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CHRONOLOGY AND BELL BEAKER COMMON WARE

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ABSTRACT. The Bell Beaker is a culture of the Final Neolithic, which spread across Europe between 2900 and 1800 BC. Since its origin is still widely discussed, we have been focusing our analysis on the transition from the Final Neolithic pre-Bell Beaker to the Bell Beaker. We thus seek to evaluate the importance of Neolithic influence in the establishment of the Bell Beaker by studying the common ware pottery and its chronology. Among the 26 main types of common ware defined by Marie Besse (2003), we selected the most relevant ones in order to determine—on the basis of their absolute dating—their appearance either in the Bell Beaker period or in the pre-Bell Beaker groups.

INTRODUCTION

This study is part of a research project now ongoing for several years and directed by M Besse. Its objective is to better explain the Bell Beaker phenomenon. Two projects funded by the Swiss National Science Foundation (FNS) made it possible to develop the study of the common ware pottery and its chronology (M Besse and M Piguet), territory analysis (M Besse and M Piguet), analysis of non-metric dental traits (J Desideri), and copper metallurgy (F Cattin).

The Bell Beaker is a culture present at the end of the Neolithic across Europe and which developed between 2900 and 1800 BC. It is characterized by decorated pottery in the form of inverted bells (beakers), common ware pottery, wrist-guards, copper Palmela points, copper daggers, V-perforated bone buttons, and a rich iconography in the form of anthropomorphic stelae. While the decorated pottery, uniform across all of Europe, seems to demonstrate an origin in southwest Europe (Müller and Van Willigen 2001; Guilaine 2004; Salanova 2004), the common ware pottery varies by region and reflects a clear dichotomy in the eastern and western regions of the Bell Beaker phenomenon (Besse 2003, 2004). Similarly, funerary and domestic structures are highly variable by region: individual burials, very common in eastern Europe, contrast with the use and reuse of collective tombs in western Europe. Variability in housing structures is also high: post construction or with dry stone, with circular, oval, or rectangular forms, with the reuse or not of earlier houses. Since the origin of the Bell Beaker phenomenon is still widely debated, we have focused on mechanisms of transition from the Final pre-Bell Beaker Neolithic to the Bell Beaker itself. The importance of Neolithic influence in the establishment of the Bell Beaker has thus been evaluated by studying the common ware pottery and its chronology.

APPROACH

Among the 26 main types of common ware pottery defined by Besse (2003), we selected the most relevant to determine their appearance either in the Bell Beaker or in pre-Bell Beaker groups, on the basis of the associated absolute dates obtained. We initially analyzed the association between the ceramic types and absolute dates, controlling for the validity of each sample. For this purpose, we determined 3 levels of accuracy for each date. It is "high" when there is a reliable connection between the sample and the pottery, "medium" when the sample is located in the same layer but far away from the pottery, and it is "low" when the location of the ^{14}C date or of the pottery is imprecise or unknown. ^{14}C dates were also rejected if the standard deviation was ≥100 BP.

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Next, we researched the presence of these ceramic types in pre-Bell Beaker groups in order to identify their possible origin. We are currently working with a set of 983 sites in 11 countries, to which we have now added the Iberian Peninsula, Denmark, and Great Britain to cover the entire range of Bell Beaker occupation (Figure 1).

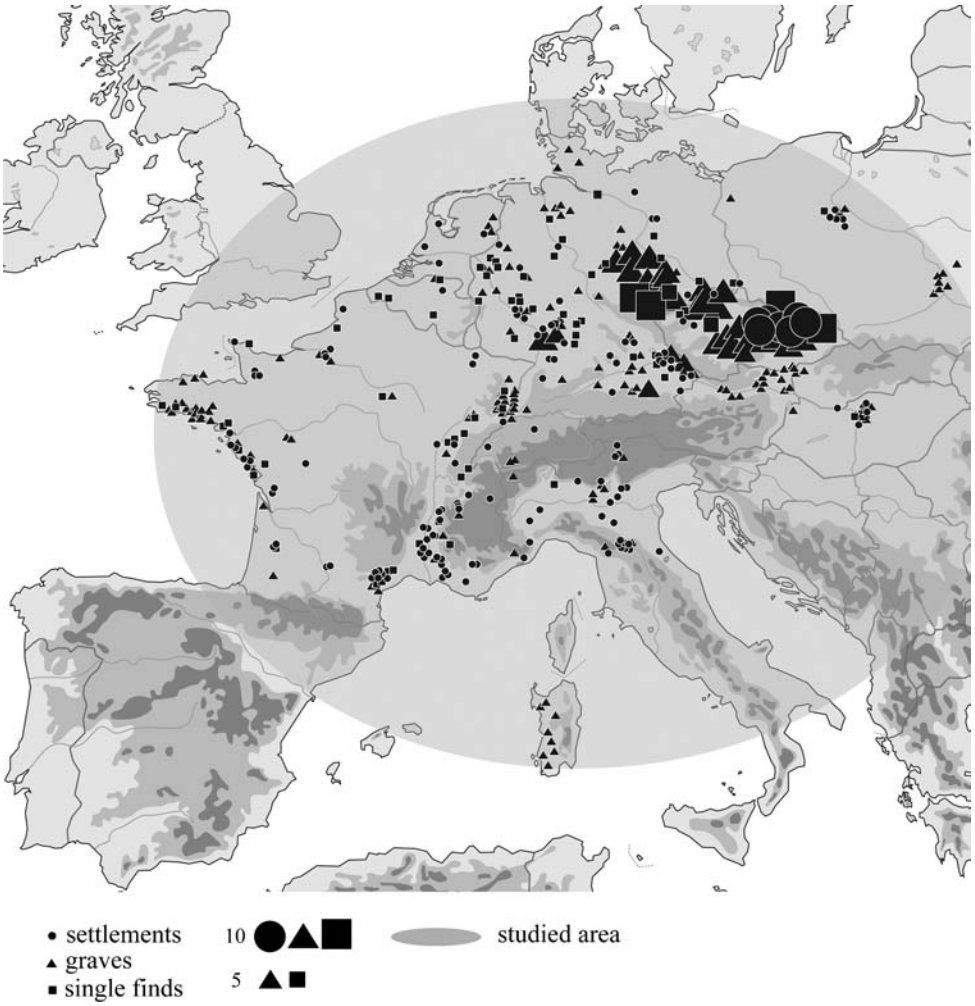

Figure 1 Map of the sites with Bell Beaker common ware

This approach is unfortunately limited by the lack of precision of the ^{14}C chronology and by the lack of ^{14}C dates, for the Bell Beaker sites but also for some groups of the Final Neolithic.

