

Acquisition and Circulation of Flint Materials in the Linear Pottery Culture of the Seine Basin

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Abstract: This paper proposes a synthesis of recent discoveries and their implications for our knowledge of the Danubian lithic territory of acquisition and the circulation networks. With the recent discoveries it is really possible to talk in terms of networks in so far as the various links are now known for the Danubian period – from the flint's extraction site to its sites of production and consumption. These networks played a part in the functions of the society of the Linear Pottery Culture and the relationships of which they are the sign are complex. There is no correlation between the distance from the sources and the intensity of the circulations.

Keywords: Early Neolithic, flint, raw material, flint network, Linear Pottery Culture (LPC)

Introduction

Thanks to preventive archaeology since the 1990s the data available concerning the lithic industry of the Early Neolithic in the North of France have become a good deal more substantial. At present, more than 200 sites can be attributed to the Danubian Neolithic and the chronology of this period is divided in two with the succession of the Linear Pottery Culture (*Rubané* in French) and Blicquy/Villeneuve-Saint-Germain (BQ/VSG) cultures, i.e. 5300–4750 BC.

This article proposes a synthesis of recent discoveries and their implications for our knowledge of the Danubian lithic industries and will give special emphasis to the evolution of the territory of acquisition and the circulation networks for flint in the Early Neolithic in the Paris Basin.

The Seine Basin Linear Pottery Culture (LPC)

The documentation for LPC sites depends on a few well-known (or rather better-known) sectors thanks to major systematic surveillance programmes in the valleys of the Aisne, Oise, and Yonne or Marne. Elsewhere new discoveries have been invaluable indicators for assessing gaps in the evidence and conducting surveys concerning the implantation of LPC in the Paris Basin. For example, the implantation of the sites of Colombelles and Démouville (Billard *et al.* 2014; Saint Allain 2010) at the edge of the Manche proves that the populations of the Early Neolithic settled the western part of the Paris Basin and reached the shores of the Manche as early as the LPC. As concerns the Villeneuve-Saint-Germain / Blicquy occupation density is higher and not only includes the main valleys but also the secondary

valleys and above all the plateaus' edges. The expansion westwards up to the outskirts of the Armorican massif is broadly attested (Marchand *et al.* 2006).

The chronological framework is now established to the extent that most of the recent research on the material culture shows the evident succession and descent of the LPC and subsequent Blicquy/Villeneuve-Saint-Germain cultures. The only important modification concerns a homogenisation of the periodisation in the North France Early Neolithic following numerous works on the ceramic serialisations of various regions (Lefranc 2007; Blouet *et al.* 2013; Meunier 2012). Thus, the Paris Basin LPC has been replaced by the 'Seine Basin *Rubané*' (Ilett and Meunier 2013) and is organised as follows: Middle Seine basin *Rubané* (instead of Middle Champagne *Rubané*), Late Seine Basin *Rubané* (instead of Late Champagne *Rubané*), and lastly Final Seine Basin *Rubané* (instead of Late Paris Basin *Rubané* [RRBP-*Rubané récent du Bassin parisien*] – final phase included). The dates for the whole North France *Rubané* sequence are included between 5300–4950 cal BC.

The LPC lithic industry in the north-east of France has been the subject of several regional syntheses since the pioneering work of Jean-Paul Farruggia (1971). The multiplicity of discoveries from LPC sites in the valleys of the Aisne, the Marne (in the Perthois), the Seine-Yonne confluence and Alsace have led to studies on the lithic finds enabling the features of the Danubian lithic industry to be fixed in its broad outlines (Plateaux 1987, 1990; Tappret and Villes 1996; Mauvilly 1997; Augereau 2004). A global survey of the whole region concerned has been conducted which has made it possible to propose the first general synthesis for the terminal expansion area of the European LPC (Allard 2005).

