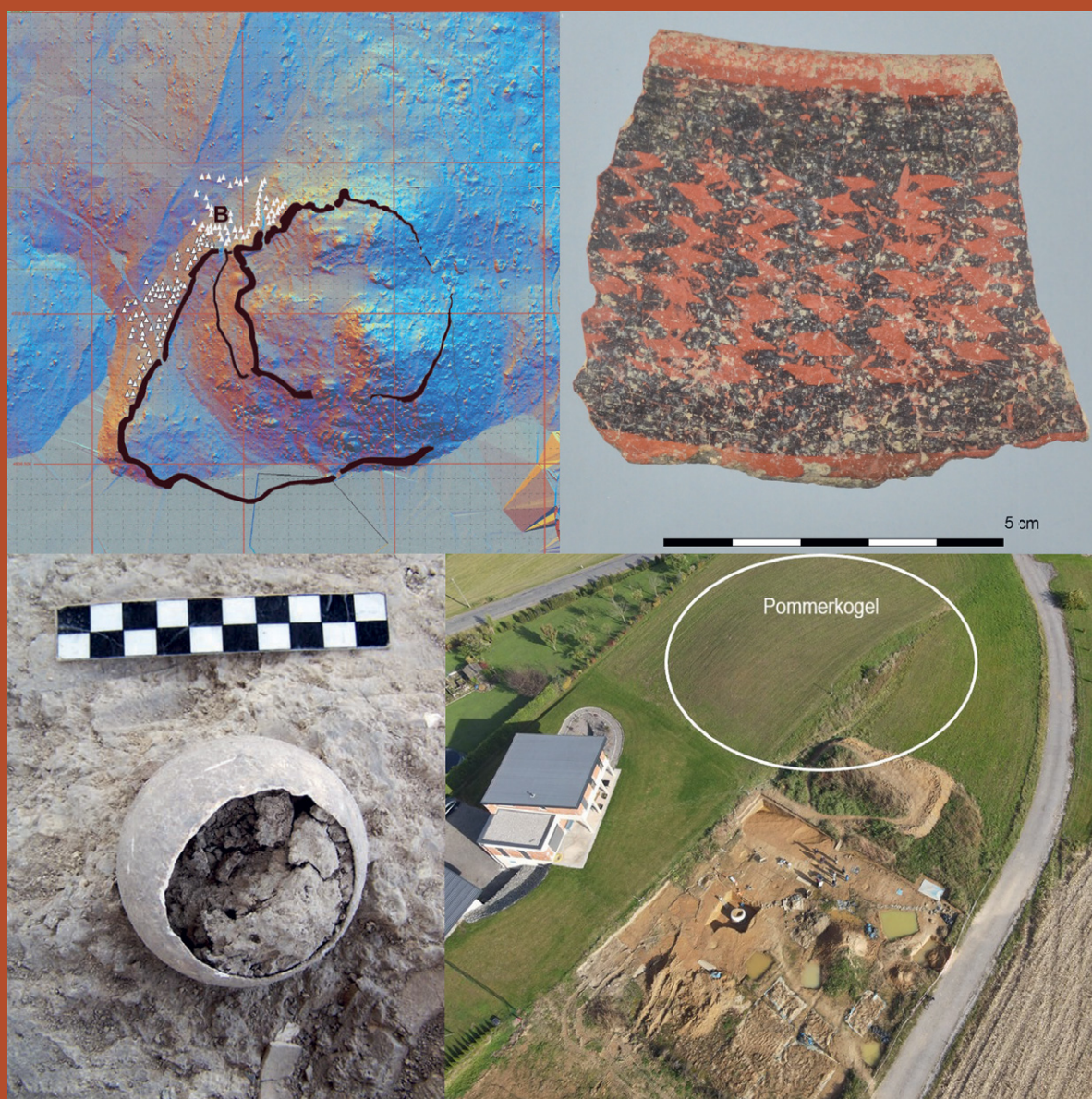




# Metal Ages / Âges des métaux

Proceedings of the XIX UISPP World Congress  
(2–7 September 2021, Meknes, Morocco)  
Volume 2 / General Session 5



Edited by  
Dirk Brandherm



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## Foreword to the XIX UISPP Congress Proceedings

UISPP has a long history, starting in 1865 with the International Congress of Prehistoric Anthropology and Archaeology (CIAAP), until 1931, date of the foundation in Bern of UISPP. In 1955, UISPP became a member of the International Council of Philosophy and Human Sciences, associate body of UNESCO.

UISPP is structured around more than thirty scientific commissions which a very representative network of worldwide specialist in prehistory and protohistory, and covering all specialist fields of archaeology: historiography, archaeological methods and theory, material culture by period (Palaeolithic, Neolithic, Bronze Age, Iron Age) and by continents (Europe, Asia, Africa, Pacific, America), palaeoenvironment and palaeoclimatology, archaeology in specific environments (mountains, desert, steppes, tropical area), archeometry, art and culture, technology and economy, biological anthropology, funerary archaeology, archaeology and societies.

The XIX World Congress of the UISPP was subject to the constraints of the Covid19 pandemic. Scheduled for September 2020 in Meknes (Morocco), it was finally held remotely in September 2021, with 32 sessions, 200 participants, 380 communications and 850 authors. The proceedings of the congress, published by the UISPP as well as in special issues of specialized scientific journals, will remain as the most important result of the Congress.

L'UISPP a une longue histoire, à partir de 1865, avec le Congrès International d'Anthropologie et d'Archéologie Préhistorique (C.I.A.A.P.), jusqu'en 1931, date de la Fondation à Berne de l'UISPP. En 1955, l'UISPP est devenu membre du Conseil International de philosophie et de Sciences humaines, associée à l'UNESCO.

L'UISPP repose sur plus de trente commissions scientifiques qui représentent un réseau représentatif des spécialistes mondiaux de la préhistoire et de la protohistoire, couvrant toutes les spécialités de l'archéologie : historiographie, théorie et méthodes de l'archéologie, culture matérielle par période (paléolithique, néolithique, âge du bronze, âge du fer) et par continents (Europe, Asie, Afrique, Pacifique, Amérique), paléoenvironnement et paléoclimatologie, archéologie dans des environnements spécifiques (montagne, désert, steppes, zone tropicale), archéométrie, art et culture, technologie et économie, anthropologie biologique, archéologie funéraire, archéologie et sociétés.

Le XIX<sup>ème</sup> congrès mondial de l'UISPP a subi les contraintes de la pandémie du Covid19. Prévu en septembre 2020 à Meknès (Maroc), il s'est finalement tenu en distanciel en septembre 2021, avec 32 sessions, 200 participants, 380 communications et 850 auteurs. Les actes du congrès, édités par l'UISPP ou les numéros spéciaux de revues scientifiques spécialisées, resteront le résultat le plus important du Congrès.

François Djindjian

President / Président UISPP

## Introduction

This volume presents a selection of papers given at the General Session 5 (Metal Ages / Âges des métaux) of the XIX UISPP World Congress, originally planned to take place in early September 2020 in Meknes (Morocco), but postponed due to the outbreak of the worldwide Covid pandemic and eventually held as a virtual on-line event from 2 to 7 September 2021. Despite those challenging circumstances, and very much to the credit of the Meknes organizing committee, the Congress turned out to be a resounding success, with many scholars, particularly from African countries attending who would not previously have had an opportunity to participate in such a forum.

Seventeen papers were presented at our General Session, covering an exceptionally wide range of topics, from the Chalcolithic in Northwest Africa and Iberia, the Bronze Age in Finland and Turkey, to the Late Iron Age in France and the eastern Alps. Not all of those papers will be found included in the present volume, as some of them were already earmarked for eventual publication elsewhere, while others reported on work still very much in progress that their authors deemed not quite ready for release in a printed format. The eight papers included in the present volume still provide a vivid and representative cross section of the range of topics discussed at the session.

Last but not least, I would like to thank the organizing committee of the Meknes UISPP World Congress, and in particular its General Secretary Prof. Larbi Boudad for their kind invitation to chair this General Session and for their tireless support in making it happen in spite of the difficult circumstances.

Ce volume présente une sélection de communications présentées lors de la Session générale 5 (Metal Ages / Âges des métaux) du XIX Congrès mondial de l'UISPP, initialement prévue début septembre 2020 à Meknès (Maroc), mais reportée en raison de l'épidémie de la pandémie mondiale de Covid et s'est finalement tenu sous forme virtuelle en ligne du 2 au 7 septembre 2021. Malgré ces circonstances difficiles, et tout au crédit du comité d'organisation de Meknès, le Congrès s'est avéré être un succès retentissant, avec de nombreux universitaires, en particulier des pays africains, qui n'auraient pas eu auparavant l'occasion de participer à un tel forum.

Dix-sept communications ont été présentées lors de notre Session générale, couvrant un éventail exceptionnellement large de sujets, du Chalcolithique en Afrique du Nord-Ouest et dans la péninsule Ibérique, l'âge du Bronze en Finlande et en Turquie, au second âge du Fer en France et dans les Alpes orientales. Tous ces articles ne seront pas inclus dans le présent volume, car certains d'entre eux étaient déjà destinés à une éventuelle publication ailleurs, tandis que d'autres rendaient compte de travaux encore en cours que leurs auteurs ne jugeaient pas tout à fait prêts à être publiés sous forme imprimée. Les huit articles inclus dans le présent volume offrent toujours un aperçu vivant et représentatif de l'éventail des sujets abordés lors de la session.

Enfin et surtout, je tiens à remercier le comité d'organisation du Congrès mondial de l'UISPP de Meknès, et en particulier son secrétaire général, le professeur Larbi Boudad, pour leur aimable invitation à présider cette session générale et pour leur soutien inlassable à sa réalisation malgré les circonstances difficiles.

Dirk Brandherm

President of the UISPP Scientific Commission  
'Metal Ages in Europe and the Mediterranean'

Président de la Commission scientifique de l'UISPP  
« Âges des métaux en Europe et en Méditerranée »

# Les objets en coquilles d'œufs d'autruche du Chalcolithique en Espagne

Linda Boutoille<sup>1</sup>

## Abstract

Numerous rock-art images of ostriches are found throughout the hinterland of Africa's Mediterranean coastline. They bear witness to the economic and symbolic significance of this animal during prehistory and of its decline in more recent times. Already in 1910, Louis Siret reported the presence of objects manufactured from ostrich eggshells in the richest tombs of the Los Millares necropolis, but even today, not least due to the difficulty of their identification, objects made from ostrich eggshells remain extremely rare in Spain. They are mostly found in the form of beads but also as complete shells and as eggshell fragments which could be used as containers and also as raw material for making beads. Even though the modalities of their exchange and circulation as well as the chronology of this phenomenon are still largely unknown, objects made of ostrich eggshells nonetheless bear witness, in the same way as amber and ivory, to the importance of exotic raw materials and their import in the constitution and in the representation of Chalcolithic élites.

## Keywords

BEAD, EGGSHELL, OSTRICH, SPAIN, AFRICA, MEDITERRANEAN, COPPER AGE.

## Résumé

De nombreuses images d'art rupestre d'autruches se rencontrent dans tout l'arrière-pays de la côte méditerranéenne de l'Afrique. Ils témoignent de l'importance économique et symbolique de cet animal au cours de la préhistoire et de son déclin à une époque plus récente. Déjà en 1910, Louis Siret signalait la présence d'objets fabriqués à partir de coquilles d'œufs d'autruche dans les tombes les plus riches de la nécropole de Los Millares, mais aujourd'hui encore, en raison de la difficulté de leur identification, les objets fabriqués à partir de coquilles d'œufs d'autruche restent extrêmement rares en Espagne. On les trouve le plus souvent sous forme de perles mais aussi sous forme de coquilles complètes et de fragments qui pourraient avoir servi de contenants mais aussi de matière première pour fabriquer les perles. Même si les modalités de leur échange et de leur circulation ainsi que la chronologie de ce phénomène sont encore largement méconnues, les objets en coquille d'œuf d'autruche témoignent néanmoins, au même titre que l'ambre et l'ivoire, de l'importance de matières premières prestigieuses et de leur importation dans la constitution et dans la représentation des élites chalcolithiques.

## Mots-clés

PERLE, COQUILLE D'ŒUF, AUTRUCHE, ESPAGNE, AFRIQUE, MÉDITERRANÉE, CHALCOLITHIQUE.

## Introduction<sup>2</sup>

L'autruche est le plus gros oiseau vivant actuellement. Devenue rare dans de nombreuses régions de l'Afrique sa place au sein des sociétés africaines est aujourd'hui minime, elle a pourtant été un élément important de la symbolique et de la vie économique des populations de l'Afrique méditerranéenne. Au cours de la préhistoire, un nombre très limité d'objets fabriqués à partir de coquilles d'œufs d'autruches sont arrivés en Espagne. Souvent présents dans des contextes funéraires semblant attester d'une position hiérarchique élevée des défunts, ils témoignent de la haute valeur de ce matériel exotique, mais aussi d'un système d'échange complexe qui était en œuvre à travers la méditerranée. L'objet de cet article est de s'interroger sur la place des objets fabriqués à partir de coquilles d'œufs d'autruche ainsi que sur les modalités de leurs échanges.

<sup>1</sup> Queen's University Belfast, School of Natural and Built Environment l.boutoille@qub.ac.uk

<sup>2</sup> Ce texte est une version légèrement modifiée d'un article publié originalement en langue espagnole dans la revue Mantova (Boutoille 2021).

### L'autruche en Afrique du Nord et en Égypte : bref aperçu

L'autruche est le plus gros des oiseaux vivants actuellement. Incapable de voler, elle excelle cependant à la course ce qui en a fait une proie idéale pour la chasse à courre. Seulement présente en Afrique, l'autruche y est menacée dans de nombreuses régions (Ash et Atkins 2009, p. 81) et rares sont les populations africaines qui ont l'occasion d'en admirer (Camps Fabrer 1963 ; 1995). Au cours de la préhistoire, la situation était différente et l'autruche connaissait une répartition beaucoup plus vaste (Camps Fabrer 1963 ; 1990). Des représentations rupestres en Égypte mais également en Algérie, au Maroc, en Égypte et en Libye illustrent des scènes naturalistes mais également des scènes de chasses (Camps 1988 ; Camps Fabrer 1963, p. 17-18 ; 1990 ; 1995 ; Darby *et al.* 1977, p. 315 ; Huard et Allard 1977a ; 1977b ; Le Quellec 1987 ; 1989 ; Manlius 2001, p. 947 ; Muir *et al.* 2011, p. 582) (Fig. 1). Ces scènes témoignent de la présence de l'autruche sur l'ensemble de la côte méditerranéenne de l'Afrique mais aussi de la place de cet animal au sein des sociétés et des croyances des populations préhistoriques du pourtour méditerranéen de l'Afrique (Camps Fabrer 1963 ; 1990 ; 1995 ; Darnell 2002, p. 126-128 ; Muir *et al.* 2011). L'autruche est ainsi le premier oiseau à avoir été représenté dans l'art égyptien (Houlihan 1986, p. 1-5 ; Muir *et al.* 2011, p. 582). Plus rares les restes osseux sont également présents et attestent de la consommation de la viande d'autruche par certaines populations mais probablement pas en grande quantité et de façon régulière (Camps Fabrer 1963, p. 17 ; Merzoug 2011 ; Muir *et al.* 2011, p. 583). Son cuir est également utilisé pour faire des cordes voire des boucliers (Camps Fabrer 1963, p. 80-81 ; 1990, p. 9).

Les autruches servaient également de source importante de produits secondaires. Leurs œufs étaient consommés et les coquilles étaient conservées et utilisées pour fabriquer des récipients et des objets de parure. Les perles et les récipients découverts en milieu funéraire ainsi que des représentations égyptiennes illustrant des œufs offerts en tribus à pharaon sont de précieux témoins pour illustrer l'importance de l'œuf d'autruche et de l'animal aux seins de ces populations (Camps Fabrer 1963 ; Darby *et al.* 1977, p. 317 ; Muir *et al.* 2011, p. 587) (Fig. 2). Ils témoignent également de l'importance symbolique de l'œuf probablement perçu comme un symbole de la renaissance mais



Figure 1. Représentation d'une chasse à l'autruche. Gravure rupestre néolithique de Thyout, Ain Sefra, Algérie (d'après Camps Fabrer 1990, p. 10).



Figure 2. Représentation d'une autruche vivante, plumes et œufs offerts en hommage à pharaon. Tombe thébaine non identifiée, Nouvel Empire (d'après Gardner Wilkinson 1878, fig. 96).

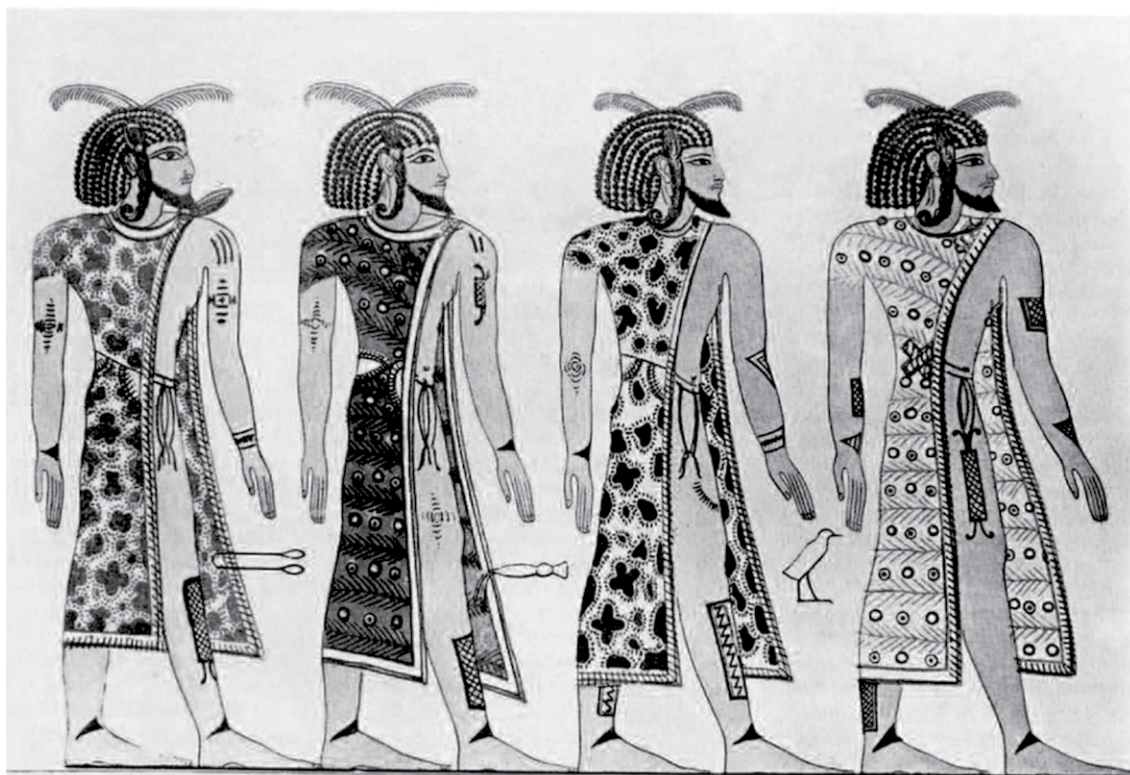


Figure 3. Représentation de chefs libyens avec deux plumes d'autruche dans les cheveux, attestant de leur rang. Tombeau de Seti 1er, Thèbes, Nouvel Empire (d'après Bates 1914, pl. 3).

également solaire (Muir *et al.* 2011, p. 588–589 ; Bailleul Lesueur 2013, p. 29 ; Kozloff 2013). Enfin, ses plumes sont des ornements très appréciés de nombreuses populations du Nord de l’Afrique et de l’Égypte de nombreuses représentations d’hommes voire de dieux égyptiens portant des plumes d’autruches sont présentes (Camps Fabrer 1963, p. 81–82 ; Darnell 2002, p. 126–128 ; Leeter 2010). Les plumes d’autruche étaient ainsi perçues comme des marqueurs sociaux (Panaite 2015 ; Shonkwiler 2013) (Fig. 3) mais aussi, dans l’art égyptien, comme le symbole de certains dieux, celui de l’âme du défunt et un symbole de protection (Darnell 2002, p. 126–128 ; Leeter 2010 ; Shonkwiler 2013, p. 53–54). De nombreux indices convergent dans le sens de l’importance de l’autruche, tout d’abord, comme symbole social et religieux mais également économique pour les populations du Nord de l’Afrique et de l’Égypte.

Parmi les produits issus de l’autruche, l’œuf d’autruche semble le seul qui soit arrivé en Espagne au cours de la préhistoire. La présence de plume est possible mais à ce jour elle n’est pas encore attestée, quant à l’autruche, si elle a fait, l’objet d’échanges en Égypte par le biais des tributs offerts à pharaon, il est peu probable que cette dernière soit arrivée vivante jusqu’en Espagne. En raison de leur rareté et de la difficulté à les reconnaître en tant que tels, les objets fabriqués à partir d’œufs d’autruche ont reçu peu d’attention de la part des chercheurs ; ils sont cependant présents dans plusieurs contextes et témoignent des réseaux d’échanges qui existaient durant la préhistoire en Méditerranée.

### **L’utilisation de la coquille d’œuf d’autruche en Espagne**

#### ***Les perles en œufs d’autruches en Espagne : production africaine ou production locale ?***

En 1910, Luis Siret a probablement été le premier à identifier des perles en coquille d’œuf d’autruche en Espagne. Selon lui, elles se présentent sous la forme de petits disques plats perforés, de quelques millimètres d’épaisseur. Sans mentionner spécifiquement les sites où elles ont été trouvées, il mentionne un grand nombre de perles fabriquées à partir d’œufs d’autruche dans des sites qu’il a explorés (Siret 1910, p. 139). Plusieurs centaines proviendraient de la nécropole de Los Millares (Santa Fé de Mondújar, Almería) et plus particulièrement de la tombe 12 (Fig. 4), qui a fourni environ 800 perles, mais aussi de la tombe 63, dans laquelle environ 12 ont été enregistrées (Almagro et Arribas 1963, p. 118 ; Harrison et Gilman 1977, p. 102 ; Leisner et Leisner 1943, p. 25 ; Maicas Ramos 2019, p. 213 ; Mederos Martín 1993, p. 146–148 ; Schuhmacher 2017, p. 300). A. Mederos Martín précise que pour la tombe 63, le nombre de perles présentes varie selon les auteurs (Mederos Martín 1993, p. 146). Par exemple, Almagro et Arribas (1963, p. 118) ne mentionnent que cinq perles, tandis que Harrison et Gilman (1977, p. 102) font référence à 12 perles. Les publications les plus récentes utilisent le numéro mentionné par V. et G. Leisner. Leur présence dans ces tombes, occupant le sommet de la hiérarchie sociale, semble indiquer que les perles en coquille d’œuf d’autruche étaient perçues comme des objets extrêmement précieux, probablement réservés à l’affichage du statut social des élites de Los Millares et d’autres sociétés du troisième millénaire av. J.-C., égal aux objets en ivoire, en cristal de roche et en ambre (Murillo-Barroso et Montero-Ruiz 2012 ; 2017 ; Schuhmacher 2017, p. 295). Ces objets fabriqués à partir de matières premières exotiques semblent même, aux sociétés du quatrième millénaire, avoir plus de valeur que les objets en cuivre peu présents dans les contextes funéraires de cette époque et qui se limitent à quelques outils (Murillo-Barroso et Montero-Ruiz 2012, p. 55 ; 2017).

D’autres perles en coquilles d’œufs d’autruche seraient également présentes à la nécropole de la Encantada (Cuevas de Almanzora, Almería) dans le mobilier des tombes 1 et 3 (Costa Caramé *et al.* 2011, 265 ; Garcia Sanjuan 2009, p. 53 ; Siret 1910, p. 323) mais il n’existe que quelques mentions de ces découvertes et rien n’est donc certains à leur sujet. À ce jour, ces perles en coquilles d’œuf d’autruche sont donc particulièrement rares pour le Chalcolithique espagnol et se concentrent dans le Sud.

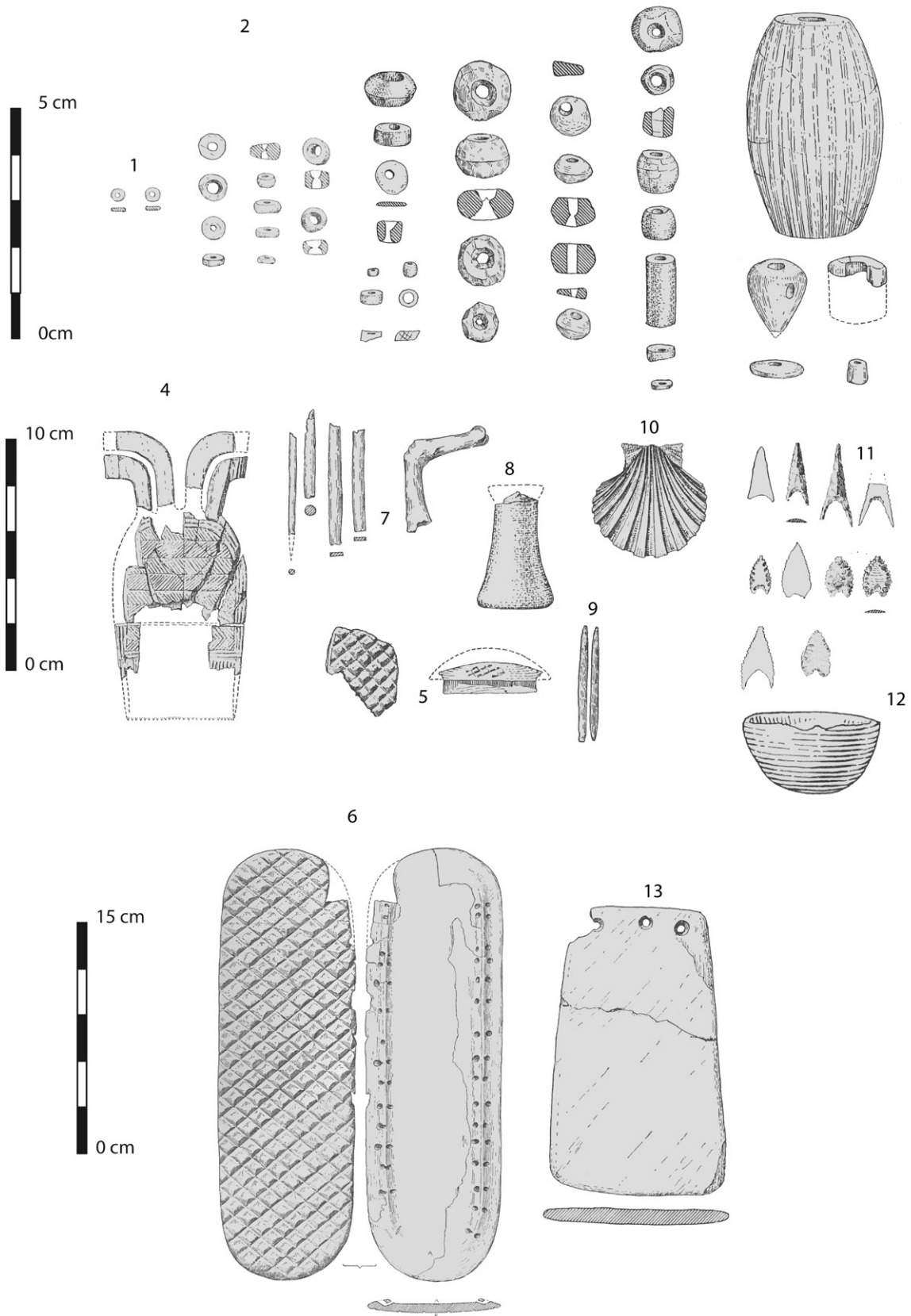


Figure 4. Tout le mobilier funéraire présent dans la tombe 12 de Los Millares. Sur les 800 perles en coquille d'œuf d'autruche, seules deux (1) étaient représentées. Parmi le mobilier funéraire plusieurs milliers de perles (2) ont été récoltées, elles sont en calcaire, coquillage, stéatite mais aussi en ivoire et améthyste mais aussi des objets en ivoire (4,5,6) et en os (7, 8) en métal. (9), coquillages (10), pointes de flèches (11), objets en terre cuite (12, 13) (d'après Leisner et Leisner 1943, pl. 11).

L. Siret considérait que ces perles circulaient sous la forme de produits finis et correspondaient donc à des importations probablement de l'Afrique du Nord (Siret 1910, p. 139). Il évoque la ressemblance avec les productions africaines mais ces dernières sont, pour lui, de qualité inférieure et il estime que l'origine des perles serait probablement à rechercher en Égypte. Pour L. Siret, les perles auraient donc circulées sous forme de produits finis avec peut-être des qualités diverses.

Deux schémas de circulations des perles peuvent être proposés. Le premier considère que les perles ont circulé à l'état de produit finis. En Espagne, les perles très régulières et d'une très bonne qualité d'exécution semblent avoir été recherchées. Basé sur l'étude des chaînes opératoires des populations contemporaines sud-africaine (Wingfield 2003), ce sont les perles qui demandent de plus long travail d'exécution et qui ont donc le plus de valeur. Dans ce cas, cela signifierait que les perles les plus précieuses ont circulées sur de plus grandes distances. Le second considère que ces perles pouvaient circuler sous forme d'ébauche et qu'ils étaient à la charge de l'acquéreur de la finir.

La qualité d'exécution d'un objet peut varier également en fonction des chaînes opératoires impliquées dans sa réalisation. En Afrique du Sud, les différentes chaînes opératoires mises en œuvre pour la réalisation de ces perles sont le reflet des différents groupes qui les pratiquent (Hitchcock 2012 ; Kabiru 2016, p. 23 ; Wingfield 2003). Pour ces populations africaines, les perles ne sont pas de simples ornements, mais elles ont d'importantes fonctions économiques, symboliques et sociales. Les coquilles d'œuf d'autruche sont également utilisées dans la médecine (Hitchcock 2012 ; Kabiru 2016 ; Wingfield 2003). Les perles sont ainsi au cœur de tout un système complexe d'échanges et de réciprocités qui définit les relations entre les différents groupes humains (Hitchcock 2012 ; Wiessner 1982 ; Wingfield 2003). Cependant faute d'étude relative à ces perles de part et d'autre de la Méditerranée, il est, à ce jour, difficile d'aller plus loin.

### ***Une coquille et des fragments d'œuf d'autruche : une importation de matière première ?***

De récentes recherches sur le site de Valencina-Castilleja (vers 3200–2300 cal av. J.-C.) et plus particulièrement sur le secteur PP4-Montelirio lèvent, en partie, le voile sur ces questionnements. Le secteur PP4-Montelirio fait partie du site de Valencina-Castilleja, situé dans la municipalité de Valencina de la Concepción (Séville) et occupant environ 450 hectares, l'un des sites les plus importants des quatrième et troisième millénaires av. J.-C. dans le midi espagnol (García Sanjuán *et al.* 2018). Le secteur PP4-Montelirio est situé dans la partie sud du site et comprend de nombreuses structures archéologiques, dont deux tombes mégalithiques, structure 10.042–10.049, et la tholos de Montelirio, qui comptent parmi les plus grands monuments funéraires du site (Mora Molina *et al.* 2013 ; García Sanjuán *et al.* 2018 ; García Sanjuán *et al.* 2019). La plupart de ces structures appartiennent au Chalcolithique (Mora Molina *et al.* 2013 ; García Sanjuán *et al.* 2018).

La structure 10.042–10.049 (3515–2875 cal. BC), une tombe mégalithique avec un couloir donnant accès à une chambre circulaire, est particulièrement intéressante. La stratigraphie de la chambre permet de distinguer deux niveaux séparés par des dalles d'ardoise. Au niveau inférieur se trouvait un individu enterré en position fléchie, couvert de cinabre ; il était accompagné d'une défense d'éléphant, d'un objet en ivoire, de céramiques, d'un important ensemble d'artefacts, comprenant une hallebarde en silex, un pommeau en ambre et un poinçon en cuivre. Au niveau supérieur de la chambre, de la vaisselle en céramique, un poignard en cristal de roche, de nombreux outils en silex, des objets en ivoire, la pointe d'une défense d'éléphant décorée, 90 perles, et une coquille d'œuf d'autruche presque complète probablement d'origine africaine ont été retrouvés (García Sanjuán *et al.* 2018 ; 2019 ; Murillo-Barroso et García Sanjuán 2013, p. 513–514 ; Murillo-Barroso *et al.* 2018) (Fig. 5). Il est possible que les objets trouvés au niveau supérieur, séparés du niveau inférieur par une couche de dalles d'ardoise, fassent également partie des biens funéraires de l'inhumation du niveau inférieur (García Sanjuán *et al.* 2018 ; 2019). Malheureusement à l'exception d'une photographie, peu de détails sont connus sur la coquille d'œuf et rien n'est certain la concernant.



Figure 5. Coquille d'œuf d'autruche découverte dans la structure 10.042-10.049 du secteur PP4-Montelirio à Valencina de la Concepción (d'après García Sanjuán et al. 2019, fig. 24).

La coquille d'œuf pourrait ainsi correspondre à une réserve de matière première, comme la défense d'éléphant du niveau inférieur, mais aussi à un produit fini, comme un contenant. L'importance particulière de la coquille d'œuf de la tombe 10.049 tient au fait qu'elle correspond à un nouveau type d'artefact en coquille d'œuf d'autruche, autrement limité aux perles.

La tombe 10.049, avec la dépouille d'un homme probablement âgé entre 18 et 25 ans, accompagnée d'objets d'origine à la fois locale et exogène, de matières premières, mais aussi de produits finis, trouve très peu de parallèles dans le Chalcolithique péninsulaire et correspondrait au niveau le plus élevé de la société (García Sanjuán *et al.* 2018 ; 2019, p. 1030). Pour L. García Sanjuán *et al.*, le statut social de l'individu dépend ou s'exprime également par la présence de matières premières exotiques, telles que les défenses d'éléphant, l'or, l'ambre et les coquilles d'œuf d'autruche (García Sanjuán *et al.* 2018 ; 2019). Les éléphants et les autruches n'étaient pas connus en Espagne et aucun animal endogène ne pouvait être comparé à eux. Ces animaux n'auraient donc dû être connus que par des traditions et des descriptions orales, ce qui a peut-être alimenté l'imaginaire des populations locales. Par conséquent, il était peut-être aussi important d'obtenir non seulement des fragments, mais des défenses entières et des œufs qui devaient nécessairement être plus expressifs

et donc de plus grande valeur. L'importance du mort s'exprimait donc peut-être par sa capacité à acquérir et accumuler des matières premières, soit pour les redistribuer, soit pour les transformer ou du moins contrôler leur transformation en objets finis.

Trois autres fragments de coquille d'œuf d'autruche proviennent respectivement de la tholos de Montelirio (3200–2300 cal. av. J.-C.), de la structure funéraire de l'Avenida de Andalucía n° 9 et du secteur DIA à Valencina de la Concepción (Fernández Flores et Aycart Luengo 2013, p. 250 ; García Sanjuán *et al.* 2019, p. 1026 ; Luciañez Triviño 2018, p. 211), mais nous ne savons pas s'il s'agit de matière première, d'objets semi-finis ou de fragments de contenants.

Deux fragments de coquille d'œuf d'autruche ont également été documentés dans la ligne 4 de la fortification de Los Millares, mais nous ne connaissons pas plus de détails (Mederos Martín 1993, p. 147 ; Peters et Driesch 1990, p. 70, p. 80, p. 89). Si la fonction de ces fragments (matière première ou contenant) reste à préciser, ils correspondent en tout cas à un élément important qui témoigne de la participation des habitants de Los Millares à des réseaux d'échanges suprarégionaux. Il est important de noter que Los Millares et Valencina de la Concepción ont fourni non seulement des objets en coquille d'œuf d'autruche, mais également d'autres objets exotiques. Cela témoigne de la mise en place d'importants réseaux d'échanges à longue distance qui ont permis l'acquisition de matériaux exogènes et leur transformation (Díaz-del-Río 2011 ; 2013 ; Murillo-Barroso et Montero-Ruiz 2012, 2017). Ainsi, la hiérarchisation des sociétés au quatrième millénaire pourrait reposer, en partie, sur la capacité d'un individu ou d'un groupe d'individus à s'inscrire dans les circuits d'échanges à longue distance de matières exogènes, comme l'ivoire, l'ambre, roches rares et coquilles d'œufs d'autruche, et peut-être de contrôler leur transformation et leur distribution (Díaz-del-Río 2011 ; 2013 ; Murillo-Barroso et Montero-Ruiz 2012 ; 2017). Le contrôle de la production de biens fabriqués à partir de matériaux disponibles localement comme le cuivre ne semble au contraire pas avoir été un moyen par lequel les élites affichent leur position sociale (Murillo-Barroso et Montero-Ruiz 2012 ; 2017).

Pour finir, il est intrigant de constater qu'aucune perle en coquille d'œuf d'autruche n'ait, à ce jour, été mentionnée sur le site de Valencina de la Concepción. On compte ainsi 90 perles dans la tombe 10.049, plus de deux milles dans la tombe 10.042 mais sans qu'aucune ne soit identifiées comme confectionnées en coquilles d'œuf d'autruche (García Sanjuán *et al.* 2019). Peut-être l'étude en cours des perles qui ornaient les vêtements des tholos de Montelirio pourra-t-elle en identifier quelques-unes. À ce jour, seules des perles fabriquées à partir de coquillages marins et de calcaire ont été identifiées (García Sanjuán 2020).

Par conséquent, à ce jour, il existe très peu de preuves de l'utilisation de coquilles d'œufs d'autruche en Espagne. Cependant, plusieurs auteurs (Siret 1910 p. 139 ; Maicas Ramos 2019 ; Muir et Friedman 2011) reconnaissent la difficulté d'identifier la matière constitutive des perles fabriquées à partir de coquilles d'œufs, ce qui conduit probablement à une sous-représentation de leur présence au sein des ensembles archéologiques. Déjà L. Siret soulignait que les perles en coquilles d'œuf d'autruche pouvaient facilement être confondues avec des perles en coquillages marins (Siret 1910, p. 139) et plus récemment R. Maicas Ramos (2006, p. 23), soulignait la difficulté de faire la distinction entre les perles en œuf d'autruche et perles de calcaire qui sont courantes dans les ensembles funéraires. Cela est facilement compréhensible, car – comme le calcaire – les coquilles d'œufs sont principalement composées de calcium, auquel des protéines sont ajoutées (Nys *et al.* 2004). Sans l'aide d'un microscope et d'analyses appropriées, il est presque impossible de faire la distinction entre une perle de coquille d'œuf d'autruche et une perle de calcaire, et donc d'appréhender leur distribution et les modalités de leurs échanges. Par conséquent, il est tout à fait possible que le nombre de perles d'œufs d'autruche soit largement sous-estimé ; en revanche, cela semble peu probable pour les coquilles entières ou leurs fragments.

### Sur la circulation et l'échange des coquilles d'œuf d'autruche

Faute d'études précises sur le sujet et des problèmes liés à l'identification du matériel, il est malheureusement impossible pour le moment de déterminer exactement les modalités des échanges des coquilles d'œuf d'autruche à travers la méditerranée. Comme l'ivoire et d'autres matériaux exogènes, il est possible que l'utilisation des coquilles d'œufs d'autruche ait commencé dans la seconde moitié du quatrième millénaire, avec le début de la formation des élites chalcolithiques, et ait cessé au cours du troisième millénaire (García Sanjuán *et al.* 2013 ; Schuhmacher 2017, p. 292). L'ivoire et les coquilles d'œufs d'autruche auraient pu être distribués par les mêmes réseaux de communication et d'échange. Compte tenu de la présence de perles fabriquées à partir de coquilles d'œufs d'autruche dans la zone péninsulaire, ainsi que de l'importance de l'autruche sur la côte méditerranéenne africaine, il est très concevable de penser que l'œuf d'autruche était considéré comme un atout prestigieux par excellence, probablement réservé à un très petit nombre de personnes, appartenant aux niveaux les plus élevés de la hiérarchie sociale.

Au Chalcolithique en Espagne, les objets fabriqués à partir de coquilles d'œufs d'autruche sont présents sous trois formes différentes :

- des produits finis (ornementation, moyens de paiement, etc.) ;
- des œufs plus ou moins complets pouvant correspondre à des produits finis (conditionnement) mais aussi à des réserves de matière première ;
- des fragments pouvant correspondre à des fragments de produits finis, des réserves de matières premières, mais aussi à des déchets ou résidus liés à la fabrication de produits finis.

Si l'on suppose que l'œuf de la tombe 10.049 et les deux autres fragments de Valencina de la Concepción correspondent à une réserve de matière première, cela indiquerait une importation de coquilles d'œufs d'autruche complets et non de perles. Par conséquent, ces dernières correspondraient à des productions locales et les œufs d'autruche circuleraient comme matière première. Par conséquent, le symbolisme et le rôle social de l'œuf pourraient être préservés. On retrouve également le même phénomène pour l'ivoire qui semble circuler comme matière première (Schuhmacher 2017), ainsi que pour les objets en cristal de roche (Morgado *et al.* 2016). Paradoxalement, ce n'est pas le cas des perles d'ambre, qui semblent avoir circulé sous forme de produits finis (Murillo-Barroso *et al.* 2018), même si cela pourrait être remis en cause à l'avenir, comme c'est actuellement envisagé en France (Leroy-Langelin *et al.* 2019, p. 159). On connaît à la fois les vestiges d'un probable atelier lié au travail de l'ivoire (García Sanjuán *et al.* 2013 ; Nocete *et al.* 2013 ; Schuhmacher *et al.* 2013) et les vestiges de la fabrication d'objets en cristal de roche (Morgado *et al.* 2016), y compris des débris de sculpture, mais nous n'avons aucune trace de la fabrication d'objets en ambre dans la péninsule ibérique (Murillo-Barroso *et al.* 2018). Cependant, M. Luciañez Triviño (2018) s'interroge sur la présence d'un atelier de fabrication d'objets en ivoire à Valencina de la Concepción. Pour elle, l'atelier devrait être trouvé ailleurs et la fabrication de ces objets d'exception aurait lieu ailleurs. L'échange de matériaux précieux pourrait être plus complexe et nécessiter plus d'étapes qu'on ne le pense habituellement. Cela remet également en question la fonction des sites comme Los Millarès et Valencina de la Concepción souvent perçus comme des centres de pouvoir et de productions.

Ainsi, à ce jour, aucun atelier de production de perles de coquille d'œuf d'autruche n'a été attesté dans la zone péninsulaire, et rien n'indique que les coquilles d'œuf d'autruche aient été transformées en produits finis en Espagne, bien que cela soit très probable.

