

CHAPTER SIX

TOWARDS A REFINEMENT OF THE ABSOLUTE (TYPO) CHRONOLOGY FOR THE EARLY MESOLITHIC IN THE COVERSAND AREA OF NORTHERN BELGIUM AND THE SOUTHERN NETHERLANDS

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Abstract

In this paper the abundant Early Mesolithic dating evidence from Sandy Flanders, situated in NW Belgium, is presented and discussed in terms of typo-chronology. Based exclusively on dates from short-lived materials, in particular carbonised hazelnut shells, it is currently possible to prove the contemporaneity of several microlith assemblage types within the Pre-boreal and first part of the Boreal. Several hypotheses, taking into consideration technological, functional, social and ethnic arguments, are formulated in order to explain this co-existence.

Résumé

Dans cette contribution une abondance d'éléments de datation du Mésolithique ancien provenant de la Flandre sablonneuse au Nord-Ouest de la Belgique est présentée et discutée du point de vue de la typo-chronologie. Grâce à des dates retirées exclusivement de matériaux à vie courte, plus particulièrement des coquilles de noisettes brûlées, il est possible maintenant de démontrer la contemporanéité de plusieurs types d'assemblages de microlithes au Préboréal et dans la première moitié du Boréal. En tenant compte d'arguments d'ordre

technologique, fonctionnel, social et ethnique, plusieurs hypothèses sont émises pour expliquer cette simultanéité.

Keywords: *Early Mesolithic, radiocarbon dates, hazelnut shells, typo-chronology, cultural identity*

Mots-clés: *Mésolithique ancien, dates radiocarbonées, coquilles de noisettes, typo-chronologie, identité culturelle*

1. Introduction

It is commonly known that absolute dating of Mesolithic open-air sites situated in unstratified coversand deposits, typical of the NW European Plain, is very problematic (Crombé, Groenendijk and Van Strydonck 1999; Gob 1990; Lanting and Van der Plicht 1997/1998; Schild 1998; Van Strydonck et al. 1995; Waterbolck 1985). The main cause hereof is the extreme bioturbation of the coversands, inducing displacement of artefacts and ecofacts, mainly in vertical sense/direction (Barton 1992). As a result artefacts and ecofacts from different occupation phases can get irreversibly mixed. The same process can also lead to an admixture of organic residue from different origin and formation (naturally versus anthropogenic origin). Furthermore absolute dating is hindered by the rarity on Mesolithic sites of clear anthropogenic structural features (e.g. structured hearths, storage pits, ditches, etc.) (Sergant, Crombé and Perdaen 2006). Normally these features yield less contaminated dating samples as they generally reach down below the level of most intense bioturbation.

Due to these problems some scholars (Vanmontfort 2007, 2008; Vermeersch 2006) seriously doubt whether it is possible to obtain reliable radiocarbon dates for the Mesolithic in the coversand area, even when dealing with sealed (wetland) contexts. To them it is almost unfeasible to work out refined typo-chronological frameworks for the Mesolithic. The present authors do not agree with this pessimistic view, which denies all recent progress in sample selection and radiocarbon dating techniques. Below we shall demonstrate using data from north-western Belgium that reliable results, which can be used for typo-chronological purposes, can be achieved by dating short-lived materials, preferably from (latent) surface-hearths.

2. Dating materials

Excavations at Mesolithic sites in north-western Europe generally yield different organic residues, mainly in a carbonised state, which can be used for

radiocarbon dating. Charcoal, carbonised hazelnut shells and burnt bones are by far the most frequently encountered dating materials. On the other hand carbonised plant remains (seeds, pips, etc.), resin, wood/bark and food crusts on pottery only occur incidentally.