When we made our first synthesis (Allard 2005) two regions – Yonne and the Aisne valley – offered satisfying conditions for research, i.e. numerous sites with substantial lithic corpora. Now, the discovery of new large lithic assemblages in Champagne at Bréviandes (Laurelut 2010), Saint Martin des Près (Garmond *et al.* 2012), or again Pont-sur-Seine (Fournand *et al.* 2010), as also in Normandy (Billard *et al.* 2014) or again in the Yonne at Etigny le Brassot (Augereau *et al.* 2006) provide a complete overview of the LPC lithic industries in the North of France and more particularly of its evolution in the Seine Basin. The transition with the Blicquy/Villeneuve Saint Germain group is also well documented with the recent discoveries of Saint Pierre d’Autils in Haute-Normandie (Prost *et al.* 2012), Sours les Ouches (Dupont *et al.* 2010), or again of Moneteau in the Yonne (Augereau *et al.* 2011).

In the LPC industry of north-east France the laminar blanks were privileged (Constantin 1985; Plateaux 1987; Mauvilly 1997; Allard 2005). A real debitage economy existed that integrated the whole of blade knapping waste (Allard 2005). Thus flake tool-making is still present, but in proportions varying greatly from one site to another. In the sector of the Seine-Yonne confluence all the series deliver assemblages in which the flake tools are preponderant (Augereau 2004). The typology of the lithic tools from the LPC in the Paris Basin underlines the obvious relationship between all the LPC lithic industries in western Europe (Cahen *et al.* 1986; Plateaux 1987; Mauvilly 1997; Allard 2005). The blade tools are the hallmark of the cultural typological unity of all the sites. The composition of the assemblages is stereotyped – being generally limited to a few categories of types by region (without taking the blanks into account). The end scrapers, the fittings for arrows and sickles, awls, and retouched blades and flakes make up the common pool. Moreover, the Paris Basin presents several regional particularities such as the abundance of splintered pieces (a point in common with Alsace and Lorraine) or the recurrent presence of toothed blades. The burins distinguish above all the Paris Basin series as this tool is practically non-existent in the other zones where the LPC was implanted (Plateaux 1982). The chronological evolution is perceptible, for the end of the Seine LPC is marked by evidence of flake debitage. This debitage becomes preponderant in the Blicquy/Villeneuve-Saint-Germain (Bostyn 1994).

The supplying territory

In the LPC the flint resources exploited were very often diversified and quite important variations are observed between the sites or the dwelling units in the settlements. In spite of the apparent diversity of materials the blades were knapped off good quality flints. This selection was often oriented towards

regional materials sometimes far from the settlements rather than varieties of flint available locally but of lesser quality. This observation explains the regional situations found in the Paris Basin or more generally in western Europe.

- Thus in the Seine-Yonne sector the sites are found in alluvial valleys that cross a geological landscape in which flint resources are plentiful and easily accessible whether in primary position or secondary (in the upper Cretaceous levels, Mauger 1985). The lithic series are rich and the local Cretaceous flint was used. A second variety described as fine-grained flint was used for blade knapping and the tertiary flint is occasional (Augereau 2004). An analogous situation is observed in the series of LPC sites in the Oise Basin (Pont-Sainte-Maxence et Chambly, Alix *et al.* 1997; Boucneau *et al.* 1996); the course of the Oise also runs through upper Cretaceous chalk basin which yields large quantities of flints in this sector.
- The lithic series from the LPC sites of the Aisne, Champagne and Normandy, on the other hand, show a wide variety of exploited flints.

In the Aisne valley an evident preference for quality existed in favour of the use of blond Senonian flints for blade knapping. The nearest deposits are at about 30–50km from the settlements. They are in principle located in the Marne and the cores arrived already prepared. Generally in the minority in the inventories, it is over-represented among the blades and the tools made from blades (Allard 2003). The Tertiary Bartonian flint is over 20km from the settlements for the known deposits. Lastly, the Turonian formations emerge in primary position 15–20km away also, but these flints are also abundant in the alluviums. They were but little exploited except for the eastern sector: in the Commune of Berry-au-Bac a real ‘frontier’ existed where the use of this flint became predominant and then almost exclusive at the sites of Berry-au-Bac ‘la Croix Maigret’ and Menneville ‘Derrière-le-Village’ (Plateaux 1990; Allard 2005). In this way, the procurement territory for the materials is wide and varied and above all oriented towards regional flints (15 to 50km).

