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Pottery technology as a revealer of cultural and symbolic shifts: Funerary and ritual practices in the Sion 'Petit-Chasseur' megalithic necropolis (3100–1600 BC, Western Switzerland)

Eve Derenne[a,*], Vincent Ard[b], Marie Besse[a]

[a] Laboratoire d'archéologie préhistorique et anthropologie, Université de Genève. Uni Carl-Vogt, Boulevard Carl-Vogt 66, CH-1211 Genève 4, Switzerland
[b] UMR 5608 TRACES, Université Toulouse Jean Jaurès, Maison de la Recherche, allée Antonio-Machado 5, F-31058 Toulouse Cedex 9, France

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ABSTRACT

Research on the third millennium BC in Western Europe has tried for decades to understand the mechanisms of the large-scale cultural changes that took place during its course. Few studies have focused on technological traditions, although these are key to considering continuities and disruptions. In this article, we used pottery technology to approach the evolution of social and symbolic practices at a major megalithic site in Switzerland: the necropolis of Sion, Petit-Chasseur (Valais). We reconstructed technological traditions for the Valaisian Final Neolithic (3100–2450 BC), the Bell Beaker Culture (2450–2200 BC), and the Early Bronze Age (2200–1600 BC). This was done using the *chaîne opératoire* approach, analyzing fashioning methods, finishing treatments, and decoration. The sequence of these technological traditions, along with architectural and historical aspects, confirms that significant breaks happened during the use of the site with specific traits coinciding with the emergence of the Bell Beaker Culture and then again with the Early Bronze Age. These findings support the idea that the transition between the Final Neolithic and the latter periods marked an important cultural and symbolic shift in Western Europe and that this shift was, at least in Western Switzerland, linked to several exogenous components.

1. Introduction

1.1. Study aims

Many scholars have worked on the transition between the Neolithic and the Bronze Age in Western Europe, as it marks one of the major upheavals in prehistoric societies' social, economic, and symbolic behaviors (Guilaine 2007; Anthony and Brown 2011; Vital et al. 2012; Kristiansen 2015; Knipper et al. 2017). This transition took place in the third millennium BC and included the sudden emergence and disappearance of the Bell Beaker Culture, a phenomenon whose origins remain highly debatable since the end of the nineteenth century (Siret 1913; del Castillo Yurrita 1928; Sangmeister 1963; Lanting et al. 1972; Harrison 1974; Gallay 1979; Strahm 1979; Desideri 2011; Brotherton et al., 2013; Gallay 2014a; Anthony and Ringe 2015; Jeunesse 2015; Lemercier 2018a, 2018b; Olalde et al., 2018).

One of the keys to understanding these shifts is to examine whether the changes observed in architecture, funerary rituals, biology, and material culture were rooted in local traditions or were rather exogenous features. Regarding the 'Beaker phenomenon', some researchers have taken this approach, studying a variety of artifacts and fields (e.g. pottery typology and technology, stone tools, archaeolzoology, and metallurgy) on a local scale in order to comprehend their placements within the Final Neolithic context (Convertini 1996, 1998; Salanova 2000; Lemercier 2004; Furestier 2007; Blaise 2010; Salanova and Tchérémissinoff 2011; Salanova 2012; Bailly 2014; Blaise et al. 2014; Lemercier et al. 2014; Labaune 2016; Convertini 2017; Lemercier and Strahm 2018). Others have done so on a much larger geographic scale, focusing on specific elements of the Bell Beaker material culture (Bailly 2002; Besse 2003; Salanova 2009).

The megalithic necropolis of Sion 'Petit-Chasseur' (Valais, Switzerland) allows for such a study and for a reflection on this Neolithic transition. This exceptional site is located at an altitude of 489 m in the Upper Rhône valley, a central alpine region located in Southwest Switzerland (Fig. 1). The valley starts near the source of the Rhône river and ends at Lake Geneva, around 145 km farther west. Its geographical situation makes it one of the key areas for transalpine contact, with only a few passes separating it from the adjacent Aosta

* Corresponding author.
E-mail address: eve.derenne@unige.ch (E. Derenne).

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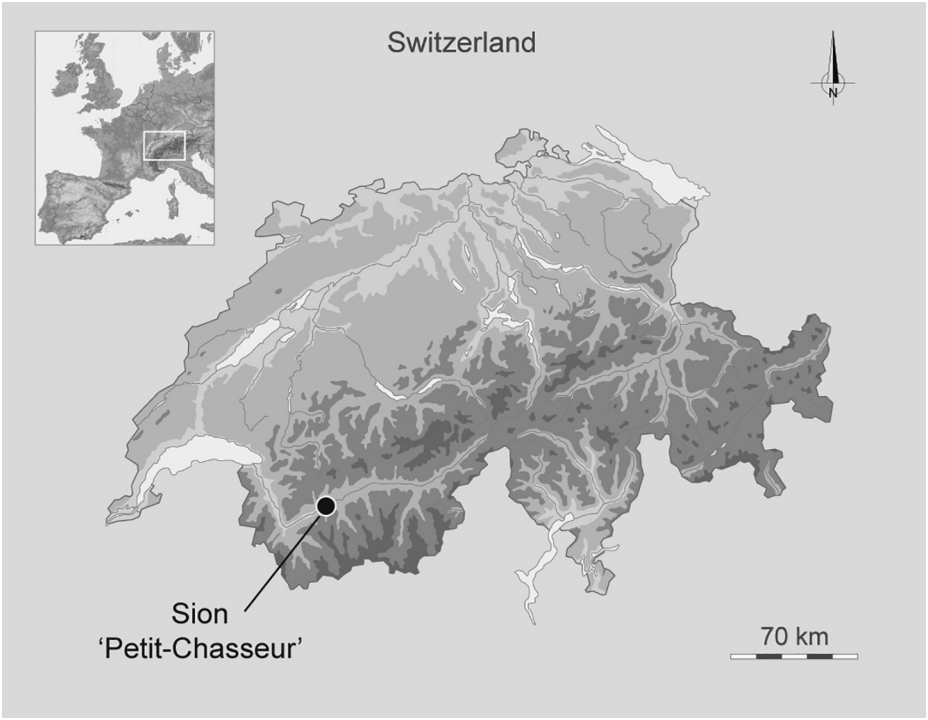


Fig. 1. The megalithic necropolis of Sion 'Petit-Chasseur'. Site location in the Upper Rhône valley in southwestern Switzerland.

valley in the south. Crossings between the two valleys have been constant throughout the ages, as attested by the discovery of the rock shelter of Zermatt Alp Hermettji, at an altitude of 2600 m, that was used between 7800 and 1500 cal BC (Curdy et al. 1998, 2003). On the western side of the valley, Lake Geneva gives access to the Swiss Plateau and other regions located farther north.

The site of Sion 'Petit-Chasseur' (Fig. 2) comprised twelve megalithic structures and 29 ornamented stelae (Favre et al. 1986; Gallay 1995) and was characterized by both funerary and ritual uses that developed over one millennium (ca. 3100–1600 BC). Its time span covered three archaeological periods (Fig. 3 and Table 1), during which it underwent almost constant modifications: the Valaisian Final Neolithic (ca. 3100–2450 BC), the Bell Beaker Culture (ca. 2450–2200 BC), and the Early Bronze Age (ca. 2200–1600 BC) (Besse et al. 2011). The definition of these three periods was based on the combined analyses of radiocarbon dates, stratigraphy, and archaeological material.

The necropolis, discovered in 1961, was extensively and meticulously excavated, studied, and published (Bocksberger 1976, 1978; Gallay and Chaix 1984; Gallay 1989; Favre and Mottet 2011; Besse 2014). It is considered one the most prominent megalithic sites of the alpine region both for its intrinsic archaeological importance and the precision of the data available regarding its stratigraphy, architecture, and archaeological material.

However, the site's technological pottery traditions remain unexamined even though the last thirty years have proven that the study of pottery *chaînes opératoires* can have a considerable impact on our comprehension of past societies. It allows researchers to trace manufacturing traditions, revealing the existence of the distinct social groups that produced these vessels and helps observe their evolution (Gosselain and Livingstone-Smith 2005; Gosselain 2008a; Roux 2011; Roux et al. 2017; Gomart et al. 2017a). Section 2.1. will present this field of study in more detail.

Our research combines technical data on the pottery from Sion 'Petit-Chasseur' with elements of the site's history of use and architectural features in order to revisit the social and symbolic dynamics analyzed in previous works (Gallay 1995, 2011, 2014a, 2014b; Harrison and Heyd 2007).

1.2. The necropolis of Sion 'Petit-Chasseur': History of the site

The first attested use of the site dates from the Valaisian Final Neolithic (ca. 3100–2450 BC). The primary structures were two dolmens, MXII (Favre and Mottet 2011) and MVI (Bocksberger 1976), with a triangular stone base around the burial chamber. These two tombs were accompanied by at least 8 anthropomorphic stelae whose style was categorized as "type A" (Fig. 4, A), featuring representations of Remedello copper daggers and spiraled pendants but no distinct anatomical traits apart from a slightly detached head (Gallay 1995, p. 178). Grave goods included four categories: weapons (such as polished greenstone, deer antler and flint arrowheads, Grand-Pressigny and other flint daggers), adornments (such as pendants made from deer antler and animal bones, boar tusk plates, and over 800 beads in Mediterranean shells, bone, green stone, and copper), undecorated pottery, and tools (small axes, stone spindle whorls, and bone awls) (Bocksberger 1976, p. 80-84; Favre and Mottet 2011, p. 118-168).

The first phase of Bell Beaker occupation saw the construction of three new dolmens, MI, MV and MXI, without the previously typical triangular base (Bocksberger 1978; Gallay and Chaix 1984; Gallay 1989). They were accompanied by at least 17 anthropomorphic stelae of a new style, "type B", characterized by entirely new features (Fig. 4, B), including depictions of body features (noses, arms, hands), rich geometric patterns, representations of bows and arrows, and adornments like necklaces and belts (Gallay 1995, p. 178). The megaliths forming the burial chamber were often reused type A stelae. During the next phase, the Bell Beaker peoples emptied dolmen MVI and aligned the skulls of the Final Neolithic burials on the eastern side of the triangular stone base. This event was followed by the construction of another set of graves, cists MII, MIII, MVII, MVIII, MIX, MX and MXIII, whose slabs were reused type B stelae. Grave goods included decorated Beakers and cups, gold and silver rings, a copper awl, perforated Mediterranean shells, arrowheads, and V-perforated buttons (Bocksberger 1978; Gallay and Chaix 1984; Gallay 1989).

