The Organisation of Flint Working in the Dutch Bandkeramik: a Second Approach

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Abstract: Research on the organisational aspects of flint working in the Dutch Linear Bandkeramik Culture (LBK) is summarized, focussing on approaches that analyse not only the relationships between settlements and regional extraction points, but also within- and between-site interactions in terms of craft-specialisation. Special attention is paid to the situation at the end of the LBK settlement of the region, when traditional exchange networks collapsed and new patterns of collaboration emerged.

Keywords: Linear Bandkeramik Culture, craft-specialisation, lithic procurement strategies, Rhine-Meuse Area

Introduction

Some four decades ago, Jacek Lech started to publish his influential research on flint mining among the early farming communities of Central Europe, (e.g. Lech 1975, 1981a,b, 1983), eventually concluding: 'among the LBK archaeological sites it is possible to distinguish flint mines, settlements connected directly with the exploitation of deposits – settlements of producers – which played a special role in supplying flint to other communities and settlements of users, connected with former by means of networks of long-distance exchange. In regions lying far from deposits we can distinguish secondary centres of distribution of mined material' (Lech 2003: 27).

At about the same time – lagging one International Symposium on Flint behind – I began to investigate the organizational aspects of Bandkeramik flint working, dealing mainly with the Dutch Graetheide area, but with an occasional excursion to Langweiler 8 in the German Rhineland, and focussing on the interpretation of within-site variability (de Grooth 1981, 1987, 1988). This Festschrift in honour of Jacek Lech offers a splendid opportunity for a second approach to the theme (cf. Lech 2003), evaluating research in the intervening years.

Initial data-set

For the initial study flint material from two Dutch Bandkeramik sites was analysed: Beek-Kerkeveld and Elsloo-Koolweg (De Grooth 1987). In Beek fifteen rubbish pits and several postholes were found in the spring of 1976 during small-scale rescue excavation at a new building estate by members of the 'Heemkunde Vereniging Beek'. They can all be dated in Modderman's (1970) phases IIc and possibly IId, i.e. in a late phase of the Younger LBK. Two of the rubbish pits examined at Beek-Kerkeveld contained a singularly large amount of flint waste. Pit B–K 7 was an elongated loam pit such as regularly found alongside Bandkeramik houses. The other, pit B–K 8, was situated at about 2.5 meters to the north-east, and had an irregular shape. Not including chips (pieces smaller than 15mm) there were 4899 flints found in both pits together, with a total weight of almost 51kg.

Habitation at Elsloo (nowadays labelled Elsloo-Koolweg) started early in Modderman's (1970) phase Ib and went on till the very end of the LBK sequence in the Netherlands (phase IId), comprising some ten house generations. In the Older LBK the village occupied an estimated area of 2–3 hectares, almost completely uncovered, with up to eleven houses standing at the same time. In the Younger LBK the settlement expanded over a much larger area, of which only about one-third has been excavated. In the younger phases as many as seventeen houses may have stood contemporaneously (Modderman 1970; Van de Velde 1979; Van Wijk and Porreij-Lyklema 2015). The assemblage originally studied at Elsloo consisted of 7328 flint artefacts, recovered from 218 ceramically dated rubbish pits, and associated with 75 out of the 95 houses excavated at that time.

The process of Bandkeramik flint working

The Beek-Kerkeveld material was excellently suitable for refitting, thus providing an insight in the *chaîne opératoire* (Pelegrin *et al.* 1988) chosen to transform raw material into manufactured products. Unworked nodules were brought into the settlement, after only cursory testing at the extraction sites. The process was aimed at the production of rather stocky blades, with more or less parallel edges. Striking platforms were made by the removal of one or several large decortication flakes. Although preparation of the core face often consisted only of the removal of bulges and decortication, sometimes a rough crest was prepared

to guide the first blade. This preparatory work was performed in the hard hammer mode. The flaking angle of the core was regularly improved by centripetal removal of tiny flakes from the striking platform (witness the faceted aspect of striking platforms on the cores and by the presence of many dihedral butts on blanks). If that did not suffice, the whole striking platform could be rejuvenated by hard hammer removal of a core tablet. The same core face remained in use, but the blades produced were 1–2cm shorter. The removal of tablets also took care of damages on the upper part of the core face when, owing to a wrong flaking angle or irregularities in the flint, hinge fracturing had occurred. Axial or lateral flanks (Cahen 1984), meant to correct damage at the bottom part of the core face, are but rarely encountered.