Si, d'autre part, nous supposons que l'œuf entier et les fragments de Valencina de la Concepción correspondent à des produits finis (récipients) et non à de la matière première, comme pourrait le suggérer la fabrication de vases en pierre imitant la forme des œufs d'autruche dans le midi péninsulaire (Mederos Martín 1993, p. 147-148), il faudrait compter sur l'importation de produits

finis, probablement à base de biens de prestige, en provenance d'autres parties de la Méditerranée. Ce système impliquerait donc l'échange de produits finis ou de produits semi-finis nécessitant peu de transformation et/ou d'investissement de travail pour leur finition (par exemple, le polissage final des billes). Les perles pourraient donc correspondre à des productions exogènes, mais aussi à des productions locales issues de la réutilisation des contenants cassés. Ce système d'échange, suivant probablement les mêmes voies que celui de l'ivoire, se distinguerait cependant par la nature des objets échangés (produits finis par opposition aux matières premières). Cependant, étant donné la rareté des restes de coquilles brutes, leur échange semble avoir été à très petite échelle.

Un troisième scénario pourrait être l'échange de produits finis conjointement à celui de matières premières. Mais là encore, l'absence d'atelier pose problème. Pour conclure et faute d'investigation sur le sujet, il n'est à ce jour pas possible de déterminer sous quelle forme circulait les coquilles d'œuf d'autruche. De plus amples investigations permettraient sûrement de déterminer sous quelles formes circulaient les œufs.

### **En conclusion**

Ainsi, le quatrième millénaire voit l'émergence évidente de vastes réseaux d'échanges de matières premières (ivoire, roches rares) mais aussi de produits finis (ambre). Ces matières premières exogènes et les réseaux d'échange qu'elles illustrent ont peut-être joué un rôle crucial dans la constitution du pouvoir des élites chalcolithiques. Le pouvoir de ces élites semble reposer sur la capacité d'un individu ou d'un groupe d'individus à occuper une place au sein de ces réseaux d'échange de produits exogènes et éventuellement dans le contrôle de leur transformation en produits finis. En fait, la disponibilité de ces produits prestigieux semble très restreinte à un petit cercle de personnes.

Avec l'arrivée de l'âge du Bronze et la culture d'El Argar, les produits fabriqués à partir de coquilles d'œufs d'autruche ne semblent plus être présents dans les tombes. Il en va de même pour l'ivoire qui, par rapport à la riche production du troisième millénaire, se raréfie, il ne reste plus dans les sépultures de l'âge du Bronze que quelques boutons percés en V. Ce changement dans le choix des éléments Le mobilier funéraire témoigne donc de la dévalorisation des œufs d'autruche et autres matières exogènes en tant que biens de prestige et indique donc un changement idéologique en termes de reconnaissance du statut social des élites. Ces produits exogènes perdent leur rôle de biens de prestige et leur contrôle et leur accumulation ne semblent plus nécessaires à la représentation du statut des élites, qui repose dorénavant davantage sur l'usage du métal. Le pouvoir des élites semble désormais reposer sur leur capacité à contrôler les réseaux d'échanges locaux, la production et la distribution des produits métalliques. Ce n'est qu'avec l'arrivée des Phéniciens dans la péninsule ibérique que l'on retrouve l'œuf d'autruche en Espagne, mais cette fois sous forme de contenants funéraires.

En conclusion, et à ce jour, les objets en œufs d'autruche se trouvent principalement dans des contextes funéraires chalcolithiques du sud de l'Espagne, mais aussi dans des contextes de l'âge du Bronze très tardif et du début de l'âge du fer. Cependant, en raison du manque de recherche et des difficultés de leur identification, il n'est pas possible à l'heure actuelle de déterminer si les coquilles d'œufs d'autruche ont circulé comme produits finis ou comme matière première au cours du Chalcolithique. Il est également possible qu'ils aient été plus abondants que ne le suggèrent les objets actuellement identifiés.

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# The painted pottery from the Chalcolithic mega-site of Valencina de la Concepción (Seville, Spain) and its possible relationship with Gar Cahal, northern Morocco

Alfredo Mederos Martín<sup>1</sup>, Thomas X. Schuhmacher<sup>2</sup>, Juan Manuel Vargas Jiménez<sup>3</sup>, Charles Bashore Acero<sup>4</sup> and Lorena Garvin Arcos<sup>5</sup>

## Abstract

Pottery with geometric decorations painted in black or red belonging to the Chalcolithic of the southern Iberian Peninsula has been known for a long time, but the provenance and dating of this type of pottery has been hotly debated. At present, its role as a highly appreciated local product, appearing not only in funerary contexts but also in settlements, is generally accepted. The number of known specimens from western Andalusia, quite small in comparison to eastern Andalusia, has recently increased, thanks to the rescue excavation preceding the construction of the new public library in Valencina de la Concepción (Seville), within the area of the Chalcolithic mega-site, where this type of pottery appears in significant numbers and displays a high diversity of decorative motifs. Here we present these pottery finds, their context and chronology as well as their possible connections with the pottery fragments recovered during the excavations carried out in the 1950s by M. Tarradell in the cave of Gar Cahal (northern Morocco).

## Keywords

CHALCOLITHIC, LOWER GUADALQUIVIR, NORTHERN MOROCCO, PAINTED POTTERY, ATLANTIC SEA ROUTE, EXCHANGE.

## Résumé

Les céramiques à décors géométriques peints en noir ou en rouge appartenant au Chalcolithique du sud de la péninsule Ibérique sont connues depuis longtemps. Mais la provenance et la datation de ce type de céramique ont été fortement discutées. Maintenant, il semble être accepté qu'il s'agisse d'un produit local très apprécié, apparaissant non seulement dans des contextes funéraires mais aussi dans des habitats. Le nombre d'éléments connus pour l'Andalousie occidentale, assez faible par rapport à l'Andalousie orientale, a récemment augmenté, grâce à la fouille de sauvetage préalable à la construction de la nouvelle bibliothèque publique dans le mégasite chalcolithique de Valencina de la Concepción (Séville), où ils apparaissent dans un nombre important et une diversité de motifs décoratifs. Nous présenterons ces céramiques, leur contexte et leur chronologie ainsi que leurs liens éventuels avec les fragments récupérés lors des fouilles menées dans les années 1950 par M. Tarradell dans la grotte de Gar Cahal (nord du Maroc).

## Mots-clés

CHALCOLITHIQUE, BAS GUADALQUIVIR, NORD DU MAROC, POTERIE PEINTE, ROUTE MARITIME DE L'ATLANTIQUE, ÉCHANGE.

## Introduction

The 'mega-site' of Valencina de la Concepción – Castilleja de Guzmán (further on Valencina) extends throughout the northeast limit of the Aljarafe Plateau, 6km to the west of modern-day Seville in the South of Spain (Schuhmacher *et al.* 2015; Mederos *et al.* 2016; Schuhmacher *et al.* 2019a; 2019b; 2021; Mederos *et al.* 2020; 2021) (Fig. 1). During prehistoric times it was located next to an inlet of the Atlantic Ocean which covered most of the estuary of the Guadalquivir (Schulz 1995; Arteaga and Roos 1995; Arteaga *et al.* 1995; Borja 2013; Arteaga *et al.* 2016; Barragán 2016). The wide prehistoric estuary reached modern-day Alcalá del Río, some 15km northeast of Valencina, facilitating navigation and giving Valencina a quick and easy connection to the Atlantic.

<sup>1</sup> Universidad Autónoma de Madrid, Departamento de Prehistoria y Arqueología. alfredo.mederos@uam.es

<sup>2</sup> Deutsches Archäologisches Institut, Abteilung Madrid. thomas.schuhmacher@dainst.org

<sup>3</sup> Museo de Valencina. jmvargas66@gmail.com

<sup>4</sup> Universidad Autónoma de Madrid, Departamento de Prehistoria y Arqueología. charlesbashoreacero@gmail.com

<sup>5</sup> Universidad Autónoma de Madrid, Departamento de Prehistoria y Arqueología. lorena.garvina@gmail.com

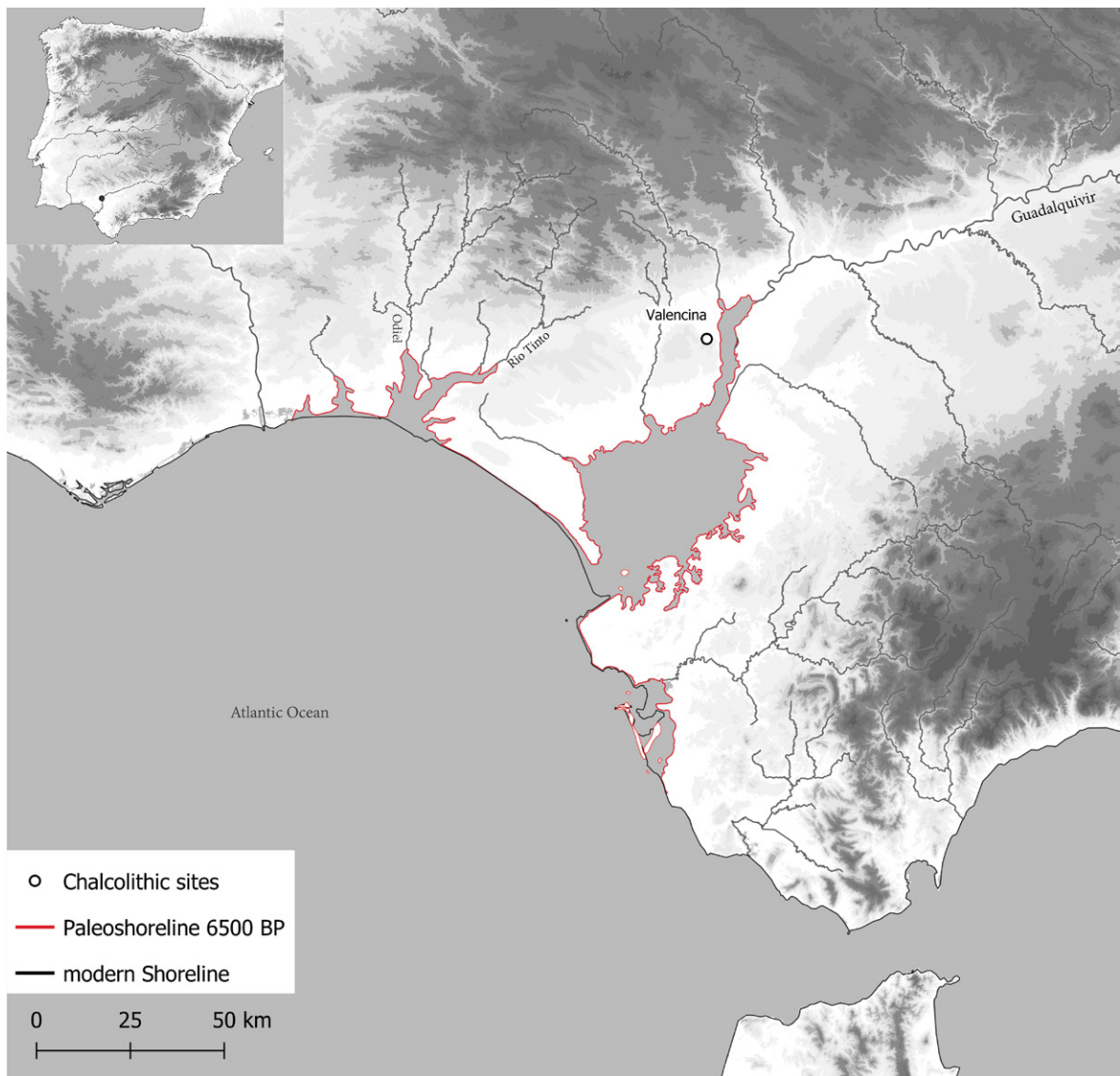


Figure 1. Situation of the site of Valencina de la Concepción and the coastline during the 3rd millennium BC (map by N. El Dana, University of Würzburg, after Arteaga *et al.* 2016 and Barragán 2016).

The site of Valencina first became known through the accidental discovery of the *tholos* tomb of La Pastora in 1860, in fact the first megalithic tomb known in the province of Seville (Vargas Jiménez *et al.* 2012; Ruiz Moreno 2013; Vargas *et al.* 2019a; 2019b). This monument, together with the tombs of Matarrubilla, 10.042–10.049 and Montelirio form the largest and most complex funerary structures in Valencina, as well as for the Chalcolithic of the Iberian Peninsula in general (Collantes 1969; Cruz-Auñon and Mejías 2013; García Sanjuán 2013; García Sanjuán *et al.* 2013; Luciañez Triviño *et al.* 2013; Fernández Flores *et al.* 2016; Luciañez Triviño *et al.* 2021). These tombs present up to 43m long and narrow corridors walled and covered by large stone slabs and one or several circular chambers built from stone slabs or dry-stone masonry and normally covered by a false corbelled dome. The structures in their entirety were originally covered by large barrows.

In contrast, the settlement of Valencina was not discovered until 1971, when the first excavation corresponding to the settlement was carried out in the area known as the ‘Perrera’ (the kennels), not far from the area of Cerro de la Cabeza, which is the main area of interest of our project (Fernández Gómez 2013; Ruiz Mata and Mederos 2020). In 1975 the first ditches were identified in the same area. These early excavations were followed by more than 120 development-led

archaeological interventions in Valencina, many of them located in the settlement area (Vargas 2004; 2013). However, we are only talking about rescue excavations or archaeological surveys ahead of construction works, and therefore actually less than 1 hectare or approximately 0.66 per cent of the urban area of Valencina has really been excavated (Mejías 2017: 87 tab. 5). Most of the materials recovered during these rescue excavations still have not been studied nor published. Large sectors of the settlement area currently lie under the houses of the modern-day town of Valencina de la Concepción and are thus no longer available for archaeological investigation.

Traditionally, the Chalcolithic mega-site has been divided into two areas (Vargas 2003; 2004; Cruz-Auñón and Mejías 2013; Mederos *et al.* 2020). The huge settlement area in the north with some 236 hectares is situated mostly under the modern town of Valencina, and a necropolis covering another 233 hectares to the southeast. More recent studies question this strict separation, given the fact that human remains and even inhumations have been located in the so-called settlement area (Costa Caramé *et al.* 2010; García Sanjuán 2013; García Sanjuán and Murillo Barroso 2013; Vargas Jimenez 2021). Therefore, it is becoming evident that the difference seems to be that in the southeast we find monumental funerary structures with rich grave goods and offerings, consisting mostly of *tholoi* as well as *hypogaea*, whereas in the northern area of the site, human bodies are buried in simple pits or in ditches, in most cases without any or only a few grave goods.

### The joint project

In 2014, thanks to a collaboration between the Autonomous University of Madrid (Spain), the University of Würzburg (Germany) and the Museum of Valencina de la Concepción, the first geophysical and archaeological survey was carried out (Schuhmacher *et al.* 2015; 2019a; 2019b; 2021; Mederos *et al.* 2020; 2021). From 2016 it became a project of the German Archaeological Institute of Madrid in collaboration with the aforementioned institutions. In 2017 the Junta of Andalusia authorized a General Research Project (Proyecto General de Investigación) centred on the northern part of the site of Valencina de la Concepción, for a duration of five years. The project focuses on the history of the Chalcolithic settlement of Valencina de la Concepción. The investigations include excavations and field surveys on the agricultural land in the northern area of the archaeological site, especially the area known as ‘Cerro de la Cabeza’. Furthermore, selected earlier rescue excavations in the adjacent northern part of the modern town, as e.g. the ones in the Nueva Biblioteca, are also included in the project. Through surface and geomagnetic surveys, the extension and structure of the prehistoric settlement area is being explored. This is followed-up with excavations which are carried out to investigate and date the multi-phase Chalcolithic earthworks and settlement areas to reconstruct the settlement’s history.

From 2014 until the present the project has been funded by the German Archaeological Institute and the University of Würzburg and from March 2018 most of the funding has come from the German Research Foundation (DFG).<sup>6</sup>

Until now we have been able to survey some 17 hectares in the northern part of the settlement. Apart from hundreds of smaller, circular anomalies, pits and dwelling structures, we detected a total of ten different lines of ditches, forming a total of five different enclosures and a sixth, smaller one to the West, with a diameter ranging from 95m to 60m (Schuhmacher *et al.* 2015; 2019a; 2021; Mederos *et al.* 2016; 2020; 2021).

Clearly, settlement activity at the site of Valencina de la Concepción began around 3300/3200 BC (Schuhmacher *et al.* 2021), at the same time as funerary activity (García Sanjuán *et al.* 2018). According to the <sup>14</sup>C-dates, shortly after that, the first, smallest, inner enclosure, defined by Ditches 11 and 12 was built. The site reached its peak with Enclosure 5, with its maximum area of some 200

<sup>6</sup> Projekt DFG SCHU 1539/4-1.2 und FA 390/12-1.2.

hectares during the Middle Chalcolithic, between 2800 and 2600 BC. The height of funerary activity also took place during this time period. The settlement and funerary activity came to an end at around 2250 BC.

### Painted pottery in Valencina

#### *La Perrera (1975) and Cerro de la Cabeza (1976)*

Small sherds of painted pottery appeared in Valencina de la Concepción since the first excavation in a pit in Grid C of La Perrera 1975 (Fernández Gómez and Oliva Alonso 1985: 45–46; Murillo and

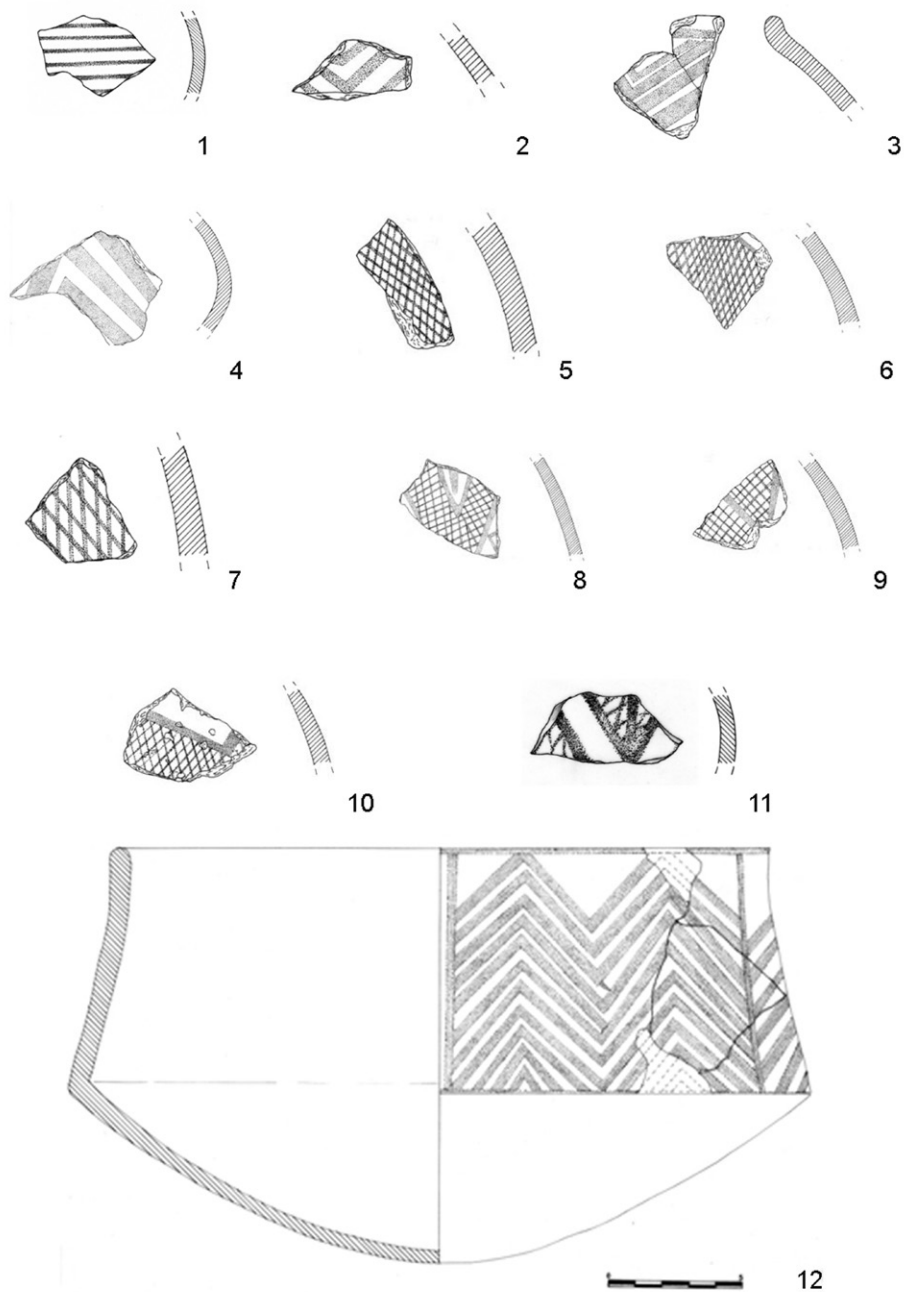


Figure 2. Valencina de la Concepción. Painted ceramics. 1-11 Excavations in 1975/76 on the Cerro de la Cabeza: 1, 2, 5, 6, 9 Ditch 1; 3, 7 Well nº 31; 4 Well nº 32; 8, 11 Ditch 2; 10 Dwelling structure; 12 Excavations in the La Emisora area (1989) (design by R. de Almeida, Loulé, modified after Fernández and Murillo 2009).

Fernández Gómez 2008: 309 no. 13; Fernández Gómez and Murillo 2009). Another sherd with painted motifs was discovered during the rescue excavations of 1976 at Cerro de la Cabeza. The fragment was part of the sediment filling from a dwelling dug into the ground (Fig. 2,10). It shows a net motif delimited on one side by an angled band, all painted in red (Murillo *et al.* 2004/05, 188 fig. 10; Murillo and Fernández Gómez 2008: 308 no. 11). The rest of the ceramic material from this context, among them plates with an almond-shaped rim, seem to indicate a chronology belonging to the Middle Chalcolithic (c. 2800–2550 BC).

The same excavation from 1976 unearthed two parallel ditches, and within the filling of both of these, several fragments of painted pottery were recovered (Murillo and Fernández Gómez 2008: 305–309 no. 5–10 and 12) (Fig. 2,1.2.5.6.8.9.11). There are at least five fragments from the first ditch and two more from the second. The motifs are always painted in brown or black over a lighter red surface. In three cases we can distinguish net motifs, sometimes defined by broader lines or angles. On fragments from the second ditch, the net motifs fill one or several lines of angled bands. Simple parallel lines or angles have also been identified. We currently have one AMS <sup>14</sup>C-date from each ditch, from human skeletal remains recovered from the filling, which produced dates of approximately 2900–2675 BC (García Sanjuán *et al.* 2018). Taking into account these dates and other data, we think that these two ditches might represent a phase belonging to the Middle Chalcolithic and that they filled with sediment towards the end of this period (Schuhmacher *et al.* 2021).

In the same area, several deep wells were discovered and two of them excavated, no. 31 and no. 32. Two fragments from well no. 31 once again present a net motif (Murillo and Fernández Gómez 2008: 303–304 no. 1–2) (Fig. 2,7). On another one we can observe parallel triangles under a horizontal line painted in brown, as well as on one from well no. 32 (Murillo and Fernández Gómez 2008: 304–305 no. 3–4) (Fig. 2,3,4). Although all sherds seem to belong to globular vessels, in the case of the last one from well no. 31 we clearly can distinguish a globular pot with a short vertical rim. The <sup>14</sup>C-date from well no. 31 also falls into the Middle Chalcolithic (2800–2550 BC)<sup>7</sup>.

### ***La Emisora (1989)***

During the rescue excavation of 1989 carried out at La Emisora, one of the most interesting pieces from Valencina of this type of pottery was discovered (Murillo 1991; Murillo *et al.* 2008: 310 no. 14; Fernández and Murillo 2009: fig. 2) (Fig. 2,12; 3). A complete carinated vessel was recovered, presenting decoration in its upper half consisting of parallel horizontal zigzag lines, interrupted by vertical lines in regular intervals. This decorated band is bounded at the top and the bottom by a continuous horizontal line.

### ***Pabellón Cubierto (2008 and 2009)***

Another example of painted pottery was discovered during the rescue excavations undertaken prior to the construction of the Pabellón Cubierto of Valencina de la Concepción between 2008 and 2009 (Inv. no. 17/833), belonging to the stratigraphical unit UD 181 (UC 133) (Ortega 2013) (Fig. 4). Interestingly, this sherd shows parallel irregular vertical zigzag lines between two wide horizontal ones, located below the rim. This fragment belongs to a carinated bowl. Among the other pottery from UC 133 is decorated Bell Beaker pottery. Nevertheless, the only <sup>14</sup>C-date available for UD 181 dates it to the Middle Chalcolithic (c. 2800–2550 BC)<sup>8</sup>.

### ***Entorno La Pastora, municipal plot (2010)***

Within the specific research project developed in the area of the megalithic tomb of La Pastora, excavations were carried out to contextualize the results of an extensive geomagnetic survey

<sup>7</sup> I-10.187. García Sanjuán *et al.* 2018.

<sup>8</sup> MAMS-48769: 4172 ± 22 BP = 2881–2639 cal BC (2 σ).



Figure 3. Valencina de la Concepción. Painted ceramic vessel from the excavation in the area of La Emisora (1989) (photograph by A. Mederos Martín).

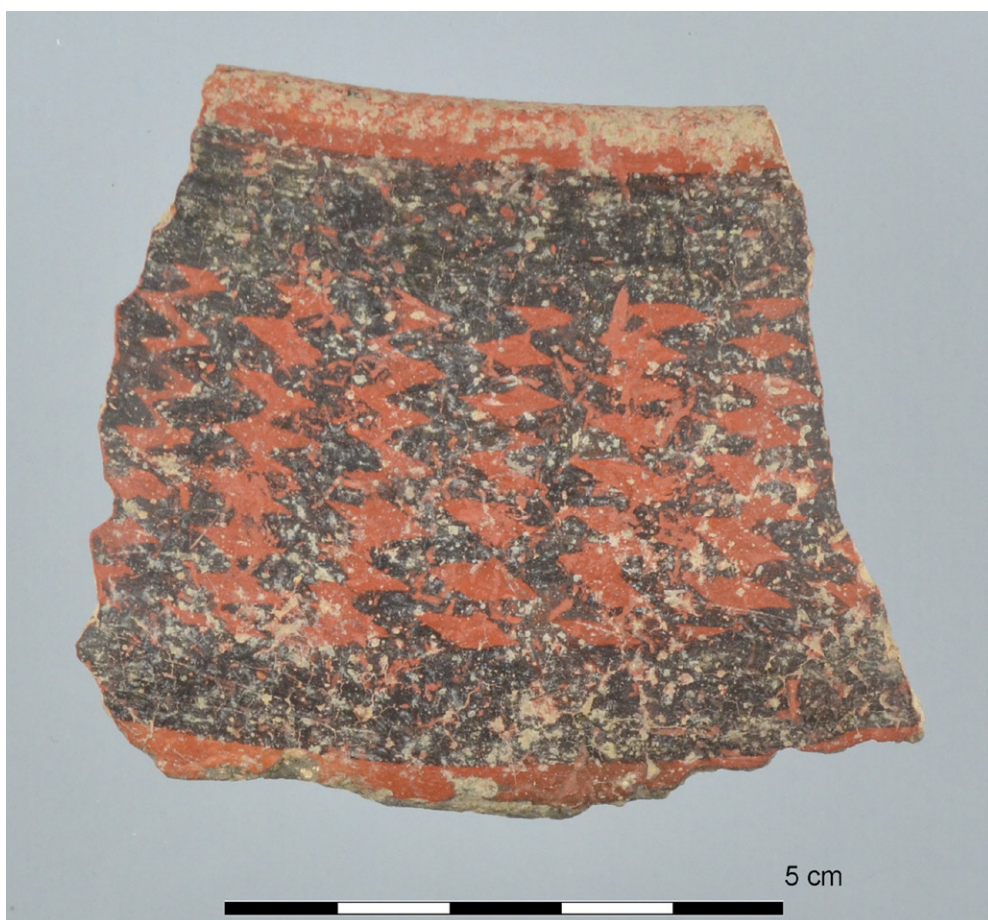


Figure 4. Valencina de la Concepción. Painted ceramic fragment from the excavation prior to the construction of the Pabellón Cubierto (2008/2009) (photograph by M. Ruppert, University of Würzburg).

whose purpose was to discover the place of the monument in its spatial context. In the excavations carried out in the municipal plot of El Cuervo-La Pastora, different prehistoric structures could be defined, among which a pit dwelling (no. 54) stands out, inside which several fragments of painted pottery were found (Vargas *et al.* 2019b). These are three fragments with geometric motifs in black on a red surface, with one example showing parallel zigzag lines and dating from 2876–2625 BC (Vargas 2021).

### ***Nueva Biblioteca (2018 and 2021)***

In 2018 and 2021, two rescue excavation campaigns were undertaken prior to the construction of the new public library of Valencina de la Concepción (Vargas 2018; Vargas *et al.* 2021). Two ditches, more or less parallel to each other delimit a settlement area. It is possible that these ditches form part of the oldest and smallest enclosure of Valencina, built shortly before 3000 BC (Schuhmacher *et al.* 2021). Between 2900 and 2850 BC, three sections of a curved mud-brick wall with a stone foundation were constructed. It seems as if these formed a monumental entrance giving access to this enclosure. In the Middle Chalcolithic, between 2800 and 2600 cal BC, the mud-brick wall collapsed into the ditches and these were subsequently filled. After that, at the end of the Middle Chalcolithic and the beginning of the Late Chalcolithic, between 2600 and 2400 BC the terrain was levelled and a series of round huts were built.

During these two excavation campaigns, a dozen of painted pottery fragments were unearthed (Fig. 5). All of them show red or brown painting, except one (NB 60/38) and another possible one (NB 116/57) painted in black over a lighter background (Fig. 5,1.13). The painting in most of the cases forms parallel lines. An exception is fragment NB 60/38, with two parallel zigzag lines painted in black over a reddish surface. With regard to sherd NB 116/57, it seems to have belonged to an almond-shaped rim of a plate, presenting a decoration consisting of two parallel lines painted in black and located on the inner surface of the vessel. In most of the remaining cases we cannot say much more about the shape of the ceramic vessels. Apart from the aforementioned plate, we have only been able to identify a hemispherical and a conical bowl.

Regarding the chronology of these painted ceramics, at the Nueva Biblioteca they have been found throughout almost the entire sequence from Phase NB I to Phase NB VI. The 21 AMS <sup>14</sup>C-dates allow us to date the painted pottery between 2900 and 2400 BC.

### ***General characterization of the painted pottery from Valencina de la Concepción***

We can define a series of characteristics for the painted pottery of Valencina de la Concepción:

1. In all cases the decoration is painted in red, brown or black upon a lighter, mostly red background. The darker painting creating the motifs.
2. We can distinguish a series of decorative motifs: In several cases we see a net or reticulate motif, sometimes combined with other decorations, such as simple lines, angles or bands of parallel horizontal angles and vertical irregular zigzag lines.
3. Most of the painted decoration seem to belong to globular vessels, in some instances preserving a short vertical rim. In other cases, the motifs are painted on hemispherical bowls or carinated vessels.
4. All the painted fragments from Valencina were found in domestic contexts or ditches. In the case of the wells from the area of Cerro de la Cabeza they could correspond to the infill of these structures once they had been abandoned or be part of a ritual deposit together with the anthropomorphic idols that were also located within the wells (Fernández and Oliva 1980).



Figure 5. Valencina de la Concepción. Painted ceramic fragments from the excavations prior to the construction of the Nueva Biblioteca (2018) (design by R. de Almeida, Loulé; photographs by M. Ruppert, University of Würzburg).

5. According to the dates available for the contexts with painted pottery, decorated vessels began to appear in Valencina at the end of the Early Chalcolithic and were used until the beginning of the Late Chalcolithic, c. 2900–2400 BC.

### Painted pottery in the Chalcolithic of the southern Iberian Peninsula

Painted pottery is quite frequent during the Chalcolithic period in the southeast of the Iberian Peninsula (Martín-Socas *et al.* 1983; Lomba 1991/92). In this part of the peninsula, these types of pottery mainly appear in funerary contexts, and are normally painted in black on a light background. Some examples are the cases of two or three ceramic bowls from Los Millares Tomb 1 (Santa Fe de Mondújar, Almería) (Leisner and Leisner 1943: pl. 8 1/10–11; Martín-Socas *et al.* 1983: 103 fig. 5b, 8a and 8b, pl. 12a–b), Los Millares Tomb 7 (Siret 1893: 50 fig. 228; Almagro Basch and Arribas 1963: 127, 319 pl. LII/50b), Los Millares Tomb 21 (Siret 1906–07: pl. III/2–3 and IV/3; Leisner and Leisner 1943: pl. 22 3/6), the only one with non-geometric motifs, but rather presenting symbolic representations painted in red, two bowls from Tomb 40 of Los Millares (Leisner and Leisner 1943: pl. 10 1/46 and 56; Martín-Socas *et al.* 1983: 112–113 fig. 3b and 4a, pl. 13a–b), Loma de la Rambla de Huechar Tomb 2 (Gádor, Almería) (Leisner and Leisner 1943: 55, fig. 25 1/38; Martín-Socas *et*

*al.* 1983: 115-116, fig. 4b and 5a, pl. 10a-b and 11a-b); Las Peñicas Tomb 3 (Níjar, Almería) (Martín-Socas *et al.* 1983: 122 fig. 8e), Loma de las Eras Tomb 2 (Tabernas, Almería) (Martín-Socas *et al.* 1983: 120, fig. 2a, pl. 9a); Loma de Belmonte Tomb 1 (Martín-Socas *et al.* 1983: 118 fig. 3a, pl. 14b), which can be contemporaneous with the beginning of the Bell Beaker period; Llano del Jautón Tomb 6 (Purchena, Almería) (Martín-Socas *et al.* 1983: 101 fig. 2b, pl. 9b), and Llano de la Cuesta de Almiel Tomb 23 (Gorafe, Granada) (Martín-Socas *et al.* 1983: 121 fig. 7).

In the region of Murcia, we find a subgroup that is characterized by the presence of painted decoration on the inner surface of the pottery. There are at least six vessels from Los Royos (Caravaca) (Lomba 1991/92: 38-40 fig. 2/1-9), a bowl from a tomb from El Capitán (Lomba 1991/92: 40 fig. 3); or a possible solar motif from Las Palomas Cave (Ceheguín) (Lomba 1991/92: 37) and Chorillo Alto (Lomba 1995: 109). This interior decoration can also be found on pottery from Level IVB belonging to the Middle Chalcolithic from the site of Los Castillejos de Montefrío (Morelábor, Granada) (Arribas and Molina 1978: 64 fig. 72/534).

These ceramics can also be found in caves, as are the examples of Cueva Alta de Montefrío (Tarradell 1952: fig. 8; Moreno 1982: 243 fig. 2d); Blanquizaes de Lébor (Totana) (Arribas 1952/53: fig. 61/5), with an exceptional example painted on a stone vessel, eleven containers from the Cueva de los Tiestos (Jumilla, Murcia) (Molina Grande and Molina García 1973: 196, 198 fig. 41, 200 fig. 43; Molina Grande 1990: 59-63), as well as other examples from the sites of Cova de les Maravelles (Jalón, Alicante) (de Dios Boronat 1983: 59, 60 fig. 11/198, 67 pl. no. 198) and Cova Ampla del Montgó (Xavia, Alicante) (de Dios Boronat 1983: 66, 68 fig. 16, 69 pl. 17/1-4).

Some examples from domestic contexts have been found at the Bell Beaker settlement of Les Moreres (Crevillente, Alicante) (González Prats and Ruiz Segura 1994: 19), Los Castillejos de Montefrío, belonging to Level VC from the Late Neolithic (Arribas and Molina 1978: 64 fig. 31/132, lám. 9e) and continuing in Level VA (Arribas and Molina 1978: 64 fig. 47/302), one vessel from El Tarajal (Níjar, Almería) (Almagro Gorbea 1977: 319-320; Martín-Socas *et al.* 1983: 122-123 fig. 6, pl. 14a), and the interesting fortified settlement of Terrera Ventura (Tabernas, Almería) (Topp and Arribas 1965: 77, 79 fig. 6).

Terrera Ventura, excavated over five campaigns between 1972 and 1975, presents the best stratigraphic sequence in south-eastern Iberia that contains painted pottery. Painted pottery first appears during the Early Chalcolithic in Phase I, 3400-3100 BC, with only one fragment, 0.51 per cent of the total of 195 sherds from this phase. The maximum presence of these types of pottery dates to the Middle Chalcolithic, Phase II, 2900-2650 BC, with seven fragments, 2.41 per cent of a series of 290 sherds. Painted pottery continues to coexist with early Bell Beaker sherds in Phase III, during the second part of the Middle Chalcolithic, 2650-2500 BC, consisting of 18 fragments, 1.29 per cent of the total of 1388 sherds belonging to this phase (Gusi and Olaria 1991: 169-176 fig. 100-104, pl. 24-26; Mederos 1995: 58, 84 tab.). This sequence seems to confirm the coexistence between painted pottery during the final moments of its use and the beginning of the Bell Beaker period, with similar dates to the case of Valencina, 2500-2400 BC. In Phase II, all the decorative motifs are present, with the exception of serpentine motifs which appear in Phase III.

In the western part of the Iberian Peninsula the presence of this kind of pottery is less frequent, although its numbers are growing, especially due to the new excavations in Valencina. Painted pottery was first discovered in western Andalusia during the excavations by George Bonsor at Campo Real (Carmona, Sevilla), in the form of a vessel with ellipsoidal or spherical tendency decorated with red zigzag lines (Bonsor 1899: 108 fig. 41-42; Cruz-Auñón and Jiménez 1985: 434 fig. 15). After these came other sherds from surface contexts at the site of Asta Regia (Jerez, Cádiz) with decoration painted in red and black (Esteve 1945: 39 fig. 6), which some authors consider to be linked to the Carambolo style pottery from the Late Bronze Age (Arribas and Molina 1978: 67). In 1975, in Valencina de la Concepción, the first example was discovered in the settlement, similar

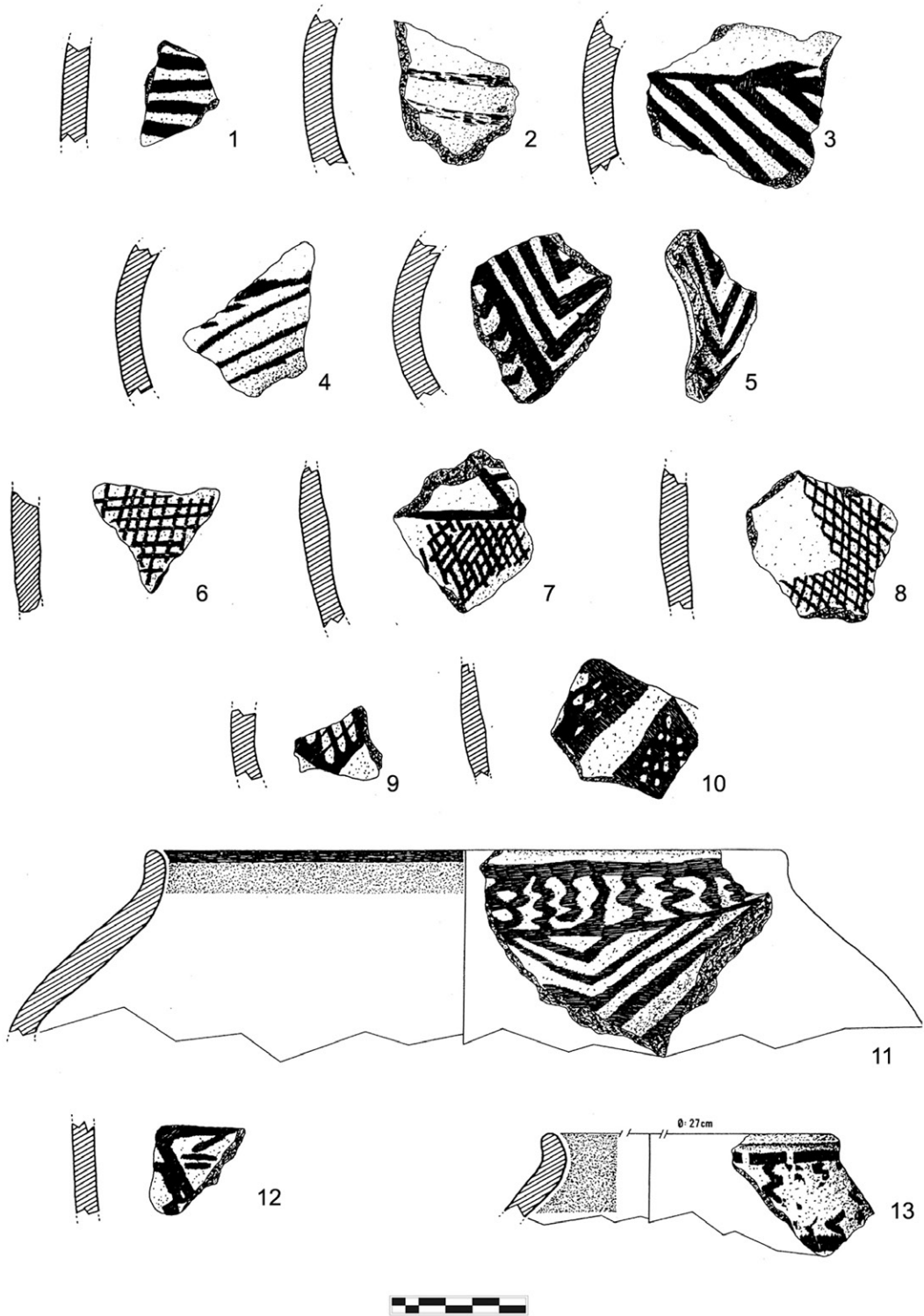


Figure 6. Gar Cahal. Painted ceramic fragments from level III B (design by C. Bashore, modified after Onrubia 1995: figs 2 and 3).

in form and decoration to the one from Campo Real, but without a reliable context, painted in black (Ruiz Mata 1975: 88 fig. 16/4). Finally, a conical painted base was recovered at La Morita (Cantillana, Sevilla) (Cruz-Auñón and Jiménez 1985: 449). The spherical ceramic container from one the *hypogaea* of Los Algarbes (Tarifa, Cádiz) presents a striking resemblance to the others, having been painted with dark stripes and a net motif (Posac 1975: 102–103, fig.7/11, pl. XI/1; Martín Socas *et al.* 1983: pl. XVb).