The first phase of the Early Bronze Age (2200–1600 BC) saw a big change in the site's use, most notable the emptying of graves, burning the deceased in pits, building paved altars in front of MVI and MXI, and

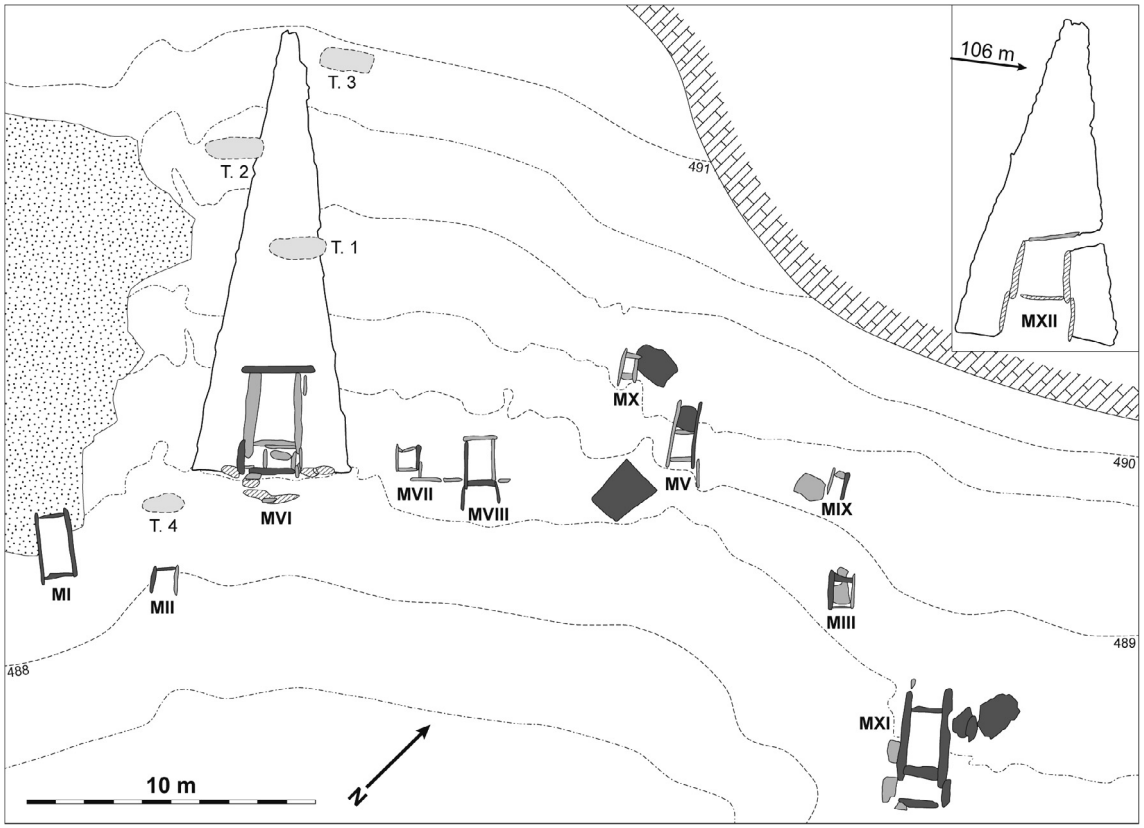


Fig. 2. The megalithic necropolis of Sion 'Petit-Chasseur'. Location of dolmens and cists. Dark grey: reused stelae. Light grey surrounded by dotted line: Early Bronze Age burials (T. 1 to 4). Insert in the upper right corner: dolmen MXII, located 106 m further east. Cist MXIII is not depicted (adapted from Corboud and Curdy, 2009, p. 20).

burying children in the small cists added to the previous dolmens. There were no added graves during the following phases. Several small cairns accompanied by faunal remains and big jars covered the dolmens and cists, and sporadic traces of fire indicate activity all around the site. The final phase of the Early Bronze Age marked the end of the use of Sion 'Petit-Chasseur'. There were seven rich individual burials dug around MXII and MVI, two of them in the latter's decayed triangular base (Fig. 5). Grave goods included bronze axes, daggers, spiraled rings and pins, resin beads and pendants, but no pottery (Bocksberger 1978; Favre and Mottet 2011).

2. Methods

2.1. The technological analysis: A brief history of research

The applied methodology is based on the technological analysis of pottery, the main principle of which is the reconstruction of the *chaîne opératoire*, "(…) une série d'opérations qui transforment une matière première en un produit"[1] (Cresswell 1976, p. 13). For pottery, this would include every step of the manufacturing process, from the selection of clay and temper to the firing of the pots and the possible finishing treatments. This work focuses on the fashioning, decorating, and finishing stages of the manufacturing process; a parallel study looking at the raw materials is also in progress (D. Carloni, ongoing PhD at the University of Geneva).

We derived our approach from the French School of *Anthropologie des techniques* (Mauss 1947; Leroi-Gourhan 1964; Latour and Lemonnier 1994), whose reflections and theories first led archaeologists to develop the technological analysis for the study of lithic material. Since the 1960s, following the lead of Jacques Tixier, they have been reconstructing the knapping sequences used to produce stone artefacts (Perlès 1977; Tixier et al. 1980; Pelegrin 1995).

Although several researchers worked on pottery techniques quite early on (Balfet 1953; Shepard 1956; Rye 1977, 1981; Rice 1987), including one specifically on Bell Beakers (van der Leeuw 1976), the analysis of styles remained the preferred approach until the late 1980s and 1990s. Archaeologists' views on this matter began to change when ethnographic studies started to reveal the diversity of potters' behaviors around the world (Arnold 1985; Roux 1994; Gallay et al. 1998; Pétrequin and Pétrequin 1999; Livingstone-Smith 2001; Gosselain 2002; Gelbert 2003, among others).

This discovery sparked interest in learning and transmission processes as researchers tried to understand the mechanisms underlying this multiplicity (Bril 2002a, 2002b; Stark et al. 2008). Often using ethnographic data, these works led to the following four conclusions. First, that the learning process occurs through observation and most importantly practice (Bril 2002b; Gosselain 2008b). Subsequently, that the apprentice learns the gestures, postures, and mental framework of her/his teacher(s) (Bril 2002b; Gosselain and Livingstone-Smith 2005; Roux 2011; Arnold 2018). Thirdly, that this mental and bodily impregnation makes it difficult for the potter to later use different methods or techniques (Roux 2011). This is explainable by the fact that techniques are often strongly associated with inheritance. They are thus generally more resistant to inter-cultural homogenization than style (i.e. morphology and decoration patterns) (Gosselain 2008a, 2008b; Roux et al. 2017). As a result, boundaries of technological traditions correspond to those of learning networks, and therefore to specific social identities (Roux 2010, 2011, 2015; Roux et al. 2017).

The "anthropological interpretation of ceramics" (Roux 2011) thus

[1] Translation: "(…) a series of operations that transforms a raw material into a product."

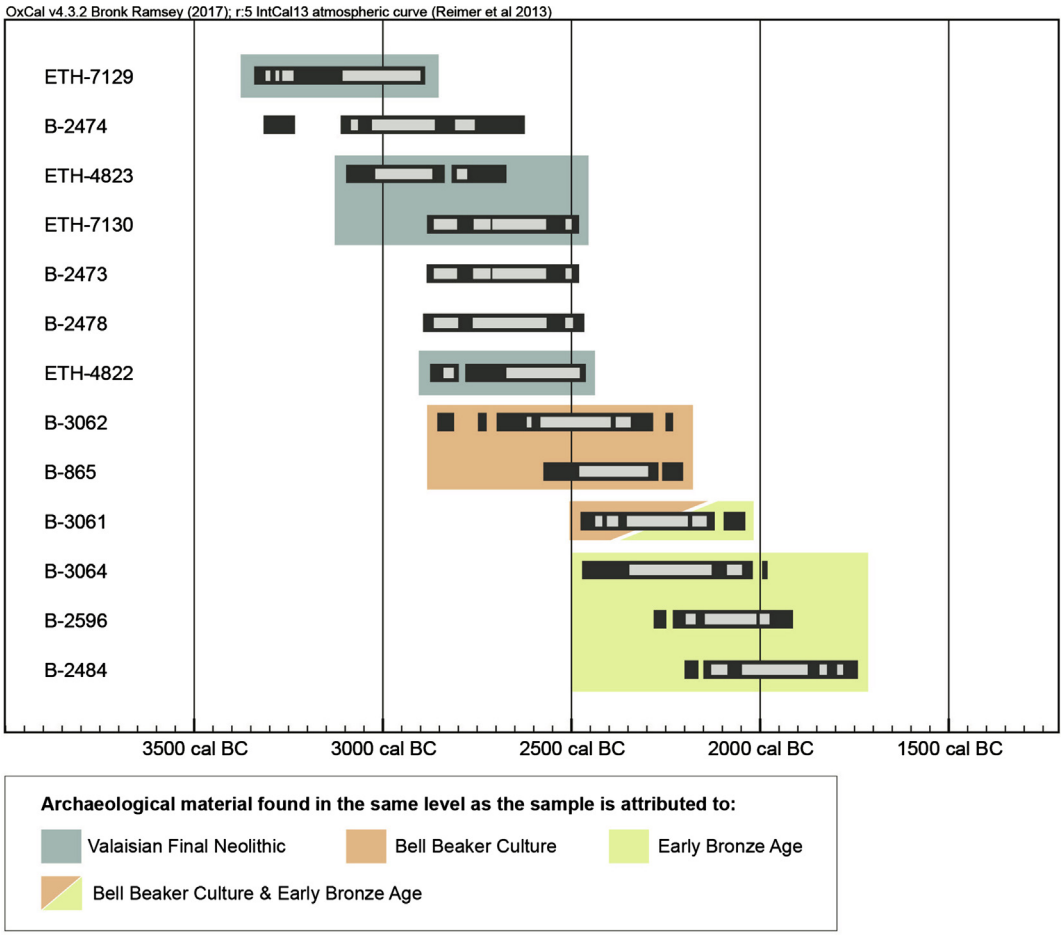


Fig. 3. Radiocarbon dates for the site of Sion 'Petit-Chasseur' (Gallay et al. 1983, p. 52-54; Baudais and Honegger 1995, p. 68). Dates with an uncertainty of ± 100 years BP and above were not taken into account. Black: 95.4% certainty (two sigma); Light grey: 68.2% certainty (one sigma).

offers great potential for archaeological studies, especially when looking for the intrusion of foreign traits, a question at the center of our research. Methods for analyzing pottery in this perspective include macroscopic and microscopic observations in tangential and radial views. X-rays are sometimes used as a complement, with the development of high-resolution X-ray microtomography in the last few years (Kahl and Ramminger 2012, Sanger 2016, Gomart et al. 2017b, Kozatsas et al. 2018).