Four types among the most important of the common ware pottery were chosen: handled pitcher (type 34/35), polypod cup (type 29), rim underlined by a line of perforations above a row (type 8), and décor of disorganized fingernail imprints (type 9). The first 2 types have already been described (Piguet et al. 2007), and are briefly summarized below.

DATING OF COMMON WARE POTTERY

The Handled Pitcher (type 34/35)

The handled pitcher is a key type in the Bell Beaker since it is present in 401 sites throughout continental Europe. Of the 401 sites, 31 sites have yielded a total of 71 ^{14}C dates; 12 samples with a standard deviation ≥100 BP were discarded (Piguet et al. 2007: Figures 12a,b, Appendix 2).

During the Bell Beaker, the handled pitcher appears first in eastern Europe, in Hungary (Hollandistrasse), and Moravia (Horní pole and Tvořihráz I), before 2500 BC. Two sites in northern Italy have very early dates for type 34/35; these are Pigloner Kopf and Monte Covolo, although for the second site the association between the date and type 34 is ambiguous. Several sites in eastern Europe date the presence of handled pitchers to around 2500 BC in Poland, Hungary, Bavaria, and northern Italy. The pottery type reached Germany and Bohemia around 2400 BC and then spread to western Europe (Switzerland and southern France); after 2400–2300 BC, the handled pitcher attained its maximum zone of expansion, although chronological data from Sardinia is lacking (Figure 2).

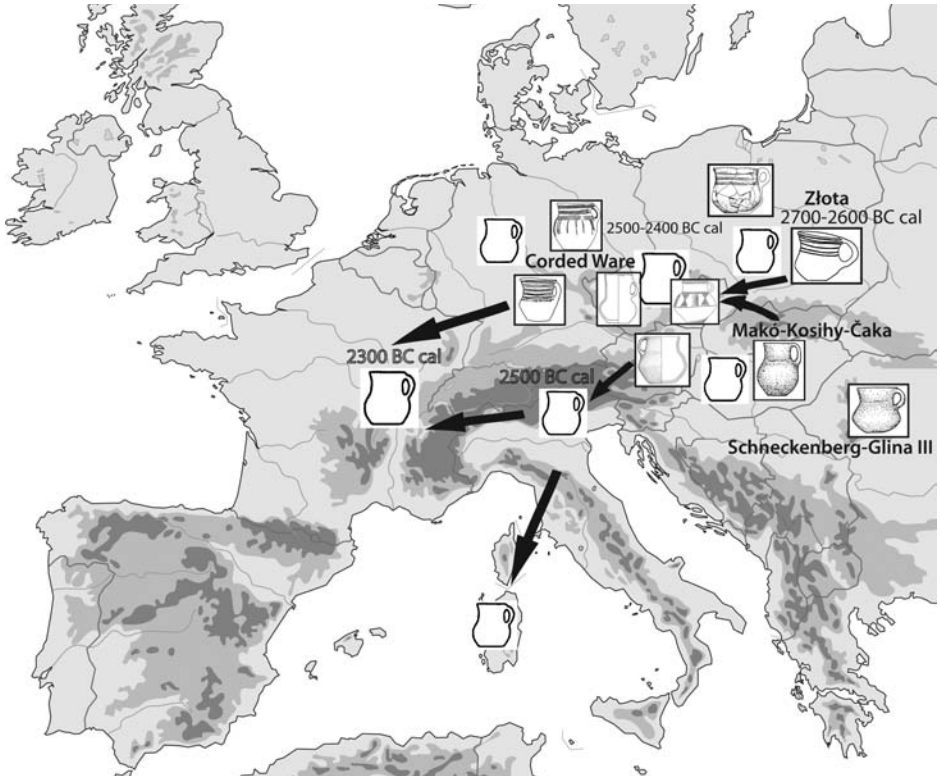

Figure 2 Origin of the handled pitcher in the Final Neolithic and diffusion in the Bell Beaker culture

The Handled Pitcher in Pre-Bell Beaker Groups

Type 34/35 appeared in the Final Neolithic in eastern Europe, in the Makó-Kosihy-Čaka group in Hungary and Slovakia and in the Złota group in southeast Poland. It rapidly spread across the Balkans (Nyirség-Zatin and Glina III-Schneckenberg groups) and then eastern Europe by the intermediary of the Corded Ware, perhaps from Moravia, and the Bell Beaker (Figure 2). The first appearance of the handled pitcher in the Bell Beaker was probably in Moravia or Hungary, as confirmed

by the ^{14}C dates. It is of interest to note, in contrast, the early presence of type 34/35 in northern Italy, as handled pitchers were present after 2500 BC in the Haut-Adige (south Tyrol) at Pigloner Kopf. The shortest and most globular cups with sometimes bent handles, which developed in central Italy during the later Bell Beaker are different and find their origin in the Final Neolithic of central Italy (Leonini and Sarti 2008).

