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## *Lithic Management in the Chassey Culture Neolithic*

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*Version peut-être non définitive*

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### Abstract

The integrated technological approach of the lithic industries in Southern France Chassey culture and neighbouring cultures is a way to highlight a complex organisation of space.

The development of long distance diffusion networks of lithic products from western Provence creates interdependence between producing-exporting sites and receiving-consuming sites. The analysis of their functioning, from raw material sources until remote consuming sites, is undergone on various scales (from supra-regional to local), through lithic technology and use wear analysis.

### Introduction

The question of spatial organization and mobility within the southern French Chassey culture and the neighbouring cultures, at the end of the 5<sup>th</sup> and during the first half of the 4<sup>th</sup> millennium, is taken up from research carried out by the authors on the lithic

industries of some 20 sites. We base our study on an integrated technological approach, reaching from the acquisition of raw materials to the use of the lithic products obtained. These data make it possible to propose a broader interpretative framework concerning the circulation and the exchange of materials through the spatial distribution pattern by adding a qualitative dimension (Perlès, 2007). This indeed leads us to reason not about materials, but about technical products. As a result, research concerns the diffusion of these products, by integrating, among other data taken into account, their position in the chaînes opératoires of the productions, the level of know-how implemented by the producers, and the circumstances of their use and management. The questions that arise are about the relationship between the lithic productions and the diffusion networks, the technical, economical and social status of the lithic products, the methods of acquisition and consumption of these products in relationship with spatial organizations and mobility systems on various scales, and the changes that these spatial organizations undergo in time and space.

## **1/ From Raw Material Sources to Consumer Sites: Networks as a key element in the Organization of Space**

In the south of France, in northern Italy and in Catalonia, the lithic productions in flint from the western Provence (primarily flint of the lower Cretaceous - Bédoulien - and, to a lesser extent, flints of the Tertiary – Oligocene) were massively diffused in several cultural spheres : the Southern Chassey culture, the Montbolo and Sepulcros de Fosa cultures of the Catalan middle Neolithic and the culture of the Vasi a Bocca Quadrata followed by the Chassey and Lagozza cultures in northern Italy, (Binder, 1998 ; Briois and alii, 1998 ; Léa, 2004 a and b, 2005 ; Gibaja, 2004). The diffusion is not however homogeneous; on certain sites the regional and local flints form a significant part of the assemblages.

Various lithic productions with different modes of diffusion have been identified. The blade productions in Bédoulien flint, the principal sources of which are situated around the Mont Ventoux and the Monts de Vaucluse, had the most massive and the most far-reaching diffusion, and are also the best studied.

The diffusion of these lithic productions in Bédoulien flint is an important phenomenon in the Provence as far back as the early Neolithic, during the 6<sup>th</sup> millennium BC, whereas west of the Rhône, in the Languedoc region, an important diffusion is only documented from the second half of the 5<sup>th</sup> millennium BC onward (Binder 1998 ; Léa 2004a ; Briois 2005). Their diffusion becomes massive over the whole of the area studied with the appearance of the technique of heated cores, between 4200 and 4000 BC (Binder 1984 ; Léa and alii, 2004). This diffusion continues during the first half of the 4<sup>th</sup> millennium BC. At the end of the 4<sup>th</sup> millennium, in contexts of the late Neolithic, a circulation of products (but no more preforms ready for débitage) can still be noted. In Catalonia, part (not yet quantified for the moment) of the flint productions known as “melados” originate from Vaucluse Bédoulien flint sources (examination D. Binder, R. Guilbert and V. Léa). Other sources of “melados” flint have not yet been identified.

The diffusion of the heated Bédoulien flint productions takes place either in the form of cores ready for ‘débitage’ or in the form of bladelets. The blades in un-heated bédoulien flint, obtained by well mastered indirect percussion or by pressure, circulate in the form of finished products, being blades ready for use. Diffusions of flakes and bladelets in un-heated bédoulien flint are also documented.

Three sites in the Provence (the pre-Chassey levels of Fontbrégoua, Giribaldi phase B, L’Eglise supérieure layer 8) document a phase (during the second half of the 5<sup>th</sup> millennium) during which flakes were massively imported and knapped by bifacial ‘débitage’.

There was also quite a large diffusion of Oligocene flint products, either un-heated (flakes, blades) or heated (bladelets). Within the lithic assemblages found on what can be

qualified as consumer sites, these largely diffused productions are variously combined in shifting proportions, underling (Binder, 1998), with some other productions of remote origin (quartz and obsidian) and with more basic productions on local raw materials.

In spite of the massive character of the diffusion of western Provence flint up to Liguria, the Aquitanian Basin and Catalonia, the proportion and the absolute quantity of these imported products vary considerably according to the sites. If we solely take into account the diffusion of bédoulien flint, we can distinguish several zones (fig. 1):

- A zone located in the immediate vicinity of the extraction sites of raw material. The sites in this zone are characterized by the presence of a great quantity of bédoulien flint, which represents the totality or at least a very high percentage of the industry. It can be defined as the production area, insofar as these sites are places of local production, either on a massive scale (Saint Martin, La Combe, Les Trois Termes, Rocalibert) or with a more limited output (les Aubes, les Rostides).
- A vast zone of massive diffusion, where numerous receiving or consumer sites comprise a majority of imported bédoulien flint. These sites can be close to the production area (La Bertaude at Orange, Claparouse at Lagnes), or far of, up to 300 km to the west (Auriac, Aude ; Saint-Michel-du-Touch, Haute-Garonne), or more than 250 km to the east (Giribaldi, Alpes-Maritimes ; Arene Candide, Liguria ; Binder, 1998). Within this zone however, there exist sites with very different proportions of bédoulien flint, sometimes very small (for instance Port-Ariane in the Hérault). These quantitative disparities do not organize according to a regular regression in line with the distance, and testify to the complexity of the circulation networks. Certain sites are characterized by the coexistence, within the lithic assemblages, of important quantities of raw material from remote and very

distant sources, in particular Provence flint and obsidian (Giribaldi in the Alpes-Maritimes, La Cabre in the Var, Trets Terres Longues in the Bouches-du-Rhône).

