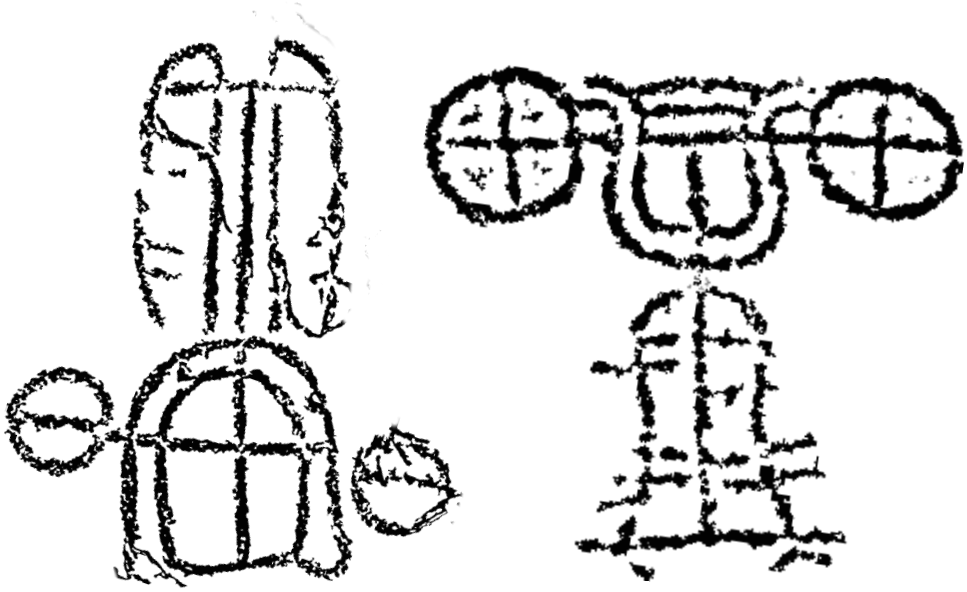
UNIVERSITY OF GOTHENBURG

Chariots of the Atlantic Warriors

-A Comparative Study of Chariot Motifs on Scandinavian and Iberian Rock Art



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Abstract

During the last two decades, ideas of long-distance interaction between cultures has gained an increased amount of attention in the field of Bronze Age research. Previous research has shown that such a long-distance interaction, connected to the trade of metal and amber, may have existed between Scandinavia and Iberia, facilitated by a group of seafaring warrior-traders, with a shared identity, set of values and cosmology. These shared ideas would leave traces in the material culture and iconography, which can be seen in rock art in both Scandinavia and Iberia.

One of the motifs which has been lifted be previous researchers as an example of this shared warrior symbology, is the chariot, which is prevalent both in Scandinavian and Iberian rock art.

By analysing and comparing the iconography and contexts of the chariot motifs, this dissertation gains new insights and interpretations on the nature of the contact and cultural exchange between Scandinavia and Iberia, and the iconographical impact this had on rock art in their respective locations, but also the meaning of the chariot motifs themselves and the relationship between them.

Keywords: Bronze Age, Rock art, Chariots, Scandinavia, Iberia, Long-distance interaction, Fränarp, Kivik, Villfara, Iberian warrior stele

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Introduction

During the last two decades, ideas of long-distance interaction between cultures has gained an increased amount of attention in the field of Bronze Age research. This includes the theory of greater parts of Europe, North Africa and Western Asia being part of a large, interconnected network of interactions during the Bronze Age, leading different cultures to be influenced by each other with regard to cosmological, economic and social structures, developing notable similarities in value systems and cultures (Harrison, 2004; Kristiansen & Larsson, 2005; Ling & Uhnér, 2015; Ling & Koch, 2018).

The expansion of trade with materials such as copper, tin, bronze, and amber was a pivotal force for the development of these new cultural networks, coinciding with social stratification, conflict, and the rise of new social classes. These ideas are partly based on iconographic and archaeological comparative research, where a similar symbolical language can be seen in the archaeological record throughout these regions, but also through recent advances in isotope analyses of copper provenience (Kristiansen & Larsson, 2005; Ling, et al., 2014).

In the specific context of Scandinavian Bronze Age research, this framework of interconnectivity and long-distance trade has to a high degree come to focus on the relationship between rock art iconography and bronze objects found in Scandinavia and those found other European regions. One of these connections are that of a Late Bronze Age Atlantic network of seafaring trader-and warrior society:

> […] the basic hypothesis that when the production-distribution-consumption system arose, its primary agents were seafaring specialists, whose shared warrior ideology is reflected in the rock art. Their cultural influence was especially strong in the Scandinavian and Iberian terminus regions of this Atlantic network.
>
> - Ling & Koch, 2018

These contacts and shared warrior ideology would leave traces in the material culture and iconography, which can be seen in findings of rock art in both Scandinavia and Iberia. Among these are motifs connected to warriors and prestige, such as horned anthropomorphic figures, weapons, shields, and chariots (Harrison, 2004; Ling & Uhnér, 2015; Ling & Koch, 2018).

In one of their works, Ling & Koch (2018) suggest that the recurring iconography of the chariot motif is the result of shared traditions between Scandinavia and Iberia:

> The stereotypic views of chariot frames, draught poles, and sometimes yokes and reins from above, whilst the wheels and draught horses are represented turned out 90°, is best explained as a shared tradition of visual art, rather than a disembodied transmission of heroic concepts.
>
> - Ling & Koch, 2018

This immediately raises the question of *if* and *how* visual similarities between iconography can be argued to indicate a direct contact between geographically distant cultures? In other words - how *similar* do two different groups of motifs need to be, for them to make a credible argument in favour of this theory?

As humans, evolution has led us to develop a great ability to detect patterns. To this day, we still have a strong tendency to see patterns, even where there in reality are none. This poses a cause for caution when we analyse and compare e iconography even in the most well-meaning attempts to accurately draw conclusions about past societies. At the same time, the human ability to make comparisons and detect patterns is a fundamental tool for archaeological research and analysis methods, and despite its risks, it still necessary for scientific progress within the discipline.

Building on the persuasive arguments by Ling & Koch (2018) with regard to the similarities of Iberian and Scandinavian rock art iconography, this thesis contributes to the discussion and deep delve into the issue of shared iconography and cultural influence.

Since there are many motif types that have similarities, according to Ling & Koch (2018), it would lie well beyond the scope and limits for this work to include them all. Many types of motifs, though very similar in form, lack the number of specific details which could be identified and compared on their own without the greater context of the objects as a group. The chariot motif however, and the very specificity in the way that it is depicted, including how it is projected, and the number of details, such as wheels, draught pole, cockpit, and horses makes it a good case for a comparative and iconographical study.

Purpose and research questions

The purpose of this dissertation is to add to the conversation surrounding the connections between Iberia and Scandinavia during the Late Bronze Age, and the existence of an Atlantic network of long-distance trading warrior society. By exploring the assumption that this warrior society had common ideals and symbology, which expressed itself through a common iconography in rock art, I aim to provide new insights, perspectives, and ideas for future research to build on. In this study, I intend to contribute to the current literature by investigating the theory of a possible direct contact and cultural exchange between the cultures, but also by analysing the chariot motifs themselves, their surrounding contexts, and the relationship between them.

To achieve these purposes, I will examine and compare chariot motifs from three different locations in Southern Sweden, Södra Mellby 42:1, Östra Tommarp 22:1, the Fränarp panel, and the so-called “Iberian warrior steles” of Southwest Iberia. Specifically, my investigation will focus on the following research questions:

1. Are the motifs ***visually similar*** enough to assume a connection of long-distance cultural exchange?
2. Do the ***contexts*** of the motifs suggest that contact was possible or even probable?

3. What was the ***meaning and function*** of the chariot motifs and their surrounding iconography, and are there similarities between the different locations in that regard?
4. If the answers to questions 1-3 above indicate that the iconography of the chariot motifs were impacted by contacts between Iberia and Scandinavia, ***what was the nature of this contact, and how was it expressed in rock art****?*

Disposition

Firstly, the theoretical framework and methods used in this dissertation will be discussed, as well as chariot terminology and a critical discussion on rock art documentation as empirical evidence. Throughout this section, historical perspective and previous research will be presented and discussed. After follows an extensive introduction to some of the contexts surrounding the material, such as rock art, Bronze Age Europe and Near east, Scandinavia, Iberia, Bronze Age warfare and chariots. This is followed by a presentation of the material used, including the Iberian warrior steles, Södra Mellby 42:1, Östra Tommarp 22:1 and the Frännarp panel.

Next follows an in-depth analysis of the chariot motifs from the presented material, followed by a comparison of the different motifs and locations. In the next section, the results of the analysis will be examined, discussing the meaning, function and relations between the different motifs and locations, their similarities, and differences, as well as their potential iconographical impact on each other.

Lastly, the results of the dissertation will be summarized in the concluding section.

Theoretical framework and methodology

As many other archaeological studies, this thesis is faced with one of the most fundamental and crucial questions in the field: what knowledge about the past can be extracted from perceived similarities between different archaeological contexts? Or rather, are the perceived similarities only in the eyes of the beholder, detached from any real meaningful connections? Being a comparative study, this issue is central for the validity of its conclusions.

In 1981, an anthology of essays was published by the Department of Archaeology in the University of Gothenburg, called "*Similar Finds? Similar Interpretations?"*. This anthology tackles the question of the meaning of similarities in finds from many different archaeological perspectives, but is at its core trying to answer the question formulated in the opening of the preface: "How far do similar finds justify similar interpretations?" (Moberg, 1981, p. A2)

On this note, Moberg lifts an important point regarding the ambiguity of the concept of "*similar"*. As Moberg (1981, p. A2-A3) states:

> Obviously "similarity" does not exist in itself; it is always relational; "similarity" – except as an entirely intuitive notion – has always to be defined, explicitly, in terms of similarity within a certain set of entities, "screened" through a certain set of attributes. The selective establishment of these two sets, the "finds" set and the attributes set, is decisive for the content of the "similarity".

The difficulties in identifying "similarities" between two sets of entities also raise the question of objectivity and selection bias. In the same moment that the finds or contexts have been chosen for comparison, a selection has been made, which inevitably will be influenced by biases and preconceived notions of expected connections between the material; the reason for why that specific set of material was chosen in the first place. This is arguably unavoidable, since the alternative of selecting archaeological contexts for comparison by chance would be a rather unfruitful endeavour. The selection of material is made because we do indeed believe, from our biases, or rather from previous knowledge of the past, that it is possible that real and meaningful similarities exist in between the materials.

Although it is important to stay aware of the fact that we have preconceived notions and biases going into the research, positive results from comparative research should not be considered invalid solely because of this human aspect. If we were to do so, we would by extension also question the viability of the entire field of archaeology, by invalidating one of its most fundamental tools for knowledge and exploration. Comparing similarities in the archaeological material is crucial for building and structuring our understanding of the past. Although we are aware that similarities in the archaeological material may make a good reason to interpret different materials to be connected, it is important to remember that similarities alone may not always be enough to with certainty claim a real connection:

> "Similar finds do indicate similar interpretations". But - we know so well (or ought to know) that in many concrete cases, the reply has to be negative, more often than not.
>
> - Moberg, 1981, p. A12

This means that in order to reach more credible conclusions when we compare materials from different contexts, such as iconography, additional qualifiers need to be included in the analysis. Simply visual similarity is not sufficient for a higher scientific standard.

First and foremost, a deeper analysis of the iconographic details of the motifs being compared is necessary. Questions that need to be considered include: How similar are they exactly? that is, what angles, number of lines, projections are used, and which parts of the subject are emphasised or ignored? What material is used and what techniques have been applied in creating them?

Another crucial factor is the contexts of the motifs. For instance, have they been created relatively contemporary or not? In which way and for what purpose were the images meant to

be used, and what types of societies created them? Finally, would there have been reasons for these societies to have been in contact with each other?

A useful comparative analysis of the images requires two levels of examination: a) What are the similarities and differences between the visual iconographic aspects of the images? b) What are the similarities and differences between their contexts? Then a final analysis can be done which focuses on what the combined answers to these questions can tell us about the relationship between the images and their respective societies?

Drawing conclusions based on perceived similarities is tricky business, but using this rather scrutinising framework, it is possible to sensibly answer the question if found similarities between the two groups of selected material justify similar interpretations or not, and whether this establishes a connection between both.

Another fundamental assumption made in this thesis is that it is possible to study prehistoric interactions by analysing and comparing iconography. This is based on the idea that interactions between groups and cultures have a significant impact on cultural expressions. By extension, it will also affect analysable material culture. One way of understanding this process is by creolization, that is, the idea that in the meetings of cultures, new forms of cultural expressions are created, such as language, traditions, and cultural expressions (Friedman, 1995, p. 208; Fernstål, 2003). This means that an object which carries symbolic meaning in its original context can be taken to a new context, and with the knowledge of its original meaning, is "translated" to its current context. An example of such a creolization process comes from Fernstål (2003) who illustrate a good example of creolization in her description of a Late Roman Iron Age vessel found in Västmanland, Sweden. The vessel had originally stood in a temple of the Roman god Apollo Grannus (associated with fertility and water) but was later found used as a cremation urn on the banks of the stream Sagaån in Västmanland, Sweden. Fernstål (2003) theorises that the vessel, with its association to Apollo Grannus, by the process of creolization, was translated to a Scandinavian context. While still being associated with water and life/death, it was given a new purpose as a cremation urn.

It is likely that iconography also has been subjected to creolization processes. Language is one area where creolization has a great impact on cultures, as there is a clear utility to communication (Friedman, 1995). In non-literate societies as the Scandinavian, and Iberian Bronze Age, symbols would most likely have had a communicative function, different from the way our contemporary art is valued (Fredell, 2004, pp. 138-140). As Fredell (2004) points out, the visual iconography of the Bronze Age rock carvings had a communicative nature, not in the same way as a text with words and grammar, but as a way of transmitting meaning, and culture. One way the rock art may have functioned in an oral tradition is to complement or materialise oral expressions, such as tales, poetry, religious activities, monologues, homages, eulogies, songs, prayers and so forth (Ibid.). As a complement to the spoken word, the visual communication of the iconography of the Bronze Age rock carvings would most likely have been subject to creolization, alongside the spoken language. When different peoples met and traded, they were also building connections in the form of alliances, new ideas, new traditions, and new expressions, building on what they had learned from other groups and cultures. Creating common language, traditions, and symbols to strengthen social bonds and facilitate communication and trade. While there would be an obvious utility in developing a shared

register of symbols, there would still be great utility in specializing them to their respective local contexts. See for example the case of the Apollo Grannus vessel (Fernstål, 2003), mentioned above. This means that the idea of the creolization process is that meetings between different peoples not only impacts culture, but makes up the fabric of cultural development itself:

> ...all cultures are involved in one another; none is single and pure, all are hybrid, heterogeneous, extraordinarily differentiated, and unmonolithic.
>
> - Said, 1993, p. xxix.

The theory that creolization processes have impacted cultural expression in Scandinavian through culture meetings and trade during this time period, finds evident support in for example the shifts in Bronze Age Scandinavian iconography. During the final stages of the European Bronze Age, there was a shift in the main source of imported metals Scandinavia, from Iberia to the northern Alpine area. At the same time, Scandinavian rock art became more influenced by Central European iconography. A good example of this is the Urnfield bird iconography, which depicted aquatic birds and was prevalent on bronze objects across Central Europe in the Late Bronze Age. The Urnfield bird iconography came to be adopted into Scandinavian rock art and metal objects (Ling & Uhnér, 2015).

There are many reasons why certain symbols and cultural expressions would exchange and transmit as result of interactions. The most basic reason must be that the expression in one way or another has a useful function for the adopter. What this function is, and why it is useful may vary greatly, and there are sometimes many intersecting factors which determines this. The symbol might be effective in communicating or upholding social or economic power, or there might genuine religious reasons for the adoption of this symbol. It may also be that the adoption of a common symbolic or ideological language, or jargon, or it might simply facilitate interactions between groups of different regional origin, much in the same way as a spoken or written language. These factors may also intersect. Whatever the reasons, in the end the symbol or cultural expression is transmitted and negotiated because it resonates in one way or another.

Kristiansen & Larsson (2005) have explored the forces and mechanics behind interaction and cultural exchange during the Bronze Age to a great extent. Their theoretical framework focuses on interactions through the lense of transmission and transformation of institutions, such as the religious, political, and economic present in large parts of European and Near East societies during the Bronze Age. Institutionalized actions and transactions performed by specialists, came with a set of values, and symbols which expressed these values. Acording to Kristiansen and Larsson (2005) a good example of such values and symbols is the concept of warrior identity, or “divine rulership”. They mean that these values and symbols took expressions in real life cultural and political practices, such as the ritualised structure of leadership in double, so called “twin” rulers, and the use of specific objects such as swords, ceremonial axes, caps, horns, or horned helmets, and chariots, in ceremonies.

Kristiansen and Larsson (2005) explain the spread of cultural traits and institutions with a reevaluation of the concept of diffusion as an interpreative process of diffusion, acculturation

and contextualization. The concepts of transmission, transformation of institutionalisation are used to explain the impacts of the diffusion process:

> Did it lead to significant reformulations of existing social and ritual practises, and thereby also redefinitions of existing institutions? Were new institutions developed, and what were their place and role, or did the changes remain marginal, adding only minor adjustments in material culture and practises? This is a task we are proposing to solve by applying the interconnected concepts of transmission, transformation and institutionalisation.
>
> - Kristiansen & Larsson, 2005, p. 27.

Kristiansen and Larsson (2005) argue that by assuming that institutions materialise in specific and recurring ways, it is possible to find these in the archaeological record as well as the meanings behind them. Along with institutions comes the adoption of a set of values, which materialise in iconography, specific objects, monuments, and buildings. These phenomenons would have been part of a greater ideological and cosmological framework (Ibid.). By applying an interperative strategy, Kristiansen and Larsson (2005) calls intercontextual archaeology, they intend to trace central symbols through several contexts, and reconstruct the meaning and structure of institutions.

Ling and Koch (2018) apply this way of viewing institutions as set of transferable values and cultural expressions connected to societal organisation, is applied on the hypothetical seafaring long-distance trading and warrior-community. The materialised values of this institution are described as being intercontextual symbols such as horned warriors, weapons, shields, and different prestige objects (Ling & Koch, 2018). In Scandinavia and Iberia, these symbols would then be expressed through the medium of rock art.

One of the symbols that Ling & Koch (2018) include in the value package of this institution is the chariot, and they argue that the visual likness between chariot motifs in Scandinavian rock art and on Iberian warrior steles is indicative of "a shared tradition of visual art, rather than a disembodied transmission of heroic concepts" (Ling & Koch, 2018). The very specific way of depicting chariots would therefore be a result of not only an adoption of the same symbolical values, but it would also likely have been a consequence of direct and extended contact between Scandinavia and Iberia. Such striking visual similarities in rock art iconography can be seen in many of the motifs which Ling & Koch (2018) connect with the trader-warrior community.

By conducting an in-depth iconographic analysis of the chariot motifs themselves, comparing them against each other, as well as their contexts, I aim to reach a deeper understanding on the nature of the relationship between the motifs, as well as the cultures which produced them.

The study will compare motifs on a regional and interregional level. The material that this study will use for comparison on a regional level are the chariot motifs from the South Swedish *Kivik grave*, Södra Mellby 42:1, and the *Villfara stone*, Östra Tommarp 22:1.

For the analysis on an interregional level, the chariot motifs from the open-air rock art panel in *Fränarp* will be compared to chariot motifs on the Southwestern Iberian so called *warrior steles*.

The inclusion of the Fränarp panel is motivated partly by the frequency in which its chariot motifs are brought up and used as comparison when discussing similarities between Scandinavian and Iberian rock art (see: Harrison, 2004; Ling & Uhnér, 2015; Ling & Koch, 2018). The second reason is of the attempt at avoiding an increased selection bias, which I would risk by manually choosing which motifs to include one by one. Since there are far too many Scandinavian chariot-motifs to include all of them, the Fränarp panel offers a good selection of motifs, contained to a single geographical context.

Chariot terminology

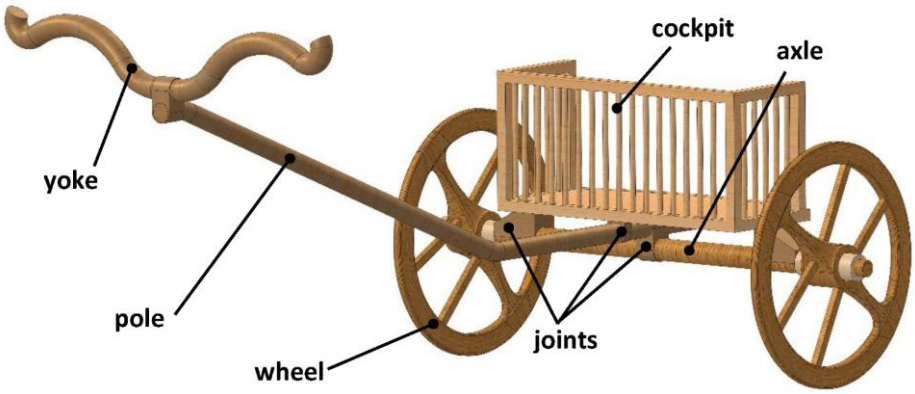

Figure 1. Schematic of a Bronze Age war chariot, inspired by one found in Armenia, after Mazzù, et al 2021.

Although the construction and function of Bronze Age chariots differed between regions and over time, there are some common parts that were necessary for the function of the chariot. For a basic understanding of the general anatomy of a chariot, fig. 1 below provides a good schematic guide. However, as mentioned above, the specific appearance and construction would have varied greatly over different regions and over time.

The yoke is fastened over the neck of the horses, which allows them to pull the chariot forward. The pole, which connects the yoke to the main body of the chariot, is a single angled or curved piece of wood, which has been shaped through a technique using steam-bending wooden bars (Mazzù, et al., 2021). The wheels are mounted on a fixed axle which is fastened to the main frame of the chariot. This allowed the wheels to turn independently from each other, with different speed, and thereby giving the chariot greater manoeuvrability in tight curves (Ibid.). The cockpit acted as a platform for the driver and passenger(s), and could in some cases be closed off in the rear with a shield. The floor could differ but would probably generally be made by interwoven leather strips, providing some elasticity for stability on uneven ground (Ibid.).

Do the chariot motifs represent real chariots?

To understand the chariot motif as a symbol, it is helpful to first recognize what place and function the chariot had in their respective societies.

As this work aims to draw conclusions of both past ideas and archaeological reality by studying and comparing iconographical images from that era, it is important to start by establishing how we should interpret what these images are meant to represent, and in what ways they were doing so. In short, are the images representations of real objects that existed among the people who made these images? If they are, to which extent were they used, and in what contexts? Does an emphasise of a special motif correspond to how common the represented object was, or how ideologically important they were to that culture? How well does the iconographic depiction correspond to the anatomy of the real-life object? This question becomes especially important as this study examines the images to discern functional details of the real-life object.

There have been different opinions on how to correctly interpret the chariot motifs on Scandinavian rock-art. Some scholars (e.g. Mats Malmer, 1981) are arguing that they did not represent chariots that existed in Scandinavia, but rather were inspired by iconography on imported goods from the Mediterranean, such as Mycenean textiles. However, no such example of Mycenean textiles has ever been found in Scandinavia (Winther Johannsen, 2010).

A great part of the Scandinavian rock carvings seems to be connected to religion, ritual and mythology, with some motifs seemingly not representing real-world objects (Winther Johannsen, 2010). This raises the question on to which extent chariot depictions were based on real life objects, or if they were merely used as cosmological symbols. One example of a cosmological myth that the chariot iconography could be meant to represent is the sun being drawn across the sky by horses, of which there are several archaeological examples. This could be compared to the myth of the Greek sun-god Helios and his chariot (Winther Johannsen, 2010). It is also possible that, as Wrigglesworth (2005) suggests, the chariot-motif might have had a more symbolical meaning, as a metaphor for traveling.

It is difficult to arrive at any definite conclusions on whether the chariot motifs can be seen as evidence of the presence of real chariots in Scandinavia at the time, especially since the archaeological material are lacking. This is a problem with the Iberian material as well, as most of the depicted artefacts on the warrior steles are completely absent in the archaeological records (Sanjuán, 2012, p. 535).

The question of the relationship between rock art and reality during the Bronze age has been a central question in Scandinavian rock art research. As mentioned earlier, in the last century, the main question of interpretation in Scandinavian rock art research has revolved around the iconography around the carvings, and its religious meaning during the Bronze Age. One of the main disputes has been whether the carvings depicted rituals, mythology, or both. Some of the most influential scholars and works in this school of interpretation during the early 20th century were Oscar Almgren (1927), with his work *Hällristningar och kultbruk : bidrag till belysning av de nordiska bronsåldersristningarnas innebörd,* and Carl-Axel Althin (1945) with *Studien zu den bronzezeitlichen Felszeichnungen von Skåne.* The main interpretations of rock carvings at the time of Almgren and Althin being that they depicted scenes and symbols of agrarian cult practises and ideology. This lead to the view that boats, which are one of the most numerous

motifs in Southern Scandinavian rock art, did not represent real objects, but were rather representations of ideas or ritual objects. This view was changed with Johan Ling's (2014) work on rock art and the relation to shore displacement. Ling showed that depictions of boats in rock art were closely related to bodies of water during the Bronze Age, thus representing real boats (Ibid.). This leads us to the conclusion that if boats represent real objects, even if they are lacking in the archaeological record, there is no real reason why the same wouldn't be true for chariots, which are also numerous in Scandinavian rock art.

Winther Johannsen (2010) gives some good arguments as to why the rock-art motifs should be seen as proof for the presence of real chariots in Scandinavia. Arguing against those who says that the chariot motif should be seen as symbols and not representations of real objects (see. Schovsbo, 1987, p.18), Winther Johansen (2010) points to the fact that even though the motif might have an for us indecipherable symbolical, or methaphysical meaning, the depiction is unlikely to be plucked from thin air. He argues that other depicted artefacts that have survived to this day is caracterized by a high degree of realism. Even though there are few parts remaining of Scandinavian chariots, that does not neccesarily mean that they did not exist. As previously mentioned, the same could be said about the thousands of ships depicted on rock art, of which very few parts remain (Winther Johannsen, 2010). Few would argue today that real ships did not exist in Bronze Age Scandinavia (see for example Ling, 2014), and there are over 185 examples of wheeled veihcles-motifs on Scandinavian rock art sites (Ibid.).

The material evidence of chariots in Scandinavia mirrors the evidence found in contemporary Aegean and Near East, in that very few vehicle-parts have stood the test of timethere as well. In Greece there are no remains of actual chariots from the Late Bronze Age, and all information is based on contemporary depictions (Littauer & Crouwel, 1979; Crouwel, 1981; Feldman & Sauvage, 2010). As Winther Johannsen (2010) argues, there are few who doubts that the depicted vehicles of the Aegean and Near East, despite the lack of physical evidence, existed in reality, and there are no real reason to not apply the same standard when interpreting the Scandinavian material. He also says the discussion on the existance of Scandinavian wheeled veichle is a result of evolutionary thinking, and a bias regarding the Scandinavian Bronze Age societies as primitive (Ibid.).

Winther Johannsen makes a persuasive argument that the most likely scenario is that wheeled vehicles as depicted in Scandinavian rock art did exist. One argument is the number of hypothetical steps and scenarios needed to explain why specifically the great number of wheeled vehicle-depictions are not based on real objects, while so many other depicted artefacts are seems farfetched. A much simpler, and more likely answer is that they were indeed real. The baseline assumption for the following will, therefore, be that the depictions of chariots are supposed to be based in some form of real, existing object within the culture that produced the image.

However, there are some questions that needs to be taken in consideration moving forward. Although the chariot-depictions are based upon real objects within that culture, it is not necessary that the image directly correspond geographically with the object being depicted. The depictions may not necessarily mean that chariots were used locally.

I do believe however, that there is a difference between the chariot motif being based on objects used by people living in a different political or cultural sphere, such as the hypothesised imported Mycenean textiles (Malmer, 1981), and a political, cultural group produces an image

of an object which exists within the same sphere at a different geographical area. Especially if this group were characterized by being highly mobile.

Like in Scandinavia, there is also a question whether chariots existed in Iberia as well. Many of the artefacts depicted on the Iberian warrior steles, including chariots, are absent in the archaeological record (Sanjuán, 2012, p. 535). However, in the case of chariots, it is likely that the situation is similar to the one in Scandinavia or the Aegean, that no examples has survived due to the perishable material of the chariot. One could argue however, that the absence of other artefacts depicted on the steles, would suggest that they didn't represent existing things, and in that case, the same would be true for the chariots. It seems strange however, that a monument which had a communicative function (Harrison, 2004) would rely on a symbology which without any real-life correlates, unrecognizable for the beholder. One of the other objects depicted on the steles are V-notched shields of Herzsprung type. Although no example of these shields have been found in Iberia, we know that these shields existed. Taken in consideration that wooden moulds for making such shields in leather have been found in Ireland (Harrison, 2004, pp. 124-131) it makes the case for these shields to have been present in Iberia even more probable. Without the right preserving conditions, it is highly unlikely that such a leather shield would have survived to this day if they were used in Iberia during the Bronze Age.

There could be many reasons as to why the artefacts depicted on the warrior steles aren't found in the Iberian archaeological record, including remelting of metal objects, relocation, or natural degradation. As seen in Scandinavia, which types of artefacts that would end up in graves, and which would be placed in hoards or other contexts would vary over time and region during the Bronze Age (Horn, 2018b). Just because an object is absent from graves doesn't mean they did not exist.

In both the case of the Iberian material, and the Scandinavian material, I would suggest that the artefacts depicted are most likely based on real life objects, which existed in some way within the group responsible for creating the motifs, or at least within said groups' greater cultural sphere and consciousness. It is possible again, that the depicted objects belonged to individuals which did not necessarily permanently stay within the steles' imminent geographical vicinity, belonging to a group with a mobile lifestyle, which lead to the artefacts ending up at different locations.

A second question regards the level of accuracy in the depictions of chariots in rock art, and how- if possible, to extrapolate information about the details of the real-life chariots.

A critical discussion on rock art documentation as empirical evidence

There are inherent problems using rock-art documentation as empirical evidence when researching past societies. One of the greatest problems lies in the nature of documentation: the fact that it is a mere copy, an interpretation made by the documenter of the object that is investigated, and not the object itself. This creates an inherent weakness in the empirical material. What sort of documentation is being used, and what conscious and unconscious decisions have been made even before the study starts by the original documenter (see. Bertilsson, et al., 2017)?

When documenting rock-art, there are several factors that will impact the results. What sort of documentation technique is used? What skills and experience does the documenter have? What motifs are the documenter expecting and looking for? What external circumstances such as weather, environmental factors and seasons are impacting the documentation. Many factors can impact the documentation process, creating varying results even if the same technique was used.

However, documentation is still a prerequisite for rock-art research. This goes for both collection and interpretation of data without documentation, especially in cases of comparative studies, as the option would be spending all time studying the carvings at the sites, an incredibly labour-intensive venture. We are also limited in our senses, as many details of carvings are hard or near impossible to see with the naked eye, without visualising documentation methods (Horn, et al., 2018).

Another problem revolves around presenting the results in a scientific manner, as your data and empirical evidence remains hidden to the reader without documentation which again, requires excellent visualizations. The question that arises is then, how can we circumvent these problems revolving documentation?

3D-documentation

One of the ways this is achieved is through 3D-documentation. These types of documentation methods have proven to show great levels of accuracy and detail and has become increasingly important in rock art research the last decade (Horn, et al., 2019). Beside the advantages of being able to record all three dimensions of the carvings, you also get rid of the human bias and decision making in the documentation process. There is of course bias in the interpretation stage, which is inevitable, but compared to traditional methods it is a great advantage. There are broadly speaking two types of 3D data collection: image-based modelling which uses multiple static images and pixel recognition to generate three-dimensional point clouds, one method using this principle is photogrammetric documentation. the second is range-based modelling which establish point clouds in relation to a laser source and receiver, such as a hand laser scanner (Horn, et al., 2019).

