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The specialisation of lithic production at the end of the Early Neolithic in Belgium; the case of the Blicquian population from Hainaut

Solène DENIS

Abstract

This paper presents some preliminary reflections on the socio-economic organisation of stone tool production of the Blicquian populations from Hainaut (Belgium, Early Neolithic). The tool production of these first agro-pastoralist communities was made by two groups of knappers with different levels of technical expertise. Indications suggest that the domestic unit was not totally autonomous when producing lithic tool blanks. In fact, blade production seems to have been organised between several villages.

Keywords: Early Neolithic, Blicquy/Villeneuve-Saint-Germain culture, lithic industries, socio-economic organisation, specialisation.

Résumé

Cet article présente des réflexions préliminaires sur l'organisation socio-économique de la production des outillages lithiques des populations blicquiennes du Hainaut (Belgique, Néolithique ancien). La production de ces premières communautés agro-pastorales repose sur deux groupes de tailleurs ne disposant pas des mêmes niveaux de savoir-faire. Un faisceau d'indices converge pour proposer que l'unité domestique ne soit pas totalement autonome pour sa production en supports de l'outillage lithique. La production de lames semble en effet organisée à l'échelle de plusieurs villages.

***Mots-clés** : Néolithique ancien, culture Blicquy/Villeneuve-Saint-Germain, industries lithiques, organisation socio-économique, spécialisation.*

1. INTRODUCTION

The Blicquy/Villeneuve-Saint-Germain culture is part of the Danubian cultures, and extends across the North of France and Belgium. Heated debate surrounds the chronological position of this culture (for an idea of the issues and challenges involved refer, for example, to BURNEZ-LANOTTE *et al.*, 2001; JADIN *et al.*, 2003; CONSTANTIN & BURNEZ-LANOTTE, 2008). Today there is a widespread consensus that the BQY/VSG followed the Linearbandkeramik (LBK), and the debate now focuses on the duration of the overlap between these two cultural entities (JADIN, 2007). Thus, the BQY/VSG constitutes the final stage of Danubian colonisation in Northern France and Belgium. Radiocarbon dating places it between 4950 BC and 4650 BC (DUBOULOZ, 2003). Periodisation based on ceramic studies prompted C. Constantin to identify three chronological stages (CONSTANTIN, 1985): an early, middle and late stage. Frequency seriation and correspondence analysis have recently been used to test the Blicquian ceramic corpus (HAUZEUR, 2008). A four-stage sequencing is proposed where stage I is very fine and the value of stage IV remains unclear (functional rather than stylistic grouping?).

Sites belonging to the Blicquian culture are located in Central Belgium (Fig. 1). Two settlement areas can be identified: one in the West, in western Hainaut, and the other in the East, in Hesbaye. The absence of sites between these two centres, some 100 km apart, may well reflect a historical reality. To date, surveys have only produced isolated discoveries between these two areas (JADIN *et al.*, 2003; VAN ASSCHE, 2008).

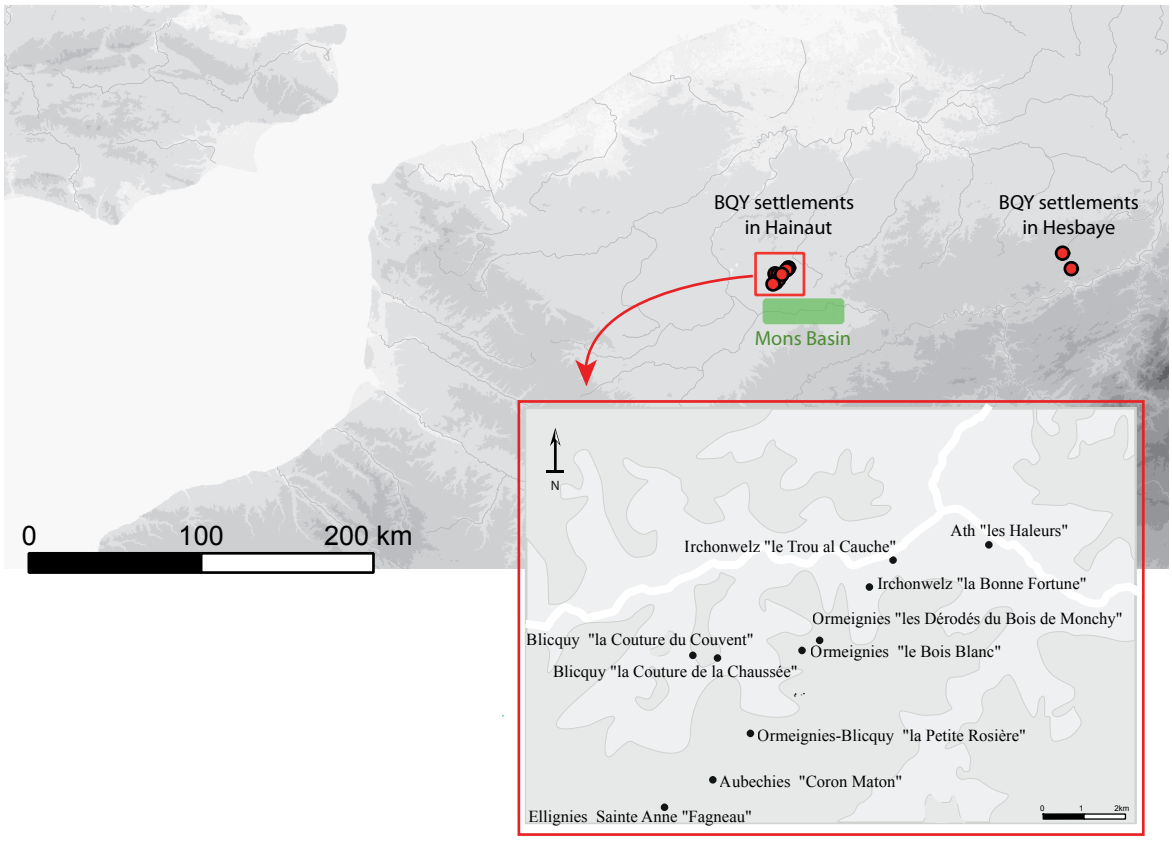


Fig. 1 – Map of the Blicquian sites. Zoom on the Blicquian (BQY) sites of Hainaut. In green: localisation of the Mons Basin which delivered the main flint outcrops exploited by the BQY populations.

Localisation	Abbr.	Discoverer	Excavation years	Organisations	Surface area	Number of features	Number of houses	Chrono-logical stage
Irchonwelz 'la Bonne Fortune', Hainaut	IBF	M. Daubechies	1978, 1980, 1983	CNRS, URA 12; CTRA Blicquy-Aubechies	1800 m2	16	3	Early
Irchonwelz 'le Trou al Cauche', Hainaut	ITC	M. Daubechies	1991	CTRA Blicquy-Aubechies ; Ministère de la région wallonne ; Service de Préhistoire Université de Liège	1500 m2	10	1 + 0.5?	Early
Ellignies-Sainte-Anne 'Fagneau', Hainaut	ESAF	L. Demarez	1969, 1970, 1976	CTRA Blicquy-Aubechies ; Service National des Fouilles de Belgique	?	10	?	Middle
Aubechies 'Coron Maton', Hainaut	ACM	L. Demarez	1980, 1988, 1999	CNRS, URA 12; CTRA Blicquy-Aubechies	1430 m2	23	1 or 2?	Late
Ormeignies 'la Petite Rosière', Hainaut	OPR	L. Demarez	1981	CNRS, URA 12; CTRA Blicquy-Aubechies	210 m2	3	0.5?	?

Fig. 2 – Description of the studied BQY site characteristics.