2.2. The pottery from Sion 'Petit-Chasseur'

The pottery from 'Petit-Chasseur' consists of 3242 elements, for a total mass of a little over 98 kg (Tables 2 and 3). Among these elements are 61 identified vases: 3 from the Final Neolithic, 28 from the Bell Beaker Culture, and 30 from the Early Bronze Age. The remaining potsherd distribution was uneven between the three periods and between the archaeological structures; the Early Bronze Age levels yielded over 82% of the site's pottery, and dolmen MXI alone contained 80% of the assemblages.

Table 1
Radiocarbon dates for the site of Sion 'Petit-Chasseur' (Gallay et al. 1983, p. 52-54; Baudais and Honegger 1995, p. 68). Calibration: OxCal v4 3.2 (Bronk Ramsey, 2017); r5 IntCal13 (Reimer et al., 2013). Dates with an uncertainty of 100 years BP and above were not taken into account. Abbreviations: PC I (Petit-Chasseur I), PC III (Petit-Chasseur III), VFN (Valaisian Final Neolithic), BBC (Bell Beaker Culture), and EBA (Early Bronze Age).

ĒSite	Layer	Structure	Sample nr	Material	BP date	2σ calibr. (95.4%)	Archaeol. material
Sion 'PC III'	/	dolmen MXII	ETH-7129	human bone	4390 ± 80	3339–2891 cal BC	VFN
Sion 'PC I'	7	hearth 3	B-2474	charcoal	4290 ± 80	3314–2626 cal BC	None
Sion 'PC III'	/	dolmen MXII	ETH-4823	human bone	4285 ± 65	3093–2676 cal BC	VFN
Sion 'PC III'	/	dolmen MXII	ETH-7130	human bone	4100 ± 80	2880–2483 cal BC	VFN
Sion 'PC I'	7	hearth 6	B-2473	charcoal	4100 ± 80	2880–2483 cal BC	None
Sion 'PC I'	6	dolmen MVI	B-2478	charcoal	4100 ± 90	2890–2470 cal BC	None
Sion 'PC III'	/	dolmen MXII	ETH-4822	human bone	4055 ± 65	2871–2466 cal BC	VFN
Sion 'PC I'	5A5MAJ	dolmen MVI	B-3062	human bone	3980 ± 70	2851–2235 cal BC	BBC
Sion 'PC I'	5A	dolmen MVI	B-865	charcoal	3920 ± 60	2571–2208 cal BC	BBC
Sion 'PC I'	5A53	dolmen MXI	B-3061	human bone	3820 ± 70	2470–2042 cal BC	BBC-EBA
Sion 'PC I'	5A52MAJ	dolmen MXI	B-3064	human bone	3790 ± 80	2468–1985 cal BC	EBA I
Sion 'PC I'	5A1/4MAJ,5A51MAJ	dolmen MXI	B-2596	charcoal	3690 ± 60	2279–1916 cal BC	EBA II-III
Sion 'PC I'	4B	postholes	B-2484	charcoal	3600 ± 80	2197–1745 cal BC	EBA IV

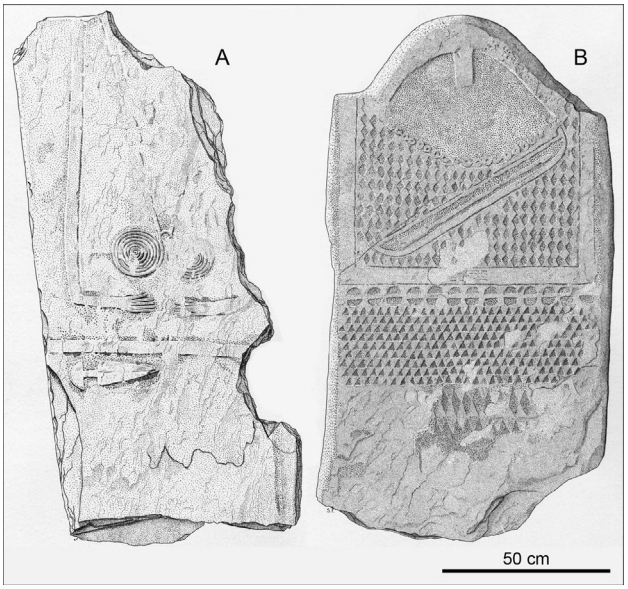


Fig. 4. The two types of anthropomorphic stelae from Sion 'Petit-Chasseur'. Type A is dated from the Valaisian Final Neolithic (left) and type B from the Bell Beaker period (right) (after Favre et al. 1986, pl. 3 & pl. 21).

Table 3
Mass distribution of the pottery from the necropolis of Sion 'Petit-Chasseur' (Switzerland), per period and per funerary monument (in grams). As dolmen MXII and cist MXIII did not yield any pottery, they were left out of this table.

Dolmen / cist no	Final Neolithic	Bell Beaker Culture	Early Bronze Age	Period unknown	Total mass (g)
MI	0	634	4700	0	5334
MII	0	0	0	0	0
MIII	0	80	0	0	80
MV	0	971	4376	984	6331
MVI	1245	1155.5	4690	0	7090.5
MVII	0	627.5	115	0	742.5
MVIII	0	8	0	0	8
MIX	0	0	0	0	0
MX	0	18	0	0	18
MXI	0	555.5	77,597	282	78434.5
Total mass (g)	1245	4049.5	91,478	1266	98038.5

found outside of the monuments. The last limitation was linked to the treatments performed by conservation professionals in the 1970s and 1980s, notably the widespread use of consolidating glue and the reconstruction of vases with painted plaster, the latter of which prevented

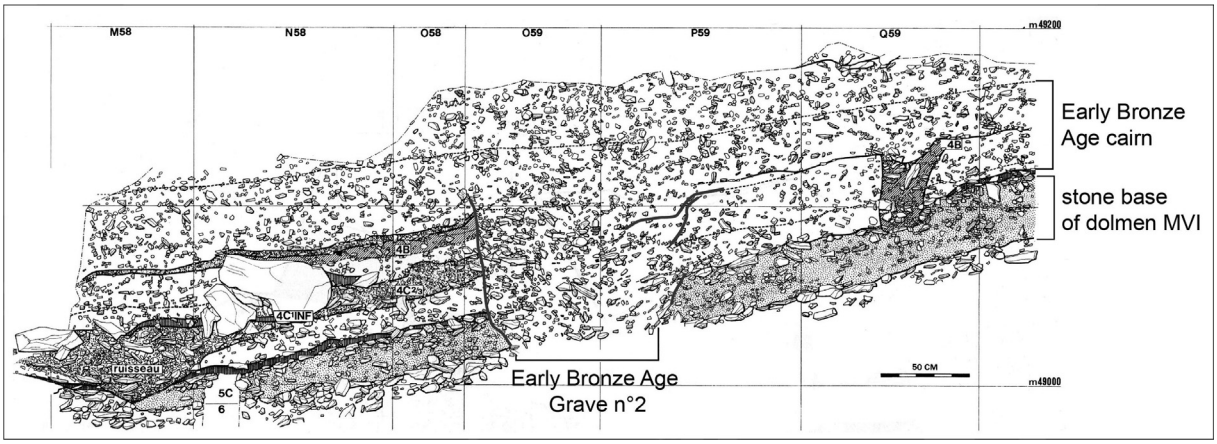


Fig. 5. Stratigraphic insertion of Grave n°2 (Early Bronze Age) of Sion 'Petit-Chasseur'. The individual burial was dug in the stone base of the dolmen and in the first levels of the Early Bronze Age cairn that covered it (adapted from Bocksberger, 1978, p. 81).

Table 2
The pottery assemblage from the necropolis of Sion 'Petit-Chasseur' (Switzerland). Number of vases and number of potsherds per period and per funerary monument. As dolmen MXII and cist MXIII did not yield any pottery, they were left out of this table.

Dolmen / cist no	Final Neolithic		Bell Beaker Culture		Early Bronze Age		Period unknown		Total # of elements
	Vases	Sherds	Vases	Sherds	Vases	Sherds	Vases	Sherds	
MI	0	0	7	16	1	0	0	0	24
MII	0	0	0	0	0	0	0	0	0
MIII	0	0	1	9	0	0	0	0	10
MV	0	0	5	30	1	211	0	124	371
MVI	3	27	7	12	1	312	0	0	362
MVII	0	0	4	18	0	8	0	0	30
MVIII	0	0	0	1	0	0	0	0	1
MIX	0	0	0	0	0	0	0	0	0
MX	0	0	0	7	0	0	0	0	7
MXI	0	0	4	27	27	2311	0	68	2437
Total of elements	3	27	28	120	30	2842	0	192	3242

We confronted three primary limitations. The first was the assemblage's high fragmentation rate and low number of identified pots. The second was the strong erosion of the sherds, especially those that were any observation in a radial view. To circumvent these constraints, we slightly adapted our data collection process, which we will explain in the following section.

2.3. Data collection

2.3.1. Macroscopic observations with low-angled light

The foundation of our data collection revolved around macroscopic observations of all 3242 elements with low-angled light to search for diagnostic traces of techniques (Ard 2014; Roux 2016, 2019). We looked at surfaces for color, shine, granularity, striation, topography, and orientation of fracture networks. When possible, we looked at sections for colors of the margins and of the core, and for the general orientation of porosity whenever it was visible. This also included the characterization of decorations through paste moisture content of paste, the tools used, and the potter's gesture, and the same characterization applied to handles and lugs. Finally, we photographed all traces with a digital camera.