One of the problems with three documentation it's the question of how to visualise a three-dimensional object unto a two-dimensional space, without introducing human bias, while still being visually comprehensible.

One method used by Horn, et al., (2019) to solve this problem is to use GIS processing on digital elevation model images. This produces a sort of digital frottage, with accurate, clear details. Beside showing a greater deal of details, than traditional documentation methods, they are also able to trace superimpositions of motifs, by judging colour differences in the visualization caused by depth differences.

The documentation used in this dissertation for analysing the Frännarp motifs was created with this technique.

Like in Scandinavia, Iberian rock art research was revolutionized by the application of Reflectance Transformation Imaging (RTI) and laser scanning for 3D-documentation of Iberian Warrior steles. These techniques were pioneered in the works of Marta Díaz-Guardamino

(Díaz-Guardamino & Wheatley, 2013; Díaz-Guardamino, et al., 2015). Besides producing a far more accurate and reliable documentation of the steles than previous works, Díaz-Guardamino has also been able to show manufactoring techniques used on the steles and engravings, as well as modifications to the motifs (Ibid.).

For the Iberian 3D- material used in this dissertation, a similar visualization concept as the one applied to the Frännarp material was used. The tool *ratopoviz* = rock art topographic visualization (now Topographic Visualization Toolbox, see https://tvt.dh.gu.se/), was created for automating the creation of visualizations for 3D rock art data. This technique process data from laser scannings to create visualizations in form of depth maps, topographic maps and blended maps (Horn, et al., 2021). Both methods emphasize local depth differences which includes the images, and the colour distribution is directly linked to depth which means it is equal across the entire documented surface. Thus, not bias is inscribed in the colouration, because no human decided to deposit more colour in certain areas like for example in traditional rubbing techniques (Horn et al. 2018).

Comparative method

When comparing iconography with the goal of investigating possible connections between different motifs, localities, groups of people, and cultures, it is not enough to simply examine the visual aspects of the motifs. Even two motifs from different contexts share several visual similarities, does it not necessary mean that these similarities are the direct result of cultural interchange. Other factors such as the material of the canvas and the technology available, limits the possible ways an image can be created, and will thus have an impact on the visuals of the finished motif. These limitations can lead to seemingly similar visual results. Artistic and technological conventions can also be spread through cultural interchange in many steps, and although similarities can be found between group A and group C, they could have spread through contact with group B, without direct contact between A, and C.

Likewise, differences in visual aspects of two motifs do not necessarily mean that the motifs themselves are *not* the results of cultural interchange. Differences can also be the natural results of adaptations to local needs, customs, the artists skills, material etc.

To reach more reliable results when using iconographic comparative analysis to determine direct cultural exchange, which is the goal of this study, there are several factors of the images that need to be considered.

I here employ a list of aspects to consider in the comparative analysis of Bronze Age rock art chariot images.

1. Visual attributes

Projection and perspectives. How is the chariot in the image perceived? Which angles and which parts of the chariot are shown? Are certain parts emphasised or unproportionable? The projection of the chariot is important, as it both tells what aspects that the carver thought where

important to display, thus saying something about the ideas and ideals expressed in the motif, and if the different regions were using similar depiction technique.

Position of the axle. This is important in understanding what type of chariot that is being depicted. The placement of the axle has an impact and different outcomes on the performance of the chariot; thus, it was placed in different positions in different regions to accommodate different needs (Littauer, 1972; Sandor, 2004a; Sandor, 2004b; Mazzù, et al., 2021). By examine the position of the axle in the chariot motifs, it is possible to see what type of chariot is being depicted, what their influences are, and indicating possible functions. This is of course therefore important for comparative reasons.

The portrayal of the wheels. There where both different ways that wheels were constructed during the Bronze Age, but also ways of depicting them. This again gives us information both on iconographic style and what type of wheel the depiction represents. Some details to examine are how many spokes are depicted, whether the centre of the wheel, the so-called *hubs*, are depicted, and to what grade the depiction of the wheel is stylized.

The depiction of the cockpit. As much artistry can be expressed in the style the cockpit is depicted, and that unlike some of the other elements can be both constructed and depicted in different ways, it has the potential to give much information to work from a comparative analysis. Some aspects to compare is the general shape of the cockpit, is it depicted as a box or rounded? Are there any specific details shown?

The horse-team. Like the cockpit, draught-horses has details which can be depicted in many different ways, which in turn could indicate iconographic similarities.

Reins and other details. Are the yoke and reins depicted? Are there any other specific details which could be used for comparison?

The artistic style. How is the chariot motif as a whole depicted? How many lines were used to draw the chariot? How does it compare specifically to any other motif?

2. Contextual circumstances

Surrounding iconography. What other motifs are the chariots closely associated with? Do these images share visual similarities? If there are other types of motifs which also share similarities, there is greater reason to believe that there is a common iconography.

What was the function of the panel where the chariot motif is carved on? In which context is the panel situated? Can anything be said about the meaning and function of the panels, and can any comparison be drawn between them?

What purpose had chariot motif? Why were they made, what symbolical meaning and function did they have, both by themselves, and in relation to surrounding motifs?

Can the carvings be dated? How does the motifs relate to each other chronologically? Are they contemporary to each other or did one come before the other? This could give us some information on if one motif could have inspired another, or if they would have been carved under similar ideological circumstances.

What are the images geographical contexts? What are the geographical contexts of the motifs? What is the distance between their locations, and is it possible/probable that travel would take place between these localities?

Other evidence of contact. Is there any other traces and evidence for contact that could lead to cultural exchange between the groups who produced the images?

I will make my comparative analysis in three steps:

1. First, I will compare two motifs with similar contexts, and which are geographically close to each other, Södra Mellby 42:1, Östra Tommarp 22:1.
2. Secondly, I will compare motifs from two different European regions, Southern Sweden and Southwest Iberia, visually similar but with seemingly different contexts.
3. Thirdly, I will compare the results and conclusions from step 1 and 2, relating them to each other.

The impact of chosen method and material

There is an argument to be made that the chosen material for comparison is rather slim compared to the known record of scandinavian chariot motifs, namely 16 out of around 93 (Winther Johannsen, 2010; 2011). If all scandinavian motifs were included in the analysis and compared to the Iberian material, it is likely that the similarities detected in this study would appear less impactful in relation to a wider, more heterogenic material. The current selection of motifs from both Frännarp and Iberia is based on visual likeness. One could argue that the hypothetical results of an iconographic comparative analysis that includes the complete record of chariot motifs, regardless of likeness, do not suggest a connection between Scandinavia and Iberia. However, the question under investigation in this study is not wether all chariot motifs in Scandinavia and Iberia have a direct connection, but wether there was a connection at all, and whether the impact of these connections can be detected in the material iconographic record. This direct connection could have manifested in just a few places, such as Frännarp, and so including more motifs would not bring more clarity, but rather muddy the waters. Another factor to consider regarding the differences between many Scandinavian motifs and the Iberian material is the dimension of time. Local thechnological or iconographical progress could explain some of the visual differences between many Scandinavian chariot motifs and the Iberian material.

An extended study that includes all chariot motifs would be both interesting and possibly very useful for understanding both the relationship between the Scandinavian chariot motifs, the chronological aspects of the iconography and function of the chariots. This is however, outside the scope of this dissertation for space- and time saving reasons.

Another aspect that impacts the results of the analysis is the nature and quality of the chosen documentations of the material. It is clear that in cases where a 3D-documentation of motifs has been connducted, a more detailed and solid analysis was possible. For some of the motifs,

such documentations were not available. Still, the quality of the availible material was sufficient enough to generate fruitful and reliable knowledge by visually analysing them. As more motifs are documented with 3D-techniques, and as these methods improve, there is much ressearch about the chariot motifs that can be added to the results of this dissertation.

One could also have included chariots from other, more distant cultures that are less likely to have been in direct contact with Scandinavia during the Bronze Age, such as Siberia, Mongolia and China (see section below). This would serve to investigate whether any similarities in chariot design is a result of natural evolution of chariot building in any culture, and the similarities between Scandinavian and Iberian chariots is not enough to establish a direct connection. However, the heterogenity among chariot motifs from the same time period, that have been considered and excluded in the meterial selection in this study, suggest that visual similarities are not concidential. Of course, one could argue that this possibility should still be more carefully investigated, though that would expand this dissertation beyond what is practically reasonable, and my be a better subject for future studies.

Background

Rock Art

Rock art is a phenomenon that is present all across the globe, and an important source of information when trying to figure out the minds of people of the past. This is especially true for cultures who have not left us with any written records. Although much information about the lives of past people can be deducted by studying the remains with archaeological methods, iconography is a chance to get a glimpse into their worldview, as they themselves wanted to depict it. This is not the least true in the case of Bronze Age Scandinavia and Iberia. It must be taken in consideration however, that the cultural context and associations needed to decipher these images has been lost with time, and that the way we interpret these images comes from our knowledge of the past, complemented with our own cultural associations and context. With this said, the rock art offers a sea of valuable information about the past to someone with a cautious mind, and complementary archaeological knowledge.

Layout of chariot motifs in rock art

Although there are differences in the depictions of chariots in the Scandinavian and Iberian material, there are some striking similarities as well. One of the most obvious being the projections used when depicting a three-dimensional object on a flat surface. For the selected material of study there are mainly two layouts of the motifs: The first style depicts the chariot from the side, however with some liberties taken with details, as to be able to show more details. This projection is not present in the Iberian material, but does occur in several Scandinavian motifs, examples being on Södra Mellby 42:1 and Östra Tommarp 22:1.

The second style is the most common and appears in both the Scandinavian and Iberian material. This projects the chariot in a sort of a mixed-top down perspective, showing the main-body of the chariot from above, while at the same time showing certain details such as draught-animals and wheels from the side. This way of projecting chariots has been used as a strong argument for a shared tradition of visual art, between Iberia and Scandinavia (Ling & Koch, 2018), mainly because its unique, ichnographic specificity.

The mixed-top down perspective, however, is a mode of depicting chariots that is very widespread phenomena. Besides Bronze Age Europe, this projection can also be found in rock art from Northern Africa (Anderson, 2016), Arabian Peninsula (Olsen, 2017), from the Andronovo Culture and related cultures of Central Asia and Northern India (Kuzima, 1994) as well as Bronze Age Mongolia (Esin, et al., 2021) (see fig. 2-8).

Figure 4. Photo of Al Mushaerefha chariot rock carving, by Richard T. Bryant 2014.

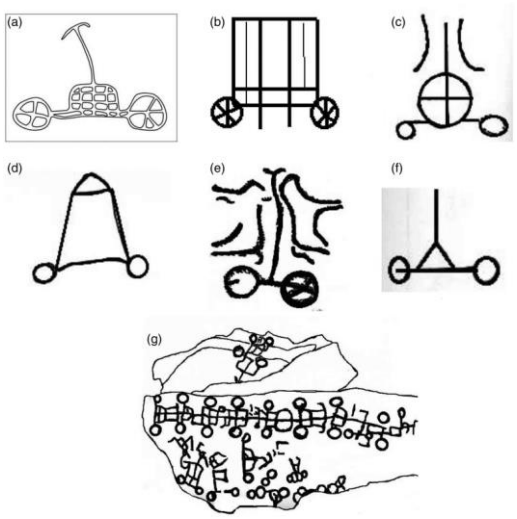

Figure 2. Collage of Saharan chariot motifs, after Anderson 2016

Figure 3. Collage of chariot motifs from rock carvings of the Andronovo culture, after Kuzima 1994.

Figure 5. Photo of the Al Maqayel chariot, by Richard T. Bryant 2014.

The prevalence of chariot motifs with the mixed-top down projection across the world might be used as an argument against the idea of a shared iconographic tradition between Scandinavia and Iberia, or at least the uniqueness of these similarities seem to be somewhat diminished by this fact. With that said, this iconographical detail should certainly not be dismissed in the comparison of the Scandinavian and Iberian material, since it may still be a result of these connections, however, it should not be used alone as proof of contact. The commonality of the mixed-top down projection requires us to make deeper analyses and comparisons of iconographical details in the chariot motifs of Scandinavia and Iberia to find indications of shared iconographical tradition.

How to understand and interpret the perspectives of the mixed-top down projection

Although not identical in form and style, the explanation from Esin, et al. (2021) of the projection of a chariot image from the Khoid Tamir river valley in central Mongolia, may be useful for understanding the perspectives of the mixed-top down chariots of the Scandinavian and Iberian material as well.

Although the green human figure and side railing depicted in Fig. 6 does not have any correlates in the Scandinavian or Iberian motifs included in this work, one can argue that the side railing of the cockpit, shown in green could be depicted in the same way in other Scandinavian carvings *(compare fig. 6 and fig. 8).*

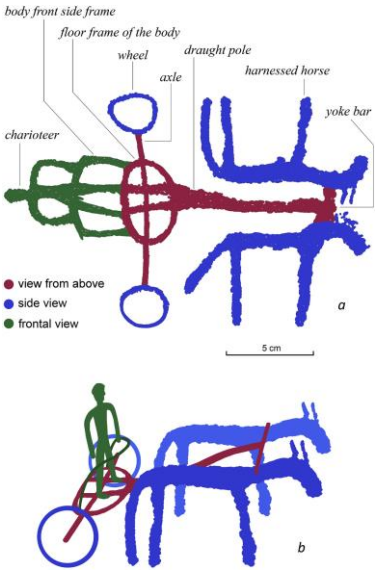

Figure 6. Drawing of Chariot motif from Khuruugiin Uzuur with explanation of projections, after Esin et al. 2021.

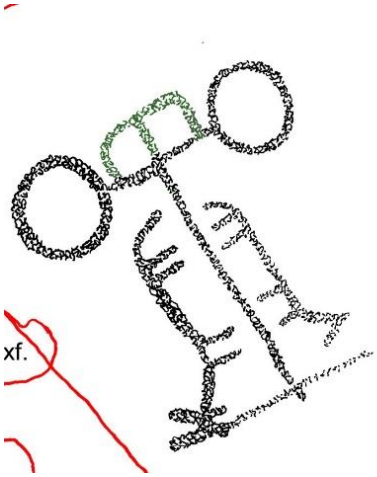

Figure 8. Chariot image from Brastad 26:4, Bohuslän Sweden. Tracing by Andersson & Toreld 2009, with suggestion for a possible similar projection of cockpit, highlighted in green by the author.

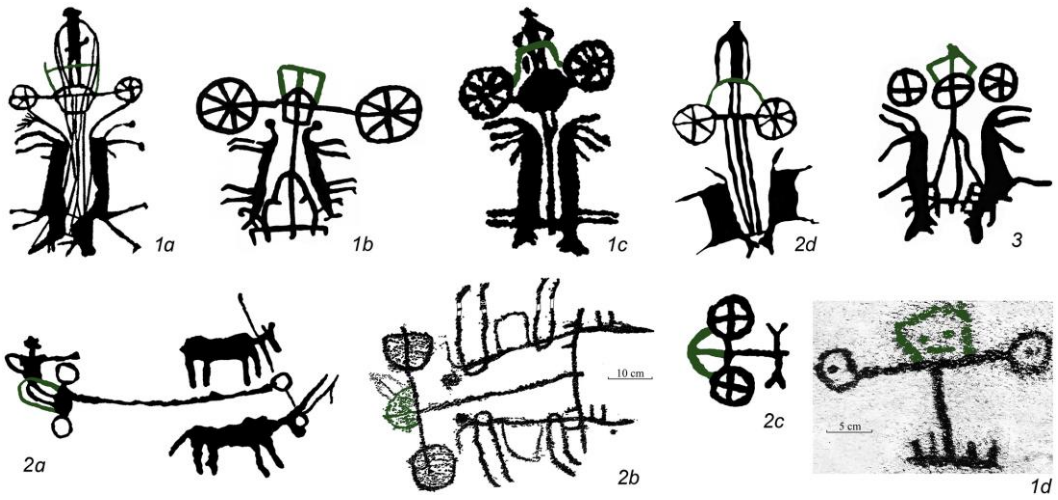

Figure 7. Mongolian Chariot-images with cockpit sides highlighted in green according to Esin et al.'s projection, after Esin, et al. 2021.

To a modern eye, this very particular and peculiar way of projecting an object may seem strange. Even more so that this way of depicting chariots is so widespread during the Late Bronze Age. This is an interesting question, and a question yet to be answered. One possible explanation according to Winther Johannsen (2010) is that this is one way of showing as many details of a chariot as possible, that the focus is not to represent it as naturalistic as possible. There are also inherent limitations with the available material and using stone as a canvas. This style may therefore have developed separately. It is also possible that the style of depicting the chariot is a result of contacts between cultures, or even, although highly speculative, that the way of depicting the chariot followed with the spread of the actual chariots, from the Eurasian steppes to Iberia in the west and Mongolian steppes in the East.

This question, however interesting, lies outside the scope of this work, and I will instead focus on comparing Scandinavian and Iberian material. It is important to notice that any apparent visual similarity between Scandinavian and Iberian chariot-depictions that comes with this style of projection, should be put in perspective that it is not unique for these two regions. However, it should not be dismissed either. It is important to examine several iconographic details and contextual circumstances to reach more solid results.

Bronze Age Europe and Near East

The third millennium BCE was a period of movement and change throughout the Western Eurasian continent. This included both the movement of people, and the reorganization of way of life and of society. The expansion of agro-pastoral economies came to change both the natural landscape and the social structures of society (Earle & Kristiansen, 2010). This era would see the accumulation of wealth among fewer individuals, and with it the stratification of society, with new forms of ritual, cosmological and political systems as a consequence (Earle & Kristiansen, 2010; Iversen, 2017).

By this time, several centralized states and state-like societies had emerged In the Near East and around the Eastern Mediterranean. Among the first of these were Mesopotamia, Egypt, and the Minoans. In these early states, where stratification had reached levels where a centralized power structure could take place, new influential ways of organizing society rose. One of those would be the concept of the divine ruler, and the belief that they represented a direct link between the profane and the divinities. This way of centralizing and legitimizing power became the norm in Near Eastern states throughout the Bronze Age (Kristiansen & Larsson, 2005, pp. 63-90).

In both Mesopotamia and Egypt, the ruler came to inhibit both ritual, political, and martial roles, as they were responsible both for conquering of territory, and religious duties such as overseeing rituals and maintaining good relationship with the gods. Eventually the kings of Mesopotamia came to be seen as semi- divine, although they never came to be cosmologically tied to the belief system in the same way as the pharaohs of Egypt, which were seen as gods incarnate (Ibid.).

In the second millennium BCE, new states would emerge in the Near East and Eastern Mediterranean. Among these were Babylon, a Mesopotamian city-state which came to conquer vast areas of the Near East. The Hittites, based in Anatolia grew to be a superpower in the region, coming into conflict with Egypt and Babylon at numerous occasions during the second millennia (Ibid.). The Mycenaeans were a network of city-states in the Greek mainland, in which areas of land were organised around centralized fortified "palaces" (Shelmerdine, et al., 2008). As the Mycenaean leaders accumulated power through expansion and trade, they came to be the dominate maritime power in the eastern Mediterranean (Kristiansen & Larsson, 2005, pp. 63-90).

During the Final Late Neolithic, Early Bronze Age, Europe saw a population boom, rising from around 8 to 13 million between 2000-1500 BCE (Müller, 2013). This was partly caused and enabled by the adoption of new crops and agrarian methods, such as stalling of cattle (Stika & Heiss, 2013). This era also saw increased stratification of society, following the emergence and demand of new commodities, which were the results of technological advances. Among these were wool textiles and bronze (Earle & Kristiansen, 2010; Sabatini & Bergerbrant, 2020). The earliest traces of wool textile production are from around 4000 BC Mesopotamia, and during the Bronze Age, wool and wool textiles became an important commodity in Europe, and part of a vast trade network, as evident by textiles made from non-locally produced wool found in Danish oak-log coffins (Ibid.).

The demands for raw materials and luxury items began the process of expanding trade networks, connecting the urban, centralised states of the Near East with the different regions and societies of Western, Central, and Northern Europe. One of the driving forces of this trade was the demand for bronze. Bronze, from which this era has been named, is an alloy of copper and tin- raw materials which during the Bronze Age were not found at the same localities (Earle & Kristiansen, 2010; Ling, et al., 2014). This resulted in vast, long distance trading networks and largescale mining of copper and tin across ore-rich locations in Europe, as well as the mass production of bronze objects. Some of the most prominent copper producing mines in Europe where in Cyprus, North Tyrol in the Alps, and Southwest Iberia, while one of the greatest tin mines were found in Cornwall in southern England (Ibid.). Baltic amber found in all mentioned areas, from England to the Eastern Mediterranean shows that Northern Europe was well connected to this network as well (Ibid.).

With this long-distance trading connecting geographically separated societies, came the spreading and interchanging of what Kristiansen & Larsson (2005) called institutions across european societies. Among these were the concepts of divine rulership and warrior aristocracies, with its different symbols, cosmology and ideology.

Towards the Late Bronze Age, there would be long established social structures and trading-networks across the different regions of Europe. In the Near East, the states of Egypt and the Hittites had grown to empires, including large territories across Anatolia and the Levant. The military arms-race between the two empires culminating in large armies and charotries clashing in huge battles during the many wars between them other (Kristiansen & Larsson, 2005, pp. 63-90; Mazzù, et al., 2021).

Scandinavia

When discussing Scandinavia in the Bronze Age, it is important to notice that Scandinavia in this time was part of several distinct cultural spheres which stretched beyond Scandinavia, but which also interacted and influenced each other. When studying chariot motifs on rock art, it is mainly within the context of a southern Nordic Bronze Age tradition, a broad cultural unit which comprise Denmark, southern Norway, Southern Sweden, and Northern Germany (Winther Johannsen, 2010). It is of course hard, if not impossible to draw any definite, distinct lines between "cultures", since they exist within greater social, economic, and cultural intersecting contexts.

One of these being examined in this very dissertation, the possibility of the elites of southern Scandinavia being part of a greater Atlantic ideological and economic trade-alliance network. However, when Scandinavia is being discussed, I will mainly be talking about the Southern Nordic Bronze Age culture.

Surplus, trade, and emergence of the warrior

In the late Neolithic, there were structural societal and technological changes occurring in Scandinavia which facilitated the stratified societal systems of the Bronze Age. In the final stage of the late Neolithic (c. 1950-1700 BCE) several aspects emerged which defines the Bronze Age, such as the warrior ideal, metal trade, an increase in agriculture, and the building of large halls. Scholars such as Iversen (2017) argues that this era should in fact rather be seen as the Earliest stage of the Bronze Age. The emergence of a stratified society which coincided with a greater agricultural surplus, did prerequisite the Bronze Age, with great displays of wealth as evident by rich neolithic hoards and depositions. Iversen (2017) argues that individuals with great wealth, so called "Big-men", used their surplus wealth in public displays of feasts, gifts, and religious ceremonies to accumulate influence and power. These hierarchies would be hard to formalize before the Bronze Age however, due to the inability to monopolize raw materials, such as flint for the gifting of prestige objects, such as tools and daggers (Ibid.).

As the new objects and materials of prestige, such as metal, could only be acuired through foreign exchange, it became possible to take control over the trade, creating a monopoly on prestige goods. In this way some powerful individuals and groups were able to cement their status and formalize existing hierarchies (Iversen, 2017).

After a significant growth of agriculture, settlements, and increased influx of metal in the Late Neolithic-early Bronze Age, by 1500 BCE, there was a well-connected, hierarchical organisation of society, with a distinct material culture in Scandinavia (Earle & Kristiansen, 2010). The Nordic Bronze Age culture had frequent connections and trade relations with societies throughout Central and Southern Europe to the south, the Atlantic regions to the west, and the Baltic coast in the east. The Nordic Bronze Age culture is known among other things for the large amount of preserved metal artefacts, made in a distinct elaborative, decorative style, deposited in graves and hoards. It is also known for the large amount of great longhouses, thousands of grave-barrows, and rock-art sites (Earle & Kristiansen, 2010). The core area of the Nordic Bronze Age culture was in the fertile areas of Denmark and Southern Sweden, which

has the greatest intensity of metal objects, thee-ailed halls, and barrows (Thrane, 2013; Earle & Kristiansen, 2010). In the rocky, coastal areas of Western Sweden and Southern Norway, the relative lack of metal objects is instead compensated by the major body of rock carving-sites

Rock art in Scandinavia

Scandinavia is home to the greatest concentration of Bronze Age rock art in whole of Europe, with about 30 000 known sites (Goldhahn & Ling, 2013). The main body of Bronze Age rock carvings are estimated to have been created between 1600-300 BCE, but the tradition of rock art in Scandinavia stretches as far back as the Mesolithic, and continues into the Iron Age. The type of objects that were being depicted varied between different regions, and over time, typically we recognize that the carvers depicted objects that were important to their culture. Broadly it can be said that there is a northern, and a southern tradition of rock art in Scandinavia, with the northern tradition depicts objects that precedes southern Bronze Age motifs, such as prey animals, boats, humans, and abstract figures. The southern tradition in turn depicts many objects and scenes which in many ways mirrors the archaeological record of the southern Scandinavian Nordic Bronze Age culture, such as weapons, wheeled vehicles, boats, humans in scenes of ritual or combat, domestic animals, lurs and symbols (Goldhahn & Ling, 2013).

There are generally speaking two ways that rock art was expressed in Scandinavia, the first, with the greatest quantity of motifs, is carved on open-air panels, the second is on stones or slabs placed inside or in close connection to burials. According to Goldhahn & Ling (2013) a regional divide can be noticed, where the use of decorated stone slabs corelates with the building of barrows, while the tradition of open-air rock art sites corelates to cairns.

There have been many different interpretations of the purpose and function of the Bronze Age rock art. Goldhahn & Ling (2013) give a good overview over the different interpretative models proposed in the last 150 years of rock art research, but in short it can be said that they have varied from being depictions of historical events, communitive and social functions, landscape-related and religious functions.

In the case of rock art on stones or stone slabs, it might be easier to parse out the purpose behind the pictures since they are found and depicted in a much more closed context. This is for example the case for the two of the main cases of study in this dissertation: the decorated stones from Mellby 42:1 and Östra Tommarp 22:1 (Goldhahn, 2009; 2013; Goldhahn & Ling, 2013; Johannsen Winther, 2013). In these cases the images are constrained to a single panel, and they are placed in a clearly funerary context. In many cases it can also be asumed with a certain amount of certainty, that the images was created with the burial in mind, since they form an integral part of the construction of the funerary monument, and are part of several uniform stones and iconografy (Ibid.). As to the specific function of the carvings in the burial context is difficult to determine. It is possible that the creation of the images was part of the burial ritual itself (Goldhahn, 2007).

The open- air rock art is more difficult to interpret, and as mentioned previously, many different interperatations of their meaning and function have been proposed. However, it is clear that

many images show strong indications of being of religious or cosmological nature, showing human figures in procession, often with raised hands (called adorant position in rock art research), but also some images which seem mythological in nature. As to what function of these religious imagry was can be debated, if the carving itself is a votive act, or if the finished religious imagry is the end goal. There is also a strong corolation between open-air rock art sites and burials, in Sweden 18 percent are within fifteen meters of graves, a pattern that ocurs in other regions in Scandinavia as well (Goldhahn & Ling, 2013).

That the rock carvings were religious in nature might be true in some, or all of the instances, but is probably too simple as explanation. It is important to recognise the inherent communicative nature of the rock art imagery. The images are often very dramatic and striking, and sometimes seem to contain narrative scenes. They are also positioned in a way that they can be seen, meaning that they where meant to be seen (Goldhahn & Ling, 2013). They also show objects of wealth and prestige, such as weapons, ships, wagons, and horses. They contain imagry which in many different ways projects power, power by force, violence, and wealth. Religion fits in with this narrative of projecting power with the legitimacy of ritual. This indicates that one of the functions of the rock carvings may have been a way of communicating or projecting power. Goldhahn and Ling (2013) argues against the idea that the elaborative rock art sites are connected to the "elite", and points to the fact that they do not fullfill the demands of exclusivity and control, in the same way as other monuments and objects associated with the elites. Instead they argue, at least in the case of coastal rock art, that they may be related to initiations rites and maritime martial groups occupied with long distance trade and warfare (Ibid.).

It is an interesting perspective and they may have a good point, since many motifs have a clear connection to ships and warfare. However, I do not agree that the inclusive and communicative nature of rock art sites speaks against the idea of them being connected to the elites. I believe on the contrary, it's openness speaks for it being a way of communicating the prestige and power of the elites to the onlooker, wether it is other members of the same social group, or people below them.

The creation of rock carvings may have had a similar function as the funding of churches in Early Medieval Europe. During the Middle Ages, the building of churches was funded by aristocrats, who besides as an expression of genuine religious piety, also did it for a combination of reasons, including power, wealth and prestige. It was a show of the wealth of the noble, being able to fund the building of a church, and maintaining a priests and religious services. It also legitimized the noble's status, following the king, which in turn was legitimized by the greater religious structures of the catholic church. By funding churches, aristocrats could tie the religious cult to themselves and thereby maintain legitimacy in the eyes of the lower classes, as well as their peers (Hansson, 2006, pp. 168-182). This was especially true in regions in the process of being christianized, such as Scandinavia in the Late Viking Age and Early Middle Age, were the building of churches was closely connected to noble estates (Vretemark & Axelsson, 2008), thus religious services would be closely tied to the owner of the estate.

A similar explanation could be used for the creation of rock carvings. The creation of a rock art motif would have been a time-consuming and labour-intensive process, possibly created by ritual specialists (Goldhahn, 2007). If it can be assumed that the rock carvings had a religious significance, the funding and organisation of the creation of a rock carving, and the possible

surrounding rituals of such an event, would have been an important show of wealth and influence by Bronze Age elites, legitimizing their power by showing their connection to religious structures.

Overview chariot depictions

There are about 185 depictions of wheeled vehicles on Scandinavian rock art, of these 93 could be considered chariots (Winther Johannsen, 2010; 2011). There are also several depictions of single wheels, or pair of wheels which could represent a chariot, but will not be considered here. The chariot motifs vary a lot in the ways they are depicted, one way of categorize them comes from Winther Johannsen, who has created a very helpful typology for wheeled vehicles on Scandinavian rock carvings. The two-wheeled vehicles are categorized in type 1 and type 2 (Winther Johannsen, 2010).

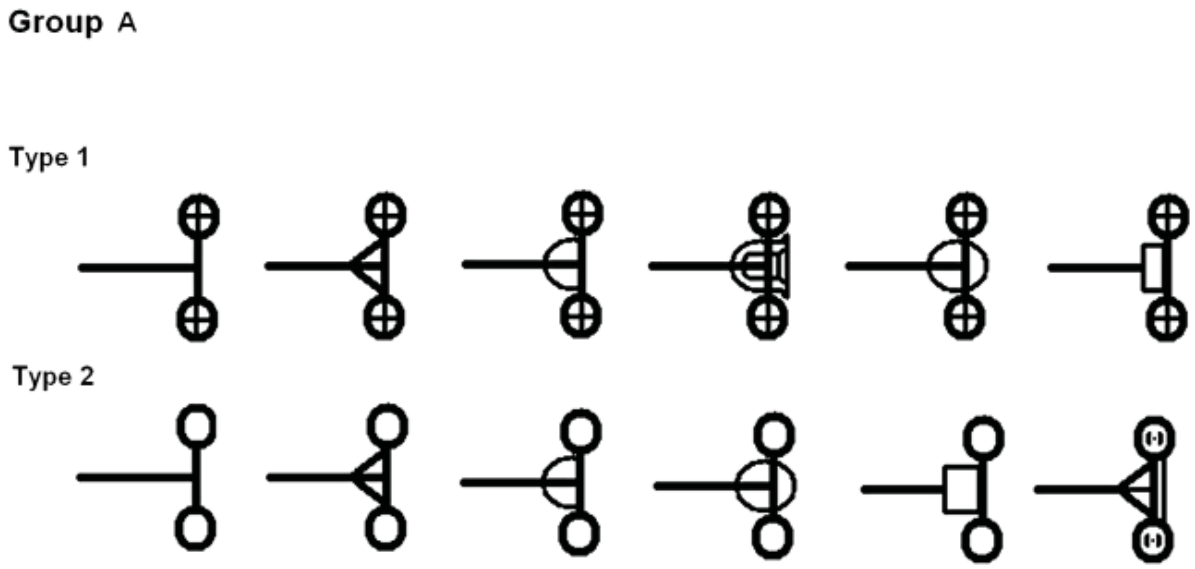

Figure 9. Winther Johannsen's typology of two-wheeled cart motifs in Scandinavian rock art, after Winther Johannsen 2010.

