The Bell Beaker Transition in Europe

MOBILITY AND LOCAL EVOLUTION DURING THE 3RD MILLENNIUM BC

Edited by Maria Pilar Prieto Martinez and Laure Salanova

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Front cover: All Over Cord Beaker from Bathgate, West Lothian, Scotland. Photo: © National Museums Scotland
Back cover: Cushion stones, gold ornaments and Beaker pottery in the artificial cave of São Pedro do Estoril, Portugal (Blech et al. 2001, pl. 70b; © P. Witte, Deutsches Archäologisches Institut, Madrid)

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PREFACE

Maria Pilar Prieto Martínez and Laure Salanova

This volume brings together 17 carefully selected articles, written by 43 researchers, who presented an initial form of their projects during the 15th International Bell Beaker Conference "From Atlantic to Ural", organised in May 2011 in Poio (Spain) by the University of Santiago Compostela and the French National Centre for Scientific Research (CNRS).

Could the circulation of objects or ideas and the mobility of artisans explain the unprecedented uniformity of the material culture observed throughout the whole of Europe? This was the basic theme of the 15th International Bell Beaker Conference, where 60 contributions were presented. The successful attendance and the quality of the projects that were presented during the conference suggested a publication. One volume was published in 2013, grouping together 20 papers that mainly concerned new excavations or item analyses (Prieto Martínez and Salanova 2013). The second volume presented here contains more synthetic overviews. The papers were selected for their major interest in the Bell Beaker phenomenon in Europe and for the different perspectives they offer. Indeed, Bell Beaker pottery is no longer the main protagonist of the current studies, which are henceforth focused on social groups (craft specialists, warriors, chiefs, extended or nuclear families), using technological studies and physical anthropology to understand the mobility patterns during the 3rd millennium BC. Chronological evolution is used to reconstruct the rhythm of the Bell Beaker diffusion and the environmental background that could explain this mobility and the socio-economic changes observed during this period of transition toward Bronze Age societies.

The chapters are mainly organised geographically, as the archaeological data and the research traditions are different according to European countries. We begin with eastern Europe and continue through to the Mediterranean shores and finish with the Atlantic coast of the Iberian Peninsula. This volume includes some of the areas that are traditionally studied and well known, such as France, the British Isles or central Europe, and also includes areas that have so far been considered peripheral, such as Norway, Denmark or Galicia, which are usually absent from summaries on Bell Beakers. This journey not only offers a complex and diverse image of Bell Beaker societies but also of a supra-regional structure that articulated a new type of society on an unprecedented scale.

In the first chapter, **A. Falileyev** discusses the Bell Beaker relationship with Indo-European linguistics. Using different theories, he presents the problems that arise when associating speakers of Indo-European and Celtic languages with archaeological remains. He highlights the fact that the latest research points towards the coherence of the existence of multilingualism (using both Indo-European and non-Indo-European languages) amongst the Beaker Folk. However, this recent research poses more questions than it answers, together with the need to continue comparing archaeology and linguistics. If this dimension is not easily elucidated, how to reach the other dimensions of the Bell Beaker phenomenon?

In her anthropological study, **E. Haduch** demonstrates that the Bell Beaker populations from the Little Poland Upland show uniformity in their morphological features and proportions, which are clearer in the male population than the female one. Their anthropological characteristics obviously differ from the local Corded Ware Culture populations and the Early Bronze Age group of the Mierzanowice culture, leading to the conclusion that Bell Beaker groups are allochthonous. This work confirms the results obtained in other regions of eastern and central Europe, where the

appearance of Bell Beakers seems to be clearly linked with the arrival of foreign groups (Price *et al.* 1988; Desideri 2011). Why did these groups move during the 3rd millennium BC? Who were they?

Based on a study of grave goods and the spatial organisation of cemeteries between the Oder and Vistula rivers, **P. Makarowicz** highlights social and gender structures of adult burials. The number of graves in each cemetery (10–15), organised in rows, could suggest nuclear families. Nevertheless, the composition of the grave good assemblages in each grave reveals some differences that go beyond age or gender, demonstrating an inequality that was institutionalised in a hierarchy of positions based on prestige and dominance, a typical feature of a chiefdom-based society.

In his technological approach to the wrist-guards found in the individual graves from central Europe, **J. Turek** proposes the same differences, even among the archer graves, as some raw materials are more frequently associated with the richest burials. In contrast to some pieces from western Europe (Salanova and Sohn 2007), the wrist-guards from central Europe never present use-wear, suggesting a symbolic role of these objects as an adornment and also a ceremonial significance in relation to warfare and Bell Beaker ideology.

There is also the abundance of weaponry elements that distinguish the British grave from Amesbury (UK). **A. Fitzpatrick** explores the possible origins of this Bell Beaker grave and those associated with it. Isotopic analysis conducted on human teeth from the Boscombe Bowmen and the Amesbury Archer and Companion site point to the existence of multiple areas, but all are definitely from the Continent. Such richly supplied graves are often associated with metalworking activities. A. Fitzpatrick therefore suggests the mobility of small groups along the coasts from the Atlantic to the North Sea in relation with mining activities. In contrast to Mediterranean regions, where metallurgy is known before the appearance of the Bell Beakers, metalworking is considered a key factor to explain the expansion of the Bell Beakers in the British Isles.

The chronology and the rhythm of this expansion still challenged the interpretation of the Bell Beaker phenomenon. The statistical analysis of stylistic changes developed by **J. Müller, M. Hinz** and **M. Ullrich** on the Rhine-Main-Neckar Bell Beaker group in southern Germany fills an important gap. The three stages identified for the development of the Bell Beakers in this region (2600–2380/2330–2230/2220–2000 BC) is consistent with the chronology of the neighbouring regions (Salanova 2011), defining constant cycles of 150–200 years, the "social time" associated with the communication structures of societies without a written language which is, in fact, the type of social memory identified through the transformations of pottery styles. In this sense, the authors consider the Bell Beaker network to be a spatial link between different societies rather than a new quality of stratification.

Nevertheless, in the northern border of the Bell Beaker expansion, the impact seems to be deeper. It corresponds with a phase of settlement expansion and with the introduction of long-houses in southern Scandinavia, a symbol of the new ideological and socio-political institutions that supported the appearance of aristocratic families who consolidated their power by establishing new long-distance networks. This is the underlying idea of **M. Artursson**. This new social and political order ("house-based society") that developed in Bell Beaker times represents the foundation of the classical Scandinavian Bronze Age culture, with a greater concentration of power and social stratification.

The same important transformations occurred from 2400 cal BC in Norway, as analysed by **C. Prescott and H. Glørstad** who postulate that the Bell Beaker phenomenon was the driving force behind the rapid changes documented in the middle of the 3rd millennium, a dynamic and essential period for the history of the region. The change from hunter-gatherer societies to agricultural and livestock-based societies, with the first evidence of metallurgy, in possibly just a single generation is one of the most dramatic changes considered to have taken place on the Norwegian coast, after the arrival of small groups from the Continent.

It is more difficult to detect the impact of Bell Beakers in the Mediterranean regions. For south-east France, **J. Cauliez** proposes a viewpoint from the receiving cultures, with the dispersion of the Bell Beaker in this region accompanied by small changes in the structures of society. The major changes are indeed identified in a previous stage, with Italian influences. Consequently, the appearance of the Bell Beakers does not mark a particular break, and some aspects of these societies, such as material culture, evolve in continuity until the Bronze Age. The author suggests a scenario that contrasts with those that have been proposed and have interpreted Bell Beakers to be the result of colonisation following the development of autonomous cultures by acculturation (Gallay 1986; Lemercier 2004). This new scenario gives priority to processes of co-existence instead of resistance and competition with autochthonous groups and reciprocal acculturation.

Before the full development of Bell Beakers in Europe, long-distance networks already existed, diffusing mainly flint items (blades and daggers). The article from **E. Ihuel, N. Mallet, J. Pelegrin** and **C. Verjux** explains how the circulation of flint daggers from Grand-Pressigny (western France) was organised over long distances between 2800 and 2400 cal. BC, extending up to the north of Germany. This laminar tradition seems to have had some cultural value, as for several centuries it was opposed to the neighbouring production areas where flint daggers were made, i.e., in the south of France, north of Italy and Scandinavia. The peak moment for exports is detected in the middle of the

3rd millennium BC, and this network ended with the full development of Bell Beakers, except in Brittany where Pressignian flint is used during the Early Bronze Age for prestigious arrowheads.

C. Rodríguez Rellán, A. Morgado Rodríguez, J. A. Lozano and **F. Rodríguez Tovar** identified the same long-distance exchanges in north-west Iberia. The petrographical analysis of a flint blade from the barrow of Chan de Armada in the province of Pontevedra (Galicia) has demonstrated that the raw material originated in Andalusia. As a result of this study, the nature and existence of long-distance contacts between Galicia and other parts of the Iberian Peninsula and Europe is discussed, proposing two arrival points in the north-west of the Peninsula, and a possible relationship with Brittany associated with the circulation of pottery styles, variscite or jadeite axes before Bell Beakers.

These flint exchange networks, which end with Bell Beakers, are rapidly replaced by metal-item circulation that developed on a broad scale. This is clearly illustrated by the article from **B. Ambruster** and **B. Comendador Rey**, which addresses early gold technology as an indicator of long-distance circulations in Atlantic Europe. The typology of these small gold objects, mainly found in burial contexts associated with Bell Beaker pottery, is quite homogeneous from southern Portugal to northern Scotland. These pieces are interpreted as having a ritual and social function, as symbols of status and power. The homogeneity of the technological know-how reflects not only the circulation of items but also the contact and exchange at the inter-regional level of craft specialists, as was also proposed for some Beakers (Prieto Martínez and Salanova 2009).

This increased mobility from the middle of the 3rd millennium BC took place during a particular environmental episode. The article from **M. Costa Casais, L. López Merino, J. Kaal** and **A. Martínez Cortizas** explains the environmental changes that occurred during this period in north-west Iberia. Based on information from different disciplines, it reveals a landscape that was already strongly influenced by human activities, recording one of the most intense alterations that occurred during prehistory. The authors highlight the fact that one of the most important environmental aspects of the Bell Beaker period is that it coincides with one of the coldest phases of the Neoglaciation, ca. 2800–1300 BC, which was a little warmer at 2000–1600 BC and was damper than subsequent or previous periods. This climatic event, soil erosion and increasing human pressure could explain the opening of new circulation roads but could have also triggered a greater demand in land appropriation, even in previously unsettled areas.

In the middle Ebro valley, **S. Pérez Díaz** and **J. A. López Sáez** have identified changes similar to those detected in Galicia, using pollen analysis of several rock shelters. This analysis reveals deforestation, evidence of erosion and fires, as well as intensification of farming activities in regions where it was not practised before, such as in settlements at higher altitude. This situation is not specific to northern Spain. For instance, carpological and anthropological analysis in northern Italy have also demonstrated an increase in deforestation and in woodland exploitation during Bell Beaker times (Castiglioni *et al.* 2008).

The article by **E. Guerra Doce, F. J. Abarquero Moras, G. Delibes de Castro, A. L. Palomino** and **J. del Val Recio** refers to another element of the economic activities during the second half of the 3rd millennium: salt production. It explores the hypothesis of Bell Beaker pottery as a symbolic marker of property rights in contexts associated with salt production in the Spanish tablelands. This hypothesis is based on restricted access to the minerals that were exploited in the area and the abundant presence of special material evidence. Indeed, the excavation at Molino Sanchón II (Zamora) provided evidence of salt production, starting around the second half of the 3rd millennium BC, that was clearly associated with a large amount of Bell-Beaker pottery, which has been recorded around salt processing areas.

On the Mediterranean coast of Valencia (Eastern Spain), **O. García Puchol, J. Bernabeu Aubán, L. Molina Balaguer, Y. Carrión Marco, G. Pérez Jordá** and **M. Gómez Puche** present the important site of La Vital, with the problematic issue of domestic space in relation to metalworking activities and burials with Bell Beaker standard grave goods. As A. Fitzpatrick considered for the British Isles, the authors consider that metalworking is a decisive factor for understanding the social dynamics between sites during the 3rd millennium cal BC in this region of Spain. Based on the economic evidence compiled from funerary and domestic spaces, they reveal changes that took place from 2300 onwards, precisely at the end of the Bell Beaker occupation of La Vital. After 2300 cal. BC, the settlement patterns changed, with new implantation at higher altitudes, the disappearance of large storage pits in the settlements indicating modifications in economic behaviours, as well as long-distance exchanges that seem to decrease.

All the articles of the present volume underline changes at social and economic levels, that occurred in different parts of Europe with the appearance of Bell Beakers, a period of transition with elements of continuities but which already foreshadows the basis of the classic European Bronze Age. This transition is also perceptible at a symbolic level, the burial contexts, as illustrated by the last article from **P. Vázquez Liz, L. Nonat** and **M. P. Prieto Martínez** dealing with the funerary world in the north-west Iberian Peninsula during the 3rd and 2nd millennia BC. This article offers a chronological proposal associated with the types of grave architecture, the grave goods they contain and radiocarbon information that has been published to date. A total of four funerary models has been identified for the period, showing

a greater flexibility in the choice of the architecture for the dead, including reused barrows, *ex novo* barrows, cists and pits. The authors show how the variety of funerary construction solutions and the tendency towards individual burial is a progressive but not a linear process in this region. This diversity in burial choices is shared by all the regions of the Atlantic part of the Bell Beaker expansion (Salanova and Tchérémissinoff 2011; Fitzpatrick this volume) and most likely reflects an unstable social and political situation during this period (Müller *et al.* this volume).

Due to its complexity and widespread nature, the Bell Beaker phenomenon has been the subject of numerous studies, analyses and documents. In concluding this introduction, we can firmly state that the sites from the 3rd millennium BC offer a dynamic archaeological record and, due to their great potential, will continue to offer new perspectives for study in the coming years, especially with regard to the environmental and economic aspects that are still missing in several parts of Europe. We hope that this volume makes a significant contribution towards extending and completing our knowledge of this historical stage, a moment of major changes and innovations that occurred 5000 years ago.

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We would like to take this opportunity to remember all of the individuals and institutions who ensured the successful completion of the Conference and without whom we could not have produced the final text presented in this volume: the *Archéologie et Gobelets* Association; the Wenner Gren Foundation, thanks to which it was possible to support 35 researchers from all over Europe; the Spanish Ministry of the Economy and Competitiveness, through the project titled *Bell Beaker International Conference: From Atlantic to Ural* (2010, HAR2010-11670- E) financed a significant part of the infrastructure used in the conference; the Local Council of Poio and the Landowners' Association of Pontevedra financed the transportation used throughout the whole of the conference, as well as the opening and closing dinners. Finally, we are also grateful for the equally helpful collaboration of the other institutions involved in organising the conference: the District Council of Pontevedra, Bodegas Martín Codax, the Regional Ministry of Culture and Tourism of the Xunta de Galicia, the Municipality of Campo Lameiro, Monastery of Poio, Rías Baixas Tourist Department, Pontevedra Museum, San Antón Museum, the District Council of A Coruña, and the Novas Rías bus company.

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1

INTRODUCTION. A FOLK WHO WILL NEVER SPEAK: BELL BEAKERS AND LINGUISTICS

Alexander Falileyev

This will be a mostly unexpected contribution to this splendid volume. First of all, it is intended to discuss some aspects of the Bell Beaker problem from a completely different angle: from the point of view of comparative and indeed Indo-European linguistics. It is widely known, of course, that some archaeologists do pay attention to the problems of identifications of the Beaker Folk with the speakers of this or that language or proto-language in European prehistory, and various suggestions are available. They are, however, normally criticised, sometimes heavily, by linguists and even by some archaeologists. In this respect my approach to this set of questions seems to be again unexpected, as I am of the opinion that nearly all of these suggestions are allowable, or at least, tolerable. The real problem here lies rather in the field of comparative linguistics, not archaeology. It should be reminded that we, linguists, do not normally do dates, to use the title of the article by A. and R. McMahon which is surely known to prehistorians, as it was published in one of the McDonald Institute monographs (McMahon and McMahon 2006). This makes any chronological association of the speakers of a language with a set of archaeological facts in prehistory effectively impossible. There are some other drawbacks in the study of languages and their relationships in early Europe, which affect these identifications, and I will address some of these issues below. At the moment two linguistic associations of the Beaker Folk are popular at least among some archaeologists and linguists. First I will offer some brief comments on the subject "Old Europeans" (in terms of the theory of H. Krahe, not of M. Gimbutas) and the *Phenomenon*, and then I will turn to the notoriously ever-lasting identification of the Bell Beakers and the Celts.

Old European (*Alteuropäisch*) is the term introduced by Hans Krahe for the language of the oldest reconstructed stratum of European river names in Central and Western Europe. According to Krahe and his follower, these hydronyms show pre-Germanic, pre-Italic, pre-Baltic and pre-Celtic features. The geographical distribution of these names to a great extent coincides with that of Bell Beaker finds, and it is not surprising, therefore, that these two notions have been associated. We find this association in the works of archaeologists and linguists alike. Thus, to quote from G. Clark and S. Piggott (1970, 289):

> "the distribution of river-names belonging to the non-Celtic but Indo-European substrate language (…), present not only in continental Europe but also in Britain and Ireland, would be best explained by referring them to the folk movements involved in the Bell Beaker reflux".

Similar ideas are expressed by linguists. As P. Kitson (1996, 103–4) maintains,

> "Bell-beakers are in fact the *only* archaeological phenomenon of any period of prehistory with a comparably wide spread to that of river-names in the western half of Europe. The presumption must I think be that Beaker Folk were the vector of *alteuropäisch* river-names to most of Western Europe"

Taking into account the place this conference was held, it will not be inappropriate to note that Professor Javier De Hoz, in an article considering the processes of Indo-Europeanization of Spain and published by the University of Santiago de Compostela, admits that such an assumption is not impossible (De Hoz 2009, 15).

Indeed, in theory, a correlation between the Bell Beaker phenomenon and the speakers of *Old European* is not unfeasible. However, the linguistic side of this comparison is really problematic. To start with, the date which has been posited for "Old European" varies. Thus, according to the classical approach of H. Krahe, it should be dated back to ca. 1500; but if we are to follow W. P. Schmid,

"Old European" river-names belong to a much earlier date, prior to the differentiation of the IE languages; and an even more complicated scheme is offered by Vyach Ivanov and T. Gamkrelidze. On top of that, these scholars (and some others, see for instance Zvelebil 1995, 191–192 for an "Old European" continuum in the Danube basin in 4500–3500 BC) may have different views on the geographical distribution of the data. These rather contradictive approaches to the problem of *Alteuropäisch* have usefully been surveyed by N. Sukhachev (2007, 101–117), where further references are provided. Therefore, there is no evident consensus among linguists regarding the time of "Old European" (cf. also Häusler 1995, 225), which already makes an association of it with the Bell Beaker phenomenon problematic. Yet another problem here is the matter of space: even in the classical presentations of the Old European theory the border of the area seems to be stretching eastwards far beyond that of Bell Beakers. Of course, this archaeological area is constantly being widened, and the papers by T. Demcenco, V. Heyd and C. Prescott presented at the conference are very illustrative in this respect. However, the area where *Alteuropäisch* hydronymy is found, say, in Eastern Europe, will be hardly associated with the phenomenon even in the distant future. Thus, Old European river-names, according to some scholars, are attested in Finland (see Nuutinen 1992, 135–137 with further references). It is worth noting that these are associated with the Battle-Axe culture (Nuutinen 1992, 135).

Apart from that, the very concept of *Alteuropäisch* is a problem in its own right: text-books on Indo-European linguistics do not normally consider this postulated stage in the history of the Indo-European languages, and many scholars working with the river-names prefer to analyse them as coined in the locally used language(s) (or extinct idioms) rather than to refer to the putative notion of "Old European". See, in this respect, G. R. Isaac's work on the ancient hydronymy of modern Scotland (Isaac 2005) or, to take another edge of the continent, the research by S. Yanakijeva who argues that there is no need to use the label *Alteuropäisch* in a discussion of the river-names in ancient Thrace (Yanakijeva 2009, 183). On a methodological level it may be considered that, according to N. Sukhachev (2007, 117):

> interpretations, offered for "Old European" by H. Krahe, W. P. Schmid, T. V. Gamkrelidze and Vyach. Vs. Ivanov are based on different concepts of "pre-history" and reflect on incompatible cultural and historical reconstructions; the linguistic argument is secondary,

and according to G. R. Isaac (2005, 190):

> "Old European" was invoked as a *deus ex machina* theory in the past to solve problems which, I believe, have been shown by later research not to be the problems at all.

Needless to say, the concept, notwithstanding the efforts of its critics, still has its adherents. It seems that the problem of *Alteuropäisch* should be freshly addressed in a systematic and comprehensive manner to revisit the essence of this model and the relevance of its manifestations. Therefore, for the time being, a reference to "Old European" in a discussion of Bell Beaker linguistic attribution by default raises more questions than it intends to answer.

As known, the very existence of the Celts in prehistory is the focus of a debate lasting for the past two decades. A "Celtosceptic" approach, also known as "New Celtic" (e.g. Collis 2010) denies it, while for linguists the reality is that a form of Celtic was spoken in prehistory, whatever the pots these people were using. This range of question has been comprehensively surveyed by S. Rodway (2010) and I will just remark that the word "Celt" below denotes a speaker of a Celtic language.

The association of the Bell Beaker Folk with the ancient speakers of Celtic is already traditional. We find it in the works of Celtic linguists and historians and Bell Beaker archaeologists. This approach has triggered consequences. Thus, the identification was adopted, although somewhat reluctantly, in very influential *The Celtic Realms* by Nora Chadwick and Myles Dillon (1967, 18–19), and is still alive and well in a number of recent publications on various Celtic linguistic matters. A more elaborate association of the *Folk* or, rather, *Phenomenon*, with the Celts comes from the camp of archaeologists. Thus, at the 1998 Beaker Congress Professor A. Gallay (2001) sought to show that the Pre-Celts and Pre-Italics emerged from the complex of Bell-Beaker setting (Fig. 1.1).

Nearly a decade later Professor Patrice Brun (2006, 30) addressed this subject, but from a different standpoint:

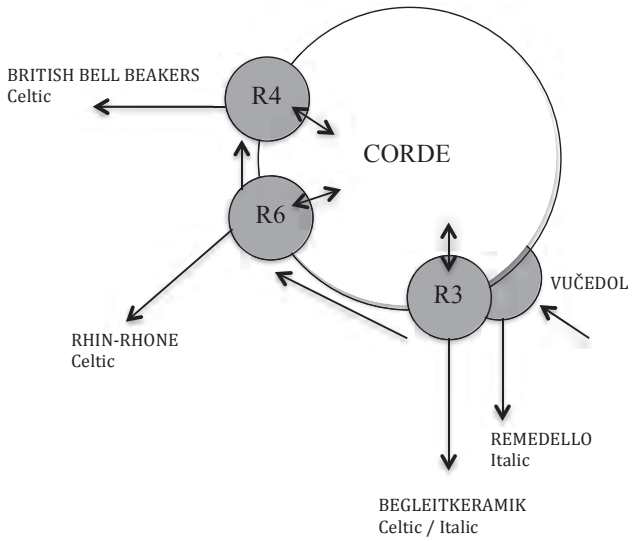

Fig. 1.1. Pre-Celts and Pre-Italics in Bell-Beaker setting according to A. Gallay (2001).

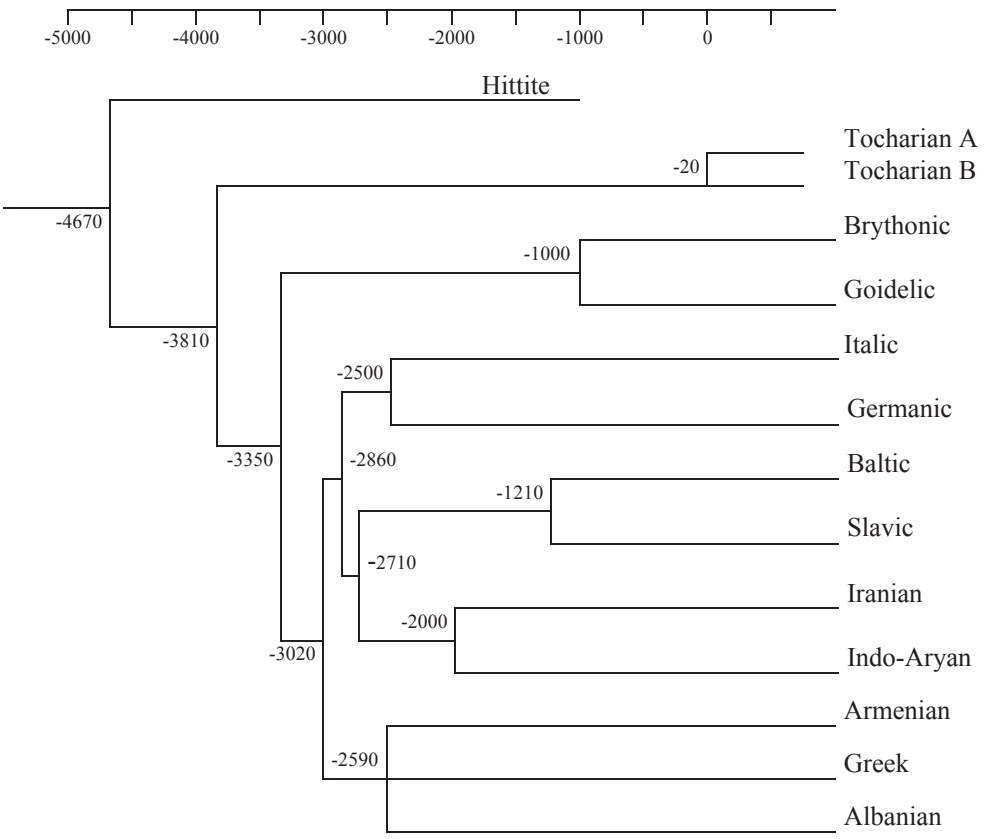

Fig. 1.2. Indo-European languages: glottochronological scheme of S. Starostin (Blažek 2007).

> Since there is no evidence that the regions of Western Europe where Celtic languages are still spoken today became Celtic after 1600 BC, they must have become so at an earlier date. Before 1600 BC, the only time when the zones which gave rise to the north-Alpine and Atlantic complexes shared similar material and structural characteristics was the second half of the 3rd millennium BC. This was the well-known Bell Beaker "package". Linking all the regions where a Celtic language was later to be spoken, this community represents a unique situation.

Similar views, varying in sometimes valuable detail, have been expressed by archaeologists dealing with the Celtic problem (see for instance Lorrio 2006, 50, with further references). These associations of the Bell Beaker Folk with the speakers of an early form of Celtic (or proto-Celtic) may be of course possible, and again it is comparative linguistics that hinders this equation. There are a lot of problems here, and these could be summarised as follows.

First, there is – once again – the matter of chronology: there is a continuous dispute on the dating of the Common Celtic, ancestor of the modern and ancient Celtic languages, and there is no tool which can provide a universally accepted dating. As linguists know, the only branch of the discipline which operates with absolute chronology is the so-called glottochronology, a part of lexicostatistics which deals with chronological relationship between languages. A look at the results of the most recent research indicates that glottochronology, in its latest model, labelled "calibrated" (linguists are learning from archaeologists!), dates the split of Common Celtic, that is the time when it started diverging into its branches, to 1100 BC. According to the same methodology, created by M. Swadesh and creatively elaborated by S. Starostin, the emergence of Common Celtic out of the continuity of other IE dialects (after pre-Hittite and pre-Tocharian were materialised) should be dated to the period 3350–3020 BC (Blažek 2007, see Figs 1.2 and 1.3). This gives us a span of at least two millennia, 3350–1100 BC, and chronologically the Beaker Folk fit here perfectly.

The problem is that many historical linguists tend to consider this method with extreme caution. There is an ongoing argument on the validity of glottochronology, an issue I will not discuss here. Instead it will be suffice to mention a following paradox. Some linguists argue that a Celtic language was introduced to Ireland in the Late Bronze Age. An alternative view is that it appeared on the Emerald Island only in the earliest centuries of the new era (see further references in Sims-Williams 2012). There are also other datings in between, of course. These views, based on purely linguistic observations in conjunction with some

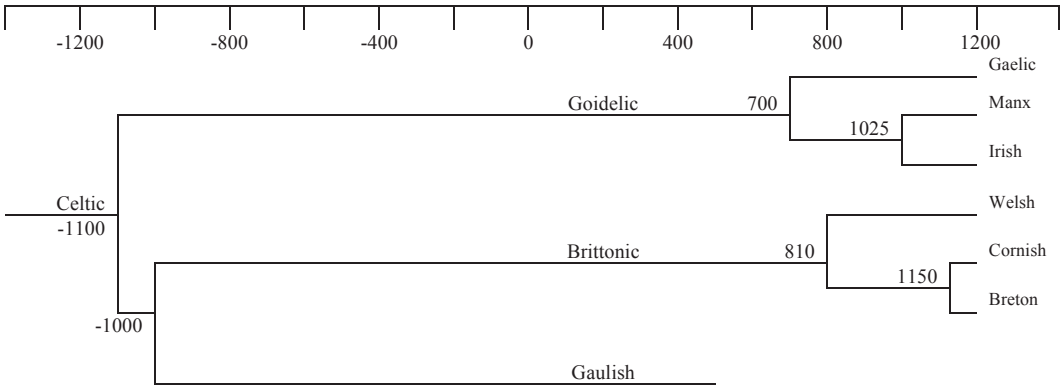

Fig. 1.3. Celtic languages: glottochronological scheme of S. Starostin (Blažek 2007).

historical (sometimes archaeological) facts, are accepted by some linguists and rejected by others. However, the very fact of such a chronological divergence seems to speak for itself. It should be stressed that these observations could not, in fact, compromise a possible chronological comparability of the Common Celtic linguistic period and the Bell Beaker age. Yet this possible chronological contemporaneity does not by default equate the speakers of the language with the people or peoples responsible for the Beaker Package.

The second point to be raised here is purely linguistic again, and concerns the relationship of Common Celtic with other early Indo-European dialects. In the scheme of S. Starostin we can see that Celtic was the third branch after Hittite and Tocharian to separate from the Indo-European continuity. In this Starostin agrees with the model presented by D. Ringe *et al.* (2002), but there are also other schemes available, e.g., by E. Hamp, T. Gamkrelidze and Vjach. Ivanov (see references in Blažek 2007), and these place Celtic in a different position of this hypothetical tree. Needless to note that the validity of the schemes has been questioned for a long time, and other approaches to the formation of the proto-groups of IE languages are available. Moreover, in recent years, and this is not reflected in any of the existing diagrams, a new theory has been offered. Professor K. H. Schmidt (1996) claims that Proto-Celtic, traditionally taken as a Western IE language, has an important set of traditionally Eastern IE linguistic features. Schmidt (1996, 22–26) lists several joint innovations which connect Celtic with the Eastern IE idioms, namely the inflected relative pronoun **ios* (Indo-Iranian, Greek, Slavic, Phrygian, and Celtic), desiderative formations with reduplication and a thematically inflected *s*-stem (Celtic and Indo-Iranian), and future in **-sje-/-sjo-* (Celtic, Indo-Iranian, Baltic, Slavic, and possibly Greek). The expansion of productivity of the sigmatic aorist (Slavic, Indo-Iranian, Greek, and Celtic) has also been added to this list (Isaac 2010, references). This theory is of importance as it, in fact, reconsiders the areal configuration of early IE dialects. Following this theory, the Italo-Celtic linguistic, and hence historical unity, advocated by the majority of Indo-European linguists and some scholars of comparative Celtic studies, turns into another myth of the discipline. It does not reject later pre-historic contacts between the speakers of Celtic and Italic, of course, which may allow to elucidate features, shared between the two groups of languages. However, with this model any connection of the speakers of Celtic with the Bell Beakers phenomenon becomes chronologically (and perhaps geographically) irrelevant – thus, according to Isaac (2010, 164), speakers of Pre- or Common Celtic were in the east ca. 2000 BC and therefore could not be involved in the historical processes happening in Western (and Central) Europe. In addition, if this theory is to be accepted, a search for the common ancestral landscape shared by pre-Celts and pre-Italics turns to be inappropriate.

Schmidt's theory has been accepted and elaborated by some scholars (cf. Isaac 2010 and the bibliography cited there) and openly doubted by others (see references in Sims-Williams 2012). I am not going to discuss it here (some comments are offered in Falileyev and Kocharov 2012), and at this point it will be probably suffice to remark that Indo-European cladistics, not unlike IE chronology, is a subject of lasting discussions, very well summarised by J. P. T. Clackson (2007, 9–15). Moreover, a very pessimistic, although balanced, view on this aspect of Indo-European studies perhaps really betrays the modern state of affairs:

> We cannot regard IE "sub-groups" as sub-groups in a classical sense. Rather, the loss or "pruning" of intermediate dialects, together with convergence *in situ* among the dialects that were to become Greek, Italic, Celtic and so on, have in tandem created the appearance of a tree with discrete branches. But the true historical filiation of the IE family is unknown and perhaps unknowable (Garrett 2006, 143).

All these reservations and sceptical comments were known to the authors and propagandists of the so-called "Celts from the West" theory, which also deserves some comments within this discussion. The earlier suggestion of B. Cunliffe

that Celtic goes back to a pidgin spoken in Early Bronze Age Atlantic Europe has been sharply criticised, particularly by Indo-European and Celtic linguists, from the very start (see references in Isaac 2010 and also Meid 2008). However, in their most recent publication B. Cunliffe and J. Koch (2010, 3) try to argue that the "Celtic as eastern Indo-European language theory" and the western genesis of Celtic "are not a priori incompatible". According to Cunliffe and Koch:

> there is no dispute here about Indo-Europeans coming originally from the east or that it had already appeared, as Celtic, along the entire Atlantic seaboard from Sagres to Orkney by pre-Roman proto-historical times, the later 1st millennium BC. The question is rather whether Indo-European became Celtic before or after it reached the ocean (Cunliffe and Koch 2010, 2–3).

The theory which places the speakers of a variety of Celtic (or proto-Celtic) in the Atlantic Europe of this time cannot by default avoid a reference to the Bell Beaker phenomenon. And it is of course easily found:

> If a distinct Celtic language had emerged by the 3rd millennium then could the period of rapid mobility, reflected in the Beaker phenomenon, have provided the context for the language to spread across much of western Europe? (Cunliffe 2010, 34).

At face value, this statement could indeed be correct, and I am inclined to think that this possibility mentioned by Cunliffe should be listed among potential solutions of Bell Beaker users' linguistic identity, but with considerable modifications, for which see below. The problem of this particular hypothesis is its setting. According to the tentative scenario suggested by Cunliffe and supplied with myriads of question marks, "the Indo-European language reached the Atlantic zone c. 5000 BC as the result of enclave colonisation bringing the Neolithic lifestyle from the Mediterranean", and "*Celtic* began to develop in the Atlantic Zone between 5000–3000 BC during the period when extensive connectivity was established along the Atlantic façade". It should be noted in this respect that the emergence of Celtic is placed by Cunliffe in a framework of Indo-European archaeology which is not accepted by the majority of linguists, and this setting has been already criticised by archaeologists as well. In the same volume R. Karl (2010, 41) asks many questions which were not considered by the author of this theory: "is the area of the 'origin' of 'the Celtic' as large as the 'Atlantic fringe'? If less, how does it spread within the 'Atlantic fringe' zone? And how does it spread beyond the 'Atlantic fringe'"?Probably these questions will be answered in further publications.[1] However, the vision of the Indo-European problem within Atlantic Celtic hypothesis contradicts what is nowadays acceptable to Indo-European linguists, and this theory does not seem to consider modern insights on the possible mechanisms of Bell Beaker networks. Therefore the Bell Beaker contribution to the spread of Celtic languages in Europe in this particular scenario is totally unlikely.

In this respect the approach of C. Gibson and D. S. Wodtko (forthcoming) to the same problem seems to be more promising. These scholars presume that there must be an "important degree of bilingualism/multilingualism" in the Bell Beaker age, which is of course very possible provided that, nowadays, archaeologists do not speak in terms of the Bell Beaker Folk, but rather a network phenomenon. One of the Indo-European languages used in this inter-community communication, as Gibson and Wodtko admit, "may have been the ancestor of Celtic". This is a quite sober hypothesis, although the nature of the communications between and within various Bell Beakers communities will never be established with any degree of precision. It should be positively considered that this approach, appropriately, does not reflect on the putative notion of "Celtic homeland", be it the West or the East. Moreover, the Bell Beaker phenomenon presupposes movements not only from the Atlantic fringe to the rest of the Continent, but from other places and in various directions, and also from the Carpathian basin and the Middle Danube westwards (cf. for instance Harrison and Heyd 2007, 170–172). Therefore, Celtic, not unlike some other Indo-European languages and possibly some non-Indo-European languages as well, could be in theory well involved in the phenomenon. A prospect that people who utilised the same pots, adhered to the same ideology and made use of the same mortuary practices spoke different languages does not upset scholars nowadays.

This leads us to the following conclusion: indeed, there is a possibility that some human beings associated with the Bell Beaker phenomenon at some place in Europe which is not (or cannot be) clarified and at some time which is not (or cannot be) identified did speak a form of Celtic which cannot be recognised. This gives us a positive flavour for the discussion of the problem. However, such a conclusion by default presupposes no further debate, neither linguistic nor archaeological. *Celtic* and *Bell Beakers* ends here.

In his valuable contribution to the conference Professor Christian Strahm has put the history and the present state of Bell Beaker phenomenon studies in the context of "Recycled Ideas". *Recycled ideas* may be used as a sub-title of the present article as well. One might be reminded, for example, that a century ago J. Abercromby (1912, 100) was of opinion that the IE (proto-)language (in contemporary terms "Aryan") was brought by Bell Beaker using tribes to the British Isles where it was adopted by the local Neolithic inhabitants and successfully gave birth to Celtic idioms. Some ten years later another renowned prehistorian offered a more sceptical verdict: "we are forced to admit that we are in total ignorance of the language spoken by the Beaker-Folk" (Peake 1922, 80). The progress of Indo-European and Celtic linguistic studies during the century on the one hand, and a sufficient development in archaeological/prehistorical research for the last hundred years on the other, brings us all back to the same set of opinions, although upgraded

to the current state of the scholarship. Recycling ideas constitutes a loop, and in case of a linguistic attribution of the Bell Beaker phenomenon, particularly its association with the speakers of Early Celtic, this loop looks like a vicious circle. As have been shown above, this association in theory may be appropriate. However, neither linguists nor archaeologists are able to prove it unambiguously, and an argument in favour encounters nearly an immediate counter-argument. Generally, it may be reminded that this problem goes beyond the interests of a comparative linguist – as S. Zimmer (1990, 313) summarises:

> the first aim of Indo-European linguistics is […] not the reconstruction of the Indo-European *Ursprache* as one of the languages spoken in an unknown antiquity by unidentified people but a reference tool in discussing the history and development of the different Indo-European languages

and if there is no defined *Ursprache*, there is no people speaking it. This statement is applicable also for the discussion of the later stages in the history of Indo-European languages and language groups, and another quotation – this time from P. Sims-Williams (2012, 442) – is revealing:

> I believe that if we want to make progress with ancient linguistic geography we have to do two things. The first is to work backwards in time from the known to the unknown, not trying to go too far too fast. The second is to use ancient linguistic data, and not use modern languages or genetics or archaeological "cultures" as surrogates for it.

He continues:

> in fact, there is no *a priori* reason why Celtic speech should coincide with any one archaeological 'culture'; hence the search for some alternative to Hallstatt and La Tène – Bell Beakers have been suggested (Brun 2006; Lorrio 2006: 50) – should surely be called off.

Thus, strictly speaking, the famous question (although slightly paraphrased here), "Pre-historical Archaeologists and Linguists – Can They Mate?" should be answered in the negative,[2] also in view of the considerable differences in the vision of the past in these two different academic disciplines (on which see e.g., Sukhachev 2007) and the list of further "interdisciplinary miscommunications" with references would be lengthy. It is still to be hoped that archaeologists may find new paradigms for their portrayal of prehistoric European past, and that the linguistic community will produce a generally accepted model of the development from Common Indo-European, otherwise *recycling* will become clinical. For European prehistory this set of questions, no doubt, will always be relevant.

Notes

1. cf. J. Collis's lecture at the14th International Congress of Celtic Studies (Maynooth, August 2011) "Celtic from the West? A critique". The abstracts of the paper say: "I wish to briefly critique the recent suggestion made in the volume edited by Barry Cunliffe and John Koch that the origin of the Celts and the Celtic languages may have been in Iberia. I will do this on grounds of logic, methodology and misuse of the classical and archaeological sources", http://www.celticstudiescongress.org/images/stories/congress/synopses.pdf.
2. The situation is different for a later period, when other type of sources could be involved in discussion (see e.g., Falileyev 2008; 2009).

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2

BELL BEAKERS AND CORDED WARE PEOPLE IN THE LITTLE POLAND UPLAND – AN ANTHROPOLOGICAL POINT OF VIEW

Elżbieta Haduch

The Bell Beaker Culture population was biologically separate from the other inhabitants of the Małopolska region in the Neolithic period. The metrical and morphological traits of the skull such as: breadth, length and height of the neurocranium, its proportions: brachycrania and orthocrania as well as the special shape of the flat occiput distinguished them from the local population of the Corded Ware Culture and Early Bronze Age group of the Mierzanowice Culture. Anthropological analysis of the Corded Ware Culture (Cracow-Sandomierz subgroup) skeletons characterised them as dolicho- or mesocranic ones. It is very important to notice that the short skulls (brachycephalic) are also present among them – for example 2-A male specimen from Koniusza mound. On the other side, among Bell Beaker graves from Małopolska Upland there were found female mesocephalic skeletons (Samborzec IX, Sandomierz 31 and Złota 374). These cases confirm interaction between Corded Ware Culture people and Bell Beaker Culture groups not only in the sphere of funeral rituals (burial from Koniusza) but point with the high probability of the incorporation of local inhabitants – females – into the newcomers' groups. This observation does not exclude the hypothesis of the allochthonous origin of the Bell Beaker Culture groups in Małopolska Upland.

Settlements in the Małopolska Upland can be traced back to the Early Neolithic period. Natural conditions, landform features, access to watercourses and the loess soils of the region were conducive to various types of development.

Characterised by unique cord ornamentation on clay vessels, the Corded Ware Culture (CWC) is a phenomenon of the 3rd millennium BC, encompassing vast areas of continental Europe. The Corded Ware people are commonly believed to have been a pastoral society with nomadic or semi-nomadic lifestyle. In Małopolska, the CWC developed from 2800/2700 to 2300/2200 cal. BC (Włodarczak 2006). Extensive sources and radiocarbon dating techniques allowed researchers to distinguish two synchronous CWC subgroups: the Cracow-Sandomierz subgroup in the area previously inhabited by the agricultural communities of the Funnel Beaker Culture (FBC) and a subgroup which preserved its Central European character without local characteristics. Their mutual impact is testified by the presence of items typical of both subgroups in grave inventories (Machnik 1994, 10).

The latest CWC phases coincide with the proto-Mierzanowice phase, during which the settlement network of the Mierzanowice (MC) culture started forming (Włodarczak 2006, 137).

Studies of the CWC are based on material obtained by grave exploration, since the culture's settlements are absent from the Małopolska region.

The Bell Beaker Culture (BBC) communities appeared in the Małopolska Upland in the early second half of the 3rd millennium BC, in the period approaching the decline of the CWC and the advent of the MC. Bell-Beaker centres in the Małopolska Upland form the eastern province of the culture. Similarly to the CWC, BBC materials originate from burial grounds.

Graves characteristics

For the CWC culture, the dead were laid to rest in graves under mounds, dug into burial mound embankments or in flat burial grounds. A certain regularity in grave orientation was observed: females were laid on the left side, males on the right, with a significant majority of male burials, particularly in higher age categories.

In the BBC communities, many characteristics of funeral rites make references to the CWC model, directly pre-dating the appearance of the BBC, as well as the early phases of the Mierzanowice Culture. The cultural interaction between the CWC and the BBC is visible not only in Małopolska, but also in Moravia and Slovakia (Budziszewski and Włodarczak 2010, 110). This interpenetration of cultures calls for an in-depth comparative analysis of their representative populations.

BBC materials are slightly younger than the Cracow-Sandomierz CWC subgroup, apparently representing a phase directly following the CWC's development period in the Małopolska Upland. In the later phase of the latter, we may notice elements typical of the BBC. There are, however, no premises indicating that the two groupings were isochronous.

BBC burial grounds in the Małopolska Upland were springing up from 2400 to 2250 cal. BC (absolute chronology of the BBC burial ground in Samborzec 2400–2200 cal. BC, in Sandomierz 2290–2190 cal. BC) (Budziszewski and Włodarczak 2010, 118).

Materials and method

The analysis of the structure of the CWC people was based on the author's own anatomical and anthropological observations of skeletons originating from CWC graves in Małopolska and data published by other authors. The detailed analysis covered only those skeletons which were in a condition that would enable skull measurements to be taken (Gleń 1979; Gleń and Kaczanowski 1980; Haduch 1999; 2003; 2008; Milisauskas and Kruk 1984 and unpublished data). The skeletons from Zielona (Haduch 2004) and from Zagaje Stradowskie (unpublished data) were not included in the comparative analysis due to their condition.

A relatively small number of BBC culture skeletons originate from Poland. Two skeletons of adult individuals come from a site in Beradź (Opatów district), five skeletons, including a child , come from Złota (Sandomierz district), one female from Sandomierz, and three skeletons from Święcice (Miechów district). Bone fragments from Świniary Stare (Sandomierz district) were not preserved. The Samborzec (Sandomierz district) series has the largest representation, containing four children, four male and two female skeletons (Gleń-Haduch 1990; Budziszewski *et al.* 2003; Haduch 2010).

All skulls and long bones were described according to Martin's methodology (Martin and Knussmann 1988). Cranial indexes and *intra vitam* body height were calculated on the basis of measurements using methods suggested by a number of authors (Breitinger 1937; Bach 1965; Manouvrier 1893; Trotter and Gleser 1952; Pearson 1899). Classification of cranial and long bone indexes accepted for such type of studies was applied (Malinowski and Wolański 1988; Piontek 2005). Age at death and sex of the individual were determined on the basis of morphological traits (Acsadi and Nemeskeri 1970; Ubelaker 1989).

Selected measurements and cranial indexes were used in the comparison. Considering the diverse condition of the bone material, and willing to include as many finds as possible, those measurements and indexes which could be taken and calculated for most of them were selected: g-op, eu-eu, po-b, main index, length/height index (porion anthropometric point).

Statistical work was performed using the STATGRAPHICS 5.0+ software for Windows. Selected metric characteristics and cranial indexes were used for concentration analysis. The results were shown in dendrograms demonstrating connection hierarchies between studied objects. The measure was the Squared Euclidean Distance. The nearest neighbour method was used for calculating the Squared Euclidean Distance. Morphological diversification was reported for Late Neolithic populations (Haduch 1997).

Results

The CWC skeletons

A typical set of traits for representatives of the CWC includes medium robustness of bones and dolichomorphic stature, associated with previous populations such as the FBC. The Corded Ware Culture is characterised by distinct diversification resulting from sexual dimorphism. This is particularly true of differences in absolute dimensions, which in all studied traits reach significantly higher values in the male series.

Both regional and local morphological diversification of the CWC population may presumably be attributed to the wide geographical extent of the culture, which stretched almost all over the Central and Eastern Europe. Skeletons from relatively numerous grave finds scattered all over the area inhabited by the CWC in Małopolska reveal a complex picture of the Corded Ware population and indicate such diversification irrespective of sex. The fact allows us to isolate two groups characterised by different cranial proportions. The first group consists of more robustness, long skulls (main index up to 75.0), with prominent occiput in the

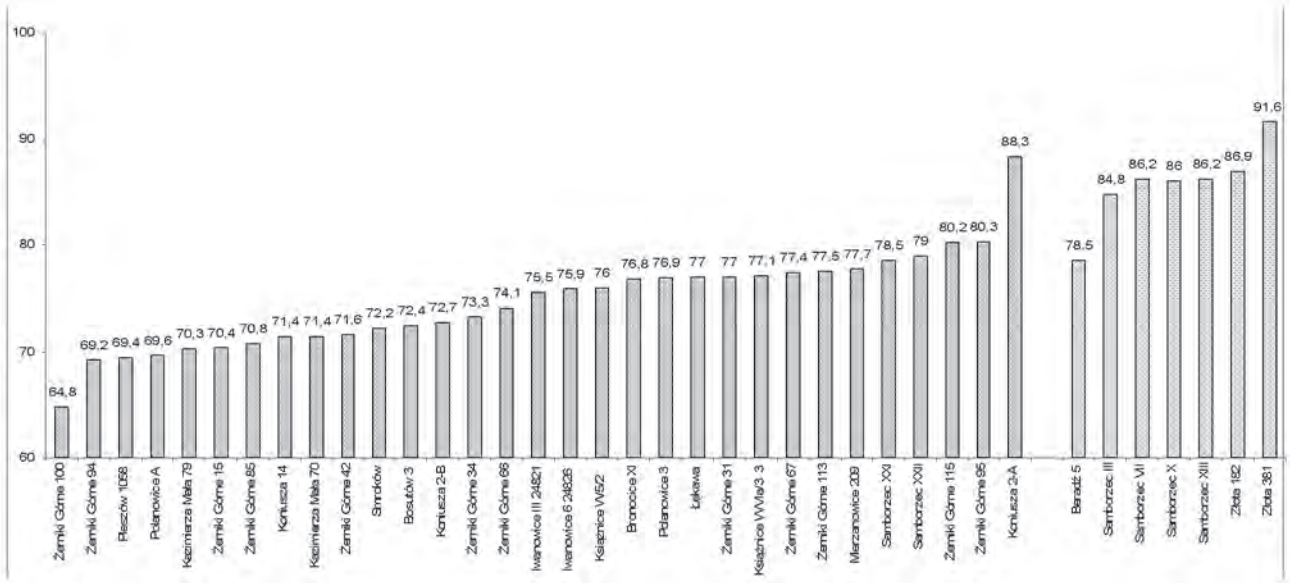

Fig.2.1. Main head index [breadth (eu-eu): length (g-op)] of the males CWC and BBC from Małopolska Upland

upper part of the squama. The other group was characterised by a prominent, albeit consistently rounded occiput, and mesocephalia (main index 75.0–79.9); short skulls are also present. Note the skull from grave 2-A dug into the side of a burial mound in Koniusza, distinctly brachycephalic, with flattened occiput, answering the characteristics of the Bell Beaker Culture (Budziszewski *et al.* 2003).

Differences in the proportions of the neurocranium result from higher total cranial lenght (g-op), lower parietal breadth (eu-eu), an elongation in the bregma-lambda-inion section, i.e. in the rear-central part of the vault in the first group, and a smaller total cranial length (g-op), greater parietal (eu-eu) and occipital (ast-ast) breadth of the skulls of the second group. The facial area includes minor differences in the proportions of the orbits, the absolute dimensions of which are lower (orbital height) and wider (mf-ek) in more strongly built skulls. These morphological differences do not demonstrate any connections to the region from which the skeleton originates. This may be a phenomenon reflecting intra-group diversification in terms of material status.

The BBC skeletons

Most skeletons from the BBC graves are distinct in that they have a set of characteristics differing from those commonly observed in Neolithic populations and the Early Bronze period, demonstrating high uniformity of many morphological traits and proportions. Skulls are short or very short (breadth/width index above 80.0) with a non-prominent or weakly prominent occiput, usually accompanied by a flattened rear part of the neurocranium in the obelica and lambdoidea section of the intraparietal suture and the upper part of the occipital squama. Another characteristics of the representatives of the BBC are medium robustness of the cranial bones, a prominent glabella, large mastoid processes, a convex nasal profile, quite massive cheekbones and a rather shallow canine fossa.

A long-term comparison

Comparison of the main head indexes of male and female skulls of CWC and BBC peoples is presented on Figures 2.1 and 2.2. Such features are observed not only in skulls of adult individuals, but also in children's skulls.

Male skulls from the BBC graves in the Małopolska region are characterised by relatively low variability of the maximum cranial breadth eu-eu and relatively large absolute value of this parameter, the result of which is the high vale of the main index (Fig. 2.1). The largest length dimension g-op was reported for skull no. 5 from Beradź; the skull fits within the mesocephalic category. This characteristic distinguishes it from other male BBC skulls, which are short. The same situation we can observe in the case of the skull from grave 2-A dug into the side of a burial mound in Koniusza (Gleń 1979).

A much greater diversification of dimensions is observed in female skulls, of which only two – no. 2 from Beradź and no. 6 from Samborzec – are short (Fig. 2.2). The remaining ones have a smaller maximum cranial width eu-eu, with slight differences in cranial length g-op Note that the above-mentioned skulls form a separate system although they differ significantly in the auricular height po-b.

Absolute dimensions have an impact on the height/length and height/breadth proportions. Considering the condition

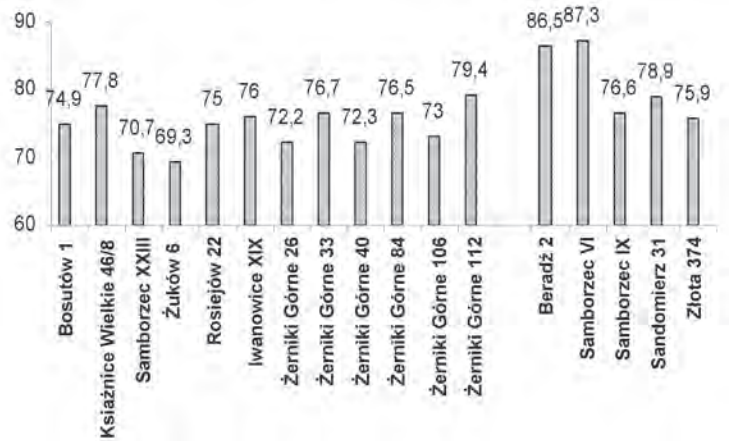

Fig. 2.2. Main head index [breadth (eu-eu): length (g-op)] of the females CWC and BBC from Małopolska Upland

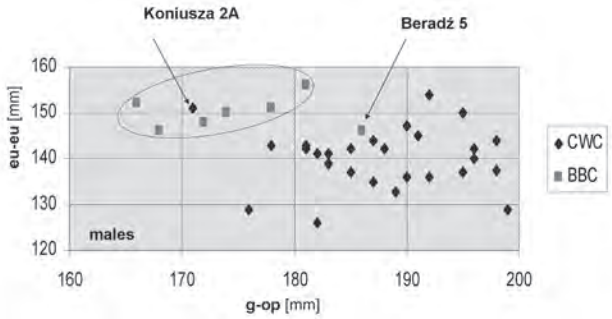

Fig. 2.3. Relation between the long head CWC males and meso- or brachycranic BBC specimen from Małopolska Upland.

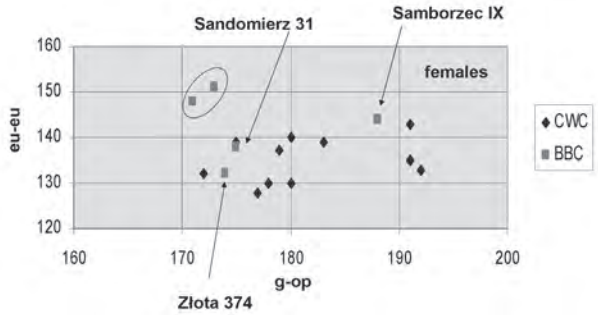

Fig. 2.4. Relation between the long head CWC females and females from BBC graves from Małopolska Upland

of the skulls, we may compare those indexes, which were calculated on the basis of the auricular height po-b. The skulls under analysis are high, except for skull no. 374 from Złota. Consequently, they are not considered different in terms of the height/length index. The height/breadth index correlates with the main index. Short or very short skulls for which the main index fluctuates between 84.8 and 91.6 are less strongly arched. Brachy- and mesocephalic skulls have relatively broader foreheads. Orbital, maxillary and nasal indexes demonstrate high variability across individuals. In most cases, the orbits are low, the nose is narrow and the central facial area is medium or broad.

The dendrograms based on squared Euclidean nearest neighbour method for Neolithic FBC and CWC as well as Early Bronze Age series of MC from Małopolska Upland based on skull parameters: g-op, eu-eu, po-b and breadth-length, height-length, height-breadth indexes present BBC specimen as separate clusters (Figs 2.3 and 2.4).

There are slight differences in *intra vitam* body height estimated on the basis of long bone measurements according to various methods used in osteological studies. Most skeletons in the present study belong to tall individuals (as per the classification applied by Jasicki *et al.* 1964). This mostly concerns male skeletons, which are classified as tall in both the CWC and the BBC series. Also, the body proportions of these pastoral groups are similar, being of slender stature (Haduch and Szczepanek in press).

All of the above metric and morphological characteristics of substantial majority of skeletons representing populations of the Bell-Beaker Culture from Małopolska distinguish them from other populations present in the region in the Neolithic period (FBC) and Early Bronze Age (MC). The characteristics were probably strongly determined by genes.

Discussion

The groups of the Bell Beaker people are the stranger ethnic element not only in Central Europe (Desideri, Eades 2002). There is no doubt, from the anthropological point of view, that the Bell Beaker communities are distinguished from the Corded Ware Culture people. In particular these differences are visible in the physical traits. This concerns the metrical parameters and skull proportions as well as

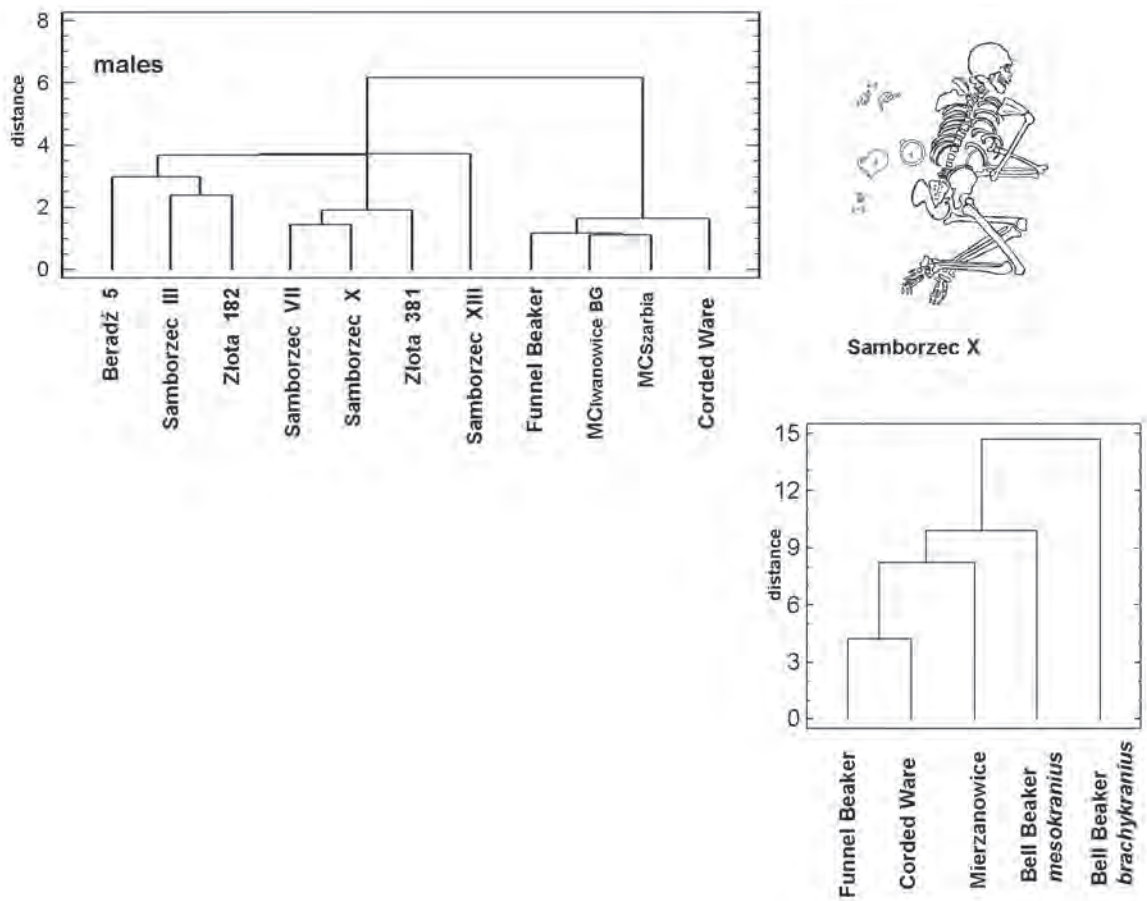

Fig. 2.5. Crania of males of CWC and BBC from Małopolska Upland. Dendrogram for squared Euclidean distance – notice the separate cluster for BBC

morphological characteristics. The Bell Beaker skulls are short (brachycranial), with flat of the nape area, in contrast – the Corded Ware Culture people had the longer ones (meso- or dolichocranial) with concave occipital region. Similar differences in comparison to the other Małopolska Upland's Early Bronze Age societies of the Mierzanowice Culture, are observed. These observations are confirmed for other Central Europe Corded Ware Culture series from Bohemia, Moravia and Slovakia (Havel and Pavelkova 1989).

These distinguishing characteristics of the biological nature are not in conflict with the archaeological data. In the opinion of Makarowicz (2003) there is any genetic relationship between Corded Ware Culture and Bell Beakers. The biological differences are confirmed in the sphere of material culture and funeral practice "bring out Bell Beakers strangeness with respect to local societies". On the other hand, the similarity in social organisation did not exclude that Beakers groups sometimes interacted with the late Corded Ware culture communities (Włodarczak and Kowalewska-Marszałek 1998). The dialogue between neighbouring locals and migrants as well as mutual assimilation of the traits of their cultures were possible (Vander Linden 2003).

The presence of long-headed female skeletons in the BBC indicates their local origin and the great probability of incorporation local inhabitants to the newcomers groups. Brachy- and mesocephalic male skulls from CWC graves also confirmed contacts with BBC groups (Figs 2.5 and 2.6).

In the light of anthropological data, a hypothesis of the autochthonous character of the CWC people and the allochthonous origin of the BBC groups in Małopolska seems likely, and the diversification of the CWC people described above is a consequence of environmentally-determined adaptive biological processes.

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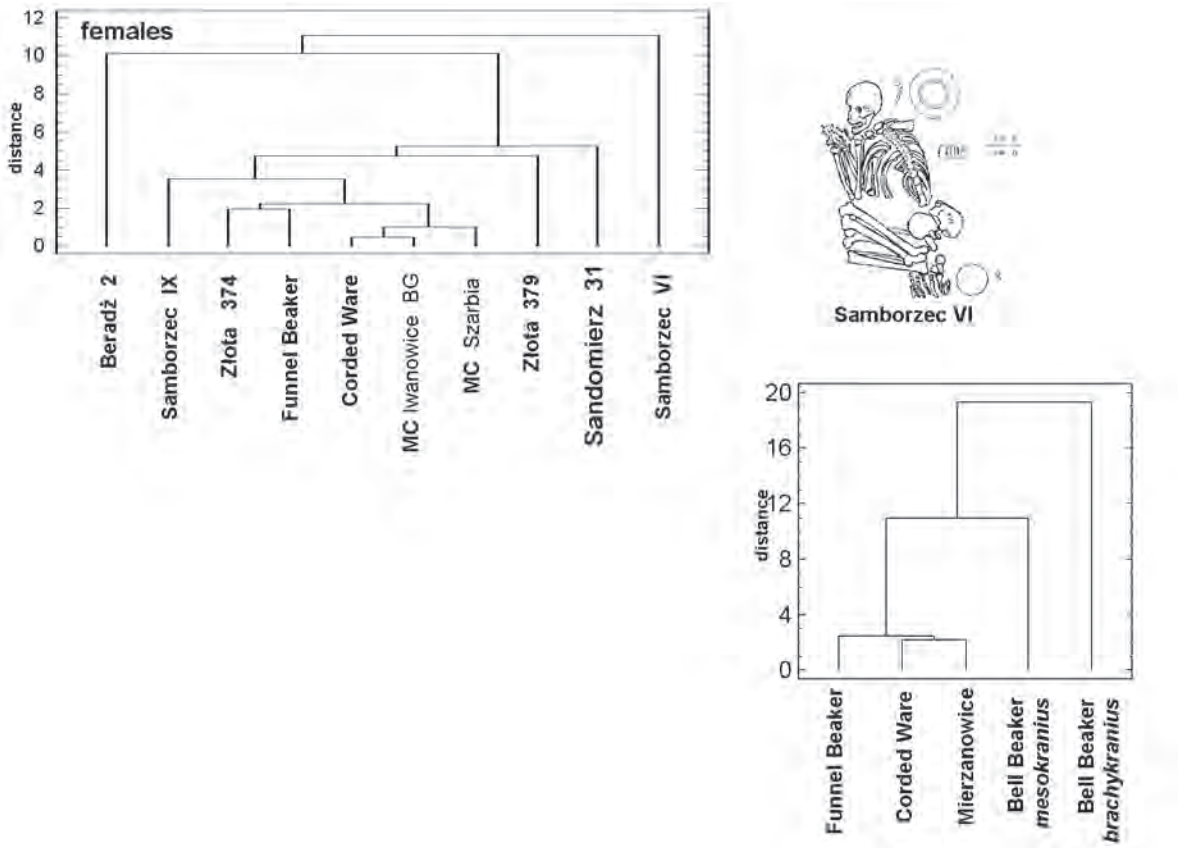

Fig. 2.6. Crania of females of CWC and BBC from Małopolska Upland. Dendrogram for squared Euclidean distance – notice the separate cluster for BBC from Beradź (grave 2) and Samborzec (grave VI)

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3

PERSONAL IDENTITY AND SOCIAL STRUCTURE OF BELL BEAKERS: THE UPPER BASINS OF THE ODER AND VISTULA RIVERS

Przemysław Makarowicz

This paper discusses the identity and social structure of Bell Beakers in the southern part of the Oder and Vistula basins (in Silesia and Lesser Poland), which are affiliated to the Eastern group, and are perceived as the genuine Beakers.

Bell Beaker societies in the studied region were ranked, with intragroup differentiation embracing both men and women. We can observe the strongly stressed opposition of masculine–feminine, which was manifested by depositing specific sets of objects together with the dead. Mature male individuals buried with archer's equipment (flint arrowheads, wrist-guards and arrow-shaft smoothers) formed a distinct category of the deceased. Among them, individuals serving as chieftains/leaders can be distinguished. Depositing with them copper and electrum ornaments, diadems or other head or hair ornaments emphasised the rank of some women in the adult and adult/mature age. The funerary rite does not stress the identity of children.

The linear arrangement of graves in the cemeteries in southern Poland could be interpreted as a symbolic reflection of the continuity of a lineage, using the burial ground.

Introduction

At the outset, it is important to remember that the area concerned in this contribution is the north-easternmost end of the Bell Beaker "oecumene" (Fig. 3.1). Here, two zones of Beaker patterns can be distinguished: lowland and upland one. In each of them, Beaker patterns are differently manifested and have different genetic relationships. In the lowland zone, stretching from Vorpommern across western Pomerania, Kujawy as far as the western portion of the Mazurian Lakes, one can speak of Bell Beaker inspirations that can be seen in the so-called *Oderschnurkeramik* and the Iwno culture (Makarowicz 2003; 2005). The inspirations reveal affinities with Jutland and north German assemblages in which a strong component of local Single Grave culture versions are readily observed. The lowland zone forms part of the North European Bell Beaker province, with the presence of "Beaker" patterns resulting from intensive west–east communication (Czebreszuk and Szmyt 2001). The upland zone, in turn, with its enclaves in Lesser Poland, Upper Silesia and Lower Silesia, belongs to the eastern province (Kamieńska and Kulczycka-Leciejewiczowa 1970; Wojciechowski 1987; Budziszewski and Włodarczak 2010). Its emergence resulted from the migrations of small Beaker groups from Bohemia and Moravia. From the south we have only grave sources and chance finds, whereas from the north we have chiefly settlements sources, chance finds and few graves. The northern enclave can be dated to 2500/2400–2000 BC, while the southern one subsisted between 2400 and 2250 BC (Makarowicz 2003; 2003a). It must be noted that only few new sources concerning Bell Beakers have been found in the two zones in recent years. Several graves have been discovered in Silesia in the course of excavations

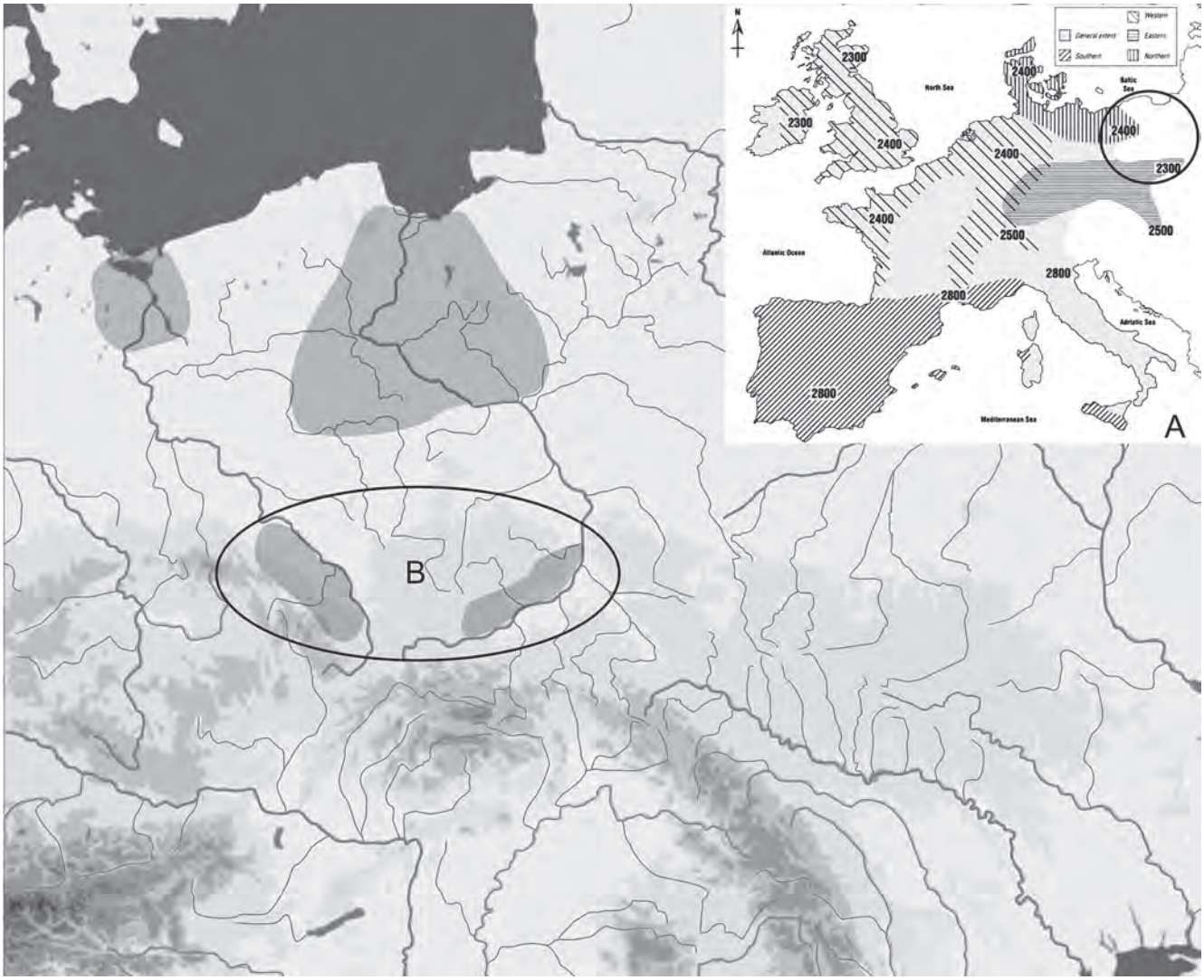

Fig. 3.1. North-eastern borderland of the Bell Beakers (A), and the Beaker enclaves in the Oder and Vistula basins (B). The analysed area is marked with an "ellipse" (after Czebreszuk 2003; Makarowicz 2003; 2005, with amendments).

carried out at the construction of A2 motorway (so far, only one has been published). Also, settlement pottery has been discovered recently at dune sites (with no stratigraphy) at the Mazurian Lakes (Manasterski 2009). It has been found to show affinities with Danish Myrhøj-type beakers, zone beakers from north Germany and the Iwno culture from the western portion of the Polish Lowlands.

In this contribution, I shall discuss Beaker societies in the southern – upland – portion of the Oder and Vistula basins (in Silesia and Lesser Poland), i.e. that part of their milieu which is affiliated to the eastern group, represents the complete set of traits of the cultural package and is treated as the genuine Beakers (Harrison 1980, 58–63).

The credible interpretation of past social structures is one of the most complex and at the same time most intriguing problems of prehistoric studies. It is a question that gains particular importance with reference to the 3rd and the beginning of the 2nd millennium BC, which was a time when signs of substantial social transformations become evident across Europe. These were mainly initiated by Bell Beakers and later continued by different groupings of the Early Bronze Age. A main if not universal dilemma of social archaeology in all ages is the question how to draw conclusions about social structure and changes that took place in it – sometimes over long period of time – from material culture. The procedures that lead towards answers to these questions are diverse and sometimes very complex. They involve qualitative and quantitative analyses of archaeological records, application of sociological and anthropological theories, as well as methods and tools of

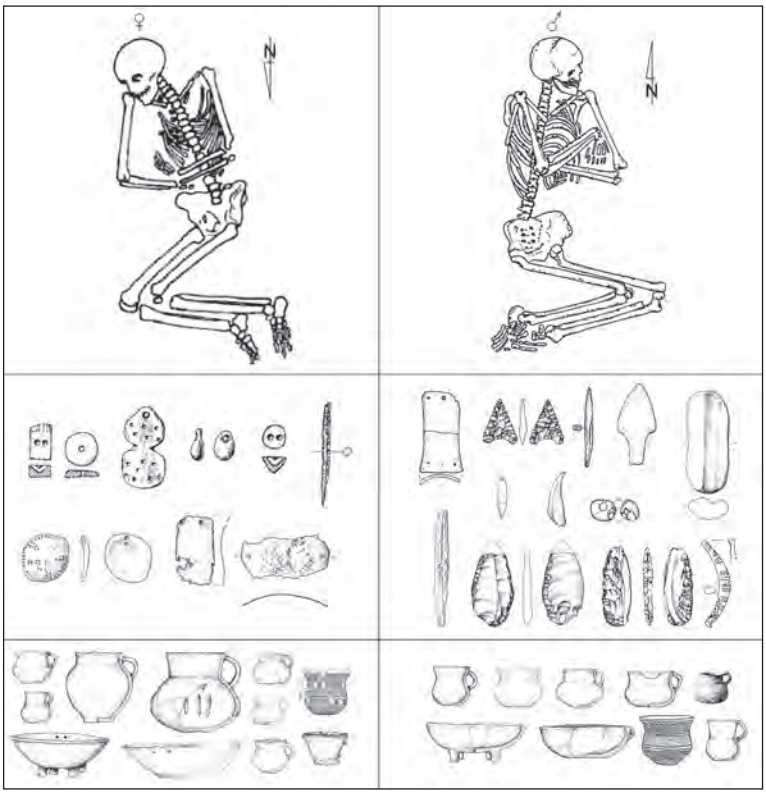

Fig. 3.2. Bell Beaker burial rites. Upper left: female, upper right: male; middle: the main types of their non-ceramic grave goods (combined); below: the main types of vessels.

converting the material "text" into one of social relations within a given human community (e.g. Makarowicz 2003a). Application of these approaches usually results in a model of the social structure, a certain ideal construct, which greatly differs from the real, complex and dynamic horizontal and vertical relations existing in prehistoric communities (Max Weber's "dimensions of society" – Mann 1986, 12).

Traditionally, burials and grave goods are believed to be the principal source of information on the social structure in the pre-statehood past. Ceremonial behaviour records are of particular usefulness, as these were rituals and symbols contained in them that formed a kind of a "language" to communicate the social status, prestige, affluence, authority, rights and duties due both to the community and to the individual (Leach 1954, 279; Garwood 1991). Monumental and complex grave structures and prestige grave goods, made of exotic raw materials, may testify to the high status of the buried person. Certain grave goods are believed to be markers of social identity: gender, age, rank and wealth. However, other approaches question a direct connection between objects deposited in graves and the identity of people buried in them. In these views, funerary rituals, including the construction of the grave and the depositing of offerings, are believed to have been a show of sorts aimed at stressing rather the status and aspirations of mourners than the social position and identify of the deceased (Thomas 1991). There is no doubt that both interpretation perspectives are important and should not be taken to be diametrically opposing but rather complementary approaches. It seems, however, that regardless whether grave goods are treated as the personal property of buried men, women and children or symbolic/selected objects offered by the family, mourners or a larger social group, they may show a real or idealised identity of the deceased (Sarauw 2007, 77). In the case of Bell Beakers, special importance is attached to a connection between a standardised set of weapons (archer's equipment, daggers) and warriorhood identity (the most spectacular example being the Amesbury Archer: Fitzpatrick 2003; 2009).

In Silesia and Lesser Poland, at small burial grounds, burials of men, women and children were discovered in relatively simple graves, deprived of any stone–timber structures (Wojciechowski 1987; Makarowicz 2003). In this regard, no distinction can be found. Certain leeway for social interpretation, however, is offered by the study of differences in grave goods.

Beaker male identity

Among men, a distinct category of the deceased was formed by mature individuals buried with archer's tackle of which flint arrowheads, wrist-guards and arrow-shaft smoothers survive (Fig. 3.2). The deceased were accompanied into

Fig. 3.3. Male representation in Lesser Poland. A: Samborzec, site 3, grave III; B: Samborzec, site 3, grave X; C: Złota, site 2, grave 173, all Lesser Poland (after Budziszewski and Włodarczak 2010).

their graves by one or up to over a dozen arrows. A distinct trait of the south Poland version of the Bell Beakers is an almost total absence of prestige beakers from graves. As a rule, next to the deceased, accompanying pottery was placed, with beakers being substituted for by large cups with handles. Men were usually furnished with two, rarely three, vessels; it is also next to them that flint and stone goods are recorded.

In two cases, mature men were buried in a supine position. The individual from a grave in Wierzbno, Lower Silesia, had been deposited in an extended position, while the man from grave III at Samborzec, Lesser Poland, had been buried in a supine position with his knees drawn up in a frog-like manner (Fig. 3.3A; Makarowicz 2003; Budziszewski and Włodarczak 2010). Both men were archers, as is shown by arrowheads found in the graves; in the case of the individual from Samborzec, a wrist-guard and a bow-shaped pendant, being an identity emblem of a kind as well, attest this. He had been given a copper dagger or a tanged point, flint goods including two knives, a striker, and two bone retouchers as well as three vessels (a bowl and two cups).

The arrangement of the individual objects, revealing the deceased's identity, in the graves is rather "functional" than "symbolic". In grave III in Samborzec, the wrist-guard lay next to the bones of the warrior's left forearm, possibly, it had been originally mounted on it; next to it lay the dagger/tanged point. The only arrowhead was recorded – together with some other objects – at the right knee. The position of the deceased from Wierzbno – extended and supine – has analogies in corpse arrangements characteristic of Beaker warrior-archer burials in Jutland (Sarauw 2007). Men interred in them were equipped with prestigious flint daggers, usually lanceolate specimens of type I in Lomborg's classification (Lomborg 1973). Seventy per cent of their graves contained two or more arrowheads. The men did not have any (stone) bracers while quivers holding arrows were found between their legs or next to their thighs (Sarauw 2007, 73).

Male body arrangements analogous to the position of the individual from Samborzec (frog-like position) can be found among Neolithic and Early Bronze societies in central Europe. Distinctive in the presence of prestigious grave goods, such burials are often interpreted as the resting places of people of high social status: warriors, metallurgists or even chieftains (Bátora 1991, 120; 2006, 188ff, fig. 134). The closest analogies, both geographically and chronologically, include graves of the warriors-chieftains of the Corded Ware culture from Kietrz in Silesia, Żuków in Lesser Poland and Nohra in central Germany, as well as slightly later burials of men of the Mierzanowice culture found in Złota and Miernów, Lesser Poland (Budziszewski and Włodarczak 2010, 83–84). The extended supine position is encountered earlier in the funerary rites of pastoral societies on Volga and Black Sea steppes, beginning with the period when pre-Yamnaya groups thrived (e.g. Rassamakin 2002; Anthony 2007).

The anthropological and archaeological literature on warfare names three major types of warriors (Otterbein 1970; Vandkilde 2006, 395–6; Sarauw 2007, 79–80). In some communities, a group of warriors is made up of all adult men, who form, in principle, an institutionalised association. In other societies, all men are warriors as well, but only some of them are organised in specialised and prestigious warfare institutions, secret associations or men's clubs. The best-developed warrior organisations are encountered in stratified societies. The membership of such organisations includes only some men who form military aristocracy of sorts, grouped in elite and professional warfare institutions.

In the case of identity of Bell Beaker men from the area in question, it seems that we deal rather with the second than the first or third types of warriorhood. This is confirmed by the graves of men who were buried without any "military objects". One has to believe they were not warriors. In turn, differences in warrior equipment, e.g. a bow, arrows, wrist-guards (or, additionally, knives and daggers) or only a bow with arrows (and bracers made of organic material?), may suggest distinctions within the group of warriors. Presumably, stone wrist-guards were placed in the graves of only some of the dead. In everyday practice, hunters/warriors used – next to stone ones – specimens made of hide, leather or other organic raw materials.

The recent debate on the significance of wrist-guards has revealed a broad spectrum of interpretation possibilities (see also Turek, this volume). Relying on different inference methods, based on detailed examination of their manufacture, morphology and manner of wearing, as well geochemical and petrographic analyses, or even modern ethnological examples, some scholars question the view that stone bracers had only a functional dimension (Case 2004; Woodword *et al.* 2006; Smith 2006; Fokkens *et al*. 2008). What they stress instead is the symbolic significance of bracers. They also argue that it was inconvenient and impractical to fasten stone wrist-guards to inner forearms, that some of them bear no traces of being worn, that there are many examples of bracers made of organic materials (hence making slate specimens redundant). What else is emphasised is the connection between these objects and the social status and personal virtues (courage, daring, self-control, integrity, vitality, etc.), their ideological and cosmological connotations as well as aesthetic (decorative) values (Woodword *et al.* 2006, 541; Fokens *et al.* 2008, 124).

In the basins of the upper Oder and Vistula rivers, male corpses, however, were laid to rest according to the rite characteristic of the BBs, i.e. on their left sides, crouched, elbows and knees bent. This was how the archer from grave X in Samborzec (Fig. 3.3B) and the individual from grave 173 in Złota were buried (Fig. 3.3C). In the first

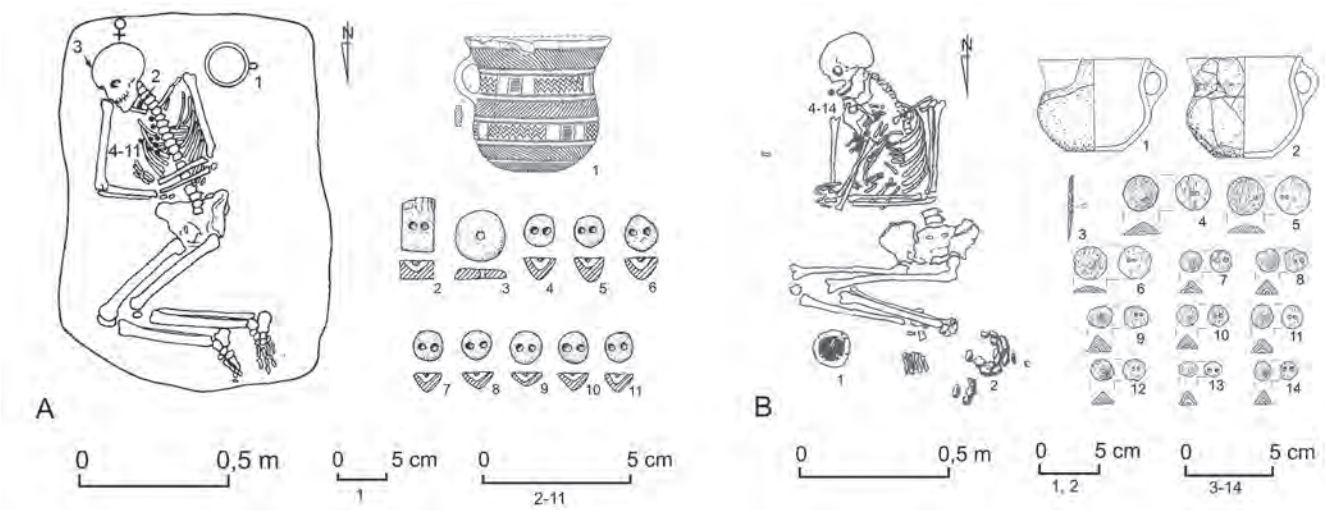

Fig. 3.4. Female representation. A: Strachów, Silesia; B: Sandomierz, site 6, Lesser Poland (after Noworyta 1976; Makarowicz 2003; Budziszewski and Włodarczak 2010).

case, three arrows were placed at the deceased's pelvis and two flint blades and two bone ones were deposited 30 cm behind his back, at the neck. With the other warrior, 11 arrowheads were found; nine lay behind his back, probably in a quiver, and two others were found next to his pelvis. The outline of decomposed wood of a bow from a Corded Ware Culture grave in Bożejewice, Kuiavia (Kośko 1997**)**, numerous representations of this long-range weapon in the Neolithic caves on the Spanish Levant coast (Guilaine and Zammit 2005, 103–115) and few surviving specimens from the Younger Stone Age found, for instance, in Great Britain, Switzerland, Poland, Russia, Lithuania and Latvia (Guilaine and Zammit 2005, 63–67; Margielewski *et al*. 2010), made mainly of yew wood, as well as the specimens that were part of equipment of the warriors represented on 3rd millennium BC stele from Le Petit-Chasseur, Switzerland (Harrison and Heyd 2007, 160, fig. 23) suggest that these could have been bows of various types: convex bows, short and long ones, and composite curved specimens, often with a double curvature as well. Bows must have been placed directly next to the deceased within the reach of his hands or on top of him.

Supported by grave goods in Beaker male burials in the south of Poland, two classes of warriors can be distinguished. The first consisted of individuals enjoying a higher status (ranked, specialised warriors/chieftains) and possessing the full archer's tackle (a bow, arrows, stone wrist-guards) and other weapons (flint daggers and knives, a copper dagger). The second class was made up of ordinary warriors whose attributes included only bows and arrows. The warriors were only men, mostly in the mature age, and only in single instances were they in the senile age group. The deceased who were buried without military equipment represented adult and senile age categories. This observation can be interpreted in two ways: either warriorhood was a stage in the life cycle of all men or it was enjoyed by only some individuals, for instance, members of dominant families or lineages.

Beaker female identity

Whereas the identity of most Beaker men is relatively strongly stressed by their "military" grave goods, the identity of women is harder to establish. They were laid to rest on a right side and their grave goods were usually more modest that those of male individuals. The rank of some women in the adult adult/mature age was emphasised by depositing with them copper and electrum ornaments, parts of diadems or other head or hair ornaments (Fig. 3.2). After they had died, they were dressed in their best funerary clothes, as testified by bone and amber V-perforated buttons that survive. Other female attributes included bone and copper awls and bone ornaments. Two to four vessels accompanied women in their graves.

Worth mentioning is the burial of a female aged 30–50 years at Strachów, Silesia, which contained, in addition to funerary clothes fastened with bone and amber V-perforated buttons, an amber pendant as well as a prestigious, richly ornamented bell-shaped cup (Fig. 3.4A). The grave goods suggest, that in this case, we are dealing with a person of a high social status (Noworyta 1976).

Above-average furnishings also accompanied a woman, aged about 30, from Sandomierz, site 6, Lesser Poland (Budziszewski and Włodarczak 2010, 24, pl. xxv). Below her foot bones, two vessels (cups) and a copper awl (slightly damaged) had been placed, while on her chest, between her

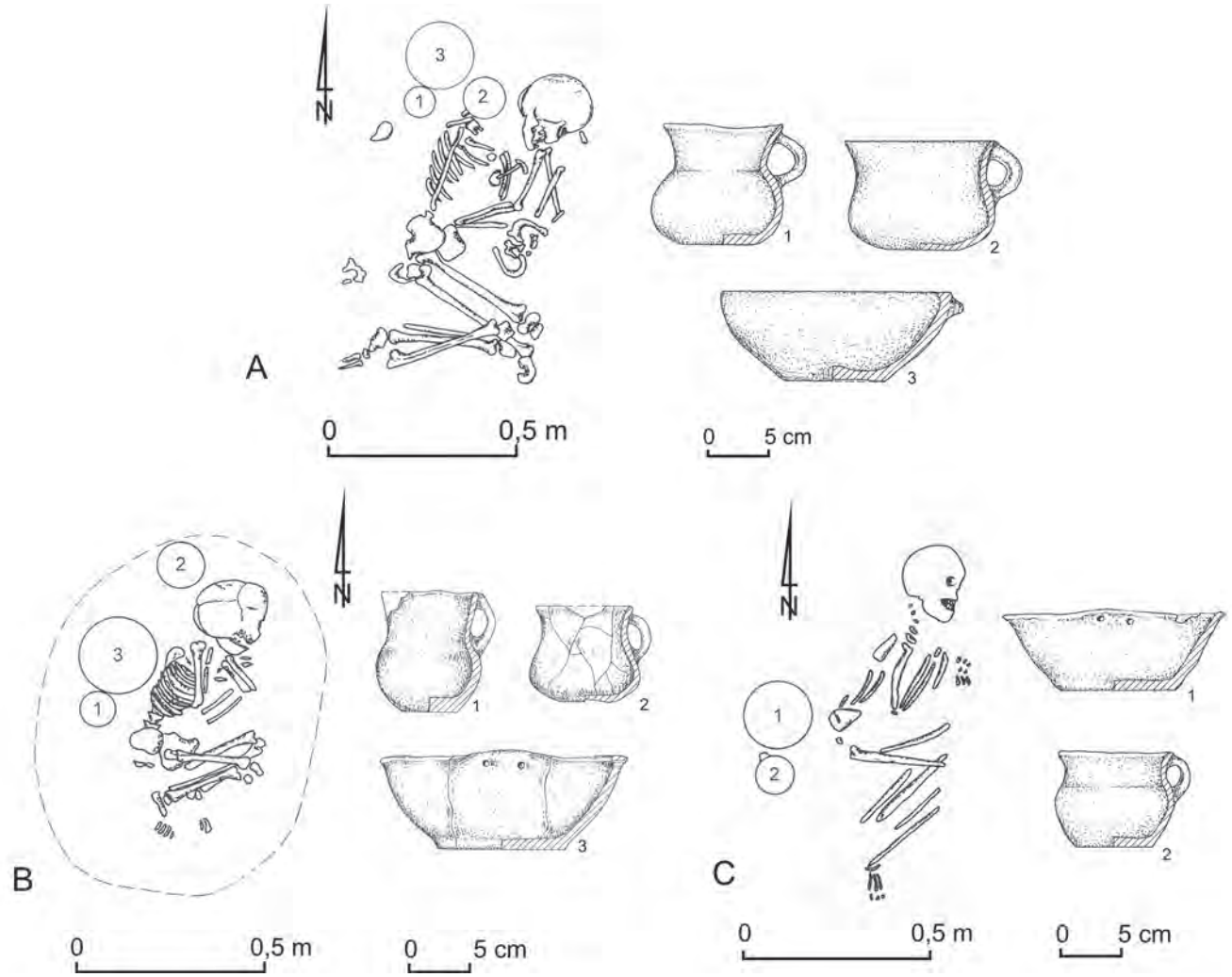

Fig. 3.5. Child representation. A: Samborzec, site 3; B: Samborzec, site 3, grave IV; C: Samborzec, site 3, grave II, all Lesser Poland (after Budziszewski and Włodarczak 2010).

ribs, there were 11 V-perforated bone buttons; three buttons were globular while the remaining seven were conical in shape (Fig. 3.4B).

Beaker children identity

Children must have been inhumed, depending on their sex, on their left or right side, along a north–south axis and facing east. Their graves held only 1–4 vessels (Fig. 3.5); in one case a flint chip was found as well. Hence, it can be believed that the funerary rite did not stress the identity of immature individuals. A certain distinction in the treatment of this category of the dead is suggested by the varying number of offered vessels. It seems, however, that the presence of vessels, hence containers for food or ritual drink, was related rather to the rite of passage and not the status of a child.

The absence of any personal furnishings for children in southern Poland indicating the sex could have been related to the fact that they were not perceived as community members with full rights. It must be noted, however, that in other regions of the Beaker oecumene, children's graves do contain non-ceramic grave goods, albeit rarely. They are interpreted as status and wealth symbols, not reflecting actual social relations but rather marking the presence of individuals favoured at succession, e.g. firstborn sons (Turek 2000, 435; 2011).

Social structure and ranking

No traces of settlements have been found so far in the area studied. This makes one think that cemeteries played a central role in the construction of social space by the local

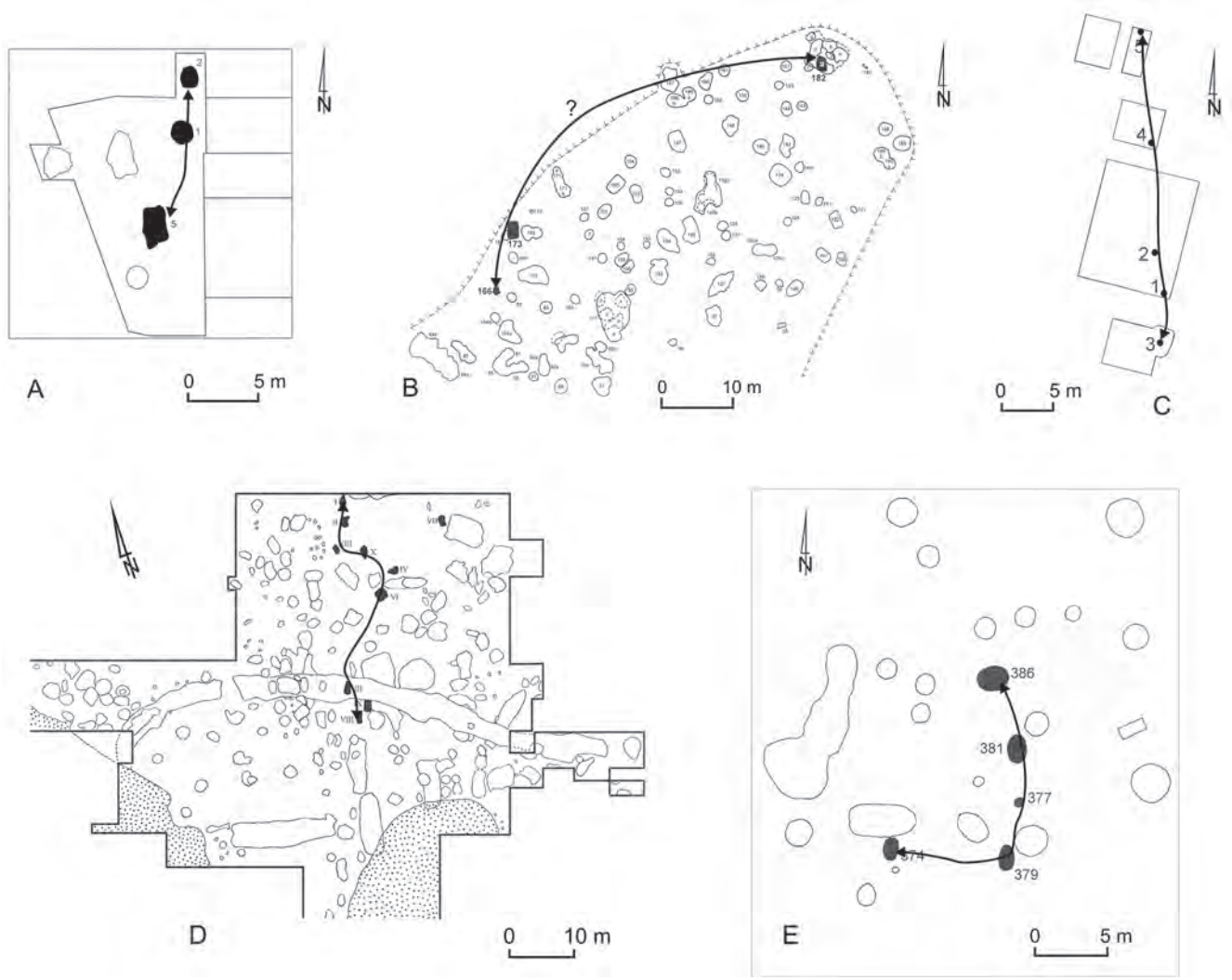

Fig. 3.6. Linear-like arrangements of cemeteries in Lesser Poland. A: Beradź, site 1; B: Złota, site 2; C: Święcice, site 7; D: Samborzec, site 3; E: Złota, site 3 (after Budziszewski, Włodarczak 2010, with amendments).

Bell Beaker users. Judging by the size of burial grounds (the largest have only 10–15 graves), it can be concluded that Bell Beaker societies were rather small. A residential group could have been formed by a family or several nuclear or stem families, or one or two extended families. The authors of a Lesser Poland Bell Beaker monograph (Budziszewski and Włodarczak 2010) suggest that the arrangement of graves at Lesser Poland cemeteries was in principle "linear" (Fig. 3.6). Despite raising doubts as to the degree of exploration of these cemeteries, it can be assumed that these were burial grounds of specific lineages. The linear arrangement of graves could be interpreted then as a symbolic reflection of the continuity of a lineage using the burial ground.