Subsequently, we gave a technical interpretation of the roughout, preform, and finishing stages of the manufacturing process for each part of the pot. To do this, we referenced several ethnographical, experimental and archaeological works documenting diagnostic traces through pictures (Martineau 2000, 2010; Livingstone-Smith 2001; Manem 2008; Ard 2014; Gomart 2012; Lepère 2014; Roux 2016).

2.3.2. Surface observations with an optical microscope (Roux 2016, 2019)

Based on our macroscopic observations of the entire assemblage, we decided to emphasize surface analyses because in many cases it was the only information available due to the fragmentation, erosion, and/or reconstruction of the pottery. We examined the surfaces of 248 potsherds, representative of each period and funerary monument, with an optical microscope (Table 4), looking at microtopography, granularity, and striation (Ard 2014; Roux 2016, 2019). Our goal was to verify our technical interpretations regarding the finishing techniques and to characterize them with further detail. This included the level of moisture content of paste of the paste, the possible addition of water, and the use of a soft or hard tool. We used the ethnographic and experimental collection of the "Préhistoire et Technologie" laboratory at the University of Paris Nanterre (France) to create a set of reference photos taken on an optical microscope. These served as our reference for the identification of the finishing techniques.

2.3.3. Complementary analyses: QEMSCAN®-processed thin sections and micro-computed tomography

As previously stated, a great proportion of potsherds exhibited high erosion levels, including in the cross-section this left us unable to detect any feature linked to fashioning techniques, like joins or specific porosity configurations. Freshly cut sections are generally ideal for both macroscopic and microscopic observations (Courty and Roux, 1995), but this was not possible in our case given the archaeological importance of the assemblage from 'Petit-Chasseur' and the already limited amount of pottery that it represents. For this reason, we were unable to study the fully reconstructed pots. To mitigate these shortcomings, we used two complementary analyses. We examined 17 petrographic maps of thin sections analyzed with QEMSCAN® for an ongoing study on raw materials (D. Carloni, PhD at the University of Geneva). We looked at porosity and inclusion orientation, particularly for the core of each section as it has been proven to better retain the features of primary forming techniques; indeed, internal and external areas tend to be more affected by secondary forming techniques (Thér 2016). Two sherds from separate Beakers were also scanned using micro-computed tomography. We then analyzed the resulting 3D models to look for porosity configurations associated with specific forming techniques (Sanger 2016; Gomart et al. 2017b; Kozatsas et al., 2018).

3. Results

The observed technological traits presented a high degree of homogeneity within each period, leading us to identify three main technological groups corresponding to each period. These results are presented in chronological order in the following section. We put an emphasis on the identified pots, as they provided the majority of the technical information, from primary forming techniques to decorations.

3.1. Final Neolithic

The Final Neolithic pottery consists of 27 potsherds and three identified pots, all undecorated. All of these elements emerged from level 5B, outside of dolmen MVI. This level corresponds to the emptying of the monument by Bell Beaker populations to claim the space for their own burials. We established that the primary forming technique used during this period was coiling (Fig. 6, A). The secondary forming technique was not identifiable due to the lack of traces. Our optical microscope analysis confirmed that once the fashioning stage was complete, the pots were smoothed while their paste was still moist, sometimes with the addition of water (Fig. 6, B-C). Potters left vessels undecorated, only adding elongated lugs for prehension (see Fig. 13).

3.2. Bell Beaker Culture

Bell Beaker pottery was more numerous, with 118 potsherds and 28 pots, among which were 3 cups and 25 Beakers. As with the Final Neolithic assemblage, we were also able to determine that coiling was the primary forming technique. Micro-computed tomography confirmed our hypothesis concerning coil joins; it showed clearly that coils were joined diagonally, and more specifically in this case from the inside to the outside of the vessel wall (Fig. 7, A). The vessels obtained their final morphology through beating, as indicated by small, flat facets observed on the outer surfaces (Fig. 7, B).

Table 4
Selection of vases and potsherds from Sion 'Petit-Chasseur' examined with an optical microscope, per period and per funerary monument. As dolmen MXII and cist MXIII did not yield any pottery, they were left out of this table.

Dolmen / cist no	Final Neolithic		Bell Beaker Culture		Early Bronze Age		Period unknown		Total # of elements
	Pots	Sherds	Pots	Sherds	Pots	Sherds	Pots	Sherds	
MI	0	0	3	2	0	0	0	0	5
MII	0	0	0	0	0	0	0	0	0
MIII	0	0	1	3	0	0	0	0	4
MV	0	0	3	10	0	15	0	94	122
MVI	2	5	1	8	0	30	0	0	46
MVII	0	0	2	6	0	8	0	0	16
MVIII	0	0	0	1	0	0	0	0	1
MIX	0	0	0	0	0	0	0	0	0
MX	0	0	0	3	0	0	0	0	3
MXI	0	0	0	13	6	32	0	0	51
Total of elements	2	5	10	46	6	85	0	94	248

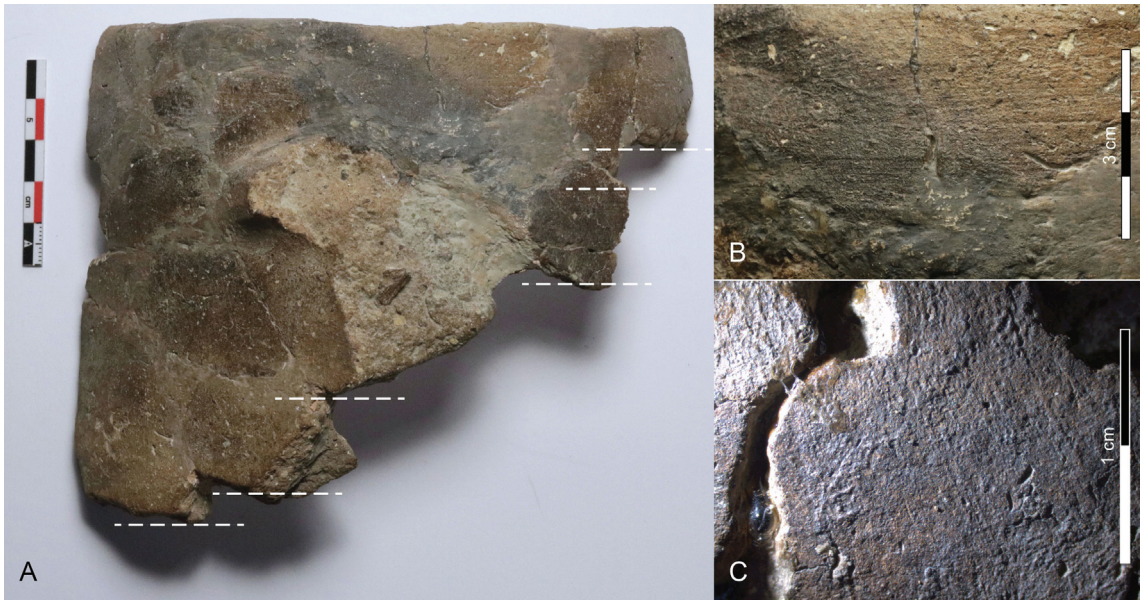


Fig. 6. Technological traces characteristic of the Final Neolithic pottery of Sion 'Petit-Chasseur'. A. Fracture networks linked to coiling (vase n°1); B. Striations due to smoothing. C. Ridges and striations typical of smoothing with the addition of water (photo on the optical microscope).

The analysis of QEMSCAN® petrographic maps also reinforced this interpretation as thin sections from Bell Beaker pots displayed particularly dense fabrics with micro-porosities oriented parallel to the walls (Fig. 8). Two Beakers and one cup were undecorated; the remaining 25 vessels were decorated when their paste had reached a leather-hard consistency, using at least three different types of tools (Fig. 9 and Table 5). Potters then went on to burnish the outer surfaces of each vase, including the three undecorated ones (Fig. 7, C).

When looking at the distribution of these Bell Beaker vessels inside the necropolis (Fig. 10), there were several notable elements. First of all, the Beakers decorated with cord impressions were found in MVI and MVII, two monuments that were located in close proximity to each other. The three undecorated pots belonged to MV and MXI, which were two of the three oldest Bell Beaker structures. This situation had already led some researchers to conclude that the vases corresponded to an early Beaker phase (Harrison and Heyd 2007), although their typo-chronological sequence was later debated (Gallay 2014b). Vases decorated with impressions of an indented tool appeared in all six monuments that yielded Bell Beaker Culture grave goods. Finally, the three Beakers decorated with a mix of two separate tools – an indented one and a stamp – were found in three different dolmens: MI, MVII and MXI. This analysis of decoration techniques' distribution among the dolmens stemmed from previous interpretations, attributing each monument to a specific lineage (Gallay 2006a, 2006b; Harrison and Heyd 2007). This hypothesis is supported by recent genetic analyses that identified cases of close kin relationships and possible paternal continuity in Neolithic megalithic graves from Northern and Western Europe (Sánchez-Quinto et al., 2019). If this were the case, and if pottery production were domestic rather than the product of specialized artisans, we could have expected to find a particular distribution of these decoration techniques in 'Petit-Chasseur' graves. Indeed, we could have imagined each lineage as having adorned its vessels with its own tools. However, the attribution of a dolmen to a lineage is contested because ethnographic examples tend to show that megalithic-erecting societies are not based on lineage, but on a system of classes that can be accessed via either age or merit (Testart 2014). Finding the use of the



Fig. 7. Technological traces characteristic of the Bell Beaker pottery from Sion 'Petit-Chasseur'. A. Oblique coil joins visible on a micro-computed tomography scan (Bell Beaker PC1 MVI Gob.5); B. Facets indicating the use of beating as a secondary forming technique (Bell Beaker n°40089, dolmen MVI); C. Polished surface (Bell Beaker PC1 MVII Gob.1).

