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Breaking the Mould: Challenging the Past through Pottery

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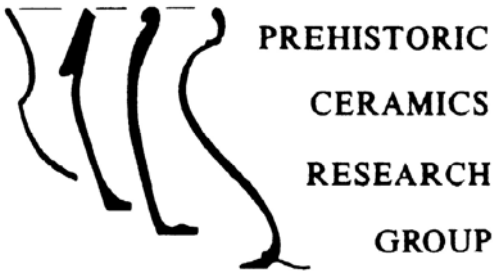

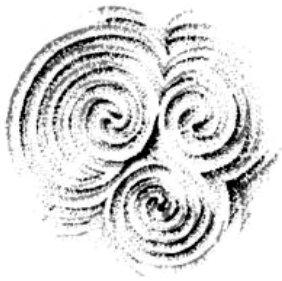

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INFLUENCE FROM THE 'GROUP RHIN-SUISSE-FRANCE ORIENTALE' ON THE POTTERY FROM THE LATE BRONZE AGE URNFIELDS IN WESTERN BELGIUM. A CONFRONTATION BETWEEN POTTERY FORMING TECHNOLOGY, ^{14}C-DATES AND TYPO-CHRONOLOGY

Guy DE MULDER, Walter LECLERCQ and Mark VAN STRYDONCK

Abstract: In 1940 Kimmig published his theory on the Central-European urnfields. His view influenced the definition of the urnfields in western Europe and also the idea of the Flemish urnfieldgroup in western Belgium. In the 1980s the concept of the group 'Rhin-Suisse-France orientale' (RSFO) proposed that western Europe had come under the cultural influence from the central European region during the Late Bronze Age. A set of pottery types was defined as characteristic for the 'group RSFO'. The presence of this group is attested in the Meuse valley in southeast Belgium. Study of the pottery production processes in western Belgium shows that the shapes are imitations of typical RSFO-pottery. The method of clay preparation, the tempering materials and the building techniques of the pots is different in western Belgium than in the core area of the group RSFO. The western Belgian chronology was established in comparison with the central European forms. The chronological validity of this typology is now being tested against dates derived from the cremated bones found in the urns. Preliminary results from two cemeteries do not confirm the typo-chronological framework in current use.

INTRODUCTION

The study area incorporates the present-day provinces of West-Flanders, East-Flanders and Hainaut in western Belgium together with the river Scheldt, and the Lys and Dender tributaries (Figure 1). Two patterns illuminate the important role played by the Scheldt basin during the Late Bronze Age: the concentration of urnfields in the valley and frequent depositions of bronze objects found during dredging activities.

The urnfields of western Belgium (Figure 2) were first recorded in the mid 19th century as a result of modern industrial activities (De Loë 1891). These early investigations were carried out by local historians and

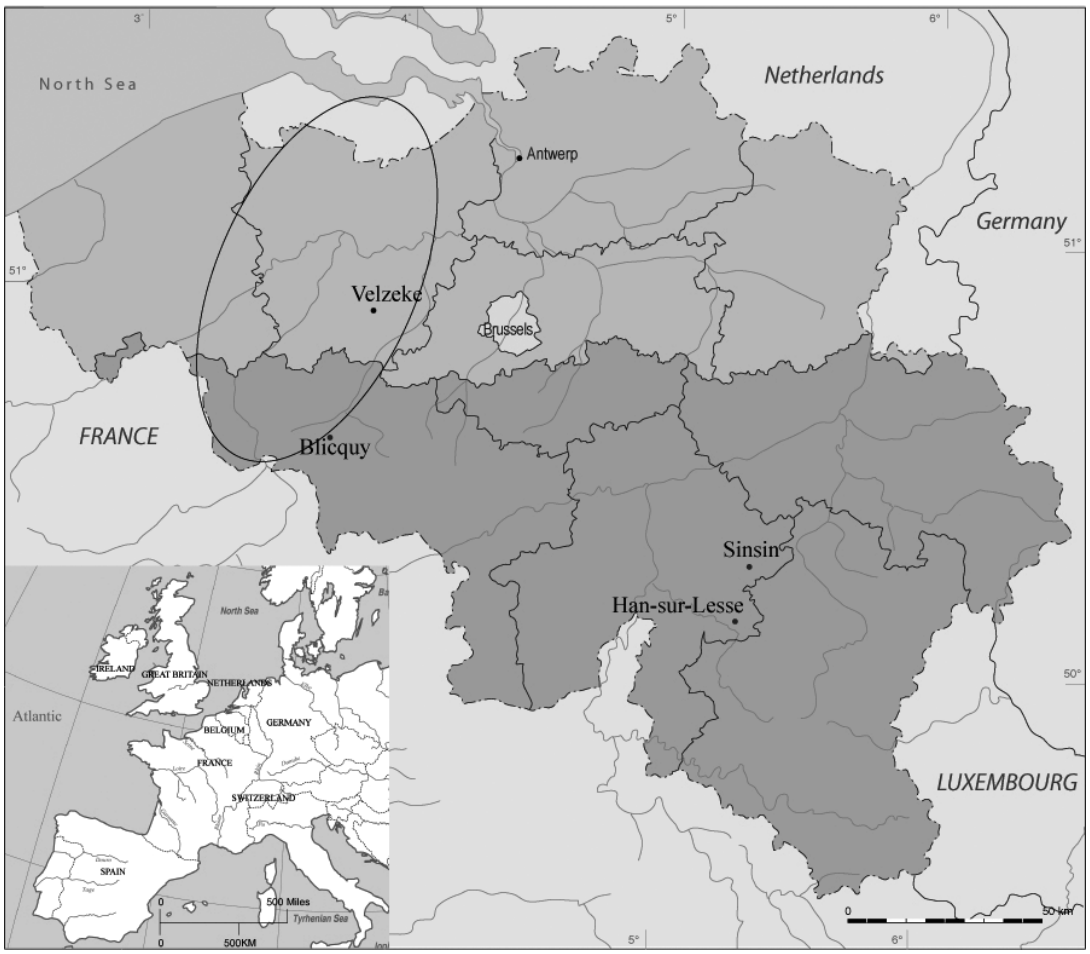


Figure 1: Map of Belgium with location of the core area of the Flemish group (ULB-CReA).

amateur archaeologists who focused primarily on the extraction of the urns. This object-orientated research limits the information available for most of these older sites to the finds themselves. Information about the different grave types, extent and layout of the cemeteries is virtually non-existent (De Meulemeester 1974: 9-10).