In Champagne the situation is similar to that of the Aisne valley. The main outcrops are located in the west and south-west of the Department along the Tertiary cuesta. Two varieties of Senonian flint are exploited representing 80% of the material at Juvigny, Orconte, and Écriennes and 56% at Saint-Dizier. The distribution of these two varieties differs between Juvigny and the settlements in the plain of Perthois. The flints’ origins are 10 to 15km away for Juvigny and 20–30km for the second variety in relation to the Perthois sites. The tertiary flint – probably Bartonian – is present in all the

settlements but is rare in the Perthois (a few pieces) and not very abundant at Juvigny (7.2%) as at Saint-Martin sur le Pré (Garmond *et al.* 2012). The tertiary flints in the settlements of the Perthois are considered to be exogenous products as they are only blades or tools (Allard 2005).

Poor quality flints, frost-shattered stones, and quartz pebbles complete the spectra of the materials for each series. The quartz is knapped following non-blade patterns, in principle for use as a splintered piece (especially in comparison with what is found in Alsace according to Mauvilly 1997). Just like the settlements in the Aisne valley these materials are in a minority in the assemblages.

The discovery of Bréviandes in the region of Troyes (Laurelut 2010; Allard unpublished)¹, presents a range of materials oriented towards neighbouring flints, between 5 and 10km from the sites. Only one piece in Bartonian flint is present (a fitting for an arrow).

In Normandy the analyses of the lithic industry of the site of Colombelles (Billard *et al.* 2014) provide evidence of highly diversified procurement of raw materials. While the regional materials (flint from the Cinglais and grey-blue granular flint of unknown origin) are very much in the majority (93%), flint of secondary origin of which the nearest outcrops are over 25km from the site were also brought to the site in a form already prepared.

Lastly, in the Moselle valley and Basse-Alsace, that is to say in the regions touching the Paris Basin, very high quality flints are globally absent. Nevertheless, lithic resources of variable quality – sometimes good such as the Oxfordian from the Commercy-Saint Mihiel region – are listed in Lorraine (Blouet 2005). However, the LPC settlements yield sparse series essentially comprising blades and blade tools made of flints from outside the Rhine-Meuse region and the Paris Basin (Champagne Senonian and Tertiary, Blouet 2005). In Basse-Alsace the situation is similar, but the series seem even poorer and the Neolithic knappers used various local lithic materials especially for non-blade productions (Mauvilly 2000). As for Haute-Alsace, it shows a situation similar to the Paris Basin with a mixed supply of regional materials and exogenous Senonian and Tertiary flints from the Paris Basin.

The circulations of flints

Very early on, Polish researchers developed the issue of acquisition and methods of procurement in the study of the LPC lithic industry (for example, the synthesis of Kaczanowska and Lech 1977), which have resulted

in several exhaustive syntheses that found the bases of the issue of the circulation networks for flint products in central Europe (Lech 1980, 1987, 1990). For Jacek Lech the circulations are synonyms of exchanges and consist of two types of networks. The first is essentially economic, as the technological study of the flints shows the existence of various links in the chain along which the flint materials were disseminated: from the extraction sites, through production and distribution to consumption. Certain exchanges turn out to be of a quite different nature and are manifested by the presence of a few exogenous objects on the sites in environments with abundant raw materials. This is the case, for instance, of the few obsidian objects at Cracow-Olszanica. These rare objects were socially significant and affirmed the ties or contacts with the neighbouring zones. The research studies on the lithic finds from the Polish LPC sites are the starting point for the ensuing discussions in this chapter.

There is plenty of evidence for the circulation of flints in the Paris Basin and all the zones of settlement known were connected together. They are also of two types just as Jacek Lech describes for central Europe.

- These circulations may have provided practically all the flint blade material as in the LPC sites of the Moselle valley and Basse-Alsace. For the Moselle corridor Campanian and Maastricht flints from the Meuse (Limburg and Hesbaye) are the most plentiful up till the Late LPC followed by flints from the Paris Basin, which replaced them in the last phases (mainly Senonian flints, Blouet 2005). A frontier exists between the Dutch flints (Rijckholt) and the flints from Belgium (Hesbaye Campanian) which distinguishes the north and south of the Moselle basin. In Basse-Alsace the flints from the Paris Basin and the North of the Jura make up the blade finds (Mauvilly 1997, 2000). This state of affairs has largely been confirmed by the recent excavations of the settlements – but also in the funerary field.
- In the LPC sites of the Aisne valley (from the Late Paris Basin LPC) a few pieces appear sporadically in exogenous materials, in Ghlin flint at Cuiry-lès-Chaudardes and also fine-grained Hesbaye flint at Missy-sur-Aisne and in a granular variety at Menneville (granular Hesbaye flint?). Ghlin flint – which is abundant in the LPC sites of the Hainaut in Belgium – is also found at Pont-Sainte-Maxence and Saint-Dizier in Champagne (one piece in each site). This last site has also yielded a small series of blades in fine-grained Hesbaye flint (Allard 2005). These few objects obviously had no economic impact, but their informative value is large since they are evidence of the existence of social relationships between the various zones of the LPC.