Nine of the twelve Blicquian sites are located in western Hainaut, to the south-west of Ath, in the area where the River Dendre originates (Fig. 1). This settlement zone is extremely localised as these sites are all concentrated within an area of 27 km^2 (CONSTANTIN & BURNEZ-LANOTTE, 2008; CONSTANTIN *et al.*, 2009). However, a tenth site has recently been discovered near the eastern Dendre (DERAMAIX *et al.*, 2016), extending the Blicquian occupation area by a few kilometres eastwards in Hainaut. This site, called Ath 'Les Haleurs', is currently under excavation and has not been included in the present study.

Generally, only small areas have been excavated so it is difficult to assess the spatial organisation within the villages. However, most of the features correspond to lateral pits and allow for comparisons between sites. Lateral pits and postholes are often the only elements that materialise the location of houses. The lateral pits are dug in the immediate vicinity of the longest sides of these houses, to the north and south.

In spite of the limited extent of the excavations, these Blicquian features delivered a plentiful lithic assemblage representing more than 90,000 pieces. We selected a sample for this present study consisting of about 45,000 pieces. Here, we will focus on the methodological tools that allowed us to deduce that a form of specialist blade production operated in Hainaut. With this perspective, four sites were then studied exhaustively (Fig. 2): Irchonwelz 'la Bonne Fortune', Ellignies-Sainte-Anne 'Fagneau', Aubechies 'Coron Maton' and Ormeignies 'la Petite Rosière'. In Irchonwelz 'le Trou al Cauche', the richest lateral pit was taken into account for comparisons.

2. RAW MATERIAL PROCUREMENT

The closest outcrops to the Blicquian sites are located about 15-20 km away, in the Mons Basin (Fig. 1), which was expected to contain a lot of outcrops. Unfortunately, the issue of flint provenancing is much more difficult to tackle given that there is currently no systematic reference collection. Given the fact that 22 Cretaceous formations are represented (ROBASZYNSKI *et al.*, 2001), numerous possibilities exist. Traditionally, in the literature, four types of flint are mentioned: Obourg flint, Ghlin flint, Turonian flint and Spiennes flint (CAHEN & VAN BERG, 1979; CAHEN *et al.*, 1986; HUBERT, 1982; ALLARD, 2005; ALLARD *et al.*, 2010). The Danubian populations did not use the latter. The BQY industry of Hainaut shows a preference for the Ghlin flint, which represents between 60 and 80 % (CAHEN & VAN BERG, 1979; CONSTANTIN, 1985; DENIS, 2014, 2017). Therefore, even if the outcrops are not accurately located, we can rationally assume that the Ghlin flint was gathered in the Mons Basin, probably in the area of Baudour (COLLIN, 2016; LEBLOIS, 2000). The different types of cortex show that the BQY population collected the Ghlin flint both from primary and secondary positions.

3. THE ORGANISATION OF PRODUCTION: A DUAL STRUCTURE

The study of production organisation resulted in the identification of two kinds of production, with different levels of technical expertise (Fig. 3). On the one hand, some production can be called simple because it only required a low to very low level of savoir-faire. On the other hand, blade production requires a higher level of skill. The Ghlin flint is largely used for producing blades whereas simple production is more frequent for the other types of raw material.

3.1. Simple production

Three types of simple production were identified: flake production, production of facetted tools and production of *pseudo-frites* on flake edges. The production of flakes and facetted tools are closely related since they are frequently combined. They lead to the production of denticulated, retouched flakes and facetted tools. However, the production of *pseudo-frites* on flake edges has not been identified up until now in VSG contexts. It consists of knapping varieties of large burin spalls after the rapid shaping of a sort of crest on the edge of a large flake (Fig. 3). This production uses special knowledge probably inherited from the LBK, where *frite* production

is well attested (CAHEN, 1984; CAHEN *et al.*, 1986; ALLARD, 2005). Nevertheless, the *chaîne opératoire* implemented for these three types of production is simple. A hard hammer stone is used to create the debitage. Frequent marks of technical clumsiness are present, such as hinged flake scars, or the distribution of impact points related to a poor adjustment of the knappers' gestures, reflecting a low to very low level of savoir-faire. In each household, the whole *chaîne opératoire* can be identified, suggesting that the production of flakes and facetted tools occurs primarily in a domestic context. The situation is unclear for the production of *pseudo-frites* on flake edges.

3.2. Blade production

Blade production necessarily involved a significantly higher level of expertise than simple flake production due to the implementation of a

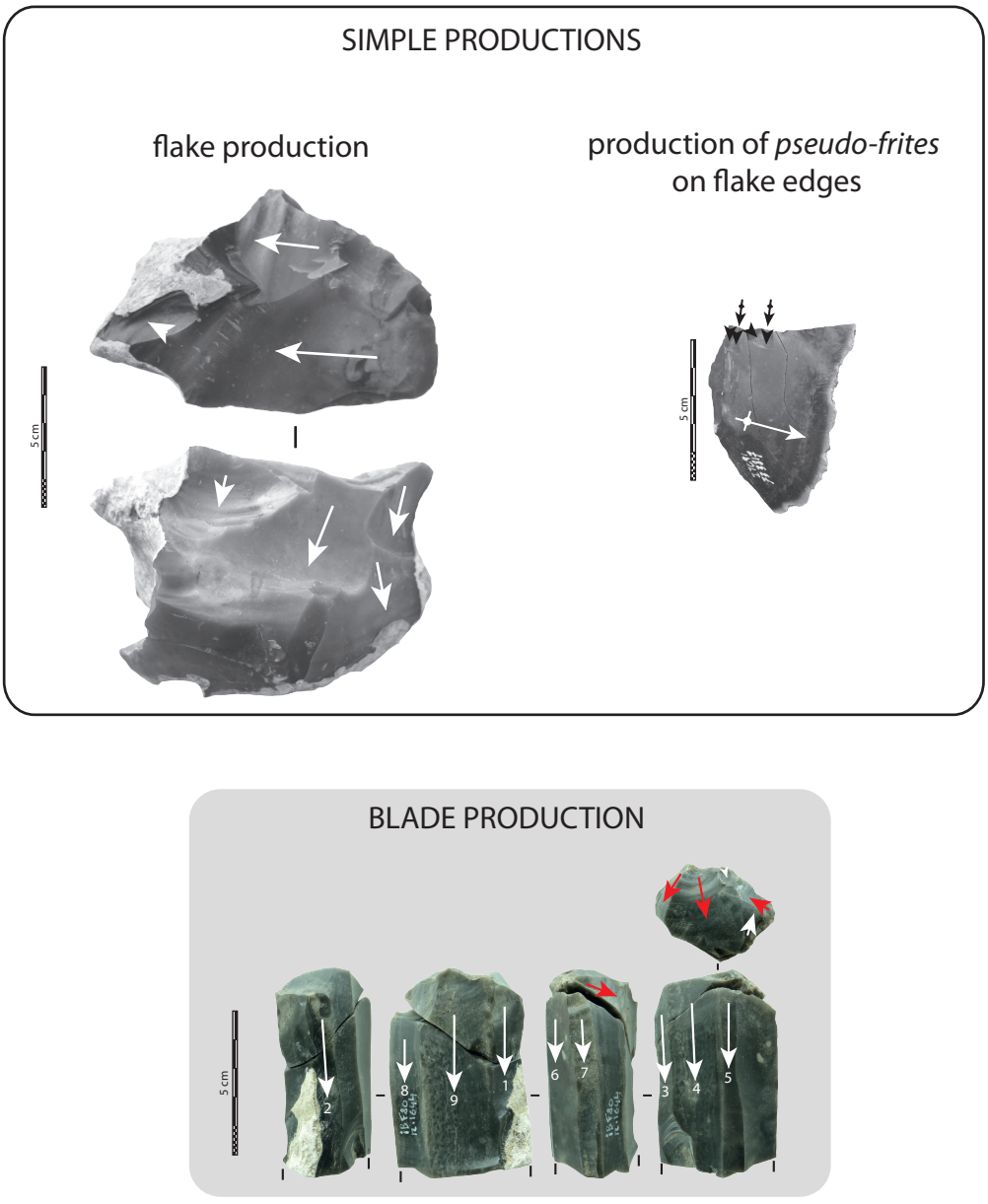


Fig. 3 – Cores representing the two kinds of productions, opposed by the level of expertise: simple products and blades. Examples of simple productions: flake core from Vaux-et-Borset; core from Irchonwelz 'le Trou al Cauche' linked to the production of *pseudo-frites* on flake edge. Blade core: Irchonwelz 'la Bonne Fortune'.

predetermined *chaîne opératoire*. We will focus here on the production using Ghlin flint, which is largely dominant in Hainaut.