Charcoal has long been the principal dating material for the Mesolithic in many countries of north-western Europe (Weninger et al. this volume). According to country charcoal dates represent between 27% (UK) and 88% (NL) of all Mesolithic dates, with a mean of 50.5% for the entire north-west Europe. However, dating of charcoal samples has often resulted in radiocarbon dates which are inconsistent (mainly too young) either with ^{14}C dates from other organic samples or with expected relative dates based on artefact typology and technology, site stratigraphy (e.g. post-depositional sedimentation), spatial evidence or palynology. This is mainly due to the use of bulk samples consisting of dispersed small fragments or samples originating from features which are either diffuse or of uncertain origin (e.g. irregular and shallow charcoal patches, natural features, etc.) (Crombé 1998). Even dating of charcoal from so called hearth-pits, which tend to be interpreted as clear anthropogenic features by most scholars (Niekus, 2004/2005; Raemaekers and Niekus this volume), is subject to some caution (Van Strydonck and Crombé 2005). In addition most sampled features do not have a clear or direct spatial connection with the artefact loci (= dwelling units), as they are often found at the periphery of sites. Hence their chronological relationship with the Mesolithic occupation remains difficult to ascertain. In general only charcoal associated with surface-hearths, which are usually interpreted as domestic hearths based on their location amid artefact units, can yield reliable dating results. Unfortunately charcoal is seldom preserved in these features due to taphonomic processes (Sergant, Crombé and Perdaen 2006); concentrations of charcoal are usually found only in surface-hearths which have been sealed soon after their use (e.g. wetland conditions). Last but not least “old wood effect” is another important restriction for the use of charcoal samples for Mesolithic chronologies, especially for the later stages when deciduous wood species with important inbuilt ages (oak, etc.) are increasingly used.

The absolute dating of burnt (cremated) bone fragments is a recent development in radiocarbon dating. Although the technique, which is based on measuring the structural carbonate, has proven its success in many cases (Naysmith et al. 2007), it still needs further refinement. Most of the intercomparison studies so far have been done on relatively large bones from Bronze Age sites or younger (De Mulder et al. 2007; Lanting, Aerts-Bijma and van der Plicht 2001). Furthermore the taphonomic processes are still unclear, especially when dealing with relative old and small samples (Van Strydonck et al. 2005).

Dating of food crusts preserved on Final Mesolithic (Ertebølle and Swifterbant Cultures) pottery has also proved to be problematic. Various studies (Boudin, Van Strydonck and Crombé this volume; Fischer and Heinemeier 2003; Craig et al. 2007) have clearly demonstrated the effects of the processing of fish on the dating results.

It is now generally accepted (Ashmore 2004; Crombé 1999; Crombé, Groenendijk and Van Strydonck 1999; Lanting and van der Plicht 1997/1998) that the use of short-lived materials, such as nuts, nutshells, pits, seeds, etc., guarantees the most reliable dating results. Carbonized hazelnut shells in particular, which are practically omnipresent on Mesolithic sites, are a good dating alternative, as they have a seasonal growth (no inbuilt age) and represent a clear food residue. Furthermore hazelnut shells are generally found in close spatial relationship with lithic artefacts, in particular with latent surface-hearths (Sergant, Crombé and Perdaen 2006).

3. Dating the Mesolithic in NW Belgium

The last fifteen years intensive Mesolithic research has been conducted by Ghent University in the north-western part of Belgium, known as the area of Sandy Flanders (c. 3000 km²). At present 12 Mesolithic sites covering c. two hectares of Mesolithic surface have been excavated mainly in the framework of salvage research (Crombé 1998, 2005). In total these excavations yielded more than 80 individual artefact loci, most of them belonging to the Early Mesolithic (Table 6-1).

In order to study the chronological relationship on an inter-site as well as an intra-site level an extensive radiocarbon dating project in collaboration with the Royal Institute for Cultural Heritage (IRPA/KIK) was initiated in 1998 (Van Strydonck, Crombé and Maes 2001; Van Strydonck and Crombé 2005). This still ongoing project resulted in a dataset of more than 150, mainly single entity, ¹⁴C dates, making the Mesolithic in Sandy Flanders one of the best dated within the northwest European context (Table 6-1). More than half of these dates (c. 53%) have been performed on samples of short-lived materials, in particular on burnt hazelnut shells (N = 78), selected from latent surface-hearths within artefact loci.