¹ Report about recent discovery of Bréviandes is in progress.

The sites of the Seine/Yonne region are an interesting case in point. In this region rich in flint materials the series are significantly numerous (sometimes some tens of thousands of objects) and made from local or regional materials near at hand. Nonetheless, the presence of Tertiary flint from the centre of the Paris Basin is evidence of the circulation of a few pieces such as for instance piece 1 at Bréviandes or 1 at Etigny 'le Brassot' (Augereau *et al.* 2006). It is therefore considered to be exogenous, although the distance from its sources is not necessarily greater than the normal regional supply.

Acquiring materials is therefore quite a complex phenomenon in the LPC. The resources in flint were obviously not one of the criteria for choosing where to found settlements and several situations can be observed according to the availability and quality of the local and regional lithic resources. The findings observed in central Europe are entirely found again in the western margin of the LPC area of expansion. Genuine circulation networks existed representing either contacts or economic relations between the production site and the consumer. This was borne out in Germany by the studies of Andreas Zimmermann who also highlighted the competition between certain distribution networks (Zimmerman 1995).

The problem concerning the Paris Basin rested on recognising the various links in the distribution circuits – especially for the flints which may be considered to have had a heavy economic impact. This is the case for example for the Rijckholt flints from the Dutch Limburg or the Campanian Hesbaye flints of which the sites, with perfectly identified knapping workshops as at Verlaine, are known (Burnez-Lanotte and Allard 2004; Allard 2007; Burnez-Lanotte 2010), Beek (De Grooth 1987) or again very recently at Cannerberg (Amkreutz and van Wijk 2015).

Near to Troyes, the site of Bréviandes is a major discovery for a better understanding of the diffusion of upper Cretaceous blond flints. This site has yielded a very important quantity of lithic finds; 10 to 20 times more than had been known hitherto in the LPC sites in Champagne. The technological approach shows very clearly that all the stages in the *chaîne opératoire* were present in the dwelling units in this site. From the initial pre-shaping to throwing away the core this settlement presents all the characteristics of a blade-producing village. We are therefore in a position to propose a new comprehensive map showing the circulations of the materials, in which the site's location is quite significant since it is near the end-user settlements of Haute-Alsace for example. A type of upper Cretaceous blond flint from the Paris Basin is indeed well attested in the Alsatian series (Mauvilly 1997) or in Lorraine

(Blouet 2005). This series is, to a certain extent, the missing link providing the proof of the presence in the Paris Basin of sites producing this flint, which was not the case with the very scanty assemblages from the Perthois – which in addition did not give this material pride of place. This flint network is the most important for the LPC in the Seine Basin.

Chronology of the circulation networks

For the materials typical of the Paris Basin the chronology of the Cretaceous flints in the collections still has to be dated precisely for the earliest occupations of the LPC. Thus, pieces made from 'upper Cretaceous flint from the Champagne plain' are found from the early phase of the LPC in Alsace (Mauvilly 1997: 333). They are, on the other hand, well attested from the middle phase of the LPC in the Moselle corridor and Alsatian plain. The site of Malling in Lorraine presents an assemblage including an important proportion of pieces in Cretaceous and Tertiary flint from the Paris Basin (Blouet 2005). In the Paris Basin the Middle LPC is very poorly documented and no reference set is known for the lithic finds.

In the late phase the networks became well established, and the circulations were dense and are very well documented (Fig. 1a). The production site of Bréviandes is dated to this phase, just as are the sites with debitage heaps in Hesbaye and the Dutch Limburg. To us the late phase seems to have been the high point for blades produced for the circulation networks. In this phase a few Bartonian flint pieces have been found which circulated towards the south of the Paris Basin (Yonne, Aube).