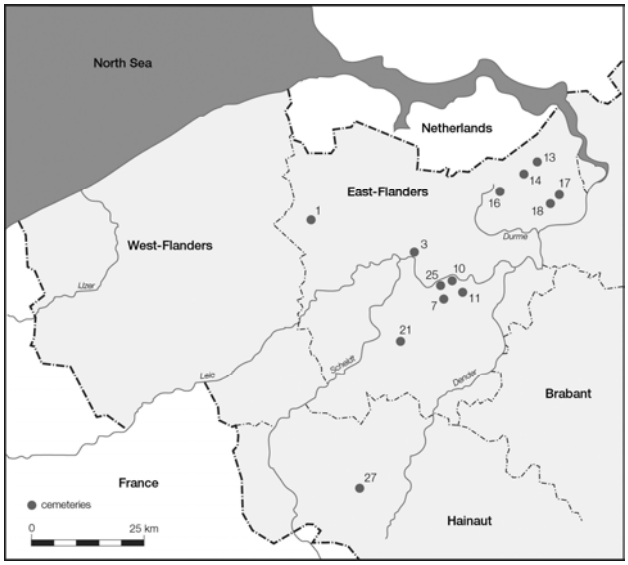


Figure 2: The Late Bronze Age urnfields of the Flemish group. Sites referred to in the paper: 1. Aalter/Oostergem, 3. Destelbergen/Eenbeekeinde, 14. Sint-Gillis-Waas/Ripstraat, 17. Temse/Veldmolenwijk, 18. Temse/Velle, 21. Velzeke/Paddestraat, 27. Blicquy.

LATE BRONZE AGE CHRONOLOGY

Extensive urnfield research in Europe began with Kimmig's (1940) study of the urnfield culture in Baden (southwest Germany), and was later extended to French urnfields (1951). According to his research, the urnfield culture of central Europe (specifically, north of the Alps) arose as the result of a synthesis between immigrant eastern European groups and local Bronze Age communities. These urnfield culture groups then dispersed into western Europe and mixed with the local population (Kimmig 1952). Kimmig's studies influenced other scholars; among them Mariën who wrote about the urnfields in central and western Europe (1948). In his contribution, the site of Temse (Veldmolenwijk) in west Belgium is assigned to the so-called Lower Rhine urnfields (Niederrheinische Grabhügelkultur) (Mariën 1948: 423-424).

De Laet and his collaborators worked on the urnfields in west Belgium in the 1950s. They restudied old finds and excavated several new cemeteries. Based on the finds from these cemeteries, they defined the Flemish group of the urnfield culture. They considered the Flemish group to have occupied the western part of Flanders, especially focusing on the province of East Flanders (De Laet *et al*. 1958). This work was elaborated on by Desittere who studied the Late Bronze Age urnfield groups located between the river Rhine and the North Sea. His proposed pottery chronology was based on comparison with contemporary central European pottery finds (Desittere 1968).

A new interpretative concept of the urnfield culture was proposed by Brun in the 1980s (Brun 1984, 1988) which shifted emphasis from migrations to a socio-economic interpretation for the changes witnessed in the Late Bronze Age. Brun introduced the concept of the 'groupe Rhin-Suisse-France orientale (RSFO)'. This group is situated in the northern Alpine area covering part of southern Germany, Switzerland and northeast France. A new chronological framework for this period was proposed (Table 1). During the first phase (etappe 1) the group RSFO is characterised by a period of internal demographic and economic growth. In the second period (etappe 2) it expanded towards the west, into the area of the Atlantic techno-complex, culturally and economically influencing regional groups. Also during this phase, the southern part of Belgium, particularly the river Meuse area, is included into the expansion zone of the group RSFO (Warmenbol 1988). The western part of Belgium comes only partially under the cultural influence from central Europe. The last phase (etappe 3) is a period of economic problems, social change and regression in the group RSFO. In northwest Europe, the Atlantic techno-complex plays a leading role again. The increased production and distribution of bronzes from the so-called Plainseau-culture in this region are testimony to the vitality of the Atlantic region at the end of the Late Bronze Age (Warmenbol 1991: 100-105).

Müller-Karpe (Germany)	**Hatt (France)**	**Brun**	**Years BC**
Bronzezeit D	Bronze final I	Etappe 1	1300 - 1200
Hallstatt A1	Bronze final IIa		1200 - 1100
Hallstatt A2	Bronze final IIb	Etappe 2	1100 - 1000
Hallstatt B1	Bronze final IIIa		1000 - 900
Hallstatt B2/3	Bronze final IIIb	Etappe 3	900 - 800
Hallstatt C	Hallstatt ancien		800 - 600
Hallstatt D	Hallstatt moyen/final	Hallstatt moyen/final	600 - 450

Table 1: Conventional chronological sequence of the Late Bronze Age and Early Iron Age in central and western Europe based primarily on typology.

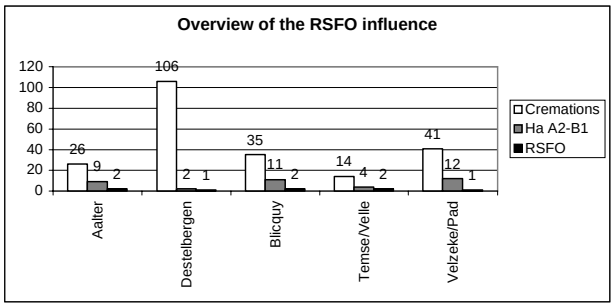
These new approaches to urnfields stimulated a revision of excavated urnfields in western Belgium, confronting the old information with this new concept (Bourgeois 1989). Recent archaeological research, for example, has demonstrated that the Flemish group covered a larger area than hitherto presumed: the urnfield of Blicquy in the province of Hainaut clearly shows the same funeral characteristics as other known sites (Henton 1994; Leclercq *in press*).