The dataset of hazelnut dates for the Early Mesolithic is substantial enough (70 dates) to allow a statistical analysis in view of the elaboration of a typo-chronological framework. On the other hand the number of short-lived dates related to the Middle (2), Late (3) and Final Mesolithic (6) is still too restricted for these purposes.

Towards a Refinement of the Early Mesolithic (Typo)-Chronology in Northern Belgium

Site	Mesolithic stage	Artefact loci	Hazelnut dates	Seed dates	Charcoal dates	Food crust dates	Bone dates	Wood/bark dates	Total dates
Verrebroek "Dok 1"	Early Mesolithic	>55	63	-	17	-	1	-	81
Verrebroek "Aven Ackers"	Early and Middle Mesolithic	>5	2	-	-	-	-	-	2
Doel "Deurganckdok" sector B	Early and Final Mesolithic	?	4	3	9	16	9	-	41
Doel "Deurganckdok" sector C	Early Mesolithic	1	-	-	-	-	-	-	0
Doel "Deurganckdok" sector J/L	Early and Final Mesolithic	3	4	-	-	2	-	-	6
Doel "Deurganckdok" sector M	Early and Final Mesolithic	>2	1	-	-	-	-	-	1
Melsele "Hof ten Damme"	Final Mesolithic	?	1	-	10	-	-	4	15
Kruishoutem "Kerkakkers"	Middle Mesolithic	7	1	-	1	-	-	-	2
Maldegem "Prinsenveld"	Early Mesolithic	1	-	-	1	-	-	-	1
Oostwinkel "Mostmolen"	Early Mesolithic	2	2	-	1	-	-	-	3
Vinderhoute "Molenbrug"	Early Mesolithic	?	-	-	-	-	-	-	0
Ursel "Konijntje"	Early Mesolithic	?	-	-	-	-	-	-	0
TOTAL		>76	78	3	39	18	10	4	152

Table 6-1: Excavated sites and radiocarbon dates listed according to dating material from Sandy Flanders in north-west Belgium.

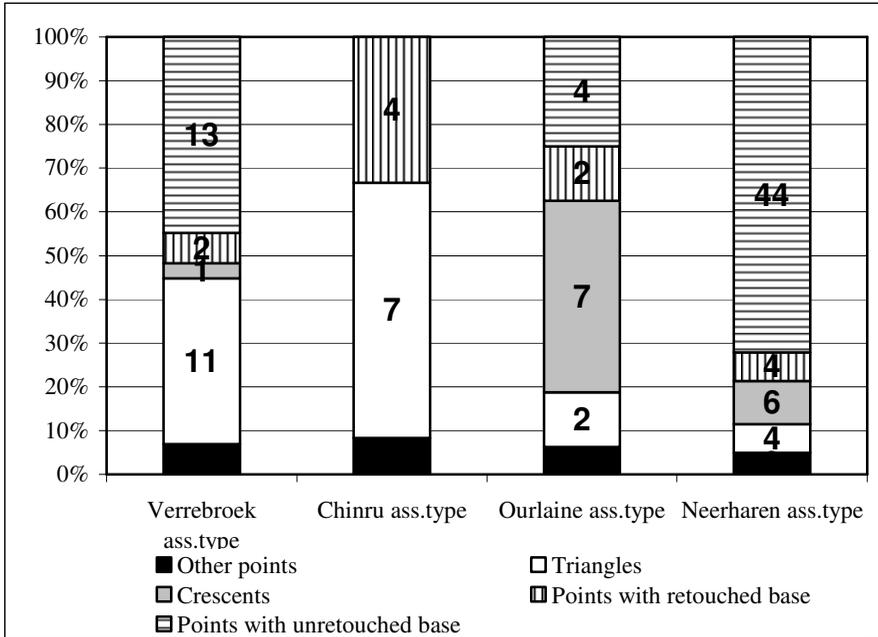


Fig. 6-1: Microlith composition of the four Early Mesolithic assemblage types. Based on data from the site of Verrebroek “Dok 1”, resp. artefact loci 6, 16, 23 and 70.