At the cemeteries, smaller grave arrangements can be distinguished. In the area under discussion, due to the small number of graves in cemeteries (often not investigated comprehensively) and the scarcity of individuals whose age and sex have been anthropologically determined, it is hardly possible to analyse systematically relationships between individual burials.

An interesting example is a cluster of three graves (nos III, VIII and IX) in the southern portion of the cemetery in Samborzec (Budziszewski and Włodarczak 2010, pl. x). It was located about 13 m south of another grave cluster (Fig. 3.7). The three graves held the remains of a man (no. III), woman (no. IX) and a child (no. VIII). Taking into consideration appropriate categories of sex and age, all of them were lavishly furnished. The grave goods found in grave III of a warrior-chieftain were described earlier. Grave IX, situated 2 m south-east of that of the man, held the remains of a woman aged 30–35 years and two vessels

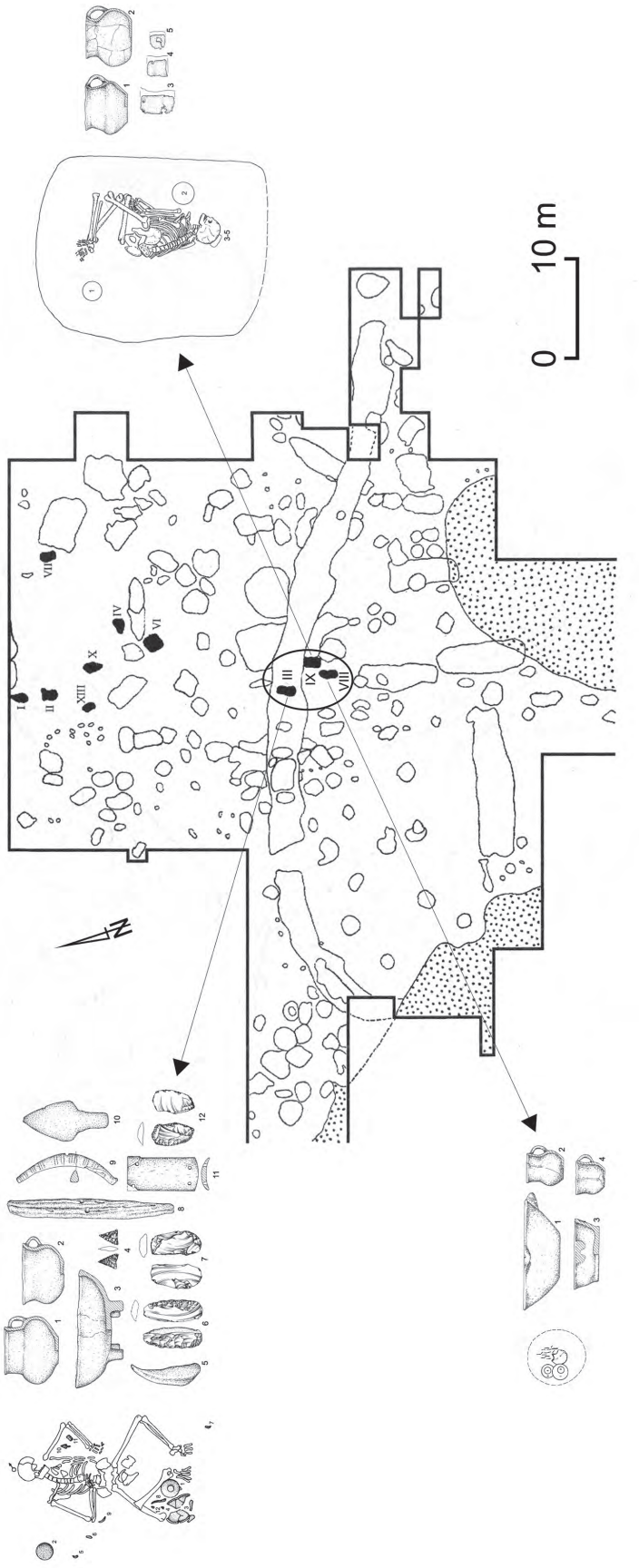

Fig. 3.7. Samborzec, site 3, Lesser Poland, graves III, VIII, and IX. Family 'burial plot'?

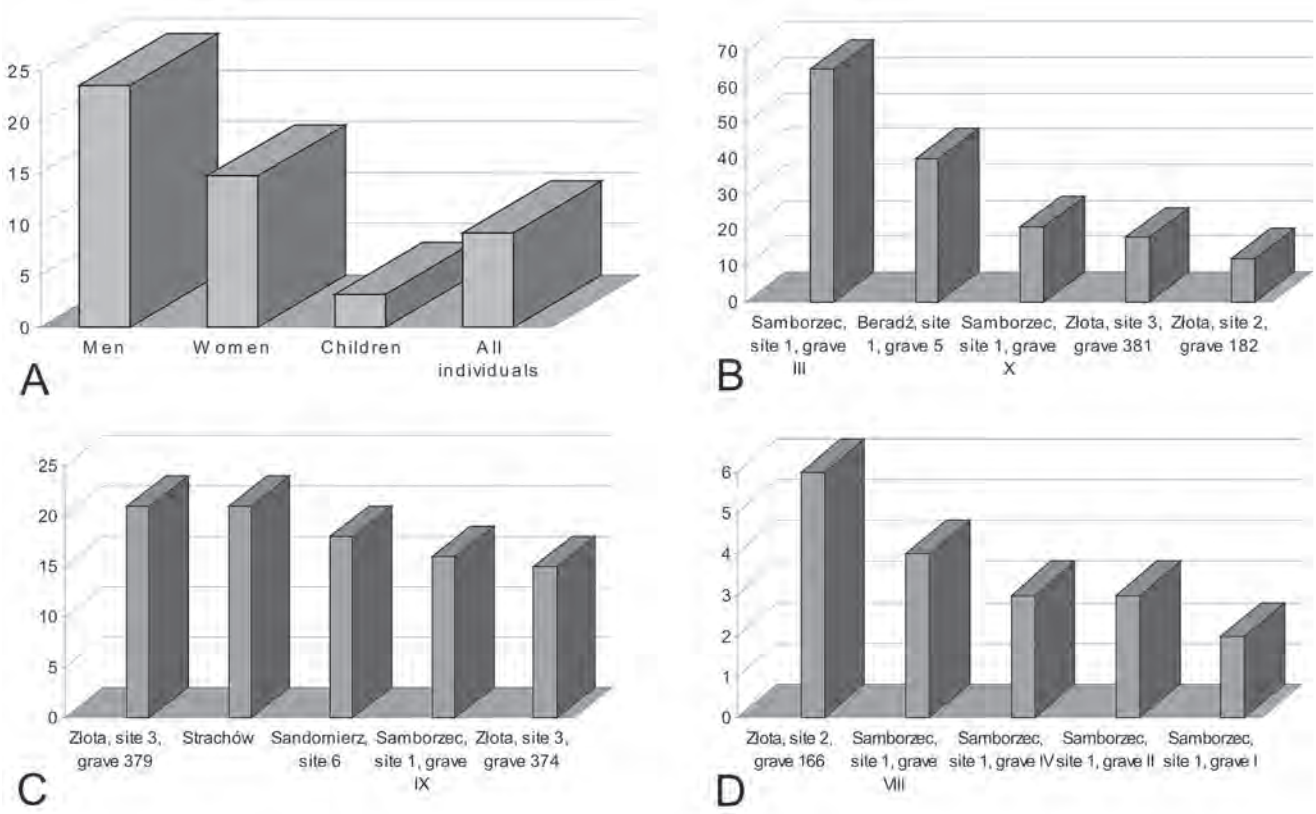

Fig. 3.8. Average score of men's, women's and children's graves on richness scale (A). Ten richest graves of men (B), women (C) and children (D).

as well as a diadem made of a thin copper sheet, placed on her head. Directly next to her, about a metre to the south-west, in a small circular pit, was buried a child below 1 year of age. With the individual, whose skeleton had survived incomplete, were recorded four vessels (the most at this cemetery in this age category): two cups placed in two bowls. It seems that the grave cluster can be interpreted as a family "burial plot" of a warrior-chieftain, possibly a leader of the whole local group (lineage?), his wife and child.

To compare differences in the wealth of grave goods, presumably following from the differences in the status of the dead, a point scale has been used.[1] The most spectacularly furnished graves were those of men in which a single individual was assigned – according to the adopted criteria – on average 23.6 points (Fig. 3.8). More modest furnishings were given to women – a single dead female was given 14.7 points – while grave goods accompanying children were the most modest, scoring on average only 3.2 points. The average for all individuals (including individuals of unknown age and sex) was 9.2 points. These differences are borne out by the comparison of the five most richly furnished burials of men, women and children, showing a clear domination of graves in which men were interred.

The presence of prestige goods made of copper and amber in graves, as well as objects connected to warriorhood, suggests some form of social ranking among the Bell Beaker individuals studied here (Fig. 3.9). The ranking goes beyond the simplest form known as kin/role ranking, in which the rank of a person depends on his or her position in the kinship system or a specific social role. In those communities, however, status did not depend only on gender and age differentiation. What we deal with in this case is ranked societies in which "inequality is institutionalized into a hierarchy of statuses – superior and inferior positions of prestige and dominance – that extended beyond age, sex, personal characteristics, and intra-familial roles" (Berreman 1989, 9; Wason 1994, 37).

In the Silesian and Lesser Poland Beaker enclaves, individuals were identified that can be interpreted as having been leaders or chieftains. In ranked, but not stratified, societies, such persons gain prestige owing to their personal skills and maintain their authority by redistributing than consuming goods (Sahlins 1960, 397ff; 1974; Wason 1994, 52).

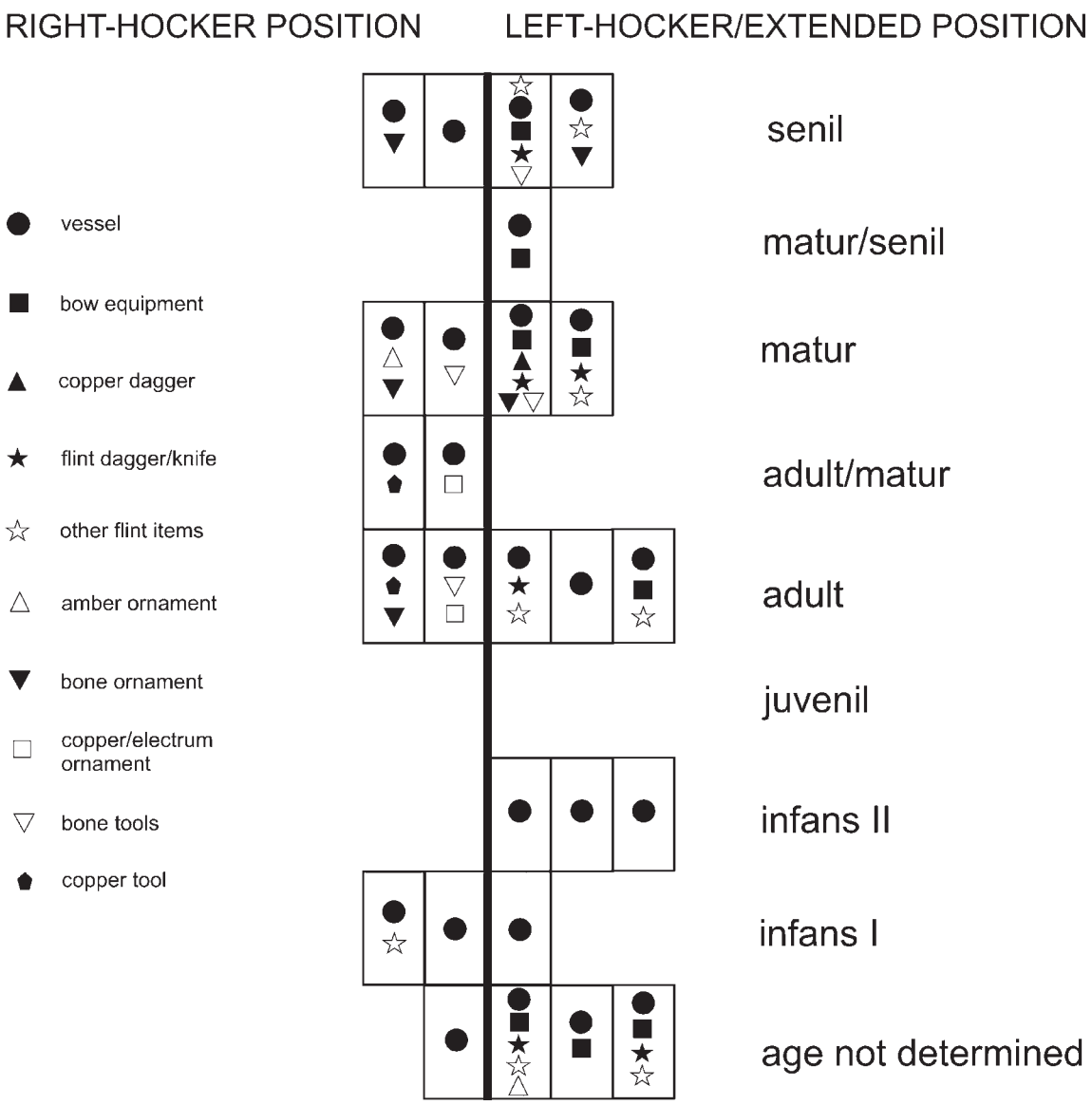

Fig. 3.9. Burial statistics for the south Polish Bell Beakers sorted according to age, gender and wealth.

Conclusions

In conclusion, it seems that the Bell Beaker social structure in the upland zone of the Oder and Vistula basins can be described in the following points:

1. Residential groups were made up of over a dozen people, hence they must have been exogamous.
2. Under the social role division, the opposition of masculine–feminine was strongly adhered to; it was manifested by depositing specific sets of objects together with the dead.
3. The sets of objects – grave goods – may have communicated the identity that the dead (only adult individuals) enjoyed when alive.
4. Absence of traces of permanent settlements may suggest a mobile way of life related to the dominant subsistence strategy, i.e. animal breeding.
5. The spatial arrangement of burial grounds can be interpreted as reflecting a kinship (lineage) social structure of the communities.
6. Bell Beaker societies in the studied region were ranked, with intragroup differentiation embracing both men and women.
7. A high status of some women is shown by their ceremonial funeral clothes, fastened with V-perforated buttons, and copper objects, in particular, diadems.
8. Groups were dominated by mature men-warriors, who demonstrated their warriorhood using

prestige objects of a military nature. Among them, individuals serving as chieftains/leaders can be distinguished. Not all men, however, were warriors.

It seems that the Bell Beakers from the upper drainages of the Oder and Vistula rivers, despite a small number of sites, reflect a supra-regional model of social relations, spreading across Europe in the 3rd millennium BC. It was based on growing individuality, clear stressing of identity, both individual and a group one (e.g. men – warriors/archers), as well as on common ethos and values, promoting a life style that fully blossomed only in certain stratified groups in the 2nd millennium BC.

Note

1. The following point scale of grave goods was used: copper or amber objects: 2 points; clay or flint objects: 1 point; wrist-guards: 2 points; flint arrowheads: 1 point for 1–2 pieces, 2 points for 3 and more pieces; flint tools: 1 point for 1–2 pieces, 2 points for 3 and more pieces; flint semi-products: 1 point for 1–10 pieces, 2 points for 11 and more pieces; bone tools: 1 point for each piece; beads/buttons/pendants: 1 point for 1–10 pieces, 2 points for 11 and more pieces; arrow-shaft smoothers and vessels: 1 point for each specimen. The total number of points was multiplied by the number of raw materials.

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4

BELL BEAKER STONE WRIST-GUARDS AS SYMBOLIC MALE ORNAMENT. THE SIGNIFICANCE OF CEREMONIAL WARFARE IN 3RD MILLENNIUM BC CENTRAL EUROPE

Jan Turek

During the 3rd millennium BC warfare symbolism became extremely important in the representation of social power, status and gender categories. Weapons were presented during funerary ceremonials, as well as in the world of the living as symbolical attributes of power and prestige. Such signifying artefacts were also used during the ceremonial warfare contests in order to emphasise male strength, fighting skills and accuracy and to reinforce the position of individual contestants within the community. The prestigious weapons were also depicted on figural grave stones and in open-air rock art. Archery became decisively important in the symbolic expression of warfare during the Bell Beaker period and it is commonly demonstrated within the burial customs.

Technology, metrics, raw materials and their colours are discussed in this paper together with the gender-signifying role of archery package.

We are going to observe how archery and its symbolism played an important role amongst prehistoric societies not only as a hunting method, but mainly as warfare phenomenon. In different cultures of the World archery shooting contests were carried out as a part of ceremonial warfare. Archery presentation also became an important feature of cosmology.

Archery and prehistoric society

Human culture is deeply structured by a variety of symbols and rituals. Some artefacts of originally practical function might have gain prestigeous and symbolic meaning, especially in the time of introduction of important technological innovations or in the context of social ceremonies and warfare ritual activities. During the 3rd millennium BC warfare symbolism became extremely important in the representation of social power, status and gender categories. Weapons were presented during funerary ceremonials, as well as in the world of the living as symbolical attributes of power and prestige. Such signifying artefacts were also used during the ceremonial warfare contests in order to emphasise male strentgh, fighting skills and accuracy and to reinforce the position of individual contestants within the community. Prestigeous weapons were also depicted on figural grave stones (such as Petit Chasseur: Fig. 4.1) or on some rock art (Cemmo, Val Camonica etc.). Archery became decisively important in the symbolic expression of warfare during the Bell Beaker period.

The Bell Beaker depiction of a bow on the figural grave stone (157 cm high, 85 cm wide) from Petit Chasseur (Gallay 2011) has a predecessor in the Corded Ware tomb interior incised decoration from Leuna-Göhlitzsch (Merseburg District) showing a bow and quiver with arrows (194 cm long, 95 cm wide; see Behrens 1973; Probst 1991, 403). The growing social importance of archery is commonly demonstrated within the Bell Beaker burial customs (Turek 2004). In the Bell Beaker Eastern Province archery sets consisted of arrows with flint arrowheads, stone

Fig. 4.1. Bow and arrow on figural stele from Petit Chasseur (photograph: J. Turek).

wrist-guards, quivers and bows (quivers yet undiscovered). Antler retouching tools and sets of flint flakes representing the craft of arrowhead production were symbolically represented in the burial context (Turek 2003). Another symbolic artefact emphasising the prestige of archery is the bow-shaped pendant mainly made of wild boar tusk (Hájek 1957; Piggot 1971; Turek 2004; Růžičková 2009). These decorative artefacts are perhaps connected to those made of halved wild boar tusks that were probably used for processing the surface of the bow. Another Bell Beaker artefact indirectly connected with archery is the sandstone arrow-shaft smoother known also from burial context.

As we shall observe further, archery and its symbolism played an important role amongst prehistoric societies not only as a hunting method, but also mainly as a warfare phenomenon. In different cultures of the World archery shooting contests carried out as a part of ceremonial warfare presentation also became an important feature of cosmology.

Wrist-guards in action

As in the present day sport of archery, the wrist-guard was an important part of an archer's equipment in the past. The existence of some kind of protection for the archer's wrist may be presumed for most prehistoric periods. However, we have to bear in mind that the Asian method of archery with an arrow positioned on the right (outside edge) of the bow makes the protection of the wrist pointless as, during shooting, the string is never in contact with the wrist (Korfmann 1972, 217). For European prehistory, it is possible to presume a prevalent method of shooting with the arrow to left (inside) of the bow. It would be more precise to say with arrow near to the wrist, as in the case of a left-handed archer the arrow would be to the right of the bow, but would still require protection of the right wrist. Throughout different prehistoric periods specific artefacts occurred (usually made of bone or antler) that may be interpreted as wrist-guards. However only at the end of the Eneolithic and beginning of Bronze Age Reinecke A1, is the use of stone wrist-guards well documented. Bearing in mind the importance of the protection of the archer's wrist we have to assume that there was a common use of such protective devices that might have been made of various organic materials (leather, wood, bark, textile etc.) as is documented within some present day pre-industrial societies. These artefacts are, however, not likely to be documented by archaeological methods. For example the Marind-Amid people of Papua New Guinea use grass bracers to protect archers' forearms (Fokkens *et al.* 2008, fig. 11). Such organic artefacts unfortunately did not survive from the European prehistory. The Inuit wrist-guard made of a wallrus tusk was of similar arched shape with a system of binding with four holes (Fokkens *et al.* 2008, fig. 12). An example of how practical wrist protection became a prestigeous artefact may be demonstrated on the Navajo leather wrist-band with a decorative silver board attached (Fokkens *et al.* 2008, fig. 13). The silver ornament has not enhanced the protective function of the wrist-guard, but turned it into an archer's ornament.

Kapauku Papuan's warfare

While discussing the use of wrist-guards and role of archery and warfare in traditional societies it is useful to view the reality of archery combat in ethnographic context. Therefore I am going to retell the highly inspiring description of tribal war between the Kapauku people of the Papua New Guinea Highlands as it was observed and recorded in 8 mm film by Leopold Pospisil in the 1950s (L. Pospisil, pers. comm. 1991). As one of the first westerners to visit them, Pospisil had a unique opportunity to live with Kapauku People and study their law and societal structure (Pospisil 1963). One of his recorded observations was a tribal war between two currently antagonised communities. He describes the event as seemingly chaotic combat taking place in a high grass zone where men of both sides were hiding and every so

often raised and shot an arrow at the enemy. There were only a few warriors on both sides and no fatal casualties. It seems that the killing of the enemy was not the priority and there was no physical contact or man-to-man combat between warriors. Women were fearlessly walking amongst the warriors, collecting arrows and pulling the injured men off the battleground. No one of the enemy would hurt the women or they would, for the rest of their life, become the target of mockery and contempt by other men of the community. This observation represents more a model of fighting for pride and presentation of strength and bravery than war that aims to kill the enemy and exterminate his community.

Bell Beaker stone wrist-guards

The wrist-guard is a specific artefact that was intended to shield an archer's wrist, the delicate area of artery, from the lash of the bowstring as it snapped forward. However, this protection is not needed if the arrow is positioned to the right of the bow a,s during shooting, the string is never in contact with the wrist. The position of wrist-guards in Bell Beaker (but also in later Nitra Culture) graves, usually near the forearm, suggests the way in which they were used. Stone wrist-guards as a part of so-called Beaker Package appear across a vast territory from the Iberian Peninsula and Ireland to present day Budapest. Volker Heyd (2000, 283) presumes that there may be about 1000–1500 finds of Bell Beaker wrist-guards from the whole of Europe and Edward Sangmeister (1974, 112) collected 262 exemples from central Europe. He mentioned 187 wide wrist-guards with four or more holes and 75 narrow ones, usually with one hole in the middle of each shorter side.

In the symbolism of Bell Beaker burial rites wrist-guards played an important role as prestigious objects. The social significance of archery equipment in the funerary context replaced the preceding symbolism of Corded Ware battle-axes, maceheads and axes. Stone wrist-guards are not the only artefacts emphasising the importance of archery in the Bell Beaker period. In the Beaker burial assemblages there are also flint arrowheads or their rough-outs, with antler retouching tools for pressure flaking (such as grave No. 117/78 in Radovesice District Teplice; Turek and Černý 2001, 605, fig. 2). There are also two-part stone arrowshaft smoothers. We may also understand the bow-shaped pendants that were recognised as bow models by S. Piggot (1971, 80–94) as a symbolic form of celebrating the social significance of archery .

Less frequent are wrist-guards discovered in settlement contexts. Besides the surface scatter finds from central Bohemia (Tuchoměřice-Kněžívka: Turek and Daněček 1997, Obr. 9, 6) most of the finds come from Moravian settlement sites of Mořice (District Prostějov), Hodějice (District Vyškov) or from Čechůvky (District Prostějov) (Ondráček *et al.* 2005). An interesting find of a wrist-guard without perforations comes from settlement pit 1/76 in Bořitov (Ondráček *et al.* 2005, taf. 6, 26). A similar wrist-guard was discovered in grave No. 35/38 at Holásky (District Brno-město; Dvořák 1991, 49, 51, Obr. 8, 11). Yet the only known find of semi-finished unpolished wrist-guard comes from Szigetszentmiklós (Aquincum exhibition 2009).

Amongst the Bohemian and Moravian Bell Beaker burials accompanied by sets of flint arrowheads (arrows) not every one contained a wrist-guard. The same observation was made by V. Heyd (2000, 284) for Bavaria, where only 7.5% of all graves contained a wrist-guard. Therefore it seems to be very possible that the stone wrist-guard was a kind of luxurious and perhaps decorative version of a common artefact and its meaning was merely prestigious. The meaning of a stone wrist-guard as a decorative object demonstrating the social status of the owner may be well documented in those cases of highly decorative and luxurious items, such as the golden wrist-guard from Agua Branca in northern Portugal (Harrison 1980, 139, fig. 96), or the wrist-guard with gold studs from Culduthel Mains near Inverness in northern Scotland (Harrison 1980, 93, fig. 65). Another example of the high value of this artefact may be seen in the find of a decorative bone case with stone wrist-guard inside that was found in the tomb No. XIII of the necropolis of Anghelu Ruju (Alghero, Sardinia; Nicolis and Mottes 1998, 296, fig. 1). Use-wear analysis of stone wrist-guards from north-west Bohemia suggests that at least some of them were worn repeatedly and, in some cases, even repaired by drilling new holes next to the broken corners. The traces of use in the sense of shooting with a bow are, however, very difficult to be identified. None of my macroscopic use-ware analyses produced clear evidence for the traces of a lash of the bowstring as it snapped forward. The majority of Beaker stone wrist-guards were found in burial contexts. The artefacts from burial assemblages are usually intact (only sometimes repaired) and therefore it is difficult to seek any specific pattern in their fragmentation that could suggest more about their use. The breakage of corners is most likely as a result of stress produced on the perforations and strapping while the wrist-guard was fastened onto a forearm.

Typology, design, metrics and chronology

The majority of stone wrist-guards found in Europe belong to the late Eneolithic and Early Bronze Age. Most were recovered from the Bell Beaker cemeteries. E. Sangmeister (1964) divided them chronologically into an earlier type – wide, arched, with four holes – and a later form – usually narrow, flat, with only two holes. The flat and narrow wrist-guards are more characteristic of Western Europe and the wider arched ones are more common in the Eastern

Province. The main concentration of wide arched wrist-guards is east of the Rhine. The fashion of stone wrist-guards perhaps comes from the area of Central Europe and only during the later development of the Bell Beaker Complex spread to the west. One of the arguments supporting this chronological consideration is the total absence of wrist-guards in burial contexts with the earliest AOO (all over ornamented) Beakers in Western Europe.

In Bohemia and Moravia the flat and narrow wrist-guards only occur together with chronologically late finds of so-called *Begleitkeramik* (e.g. Most-Souš Reimund Kopmposch sand quarry; Tuchoměřice-Kněžívka; Turek and Daněček 1997, Obr. 9, 6). This trend carries on in the subsequent Epi-Corded Ware Cultural Complex in eastern Moravia, such as in finds of the Chłopice-Veselé Group (narrow and long wrist-guard from the cemetery at Sudoměřice; Podborský 1993, obr. 161, 13) as well as amongst the burial finds of Nitra Culture (Holešov, District Kroměříž, graves No. 160, 167, 206, 290 a 310; see Ondráček and Šebela 1985, Tab. 18:9, 10, 20:18, 28:17, 30:24). The new elements in the Nitra culture are very narrow, almost cylindrical in shape, without any perforations, and with fastening grooves on sides near the ends (e.g. Holešov – graves No. 46 and 84; Ondráček and Šebela 1985, Tab. 6:9, 11:29).

The tradition of two holed narrow wrist-guards continues also in the Early Bronze Age Proto-Únětice Culture. M. Bartelheim (1998, Karte 172) listed eight examples from Bohemia and Moravia. The fashion of stone wrist-guards also continues in some other Early Bronze Age Cultures in Europe, such as in north Italian Polada Culture (Aspes and Fasani 1976, 326 Abb. 3). In the period of developed Únětice Culture stone wrist-guards disappeared from material culture. Roughly at the same time stone wrist-guards appeared in regions which were previously not exposed to the Bell Beaker style and ideology. In the Aegean region, for example, marble wrist-guards had already appeared in the Early Cycladic period (e.g. an item in the collection of Albertinum, Antikeabteilung, Dresden or from Pelos on the island of Melos; see Bouzek 1967, Tab. 5A, 9). Stone wrist-guards are also known from early Helladic contexts in Greece and Crete (Volker Heyd, pers. comm. May 2011). Later, some bone and antler wrist-guards appeared in the Maďarovce Culture (*Reinecke A2*) or in the Early Iron Age Horákov culture in Moravia (Vencl 1984, 308); however stone wrist-guards were never fully restored into material culture.

The basic typology of stone wrist-guards from the Eastern Province of the Bell Beaker culture was established by Edward Sangmeister (1964; 1974). He sorted wrist-guards according to the five main descriptors: metrics, proportions, shape, degree of arching and perforation (Sangmeister 1974 113–116, Abb. 8). The Sangmeister typology really covers the main types of Central European Beaker wrist-guards and it is possible to extend it by only a few variants. The typology was further developed by Turek (2004); Fokkens *et al*. (2008) and most recently by Woodward *et al.* (2011).

Typology

Figure 4.2 presents the revised Sangmeister's typology:

Type A: wide, distinctively arched wrist-guard with four holes and elevated edges on the wider, shorter sides. These examples are usually decorated by engraved lines along the shorter sides and sometimes also between the perforations. In the case of type A, holes are drilled only from the avers (outer) side.

Type B1: wide, slightly arched wrist-guard with four holes, widened shorter sides and thin polished long sides.

Type B2: is a variant of the previous type with convex shorter sides.

Type C: wide, slightly arched wrist-guard with four holes, of oblong or slightly trapezoidal shape.

Type D1: narrow, long and flat wrist-guard with four holes and straight shorter sides.

Type D2: this is a variant of the type D1. It differs by its convex shorter and longer sides that become narrower towards the both ends.

Type E: narrow, short and flat wrist-guard with four holes, slightly wider ends and rounded edges.

Type F: narrow, short and flat wrist-guard with extremely widened ends, "tightened" body and one hole in the middle of each shorter side.

Type G1: narrow, long, and flat wrist-guard of an oblong shape and one hole in the middle of each shorter side. The sides are rounded and more or less straight cut.

Type G2: narrow, but short wrist-guard with a rounded top and flat base, sometimes with sides ground into "sharp" edges. One hole is located in the middle of each shorter side. The ends of these wrist-guards are sometimes so rounded that it turns the whole object into an oval shape.

With different types of wrist-guards may appear various exceptions and accessories, such as additional perforations. Three holes in the shorter sides sometimes appear on arched wrist-guards of type B (Tišice, Fig. 4.3), as well as on flat ones of type D (in this case it seems to be more frequent, e.g. Tvořihráz, grave 2/91; Bálek *et al.* 1999, Tab. 8, 14; Jezeřany-Maršovice, grave – obj. 67; Langová and Rakovský 1981, obr. 3, 16). In **all three cases** presented here one corner of the wrist-guard was broken. This may suggest that "extra" middle perforations were added in order to mend the artefact. However, we have to bear in mind examples of other intact wrist-guards with six holes (Stehelčeves, okr. Kladno; Hájek 1961, Tab.1, 5; Praha – Letná; Hájek 1966, Abb. 8, 2; Předmostí – objekt I (B); Hájek 1966, Abb. 2, 3; Medunová-Benešová 1962; Riehen BS; Degen 1976; 77, 86, or from Britain – Winterslow – Hut; Clarke 1970, fig. 134).

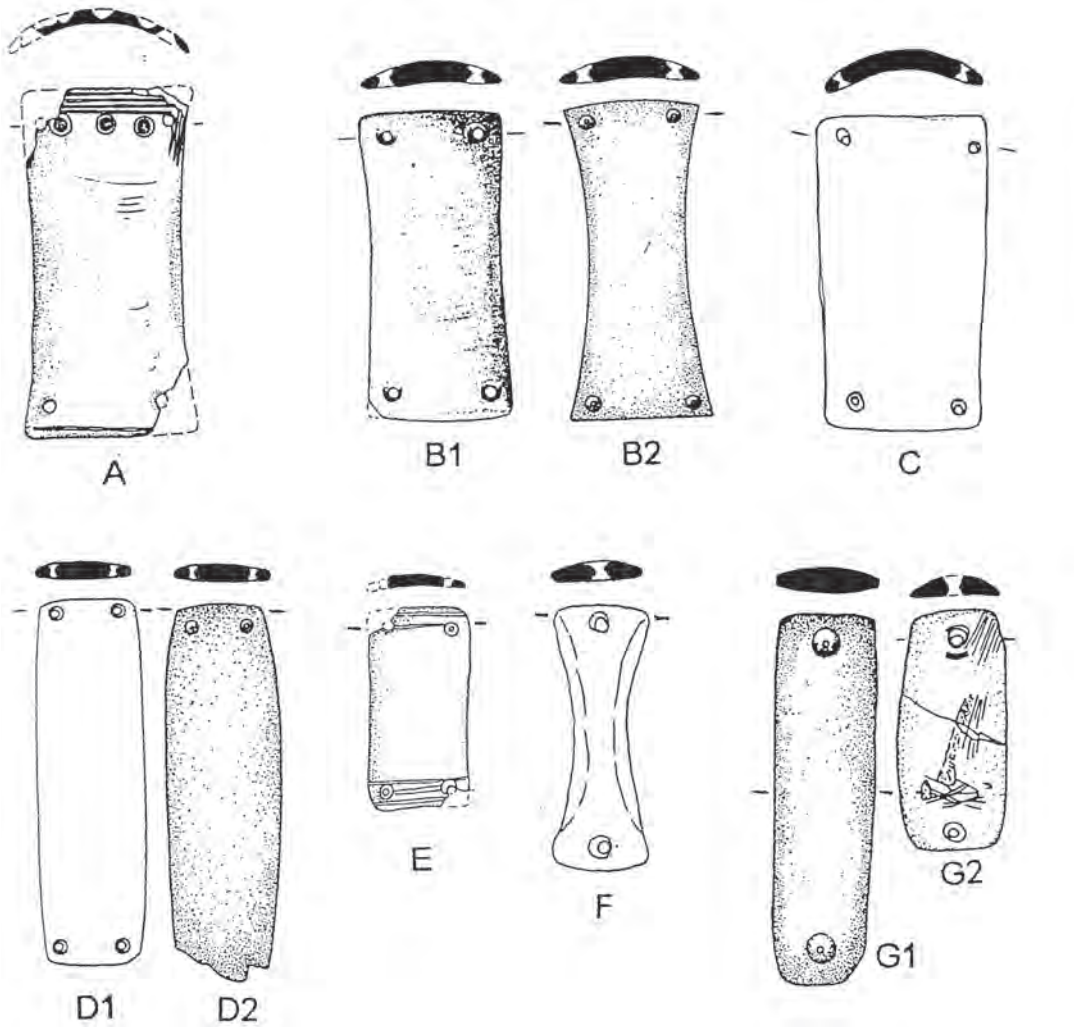

Fig. 4.2. Typology of Bell Beaker stone wrist-guards (after Turek 2004).

Fig. 4.3. Tišice (Mělník District, Central Bohemia) a detail of drilling the perforations on wrist-guard from Bell Beaker grave 77/99 (photograph: J. Turek).

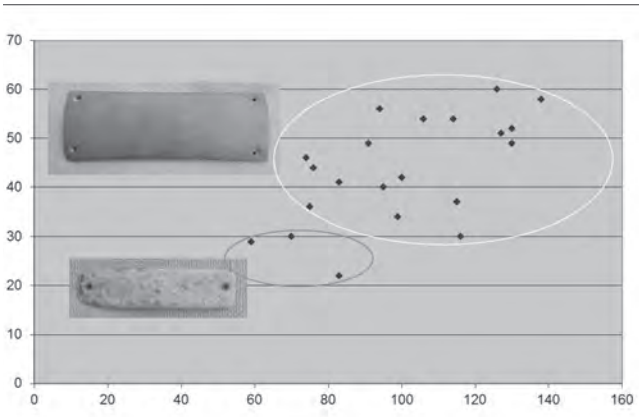

Fig. 4.4. Graph of metrics of Bohemian Bell Beaker wrist-guards (in millimetres). White outline is the range of A–C types, Grey are types D–G.

Fig. 4.5. Bell Beaker stone wrist-guards from Bohemia. Top left: Řež (Prague-East District), top right: Stehelčeves (Kladno District), bottom left: Bylany (Kolín District), bottom right: Prague–Lysolaje (photograph: J. Turek).

Fig. 4.6. Bell Beaker stone wrist-guards from Bohemia. Top: Prague–Lysolaje, below: Prague–Ruzyně (photograph: J. Turek).

Raw materials

The most common raw materials used in the production of stone wrist-guards in north-west Bohemia were Tertiary metamorphic and silicified mudstones or fine grain sandstones. These rocks were probably ideal materials for the technological and functional requirements of production and use of wrist-guards. Their laminated structure made possible the grinding of the artefact into the desirable arched shape. The rocks used for the production of wrist-guards are of a similar nature and they may be divided into four basic categories: Tertiary silty mudstones, Carboniferous grey or ochre aleuropelites, red/purple coloured silicified psamits with green dots of pelites of Perm age and, used exceptionally, very fine grain sandstones (almost quartzite - Libochovice). The raw material was probably gathered in a form of pebbles transferred by erosion into the secondary deposits. The mudstones were eroded and silicified during the Tertiary age that made them harder and stronger. Still during the Tertiary period their erosion and transportation by rivers began. In the Eneolithic period, the primary outcrops might have been covered by Quaternary sediments and not, therefore, directly accessible. This is one of the main reasons that restrain us in detecting the primary sources of these rocks. The transferred stones might have been gathered in the Bell Beaker period in the banks along the watercourses or directly in their riverbeds. Bearing in mind that pebbles at least 15 cm long were needed for the production of wrist-guards, it is probable that they were gathered within a zone 10–15 km from the primary source. However, the collection of raw materials was most likely carried out within a more local range close to the source.

The second main group of raw materials represent the metamorphic Silur rocks of the Ore Mountains Palaeozoic. These were transferred into the lowlands by the similar mechanism as Tertiary mudstones and they were probably collected in the same fashion.

The wider four holed arched stone wrist-guards were mainly made of pale grey or ochre coloured aleuropeites or, alternatively, red/purple psamites. The later Beaker narrow and flat wrist-guards with two holes were more frequently made of dark rocks such as dark grey aleuropelite (Most-Souš), or dark schists (e.g. dark Proterozoic schist of the Zbraslav-Kralupy group from Tuchoměřice-Kněžívka; see Turek and Daněček 1997, 133, obr. 141, 6). It seems also that the nature of schist as a raw material is more suitable for flat rather than arched wrist-guards. A small Moravian collection published by A. Přichystal (2000a, 133; 2000b, 63) is useful for the comparison of raw materials used in north Bohemian wrist-guards .

Metrics

Analysis of metric features was carried out on a collection of 21 wrist-guards from Bohemia recovered from north Bohemia (Turek 2004), Prague and central Bohemia (Figs 4.4–4.8). The data gained by this analysis are in line with the basic typology of wrist-guards as presented above.

The length of wrist-guards ranges between 59 mm and 138 mm and their width between 22 mm and 58 mm. As Figure 4.4 shows, one of the major differences between the main types of wrist-guards is their width. The types D–G are flat and narrow with two or four perforations (outlined in red on Fig. 4.4), while types A–C (outlined in yellow) are arched, wider and with four or more perforations.

The width of these arched wrist-guards fits ergonomically for comfortable wearing on the wrist of an adult person. It is also important to mention their slightly asymmetric proportions in relation to the anatomy of the human forearm. Their lower side (adjacent to the wrist) is usually 1–3 mm narrower than the upper side nearer to the elbow. This makes the wrist-guard more stable and comfortable on a forearm Also, Sangmeister's analysis of the dimensions of Central European wrist-guards suggests that the majority of arched examples are wider than 40 mm and their length usually exceeds 140 mm (maximum length 160 mm), which also correlates with the ergonomic needs for protection of an adult archer's wrist and forearm (Sangmeister 1974, 152, diagr. 5). Within Sangmeister's collection there is only one miniature wrist-guard, which is of type G and its size is 30 × 20 mm. Any gigantic examples that would exceed human dimensions have not been recorded in Central Europe, however, some examples are known from Great Britain, such as an extremely wide wrist-guard with copper rivets from Barnac, Cambridgeshire (Kinnes 1995) or the Scottish wrist-guard from Culduthel Mains near Inverness (Harrison 1980, 93, fig. 65), which was decorated with gold rivets.

Colour significance

I have already discussed raw materials and trace wear analysis of wrist-guards in a previous study of the finds from north-west Bohemia (Turek 2004), therefore, I am going to focus on the topic that has only been discussed marginally – the colour of the wrist-guard surface (I am grateful to Antonín Přichystal for most of the raw material determinations). The raw materials used for the production of wrist-guards were always evaluated with regard to their practical function and properties of the stone for manufacturing. Bearing in mind that most of the rocks concerned originated a considerable distance from the regions of their consumption (Turek 2004; Fokkens *et al.* 2008), it is quite possible that the colour and design of the stone played an most important role in its choice. It needs to be observed that the polishing of the surface and its subsequent post-depositional patina might have led to a different colour tone than would be apparent on the surface of fresh raw material. Different basic colour shades were perhaps purposefully chosen for different types of wrist-guards. The A–C arched wrist-guards that are most

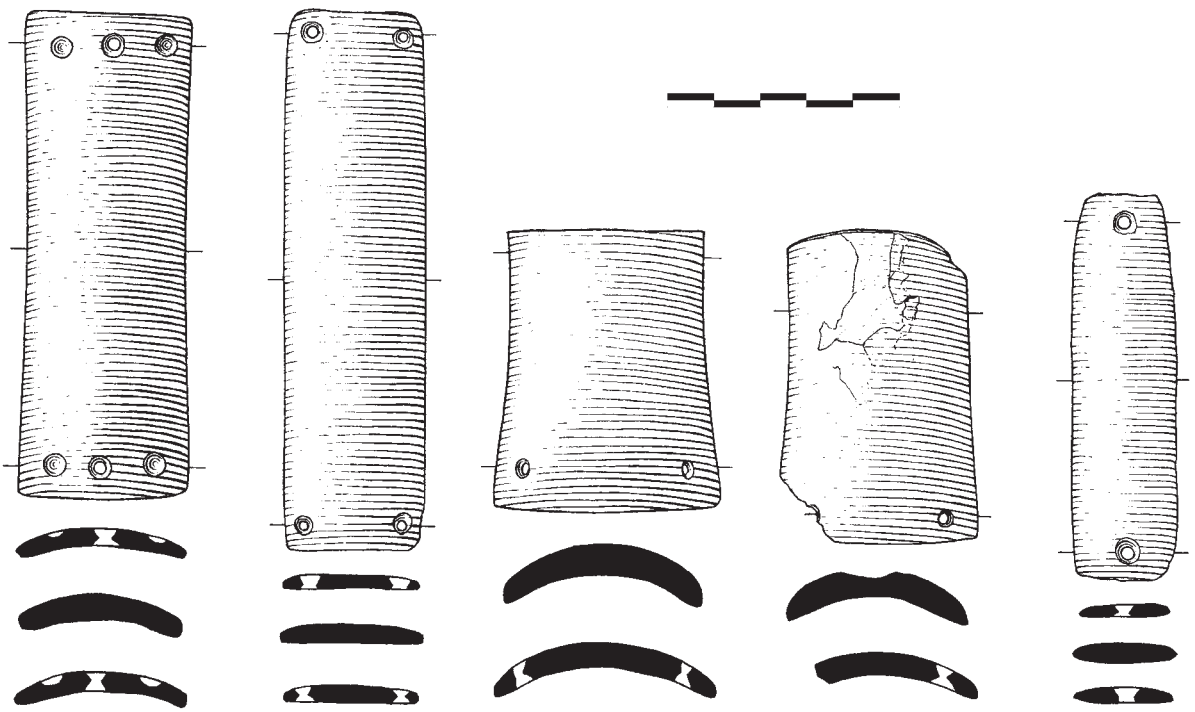

Fig. 4.7. Bell Beaker stone wrist-guards from Bohemia. From left: Stehelčeves, Lysolaje, Neratovice, Lysolaje, Ruzyně (drawing courtesy of Archaeological Institute Brno).

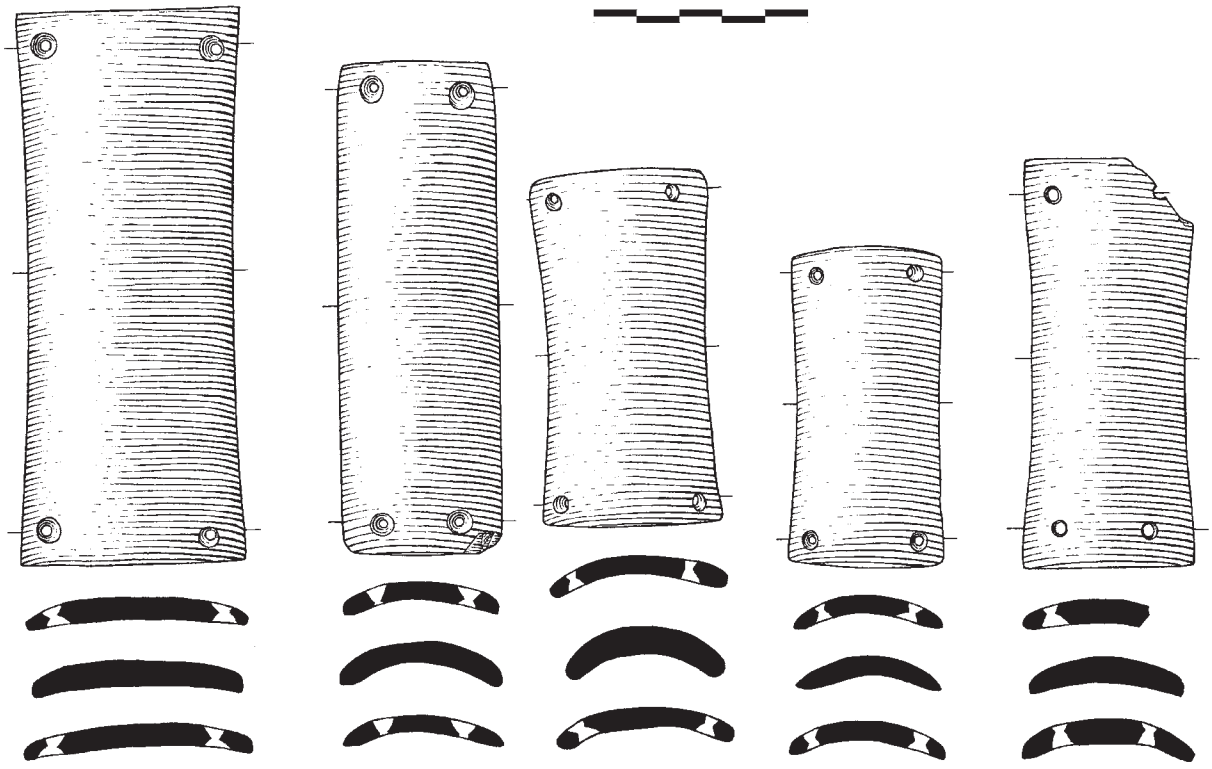

Fig. 4.8. Bell Beaker stone wrist-guards from Bohemia. From left: Neratovice, Lysolaje, Řež, Lysolaje, Neratovice (drawing courtesy of Archaeological Institute Brno).

Table 4.1 Raw materials used for production of Bohemian wrist-guards and their main colours

Raw materials	*Colour*	*No.*
claystone	yellow/grey	12
aleuropelite	yellow	8
psamite	red	2
clay duststone	grey	1
sandstone	white	1

commonly represented amongst Bohemian examples are prevalently made of light rocks, such as ochre/yellow and light grey claystone (12 items) and ochre aleuropelites (8 items) (Table 4.1). These materials represent almost 78% of all raw materials used in Bohemia for the production of stone wrist-guards. Only two arched wrist-guards were made of carmine (dark red/violet) psamit.

It is important to emphasise that this material was exclusively used for the production of the most decorative engraved wrist-guards with elevated ridges on the short edges. These come from Mostu-Souš (Turek 2004, obr. 8, 5), z Poláky (Turek 2004, obr. 8, 2) and Velké Žernoseky (Turek 2004, obr. 9). It seems that the red wrist-guards were of particularly high social prestige. Therefore it is no surprise that one of the wrist-guards accompanying the Amesbury Archer is also of dark red colour (Fitzpatrick 2011). One wrist-guard of grey claystone and one of white/yellow-grey fine grained sandstone/quartzite. It is possible that certain types of wrist-guards were connected to specific colour and the choice and search for raw material was devoted to this imperative.

Production technology, hafting, wearing, damage and repair

The trace ware analysis of 15 wrist-guards from north-west Bohemia and Tišice (District Mělník) also provided data for the reconstruction of production technology of these stone artefacts (Turek 2004). Considering the natural properties of raw materials and the desired shape of final products, it is possible to presume that the original form of the material was a long pebble (see above). The pebbles might have been used straightaway or after breaking along or sawing across. Cross sawing was probably used to produce straight and clear-cut shorter sides of the arched wrist-guards. Traces of sawing were, however, erased by subsequent polishing. The main technological step was then grinding, which, considering the relatively soft raw materials used would not require particularly hard and resistant grindstones. The shape of arched wrist-guards suggest that, besides the flat grindstones, some kind of cylindrical grindstone might have been used for grinding their inside. Grindstones rarely appear in Bell Beaker burial assemblages and settlement finds of this period are not sufficiently analysed and published. In an attempt to search for possible tools that might have been used for production of wrist-guards, we should start with detailed examination of the outer side of the so-called arrowshaft smoothers, as some of them seem to be just the right size and shape for this alternative use. Also the material, which is medium coarse sandstone, may fit with the production traces on the inside of some wrist-guards. A further technological step was the smoothing and polishing of the wrist-guard's surface, which focused mainly on its outer side, eventually on its sides and edges. We usually do not find many traces of rough grinding on the outer side of wrist-guards. Decoration by engraving may follow. The decoration consists of bands of parallel lines and usually covers zones along the edges of the shorter sides. Examples of such decorated wrist-guards come from north-west Bohemia: Bílina, Most-Souš and Velké Žernoseky, from southern Germany: Bobfingen-Flochberg (Kr. Ostalbkreis), Dillingen (Kr. Dillingen a.d. Donau), Grossmehring (Kr. Eichstätt; Heyd 2000, 68–70), from central Germany: Düppel (Harrison 1980, fig. 37, 6), or from Baden-Würtemberg: Kornwestheim, Kr. Ludwigsburg (Sangmeister 1974, 105, Abb. 2, 2) and from many other sites in Central Europe. The band of engraved lines may also appear along the shorter side, between two holes, which may schematically represent the in which the wrist-guard was strapped onto a forearm.

On the outer side of some examples were drilled three or four hollows, along the shorter sides between the holes, such as on the wrist-guard from Bílina (obr. 8, 1), Předmostí (obj. II. (C); Hájek 1966, Abb. 3, 10; Medunová-Benešová 1962), Henzing in Lower Austria (Neugebauer and Neugebauer-Maresch 2001, 434, fig. 5, 8) or from the tomb III at Anghelu Ruju (Alghero, Sardinia; Manunza 1990, 59, Tav. II, 20). Other ways of decoration, such as the example from Culduthel Mains (Harrison 1980, 93, fig. 65), which was decorated with gold rivets, have not been recorded in Central Europe.

Holes were drilled only after polishing and possible decorating were finished. This succession of technological steps is illustrated for example by the disturbance of engraved decoration by drilling on the wrist-guard from Moras sand quarry in Bílina (Turek 2004, fig. 8, 1). Drilling was done with a pointed tool, not with any kind of hollowed drill. Considering the relatively soft raw materials used it is most likely that a flint drill was used.

Two thirds of analysed wrist-guards were perforated by drilling from both sides. The drilling usually started on the inner side and was later connected with a shallower drilling from the outer side. Evidence of such technology may be seen in the wrist-guard from Most-Souš (Turek 2004, fig. 7, 1), with traces of drilling begun on the inner side which was finally moved and finished further from the edge. Four wrist-

guards drilled from one side only were worked from the inside. An exception is the wrist-guard with six holes from grave No. 77/99 in Tišice (Fig. 4.3), which was perforated from the top, outer side (Turek 2004). More distinctive traces of the outer drilling seem to be visible on the later narrow and flat wrist-guards with two holes. In some cases there are also traces of tiny point hollows on the outer side, which were possibly made to "find" and join the main perforation drilled from the inside (cf. Radovesice – wrist-guards from graves 53/80-I and II). Some wrist-guards had clear traces of a breakthrough in the area, where there was an excessive pressure by a drill from the inside. The chipped edges of the hole were afterwards cleaned by polishing. Traces of very fine circular lines scratched on both sides around the perforation were observed on one of the wrist-guards from Tišice. These traces were caused by the wider "handle" of the flint drill as it got through the body of the wrist-guard.

E. Sangmeister (1974, 114) describes an exceptional appearance of cylindrical perforations of some wrist-guards. In connection with this it is necessary to observe that the important factor influencing the final shape of a perforation is the hardness of the raw material and that the drilling of soft materials such as claystones and sandstones would naturally result in a conical shape to the hole.

The question of the function of wrist-guards has already been discussed and I mentioned the possibility that stone wrist-guards were mainly decorative and prestige objects (Turek 2004). The results of trace ware analysis suggest that at least some wrist-guards were worn repeatedly. This could be proven, for example, by a polished ridge that originated from the abrasive influence of frequent motions of straps around and between the holes. The redrilled holes on wrist-guards with broken corners are evidence of using the artefact even after fixing. An extreme example is the broken and repeatedly fixed wrist-guard from Velké Žernoseky. This ended up with only two diagonal holes, which could hold it on the wrist, but not very well.

In the quest for traces of using wrist-guards in connection with shooting with bow we face the problem of rare and uncertain evidence. The trace wear analysis has not produced any clear traces of wear caused by the repeated lashes of a bowstring. Only on the wrist-guard from Radovesice, grave 116/78 there were certain traces of a highly polished surface in the central part of the outer side and almost invisible ridges across the middle of the outer side were recorded on wrist-guards from Velké Žernoseky and Štětí. It is, however, difficult to decide whether these features are as a result of bow shooting.

Also amongst the German finds there is only a limited number of wrist-guards with presumably bow shooting traces. These traces were recorded, for example, on a wrist-guard from grave D at Hofheim (Main-Taunus Kreis; Jockenhövel 1970).

Wrist-guards found in the authentic position in graves are usually placed on the left forearm of a deceased person. Havel (1978, obr. 5 a 7), in his analysis of the Bell Beaker burial rite in Bohemia and Moravia, recorded the prevalent occurrence of wrist-guards in front of the buried person's chest or face, however, he did not deal with information on which wrist they were placed. It seems that left arm wearing was recorded in most cases in Beaker cemeteries in Bohemia, Moravia and also in southern Germany, where V. Heyd (2000, 66, 284) presents only one example of an adult male burial (on left side, head towards north-east) from the grave No. 3 at Barbing (Kr. Regensburg) with a wrist-guard on the right forearm. The prevalent occurrence of wrist-guards on the left wrists of buried people is perhaps the reflection of the natural division of the population into right- and left-handed individuals.

The position of wrist-guards in funerary contexts

Another question on use of stone wrist-guards is related to the way they were worn and fastened on the archer's wrist. Fokkens *et al.* (2008) carried out an analysis of the locations of wrist-guards in funerary contexts in relation to the buried person's anatomy. All wrist-guards were found on or near the left forearm. Fokkens further studied the position of wrist-guards on forearms analysing a collection of 31 graves from England and Central Europe that offered relevant archaeological records. About 60% of wrist-guards were found on the outer side of the wrist (Fokkens *et al*. 2008, 113, fig. 2, 116). Despite the possible shifting of wrist-guards during post-depositional processes it seems that most buried individuals had the wrist-guard on the outer wrist. Fokkens further interprets this position as evidence that wrist-guards were worn as a decorative attachment on a leather (?) bracer (Fokkens *et al*. 2008, 118, fig. 10). Unlike Dutch colleagues I believe that this might have been the common way of wearing and displaying the decorative stone wrist-guard, the method of hafting on fthe orearm made it possible to turn the wrist-guard into the inner wrist position when needed for shooting an arrow. Thus it would be natural that at the time of the funeral that most individuals had their wrist-guard in the "presentation" position and not in the "ready to shoot" position.

Another question connected to stone wrist-guards is their secondary or parallel alternative use. Harrison (1980, 53) states that some of the flat examples from Western Europe appear to have traces of secondary utilisation as whetstones. The finds from Bohemia and Moravia do not seem to have any traces that could be interpreted in this manner. It is also important to emphasise that the raw materials used in Bohemia and Moravia are not suitable for sharpening or grinding. Some prehistoric stone axes show traces of alternative use perhaps as a flaking pad ,for instance for production of arrowheads. I believe that most of the Bell

Beaker wrist-guards were made of too fragile material to be used for similar purposes.

Gender context of the archery symbolism

Four Bell Beaker burials in female position and accompanied by stone wrist-guards have been found in Bohemia, Moravia and southern Bavaria. Stone wrist-guards usually come from the context of male burials (bodies on left side, head orientated to north). Female burials with examples were recorded in Oberstimm (Kr. Pfaffenhofen a.d. Ilm), grave 1 (Reider 1982, 41, Abb. 22), in Moravia grave No. 12/34 from Šlapanice II (District Brno-venkov; Dvořák and Hájek 1990, 10, Taf. XVI), in Bohemia in grave III at Praha-Vršovice and two wrist-guards were discovered in a rich female grave 77/99 at Tišice (District Mělník; Turek 2002; 2003; 2004).

The mixed gendered assemblages seem to be characteristic for the "rich" female burials with decorated beakers, burial chambers and eventually surrounded by a circular ditch. I presume that the relationship between decorated beakers, internal construction of the grave and package of prestigious goods is more likely to be a reflection of certain social distinctions rather than chronological differences. Also, the blending of male and female gendered assemblages in the "rich" graves seems to be rather a reflection of social differentiation then of chronological aspects of the period under examination. We should bear in mind Brodie's (1997, 300–301) comment that not every item of the burial assemblage must be indicative of deceased social category. It should be stressed that "gendered" artefacts should not be simply read only as a reflection of social category of the deceased person, but in some cases as a symbolic demonstration of the relations between the buried individual and other members of the community. Some artefacts may therefore rather represent the mourners and their relationship with the dead. In this context it is important to note that one of the wrist-guards in grave 77/99 at Tišice was detached from the buried body, near the western wall of the grave pit and the other one was on the left forearm, however turned with its inside up (post-depositional movement?). This could be an example of the reflection of the other members of the community into the funerary ritual in order not only to emphasise the social position of the deceased person, but also to reinforce communal identity. In certain occasions male gendered prestigious artefacts and perhaps even the male role might have been "delegated" onto women in the quest of reinforcement of the social norms, rules of social relations and differentiation. It is also possible that some women gained the male gender role and acted as Bell Beaker Amazons (Turek 2011).

3rd millennium ceremonial warfare and archery prestige

I have repeatedly presented the concept of ceremonial warfare and the role of symbolic weapons in ritual combats and ceremonies, including the funerary practices of the 3rd millennium in Central Europe (Turek 2005; 2007). Here I want to discuss the possible procedures of the warriors' competition known as ceremonial warfare in two different Copper Age contexts. The Corded Ware (2900–2500 BC) phenomenon is renowned for its battle-axes and mace heads. These weapons suggest some kind of man-to-man combat during ceremonial fighting. Besides the skills, fighting strategy and handling the weapon, physical strength would be required from the successful combatant. The competition might have been different in the Bell Beaker Period (2500–2300/2200 cal. BC). The bow and arrows offered some distance between combatants and for ceremonial competition within the same community it may well be possible that warriors were involved in some kind of ceremonial archery shooting contest, without threatening each other at all. Such competition would rather test one's accuracy and skills than strength and could possibly be opened also to female archers (Turek 2011).

Conclusion – The role of archery in ideology and cosmology of past societies

Archery played an important social role in ancient civilisations. The legendary archers acted decisive roles in some stories of the medieval Europe, such as legends of William Tell or Robin Hood. The 4th century BC scene on the famous electron vessel of the Skythian Kurghan Kul Oba depicts the legendary competition of pulling the bowstring (Hermitage National Museum, St. Petersburg). References to archery skills and prestige may be found in Homer's Iliad and Odyssey. Legends of mythical archers are, however, not exclusively a European prerogative. Much earlier are the Hindu epic mythological stories such as Mahabharata, telling the story of decisive battle in the Kurukshetra War between Kauravas and the Pandavas Bharata lineages, and Ramayana describing the battle between Rama and daemon Ravana, who kidnapped his wife Sita. The battle of Ramayana supposedly happened in 3102 BC and despite the fact that the written text date falls into the 1st millennium BC, the story itself is much earlier. In these stories archery was related to virtues and values such as noble descent, bravery, strength and accuracy. Such symbolism was perhaps valued also by European prehistoric farmers. Within the system of ascribed hereditary status (Turek 2011) archery became an important symbol of power, wealth and identity.

This was perhaps due to the role of archery in ceremonial warfare. The warfare symbolism structured prehistoric society more significantly than some important agricultural means of production, such as plough, team, or sickle that never occurred in Copper Age burial assemblages. Also, the significance of archery as a symbol of hunting is not very likely for European Copper Age society. As we know from the archaeozoological analysis of rare Bell Beaker settlement finds, the percentage of wild species is generally very low (Turek 2005).

It is very likely that during the Bell Beaker period archery symbolism was connected to Beaker ideology that, together with a prestigious objects package and copper metallurgy, spread over most of Western and Central Europe. It is also possible that archery symbolism and solar cult (Turek 2005) were shaping the Bell Beaker cosmology. Unfortunately the true nature of such cosmology remains a mystery.

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5

THE EARLIER BELL BEAKERS: MIGRATIONS TO BRITAIN AND IRELAND

Andrew P. Fitzpatrick

The earliest Bell Beaker burials currently known in Britain and Ireland are in central southern England (Wessex) and date to ca. 2375 cal. BC. Isotope analyses of the Boscombe Bowmen and the Amesbury Archer has shown that they are certainly or probably those of immigrants. In Scotland the earliest burials also appear to be of immigrants who arrived only one generation later (ca. 2350 cal. BC). In Ireland copper mining started at Ross Ireland in the 24th century BC and it appears to have been introduced directly from continental Europe by Bell Beaker groups.

The mortuary rituals in Britain and Ireland include collective and individual burial which, in general terms, are typical of southern and western Europe, and north-west and central Europe respectively. This suggests that the Bell Beaker Set may have been introduced to these islands from more than one region of continental Europe in a time of rapid change that involved the wide and rapid movement of people and ideas, and materials and objects.

The Bell Beaker "Set": islands and networks

The currently recorded distribution of Bell Beaker finds across Europe is extensive but discontinuous. As a result it seems clear that travel and migration played important roles in constructing and maintaining the Bell Beaker Set. Those regions with Bell Beaker finds can be seen as "islands" of finds (Vankilde 2005) or "nodes" in a network. The concept of a network allows the finds to be seen as a polythetic "Set" that includes a mixture of international and local traits, a feature that is typical of those regions with Bell Beaker finds all across Europe and Africa (Clarke 1976; Vander Linden 2004; 2006).

Recent discoveries in Britain and Ireland and the application of scientific techniques, particularly isotope analyses and radiocarbon dating to them, have allowed a reconsideration of the journeys that introduced the Bell Beaker Set to these islands (Fig. 5.1). It currently appears that journeys were made to different regions at approximately the same time in the late 25th or 24th centuries BC and the evidence for this is summarised in this paper. Dates given in italics are dates derived from the Bayesian statistical modelling of radiocarbon dates.

The earliest Bell Beaker burials in southern England: Wessex

The earliest Bell Beaker finds yet known in England are from Boscombe Down, Wiltshire, close to Stonehenge. Extensive excavations here have revealed a number of finds belonging to the regional Late Neolithic "Grooved Ware" culture and also a number of Bell Beaker graves. Three of these recently published graves (Fitzpatrick 2011) are of particular importance and they are considered in detail below.

The Boscombe Bowmen

The earliest of these graves is that of the "Boscombe

Fig. 5.1. Location of sites mentioned in text.

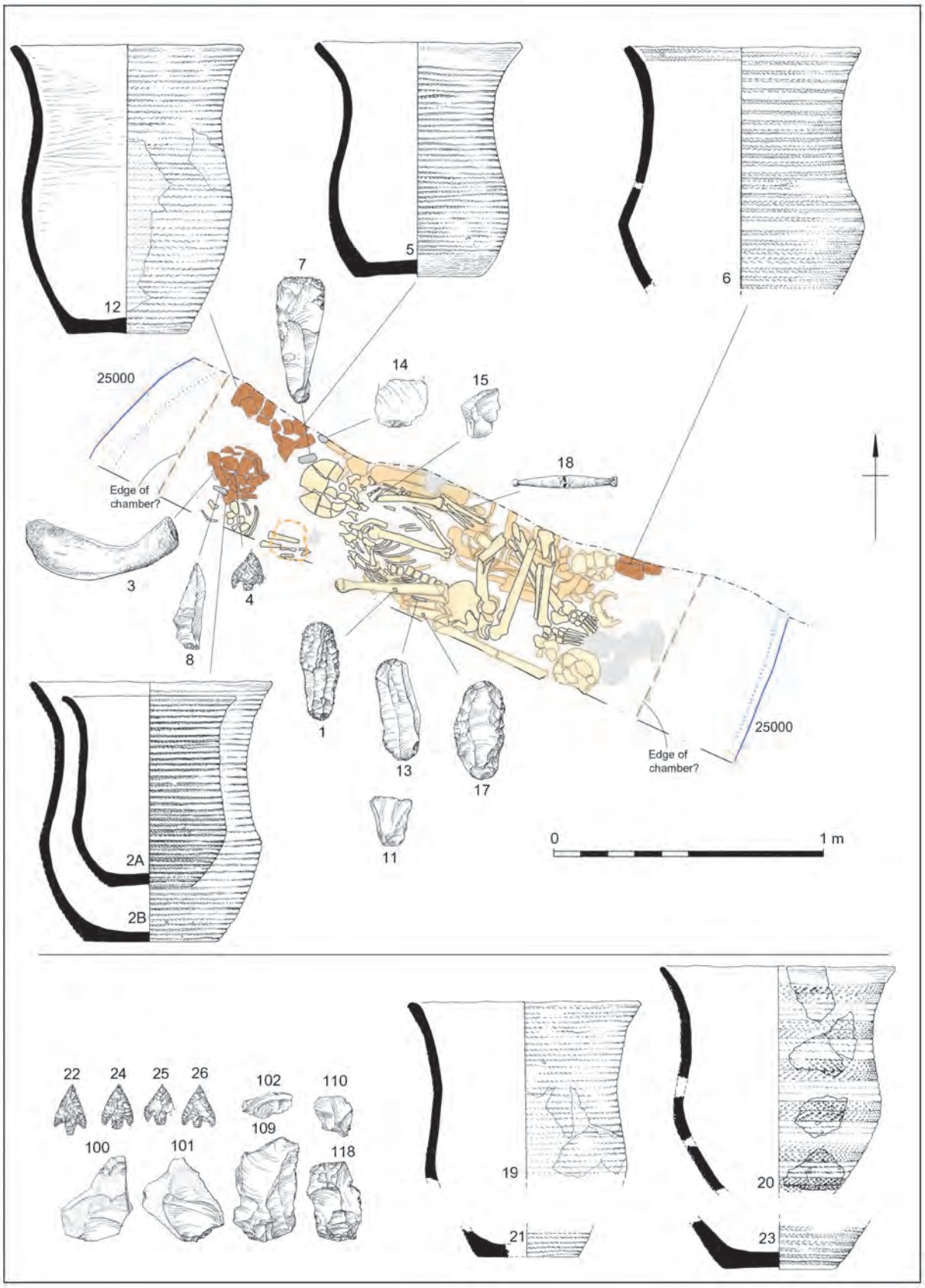

Fig. 5.2. The grave of the Boscombe Bowmen, Wiltshire (Source: Fitzpatrick 2011).

Table 5.1. Radiocarbon measurements from early Bell Beaker burials at Boscombe Down

Lab. code	*Context*	*Sample*	*$\delta^{13}C$ (‰)*	*Radiocarbon age (BP)*	*Calibrated date BC (95% confidence)*	Posterior density estimate cal. BC (95% probability unless otherwise stated)
Boscombe Bowmen						
OxA-13542	25010	25010a: adult male, disarticulated, right femur	–20.70	3955±33	2580–2340	*2500–2340 87.4%*
OxA-13543	25008	25008b: Adult male, disarticulated, right femur	–20.65	3822±33	2470–2200	*2470–2310*
OxA-13681	25010	25010b: Subadult, disarticulated, right femur	–21.10	3825±30	2300–2140	*2460–2290*
OxA-13598	25007	25010e: 5–6 year old juvenile, articulated, left femur	–21.40	3889±32	2470–2230	*2410–2270 90%*
OxA-13624	25004	25005: 30–40 year old male, articulated, right femur	–20.90	3845±27	2460–2200	*2340–2200*
Amesbury Archer						
OxA-13541	1289	1291: 35–45 male, right femur	–20.6	3895±32	2470–2280	*2380–2290*
OxA-13540	1289	1291: Boar's tusk ON 6611	–21.3	3877±33	2470–2210	*2380–2290*
OxA-13623	1289	1291: Boar's tusk ON 6592	–20.1	3866±28	2460–2210	*2380–2290*
"Companion"						
OxA-13562	1236	1238: 20–25 male, right femur	–20.4	3829±38	2460–2140	*2350–2260 59.7%*

Bowmen" (Fig. 5.2). This dates to the 24th century BC and unlike most graves in Wessex and southern England, which are single graves, it is a collective grave.

The grave probably had a wooden chamber but it was not covered by a barrow. Only the last two Bell Beaker burials in the grave were articulated and the other five or six individuals were represented by some – but not all – of their disarticulated remains. As the grave had been disturbed in modern times it is uncertain if the absence of bones is due to secondary burial rites or to bones being displaced when new burials were made.

At least five adult males, a teenager who was probably also male, and one, possibly two, children were represented. The similarities in the shape and details of their skulls suggest, even in the current absence of DNA analyses, that these men came from a closely related community. Isotope analysis of the only three suitable samples demonstrated that these men had been resident in one location aged 5–7 and in a second location aged 11–13. The strontium isotopes indicate that the geologies that underlay those locations comprised very ancient rocks. Their place of burial (Boscombe Down) represents a third location with a much younger, sedimentary, geology. The nearest region that provides comparable biosphere values is Wales but Brittany, Portugal, the Massif Central and the Black Forest are all also possible (Evans *et al*. 2006). Bayesian modelling of the radiocarbon dates indicates that the first of the Boscombe Bowmen to die did so 2500–2340 cal. BC (Table 5.1; Barclay and Marshall 2011).

The beakers from the grave were mainly All-Over-Corded beakers with low-carinated and low-bellied S-shaped profiles (seven examples), one of which was decorated with plaited (or doubled) cord and has decoration inside the rim. There was also one Cord-Zoned-Maritime beaker. All the pots were made locally. There are similarities between the pots and All-Over-Corded beakers from the Lower Rhineland but also with some finds from northern and western France (Barclay 2011). However, the isotopes analyses exclude the biosphere of the Lower Rhine as one of the childhood residences of the Boscombe Bowmen. The typical burial rite in this region is also single burial. A small antler pendant of a rare but widely distributed European type offers little guide as to the childhood residences of the Boscombe Bowmen.

The most economical interpretation of this evidence is that the grave of the Boscombe Bowmen contained the burials of the males of a small family group that travelled to Wessex in the 24th century BC. The family practised the collective burial rite typical of much of western and Atlantic Europe (Salanova 2003; 2004), and the early date of the grave in the British sequence would suggest that they came from this region. While the pots have strong similarities with those found in the Lower Rhine region, parallels may also be drawn with finds northern and western France.

The Amesbury Archer

The Amesbury Archer was buried 700 m away. The single grave was also a flat grave with a wooden chamber.

Modelling of the radiocarbon dates suggests that this 35–45 year old man was alive at the same time as the last of the Boscombe Bowman (*2380–2290 cal. BC*) and the oxygen isotopes suggest that as a young teenager he lived in a cold climate. The biosphere zone compatible with the oxygen isotopes of the Amesbury Archer stretches from the Alps to Scandinavia but the strontium isotopes exclude the older geologies of Scandinavia (Chenery and Evans 2011). A southern German or sub-Alpine origin for the Amesbury Archer's teenage residence is suggested because the Bell Beaker Set is not thought to have been introduced to central and northern Germany and Poland any earlier than it was to Britain. In general the typological similarities of the objects in his grave are with western, not central, Europe.

An exceptionally large number of grave goods were placed in the grave (Fig. 5.3), making the burial one of the best-furnished Bell Beaker examples yet found. Finds included five Bell Beakers, three copper knives, two wrist-guards, and a pair of gold ornaments. Over 100 pieces of worked flint included 17 barbed and tanged arrowheads and other objects included a stone metalworking tool (a cushion stone), and an antler pin.

The copper used for the knives (and perhaps the knives themselves) comes from continental Europe (Needham 2011) and not, as might have been anticipated, from Ireland. Two knives could be from northern Spain, the third from western France. Although the style of the gold ornaments is British it may have Iberian origins or represent a fusion of Iberian and central European styles. The gold they are made from may also be continental European.

One wrist-guard (a black one) may also be Continental but the other (red) one could be made from a rock found in south-west Wales. General, but not exact, parallels for the antler pin come from Corded Ware contexts in western Switzerland and central and western France, although the closest parallel from Vinelz, Kt Bern, is not a stratified find (Fitzpatrick 2011, 157–158; Strahm 1979).

Three of the beakers are All-Over-Corded decorated. Plaited cord was used on two of them and these also have decoration inside the rim the cord is plaited. The decoration of the other two beakers is Maritime-Derived. This assemblage may represent the transition in Wessex from "international" types to insular types.

The presence of the stone metalworking tool (a "cushion stone") may help explain both why the Amesbury Archer travelled to Britain and the "over-provision" of grave goods. Even though his burial is the earliest of someone who had the status of a metalworker yet found in Britain, he was buried far from sources of metal. The status of the metalworker and the ability to obtain metal objects and/or metal from continental Europe may help explain the "richness" of the grave. Over-provision (*Überaustattung*; Hansen 2002) occurs regularly in single graves of Bell Beaker metalworkers in central Europe (Fitzpatrick 2011, 224–229).

The "Companion"

A few metres away from the grave of the Amesbury Archer was the burial of a 20–25 year old man who had died a generation, possibly two, after him (*2350–2260 cal. BC*). The presence of a rare trait in the bones of their feet demonstrates that the two were biologically related. The oxygen isotopes also suggest that the "Companion" man may also have travelled to continental Europe.

In comparison with the Amesbury Archer, the burial of this young man was much less well-furnished. Grave goods comprised a pair of gold ornaments similar to those placed with the Amesbury Archer, a boar's tusk, and perhaps some flint flakes. The presence of the gold ornaments would suggest that at least some social status passed between generations although in it is not known if this status was ascribed or achieved.

Other early Bell Beaker burials in Wessex

A review of early Bell Beaker burials in Wessex prompted by the discoveries at Boscombe Down (Fitzpatrick 2011, 195–202) suggests that they were often isolated graves or in small cemeteries. Finds include Thomas Hardye School at Dorchester (Dorset), Chilbolton (Hampshire) and Bulford Camp, Wilsford cum Lake G54 and Winterbourne Gunner (Wiltshire) and, in the upper Thames valley, Barrow Hills at Radley (Oxfordshire).

It now seems likely that there were wooden chambers in many of these graves and the burials were usually oriented north-west to south-east. In some cases there is evidence for secondary burial rites such as the rearrangement of the corpse or skeleton and a number of the graves also have evidence for the insertion of later burials. Some of the graves contained two or more pots, suggesting that in Wessex the placing of multiple pots was an early trait.

Early Bell Beaker settlements in Wessex

Despite the scale of the excavations at Boscombe Down, over 40 ha, only two pits containing sherds from All-Over-Corded beakers were identified. In general Bell Beaker settlements remain rare in Britain (Gibson 1982, 43–47) though it seems likely that, in part, this is due to a lack of awareness of what sort of evidence might be expected; typically only isolated pits such as at Boscombe Down or a few post-holes, rather than complete buildings (Brück 1999; Allen 2005).

What appears to be the earliest non-funerary assemblage in Wessex comes from the henge at Mount Pleasant, Dorset (Longworth 1979). This material, which mainly came from ditch fills and was associated with later pottery, is arguably residual rather than representing ancestral heirlooms or relics (*pace* Woodward 2002, 1042–1043). Typologically early elements include All-Over-Corded and paired cord

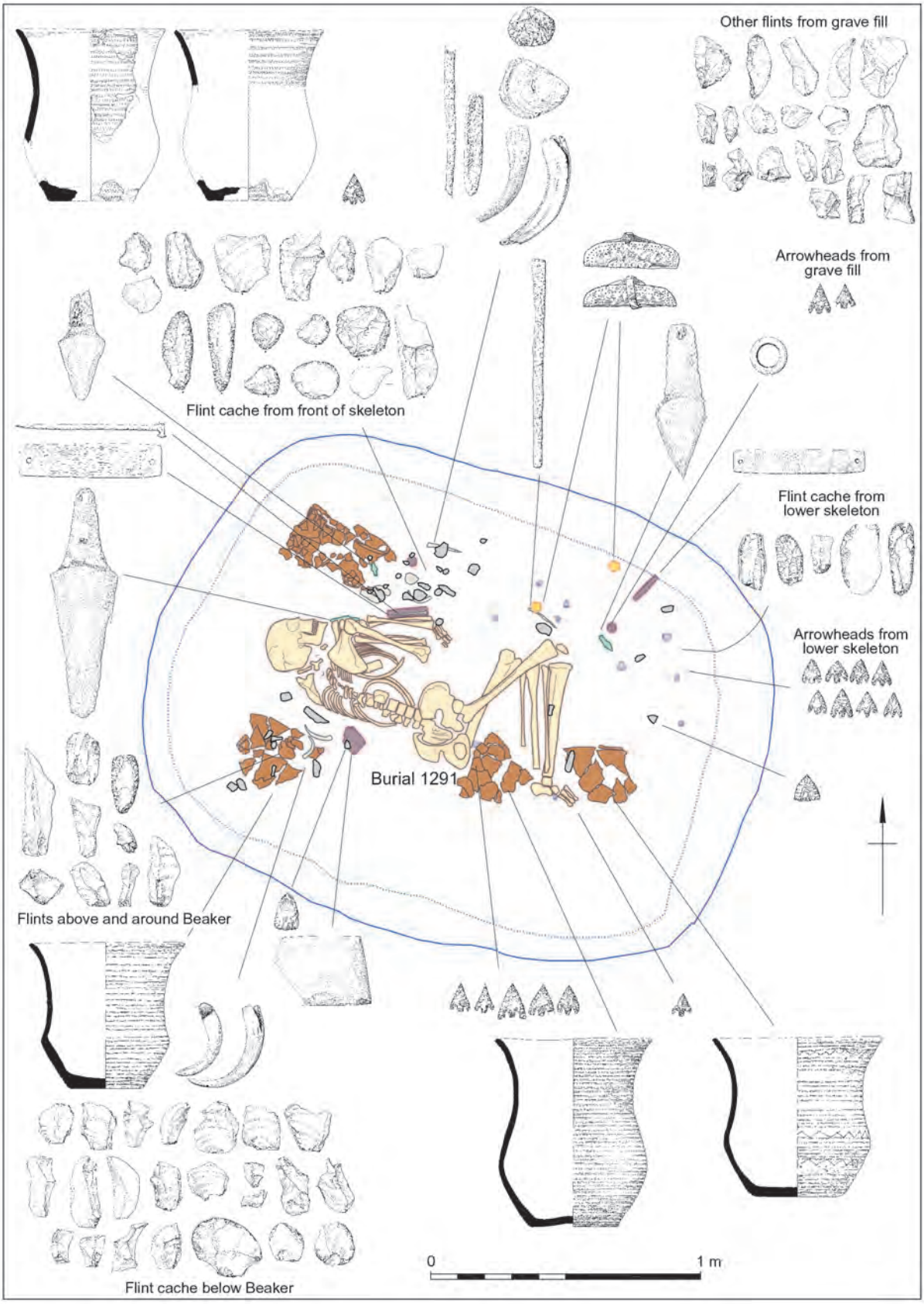

Fig. 5.3. The burial of the Amesbury Archer, Wiltshire (Source: Fitzpatrick 2011).

(possibly a variation on plaited cord) and there is also a Cord-Zone-Maritime beaker. Unusually for Britain, there is also what may be a polypod bowl (Longworth 1979, P227).

In general there is very little evidence for contact between the apparently small groups that introduced the Bell Beaker Set into Wessex and the indigenous Late Neolithic (Grooved Ware) communities. Radiocarbon modelling (Barclay and Marshall 2011) suggests that at Boscombe Down the overlap between the earliest Bell Beaker burials and the final use of Late Neolithic Grooved Ware could have been quite short, perhaps no more than 50–75 years. At Boscombe Down at least, the adoption of the Bell Beaker Set was relatively rapid, being widespread by 2300 cal. BC.

The radiocarbon modelling also suggests that the early international/standard styles of beaker were rapidly superseded by Wessex/Middle Rhine regional types, perhaps closer to 2300 BC than the 2200 BC suggested by Needham (2005). This also raises the possibility that the extended chronology often proposed for the use of beakers in Britain, will need to be revised. The continued use of beakers well into the Bronze Age is anomalous in relation to their rapid disappearance in continental Europe and Ireland.

Journeys to Wessex

Isotope analyses show that the earliest Bell Beaker burials currently known in Britain, at Boscombe Down, are of migrants. The fame and importance of nearby temples such as Durrington Walls and Stonehenge may help explain the final destination of the journeys of the Boscombe Bowmen and the Amesbury Archer, but where those journeys started from is less clear.

In Britain, great emphasis has traditionally been placed on the Rhineland as the region from which the Bell Beaker Set was introduced to the island (e.g. Abercromby 1902). This connection has been emphasised in most subsequent studies, largely on the basis of the pottery (e.g. Clarke 1970; though see Lanting and van der Waals 1972, 30–31; Lanting 2008).

A recent reformulation of this view was by Needham who suggested that northern France acted as a "fusion corridor" in which influences from the south and west were fused with ones from the east (Needham 2005). The Rhineland was suggested to have mediated influences from Corded Ware groups to the east with northern France being "hugely influential" in determining the styles of the first beaker pottery in Britain.

Although Needham emphasised one of the most important early types of British beaker, the "low-carinated" form, suggesting it originated in the "fusion corridor" (Needham 2005, 176, fig. 3), the continental European examples collated by him form a heterogeneous group, many of which are likely to be later in date than the early British finds. However, Needham noted that more sinuous S-profile beakers were also present from the outset. These beakers sometimes also have low bellies and it now seems clear that they occur in several of the earliest groups from Britain dating to the 24th century BC. This suggests that the earliest British beakers placed in graves were influenced by a range of Continental styles rather than a single region. In due course domestic assemblages may provide more sensitive information as these display greater regional diversity (e.g. Besse 1996; Piguet and Besse 2009).

It is important to bear in mind the limitations of isotope analyses. They are generally better at stating where people *did not* come from than from where they did. An important conclusion to be drawn from the strontium isotopes of the Boscombe Bowmen suggest that they made a series of shorter journeys rather than a single long journey.

In the case of the Amesbury Archer, the circum-Alpine region where he was resident as a teenager straddles three of the great rivers of Europe; the Rhine, the Rhône and the Danube. Although scholarly tradition in Britain might assume a journey to Wessex from the Alpine region would have been down the Rhine, it is arguable that a journey would initially been to the south towards the Mediterranean or to the west across France. If the journey – *if* it was a single journey – was to the south, at some point it must have turned to the west, possibly across central France, or if further south to follow the River Garonne. The Rhône and Saône were important axes in the distribution of the Bell Beaker Set into central Europe (Heyd 2001; 2007; Harrison and Heyd 2007).

In addition, many of the objects placed in the graves are, like the beakers themselves, "international" types and the provenancing of materials is not straightforward. For example, although the sources of the copper used for the knives placed with the Amesbury Archer may have been along the Atlantic façade (and the two largest concentrations of Bell Beaker metal objects in France are in the Midi and the north-west), the metals could have been traded widely.

In consequence it is not currently possible to identify "homelands" for the migrants buried at Boscombe Down. However, the wider, and perhaps more interesting, point is that much of the evidence of points to a time of widespread, and long distance contact and this will have involved journeys from "islands" in the Bell Beaker Network.

The Bell Beaker network: long distance contact

Northern England

Despite the primacy often ascribed to Wessex in prehistory it should not be assumed that it was the first region in England, or Britain, to which the Bell Beaker set was introduced. Humphrey Case drew attention to the presence of large quantities of All-Over-Corded vessels in northern England, often from coastal sites exposed by the erosion of sand

dunes, for example at Ross Links, Northumberland (Clarke 1970, 529, 552; Case 1993, 260; 2001, 367). Although later types of pottery have also been found at these sites and this has been used to suggest that the use of All-Over-Corded in Britain was long-lived, the finds cannot be shown to be stratigraphically associated. Accordingly, this should not be considered sufficient evidence to extend the domestic use of All-Over-Corded beakers in Britain beyond the date at which they were placed in graves. Instead, it seems increasingly likely that in Britain the use of All-Over-Corded beakers was widespread and relatively short-lived (cf. Case 2001, 367; Sheridan 2007, 99, 105) before being superseded by insular regional types. This would also suggest that the Bell Beaker Set was adopted widely and rapidly.

It may be noted that one of the earliest graves from northern England is also of a metalworker. The finds from the grave at Kirkhaugh, Northumberland, included a stone hammer and a possible touch-stone (or a small cushion stone), one gold basket-shaped ornament, and an All-Over-Corded beaker (Maryon 1936).

Wales

In contrast, very few earlier Bell Beaker finds are known from Wales and no typologically early beakers or other pots have yet been identified with certainty. Cardium stamped sherds are known from Newborough Warren, Anglesey, where All-Over-Corded and also Finger Nail (possibly pinched) decorated sherds have also been found. Although the sherds are not necessarily from Maritime-derived vessels (Clarke 1970, 523, fig. 82, E 1826; Lynch 1970, 87–88, fig. 33, 7–10), they are clearly from a relatively early collection in a coastal location.

Perhaps the most important new evidence from Wales comes from relatively small-scale excavations at three of the 13 Welsh copper mines that were certainly or probably worked in the Bronze Age. The mines at Copa Hill, Tyn y Fron, and Erglodd are which are all in Ceredigion in west central Wales have yielded third millennium radiocarbon dates.

The earliest dated activity is from Erglodd where an ore-crushing floor that also contained debris from fire setting yielded a date of 2340–2130 cal. BC (Beta-214364, 3800±40 BP) (Timberlake 2006, 83; 2009, 104, table 7.1). The most extensively explored of these early mines is Copa Hill which is *c*. 25 km inland from the Irish Sea following the valley of the River Ystwyth (Timberlake 2003). The earliest gold object known from Wales, a small disc ornament, came from what was probably a disturbed inhumation grave at Banc Tynddol which is at the foot of Copa Hill (Timberlake *et al*. 2004). These 3rd millennium dates for copper mining in west Wales and the proximity of the mines to Ireland may not be coincidental.

Ireland

For many years the Bell Beaker Set was considered to have been introduced to Ireland via Britain. The similarities in metallurgical composition between some Irish and central European objects were interpreted as the results of contacts between the two regions that were mediated through Wessex (e.g. Case 1966, 168. cf. O'Brien 1995, 44).

This view was steadily superseded by an increasing emphasis on Atlantic connections, both specifically in metallurgy (e.g. Ryan 1979; Sheridan 1983), and more generally (e.g. Case 1995; 2001, 375). The key find in decisively changing this view was the excavation of the Ross Ireland, County Kerry, copper mine, the earliest known mine in north-west Europe (O'Brien 2001; 2004; 2007). Radiocarbon dating suggests that mining started *c*. 2400 BC (Fig. 5.4) and the ores from Ross Island became the dominant source for early copper across Ireland and an important source for Britain (the so-called "A-metal").

Copper mines and gold streaming

In addition to work at the mine, an associated work camp was also excavated, providing a good understanding of the extraction and processing stages. The pottery from the work camp is beaker. The copper has a high arsenic content and the knowledge and skills necessary to produce and work the metal are considered likely to have drawn on expertise from continental Europe (O'Brien 2001, 561; cf. O'Brien 2004, 563–565; Roberts 2009). While it is, again, not possible to identify a precise region from which metallurgy was introduced, this must have involved journeys across the Irish Sea and the western Channel or Atlantic seaboard.

Prodigious quantities of Irish gold were used in Ireland and Britain during the Bronze Age (Eogan 1994). Precisely when this gold began to be exploited is not yet clear but it is notable that what is probably the earliest gold object from Ireland, the Deehommed (or Benraw) ornament, was found only 12 km north of the Mourne Mountains in Co. Down (Fig. 5.5). The Mournes have been argued to be one the principal sources of the Irish gold (Warner *et al*. 2009) and both gold and tin may have been extracted there by the deep digging of fluvioglacial sediments, a technique known as 'streaming' (Warner *et al*. 2010).

Recent analyses confirm that the Deehommed ornament is not of Irish gold and as its best parallel is from Estremoz (Évora) in Portugal, it is probably an import, arguably from the Atlantic façade (Cahill 2006, 267–268; Taylor 1980, 22, pl. 3, h–i; O'Connor 2004, 209, fig. 18.3). However, recent work on lead isotope ratios suggests the gold may be from Cornwall in south-west England (Standish in prep.). In this context the suggestion that the non-local beakers found in Brittany might be from Portugal (Salanova 2000; Cardoso *et al*. 2005) may be relevant.

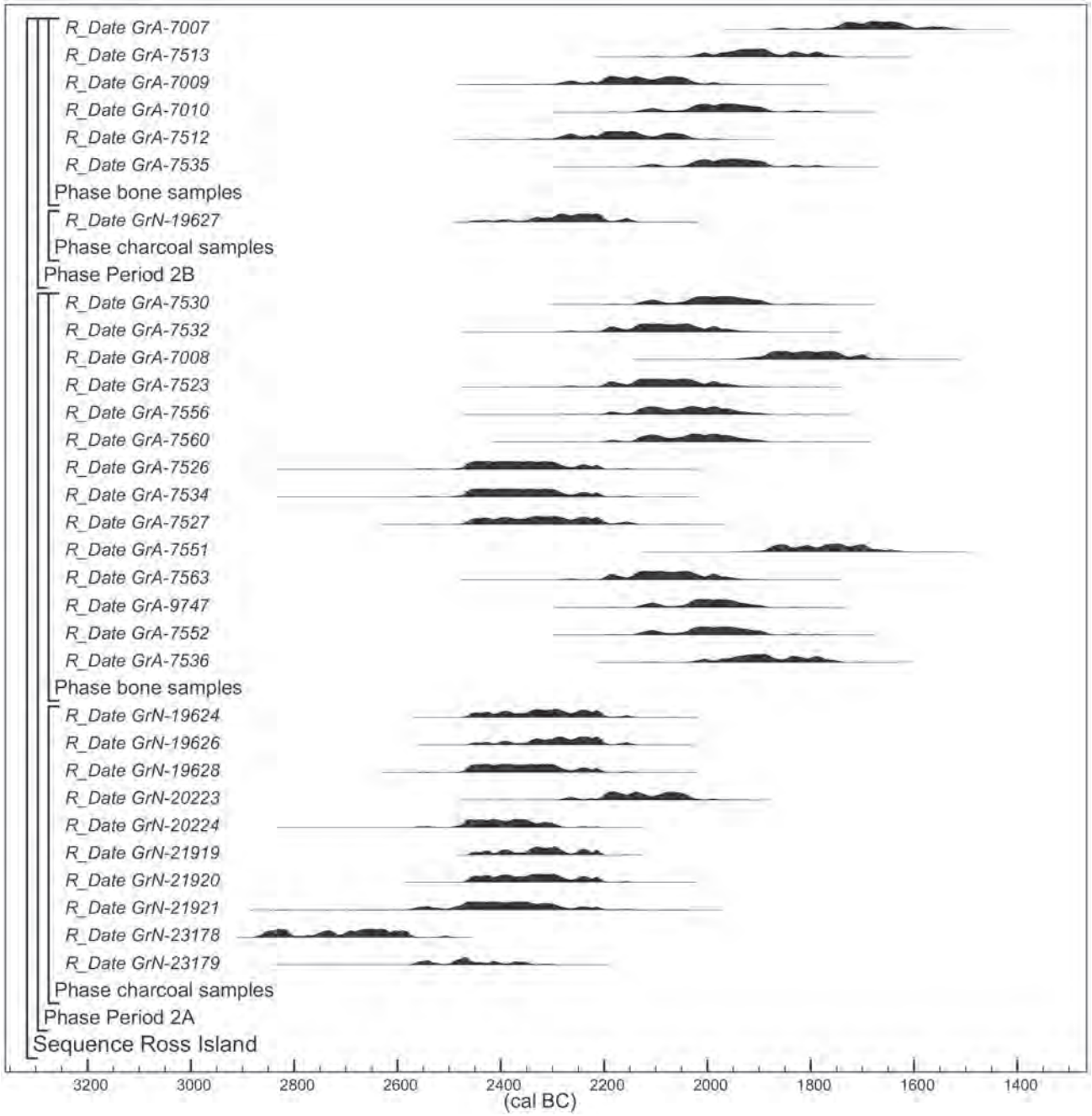

Fig. 5.4. Probability distribution of radiocarbon dates from the work camp at Ross Island, Co. Kerry (Source: Fitzpatrick 2011).

Burials

Other possible Atlantic links with Ireland include the origins of the small megalithic "wedge tombs" which are found widely across Ireland, and especially in the west (Walsh 1995) (Fig. 5.6). Continental origins for wedge tombs have often been sought in the earlier *allés couvertes* typical of north-west France, and especially Brittany (e.g. Brindley and Lanting 1992, 26). However, the differences between these monuments, notably the double wall and the typical U-shape of wedge tombs, suggest that they are of a different date.

This is supported by radiocarbon dating that shows that the tombs appeared in the 24th century BC (Brindley and Lanting 1992; Brindley 1995; Schulting *et al*. 2008) and most seem likely to have been built in the second half of the 3rd millennium BC even if their use continued into the Bronze Age. This makes them broadly contemporary with the

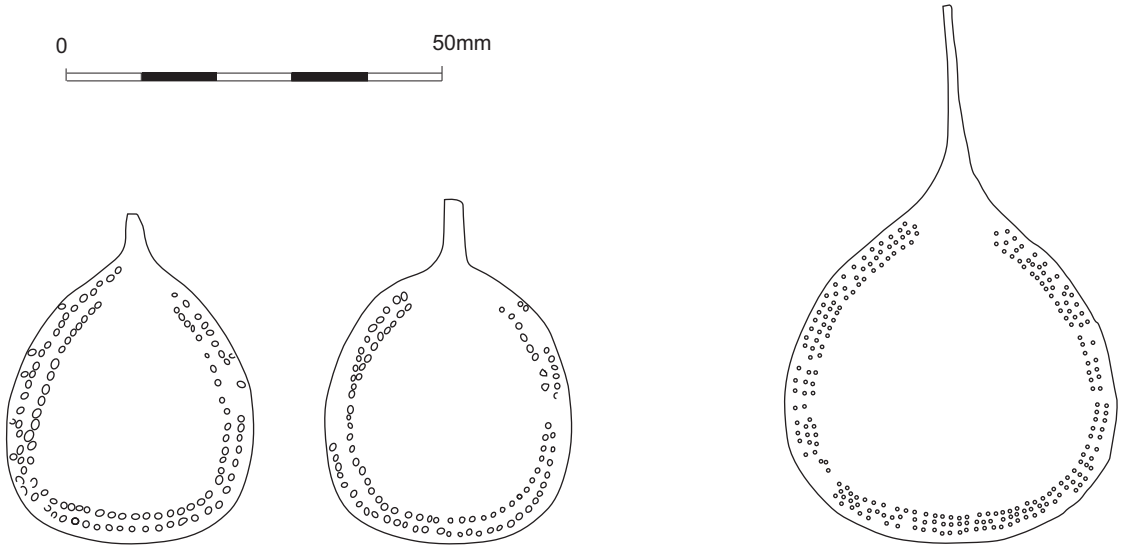

Fig. 5.5. Gold ornaments from a) Estremoz, Évora, Portugal and b) Deehommed, Co. Down, Ireland.

Fig. 5.6. Labbacallee wedge tomb, Co. Cork (Photograph courtesy National Monuments Service, Ireland).

extensive use (and often reuse) of megalithic tombs by Bell Beaker groups along the Atlantic seaboard from Portugal to Brittany (e.g. Salanova 2003). Although few wedge tombs have been excavated in modern times it is clear that they were used for collective burial and Bell Beaker objects are relatively frequent finds. A very few typologically early beakers have been found and the example from Cashelbane, Co. Tyrone in Northern Ireland appears to have been decorated using plaited cord (e.g. Case 1995, 20, 25).

Settlements

The evidence for Bell Beaker buildings in Ireland is modest but a number pits and midden deposits have been found across Ireland. Some of the beakers from these finds typologically early traits and these include vessels decorated with plaited cord at Ballynagilly, Co. Tyrone, and Lough Gur site C, Co. Limerick and internal rim decoration at Lough Gur site C, Newgrange, Co. Meath, and Ross Island (e.g. Case 1993, 251, fig. 7, 1; 1995; 20, fig. 12.8–12.9).