The shaping phase of blade production involves cresting. Blades are obtained by indirect percussion. The striking platforms are facetted and the debitage is often rotating, cores have peripheral blade surfaces. This production generally aims to obtain blades about 10 cm long, with a width of 18-20 mm and a thickness of 5-6 mm.

In addition, production is geared towards trapezoidal blades with symmetrical sections, as evidenced by the high number of blades with three facets and an operating code 212'. This code corresponds to the order in which the previous blades were detached. So, the interpretation of this code gives the organisation of the debitage. Such products can be repeatedly obtained by initialising and maintaining specific debitage arrangements, which knappers need to know and implement successfully (Pelegrin, pers. com.). Thus, we can establish that the standard skill level of Ghlin blade knappers was very good.

This duality of production reflects the existence of two groups of knappers who do not have the same knowledge and savoir-faire, as has already been demonstrated by A. Augereau in VSG contexts (AUGEREAU, 2004).

4. BLADE PRODUCTION: SHARING SKILLS BETWEEN SEVERAL VILLAGES?

We will focus our analysis on the blade production using Ghlin flint, which is most common on the Blicquian sites of the Hainaut.

4.1. Techno-economic diagrams

The methodological tool used here is the techno-economic diagram (PERLÈS, 1990). It enables us to visualise the quantitative representation of the different stages of the blade production *chaîne opératoire* carried out on the sites or within the different households when the excavated corpus is suitable.

In keeping with the observations made on the *chaîne opératoire,* we chose to use a diagram constructed on eight categories of artefacts (Fig. 4).

The first techno-economic class concerns the primary flakes from shaping the core. Their identification is complex where these industries are based on a dual organisation (simple production/blade production). They are usually obtained by hard hammer stone percussion which shapes out the core, giving it an ideal morphology for cresting.

This last step is the second category of our diagrams that includes preparation flakes from cresting.

The crested blades themselves are classified as a third category. This helps to identify a possible segmentation of the *chaîne opératoire* at the end of shaping the cores.

The fourth category comprises all the pieces attributed to the maintenance of all types of blade debitage. These may include the maintenance of the striking platform or core convexities, the correction of accidents, regularisation of the flanks or ridges.

The fifth category represents the intended blanks, the blades.

The sixth techno-economic class consists of flakes that appear to be attributable to blade debitage according to the evidence of indirect percussion or the reading of diacritical schemas. However, we were not able to assign them to a more specific stage of the *chaîne opératoire*.

The seventh category consists of small flakes produced by indirect percussion, the small retouch flakes attributable to blade production by interpreting the diacritical schemas. These consist mainly of blade tool spalls, mainly burin spalls.

The eighth category consists of blade cores. The latter are, with very few exceptions, reused for low-skill production, particularly flake production. Also, flakes from simple blade core production are also included in this category.

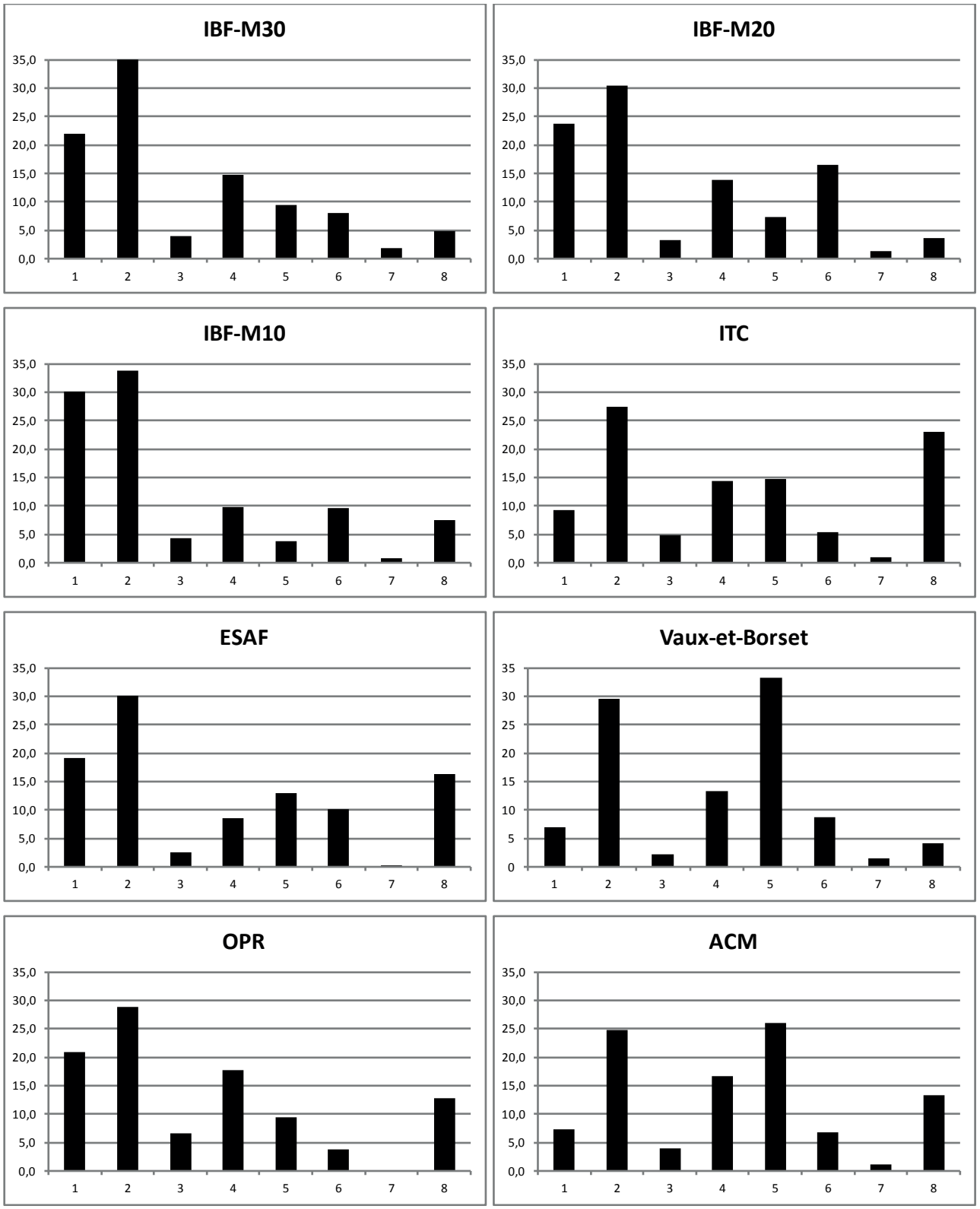


Fig. 4 – Techno-economic diagrams of the blade production in Ghlin flint for the different sites studied, in % of weight.

A general reading of these techno-economic schemas leads to the identification of all the stages of the *chaîne opératoire* within each site or household (Fig. 4). It can therefore be said that the debitage takes place within each domestic unit. But does that mean that each household has a blade knapper and autonomous lithic tool production? Various strands of evidence converge to indicate the existence of producers at the village or even supra-village scale.

