

Rock art and Celts-Germanic vocabulary

Shared iconography and words as reflections of Bronze Age contact

Abstract

Recent discoveries in the chemical and isotopic sourcing of metals and ancient DNA have transformed our understanding of the Nordic Bronze Age in two key ways. First, we find that Scandinavia and the Iberian Peninsula were in contact within a system of long-distance exchange of Baltic amber and Iberian copper. Second, by the Early Bronze Age, mass migrations emanating from the Pontic-Caspian steppe had reached both regions, probably bringing Indo-European languages with them. In the light of these discoveries, we launched a research project in 2019 — ‘Rock art, Atlantic Europe, Words & Warriors (RAW)’ — based at the University of Gothenburg and funded by the Swedish Research Council (Vetenskapsrådet). The RAW project undertakes an extensive programme of scanning and documentation to enable detailed comparison of the strikingly similar iconography of Scandinavian rock art and Iberian ‘warrior’ stelae. A linguistic aspect of this cross-disciplinary project is to re-examine the inherited word stock shared by Celtic and Germanic, but absent from the other Indo-European languages, exploring how these words might throw light onto the world of meaning of Bronze rock art and the people who made it. This paper presents this linguistic aspect of the RAW project and some preliminary findings.

Keywords: rock art, Bronze Age, Proto-Celtic, Proto-Germanic

Introduction

The recurrent themes and concepts found in both the rock art of Scandinavia and the Late Bronze Age ‘warrior’ stelae of the Iberian Peninsula could undoubtedly also be expressed in words. As this iconography belongs to an age before writing, is there any way to find out what those words were?

Recent major breakthroughs in the sequencing the genomes of ancient human beings carry important implications about the languages spoken in Bronze Age Europe (Allentoft et al. 2015; Haak et al. 2015; Cassidy et al. 2016; Olalde et al. 2018; 2019). This work now reveals mass

migrations emanating from the Pontic-Caspian steppe spreading widely across Western Eurasia, transforming the populations of regions including Southern Scandinavia and Atlantic Europe. In these results the archaeogenetic evidence confirm important aspects of the so-called ‘steppe’ or ‘kurgan hypothesis’ of the homeland and dispersal of the Indo-European languages, as formulated by Marija Gimbutas (1970) and subsequently elaborated by her student J. P. Mallory (1989; 2013), and David Anthony (2007; Anthony & Ringe 2015). Thus, the milestone genetics studies cited above have tended to the conclusion that the migrants with steppe ancestry

who transformed European populations by 2000 BC also brought with them early forms of Indo-European speech.

A significant negative finding of this sequencing of ancient genomes is that many regions, including Northern and Western Europe, underwent no comparably large and abrupt in-migration subsequently, following the Neolithic–Bronze Age Transition and before historical times. While it remains possible that genetically undetectable groups brought new languages to these countries later on in the Bronze Age and/or Iron Age, such hypothetical pre-historic migrations are no longer needed to explain why Germanic and Celtic languages are where we find them at the dawn of history. The simpler hypothesis is that these two Indo-European branches evolved *in situ* in their historical homelands over the course of the Bronze Age (Koch 2019).

An intriguing fact about the Celtic languages of Western Europe and the Germanic languages of the North is that these two Indo-European branches share a sizeable body of inherited vocabulary that is absent from most or all of the other branches (Hyllested 2010). Undoubtedly, this set of words reflects a historical stage later than the main body of Indo-European vocabulary attested more widely. Up until now, it has not been clear whether the Celto-Germanicisms (CGs) reflect a lengthy and evenly spaced continuum over many centuries or peak with a denser cluster as the result of a specific episode of intense interaction. A more defined absolute chronology may be possible now.

A new research project

Recent chemical and isotopic sourcing of copper artefacts in Scandinavia and amber in Iberia reveal a trade system that arose and ended in the Late Bronze Age, 1400/1300–900 BC (Ling et al. 2013; 2014; Murillo-Barroso & Torres 2012; Odriozola et al. 2019). Much remains to be explained about this previously unrecognized

episode of Iberian–Scandinavian contact. What were the exact dates and volume of this trade? What regions and communities were involved? Did people and ideas move with valuable raw materials? To answer these questions, we have launched in 2019 a new research project: Rock art, Atlantic Europe, Words & Warriors (RAW), based at the University of Gothenburg and funded by the Swedish Research Council (Vetenskapsrådet). RAW uses new technologies and crosses between three disciplines: linguistics–archaeology–genetics (LAG). Its syntheses seek to advance understanding of the formation of Atlantic Europe’s languages, cultures, and populations.

A preliminary look at 1) rock-art motifs shared by these regions at this time and 2) the earliest layer of vocabulary shared by Germanic and Celtic (but not Indo-European as a whole) suggests that seafaring warriors were the primary agents of this trade. RAW is fully investigating these data fields and this hypothesis.

Parallels between Iberian warrior stelae and Scandinavian rock art were noted years ago (Almagro Basch 1966). Only recently have shared motifs (e.g. shields, spears, swords, horned helmets, mirrors, bows and arrows, chariots with two-horse teams, dogs, mirrors, &c.) begun to be recognized more fully and closely dated to the span 1300–900 BC (Ling & Koch 2018). RAW is building an on-line library of 3D images of rock art to allow researchers world-wide to compare remote immovable objects in fine detail. Data is being entered about motifs, typology of artefacts depicted, artistic conventions, carving techniques, successive carving events, dating, archaeological contexts, and the script and language of Iberian stelae with writing (Untermann 1997; Koch 2013; 2019).