### **Painted pottery in Gar Cahal**

During his excavations at the cave of Gar Cahal, near Ceuta, Miquel Tarradell found a series of decorated ceramics in Level IIIb, painted in dark red or blackish brown upon lighter, pinkish, yellowish or red ground (Tarradell 1954: 353–357 fig. 3; 1957: 108; 1958: 280–281) (Fig. 6. 7). The decoration includes parallel lines, reticulate motifs, triangles, serpentine lines, but also vertical zigzags placed between horizontal lines, as well as different combinations of these motifs. Level IIIb was covered by Level IIIa, which contained Bell Beaker pottery. All these painted pieces correspond to different containers, and only two of them belong to the same vessel. Another sherd was found in Level IV, possibly as a consequence of ancient disturbances. Later on, Gozalbes (1977: 413) collected another fragment, painted with a chevron, recovered from an area affected by looters, from a context that also contained Bell Beaker ceramics and others with incised decorations. In other areas of the cave these different types of pottery were found in different stratigraphic units.

Tarradell favoured a Sicilian origin of this type of pottery, despite the disposition of the motifs being different, though he recognized that the themes and the colour of the background and the motifs are similar to the decorations belonging to the Serrafelicchio style (Tarradell 1957: 109; 1958: 287; Pericot and Tarradell 1962: 213). His idea of a Sicilian origin for this style of ceramics was followed by Evans (1952: 60), Bosch Gimpera (1965: 26), Camps and Camps-Fabrer (1972: 39), or Harrison and Gilman (1977: 92), though Gilman (1976: 184) had shortly before claimed that Tarradell's assumption was premature, and Onrubia (1986: 280) preferred to defend a more generic Central Mediterranean origin.

The decorations of the painted pottery of the Serrafelicchio style can be grouped in three basic types: dark lines on yellow or red backgrounds, white motifs on a red background, and opaque black decorations, in some occasions outlined in white, upon a bright red ground, though this last type is only present in the upper levels of the eponymous site of Serrafelicchio and presents a wider range of decorative motifs and ceramic types. The motifs are varied and are associated and combined in different ways. The most simple ones are zig-zag lines, series of parallel lines, thick bands or points, serpentine lines, chains and net motifs (Bernabò Brea 1953/54: 163–165 pl. 6; 1966: 75–78 pl. 24; Tusa 1983: 190–192, 196, 209–214).

However, Tarradell also highlighted the finds of the two fragments with a reticulate motif from Montefrío (Granada) and Mesas de Asta (Jerez de la Frontera, Cádiz), as well as other painted pottery from Los Millares and the Montgó cave which he studied at the archaeological museums of Granada, Jerez de la Frontera and Alicante (Tarradell 1952: fig. 8; 1954: 353–357 fig. 3; 1958: 286 no. 6; Arribas and Molina 1978: 66), though he admitted that this type of decorative motif was rare in the Iberian Peninsula. As we have previously discussed, the number of fragments with a reticulate motif has grown and is quite numerous, especially in Valencina, where we have also discovered pottery with the other decorative motifs present in Gar Cahal. We can also see formal similarities between the ceramic containers from Campo Real, Valencina and Los Algarbes, though the only instance where a complete profile of a pottery vessel can be identified is a ceramic sherd from Gar Cahal.

Tarradell's account of the stratigraphic position of the painted pottery from Gar Cahal over the years has drawn some criticism (Camps 1968: 351; Gilman 1975: 101; Onrubia 1995: 129 n. 8; Daugas *et al.*



Figure 7. Gar Cahal. Painted ceramic fragments from level IIIB (after Vijande *et al.* 2011: fig. 10).

1999: 353; Daugas and El Idrissi 2008: 69–71 tab. 2), especially following the new French-Moroccan excavations that had the objective of cleaning the profiles, carried out by Daugas and Raynal. This excavation was followed by two sondages carried out in April and May 1988 by Ballouche, Daugas and Raynal, who considered the painted pottery to belong to the local medieval phase (Daugas and El Idrissi 2008: 71; Daugas *et al.* 2008: 794 tab. 5). The planimetry of these two sondages was presented by Ouchaou (1998/99: 40 fig. 20), where it can be seen that the 1988 excavations were carried out at the bottom end of the cave, some 15m into the interior, reaching a depth of -1m in one sector and -2.50m in the other (Fig. 8).

The stratigraphy presented by Tarradell is reasonably well documented, especially taking into account the problems derived from the topography of the cave itself and the time at which the excavations were carried out. On the other hand, he had used the stratigraphy from Sector A, which was excavated after the initial sondages carried out in the spring of 1954, otherwise known as Sector S, which measured 6 × 3m, reaching a depth of 4m, in order to obtain an initial section before excavating Sectors A, B and C (Tarradell 1954: 347, 348 fig. 1). Though in the initial paper that was published (Tarradell 1954: 348–349 fig. 1–2), the graphical information lacks detail, in the second paper it was better presented (Tarradell 1955: 15 fig. 2, 17 fig. 3). The sequence belongs to Sector A, excavated in November of 1954, same as the South Section which he publishes (Fig. 9). The initial Level 1, or Stratigraphic Phase I reaches -0.60m, and contained a large quantity of medieval Islamic pottery and a bronze coin of Roman Emperor Arcadius, 377–408 AD (Tarradell

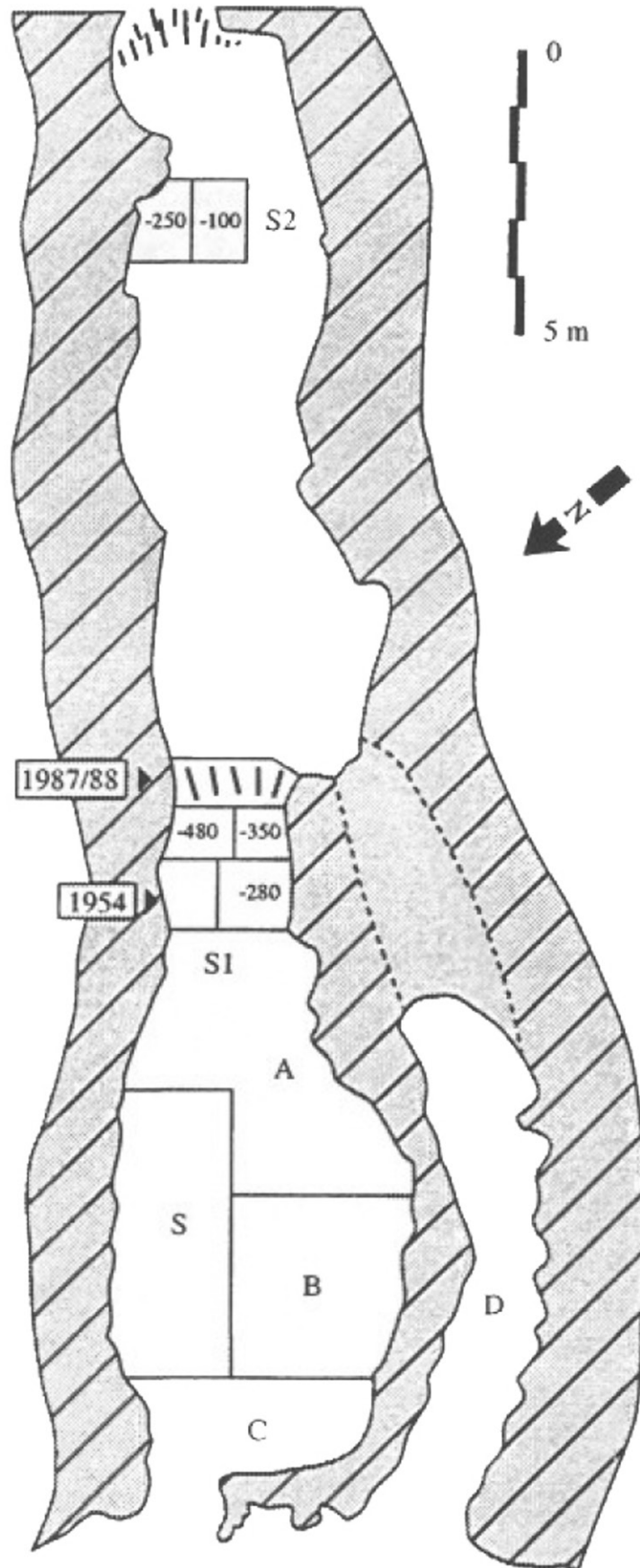


Figure 8. Gar Cahal. Plan with indication of the sectors excavated by M. Tarradell (A, B, C, D and S) and the French-Moroccan sondages (S1 and S2) in the cave (after Ouchaou 1998/99: fig. 2).

1954: 348, 352). In the revision carried out by A. Gilman, a total of 33 glazed ceramics and 57 wheel-thrown ceramics were identified (Gilman 1975: 103 tab. 17).

Stratigraphic Phase II, between -0.60 and -1.40m, was excavated in two artificial levels, 2 and 3, measuring 0.40m each, and belong to the Early and Middle Bronze Age or Bronze II, where the author indicates that it was 'free of modern objects', though in lower levels he indicates the presence of a Bell Beaker and two incised ceramics (Tarradell 1954: 352). During the first revision of the materials at the Museum of Tetuan, carried out in 1970 by Gilman, he indicates the presence of only one glazed sherd, having practically disappeared in the stratigraphy, and another 14 wheel-thrown ceramics, significantly decreasing in number, though the most relevant information is the large amount of hand-made non-decorated ceramics, a total of 349 sherds, as well as the absence of Bell Beaker pottery, two painted ceramics, four Achakar-style sherds, and one Cardium-decorated sherd (Gilman 1975: 103 tab. 17). In the study carried out by Jorge Onrubia in 1987, two painted sherds are confirmed to exist (Onrubia 1995: 130 tab. 1, 131 fig. 2/2, 133 fig. 3/7). However, in the study carried out by J. P. Daugas in 1991, the authors indicate the presence of seven modern sherds, three wheel-thrown fragments, two Bell Beaker sherds, two Cardium-decorated ceramics and one painted fragment (Daugas and El Idrissi 2008: 71 tab. 2; Daugas *et al.* 2008: 794 tab. 5). Based on the two dates obtained by means of thermoluminescence on burnished ceramics, 1900±300 BC and 220±300 BC, the same authors maintain that these ceramics belong to the Bronze Age (Daugas *et al.* 1999: 353, 351 tab. 1). Other authors prefer to date this level to the Late Neolithic, with a continuation until the beginning of the second millennium BC (Gilman 1975: 101–102).

Stratigraphic Phase IIIa presents a more careful excavation, between -1.40 and -2.05m, detecting a succession of hearths and most of the Bell Beaker pottery. These 65cm were excavated in five artificial levels, some of about 5cm, and a medium depth of 13cm. Only the right side of the sector was intact, given the fact that a previous sondage, which had reached a depth of -3.10m, had affected the left side and had been subsequently been filled-in after the excavation (Tarradell 1954: 350, 352; 1955: 17 fig. 2). According to Gilman, there were two glazed ceramics, eleven wheel-thrown sherds, 37 Bell Beaker ceramics, no painted elements and one Cardial-ware sherd (Gilman, 1975: 101, 103 tab. 17). In Daugas' study, he indicates the presence of four modern ceramics, six wheel-thrown fragments, twelve Bell Beaker sherds, two Achakar-style ceramics, and no painted elements (Daugas and El Idrissi 2008: 71 tab. 2; Daugas *et al.* 2008: 794 tab. 5). The low number of Bell Beaker sherds indicated by Daugas is surprising, since 37 of the 43 Bell Beaker sherds documented in the cave belong to this level, especially given the fact that in his study there are only 36 fragments present at the museum, which would mean that seven fragments would have been lost or had disappeared after Gilman's study.

Stratigraphic Phase IIIb is the most interesting for our study, since it presents most of the painted pottery recovered from the cave. It also presents a series of hearths between -2.05 and -2.70m. These 65cm were excavated in four artificial levels, numbers 9–12, measuring an average of 16.25cm in thickness each. Tarradell (1954: 350, 353; 1955: 17 fig. 2) admits the presence of three sherds with impressed Cardium decoration, which possibly belong to the same vessel, as well as three incised sherds that must belong to the lower level, though Tarradell (1958: 289 tab.) is not very sure, even proposing that they were found above the painted pottery and below the Bell Beaker ceramics. We must not forget that the left side of the sector was affected by the previous sondage which had reached -3.10m, reaching Stratigraphic Phase IV. According to Gilman there was one glazed fragment, four wheel-thrown ceramics, three Bell Beakers, seven painted ceramics and two Cardium-decorated vessels (Gilman, 1975: 103 tab. 17). On the other hand, Daugas indicates the presences of no modern ceramics, four wheel-thrown ceramics, seven painted ceramics, one Bell Beaker and two Cardial-ware sherds (Daugas and El Idrissi 2008: 71 tab. 2; Daugas *et al.* 2008: 794 tab. 5). Onrubia indicates the presence of nine painted sherds from Sector A: fragments 1, 3–5 and 9–13 (Onrubia, 1995: 130 tab. 1, 131 fig. 2/3–5, 133 fig. 3/9–13), which include the five fragments published by Tarradell (1954: 353 fig. 3/1–5). Two aspects of this data are very interesting, on the

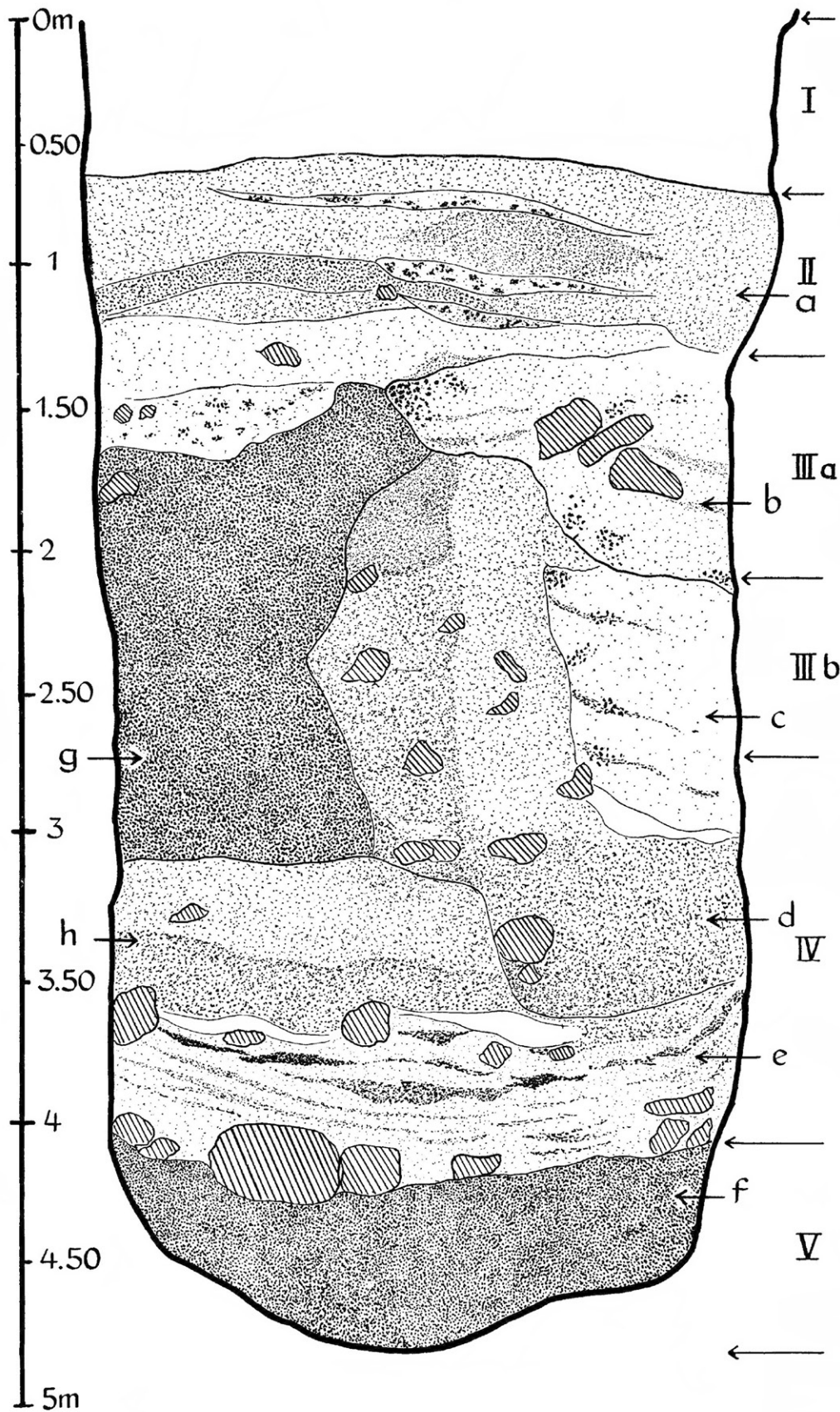


Figure 9. Gar Cahal. Stratigraphy of sector A of Tarradell's excavation (after Tarradell 1955: fig. 3).

one hand, there is no presence of painted ceramics neither in the upper Level IIIa, nor in the lower Level IV. On the other hand, one of the two fragments from Level II, no. 2, belongs to the larger vessel from Stratigraphic Phase IIb, no. 1 (Onrubia, 1995: 130), which could indicate either alterations of the stratigraphy or that vessel no. 1 was intrusive.

According to Tarradell's original drawings and sketches, which recently have been published (Ramos Muñoz *et al.* 2021: lám. 86, 101), Stratigraphic Phase IIIb was divided into four artificial levels, all excavated during the 15th day of the excavations: Level 9 from -2.05 to -2.10m, Level 10 from -2.10 to -2.30m, Level 11 from -2.30 to -2.50m, and Level 12 from -2.50 to -2.70m. In Level 9, one of the painted sherds and one of the Cardium-decorated sherds appeared, in Level 10, three painted sherds, the other two Cardium-decorated sherds, and one Bell Beaker sherd were found; in Level 11, three painted sherds were recovered and in Level 12, three painted sherds, with the decoration of two of them almost completely lost, were found together with two Bell Beaker sherds. Only one more painted sherd was recovered, belonging to the upper levels of Stratigraphic Phase IV, in Level 13, between -2.70 and -2.90m, where the last fragment of a Bell Beaker vessel also appeared.

The most recent study has not revised the ceramic material nor presents colour photographs of the pottery, but rather accepts the data presented by Daugas and El Idrissi (Becerra *et al.* 2021: 209 tab. 1), proposing a Neolithic chronology for this pottery, possibly more specifically belonging to the Late Neolithic (Becerra *et al.* 2021: 213).

The fauna from this level indicates the presence of domestic pigs and bovids, which are absent from Stratigraphic Phase IV onward, while small ruminates, goats and sheep represent almost half of the fauna, 47.5 per cent, in contrast to mufflon and gazelles, which were being hunted (Ouchaou 1998/99: 43-44, 45 fig. 8).

According to the study of the lithic industry, Box 17 has been attributed to the Neolithic, but the materials from Level 12 from Stratigraphic Phase IIIb, are mixed with those from Level 13, which belongs to Stratigraphic Phase IV, between -2.60 and -2.80m. The contents of the second box, no. 18, all belongs to Stratigraphic Phase IV, between -2.80 and -3.20m, comprising blades and bladelets, backed bladelets and some geometric microliths, for example a trapeze manufactured using the microburin technique (Ramos *et al.* 2021: 224, 231, 237). It should therefore be attributed to the level with Cardial ware pottery from the Early Neolithic, which was not identified by Tarradell.

On the other hand, Stratigraphic Phase IV, with a depth from -2.70 to -4.30m, was divided into eight artificial levels, numbered 13–20, each measuring 20cm, which Tarradell (1954: 350) considered to be Neolithic, presenting very little pottery and a significant amount of flint. Nevertheless, Camps and Camps-Faber (1972: 39) believed that, given the absence of polished stone axes, arrowheads, and almost no pottery, this stratigraphic phase belonged to the Late Iberomaurusian Epipaleolithic and not the Neolithic. More recently this chronology, really belonging to the Late Upper Palaeolithic, has been confirmed for Phase V based on a selection of the lithic industry (Ramos *et al.* 2021: 224). According to Gilman's study, there is no glazed pottery, nor any Bell Beaker fragments or Cardial ware ceramics, while there is only one fragment of painted pottery. The remaining pottery consist of 179 handmade sherds, of which only one presents decoration consisting of a relief cord (Gilman, 1975: 103 tab. 17). On the other hand, Daugas identifies eight modern ceramics, one wheel-thrown sherd, 18 Bell Beaker fragments, one painted sherd and twelve Cardial fragments (Daugas and El Idrissi 2008: 71 tab. 2; Daugas *et al.* 2008: 794 tab. 5).

The difference between one study and the other is quite perplexing, and is important given the continuity that would exist due to the presence of the 18 Bell Beaker fragments. The only explanation would be that Daugas confused the identification numbers on the sherds because they were not clear. No painted ceramics are mention by Onrubia (1995: 130 tab. 1). If the data presented by Daugas were to be accepted, we should highlight two factors: Firstly, that the materials from

Bell Beaker Stratigraphic Phases IIIa and IV in Sector B could have been mixed if there was no Stratigraphic Phase IIIb in this sector. On the other hand, there could have been a Cardial level belonging to the Early Neolithic that was incorrectly identified. Nonetheless, the absence of both data in Gilman's study for his doctoral thesis creates serious doubts regarding J. P. Daugas' study. For example, he indicates that the stratigraphy of the cave produced 20 Cardial pottery fragments (Daugas and El Idrissi 2008: 71 tab.; Daugas *et al.* 2008: 794), in contrast to the four fragments documented by Gilman (1975: 103 tab. 17).

The final Stratigraphic Phase V has a depth between -4.30 and -4.80m, divided into four artificial levels of approximately 12.5cm each. The level is considered to be 'practically sterile' according to Tarradell (1954: 350), and it is considered to belong to the Late Iberomaurusian Epipaleolithic according to Camps and Camps-Fabrer (1972: 39), a proposal which was accepted by Gilman (1975: 102). The sequence of the lower levels was established by Abdeljailil Bouzouggar and Nick Barton by excavating a new sondage in 2001, where they identified 15 sedimentological levels, and obtaining dates from Levels 10, OxA-11.321 9470±55 BP, 9.122-8.620 BC, and 12, OxA-11.322 11.180±65 BP and 11.123±65 BP, 11.281-10.969 BC and 11.213-10.901 BC (Bouzouggar *et al.* 2006: 141 tab. 1), which indicate that Level 12 belonged to the Late Upper Palaeolithic. We can also add to this the fact that the study of the lithic industry confirms that this level belongs to the Upper Palaeolithic (Ramos *et al.* 2021: 224). However, we must indicate that in the lower levels of Stratigraphic Phase V some 'raclours' were found that can be attributed to the Middle Palaeolithic, and were probably the product of sporadic occupation or frequenting of the cave, documented in Levels 12, -2.70 to -2.90m and, more logically in Level 21, -4.30 to -4.50m (Ramos *et al.* 2021: 225-226), though these elements could also be the result of the reuse of older objects that were brought to the cave.

Due to the presence of Caprinae in Stratigraphic Phase V, Ouchaou (1998/99: 43-44) attributes this level to the Early Neolithic; however, he also recognizes that the only remains belonging to Suidae for Level V corresponds to a wild boar, and there are no domestic bovines, only antelopes. The problem appears due to the presence of a phalanx bone belonging to a sheep and six teeth belonging to Caprinae that are considered as domesticated animals, though they could be the result of some type of intrusion, given the fact that 90 per cent of the faunal remains belong to small wild ruminants (Ouchaou, 1998/99: 44, 45 fig. 8).

Antonio Gilman only mentions the presence of two pottery fragments from Stratigraphic Phase V, one with no decoration and another with corrugated decoration. According to Daugas, there are still seven modern pottery sherds, one wheel-thrown fragment and two sherds with Cardium decoration (Daugas and El Idrissi 2008: 71 tab. 2; Daugas *et al.* 2008: 794 tab. 5).

It is true that the stratigraphy of Gar Cahal suffered alterations during medieval and modern times, but comparing the data presented by Tarradell (1955) and Gilman (1975) with that from these new excavations, we think that these more recent alterations did not affect the levels containing the painted pottery. Furthermore, the morphology of the painted vessels is fully comparable with Middle Chalcolithic containers from the Iberian Peninsula.

Becerra *et al.* (2021: 211) also mention the recent discovery of painted pottery during the excavations in the Neolithic or Late Neolithic sites of Ifri n'Ammr ou Moussa (Meknes) and Oued Beth. At the latter site, 'substantial numbers of painted and polychrome pieces' were recovered, with two radiocarbon dates: Beta-486879: 4500 ± 30 BP = 3352-3096 cal BC (2  $\sigma$ ), and Beta-486878 4370 ± 30 BP = 3091-2906 cal BC (2  $\sigma$ ) (Lucarini *et al.* 2021: 153 tab. 2), therefore contemporaneous with the Early Chalcolithic in southern Iberia.

### Other elements in the commercial relationship between southern Iberia and northern Morocco

With all this information in mind, we are sure that painted ceramics constitute one more element that highlights the relationship between the southern Iberian Peninsula and the Magreb throughout the first half of the 3rd millennium BC (Schuhmacher 2016; 2017). Other elements which underline this relationship for the first half of the 3rd millennium BC are cylindrical ivory boxes, found primarily in the Portuguese Estremadura, but also in the Alentejo and in southern Spain, as well as in the contemporaneous necropolis of Rouazi-Skhirat (Rabat) (Daugas 2002; Bokbot 2005: 145–146 fig. 27, 28). We could add another pottery type to this discussion. Daugas saw similarities between comb-decorated vessels of the Rouazi-El Kiffen type and those of the Bell Beaker horizon (Daugas 2002: 151–153; Bokbot 2005: 148 f.). He thinks it possible that the ceramics of the Rouazi-El Kiffen type were part of the evolution of Bell Beaker pottery decoration in the Iberian Peninsula. More recently, Jan Turek revisited this idea, proposing that the Bell Beaker phenomenon originated from contacts between northwest Africa and Portuguese Estremadura (Turek 2012).

Furthermore, though there are relatively few metal objects that have been discovered in Gar Cahal specifically and in northern Morocco more generally, the existing metal objects clearly indicate contact between southern Iberia and northern Morocco during the Middle Chalcolithic and the Bell Beaker phase. In the case of Gar Cahal, the metal objects comprise a fragmented Palmela type projectile head, recovered from Stratigraphic Phase I (0–0.6m), and part of an awl with a circular section recovered from Stratigraphic Phase II (0.6–1.4m), which contained only one Bell Beaker sherd (Tarradell 1954: 352; Becerra 2021: 265). In both cases the objects were recovered from levels close to the surface that were probably altered at some point. A third metal object, consisting of the distal half of a copper axe was recovered during the excavations carried out by Daugas, though its context is not clear (El Idrissi 1992; Bokbot 2005: 138, 158 fig. 36). Similarly, other metal objects characteristic of the Middle Chalcolithic and the Bell Beaker period have been found at other sites in northern Morocco, as in the cases of Aïn Smen, Sidi Messaoud, Aïn Dalia, El Heriga, Ifri n'Amr ou Moussa, Caf Taht el Gahr, Kehf el Baroud or Oued Akrech (Monteagudo 1977: 34–41 nos 93–138A; Bokbot 2005: 147–149, 157–159 fig. 33–41). From a technological point of view, little can be said regarding these objects. Elemental analysis has been carried out only on three objects belonging to the Chalcolithic, a Palmela point from Aïn Smen, and a Palmela point and awl from Ifri n'Amr ou Moussa (Montero *et al.* 2012: 114 tab. 1). Both Palmela points are made from almost pure copper, while the awl is made from arsenical copper (1.59% As). With such a limited set of analytical data it is impossible to draw any meaningful conclusions regarding the technological aspects of the production of such objects. However, from a typological point of view, the presence of metal objects that are characteristic of the Middle Chalcolithic, such as copper awls and flat axes, and of the Bell Beaker phase, Palmela points and daggers, indicate close contact between southern Iberia and northern Morocco, especially considering the Iberian origin of the Palmela points. Another interesting aspect we must take into account is the suggestion by some authors regarding the use of flat axes as copper ingots (Gomez Ramos 1993; Ruiz Taboada *et al.* 2019). Without a more comprehensive programme of archaeometallurgical analyses of the metal objects from northern Morocco it is difficult to know if they were imports or produced locally.

Most likely, these objects reached the Maghreb in exchange for elephant ivory and ostrich eggshells moving from Northwest Africa to the Iberian Southwest (Schuhmacher 2016; 2017; Boutoille 2021). Ivory was mostly imported as raw material and subsequently worked in local workshops in the Iberian Peninsula, to be consumed and deposited in monumental prestige tombs, such as Tomb 10.049 and Montelirio, both in Valencina de la Concepción, one of the main Chalcolithic central nodes in the southern Iberian Peninsula and production centre for a large quantity of high-quality prestige goods, among which we probably have to include painted pottery (Nocete *et al.* 2013; García Sanjuán *et al.* 2013; Lucíañez *et al.* 2013; Lucíañez *et al.* 2021).

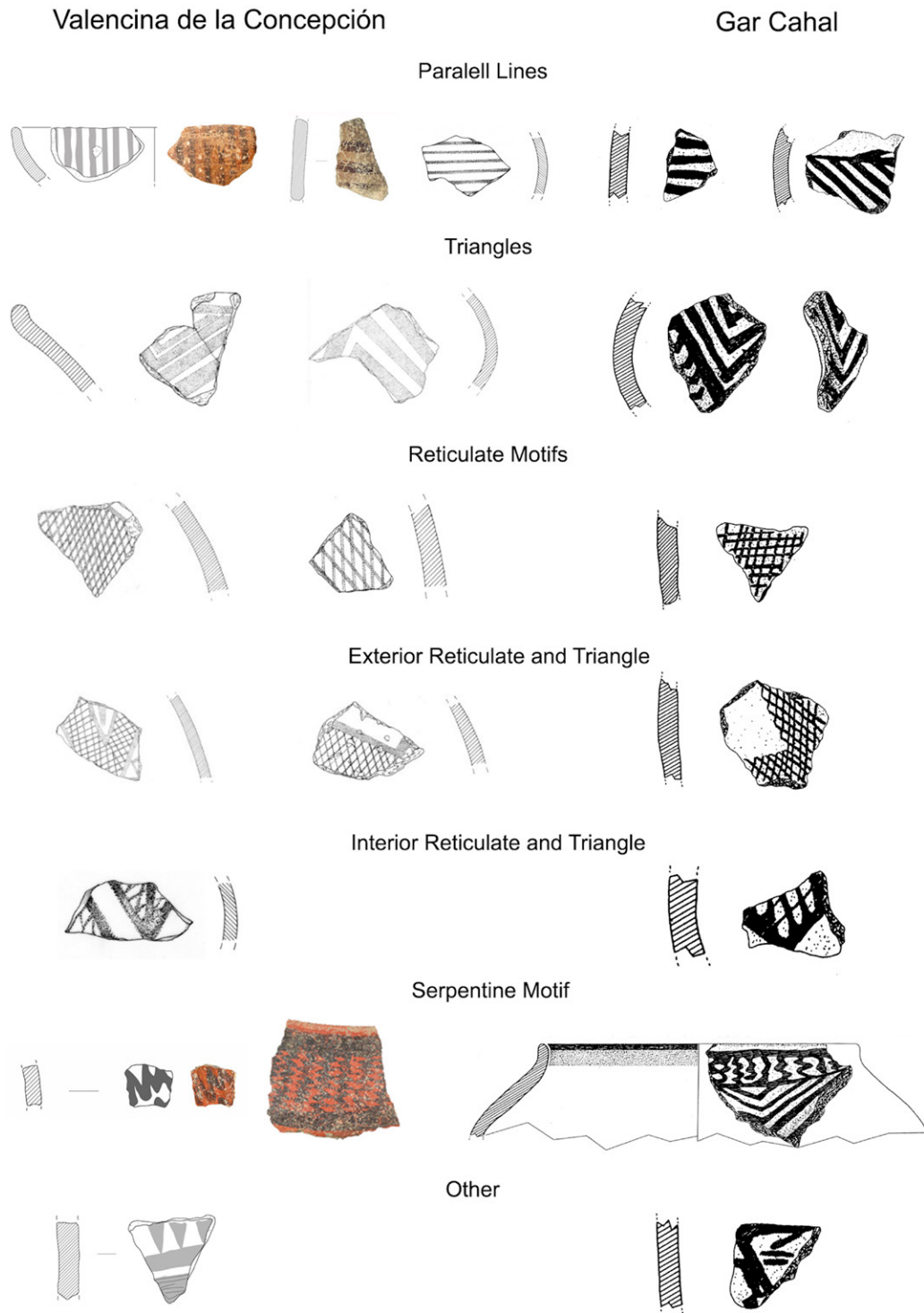


Figure 10. Comparative figure of the motifs of painted ceramics from Valencina de la Concepción and Gar Cahal (design by C. Bashore).

## Conclusion

Over the past few decades, the chronology of the painted ceramics from the Gar Cahal cave, recovered by M. Tarradell during his excavations in 1954, has been questioned, having been recently attributed to the medieval phase of the site. However, our revision of the stratigraphic sequence of the site demonstrates consistency of their attribution to Level IIIb, assuming the existence of some intrusive elements at the interface between different stratigraphic units, which is then succeeded by Stratigraphic Phase IIIa, which has Bell Beaker ceramics but no painted pottery. There is also a notable lack of coherence between the first study of the materials, carried out at the Archaeological Museum of Tetuan by A. Gilman in 1970 for his doctoral thesis, and the study of the same materials by J. P. Daugas in 1991. Regardless, Level IIIb, which contains painted pottery, presents the most coherent data. The explanation for the existing contradictions must lie in the numbering of the finds from each level, which would have been read incorrectly during the second study carried out in 1991, probably because the identification numbers on the sherds were not clear.

In the Gar Cahal cave, serpentine motifs associated with triangles are one of the most common decorations on painted pottery, which seem to correspond to two vessels (Tarradell 1954: 353 fig. 3/1; Onrubia 1995: 131 fig. 3/1–4, 6), while the remaining sherds correspond to reticulated motifs (Tarradell 1954: 353 fig. 3/2–5; Onrubia 1995: 133 fig. 4/8–12) or parallel lines (Onrubia 1995: 131 fig. 3/5, 133 fig. 4/1).

If we consider the motifs represented in Gar Cahal and search for parallels, we can find parallel lines throughout the entire south of the Iberian Peninsula, for example in Montefrío (Granada) (Arribas and Molina 1978: 64, fig. 47/302) or in Valencina de la Concepción (Murillo and Fernández Gómez 2008: 306 no. 7) (Fig. 10).

Inverted triangles are also a common motif, especially in the southeastern Iberian Peninsula, e.g. Los Millares Tomb 1, and Loma de la Rambla de Huéchar Tomb 2 (Martín Socas *et al.* 1983: fig. 4b, 5a, 5b, fig. 8a–b), or at the fortified settlement of Terrera Ventura (Gusi and Olaria 1991: 175 fig. 104/5). On the other hand, horizontally oriented triangles are more common, the best example being the complete vessel that was recovered from El Tarajal (Martín Socas *et al.* 1983: fig. 6). Furthermore, painted ceramics with upward-pointing triangles can also be found in the Lower Guadalquivir, as in the case of Valencina de la Concepción (Murillo and Fernández Gómez 2008: 305 no. 4, 310 no. 14), though there are also some fragments where the triangles are inverted, pointing downward (Murillo and Fernández Gómez 2008: 304 no. 3, 305 no. 5, 306 no. 6, 307 no. 8). Regarding the less common serpentine motifs, these can be found in Almería, as is the case of Terrera Ventura (Gusi and Olaria 1991: 175 fig. 103/3).

Less frequent are reticulate motifs. As we have seen, there are several of them in Valencina de la Concepción, where it constitutes the most common motif (Murillo and Fernández Gómez 2008: 303 no. 1, 304 no. 2, 307 no. 9, 308 no. 10–11), some of which are very similar to those from Gar Cahal, and can also be found at the Cueva del Toro cave (Antequera, Málaga) (Martín Socas *et al.* 2004) and at the Cueva Alta de Montefrío (Granada) (Moreno 1982: 243 fig. 2d).

Ivory, ostrich eggs and possibly ostrich feathers were products that were regularly exchanged between the coastal areas of Algeria and Morocco and the south of the Iberian Peninsula (Schuhmacher 2016; 2017; Boutoille 2021). In exchange, high-quality objects from the Lower Tagus, the Lower Guadalquivir and the Iberian Southeast, such as metal items or some types of pottery, would have been traded. If during the Late Chalcolithic the most common objects were Bell Beaker pottery and metal Palmela points, during the previous period we believe that apart from metal axes and awls, as well as flint daggers, painted pottery, an element whose production seems to be limited to the Iberian Peninsula, as we have seen, present in both settlements and in

funerary contexts, would have been exported to northern Morocco as a complementary element for exchange.

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# Dérive chronologique ou changement de paradigme ? Le cas du Bronze ancien en Europe centrale

Mireille David-Elbiali<sup>1</sup>

## Abstract

Chronological classification of archaeological remains was the primary task of pre-and protohistory since its foundation in the 19th century. The available tools are relative chronology – typology, assemblages and stratigraphy – and absolute chronology – cross dating, radiocarbon dating and dendrochronology. The latter two have been dominant since the second half of the 20th century for Bronze Age dating. But are their results always accurate? As this contribution demonstrates by citing examples, in particular the misuse of these methods in a 2015 article by Stockhammer et al., the answer to that question is negative. The existing chronological framework for the Bronze Age has been built and refined for a century and a half. It is effective. However, a solid chronology always builds on integrating all relevant information and not only radiocarbon determinations or a misunderstood typology.

## Keywords

CENTRAL EUROPE, BRONZE AGE, RELATIVE CHRONOLOGY, ABSOLUTE CHRONOLOGY.

## Résumé

Classer chronologiquement les vestiges archéologiques représente la tâche première de la pré- protohistoire dès sa fondation au 19ème siècle. Les outils à disposition sont la chronologie relative, qui recourt à la typologie, aux ensembles clos et à la stratigraphie, et la chronologie absolue, qui utilise le cross dating, le radiocarbone et la dendrochronologie. Ces deux dernières méthodes sont devenues prépondérantes au cours de la seconde moitié du 20ème siècle pour les datations qui concernent l'âge du Bronze. Leurs résultats sont-ils toujours fiables ? Non, comme le démontre cette contribution en citant des exemples, en particulier leur mauvais usage dans un article de Stockhammer et al. de 2015. Le cadre chronologique actuel pour l'âge du Bronze, bâti et affiné depuis près d'un siècle et demi, est performant, mais une datation solide se construit cependant toujours en intégrant toutes les informations disponibles et pas simplement celles du radiocarbone ou d'une typologie mal maîtrisée.

## Mots-clés

EUROPE CENTRALE, ÂGE DU BRONZE, CHRONOLOGIE RELATIVE, CHRONOLOGIE ABSOLUE.

## Introduction

Cette communication revient sur une question fondamentale de notre discipline, celle de la datation à l'âge du Bronze, laquelle semble soumise à un affaiblissement progressif de la rigueur méthodologique. Il s'agit d'une question d'importance, car elle pourrait modifier de façon profonde l'histoire de cette période construite depuis maintenant près d'un siècle et demi.

## La protohistoire, une science historique

La pré- protohistoire est fondée en tant que discipline scientifique au 19ème siècle, comme beaucoup d'autres sciences. Elle a pour but le découpage du temps et elle s'inscrit donc d'emblée dans les sciences historiques. Ce sont les antiquaires/archéologues de l'époque qui développent les outils méthodologiques permettant cette mesure du temps.



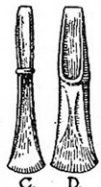
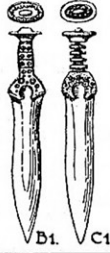



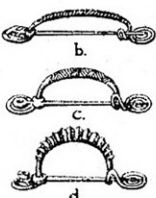



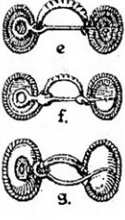
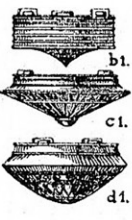




Or le 19ème siècle est marqué par une révolution de la pensée suite à la publication de la théorie de l'évolution des espèces par Charles Darwin en 1859. Il n'est donc pas étonnant que cette théorie

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<sup>1</sup> Université de Genève, Département F.-A. Forel des Sciences de l'environnement et de l'eau – Laboratoire d'archéologie préhistorique et anthropologie. mireille.david-elbiali@unige.ch

influence fortement la démarche du préhistorien suédois Oscar Montelius, lorsqu'il propose en 1885 un système de mesure du temps de l'âge du Bronze pour le nord de l'Europe. Il remplace dans son système l'évolution des espèces vivantes par l'évolution des formes des objets et de leurs décors (Fig. 1).

### Die Einteilung der Bronzezeit auf Grund der typologischen Methode von Oskar Montelius.

Periode:	Beiltypen	Schwerttypen	Fibeltypen	Dosentypen	Vorkommen:
1					Beile A und B sowie Schwert A1, nie mit Fibel a. zusammen, also älter.
2					Beile C.D. mit Schwertern B1, C1, und Fibel a. zusammen, also gleichaltrig. Nie mit Dose a1. zusammen, also älter als diese.
3					Beile E.G. mit Schwertern D1, E1, und Fibern b, c, d. und Dose a1. zusammen, also gleichaltrig.
4					Beile F.H. mit Schwert F1, Fibel e, f, g. und Dosen b1, c1, d1. zusammen, also gleichaltrig.
5					Beil J mit Schwert G1, Fibel h. und Dosen e1, f1. zusammen, also gleichaltrig.

Dr. Jacob-Friesen 1922

Figure 1. Éléments typologiques d'O. Montelius (1885) réorganisés par K. H. Jacob-Friesen (1928, fig. 7).

Dès 1899, l'archéologue allemand Paul Reinecke établit, sur le même modèle que celui d'O. Montelius, un système chronologique adapté à l'Europe centrale, qui sert d'ossature à ceux qui sont en usage actuellement (Reinecke 1902).

### **Les méthodes de datation relative et absolue**

O. Montelius expose en 1903 le cadre théorique de la *méthode typologique*. Il considère que chaque objet fabriqué par l'homme est soumis à des lois d'évolution et il avance trois critères qui permettent de reconstituer leur succession typologique (Eggers 1974) :

1. les *caractères typologiques*, qui permettent de retracer l'évolution des formes et des décors ;
2. les *ensembles clos*, qui définissent les associations d'objets déposés au même moment ;
3. la *stratigraphie*, qui repose sur la superposition des couches sédimentaires.