4.2. Blade production and levels of expertise

The characteristics of the blades and the *chaîne opératoire* of Ghlin flint blade production show that knappers generally have a good level of skill (Fig. 5). The evaluation of the regularity of the blades led us to establish a four-tiered classification, ranging from 0 –very regular blades- to 3 –very irregular blades - (Fig. 5). Between 50 and 60 percent of the blades are regular blades (level 1). This degree of regularity corresponds to the level of average (or standard) savoir-faire observed on the Blicquian sites. The search for trapezoidal blades with code 212' involves the implementation of particular debitage arrangements (BINDER & GASSIN, 1988; BINDER, 1991; ASTRUC *et al.*, 2007; Fig. 6). These require not only knowledge but also the necessary savoir-faire to initiate and maintain them. It is therefore possible to establish that the standard skill of Ghlin flint knappers was very good. Therefore, it is possible to isolate all the pieces that deviate from this level of competence.

4.2.1. From apprentice knappers...

During the study of the Ghlin flint blade cores, we had the opportunity to identify three cores showing the work of young knappers or apprentices. A preform discovered in Feature 5 of Ellignies-Sainte-Anne could not lead to the creation of blades due to poor control of the convex surfaces. In Feature 21 of Irchonwelz 'la Bonne Fortune', a preformed tablet was

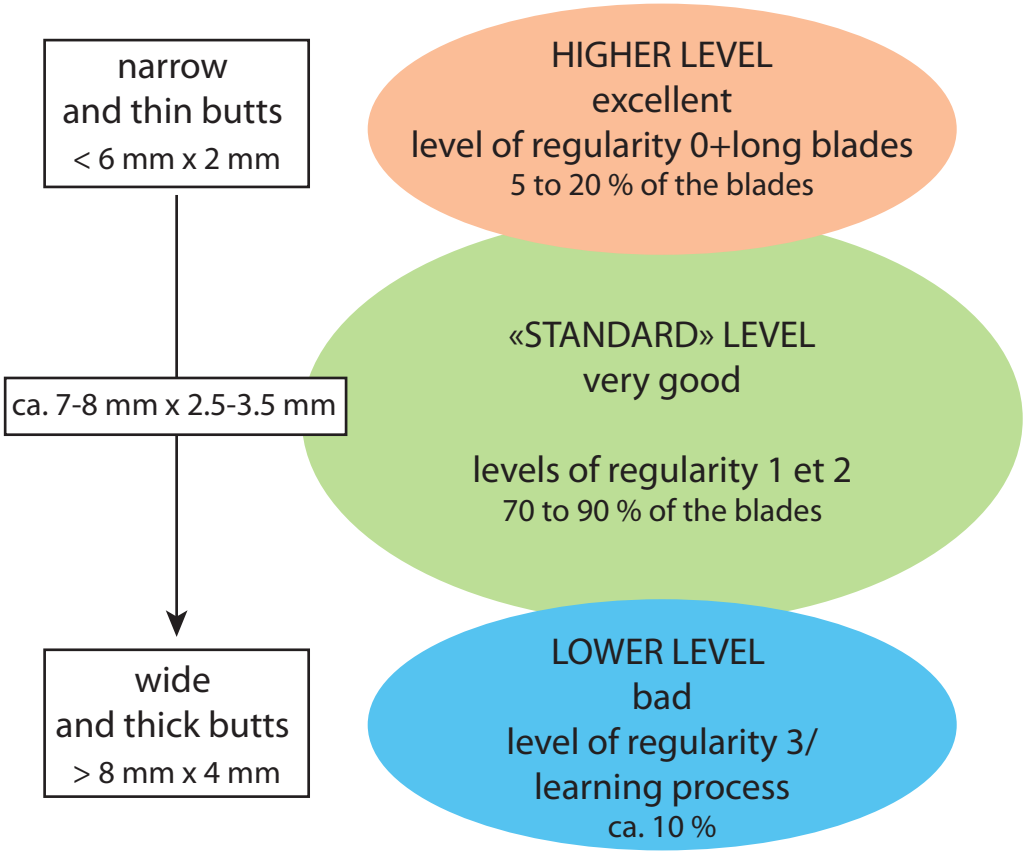


Fig. 5 – Distinction of 3 levels of skill in the blade production.

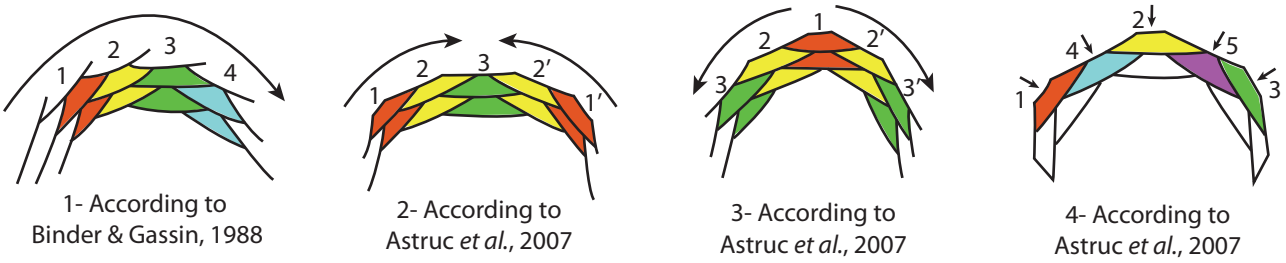


Fig. 6 – Particular arrangements of the debitage which led to obtain trapezoidal blades with 212′ code. After Jacques Pelegrin's figure (ASTRUC *et al.*, 2007) built after a long experience of knapping tests and observations of archaeological material.

knapped using a short debitage sequence that was stopped by a knapping accident (Fig. 7). This piece also shows the work of a knapper in the process of acquiring the skills needed to produce blades. Finally, in Feature 9 of Irchonwelz 'la Bonne Fortune', an economically exhausted core (no further desired blank can be obtained) was probably then reworked by a young knapper.

Thus, some artefacts attest to the presence of young or apprentice knappers involved in the process of acquiring the necessary knowledge and savoir-faire for blade production. No blade