3.1 Early Mesolithic microlith assemblage types

At present four microlith assemblage types, named after their type site, are defined for the Belgian Early (Pre-boreal/beginning of Boreal) Mesolithic (Crombé 1999, 2002): the “Neerharen”, “Ourlaine”, “Verrebroek” and “Chinru” assemblage types. All four have also been attested on several excavations within Sandy Flanders. Below a brief description of these assemblage types will be given as well as their typological affinities with other north-west European traditions (for complete references see Perdaen, Crombé and Sergant 2008a) (Fig. 6-1).

(1) Sites belonging to the “Neerharen” assemblage type exhibit a microlith spectrum characterized by an absolute dominance (over 50%) of points with a natural base (consisting of obliquely truncated points and unilaterally backed points). The spectrum is completed with triangles (both isosceles and scalene triangles), crescents and points with retouched bases, each represented by 10 to 15%. At least seven artefact loci from Sandy Flanders yielded microliths which can

be attributed to the Neerharen assemblage type: Verrebroek “Dok 1” (5 loci), Oostwinkel (1 locus) and Vinderhout. Sites with a similar microlithic composition in north-western Europe are known in the “Duvensee” complex, which gathers different regional traditions e.g. the Epi-Ahrenburgian, the “Star Carr”, “Duvensee” and “Kormornica” assemblage types. The “Neerharen” assemblage type also shows affinities with more south-eastern traditions such as the *Halterner* and *Hambacher Gruppe* from western Germany and a number of sites in northern and eastern France.

(2) The “Ourlaine” assemblage type is dominated by crescents (35-45%). Together with truncated points and unilaterally backed points they form about three-quarters of the total microlithic toolkit. Points with a retouched base and triangles only occur incidentally. Together thirteen loci - Verrebroek Dok 1” (11 loci) and Doel “Deurganckdok-sector J/L” (2 loci) - clearly belong to this assemblage type. Compared to the “Neerharen” assemblage type, the “Ourlaine” shows more similarities with assemblages to the east and south of Belgium, more specifically the *Groupe de Hailles* and the *Tardenoisien moyen* from northern France, the *Mésolithique ancien de l’Est* from eastern France and the *Hambacher Gruppe* from western Germany.

(3) The “Verrebroek” assemblage type is also characterized by the presence of points with a natural base, now in combination with (scalene) triangles. Points with a retouched base and crescents are sometimes present in low numbers. Loci belonging to this assemblage type are found at Verrebroek “Dok 1” (5 loci) and Verrebroek “Aven Ackers” (1 locus). For comparisons we once again have to turn to northern Germany and southern Scandinavia.

(4) Lastly there is the “Chinru” assemblage type, characterized by the presence of triangles and points with a retouched base. This assemblage type so far has only been found within 5 artefact loci at Verrebroek “Dok 1”. Sites with a similar composition are found in the Beuronian B of eastern France and western and south-western Germany.

3.2 Absolute dates

From a total of 70 hazelnut dates belonging to the Early Mesolithic (cf. supra), 38 dates can be securely attributed to one of these four assemblage-types (Table 6-2). These dates have been obtained on samples originating from 26 different, mainly small-sized (<25/30m²) artefact loci. Care was taken for the sample selection to be unbiased and the cultural attribution to be the only selection criterion. Hazelnut dates from very discrete loci which yielded too few microliths,

Chapter Six

as well as dates from (very) large (>30m²) artefact units, which might represent palimpsests (Crombé, Perdaen and Sergeant 2006), were omitted from the present study.

