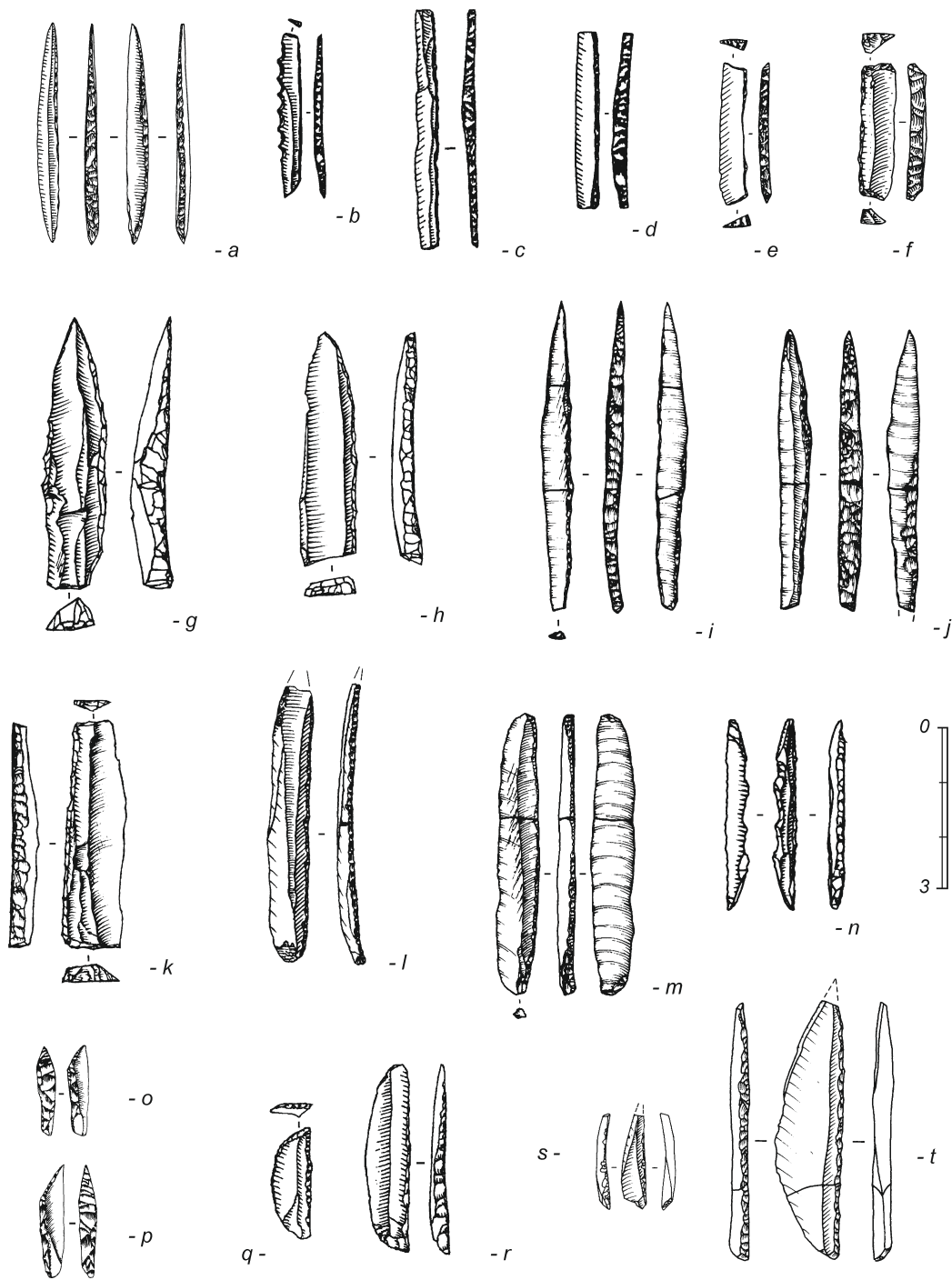


Fig. 4. Points: a: Alternating backed points, Vigne Brun, unit OP10; b: Denticulated backed bladelet, Pataud, layer 2; c, d: Backed bladelets, Pataud, layer 2; e, f, k – Bitruncated backed bladelets, e: Pataud, layer 2, f: Terra do Manual, k: Vachons, abri 3, layer 3; g to j: Backed points with truncated base, g and h: Vachons, abri 3, layer 3, in Pesesse 2010b, i and j: La Croix de Bagneux, locus 11-14; l: Bladelet with marginal retouch, Isturitz, coll. Saint-Périer, layer 4; m: Retouched bladelet, La Croix de Bagneux, locus 8; n: Microgravette with opposed denticulated edges, Vigne Brun, unit OP10; o, p: Angled backed points, Paglicci, layers 19a and 18b; q, r: Bipointed elements, Goyet, upper shelter; s - t: Picardie bladelets, s: Grotte du Renne, layer V, t: La Picardie (a: Pesesse 2006; b, c, d, e: Bricker 1995; f: Klaric et al. 2009; g, h, k: Pesesse 2010b; i, j, m: Kildéa & Lang 2011; l: Simonet 2009; n: Pesesse 2008a; o, p: Palma di Cesnola & Bietti 1983; q, r: Otte & Noiret 2007; s, t: Klaric 2013).

Abb. 4. a - alternierende Rückenspitze, Vigne Brun, Einheit OP10; b - gezähntes Rückenmesser, Pataud, Schicht 2; c, d - Rückenmesser, Pataud, Schicht 2; e, f, k - Rückenmesser mit doppelten Endretuschen, e: Pataud, Schicht 2, f: Terra do Manual, k: Vachons, Abri 3, Schicht 3; g bis j - Rückenspitzen mit Endretuschen an der Basis, g, h: Vachons, Abri 3, Schicht 3; i, j: La Croix de Bagneux, Orte 11-14; l - Mikroklinge mit Randendretusche, Isturitz, Sammlung