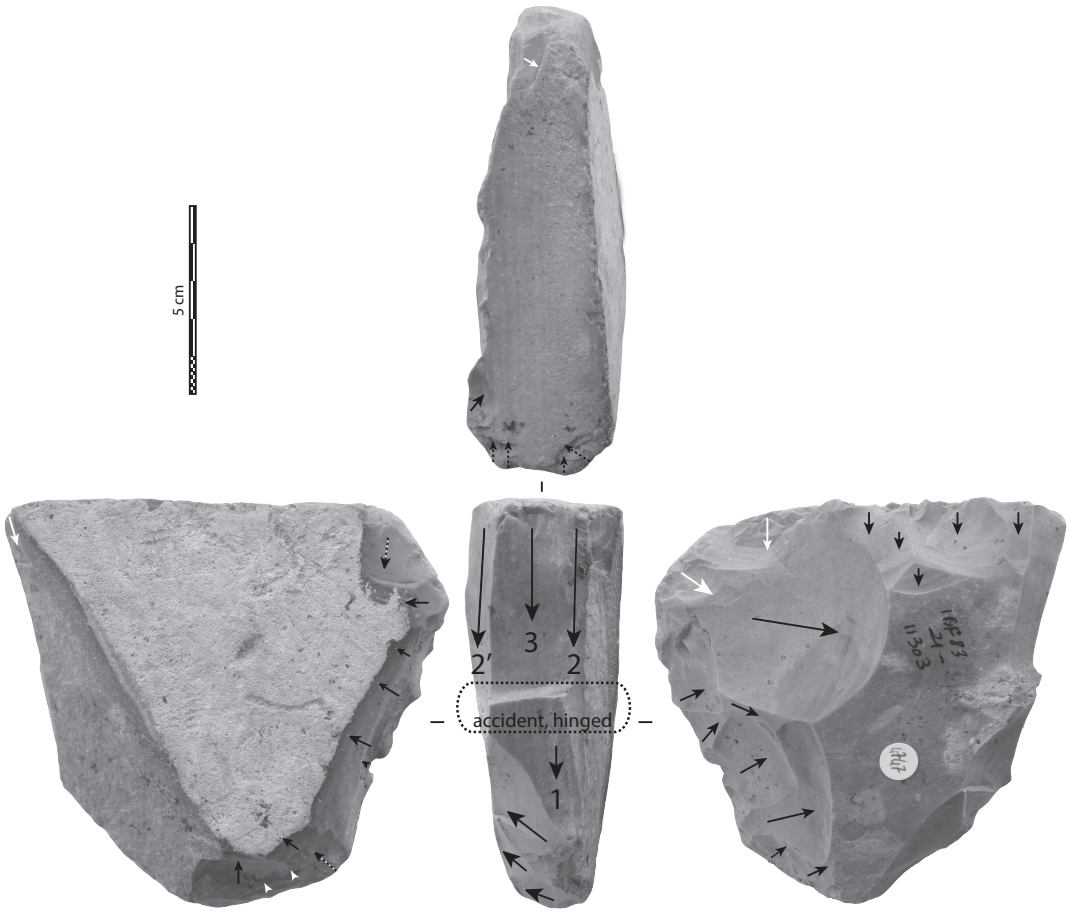


Fig. 7 – Ghlin flint tablet knapped by an apprentice, Irchonwelz 'la Bonne Fortune', Feature 21.

was actually obtained from the debitage. On the other hand, the very irregular blades and even some irregular blades (ranks 2 and 3) could reflect the presence of knappers able to carry out blade production but with a lower level of savoir-faire than the standard level (Fig. 5).

We will focus here on the very irregular blades which diverge the most from the average level of savoir-faire. The butt sizes of these blades tend to be larger than those of the blades corresponding to the standard level of expertise (Fig. 5). This is a good indicator of a low level of skill. With the exception of the site of Irchonwelz 'la Bonne Fortune', these very irregular blades seem to play little or no role in the toolkit. Thus, some of these very irregular pieces do not seem to have the same economic value as the rest of the production.

Consequently, in addition to the evidence of young people involved in the process of acquiring the necessary savoir-faire to produce blades, these very irregular blades could correspond to a slightly higher level of skill, but nonetheless lower than that for standard production.

In contrast to this evidence of apprentices, some blades display 'exceptional' characteristics that set them apart from average skill.

4.2.2 ...to the best knappers

The artefacts showing superior expertise can be divided into two groups: on the one hand, extremely regular blades and, on the other, very long blades.

Some blades exhibit an above average level of skill on account of their marked regularity. They are characterised by the parallelism of their edges and the regularity of their dorsal ridges (Fig. 8). Other parameters are often emphasised, such as straightness, the regularity of their profile, their thinness and the restricted dimensions of their butts. Cores corresponding to this quality of debitage were discovered at Ellignies-Sainte-Anne. The most regular artefacts from Hubert's excavation present extremely regular scars. On the final removals, sharp ripples are visible, particularly on the bulb of percussion on the blade. Such characteristics suggest the use of pressure flaking, which has already been mentioned in publications for the Blicquy group (CAHEN & VAN BERG, 1979; CONSTANTIN, 1985; CAHEN *et al.*, 1986; JADIN *et al.*, 2003). However, the criteria described above are not all simultaneously present. Moreover, with rare exceptions, these blades have a mesial bulge on their ventral surface or 'belly', which is typical of indirect percussion (Pelegrin, in preparation). A single artefact, discovered in Feature 9 of Irchonwelz 'la Bonne Fortune', presents all the characteristics of pressure flaking: small butt, thinness, straight edges and parallel and regular dorsal ridges, ripples on the bulb of percussion which is high and short. However, this is the only artefact for which pressure flaking could be identified. It is therefore reasonable to rely on the rates of recovery of the two techniques, particularly in the case of the use of indirect percussion by knappers with an extremely good level of savoir-faire.

These very regular artefacts therefore correspond to the most competent elements of Ghlin's flint blade debitage. The knappers possess the same knowledge but optimal savoir-faire. Long blades also show the existence of special expertise.

These long blades exceed 14 cm and reach a length of up to 20 cm, which is about twice as long as for standard blade production. However, 'the difficulty of producing large regular pieces grows exponentially with their size' (PELEGRIN, 2002, p. 142). Consequently, these artefacts necessarily involve a greater degree of savoir-faire than for standard blade production, all the more so as the shaping of large nodules involves specific knowledge and savoir-faire. However, the elements from this *chaîne opératoire* do not have present enough specific attributes to be identified and located, with the exception of a potentially large core from Irchonwelz 'la Bonne Fortune' (House 30). It is therefore difficult to locate the precise place of production of these large blades, especially since they are only rarely present. Nevertheless, it seems obvious that these pieces were not produced in a domestic context since they were not discovered at all of the sites and within all the housing units. They have been recovered from:

- House 30 of Irchonwelz 'la Bonne Fortune'. However, these are only crested blades with the longest 16 cm. It could therefore be suggested that no blade longer than 16 cm had been produced.
- On the other hand, the long blade discovered in Feature 5 of Ellignies-Sainte-Anne measures 19.5 cm, which is considerably larger than IBF. This very curved blade presents four facets and a small butt (7 x 2 mm) and was left intact and unretouched.

Other long blades have been discovered on other BQY sites. These include an artefact discovered in Vaux-et-Borset (Hesbaye). This trapezoidal blade is shorter and wider than the Ellignies-Sainte-Anne blade. It measures 150 x 27 x 8 mm and had been used. Long blades are also present at Blicquy 'la Couture de la Chaussée'. We had the opportunity to examine the one preserved at the Domus Romana (Aubechies). It is a blade with a triangular section measuring 187 x 22 x 7 mm and a small butt measuring 5 x 1 mm. This blade, like that of Ellignies-Sainte-Anne, has survived intact. The publication of the site of Blicquy 'la Couture de la Chaussée' shows the existence of a second long blade. This latter is a crested blade measuring 152 x 19 x 12 mm (CAHEN & VAN BERG, 1979, p. 22). As for the other sites not studied exhaustively here, long blades also appear to be present at Ormeignies 'le Bois Blanc' (CONSTANTIN *et al.*, 1982). They are all from Feature 2, unretouched and measure 155 x 29 x 5 mm, 146 x 23 x 5 mm