- A remote zone, in Catalonia, at a distance of more than 400 km, where the productions of 'melados' flint (among which an unspecified proportion of bédoulien flint) have an unequal distribution: while abundant in funeral contexts (Bòbila Madurell), they rarely occur on settlement sites (Ca N'Isach). Moreover, the products in 'melados' flint, far from decreasing in quantity from the Pyrenees in the north towards the south, are concentrated in two regions, the Vallès and the Solsonès; Almost all the cores are found in the Vallès; some sites however, such as Cami of Can Grau, are without (Gibaja, 2003, 2004 ; Gibaja, Palomo and Terradas, 2006).
- A peripheral zone where the imported bédoulien flints form a minority (Capdenac-le-Haut, Lot ; Roucadour, Lot ; Montou, Pyrénées orientales).

Within the diffusion area, know-how is not shared. The most elaborate know-how concerns the shaping out and the heating of the cores, as well as the 'débitage' of robust blades in un-heated flint, all of which is only mastered within the production area (Binder and Perlès 1990 ; Binder and Gassin 1988 ; Léa 2004a). It is indeed near the sources of raw material that we find sites where great quantities of cores were shaped out (Léa, 2004b, 2005 ; Léa and alii 2004). Beyond the production area, no sites are known where cores were shaped out and heated, even if raw material of sufficient quality was available. Thus, on the Chassey site of Lattes in the Languedoc, near Montpellier, the neolithics exploited bédoulien flint pebbles, in secondary position in alluvia (Léa 2004a). These flints are of the same origin and of the same quality as the bédoulien flints from the Vaucluse that feed the diffusion networks, and the pebbles are of a sufficient size for a 'débitage' of bladelets by pressure. However, the local knappers only exploited these pebbles to obtain flakes by direct percussion, while they imported heated cores from the Vaucluse from which they obtained bladelets by pressure. The 'débitage' by pressure of

bladelets from shaped out and heated cores is indeed attested on numerous consumer sites within the diffusion area, such as at the cave of l'Eglise supérieure, at Lattes, at Auriac PIV, but also in Catalonia, for instance at Bòbila Madurell. One could speak of domestic 'débitages' (Binder and Gassin 1988) given that these 'débitages' demand lesser know-how than the shaping out of cores. There are also indications that bladelets circulated as finished products. In the zone of remote diffusion, in Catalonia, we can distinguish several types of receiver sites. The blade products in 'melados' flint are only numerous on funeral sites. But there are also strong differences between the funeral sites themselves. In the necropolis of Bòbila Madurell, there are cores in 'melados' flint that are not exhausted, repaired and maintained products, used or new blades, sometimes presenting connections between them; some tombs, with richer funeral gifts as others, stand apart with the presence of several cores. In the necropolis of Cami de Can Grau there are no cores; there are blades in 'melados' flint, but they represent à lesser proportion of the grave goods. No difference in the richness of the gifts has been observed (Gibaja, 2003, 2004). In the peripheral zone, it is possible that only the finished products circulate in certain cases, while the users do not master the 'débitage' by pressure, such as in Roucadour where the bladelets in heated fair flint are only present on a very anecdotic scale, while cores and flakes are totally missing, or at the Arene Candide (Binder, 1998). It is this absence of mastering the most elaborated know-how which made it possible to propose the hypothesis of specialised productions conceived for a diffusion in quantity, destined to circulate over long distances (Binder and Perlès, 1990 ; Perlès 2007).

The importance of these specialized productions confers on the Chassey lithic industries a relatively standardized character. We therefore wondered about the existence of standards of management for these productions by the users-consumers. In particular, we tried to check if there were specific uses for certain categories of lithic products, indicating the

existence of mental models of use for these products, models which would have been integrated into the lithic producers project.

## **2/ Exported products: Utilitarian and Social values**

It is possible to distinguish differences in the management methods used according to the technological categories of the diffused products and according to the region. The management of blades in un-heated bédoulien flint (and, in the Provence, blades in un-heated Oligocene flint) within the area of massive diffusion can be described through the example of the cave of the Église supérieure (Binder and Gassin, 1988 ; Gassin, 1996, 1999). The majority of imported blades that show traces of use are retouched, whereas the bladelets obtained by pressure on imported heated flint and the flakes from local or from imported flint, mainly knapped on the spot, are in their vast majority used without retouch, with the exception of flakes transformed into bifacial or bi-truncated geometrical points. Most of the blades were used in several different zones, both untreated edges and retouched edges, and were mainly used along the untreated edges with no retouch (fig. 2). Indeed, it appears that the retouch was frequently a way of resharpening or of recycling blanks first used untreated. More than a third of the blades in un-heated Oligocene or bédoulien flint were the subject of recycling for one or several uses different from their initial function.

One notes a great flexibility in the use of these imported products. By comparing two close sites, the Grotte de l'Église and the Baume Fontbrégoua, 20 km apart, one observes that in the Grotte de l'Église the bladelets were especially used to cut (as is the case for a majority of the series analysed), whereas the flakes in local raw material (pebbles from the Verdon) were mainly used to scrape. In Fontbrégoua, where there is no local raw material, the bladelets are indifferently used to cut and to scrape. This opportunist



behaviour suggests that the exported blade productions are conceived as being primarily multipurpose.

The differences between productions are in fact especially visible on the management level, which opposes products with a long management, circulating as finished products, intensely used and recycled, and products with a short management, where the débitage mostly occurs on the spot, and are less intensely used and recycled. The blades in unheated flint (Bédoulien or Oligocene) of the first group are characterized by their very intense use, by the methods of their maintenance (consecutive use of both edges, and even other active zones such as fractures, and frequent transformations by retouch), as well as by a great diversity of uses (fig. 3). The bladelets in heated bédoulien or Oligocene flint and the flakes on local or imported raw material form the second group. The maintenance of the bladelets is primarily done by the consecutive use of the two edges, retouching not being very frequent. Most of the flakes have only a single zone of use and are even less often retouched.