The chronology of the Late Bronze Age and the Early Iron Age in our study area is largely based on the typo-chronology of two categories of objects: pottery and bronze objects. Unlike central European cemeteries, graves of the Flemish group are characterised by a non-elaborate burial ritual where only the urn with the cremation remains is deposited in the grave; infrequent funeral gifts consisted of a cup or beaker. Bronze objects are almost completely missing (De Mulder 1994).

Although unknown in cemeteries, bronze objects appeared in large quantities during dredging activities at the end of the 19th and the first half of the 20th centuries in the river Scheldt. Based on comparison with Atlantic and Continental bronzes, a chronological framework for these bronze finds was established (O'Connor 1980; Verlaeckt 1996). This chronology has been tested against a series of ^{14}C-dates derived from wooden shafts of spearheads, socketed axes and a ferrule (Bourgeois *et al*. 1996: 65-68).

Settlements are little known in western Belgium. Only a few contexts brought to light evidence of domestic pottery. Due to the scarcity of the material it is not easy to compare the pottery from funerary and domestic sites in order to build up a chronology of the Late Bronze Age. As with cemetery assemblages, finds of metalwork are also exceptional in settlements (Bourgeois & Cherretté 2005: 59-65).

To conclude, the chronological framework for the Late Bronze Age in western Belgium was build on two categories of objects which are seldom found in the same context. In central Europe the combination of pottery and bronze objects within one grave is relatively frequent, which enables the creation of a more detailed chronology. However, a recent series of radiocarbon dates, undertaken on the wood conserved in the shafts of bronze objects (Bourgeois *et al.* 1996: 147-149) and on charcoal fragments from the two urnfields at Velzeke (De Mulder & Van Strydonck 2004), created the possibility to test the typological sequence of the Late Bronze Age metalwork and pottery for the first time independently.



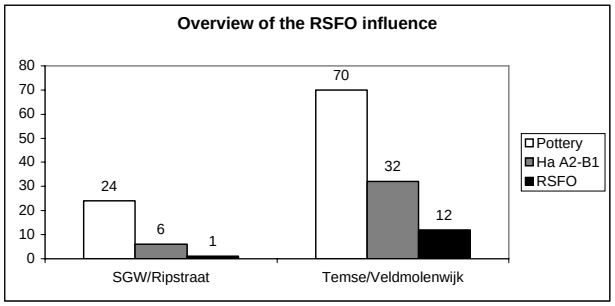


Figure 3: Comparison between the total number of cremations. Late Bronze Age (Ha A2-B1) dated cremations/pottery and RSFO-pottery in the urnfields of the Flemish group.

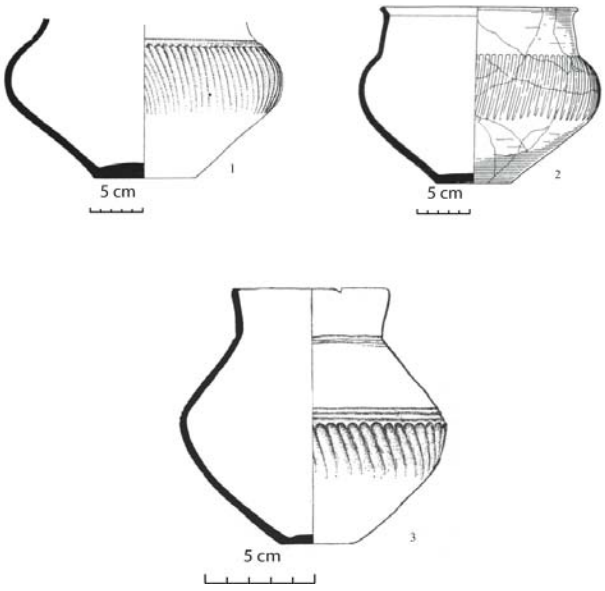


Figure 4: The urns 'à décor cannelé': 1 (Zandhoven), 2 (Herstal) and 3 (Temse/Velle).

CHRONOLOGY OF THE LATE BRONZE AGE POTTERY IN WESTERN BELGIUM

A series of pottery types and bronze objects were defined as typical guide fossils for the group RSFO (Brun & Mordant 1988: 631-632). A few of these pottery types appear also in some of the urnfields in western Belgium. From the twenty-seven known cemeteries of the Flemish group, only thirteen sites are dated precisely to the Late Bronze Age; of these, just seven can be related to pottery of the group RSFO (Figure 3).

Before giving an overview of the pottery types, we have to discuss an isolated find from the cemetery of Temse/Velle. One of the graves contained a biconical urn with a rounded body and a funnel-shaped neck. This urn is decorated with broad fluting on the body, delimited by two broad grooves on the transition to the shoulder (Figure 4.3). This kind of decoration is described as the so-called *décor cannelé*, which is typical for the period of Bronzezeit D-Ha A1 (phase 1) in east France (Mordant 1988) and the German urnfields in the Rhine area (Sperber 1987: 94). This urn was traditionally dated to the period Ha A2-B1 (Bourgeois 1989: 109) because there was no evidence that the urnfield tradition started earlier. However, the similarities in decoration make it likely that influences made themselves felt already in Ha A1 (Warmenbol 1991: 101).

This assumption was confirmed by a re-evaluation of other Belgian finds. East of the river Scheldt by the

village of Zandhoven, an urnfield cemetery was discovered in the 19th century. One of the urns, stored in the collection of the Brussels Royal Museum for Art and History, shows the same kind of so-called *décor cannelé* as the above pot from Temse. The urn has a more rounded body and shoulder (Figure 4.1), according to the traditional typo-chronology, be dated to a younger phase of the Late Bronze Age (Desittere 1968: 95, fig. 79.6). Another urn with this type of decoration was unearthed in the cemetery of Herstal in east Belgium (Alenus-Lecerf 1974: 26-27), also suggesting an earlier start of the influence of the group RSFO than posited by the traditional chronological framework (Figure 4.2).