Raw material

The majority of flints worked at both Elsloo and Beek-Kerkeveld were of the type commonly referred to as 'Rijckholt' flint (Löhr *et al.* 1977), originating in the Upper Cretaceous Gulpen Formation. Additionally, at Beek-Kerkeveld, important amounts of 'Valkenburg' flint from the Maastricht Formation were worked (cf. De Grooth 1987, 2013b).

Bandkeramik social organisation

In socio-economic terms, the Bandkeramik may be regarded as a 'community society' (Fried 1975) displaying a limited degree of social stratification. In settlements, contemporary houses were grouped in wards of two to five farms. Larger settlements were composed of between two and five of such wards, with totals of 10–20 dwellings. The smaller settlements, consisting of only one ward, were often occupied for shorter periods than the large ones; they were founded later, as though they were subsidiary villages of a primary settlement, and were sometimes abandoned earlier, too. Single farmsteads are rare (De Grooth and van de Velde 2005; Zimmermann *et al.* 2004: 62). The fact that constant groups of farms remained together for generations implies that the relationships between the occupants were fairly enduring. In anthropological terms such an enduring group is known as a lineage. In such communities some form of craft-specialisation is perfectly feasible. Basically, the term 'specialist' refers to those people who perform complicated tasks more successfully than others and, because of their special skills, tend to perform them more often as well, or to co-ordinate the work of less experienced team-mates (Olaussson 1997). Moreover, they consistently produce objects for people outside their own household. As regards flint working, such specialisation would lead to a clear differentiation in the assemblages dumped at different farmsteads. Rubbish left by specialists would be characterised by high amounts of knapping debris (flakes, cores, rejuvenation pieces) and few blades and tools. Refuse pits belonging to the houses of 'consumers' would contain a preponderance of blades and tools.

Looking for specialist flint knappers

For Beek-Kerkeveld, the large amount of waste material combined with the small number of tools (less than 1%) at first sight seemed to indicate that near this two pits tools and blades could have been made that fulfilled the needs of the whole settlement. A first test of this hypothesis, however, proved to be negative: the tools and blades found in the site's other rubbish pits were not related to the waste in the 'rich' pits. On the contrary, most of these pits contained preparation and rejuvenation pieces as evidence that flint had been knapped in their surroundings as well. Because only a small part of the Beek-Kerkeveld site had been excavated, this first refutation was not necessarily conclusive. Therefore, the search for Bandkeramik specialist flint knappers was continued at Elsloo (now known as Elsloo-Koolweg), as this large and long-lived settlement hopefully would provide information on structural activity patterns, i.e. patterns that recur throughout time rather than being just idiosyncratic.

Given the modular ('segmentary') structure of the Elsloo settlement, it seemed possible that hypothetical flint knapping specialists could have worked both for the whole village, or on the level of the separate wards. The first case would result in a very high concentration of flint waste belonging to a single farmstead in every habitation phase. This kind of specialisation was labelled 'loose mode of production' in Piet Van de Velde's (1979) analysis of Bandkeramik social structure. In the second case, when a lineage mode of production was practised, one would expect to find for every settlement phase systematic differences in the amount of flint waste per farmstead within the household clusters.

Again, the first analysis revealed no evidence for specialist flint knappers: In every settlement phase, the pits of most houses contained flint waste from all production stages. Even when little flint is present, we find cores, rejuvenation pieces and unmodified flakes, the most characteristic manufacturing waste. In this respect there existed no obvious differences between settlement phases. In organizational terms, such a pattern corresponds to the domestic mode of production. In this, the family, living in a single household, is the unit of production and consumption, and division of labour is based on age and sex alone.