The ranges of uses of the productions also show differences. On the analysed sites - L'Église supérieure (Var), Fontbregoua (Var), Giribaldi (Alpes-Maritimes), La Combe (Vaucluse), Montou (Pyrénées-Orientales), Saint-Michel-du-Touch (Haute-Garonne), Roucadour (Lot) – the imported blade products are primarily characterized by their extreme functional multipurpose; and only the harvest activity is specifically reserved for the blade products. The same multipurpose has been noted on sites in Catalonia. The domestic productions have more limited functions, and therefore appear as being more specialized. Thus, on the pre-Chassey site of Giribaldi in Nice, one observes an important production of small flakes obtained by bifacial retouching of imported bédoulien flint flakes. These small flakes were mainly used to work on bone material (grooving, scraping) and show a lesser diversity of uses than the blades imported as finished products on the same site.

If the functional multipurpose of the blades has been observed everywhere, the same does not apply to the variations in the intensity of use of the different technological categories.

At la Combe (Caromb, Vaucluse), only a few kilometers from the sources of raw material, where cores were shaped out and the 'debitage' of blades took place, only a single blade was retouched, and all the other used blades were used by the unretouched edges (fig. 4). Although the blades were sometimes used on both edges, or the same edge was the subject of different successive uses, there was no maintenance or recycling of the blades by retouch. Only the piercers were worked by retouching for their use. The analysis has however not yet advanced enough to evaluate the differences in intensity of use of the various technological categories (blades / bladelets / flakes). However, the partial data from la Combe make it possible to propose the hypothesis of a "short term management" of the blades on a site with an abundant specialized production, situated at the head of the diffusion networks.

In Catalonia, one can oppose the site of Bòbila Madurell, where most blades are used unretouched, and where the narrowest blades are less used than the large blades, to Camí de Can Grau, where the majority of blades are used retouched and where there is a high usage of all the blades, including the narrowest (Gibaja, 2003).

Beyond these statements concerning the link between the quantitative availability of the products and the intensity of use and recycling, one can underline the facts which dissociate from this logic of an economic nature.

1. In Catalonia, in the zone of the furthest diffusion, and outside the cultural context associated with the production of these blades, one notes a marked investment in funeral rituals. The presence in some burials of Bòbila Madurell of unused blades that present connections between them, suggest that in these cases the aims of the lithic production was the obtaining of products to accompany the buried corpse (Gibaja and Terradas, 2005). One can wonder if the conception and the value of the imported products changed, or if there is not right from the start a specific production intended for these burial

practices. The presence at la Bòbila d'En Joca of completely condemned cores in Provence flint (pitted arrises, proximal ends destroyed by scars) even suggests the import of cores that were not intended to be knapped.

2. The fact that flakes in bédoulien flint, products with no particular technical investment, were diffused over long distances, to places where local raw material often provides an equivalent, stresses the social role of diffusion and exchange. As much as the useful tools, it is the exchange itself which appears enhanced.

### **3/ Spatial organization of technical activities within the local territory**

The integrated approach of the lithic industries also furnishes indications on the circulation and the management of lithic productions on a large scale, the scale of a local territory, which could be qualified as community territory.

#### **A/ Circulations, rhythm and duration of occupations**

At the cave of Montou, in a Montbolo context, it has been shown, by the presence of cores in a terminal phase of production and by a few small flakes, that the bladelets in heated flint were struck off on the spot. These bladelets are far from numerous (approximately 15% of the lithic industry). They probably concern the end of the débitage, the cores having already been the object of earlier débitage in other places. The concept of intermittent débitage (fig. 6) has been proposed (Léa, 2005, 2006). There would be a circulation of cores within a local territory, with phases of débitage when necessary, according to the needs linked to the tasks to which the occupants of the site devote themselves. In this specific case, the bladelets were used to cut plants and soft animal material. Likewise, the blades in bédoulien flint, resharpened, transformed and recycled to the extreme, are at the end of the cycle of use and show a long and complex chronology of uses (fig. 5, 6). Only the last uses of these blades would be related to the occupation of the site, and thus with its function. They were used before retouching to

collect plants, and after retouching to scrap and split plant stems and for the fabrication of pottery. The blades in unheated bédoulien flint and the cores in heated bédoulien flint would belong to some mobile equipment, which the users took with them during their cycles of exploitation of the territory. This would be compatible with the short but recurring occupations of the site, as shown, in particular, by the sediment studies (F. Claustre, oral com.). It is also probable that at this stadium of the processes of diffusion, part of the unheated blades circulated fitted to a handle.

It is therefore necessary to take into account the chronology of the uses so as to identify the uses in situ of the tools and to distinguish them from former uses, linked to the exploitation of other parts of the territory.

The model of intermittent debitage is not the only possible one for the bladelets : at the grotte de l'Eglise supérieure, there seems to have been stockpiling of bladelets obtained by debitage on the spot and only partly used. Cores give evidence to the debitage in situ. In layer 6, most of the unused bladelets were grouped together in a zone at the back of the cave, whereas the used bladelets were spread out over whole the excavated area. Throughout all the layers, it was noted that the largest and most regular bladelets were more frequently used; the hypothesis of a choice by the users in a stock of bladelets could explain this fact. This mode of building up an assemblage could be correlated with occupations of a longer duration.

## B/ Functional complementarities

The spatial organization of the territories is also revealed by the functional specificities of the sites, which the techno-functional approach helps to define. These specificities can be interpreted in terms of functional complementarities between sites, on the scale of subsistence territories or community territories.

The relative importance of arrowheads with impact traces and of used sickle blades shows strong contrasts between sites. One can distinguish a group with a strong presence

of armament (Roucadour, Eglise supérieure 8 à 6) and a group more invested in harvest tools (Chiris, Bòbila Madurell fosas). The comparison between two sites where the composition of the fauna is very contrasted, with mostly hunted wild species at Roucadour (Lot) and mainly domestic species at Chiris (Alpes-Maritimes), show that the percentage of impact fractures on arrowheads is higher on the site where hunting is an important activity. In this case, there is a functional link between the use of weapons and hunting. The presence of numerous intact arrowheads at Chiris, a site with no direct link to hunting activity, shows either the circulation of weapons and tools within the territory, or specific functions for the weapons, independent or complementary with hunting functions: male display, games, war.