The Polypod Cup (Type 29)

Type 29 is found at 106 sites, mostly in the Czech Republic and the Elbe-Saale region (Germany), and more disparately in other regions (Sardinia, France, Germany). Few dates are available for this ceramic type: only 8 sites have yielded 15 ^{14}C dates and 5 of these were discarded (Piguet et al. 2007: Figure 5 and Appendix 1).

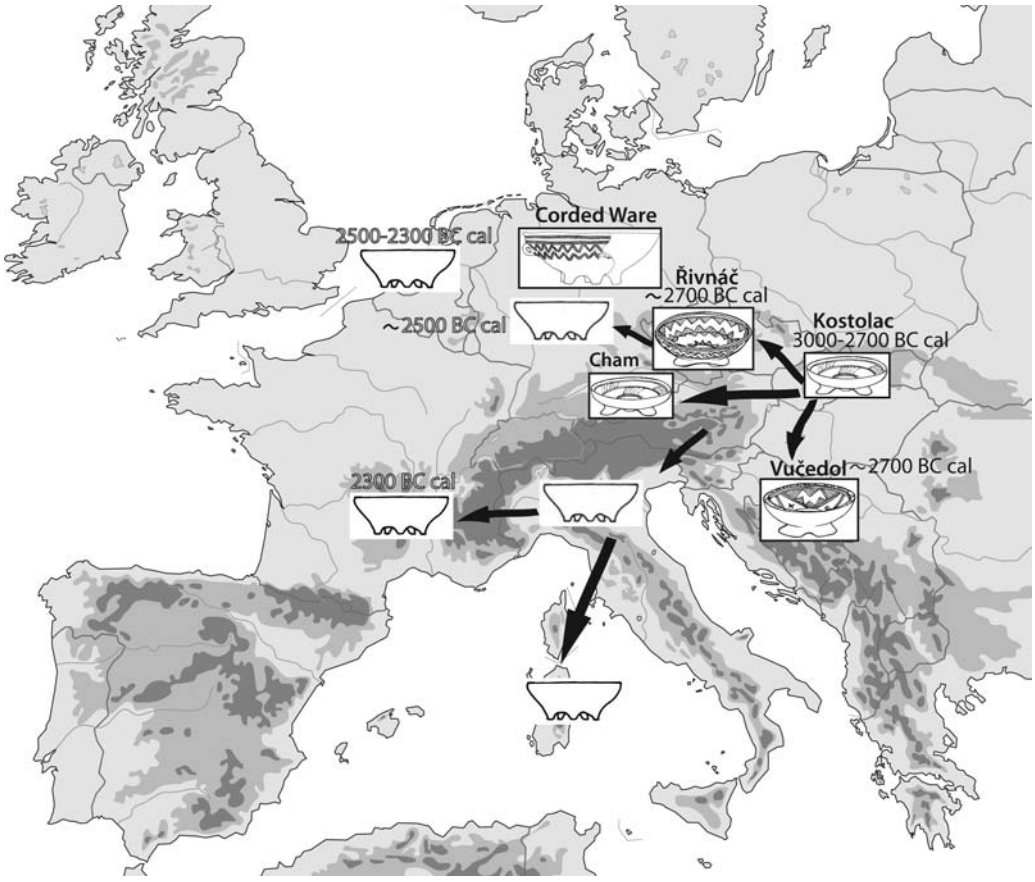

Figure 3 Origin of the polypod cup in the final Neolithic and diffusion in the Bell Beaker culture

The earliest dates, situated around 2500–2400 BC, are from Marktbergel in Bavaria and Vlaardingen in the Netherlands, although for this latter site the small polypod seems fairly different from the examples known in the Bell Beaker. In France, the appearance of the multifooted cup can be situated around 2350–2300 BC (Derrière-le-Château, Le Serre 1). Despite the large presence of polypod cups in the eastern zone, only a single date is available, from Samborzec in Poland, between 2470 and 2140 BC (Ki-7923, Budziszewski et al. 2003).

The Polypod Cup in the Pre-Bell Beaker Groups

The polypods of the Bell Beaker seem to have developed from footed cups in the form of a cross (Kreuzfussschalen) in central Europe, which first appeared in the Kostolac group in Slovakia and in northwest Hungary during the Final Neolithic. It then spread throughout the several cultures in eastern Europe (Vučedol, Řivnáč, Cham, Corded Ware) and were almost always decorated (Figure 3). After their appearance in the Bell Beaker in eastern Europe, polypods rapidly spread in central Europe via Germany where they were first found around 2500 BC and probably via northern Italy, and then to the southern France where dates for the first multifooted cups are earlier than 2300 BC.

Line of Perforations Above a Row (Type 8)

For this type, the rim is underlined by a row of equidistant and traverse perforations above a horizontal row, most often of triangular section. Known from 55 sites, type 8 is mainly found in France, particularly in the south and in the Rhone Valley, but also in Italy, the Netherlands, and southwest Germany. Only 16 sites yielded ^{14}C dates in association with the Bell Beaker layers for a total of 30 dates, of which 11 were discarded (Figure 4 and Table 1).