However, the different types of specialisation are not mutually exclusive. So, the evidence pointing to the existence of specialists could be covered and partly

obscured by refuse produced by these domestic activities. The result would be a multivariate patterning which cannot be readily distinguished by visual inspection or simple statistical aids. The results of a Principal Components Analysis (cf. Doran and Hodson 1975; Baxter 1994) indeed revealed some hidden variability in the data-set that was thought to point to the presence of *ad hoc* specialists. During every house generation one or at most two of the households worked more flint, in a more efficient way, and transferred part of the blanks and tools manufactured to be used and discarded by the other households in the settlement. This 'loose mode of production', however, was of minor importance in comparison to the domestic one. As the knapping traditions persisted for centuries, the transmission of knowledge and know-how must have formed a stable part of the communities' routine. The necessary theoretical knowledge may be transferred from generation to generation in myths and rituals, whilst practical know-how would have been acquired in a structured trajectory of 'learning-by-doing'.

Despite the great number of flint artefacts, at Elsloo no pits containing concentrations of manufacturing waste comparable to those of Beek-Kerkeveld were recovered. Given the ample evidence for local flint production at Elsloo, this difference does not seem to reflect structural differences in the intensity of flint working at both sites. Partly this may simply be due to a better state of preservation encountered at Beek-Kerkeveld, where a thick colluvial layer prevented erosion, but differences in the method of refuse disposal may have played a role as well.

Recent developments

Meanwhile, lithic assemblages from other LBK settlements have provided new insights into the themes discussed before (cf. Fig. 1). The most important of these, Geleen-Janskamperveld, extended over approximately 4.5ha, of which 2.7ha, or 61% was investigated (Van de Velde 2007). Habitation started early in the Flomborn phase, and lasted approximately 100 years (or four house generations), comprising the phases Ib and Ic of the Dutch chronology (cf. Modderman 1970). During this time an estimated number of 90 houses were constructed, of which 69 have been excavated. The settlement yielded some 7950 flint artefacts, with a total weight of c. 58kg (De Grooth 2007).

Through the analysis of these flints in terms of raw material provenance, it could be demonstrated that they originated from a cluster of mining sites in the Dutch/Belgian borderland, where 'Rijckholt-type' flints were extracted from residual loams (cf. De Warrimont and Groenendijk 1993; Felder 1998; Brounen and Peeters 2000/2001; De Grooth 2011). The most important of these is the Banholter Grub (mun. Eijsden-Margraten, NL) in Southern Limburg, whilst the nearby sites of Mheer-Hoogbos (mun. Eijsden-Margraten, NL) and Remersdaal-Rodebos (mun. Voeren, B) may have played a secondary role (De Grooth 2007: 149–150). Subsequently, new excavations at both Beek-Kerkeveld (Van Betuw 2009) and Elsloo (De Grooth 2015a) showed that the same type of eluvial flint was used there, as was the case in several other Dutch sites. Moreover, this holds true for the Rhenish Bandkeramik as well (De Grooth 2015b). These extraction sites are located at a considerable distance from all LBK settlement areas involved in their exploitation: some 25–30km from both the Graetheide and the Aldenhovener Platte, and 10–15km from the Caberg on the left bank of the Meuse (De Grooth 2016). Thus, its users displayed a clear preference for the acquisition of high quality raw material from considerable distances, rather than make do with local rocks of lower quality.

Within- and between-site differentiation

The Flomborn-time settlement of Geleen-Janskamperveld consisted of two spatial units, or wards, in the north-eastern and south-western part of the settlement respectively. Both consisted of several groups of houses. These wards differed significantly with regard to the intensity of flint working (De Grooth 2013a). Whereas similar amounts of blades and tools were present in the two wards, the south-western ward contained significantly more production waste, indicating that the inhabitants of the two wards used different procurement strategies.

Additionally, a comparison of the proportions of cores, flakes and blades and tools from the Flomborn-time assemblages of Geleen- Janskamperveld, Elsloo-Koolweg and Langweiler 8 revealed marked differences between the three coeval sites (Tab. 1), indicating that in the earliest stages little flint was worked at Langweiler 8, and its inhabitants may even have received prepared cores from Geleen-Janskamperveld, and blades from Elsloo-Koolweg (De Grooth 2008).