With 15 dates the “Ourlaine” assemblage type is currently the best dated taxon within Sandy Flanders, followed by the “Neerharen” (9 dates), the “Verrebroek” (8 dates) and the “Chinru” assemblage types (6 dates). Based on these dates an attempt can be made to calculate the chronological range for each assemblage type separately. In order to calculate the introduction phase, the blooming period and the decline of the different cultural phases the Quartile Interval (QI) and the 95% probability range was calculated from the density diagrams (Table 6-3; Fig. 6-2).

	lab n°	BP
Neerharen Group		
Verrebroek "Dok" 22	UtC-8389	9310±40
Verrebroek "Dok" 22	UtC-9438	9290±80
Verrebroek "Dok" 17	UtC-7119	9280±50
Verrebroek "Dok" 17	UtC-7120	9270±50
Oostwinkel "Mostmolen"	UtC-3438	9250±160
Verrebroek "Dok" 22	UtC-8393	9210±40
Verrebroek "Dok" 9	UtC-7851	9130±75
Verrebroek "Dok" 70	UtC-9223	9080±60
Verrebroek "Dok" 17	UtC-7118	8930±60
Ourlaine group		
Verrebroek "Dok" 2,1	UtC-8398	9265±40
Verrebroek "Dok" 14	UtC-7045	9230±50
Verrebroek "Dok" 18	UtC-9224	9160±60
Verrebroek "Dok" 1	UtC-3915	9110±65
Verrebroek "Dok" 2,1	UtC-3445	9100±130
Verrebroek "Dok" 14	UtC-7046	9100±60
Verrebroek "Dok" 23	UtC-9228	9020±60
Verrebroek "Dok" 4	UtC-8397	9065±40
Doel "Deurganckdok-J/L"	KIA-30962	8965±45
Verrebroek "Dok" 39	NZA-11015	8900±90
Verrebroek "Dok" 91	NZA-11248	8755±85
Verrebroek "Dok" 67	UtC-8388	8755±40
Verrebroek "Dok" 49	NZA-11249	8675±55
Doel "Deurganckdok-J/L"	KIA-24034	8630±60
Doel "Deurganckdok-J/L"	KIA-24454	8485±40
Verrebroek group		
Verrebroek "Dok" 41	NZA-11012	9180±60
Verrebroek "Dok" 6	UtC-8961	9165±45

Verrebroek "Dok" 6	UtC-3439	9150±100
Verrebroek "Dok" 2,2	UtC-3436	9130±170
Verrebroek "Dok" 7	UtC-3451	9120±120
Verrebroek "Dok" 71	UtC-9419	9070±70
Verrebroek "Dok" 7	UtC-8395	9015±40
Verrebroek "Dok" 2,2	UtC-8391	8850±50
Chinru group		
Verrebroek "Dok" 16	UtC-7117	8850±40
Verrebroek "Dok" 28	UtC-9433	8800±80
Verrebroek "Dok" 99	UtC-9226	8810±60
Verrebroek "Dok" 92	NZA-11017	8790±60
Verrebroek "Dok" 72	UtC-7252	8750±40
Verrebroek "Dok" 68	UtC-9222	8400±60

Table 6-2: Radiocarbon dates on carbonised hazelnut shells according to assemblage type.

assemblage type	95% probability range	Quartile Interval (QI)
“Neerharen”	8711 – 8004	8543 – 8318
“Ourlaine”	8552 – 7542	8345 – 7784
“Verrebroek”	8606 – 7857	8416 – 8241
“Chinru”	8185 – 7382	7974 – 7721