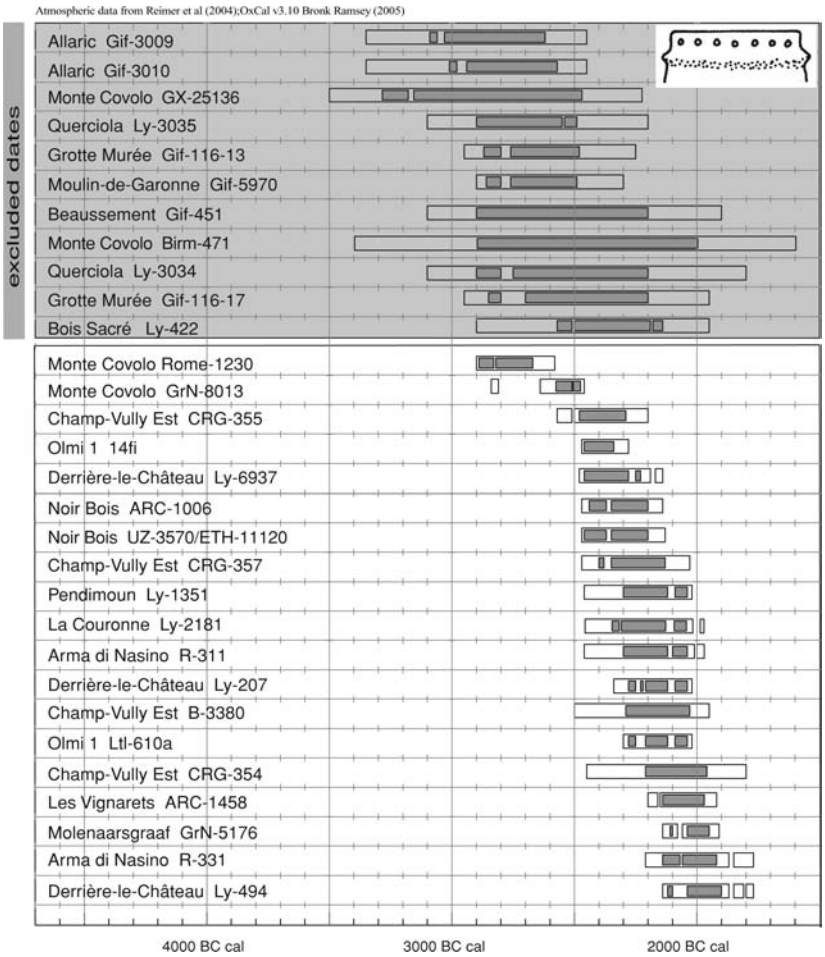

Figure 4 ^{14}C dates for type 8 in Bell Beaker culture. In gray: excluded dates (the standard deviation is ≥100 BP). See Table 1 for the references.

Table 1 ^{14}C dates of type 8 (line of perforations) in Bell Beaker culture. Calibrated dates with OxCal v 3.10 (Bronk Ramsey 1995, 2001).

Site	Village	District	Country	Stratigraphy	Sample material	Lab code	Age BP	Cal BC (2 σ)	References	Accuracy
Allaric	Aslonnes	Vienne	France	boring VI-280	charcoal	Gif-3009	4260 ± 140	3350–2450	Pautreau 1975	high
Allaric	Aslonnes	Vienne	France	boring VI-310	charcoal	Gif-3010	4220 ± 140	3350–2450	Pautreau 1975	high
Beaussement	Chauzon	Ardèche	France	boring 3, layer 3	charcoal	Gif-451	3975 ± 200	3100–1900	Montjardin 1967	high
Bois Sacré	Saint-Côme-et-Maruéjols	Gard	France		charcoal	Ly-422	3890 ± 140	2900–1950	Roudil et al.1974	high
Derrière-le-Château	Géovreissiat	Ain	France	pit 215, area 1	charcoal	Ly-6937	3860 ± 55	2480–2140	Hénon & Vérot-Bourrély 1998	medium
Derrière-le-Château	Géovreissiat	Ain	France	str. 309, area 1	charcoal	Ly-207 (OXA)	3755 ± 50	2340–2020	Hénon & Vérot-Bourrély 1998	medium
Derrière-le-Château	Géovreissiat	Ain	France	str. 39, area 3	charcoal	Ly-494 (OXA)	3620 ± 55	2140–1770	Hénon & Vérot-Bourrély 1998	medium
La Couronne	Martigues	Bouches-du-Rhône	France	layer 3D	unknown	Ly-2181	3780 ± 80	2466–1981	Lemercier et al. 2007	unknown
Les Vignarets	Upie	Drôme	France	unknown	unknown	ARC-1458	3669 ± 46	2200–1920	Lemercier 2002	unknown
Moulin-de-Garonne	Muret	Haute-Garonne	France	str. 16	charcoal	Gif-5970	4080 ± 100	2900–2300	Jolibert 1988	high
Grotte Murée	Montpezat	Haute-Garonne	France	layer 6	charcoal	Gif-116-13	4081 ± 118	2950–2250	Courtin 1967	low
Grotte Murée	Montpezat	Haute-Garonne	France	layer 6	charcoal	Gif-116-17	3960 ± 175	2950–1950	Delibrias & Evin 1975	low
Pendimoun	Castellar	Alpes-Maritimes	France	base of the layer	charcoal	Ly-1351 (OXA)	3775 ± 65	2460–2020	Binder 2003	medium
Arma di Nasino	Borghetto d'Arrosia	Savona	Italy	layer VII, area E	charcoal	R-311	3765 ± 70	2460–1970	Skeates 1994	high
Arma di Nasino	Borghetto d'Arrosia	Savona	Italy	layer VII	charcoal	R-331	3645 ± 70	2210–1770	Skeates 1994	high
Monte Covolo	Villanuova sul Clisi	Brescia	Italy	US 116/134	charcoal	GX-25136	4250 ± 200	3496–2299	Poggiani Keller et al. 2003–2006	medium
Monte Covolo	Villanuova sul Clisi	Brescia	Italy	layer 8, str. 8	charcoal	Birm-471	3950 ± 320	3400–1600	Sarti 1997	medium
Monte Covolo	Villanuova sul Clisi	Brescia	Italy	US 134	charcoal	Rome-1230	4180 ± 60	2900–2582	Poggiani Keller et al. 2003–2006	medium
Monte Covolo	Villanuova sul Clisi	Brescia	Italy	layer 8, str. 10	charcoal	GrN-8013	4010 ± 40	2840–2460	Sarti 1997	medium
Olmi 1	Sesto-Fiorentino	Florence	Italy	settl. layer	seeds	14fi	3890 ± 30	2469–2290	Leonini et al. 2008	high
Olmi 1	Sesto-Fiorentino	Florence	Italy	settl. layer	charcoal	Ltl-610a	3754 ± 45	2298–2028	Leonini et al. 2008	low
Querciola	Sesto-Fiorentino	Florence	Italy	layer 3, str. A up.	charcoal	Ly-3035	4130 ± 150	3100–2200	Sarti 1997	medium
Querciola	Sesto-Fiorentino	Florence	Italy	layer 3, str. A low.	charcoal	Ly-3034	3960 ± 200	3100–1800	Sarti 1997	medium
Molenaarsgraaf	Molenaarsgraaf	Zuid-Holland	Nether.	deposit 1	charcoal	GrN-5176	3640 ± 30	2140–1910	Louwe Kooijmans 1974	high
Champ-Vully Est	Rances	Vaud	Switz.	layer 4b1	charcoal	CRG-355	3910 ± 60	2570–2200	Gallay & Baudais 1985	high
Champ-Vully Est	Rances	Vaud	Switz.	layers 4b1, 4b2	charcoal	CRG-357	3800 ± 70	2470–2030	Gallay & Baudais 1985	high
Champ-Vully Est	Rances	Vaud	Switz.	layer 4a1	charcoal	B-3380	3750 ± 80	2500–1950	Gallay & Baudais 1985	high
Champ-Vully Est	Rances	Vaud	Switz.	layer 4b2	charcoal	CRG-354	3700 ± 85	2450–1800	Gallay & Baudais 1985	high
Noir Bois	Alle	Jura	Switz.	layer 3d, area A	charcoal	ARC-1006	3835 ± 55	2470–2140	Othenin-Girard 1997	high
Noir Bois	Alle	Jura	Switz.	layer 3d, area A	charcoal	UZ-3570/ ETH-11120	3845 ± 60	2470–2130	Othenin-Girard 1997	high