Polypod bowls are a notable feature of Irish domestic assemblages. Several wooden examples are also known, usually from bogs, and the bowl from Tirkernaghan, Co. Tyrone has been shown to be broadly contemporary (Earwood 1992; Case 1995, 20; Carlin 2011). The number of polypod bowls from Ireland is not large but they are much more frequent finds than in Britain. Although bowls are best known in central Europe, these bowls occur in small numbers in Western Europe (Piguet *et al*. 2007, 252–252, fig. 4).

Another type of object found widely in Ireland, including an example from Ross Island (O'Brien 2004, 363, fig. 167, 330), but best known in central Europe is the hollow based arrowhead. Barbed and tanged arrowheads, the most common western European type are also found (Green 1980; Case 1995, 24; 2001, 375; Woodman *et al*. 2006, 126–155). The apparently contemporaneous and extensive use of two different types of arrowhead appears to be distinctive to Ireland.

Scotland

Burials

The Irish Sea also appears relevant to the arrival of the Bell Beaker Set in Scotland. This is best seen in the small number of early radiocarbon dated Bell Beaker graves (Sheridan 2007, 96–98; 2008a; Cook *et al*. 2010) (Fig. 5.7; Table 5.2).

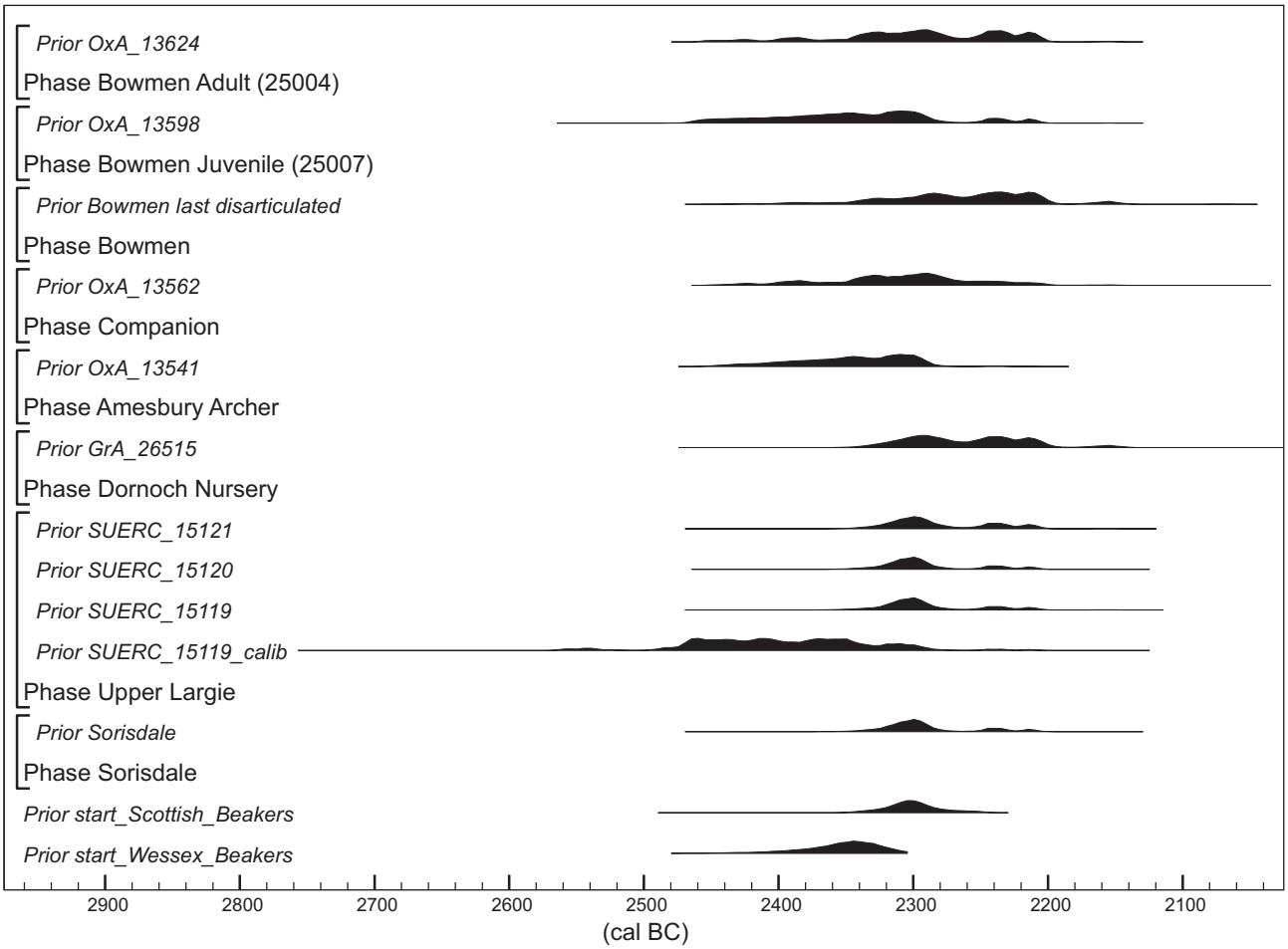

Fig. 5.7. Probability distribution of radiocarbon dates from early Bell Beaker burials at Boscombe Down and Scotland and the modelled start dates for Beakers in Wessex and Scotland (Source: Fitzpatrick 2011).

The distribution of these single graves is noteworthy in that finds in the Highlands and Islands in the north and west are as early, if not earlier, than those in the fertile agricultural lands of the Lowlands in the south and east of the country. This suggests that the Bell Beaker Set was distributed around Scotland both rapidly and widely. These early graves are often oriented east–west.

Isotope analyses suggests that the person buried at Sorisdale on the Isle of Coll in the Inner Hebrides (Ritchie and Crawford 1978) may have spent their early childhood in a different location somewhere to the south where the underlying geology was young Cenozoic or Cretaceous (Sheridan 2007; 2008a, 253–254, fig. 21.9, 3). The burial was accompanied by a low-carinated All-Over-Corded beaker. Other All-Over-Corded or Maritime-derived vessels are known from the island.

The grave at Upper Largie, Argyll and Bute, probably had a wooden chamber and was set within a ring ditch in which stood a series of freestanding timber posts. The grave goods included two beakers with Maritime-derived decoration and a third All-Over-Corded vessel; all are S-profiled with low bellies. Sheridan has argued that the setting of posts within the ring ditch and also the beakers have strong continental links. She suggests that these links are specifically with the Netherlands and that they represent the first sign of the links across the North Sea that are seen in slightly later finds from eastern Scotland such as Newmill, Perth and Kinross (2007, 96–99; 2008a, 258; 2008b, 63–65; Cook *et al*. 2010, 197–198). Although the pots might be considered to be of international types rather than specifically Dutch, and the setting of posts can also be paralleled in Bell Beaker contexts elsewhere, for example at Tvořiház I grave 2/91, Znojmo, Czech Republic (Bálek *et al*. 1999, Tab. 5), the Continental connections of the burial rite are clear.

There are sources of copper in the Kilmartin Valley and Upper Largie lies at the south-western of the Great Glen

Table 5.2: Radiocarbon measurements from early Bell Beaker burials in Scotland

Lab. code	*Sample*	*$\delta^{13}C$ (‰)*	*Radiocarbon age (BP)*	*Calibrated date BC (95% confidence)*
Upper Largie, Argyll and Bute				
SUERC-15119	Charcoal (hazel), same level as grave goods.	–	3915±40	2550–2280
SUERC-15120	Charcoal (oak), post-pipe in ring ditch.	–	3900±35	2480–2280
SUERC-15121	Charcoal (oak), fill of ring-ditch.	–	3880±35	2480–2200
Sorisdale, Isle of Coll, Argyll and Bute				
OxA-14722	Human bone	–	3879±32	2470–2200
Dornoch, Highlands				
BM-1413	Human bone	–	3884±46 ±100	2630–2030
GrA-26515	Cremated bone of young adult, *possibly* associated with adult burial with whom grave goods considered to be associated but which contained insufficient collagen to produce radiocarbon date	–	3850±40	2470–2150

which runs across Scotland. The number and range of ritual monuments in the Kilmartin Valley may reflect this pivotal location and Sheridan has suggested that exploration for metals and their subsequent exploitation played a part in this (2008a, 258; 2008b, 63; Cook *et al*. 2010, 197–198). At the north-eastern end of the Great Glen the Migdale-Marnoch metalworking tradition developed in the Early Bronze Age. This was one of the earliest Bronze Age traditions to develop in Britain and Ireland and it displays links with both Ireland and continental Europe (Needham 2004; O'Connor 2010, 595–597).

A metallurgical or prospecting context might be speculated upon for the inhumation burial at Dornoch at the edge of the highlands in north-east Scotland (Ashmore 1989). Here the primary burial was accompanied by an All-Over-Corded beaker and a red wrist-guard.

Bone has not survived in a number of other possibly early graves in eastern Scotland but modelling of the radiocarbon dates from Sorisdale, Upper Largie and Dornoch suggests that the date to *2340–2250 cal. BC (at 95% probability)* or *2320–2280 cal. BC (at 68% probability)*. This is slightly later than in Wessex where earliest burials at Boscombe Down date to *2420–2300 cal. BC (at 95% probability) or 2380–2310 cal. BC (at 68% probability)* (Barclay and Marshall 2011) (Fig. 7).

Settlements

The rare early domestic assemblages from in Scotland typically contain, as in England, fingernail decorated vessels. It is also noteworthy that two of the few "genuine" Maritime beakers (as opposed to Cord-Zoned examples) noted by Clarke were from Glenluce Sands, Dumfries and Galloway and the Poltalloch estate, Argyll and Bute, the latter not far from the Upper Largie burial (Clarke 1970, 54, 59, 71, fig. 79–80, E 1810–1; E1550; Sheridan 2008a, 258; Cook *et al*. 2010, 198). Both sites are on the west coast and were decorated using cardium (cockle) shells, a style of decoration common on the Atlantic façade. All-Over-Corded beakers were also found at these locations, albeit in uncertain association (Clarke 1970, 71). Many of the Glenluce Sands vessels were All-Over-Corded, often with decoration inside the rim, while one was decorated with plaited cord.

Like the early pottery from Ireland and southern England, there are wide-ranging connections in the ceramic styles of the finds from Scotland. Prospection for local sources of copper might provide a context for some of the early burials.

Discussion

The evidence for the arrival of the Bell Beaker Set in Britain and Ireland is rare, but some of it is of high quality. Modern excavations and the systematic application of isotope analyses, radiocarbon dating and materials analyses to the finds as well as the review of earlier discoveries have transformed the data set in recent years. This has allowed the earliest Bell Beaker burials in Britain to be identified as those of migrants. The evidence from Ross Island can be interpreted as representing a mining enclave founded by incomers.

The date and varied locations of these early finds suggest that the Bell Beaker Set was distributed across these islands both rapidly and widely in the 25th but mainly 24th centuries BC. The first Bell Beaker burials appeared in Wessex by 2375 BC and by 2350 BC in Scotland (Fig. 5.7). As this represents just one generation and so few early finds are currently dated, it is possible that the first Bell Beaker burials in Scotland may prove to be earlier than those in Wessex. As the radiocarbon dating for the rapid appearance of regional styles of pottery in Britain becomes more firmly it also allows greater weight to be placed on the presence or absence of typologically early traits.

Although it is not considered possible to determine "homelands", the evidence of the burials at Boscombe Down and the mining and metallurgy at Ross Island suggests that these migrants travelled in small groups, possibly utilising improved sailing skills or technologies to voyage along the coasts of the Atlantic, the Channel and the North Sea. As with many other regions in Europe, the distribution of Bell Beaker finds in Britain, particularly the early ones, is discontinuous and often coastal.

The contrasting evidence from Britain and Ireland, especially that of the differing burial rites – megalithic collective graves in Ireland, mainly single graves with secondary burial rites in England – is consistent with the suggestions of Case and earlier commentators that the Bell Beaker Set was introduced to Britain and Ireland from different parts of continental Europe (Case 1995; 2001, 363–365; 2007, 245). At this time Ireland seems to have faced the Atlantic and Case argued that Irish connections were "arguably the widest … of any insular group" (2001, 375). Early finds in western Scotland and the slightly later mining in west central Wales may also look to the Irish Sea and the south rather than the east. In this wider context the location of the early finds in Wessex appears almost anomalous.

The current evidence for the arrival of the Bell Beaker Set in Britain and Ireland also contributes to the increasing emphasis on travel and migration in recent works of synthesis in western and central Europe (e.g. Brodie 2001; Heyd 2001; Salanova 2001, 96; 2007; Vankilde 2005, 96, 102; Heyd 2007; Harrison and Heyd 2007).

In central Europe several types of evidence have been argued to show migration; craniology (e.g. Budziszewski *et al*. 2003), dental morphology (Desideri and Besse 2010), and isotope analyses (e.g. Price *et al*. 1998; 2004; Heyd *et al*. 2002–2003). The close anthropological links between the individuals buried in some small cemeteries in Bavaria and Lower Austria also suggest that the Bell Beaker Set was introduced there by small migratory groups. Marriage and alliances between Bell Beaker and non-Bell Beaker communities have been argued to have played a key role in the transferral of the Bell Beaker Set (Brodie 1997; 2001; Vander Linden 2007) and a few well-furnished graves of children suggest that social status could be ascribed or inherited within some communities (Heyd 2007, 337, 352).

The wider European context of widespread but seemingly small scale migration and intermarriage is also important in providing some of the context for the arrival of the Bell Beaker Set in Britain and Ireland. While metallurgy undoubtedly was an important factor (Needham 2005, 207–208; 2007, 43; Sheridan 2008a; 2008b; Timberlake 2009, 101–102), the broadly contemporary appearance of the Set in central Europe should caution against placing too much emphasis on metallurgy as *the* key factor in its appearance in these islands. The Bell Beaker network also encompassed many regions that did not have metals and the importance of exploration and travel in their own right should not be overlooked (Kristiansen and Larsson 2005).

This period of widespread mobility in northern Europe in the 25th–23rd centuries BC also provides one context in which the rapid dispersal of languages might be envisaged (Cunliffe 2010, 34; Fitzpatrick 2011). The journeys identified by isotope analyses were made in childhood, presumably in the company of adults and childhood residency in other households is one way in which links between widely separated communities can be maintained. Reasons for making such journeys could have included being apprenticed to learn skills, especially in metalworking (cf. Vankilde 2005, 82, 96, 102; Roberts 2009), fosterage by relatives, or arranged marriages. The last two possibilities emphasise the family and the household and the residencies afforded by them could have provided an environment found across much of Europe in which a lingua franca, bi-lingualism or other languages might be learnt and systems of clientship established.

While these possibilities might be common to much of the Bell Beaker Network, whether they led to more precise linguistic structures is not known. But it seems certain that one of the things that integrated different 'islands' or nodes in the Bell Network was the language or languages spoken by the small migratory groups such as those who introduced the Bell Beaker Set to Britain and Ireland.

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6

BELL BEAKERS – CHRONOLOGY, INNOVATION AND MEMORY: A MULTIVARIATE APPROACH

Johannes Müller, Martin Hinz and Markus Ullrich

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*As Bell Beaker (BB) research in southern Germany already has documented archives that might be used for intense typochronological studies, we are able to present a statistical estimation and a societal interpretation of the Rhine-Main-Neckar Bell Beaker group. The quantification of stylistic changes resulted in a pattern of different intensities of change with at least 3 phases of increase, decrease and cessation of style development (*ca. *2600–2380 cal. BC; 2330–2230 cal. BC;* ca. *2220–2000 cal. BC). A rhythm within the development of BB styles seems to be indicated. Intervals, in which new decoration patterns are created, are followed by intervals, in which the development of new patterns decreases. The discontinuation of the development of the existing designs after a certain number of generations displays, in our opinion, the lacking stable chain of ideological patterns over the course of generations: a recreation of the society became necessary. If our interpretation is valid, BB societies in Central Europe must still be considered to have been organised in dramatically unstable conditions: Probably the limitation of ideological transmissions over time limited the development of stable political institutions. The BB network functioned as a spatial link between different societies and not so much as a new quality of stratification within regional societies.*

Social practices of non-literate societies depend heavily on institutions that secure the transformation of knowledge and ideologies from one generation to the next. In these societies, knowledge transformation is also bound to an active role of material culture within the communication process. In this respect, we use Bell Beaker (BB) shapes and decoration patterns to observe a structural patterning, which, in turn, might indicate ways in which these transformations took place. As BB research in Southern Germany already has documented archives that might be used for intense typochronological studies, we are able present a statistical estimation and a societal interpretation of the Rhine-Main-Neckar Bell Beaker group.

In archaeological research, typologies and chronologies are implemented to reconstruct the social developments of the societies we intend to investigate. In our case, we are interested in a high-resolution chronology for the Rhine-Main-Neckar Bell Beaker development, which was established by a PhD thesis (Ullrich 2008). Whereas this new chronological model already informs about the development and contemporaneousness of different Corded Ware (CW) and BB styles, one main effort of the present analysis is placed on the reconstruction of the speed of stylistic change in the case of BBs. In a combination of the linear timescale, which is derived by the scientific dating of inventories within the sequence of a correspondence analysis, and the multidimensional ordination of ceramic shapes and decorations, the rate of change will be specified with the help of multidimensional scaling procedures. In an interpretation, we would like to apply the quantified changes in ceramic design as a proxy for the innovation rate within BB societies. A surprising result is the detection of memory patterns in stylistic developments.

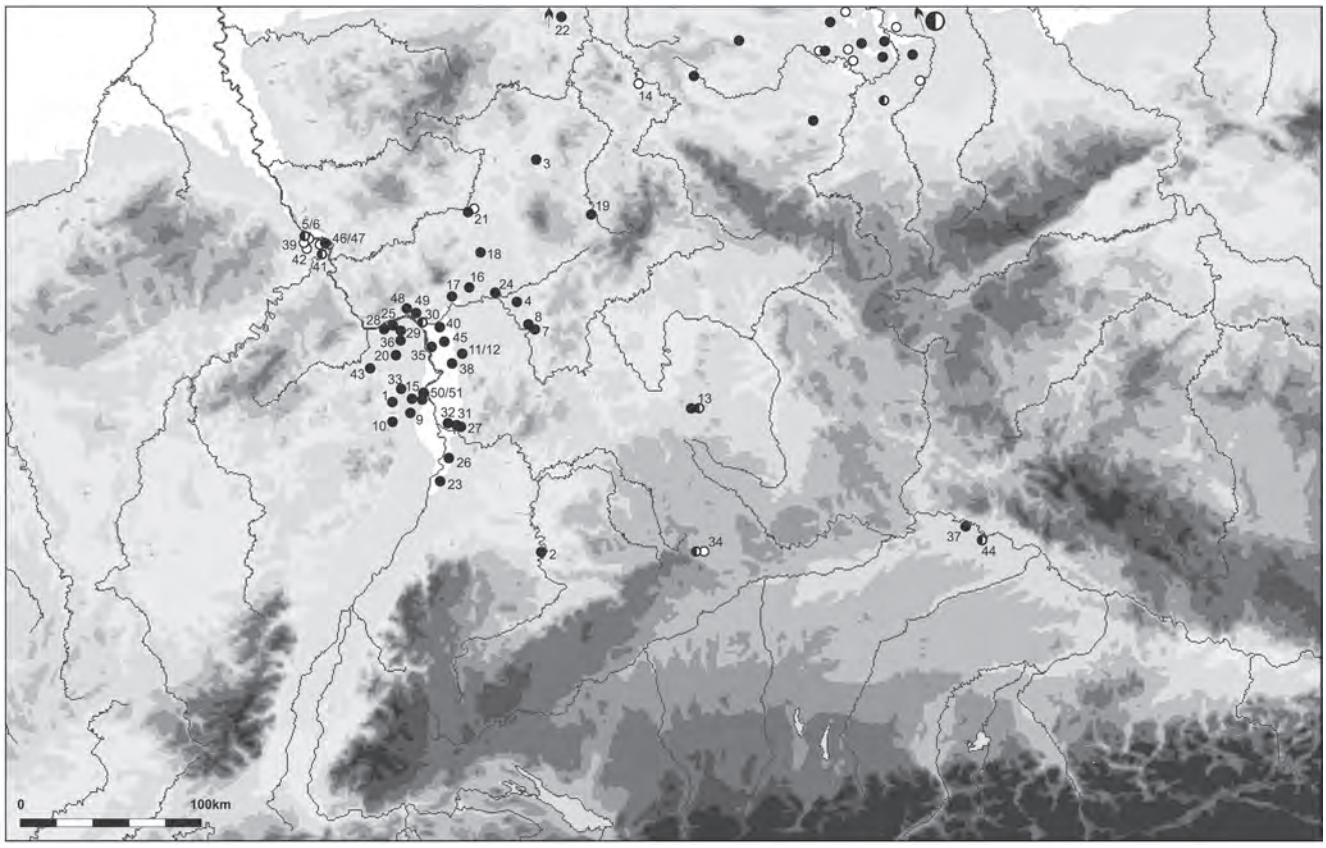

Fig. 6.1. The Rhine-Main-Neckar Bell Beaker region (Ullrich 2008, 59 fig. 20), indicated by the typical metopic beaker decoration (Younger Bell Beaker ceramic style, BB b2/c). While the main cluster of this BB type is found in the Rhine-Main-Neckar area, the high number of similar beakers from Central Germany displays close communications between both regions, while further finds also point to links with other south central European areas.

Chronological considerations

The used methodological approach to construct chronologies can be summarised as follows:

1. Decoration types and pot shapes of the Rhine-Main-Neckar region (Fig. 6.1) are used in a correspondence analysis (CA) to detect the degree of similarity and dissimilarity between assemblages or single beakers. The results may be attributed to chronological differences, but also social, ritual or other triggers. Therefore, radiocarbon dates or stratigraphy are necessary to identify the sequences as chronology.
2. Thus, radiometric dating and vertical stratigraphy are used to independently identify chronology within the typological sequence derived by the CA (cf. Müller 2009). As the number of available BB radiocarbon dates is limited, the chronological deviation of the time-model is fine, but restricted.
3. Therefore, in a third step, radiocarbon dated assemblages of neighbouring regions are integrated into the data set in order to verify or falsify the results with the assistance of further scientific dating. As the added assemblages are congruent with the typological sequence, they are integrated without difficulties.

Research history on the chronology of the Rhine-Main-Neckar-BB Group

The Rhine-Main-Neckar region is a part of the Western Central European BB area, which has been a focus of research for decades (cf. Heyd 2000). During the last century, three authors already reconstructed chronologies for the Middle Rhine area. As a masterpiece of typological considerations, Edward Sangmeister (1951) identified a zoned, s-profiled beaker – entirely ornamented in part – in his phase 1. As a result of local development, cylindrical and funnel-shaped bell beakers display an increased variability of the decoration zones in phase 2, finally resulting in "Rheinisch" beakers – ton-like shapes with complex zones – in phase 3.

In the typologies of Sangmeister 1951 and Gebers 1978,

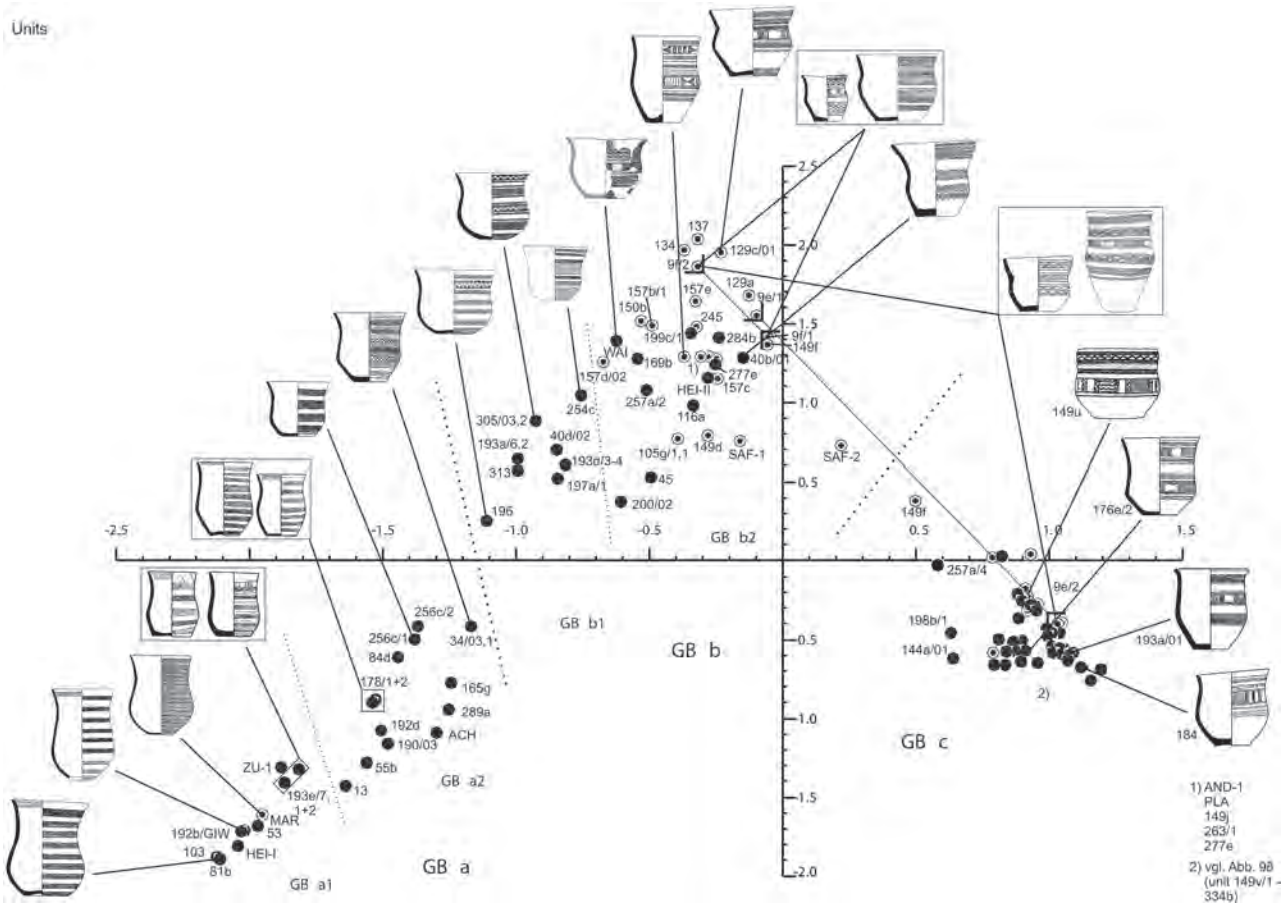

Fig. 6.2. CA of the beakers of the Rhine-Main-Neckar complex, 1st and 2nd eigenvectors (x and y axes) (Ullrich 2008, 112 fig. 49). Both beaker shapes as well as decoration field types are used as variables for the CA. The different symbols indicate beakers from different geographical areas: circles with dots: Middle Rhine and Mosel; points: Upper Rhine, Main and Neckar. Lines display find combinations.

the Corded Ware (CW) and Bell Beaker development in the Rhineland was consolidated in the "Rhine Beaker Group" (*Rheinische Bechergruppe*). In a first attempt to provide a seriation, Gebers was able to detect different CW and BB groups, partly judged as contemporaneous. In his latest attempt, Heyd (2000) was able to identify 3 different phases for the Bavarian BB development. Even though all authors could not or did not incorporate ^{14}C-dates into their inquiries, they alternatively used find associations and vertical stratigraphy for their compilations. The latest attempt to disentangle the chronological situation in Southern and Western Germany was conducted by Ullrich 2008. Both CW and BB pots and assemblages were used for different correspondence analyses (CAs) and the subsequent interpretation developed in conjunction with absolute dating.

Typochronology and absolute dating

Beside other CAs, the typological analyses of elaborately decorated BBs of the Rhine-Main-Neckar region represent a valid example for chronological considerations. Figures 6.2 and 6.3 indicate a typological sequence, which is based on 169 units, of which the decoration field types as well as the decoration motives and the shapes were used as variables. The sequence could be separated by clear breaks in the eigenvector loadings into different inventory groups:

- BB a1: mainly high, slim beakers with oblique hatched bands
- BB a2: mainly wide beakers with cross hatched band motives
- BB b1: similar to a2, but the profiles are more smoothed
- BB b2: individual band types
- BB c: mainly ton-like beakers with smoothed profiles and scratched metopic motives, seldom band motives. The decoration zone is "short" and ordered mainly in stripes.

As contexts and the stratigraphy of BBs are available in only very small numbers within the region of interest,

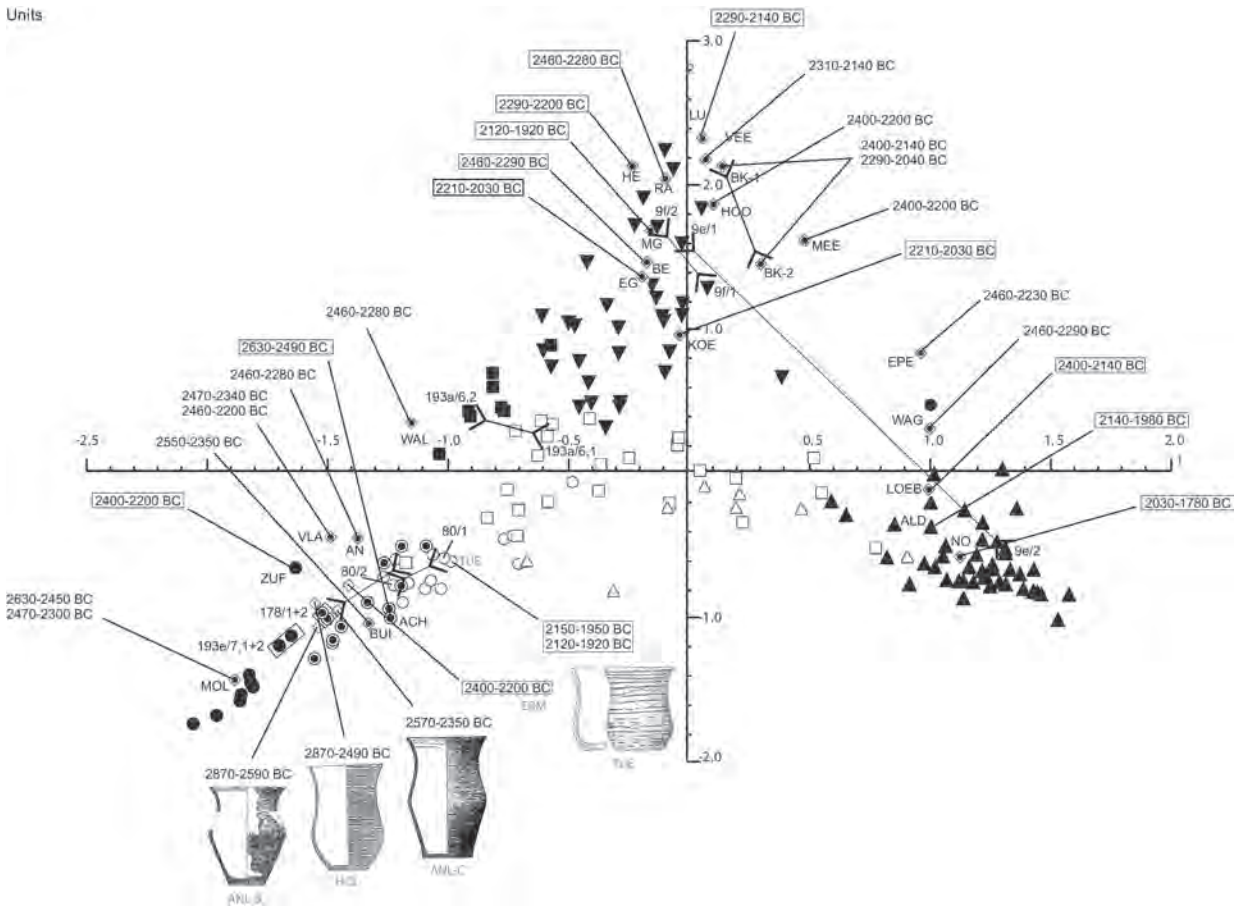

Fig. 6.3. CA of beakers of the Rhine-Main-Neckar complex, matrix of the 1st eigenvector (cf. Ullrich 2008, 113 fig. 50).

absolute dates were primarily used for the interpretation of the typological sequence. Only radiocarbon samples of short-lived materials were seen as qualitatively relevant and for that reason more strongly weighted than samples of other materials. Furthermore, only dates with short standard deviations were used, since only these allow an association with only one wiggle-area of the calibration curve. Thus, an argumentation on the resolution of single wiggle-sections by using a data series was possible and single outliers could be excluded (Ullrich 2008, 73).

If radiometric dating from the region is used in this sense, generally the chronological value of the sequence is verified (Ullrich 2008, 117 fig. 51): The seriated sequence is in line with a succession of old to young radiocarbon values. BB a1 and BB a2 are dated older than ca. 2350/22500 cal. BC, BB c younger. In spite of this, the age of BB b is not clear: there is a lack of radiocarbon dates from the regions. In any case, the addition of inventories from the Middle-Elbe-Saale region with radiometric dates (Ullrich 2008, 120 fig. 53) and radiometric dated assemblages from the Lower Rhine area (Ullrich 2008, 122 fig. 55) clarifies the pattern: While the general chronological meaning of the sequence is still clear, there is an overlap in the dating of the groups BB b2 and BB c.

This overlap in dating also remains stable in different analyses (e.g. with the integration of contact finds), so that the late contemporaneous existence of different BB styles after a general BB style is demonstrated. If we combine the typological evidence of different BB types, including both the elaborately decorated as well as the simply decorated ones, the absolute dating also supports this chronological pattern (Fig. 6.4; Appendix 6.1). In consequence, we arrive at the duration of BBs between ca. 2550 and 2000 cal. BC, partly contemporaneous with Corded Ware and West German Beakers (Fig. 6.5). In general, the differentiation between the Older Bell Beaker ceramic styles BB a (ca. 2550–2250 cal. BC) and BB b1 (ca. 2460–2250 cal. BC) and the Younger Bell Beaker ceramic style BB b2/c (ca. 2350–2000 cal. BC) is relevant with respect to BB chronologies (Ullrich 2008, 167). This chronological development is also comparable to absolute chronologies of neighbouring regions (e.g. Salanova 2011).

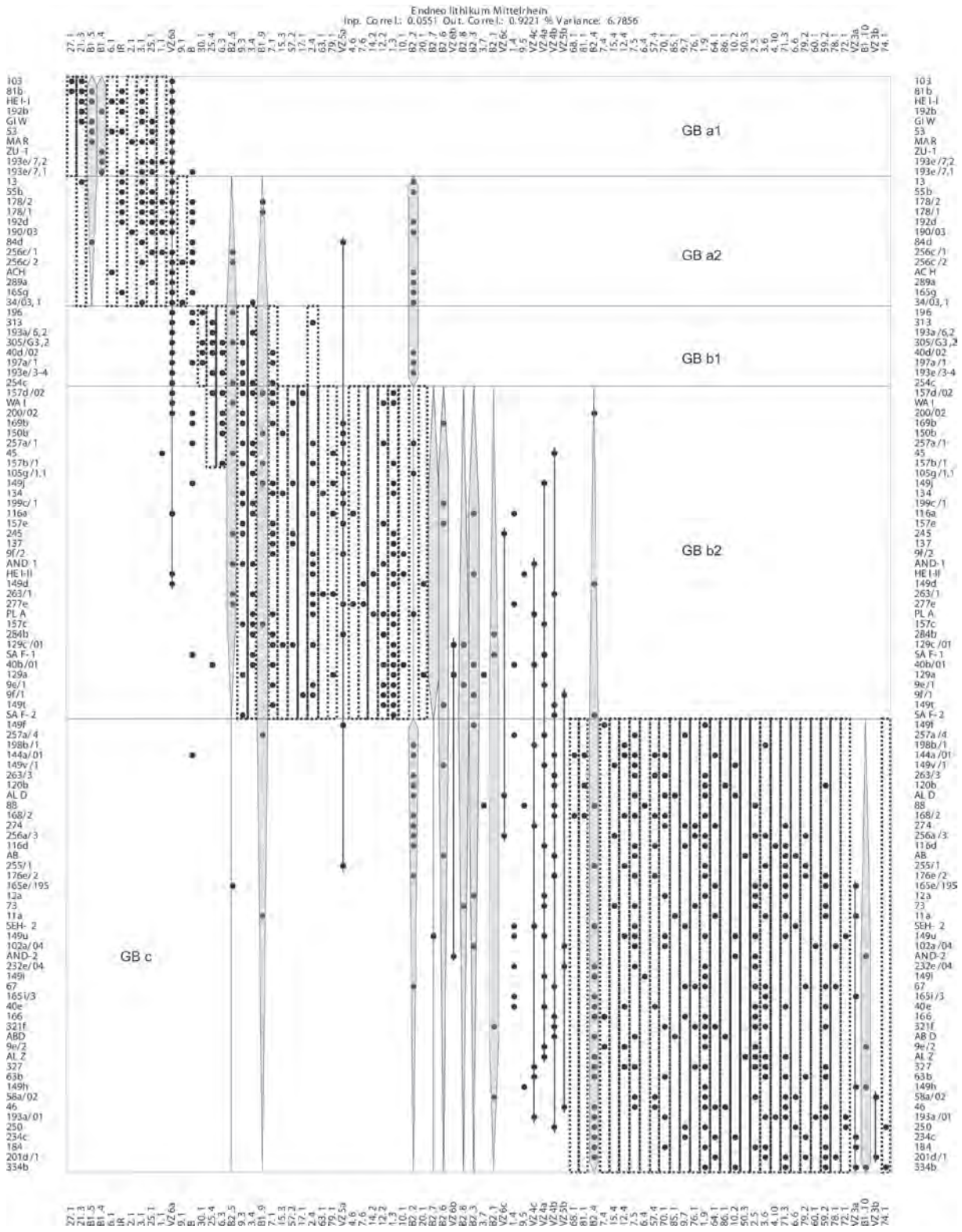

Fig. 6.4. CA of Rhine-Main-Neckar complex and simply decorated beakers, including assemblages with radiometric dating (list 1), 1st and 2nd eigenvectors. Radiocarbon results are indicated, short-lived samples marked with a frame. Units: circles around points: BBa2; quadrants: BB b1; standing and hanging triangles: BB b2; open circles: simply decorated beakers in corded technique; open quadrants: simply decorated beakers in comb punch technique; open triangles: simply decorated beakers in scratched technique (Ullrich 2008, 131 fig. 59).

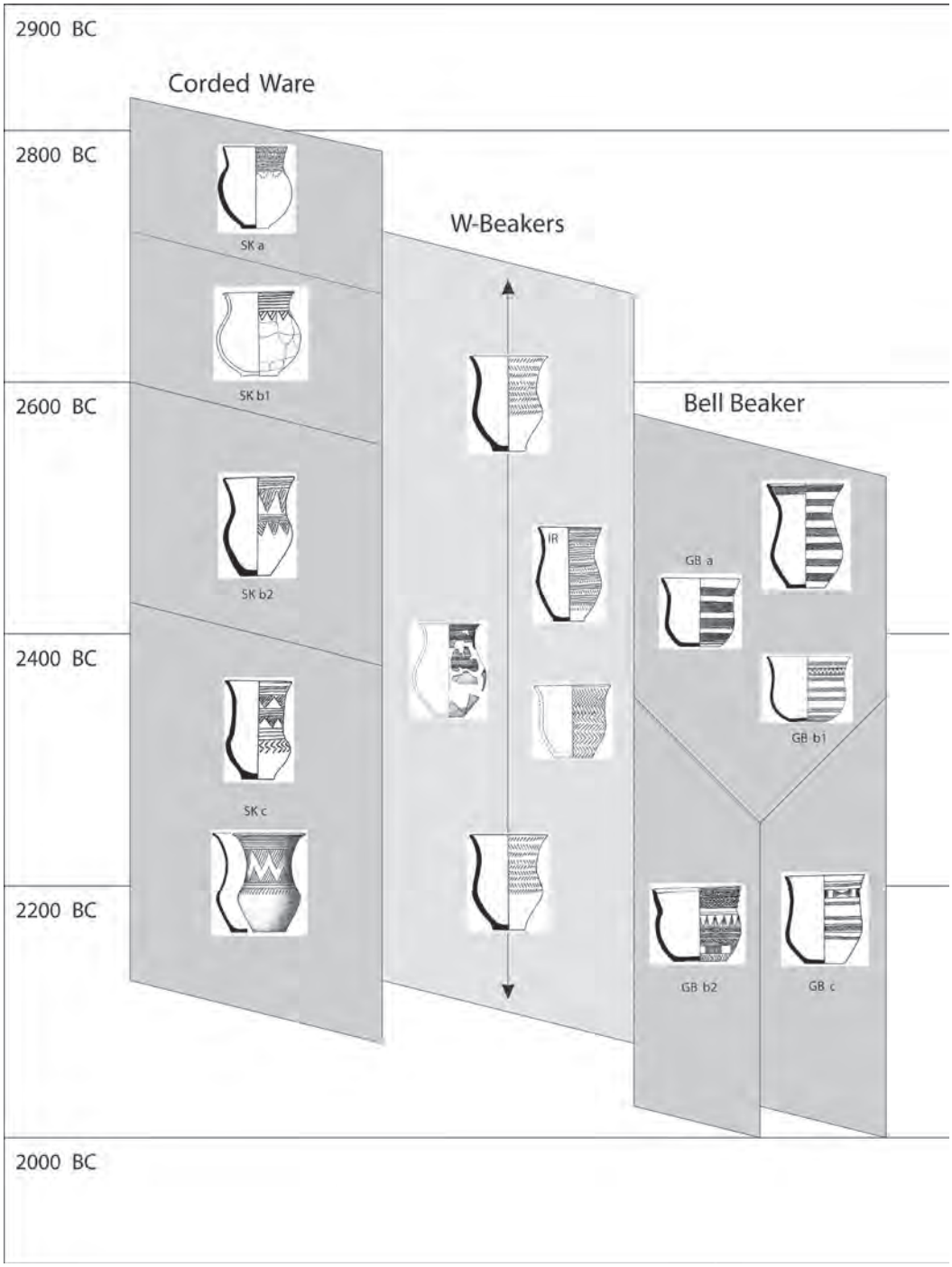

Fig. 6.5. Probable absolute dating of Rhine-Main-Neckar Bell Beakers, Corded Ware and the west German Beaker Group (after Ullrich 2008, 134 Abb. 61).

Based on this chronological model, further questions about the construction of changing designs and the meaning of speed within the stylistic development might be asked.

The speed of change

One advantage of multivariate analyses is the reduction of complex and manifold circumstances to a synthesised display. In our case, the objective is to describe the speed and

diversity of stylistic changes within southern German Bell Beaker pottery by a quantitative proxy which is mapped on a linear time scale. We will use Nonmetrical Multidimensional Scaling (NMDS) as a method to calculate such a proxy. The method itself was implemented by Kruskal (1964) and soon found its way into archaeological investigations (e.g. Drennan 1976; Hinz and Müller 2014).

Unlike CA, which operates on a contingency table and converts it innately in an $\chi 2$ metric of dissimilarities, in MDS and also in the variant NMDS, a dissimilarity matrix is used as the starting point of the algorithm. Therefore, the resulting metric of the ordination result depends on the metric of the dissimilarities entered. By choosing a metric for the distances which is at least nearly Euclidean, it is possible to relate the result to vectors for the data that behave metrically, like for instance time: In contrast to the values on the eigenvectors of the CA, the values of the NMDS factors can be used on a ratio scale for comparisons, given the appropriate metric of the distances in the first place (comp. Baxter 2003, 205). This allows it to combine the ordination result with other metric variables, such as time.

The method itself is exhaustively described elsewhere (e.g. Kruskal 1964). Its basic idea is to iteratively optimise a representation of the original data in lower dimensionality to best fit the distances of the original data set. We used the algorithm "metaMDS" (with the subalgorithm "isoMDS") of the package "vegan" of the statistical environment R. By doing so, we transform data on a nominal scale into data on a ratio scale and make it possible to temporalise the speed of change.

Having a model of cultural development vs. time at hand, a further step would be to utilise this model to estimate dates for not absolutely dated sites. This can be achieved by using non-linear estimators such as LOESS (locally weighted scatter plot smoothing). The algorithm used ("loess" from the package "stats") is based on Cleveland *et al.* (1992).

The LOESS method, originally proposed by Cleveland (1979), is basically a locally optimised polynomial regression for a given window of the data (specified by the span, i.e. the percentage of data used as window size). In our case, we used a second degree polynomial. The assumption here is that not the rate of change between two cases documented by the archaeological record is static but the rate of change of change, thus the second derivate, and that the likelihood for rapid change in a specific situation depends on the general tendency of a society towards innovativeness in a given timeframe. The fitting itself is done by least squares. The resulting model is rather a smooth description of the data than an analytical model, but it can be used to impute the values of missing data given that the initial data for the model describes the trend sufficiently, and it represents the best possible estimation of processes taking place between two situations documented by the archaeological record. We used the "loess" method package "stats" of the statistical environment R. To reduce the influence of outliers, we used a rather conservative span for the smoothing window.

We used the data of the Rhine-Main-Neckar Bell Beaker assemblages with the addition of radiometric dated assemblages from neighbouring regions for the NMDS, resulting in the dataset of Figure 6.4.

The result of the NMDS is rotational invariant. Therefore, we rotated the resulting solution so that the order of the absolute dates is best represented on the first dimension, and by this it becomes the best possible representation of the temporal factor influencing the development of style. It is certain that none of the principal components will represent a temporal development exclusively, but by doing so we are able to identify and use that one which is most strongly associated with dissimilarities resulting from developments on a temporal axis. The closer the points representing the inventories, the more similar they are, which means, the less change occurring between them. And, unlike in the case of the CA, the distances between equally dissimilar sites stay the same on the whole length of the dimension. The qualitative value of dissimilarity becomes a metric measurement of it. This provides the possibility to show the speed of change quantitatively by mapping dissimilarities of the feature sets against calendrical age. The differences between the coordinates on that dimension of two phases quantify the qualitative similarities or dissimilarities of the inventories (which does not mean plain quantitative differences, e.g. in the number of respective types which were discussed above). Thus, the curves of Figures 6.6 and 6.7 reflect the speed of typological developments in their inclination degree.

Figure 6.6 displays again what we already observed in the CA of the Rhine-Main-Neckar complex and simply decorated beakers (Fig. 6.4). The general gradient of the NMDS scores of the 1st factor versus time is displayed in the linear regression. The aberration from this vector indicates the diversity of single assemblages from the general development. While before ca. 2400 cal. BC, the BB assemblages display a quite similar aberration pattern from the main trend, ca. 2400–2250 cal. BC a huge diversity is visible in the score values. This represents the high diversity in the BB assemblages, followed again by a phase of higher similarity ca. 2250–2100 cal. BC. At the end of the BB stylistic development significantly more variable scores are displayed again, which also indicate some kind of diversity in the record.

Related to the CA results and the typochronological considerations, the linear patterning of some of the dated assemblages displays the typological development of the detected stylistic groups BB a/b1, BB b2 and BB c. In Figure 6.6, the three stylistic developments are indicated by three different linear regressions. It is obvious that these differences are responsible for the high diversity of the stylistic development at certain stages. Beside the

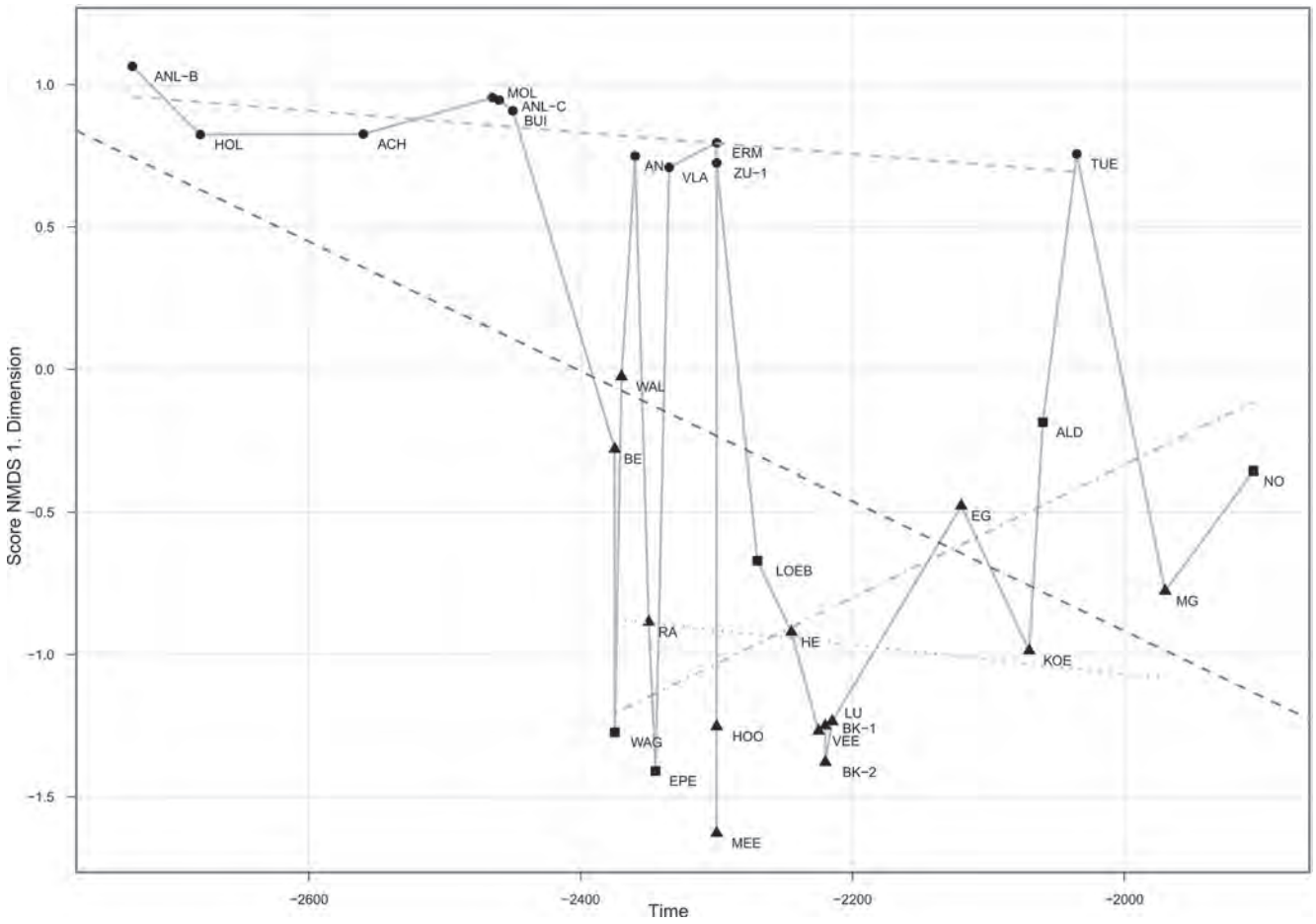

Fig. 6.6. Results of the nonmetric multidimensional scaling procedure (NMDS) with Rhine-Main-Neckar Beaker assemblages and their temporal developments. The x-axis gives the time linear in cal. BC according to the radiocarbon dates. The y-axis represents the scores on the 1st factor of the NMDS, expressing a (quasi)-linear measurement of typological difference. The symbols represent the dated specimens (BB a/b1: circles; BB b2: triangles; BB c: squares). A linear regression of scores/time was calculated for the individual style groups and the whole sequence (BB a/b1: light dashed line; BB b2: dot-dashed line; BB c: dotted line; all: strong dashed line). Phases of higher and lower diversity of BB ceramic styles are visible.

early similar development within the BB style (BB a/b1), the diversity of two different contemporaneous styles (BB b2 and c) is observable in high and low MDS first factor scores, which are mapped separately on both sides of the linear regression of all scores. Remarkable is that the group BB a/b1 shows a stylistic inertia, expressed in the analysis by the fact that the related regression line of the intrinsic development of the style (light dashed line) has a rather shallow slope. The same is true for the style BB b2, but here the scores of the NMDS show a higher diversity, indicating a higher variability of these vessels, while the style BB c, although there are fewer dated examples of it, seems to become more similar to the overall stylistic pattern during its development.

Figure 6.7 shows the development of the whole ceramic sequence. Again, the NMDS scores are plotted against the mean radiocarbon age of the dated specimens, and the general trend of development is indicated by the straight dotted line which is the linear regression of this development. From the dated examples and their NMDS load, a Time-Stylistic Development model was computed as indicated above as a smoothed trend using LOESS. With this model, the estimated NMDS scores were simulated for a temporal vector of the span of the existing radiocarbon dates in steps of 10 years. The uncertainty of the radiocarbon dates was overcome by the use of the typological ordering as a possibility to divide the time-spans in between radiocarbon-dated assemblages. The result is the bold dashed curve, showing the general stylistic development. The dotted lines accompanying the curve represent the 1st resp. 2nd sigma ranges of the estimation. The shaded area below is a translation of the steepness of this curve. Steeper parts of the curve indicate more rapid development and result in peaks of the shaded area, while a gentle slope represents slower

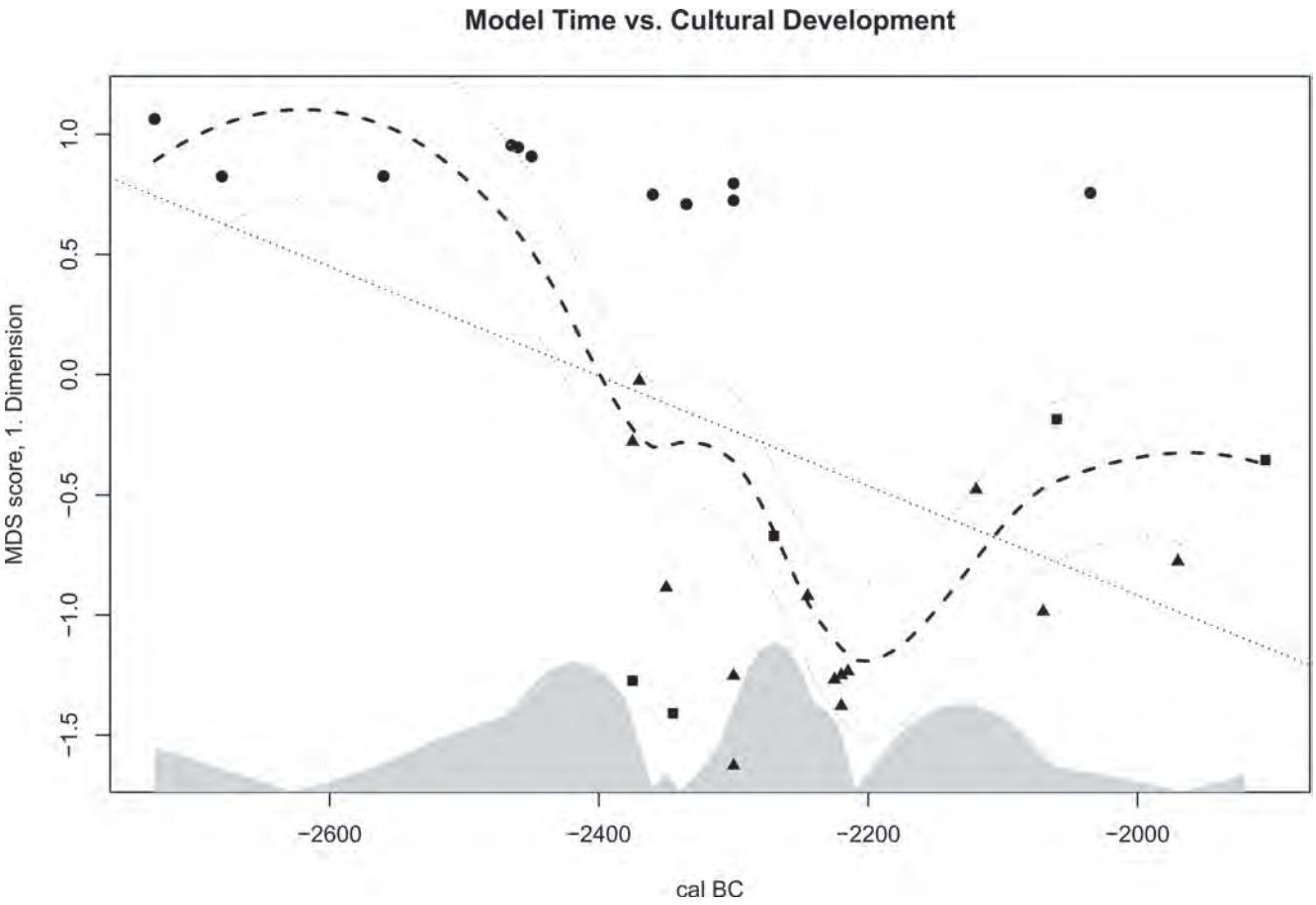

Fig. 6.7. Results of the NMDS (compare Fig. 6.6) with an estimation of the general stylistic development. The general trend is indicated by the straight dotted line (linear regression). The bold dashed curve represents the estimated development through time, calculated with a locally weighted prediction algorithm (LOESS, see text), accompanied by the 1 resp. 2 σ ranges of this prediction. The shaded area is a representation of the steepness of this curve and thereby of the speed of innovation in different times. A regular pattern of faster and slower stylistic development becomes evident (increase, decrease, and cessation).

development and in this range the area approaches zero. The estimation of the regression error envelope also shows that the data distribution is sensitive but nevertheless underlines our model. In Figure 6.7, a general trend is indicated by a linear regression. The locally weighted prediction algorithm (LOESS), accompanied by the 1st resp. 2nd sigma ranges of this prediction, represents the estimated development through time, its steepness the speed of innovation in different times.

In result, the BB stylistic development of the Rhine-Main-Neckar area follows a kind of rhythm:

- ca. 2600–2380 cal. BC, a first trend of increased stylistic changes took place with a peak around 2430 cal. BC, followed by a cessation around 2380–2330 cal. BC.
- A further tremendous trend of increased stylistic developments is indicated ca. 2330–2230 cal. BC with a peak around 2270 cal. BC and a cessation at the end.
- A third phase of stylistic development is observable ca. 2220–2000 cal. BC with a peak around 2130 cal. BC and a later cessation.

In summary, a rhythm within the development of BB styles seems to be indicated. Intervals, in which new decoration patterns are created, are followed by intervals, in which the development of new patterns decreases. We are not necessarily talking here about the introduction of new styles but rather about the mixture of different styles or patterns to new combinations.

In short, the speed of stylistic change is not uniform during the Rhine-Main-Neckar Bell Beaker development. The quantification of stylistic changes resulted in a pattern

of different intensities of change with at least 3 phases of increase, decrease and cessation of style development. How is this pattern to be explained?

Memory structure in BB societies

The increase and decrease of stylistic changes in ca. 150–200 year intervals focuses our attention on communication structures in non-literate societies. The BB stylistic rhythm, which is detected for the Rhine-Main-Neckar region, may be attributed to the entire scope of southern and central Germany, as Ullrich was able to demonstrate the huge similarities in the chronological and stylistic development of the mentioned regions (Ullrich 2008, 121). What triggered BB communities to develop pottery styles in such a cyclic rhythm, which involved the creation of innovative styles and the separation of some design elements probably for special purposes? Why did the development of new patterns and creativity cease after a certain time period and resume again with a similar speed?

We suggest that the construction and creation of new design systems and their function for individuals and societies is influenced by the nature of memory, in particular social memory in non-literate societies (Forty and Küchler 1999). Bradley already described variations of remembering and forgetting within past societies (Bradley 2002). By comparative studies he noted a maximum span of 200 years for unaltered oral traditions. In a recent study, Whittle came up with 100–200 years duration for memory transmission in non-literate societies (Whittle *et al.* 2011, 911–914) as some type of real social memory in contrast to "mythical time". To sum up, approximately 4–8 generations of more or less unchanged memory transmission seem to guarantee the prerequisites for the transmission of ideological basics within an unaltered societal background.

In such a discourse we would also like to associate the BB stylistic cycle with the notion of social time, which Braudel (1990) already limited to 5–6 generations. The development of ceramic designs in approximately 5–10 generations suggests stable social structures, in which the creativity of the society and in this case the use of design motives in mainly ritual contexts more or less flourished. The discontinuation of the development of the existing designs after a certain number of generations displays, in our opinion, the lacking stable chain of ideological patterns over the course of generations: a recreation of the society became necessary. Once more, the cycle of increase, decrease and discontinuation of design development became obvious in the archaeological record (thus serving as a model to interpret our results of the multivariate analyses).

The consequence: If our interpretation is valid, BB societies in Central Europe must still be considered to have been organised in dramatically unstable conditions: Probably the limitation of ideological transmissions over time limited the development of stable political institutions. The BB network functioned as a spatial link between different societies and not so much as a new quality of stratification within regional societies. This contrasts clearly to the Central European Early Bronze Age, in which some rich burials include antique objects, which materialised the overcoming of the limitations of oral memory transmission.

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Appendix 6.1

Site	*Lab. ref.*	*Context*	*Material*	*BP determination*	*Calibrated date cal. BC*
Rhine-Main-Neckar					
ACH Achenheim	GrA-15976	burial	bone	4045±40	2630–2490
ALD Aldingen	Hd-13664	burial (burial 35)	bone	3685±40	2140–2020 (61.4%) 2000–1980 (6.8%)
TUE Tuckelhausen	Hv-9436	multi-levelled double burial (*Etagendoppel-bestattung*) (top burial)	bone	3680±60	2150–1950
	Hv-9437	(bottom burial)	bone	3635±40	2120–2100 (5.4%) 2040–1920 (62.8%)
ZU-1 Zuffenhausen	GrN-9298	burial 1 (1933)	bone	3830±35	2400–2380 (1.9%) 2340–2200 (66.3%)
Lower Rhine (and neighbouring regions)					
AN Annertol	GrN-6643	burial (Tumulus III)	charcoal	3870±35	2460–2420 (14.2%) 2410–2280 (54.0%)
ANL-B Anlo	GrN-851	burial B	charcoal	4140±70	2870–2800 (20.0%) 2790–2620 (46.0%) 2610–2590 (2.2%)
ANL-C Anlo	GrN-1976	burial C (*terminus ante quem*)	charcoal	3965±50	2570–2510 (25.3%) 2500–2400 (38.9%) 2380–2350(4.0%)
BK Bennekom	GrN-6155	burial	charcoal	3820±55	2400–2380 (4.3%) 2350–2190 (58.2%); 2170–2140 (5.7%)
	GrN-12268		charcoal	3770±60	2290–2130 (58%) 2090–2040 (10.2%)
BUI Buinen	GrN-6152	burial	charcoal	3945±35	2550–2540 (2.4%) 2490–2400 (51.9%) 2380–2350 (13.9%)
EPE Epe-Klokbekerweg	GrN-13714	burial	charcoal	3865±30	2460–2420 (5.9%) 2410–2280 (58.8%) 2250–2230 (3.5%)
HOL Holzhausen	KN-112	burial mound (bone-112)	charcoal	4100±100	2870–2800 (14.7%) 2780–2560 (48.3%) 2530–2490 (5.2%).
LU Lunteren	GrN-6332	burial	charcoal: charred branches	3790±35	2290–2190 (49.9%) 2180–2140 (18.9%)
MEE Meerlo	GrA-14066	burial	?	3840±35	2400–2380 (6.4%) 2350–2270 (36.9%) 2260–2200 (24.9%)
MG Molenaarsgraf	GrN-5131	burial (burial I)	bone	3635±40	2120–2100 (5.4%) 2040–1920 (62.8%)

MOL Mol	GrN-3641	burial BP	charcoal	4005±60	2630–2450 (68.2%)
	GrN–6646		charcoal	3895±45	2470–2300 (68.2%)
VEE Veen	GrA-14080	burial	?	3810+-40	2310–2190 (59.4%) 2170–2140 (8.8%)
VLA Vlaardingen	GrN-2158	domestic site	charcoal	3910±30	2470–2390 (46.1%) 2380–2340 (22.1%)
	GrN-3097		charcoal	3850±50	2460–2440 (1.1%) 2430–2420 (2.1%) 2410–2370 (11.4%) 2360–2270 (34.0%) 2260–2200 (19.6%)
WAG Wageningen	GrN-7099	burial	charcoal	3875±35	2460–2420 (15.5%) 2410–2290 (52.7%)
WAL Wallhofen	Hv-5951	burial (*terminus post quem*?)	charcoal	3875+-75	2470–2280 (60.1%) 2250–2230 (5.3%) 2220–2200 (2.8%)

Site	*Lab. ref.*	*Context*	*Material*	*BP determination*	*Calibrated date cal. BC*
Middle Elbe-Saale					
BE Bernburg	Hd-19285	burial	bone	3871±22	2460–2440 (2.2%) 2430–2420 (3.1%) 2410–2290 (62.9%)
EG Egeln-Galgenberg	KN-4865	burial (burial 1927)	bone	3738±42	2210–2120 (42.3%) 2100–2030 (25.9%)
ERM Ermstedt	KI-4145	burial 2/69	bone	3840±50	2400–2370 (7.9%) 2350–2200 (60.3%)
HE Hedersleben	Hd-19265	burial	bone	3810+-24	2290–2245 (36.8%) 2240–2200 (31.4%)
KOE Kothen-Gutersee	Hd-19333	burial	bone	3733±54	2210–2030 (68.2%)
LOEB Lobnitz	Bln-1447	burial (burial 1/Stelle 5)	bone	3810±61	2400–2380 (3.3%) 2350–2190 (53.3%) 2180–2140 (11.6%)
NO Nohra	Bln-3752	burial (burial 16)	bone	3580±50	2030–1990 (9.8%) 1980– 870 (52.7%) 1840–1820 (4.3%) 1790–1780 (1.4%)
RA Rathmannsdorf	GrN-23312	burial	KN	3870+-30	2460–2420 (9.9%) 2410–2280 (58.3%)

Calibration: OxCal v3.9 im 1-Sigma-Bereich (68.2%) (Ullrich 2008, 191–193 list 7 with further references).

Appendix 6.1. Radiocarbon dates of decorated Bell Beakers from the Rhine-Main-Neckar region, the Lower Rhine and the Middle Elbe-Saale-region with small standard deviations (cf. Fig. 6.4).

7

THE LONG-HOUSE AS A TRANSFORMING AGENT. EMERGENT COMPLEXITY IN LATE NEOLITHIC AND EARLY BRONZE AGE SOUTHERN SCANDINAVIA 2300–1300 BC

Magnus Artursson

The importance of the long-house in southern Scandinavia increased during the transition between the Middle Neolithic B and the Late Neolithic, 2500–2200 BC, parallel to the increasing importance of Bell Beaker networks in some central regions of the area. The general change in architecture and the gradually increased range in sizes show that the long-house in itself received a number of new symbolic and ideological meanings, closely connected with the establishment of a marked settlement hierarchy and a more stratified society. The investment in large long-houses during the Late Neolithic and Early Bronze Age, 2300–1300 BC, indicates that these buildings received several new economic and social functions and became an important symbol for the gradual establishment and strengthening of chiefly power. The large long-house became a symbol for this new social and political order, and most likely it was transformed into a differentiating corporate body for the developing chiefly power. This might imply the introduction of a "house-based society", where the large long-house worked as a transforming agent for society. In societies developing towards a greater concentration of power and social stratification, the long-house as symbol and institution offered opportunities for ideological, social and political manipulation. The establishment of a "house-based society" made it easier for aspiring chiefs and rising aristocratic families to break away from the old, more egalitarian and kin-based society, and by establishing new long-distance networks with other aristocratic "houses", alternative social structures and ideological systems could be constructed.

Introduction

During the last 20 years a considerable number of studies of Late Neolithic and Bronze Age long-houses and settlements in southern Scandinavia have been published. Hundreds of long-houses from this time period have been excavated and the majority of them have been dated by radiocarbon analysis, which has made it possible to produce a well-documented typo-chronological model (Artursson 2009; 2010). In my dissertation I made a comparative study of the development of the building tradition and organisation of Late Neolithic and Bronze Age settlements across southern Scandinavia. The variation in size and associations of long-houses and farmsteads have been used to analyse economic, social and political complexity. The materials and energy invested in residential housing and in the complexity of farmsteads illustrate the social stratification and centrality of different regional societies. Settlements range from single farms to hamlets, which form networks of community structures. The internal organisation of these different settlements has been used to discuss the economic specialisation and social stratification that forms the basis for polities in the form of chiefdoms of different size and complexity (Artursson 2009).

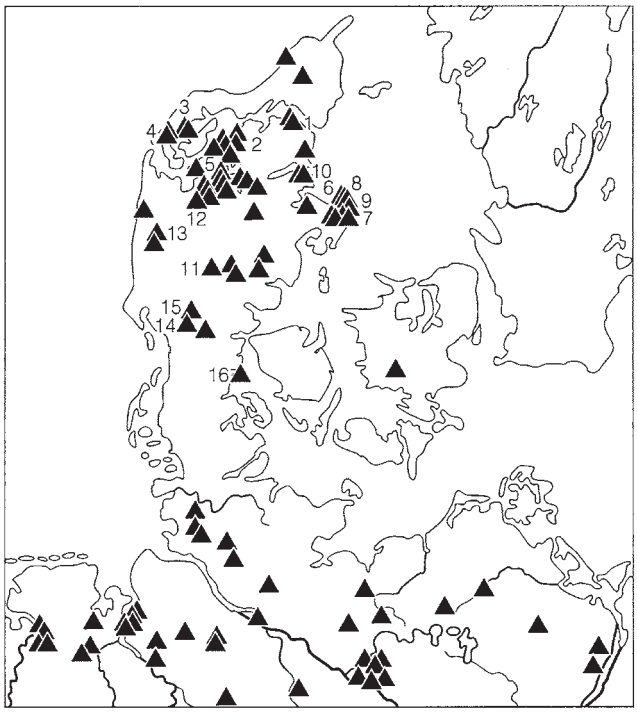

Fig. 7.1. The distribution of settlements with Bell Beaker ceramics in Denmark (from Sarauw 2007b, fig. 18).

Background

During recent years, the discussion concerning different perspectives for the analysis of the economic, social and political organisation of Late Neolithic and Bronze Age societies in southern Scandinavia has been intense. Traditionally, Bronze Age societies in this region at least have been treated from a macro-perspective, where a holistic approach has been used to describe and discuss general development. Long-distance contacts and aristocratic networks covering large parts of Europe have been considered important for transforming society and establishing small- and medium-sized chiefdoms in southern Scandinavia (Kristiansen 2006).

This approach has been questioned by post-modernist, post-processual researchers and others, claiming that a micro-perspective can better describe the situation; they concentrate on the local variation and development. The traditional emphasis on chiefdoms as the only possible form of political organisation is criticised, and as an alternative more egalitarian or simply less complex political forms are presented and discussed. This criticism of the traditionally dominant chiefdom model is, in many ways, well founded, and a more balanced discussion of alternatives could be productive. A heterarchical perspective can, according to some researchers, give a broader and more complex view of society (for discussion see Levy 1995).

However, recent large-scale studies of building tradition and settlement organisation provide evidence to support the establishment of stratified polities in the form of chiefdom-like institutions with some hereditary transfer of power already during the beginning of the Late Neolithic, 2300 BC. The conflict between the micro- and macro-perspective can, therefore, be considered non-existent as they are simply describing two sides of society that complement each other; a chiefly aristocracy supported by warriors based on networks of long-distance contacts, and local communities based on agriculture and animal husbandry.

Some regional variation in material culture, economic specialisation and social and political organisation shows the importance of local traditions and economy, and also the importance of geographical position for the centrality of individual chiefdoms. It is also evident that the centrality and importance of individual chiefdoms could change over time due to internal or external factors, which means that the central hubs of the networks shifted over time, producing a dynamic web of constantly changing alliances. Most recent studies support the view that the polities of central regions in southern Scandinavia were part of an extensive network of long-distance contacts, supporting chiefs and aristocratic central places over the whole area.

Southern Scandinavia and Bell Beaker networks in action

In this context, it is important to consider the influences from different Bell Beaker networks operating in the vicinity of southern Scandinavia, for instance in the Rhine area. It is evident that there is a considerable influence from the north-west European Bell Beaker culture in northern Jutland during the first half of the Late Neolithic, 2300–1950 BC (Vandkilde 2005). The distribution of settlements with Bell Beaker ceramics shows a clear concentration in this region (Fig. 7.1), and the distribution of early metal objects underlines the importance of this area for the long-distance networks (Fig. 7.2) (Vandkilde 1996; 2005; Sarauw 2007a; 2007b).

An important settlement in northern Jutland is Bejsebakken, placed on a small ridge between two rivers, giving it a dominating position close to one of the inlets to Limfjorden. Probably, at least three to five contemporary farmsteads existed here, and the presence of flint mines and dagger hoards close to the settlement shows its importance as a centre for the production and distribution of flint daggers in southern Scandinavia (Vandkilde 2005; Sarauw 2007b; Artursson 2009). The presence of Bell Beaker ceramics at Bejsebakken shows that this settlement also was a part of Bell Beaker networks following the North Sea coast from the Rhine area to Limfjorden.

The concentration of settlements with Bell Beaker ceramics in northern Jutland and the comparatively large

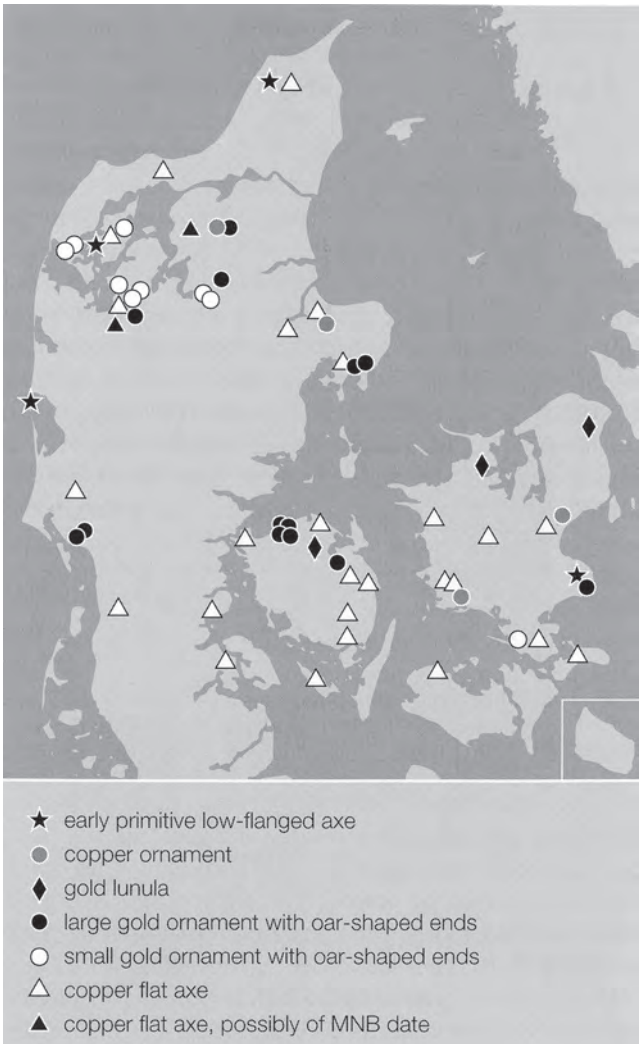

Fig. 7.2. The distribution of early Late Neolithic metal objects in Denmark (from Vandkilde 1996, fig. 184).

number of finds of early metal objects in the same region is probably no coincidence. It is highly likely that the Bell Beaker networks that carried the ceramics and metal objects to northern Jutland were connected to centres in the Limfjord region where the production and distribution of well made, high prestige flint daggers was organised. Finds of early flint daggers produced in northern Jutland have been made in the Rhine area and Great Britain, further supporting this interpretation (Apel 2001).

Southern Scandinavia is interesting when it comes to the Bell Beaker culture, as there seems to be a north–south boundary between regions where this special type of material culture was adopted and used, and regions where it was not. The western part of Denmark and south-western Norway seem to have been involved in north-east to south-west running long-distance networks, while eastern Denmark and southern Sweden were probably involved in networks going north–south, crossing the Baltic Sea and connecting them with the great rivers Oder and Weichsel and their respective long-distance networks. This probably shaped two different cultural systems with differentiated material cultures, though some types of objects like flint daggers and certain variants of arrowheads were shared as symbols for a warrior aristocracy in both areas (Vandkilde 1996; 2005; Sarauw 2007a).

Scandinavian building tradition and the rise of a "house-based society"

The core region for the Bell Beaker culture in southern Scandinavia was, as we have seen, northern Jutland. Because of this it is interesting to see that there are certain differences in building tradition between western Denmark and eastern Denmark and southern Sweden. There seems to be a difference in variation in house sizes between these two areas; western Denmark shows a less developed variation while the variation starts to increase in eastern Denmark and southern Sweden already during Late Neolithic I, 2300–1950 BC. Besides this, the architecture in southern Scandinavia seems to have been relatively homogeneous during this time period; two-aisled, rectangular long-houses were used as the main buildings in the farmsteads, sometimes complemented with small buildings for specialised functions and activities such as storing or different types of craftsmanship. A trait that seems to have been more common in northern Jutland is long-houses with sunken floors, though this type of buildings also exists in limited numbers in eastern Denmark and southern Sweden (Artursson 2009).

The ratio in size variation was approximately 1:2 in northern Jutland compared with 1:3.5 in eastern Denmark and southern Sweden during Late Neolithic I (see Table 7.1 & Fig. 7.3). This might imply a difference in importance of the long-house as such between these regions. Maybe the

Time period	*Absolute date (cal. BC)*	*Size of long-houses (length/ width) m*	*Estimated roofed area* m^2	*Ratio size of long-houses (smallest/ largest)*
LN I	2300–1950	9–30 6–8	70–250	1:3.5
LN II–BA IA	1950–1600	9–47 7–9	70–350	1:5
BA IB–BA II	1600–1300	10–60 7–10	75–450	1:6

Table 7.1. General development of the size of long-houses in southern Scandinavia during Late Neolithic I–Bronze Age period II, 2300–1300 BC. Notice that the variation in size of the buildings varies between different regions in the area

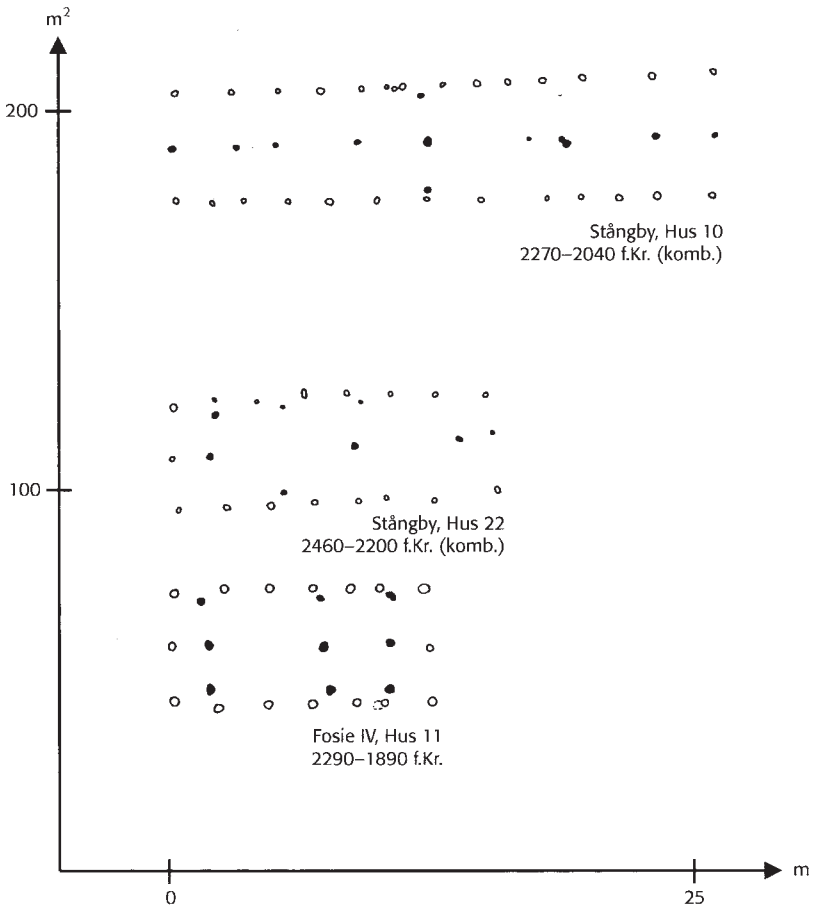

Fig. 7.3. An overview of the general variation in size of long-houses from Scania, southern Sweden during Late Neolithic I, 2300–1950 BC. Size and length are given on the axes (from Artursson 2009, 54, fig. 3).

long-house was used as an active symbol in eastern Denmark and southern Sweden, creating a "house-based society" in which the large long-house worked as a transforming institution. In a society in transformation towards a greater concentration of power and social stratification, the long-house as a symbol and institution must have offered new opportunities for ideological, social and political manipulation, making it easier for aspiring chiefs and rising aristocratic families to break away from the old, more egalitarian and kin-based society (for a theoretical discussion concerning "house-based societies" see Carsten & Hugh-Jones 1995).

The increasing importance of the long-house as a social, political and economic concept and symbol in southern Scandinavia during the end of the Middle Neolithic B and the beginning of Late Neolithic I, 2500–2000 BC, can be seen in the gradual increase in the range of house size. The range in size of long-houses, which constituted the main dwelling type in southern Scandinavia already from the beginning of the Early Neolithic, 4000 BC, had for a long time varied between 10 m and 22 m in length and the total inner surface can be estimated to have varied between 70 m^2 and 140 m^2, giving a ratio of 1:2. During the end of the Middle Neolithic B a definite change can be seen; the layout of the long-houses takes on a more formalised appearance and at the same time the number and complexity of ritual deposits in long-houses increased considerably.

The investment in large long-houses with an estimated roofed area of up to 250 m^2 in eastern Denmark and southern Sweden during Late Neolithic I implies that these buildings received several new economic and social functions, thus becoming important symbols for the gradual establishment and strengthening of chiefly power. They became a symbol for a new social and political order, used by the developing chiefly families and warrior aristocracy as differentiating corporate bodies where exclusive patterns of behaviour, customs and material culture established and secured their privileged position.

However, the more limited ratio in house size of 1:2 and an estimated maximum roofed inner area of approximately 120 m^2 in northern Jutland (Sarauw 2006), can not in itself be considered an indication of an egalitarian society. Comparative anthropological studies shows that already a ratio of 1:2 can be a sign of a stratified society where certain households have been using the main building as some form of a differentiating body (Artursson 2009). This interpretation of the size ratio would actually be more in accordance with the character of other materials in this

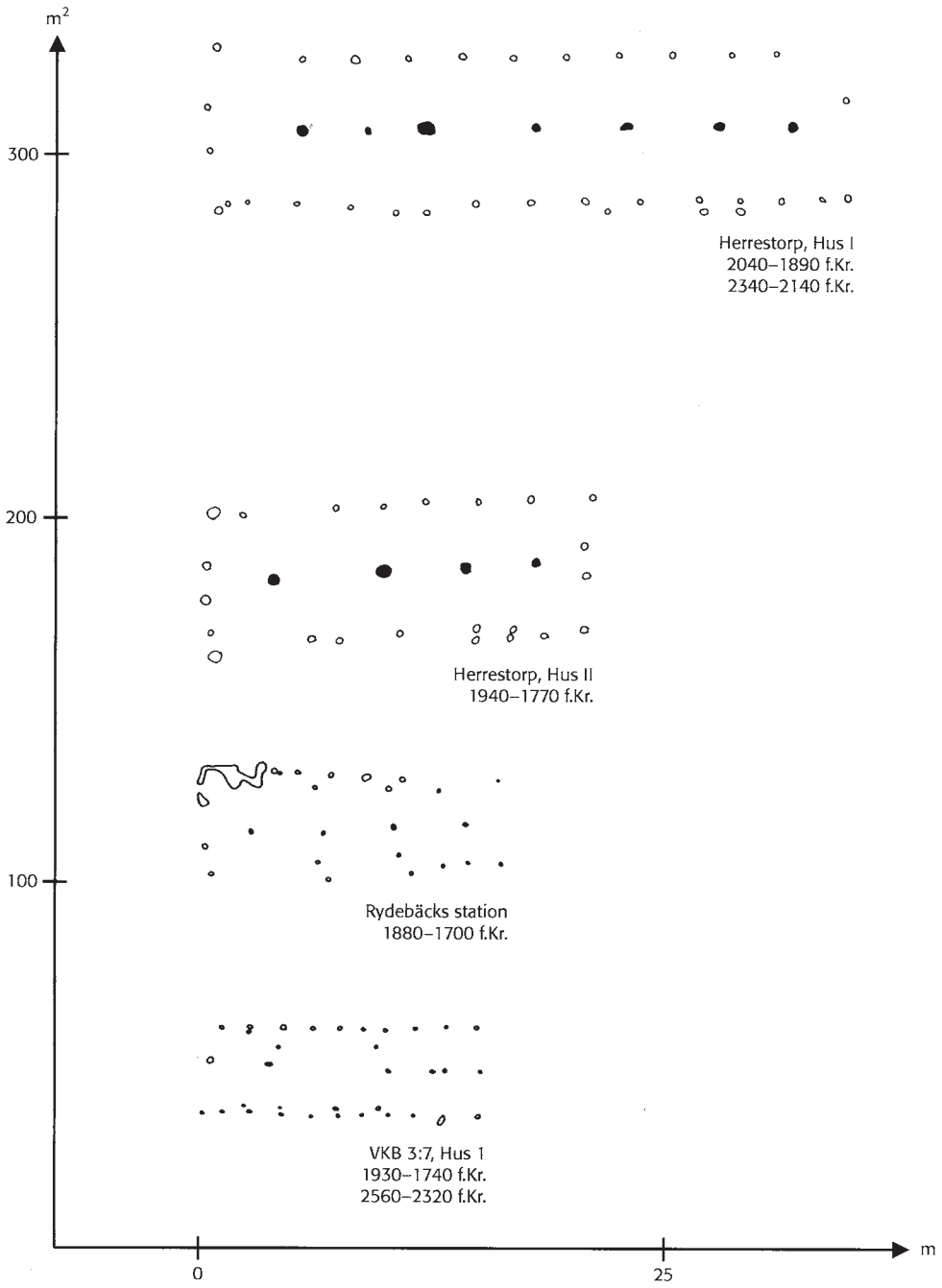

Fig. 7.4. An overview of the general variation in size of long-houses from Scania, southern Sweden during Late Neolithic II, 1950–1700 BC. Size and length are given on the axes (from Artursson 2009, 55, fig. 4).

region; the variation and complexity of graves, hoards and settlements all implies that society in northern Jutland also was stratified. The long-distance contacts visible by the presence of Bell Beaker material culture in the region shows that certain groups were active partners in extensive networks stretching over north-western Europe, engaged in the exchange of metal, metal objects, exclusive Bell Beaker ceramics and locally produced flint daggers.

During Late Neolithic II, 1950–1700 BC, the difference in ratio of house size between regions seems to disappear. The ratio generally increases to 1:5 and the large long-houses now have an estimated roofed area of up to 350 m^2 (see Table 7.1 and Fig. 7.4). At the same time, around 2000 BC, the importance of the Bell Beaker networks seems to decline and gradually the material culture in southern Scandinavia becomes more homogeneous. The use of Bell Beaker ceramics in northern Jutland fades away, and at the same time the local production of metal objects grows in importance (Vandkilde 1996; 2005).

In the beginning of the Early Bronze Age, around 1600

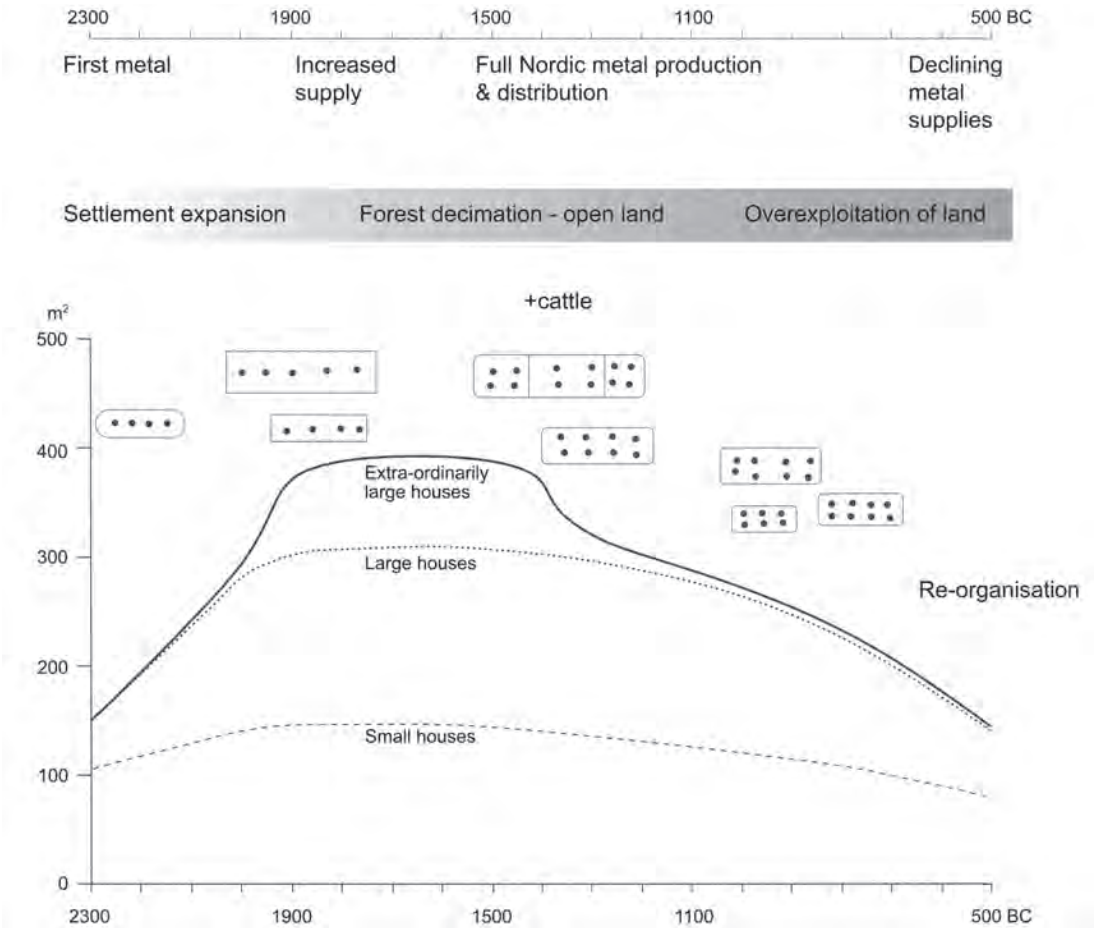

Fig. 7.5. A model of long-term change of society in southern Scandinavia during the Late Neolithic and Bronze Age, 2300–500 BC (from Kristiansen 2006, 192, fig. 50).

BC, the maximum in size variation of long-houses is reached; the largest long-houses from this time can be more than 50 m long, 10 m wide and have an estimated inner surface of more than 450 m² (see Table 7.1 and Fig. 7.5). At the same time there is a shift from a two-aisled to a three-aisled construction, which might be significant as this probably made it easier to build wider and taller long-houses. These are gigantic buildings which must have constituted great local investments in material and labour, which suggests that they were meant to be in use for a considerable time. This assumption is confirmed when details in their construction are studied and series of radiocarbon dates analysed; quite a few have been repaired and/or lengthened and the extensive use of radiocarbon dating has made it possible to identify different phases in the construction. This maximum in size variation is paralleled with the establishment of the classical Scandinavian Bronze Age culture; an extensive production of elaborate local bronze objects demonstrates the complexity of society and the accomplishment of a true chiefly organization (Vandkilde 1996; Kristiansen 2006).

Long-houses and social and political organisation

Based on general similarities in plan and inner division of long-houses of different sizes in southern Scandinavia, it is most likely that just one family or an extended family lived in every building. Thus, it is evident that the basic social unit in general was the family, but the long-house could be of varying size and complexity according to the social status of the individual household. The social unit in the large chiefly long-houses was probably based on a family, but other persons and specialists could be associated through different forms of social ties.

The size if these families or extended families can be estimated to vary between 5 and 30 persons, depending on their social and political position in society. There are a few exceptions where there are signs that some of the medium-sized or large long-houses have been used as dwelling-places for two families. An often-presented interpretation of these buildings is that they have been inhabited by two chieftains with their families, and that this is the material representation of a presumed institution of *"twin chiefs*", an

indo-european concept which is based on information from the Vedic texts. It is assumed that the chiefly power might have been divided between a ritual leader and a warrior leader, providing polities in southern Scandinavia with specialized knowledge in respective areas (for discussion see Kristiansen 2006).

The ever increasing social, political and ritual importance of the large long-house and farmstead as an important unit to organise and institutionalise the emerging chiefdoms can be seen in many ways. The size of the large long-houses increased over time and special rooms for important social events and ritual feasting were added. The traditional concept of the "hall" has probably its roots in this time period. There are some variations in theme and emphasis over time, but the main trend is clearly visible.

The large farmsteads, emphasised through the impressive and massive long-houses, can in general be seen as the material expression of an institution similar to that of the ethnographic concept of the "house". The large long-house as such can be seen as an effective transformative agent, which could be used to redefine and further elaborate social and political positions and structures in a "house-based" society (compare discussion in Vaneeckhout 2010, 21ff). In societies in transformation towards a greater concentration of power and a gradual increase in social stratification, the long-house as a symbol and institution offered opportunities for ideological, social and political manipulation. In the large "hall" in the long-house an elite ideology with aristocratic overtones could be created and further improved to help construct a stratified society with marked social spheres. Thus, alternative social structures and ideological systems could be constructed, competing with the traditional, more egalitarian kin-based society (Artursson 2009, 192).

Settlements and social and political organisation – the establishment of a settlement hierarchy and chiefly power

From the beginning of the Late Neolithic I, 2300 BC, there are evidences of an increasing complexity in settlement structure and the introduction of a clearly visible settlement hierarchy in some central areas of southern Scandinavia. The increase in range of house sizes and the establishment of chiefly farmsteads and hamlets are clear signs of the transformation of society towards a more stratified structure. Around 2000 BC a new social and political order was firmly established, constituting the base for the classical Scandinavian Bronze Age culture emerging around 1600 BC.

Other signs of emerging small and medium sized chiefdoms, where individuals and families claimed hereditary right to power, are more complex and varied burial customs. During Late Neolithic I, 2300–1950 BC, different kinds of more or less complex inhumation graves, chamber graves, gallery graves, boat graves, barrows with inner stone and wooden constructions and wooden death houses were erected, in which individuals equipped with high status flint and stone objects occasionally were buried (for discussions see Hansen 1996; Stensköld 2004; Nordquist 2001; Sarauw 2007a; Carlie *et al*. 2007; Artursson 2009). It is evident that different burial customs were in use in parallel, both locally and regionally. This implies that there must have existed several contemporary burial customs, probably used based on social and political position and maybe personal preferences. Later, during the Early Bronze Age, approximately 1500–1300 BC, a very large number of barrows and cairns of different size and complexity were erected, in some cases concealing spectacular burials with high status bronze weaponry and personal adornments. In some regions different kinds of cult and death houses complemented these burial monuments.

Also, variation in size and wealth of offerings consisting of high status objects made of flint, stone, copper, bronze and gold increased, with imported objects as extremes. The offerings were mostly deposited at traditional communal ritual sites in wetlands and on dry land, sometimes at special natural formations. This must be seen as an indication of increasing social complexity and manipulation of the traditional cult sites. There is also a gradual shift from the use of mainly communal ritual sites to more individualised ritual places, sometimes situated close to or in the large long-houses at chiefly farmsteads and hamlets.

Transformation of society was greatly enhanced by the gradual establishment of long-distance chiefly networks in which the large farmsteads and hamlets worked as important hubs for meetings and the organisation of alliances. These alliances were important for the control of exchange and distribution of prestige goods that supported the whole social and political structure. This structure was primarily based on cooperation and alliances, but harsh competition was also a part of the game, sometimes erupting in deadly violence and war. The ideology of the warrior can be seen symbolically staged in many contexts like graves and offerings or depicted in rock-carvings all over southern Scandinavia (Kristiansen 2006).

Conclusion

The gradual development of the large long-house and more complex farmsteads during the Late Neolithic and Early Bronze Age in southern Scandinavia can be seen as just one part of a set of symbols used to separate the chiefly aristocracy from the lower ranks of society. The large long-house became one of several material representations for this new social and political order, and most likely, this type of building can be seen as a differentiating, corporate

body with warriors and specialists attached, used to develop and gradually strengthen chiefly power. A settlement hierarchy was established, where large farmsteads and associated hamlets worked as important hubs in networks of long-distance contacts, gradually integrating southern Scandinavian polities with the rest of Europe. The Bell Beaker networks in action in northwestern Europe integrated above all polities in northern Jutland, influencing society and material culture, forming the foundation for the later prosperity of the classical Scandinavian Bronze Age culture.

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8

EXPANDING 3RD MILLENNIUM TRANSFORMATIONS: NORWAY

Christopher Prescott and Håkon Glørstad

The transformation of coastal and southerly Norway to an agricultural society has long been a theme of interest for Nordic prehistorians, and has commonly been interpreted as the outcome of a long drawn process of gradual transformation of hunter-gatherer societies. In the course of the last 20 years there has been an interpretative shift that instead emphasises a rapid transformation in the mid-3rd millennium, around 2400 BC. Agricultural evolution as a prime driver in prehistory has been abandoned in favour of a suite of related factors that include the establishment of the farm institution, but also technologies, expanding maritime communication, ideology and hierarchical social institutions. The Bell Beaker phenomenon is increasingly regarded as the driving force behind the dramatic transformations of large tracts of Scandinavia.

