

Skeuomorphs what art thou?

A skeuomorphic perspective on material preference and categorisation
in prehistory

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Abstract

Past material categorisation and preference in archaeological research are often heavily influenced by modern material perception, through the use of modern language and modern terminological connotations. This thesis seeks to clarify material categorisation and preference in the past, by studying two different skeuomorphs; Aurignacian shell skeuomorphs made from ivory, and south Scandinavian metal dagger skeuomorphs made from flint. The focus of this thesis is on the raw material properties of the skeuomorphs presented above, and how these properties afford certain actions, limitations, and possibilities in the imitative act of past producers of material culture.

A theoretical framework, with a focus on the notion of cultural spheres and how they are differently constructed through time and space, is applied. This framework is further supported by a reflexive methodology, as to be more critical of both the modern influences on past materials – and to be more self-aware of the terminology and linguistic connotations that can influence the research outcome in this thesis. Being self-critical of modern conceptions, influences, and terminology, through a reflexive methodology, enables a possibility to separate the modern cultural sphere from potential spheres in the past. In this thesis, this is concluded by the emergence of two pathways toward an alternate material categorisation and preference in the past within the skeuomorphic materials. The two material pathways are *metaphorical* materials and *meaningful* materials. A categorisation and preference of material in the past, based on these two material outlooks, would further indicate the value of variation in coexistence rather than a linear material progression in past material assemblages.

Keywords: skeuomorphism, material properties, material categorisation, material preference, material perception, material interpretation, affordance, cultural spheres, reflexive methodology, archaeological terminology, imitation, original, centre and periphery, metaphorical material, meaningful material, southwestern French Aurignacian, ivory beads, south Scandinavian neolithic, flint daggers

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1. Introduction

The identification of material culture that is either visually identical, or visually similar, can be considered one of the basic methods used in structuring archaeological material, and the basis of further archaeological analysis. It is then natural that the origin of this basic method of categorisation lies within humans themselves, as it is often governed by a human desire for definition and typological groupings (Stockhammer, 2017). However, problems arise when this need for categorisation imposes artificial patterns of material categorisation and preference, onto past material culture. The division of artefacts into material typologies is rarely reflected upon in archaeological practice, most probably as material typologies seem self-evident when discussed in archaeological contexts, in which typologies are commonplace, to the point of being taken for granted, when conducting excavations (Read, 2009). In some settings, categories based on raw materials might seem logical, however, this also promotes the assumption that the perception of the material that the archaeologist experience today, is the same as that of prehistory. Dwight Read (2009) uses the example of a clay arrowhead; as the material is clay, the arrowhead would not function as an arrowhead intended, as would not a pot made to cook food over a fire if it were made of wood. To categorise the arrowhead as either clay or as an arrow, in a typology or in categorisations based on modern perceptions can then almost seem fatuous. Clays with different provenance may or may not impact the material perceptions of the finished vessels. A specific lithic axe-form can be made from different kinds of stone raw material, but still have the same use as one another. Thus is the complexity of prehistory.

But how do we discuss and relate to the questions of past material categorisation and preference of material, when we as archaeologists, do not have direct access to the thoughts and cultural behaviour of the people of the past? It is then increasingly important to ask oneself; how does the modern archaeologist's perception of the past affect the research outcome? To break away from modern categories and perceptions of materials, and hence discern past material categorisation and preference of materials, this thesis will study the skeuomorphic phenomenon. Skeuomorphism is often described as the act of imitating the *form* of one artefact in another medium. Like Read's (2009) example of the form of an arrow made in clay, or the form of a pot made in wood. Skeuomorphs tend to upend our modern material categorisations, as they do not conform to the choice of material which modern humans are accustomed to perceive in certain object categories. To us are skeuomorphs confusing. This is also what makes them the perfect archaeological object to study when

trying to discern past material perceptions, as they do not necessarily conform to modern day material expectations.

Skeuomorphs can be studied in relation to past material categorisation and preference because of *how* certain elements of an artefact carry over into another raw material. And how *form*, *feel* and *visual properties* manifest in this new skeuomorphic object. The material process of the skeuomorph can be used to discuss prehistoric views on materials, creative influences, and the creative process in past societies. The skeuomorphic phenomenon highlights artistic liberties taken, and raw material interpretations made, in past production processes. The producer of an artefact made the choices regarding *how* to imitate another artefact, and in a skeuomorphic object these choices led to a more or less accurate ‘copy’ of the ‘original’ model. When analysing skeuomorphic objects, aspects such as choice of material and what material restrictions or allowances that entail, is important. The choice of material can be based on both physical environmental restrictions, but also social restrictions in the form of traditions, and other social constructs that do not leave obvious traces in the archaeological record. Skeuomorphs then enable a material perspective which can discern how material and social preferences, restrictions and tradition might have been structured and reflected in the material perception of the past. By contrasting the raw material of the skeuomorph with the raw material of the perceived ‘original’, skeuomorphs then become good indicators of material perceptions in the past, and how past material categorisation and preference might have been experienced.

We can today perceive a material as more valuable depending on production method or modern-day economical values. In the past, a ‘more valuable’ or ‘more preferable’ material might just have been chosen to make a skeuomorph because it could properly mimic desirable material properties of the ‘original’ material or artefact. The study of skeuomorphs will then help in opening up the material discussion in archaeology today – and heed each artefact on their own terms in prehistoric contexts.

1.2. Aim and research questions

The aim of this thesis is to study skeuomorphic objects, with a focus on what raw material the skeuomorphs are created from, and what specific properties these raw materials have, to further the modern understanding of how material categorisation, material preference, and value of material, could have been viewed in the past. To be able to do this, four research questions were formulated:

- How can terminology such as ‘original’, ‘copy’, ‘centre’ and ‘periphery’ used in the archaeological discourse in relation to skeuomorphs affect the understanding of skeuomorphs as manifestations of past material as preference and categorisation?
- What are the differences between how the form of an object and the visual properties and attributes of a material affect the interpretation of skeuomorphism in an object?
- How can we differ skeuomorphs from copies in ancient materials?
- How can the perception of skeuomorphs as ‘fringe’ objects, or set in a periphery, be detrimental to the representation of past material culture?

To be able to properly answer the research questions above, some considerations must be made. Artefacts of the past are interpreted by archaeologists and imbued with meaning, a meaning that does not necessarily need to align with how the object was viewed in past societies or by past individuals. As stated in the introduction of this thesis, this modern interpretation of artefacts can be done through modern material classifications, or typologies, which provides the structure of archaeological interpretation. To move away from these modern archaeological structures, it would be prudent to reflect upon the modern language that is used to describe the relationship between artefacts in the past, as it is through words and communication that knowledge is shared. By using words such as ‘imitation’, ‘copy’, ‘original’ and ‘skeuomorph’ in association with past material culture, archaeologists either purposefully or unconsciously imbue meaning into the objects, a meaning that can differ depending on which words are used.

When discussing skeuomorphs, terminology such as ‘imitation’, ‘copy’, and ‘original’ are highly relevant. They describe the relationship between the skeuomorph and the ‘original’ in a way that makes skeuomorphism, as a concept, more understandable. Metal is *imitated* in pottery, or a metal vessel is *copied* into a pottery vessel. ‘Imitation’ and ‘copy’ can both describe a skeuomorphic relationship between artefacts, but the associated meaning with the different words can affect the outcome of the understanding of skeuomorphism, and the skeuomorphs that they are used to describe. This can be seen as detrimental to the research of skeuomorphs, but without this terminology it would be very convoluted to describe a skeuomorphic relationship between artefacts in modern research. It is then of interest in this thesis to also highlight the relationship between the concepts of ‘original’, ‘imitation’, and ‘copy’, and how they relate to skeuomorphism. This since a significant part of the discussion of imitation and copies in archaeological material often excludes the skeuomorphic phenomenon. The terminological relationship between ‘original’, ‘imitation’ and ‘copy’ are,

in part, the focus of the following section. This as they lay the foundation of how skeuomorphism can be further developed to understand material categorisations and preferences in the past, and what makes a skeuomorph a skeuomorph.

1.2. Research history

The research history of this thesis aims to provide an extensive presentation of previous literature on how the phenomenon of skeuomorphism has been developed since its conceptual birth in the late 19th century. As this is a broad subject to undertake, the research history has been further divided into two subsections. The first subsection will briefly present how skeuomorphism has been set apart from other adjacent terminologies, such as ‘imitation’ and ‘copy’. Further, it will explore how the entanglement of these terminologies has affected, and still affects, the definition of skeuomorphism today. The second subsection focuses on the archaeological interpretation of skeuomorphism as a social phenomenon, starting in the late 19th century. The heavy influence of Henry Colley March, John Myres and Gordon Childe in the early skeuomorphic interpretations will be contrasted with the three heavy thematic influences in skeuomorphism today: economic impact, the impact of innovation, and the skeuomorphs’ impact on identity and metaphorical boundaries.

1.2.1. *The entanglement of imitation and copy in archaeological terminology*

What is the definition of the two words ‘imitation’ and ‘copy’? In the thesaurus imitation and copy appears as synonyms for each other, but also as synonyms to *clone* and *duplicate* (Merriam-Webster, n.d.). As both Tim Flohr Sørensen (2012) and Philipp Stockhammer (2017) point out, a large portion of archaeological material does not contain *direct copies*, which are copies identical to the point of carbon copies, or clones, and are often produced *en masse*. Copies in a seriation can be quasi-discussed with the introduction of metal casting in moulds. However, producing near-perfect copies of an original was still hard even with the use of moulds, and copies of a single origin were not made possible in the large quantities that we associate with copying today (Sørensen, 2012; Stockhammer, 2017).

These discrepancies between our perception of a ‘copy’ and the impossibility of such copies in the past, made Stockhammer (2017) formulate two requirements for an object to be considered a ‘copy’ in the archaeological material record: (1) the identification of a group of objects with common stylistic features, (2) said group need to have a known place or area of production. With a group of objects determined with these requirements in mind, a ‘copy’ becomes an object that is visually similar to another but produced outside the production area

of the perceived ‘original’. The relation to the ‘original’ production area, and in extension the ‘original’ object, is then proved by the use of the same raw material that was being used in the production of the ‘original’. The major difference between original and copy, according to Stockhammer, is then that the raw material of the copy was sourced from a different deposit located outside of the main production area (Stockhammer, 2017). A copy then needs to be in the same material as the original, as the comparison in material provenance is key in the copy-original relationship. This contrasts with the skeuomorph, as a condition of a skeuomorph is that it must be in a different material from the ‘original’. Skeuomorphs are also not limited to being produced outside of the main production area of the perceived ‘original’.

‘Imitation’ and ‘copy’ were in a similar fashion discussed by Sørensen (2012). However, Sørensen also points out that copies can be produced in such ways that render functional features in the ‘original’ to become stylistic and non-functional, similar to skeuomorphs. An example of such a copy is the bronze scimitars found in Rørby, Denmark, where the handle of the sword has been fused with the scabbard to create a curved ‘sword’. In the ‘original’ scimitar, this curved part was indeed just the scabbard, not an actually curved sword. This fusion of sword blade and scabbard could, according to Sørensen, be considered skeuomorphic, but with one major difference: both the ‘imitation’ and the ‘original’ was made in the *same* raw material. The scimitars were then unable to be deemed as skeuomorphs, and hence became ‘copies’ instead. In this way of copying, Sørensen argues, that *similarity* was a part of *creative reflexivity* in the past. This creative reflexivity could then help generate new perspectives, not only on material properties or production processes, but also on fundamental questions about what an object truly is for the people in the past (Sørensen, 2012).