Setting aside the samples from Monte Covolo in northern Italy, which are complicated because they come from a complex stratigraphy (Rome-1230 and GrN-8013), the earliest dates come from the Florentine region around 2400 BC, in the second phase of the Bell Beaker, as at Olmi 1 (14Fi). Type 8 was also established in France and Switzerland, with the sites of Champ-Vully Est (CRG-355, CRG-357, B-3380), Noir Bois (ARC-1006 and UZ-3570/ETH-11120), and Derrière-le-Château (Ly-6937) situated between 2400 and 2300 BC, and then spread north where it is found at 2100 BC in the Netherlands.

Line of Perforations Above a Row in Pre-Bell Beaker Groups

The style "line of perforations above a row" is present before the Bell Beaker in the Globular Amphora culture at the Polish sites of Żegotki 18, Ciechrz 25, and Siniarzewo 1 (Szmyt 2000). At these sites, this type is associated with phase IIIa of the Globular Amphora culture, between 2900 and 2400 BC. In eastern Switzerland, the Horgen culture has several kinds of recipients with a row of traverse perforations, with which 1 or 2 grooves are sometimes associated. This décor appeared after 3200 BC at Gletterens "Les Grèves" (Castella 1987) and persisted until 2900 BC at the latter site. According to Barfield et al. (1979), the Horgen culture could have been the origin of pottery with perforations under the rim, which developed in northern Italy during the Final Neolithic.

It is, however, difficult to find a relationship between the presence of the type of Final Neolithic in northern Europe and its establishment in southern Europe at the beginning of the Bell Beaker. No site in the northern domain has yielded dates that could represent a marker between these regions and southern France or northern Italy where this type of décor appeared first in the Bell Beaker period. Vases with perforated rims were also present in the Armorican Final Neolithic where they were associated with Kerugou pottery and the Croh-Collé style (Pollès 1985), but according to L'Helgouach (2001), these are "completely different from the common ware pottery in Bell Beaker houses" and moreover, "direct relationships with the Bell Beaker is nowhere indicated."

Thus, the line of perforations associated with a row seems to have appeared during the Bell Beaker (Besse 2003; Lemercier 2004), but this décor could also have derived from pottery with passing holes (*ceramica a fori passanti*) in the Final Neolithic of northern Italy. The appearance of this décor in northern Italy is, however, unfortunately poorly dated because only the site of Lovere provided a date, also fairly poor, for US38 (GX-24942: 3930 ± 110 BP, or 2700–2100 BC) (Poggiani Keller 1999–2000). We can nevertheless assume its presence prior to 2600 BC, the date obtained for stratum 8 at Monte Covolo (GrN-8013), since these elements of décor are also present in lower strata (9, 11, and 12).[1] This hypothesis of relationship between type 8 and pottery with passing holes in the Final Neolithic should, however, be put into perspective because the recipients from the Final Neolithic are coarse types with rectilinear rims, while the Bell Beaker recipients with this décor are jars with curved profile (Leonini 2003).

In conclusion, type 8 seems to appear during the Bell Beaker, but may have been derived from the pottery with passing holes already present in the Final Neolithic of northern Italy. It is present around 2400–2350 BC in the Florentine region and 2350 BC in east-central France and in Switzerland (Figure 5).

[1]The White Ware levels at Monte Covolo have been dated by 3 samples: Rome-1231: 4220 ± 60 BP and GX-25139: 4430 ± 150 BP for US210 and GX-25123: 4160 ± 40 BP for US321, but these dates are not clearly associated with types 8 and 9 (Poggiani Keller and Baioni 2001–2002).