This categorization is not based on projection, as both contains two-wheeled vehicles depicted from the side and above. The difference lies instead in that type-2 is generally coarser than type-1, with the main difference being that they have solid disc wheels instead of spoked wheels (Winther Johannsen, 2010). Winther Johannsen argues that these two types are meant to represent two different kinds of vehicles, with type-1 closer representing a real chariot. One may question whether the absence of spokes is enough to classify a motif as a different type of vehicle, and not just a stylized type-1 chariot. Winther Johannsen (2010) responds to this criticism with the argument that type-2 motifs are sometimes depicted with oxen as draught animals, but mainly that there are motifs depicted with crescent-shaped notched disc wheels. There is evidence for these wheels in the archaeological record, and these would be to coarse and heavy to be used with a typical type-1 light-weight chariot (Winther Johannsen, 2010; 2011).

I do believe there are a lot of merit to Winther Johannsens idea that different types of two-wheeled vehicles are represented on rock art, especially since they would have been created in the span of several centuries. In particular I believe that the crecent-notched disc wheels are a good argument for the existence of a coarser chariot type, perhaps used for a different purpose than light-weight spoked chariots. I'm not convinced however, that this means that the absens of spokes in a chariot depiction always are meant to represent a non-spoke wheeled chariot. It is completely possible that this may be the case in several depictions, but I don't believe that this strict categorization can be generalized to include all depictions without spokes, not without additional specific contextual circumastances. It is a likely that type-1 chariots where in some cases stylized to not include spokes, as the depictions aldready are inherently stylized. This seems to be the case for example in the Iberian material, in which many chariot depictions have very similar details on the box and railings, but some have four spokes, some have non, and some have two, or the central axle depicted across the wheel (Harrison, 2004). This variation may be just variation in depiction-style. Remove the crecent-notched wheel chariot from Winther Johannsen's own example of variations within type-1 and type-2 chariots, and you have basicly the same vehicles with or without spokes (see fig. 9).

Winther Johannsen has identified some differences in the geographical distribution of type-1 and type-2 motifs however (Winther Johannsen, 2010). This could speak in favour for his idea of them being representations of different vehicle types with different purpose, if they represent how they were used in different regions. Winther Johannsen has also made a chronology, in which type-2 are generally dated to be most common from period IV to VI, while type-1 are most common between II and V (Winther Johannsen, 2010) (see fig. 10 below).

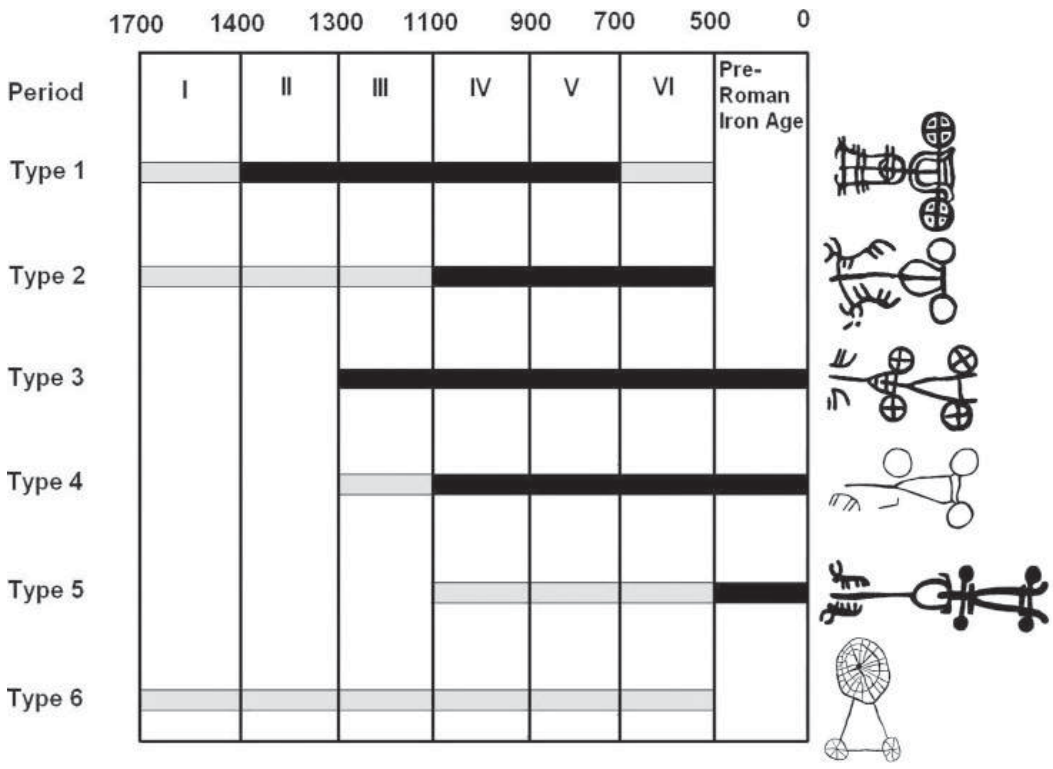

Figure 10. Chronological distribution of Winther Johannsen's cart motif typology in Scandinavian rock art, after Winther Johannsen 2010.

Winther Johannsen's typology may be useful for dating chariot motifs and gives us an interesting perspective on the wheel types of the chariots, and whether they represent different chariot-types all together. It doesn't account however for the placement of the axle, which is another very important aspect when deciding which type of chariot is being depicted, and in which way it was used. Another point which is cause for cation is the fact that the chronology is based on quite scares archaeological data, using a few artefacts and presumptions of evolution of wheel technology. The second basis for the chronology is the different chariot-motifs connection to nearby ship-motifs, which has a more solid chronology in rock art (Winther Johannsen, 2010). Although this strengthens Winther's chronology somewhat, the proximity to ship motifs can not be taken as a sure that the chariot motif is contemporary.

In Scandinavian rock art, like in many other regions, there are both chariot motifs with side-projections and mixed-top down projections. Both are depicted with or without a driver, although most of the chariots with a mixed-top down projection lack driver. The lack of depicted driver doesn't necessarily mean that they represent empty chariots. There are cases where there are humans depicted standing behind or next to the chariot, which could perhaps represent a driver (Winther Johannsen, 2010).

We may also consider Littauer's (1972) point regarding the use of Aegean chariots between battles. Littauer points out that it would be unlikely that the passenger would prefer standing in a springless, jolting chariot for long periods of time, especially in uneven terrain. Walking beside the chariot would probably be preferable for longer distances, and also have the benefit of relieving the strain on the animals and enabling the carrying of equipment (Littauer, 1972). A similar explanation could apply to the use of Scandinavian chariots, and thus explain the lack of drivers in some carvings.

The position of the axle can sometimes be difficult to determine, due to stylized or simplified depictions. However, generally it seems like the majority of the depictions have the axle towards the rear end of the chariot (Winther Johannsen, 2010). This would mean that they have a construction closer in line with Egyptian chariots than Myceanean (Winther Johannsen, 2010; Mazzù, et al., 2021). As previously mentioned however, there are many cases, where the position of the axle is hard to determine.

Most chariot depictions are depicted with a team of draught animals, with only a few exceptions. According to Coles (2005, p. 70) the exeptions could be explained that they were more shallowly carved then the rest of the chariot, and are to indistinct to notice today. I've not been able to confirm this claim by studying modern 3D-documentation. I find it more likely that it is a iconographic or styilized choice by the carver.

When horses are depicted, they are sometimes depicted with phallus, indicating that they are stallions. The significans of this can be discussed. According to Crouwel (1981, p. 37), stallions were prefered for chariot teams in Egypt for their strength and agressivnes. They also appear often in chariot motifs in Greek Bronze Age art.

Depicting horses with phallus has also a parallel in how humans are often depicted on Scandinavian rock art. Many human figures, especially armed human figures, are depicted with an overemphasised erect penis. This question connects therefor to a wider discussion on how ideology is represented in rock art, and how to interpret it. Is the overemphasized phallus a mark of virility? musculinity? Agressiveness? Since it is often connected to scenes of combat or

weapons, one may be tempted to draw such a conclusion, but it is important to know that these assumptions comes from a contemporary point of view. It is an important question, as we are trying to understand how and if this iconography is an expression of warrior ideology.

Iberian Peninsula

The Iberian Peninsula which consists of modern Spain and Portugal, positioned in the extreme south-western Europe, between the Mediterranean and Atlantic Sea, is an ecological and climatic diverse area of 600,000 square km.

The beginning of the Bronze Age in the Iberian Peninsula, c. 2200 BCE, is marked by the decline of the earlier Copper age Bell Beaker culture and the rise of the south-eastern Argaric societies. Though the Argaric culture is very well documented and studied, far less is known of other Iberian Bronze Age cultures. This is partly because there has been less intensive study of this field of Iberian archaeology, but mostly because there are far less well-preserved remains from these cultures, both of everyday life and funerary contexts (Lull, et al., 2013).

During the Early Iberian Bronze Age between 2200- 1550 BCE, there was a rise in social contrast between geographical and cultural region, with a heavily populated, socially stratified, and organised settlements within the Argaric societies, and less populated and stratified societies in the Argaric periphery (Lull, et al., 2013). While the end of the Copper Age led to population and settlement growth in the South-eastern peninsula, the opposite was true in the other parts. In the north-west and central areas, there seems to have been a less dramatic decline, and some continuation of previous Copper Age traditions, while the south saw most of the settlements and funerary sites abandoned (Lull, et al., 2013).

The Argaric culture was an expansive and socially stratified state or state-like society which saw great architectural, economic, and political development between 2200- 1550 BCE. This culture was centred around central fortified hilltop settlements, with stratified social and political class systems and formalized rituals, as evident by differences in grave goods. These settlements were also centres of production for cereal, metallurgy, and textile goods (Lull, et al., 2013). The Argaric culture seem to have had a rather expansive and aggressive attitude towards their neighbours, both influencing and inspiring to emulating social and economic structures, but also forcing a need to build fortified settlements. At the end of the Early Bronze Age, the Argaric cultue collapse, according to Lull et al. (2013), due to internal forces, evident by end of funerary practices and fall of its economic system. This fall could have been brought by an agricultural crisis caused by over-exploitation of the environment.

In the Late Iberian Bronze Age c. 1550-1300 BCE, the areas of the former Argaric culture saw a large amount of abandonment of settlements, and a greater decentralization and diversification of production. There also generally seems to be greater self-sufficiency and a decline in social stratification and political control (Lull, et al., 2013). The central and north parts were much less affected by the fall of the Argaric culture and maintained their economic and political structures to a greater extent. Along the Atlantic coast, there are little data on settlements and cemeteries from the Iberian Late Bronze Age.

In the final part of the Iberian Bronze Age c. 1300-900 BCE, until the Phoenician colonization, there is a remarkable lack of knowledge concerning certain aspects, such as settlements, houses, and funerary record (Lull, et al., 2013). At the same time there is a boom in the manufacturing and movement of metal objects. The societies around the western coast, from Northern Iberia to the South-west was part of the Atlantic Bronze Age, a network of societies along the European Atlantic coast and the British Isles. Although the Atlantic Bronze Age not necessarily was a coherent cultural or political unit, as evident by several regional differences, there are some common traits and artefacts associated with this network of societies. One of the main characteristics of the Atlantic Bronze Age being the focus on metallurgy, with the production and trading of bronze. Another, which may explain the lack of funerary evidence in Iberia is the disappearance of formal burial customs, possibly instead letting the dead body decay by exposing to the elements, thereby letting it return to the natural world (Harrison, 2004, p. 11).

There main evidence of some sort of regional political and social hegemony power being one of the main objects of analysis in this dissertation, the so-called Iberian Warrior steles. These engraved standing stones depicts objects of status and power, such as weapons and luxury items, but also sometimes human figures, surrounded by these objects. Lull et al. (2013) suggests that this iconographic symbolism, coupled with concentration of wealth as evident of findings of hoards of gold-items, and an increase in the movement of goods, seems to indicate that an influent, wealthy social group existed, perhaps controlling long-distance trade in the region. The iconography and artefacts of the steles, mirrors other regions along the Atlantic coast, and in the Mediterranean. The Iberian warrior steles and these connections will be further examined in this dissertation.

Bronze Age Warfare

For the greater part of the 20th century, the subject of warfare was absent or deprioritized in the mainstream Bronze Age research. The Bronze Age was seen as a relatively peaceful time, and depictions and artefacts such as weapons was interpreted as being of a ritual or symbolic nature (Horn & Kristiansen, 2018, pp. 5-10). This fact may be puzzling when looking at the massive amount of material from the era of found weapons, fortified settlements, depictions of warriors and violence, human remains which bears marks of violence, and historical contemporary sources of warfare in other parts of the Bronze Age world. One common argument has been that weapons of this era was not fit for battle, which has been refuted using use-wear analysis in recent times (Horn, 2018).

One explanation for this phenomenon is that it is the result of scientific trends, which tends to follow the zeitgeist of society. The view of the Bronze Age as a peaceful time originated in the war weary post-war era of the mid-20th century, in which there was a much greater interest in studying peaceful trade and interactions, while warfare were relegated to a role of less importance in prehistoric societies (Horn & Kristiansen, 2018, pp. 5-10).

Although we should be wary of trends and ideology of our own times, I hope that we have moved past this dichotomy- to view the Bronze Age as either a time of peaceful interactions and religion, or a time of violence, domination, and war- but rather a syncretism of these views

(Vankilde, 2003; Harding, 2018). There can't arguably be one without the other, rather these aspects fuel each other.

In the context of this work, it is of greatest importance to recognise what the symbols of warriors, weapons and combat are meant to represent, as the lens through we view these things changes the outcome of the interpretations. If we believe that all objects associated with warfare were just of symbolic or had a ritual meaning, the outcome will be different, than if we see them as objects of warfare and violence. The coercive power dynamics inherent in violence would most likely have had a different impact on social relations, both within and between groups of people, than just trading and rituals.

I therefore make it clear, that when discussing warriors, warfare, weapons, and chariots, it is with the implications that these were real aspects of the Bronze Age, not ritual symbolism, and that violence and the threat of violence were part of the greater interchange between people.

Small scale conflicts to state warfare

With new institutions, stronger social hierarchies, trade networks and wealth, conflicts came inevitably to become a part of affairs in the Bronze Age. These conflicts would however vary in modus and scale depending on geography and the warring parties, ranging from raiding parties and conflicts over trade routes with smaller groups of warriors, to empires fighting full-scale wars.

The wars of the Near East are well documented, and stood between rich empires such as the Egypt, Hittite, and Syrian, with armies of thousands. In the famous battle at Kadesh in 1274 BCE, the Hittite and Egypt armies met, it is estimated that around 6000 chariots participated (Mazzù, et al., 2021).

In Northern Europe there are evidence of violence and conflicts, both in the great amount of archaeological material of weapons deposited in graves and hoards, but also depicted in rock carvings. The largest in scale battle known today in Northern Europe stood at the Tollense valley in North-eastern Germany in around 1250 BCE (Price, et al., 2017). The battle has left traces of a great number of Bronze Age weapons and damaged human remains. According to estimates, between 1000-2000 individuals would have participated in the battle (Lidke, et al., 2018), some suggesting more than 2000 (Price, et al., 2017). This would have been a huge number of participants by North European Bronze Age standard, which mean that people from a vast area would have been mustered (Price, et al., 2017; Lidke, et al., 2018). This presumption is also strengthened by isotope analyses (Price, et al., 2017). The skeletal material also indicates that perhaps a warrior-class participated, or at least battle-seasoned individuals, since there are skeletal remains which shows signs of both lethal trauma to bones and skulls, which would have been dealt during the battle, and previously healed damages (Lidke, et al., 2018).

Chariots

There is not a total consensus on where the two-wheeled chariot was invented. While some has traditionally pointed to the Near East, other have suggested that the chariot most likely was first developed by Northern Eurasian steppe- societies before 2000 BCE, as evident by several chariot-burials found in this region (Kuznetsov, 2006; Chechushkov & Epimakhov, 2018; Mazzù, et al., 2021). Eventually the use of horse-drawn chariots spread across Eurasia during the Bronze Age from China to Europe and northern Africa. By the time of the Late Bronze Age, the chariot had become an integral part of the military of the empires in the Near East. These great chariotries of the Hittite, Egyptian and Assyrian empires relied on the speed and mobility of these chariots which provided missile-units with a highly mobile shooting platform. The culmination of this type of chariot-warfare being the famous battle of Kadesh in the mid-13th century BCE, in which the lightweight Egyptian chariot, focused mainly on speed and manoeuvrability, carrying a two-man crew of one driver and one archer, met their main rival the Hittites, preferring chariot-teams of three, with one driver, one shield bearer, and one javelin thrower (Littauer, 1972).

Although no intact remains of chariots have been found in Aegean contexts, there are numerous depictions of chariots from the Late Bronze Age, second only to Egypt (Feldman & Sauvage, 2010). The main difference between Egyptian depictions of chariots and Aegean, are mainly the absence of the bow in Aegean depictions, instead they are more closely related to other weapons as spears, swords, and daggers. They are also more commonly depicted as a mean of transportation between battles (Ibid.). The iconography indicates that the chariot was not used as a mobile shooting platform in the same way as in the Near East, but rather a way to make the warrior, more focused on close- range combat, more mobile (Littauer & Crouwel, 1996; Feldman & Sauvage, 2010). The reason for this type of chariot-warfare may have been that the more mountainous topography of Greece didn't lend itself for great scale battles with high-speed chariot archery (Littauer & Crouwel, 1996; Feldman & Sauvage, 2010; Mazzù, et al., 2021).

Mazzù, et al. (2021) gives an additional possible explanation as to why chariots may not have been as central to the military in the Greek as in the near east. A large army of chariots is very expensive to maintain, since it requires breeding and training of large number of horses, which does not provide milk nor meat. The surplus wealth and organisation required was available in the empires of the Near East, but unavailable to the smaller communities of the Aegean (Mazzù, et al., 2021).

Chariot as manifestation of power and identity

Constructing the technically complicated chariots of the Late Bronze Age required a very specialised set of skills, probably restricted to a few chariot-making specialists (Mazzù, et al., 2021). Thus, acquiring a chariot required both access to these specialists and the resources to build and maintain the chariot over time. It also required a lot of training to handle the chariot,

as well as resources for keeping and breeding horses (Ibid.). The restricted nature of the chariot would therefore probably have been a mark of wealth and prestige. This has led to the academic interpretation of associating chariots with warrior identity and royalty in the Bronze Age societies, which was especially evident in the empires of the Near East. Although the chariot was part of a widespread cross-cultural idea as an object of the elite and prestige, the way it was used and depicted as tool to manifest power varied across regions and contexts (Feldman & Sauvage, 2010).

In Egypt there is a large number of representations of chariots that shows its role in manifesting social status of the royalty and elites. These depictions show the owner of the chariot in prestigious scenes of hunting or battle. The chariot is very prevalent in depictions of Pharaohs conquering or subjugating enemies, often showing the pharaoh driving the chariot, shooting his bow, and running over enemy soldiers (Ibid.). The chariot is here represented as a tool of power, both as a weapon which makes him able to conquer his enemies physically, but also as a vehicle which places him above his enemies, both physically but arguably also in status, the impressing chariot projecting the pharaoh's wealth and power.

In the Aegean the chariot is also depicted as an object of prestige, although they differ from the Egyptian depictions in some ways. Instead of bows, which was significant as a symbol of power and prestige in Egypt, other close-range weapons are shown. The chariot is mostly shown as part of ritual activity or as convenience of warriors, although still signalling elite status (Feldman & Sauvage, 2010). Littauer (1972) noted that when the warrior elite of the Aegean went from using a heavy corselet type armour, probably designed for chariotry, to a lighter, less cumbersome type of armour, they continued to use chariots, accustomed to the prestige and convenience associated with it. This indicates that the chariot had an important role as an object projecting power and the prestige of warrior-elite identity.

As a contrast to Egypt and the Aegean, Feldman & Sauvage (2010) has noted that depictions of chariots are noticeably scares among the Hittites, a nation that had great military success with chariots. They suggest that the chariot's inherent prestige is not enough to dominate the rhetoric of power through visual medium, that it needs to fit within regional ideology. According to Feldman & Sauvage (2010), the Hittite royalty gained legitimacy mainly through contact with the divine realm and effectiveness of their leadership, rather than visual expressions of military might. They also note, however, that the main deity of the Hittites, the weather god, is often depicted mounting a chariot (Ibid.).

The Iberian and Scandinavian material will be examined at a greater extent at a later in this work, but in short, it can be said that the Iberian Warrior steles has been interpreted as commemoratory funerary monuments, with the purpose of projecting power and the elite status of the deceased and their living relatives (Ibid.). With this interpretation, the objects depicted on the stone are chosen because they are attributes associated with a warrior/elite identity, and thus communicates this status to the onlooker. Since its inclusion among the motifs in the last phase of the Warrior steles (Harrison, 2004, pp. 148-149), the chariot must have been an object, effective in signalling this prestige and power.

The anatomy and functions of Bronze Age chariots

The war chariot of the Mediterranean and near east were an impressive piece of technology that would been able to reach speeds of up to 40 km/h and would be able to withstand great stress from acceleration, stops and changes in direction (Mazzù, et al., 2021). The Egyptian so-called *Tutankhamun-class chariots*, named so after the intact chariots found in the tomb of Tutankhamun has been pointed out to be examples of extraordinarily sophisticated engineering (Sandor, 2204a; Sandor, 2004b). Beside the slender and lightweight body of the chariots, they also feature several systems for suspension and dampening the effects of acceleration and speed on the stability of the chariot (Sandor, 2004a). Among these are flexible bending of the pole and that the tail end that connects to pole to the frame are loosely nested in a socket between the frame and axle, which absorbs some of the impact from acceleration (Ibid.).

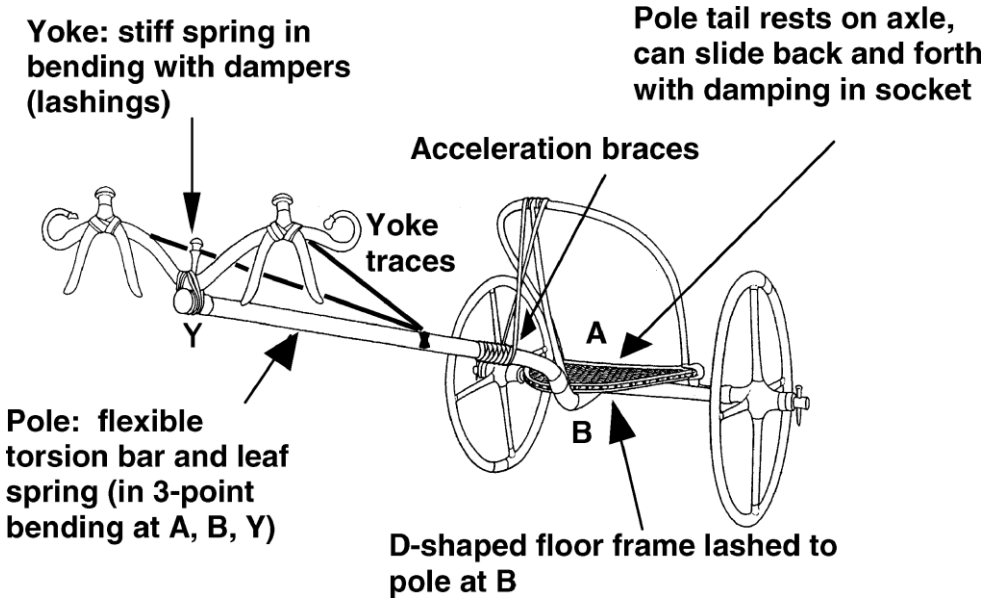

Figure 11. Schematics of the suspension system of the so-called Florence chariot, after Sandor 2004.

One of the major regional differences in the construction of chariots is the position of the axle. The chariots of the near east, such as the Egyptian and Hittite chariots has the axle placed further back at the end of the chariot, while the chariots of the Aegean- and italic peninsula has the axle placed in the centre.

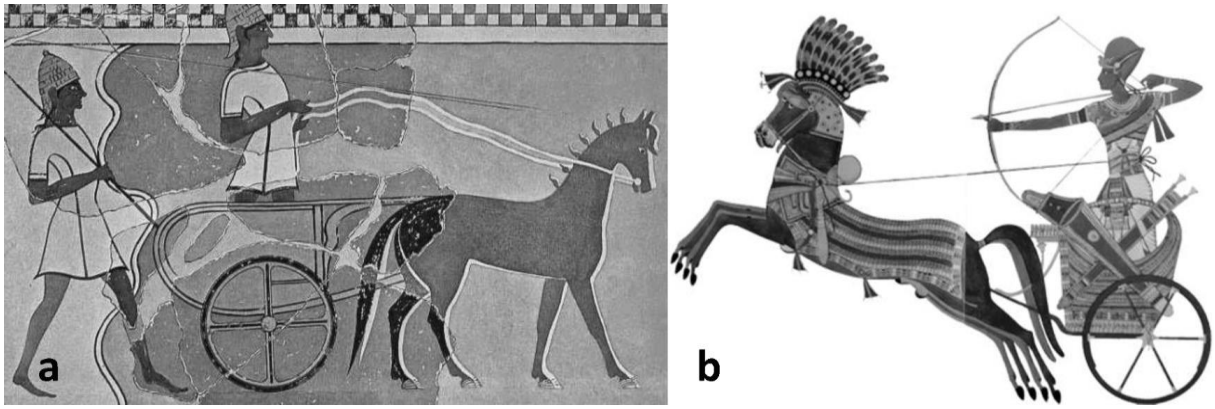

Figure 12. Examples of axle placement. To the left, a fresco from the Pylos palace of an Mycenean chariot with a central axle. To the right, a reproduction of the Abu Simbel temple carving, depicting an Egyptian chariot with a rear axle, after Mazzù, et al 2021.

The reason for the position of the axle has earlier been discussed (Littauer, 1972; Sandor, 2004a; Sandor, 2004b), one possible explanation proposed being that a centrally placed axle reduces the weight on the horses' shoulders, by directing most of the passengers' weight on the wheels.

Using dynamical finite element and multibody simulation analyses, together with an experimental device, Mazzù, et al (2021) gives credence to earlier explanations for the different placement of the axle on Egyptian and Aegean-italic chariots, as well as explanation for the use of a woven floor. They found that the main advantage of rear axle placement used in Egyptian chariot, together with the woven floor was that it reduces vibration conducted to the passenger in high speeds. This is crucial in the Egyptian way of chariot-warfare, which mainly relies on the high precision of the archer. The Greek and italic orography suggests that chariotry was not used in the same way, and therefore it is possible that a central axle, which reduces the strain on the horses was preferable (Mazzù, et al., 2021).

Use of chariots in Scandinavia

Like in the Aegean, there are very few remains of chariots in northern Europe, but many visual representations in rock art, mainly in Sweden and Norway. What remains of wheeled vehicles that has been found comes mainly from Denmark and northern Germany and indicates that wheeled vehicles have been present at least since the late Neolithic- early Bronze Age (Winther Johannsen, 2010). The material evidence for chariots are scares and ambiguous, one possible find being curved copper rods found in a copper hoard on Jutland, which has been interpreted as part of a chariot yoke, similar in shape to one found in the tomb of Tutankhamun (Ibid.). Winther Johannsen (2010) suggests that some northern-European objects which has been interpreted as awls or tattoo-needles might have actually been stimuluses, a needle-like object mounted on a stick, used to spur horse-teams. These are known from Greek depictions of chariots (Ibid.) and may have been used in Northern Europe as well.

The validity of chariot motifs as evidence of real-life chariots in Scandinavia has previously been discussed, and as Winther Johannsen (2010) has argued, although there are no known

chariots in the Scandinavian archaeological record, it is unlikely that the symbol wasn't based on a real object in the community, comparing it to ship motifs, which are also lacking in the archaeological record (see section "Do the chariot motifs represent real chariots?").

If it can be assumed that the chariot motifs were based on real objects, then how and when were they used? Can their function, and way they were being used be understood by analysing the motifs on rock art?

One question which comes to mind is if the chariot was used as a vehicle of war, as it was in the Aegean and Near East? There are currently no known chariot motifs in Scandinavia which are depicted as being part of active combat, however this is generally the case for most Aegean chariot depictions as well, were they are more often shown carrying warriors not currently active in combat (Littauer, 1972; Feldman & Sauvage, 2010). There are also no archers or bows depicted in association with Scandinavian chariot motifs, which suggests that they weren't used as a mobile shooting platform as Egyptian chariots were (Feldman & Sauvage, 2010).

There are also no sure cases where there are two human figures depicted together in the Scandinavian chariot motifs, one driver and one warrior, as were the norm in chariot-warfare in Egypt and the Aegean. Kristiansen & Larsson (2005, pp. 223-224) argues however that there are one instance from Bohuslän in western Sweden, depicting chariots with teams of warriors and drivers (see fig. 13).

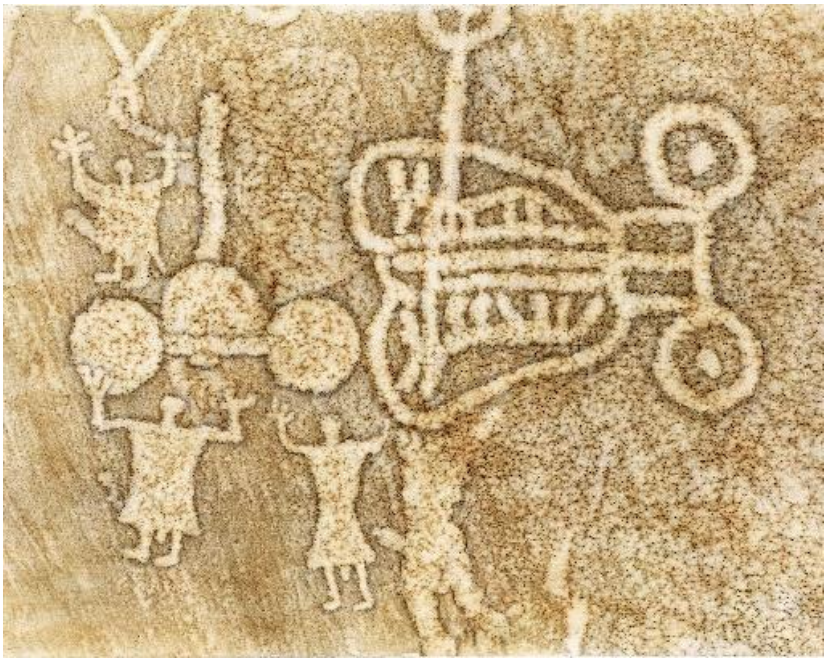

Figure 13. Brastad 18:1, rubbing by Dietrich Evers 1970.

Chariots are not always depicted with two human figures riding inside the chariot in Egyptian and Aegean contexts, however. Egyptian pharaohs are sometimes depicted booth driving and shooting his bow at the same time, alone in the chariot (see fig.12), and there are depictions of Aegean chariots where the warrior is walking behind the chariot (see fig. 12). If the Scandinavian chariots were used in combat, it is probable that they were used in a similar

manner as in the Aegean, namely as a way of transporting warriors between combat (Mazzù, et al., 2021). Although no combat with chariots is depicted, there are several cases of weapons and armed human figures in proximity to chariot motifs, as well as armed drivers (see fig. 13).