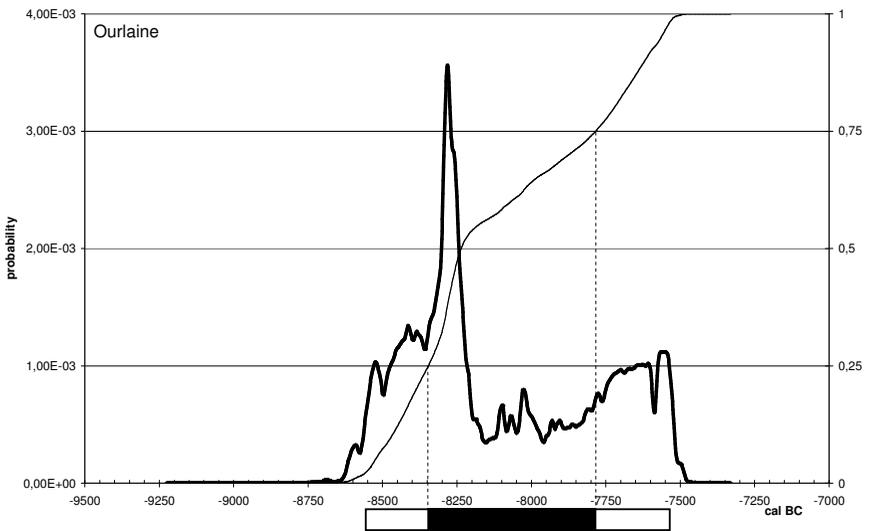
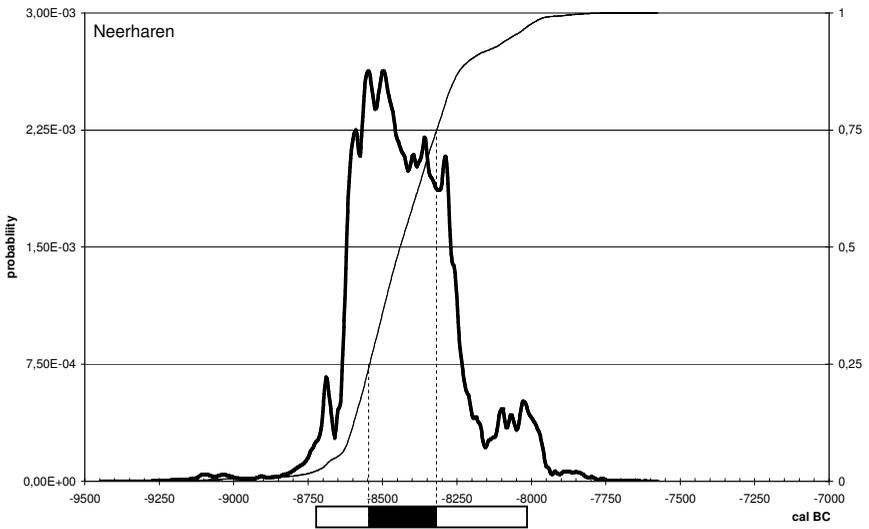
Table 6-3: 95% probability and Quartile Interval for each individual assemblage type.

4. Discussion

The data from north-western Belgium clearly contradict the typo-chronological framework for the Belgian Mesolithic as proposed in the 1980s by André Gob (Gob 1981, 1984, 1990). In Gob’s chronology, which has been and locally is still used by many scholars (e.g. Otte and Noiret 2006; Reynier 2005; Spier 1990), the different Early Mesolithic assemblage types are interpreted as strictly diachronic, starting with the “Neerharen” (= *Epi-Ahrensburgien*), followed first by the “Ourlaine” (= *Beuronien A*), and later by the “Chinru” (= *Beuronien B*) and finally ending with the “Verrebroek” assemblage type (= *Beuronien C*). The dating evidence from Sandy Flanders, however, shows that this strictly linear model cannot be applied to north-western Belgium nor probably to other regions within the coversand area of northern Belgium and southern Netherlands (cf. infra).

Although the number of samples per taxon is still relatively low the dating evidence from Sandy Flanders (Fig. 6-2) clearly demonstrates that three out of four assemblage types, i.e. the “Neerharen”, “Verrebroek” and “Ourlaine” assemblage types, are at least partially contemporaneous between c. 8700/8500 cal BC and c.