The functional status of the sites may undergo developments linked to changes in the territorial organization. On the two stratified sites of the Baume Fontbrégoua and the grotte de l'Église, the more recent levels show a bigger diversity of activities than the older levels. This could be explained by the breaking up of vast territorial units, associating complementary specialized sites, on which the range of tasks carried out is restricted (old phase), into small more autonomous units, characterized by more diversified activities (recent phase).

The particular weight of activities of the artisan type can be identified through techno-functional studies. On the site of La Combe, close to the raw material deposits of the Mont Ventoux, an important production of blades takes place through a single integrated 'chaîne opératoire', starting with the production of unheated blades by indirect percussion or pressure, then, after transforming and heating the same cores, continuing with the debitage of bladelets in heated flint by pressure (Léa and alii 2004, Léa 2005). The uses of the lithic products show a weak representation of the activities linked to the acquisition of food, and a strong representation of activities concerning the transformation of mineral, plant or animal material. On the Giribaldi site, an importing site situated far from the sources of raw material, an important part of the lithic tools was used to work

bone (Gassin and alii, 2004). This same site is at the same time characterized by an abundant production of pottery, probably specialized.

## **Discussion**

The barémo-bédoulien flints of the western Provence were the object of a large scale exploitation and diffusion within the societies of the Southern French Middle Neolithic. A technological and functional approach of these lithic elements allows us to discuss the territorial organisation of the Chassey Culture communities, from the angle of their relationship to sedentariness and mobility.

The sites with specialized workshops located in the immediate vicinity of deposits of barémo-bédoulien flint are the only ones that seem to have had direct access to the sources of raw material. The consumer sites located at less than one day walking from the deposits do not seem, indeed, to have had a direct access (La Bertaude, Claparouse, la Blaoute in the Vaucluse). This statement suggests the existence of a close control of the sources by some of the communities.

The diffusion of barémo-bédoulien flint takes place primarily in a vast area of massive diffusion for which no notable decrease in quantity of the diffused products can be observed in relationship to the distance. The exported products are blades and bladelets, preforms and cores, but also flakes. There seems to be no difference, in quantitative or qualitative terms (nature of the products, degree of intensity of use and recycling), regarding the geographical distance within this area, including the receiver sites situated at less than one day's march from the sources. This diffusion seems to build on exchange networks ensuring a regular supply. If one refers to the theoretical models proposed by C. Renfrew (Renfrew, 1984), such a distribution invalidates the hypothesis of "down-the-line" exchanges (successive exchanges across successive territories). It reveals then not only a circulation by intermediation but especially an important structuring of space, with complex (and stable?) relational networks between sites.

Some particular cases have been identified on the margins of the area of main diffusion. They must be underlined because they probably reveal a multiplicity of functioning, on the periphery of course but maybe also, without us being as yet able to identify it, within the main area.

A quantitative decrease of the products is observed starting at the north-western margins of the massive diffusion area (“peripheral area”), which could this time be the sign of a secondary “down-the-line” diffusion.

A redundant phenomenon was noted: in most of the caves occupied during the Chassey period in southern France, blades and bladelets in barémo-bédoulien flint are rare. However, in some of these caves the presence of seasonal pastoral activities has been clearly proved. In the Pyrénées Orientales, in the cave of Montou in a not Chassey but Montbolo context, the few barémo-bédoulien products are spread throughout several layers of seasonal, transitory occupations. The intermittent blade debitage (Léa 2005) takes place here on an extremely reduced scale, and in a relatively marginal place within the community territory. Even if the equipment needed to produce bladelets (a compressor in bone) is present at Montou, it remains difficult to defend the hypothesis of itinerant pedlars, specialists in knapping and who would accompany certain members of the communities on their trips (related to pastoralism in particular). There remains then the hypothesis according to which certain know-how needed to carry out pressure debitage on preforms or cores is diffused within the receiving communities. The analysis of the Montou material has, moreover, permitted a new particular view on barémo-bédoulien productions and to propose the concepts of intermittent debitage (heated bladelets) and of intermittent use (un-heated blades), at several points on the diffusion routes.

Indications of intermittent use of un-heated blades have been observed on other sites, within the area of massive diffusion and one can suppose that these blades are, generally, conceived, outside the area of production, as tools with a long lifespan. On the other

hand, we have shown that, within the area of massive diffusion as well as on its margins, intermittent debitage was not the only mode of providing users with bladelets in heated flint, and that other methods were possible: constitution of a stock of bladelets within the framework of domestic debitage, import of bladelets already struck off.

In Catalonia, in a cultural space different from that of the Chassey culture, the productions in fair flint had a particular status, probably socially enhanced as is shown by their abundance in burial contexts. The abundance of cores in certain tombs would suggest that certain individuals could have played a privileged role in the diffusion of lithic productions in this region; these individuals could constitute the social elite (Gibaja, 2004). The hypothesis of the existence of redistribution centres of imported blade products, having a privileged contact with the groups that exploit the raw material or with groups that play the part of intermediaries has been proposed, with cautious reserves (Gibaja, 2003). We propose to see here the indications for the existence of “central locations” (Renfrew, *op. cit.*). This hypothesis is maybe better supported in Catalonia than elsewhere, in the Provence and the Languedoc in particular. At all events, this change of status of imported productions could take place within the diffusion network(s) that feed the communities of the Languedoc (Briois and alii, 1998, Léa, 2004a), by the crossing of a cultural border. But it is also possible to consider that these goods belong to circulation networks different from those of current goods, where, right at the root, the producers know that their products have a vocation to be invested with symbolic value in the context of funeral practices.