Both Stockhammer (2017) and Sørensen (2012) discuss the role of the ‘copy’ in archaeological material, but the concept of imitation does not get the same thorough analysis. ‘Imitation’ is still considered a synonym ‘to copy’. Sørensen (2012) does in the introduction of his article refer to imitation as something that can both occur in objects of the same raw material, but also across raw material categories (Sørensen, 2012). Objects with similar forms can then be regarded as either ‘copies’ or ‘imitations’ of one another, depending on their relationship to the raw material used in the production process. *Imitation* can then in my opinion be viewed as an umbrella concept that includes ‘copy’ and ‘skeuomorph’ as different outlets of imitative relationships in modern terminology. A further discussion about what constitute as a copy and a skeuomorph would create an approach to past material culture that

does reflect a more complex imitative relationship between artefacts than is often considered in archaeological research

1.2.2. Skeuomorphism in archaeology

The term skeuomorphism was first referenced in 1890 by Henry Colley March in an article published in *Transactions of Lancashire and Cheshire Antiquarian Society*. It is however not certain if the term *skeuomorphism* was first coined by Henry Colley March or his contemporary colleague John Myres. Skeuomorphism as presented by Colley March (1890) constitutes as a supplementary ornamental type to the previously known *Zoomorphs*, ornamental animal-derived shapes, and *Phyllomorphs*, ornamental leaf-derived shapes. A skeuomorph defined by Colley March is then an object which transforms useful and crucial structural features into something that performs no function other than to satisfy a mental demand:

As soon as man began to make things, to fasten a handle to a stone implement, to construct a wattled roof, to weave a mat, skeuomorphs became an inseparable part of his existence, grew, as it were, with the growth of his brain, and ultimately occasioned a mental craving or expectancy. (Colley March, 1890, p. 166)

It was this *expectancy* carried within the human mind that transferred functional structures into ornamental features when new forms and materials were developed. The mind expected the new material to look a specific way and to have certain visual characteristics, which resulted in a skeuomorph which became the carrier of an aesthetic sense, where visual preferences were incorporated into other materials as they were ‘stylish’ (Colley March, 1890).

Colley March then differs between skeuomorphs created by (1) individuals that imitate an ‘original’ that is already incorporated into their own society’s mind and aesthetics, and (2) skeuomorphs created by individuals outside of this ‘original’ context. The skeuomorphs that were created outside of the ‘original context’, did not have the artistic impulse or attention to follow the society’s specific sense of aesthetics. Rather they produced skeuomorphs that did not fully understand the intricacies of the original object and the context in which it should be understood. Hence these ‘out of context’ skeuomorphs would cater more to a monetary gain or *prestige* connected to foreign aesthetics, rather than a deeper cultural and societal understanding of the aesthetic. In contrast, skeuomorphs created within the society in which the ‘original’ object, and aesthetic, could be found were swayed by the overarching need of

the aesthetic, as both the producer and the consumer of the skeuomorph interacted within the same sphere. Although the creator of a skeuomorph is affected by the aesthetic expectancy of their society, and this in turn dictates the outcome of the skeuomorph, the consumer in the very same society is a major deciding factor for the outturn and survival of said skeuomorph. The consumer expects to see certain aspects in an object, even if these aspects can be either exaggerated, simplified, diminished, or as unchanged in their 'original' presentation. It is only when the expectancy of a certain aesthetic in the consumer is weakened, that the skeuomorph also fades out of society's consciousness and material culture (Colley March, 1890).

Similarly did John Myres (1929; 1933) define skeuomorphs as an *intention* of imitation that is understood *between* the producer and consumer, rather than a craving of a certain aesthetic by the consumer only. Only when this intention is made obsolete and becomes purely stylistic as its own reference, does the object stop being a skeuomorph and becomes a self-sustaining 'stylistic object'. An example of this can be found in the article *Geometrical Art in Southeast Europe and Western Asia* written in 1929 by Myres. In this article does Myres discuss skeuomorphism in late Iron Age geometrical pottery from the Mediterranean, and their skeuomorphic relationship to woven baskets. Myres argued that the linear ornamentation of vessels around the Mediterranean should not be labelled 'Geometric' if an imitative intent is obvious. Linear ornamentation should only be called Geometric, and hence a self-sustaining style, when the skeuomorphic intent is made obsolete by the appreciation of linear designs as a pure form, without aesthetic connotations of a basket precursor. Skeuomorphs as defined by Myres (1929) then lean more towards natural imagery rather than dependent on a stylistic need, or expectancy.

Gordon Childe refers in his book *Piecing together the past – The interpretation of archaeological data* (1956), to Myres' definition of skeuomorphs. He also further explains the skeuomorphic phenomenon as "... Shapes proper to wood-carving may be copied in pottery or metal and then the copies disclose what the wood-carver could do." (Childe, 1956, p. 13). This quote can be said to summarise Gordon Childe's more pragmatic view of skeuomorphs compared to previous definitions. Childe points out, and puts a heavier emphasis on, the usefulness of skeuomorphs as objects which embodies the possibilities of other materials, and the possibility to observe the production techniques of artistic mediums which were not preserved in the material record (Childe, 1956)

Overall, the early study of skeuomorphs put an emphasis on the aesthetic and cultural material conservatism in the structure of the skeuomorph, and the possibility to linearly trace

technological or material development. It can also be said that these three authors; Colley March, Myres and Childe, in different ways all influenced the three main themes within the study of skeuomorphism as a phenomenon today; value-oriented skeuomorphism, technological innovation and skeuomorphic metaphors. All three of these themes are interlinked with the study of how skeuomorphic object was influenced by the producer, to maximise a favourable response from the target audience.

1.2.2.1. Value-oriented skeuomorphism.

In the 1980s a value-oriented concept of skeuomorphs was popularised and has become a common element of contemporary skeuomorphic studies. Michael Vickers (1985; 1989; 1999) has been a major spokesperson of this line of thinking, which is mostly reliant on the perceived economic and prestige impact that skeuomorphs might have had in ancient Mediterranean societies. This perspective on skeuomorphs draws inspiration from the *hierarchy of materials*, an ancient Roman recording originating from Galilee (Vickers, 1999). In this text, as transcribed by Vickers in 1999, ancient materials are arranged in a top-down order, from the most valuable and desired gold to least valuable and desired potter's clay. According to Vickers (1999) this confirms a societal value-oriented perception on materials in ancient Mediterranean times, where precious metals are viewed as more valuable and prestigious, and materials such as clay are viewed as 'primitive' and 'lesser'. Such a skeuomorphic perspective will generate a skeuomorph which is always deemed of lesser value as it is created from a modern perceived 'lesser' material. The skeuomorph is then perpetually reaching to be perceived as an object of higher prestige, and hence to be a part of a higher value-category in the hierarchy of materials (Vickers, 1999). To be able to create such a skeuomorph, a skeuomorph that could access prestige and economic values given to other materials, Vickers (1985) introduced the theory of how different colours painted on pottery from antiquity could be used to imitate different metals. If a skeuomorphic object truly wants to imitate a metal vessel, similar structural elements to the original would not be enough to make a convincing skeuomorph. Additional aesthetical and material markers, such as colour, were still needed for the skeuomorph to be convincing according to Vickers (1985). This colour theory was made apparent in Attic painted pottery vessels from the Mediterranean, where the form of the vessels was greatly reminiscent of contemporary metal vessels. Hence did Vickers draw the conclusion that the colours used by the ancient artisans who painted the pottery, would also be derived from a perception of metal. In simple terms, Vickers' suggestion is that colours such as purple, white, black, and red should be considered

as substitutes for copper, ivory, silver and gold respectively. This can be expressed in different ways, the dark brown glaze of Corinthian pottery is perhaps in imitation of copper-rich bronze, whilst the lighter-toned glazes would be in referral to tin-rich bronze. Hence could the artisans of the antiquity imitate wide variety of different metals (Vickers, 1985). That the artisans were skilled in the colour coding of ancient pottery does however not automatically mean that the skeuomorphs were seen as truly entering the value-category which it strived to be a part of. Vickers (1989) argues that even if the clay skeuomorphs imitated high value metals such as gold and silver, the artisans were still of low social standing in the social hierarchy. The artisans of the painted pottery were not valued by the upper-class as they were partial to the finery of metals such as gold and silver. The low survival rate of precious metals in ancient context, often bolster the importance of pottery, which would give a false testimony of the importance of clay and pottery in contrast to that of precious metals. Vickers continues that instead of being given more importance in antiquity, that pottery skeuomorphs should instead be viewed as more accessible and cheaper alternatives to metals for the masses (Vickers, 1989).

David Wengrow (2001) also explores the importance of colour, but also texture, in ancient skeuomorphs. Wengrow's skeuomorphs are understood from a perspective of aesthetic labour and the implication this labour has in societies that became increasingly complex. The focus lies on basket skeuomorphs in pottery from the Late Neolithic lowland Mesopotamia, and how motifs in these skeuomorphs would imitate characteristics of the rim and body of baskets. The correspondence of the motifs in the pottery, and the constructional elements vital to the production process of the baskets, would suggest that the painters of the skeuomorph would in some ways recreate the operational procedures of basketry when creating the outer appearance of the skeuomorph. This would include the texture and colour schemes of woven vessels. Wengrow (2001) suggests that the inclusion of the texture and colour of the baskets in the skeuomorphs, would evoke an associated sensory experience in the pottery, as well as a visual experience, among the consumer of the material culture. The importance of the correct reception of the skeuomorph among the target audience then becomes key. If the producer of the skeuomorph does not manage to evoke a 'basket-like' response in the consumer through their designs, the social efficiency of the skeuomorph would be lost, and the skeuomorph would be undesirable for the consumer. The appreciation of painted pottery then become dependent upon, and mediated by, the positive experience of visual and tactile properties of

baskets. This might even suggest that the skeuomorphs could have been evaluated with the associated functions and meanings of baskets in mind (Wengrow, 2001).

1.2.2.2. Technological evolution and technological innovation.

It is no surprise that skeuomorphs, as products of material culture, are commonly linked to technological innovation. In the early concepts of skeuomorphism, in this thesis represented by Colley March (1890), Myres (1929; 1933) and Childe (1956), technological innovation took form in the thought of technological evolution. As in all things evolutionary, technological evolution is the concept in which materials and techniques are viewed as part of a continued progression towards discoveries of even more apt materials and techniques for the application in question. This consequently leads to a skeuomorph being viewed as an object that embodies past materials and techniques that are present despite improvement to the material or technology, which results in the lack of function, purpose and meaning for the skeuomorphic elements of the object (Frieman, 2012b). This perspective of technological evolution would then imply that the imitative skeuomorph is less technologically advanced, and that the skeuomorph in its entirety is less valued (Frieman, 2021). This reasoning can seem to be harsh, but it has also been prevalent throughout the research of skeuomorphs, which is reflected in the value-based skeuomorphism presented in 1.2.1.1 *Skeuomorphism and value* in this thesis. Further, Catherine Frieman (2021) conclude that the original concept of skeuomorphism represents habits, i.e., technological and material conservatism, rather than choices born in, and from, creative evolutionary technologies. The thought that skeuomorphs and imitations in general, would be less innovative than their ‘originals’, and hence inherently derivative and less creative in nature, has been discussed among others by Frieman (2021) and René Girard (1990). Girard points out that in modern society the statements “to be innovative” and “to be imitative” have become contradictory to one another, as innovation has become synonymous with leaving all the old behind (Girard, 1990, p. 11). A major constituent of modern knowledge production, which has also been adopted into archaeological research, is this abrupt true and false mentality. The dichotomy between being new and innovative versus being retrogressive and imitative next to fraudulent. A philosophy that in simple ways falls back on the classic interpretation of the shifting paradigms of Thomas Kuhn, in which innovation is what drives knowledge forward and conservatism stigmatises progress (Kuhn, 1970; Girard, 1990).