Il pose ainsi les bases de la chronologie relative qui répond à la question : cet objet est-il plus ancien ou plus récent que cet autre objet ?

La seconde question qui préoccupe les préhistoriens est celle de la date de fabrication et d'usage d'un objet. La chronologie absolue est résolue d'abord par le *cross-dating*, qui consiste à recouper des informations provenant des régions qui disposent de dates historiques, comme l'Égypte, avec celles des contrées protohistoriques (Montelius 1885, p. 333-336). À partir du milieu du 20<sup>ème</sup> siècle, les méthodes des sciences naturelles, d'abord la mesure du <sup>14</sup>C puis la dendrochronologie, prennent le relais. Au cours des dernières décennies, ces méthodes de datation absolue ont pris une place prépondérante dans notre discipline, or les résultats obtenus ne sont pas des vérités incontestables et ils doivent aussi être pris avec circonspection.

Le radiocarbone fournit des dates peu précises, sous la forme de fourchettes de probabilités et avec un taux d'erreur relativement élevé. Ainsi une seule date a très peu de fiabilité et c'est une multiplication des dates qui s'avère nécessaire. Les résultats de la dendrochronologie sont parfois aussi remis en question suite à l'amélioration des courbes de datation. Il est instructif de rappeler la saga de la datation de l'éruption qui a eu lieu sur l'île de Thera/Santorin, que les chercheurs associent à la chute de la civilisation minoenne. Les données archéologiques, notamment l'étude de la céramique, placent ce déclin aux environs de 1570-1500 avant J.-C. (Warren 1996), alors que les datations absolues tant <sup>14</sup>C que dendrochronologiques sont remontées, suivant les auteurs, jusqu'au milieu du 17<sup>ème</sup> siècle avant J.-C., pour finalement coïncider, dans une dernière évaluation du <sup>14</sup>C, avec les dates de la chronologie relative (Pearson *et al.* 2018). Cet exemple, qui n'en est qu'un parmi d'autres, montre bien que les méthodes de datation absolue ne sont pas infaillibles. On peut encore mentionner les datations dendrochronologiques erronées de Zürich – Mozartstrasse (canton de Zürich, CH) (Gross *et al.* 1987 ; correction Conscience 2001) et du captage de la source de St.-Moritz (canton des Grisons, CH) (Seifert 2000 ; correction Reitmaier 2012).

Il faut encore relever un problème majeur, c'est que ces deux méthodes échappent aux archéologues, qui doivent avoir recours à des spécialistes pour effectuer ces datations, que leur coût est très élevé et que le dialogue entre spécialistes est souvent limité à une page de résultats sans commentaire.

Malgré les risques inhérents à ces méthodes et au vu de la pratique de plus en plus répandue d'interpréter les dates <sup>14</sup>C en termes de chronologie relative, faut-il quand même changer de paradigme et instituer le radiocarbone comme la référence chronologique ultime ?

### **Un exemple paradigmatique : la fin du Bronze ancien en Europe centrale**

Pour illustrer les effets que pourrait avoir sur la chronologie de l'âge du Bronze l'usage prépondérant des dates <sup>14</sup>C, utilisées indépendamment de la typochronologie, un exemple s'impose : celui de la fin du Bronze ancien et de la transition avec le Bronze moyen en Europe centrale.

### Historique et définition des phases de la fin du Bronze ancien

Rappelons d'abord l'historique de la définition de cette phase ! Dans un article de 1924, Paul Reinecke subdivise le BzA en deux parties : BzA1 et BzA2. Il définit ce dernier comme l'horizon Trassem – Langquaid – Tinsdahl, qui désigne actuellement la phase BzA2b, le BzA2 pouvant actuellement être subdivisé en plusieurs phases : les BzA2a ancien et BzA2a récent qui appartiennent au cycle classique du Bronze ancien et les BzA2b, BzA2c et BzB ancien qui appartiennent au cycle final (David-Elbiali et David 2009). Les éléments typologiques caractéristiques du BzA2b au nord des Alpes sont énumérés dans le manuel de protohistoire d'Hermann Müller-Karpe de 1980 :

- épingles à tête globuleuse perforée en oblique et tige torsadée ;
- haches à rebords et tranchant très développé en demi-cercle (type Langquaid) ;
- poignards à base arrondie et lame légèrement galbée.

Les épingles sont plutôt caractéristiques de la partie orientale de l'Europe centrale et atteignent le Bassin des Carpates (David 2002, carte 13), alors que les haches de type Langquaid ont une répartition plus occidentale (David-Elbiali 2000, carte 14).

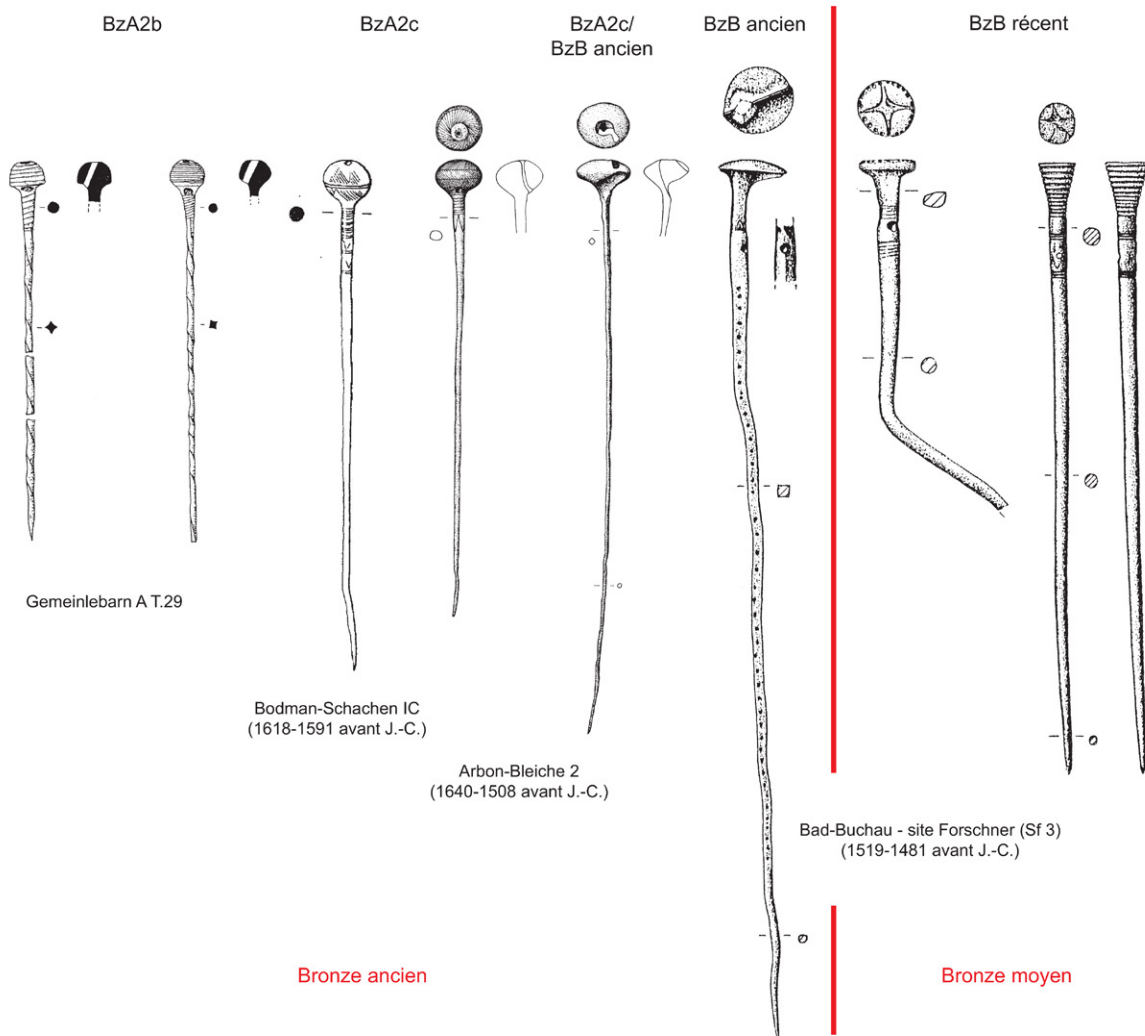


Figure 2. Évolution typologique des épingles à tête globuleuse perforée de la fin du Bronze ancien (d'après Bertemes 1989, pl. 22 ; Köninger 2006, fig. 7,C ; Hochuli 1994, pl. 84,781-786 ; Keefer 1990, fig. 2).

Aujourd'hui, il est possible de dater de façon absolue les haches de type Langquaid. Ainsi à Meilen-Schellen sur le lac de Zürich en Suisse, un exemplaire a été retrouvé à l'intérieur de la couche A, qui est datée par la dendrochronologie du milieu du 17<sup>ème</sup> siècle avant J.-C. (Conscience *et al.* 2005, pl. 42,763). On en retrouve un autre exemplaire en Italie du Nord sur le palafitte de Cazzago Ponti (Varese), qui est daté par le radiocarbone entre 1695 et 1506 cal BC à 91,7 % (LTL661A : 3329±45 BP) (Grassi et Mangani 2014, 103). Sur le lac de Constance, le site allemand de Bodman Schachen a livré deux niveaux attribuables à la fin du Bronze ancien (Köninger 2006, fig. 7C). L'horizon Ib du BzA2b a fourni de la céramique qui présente des similitudes avec celle de Meilen – Schellen. Cette phase de construction est datée par dendrochronologie entre 1644 et 1640 avant J.-C. ; elle est donc contemporaine de la couche A de Meilen – Schellen. Quant à l'horizon IC du BzA2c, daté par dendrochronologie entre 1618 et 1591 avant J.-C., on y a retrouvé une épingle à tête globuleuse décorée perforée en biais, une hache à rebords encore apparentée au type Langquaid et de la céramique décorée de la culture d'Arbon-Landsberg. Les bronzes ne sont, en effet, pas les seuls témoins à valeur chronologique de cette fin du Bronze ancien ; la céramique connaît, elle aussi, une évolution typologique conjointe. La fin du Bronze ancien peut ainsi, comme mentionné ci-dessus, être subdivisée en trois phases : BzA2b, BzA2c et BzB ancien.

Les épingles à tête globuleuse perforée subissent des modifications progressives de morphologie du BzA2b au BzB ancien, puis évoluent en formes à col perforé au Bronze moyen (Fig. 2). Les petites têtes globuleuses du BzA2b, comme on en trouve par exemple dans la tombe 29 de Gemeinlebarn A (Traismauer, Bez. Sankt Pölten, A) (Bertemes 1989, pl. 22), se font plus volumineuses dans le courant du BzA2c, comme on peut l'observer à Bodman Schachen – mentionnée ci-dessus –, puis à la toute fin du Bronze ancien, les têtes deviennent de plus en plus lenticulaires jusqu'à se réduire à un disque et la perforation de la tête migre vers le col, comme à Arbon – Bleiche 2 (canton de Thurgovie, CH) (Hochuli 1994, pl. 84,781–786) ou au Site Forschner (Bad-Buchau, Kr. Biberach, D), la dernière phase d'occupation (Sf3) de ce dernier étant datée par dendrochronologie entre 1519 et 1481 avant J.-C. (Billamboz *et al.* 2009, p. 449 et 560, fig. 10).

Dans les régions plus occidentales, on trouve les poignards à lame galbée mentionnés par H. Müller-Karpe, avec des épingles à tête perforée d'un modèle un peu différent des exemplaires précédents. Deux sépultures du Jura français, La Chapelle-sur-Furieuse et Charcier (Mordant et Pétrequin 1989), ont livré des mobiliers analogues : un poignard décoré de forme galbée, une hache allongée, une spirale en or et respectivement une et deux épingles à tête de massue perforée. Cette composition rappelle celle des tombes masculines de haut rang d'Europe centrale, comme l'inhumation 13-1970 d'Alteglöfsheim en Bavière (David-Elbiali et David 2009, fig. 3,H). Un poignard et une épingle à tête de massue perforée, du même type que les exemplaires des deux sépultures jurassiennes, sont datés entre 1646 et 1619 avant J.-C. sur le site palafittique de Concise – Sous-Colachoz / Village E12 (canton de Vaud, CH) (Winiger *et al.* 2012).

En résumé, comme en attestent les exemples ci-dessus, le dernier tiers du Bronze ancien est caractérisé par un horizon qui s'étend du Bassin des Carpathes à la Saône et de la région nordique au nord de l'Italie ; il est défini depuis maintenant un bon siècle par la typologie et la chronologie relative et peut, depuis plusieurs décennies, être daté par la chronologie absolue entre environ 1700 et 1500 avant J.-C., grâce notamment à plusieurs sites dendrodatisés. Une analyse chronotypologique fine permet même de subdiviser ce cycle final du Bronze ancien en trois phases.

### ***La fin du Bronze ancien selon Stockhammer et al. 2015***

Un article de 2015, signé par Stockhammer *et al.*, remet en question ce cadre chronologique par le biais de dates <sup>14</sup>C et sans tenir compte des autres données. Dans ce texte, les auteurs font l'impasse sur toute le cycle final du Bronze ancien – soit les phases BzA2b, BzA2c et BzB ancien – et prétendent que le Bronze moyen commence directement après le cycle classique – BzA2a – et qu'il y a contemporanéité entre plusieurs phases du début du Bronze ancien (Fig. 3). Malgré

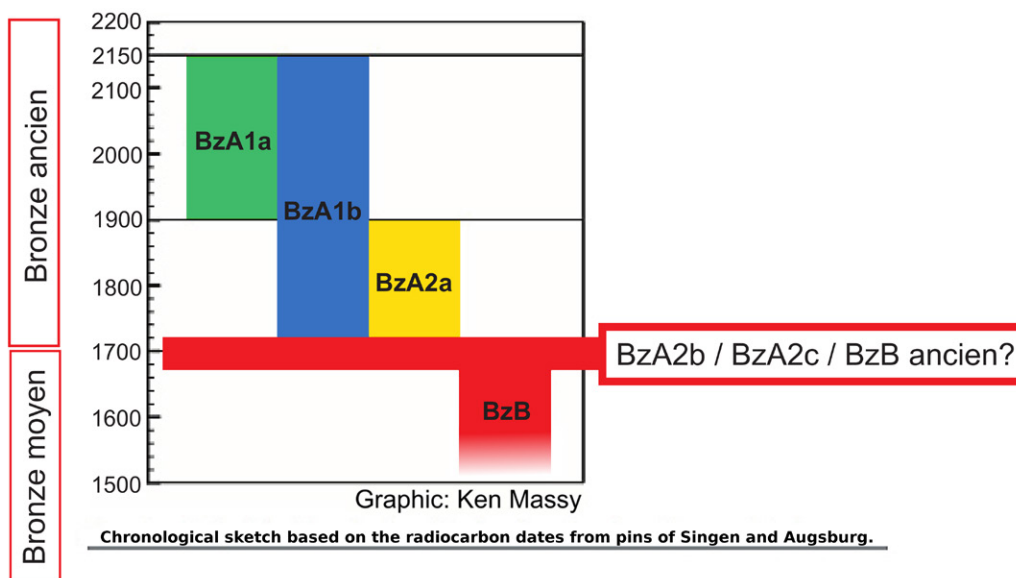


Figure 3. Graphique comparatif des phases de chronologie relative et absolue du Bronze ancien et du début du Bronze moyen proposé par Stockhammer *et al.* 2015 (fig. 7) avec, à droite, mention des phases supprimées.

de grossières lacunes typologiques et méthodologiques, cet article a reçu une certaine audience positive, qui révèle la fragilité de notre discipline.

La région choisie est la vallée du Lech en Bavière, qui a livré 390 sépultures du Néolithique final et du Bronze ancien (Massy 2018) : 140 individus ont été datés par  $^{14}\text{C}$ , dont une série de tombes avec des types d'épingles considérés comme des fossiles directeurs. Malgré sa richesse, le corpus présente un énorme biais. En effet, dans cette région se développe au BzA1–A2a la culture de Straubing ; elle livre beaucoup de sépultures, souvent accompagnées de mobilier funéraire. Par contre aux phases suivantes – BzA2b, BzA2c et BzB ancien – il n'y a quasiment plus de sépultures et le mobilier funéraire se fait rare. Les dépôts augmentent et les habitats, notamment ceux de hauteur, sont mieux connus, mais ni les uns ni les autres ne sont pris en compte dans l'étude. Ces données bavaroises sont complétées par des sépultures datées par  $^{14}\text{C}$  de la nécropole de Singen – Am Hohentwiel (Kr. Konstanz, D) (Krause 1988), qui remonte aux mêmes phases anciennes. À ce corpus inadéquat se rajoute une méconnaissance de la chronotypologie : certains types de la fin du Bronze ancien sont en effet attribués par les auteurs à la première phase du Bronze moyen.

Le tableau des dates  $^{14}\text{C}$  qui figure dans l'article de Stockhammer *et al.* 2015 montre que la démonstration des auteurs repose sur peu à très peu de datations, une seule par tombe et moins de dix par type d'épingle, parfois une seule date par type pour les plus récents (Fig. 4) ; les fourchettes statistiques sont larges, ce qui est la caractéristique fréquente des dates  $^{14}\text{C}$ . D'autre part, il y a inadéquation du corpus pour répondre à la question du passage du Bronze ancien au Bronze moyen, car les données présentées concernent essentiellement les types du BzA1, qui sont les plus anciens. Le résultat est un large recoupement de dates qui suggèrent que les cycles ancien et classique du Bronze ancien se développent entre environ 2200 et 1700 avant J.-C., ce qui est connu depuis longtemps. Quant au cycle final du Bronze ancien, il est attribué au Bronze moyen à cause de données très lacunaires, mais aussi par une méconnaissance de la typologie. Ainsi l'épingle à tête enroulée et tige torsadée n'est pas un type du Bronze moyen, mais du BzA2b–c présent dans des ensembles datés par la dendrochronologie, notamment à Wädenswil – Vor der Au (canton de Zürich, CH) (1607–1598 avant J.-C., Conscience *et al.* 2005, pl. 19,409).

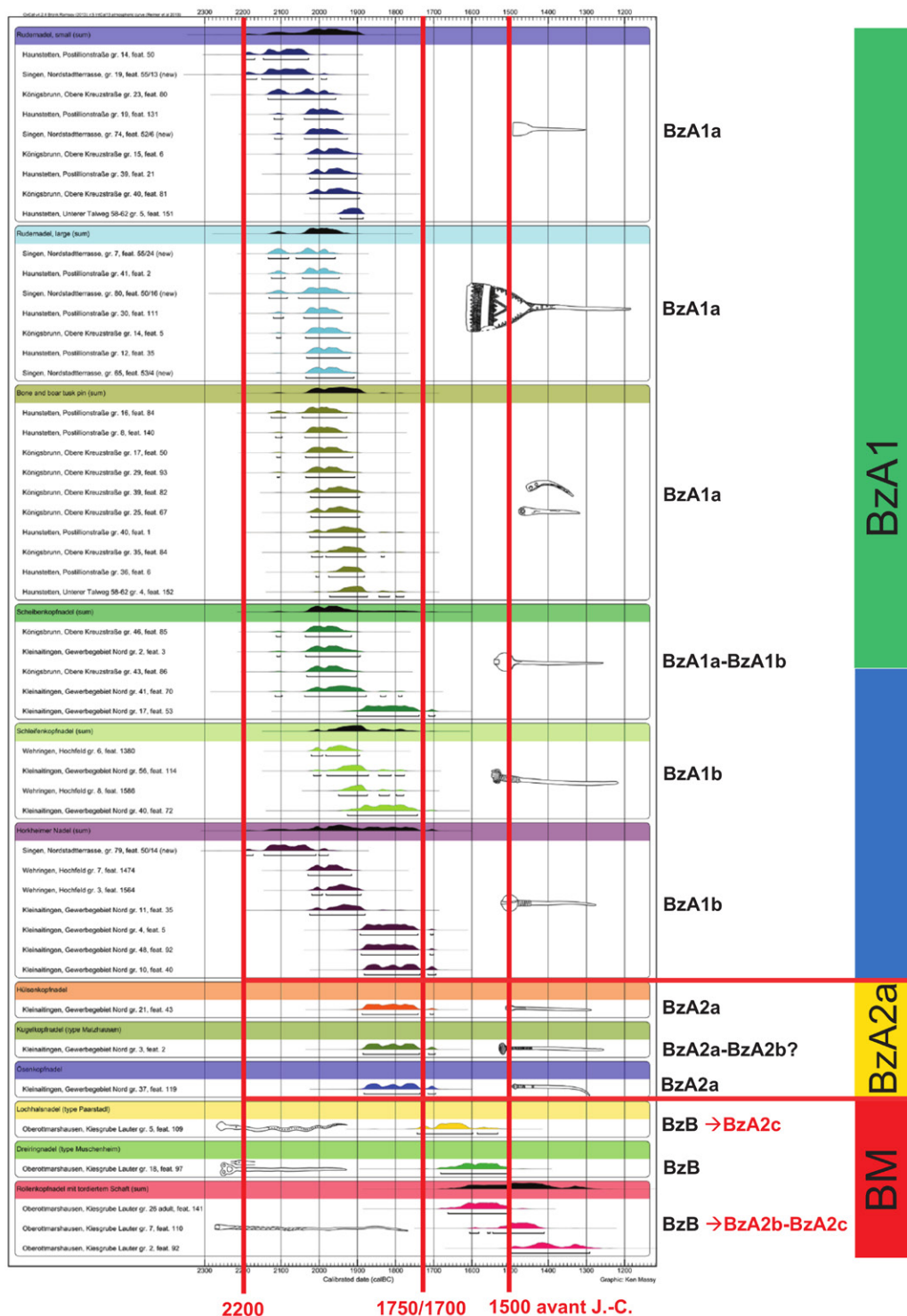


Figure 4. Tableau des dates <sup>14</sup>C avec indication des phases de chronologie relative auxquelles sont attribuées les types d'épingle, en rouge les phases corrigées (d'après Stockhammer *et al.* 2015, fig. 6, modifiée).

Au-delà des biais méthodologiques déjà mentionnés, cette étude montre finalement que le radiocarbone est peu adapté à ce genre de problématique, notamment aussi parce que du point de vue technique la courbe du radiocarbone est à cette période très sinueuse et ne fournit que des fourchettes larges.

### *La fin du Bronze ancien selon Massy et Stockhammer 2019*

Deux des auteurs de l'article de 2015 publient en 2019 un nouvel article sur la même thématique (Massy et Stockhammer 2019). La méthodologie est tout aussi lacunaire, les auteurs n'ayant toujours pas compris deux choses :

1. dans une région donnée, on ne trouve pas forcément toutes les périodes et toutes les catégories de sites ;
2. selon les régions, il existe des variantes régionales des types, qu'il faut savoir identifier, et leur datation n'est pas forcément synchrone. Si on prend l'exemple des épingles à bélière, les modèles classiques apparaissent dans le complexe d'Ūnétique et ils sont plus anciens que les variantes suisses qui leur succèdent à la phase suivante. C'est aussi le cas des épingles à tête discoïde, etc.

### Le lien entre chronologie relative et chronologie absolue

Le découpage de la chronologie relative est artificiel, mais il permet de situer les découvertes les unes par rapport aux autres et dans le temps. Ce découpage est très utile voire indispensable pour

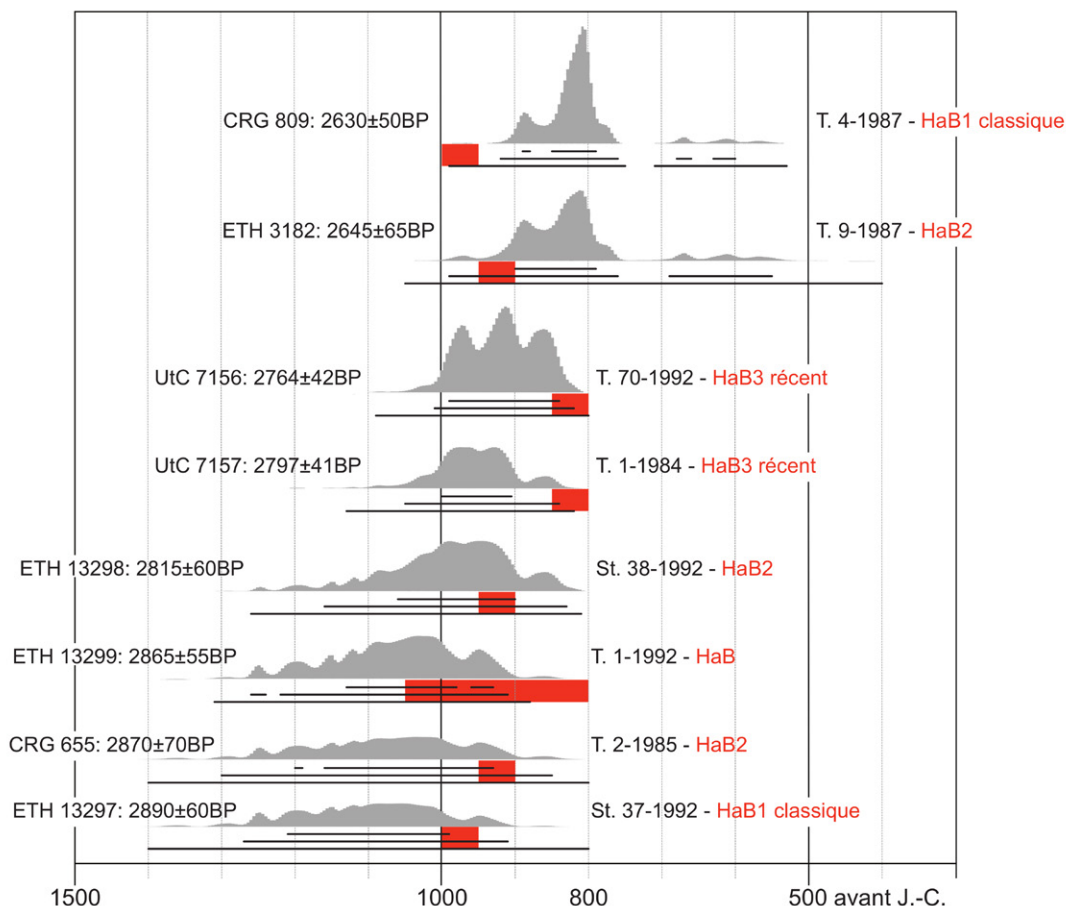


Figure 5. Lausanne – Vidy et Pully – Chamblandes (canton de Vaud, CH). Histogrammes des dates <sup>14</sup>C avec indication des phases de chronologie relative (carrés rouges) (T. : tombe ; St. : structure) (d'après David-Elbiali et Moinat 2005, fig. 3, modifiée).

ordonner les découvertes. Historiquement, les informations de la chronologie relative et celles de la chronologie absolue sont liées et doivent le rester. La présence d'un fossile directeur ne permet pas toujours de dater correctement un ensemble, mais une unique datation <sup>14</sup>C ne permet quasiment jamais de situer correctement un ensemble dans le temps. En effet, on remarque fréquemment un décalage entre les attributions de chronologie relative et les datations <sup>14</sup>C.

Prenons l'exemple des nécropoles Bronze final de Lausanne – Vidy et Pully – Chamblandes dans le canton de Vaud en Suisse (Moinat *et al.* 2003) ! Seize dates <sup>14</sup>C ont été réalisées sur les structures. Huit sépultures à crémation, datées par le radiocarbone, ont également pu être attribuées à une phase de chronologie relative grâce au mobilier funéraire – métal et céramique – et au rituel employé. Ces dates sont présentées dans la figure 5. Les traits noirs sous les histogrammes montrent l'extension totale des dates à 1, 2 et 3 sigmas, alors que les carrés rouges correspondent à l'attribution chronotypologique. La phase de chronologie relative ne correspond jamais à la probabilité maximale de la date radiocarbone, mais elle se situe toujours en léger ou fort décalage. Or l'attribution chronotypologique est ici particulièrement fiable, car elle a été établie sur la base de sériations de tombes (Sperber 1987), puis elle a été affinée à l'aide de mobiliers analogues découverts en contexte palafittique en tenant compte des dates dendrochronologiques disponibles.

**Conclusion**

Une attribution chronologique sérieuse ne se fait jamais à partir d'un seul objet, mais du recoupement de l'ensemble des informations disponibles. Dans le cas d'une sépulture, par exemple, il faut examiner la totalité du mobilier funéraire, l'architecture, le rituel, la position dans la nécropole et bien sûr les dates absolues s'il y en a. C'est le recoupement de toutes les données qui permet l'attribution la plus correcte. On est donc loin de la datation par <sup>14</sup>C d'un type d'épingle mal identifié.

La datation est une prérogative de l'archéologue qui repose sur une combinaison de chronotypologie, de chronostratigraphie et de chronologie absolue. Ce cadre calendaire est développé depuis plus d'un siècle et même s'il doit encore être amélioré, il est suffisamment étayé pour ne pas nécessiter des remises en question comme celle qui a été évoquée ci-dessus de la part de Stockhammer *et al.*, qui n'amènent que de la confusion et qui reposent sur des arguments lacunaires voire erronés. La figure 6 met en parallèle les modifications entraînées par l'article susmentionné par rapport à la chronologie fondée sur l'évolution du système de P. Reinecke.

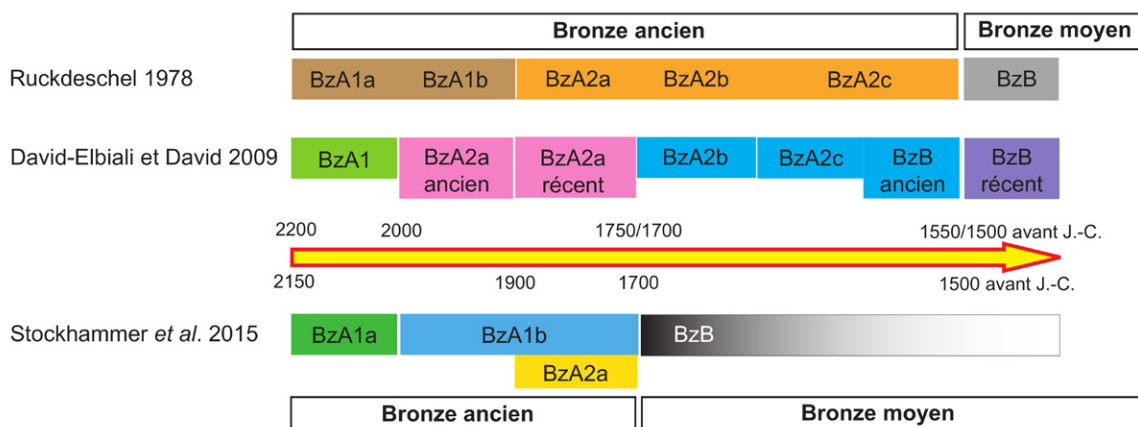


Figure 6. Comparaison de trois systèmes chronologiques proposant des phases de chronologie relative et absolue du Bronze ancien et du début du Bronze moyen en Europe centrale. Les deux du haut (d'après Ruckdeschel 1978 ; David-Elbiali et David 2009) constituent une amélioration du système de P. Reinecke ; celui du bas résume la proposition de Stockhammer *et al.* (2015).

Beaucoup de thèmes requièrent l'attention des archéologues qui s'intéressent à l'âge du Bronze et des attributions chronologiques correctes constituent les prémices incontournables de travaux de qualité.

Si le cadre calendaire mérite d'être développé dans la continuité pour assurer une cohérence entre les corpus récoltés, le récit historique est très dépendant de la période durant laquelle il est élaboré. L'interprétation de certaines données archéologiques peut ainsi se modifier radicalement, ce qui témoigne de l'évolution de nos sociétés et pas toujours d'une compréhension améliorée de celles du passé.

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# Between defensive and symbolic. ‘Fortified’ hilltop sites in the Irish Late Bronze Age

Dirk Brandherm<sup>1</sup>, Cormac McSparron<sup>2</sup> and Linda Boutoille<sup>3</sup>

## Abstract

A sharp increase in the number of so-called hillforts in many parts of Late Bronze Age Europe has usually been considered a key indicator of rising levels of intergroup violence during the final centuries of the second millennium BC. With over a hundred Late Bronze Age hillforts, Ireland provides an excellent case-study region to test this hypothesis. What little hard evidence we have for the function of these sites only lends very limited direct support to viewing increased levels of intergroup violence as a dominant factor in Irish Bronze Age society and rather suggests that other phenomena, such as regular communal gatherings and feasting activities, may have played an equally or even more significant role in the social life of Irish Late Bronze Age communities, ultimately driving the appearance of – both enclosed and unenclosed – hilltop sites during the final centuries of the second millennium BC.

## Keywords

IRELAND, BRONZE AGE, HILLFORT, WARFARE.

## Résumé

Une forte augmentation du nombre de sites de hauteur enclos dans de nombreuses régions d'Europe au Bronze final a habituellement été considérée comme un indicateur clé de l'augmentation des niveaux de violence intergroupes au cours des derniers siècles du deuxième millénaire av. J.-C. Avec plus d'une centaine de hillforts du Bronze final, l'Irlande fournit une excellente région d'étude de cas pour tester cette hypothèse. Le peu de preuves tangibles dont nous disposons pour la fonction de ces sites en effet semble suggérer que la société de l'âge du Bronze irlandais ne peut être limitée au seul phénomène guerrier et que d'autres phénomènes, tels que les regroupements communautaires dans le cadre de festivités ou de célébrations, ont pu également jouer un rôle équivalent voir plus important dans la constitution de ces sociétés de la fin de l'âge du Bronze et ont pu générer des manifestations tels que le développement de ces sites.

## Mots-clé

IRLANDE, ÂGE DU BRONZE, SITE DE HAUTEUR, GUERRE.

## Introduction<sup>4</sup>

As far as the Irish Bronze Age is concerned, it has generally been taken for granted that the choice of location for hilltop settlement sites to a considerable extent was driven by defensive considerations and that any earthworks enclosing such sites were defensive in nature. Consequently, the emergence of enclosed hilltop sites in increasing numbers from the beginning of the Late Bronze Age has generally been viewed as an indicator of increased levels of intergroup violence, a notion that also draws on the development of bronze armour and weaponry and on the appearance of warrior imagery across much of Atlantic Europe at the time.

While defensive considerations in many instances may indeed have played a role in the choice of location and in the enclosure of hilltop sites in Late Bronze Age Ireland, an almost exclusive emphasis on the supposed defensive character of these sites has dominated the discussion of their function to such an extent that we have lost sight of the fact that in a large number of cases, defence might not have been their sole or primary function at all, and that they may rather have fulfilled

<sup>1</sup> Queen's University Belfast, School of Natural and Built Environment. d.brandherm@qub.ac.uk

<sup>2</sup> Queen's University Belfast, School of Natural and Built Environment. c.mcsparron@qub.ac.uk

<sup>3</sup> Queen's University Belfast, School of Natural and Built Environment. l.boutoille@qub.ac.uk

<sup>4</sup> The present paper constitutes an expanded version of a French-language contribution to the 2020 APRAB conference *Âge du Bronze, âge de guerre - Èta di u Bronzu, età di guerra* (Brandherm et al. forthcoming).

a broad range of different purposes. In this contribution, we aim at addressing some problems of the identification and categorization of Irish Bronze Age hilltop sites that have arisen from the preconceived notion of their defensive nature.

It is evident that not all sites which in the past have been identified as hillforts seem to possess a system of man-made defences, and for many of those sites which appear to have one, we would like to argue that the presence of what we conventionally categorize as a defensive system should not dominate our perception of the function of these sites, at least not to the extent that has been the case in the past. We certainly do not claim that there was no intergroup violence in Bronze Age Ireland. Clearly there was. What we would like to challenge is a narrative that depicts increased levels of intergroup violence as a central factor in the shaping of Irish Late Bronze Age society.

### **Problems of categorizing Irish hilltop sites**

At the beginning of the 1970s, B. Raftery (1972) established a typology of Irish hillforts which still provides the basis for categorizing these sites today and which also appears to have influenced similar systems for categorizing enclosed hilltop sites in other part of Late Bronze Age Europe (cf. Jockenhövel 1975: 46–47), notwithstanding a number of issues that plagued the approach underpinning Raftery's particular site typology from the outset. Based on c. 40 sites identified at the time, the relevant sites were categorized according to discernible surface features, either based on ground-based survey work or aerial photographs (Raftery 1972: 39). In his system of classification, Raftery defined three distinct classes of hillforts:

Class 1 sites feature a univallate system of enclosing features, either a stone or an earthen bank, which may or may not be accompanied by a ditch;

Class 2 sites are characterized by a multivallate system of more widely spaced enclosing features;

Class 3 sites correspond to inland promontory forts. It should be noted that sites located on coastal promontories were not included in this class by Raftery, despite there being a substantial number of these, between 280 and 508. Considering their large number, we know relatively little about coastal promontory forts as a category. Some of them have on occasion produced Bronze Age dates but they are mainly attributed to the medieval period (O'Brien and O'Driscoll 2017: 22–23; O'Driscoll *et al.* 2019: 84–85).

Raftery's site typology undoubtedly provides a very pragmatic labelling system, in that sites can be assigned to one of his three classes without the need for any excavation or survey data, based exclusively on site topography and on the visible remains of banks or ditches. In that respect it is very useful, as we still only have excavation data for a small minority of the relevant sites. However, this typology does not tell us anything about the function of those sites. We tend to assume a defensive purpose of their enclosing features based on the morphology of these features, but to begin with, this is really nothing more than an unproven assumption.

The logic of Raftery's – pragmatic but uninformative as far as site function is concerned – typology nevertheless continues to inform, even define, many premises of recent and ongoing 'hillfort' research. For example, the 'Atlas of Hillforts of Britain and Ireland' (Lock and Ralston 2017), based on this typology has done an excellent job of compiling a huge amount of remote sensing data, information from archives, etc. The quality of these data, however, can be very heterogeneous, something that is probably inevitable in this type of compilation. The inclusion of the British and Irish sites together in the same database creates further issues, as with a limited number of exceptions, hillforts in Britain are attributable to the later Iron Age, while very few Irish hillforts have produced any evidence of Iron Age occupation. Where dating evidence is available, the Irish sites included in the 'Atlas' have predominantly produced Late Bronze Age dates (O'Brien and

O'Driscoll 2017: 30–37; O'Driscoll 2019: table 1), although this does not mean that the enclosing elements at these sites necessarily all have to be contemporary with any Bronze Age occupation.

In this respect, the distribution of sites shown by the 'Atlas' (Lock and Ralston 2017), which would seem to indicate that Britain and Ireland were strewn with hillforts during the same chronological period, is quite misleading. Ireland in terms of the chronology of these sites aligns much more closely with developments on the Continent than in Britain (cf. Jockenhövel 1974: 21–23).

### The hilltop sites of Ireland

Despite the significant amount of survey and data collection work invested in the creation of relevant databases (Lock and Ralston 2017; O'Brien and O'Driscoll 2017; National Monuments Service n. d.), due to the fact that different projects in the past have employed different criteria to categorize sites, and also due to the fact that in the majority of cases reliable dating evidence is lacking, the number of Irish hillforts featuring a Bronze Age occupation remains difficult to establish with any degree of accuracy.

O'Brien and O'Driscoll (2017: 447–495) estimate the number of Irish hillforts currently known at 108, excluding sites of less than one hectare and coastal promontory forts. They count 65 Class 1 sites, 38 Class 2 sites and five Class 3 sites.<sup>5</sup> In contrast, the 'Atlas of Hillforts of Britain and Ireland' (Lock and Ralston 2017) lists 507 Irish sites, including both sites of less than one hectare and coastal promontory forts, while at the same time covering a much wider chronological span, from the Neolithic to the medieval period. Of these, 16 sites are securely attributable to the Late Bronze Age, a total of 62 sites belong to Class 3, and 485 out of the total of 507 sites have no available dating evidence. Finally, the online database established by the National Monuments Service (n. d.) for the Republic of Ireland lists 769 sites, including 73 hillforts of Class 1 and 2 over one hectare, 68 inland promontory forts (Class 3), 508 coastal promontory forts, and 120 enclosed hilltop sites with an area of less than one hectare and of uncertain chronology.

Irish hilltop sites thus vary widely in their size, mostly between 1 and 10 hectares, but both smaller and considerably larger sites are known, with Spinans Hill 2 in County Wicklow reaching a surface area of 131ha (Fig. 1). A similar degree of variation is found when it comes to the elevation of these sites, mostly between 100 and 300 meters, although some sites have a higher elevation than that. Many have been identified as occupying a strategic position, although the criteria for making this determination are often not very clear, and in many instances "strategic position" simply seems to mean that they are located on a hill, which forms part of the definition of all of these sites. An important feature shared by the majority of Irish hillforts is the lack of internal structures. O'Brien and O'Driscoll (2017: 29; O'Driscoll *et al.* 2018: 82) estimate that there are 31 sites with structures within the enclosed perimeter, and only nine sites that have more than ten internal structures representing a Bronze Age occupation. Some hillforts have produced practically no archaeological material, despite having been subject to extensive excavation, such as at Ballylin (Co. Limerick), for which the effectiveness of the defensive system has been called into question (O'Brien *et al.* 2016; O'Brien and O'Driscoll 2017: 142–159; O'Driscoll 2017: 8).

More than a third of enclosed Irish hilltop sites incorporate some kind of burial monument within their perimeter (O'Brien and O'Driscoll 2017: 29; O'Driscoll *et al.* 2019: 82). In many instances these monuments appear to predate the construction of any enclosing features, and the fact that those locations were chosen thus might be seen as indicative of an intention to use real or fictitious ancestral ties as a means of symbolically legitimizing power and control over a territory.

<sup>5</sup> The attentive reader may notice that the inventory established by O'Brien and O'Driscoll (2017: 447–495) actually lists six Class 3 sites (nos 16, 24, 30, 42, 69, 81), while only five appear in the accompanying distribution map. This is probably due to a typing error in their listing; the site of Commons of Lloyd, Co. Meath (no. 30) is really a Class 2 site.