On the RAW project’s linguistic aspect

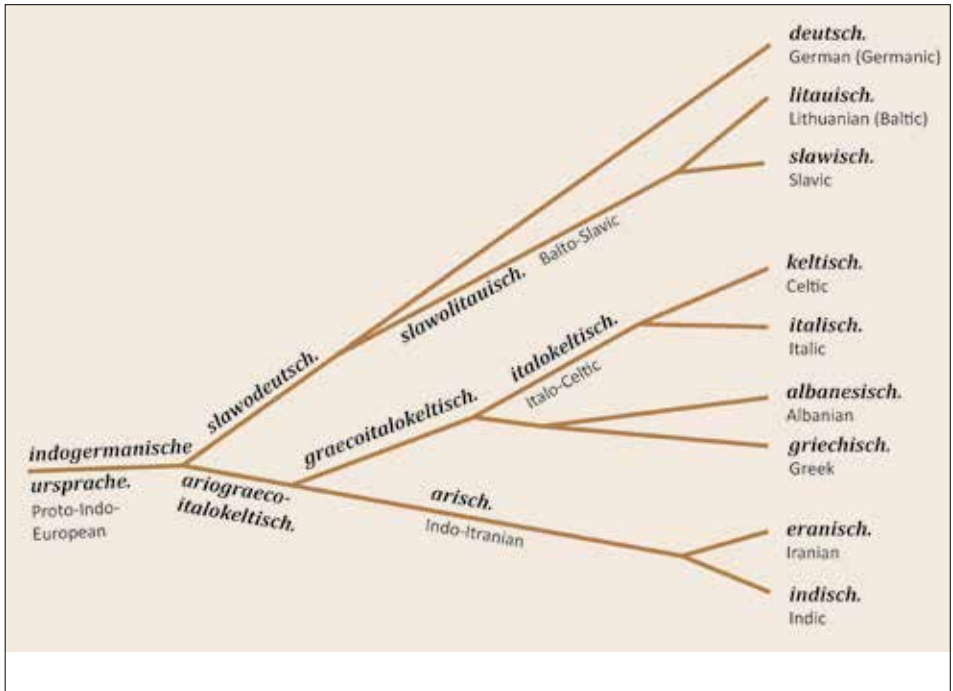
Viewed methodologically, not all Celto-Germanicisms (CGs) are similar cases. In the most straightforward examples, the

item of vocabulary occurs in Celtic and Germanic languages, it is based on the same root, the word is formed in the same way, has the same meaning, and can be reconstructed phonologically as equivalent Proto-Celtic and Proto-Germanic forms. In some cases, the possibility of a prehistoric loanword between the branches can be excluded, in others it cannot. In some examples, the root is found in other Indo-European languages, but the word has been formed in the same way (with the same suffix(es) for example) only in Celtic and Germanic, thus the word for 'axle', where the suffix with -l- with that meaning is unique to Celtic and Germanic. In some cases, it is a distinctive secondary meaning that is uniquely Celto-Germanic. For example, Proto-Indo-European **bhrgh-* meant 'height, hill', but came to mean a fortified settlement in both Celtic and Germanic; the development through Celtic

brigā meaning both 'hill' and 'hillfort', later 'town', shows what happened to this word and points to the age of the hillforts as the era when the change of meaning most probably occurred. There are other examples, such as 'shield', where Celtic and Germanic words (**skeito-* and **skeldu-* < **skeltu-*) have different etymologies, but their prehistoric forms sounded so much alike that coincidence is unlikely. There are also some words with unique histories associated with long-distance exchange of precious commodities, such as the Germanic 'silver', probably of non-Indo-European origin and found also as Celtiberian *silabur*.

A smaller group of Celto-Germanicisms occur also in Italic and/or Baltic. The former especially is hardly surprising as a close relationship between Celtic and Italic is widely recognized. Going back 150 years

Fig. 1. The Indo-European family tree published by August Schleicher in 1861 anticipated groupings universally accepted (Balto-Slavic and Indo-Irannian) or widely accepted (Italo-Celtic) today. At the time, Anatolian and Tocharian were not yet discovered. (Drawing by author)



to August Schleicher (1861/1862) many linguists have argued for Italo-Celtic as a primary subgrouping, or branch, of Proto-Indo-European. (Fig. 1). Thus, it is likely that many Italo-Celtic words found in Latin, which is abundantly attested from ancient times, had once occurred also in Celtic, but died out before that branch was fully recorded in the Middle Ages. In this light, it is remarkable that there are relatively few Italo-Celto-Germanicisms (ICGs), i.e. CG words also showing parallels in the copiously and anciently attested Latin. This distribution could be seen as a falsification of the Italo-Celtic hypothesis, i.e. the idea the Celtic and Italic descend from a single primary branch of Proto-Indo-European. But, as an Italo-Celtic branch is increasingly a consensus view amongst linguists (e.g. Ringe et al. 2002; Schrijver 2016), an alternative explanation is preferable; the distribution could be explained if the bulk of the Celto-Germanicisms date from a period of contact after Proto-Italo-Celtic had split into Italic and Celtic. That conclusion would help us in the present research by narrowing the chronological horizon at which the contact took place. By the 6th century BC, three separate Italic languages are found in writing: Old Latin, Venetic, and Oscan. Therefore, estimating approximately, the unified Proto-Italic had probably split up by about 1000 BC, and its Proto-Italo-Celtic ancestor by about 1500 BC. In other words that we have more CG words than ICG words suggests that the main period of contact would not have been the European Early Bronze Age, about 2000 BC, but later. It should be pointed out that it is not theoretically necessary that ICG words—attested in Italic, Celtic, and Germanic—entered Germanic before Italic and Celtic separated. Celtic retained most of the words it had inherited from its Italo-Celtic ancestor and therefore could have passed its inherited Italo-Celtic words to Germanic after the split with Italic. The key point is that most of the CG words not found in Italic are probably newer than the Italo-Celtic split.

As shown in earlier studies (especially Hyllested 2010), warfare and ideology are heavily represented in the meanings of the CG words. One of the discoveries that motivated the RAW project is that several of these same meanings were also represented in the iconography prominently shared by Iberian and Scandinavian rock carvings of the Late Bronze Age (Ling & Koch 2018). These correspondences are suggestive of both a figurative and a literal lingua franca shared by a mobile class of trader–raiders operating along the Atlantic seaways in the Late Bronze Age. Something analogous to a lingua franca can be seen in the visual code of carvings on stone used to express shared elements of the warrior ideal. But in factoring in the correspondences with CG words, we recognize a true lingua franca, a shared language that defined the essential characteristics of the mobile groups who crossed linguistic frontiers between Bronze Age Scandinavia and the metal-rich Atlantic West.

In the most straightforward examples, a CG word corresponds to a manmade object represented repeatedly on carved stones in both Late Bronze Age Scandinavia and Iberia: for example, *gaiso- ‘spear’. But we can go beyond these most obvious correspondences to the structure of societies that produced rock art, as recently investigated from an anthropological perspective (Ling et al. 2018). The socio-economic cornerstone of this ‘Maritime Mode of Production’ model was the Bronze Age chiefdom amassing agricultural surpluses to finance long-distance expeditions in seaworthy vessels. Key elements of this society anticipate the Viking Age 2000 years later. Anthropological analogies lead also to understanding the carving and re-carving of rock art as ritual activity, accompanying transmission of secret knowledge and oath-taking initiations into the societies of sea-faring trader-raider bands. For almost every essential facet of this system, one finds a CG word. A few of these initial findings are presented below.