1.2.2.3. Identity and material metaphors.

Innovation in the study of skeuomorphism also presents another conundrum; that of past identities, and the construction of said identities, linked to material metaphors. Humans are habitual creatures and will think and act in relation to other people around them, as well as the dynamic landscape which they inhabit. Material metaphors can be gleaned from material culture, as they ease the understanding of contrast and comparison. Metaphors have been used as a process of thought when trying to bridge and understand one phenomenon contra another, or one behaviour contra another. It then stands to reason that metaphors are at the most efficient when they are constructed with an act of transformation in mind. Skeuomorphs then become an efficient material metaphor. As metaphors are cognitive and rhetorical; they embody the social stage in which they are made. Hence, they become central in the construction of the social strategies which sustain individual and group identities, the essence of social inclusion and exclusion (Ray, 2018). Carl Knappett (2002) refers to the concept of material metaphors when discussing the relationship between skeuomorphs, the artisan and the consumer. Skeuomorphic vessels made of valuable metals become a metaphor of nobility, even when the noble individuals in question are out of sight. Clay skeuomorphs of such vessels then try to emulate the very essence of what the noble metal vessels stand for (Knappett, 2002). The material metaphor of the skeuomorphs tries to bend reality, to transform one social group into another. In the nobility's effort to exclude other social groups through material exclusivity, they are inevitably assimilated into other identities (Knappett, 2002).

To further this reasoning Knappett (2002) presents the idea of a world of signs, namely the world of iconicity, indexicality and symbolism. However, Knappett views symbolism as less common in material culture, and rather refers to icon and index as prominent conveyors of meaning in artefacts. This was a reaction to the view that material culture could be read as one would a text. Text is often strict in its symbolism, in ways material culture is not. To circumvent this problem, Knappett suggests that focus is put on how *meaningfulness* is constituted via iconicity and indexicality, rather than symbolism. This would allow the material culture, and the skeuomorph, to connect to a larger societal life via technology and innovation. When skeuomorphs are derived from iconicity, meaning visual similarity, the method of production of the skeuomorph *cannot* be traced to the 'original'. The only way to connect the 'original' and skeuomorph is then through the visual similarity in the finished product. In the cases in which the method of production of the original *can* be traced in the

skeuomorph, the relationship is called indexical. Indexicality is however not necessarily a given condition for the creation of skeuomorphs. In practice, an indexical relationship between the skeuomorph and the 'original' can have many different forms. However, Knappett (2002) draws on the example of certain pieces of Minoan basket skeuomorphs in clay. In the production process of the basket skeuomorphs, a mould shaped like a woven basket was created, in which clay was then forced to create the skeuomorph. This creates a direct link between the 'original' basket and the creation of the clay skeuomorph, which deems the relationship indexical. Further does the success of the skeuomorph in an indexical relationship rely on the degree of likeness that it achieves. This in turn relies on how much skill is invested into the production of the skeuomorph. A truly successful skeuomorph in this sense does not only imitate the object, but also the consumption pattern of the original, according to Knappett (2002). If this level of imitation is achieved then the skeuomorph is accepted as a prestige object on its own, not only an emulation of a prestige object. The use of an indexical approach when creating a skeuomorph might then not only be because of familiarity of the material, or technological 'conservatism', but rather a desire among the producer and consumer to rebel against existing material, and hence social, structures (Knappett, 2002).

Another application of material metaphors in the study of skeuomorphs is presented by John Blitz (2015), on how metaphors can be used to help in the interpretation of the adoption of innovative artefacts. Blitz argues that the signifying properties of skeuomorphs are familiar in the society which consumes the skeuomorph. These similar properties then enable said society to categorise new technologies or materials into pre-existing cultural categories. This would render the introduction of new materials or technologies more culturally accessible and desirable (Blitz, 2015). In contrast to Knappett's (2002) material metaphors which engage in closed societal contexts, Blitz takes the material metaphor into the realm of boundary objects. Objects which engage people of the 'periphery'. If people of the periphery are assumed, so is the perception of people at the 'centre'. It seems in the study of skeuomorphs as material metaphors an assumption of hierarchy is made. As Frieman (2012b) writes, skeuomorphs are often explained as metaphoric construction of identity, and are often set in contrast to the material culture of neighbouring people. Skeuomorphism then becomes a mirror of the reorientation of identity, especially in response to foreign influence. This is a stance that are both present in Knappett's (2002) and Blitz' (2015) metaphors. Knappett (2002) points out that when societal groups with different social identities interact with each other, one group

will perpetually reach towards the power and influence of the other societal group. The noble is the centre, and the poor are the periphery. Similarly, Blitz (2015) assumes a central technology, or a seat of innovation, that disperses its knowledge and influence onto the people in the periphery. However, how can we today with some level of certainty ascertain that past societies in these so-called peripheries, truly were in the peripheries? What is to say that they did not see themselves as centres in their own perception of the world?

1.2.2.4. Mimicry and subversive identities.

‘Mimicry’, in addition to concepts of ‘imitation’, ‘copy’, and ‘original’, is also frequently used as an archaeological terminology in skeuomorphism. What set mimicry, or *mimesis*, apart from the above terminology is that mimicry is already a concept and terminology used in anthropology and post-colonial theory. Mimicry is used as a description of shifting identities, or self-image. The act of imitation in a post-colonial setting is considered more of a form to relate and recognize the other. Mimicry, as presented by Homi Bhabha (1984), symbolizes, in a colonial setting, the desire for a reformed and recognizable other, but with an ambivalence towards the other being the same but not quite. Mimicry is then dependent on producing a difference between ‘new’ and the mimicry of ‘new’, otherwise it is rendered obsolete. Mimicry becomes a way for the colonized to access *the other*, as the other is the visualization of power, but also for the colonizer to solidify power. This solidification is made possible by the almost imitation of mimicry, as the colonizers’ exertion of power depends on the colonized to operate under the same power language as the authority. But only as a partial presence, so as to not have equal access to the power in question. Mimicry then alienates the colonized from the original language of liberty and creates a new language, which is normalized in the colonial state (Bhabha, 1984). However, it is not only the colonized that is affected by mimicry, as the notion of being able to access and mimic the colonizer’s original identity, means that the identity of the authority is constantly undermined (Huddart, 2006).

This subversive effect of mimicry on material culture production and identity has been explored in relation to skeuomorphic objects by Rodney Harrison (2003). Harrison highlights the knapped glass ‘skeuomorphs’ found in the post-contact artefact assemblages of Aboriginal people in New South Wales. The Aboriginal people used the ‘new’ glass material to imitate knapped stone tools which had not been manufactured in Aboriginal communities for centuries. The function between the glass tools and the stone tools also varies, and Harrison highlights the trade function these glass tools had in the relationship between Aboriginal people and the colonialists. The glass tools, conclude Harrison, can be interpreted as ‘jokes’

and manifestations of Aboriginal material culture viewed through Western eyes, used subversively as a humorous gesture representing the Aboriginal perspective on colonialism (Harrison, 2003). The use of new material in an old stylistic repertoire then became a way of commenting on the colonial influx, but also as a way to strengthen the local identity when faced with colonial influence. Skeuomorphism in this sense, then become a direct response to foreign incursion and attempted cultural disruption (Frieman, 2012b).

2. Theoretical framework and methodology

The theoretical framework of this thesis takes great inspiration from *posthumanism* and the *non-human*; the distribution of agency through dynamic factors not dependent on human intention or control (Keeling & Lehman, 2018). Posthumanism is a vast philosophical framework encompassing several alternative pathways on how, and to what extent, the human can be perceived as a participant in change. This thesis does not put one specific posthuman framework over another. The reason which posthumanism has had an impact on this thesis is the posthuman destabilisation of the human as the important instigator of change and effect, may it be physical or metaphysical. These aspects of posthumanism have in later years been adapted in archaeological theory, to further the understanding of human personhood and the relationship between humans, things and nature in the past and present, as seen in Christina Fredengren (2013) and Craig Cipolla et al. (2021) among others.

In relation to posthumanism one can also discuss the relationship between human, thing, and nature through the archaeological perspectives of entanglement as presented by Ian Hodder (2012; 2015; 2016). In this instance it is important to note Hodder's point that human-thing interaction is vital for change, and *entanglement* of humans and things as a way to reconstruct past phenomenon and action. However, this thesis concerns the relationship between human, things, and nature as not always being able to fit into modern day 'rationale'. To entangle humans and things also means that one must use modern constructs and meanings to build up a map of the past. Past cultures are abstract and complex in ways which archaeologists as products of modern cultures can have difficulty to grasp through modern constructs. This as archaeologists stand outside of the past's cultural associations; we have access to the tangible material culture of the past, but the cultural mind and its associations are gone. To apply modern meaning through the entanglement of modern language and concepts onto past materials is problematic, and the theoretical framework of this thesis does not aspire to provide an absolute solution to such a complex statement. This thesis does however hope to start a conversation.

2.1. Cultural spheres – a theoretical framework

Skeuomorphism as a theoretical perspective was created by archaeologists, for archaeologists, to analyse and understand material change in the past. How skeuomorphism has been applied through the ages, as evident above, has been varying. It is then the intent of this subsection to formulate and present a theoretical framework which can be used to discuss skeuomorphism

from the context of cultural material influence and agency of things. The following assumptions are then needed to be considered true if we as archaeologists of today want to be able to study past material preference and categorisation:

- Culture should be understood as a sphere encompassing interactions between humans, things, and nature. To uphold a human culture is then dependent on specific interaction with the environment in which humans reside.
- The specific interaction with the environment either limits or allows different human actions through perception, hence human action adhere to both the environment and the cultural sphere in which the environment resides. Human decisions and actions are then relational in their essence, and the agency of *non-humans* (in this thesis: all things and nature that are *not* human) and the influence of materials need to be assumed.
- If the interaction between different agents (humans, things, and nature) in a cultural sphere is assumed, the dependency of culture-specific expressions will differentiate modern and past cultures from each other.
- The categorisation of past materials and artefacts can be considered flawed when the aspect of modern influence is not properly reflected upon in relation to past material analysis.

In this thesis the relationship between humans and things is key to the continued interpretation of skeuomorphs, and how skeuomorphs can be used to perceive past material preference and categorisation. One of the main concerns then becomes that of the definition of *culture*, and how culture fits together with the notions of human and non-human agency.

To consider the value of skeuomorphic artefacts in archaeology, one has to consider the way in which culture is defined and generated in society. Material culture, skeuomorphs included, is understood within the limits of cultural expression, or cultural understanding. It is then important to define the framing of the concept of culture and how it affects this thesis. Tim Ingold (2011) writes about differentiating and discussing worldviews as an outlook of a sphere or the outlook as a globe. In modern times we often conflate the world around us to a globe, a globe which we can spectate, whether it be on maps or those privileged few that can spectate from space. The global environment of modern times then becomes set apart from life – it is its own entity, set apart from the modern human lifeworld. Contrasting to the modern global worldview, is the outlook of a sphere. It is the spherical worldview which dominated in the past, at least in European philosophy (Ingold, 2011). Spheres are hollow and

transparent, and are meant to be perceived from within, the outlook and experience expanding ever outwards. This transparency also enables spheres to be multi-layered, ever spinning around each other, enabling a depth to the perception of the world (Ingold, 2011). If culture is then understood as a cultural sphere, human perception would then be located within the process of culture and cultural expression, rather than being disembodied from the process and reacting to the finished cultural expression as a whole. The cultural sphere then encompasses interactions between humans, things, and nature, as these interactions are needed to uphold a human cultural sphere within a specific environment.

Humans physically move around in nature, and nature is housed in the sphere of human-lived experience. This coexistence within the sphere, between humans and nature, can be called the environment. Not only do humans coexist in the sphere with nature, but they also directly impact nature by physically collecting raw materials from their environmental and natural contexts. This is a premise for human agency, the power to impact the environment around us. However, humans are not the only ones to hold agency in a cultural sphere. As Linda Nash (2005) points out, the physical materials which are derived from nature, can influence and constrain human actions. Hence can certain environmental properties, e.g., raw materials, also shape human intention. This as humans develop their plans and intentions in accordance or relation to their engagement with the world, or one might say through the engagement with the environment within their cultural sphere, and not through disembodied contemplation. According to Nash (2005), this does not necessarily argue for an environmental deterministic view of past cultures, but rather the reliance and need for human and non-human participation in the creation of culture.