Saint-Périer, Niveau 4; m - Mikroklinge mit Endretusche, La Croix de Bagneux, Ort 8; n - Mikrogravettespitze mit gezähntem gegenüberliegendem Rand, Vigne Brun, Einheit OP10; o, p - geknickte Rückenspitzen, Paglicci, Schichten 19a und 18b, in Palma di Cesnola und Bietti 1983; o, p - Doppelspitzen, Goyet, Abri supérieure; q, r: Picardie-Rückenmesser, q: Grotte du Renne, Schicht V, r: La Picardie (a: Pesesse 2006; b, c, d, e: Bricker 1995; f: Klaric et al. 2009; g, h, k: Pesesse 2010b; i, j, m: Kildéa & Lang 2011; l: Simonet 2009; n: Pesesse 2008a; o, p: Palma di Cesnola & Bietti 1983; q, r: Otte & Noiret 2007; s, t: Klaric 2013).

criticized (De la Peña Alonso 2009; De la Peña Alonso & Vega Toscano, 2013). The position of the burins de Noailles in the Cantabrian sequence has also been questioned (Arrizabalaga & de la Peña Alonso 2012; Bradtmöller et al. 2015). Other hypotheses are currently emerging, calling into question the value of the Noailles burin as a marker (Noiret 2011; Touzé 2012; Calvo et al. 2016). Morala points out that the "Noaillian does not exist as a separate cultural entity" (Morala 2011). What would emerge from mapping and seriation based on the Vachons point and micropoint (Simonet 2011b), on Isturitz type retouched pieces (Goutas 2004a, 2008; San Juan & Vercoutère 2005) or from taking account of other markers such as the double grooving or grooving-splitting production techniques applied to hard animal materials (Goutas 2013)? Precisely which Noaillian does the Noailles burin designate?