In the next four years, the RAW team will examine these correspondences much more deeply in several fields, including a full accounting of the attestations of the relevant rock art motifs with a breakdown of specific recurring details, the typology of Bronze Age objects represented on the stones, and etymological exploration of the corresponding words with lists of their earliest attestations and ranges of meaning. A key aspect of the linguistic work will be to establish absolute and relative chronologies. Dating can be established through multiple approaches, including most importantly the chronology of linguistic changes and linguistic palaeontology, that is, the date of the technology and social institutions described by the vocabulary. By putting together the known sequence of linguistic changes with the absolute chronology of technological innovations, we will narrow possible date ranges for the CG vocabulary.

The where and when of Proto-Germanic are challenging questions owing to the late attestation of the Germanic languages, beginning the Gothic Bible of Wulfila in the 4th century AD (Jasanoff 2008) preceded by the earliest runic inscriptions possibly two centuries before that (Faarlund 2008). When Tacitus completed his *Germania* in AD 98, Germanic-speaking groups were established widely across Central Europe up to the Roman frontier at the Rhine and Danube. However, across much of this territory Ancient Celtic place- and group names are found, as well as La Tène and Hallstatt material, all suggesting that Germanic had expanded at the expense of Celtic some centuries before Tacitus. Consequently, an earlier explanation of the CG words has been to view most as due to Iron Age contact in Central Europe (e.g. Ringe 2006; Faarlund 2008). That alternative hypothesis is one the RAW project is re-examining closely. It leads to some testable predictions. These include the expectation that the CG words would occur more frequently in Old High German, in the territory of the Iron Age contact, and less fre-

quently in Old Norse and the old futhark runes of Scandinavia, outside formerly Celtic-speaking territory.

Within the preliminary sample below, a high proportion of CG words are attested in Old or Middle Irish. This pattern would be expected if either or both of the following were the case: that the contact with Germanic had taken place before Goidelic had emerged as a separate language from Proto-Celtic or the contact had taken place over the Atlantic seaways. But it would be unexpected if the contact had mostly taken place in the La Tène Iron Age, overland, in Central Europe.

There is a long-standing consensus that before about 500 BC the common ancestor of the attested Germanic languages was spoken in southern Scandinavia extending into northernmost Germany along the Baltic (Faarlund 2008)—in other words, more or less the same time and place as the Nordic Bronze Age. As a linguistic development, a date about 500 BC is also conventional for key changes that transformed a language that still resembled Proto-Indo-European to one looking more like Gothic or Old Norse. Chief amongst these is Grimm's Law, a sweeping shift in the consonant system that operated across all of Proto-Germanic (Ringe 2006; Faarlund 2008; Jasanoff 2008). This innovation can be represented as follows (using * 'star' as a notation of prehistoric linguistic forms): $*bh > *b$, $*b > *p$, $*p > *f$; $*dh > *d$, $*d > *t$, $*t > *p$; $*gh > *g$, $*g > *k$, $*k > *h$; $*g^wh > *g^w$, $*g^w > *k^w$, $*k^w > *h^w$. A second major change in the consonant system is known as Verner's Law, which depends on the position of the word accent in Proto-Indo-European, rather than in Germanic. It therefore must have operated before the accent moved. Verner's Law is usually seen as occurring after Grimm's Law, but the reverse order is possible. Germanic merged short $*ō$ and short $*ā$ as $*ǫ$. That change occurred also in Balto-Slavic and Indo-Iranian and so probably happened early, before the age of Late Bronze Age rock art. Those four changes—Grimm's Law,

Verner’s Law, the Germanic accent shift, and $*\ddot{o} > *\ddot{u}$ —went a long way towards transforming Proto-Indo-European into Germanic. The fourth of these changes is not so obvious for distinguishing loanwords and their date: so long as Germanic still had no vowel $*\ddot{o}$, it could only substitute its $*\ddot{a}$ for the foreign sound. The CG words of interest to us did participate in Grimm’s Law and Verner’s Law (and so implicitly the accent shift too) just like inherited native vocabulary. That means the contact occurred before those changes took place. If we keep the conventional date for Grimm’s Law at 500 BC—or any time earlier—that would be too early to explain the CG words showing Grimm’s Law as the result of Germanic expansion into Central Europe during the La Tène Iron Age (~475–50 BC).

A confusing point about the conventional history of Germanic should be clarified. Because Grimm’s Law, Verner’s Law, and the accent shift are usually dated to the Early Iron Age, it is often stated that Germanic did not exist until then. What that means is that a language looking like that found in the earliest runes did not yet exist. But Pre-Germanic or Proto-Germanic as a distinct linguistic community must have existed. By 1400 BC both Old Indic and Mycenaean Greek are found in writing. These two were then fully separate languages and could not have been mutually intelligible. In any viable family tree of the Indo-European languages (Fig. 2), at the point when Indic and Greek were separate languages, Germanic must also have been a separate language. The undifferentiated Proto-Indo-European had ceased to exist.

On the Celtic side, several fully separate Ancient Celtic Languages are attested in the Iron Age, including Gaulish and Celtiberian; it follows that linguistic innovations common to all of Celtic were complete by the end of the Bronze Age. These include, in approximate order: syllabic $*r$ and $*l > *ri$ and $*li$ in most positions, $*g^{\ddot{v}} > *b$, $*bh > *dh > *gh > *g^w > *b > *d > *g > *g^w$, $*p > *q$ (then disappearing altogether in

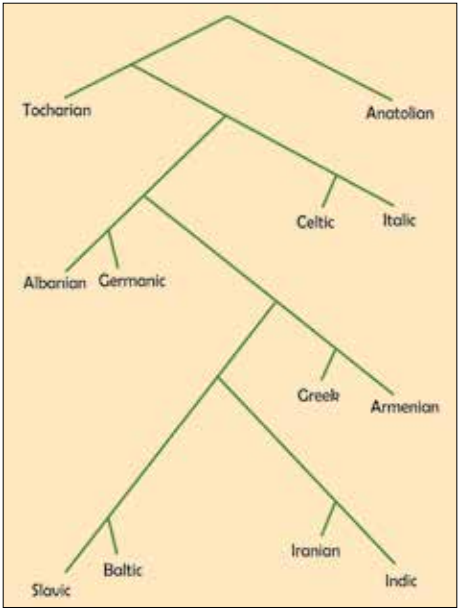


Fig. 2. J. P. Mallory’s (2013) simplified version of the Indo-European family tree of Ringe, Warnow, and Taylor (2002), indicating the close association between Italic and Celtic. (Drawing by author)

most positions), long $*\ddot{o} > \text{long } *\ddot{u}$ in final syllables, long $*\ddot{o} > \text{long } *\ddot{a}$ in all other syllables, syllabic $*\eta$ and $*\eta > *am$ and $*an$, long $*\ddot{e} > \text{long } *\ddot{i}$ (McCone 1996; Isaac 2007).