The defined RSFO types are dated to the period Ha A2-B1. Only six out of twenty-five defined pottery forms are recognised in the cemeteries of the Flemish group (Table 2). Type 10 is a ribbed shoulder beaker with a funnel-shaped neck and rim. This kind of beaker was found at the sites of Temse/Veldmolenwijk (Figure 5.1-4) and Blicquy (Figures 5.5 and 8.2). A second group of beakers (Type 11) has the same shoulder as Type 10, but with a straight, vertical neck and a rim. Again, the sites of Temse/Veldmolenwijk (Figure 6.1) and Blicquy (Figure 6.2) show evidence of the appearance of this class. Type 18 is only known from a single find from the urnfield of Temse/Veldmolenwijk. These pots are rounded, biconical urns with a decorative pattern on the shoulder. The urn in Temse/Veldmolenwijk differs from the classical RSFO type by the lack of decoration and a flat lip (Figure 6.3). An incomplete urn from Temse/Velle is representative of Type 19, a biconical pot with everted rim and broad horizontal grooves (Figure 6.4). Type 21 biconical urns are more frequently attested in the cemeteries. They occur at Aalter/Oostergem, Sint-Gillis-Waas/Ripstraat and Temse/Veldmolenwijk (Figure 7). Finally, there are biconical amphorae (Type 26) with horizontal grooves and festoons around the handle on the shoulder. Single finds occur at the sites of Aalter/Oostergem (Figure 6.5), Destelbergen (Figure 6.6), Velzeke/Paddestraat (Figure 8.1) and Blicquy. Imitations of this type are the mini-amphorae from Temse/Veldmolenwijk (De Laet *et al.* 1958: 101, fig. 122) and from Wetteren (De Laet *et al.* 1958: 154, fig. 221). Due to their size they cannot be used as urns but rather functioned as funerary grave goods.

Figure 3 gives an overview of the number of cremation graves uncovered at the excavated sites. This number is compared with graves of unquestionable Late Bronze Age Ha A2-B1 date and graves containing typical RSFO pottery. Sint-Gillis-Waas and Temse/Veldmolenwijk are older excavations and the exact number of graves cannot be assessed. The graph shows the total number of ceramic finds compared with Ha A2-B1 pottery and typical RSFO forms. This overview suggests that these types are rather exceptional in the cemeteries. Only the site of Temse/Veldmolenwijk shows a larger amount of RSFO style pottery. This site has also yielded a larger variation of RSFO forms.

Other Late Bronze Age urns and beakers in western Belgium display influences from RSFO ceramics. The

	RSFO pottery types					
Site	10	11	18	19	21	26
Aalter/Oostergem	-	-	-	-	1	1
Blicquy	1	1	-	-	-	1
Distelbergen	-	-	-	-	-	1
Sint-Gillis-Waas		-	-	-	1	-
Temse/Veldmolenwijk	4	1	1	-	6	1
Temse/Velle	-	-	-	1	-	-
Velzeke/Paddestraat	-	-	-	-	-	1
Wetteren	-	-	-	-	-	1

Table 2: Overview of the different RSFO ceramic types in the Late Bronze Age urnfield cemeteries.

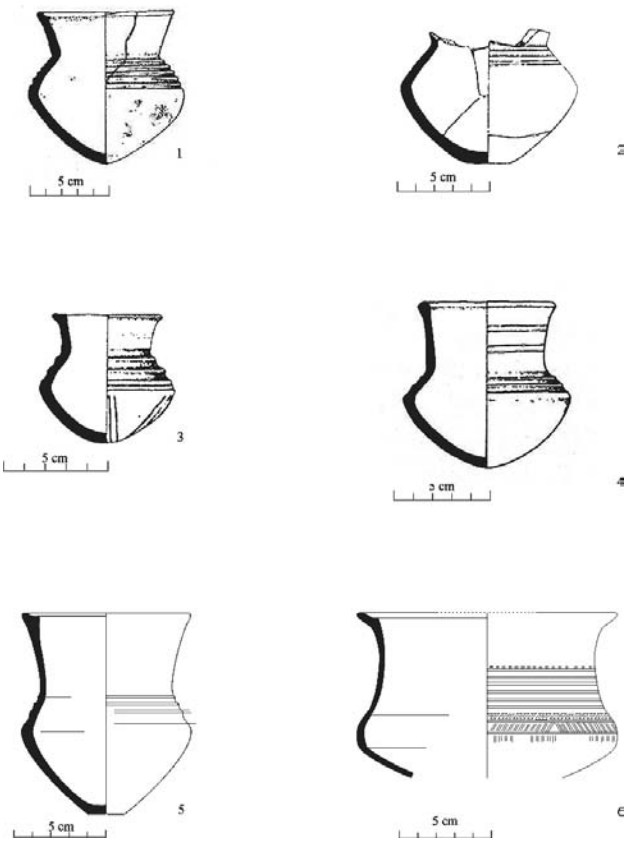


Figure 5: Shoulder beakers with a funnel-shaped neck (RSFO type 10) from Temse/Veldmolenwijk (1-4), Blicquy (5) and Han-sur-Lesse (6).

beaker found in grave 6 at the Velzeke/Paddestraat cemetery can be classified as an evolved shoulder beaker (De Mulder & Rogge 1995: 22). The shoulder is rounded with a funnel-shaped neck that seems to form a smooth line from shoulder to neck. The transition from shoulder to neck is marked by a broad groove (Figure 8.3). Parallels for this form can be found at the lake settlement of Hauterive-Champréyres (Borello & Gross 1988: 81). The geometric decorative patterns on the urns in the Flemish group mirror similar combinations of motives from central Europe. The use of different types of grooves to emphasize the transition from body to shoulder and shoulder to neck are a typical example. Another popular decorative pattern are triangular motifs filled with small grooves, which adorn the shoulder of the urn. In contrast with the core area of the group RSFO

stand the different combinations of styles which are rather subtle in the Flemish group.