Slettabø in southwestern Norway, with its potsherds, bifacial points, osteological data and maritime orientation, is a referential site in this regard. Arne Skjølsvold excavated the site in the early 1960s, and interpreted it within a framework of protracted local agro-pastoral development in hunter-gatherer groups under the influence of various Neolithic cultures. The present article re-evaluates stratigraphy and chronology, and outlines the site's maritime character. Slettabø layer II is seen in context with mid-3rd millennium sites in western Scandinavia, e.g. in Jutland, but also sites to the north like the Mjeltehaugen grave monument with decorated slabs and the Skrivarhelleren rock shelter in the uplands. Interpreting data is based on social anthropological perspectives and a fundamentally historical approach.

Introduction

The region of Bell Beaker influence in northern Europe has been significantly expanded in the last decade, i.e. to encompass parts of Denmark. Concurrently, the content of what is ascribed to this archaeological category has also developed from a narrow typological assemblage to the diverse expressions of a complex socio-cultural movement. This article argues that the Bell Beaker movement should be further expanded north into the Scandinavian Peninsula, triggering the Nordic Late Neolithic (also known as the "Dagger Period"). This not only helps to make sense of developments in Scandinavia, it continues to dramatically expand the Bell Beaker region with an informative case study. Bringing mid-3rd millennium processes in Norway together with broad European developments by placing them in a Bell Beaker context generates a powerful interpretative context and a case that may help to also understand the massive transition other places in Europe.

Quite often major changes in archaeological materials – style, technology, function – indicate broader modifications in population, society, technology, economy or mentality. Developing this evidence exposes, however, that historical *transitions* are often inaccurately reflected in archaeological periodisation and cultural terminology. The profound transformation of 3rd millennium Norway and Scandinavia cut across two somewhat anonymous periods (Middle Neolithic B3, Late Neolithic 1), refocuses the transition to the Bronze Age from period 1 to the Late Neolithic, and is

thus a case in point. The transformation at this time is one of the – if not *the* – most dramatic rerouting of the historical trajectory as far as scope (economy, society, technology, and mentality), speed (a generation?) and geographic impact (1000 km along the coast) experienced in Norway after deglaciation. In simple terms the hunter-gatherer lifestyle was terminated and a Bronze Age-style agro-pastoral European society was rapidly established. Sometime just after or before 2400 BC in most of Norway – along the coast north to the Arctic Circle, east into present-day Sweden and through the valleys and fjords into the highlands of the interior – life was forever transformed.

Although the mid-3rd millennium "Late Neolithic" has long been recognised, perhaps with a misnomer, as the period of "final Neolithisation", the dramatic nature of societal change has only recently been explicitly explored, and is still accepted with hesitation. This is partly related to some empirical issues. The interpretation of some archaeological patterns available to archaeology for decades has only gradually gained momentum (see Prescott and Walderhaug 1995 to Prescott and Glørstad 2011a), whilst several archaeological sources have matured in the last 15 years in light of new excavation methods (large scale topsoil removal), refinement of dating methods (the consolidation of AMS-dating), scientific analyses (metallurgy, aDNA and isotopes), as well as new finds from the period (e.g. dual-aisled longhouses, clearance cairns and fossilised fields). It is also related to some fundamental theoretical issues tied to the challenge to the previous predominance of small scale identity analysis or a local Neolithisation platform –and how archaeological periodisation structures interpretation (Prescott and Glørstad 2011b).

Among those who interpret the archaeological record as a fundamental transformation of society in the mid-3rd millennium BC, explanations have pretty much followed familiar lines; from internal evolutionary development, variable external influences on indigenous societies to migration. The sources of transformational dynamics have varied accordingly, from internal ecological or social dynamics inherent to Neolithic societies, agricultural evolution, diffusion from various Corded Ware sources and intermittently (and recently with increasing acceptance) Bell Beaker sources.

To elaborate briefly on the latter option, in a Scandinavian perspective the chronology of the mid-3rd millennium, the western Scandinavian geography and the archaeological expression of the ensuing Late Neolithic 1 all point to a Bell Beaker influence. In Norway, and particularly southwestern and coastal western Norway, there are numerous archaeological expressions of the impact of a material, technological, cultural, social and economic force that in western Europe is surmised under the term "Bell Beaker Culture".

The Slettabø site

An iconic "Neolithic" point of reference in Norwegian archaeology is the Slettabø-Site (Figs 8.1 and 8.2). Excavated in the 1960s by Arne Skjølsvold and later published by him (Skjølsvold 1977), the site is located south of Stavanger in Rogaland, on the south-west coast of Norway. It is thus on the Norwegian side of the Skagerrak strait between Jutland and Norway. The site is about 300 m from today's coast, but protected from the ocean winds by a barren ridge. The cultural deposits on the site that have been partially investigated are 5–9 m above present sea level. During the Neolithic and Early Bronze Age sea levels were higher, and the topography would have been significantly different than today (Fig. 8.2). The site would have been located on an island, in a small protected cove along a narrow, shallow channel leading from the open sea of the Skagerrak Strait into a calm skerry and inlet landscape. The site is thus best characterised as a protected harbour site accessible only by boat, but centrally placed to facilitate movement along the coast, into the Skagerrak Strait, and also into the protected inland.

The cultural deposits were found in three main layers. These were divided by aeorial sand deposits which the excavator Arne Skjølsvold emphasised as stratification indicative of abandonment between the three phases of assumed continuous habitation. The upper layer (I) was dated primarily to the Bronze Age, while the lower layers (II & III) were assigned a Middle to Late Neolithic (layer II) date and Early to Middle Neolithic (layer III) dates. The suggested age, evaluation of stratigraphy and discussion of disturbances is partly based on radiocarbon dates from the layers (with the shortcomings inherent to radiocarbon and its interpretation in the 1970s), the lithics and in particular the ceramics, especially those with cord-stamp decoration (that particularly characterise layer II).

The subtitle of Skjølsvold's site publication was "*A contribution to the discussion concerning the relationship between hunting and farming societies in the Younger Stone Age and Bronze Age"*. He interpreted the site within a framework of a protracted local Neolithic development in hunter-gatherer groups, albeit influenced by various Scandinavian Neolithic cultures. The site's position in the landscape, the archaeological materials and a small and fragmentary osteological collection encompassing marine and terrestrial species, notably also cattle, lead Skjølsvold to pursue his interpretative discussion with in a framework of "economic dualism" in the Pitted Ware Culture – a recurrent concept in pre-1990's cultural historical archaeology. "Cultural dualism" is akin to concepts of primordial ethnic identity, but it appeals to conservative adaptation and cultural tradition instead of "blood". The central theme was a presumed relationship between separate hunting groups and farming groups that co-inhabit the same area. Explicitly

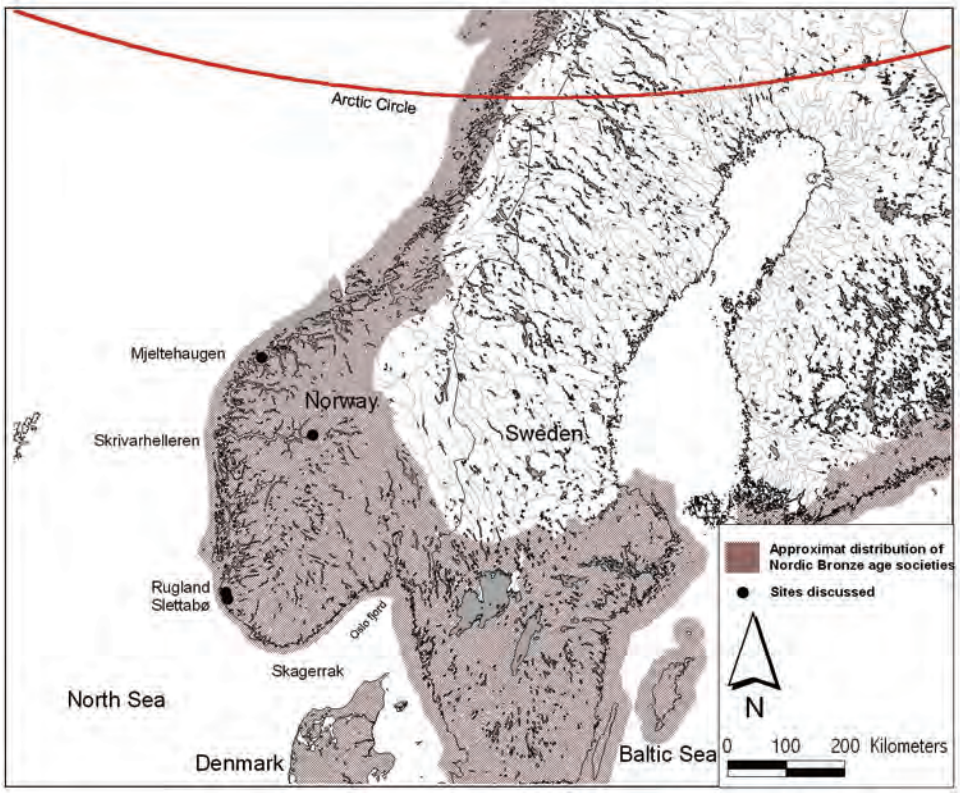

Fig. 8.1. Map of Scandinavia with sites, geographic features and regions discussed in the article indicated. The shading indicates the general extent of the Nordic Late Neolithic and later Nordic Bronze Age (map by H. Glørstad).

Fig. 8.2. The Slettabø site during excavation in the mid-1960s. The stratification (dark cultural layers seperated by aeolian sand) can be discerned. To the right: the ridge that shielded the site from the open sea. To the left, a low lying strip that would have been a protected channel between islands along the coast during the Neolithic and into the Late Bronze Age.

avoiding characterizing these groups as different ethnicities, though implicitly treating them as such, he reiterates much of the recurrent view of a chronologically drawn-out process of ecologically determined interaction between groups with variable cultural traditions that specialised in the exploitation of variable environments or resources.

Since Skjølvold's publication, a number of interpretative premises have changed. From both an archaeological point of view specifically pertaining to the stratigraphy at Slettabø (Glørstad 1996), as well as a sedimentological perspective pertaining to a more general history of coastal sand dunes (Prøsch-Danielsen and Selsing 2009), Skjølvold's claim that the sand layers represent long periods of abandonment between three discrete periods of settlement cannot be sustained. The dunes could, even most likely *would*, have been formed over the course of hours or days. Likewise, the tendency to regard the Neolithic as a 1600 year long amorphous "development" of hunter-gatherers gradually evolving into farmers is being replaced by a more historically oriented perspective, in which developments in chronology and data allow the definition of more specific cultural, social and economic periods (as argued in Glørstad 2009; Glørstad and Prescott 2009; Prescott 2009; Prescott and Glørstad 2011b). This general view, along with more specific re-interpretations of stratigraphy and ceramics at the Slettabø site (Glørstad 1996), entail that the deposits represent a sequence of episodes that should be viewed diachronically and not as the "synchronic mush" over a recurrent theme of acculturation, and hunter-gatherers and farmers interacting over millennia.

In the context of the northern European Bell Beaker Culture (Prieto-Martínez 2008, also Sarauw 2008; Vander Linden 2007; 2011; Vandkilde 2001) layer II from Slettabø is of particular importance. This layer yielded typical Middle Neolithic elements like slate points, basaltic adzes, tanged blade points, and ceramics with cord-stamp, twisted cord, comb-stamp and pit decoration. Layer II also contained barbed-and-tanged bifaces, points with strongly incurvate bases (Fig. 8.3) and sherds of a northern European type bell beaker (Fig. 8.4) (Skjølsvold 1977, 364. Also discussed in Glørstad 1996; Prescott and Walderhaug 1995; Prieto-Martínez 2008). Mineralogical analysis of the sherds from Slettabø demonstrated that most of the clays from those sherds that were analysed were probably of local or regional south-west Norwegian origins. The bell beaker from layer II differed from the other analysed specimens, and contained "a particular clay mineral, possibly of continental (North German) type." (Rosenqvist and Rosenqvist 1977, 301). Glørstad (1996) has reviewed the spatial relationships between various sub-depositions from the Slettabø site. He suggests that the Bell Beaker material represents a distinct episode of use. This interpretation is supported by several radiocarbon dates of charcoal that Skjølsvold (1977, 177) published 3970±100, 3860±100, 3790±70, all BP or recalibrated in OXCAL4.1 (Bronk Ramsey 2011) to 2866–2155, 2581–2028 and 2486–1946 cal. BC**.** Other dates established older phases of occupation in the cultural layer II. These samples which provided Middle Neolithic B to Late Neolithic 1 values are associated not only with the Bell Beaker artifact material, also another important element; at least seven cattle bones (Skjølsvold 1977, 68f).

The tanged-and-barbed points, the bifacial points with strongly incurvate bases and the Bell Beaker all point to a Bell Beaker phase. This phase is then followed by layer I, which i.a. yielded a type VI flint dagger (Nordic Early Bronze Age Period I–II), a copper alloy awl of Late Neolithic/Bronze Age type, and several radiocarbon dates from the Early into Late Bronze Age, and one from the Late Bronze Age/Early Pre-Roman Iron. Thus, instead of two long phases of cultural dualism and a protracted process of Neolithisation and acculturation, layer II and I probably represent a series of Bell Beaker and Bronze Age visits, and the establishment of this cultural package in western Norway.

Interpreting the cultural context

The Slettabø-context has several inherent contextual limitations. There are few readily coherent stratigraphic markers that allow us to delimit discrete visits and study their constitution, there are obvious problems in delineating individual depositional episodes, the radiocarbon dates are based on charcoal fragments from the layers and the site is not completely excavated. Still, important elements speak for themselves, and the bifaces, the cattle bones and the bell beaker can be circumstantially (Prescott and Walderhaug 1995) and spatially (Glørstad 1996) related to each other. It also clearly represents a Bell Beaker phase, and heralds both the end of the preceding Neolithic and initiates the ensuing Bronze Age.

The depositional practices behind the beaker and the points are not clear. Do these finds represent a disturbed grave? Skjølsvold found no evidence of this. The Bell Beaker finds are embedded in a context of locally produced ceramics, and the depositional context resembles the situation found on Bell Beaker settlements in Jutland analysed by Prieto-Martínez (2008). The position of the site clearly demonstrates a maritime orientation. As the Bell Beaker phase does not seem extensive, and there are no long house or farm remains in the immediate vicinity and it is unlikely such a farm settlement could have been located on the island, the Slettabø site could be interpreted as a harbour. This is probably also a relevant background for both earlier Neolithic and later Bronze Age depositions. However, compared to the earlier depositions, which are conceivably tied to the exploitation of local maritime resources, the flint arrowheads, the bell beaker and the cattle bones indicate that

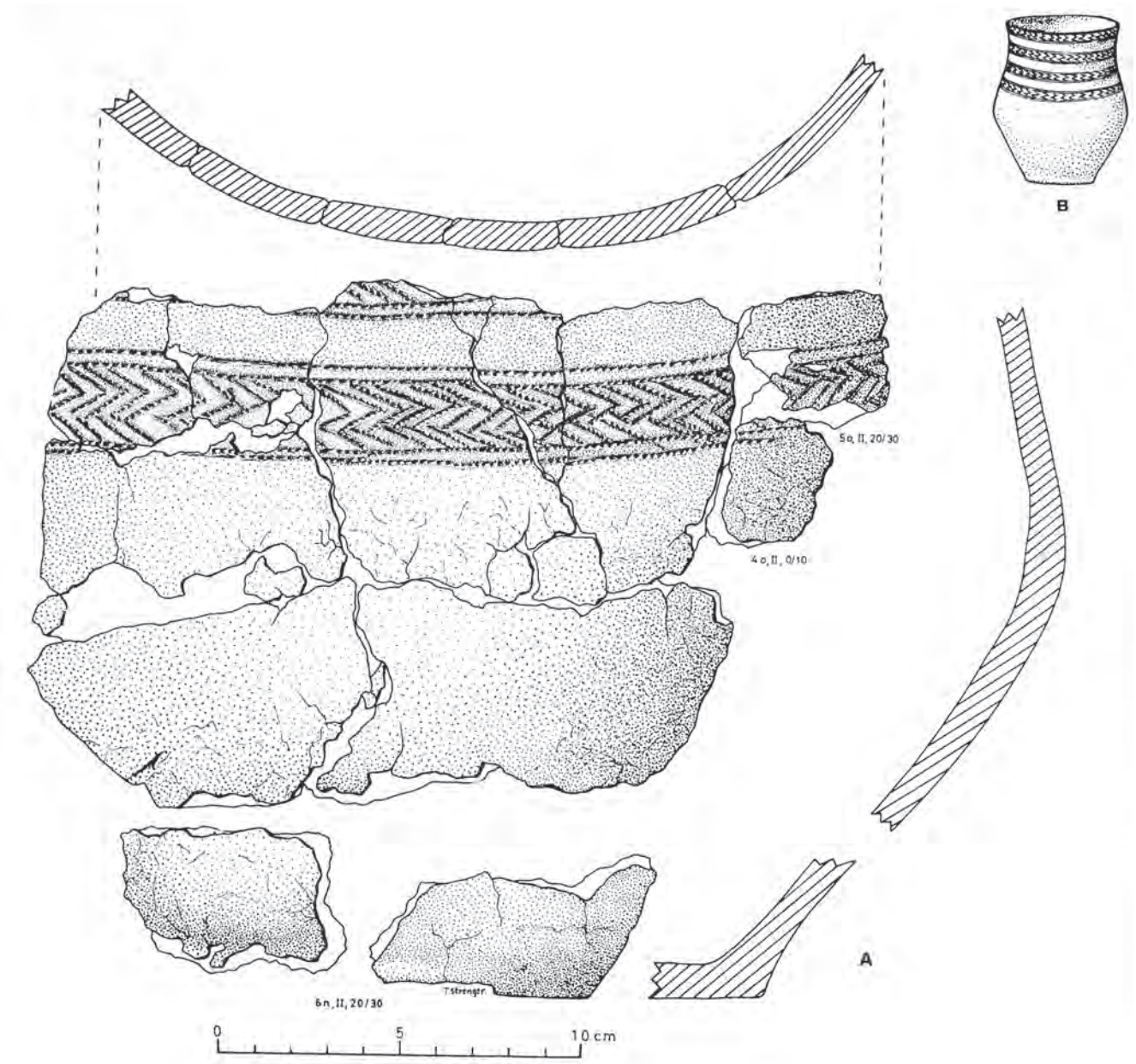

Fig. 8.3. The Bell Beaker sherds from layer II, Slettabø in Rogaland (drawing by Tone Strenger in Skjølsvold 1977, pl. 54)

as of the Bell Beaker phase the people who used the site were directly part of a much more extensive northern European network. The continuation of this network is demonstrated by later bifacial points, the flint dagger, Bronze Age ceramics and the bronze awl. The economic basis for participation – and probably initial establishment of the settlement – was agro-pastoral and maritime, but as other places in Norway the economy was multi-resourced and catered to variable economic scales (Prescott 1995).

Indeed, instead of Skjølsvold's local "hunter–farmer" dichotomy it is more reasonable to see the Bell Beaker material from Slettabø in a broader western Scandinavian perspective. Here, Slettabø becomes one of the archaeological points on the map that charts the establishment of this westerly European culture in Scandinavia (see Kristiansen 2011; Prescott 2009; 2011; Prieto-Martínez 2008; Sarauw 2007; 2008; Vandkilde 2001). Slettabø layer II is not an isolated south-western Norwegian occurrence, or an expression of the terminal phase of the Pitted Ware Culture, but instead part of a regional northern European network,

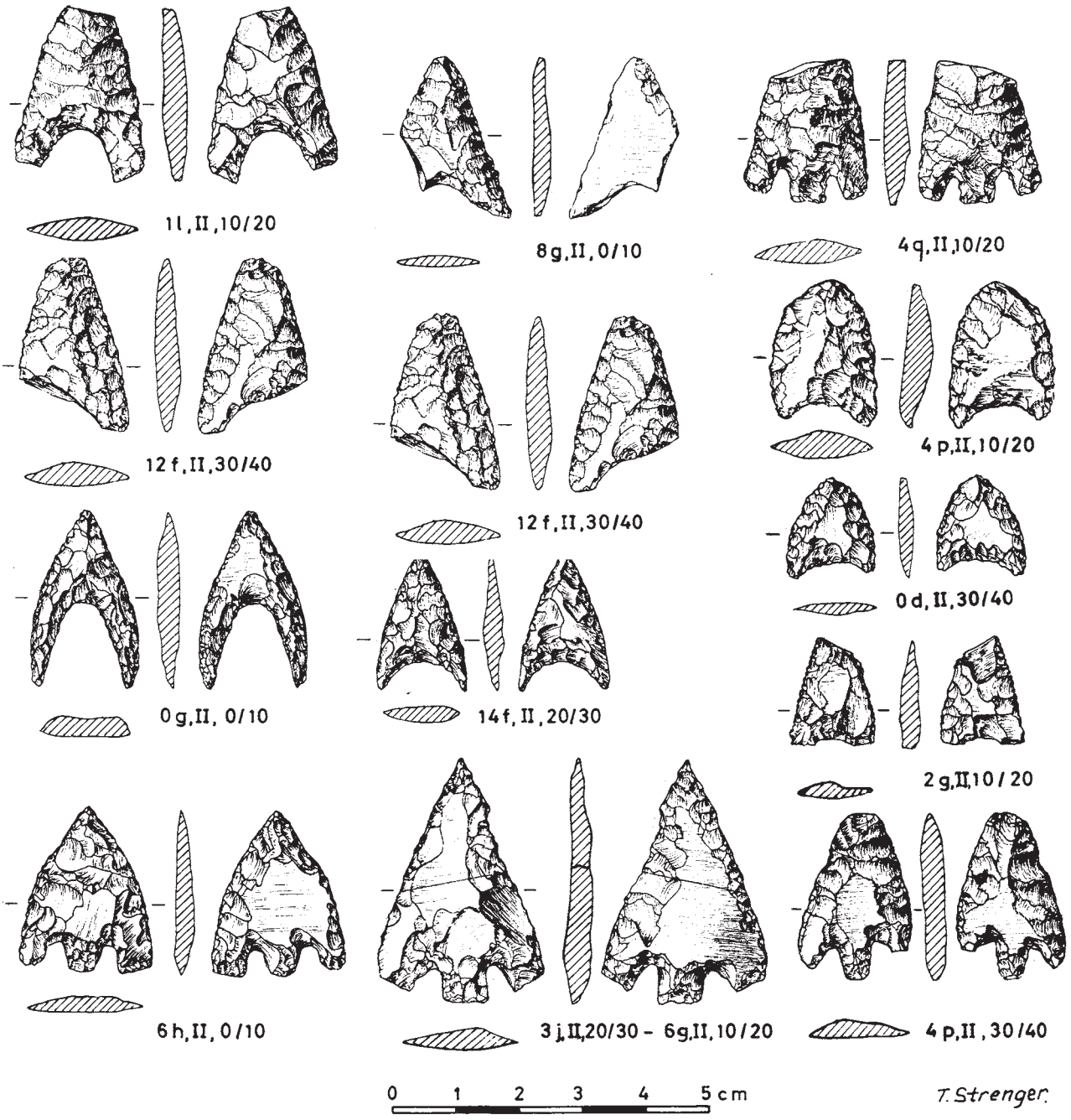

Fig. 8.4. Bifacial points from layer II, Slettabø (after Skjølsvold 1977, pl. 12).

bound together by maritime movements and networks around the Skagerrak Strait and the easterly North Sea region. In short, we interpret the site as a Bell Beaker harbour, – and as such, an expressive testimony to a fundamental new pattern of human movement in the end of the northern European Stone Age – and oversea travelling on a regular basis.

Beyond southerly western Scandinavia

The Bell Beaker Culture, though mentioned in several Nordic publications, has not been a fixture in the archaeology of the Scandinavian Peninsula. It comes largely across as an appendix to the period and culture typology, and identifying Bell Beaker material has not been convincingly on the agenda before the 1990s. Still, even as the evidence stands today, Slettabø is not an isolated fluke in Scandinavia

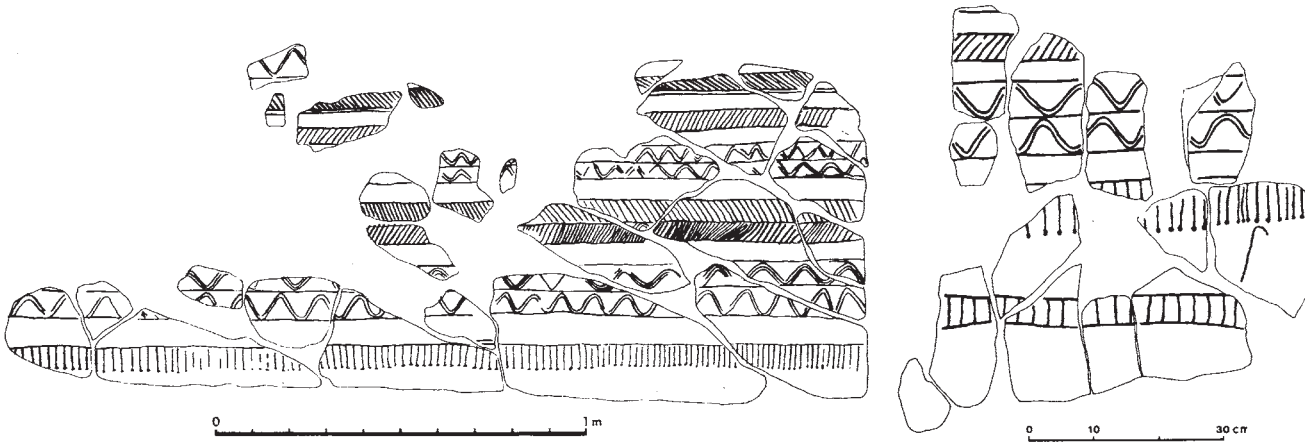

Fig. 8.5. Panels from the Mjeltehaugen site, Sunnmøre (from Mandt 1983,16).

Fig. 8.6. The Skrivarhelleren site in Årdal (790 masl), Sogn (photograph: C. Prescott).

(Prieto-Martínez 2008; also Sarauw 2007; Vandkilde 2001) or Norway (Holberg 2000; Prescott & Walderhaug 1995). In diachronical terms, its ushers in the Bronze Age, and as such is important in a retrospective discussion of the Nordic Bronze Age. In more or less contemporaneous terms the network which Slettabø represents extends not only south to Jutland and Germany, but also north along the coast and into the inland of Norway.

There are several direct and indirect indications of this cultural complex's impact. Two possible wrist-guards are found in Norway, though dubious, one of these was made out of slate and found on a Nordic Late Neolithic agrarian site, Rugland (Lindblom 1982, 22; also Holberg 2000), near Slettabø. The other was found 600 km north of Slettabø, at Hitra in Trøndelag (Holberg 2000; Scheen 1979, 32), potentially in association with a reworked type I flint dagger. Several amber buttons, some with oblique perforations, are found along the same coastal stretch (Melheim in press). This distribution is mirrored by some of the most extensive Scandinavian occurrences of the relevantly infrequent bifacial flint arrowheads with barbs and tang (Holberg 2000; Myhre 1979; Østmo 2008). These points are concentrated to south-west Norway, but are spread north along the coast to the 62nd parallel. This distribution can be extended and elaborated by the numerous points with strongly incurvate bases and barbs, that are found in the earliest part of the Nordic Late Neolithic 1, also in the interior (Prescott 1991). A similar argument may be applied to the earliest examples of the approximately 500 type 1 flint daggers found in westerly Norway (Apel 2001; Scheen 1978).

The Mjeltehaugen grave on the island of Giske, on the outer coast of Sunnmøre – 500 kilometers north of Slettabø – is an expressive indication of the impact and establishment of a Bell Beaker mentality and materiality. Mjeltehaugen represents a large burial mound (originally 30 m in diameter and 8–9 m high). Inside the mound, the remains of burial cists were found. The number of cists and burials is subject to discussion – from one to eight. The split flagstones, which were used to construct the cist(s) (Fig. 8.5), are important to the present discussion. They were unfortunately broken in the course of the excavation in 1878, but significant features can still be seen. They were decorated with an early type of boat figures (Mandt 1991), as well as a simple bands of geometric designs. The dating of the decorated slabs has been debated (Carrasco 2009; Linge 2007; Lorange 1879; Mandt 1983; 1984; Prescott 2012; Prieto-Martínez 2008; 2011), and circumstantial suggestions range from the Nordic Middle Neolithic B (i.e. Corded Ware) through the Nordic Late Neolithic to the Early Bronze Age. The discussion remains complicated as there is ample reason to expect an extended use of the monument and a composite "biography", as with so many other monumental graves. However, the decoration of the slate slabs should typologically be referred to the Bell Beaker phase (Prieto-Martínez 2011), and probably around the same time as the Slettabø Bell Beaker phase. In this framework, Mjeltehaugen represents the monumental expression of a new elite established as part of the Bell Beaker expansion north along the coast.

In a somewhat more surprising environment, the finds from the Skrivarhelleren rock shelter (Fig. 8.6) in the highlands (790 m asl) east of the innermost reaches of the Sogne fjord, have yielded dates and materials that suggest chronological and cultural affiliations (Prescott 1991) similar to Slettabø and Mjeltehaugen. Apart from yielding an extensive assemblage of sheep, goat and cattle, and surprising indications of early metallurgy in an area rich in copper deposits (Melheim 2011; Prescott 2006), it has produced typical Late Neolithic 1 elements like bifacial points with incurvate bases, a basaltic shaft hole axe and type 1 flint dagger fragments. Excavations of the lower Late Neolithic layers also produced mother-of-pearl beads, bone pendants, bone beads and a slate pendant indicative of Bell Beaker affiliations (Melheim 2011; Prescott 1991).

The list of direct and circumstantial evidence could be expanded with materials and data from settlements, graves and production sites (Holberg 2000; Melheim 2011). The material mentioned above, along the coast and into the highlands – but in ready proximity to waterways – demonstrates the extensive geography and dramatic impact of the Bell Beaker movement – not just as a few adopted or imported material elements, but as a fundamental cultural expression at a time of transition.

Contextualising transition: beyond Bell Beaker typology

The above review is in many aspects similar to the typological mapping of Bell Beaker features that typifies much of the work done within the Bell Beaker research tradition – identifying traits, plotting them on a map or in a chronological table, and refining distributional or chrono-typological boundaries. As such, this exercise is useful here as it helps create a broadly embedded Bell Beaker context for the Norwegian material, and elaborate the northern European Bell Beaker data. The Norwegian case, however, is interesting in a larger discursive context. The distinct appearance of the Late Neolithic data in marked contrast to the pre-Beaker situation creates a productive matrix for discussing general historical aspects of societal change. The classic debate of migration versus acculturation could be nuanced and discussed with greater precision than normally done in archaeological interpretations. Fundamental changes in three institutional systems, that is, the subsistence economy, communication and tool technology (metallurgy) seem to be essential for analysing this process of change.

Before the mid-3rd millennium most of Norway was characterised by hunter-gatherer societies. In eastern Norway, there were evidently islands of Corded Ware groups. From the stretch along the Oslo fjord to south-east Norway there were potentially some groups that may have practised small-scale agriculture and animal husbandry in combination with hunting, gathering and fishing. With the transition to the Nordic Late Neolithic, initiated with the Bell Beaker influx, all this has changed – the rather incoherent, but diverse situation of the Middle Neolithic B is

replaced with a high degree of uniformity of fundamentally western and northern European expression. The diverse small-scale local and regional expressions throughout the area are replaced by dual-aisled long house architecture based on roof-bearing post construction, the establishment of farms, a strong element of transhumant pastoralism (resembling historical shieling practices), agro-pastorally based multi-resource economies, bifacial lithic technologies, and potentially incipient metallurgy.

These developments are expressions of, and dependent upon, two important institutions (alliance) networks and maritime capacities. First, the areas of western Scandinavia were integrated in a broad northern and western European mid-3rd millennium network of interaction. This network had remarkable structural stability and efficiency, as demonstrated in the speed in which knowledge was transmitted over a wide geographic range. The latter is notable for this period, as the western Scandinavian case indicates that a novel feature arising at this time was habitual maritime traffic across open stretches of ocean, for example the Skagerrak Strait between Jutland and Norway. This indicates the second institution; a fundamentally maritime oriented perspective, binding together larger fields of ongoing interaction than before. This might have been associated with development of boat technology, might have been associated with a political structure based on alliances, kin-relations, or possibly an associated dynamic of exchange driven by an evolving elite. Access to and distribution of a fundamental new tool technology, conceivably also the use of copper-alloy objects as well as the knowledge of mining, extraction and casting, was an important part of this expanding network. Thus these explanatory components are conceivably inter-related, i.e. a package of economy, technology and exchange and alliance.

Creating consistent patterns and interpretations

As mentioned above, the Norwegian case is especially interesting because the 3rd millennium Bell Beaker inspired developments cut across and replaced a heterogeneous pre-existing situation consisting of various hunter-gatherer-fisher groups along the coast and in the interiors, conceivably groups with some small scale agriculture in southern Norway. This small scale agriculture could reasonably be interpreted as part of an easterly Corded Ware/Battle Axe tradition. There is thus no coherent, pre-existing local precursor or source for the mid-3rd millennium development. Disregarding modern political boundaries, the Norwegian development is best seen in light of general developments in westerly northern Europe, and the Bell Beaker Culture is probably the most important factor, at the moment the only candidate, in explaining the trajectory.

Simply identifying the Bell Beaker Culture as an important dynamic factor is in itself a premise of explanation, and represents a radical historical interpretation, but it does not constitute an explanation in itself. The present authors have previously generally explored the structure of relevant explanatory approaches applied to variable contexts, as well as more explicitly discussed various social, ideological and economic factors that played in during the mid-3rd millennium. In general we have advocated the analytical advantages found in the tension between history and structure. This entails creating empirically responsive patterns for particular regions and periods that are interpreted in light of models and ideal types. The goal of this approach is to create historically accurate narratives – and, more importantly, interpretative *explanations* (see articles in Glørstad and Prescott 2010; Prescott and Glørstad 2011).

We would also advocate a genuine historicity, i.e. the study of events taking place in discreet windows of time and spaces. This means that though outcomes are broadly comparable, the forces and actions leading to the 3rd millennium transition varied. Taking the Norwegian case as an example, southwest and western Norway faced a different trajectory of development than eastern Norway, traditionally closely connected to easterly Scandinavia. In the latter area the Battle Axe and perhaps "relict TRB" traditions must be paid considerable attention (Glørstad 2011; Østmo 2008).

This then leads to multifactor explanations that differentiate between the various regions affected, the internal factors in "source" Bell Beaker societies, as well as an understanding of the pre-existing conditions and environment in a fundamentally human ecological approach. For example, migration was probably an important factor, but the structure and scale of migration was probably different along the western Norwegian coast (small-scale) and in south-west Norway (more direct establishment of settlements). This could perhaps also be contrasted to the eastern parts of the country where encompassing relations with south and eastern Scandinavia must have made movement of people the more commonplace situation.

Otherwise, a combination of factors encompassing expansionism – both "soft-power" as well as the threat or actual use of physical force, social knowledge or capital, competition and enticement, and internal stress in the pre-existing "Neolithic" societies, are applied to create a suite of multi-factor anthro-historical explanations.

The above approach and explanatory attempts will undoubtedly be revised, moderated, elaborated and challenged in the future. However, the interpretative approach and this explanatory cultural-historical framework offers explanations more consistent with the archaeological patterns – not only within limited geographic and chronological archaeological fields, but across regional schools and chronologically-based traditions. We would contend that the outline we have drawn up offers a comprehensive and consistent platform

of historical interpretation of the Norwegian record, and breaks a long interpretative gridlock. This approach defines the mid-3rd millennium as a dynamic and pivotal epoch in the region's history. The historical trajectory was rerouted, establishing an initial Bronze Age context, and a number of the institutions decisive in the following millennia of history were established. As such, the Norwegian case is also interesting in that it creates a case to identify the forces and factors potentially at work in broader northern and western European perspective. The Norwegian case, though geographically marginal, is a poignant expression of the forces that dramatically transformed western and northern Europe in the mid-3rd millennium BC.

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9

THE BELL BEAKER COMPLEX: A VECTOR OF TRANSFORMATIONS? STABILITIES AND CHANGES OF THE INDIGENOUS CULTURES IN SOUTH-EAST FRANCE AT THE END OF THE NEOLITHIC PERIOD.

Jessie Cauliez

As in whole Europe and North Africa, the Bell Beaker phenomenon in the north-western Mediterranean is characterised by the rapid emergence of a specific pottery production, at about 2550 cal. BC, which initially exclusively consisted of Maritime Beakers with zoned dot-impressed ornamentation. They are associated with a series of secondary objects (polypod bowls, barbed and tanged arrowheads, bow-shaped pendants, daggers with copper blade and Palmela points) that are completely different from the preceding and contemporaneous productions related to the local groups, therefore indicating that a part of the technical procedures is renewed in the mid-3rd millennium BC. Certain scholars interpret this record as an indicator of strong competition. The local groups are believed to have "weak identity" and as the Bell Beaker phenomenon establishes, they would have been dismantled and disappeared very rapidly.

On the contrary, our researches, based on the analysis of the pottery series preceding or accompanying the Bell Beaker phenomenon in the French Mediterranean area, aim to demonstrate stabilities and an example of integration. The cultural landscape considerably changes only during the later stage of the Bell Beaker complex, the "Rhodano-Provençal" style, however, without the complete disappearance of the indigenous cultures. As a matter of fact, the archaeological data suggest a process of reciprocal acculturation.

Introduction

In the Mediterranean, the Bell Beaker process, in the beginning exclusively represented by bell-shaped "Maritime" Beakers with zoned dot-impressed ornamentation quoted as "standard", is distributed over the Italian peninsula, Sicily, Sardinia, the Balearic islands, southern France and the greater part of the Iberian Peninsula (Salanova 2000; Guilaine 2004, 239). The very first appearances of the Bell Beaker phenomenon are directly associated with pottery of indigenous cultures insofar as the beakers are generally recovered from individual or collective burials assigned to local groups (Lemercier 2004a; Lemercier *et al.* 2011; Lemercier and Tchérémissinoff 2011). Distinct features are traditionally attributed to these beakers, forming the Bell Beaker *set* or *package*: polypod bowls, barbed and tanged arrowheads, bow-shaped pendants, daggers with copper blade and Palmela points (Strahm 2004). Several interpretations have been proposed in order to explain this phenomenon but they are still debated (Salanova 2000; Bailly 2002; Besse 2003; Lemercier 2004b; Guilaine *et al*. 2004; Furestier 2007; Salanova 2008).

In southern Mediterranean France, the Bell Beaker

phenomenon appears at the end of the Final Neolithic period, between the middle and the end of the 3rd millennium BC. This region is thought to be an area of dispersal of the Bell Beaker phenomenon and not an area of emergence (Lemercier 2004a; Guilaine *et al.* 2009, 176; Salanova 2011). The area of origin of this phenomenon is located elsewhere, but is still undetermined, despite the numerous hypotheses proposed on this matter in the last hundred years. The Iberian Peninsula may be the best candidate for the origin of the phenomenon, in that it has yielded the earliest radiocarbon dates and the largest number of vessels assigned to the "standard" stems from the Tagus estuary in Portugal (Bailly and Salanova 1999; Guilaine *et al.* 2001; Salanova 2000; 2002; 2008; 2009). However, scholars still suspect a northern origin in relationship with another pan-European phenomenon emanating from central Europe: the Corded Ware Culture (Vander Linden 2004). Others emphasise the role of Sicily in the distribution of this pottery type (Guilaine 2004; Guilaine *et al.* 2009).

Based on the study of more than 320 Bell Beaker sites scattered over the regions of Languedoc, Provence, Drôme, Ardèche and Isère, four stylistic variations from the analysis of the decorative styles of the pottery have been defined over the last years (Lemercier 2004a; 2012). The decorated Bell Beaker pottery of style 1 is comprised of corded, linear, "international" and mixed (dot-impressed and corded) decorations. They do not constitute a complete range of pottery, but rather few and standardised elements that characterise the "standard" beaker as defined by L. Salanova (Salanova 2000; 2002; 2004). The ornamented pottery of style 2 is characterised by dot-impressed geometric decoration. It shows a variety of decoration patterns and morphologies compared to the standard vessels they are often associated with. From a chronological point of view, styles 1 and 2 are thought to be contemporaneous and together they form the first Bell Beaker stage dated from 2550–2500 to 2400–2350 cal. BC. The ornamented pottery of style 3 exhibits incised, incised and stamped, complex dotted patterns and defines the regional "Rhodano-Provençal" group in southern Mediterranean France, which actually represents the second stage of the Bell Beaker evolution from 2400–2350 to 2150–2100 cal. BC. Finally, the ornamented pottery of style 4 exclusively shows incised and barbed wire type decorations, sometimes associated with stamped patterns. They are characterised by both the Bell Beaker tradition and specificities preceding the fully developed Early Bronze Age where morphology and decoration techniques are concerned. This style 4, the so-called Epi-Bell Beaker or barbed wire style represents the third Bell Beaker stage and runs from 2150–2100 to 1900 BC.

In the French Mediterranean area, the first two stages at least certainly show interactions between the Bell Beakers and the autochthonous cultural groups of the Final Neolithic period. This is the case for example on the sites of La Fare (Forcalquier, Alpes-de-Haute-Provence), where an individual is buried next to a vessel with Bell Beaker decoration of style 1 and two small beakers of local tradition (Lemercier *et al.* 2004a; 2011), and also of Les Calades (Orgon) and Escanin (Les Baux de Provence) in the department of Bouches-du-Rhône, where the "complementary ware" associated with the beakers *sensu lato* are indigenous productions assigned to the Final Neolithic (Besse 2003; Strahm 2004). This link between the first Bell Beakers and "local" pre-Bell Beaker pottery shapes is not specific to southern France since it has also been observed on the Iberian Peninsula both on its Mediterranean and Atlantic coast and also in Sicily (Guilaine 2004, 242). Consequently, when the first decorated Bell Beaker potteries (styles 1 and 2) diffuse across the Mediterranean area, they seem to spread fully into the local cultures of the Final Neolithic period. Although this global model for the establishment and evolution of the Bell Beakers in Southern France is considered proven, it should, however, be stressed that previously it has mostly been the Bell Beaker point of view that is emphasised by the authors when the relationships between the Bell Beaker phenomenon and the local cultures of southern Mediterranean France are analysed. When the autochthonous substratum is considered, for instance, in general first the pottery elements, morphologies and/or decorations, which are likely to have had an impact on the appearance and the development of the Bell Beaker culture are identified, and not the contrary (Salanova 2000, 191–192; 2002, 163; Guilaine 2004, 247; Lemercier 2004a, 237). So let us, with this contribution, get off the beaten track and not detail once again the functioning of the Bell Beaker system, its origins, the modalities and the causes of its diffusion but to take the opposite perspective, the one of the local groups in analysing whether they are autonomous or not at the beginning of the Bell Beaker period.

The arrival of the Bell Beaker phenomenon in southern Mediterranean France: an establishment within a competing environment

In the French Mediterranean coastal area at the beginning of the Final Neolithic at about 3500 BC, the region is divided up into several geographical and cultural unities (Fig. 9.1). This fragmentation is interpreted as the result of an exceptional demographical growth, leading to a crisis of the agro-pastoral systems developed since the Middle Neolithic period, notably in the entire area of southern France assigned to the southern Chassean culture (Delhon *et al.* 2009; Lepère 2009). This undeniable densification of settlements (increase in the number of sites, multiplication of settlements in previously sparsely occupied areas, occupation of mountain areas, development of collective

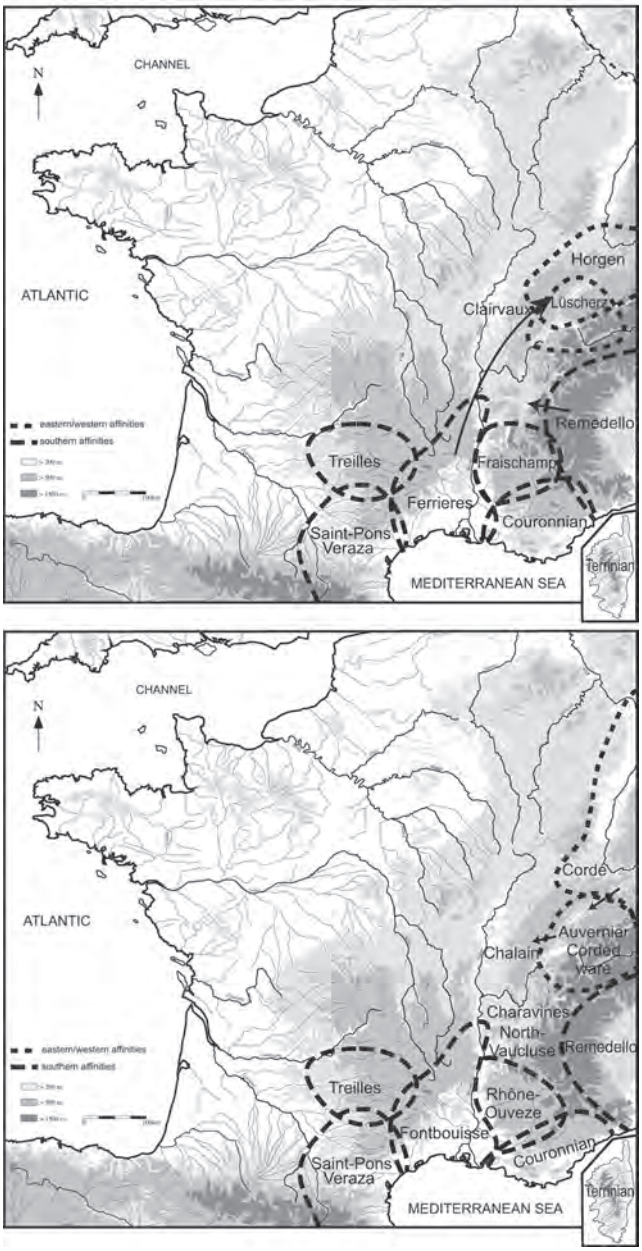


Fig. 9.1. Distribution map of the different cultural groups from the Final Neolithic (2800/2700–2200/2100 cal. BC) principally established from the pottery studies (D'Anna et al. 2008, 28–29, modified).

burials etc …) is accompanied by substantial changes in the social functionality and by increasing competition between men, mirrored by exchanges of prestige goods over long distances, the development of anthropomorphic art and the boom of megalithism (Guilaine 1994; 2007). Competition over the control of production facilities and natural resources may have led the groups to assert their authority over micro-regions separated by cultural barriers. This territorial restructuring is represented by the fragmentation of the area into micro-regional groups recognizable through the diversity of the pottery styles.

Equally, according to the current theories, the arrival of the Bell Beaker phenomenon in the Mediterranean area of southern France 1 millennium later takes place in a context of competition. The authors advance five arguments to corroborate this hypothesis of opposition and competition (Giligny *et al.* 1997; Lemercier 2004b; Lemercier and Furestier 2009, 399).

1. The arrival of this phenomenon seems to be favoured by the vicinity of the Rhône River and the different secondary fluvial axes (Lemercier 2004a). During the stage of appearance of the Bell Beaker phenomenon, at about 2550 BC, the first beakers assigned to the styles 1 and 2 generally occur on sites showing particular topographical situations, localised on the Mediterranean coast or next to the Rhône River (Fig. 9.2). These sites are isolated, frequently at high altitudes, or enclosed and of small size: Les Calades at Orgon, Le Fortin-du-Saut at Châteauneuf-lès-Martigues, Le Col Sainte-Anne at Simiane-Collongue in the department of Bouches-du-Rhône (Barge-Mahieu, 1987). This specific type of settlement illustrates a progressive arrival of the Bell Beaker phenomenon within a context opposed to its development.
2. At its arrival, the Bell Beaker would have preferentially settled in "favourable" regions, notably in Provence, seemingly avoiding regions where the local groups exert cultural influence as it is the case in the adjacent region in Languedoc, in which the Fontbouisse group established and expanded. This hypothesis is based on the observation that west of the Rhône River and notably in eastern Languedoc, the absence of the Bell Beaker phenomenon is particularly marked in areas where the Fontbouisse group is extensively developed. Bell Beaker remains of the early stage have been recovered from more than 30 Fontbouisse sites (from over 200 in this area) (Gutherz 1988; Roger 1995; Lemercier 2004b), a fairly limited evidence compared to the hundreds of sites and vases discovered in the region east of the Rhône river (Lemercier 2004a, 232). The Bell Beakers would thus be particularly absent from the area of expansion of the Fontbouisse group, an absence mirroring, according to certain authors (Lemercier 2004b), a process of rejection of the phenomenon, also observed in other areas as northern France (Salanova 2002).
3. The Bell Beaker phenomenon is not represented in Languedoc, precisely because this region is an area of important cultural development occupied by particularly active groups, not very willing to receive this phenomenon. This argument is believed to be

Fig. 9.2. Interpretation of the Bell Beaker phenomenon in Mediterranean France. Map of the explorations, the implantations and the diffusions of the early Bell Beaker phase (from Lemercier 2004b, 231).

mirrored by the fact that the Fontbouisse group is distributed over a large geographical area; entire Languedoc is included in its deployment. This activity is also thought to be implemented by the fact that the Fontbouisse group would split off into numerous micro-regional facies illustrating its diversity and dynamics: central facies, Cèze-Ardèche facies, facies from the Lower Cévennes and the surroundings of Montpellier, facies of the Causses and coastal facies (Jallot 2003). All these facies interfere with each other and fragment the entire territory of Languedoc. In addition, they would be very little receptive to external influences (Pétrequin *et al.* 1987; Giligny *et al.* 1995). As a matter of fact, interactions between local Fontbouisse groups and other, exogenous groups are only rarely reported in Languedoc.

4. When the Bell Beaker phenomenon arrives in southern France, pottery production apparently shows a more varied range compared with the preceding stages. In other words, the system of pottery production of local groups is renewed (Giligny *et al*. 1997). New composite shapes appear such as the carinated vessels, vases with curved profile or necked vases as well as ornamented vessels with new patterns accomplished by totally unknown or rare techniques as for instance impressed decorations. Scholars postulate that the local groups and notably those of Languedoc would have changed one part of their production in order to rival the richly ornamented Bell Beaker potteries.
5. Not all the groups of southern France have reacted in the same manner to the arrival of the phenomenon. In this scenario, Provence is indeed described as the area systematically receiving the Bell Beaker phenomenon, precisely because it was occupied by groups believed to have weak identity compared to the Fontbouisse group in Languedoc. Within these groups with weak identity, pottery production would evolve little and be characterised by some monotony, which is suggested by unvaried plastic decoration, the scarcity of incised ornaments and a repertory of hardly diversified shapes (Giligny *et al.* 1997, 254; Vital 2006). These entities in Provence are also not believed to have very strong cultural influence, as they are systematically dependant on neighbouring evolutions. The models of emergence and evolution of the cultural groups identified east of the Rhône River and up to the Italian border proposed

by different authors for the Provence area are indeed based on the diffusionist concept of an east-west trend of spread (Cauliez 2010). Before pursuing their own evolution, they would first incorporate influences stemming from the west side of the Rhône River (D'Anna 1999). Definitely, the Bell Beakers would have seen in this weak Provençal dynamism an ideal territory for their establishment.

A necessary revision of the autochthonous cultural groups of south-eastern France

Important work has been accomplished concerning the revision of the chronological and cultural framework of the end of the Neolithic period in south-eastern France. It permits actually to re-examine the current hypothesis, at least to change this vision (Cauliez 2010; 2011a).

State of research

As a matter of fact, before researchers could benefit from continuously renewed chronometrical data, as it is the case today, pottery has for a long time been considered one of the best means to identify cultures, which were described and arranged in periodisation systems based on relative chronology. Hidden behind the term of "cultures", the Neolithic societies, representing many ethnic groups, share a territory according to concepts of cultural anthropology and ethnology. At the end of the 1980s, cautions were applied about the way to reconstruct prehistoric societies based merely on material culture. Pottery, material culture in a wider definition, plays only a minor role within the definition of cultures which are primarily recognised through social, economic, political and religious aspects. In a way restricted to well-defined geographical and cultural entities, the modalities and the temporal and spatial circulation of the transferred products and techniques were, in addition, analysed only sparsely while they are dispersed through multiple paths, combined and governed by different factors: exchange, trade, filiations, marriages, traditions … In order to tackle these different problems, archaeologists have very rapidly proceeded to ascribe a more abstract and descriptive meaning to the cultures they define. Nonetheless, arguable methods have been maintained within the characterisation of the cultural groups mainly based on the presence/absence of some particularly diagnostic pottery elements. Provence is a salient example: during the Final Neolithic, between 3500 and 2000 BC, the Fraischamp group, the Couronnian, the North-Vaucluse group and the Rhône-Ouvèze group have been identified on the archaeological sites merely through the presence of some diagnostic types (Clarke, 1978). As a kind of monothetic units with high stability, they were thought to mirror the existence of social entities with delimitated geographical extension developing original traits (Fig. 9.1).

However, at the start of the 2000s, this compartmentalisation of south-eastern France into four groups strongly masked the uncertainties which arose from the rather poor and not very homogeneous documentation of pottery that was employed in their identification, and which was difficult to apply to a social and cultural interpretation of the end of the Neolithic period. In addition, the stratigraphies and the closed finds of the eponymous sites, initially used for the identification of the groups were not sufficient to support the definition, the sequence and the connections of the cultures identified for this period. And finally, in describing the end of the Neolithic in the Mediterranean region of southern France essentially based on these few elements, this chronological and cultural stage was reduced over the years to forced templates, with small groups developing in a linear and static way within a periodisation, the duration of which could sometimes last over one millennium (Lemercier 2007, 492).

Adopting the hypothesis according to which all the groups occupying Provence were dependent on the cultural evolution previously initiated in Languedoc, the models of local development were generally under-estimated, as the originality of a culture was determined according to its Languedocian influences rather than based on the heritage of the indigenous substratum. The trend to oppose groups to each other also prevailed so that the cultures quoted as closed material assemblages were described to mutually exclude each other without taking into account possible interaction. Finally, within this scenario scholars tend to under-estimate the possibility that the more northern (along the Saône-Rhône axis for example or on the Swiss plateau and in the Jura) and adjacent Italian groups may have played a role in the development of assemblages on the French Mediterranean coast. These notions, for a long time commonly accepted, matched the actual data less and less, which suggest interpreting this period as being emblematic of complex networks governing the societies.

A new social and cultural landscape

Although they are still relevant, the constructed frameworks have subsequently been dismantled and then reconstructed in order to understand better the Final Neolithic in southern France, a stage and a region the Middle Neolithic groups split off, followed by the spread of copper metallurgy and finally by the development of the Bell Beaker culture (Cauliez 2010; 2011a). It is based on the study of the mechanisms of the stylistic evolutions of pottery as this category still remains the best adapted to yield information on the dynamics of exchange and intercultural relations. On the other hand, in order to describe this dynamics, within this study we have given priority to a radical change in the attitude towards pottery. On the one hand it was necessary

Fig. 9.3. Location of the 18 sites of south-eastern France taken into account in this study. The 26 pottery assemblages have been defined based on these sites (CAD: J. Cauliez).

to develop a broad-scale approach over the long period of time. On the other hand, it was absolutely essential to study especially large and well-dated series of artefacts found in reliable stratigraphic contexts. Based not only exclusively on the identification of some pieces believed to be diagnostic, but rather on the associations of the artefacts amongst each other, the chronological and cultural characterisation of the pottery assemblages has been done by choosing an

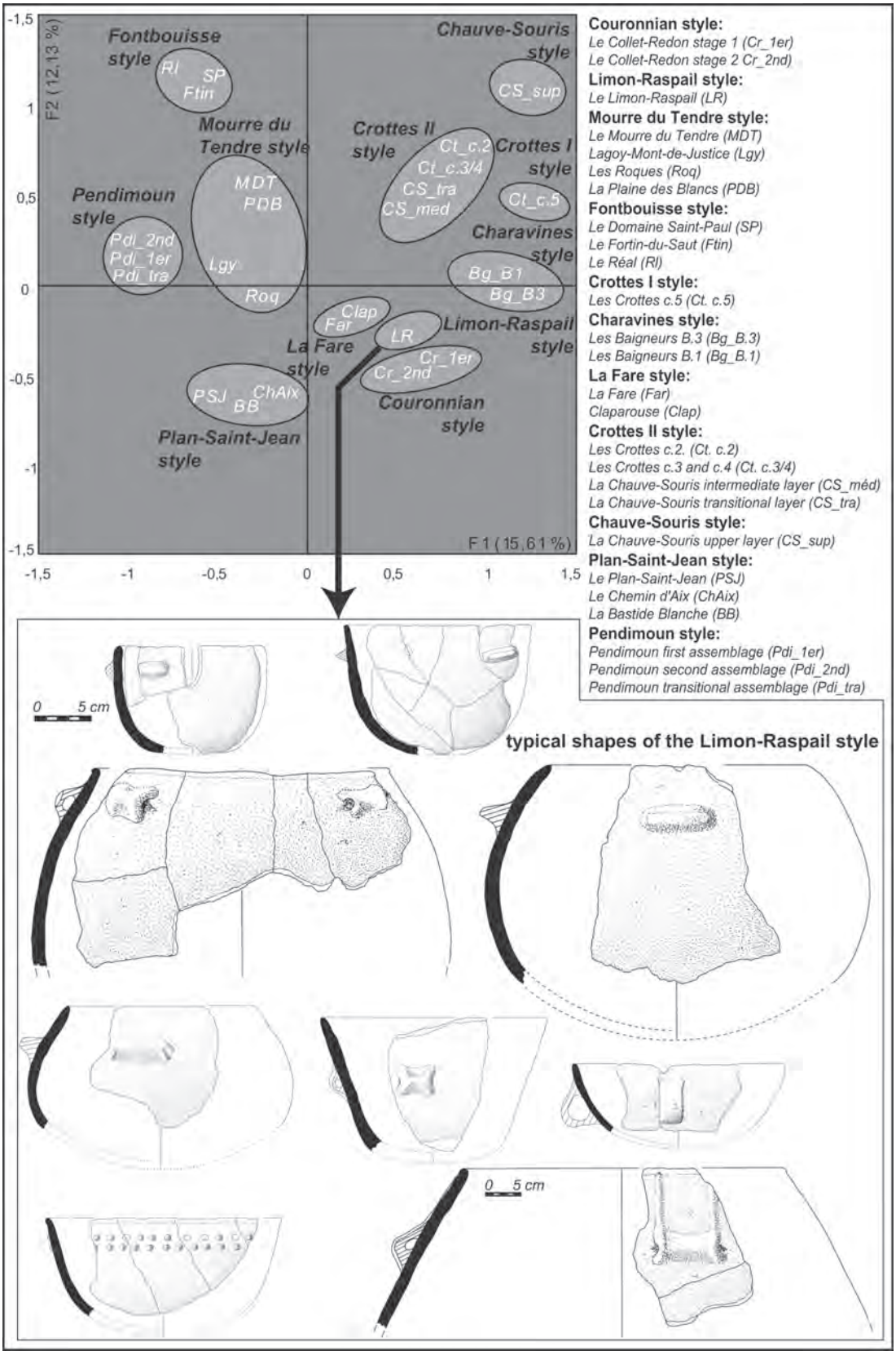
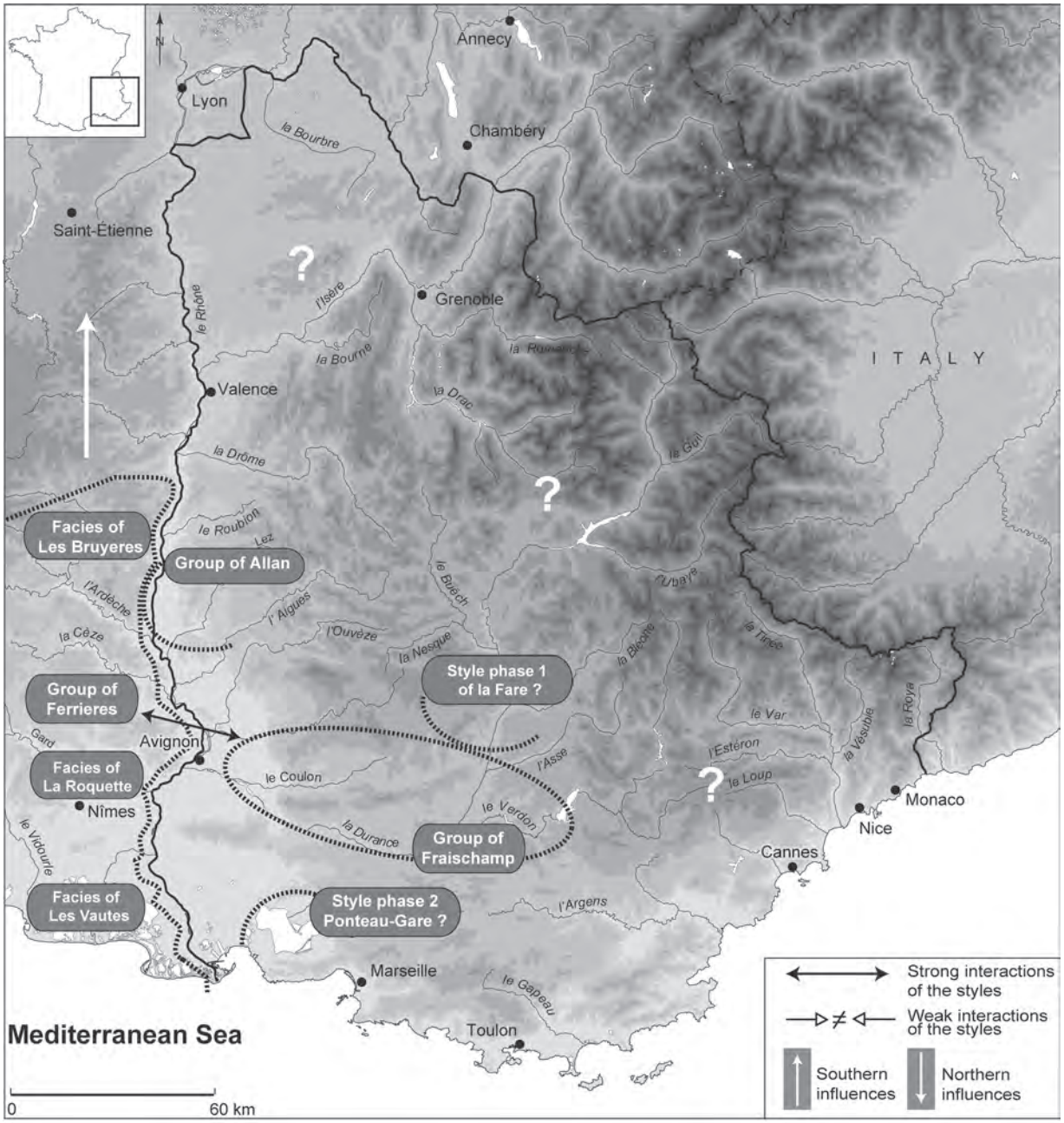


Fig. 9.4. Factorial correspondence analysis. Factorial plot showing the sites related to the 11 new typological and stylistic entities identified from 26 pottery assemblages (CAD: J. Cauliez).



STAGE 1 from 3400 to 2900-2850 BC

Provence: apart from centres of demographical growth

South-north directed influences stemming from Languedoc oriented towards the Saône-Rhône axis (from the Ferrieres group to the Horgen, Lüscherz and Clairvaux groups)

Fig. 9.5. Cultural landscape from 3400 to 2900–2850 cal. BC in south-eastern France. Modelling of the cultural processes (renewal of the styles and interactions) and with mention of the main influences prior to the establishment of the Bell Beaker phenomenon (the assemblages marked by a question mark are still under study (CAD: J. Cauliez).

exhaustive approach from the quantitative and qualitative point of view, in addition using statistical methods of classification such as co-occurrence distribution, ascendant hierarchical classification and factorial correspondence analysis (Cauliez 2011b).

Thus we have obtained a new chronological and cultural framework for south-eastern France based on the study of 26 distinct pottery assemblages from 18 sites scattered over the French Mediterranean area, for the greater part assigned to the final Neolithic sequence (Fig. 9.3). No less than 9027 typologically diagnostic pieces were recorded and defined, which covers in fact, an important part of pottery variation present in a large south-eastern area during the Final Neolithic period. We especially focused on the decoration structure and on the morphology of pottery by using a specific method based on technical and stylistic observations (Cauliez 2011b).

These assemblages, a kind of "statistical showrooms mirroring the collective production at a distinct moment in the cultural evolution" (Clermont 1999, 73), provide the basis for the identification of at least 11 new typological and statistical assemblages, which diverges in number from the simplified landscape that was previously described (Fig. 9.4). From the former groups, only the Fraischamp group was preserved in its original definition; the other groups are actually split up into several chronological and geographical entities.

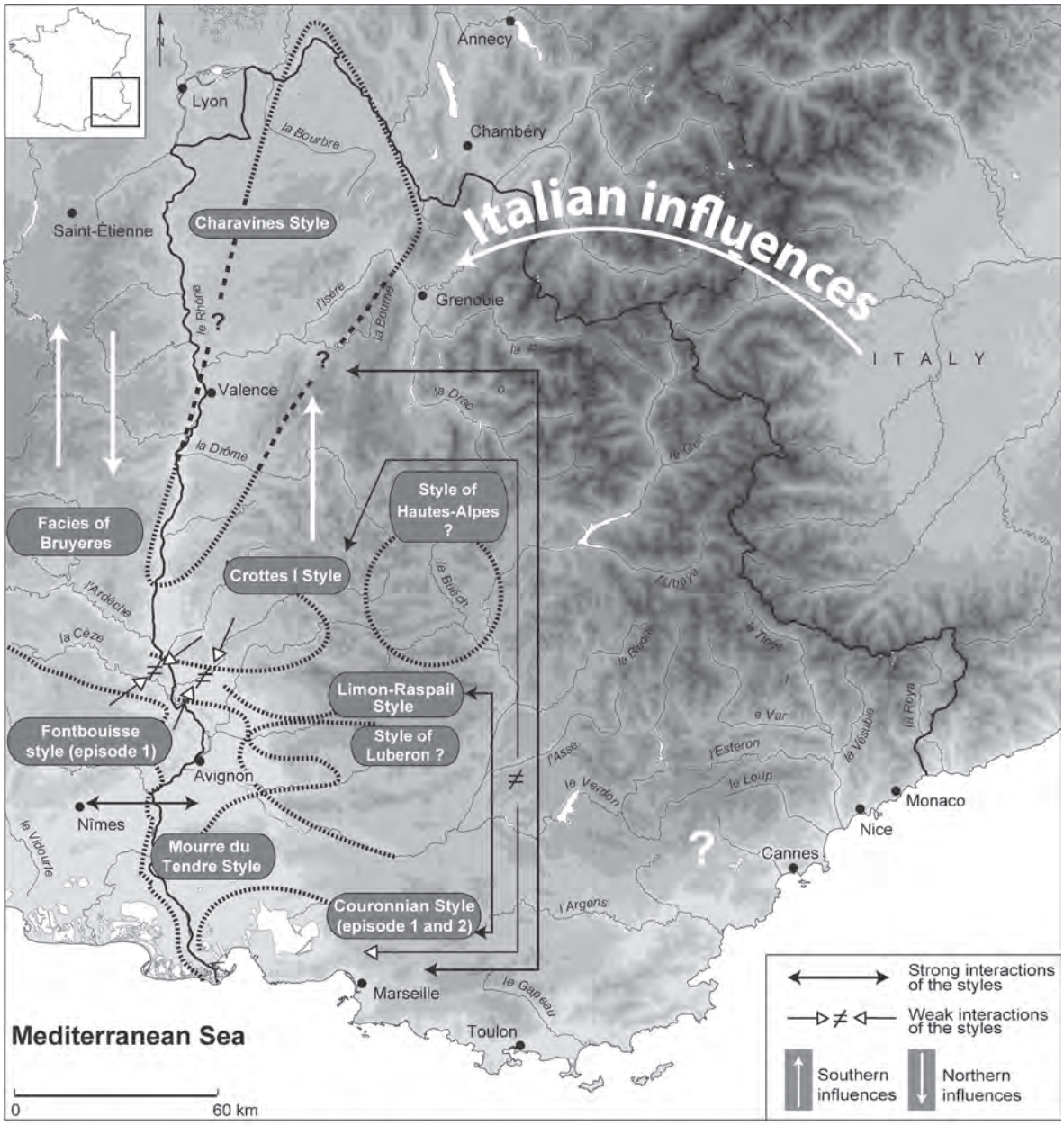
The beginning, evolution and end of the proposed alternative assemblages have also been incorporated into a new chronological and geographical four-staged framework established on the basis of 25 new chronometrical radiocarbon AMS dates. This periodisation was applied to the entire French Mediterranean coast (see details in Cauliez 2011a, 125). In order to stress continuity and to identify changes and evolutions, these groups have in addition been interconnected with each other, according to the polythetic models of D. L. Clarke (1978, 36, 264). This has permitted us to demonstrate affinities or antagonisms, interactions of influences or oppositions and to identify the mechanisms that formed them. Yet, the polythetic models of Clarke have been a solution to take into account, in a more adapted manner, the cultural realities by working with pottery groups identified as key types (artefacts specific to a defined geographical area), exclusive types (testifying to the originality of distinct assemblages within the studied group) and non-essential types (indicating phenomena of continuity and intercommunication with other groups and other regions). Considered in this way, the evaluated assemblages are conceived as groups exhibiting both their unique characteristics, but also elements revealing relations with the surrounding environment and the preceding or succeeding entities (Pétrequin 1997).

The assemblages are continuously changing; they are interconnected and are part of networks. Far from the classical description of opponents and series of successions, the identification of common cultural areas is highlighted. The mechanisms of interconnection between these assemblages, their geographical and chronological variability, their local specificities and furthermore their ability be part of other groups on the supra-regional level is emphasised. Consequently, this allows to better understand in which way the cultural entities interact or are complementary, independent or autonomous (Figs 9.5–9.8).

With these bases dismantled, in the course of our reflection the present study primarily permitted describing a range of evolutionary processes of several aspects in direct association with the appearance and the development of the Bell Beaker phenomenon in the north-western Mediterranean area. In this regard, we have analysed the pottery assemblages slightly prior to the arrival of the Bell Beaker phenomenon in south-eastern France in more depth and also the series contemporaneous to its emergence in the same region though they provide from sites that have not yielded Bell Beaker remains. Finally, we have examined the coeval series originating from sites where strict contemporaneity of Bell Beaker elements and elements of local tradition is reported (La Grotte de la Chauve-Souris at Donzère in the department of Drôme, La Fare at Forcalquier in the department of Alpes-de-Haute-Provence, Le Fortin-du-Saut at Châteauneuf-lès-Martigues in the department of Bouches-du-Rhône). Stylistic (morphology of the vessels, handle types, base types etc) and technical comparisons (notably of the decorations) made between these different assemblages and in a twofold approach – qualitative and quantitative – allow us to identify continuities, changes and evolutions of the pottery traditions. In parallel, we have realised a complete inventory of the Final Neolithic sites in south-eastern France and re-examined all the archaeological contexts which have yielded Bell Beaker elements (dating, reliability of the stratigraphies, stylistical phase of the Bell Beaker culture represented, type of indigenous production associated, etc). Lastly, the underlying questions were the following: does the arrival of the Bell Beaker phenomenon introduce changes in pottery production? Does it have a significant impact on local groups and how do the receiving populations of southern France behave at the moment of its emergence (Salanova 2002, 157, 163)? At the end of these analyses we defend the opposite view to the current hypothesis, suggesting the development of a scenario that gives priority to processes of cohabitation rather than resistance and competition of the autochthonous groups.

Local cultures and Bell Beaker phenomenon: a model of integration and cohabitation

Our alternative proposition, putting emphasis on the perfect integration of the Bell Beaker phenomenon into



STAGE 2 from 2900-2850 to 2600-2550 BC

Provence: center of demographical growth

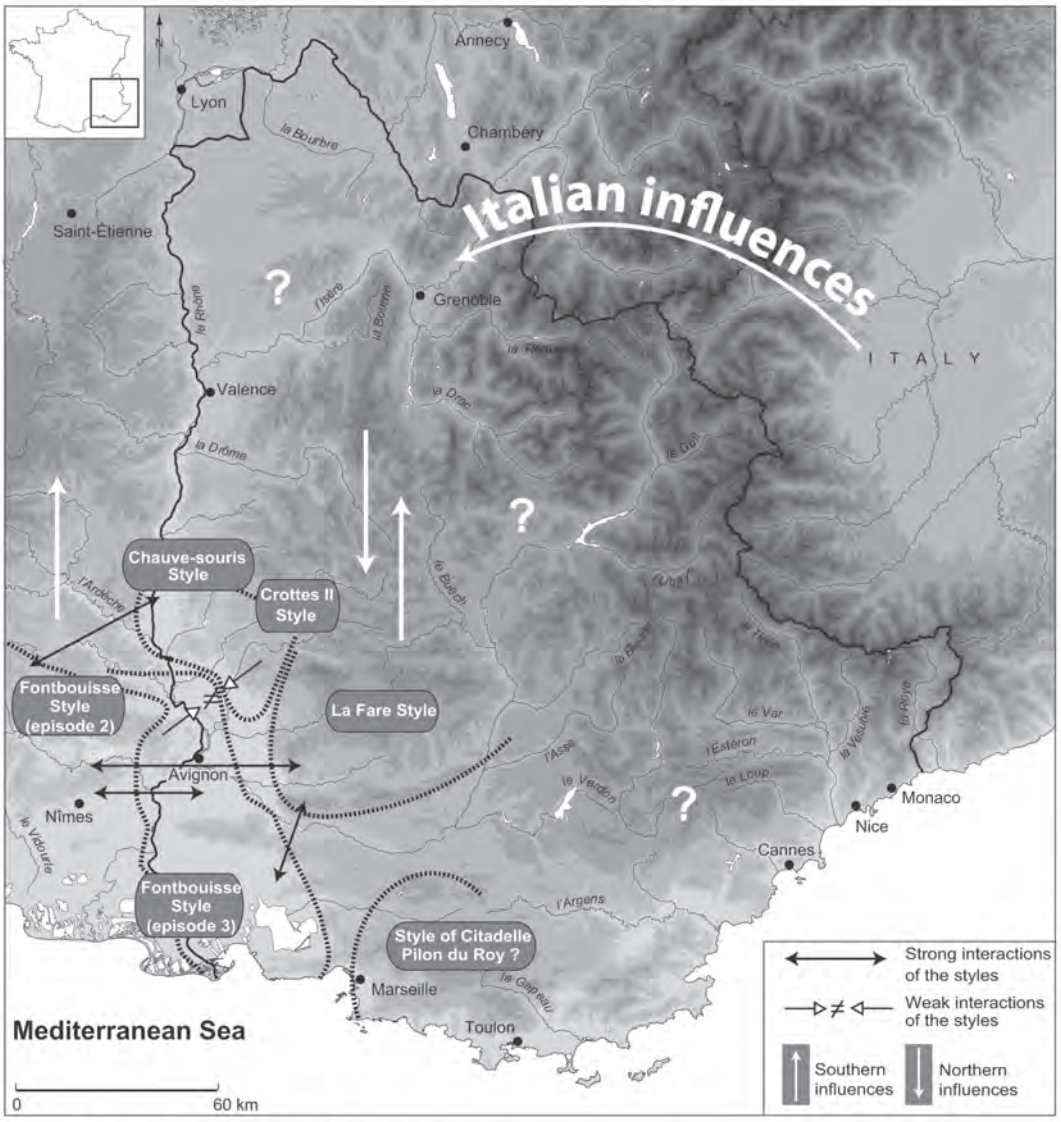
Diversity and renewal of the pottery styles

South-north directed influences stemming from Languedoc oriented towards the Saône-Rhône axis (From the Ferrieres and Fontbouisse groups to the Clairvaux and Chalain groups)

North-south directed influences from the Saône-Rhône axis oriented towards Provence (From the Auvernier-Corded ware group, the Clairvaux and Lüscherz groups to the Charavines, Limon-Raspail and Crottes I groups)

Italian influences in Provence (Rinaldone group) accompanying the diffusion of copper metallurgy as far as Languedoc in following routes of distribution on the northern side of the Alps

Fig. 9.6. Cultural landscape from 2900–2850 to 2600–2550 cal. BC in south-eastern France. Modelling of the cultural processes (renewal of the styles and interactions) and with mention of the main influences prior to the establishment of the Bell Beaker phenomenon (the assemblages marked by a question mark are still under study (CAD: J. Cauliez).

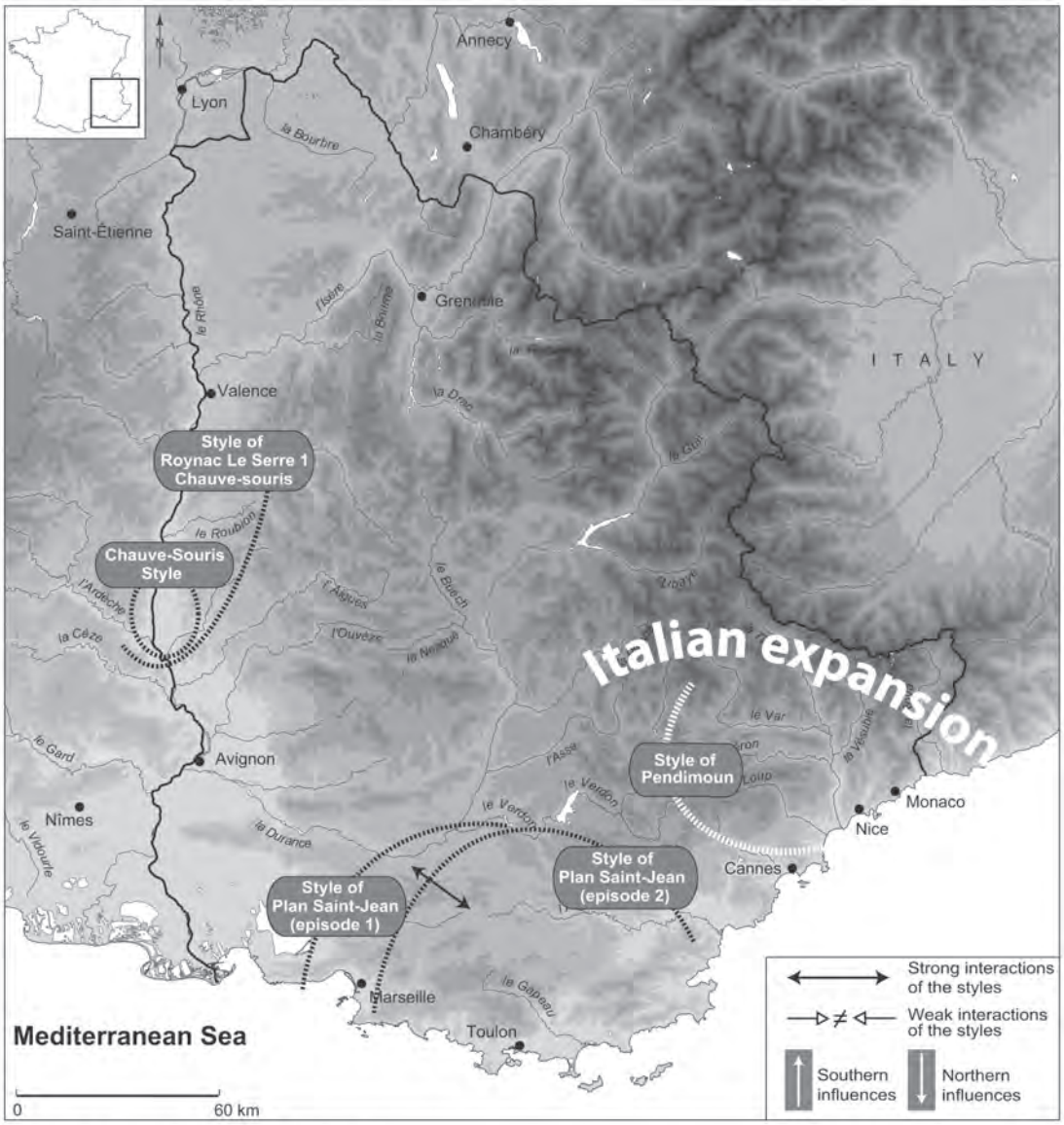


STAGE 3 from 2600-2550 to 2400-2350 BC
Provence: center of demographical growth
Diversity and renewal of the pottery styles
South-north directed influences stemming from Provence oriented towards the Saône-Rhône axis
North-south directed influences from the Saône-Rhône axis oriented towards Provence
Italian influences in Provence (Remedello group)
Diffusion and integration of the Bell Beaker phenomenon into the local groupes according to processes of cohabitation and integration

Fig. 9.7. Cultural landscape from 2600–2550 to 2400–2350 cal. BC in south-eastern France. Modelling of the cultural processes (renewal of the styles and interactions) and with mention of the main influences during the establishment of the Bell Beaker phenomenon (the assemblages marked by a question mark are still under study (CAD: J. Cauliez).

the receiving environment is based on the following four observations:

1. At the moment of its emergence, the Bell Beaker phenomenon does not avoid the Fontbouisse group, at least in Provence. Here, in an area corresponding to the entire east bank of the Rhône river, some sites formerly attributed to peripheral facies are thought to mirror, according to certain scholars, phenomena of transitions and boundaries between the Fontbouisse *stricto sensu* of Languedoc on the one side and the



STAGE 4 from 2400-2350 to 1950 BC

Process of regionalisation of the Rhôdano-Provençal group, nevertheless:

- cases of cultural mixing dominated by indigenous assemblages associated with some decorated potteries of the Rhôdano-Provençal group (Chauve-Souris style)
- cases of cultural mixing dominated by Bell Beaker assemblages of the Rhôdano-Provençal group including some indigenous decorated potteries (Roynac le Serre, Mas de Vignole IV etc...)
- maintenance of the original Early Bell Beaker facies in Final Neolithic pottery styles with Italian influences such as Pendimoun style
- cohabitation between the Rhôdano-Provençal group of the Bell Beaker and mixed pottery styles (shapes and decorations of the Bell Beaker common ware are adopted and merged within ranges of pottery that remain however dominated by typical Final Neolithic productions: Plan-Saint-Jean style)
- maintenance of these enclaves within conservative refuge areas
- diffusion and integration of the Bell Beakers according to a process of cohabitation and not of competition

Fig. 9.8. Cultural landscape from 2400–2350 to 1950 cal. BC in south-eastern France. Modelling of the cultural processes (renewal of the styles and interactions) and with mention of the main influences when the Rhodano-Provençal group developed (the assemblages marked by a question mark are still under study (CAD: J. Cauliez).

cultural groups of Provence on the other (Courtin 1974; Escalon de Fonton 1974; Jallot 2003). In the literature, these sites which have yielded elements that are quoted as "mixed", thus testify to the fact that the Fontbouisse group exerted influence on the local groups of Provence (D'Anna 1999). Indeed, the detailed analysis of several of these assemblages allows us to actually confirm that these sites do not differ from typical Fontbouisse sites at all. In these settlements, we deal not only with an influence, but also with a real expansion of the Languedocian Fontbouisse group. Moreover, as a matter of fact, it is precisely within this expansion of the Fontbouisse group to Provence, at the margins of the Rhône axis that the Bell Beaker phenomenon seems to enter the territory the easiest (Fig. 9.7). At Fortin du Saut (Châteauneuf-les-Martigues, Bouches-du-Rhône), on the sites of Les Calades (Orgon, Vaucluse) or La Balance (Avignon, Vaucluse), the number of Bell Beaker pottery productions nearly equals the one of vessels from the Fontbouisse group. Other elements of the Bell Beaker *set* (Strahm 2004, 202), such as specific arrowheads (Furestier 2007) and ornaments (Lemercier *et al.* 2004b, 230) are also present. Consequently, the inclusion of the Bell Beaker phenomenon cannot be related to groups with weak identity, as it is considered to have a strong identity precisely within the Fontbouisse group which is mostly present at its start in Provence.

2. This description of a context of competition wherein the groups with weak identity would be more susceptible to accept the Bell Beaker phenomenon is not perceivable. On the contrary, detailed analysis of the processes of reformation of the pottery production based on the polythetic models of Clarke shows that the cultural assemblages in Provence interact according to complex small and wide scale mechanisms (Tremblay 1999, 5). This is suggested by:
   - the presence of a spatial and temporal continuum of pottery styles: all the groups identified in Provence during the different stages of the Final Neolithique are to some extent related to types of common ware. This common basis is composed of types with large geographical distribution and types with long duration. It allows assuming continuously mobile, interrelated groups belonging primarily to the same dense and wide network;
   - the fact that each pottery group establishes as a result of local evolution, based on an indigenous substratum. This stresses the importance of heritage and mirrors strong territorial anchorage;
   - the fact that Italian and northern (from the Saône-Rhône axis and the Swiss plateau) influences systematically are introduced on this basis (Cauliez *et al*, 2011). The latter testify to the frequency of interactions and the opening of the Provence region to cultural groups stemming from other areas than Languedoc (Figs 9.6–9.8);
   - the fact that the pottery groups in the epicentre of our observation occasionally disperse specific elements from their region to the peripheral areas (Figs 9.6 and 9.7). The introduction of elements from Provence into the northern context is shown for example by the sites assigned to the Auvernier-Corded Ware such as Ouroux-sur-Saône in the department of Saône-et-Loire or of Yverdon "Avenue des Sports" (canton of Vaud), Delley Portalban II (canton of Fribourg), Auvernier "La Saunerie" or also Saint-Blaise "Bains des Dames" (canton of Neuchâtel) on the shores of the Lake of Neuchâtel (Thévenot *et al*. 1976; Pétrequin *et al.* 1987; Ramseyer 1987; 1988; Bailly 2002). The distributed elements are selected: only carinated vessels and herringbone decoration patterns[1] specific of some sites in Provence (Le Mourre du Tendre for instance) are recovered and seem to have been selected for their great "visibility" (Perlès 2007, 321).

     Thus, each entity in Provence is governed by its own dynamics, established from cultural cross-fertilisation of the local substratum and borrowings from the adjacent areas. In this respect, the concept of the societies in Provence described as expressionless at the end of the Neolithic period is not valid. Likewise, the distinction between groups with weak or strong identity should be abandoned.

3. Still in the same perspective, we cannot directly link the changes observed within local pottery traditions of southern France with the arrival of the Bell Beaker phenomenon. This observation is founded on a complete re-evaluation of the available radiocarbon data as well as on 25 new chronometric AMS measures obtained (Cauliez 2011a). These data reveal that the changes in pottery occur prior to the arrival of the Bell Beakers. Thus the massive use of segmented shapes and the regression of simple types within the pottery assemblages are in fact the result of processes that started before the arrival of the Bell Beaker phenomenon (Fig. 9.9).

   These changes stem from the continuous influence exerted by the Ferrieres and Fontbouisse groups on the entire area of southern France. These changes are also the result of the input of Italian cultures, for example the Rinaldone or Remedello cultures (Figs 9.6 and 9.7), which diffuse specific metallic (daggers, awls) and ceramic artefacts (vessels with inverted rim, metopic decoration, carinated necked vessels) across the entire area of southern France, for example in the hypogeum

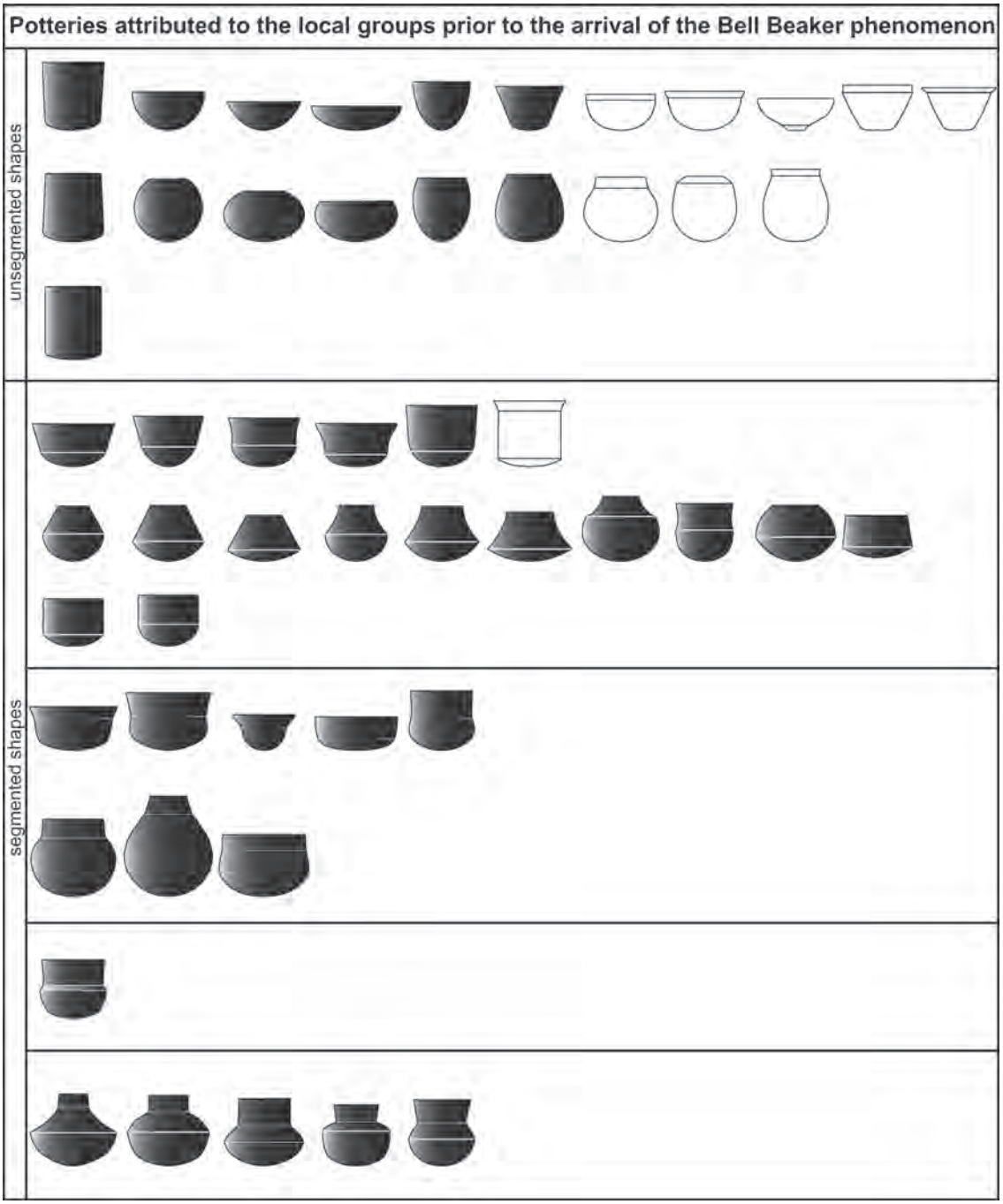


Fig. 9.9 The shape types of the vessels recorded in the pottery productions of the local groups prior to the arrival of the Bell Beaker phenomenon (CAD: J. Cauliez).

of Les Crottes at Roaix in the department of Vaucluse or furthermore within the Neolithic village of Charavines at the site of Les Baigneurs in the department of Isère (Cauliez 2011a). These cultures, initially distributed over the Tyrrhenian coast in Northern Latium, Southern Tuscany and the Po plain (Cornaggia and Castiglioni 1971; De Marinis and Pedrotti 1997; Cremonesi *et al.* 1998; Miari 1998; Steiniger 2005), possess the knowledge of metallurgical practices and they certainly initiated the diffusion of copper metallurgy beyond the Alps on the French territory (Rossi and Gattiglia 2005; Strahm 2005; Sangmeister 2005; Guilaine *et al.* 2009, 165). In addition, prior to 2550 BC, southern Mediterranean France had already attracted strong

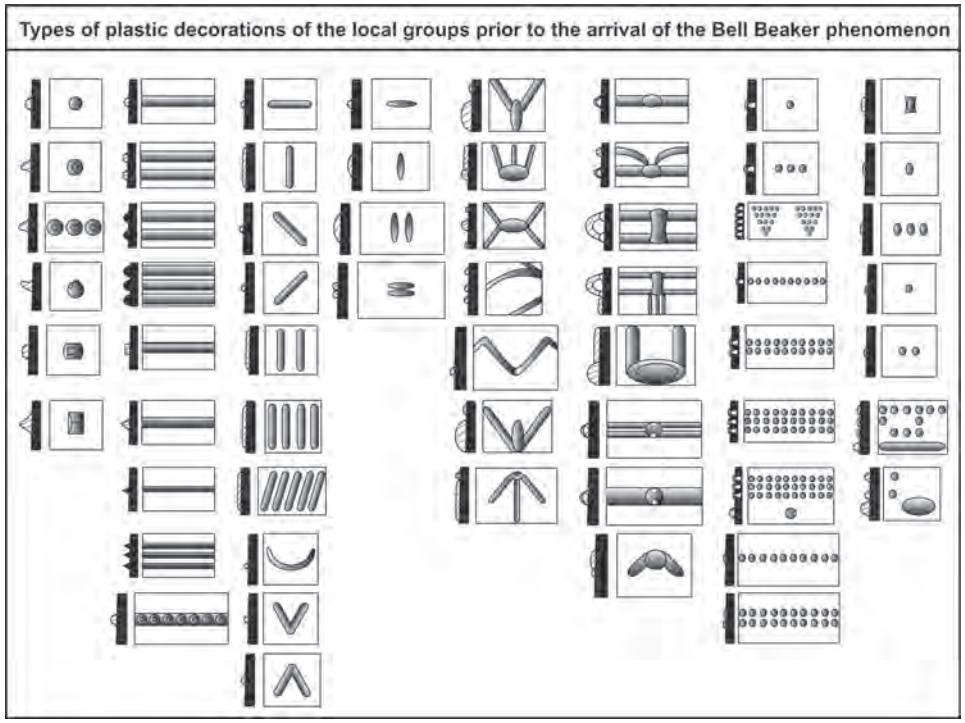


Fig. 9.10. The types of plastic decoration present in the pottery productions of the local groups prior to the arrival of the Bell Beaker phenomenon (CAD: J. Cauliez).

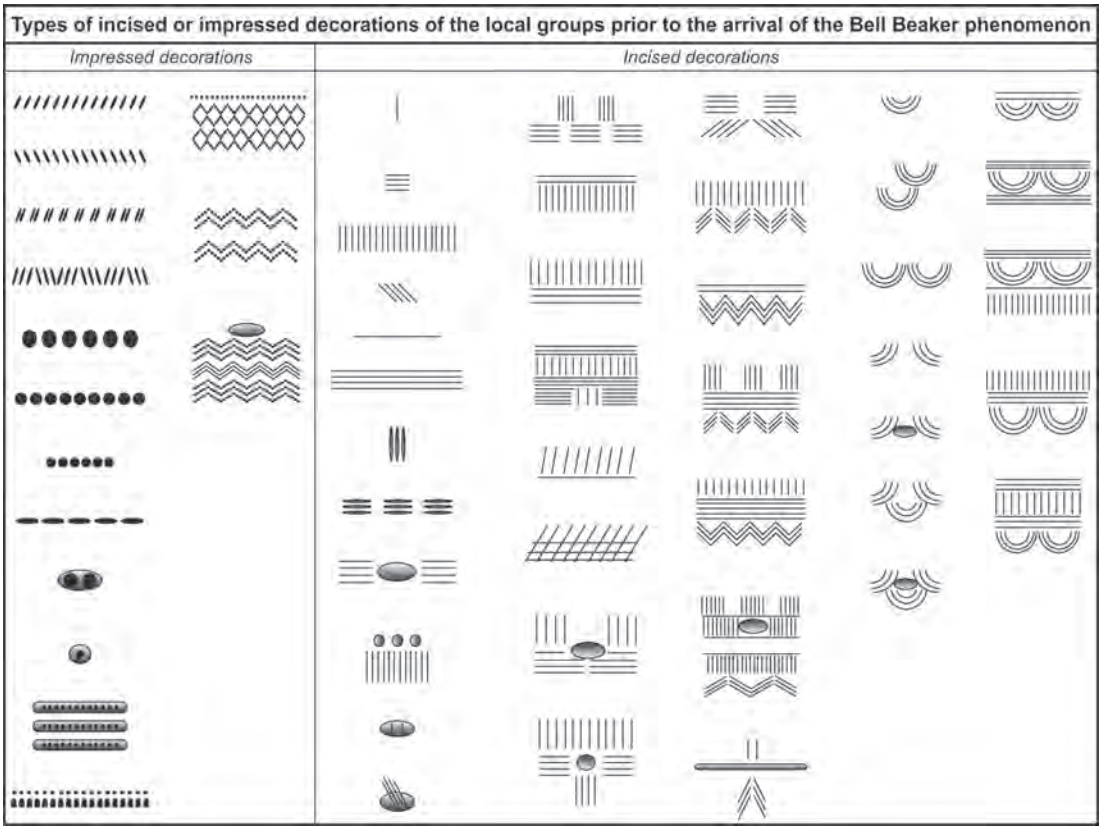


Fig. 9.11. The types of incised or impressed decorations present in the pottery productions of the local groups prior to the arrival of the Bell Beaker phenomenon (CAD: J. Cauliez).