Once again, new advances in archaeogenetics now make linguistic dating more feasible in providing confirmation that later (i.e. post-Anatolian) Proto-Indo-European expanded from the Pontic–Caspian steppe in 3rd millennium BC. Therefore, the separation of the post-Anatolian branches would be later than this, as the result of Indo-European-speaking communities becoming isolated from the homeland and each other due to far-flung outward migration.

Examples arranged by meaning

It must be stressed that the present word list is brief and preliminary, barely scratching the surface. The RAW project’s full study will: 1) collect all the Celto-Germanic

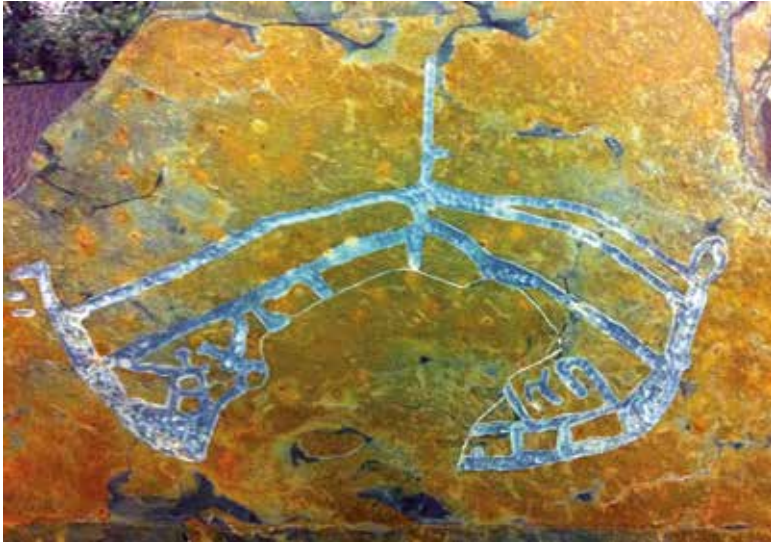


Fig. 3. Bronze Age rock carving depicting a sea-going vessel with a mast, Auga dos Cebros, Galicia, Spain (photo: Xabier Garrido)

words; 2) re-evaluate their etymologies; and 3) criteria for dates of borrowing or stage of common origin; 4) how the words are actually used in their early occurrences; and 5) thousands of corresponding rock art images and Bronze Age artefacts. The main sources used in compiling the following are Hyllested (2010) in general, Kroonen (2012) for Germanic, Matasović (2009) for Celtic, and de Vaan (2008) for Italic. Ancient Nordic runes are cited from Antonsen (1975).

Maritime vocabulary

SAIL (noun). Proto-Germanic **segla-* 'sail, canvas': Old Norse *segla*, Old English *segel*),

Old Saxon *segal*; Proto-Celtic **seiglo/ā-*: Old Irish *séol* glossing Latin 'uelum' 'sail', Old Welsh *huil* glossing 'uelum' 'sail'.

MAST. Proto-Germanic **masta-* 'post, mast' (< **mazdo-*): Old Norse *mastr* 'mast', Old English *mæst* 'mast', Old High German *mast* 'stick, pole, mast'; Proto-Celtic **mazdyo-* 'post, stick, beam, log'; figuratively 'leader': Middle Irish *maide*; Proto-Italic **mazdo-*: Latin *mālus* 'pole, mast' < **mazd-lo-*.

ROW (verb). Proto-Germanic **rōan-*: Old Norse *rōa* 'to row', Old English *rōwan* 'to row'; Proto-Celtic **rāyo-* < **rō-yo-*: Old Irish *rāid* 'rows'.



Fig 4. Rubbing of rock art image of a sea-going vessel and crew with paddles, Tanum, Bohuslän, Sweden (source: Gerhard Milstreu, Tanum Rock Art Museum Underslös/SHFA)



Fig. 5. Rubbing of rock art image of a chariot and two-horse team from Frännarp, Jönköping, Sweden, showing recurrent conventional representation of the horse, chariot frame, wheels, axles, spokes, yoke, and yoke pole (source: Dietrich Evers, SHFA).

HARBOUR, SHELTER FOR VESSELS. Proto-Germanic **habanō-* 'harbour' < **kapóno-*: Old Norse *hǫfn*, Old English *hæfen*, Old High German *havan*; Proto-Celtic **kawno-* < **ka(p)ono-* 'haven, harbour, port, bay': Middle Irish *cúan*.

FRESH WATER. Proto-Germanic: Icelandic *lind* 'spring, fountain', Middle High German *lünde* 'wave'; Proto-Celtic **lindom* 'drinkable water', Gaulish *linda* 'beverages', Ancient Brythonic *lindon* 'lake, pool', Middle Welsh *llyn* 'drink, lake', Old Irish *lind* 'liquid'.

Metallurgy and exchange

SILVER. Proto-Germanic **silubra-*: Gothic *silubr*, Old Norse *silfr*, Old English *sioluf*, Old High German *silabar*; Proto-Celtic: Celtiberian *silabur*; Baltic: Lithuanian *sidābras*. ¶Note. Kroonen (2012: 436): 'A non-IE Wanderwort whose distribution appears to be "circum-Celtic".' Cf. Basque *zilhar*.

IRON. Proto-Germanic **isarna-*: Gothic *eisarn*, Old Norse *ísarn*, Old English *ísarn*, Old High German *isarn*; Proto-Celtic **isarno-*: Old Irish *íarn*, Old Welsh *hearn*, Old Breton *hoiarn*. ¶Note. Usually interpreted as a prehistoric loanword from Celtic to Germanic, probably early in the Iron Age, although iron was known and

sporadically used before it became the standard fabric for weapons and tools.