A contrasted situation is visible in the South of France. Whereas, in the Provence, the Rhône valley or the eastern Languedoc, the lithic productions of the Vaucluse are almost totally absent from grave goods, the blade products are present in tombs in the Aude and in the Garonne valley : burial monument A185 at Saint-Michel-du-Touch and tomb CAO-4 at Villeneuve-Tolosane, possibly Maison Vignaud at Tournefeuille, in the Haute-Garonne, cist tomb of las Faïchos at Cournanel in the Aude (Vaquer, 1990 ; De la Briffe



and alii 2007). It seems that here the blade productions would be socially and symbolically enhanced, on the margins of the diffusion area, whereas they would not profit of such an enhancement within the area of massive diffusion, where they would be confined to technical uses. But, contrary to what was observed at la Bòbila Madurell, none of these sites present indications of controlling this diffusion or permit to evoke a network or a period of diffusion specifically aimed at burials. Indeed, the blade productions in bédoulien flint represent an important part, sometimes the majority, of lithic equipment on sites of the western Languedoc. The difference observed in the funerary domain with more eastern regions suggests, for this region, a double statute for the imported Provence productions: at the same time basic element of the technical system, integrated into everyday life, and precious goods strongly enhanced. The distance crossed from the production zone, be it geographical or cultural, seems to play a determining part in the acquisition of this characteristic of “precious good”.

It seems that the structuring of space is more difficult to highlight within the area of massive diffusion. The hypothesis of “central locations of redistribution or market places, where high proportions of flint are recorded”, has been discussed for certain sites that have rendered abundant imported lithic industries, such as Auriac, Lattes, la Cabre, Chiomonte-la Maddalena in the Piémont (Léa, 2004a). Indeed, the criterion of abundance of imported lithic products does not seem sufficient, in the absence of facts such as the presence of preforms or little exploited cores, caches or reserves of cores and blades, indications of a local mastering of the techniques of shaping out, heating and debitage. The big open air sites of the Rhône valley, such as Le Gournier or of the Garonne valley (Vaquer, 1990) have sometimes been interpreted as places of periodical gatherings of the populations for social events that reinforce the cohesion of the groups. These places could have played a key part in the diffusion of lithic productions. However, one does not find convincing evidence of their functioning as places of exchange. The diversity of the imported raw material and of the sources, as at Nice-Giribaldi, at Saint-Raphaël-La Cabre

or at Trets-Terres Longues, where the lithic assemblages associate in particular flint from the western Provence and obsidian, in large quantities, could constitute a significant indication of its status as a place of exchange.

The observations that one can make on the functioning of the diffusion networks of lithic productions suggest the existence of nodes in these networks, at two different spatial levels of functioning of these networks: supra-regional and local. The different sites belong at the same time to two spheres of circulation. On the supra-regional scale, the network would be structured by places from where the flows of diffusion would be organized. The sites in the production zone form the head of these networks; the distant nodes seem only to be convincingly perceptible in Catalonia, and maybe in the eastern Provence. The arguments are missing to characterize such sites within most of the area of massive diffusion. At the local scale, there would be sites at the heart of the community territories, organising the circulation according to daily or seasonal rhythms, tied to the exploitation of the subsistence territory. It seems that sites where artisan production functions are developed occupy node positions, on these two scales of observation.

The spatial organization of the production and the diffusion of lithic industries in bédoulien flint is different from that described for stone axes in metamorphic alpine rocks (jadeitites, omphacites and eclogites), where part of the producer sites are established at quite a long distance from the deposits of raw material, between 40 and 120 km (Thirault, 2004). This example underlines the fact that the structuring of space by the diffusion of knapped lithic productions in bédoulien flint is only one aspect of the spatial organization of the Chassey communities. The aureole model drawn by the diffusion starting from the production zone in the immediate vicinity of the deposits in the Vaucluse must not be interpreted as a centre-periphery model, which would suppose some form of domination by the centre over the periphery. Such a dissymmetry of the interactions would logically translate itself by a hierarchical organization of the spatial framework but up till now no indication of the kind has been noted, if it is not perhaps, at a regional scale, in Catalonia.

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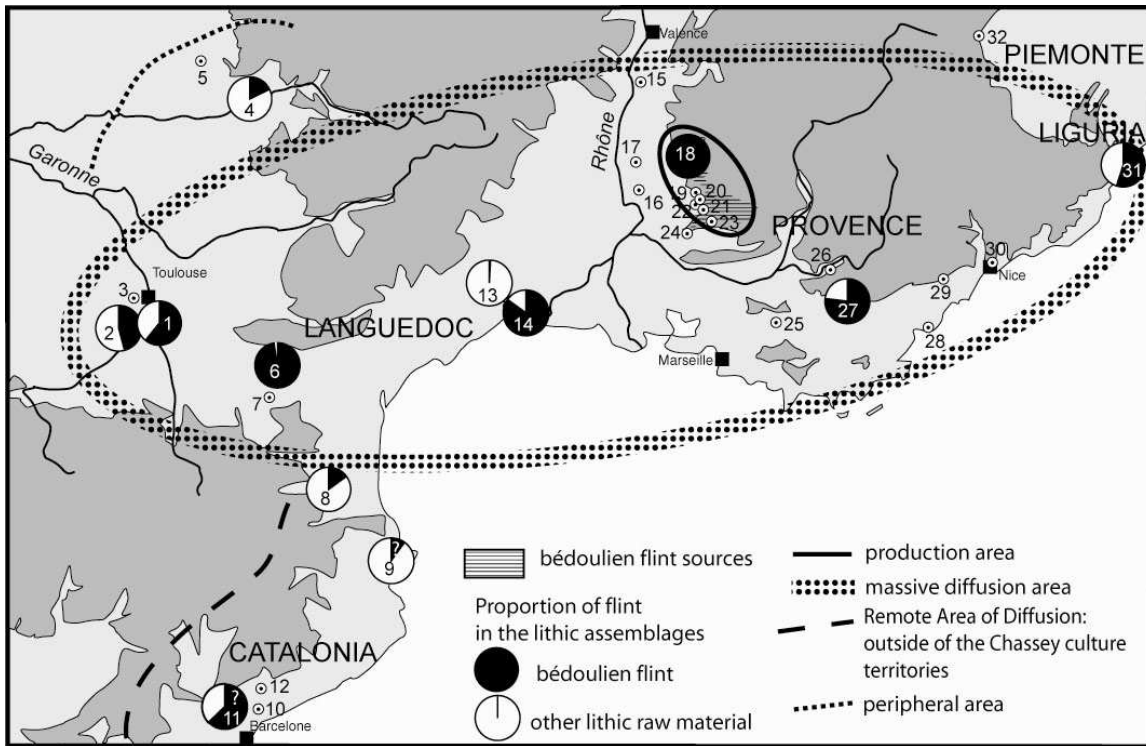


Figure 1. Bédoulien flint diffusion areas. End of Vth – beginning of IVth millennium BC.