Even though there is no real evidence of chariots being used in combat, it can't be completely ruled out as a possibility. Skeletal remains of horses have been found together with human remains at the Tollense battlefield, although what function they served during the battle remains unclear (Lidke, et al., 2018).

There are several cases in rock art where the chariot seems to have a ritual function or cosmological symbology. This includes depictions of chariots in processions, and some chariots who shows super-natural qualities. Among these are elements that could be connected to Bronze Age cosmology of the sun driving a vehicle or horse-team across the sky (Winther Johannsen, 2010). This could possibly speak against that the chariots were based in real-life objects. However, even if there is a strong seemingly mythological aspect to many of the chariot motifs, it would be unlikely that there were not a profane, real-world object to associate the mythical object with. The chariot as a mythological iconographic symbol would most likely have gained strength by the association with the prestigious symbol of the real-life vehicle and its functions, like moving a person with great speed, and vice versa. A similar case would be weapons such as swords and spears, which real use would explain their ritual function (Horn, 2018b).

Use of chariots in Iberia

Concerning the chariots of the Iberian Peninsula, Quesada (1994) suggests, based on typology and iconography, that they most closely relate to the chariots of the Aegean, which he sees as the most plausible origin. He bases this assumption partly on the looped handles placed at the rear of the chariots, which occurs both on the Iberian and Aegean chariots. As the chariot motifs belongs to the last chronical phase of the Iberian warrior steles according to Harrison (2004), and assuming that they were inspired or influenced by Aegean chariots, Harrison suggests a late Mycenaean origin, in the Late Bronze Age (Harrison, 2004, pp. 148-149).

As for how chariots were used on the Iberian Peninsula, there are some things to take in consideration.

There is no clear evidence of chariots in the archaeological material contemporary with the steles. Since the most parts of the chariot would most likely have been constructed with perishable material such as wood and sinews, it is unlikely that any of these parts would survive to present day. This situation mirrors that in both Scandinavia and the Aegean (Littauer & Crouwel, 1979; Crouwel, 1981; Feldman & Sauvage, 2010; Winther Johannsen, 2010). Chariot fittings and terret rings in bronze, used to separate reins, have been found from the 10th century BCE onward. By the early Iron Age chariots were certainly present in Iberia as evident by aristocratic chamber burials (Harrison, 2004).
As mentioned earlier, even if the chariot-depictions are based upon real objects within that culture, it is not necessary mean that chariots were used locally. If there was in fact an Atlantic network of seafaring warriors, responsible for the carving of the chariot motifs, it is possible that the chariots were used elsewhere along this network.

Presuming that that the chariot motifs on the steles did represent actual chariots, how were their used? Since they appear on the steles together with other objects related to combat, such as swords, spears, and shields, and objects of status, such as mirrors, razors and musical instruments (Harrison, 2004), it seems reasonable to believe that the chariot would be associated with such concepts. Thus, the chariot would probably have been a prestigious vehicle associated with a warrior identity (Ibid.). it would also not be too farfetched to assume that it would have had a martial function as well.

Quesada (1994) assumes that chariot warfare in Iberia would more resembles the combat style of Mycenaean warriors, with smaller groups of combatants using hand to hand combat, rather than large scale archer and javelin-based chariotries of the Near East.

The Material

The Scandinavian rock carvings

Södra Mellby 42:1

Södra Mellby 42:1, also known as the *Kivik-grave*, or *Bredarör*, is a Bronze Age cairn located on the easter coast of Scania in southern Sweden. This giant cairn is one of the largest burial monuments in northern Europe (Goldhahn, 2009), and one of the most famous prehistoric sites in Sweden. Besides its monumentality, it is also famous for the dramatic imagery on the decorated stone slabs which made up the stone cist in the centre of the cairn.

Situated 300 metres from the sea, the Kivik grave would have been easily accessible by boat for all the communities in the area, and it would most likely have been impossible to miss the sight of this monumental cairn while traveling along the coast.

The Kivik-grave came to be rediscovered in the mid18th century, when two men stood accused of looting treasures from the cairn. The men had been collecting stones from the cairn to build a stone fence when they found the inner chamber of a cist grave. A trial was held after rumours that they had found, looted, and hidden the treasures, which according to the law belonged to the state. The men denied the allegations, although many witnessed that the men had sold objects found in the cairn, they were released for lack of evidence. There is little to no knowledge of what objects may have been in the grave at the time of construction (Goldhahn, 2013, pp. 47-52). What was left however, was eight illustrated stones which made up the walls of the cist. after the trial there was some interest in the grave, which led to the removal of some of the stones. Of these were some returned, while some has been lost or destroyed (Goldhahn, 2013, pp. 19-32;53-92). Some of the motifs however have later been reconstructed, using depictions from late 19th century (Goldhahn, 2013, pp. 19-22). Naturally, the fact that the original motifs are lost, is a cause for caution when using them as sources, however, researchers using modern documentation techniques has shown that the intact original motifs corresponds well with the 18th century depictions, therefore we can assume that the depictions of the now lost motifs should be pretty accurate (Toreld & Andersson, 2015).

The motif

The chariot motif on slab no.7 is located in the upper- right corner of the stone, and comprises of a left- facing chariot, drawn by two horses, driven with reins by a human figure. The other associated motifs on the slab includes four armed human figures to the left, two four legged mammals beneath, an aquatic animal, and a procession of anthropomorphic figures at the bottom of the slab. There have been several interpretations on what this composition of motifs are meant to represent, but also the separate motifs themselves, and which details that can be confirmed. Different methods of documentation have yielded quite different results. One point of discussion has been the detailed frottage documentations of Dietrich Evers from *1970* (see fig. 16), which was criticized by Toreld & Andersson (2015) for being retouched with pencil and eraser, thus being images of imagination with little scientific value. Toreld & Andersson's documentation using rubbing techniques and tracing on plastic sheets, lacked some of the details that are present on Evers rubbings.

Using modern 3D-documentation such as Structure from motion *SFM*, and Reflectance Transformation Imaging *RTI*, Bertilsson, et al. (2017) has shown however that many details shown in Evers documentation, do also show on laser scannings, thus proving that they are more accurate than Toreld & Andersson assumed.

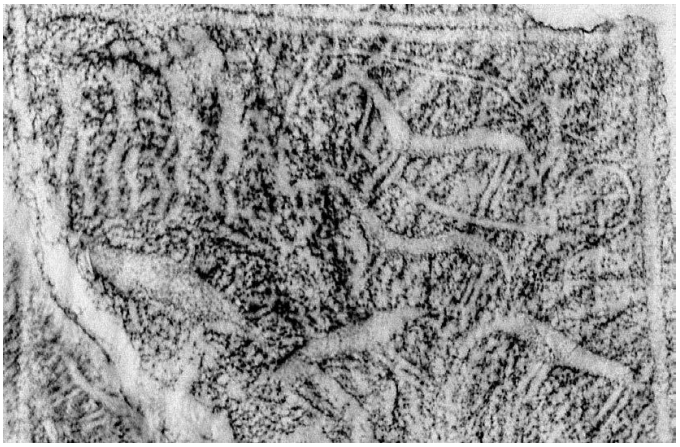

Figure 15. Rubbing of the chariot motif from Södra Mellby 42:1, after Toreld & Andersson 2015.

Figure 14. Rubbing of the chariot motif from Södra Mellby 42:1, by Dietrich Evers 1970.

Figure 16. Tracing of the chariot motif from Södra Mellby 42:1, by Andreas Toreld & Sven-Gunnar Broström 2010.

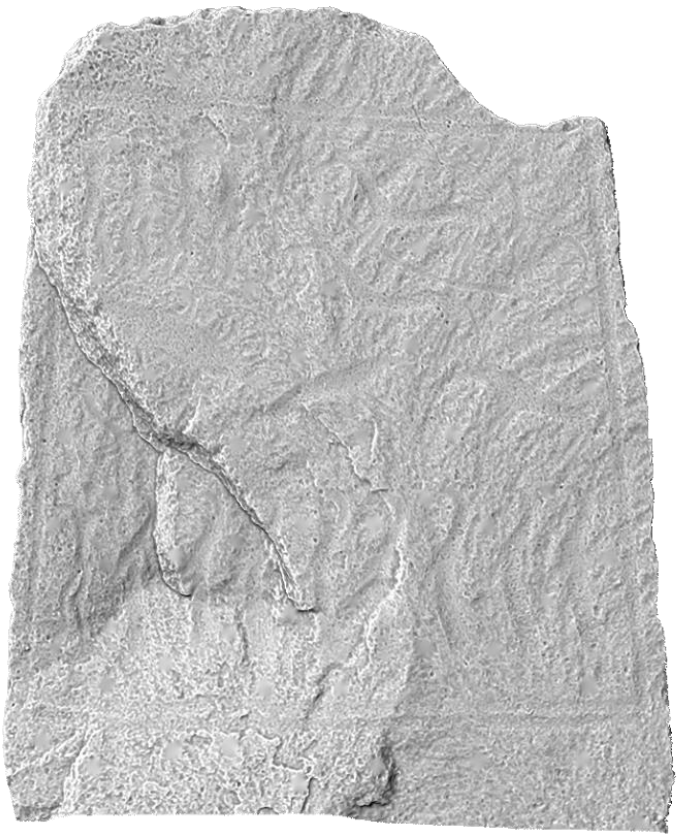

Figure 17. 3D-image of slab no. 7 with the chariot motif from Södra Mellby 42:1, by Christian Horn 2019.

Dating

There has been some different arguments for the dating of the monument, some suggesting that the monument had been constructed in Bronze Age period II sometime between 1400-1300 BCE (Goldhahn, 2013), and some arguing for an earlier date, Period II, 1600-1400 BCE (Kristiansen & Larsson, 2005). Based on observations of the prows on the boat depictions, Bertilsson, et al. (2017) also argues for an earlier date, 1600-1500 BCE. On examination of the material from the 1930s excavation it was found that several individuals had been buried at separate times since the time of construction until the 9th century BCE (Goldhahn, 2009).

Earlier interpretations

The interpretations of slab no.7 are connected to the interpretation of the Kivik grave itself. Although many different interpretations have been proposed in the last two centuries, one of the most common has been that it was built for the occasion of burying a great chief or spiritual leader, as Kristiansen & Larsson (2005) puts it, "a Ulysses of the North". Many interpretations of the motifs since the 18th century has relvolved around the idea that they are scenes depicting funeral rituals for this specific individual (Goldhahn, 2009).

Studying the human remais found in the grave at the excevation in the 1930's, Goldhahn (2009) found that the bones belonged to several different young individuals, buried at different times. The earliest were two individuals, buried soon after the building of the monument. Goldhahn suggests that the inside of the grave would have been accessible for a long period of time and used for several reburials (Goldhahn, 2009).

Östra Tommarp 22:1

Östra Tommarp 22:1, or the" Villfara" mound is located in the middle of farmland in Österlen, six kilometres from the south-eastern Scanian coast in southern Sweden. The mound lies just 20 kilometres south of the Kivik grave, Södra Mellby 42:1. Although the mound itself is today completely destroyed, its pictured stone still remains at Lund University Historical Museum (Winther Johannsen, 2013).

Although the chariot motif on the pictured stone from Östra Tommarp 22:1, also known as" Villfarastenen", bares striking visual similarities with the more famous chariot motif from one of the slabs in the "Kivik grave" Södra Mellby 42:1, there has been surprisingly little written on the subject, especially during the last 70 years. This may have many reasons, but most probably it's partly because the uncertain circumstances surrounding the stones original position and context.

The first time the stone came to be known to the academic society is in the written accounts of N. H. Sjöborg during the 1830's. According to Sjöborg, the pictured stone was positioned as part of a dry-stone fence on the border between two farming estates, and that it had been taken from the nearby burial mound, the so called "*Willfara-högen*" (Sjöborg, 1830, p. 146). In 1862-63 Sven Nilsson documented the stone and partly excavated the mound, which at that time had since long been flattened and used as farmland. During the excavation they found a horse tooth, pieces of pottery, some flint objects, and a bronze ornament with spirals. Nilsson also concluded that the mound had not previously been excavated (Nilsson, 1865, pp. 130-133). There is no real hard evidence that the stone with certainty came from the nearby "Willfara-högen", the best we are able to get is the word from local elders asked by Sjöborg and Nilsson in the mid 19th century, and the conclusions that due to the stones weight, "*Almost to heavy to be drawn by two strong horses"*- according to Nillson (1865), its unlikely to have been moved very far. We must therefore be sceptical in any conclusions that we draw from it, however I do believe that the principle of Occam's razor does apply in this situation. If a very heavy pictured stone with Bronze Age motifs is found in close proximity to a Bronze Age mound, and local people says that the stone was taken from it, I think it is reasonable to assume that that's the case.

Another uncertainty surrounding the "villfarastenen", is the motif of the chariot in question. There has been debates whether the motif is in fact a forgery. One who claimed this was Carl-Axel Althin in 1945, which points to the fact that the v-style lines of the carving could not have been made with tools available during the Bronze Age, the part of the stone where the chariot motif is seems to have been chipped off and removed a part of a ship-motif- therefore must have been made more recent than the ship, and that the chariot motif is suspiciously similar to depictions of the Kivik-motif from the late 18th century (Althin, 1945). Althin's claims was

disputed by Arthur Nordén in 1946, who meant contrary to Althin that the motifs were not forgeries, pointing to the fact that there are other undisputed Bronze Age carvings made with v-style lines, and that the chipped of piece was not big enough to have removed all the surface were the chariot is depicted. He also mentions the unlikeliness of the scenario that someone on the countryside of Scania in the period between the finding of the Kivik grave in 1780 and Sjöborg's discovery of the "Villfara"-stone in 1830, had seen the depictions of the chariot motif from Kivik and decided to painstakingly peck the image in the surface of the hard diorite stone (Nordén, 1946). Sjöborg described the chariot motif in 1830 and noted the similarities with the one in Kivik-grave (Sjöborg, 1830).

Although I agree with Nordén on most accounts, I'm not as certain that the chipped surface of the rock necessarily is unsubstantial. This however does not necessarily mean that the chariot was carved in the late 18th century or early 19th century. We have several cases of rock-art being "modified" or "updated" during the Bronze Age, both in Scandinavia and the Iberian Peninsula (Harrison, 2004; Horn & Potter, 2018).

The question of the stone's original position

According to Sjöborg, the stone was at the time part of a drystone wall, placed at the point where it crossed the Villfara mound (Sjöborg, 1830, p.146; Nilsson 1865 p.130). It is as before mentioned that the stome and the mound was originally part of the same site, but since one of the goals is to compare the Villfara stone with Kivik, it is also of interest explore the context, and where stone was originally situated. As Johannsen has pointed out, the fact that the carvings appears to have been made over a long period of time indicates that the stone was accessible, which means that the stone was probably placed on the outside of the mound (Winther Johannsen, 2013). Johannsen sees it as possible that the stone was originally part of a kerbstone circle (Ibid.) or as Nordén (1946, p.130) suggested, on the top of the mound. Furtheremore, he suggests hat the stone was placed laying down with picture side facing upwards, since the lower side is covered with cup-marks, indicating that the whole surfice was above ground (Winther Johannsen, 2013).

The motif

Winther Johannsen (2013) suggests that the placement and direction of the chariot is important, as he connects this imagery of the stone with the widely adopted theories of Flemming Kaul (1998) on Bronze Age cosmology, and the daily sun-cycle. According to Kaul, in Bronze Age cosmology the sun is carried by different entities across the sky at day and under the sea at night. As the sun travels from east to west, it faces right, and at dusk and night, the entity faces left, and travels beneath the sea towards east. Among these entities are a horses and ships (Kaul, 1998). Winther Johannsen (2013) interprets the motifs on the Villfara-stone to display scenes of the different stages of the sun's journey through day and night, the chariot representing the sun as it's facing left to descend into the sea at dusk.

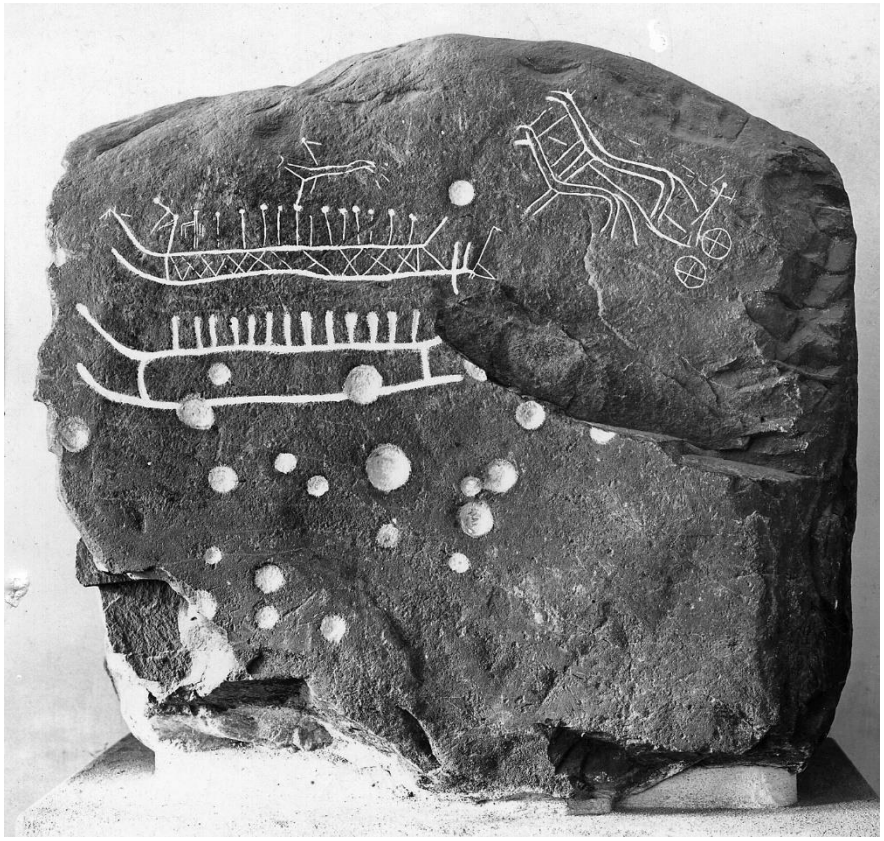

Figure 18. The Villfara stone, photo by Carl-Axel Althin, 1945.

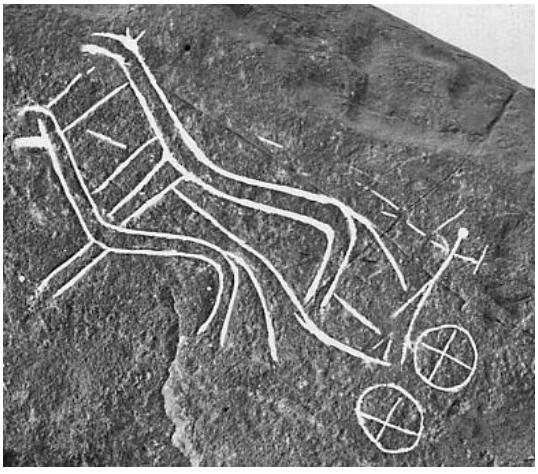

Figure 20. The chariot motif from the Villfara stone, photo by Carl-Axel Althin, 1945.

Figure 19. The chariot motif from the Villfara stone, photo by Berta Stjernquist, 1960.

Dating

Unfortunately, few of the artifacts excavated from the mound have remained to date, most of them missing already in 1933. Judging by the surviving artefacts it has been suggested that they Villfara mound contained the remains from two separate burials, the first belonging to late Neolithic or Bronze Age period I, and the second to the Bronze Age period II (Winther Johannsen, 2013). According to Winther Johannsen, engraved stone whas part of the period II grave.

The Frännarp panel

Frännarp is situated around 35 kilometres inland from the Scanian Baltic coast, 30 kilometres north of Kristianstad in Southern Sweden. The open air, eight by five metres long rock panel is located on the southwest facing slope of a small hill in the vicinity of a small body of water and a stream. It is situated in an area with a highly dense concentrations of Bronze Age burial sites, monuments, and other rock carving sites (Coles, 2002).

The Frännarp panel, also named Gryt 1:1, is a unique rock carving site, as it contains the largest amount of exclusively chariot motifs in a Scandinavian context. Even so there are not many academic studies written about the site, except for documentation purposes which it has been numerous times since the discovery of the carvings in the beginning of the 20th century. One of the more expansive works written about this site is John Coles (2002) article in *Proceedings of the Prehistoric Society 68,* where he combines an examination of the rock art panel itself with motifs, and a field survey of the archaeological contexts of the surrounding area. Coles (2002) argues that the Frännarp site must have had a very specific significance, both locally, but also in the wider cultural landscape.

The landscape

The Frännarp panel is surrounded by bodies of water. To the east flows the great river Helge Å (*Holy River*) from north to south. To the south flows Almaån, a tributary river to Helge Å, in a direction of from west to east. The landscape to the north, and north-west, is dominated by lakes, wetlands, and streams. The small stream Olingeån flows from the northern wetlands to the south, and passes in near proximity, just north to the Frännarp panel, before it flows out to Helge Å in the east (Coles, 2002).

This basin, in which the Frännarp site is the centre of, has been extensively occupied during the Bronze Age, as evident by the many archaeological sites found in the area.

Coles (2002) field survey in the Olingeån basin found that there are approximately 260 prehistoric sites in the area, including several barrows, cairns, settlements, stone settings, and blocks of stone with cup marks. Although not all of them are identified to be contemporary with the Frännarp panel, Coles believes that over 150 of them most likely can be dated to the Bronze Age. The Barrows are placed on visible hights, between 50- 60 meters and are most likely contemporaries to the Frännarp panel according to Coles (2002). What more is that of the 37

barrows, over 20 of the are placed around the landscape in a way as so they can be seen from the Frännarp panel, situated on the side of the slopes facing the panel.

Finally, Coles (2002) field survey notes that an ancient land based routeway runs from the lake Tydingen north of Frännarp, to the Almaån south of Frännarp. It intersects Olingeån just northeast of the Frännarp panel and continues just next to the panel itself.

This route would have increased the accessibility to the site from a greater distance, traveling both north and south (Ibid.). The proximity to graves and monuments may also tell of a ritual importance of the site.

The motifs

The collection of carvings on the Frännarp panel is spectacular and unique from a Scandinavian perspective. Although there are other sites with four-wheeled carts and chariot motifs in Scandinavia from the Bronze Age, few are so rich in in detail and artistic expression. There is also no other known site with such a large collection of solely chariot motifs on a single panel anywhere in in Scandinavia.

There are over fifteen clearly identifiable chariots, with many more pair of wheels and shapes possibly indicating more. The carvings vary somewhat in shape and design but are all projected from a mixed top-down perspective. Some of the motifs are more clearly visible, pecked out with deeper lines, while some are barely visible. The great majority of the chariots are, with a few single exemptions, facing as if they are traveling downward the rock surface.

There appear to be only chariot motifs carved on the panel, although there are some marginal shapes which might indicate anthropomorphic figures, although none of them could be identified as human figures with certainty.

Figure 21. Structure from motion image of the Frännarp panel, by Christian Horn 2018.

Earlier interpretations

Coles (2002) focus in his work on Frännarp focused on the sites place in relation to the surrounding landscape. He concludes that the site must have had a great significance, due to its central placement in the midst of an area with a large number of funerary monuments, and waterways, and the access to it via an ancient land way route. As for the meaning of the panel, and the motifs themselves, he is more cautious, but suggests that the motifs may have a connection to the barrows and cairns surrounding the site. Coles speculates that the differences in appearance and design of the chariot motifs may have corresponded to real life chariots of certain individuals, and that the number of nearby barrows and cairns corresponds to the main most clear motifs on the panel (Coles, 2002). Coles further suggests that Frännarp, due to the imagery and layout of the panel, and land route access may have been the centre of communal rituals surrounding funerals or reverence of deceased individuals of prestige (Ibid.).

Dating

There is no definitive dating of the Frännarp panel, and different datings have been suggested by scholars. While Althin (1945) suggested a dating of the Later Bronze Age, Period IV, Piggot (1983) suggested an earlier dating of Period II. Coles (2002) agrees with Piggot, placing the Frännarp panel in context with other spectacular carvings of two-wheeled carts with now established datings of the Early Bronze Age, such as Södra Mellby 42:1 and Östra Tommarp 22:1.

It should be noted however that this dating is based on other known Scandinavian examples of carvings of chariots, and does not take in account the more iconographical similar Iberian material, which in turn are generally dated to the Late Bronze Age (Harrison, 2004; Díaz-Guardamino, et al., 2019b).

The Iberian warrior steles

Overview warrior steles

The so-called Iberian Warrior steles are an artefact type dated to the Late Bronze Age. They consist of about 140 currently known decorated slabs of stone found on the Iberian Peninsula. Since the first stone rediscovered in 1898, they have generated a lot of academic interest and publications. Named “Warrior-steles” due to the general standardisation of the iconography across the steles, which includes a panoply of objects related to warriors (Díaz-Guardamino, et al., 2019). Since there is a general lack of evidence in the archaeological record from the Late Iberian Bronze Age (Lull, et al., 2013), the Iberian warrior steles has become a very important source for information about the life and worldview of the people living on the Iberian Peninsula in this era.

Phases of motifs

The motif composition on the warrior steles evolves through a couple of chronological phases. The first phase includes a large shield in the centre, with a spear above and a sword below (see fig. 26). At a later stage new objects such as mirrors, brooches, combs, and helmets are added in the spaces around the shield (see fig. 24, 25). The next objects to be added is the chariot and small human figures (see fig. 22). In many cases it is clear that the additional objects to the central shield and weapons have been added at a later stage, due to the different engraving technique used (Harrison, 2004, pp. 44-46). In the next stage the motif composition, it evolves to be more varied. Generally, the human figures receive a more central role, both in new steles and in recut ones. The human gets bigger and replaces the shield as a central motif (see fig. 23, 27). Later, horned figures appear as central motif, often appearing in pairs or in narrative scenes (Ibid.) (see fig. 28, 29). These sequenced iconographic changes could mirror ideological changes (Harrison, 2004, pp. 83-85). Sanjuán (2012) critizeses this perspective and points out that since most steles lack chronological context, the differences in motivs could as well have functional or ideological causes, rather be explained by changes over time or by diffusion.

Figure 26. Visualization of the Baracal I stele, , created using "ratopoviz"by Marta Diaz-Guardamino2022.

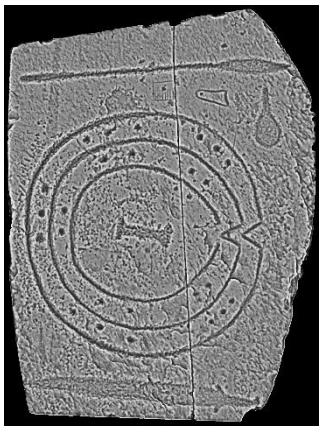

Figure 25. Visualization of the Brozas stele, created using "ratopoviz" by Christian Horn 2019.

Figure 24. Visualization of the Torrejon Rubio I stele, created using "ratopoviz", by Christian Horn 2021.

Figure 22. Visualization of the Zarza Montanchez stela, , created using "ratopoviz"by Forall M. Embers 2021.

Figure 23. Visualization of the Cabeza de Buey III stele, created using "ratopoviz" by Christian Horn 2020.

Figure 27. Visualization of the Zarza Capilla I stele, created using "ratopoviz" by Christian Horn 2021.

Figure 28. 3D-image of stele of Almadéndela Plata 2, after Díaz-Guardamino et al. 2015.

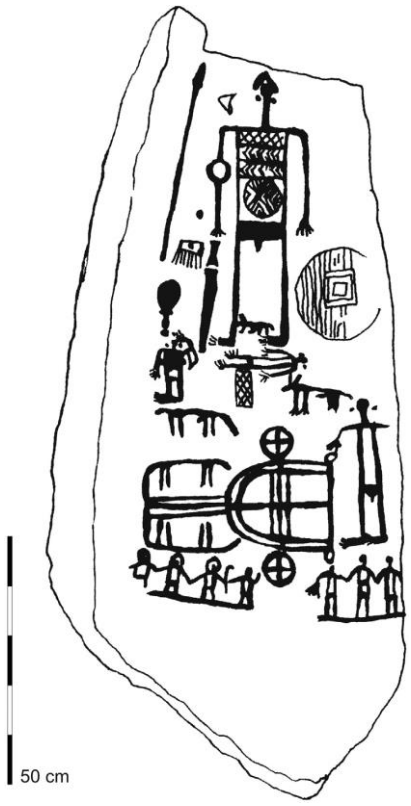

Figure 29. Line drawing of the stele of Ategua (Córdoba,Spain), after Díaz-Guardamino et al. 2015.

Another problem that appears when trying to derive information about ideology, and power structures from the iconography on the warrior steles, since many of the depicted objects does not correspond to the archaeological record (Sanjuán, 2012). However, as Winther (2010) has mentioned, the absence of archaeological artefacts does not necessarily mean that they didn't exist.

Geographical context

For a long time, the study of the warrior steles was focused nearly solely on their iconographical motifs, while the geographical context was hardly taken account for. One of the reasons being that most steles were non-stratified finds, often found by local farmers, and could not be connected to any recognisable archaeological features, thus leading to a consensus among academics that they were de-contextualised or lacking functional context (Sanjuán, 2012; Díaz-Guardamino, et al., 2019). This led to a situation where when new steles were discovered from the 1970's forward, the context of the findspot and geographical situation were not studied (Sanjuán, 2012). Studies from the 1990's and forward however, using among other methods, GIS-based spatial analysis, has focused on reoccurring locational patterns and contexts (Díaz-Guardamino, et al., 2019). These studies have shown that there is a pattern of warrior-steles

being placed in the landscape in connection to pathways, passage zones and important resources (Ibid.).

A recent multidisciplinary study by Díaz-Guardamino, et al. (2019) which compared a number of steles in the Guadalquivir- and Guadiana valley showed that the steles were most likely produced by the local communities, using local material and engraving techniques, while depicting broadly shared iconographic conventions in the motifs.

Meaning and function behind the Iberian warrior steles

Although it is impossible to know with certainty what function or functions the steles had within the Late Bronze Age societies, there are some established interpretations. Most researchers agree that the steles most likely had some sort of funerary or commemorative purpose, but the opinions on specifics differ. It is most likely that the steles had a multitude of functions at any given time, and possibly changing as times changed (Harrison, 2004; Sanjuán, 2012). Among the proposed theories are burial markers, cenotaphs, and claims of ancestral rights to territory. There is also some archaeological evidence linking the steles to funerary contexts, both older oral references of non-archaeologists in the late 19th century finding steles covering burials, as well as archaeological findings in the 20th century (Díaz-Guardamino, et al., 2019). Among them are the Cortijo de la Reina steles and the Granja de Céspedes stele, which were found face down, covering burials containing ashes and bones (Ibid.). Sanjuán (2012) has also pointed out that the prospect of steles functioning as funerary object would coincide with a long tradition of decorated monuments as a part of funerary ideology in Iberia, stretching to Neolithic times.

One of the lenses to observe similarities between the Iberian and Scandinavian rock art is through the broader narrative of stratification of society and the emergence of the warrior-class in Bronze Age Europe (Kristiansen & Larsson, 2005, pp. 204-250). One way of observing this is through the material objects of war and prestige, and the depictions of these in the iconography. The Iberian Warrior Steles, named specifically after what was considered depictions and warriors and the warrior's panoply, may be one of the mediums through which this identity and prestige was manifested and communicated, as proposed by Harrison (2004) among other. By looking at the iconography of the Iberian steles and Scandinavian Rock art through this lens, it may give some useful interpretations for understanding a possible ideological connection between the areas, and by extension the motifs themselves. Although it is near impossible to know for sure what the steles was supposed to mean, or for what purpose they were created, Harrison (2004, pp. 6-7) emphasise the creation of the steles as a iconographic product of a culture located at the crossroads between the Meditteraenan and the Atlantic cultural spheres. At the heart of a long distance trading network, Iberia would be well open for currents of ideological and intellectual stimuli, informing the worldview and ideology, which in turn would be mirrored in the warrior steles (Ibid.).