CHARCOAL. Proto-Germanic **kula-* < **gulo-*; **kulan-*: Old Norse *kol* (pl.), Old English *col*, Old High German *kolo*; Proto-Celtic **glāuo-*: Middle Welsh *glo(u)* 'charcoal' and Proto-Celtic **goulo-*: Middle Irish *gúal*.

BOOTY, PROFIT. Proto-Germanic: Middle Low German *būte*, *buite* 'exchange, booty'; German *Beute* 'booty', Swedish *byte*, Icelandic *býti* 'exchange, barter'; Proto-Celtic **boudi-*: Gaulish *Boudi-latis*, *Boudicca*; Old Irish *búaid* 'victory, gain, profit', Middle Welsh *bud* 'profit, advantage'; Old Breton *bud* glossing 'bradium'.

NUMBER. Proto-Germanic **rīma-*: Old Norse ON *rím* 'computation', Old English *rím* 'number', Old High German *rīm* 'account, series, number'; Proto-Celtic **rīma-*: Old Irish *rím*, Middle Welsh *rif* 'number'.

Horse and chariot package

HORSE. 1. Proto-Germanic **marha-* 'horse, steed': Old Norse *marr*, Old English *mearh*, Old High German *marh*; Proto-Celtic **marko-* 'horse, steed': Gaulish *markan*, Old Breton *marh*, Old Cornish *march*

Fig. 6. Late Bronze Age stela from La Solanilla, Córdoba, Spain, showing spear, V-notched shield, mirror, chariot with two-horse team, and warrior with sword (source: Hoz et al. 2005).



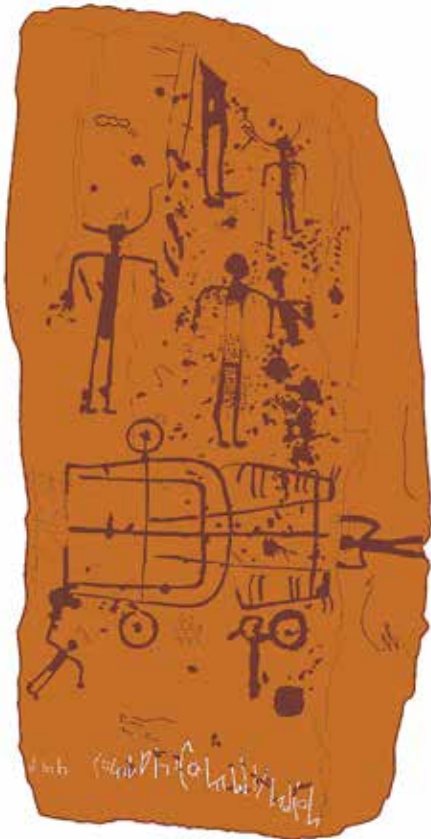


Fig. 7. Late Bronze Age stela from Majada Honda, Badajoz, Spain, showing warriors, one with a horned helmet, chariot with two-horse team, warrior, and a subsequently added Early Iron Age South-western 'Tartessian' inscription (after Hoz et al. 2005).

gl. *equus*, Middle Welsh *march*, Middle Irish *marc*.

2. Proto-Germanic **hangista-* ~ **hanhista-* 'horse, stallion, etc.': Old Norse *hestr* 'stallion; horse', Old English *hengest*, *hengst* 'gelding, horse', Old High German *hengist* 'gelding'; Proto-Celtic **kanx-s-ikā-*: Middle Welsh *cassec*, Breton *kazeg* 'mare'.

¶Note. These words competed with the general Indo-European word for 'horse' **H₂eḱwós*, which also occurred in both Germanic and Celtic.

HORSE+RIDE (unique CG compound of two Indo-European words). Old Norse personal name *Jó-reiðr*, Old English *eo-red*, Old Saxon *eo-rid-folc* 'cavalry'; Gaulish

personal name *Epo-rēdo-rīx*, Middle Welsh *ebrwyð* 'swift'.

AXLE. Proto-Germanic **ahsula-*: Old Norse *ǫxull* 'axle'; Proto-Celtic **axsilā-*: Middle Welsh *echel*, also *achel* 'axle-tree, axle, axis, pivot', Middle Breton *ahel* 'axle'.

¶Note. The root **H₂eḱs-i-* 'axle' is Proto-Indo-European. It is the suffix with **-l-* that is a unique shared development in Celtic and Germanic.

WHEELED VEHICLE. Proto-Germanic **wagna-*: Old Norse *vagn*, Old English *wægn*, *wægn*, Old High German *wagan*; Proto-Celtic **wegno-*: Old Irish *fén* (also *fé-nae* < **wegnyā*), Middle Welsh *gwein*. An Ancient Brythonic word for two-wheeled war chariot is *couinnus* < **kom-wegno-*.

Weapons and warfare

SHIELD. Proto-Germanic **skeldu-* < **skelh-tú-*: Gothic *skildus*, Old Norse *skjöld*, Old English *sciold*, Old High German *scilt*; Proto-Celtic **skeito-*: Old Irish *sciath*, Old Welsh *scuit*; Proto-Italic **skoito-*: Latin *scūtum*.

SPEAR. 1. Proto-Germanic **gaiza-* 'spear, tip' < **gaiso-*: Old Norse *geirr*, Old English *gār*, Old Saxon *ger*, Old High German *ger*; Proto-Celtic **gaiso-* 'spear': Gaulish *gae-sum*, Old Irish *gae*, Middle Welsh *gwayw*.

2. Proto-Germanic **speru-* 'spear' < **sperH-u-*: Old Norse *spjǫrr*, Old English *spere*, Old High German *spēr*; also Old Norse *spar(r)i* 'roof-beam, pole, spar'; Proto-Italic **sparo-* < **sprH-o-*: Latin *sparus* 'hunting spear, javelin'.

BOW AND ARROW. Proto-Germanic **arhw-ō-* 'arrow' (< 'belonging to a bow'): Gothic *arhu-azna*, Old Norse *ǫr*, Old English *earh*; Proto-Celtic **arkwo-* 'bow (and arrow)': very common Hispano-Celtic name *Arquius* 'bowman', feminine *Arcea*, place-name *Arco-brigā* 'bow-shaped hill'; Middle Welsh *arffet* 'lap, groin' < **arkwetā*; Proto-Italic **arkuo-*, **arkwo-* 'bow': Latin *arcus*, gen. *arqui*.