The Rayssian

On several occasions, the Gravettian with Noailles burins and Raysse burins sparked criticisms as regards the coherence and the unity of the Gravettian. David suggested excluding these industries from the Gravettian cycle (David 1985). More recently, the question of ascribing complexes with Raysse burins to the Gravettian has been raised again (Klaric 2003, 2007, 2008). Indeed, this technical system is very different from that of earlier or later complexes. A unipolar laminar debitage initiated on the narrow side of a core and progressively invading the wide side yields thick blanks, essential for making a common toolkit. Blades and some flakes are then transformed using the Raysse method in order to produce light bladelets with a convex cutting edge, Picardie bladelets (Fig. 4: s & t), detached at the junction of the lower face and the bladelet debitage surface of a core known as the Raysse burin (Klaric 2007). At the eponymous site, la Picardie, no Gravettian points were found (Klaric et al. 2011). It is thus relevant to question the reality of the association between Picardie bladelets and Gravettian points for similar archaeological assemblages. Even in very rich assemblages, like layer 4 from Abri Pataud, which contains multiple occupations, their number remains very low in the upper horizon attributed to the Rayssian (Pottier 2005), as in Solvieux 6M (Sackett 1999).

Present data do not elucidate the order of the different Noailles burin and Raysse burin phases, especially as these two technical traditions do not follow the same geographic distribution (Klaric et al. 2009). The Raysse burin complexes are present from the north of Aquitaine to the Paris basin and the northern fringe of the Noailles burin complexes, where it reaches the Cher (Kildéa & Lang 2011) and possibly the Vosges (Hans 1997). We must therefore look for different processes in order to understand why the Noailles burin tradition did not evolve in the

same way depending on the geographical zone considered and thus the criteria pointing towards Rayssian roots in earlier technical traditions. This entity presents the double advantage of being characterized by a very specific and easily recognizable lithic technical system and a limited geographical extension.

During the recent Gravettian

This period corresponds to a chronological division with blurred limits, mainly made up of complexes situated between the Rayssian and the Protomagdalenian, as well as comparable sites. The lithic technical systems of the assemblages attributed to the recent Gravettian reveal extensive diversity (see Klaric et al. 2009), which can be explained notably by a certain diachronism, partly demonstrated for the Peyrugues stratigraphy (Klaric et al. 2009). During this period of time, several reorganizations of the technical system occur, resulting during the following period in the disappearance of the Gravettian point and its replacement by bitruncated bladelets (Klaric et al. 2009).

Some technical traits appear to be shared by several of these complexes, like a high proportion of bipolar laminar blanks, often associated with successive unipolar production on the same core, with a narrow and well-arched debitage surface (Nespoulet 1996, 2000; Klaric 2003; Simonet 2009). Microlith blanks, which are abundant during this phase, are produced by knapping small blocks and flakes. Significant blade debitage, using an adaptive schema, the polyhedral burin, is developed in several complexes (Klaric 2006). This production can follow a more specific organization named Kostienki, as at Blot (Klaric 2000), but which is different from the Kostienki knives described in Central and Western Europe (Klaric et al. 2015).

Comparisons can be drawn between sites like le Blot in the Massif Central and Mainz-Linsenberg in Rhineland (Klaric et al. 2009), le Cirque de la Patrie and la Croix-de-Bagneux, locus 11-14 (Fig. 4: i & j; Kildéa et al. 2011). Similarities between the Portuguese sites of Terra do Manual (Fig. 4: f) and Cabeço do Porto Marinho II have also been established (Aubry et al. 2007; Klaric et al. 2009). But even though similar intentions are perceptible over long distances, a geographic component must also be taken into account in order to appraise the diversity of these complexes. Thus, industries with abundant geometric pieces and points with curved backs are well-represented in Belgium at Goyet (Fig. 4: q & r), Spy and Engis (Otte 1979) as well as in France, at l'Abri des Roches (Primault 2003) and in layer 3 of les Vachons, which contains numerous Gravettian occupations (Fig. 4: g & h; Pesesse 2010b). However, their position in regional sequences has not yet been defined. Are they comparable to locus 11-14 at la Croix-de-Bagneux or do they represent a very different component?

For a long time, our understanding of these complexes was limited to a general impression of polymorphism, with no coherent explanatory grounding. At present, several economic, functional and chronological aspects provide solid leads for understanding these industries (Aubry et al. 2007; Klaric et al. 2009). Variability dissimulated the diversity of technical solutions. Without an adequate chronostratigraphical framework, most of the information that could be gleaned from the successive restructuration of these technical systems still eludes us.