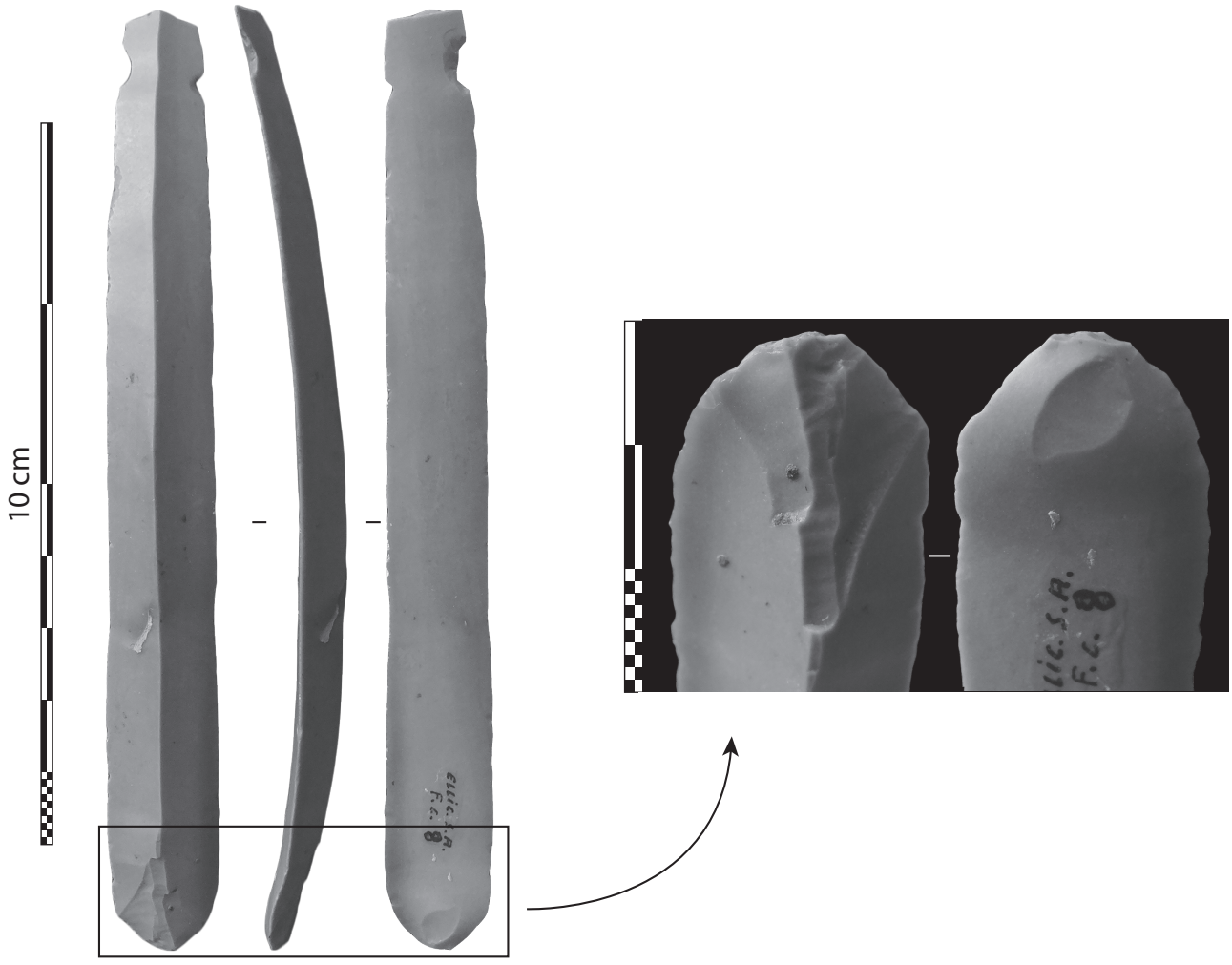


Fig. 8 – Very regular blade in Ghlin flint discovered in Ellignies-Sainte-Anne excavated by François Hubert (SNF, in 1970-1971 and 1980), conserved in the Archaeological Department, SPW.

and 141 x 18 x 6 mm. It is specified in the bibliography that they were 'discovered grouped in packages'. They can thus be considered as a hoard (CONSTANTIN *et al.*, 1982, p. 29).

Taken together, these long blades reflect the presence of knappers with an excellent level of skill. They were only identified in House 30 of Irchonwelz 'la Bonne Fortune', Feature 5 of Ellignies-Sainte-Anne, the Blicquy eponymous site, Vaux-et-Borset and Ormeignies 'le Bois Blanc'. They are also rare and in the minority in these assemblages. This production of long blades in Ghlin flint therefore appears quantitatively marginal and this may result from constraints linked to the quality of the raw material. The outcrops of Ghlin flint perhaps only offered a few large tablets capable of producing long blades. This production is not identified at all sites and the contexts of discovery are sometimes uncommon (Ormeignies 'le Bois Blanc'). Although it is difficult to prove the location of their production, it is obvious that this production was not carried out on a domestic scale. In addition, the savoir-faire required to produce these large blades was much higher than for standard blade production. This long blade production involved in particular the perfect control of the shaping of large volumes.

The examination of the level of expertise of Ghlin flint blade producers shows on the one hand the existence of apprentices, young knappers and knappers with a standard level of skill. The quality of Ghlin flint blade debitage makes it possible to assert that the savoir-faire involved was very good. But this is nonetheless distinguished from the blade debitage which shows a very high degree of expertise. This is revealed in two ways; on the one hand, these are extremely regular blades, and on the other, by the presence of rare long blades.

In each domestic unit, these three levels of skill are identified. This immediately rules out the presence of a single knapper within the domestic unit. Since the pits seem to have been filled rapidly (ALLARD *et al.*, 2013), at least in LBK contexts, these three levels would not be indicative of the technical progress of the knappers, but of three separate individuals.

4.3. Annual production output

However, an evaluation of the annual production output runs counter to the hypothesis of the coexistence of three knappers in each household.

To establish a hypothetical annual output, the data are analysed per house for Irchonwelz 'la Bonne Fortune'. The sites of Ellignies-Sainte-Anne and Aubechies contained several pits which (certainly) came from different domestic units. However, in the absence of a clear spatial organisation at these sites, we took into account all of the features, which necessarily resulted in inflating the annual production output. On the other hand, at Ormeignies 'la Petite Rosière', two pits belonged to the same house. We multiplied the number of blades by two to estimate the production of an entire building. Similarly, we multiplied the number of blades by four in Irchonwelz 'le Trou al Cauche' since only one pit was studied. To model this annual output, we have used the recent results obtained at the LBK sites of the Aisne valley which suggest a rapid filling of the pits within three to five years (ALLARD *et al.*, 2013). Experiments suggest that the debitage from a block leads to the production of 20 to 30 blades (Pelegrin, pers. comm.). Thus, annual output is very low (Fig. 9). Less than six blocks would have been knapped in a given year per household unit, or a maximum of two blocks per knapper (based on the model of three individuals per farmstead). This number could just be enough to maintain the skill level of an excellent knapper. On the other

Ghlin flint	no. blades	annual output	no. blocks/year
IBF10	32	6 to 11	<1
IBF20+9	368	74 to 123	2 to 6
IBF30	244	49 to 81	2 to 4
ESAF	258	52 to 86	2 to 4
ESAFHUb	207	41 to 69	1 to 3
ACM	327	65 to 109	2 to 5
ITC73	91	72 to 120	2 to 6
OPR	27	10 to 18	1
VCM98	96	128 to 76	3 to 6

Fig. 9 – Evaluation of annual output of Ghlin blades in the settlements studied.

hand, this level of output is clearly insufficient to optimise the skills of a young knapper in the process of acquiring knowledge. This estimate of annual production output does not suggest that production was in a 'domestic' context.

4.4. The techno-economic diagrams: quantitative variations of certain stages of the *chaîne opératoire*

We have already mentioned that the techno-economic diagrams for the blade production of the Ghlin flint show that production took place within the villages, but we have not yet considered the quantitative variations (Fig. 10). Three techno-economic classes can be identified on the basis of considerable variations between sites. These are primary flakes from the beginning of shaping out, blades and cores (Fig. 10 and Fig. 11).

All Irchonwelz 'la Bonne Fortune' farmsteads show an over-representation of primary flakes and a distinct shortage of blades. The site of Ormeignies 'la Petite Rosière' follows the same pattern. Ellignies-Sainte-Anne also has a high proportion of primary flakes but a greater blade proportion. On the other hand, blades are more abundant at Aubechies than elsewhere, even when primary flakes are poorly represented. At Irchonwelz 'le Trou al Cauche' and at the Hubert excavation at Ellignies-Sainte-Anne, cores appear to be more heavily represented than at the other sites.

Blades are consistently under-represented in household units with a high level of primary flakes (Fig. 11 and Fig. 12). It is thus tempting to see the concomitant transport of preforms and blades by knappers from these sites.

By comparison, the Aubechies site has a high percentage of blades. The techno-economic diagram of Vaux-et-Borset shows strong similarities with that of Aubechies. In Vaux-et-Borset, Ghlin flint is clearly exogenous. It was brought by knappers from Hainaut, in the form of blocks and preforms, as well as blades (DENIS, 2014).