COMPARING RADIOCARBON DATES AND TYPO-CHRONOLOGY

Since the first successful results by Lanting and colleagues (2001) ^{14}C-dating of cremated bones has allowed for enhanced chronological precision. The dating of cremated bones is possible due to the compaction and the changes in the crystalline structure of the bone. A series of tests were undertaken on cremated bones from the two Velzeke urnfields to clarify the technique. It was ascertained that reliable results require bones to have been cremated above 725°C. These bones have a pale white, light grey colour. The structural carbonate in bones, which can be used for dating, is protected by the increase in crystallinity and the compaction of the bone. As the outer part of the cremated bone can be contaminated by reactive agents in the environment, the surface of the bone samples is leached away. A simple visual analysis is performed to see whether both inside and outside are completely cremated. To avoid contamination no spongy parts of the bones are used. Blackish bones are symptomatic of incomplete cremation, making bones much more vulnerable to contamination

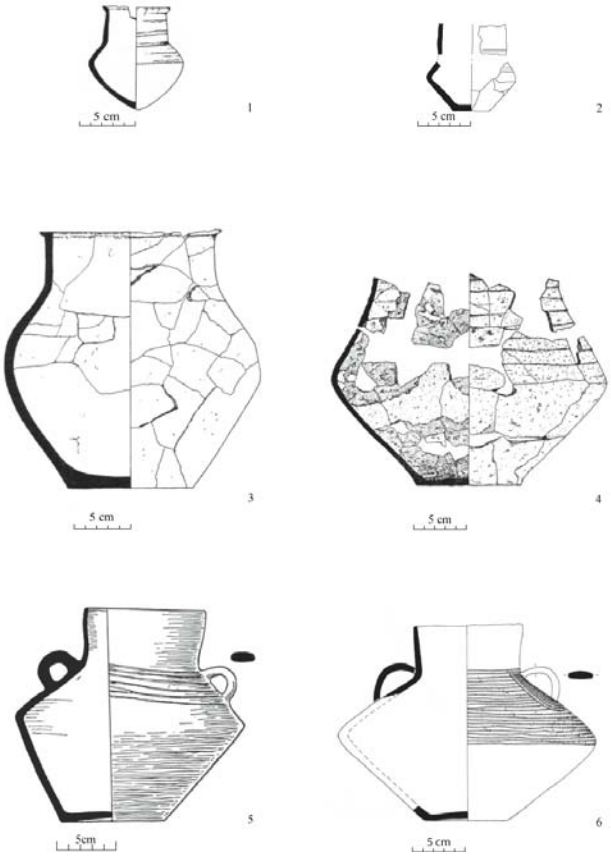


Figure 6: RSFO pottery: shoulder beakers (type 11) from Temse/Veldmolenwijk (1) and Blicquy (2); type 18 from TemseVeldmolenwijk (3), type 19 from Temse/Velle (4) and biconical amphorae (type 26) from Aalter/Oostergem (5) and Destelbergen (6).

(Van Strydonck *et al.* 2005). The test results were further tested against dates derived from charcoal samples from the same cremations (De Mulder *et al.* 2007).

To compare the typo-chronological date with the ^{14}C date, the typo-chronological age range is set at two standard deviations of a normal probability distribution (Van Strydonck *et al.* 2004). This means that the objects (urns) of one type (style) are normally distributed over this age range, with a higher probability that the urn's date falls within the range of one standard deviation than the lower or upper tail ends. Some critical remarks in relation to the precision of dating and the speed of stylistic change have been made about the use of radiocarbon dates to construct typo-chronologies. Firstly, dating ranges are rather broad: two standard deviations (95% probability) easily covers a period of two centuries and sometimes, as for the Early Iron Age, three or four centuries due to the so-called Hallstatt plateau. At one standard deviation a more precise date of about one century can be obtained, but with only a statistical certainty of about 68%. Secondly, stylistic changes and the life span of a specific ceramic tradition can change rapidly in established typo-chronologies (Sheridan 2003: 216). Such rapid change could not be accurately reflected in radiocarbon-based dating methods.

Table 3 presents a comparison between typo-chronological dates and calibrated radiocarbon dates, using one and two standard deviations. Two dates on typical RSFO forms have been obtained. The first one was taken from the cremated bones inside a biconical amphora (Type 26) from grave 14 at Velzeke/Paddestraat (Figure 8.1). The typo-chronological date places the urn between 1100 and 900 BC. The calibrated ^{14}C-date at one standard deviation places the urn into the 10th century calibrated BC; two standard deviations include the late 11th century down to the mid 9th century calibrated BC (Figure 9). A second set of results was obtained from the cremated bones found in a biconical urn and a shoulder beaker (Type 10) from the urnfield at Blicquy (Figure 8.2). Stylistically, the beaker is associated with ceramic forms from Ha B1 (1000-900 BC). Because the two radiocarbon dates on the cremated fragments from the urn and the beaker are associated with each other, we have averaged the ^{14}C-dates. The calibrated date covers the mid 13th century until the mid 11th century calibrated BC (Figure 9). It is thus significantly older than dating derived from the conventional typo-chronology.

In the lake settlement of Chens-sur-Leman/Port de Tougues in eastern France a related beaker has been found. Typologically, the beaker is part of a ceramic ensemble typical of the period Ha A2-B1. A series of dendrochronological dates from this site range from 1071 to 905 BC. The shoulder beaker at the site of Port-de-Tougues is part of a ceramic ensemble dendrochronologically dated to between 1071 and 1054 BC (Billaud & Marguet 1992: 340-341). Interestingly, the proposed one and two standard deviation ^{14}C-date range of Blicquy falls within the dendrochronological date of Port-de-Tougues. The ^{14}C- age for the beaker at

Blicquy seems to be confirmed by this date. This kind of shoulder beaker is therefore older then hitherto presumed in the typo-chronological studies of Late Bronze Age pottery.