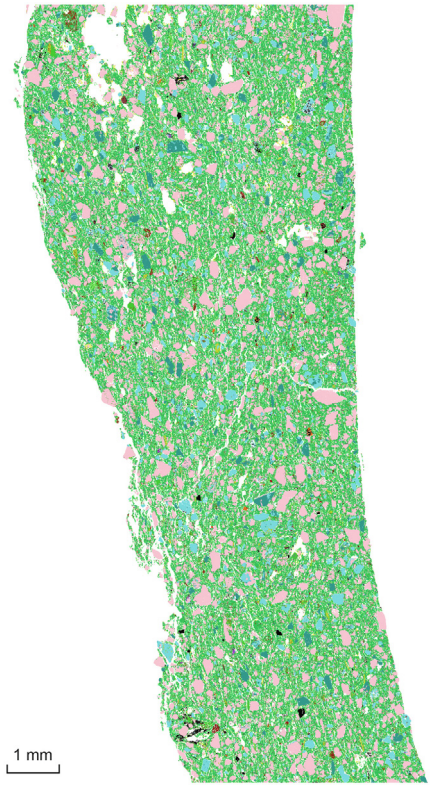


Fig. 8. QEMSCAN® petrographic map of Bell Beaker PC1 MXI Gob.1. Dense fabric and extremely fine porosities (D. Carloni).

same decoration technique in several dolmens would thus be most probable, which happens to be the case in our study.

3.3. Early Bronze Age

The majority of the ceramic assemblage was attributable to the Early Bronze Age levels, with 2842 potsherds and 30 jars. The distribution of jars was extremely uneven, with 27 linked to dolmen MXI (23 were found inside the burial chamber, 3 inside the adventitious cists, and one in the outside level of the dolmen). The three remaining jars were found in dolmen MI, dolmen MVI, and cist MV. The vast majority – 27 out of 30 – exhibited traces of coiling as a primary forming technique (Fig. 11, A). Four of them even bore traces of a peripheral coil added to the base to make it more protruding (Fig. 11, B). Except for this specific coil, the type of joins was not identifiable, together with the secondary forming technique. However, unlike what was found for Bell Beaker vessels, QEMSCAN® petrographic maps showed large pores, which would indicate that they were not beaten. Surface treatments on the other hand were particularly visible; 26 jars were smoothed when their paste was still wet, with the further addition of water leaving extremely characteristic traces (Fig. 11, C). Potters did so after adding the horizontal lugs and smooth cordons on the upper third of the vessels.

The smoothing traces they left were so distinct that we could analyze the pattern on the outer surfaces, identifying specific hand gestures and thus getting closer to the individual artisans (Fig. 12). One pattern was particularly widespread, appearing on 10 out of 26 jars. Here, the potter smoothed the upper third of the jar and its cordons horizontally and then smoothed the rest of the vase with an upward motion, starting at the base. Four jars presented a variant to this pattern; the smoothing involved only horizontal motions. Two vessels presented oblique traces on the upper third part, between the cordons. The rest of the surfaces did not yield interpretable striations. Ten more jars could not provide information, as they were simply not preserved below the upper third part. Seven of them displayed horizontal smoothing, leading us to believe that they could belong to the first and principal pattern described above. The remaining three presented a combination of horizontal and vertical striations.

To sum-up the results of our technological analysis, each period demonstrates a different *chaîne opératoire* (Fig. 13). The Final Neolithic potters used coiling to make their vases and finished them by smoothing the outer surfaces, not decorating them. The Bell Beaker artisans used coiling as well, preforming the vessels through beating, and decorated them heavily before burnishing them. Finally, the Early Bronze Age potters produced coiled jars that they smoothed after adding cordons and horizontal lugs. These operational sequences represent three technological traditions.

Each tradition presents a distinct morphology: small jars during the Final Neolithic, Beakers and cups for the Bell Beaker Culture, and large jars during the Early Bronze Age.

The choices made were thus very different, as the comparison of Bell Beaker and Early Bronze Age pottery makes particularly clear. On the one hand, artisans manufactured small vases that required a significant technical investment; on the other, they made large, coarse vessels that, although almost standardized in morphology, displayed very irregular profiles and seemed hastily produced.

Nevertheless, it is important to mention that the selection of a different category of vessel for the deposits of each period could emphasize these differences in *chaînes opératoires* and morphology. It would thus be necessary to study the pottery from the Upper Rhône valley settlements. We could then see if, for example, there was a total absence of fine ware during the Early Bronze Age, or if the population just made the choice to deposit only coarse specimens in Sion 'Petit-Chasseur'.

4. Discussion

The following section will evaluate whether the transition from the Final Neolithic to the Bell Beaker Culture was the result of an evolution of local components or of a break that could be explained by the arrival of exogenous elements (e.g. objects, ideas, or people). We will also discuss the issue of migration as it relates to this overarching question. Finally, this section aims to address the continuity – or lack thereof – between the Bell Beaker and Early Bronze Age phases of Sion 'Petit-Chasseur', and its meaning in terms of social and symbolic functions at the end of the 3rd millennium BC.

4.1. The transition between the Valaisian Final Neolithic and the Bell Beaker Culture

There have been many studies describing the emergence of the Bell Beaker Culture in Western Europe as abrupt, with several likely elements of rupture with the preceding Final Neolithic cultural groups (Sangmeister 1963; Lanting and van der Waals, 1976; Shennan 1976; Harrison 1980). However, some works have shown particular fields of activity to be rooted in local traditions (Convertini 1998; Bailly 2002; Besse 2003; Besse and Desideri 2005; Furestier 2007; Desideri et al. 2012). The question here is therefore: does the site of Sion 'Petit-Chasseur' present arguments in favor of a division or of a continuity between the Final Neolithic and the Bell Beaker Culture?

Pottery technological traditions can assist with this answer. As we described earlier, Bell Beaker pottery revealed manufacturing and finishing techniques that contrasted strongly with the ones that we found for earlier periods. The use of beating, the burnishing of surfaces, and the impression of complex geometrical patterns to decorate the vessels testified to the potters' intention of creating particularly well-finished objects.

Their morphology also showed a shift: the Final Neolithic vases were jars, whereas funerary vessels from 2450 BC were beakers or cups, which are much smaller.

After reexamining the site's history, we found four additional

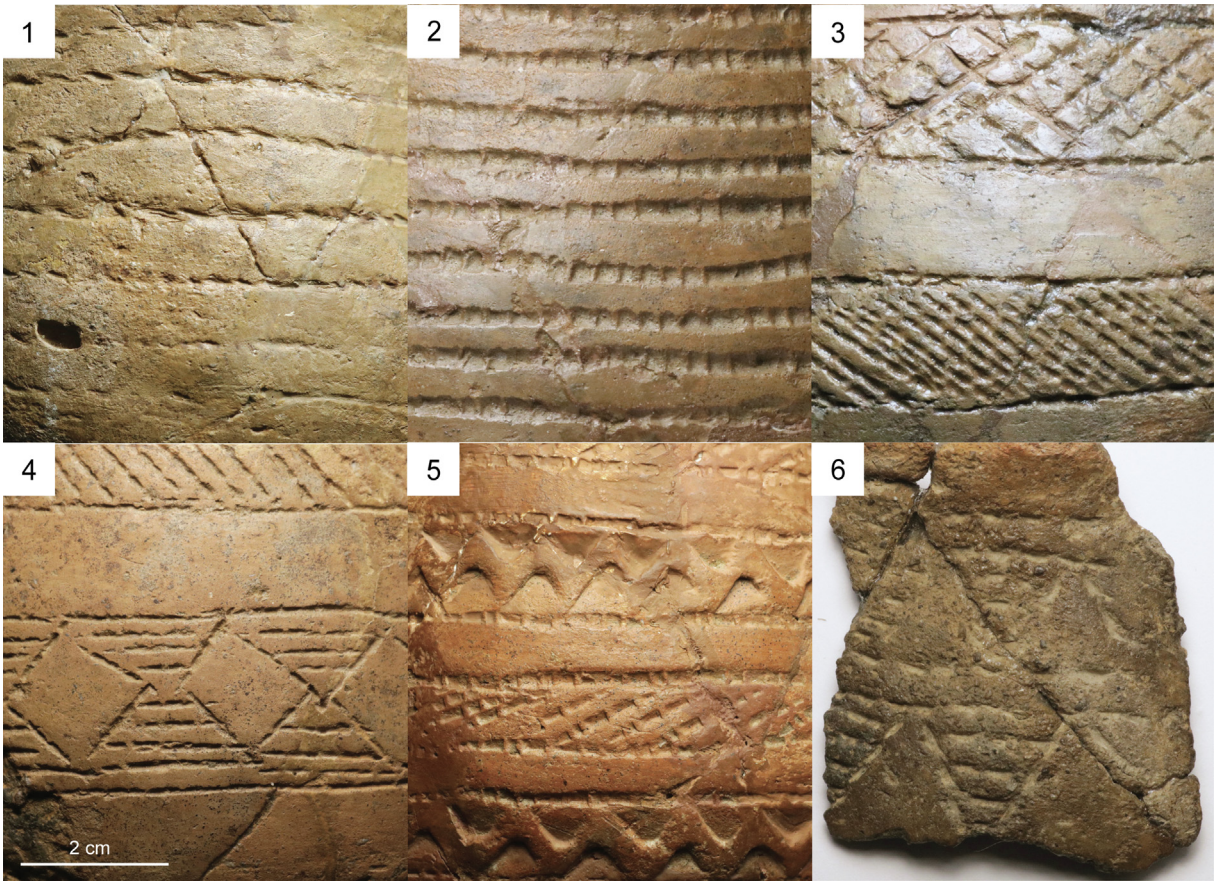


Fig. 9. Decorated beakers and cups from Sion 'Petit-Chasseur'. 1. Z-twisted cord impressions on Gob. 40,088 (MVI); 2. Linear impressions with an indented tool on Gob. 40,089 (MVI); 3. Geometric impressions with an indented tool on Gob. 40,068 (MVI); 4. Geometric impressions with an indented tool on PC1 MVII Gob.2; 5. Mix of impressions using an indented tool and a stamp on PC1 MVII Gob.3; 6. Geometric pattern made with a single stamp on PC1 MXI Gob.3.

Table 5
Distribution of Bell Beaker Culture decoration techniques in Sion 'Petit-Chasseur', depending on the vase morphology.