The final phase of the LPC shows a modification of the territory of supply as compared with the preceding phases in that the local materials became predominant at the expense of the regional materials (this fact is especially evident at the very end of the LPC). The circulation networks were still active and followed the same routes. At this period also the circulations between the sites in the Aisne/Oise valley and that of Saint Dizier with Belgium appeared. This concerns a few blades – Ghlin flint from the Hainaut and Hesbaye Campanian flint (Fig. 1b).

This period also witnessed the emergence of LPC sites in Normandy and raises the question of the possible circulations of the 'Cinglais' flint. This good quality material, massively exploited for blade production in the LPC, may have been the subject of a genuine circulation network which we are unable to document in our current state of knowledge. New discoveries are needed but also the systematic search for this flint in the collections from the centre of the Paris Basin.

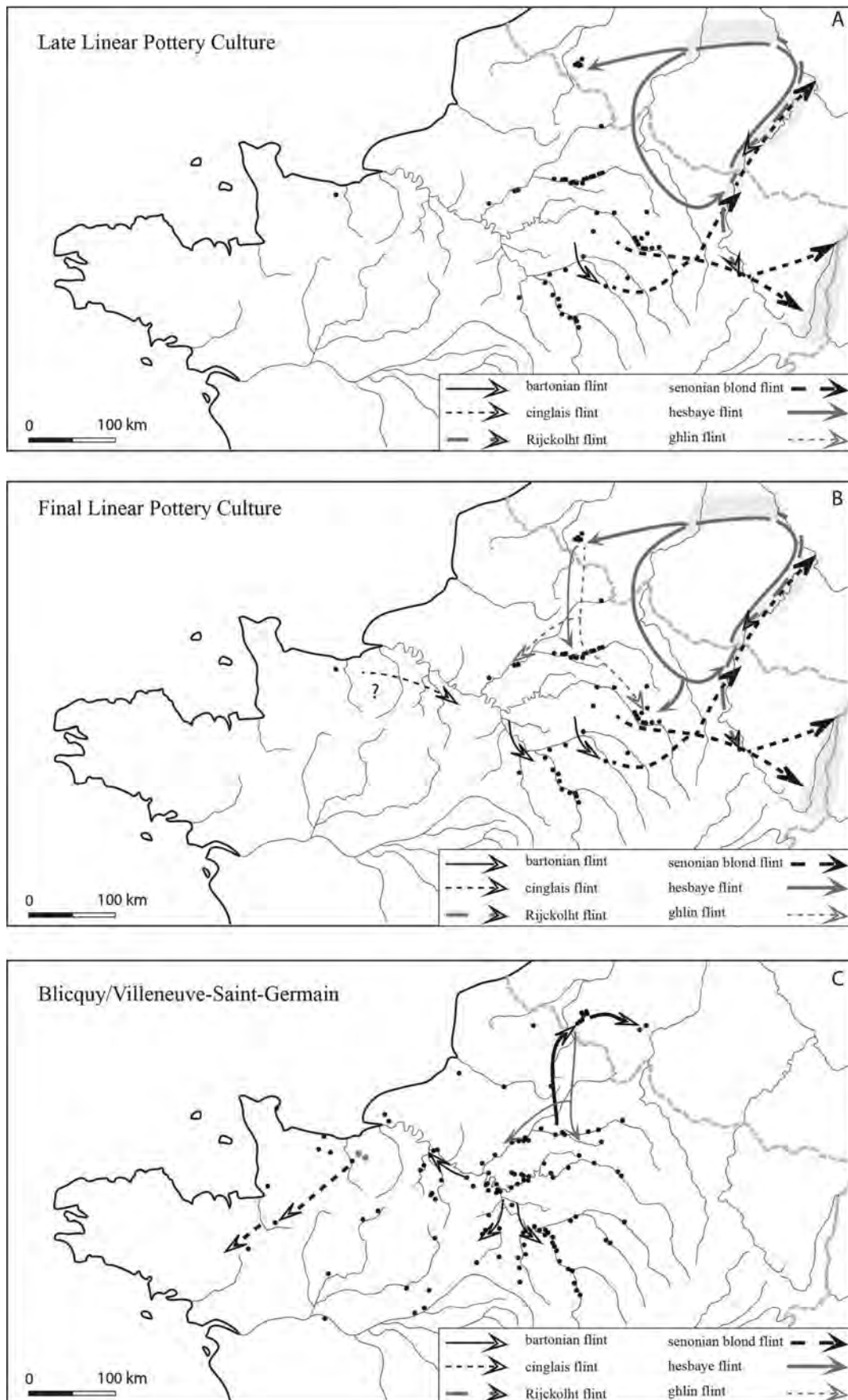


Fig. 1. The flint circulation networks during the early Neolithic in the northern France. A: Late LPC; B: Final LPC; C: Blicquy/Villeneuve-Saint-Germain. Drawn: P. Allard.

In the framework of a general synthesis the post-LPC is more delicate to describe as it is particularly poorly documented for the east of the Paris Basin (Champagne). In the Villeneuve-Saint-Germain a phenomenon of falling back on local raw materials occurred, but for all that the exchanges of raw materials did not disappear and continued to exist in ways that were still relatively complex. Generally, it is observed that the territory of supply in raw flint materials shrank in the Villeneuve-Saint-Germain to the materials available within a radius of 5 kilometres around the village. However, the presence of Cretaceous flint on the sites right in the heart of the Tertiary basin or of Bartonian flint in villages hundreds of kilometres from the core zone (Normandy, Belgium) is evidence of an occasional recourse to regional or exogenous materials.

The Blicquy/Villeneuve Saint Germain culture is especially marked by a strong distribution network of Tertiary Bartonian flint (Bostyn 1994, 2008; Denis 2014). This material was exploited on production sites by experienced knappers and circulation routes similar to those found for the LPC reappeared. Thus, a few Bartonian pieces circulated towards the Seine/Yonne region, a few more towards Normandy, and a dense network developed with the sites of the Hainaut as far as Hesbaye in Belgium (Fig 1c).