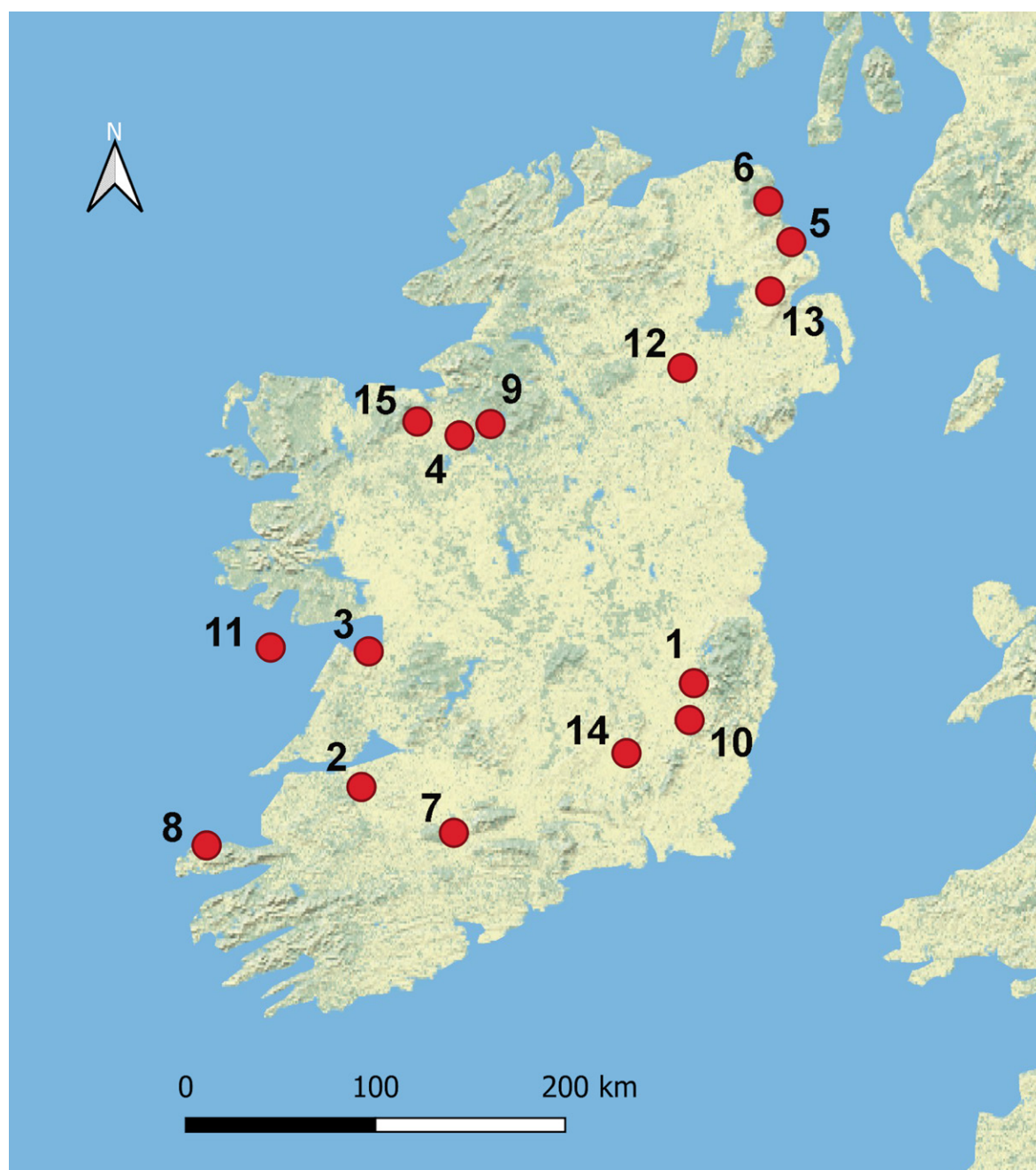


Figure 1. Location of sites mentioned in the text: 1 – Spinans Hill/Brusselstown Ring, Co. Wicklow; 2 – Ballylin, Co. Limerick; 3 – Turlough Hill, Co. Clare; 4 – Mullaghfarna, Co. Sligo; 5 – Knockdhu, Co. Antrim; 6 – Lurigethan, Co. Antrim; 7 – Gastle Gale, Co. Limerick; 8 – Faha, Co. Kerry; 9 – Doon Roeree, Co. Roscommon; 10 – Rathgall, Co. Wicklow; 11 – Dun Aonghasa, Co. Galway; 12 – Haughey’s Fort, Co. Armagh; 13 – Lyles Hill, Co. Antrim; 14 – Freestone Hill, Co. Kilkenny; 15 – Knocknashee, Co. Sligo (map by the authors).

Finally, most fieldwork on Irish hilltop sites over the past two decades has been conducted by University College Cork (O’Brien and O’Driscoll 2017: 126), mainly focussing on Class 2 hillforts in the southern half of the island of Ireland, where these are also more frequent, and it remains to be seen to what extent the conclusions drawn from those studies are fully applicable to the northern half of the island, where Class 1 sites dominate.

Other research, conducted by S. Bergh (2015; 2016) from NUI Galway has demonstrated the presence in the west and north-west of the island of a type of hilltop site featuring unenclosed clusters of roundhouse footprints. The main examples of this group so far are Turlough Hill (Co. Clare), with around 140 roundhouses (Bergh 2016; O'Malduin *et al.* 2021), Mullaghfarna (Co. Sligo), with around 150 roundhouses (Bergh 2015), and Knocknashee (Co. Sligo), with more than 50 roundhouses (Brandherm *et al.* 2018). Both Turlough Hill and Knocknashee in the past have misleadingly been categorized as Class 1 hillforts (O'Brien and O'Driscoll 2017: 493; Brandherm *et al.* 2021: 51–53); Mullaghfarna has long been interpreted as a Neolithic settlement, related to the construction of the cairn which dominates the site (Bergh 2015) and had therefore not been included in any inventory of Irish hillforts.

### ***Univallate enclosures***

Class 1 sites are the most numerous category of hillforts in Ireland, but they are also the group for which we have the least information about the nature of their occupation or their function, and in that sense they constitute the most problematic category. They can be located in quite variable topographical situations. Two examples that have been extensively excavated, Lyles Hill (Co. Antrim) and Freestone Hill (Co. Kilkenny) are situated on domed hills at elevations of 219m and 134m respectively.

Due to the fieldwork undertaken at those two sites we have more information for them than for most other Class 1 hillforts. The earthen banks enclosing these two hilltop sites are securely dated to the Late Bronze Age, but there is no evidence of contemporary structures within the enclosed areas, and once again this absence appears conspicuous. Instead, Lyles Hill yielded abundant Neolithic material, including the remains of a megalithic tomb (Gibson and Simpson 1987; Mallory and McNeil 1991: 33–36; Waddell 2010: 45–46; Lock and Ralston 2017: NI 0805; O'Brien and O'Driscoll 2017: 485). Freestone Hill includes a large Early Bronze Age cairn and has also produced a considerable amount of other Early Bronze Age as well as Iron Age material. A black layer containing pottery, glass beads and animal bones constitutes what might be considered a Late Bronze Age occupation level, or alternatively a midden deposit stemming from repeated use of the site for feasting activities (Raftery 1969; Waddell 2010: 285–286; O'Floinn 2000; Lock and Ralston 2017: IR 0678; O'Brien and O'Driscoll 2017: 468). It is noteworthy that at Freestone Hill the Late Bronze Age enclosure respects the Early Bronze Age cairn, while the subsequent Iron Age activity at the site caused it considerable damage.

A number of other Class 1 sites also include earlier burial monuments. This appears to be an important characteristic of many sites particularly in this category and may relate to their function. One could of course argue that the inclusion of earlier burial monuments might simply be due to the fact that the builders of Late Bronze Age so-called hillforts chose similar topographical positions as the builders of many Neolithic tombs and Early Bronze Age cairns, and that they did so for entirely unrelated reasons rather than actively seeking spatial proximity to earlier monuments. However, the large number of instances of such proximity, along with the fact that the relevant Late Bronze Age structures invariably seem to respect the earlier monuments, would appear to suggest that this proximity is not due to coincidence but may indeed have been actively sought by Late Bronze Age communities. If that was indeed the case, it would undermine the notion that the addition of enclosing earthworks to these sites in the Late Bronze Age was primarily motivated by defensive considerations.

### ***Multivallate enclosures***

Hilltop sites featuring multivallate enclosures are considerably less numerous than univallate hilltop sites. As indicated above, O'Brien and O'Driscoll (2017, 447–495) only count 38 Class 2 sites larger than one hectare in area, and very few smaller sites feature a system of widely spaced

enclosing features. As was the case with their univallate counterparts, multivallate sites vary greatly in size and in the details of their topographical setting, but it is perhaps interesting to note that the small number of hilltop sites that have produced evidence of craft production of elite objects invariably belong to this category, Raftery's Class 2. Both Rathgall in County Wicklow (Raftery 1970; 1971; Becker 2010; Waddell 2010: 285–286; O'Brien 2017: 14–15) and Haughey's Fort in County Armagh (Mallory 1995; Mallory and Bahan 2014; O'Brien 2017), as well as the multivallate coastal promontory site of Dun Aonghasa in County Galway (Cotter 2012a; 2012b; McCormick and Murphy 2012: 157–158; 166; O'Brien and O'Driscoll 2017: 34–35; O'Driscoll 2017: 12) have produced evidence for the production of bronze weaponry and gold objects, Rathgall apparently also for the working of exotic materials.

Rathgall is situated at an elevation of 136m above sea level, on a gentle hill rising c. 40m above the surrounding countryside. Research carried out at the site by Raftery in the 1970s (Raftery 1970; 1971; Waddell 2010: 270–273; O'Brien 2017: 14–15; O'Brien and O'Driscoll 2017: 35–36) has demonstrated the complexity of the site, with at least one Middle and Late Bronze Age episode of occupation (1400–1000 BC) and a subsequent medieval phase. The site features four concentric stone ramparts, enclosing an area of 7.3ha. Not all the ramparts are contemporary. The innermost ring dates to the medieval period, while the other three are likely linked to the Bronze Age occupation, although their exact chronology remains poorly understood. The excavation of the central enclosure has yielded traces of metalwork production, including a substantial number of clay mould fragments for manufacturing bronze weapons and tools, as well as an unusual funerary complex (Raftery 1973). The finds, which includes glass beads, numerous metal tools, lignite bracelets, amber fragments, stone implements as well as gold objects, seem to attest to the high social status of the inhabitants of the site. The significant number of casting moulds for bronze weapons from the site might be taken to suggest that it was a production centre for the paraphernalia of a warrior elite, and O'Brien and O'Driscoll (2017: 401–414) by extension attempted to link Class 2 sites via the spatial distribution of weapon depositions, such as swords and spearheads, to the practice of warfare. However, as J. Waddell (2010: 286) has pointed out, the presence at Rathgall of evidence for weapon production and elite consumption, as well as the presence of a funerary complex associated with the possible remains of a cremation area and the presence of a metalwork deposition associated with human remains set this site very much apart from other hilltop enclosures of the Late Bronze Age in Ireland, even if some of these elements can be found individually at a small number of other coeval sites.

One of those other sites is Haughey's Fort, situated on a drumlin elevated above the surrounding plain by approximately 20m, at 74m above sea level (Fig. 2). Three widely spaced ditches enclose an internal area of 360m<sup>2</sup> and have produced radiocarbon dates clustering around 1150–1050 cal BC. The interior features a series of structures, including pits and three posthole alignments (Mallory and Bahan 2014). The pits and postholes have revealed traces of metalworking activity, relating to both copper alloys (Brandherm 2014) and gold (Warner 2014). The site also produced evidence of feasting in the form of a very large amount of animal bones. An 18m section of the ditch yielded around 3000 animal bones, with a minimum number of individuals of 69 cattle, 43 pigs, six dogs, four goats and three horses (Murphy and McCormick 1996; Mallory and Bahan 2014: 25–26; O'Brien and O'Driscoll 2017: 416). The study of the carpological remains from Haughey's Fort revealed the absence of cereal husks, indicating that the cereals found were not processed at the site itself (McClatchie 2014). Recent geophysical survey work at the site has identified what appears to be evidence of an dense roundhouse occupation, not necessarily all of it domestic in nature (O'Driscoll, pers. comm.). The immediate vicinity of Haughey's Fort features several coeval sites with a ritual function, including a man-made sacrificial pond at King's Stables (Lynn 1977) and the Tamlaght hoard, which included bronze vessels of the Fuchsstadt and Jenišovice types, imported from central Europe (Warner 2006).

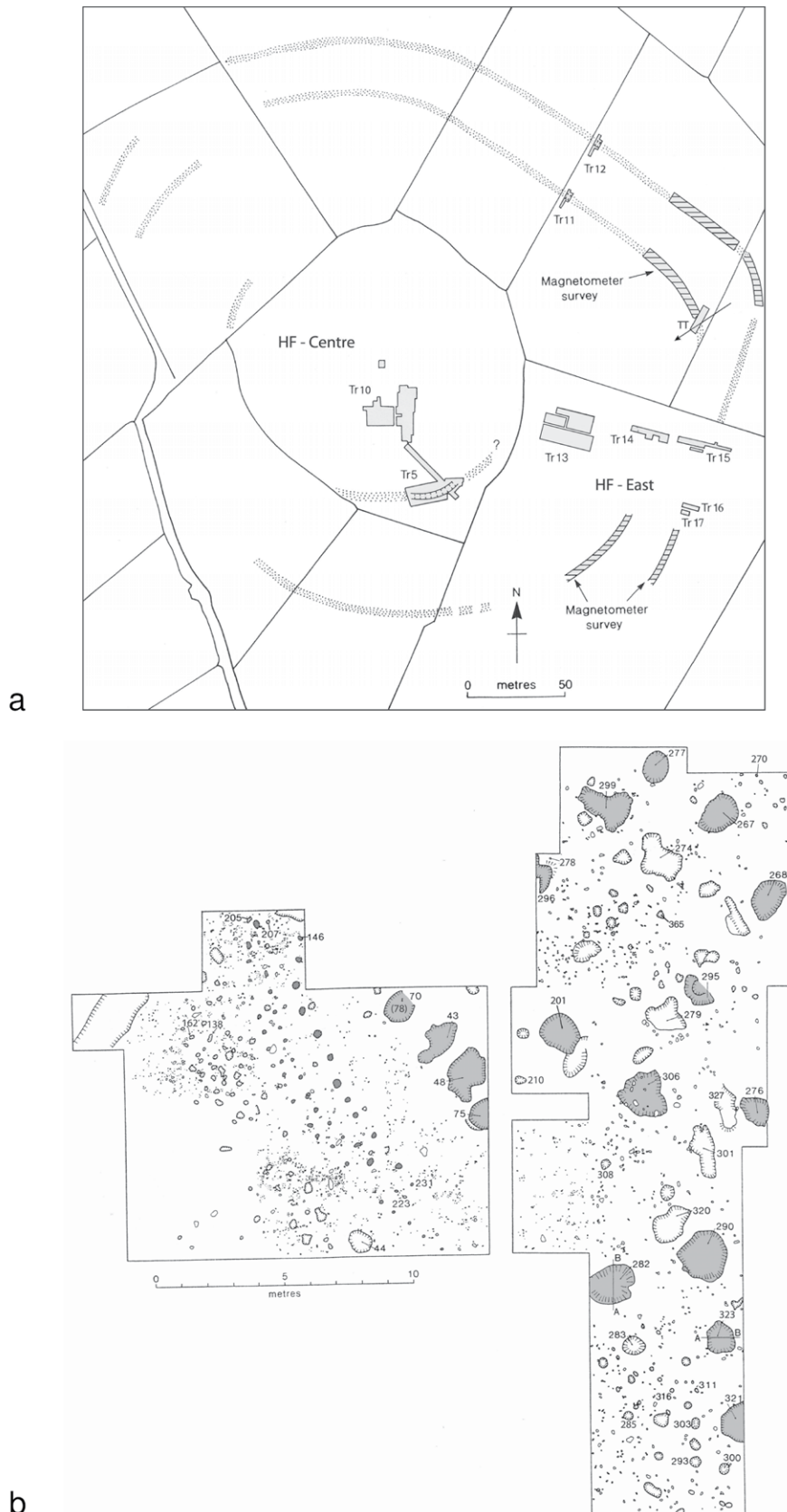


Figure 2. Haughey's Fort: a - Overview plan of the site; b - Plan of central area that has produced evidence of craft activities (after Mallory and Bhan 2014: figs 1 and 2).

A characteristic that both Rathgall and Haughey's Fort have in common is that they are located on gentle domed hills which do not occupy a particularly strategic or defensible position. This raises the question if the presence of multiple, widely spaced lines of enclosing elements should perhaps be understood primarily as the symbolic expression of a specific status of these sites, rather than in purely defensive terms. Already J. Mallory and G. Baban (2014: 25) pointed out that, given the lack of evidence for the use of projectile weapons in the Irish Late Bronze Age, the wide spacing of multiple lines of 'ramparts' in Class 2 sites may not have arisen out of defensive considerations. Like a number of other authors (Mallory and McNeil 1991: 118; Hawkes 2015; 2018) they instead suggested that the appearance of these sites should be seen as closely related to the adoption of practices linked to communal gatherings in connection with feasting activities.

We also find an association between craft production and feasting practices at the multivallate site of Dun Aonghasa in County Galway, although the latter is situated in a starkly different topographical setting from Rathgall and Haughey's Fort (Cotter 2012a; McCormick and Murphy 2012: 157–158, 166; O'Brien and O'Driscoll 2017: 34–35; O'Driscoll 2017: 12).

No other Irish hillforts so far seem to have produced clear evidence of feasting practices, although absence of evidence here should not necessarily be taken as evidence of absence, and in many cases relevant evidence might simply remain undetected due to lack of excavation. On the other hand, we know of more than 1000 *fulachtaí fia*<sup>6</sup> scattered across Ireland, which appear to attest to a widespread practice of communal feasting, beginning in the Neolithic and intensifying during the Bronze Age (Hawkes 2015; 2018). The *fulachtaí fia* seem to indicate that communal feasting was practised at a considerable scale in settings other than hilltop sites, so this practice would not necessarily and exclusively have been linked to hillforts.

In consequence, while some Class 2 hillforts do indeed seem to have served for communal gatherings in connection with feasting practices and as centres for specialized craft production, this is perhaps not the case for all sites of this class, and as J. Waddell (2010: 286) has pointed out for Rathgall, those functions might only have been fulfilled by a small minority of sites from this category. Further fieldwork is clearly needed to shed additional light on this question.

### ***Inland promontory sites***

Sites situated on inland promontories closed off by an earthen or stone bank or a system of banks and ditches correspond to Raftery's Class 3. As mentioned above, coastal promontory sites are not included in that category. According to the 'Atlas of Hillforts', currently 62 inland promontory sites have been identified in Ireland (Lock and Ralston, 2017). On average they are much smaller than sites of the previous two categories.

O'Driscoll and O'Brien (2017: 22) only count five inland promontory sites whose surface area exceeds one hectare. Of these, two feature an internal roundhouse occupation, one incorporates the remains of a small cairn, and the remaining two do not seem to possess any internal structures (O'Brien and O'Driscoll 2017, nos 16, 24, 42, 69, 81). The two sites featuring clear signs of an internal occupation are Knockdhu and Lurigethan, both in County Antrim.

So far only Knockdhu has been the subject of archaeological fieldwork, in the form of an excavation campaign (MacDonald 2016) and a LIDAR survey (McNeary 2014) in 2008 and 2014 respectively that identified a closely spaced trivallate system of banks and ditches delimiting an area of c. 8ha, including close to 90 roundhouse footprints (Fig. 3). The excavation firmly established a Late Bronze Age date both for the trivallate defences and for most of the small sample of partially excavated roundhouses, although one of the houses also produced evidence for a Late Neolithic/

<sup>6</sup> Burnt mounds or *fulachtaí fia* (sing. *fulacht fiadh*) are defined as accumulations of charcoal and burnt stones, constituting the remains of structures used for cooking food by immersing heated stones in a pool of water to bring it to the boil.

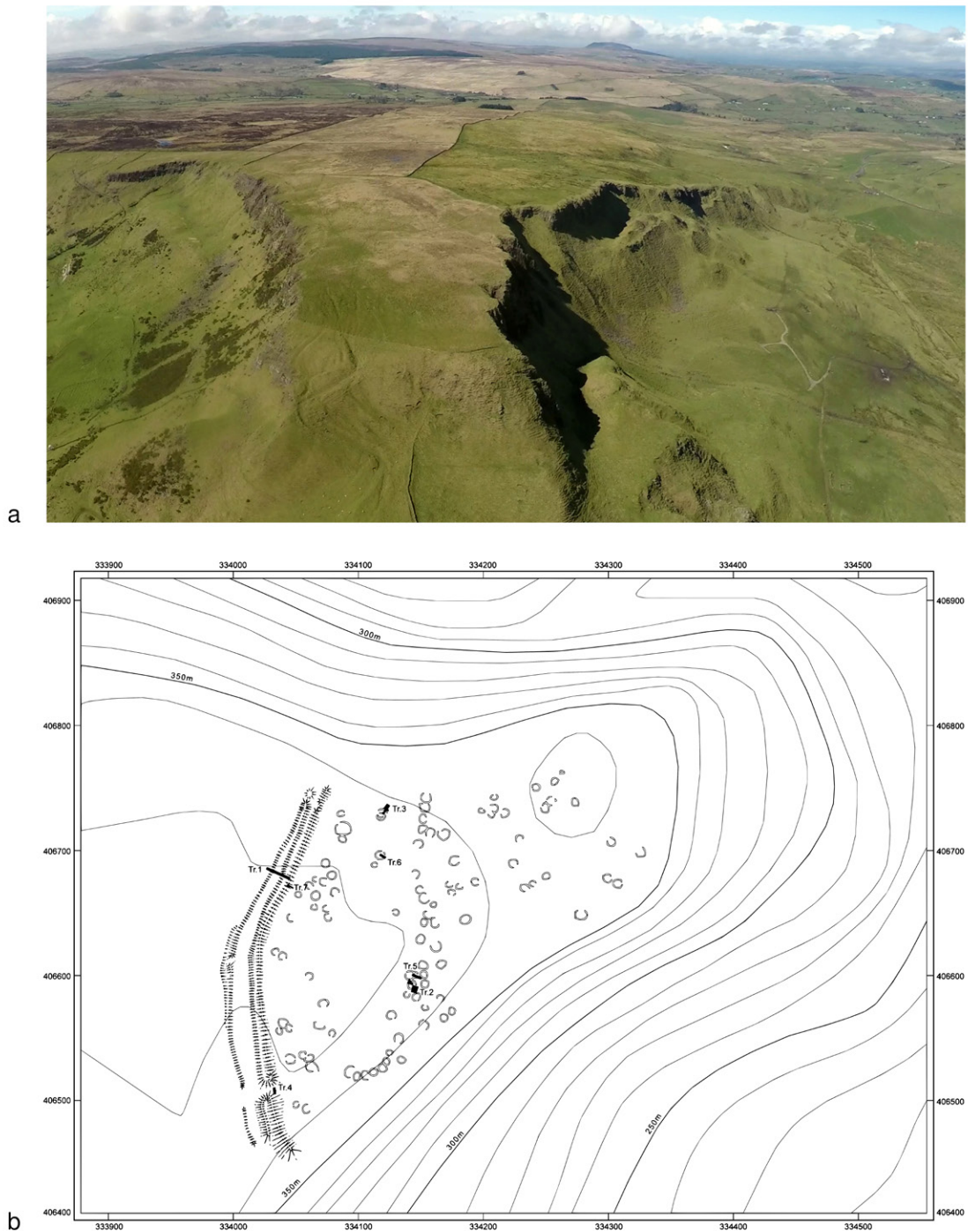


Figure 3. Knockdhu: a – Site seen from the East (ShutterSpeed Ireland); b – Overview plan of the site indicating the position of bank-and-ditch system and roundhouse footprints (after Macdonald 2016: fig. 1).

Early Bronze Age phase (MacDonald 2016: 44). With the exception of a lithic assemblage testifying to knapping activities associated with some of the roundhouses, no artefacts have been discovered at the site, and due to the acid nature of the soils no faunal remains were found to have been preserved (MacDonald 2016: 43).

The site of Lurigethan (Lock and Ralston 2017: NI0807; O’Brien and O’Driscoll 2017: 483 no. 81), which to date has not been excavated, nor surveyed in any detail, features a surface area of 9.7ha,

enclosed by a complex system of up to six closely spaced banks and four ditches, forming three lines of bank-ditch-counterscarp systems that block access from the southwest. A number of what appear to be roundhouse footprints are clearly visible in the available aerial and satellite imagery, although ground-based work would be required to confirm their nature.

Compared to Class 2 sites in particular, which are predominantly located on rather gentle elevations, the choice of location of the larger inland promontory sites presents itself as much more dramatic. The five Class 3 sites included in O'Brien's and O'Driscoll's inventory are positioned at elevations ranging from 319m, for Castle Gale (Co. Limerick) to 822m for the site of Faha (Co. Kerry). The Knockdu and Lurigethan sites are positioned at elevations of 362m and 343m respectively.

A similarly dominant topographical position cannot be claimed for most other inland promontory sites, located either in river bends or on low hills, and whose defensive nature in some instances appears questionable, which is, however, only one of the reasons why O'Brien and O'Driscoll (2017: 22) do not include them in their inventory of Bronze Age hillforts. For example, the site of Doon Roeree, Greaghmagh (Co. Roscommon) positioned at an elevation of 230m, above the confluence of two rivers, and included in the 'Atlas of Hillforts of Britain and Ireland' (Lock and Ralston 2017: IR1088), is not included in O'Brien's and O'Driscoll's inventory simply because it only covers an area of 0.9ha.

This raises the question of what should be considered to be a dominant topographic position. From what elevation above the surrounding countryside is a location to be considered dominant or 'strategic'? What are the physical characteristics that make it defensive in any meaningful sense of that term? For example, the site of Doon Roeree is described as a rectangular inland promontory fort bounded by steep, 20m high slopes, projecting towards the confluence of two river systems at the east, south and west, with an earthen bank and external ditch to the north (Lock and Ralston, 2017, IR1088). In this case, do the river courses in combination with the steep slopes not provide excellent natural defences on par with those of much more formidably situated sites?

In any case, even some of those sites that at first glance seem to be among the most formidable are not completely impregnable and lack defences on slopes that, while making for a rather steep ascend, could still be climbed holding weapons, as in the case of Lurigethan. The defensive value of these sites thus very much depends, as one might expect, on the social conventions that governed the behaviour of the parties involved in armed conflicts at the time.

### ***Unenclosed hilltop sites***

Among the sites conventionally labelled as 'hillforts' are several which do not appear to have any enclosing elements or man-made defences, and which therefore should not be included in that category. The best-known examples of this type of site are probably Knocknashee (Co. Sligo) and Turlough Hill (Co. Clare), both located in the west of Ireland, which is perhaps not a coincidence.

In the specialist literature, Knocknashee has normally been categorized as a Class 1 hillfort (O'Brien and O'Driscoll 2017: 479), sometimes even as a Class 2 site (Condit and Gibbons 1991: 9; Condit *et al.* 1991: 61). According to descriptions based on visual observations made as part of the survey that originally identified the site as a hillfort, the site would have a rampart 3.8m wide and 1.5m high, completely enclosing the hilltop plateau (Condit and Gibbons 1991: 9; Condit *et al.* 1991: 61; O'Brien and O'Driscoll 2017: 479). In addition to at least 51 circular structures, some of which have been partially excavated and securely identified as the footprints of Late Bronze Age roundhouses, the summit plateau of Knocknashee features a number of small enclosures and two large Neolithic cairns (Brandherm *et al.* 2018; 2020).

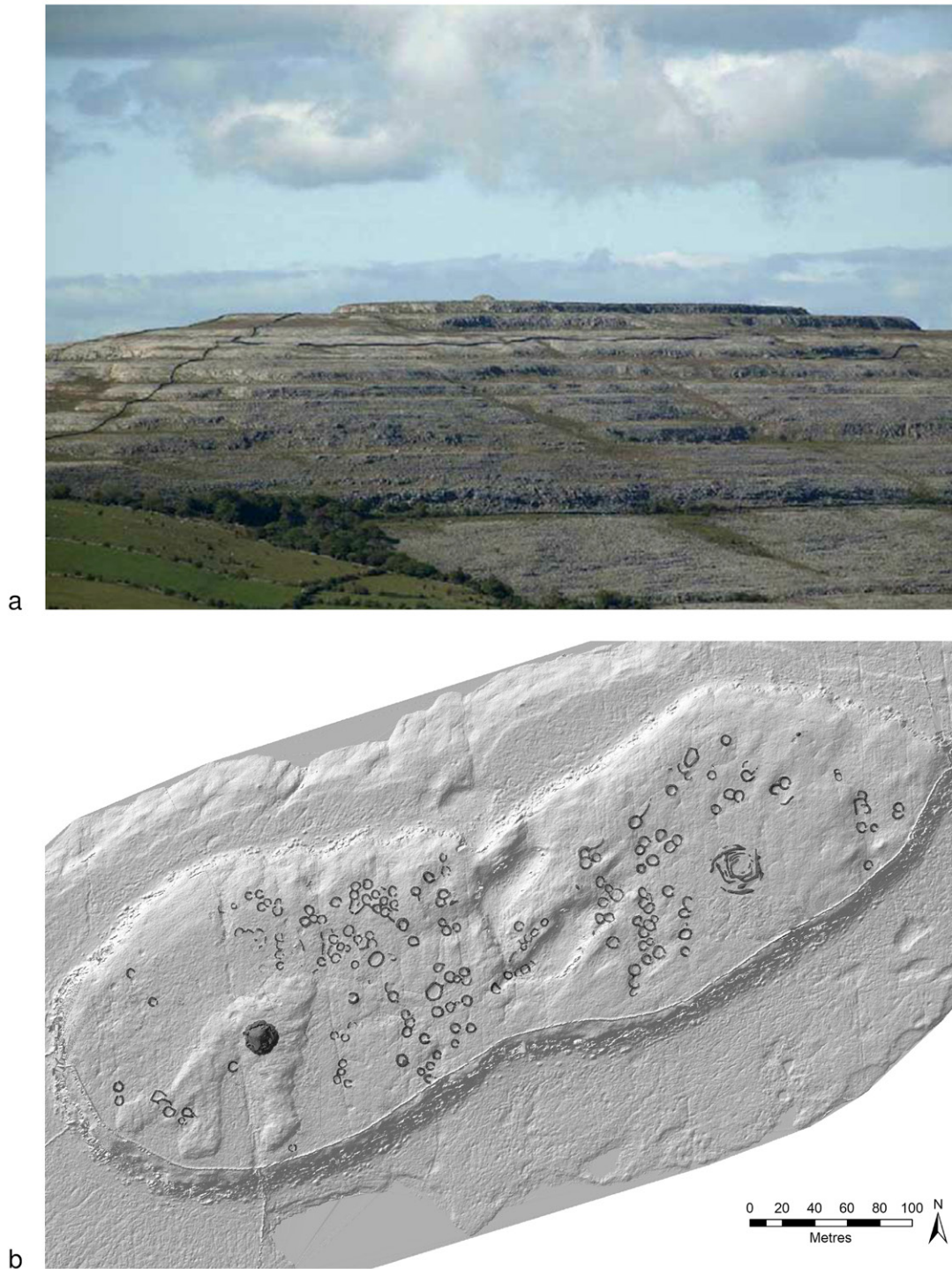


Figure 4. Turlough Hill: a – Site seen from the South (after Bergh 2015, fig. 12); b – Plan of the western summit, indicating the position of roundhouse footprints, cairn and labyrinthine structure of unknown function (after Ó Maoldúin *et al.* 2021: fig. 2).

However, recent excavations of the system of banks enclosing the summit plateau (Brandherm *et al.* 2021) suggest that they did not have any defensive purpose and are most likely of post-medieval date. Therefore, in the Late Bronze Age, Knocknashee would have consisted of a minimum of 51 circular structures or roundhouses and potentially a few small non-defensive enclosures in close proximity to two much earlier megalithic monuments, but without any earthworks enclosing the

summit plateau. The site thus should not be categorized as a hillfort, and consequently should not be included in the 'Atlas of Hillforts of Britain and Ireland'. Indeed, the relevant entry in the 'Atlas' itself points out that despite one of the two cairns located on the summit plateau having served as a trigonometrical point for the Ordnance Survey, the site was never identified as a hillfort in any maps prior to the 1990s (Lock and Ralston 2017: IR 0706).

The case of Knocknashee demonstrates that Bronze Age hilltop sites in 'strategic' or topographically dominant position are not necessarily defensive in nature, and that the choice of their location may have been motivated by the presence of earlier monuments. On this basis, S. Bergh (2015; 2016) has suggested a possible function as gathering places related to ancestor rituals. While a specific link to ancestor rituals is hard to demonstrate, and while artefactual material from the partially excavated roundhouses at Knocknashee is sparse (Brandherm *et al.* 2020: 157–159), it will be interesting to see if future excavations at the site might produce significant quantities of animal bones or midden material which could be interpreted as evidence for communal feasting activities, similar to some Class 2 sites.

The same goes for the site of Turlough Hill in County Clare, a very impressive limestone peak dominating Galway Bay and the surrounding countryside (Fig. 4). The site features about 150 circular structures. Like at Knocknashee, only a very small proportion of these have been partially excavated, and those also have been identified as roundhouse footprints which produced Late Bronze Age dates (O'Maldúin *et al.* 2021). They cluster around a large Neolithic cairn and another large drystone structure of potentially Neolithic date. This is one of the largest concentration of roundhouses on any hilltop in Ireland, but there are no enclosing elements or prehistoric defences on the western summit of Turlough Hill, where the vast majority of roundhouse footprints are located. The eastern summit is home to a large univallate hexagonal enclosure of uncertain date and function. As at Knocknashee, the choice of location for the Bronze Age site then does not necessarily seem to have anything to do with warfare or defensive considerations.

### **Hilltop sites as regional centres**

Some hilltop sites possess characteristics that suggest their role as regional centres, either for craft production, e.g. Rathgall and Haughey's Fort, as places for communal gatherings, e.g. Knocknashee and Turlough Hill, and in some instances potentially for both. However, this is not the case with all relevant sites, and some of the more complex sites pose particular challenges to their interpretation.

This holds true, for example, for the 'hillfort complex' at Spinans Hill (Co. Wicklow), which comprises three different enclosures: Spinans Hill 1 and 2, and Brusselstown Ring. With an area of 131ha, Spinans Hill 2 constitutes the largest 'hillfort' in Ireland (O'Driscoll 2019: 311–313), enclosing both Spinans Hill 1 (Class 1) and Brusselstown Ring (Class 2). Inside and in the immediate vicinity of Brusselstown Ring, aerial photographs and terrestrial surveys have revealed c. 250 roundhouse footprints. Spinans Hill 1, on the other hand, incorporates a megalithic cemetery but apparently no roundhouse footprints (O'Driscoll 2019: 313). The bank defining the outline of Spinans Hill 2 does not form a complete perimeter but on its southern flank features a several hundred metre wide gap, which renders it ineffective as a defensive enclosure (Fig. 5). What we seem to be dealing with here is, on the one hand, a nucleated settlement of considerable dimensions, featuring a multivallate enclosure that both marked the status of this site and likely functioned as a defensive feature (Brusselstown Ring), and, on the other hand, an enclosed ritual or sacred space (Spinans Hill 1), spatially segregated from each other but bound together by the enclosing earthwork of Spinans Hill 2. These characteristics as well as the cumulative labour investment that went into the construction of the Spinans Hill complex would clearly seem to indicate its role as a political and likely also economic centre.



Figure 5. Spinans Hill: a – Overview of the Spinans Hill complex; b – Roundhouse occupation at Brusselstown Ring (after O’Driscoll 2019: figs 7 and 8).

However, things may be more complicated than this, as the Spinans Hill complex forms part of the Baltinglass hillfort cluster, also known as ‘Ireland’s hillfort capital’, featuring a concentration of nine enclosed hilltop sites in an area measuring no more than 10km by 4km (Condit 1992). This cluster, situated on the south-western edge of the Wicklow Mountains, represents a unique phenomenon in terms both of the density of enclosed hilltop sites and of the complexity of their interrelationship. The Baltinglass hillfort cluster consists of three individual hillforts and two subclusters of three enclosed hilltop sites each, one of which is the Spinans Hill complex. The clustering of that many large enclosed sites in a very limited area suggests that not each of them can have functioned as a political or economic centre at a regional level, but that their functions, to some extent at least, must have been complementary. By the same token, it is precisely those instances where different sites of likely complementary function cluster in close spatial proximity that offer the most promising prospect of gaining a better understanding of their specific roles.

## Conclusion

From the above it is obvious that the functions of Irish Late Bronze Age hilltop sites apparently were rather diverse and might even have varied between sites that based on their morphological features are conventionally grouped in the same category. Some sites appear to have served as locations for communal gatherings, in some instances linked to feasting practices. A small minority of multivallate sites have also produced evidence of specialized craft production and consumption that may hint at their possible role as élite residences and political centres at a regional level. The vast majority of hilltop sites, however, lack traces of domestic structures or dwellings, and evidence of permanent occupation remains conspicuously elusive. Importantly, some of Ireland’s most iconic hilltop sites of the Late Bronze Age completely lack enclosing elements that could be interpreted as defensive structures.

Consequently, without wanting to deny that intergroup violence certainly existed in Bronze Age Ireland, it is evident that the choice of location of Irish Late Bronze Age hilltop sites was not always driven by the desire for protection from such violence and that not all enclosing features at those sites were primarily defensive in nature. The proportion of hilltop sites with a defensive purpose is difficult to establish based on the morphology of their enclosing features alone, but it is quite clear that the number of sites included in the ‘Atlas of hillforts of Britain and Ireland’ does not necessarily provide a reliable indicator.

Even if one accepts that the number of enclosed hilltop sites in the island of Ireland increased considerably towards the end of the Bronze Age, that increase obviously cannot be taken as evidence of correspondingly rising levels of intergroup violence, not any more than the number of passage tombs in similar topographical positions can be taken as an indicator of mortality levels among the social élite in the Irish Neolithic. Otherwise, applying the same flawed logic, based on the number of intercontinental ballistic missile launch sites in the United States and the Soviet Union, one would have to assume a constant state of thermonuclear war between these two polities during the second half of the 20th century, when we know for certain that fortunately this was not the case.

Rather than being a simple expression of increasing levels of intergroup violence, the emergence of enclosed hilltop sites towards the end of the second millennium BC, and of multivallate sites of Class 2 in particular, is likely to reflect changes in the political economy of Bronze Age middle-range societies in the island of Ireland, possibly heralding a transition from simple ranked chiefdoms in the Early Bronze Age to stratified chiefdoms in the Late Bronze Age (cf. Gilman 1981; Earle 1987; Upham 1987). In such a scenario, the construction of hilltop enclosures as a communal endeavour, possibly associated with recurring social gatherings and feasting activities, might be viewed as an attempt to mask increasing levels of social inequality. Broadly coeval developments in the funerary and depositional records would seem to support such a notion. By the Late Bronze Age, grave goods and funerary architecture are no longer used to mark élite burials, and many Dowris metalwork

depositions can no longer be read as 'personal' hoards, unlike most metalwork depositions of the Early and Middle Bronze Age in Ireland.

In a sense, then, the increase in the number of hilltop sites in the Irish Late Bronze Age may be viewed as one of a number of new ways of representing group status, inspired by forms of social expression first seen on the Continent but very much driven by changes in the political economy of Irish Bronze Age society. The inherent instability of chiefdom polities may also help to explain the short-lived nature of some Irish hillforts and ultimately of the hillfort phenomenon itself in the island of Ireland.

This reading of the archaeological evidence does not constitute an attempt at pacifying the past. The large number of weapons in Irish metalwork depositions leaves little doubt that violence was very much a part of Bronze Age life, but the fact that the ways in which this state of affairs filtered into the archaeological record changed significantly over time should not be mistaken as indicating changing levels of that violence. In order to gain a better understanding of Irish Late Bronze Age society and of the extent and role of intergroup violence, more will be needed than counting the number of enclosed hilltop sites or the number of enclosing elements at each of those sites.

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# Analyses chimiques et pétrographiques des céramiques du premier âge du Fer dans le Sud-Ouest de la péninsule Ibérique : bilan et perspectives

Michał Krueger<sup>1</sup>, Dirk Brandherm<sup>2</sup> et Violeta Moreno Megías<sup>3</sup>

## Abstract

We present a brief overview of the results of an archaeometric research programme which over the last few years has studied the petrographic and chemical composition of Early Iron Age pottery from southwest Iberia, mainly from the lower Guadalquivir region in western Andalusia. The aim of this programme was to establish a scientific basis for distinguishing between imported Phoenician pottery and local imitations, to identify the transfer of technical know-how between the two communities involved, and ultimately to establish the provenance of the ceramics in question and to identify their production centres. We also outline perspectives for a follow-up project that will build on the results obtained in this programme.

## Keywords

IRON AGE, ARCHAEOOMETRY, POTTERY, X-RAY FLUORESCENCE SPECTROMETRY, PETROGRAPHY.

## Résumé

Nous présentons un bref aperçu des résultats d'un programme de recherche archéométrique<sup>4</sup> qui au cours des dernières années a étudié la composition pétrographique et chimique des poteries du premier âge du Fer du sud-ouest de l'Ibérie, principalement de la région du bas Guadalquivir en Andalousie occidentale. Le but de cette recherche était d'établir une base scientifique pour distinguer entre la poterie phénicienne importée et ses imitations indigènes, d'identifier le transfert de connaissance technique entre les deux parties, et finalement d'établir la provenance des céramiques en question et d'identifier leurs centres de production. Nous discutons également des perspectives pour un projet de suivi qui s'appuiera sur les résultats obtenus dans cette recherche.

## Mots-clés

ÂGE DU FER, ARCHÉOMÉTRIE, CÉRAMIQUE, SPECTROMÉTRIE DE FLUORESCENCE DES RAYONS X, PÉTROGRAPHIE.

## Introduction

Dans les débuts de l'âge du Fer sur les côtes méditerranéennes et atlantiques de la péninsule Ibérique, environ trente colonies ont été établies par les Phéniciens, commençant au moins à partir du XI<sup>e</sup> siècle av. J.-C. Les processus d'échange culturel intenses avec la population indigène sont bien visibles dans la sphère de la culture matérielle, particulièrement dans la céramique. Un des problèmes de l'archéologie de la Péninsule Ibérique de cette époque est l'évaluation culturelle des artefacts trouvés dans les sites autochtones et définis comme « d'importation ». Ces objets traditionnellement sont perçus comme produits des ateliers phéniciens. Cependant, les études réalisées ces dernières années démontrent que l'adaptation du tour de potier par la population indigène a été très rapide, ce qui a changé significativement le processus de la production céramique dans le sud de la péninsule Ibérique déjà dans les premiers moments de la colonisation phénicienne.