When does the Gravettian end?

In Aquitaine and the Massif Central, the end of the Gravettian is defined in four assemblages referred to as Protomagdalenian. They are characterized by a departure from the Gravettian point concept (except at le Blot, where the reasons behind their presence remain to be verified, Klaric et al. 2009). This point clears the way for light projectiles, often truncated at one or both ends (Fig. 4: b-e). They are issued from a very different unipolar convergent schema than that used during an earlier phase (Klaric et al. 2009). In addition, renewed excavations at l'Abri Pataud confirm the importance of microlithic projectiles in level c. 2 (Nespoulet et al. 2011; Nespoulet et al. 2013). At the same time, the production of large blades could reflect different intentions, such as stockpiling raw material (Klaric et al. 2009; Guillermin 2011). Not all the aspects of this industry are yet known and questions still pend as to whether or not it is part of the Gravettian. The term Protomagdalenian is sometimes used to argue in favour of a separation from the Gravettian (Surmely & Alix 2005; Surmely & Hays 2011). The appellation 'final Gravettien' is also used to break away from the hypothetical link with the Magdalenian and to relocate this complex within the Gravettian mosaic (Klaric et al. 2009; Guillermin 2011). As very few complexes have undergone a comprehensive study, it is still too early to define the hypothetical Gravettian nature of the Protomagdalenian.

The virtual absence of Gravettian points and the original character of these complexes indicate, once again, the arbitrary character of this attribution. Does the absence of Gravettian points mark the end of the Gravettian? This is just as striking when we consider the end of the Gravettian in the southeast of France and in the Italian peninsula (Bazile 2007; Palma di Cesnola & Bietti 1983; Palma di Cesnola 2001). In some areas, the Gravettian is followed by the Epigravettian, and several technical traits considered to be Gravettian, including the Gravettian point, subsist (Martini & Lo Vetro 2005). The stages of this evolution have not yet been accurately described and current limits are largely based on conventionally defined chronological cut-off points (Mussi 2001), which have to be discussed (Tomasso 2014). Some levels, like horizons 19a to 18b from la Grotta Paglicci (Fig. 4:

o & p), attributed to a final Gravettian (Palma di Cesnola & Bietti 1983), could indicate a more complex scenario, given the rare information available for early Epigravettian technical systems (Silvestrini et al. 2008; Cancellieri 2010).

In these cases, the Gravettian point is not considered – depending on the geographical context and the traditions relating to analysis of the collections – in the same way as a distinctive Gravettian characteristic. The absence of this piece from so-called Protomagdalenian complexes does not signify the end of the Gravettian (Guillermin 2011); its continuity in Italian and Provençal complexes can be interpreted in several ways, as an Epi- or Tardi-Gravettian (Laplace 1997).

Openings

The diversity of the data issued from the analysis of technical systems contrasts with the construction of a unitary image of the Gravettian. In fact, there is no single Gravettian lithic economy and no single Gravettian technical system. The choices developed are in marked contrast with each other and thus cannot be ascribed to the supposed variability of the operative modalities. If we were to interpret this period in terms of variability, we would ignore all the complexity of the technical processes brought to light by technological studies carried out over the past twenty years.

Yet, for this major Upper Palaeolithic phase, the emphasis is often on the rare points of contention which crystallize our representation of the "Gravettian culture". They allow us to propose a sum of traits considered to be Gravettian. But when we examine the archaeological data a little more closely, the limits of this proposition are clear. And when data from other records question the very basis of this entity, allegedly unifying elements are highlighted even more. These data allow us to surpass the myth of a Pan-European culture, a "Golden age" (Roebroeks et al. 2000) during the Upper Palaeolithic.