Decoration technique	Beakers	Cups
Undecorated	2	1
Z-twisted cord impressions	4	0
Indented tool impressions	14	1
Indented tool and stamp impressions	3	0
Stamp impressions	0	1
Unidentified technique	2	0

indications of disruption linked to the Bell Beaker phases. The first one appears in the architecture of the dolmens and cists built after 2450 BC. Indeed, unlike their Final Neolithic predecessors, they did not feature a triangular base; their burial chamber stood alone. The breaking of the "type A" stelae and their use to build the first Bell Beaker monuments marks a second change. Their systematic destruction, with a particular emphasis on the heads, could be a powerful sign of rejection towards the preceding individuals buried in the necropolis (Harrison and Heid 2007, p. 151). A third sign of a shift is the erection of a new type of stela, "type B". These stelae's anthropomorphic features were exacerbated and engraved with specific patterns. Representations of bows and arrows, weapons never before depicted, replaced those of Remedello daggers (Gallay 1995; Harrison and Heyd 2007). The last indication of disruption is the level 5B of dolmen MVI – here marks a caesura as the Final Neolithic remains and their accompanying grave goods were thrown outside of the structure to allow for the first Bell Beaker funerary deposit (Bocksberger 1976 vol 1, p. 144).

However, several elements indicate that there could also have been forms of continuity between the Final Neolithic and the Early Bronze Age. Coiling used as a primary forming technique is one of them. The history of use of Sion 'Petit-Chasseur' also provides evidence for continuity. First of all, the site retained its funerary status as the populations neither abandoned nor sealed off the necropolis and rather enriched it with new monuments while reusing the ancient ones. Additionally, while the Bell Beaker Culture people emptied the Final Neolithic bodies from dolmen MVI, they kept the skulls and aligned them alongside the monuments triangular stone structure. Finally, a last sign of continuity lies in the uninterrupted making of stelae. Even though, as stated above, Bell Beaker stelae were different from those of the Final Neolithic, they were also similar in many ways, such as the depictions of anthropomorphic characters together with personal ornaments and weapons.

In light of this analysis, we argue that there was indeed a clear division between the societies of the Final Neolithic and Bell Beaker periods in Sion 'Petit-Chasseur' with regard to architecture, material culture, technological traditions, and social function. Nonetheless, Bell Beaker populations used the same necropolis and perpetuated the tradition of stela-engraving, and some researchers have claimed that these elements "*must be understood as part of a millennial tradition of respect for the site, and an intense desire to use its monumentality as a means of social validation for the community, by those who believed they were its legitimate heirs and successors.*" (Harrison and Heyd 2007, p. 185). Without going so far as this interpretation, we suggest that the people who were responsible for those consequential changes wished to establish themselves within the local traditions, while still providing their unique twist to assert their control over the site.

Data from the domestic sphere could also bring another argument to

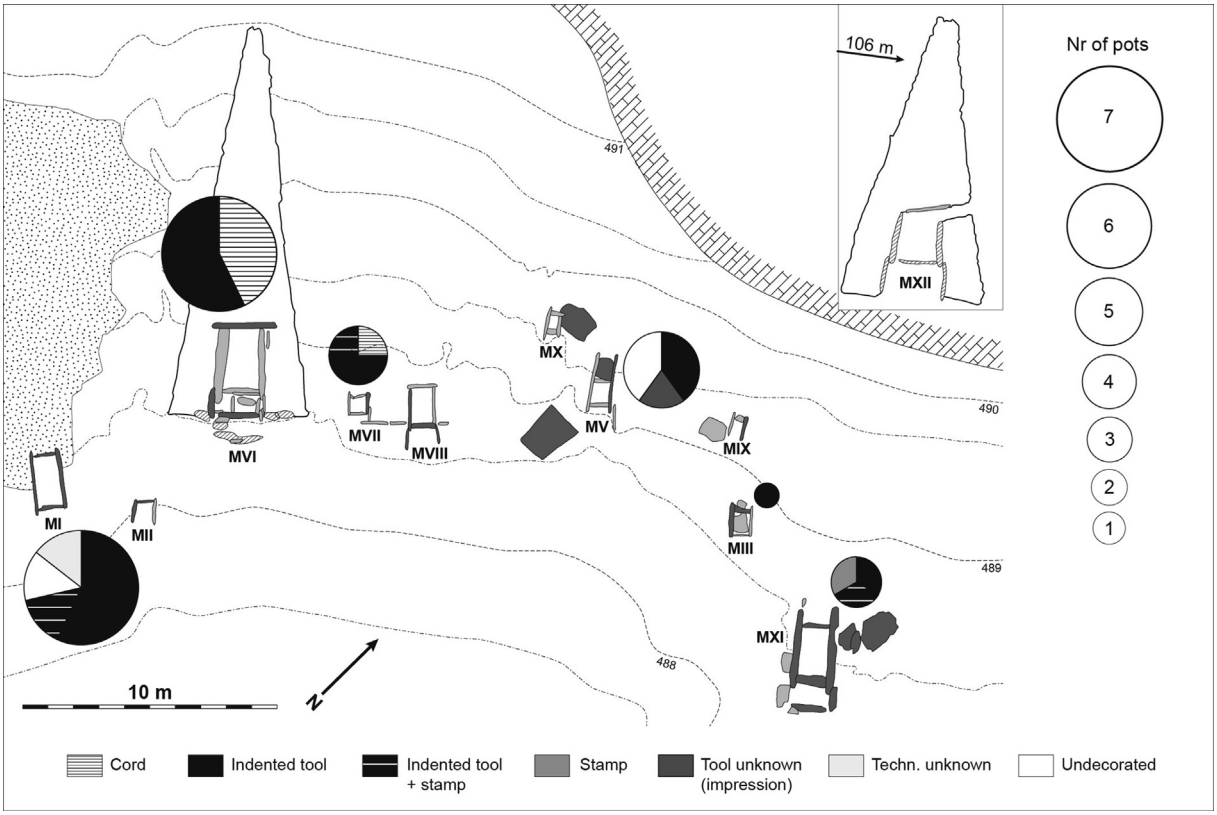


Fig. 10. Geographic distribution of the Bell Beaker vessels among the dolmens and cists of Sion 'Petit-Chasseur' (cist MXIII is not depicted**).** The pie charts indicate the decoration technique (adapted from Corboud and Curdy, 2009, p. 20).

this debate. Several Final Neolithic settlements were found in the Upper Rhône valley (Fig. 14), e.g. Sion 'Sous-le-Scex' (Honegger 2011), Bramois 'Pranoé' (Mottet et al. 2011), Sion 'La Gilière 1 & 2' (Baudais and Schmidt 1995), Savièse 'Château de la Soie' (Baudais 1995), Salgesch 'Mörderstein' (Mottet and Giozza 2005), Collombey-Muraz 'Barmaz I' (Honegger and Desideri, 2003), and Saint-Léonard 'Les Champlans' (Mottet and Giozza 2011). The first two were located in close vicinity to 'Petit-Chasseur' and were contemporary to the erection of dolmen MXII and MVI. The only occurrence of a probable continuity with the Bell Beaker period, and the only Bell Beaker settlement of the region, is at Bitsch 'Massaboden', a site yielding extremely eroded Bell Beaker levels (Meyer et al. 2012).

This scarcity of information regarding Bell Beaker settlements extends to the whole of Western Switzerland (Desideri et al. 2012; Besse et al. 2019) and is even more striking when compared to what is known for the Final Neolithic, especially in the Three-Lakes region and around Lake Geneva. Indeed, during the first half of the third millennium BC, populations living in those areas occupied lakeshores, building the

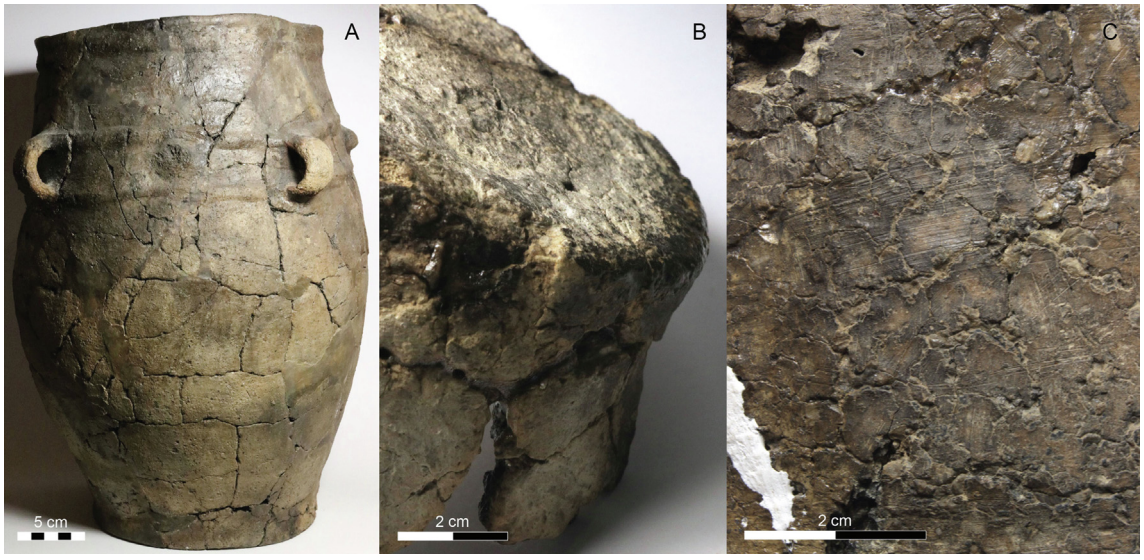


Fig. 11. Technological traces associated with the Early Bronze Age pottery from Sion 'Petit-Chasseur'. A. Horizontal breaks characteristic of the use of coiling as a primary forming technique; B. Superimposed coil join on the external surface of a jar's base; C. Striation linked to smoothing on wet paste with the addition of water.