<sup>1</sup> Uniwersytet im. Adama Mickiewicza w Poznaniu, Wydział Archeologii. krueger@amu.edu.pl

<sup>2</sup> Queen's University Belfast, School of Natural and Built Environment. d.brandherm@qub.ac.uk

<sup>3</sup> Universidad de Sevilla, Departamento de Prehistoria y Arqueología. vmoreno1@us.es

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## État de la question

Les études de provenance ne sont pas fréquentes au sein des recherches archéologiques du Sud-Ouest de la péninsule Ibérique. On observe cependant une augmentation considérable de ces travaux au cours de ces trois dernières décennies. Les travaux les plus remarquables sont ceux d'A. González Prats et J. A. Pina Gosalbez, qui déjà au début des années quatre-vingt ont analysé les pâtes de 64 échantillons de céramiques réalisées aux tour et originaires du gisement de Peña Negra (province d'Alicante). Le but de leur étude était d'identifier le lieu de production (González Prats et Pina Gosalbez 1983). Les études de l'analyse minéralogique des céramiques protohistoriques ont été multipliées au cours des années quatre-vingt et quatre-vingt-dix (González Vélchez *et al.* 1985 ; Galván Martínez 1986 ; Galván García et Galván Martínez 1987 ; Arribas Fernández *et al.* 1987 ; Pringle 1988 ; Millán Chagoyen *et al.* 1990 ; Barrios Neira *et al.* 1994 ; parmi beaucoup d'autres). Concernant le Sud-Ouest de la péninsule Ibérique, dans cette dernière décennie, deux types de travaux commencent à apparaître. Les premiers se concentrent sur la caractérisation minéralogique et chimique de céramiques originaires d'un seul gisement (Gómez Morón et Polvorinos del Río 1997 ; Navarro Gascón 1997), et les seconds sont des tentatives d'appliquer des nouvelles méthodes dans l'analyse des pâtes (Mosquera Díaz *et al.* 2001). Parfois, à travers des techniques archéométriques, on essaie de découvrir la provenance de certains groupes de poteries (Cardell *et al.* 1999) ainsi que d'approfondir les aspects de la technologie et de la fonction des différentes typologies de céramique (Polvorinos del Río *et al.* 2005).

Dans les dernières années, une équipe de l'Université de Séville a concentré son attention sur les céramiques turdetaines et puniques de la vallée du Guadalquivir. L'une de ses principales découvertes a été l'identification d'un possible centre de production de la céramique du type Kuass lié au site du Cerro de San Juan de Coria del Río, l'antique Caura (Escacena Carrasco et Moreno Megías 2014). Une autre question importante est l'identification des caractéristiques productives des récipients de stockage et de transport, les amphores, dont le degré de connaissance a considérablement augmenté ces récentes années (Moreno Megías *et al.* 2020 ; 2022).

Un autre projet de recherche développe ces dernières années sur la provenance de céramiques phéniciennes de la côte andalouse et atlantique de la péninsule Ibérique a été réalisée pour une équipe allemande (Behrendt et Mielke 2014). Les premières analyses ont été réalisées par activation neutronique (AAN), technique qui se révéla peu adaptée pour un grand nombre d'échantillons. L'équipe innova alors en utilisant pour première fois sur la céramique phénicienne de l'Occident un pXRF (Behrendt *et al.* 2012). Pour ce projet, plus de 1000 échantillons de céramique provenant d'une soixantaine de sites et datés du IX<sup>e</sup> au VI<sup>e</sup> siècle av. J.-C ont été analysés.

Cette recherche a permis l'identification de plusieurs centres de production de céramique phénicienne, particulièrement dans la région de la baie de Cadix et dans la région de Malaga. Un apparent réseau de relations économiques a été observé entre les régions mentionnées. Cependant, aucun centre de production de la péninsule Ibérique ne démontre de traits de spécialisation pour un type déterminé de céramique (Behrendt et Mielke 2013).

À travers l'analyse chimique des céramiques, Philip Johnston, chercheur américain, a abordé le sujet de la production céramique de la colonie phénicienne de Castillo de Doña Blanca. Il a établi des zones de production possibles et a, ainsi ouvert des pistes de réflexion sur les modalités du commerce. Son travail a consisté à analyser par activation neutronique une quantité considérable (162) d'échantillons provenant du Castillo de Doña Blanca. L'analyse pétrographique a, ensuite, été réalisée à travers l'observation microscopique des lames minces. La combinaison de ces deux méthodes permet, selon le chercheur, d'identifier les sources possibles de matières premières utilisées dans l'élaboration de la céramique (Johnston 2014). Ses recherches ont déterminé que le centre de production de la majorité des céramiques du Castillo de Doña Blanca se situait dans la région de la baie de Cadix.

Cependant, au VIII<sup>e</sup> siècle av. J.-C. au Castillo de Doña Blanca certaines céramiques sont aussi importées d'autres régions de la Méditerranée occidentale. On a constaté qu'un nombre important des amphores provenaient du Cerro del Villar, un hameau phénicien situé près de Malaga. Cette constatation confirme l'observation des chercheurs allemands mentionnés antérieurement.

Ces recherches dans la baie de Cadix ont été rejointes par de nombreuses autres au cours des dernières années (Edreira Sánchez *et al.* 2001 ; Domínguez Bella *et al.* 2004 ; Cau Ontiveros 2007 ; Fantuzzi *et al.* 2020) qui ont fourni des informations fondamentales pour la caractérisation de la production locale tout au long de la Protohistoire, l'un des centres de production les plus puissants du sud-ouest.

## Bilan

Entre les années 2014–2016, une série d'analyse de récipients céramiques provenant de l'Andalousie occidentale a été effectuée en utilisant un spectromètre de fluorescence de rayons X Bruker Tracer III SD. L'objectif de la recherche était d'établir une base de données facilitant l'identification de la provenance des céramiques (Krueger *et al.* 2015 ; Krueger et Brandherm 2016). Au fil du projet, plus de 200 échantillons de céramique provenant d'une vingtaine de gisements archéologiques, cruciaux pour la région du Bas Guadalquivir ont été analysés et principalement des gisements de Setefilla et de la zone de Los Alcores (Fig. 1). Pour la première fois, des poteries conservées entièrement et qui n'avaient jamais été étudiée par des méthodes archéométriques ont pu être analysé (Bartkowiak et Krueger 2015 ; Krueger et Brandherm 2019).

La stratégie d'échantillonnage a visé à choisir au sein d'un matériel céramique technologiquement divers. Les résultats de l'étude précédente ont montré une corrélation significative entre les techniques de fabrication et des résultats chimiques. Pour cette raison, les productions faites au tour de potier et faites à la main ont été étudiées séparément. Pour chaque échantillon, deux



Figure 1. Carte de répartition des sites du Sud-Ouest de la péninsule Ibérique étudiés et mentionnés dans le texte (réalisation de la carte par B. Walkowski).

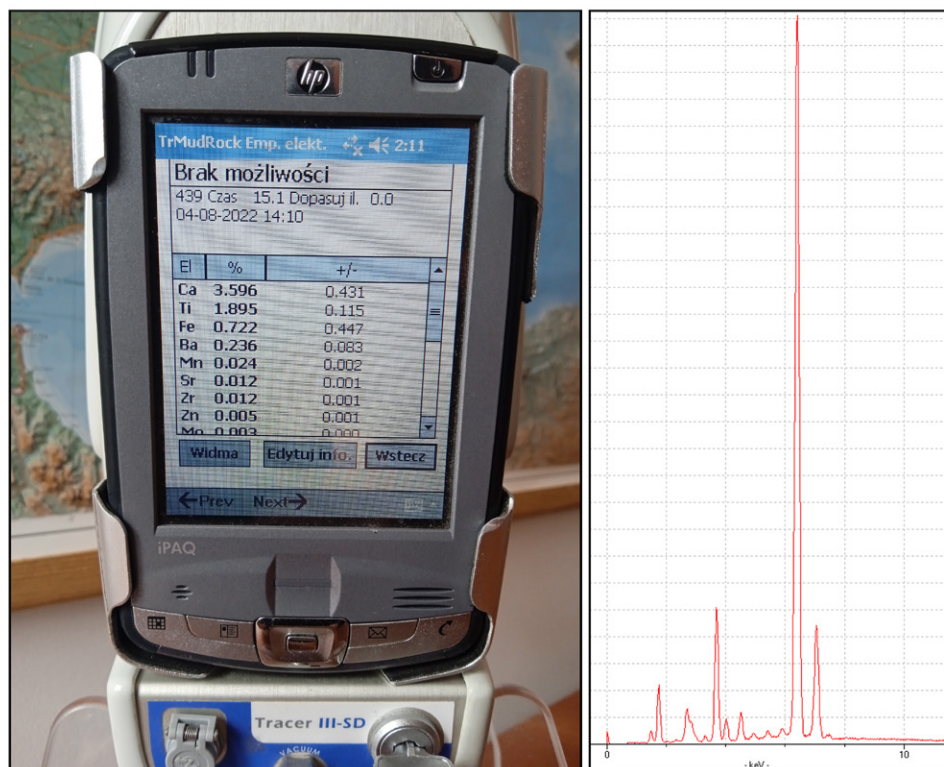


Figure 2. Liste des oligo-éléments détectés sur l'écran du spectromètre de fluorescence de rayons X Bruker Tracer III SD en mode semi-quantitatif (à gauche) et spectre XRF exemplaire mesuré par le même instrument (à droite) (photographie de M. Krueger).

analyses par pXRF ont été réalisées à deux différents points de la même surface (Fig. 2). Pour le traitement statistique des données, le phosphore et le baryum ont été exclus, car ils sont affectés par les processus post-dépositionnels. En conséquence, l'ensemble final d'éléments chimiques a inclus : Al, Si, K, Ca, Si, V, Cr, Fe. Deux procédures statistiques différentes ont été utilisées pour grouper le résultat chimique dans un plan compréhensif : le test de titane-potassium et l'analyse composante principale.

Il était possible d'observer que les échantillons faits au tour de potier de La Cruz del Negro et Setefilla forment des groupes chimiques bien définis. Les échantillons de La Cruz del Negro sont caractérisés par des concentrations basses de potassium et de titane. L'analyse des composants principaux offre une évaluation plus précise des échantillons des différents sites. La concentration observable dans l'analyse des composants principaux des échantillons faits au tour de potier apparaît particulièrement significatif. Les échantillons sont divisés en trois groupes selon leur composition chimique : Setefilla, El Campo de las Canteras et La Cruz del Negro.

Les deux tests statistiques ont produit les résultats qui sont compatibles l'un avec l'autre. Comme aucun atelier de poterie du début de l'âge du Fer n'a été identifié dans la zone étudiée, il est impossible de déterminer la provenance géographique précise des poteries faites au tour. Avec la base de données de référence, la composition chimique des échantillons fournit les informations qui permettent de confirmer ou de rejeter la production exogène d'une céramique. Malheureusement, on ne peut pas comparer les résultats aux effets des analyses faites par l'équipe allemande puisque la méthodologie utilisée est différente. Néanmoins, les études précédentes suggèrent l'origine locale des produits céramiques de la région.

Les résultats obtenus démontrent le grand potentiel de méthodes archéométriques pour l'étude de l'échange culturel de la fin de l'âge du Bronze et du début de l'âge du Fer. Ce type d'étude est nécessaire pour obtenir de nouvelles informations sur la technologie de fabrication et du contenu des récipients de l'Andalousie occidentale.

En 2018, un nouveau projet appelé *Tartessos à la lumière des études de laboratoire sur la céramique* a démarré. Environ 150 échantillons de céramique provenant de huit gisements cruciaux pour la région ont été analysés à ce jour. Cette nouvelle recherche consiste en trois étapes d'investigation. Dans un premier temps, les analyses typologiques qui comprennent les études de l'ornementation et des traits macro-morphologiques et micro-morphologiques. Les types bien définis constituent des éléments de datation de grande valeur. Grâce à la chronologie radiocarbone créée précédemment (Brandherm et Krueger 2017), il est possible de replacer par analogie les nouvelles céramiques au sein de la chronologie.

La seconde étape de la recherche consiste à analyser les échantillons avec des méthodes de laboratoire. Des lames minces dans un premier temps ont été réalisées et complétées avec des analyses chimiques (SEM, XRF) et pétrographiques (Moreno Megías et Krueger 2019 ; Krueger *et al.* 2020 ; Niedzielski *et al.* 2020 ; Krueger et Moreno Megías 2021 ; Krueger *et al.* 2021). Ces dernières ont été réalisées avec un microscope de lumière polarisée qui permettant d'identifier l'origine possible de l'argile, surtout pour résoudre la question des importations, ainsi que de décrire le processus de préparation, de pétrissage et de cuisson du produit de poterie (Fig. 3). Les analyses pétrographiques ont permis de différencier dans une large mesure les gestes de préparation de la pâte céramique typiques de la population locale, par exemple dans le cas de Setefilla, du nouveau mode de production de la poterie introduit par les Phéniciens, qui a fini par être rapidement adopté dans toute la production ultérieure au tour. D'autres productions en particulier, comme celles de la zone de Carmona, sont des recettes céramiques extrêmement caractéristiques et reconnaissables du début du premier âge du Fer.

Un autre objectif consiste en la reconnaissance de la fonction des poteries et de l'analyse du cycle de la vie d'une vaisselle funéraire. Il y a un débat sur la question de savoir si les vaiselles ont été

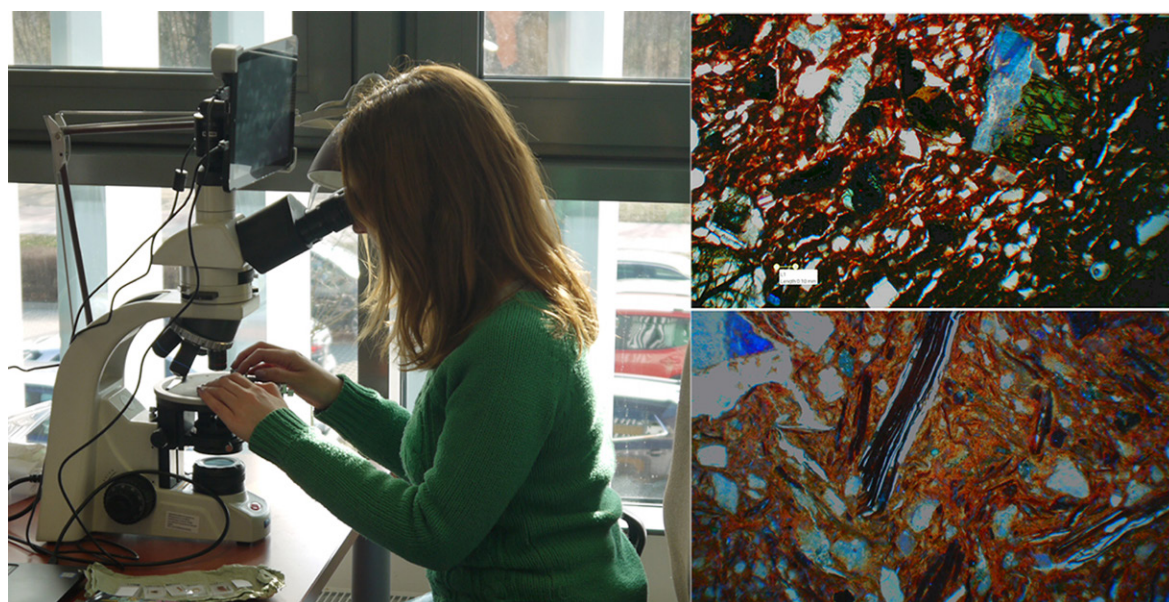


Figure 3. Observation de lames minces pétrographiques avec un microscope à lumière polarisée (à gauche) et lames minces représentatives de la poterie de l'âge du Bronze final provenant de Setefilla (à droite) (photographies de M. Krueger et V. Moreno Megías).

produites exclusivement pour l'usage funéraire ou si préalablement elles ont été utilisées pour cuisiner par exemple. Jusqu'à présent, cet aspect n'a pas été suffisamment investigué.

Des micro-études ont également été effectués et incluent l'analyse du contenu d'une sélection d'échantillons. Le laboratoire de l'Université de Bristol offre la possibilité d'analyser des échantillons sans que aucune substance ne soit visible sur les parois. En analysant le matériel de contextes funéraires il est alors possible de répondre à la question de la spécificité fonctionnelle des urnes funéraires. Grâce à ces analyses, il a été possible de prouver que certains récipients « à chardón » contenaient de la cire d'abeille. Un article présentant les résultats de cette recherche est en cours de rédaction.

### Perspectives

La troisième étape d'analyse, qui n'est pas encore terminée, se concentre à l'interprétation de la production, d'usage et de la désuétude des céramiques. À ce niveau, il est important de considérer l'importance du contexte archéologique dans lequel les vaisselles utilisées sont trouvées. Ni la classification, ni les méthodes de laboratoire ne sont capables de répondre aux questions sur la culture symbolique, rituelle ou de l'identité. Ce sont des questions pourtant particulièrement importantes à l'heure d'interpréter la signification et la fonction des céramiques. Il a été démontré que les pensées et les significations sont créés à travers des actions quotidiennes et répétées. Par conséquent, la culture matérielle est un porteur d'idées. Dans ce point de vue le choix d'une technologie céramique déterminée est un acte qui dépend des facteurs sociaux et des traditions, des croyances, et de l'organisation sociale, etc.



Figure 4. Installation de laboratoire avec loupe binoculaire, spectromètre portable de fluorescence de rayons X, microscope numérique portable et microscope à lumière polarisée (photographie de M. Krueger).

Les questions technologiques sont indéfectiblement enracinées dans les relations sociales. La céramique constitue une trace des décisions prises dans l'usage de la culture matérielle. À travers des objets d'usage quotidien, entre autres les vaisselles céramiques, les habitants de l'Ibérie sud-occidentale pouvaient exprimer leur identité, leur tradition ou leur réceptivité aux éléments extérieurs.

À la fin, il est important de souligner que les méthodes que nous avons prévues utiliser sont peu invasives et l'investissement financier dans les instruments de mesure nécessaires est relativement modeste par rapport à de nombreuses autres techniques archéométriques (Fig. 4). La prise d'échantillons n'affecte pas les pièces de grande valeur muséologique. Les résultats de cette recherche peuvent fournir des données relatives aux relations entre la technique de fabrication, la forme, le contenu des vaisselles, et leur signification sociale. C'est un point de vue global qui n'a pas été adopté jusqu'à présent d'une manière commune.

## Conclusion

Au cours de la mise en œuvre du projet, une base de données a été créée contenant les résultats chimiques et pétrographiques des échantillons de céramique analysés. Dans de nombreux cas les résultats indiquent une relation entre les sites archéologiques et la composition élémentaire du matériel analysé. Néanmoins, de moment il est difficile de déterminer la provenance géographique précise des poteries faites au tour sauf dans quelques cas très spécifiques. Une question intéressante est l'interprétation du processus de production et d'utilisation de la céramique. Les échantillons provenant de différents contextes archéologiques peuvent alors fournir des informations importantes sur les types d'aliments cuisinés dans ces récipients.

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# The emergence of Celtic culture in Styria

Florian Mauthner<sup>1</sup>

## Abstract

The intensity of research into the La Tène Culture has increased in Styria (southern Austria), the Štajerska and Prekmurje (Slovenia) through recent archaeological excavations in Kleinklein and Lang, among other sites. The data from all later Iron Age cemeteries excavated in western Styria up to this point form the basis for a doctoral thesis which is mainly concerned with questions regarding the new Celtic population. This article presents a newly excavated burial from Lang/Schirka and discusses the context of other burials known from its vicinity. Together with the analysis of and comparison with results of Celtic settlement research in the Slovenian Štajerska, this allows us to gain new insights concerning the newly arrived populations.

## Keywords

EARLY CELTS, STYRIA, LATE HALLSTATT, TRANSITION, GRAVES.

## Résumé

L'intensité des recherches sur la culture de La Tène s'est accrue en Styrie (sud de l'Autriche), en Štajerska et Prekmurje (Slovénie) grâce à de récentes fouilles archéologiques à Kleinklein et Lang, entre autres sites. Les données de tous les cimetières de l'âge du Fer postérieurement fouillés jusqu'à présent dans l'ouest de la Styrie constituent la base d'une thèse de doctorat qui s'intéresse principalement aux questions concernant la nouvelle population celtique. Cet article présente une sépulture récemment fouillée de Lang/Schirka et discute le contexte d'autres sépultures connues dans ses environs. Avec l'analyse et la comparaison avec les résultats de la recherche sur les peuplements celtiques dans la Štajerska slovène, cela nous permet d'acquérir de nouvelles connaissances sur les populations nouvellement arrivées.

## Mots-clés

PREMIERS CELTES, STYRIE, HALLSTATT TARDIF, TRANSITION, TOMBES.

## Introduction

The settlement of 'Celts' in the area of modern Styria in Austria as well as the Stajerska in Slovenia has long been a central theme of research, with new insights having been gathered in recent years mainly through major development-led excavations like in Srednica/Ptuj, Nova tabla/Murska Sobota or Wohlsdorf/Styria. Current field research in Kleinklein and Lang has permitted to gather new information on aspects of on the emergence of 'Celtic Culture'.

Additionally, the publication of archival materials from the Archo Norico Burgmuseum Deutschlandsberg of several LT B2 burials in Lang, Unterpremstätten-Zettling and Dobl-Zwaring as well as the battlefield near Deutschfeistritz (Guštin 2017; Guštin 2020; Guštin and Božič 2019; Guštin and Kavur 2016), in combination with the excavation results from Lang and Kleinklein (Fig. 1), permits to address new topics and ideas about the La Tène period, which will be presented here.

## Lang/Schirka, Burial 3 from Barrow 9

A La Tène cemetery, consisting of barrows and flat cremation burials, is known from a ridge in Lang/Schirka. The flat cremation burials, which have been known for quite some time, also included a chariot burial from the LT B2 to LT C1 transition and have been kept in storage in the Burgmuseum since the 1980s (Berndt and Bernhard 1998: 38–39; Bernhard 2012; Guštin 2021).

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<sup>1</sup> ASIST Archäologisch-Soziale Initiative Steiermark – ASIST & Archo Norico Burgmuseum Deutschlandsberg. florian.mauthner@gmx.net



Figure 1. Map of the mentioned sites of Early La Tène period in Styria (map by the author).

The excavations of 2021 provided new insights into the cemetery and grave inventories. In Barrow 9, which was systematically excavated, four cremation burials from the La Tène period were discovered around a large, centrally placed pit of the Lasinja Culture, with Burial 3 being the most interesting one.

Burial 3 was put down before the barrow was erected, which according to the central Burial 4 dates to LT C1 (Fig. 2). The burial pit is almost square with side lengths of 77 × 78cm and had rounded corners. Its fill contained a mix of fragmented pottery and remains of the funeral pyre, and also



Figure 2. Lang/Schirka, plan of the cemetery with plan of Tumulus 9, overview of the graves (image and plan by the author).

contained some metal finds. Underneath this deposit, an omphalos bowl was discovered which had been used as an urn for the cremated bones and which was partially covered and surrounded by the remains of other items of pottery, such as the neck of a flask. In the southern part of the pit a concentration of heavily burnt pottery could be identified which probably was deposited in an organic container, since in this area, a 25 × 50cm zone did not contain any pyre remains (Fig. 3). The burial's grave goods include a silver wire bracelet, a silver finger ring, two iron brooches of Münsingen type with differently ornamented feet, a ceramic bead and fragments of wheel-thrown pottery (Fig. 4).

The remarkable silver wire bracelet was produced during the early La Tène period (LT B) and is of a type that frequently appears in women's burials. The specimen from Lang belongs to Group 1 of wire bracelets after Guštin (2009: 478–479) that is distributed from the settlement area of the Helvetians along the Upper Danube area to the bend of the Danube, with the Lang specimen being the southernmost find of the eastern group. The plain silver ring of type AR-K2 after Bujna has parallels in Slovakian cemeteries (Bujna 2005: 80 fig. 64) and also in the cemetery of Mannersdorf am Leithagebirge in Lower Austria (Ramsl 2011: 109 fig. 79,22/3b). The iron brooches with plain bow and foot plate with organic application of Münsingen type can be identified as belonging to Type 1 B1 after Bujna (1998: 172–173 fig. 1,1B1) and are widely distributed across the Celtic world. The second brooch has a foot decoration in form of an acorn, with the shell fashioned from iron into which a round inlay, probably coral, is inserted.

The very interesting ceramic bead can possibly be compared with the beads used to decorate a brooch foot in woman's burial 1 in Michal na Žitovu in Slovakia. This burial assemblage also contained another five brooches, six bracelets, a hair pin and a few fragments of a belt and of pottery (Benadik 1962: 362 fig. 8,4). That burial can probably be dated to the transition from LT B1 to LT B2.

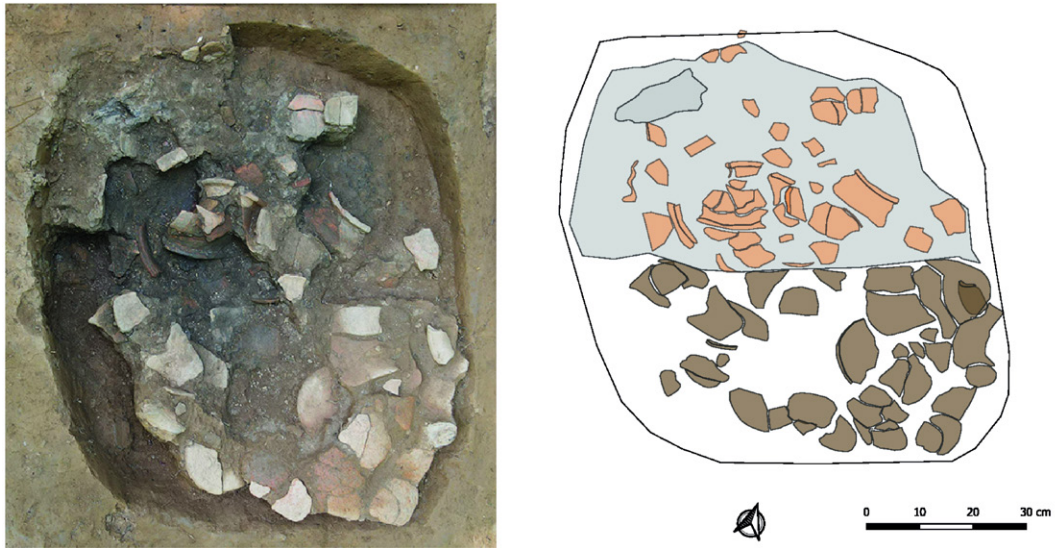


Figure 3. Lang/Schirka, Tumulus 9, Grave 3 (photograph and plan by the author).

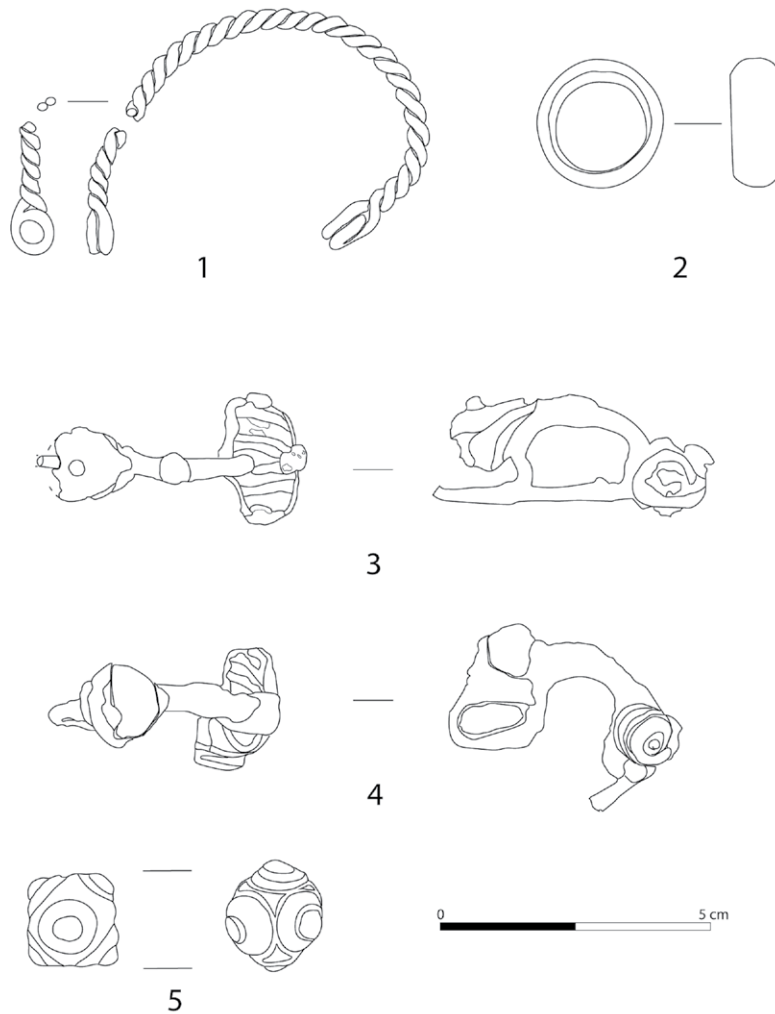


Figure 4. Lang/Schirka, Tumulus 9, Grave 3: 1 silver bracelet, 2 silver fingerring, 3 iron fibula type Münsingen, 4 iron fibula, 5 ceramic object (drawings by the author).

The majority of pottery fragments from Burial 3 in Lang are still in the process of being restored due to their condition, but a few further interesting aspects could be recorded during excavation. The possible organic container already mentioned above exclusively contained coarse pottery. In the area where the remains of the pyre had been deposited in the northern part of the burial pit, fine pottery was recovered, which can be reconstructed as bowls, cups and flasks, and in a few cases as stemming from vessels with a conical neck (*Kegelhalsgefäße*). As already mentioned, the urn was an omphalos bowl.

### The beginning of Celtic Culture in Styria

In northern Styria, the earliest La Tène/Celtic finds of phases LT A and LT B1 must be considered to be isolated single finds in settlement contexts. Among them are the sword chape from Kainischtraun, the fragment of a beaked flagon from the Kulm near Aigen im Ennstal or also the pottery finds from Kaiserköpperl near Rottenmann (Tiefengraber 2015: 598–602), as well as the bronze belt hook from the Ausseerland (Modl 2021). In central Styria, bronze brooches from phase LT B1 are known from the Kulm near Weiz, the Königsberg near Tieschen and the Dietenberg near Ligist (Tiefengraber 2015: 601–602).

‘Celtic’ settlement activity in Styria only properly starts in phase LT B2, with the cemeteries from Lang, Unterpremstätten-Zettling and Dobl Zwaring and a single burial from Graz. The complete period of La Tène/Celtic settlement can be observed in the cemeteries of Lang and Kleinklein, which are continually used from the early to the late La Tène period.

Next to the famous Hallstatt period barrow of the Pommerkogel at the foot of the Burgstallkogel near Kleinklein (Egg and Kramer 2016), a La Tène warrior burial was excavated in the 1980s (Dobiat 1996). Further excavations in 2019–2020 discovered another 13 La Tène burials (Fig. 5). The cremation burials were partially affected by agricultural activity, resulting in variable states of preservation. Seven burials contain weapons in the form of swords with scabbards, spearheads or knives. All burials contain dress components and/or jewellery but little pottery. Fragments of bronze hollow buckle anklets and of an iron knot ring, which either was a bracelet or a torc, seem particularly noteworthy. During the excavations, remains of organic containers for the burnt bone and traces of wooden grave constructions could be recorded.

In Burial 1, a sword with richly decorated scabbard and remains of a belt chain, a spearhead and fragments of a shield rim fitting were found. Apart from these, there were also remains of an iron brooch, an iron razor and three urns in this burial. All these finds can be dated to the end of LT B2 (Dobiat 1996). The start of this cemetery in the early LT B2 phase is marked by Burial 2, which contained a sword of Kosd C type, a spearhead with a narrow, elongated blade, a knife and three early La Tène scheme brooches. In addition, a bronze and an iron ring could be recovered, which probably were attaching the sword to the belt suspension, and a few fragments of pottery (Mauthner 2022).

Another two early La Tène burials from the vicinity of Unterpremstätten and Dobl-Zwaring have already been published. Both contained a sword of Hatvan-Boldog type and an early La Tène scheme brooch, with the latter also containing a nail with a swastika decoration. The former also contained a knife, two bowls and a *Kegelhalsgefäß* (Guštin and Kavur 2016).

An important cemetery was excavated in Wohlsdorf during the construction of the Koralmbahn. This cemetery consists of 13 burials, with a preliminary report already published. These burials date to the transition from LT B2 to LT C1 (Szilasi 2015).

On the Kugelstein, a ridge overlooking the Mur valley near Deutschfeistritz, a large number of weapon finds were made which date to the early La Tène period. These include spearheads, swords,

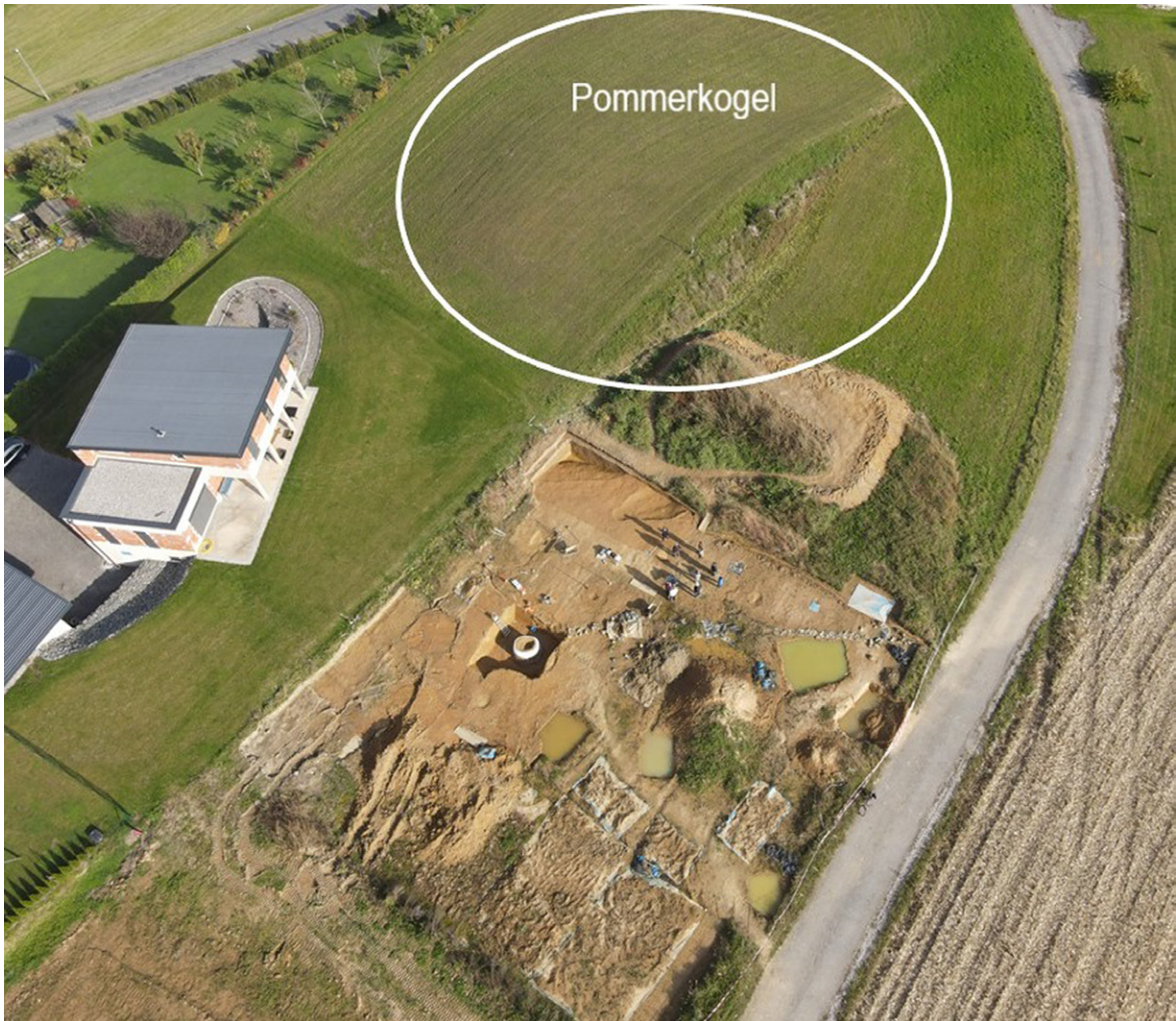


Figure 5. Kleinklein, Celtic cemetery next to burial mound 'Pommerkogel' (photograph by H. Vrabec).

belt chains, shield bosses and brooches and a few tools, scattered across an area of  $2,3 \times 0,8$  km. Due to their preservation – many objects are broken into pieces – an interpretation as a battlefield seems justified. The finds date from LT B2 to the turn to LT C1 and indicate that the battle took place around 300 BC (Guštin 2017; Guštin and Božič 2019; Tiefengraber and Hebert 2021).

In the neighbouring region of northern Slovenia, the Stajerska, Celtic burials were discovered during motorway development. In Srednica near Ptuj, a few prehistoric features were excavated, including – besides houses from the Chalcolithic and remains of Hallstatt period buildings – a cemetery containing 27 Hallstatt barrows. Into one of these, four burials were inserted in the La Tène period. Inhumation burials 4, 6 and 7 were women's graves with necklaces, bracelets and bronze as well as iron brooches. Cremation grave 9 contained a warrior who had been buried with a sword, spearhead, knife and brooches as well as pottery fragments. These burials date to phases LT B2 and LT C (Lubšina-Tušek and Kavur 2011).

Another small cemetery with three burials was excavated in Orehova vas near Maribor, with a cremation of a woman and two weapon burials. One of the latter, Grave 3, was a double burial containing an inhumation of a woman in addition to the cremated warrior (Grahek 2015).

## Discussion

The turn from the late Hallstatt (Ha D2/3) to the early La Tène period in the eastern Alps is difficult to identify. The phases preceding the early La Tène period can hardly be identified in the archaeological record, except perhaps the burials from Bergla, which can be dated to the Ha D2/3 phases due to bead and pottery finds and which seem to be the latest Hallstatt culture burials in Styria (Artner 2007). A comparatively sparse occupation can also be expected in Štajerska to the south, where sparse remains are known from Rifnik and the vicinity of Celje (Mele 2012: 153).

Evidence for the burial practice in the La Tène cemeteries of western Styria to date consists exclusively of cremation graves. This is noteworthy, since in the larger cemeteries in Lower Austria like Mannersdorf or Pottenbrunn, both inhumation and cremation were practised. In Srednica near Ptuj, the LT B2 burials indicate a similar mixed practice with three inhumations and one cremation grave (Kavur and Lubšina-Tušek 2016). An interesting aspect of burial practice is the ‘culture of memory’ indicated by the reuse of old cemeteries and barrows, which can repeatedly be observed in the south-eastern Alps. The cases in Kleinklein around the Pommerkogel and those also already mentioned in Srednica near Ptuj (Fig. 6) seem to imply this (Mauthner forthcoming), with further examples from the Gracarca in Carinthia (Gleirscher 2009: 144-145) and a few sites in Slovenia supporting this suggestion (Guštin *et al.* 2017).



Figure 6. Srednica near Ptuj, plan of the cemetery with Celtic graves (after Kavur and Lubšina-Tušek 2016: fig. 11).

A particularly important burial for the early La Tène culture in Styria is Burial 3 of Barrow 9 on the cemetery of Lang/Schirka. The silver bracelet and silver finger ring are comparable to finds from La Tène period cemeteries in Slovakia. Also exceptional is the iron brooch with the remarkable foot decoration in the form of an iron acorn filled with another material, possibly coral. Due to the amount of finds in it, the burial can be dated to phase LT B1c, i.e. the end of the 4<sup>th</sup> century BC.

In this context it must also be considered whether Hallstatt period traditions continued, as has already been suggested for neighbouring Carinthia (Gleirscher 2005: 106). On the one hand, the La Tène period Barrow 9 from Lang/Schirka might indicate that Hallstatt burial traditions continued. Also, Burial 3, with its burial rite including the deposition in the grave of pyre remains and (fragmented) pottery, may also well be following Hallstatt period practices. On the other hand, it might also be possible that another change in customs and traditions at the end of the Hallstatt period resulted in material culture leaving no identifiable traces in the archaeological record, creating an apparent hiatus due to an ‘evidence filter’ between the late Hallstatt period and the final stages of the early La Tène period. With the cemetery of Bergla (Artner 2007), already mentioned above, and the possibly late Hallstatt/early La Tène transition period finds and features from the Bubenberg/Hoarachkogel (Berndt and Bernhard 1998: 38–39), which are still awaiting proper assessment and analysis, more light could possibly be shed in the next few years on this archaeologically barely traceable period.

The research conducted over the last few years has already significantly improved the picture of the early La Tène period in Styria and the Stajerska, with the cemeteries demonstrating a once more archaeologically observable, quite dense occupation in the phase LT B2 (end of 4<sup>th</sup> / beginning of 3<sup>rd</sup> century BC).

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# On the symbolic values of the Iron Age walls in the western Iberian Plateau: an approach to the landscape archaeology of warfare

Luis Berrocal Rangel<sup>1</sup>, Lucía Ruano<sup>2</sup>, Pablo Paniego Díaz<sup>3</sup>,  
Gabriel Bartolomé<sup>4</sup> and Luis Berrocal Maya<sup>5</sup>

## Abstract

Among the Celtic territories, the Iberian Peninsula is the area with the largest number of hillforts with upright stone band defences, usually misnamed 'chevaux-de-frise'. Parallels are found from southeastern France (Pech Maho, Languedoc) to Ireland (Dun Aonghasa, Galway), Wales (Castell Henllys) and Scotland (Kaimes Hill, Midlothian), most of them dating from the Iron Age. However, new data and research highlight different contexts that could lead to a variety of explanations beyond their defensive purpose. Using geographical information systems (GIS) and LiDAR images to study the landscape, we have analysed one of the most significant groups in the Iberian Peninsula, built by a Celtic people called Vettones. In their territory, large oppida with massive and solid ramparts, moats, bastions and, probably, towers are distinctive. Nevertheless, there are only six examples with upright stone band defences, all among the most powerful and wealthy oppida. If the upright stone bands were simple defensive devices, we examine what the reasons for this difference are and, by analysing the meaning of these elements, we attempt a more comprehensive definition of this group.

## Keywords

CHEVAUX-DE-FRISE, HILLFORT, IRON AGE, DEFENSIVE ARCHITECTURE, FORTIFICATIONS.