By definition, the denominations attributed to the main Upper Palaeolithic complexes are artificial frameworks. However, these denominations sometimes embody a pre-existing prehistoric entity (Clark & Lindly 1991). The Gravettian is often hampered by this confusion, as studies are often geared towards the characterization of the Gravettian, thus clustering together several millennia of history under a single label (De la Peña Alonso 2012). The aim is not to group together all the technical manifestations occurring between the Aurignacian and the Solutrean or the Epigravettian under a single heading. Moreover, this attribution is often established without any critical analysis (De la Peña Alonso 2009), simply by invoking the alleged chronological Gravettian framework. Thus, it must be acknowledged that the term "Gravettian" does not have the same meaning as

the other Upper Palaeolithic nomenclatures, as this term encompasses extensive heterogeneity. As far as the lithic industry is concerned, it is not appropriate to speak of the Gravettian in order to tackle the complexity of the underlying processes. It appears rather to be necessary to define research perspectives beforehand, to explain the meaning ascribed to the term Gravettian and above all, to describe the level of detail considered in archaeological data and technical facts. Only in this way will the different approaches to the Gravettian, which vary depending on the themes considered and the level of technical interpretation, be able to progress in a constructive way.

In the same way, referring to the Early, Middle or Recent Gravettian merely alludes to very badly defined chronological phases with no concrete anthropological grounding. And the presence of several technical traditions during the recent phase of the Gravettian shows that it is not possible to include them under a single label. The problem is identical if we consider assemblages comparable to the upper levels of the site of la Gravette and those with Font-Robert points as early Gravettian, or Noaillian and Rayssian industries as Middle Gravettian. What does it signify to compare the recent Gravettian, which included several sites with several different technical systems, with the early Gravettian, which contains several complexes with the same system?

It is thus clear that all these denominations have not yet been perfectly defined and that they can convey different meanings. Moreover, choosing the term Fontirobertian or Noaillian, instead of Gravettian with Font-Robert points or Noailles burins, might have an impact on the underlying debate. A designation like the Noaillian, or the Gravettian, tends to legitimize *a priori* the existence of a "Palaeolithic culture". From the Noaillian as a technical lithic system, we pass imperceptibly towards the "Noaillian" as a human group, as pointed out by Clark and Lindly (1991). We are thereby confronted with two different research perspectives leading to distinctive study targets. Many authors have warned against this essentialist perspective, related to a misunderstanding of material culture (Binford & Sabloff 1982; Clark & Lindly 1991; Boissinot, 1998; Pauketat 2001; Pargeter et al. 2016). The demonstration that first paradigms in Gravettian studies have not really changed, even if different analytical approaches have been used, has clearly been demonstrated (De la Peña Alonso 2012). Indeed, technological studies did not call into question the inherited theoretical background (Clark & Riel-Salvatore 2006b; De la Peña Alonso 2012).

Given the singularity of these technical traditions, questioning the definition of the Gravettian would imply analyzing the links that exist between them. In this aim, it would be necessary to describe all the solutions developed at any given moment. However, it is both difficult and simplistic to reduce the mass of information from each assemblage or each phase into

a simple schema, even if it summarizes the main tendencies. Moreover, quantitatively underrepresented methods often provide invaluable information concerning technical solutions. If these are disregarded, technology becomes a partitioned outlook rather than an apt tool for bringing to light the different parameters making up an assemblage. It is also interesting to note that lithic technology did not manage to bridge the gaps left by typology between the phases of the Gravettian – if we accept that the Gravettian should, at some stage, link these complexes together. For the moment, no one knows how the transition occurs from the early Gravettian to the Gravettian with Font-Robert points, to the Gravettian with Noailles burins, to the Rayssian, to the recent Gravettian periods and to the Protomagdalenian.

The function of the Gravette point is to bring together all these complexes. But if we only take account of this tool, we minimize the singularities of each complex and tend to produce a circular logic "there are Gravettian points therefore it is Gravettian", which has been proven wrong as Gravette points have also been identified during the Magdalenian (Langlais 2007) and Epigravettian. When we consider these attributions close up, the Gravettian point is neither sufficient, nor necessary for defining the Gravettian. Moreover, there is no single type in all the different archaeological complexes, but rather a class of tool which consists of several types during the different phases of the Gravettian. In addition, these different types of Gravette points do not all have the same functional properties. Therefore, the Gravettian point only exists on a relatively high level of abstraction.