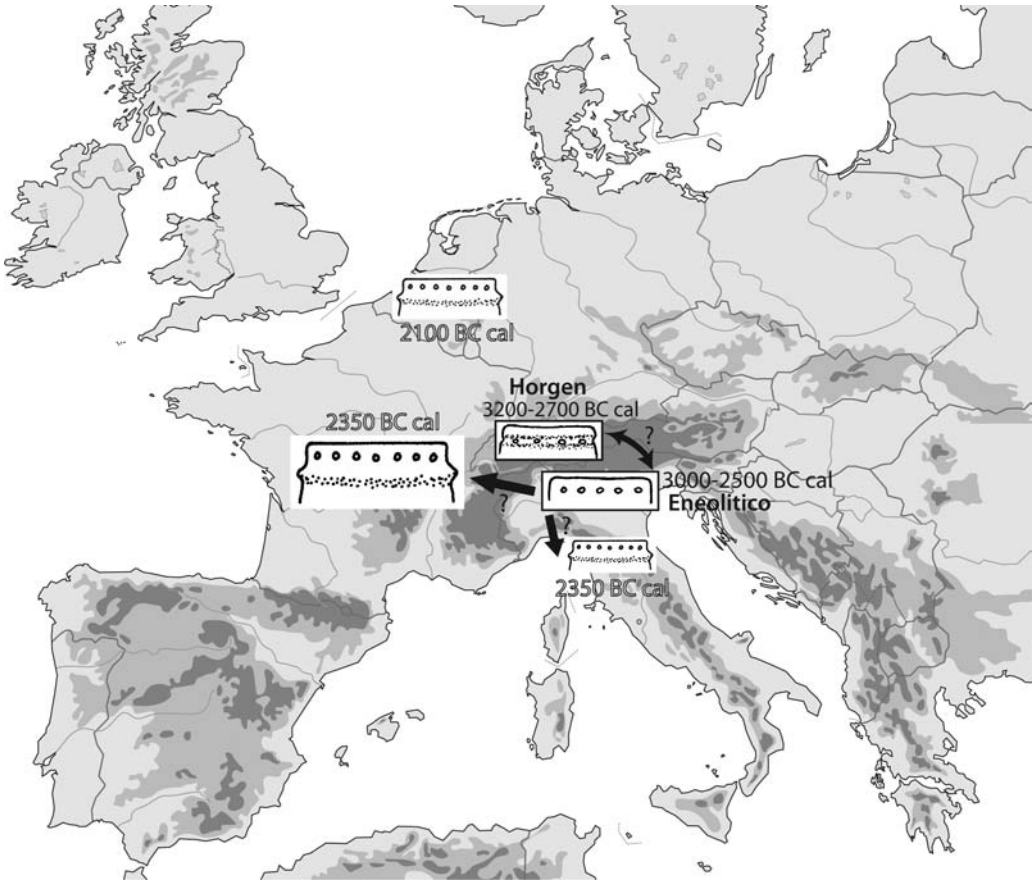

Figure 5 Origin of the line of perforations in the final Neolithic and diffusion of type 8 in the Bell Beaker culture

Décor of Disorganized Fingernail Imprints (Type 9)

The décor of disorganized fingernail imprints is disparately present in the Bell Beaker across northern Europe (the Netherlands, Rhineland region) and in southern Europe (France and Italy) at 29 sites; only the eastern zone lacks this type of décor.

Thirteen sites have yielded 22 ^{14}C dates, of which 6 were discarded (Table 2, Figure 6). The earliest date is from the site of Gemeente in the Netherlands (Grn-6650C),[2] closely followed by sites in Switzerland, northern Italy, and France grouped around 2400–2350 BC: Champ-Vully-Est (Crg-355), Rubiera (Grn-9828), Ambrosetti 1 (14Fi), Les Calades (Arc-606), Derrière-le-Château (Ly-6937), Kempten (Uz-4846/Eth-26473), and Sant'Ilario d'Enza (R-1291).

Fingernail Imprints in Pre-Bell Beaker Groups

Fingernail impressions are present in several pre-Bell Beaker horizons particularly in the northern zone: the Corded Ware in the Netherlands, the Funnel Beaker and Northern Corded Ware cultures in Germany, the Funnel Beaker and Corded Ware cultures in Poland, and the Corded Ware culture in Switzerland, but also the White Ware of northern Italy and the Artenacien.

[2]This is probably a Riesenbecher (Van Giffen 1955).

Table 2 ^{14}C dates of type 9 (disorganized fingernail imprints) in Bell Beaker culture. Calibrated dates with OxCal v 3.10 (Bronk Ramsey 1995, 2001).