Chapter Six



Towards a Refinement of the Early Mesolithic (Typo)-Chronology in Northern Belgium

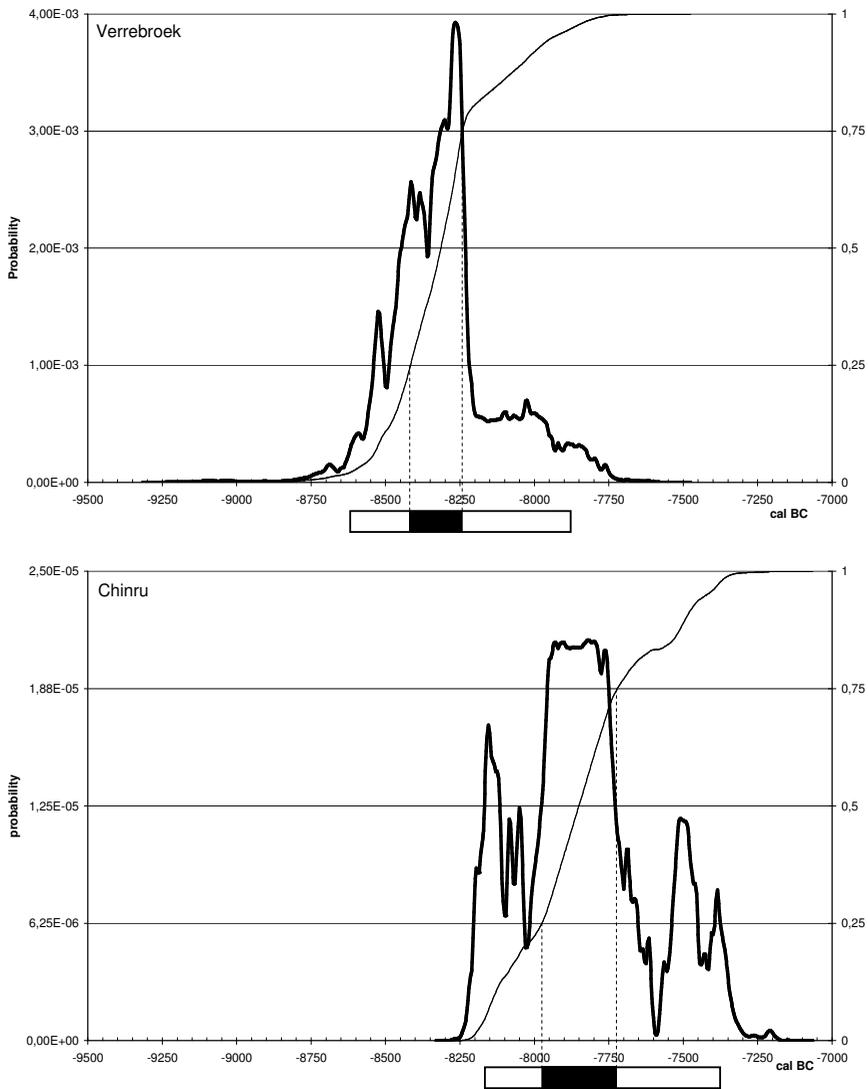


Fig. 6-2: Graphic representation of the 95% probability and the Quartile Interval for each individual assemblage type, based on dating evidence from Sandy Flanders.

8000 cal BC, i.e. during the Late Pre-boreal and the transition towards the Boreal¹. Judging by the QI the “Neerharen” assemblage type might be slightly older than the other two, but this still demands further dating evidence. On the other hand the QI clearly indicates that the “Neerharen” and “Verrebroek” assemblage types are restricted to the Late Pre-boreal, whereas the “Ourlaine” assemblage type continues into the Boreal, until c. 7800/7500 cal BC. The “Chinru” assemblage type is the only one to have a Boreal origin, its optimum largely coinciding with the Boreal part of the Ourlaine assemblage type. In conclusion the available radiocarbon dates from Sandy Flanders prove a partial contemporaneity of three assemblage types during the Late Pre-boreal and two assemblage types during the first half of the Boreal.

Based on various technological, morphological and raw material resemblances it may be assumed that the younger “Chinru” assemblage type is a further evolution of the “Verrebroek” assemblage type. Both types are characterized by the presence of numerous, predominately scalene triangles, which morphologically do not differ at all (Crombé 2002). Another line of continuity is the preferred use of Tienen quartzite as exotic raw material in both assemblage types (Perdaen, Crombé and Sergant 2009). Furthermore both assemblage types (and also the “Neerharen”) present the same knapping characteristics, as demonstrated in a recent paper by Perdaen, Crombé and Sergant (2008a; 2008b; Perdaen, Noens and Ryssaert this volume).