This differential representation of the different techno-economic classes could signify a certain dependency amongst the sites for the production of blades, which could result from the knapper moving from one farmstead to another, and even from one village to another (Fig. 13).

4.5. Concentration of waste production from apprentices and most skilled knappers

Lastly, we will develop a final argument. The transmission of knowledge of this blade production obviously involves the presence of apprentices. If there are very irregular blades in each household, then these are probably an indication of inexperienced knappers. Furthermore, we pointed out earlier the

% WEIGHT	1	2	3	4	5	6	7	8	TOTAL
IBF10	30	34	4	10	4	10	1	7	100
IBF20+9	24	30	3	14	7	16	1	4	100
IBF30	22	35	4	15	9	8	2	5	100
OPR	21	29	7	18	9	4	0	13	100
ESAF	19	30	3	9	13	10	0	16	100
ITC	9	27	5	14	15	5	1	23	100
ESAFHub	8	30	5	14	14	5	0	24	100
ACM	7	25	4	17	26	7	1	13	100
Vaux-et-Borset	7	30	2	13	33	9	2	4	100

BEGINNING OF SHAPING OUT

BLADES

CORES

Fig. 10 – Quantitative variations in the techno-economic diagrams of the Ghlin flint blade production, in % of weight.

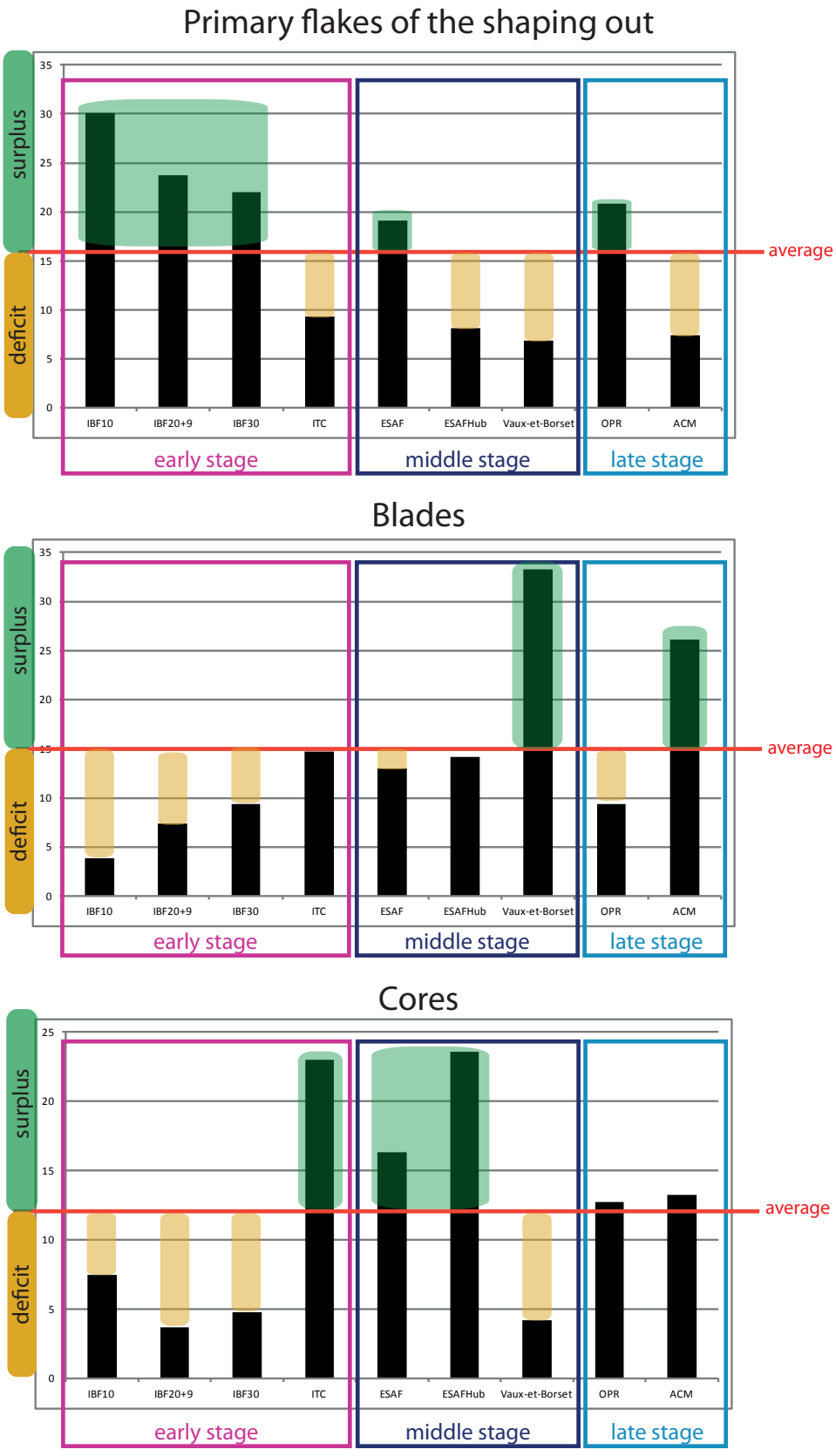


Fig. 11 – Focus on the quantitative variations of three stages of the *chaîne opératoire* of Ghlin flint blade production: the first step of the shaping out, the blades and the cores (in % of weight). Classified by chronological stages, the distinction of the surplus and the deficit shows a kind of balance between sites.

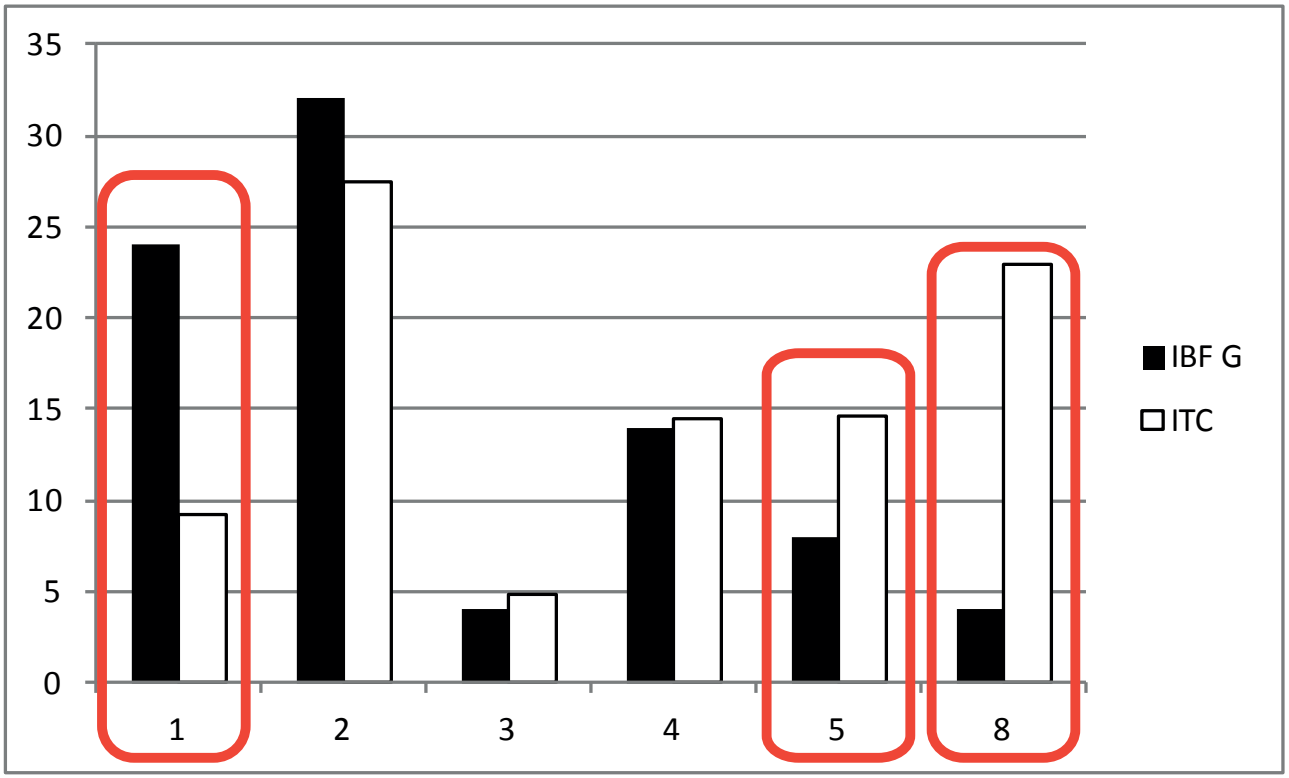


Fig. 12 – Comparisons between the techno-economic diagrams of Irchonwelz 'la Bonne Fortune' and 'le Trou al Cauche': the surplus and the deficit show a kind of balance between the two sites.