Site	Village	District	Country	Stratigraphy	Sample material	Lab code	Age in BP	Cal BC (2 σ)	References	Accuracy
Derrière-le-Château	Géovreissiat	Ain	France	area 1, pit 215	charcoal	Ly-6937	3860 ± 55	2480–2140	Hénon and Vérot-Bourrély 1998	medium
Derrière-le-Château	Géovreissiat	Ain	France	area 1, str. 309	charcoal	Ly-207	3755 ± 50	2340–2020	Hénon and Vérot-Bourrély 1998	medium
Derrière-le-Château	Géovreissiat	Ain	France	area 3, str. 39	charcoal	Ly-494	3620 ± 55	2140–1770	Hénon and Vérot-Bourrély 1998	medium
Goërem	Gâvres	Morbihan	France	3rd part, CN12	charcoal	Gif-768	4100 ± 140	3050–2200	L'Helgouach 1970	medium
Goërem	Gâvres	Morbihan	France	corridor, AW6	charcoal	Gif-329	3860 ± 200	2900–1700	L'Helgouach 1970	medium
Les Barres	Eyguières	Bouches-du-Rhône	France	west area, D26/D28	charcoal	Gif-10009	3750 ± 60	2350–1960	Barge 2000	medium
Les Calades	Orgon	Bouches-du-Rhône	France	house 2, layer 12	charcoal	ARC-606	3855 ± 50	2470–2150	Barge-Mahieu 1992	high
Ambrosetti 1	Sesto-Fiorentino	Florence	Italy	unknown	seeds	14fi	3890 ± 50	2482–2205	Leonini et al. 2008	high
Ambrosetti 1	Sesto-Fiorentino	Florence	Italy	unknown	charcoal	Beta-94384	3740 ± 70	2433–1945	Leonini et al. 2008	low
Querciola	Sesto-Fiorentino	Florence	Italy	layer 3, str. A upper	charcoal	Ly-3035	4130 ± 150	3100–2200	Sarti 1997	medium
Querciola	Sesto-Fiorentino	Florence	Italy	layer 3, str. A lower	charcoal	Ly-3034	3960 ± 200	3100–1800	Sarti 1997	medium
Rubiera	Rubiera	Reggio Emilia	Italy	unknown	charcoal	GrN-9828	3900 ± 60	2570–2200	Bermond Montanari et al. 1982	medium
Sant'Ilario d'Enza	Sant'Ilario	Reggio Emilia	Italy	unknown	charcoal	Birm-828	3860 ± 100	2600–2000	Skeates 1994	medium
Sant'Ilario d'Enza	Sant'Ilario	Reggio Emilia	Italy	unknown	charcoal	Birm-827	3840 ± 100	2600–1950	Skeates 1994	medium
Sant'Ilario d'Enza	Sant'Ilario	Reggio Emilia	Italy	unknown	charcoal	R-1291	3840 ± 60	2470–2130	Skeates 1994	medium
Gemeente	Oostwoud	Noord-Holland	Netherlands	under barrow II	bone	GrN-6650C	3945 ± 55	2580–2280	Lanting and Mook 1977	unknown
Molenaarsgraaf	Molenaarsgraaf	Zuid-Holland	Netherlands	pit 210	charcoal	GrN-5705	3635 ± 60	2200–1870	Louwe Kooijmans 1974	high
Champ-Vully Est	Rances	Vaud	Switzerland	layers 4b1, 4b2	charcoal	CRG-357	3800 ± 70	2470–2030	Gallay and Baudais 1985	high
Champ-Vully Est	Rances	Vaud	Switzerland	layer 4b2	charcoal	CRG-354	3700 ± 85	2450–1800	Gallay and Baudais 1985	high
Champ-Vully Est	Rances	Vaud	Switzerland	layer 4b1	charcoal	CRG-355	3910 ± 60	2570–2200	Gallay and Baudais 1985	high
Kempten	Wetzikon	Zürich	Switzerland	layer 16	charcoal	UZ-4846/ ETH-26473	3835 ± 55	2470–2140	Rigert et al. 2005	high
Zwillikon-Weid	Affoltern	Zürich	Switzerland	area 2, layer 3 base	unknown	UZ-4442/ ETH-23033	3820 ± 55	2465–2064	Rigert 2002	high

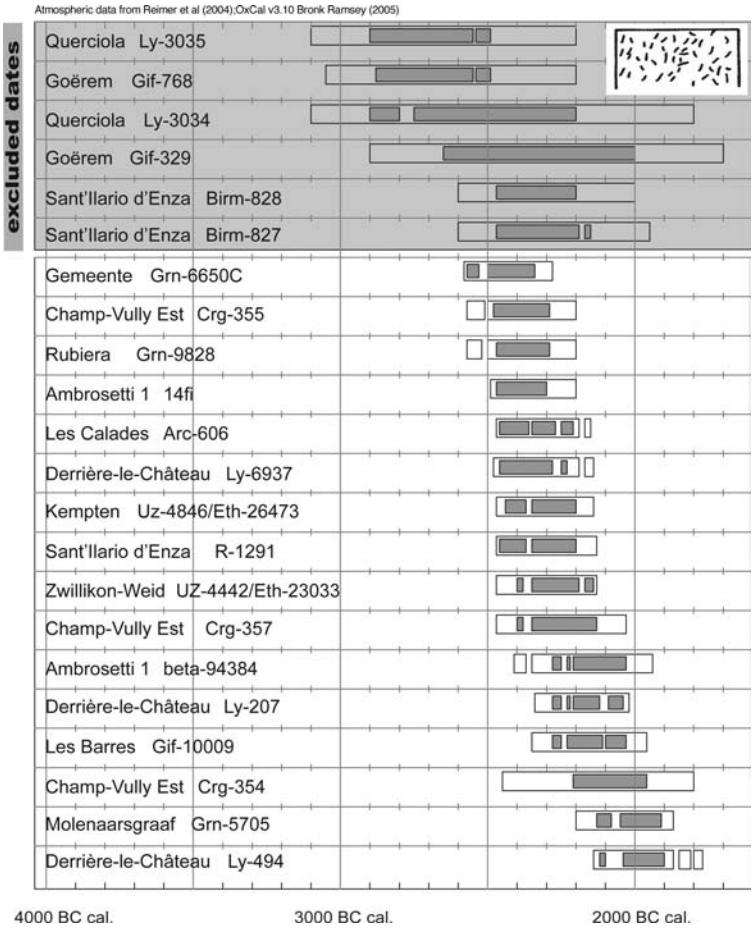

Figure 6 ^{14}C dates for type 9 in Bell Beaker culture. In gray: excluded dates. See Table 2 for the references.

In Germany, fingernail décor is known from the Funnel Beaker and Corded Ware cultures in the Elbe-Weser Dreieck region (Strahl 1990), the Saale and Saxe-Anhalt (Matthias 1987), but also in the "Riesenbecher" of the Hesse that belongs to the Single Grave culture (Lichardus 1980) with several variants: disorganized fingernail impressions, aligned impressions, finger impressions with nail traces. The appearance of this decoration is dated around 3100 BC both in the late Funnel Beaker context as well as in the early Globular Amphora context (Müller 2001).