AXE. Proto-Germanic **bīpla-* 'axe': Old Norse *bíldr* 'axe', Old High German *bīhal*; Proto-Celtic **beiali-* < **beiH-li-*: Old Irish *biáil*, Old Welsh *bahell*, Middle Welsh *bw-yall*.



Fig. 8. Late Bronze Age stela from La Pimienta, Badajoz, Spain, showing two warriors with swords, a bow and arrow, a large notched shield, and spear (photo: Jane Aaron)

BATTLE, FIGHTING. 1. Proto-Germanic ***badwo-** 'battle': Old Norse *bǫð*, Old English *beado*, Old Saxon *badu*, Old High German *batu-*; Proto-Celtic ***bodwo-**: Middle Irish *bodb*, *badb* 'war-god(dess); scald-crow (i.e. bird on the battlefield and manifestation of the war-goddess)'; Old Welsh *bodu-* common in personal names.

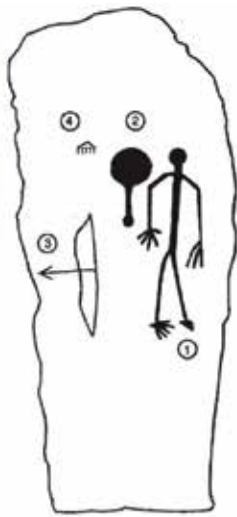
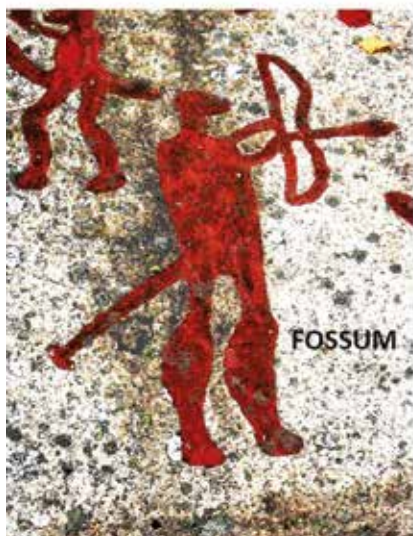
2. Proto-Germanic ***habu-** 'battle' < ***katu-**: Ancient Nordic *habu* (Strøm whetstone, Sør-Trønelag, Norway ~AD 450), Old Norse *hǫð*, Old English *heaðo-*, Old Saxon *hathu-*, Old High German *hadu-*; Proto-Celtic ***katu-** 'battle': Gaulish *Catu-slougi*, &c., Old Irish *cath*, Ogamic Primitive Irish RO-CATOS; Old Welsh *cat*.

3. Proto-Germanic: Gothic *weihan*, Old Norse *vega* 'kill, fight', Old English, Old High German *wihan* 'fight'; Proto-Celtic ***wik-** 'fight': Ancient Brythonic *Ordo-uices* 'hammer fighters', Old Irish *fichid* 'fights', *fecht* 'military expedition', Old Welsh *guith* 'battlefront', Middle Welsh *gweithen* 'combat'. ¶ Contrast Latin *vincō* 'conquer', Lithuanian *vēikti* 'make, work'.

4. Proto-Germanic ***prak-ja-**: Old Norse *prekr* 'strength, bravery', Old English *prece* 'force, oppression', Old Saxon *wāpan-threki* 'ability with arms'; Proto-Celtic ***tresso-**: Old Irish *tress* 'battle', Middle Welsh *treis* 'violence'.

TROOP (unique CG meaning for this root). Proto-Germanic ***drūhta-**: Gothic *driugan* 'to serve as a soldier', Old Norse *drótt* 'company, following', Old English

Figures 9 & 10. Late Bronze Age rock art depicting bows and arrows: left - Fossuim, Bohuslän, Sweden (source: SHFA); right - Montemolin, Sevilla, Spain (source: Harrison 2004)



C 79. MONTEMOLÍN, Se.





Fig. 11. The bow-shaped hill viewed from the ruined Roman town of Arcobriga (Monreal de Ariza, Zaragoza, Spain; source: <http://aeternitas-numismatics.blogspot.co.uk/2012/03/la-ciudad-celtiberade-arcobriga.html>) with the bow and arrow of the Montemolín stela (fig. 10) superimposed.

dryht 'companion', Old High German *truht* 'troop'; Proto-Celtic **drungos*: Gaulish *drungos* 'groups of enemies'; Middle Irish *drong* 'troop', Middle Welsh *dronn* 'multitude'. ¶ Contrast the meaning of Old Church Slavonic *drugŭ* 'friend, other', Lithuanian *draugas* 'friend'.

Society and settlement

KING, LEADER. Proto-Germanic **rīk-* 'ruler, king': Gothic *reiks*; cf. Gothic *reiks* 'rich, powerful', Old Norse *rikr*, OE *rice*, Old High German *rīhhi*; Proto-Celtic **rīxs* = **rīg-s* 'king': Ancient Brythonic RIX, Old

Irish *rí*, Old Welsh *ri*; Proto-Italic **rēks* = **rēg-s*: Latin *rēx*, genitive *rēgis*.

KINGDOM, REIGN, REALM. Proto-Germanic **rīkja-*: Gothic *reiki*, Old Norse *ríki*, Old English *rice*, Old Saxon *rīki*, Old High German *rīhhi*; Proto-Celtic **rīgjom*: Old Irish *ríge* 'ruling, kingship, sovereignty'.

PEOPLE, TRIBE. Proto-Germanic **pseudō-* 'nation, people': Gothic *þiuda*, Old Norse *þjóð*, Old English *þeod*, Old Saxon *thiod*, *thioda*, Old High German *diota*; Proto-Celtic **toutā* 'people, tribe, territory, group and land ruled by a **rīxs*': Gaulish **Touto-* in personal names, Old Irish *túath*,

Old Welsh and Old Breton *tut*; Proto-Italic **toutā-* 'town, society': Oscan *touto* 'community', Venetic *teuta* 'ciuitas'; Proto-Baltic **tautā-*: Old Prussian *tauto*, Lithuanian *tauta* 'land', Latvian *tauta* 'people'.

LAW, JUSTICE (unique CG formation and meaning).



Fig. 12. Rock art panel from Skee parish, Bohuslän, Sweden: iconography includes sea-going vessel and confronting warriors with raised axes (discovered and 1992 by Sven-Gunnar Broström and Kenneth Ihrestam; source: SHFA).