Elsloo-Koolweg: a second approach

The presence of this kind of differentiated lithic interaction both within and between settlements made me feel the need for a reassessment of the ways flint working was organized at Elsloo-Koolweg, especially as regards the notion of *ad hoc* specialists. Starting this second approach made me realise that I initially had treated Elsloo-Koolweg too much as a closed universe, without due consideration of its relationships with the outside world. Moreover, too little attention was paid to the fact that only part of the settlement was excavated. Whereas most of the Flomborn-time houses

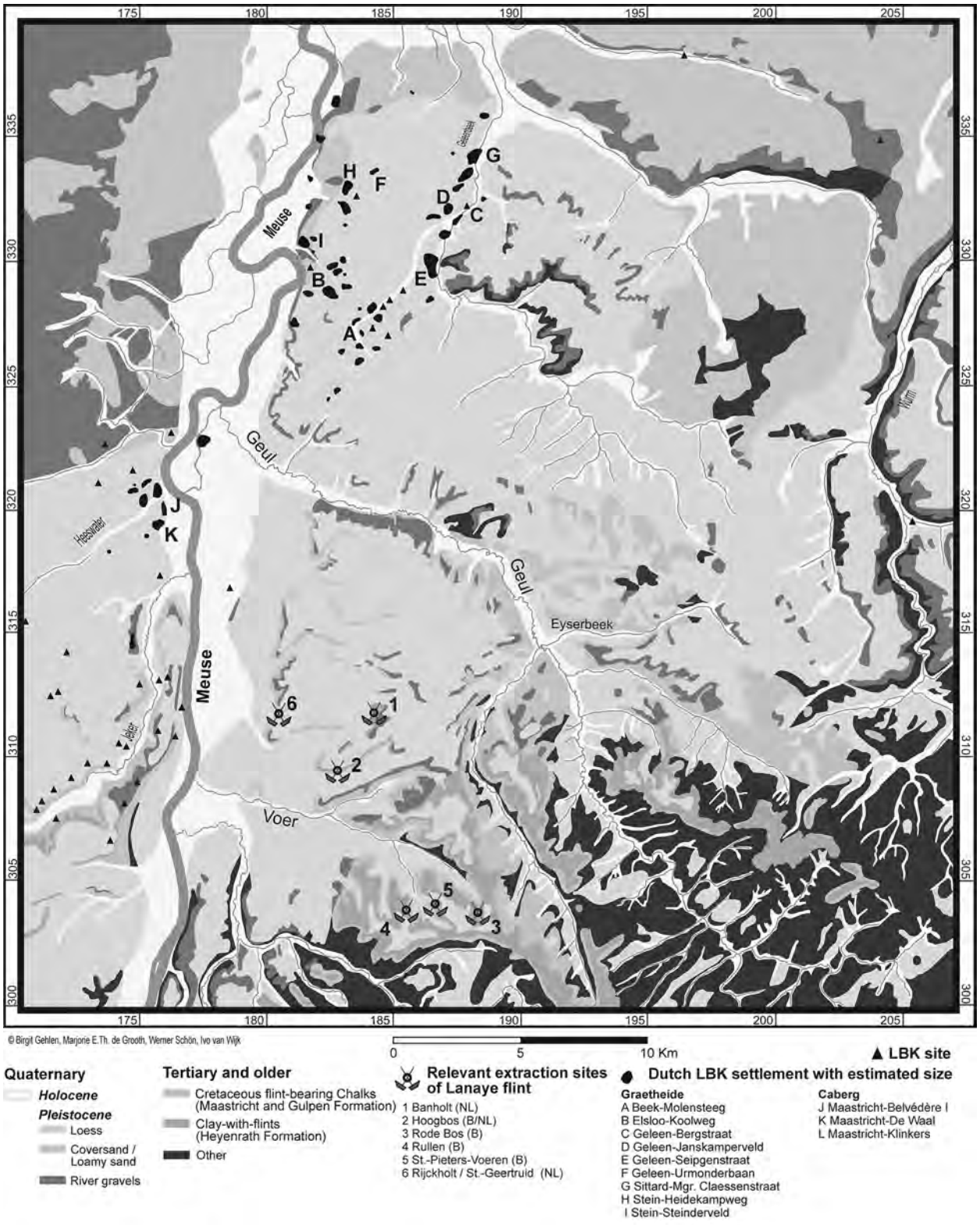

Fig. 1. Study area with relevant LBK settlements and flint extraction extraction points, plotted on simplified geological map. Adapted by Marjorie de Grooth and Ivo van Wijk from De Grooth 2011: Fig.1.