It should be noted that seeing the Iberian steles as simply "warrior" identity may be too reductive. Many motifs of the steles do not necessarily fit with the generalisation of warrior panoply, example given is steles with motifs of anthropomorphic figures with an over emphasised arched object above or around their head, generally interpreted as headdresses or "diadems". These figures are not shown with weapons as in other steles and may at a first glance

does not seem to be in the same category as the other Iberian Steles, as Harrison (2004) suggests, calling them "puzzling". Sanjuán (2012) however, gives another possible interpretation, pointing to the Almadén de la Plata II stele (see fig. 30), which shows one horned figure with weapons next to a figure with a "diadem". He suggests that this may reflect the dual/twin rulership ideology which is hypothesized to have been fundamental to both religion and society in Bronze Age Europe (See. Kristiansen & Larsson, 2005).

The division between the "warrior"- motif and the "headdress"-motif may reflect the dual leadership of the profane/military and religious (Sanjuán, 2012). Thus, the steles should perhaps be seen as communicators of power, leadership, and prestige, of which the warrior identity seem to play a very significant role but is not at its core.

It is therefore important to consider other aspects of power and prestige than just the inherent projection of power of the warrior and their weapons when interpreting the iconography. Other aspects which may have been inherent in the broader ideology of the ruling elite, such as religious and cultural markers may also need to be taken in consideration.

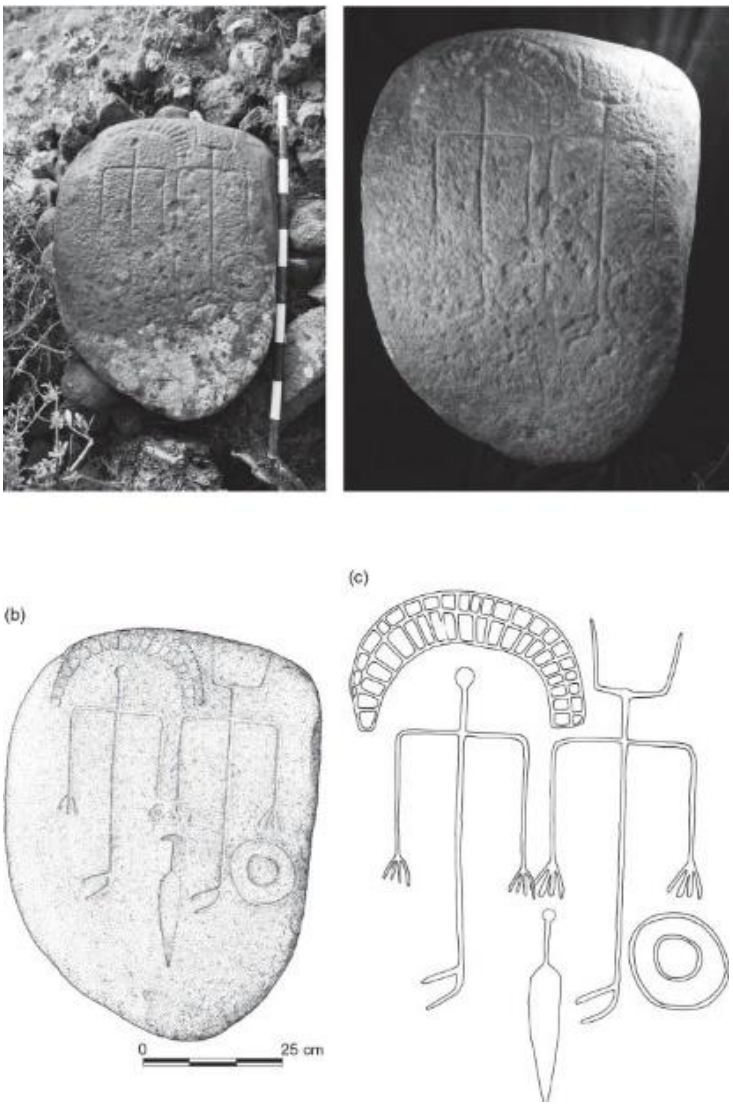

Figure 30. Photographs and drawings of the Almadén de la Plata II stele, after Sanjuán 2012.

Analysis

The Scandinavian material

Södra Mellby 42:1

The chariot is projected from a side-view, facing left, with a slight above-perspective as to be able to show both horses and both wheels. The motif is made with shallow single line carvings, with wider lines to represent surfaces when needed. The horses are drawn in almost a S-curve The horses and wheels are placed above each other, the horses are almost completely parallel to each other, the lower is situated just slightly more to the left relative to the other horse. The same goes for the wheels, but the difference is miniscule. The driver is situated just behind the horses, and in front of the wheels.

The axle is not clearly depicted, although the spokes could represent the axle. The wheel placement indicates however that the axle is situated in the rear end of the chariot.

The wheels are depicted with four spokes, no hubs or linchpins visible. The spokes are very close being perfectly vertical and horizontal in relation to the slab. The vertical spokes are roughly in line with the would-be axle.

The draught pole is depicted as a single line, bending upwards towards the horses' necks. The length of the draught pole differs between documentations but would either start somewhere in front of the wheels, or behind them. The yoke is represented as a single line, placed at the end of the draught pole, connecting at the horses' necks. a second line is depicted in Evers documentation between the shoulder of the lower horse and the stomach of the upper horse. This line is not visible on Toreld & Andersson however. There are two reins between the drivers hands and mouths of the horses. Here the documentation differ, with Evers showing the the reins connecting to elaborate bridles at the horses mouths, while Toreld & Andersson plastic sheet tracing shows the reins stopping before they reach the mouths. SfM however supports Evers documentation.

Under the driver's feet are a rectangular object, Evers represent this as a box, while Toreld & Andersson only considers a line crossing the draught pole. The newer SfM model supports Evers again. This could perhaps be interpreted as a standing platform, but also as a highly stylized side and railing of the cockpit, miniaturised as to not obscure the driver. What Toreld & Andersson depict as a crossbeam below the draught pole, does appear as a continuation of the box shows as a circular object on Evers. I would suggest however, by analysing SfM documentation, that both sides of the box continue beneath the draught pole.

Östra Tommarp 22:1

The chariot is projected from a side-view, facing left, with a slight above-perspective as to be able to show both horses and both wheels. The horses and wheels are placed above each other, with both the lower horse and lower wheel are placed slightly to the left. The driver is situated behind the horses, and slightly in front of the wheels. Both arms and legs of the human figure can be seen, the perspective indicates that the figure is seen from side-frontal view.

The axle itself is not depicted but would according to wheel placement be situated in the rear end of the chariot.

The wheels are depicted with four spokes, no hubs or linchpins visible. The vertical spokes are roughly in line with the axle, tilting slightly to the right.

Due to deterioration of the stones surface, the details are hard to distinguish. There seem to at least be a single line draught pole extending from just beneath the human figure to a line, possibly the yoke, connecting the horses' necks. There is a second less clear line above, parallel to the draught pole, stretching between the driver and upper horse's hind legs. This line is not as clear as to if it is carved or a natural crack. It could represent the other side of the chariot, if it is perceived from slightly above, or it could perhaps represent the upper railing of the box side.

The motif is carved with sharp V-shaped lines. The body of the horses are carved using two parallel, continues lines, stretching from muzzle to the hind feet, the negative space in between the lines forming the body. Tails are clearly shown, carved with a single line. Faint parallel lines indicate ears.

It is difficult to identify any details on the driver. However, the left leg seems to be longer than the right, extending down to the draught pole. The head is carved as a small circular indent. There are several thin lines, which could be interpreted as arms, reigns, stimulus, or a weapon, however they are to faint to be able to say anything conclusive.

There is a very faint, triangular form at the rear end of the draught pole. The right side of the triangle is parallel with the drivers left leg, the left side parallel with the right leg, if it extended down to the draught pole as the left leg. I see three possible explanations for this object. It could be a highly stylized depiction of the box, or a standing platform, in a similar way as Södra Mellby 42:1. It could also be there to show the inner sides of the legs, making the legs very wide, however this seems unlikely and has no correlates in the Scandinavian material. Perhaps more likely is it that the right side of the triangle is supposed to be the figures right leg, thus extending it to the same length as the left leg, bending the knees slightly as if bracing.

Comparing Södra Mellby 42:1 and Östra Tommarp 22:1

Although Södra Mellby 42:1 and Östra Tommarp 22:1 share many visual similarities, the state of the carved surface of Östra Tommarp 22:1 makes it difficult to draw any final conclusions. The lack of details in comparison to Södra Mellby 42:1 could possibly be the results of the

difficulties in carving on the hard diorite stone surface, thus less details were able to being depicted. It could also be that more details were being preserved in Södra Mellby 42:1 due to better conditions.

With that said, the form and composition of the motives are strikingly similar. There are some obvious differences such as the horses and the driver being depicted with deep carved lines outlining the bodies rather than being carved with shallow broad surfaces. That different techniques were used during the carving processes doesn't necessarily mean a strong chronological difference, as different techniques have been found to be used within the same closed context, such as the mound at Sagaholm (Goldhahn, 1999, p. 76).

Both motifs are projected in the same side-view way, facing left, with a slight above-perspective. Both horses and wheels are shown above and under, parallel to each other. The lower horse and wheel are placed slightly to the left in reference to the one above, although this difference is greater in Östra Tommarp 22:1.

The horses are depicted in a similar way on both motifs, although different carving techniques were used, with curved, almost S-shaped bodies, extended parallel legs and tails.

The wheels are placed in the rear of the chariot in both motifs, with the driver in front. The wheels are depicted in the same way with spokes. The draught pole has a similar curvature bending upwards and connects to a yoke, the placement seems similar, although the number of lines on each motif is hard to get a clear view of. It is possible that some of the lines on Östra Tommarp 22:1, are supposed to represent reins, as there are some lines that could indicate this between the heads of the horses and the driver. In that case there would be another clear similarity with Södra Mellby 42:1, however as of the material available to me, I cannot confirm this. There is no clearly visible cockpit on either motif, in the style of those on the Frännarp panel. A possible representation is the square object shown on Södra Mellby 42:1, as proved by Bertilsson, et al. (2017), and the triangular shape beneath the driver's feet on Östra Tommarp 22:1. Another explanation previously discussed is that is the drivers other leg bracing in a similar way as the driver in Södra Mellby 42:1.

Another point that speaks in favour of a connection between Södra Mellby 42:1 and Östra Tommarp 22:1 is the visual aspects of these two motifs differ from other known Scandinavian chariot images with the same side-view projection.

As is, I would argue that there are not enough visible details on the documentations of Östra Tommarp 22:1, to alone determine if the similarities are the result of direct visual contact. As 3D documentation has proven to be very effective in discovering and confirming details on rock carving motifs, I would suggest that future 3D-documentation survey of Östra Tommarp 22:1 could generate much needed new material for analysis.

As for comparison of their contexts, there are some strong indications for connections between Södra Mellby 42:1 and Östra Tommarp 22:1. They are first and foremost found within 20 km of each other. Estimations based on experiments with replicas of the Iron-age Hjortspring boat, which is similar in depictions of Bronze-age ships, puts the travel speed up to approximately 100 km per day (Crumlin-Pedersen, 2003; Vinne, 2003). Based on this estimated speed, one would be able to travel from Södra Mellby 42:1 and reach Östra Tommarp 22:1, including the journey land inward, within a couple of hours.

Both motifs are found in a funerary context, although the way the motifs are placed in relation to the graves differs, the carvings of Södra Mellby 42:1 being situated on slab as part of a cist inside the grave (Goldhahn, 2013), and on a stone on top of the mound or as a kerb-stone in Östra Tommarp 22:1 (Winther Johannsen, 2013). The creation of both motifs has been dated between period Ib-II, but more importantly, the motifs on both Södra Mellby 42:1 and Östra Tommarp 22:1 were accessed several times over a time span of several hundred years after creation, as the multiple reburials in Kivik, and the open air placement at Villfara has shown (Goldhahn, 2009; Winther Johannsen, 2013).

As for the other surrounding motifs of Södra Mellby 42:1 and Östra Tommarp 22:1, there are no clear visual parallels. There are ships and horses depicted on the nearby slabs in Södra Mellby 42:1, but none of these has the same visual similarity with the motifs on Östra Tommarp 22:1 as the chariot motif. This doesn't necessarily mean that there is no connection between the chariot motifs, however. It might have been more important that the ships reflected a contemporary style of real-life ships, which the additions of details to the upper ship on Östra Tommarp 22:1 may suggest (Winther Johannsen, 2013). The chariot might have carried a different symbolical meaning, in which it's visual likeness to Södra Mellby 42:1 had greater importance. An important factor might be the placement of the chariot motif on the panels themselves, as both are placed in the upper left corner. In the case of Östra Tommarp 22:1, Winther Johannsen (2013) suggests that the placement and direction of the chariot is important, as he connects this imagery with the daily journey of the sun in Bronze Age cosmology (Kaul, 1998).

Frännarp

I have selected fourteen motifs, of those that I find sufficiently detailed and visible enough to analyse. Those fourteen motifs have I split into two tiers of visibility, and numbered them by the alphabet from left to right. Although there are many more identified chariot motifs, especially with 3D documentation, I will not discuss every one.

Although the motifs may vary in their details (see the discussion below), they have various traits in common. All chariot motifs on the Frännarp panel are depicted using a mixed-top down projection and depict wheels with four spokes. All Frännarp motifs also lack any discernible human figures in connection with the chariots.

Tier 1, high level of detail

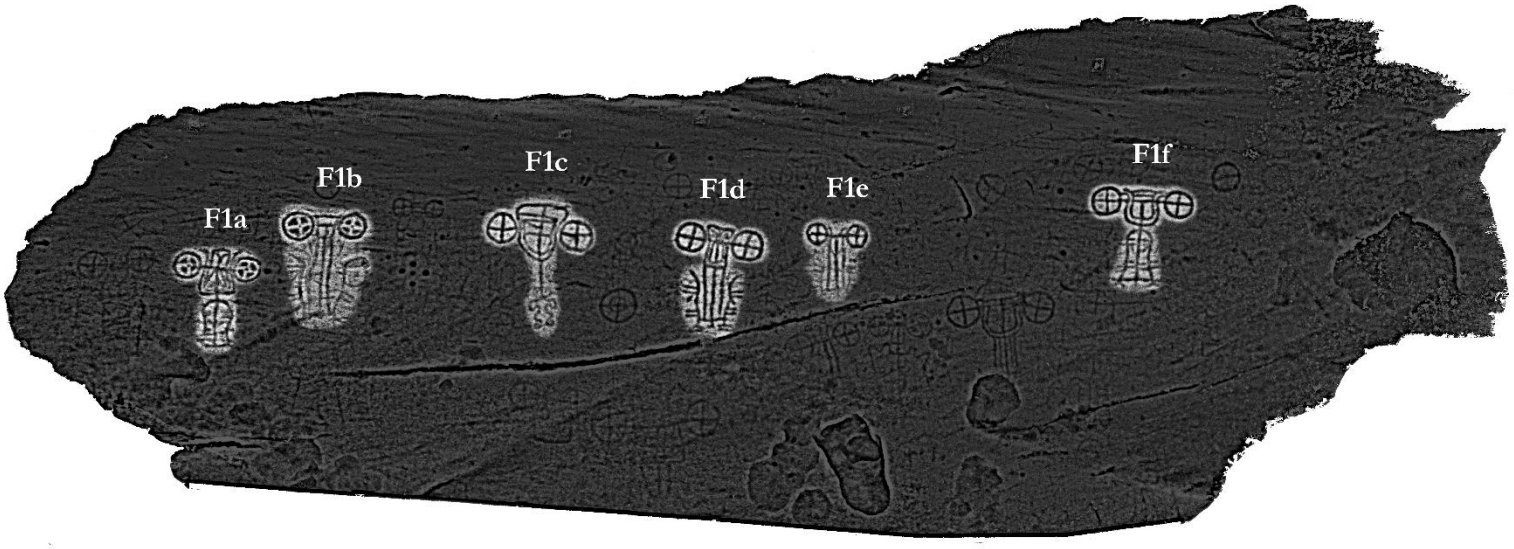

Figure 31. 3D-visualization of topographic data, depicting the Frännarp panel, after Horn, Pitman and Potter 2018. Edited by the author to highlight individual motifs belonging to Tier 1.

F1a

Similar to several other chariots on the Frännarp panel, this motif depicts the cockpit rather elaboratively. It consists of several intersecting lines, creating an X-, or almost hourglass-shape. Although it may be difficult to discern, the pattern that makes up the cockpit (excluding the draught pole and axle) appears to have been made using only one single, weaving line. This could very well be a completely aesthetic choice, but it could also represent something more tangible, such as a weaved floor.

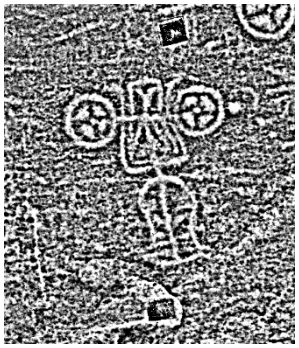

Figure 32. Structure from motion image of chariot motif on the Frännarp panel, by Christian Horn 2018.

Figure 33. 3D-visualization of topographic data, depicting chariot motif from the Fränarp panel, after Horn, Pitman and Potter 2018. Edited by the author to highlight details of the cockpit.

It is also possible that the cockpit's outer line represents a railing, given that it has an elongated, square Ω-like shape. The outward-extended pieces at the rear of the chariot are an interesting element, although it is not completely clear from what perspective they are projected.

Similarly, the wheels also possess some interesting aesthetic element. Here, the carver has chosen to represent the spokes using negative spaces; the empty spaces between the spokes are carved, rather than the spokes themselves. The hubs of the wheels are represented with a carved dot. This almost sculp-like approach contradicts the manner in which the other components of the chariot have been carved. For example, the draught pole and horses are all depicted using the more commonly observed carved lines rather than negative spaces. The axle is situated in the middle of the depicted main chariot body.

The horse-team, turned inward towards the draught pole, are illustrated in a unique way as their tails are connecting, which makes their bodies form a bell-like shape. The details of the horse-team are more diffuse, however, they appear to be portrayed with ears, four legs and phalluses. However, it is difficult to clearly confirm the lines and what they are meant to represent. The right-hand horse, and possibly even the left-hand one, contain a line that could be a yoke or other part of the traction system.

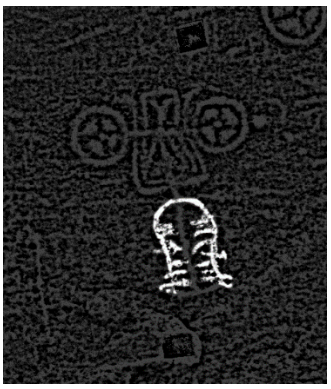

Figure 34. 3D-visualization of topographic data, depicting chariot motif from the Fränarp panel, after Horn, Pitman and Potter 2018. Edited by the author to highlight details of the horse-team

F1b

The cockpit of this chariot is also depicted using a single line in an elongated D- shape. The axle is visible, situated in the middle of the cockpit. There are also two faint, slightly curved lines on either side of the draught pole, possibly indicating the outline of a larger cockpit. If this is the case, then the inner D-shape could represent a standing platform (see fig 36). This would place the axle more towards the rear of the chariot and make the draught pole's length in relation to the cockpit more similar to the other chariot motifs on the panel.

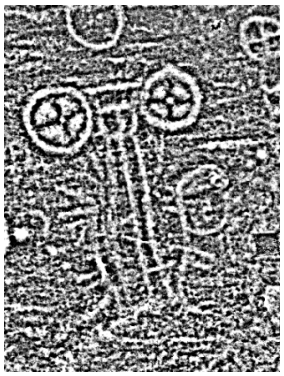

Figure 35. Structure from motion image of chariot motif on the Fränarp panel, by Christian Horn 2018.

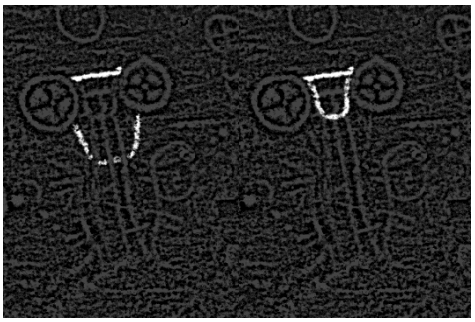

Figure 36. 3D-visualization of topographic data, depicting chariot motif from the Fränarp panel, after Horn, Pitman and Potter 2018. Edited by the author to highlight details of the cockpit.

The draught pole is runs from the axle to the head of the horses. There are three lines connecting the cockpit to the heads of the horses, which is likely meant to represent reins on both sides of the draught pole.

The wheels are made in a similar style as in motif 1a, where the artist has carved out the negative space between the spokes. The hubs are also depicted.

The illustration of the horses, turned outwards from the draught pole, contain some slightly confusing details. It appears as though both horses are portrayed with four legs and with phalluses. However, some lines that seem to indicate legs extend above the horses, but this could be part of the traction system. Further, what appears to be the right horse's tail in the 3D documentation almost form a closed circular shape with what may be the phallus, and there is a second carved line on the rear of the left horse, giving the impression of it having two tails. Perhaps these rather confusing details are due to mistakes or earlier attempts at carving a chariot in the same space.

F1c

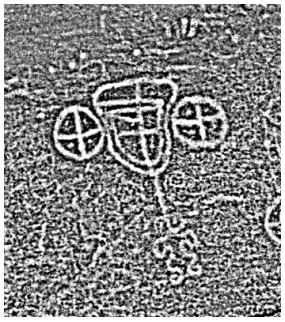

Figure 37. Structure from motion image of chariot motif on the Frännarp panel, by Christian Horn 2018.

The cockpit is depicted as an elongated D- shape, slightly extended outwards in the rear, with double lines with the inner line forming a smaller D-shape. On the left-hand side of the cockpit, the outer shape connects the inner shapes right-side line to a perpendicular line. An additional angled line connects the inner left-hand side to the draught pole. The draught pole is visible through the cockpit and extends to the very rear of the chariot.

The axle is more ambiguous, as the wheels' positions do not align with the crossing line that appears to be the axle. On the left-hand side, a short line seems to extend from the wheel and connects with the inner D-shape, just above the supposed axle.

The wheels are made with single carved lines, but with the addition of a carved dot in each of the spaces between the spokes.

A horse-team could possibly be distinguished on each side of the draught pole, but they are so faint that it could be argued that a horse-team has not been portrayed. There is also a spiral shape carved on the right-hand side of the draught pole, but it is impossible to make any credible interpretation of its intended meaning.

There is an unusual feature at the end of the draught pole where the horse-team would be expected. Two loops with carved dots in the middle, which continues outwards in two snakelike, mirroring lines. It is difficult to interpret exactly what these are meant to represent, although the most likely explanation is perhaps that the loops are the yoke, and the lines are the reins laying in front of the chariot. Perhaps this is a representation of a chariot without horse team.

F1d

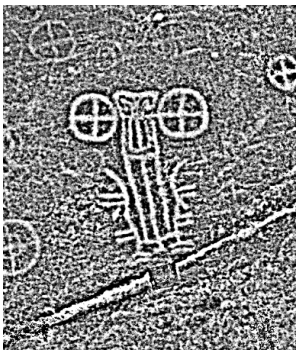

Figure 38. Structure from motion image of chariot motif on the Frännarp panel, by Christian Horn 2018.

This motif has a rectangle-shaped cockpit, with the rear corners curved slightly outwards. In front of the axle is another rectangular shape, inside and parallel to the cockpits outer line. Since the draught pole is not visible between the outer and inner lines of the front of the cockpit, it these lines could represent the top railing and bottom of the front and sides of the chariot. The outer line continues on the left-hand side to the rear end, while there seems to be a break on the right-hand side above the axle. The rear of the chariot has two indistinct curved shapes, although it is hard to tell from the SfM documentation whether they are intended to be symmetrical. In Evers, they do not appear to be intended to be symmetrical While this section of the chariot is difficult to interpret, it has several visual aspects in common with motif 1a, such as the curved end pieces.

The axle is situated near the centre of the cockpit, and the horizontal spokes of the wheels align with the axle. The wheels are again carved with single lines, with small, faint indications of dots in the space between the spokes.

The draught pole extends from the rear end of the chariot to a small intersecting line in the front aligning with the heads of the heads of the horses. The yoke is represented using a single line connecting the necks of the horses. Additionally, one line on each side of the draught pole connects the yoke to the cockpit, continuing the outer lines of the sides of the cockpit, again possibly representing reins.

The horse-team is facing outwards from the draught pole. Both horses are clearly portrayed with four legs, ears, tails and phalluses.

F1e

It's difficult to determine the structure of this chariot. the draught pole is prominent and stretches from the axle to a yoke or harnessing at the heads of the horses. There are also two parallel lines on the sides of the draught pole, which could be reins. However, they also seem to make up the sides of the cockpit.

There is only a very faint, slightly V-shaped line that could indicate the front of the cockpit (see fig. 40 below). Behind the axle at the rear, the sides continue as curved lines similar to the chariots described above. These extensions could represent the end of the reins, but this is unlikely as they also appear in chariot motifs without visible reins.

Figure 39. Structure from motion image of chariot motif on the Frännarp panel, by Christian Horn 2018.

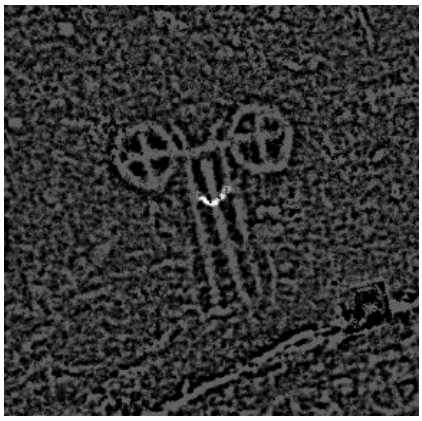

Figure 40. 3D-visualization of topographic data, depicting chariot motif from the Frännarp panel, after Horn, Pitman and Potter 2018. Edited by the author to highlight possible front of the cockpit.

The horse-team, which is facing outwards, is very faint, and the details are challenging to discern. There might be two or three lines connecting the horses, one by the heads, one approximately by the shoulders, and possibly one by the rears (see fig. 41 below).

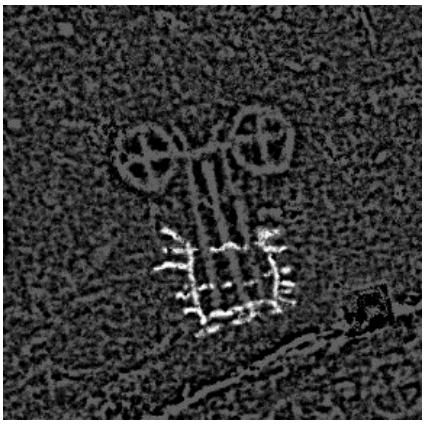

Figure 41. 3D-visualization of topographic data, depicting chariot motif from the Frännarp panel, after Horn, Pitman and Potter 2018. Edited by the author to highlight details of the horse-team.

F1f

This chariot has a clear Ω-shape and its sides are depicted using double lines. The sides end in curved extensions in the rear with parallel double lines connecting them. It is difficult to discern whether this section is meant to represent a closed back or the floor of the cockpit.

The axle is situated in the middle of the cockpit, although closer to the rear than the front. The vertical spokes of the wheels aligning with the axle. The wheels are carved using single lines as having four spokes and no visible hubs. The spaces between the spokes are empty.

Figure 42. Structure from motion image of chariot motif on the Frännarp panel, by Christian Horn 2018.

The draught pole is visible through the cockpit and extends from the axle to a crossing line at the heads of the heads of the horses. The horse-team is bell-shaped, turned inwards, and have connected tails, similar to the horse-team in motif 1a. The horses are portrayed with ears, phalluses and four legs. Some of the lines depicting legs extends outwards, outside the body. Similarly to motif F1b, it is possible that they are meant to represent parts of the traction system.

Tier 2, low level detail

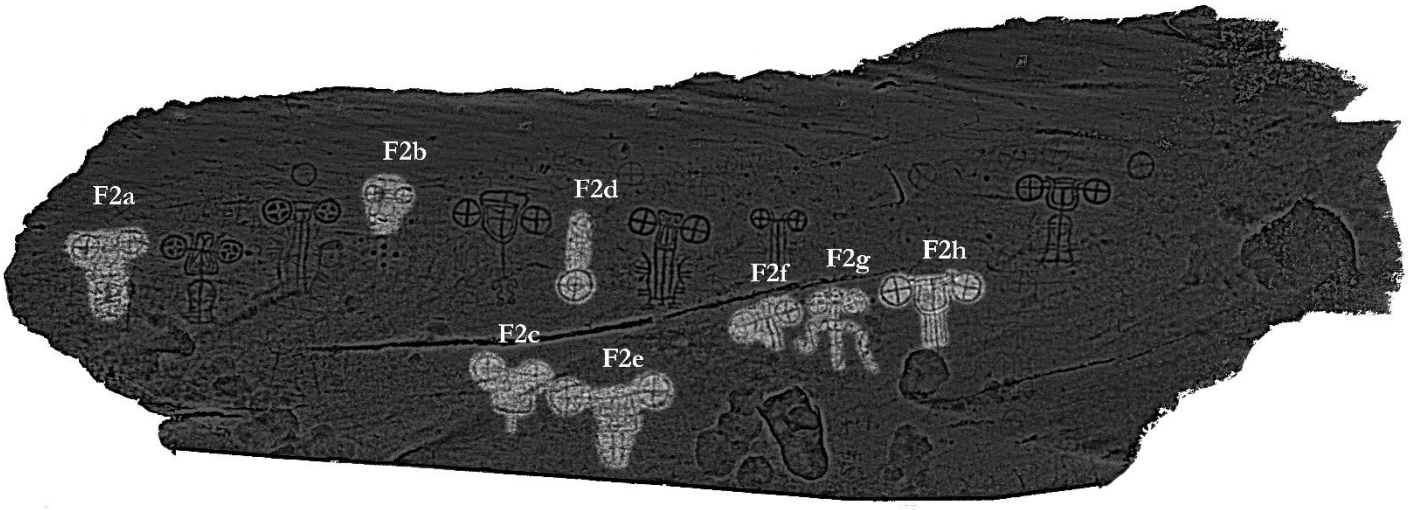

Figure 43. 3D-visualization of topographic data, depicting a chariot motif on the Fränarp panel, after Horn, Pitman and Potter 2018. Edited by the author to highlight individual motifs belonging to Tier 2

F2a

The cockpit is small, D-shaped, possibly illustrated using two faint outer lines, although they are difficult to distinguish. There are also possibly some faint details in the rear, behind the axle.

The wheels are carved using single lines, depicting four spokes, and the axle is situated in the rear end of the chariot. However, if there indeed are some details in the rear, the axle may rather be placed in the centre.

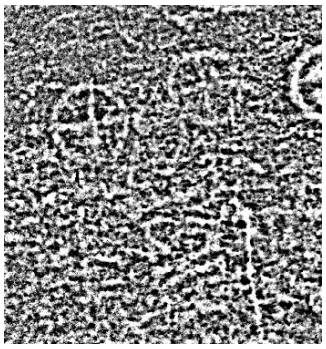

Figure 44. Structure from motion image of chariot motif on the Fränarp panel, by Christian Horn 2018.

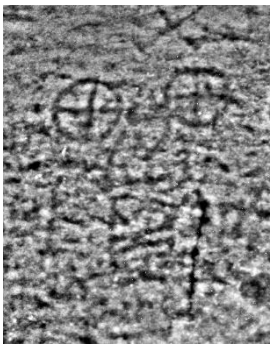

Figure 45. 3D-visualization of topographic data, depicting a chariot motif from the Fränarp panel, after Horn, Pitman and Potter 2018.

The horse-team is very faint and facing inward, towards the draught pole.