The Jurassic flint called 'Cinglais' was heavily exploited and regional networks developed (Charraud 2015), especially westwards, since this flint is found in the distant settlements in Brittany as for example at Betton and Saint Etienne en Cogles. The sector containing the 'Cinglais' flint outcrops is where the first convincing vestiges of Late Neolithic mining activity have recently been found. There are two extraction sites with simple shafts that have yielded evidence of indirect percussion blade debitage at Soumont-Saint-Quentin and Espins. The finds present the characteristics of Danubian debitage and two dates in shaft 26 of Espins indicate the beginning of the 5th millennium: 4997–4793 cal BC and 4930–4719 cal BC, i.e. the group of Blicquy/Villeneuve-Saint-Germain (Charraud 2015).

Conclusion

This assessment concerning the management of the territory of acquisition and the flint circulation networks for the Paris Basin highlights the intensity of the contacts between the various zones of settlement in the LPC western area of expansion. With the recent discoveries it is really possible to talk in terms of networks in so far as the various links are now known for the Danubian period – from the flint's extraction site to its sites of production and consumption. The regular presence of a few exogenous pieces in the assemblages is also evidence of more discreet but still

important contacts as they prove the existence of links with regions which are not always apparent in the other types of materials. Here we have only described the flint products but these kinds of circulations can also be observed for hard stones or for personal ornaments for example.

This management of materials is entirely in line with the founding and innovative research on the LPC sites in central Europe conducted, in particular, by Lech who had demonstrated all the importance and organisation of the networks through which lithic products circulated (Lech 1987, 1990). These networks played a part in the functions of the society of the LPC and the relationships of which they are the sign are complex. For example, there is no correlation between the distance from the sources and the intensity of the circulations – as the circulation of Bartonian flint in the Paris Basin shows or the frontier effects that can be perceived. For the latter the LPC production sites are still to be discovered. The Blicquy/Villeneuve Saint Germain group reproduced communication routes that had been put in place in the LPC. Our knowledge has also increased now that the earliest flint mines have been found in Normandy – thereby also confirming the model for central Europe where these centres are disconnected from the settlements.

The next step necessary now would be to cross the whole material culture and compare the circulation routes so as to have a clearer idea of the meaning of these links between the various zones of settlement for which we can sometimes see strong regional variations in the assemblages of finds.

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