## Résumé

Parmi les territoires celtiques, la Péninsule ibérique est la région avec le plus grand nombre de sites fortifiés disposant de défenses de bandes de pierres plantées, qui sont connues sous le nom inadapté de « chevaux-de-frise ». Les exemples de telles installations sont localisés du sud de la France à l'ouest de l'Irlande, le pays de Galles et l'Écosse, et la plupart de ces exemples sont datés de l'âge du Fer. Cependant, nouvelles dates et recherches récentes soulignent les contextes et la topologie d'apparition, parce qu'ils peuvent éclairer sur leurs fonctions défensives. Avec l'utilisation des systèmes d'information géographique (SIG) et des images LiDAR nous proposons l'étude du paysage de l'âge du Fer dans l'ouest du plateau espagnol, où oppida et fortifications disposant d'une quantité élevée de bandes de pierre plantées défensives sont bien connues parmi l'ancien peuple des vettones. Dans ce territoire, il y a des grands remparts avec des fossés, des gros bastions et des tours. Néanmoins, nous connaissons seulement six cas de défenses de pierres plantées, c'est ça dans les plus riches et grands oppida. C'est pour ça que nous nous demandons les raisons pour ces défenses, bien qu'ils soient considérés comme de simples engins défensifs. À travers des analyses spatiales et des ensembles des significations symboliques et réels de ces contextes, nous proposons une plus compréhensive définition de ce groupe.

## Mots-clés

BANDES DE PIERRE PLANTÉES, SITE FORTIFIÉ, ÂGE DU FER, ARCHITECTURE DÉFENSIVE, FORTIFICATIONS.

## Hillforts with *chevaux-de-frise*, a prehistoric defence?<sup>6</sup>

Upright stone bands or rows in the vicinity of Late Bronze and Iron Age settlement walls are a controversial protohistoric device well known throughout the vast expanses of western Europe, from eastern Italy to northern Scotland (Fig. 1). Traditionally, these elements have been considered

<sup>1</sup> Universidad Autónoma de Madrid, Departamento de Prehistoria y Arqueología. luis.berrocal@uam.es

<sup>2</sup> Universidad Complutense de Madrid, Departamento de Prehistoria, Historia Antigua y Arqueología. lruano02@uam.es

<sup>3</sup> Instituto de Arqueología de Mérida (CSIC). pablo.paniego@iam.csic.es

<sup>4</sup> Universidad Complutense de Madrid, Departamento de Prehistoria, Historia Antigua y Arqueología. gabartol@uam.es

<sup>5</sup> Universidad Autónoma de Madrid, Departamento de Prehistoria y Arqueología. luis.berrocalm@estudiante.uam.es

<sup>6</sup> Project *Late Prehistory Architecture in the Western Spanish Plateau. Archaeotecture and Archaeometry about the Built Heritage of the Vettones Hillforts* (HAR2016-77739-P), Ministerio de Ciencia, Innovación y Universidades, Spain.



Figure 1. Distribution map of upright stone bands in Europe (modified after Berrocal Rangel 2017: fig. 13.1).

a defensive feature, incorrectly labelled as *chevaux-de-frise* (Ralston 2006: 85). Following a functional definition, the *chevaux-de-frise* is a type of 'portable defensive obstacle, typically a beam from which rows of sharpened stakes protrude, used in field fortifications or to close a breach in a wall' (Random House 2010), and therefore we can see no similarities between genuine modern *chevaux-de-frise* and our protohistoric upright stone bands unless we are talking about a common defensive function. However, attributing this sole purpose to these devices seems debatable.

It would be plausible to relate these protohistoric upright stone bands to contemporary or later Roman defensive obstacles. Julius Caesar, in his work *De bello gallico* (VII, 73, 9), informed us of the entanglements used by the Roman legions to reinforce the defences of their camp. These obstacles were placed between the *vallum* and the *agger* – or between the *aggeres* – and were only used to strengthen the defences of temporary camps, but not of permanent fortifications or cities (Deyber 1996: 61). Moreover, none of these Roman military devices is comparable with the development of upright stone bands, as neither *cippi* nor *lilia* were built of stone. Although there are some cases in the Northwest of the Iberian Peninsula dating to the first centuries of the Roman presence in these regions and, probably, these upright stone bands were built under the influence or using the knowledge of Roman military engineers, most of the almost one hundred cases date to either protohistory or to the medieval period (Berrocal-Rangel 2017).

Even then, groups of strikingly similar upright stone bands have been documented in Scotland, Ireland, Spain and Portugal, all of them 'sets of upright, jagged stones arranged in irregular rows, in restricted patches, generally outside, but in close proximity to fortifications' (Ralston 2006: 85). The simplest answer to explain such a wide distribution across western Europe is to reject that these examples were the result of particular cultural links. It is more likely that they were simple defensive elements that may have developed locally and probably had different functions. Most

of the known cases are located in the Iberian Peninsula, around the Northern Plateau and the Atlantic coast. Outside Iberia, we can find different groups on the coasts of Ireland: Dún Aonghasa and Dún Dubh Cathair, Co. Galway; Dúnnamo, Co. Mayo; and Ballykinvarga, Co. Clare (Cotter 2003; 2012; Waddell 2010: 228); Wales: Castell Henllys, Pembrokeshire; Carn Alw, Dyfed; and Pen-y-Gaer, Caernarvonshire (Mytum and Webster 1989) and Scotland, including the Shetland Islands: Dreva and Cademuir Hill, Peeblesshire; Fell of Barhullian, Wigtownshire; Kaimes Hill, Midlothian; Burgi Geos, Shetland Islands (Harbison 1971). Four cases have been located on the Mediterranean coast: Els Vilars and Molí d’Espigol, eastern Spain (GIP 2003; Principal *et al.* 2010), Pech Maho, southern France (Belarte *et al.* 2011; Gailledrat and Moret 2003) and Coppa Nevigata, Italy (Cazzela *et al.* 2012). Recently, four more sites have been published, all of them from Provence (France), and dating to the end of the Iron Age (Isoardi *et al.* 2021: 260).

Since Alexander Hoggs (1957) proposed the first interpretations of this device, there has been much discussion about its possible uses and meanings (Caulfield 1981; Harbison 1971). We have already published a paper where this issue is discussed in depth (Berrocal Rangel 2017). However, we do not want to focus here on the several proposed origins of this device nor on the defensive effectiveness of the different types, but rather highlight an aspect related to both the function and the meaning of these upright stone bands: an element with an obvious defensive purpose imbued with strong symbolism.

### **Examples of upright stone bands in the Iberian Peninsula**

The largest number of hillforts with upright stone bands has been documented in the Iberian Peninsula, with about 90 known cases located mainly in the Spanish-Portuguese Northwest (Alonso *et al.* 2003). However, not all these cases are the same or contemporary, nor do they belong to the same human groups. By studying the relationships and proximity between well-dated sites, we have been able to draw up a distribution map that shows the existence of at least three different and isolated groups of settlements with upright stone bands: the Northwest, the Southwest, and the Northern Plateau. Some cases in the East, such as Els Vilars, Molí d’Espigol and Pech Maho, suggest the existence of a fourth group (Fig. 2).

All of these groups may have appeared at approximately the same time and in a similar historical context in the 8th century BC, a transitional period for the populations of the Late Bronze Age. These are the cases of Passo Alto (800/775–700/675 cal BC), Els Vilars (800/775–700/675 cal BC), Seja and Manzanal de Abajo (770/730 cal BC) or Alto del Arenal (750/710 cal BC) (Berrocal Rangel 2017: 158–162). From the Late Bronze Age to the end of the Late Iron Age, several settlements were guarded by this device, some of which appeared between the 1st century BC and the 1st century AD, already under Roman rule. This fact raises the question of whether the same mechanism, with the same meanings, could have survived unchanged throughout the Iron Age and the early Roman occupation of the Iberian Peninsula. In order to try and resolve this question, we have analysed several morphological features of the hillforts and their defences, as well as their architectural characteristics and the average effective range of contemporary weapons (Berrocal Rangel 2017). With all this information, we have been able to propose four different types of upright stone bands, which are distinguished from each other by their distinct distribution and, therefore, by their different functions (Types A–D: Berrocal Rangel 2017: 162–166).

Our Types A and D are the simplest defensive devices, easily built on rocky terrain. The first group is located in the Northern Plateau, next to small hillforts on high mountain promontories or at river confluences. Dating from the Late Bronze Age to the Iron Age, the upright stone bands appeared in combination with open enclosures built with dry-stone walls, where the presence of bastions or towers is not very frequent. The upright stones are closely packed and randomly arranged, always located along the most open and accessible sections. By analysing their distribution, we have been able to suggest that this device could have been a key component in the defensive system,

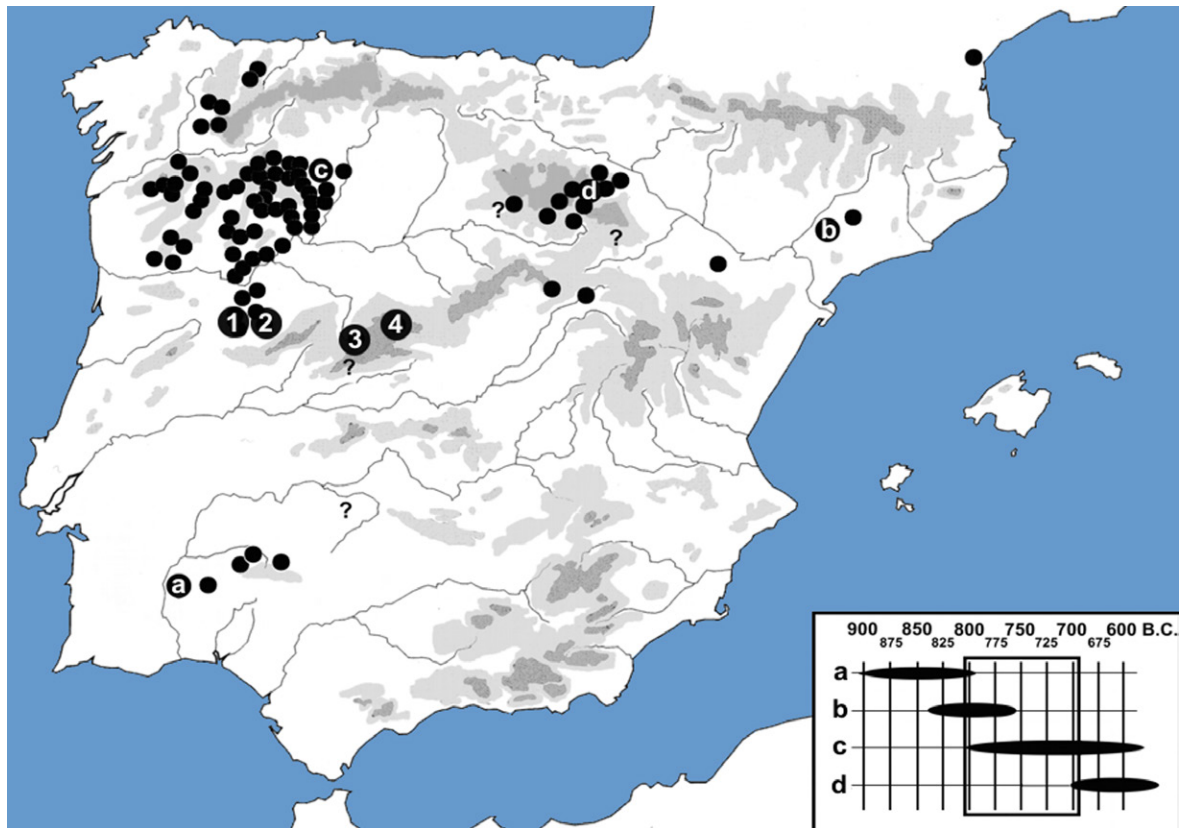


Figure 2. Distribution map of upright stone bands and dated sites of the Iberian Peninsula mentioned in this paper: 1. Las Merchanas, 2. Yecla la Vieja, 3. La Mesa de Miranda, 4. Las Cogotas. Oldest radiocarbon-dated sites: a. Passo Alto, b. Els Vilars, c. Castros de Seja-El Manzanal de Abajo, d. El Arenal (map by the authors).

since it seems to be really effective against Iron Age short-range weapons (Quesada 1997: 476). Although Type D seems to share this defensive function, it clearly differs from the earlier Type A in date, design and location. In this case, the examples are found in the Northwest of the Iberian Peninsula, always dated to the Roman period. It is easy to justify an influence of Romans defensive systems, since the ditches and embankments of several settlements, such as the one at San Isidro, in Asturias, recall the Roman *dupla fossa agger atque* with sharp V-shaped sections.

We cannot assign a set of features for Type C, as this group includes unique and isolated examples characterised by its own peculiarities, all of them dating to the Iron Age. These include Els Vilars, Pech Maho, and perhaps Coppa Nevigatta, Molí d'Espigol, Castell Henllys and Kaimes Hill. In none of these cases, the upright stone bands show a clear defensive function, as these settlements are located on plains or low hills, next to fluvial terraces with no natural dominant positions. However, this device appeared in combination with univallate enclosures, ditches, bastions and towers. Bands of scanty upright stones are found in linear rows, surrounding the walled perimeter. They seem to be stratigraphically related to extraordinary deposits – such as the horses found in the foundations of the wall of Els Vilars – so we presume that they may have been designed with a symbolic meaning in mind.

The last group of our typology, Type B, is similar to Type A, but its examples are distributed throughout the Iberian Peninsula, presenting important differences in form and morphology. Although these cases are easily recognisable as defensive devices, they are always related to symbolic remains, such as sculptures and engravings. Hereinafter, we will focus only on a few examples of this last group.

### **Upright stone bands as defences or defenders?**

Along the western Iberian Plateau, more than thirty cases of hillforts with upright stone bands are known. Categorised as Type B, they share similar characteristics, such as their location on promontories at the confluences of rivers or meanders, surrounded by river gorges. They appear next to medium or large settlements (between 1 and 30 hectares), with open-walled, univallate enclosures. These sites are defended by semi-circular bastions on either side of the main gates, as well as by ditches and a large number of upright stones along the most accessible side. Dating to the Iron Age, these upright stones and ditches are located at a distance of between 20 to 50 metres from the walls, designed to effectively shield them against spears, bows and slings (Almagro Gorbea and Lorrio 2004: 85-91; Bergman *et al.* 1988: 658; Griffiths 1989: 263).

What has caught our attention regarding this group is that they always appear in relation to remains that seem to have a strong symbolic value. As we have already mentioned, the examples of Type C are associated with fortresses that are very well defended by stone ramparts with regular towers or bastions, as is the case of Els Vilars. Located in a plain landscape, a narrow shallow ditch surrounds the entire fortress, and at a distance of 3 metres, flat, aligned upright stones are placed between the ditch and the rampart. A technical explanation for this strange arrangement has been proposed, arguing that the stones may have served to support a defensive barrier of thorny hedges (Quesada 2003: 94). However, in our opinion, the upright stone bands here are useless as a defensive device and this fact, together with the presence of several deposits of horse foetuses, reinforce our alternative proposal of a strong symbolic meaning (GIP 2003: 260-264). But, unlike these Type C cases, our Type B presents several characteristics that do not allow us to underestimate its defensive character.

In this context, we argue for some form of connection between this coarse device and other elements with a clear symbolic meaning. We have found a hypothetical explanation in the Greek myths about the foundation of Cadmeia, the first citadel of Thebes that was built by a race of fierce warriors, the *spartoi* (Berrocal Rangel 2017: 168). These people were born from the planted teeth of a dragon, killed by Cadmus by order of Athena. It is worth recalling that this founding myth is considered one of the oldest in Greek mythology, probably dating back to Mycenaean times. The groups of upright stones could therefore be considered as warrior *stelae*, symbols of the founders and defenders of the settlement.

### **Upright stone bands among the *Vettones* fortresses**

In order to prove this idea in the northern Iberian Plateau, we have tried to confirm the spatial relationship between symbolic remains and upright stone bands, especially when these are located in consistent places for the defence of the settlement. To that end, we have chosen four fortified settlements, located in lands of the *Vettones*, a Hispano-Celtic people among whom the stone craft productions were one of the most important handicrafts. In their settlements, we usually find large walls, built with thick stone masonry and accompanied by big sculptures and engravings depicting animals. The animal sculptures are known as *verracos*, from the Latin *verres* (male boar), as they were identified as depictions of male boars and bulls. Boars are usually represented in an attitude of attack, with faces of ferocity denoted by the size of their open eyes, tusks and ears – the latter pointing back. A small number of these *verracos* have been unearthed in their primary context, located on both sides of the main gate of hillforts and dated to the end of the Late Iron Age or the early years of the Roman presence in these lands (1st century BC / 1st century AD), such as San Vicente gate in Ávila. The walls also bear engravings depicting horses and deer, but also boars and wolves, with a strong symbolism that is widely recognised.

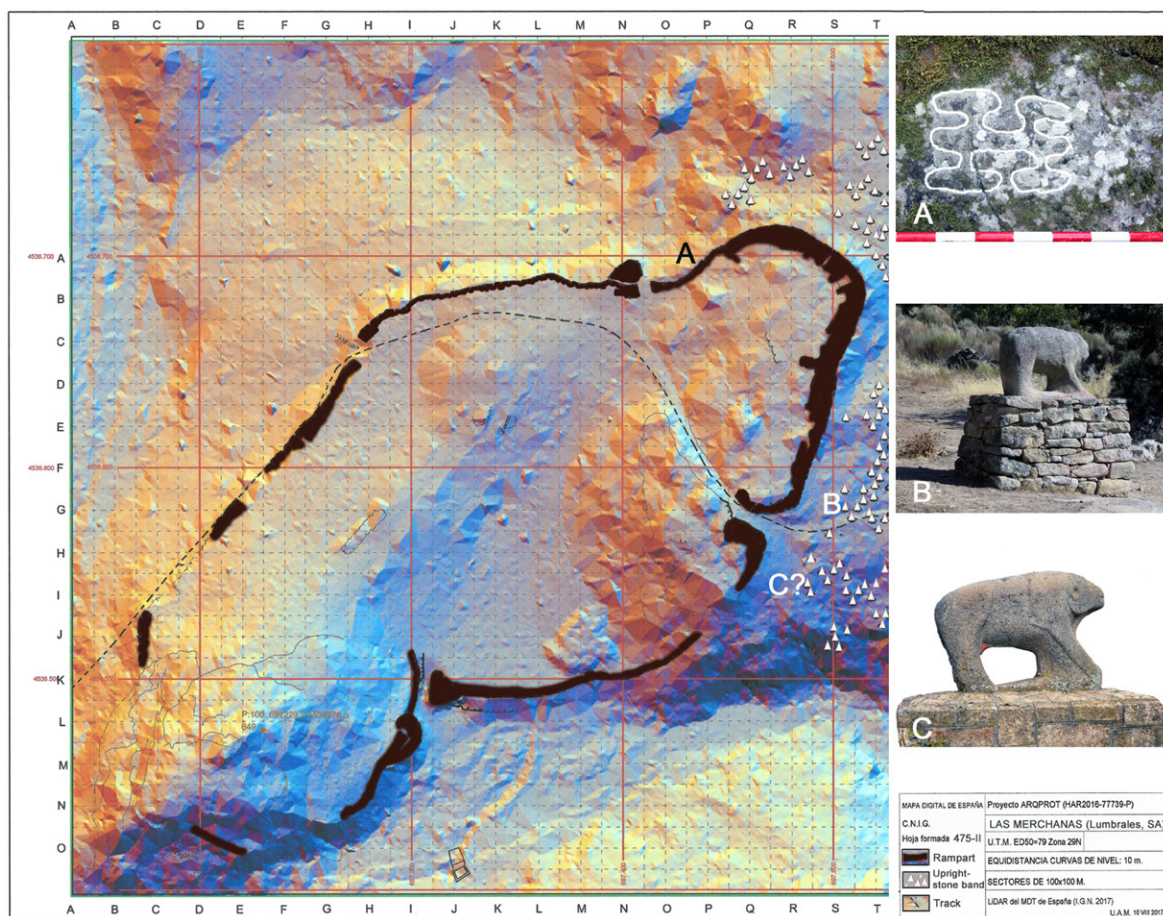


Figure 3. Las Merchanas hillfort, with upright stone band (LiDAR visualisation: hill-shading from 16 directions, 35° sun angle). Azimuthal wolf image (A), engraving and twin verracos (B, C) (map and photographs by the authors).

### *Las Merchanas (Lumbrales, Salamanca, western Spain)*

The hillfort of Las Merchanas is a settlement located near the Spanish border with Portugal. Covering a surface of almost five hectares, this village was defended by a univallate enclosing wall with an undulating layout, due to the large granite outcrops in the area (Fig. 3). Two large gates at the southern and eastern corners of the rampart were defended by a pair of round bastions. From the latter – the largest of these – a huge upright stone band stretched northwards for a distance of 50 metres. The beginning of this band, next to the gate, coincides with the place where a sculpture of a boar in attack attitude was found (Fig. 3.B), and thanks to the lithological and formal analysis we have good reasons to suspect that there was another twin sculpture (Fig. 3.C), one on each side of the gate (Berrocal Rangel *et al.* 2018: 350; Manglano 2018: 147–153). The end of the upright stone band coincides with an engraving carved next to an intricate chink on the north side of the wall (Fig. 3.A). This is a well-known Iron Age motif, representing an azimuthal figure of a wolf, as identified in Celtic pottery and metalwork (Blanco 1997). Thus, there is an obvious spatial relationship between the huge upright stone band and the location of the defensive symbolic representations. We have carried out a visibility and relief analysis – conducted with ArcGIS 10.3 and using different LiDAR visualization techniques, calculated with Relief Virtualization Toolbox (Kokalj *et al.* 2011) – to study this hillfort, and the results obtained are conclusive. The section where the upright stone bands are found is the easiest natural access to the settlement. Furthermore, the upright stones, the twin sculptures and the engraving mark a side of the outskirts that is not visible from the hillfort, neither from the gate nor from the wall. In essence, it is easy to recognise in this example a clear

defensive function for the upright stone bands, along with the remarkable symbolic remains that accompanied them.

**Yecla (Yecla de Yeltes, Salamanca, western Spain)**

In the same region, the fortified settlement of Yecla is another archetypal hillfort. With a similar surface area to the previous case, surrounded by the Huebra river and with a univallate perimeter wall of undulating layout, this enclosure is defended by large round bastions next to the four main gates (Fig. 4). In this example, we only know one *verraco* sculpture, a splendid well-preserved boar in attacking attitude (Martín and Pérez 2004). This *verraco* was also found in front of the main entrance of the hillfort. To the north of this gate, the upright stone bands extend. The excavation of this site showed that the *verraco* was located above a sequence of strata containing *Vettonian* pottery (Martín and Pérez 2004: 289), and a small group of upright stones, dated to the end of the Iron Age, was placed on top of the highest stratum (Benet and López 2008: 175–176). Although the *verraco* was found removed from its original position, this sculpture shows a very good state of preservation, so we presume that it would not have been moved very far.

Yecla hillfort is also a very well-known site for an important group of engravings, carved on the stones of the wall (Romero and Martín 2008). In this sense, this hillfort is exceptional, not because of its shape, extension or engravings – in which it coincides with other sites in the same region – but because of the number and variety of the motifs that were represented on its walls and on the



Figure 4. Yecla hillfort, with upright-stone bands (A, B, white triangles) and engravings (red dots) (LiDAR visualisation: hill-shading from 16 directions, 35° sun angle). On the right: northern upright stone band (A), and a horse (3), a doe and her fawn (2) and a hunting horseman (5) engraved on the ramparts. All of them are located next to the gates (1–5) of the hillfort (map and photographs by the authors).

rocky outcrops on which they were built. With 107 figures, presumably dating to the Late Iron Age, this collection shows mainly depictions of horses and deer, generally isolated, although there are also some groups. There is at least one scene with a spear-wielding horseman chasing a boar and accompanied by a dog, according to the well-known Celtic iconography of the ‘hunt of the infernal horseman’ (Fig. 4.5) (Almagro Gorbea 2018: 123–126; Green 1992: 46–47). Another, simpler one shows a doe suckling her calf (Fig. 4.2), but identifiable scenes are scarce compared to the presence of isolated animals or meaningless groupings of horses and hinds. Other isolated animals can also be distinguished, such as a snake and a mustelid, as well as two boards and three wolves (Fig. 5.1–4).

An overview of the extent of the engravings shows how they are located near the five gates of the walls – three large entrances and two gates – but we do not know which of them date from the Iron Age and which were opened in later times (Fig. 4.1–5). Likewise, upright stone bands run alongside two sectors of the walled perimeter: to the west, with a large field of upright stones closing off access to the flatter part of the surrounding area, while to the south, a small field of upright stones marks a very interesting sector next to a gate that was closed in medieval or later modern times (Fig. 4.4). What is interesting about this site is that the aforementioned sculpture of a boar attacking (Fig. 5.V) was found among the upright stones of the western access, near the main gate where, if the example of Las Merchanas and San Vicente de Ávila is repeated, there should be a second *verraco*.

More interesting, however, is the upright stone band to the south, small and close to the wall, where singular figures of wolves and boars in an attacking attitude are used to mark its limit next

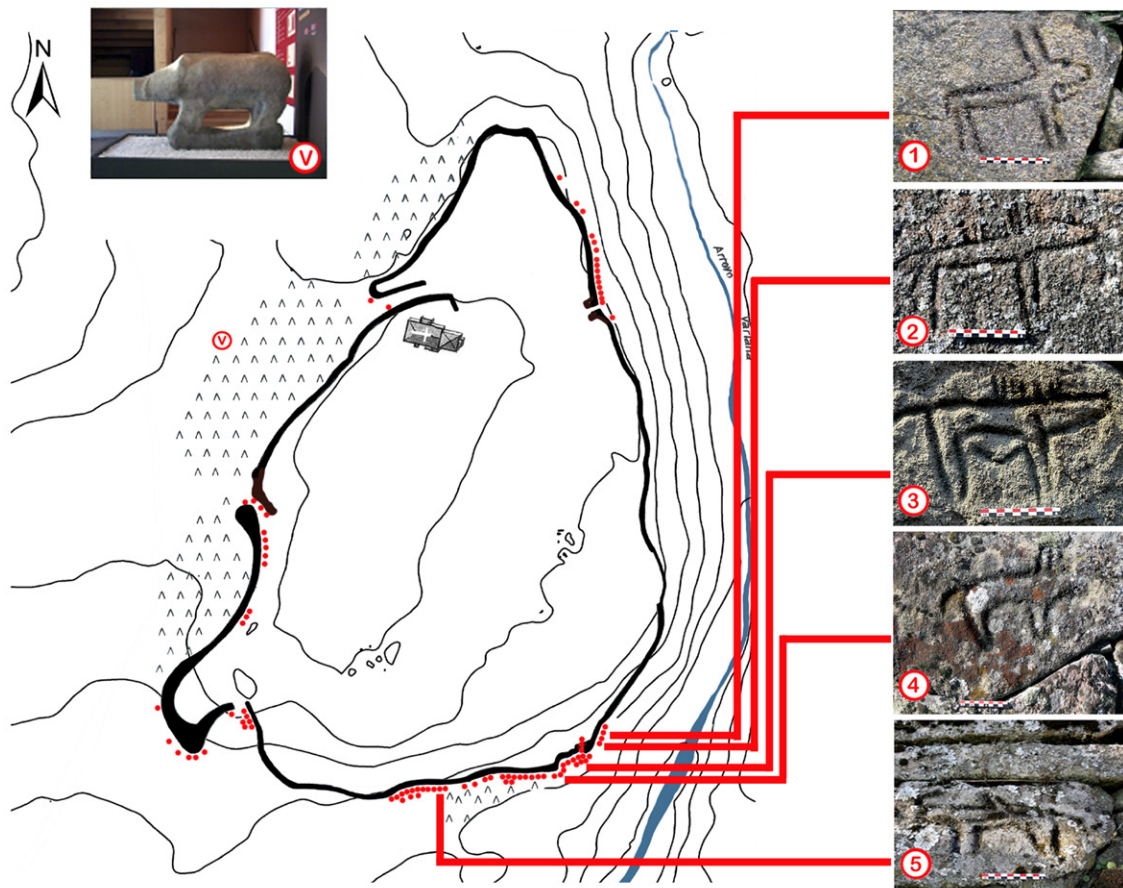


Figure 5. Location of the unique representations of wolves and boars in the hillfort of Yecla, flanking the southern upright stone band and gate no. 4 (map and photographs by the authors).

to the aforementioned gate (Fig. 5). Thus, we see, from east to west, the location of a wolf with open jaws and a boar with its back bristling, both in an attacking attitude, to the left of the gate (Fig. 5.1–2). Another boar and a second wolf are documented on the other side of the gate, just where the field of upright stones begins – or ends. A third possible wolf – or boar, as is not clearly distinguishable – is isolated at the end of the field. This is a replica of the Las Merchanas pattern, as the figures of the wolves and boars, all of them in attacking attitude, were located near a smaller upright stone band and a gate. In addition, the two groups of upright stone bands are visually controlled from the ramparts, which would make sense if we are defending a dual purpose, both defensive and symbolic.

### ***La Mesa de Miranda (Chamartín, Ávila, Central Spain)***

The *oppidum* of La Mesa de Miranda has three enclosures succeeding each other chronologically, from the Early Iron Age to the end of the Late Iron Age (Fig. 6). The oldest, dated to between the 5th and 4th centuries BC, has access only through the south side and was defended by a massive wall with two gates and bastions at each end of this side of the rampart. Between the two gates, a deep ditch and a wide upright stone band of more than 100 metres long form a formidable defence, but no symbolic monuments, such as sculptures, engraving or cave paintings, are known (Álvarez Sanchís 2007: 238). We believe that this is due to the later occupation of the second enclosure, dated between the 3rd and the 2nd century BC, when all the monuments on the periphery could have been removed outside the new rampart in order to clear the inner space. Here, near the entrance of this new enclosure, a *verraco* sculpture was found (Fig. 6.B) (Manglano 2018: 79). This enormous and poorly preserved bull reminds us of another one that was moved a long time ago to the square of the nearby medieval village of Chamartín (Fig. 6.A).

On the other side of this second enclosure, a band of upright stones closes the main access from the west. Right next to it, a small figure was painted on a rock shelter at an unknown time during recent prehistory (Fig. 6.C). LiDAR images and GIS analysis have shown that this last upright stone band and the *verraco* are located on the more accessible outskirts of the *oppidum*, where the two main gates are. This seems to replicate the example of Yecla, although in this case the upright stone band is not visually controlled from the ramparts, putting the defensive role ahead of a possible symbolic explanation for this device.

### ***Las Cogotas (Cardeñosa, Ávila, Central Spain)***

Only twenty kilometres to the east, the *oppidum* of Las Cogotas has the largest field of upright stones of this region. This settlement has two enclosures of different dates, the older one dating to the 5th–4th centuries BC, and the later one to the 3rd–1st centuries BC (Fig. 7). The upright stone band is actually divided into two wide bands that cover the only accessible side of the older univallate enclosure, the northwest side. Three large *verracos* were found in this hillfort, two bulls and a boar (Fig. 7.A–C), and at least two of these sculptures were found among the upright stone band, just 20 metres away from the biggest gate (Manglano 2018: 90–91). Unfortunately, the *oppidum*'s surroundings have been the largest traditional granite quarry in Iberia, so masonry works from Roman to modern times could have destroyed other symbolic monuments as well as many of the upright stones. LiDAR visualizations and GIS analysis have shown that the two upright stone bands and the *verracos* were located again on the easier access to the fortress, the northwest side. In this case, both elements were highly visible from the nearby rampart.

### **Conclusions: upright stones as symbolic and functional defences**

According to the facts outlined above, we argue for a context-based interpretation of a group of upright stone bands with an unquestionable defensive function in the Celtic Iron Age settlements of the western Iberian Plateau. These bands are located in front of the main accessible side of the

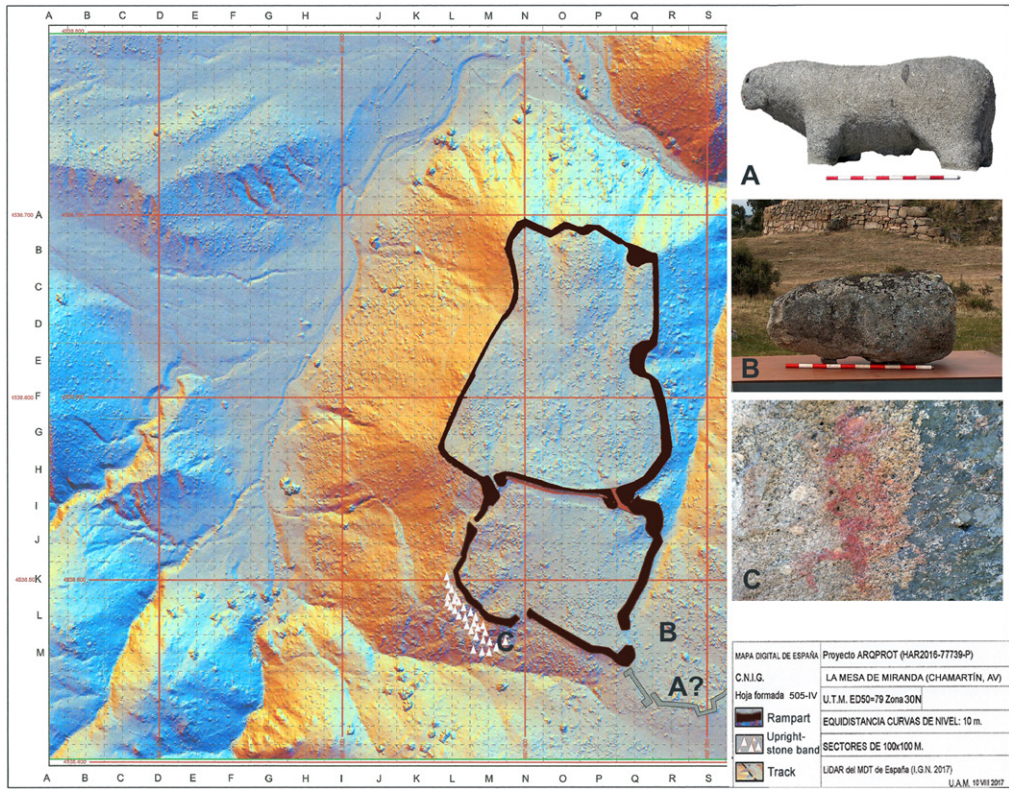


Figure 6. La Mesa de Miranda hillfort, with an upright stone band (LiDAR visualisation: hill-shading from 16 directions, 35° sun angle). Upright stone band from the second enclosure (white triangles), verracos (A, B) and red painting on a rock shelter (C) (map and photographs by the authors).

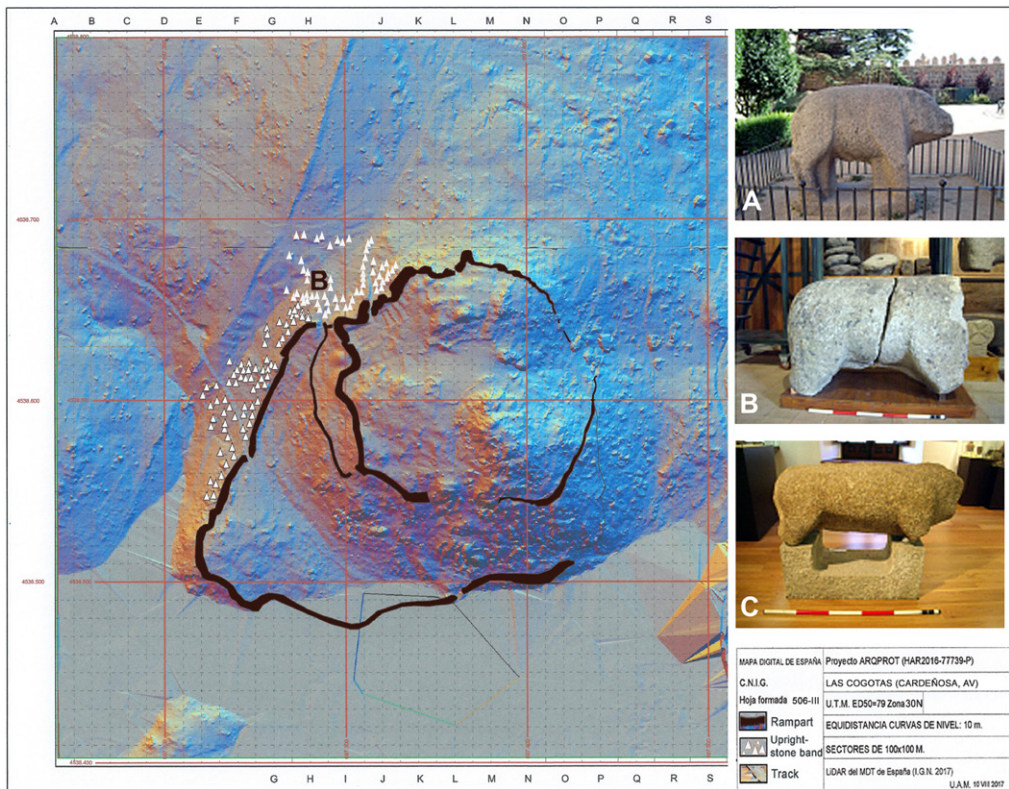


Figure 7. Las Cogotas hillfort, with upright stone bands (LiDAR visualisation: hill-shading from 16 directions, 35° sun angle). The three verracos (A, B, C) found at the site (map and photographs by the authors).

ramparts, in combination with ditches or without them, and usually at a distance of 20 to 50 metres from the walls. This suggests that they were designed to enhance an effective defence against the use of spears, bows and slings, medium-range weaponry well known in Iron Age archaeological contexts.

In addition, we have studied four fortified sites equipped with this device. Like other examples of Type B, these hillforts show that defensive upright stone bands are always related to symbolic remains, such as sculptures, engraving and, perhaps, paintings. All of them are representations of bulls, boars and wolves, and the last two are always presented in a clear attacking attitude, charging against outsiders or strangers who try to cross the upright stone band. Therefore, we believe that these groups of upright stones were also symbols of protection for the communities that inhabited these fortified settlements, according to our interpretation of other older cases of this singular device located in Italy, France, Spain, Wales, Ireland or Scotland.

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# Celtic swordplay: the contribution of the use-wear analysis of swords and scabbards from the La Tène site

Guillaume Reich<sup>1</sup>

## Abstract

Use-wear analysis has been recently undertaken to disambiguate marks of destruction on Celtic weapons of La Tène (Switzerland). Traces relating to combat use, i.e. produced incidentally in the course of fighting (at war, during battles), and traces resulting from intentional damage inflicted as part of during religious rituals (a frequent phenomenon in the Gallic context) can be distinguished from each other. Results have been reached thanks to an approach combining disciplines that are rarely used in Iron Age studies: experimental archaeology, forensic sciences, biomechanics, ethnoarchaeology, material sciences, applied mathematics, anthropology, forensic medicine and battlefield archaeology. The elaboration of a new lexical field and the consideration of restoration techniques bring to light new evidence concerning the fighting techniques of the ancient Celts and provide a better understanding of Celtic warfare. Here we focus on the uses of swords and scabbards.

## Keywords

LA TÈNE, CELTIC WEAPONRY, FIGHTING TECHNIQUES, WAR, USE-WEAR ANALYSIS.

## Résumé

La tracéologie a récemment été utilisée pour distinguer les traces de destruction sur les armes celtiques de La Tène (Suisse). On distingue en effet des traces liées à l'usage martial, c'est-à-dire obtenues fortuitement au cours de combats (à la guerre, lors de batailles), et des mutilations volontaires produites lors de rituels religieux (un phénomène fréquent en contexte gaulois). Des résultats prometteurs ont été acquis grâce à diverses disciplines peu ou pas utilisées d'ordinaire dans les études sur l'âge du Fer : archéologie expérimentale, sciences forensiques, biomécanique, ethnoarchéologie, ingénierie des matériaux, mathématiques appliquées, anthropologie, médecine légale ou archéologie des champs de bataille. L'élaboration d'une terminologie adaptée et la prise en compte des techniques de restauration apportent également de nouveaux témoignages sur les techniques de combat des Celtes et permettent une meilleure compréhension de la guerre dans le monde celtique. Nous nous focalisons ici sur l'utilisation des épées et des fourreaux.

## Mots-clés

LA TÈNE, ARMEMENT CELTIQUE, TECHNIQUES DE COMBAT, GUERRE, TRACÉOLOGIE.

## Introduction

The archaeological site of La Tène (Switzerland), located at the level of the northern spillway of Lake Neuchâtel, where the Thielle River resumes its course, was identified in 1857. Investigated by generations of prehistorians, the site has yielded about 5000 artefacts in a variable state of preservation, but most of them presenting an exceptionally well-preserved original surface due to the deposition of the material in an anaerobic atmosphere. The remarkable taphonomic conditions are not the only asset of the site, since the volume of material found, whether organic or metallic, makes it one of the most emblematic batches of recent protohistory.

Object of a growing interest within the historical sciences, particularly since its designation as the eponymous site of the Late Iron Age in temperate Europe at the 7th International Congress of Prehistoric Archaeology and Anthropology in Stockholm in 1874, this famous complex has nonetheless been the subject of bitter debate as to its nature and functions (Kaeser 2013), justifying new excavations in 2003 (Reginelli 2007). The surviving architectural structures, formerly identified as and supposed to be bridge piers, named in the archaeological publications as the

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<sup>1</sup> MSHE Ledoux - UAR 3124, CNRS, UBFC, Besançon. dr.guillaume.reich@gmail.com

'Pont Vouga' (Vouga Bridge) and 'Pont Desor' (Desor Bridge), have been interpreted respectively as the remains of a pile dwelling settlement or an oppidum, the ruins of a lacustrine village, a refuge or an arms shop, the traces of a fortress, an arsenal or a military post, the remains of a toll house or a settlement with a port.