F2b

F2b is a small, peculiar carving. The cockpit is depicted using three lines, including the axle. The front of the chariot is less than straight-forward to identify. It could be the faint curved line in front of the previous three, or it could be the larger circular shape in front of the curved line. The sides extend in two bent lines behind the chariot, both to the left at an angle of almost 90 degrees.

Figure 47. Structure from motion image of chariot motif on the Fränarp panel, by Christian Horn 2018.

Figure 46. 3D-visualization of topographic data, depicting a chariot motif from the Fränarp panel, after Horn, Pitman and Potter 2018.

There also appear to be three hooked lines in connection to the circular shape in front of the chariot but their meaning is hard to decipher.

No draught pole or horse-team is clearly visible. It is also difficult to determine whether the circular shape consisting of five cup marks below the chariot is part of the same motif.

F2c

This motif is barely visible, but with some effort one can identify two wheels with visible spokes, carved using a single line, and a somewhat broad cockpit with a square front.

Figure 49. Structure from motion image of chariot motif on the Fränarp panel, by Christian Horn 2018.

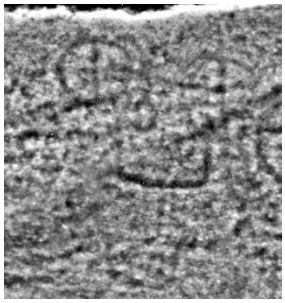

Figure 48. 3D-visualization of topographic data, depicting a chariot motif from the Fränarp panel, after Horn, Pitman and Potter 2018.

F2d

F2d is an interesting motif, different from the other described motifs on the Fränarp panel in many ways. It is depicted with a single wheel, consisting of two concentric circles and four spokes. There are also four barely visible lines, forming a cross between the spokes, possibly a second set of spokes. There is one central line reaching upward from the wheel, with one additional line on each side, possibly a draught pole with reins. If this is the case, then the vehicle is traveling upwards, instead of downwards, like the other chariots on the panel. There also seems to be additional perpendicular lines crossing the three main lines, which could be interpreted as legs on a horse team. Two lines seem to curve slightly, perhaps indicating tails (see fig. 51).

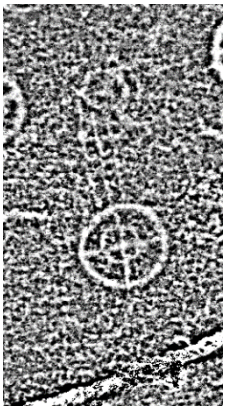

Figure 50. Structure from motion image of chariot motif on the Fränarp panel, by Christian Horn 2018.

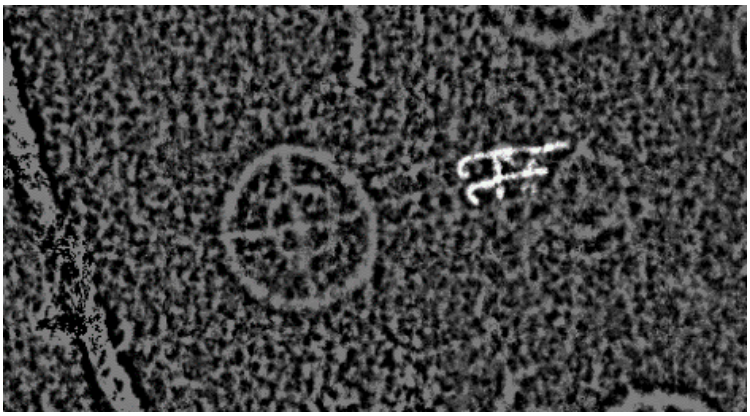

Figure 51. Structure from motion image of chariot motif on the Fränarp panel, by Christian Horn 2018. Edited by the author to highlight possible details of the horse-team

There seems to be a circular shape in the front, although it is hard to discern any details. It could be a second wheel; however, it seems unlikely since it differs a lot in shape, as well as in the depth of the line from the first wheel.

There might be two other cases of a similar carving on the panel, however these are so faint that no sure conclusions can be made, and the interpretations must be considered speculative (see fig. 52 and 53).

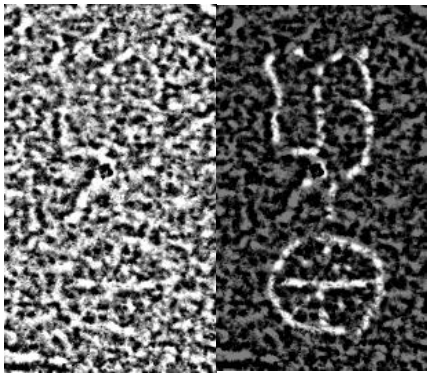

Figure 52. Structure from motion image of possible chariot motif on the Fränarp panel, by Christian Horn 2018. Edited and interpreted by the author to highlight possible details.

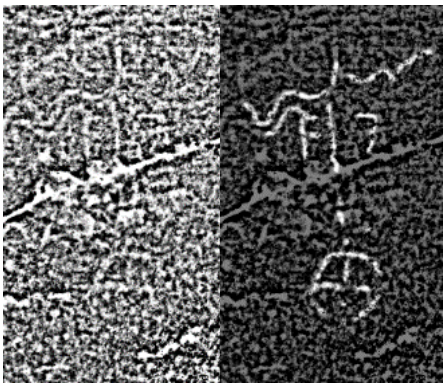

Figure 53. Structure from motion image of possible chariot motif on the Fränarp panel, by Christian Horn 2018. Edited and interpreted by the author to highlight possible details.

F2e

Similar to motif F2c, motif F2e is also barely visible. It has a relatively long axle, situated at the rear of the chariot. It has spoked wheels, which are carved with single lines. The cockpit is rather diffuse, but seems to be shaped like a square.

Unlike F2c, this motif has a visible draught pole and horse-team, although details are hard to discern.

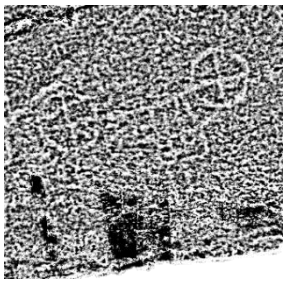

Figure 55. Structure from motion image of chariot motif on the Fränarp panel, by Christian Horn 2018.

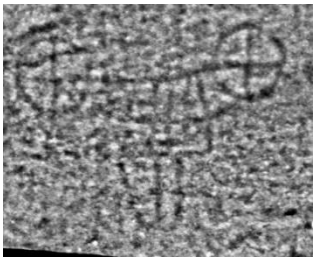

Figure 54. 3D-visualization of topographic data, depicting a chariot motif from the Fränarp panel, after Horn, Pitman and Potter 2018.

F2f

Very few details are visible on this motif, but it may possibly mirror motif F1e in various aspects. However, unlike motif F1e, the draught pole seems to extend further back, behind the axle. The two lines parallel to the draught pole could be the side of the cockpit or reins. They do also extend in the back and ends in either rear extensions or in a loop, although this is hard to discern (see fig. 58).

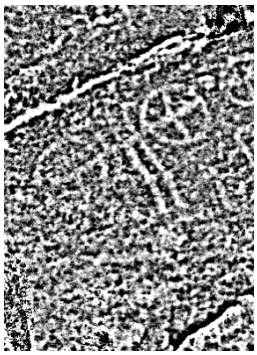

Figure 56. Structure from motion image of chariot motif on the Fränarp panel, by Christian Horn 2018.

Figure 57. 3D-visualization of topographic data, depicting a chariot motif from the Fränarp panel, after Horn, Pitman and Potter 2018.

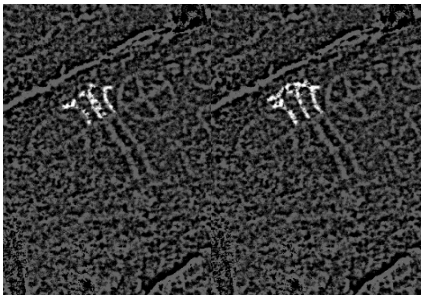

Figure 58. 3D-visualization of topographic data, depicting chariot motif from the Fränarp panel, after Horn, Pitman and Potter 2018. Edited by the author to highlight details of the rear.

The two vertical spokes out of the four on the wheels are parallel with the axle. The position of the axle is hard to determine due to lack of details in the chariot, but seems to be in the centre of the cockpit. The wheels are carved using single lines.

F2g

The F2g motif contains several distinctive features. Firstly, there are two meandering lines that extend from the draught pole in the front of the cockpit. These lines do most likely represent reins, possibly ending in draught animals, however this is hard to tell with any certainty. This would place the horses in an unusual position away from the draught pole. Secondly, there is another shape next to the draught pole in the front, which could also be interpreted as a horse.

Figure 59. Structure from motion image of chariot motif on the Fränarp panel, by Christian Horn 2018.

Figure 60. 3D-visualization of topographic data, depicting a chariot motif from the Fränarp panel, after Horn, Pitman and Potter 2018.

Figure 61. 3D-visualization of topographic data, depicting chariot motif from the Fränarp panel, after Horn, Pitman and Potter 2018. Edited by the author to highlight possible reins.

There are three possible places where the front of the cockpit could be situated, either above the "reins", in aligned them, or in front of them, although this would make the cockpit very elongated.

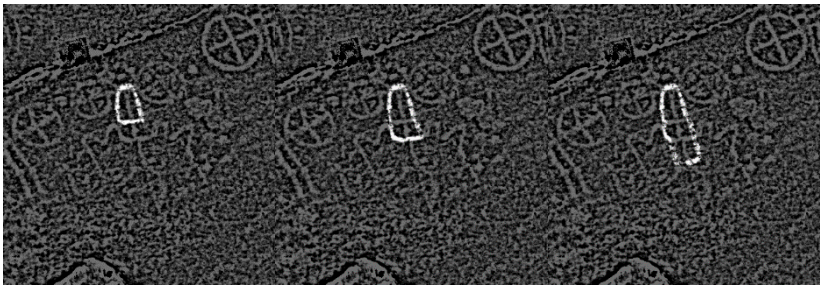

Figure 62. 3D-visualization of topographic data, depicting chariot motif from the Fränarp panel, after Horn, Pitman and Potter 2018. Edited by the author to highlight different interpretations of where the front of the cockpit is situated.

The axle is placed in the very rear of the chariot, and is barely visible. The wheels are carved using single lines, but the spaces between the spoke indents have been carved. Unlike in motifs F1a and F1b, the spokes are not left uncarved, but are also carved. The vertical spokes on the left-hand side wheel are parallel with the axle, while the right-hand side wheel tilts slightly to the left.

There is also a circular shape in the rear of the chariot, behind the axle, with five deep cup marks, comparable to motif F2b.

F2h

This motif has deeper lines than the others in the lower tier, and is thus easier to discern. There is however a damage on the surface in front of the draught pole, which possibly has erased some features.

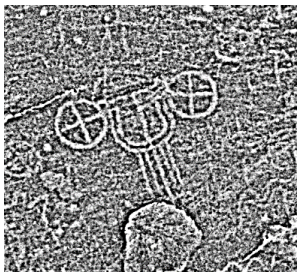

Figure 64. Structure from motion image of chariot motif on the Fränarp panel, by Christian Horn 2018.

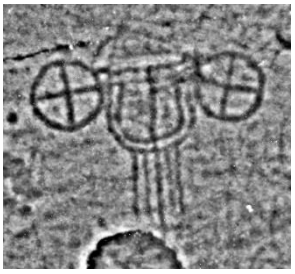

Figure 63. 3D-visualization of topographic data, depicting a chariot motif from the Fränarp panel, after Horn, Pitman and Potter 2018.

The cockpit is similar in form and style to that depicted in motif F1f, as it is also Ω-shaped with double carved lines indicating the sides and back of the cockpit. The sides also end in rear extensions behind the axle. Both axle and draught pole can be seen through the cockpit. The axle is placed in the mid-rear section of the cockpit. The wheels are carved using single lines and the vertical spokes on the left wheel are parallel with the axle, while the right wheel tilts slightly to the right.

This motif has the highest number of lines parallel to the draught pole, with two lines on each side. These could represent for example yoke braces, but since they all extend to the front of the cockpit, they are more likely to be double reins.

The Iberian material

Like the Frännarp panel motifs, the Iberian chariot motifs have also been divided into two categories. The first category has available 3D-documentation, as well as the catalogue presented in Harrison. The second group consists of motifs with missing or unavailable 3D-documentation. The analyses of the motifs in the second category are thus based on more parsimonious background material. The 3D-documentation was made during fieldwork seasons in the "Rock art, Atlantic Europe, Words & Warriors" project funded by the Swedish Research Council. The 3D data has been visualized in accordance with the method described in Horn, et al. 2021.

Tier 1, 3D-documentation of motifs available

S1a Capote (Higuera la Real), Ba

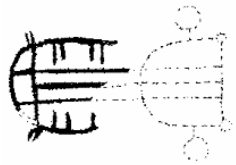

Figure 66. Drawing of chariot motif from the Capote (Higuera la Real) stele, after Harrison 2004.

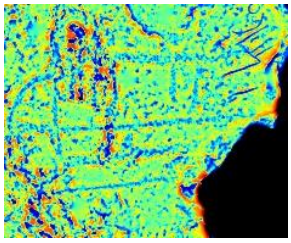

Figure 67. Visualization of chariot motif from the Capote (Higuera la Real)stele, created using "ratopoviz" by Christian Horn 2020.

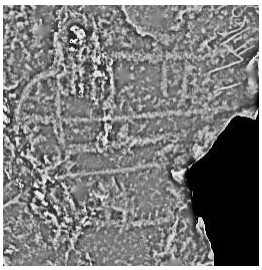

Figure 65. Visualization of chariot motif from the Capote (Higuera la Real)stele, created using "ratopoviz" by Christian Horn 2020.

The section of the motif that would depict the cockpit is missing due to damage. A central draught pole connects to a single perpendicular line, representing the yoke which connects at the heads of the horses. Two thinner lines on either side parallel to the draught pole represent the reins, which extend past the yoke and connect to each other and the bodies of the horses, forming a curved, continuous line.

The horse-team is facing inward, ears represented, although some details seem to differ on the 3D-documentation and Harrison.

S1b Cabeza de Buey II, Ba

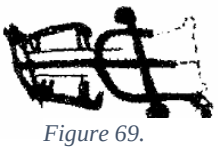

Figure 69. Drawing of chariot motif from the Cabeza de Buey II stele, after Harrison 2004.

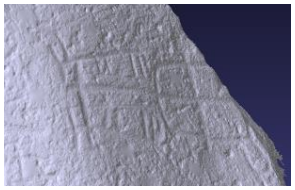

Figure 68. Laser scanning of chariot motif from the Cabeza de Buey II stele, by Forall M. Embers.

Most of the motif is visible, although the upper right corner of the cockpit is missing due to damages. The cockpit has an elongated D- or Ω-shape, with a loop extension in the rear. The sides and front are carved using a single line and the axle is visible through the cockpit and placed in the middle. The wheels are depicted with carved solid circular shapes without spokes.

The draught pole extends from the rear of the cockpit to the yoke, placed on par with the necks of the horses. The horse-team is facing inward and ears, mouths, legs and tails are depicted. Reins are depicted as thin lines running parallel to the draught pole and connects at the horses'

mouths. It is not obvious where the reins end, but at least the upper rein is clearly depicted as reaching inside the cockpit.

S1c Cabeza de Buey II, Ba

This is the second chariot motif on the Cabeza de Buey II stele and it is substantially less distinguishable than the previous. However, a D-shaped cockpit has been carved with several shallow lines representing a single line, possibly this is meant to illustrate extensions in the rear. A draught pole and a centrally placed axle are also visible through the cockpit. Two deep cup marks above and beneath chariot are also possible depictions of wheels.

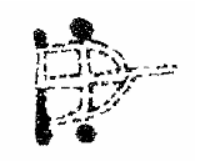

Figure 71. Drawing of chariot motif from the Cabeza de Buey II stele, after Harrison 2004.

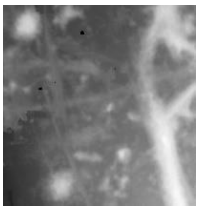

Figure 70. Visualization of chariot motif from the Cabeza de Buey II stele, created using "ratopoviz" by Ashely Green 2022.

S1d Cabeza de Buey IV, Ba

In this motif, the sides of the cockpit are depicted using two lines, the inner line is square-shaped, while the outer line is D-shaped. The space between the lines become narrower towards the rear and the lines seem to unite in small outwards pointing extensions. A single vertical line marks the rear end of the chariot.

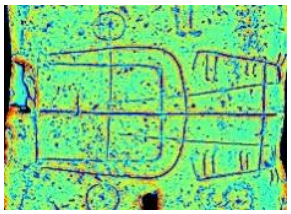

*Figure 72. Visualization of chariot motif from the **Cabeza** de Buey IV stela, created using "ratopoviz" by Christian Horn 2020.*

The draught pole and centrally placed axle can be seen through the cockpit. The draught pole extends from the rear end of the chariot to the yoke on par with the necks of the horses. The depiction of the yoke is relatively detailed, showing the curves at the ends that pass over the horses' necks.

The reins are represented by two lines that extend from the moths of the horses to the axle in a slight angle towards the centre. The horse-team is portrayed as facing inward, with ears, mouths, legs and tails depicted.

The wheels are depicted using single lines and single dots in the centre of the wheels, representing the hubs. Additionally, there are some very faint lines that may be meant to represent spokes on the upper wheel.

S1e Cabeza de Buey Palacios, Ba

The cockpit of this chariot has an elongated D- or Ω-shape, with loop-shaped extensions in the rear. The sides and front of the chariot are carved using a single line, and the draught pole can be seen through the cockpit. However, the axle and wheels are either not visible in the documentation or were not included by the carver.

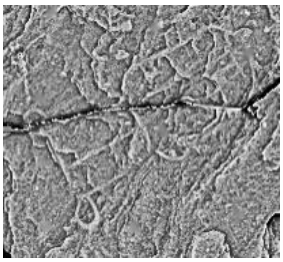

Figure 73. Visualization of chariot motif from the Cabeza de Buey Palacios stela, created using "ratopoviz" by Ashely Green 2022.

The draught pole and its two parallel reins connect to a yoke at the heads of the horses. The details of the horses are hard to distinguish, although the two appear to connect by the mouths and form a continuous line from tail to tail, , forming an oval shape that nearly connect to the front side of the cockpit.

S1f Capilla VI, Ba

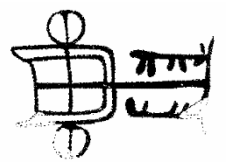

Figure 74. Drawing of chariot motif from the Capilla VI stela, after Harrison 2004.

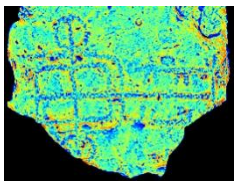

Figure 75. Visualization of chariot motif from the Capilla VI stela, created using "ratopoviz" by Christian Horn 2020.

This chariot has almost a square D-shape, with the cockpit being carved using two lines. The inner is completely square, although the lower left part is missing due to damage. The sides of the cockpit extend further back past the end of the floor.

The axle is centrally placed and can be seen together with the draught pole through the cockpit. The draught pole extends from the rear end of the chariot to the yoke which connects with the heads of the horses. The wheels are aligned with the axle and carved using a single line. Single vertical spokes are depicted in line with the axle, alternatively the axle is depicted through the wheels.

The horse-team is facing inward towards the draught pole, and parts of the lower horse are missing due to damage.

S1g Inedita Capilla Tabla de las Canas, Ba

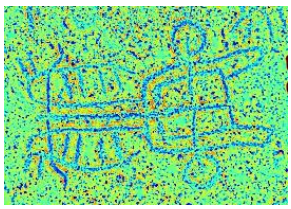

Figure 76. Visualization of chariot motif from the Inedita Capilla Tabla de las Canas stela, created using "ratopoviz" by Ashely Green 2022.

The cockpit of this motif shares some distinct features with motif S1f, described above. They are both carved using two lines in a square shape, with the sides extending in the rear past the end of the floor. In this motif, the sides extend further back than they do in motif S1f.

The axle is placed centrally and can be seen through the cockpit together with the draught pole. The draught pole extends from the rear end of the chariot to the yoke in the front, which connects to the necks of the horses. The yoke is represented by a straight line with curved endings past the necks of the horses. Further, the reins run from the mouths of the horses to the front of the cockpit. The horse-team is facing inward towards the draught pole, with ears, mouths, legs, and tails illustrated.

The wheels are aligned with the axle and carved using a single line. In similarity with motifs S1f and S1g, the single vertical spokes are aligned with the axle, alternatively the axle is depicted through the wheels. There might be some very faint lines depicting additional horizontal spokes as well, though this is not clear.

S1h Olivenza, Ba

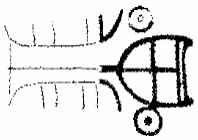

Figure 79. Drawing of chariot motif from the Olivenza stela, after Harrison 2004.

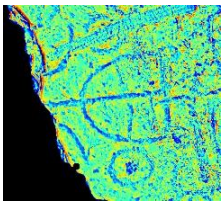

Figure 77. Visualization of chariot motif from the Olivenza stela, created using "ratopoviz" by Christian Horn 2021.

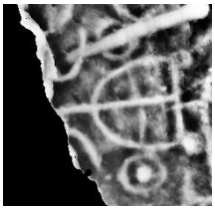

Figure 78. Visualization of chariot motif from the Olivenza stela, created using "ratopoviz" by Christian Horn 2021

The cockpit of this chariot has a D- or Ω-shape, with loop-shaped extensions in the rear. The sides and front are carved using a single line, and the draught pole together with the centrally placed axle can be seen through the cockpit. The two wheels are carved using a single line, with the hubs being represented using single dots in the middle of the wheel. Again, no spokes are clearly visible, although the bottom may have a few smaller traces of them. The upper wheel is obscured by damage to the stone.

The greater part of the horse-team is missing due to damage to the stone and we can only detect their presence by their tails, which are still visible. From the directions of the curved tails, we can deduce that the horses appear to have been facing outwards away from the draught pole.

S1i Olivenza, Ba

The C65b motif is more ambiguous than the others as there appear to be several re-carvings on top of each other, or possibly other unfinished carvings intersecting with the main lines. This chariot motif does not appear on Harrison but is visible in 3D documentation. It seems near identical to the other chariot motif on the Olivenza stele, S1ia. It is therefore possible that a re-carving of this motif was made in another location.

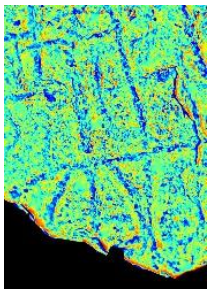

Figure 80. Visualization of chariot motif from the Olivenza stela, created using "ratopoviz" by Christian Horn 2021.

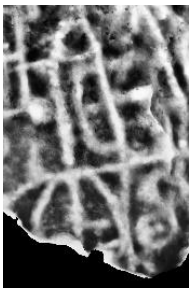

Figure 81. Visualization of chariot motif from the Olivenza stela, created using "ratopoviz" by Christian Horn 2021

S1j Orellana de la Sierra, Ba

The cockpit of motif S1j has an elongated D-shape and there appears to be two loop-shaped extensions in the rear. Unlike the previous motifs with this feature, the rear extensions of this chariot are placed vertically aligned to the rear backline. Presumably, this peculiarity can be contributed to the carver running out of space on the right side of the chariot. The sides and front of the cockpit are carved using a single line and the draught pole and axle are visible through the cockpit. The axle is situated in the centre of the cockpit and the wheels are on par with the axle. Similar to other motifs, the wheels

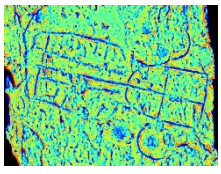

Figure 82. Visualization of chariot motif from the Orellana de la Sierra stela, created using "ratopoviz" by Christian Horn 2021.

are again carved using a single line, with the hubs being represented by single dots in the middle of the wheels.

The front section of the chariot motif is similar to that depicted in motif S1e. The draught pole connects the yoke to the necks of the horses. Two parallel reins connect the mouths of the horses, allowing the horses to form a continuous line from tail to tail. The tails also form an oval shape, and thus nearly connect the horses to the front side of the cockpit.

S1k Zarza Capilla I, Ba

Figure 84. Drawing of chariot motif from the Zarza Capilla I stela, after Harrison 2004.

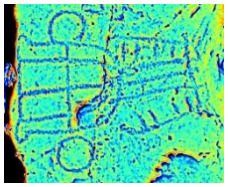

Figure 83. Visualization of chariot motif from the Zarza Capilla I stela, created using "ratopoviz" by Christian Horn 2021.

The sides of the chariot in motif S1k are carved using double lines that end in slightly outwards curving rear extensions. The lines illustrating the draught pole and axle cross in the centre of the cockpit and are both visible. The wheels are on par with the axle and are carved as single line circles without any further details visible. The draught pole connects to the yoke, which in turn connects to the necks of the horses. Two reins connect at the mouths of the horses and run parallel to the draught pole back to the front section of the cockpit. A very faint line also seem to connect the mouths of the horses, making them form a continuous line from tail to tail.

S1l Zarza Capilla III, Ba

Figure 86. Drawing of chariot motif from the Zarza Capilla III stela, after Harrison 2004.

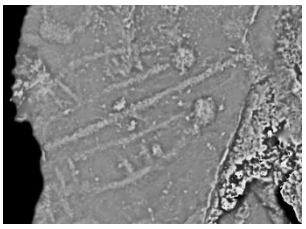

Figure 85. Visualization of chariot motif from the Zarza Capilla III stela, created using "ratopoviz" by Forall M. Embers 2021

The S1l motif has several unique features, and has a substantially different appearance than any of the previously described motifs. It is difficult to determine with any certainty what the details are intended to represent. A draught pole has been depicted, connecting to what presumably is an axle with loop shaped ends. Other details include horses and what feasibly may be reins. This motif is not at all comparable to any other Iberian or Scandinavian chariot motifs. Perhaps it is an unfinished carving, but this is difficult to determine. The front section of the motif has also been erased through damages to the stone.

S1m Tejera del Tietar El Calvario, CA

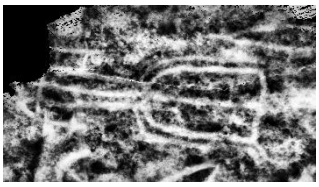

Figure 87. Visualization of chariot motif from the Tejera del Tietar El Calvario stela, created using "ratopoviz" by Ashely Green 2022.

The details of this motif are not clearly distinguishable. The cockpit has an elongated D- or Ω-shape, and the sides are carved using double lines, ending in outwards curving rear extensions. The draught pole is visible through the cockpit, but there is no visible axle or wheels.

Portions of the horse-team are missing due to damage to the stone, but it appears to form a horseshoe-like shape, with the horses connected by the mouths, similar to the horse-team in motif S1a. The reins run parallel to the draught pole and seem to extend to the inside the cockpit.

Possibly, there is a faintly carved bell shape inside the cockpit. However, this could also be the traces of an older chariot carving.

S1n Torrejon el Rubio I, C

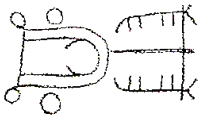

Figure 88. Drawing of chariot motif from the Toerrejón el Rubio I stela, after Harrison 2004.

Figure 89. Visualization of chariot motif from the Torrejon el Rubio I stela, created using "ratopoviz" by Christian Horn 2021.

The cockpit of motif S1n has an elongated D- or Ω-shape, with loop extensions in the rear. The sides and front are carved with double lines, the draught pole and axle is not visible through the cockpit. The wheels indicate a central position of the axle. The wheels are depicted as simple circles and carved with a single line. The 3D-documentaion indicates that there might be faintly carved spokes and hubs, however this is very difficult to determine.

The draught pole connects to the yoke, which connects at the heads of the horses. No reins are visible.

S1o Zarza de Montánchez, Ca

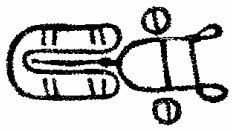

Figure 90. Drawing of chariot motif from the Zarza de Montánchez stela, after Harrison 2004.

Figure 91. Visualization of chariot motif from the Zarza de Montánchez stela, created using "ratopoviz" by Forall M. Embers 2021

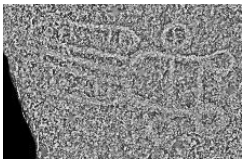

Figure 92. Visualization of chariot motif from the Zarza de Montánchez stela, created using "ratopoviz" by Forall M. Embers 2021

The cockpit has an elongated D- or Ω-shape, with two loop extensions in the rear. The sides and front are carved using a single line, the axle is placed in the centre of the cockpit, visible throughout. The wheels are aligned with the axle and carved using a single line.
The single vertical spokes are on par with the axle, alternatively the axle is depicted through the wheels. The spokes of the upper wheel are only faintly visible in the 3D-documentation.

The depiction of the draught pole, horse-team and reins differ between Harrison and the 3D-documentation. The dot on the draught pole close to the front of the chariot is not as apparent in the 3D-documentation. However, there may be a faint line connecting the back ends of the horses in its place.

There is also a faint line representing the yoke by the heads of the horses, that is not visible in Harrison. Also, instead of the reins connecting at both the horses' mouths and tails, the 3D-documentation seem to indicate that the reins in fact connect to the front section of the cockpit.

S1p El Viso IV, Co

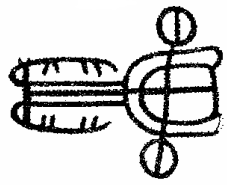

Figure 93. Drawing of chariot motif from the El Viso IV stela, after Harrison 2004.

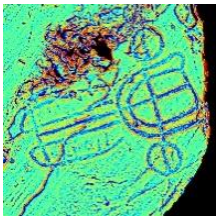

Figure 94. Visualization of chariot motif from the El Viso IV stela, created using "ratopoviz" by Christian Horn 2021.

This motif has some similarities with motif S1k. The cockpit has an elongated D- or Ω-shape. The sides are carved with double lines, ending in small, outwards curving rear extensions. The draught pole and axle can be seen through the cockpit. The axle is situated in the centre of the cockpit, and the wheels, carved using single lines, are on par with the axle. Though the wheels are aligned with the axle, the lower wheel is tilting slightly to the right and is slightly closer to the front than the upper wheel. Like 1f and 1g, the vertical spokes are in line with the axle, alternatively the axle is depicted through the wheels.

The draught pole connects to the yoke, which connects at the heads of the horses. Two reins parallel to the draught pole extends from the front of the cockpit to the mouths of the horses and form two continuous lines from the cockpit through the horses' heads to their tails.

T2, 3D-documentation of motifs not available

S2a Cabeza de Buey I, Ba

Figure 95. Drawing of chariot motif from the Cabeza de Buey I stela, after Harrison 2004.

In motif S2a, the cockpit has an elongated D- or Ω-shape, with large loop extensions in the rear end. The sides and front are carved using a single line and the axle is visible through the centre of the cockpit. The wheels, carved with a single line, have four spokes each and are aligned with the axle.

The draught pole is also visible through the centre of the cockpit and extends from the rear end of the chariot to the yoke on par with the necks of the horses. The horses are facing inwards and their mouths appear to be connected to the yoke in a similar fashion as in motif S1p. Though notably, no reins are visible parallel to the draught pole in this documentation. Both horses are depicted with ears, legs, and phallus.

S2b Fuente de Cantos, Ba

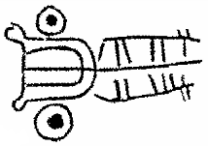

Figure 96. Drawing of chariot motif from the Fuente de Cantos stela, after Harrison 2004.

The cockpit has an elongated D- or Ω-shape. The sides are carved using double lines, ending in small, outwards curving rear extensions, similar to those of the chariot in motif S1k. The draught pole can be seen through the cockpit. The axle is not visible, but if conclusions can be drawn from the wheel placement, the axle is situated in the centre of the cockpit. The wheels are carved as single line circles with relatively large hubs in the middle, illustrated as dots.

The horse-team faces inwards and the yoke can be seen as short lines under the heads of the horses.