Fig. 13. Detail of rock art panel from Tanum, Bohuslän, Sweden, showing confronting warriors with raised axes (source: SHFA).



Proto-Germanic **rehtuz* < PIE **H₃reǵ-tu-*: Old Norse *réttir*; Proto-Celtic **rextus* < PIE **H₃reǵ-tu-*: Old Irish *recht*, Middle Welsh *kyf-reith* 'law'. ¶|Contrast Latin *rectus* 'straight' (verbal adjective of *regō* 'guide, direct').

FREE (unique CG meaning). Proto-Germanic **frija-* 'free': Gothic *freis*, Old English *frēo*, Old High German *frī*; also Gothic *freihals*, Old Norse *frjals*, Old English *freols* 'free'; Proto-Celtic **(p)rijo-* 'free': Middle Welsh *ryδ*, Old Cornish *rid*. ¶|Contrast Vedic Sanskrit *priyā-* 'dear'.

SETTLEMENT. Proto-Germanic **burpa-* 'settlement, crowd(?)': Gothic *þaurp* 'farmland', Old Norse *þorp* 'isolated settlement', Old English *þorp*, *þrop* m. 'crowd', Old Saxon *thorp* 'village', Old High German *dorf*; Proto-Celtic **trebā* 'settlement': Old Irish and Old Welsh *treb* 'village, settlement'. ¶|Contrast meaning of Lithuanian *trobà* 'cottage, farmhouse', Latvian *traba* 'hut, hovel' < Proto-Indo-European **trob-eH₂*.

FORTIFIED SETTLEMENT, HILLFORT. 1. Proto-Germanic **burg-* 'fortified place, town': Gothic *baurgs*, Old Norse *borg* 'town; citadel; small hill', Old English *burg* 'city, fortified town', Old Saxon *burg* 'cas-

tle; city', Old High German *burg*; Proto-Celtic **brig-* 'hill' > 'hillfort' > '(fortified) town': Hispano-Celtic *brigā*, Gaulish *brigā*, Middle Irish *brí*, Middle Welsh *bre*, Middle Breton *bre* < Proto-Indo-European *√bhergh-* 'be high, hill'.

2. Proto-Germanic **tūna-* 'fenced area' < **dūno-*: Old Norse *tún* 'enclosure, courtyard, homestead; home, field; town', Old English *tūn* m. 'enclosed piece of ground, yard; town'. Kroonen: 'A Pre-G[ermanic] loanword from Celtic **dūno-...*'; Proto-Celtic **dūno-*: Gaulish, Hispano-Celtic *dūno-* 'fortified town, oppidum', Old Irish *dún* n. 'fort, rampart', Middle Welsh *din*, Old Breton *din*.

FLOOR (unique CG word formation and meaning). Proto-Germanic **flōruz*: Old English *flōr*; Proto-Celtic **(p)lāro-* < **plōro-*: Old Irish *lár* 'ground, surface, middle', Middle Welsh *llawr* 'floor, ground', Breton *leur*. ¶|Contrast Latin *planus* 'flat'.

INHERITANCE. Proto-Germanic **arbja-*: Ancient Nordic *arbija* 'inheritance, patrimony' (Tune stone, Østfold, Norway ~AD 400), Old Norse *arfr* (< **arba-*), Old English *ierfe* 'inheritance', Old Saxon *erbi*, Old High German *arbi*, *erbi* < Proto-Indo-European **H₃orbh-io-*; Proto-Celtic **orbio-*

'inheritance': Old Irish *orbe*, Archaic Welsh *wryyð* 'inheritance, legacy'.

HEIR. Proto-Germanic **arbjan-* 'heir': Gothic *arbja*, Ancient Nordic *arbijano* 'of heirs' (Tune stone, Østfold, Norway ~AD 400), Old English *ierfe*, Old High German *arbeo*, *erbeo* < **H₃orbh-ion-*; Proto-Celtic **orbo-* 'heir, successor, inheritor': Old Irish *orb* < Notional Proto-Indo-European **H₃orbh-o-*.

BOY, YOUTH. Proto-Germanic **magu-*: Gothic *magus* 'boy', Ancient Nordic dative *magōz* 'son' (Vetteland stone, Rogaland, Norway ~AD 350), Old Norse *mōgr* 'son; youth', Old English *magu* 'child; son; man'; Proto-Celtic **magu-*, **mogu-*: Old Irish *mug* 'slave, servant'; Middle Welsh *meu-dwy* 'hermit, monk' < 'servant of God', Middle Breton *maoues* 'girl'.

PERSON ACTING ON BEHALF OF A LEADER. Proto-Germanic **ambahta-* 'servant, representative': Gothic *andbahts* 'servant, minister', Old High German *ambaht* 'servant, employee, official'; Old Norse *ambátt* 'bondswoman; concubine' < **ambahta-*; Proto-Celtic **ambaxto-* 'representative, vassal' < **ambi-ag-tó-* 'one sent around': common Hispano-Celtic name *Ambatos*, feminine *Ambata*; Gaulish *ambactus* 'vassal', Middle Welsh *amaeth* 'ploughman'.

HOSTAGE. Proto-Germanic **gīsla-* 'hostage' < **ghei-slo-*: Old Norse *gisl*, Old English *gisel*, Old Saxon *gisal*, Old High German *gisal*, cf. Ancient Nordic *asugisalas* = *ansu-gīs⁹las* genitive singular (Kragehul spearshaft, Fyn, Denmark ~AD 300); Proto-Celtic **geislo-* 'hostage': Old Irish *gíall* m. 'hostage', Middle Welsh *gwystyl* 'pledge, surety, hostage', common in Old Welsh names, e.g. *Cat-guistl* 'war hostage'.

JOKER, FOOL. Proto-Germanic **trūpa-*: Old Norse *trūðr* 'juggler, fool', Old English *trūð* 'trumpeter, actor, buffoon'; Proto-Celtic **drūto-*: Middle Irish *drúth* 'professional jester, fool', Middle Welsh *drut* 'reckless (in battle), furious, foolish, foolhardy, dear, expensive'.

SECRET, SECRET KNOWLEDGE. Proto-Germanic **rūnō-*: Ancient Nordic *rūnō* 'rune' accusative singular (Einang stone, Oppland, Norway ~AD 350–400; Noleby

stone, Västergötland, Sweden ~AD 450), Old Norse *rún* 'rune, secret', Old English *rún*, Old Saxon *rūna* 'whisper, secret, rune'; Proto-Celtic **rūnā* 'secret': Old Irish *rún*, Middle Welsh *rin* 'spell, enchantment, secret', *kyf-rin* 'secret'.