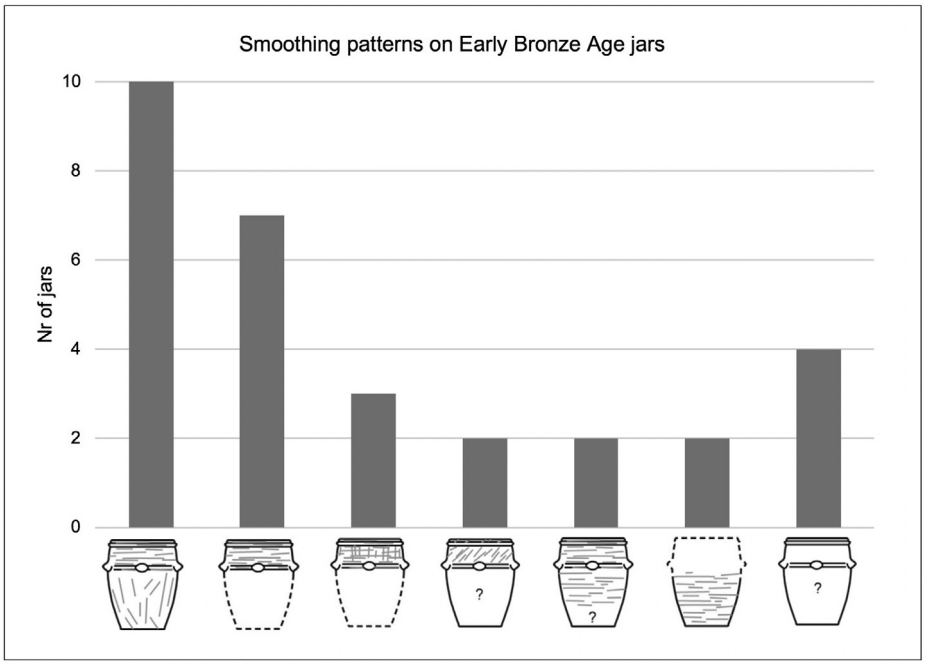


Fig. 12. Smoothing patterns on Early Bronze Age jars from Sion 'Petit-Chasseur'.

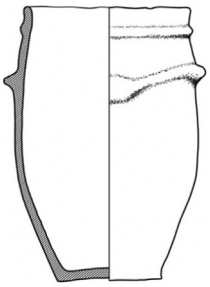
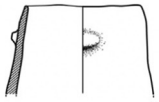
Period	Primary forming technique	Secondary forming technique	Surface treatment	Decoration technique	Nr of vases	Morphology
Early Bonze Age (2200-1600 BC)	Coiling	-	Smoothing + water	Plastic decoration	30	
Bell Beaker Culture (2450-2200 BC)	Coiling	Beating	Polishing	Impressed decoration	28	
Final Neolithic (3100-2450 BC)	Coiling	-	Smoothing	No decoration	3	

Fig. 13. Summary of the three technological traditions of the pottery from Sion 'Petit-Chasseur' (Switzerland). The last column on the right features the most prominent vessel type for each period.

renowned pile-dwellings that yielded extraordinary amounts of archaeological materials (Winiger 2008; Arnold 2011). The reasons for abandoning those villages, sometime between 2500 BC and 2200 BC, remains unknown (Mauvilly and Boisaubert 2005). The same phenomenon occurred in the French Alps, leading some researchers to believe that the water levels had probably risen and made the shores uninhabitable (Billaud and Marguet 2005, 2007). However, this hypothesis was invalidated as climatic data showed that this time span corresponded to an optimum, which would have created an environment particularly favorable to establishing settlements on lakeshores (Magny 2006). Simultaneously, settlements appeared in the hinterland, in areas that had not previously been occupied (Gallay and Baudais 1985; von Burg 2002; Mauvilly and Boisaubert 2005; Mauvilly et al. 2014).

4.2. *Bell Beaker Culture and migrations*

The presence of a culture break raises questions pertaining to cause, including whether it could be attributable to migration. Material culture gives a complex response regarding this issue, and biological anthropology brings varying interpretations as well.

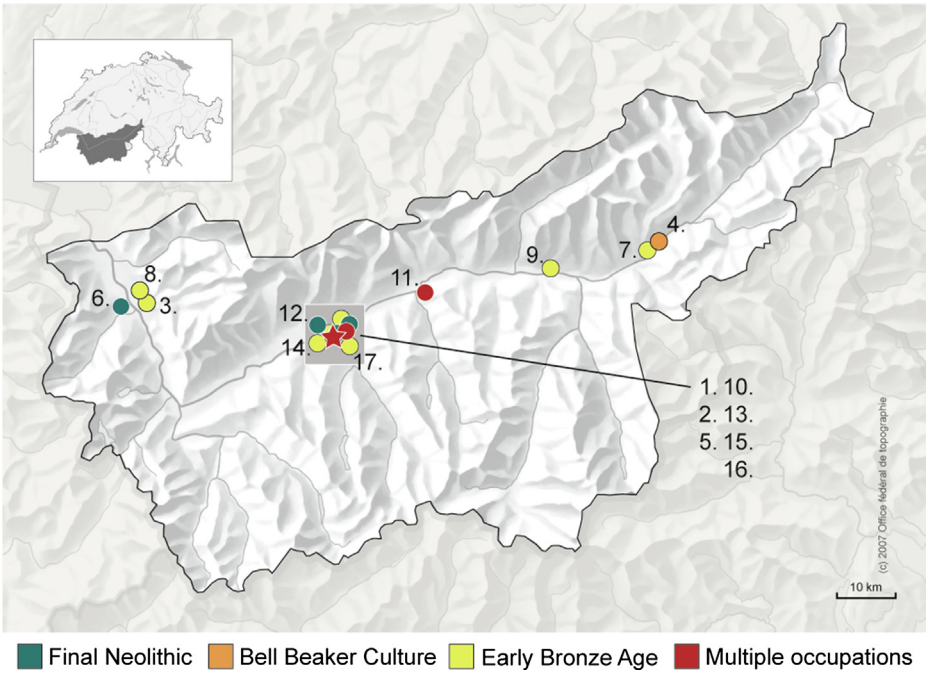


Fig. 14. Final Neolithic, Bell Beaker Culture, and Early Bronze Age settlements and necropolises in the Upper Rhône Valley (Switzerland). Star: Sion 'Petit-Chasseur' megalithic necropolis. 1. Ayent 'Le Château', 2. Ayent 'Zampon-Noale', 3. Bex 'Les Mûriers', 4. Bitsch 'Massaboden', 5. Bramois 'Pranoé', 6. Collombey-Muraz 'Barmaz I', 7. Naters 'Altersheim', 8. Ollon-Saint Triphon 'Le Lessus', 9. Rarogne 'Heidnischbühl', 10. Saint-Léonard 'Les Champlans', 11. Salgesch 'Mörderstein', 12. Savièse 'Château de la Soie', 13. Sion 'La Gillière 1 & 2', 14. Sion 'Les Maladaires', 15. Sion 'Petit-Chasseur, 16. Sion 'Sous-le-Scex', 17. Vex 'Le Château'.

4.2.1. Cultural influences on Sion 'Petit-Chasseur' Bell Beaker material culture

Sion 'Petit-Chasseur' exhibits several cultural influences with regard to archaeological material. A Bell Beaker silver ring found in dolmen MVI testifies to influences farther east in the Czech Republic and in Austria (Bocksberger 1976, vol. 2 pl. 33, 86; Besse 1996). In contrast, the funerary ritual (a collective burial) is typical of southwestern Europe, most notably southern France and northern Spain, whereas single graves are more common in the East (Besse 2003; Besse and Desideri 2005). The stelae related particularly to engravings from northern Italy, the most striking comparison residing in the specimens of Aosta 'Saint-Martin-de-Corléans' (Gallay 1995; Mezzena 1998).

4.2.2. Dental nonmetrics and strontium isotope studies

Studies of dental nonmetrics have also looked to analyze the peopling of third millennium BC western Switzerland (Desideri and Eades 2004; Desideri 2011; Desideri et al. 2012). These analyses concerned a group of 520 individuals from the same three periods, 183 of whom were part of the necropolis of Sion 'Petit-Chasseur'. It appeared that Bell Beaker individuals were partially linked to the previous Final Neolithic population, revealing a "moderate population contribution" (Desideri et al. 2012, p. 94). However, no connection could be established between the Bell Beaker and the Early Bronze Age individuals.

The study continued with another set of 1154 individuals from the Czech Republic, Hungary, southern France, and northern Spain (Desideri and Besse 2010). Swiss Bell Beaker individuals showed no connection with the ones from the eastern group but could be related to the southern domain to a certain extent.

The strontium isotope analyses performed on 23 of the Bell Beaker individuals from Sion 'Petit-Chasseur' further confirmed that 7 of them, all adult, had changed their residence area in the 10–15 years preceding their deaths (Desideri et al. 2010; Herrscher and Goude 2015).

4.2.3. aDNA studies

In the last decade, several aDNA studies focusing on large-scale migrations during European prehistory have brought important new data, especially for research on the Final Neolithic and on the transition with the Bronze Age. Studies such as those by Brotherton et al. (2013), Allentoft et al. (2015), and Haak et al. (2015) have shown that Eastern and Central Europe received an important genetic influx from the Eurasian steppe from 3000 BC onwards. They associated this Eastern influx to the arrival of a culture referred to as "Yamnaya", whose admixture with local populations likely led to the emergence of the Corded Ware Culture. At the same time, Brotherton et al. (2013) also analyzed Bell Beaker individuals from Mittelelbe-Saale in Germany and showed that they had a greater affinity with populations from the Iberian Peninsula than with previous and contemporary populations of the same region. These findings correspond with Desideri and Besse (2010) on dental nonmetrics, hinting at a West-East gene flow for the Bell Beaker period.

Many archaeologists have discussed at length these studies on aDNA (Heyd 2016; Vander Linden 2016; Heyd 2017; Kristiansen et al. 2017; Furholt 2018; Guilaine 2018). Specifically, several of them caution against interpretations based on the implicit premise of a correlation between biological and cultural identity and advocate for a renewed and more nuanced theorization of the concept of "migration" (Vander Linden 2016; Furholt 2018).