I would agree with Nash (2005), that the engagement with, and agency of, the environment or even non-human agents in the cultural sphere, do not have to be an argument for environmental determinism. Rather I would argue that it might be more successful to view the exchange between humans and non-humans as a modified *environmental possibilism*.

Environmental possibilism is an idea originating in the field of geography, and stresses humanity's freedom of choice. Nature is where materials in the physical environment provide the opportunity of human actions, both as a limitation and as an advantage. However, humans still have the discretion to choose how to interact with the material world, and hence choose to be limited or to take innovative action (Fekadu, 2014).

Environmental possibilism also lean into the concept of the theory of affordance. Affordance was first introduced by the psychologist James Gibson (1966), as an ecological approach to

perception, opposed to the established cognitivism in mainstream psychology. Affordance opposes that perception is achieved through a mind encased in a body, but rather through mind and body bound together which engages with the surrounding environment. It is the very act of exploring the world with mind and body that leads to discovering affordance, the limitation and allowance, of the surrounding environment (Gibson, 1966; Ingold, 2018). Ingold (2018) would come to critique this perspective and would propose a temporal aspect of the engagement of the environment. Ingold (2018) instead adopts the perspective that humans need to be ready to take advantage of favourable moments in the environment, and that is the essence of affordance. As the world is not always favourable and waiting on human actions to take place, humans also need to be waiting on the environment for favourable conditions. This results in that both the environment and the human perceiver must be reinstated in the current of real-time, as this is the only way to re-establish the equal agency between the two. Humans live in a world that is forever in motion, forever changing, and never fully realised, but through creativity and imagination, humans can make sense and take advantage of the environment (Ingold, 2018). In the same vein, Neeraj Vedwan (2006) argues how perceptions of risk are cumulative and historically specific. Hence does humans engage with the environment with an aggregation of values and practise which constrain and afford creative possibilities at any point in time (Vedwan, 2006). Not only are then the affordances that the environment imposes on humans locked in time, but also how humans react to limitations and advantages are specific to different cultural spheres locked in time.

The production and perception of skeuomorphs are then situated within a cultural sphere. A cultural sphere which is dependent on, and encompassing of, the interaction between humans, things, and nature. The interaction within the cultural sphere, through the perception of the surrounding environment, enables human imagination, choice, and acts. It is then the *process* which enables cultural expression, and it would consequently make sense if it were the *mind* in the process of making a skeuomorph that holds the most information about past material preference and categorisation. Ingold (2007) discusses the problem of how a focus on consummation of the finished artefact take away the material and its affordance from the artefact. He argues that if this focus is applied, materials are incorporated into the object, and only the fully transformed and realised artefact become centre of attention. If focus is applied on the production process, more specifically the selection of the raw material and raw material properties, archaeologists could begin to unravel the choices dictated by affordances and past environments in past cultural spheres. Human culture is dependent on specific interactions

with the environment in which humans reside, as human decisions and actions are relational in their essence (Dobres, 1999; 2010; Gell, 1998). In other words, the agency of non-humans and the influence of materials needs to be explored – not in relation to modern-day specific interactions in our cultural sphere, but on the terms of past specific interactions in *their* cultural sphere. Ergo if the always-changing relationship between different agents (humans, things, and nature) in a cultural sphere is assumed, the dependency of culture-specific expressions will differentiate modern and past cultures from each other. This as the interaction between human, things, and nature is fundamentally different when the current of time is considered.

Following the stances discussed above, skeuomorphs are the finished products of the interaction between humans and nature. Human perception has then formed the process of making the skeuomorph according with affordances and cultural expressions within their environment (affordances) and cultural sphere (cultural expressions) which encompasses all. Humans imagine the possibilities in the environment, and with these pre-sets can overcome the limitation of affordances in the environment. That is the power of the skeuomorph, to imitate different mediums' visual properties, affordances are overcome through the realisation of the choices made by a past producer. As the thing (skeuomorph) is imagined in the human mind – and realised through the interaction with the environment surrounding the producer, it has a relationship and an interaction with humans and nature before it is even fully created. The material choice of the skeuomorph is then important, as the choices represent creative responses to the affordances in the environment. The other side of the skeuomorph, the one which is realised through cultural expressions in the cultural sphere, then relies on past societies and the sense of community. A producer of a skeuomorph does not act without care of others, but rather choices can be made based on cultural expressions which have meaning for the community in a cultural sphere. Humans themselves then become an affordance in the interaction with the environment in the creation process of material culture.

The separation of past and present then pose a problem for modern-day archaeologists as past categorisation cannot be dictated by modern-day interaction with materials, or modern-day *conditions* of interactions. However, it lifts the importance of the study of skeuomorphs, as skeuomorphs can help with unlocking this cultural sphere of past societies. Agents such as humans, things (skeuomorphs) and nature interact with each other within a society, within a sphere. The different actors do not have a hierarchical effect on each other, but rather the engagement within a sphere creates a cultural sphere, a sphere which in turn can affect the

agents. To separate past and present cultural spheres is crucial as they are fundamentally different, as the agents within the spheres are fundamentally different. However, this does not mean that the different cultural spheres cannot be bridged. If the relationship between humans, nature and skeuomorphs is considered, and if the material properties of raw material are considered as of equal agency over human choices in the past, then archaeological material culture, particularly skeuomorphs, becomes a bridge between modern-day and the past material preference and categorisation of materials.

2.2. Methodology

This thesis will explore and hopefully expand the scientific understanding of past material preference and categorisation through the study of archaeological skeuomorphic objects, specifically through the study of the choice of raw materials when creating skeuomorphic objects. To do this efficiently and comprehensively this thesis will conduct a qualitative research approach, in the form of an adapted reflexive methodology. The reflexive methodology used in this thesis is based on the reflexive methodology presented in the book *Reflexive methodology: New vistas for qualitative research* (2018) written by Mats Alvesson and Kaj Sköldbörg.

One of the basic assumptions that a reflexive methodology relies upon is the fundamental importance of interpretation. If such importance of interpretation in research is assumed, it will result in the rejection of the premise that empirical data (i.e., reality) and the research-produced text are in a simple mirroring relationship. This does not mean that empirical data cannot be used to draw conclusions when a reflexive methodology is employed. It does however call for a higher awareness of the theoretical assumptions that influence the researcher when interpretations are made from empirical materials. Language and preunderstanding of the data are major determinants when interpretations are made and conveyed in text and speech. This raises the need for language and preunderstandings to be reflected upon when conducting research. This is called *careful interpretation* by Alvesson and Sköldbörg (2018) and is with *reflection* the two basic characteristics of reflective research. If careful interpretation refers towards the awareness of how e.g., language and preunderstanding of the data affect the research, *reflection* in turn puts the focus on the person, the researcher, and in extension the research community, society, as well as intellectual and cultural traditions. Reflection can then be said to be part of a reflexive methodology in which the researcher self-reflects and become self-aware. Thusly, the core of reflective research consists of the consideration and reflection upon the perceptual,

theoretical, linguistic, (inter)textual, political, and cultural circumstances and assumptions that surround and affect the interpretations. However, as Alvesson and Sköldberg (2018) stress – and I agree with – that it is impossible to be fully aware, or to clarify everything. There will be taken-for-granted assumptions (read my theoretical assumptions above) within the relevant research field and research community, as well as within the researcher’s own social culture and language. But there is a need, and importance, to stimulate critical reflection and awareness when dealing with research material, and the conclusions drawn from these materials about the ‘reality’ that we believe they represent.

The methodology that Alvesson and Sköldberg (2018) present rests on different *levels* of interpretation. These levels are not static: they can be replaced, added onto, or reduced in whatever way that optimises reflection within the targeted field of research. The point of a *reflexive interpretation* is not the number of levels that are utilised, but rather the principle of reflection and interpretation of the subject, which is dictated according to the specific need and limitations of different research. The levels used in a reflexive methodology are comprised of; contact with the empirical material, awareness of the interpretative act, clarification of political-ideological contexts, and the handling of representation (Alvesson and Sköldberg, 2018). This thesis, as will be further explained in 2.3. *Material selection*, will not be directly based on empirical observations of the material presented, but rather on literature studies of skeuomorphic materials, and their properties, as they have been recorded by others. As my thesis deals with secondary accounts, the interpretative levels will also have to focus on the reflectivity of these accounts and my own. The application of a reflexive methodology will then need some adaptations and will hence deviate from the methodology presented above. Instead of specific theories, the levels of interpretation will focus on the awareness of the interpretative act, clarification of political and ideological influences, and representation.

Lastly, I will address representation and how it will be used in this thesis. In their book, Alvesson and Sköldberg (2018), problematise representation and how it can be interpreted into a reflexive methodology. Representation can be interpreted in the regular sense of whose views and interests the researcher express (ethical-political dimension). However, representation can also be interpreted as re-presentation, the reproduction or construction of a specific reality, in which interpretation in turn relies on how well it is captured by the researcher (epistemological dimension). In this thesis, the interpretative level of representation will primarily be incorporated as the re-presentation of artefacts. The

representation and problematisation of human involvement, interests and views concerning the ethicality and multivocality of the research of things, are a perspective of a reflexive methodology that in this thesis will be explored through the analysis of the written text.

Rather than focusing on a human-centred perspective, does the theoretical framework in this thesis emphasise the non-hierarchical distribution of agency among humans, things, and nature. The framework does however divide the past and present into two different life worlds, or cultural spheres. By applying a reflexive methodology which promotes awareness of both the self and interpretative act, carried out by archaeologists, on material culture sourced from the past, the nuances between the separation of the cultural spheres presented in the theoretical framework will become accentuated. The application of a reflexive methodology in combination with a theoretical framework which promotes a material coexistence within specific cultural spheres is key in order to further reflect upon past material categorisation and preference, as disconnected from modern influences.

2.2.1. Methodological criticisms

In this section, the reflexive methodology used in this thesis will be problematised and some criticisms and concerns will be discussed. Criticisms such as the concern of linguistic reduction in reflexive methodologies will be explored, and how the inclusion of an *ordinary language philosophy* can counteract the criticisms against the use of reductionism.

The application of reflexive methodologies onto written materials, such as literature studies, runs the risk of exaggerated interest in language and text, which could result in linguistic reductionism (Alvesson & Sköldberg, 2018). Reductionism in philosophy is by the critics referred to as a crude simplifier – a way to take something complex and reduce it into something fundamental and simplistic. Reductionism can also be explained in the terms of *Ockham's razor*; if a complex matter can be reduced and explained in more simplistic and fundamental terms, the simplistic way is preferred (Baggini & Fosl, 2010). As this thesis will investigate how language is used by modern archaeologists to structure an understanding of the past, it is then important to be aware of linguistic reductionism. To simplify words and concepts such as 'imitation', 'copy', 'original' and 'skeuomorphism' into their fundamentals would not nurture the broader discussion of skeuomorphism that this thesis advocates. The complexity of the language used to describe skeuomorphic phenomenon, is then more in line with an ordinary language philosophy; words cannot be boiled down into a specific set of finite rules or conditions of how they can be applied. Instead, the focus should be on how

words are understood in the context of how they function in communities with competent language users (Baggini & Fosl, 2010). To avoid falling into the trap of linguistic reductionism, this thesis will *not* try to reduce specific words to their fundamentals, but rather advocate for an awareness of how researchers use language in relation to skeuomorphic artefacts. To be able to do this, some deconstruction of the words and concepts of imitation, copy and skeuomorphism are necessary. However, they are not assumed to be universally applied through different disciplines. As in line with ordinary language philosophy should terminology such as imitation, copy, and original in this thesis be understood in the context of skeuomorphic research. Reductionism is in this thesis a heuristic device, rather than the end goal of the analysis.