Approaches to lithic industries focus mainly on differentiating elements without necessarily being able to interpret these differences. Thus, the observed variations in Gravettian points are not integrated into an overall system enabling us to understand which other elements vary simultaneously and what impact these choices have. Moreover, these formal variations, such as projectile morphology, mask more sustainable conceptions. Thus, functional attributes may be replicated with very different technological and typological solutions. We could thus go from a seriation based on the shapes and production of objects to a seriation based on the properties of objects. If we are unable to understand or validate the implications of the modifications observed, then it is high time to reconsider the pertinence of our criteria of differentiation.

Explanations for the variability of the assemblages are mainly ad hoc explanations in the absence of prior systematics (Dunnell 1971, 1986) allowing us to identify conventional variations. This question is even more difficult when the degree of technical variation also changes between the different phases of the Gravettian. Complexes with Noailles burins, such as Brassempouy, show a wide range of technical diversity and variability. But how far can the cursor of variation go? And where is the limit allowing for the integration of

the series of Mugardua Sur in this complex? Conversely, when a very low variation in debitage is observed, like at la Picardie, should this low variation be a priori expected for all the sites from this period? There are clearly two risks: being too all englobing or too exclusive, resulting in the clustering of different sites or the isolation of certain complexes. In the first case, this follows a clear historiographic pathway: a first phase of redefinition limiting the number of sites attributed to a period (Klaric 2003, 2007), and a second phase questioning new sources of variation (Klaric in press), before possibly reconsidering some of the criteria established in the first phase.

However, it appears to be necessary to question when the Gravettian point undergoes major changes. In this way, we note its absence in certain complexes from the beginning or the very end of this long phase (Bayacian, Maisierian, Protomagdalenian). But its scant representation or its absence from several complexes from the heart of this period (Saint Julien, le Callan, la Picardie) reveals all the complexity of these issues. Whereas the lithic industry with Raysse burins from la Picardie appears very exotic in the French Gravettian (Klaric 2003, 2007), this original production is associated with double grooved Isturitz type pieces, which were, until now, emblematic of the Noaillian in la Grotte du Trilobite (Goutas 2013). But it is, as of yet, difficult to make sense of this observation. Does it tend to show the absence of synchrony in the evolution of lithic and bone technical traditions, to counter-balance the originality of the Rayssian lithic system, to point towards the integration of distinct technical norms (Goutas 2013)? As Pottier (2005) points out, it is important to recall that there is a majority of Isturitz type pieces in the upper part of layer 4, which is a complex containing abundant Raysse burins (Bricker 1995). Once again, radiocarbon dating does not resolve which of these hypotheses bears the most weight (Klaric 2007, 2013). Undoubtedly, a combined approach will allow us to gain insights into the relationships between coexisting or successive traditions during the Gravettian.

Instead of adopting an essentialist approach aimed at interpreting the Gravettian, the Rayssian and the Noaillian as expressions of a Palaeolithic reality, it is imperative to address the multitude of latent information by studying the evolutions and the interactions between these technical traditions on different levels. The aim is to understand which modifications, which social network reorganizations translate these technical changes. However, rather than considering them as diagnostic of the Gravettian, it is important to remember that "the Gravettian does not exist".

For thirty years in France, studies of the Gravettian have redefined the tools, verified the archaeological sequences by revising studies of collections or resuming fieldwork, reconsidered the seriation, introduced a multitude of new techniques, reconsidered the technical, economic or social data. Yet the overall

framework of reflection, the Gravettian, remains irrational. In sum, the aim is still to enhance our understanding of the Gravettian. As Bourdieu says of the State (Bourdieu 2012), since the Gravettian, the point of view is always based in the Gravettian. Is this still useful? Describing the diversity of techniques, acknowledging the originality of the practices, attributing a new site to this period only perpetuate the existence of this "chimera" (Clark & Riel-Salvatore 2012).

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