S2c Valdetorres II, Ba

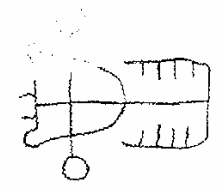

Figure 97. Drawing of chariot motif from the Valdetorres II stela, after Harrison 2004.

This motif is more simplistic than the previous. The cockpit has a D- or Ω-shape, with outward curving extensions in the rear. The upper left-hand side is missing due to damage to the stone (Harrison, 2004, pp. 260-261), yet it is visible that the sides and front are carved using a single line. The draught pole and the centrally placed axle can be seen through the cockpit. The wheels are depicted as single line circles with no hubs or spokes visible at all.

The draught pole connects to the yoke, which connects at the heads of the horses, which are faced inwards. The horses are portrayed with legs, but no ears, phalluses, or long tails are detectable. No reins are visible in this motif. Two smaller, slightly bent lines are pointing out in a backwards direction from the rear end of the cockpit. It is unclear what these lines are intended to represent, but they are unique as no similar lines are found in any of the other motifs.

S2d Quintana de la Serena, Ba

Figure 98. Drawing of chariot motif from the Quintana de la Serena stela, after Harrison 2004.

Although it is not obvious, motif S2d is a possible chariot depiction. It is not detailed enough to be comparable with either other Iberian or Scandinavian chariot motifs. It consists of a square with a horizontal line through its centre and a semicircle attached to the right-hand side of it, forming a D-shape. There are two large dots placed on the outer side of both the lower left corner and in the middle of the bottom line of the square. Although the horizontal line may represent a draught pole, and the semicircle may illustrate a part of a cockpit, these are only mere guesses, as this figure is too simplistic to draw any reliable conclusions from.

S2e Solana de Cabañas, Ca

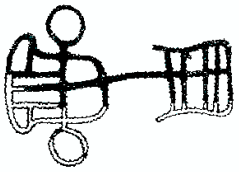

Figure 99. Drawing of chariot motif from the Solana de Cabañas stela, after Harrison 2004.

This depiction differs from the other motifs, as the sides and front of the cockpit are carved with a single line in front of the axle, and with double lines behind it. The lines illustrating the sides of the cockpit end in loop-shaped extensions. The axle is placed in the centre and the wheels are carved as circles without any detectable spokes or hubs. The lower parts of the motif are missing due to damage to the stone. On the original steles, there is a second pair of wheels and axle between the front of the chariot and the horse-team, which according to Harrison (2004, pp.218-220) are the results of previous failed carving attempts.

The axle and draught pole are visible through the cockpit. The draught pole extends to a line between the mouths of the horses, which likely represents the yoke or reins. The horses face inwards and so the draught pole, yoke and horses together form a continuous bell shapeThe upper horse is depicted with phallus, but there is no visible phallus on the lower horse.

S2f Valencia de Alcántara I, Ca

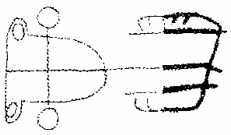

Figure 100. Drawing of chariot motif from the Valencia de Alcántara I stela, after Harrison 2004.

The greater part of this motif is missing due to damage to the stone. The steles has also been defaced at some point in time, as several thin lines are visible on its surface (Harrison, 2004, pp. 202-203). The only information that can be drawn from this motif in its current state is that it likely depicts a chariot as it has two horses with legs, facing towards each other, and they are connected through a vertical line that may be a yoke. There also appears to be a draught pole and two reins attached to the yoke, extending backwards, but they have unfortunately been completely interrupted by the damages.

S2g Valencia de Alcántara II, Ca

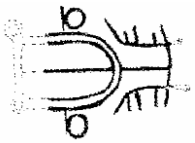

Figure 101. Drawing of chariot motif from the Valencia de Alcántara II stela, after Harrison 2004.

The rear part of this motif is missing due to damage to the stone. The sides and front are carved using double lines, at the sides may extend behind the cockpit, ending in loop-like shapes. The draught pole is visible through the cockpit, though the axle is not. There are lines on the outside of the cockpit, just behind the wheels, that presumably represent the axle. The wheels are carved as single line circles without any visible details such as spokes or hubs. The draught pole connects to a vertical line by the heads of the horses, likely representing the yoke. the horse-team is facing outwards and are each equipped with four legs and a tail. It is difficult to make out any details on their heads with any certainty, due to damages to the stone.

S2h Ategua, Co

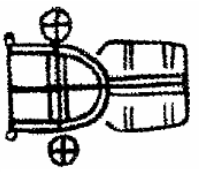

Figure 102. Drawing of chariot motif from the Ategua stela, after Harrison 2004.

The cockpit again has an elongated D- or Ω-shape and the sides are carved with double lines, ending in small, outwards curving loop-shaped rear extensions. The draught pole and axle can be seen through the cockpit, and are both situated in the centre of the cockpit, with two parallel lines on both sides of the axle. This may be an indication of a standing platform. The wheels are carved as single line circles with four spokes each.

The draught pole and two parallel lines, which may be reins, connect to the yoke by the mouths of the horses. This makes the horses form a continuous line from tail to tail, facing inward.

S2i El Viso I, Co

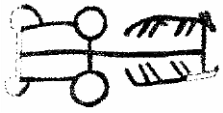

Figure 103. Drawing of chariot motif from the El Viso I stela, after Harrison 2004.

The design of this motif is unique in comparison to the previously described motifs. The cockpit is carved with single lines and in a square shape. The axle is placed at what appears to be the front wall of the cockpit, with the wheels depicted partly inside the cockpit as empty circles. At the rear end there seem to be loop extensions, but the very rear end is missing as the motif reaches the edge of the steles.

If the axle was truly placed just under the front wall of the cockpit, it would create a poor weight distribution of the chariot, as the weight of the driver would tip the cockpit backwards and lift the yoke upward, putting a large amount of strain on the horses' throats. It is likely that this rather is a mistake in the design of the motifs, or that the front of the cockpit is not depicted or visible.

The draught pole is visible through the cockpit, and it connects to a yoke on par with the heads of the horses. The horse-team is facing inward and the upper horse is depicted with two ears and a phallus.

S2j El Viso II, Co

Figure 104. Drawing of chariot motif from the El Viso II stela, after Harrison 2004.

There are three different interpretations of this motif in Harrison, which should be taken into consideration since there is no 3D-documentation available for reliable comparisons between them to be made. This is the latest version in Harrison.

The cockpit has an elongated D- or Ω-shape, with loop extensions in the rear. The sides and front are carved using a single line. The draught pole and axle are visible through the cockpit and are both placed in the centre. The wheels are carved as solid discs on the outside of the chariot, on par with the axle.

The draught pole extends from the rear to the yoke in line with the shoulders of the horses. the horse- team is facing outwards, the upper is depicted with phallus.

There are two parallel lines on either side of the draught pole connecting the front of the cockpit and the yoke.

S2k Carmona (Cuatro Casas), Se

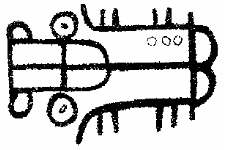

Figure 105. Drawing of chariot motif from the Carmona (Cuatro Casas) stela, after Harrison 2004.

The cockpit of the S2k motif has an elongated D- shape, with loop extensions on the sides of the rear section. The sides and front are carved using a single line, and both the axle and draught pole are visible through the cockpit and placed in the centre. The wheels are carved using a single line and are depicted without spokes but with a single dot in the centre, representing hubs.

The draught pole connects to the yoke, which in turn connects to the heads of the horses. What appears to be two reins extend from the yoke and connects to the horses' mouths. This forms a continuous line with the horses' bodies. While the legs of the horses portray them as being turned outwards from each other, the heads are either turned inwards, or are so small that they are indistinguishable from the yoke and reins. The horses have no visible ears or phalluses.

S2l Écija V, Se

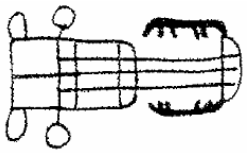

Figure 106. Drawing of chariot motif from the Écija V stela, after Harrison 2004.

The cockpit of this motif has a square D-shape and its front has two vertical lines between the axle and the front, which has not been found in any other motif. These lines are intersected by the draught pole and reins, creating an almost chequered pattern. It is hard to determine if this has any representational significance, or if it is merely an aesthetic choice. In the rear, the sides extend in loops.

The axle is visible through the cockpit and the wheels are depicted as empty circles, carved using a single line.

The draught pole extends from the rear end of the chariot to the yoke, which connects to the mouths of the horses. An arching line connects the mouths of the horses, likely representing the reins. The horse-team is facing inward and has legs but no visible ears of phalluses.

S2m Aldeanueva de san Bartolomé, To

The cockpit of the S2m motif is Ω-shaped with small loop extensions in the rear. The sides and front are carved using double lines, while the rear end is carved using a single, straight line. The draught pole and axle are both centrally placed and can be seen through the cockpit. The wheels are on par with the axle and are carved as single line circles without any visible details such as spokes or hubs.

There are no visible horses or reins in the motif, though this may be due to erosion of the stones surface (Harrison, 2004, pp. 228-229).

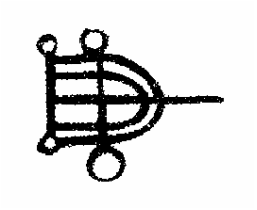

Figure 107. Drawing of chariot motif from the Aldeanueva de san Bartolomé stela, after Harrison 2004.

S2n Las Herencias I, To

The cockpit is Ω-shaped with the sides being carved using double lines, and ending in outwards curving loop extensions at the rear. The draught pole is visible through the cockpit, but the axle is not. Inferring from wheel placement, the axle is situated in the centre of the cockpit. The wheels are carved with double lines without any visible details such as spokes or hubs.

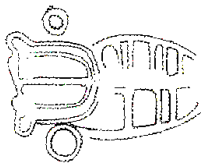

Figure 108. Drawing of chariot motif from the Las Herencias I stela, after Harrison 2004.

The head section of the horse-team, the draught pole, reins and yoke, are not visible due to damage to the stone. The horses are facing inward with the rear ends of the horses being connected to the cockpit.

S2o Talavera de la Reina, To

The cockpit of the S2o motif is square-shaped with rear loop extensions and is carved using single lines. The axle is visible through the cockpit, and the wheels are carved using single lines with spokes depicted as small crosses inside the wheels.

Figure 109. Drawing of chariot motif from the Talavera de la Reina stela, after Harrison 2004.

The front part of the motif is more difficult to distinguish and appears somewhat confusing. There seems to be a draught pole and parallel reins depicted, as well as an inward facing horse-team, although many details are not visible.

Chariot depictions

Although there are local differences in the way the chariots are depicted in Iberia, there are generally far more similarities than differences. Starting with the shape of the cockpit/box, they are with some few exceptions all shaped as an elongated D, or Ω, some fronts are more square-

shaped, although with rounded corners. The frame/sides of the box are depicted either with one single line, or two lines. The central pole is either shown as running from the yoke to the far back of the chariot, visible crossing the frame and axle, or in some cases just to the front of the box. Although most common the pole is represented by one line, in some cases there are three lines drawn between the chariot and the yoke, which could be interpreted in several ways. It is unlikely that they are representations of a second or third draught pole, since firstly they would not serve any practical purpose on a chariot drawn by two horses, and secondly only runs from the yoke to the front or middle the box, while the central line goes all the way to the rear. More likely is that they are either depictions of the reins, the yoke traces, or a pole brace, as seen in Aegean chariots (see fig. 110).

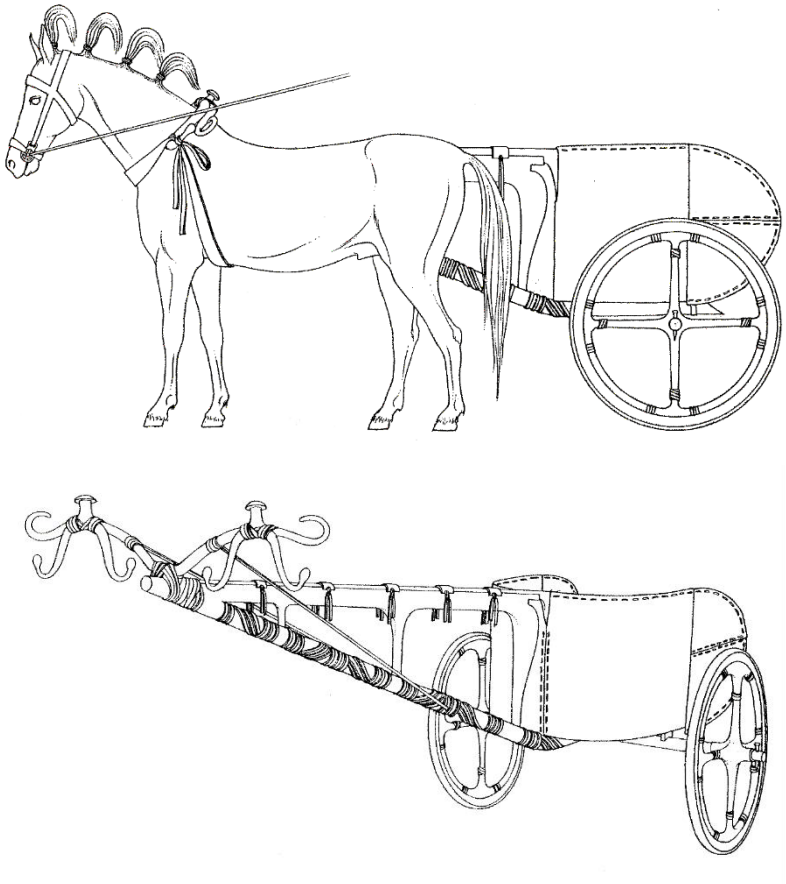

Figure 110. Drawing of Aegean chariot, after Crowel 1981.

The axle is almost always visible through the chariot, and is with very few examples always placed in in the centre of the box. The wheels differ to some degree between motifs, from being represented by simple empty circles to two or four spokes visible or with a simple dot in the middle representing the linchpin or solid engraved circles. When only two spokes are visible then they are in line with the axle.

Another detail depicted on almost all chariot-motifs are the rear extensions on the sides of the chariot, sometimes depicted as extended sides of the box, and sometimes as circular/semi-circular. One interpretation of the loops is that they are handles, to help mounting and dismounting of the chariot (Harrison, 2004, pp. 145-148), which is a feature that is common in

the Aegean chariots in later Geometric era (Quesada, 1994). If the loops on the chariots of the steles were directly inspired by the Aegean rail chariots, then this would push the dating of the Stele chariot motifs to a much later date (Ibid.). It is also possible though, that they are inspired by older Aegean chariots, which had rear wings extending the sides of the chariot behind the floor. Crouwel (1981, p. 67) suggests that since the rear wings of the older Aegean chariots were solid, without openings for handgrip, it is unlikely that they served as mounting aid. Instead their purpose was to serve as mudguards to protect the crew against stones and dust from the wheels. Since the knowledge of Aegean chariots also comes from iconography, it is perhaps unlikely that there is enough evidence of the functionality of the Aegean chariots to rule out that the rear wings could have been used as gripping aids in mounting and dismounting. Even if solid, it would have been possible to get enough grip from the wings frame to help in mounting the chariot. In that case it is possible that such rear wings possessed a double functioning as aid for mounting, and protection from dust.

It is hard to decide, based solely on iconography, whether the chariots on the Iberian steles had solid wing-extensions similar to the older Aegean chariots, or rail handles akin to chariots of the later Aegean Geometric period, although some motifs seem to indicate that some are solid continuous extensions of the sides (see fig. 83, 94). Even if they were looped, nonsolid handgrips, like the Geometric Aegean rail-chariots, it does not necessarily suggest that they were a later Iron Age import. It cannot be ruled out that they could be an Iberian adaptation of the older Aegean chariots with solid wings, which was perhaps more suitable to local needs.

Comparing chariot motifs of Frännarp and the Iberian steles

Projection

The mixed-top down projection is one of the most obvious visual similarities between the chariot motifs of the Frännarp panel and the Iberian steles. If this way of depicting a chariot was unique for Scandinavia and Iberia, it would almost be enough for assuming a connection between these motifs, but as previously discussed, this a strangely common mode of depiction, with a wide geographical spreading (Kristiansen & Larsson, 2005, p. 178; Olsen, 2017; Esin, et al., 2021). This fact makes any comparison between the Frännarp panel and the Iberian material require a much deeper analysis and comparison of details.

Wheels

All chariot motifs on the Frännarp panel are depicted with four spokes. Two of them, F1a and F1b, differ from the other motifs on the panel as they are depicted with hubs and negative spaces forming the hubs. Among the Iberian motifs with available 3D-documentation there are two motifs, S1d and S1h that may have faint lines representing four spokes, and four motifs; S1f, S1g, S1o and S1p, which has two spokes clearly visible. Three are depicted with only hubs; S1d, S1h and S1j. Among the motifs without 3D-documentation, three motifs are depicted with four spokes; S2a, S2h, and S2o, and no motifs are depicted with two spokes. Two motifs are

depicted only with hubs: S2b and S2k. The rest of the Iberian motifs have wheels depicted as empty circles, or other.

In Frännarp the way of depicting the wheels with four spokes seems to have been a crucial part of the chariot iconography, as it includes all motifs. This separates the wheels from the other chariot details, such as the cockpit, the horse team, or the rains, which shows much greater variety. This isn't the case on the Iberian motifs, however. Although there are some motifs depicted with four spokes, there is much greater variety in the way that the wheels are depicted. It is possible however that the spokes on some motifs have faded with time, as indicated by S1d and S1h.

Axle placement

Among the Frännarp motifs where the axle could be discerned, half of them had a centrally placed axle: F1a, F1b, F1c, F1d, F1f and F2f, while the other half had a rear placed axle: F1e, F2a, F2c, F2e, F2g and F2h (F2b and F2d are arguably not clear enough to determine). Except for those who could not be determined, all the Iberian motifs had centrally placed axles. Interestingly enough, all except one of the Tier 1 motifs on the Frännarp panel had centrally placed axles, while all except one of Tier 2 had them placed in the rear. If the Tier 2 motifs are less visible than Tier 1 because of erosion of the carvings, it may indicate that they are older. This could indicate a shift in style of chariots, where the rear placed axle represents an older form, more similar to the ones depicted on Södra Mellby 42:1 and Östra Tommarp 22:1. This would mean that the Tier 1 chariots are closer in style, but also chronologically to the Iberian chariots than Tier 2.

Cockpit

F1a.

There is no obvious correlate to the F1a motif among the Iberian motifs when it comes to the intricacy of the inner pattern inside the cockpit, although there are some Iberian chariots that are depicted with double line sides and front. Although none of the Iberian motifs can be said to closely resemble the shape of F1a, the closest in shape to motif F1a are the motifs S1d, S1f, S1g, S1k, S2e, and S2l, as they all have the same square Ω-shape. However, there are no other similarities between the cockpits.

F1b

The structure of this cockpit can be interpreted in two separate ways. Either the sides of the cockpit are represented by the lines between the wheels, or by the more faint diagonal lines in front of the wheels. If we assume that the inner, deeper carved lines are intended to illustrate the sides of the cockpit, motif F1b has an elongated Ω-shape that clearly resembles several of the Iberian motifs, the most similar arguably being motifs S1b, S2b, S2c, S2e, S2k, S2m, and S2n. There are also other Iberian motifs with more ambiguously Ω-shaped cockpits, where is not fully clear that they are intended to be Ω-shaped. These have been excluded from this comparison.

F1c

The cockpit of motif F1c is illustrated using double lines, and it has been equipped with a relatively pointed front. The lines representing the sides continue around the back end of the cockpit where they meet, in an uninterrupted line. There are few obvious correlates among the Iberian motifs for the rear end design of the cockpit, with exception for S2e, which also has the sides of the cockpit continuing to the back end and meet, in an uninterrupted line. The pointed front is mirrored in the Iberian motif S2m.

F1d

The F1d cockpit also has few similarities to the Iberian motifs. The rear end of the cockpit, with its curved extensions, is especially unique. The double lined square shape of the cockpit is most similar to the Iberian motifs S1d, S1f, S1g, S1k, S2e and apart from being double-lined, S2l.

F1e

With its single lined, very narrow and rounded cockpit, this motif is most similar to the Iberian S2a, S2j and S2k. They also share a more simplistic aesthetic, lacking any detail within the cockpit apart from the draught pole and axle.

F1f

Together with F2h, the cockpit of F1f has the most evident correlates in the Iberian material, although the Iberian motifs generally has more of an D-shape than the somewhat more curved Ω-shape of F1f. With its double lined sides, the F1f motif is most similar to S1d, S1k, S1p, S2b, S2h, and S2m. The Ω-shape is most clearly mirrored in the s1b, s1k, s2e, and s2b motifs.

F2a

The small, pointed D-shaped cockpit of motif F2a is rather unique in its small size. However, the pointed D-shape can be seen in several of the Iberian motifs S1h, S2c, and particularly S2m. D-shaped cockpits are generally common among the Iberian motifs.

F2b

Motif F2b is perhaps the most puzzling of the Frännarp motifs. The small and simplistic cockpit, that only consists of three lines including the axle, is not found among the Iberian motifs. The ambiguousness of details such as the front of the cockpit makes it unsuitable to make any certain comparisons with this motif. The front could either be represented by a faint curved line in front

of the previous three, or by the larger circular shape in front of the curved line. The two distinctive rear extensions are also not found in any other motif.

F2c

This motif is also so faint that any details are hard to make out, making it similarly unsuitable for comparison as motif F2b. However, it can be made out that the cockpit is clearly square, and drawn with a single line. This may make it closest correlating to motifs S1f, S1g, S2l, which are also square, and motifs S2i and S2o, which are square with single lines.

F2d

This motif fundamentally differs from all other motifs as it only consists of one wheel, and possibly horses. No cockpit is visible at all, which makes this chariot lack any correlates among both the Iberian and Frännarp motifs. This unique chariot is discussed in further detail in the discussion section below.

F2e

The cockpit of motif F2c is clearly square, making it similar in this aspect to the Iberian motifs S1f, S1g, S2i, S2l and S2o. Any other details of the cockpit are difficult to make out and are thus also difficult to use for comparisons. .

F2f

The cockpit of this motif is not visible enough for comparisons to be made. Like in motif F1e, the sides appear to be carved as straight lines, but any other details are impossible to distinguish with any certainty.

F2g

Because it is unclear exactly where the front of the cockpit is located, it is difficult to search for any correlates of this section among the Iberian motifs. However, it is possible that the front is square, which makes it akin to the S1f, S1g, S2i, S2l, and S2o motifs.

F2h

This cockpit is very similar in its distinctly curved Ω-shape and double lines to the cockpit in motif F1f. Together they are the Frännarp motifs with the most likeness to several of the Iberian motifs, in particular S1d, S1k, S1p, S2b, S2h, and S2m.

Draught pole, yoke and reins

Like the projection of the chariot motifs, details like the draught pole, yoke and reins are aspects which often are very similar between the motifs on the Frännarp panel and the Iberian steles. When the draught pole is visible through the cockpit of the chariot, it reaches to the furthest back of the chariot in almost all cases of the Iberian motifs, while it varies among the Frännarp motifs. When depicted, the reins are most commonly shown as straight lines parallel to the draught pole, both in the Iberian material and Frännarp.

The placement of the yoke is sometimes hard to determine both in the Iberian material and on the Frännarp and seems to be more inspired by artistic freedom than real life. In both materials, the most common placement of the yoke is at the head of the horses, as in F1a, F1b, F1fS1a, S1b, S1f, S1k, S1n, S1p, S2a, S2b, S2c, S2f, S2h, S2i, S2k, S2l, while the more likely and practical placement, the front of the shoulders, as in F1d, F1e,S1d, S1g, Slj, S2g, S2j, are fewer.

Horses

Both the Iberian material and the Frännarp motifs have horse teams depicted turned towards the draught pole and outwards. When it comes to details, they tend to vary from motif to motif, some showing the ears of the horses, while others don't, the shape of the body varying. No real trend can be distinguished between the Iberian material and Frännarp.

Some notable examples are F1a and F1f, where the horses form a bell shape, their tails connecting. This closely resembles S1a and S2e, although inverted, the horses connecting at the mouths instead.

Rear extensions

This may be one of the most crucial details when comparing the motifs from Frännarp and the Iberian steles. Many of the forementioned characteristics of the chariot motifs, such as the mixed-top down projection, the inward or outward facing horse-team, reins, draught pole etc. do also occur in wildly different regions throughout the Eurasian continent (Kristiansen & Larsson, 2005, p. 178; Olsen, 2017; Esin, et al., 2021). The rear extension details, however, is much less common, if not non-non existing in other contemporary chariot motifs. Thus, it is important to focus on this detail in particular.

As mentioned earlier, there are some different explanations on what the extensions on the Iberian chariot motifs represent, one being handles, to help in mounting and dismounting of the chariot, a presumption based on similar details on depictions of Aegean chariots (Harrison, 2004, pp. 145-148). Crouwel (1981, p. 67) suggests that since the rear wings of the older Aegean chariots are solid, without openings for handgrip, it is unlikely that they served as mounting aid, rather their purpose was to serve as mudguards. It is possible that this explanation is applicable to the Iberian chariots as well, although it is not impossible that the extensions functioned as both.

Although they differ somewhat in shape, many of them for instant could be described as loops, it is reasonable to assume regardless of their function, that they are meant to represent an extension, or ending of the sides of the cockpit (see for example Crowel's illustration of an

Aegean chariot, fig. 110). This is especially apparent in some of the Iberian motifs such as S1d, S1f, S1g, S1k, S1p and S2n.

With this perspective it is possible to interpret and compare the rear extensions of the Frännarp chariot motifs. Although not all described chariot motifs on the Frännarp panel clearly depicts rear extensions, most of them have in some form, although the shape differs from motif to motif. There strictly speaking only two motifs on the Frännarp panel who has clear parallels in the Iberian material regarding the rear extensions; F1f and F2H. Similar to these among the Iberian material are S1k, S1p, S2b, S2h, S2m and S2n, but arguably also S1d, S1f and S1g. The most important similarity is that the extensions are represented as continuations of the sides, which, although not completely identical in form, most likely represents the same iconographic function. If we accept the premise that the rear extensions on F1f and F2H has the same iconographical function as the discussed Iberian motifs, and we accept that the rear extensions on the Iberian motifs are representing the endings of the sides of the cockpit, it is reasonable to assume that it is highly probable that all, or most of the rear extensions on the Frännarp motifs are meant to represent this as well.

Discussion

It is clear that there is a strong case to be made in favour of the chariot motifs of Södra Mellby 42:1 and Östra Tommarp 22:1 to be directly related, meaning that one of the motifs inspired the other. Not only visual details, but also composition and position of the motifs show similarities to a degree that other chariot motifs do not. The contexts surrounding Södra Mellby 42:1 and Östra Tommarp 22:1 also speaks in favour of the motifs being related, as they are found in similar funerary and iconographical contexts. One of the strongest indications of a relation between these motifs is the geographical proximity of the two locations. The proximity of less than 20 kilometres from one site to the other makes it highly likely, if not guaranteed, that the people living there were in regular contact with each other. The final indication of a relationship between the motifs is that both of them appear to have been accessible for several hundred years. The stone at Östra Tommarp 22:1 is laying openly on the ground (Winther Johannsen, 2013), and osteological data shows that the grave at Mellby 42:1 was opened for reburial on several occasions (Goldhahn, 2009).

A possible explanation to why the creation of one chariot motif was inspired by the other could be that the older motif carried a strong enough symbolism and recognition for the local population that it was considered worthwhile to imitate, or "transfer" the motif to the next location in the creation of the new carvings. As the other surrounding motifs differ between Mellby 42:1 and Östra Tommarp 22:1, it is possible that the two panels as a whole tell different stories, although the chariot may itself illustrate a similar concept in both panels. Another possibility is that the similarity of the collection of motifs for some reason was not so important, or that they couldn't be modified for the purpose of the story being told.

As previously mentioned, experiments with replicas of Early Iron Age boats have shown that the ships that were used in the Late Bronze Age were highly seaworthy and effective, potentially reaching speeds of up to 100 km per day (Crumlin-Pedersen, 2003; Vinne, 2003). Based on these estimates, Late Bronze Age sea farers would have been able to travel between Southwest Iberia and Southern Sweden in just a matter of a few weeks. Using chemical and isotopic sourcing, scholars has also shown that during the Late Bronze Age, there was a great influx of Iberian copper in Scandinavia. At the same time as there was an increase of Baltic Amber in Southwest Iberia (Ling, et al., 2014; Ling & Uhnér, 2015; Ling & Koch, 2018). These findings strongly indicate a trade relationship, likely by sea, between the two regions.

Another indication of intensive interactions between individuals from Scandinavia and Iberia comes from Cliff's End on the Isle of Thanet, in south-east Britain (McKinley, et al., 2014). Researchers have interpretated this location as an important centre of trade during the Late Bronze Age and early Iron Age. Among other things, the material support for this interpretation includes finds of bun ingots and Baltic amber (McKinley, et al., 2014; Ling & Koch, 2018). Furthermore, human bones have been found at the site, and when running strontium and oxygen isotope analysis, the data identifies signatures that are consistent with both the local population and individuals descended from Scandinavian and West-Mediterranean geology (Ibid.). Moreover, Cliffs End is also situated in a h strategical position for maritime trade between the Scandinavia, South-west Iberia, and the tin mines in Wales (Ling & Uhnér, 2015).

Since there is significant evidence that produce has been moved between these areas, and we know that it was highly possible to travel these distances in a relatively short amount of time, it is only logical to suppose that people have also moved between the areas. It would therefore seem reasonable to assume that ideas of iconographic details would imprint on, and be exchanged and incorporated by, the people who saw those motifs with their own eyes. However, if this assessment is correct, and the details of the chariot motifs indeed do indicate a direct contact between individuals connected to Fränarp and the Iberian steles, as a result of members of this trading- and warrior community coming in contact with the chariot motifs abroad, there are some further questions that need to be taken into consideration.

It seems apparent that the goal of the iconographical similarities was not merely to copy motifs, as it would probably not have been very difficult to achieve a much more similar copy if that was considered important. Rather, it appears that it was the common idea of *how* a chariot is depicted, with aspects such as the angle of projection and so forth, and which constructional details to include, that was considered most important. The selection of visual aspects that were carried over from motif to motif rather appear to have focused on including aspects related to the chariots function and symbolic meaning, such as the wheels and horses- *speed*, reins- *control, or dominion over the horse, and by extension others*, cockpit- *mean of movement* etc.

Regarding other motifs associated with the chariot motifs, there are certainly many similarities that could indicate contact and iconographic exchange between Scandinavia and Iberia. Among these, the horned warrior figures, and certain distinct poses and hand gestures have strong visual similarities between Scandinavian and Iberian rock art (Ling & Uhnér, 2015; Ling & Koch, 2018). The Fränarp panel, however, does not include any clearly distinguishable other types of motifs than the chariots themselves, which greatly contributes to the panel's uniqueness in a Scandinavian context, but makes it harder to relate to other motifs based on surrounding images.

This leads us to the question of the function of the carving sites and the chariot motifs. First of all, it is important to remember that the Fränarp panel consists of one context, it is made in a single location. While the motifs on the Iberian steles come from several different contexts, geographically speaking. If we combine this point with the composition of motifs and spatial relation to the landscape, there are certainly indications that the Iberian steles and the Fränarp panel might have had different functions. The Iberian steles have a composition consisting of prestige objects and weapons, and sometimes including a central human figure (Harrison, 2004). The Fränarp panel, on the other hand, only depicts chariots. Thus, when we compare the Iberian steles with the Fränarp panel, there seems to be distinct differences in the iconographical message that is communicated. At the very least, the two regions have significantly different ways of communicating similar messages. Most scholars agree that the Iberian steles most likely served some kind of funerary purpose, possibly marking the prestige of a specific individual and their connection to the nearby land and communities (Harrison, 2004; Sanjuán, 2012; Díaz-Guardamino, et al., 2019).