2.3. Material selection

The case studies in this thesis are comprised of a critical literature study of skeuomorphic artefacts and their raw material properties. The skeuomorphs chosen for the two case studies in this thesis are Aurignacian shell skeuomorphs made out of ivory, and Late Neolithic metal dagger skeuomorphs in the form of fishtail flint daggers. These two materials were chosen on the premises that both skeuomorphs are of a single raw material (ivory and flint), and that they can be traced to a specific culture in time and space. This makes it possible to attribute the skeuomorph to specific cultural expressions within a cultural sphere. Geographical or temporal connectivity between the case studies is not deemed important in this thesis, as the skeuomorphs should be considered on their own terms within their respective cultural spheres.

The study of Aurignacian shell skeuomorphs will have a primary focus on Aurignacian industries in Southwestern France also known as the *Castel Merle* rock shelter sites, approximately dated at 30.000 BCE. Of special interest is the three rock shelters of La Souquette, Abri Blanchard and Abri Castanet. Perceptions or conclusions specifically applicable to other Aurignacian sites throughout Eurasia will not be made in this thesis, other than statements that concern general interpretation of the Aurignacian period. Neither will contemporary industries of *Homo neanderthalensis* be considered. This as other Aurignacian and *Homo neanderthalensis* sites outside of the confirmed chronology at Castel Merle cannot be verified as part of the same cultural sphere. The Castel Merle valley also houses numerous Palaeolithic sites other than the ones mentioned above, such as: Abri Labattut, Roc de l'Acier, Abri Reverdit and Abri des Merveilles (White, 1989). However, these sites do not contain evidence of seashell skeuomorph production: They will be discarded in this thesis, as they cannot be determined to be contemporary with the shelters in which shell skeuomorphs have

been found. A focus will be on the skeuomorphs of the shells that have a high spire, but some consideration will also be given to the basket beads, which are considered to be a skeuomorph of the Mediterranean sea-snail *Cyclops neritea*. The ivory of which the shell skeuomorphs are created from possess certain attributes; elasticity, strength, and lustre, which are utilised to make a skeuomorph with as close visual resemblance as possible to the ‘original’ shells at Castel Merle. The Aurignacian shell skeuomorphs were then chosen as a case study in this thesis to focus on and further understand past material categorisation between different materials that can produce similar visual attributes.

The study of the metal dagger skeuomorphs in Late Neolithic southern Scandinavia (LNII) will have a special focus on the so-called ‘fishtail’ type daggers, also known as type IV flint daggers in Ebbe Lomborg’s (1973) typology of the flint daggers. The flint daggers are dated to have been produced between 1950-1700 BCE, with confirmed production sites in Denmark but also potentially some sites in the southwestern parts of Scania, Sweden (Apel, 2001). The flint daggers will not have the same site-specific presentation as the shell skeuomorphs at Castel Merle. Since mobility between Aurignacian settlements in Europe cannot be properly established, we do not know how far the Aurignacian consciousness at Castel Merle reached, or how much of the ‘Aurignacian at Castel Merle’ had in common with other Aurignacian settlements in Europe. I deem the cultural sphere of the Late Neolithic to not be place-specific, but rather span across a larger geographical area with active human clusters which interact with each other within a *shared* cultural sphere, with a *shared* understanding of flint, metal and daggers. Rather than viewing every individual settlement as being an isolated cultural sphere on their own within the same environment. The flint daggers have commonly been interpreted as skeuomorphs of metal daggers from the Classical Únětice culture from continual Europe. The most convincing argument that has been put forward of this skeuomorphic relationship is the shape of the flint dagger, which can be interpreted to imitate the form of the metal dagger (Apel, 2001; Frieman, 2012b). However, the flint material has not been worked in such a way that it would be a convincing visual imitation based on material properties in the flint material (see Appendix C.). The flint daggers were then chosen as a case study for this thesis to focus on and further understand past material preferences between different materials, when the skeuomorph does not seem to adhere to the visual imitation of attributes specific for the material of the ‘original’.

Skeuomorphic analysis of specific objects in societal contexts has been done before, in this thesis primarily represented by Jan Apel (2001) and Frieman (2012b). The aspiration of this

thesis is to lift skeuomorphism into a discussion that enables analysis across spatial and temporal 'boundaries'. This would also enable a critical revision of the skeuomorphic phenomenon, and the archaeologist's part in interpreting material preference, use, and categorisation in different prehistoric contexts, with a focus on how material preference and categorisation have been realised into skeuomorphic objects and how this can reflect past material perception.

3. Ivory

In this chapter, the ivory usage in the early Aurignacian culture of Castel Merle is presented with a focus on seashell skeuomorphs, and how the material properties of ivory (elasticity, strength, and lustre) have been used to imitate both visual and tactile aesthetics of the seashells. Before the material properties are explored, a brief overview of the area of Castle Merle will be presented, with the purpose of giving a cultural context and understanding of the cultural organisation of the southwestern French Aurignacian cultural sphere.

La Souquette, Abri Blanchard and Abri Castanet are rock shelters situated in the ‘vallon de Castel Merle’, a karstic dry valley near the river Vézère in the Dordogne region of inland southwestern France. The valley is one of the numerous dry valleys in the area, created by the collapse of a subterranean cavity. The shelters themselves were created by the differential erosion rates of the cretaceous limestone cliffs that the valley is surrounded by, and provided attractive habitation sites during the Upper Palaeolithic in France (O’Hara et al., 2015).

3.1. The Aurignacian at Castel Merle

Between 30.000 and 40.000 years ago, at the beginning of the European Upper Palaeolithic, there was a significant change in material use in the archaeological record. The traditional Lower and Middle Palaeolithic material repertoire consisting of stone and wood, changed with the appearance of materials such as antler, bone, mammoth ivory, various shells, amber and steatite (Conneller, 2013; Mellars, 1989). This change of material use in the archaeological record is seen as the dawn of the Aurignacian I period in the southwestern French palaeolithic. This, combined with a greater focus on body ornament production, distinguishes the Aurignacian I from previous documented material records. The emergence of ornamental production is noticeable in the material record of Castel Merle, as deposits of mammoth ivory, and both fossilised and non-fossilised species of marine and freshwater shells has been found (White, 1995). The early Upper Palaeolithic culture of Aurignacian I also introduced the production of animal and human figurines and a widespread production of beads and pendants for bodily ornamentation. Most of the ivory raw material that was procured during the Aurignacian went into the production of these body ornaments (White, 1997; Heckel, 2009).

The features that are imitated in the seashell skeuomorphs are both the direct morphology of the original shell, the *lustre* of the shell material, but also the meandering pattern of punctuations found on Atlantic seashells in contemporary layers to the skeuomorphs at Castel

Merle (White, 1989). The skeuomorphs which are the main focus from a form feature perspective in this thesis are the skeuomorphs most akin to various pointed spire seashells, which imitate form, lustre and décor of the natural shells (for visual reference of the high spire seashell skeuomorphs see [O'Hara et al., 2015, fig. 3](#)). However, Randall White (1989) and Claire Heckel (2009) argue the basket beads also could be skeuomorphs of the Mediterranean native seashell *Cyclops Neritea*, which have a smaller more blunt-shaped spire (for visual reference of basket beads see [Heckel, 2018, fig. 1](#)). The features that were of most interests in these shells seem to have been the form, but more prevalent is the visual lustre which has been produced in the skeuomorphs. Basket beads are also the most widespread bead in Aurignacian contexts, with around 1.000 specimens found only at Castel Merle from the Aurignacian I. In contrast, spanning all Aurignacian sites in France, does pierced marine-, freshwater- and fossil shells make up one third of the suspension ornaments (White, 1997).

A well-known problem with the Aurignacian I at Castel Merle is that none of the artefacts recovered from the shelters of La Souquette, Abri Blanchard and Abri Castanet, have been found in situ. It is then hard to make assumptions based on how the artefacts were being used or what cultural significance they truly had based on their find-contexts.

3.1.1 Chronology and continuity

Most of the shell skeuomorphs at Castel Merle have been found in the La Souquette shelter, a total of six high spire shell skeuomorphs and 434 basket beads. This makes La Souquette the primary shelter of interest concerning the production and realisation of the seashell skeuomorphs (White, 1989; 1992). The main reason that the high quantity of beads has been recovered from La Souquette is that the shelter was the target of poorly done excavations carried out during the early half of the 20th century, but also from a mining operation conducted in historic times (White, 1989). The debris from these early excavations was then water sieved by Marcel Castanet between 1910 and 1911. The debris that was meticulously water-sieved yielded a large number of artefacts, that was assumed to belong to the La Souquette shelter as this was the shelter which underwent major excavations at the time (White, 1989). A certain degree of caution then needs to be exercised as the find-contexts of the skeuomorphic beads are destroyed, and not properly documented.

Excavations carried out at La Souquette in 1982 by Alain Roussot uncovered and established a detailed stratigraphy, and an intact Aurignacian I layer resting on bedrock, away from the main zone of previous excavations. This peripheral zone did not yield any skeuomorphic beads; however, two pierced shells and two fragments of mammoth ivory was recovered.

Roussot also noted that all layers above this bedrock layer were disturbed by historical or modern activity (White, 1989). As the Abri Blanchard and Abri Castanet shelters both have intact stratigraphy, they can be used as models for the destroyed stratigraphy at La Souquette as will be further explained below.

Abri Blanchard and Abri Castanet share a close relation, both in continuity and spatially, as Abri Castanet is located approximately 50 meters southeast of Abri Blanchard, and the two sites share the same shelter platform. There has been some discussion about the contemporariness of the Abri Blanchard and the Abri Castanet shelters, and recent research has argued that the two shelters have some sort of continuity, however, the rough excavations of the sites during the early 20th century make interpretations hard (Tartar et al., 2014). This as the artefacts found at Abri Blanchard were curated as one assemblage. However, as the artefacts of Abri Castanet were curated with layer specifiers, they can be used to determine the temporal provenance of the beads and ornaments of Abri Blanchard if a continuity between the shelters is assumed (White, 1989).

In the early 20th century two layers were uncovered at Abri Blanchard, Unit B and D. Both layers were determined Aurignacian in nature, and were separated by a sterile layer of debris from a collapsed ancient ceiling (Bourrillon et al., 2018). Similarly, was a layer of collapsed ceiling debris documented in Abri Castanet (Mensan, 2012). This opens up the possibility to merge the two stratigraphical matrixes of the shelters. Layer A at Abri Castanet, which was found under the collapsed ceiling, would correspond with layer B in Abri Blanchard. In Abri Castanet layer A contained artefacts of bone, antler, and ivory, and all the shell skeuomorphs and bead production debris, which were determined to belong to the Aurignacian I (White, 1989). The similar stratigraphy of the two shelters can then be used to securely uphold the stratigraphical matrix and use of the shelters at Castel Merle. A stratigraphic provenance has hence been determined for all the non-lithic artefacts at Abri Blanchard and Abri Castanet. Based on the classification of artefacts, unit layer A/B has been attributed to Aurignacian I, and it is in this layer the shell skeuomorphs and unworked ivory was found (White, 1989).

The chronology of La Souquette might be thoroughly destroyed, but through relations and corroboration with the contexts of Abri Blanchard and Abri Castanet, the artefacts recovered from these destroyed contexts can be chronologically determined with relative security. The stratigraphic link between Abri Castanet and Abri Blanchard, provides a stratigraphic anchor for the entirety of the Castel Merle sites. An anchor that must be assumed and trusted as it is

difficult to revise with more recently done excavations (White, 1989). Thus, all the seashell skeuomorphs have to be assumed to belong to Aurignacian I at Castel Merle.

3.1.2. Trade and import of skeuomorphic materials

Trade and import at Castel Merle are indicated by both the actual seashells and the ivory from which the skeuomorphs were made. Genuine shells were widely exchanged from great distances, often over 300km. This estimate is based on the presence of five species of Mediterranean shells; *Columbella rustica*, *Homalopoma sanguineum*, *Nassarius corniculatus*, *Nassarius gibbosulus*, *Nassarius mutabilis*, in Aurignacian sites in southwest France (see Appendix A.). In reverse has three Atlantic shell species; *Littorina obtusata*, *Littorina littorea*, *Nucella lapillus* been present in five Mediterranean sites (Vanhaeren & d'Errico, 2006; see Appendix A.). The shell of which the basket beads are argued to imitate is also interesting from a connectivity perspective, as the *Cyclops Neritea* shells have only been documented at sites in south-eastern France, also from the Aurignacian I (White, 1997). The occurrence of natural shells at Castel Merle would then indicate a larger network of trade and influence, and this is iterated in the ivory.