- 1 Saint-Michel-du-Touch, Toulouse (Haute-Garonne) ; 2 Villeneuve-Tolosane, Cugnaux (Haute-Garonne) ; 3 Maison Vignaud, Tournefeuille (Haute-Garonne) ; 4 Capdenac-le-Haut, Capdenac-le-Haut (Lot) ; 5 Roucadour, Thémines (Lot) ; 6 Auriac, Auriac (Aude) ; 7 Las Faïchos, Cournanel (Aude) ; 8 Montou, Corbères les Cabanes (Pyrénées orientales) ; 9 Ca N'Isach, Palau-Savardera (Girona) ; 10 Bòbila d'En Joca, Montornès del Vallès (Barcelona) ; 11 Bòbila Madurell, Sant Quirze del Vallès (Barcelona) ; 12 Camí de Can Grau, La Roca del Vallès (Barcelona) ; 13 Port-Ariane, Lattes (Hérault) ; 14 Lattes, Lattes (Hérault) ; 15 Le Gournier, Montelimar (Drôme) ; 16 La Bertaude, Orange (Vaucluse) ; 17 Rocalibert, Piolenc (Vaucluse) ; 18 Saint Martin, Malaucène (Vaucluse) ; 19 La Combe, Caromb, (Vaucluse) ; 20 la Blaoute, Crillon le Brave (Vaucluse) ; 21 Les Aubes, Blauvac (Vaucluse) ; 22 Les Rostides, Villes sur Auzon (Vaucluse) ; 23 Les Trois Termes, Gordes (Vaucluse) ; 24 Claparouse, Lagnes (Vaucluse) ; 25 Terres Longues, Trets (Bouches-du-Rhône) ; 26 Grotte de l'Église supérieure, Baudinard (Var) ; 27 Fontbrégoua, Salernes (Var) ; 28 La Cabre, Saint Raphael (Var) ; 29 Chiris, Grasse

(Alpes Maritimes) ; 30 Giribaldi, Nice (Alpes Maritimes) ; 31 Arene Candide, Finale

Ligure (Liguria) ; 32 Chiomonte-la Maddalena, Chiomonte (Piemonte)

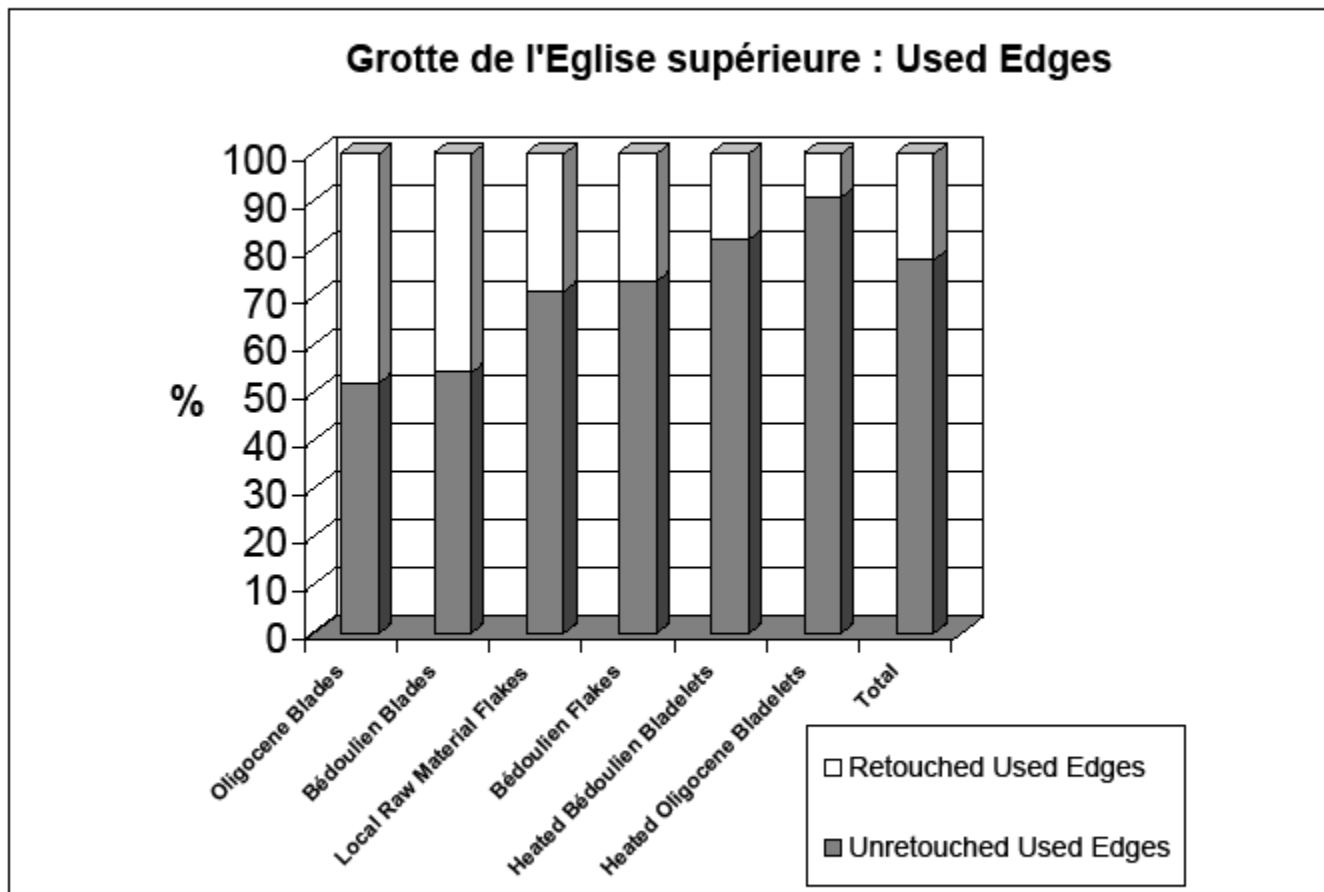


Figure 2. Grotte de l'Église supérieure : nature of the used edges.