Regarding the Bell Beaker phenomenon's diffusion in particular, a recent study on 400 ancient Europeans – including 226 Bell Beaker individuals – concluded that although the latter all belonged to the Bell Beaker Culture, they sometimes displayed very different ancestry. For example, Iberian Bell Beaker populations had a genetic affinity with the previous local populations and Eastern Bell Beaker populations presented higher levels of steppe-related ancestry, as seen in the Corded Ware populations (Olalde et al. 2018). This last conclusion tempers the idea that the Bell Beaker Culture was linked to an important West-East gene flow and is in accord with previous observations made on material culture. Strahm (1998) pointed out the similarities between the Bell Beaker Culture and the Corded Ware Culture regarding funeral rites, pottery morphologies and decorations, and the use of weapons as a potential indicator of status. The Corded Ware Culture loosely dates to between 2900/2800 BC and 2400/2000 BC, with inconsistencies due to several plateaus in ^{14}C calibration curves and differences in data between the regions where it was unearthed. Its later phases were likely contemporaneous with the Bell Beaker Culture (Furholt 2003; Włodarczak, 2009; Beckerman 2015).

Another key finding from Olalde et al. (2018) was that in Britain, the advent and development of the Bell Beaker Culture coincided with a considerable population turnover, indicating the arrival of substantial groups of people from the continent bearing great percentages of

steppe-related ancestry (Olalde et al. 2018). The tombs of the 'Amesbury Archer' and of the 'Bowmen' in Boscombe Down, Amesbury, which are among the earliest examples of Bell Beaker graves in the United Kingdom, illustrate this phenomenon. Oxygen isotope analyses revealed that the majority of these individuals had recently moved, and that the archer found in the eponymous burial most probably originated from the circum-alpine region (Fitzpatrick 2011).

The latest aDNA data on 271 individuals from the Iberian Peninsula provided two noteworthy findings showing that movements of population also played a big role in this region during the third millennium BC. The first was evidence of sporadic contact with North Africa during the first half of the millennium. The second was the replacement of almost 40% of the Iberian Peninsula's ancestry by people bearing steppe-related ancestry, with a significantly higher contribution from males than females, by approximately 2000 BC (Olalde et al. 2019). The first finding would support the hypothesis for the emergence of the Bell Beaker phenomenon – or at least some of its components, like the Maritime Beaker – through the integration of North African traditions in the already highly developed societies of southern Iberia (Guilaine 2018). The second finding could indicate important population movements originating in the East during the third millennium BC, possibly in connection with the Bell Beaker Culture (Olalde et al. 2019).

Nonetheless, population influxes are not required to explain the arrival of exogenous cultural traits, as illustrated by genetic data on the peopling of Sardinia through the analysis of 43 individuals (Marcus et al. 2019). This study showed that from the Early Neolithic until the second millennium BC, there was minimal gene flow and no identifiable steppe-related ancestry. Yet, the Bell Beaker Culture reached the island during the third millennium BC and developed there like it did across Europe. No clear-cut approach can thus be taken when tackling the issue of the appearance of the Bell Beaker phenomenon and the diffusion of its cultural elements.

To conclude on this issue, we would argue that Sion 'Petit-Chasseur' – and western Switzerland in general – saw a partial renewal of its population with the emergence of the Bell Beaker Culture. However, an explanation for this biological input and arrival of new cultural and technical traits does not necessarily require mass population migration, because, as shown by Robb (2013) and Knappett and Kiriatzi (2016), the mobility of only a few individuals or small groups of people can have a lasting impact on a region.

4.3. From the Bell Beaker Culture to the Early Bronze Age

The third and final question we wish to address is whether the first Bronze Age phase blended seamlessly with the Bell Beaker Culture. As with the Bell Beaker Culture, the emergence of the Early Bronze Age seems to be the starting point of a big shift in social and symbolic practices in Western Europe. Furthermore, as we mentioned earlier, biological data hints at a curious disconnection between Bell Beaker and Early Bronze Age individuals in the necropolis of 'Petit-Chasseur'.

As previously described, pottery showed obvious indications of a shift. From a morphological standpoint, huge jars replaced small beakers and cups, with the biggest one weighing almost 7 kg and reaching a height of over 50 cm. Technological traditions changed as well, with the resurface of smoothing with water replacing beating and burnishing, and simple smooth added elements, like cordons, taking the place of complex impressed decorations. In essence, large, poor-quality vessels succeeded the highly perfected Bell Beaker vases.

These changes in pottery mirror a clear modification in the site's status. From 2200 BC, collective graves were no longer in use, and the funerary function of the necropolis decreased remarkably. In six centuries, Sion 'Petit-Chasseur' only counted 12 new burials. Dolmens MVI and MXI received a last body inside their burial chamber, cist MV received a fetus, and the adventitious cists on the western side of dolmen MXI and against MVI saw child burials. Finally, there were four single graves in the ruins of the triangular stone base of dolmen MVI and three around dolmen MXII. None of these burials contained pottery as part of the grave goods. There were jars deposited inside the dolmens and cists or in the vicinity, together with great amounts of animal remains. These deposits coincided with the construction of stone structures that differed markedly with what came before them. Those cairns were made of several levels of stones with the jars in between. The cairn filling and covering dolmen MXI yielded the vast majority of those vessels. Over the course of these six centuries, several traces of fire disseminated around the site (some inside the adventitious cists), signaling another activity that is undefined to this day.

In our view, all of these elements indicate a shift from a funerary function to a more symbolic use of Sion 'Petit-Chasseur', starting at the beginning of the Bronze Age. The pottery deposited on the site was very different from the vessels of the previous period, and probably had a very different meaning too as they were no longer part of the funerary ritual.

However, two elements point towards a continuity between the Bell Beaker and Early Bronze Age phases of Sion 'Petit-Chasseur'. The first one is the use of coiling, the same roughout technique that characterized Bell Beaker pottery. The second element relates to the site history, as people did not abandon the site for another half millennium. This demonstrates that even though the necropolis lost its importance as a burial ground, its symbolic value was still relevant, enough so that other structures developed over previous ones along with object deposition.

With this in mind, it seems reasonable to assume that there was indeed a second break in the occupation of Sion 'Petit-Chasseur', this time with the emergence of the Early Bronze Age. Some elements resemble the condemnation rituals described by Sohn (2007, 2008) for the end of the Neolithic in France, including pottery deposits and animal remains showing traces of consumption, fire, and cairns. However, these often took place over a very short period of time, unlike at 'Petit-Chasseur'. Even if we are not dealing with a condemnation ritual, we are still facing a ritual of some sort, which leaves us wondering whether the jars belonged as specific ritual offerings, not as objects *per se*, but as containers. This would partially explain the lack of investment put into their manufacturing as well as their large capacities.

4.4. Potters, learning networks, and technological disruptions through time

We therefore identify two discontinuities in pottery technological traditions at 'Petit-Chasseur': the first between the Valaisian Final Neolithic and the Bell Beaker Culture, and the second between the Bell Beaker Culture and the Early Bronze Age. The history of the site brings many elements confirming this analysis, and the archaeological context suggests that at least one of these discontinuities also contained a biological input. Altogether, this would indicate that potters belonging to different learning networks from one period to the next manufactured the vessels deposited in the necropolis. It would thus signify a disruption in knowledge transmission between these producers, and it could even be possible that there was no relation between the Bell Beaker potters and their Final Neolithic predecessors.

As to the causes of these discontinuities in pottery technology, ethnographic and archaeological studies point out several possibilities (Knappett and Kiriatzi 2016) including the mobility of individuals through matrimonial networks (Gallay and De Ceuninck 2003; Gosselain 2008a), the travels of specialized potters (Boileau 2005), and displacement driven by conflict (Cameron 2011).

The notion of conflicts impacting the operational sequence of pottery is not uncommon (Berg 2018). This could explain the disruption between the Final Neolithic and Bell Beaker phases of 'Petit-Chasseur' particularly well, as it was accompanied by signs of a contestation of the local power, e.g. through stelae iconography and appropriation of funerary monuments and by a partial biological renewal. It is very probable that archery played an important role in this evolution. Indeed, analyses combining grave goods and biological data suggest that

Bell Beaker societies had a warrior class of specialized archers (Sarauw 2007; Lemercier 2011; Liesau von Lettow-Vorbeck et al. 2014; Salanova 2016; Ryan et al. 2018). Sion 'Petit-Chasseur' would not be an exception, with its depictions of bows and arrows appearing on stelae during the Bell Beaker period and the barbed and tanged arrowheads discovered in many burials.

5. Conclusion

Ultimately, when put back in context, the new data on the pottery assemblages from Sion 'Petit-Chasseur' (Valais) presented here validates the idea that the site was subjected to major modifications throughout its occupation, both in terms of function and use.

We thus conclude that a significant break in pottery traditions happened with the emergence of the Bell Beaker Culture. As strontium isotope analyses previously suggested (Desideri et al. 2010), this break was most probably linked to the arrival of foreigners, either a few individuals or a larger group, whose geographical origin remains unclear. This break appeared side-by-side with several elements of continuity, such as the ongoing use of the necropolis itself and the engraving of new stelae following the general model of those from the Final Neolithic. They indicate a particular desire of the new occupants to establish themselves locally, within the preexisting traditions. The anthropomorphic stelae especially emphasize the symbolic elements, with depictions of personal ornaments and weapons, as well as rich geometric engravings probably referring to patterned clothing. It is worth nothing that previous researchers have already hypothesized that the Bell Beaker population could have wanted to legitimize a new power through the appropriation of the necropolis and of its social and symbolic codes (Gallay 1995; Harrison and Heyd 2007).

Another important social and symbolic shift happened between the Bell Beaker Culture and the Early Bronze Age: the collective burial ritual disappeared along with the stelae and their symbols. However, the memory of the site and its importance remained as its use continued for the next several centuries in what can be seen as a form of ritual use. While each cultural occupation of Sion "Petit-Chasseur" distinguished itself from those that came before, the site itself never lost its prominence.

To conclude, our findings support the theories that argue for the existence of large-scale modifications during the third millennium BC in Western Europe, including an important cultural and symbolic shift around the emergence of the Bell Beaker Culture and of the Early Bronze Age. The specific data collected on the pottery from Sion 'Petit-Chasseur' (Valais) showed that this shift was, at least in Western Switzerland, linked to several exogenous components.

CRediT authorship contribution statement

Eve Derenne: Funding acquisition, Conceptualization, Methodology, Investigation, Formal analysis, Visualization, Writing - original draft, Writing - review & editing. **Vincent Ard:** Conceptualization, Methodology, Validation, Writing - review & editing. **Marie Besse:** Funding acquisition, Supervision, Project administration, Conceptualization, Writing - review & editing.

Declaration of Competing Interest

None.

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