The possibility of a live mammoth population in the surrounding environment of Castel Merle has been both discussed and analysed with varying opinions. White (1989) and Heckel (2009) have argued that the ecosystem around Castel Merle would not have been able to support a mammoth population during the Aurignacian I. This statement is based on the lack of mammoth remains other than ivory at Castel Merle, and that only one intact section of a mammoth tusk has been recovered from the site. Additionally, the early stages of tusk reduction are rare to recover from the site, which could be caused by the absence of mammoth hunting grounds in the area (White, 1989, 1997; Heckel, 2009). Early stages of ivory reduction are present at Castel Merle, in the form of ivory rods. The cylindrical rods, 10 cm long and 0.45 to 1.40 cm in diameter, are the largest singular units of worked ivory found at the Castle Merle sites and would support the assumption that ivory was an imported material, as it would be easier to transport than a whole mammoth tusk (White, 1989). The ivory used to produce shell skeuomorphs at Castel Merle, as well as natural shells, could have been imported from outside the Castel Merle environmental sphere. Even if the ivory at Castel Merle was not imported, one would argue that the bead production, and hence the ivory, seems to have been important to the people occupying the site. This as considerable effort has been put into the acquisition of materials and the manufacturing of the beads. This would be the case both if ivory procurement happened through local hunting and carrying tusks or ivory

rods from the hunting grounds, or if the ivory was imported from hunting grounds outside the local environment. It is, however, not known if the materials were imported through travel or extended trade networks among different groups.

The skeuomorphs of the southwestern French Aurignacian that is presented in this thesis is primarily made of ivory, but bead skeuomorphs made out of stone, primarily steatite, do also exist. Steatite, in opposition to ivory, is easier to determine provenance on, as this stone is not native to the Dordogne region in which the Castel Merle sites reside. This means that the steatite had to be transported from either the highland region of Massif Central in the middle of southern France, or the Pyrenees mountains on the border between modern France and Spain. This means that no matter which source the steatite derived from, it had to be transported at least 100km (White, 1989).

3.2. Material properties of ivory

In modern society ivory is often used in referral to dental materials of commercial value, however, there are differences in the properties of ivory from different animals. The ivory used by the Aurignacian culture in southwestern France, consisted mainly of what has been labelled *true* ivory, i.e., proboscidean tusks. Also known as the upper incisors of modern elephants, or their now extinct relative the woolly mammoth (White, 1997; Heckel, 2009). A major difference between the ivory of proboscidean tusks and other kinds of ivory, is that of the sheer size of the tusk, which in turn affects the integrity and properties of the tusk itself. To uphold the weight and size of the tusk, and still be impact- and stress-resistant, the tusk needs to be complex in both the internal structural architecture, but also in the chemical structure (Pfeifer et. al., 2019). Concisely explained, like the growth rings in trees, elephant and mammoth ivory have in their transverse profiles a unique pattern called a *Schreger pattern*. The Schreger lines, which create this pattern, are spaces filled with dental tubules and collagen that occur between the yearly growth phases of the ivory. The Schreger lines tend to be more developed and visible closer to the outer tusk, and more dense and less pronounced closer to the tusk's nerve canal and pulp cavity (Pfeifer et. al., 2019). When ivory is worked, the ivory tends to naturally split along these Schreger lines. The ivory of the outer tusk is then also more easily worked, as it is less dense with a more developed Schreger pattern. The inner ivory is mostly found in waste contexts, which is corroborated by the findings at the rock shelters of Castel Merle (Heckel, 2009; White, 1997).

3.2.1. Elasticity and strength in the craft process

The elasticity of the proboscidean ivory makes the material easy to work with without fracturing from both a technical and craft perspective. Mammoth ivory can be split into rods and carved into artefacts without making it brittle. It is these inherent properties of elasticity and softness (due to the Schreger lines), combined with toughness and strength (as qualitative characteristics made clear in the microstructure), that make ivory exceed other materials such as bone and antler, as a prime material for sculpting and carving. The elasticity of the ivory made the material shatter-resistant when under pressure, but is also strong, tough, and stiff, which due to the microstructure of the ivory which favours such properties (Heckel, 2009; Pfeifer et. al., 2019).

A proboscidean tusk is mainly composed of dentine, encased in a thin layer of cementum. Only the tip of the tusk is coated with enamel, which would usually wear off within the first five years of the mammoth's life. After this, the entirety of the tusk would only be composed of dentine and cementum. Dentine is composed of 70 percent rigid inorganic materials, 10 percent water and 15 to 20 percent collagen and lipids, compared to the enamel which is composed of 95 percent rigid inorganic material. This makes enamel strong, but quite brittle, in comparison to proboscidean tusks (Heckel, 2009). This would explain why mammoth ivory was favoured as a sculpting material at Castel Merle, as similar materials such as teeth would be too brittle for the intricacy needed to create the skeuomorphs and other ornaments.

3.2.1.1. Craft process.

The predominantly recorded basket shell skeuomorphs recorded among the Castel Merle sites display a remarkable standardization (White, 1989; See [Heckel, 2018, fig. 1](#)). The basket shell skeuomorphs even size distribution would point to a well-defined production standard, both within and between, the shelters of Castel Merle. This standardization in the production sequence would point towards a cognitive reality in which the final form of the bead was embedded into the production process from the beginning. Then the reduction sequence from which the beads were realised, was carried out with a particular aesthetic in mind (White, 1995). White has on several occasions described a possible production sequence of the basket beads, as these are the most abundant beads in the Aurignacian I (White, 1989; 1995; 1997).

The ivory rods mentioned above seem to have been the first on-site step towards the production of shell skeuomorphs. The production sequence for the basket shell skeuomorphs begins with (I) the pencil-like ivory rod, (II) the rod is divided into pieces by circumcisions made into the rod, and then snapping the rod apart at the weak points, (III) the bilateral

thinning of the bead; optional preliminary polishing occurs, (IV) a perforation is made near the lower bulb of the bead for means of suspension, (V) Polishing and grinding to remove the upper portion of the bilateral thinning and to round out the bulb; it was also at this stage that the polishing with red ochre to produce a lustrous surface occurred. This is quite a complex production- and technology sequence and could take up to three hours to complete (White, 2007; 1992).

Moreover, a certain pattern of craft specialization can be observed through the establishment of a production sequence. From the debris assumed to belong to La Souquette, a majority of the beads found are from the IV stage, in comparison to the two other shelters. This could mean two things; either La Souquette were the place of production in which stage IV beads were turned into finished beads, or there was a stockpile of stage IV beads at La Souquette (White, 1997). The large quantity of stage IV beads would however point to some sort of craft specialisation pertaining to the production and distribution of basket shell beads might have occurred at the Castel Merle sites (Heckel, 2018).

Craft specialisation would be a viable alternative perspective to view production at Aurignacian sites. Craft specialisation and organisation can have important implications for the emergence of social complexity and art. Rather than being just a byproduct of already established social complexity and artistic performance, craft specialisation consequently indicates a more complicated division of labour than previously thought (White, 1997). The production of skeuomorphs at Castel Merle then becomes a production made within a cultural sphere and a part of a cultural process. White (1997) also puts forward the possibility that shell skeuomorphs during the Aurignacian period were produced in specific places in the landscape, perhaps at locales at which groups from distant locations aggregated. This would then explain to some degree the hyperabundance of imported raw materials at certain places e.g., Castel Merle.

3.2.2. Lustre

Another material property of ivory is the visual effect that can be achieved by working the ivory surface. Surface lustre is documented on almost all beads produced during the Aurignacian I, not only in the ivory skeuomorphs. However, it has been determined to not be the product of post-depositional processes. Visual and haptic properties such as colour, lustre, softness, and warmth of touch which ivory possesses, differ from other similar materials such as bone and antler (White, 1997; 1995). Both ivory and teeth can imitate the lustre and shine of shell, but only ivory can realise this property without compromising the strength and

integrity of the material. This in comparison to teeth which rely on the brittle enamel to visualise lustre and shine (Heckel, 2009).

As mentioned in subsection 3.2.1.1. *Craft process* is the lustre and *mother of pearl* shine intentionally produced by the means of grinding and polishing the ivory with red ochre. Red ochre is a natural metallic abrasive powder which would finely grind and polish the ivory until lustre emerged from the material (White, 1997; 1995). Scanning Electron Microscopy analyses of Aurignacian I shell skeuomorphs from southwestern France has confirmed particle traces of red ochre in the grooves left by fine grinding on all of the tested beads. Red ochre is also present as large caches at both Abri Blanchard and Abri Castanet at Castel Merle (White, 1995). This would further the idea of labour division and craft specialisation at the site.

3.2.3. *Punctuation décor*

Other than the lustrous properties of ivory that could be made to imitate shells, punctuations were also often drilled into the skeuomorphs, perhaps to imitate the pigmentation or texture of natural shells (Conneller, 2013; see Appendix A.). Punctuation décor can be found both on the seashell skeuomorphs and the basket shell skeuomorphs (See [O'Hara, 2015, fig. 3](#)). The technique used to create these alignments of visibly separate punctuations is referred to a *powerturn*, which uses a pointed tool and hand pressure to create small indentations on surfaces. The tool point is moved in an arc of 90 to 130 degrees in multiple directions, in a uniform and continuous gesture. Thus is a comma-like groove or punctuation created from the initial dent the tool point made in the material (Bourrillon et al., 2018).

Punctuation décor, in general, can also be found on other Aurignacian artefacts, such as blocks and cave art. The specific visual this technique creates, makes it possible to trace it over different materials. At the Castel Merle sites the punctuation technique is clearly visible on various artefacts; a mammoth tooth plaque, fish-like pendants and several wall and slab arts uncovered at Abri Blanchard, and of course on the ivory shell skeuomorphs recovered from La Souquette (Bourrillon et al., 2018). The punctuation décor can then be interpreted as an imitation of naturally created patterns on seashell, but also as an indicator of how the material view during the Aurignacian was fluid. All different kinds of materials such as rock, ivory, or even bone, could possess the same material feel, if marked with the punctuation décor.

3.3. Metaphoric materials

The shell skeuomorphs at Castel Merle can be interpreted with ornamental purpose, as a result of an aesthetic and visual need. The form and the visual output of the shell skeuomorphs become a material metaphor for another material, but with a big difference; the shell skeuomorphs need to be created, formed by human hands, ideals, and imagination to be as similar to the naturally occurring shells as possible. This is possibly why ivory was favoured as a material to create shell skeuomorphs, as ivory is the material best suited to create the visual properties strongly connected to the shells; lustre. To further this point one can refer to studies made from other Aurignacian sites in which ivory has been present. The distinct favouritism of ivory as a raw material for the skeuomorphs, does not have to mean a disinterest in other materials, or random use of materials which could be provided with easy access to the production site of Castel Merle. The distinct use of one material in bead production, could in fact, point to several pronounced choices concerning the use of certain raw materials in the surviving archaeological artefacts.