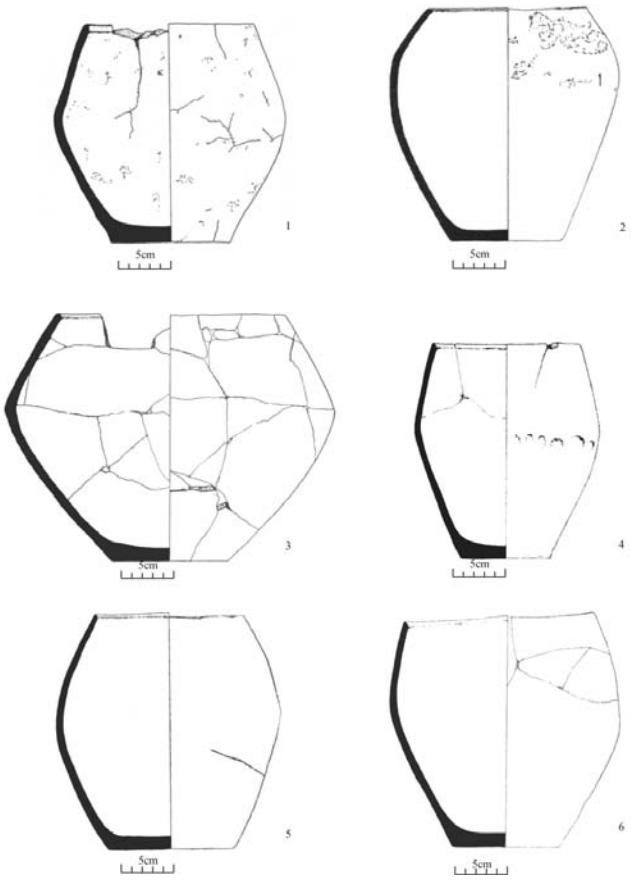


Figure 7: Biconical urns (type 21) from Temse/Veldmolenwijk.

The shoulder beaker from grave 6 in the urnfield of Velzeke/Paddestraat stylistically belongs to the phase Ha B1 (1000-900 BC) (Figure 8.3). The calibrated ^{14}C-date at one standard deviation agrees with the proposed typo-chronological date. The two standard deviation range enlarges it to the late 11th and mid 8th centuries BC.

The biconical, sharp angled forms (Figure 8.4-6) are traditionally considered the chronological guide fossil for the oldest phase of the Late Bronze Age (Ha A2-B1) (De Laet *et al.* 1986: 83-84). According to the typo-chronological framework, urns of this type in the urnfield at Velzeke-Paddestraat have been assigned to the period 1100-900 BC. However, ^{14}C-results from three cremations, graves 30, 21 (Figure 9) and 27, place these between the 10th and 9th centuries calibrated BC (at one standard deviation). At two standard deviations these ^{14}C-dates bridge the late 11th and the end of the 9th century calibrated BC. These results thus show a tendency towards a younger date for the cremations than attributed to the urns by pottery typologies.

In the latest phase of the Late Bronze Age, Ha B2/3, conventionally dated 900 to 750 BC, there is an evolution in the pottery to more rounded forms. The typical angular biconical shapes are replaced by more curved urns (De Laet *et al.* 1986: 84). A few ^{14}C-dates are available from the Velzeke-Paddestraat necropolis. Grave 32 (Figures 8.8 and 9) provides an age between 1160-1140/1130-970 calibrated BC (two standard deviation). Cremation graves 20 (Figures 8.7 and 9) and 13 have roughly similar calibrated age ranges - 1050-910 BC and 1050-890 calibrated BC respectively (two standard deviations). In contrast to the carinated, biconical forms above, here the ^{14}C-date is older than the typo-chronological age. This result thus completely reverses the internal chronological sequence originally proposed for the cemetery at Velzeke-Paddestraat.

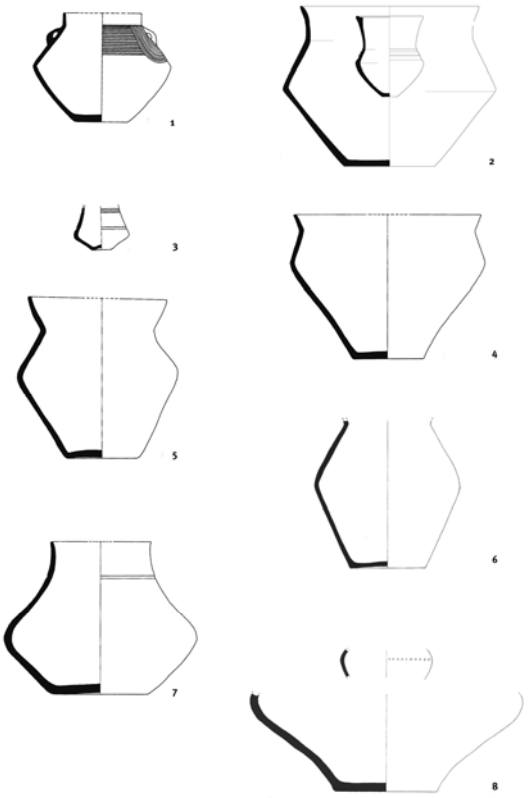


Figure 8: Pottery from the urnfields at Velzeke and Blicquy used for radiocarbon dating.

To summarise, the typo-chronological date for some of the central European influenced forms seems to agree with the calibrated absolute dates. Although less secure, the calibrated ^{14}C-dates with a one standard deviation range mirror the typo-chronological framework. The more secure dates at two standard deviations enclose a larger period than the tight typo-chronological system. Most surprising are the dates for the regional pottery where the expected dates are reversed. The rounded pottery covers the period between the middle of the 12th century and the 10th century BC, while the angular, biconical forms cover the late 11th century until the end of the 9th century BC. More ^{14}C-dates are required to place the discussion on a more solid statistical basis.