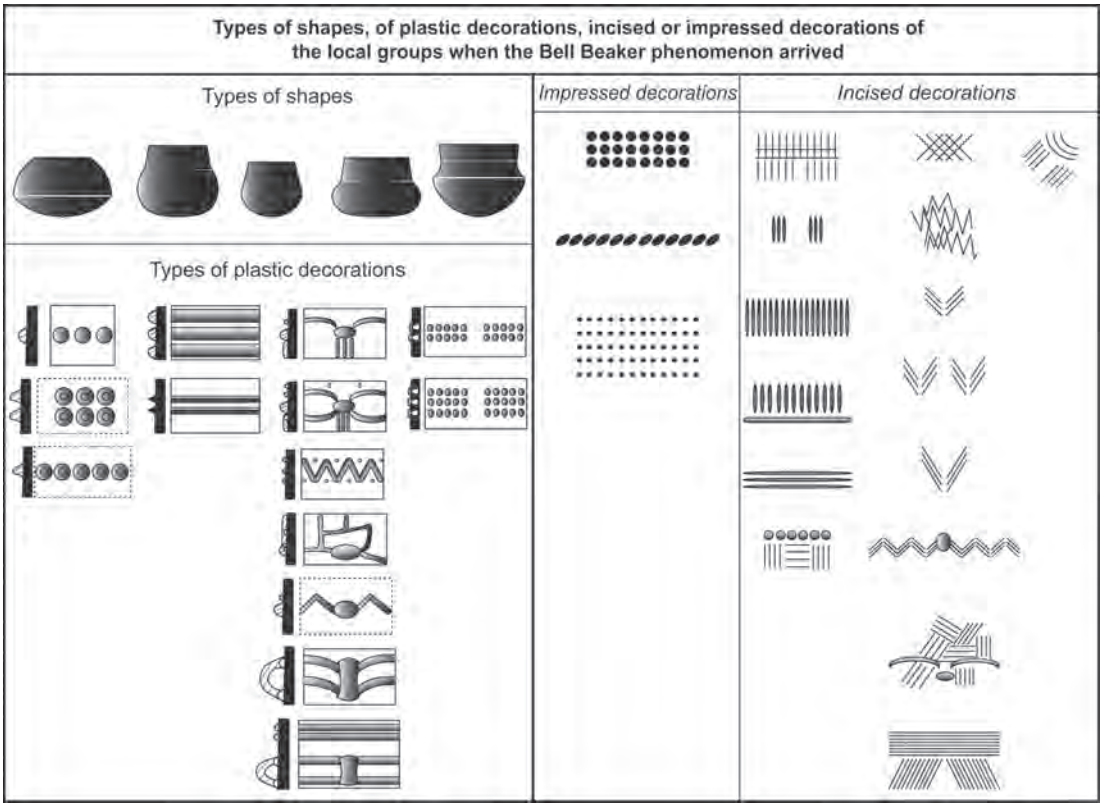


Fig. 9.12. New shapes and decorations present in the local productions at the moment of the arrival of the Bell Beaker phenomenon (CAD: J. Cauliez).

eastern influences to a very large extent of which the impact on the functioning and the transformation of the local cultural groups has certainly been determinative.

Equally, the diversity of the repertory of incised/deep or plastic decorations we could identify within the pottery assemblages of the local cultures, assuredly started prior to the establishment of the Bell Beakers (Figs 9.10 and 9.11). The organisation of incised/deep decorations into complex geometrical patterns and incised or stamped decoration techniques are known from the stage prior to the Bell Beaker phenomenon during which they disperse rapidly. Moreover, at the arrival of the Bell Beaker phenomenon, the syntax of the decoration, the techniques used and the morphology of the vessels present in the local productions do not undergo substantial changes (Fig. 9.12).

Finally, the appearance of polypod bowls and the increase of flattened or flat-based vases, identified within the local productions of Provence and Languedoc, currently attributed to the presence of Bell Beakers in Southern France, can not be directly related to the arrival of the phenomenon either. As a matter of fact, they occur in high quantities among the Bell Beakers (Besse 2004, 216; Besse *et al.* 2009; Piguet *et al.* 2007, 252–53), nonetheless they are known in the cultures that precede the Bell Beaker phenomenon and notably during the early stage of the Corded Ware (Giligny *et al.* 1995, 317) of which the influence is perceivable from 2700 BC on in the north-western Mediterranean (Cauliez 2011a). All the changes observed within the pottery traditions equally may originate from cultural complexes distinct from the Bell Beaker phenomenon and preceding it.

4. This process of cohabitation is stressed by the fact that phenomena of technical and stylistic mixing are present within the pottery production (Convertini 1996; Bailly 2002). The macroscopic analysis of several vessels has thus permitted to demonstrate the technical uniformity of Bell Beaker and Fontbouisse productions in sites as La Balance (Avignon, Vaucluse), Les Calades (Orgon, Bouches-du-Rhône) or also at Les Barres (Eyguières, Bouches-du-Rhône) and in the sites of Vaunage (Gard). Here, the clay materials used for the manufacturing of both the local products and the Bell Beakers are exactly the same. These petrographic analyses also show that the Fontbouisse vessels have been manufactured according to Bell Beaker techniques: the use of grog-temper, a typical Bell Beaker technique was identified on local vases as at Les Barres (Eyguières) or inversely the use of

calcite temper, unique to the Fontbouisse group is known for Bell Beaker vessels as it is the case at Le Vignaud 3 "Chemin du Puits-Neuf" at Langlade in the department of Gard (Convertini 1996; 2001; Hayden *et al.* 2009). In addition to the use of similar materials, the existence of stylistic transfer validates the assumption of alternate functioning of local groups and the Bell Beakers. Certain cases of mixed objects are well known, for example the small vessel with Fontbouisse decoration and pushed-in base typical for the Bell Beaker potteries providing from "La Place du Palais" at Avignon (Courtin 1974; Sauzade 1983). Others have been discovered recently at Fortin-du-Saut, where a typical Bell Beaker exhibits Fontbouisse decoration (Furestier *et al.* 2007). In southern Mediterranean France, the cases of stylistic mixing and connections of the manufacturing techniques observed between the autochthonous groups and the early Bell Beaker assemblages allow to put forward the clear assumption according to which the Bell Beaker phenomenon and the local groups influence each other and that each of them may be an important component in the evolution of the other one.

The development of the Bell Beaker Culture in the French Mediterranean region

Current theory

The Rhodano-Provençal style of the Bell Beaker culture is thought to expand across the entire French Mediterranean region during the ensuing period. At the moment of its deployment, the local cultures assigned to the Final Neolithic are thought to have been rapidly replaced. In the literature, "a very rapid process of acculturation of the indigenous pottery traditions" is assumed to occur under strong Bell Beaker influence (Laporte *et al.* 2008, 619) or moreover, the Rhodano-Provençal group "obviously substitutes the local cultures through complete acculturation of these latter" (Lemercier and Furestier 2009, 399).

Eastern Languedoc, initially not concerned with the Bell Beaker expansion during its early stage, would have been occupied by regional Bell Beaker establishments, although invariably in a sporadic manner as the number of sites which have yielded Bell Beaker elements of the Rhodano-Provençal style is clearly lower in Languedoc than in Provence. In addition, O. Lemercier and R. Furestier assume "differential success in Languedoc concerning the acculturation of the Final Neolithic local cultures by the Bell Beakers" (Lemercier and Furestier 2009, 399). Important relations would have been maintained with the Iberian domain and more particularly with central and north-eastern Spain (Lemercier 2004b). The Bell Beaker groups are supposed to be fully autonomous during the stage of the Barbed Wire style. New influences coming in from northern regions (Rhône culture) would then establish and illustrate the importance of exchanges initiated by the first Bell Beakers along the Rhône valley in the direction to northern and eastern France. Italian influences considerably increase in Southern Mediterranean France at the transition between the Rhodano-Provençal group and the Early Bronze Age, at about 2200–2000 cal. BC. Several Epi-Bell Beaker pottery assemblages dated to the transition between the 3rd and the 2nd millennium BC illustrate these connections, for example the assemblages recovered from Parc Georges Besse II (Nîmes, Gard) or those resembling Camp de Laure in the department of Bouches-du-Rhône (Courtin 1975; Gernigon *et al.* 2008; Escallon *et al.* 2008, 535; Laporte *et al.* 2008, 620).

Progressive change of the local groups and maintenance of cultural enclaves

The scenario developed for Provence and to a larger extent for southern France, can seemingly be refined here. Three observations allow us to put the homogeneity of the phenomenon of regionalisation of the Rhodano-Provençal group of the Bell Beakers into perspective, the rapid disappearance of the local cultures and the mechanisms of acculturation.

First and foremost, processes of regionalisation do not occur simultaneously throughout entire southern France: a series of phenomena testifying to cultural mixing point to the maintenance of indigenous traditions. A complete revision of the available radiocarbon data set providing from the sites of the Final Neolithic period in south-eastern France as well as the measures of 25 additional chronometric samples accompanied by the exhaustive analysis of the pottery assemblages (Cauliez 2011a), show that during stage 4 of our new periodisation (Fig. 9.8), locally restricted processes of cohabitation are still present during some time. Identified during stage 3, it is maintained at the beginning of stage 4, until about 2300 BC, in associating several decorated elements assigned to the regional Bell Beakers with a predominant range of Final Neolithic attributes of local tradition (Vital 2006, 281).

Other establishments, this time assigned to a narrow definition of the Rhodano-Provençal Bell Beaker group, nonetheless including some traditional indigenous elements,[2] also attest to an evolution of the late Bell Beakers in agreement with the local groups. The latter are still present as for example in the department of Gard on the sites of Le Mas de Vignobles IV (Nîmes), Le Moulin Villard (Caissargues), Le Bois Sacré (Saint-Côme and Maruéjols), Maupas (Calvisson: De Freitas *et al*. 1990–1; Roger 1992; Convertini *et al.* 2004; Furestier 2007) or Le Vignaud 3 (Chemin-du-Puis-Neuf at Langlade: Hayden *et al.* 2011).

Although a more detailed analysis is required (Laporte *et al.* 2008, 619), these Bell Beaker sites demonstrate that the Fontbouisse group continues through some decorated vessels or through containers that show mixed ornamentation, half of the Fontbouisse type, half of the Bell Beaker type. On these sites, the lithic production definitely shows cultural mixing. Typical Bell Beaker artefacts such as unguiform end scrapers, splintered pieces, backed and tanged arrowheads appear next to lithic pieces of the local groups from the Final Neolithic such as long blades with made from oligocène flint originating from the Largue valley (Furestier 2005, 306). In the core of the central Rhône sector (Fig. 9.8), the site of Roynac Le Serre 1 (surface 2) or, more northwards in the Vaise plain, the site of Gorge de Loup (Lyon) exhibit similar processes at a slightly later point in time (Vital 2008; Vital *et al.* 2007). According to the current hypothesis, they represent an Early Bronze Age facies, at about 2290–2210 cal. BC (ARC-1669: 3845±45 BP). These productions contain small carinated beakers, dishes and bowls decorated with typical Bell Beaker incised and/or comb-impressed zoned ornamentation. However, several types survive from the Final Neolithic: large containers as well as plastic decoration associated with jars of the Early Bronze Age type (Vital 2005, 19; 2008, 543). Analogies for these productions from the Rhône region can be found in the Jura massif in the Clairvaux and Chalain groups or also during the late stage of the Auvernier-Corded Ware (Vital 2005; 2008; Vital *et al.* 2007, 33), altogether constituting cultural representatives that initially preceded the arrival of the Bell Beaker phenomenon. These intermediate cultural entities are termed style of Vaise (Vital *et al.* 2007; Vital 2008).

Secondly, the homogeneity of the phenomenon of regionalisation related to the Rhodano-Provençal Bell Beaker group has to be put into perspective as there are locally restricted mixed enclaves until the Early Bronze Age transition as it is attested by the style of Plan-Saint-Jean identified in the centre of the department of Var (Fig. 9.8), based on three pottery series: Le Plan-Saint-Jean (Brignoles, Var), La Bastide Blanches (Peyrolles, Aix-en-Provence) and Le Chemin d'Aix (Saint-Maximin, La Sainte-Baume). These mixed assemblages dated between 2200 and 2000 cal. BC (Cauliez 2011a) are representative of a process of cultural assimilation. The pottery of the Plan Saint-Jean style does not maintain the decoration system of the preceding stages related to the autochthonous substratum, at least concerning the incised decorations since these latter disappear more or less to the benefit of plastic decorations (Fig. 9.13). However, distinct elements of the repertory of this substratum are preserved in their whole diversity, like the carinated shapes, prismatic knobs and H-shaped lug handles, decorations of single or contiguous cordons arranged in a V-configuration, horizontal lines of double or triple buttons and pellet application with *repoussé* technique, incised herringbone patterns, impressions of dots and stamped ovals on the rim of the vessel or on the cordons. The Plan Saint-Jean style includes also specificities related to the common ware of the Rhodano-Provençal Bell Beaker group: horizontal cordons of triangular section placed under the rim, low-carinated vases decorated with small impressed curvilinear motifs, flat bases showing vertical bands of incised parallel lines and open shapes decorated with rectangular-shaped impressions arranged in a checkerboard design. Finally, the Plan Saint-Jean style exhibits pieces that pre-figure the Early Bronze Age with typical pottery elements of the Epi-Bell Beaker stage, dated to 2100–2000 cal. BC: small single-lugged carinated vessels, vases with footed flat base and wide-rimmed containers, plastic or impressed decoration. A high number of large jars, decorated with horizontal cordons and handles below them as well as fingernail or awl impression are also analogous. Thus, the Bell Beakers are not inactive concerning the formation of one part of this style. The latter, however, is mixed as only Bell Beaker shapes and decorations related to the common ware are adopted and incorporated into an assemblage still dominated by typical Final Neolithic products.

This existence of a mixed Neolithic style is not an isolated case in the French Mediterranean region (Laporte *et al.* 2008). Surviving attributes related to the autochthonous groups can be identified on the margins of the Languedocian hinterland in the upper Garonne basin (Gernigon *et al*. 2008). Here, the pottery productions are thought to be inspired by groups of indigenous tradition, the Artenacian, the Veraza culture and the Treilles group without, however, presenting the entire range of their characteristics. The Bell Beakers would have participated into this cultural ambience through their common ware as it is the case for the Plan-Saint-Jean style (Gernigon *et al*. 2008, 479). Amongst all these examples it is interesting to emphasise that solely certain elements of the decorative range of the Rhodano-Provençal Bell Beaker group (cordon with triangular section below the rim; single-lugged vases, curvilinear decoration or impressions of small rectangles …) are borrowed, reinterpreted and merged with proper local traits. Beyond these stylistic similarities, petrographical and technical analyses are required in order to detail these phenomena of mixing (Salanova 2002). It is equally important to analyse the question of the time span occupied by this process in order to determine the moment when these Bell Beaker characteristics appear as fully incorporated into the local productions (Salanova 2008, 145).

In the Languedocian hinterland, this late survival of pottery groups with local, even mixed, tradition until a very late date is explained by the existence of three metallurgical districts exploited from the end of the 4th millennium BC (Laporte *et al.* 2008, 619). However, the fact that the department of Var, occupied by the Plan-Saint Jean style, exhibits an identical configuration compared to

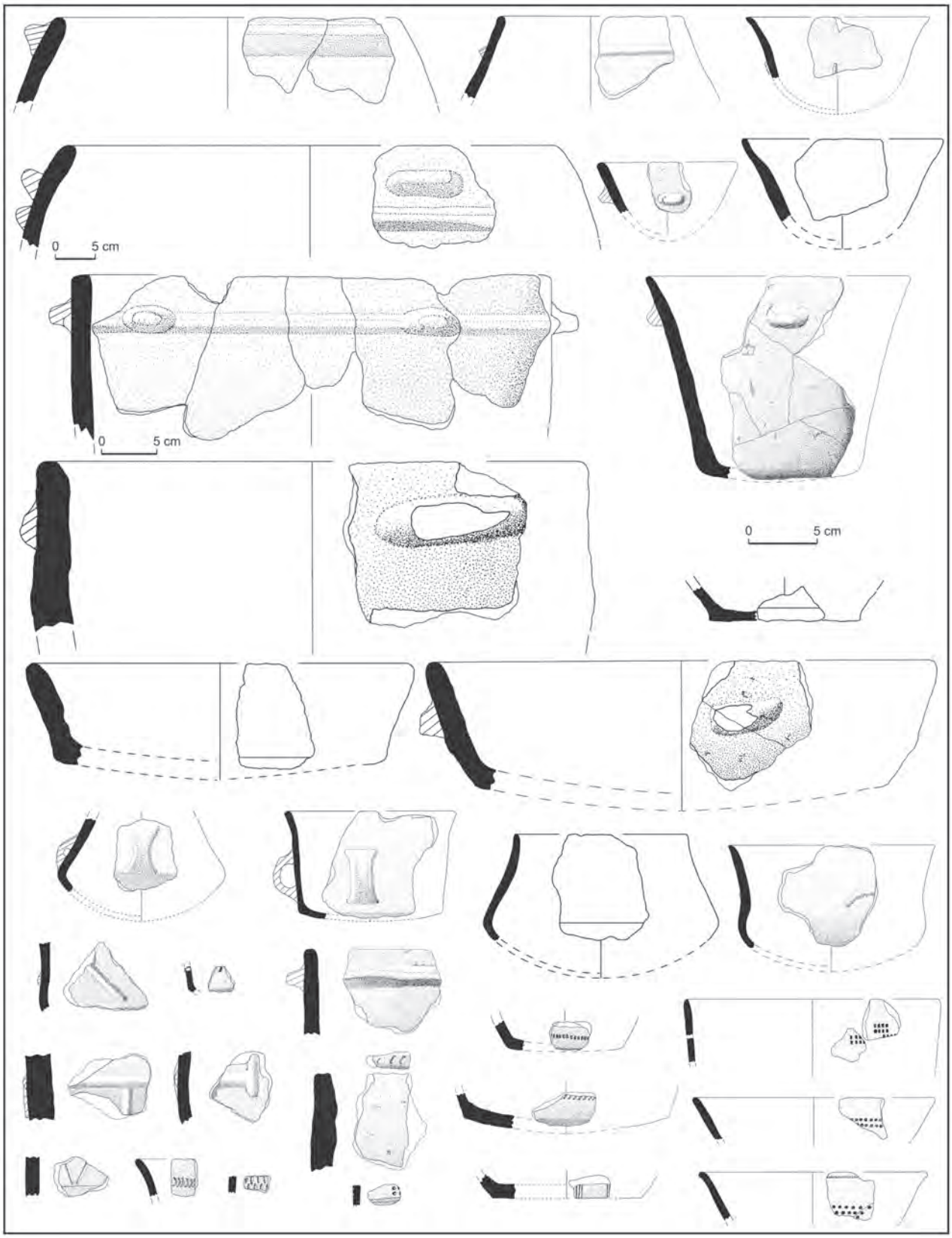


Fig. 9.13. Synthesis of the shapes and decorations of the mixed style Plan-Saint-Jean identified in central and eastern Provence at the moment when the Rhodano-Provençal Bell Beaker group develops (drawings CAD: J. Cauliez).

the Languedocian hinterland, without yielding any remains related to metallurgical activities, tends to minimise this technical argument for explaining the survival of the indigenous style at later dates, all the more that during the preceding stage it is within the Fontbouisse group, which possesses the knowledge of metallurgy, that the Bell Beakers integrate massively. This fact is moreover demonstrated for the preceding periods in producing regions (Gutherz *et al*. 2005; Strahm 2005, 27): there is no doubt that metallurgy was not the factor of change in the development and the evolution of the styles. On the other hand, it can be stated that it is systematically in areas in which the Bell Beaker establishment has been less marked that these mixed Neolithic cultures persist (see the catalogue of the Bell Beaker sites published in Lemercier 2004a and Furestier 2005, as well as the lists of Bell Beaker sites published in Morin 2000 and 2005). In southern France, the department of Var and the Languedocian hinterland can then appear as conservative refuge areas, developing specific schemes, however particularly influenced by the Bell Beakers since the Final Neolithic and this perhaps until the Early Bronze Age.

The third point is that the regionalisation of the Rhodano-Provençal Bell Beaker group is neither instantaneous nor ubiquitous as groups with Italian affinities associating pottery of local tradition with decorated pottery yet assigned to an early Bell Beaker stage may have existed at the foot of the southern Alps in the department of Alpes-Maritimes. This could be represented at least by the Italian style which we termed Pendimoun style, identified from the study of the site of the Pendimoun shelter (Castellar). In this shelter, two phases have been recognised stratigraphically. At the top was an establishment of the regional Rhodano-Provençal Bell Beaker group (strictly speaking) that yielded beakers with mixed decorations (derived from the international style) or Rhodano-Provençal style decorations and Bell Beaker common ware (Binder, 2003). At the basis of the sequence, a Final Neolithic occupation has provided elements with affinities from the Po plain (pottery with metopic decoration), to which is associated ornamented pottery of the early Bell Beaker stages. A radiocarbon date has been obtained from a small oak branch from layer 3005 at the bottom of the sequence. This date is particularly problematic as it shows an important interval of more than 100 years compared to the phase of integration of the Early Bell Beaker in south-eastern France. At Pendimoun, it dates the moment within the Final Neolithic characterised by metopic decoration and Early Bell Beakers at about 2290–2050 cal. BC. According to the field directors, this date could nevertheless be considered reliable given the quality of the sample and the rather late dating of the regional Bell Beaker sequence to about 2100 cal. BC (D. Binder, pers. comm.). Three undated sites have produced exactly the pottery characteristics of this style: the Barriéra cave at La Turbie, the dolmen of Coulet de Stramousse at Cabris in the department of Alpes-Maritimes, as well as the caves at Saint-Benoît in the department of Alpes-de-Haute-Provence. Consequently, the Pendimoun style is distributed over a large trans-alpine area. These three sites are located at high altitudes or in steep areas and they are established in caves, shelters or dolmens. In so far as the radiocarbon dates would be currently not-refutable according to the field director of the Pendimoun excavation, the survival of the Early Bell Beakers at very late dates, during one more century, may be explained by the geographical location of this style, set back at the outer edges of the Maritime Alps. This is contradictory to the commonly acknowledged schemes concerning the arrival of the Bell Beaker phenomenon. We make some reservations about the acceptance of this possible interpretation since the framework of the Final Neolithic cultures in the trans-alpine area still requires further substantial documentation (Visentini 2002).

Conclusion

When considering the Bell Beaker phenomenon from the point of view of the receiving cultures, it can be noted that this phenomenon of large transgression has not been at the origin of the changes affecting the local populations neither in Languedoc nor in Provence. Nor has it been in Languedoc where there has, in fact, been a rejection of the Bell Beaker phenomenon in this region if we consider the low number of Bell Beaker remains and the scarcity of discovered sites and similarly in Provence, as the establishment of Bell Beakers does not occur within an environment of competition and rather seems to be the result of slow integration, supported by the absence of radical reactions by the indigenous cultures. It also has to be noted that the integration of the Bell Beaker phenomenon is not determined by the weakness of local styles since the Bell Beakers in Provence are, at first, associated with the Fontbouisse group, believed to be a group with a strong identity. Moreover, the local groups in Provence in which the Bell Beaker phenomenon appears are governed by mechanisms of complex organisation and thus do not have a weak cultural influence. It should be noted that only M. Vander Linden has defended (2006) the theory of integration for southern France. Other authors such as N. Brodie or S. Needham also proposed similar theories for other geographical zones such as the British Isles (Brodie 2001; Needham 2005).

This process of integration and cohabitation is stressed by exchanges and technical crossover but also by the maintainance of exogenous pottery traditions of which the rich ornamentation and varied morphology is established quite prior to the arrival of the Bell Beaker phenomenon in southern France. According to these data, in Provence we would be observing a case where the diffusion of Bell Beaker in this area is exclusively accompanied by minor

changes in societal structures; its intrusion seemingly does not disturb the functioning in process (Salanova 2002, 159). In this case, already mentioned by L. Salanova for other regions, only the stylistic scheme of the Bell Beaker circulates; its influence appears at the level of decorative themes and the morphology of the vessel, but in parallel it is systematically modified by the influence of local traditions. As a matter of fact, Bell Beaker productions rarely exhibit technical characteristics that distinguish them from typical containers of the indigenous cultures. Similar examples are known almost everywhere in Europe more particularly during the Final Neolithic of central western France (Artenac) or of northern Portugal (Salanova 2000, 180).

However, during the late Bell Beaker phase, a recreation of the cultural landscape, wherein the Bell Beakers and the local groups are still in interdependency, can be stated. At the moment when the Rhodano-Provençal Bell Beaker group develops, several sites are representative of phenomena of cultural mixing; others of processes of assimilation and still others indicate the persistence of Early Bell Beaker productions during the development of the Rhodano-Provençal group. These different cases allow to clearly abandon the hypothesis of rapid disappearance of the local cultures and to support the one of acculturation of the indigenous groups given that both Bell Beakers and local groups interact.

In addition, they demonstrate that the study of the local pottery traditions can help us to define the characteristics of the Bell Beaker process. However, of course this hypothesis has to be refined by incorporating the other elements of the technical system (lithic industry, ornaments, settlements, etc) and the further exchanged materials diffused in the north-western Mediterranean (flint daggers of Grand-Pressigny originating from Indre-et-Loire in France, copper varieties and other hard rocks from orthern Italy…), testifying to the complexity of networks of influences at the end of the Neolithic period and to the diversity of possible impacts on the receiving societies.

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Notes

1 It has to be clarified that within these circulations there is no diffusion of techniques nor even transfer of artefacts as such. Petrographic analyses on pottery from Charavines and Delley Portalban II, demonstrate that the origin of the fabrics of these typical Provençal vases is located in the alpine region (Sturny and Ramseyer 1984; Benghezal 1994). Thus, influences from Provence do not occur as imports.

2 Based on the chronological and cultural framework, he elaborated for south-eastern France, J. Vital reconsiders the dating of two of these sites to lie between 2480 and 2350 cal. BC. (Vital 2008, 541). The radiocarbon dates of Moulin Villard and of Bois Sacré are: Bois Sacré: Ly 422: 3890±140 BP: 2250–1650 cal. BC at 2δ; Moulin Villard: Ly 4945: 3945±70 BP: 2140–1850 cal. BC at 2δ.

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10

THE DAGGER PHENOMENON: CIRCULATION FROM THE GRAND-PRESSIGNY REGION (FRANCE, INDRE-ET-LOIRE) IN WESTERN EUROPE

Ewen Ihuel, Nicole Mallet, Jacques Pelegrin and Christian Verjux

Flint daggers from Grand-Pressigny are the best-known examples of flint craftsmanship in the middle part of France during the Late Neolithic and Bell Beaker periods. Several activity phases have been identified between the late 4th and late 3rd millennia cal. BC based on observations of changes in these productions. While the oldest flint daggers from Grand-Pressigny were relatively short and wide, between 2800 cal. BC and 2400 cal. BC they became much longer (up to 34 cm). This activity reached its apogee during this period and flint daggers were diffused over hundreds of kilometres, from the Pyrenean Mountains to northern Germany and from Brittany to Switzerland. During the Bell Beaker period, this phenomenon is above all associated with burials, which show a strong Rhine region influence. In this context, Pressignian objects seem to have played a symbolic role in the funerary practices. By the end of the Bell Beaker period, the flint dagger phenomenon seems to decrease. Nevertheless, the Grand-Pressigny flint has continued to be diffused until the Early Bronze Age on the Atlantic coast for the production of high quality arrowheads.

Introduction

This contribution presents the results of a collective research project on the diffusion of flint tools, flint daggers in particular, from the region of Grand-Pressigny (France, Indre-et-Loire), which have been discovered throughout France, as well as across a large part of western Europe during the 3rd millennium. This phenomenon raises questions concerning the relationship between Pressignian productions and the Bell Beaker phenomenon over this vast geographic zone. For example, flint daggers are often cited one as of the components of Bell Beaker assemblages and contribute to discussions on the emergence of human warfare and the existence of an aristocracy that controlled long distance exchanges. However, since the coexistence of daggers, Pressignian tools and Bell Beaker vases is not always evident, such arguments must be considered with caution.

The dagger phenomenon in Europe

At the end of the Neolithic period, the development of flint and copper daggers extended beyond the European continent. The original impulse of this phenomenon is to be found in the Near East before the 6th millennium. In many cultures, the manufacturing of copper daggers clearly began in the first metallurgical contexts in south-east Europe, in Bulgaria and the former Yugoslavia. Several centres, including the Mondsee and Pfyn cultures of central Europe, played a direct or indirect role in the emergence of the productions in the western regions studied here, after traversing Switzerland (Strahm 2007; Schlichterle 2003; Honneger 2006). The adoption of daggers is not limited to this metallurgical sphere, however, and two production types rapidly developed starting in the 4th millennium: copper daggers and flint daggers, the latter mostly in zones lacking metal. The first flint daggers in western Europe are dated

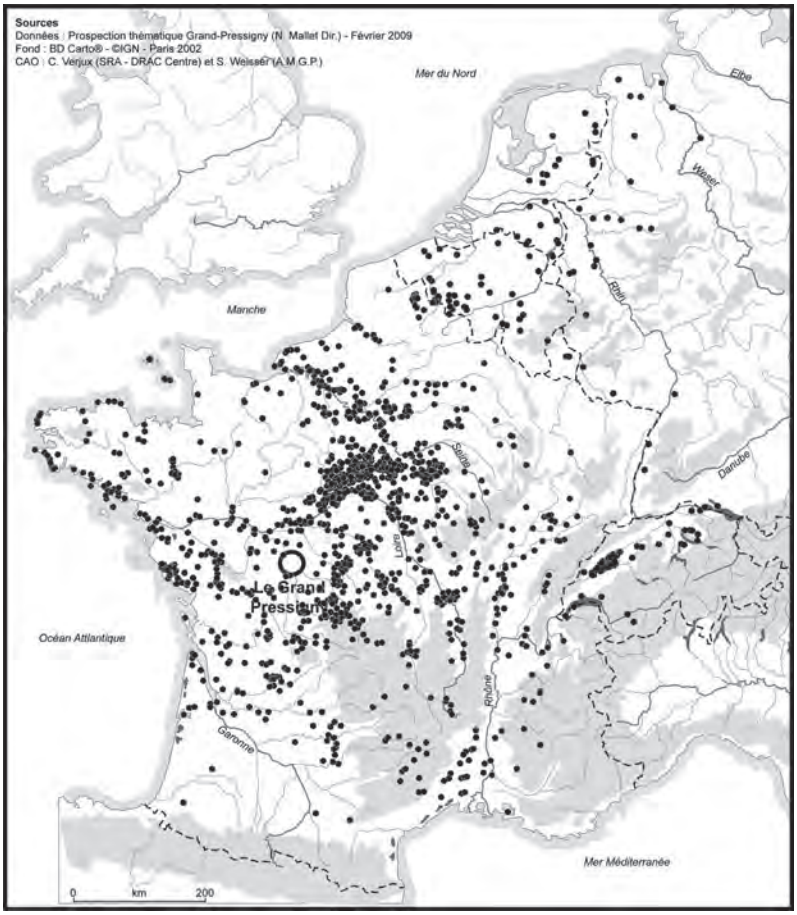

Fig. 10.1. Distribution of objects from Grand-Pressigny.

to 3800–3600 cal. BC in the Trentino region of northern Italy (Mottes 2006) and 3400 cal. BC in the Pfyn contexts, followed by Horgen in eastern Switzerland (Honneger 2006). They are nonetheless rare at this time and reflect a multitude of local and distant raw material sources in northern Italy, central France (Yonne flint), southern France (Forcalquier flint) and the northern Paris Basin (Bartonian Tertiary flint). The manufacturing methods adhere to diverse norms that arose from local technical traditions (Mottes 2006), or were perhaps adapted from metal technologies, sometimes of a distant origin (Renault 2006; Vaquer 2006).

The Grand-Pressigny workshops

History

Somewhat distant from this first centre of production, the development of dagger productions occurred a bit later in the Touraine region of France, beginning at 3200–3100 cal. BC. It is nonetheless rooted in the local technical traditions of western France (Ihuel 2008). The laminar products in Touraine between 4200 and 3000 cal. BC are poorly known, though a few archaeological elements associate them with an early age, contemporary with the first Chassean influences observed on the Atlantic coast. The western tomb at Moustoir in Carnac (Morbihan) contained a deposit of four unretouched Pressignian blades manufactured using a specific technology. They were accompanied by a Castellic type pottery element (Cassen 2001; Hamon 2003). In approximately 20 graves in Brittany, analogous observations have been made of unretouched blades in early collective burials, suggesting that this was already a widespread phenomenon.

From the time of their emergence during the 3rd millennium, the Pressignian products display a precise technical specificity observed only in Touraine and several small and distant secondary production zones, including the Vercors, Charente, Dordogne and Reims regions, while at the same time, the use of daggers made on flint blades became more widespread. This specificity is unique to western continental Europe, extending from southern France to northern Germany.

The limits of the zone of circulation of Pressignian blades are represented by the English Channel to the west, the North Sea, the Rhine Valley, the western bank of Constance Lake in Switzerland, the northern-alpine Massif, and the Mediterranean and Pyrenees to the south (Fig. 10.1). In

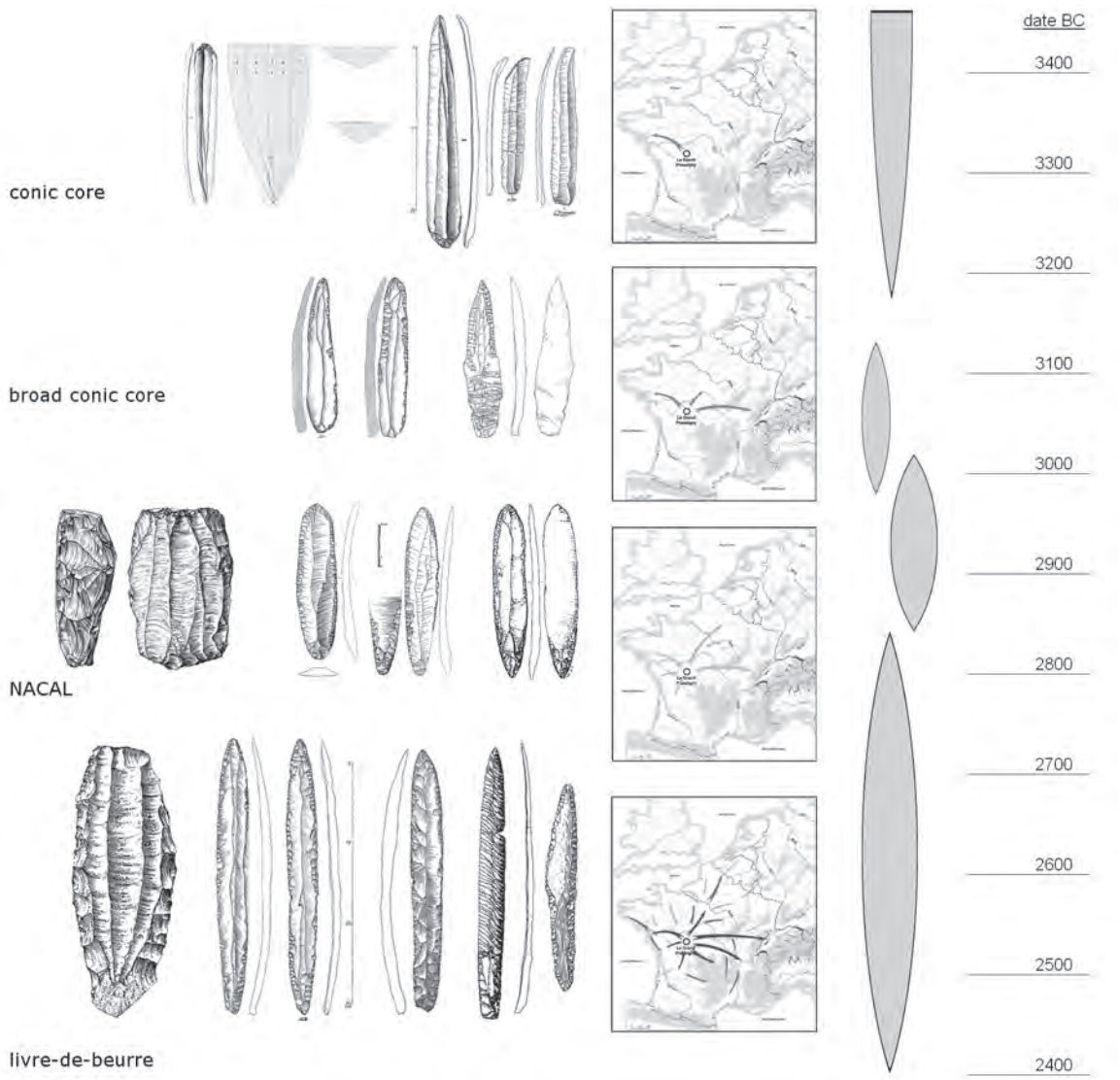

Fig. 10.2. Chronological references of several laminar productions from Grand–Pressigny.

cultural terms, during the Final Neolithic and Bell Beaker periods, it is interesting that this diffusion did not reach Great Britain, the Iberian Peninsula, Italy or Eastern Europe. This laminar tradition appears to have had a cultural value since during a few centuries it was opposed to neighboring production zones where flint daggers were realized through shaping techniques, in southern France, northern Italy and Scandinavia (Vaquer 2006; Gilbeau 2010; Honegger 2003; Appel 2001).

Pressignian production methods and strategies nonetheless underwent major transformations during the 3rd millennium, as in other dagger production centers. The technical sophistication of the production sequences (*chaînes opératoires*) and the standardisation and dimensions of the daggers significantly increased, indicating that the knappers were highly specialised and the expectations of those for whom they were made were very high.

There is evidence for the manufacturing of long blades at the end of the 5th millennium in Grand-Pressigny, but it is during the 3rd millennium that their production and use as blanks for the realisation of daggers was most prevalent (Fig. 10.2). The apogee of the workshops occurred between 2650 and 2450 cal BC, when their function becomes uncertain (Mallet 1992; Honegger 2001; Mallet *et al.* 2008).

The nature of Grand-Pressigny flint and its exploitation

Due to the abundant presence of high quality flint in the form of large plaques throughout the region, the Grand-

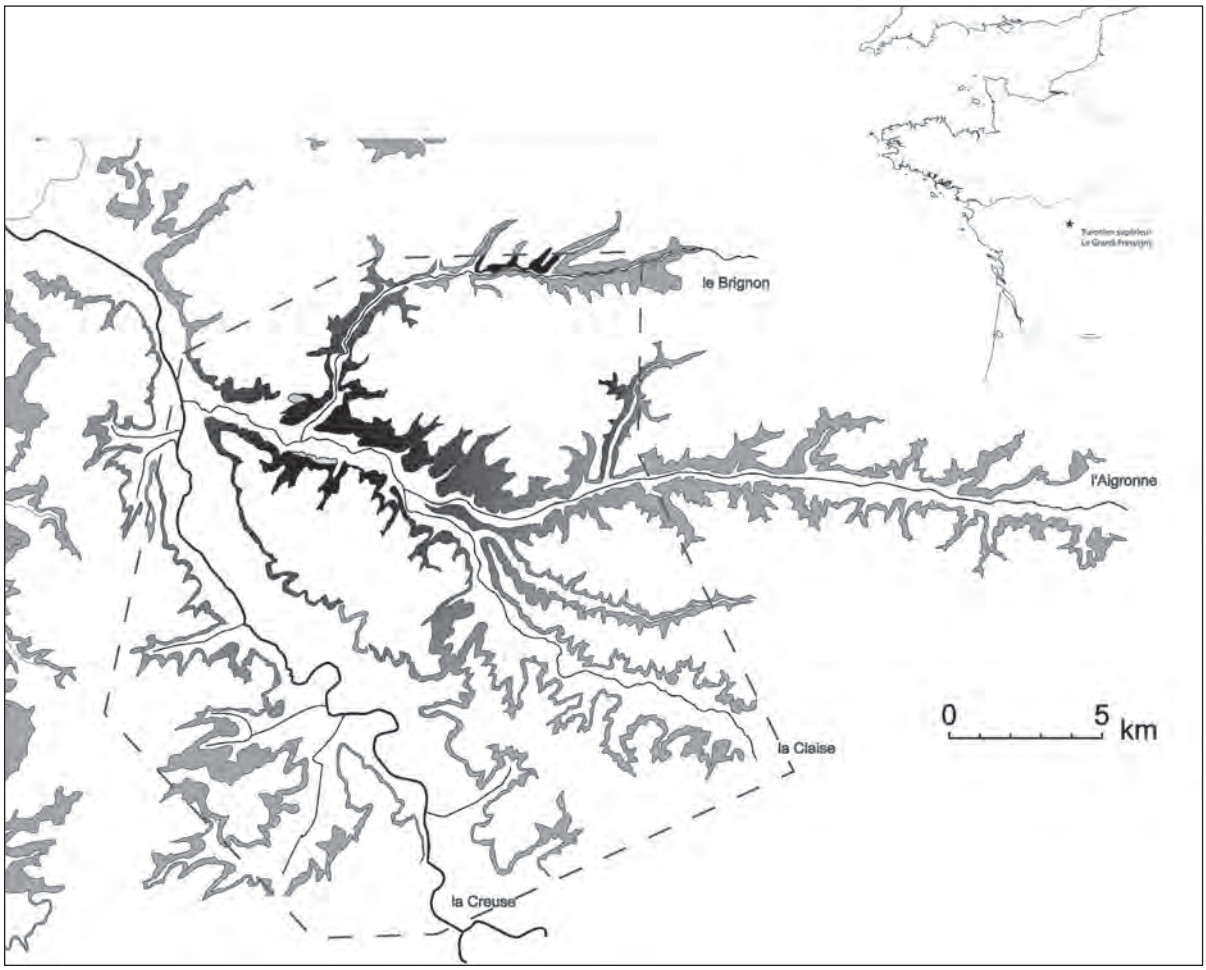

Fig. 10.3. Locations of workshops in the southern Touraine area.

Pressigny workshops were able to produce large numbers of blades and diffuse several thousands of them across all of western Europe, with the exception of Italy, the Iberian Peninsula and Great Britain.

Grand-Pressigny flint is a secondary flint of the Upper Cretaceous located in the extreme south of the Paris Basin, in the southern Touraine and northern Poitou areas (Fig. 10.3). This geographic region is composed of plateaus cut through by numerous valleys, including the Vienne, Creuse, Claise, and their tributaries. The zone of outcrops extends over approximately 20 km from east to west, and nearly as much from north to south. A geologic and petrographic study has shown that this flint, originating from the yellow freestone formations of the Upper Turonian, constitutes a typical and homogeneous material that was formed in an open and shallow marine environment, within a well-delimited and relatively small zone. This particular flint is very distinct from the siliceous stones originating from other formations of the Upper Turonian.

The type-facies displays the following macroscopic characteristics. It has diverse colours, dominated by brown-yellow, dotted with lighter spots. It has a relatively fine texture with fine translucent granulations due to the presence of detrital quartz. We also observe fossil organisms. Microscopically, Pressignian flint can be determined as resulting from the silicification of an ancient, very fine sand mostly composed of limestone gravels or pellets measuring 100–300 microns, associated with quartz and the remains of small, finely fragmented marine organisms; these organisms are not typical of any particular geological horizon, but are nonetheless always distributed in a highly characteristic association dominated by porifera spicules, the foraminifera associated with bryozoa, echniodermata and mollusc fragments (Giot *et al.* 1986).

However, though the flint plaques still in place in the bedrock, a yellow freestone, display the characteristics of the type-facies, they are distinguished by the presence of carbonates, which make them difficult to knap. Their transit in a formation of altered yellow freestone is necessary for their decarbonatation, and this is why there are no

flint exploitation mines, shafts or galleries in the yellow freestone of the Grand-Pressigny region. On the contrary, the flint found in the loose formations composed of the altered clays of the yellow freestone, the slope colluviums and the ancient alluviums of the upper river terraces, was extensively exploited. It is in these formations that traces of exploitation have been discovered, and in particular, extraction pits dug into the yellow freestone clays. These pits measure 2–2.5 m in diameter and are approximately 1.5 m deep. They were refilled with knapping by-products, including numerous flakes of all sizes and *Livre-de-beurre* cores. All of these altered clays and slope colluvium sources correspond to the same geographic unit and are located on the edges of plateaus and in the upper part of the slopes. This is where we find the immense knapping workshops that cover several hundreds of hectares on the plateaus dominating the numerous valleys of the region.

The laminar productions of Grand-Pressigny

Among the different laminar product types that have been identified in Pressignian workshops, only three are associated with the Bell Beaker period.

The manufacturing of blades on very distinct cores, locally called *Livre-de-beurre* ("block of butter") cores, was oriented toward the production of long, regular blades that were retouched into daggers. These blades are 25–38 cm long, 38–60 mm wide and 9–14 mm thick. The *Livre-de-beurre* cores have an asymmetric oblong shape. Their intensive preparation was realised through the detachment of flakes from two lateral crests, using a single striking platform. This latter was facetted and prepared for the detachment of each blade through the shaping of a sharp dihedral that was then pecked (Pelegrin and Ihuel 2005). *Livre-de-beurre* cores reflect a high degree of investment in the manufacturing of daggers. Their preparation required a high level of skill whose acquisition would have required a long apprenticeship. They are the product of a long series of innovations made over several centuries and thus constitute the apogee of the Pressignian workshops (Pelegrin 1997; 2002).

After the detachment of long blades, some *Livre-de-beurre* cores were reworked by less skilled knappers to manufacture short, thick and irregular blades. Observed in the occupation sites and at some workshops, such as that of Bergeresse at Abilly, such blades were seldom diffused beyond the Grand-Pressigny region (Millet-Richard 1997; Verjux and Weisser 2011).

Another type of core is found along with the *Livre-de-beurre* cores in some of the workshops. From these "flat cores" short, relatively thin and very wide blades were detached. These blanks were mostly used for the fabrication of notched saws. The blades detached from these relatively flat, quadrangular cores have smooth or facetted rectilinear butts. These are "secondary" products that were apparently manufactured by the knappers of the long blades, but using less sophisticated methods and techniques, which nonetheless still required a high skill level (Pelegrin and Ihuel 2005).

In the Grand-Pressigny region, the by-products of *Livre-de-beurre* core reduction are found over vast surfaces. The discontinuous and extensive nature of these flint knapping activities appears to have been determined by the available resources. The knapping activities, from initial core preparation to the detachment of long blades, occurred in large part at the sites where the flint plaques were extracted. Large concentrations of core preparation and reduction by-products have also been observed on the slopes and valley bottoms, to which initially prepared cores were imported, therefore indicating a segmentation of production sequences across a zone covering several kilometres (Millet-Richard 1997; Pelegrin 1997; 2005; Villes 2005; Fouéré 2002; Verjux and Weisser 2011). Based on several arguments, one of us (JP) believes that the flint was extracted by local agriculturalists, especially during land clearing operations. The extracted plaques would then have been given to passing knappers who would reduce them completely in place or initially prepare them to be transported to a nearby occupation site where they would be fed and lodged (Pelegrin 2005).

This particular production model, implying that the knappers practised a form of mobility, is different from the northern flint mining activities associated with the specialised production of axes during the Middle and Late Neolithic, in Michelsberg, for example (Pelegrin and Richard 1995; Marcigny *et al.* 2007). It is also distinct from the metallurgical industries of southern France, such as that of Cabrières-Péret in the Hérault Department, which were associated with long-term installations organised for the exploitation of nearby veins (Ambert 2005).

It is remarkable that flint sources several hundreds of kilometres away were exploited by knappers from Grand-Pressigny (Pelegrin 2002; 2012). This phenomenon includes the true "satellite workshops" in Vassieux-en-Vercors (Drôme, with *Livre-de-beurre* and flat cores: Riche 1999) and the region of Reims (Marne: Allard and Pelegrin 2007), as well as "seasonal concentrations" in the Charente and Dordogne Departments where a few dozen *Livre-de-beurre* cores indicate an episodic exploitation (Delage 2004; Fouéré *et al.* 2008).

Were these workshops still active in the Bell Beaker period? The answer to this question must be sought outside of the Grand-Pressigny region since the workshops there have not yet been precisely dated. This is because they have yielded few features other than flint concentrations and extraction pits in clays in which charcoal is not preserved. In order to understand the strategies of flint circulation and their economic significance, an inventory was realised, first

at the regional and then national scales. The recording of more than 6700 items enabled the creation of a Geographic Information System that is currently under study (C. Verjux and S. Weisser). We will thus now address the Pressignian objects in their domestic, and then funerary contexts.

Pressignian tools in the domestic sites from the Final Neolithic and Bell Beaker periods

Domestic sites from the Final Neolithic period

Around 3000 cal. BC, the zone of circulation of flint daggers spreads from the Atlantic coast to western Switzerland, and from the North Sea to the Mediterranean. The peak of exportations occurred during the Final Neolithic period of the 27th–25th centuries (Mallet 1992; Honegger 2003). This is observed in all the cultural entities of this zone (Fontbouisse, Artenac, Gord, Conguel, Deule-Escaut, Late Lüscherz, Auvernier, EGK: Fig. 10.4). Numerous domestic sites of this period, pre-dating the arrival of the Bell Beaker phenomenon and recently excavated, have yielded an abundant record, often completed by large assemblages resulting from surface surveys. This is the case for the sites of Moulins-sur-Céphons (Indre), Challignac (Charente), Douchapt, Villetoureix (Dordogne), Ouzouer-le-Marché (Loir-et-Cher), Bettencourt-Saint-Ouen (Somme), Coex (Vendée), Chalain and Clairvaux (Jura), Houplin-Ancoisne, (Nord), as well as numerous villages in the Three Lakes region of western Switzerland (Burnez 2010; Chancerel 2009; Fouéré 1998; Gandriau 2001; Genty 1987; Hamon 2006; Honegger 2001; Martial *et al.* 2004; Pétrequin 1995). These occupation sites have yielded relatively high numbers of Pressignian flint objects, reaching several dozens and often constituting 3–4% of their assemblages (Cottiaux 2006; Ihuel 2008). Most of the objects discovered in these villages consist of fragments of daggers made on blades detached from *Livre-de-beurre* cores, which were often reworked after they were broken to make other small tools (end-scrapers, lighters, etc). Depending on the region, they were accompanied by varying numbers of Pressignian flint objects, such as flakes that are sometimes retouched into arrowheads. This is especially true in Brittany where good quality flint is rare. Notched saws made on flakes or blades are also well represented in the occupation zones between the Seine and Dordogne rivers. These numerous discoveries suggest both a long-term circulation network and the existence of a small number of objects with a high social value, such as the polished daggers and obliquely retouched daggers found at Ouroux-sur-Saône (Saône-et-Loire: Thévénot 1973). The acquisition of such objects could imply long distance circulations, and they were sometimes even the objects of local imitations, though of a lower quality, on Pressignian daggers (Mallet 1992).

Domestic sites of the Bell Beaker period

On the other hand, domestic sites showing clear evidence of a link between the Grand-Pressigny region and Bell Beaker vases are extremely rare, seeming to indicate a major change.

• Short episode during the 5th millenium, unretouched blades	**ware style**
around 4200–3800, Le Moustoir, Carnac, France	Chasséen/Castellic
• First blades exported towards Jura: 31e siècle	
3040 BC, Chalain 4, Jura France	Clairvaux ancien
3010 BC, Chalain 19 H-K, Jura, France	Clairvaux ancien
• First flint daggers exported towards Jura: 30e siècle	
2980–2950 BC, La Motte-aux-Magnins, ABC, Clairvaux, France	Clairvaux récent
• First flint daggers exported and made on livre-de-beurre's blade	
2760–2730 BC, Avenue des sports, Yverdon, Vaud, Suisse	Lüscherz récent
2712–2674 BC, Bain des dames, Saint-Blaise, Neufchâtel, Suisse	Lüscherz récent
• Last flint daggers exported	
2862–2450 BC Wijtrijt (Nederland)	
2567–2299 BC Eext-Galfgwandenveen (Nederland)	EGK, vase PFB
2571–2354 BC Jablines (France, Seine-et-Marne)	AOC, 2IIb
2574–2350 BC Ciry-Salsogne (France, Aisne)	AOC, 2IIb
2530 BC Avenue des sports, Yverdon, Vaud, Suisse	Auvernier-Cordé récent
2470–2209 BC Eext-Schaapdijksweg (Nederland)	EGK, vase PFB
2463–2146 BC La Folie, Poitiers (France, Vienne)	AOO
2460–2130 BC La Folie, Poitiers (France, Vienne)	AOO

Fig. 10.4. Chronological references for several laminar productions from Grand-Pressigny.

Only the site of Digulleville in the Manche Department has yielded vase fragments of the international style within a pit-hearth and a burned Pressignian dagger fragment (Letterlé and Verron 1986). A few domestic Bell Beaker sites thus have ambiguous contexts that are difficult to interpret and dates that are often unreliable. At Brétignolles, le Petit-Rocher in the Vendée Department, for example, the dating of the site appears to be too old (4290±130 BP, or approximately 2900 cal. BC: Pautreau 1979; Joussaume 1981). In other cases, there are palimpsests involving the Final Neolithic-Bell Beaker-Early Bronze Age periods, such as at Rousselerie-l'Hermitage in Saint-Brévin-les-Pins in the Loire-Atlantique Department (4260±60 BP, or approximately 2900 cal. BC: Tessier and Bernard 1995), or the site of Pinacle in Jersey (Jersey Island) whose status is difficult to determine. This site consists of a rocky platform delimited by walls and contains extremely fragmented archaeological materials in secondary position, especially the arrowheads (Patton 2001). On the other hand, the Bell Beaker occupations recently excavated over large surfaces have not yielded Pressignian flint objects, be it the dry stone habitat of the Ile de Molène in the Finistère Department (Pailler *et al.* 2010), the Place Lamennais in Saint-Malo in Ile-et-Vilaine (Guyodo 2001) or the sites of Vivier à Poses and Les Florentins in Val-de-Reuil (Eure) (Billard *et al.* 1998). The Bell Beaker levels of the external wall of Les Loups in Echiré (Deux-Sevres) yielded no Pressignian elements, in contrast to the oldest levels of the internal wall (Burnez 1996). In eastern France, the situation is identical to the site of La Noue Saint-Marcel in the Saône-et-Loire Department (Salanova and Ducreux 2005) and the dry stone habitat of Calades in Orgon (Bouches-du-Rhône: Barge-Mahieu 1989). In central France, there are no recent data despite possible surface sites observed in the Vienne Department by J. Airvaux. In Switzerland, in the Jura and Bas Dauphiné areas, in the Rhône Valley, and in southern France, the arrival of the Bell Beaker culture in the 25th century appears to correspond to a decrease in the number of tools in Pressignian flint in the occupations (Mallet 1992; Honegger 2001).

Pressignian tools in Final Neolithic and Bell Beaker burials

The funerary sites of the Final Neolithic contain various cultural traditions, including those of the early and late Bell Beaker period. The burials confirm the gradual disappearance of the use of daggers and other tools in Pressignian flint during this period, but they present less clear and less abrupt image of their abandonment.

In France, Belgium and Holland, we observe two contemporary funerary traditions: the burial in individuals tombs and the reuse of collective burials (Salanova 2000; Chambon 2003, Salanova and Tchérémissinoff 2011). The presence of Pressignian objects in Bell Beaker deposits is therefore reliably known in only a small number of sites corresponding to individual burials associated with early type AOO Bell Beaker vases (All Over Ornamented), which represent influences from the Rhine region (Salanova 2000; Salanova and Tchérémissinoff 2011). Pressignian tools are absent, on the other hand, from the sites attributed to late phases of the Bell Beaker period, such as that of Bouilloires (Vendée).

Pressignian flint daggers in individual burials

In the Pressignian deposits associated in individual burials, there are two opposed situations: a high frequency of flint daggers in northern Europe, especially in Holland, Belgium and northern France, and a low frequency in southern France.

In northern Europe, retouched daggers made on long Pressignian flint blades, or Tertiary flint blades transformed using the Pressignian technology, are found in numerous EGK (*Einzel Grab Kultur*) burial sites, including 38 that contained only one dagger (25 sites with one dagger in Pressignian flint and 13 with one dagger in Tertiary flint: Delcourt-Vlaeminck 1999; Mallet 2006) in association with vases of the AOO (All Over Ornamented) or PFB (Protruding Foot Beaker) traditions. These local Final Neolithic ceramics of the Rhine region are often associated with burials that contain battle-axes or flint objects with a quadrangular section, such as in the Eext-Galfgwandenveen burial in Holland (Figs 10.5 and 10.6). This first observation argues in favour of a continuity between the Final Neolithic and an early phase of the Bell Beaker for the Pressignian deposits. Dates are available only for the burials in Holland, which are in principle the oldest: the Eext-Galfgwandenveen burial radiocarbon dated 2564–2299 and 2567–2299 cal. BC, and that of Eext-Schaapdijksweg with a PFB vase dated 2470–2209 cal. BC (Van der Waals 1991). For the burials with a Tertiary flint dagger, we can speak only of the deposit of early Bell Beaker vases in the Doorwerth burial (Delcourt-Vlaeminck 1998; Mallet 2006). The relative frequency and early dates of the flint dagger deposits in the Bell Beaker of the EGK type argue for a long use duration in this zone, which indicates that this was the last core area of this practice. In addition, several observations concerning the investment associated with the retouching indicate a cultural particularity. Seventeen Pressignian daggers out of 25 are polished, as are six out of 13 of those in Tertiary flint. This is thus an identical and contemporary phenomenon. The extensive polishing also sometimes appears to extend onto the point of the dagger, which is thus rounded on several specimens, such as that of Emst-Hanendorp in Holland (Fig. 10.6, Delcourt-Vlaeminck 1998; 1999).

Three individual burials contained Pressignien daggers among 40 Bell Beaker individual burials known in France

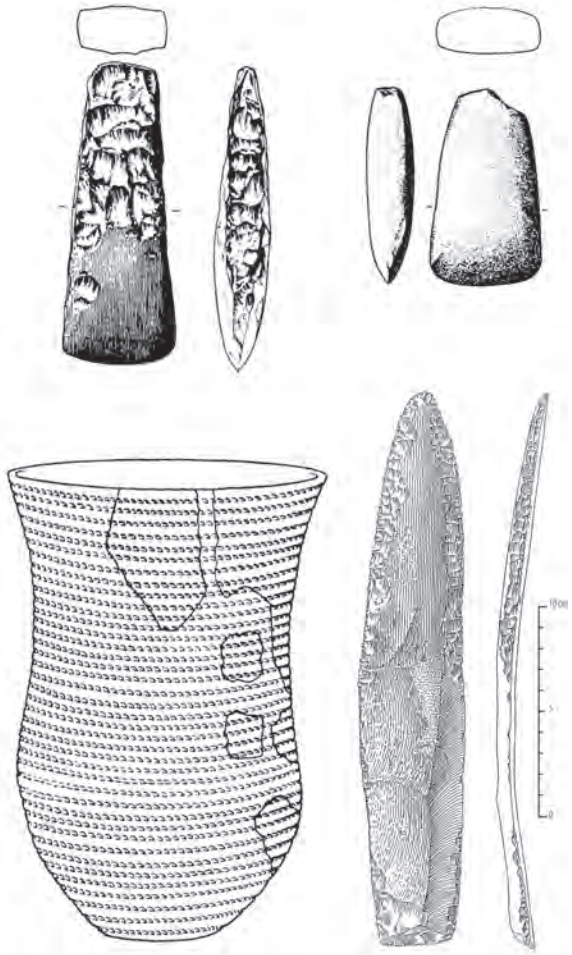

Fig.10.5. Artefacts from the grave of Greven, Germany (from Lanting et al. 1976).

(Fig. 10.7). They are located in the northern half of France, that of the site of La Folie in Poitiers (Vienne), Haut-Château in Jablines (Seine-et-Marne) and La Bouche à Vesle in Ciry-Salsogne (Aisne) (Tchérémissinoff *et al*. 2000; Laporte *et al.* 1992; Desenne *et al.* 2000). Based on their artefacts and architecture, these sites can be interpreted as an extension of the Bell Beaker practices of the Rhine region in which the deceased is associated with a vase and a Pressignian flint dagger (Laporte 1992 *et al.*; Salanova and Tchérémissinoff 2011). A few differences with the Rhine region can nonetheless be noted, such as the absence of battle-axes. In addition, in the Poitiers burial, dated 2470–2130 cal BC. (GrA-18765: 3835±45 BP, and GrA 17489: 3815±35 BP: Tchérémissinoff *et al.* 2000), the flint dagger is represented by a fragment of an unretouched Pressignian blade and a micro-denticulated flint tool from the same origin (Salanova and Tchérémissinoff 2011). Only the Jablines dagger is polished, and dated 2570–2350 cal BC. (GrA-32767: 3970±30 BP: Lanting 2008). The vases (AOC 2IIb type or AOO: Lanting 1976) contained in these three burials have the particularity of being realized with clays of a local origin, but using techniques of the Rhine tradition (Salanova 2000).

In conclusion, the inclusion of Pressignian and Tertiary flint daggers in individual burials is a Rhine cultural tradition anchored in a PFB tradition of the Final Neolithic. In an Early Bell Beaker context, this tradition is centered in the Rhine region and is occasionally found in the northern half of France where it takes a minimalist form, lacking axes and amber beads.

This type of deposit is characterised by a very high frequency of daggers that are extensively polished and/or finished by a covering retouch realised with the pressure technique, and sometimes oblique. We nonetheless observe that the daggers with a polished back are often the most distant ones. The polishing technique remains the same, however, for all flint types and the completely polished daggers are represented identical proportions in the two flint types: seven out of 25 in Pressignian flint and three out of 13 in Tertiary flint.

Pressignian flint daggers in collective burials

A recent synthesis of the southern half of France clearly indicates that collective burial was the dominant practice during the Bell Beaker period in this region, represented by 93% of the contexts, and 86% on the Atlantic coast, which seems to be valid in the northern half (Salanova and Tchérémissinoff 2011). In the Armorica Massif, Bell Beaker burials have been found in association with megaliths, with the exception of one pit burial in the Vendée Department, perhaps showing influence from the Rhine region (Salanova and Tchérémissinoff 2011). These Bell Beaker funerary deposits generally occupy only part of the ancient tombs, which are of variable types and ages (Salanova 2000).

In the megaliths of western France, numerous Pressignian deposits are attributed to the Final Neolithic and are associated with vases of diverse local cultural traditions: Kerugou, Conguel and Croh-Collé, Artenac and Taizé in the south-west and Gord in the northern Paris Basin. Except in rare cases, the artefacts originate from ancient excavations lacking detailed reports. The daggers in this context constitute the most frequently deposited Pressignian objects. They are fresh or resharpened, as in the Cenon necropolis in the Charente Department (Gauron and Massaud 1983), and are sometimes accompanied by dagger fragments, some of which were reused, like those from the gallery grave of La Boutinardière in Pornic (Loire-Atlantique). Pressignian flint flakes were also deposited, as in the gallery grave of Mané-Roullarde in La Trinité sur Mer (Morbihan: Miln 1882). In each burial, the Pressignian objects are always represented by small quantities (1–3 objects, for example, at Trédaniel in the Côtes-d'Armor Department, which could correspond to a small number of individual endowments).

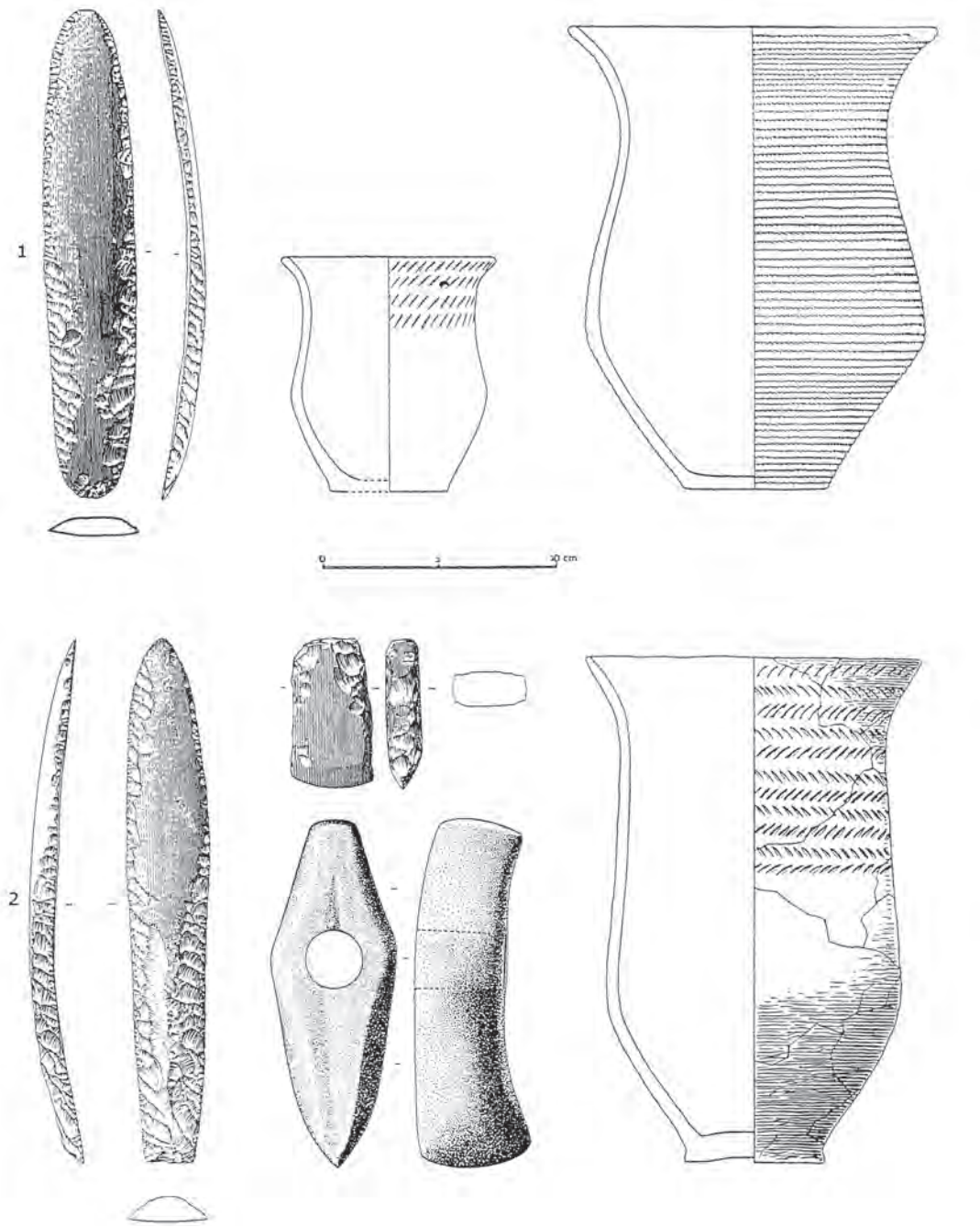

Fig 10.6. Artefacts from the Dutch individual burials of Emst-Honendorp (1) and Eext (2) (from Van der Waals 1991).

Very few Final Neolithic graves contain a high number of Pressignian objects. The gallery grave of the Usine Vivez in Argenteuil in the Val d'Oise Department, which has sixteen daggers, some in Tertiary flint, is an exception (Mauduit *et al.* 1977). In most cases, there is insufficient data to determine whether the objects were deposited individually with the deceased or whether they were collective offerings, as in the Late Neolithic in the Paris Basin for some of the artefacts, such as the axes and some vases (Sohn 2002). Recent excavations show that the objects are generally found outside of the burial and in this case they may have suffered the consequences of an emptying of the grave, as is true for the gallery grave of Beaumont-sur-Oust in the Morbihan Department (Tinevez 1988), or they are found individually within a burial space, such as in the gallery grave of Sainte-Claude in Bury in the Oise Department (Salanova 2002). In such cases, some daggers can be interpreted as elements of the personal equipment of the deceased, especially if

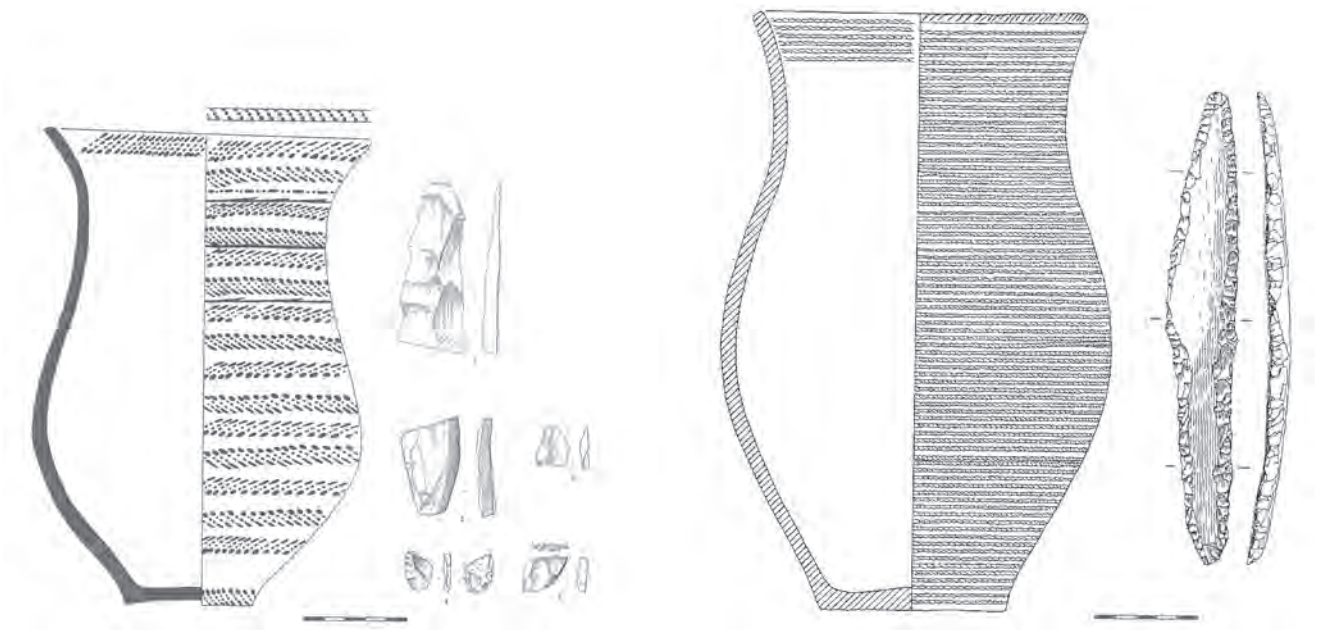

Fig. 10.7. Artefacts from individuals burial of La Folie Poitiers (Vienne, France) (left) and Jablines, le Haut-Château (Seine-et-Marne, France) (right) (from Tchérémissinoff et al. 2000; Laporte et al. 1992).

they were extensively used (tumulus B1 of Chenon, in the Charente). In this case, they were resharpened many times or display intensive use-wear, often characteristic of use as a lighter, which is true for the burial pit of Bois Pargas in Pageas in the Haute-Vienne Department (Perrin *et al*. 2007).

In the collective burials, it is difficult to demonstrate an association between the Bell Beaker and the Grand-Pressigny cultures since there is still little documented evidence. The clearest examples are a few rectangular-barbed and tanged arrowheads, traditionally associated with Bell Beakers, as at Kercadoret in Locmariaquer, Rogarte in Carnac (Fig. 10.8, Morbihan) and Les Tombeaux in Scorbé-Clairvaux (Vienne), which could correspond to a destroyed grave (Airvaux and Primault 2002). In the burials containing Bell Beaker and Final Neolithic pots, we continue to find daggers and dagger fragments. This is the case of the Kercardo burials in Carnac (Morbihan), of dolmen E136 in Taizé, and the Puyraveau II dolmen in Saint-Léger-de-Montbrun (Deux-Sèvres: Ard 2011). We also find "ersatz", or dagger substitutes, in these dolmens; these are objects that symbolize flint daggers, but in a fragmentary or unfinished form, such as the fragment of an unretouched blade found in the La Folie burial in Poitiers, or that of Rogarte in Carnac. To illustrate this relative paucity of Pressignian deposits in collective burials, we can compare them with the most clearly identified Bell Beaker deposits, corresponding to the international maritime style, where we find no arrowheads or Pressignian daggers, be it in the gallery grave of Goërem in Gavres (Morbihan) (L'Helgouac'h 1970), that of Crugou in Plovan (Finistère), the Men-ar-Rompet burial in Kerbors (Côtes-d'Armor), the Ville-ès-Nouaux burial in Jersey (Salanova 2000), the gallery grave of Aremberg in Calais (Pas-de-Calais: Salanova 2003), the megaxyle of Saint-Laurent-Médoc (Gironde: Courtaud and Chancerel 2009), or dolmen E45 in Taizé (Deux-Sèvres), etc. The well-documented example of Pierre-Virante in Xanton-Chassenon (Vendée) illustrates this paucity of daggers in western France since this Bell Beaker funerary monument contained no daggers, while the dolmen that it leans against contained several daggers associated with Final Neolithic pottery (Joussaume 1977). Similarly, the Puyraveau II dolmen in Saint-Léger-de-Montbrun contained at least 87 flint daggers and one copper dagger, but only three vases of the international style (Ard, 2011). Finally, in Switzerland, the necropolis of Petit-Chasseur in Sion, in the Valais, also provides evidence for the reuse of a collective burial in the Bell Beaker period, but contains no direct evidence of daggers. Only stele 18, on which a dagger is represented, is interpreted as evidence of a flint weapon. But is this really a flint object, and what is its nature? We will never know.

Conclusion

While Pressignian artefacts are indeed associated with the Bell Beaker culture, they disappear before the end of this period. Daggers, arrowheads and their by-products are found only in the early phases of the Bell Beaker period, mainly in burials. It is moreover in the burials with influence from the Rhine region that the need to deposit a dagger seems to have been most prevalent. This practice appears to reflect

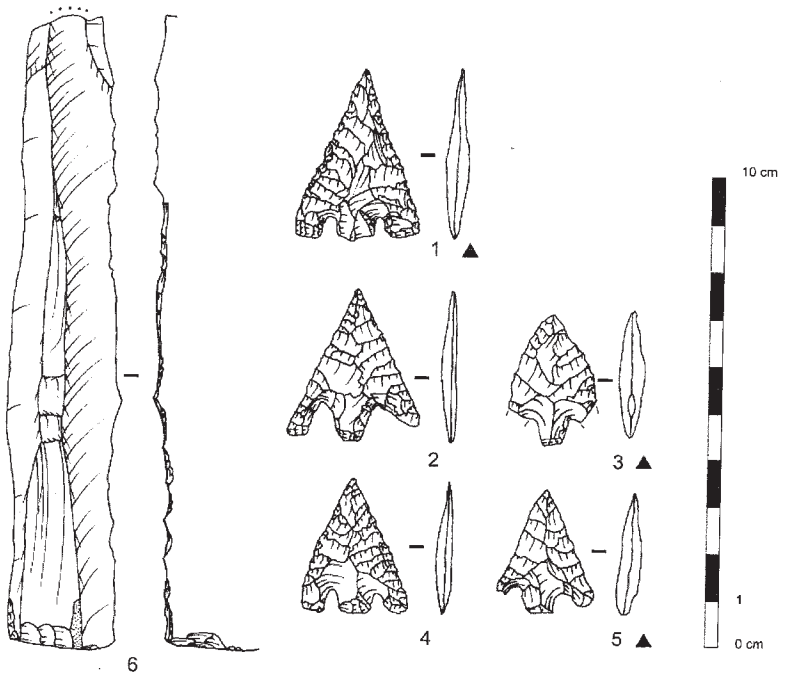

Fig.10.8. Pressignian tools found in the collective grave from Rogarte, Carnac (Morbihan, France). The three artefacts indicated by a triangular are made in local flint.

an appreciation of socially valued objects originating from relatively long distances. In this cultural context, Pressignian objects may have played a symbolic role in Bell Beaker funerary practices, even if it is sometimes difficult to correlate this element with masculine values. For example, in the Jablines burial, it appears that the dagger was associated with a woman rather than a man (Chambon 2003) and the use-wear analysis on Pressignian flint daggers is more compatible with agricultural activities than with war related activities (Plisson and Beugnier 2004). In funerary contexts, the presence of "ersatz", or dagger substitutes, is unique to the Bell Beaker period, which could be seen as an indicator of its decline in the face of influences from the Rhine in the domain of pottery. Meanwhile, in western France, some objects in Grand-Pressigny flint show that flakes continued to be diffused after the Early Bell Beaker period for the fabrication of arrowheads. On the Atlantic coast, these rectangular-barbed tanged arrowheads, geometric or with a concave base, had a specific symbolic value until the Early Bronze Age. They were made from many different materials and are found on both sides of the English Channel, perhaps reflecting new cultural influences (Nicolas 2011).

Acknowledgments

The diffusion of flint tools from Grand-Pressigny was the object of a collective research project, including several PhD students, conducted over the past 25 years by a small team of researchers affiliated with the *Centre d'Etudes et de Documentation Pressigniennes* and the Friends of the Museum of Grand-Pressigny. We would like to thank the support of the Regional Archaeology Service from the Centre region.

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11

LONG-DISTANCE CONTACTS: NORTH-WEST IBERIA DURING THE 3RD MILLENNIUM BC

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Due to its peripheral situation, north-western Iberia has been traditionally contemplated as a territory that was relatively isolated from the long-distance trade routes that would have existed across the Peninsula during late prehistory. Furthermore, if these contacts took place, they have been considered to be restricted to the closer territories, such as the north of the Duero River or the western part of the Cantabrian Rim and the Spanish Meseta. Likewise, many authors have repeatedly mentioned the possibility of sea contacts between the north-west and other territories of the European Atlantic coast. Nevertheless, these contacts have hardly ever been proved with any certainty. Now, technical similitudes and petrographic analysis have allowed us to confirm the presence of a blade made from Turón flint (Málaga, Andalusia) within the grave goods deposited in the Chan de Armada I mound (Pontevedra, Galicia). This circumstance provides a basis to revise other possible evidences of long-distance contacts that existed in the north-west and also their possible precedents in former millennia.

Introduction

The Galician territory, located in the north-west part of the Iberian Peninsula, is part of the Hercynian or Variscan orogenic belt. The lithology of this area is mainly composed of igneous and metamorphic rocks such as granite and schist, while cryptocrystalline rocks like flint are almost absent, it being possible to find only small deposits of chalcedony, opal and jasper (Rodríguez *et al.* 2009). These local cryptocrystalline rocks, although good for knapping, were hardly worked during late prehistory, when the lithic assemblages were made mainly from other raw materials such as quartz, rock crystal or slate (Rodríguez 2010).

This circumstance means that most of the flint found in the prehistoric sites across the Galician territory probably came from other areas of the Iberian Peninsula. Thus, flint items seem to have been prestige goods causing, to some extent, the appearance of a dichotomy between everyday lithic assemblages and those deposited in funerary contexts. The flint found in domestic sites hardly exceeds 5% of the lithic assemblage (Rodríguez 2010); in contrast, flint artefacts (mainly arrowheads, microliths and blades) represent 65% of the flaked assemblages of north-western megalithic contexts that have been reliably studied up to now (Fábregas 1992).

Despite this supposed non-local origin of the Galician flint, only a small number of specialists have tried to identify its provenence and the way in which it arrived in our territory (Abad 1987; Bello 1995; Rodríguez *et al*. 2009). The scarcity, or even the absence, of petrographic analysis has significantly limited these studies, so the flint sources have had to be identified on the basis of macroscopic analysis of the raw material. In the present study, we bring to light the results of the first petrographic analysis of a prehistoric flint artefact carried out in the Galician territory: a blade found in the Chan de Armada I mound (Marín, Pontevedra). The analysis has allowed us to identify the southern origin of this blade – the

Turón Valley (Málaga, Andalusia) – and, in consequence, to verify the fact that the north-west was not isolated from the long trade routes during the 3rd millennium. On the basis of this new information and the presence in our territory of more allegedly non-local artefacts, the hypothesis of the existence of long distance contacts between Galicia and other parts of the Iberian Peninsula or even Europe is explored and its nature discussed. Likewise, the possible precedent of these contacts during former millennia is also examined.

A Turón flint blade in Chan de Armada I mound

Chan de Armada I is located in the Morrazo Peninsula, one of the several spits of land projected into the sea that exist along the Western Coast of Galicia (Fig. 11.1). The available information about this site is fairly limited, as it came from an old archaeological intervention (1957) during which, furthermore, it was discovered that the integrity of the monument had been seriously damaged by the action of furtive excavations. Moreover, the details of the excavation were not published until two decades later (De la Peña and Rodríguez 1976) because of the death of one of the archaeologists, a circumstance that also made necessary the reconstruction of the exact position in which each archaeological artefact was originally found.

A small polygonal chamber and a short passage composed of 13 orthostats with no capstones conserved *in situ* were documented during the excavation (Fig. 11.2). An accumulation of stones was also found in front of the narrow entrance which, due to its similarities with the evidence found in other Galician mounds (Fábregas and Vilaseco 2006), could be interpreted as the remains of the closure of the monument.

The grave goods recovered from the Chan de Armada mound (Fig. 11.3) comprise two flint blades and 15 arrowheads made on flint, quartz, schist and slate. Besides the flaked industry, two polished axes, two spheroids and non-decorated pottery were found together with ochre and limonite fragments. Some of these objects would have had a special significance, due to their large dimensions or technical characteristics; this is the case of one of the flint arrowheads, which shows a much more elaborate technique than the other projectiles recovered. Regarding the flint blades, one of them is made from a grey, grainy siliceous rock and its dimensions (189 mm) make it the largest blade found in the Galician territory until now. This artefact shows a faceted platform, a relatively marked bulb of force and an average longitudinal curvature that suggest it was probably made by indirect percussion. The second blade, fractured by flexion, was made from a high quality, cream coloured flint; it shows an extremely marked dihedral platform and a practically non-existent bulb of force, both characteristics compatible with pressure flaking.

Both the quality of flint and the large size of the blanks from which the blades of Chan de Armada must have been flaked (incompatible with the characteristics of the local blanks of this raw material) suggest a probable non-local origin of these artefacts. Furthermore, the flaking techniques used during its production – possibly indirect percussion and pressure – imply that both blades would probably have arrived in the Galician territory already transformed. Our conviction about this circumstance is based on the absence, nowadays, of clear evidence of the local development of these techniques during late prehistory, over and above sporadic microlaminar products, derived from technical traditions typical of former periods (Rodríguez 2010).

The raw material and the technical characteristics of the non-fractured blade of Chan de Armada were not determining enough to allow us to identify a specific origin of this artefact. Moreover, we must take into account that the use of indirect percussion seems to have been present in all the production centres in the west and the north part of the Iberian Peninsula (Morgado *et al.* 2009; Tarriño 2006). In contrast, the possibility that the second blade could have been made by pressure flaking reduced the potential sources of origin since, apart from specific examples in the centre and east of the Peninsula, the production of long flint blades by pressure flaking has been mainly documented in southern Iberia. Therefore the technical characteristics pointed to a possible southern origin of the fractured blade of Chan de Armada I, specifically to one of the production centres that would have exploited the flint formations which exist in the Campo de Gibraltar Complex (Cordillera Bética, Andalusia). Fortunately, the lithic production from this region is well documented, both technically (Pelegrin and Morgado 2007; Morgado *et al.* 2009) and from the point of view of raw material characterisation (Rodríguez-Tovar *et al.* 2010).

The Campo de Gibraltar complex consists mostly of allochtonous Palaeogene and Lower Miocene flysch sediments comprising clayey and sandy sediments, locally conglomeratic, that were deposited in deep-water environments or flysch troughs (Rodríguez-Tovar *et al.* 2010). These formations were exploited during almost the entirety of late prehistory; nevertheless, it would have been during the Late Neolithic (end of the 5th and the beginning of the 4th millennium BC) when the development of complex technical processes for the production of long blades (120–400 mm) would have taken place in this area (Morgado *et al.* 2009). Those were based on the elaboration of prismatic blade cores which required a high technical command by the knapper, due to the necessary making of pre-forms or "pre-cores" which allowed a standardised production (Pelegrin and Morgado 2007) (Fig. 11.4).

These blades were obtained by shaping the edge of the core at an extremely dihedral angle so that a precise point for the application of pressure was created; this circumstance produced a specific characteristic which is also shared by

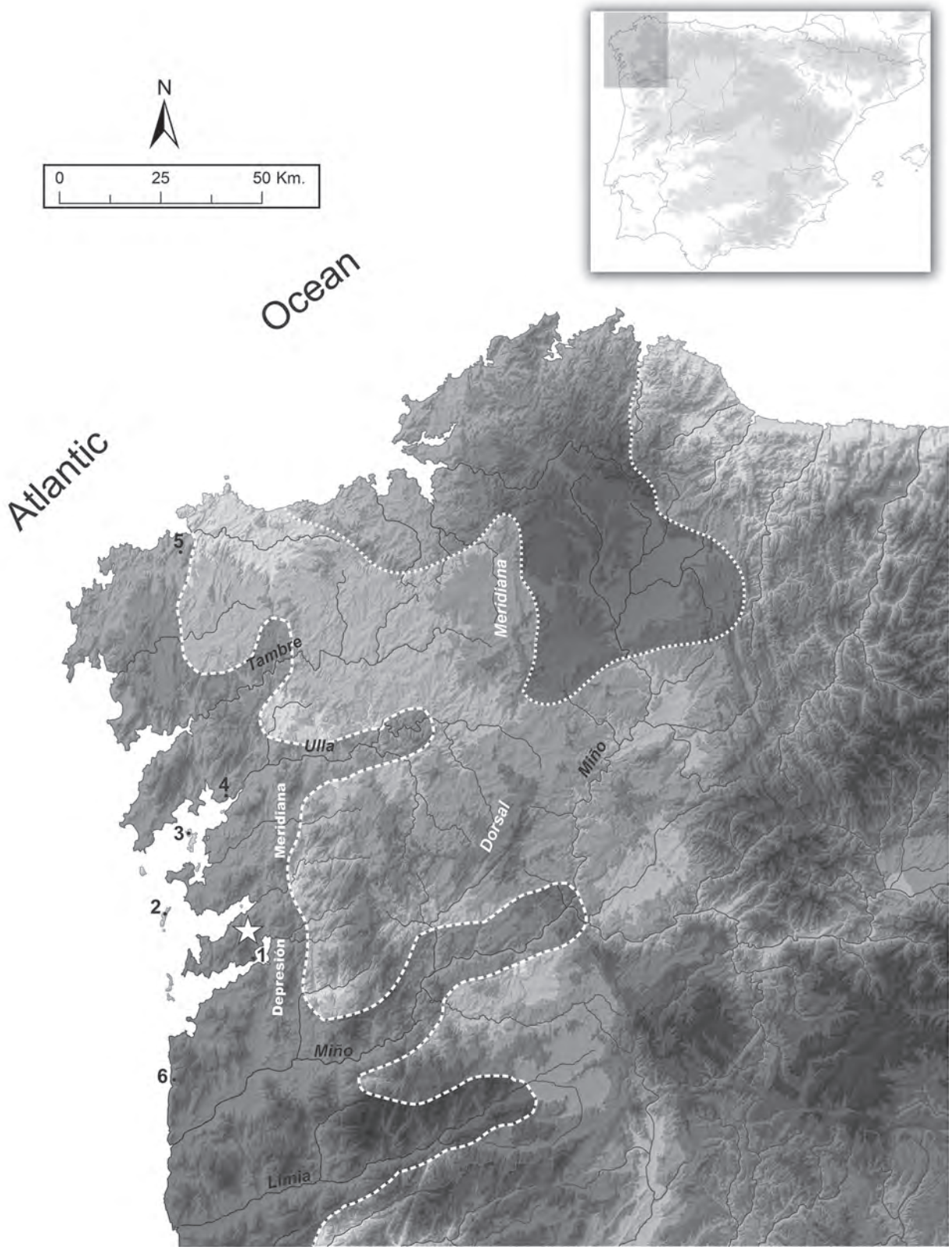
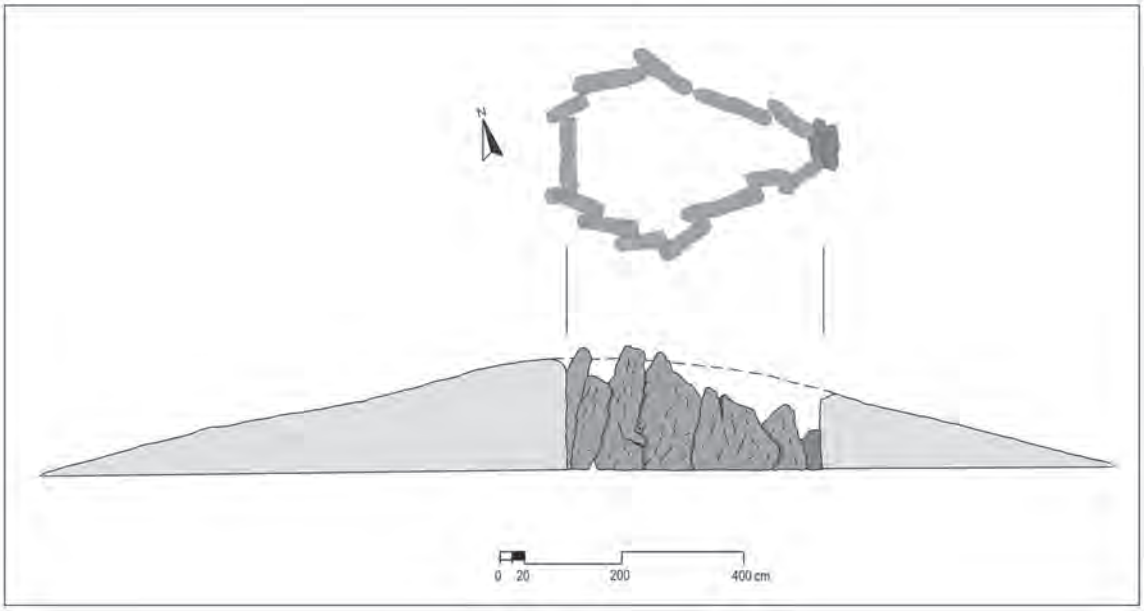


Fig. 11.1. Map of the north-western Iberia with the two main areas of distribution of flint artefacts. Sites referred in the text, Chan de Armada I indicated by a star: 1. O Regueiriño/A Fontenla; 2. Ons Island; 3. Guidoiro Areoso; 4. Os Campiños; 5. Dombate; 6. Petroglyphs containing engravings of ships.



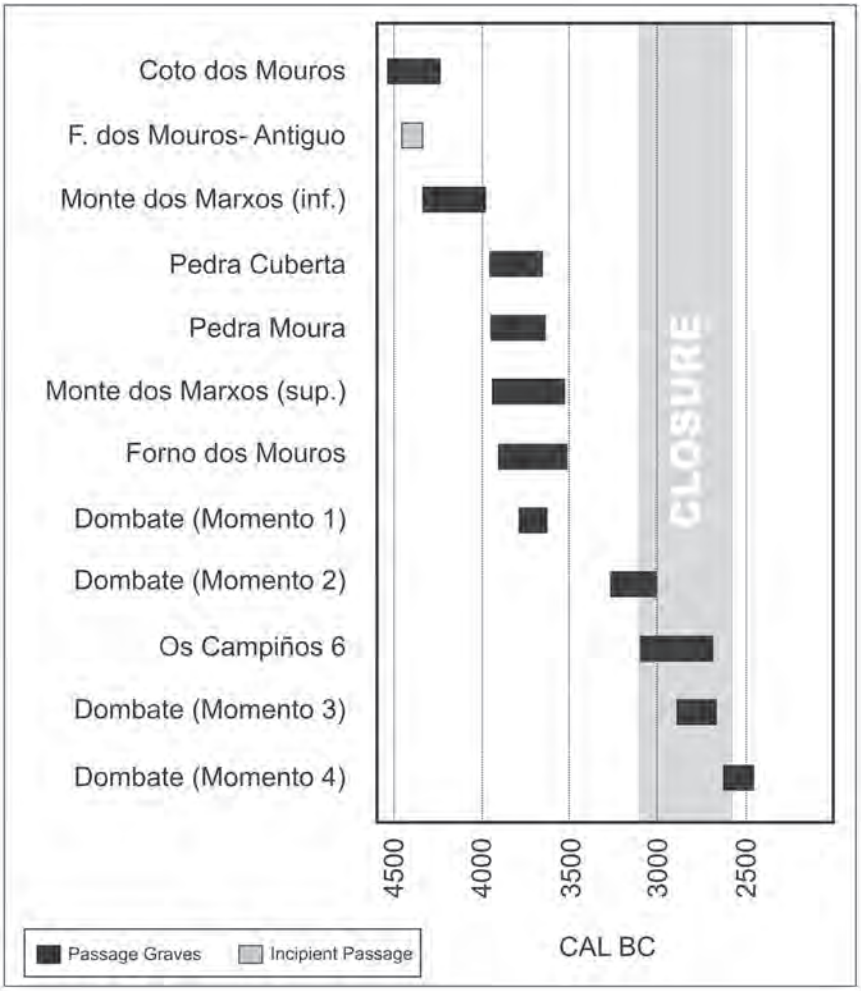


Fig. 11.2. Chan de Armada I (De la Peña and Rodríguez, 1976). Radiocarbon dates of Galician passage graves.

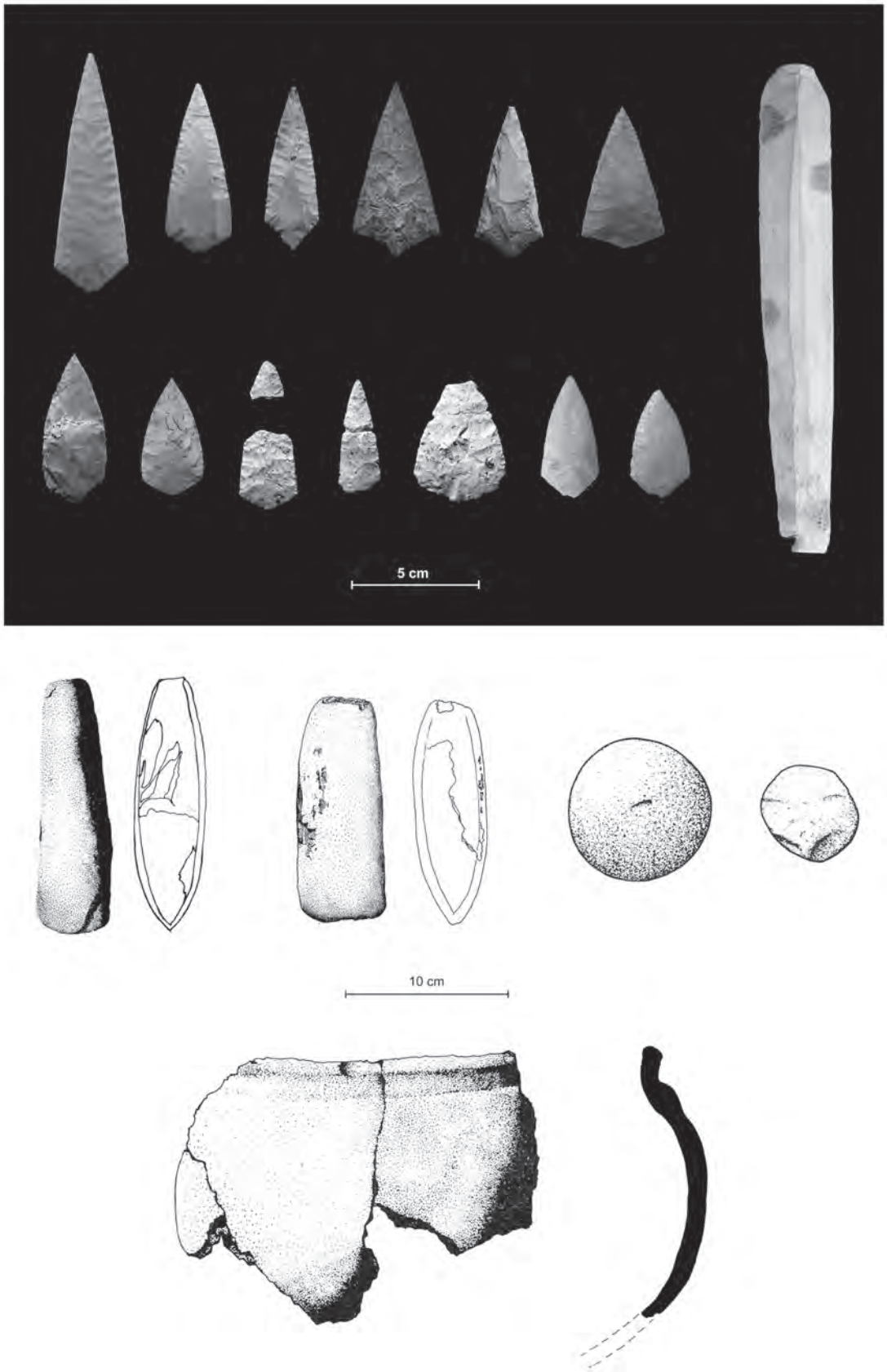


Fig. 11.3. Grave goods from Chan de Armada I.