On the other hand the relation between the contemporaneous “Neerharen”, “Verrebroek” and “Ourlaine” assemblage types is much less obvious. The former two might be seen as functionally complementary, given the fact that they belong to the same technological group (Perdaen, Crombé and Sergant 2008a). According to several ethnographic observations the morphology of arrow tips and barbs and hence the way arrows are arranged is sometimes determined by the prey species, animal size, hunting season, weather or forest context (Ellis 1997; Griffin 1997). Knowing from microwear analysis on 467 microliths (Crombé et al. 2001) that most Early Mesolithic microliths in Sandy Flanders were used as components of Mesolithic hunting gear, either as tips (points with a retouched base and unilaterally backed points) or as barbs (crescents, triangles and obliquely truncated points), it might be assumed that the “Neerharen” and “Verrebroek” assemblage types are the expression of comparable functional differences. Unfortunately, this hypothesis cannot yet be verified as no reliable faunal or environmental data is currently available for the Early Mesolithic in Sandy Flanders. Animal bones are too fragmented due to burning to offer detailed information on prey species, prey size or hunting season. Other seasonal information is also lacking. The omnipresence of carbonized hazelnut shells cannot be used as a clear seasonal indicator. When stored properly (in a cool, dry place out of direct sunlight)

hazelnuts can be kept for up to six months, and when dried or roasted they remain edible for over a year (Mason 1996). Also, at Verrebroek “Dok 1” there are faint indications for the storage of hazelnuts: at least three possible storage pits, containing numerous charred hazelnut shells, were found (Crombé, Perdaen and Sergeant 2005).

The “Ourlaine” assemblage type, which is the only Pre-boreal type persisting into the Boreal synchronic with the “Chinru” type, probably needs to be interpreted on a different level. From a technological perspective this assemblage type differs in many respects from the three other types, suggesting that it might belong to a different technological group (Perdaen, Crombé and Sergeant 2008a). Based on this observation and by comparison with Final Palaeolithic and ethnographic evidence it has been suggested that the “Ourlaine” assemblage type might be produced by a different group of people, belonging to a different lithic tradition, perhaps even a different “cultural tradition”. Indeed, the observed differences in technology, origin (“roots”) and geographical distribution make it plausible that we are dealing with two different populations (dialectic tribes or language families), each with its own cultural traditions: a north European tradition producing “Neerharen”, “Verrebroek” and later on “Chinru” assemblages, and a west European tradition characterized by “Ourlaine” assemblages (Crombé 2002; Perdaen, Crombé and Sergeant 2008a).

5. Conclusion

The dating evidence on short-lived materials extracted from latent surface-hearths within the sandy lowland of north-western Belgium clearly demonstrates that until now the relationship between different microlith assemblage types within the Belgian Early Mesolithic has been addressed in too simple a way. Clearly evolution cannot explain all variability, but functional and ethnic factors should also be considered. Also it should be considered that the same complexity may also have existed in the later Mesolithic stages. The Middle Mesolithic in Belgium, for example, also demonstrates the existence of at least two different microlith assemblage types, known as the “Sonnisse Heide” and the “Gelderhorsten” assemblage types (Crombé 1999). Future datings will have to clarify the chronological relationship between both.

Further research will also have to demonstrate to which extend the Early Mesolithic chronology defined in this paper is also applicable to other parts of the coversand area of northern Belgium (e.g. Campine area) and the southern Netherlands. So far the available dates on short-lived materials from the latter areas are too restricted to be compared on a statistical basis with Sandy Flanders. Only

10 hazelnut dates from 4 sites (Haelen, Neerharen, Posterholt and Zutphen) are presently available. However, despite the low numbers these few dates do not seem to contradict the absolute chronology from Sandy Flanders.

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Chapter Six

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¹ Following the chronozonation of Mangerud et al. (1974) the boundary between the Pre-boreal and Boreal has been set at c. 9000 BP (c. 8000 cal BC).