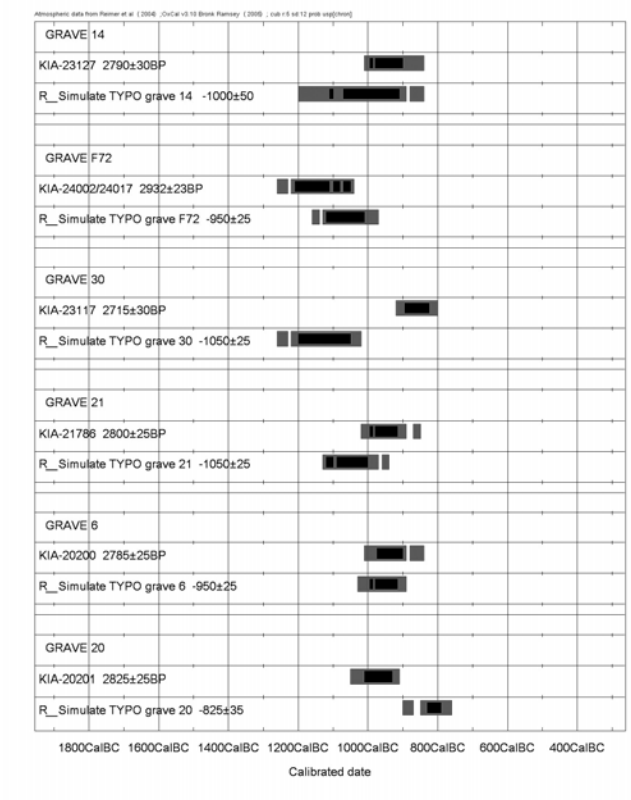


Figure 9: Comparison of radiocarbon dates and typo-chronological dates for graves 6, 14, 20 21, 30 (Velzeke) and F72 (Blicquy).

POTTERY TECHNOLOGY

For the study of the pottery technology we chose to analyse the ceramics of three sites with Late Bronze Age occupation: the Blicquy-"Ville d'Anderlecht" (Hainaut) necropolis, the cave of Han at Han-sur-Lesse and "Trou del Leuve" at Sinsin (Namur). The site of Blicquy is, as already mentioned, located within the area of the 'Flemish group' in western Belgium. The findspots of Han-sur-Lesse and Sinsin are in the southern part of the Meuse valley, which was incorporated in the sphere of the group RSFO during the Late Bronze Age phase Ha A2-B1.

The goal of the larger-scale study is to analyse and characterize each vessel according to morphology, decor, surface treatment and composition of the clay. Here, we will limit our discussion to the thin-section analysis, undertaken on representative sherds of each group. The analysis utilised a binocular magnifying glass *Nachet GLI 154* and a polarizing microscope *Zweiss Standart RP*.

The cemetery of Blicquy is situated near the village of Leuze-en-Hainaut in an area rich in Bronze and Iron Age sites (Henton & Demarez 2005). Geologically, the site lies in the rich Belgian loess belt. From the thirty-five tombs that have been found, twenty-six constitute urn cremations, seven are so-called 'bonepackgraves' and two graves consisted of a mixed packet of cremated bone and charcoal deposited in a pit (so-called Brandgrubengräber). Some of the ceramic finds from the urngraves are influenced by the group RSFO, while the others fit in the regional typological framework for the Late Bronze Age.

# grave	Date BP	Calibrated date (1 stdev)	Calibrated date (2 stdev)	Typological date
	Paddestraat			
32	KIA-20076: 2880±25	1120BC (68.2%) 1010BC	1160BC (1.0%) 1140BC 1130BC (94.4%) 970BC	900-750 (Ha B2/3)
20	KIA-20201: 2825±25	1010BC (68.2%) 930BC	1050BC (95.4%) 910BC	900-750 (Ha B2/3)
13	KIA-23418: 2810±30	1000BC (68.2%) 920BC	1050BC (95.4%) 890BC	900-750 (Ha B2/3)
21	KIA-21786: 2800±25	995BC (2.4%) 985BC 980BC (65.8%) 915BC	1020BC (94.4%) 890BC 870BC (1.0%) 850BC	1100-1000 (Ha A2)
14	KIA-23127: 2790±30	995BC (3.0%) 985BC 980BC (65.2%) 900BC	1010BC (95.4%) 840BC	1100-900 (Ha A2-B1)
6	KIA-20200: 2785±25	975BC (68.2%) 900BC	1010BC (87.0%) 890BC 880BC (8.4%) 840BC	1000-900 (Ha B1)
30	KIA-23117: 2715±30	895BC (68.2%) 825BC	920BC (95.4%) 800BC	1100-1000 (Ha A2)
27	KIA-21790: 2700±35	895BC (23.9%) 865BC 855BC (44.3%) 810BC	920BC (95.4%) 800BC	1100-900 (Ha A2-B1)
	Blicquy			
F72	AVERAGE: 2932±23	1210BC (58.5%) 1110BC 1100BC (7.1%) 1080BC 1070BC (2.6%) 1050BC	1260BC (6.0%) 1230BC 1220BC (89.4%) 1040BC	1000-900 (Ha B1)

Table 3: ^{14}C dating results for the Late Bronze Age pottery of the sites Velzeke/Paddestraat and Blicquy. Atmospheric data from Reimer *et al.* (2004); OxCal v3.10 Bronk Ramsey (2005); cub r:5 sd:12 prob usp[chron].

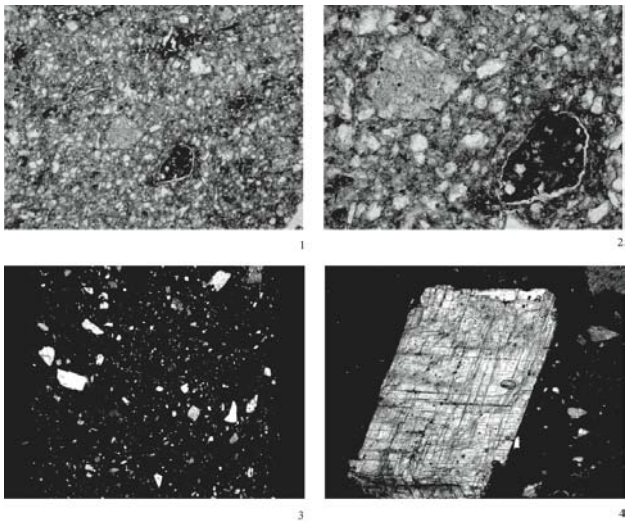


Figure 10: Thin section. 1-2: Blicquy-'Ville d'Anderlecht', grog temper (1.x 25; 2. x 100); 3-4: Sinsin 'Trou del Leuve', calcite temper (1. x 25; 2. x 100).