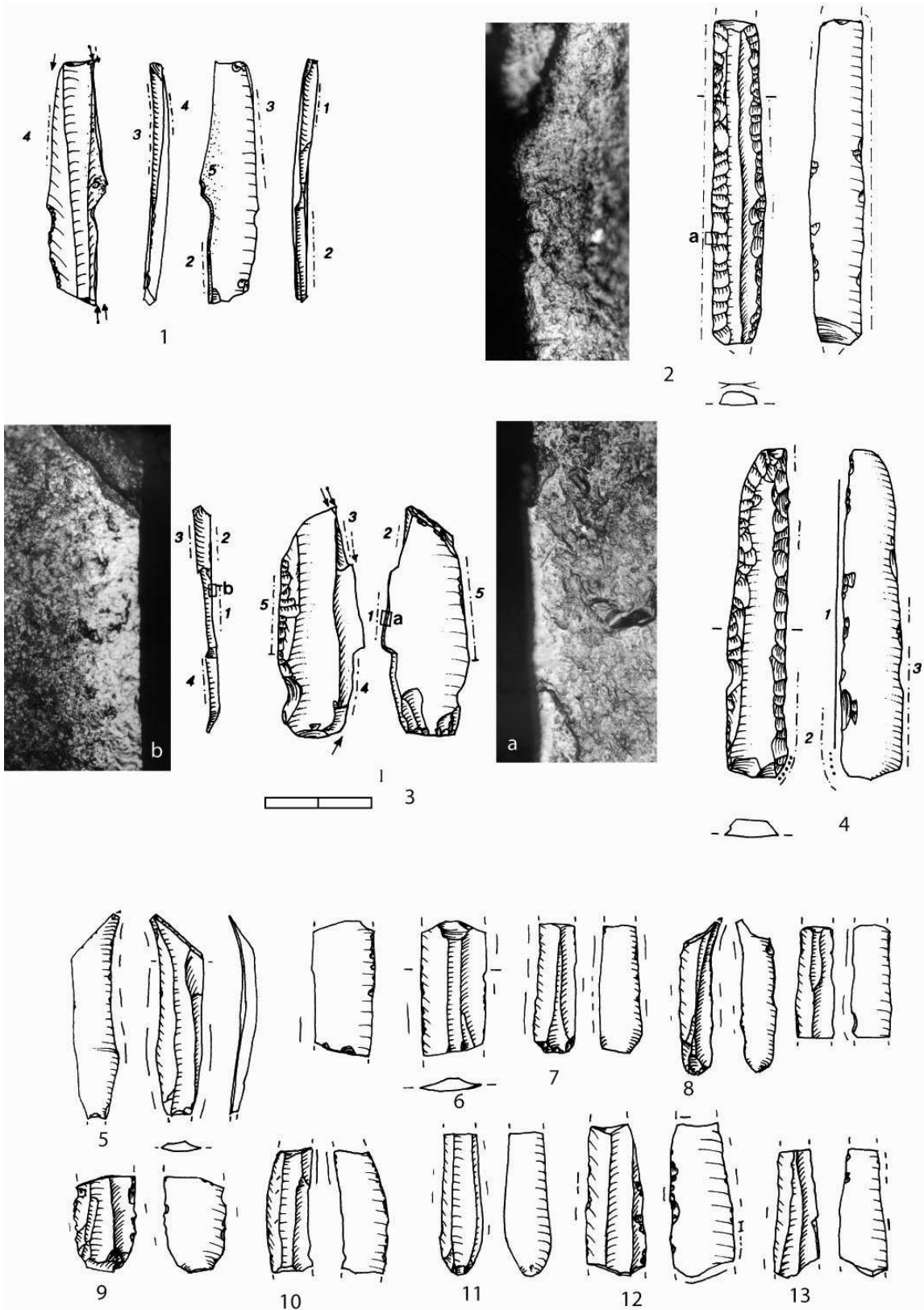


Figure 3. Differences in the management of imported products in the Grotte de l'Église.

1 : n°377, c. 5. Non heated bédoulien flint. Used to cut vegetal (used zone 5), then retouched in burin, and used to scrape vegetal (used zones 1 to 4). 2 : n° 41, c. 7. Non heated bédoulien flint. Scraping hide with both sides. 3 : n° 155, c. 6. First used to scrape hide (used zone 5), and then used ans rejuvenated as a burin to scrape vegetal. 4 : n° 36,

c.8. Non heated bédoulien flint. Cutting vegetal (used zone 1), then retouched and scraping hide (used zone 2). Scraping hide with the other side (used zone 3). 5 to 14 : level 4B/5. Heated bédoulien flint. Bladelets used in butchering (Gassin, 1996).