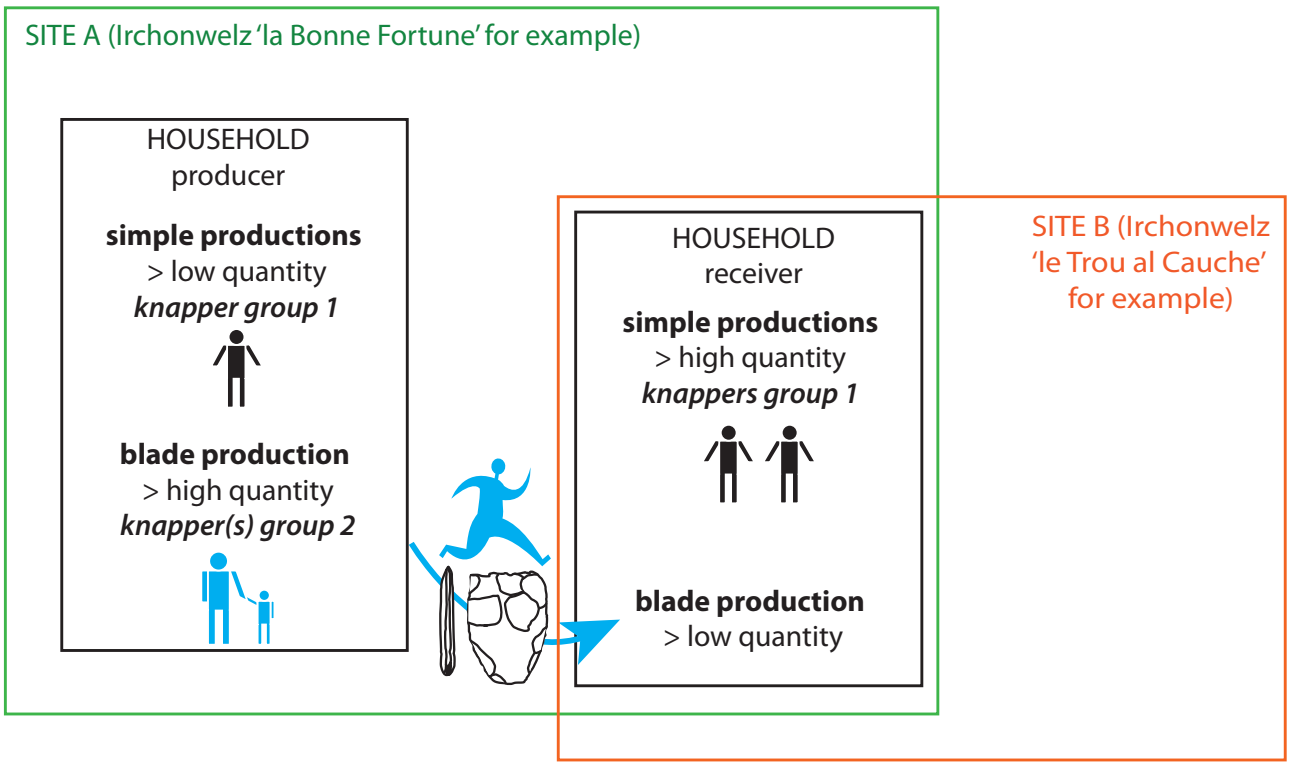


Fig. 13 – Synthetic schema of the production organisation.

existence of preforms and a core that attest to debitage created by young people in the process of acquiring the necessary skills to produce blades. These traces of learning are undoubtedly fleeting. But they are probably difficult to detect, especially within this dual production structure. The three pieces that potentially attest to such apprenticeship work come from Features 9 and 21 of Irchonwelz 'la Bonne Fortune' and Feature 5 of Ellignies-Sainte-Anne, namely from features where a certain overrepresentation of primary flakes from the shaping out phase was identified. On the other hand, very regular blades have been found in almost all the domestic units, but they are more frequent in Irchonwelz 'la Bonne Fortune'. The most regular cores were discovered at Ellignies-Sainte-Anne (Hubert excavation and Feature 5) and in House 30 at Irchonwelz 'la Bonne Fortune'. A certain concordance emerges from these different parameters, where Ellignies-Sainte-Anne and Irchonwelz 'la Bonne Fortune' contain a surplus of primary flakes from shaping out, very regular blades and evidence of training. Finally, the long blades that demonstrate the work of excellent knappers have been identified in House 30 of Irchonwelz 'la Bonne Fortune' and in the Ellignies-Sainte-Anne Feature 5. The production from both the best knappers and apprentices therefore appears to be concentrated in the same features, which also present a certain overrepresentation of waste products.

5. CONCLUSION

To summarise, it seems that the evidence converges to imply that the domestic Blicquian unit was not autonomous when producing blades. There was probably no specific blade knapper in each household. It is possible that knappers moved from one farmstead to another, and especially from one site to another, to produce blades (Fig. 13). The example of the site of Aubechies seems rather convincing for this latter perspective. There would thus have been a form of specialised inter-community production, with specialisation being characterised here as a small group of knappers who held skills not accessible to all and whose blade production was destined for redistribution to a larger community (ROUX & PELEGRIN, 1989; PERLÈS, 2001). The concentration of waste debitage and a small proportion of blades at Irchonwelz 'la Bonne Fortune' suggest that preforms and blades were removed from the site. This example is reminiscent of the situation in Langweiler 8 in the Merzbach Valley (ZIMMERMANN, 1995; LÜNING, 1998) where Langweiler 8 was described as a central site.

The interpretation of these techno-economic schemas makes it possible to determine whether the debitage occurred *in situ* or not. Other criteria have to be combined with these schemas in order to enhance our understanding of the socio-economic organisation of production. Indeed, in the light of the results presented above, we must envisage a form of supra-village organisation of blade production for these Blicquian communities of Hainaut. Blade knappers would have moved from one settlement to another and from one household to another. They would have carried preforms and blades and would have frequently finished the process of knapping locally. The development of simple production during the BQY/VSG culture could be closely linked to this specialised organisation of the production of lithic tools. With the development of domestic flake production, it would have been possible to do without specialist blade knappers to obtain the thick flakes produced at the beginning of the blade *chaîne opératoire*. From this perspective, the example of the two BQY sites at Irchonwelz attributed to the early chronological stage would prove particularly convincing (Fig. 14).

productions	blade	simple	indeterminate
IBF Feature 9	67	4	28
IBF House 20	52	4	44
IBF House 10	45	8	47
IBF House 30	45	5	50
ITC 73	21	72	7

Fig. 14 – Quantitative representation of the two kinds of production on the sites of Irchonwelz 'la Bonne Fortune' and 'le Trou al Cauche' in % of number.

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