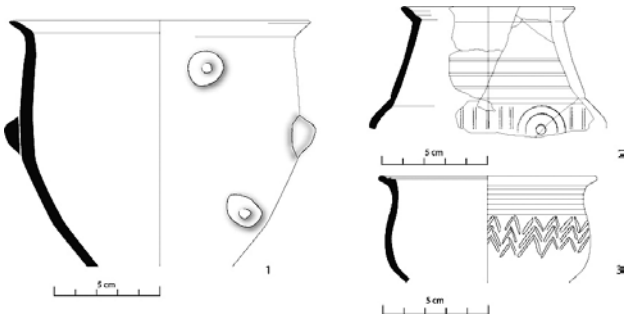


Figure 11: Some RSFO ceramics from Han-sur-Lesse.

Observation by binocular magnifying glass of Blicquy ceramics indicate a loess matrix with grog temper: *silt* (4 and 62 µm) according to the Wentworth scale (Tucker 1981). Some plant inclusions were present, but were too rare to be considered tempering material; they were either mixed into the clay accidentally during the preparation process or had been originally present in the clay. The thin sections (Figure 10) show a matrix with small quartz of short height, the same as already observed under the binocular glass, and some unidentified orange inclusions. The grog temper has the same composition as the matrix (Leclercq *in press*).

The second site was "Trou del Leuve" at Sinsin. The cave is located in the Calestienne, a calcareous massif. This massif forms a natural border between the high plateau of the Ardenne and the Fagne-Famenne depression where we find the majority of the caves in Belgium. The cave was excavated in 1884 and 1904 by A. Bequet (Bequet 1883, 1885). The majority of the Bronze Age ceramics and other artefacts of this period, particularly the 'gold baskets', were discovered during these excavations. The ceramic finds present affinities with the group RSFO. Between 1970 and 1980, new excavations were conducted in this cave (Warmenbol 2006). The first results of the petrographical analysis of the ceramics indicate the use of calcite as the main temper. Some ceramics present a different temper made up of plant inclusions and grog.

The final site is Han's cave at Han-sur-Lesse, characterised by its subterranean river crossing the calcareous massif of Boine. The river emerges from the massif at "Trou de Han" (Warmenbol 1988: 206). This site was interpreted as a place of worship and a natural sanctuary with cults for and gifts to the dead (Warmenbol 1996). During a century of excavations and subaquatic explorations at "Trou de Han", a large amount of ceramics and metalwork was discovered. Among the metalwork we can cite gold baskets, similar to those found at "Trou del Leuve", and some gold discs. Preliminary results of the ceramic study demonstrate that the pottery from "Trou de Han" is remarkable for the quality of its finish. Typical vessels of the group RSFO are present comparable in quality with those from southwest Germany and Switzerland (Figure 11.2-3). Also attested are some unusual specimens, notably one vessel with bulges on the body (Figure 11.1). A parallel for this specific decoration can be found in a handled cup from Landau, south Germany whose entire body was decorated with the same kind of bulges, the so-called 'Warzendekor'. The cup is dated to the Ha B1 phase (Sperber 1987: pl. 25, 121). Initial results of the clay analysis show the use of two main tempers, grog and calcite, in a loess matrix. A third variant of temper is the mixed use of grog and calcite.

By comparing the three sites and the literature on the ceramics of the Bronze Age, we can isolate two groups. The first group is dominated by the presence of a calcite temper in the clay; the other lacks this specific temper. In this study, the group with a calcite temper is only concentrated in the Calestienne region where the raw material (calcite) was in abundance. The sites of Sinsin and Han-sur-Lesse, where this specific kind of temper is used, are located within the zone of influence of the group RSFO. In contrast, the pottery found at Blicquy is dominated by the use of grog temper. The finish does not reach the quality of the majority of the ceramic finds at Han-sur-Lesse.

CONCLUSION

Traditionally, the study of the Late Bronze Age in Belgium was based largely on typological seriation and context studies. However, the methods employed throughout the paper have demonstrated the potential for enhancing our understanding of ceramics through careful analyses of fabric composition and ^{14}C dating.

By analyzing the technical aspects of the pottery produced in the Meuse valley and the Scheldt area, the difference between the two regions in relation to technological traditions are clear: while the Meuse valley of southern Belgium is part of the core area of the group RSFO in the Late Bronze Age, the Scheldt valley of western Belgium is untouched. The studied sites in the Meuse valley yielded pottery of both better technological

quality and better finish. These imitations of RSFO-pottery in the Scheldt valley are limited to finds from five cemeteries. In the settlements of this region, examples of RSFO-inspired vessels are not yet known.

A series of ^{14}C-dates was used to test the typo-chronological framework of the urnfields of the 'Flemish' group against absolute dates. Preliminary results are not always in agreement with the existing scheme. The urns displaying RSFO-influence follow the traditional typo-chronology and the calibrated one standard deviation range overlaps with the typo-chronology. However, regional pottery forms provide a startlingly different picture. In this instance, the available ^{14}C-dates have inverted the classical dating scheme. Based on this information the rounded forms are older than the angular, biconical shapes. Clearly, there is a need for more ^{14}C-dates to establish a firm statistical base for a discussion of the typo-chronology put forward by De Laet and his school, and to propose a new framework for the Late Bronze Age pottery in west Belgium.

It should be noted that Dutch scholars have been asking similar questions, and a comparable project on cremated bones in the southern Netherlands gives a different picture. Here, the typo-chronology of the pottery and the ^{14}C-dates both indicate the same chronological period (Lanting & van der Plicht 2001/2002). In the near future, new absolute dates will be available for the cemetery at Destelbergen in the area of the Flemish group. Results of a ^{14}C-dating project on an urnfield cemetery in Northern France are also forthcoming and will add more information for a continuing discussion about the Late Bronze Age typo-chronological framework.

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