In locals studied in France, Belgium, Germany, and Russia fox canine teeth dominate the bead production, followed by smaller quantities of vestigial canines of primarily red deer. In Spain and Italy however, most of the beads made from teeth were vestigial canines of red deer, and fox canines were completely absent from the material (White, 1995). Further it has been studied that species that compose the raw material in bead and ornamental production are not found in, and are fundamentally different from, the species found in food debris depositions. This would suggest that the raw material chosen for ornamental purposes was not exclusive to dietary preferences (White, 1995). The ivory of Castel Merle can then be interpreted as important for the raw material's symbolical behaviour when formed into a skeuomorph, or figurines with ornamental purpose. White (2007) points out that the animals whose teeth were used for ornamental purposes and for sustenance were mutually exclusive, and in the case of the mammoth ivory probably not endemic to the area, which could imply that the animals of which the ornaments are made of contributes to a collective symbolic imagination. The production process of a single bead is time-consuming, three hours, which would imply that the production of shape and lustre was significant for the symbolic value of the skeuomorphic beads (White, 2007). As the raw materials were not chosen for their availability in the surrounding landscape, but rather their proclivity to imitate shell properties such as lustre, combined with that the raw materials were probably not associated with consuming, could lead to an interpretation of a metaphor, a shell identity. Similarly, is the punctuation décor

found on some shell beads interesting, as the punctuation décor does not seem to be limited to the imitation of shell. The décor can be found on all manners of materials and forms as mentioned above, everything from stone slabs, to walls, and shell skeuomorphs. If this décor originates in shell imitation is not known, but White (1995) points out yet again that the transfer of natural patterns such as the punctuation décor onto new contexts and mediums can be an indication that the beginning, or fundamentals, of a metaphor was being conceived in material forms.

The occurrence of material metaphors then leads to the creation of the metaphors. As mentioned above, the shell skeuomorphs had to be created by human hands, in contrast to the naturally occurring seashells in the environmental sphere. The process of making the skeuomorphs then also becomes a process of making a metaphor, additionally to transforming one medium into another. This raises questions considering the relationship between the natural occurring shells and the skeuomorphs, as this transformation happened in the same sphere in which the natural shell beads were also created and used. A metaphor creates a fusion between two mediums, or two objects, which in turn creates a new entity with characteristics from both ‘original’ mediums (Merriam-Webster, n.d.). The natural occurring shell and the ivory are combined by using the form of the natural shell and the properties of imitation of ivory to create the shell skeuomorph. The shell skeuomorph is not *like* a natural shell, it *is* a natural shell, and that is the nature of a material skeuomorph. But how can we know for sure that the skeuomorphs were viewed in Aurignacian times as natural shells and not as ivory imitations?

We should not forget that the production process of the skeuomorphs happened at Castel Merle without any obvious attempts at hiding that the skeuomorphs were being produced. It can then be assumed that the people converging at Castel Merle know that the shells and the skeuomorphs were not sourced, nor produced, in the same way. The shell skeuomorphs were produced in the centre of the Castel Merle cultural sphere, literally, and were not created for a purpose of abridging or crating an understanding of another cultural sphere’s material culture. The skeuomorphs are a product of the realisation of a cultural and material metaphor of importance, in which properties inherent to natural shells were key. The metaphor of Aurignacian shell skeuomorphs, was then not dependent on the lack of understanding of the craft process to create a convincing ‘imitation’, but rather the combination of natural shells and ivory creates a metaphorical shell – a metaphorical shell that behaves like a shell would, both visually (lustre) and in tactile form (shell form and punctuation décor).

How was then the natural shell and the skeuomorphs viewed in the same cultural sphere? Was the shell considered a live material after it had been abandoned by whatever living organism that was living inside of it? Were shells that washed up at shore empty and devoid of life, also deemed as devoid of life by the ancient Aurignacian people? Was ivory in turn seen as a living material, with properties that could be evoked by human touch, such as creating lustre by polishing the ivory? Or did just the feeling of the warmth and softness of the ivory evoke a feeling of a living material? Such questions are the core of this thesis; how could the material preference and categorisation be perceived through skeuomorphic materials? What we can perceive of material use in the Aurignacian cultural sphere would indicate a material categorisation based on metaphor, and merging materials, rather than a categorisation based on a typological need to divide materials based on a technicality. There is a sense of *fluidity* in the outlook on materials, that might set the Aurignacian cultural sphere apart from the modern cultural sphere.

4. Flint

Flint in this thesis is represented by the Late Neolithic flint daggers of the ‘fishtail’ type (See Appendix B.). The terms ‘chert’ and ‘flint’ is often internationally used interchangeably in archaeology, most predominantly does English speaking archaeologists differentiate between the two. However, in Swedish and other Scandinavian languages there is no word for ‘chert’. All fine-grained, siliceous rocks used for knapping in this area is only referred to as ‘flint’ (Högberg & Olausson, 2007). Flint is a material that, depending on the type of flint, can have differences in the inherent material properties, but also in environmental properties such as environmental affordances and availability. In this chapter I will foremost focus on the Senonian flint, which most of the Late Neolithic fishtail daggers are made from. First by presenting a brief overview of the Late Neolithic cultural sphere which produced the fishtail daggers, and how they used flint to make these quite technologically complex daggers.

4.1. Late Neolithic in southern Scandinavia

Unlike the early and middle Neolithic, which have distinct cultures associated with them, the Late Neolithic, especially LNII in south Scandinavia, are defined by a movement towards a lack of distinct cultural indications. The beginning of LN I, still had culture specific indicators such as Bell Beaker single burials and pottery in northern Denmark. However, in the late Middle Neolithic, the traditions of the Battle Axe and Pitted Ware cultures merged into one in Denmark, south and central Sweden, and the south-eastern parts of Norway. This new cultural expression shared a unified material expression, which carried over into a perceived singular culture expression in LNII (Apel, 2001; Price, 2015). The fishtail daggers are produced during the second phase of the Late Neolithic, LNII, which have been dated by Helle Vandkilde (1996) to be between 1950 BCE and 1700 BCE. This corresponds with a revised chronology of the central European Únětice culture, which places the Únětice classical period as contemporary to LN II and the fishtail daggers. Vandkilde (2017) also further conclude that based on contact finds, it could be presumed that LNII is contemporary with the Únětician classical phase, and a likely source of influence on the emergence of the fishtail daggers.

A problematic mindset that is lifted in this thesis is how modern categorisation is imposed on past material culture. The late Neolithic Scandinavian flint daggers are a stellar example of this. The fishtail daggers are classified in a typology created by Lomborg in 1973, and for a long time Lomborg’s typology dominated the view of the Late Neolithic flint daggers. Lomborg divided the daggers into six different dagger types (I-VI). With the type VI dagger

technically assigned to the early Scandinavian Bronze Age, period I, and not the Neolithic. All of Lomborg's main dagger types also have subtypes, which showcase a diversity within the types themselves (Lomborg, 1973). Flint daggers of type I-II is of a lanceolate shape, and the type III-V have a more pronounced difference between handle and blade (Apel 2001). The one type of flint dagger that have been universally described as a skeuomorph is the type IV, the fishtail dagger (see Appendix B.). It is called fishtail dagger because of the wide and fishtail-like pommel, and the rounded shoulders of the blade (Apel, 2001; Vandkilde 1996; Lomborg 1973).

The pommel and the rounded shoulders of the blade are also features that are considered to be of skeuomorphic origin among the fishtail daggers. All of the skeuomorphic features include: (1) the wide and protruding pommel, (2) the rounded shoulders and triangular shape of the blade, and (3) the zigzag flake scar decoration of the edges and faces of the handle. These features are considered to imitate; (1) the wide pommel on central European bronze and copper daggers, (2) the triangular blade and rounded shoulders where the blade is attached to the handle of said bronze and copper daggers, and (3) is considered to imitate stitching of a leather or textile protection that was secured onto the metal dagger's handle (Frieman, 2012a; 2012b; Apel, 2001; see appendix C.).

4.1.1. Raw material acquisition and provenance

In some cases, the visual aspect of differencing flint is enough, but most often the visual distinction between flints is not clear. The distinction between flints when it is incorporated in artefacts is even harder, as the flint used in artefacts often lack the cortex. The cortex, or outer layer of the flint, is often essential when determining flint provenance. And without the protecting cortex, the flint will also be more prone to discolouration or patination, which makes the visual identification of flint less reliable (Olausson et al., 2012). A further complication of determining the provenance of Scandinavian flint, is the glacial movement that has naturally mined and redeposited flint in moraines, and glaciofluvial- and lacustrine deposits (Olausson et al., 2012). Attempts have been made to determine flint provenance with EDXRF (non-destructive energy dispersive X-ray fluorescence), however, the success of this method have been varying, and in some instances this method could not determine the difference between Senonian flint and Falster flint (Hughes et al., 2010; Högberg et al., 2012).

By using the visual classification, a certain prevalence of Senonian flint in the fishtail dagger material can be noted. The majority of the flint daggers were, according to Apel (2001), made from Senonian flint – with a minority made from Danian flint, Kristianstad flint and quartzite.

The type IV fishtail dagger subtypes A and B have been documented to be made of almost any flint and not bound to specific mining places in Denmark, according to David Barrowclough (2004). However, in the case of the subtypes C, D and E, which is also considered to be the most spectacular daggers, are made from almost exclusively Senonian flint. The finer quality Senonian flint enabled the knapper to create thin blades by using the pressure flake technique to make the intricate stitching on the handle, which would not be possible in lower quality flint as the flint would crack. Senonian flint were however restricted in its distribution, as it is limited to deposits around the Limfjord area in Northern Jutland, Denmark, Falster, Lolland, and south-eastern Zealand. Barrowclough (2004) also notes that Falster flint seems to have been favoured in the production of type IV C, D and E daggers. The prevalence of certain kinds of flint within certain subgroups of flint daggers should also be viewed with some caution. This as the modern perception and differentiation of flints can affect the way that the flint daggers were categorised into a modern-made typology in the first place.

As mentioned briefly above, flint can be found in both primary and secondary deposits in Scandinavia, this also means that flint mining can be done at surface level by prospecting the ground and digging pits, or by mining deeper below surface level. When mining deeper below surface level, pits were sometimes dug as deep as seven meters underground, creating circular shafts. These shafts could then branch off into galleries which followed the flint nodules underground (Apel, 2001). Recent excavations of settlement sites close to these mining areas also suggests that they were excavated by members of local communities over many generations, and not carried out as a controlled industry from a specific seat of power (Frieman, 2012b).

Apel (2001) also concludes that the areas around the mines were important locations and developed into flint knapping 'centra', which would develop a monopoly on the dagger production. This as big pieces of Senonian flint, or as Barrowclough (2004) and Högberg et al. (2012) concluded; a similar type of flint, were a necessity for the development of the complex flint knapping technique of IV daggers. Apel then identifies main areas of sourcing flint material and production sites of prestige daggers in southern Scandinavia, which later shifted during the transition into LN II. This shift occurred from being primarily two core areas during the LN I; one in the Limfjord area in northern Jutland, Denmark, and another comprised of the eastern Danish islands and southwestern Scania; to predominantly consist of the eastern Danish islands during LN II (Apel, 2001).

4.1.2. Craft process

Important to note according to Apel (2001) is that although the fishtail daggers are interpreted as prestige objects, the production of flint daggers during LN II decreased, as the local production of metal objects increased. This decrease in flint dagger production did not seem to impact the type IV fishtail daggers negatively in the approximately 250 years they were in production, as both the quality on the daggers and the flint technology became more complex and time consuming. It is then interesting to study the production process of the type IV fishtail daggers, as they alone of the flint daggers achieved a complex knapping technology: an advancement that could be connected to their skeuomorphic relationship to central European metal daggers.

Apel (2001) concluded that to study the mode of production of the flint dagger, one must consider the flakes' debitage and the cognitional impact on the production. The progression from one production stage to another is defined by the completion of a mental template, as the template follows an idea of the performance of continued reduction. Apel does then only use diagnostic flakes that are unique to a specific mental template in his analysis of the reduction process. A consequence of this is that only a portion of flakes from a site will be assigned to a production stage, however, they will form a picture of the cognitive progression of the knapper as new gestures can be identified when they are introduced into the process. From this perspective a *Chaîne opératoire* has been formed, complete with seven stages, for a generic biface:

(I) a *blank* or untouched piece of flint is chosen of proper quality and dimensions, (II) a *rough out* is made into the shape desired, (III-V) primary, secondary and final preform is made to reduce the rough out into a thin blade and pronounced handle. After the final preform the overall shape of the dagger should be in place. During the first three stages direct knapping is used, but during the (IV) second and (V) final preform, tools are used to punctuate, and pressure-trim the edges and start the process of implementing a zigzag décor on the handle if desired. But before this decorative process, the surface appears to have been ground smooth. During the last stages (VI) flaked implement and (VII) retouched implement, the dagger is decorated with parallel retouch flake scars on the blade and other retouches, as the completion of the zigzag décor on the handle, is finalised (Apel, 2001). It has been speculated that the zigzag décor ridge implemented on type IV daggers was made by fine copper-tipped tools that were used as pressure flake tools. This as nine prehistoric IV E daggers and a replica

underwent microwear analysis, which concluded that the replica and several of the prehistoric daggers had traces of copper on the stitching (Barrowclough, 2004).