The hypothesis that this site, shrouded in mystery, was a place of worship, which was advanced as early as 1898 by Sophus Müller but which did not meet with the enthusiasm of his contemporaries, was quickly abandoned (Müller 1898). It was not until Klaus Raddatz in 1952 proposed to consider the site as an 'Opferstätte', i.e. a place of sacrifice, in the same way as the Nordic wetland/bog deposits that the place was recognised to be so (Raddatz 1952). In 1954, René Wyss agreed with the cult hypothesis and interpreted La Tène as an 'offrande à la divinité guerrière Mars Caturix' (Wyss 1955). As early as 1959, José Maria de Navarro adheres to this 'cultic' interpretation (De Navarro 1959); later on, the idea of 'dépôts rituels' (ritual deposits) is taken up by Herbert Jankuhn (1966), Renate Rolle (1970) and Walter Torbrügge (1970/71) to varying degrees. Richard Pittioni challenges cult hypothesis, and particularly insists on the difference between the known cult sites (Duchcov, Moritzing, Roquepertuse and Entremont) and the site of La Tène (Pittioni 1968). It was the discovery of the site of Gournay-sur-Aronde (France), excavated in 1977 at the instigation of Jean-Louis Brunaux, that brought the most tangible arguments to this thorny issue (Brunaux et al. 1980). Interpreted as a sanctuary, this French site has significantly renewed our knowledge of Celtic weaponry and the beliefs of the Gauls. The French site and the Swiss site show astonishing similarities, with accumulations of hundreds of weapons showing traces of destruction, human and animal bones, making the cultic interpretation more convincing. Following the work of Andres Furger Gunti in 1984 (Furger-Gunti 1984) and especially Felix Müller in 1992 (Müller 1992), the cultic function of the La Tène site seems to have become established within the scientific community. More recently, Thierry Lejars, in his study of the La Tène collection preserved in Bienne (Lejars 2013: 428), proposed to read it as the architectural and movable remains of a military trophy erected on the banks of the Thielle to commemorate one or more warlike events that occurred during the La Tène C1b/early La Tène C2 phase (end of the 3rd century/beginning of the 2nd century BC).

However, in order to support this interpretation, the file lacked a crucial element: an understanding of the pre-depositional treatments of the main category of artefacts recorded at the site, namely weapons. These weapons – iron spear heads, spear butts and spear hilts, swords, scabbards and suspension/belt elements, shield bosses, rivets/nails, reinforcements for shield handles or, rarely, complete shields – represent the most significant part of the La Tène corpus and give the site an undeniable warlike character. For the Swiss collections of Neuchâtel, Biel, Bern and Geneva alone, the minimum number of individuals of La Tène weapons is 329 (106 swords, 99 scabbards). Attention was focused on the largest collection of La Tène weapons at the Laténium (Neuchâtel).

Many of the weapons in the La Tène assemblage appear to show traces of destruction that alter their original morphology. It is these traces that we propose to investigate in order to identify the causes behind the abandonment of those weapons (Reich 2018). The aim is to determine whether it is possible to distinguish between traces of martial use, i.e. produced fortuitously in the context of combat (in war, during battles), and destruction occurring during intentional ritual decommissioning, a frequent phenomenon in the Celtic context. Corollary: if the distinction between destruction in the context of fighting and in the context of ritual can be identified, is it possible to go back upstream from the trace, therefore to the initial gesture? In other words, can we, from the stigmata identified on the weapons, better understand the Celtic fighting techniques or hope to understand the rites related to spiritual beliefs? We have been able to answer in the affirmative to the main issues raised. This short article presents some of the results obtained from the analysis of swords and scabbards and briefly explains the methodological means used to obtain them.

### **Use-wear analysis on iron weapons: methodology**

The state of preservation of most of the weapons from the eponymous deposit, as we have said, remains remarkable: many of them have a surface simply covered with a fine patina, close to their original appearance. However, the original surface (limitos) of this military equipment is not always directly observable, reflecting deposits affected by variable taphonomic phenomena and various treatments of the artefacts after their discovery. Thus, some weapons in the La Tène corpus are extremely fragmented or trapped in large sedimentary concretions, to the point that the morphology of the weapon suffers. Others are subject to various alterations, such as acid attacks (sulphides) or the formation of gangues of powdery corrosions blistering the surface of the weapon. Others have been subjected to excessive restoration work, using various physical and chemical processes that expose the metal, such as electrolysis. Despite this, it seemed appropriate to develop an original use-wear analysis method that could shed light on the destructive treatments to which the weapons were subjected before being abandoned. Although its use was not deemed necessary for La Tène weapons, for other less well-preserved collections, the potential of 3D and X-ray imaging such as tomography should be emphasised, as this non-destructive method is particularly well-suited to gathering information under corroded envelopes.

A systematic recording of the archaeological documentation proved to be an indispensable prerequisite. Metric data and precise descriptions formed the primary backbone of this exhaustive cataloguing exercise. Macroscopic drawings and photographs (overall views of the weapons and of the most obvious traces) as well as microscopic ones (small traces, tenuous details linked to design or conservation-restoration) have thus supported a classic typo-chronological study. The latter allows clear comparisons, which examine the influence of these militaria in various territories, from the nerve centres of the La Tène culture to the margins of the Celtic koinè.

The study did not limit itself to this conventional approach. In order to carry out the use-wear study, it was necessary to highlight – and thus understand – the marks associated with the manufacture of the weapons (conceptual and practical notions of palaeometallurgy), the physical deformations and chemical alterations attributable to post-depositional processes and the transformations caused by the restoration processes (empirical or calibrated, ancient or recent; identified through observation and the rare archives available). The identification of traces required the establishment of a standardised semantic framework. This adapted terminology made it possible to isolate and classify the traces according to their main characteristics quite quickly.

Forensic science has been of great assistance in the creation of a coherent lexical field (perception of the trace) but also in the recording of destruction traces. When working on traces where the stakes are high (the guilt or innocence of a person in the context of an offence or crime), the forensic services deploy a semantic arsenal (for example, the classification of traces into ranges: moulded traces, slipped traces or superimposed traces) and techniques (such as the precise moulding of a trace or the use of different angles of incidence in the optical examination of traces: low-angled light, slanting light or zenithal light), which can be transposed in part to the study of Celtic weaponry.

A sine qua non for its effectiveness, the use-wear analysis was coupled with a morpho-functional approach to the weaponry. Thus, the examination of the use that may have been made of these weapons was based on and nourished by a combination of different disciplines, sometimes far removed from each other.

Experimental archaeology constitutes the primary basis of the approach. It has the merit of making it possible to establish an observation based on what has been observed: the gesture prior to the creation of a trace is known; the link between the cause and the consequence remains obvious. Rightly restricted for ethical reasons, martial experimentation with replica weapons cannot



Figure 1. Martial experimentation with secure polymer simulators (photograph by the author).

suffer from insufficient material, physical and psychological preparation. Before using a weapon – initially intended to injure and/or kill an adversary – while seeking to preserve one’s own and one’s partner’s bodily integrity without impairing the fluidity of movement, a long period of training is desirable, both for men and for the horses used as mounts. Neutral simulators made of various materials (wood and polymers) were used for this familiarisation phase. This stage allowed the various individuals involved (from the beginner to the experienced fighter) to concentrate on gestural harmony, so that blows could be effectively delivered without fear of irreparably injuring their comrade (Fig. 1).

In order not to be too costly (and therefore impossible to implement with personal means), the experimentation justified, before using realistic facsimiles, the removal of certain theoretical limits. Indeed, some argue that for an archaeological experiment to be scientifically valid, it must use weapons that are perfectly identical to the originals. While it is possible and obviously necessary to respect the metric data (dimensions, weight, angles), the morphological characteristics and the fundamental physico-chemical properties of the weapon, aiming at an equal ductility, a similar microhardness, a strictly equivalent composition and internal structure is a challenge. It is an ideal which we can hope for, but as such it remains unattainable: a replica can never be an exact copy. And even if it were, thanks to the monopolisation of considerable resources, a tiny deviation in the use of this facsimile could reduce the efforts to nothing. It is clear that the best is sometimes the enemy of the good. On the other hand, it is up to us to define, according to the problems raised, the criteria by which a replica can be judged as acceptable for the purposes of the experiment. In order to achieve this, we devised the production of control samples subjected to a battery of identical tests (Fig. 2). These samples, reproducing the same half-section of a longitudinal fragment of a La Tène sword blade, were designed with various technical processes, meeting both protohistoric and modern metallurgical criteria, with ferrous alloys of varying carbon and phosphorus contents, and finished with different types of processes (tempering, annealing, etc.). Cutting blows were then delivered by the same cutter sliding in small guillotines in which the test specimens were placed; the blade fell from several predefined heights, which were strictly identical from one test specimen to the next. The outcome from these tests shows that, as long as the range of ferrous alloys is sufficiently close, there is no need to achieve absolute similarity between the archaeological artefact and its replica.

Sample	Designation	Item	C	Si	S	P	Mn	Ni	Cr	Mo	V	Cu	Fe
n°1	Low furnace iron	Control sample	0,15	0,25	0,0101	0,0099	0,4564	0,0207	0,022	0,0052	0,041	0,0312	99,0035

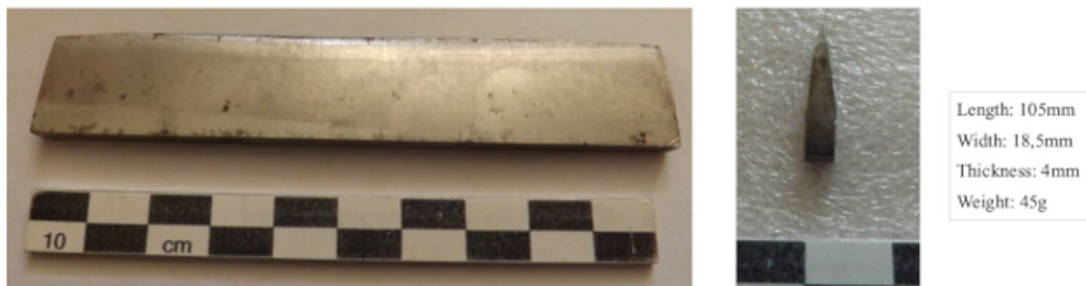


Figure 2. Example of a control sample undergoing a battery of tests in a guillotine (after Reich 2018: 455).

Once these essential preliminaries had been completed, the use of facsimiles could be considered. In order not to rule out the possibility that La Tène weapons may have been destroyed intentionally, weapons reconstituted for the occasion were deliberately mutilated with tools: hammers, clubs, axes, shears, pliers, stones, etc. At the same time, good replicas of La Tène weapons were used during many fighting sessions (Fig. 3). In order to prevent unfortunate injuries, the fighters wore appropriate body protection that had to combine resilience to the efficiency of the metal weapons in their various potential uses and minimal weight in order to maintain optimal conditions for exercise. The salvifical marriage of these various elements has sometimes proved to be visually



Figure 3. Experimental use of facsimiles: sword strike by a cavalryman on the shield of an infantryman (photograph by the author).



Figure 4. A replica sword bent in the middle part (photograph by the author).

rocambolique: 1600N European historical martial arts masks or medieval camails combined with gladiatorial helmets, chain mail, gambesons and anti-cut clothing designed for lumberjacking, traditional butcher's gloves, manicae and ocreae, etc. In order to be valid and reproducible, these experiments were recorded in protocols that allowed the communication of the experimental conditions, the description of the gestures used and the results observed (Figs 4 and 5).

For fighting techniques, the use of different sources has made it possible to determine the most likely gestures. Ancient iconography, both indigenous and non-indigenous, observed in statues and in reliefs as well as on coins and other media, is of crucial help. It is simply necessary to bear in mind that this type of imagery, by its very nature, is the selection of a moment T of a complex sequence of movements. Interpreting the upstream and downstream of this frozen moment raises the problem of parataxis: the gaps must be filled. Other information (cf. below) can then help the reader of the image who wants to reproduce the gesture, without answering all his questions. The interpreter faces another limitation: he must move from a two-dimensional materiality to a three-dimensional spatial reality. In addition, the technical actions reconstructed, in order to be described intelligibly, presuppose the development of an ad hoc terminology, often abstruse for the uninitiated (this is one of the challenges of the motor praxeology).

In an extremely summary way, verbal testimonies about these martial actions have been left to us. A rereading of the ancient literature proves to be profitable, although one must naturally be wary of the inevitable topoi conveyed by the texts. A critical apparatus remains necessary. These written sources nevertheless provide a common thread, if only through the negative reflection they can sometimes send back (pointing out martial customs that are foreign to the culture that issued them). Paradoxically, if the Greeks and the Romans were verbose about the customs of the Celts, for which accounts of confrontations abound, it is not so much their barbaric martial techniques that cause astonishment, but rather the prolegomena to combat, their tactical conceptions or the customs after the battle. In the last centuries before our era, therefore, there are probably bridges between these cultures, at least in terms of the way in which weapons were handled.



Figure 5. Notches with warping on the medio-distal region of a Celtic sword replica (photograph by the author).

Following this same logic, the use of ethnoarchaeology has proved to be of the greatest interest. This approach offers the major advantage of providing a comparator reference, valid in a given cultural framework, but sometimes transposable, at least in certain aspects, to Celtic societies. These parallels make it possible to move from the inanimate object to the moving weapon, thanks to information of another kind, namely the direct or indirect, oral or written testimonies gathered by anthropologists and ethnographers from 'traditional' populations currently living or from cultures that have recently disappeared. They provide a basis for understanding the various treatments to which the weaponry may have been subjected, from its conception to its abandonment: techniques of manufacture or repair, uses in combat, and cultural practices. Comparisons with other ancient cultures have also proved fruitful, particularly in the description of a battle setting or the statement of a religious rite.

The armament was instinctively set in motion, supported by three essential axes for the development of an 'archaeology of gesture'. The first axis is the consideration of biomechanical laws. The aptitudes and limits of the human body are similar for the contemporary experimenter (provided he is physically prepared) and the Celtic warrior. Second axis: the use of applied mathematics and material engineering considerations. In other words, the dynamic properties and intrinsic characteristics of weapons can be judged. These are based on physical laws and have not changed since protohistory. Third axis: the use of anthropology and forensic medicine. Some Second Iron Age sites, starting with La Tène and Ribemont-sur-Ancre, have been the subject of in-depth osteological investigations that have made it possible to identify the areas most affected (fatal or incapacitating wounds) on human skeletons (Jud and Alt 2009; Ricard 2014; Thiol 2002). The forensic evidence available for more recent periods offers insight into soft tissue reactions to bladed weapons and provides relevant comparisons with the injuries likely to be produced by Celtic weapons.

Once the weapons have been used, it remains to harvest the fruits of the experimentation, i.e. to compare the macroscopic and microscopic traces produced on the facsimiles with those observed on weapons from archaeological contexts. Funerary contexts (individual graves or necropolises) are of limited interest here. Sites considered as 'sanctuaries' are already more interesting, but also more problematic because, after all, their characterisation is not so obvious. This is where battlefield archaeology comes in, and we believe that it has an undeniable advantage: weapons found in an identified theatre of operations (such as Alesia or Kalkriese), if they are subject to alteration, are likely to have been altered accidentally by their mere use in battle. If the experimental weapons show traces of destruction close to those observed on the archaeological battlefield, this confirms that the use made of them is plausible. All that remains to do is to compare all of these weapons, in known contexts (experimentally: fight; battlefield archaeology: war), with the original artefacts from the La Tène site. If the traces are comparable – and they are! – it is a valuable indicator of the function and nature of the eponymous deposit.

A notable advantage of this multidisciplinary approach is the possibility of identifying plausible leads from converging clues, i.e. if several paths, including various rational procedures (strictly factual, measurable, verifiable and objective), lead to the same observation(s), it is convincing that this can be established as a rule. More concretely: results confirmed simultaneously, through experimentation with facsimiles, materials engineering and applied mathematics, are rather auspicious and favour the projection of the initial working hypothesis onto the original artefacts. Without denying that it may occur marginally at some point in the enterprise, empiricism here is generally overcome by the multiplication of approaches, as are fantasies and other cultural paradigms. Three types of bias posed potential dangers here: excessive smoothing of data (i.e. believing that because three cats in a litter are grey, the fourth is necessarily grey), circular reasoning (i.e. justifying causes and consequences in the same breath) and the potential weakness of interdisciplinarity (the addition of two half-mastered skills does not equal complete mastery). It seems to us that they have been avoided by three means: firstly, rigorous caution, sometimes

perhaps excessive, limiting itself to elaborate minimalist scenarios in certain cases (bringing its share of frustrations, moreover); secondly, the generalisation of an idea solely on the basis of the gathering of a majority of tangible data, or at the very least supported by the combination of ‘empirical’ arguments and solid testimonies; thirdly, the contribution of multiple people with attested competencies (engineers, mathematicians, restorers, blacksmiths, palaeo-metallurgists, etc.).

### **The marks of destruction on La Tène swords and scabbards**

The reader will forgive us for focusing on a few brief aspects and providing a short exegesis of some fifteen years of research; for complete demonstrations, we refer to our aforementioned doctoral thesis and to our already published works (e.g. Reich 2020).

Five categories of traces have been identified on the La Tène archaeological material: 1. breakage and fragmentation; 2. notches; 3. perforations; 4. crushing; 5. bending. A standardised descriptive vocabulary was established in order to specify the exact morphology of a trace sub-type. It should be noted that experiments carried out with specific objects (weapons or tools) leave a characteristic signature on the ferrous alloys. The comparative assessment of the marks from the experimental corpus and those visible on the original militaria allows us to specify that none of the destruction marks on La Tène weapons (apart from one pole weapon of dubious provenance) stems from a ritual mutilation. The traces of anthropogenic origin on the weaponry are produced by other weapons, and one cannot seriously consider a mock battle for the sole purpose of slightly damaging the weapons.

#### ***Breakage and fragmentation***

The observation is without appeal: at La Tène, only taphonomic processes linked to abandonment or corrosion products reactivated since the discovery of the weapon caused the fragmentation of swords and scabbards.

#### ***Notches***

While some notches may have been created by corrosion following the abandonment of the swords, everything leads to the interpretation that these marks were produced accidentally by the encounter of two weapons in combat. Indeed, the first essential point is that notches are almost exclusively observed on offensive weapons (swords and polearms). A second essential aspect is that these marks tend to be distributed on the ‘expected’ parts, according to martial logic. Thus, it is clear that the stigmata on sword blades are mostly concentrated in the medio-distal to distal areas (the area where the blows can be delivered with the most strength and where the material can absorb the impact without being weakened) (Figs 6 and 7). These notches are, in most cases, shallow: they are mostly notches of less than 2 millimetres or notches of less than 5 millimetres. Furthermore, it is significant that, for the La Tène corpus, only one sword scabbard has a potential notch.

In general, we remain sceptical about the interpretation of such marks as deliberately produced marks. Indeed, these light marks do not in any way neutralise the weapon in its martial uses. Thus, apart from being located in the active parts of the offensive weapons, the notches on the swords from the La Tène site have little in common with the most obvious cases of ritual destruction observed at other archaeological sites, both in terms of intensity and frequency.

The evidence of minor notches on swords kept in scabbards (at the time of the site’s discovery) is a strong argument for interpreting these swords as functional weapons used in at least one battle prior to deposition, even several years earlier. The warping that would have been present on these marks has disappeared in many cases, suggesting maintenance and repair of the swords,



Figure 6. La Tène sword no. 2745 with a series of notches concentrated in the medio-distal part of the blade, NMB New Museum Biel, Schwab Museum Collection (photograph by B. Redha, Service archéologique du canton de Berne).



Figure 7. Focus on the notches with warping of La Tène sword no. 2745, NMB New Museum Biel, Museum Schwab Collection (photograph by B. Redha, Service archéologique du canton de Berne).

including sharpening. Indeed, the precise fit of the scabbard plates directly on the blade of the sword prevents a sword with even a slight overhang from being placed back in the sheath.

### *Perforations*

No swords from the La Tène site are affected by perforation. A few perforations have been found on sword scabbards, but these are probably due to taphonomic reasons (corrosion). It is not insignificant that the other category of artefact concerned by this type of destruction is the shield boss: these alterations only affect thin metal sheets. It is hardly possible to interpret these perforations as anything other than the result of electro-chemical decay. Indeed, there is no indication of any physical-mechanical process for obtaining these holes, a process that could occur in the context of anthropogenic destruction, whether voluntary or accidental. No ‘secondary’ trace around these stigmata (sinking, formation of a teat, etc.) is observable, so that the natural formation of these holes, mostly perforating, is obvious.

***Crush damage***

Crush damage on swords appear to be of anthropogenic origin. Some swords show crush damage with slight settling of the material, distributed between windings, crumpling and corrugations, associated with notches. These marks are reminiscent of the marks produced by blunt impacts against a polearm shaft or the rim of a shield (possibly reinforced with metal strips).

In the Neuchâtel corpus, only one example of a sword scabbard shows an instance of crush damage. This deformation occurs at the level of the trigger guard: the lower fixing lug seems to have been pulled violently, remaining in place only due to the presence of the rivet. This type of combination of traction and compression could have been achieved by a fall. The scabbard, held to the side during an accident (fall of the warrior) by the presence of the trigger guard, would then have been bent slightly, causing the gutters to burst in the middle and the trigger guard to be crushed.

***Bending damage***

The voluntary bending on the swords appears to be very inconclusive in view of the low intensity of alterations at the Swiss site. There is none of the relentlessness seen at other archaeological sites, where the bending can be extremely pronounced, with complete windings or 'knotted' swords. There is not the systematic nature of deliberate deformation of artefacts. Alterations related to taphonomy (falling after exposure, corrosion, sedimentary compression) are conceivable. However, what seems to prevail in this assemblage are deformations that are too subtle to be the result of a deliberate attack on the weapons, but too pronounced to be the result of the weapons' abandonment alone. There is nothing to definitively rule out these causes, but they appear implausible.

Rather, the corpus invites us to read the bending damage (bending and twisting) on the swords as resulting from 'normal' use. In most cases, the bending damage visible on the swords can be the result of various phenomena frequently occurring in the course of their martial use of weapons, easily explained by hitting and trapping in a physical body, such as by slamming into a shield. The rapid translation of the shield by the opponent is likely to bend or twist the blade.

The most common trace observed on scabbards is bending. Folds and twists are common and vary in nature, from very slight to very pronounced bending, even slight twists and windings. The few traces on archaeological specimens have been explained by martial experiments: they may have occurred during various 'accidents' along the way. A recurrent deformation is produced by the simple bending of the infantryman's legs, in the context of the fight itself or at other times, when the sword is drawn. The distal part of the scabbard and the chape come to rest against the ground. A simple lateral pressure or a continuous downward movement is enough to slightly arch the very thin sheets of the empty scabbard.

Another type of curvature is created by the entanglement of the infantryman's legs in the scabbard, especially at high speeds. It can happen that the suspension system moves slightly from the outermost part of the hip: the scabbard slips and the feet or legs get entangled in it, which can also cause a fall. It can also happen that another fighter unintentionally hits the scabbard. These episodes alone can cause the scabbard to bend slightly and twist slightly, as we have seen. It should be noted that a scabbard containing a sword may, in some falls, be similarly bent by the weight of the fighter's body: the sword is then also bent. The sword may tend to come out of the scabbard very slightly in the event of a fall; the bending of the scabbard and the blade still takes place.

We also noticed marked, or even very marked, bending damage in the proximo-medial and medial parts of the scabbard, caused by the infantryman falling on his right flank during the martial use of the sword. As he fell, the hip and the buttocks of the scabbard wearer compressed the two plates – causing a rough crush at the same time. The scabbard adjusted to the shape of the wearer's



Figure 8. Wrapping the sword scabbard around the fighter's leg after a fall (photograph by the author).

body. We also produced a very marked bending, broken down into three flexions (one weak and two marked), obtained by the infantryman falling as a result of his legs being entangled in the scabbard. As he fell, his hindquarters, hips, flanks and legs compressed the entire scabbard, which was then emptied of its sword. This accident caused the scabbard to wrap around the fighter's leg (Fig. 8).

The last case of bending damage, usually a weak and gentle bend, is produced by the rider. When he uses his sword and moves at a trot or gallop, the empty scabbard beats on the horse's croup. This repetitive swinging movement, a succession of small rapid blows, is sufficient to cause this rounded flexion.

Several scabbards seem to have been straightened in the past, although it is not possible to say whether this was done in the Celtic period or after the discovery of the artefacts. A bent blade prevents the sword from being put back into the scabbard; it is therefore natural that the object, which is quite fragile and certainly subject to regular alterations, frequently shows the marks of a straightening.

Alterations linked to taphonomy could also have occurred, from falls after exposure to corrosion to sedimentary compression. However, what seems to prevail in the La Tène archaeological corpus are deformations that are too subtle to be the result of a deliberate attack on the original weapons, but too pronounced to be the result only of the abandonment of the artefacts. There is nothing to definitively rule out these causes, but they appear implausible.

It follows from these observations that all the traces of destruction on the swords and sword scabbards from the La Tène site can be produced accidentally in the course of a fight. A similar

observation is made for the other components of the weaponry, i.e. spear heads and spear butts, as well as the shields.

**From traces to gestures: proposal for the restitution of some sword fighting techniques**

Raising the question of the uses of swords means taking into account the constraints that prevailed in their development and understanding that a priori minimal variations are important, such as the shape of the ‘guard’, the size of the grip, the physiognomy of the distal end or the presence of a median rib. It means identifying the role of the scabbard and the suspension system in the context of fighting, understanding the joint articulation of the sword with other weapons (notably the shield) or perceiving the role of the swordsman within a group of fighters. More generally, to appreciate the effectiveness of this weapon is to glimpse the evolution of martial techniques and to identify the existence of ‘types of warriors’ whose panoplies are confirmed by typo-chronological analysis.

Relatively long, the Celtic sword is thought to be designed to strike with the edges, making frank use of its two parallel cutting edges (axial symmetry of the weapon). When the sword is held vertically, pointing upwards, the cutting edge facing the opponent is called the true edge, while the edge of the blade facing the fighter holding the sword is the false edge. The narrow flatness and the frequently lenticular cross-section of its blade favour aerodynamics: the sword has only a reduced hold on the air during rotational movements. This impression of a weapon designed for cutting is supported by the dynamic properties of the sword (Fig. 9). These properties reflect its applied use: the weapon is not designed as a motionless object.

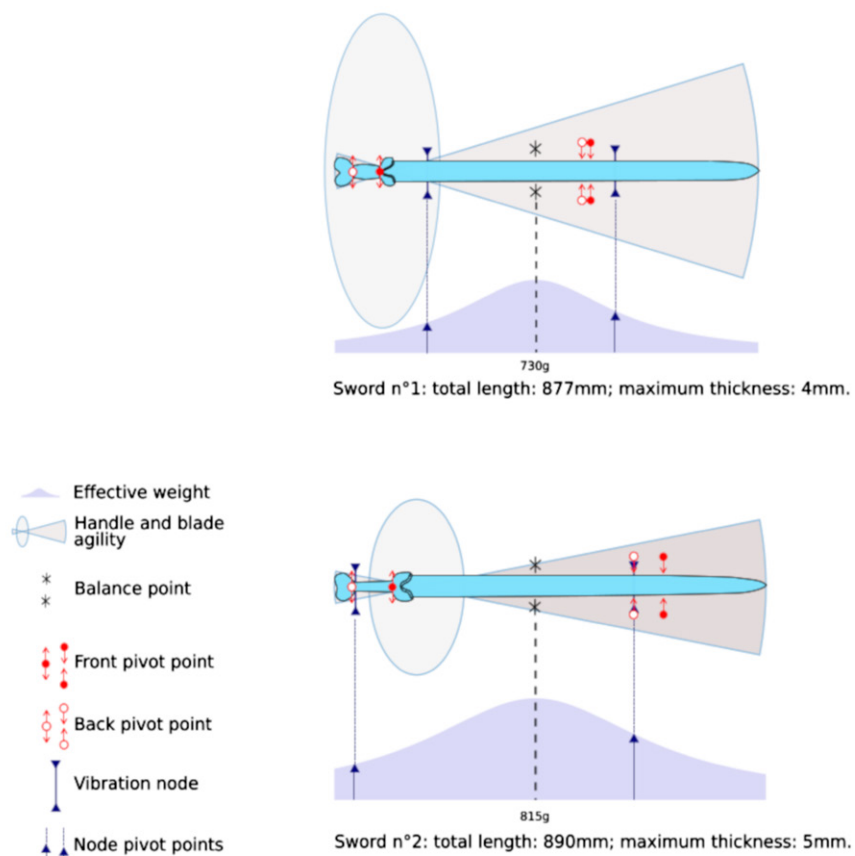


Figure 9. Dynamic properties measured on two replica swords based on La Tène specimens (after Reich 2018: 418).

The overall mass of the sword has an impact on its mobility as well as on its efficiency in defence and attack. The distribution of the mass is rather homogeneous on the Celtic swords measured. The point of balance is approximately in the middle of the total length of the sword, i.e. in the medial region, between the weak and the strong part of the blade. This confirms that La Tène swords are suitable for cutting strikes, but require a lot of strength and energy to use. The best way to overcome this energy-consuming defect is to adopt a dynamic fighting style with wide 'throwing' gestures. Rotational inertia carries the weapon away. The sword requires a little force on the first strike, but once set in motion, the blade is easy to handle.

The pivot points, or rather the centres of oscillation associated with a point, occur in pairs and are a consequence of the rotary inertia of the sword. A point measured along the length of the grip has a corresponding point in the blade. In other words, if the hilt is moved laterally back and forth, one point in the blade remains stationary. The locations of these centres of oscillation associated with a point provide important information about how the sword reacts to changes in movement. A forward pivot point placed in the mid-distal to distal region, close enough to the tip, as is the case on the Celtic specimens, favours the use of the cut. The distal part is maintained in the same area during a rotational movement of the hand. Thus, when the hilt is moved sideways, the strong part of the sword forms a cone with the point at the apex, thus covering the openings and keeping the opponent under the threat of an attack, while allowing the swordsman to bring his blade back quickly if necessary.

When a sword hits or clashes, it vibrates. There are two main places in the sword where the vibrations are cancelled out. These areas are called 'vibration nodes'. On La Tène swords, the vibratory node of the blade is located in the mid-distal region, about three quarters of the way down the sword (close to the tip). It corresponds on the physical level to the resilience zone, i.e. the place on the blade where the material best absorbs the energy of a shock. Optimal use of the weapon, for particularly powerful blows, favours positioning the hand at the vibratory node of the handle. This is in line with our proposal to grip the sword with a finger placed in the hollow of the guard; a grip that justifies the development of these 'chapeau de gendarme' guards (Fig. 10).

Similarly, the preferred striking area corresponds to the resilient area. When hitting with the edges, the mid-distal cutting edge is used. This is roughly the distance that the eyes and arm estimate when striking instinctively with any blunt object.

The physical characteristics of the Celtic sword confirm its almost instinctive use. The cutting strokes with the Celtic sword are distributed on at least four axes, each of which is defined by two trajectories (up and down). These circular strikes thus correspond to a base of at least eight offensive strikes.

With its frail guard, moreover not systematically present, the Celtic sword is probably not used in the framework of a binding fencing. If it does not have a real guard, this cannot exclude the use of parrying – occasionally or frequently – with the strong part of the blade of a blow delivered by an opponent equipped with a sword or a spear. However, defensive protection seems to be mainly provided by the shield, and the clash of a blade against another sword is not a systematic occurrence. The sword is therefore used in a fluid and natural gesture, classic in swordplay, with the right hand only. These wide movements come up against a difficulty: the presence of the shield. The martial complexity of the shield's protective cone can be circumvented by the special grip of the sword already mentioned, i.e. by placing the thumb or index finger in the hollow of the guard. This allows the blade to be angled more than in a simple 'hammer' grip, i.e. with the fingers folded around the handle. The grip is also more flexible. Thus, in wide movements, the transition from true edge to false edge is easy and the sword can really spin around the edges of the shield.



Figure 10. Different grip hypotheses of the Celtic sword. Top, normal or classical grip. In the middle, grip with index finger on the guard. Bottom, grip with thumb on the guard (after Reich 2018: 419).

It should be noted here that all the elements coincide for an optimal use of the medio-distal part of the blade. It is therefore quite logical that this most efficient area of the Celtic sword (i.e. the place where the blade is most efficient and most vulnerable) is preferentially affected by the alterations noted above (notches and bending damage).

The distal end of the sword is pointed but not sharp. This profile does not prevent effective penetration into the flesh. On the standard examples of the eponymous deposit, the occasional use of the thrusting blow cannot be ruled out, but its use is not systematic or pre-established. The linear thrust can be exceptionally placed when the opportunity arises: an axial strike aimed at the body on a 'central' line, either horizontally, upwards or downwards, creates surprise in the opponent.

In fact, this generally 'ogival' point, with its curvilinear contours, can be explained by the fact that the sword is also a slashing weapon, i.e. intended to graze, slash or scar the opponent. This morphology predisposing it to slash is particularly adapted to the wide gestures of the swordsman.

Taking into consideration these characteristics of the Celtic sword, the general principle of the design of the scabbard becomes clear. Stabilised during movement – walking or running – thanks to a semi-rigid suspension system placed at the level of the trochanter of its bearer, this scabbard corresponds to a specificity and a martial advantage of the Gallic warrior. The metal sheath is placed on the right side of the warrior so that the drawing of the sword with the right hand is not disturbed by the presence of the shield held in the left hand. However, the action of drawing the sword is more than simply removing the weapon from its sheath: it seems to us to be the preliminary phase to the offensive, a sort of ‘launching pad’ to set the weapon in motion (Fig. 11).

This need, possibly heightened by cultural considerations (beliefs, pageantry, etc.) which we will not go into here, may partly justify the continued use of ferrous alloys for the integral design of Celtic sword scabbards. This complex technological choice is indeed understood if it provides obvious advantages on the battlefield. A priori, the metal scabbard is slightly heavier, more difficult to produce (notably by making thin and ductile sheets) and more time-consuming to make than a leather and/or wooden sheath. The advantages it offers in terms of dismantling for maintenance (to avoid corrosion that settles on the iron in the presence of the slightest humidity) and repair (straightening a scabbard is done quite easily by unbuckling the bolt and the two plates: the scabbard is stronger because it is less brittle) are counterbalanced by the need for constant cleaning – to avoid deterioration of the sword which could increase the friction effect between the two parts – to which organic materials are not as subject. But organic materials easily absorb water: these fluctuations, far from being harmless in terms of feel, are sufficiently perceptible to be problematic when drawing the sword if the scabbard is perfectly adjusted to the sword. It should also be pointed out that the coefficient of friction of a ferrous alloy against another ferrous alloy – such as that of a sword against a Celtic scabbard – is generally lower than that of a ferrous alloy against wood or leather. The adhesion between the two objects is further reduced by the application of a fatty substance, a basic treatment expected for the protection of ferrous alloys occasionally identified on archaeological specimens. In fact, there is every indication that the scabbard is designed to allow for the quickest possible extraction of the sword: this gives the warrior a martial advantage.

On horseback, the movements of the sword are more limited because of the rider’s seat. The blows are mostly delivered from the top down, aiming at the opponent’s upper limbs, torso and head. The rider may also make wide upward thrusts, as well as sideways ‘swipes’. In this respect, it should be noted that, perched on a mount whose height at the withers is close to that of present ponies, the warrior has no difficulty, by bending a few degrees, to reach the ground with the point of his sword (the risk of imbalance is almost nil, especially for trained men). A reminder is also necessary: it is

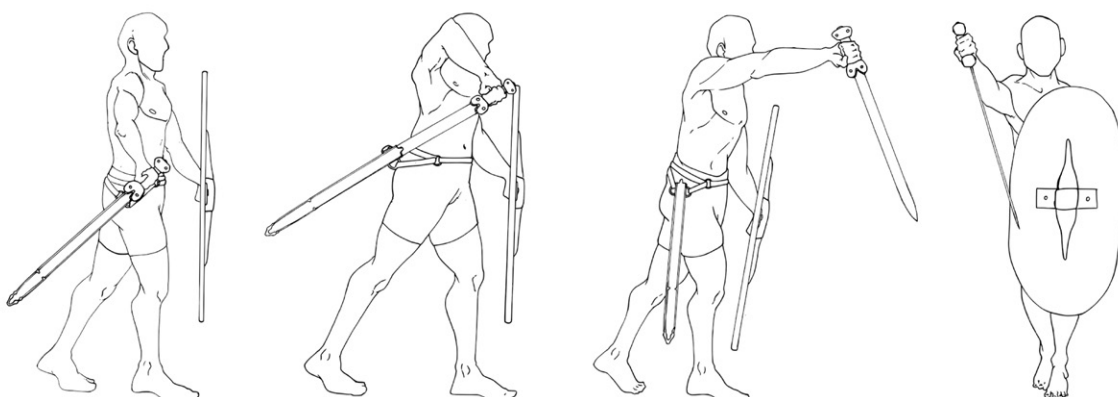


Figure 11. Propulsion of the sword out of the scabbard when drawing the weapon and the use of the false edge for a dynamic upward thrust (drawing by the author).

the upper limbs, the trunk and the head of the opponent, protecting the vital organs, which are primarily targeted during the strikes. The classification followed for more than a century, almost systematically assigning long swords to riders, does not offer complete satisfaction. The greater lengths of swords seem to us to denote variations in the (potentially equestrian) use of swords, rather than affirming their use by horsemen alone. It should be remembered that the swords of ancient horsemen are far from always being very long.

These swords seem to be designed for a martial art that is ample, dynamic, fast, almost aerial, but free of precipitation. Their instinctive handling, a priori very simple, is optimised by the virtues of training, especially in the technical articulation of the sword with the other components of the panoply – particularly the shield with central grip, active in infantry combat, which does not oblige to advance the sword excessively – and the tactical dialogue between the swordsman's play and the martial gestures of his brothers-in-arms. The flexible conception of the Celtic sword imposes limits on it, notably to avoid digging into the opponent's shield so as not to distort it – the free blow (without real intention) makes no sense, and the engaged strike must reach its goal efficiently. It is in the collective dynamic that the potential deficiencies of the sword are overcome. Indeed, it seems to us that it is by leaving it up to a spearfighter to create an opening in the opponent's defence through an important proprioceptive phase with his polearm that the sword can reveal its full potential in an infantry formation. The thoughtful arrangement of the fighters, the spacing of the warriors without giving way to arbitrariness and the esprit de corps thus play a crucial role, which suggests the specialisation of these troops.

In conclusion, it should be noted that the identification and characterisation of such a site as La Tène is a major heuristic challenge (Kaenel 2007) for other sets of Celtic weapons whose exact nature has yet to be defined, such as the assemblages from Gournay-sur-Aronde and Ribemont-sur-Ancre. The use-wear analysis of the weapons has confirmed that the La Tène site is indeed a military trophy erected to commemorate one or more warlike events in the LTC1b–LTC2a phase. Far from being a simple feast for crows, it is an offering to one or more Celtic deities, consecrating through this ritual operation some or all of the bodies of warriors who died in battle, the weapons used in battle taken from the remains and the booty taken from the baggage of the defeated enemy.

In general, these results are of great interest to polemology, as they provide new elements for understanding the art of war (technical and tactical elements). It seems more and more tangible that the principles of Western warfare do not only derive from the Hellenistic model, as is sometimes claimed, but also inherit from Celtic conceptions, whose real contributions have yet to be evaluated in a holistic reading of the warriors' actions.

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## Authors / Auteurs

### **Gabriel Bartolomé**

Universidad Complutense de Madrid, Departamento de Prehistoria, Historia Antigua y Arqueología,  
Avda. de Séneca 2, Ciudad Universitaria, 28040 Madrid, España  
E-mail : gabartol@ucm.es

### **Charles Bashore Acero**

Universidad Autónoma de Madrid, Departamento de Prehistoria y Arqueología, Campus de  
Cantoblanco, 28049 Madrid, España  
E-mail : charlesbashoreacero@gmail.com

### **Luis Berrocal Maya**

Universidad Autónoma de Madrid, Departamento de Prehistoria y Arqueología, Campus de  
Cantoblanco, 28049 Madrid, España  
E-mail : luis.berrocalm@estudiante.uam.es

### **Luis Berrocal Rangel**

Universidad Autónoma de Madrid, Departamento de Prehistoria y Arqueología, Campus de  
Cantoblanco, 28049 Madrid, España  
E-mail : luis.berrocal@uam.es

### **Linda Boutoille**

Queen's University Belfast, School of Natural and Built Environment – Geography, Archaeology and  
Palaeoecology, Belfast, BT7 1NN, United Kingdom  
E-mail : l.boutoille@qub.ac.uk

### **Dirk Brandherm**

Queen's University Belfast, School of Natural and Built Environment – Geography, Archaeology and  
Palaeoecology, Belfast, BT7 1NN, United Kingdom  
E-mail : d.brandherm@qub.ac.uk

### **Mireille David-Elbiali**

Université de Genève, Département F.-A. Forel des Sciences de l'environnement et de l'eau –  
Laboratoire d'archéologie préhistorique et anthropologie, 66 boulevard Carl-Vogt, 1211 Genève 4,  
Suisse  
E-mail : mireille.david-elbiali@unige.ch

**Lorena Garvin Arcos**

Universidad Autónoma de Madrid, Departamento de Prehistoria y Arqueología, Campus de Cantoblanco, 28049 Madrid, España  
E-mail : lorena.garvina@gmail.com

**Michał Krueger**

Uniwersytet im. Adama Mickiewicza w Poznaniu, Wydział Archeologii, ul. Umultowska 89D, 61-614 Poznań, Polska  
E-mail : krueger@amu.edu.pl

**Cormac McSparron**

Queen's University Belfast, School of Natural and Built Environment – Geography, Archaeology and Palaeoecology, Belfast, BT7 1NN, United Kingdom  
E-mail : c.mcsparron@qub.ac.uk

**Florian Mauthner**

ASIST Archäologisch-Soziale Initiative Steiermark & ArcheoNorico Burgmuseum Deutschlandsberg, Rinneggerstraße 54, 8045 Weinitzen, Österreich  
E-mail : florian.mauthner@gmx.net

**Alfredo Mederos Martín**

Universidad Autónoma de Madrid, Departamento de Prehistoria y Arqueología, Campus de Cantoblanco, 28049 Madrid, España  
E-mail : alfredo.mederos@uam.es

**Violeta Moreno Megías**

Universidad de Sevilla, Departamento de Prehistoria y Arqueología, C/ María de Padilla s/n, 41004 Sevilla, España  
E-mail : vmoreno1@us.es

**Pablo Paniago Díaz**

Instituto de Arqueología de Mérida, Plaza de España 15, 06800 Mérida, España  
E-mail : pablo.paniago@iam.csic.es

**Guillaume Reich**

MSHE Claude Nicolas Ledoux- UAR 3124, CNRS, UBFC, 32 rue Mégevand, 25030 Besançon cedex, France

E-mail : dr.guillaume.reich@gmail.com

**Lucía Ruano**

Universidad Complutense de Madrid, Departamento de Prehistoria, Historia Antigua y Arqueología, C/ Profesor Aranguren s/n, Ciudad Universitaria, 28040 Madrid, España

E-mail : lruano02@ucm.es

**Thomas X. Schuhmacher**

Deutsches Archäologisches Institut, Calle Serrano 159, 28002 Madrid, España

E-mail : thomas.schuhmacher@dainst.org

**Juan Manuel Vargas Jiménez**

Museo de Valencina, Plaza de España 9, 41907 Valencina de la Concepción, España

E-mail : jmvargas66@gmail.com