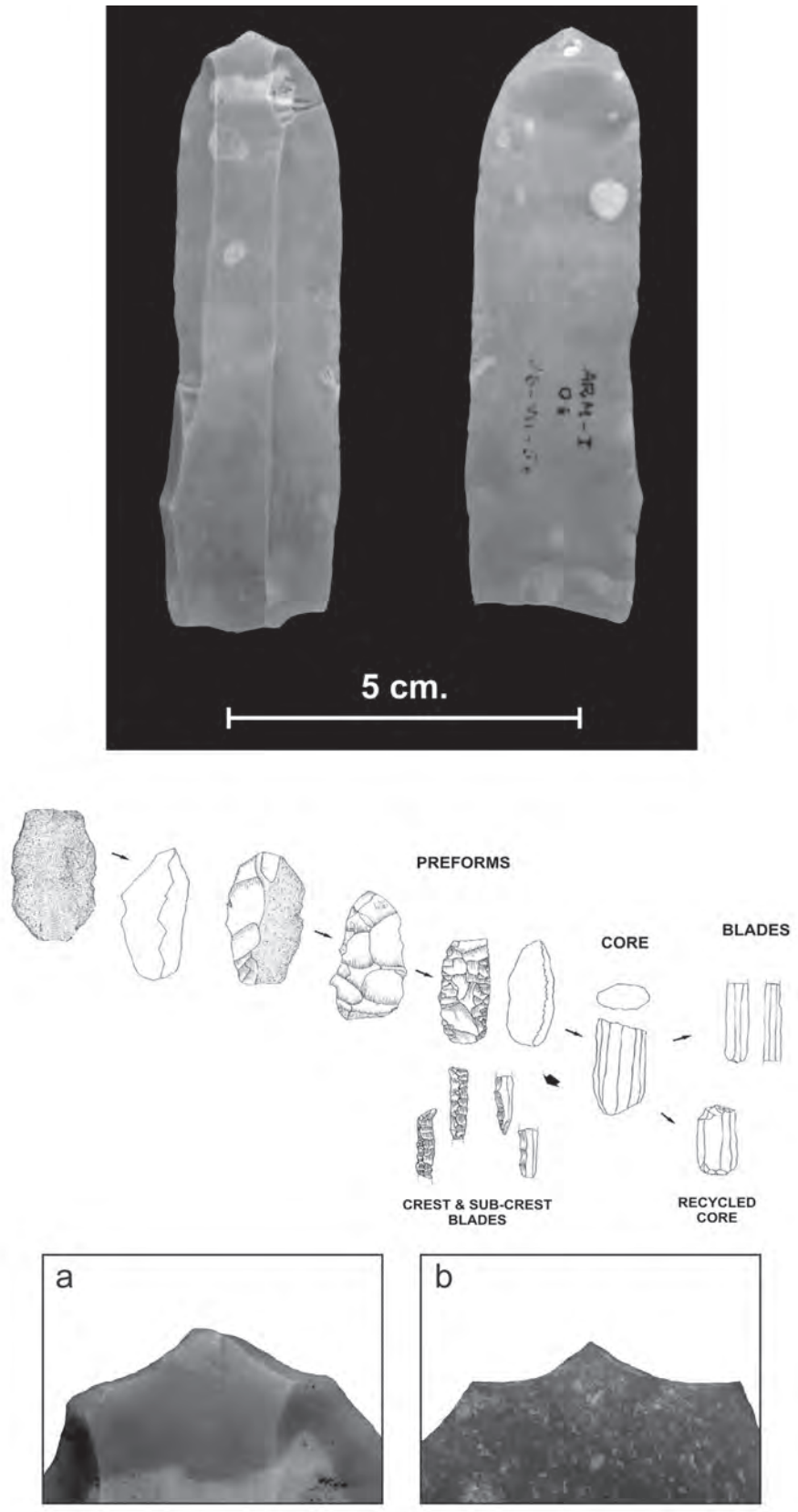


Fig. 11.4. Turón flint blade found in Chan de Armada I. Main stages of the method of production of flint blades in the south of the Iberian Peninsula (Pelegrin and Morgado 2007). Dihedral platform (a. Chan de Armada I; b. Turón flint blade).

the Chan de Armada blade: an extremely marked dihedral platform (Fig. 11.4). The presence of blades with this type of platforms and with high lengths and widths was related with the use of the reinforced pressure flaking (Pelegrin and Morgado 2007). In this sense, the experimental knapping showed that the blades made by reinforced pressure had a minimum width of 22 mm (Pelegrin and Morgado 2007). The Chan de Armada blade shows, in conclusion, technical (an extremely marked dihedral platform) and metrical characteristics (25 mm width) that could be related with the reinforced pressure.

The possibility of a southern origin for the Chan de Armada blade made necessary an analysis of the raw material. The results allowed us to find some characteristics that suggested without doubt that the flint was obtained at one of the quarries of the Rio Turón Valley (Málaga) (Fig. 11.5). This evidence, subsequently backed by the mineralogical and geochemical analysis, was mainly based on the identification in the Galician blade of specific fossil traces: *Chondrites* and *Physosiphon*, biogenic structures resulting from the live activity of an individual organism modifying the substrate (Rodríguez-Tovar *et al.* 2010), which were also identified in the ichnological studies carried out in this area of the Malaga province by the Departamento de Estratigrafía y Paleontología of the Universidad de Granada. This technical and fossil evidence has already allowed the archaeologists to identify blades made from the same raw material in other archaeological sites of the region, such as Los Millares (Almería) or Los Castillejos de Montefrío (Granada), proving a wide circulation of these products across Andalusia. Nevertheless, the new evidence of contacts with the Northwest – 700 km away from the original source of the raw material – turns the Chan de Armada blade into one of the most remote contacts documented in the Iberian Peninsula during the late prehistory.

The specific chronology of the contacts through which the Turón blade arrived to the Galician territory is very difficult to establish, due to the aforementioned problems of the site and to the absence of radiocarbon dates. These circumstances prevent us from speculating with any degree of certainty about the particular moment at which the deposition or depositions of the grave goods were made, and only an approximated relative chronology can be established based on a comparison with other similar contexts in which radiocarbon dates are available. The radiocarbon dates for passage-graves in Galicia suggest that this type of burial chamber reached its height during the 4th millennium. The dates obtained in the closure levels of the entrance of two of these monuments, Dombate and Os Campiños 6 (A Coruña), show that the abandon of the passage-graves seems to have occurred mainly during the transition and the first half of the 3rd millennium BC (Fig. 11.2). The aforementioned existence of a possible closure level in front of the passage of Chan de Armada I, allows us to raise the hypothesis by which a closure episode –more or less coetaneous with those suggested in Dombate and Os Campiños– could have existed. This circumstance would provide us with a possible *terminus ante quem* for the deposition of the flint blades inside the tomb.

In regard to the lower chronological limit of the deposition, the only information we have is provided by the presence of arrowheads; the studies carried out in the north-western megaliths (Fábregas 1992) evidence that there is no evidence of projectiles in archaeological contexts prior to the transition between the 4th and the 3rd millennia BC. Furthermore, the fact that the artefacts recovered during the Chan de Armada excavation can be considered evolved types of the triangular and convex-bottom arrowheads probably confirms that they were deposited inside the burial chamber during the first moments of the 3rd millennium.

These chronological coordinates are consistent with the limits established for the production of long blades by pressure flaking in south Iberia. This type of artefact appeared in regional archaeological contexts around 4100–3800 cal. BC (Pelegrin and Morgado 2007), reaching their height in the last quarter of the 4th millennium and then gradually disappearing in the middle of the 3rd.

In conclusion, the available information seems to show the possibility that the flint blade made on Turón flint found in Chan de Armada I was deposited inside the chamber in the beginning of the 3rd millennium. Nevertheless, problems with the archaeological context of the site and limited information derived from the intervention hinder any attempt to determine the character or duration of the episode or episodes of use of the burial chamber and also to establish if all the artefacts were deposited at the same time. Due to these circumstances we cannot also deny, although there is no evidence in this direction, the possibility of a reutilisation of the monument at a later time, as seems to have occurred in the neighbouring mound of Chan de Arquiña, especially if we take into account that human presence during the second half of the 3rd millennium was documented only a few hundred metres away from Chan de Armada (García-Lastra 1984–1985).

The nature of long distance contacts with the north-west during late prehistory

The presence of southern items in the north-west clearly shows the existence of long distance contacts between this territory and other points of the Iberian Peninsula during late prehistory. Nevertheless, it is very difficult to determine the nature and intensity of these contacts due to the scarcity of information. The absence both of artefacts coming from well-known archaeological contexts and of petrographic analysis hinders our knowledge about the specific origin

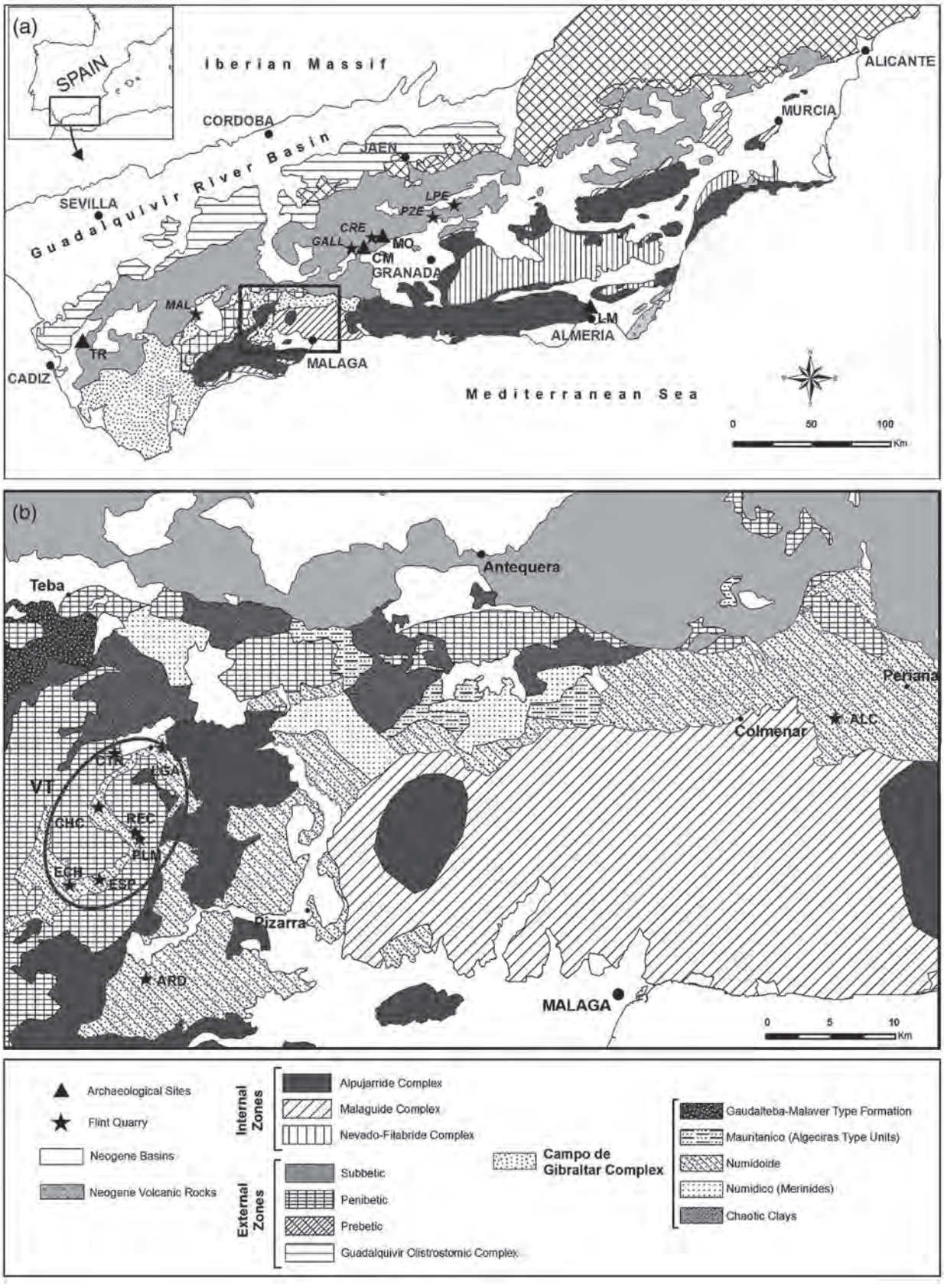


Fig. 11.5. Geological map of southern Spain. VT (Turón Valley) (Rodríguez-Tovar et al. 2010).

of many of these items. So, information about the long distance contacts can be only partially glimpsed through an analysis of the characteristics and distribution of these non-local objects, hoping that the results allow us to establish a hypothesis on how and through which routes they arrived.

As we have already pointed (Rodríguez *et al.* 2009), there are a small number (15) of "long blades" (lengths greater than 100 mm) in the north-west. Most of them were found in megalithic funerary contexts of very heterogeneous chronologies (5th to the end of the 3rd millennium BC). Nevertheless, this number of blades is only a small part of the total amount of this kind of objects that must have come to the north-west, since there is evidence suggesting that many of these blades would have been ruthlessly broken to be used as a basis for making artefacts such as arrowheads (as we can see in one of the Chan de Armada projectiles) or microliths. This circumstance suggests that, in most cases, the prestige of the long blades within the Galician prehistoric communities could have been due to the scarcity of the raw material from which these artefacts were made, rather than their dimensions or technical characteristics (Rodríguez *et al.* 2009).

The analysis of the distribution of these items, and of the flint itself, across the north-west can give us some ideas about the routes through which they arrived in our territory. This distribution shows the existence of two main areas separated by the *Dorsal Meridiana* (Fig. 11.1), a small mountain range that seems to have played a dividing role between eastern and western throughout history. This division can also be observed in the existence of differences in the megalithic grave goods and art (Criado and Fábregas 1994; Carrera 2011) and also in the open-air rock art (Fábregas *et al.* 2009); differences that seem to have lasted, at least, until the Iron Age (Carballo 2003).

The first of these areas – much more important in terms of the number of flint items documented – runs in parallel to the western coast and, within it, a gradual decrease in the number of flint artefacts can be observed as we advance to the north and inland. The second area is centred in the north-east of Galicia and, although this zone boasts one of the larger concentrations of megalithic mounds in the Galician territory (Criado and Fábregas 1994), the flint artefacts deposited inside the tombs are relatively few in comparison with the western megaliths; this circumstance occurred despite the presence in this area of local sources of cryptocrystalline rocks that were exploited mainly during the Upper Palaeolithic, but also during late prehistory. In the map of distributions, a vacuum of flint accumulations can also be observed in south-western Galicia; nevertheless, this circumstance is probably due more to a scarcity of intensive research in this area than to a real absence of flint artefacts.

Therefore, according to these distributions, we can propose two main gateways for the movement of flint into Galicia: a "Western" and a "Meridional" route. The first would probably have followed the Cantabrian coast of Galicia and/or some of the mountain passes that exist in the eastern mountain ranges, such as those used by the pilgrims of the Primitive and the French Way to Santiago de Compostela. It can be assumed that this western route would have been the more probable way of entry of raw materials and artefacts coming from the Cantabrian Rim and possibly the Spanish Meseta. The contacts between these areas during the 3rd millennium are well known from the documentation of Galician artefacts in the current territory of Asturias, as happened in the case of the double pick of Marabíu (De Blas and Corretgé 2001).

Other evidence is the presence of common elements in rock art, as the *Peña Tú* representations (quadrangular motifs, sometimes accompanied by weapons such as daggers or halberds, probably representing an anthropomorphic entity), which has been engraved in a more natural or schematic way in different points of the north-west (Fig. 11.6) during the second half of the 3rd and the beginning of the 2nd millenium (Fábregas *et al.* 2004). The distribution of these representations could indicate the existence of some kind of "common beliefs" engendered by contacts between these different areas, the origin of which can probably be traced in former millennia.

Regarding the Meridional routes, it seems that the introduction of flint would have mainly taken place along the western coast from the Portuguese territory, advancing across the wide coastal plain and geographical features such as the *Depresión Meridiana* – a fault that crosses from south to north all along the western side of the Galician territory and which has remained a major communication route up to the present day – and the major rivers (Limia, Miño and Ulla), which apparently were important in the distribution of flint to the inlands (Fig. 11.1).

Although we do not have analytical evidence to support it, the flint distribution across Galicia – even taking into account the existence of gaps in research – seems to show that this last area could be the most important route of entrance of this raw material into our territory. Maybe much of this flint had its origin in the production centres documented in the Portuguese Estremadura. It is possible that areas such as the south-western coast or the centre of Portugal, where the blades from Extremadura and from the Andalusia workshops would have arrived (Nocete *et al.* 2005; Morgado *et al.* 2009), might have played an important role as intermediary points from which the more southern items could have been introduced to trade networks which, in turn, allowed their passage to the north-west. The alternative to this possibility would be the existence of direct contacts, more or less sporadic, between the south and Galicia, as seems to be shown by the absence, until now, of blades made from Turón flint in the Portuguese territory.

The western coast of the Iberian Peninsula has traditionally been considered a favourable route through

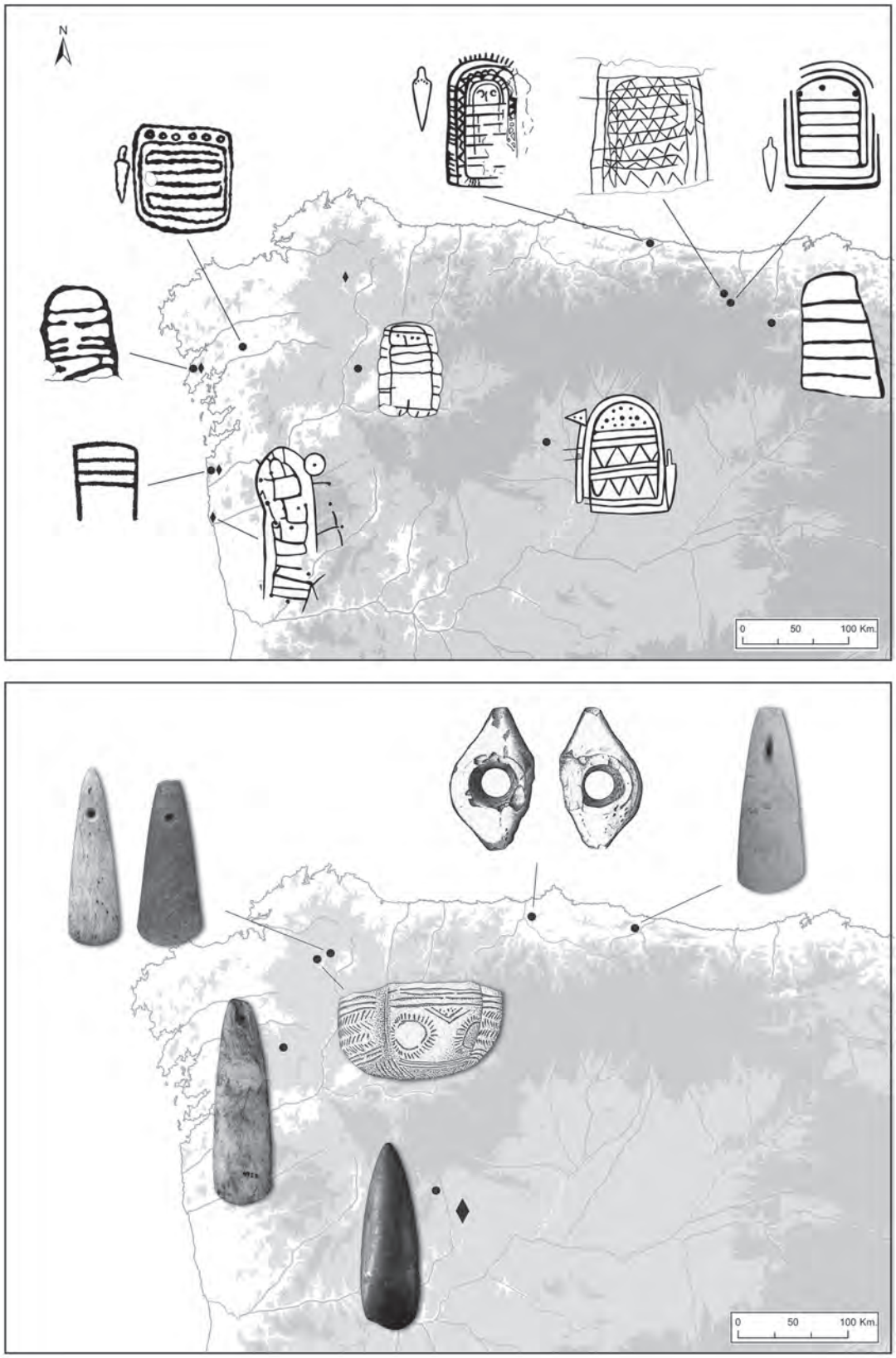


Fig. 11.6. Map of the north-western Iberia showing the distribution of the Peña Tú motifs and of the main objects referred in the text: Tumiac and Cangas perforated axes; Alpine axe of Bragança; double pick of Marabiu; Monte Pirleo pot; Palazuelos variscite mines.

which movements of people and objects took place during prehistory. The importance of this area in the spread of farming has been widely discussed, even appealing to the use of the coastal navigation to try to explain the apparently rapid expansion of the Neolithic along several areas of the Iberian Peninsula (Zilhão 2001). Although the details of the introduction of agriculture in the north-west are far from clear, the information we have nowadays shows an apparently early introduction of food-producing economies in the southern Atlantic coast of Galicia, maybe due to better climatic conditions in this area at that time (Fábregas 2010) and to the influxes coming from north Portugal through the coastal way.

Meanwhile, the possible use of coastal navigation along the Atlantic façade of the Iberian Peninsula during late prehistory remains a very controversial issue. In contrast to the difficulty of transit by land across much of the Galician territory, the navigation across the "Rías" – long and narrow inlets – is usually calm because they are sheltered from storms and rough seas. In this sense, the proximity to the coast of many of the Neolithic and Bronze Age sites in this area could have facilitated the interaction between the communities that lived on them. Likewise, crossing the Rías by sea would have saved long detours, so the control of those areas in which the ford was easier would have been important for these communities, as seems to have happened in O Regueiriño and A Fontela sites (Moaña, Pontevedra) (Rodríguez 2010) and maybe in Guidoiro Areoso (Vilanova de Arousa, Pontevedra), a small islet in the middle of the Ría de Arousa where several mounds were built.

This navigation across the Rías, which may have been made using small canoes similar to those of the Iron Age found in the Limia River (Alves and Rieth 2007), is indirectly confirmed by the documentation of rock art in the Ons Island, almost 4 km from the coast of the Ría de Pontevedra. The presence of these engravings proves that the prehistoric communities of Galicia would have practised coastal navigation since, at least, the 3rd millennium BC. Nevertheless, evidence of this kind of navigation is far from sufficient to demonstrate the capabilities required for successful navigation between the south and the north-west of the Iberian Peninsula and also between the latter and other areas of the Atlantic European coast. We must take into account that several authors (Ruiz-Gálvez 1998; Cunliffe 2004) have expressed the difficulties of navigation along this route, mainly to the north, when the prehistoric navigators would have had to travel against the prevailing current and wind. Maybe as a result of these difficulties there is no clear evidence of maritime contacts between the north-west and the south until at least the end of the 2nd millennium BC, when the first evidence of Mediterranean objects are found in Galicia (Ruibal 2004) and we also have the representations of alleged Mediterranean ships on petroglyphs, the engraving of which, nevertheless, has been moved forward to the beginning of the 2nd millennium (Costas and De la Peña 2011).

Together with this coastal way, other inland routes of entrance into Galicia across the south-east must be considered, through which items from the Spanish Meseta and Portuguese region of *Tras-Os-Montes* could have come into the north-west. Likewise, it is possible that this area might have been the route of entry for southern items, such as the pot found in the Monte Pirleo mound (Guitiriz, Lugo), which could have arrived across the *Vía de la Plata* (Fig. 11.6) a traditional path, the importance of which drastically increased in the next millennia, as demonstrated by the recent discovery of examples of "south-western" *stelae* in the south-east of Galicia and northern Portugal (Alves and Reis 2011). Nevertheless, these south-eastern routes would have played an important role since, at least, the 4th millennium BC, when items from the Spanish Meseta and central Iberia, such as variscite beads from Palazuelos (Zamora) and maybe sillimanite axes or even flint, would probably have arrived in Galicia.

During the 3rd millennium BC, contacts through these southern routes (both coastal and internal) would be more frequent and intense, as suggested by the distribution of objects such as *Penha* pottery. These contacts by land may have been favoured, in subsequent times, by pioneering experiments in horse riding, which seem to be beginning to occur in the transition between the 3rd and 2nd millennia, given the references in Galician rock art (Fábregas *et al*. 2011).

The Atlantic connection: sea contacts between Galicia and other parts of the European Atlantic coast

Given its condition of *Finisterre*, the Galician territory has been considered a significant stage in the routes by sea among different regions of the western Atlantic coast of Europe, such as Brittany. There have been many authors who found characteristics shared by these territories which would only have been possible due to the existence of more or less sporadic contacts. This is the case not only of megalithic art (Cassen and Vaquero 2000), but also of elements of the material culture such as pottery (Suárez 1997; Prieto and Salanova 2009).

The lithic industry, especially polished artefacts such as axes and beads, also suggests a similar connection; since the distribution analysis of alpine axes conducted by P. Petrequin (Petrequin *et al.* 2007; Fábregas *et al.* 2012) shows the presence of some of these artefacts in the north-west of the Iberian Peninsula. This is especially evident in the case of the Tumiac type, polished axes with a proximal perforation, of which not only is there documentation of one example made in jadeite in the Galician territory (Vilapedre,

Lugo) but also it seems that imitations were made locally all over the north-west (Cangas Type) (Fig. 11.6). These coincidences in the axe types from Galicia and Brittany suggest the possible existence of contacts between these two areas since, at least, the 4th millennium, a hypothesis that can be also reinforced by the documentation of variscite beads from Palazuelos in several Breton mounds (Querré *et al.* 2008).

Contacts by sea have been repeatedly mentioned as the method through which the communication between northern Iberia and Brittany would have been made. These have been frequently defined as the result of direct contacts between *Finisterres*, avoiding the dangerous coast of the Bay of Biscay (Cunliffe 2004). Nevertheless, this option would have required deep-sea navigation, without visual contact of the coast, for more than 48 hours (Naveiro 1991). This kind of navigation would have required considerabe development in boat construction techniques and a wide knowledge of navigation, meteorology and astronomy (Ruiz-Gálvez 1998). Although these can be defended for the later periods of the 3rd millennium, they are much more difficult to trace in these earlier times. According to these circumstances, the coastal navigation through the Bay of Biscay might be more likely, even taking account the danger of its coast.

The choice of one of these two possible routes – a deep-sea contact between Galicia and Brittany or a coastal navigation along the Bay of Biscay – can have important consequences for our understanding of the archaeology of northern Iberia and about the relations of the different areas which form this territory. Thus, in the frame of a hypothesis that accepts direct contacts between *Finisterres*, the importance of the role played by the north-west increases substantially, since this area would become the gate of entrance and point of departure from all the "Atlantic items" and a hub from which these would be distributed to other parts of the Iberian Peninsula such as the Cantabrian Rim, the Spanish Meseta or the Portuguese territory. In contrast, if we accept the possibility of a coastal navigation in which a journey is divided into many stages, the entire Cantabrian Rim would become a potential entrance and departure point for different items. Unfortunately, we are far from answering these questions, due the present state of our knowledge.

Conclusions

The evidence of the presence of a flint blade from the south of the Iberian Peninsula in the Galician territory allows us to prove clearly the existence of long-distance contacts between these two areas during late prehistory. In consequence, this circumstance also evidences that the north-west was not isolated from the commercial networks in the 3rd millennium BC, which would probably have had their origin in earlier times. These contacts would have connected the north-west with other areas within the Peninsula, but probably also beyond it, such as Brittany. Furthermore, the results achieved show the importance of the technical and petrographic analysis of flint as a method to determine the existence of long-distance contacts.

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12

EARLY GOLD TECHNOLOGY AS AN INDICATOR OF CIRCULATION PROCESSES IN ATLANTIC EUROPE

Barbara Armbruster and Beatriz Comendador Rey

This paper deals with goldworking technology, more precisely with the manufacturing processes and tools used in Atlantic Europe during the Copper Age and the beginning of the Early Bronze Age. It takes an interdisciplinary approach to the study of the technological aspects of early fine metalworking crafts.

Along with copper, gold was one of the first metals used by early metallurgists. Atlantic Europe is rich in gold artefacts attesting to the use of particular types of ornaments, from southern Portugal up to the north of Scotland. Precious metal objects are valuable goods with symbolic meaning used in rituals as well as in funerary contexts. They also had an important social function for gift exchange between elites and for demonstration of power. Gold artefacts can indicate cultural contact leading to the exchange of technological and artistic know-how.

One purpose of this paper is to investigate the traces of exchange and circulation processes in the archaeological record so as to be able to reconstruct the goldworking craftsmanship of the past.

The second purpose is to present an interdisciplinary approach to the analysis and definition of the early art of goldworking. Finally, the role of metal technology in tradition, innovation, contact and cultural change for understanding of early metal-using societies will be discussed.

Phenomenology

Early metallurgy in Atlantic Europe is rich in gold artefacts attesting to the use of particular types of ornaments, from southern Portugal up to the north of Scotland. This paper deals with early metal technology, in particular the manufacturing techniques, workshops and tool equipment of fine metalworking in Atlantic Europe during the Copper Age and Early Bronze Age. It focuses on the production of early sheet ornaments and takes an interdisciplinary approach to the study of the technological aspects of early fine metalworking crafts (Armbruster and Guerra 2003).

Gold is a rare metal, whose magical power derives from its shining, sunlike colour and its resistance to corrosion – its inalterability. The noble metal played an important role in all late prehistoric cultures (Bachmann 2006). The craft of goldworking and its products were anchored religiously, socially, and economically in Copper Age and Early Bronze Age societies, of which some adopted Bell Beaker pottery while others did not. A considerable number of gold objects are known of from the beginning of metallurgy in the 3rd and 2nd millennia BC in western Europe, owing to the custom of depositing valuable things in graves. Even so, a precise estimation of the actual occurrence of gold is problematic, since we are aware of only part of early gold production.
Most of the earliest artefacts made of gold from the Atlantic area were found in funerary contexts, predominantly in male inhumation graves. In these contexts they are usually associated with Beaker pottery, copper weapons and stone wrist-guards, as in the case of the Bell Beaker grave of Pago de la Peña (Zamora, Spain), which has gold strips, or in the artificial cave Gruta de São Pedro do Estoril (Portugal), where small gold wire spirals were found (Maluquer de Motes 1960; Gonçalves 2005). In some regions of Atlantic Europe metal appears in association with Bell Beaker pottery

in funerary contexts (Comendador 1998). But there are many other cases of isolated finds, which in some instances can be interpreted as intentional depositions.

The gold artefacts produced testify to a specialised craft with a considerable technical and aesthetic standard. The goldsmith, who knew how to work with valuable materials and whose task was to make important valuable goods and ritual objects, is therefore to be seen as a figure that stood out within society. Richly furnished graves of the Late Copper Age, like that of the aforementioned Amesbury Archer in Wiltshire in Britain, containing gold and bronze finds as well as stone metalworking tools, are considered proof of the high social esteem in which the early metallurgists were held (Fitzpatrick 2002).

Morphology and technology

There are several aspects involved in the creation and conceptualisation of the artefact: aesthetics, symbolism, and the technology used in its materialisation. The traditions of early goldwork started with two-dimensional sheet objects, but later developed into manufacturing techniques that included hammering to shape three-dimensional gold objects such as vessels and other objects. The earliest objects in the west are thin gold sheet artefacts crafted using a two-dimensional concept, as well as small wire spirals (Eluère 1977; Taylor 1980; Perea 1991). The predominant types of gold items associated with Bell Beaker are personal ornaments, such as ear pendants, diadems, neck ornaments, cylindrical wire spirals worn most probably in the hair and on a finger, and decorative sheet appliqués. There are artefacts present in the archaeological record of early metalworking which have the same morphology and were made with the same techniques. This is the case of disappeared "sets" like the one from São Bento de Balugães (Barcelos, Braga, Portugal) which had a cylindrical collar with parallel bands cut in a flat gold sheet and Palmela points (Estacio da Veiga 1891, pl. 4, 2; Schubart 1971, fig. 86), or assemblages that have reappeared, like the one in Cícere (Santa Comba, A Coruña, Spain) with a similar ornament on which we can observe the marks made during the cutting of the parallel bands (Armbruster *et al.* 2004, fig. 4).

The technological study of the manufacture of certain objects can help to determine their chronological position. This is the case of the Urdiñeira assemblage (A Gudiña-Riós, Ourense) constituted by two gold bracelets and a "sun disc" in bronze. We suggest that this hoard could date from the Late Bronze Age, because it can be linked to a solid gold bracelet made using the lost-wax process technology (within the framework of the Villena-Estremoz technological domain system) and also due to the bronze composition of the sun disc (Comendador and Méndez 2008; Lackinger and Comendador 2013).

The exceptional physico-chemical properties of the metal played a decisive role in the development of early gold technology (Gmelin 1950–4). In early metallurgy native gold washed from alluvial deposits was used as raw material. This is a natural alloy of gold, with a tiny proportion of copper and, depending on the deposit, up to 50% silver. Deliberately made gold alloys did not appear in this early stage of gold metallurgy. Gold is a very dense precious metal (density 19.34), highly suitable for the manufacture of jewellery and ornamentation by means of casting or plastic shaping techniques. Its melting point is around 1000°C. To reach this temperature the charcoal furnace must be fitted with a bellows. Gold is very malleable and can be burnished to a high lustre. It is hardened in cold-working by hammering, chasing, punching or bending. To avoid cracking, gold is annealed at approximately 750°C. Annealing recrystallises the metal structure after it hardens or becomes brittle during plastic deformation. Goldworking took place in a cooled state, except for melting, casting, and annealing. As gold is resistant to most chemical influences its shining colour stays unchanged, even after millennia. Before any goldwork is begun, an idea of the form, decoration, and art of the technical realisation of the desired object is developed and the quantity of metal measured.

Most early gold artefacts are made of sheet with the exception of cast beads. Hammered gold objects were produced from a primary cast product, as large gold nuggets are extremely rare. The cast was made in moulds of charcoal, stone, metal, or clay, but unfortunately no casting moulds for goldworking are known from this period. For casting, the natural gold alloy had to be melted in a clay crucible in the blazing heat of the charcoal and then poured into the mould. The preliminary cast product was then worked by plastic shaping techniques such as hammering, chasing, punching or bending.

Hammering is the most common type of goldwork used during the Copper Age and Early Bronze Age. A thin sheet is hammered into shape by several consecutive steps of plastic shaping of a gold ingot using repeated annealing during the deformation process. Analogies from ethnoarchaeology and iconography give hints about the working position of early metallurgists as well as the tool equipment of the workshop. For instance, traditional goldsmiths from Mali, western Africa, sit on the ground while hammering (Armbruster 1993, fig. 6). A 16th century German chronicle, the *Hausbuch der Mendelschen Zwölfbrüder-Stiftung zu Nürnberg*, shows a craftsman producing large quantities of metal sheet strips while sitting on a stool (Treue *et al.* 1965).

Metalworking tools

Direct proof of goldworking is exceedingly rare for the earliest gold metallurgy, because of the absence of any

features which would identify workshops, crucibles or casting moulds for precious metal. The metalworking tools needed in plastic shaping techniques are anvils and hammers, which, during this period, were made of stone. Cushion stones are stone tools with flat surfaces used in metalworking (Armbruster 2010, 14–16). The grave goods found in the artificial cave of São Pedro do Estoril (Portugal; Fig. 12.1), contain this kind of goldsmith's equipment: two cushion stones associated with gold wire spirals, stone wrist-guards, copper daggers and Bell Beaker pottery, interpreted as a tomb of an early metallurgist of high rank in society (Brandherm 2011, 319–321). A comparable set of cushion stones, other stone tools and copper objects, such as a flat axe and a Palmela point, were also found in the megalithic monument of Seixas (Viseu, Portugal; Fig. 12.1) (Armbruster 2006, 174; Brandherm 2011, 321).

We are familiar with these types of stone implements from ethno-archaeological studies carried out in Latin America and Africa. The stone tools used by the goldsmiths from mid-coast Peru include stones of various different shapes. Garcilaso de la Vega (ca. 1539–1615) describes stone hammers without handles used by the goldsmiths from Cuzco (Peru) (Lothrop 1950). Stones were used for hammering, held and guided directly by the hand without any hafting of the stone. One illustration shows a Peruvian goldsmith making a gold bowl using a stone hammer and a large stone anvil in the *Chronicle* of Girolamo Benzoni from the 16th century AD (Benzoni 1565) (Fig. 12.2). Working iron with these tools is historically documented in an ancient chronicle of the kings of Angola from the 17th century AD (Cavazzi 1687).

We can document the use of these stone tools in metallurgical workshops dating from the middle of the 3rd millennium BC (2500 BC), based on the iconographic information offered in the depictions of the Egyptian tombs of Ti and Mereruka: stones clutched in the hands, stones used to manipulate the crucible during the melting process, and stone hammers and anvils (Scheel 1989; Garenne-Marot 1985). Different metalworking tools and a group of goldsmiths are depicted on a wall painting at the tomb of Rechmire, near Thebes, dating from the middle of the 2nd millennium BC (1450 BC) (Fig. 12.2). The goldsmith's tools used in this Egyptian fine metalworking workshop are: furnace, blow-pipe, tweezers, anvils made of bronze (copper-based alloy) fixed in a block of wood, hammer stones and a copper-based punch or chisel. The techniques illustrated refer to the polishing and metal rising of a silver vessel, decoration by chasing and hammering for shaping metal sheets.

The functionality and effectiveness of metalworking stone tools can be verified by means of experimental archaeology (Armbruster 2006, 181; Freudenberg 2009). The working process leaves traces of metal on the surface of the tools, and hammering marks on the metal artefact. The first work in experimental archaeology on stone tools for metalworking was carried out at the Römisch-Germanisches Zentralmuseum in Mainz (Germany) by H. J. Hundt, (Hundt 1975). He produced copper pins and daggers by hammering with stones fixed in wooden handles and a stone anvil.

In early metal production, we can find tools of different shapes, both wide and narrow, such as the stone hammers of Vaucluse and Belle Île (Morbihan, France), exhibited at the Musée d'Archéologie Nationale in Saint-Germain-en-Laye (Armbruster 2006, 176). Stone hammers are known to have existed all along the Atlantic shore, but no comprehensive study yet exists. Some regional studies offer a glimpse of the large quantity and variety of such early metallurgist's tools (Brandherm 2000; Boutoille 2012).

The richest and most famous grave of its kind is the burial site of the Amesbury Archer (Wilshire, southern England), found in 2002 near Stonehenge (Fitzpatick 2009). It is the earliest evidence that could be interpreted as a rich metallurgist's grave. Apart from the cushion stone, the funerary assemblage of the man from Amesbury contains a pair of gold earrings, wild boar tusks, flint arrowheads, a copper knife and dagger, several Bell Beakers, wrist-guards and other knapped stone objects, reflecting a wide range of valuable objects related to high status. Another rich assemblage that has been known of since the 1930s is the Kirkhaugh assemblage (Northumberland, UK), consisting of a gold earring, a stone hammer made from an axe, a cushion stone and a Bell Beaker, with other stone objects (Maryon 1936).

There are graves with implements of metallurgists who worked with copper and gold all along the Atlantic coast, including the Netherlands, dating from the period of the use of Bell Beakers. In Holland, in the 1960s, using a systematic approach, Jay Butler and Dideric van der Waals were the first archaeologists to define the term "cushion stones", and to identify this kind of funerary context and the implements associated with it (Butler and van der Waals 1967). Based on the comparative study of these specialised stone tools, the Lunteren Bell Beaker assemblage was interpreted as the burial of a craftsman, a metallurgist.

Form and function of early gold ornaments

The predominant morphologies of gold artefacts produced in early metal production were thin decorative sheet appliqués hammered to shape ornaments such as diadems and wire spirals. Holes were pushed through on the corners or ends of sheet ornaments with a conical metal point, serving as a means of fastening them onto cloth or other material.

A couple of gold sheet diadems are associated with a cylindrical collar with parallel bands cut in a flat gold sheet (so-called *gargantilla de tiras*) in the group from Cícere (Santa Comba, A Coruña, Spain) (Fig. 12.3). They were

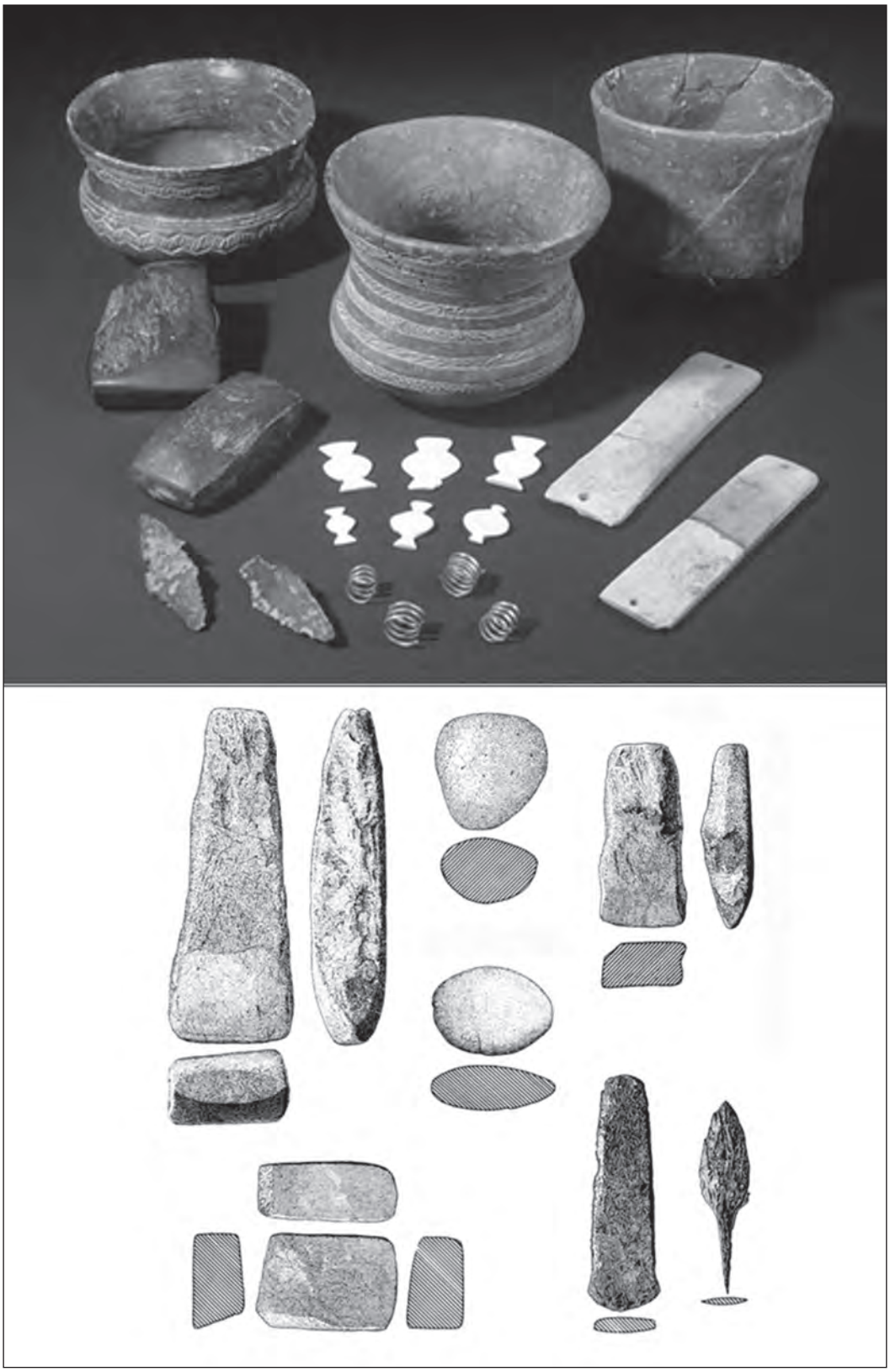

Fig. 12.1. (Above) Cushion stones, gold ornaments and Beaker pottery in the artificial cave of São Pedro do Estoril, Portugal (Blech et al. 2001, pl. 70b; © P. Witte, Deutsches Archäologisches Institut, Madrid); (below) stone tools for metalworking in the megalithic monument of Seixas, Viseu, Portugal (Leisner 1998, pl. 3: 1, 3, 5, 12, 30, 31).

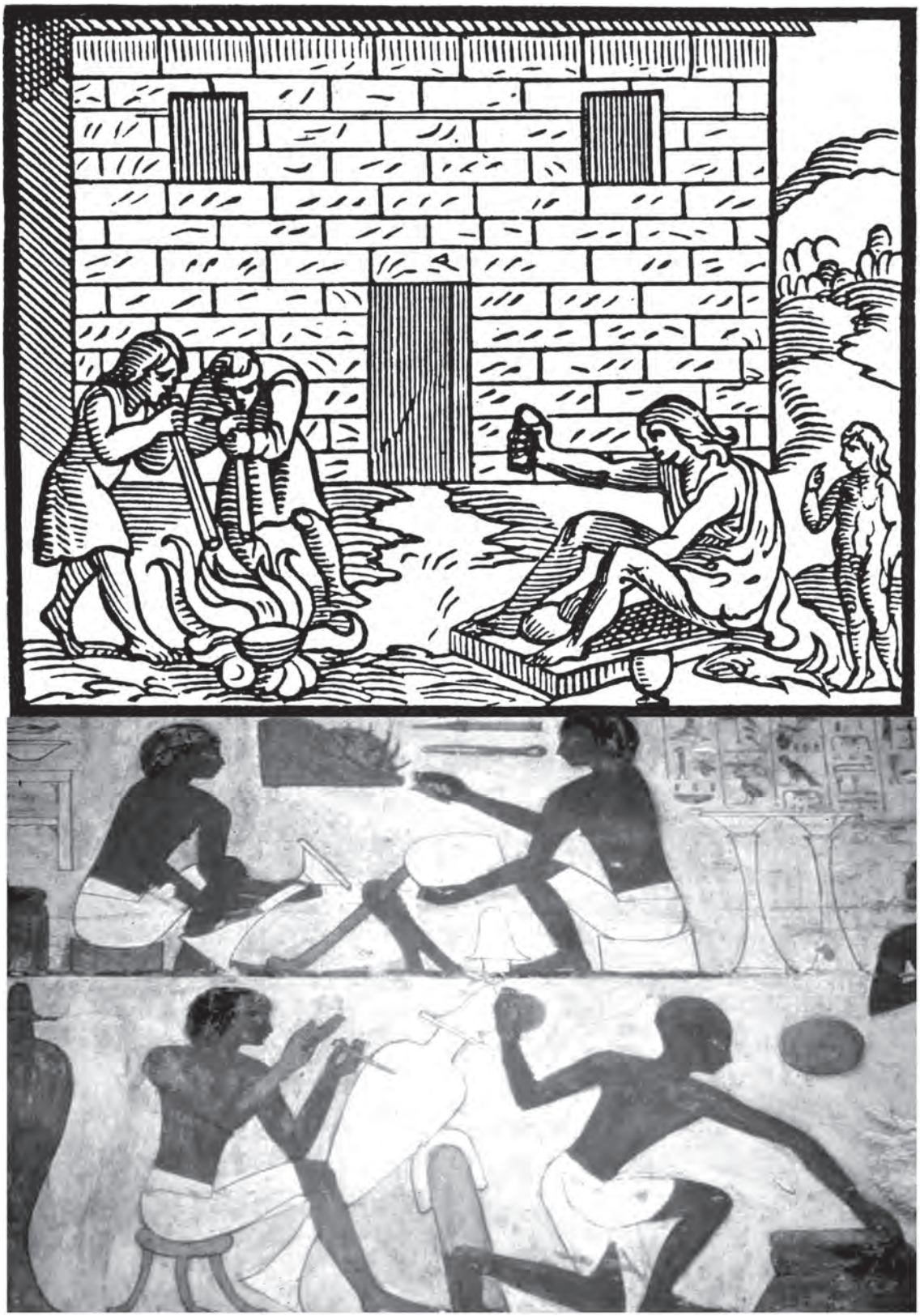

Fig. 12.2. (Above) Depiction of Peruvian goldsmiths making a gold bowl using a stone hammer and a large stone anvil from the Chronicle of Girolamo Benzoni, 16th century AD (Benzoni 1565); (below) depiction of stone tools and metallurgical workshops in the Egyptian tomb of Rechmire (© B. Armbruster).

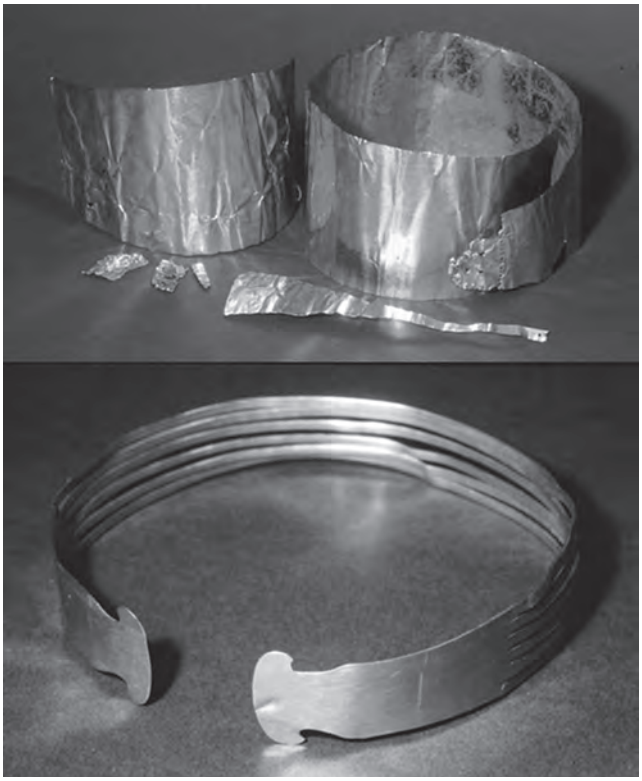

Fig. 12.3. (Above) Gold sheet diadems; (below) cylindrical collar with parallel bands cut in a flat gold sheet (so-called gargantilla de tiras) from Cicere, Santa Comba, A Coruña, Spain (© B. Armbruster).

made from a rectangular hammered gold sheet. A part of the long sheet has parallel bands that were cut in a flat gold sheet before it was bent into a cylindrical shape. This particular design exists in several comparable items of distinct size (collars, bracelets, rings), with a distribution ranging from Portugal, throughout Spain, to France (Armbruster *et al.* 2004). One *gargantilla de tiras* is associated with two solid gold bracelets in the group of A Golada (Pontevedra, Spain), pointing to a relation with later artefacts, comparable to the As Silgadas assemblage (Caldas de Reis, Pontevedra, Spain) (Comendador Rey 1998a). The Caldas de Reis hoard represents the heaviest late prehistoric gold hoard from Atlantic Europe ever found. It contains small fragments of this type of ornament.

There is some controversy as to the chronology of the hoard of As Silgadas. We believe that the assemblage comprises artefacts from different chronologies (Comendador Rey 1998b; 2010). Fragments of a cylindrical collar with parallel bands cut in a flat gold sheet are dated to the Chalcolithic or Early Bronze Age. However, the three solid gold bowls were made with the lost-wax process, although their shapes, as well as the comb, remind us of ancient models (Armbruster 1996). The decoration of the bowls is considered to have been made with a lathe. However, the parallel lines of the decoration could have been made with a metallic point fixed to a marking gauge. With regard to the lost-wax process, it had been widely introduced in the Iberian Peninsula during the Late Bronze Age, but the existence of this technique was known previously in the eastern Mediterranean, and not only for vessel production. So, until the new review comes out, we would propose that the chronology of the hoard to be around 1400–1000 BC.

Tubular beads, decorative appliqués and ear ornaments are other characteristic shapes of early gold sheet work (Hernando 1983; Eluère 1977; Armbruster and Parreira 1993, 176–179 and 206–211). Massive olive-shaped or bi-conical beads and small wire spirals also figure in gold assemblages from graves with Bell Beaker vessels.

Ear pendants are found from Portugal to the British Isles. This is a very characteristic piece of jewellery of the early metal production of western Europe, dating from the period of use of Bell Beakers or the Early Bronze Age in the British Isles according to the regional chronology. For example, the pair of leaf-shaped ear pendants from Emergeira (Torres Vedras, Lisbon, Portugal; Fig. 12.4) is stylistically and technologically very close to an Irish sample, considered to proceed from Castletreasure (Cork, Ireland) (Armbruster and Parreira 1993, 154–157; Taylor 1980, pl. 3). They are made of hammered sheet with a hook-like appendix, made of one gold piece. There are flat oval or leaf-shaped examples and also partly rolled examples, the so-called basket earrings. These ear ornaments decorated with punched geometric motifs are mainly found in pairs (Russel 1990). This kind of rolled sheet earring continued to exist until the Late Bronze Age in Belgium (Warmenbol 2004). In the British Isles there are examples of rather large ear ornaments made from a thin oval gold sheet, such as the one from Orbliston, Moray (Fig. 12.4) (O'Connor 2004, 206 fig. 18.1).

Another characteristic artefact type from Beaker and Early Bronze Age contexts are the archers' wrist-guards (Fokkens *et al.* 2008). Most of them are made of stone, bearing holes for fastening the plate onto the arm. Others were fixed with rivets, most probably on a leather band. We know of rare examples with gold rivets or, to be more precise, copper rivets covered with thin gold sheet, like the wrist-guard from Culduthel (Inverness, Scotland; Fig. 12.5) (Ritchie and Ritchie 1985, 64 fig. 41). In this case the rivets are clearly ornamental elements besides being functional. The only gold specimen known is the one from Vila Nova da Cerveira (Portugal; Fig. 12.5) (Armbruster and Parreira 1993, 148–151). This gold wrist-guard is a purely decorative prestige object, with no practical function. It is made from a thick gold plate decorated with four chased pseudo-rivets, which have no practical purpose. Rivets are generally functional elements on stone wrist-guards serving to hold the plate in place. The gold specimen bears two perforations that could be used to fasten it.

The last gold sheet ornaments that we consider here are

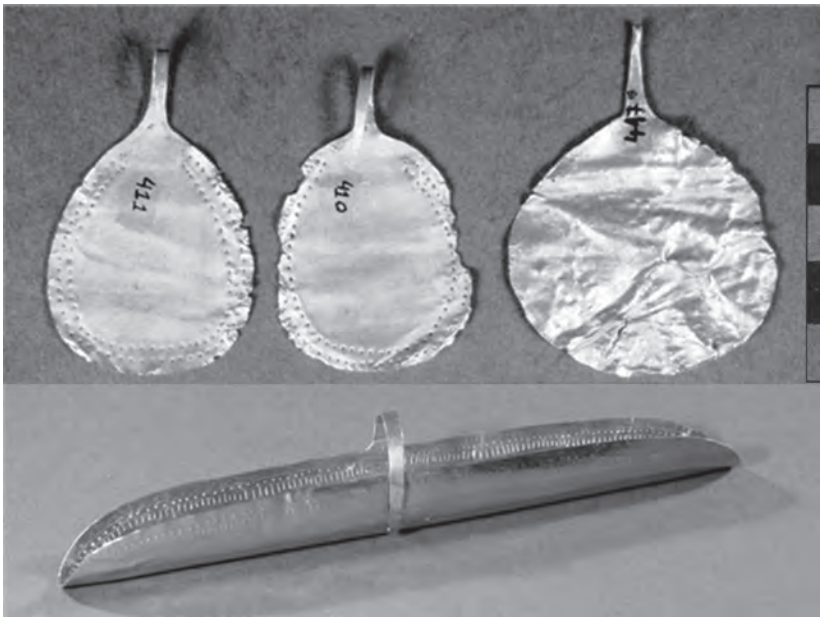

Fig. 12.4. Ear pendants: (above) Emergeira, Torres Vedras, Lisbon, and Estremoz, Evora, Portugal; (below) Orbliston, Moray, Scotland (© B. Armbruster).

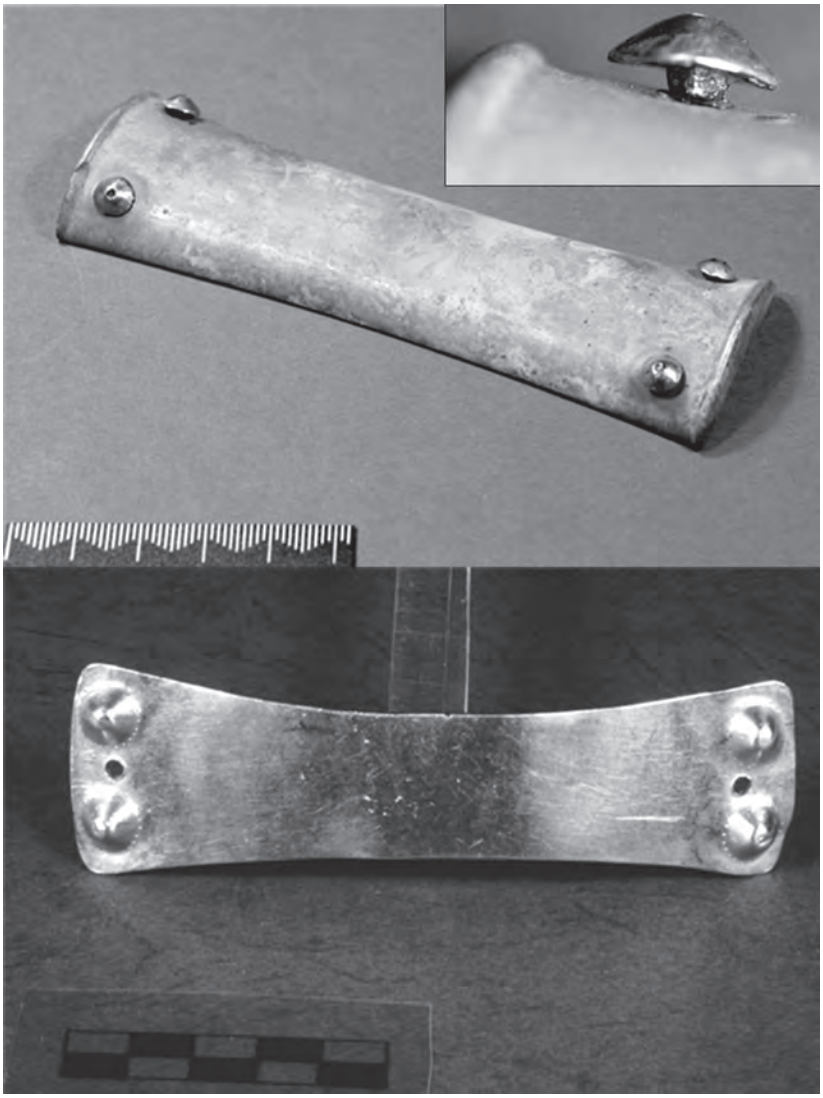

Fig. 12.5. (Above) Wrist-guard with copper rivets covered with gold sheet from Culduthel, Inverness, Scotland; (below) gold specimen from Vila Nova da Cerveira Portugal (© B. Armbruster).

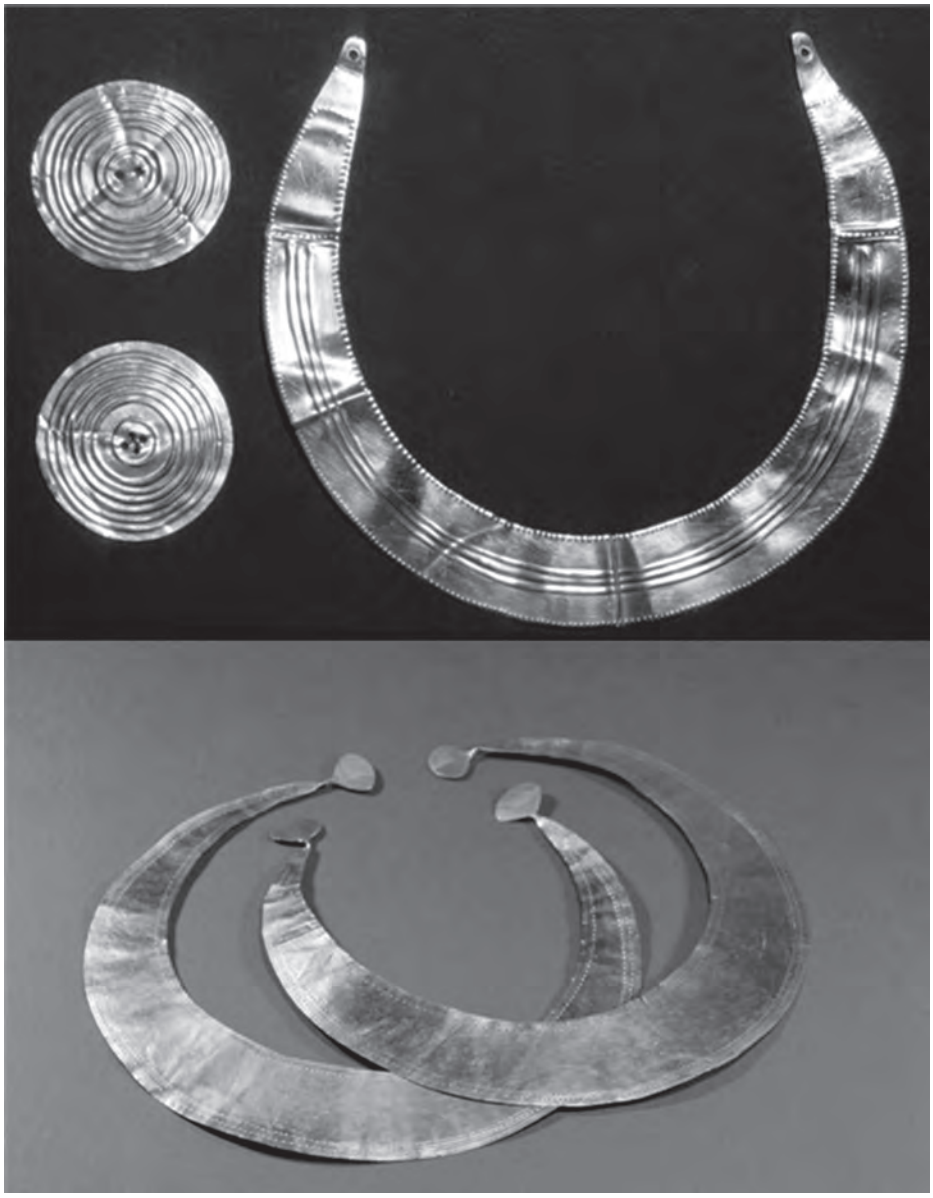

Fig. 12.6. (Above) Lunulae. Cabeceira de Basto, Portugal; (below) Coulter, Pebbleshire, Scotland (© Armbruster).

Early Bronze Age lunulae and discoid appliqués (Taylor 1980; Eogan 1994). The lunulae are decorated with punched and chased geometric motives (Fig. 12.6). No lunula has ever been found in a funerary context. The discoid sheet appliqués often bear a concentric decoration as well as cross and zigzag motives. They are perforated for sewing onto cloth. It is very rare to see an association between lunula and disc. For a long period the only case known was the lunula with a pair of discs from Cabeceiras do Basto (Fafe, Portugal) (Armbruster and Parreira 1993, 56–59). Recently the new discovery of such a ensemble from Ireland documents the same grouping of gold jewellery (Kelly and Cahill 2010). The bent ends of certain lunulae are the only concession to three-dimensional design on these flat sheet ornaments.

The large crescent-shaped neck ornaments and the discoid appliqués are interpreted as symbols of a moon or sun cult. From the Neolithic period on we can see diachronic and interregional symbols on all different kinds of materials throughout Atlantic Europe (Gessner 2005).

Conclusions

To conclude we will discuss the following aspects related to early goldwork production in Atlantic Europe. Firstly, goldwork manifestations spread across the entire Atlantic shore, from the south of Portugal, passing through the north of Scotland, to Denmark. It is interesting to note the similarities not only of morphologies, but also of the

technological system domains (working practices, design concepts ...) and symbolism.

Bell Beaker and Early Bronze Age goldwork probably never had a purely decorative character; rather, above all else, it acquired a ritual and social function as a symbol of status and power. For the elites, gold objects served to represent, legitimise, and preserve their power, authority, and identity (Clarke *et al.* 1985). As in many traditional cultures even today, gold objects have been enveloped in a system of symbols, coded sign language, and religious or social values, which are conveyed through their ownership, accumulation, categorisation, or exchange. In prehistory gold was symbolic of the life-dispensing sun and thus embodied fertility, well-being, and permanence, to which can be added an apotropaic quality.

In the area of Atlantic Europe as a whole there are indications of interrelationships and a "common sense" between geographically distant regions, not only with regard to the custom of depositing valuable luxury goods in graves, but also in terms of their morphological and technological characteristics. This might reflect contact and exchange on an interregional level.

The finds of goldworking assemblages such as grave goods in funerary contexts raises questions as to the social status of these individuals, and in general about the social model of early metallurgy groups. By means of this multidisciplinary approach based on archaeology, materials science, ethno-archaeology and experimental archaeology, it is possible to propose early goldwork as an indicator of processes of interaction and exchange and the dissemination of know-how and metallurgical knowledge in the Atlantic area.

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13

ENVIRONMENTAL CHANGES IN NORTH-WESTERN IBERIA AROUND THE BELL BEAKER PERIOD (2800–1400 CAL. BC)

Manuela Costa-Casais, Lourdes López-Merino, Joeri Kaal and Antonio Martínez Cortizas

This contribution aims to describe briefly the environmental changes occurred during the Bell Beaker period (ca. 2800–1400 BC) in the north-west of Iberia, based on palaeoenvironmental reconstructions obtained from both natural and anthropogenic archives (colluvial soils, mires, sedimentary formations, archaeological sites, etc), through a multidisciplinary approach including "biotic" (pollen, non-pollen palynomorphs, charcoal, soil organic matter, etc) and "abiotic" proxies (elemental composition, isotopic composition, physico-chemical properties).

Regarding climate, it is noteworthy that the Bell Beaker period took place during the second half (ca. 2600–1200 BC) of the episode known as Neoglaciation, which was one of the coldest phases of the Holocene. Temperatures were estimated to be 1–2°C lower than at present in north-west Iberia, and two main cold phases were detected: i) from ca. 2200 BC, when temperatures were up to 2°C lower than today, and ii) from ca. 1600 to 1400 BC, with temperatures around 1.5°C lower than nowadays. These climate changes, together with increasing human pressure on the landscape, triggered the restructuration of the vegetation cover (mainly through forest clearing) and enhanced soil erosion. This resulted in a change from a landscape with well-distributed soil resources to a preferential accumulation of (colluvial) soils at lower elevations and the infilling of relief depressions. Most likely, this fact could have triggered a large demand in land appropriation, compared to earlier cultural phases. Simultaneously, the exhumation of the rocks at mountain-tops and slopes caused a greater availability of areas (i.e. rock surfaces) for the expression of Rock Art.

Introduction

Climatic variability and human impact are the main driving forces of landscape change. Disentangling the origin of such environmental changes is not an easy task, but the use of different methodologies supported by a variety of proxies and environmental archives – a multi-proxy approach – may provide deeper insights into the patterns and processes of landscape transformation. During the last decades a large effort has been made in the north-west of the Iberian Peninsula to reconstruct Holocene environmental change, but some geographical and chronological gaps still exist. Figure 13.1 synthesises the main steps followed to obtain multi-archive, multi-proxy, reconstructions of past environments and environmental changes and the driving forces (in particular, identifying human-induced changes). The feedback between the second and the fourth steps are critical in solving the gaps in chronology and spatial distribution of the available knowledge.

The studied area is located in south-west Europe and occupies the north-west sector of the Hercynian Hesperic massif of the Iberian Peninsula (Fig. 13.2). Three main lithological units can be distinguished: granites and granitic rocks, which dominate in the western part (Sector IV, Fig. 13.2); locally occurring patches of basic and ultrabasic rocks; and shales, schists, gneiss, quartzites and other metamorphic rocks, which are particularly extensive in the central and eastern sectors (I–III and V, Fig. 13.2). These materials were strongly fragmented during the last phases

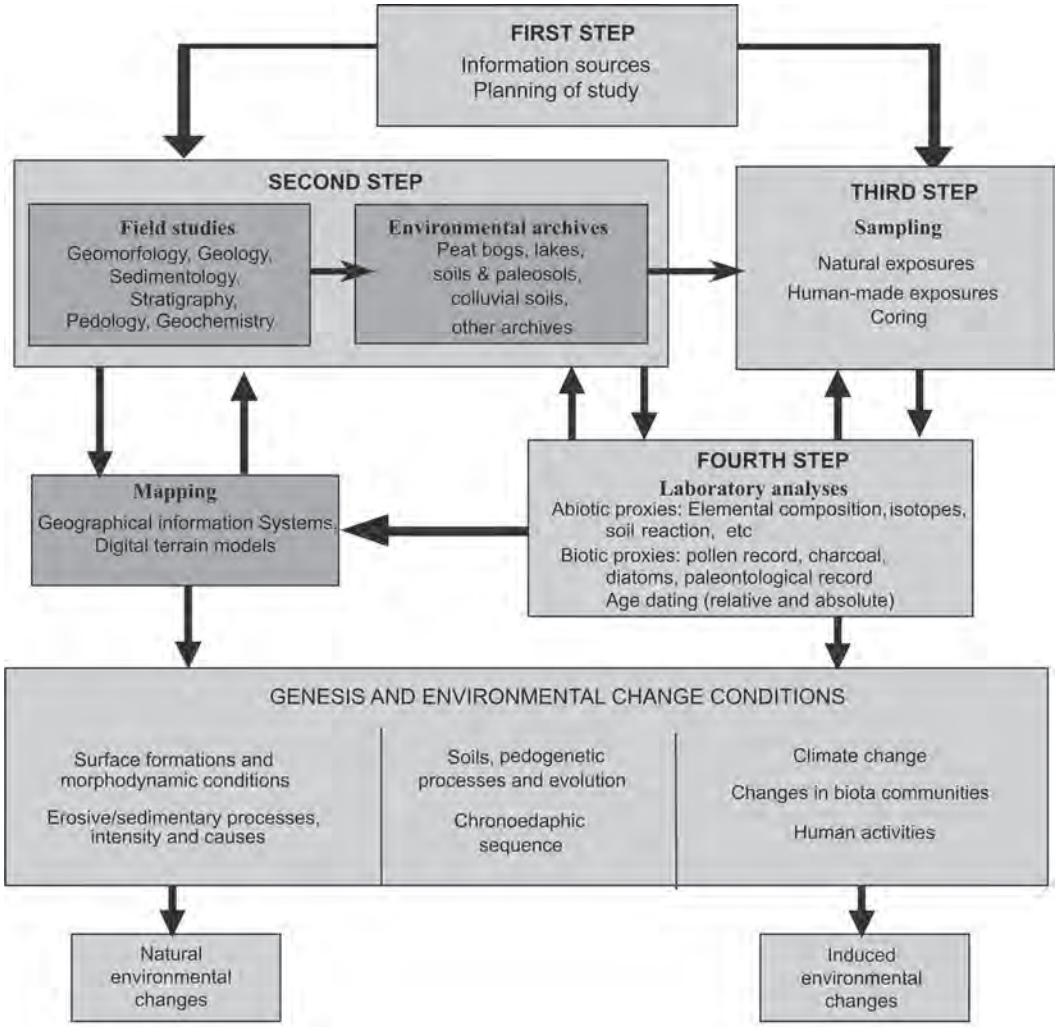

Fig. 13.1. Steps followed in the multi-archive, multi-proxy, approach to palaeoenvironmental reconstruction in north-west Iberia.

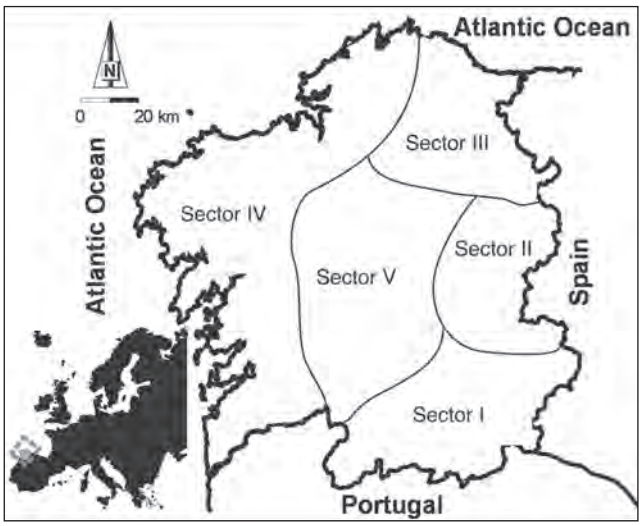

Fig. 13.2. Location of the study area indicating the sectors cited in the text.

of the Hercynian orogeny (Parga Peinador 1969), producing faults and running fractures developed as a result of rifting in the Atlantic. Uplifted blocks and basins were formed by intense tectonic movements along the unstable Atlantic margin, from the Eocene until at least the Early Quaternary (Pérez Alberti 1991). Tropical conditions during the Tertiary, which became less humid during its later stages, resulted in deep weathering of rocks and sediments in the tectonic depressions and along the coast (Nonn 1966; Pérez Alberti 1993). Glacial and periglacial conditions were dominant during the Pleistocene (Pérez Alberti *et al.* 1994; Pérez Alberti and Valcárcel Díaz 1998). In coastal areas, the Holocene sea transgression represents the beginning of a paraglacial dynamic, in which the continental deposits that covered the Eemian coastline were eroded (Blanco Chao *et al.* 2003). These large-scale changes in climate, tectonic activity and morphodynamic processes are key to understanding the relief macroforms that, in combination with the climatic variability and progressive intensification

of human transformations, explain the present landscape of north-west Iberia (Martínez Cortizas *et al.* 2009a).

In the following sections we present an informative, but not exhaustive, synthesis of the available evidence of environmental conditions in the Bell Beaker period in north-west Iberia, as gathered from evidence of different disciplines, focusing on:

- Changes in vegetation, because the large amount of palynological and anthracological studies developed in archaeological sites, colluvial soils and mires allow for a detailed geographical approach in that respect.
- A synthesis on the evolution of climate, geomorphologic and soil changes. The evidence used for that purpose is from specific areas, inhibiting a generalised description for north-west Iberia.
- The early detection of mining and metallurgical activities, based on novel insights provided by studies on prehistoric atmospheric metal pollution reconstructed from peat records.

Changes in vegetation

From a general point of view, during the chronological framework of the Bell Beaker period (ca. 2800–1400 BC) the landscape was already strongly influenced by human activities. This represents continuation of the management of continental areas that began during the Neolithic – when humans began "landscape domestication" – in most of the area (Martínez Cortizas *et al.* 2009a). However, some geographical differences in the chronology and rhythmicity of human modifications could be observed. Overall, anthracological (i.e. pedocharcoal) records seem to point to a greater heterogeneity in the spatial dynamics, because they mainly reflect changes in the local woody vegetation. This can be the reason why, in some mountainous areas, forest decline is not as evident and widespread as suggested by pollen records from lower elevations. Therefore, it is necessary to be aware of the scope and limitations of each proxy and the fact that the combination of several proxies has a larger potential for a more realistic interpretation of past patterns of change and processes.

The main features detected in the vegetation changes in different areas in north-west Iberia depicted in Figure 13.2 may be decribed as follows. In the northern Mountains of Lugo (Sector III, Fig. 13.2), the first evidence of human transformations is detected at the beginning of the 5th millennium BC, during the Neolithic, although the earliest evidence of agricultural activities corresponds to the second half of the 5th millennium (in the Xistral Mountains); followed by records from the Neda and Buio Mountains (Sector III, Fig. 13.2) from the 4th and 3rd millennia. According to Ramil Rego (1993a), the first episodes of deforestation occurred before the appearance of cereal pollen in the palynological records, pointing to a first human impact – increase in synanthropic taxa – mainly related to pastoral activities. These activities were not synchronous in all areas, indicating uneven anthropogenic pressure. In general, although in some areas there is evidence of early human transformations of the vegetation cover, forests may have been extensive during the 5th and 4th millennia (Carrión 2005); while from the 3rd millennium, and coeval with the onset of the Bell Beaker period, forest regression was more intense and agricultural and pastoral activities increased (i.e. Mighall *et al.* 2006).

In the Bocelo Mountains (Sector V, Fig. 13.2), woodland cover was also dominant before the 3rd millennium BC, with scarce evidence of anthropogenic activities (Ramil Rego 1993b; Aira *et al.* 1994). However, since the start of the Bell Beaker period, human activities increased accompanied by a remarkable decrease of the oak forest and the spread of the heathland and nitrophilous taxa.

In the Xinzo da Limia basin (Sector I, Fig. 13.2), the available palynological data show some indications of human pressure from the 4th millennium, most likely linked to the megalithic phase that preceded the Bell Beaker period, although tree cover was not thoroughly affected. On the other hand, similar to other Galician areas, it is during the 3rd millennium BC that forest decline started to become more intense with concomitant shrubs and cereal crop expansion (Van Mourik 1986; Álvarez *et al.* 1996).

In the south-western coastal areas and inland of the Pontevedra province (Sector IV, Fig. 13.2), the overall picture is the same. From the 5th millennium onwards some deforestation is detected, increasing during the 4th millennium and, again, probably linked to megalithism (see also Fig. 13.4). Nevertheless, the oak forests were still largely intact as well. It is by the end of the 4th millennium and during the Bell Beaker period (3rd and 2nd millennia BC), that the woodlands started to retreat and heathlands, grasslands and nitrophilous taxa to spread. This change in vegetation composition was mediated by agriculture and pastoral activities (Aira and Guitián 1984; López García 1986; Aira *et al.* 1989; Gómez Orellana *et al.* 1996, 1998; Ramil Rego and Gómez Orellana 1996; Carrión *et al.* 2010).

In the Barbanza Mountains (Sector IV, Fig. 13.2), the palynological analyses of several palaeosols and soils buried below megalithic mounds suggest anthropogenic transformations since the second half of the 5th millennium BC (Torras 1982; Criado *et al.* 1986; López García 1992; Aira *et al*. 1989). Later on, abundant evidence exists for continued landscape anthropisation in the north-west of Galicia.

Finally, in the Ancares and Courel Mountains (Sector II, Fig. 13.2) it is also from the first half of the 3rd millennium BC that the forest declined and shrubs spread, and herbaceous

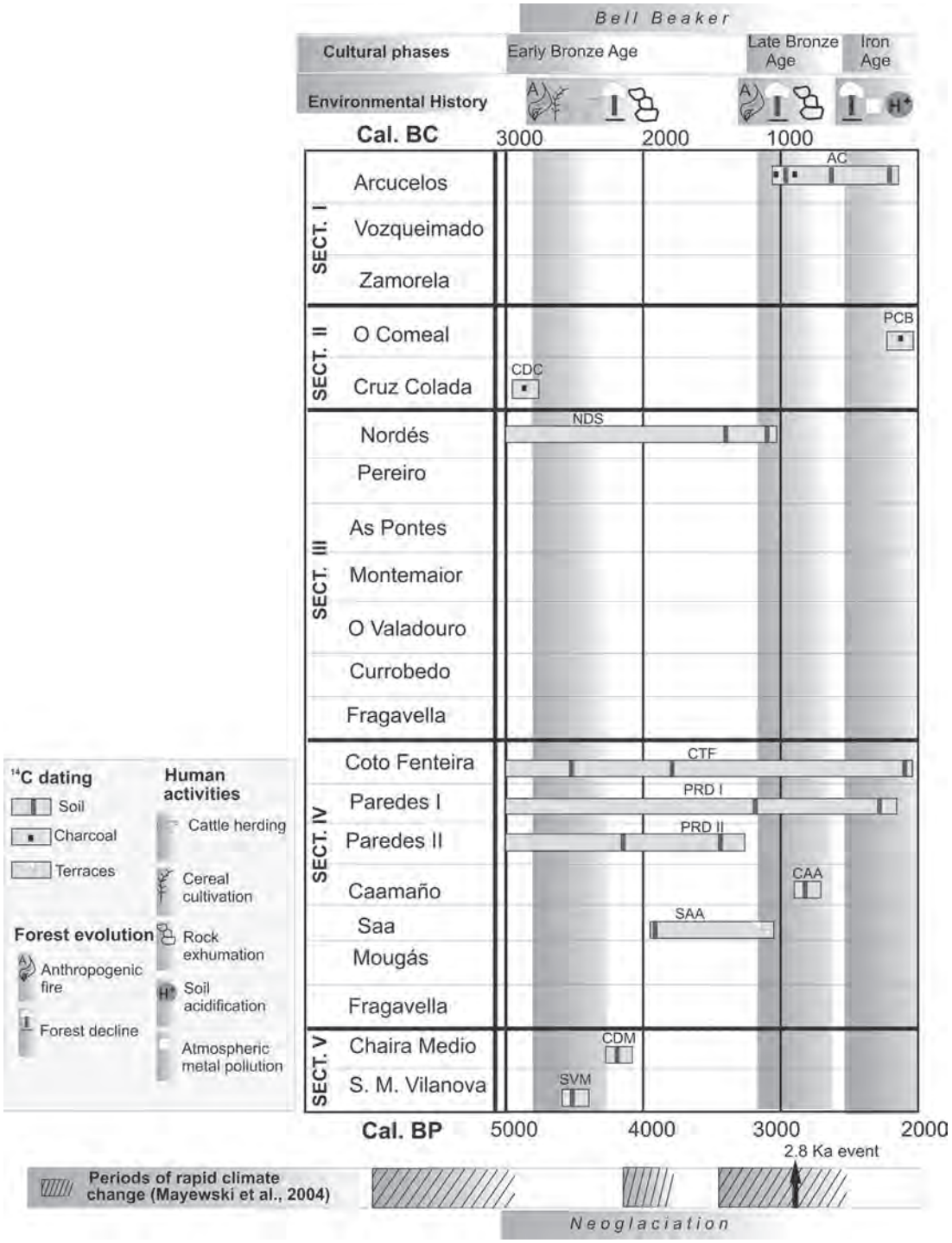

Fig. 13.3. Synthesis of the environmental history of north-west Spain during the Bell Beaker period, showing the chronology of key cultural periods, some dated, reference soil sequences for each sector studied, forest evolution, human activities (direct and induced changes) and phases of Holocene rapid climate change (modified from Martínez Cortizas et al. 2009b).

formations are evident, as well as an increase in charcoal content in soils, suggesting the impact of forest fires (Santos *et al.* 2000; Muñoz Sobrino 2001; Carrión 2005).

Climate, geomorphologic and soil changes

In those areas where geomorphological, soil and geochemical studies are available, the results point towards a rapid change

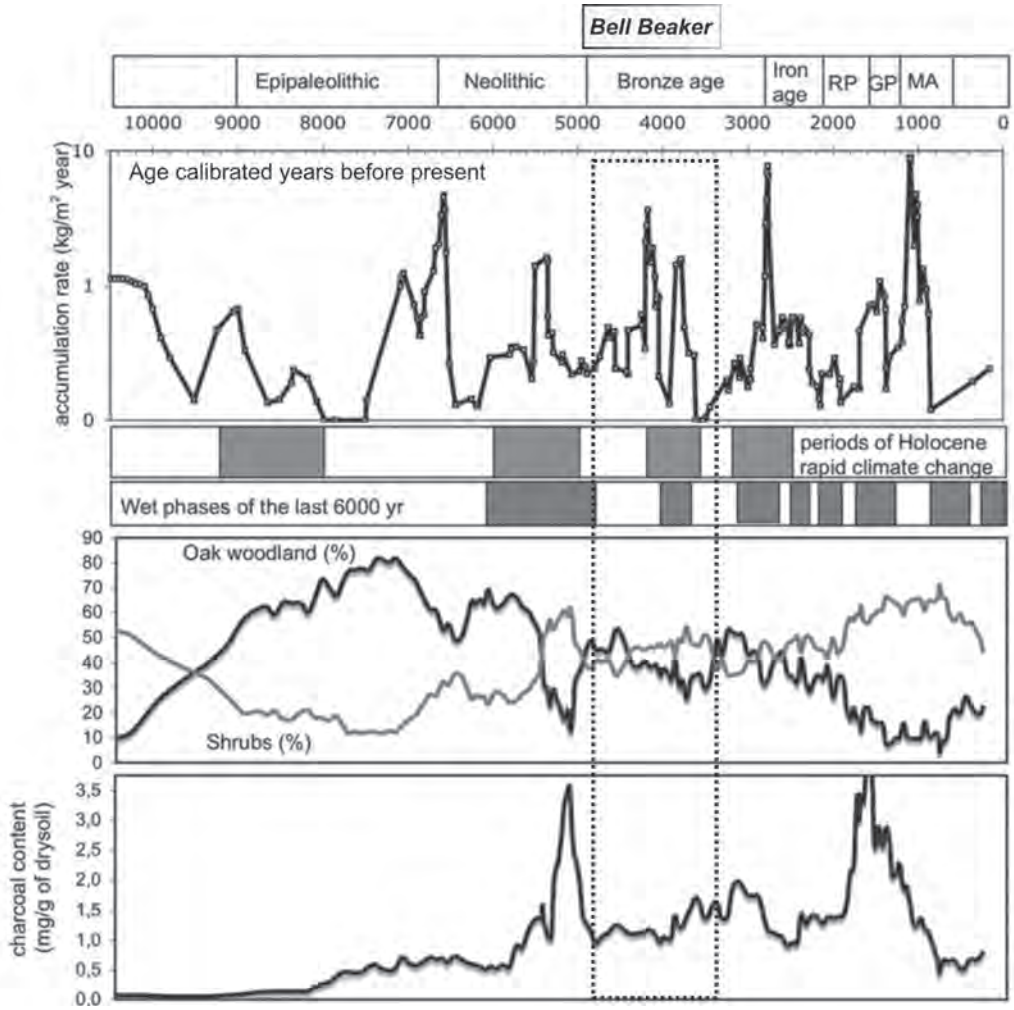

Fig. 13.4. Holocene changes in soil accumulation/erosion rates, vegetation change, and charcoal content in colluvial soils in Campo Lameiro, Pontevedra (north-west Spain; Sector IV in Fig. 13.2). The Bell Beaker period is highlighted (modified from Martínez Cortizas et al. 2009a). (RP: Roman Period, GP: Germanic Period, MA: Middle Ages).

in erosion/sedimentation rates, coeval with forest decline. Landforms were characterised by undulated topographies controlled by the tectonic genesis of the macroforms, as already mentioned. Among positive topographies, denudated mountain-tops with visible rock outcrops were already evident, whereas negative topographies (synclines) would be represented by sediment-filled basins and small depressions, valleys and lower slopes. Basins, small depressions and river valleys were the main reception areas of the eroded material. A synthesis of the main changes associated with human activities, and some of the reference soil sequences for the different sectors, are provided in Figure 13.3.

The erosion induced by anthropogenic deforestation was not a unique feature of the Bell Beaker period. This process would have begun in the Neolithic (Martínez Cortizas *et al.* 2009a). Nevertheless, the Bell Beaker period represents a moment of rapid change. At the beginning, the intensity of erosion seems to have shown certain variability among the different areas. However, saprolites and unweathered rock surfaces were exhumed as erosion became stronger (Fig. 13.3). As an example, in Campo Lameiro, located in the inland of the Pontevedra province (Sector IV, Fig. 13.2), studies of colluvial soils showed three main phases of accelerated erosion/sedimentation linked to vegetation changes (Fig. 13.4): i) 2750–2570 BC, ii) 2400–2050 BC, and iii) 1850–1600 BC; the second being the strongest for the Bell Beaker period (Martínez Cortizas *et al.* 2009b). The consequent transport and sedimentation of the eroded material to lower elevation areas generated landscapes with smoother relief and thicker soils (Fig. 13.5) with higher moisture and nutrient contents (locally known as *brañas*). This landscape was, beyond reasonable doubt, more suitable for the development of agricultural and pastoral activities. Hence, these changes meant soil redistribution

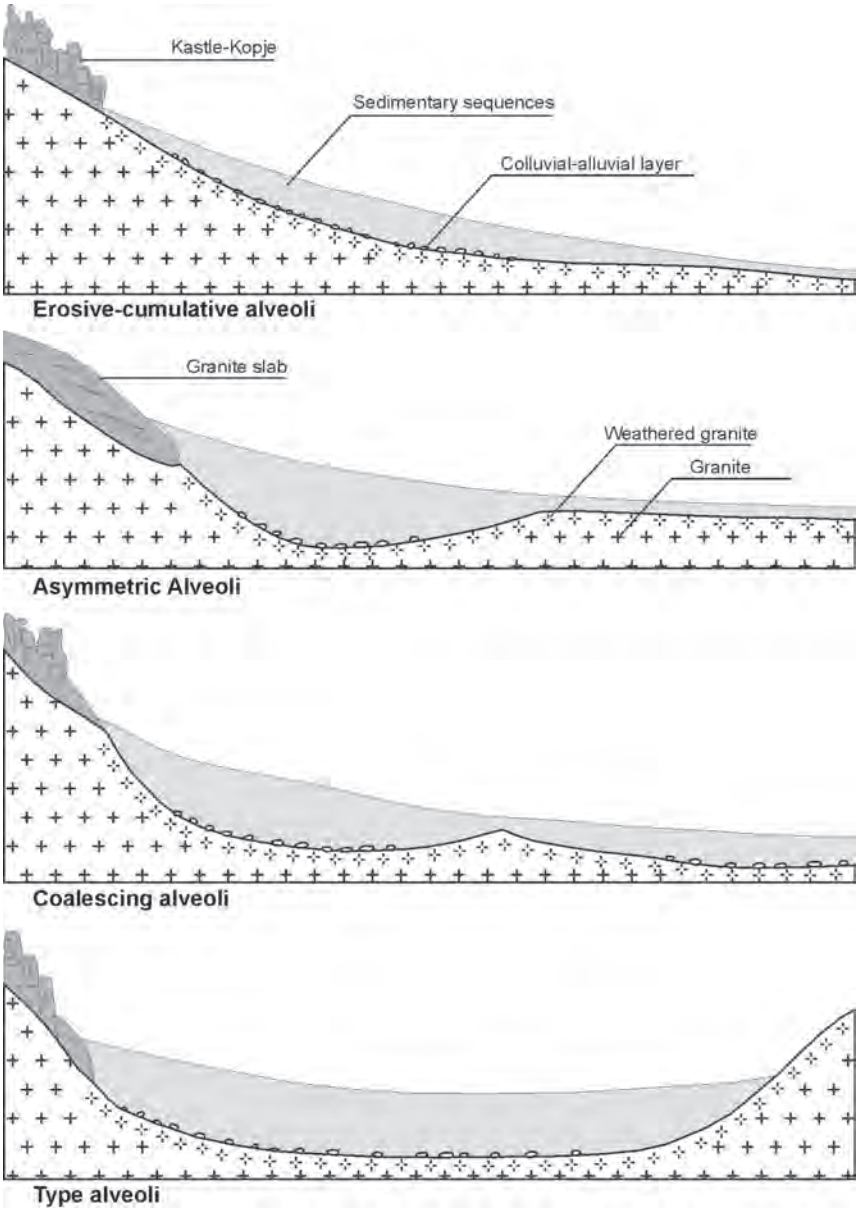

Fig. 13.5. Different types of small basins (alveoli) identified in the Campo Lameiro Rock Art Park area. The eroded soil from the slopes is accumulated in these reduced areas named "alveoli" and locally known as brañas (modified from Costa-Casais et al. 2006–8).

and concentration in more reduced, localised, areas, which were probably subjected to greater demand and control of the soil resources by human groups. By the end of the Bell Beaker period soil erosion may have also been perceived as a critical problem – at least in some areas – since evidence of early terracing systems has been found in Sector IV (Saa soil sequence, Fig. 13.3). At the same time, the progressive exhumation of rock outcrops on mountain-tops and slopes added a new resource (i.e. rock surfaces; Fig. 13.5) that was used to develop rock art (Costa-Casais *et al.* 2008).

On the other hand, the importance of climate control in the aforementioned reshaping of the landscape should not be underestimated. In fact, one of the most important palaeoenvironmental aspects during the Bell Beaker period is its coincidence with one of the coldest phases of the Neoglaciation cold spell. Since the onset of the Hypsithermal (Holocene Thermal Maximum) the temperatures in north-west Iberia would have been similar or even higher than today. But at ca. 3700–3600 BC the warm conditions were interrupted by the so-called Neoglaciation phase, when temperatures could have been 0.5°C lower than today (Font Tullot 1988). However, there was a partial recovery by ca. 3100 BC, when a warmer episode probably occurred (Martínez Cortizas and Pérez Alberti 1999). This warmer

pulse could be related to the dismantling of the coastal sedimentary formations located in south-west Galicia (Fig. 13.2), probably linked to a punctual sea level rise (Blanco Chao *et al*. 2003). Later, an abrupt cooling occurred synchronous with the beginning of the Bell Beaker period, ca. 2800–2700 BC (Martínez Cortizas *et al.* 1999; 2005). The whole Bell Beaker was embedded in this cold phase (temperatures did not recover to previous values until ca. 1300–1200 BC), although a relatively brief amelioration was detected, and three phases can be separated: two colder phases, with temperatures 1.5–2°C lower than today, the first one ca. 2800–2000 BC and the second one ca. 1600–1400 BC; and a less cold phase by ca. 2000–1600 BC (Martínez Cortizas *et al.* 1999). Regarding the precipitation regime, the whole period seems to have been somewhat wetter than today, but considerably more humid than previous ones. Besides, two small maxima in humidity have been detected at both the onset and the end of the Bell Beaker period. Moreover, Fábregas Valcarce *et al.* (2003) point out that wind intensity was high until 2200 BC, and low or very low later on.

This climatic scenario most likely affected human activities and their impact on the landscape, as well as the response of the landscape to the induced transformations, which in turn could have triggered changes in the nature and intensity of human activities. These complex feedback mechanisms and post-disturbance responses are still very difficult to assess.

Geochemical records: atmospheric pollution, mining and metallurgy

Geochemical studies carried out in peat records in north-west Iberia have detected heavy metal atmospheric pollution, mainly lead (Pb), since at least 3200 years ago (Martínez Cortizas *et al*. 2002; Kylander *et al.* 2005). Thus evidence of extensive mining and metallurgy seems to occur after the Bell Beaker period (Fig. 13.3). However, recent investigations in peatlands from the Xistral Mountains (Sector III, Fig. 13.2) provided data indicating metal (nickel, Ni) enrichment/pollution since the end of the Bell Beaker period (Pontevedra Pombal, pers. comm.). Up to now this is the earliest evidence of atmospheric metal pollution in north-west Iberia. Further research is necessary in order to have more information on older chronologies and to know the overall impact of the human activities on the environment.

Final remarks

In summary, the 3rd millennium BC represented a turning point in the intensity of human impact on the "naturally" occurring mixed deciduous forest dynamic. Even though human pressure has been detected in previous chronologies, it did not imply as intense modifications as those reconstructed for the Bell Beaker period. On the contrary, since the start of the Bell Beaker period an abrupt forest regression was detected in many records spread over the whole area (north-west Iberia), sometimes being noteworthy. Deforestation was the consequence of the intensification of agricultural and pastoral activities, leading to an open landscape where grasslands, shrublands, ferns and crops were dominant, and accelerated soil erosion. The deforestation occurred gradually, increasing at the end of the Bell Beaker period, into the 2nd millennium BC. The redistribution of the eroded soil and the genesis of new landforms (infilling of basins and depressions) transformed the way human populations used the landscape, and probably demanded some measures of erosion control in some areas.

One of the most direct evidences of the intensification of human impact on the landscape is the increase in charcoal contents of colluvial and buried soils corresponding to the Bell Beaker period. The large charcoal accumulation was, at least in part, the consequence of slash-and-burn practices aimed to open the landscape to develop crops and generate pasture. During the Bell Beaker period, both population increase and settlement in new areas led to an increase in agricultural practices, more evident ca. 2500–1200 BC, although it varied between regions. For example, the anthracological record of Campo Lameiro (Sector IV, Fig. 13.2) showed high charcoal contents throughout the Bell Beaker (Kaal *et al.* 2011), increasing slightly by the end of the period.

Moreover, palynological and anthracological data for the north-west of Iberia also show that human transformation of the landscape did not only involve the most accessible areas, such as coastal plains, but also those at higher elevations, in the mountains. Although the chronological pattern of the earliest anthropogenic impact differs between areas, there is evidence of widespread anthropisation since the 3rd millennium BC in the whole north-west Iberia.

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14

EVIDENCE OF AGRICULTURE AND LIVESTOCK. THE PALYNOLOGICAL RECORD FROM THE MIDDLE EBRO VALLEY (IBERIAN PENINSULA) DURING THE 3RD AND 2ND MILLENNIA CAL. BC

Sebastián Pérez-Díaz and José Antonio López-Sáez

The study of pollen, spores and non-pollen palynomorphs can make interesting contributions to archaeological research. Archaeopalynology provides data about the environment in which humans lived, providing an overview of the prevailing climatic conditions, and how they exploited their natural resources. In this way, we can determine patterns of evolution in the vegetation at local and regional scales, as well as infer palaeoclimatic hypotheses or palaeoecomic patterns. In this paper we aim to identify evidences of human modification of the natural landscape, as well as indicators related to productive economic practices in the central sector of the Ebro valley (Southern Basque Country). In recent decades, archaeological researchers have paid particular attention to the northern sector of the middle Ebro valley, the Sierra de Cantabria, where an intensive programme of archaeological fieldwork has been undertaken. The sites, rock shelters, are located on the southern slopes of this mountainous area, providing rapid access to different ecosystems, with a great variety of available food resources. The archaeological sequences cover a wide chronological range, from the Early Neolithic to the Roman period. The palynological record has detected the presence of cultivated fields in the vicinity of several archaeological deposits, as well as highlighting the existence of livestock practices, which could form the basis of the diet of Bell Beaker groups.

Introduction

The emergence of several wide-spectrum cultural innovations associated with the Neolithic technocomplex, from ca. the 6th millennium cal. BC, was the starting point for evolution in the ways of life of communities that previously inhabited the Iberian Peninsula. These modifications, affecting vital aspects of human communities and the structuring of space, settlement patterns, social relationships, funeral behaviour, etc., are especially evident in the Middle–Final Neolithic (ca. 4500–3200 cal. BC), Chalcolithic (ca. 3200–2200 cal. BC) and Bronze Age (ca. 2200–900 cal. BC) (Fernández-Eraso *et al.* 2009; Sesma *et al.* 2009).