While it seems to be absent in the eastern zone of the Bell Beaker territory, this décor is well represented in pre-Bell Beaker groups in Poland, where it is generally present as rows of finger and nail impressions below the rim and/or above a smooth row. This is the case for the Funnel Beaker culture (Kośko 2000) where this décor is dated between 3200 and 2800 BC, the Globular Amphora culture between 2900 and 2600 BC (Szmyt 2000), and the Corded Ware culture (Czebreszuk 2001; Furholt 2003). In Switzerland, in the Corded Ware layers at Auvernier-La Saunerie, this type of impression is present in the early and middle phases dated between 2784 and 2508 BC (Complexes I–IV). It then disappears from the following complex (V) dated between 2498 and 2440 BC (Ramseyer 1988).

In southern Europe, fingernail impressions are present more sporadically with 2 elements found in "White Ware" levels at Monte Covolo in northern Italy, earlier than 2600 BC (Barfield et al. 1975–1976), and a recipient found in a tomb at Spilamberto in a Final Neolithic context dated between 2900 and 2500 BC (Steiniger 2008).

Finally, the Artenacian in western France has a few examples of fingernail impression, from the sites of Artenac (Charente), Terrier-de-Biard (Charente), and La Lieue (Haute-Vienne), but here the nail marks are aligned on a careen or in a block (Burnez 1976). The 2 sherds found in the Pierre-Virante megalith at Xanton-Chassenon (Vendée) are, in contrast, closer to the type 9 known during the Bell Beaker (Joussaume 1981). These sites are unfortunately undated.

In conclusion, fingernail impression décor seems to have an origin in northern Europe (Funnel Beaker and Corded Ware cultures in Germany), and first appears in the Bell Beaker around 2400 BC in the Netherlands, then in Switzerland, France, and northern Italy (Figure 7).

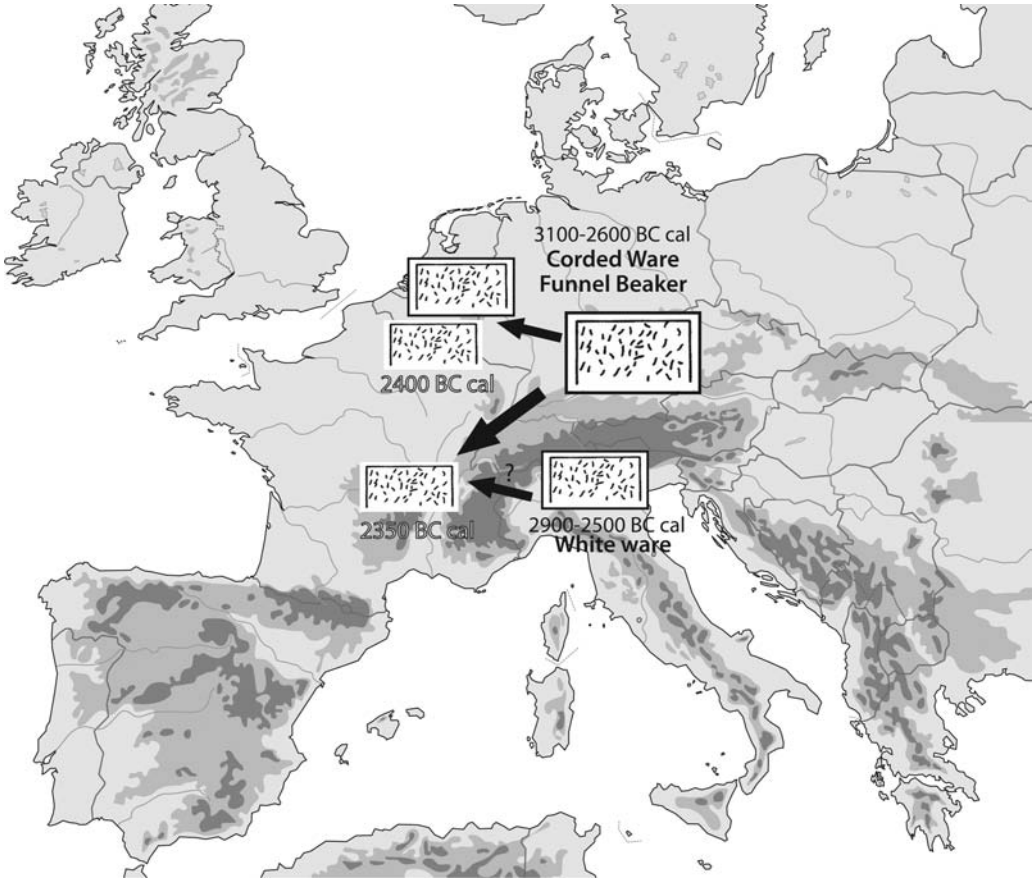

Figure 7 Origin of the disorganized fingernail imprints in the Final Neolithic and diffusion in the Bell Beaker culture

CONCLUSION

This study reveals that the pre-Bell Beaker Neolithic cultures played different roles depending on the region (Piguet et al. 2007). While the importance of the Neolithic influence in the eastern Bell

Beaker is clear, the situation in western Europe is different. Here, there appears to be a partial renewal of the common ware pottery with new forms that appeared during the Bell Beaker (type 8) and others that seem to have been derived from the preceding Neolithic (types 29, 34/35, and 9). Analysis of the associated dates for these ceramic types demonstrates the rapidity of diffusion of a form from its first appearance to its expansion across the Bell Beaker sphere. This approach to ceramic chronology is, however, limited by the calibration curve for ^{14}C dates, with a plateau during the 3rd millennium, and limits the precision of the dates. Some cultural contacts at the end of the Neolithic are probably very fast and beyond the precision of ^{14}C dates. We also note an imbalance in the availability of dates; while the Czech Republic contains more than 300 sites with Bell Beaker common ware pottery, only 15 ^{14}C dates are available. Nevertheless, it is now possible to propose scenarios for the appearance and spread of the most important types of Bell Beaker common ware pottery.

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