OATH, TO BIND BY OATH. 1. (unique CG meaning). Proto-Germanic **aiþaz*: Goth. *aiþs* 'oath', Old Norse *eiðr*, Old English *āþ*, Old High German *eid*. Cf. Old Norse *ganga eið* 'take the oath'; Proto-Celtic **oitos* 'oath': Old Irish *oeth*, Middle Welsh *an-udon* 'false oaths'. ¶ Contrast Greek *oitos* 'faith', all from PIE **H₁oi-to-s* 'walking' < √*H₁ei-* 'go'.

2. Proto-Germanic **leugo-*: Gothic *liugan* 'to marry', Old Frisian *logia* 'to arrange, allot; join, vouch, marry', cf. Ancient Nordic *leugaz* 'oath taker'? (Skåang stone, Södermanland, Sweden ~AD 500); Proto-Celtic **lugiom* 'oath, to swear', Old Irish *lugae*, Middle Welsh *llw*.

POETRY, STORYTELLING. Proto-Germanic **skāpla-*: Old Norse *skáld* 'poet'; Proto-Celtic **sketlo-*: Old Irish *scél* 'saga, narrative', Middle Welsh *chwedl* 'traditional narrative, tidings'.

The supernatural

FURIOUS, ECSTATIC (unique CG word). Proto-Germanic **wōð-*: Gothic *wōþs* 'furious', Old Norse *óðr* 'poetry; furious'; cf. Old Norse god's name *Óðinn*, Old English *Wōden*, Old High German *Wuotan*, cf. Ancient Nordic *wōdurīde* 'furious' + 'rider' (Tune stone, Østfold, Norway ~AD 400); Proto-Celtic **wāti-* < **wōti-*: Gaulish *vātes* 'prophets', Old Irish *fáith* 'prophet', *fáth* 'prophetic wisdom', Old Welsh *guaut* 'prophetic verse'.

WEREWOLF. Proto-Germanic: English *were-wolf*, Danish *varulv*; Proto-Celtic **wiro-kū*, genitive **wiro-kunos*, accusative **wiro-konam*: Celtiberian *uiroku*, Ancient Brythonic place-name *Viroconium* 'Wroxeter', Old Irish *Ferchu*, Old Welsh *Guurci*, Old Breton *Gurki*.

MAGIC. Proto-Germanic **saida-* 'magic, charm': Old Norse *seiðr*; Old Norse *síða* 'to work charms', Old English *-siden* 'magic' < **sidnō-*. Proto-Celtic **soito-* 'magic': Middle Welsh *hud*, Breton *hud*, Old Cornish *hudḡl*

'magus'; Baltic: Lithuanian *saĩtas, seĩtas* 'magic'.

SACRED GROVE, SANCTUARY (unique CG suffixed formation). Proto-Germanic ***nemīpa-**: Old Saxon *nimidaz* 'sacred grove', Swedish farm name *Nymden*; Proto-Celtic ***nemetom**: Gaulish *nemeton*, Old Irish *nemed* 'sanctuary, person of special privilege or exemption', Archaic Welsh *niuet* 'special privilege'. ¶ Contrast Latin *nemus* 'sacred grove' without the suffix.

SUPERNATURAL BEING, PHANTOM. Proto-Germanic ***skōh-sla-** < **skōk-slo-*: Gothic *skohsl* 'evil spirit, demon'; Proto-Celtic ***skāx-slo-** < **skōk-slo-*: Old Irish *scál* 'phantom; the god Lug', Middle Welsh *yscawl* 'young hero, warrior'.

Conclusions

At this preliminary stage of the investigation, we can note details consistent with our hypothesis that the Late Bronze Age — when copper from the Iberian Peninsula reached Scandinavia and Scandinavian rock art and Iberian warrior stelae shared elements of iconography — was also the horizon to which many Celto-Germanicisms can be most plausibly attributed.

1. What is now known about the expansion of the genetic 'steppe component' (~50% Eastern Hunter-Gatherer : ~50% Caucasus Hunter-Gatherer) from the Pontic-Caspian Steppe in the 3rd millennium BC is the basis for a strong case that later (post-Anatolian) Proto-Indo-European expanded together with this gene flow. It follows that most items of inherited vocabulary that predate ~2500 BC should show a wide geographic distribution, with attestations in both eastern and western Indo-European languages. Some words may occur only in Northern and Western Europe due to random loss in the other branches. However, as a group, words with NW distributions reflect regional developments after ~2500 BC.
2. The many CG words with Germanic forms showing Grimm's Law, and the usual dating for that linguistic change at ~500 BC, are consistent with Bronze Age contact and not with an alternative scenario in which the contact took place in Central Europe during the La Tène Iron Age.
2. The numerous CG words which are either altogether absent from Latin and the other Ancient Italic languages or show linguistic innovations that did not occur in Italic suggest that most of this vocabulary arose after Italic and Celtic had separated; that was probably after the Early Bronze Age.
4. The high proportion of CG words attested in Ancient Nordic runes and Old Norse is consistent with a model of contact by sea in the Late Bronze Age.
5. The high proportion of CG words in Irish better suits a model of contact by sea in the Late Bronze Age than of contact in Central Europe after 500 BC.
6. Many CG words fit the culture and value system of the European Bronze Age—spear, shield, axe; sail, mast, to row; horse, axle, wheeled vehicle; silver—although linguistic palaeontology cannot always decisively differentiate Bronze Age from Iron Age vocabulary with these.
7. Many CG words can be correlated with the recurring iconography shared by Scandinavian rock art and Iberian warrior stelae.
8. At the level of social organization, several CG words are consistent with the chiefdoms of the Bronze Age: 'king', 'kingdom', 'tribe', 'hostage', 'servant/representative'. The example of the shared change of meaning from Indo-European 'height, hill' to Celtic and Germanic 'fortified settlement' ('berg' > 'burg') suggests that the two groups participated in the Age of Hillforts while in contact with each other. This phenomenon began in the middle of the Bronze Age in Atlantic Europe.
9. CG vocabulary for magic, oath taking, and secret knowledge is consistent with integral ritual aspects of the 'Maritime Mode of Production' model as applica-

ble to the Nordic Bronze Age (Ling at al. 2018).

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