In the last decades, archaeologists have shown special attention in post-Neolithic communities. The result of this interest is the increase in the number of archaeological sites, of several types, assigned to the metal ages (Chalcolithic, Bronze Age and Iron Age), that are known in the Basque area of the middle Ebro valley. Many studies carried out at those sites cover aspects such as lithic tools, evidence of use of metals, urban planning, funeral conduct, etc. However,

among all these studies, archaeobotanical researches have been relegated.

Archaeology, as a discipline that reconstructs past societies through their material remains, needs input from many disciplines (geology, botany, zoology, mineralogy, sedimentology, etc) that are fundamental to explain adequately the mechanisms of change and evolution in past cultures. In this multidisciplinary context, the study of botanical remains recovered from different archaeological sites helps to characterise, from the standpoint of social and economic development, human groups who lived in a given geographical context. In fact, palaeoenvironmental studies are a basic complement in the understanding of past societies, their socioeconomic structure and their impacts on the environment (Brun 2010).

The study of pollen, spores and non-pollen palynomorphs makes interesting contributions to archaeological research. Archaeological palynology provides data about the environment in which humans lived, offering an overview of the prevailing climatic conditions, the possibilities of plant life in the area, how humans learned to use the available resources and how, inevitably, the environment has changed, due to the progressive increase in the need for natural resources in different cultural and chronological periods. In this way, we can determine patterns of evolution in vegetation at local and regional scales, as well as infer climatic or economic hypotheses. However, palynology is not only a tool for palaeoenvironmental reconstruction, but it also helps to identify evidence of human impact such as deforestation of anthropogenic origin, and the development of agricultural and livestock practices (López-Sáez *et al.* 2003; 2006).

In fact, one of the most interesting contributions made by the pollen record is related to economic practices. It is common to characterise Bell Beaker groups as farmers and stockbreeders, but it is equally frequent to spend little attention to the information provided by archaeobotanical disciplines. Although in the last decades palynological studies have increased in the Basque Country (Peñalba 1989; Isturiz and Sanchez 1990; Iriarte 1994; 2009; Pérez-Díaz 2012), the information available for understanding the main events in vegetation history is sparse and fragmentary. This paper is presented as a new contribution to fill this gap, by offering a synthetic view of the evolution of landscape, climate and economic characteristics at three archaeological sites located in the south sector of the Basque Country (northern Iberian Peninsula).

Study area

The middle Ebro valley is located in the north of the Iberian Peninsula. It is bordered, in the north, by the Pyrenees and the Bay of Biscay, in the east by the Catalan Coastal Range, in the south by the Iberian Range and in the west by the Cantabrian Mountains. In the middle zone of this valley is located the Sierra de Cantabria, the southernmost orographic barrier in the Basque Country. This range is small but compact, with maximum altitudes of 1446 masl (Ollero and Ormaetxea 1997). The relief is generally smooth, highlighting some rugged sandstone hills. Morphologically it should be noted that several levels developed, associated with glacis and terraces of the Ebro River, which takes a meandering course in this sector (Gonzalez and Serrano 1995). The predominant lithology is Cretaceous Limestone with marl and sandstone levels deposited on a base of clay, gypsum and ophites (Ramirez del Pozo 1973).

From a climatic point of view, this area belongs to the Mediterranean biogeographical region. However, its altitude and proximity to the central area of the Basque Country (with transitional climatic conditions), determines the existence of different local environments. Large deciduous forests are formed by beech (*Fagus sylvatica*) and oak (*Quercus robur*), indicating wet conditions on high ground. In places with more insolation, usually on the southern slopes, there are evergreen forests (*Quercus ilex* subsp. *rotundifolia*, *Q. coccifera*) with shrubs of *Buxus sempervirens* and *Rosmarinus officinalis* (Aseguinolaza *et al.* 1996).

Archaeological context

A great deal of systematic archaeological research has been carried out in the middle Ebro valley since the beginning of the 20th century. This intensive work has documented a significant number of deposits of many types, such as megalithic monuments, caves, rock shelters, open air sites, etc (Fernández-Eraso 2007/2008; Fernández-Eraso and Mujika Alustiza 2013).

In recent decades, archaeological researchers have paid particular attention to the northern sector of the Middle Ebro Valley, the Sierra de Cantabria, where an intensive program of archaeological fieldwork has been undertaken. In this sense, the development of multidisciplinary research projects has favoured new archaeobotanical studies in this area. In particular, pollen, charcoal and seed studies have been made of deposits at Peña Larga, San Cristobal and Peña Parda, among others. Together, they cover a wide chronological sequence, from the Early Neolithic to the Roman Period (Fig. 14.1).

These sites are located on the southern slopes of this mountainous area, in several strategic places. On the one hand, they enjoyed good visual control over different sectors of the Ebro valley. On the other, their location provided rapid access to different ecosystems, with a great variety of available food resources.

The Peña Larga rock shelter is located in the municipality of Cripan, at 900 masl. This archaeological site was occupied

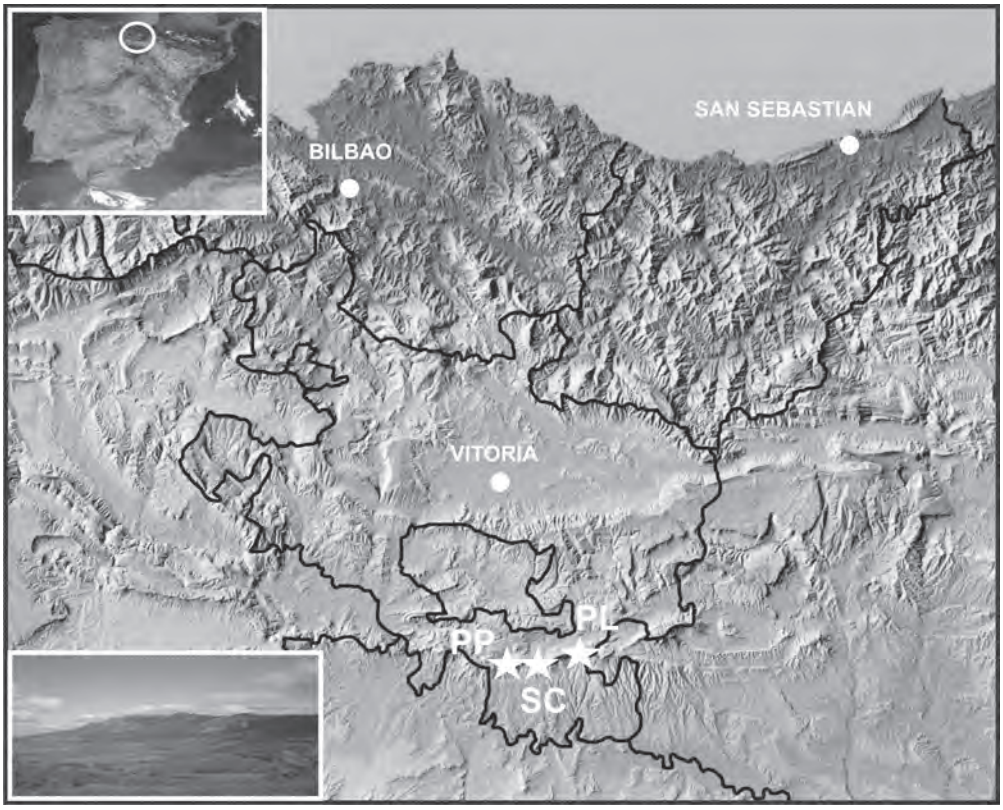

Fig. 14.1. Location of the archaeological sites. PL (Peña Larga), SC (San Cristobal) and PP (Peña Parda).

at different times in the Middle and Final Holocene. The earliest documented record is dated in the Early Neolithic (from ca. 5700 cal BC), characterised by the presence of cardial pottery. Subsequently, an archaeological level corresponding to the Late Neolithic was documented, with no radiocarbon determinations. The following periods of occupation have been assigned to the first Chalcolithic (burial context, ca. 3600–2700 cal. BC) and Late Chalcolithic (2800–2400 cal. BC). The archaeological sequence ends with a level corresponding to the Early Bronze Age (Fernández-Eraso 1992; 1996; 1997). A palynological study at this site (Iriarte 1997) is completed with the one presented here, following the archaeological work carried out in recent years. A total of 11 samples was taken for the palynological research, but four of them were sterile (Fig. 14.2).

The rock shelter of San Cristobal belongs to the town of Laguardia, at 1037 masl. The different archaeological excavations have identified several levels of occupation. The oldest is dated in the 4th millennium cal. BC, corresponding to the Late Neolithic. The rest of the sequence, in relation to the use of the site as livestock place, is dated in the 3rd millennium cal. BC, in the Chalcolithic (Fernández-Eraso 2002; 2008; 2008/2009; Fernández-Eraso and Polo 2008/2009). The site was later occupied again during the Bronze Age and in the Middle Ages. Sixteen samples were taken for the palynological analysis, all of them from Chalcolithic levels (Fig. 14.3).

Finally, the site of Peña Parda, located in the foothills of the Alto de Cervera (Laguardia), at 975 masl is a small rock shelter discovered in 1997. Since then a group of researchers at the University of the Basque Country (UPV/EHU) have carried out several archaeological activities. They have found a stratigraphic sequence with several archaeological levels, all of them belonging to the same chronocultural framework. Unable to obtain radiocarbon dates, the techno-typological comparison of the archaeological remains with others from nearby sites, situates the occupation of the shelter in the Early Bronze Age, chronologically dated in the 2nd millennium BC (Fernández-Eraso 2003). Thirteen samples were taken for the palynological analysis although one of them was sterile (Fig. 14.4).

Agro-pastoral communities in the middle Ebro valley during the 3rd and 2nd millennia cal. BC

Anthropic pollen evidence

The human impact on the vegetal landscape is the mechanism transforming natural ecosystems through human influence,

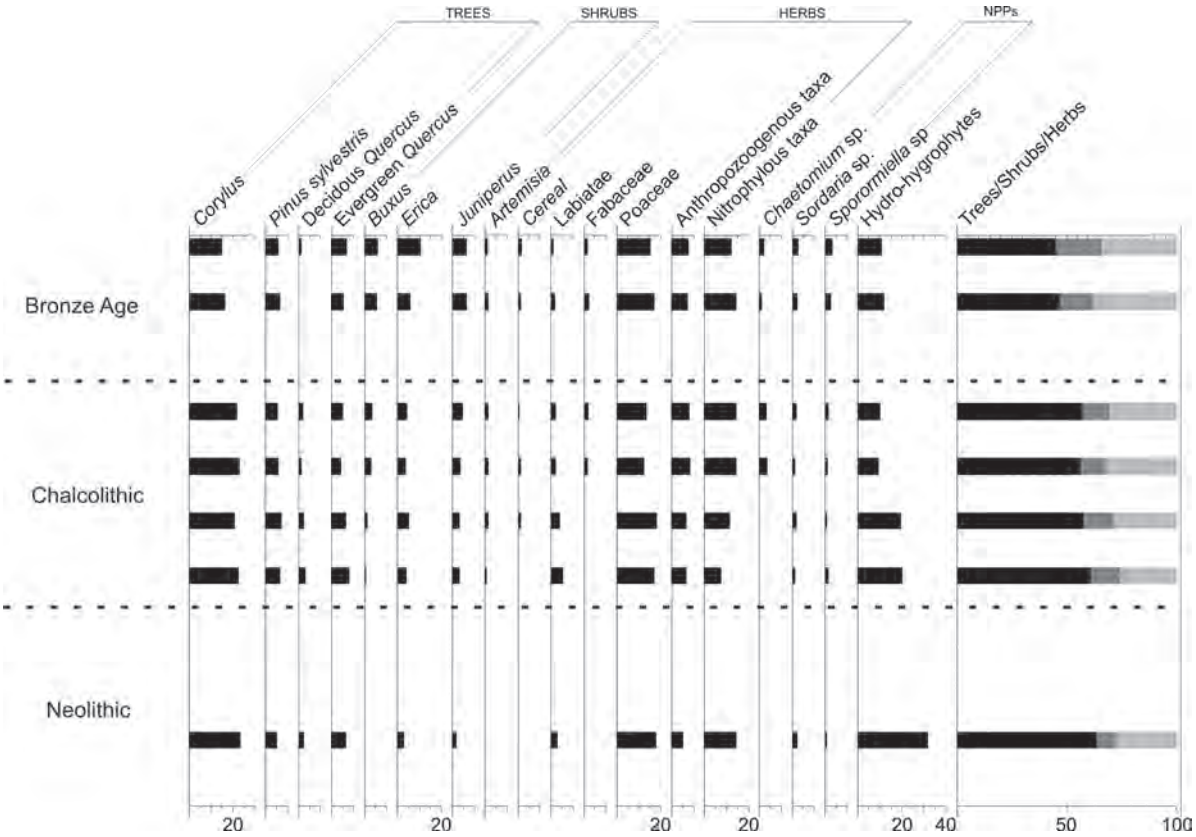

Fig. 14.2. Synthetic pollen diagram of Peña Larga.

by exploiting their natural resources (hunting, fishing, gathering, farming, livestock, etc). It is not an occasional phenomenon but a process in which a series of facts will take place as a result of increasing human pressure on the environment. Therefore, when we speak about "human impact dynamics" or "human impact processes", we must understand it from the convergence of various signals of human impact and not from just one. Among these signals, detected through the study of pollen grains and non-pollen palynomorphs, were the following: loss of tree cover (deforestation), evidence of erosion and fire, increase in nitrophylous, anthropogenic and anthropozoogenous pollen taxa, presence of serial stages in the degradation of natural vegetation, and evidence of pastoralism and agriculture. This section focuses attention on the palynological evidences of pastoralism and agriculture.

From the palynological point of view, the perception of human impact on the vegetal landscape is based on the so-called anthropogenic indicators in pollen diagrams, pollen types associated with human activities (Behre 1981; 1986; 1988). In recent years, the interest in studying other non-pollen palynomorphs that frequently appear in the palynological samples has enabled more reliable determination of other economic practices, such as those related with cattle raising and sheep herding (López-Sáez and López-Merino 2007).

Livestock evidence

Some examples of human impact evidences usually documented in the pollen diagrams related with cattle raising, are the presence of anthropogenic (*Urtica, Plantago, Polygonum*, Rubiaceae, Geraniaceae, Chenopodiaceae) and anthropozoogenous taxa (*Aster*, Cichorioideae, Dipsacaceae, *Papaver*, *Rumex*, Boraginaceae, *Centaurea*, *Malva*, Solanaceae). Such non-pollen palynomorphs as *Pseudoschizaea circula* and *Glomus* cf *fasciculatum* indicate the existence of erosion, often associated with pastoral activities (van Geel *et al*. 1989; Pantaleon *et al*. 1996; López-Sáez *et al.* 2000). Finally, other non-pollen palynomorphs, like coprophilous fungi such as *Podospora*, *Sordaria* and *Sporormiella*, are evidence of livestock at a local scale (van Geel 1976; 1983; 2003; López-Sáez *et al.* 1998; 2000; Galop and López-Sáez 2002; van Geel 2006; López-Sáez and López-Merino 2007; Cugny 2011).

Agriculture evidence

If the development of pastoral activities is easily seen in the pollen record, with the emergence of those specific pollen groups and non-pollen palynomorphs, the question of the appearance of agricultural evidence is still a problem to solve. In the palynological record, cereals are the most

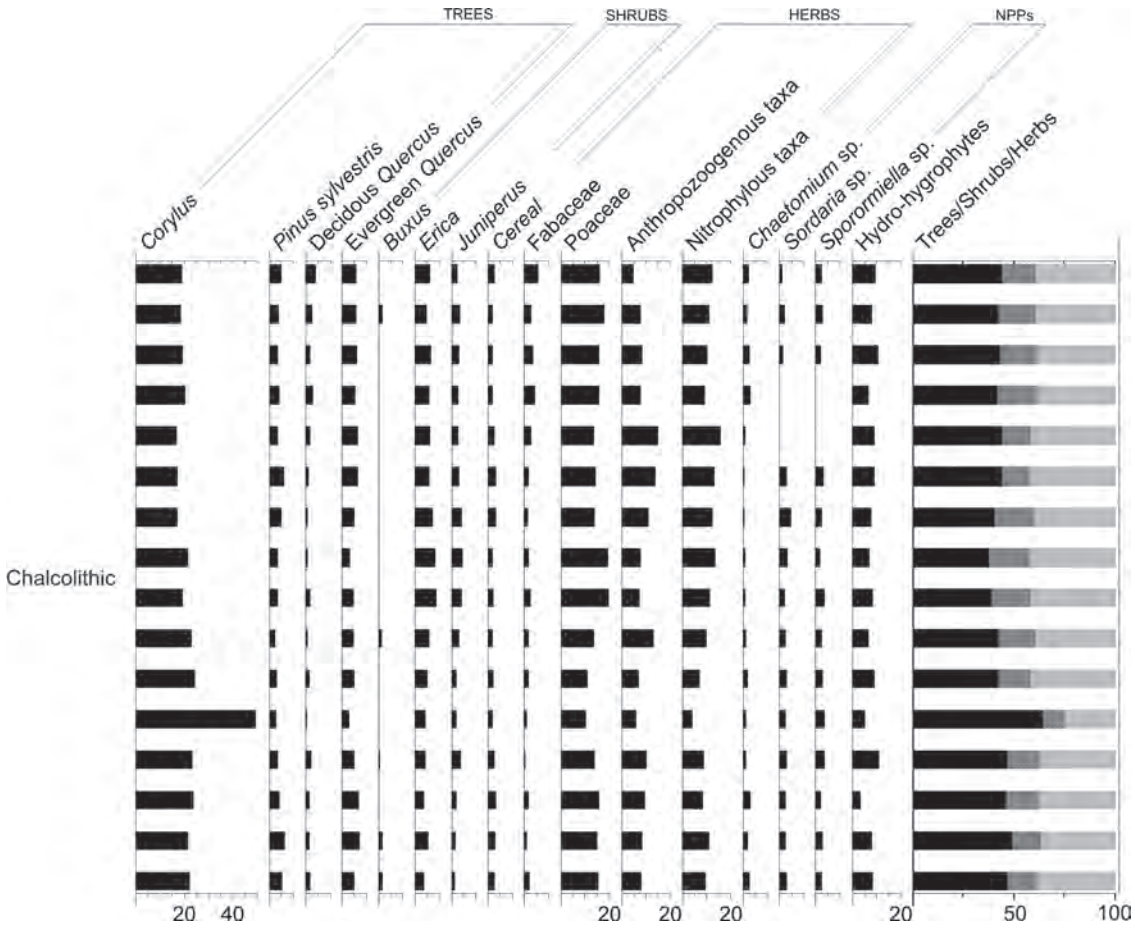

Fig. 14.3. Synthetic pollen diagram of San Cristobal.

frequent group of cultivated plants, providing a unique contribution to human nutrition. In this case, we must consider the existence of two kinds of evidence. On the one hand, negative evidence, due to the absence of cereal pollen grain in a given context. It should be noted that the absence of evidence does not imply evidence of absence, because the pollen grain is autogamous, that is, it does not need external actors to fulfil its reproductive role, and because the pollen grain is relatively large, its dispersal is not high. These two factors determine low production and poor dispersal of pollen. On the other hand, the positive evidence, the presence of cereal pollen percentages higher than 3% suggests local cultivation, according to current pollen rain studies (Diot 1992; López-Sáez *et al.* 2003; López-Sáez and López-Merino 2005).

The Sierra de Cantabria pollen record in the 3rd–2nd millennium cal. BC

From the late 4th millennium and during the 3rd millennium cal. BC, the regional vegetation landscape in the Sierra de Cantabria possessed significant tree cover, mainly composed of deciduous taxa. Although this area belongs to the Mediterranean biogeographical region, the location of the sites, at relatively high altitudes, determines the existence of high rainfall and cool temperatures.

In Peña Larga and San Cristobal the dominant tree community was deciduous forest, in which hazel reached the leading role, together with deciduous oak (Figs 14.2 and 14.3). Due to the high level of insolation and the presence of calcareous substrates, this may have been *Quercus faginea*.

Also in the vicinity, there were a few masses of evergreen forest, like holm oak, in the drier and rocky areas. These formations, common in Mediterranean biogeographical areas, were accompanied by a dense thicket of boxwood. Although boxwood is poorly represented in the diagrams because of its zoophylous character, it possibly played a leading role in the environment. Finally, at a regional scale, some pines (*Pinus sylvestris* and *P. pinaster*), may have been frequent in forest clearings with lower humidity (Aseguinolaza *et al.* 1996).

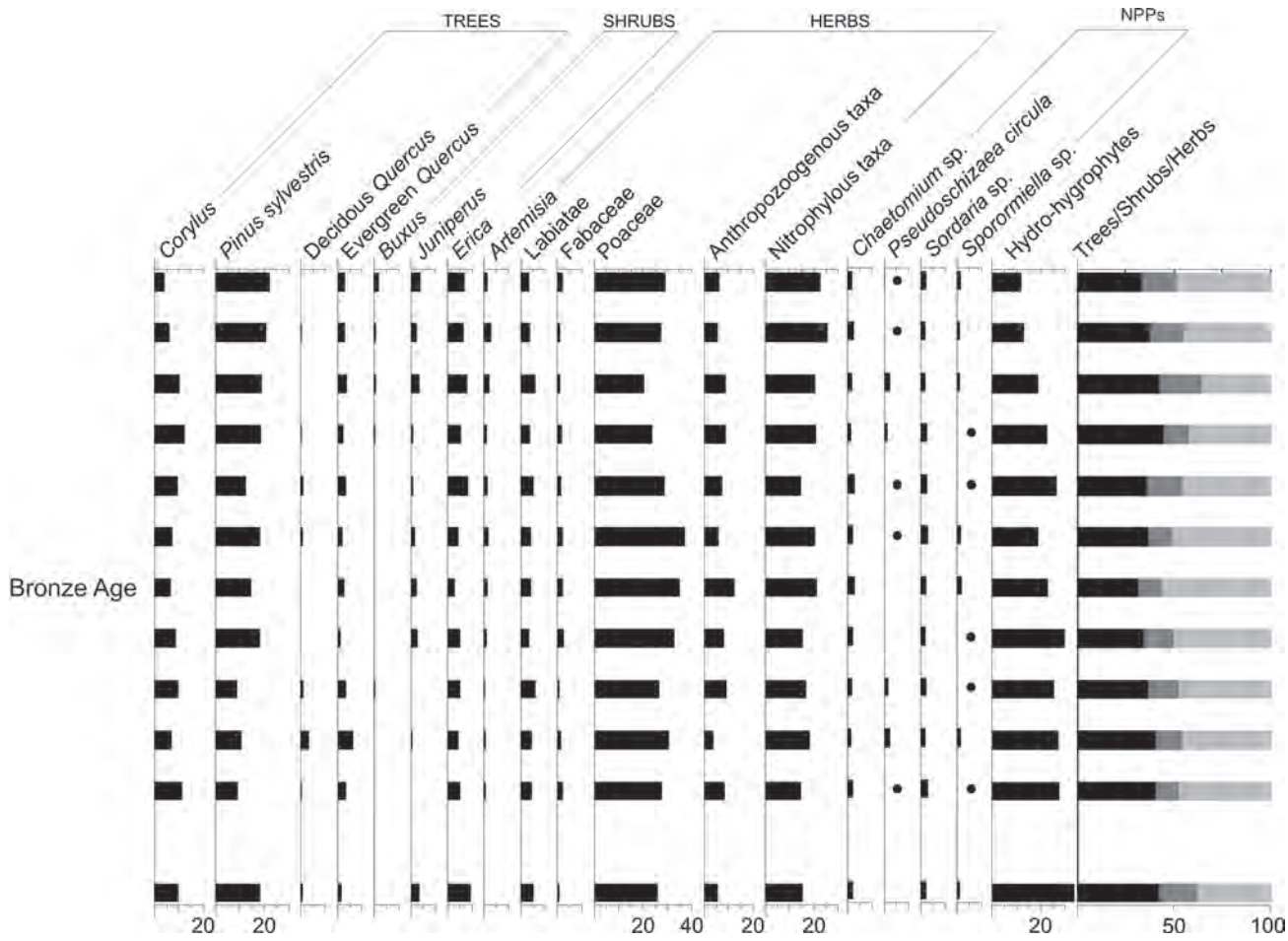

Fig. 14.4. Synthetic pollen diagram of Peña Parda.

In the vicinity of the archaeological sites, open areas were common, mainly occupied by herbaceous vegetal formations. Grass pastures, anthropozoogenous and nitrophylous communities reached a significant representation. This gives an idea of the intense modification of the vegetal landscape by the inhabitants of those settlements (Pérez-Díaz 2012).

From the perspective of productive economic practices, several indicators are identified throughout this period both in Peña Larga and San Cristobal rock shelters. Cereal pollen grains have been documented at both these archaeological sites. In Peña Larga, their values are not so high (<1.5%), but their presence is a significant fact at that time, because they were previously absent (Fig. 14.2). In the case of San Cristobal, the percentages are higher than 3% (Fig. 14.3), which suggests that the fields were relatively close to the sampling site (Diot 1992; López-Sáez and López-Merino 2005).

In addition to cereals, during the Chalcolithic, diagrams show the intensification of farming practices. This idea is based on several clues. On the one hand, the extension of anthropozoogenous pastures (Chenopodiaceae, *Plantago* sp., *Urtica dioica*, etc.). Furthermore, the presence of some non pollen palynomorphs of coprophylous ecological conditions (*Sordaria* sp. and *Sporormiella* sp.) (López-Sáez and López-Merino 2007). In addition, we have identified carbonicolous spores (*Chaetomium* sp.), indicating fire events (Fig. 14.2 and 14.3), probably to clear the forest in search of pastures (López-Sáez *et al.* 1998; 2000). Other studies carried out in these sites point in the same direction. The micromorphological analyses performed have identified different sedimentological cycles caused by the accumulation of animal excrements (Fernández-Eraso and Polo 2008/2009). Finally, the archaeozoological study (Castaños 1997) shows the prevalence of domestic animals over wild species.

In this region, at the present we have only one other similar archaeobotanical study. Although located in the same biogeographical context (the Ebro Valley), its altitude (547 masl) determines different climatic conditions (drier and warmer), which affects the composition of the vegetal landscape. It is the site of San Juan Ante Portam Latinam, a burial deposit dated in the late Neolithic or Early Chalcolithic

(second half of the 4th millennium cal. BC) (Armendariz 2007). The palynological study (Iriarte 2007) shows a deforested landscape and the presence of nitrophylous taxa (*Plantago* sp., Chenopodiaceae), a direct consequence of human impact, probably due to livestock. There is no direct evidence of agricultural practices, probably due to the funerary character of the site.

Therefore, we can determine that the human groups that lived in the Sierra de Cantabria in the late 4th millennium and the 3rd millennium cal. BC developed a diversified economy, based on the raising of domestic animals and the cultivation of cereals to complement the human diet.

From the beginning of the 2nd millennium cal. BC, and for about a millennium (Bronze Age), the palynological diagrams at Peña Larga and Peña Parda rock shelters show a reduction in the representation of forest species (Figs 14.2 and 14.4). As during the 3rd millennium cal. BC, forests were composed mainly of meso-thermophylous taxa, above all hazel and oak (Pérez-Díaz *et al.* 2007; Pérez-Díaz 2012). However, at this moment significant progress is seen in elements adapted to drier climatic conditions, such as pines, evergreen oaks, boxwood, and juniper. The presence of those frequent species in Mediterranean biogeographical areas in the 2nd millennium is corroborated by the anthracological analysis at Peña Parda (Ruiz-Alonso and Zapata 2003). This shows the prevalence of thermophylous flora, such as boxwood, yew, pines, juniper and honeysuckle in the wood macro-remains. These facts, together with gradual regression of the hydro-hygrophilous flora and other elements associated with wet conditions, suggest the dominance of drier climatic conditions during the Bronze Age in Sierra de Cantabria, similar to present day conditions.

The reduction in the areas occupied by forest is closely linked to human activities. Indeed, the herbaceous flora favoured by human presence and their economic practices (anthropozoogenous and nitrophylous taxa) are represented significantly at this time. These open areas were cleared for farming. Agricultural practices are documented in Peña Larga (Fig. 14.2), where palynological research shows low values of cereal pollen, but which are representative of these practices. In the case of Peña Parda, direct evidences of agricultural practices are absent in the entire archaeological sequence, that is, cereal pollen grains or other crop species have not been identified (Fig. 14.4). Obviously this does not mean that the inhabitants were not aware of agriculture, as at this time in Prehistory, the productive economy is assumed to have spread throughout the Iberian Peninsula (Barandiaran *et al.* 1998).

As mentioned above, the absence of cereal pollen in a given context is not direct evidence of the absence of agricultural activities. Several factors may explain this. On the one hand, the particularities of cereal pollen, such as pollen production and its dispersal. Experiments on pollen rain (Subba Reddi and Reddi 1986) have demonstrated the low pollen production of certain cereal species such as *Hordeum vulgare*, *Triticum aestivum*, *Avena sterilis* and *Panicum millaceum*. Another reflection is provided by the fact that because the grain of the genera *Avena*, *Hordeum* and *Triticum* are autogamous, that is, self pollinated, pollen dispersal by wind is quite limited (Heim 1970; Bottema 1992; Bower 1992). We can also point to the larger weight of cereal grains as another factor that limits their dispersal. Therefore, the low pollen production of certain grains, coupled with their reduced dispersion and relatively large size can result in the absence of cereal pollen grains in archaeological contexts relatively distant from the fields (López-Sáez and López-Merino 2005). Peña Parda is a clear case in this sense. It is a rock shelter located in a relatively high and craggy area of Sierra de Cantabria, unfavourable for cultivated fields. It is probable that its inhabitants did not cultivate in the immediate vicinity, but in the lands located at lower altitudes and in flatter areas. Therefore, the relative remoteness of these hypothetical crops could impede the arrival of the pollen grains to the sediments studied here.

The other explanation is related to the economic pattern at the site. In this case it seems that Peña Parda could have formed part of a network of stalls or pens located in shelters at mid-altitudes in this mountainous area (Fernández-Eraso 2003), whose use extended from the Chalcolithic to the start of the Middle Bronze Age. In the Sierra de Cantabria, there are some other examples of this kind of archaeological settlements, from the economic perspective oriented towards pastoral activities, such as Los Husos I, Los Husos II, San Cristobal and Peña Larga (Fernández-Eraso 1997; 2000; 2001; 2001/2002; 2002; 2003; 2007/2008; 2008; Fernández-Eraso *et al.* 2001; Fernández-Eraso and Polo 2008/2009; Polo and Fernández-Eraso 2008). Peña Parda profile fits well into this pattern, owing to the appearance of several pollen indicators of pastoral activities, such as Chenopodiaceae*, Plantago lanceolata*, *P. major/media*, *Dipsacus fullonum*, *Polygonum aviculare*, etc. (Galop 1998; 2000; López-Sáez *et al.* 2003) and coprophylous fungi. In addition, the carpological study only identified a few wild macro-remains and no cultivated seeds were found (Ruiz-Alonso and Zapata 2003).

Perhaps, the absence of direct evidences of cultivation in Peña Parda can respond to a combination of both explanations. The limitation that the topographical location of the site could have imposed upon the arrival of pollen grains from the areas where cereals were cultivated and an economic orientation of the site towards cattle grazing activities (Pérez *et al.* 2007).

However, in both sites (Peña Larga and Peña Parda) palynological evidences of the presence of livestock are present. Besides the existence of pastures for livestock use (nithrophylous and anthropozoogenous vegetal communities), this has been identified through a number of ascospores of coprophylous *Sordaria* and *Sporormiella*

fungi, clear evidence of the presence of livestock at a local scale (van Geel 1976; 1978; 2006; van Geel *et al.* 1983; 2003).

In the lower sector of the Ebro valley, another archaeological site possesses a chronological sequence that begins in the 2nd millennium cal. BC and ends in the last centuries of the 1st millennium. This is the site of La Hoya (Laguardia, 600 masl). During the Middle and Final Bronze Age, the palynological diagram (Iriarte 2002) shows a Mediterranean vegetal cover, with some indicators of high humidity, unlike the modern climate. Open areas were dominant, generated by human activities. The sparse tree covers were composed by taxa typical of Mediterranean biogeographical areas (*Pinus*, *Quercus ilex-coccifera*, Cupressaceae, Oleaceae), along with other deciduous items (*Alnus*, *Corylus*, *Salix*, *Tilia*, *Betula*, *Ulmus*). Among the grasses, Poaceae and Compositae liguliflora are dominant, along with other ruderal taxa (*Plantago*, Chenopodiaceae). Cultivated fields have also been detected in the vicinity by the high percentages of cereal grains.

Concluding remarks

- Post-Neolithic groups seem to be characterised by increasing socioeconomic complexity.
- To understand the full cultural integrity of this cycle it is essential to pay attention to the different archaeobotanical disciplines (anthracology, carpology, phytoliths, palynology).
- In the case of the archaeological sites in Sierra de Cantabria (Peña Larga, Peña Parda and San Cristóbal), the palynological record contributes to the economic characterisation of the human groups that lived in the middle Ebro valley from the Neolithic onwards.
- In all these archaeological deposits, pollen diagrams exhibit numerous evidences of the existence of pastures for cattle grazing.
- The presence of cereal pollen from the Chalcolithic onwards also indicates the existence of cereal crops, to complement the human diet.
- This reflects the existence of a consolidated and complex set of economic practices during the 3rd–2nd millennia cal. BC in the middle Ebro valley, supporting the idea of an agro-pastoral community that was fully established by the Chalcolithic and Bronze Age.

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15

BELL BEAKER POTTERY AS A SYMBOLIC MARKER OF PROPERTY RIGHTS: THE CASE OF THE SALT PRODUCTION CENTRE OF MOLINO SANCHÓN II, ZAMORA, SPAIN

Elisa Guerra Doce, Francisco Javier Abarquero Moras, Germán Delibes de Castro, Ángel Luis Palomino Lázaro and Jesús del Val Recio

The archaeological site of Molino Sanchón II (Villafáfila, Zamora, Spain) is interpreted as a salt processing factory. Natural brine obtained from the saline Villafáfila Lake Complex was boiled in coarse ceramic vessels placed on supports made of raw clay, which stood over a hearth of glowing embers in order to produce hard salt cakes. Hundreds of Beaker sherds, largely corresponding to the Ciempozuelos style (one of the late regional variants in Iberia) have been recovered in the excavation area. Fine ware, more frequently deposited in tombs, together with more common Beaker pottery, such as storage vessels, occurs almost everywhere in spatial relation to salt processing areas. A similar situation has been observed in other Iberian sites where Beaker pottery clusters in metalworking areas. In this paper we argue that the presence of Beaker pottery at these sites may be explained as a way to claim property rights over the most profitable activities, acting as a symbolic marker.

Introduction

The study of salt has emerged as an important issue in European prehistory over the last years, and it has become a major area of research in its own right (Abarquero *et al*. 2012; Brigand and Weller 2015; Harding 2013; Nenquin 1961; Nikolov and Bacvarov 2012; Weller 2002; Weller *et al*. 2008). However, considering that salt is highly soluble and it is therefore archaeologically invisible, research has focused on the technological aspects of its procurement activities: the production sites and the equipment used in the process.

Production techniques known from ethnographic studies, archaeological excavations and historical texts were quite diverse in prehistoric Europe. Among the most frequent procedures are burning of halophyte plants; evaporation of salt water either at lagoons and salt marshes, or at salt yards, but also by means of briquetage (massive deposits of ceramic and fired clay implements associated to boiling brine, which are broken and discarded on-site after use); filtering salty sand or mud; mining and quarrying, and a recently documented technique involving wooden troughs and wattle fences (Harding 2013). While some evidence points to the intentional evaporation of brine at the Mesolithic site of Moriez, in Provence, France (Morin, 2002; Morin *et al*. 2008), the earliest confirmed data for salt production in Europe come from the Romanian site of Lunca-Poiana Slatinei, which have been dated to the Early Neolithic (beginning of the 6th millennium cal. BC) (Weller and Dumitroaia 2005) (Fig. 15.1).

In Iberia, the earliest evidence for salt production is found at Cardona, Barcelona, where halite, a hard rock salt was extracted from the Muntanya de Sal by the Middle

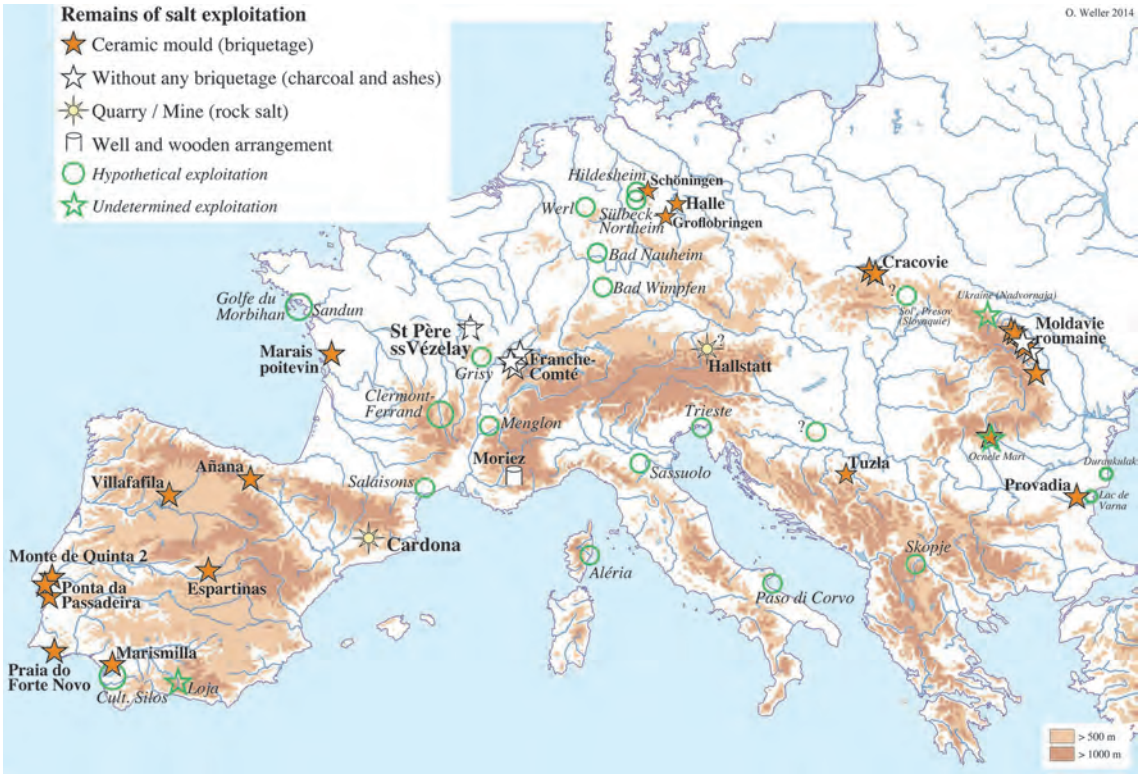

Fig. 15.1. Neolithic and Chalcolithic salt production sites in Europe (after Weller 2015)

Neolithic (4500–3500 cal. BC) (Fíguls *et al*. 2005). Some other Neolithic and Copper Age sites, spanning from the late 4th to the early 3rd millennium cal. BC (La Marismilla, Praia do Forte Novo, Gaspeia, Monte da Quinta 2, Punta da Passadeira) seem to be related to the production of salt, mainly on the basis of the occurrence of large quantities of coarse ceramic vessels (for references see Abarquero *et al*. 2012, 307–308). Certainly, boiling brine seems to have been the most widespread method in prehistoric Iberia, and by the end of the 3rd millennium, not only is evidence more conclusive but it also comes from inland sites.

Molino Sanchón II is an archaeological site located in the north-west of Spain (province of Zamora) (Fig. 15.2). It sits on the shores of a small stream connecting the two largest lagoons of the Villafáfila Lake Complex (Las Lagunas de Villafáfila), a collection of shallow saltwater lakes included in the Ramsar Convention protection list of wetlands of international importance (Rodríguez *et al*. 2000, 154). The exploitation of salt at the Villafáfila Lake Complex is well documented from at least the 10th to the end of the 16th century AD, when this activity was no longer profitable and was suddenly abandoned (Rodríguez 2000). According to the written records, the methods employed for the exploitation of salt during the Middle Ages combined the evaporation of the brine in shallow pools through solar heating with the exposition of saline water to direct fire in order to reduce brine most rapidly. Archaeological data, however, show that salt-making can be traced back to prehistoric times.

The excavation of Molino Sanchón II in 2009 produced evidence for salt production dated to the 3rd millennium cal. BC. Since a more extensive description of Molino Sanchón II has been published elsewhere (Abarquero *et al*. 2010; 2012; Guerra *et al*. 2011), the following is a brief summary of the results of the archaeological excavation of this site. Three different phases of activity were identified within the test trench. The final phase (phase III) corresponds to an Early Medieval cemetery, and it will not be discussed further here. During phases I and II, the site operated as a salt-making factory through boiling brine (Fig. 15.3): 1) natural brine obtained from the Villafáfila lagoons was poured into coarse ceramic vessels placed over fires; 2) supersaturated hot brine was then transferred to smaller pots placed on clay pedestals over glowing embers in order to speed up the crystallisation process; 3) the small pots were finally broken up to obtain hard salt cakes.

Archaeological evidence for salt-making during the prehistoric occupation of Molino Sanchón II consists of several layers of ashes, charcoal and mud pellets, where many pedestals were still *in situ*, found together with abundant *briquetage*, i.e. refused brine-boiling implements such as clay supports and roughly-made plain vessels that have been considered to be one of the main hallmarks of

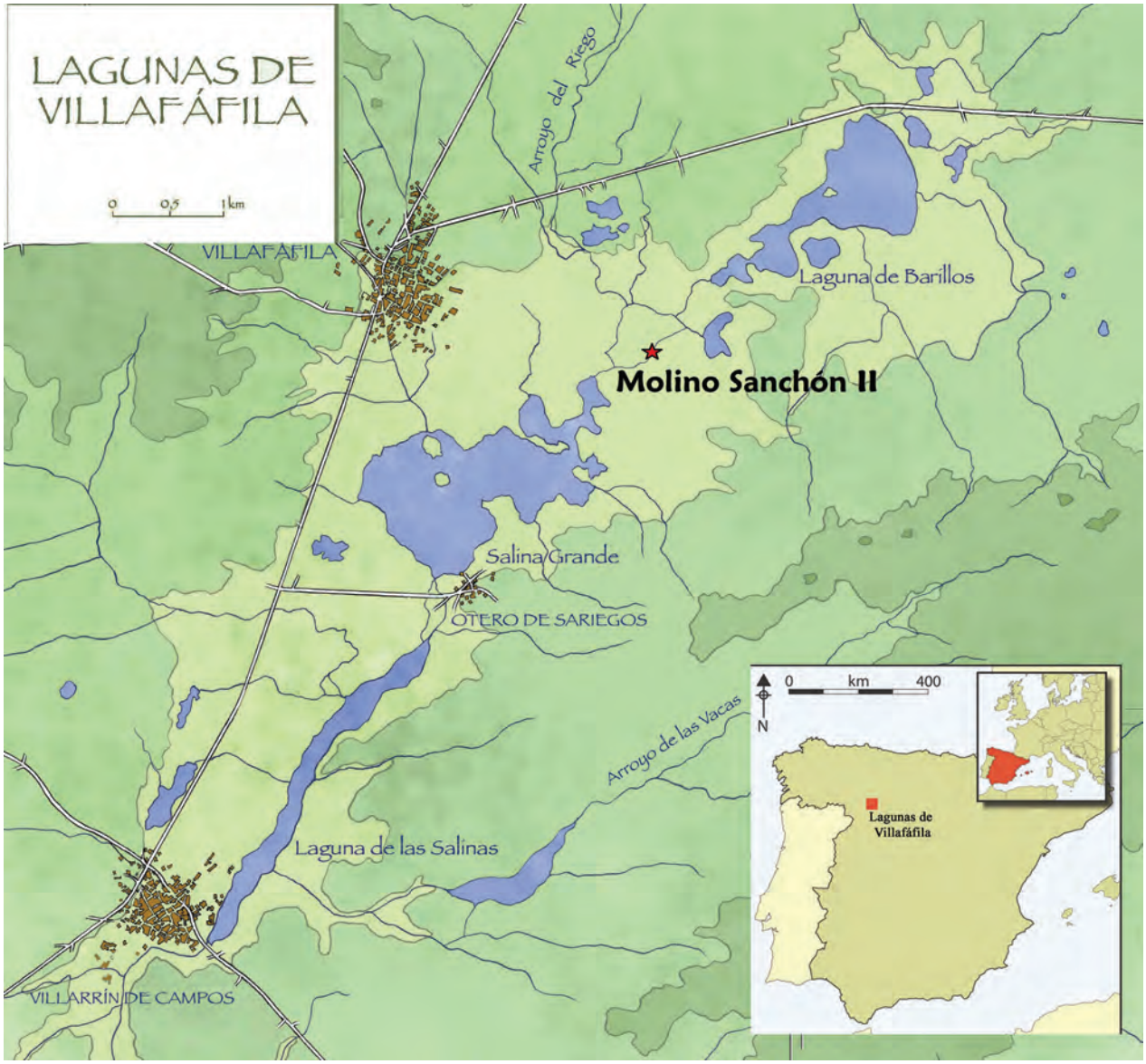

Fig. 15.2. Map of the Villafáfila Lake Complex (Zamora, Spain) with the location of Molino Sanchón II.

ancient salt production (Harding 2013, 54). Chronologically, the exploitation of salt at Molino Sanchón II took place during the second half of the 3rd millennium (approximately 2400–2000 cal. BC), on the basis of the AMS dating of five charcoal samples.[1] Surprisingly, a profuse amount of Beaker pottery occurs almost everywhere in spatial relation to salt processing areas. Here we examine the significance of Beaker pottery at Molino Sanchón II, and propose symbolic and political interpretations in the light of other cases in Iberia during the 3rd millennium, which illustrate that Beaker sherds cluster in specialised activity areas.

The distribution of pottery at Molino Sanchón II

In order to assess the significance of Beaker pottery at this salt factory, it is necessary to describe briefly the prehistoric occupation of the site.

The excavated area, a trench of 36 m^2 divided into three sectors (1AB, 1D and 1F), clearly shows two distinct phases of prehistoric occupation, both related to salt-making activities (Fig. 15.4). Phase I is divisible into three consecutive subphases: in subphase Ia, several holes were dug down on the bedrock clay to reach the groundwater table. These have been interpreted as well-pits from which to collect salt water.

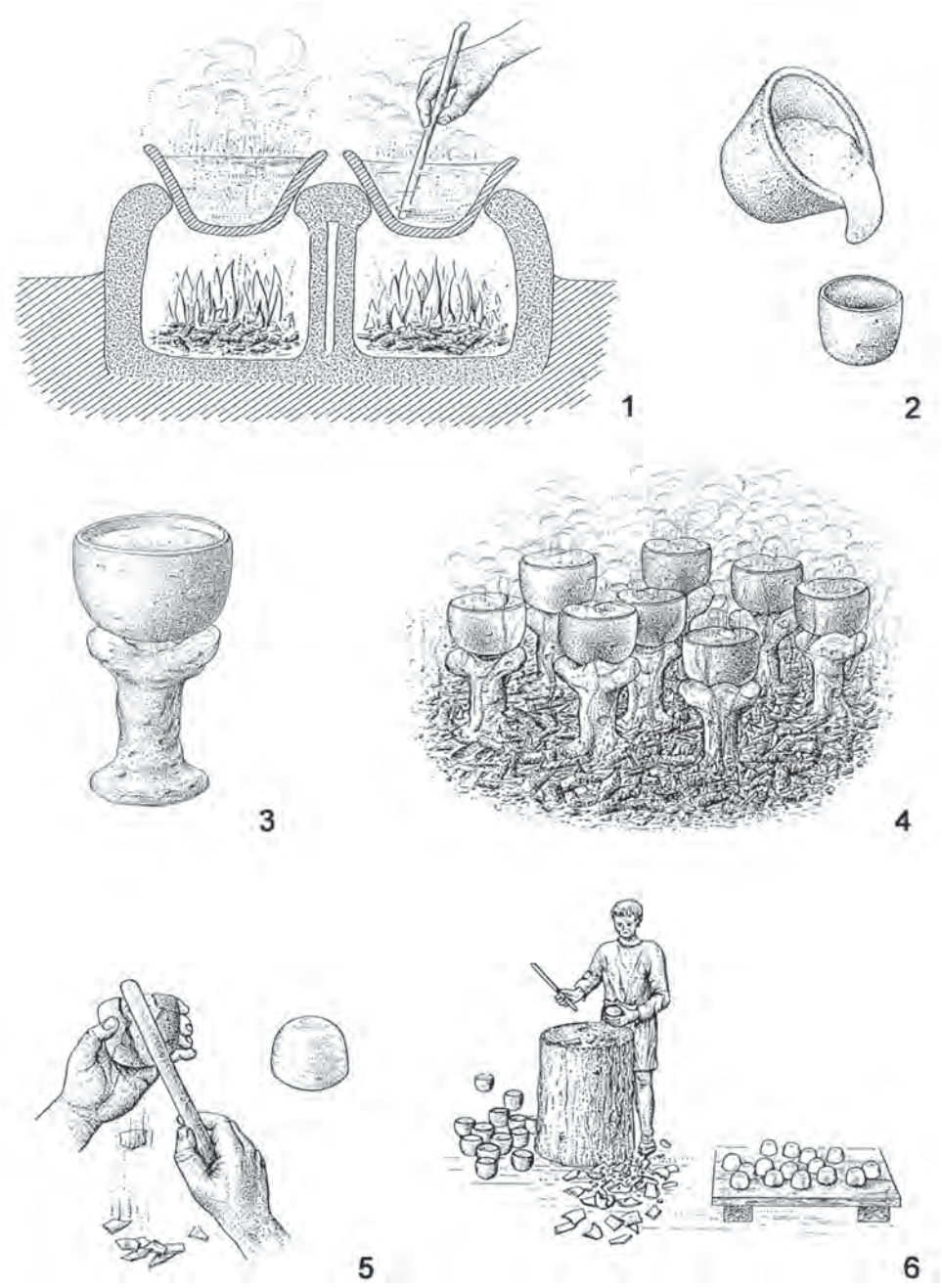

Fig. 15.3. Recreation of the brine-boiling process at Molino Sanchón II.

They were subsequently filled with successive layers of ashes and charcoal, possibly resulting from the conditioning of a brine-boiling activity area that may have been operating elsewhere (Fig. 15.5). On the other hand, the deposits of subphase Ib are characterised by the occurrence of brine-boiling implements found in their original position. Among them it is particularly interesting to note that two clay pedestals remained intact on a mud platform that sealed one of the well-pits of subphase Ia. Many horizontal layers of ashes, charcoal and small mud pellets contained thousands of sherds from roughly-made plain vessels broken *in situ* and fragments of clay supports. Besides, some pits were dug at the end of this subphase, the meaning of which is unclear but they do not seem random rubbish pits. The fact that their fills show a massive deposition of pottery sherds, including many Beaker fragments, can be seen as an indication of ritual activity in the form of votive offerings. Finally, subphase Ic consists of refuse layers. In contrast to the earlier levels,

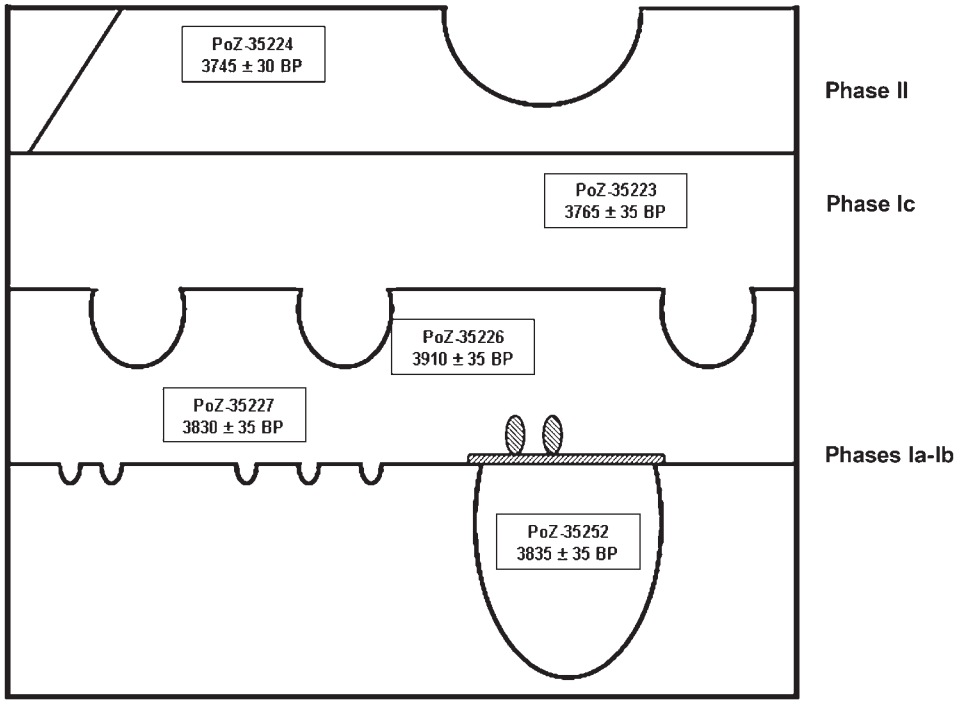

Fig. 15.4. Idealised cross-section of the excavated area at Molino Sanchón II. The radiocarbon dates were obtained from five charcoal samples.

Fig. 15.5. Well-pit in sector F. In the low left corner of the image, a large Beaker pot deposited in this pit.

Fig. 15.6. Drying-area (phase II).

these concentrations of briquetage are found in a secondary position mixed with ash and charcoal, and mud platforms with clay supports are completely absent. Beaker pottery is abundant in all these three subphases.

In Phase II, which followed shortly after, most of the excavation area was covered with a bed of white clay sediment, forming a compact and hard surface. It produced abundant potsherds and briquetage but only a handful of Beaker sherds. A number of pits, some of them lined with mud and filled exclusively with clay, may have been used as deposits of brine, possibly to remove sediment and also to increase the salinity through evaporation. Only one of these pits contained some pottery, but the others are artefactually sterile. Evidence for brine-boiling during phase II is restricted to a small and precise area in sector 1AB, and consists of a number of clay pedestals found *in situ* (Fig. 15.6). This is a similar situation to that observed in subphase Ib with the occurrence of brine-boiling implements found in their original position. Interestingly, a number of Beaker sherds have been recovered in this area.

The great majority of the find assemblage at Molino Sanchón II consists of pottery, with approximately 30,000 sherds. Because of the non-specific character of the bulk of the collection, only a representative selection has been chosen for a detailed study, including many different forms and decorations. Therefore, the analysis has been performed for 6025 sherds, representing almost 20% of the total collection. Materials from subphases Ia and Ib have been considered together, on the basis of the technological similarity of the pottery assemblage within these two subphases. Besides, two radiocarbon dates, that are practically identical, obtained from samples from the well-pit in sector 1F (PoZ-35252: 3835±35 BP; 2458–2154 cal. BC) and a drying area with Beaker pottery within subphase Ib (PoZ-35227: 3830±35 BP; 2457–2150 cal. BC), seem to suggest that the filling of the well-pits and the beginning of the boiling activities occurred at approximately the same time.

The distribution of ceramic types within the two phases of prehistoric occupation is indicated in Table 15.1. The ceramic assemblage is dominated by large pots of varying shapes. It is clear that plain types heavily outnumber decorated ones. Plain types rise to over 83% of the selected assemblage, and reach 97% of the pottery finds. It should be noted that during the salt-making process, once the saturated brine solution cooled down and the crystallisation was completed, ceramic pots had to be broken open in order to obtain hard and transportable salt cakes. The use of decorated wares, therefore, would not add any additional advantage from a practical point of view.

Among the decorated types, we have differentiated between non-Beaker and Beaker sherds. Non-Beaker ornamented sherds are poorly represented all along the sequence, since they make up less than 2% of the selected assemblage in each phase (although they reach 4.5% in the drying area of phase II), and this figure plummets to 0.1% when considering the whole ceramic collection. Common

Table 15.1. Distribution of ceramic types during the prehistoric occupation at Molino Sanchón II.

		Subphases Ia-Ib	*Subphase Ic*	*Phase II (white sediment)*	*Phase II (drying area)*
Plain types		2533 (83.6%)	2028 (92.9%)	462 (96%)	300 (90.3%)
Decorated types	Non-Beaker	45 (1.48%)	44 (2%)	5 (1%)	15 (4.5%)
	Beaker	451 (14.88%)	111 (5 %)	14 (2.9%)	17 (5.1%)
TOTAL		3029	2183	481	332

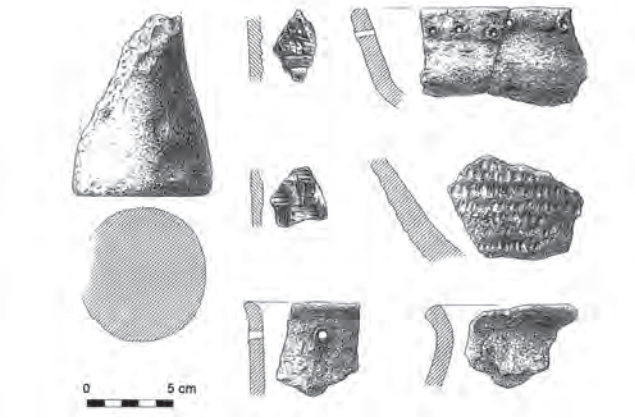

Fig. 15.7. Briquetage from Molino Sanchón II.

motifs include applied cordons and other plastic decorations (small horizontal handles or ribs in relief), incised, fingernail and impressed designs with quite simple patterns, and very rarely, painted motifs. A reduced number of sherds show basketry impressions on their bases (Fig. 15.7).

As far as Beaker pottery is concerned, there is an unusual occurrence of this distinctive ceramic type, especially bearing in mind that Molino Sanchón II has been interpreted as a salt production site. The collection of Beaker pottery from Molino Sanchón II is probably the most abundant in all Iberian Beaker sites. It should be pointed out, however, that Beaker sherds in Molino Sanchón II only represent approximately 2% of the total collection. On the surface, over 100 ornamented sherds were previously collected during field-walking surveys, and almost 600 were recovered during the excavation (Fig. 15.8). While 18 of them were unassociated finds, as they were found in the layers corresponding to the medieval cemetery (Phase III), the remaining sherds of the collection (593) are associated with the prehistoric occupation of the site. The vast majority was unearthed at subphases Ia–Ib where Beaker pottery makes up more than 14% of the selected assemblage but this figure reduces dramatically when considering the upper layers.

Despite the abundance of Beaker pottery at Molino Sanchón II these vessels were not used throughout the process of brine boiling. While the high quality of the pots themselves and their lavish decoration had already called into question this possibility, the hypothesis has been supported by the results of the technological analysis of the different ceramic types from this site. On the basis of the detection of chloride as a marker for salt-making pottery (Horiuchi *et al*. 2011), the different concentrations of Cl between non-Beaker and Beaker pottery at Molino Sanchón II seem to indicate other uses for Beakers (Odriozola and Martínez-Blanes 2012). Taking into account that most of the year the site is completely flooded with saline water, there is no sense in carrying out residue analysis though, as any potential residue is likely to have been washed out.

The distribution of Beaker pottery at Molino Sanchón II

Beaker collection at Molino Sanchón II includes fine wares of the kind more frequently found in tombs, together with large vessels. Among the different stylistic variants of Beaker pottery, comb impressed decoration is attested in one case only. This sherd has been decorated with a series of eight comb-impressed lines that run in parallel, alternating with undecorated areas. Despite the smallness of the piece, it might stylistically be recorded as Maritime Lined (or Linear) variety (MLV), resembling to some Beaker pots found in Portugal and Galicia (western Iberia) (Prieto and Salanova 2011). It comes as no surprise that it has been recovered in the subphase Ib, dated around 2400–2200 cal. BC, since Maritime variants have been proved to be chronologically located by the mid-3rd millennium BC and their heyday was earlier than the Ciempozuelos style in central Iberia (Ríos 2011).

Leaving that aside, practically all the sherds found at Molino Sanchón, either in the course of field survey or during the excavation campaign, correspond to the Ciempozuelos variant, which is characterised by incised and impressed motifs, some of them filled with a white paste, in a wide range of designs. The Ciempozuelos style also includes some later variants, which have their own characteristics according to some scholars (Fernández-Posse 1981): the Silos/Vaquera style comprises patterns and designs very similar to the Ciempozuelos variant but in a sloppy manner.

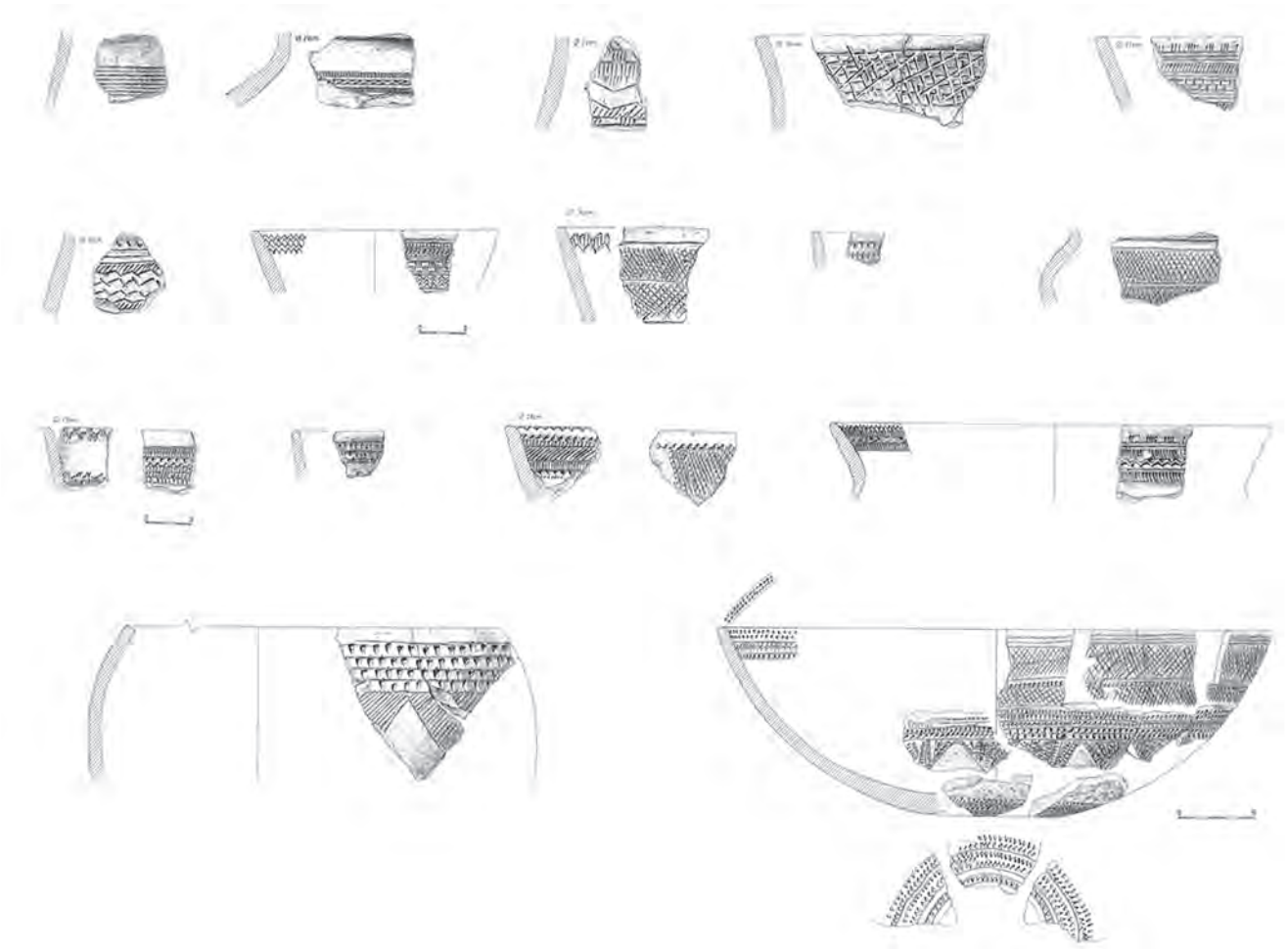

Fig. 15.8. Beaker pottery from Molino Sanchón II.

Another group is represented by Molino beakers, which consist of large pots, possibly used for storage.

On the basis of the figures shown in Table 15.1, it seems clear that Beaker pottery is particularly abundant in subphases Ia–Ib when the salt-making centre started to operate around 2400 cal. BC. The drastic reduction in the number and frequency of this ceramic type in the upper layers, however, should not automatically be interpreted as irrefutable evidence for the decline of importance of Beaker pottery at Molino Sanchón II. In this sense, it should be noted that the inventory of each phase has been made for the excavated area as a whole (36 m^2), but the drying area containing briquetage *in situ* within phase II is confined to a very reduced area in sector 1AB, and seems to exceed the eastern profile of the trench. Although it is true that the remaining pottery (plain types and non-Beaker ornamented sherds) within the drying area at phase II differ from the materials recovered at the previous phase, we lack visual perspective to assess whether Beaker pottery has the same function here than in the lower layers.

The largest number of Beaker sherds comes from subphases Ia–Ib, which have produced a total amount of 451 pieces. These characteristic vessels occur almost everywhere in spatial relation to salt processing areas but rather than being used in the processing and production of salt, they seem to have played a key role in the development of ritual activity at Molino Sanchón II. For instance, the deliberate deposition of Beaker pottery into those ritual pits at the end of the subphase Ib suggests a ritual practice in relation to the closing off of the drying area within the trench.

It is an interesting fact to note that two of the well-pits within subphase Ia, one located in sector 1D and the other one in 1F, contained a large Beaker pot in each of them, fairly complete in the latter case.[2] Our assumption that this was the result of a deliberate act, suggesting a kind of votive offering (Abarquero *et al*. 2010) is firmly supported by additional evidence. The well-pit at sector 1F also produced a few animal bones of domestic species with signs of human manipulation which may be indicative of feasting, and all the more so when faunal remains are extremely

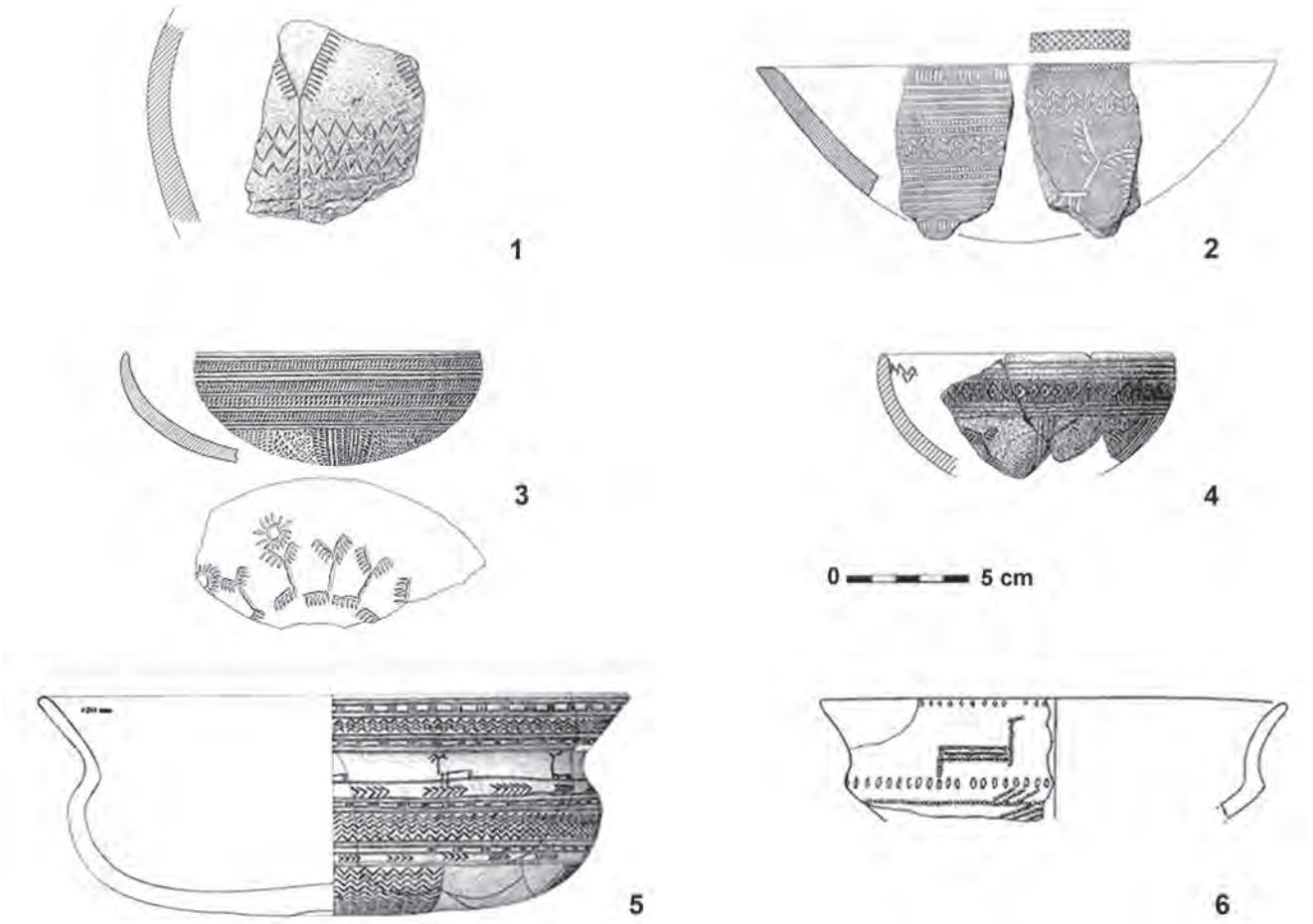

Fig.15.9. Comparison of some Beaker pots with deer motifs: 1. Molino Sanchón II (Villafáfila, Zamora, Spain); 2. Museo de Córdoba (after Leisner 1961); 3. Las Carolinas (Madrid, Spain; after Leisner 1961); 4. La Calzadilla (Almenara de Adaja, Valladolid, Spain; after Delibes and Guerra 2004); 5. Camino de las Yeseras (San Fernando de Henares, Madrid, Spain; after Liesau et al. 2008) with 6. the piece from the prehistoric salt production centre at Provadia-Solnitsata (Bulgaria; after Petrova 2011).

scarce at Molino Sanchón II (Liesau and Daza 2012). The same well-pit at sector 1F also provided, together with many Ciempozuelos pots, a Beaker sherd with symbolic decoration, more specifically a deer motif similar to those displayed in open-air sites with Schematic Art (Fig. 15.9).

Beaker pottery with symbolic motifs, such as suns or deer with exaggerated antlers, is rather exceptional in Iberia. Some 25 examples, mainly corresponding to the Ciempozuelos style, have been discovered in both tombs and settlements (Garrido and Muñoz 2000). The deer motif is displayed on the three distinct vessels of the Ciempozuelos ceramic set, mainly on Bell Beakers and hemispheric bowls (Delibes and Guerra 2004). The ditched enclosure at Camino de las Yeseras, Madrid has provided a carinated bowl with a series of deer, deposited in a burial context (Liesau *et al*. 2008). Despite the fact that the composition at the Molino Sanchón II sherd is partial, owing to breakage of the vessel, parts of two male deer can be observed. The most complete cervid figure shows a huge antler including a series of tines sprouting from the two main beams, a long neck and a portion of the body as well. Three zig-zag lines that run in parallel behind the animal create the sensation of depth (an attempt to depict the waves at the surface of the lakes?). This is an exceptional element among the compositions of the symbolic pottery, since the motifs tend to be displayed in isolation. The presence of a long line to the right, cut by smaller notches might correspond to the antler of another deer.

We cannot help but admit that it is, at the very least, an astonishing coincidence that a ceramic pot from the prehistoric salt production centre at Provadia-Solnitsata, Bulgaria, is ornamented with a cervid figure. A rather schematic depiction of what it seems to be a female deer in a comb-impressed pattern is shown on a carinated vessel dated to the Middle Chalcolithic Hamangia IV period, which has been recovered in a building where brine boiling was carried out (Petrova 2011, 66, fig. 2.3).

Beaker pottery and specialised activity areas in Iberia

Although a number of Neolithic and Copper Age sites in Europe have provided evidence for salt production, the association of this activity with Beaker groups is currently confined to Iberia. The excavations at Espartinas (Ciempozuelos, Madrid) have revealed an artificial mound built up primarily by huge quantities of sherd material interpreted as briquetage, and areas of burning, where apart from Copper Age pottery a handful of Beaker sherds was recovered (Ayarzagüena and Carvajal 2005; Valiente and Ramos 2009). At Fuente Camacho (Loja, Granada), prehistoric pottery including a few Beaker sherds, has been found near the Middle Age saltworks (Terán and Morgado 2011). Recently the occurrence of Ciempozuelos Beaker pottery has been reported at the Salt Valley of Salinas de Añana (Vitoria) in spatial relation to brine-processing areas (Plata and Martínez 2014). This spatial relationship between Beaker sites and inland salt-marshes in Iberia might suggest that Beaker elites controlled the production of salt (Delibes and del Val 2007–8)

This association of Beaker pottery and specialised activity areas has also been noticed in other archaeological sites of Iberia. A strong link between copper metallurgy and Beakers can be observed in some places, such at La Loma de la Tejería (Albarracín, Teruel, Spain), a seasonal camp site involved in mining of copper ores, where some Ciempozuelos sherds have been found (Montero and Rodríguez de la Esperanza 2008). At the Copper Age fortified settlement of Zambujal (Torres Vedras, Portugal), Beaker pottery remarkably tends to cluster in metalworking areas (Kunst 1987). Other settlements, smaller in size, such as Arenero de Soto at Perales del Río (Getafe, Madrid) (Blasco *et al.* 1989; Rovira 1989), El Ventorro (Villaverde, Madrid) (Priego and Quero 1992) – recently reinterpreted as an aggregation site, used as a communal or supracommunal feasting area (Diaz del Rio 2001; 2006) – or Pico Castro (Quintanilla de Arriba, Valladolid) (Rodríguez Marcos 2005), have also produced Beaker pots spatially related to remains of copper metalworking illustrating different moments of the smelting process.

Thus, we find it difficult to explain by chance the presence of symbolic Beaker pottery at Pico Castro (a sun motif on the inner wall of a bowl) or El Ventorro (part of a deer motif on a Bell Beaker). At the latter site, there is also evidence for the use of Beaker pots as reduction pots for smelting copper ores (Harrison *et al.* 1975), a very extraordinary circumstance in Iberia (Guerra 2006). Recently, the discovery of a Ciempozuelos hemispheric bowl with symbolic decoration (a series of male deer associated with sun motifs) has been reported at La Calderona (Valdemoro, Madrid), where a mould for casting chisels has also been found (Sanguino and Oñate 2011). All this evidence can be seen as an indication of the ritual link between metalworking and Beaker pots (some of them even decorated with symbolic designs). It should be emphasised that the deer motif has been considered a symbol of regeneration because of the regrowth of its antlers (Gimbutas 1974, 171). This would explain the choice of this motif at sites involved in the extraction and processing of minerals, either copper or salt, since the regeneration of mineral resources is sought.

The symbolic use of Beaker pottery

Some scholars have remarked on the interest of Beaker elites in establishing their control over the most profitable activities with the aim of gaining a most advantageous position from a social and economic point of view (Blasco *et al*. 2008, 309). In order to claim property rights over those activities Ciempozuelos groups in Iberia would have made use of their distinctive pottery, acting as a property mark on them (Delibes and del Val 2007–8). We are not assuming that Beaker pots were directly used in metalworking or salt processing. Rather, they might have served for the consumption of special foods and alcoholic drinks in the course of propitiatory ceremonies aimed to invoke supernatural powers in order to succeed in the procurement of mineral resources (copper and salt respectively). Certainly, mining and metallurgical activities amongst preindustrial societies have symbolic and magical connotations (Blas 2010; Budd and Taylor 1995; Eliade 1978). Ethnographic cases, likewise, illustrate the importance of performing ritual ceremonies near the salt works. These usually consist of purification rites and votive offerings to the salt deities that usually adopt the form of female salt goddesses, such as *Hurúng Wuhti* ("The Woman of the Hard Substances") among the Hopi, *Mawe* ("Salt Mother") among the Zuñi (Hodge 1912), or *Huixtocíualtl* among the Aztecs (Batalla and de Rojas 2008). It is worth noting that traditional salt makers in Veracruz, Mexico, pour some liquor during these ceremonies (Martell 2011, 54).

If similar ceremonial activities were held at Molino Sanchón II, they might have ended up with Beakers being cracked. We have evidence of this practice at Almenara de Adaja (Valladolid, Spain), where Ciempozuelos Beaker hemispheric bowls were probably intentionally smashed, as indicated by the presence of a number of perfect halves in association to two human ribs deposited at the bottom of a pit. Besides, the Beaker ceramic assemblage included a bowl with symbolic decoration on the outside (Delibes and Guerra 2004) and another bowl containing traces highly suggestive of beer and honey (Guerra 2006).

Although we cannot reconstruct exactly the rituals that Beaker elites performed at these specialised activity areas, the evidence points to the use of their distinct pottery

(possibly for the consumption of alcoholic beverages) in the course of ceremonial activities that concluded with Beakers being smashed. Not surprisingly residues indicative of beer have been detected in Beaker and non-Beaker vessels from the mining camp at La Loma de la Tejería (Montero and Rodríguez de la Esperanza 2008). Ultimately these vessels, even fragmented, would have functioned as symbolic markers of property rights. Taking into consideration the complexity of restricting access to copper ores or to saline lakes, Beaker pottery can be seen as a means to claim ownership of them in order to prevent others from exploiting those resources.

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Notes

1 The radiocarbon dates cited in this paper have been calibrated using the IntCal04 curve and the OxCal v.4.2 programme at two standard deviations.

2 A carbonised cereal grain has been found within the fabric of this large pot deposited in the well-pit at sector 1F. Its identification has been difficult to establish due to its bad preservation state, but Dr Lydia Zapata (Universidad del País Vasco) opted for a variety of barley (*Hordeum* sp.). Rather than being intentional, it seems more likely the result of an accidental inclusion.

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16

EXPLORING SOCIAL NETWORKS THROUGH BELL BEAKER CONTEXTS IN THE CENTRAL VALENCIA REGION FROM RECENT DISCOVERIES AT LA VITAL (GANDÍA, VALENCIA, SPAIN)

Oreto García Puchol, Joan Bernabeu Aubán, Lluís Molina Balaguer, Yolanda Carrión Marco and Guillem Pérez Jordà

Recent discoveries carried out in the open air site of La Vital (Gandia, Valencia, Spain), have provided an interesting dataset about internal and external organisation of domestic space, metallurgical activities and burial practices dated to the pre-Beaker Chalcolithic and Bell Beaker periods. According to several analytical criteria (i.e. spatial and chronometric), ten structure clusters have been established: most of them include a household area (hut pit), around which storage and burial structures are distributed. The survey conducted at La Vital has offered interesting results, which permit us to address the appearance of the Bell Beaker assemblage in the central-southern Iberian coast, from an accurate chronometric perspective. In this frame, a large number of AMS dates have been obtained from human bones and short-lived species. This framework allows us to explore social dynamics as a reflection of the changeable social networks established through regional social relationships. In this paper we focus our analysis in some aspects related to burial practices and socio-economical analysis (mainly related to metalwork activities and storage capability intra-sites and between sites).

Introduction

Recent Bell Beaker archaeological discoveries in central Mediterranean Spain, although mainly related to rescue excavations carried out in the last decade, have provided renewed information on this period, covering features such as the structure and organisation of domestic spaces and activity areas in settlements, burial customs, subsistence activities, craft specialisations (metalwork) and interaction networks (Pérez *et al.* 2011; García Puchol *et al.* in press). Together with a new radiocarbon dataset, this information sheds new light on our knowledge about the historical processes of the 3rd millennium BC in this region and in neighbouring areas (Pérez Jordá & Peña Chocarro, 2013; García Puchol *et al.* 2013).

Previous synthesis of the current record (Juan Cabanilles 2005; López Padilla 2006) showed how maritime and international series, as regional styles, are present in domestic and funerary contexts. Mortuary Bell Beaker data in the region came from caves, outside the habitable areas, and pits such as silos located inside settlements. Caves are the preferred place for collective burials from the Late Neolithic and Chalcolithic periods, and Bell Beaker deposits confirm their continuity in use until the beginning of the Bronze Age (Soler 2001). Although the absence of megalithic structures marks distances with other neighbouring areas, the predominance of similar practices (collective burials) and good graves (eyes, idols) show clear similarities with south-east Spain, the location of the Millares culture. These relationships are emphasised by the exchange of raw materials to make polished stone tools (Orozco 2000) and large flint blade (García Puchol and Juan Cabanilles 2009). On the other hand, Late Neolithic

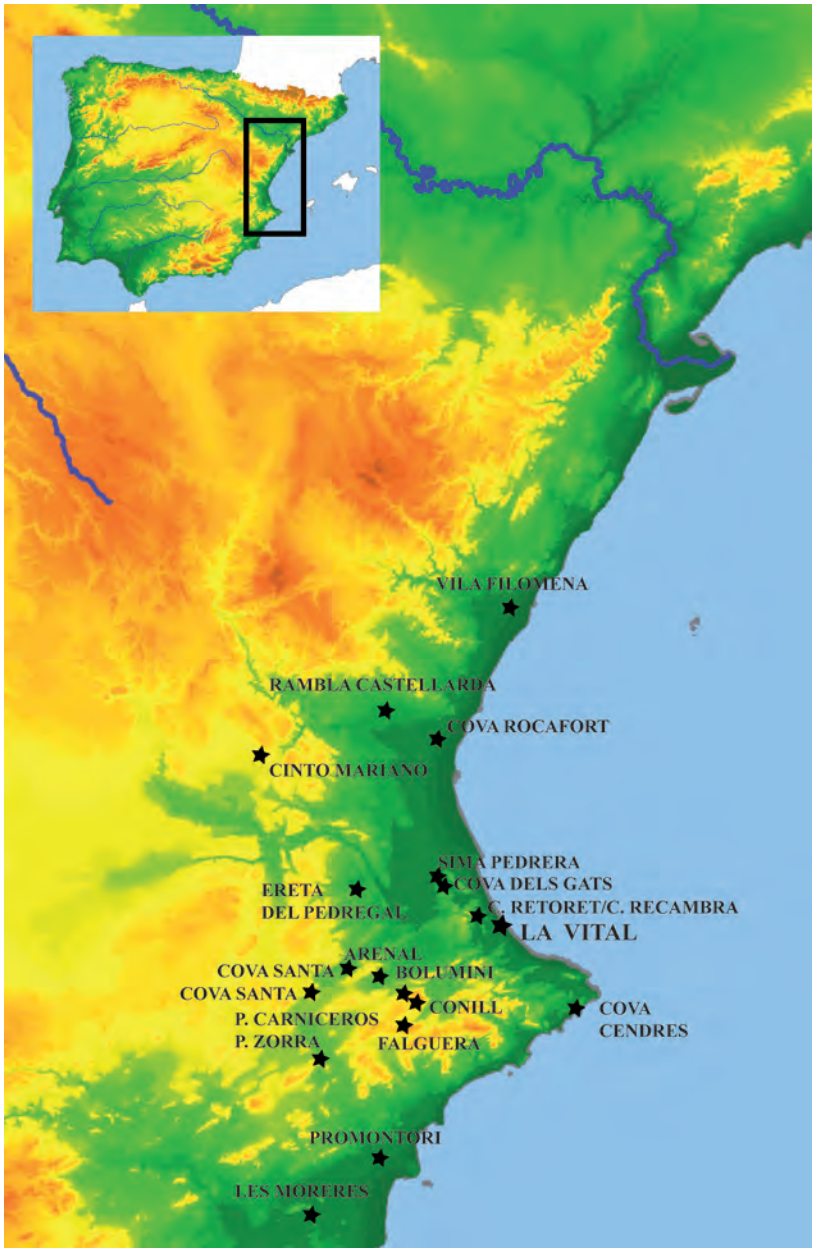

Fig. 16.1. Location of the archaeological site La Vital and the main Bell Beaker sites in the region.

Table 16.1. Radiocarbon AMS data from La Vital. Dates were calibrated using Oxcal 4.2 (Bronk Ramsey 2009) and Intcal13 curve (Reimer et al. 2013).

Sample ID	*Lab. ref.*	*material (bone)*	*Age BP*	*Cal BC 68.2%*	*Cal BC 95.4%*
UE 3110 Burial	Beta 222443	Human	3830±40	2389–2202	2459–2148
UE 2214 Burial	Beta 222444	Human	4000±50	2574–2470	2835–2346
UE 2214 Burial	OxA-V-2360-15	Human	3946±28	2550–2350	2566–2344
UE 2202 House	Beta 222445	*Ovis aries*	4040±40	2620–2488	2840–2469
UE 3088 House	Beta 222446	*Bos taurus*	3920±40	2472–2346	2561–2290
UE 3053 House	Beta 222447	*Bos taurus*	3870±50	2457–2291	2472–2202
UE 3056 Burial	Beta 229791	Human	3920±50	2475–2310	2568–2214
UE 2137 Heart	Beta 229792	*Ovis aries*	4100±50	2856–2577	2873–2496
UE 2194 House	Beta 229793	*Bos taurus*	4150±50	2871–2640	2881–2581
UE 2115 Pit	Beta 229794	*Sus* sp.	4180±40	2881–2695	2891–2631
UE 3144 House	Beta 229795	*Sus dom.*	4070±50	2840–2493	2864–2474
UE 2193 Ditch	AA 72170	*Bos taurus*	4045±52	2831–2481	2859–2467

individual burials using domestic pits in settlements have been recognised from the first half of the 4th millennium (Tossal de les Basses: Roser 2010), continuing in use to the end of the 3rd millennium cal. BC (Costamar and Flors 2009; Beniteixir and Pascual Beneyto 2010).

The analysis of the archaeological record from La Vital open air site constitutes the starting point for exploring social relationships in the regional Chalcolithic Bell Beaker period. La Vital is located on a terrace on the right bank of the river Serpis, in the Mediterranean coastal town of Gandia (Valencia, Spain) (Fig. 16.1). The rescue excavations, carried out on an area of 6000 m^2, allowed us to document several occupation phases including Epicardial Neolithic, Chalcolithic, Iberian, Roman, Islamic and Middle Ages structures. An important part of these structures belong to a metal producing settlement dated to the pre-Beaker Chalcolithic and Bell Beaker (Maritime and International styles) periods (2800–2300 cal. BC).

When these vessels appear, around 2450/2400 cal. BC, their presence cannot be explained as part of the local ceramic tradition. Neither the shape of the vessels, nor the decorative grammar, has any relation with the ceramics we find among the Late Neolithic and Chalcolithic regional groups. Anyway, the petrographical analysis carried out on both vessels permits no doubt about their local origin (Molina and Clop 2011). This fact has been repeatedly tested at different Iberia sites (Clop 2005). The similarities that show the CZM vase, with others of the same class, coming from some northern regions (Catalonia, Basque Country, Languedoc) cannot be explained without some direct reference. So, if the pots were made locally , we must consider that those who made them were the ones that were moving. The material culture left at this site shows different evidence of contacts with both areas: the south-east and the Pyrenees. Stone polished axes, some varieties of identified flint, and personal ornaments (Garcia Puchol 2011; García Puchol and Juan Cabanilles 2006; Orozco 2000; 2011; Pascual Benito 1998) prove the range and intensity of contacts during the Late Neolithic and Chalcolithic. The analysis of social relationships through economic information compiled in domestic spaces (storage capability and specialised crafts) and rituals (mainly burial practices) shed new light to explore several aspects of the operation of Chalcolithic social networks (Clark 1976).

Domestic spaces, metalworking activities and individual pit burials at La Vital

Chronological background

An important set of radiocarbon dates were obtained from short-life samples. Human bones from the different burials and other faunal remains were taken for AMS radiocarbon dating (Pérez *et al.* 2011). This database provides the basic framework that allows us to reconstruct the life span of the settlement (Fig. 16.2 and Table 16.1). According to this, Chalcolithic occupation starts around 2800 cal. BC. At this moment, La Vital appears as a typical Late Neolithic site. The material culture (flint industry, ceramic collection) shows no clear differences with that documented at the other known sites dated from the middle of the 4th millennium. The only difference is the evidence of metalwork. Transformation of copper is tested by the presence of different material evidences, including melted metal drops and ceramic reduction vessels. This is the first time, in all the central area of the Mediterranean Iberia, that this kind of activities has been well documented before the Bronze Age period.

The two more recent dates belong to two burial structures where we have documented the only examples of Bell Beaker pots. Although we notice some chronological span between the dates of the two events, an important correlation can be seen if we consider the calibrated values with 95% probability. So, it is quite possible than both events occurred in a short period of time. These dates situate the appearance of the Bell Beaker pottery around 2450/2400 cal. BC. Both vessels belong to impressed varieties. The first, from Grave 10, is a classical Maritime pot (MHV), decorated with the use of a bone/wood comb (Fig. 16.3).

The second pot represents one of the few known cases of CZM (Corded Zoned Maritime) in the Levantine area, and can be considered one of the southern examples of this kind of decoration in Europe (Fig. 16.4). The burial where this pot appeared dates the last episode of use of the site (Grave 11: Fig. 16.4). Around 2300 cal. BC, La Vital is abandoned. No evidence of any incised Bell Beaker examples was recovered among the ceramic package. So it can be accepted that the appearance of the regional incised variants occur somewhat after this moment. As we know by the dates from the Late Chalcolitic site of Arenal de la Costa (Ontinyent, Valencia) and from the Early Bronze Age village of Muntanya Assolada (Alzira, Valencia), the end of the Bell Beaker cycle can be dated around 2200 cal. BC (Diez 2011).

Domestic spaces and metalwork activities

As it is usual for the known open air sites from this period in the region, all we find are negative structures excavated in the terrace soil (Chapman 2008; Juan Cabanilles 2005). The most common ones are storage pits (“silos”), distributed all along the excavated area. We have also documented some hut pits, characterised by their ephemeral architecture (absence of any stone structure, use of dried clay for the walls) and a possible ditch at the edge of the excavated zone. Fieldwork demonstrated the reuse of some of storage pits as burial structures.

According to different spatial and chronometric criteria,

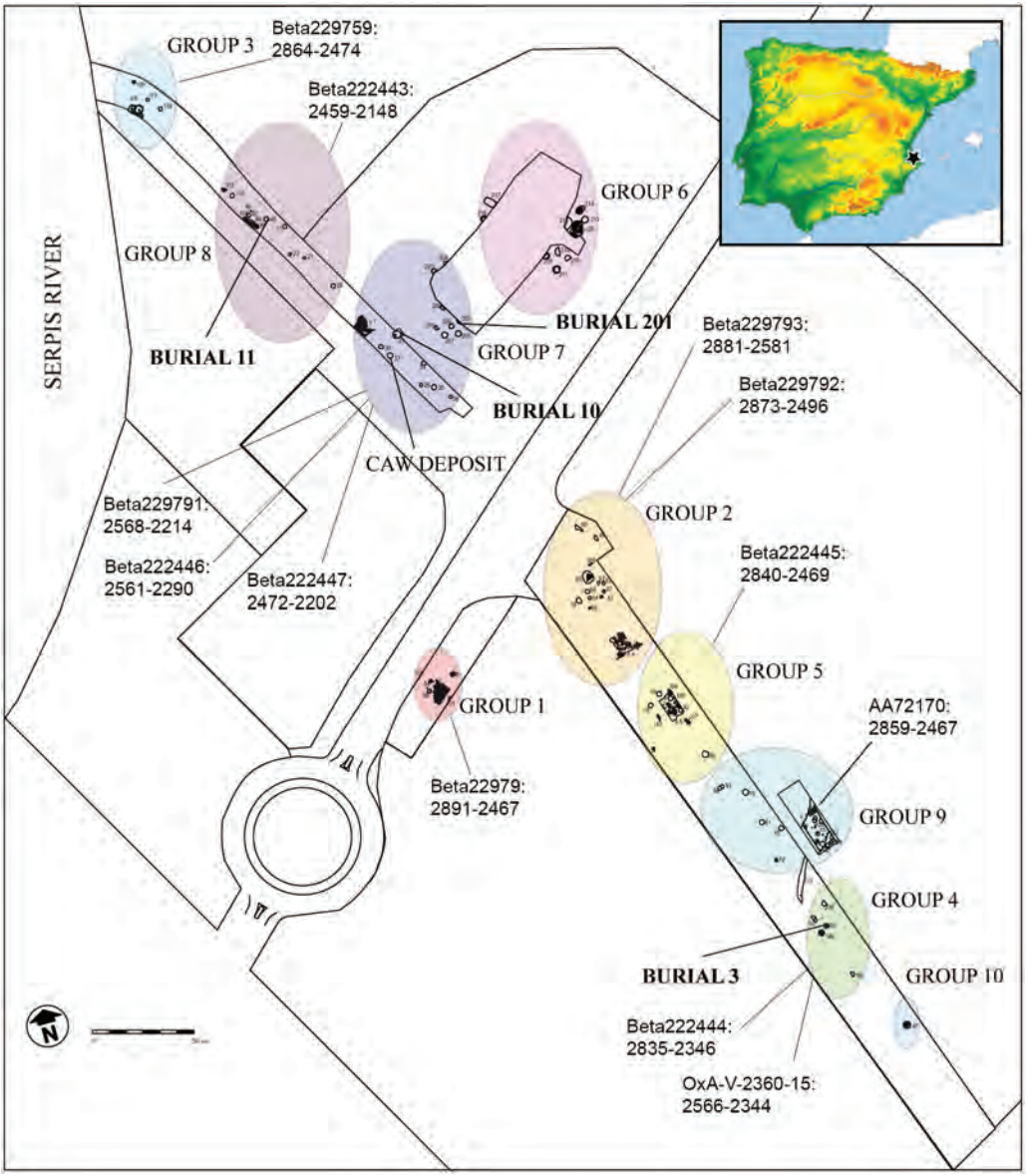

Fig. 16.2. Plan of the site La Vital (Gandía, Valencia). Calibrated radiocarbon dates (2σ) corresponding with the different groups recognised.

ten structure clusters have been established using a K-means test (Gómez *et al.* 2011). Most of them include a household area (hut pit), and different storage pits and burial structures distributed around it (Fig. 16.2). The long occupations detected at La Vital allow us tosuggest that domestic structures appear across a wide area occupying the same place and respecting, apparently, previous domestic and ritual locations. Bell Beakers correspond with domestic groups 7 and 8. Both groups adjoin some remains corresponding with a fragmented domestic dwelling and several pits, some of them used as funerary graves. The only Bell Beaker pots were located in the burial pits.

Several distinctions can be indicated between groups from the variability in storage capability indicated by the presence of pits of different sizes. In this sense two groups (2 and 7) reach 20,000 litres of storage capability, likely for cereals (Pérez *et al.* 2011).

In the course of the excavation a significant number of remains were recovered proving the existence of metallurgic activities. A noteworthy fact is the complete absence among this material of any remains of slag resulting from the first steps of the mineral reduction process. This fact suggests that these first steps were carried out somewhere away from the site (Rovira and Montero 2011). The analytical tests situate the origin of the copper in the south-east of Iberia (Almeria province) (Rovira and Montero 2011). The possibility that,

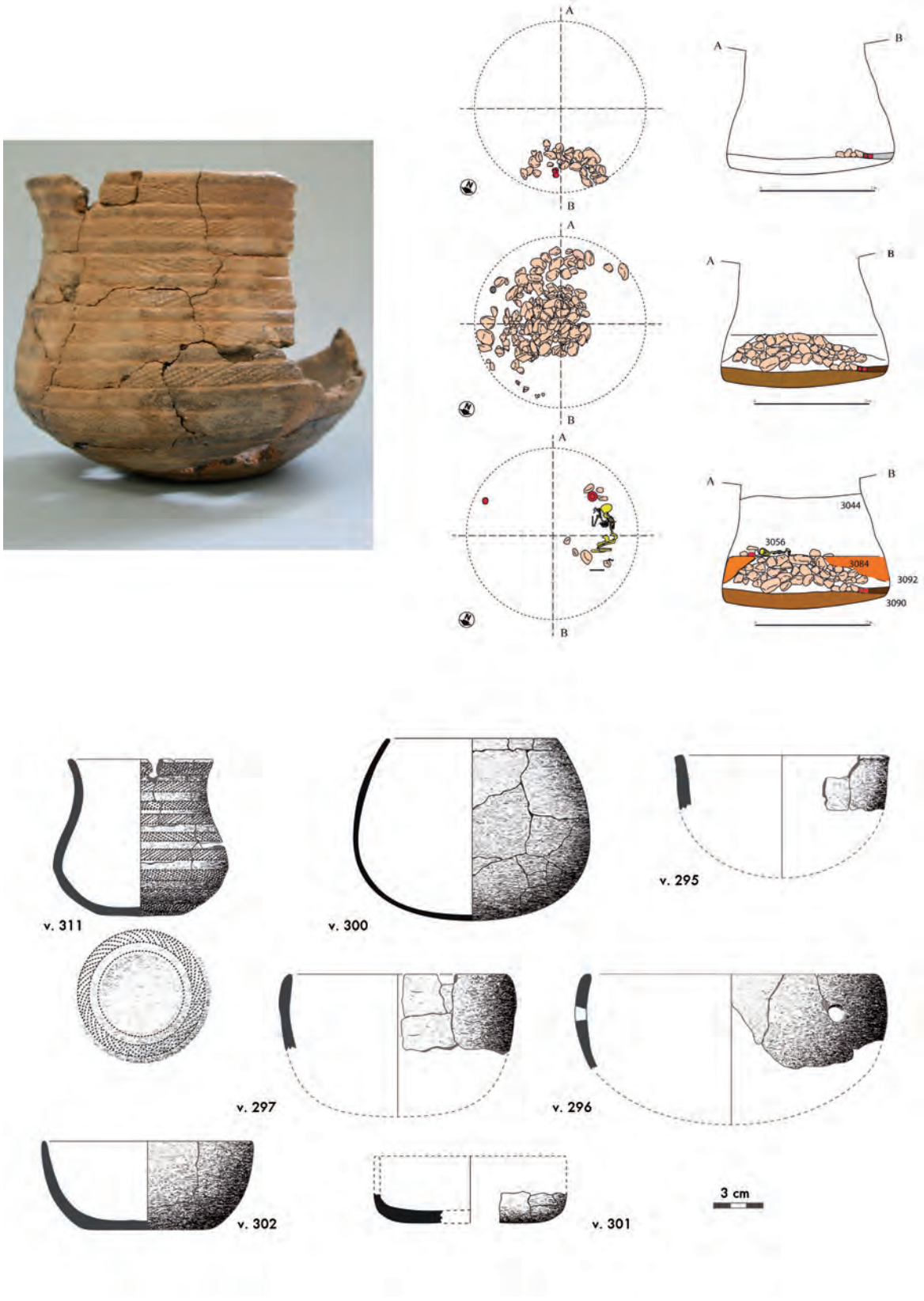

Fig. 16.3. Grave 10 and picture of MHV (Maritime Herringbone Variety) vessel found. At the bottom, small vessels placed bottom up at the base of the burial (from Pérez et al. 2011).