Table 1. Comparison of the intensity of flint working at Elsloo-Koolweg, Geleen-Janskamperveld and Langweiler 8 during the Flomborn phase. Adapted from De Grooth 2007: Table 10–30.

	Elsloo	Geleen-JKV	Langweiler 8
% flakes	76.0	72.7	63.2
% cores/hammerst	2.9	1.0	2.3
% blades/tools	18.9	24.2	32.8
N	3515	4866	1351
Flakes: Cores	26.4	75.3	27.5
Blades: Cores	3.9	14.2	7.7
Tools: Cores	2.4	10.8	6.6
Flakes: Tools	10.5	7.0	4.2
Flakes: Blades	6.4	5.3	3.6

may have been recovered, only about one-third of the younger ones are thought to be documented (Van Wijk and Porreij-Lyklema 2015). This reassessment is still in its early stages, but the following example may serve as illustration.

Given the high proportion of unmodified flakes (68.5% overall average), Elsloo-Koolweg would qualify as a settlement 'connected directly with the exploitation of deposits' (Lech 2003: 27), and it is generally assumed that unworked flint nodules were brought into the settlement. However, during the youngest phases (Modderman IIc and IId), a drastic decrease in flint waste is documented (Fig. 2), concerning most of the houses all over the excavated part of the settlement. In the Middle Merzbach Valley similar low percentages of unmodified flakes are seen to be characteristic for small, satellite settlements. These are thought to have been partly dependent on the inhabitants of the large pioneer sites, who had better access to resources, were more actively involved in knapping and redistributed worked cores and blades on a regional scale (Kegler-Graiewski and Zimmermann 2003).

For Elsloo-Koolweg such an interpretation would seem problematic. Apart from being itself one of the pioneer settlements on the Graetheide, the village remains a large one. In the excavated part 20 house plans belong to phase IIc, and 18 to phase IId (Van Wijk and Porreij-Lyklema 2015: 190).

Before offering scenarios interpreting this phenomenon, a brief discussion of the general situation at that time is called for. In the Rhine-Meuse region first signs of disruption in the seemingly stable Bandkeramik world become visible during phase IIa (or House generation IX–X of the Middle Merzbach chronology, cf. Stehli 1994: 135). In phase IIc (i.e. from House Generation XII onward) the Rhineland witnessed a period of dramatic population decline, in which the long-lived exchange and communication networks lose their importance (e.g. Gehlen and Schön 2009; Zimmermann