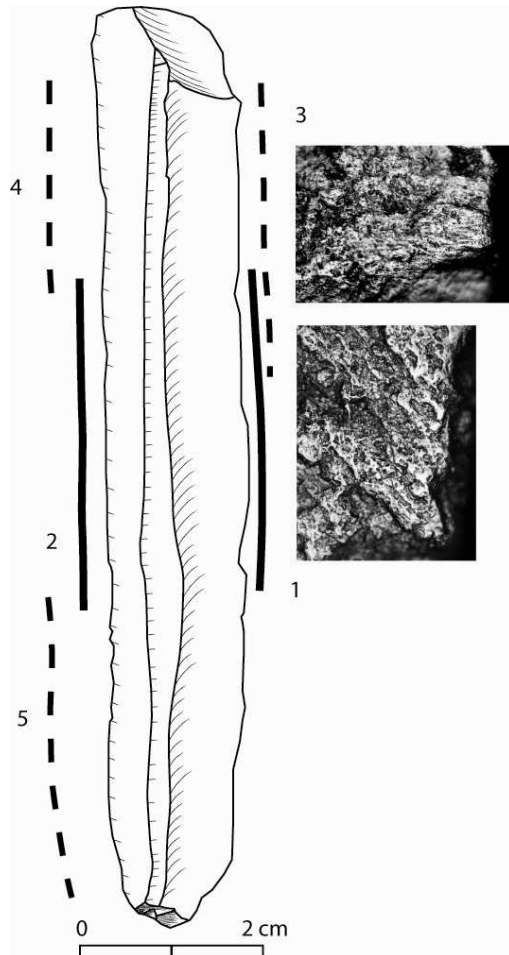


Figure 4. Blade in non heated Bédoulien flint in La Combe site, used without any retouch.

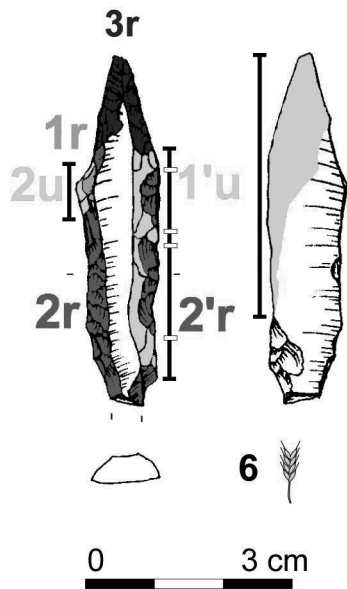


Figure 5. Montou. Unheated bédoulien flint blade. Tool rejuvenation. u :use. r :rejuvenation.

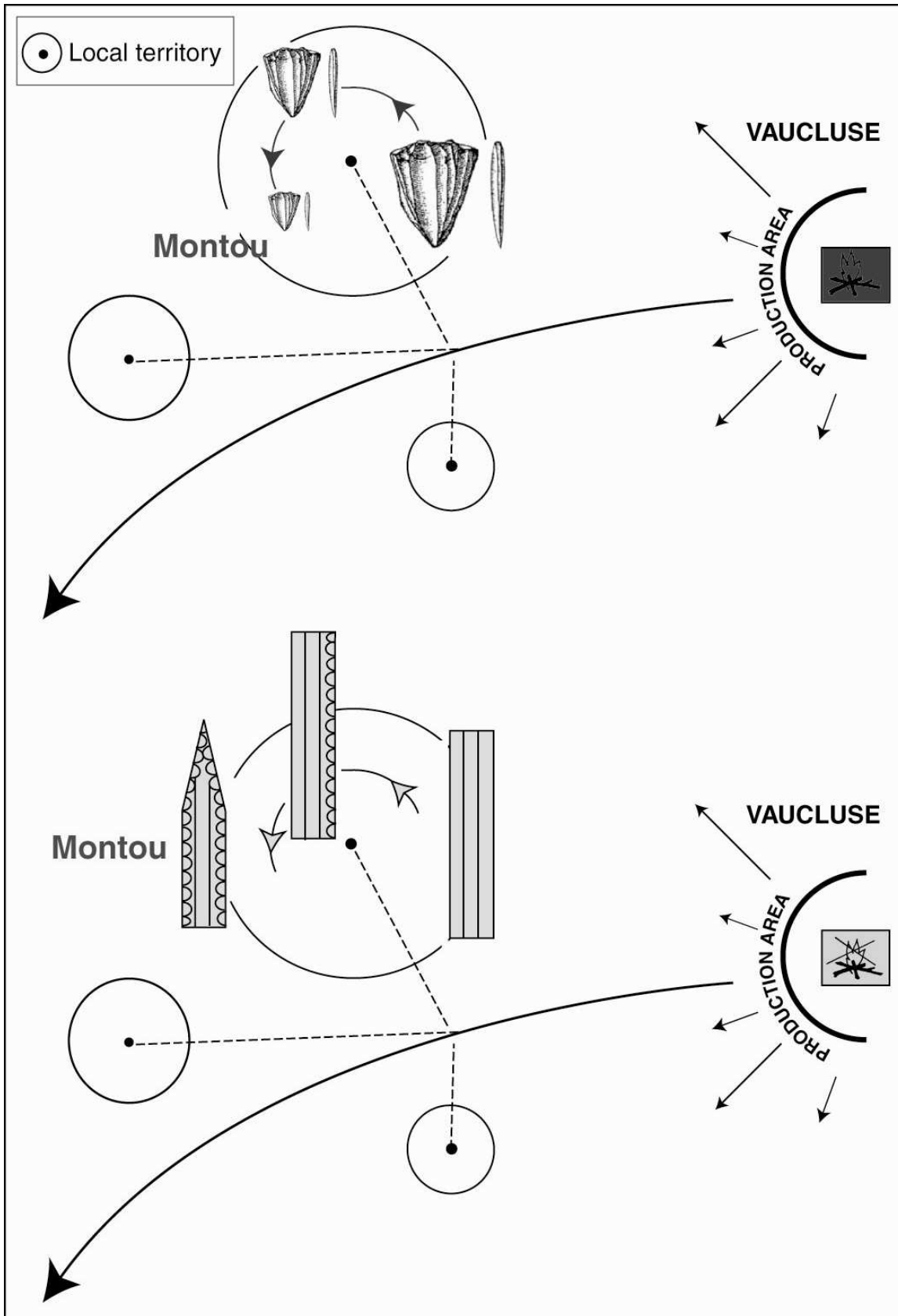


Figure 6. Intermittent debitage of heated cores and curation of imported non-heated Bédoulien blades in Montou cave (Léa, 2005, 2006).