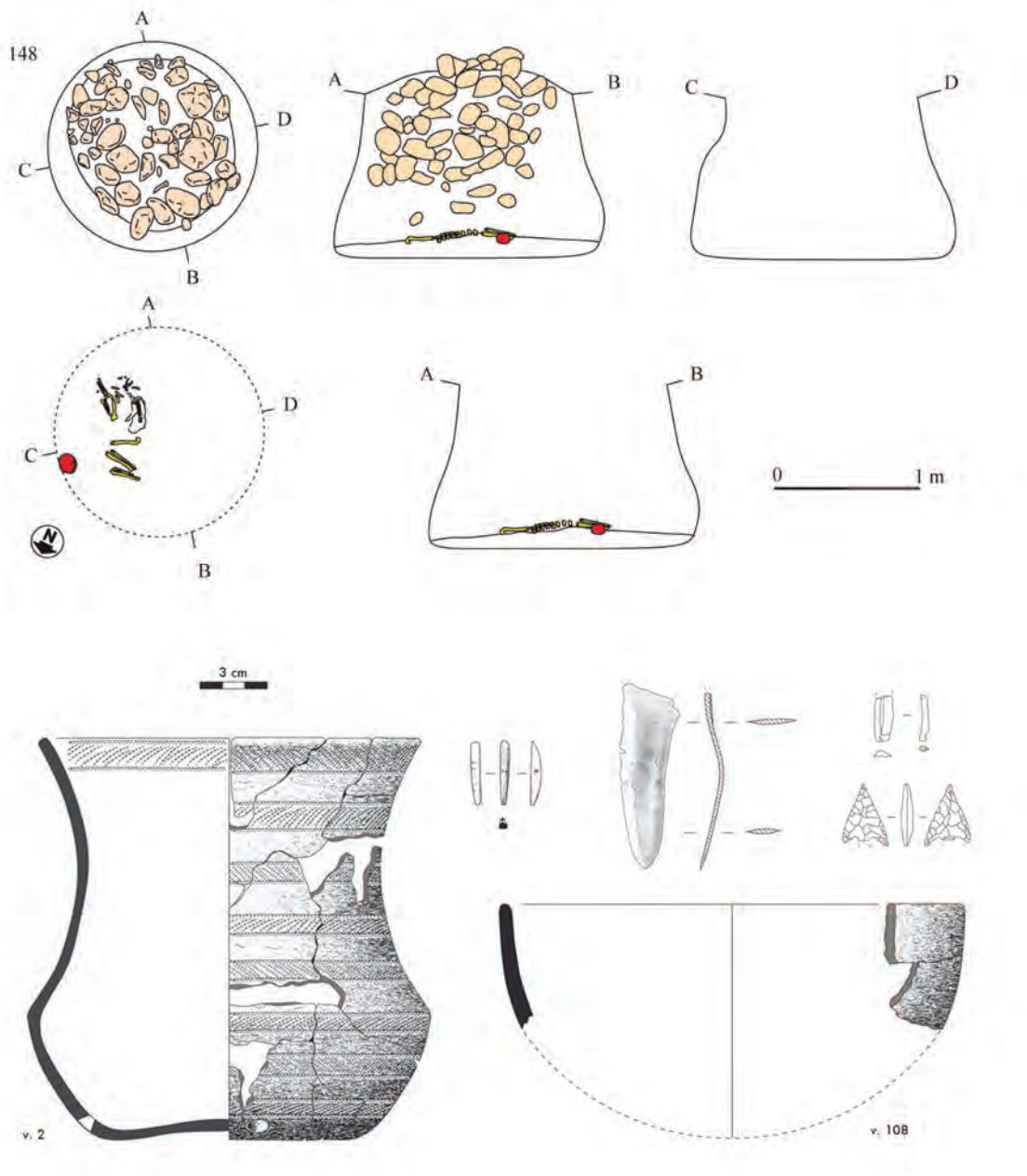

Fig. 16.4. Grave 11 and grave goods found (from Pérez et al. 2011).

after reducing the mineral, this arrived at La Vital in the form of balls of crude copper suggests some kind of direct contact, maybe by sea (Molina and Orozco 2011). Actual data in the area allow us to corroborate some evidence of metallurgical activities in domestic contexts before the Bronze Age in only two main sites: La Vital and Ereta del Pedregal (Navarrés, Valencia).

At La Vital, these we can recognise a Chalcolithic phase in the regional sequence. At the same time, it makes clear that this presence has no relation with the appearance of the Bell Beaker. Considering the chronology obtained, at least 300 years separate the evidence of metalwork from the first Bell Beaker ceramics.

Graves and rituals

At the moment, four mortuary structures have been documented. All of them contain remains of a single deposition (Bernabeu *et al.* 2010; García Puchol *et al.* 2011; García Puchol *et al.* 2013). Grave goods (vessels, copper and flint objects) appear as part of the burial rituals. Despite these two characteristics, no other regularity can be

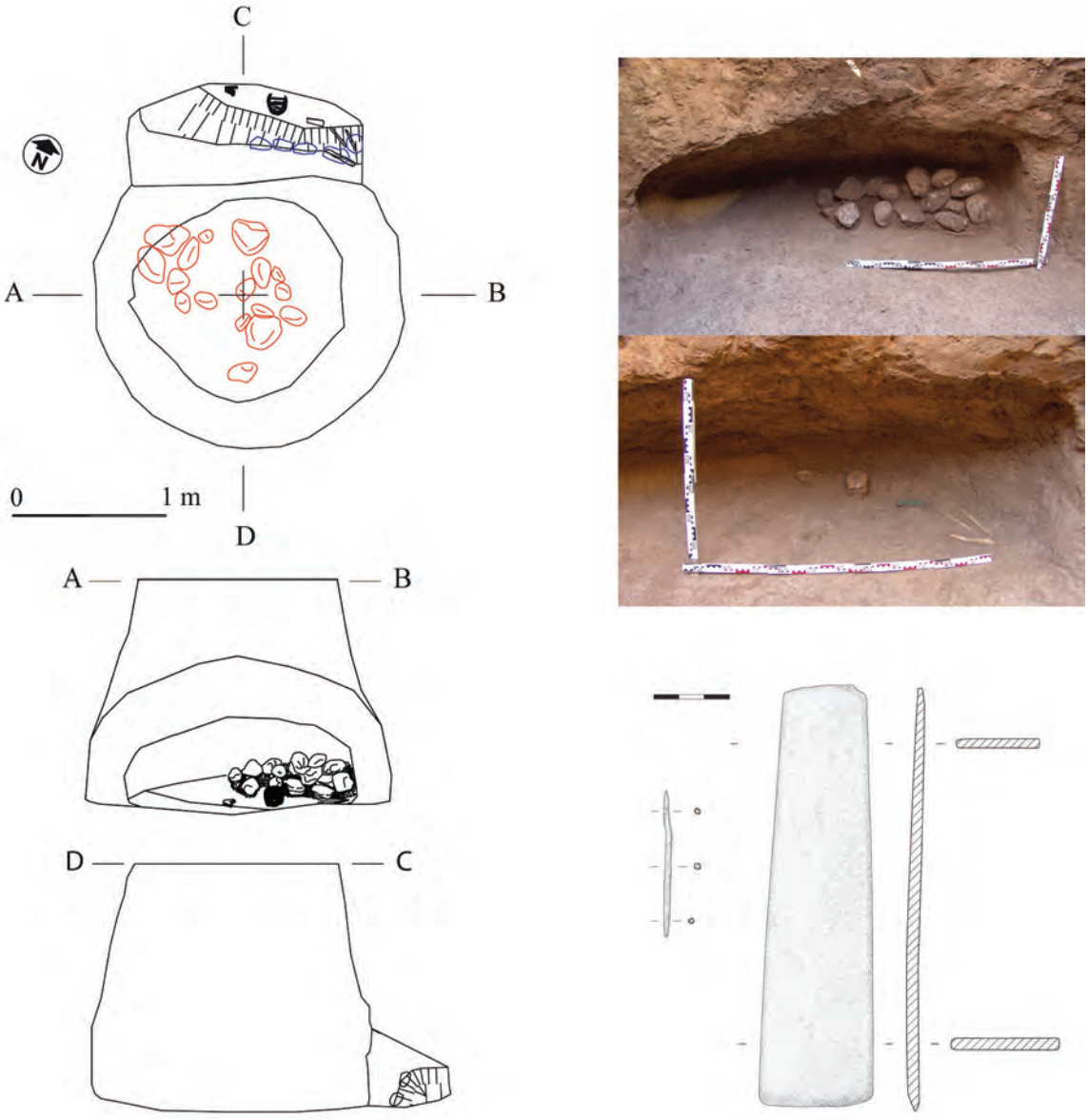

Fig. 16.5. Grave 3 and metal objects found (from Pérez et al. 2011).

determined in the treatment of the human remains. Grave 3 reveals a secondary deposition (cranium and a few post-cranial bones) corresponding to an adult male 20–40 years old. Beside the cranium we found some copper objects, an axe and a punch (Fig. 16.5). Grave 10 offers clear evidences of a quite complex ritual related to the primary deposition of a young woman (Fig. 16.3). At its bottom, a small stone wall enclosed an area where two small bowls containing some faunal remains (rabbit bones) were left. Over this first action the pit was half filled with stones and blocks. Sands were used to level a layer where the woman was placed. Beside her appeared a non-decorated pot and, in the opposite side of the pit, we found the Maritime vessel.

The presence of some fragments of bowls in the fill suggests some kind of consumption ritual related to the burial (García Puchol *et al.* 2013). This burial is situated in group 7 that comprises several storage pits around a dwelling identified by several levels of fills in a partially excavated structure. In a storage pit just beside the grave we found a complete articulated cow skeleton and other faunal remains. Although there is no direct evidence of a relation between the two structures, their close proximity suggests some kind of link. The idea of an animal offering connected with the mortuary ritual is quite suggestive as reflecting some Late Neolithic and Chalcolithic contexts in southern Iberia (Cámara *et al.* 2008).

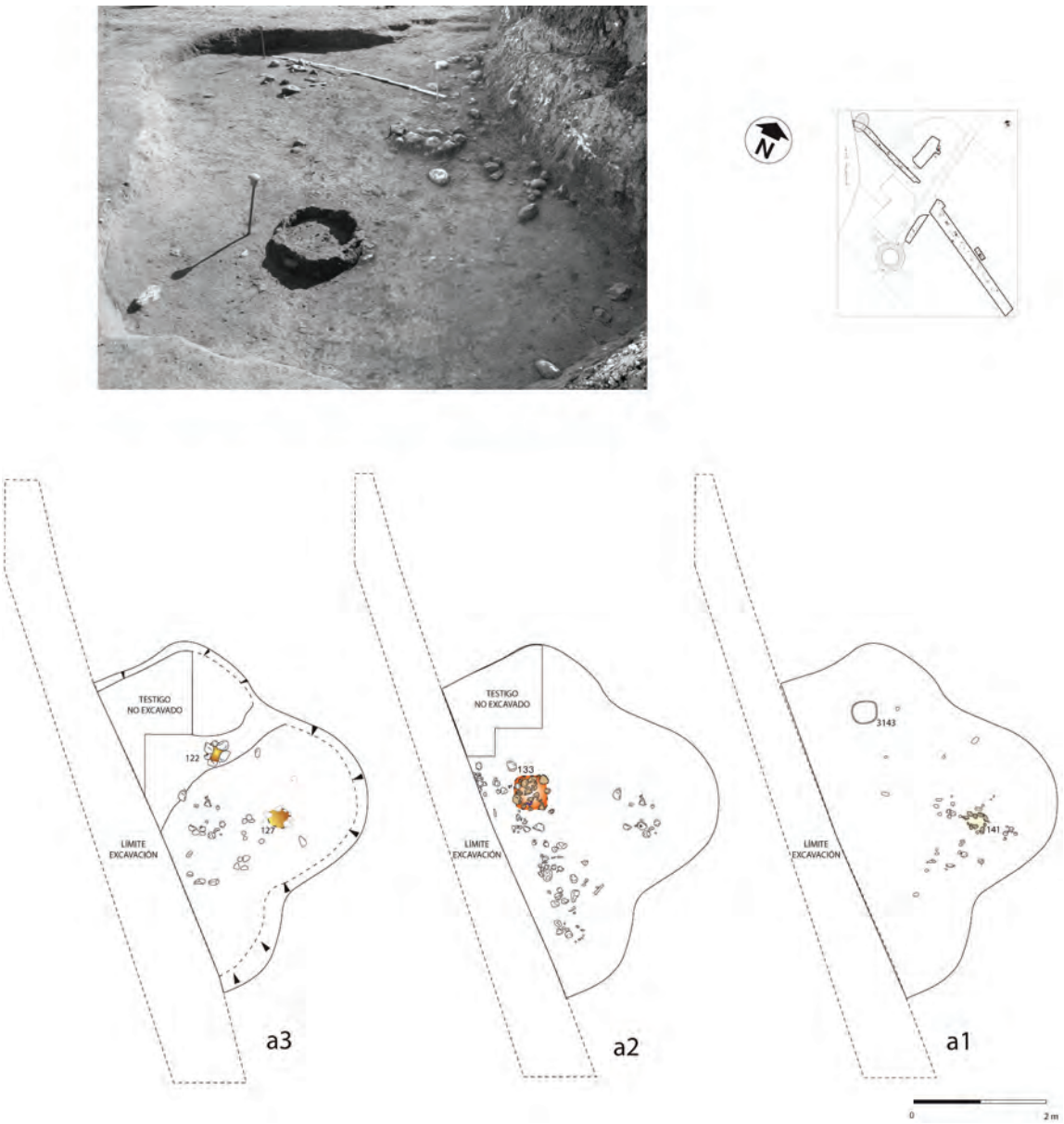

Fig. 16.6. Detail of house 8 in La Vital (from Pérez et al. 2011).

Grave 11 contains a male skeleton (20–40 years old), placed at the bottom of the structure (Fig. 16.4). The skeleton also indicates a complex procedure of post-mortem treatment. While the post-cranial skeleton is complete, the only remains belonging to the cranium are a few teeth. Related to the burial we found the second Bell Beaker vessel (CZM style), a copper dagger and a flint arrowhead. This structure is located in group 8 together several storage pits near to the remains of a domestic space.

The last identified grave (number 201) appeared in a cut made by the bulldozers, so just a small part of it could be excavated. Remains of an individual were recognised (Pascual Beneyto 2010). As part of the associated grave goods, there are a decorated bowl, a copper dagger and several items from a necklace.

Discussion

The 4th and the 3rd millennia cal. BC mark the development of Late Neolithic and Chalcolithic periods in the regional sequence. Continuities between the periods in different aspects have been stressed in the archaeological literature (Bernabeu 1995; Bernabeu *et al*. 2006; 2012; Juan Cabanilles 2005). Although excavation results at La Vital confirm that metalwork is present in the region prior to Bell Beaker times,

continuities between the Late Neolithic and Chalcolithic periods are clearly outlined by material culture, settlement patterns and burials, among other features we describe below.

Locational patterns

Sites are located along rivers in alluvial valleys occupying wide areas and comprise mainly pits, silos and domestic spaces of varying nature (Fig. 16.6), and ditches (Bernabeu 1993; Bernabeu *et al.* 1994; Gómez Puche *et al*. 2004; Jover 2010; Garcia Puchol *et al.* 2008; in press). Sites like Ereta del Pedregal present distinctive features, probably conditioned by their location in the border of the Navarrés wetland area (Juan Cabanilles 2005). These villages occupy extensive areas, sometimes over 30 ha, exhibiting a hierarchical site-size distribution in regional locational patterns. Radiocarbon data for ditched enclosures put their construction and use ca. 3000–2500 cal. BC. If these are defensive enclosures, this could indicate a shift in conflict and competition between communities on the second part of this cycle, coinciding with the spread of copper metallurgy and some time later, the Bell Beaker pottery: that is, at the time when La Vital was occupied. By the end of the period, after ca. 2300 cal. BC, the locational pattern changes, and some villages move to the top of the hills, a position that becomes characteristic of the Bronze Age.

Subsistence economy

Analysis of animal bones and seeds recovered from all these sites from ca. 3500 cal. BC, and probably earlier (Pérez Jordá and Peña Chocarro 2013), reflects an agricultural system shift from intensive horticulture to extensive agriculture (Bernabeu 1995; McClure *et al.* 2009), with a reduction in crop diversity now based on free-threshing cereals. Animal husbandry shows interesting changes relating to the quantitative and qualitative increase in the presence of cows, beginning to be used as workforce (e.g. allowing the introduction of the plough). This extensive agricultural system allows for increased production and surplus accumulation. As a consequence, it is possible to imagine that some kind of inequality could emerge as a result of differential wealth accumulation. Using storage pit capacity distributions it could be possible to approach social dynamics through economic behaviour. This distribution clearly shows an unequal distribution pattern in both intra-and inter-site distributions. That means that great accumulation occurs only in some sites and in some households within a site (Bernabeu *et al*. 2006; Pérez Jordá *et al.* 2011b; Pérez Jordá and Peña Chocarro 2013) during the Late Neolithic and Chalcolithic periods. This is the case at La Vital, where different storage capability is present between domestic units at different times (Pérez Jordá *et al.* 2011b). In fact, one of the big concentrations is in groups 7 and 8 (Bell Beaker) while the other is present in group 2 (pre-Bell Beaker). Once again, this economic system seems to change, coinciding with the changes outlined in settlement patterns (after ca. 2300 cal. BC), when large pits disappear and it is possible to observe diversification in cereal crops probably linked with an intensive agricultural model (Pérez Jordà and Peña-Chocarro 2013).

Craft and specialisation

During this cycle the appearance of special goods that require considerable labour and expertise to produce (i.e. specialists) is continuous. Some flint products (long blades and arrowheads), are common from the beginning; others, like copper metalwork only appears at the beginning of the 3rd millennium, and seems less common; and others are simply poorly known because they are rarely visible in the archaeological record, such as is the production of cloth. The manufacture of both linen and possibly wool is reflected in items such as loom heddles recovered at some sites and, especially, by a linen tunic recovered at Cueva Sagrada, a burial cave near Murcia (Eiroa 2006).

The scarcity in metalwork evidence is general in the Valencia region during the 3rd millennium cal. BC. La Vital displays clear remains that prove the existence of metalworkers on the site in a pre-Beaker chronology. The analysis carried out shows copper mineral originating from south-east territories (Murcia and Almeria provinces), reflecting long distant connections (Rovira and Montero 2011). If the current data of a very localised presence of this kind of specialised work is correct – only some well connected places – we must conclude that the importance of control and distribution of metalwork should be a determining facrtor for understanding social dynamics between sites during the 3rd millennium.

Networks of interaction

The spread of copper metalwork illustrates the importance of interaction networks in understanding the system and inter-system relationships. During the 3rd millennium cal. BC, east and south-east Spain configures a macro-region where we can see how ideas, materials and perhaps people flow in different ways and using different networks. In some cases we can identify different regional sources of raw material used to made polished stone tools (Orozco 2000), indicating a certain degree of inter-system linkages; but the same tools could be made using rocks coming mainly from the south-east or, less commonly, from northern Spain (Catalonia) as, for instance, probably the variscite beads. Steatite or amber and ivory indicate a clear development of inter-system linkage, although we do not always know from where to where they move.

Using some of these networks carved bone idols and Bell Beaker pots (at least the earliest ones) were spread. Probably they are locally made but the distribution over extensive area can (south Iberia, for carved bone idols) indicate the growing importance of these networks. The case of Bell Beaker decoration is striking of the special position of the central Valencia region. La Vital is the southern point for the arrival of the corded Bell Beaker, a kind of decoration mainly distributed over central and north Iberia.

By the end of this period, when La Vital was abandoned, these networks radically change, or at least, the abundant flow of commodities that we describe earlier, stopped. The same is true considering the flow of ideas, as is clearly showed by the absence of elite grave goods from the Argaric culture (south-east) in the Valencian region (Bernabeu *et al*. 2013) at the beginning of the 2nd millennium cal. BC.

Burial practices

Only a small number of individual pit burials associated with Bell Beaker objects are well known in the Valencia region. The lack of information about several ancient excavations, such as Villa Filomena (Soler 2013), restrict our understanding about contextual data in relation to domestic units and their specific components and rituals.

The use of caves for collective burials, together with the absence of megalithic architecture, is considered a characteristic of the 4th and 3rd millennium in the Valencian region. The traditional view was that this ritual could be found throughout the Bell Beaker horizon, when inhumations began to appear in pits or silos within settlements, representing some kind of prelude to the Bronze Age. Recent work sheds light on a more complex panorama. We know now that, in addition to the use of caves for collective burials, individual pit burials within the settlement area also occurred from earliest times to the end of the Chalcolithic. The continuity in use of both rituals has been confirmed by recent excavations (Pascual Beneyto 2010; Flors 2009; García Puchol *et al*. 2013) and extensive programmes of radiocarbon dating (McClure *et al.* 2012; García Puchol *et al.* 2013). From the introduction of metallurgy and the diffusion of Bell Beaker pottery, individual burials becomes reinforced and traditional grave goods in collective burials, like idols, are displaced by new ones, like copper daggers, suggesting a clear ideological fracture with the previous cosmogony, where collective burials were the norm. The excavation of la Vital with its rich Bell Beaker burials clearly exemplifies this point and confirms the idea that the introduction of metallurgy and the spread of the first Bell Beaker pots could be considered the turning point of this process.

At la Vital, these burials are expensive ceremonies and as they correlate with households with greater storage facilities we can conclude that they are indicators of growing inequalities. In the central Valencia region, during the Bell Beaker period, specific ritual practices related to distinctive funerary ceremonies are more visible in the archaeological record. This phenomenon is visible in other Iberian areas where Bell Beaker components are well represented by some kinds of mortuary tombs (Garrido 2005).

Conclusions

In summary, in the last period of occupation at La Vital, the Bell Beaker vessels make their appearance, related to mortuary contexts. This exclusivity is associated with an increase in the ritual procedures that imply some kind of consumption ceremonies, around the graves and before they are closed. This makes the social dissymmetry more evident, or, at least, more visible. In a more general, long term approach to prehistoric social dynamics, using a Complex Adaptive Systems approach (Bernabeu *et al.* 2013, 31–32), the Late Neolithic to Chalcolithic is considered a period of significant population growth. Fuelled by changes in the economic system, competition between households was probably based in a cycle of client-patron relationships. Increased production and accumulation is a consequence of agricultural intensity, that allows a patron to accumulate more surplus and means of production in a competing cycle that arises around the first half of the 3rd millennium cal. BC. We agree with the interpretation outlined by authors considering the Chalcolithic as a time of significant and rapid population growth and development of hierarchical trends, but it looks as though any decision-making hierarchies are of the temporary, "sequential" form. In spite of evidence for increasing complexity in social interactions and in inequalities of wealth and power, there is little indication of the kinds of socio-economic specialisation and interdependence that bring together multiple communities in complex social systems requiring permanent hierarchical information processing and decision making. There is no evidence of mass production and items of special workmanship could be created by part-time specialists at the household level. Most goods requiring special skills seem to end up with a few individuals, again indicating elite prestige and possibly elite-mediated ideologies as forces behind socio-spatial network structures. Evidence for inter-regional and extra-regional trade increases with some items coming from distant places but this makes up an insignificant part of the economy overall. If communities begin to operate in some kind of coordinated way at a regional level, they seem to be linked only very loosely. While Bell Beaker ceramics exhibit common forms and design attributes throughout the region, they were made locally. Craft products may move among elites, but seem to link them with only weak ties over broad geographic areas.

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17

DYNAMISM AND COMPLEXITY OF FUNERARY MODELS: THE NORTH-WEST IBERIAN PENINSULA DURING THE 3RD–2ND MILLENNIA BC

Pablo Vázquez Liz, Laure Nonat and Maria Pilar Prieto Martínez

The funerary patterns documented in the north-west Iberian Peninsula (Galicia and the northern part of Portugal as far as the River Duero) from the 3rd and 2nd millennia BC reveal, on the one hand, a certain degree of continuity with respect to the solutions already used in previous periods – tumuli – and on the other, a certain degree of originality, with the appearance of new formulas – cists – or a larger number of previously existing forms that were only rarely found in the region – pits. The coexistence of different structures in the same space (the necropolis), which in some cases were even contemporary with different rites, reflects an important degree of dynamism in the funerary sphere, which leads to some difficulty in its interpretation, as well as in generating the models into which many of these formulae are condensed. In order to structure the available information, we will present a conceptual proposal that owes its existence to cultural anthropology, and which is chronological in relation to a number of types of architecture and their accompanying grave goods, mainly pottery, that lack an absolute temporal context.

Introduction

Different authors who study the funerary world of the north-west Iberian Peninsula in the last millennia of late prehistory agree on the fact that is now more apparent and clearly important in the archaeological record: its heterogeneity. This dimension, a synonym of the polymorphism of burial methods, can be connected in all likelihood with the changes that occurred in the conception and perception of death throughout such an extensive period. In the archaeological record, these changes are mainly seen in the architecture and rituals (the way bodies were treated, material offerings, etc) used by these communities.

Although it is true that, on a local scale the solutions used indicate a diversification of forms, this circumstance should not be considered as a complete absence of standards, as on a global scale it is possible to highlight a number of recurrent features that make it possible to perceive the existence of funerary models. These properties are not only associated with tangible archaeological evidence, such as the architectural composition of the burial or its grave goods, but also with the symbolic perception the communities seem to have attributed them with.

The reproduction of these features could be indicating the adoption and integration of behavioural codes, thereby translating an identity[1] (Nonat 2011). However, these models are not rigid but instead are flexible, as in the same way as the identity they transmit, they are the result of a dialectic process, and therefore a dynamic process, between the elaboration and reproduction of a system of values (symbolic, social, etc) and the emergence of internal particularities resulting from the changes that occurred over two millennia.

Based on this consideration, we can identify three main funerary models: tumuli, pits and cists, without this sequence

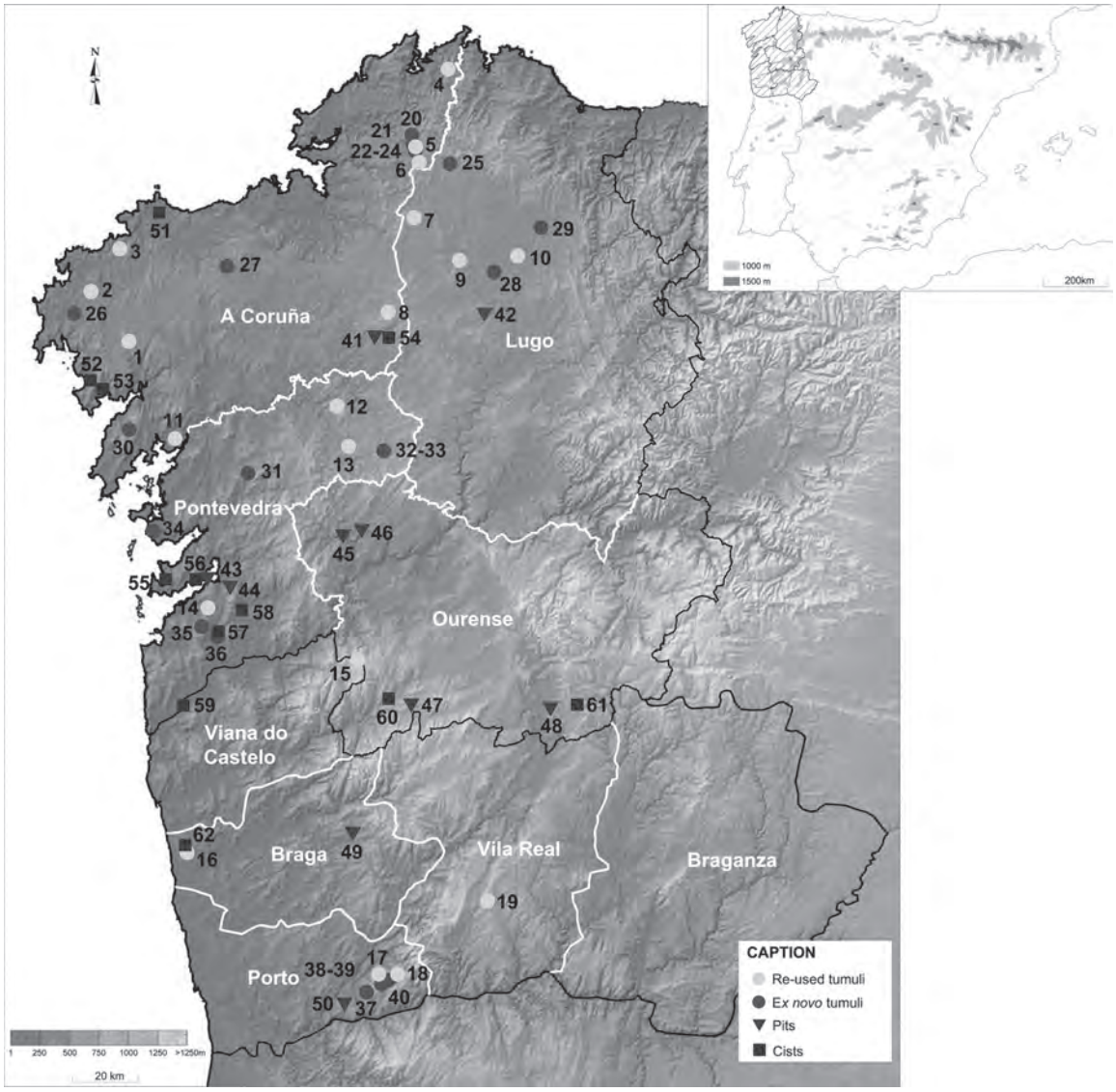

Fig. 17.1. Location of sites mentioned in the text. 1. Parxubeira 2 (Mazaricos, A Coruña); 2. Arquiña de Vilaseco (Vimianzo, A Coruña); 3. Dombate (Cabana de Bergantiños, A Coruña); 4. Forno dos Mouros 5 (Ortigueira, A Coruña); 5. Ponte da Pedra 0 (As Pontes, A Coruña); 6. A Mourela 7 (As Pontes, A Coruña); 7. Monte Pilreo 5 (Guitiriz, Lugo); 8. Forno dos Mouros (Toques, A Coruña); 9. Monte Campelos 1 (Begonte, Lugo); 10. Madorra da Granxa (Castro de Rei, Lugo); 11. Campiños 6 (Rianxo, A Coruña); 12. Marco do Camballón 5 (Vila de Cruces, Pontevedra); 13. A Romea (Lalín, Pontevedra); 14. Cotogrande 5 (Vigo, Pontevedra); 15. Alto da Portela do Pau (Melgaço, Viana do Castelo); 16. Dolmen de Monte da Cerca (Esposende, Braga); 17. Cabritos 1 (Amarante, Porto); 18. Chã de Parada 1 (Bãiao, Porto); 19. Madorras 1 (Sabrosa, Vila Real); 20. Reboredo 1 (As Pontes, A Coruña); 21. Illade 3 (As Pontes, A Coruña); 22. Veiga de Vilavella 240 (As Pontes, A Coruña); 23. Veiga de Vilavella 242 (As Pontes, A Coruña); 24. Veiga dos Mouros 229 (As Pontes, A Coruña); 25. Lousada 5 (Xermade, Lugo); 26. Prado do Rei 2 (Dumbría, A Coruña); 27. Rechaba (Tordoia, A Coruña); 28. Roza de Afora (Outeiro de Rei, Lugo) ;29. Vedro Vello 1 (Castro de Rei, Lugo); 30. Pedra da Xesta 1 (Boiro, A Coruña); 31. Monte dos Cregos (Campo Lameiro, Pontevedra); 32. Tecedeiras (Lalín, Pontevedra); 33. Monte das Cabras (Lalín, Pontevedra); 34. As Mamelas (Sanxenxo, Pontevedra); 35. Alto de S. Cosme (Mos, Pontevedra); 36. Vilafría 1 (O Porriño, Pontevedra); 37. Chã de Carvalhal 1 (Bãiao, Porto); 38. Outeiro de Gregos 1 (Bãiao, Porto); 39. Outeiro de Gregos 5 (Bãiao, Porto); 40. Meninas do Crasto 4 (Bãiao, Porto); 41. Agro de Nogueira (Toques, A Coruña); 42. Agro de Penarrubia (Lugo, Lugo); 43. A Devesa de Abaixo (Moaña, Pontevedra); 44. Monte Buxel (Redondela, Pontevedra); 45. Cameixa (Boborás, Ourense); 46. Monte Mesiego (O Carballiño, Ourense); 47. Coto de Laborada (Calvos de Randín, Ourense); 48. Fraga do Zorro (Verín, Ourense); 49. Vale Ferreiro (Fafe, Braga); 50. Tapado da Caldeira (Bãiao, Porto); 51. Taraio (Malpica, A Coruña); 52. Pedramarrada (Carnota, A Coruña); 53. Bicos de Lago (Muros, A Coruña); 54. Agro de Nogueira 1 (Toques, A Coruña); 55. Gandón 1 (Cangas do Morrazo, Pontevedra); 56. A Devesa de Abaixo (Moaña, Pontevedra); 57. Atios (O Porriño, Pontevedra); 58. Monte Forte de Gabriel (Ponteareas, Pontevedra); 59. Quinta da Água Branca (Vila de Nova de Cerveira, Viana do Castelo); 60. Praia da Rola (Muíños, Ourense); 61. A Forxa (Riós, Ourense); 62. Agra de Antas (Esposende, Braga).

corresponding to the choice of a chronological criterion. Figure 17.1 shows the complete list of sites used in this study, and their geographical distribution in the study area.

Tumuli

The re-use of Neolithic tumuli

Throughout the 3rd and 2nd millennia BC, the communities in the north-west Iberian Peninsula used pre-existing monuments, demonstrating an intention to maintain an ideological link with their ancestors that was either direct (involving the use over time/continuity) or indirect (replacement or intrusion), or of the perception that formed around them. In fact, some re-uses may be considered as replacements or intrusions that sought to replace their ancestors, something that indirectly reveals an effort to subordinate them with the aim of hierarchising power.

We detect the use of some tumuli from Neolithic necropoli or sacred places mainly through the presence of objects, although in some cases we also have radiocarbon datings, which are becoming increasingly frequent and allow us to reconstruct the frequently complex history of the monument. However, the gesture that accompanies these re-uses at both architectural and ritual level is concealed or diluted in the archaeological record in most cases, especially at both ends of the two millennia.

In the first half of the 3rd millennium BC we mainly see constructive periods, whose possible links with funerary practices we are still unaware of: the closure of the corridors in megalithic monuments such as Campiños 6 (Rianxo, A Coruña; Fábregas and Fuente 1991–1992) or Dombate (Cabana de Bergantiños, A Coruña; Bello 1995); the reconstruction of tumuli, such as A Romea (Lalín, Pontevedra; Prieto 2007); or redesign of the chamber, as in Cotogrande 5 (Vigo, Pontevedra; Abad 1995). The presence of Penha-type pottery in some of these monuments, such as Cotogrande 5 or Monte Pirleo 5 (Guitiriz, Lugo; Fábregas and Fuente 1988), indicates that they were used for funerary or cult purposes, considering the likely location, due to its relative chronology, of this type of pottery in the period in question.

In the later stages of this period, developed stone grave goods would also have been frequent (maces, chisels, hoe heads, double hoe heads and double axes), which in some cases were deposited in pits that were presumably used for human burial in the tumulus mound, as in Monte Campelos 1 (Begonte, Lugo; Rodríguez 1983), although more often in newly-built tumuli, a sign of the emergence of elites – particularly in the interior of Galicia – and more clearly in the middle and upper stretches of the River Miño (Fábregas 1995, 103).

The data for the second half of the 3rd millennium, which are now more abundant, indicate that the people who brought Bell Beaker pottery were now fully implanted in the north-western Iberian Peninsula and visited the Neolithic monuments repeatedly, or even systematically. In most cases, they seem to have preferred megalithic tumuli with corridors, such as Dombate (Cabanas de Bergantiños; Bello 1995), Parxubeira 2 (Mazaricos, A Coruña; Rodríguez 1988) (Fig. 17.2a) or Madorras 1 (Sabrosa, Vila Real; Gonçalves and Cruz 1994), although on rarer occasions they left their mark on monuments with chambers of different shapes and sizes, such as Cotogrande 5, or less monumental structures, such as Alto da Portela do Pau 1 (Melgaço, Viana do Castelo; Jorge *et al.* 1997).

Architectural contributions appeared with the creation of a new access path to the burial space, excavating a shaft from the top of the tumulus down to the original chamber, as seen in Forno dos Mouros (Toques, A Coruña; Prieto *et al*. 2008) or modifying the primitive access points, as is the case with Dombate (Bello 1995). In all likelihood, we could interpret this pottery as the grave goods from the original burials of one or more bodies, as occurs in several zones where the Bell Beaker burials were conserved in good conditions, as in the tumulus La Sima (Miño de Medinaceli, Soria; Rojo *et al.* 2005, 77) in the north of Spain's central plateau.

The presence of metallic elements is difficult to interpret, as on the one hand the majority of them are not clearly associated in stratigraphic terms with the Bell Beaker pottery, and on the other these are finds from old excavations, saved from the destruction of the monument, or discovered in areas that have been highly affected by plundering at different times. Flat axes have been found in Arquiña de Vilaseco (Comendador 1997, 137), Palmela-type points (in Parxubeira 2 and 4) and silver spirals in the Dolmen de Monte Cerca (Esposende, Braga; Jorge 1980a), together with other pieces such as halberds or daggers.

In any event, the re-uses with Bell Beaker pottery contrast with those with other types of grave goods, in some cases from a later period, which seem to be at a distance from the megalithic structure, both those that probably belong to the last centuries of the 3rd millennium with Taraio-type vessels, as well as those from the 2nd millennium, with tronconical, oval and horizontal wide rim vessels, where it is much clearer to see the distance involved. The pottery was apparently deposited on the periphery of the monument, in superficial areas of the tumular mass, as in the tumulus of A Romea (Lalín, Pontevedra; Prieto 2007), or in what are thought to be pits or indentations, also in the tumular sediment, as may be the case of Marco de Camballón 5 (Vila de Cruces, Pontevedra; Calo and Sierra 1983, 67).

In Galicia, the wide rim vessel is found in a large number of megalithic tumuli, but to much lesser extent in the north of Portugal (Nonat 2011, 155), predominated by oval and troncoconical vessels (Bettencourt 2010, 144). The absence of human bones prevents us from identifying and defining the exclusive relationship between this material and burials,

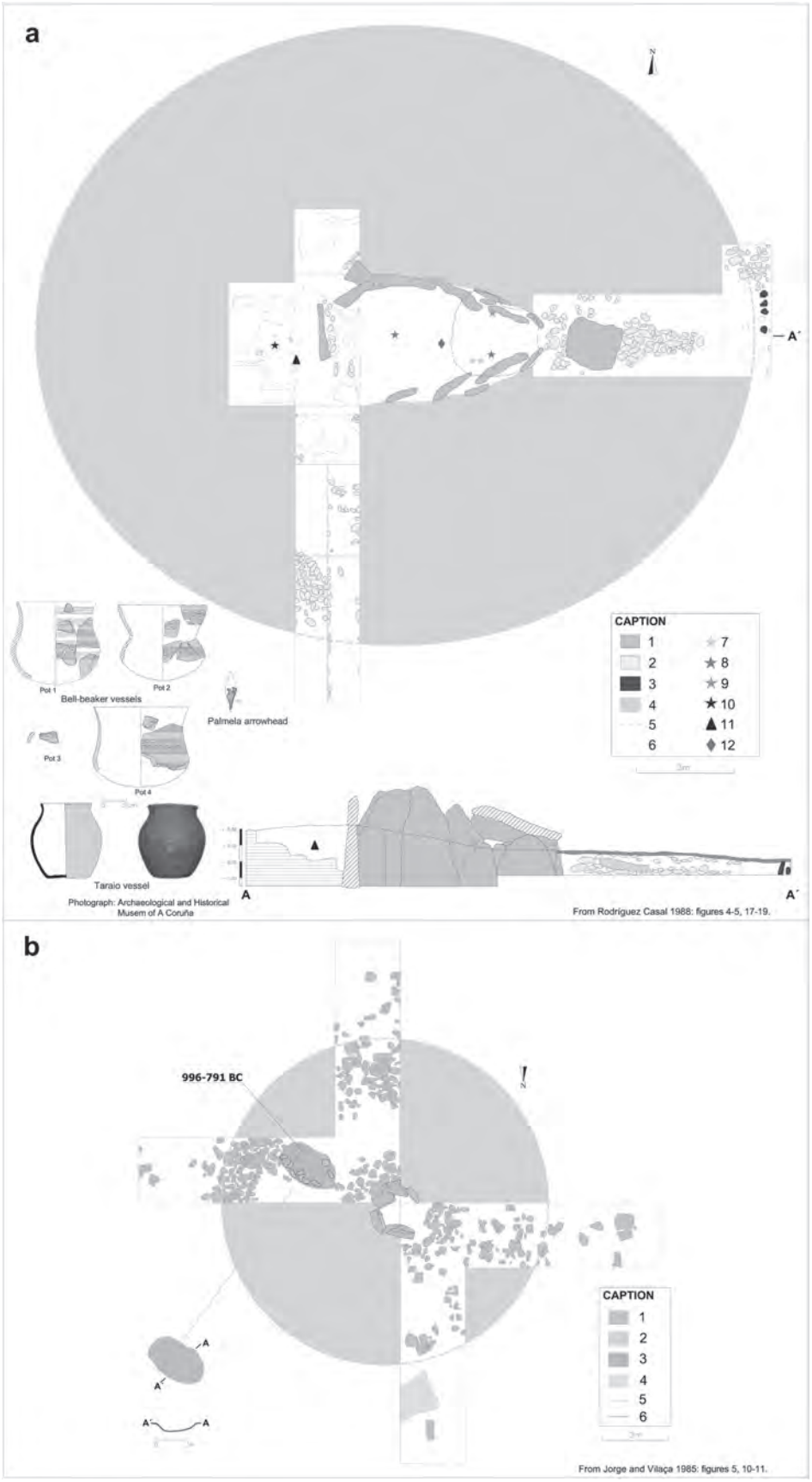

Fig. 17.2. Examples of reused Neolithic tumuli. (a) Parxubeira 2 (Mazaricos, A Coruña): (1) Granite slabs (2) Granite stones (3) Idols (4) Limits of tumulus (5) Coverings (6) Cutaways in substrate (7) Bell Beaker vessel 1 (8) Bell Beaker vessel 2 (9) Bell Beaker vessel 3 (10) Bell Beaker vessel 4 (11) Undecorated Bronze Age vessel (12) Palmela arrowhead; (b) Cabritos 1 (Baião, Porto): (1) Granite (2) Limits of tumulus (3) Pit (4) Outcrop (5) Chamber (6) Pit stones.

as we also have to take into account the possibility that they may have corresponded to simple offerings.

However, at the end of the 2nd millennium and start of the 1st millennium BC, the example of Cabritos 1 (Amarante, Porto; Jorge and Vilaça 1985) (Fig. 17.2b) reveals a more violent use of the monument, with the excavation of a pit, partially surrounded by stones, down to the substrate, possibly used for a burial and without grave goods.

Ex novo *tumuli*

In parallel to the re-use of previously existing tumuli, new structures were built in which the changes seem to form a part of a sense of continuity: new features were adopted, at the same time as using an older type of language. This means that next to new elements, such as the individual nature of a wide range of internal burial methods (cists, steles, pits, the absence of chambers, charcoal floors), we can identify signs of continuity (tradition) that were still in place until the 2nd millennium BC, such as the desire to dig into the very heart of the ancient necropoli.

In order to present the main features of these tumuli, we can differentiate between three groups depending on the composition of the tumular mass: (1) stone and earth, (2) mainly earth, and (3) only stone, without there being any chronological connotations associated with this differentiation.

1. The *structures made of stone and earth* (Fig. 17.3), as in the previous period, are indicative of a search for specific materials and the will to persist. The Bell Beaker tumulus of Chã de Carvalhal 1 (Baião, Porto; Cruz 1992) not only reflects the physical effort required for its construction, but also the complex combination of architectural elements, giving the structure an appearance of great solidity.

   The use of specific materials can be seen in the presumably Bell Beaker tumulus of As Mamelas (Sanxenxo, Pontevedra; Cano 2011), in which the visual interplay caused by the different chromatic nuances and textures of the soil and rocky materials seem to be the result of a detailed design and construction, or in the tumulus of Alto de S. Cosme (Mos, Pontevedra; Parcero 1997b) also resumed to be from the bell beaker period, which uses a wide range of geological materials in its structure.
2. The *tumuli mainly made of earth* (Fig. 17.4) present a wide range of internal burial solutions: megalithic cists such as Lousada 5 (Xermade, Lugo; Pombo and Rego 1989–90, Vázquez Varela and Gabeiras 1993–4) or Veiga dos Mouros 229 (As Pontes, A Coruña; Maciñeira 1941); a pit marked by a stele, as in Reboredo 1 (As Pontes, A Coruña; Vaquero 1999); a layer of charcoal in the centre, as in Veiga de Vilavella 242 (As Pontes, A Coruña; Maciñeira 1941); the absence of a chamber, as in Veiga de Vilavella 240 (As Pontes, A Coruña: Maciñeira 1941) or Vilafría 1 (O Porriño, Pontevedra; Fábregas 1992, 405).

   However, we should not rule out the possibility of central wooden structures that would hardly leave any signs of their presence in the archaeological record.

   The fact that much of the data available on the sites we have mentioned come from old excavations, plundering or complete destruction as a result of planting trees or crops, from which we are only able to obtain remains found by the owners of the land (as is the case of Vedro Vello 1, in Castro de Rei, Lugo; Fábregas 1994), means that it is necessary to exercise caution with regard to the references and illustrations that exist of the oldest elements, or modern attempts at reconstruction using graphic techniques (Vázquez et al. 2011), of both some of the classics (Veiga de Vilavella 242) and the most recent (Vedro Vello 1).

   The absence of dates means that it is not possible to establish precisely to which chronological period the group of monuments belongs, although if we consider the extent and characteristics of the material found, it would seem to have been a long period, covering practically all of the 3rd millennium BC: Penha-type pottery and stone tools in Lousada 5 or Vilafría 1; advanced stone grave goods in Vedro Vello 1 or Veiga dos Mouros 229; Bell Beaker pottery in Tecedeiras (Lalín, Pontevedra; Filgueira and García 1977, 98) or Veiga de Vilavella 242; and exclusively metallic grave goods in Veiga de Vilavella 240.

   These are mainly concentrated in areas with wide valleys, although it is true that this fact could well reflect a distortion in the archaeological research. In general, the architectural composition indicates a considerably limited physical involvement, with low tumuli that do not stand out in the landscape.

   The architectural simplicity and discretion of some of these tumuli contrasts with the presence of luxurious grave goods (Veiga de Vilavella 240), although the choice of placing them in necropoli with megalithic tumuli could simultaneously vindicate and legitimise the position of the individual, making it possible to hide the contents of structure with such a modest exterior from the world of the living.
3. Other discrete types of architecture are the *tumuli mainly made of stone* (Fig. 17.5), due to the fact that they are perfectly integrated within the surrounding landscape, due to their low height and the use of local materials, meaning they can easily be mistaken for the rocky outcrops frequently seen in the area.

   We only currently know of a limited number of examples in the north-western Iberian Peninsula,

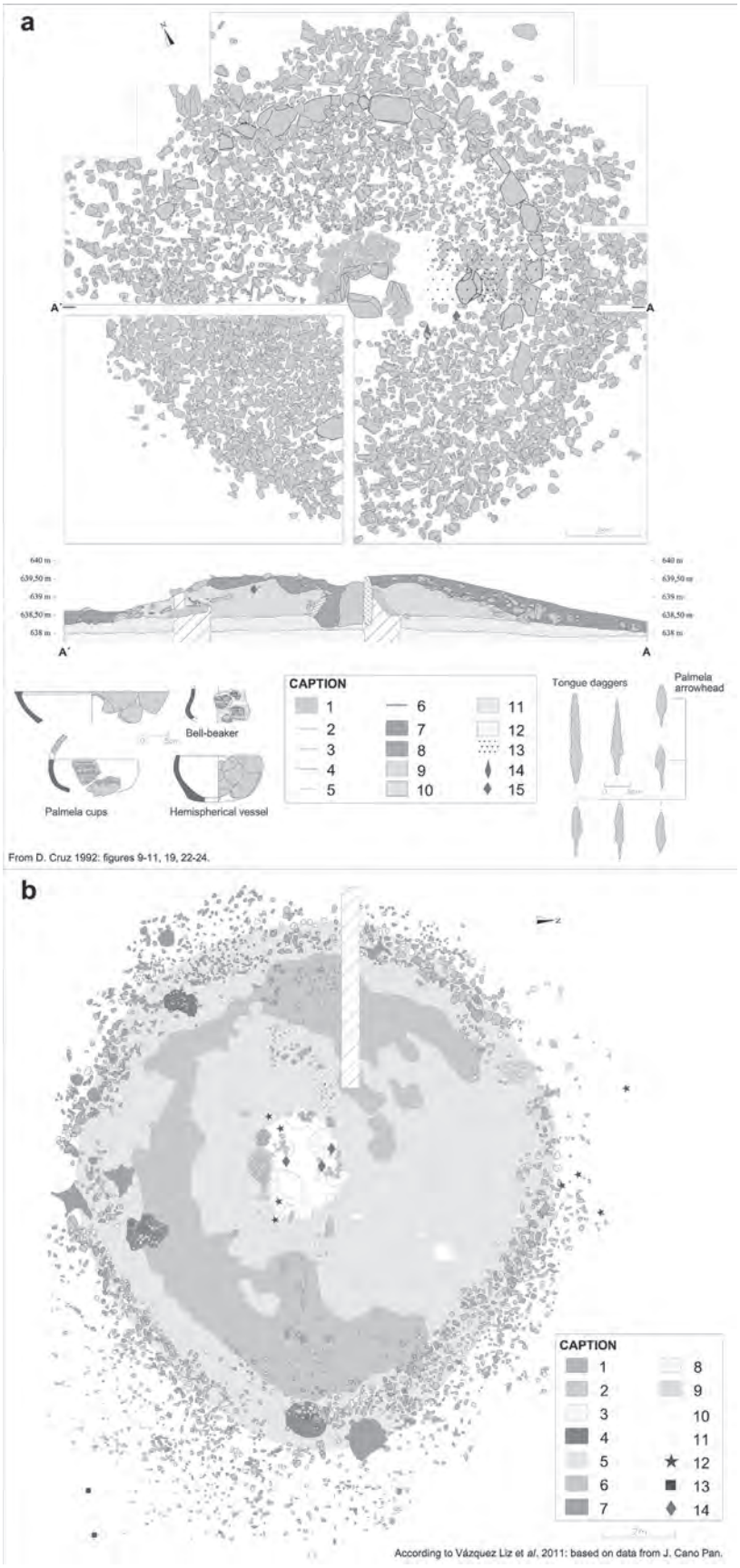

Fig. 17.3. Examples of new stone and earth tumuli. (a) Chã de Carvalhal 1 (Baião, Porto): (1) Granite (2) Shell (3) Stone circle (4) Chamber (5) Buttress (6) Monolith (7) Plant layer (8) Recent alteration (9) Tumular mass (10) Clear tumular mass (11) Soil under tumulus (12) Lightest level (13) Pottery concentration (14) Copper daggers (15) Palmela arrowheads. (b) As Mamelas (Sanxenxo, Pontevedra): (1) Schist (2) Granite (3) Quartz (4) Combustion structures (5) Tumular mass (6) Muddy internal layer (7) Roots (8) Marker (9) Recent alteration (10) Lower layer of stones (11) Pits in substrate (12) Bell Beaker pottery (13) Concentration of Penha-type pottery, (14) Palmela arrowheads.

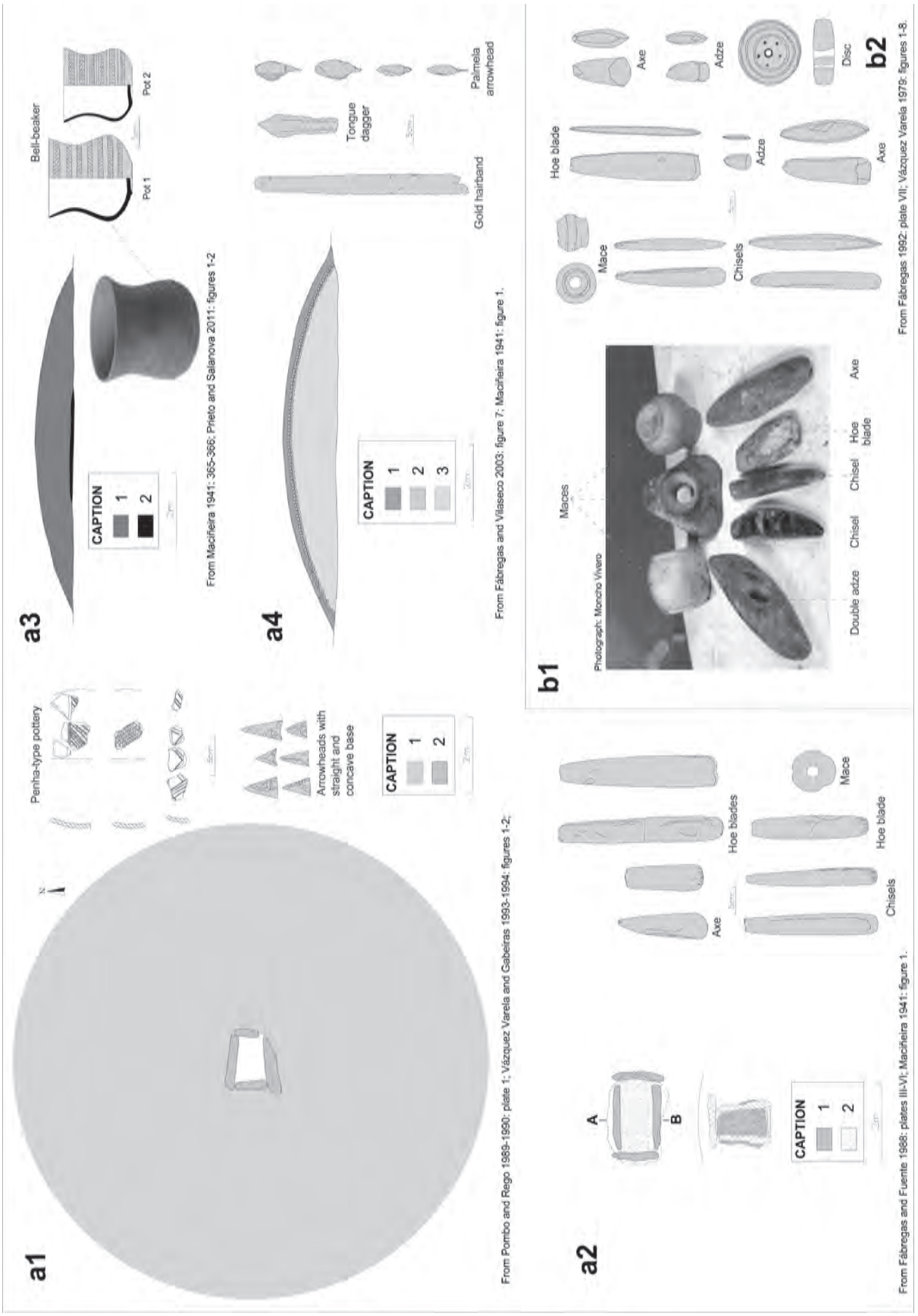

Fig. 17.4. Examples of new earth tumuli. (a1) Lousada 5 (Xermade, Lugo): (1) Limits of tumulus (2) Chamber; (a2) Veiga dos Mouros 229 (As Pontes, A Coruña): (1) Slate chamber (2) Combustion residue. (a3) Veiga de Vilavella 242 (As Pontes, A Coruña): (1) Humic tumular mass (2) Combustion remnants. (a4): Veiga de Vilavella 240 (As Pontes, A Coruña): (1) Plant layer (2) Shell (3) Tumular mass.Examples of tumuli with an undefined composition. (b1) Roza de Afora (Outeiro de Rei, Lugo): (b2) Rechaba (Tordoia, A Coruña).

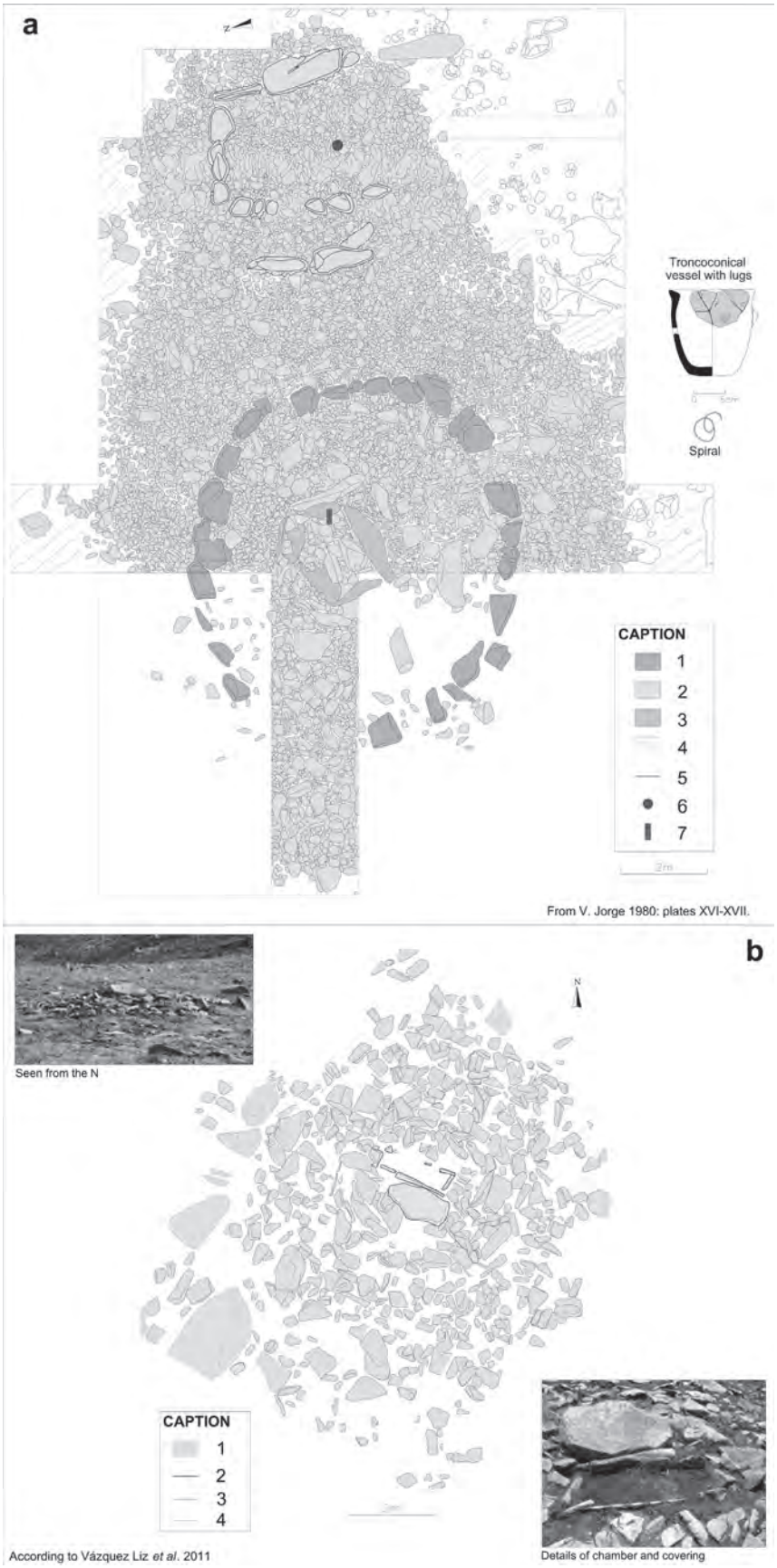

Fig. 17.5. Examples of stone tumuli. (a) Outeiro de Gregos 1 (Baião, Porto): (1) Stone ring (granite) (2) Granite (3) Chamber (4) Outcrop (5) Peripheral structure (6) Ceramic vessel (7) Silver spiral. (b) Monte dos Cregos (Campo Lameiro, Pontevedra): (1) Granite (2) Chamber (3) Shell (4) Outcrop.

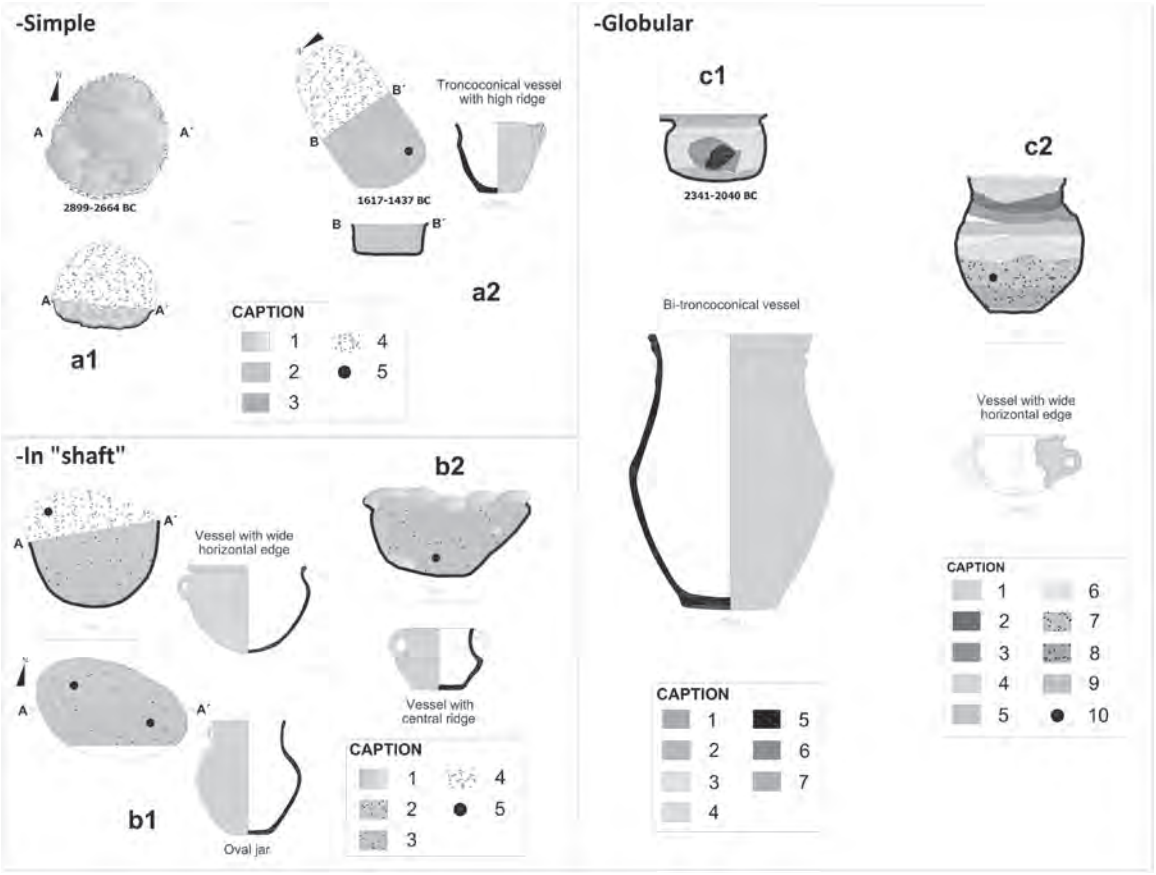

Fig. 17.6. Examples of pits. (a1) Devesa de Abaixo 7 (Moaña, Pontevedra)- (a2) Tapado da Caldeira 1 (Baião, Porto): (1) Layer of stones (2) Compact dark brown earth (3) Level containing charcoal and ashes (4) Natural earth (5) Location of the vessel; (b1) Coto de Laborada (Calvos de Randín, Ourense)- (b2) Monte Mesiego (O Carballiño, Ourense): (1) Layer of stones (2) Loose ash-coloured earth (3) Compact grey earth (4) Plant soil (5) Location of vessels; (c1) Cameixa (Boborás, Ourense): (1) Original soil used for cultivation (2) Upper filling material of the pit: brown earth (3) Intermediate filling material: yellowish-brown earth (4) Lower filling material: very yellow earth (granitic sand) (5) Filling material inside vessel (caused by combustion: dark earth (6) Vessel (7) Filling material in base of pit: grey-brown earth-(c2) Monte Buxel (Redondela, Pontevedra): (1) Organic soil (2) very organic black earth (3) Dark earth (4) Loose granitic sand (5) Dark brown earth (6) Light clay (7) Deposit with blocks of quartz and granite (intentional sealing of the pit) (8) Dark earth with fragments of granite (9) Malleable clay (internal lining of pit) (10) Vessel.

although they stand out due to the fact that they are located in mountainous areas,[2] sometimes in groups or standing alone. The most important of these in monumental terms, such as Meninas do Crasto 4 (Bãiao, Porto; Jorge 1983), have a diameter of 14–15 m, and are nearly 1 m high, while others such as Monte dos Cregos (Campo Lameiro, Pontevedra; Nonat 2010) have a diameter of only around 8 m and a height of 0.3 m. They contain chambers in the megalithic tradition, such as in Outeiro de Gregos 1 (Bãiao, Porto; Jorge 1980); non-monumental cists, as in Monte dos Cregos, Pedra da Xesta 1 (Boiro, A Coruña; Aira *et al.* 1986) and possibly Meninas do Crasto 4 (Bãiao, Porto; Jorge 1983), or otherwise the central space may have an oval shape, surrounded by stones of a larger size than those used in the rest of the tumulus, also covered with stones, as in Prado do Rei 2 (Dumbría, A Coruña; Lestón 2009).

Whenever grave goods are found, these are limited to troncoconical ceramic vessels, at times combined with a silver spiral. The radiocarbon dates indicate that these tumuli were already being built by the second half of the 3rd millennium BC until at least the end of the second half of the 2nd millennium, although if we consider the data from a nearby regions, such as the Beira Alta in Portugal, they may well have continued until the 1st millennium, such as some of the tumuli from the necropolis of Senhora da Ouvida (Viseu; Cruz y Vilaça 1999).

Finally, we have a series of examples of newly built tumuli of an indeterminate nature, as it is impossible

to fit them in with either group due to the absence of data caused as a result of the intensive anthropic activity they have suffered since the modern age which has led to their disappearance: Rechaba (Tordoia, A Coruña; Vázquez Varela 1979), Roza de Afora/Pago de Matela (Outeiro de Rei, Lugo; Fábregas 1992) or Monte das Cabras (Lalín, Pontevedra; López Cuevillas and Bouza Brey 1929).

Pits

As these structures are invisible in the landscape and do not contain any remnants of bones, the only way of making a differential diagnosis between a funerary and/or domestic pit often depends on the evidence provided by the archaeological context of which they form a part. We are still unaware of how widely they were used as funerary elements and their symbolic and social implications, as it is difficult to determine the status of the individuals who were buried.

Based on the profile resulting from excavating these pits in the natural terrain, revealing their horizontal profile, it has been possible to establish three main groups: simple pits, "shaft" pits and globular pits (Fig. 17.6).

Pits are quite exceptional in the north-western Iberian Peninsula, as apart from pit 6 in A Devesa de Abaixo (Moaña, Pontevedra), dating from the start of the 4th millennium BC, we do not know of any other similar element for the whole time interval in question. We do not find another funerary pit until the first half of the 3rd millennium, specifically in the same site and with very similar architectural features, the case of structure 7 (Vázquez and Prieto 2011): shallow, with a slightly concave profile, an apparently circular ground plan, with a floor either wholly or partially covered with charcoal and ashes, and one or more layers of stones that could be interpreted as a protective layer or as having been used to weigh down the dead (Esparza 1990, 130).

The limited human effort involved in conditioning the previous burial in the natural terrain, due to its shallow depth, suggests it should be considered as a *simple pit.*

The examples of simple pits from the second half of the 3rd millennium onwards seem to use some of the features we have already mentioned: at times they are covered with stones, and are always shallow, although the shape of the opening becomes oval or more anthropomorphic, and their profile tends towards an open "U" shape, as is the case of pit 7 of Agro de Nogueira (Toques, A Coruña; Meijide 1996), tomb 3 of Vale Ferreiro (Fafe, Braga; Bettencourt 2005, 161) and the pits of Tapado da Caldeira (Porto, Bãiao; S. Jorge 1980) from the middle of the 2nd millennium, in all likelihood indicating that the body was cremated beforehand.

The process of interpreting funerary practices is complicated in the case of pits that are much deeper – around 1 m – and which therefore call for a greater physical involvement, the reason why they are known as "wells" (shaft pits above), such as those of the necropolis of Coto da Laborada (Calvos de Randín, Ourense; López Cuevillas and Lorenzo 1930), Monte Mesiego (O Carballiño, Ourense; López Cuevillas and Chamoso 1958) or Agro de Penarrubia (Lugo, Lugo; Meijide 1996, 225).

Finally, the pits with a *globular profile*, ideal for preserving foodstuffs, are more indicative of a type of architecture that was previously used in a domestic context before being reused for a funerary context, as is the case of pit 7 from Monte Buxel (Pazos de Borbén, Pontevedra; Lima and Prieto 2002) or some of the holes from the site of Fraga do Zorro (Verín, Ourense; Prieto *et al*. 2009b). However, there are structures with a similar profile, although shallower, that were conditioned for exclusively funerary purposes and adapted to the dimensions of the urns they contained, as in Cameixa (Boborás, Ourense; Prieto *et al.* 2009a).

With regard to the grave goods, there is a significant apparent lack of metal items,[3] combined with the use of pottery that traditionally was mainly used in reused tumuli, such as the oval or wide horizontal rim vessel, in comparison to the intentional or unintentional quest to deposit pottery with unique features, evidence of contacts with more distant areas and contrasting with the rudimentary nature of the architecture (Nonat 2011, 210).

Cists

The dating of the cremation cist from the necropolis of Agro de Nogueira (Bettencourt and Meijide 2009) in the first centuries of the second half of the 3rd millennium BC has considerably put back in time the arrival of this funerary practice in comparison to those that already existed, as they were traditionally dated to a considerably later period. They are defined by being clearly individual structures (or tending towards the individual), recognising and highlighting the individual in death in comparison to a collective entity or community.

From an architectural perspective, they are generally characterised by being box shaped, made of slabs wedged into shallow furrows in the natural terrain, reinforced with wedges and a covering that frequently overhangs the internal dimensions of the chamber. They may have a stone floor, as is the case of Quinta da Agua Branca (Vila Nova de Cerveira, Viana do Castelo; López Cuevillas 1955) or of beach sand, as in the necropolis of Agra de Antas (Esposende, Braga; Cruz and Gonçalves 1998–9), a stone ring around the structure, as in Bicos de Lago (Muros, A Coruña; Bóveda 2008) or Gandón 2 (Cangas do Morrazo, Pontevedra; Peña 1985) or in exceptional cases, even with a "micro-tumulus" of stones, as in Agro de Nogueira 1 (Meijide 1996).

Their shapes (Fig. 17.7) are generally rectangular, as

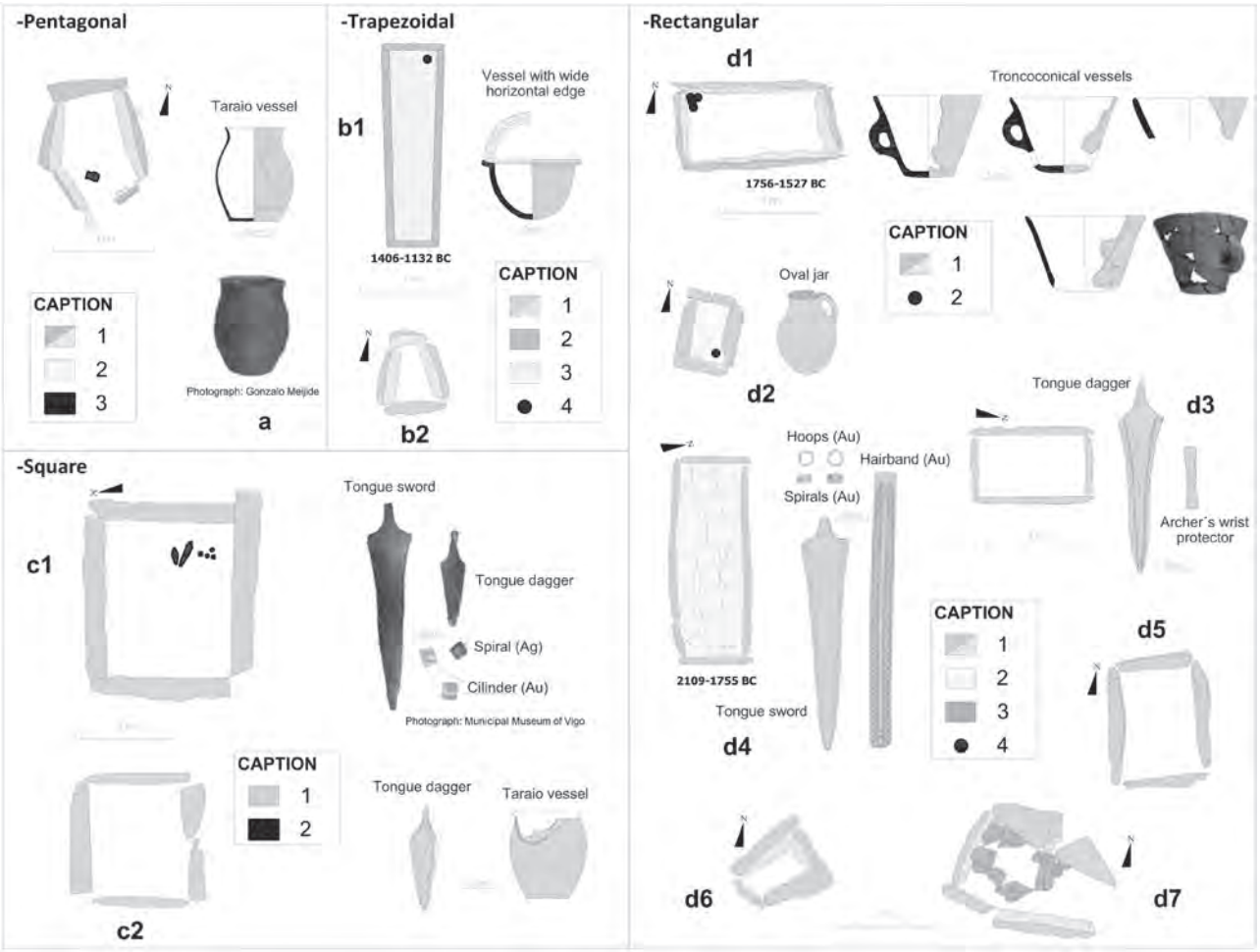

Fig. 17.7. Examples of cists. (a) Agro de Nogueira 1 (Toques, A Coruña): (1) Schist slabs (2) Shims (3) Vessel; (b1) Agra de Antas (Esposende, Braga)- (b2) Gandón 1 (Cangas do Morrazo, Pontevedra): (1) Granite slabs (2) Slate slabs (3) Sandy floor (4) Vessel; (c1) Taraio (Malpica, A Coruña) (c2) Atios (O Porriño, Pontevedra): (1) Granite slabs (2) Grave goods; (d1) A Forxa (Riós, Ourense): (1) Slate slabs (2) Ceramic vessels; (d2) Praia da Rola (Muíños, Ourense)- (d3) Pedramarrada (Carnota, A Coruña)- (d4) Quinta da Água Branca (Vila Nova de Cerveira, Viana do Castelo) (d5) Bicos de Lago (Muros, A Coruña) (d6) Devesa de Abaixo (Moaña, Pontevedra) (d7) Monte Forte de Gabriel (Ponteareas, Pontevedra): (1) Granite slabs (2) Floor slabs (3) Internal structure (4) Vessel

in A Forxa (Ríos, Ourense; Prieto *et al.* 2009), A Devesa de Abaixo (Moaña, Pontevedra; Vázquez 2005) or Monte Forte de Gabriel (Ponteareas, Pontevedra; Villar 2009); pentagonal, as in Agro de Nogueira 1; trapezoidal, as in Gandón 2 or Agra das Antas; or square, as in Atios (Porriño, Pontevedra; Álvarez *et al*. 1970) and Taraio (Malpica, A Coruña; Vázquez 1980). They appear in isolated cases in A Devesa de Abaixo, in a very limited number in the site of Agro de Nogueira, or in true necropolis such as Agra de Antas.

It is important to note the association between a cist of larger dimensions used as a burial with one of smaller proportions for cremation (Meijide 1996, 230; Nonat 2010, 119), as it could be suggested, as does D. Brandherm (2007, 75), that this could be connected with the practices of Wessex I in the south of England, where "the majority of the rich male grave goods are found in burials, and in the case of the female burials, these are invariably cremations".[4]

The cists reflect a significant diversity in the deposition of goods, with the Taraio-type vessel that appears on its own, or at times combined with a tongue dagger, or otherwise the latter associated with an archer's wrist-guard. These also attest to luxurious grave goods (weapons and jewellery), making it possible to see how they belonged to a restricted category of individual, possibly an elite, although it is true to say that they are not the most frequent type, as there are cists without grave goods but which also, in the same way as in the pits, feature a repertoire of pottery types that are recurrent in the funerary world of the 2nd millennium BC: wide horizontal edged, oval or troncoconical vessels.

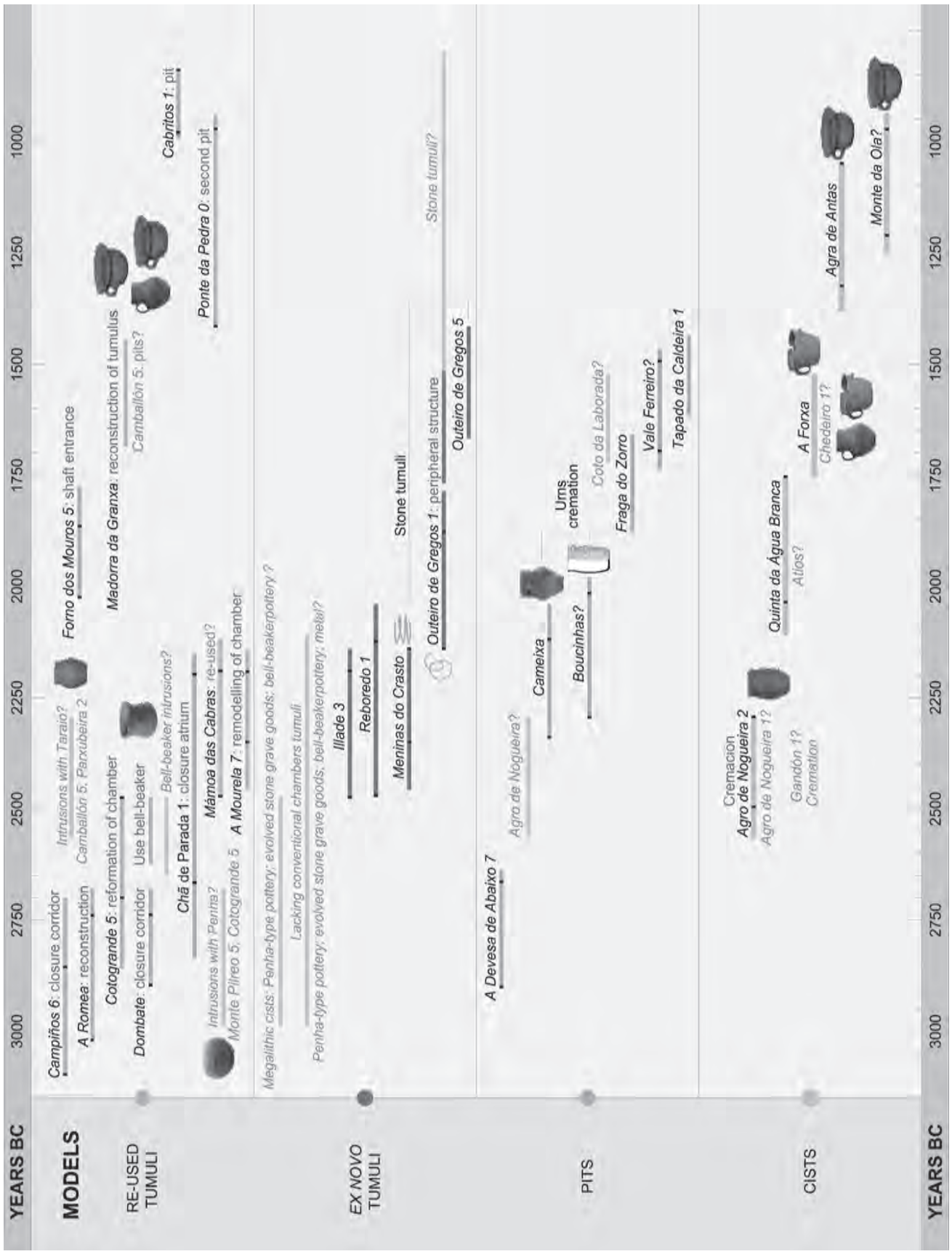

Fig. 17.8. Chronological diagram of the different sites that comprise the funerary models. The widest strips represent the full interval of the dating calibrated in 2 σ, and the area between the black squares is the highest range of probability. The narrowest strips in the lighter colour reproduce the hypothetical temporal location of the sites or group of sites which lack absolute chronological contexts, deduced from the data provided by elements with a similar structure or which form a part of the same archaeological element, which are well contextualised at temporal level.

Final considerations

The variety of new features that appeared over these two millennia, such as the tendency towards individual burial space or the loss of visibility in the landscape, does not seem to have evolved in a precisely linear manner, but instead, at the same time as megalithic tombs continued to reused, with all of their monumental and collective connotations, cists were built and pits were conditioned, and with them the will to highlight the individuality of the deceased in his or her journey to the great beyond. The impulse of these new features could be explained by a change in the process of identification and legitimation of the role of specific individuals within society, which would have resulted in a certain flexibility in the choice of the type of architecture, in comparison to structures that were more strictly selected, and in some cases even standardised (Nonat 2011, 201–208).

The tumulus – either as a subsequent reuse or as a result of an *ex novo* construction – represents all of the complexity involved in a tradition that lasted for millennia with the inclusion of new elements and the continuity of others as a way of perpetuating the past. The acquisition of gestures did not mean that the same significance was transmitted from one moment to another, as they could have been adapted, transformed and used depending on changes at social or symbolic level, amongst others. And so, the deposition of material in the 2nd millennium BC in the megalithic tumuli did not necessarily respond to the same practices as those from the 3rd millennium.

The communities seem to have deposited and therefore recognised in the different funerary solutions a system of values and symbols, an identity, which would have drawn all of its significance as a process (integration, appropriation) and as a result of this[5] (model). These models therefore seem to transfer a dynamic language with series of highly developed codes. Curiously, and as highlighted by R. Fábregas, if we eliminate the doubtful cases from a number of old excavations, the presence of Bell Beaker pottery seems to be restricted to tumular shapes (Fábregas 2011, 236) as if it were the only funerary model worthy of receiving it.

There are a variety of scenarios, as different types of architecture and even different ways of dealing with bodies are associated in the same funerary area. This combination may be the result of different ideologies, behaviours and approaches towards death taking shape over a long period of time, combining features of continuity (such as burial) with specific aspects resulting from local traditions or from external contacts (cremation), which in turn were included in the complex milieu of the funerary world. In essence, this is a constant interplay between continuity and change, between the will to conserve and preserve the global identity of a community and the internal dynamic created as a result of interactions between the individuals who comprise it (Belkaïd and Guerraoui 2003, 124).

In order to summarise all of the information provided by the analysis of the proposed funerary models, Figure 17.8 is a chronological diagram showing the location of the sites included in this study (se also Table 17.1), together with the most characteristic pottery types at formal and decorative level in the 3rd and 2nd millennia BC that accompany them in some cases, as well as the hypothetical location of other elements (architectural, material, etc) of paramount importance in the development of the funerary world in the chronological period studied.

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Notes

1 Les individus … construisent et partagent des significations qui fondent leur identification commune …" (Vinsonneau 2002a, 12).

2 However, there seems to be an example in Galicia that breaks with this mould: Guidoiro Areoso I, with a Megalithic chamber, on an islet in the Arousa estuary (Rey 2011).

3 However, there is the site of São Bento de Bagulâes (Barcelos, Braga, Portugal) which due to the context of its discovery and the age of the data, does not make it possible to say if this is a cist or a pit (Ladra *et al.* 2003, 58).

4 We would point out that the cremation remains from the cist of Agro de Nogueira would correspond to an individual of some 40 years of age, perhaps female (Meijide 1996, 224).

5 Ainsi, l'identité peut être perçue à la fois comme le produit résultant d'un processus mais également comme le processus en soi" (Vinsonneau 2002b, 18).

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18

CONCLUDING REMARKS.THE BELL BEAKER TRANSITION:THE END OF THE NEOLITHISATION OF EUROPE; THE STARTING POINT OF A NEW ORDER

Maria Pilar Prieto Martínez and Laure Salanova

This concluding article explores the progress realised in recent decades in the interpretation of the Bell Beaker phenomenon. If research from the 20th century was mainly focused on questions relating to its origins and the mechanisms of its spread, the current issue turns around the identity of the people and groups that moved during the second half of the 3rd millennium BC, their insertion into local cultures and the reasons for this high degree of mobility. Each article in this volume contributes some original answers to these questions, stimulating the fascinating debate of why Bell Beakers existed. The answer to this latter question required considering the trajectory of European societies after the Neolithic transition to measure the impact of the Bell Beaker transition, which simultaneously represents the ultimate stage of Neolithic society and the foundation of a new social order that would not really evolve until the Industrial Revolution.

Questions about the mobility patterns, origins and mechanisms of its spread have been inseparable bed-fellows of Bell Beakers since they were identified as an important archaeological phenomenon at the end of the 19th century (Cartailhac 1886; Castillo 1928; Sangmeister 1961; Harrison 1974). The bipolar origin of the phenomenon continues to be hotly debated today (Desideri 2011), while the question of their dissemination has undergone more variations over time, with the evolution of the discipline that brought new methods of analysis that not only include the technology and archaeometry of pottery but also the biological and physical anthropology of human bones found in burial contexts (Leeuw 1976; Cabral *et al.* 1988; Echallier and Jallot 1992; Price *et al.* 1988). Initially attributed to mass migrations or invasions, by the 20th century, the spread of Beaker culture came to be considered a process of restructuring networks of exchange on a broad scale (Clarke 1976). After a period of inactivity in the 1980s, the Bell Beaker "phenomenon" (Strahm 1995) has returned with renewed interest, as we have gradually obtained a deeper understanding of the archaeological record in detail. At the same time, new and varied theoretical and methodological perspectives have appeared, demonstrating the need for an overview of the phenomenon within a wide temporal perspective that brings together local, regional and macro-territorial knowledge to fully understand it. This is clearly illustrated by the present book. As a result, the question has changed. Instead of considering its dissemination, the Bell Beaker problem currently revolves around several questions: Who were the people who moved? Where? Was the Bell Beaker mobility similar in the different parts of its expansion? How were the different mechanisms of circulation organised and on what scale? How have the multiple possibilities for movement (of people, objects, raw materials, ideas) operated on different levels of social life? How were they integrated into local traditions? Why? What are the places and the meaning of the Bell Beaker phenomenon in the evolution of European societies?

The last 15 years of research have been vital in obtaining a clearer understanding of the phenomenon in the three levels mentioned above. We can now confirm many of the hypotheses surrounding the Bell Beakers and from very different points of view.

Who were the people who moved?

Several articles directly address this question in Poland (E. Haduch), in Norway (C. Prescott and A. Glørstad) and in the British Isles (A. Fitzpatrick). Isotopic analyses indicate that there was movement between far-distant points within Europe, while physical anthropology has demonstrated the presence of individuals with characteristics that differ from those considered already present during previous periods. Foreign-born individuals are frequently associated with Bell Beaker grave goods. As it has in previous stages of the discipline, this inevitably inspires us to consider that a population from far away appeared with a new material culture. However, was the population the one that introduced the Bell Beaker phenomenon, or were they directly the bearers of change in certain areas? As for the southern part of France, for which J. Cauliez has shown, on the basis of cave stratigraphy, that social changes appeared quite earlier than the Bell Beaker period, the answer can certainly vary according to regions.

Despite regional variations, it yet seems clear that the supra-local homogeneity observed in the whole of Europe during the second half of the 3rd millennium BC, in similar funerary rituals, in the way of interacting with territory, in the way of representing iconography and decorating pottery, and in the way of representing social differences, could not have been the result of the spontaneous generation of ideas. This "spatial link between different societies" that represents the Bell Beaker phenomenon (Müller *et al*.) and which was quickly assimilated within 100–200 years (the equivalent of 4–8 generations in the whole of Europe) could not be explained without human contacts. It would have been necessary to talk, explain, listen, understand and convince, and this most likely required the movement of a significant number of people (see this in the volume the work by Falileyev and Müller *et al.*). Although the analysis of material culture and human bones from Bell Beaker graves has revealed the mobility of a population, it is however difficult to validate the hypothesis of the last century, which supposed massive migrations. The archaeological data mainly come from the best-preserved cemeteries in Central Europe, which rather suggest the movement of small groups. A larger number of local and regional studies throughout the whole of Europe are still necessary, as we still lack data from areas where bones are not preserved in the archaeological record, in order to correctly identify the magnitude of the intensity of movement and its long-term effect on the continent. Nevertheless, several articles from this volume offer the opportunity to give a more precise identity to these travellers, such as archers that were closely linked with mining activities and high social status (P. Makarowicz; J. Turek; A. Fitzpatrick; P. Makarowicz; C. Prescott and A. Glørstad) and craft specialists that shared advanced techniques and skills to manufacture prestigious items (B. Armbruster and B. Comendador Rey) or to exploit economic resources (E. Guerra Doce *et al.*; O. García Puchol *et al.*). Both of these social components are surely involved in the process of change that characterised the second half of the 3rd millennium BC.

Where?

The mechanisms of the circulation of items and people have been the main topic of Bell Beaker studies since the beginning of the 1990s. The different types of circulation patterns identified (local, regional and macro-regional) demonstrate a high degree of mobility in the second half of the 3rd millennium BC. Was Bell Beaker mobility similar in the different parts of its expansion? It is difficult to answer this question precisely.

For the local and regional scale, programmes of archaeometric analysis were mainly developed in the south-west part of the Bell Beaker expansion (Spain, Portugal and France). Those analyses of pottery have revealed a circulation pattern of pots that seems to be characteristic of the most western fringe of the Bell Beaker expansion and which developed on a regional scale in the framework of ceremonial meetings (Salanova *et al*. in press). In the more continental regions, e.g., in eastern France, the cases of pottery circulation, quite numerous in domestic sites, are correlated with seasonal movement between settlements from the plains and those from higher altitude. Due to the best preservation of the burials, this topic was approached in a different way in the eastern part of the Bell Beaker expansion, where the anthropological data were favoured. It is certain that both methods should be developed on a European scale in order to compare in the same terms the mobility patterns and their intensity in each region.

Before the Bell Beaker phenomenon, such networks already existed, as illustrated by the articles of C. Rodríguez Rellán and E. Ihuel *et al.*, which deal in both cases with flint daggers and blades that circulated during the first half of the 3rd millennium in western Europe. Each of these flint networks delimits macro-regional entities that seem to be in competition and thus delimit juxtaposed cultural groups (E. Ihuel *et al*.; and also J. Cauliez for the pottery entities before the Bell Beakers). The originality of the Bell Beaker expansion is that it made the European space uniform, with identical social codes, despite the local variations of ways of life. As already mentioned, this new social order

is disseminated by small groups, and the diversity observed in the burial contexts at the end of the 3rd millennium (cf., P. Vázquez Liz *et al.*), with only some categories of graves containing Bell Beakers, surely reflects the fact that it should have concerned only one part of the population.

How?

Although the mechanisms of circulation and the roads for these circulations are now more clearly understood, the remaining question is how the networks that developed on an unprecedented scale with the Bell Beaker phenomenon became integrated in territories occupied by such different societies? The chapters by P. Makarowicz, M. Artursson, P. Vázquez *et al.*, J. Cauliez, C. Prescott and A. Glørstad, M. Costa Casais *et al*., S. Pérez Díaz and J. A. López Sáez give some answers regarding local insertion and regional historical processes that underlie the Bell Beaker expansion. The answers are obviously different in each chapter, as in some areas quite sudden changes occurred, and in others, the Bell Beakers seem to rather reflect a gentler transition. These differences led one of us to compare the Bell Beaker phenomenon to a musical standard, adopted and adapted by different cultural traditions (Salanova 2000). In the cultural landscape of the 3rd millennium, the impact of the Bell Beakers could not have been the same, depending on whether it was in southern Europe where stratified societies with intense metallurgical activities are still known from the end of the 4th millennium or in the northern part of Europe where the Neolithic economy was adopted quite late, during the first half of the same millennium (compare the chapters by J. Cauliez for the Mediterranean regions and the chapter by C. Prescott and A. Glørstad for Scandinavia). This impact can also be measured according to the duration of the phenomenon, which in some areas lasted for 400 years and, in others, lasted more than 1000 years with important roots into the Bronze Age (Needham 2005; Laporte *et al.* 2008). Whatever the visibility of the changes in the archaeological record, the Bell Beaker transition is similar at a super-structural level and is not limited to the selective deposition of grave goods in graves. It is associated with a more intense exploitation of the territory, extending the areas dedicated to growing crops and raising livestock at a time when the climate was worsening.

Why?

This question of the environmental and economic background during the Bell Beaker development is still poorly understood. Control over mining activities or other important raw materials such as salt is considered a key factor to explain the high degree of mobility (C. Prescott and A. Glørstad and A. Fitzpatrick for northern Europe; Guerra Doce *et al.* and García Puchol *et al.* for southern Europe). It is certainly an essential factor in the northern regions where metal items belong to the novelties that brought the Bell Beaker phenomenon, but in some areas, mining activities are not so clear, although the abundance of easily accessible raw materials makes it possible to propose hypotheses about their exploitation during prehistoric periods.

The two articles that set up the environmental framework of this period in northern Spain (M. Costa Casais *et al.;* S. Pérez Díaz and J. A. López Sáez) also propose to take into consideration the climatic event during which Bell Beakers developed. This period is marked by a clearer anthropisation and exploitation of the landscape, even in areas of mountains or in regions like Spain where the farming economy had been practised for several millennia before the appearance of Bell Beakers; at the same time, a soil erosion episode occurred that could have favoured the opening of new circulation roads. This human pressure could easily explain the mobility of the small groups observed in northern Europe who settled new villages such as in Norway (C. Prescott and A. Glørstad). New, more stable settlement patterns are also noticed in eastern Europe, in Poland, with Bell Beakers, which is in contrast with the previous Corded Ware culture that left little evidence of permanent settlements (Czebreszuk and Szmyt 2008).

We know of other historical examples of such a large scale that have been documented throughout our history, such as the Roman conquest or the large-scale colonisation that has taken place all over our planet in modern times, triggering a more or less rapid expansion of a new ideology, a new way of organising society, and a new political and economic approach. Does the Bell Beaker phenomenon represent such a phenomenon of globalisation?

Despite regional variation, the unprecedented homogeneity that accompanies the Bell Beaker phenomenon could be considered the completion of a long process that started in Europe with the Neolithic transition. If the latter brought a new economic system, based on food production, the Bell Beaker transition concludes this process, while all the regions from Europe have adopted a Neolithic economy, setting up a social structure, which did not evolve a great deal before the Industrial Revolution. In this sense, the Bell Beaker phenomenon can be considered to reflect the ultimate stage of the Neolithic in Europe. However, as several authors from this volume have underlined, if there were no inventions that radically modified the way of life of societies from the 3rd millennium BC, then the social order of the communities from the Bell Beaker times, which were clearly connected with the creation of new interests and dominant groups who controlled the networks of power, is definitively transformed. In this sense, the Bell Beaker phenomenon also represents a starting point, laying the foundation for subsequent societies. On the whole, it should

be considered a transition process that simultaneously marks the end of the European Neolithic, with stable social structures and a genuine turning point towards urban and stratified civilisations.

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