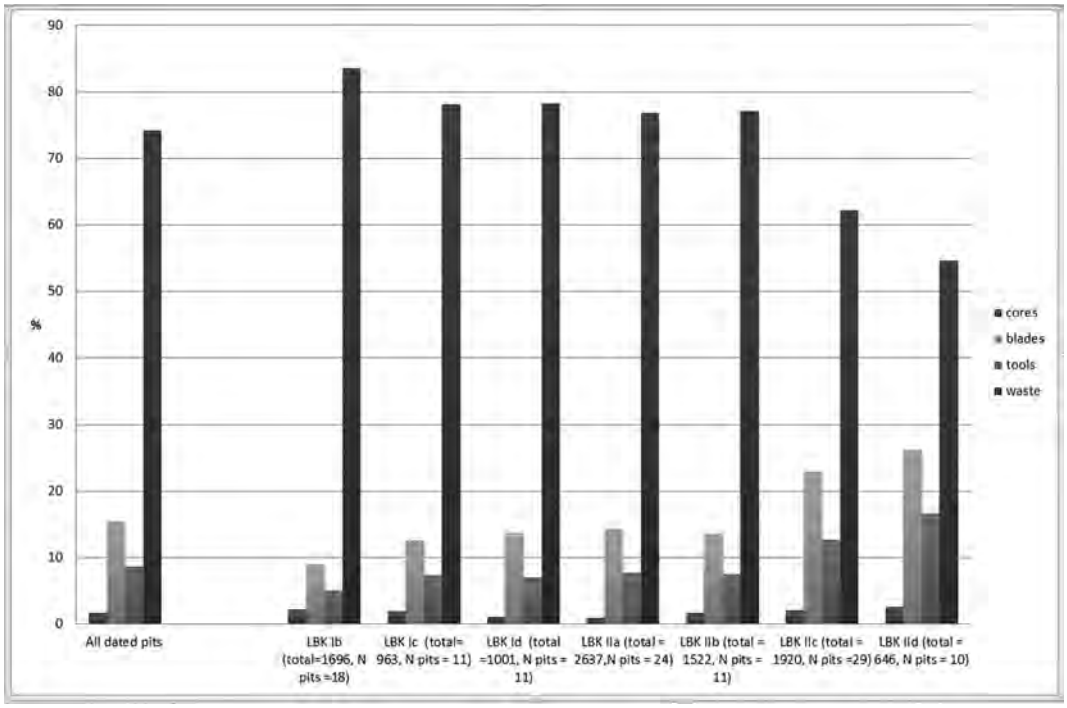

Fig. 2. Elsloo-Koolweg: diachronic comparison of assemblages from dated pits containing at least 15 flint artefacts.

1995). Recently it has been suggested that part of the population of the Rhineland may have migrated to the Graetheide at the relevant time (Balkowski and Hartmann 2015). At both the Graetheide and the Caberg clusters an increasing number of settlements and coeval houses are documented, and the adjacent Belgian Hesbaye region is flourishing too. From phase IIa onward we see changes in lithic preferences at the Dutch sites. Whilst Elsloo-Koolweg continued to use the traditional Banholt material, some other settlements experimented with alternative flint sources (De Grooth 2016), among which the Hesbaye flints exploited at sites such as Verlaine 'Petit-Paradis' (Allard 2005).

To interpret the decrease in flint waste encountered at Elsloo-Koolweg, one can design several scenarios that are not mutually exclusive.

A first scenario is based on within-site changes: the dominant domestic mode of production would have been replaced by the kind of specialisation between wards as outlined for Geleen-Janskamperveld. However, in that case one has to assume that all producers' households were located in the unexcavated part of the settlement.

A second scenario assumes a change in Elsloo's procurement strategy: instead of bringing unworked nodules into the settlement, initial core preparation and part of the blade production were performed at the Banholt extraction site. The presence of blade cores and rejuvenation pieces at Banholt offer empirical support of this idea. Moreover, similar strategies have been described for sites such as Maastricht-Klinkers (De Grooth 2013b: 46)

On the other hand, unworked nodules were still being brought from the Banholt resource into coeval Beek-Kerkeveld.

A third scenario is based on changes in Elsloo's role as a supplier of flint to the outside world. With the collapse of the traditional exchange networks, those cores and blades formerly exported would instead remain in the settlement, to the detriment of the percentage of flakes.

In a final scenario, Elsloo's inhabitants would indeed have worked less flint themselves, creating an opportunistic dependency on e.g. Beek-Kerkeveld, in the framework of inter-settlement (and thus inter-lineage) alliance building (cf. Golitko 2010, esp. 329–33). The refitting evidence from Beek-Kerkeveld, suggesting that some of the cores prepared there were moved out of the excavated area (De Grooth 1987: 33), offers some empirical support for this scenario.

The scenarios are not mutually exclusive, and all are feasible in a time of disruption, when the stable kinship-based patterns of interaction between social groupings broke down (e.g.Van de Velde 2016), to be replaced by more flexible and opportunistic alliances.

Such a cooperation would counteract, at least temporarily, the negative stressful relationships, based on distrust, rivalry and strife that by several researchers are seen as the basis of Younger Bandkeramik inter-and intra- village interactions (cf. Petrasch 1999; Golitko 2010; Van de Velde 2016).

Concluding remarks

As stated before, this reappraisal is still very much a work in progress. The idea of *ad hoc* lithic specialists working at Bandkeramik sites such as Elsloo-Koolweg still seems plausible. However, finding evidence for their presence turned out to be harder than I initially thought. Firstly, the vast majority of waste material seems to have been the result of domestic production on the level of individual households. Secondly, part of the variety may be the result of multiple interactions not only with the outside world, but also between different wards within the settlement. Thirdly, the importance of diachronic fluctuations has to be assessed.

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