It is more difficult to draw similar connections regarding the motifs of the Fränarp panel. It is very hard to identify any depiction of an individual through the busy pattern of dozens of chariot motifs covering the panel. Although it is of course possible that the individual chariots are intended to represent a specific deceased individuals, or their personal vehicles either in this life or the afterlife. Coles (2002) carefully speculates about this possibility, noting the differences in the design of the chariot motifs at Fränarp might represent artistic differences

in specific real-life chariots. Coles (2002) also notes that the number of major chariot motifs on the panel corresponds to the number of major burial monuments in the vicinity, although this speculation is of course unsubstantiated.

In some ways the Iberian steles seem to have a function closer in similarity to the stone of Östra Tommarp 22:1, as both the steles and the stone have a more direct association to a single funerary context which they mark above ground. The Frännarp panel, however, seems to rather have a connection to the local communities, and is more resembling the steles, as it is placed at a geographical crossroad (Coles, 2002; Díaz-Guardamino, et al., 2019).

The Iberial steles reflect a sense of importance in representing a specific individual, connected to their closest community, as a way of claiming their rights to the land (Díaz-Guardamino, et al. 2019). In Frännarp, on the other hand, it appear to have been regarded important that each community warrior or leader-figure was represented on the Frännarp panel, as a way of establishing their role as a part of the greater community. This would have given the Frännarp panel a more communal focus.

As for the function of the Frännarp panel, there might be an explanation of the symbolic meaning of the chariot motifs in the motif F2d. This motif, and perhaps two other similar carvings, differ a great deal from the other chariot motifs on the Frännarp panel. The main difference being that it has one single wheel-cross with another concentric circle between the centre and outer circle in the rear of the chariot, which the other chariots do not have. It is also, unlike the other chariot motifs, traveling in an upwards direction on the sloping panel. I argue that this motif shares several significant characteristics with Bronze Age solar iconography, take for example the specific way that the wheel is depicted, as a cross in circle. Additionally, the Bronze Age cosmology commonly understands the sun as being drawn by one or more horses (Kaul, 1998; Franck Bican, 2004; Milstreu & Dodd, 2018) (see fig. 111 below).

Figure 111. Upper left: rock carving from Fossum, Upper right: Trundholm chariot, courtesy of Underslös Museum. Lower left: Tracing of rock carving at Svarteborg 9:1, by Torsten Högberg 1974. Lower Right: Carving on a bronze razor from Neder Hvolris, Photo by John Lee, Danish National Museum.

As the details of motif F2d are a bit unclear, any assumptions of its meaning must be made with caution. A second possible interpretation of F2d, is that it is not a chariot, but rather a “sun stand”. This object has corelates both in archaeological record in the form of a bronze holder with an inlaid amber disc found in Denmark, and in Swedish rock *carvings* (see fig. 112 and 113).

Figure 112. Photo of bronze holde with amber disc, by Jesper Weng, Danish National Museum

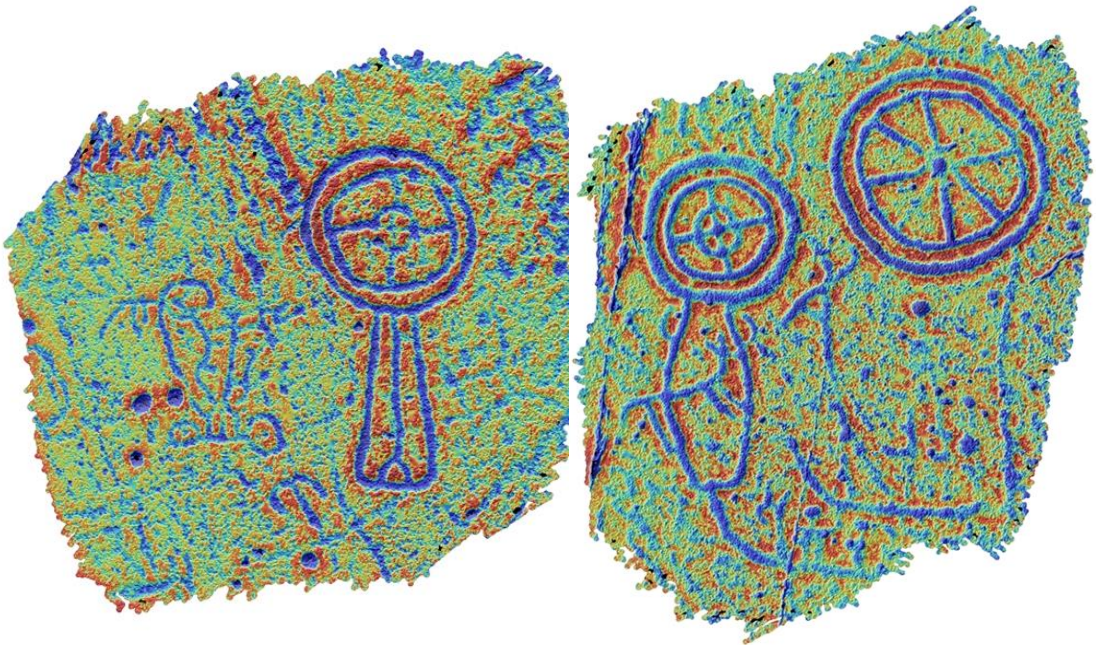

Figure 113. 3D-images of rock carvings from Backa, Bohuslän, by Meijer, Horn and Ivarson.

The similarities to F2d are indeed compelling and may strongly indicate that it should be interpreted in the same way but does not necessarily mean that it is not meant to represent a chariot. As previously mentioned, there is an established connection between the cosmological sun and horses (Kaul, 1998; Franck Bican, 2004; Milstreu & Dodd, 2018). If the “sun stand” is an object meant to represent the cosmological sun, it is a representation of the Bronze Age peoples concept of the sun, which was believed to be drawn by a horse. Note that the sun stand motifs on the Backa carvings are also in close connection to a chariot and horses (see fig. 107).

It is possible that F2d could be either a sun-chariot or a sun stand, but either way it strongly indicates that it is a representation of the cosmological sun.

If we interpret F2d as a representation of the sun, then the Fränarp panel needs to be perceived from a cosmological viewpoint, since it then contains religious imagery next to the political connotations of a collection of real-life chariot representations.

There are several ways of interpreting the other Fränarp chariot motifs using this perspective.

The chariot motif may in fact be a representation of a real-life chariot, and by carving the motif into the panel which has this connection to this solar imagery, the owner of the chariot shows their connection to the sun, or how they as chariot drivers represents the sun.

Another possibility is that the chariot motifs and the direction in which they are facing represents different stages of the sun cycle, in line with the theory of Kaul (1998), as previously discussed on Södra Mellby 42:1 and Östra 22:1. The chariot motifs that are facing downhill are representations of the sun travelling to or through the underworld at night, while the upwards traveling, one-wheeled motifs represent the sun rising.

This would however not explain the large discrepancy between the number of downward-facing chariot motifs in relation to upward-facing ones. A funerary aspect may be applied to explain this, which would also connect the Frännarp panel to the respective discussions on Södra Mellby 42:1, Östra Tommarp 22:1, and the Iberian steles.

As previously discussed, there are arguments to be made that the chariot motifs and their surrounding imagery on Södra Mellby 42:1 and Östra Tommarp 22:1 likely include cosmological iconography (Kristiansen & Larsson, 2005; Winther Johannsen, 2013). This would mean, although hardly surprising, that cosmology and cosmologically symbolic iconography is closely connected to funerary practises and contexts. Furthermore, a possible interpretation of the Frännarp panel would then be to see the chariot motifs as a depiction of funerary processes in some way connected to the cosmological cycle of the sun. The chariot motifs could be seen as representations of deceased individuals on their chariots, traveling downwards towards the underworld, following the journey of the sun at night, and is reborn with the sun as it rises, depicted as the singular-wheeled vehicle facing upward.

Discussing the Iberian material and Frännarp panel in relation to Södra Mellby 42:1 and Östra Tommarp 22:1 there are some significant differences. Both Södra Mellby 42:1 and Östra Tommarp 22:1 are believed to have been created earlier than the Iberian motifs, Södra Mellby 42:1 being dated to Nordic Bronze Age Period I-II, around 1600-1400 BCE (Kristiansen & Larsson, 2005; Bertilsson, et al., 2017) or 1400-1300 BCE (Goldhahn, 2013) and Östra Tommarp 22:1 Nordic Bronze Age Period II, around 1400-1300 (Winther Johannsen, 2013). The Iberian material is dated to the Final Iberian Bronze Age, 1300-900 BCE (Harrison, 2004; Lull, et al., 2013), which is also the period when contacts between Iberia and Scandinavia would have been most intensive, as seen by the exchange of Iberian bronze and Baltic amber (Ling, et al., 2014; Ling & Uhnér, 2015; Ling & Koch, 2018).

Several aspects of the chariot motifs from Södra Mellby 42:1 and Östra Tommarp 22:1 differ from the Iberian material, such as the side-view perspective, the lack of emphasis on the cockpit and the rear position of the wheels. The position of the wheels is more similar to those seen on depictions of Near Eastern chariots, which may speak in favour of Kristiansen & Larsson (2005), who propose that there are Hittite connections to the iconography of Södra Mellby 42:1.

This would strengthen the theory that the iconographical similarities in Iberian and Scandinavian chariot motifs correlates with increased contacts and trade between the regions in Period IV-V, as these similarities do not seem to appear in the earlier material from Södra Mellby 42:1 and Östra Tommarp 22:1.

We can now begin to make out a potential chronology of the iconography of chariot motifs: There was a tradition of depicting chariots in funerary contexts in Scandinavia since at least period II, as evident by the carvings at Södra Mellby 42:1 and Östra Tommarp 22:1. This iconography, possibly influenced by contacts with Anatolia, and the spread of institutions such

as divine aristocracies (Kristiansen & Larsson, 2005), also had a cosmological symbolism connected to the daily journey of the sun (Winther Johannsen, 2013).

As contacts and trading increased between Scandinavia and Iberia in the Late Bronze Age, a network of traders and warriors along the Atlantic coast was established, their common ideals and identity manifested in a set of objects and concepts (Ling, et al., 2014; Ling & Uhnér, 2015; Ling & Koch, 2018). Among these were the chariot as an important prestige object, which at this time were most likely inspired by the centrally axled Aegean chariots (Quesada, 1994; Harrison, 2004). As the chariot became an important object of prestige and warrior identity, it was added to the panoply of objects depicted on the funerary Iberian steles in the Late Bronze Age (Harrison, 2004, pp. 148-149) and incorporated in the toolset of symbols of identity of the Atlantic warrior community. The iconographic details of the chariot motif being formed through the contacts between Scandinavia and Iberia, reaching a similar iconographical language.

This similar language was mainly present in iconographical detail, with the main function of communicating prestige and identity, but also for its funeral connotation, as the use of the chariot motif came to be adopted into local traditions and circumstances. In Iberia, the chariot motif would be included in an iconographic practice with a long tradition of standing stones as funerary- as monuments, stretching back to Neolithic time in Iberia (Sanjuán, 2012), showing the prestige of a deceased individual. In the case of Fränarp, the shared iconography would be adopted into a long history of chariot motifs in funerary contexts with strong cosmological symbolism connected to the solar cycle and political rulership. This may also explain why there is a greater emphasis on depicting the spokes on the Fränarp motif, than on the Iberian motifs, as the wheel-cross has been identified as a common symbol for the sun during the Bronze Age (Winther Johannsen, 2011).

In Conclusion

In this dissertation, I have analysed and compared chariot motifs on Bronze Age rock carving from three locations in Southern Sweden, Södra Mellby 42:1, Östra Tommarp 22:1 and the Fränarp panel, and compared this material to the chariot motifs on the Southwestern Iberian warrior steles. This with the purpose to answer the following research questions:

1. Are the motifs ***visually similar*** enough to assume a connection of long-distance cultural exchange?
2. Do the ***contexts*** of the motifs suggest that contact was possible or even probable?
3. What was the ***meaning and function*** of the chariot motifs and their surrounding iconography, and are there similarities between the different locations in that regard?

4. If the answers to questions 1-3 above indicate that the iconography of the chariot motifs were impacted by contacts between Iberia and Scandinavia, ***what was the nature of this contact, and how was it expressed in rock art****?*

To achieve this, I applied a method of comparative iconographical analysis, which was then put in juxtaposition to the results of a comparative analyses of the contexts of the motifs.

The theoretical framework builds primarily upon different bodies of earlier research, the first being Kristiansen & Larsson (2005), which has studied the forces and mechanics behind interaction and cultural exchange during the Bronze Age, building a theoretical framework which focuses on interactions through the lense of the transmission and transformation of institutions, by searching for the common symbols which follows them. The second being primarily Ling & Uhnér (2015) and Ling & Koch (2018), which has argued for the existence of a network of traders and warriors along the Atlantic coast during the Late Bronze Age. The ideals of this warrior society would manifest in common iconography and symbols on rockart, chariot motifs being one of those symbols.

An account on the historical, geographical and technical contexts surrounding the Bronze Age chariots was given, aswell as an description of rock art in general and the specific material. I then proceded with an analysis of the iconographical details of each motif, starting with Södra Mellby 42:1, Östra Tommarp 22:1 and the Frännarp panel, after which I continued with the Iberian motifs.

After analysis followed discussion, where first Södra Mellby 42:1, Östra Tommarp 22:1 was compared to each other and discussed. The conclusions drawn from this was that the visual aspects and context surrounding these motifs suggests that it very likely that a direct connection can be drawn between these motifs.

After this the chariot motifs of the Frännarp panel were compared to the Iberian motifs, starting with the iconographical aspects of the motifs. Afterwards a discussion followed around the context surrounding the material, concluding that it is likely that the iconography of the chariot motifs was influenced by each other as a result of the ideological interchange taking place through the intensive trade contacts between Scandinavia and Iberia. However, although the analysis and comparison reached the conclusion that the chariot motifs of Frännarp and Iberia had similarities in iconography as an object of prestige and elite- warrior identity, as well as having a funerary function, their symbolism was deployed in different ways, adopted to local customs.

Finally, the chariot motifs of Södra Mellby 42:1 and Östra Tommarp 22:1, were compared to the chariot motifs of Frännarp and Iberia. The following discussion concluded that the motifs of Södra Mellby 42:1 and Östra Tommarp 22:1 did share similarities as funerary functions, but no iconographical details. This spoke in favour of the hypothesised impact of the contacts between Scandinavia and Iberia on Scandinavian chariot motifs, as the motifs on Södra Mellby 42:1 and Östra Tommarp 22:1 most likely preceded these contacts. However, the local customs of cosmology in funerary context prevalent at Södra Mellby 42:1 and Östra Tommarp 22:1 may have still been present at the time of the creation of the Frännarp motifs, evident by possible cosmological sun iconography among the chariot motifs. This could explain some of the differences in how chariot imagery was used between Frännarp and Iberia. This discussion also

led to a suggestion of a funerary interpretation for the symbology of the Fränarp panel, connecting the images to the cosmological journey of the sun, the chariots representing the deceased owner descending to the underworld, being reborn with the rising sun.

References

Almgren, O., 1927. *Hällristningar och kultbruk : bidrag till belysning av de nordiska bronsåldersristningarnas innebörd.* Stockholm: Wahlström & Widstrand.

Althin, C.-A., 1945. *Studien zu den bronzezeitlichen Felszeichnungen von Skåne.* Gleerup: Lunds Universitet.

Anderson, H., 2016. Chariots in Saharan rock art: An aesthetic and cognitive review. *Journal of Social Archaeology,* 16(3), p. 286–306.

Bertilsson, U. o.a., 2017. The Kivik tomb: Bredarör enters into the digital arena - documented with OLS, SfM and RTI. i: S. Bergerbrant & A. Wessman, red. *New perspectives on the Bronze Age : proceedings of the 13th Nordic Bronze Age Symposium held in Gothenburg 9th to 13th June 2015.* Oxford: Archaeopress Archaeology, pp. 289-305.

Chechushkov, I. V. & Epimakhov, A. V., 2018. Eurasian Steppe Chariots and Social Complexity During the Bronze Age. *Journal of World Prehistory,* Volume 31, p. 435–483.

Coles, J., 2002. Chariots of the Gods? Landscape and Imagery at Frännarp, Sweden. *Proceedings of the Prehistoric Society,* Volym 68, pp. 215-246.

Coles, J., 2005. *Shadows of a Northern Past. Rock Carvings of Bohuslän and Østfold.* Oxford: u.n.

Crouwel, J. H., 1981. *Chariots in Bronze Age Greece.* 3 ed. Amsterdam: Allard Pierson Series.

Crumlin-Pedersen, O., 2003. The Hjortspring Boat in a Ship-Archaeological Context. i: O. Crumlin-Pedersen & A. Trakadas, red. *Hjortspring: A Pre-Roman Iron-Age Warship in Context. Ships and Boats of the North 5.* Roskilde: Viking Ship Museum, pp. 209-232.

Díaz-Guardamino, M., García Sanjuán, L., Wheatley, D. & Rodríguez Zamora, V., 2015. RTI and the study of engraved rock art: A re-examination of the Iberian south-western stelae of Setefilla and Almadén de la Plata 2 (Seville, Spain). *Digital Applications in Archaeology and Cultural Heritage,* 2(2-3), pp. 41-54.

Díaz-Guardamino, M. et al., 2019. Rethinking Iberian ‘warrior’ stelae: a multidisciplinary investigation of Mirasiviene and its connection to Setefilla (Lora del Río, Seville, Spain).. *Archaeological and Anthropological Sciences,* 11(11), pp. 6111-6140.

Díaz-Guardamino, M. o.a., 2019b. Late Prehistoric Stelae, Persistent Places and Connected Worlds: A Multi-disciplinary Review of the Evidence at Almargen (Lands of Antequera, Spain). *Cambridge Archaeological Journal,* 30(1), p. 69–96.

Díaz-Guardamino, M. & Wheatley, D., 2013. Rock Art and Digital Technologies: The Application of Reflectance Transformation Imaging (RTI) and 3D Laser Scanning to the Study of late Bronze Age Iberian Stelae. *MENGA. REVISTA DE PREHISTORIA DE ANDALUCÍA = JOURNAL OF ANDALUSIAN PREHISTORY,* Volym 4, pp. 187-203.

Earle, T. & Kristiansen, K., 2010. Introduction: Theory and Practice in the Late Prehistory of Europe. In: T. Earle & K. Kristiansen, eds. *Organizing Bronze age societies : the*

Mediterranean, Central Europe, and Scandinavia compared. New York: Cambridge University Press, pp. 1-33.

Esin, Y., Magail, J., Gantulga, J.-O. & Yeruul-Erdene, C., 2021. Chariots in the Bronze Age of Central Mongolia based on the materials from the Khoid Tamir river valley. *Archaeological Research in Asia,* Volume 27, p. 100304.

Feldman, M. H. & Sauvage, C., 2010. Objects of Prestige? Chariots in the Late Bronze Age Eastern Mediterranean and Near East.. *Ägypten und Levante,* Volume 20, pp. 67-181.

Fernstål, L., 2003. Where Different Waters Met, Aspects on the Apollo Grannus vase and its position near Sagån in the province of Västmanland. *Current Swedish Archaeology,* Volym 11, pp. 25-44.

Franck Bican, J., 2004. Helleristninger og Realia. i: G. Milstreu & H. Prøhl, red. *Prehistoric Pictures as Archaeological Source = Förhistoriska bilder som arkeologisk källa.* Tanumshede : Göteborg:: Tanums hällristningsmuseum ; Institutionen för arkeologi, Göteborgs universitet., pp. 179-190.

Fredell, Å., 2004. To let the Pictures Talk- Possibilities and limitations in the interpretation of prehistoric figurative rock art. i: G. Milstreu & H. Prøhl, red. *Prehistoric Pictures as Archaeological Source = Förhistoriska bilder som arkeologisk källa.* Tanumshede : Göteborg: Tanums hällristningsmuseum ; Institutionen för arkeologi, Göteborgs universitet., pp. 137-148.

Friedman, J., 1995. *Cultural ldentity and Global Process.* London,: Thousand Oaks & New Delhi.

Goldhahn, J., 1999. *Sagaholm. Hällristningar och gravritual.* Umeå: u.n.

Goldhahn, J., 2007. Dödens hand—en essä om brons- och hällsmed. *Gotarc Serie C (Gothenburg Archaeological Theses),* Volym 65.

Goldhahn, J., 2009. Bredarör on Kivik: a monumental cairn and the history of its interpretation. *Antiquity,* 83(320), pp. 359-371.

Goldhahn, J., 2013. *Bredarör på Kivik – en arkeologisk odyssé.* Simrishamn: Artes Liberales.

Goldhahn, J. & Ling, J., 2013. Bronze Age Rock Art in Northern Europe: Contexts and Interpretations. i: H. Fokkens & A. Harding, red. *The Oxford Handbook of the European Bronze Age.* u.o.:Oxford University Press.

Hansson, M., 2006. *Aristocratic Landscape : The Spatial ideology of the Medieval Aristocracy.* Lund Studies in Historical Archaeology; Vol. 2 red. Lund: Lund University.

Harding, A., 2018. Bronze Age encounters: Peaceful or violent?. i: C. Horn & K. Kristiansen, red. *Warfare in Bronze Age Society.* Cambridge: Cambridge University Press, pp. 16-22.

Harrison, R. J., 2004. *Symbols and warriors : images of the European Bronze Age.* Bristol: Western Academics & Specialist Press Limited.

Horn, C., 2018b. Die by the sword … or the spear? Early bronze weapons in Scandinavia. i: M. Fernández-Götz & N. Roymans, red. *Conflict Archaeology : Materialities of Collective Violence from Prehistory to Late Antiquity.* London: Routledge, pp. 51-60.

Horn, C., 2018. Warfare VS. Exchange? Thoughts on an Integrative Approach. i: C. Horn & K. Kristiansen, red. *Warfare in Bronze Age society.* New York: NY: Cambridge University Press, pp. 47-60.

Horn, C. o.a., 2021. Artificial Intelligence, 3D Documentation, and Rock Art—Approaching and Reflecting on the Automation of Identification and Classification of Rock Art Images. *Journal of Archaeological Method and Theory,* Volym 29, pp. 188-213.

Horn, C. & Kristiansen, K., 2018. *Warfare in Bronze Age society.* New York: NY: Cambridge University Press.

Horn, C., Ling, J., Bertilsson, U. & Potter, R., 2018. By All Means Necessary – 2.5D and 3D Recording of Surfaces in the Study of Southern Scandinavian Rock Art. *Open Archaeology,* 4(1), pp. 81-96.

Horn, C., Pitman, D. & Potter, R., 2019. An evaluation of the visualisation and interpretive potential of applying GIS data processing techniques to 3D rock art data. *Journal of archaeological science, reports,* Volym 27.

Horn, C. & Potter, R., 2018. Transforming the Rocks – Time and Rock Art in Bohuslän, Sweden. *European journal of archaeology,* 31(3), pp. 361-384.

Iversen, R., 2017. Big-Men and Small Chiefs: The Creation of Bronze Age Societies. *Open archaeology,* 3(1), pp. 361-375.

Kaul, F., 1998. *Ships on bronzes. A Study in Bronze Age Religion and Iconography.* Copenhagen: Publications from the National Museum, Studies in Archaeology & History 3, 1–2.

Kaul, F., 2004. *Bronzealderens religion : studier af den nordiske bronzealders ikonografi.* København: Det Kongelige Nordiske Oldskriftselskab.

Kristiansen, K. & Larsson, T. B., 2005. *The Rise of Bronze Age Society: Travels, transmissions and transformations.* Cambridge: Cambridge University Press.

Kuzima, E. E., 1994. Stages of Development of Stock-breeding Husbandry and Ecology of the Steppes in the Light of the Archaeological and Paleoecological Data (4th millenium BC - 8th century BC). i: B. Genito, red. *Archaeology of the Steppes: Methods and Strategies.* Naples: Papers from an International Symposium held in Naples 9-12 November 1992, pp. 17-31.

Kuznetsov, P. F., 2006. The emergence of Bronze Age chariots in eastern Europe. *Antiquity,* Volym 80(309), pp. 638-645.

Lidke, G., Jantzen, D., Lorenz, S. & Terberger, T., 2018. The Bronze Age battlefield in the Tollense Valley, Northeast Germany. In: M. Fernández-Götz & N. Roymans, eds. *Conflict Archaeology.* Milton: Routledge, pp. 61-68.

Ling, J. et al., 2014. Moving metals II: provenancing Scandinavian Bronze Age artefacts by lead isotope and elemental analyses. *Journal of archaeological science,* Volume 41, pp. 106-132.

Ling, J., 2014. *Elevated rock art : towards a maritime understanding of Bronze Age rock art in northern Bohuslän, Sweden.* Oxford: Oxbow Books.

Ling, J. & Koch, J., 2018. A sea beyond Europe to the north and west. i: J. Dodd & E. Meijer, red. *Giving The Past A Future : Essays In Archaeology And Rock Art ; Studies In Honour Of Dr. Phil. H.C. Gerhard Milstreu.* u.o.:Archaeopress Publishing Ltd Oxford, pp. 96-111.

Ling, J. & Uhnér, C., 2015. Rock Art and Metal Trade. *Adoranten,* pp. 23-43.

Littauer, M. A., 1972. The military use of the chariot in the Aegean in the late Bronze Age. *American Journal of Archaeology,* 76(2), pp. 145-157.

Littauer, M. A. & Crouwel, J. H., 1979. *Wheeled vehicles and ridden animals in the Ancient Near East.* Leiden: s.n.

Littauer, M. A. & Crouwel, J. H., 1996. ROBERT DREWS AND THE ROLE OF CHARIOTRY IN BRONZE AGE GREECE.. *Oxford journal of archaeology,* 15(3), pp. 297-305.

Lull, V., Micó, R., Rihuete Herrada, C. & Risch, R., 2013. Bronze Age Iberia. i: H. Fokkens & A. F. Harding, red. *The Oxford Handbook of the European Bronze Age.* u.o.:Oxford University Press.

Malmer, M. P., 1981. *A Chorological Study of North European Rock Art.* Stockholm: Vitterhets Historie och Antikvitets Akademiens handlingar, Antikvariska Serien, 32. delen.

Mazzù, A. et al., 2021. Dynamical behaviour of Bronze Age war chariots. *Journal of Archaeological Science: Reports,* Volume 36, pp. 2-15.

McKinley, J. o.a., 2014. Cliffs End Farm, Isle of Thanet, Kent: A mortuary and ritual site of the Bronze Age, Iron Age and Anglo-Saxon period with evidence for long-distance maritime mobility. *Wessex Archaeology Report,* Volym 31.

Milstreu, G. & Dodd, J., 2018. The cup-mark: the smallest, most frequent, cosmopolitan and most complicated symbol. *Adoranten,* pp. 5-30.

Moberg, C.-A., 1981. *Similar finds? Similar interpretations? : Glastonbury - Gothenburg - Gotland : nine essays.* Göteborg: Dep. of archaeology [Inst. för arkeologi] Göteborgs Universitet.

Müller, J., 2013. Demographic traces of technological innovation, social change and mobility: from 1 to 8 million Europeans (6000–2000 BCE). i: S. Kadrow & P. Włodarczak, red. *Environment and Subsistence – Forty Years after Janusz Kruk's 'Settlement studies . . . '.* Bonn: Mitel & Verlag Dr. Rudolf Habelt, pp. 1-14.

Nilsson, S., 1865. *Skandinaviska nordens ur-invånare: ett försök i komparativa ethnografien och ett bidrag till menniskoslägtets utvecklingshistoria. Bd 2 Bronsåldern..* Stockholm: u.n.

Nordbladh, J., 1989. Armour and Fighting in the South Scandinavian Bronze Age, especially in View of Rock Art Representations. *BAR International Series,* Volym 500, pp. 323-334.

Nordén, A., 1946. Villfarastenen : ett omtvistat fornminne i nyckelställning inom hällristningskronologien. *Fornvännen,* pp. 129-146.

Olsen, S. L., 2017. Insight on the Ancient Arabian Horse from North Arabian Petroglyphs. *Arabian humanities,* 8(8).

Piggot, S., 1983. *The Earliest Wheeled Transport.* London: Thames & Hudson.

Price, T. D. et al., 2017. Multi-isotope proveniencing of human remains from a Bronze Age battlefield in the Tollense Valley in northeast Germany. *Archaeol Anthropol Sci,* 11(1), pp. 33-49.

Quesada, F., 1994. Datos para una filiación egea de los carros grabados en las "Estelas del Suroeste". In: C. De la Casa, ed. *V Congreso Internacional de Estelas Funerarias. Soria, 28 de abril al 1 de Mayo de 1993. Actas del Congresso I.* s.l.:s.n., pp. 179-187.

Sabatini, S. & Bergerbrant, S., 2020. Textile Produktion and Specialization in Bronze age Europe. In: *The textile revolution in Bronze Age Europe : production, specialisation, consumption.* Cambridge: Cambridge University Press, pp. 1-14.

Said, E. W., 1993. *Culture and Imperialism.* London: u.n.

Sandor, B. I., 2004a. Tutankhamun's chariots: secret treasures of engineering mechanics. *Fatigue & fracture of engineering materials & structures,* Volume 27(7), pp. 637-646.

Sandor, B. I., 2004b. THE RISE AND DECLINE OF THE TUTANKHAMUN-CLASS CHARIOT. *Oxford journal of archaeology,* Volume 23(2), pp. 153-175.

Sanjuán, L. G., 2012. The Warrior Stelae of the Iberian South-west. In: T. Moore & X. Armada, eds. *Atlantic Europe in the First Millennium BC.* Oxford: Oxford University Press.

Schovsbo, P. O., 1987. *Oldtidens vogne i Norden.* Frederikshavn: u.n.

Shelmerdine, C. W., Bennet, J. & Preston, L., 2008. Mycenaean States. i: C. W. Shelmerdine, red. *The Cambridge Companion to the Aegean Bronze Age.* Cambridge: Cambridge University Press, pp. 289-309.

Sjöborg, N. H., 1830. *Samlingar för Nordens fornälskare T. 3.* Stockholm: s.n.

Stika, H.-P. & Heiss, A. G., 2013. Plant Cultivation in the Bronze Age. i: H. Fokkens & A. Harding, red. *The Oxford Handbook of the European Bronze Age.* u.o.:Oxford University Press, pp. 348-363.

Thrane, H., 2013. Scandinavia. In: H. Fokkens & A. Harding, eds. *The Oxford Handbook of the European Bronze Age.* Oxford: Oxford University Press.

Toreld, A. & Andersson, T., 2015. Ny dokumentation av Kiviksgravens hällbilder.. *Fornvännen,* pp. 10-26.

Vankilde, H., 2003. Commemorative tales: Archaeological responses to modern myth, politics, and war. *World Archaeology,* 35(1), pp. 126-144.

Vinne, M., 2003. Sea trials. i: O. Crumlin-Pedersen & A. Trakadas, red. *Hjortspring: A Pre-Roman Iron-Age Warship in Context. Ships and Boats of the North 5.* Roskilde: Viking Ship Museum, pp. 103-118.

Vretemark, M. & Axelsson, T., 2008. The Varnhem Archaeological Research Project: A New Insight into the Christianization of Västergötland. *Viking and medieval Scandinavia,* 2008(4), pp. 209-219.

Winther Johannsen, J., 2010. The Wheeled Vehicles of the Bronze Age on Scandinavian Rock-carvings. *Acta Archaeologica,* 81(1), pp. 144-247.

Winther Johannsen, J., 2011. Carts and wagons: on Scandinavian rock carving. *Adoranten,* Volym 2011, pp. 95-107.

Winther Johannsen, J., 2013. The Villfara Monument– Rock Carvings, Death, Cosmology and Rituals in Early Bronze Age Scania. *Lund Archaeological Review,* Volym 19, pp. 19-34.

Wrigglesworth, M., 2005. Vognmotivet i vestnorsk bronsealderkontekst. In: J. Goldhahn, ed. *Mellan sten och järn. Del II.* Göteborg: s.n., pp. 561-570.