Further Apel (2001) also suggests that the first stages of production were carried out close to the mining area and away from the settlement, to help the individual to train their *know-how* or *practical performance of an action*. This also alludes to an accepted apprentice system in LNII societies, as know-how is only achieved by learning theoretical knowledge provided by a teacher, but also by practising this knowledge repeatedly. An abundance of, and easy access to, raw material is then needed to provide ample material for practice. However, the later stages of the knapping process, which would be harder to grasp without proper verbal instruction, could be executed closer to the settlement site as the exclusivity of the knapping knowledge was not compromised. This has been proven by archaeological finds of debitage inside the settlements but would also only be logical according to Apel. This as the display of technology in front of the consumers would remind them of the prestige and exclusivity of the technology.

Frieman (2012a; 2012b) does not agree with this and, even if the flint knapping seems to be split between the mining sites and the settlements, she does not find it convincing that this would necessarily point towards a centralised hierarchy or apprentice system. Vandkilde (1996) is also sceptical of a centralised power and points out the possibility of the first stages being carried out at the mining site, but that the artefacts are then traded and transported away into the periphery, in which high-quality flint was scarce. It was then less about a centralised and coveted knowledge, but rather a centralisation based on limitations in the environment.

4.2. Material properties of flint

It then seems that in the case of the fishtail dagger, the main skeuomorphic imitation was in the form of the dagger, and less important was the actual visual material correspondence to bronze. Flint is a hard material, which affords certain actions, as mentioned above in 4.1.2. *craft process*. The material properties of flint that is of interest in this thesis will then be the properties which enable the dagger to perform in relation to its form.

4.2.1. Practical properties of a dagger form

Apel (2001) and Niels Skak-Nielsen (2009) both discuss the limitation of the practical function that the flint material presents for the dagger form. In general, past discussions of the ‘dagger form’ categorise it as a weapon. However, Skak-Nielsen finds that this is not likely in the case of the IV dagger, as a dagger used as a weapon would have favoured a pointier

design. Skak-Nielsen instead argues for the fishtail daggers to be interpreted as *food-knives*. This as the signs of repair and wear on the edges of the fishtail daggers, would suggest that they were rather used to slash than stab, and would be perfect to butcher and skin animals. Apel (2001) is also of a similar opinion, and further points out that the tip on flint daggers is especially fragile and blunt, which would cause the tip to shatter on impact if used as a stabbing tool. Considering this, Apel also reaches the conclusion that the dagger would have been a good tool for butchering, as the thickness of the blade and bifacial retouched edges are highly efficient in skinning, as the flint dagger naturally takes the path of less resistance. But as Apel noted concerning the brittle tip of the blade, it would neither be able to cut through bones nor other hard parts of the animal. As the properties of flint differ from metal, the practical function and use of flint daggers also differ from metal daggers. Metal daggers can be used as stabbing tools, but are less efficient as butchering knives, as they lack the natural manoeuvrability and sharpness of the flint daggers (Apel, 2001).

It could then be said that the flint and the metal daggers occupied different practical functions. However, this did not change the deposition pattern of the metal daggers, which also became more common during LN II, as the new metal depositions continued to follow the old flint deposition pattern; single depositions, and one- and multi-typed hoards predominantly associated with wetlands (Vandkilde, 2005).

4.2.2. Resharpener and repurposing

The resharpening of flint daggers is often discussed in a practical sense, a necessity for continued practical function, as resharpened daggers are a usual occurrence. Stensköld (2004) critiques the scientific discussion surrounding resharpening, as it is mostly written off as a practical need to enable the functionality of the dagger. The resharpened daggers are then considered to be of lesser value, and lower in the 'prestige hierarchy'. Resharpened daggers, generally across all types of flint daggers, are less frequently used as 'sacrificial offerings' than daggers that have not been resharpened. When resharpened daggers are used in deposits they are always deposited in water without other objects. The resharpened daggers are also less frequent in grave contexts (Stensköld 2004).

Apel (2001) points out that all daggers have been sharpened at least once, that is in the creation process when the blade is sharpened for the first time. This could point to that sharp edges were considered something essential that a flint dagger should have. Apel also identifies four different categories of resharpening in the flint dagger material; (I) Dagger that only have been subjected to final retouch, and hence are in pristine condition with the only

damage being from excavation or after the deposition was made. This retouch was done by an experienced knapper, that knew how to correctly retouch bifacial edges into an evenly curved lenticular cross-section. Category (II) is still performed by knappers with knowledge on how to retouch bifacial edges, without decreasing the edge angle too much, as the flake scars run well into the blade. It is performed after the initial sharpening of the blade, and the cross-section retains its lentil shape. Category (III) is performed by a person that did not understand how to successfully resharpen bifacial edges; hence the flake scars are short, and the edge angle higher. This compromises the shape of the cross-section which will be uneven, but still lenticular. The blade surface will also be compromised, with abrupt flake scars and hinges. Category (IV) is repurposed daggers that have been additionally knapped or ground into different objects. It is difficult to know how widespread the repurposing of type IV flint daggers has been. However, it is known that it occurred. It has been interpreted that it was usually broken daggers that were repurposed entirely; the handles of type III and IV daggers have been known to be repurposed into chisels and axes, and the tip of the blades could be worked into arrowheads or spear points (Stensköld, 2004; Apel, 2001).

4.2.3. Symbolic properties of a dagger form

According to Frieman (2012a; 2012b) the fishtail flint daggers were often deposited in burial contexts and were rarely found in hoards. Frieman suggests that the separation of find contexts is because of the metal, and the type IV flint dagger, existed in separate functional worlds and were not made from the same material, despite morphological similarities. However, Frieman (2012b) also points out that despite there being a large number of known flint daggers, a lot of them do not have a finds context as they have been recorded as stray finds or unknown context, but certain patterns can be discerned when studying the Type IV fishtail daggers.

The coexistence of the metal and flint dagger types, and the fact that dagger types of both metal and flint had been circulating in Europe for two millennia, suggests that both metal and flint daggers were part of a larger pattern of production and use, a *dagger idea*. But this idea does not pertain to the shared meaning or essence of the dagger types but should be seen as a shared form and technological heritage (Frieman, 2012a). The type IV fishtail daggers were products of skilled local knapping trajectories whilst using local raw material, however, both the knapping trajectories and the raw material were put into a new production system – a system with craft specialisation and where standardization was valued. Frieman (2012a) ascribes the popularity of the flint daggers to mean that the form itself was recognisable: it did

not matter if the person carrying the dagger and the person observing the dagger had two separate experiences or considered the form to have separate functions. Frieman (2012a) then views the fishtail dagger as a boundary object. An object which exploits a common material language to bridge social gaps, which would otherwise be impossible to bridge.

4.3. Meaningful materials

The selectivity surrounding the flint which was most commonly used among the fishtail daggers would indicate some sort of importance of the flint material. And this importance can be further explored by viewing flint as a meaningful material. Meaningful in the sense that the material used to create the skeuomorphs, flint, was meaningful in the cultural sphere independent from the material which it was thought to imitate. In the very production of the fishtail daggers, there are many steps which lean into the *flintness* of the material. Apel (2001) points out that before the characteristic retouch flake scars are implemented on the blade, the dagger is ground smooth. I would argue that a smooth blade is more characteristic of the continental bronze daggers, rather than the parallel retouch flake scars implemented in the last stages of production. The whole flint dagger, when finished, would then be a visual statement that sets it apart from bronze daggers in that it does not try to hide the flintness of the material. The skeuomorphic properties of the flint daggers are then mostly determined by the morphological similarities in the silhouette of the dagger, the dagger form. This emergence of a 'dagger idea' across different dagger artefacts in prehistory, and that the emergence of this idea would be a reaction to the innovation and adoption of metallurgy, is pointed out by Frieman (2012a). Frieman does however put the focus on the dagger idea as an intrinsic part of the innovative *process*. The specific form of the fishtail dagger communicates a new idea of an aesthetic form made with bronze down on the continent, which in turn communicate specific technological knowledge of the bronze material and afford certain technological advancement of the flint material. Frieman then concludes that the finished flint dagger becomes a boundary object, in which the dagger form helped with bridging different social boundaries, or cultural spheres, despite cultural and ethnic differences between said spheres. This by communicating shared participation and understanding different social systems of exchange and communication through the visual of the dagger form and idea (Frieman, 2012a).

Could this then explain the symbolic properties and meaning that the flint dagger would possess in the LNII cultural sphere? If one follows Lomborg's (1973) typology, the flint daggers in the categories I and II are of a lanceolate shape, with category III having a more

pronounced difference between blade and handle than the lanceolate blades. It then might seem that a change toward a more continental and bronze dagger form appeared in late-type III and type IV daggers. The chronology of Lomborg's typology has been criticised by, among others, Torsten Madsen (1978) and Vandkilde (1996). Madsen in particular have called into question the degree to which the daggers 'types' overlap chronologically with each other, as he is of the opinion that the overlap is much greater and complicated than the typology presented by Lomborg (1973). The thought that the dagger idea would be prevalent in the flint daggers can then be a point of discussion. The form of the fishtail daggers enabled the technological development of a complex knapping technique, which required practise and verbal instruction in order to learn efficiently. There seems to have been no room for trial and error. The flint raw material was then difficult to transform into such a dagger shape, as it would perhaps have been more efficient to use, say, clay to mould into the desired shape rather than to undergo hours upon hours to successfully knapp a fishtail dagger out of flint. Flint, or rock, has been used for sharp-edged artefacts from the emergence of *Homo sapiens sapiens*, and could as such have had specific connotations that were incorporated in the dagger form, as a sharp-edged tool. The dagger form then lends itself towards flint in the LNII cultural sphere, rather than another material, as it is in flint that the people of the LNII cultural sphere could fathom the specific dagger form and idea. The flint held meaning in the LNII cultural sphere, it was important to use specific flint and to fabricate the daggers in specific ways to create the desired form. It seems not to have mattered that the practical functions of flint (slicing edges) and metal (stabbing), were different. Perhaps then did the people in the LNII cultural sphere not think about making a metal dagger out of flint, but rather make a dagger with specific properties important to their cultural sphere? The flint daggers have been used, as proven by the reshaping and repurposing, but some specimens have not been resharpened and have retained their specific 'dagger form' in the material record. It would then not be far-fetched to assume that the dagger form might not be crucial for the practical or symbolical use of the dagger, that the properties of slicing in the flint dagger were appreciated and did not make the skeuomorph something lesser than the metal dagger. The fishtail dagger could very well function as a boundary object and give meaning to the flint dagger in relation to the metal dagger. I do however think that in the mind of the people of the past it was the 'flintness', or the flint affordances, that was important for the flint dagger to carry meaning in ways the metal dagger could not.

5. Transforming materials - material preference and categorisation

Above I have used ivory and flint as examples of metaphoric and meaningful materials, two ways of many in which one can view past materials in skeuomorphic relationships. In this chapter, I will further explore in which ways ivory and flint, metaphoric and meaningful materials, can be used to both expand and challenge our views of material preference and categorisation in the past. This will be done by discussing archaeological constructs of the past in relation to skeuomorphs.

5.1 Enriching past material preference and categorisation

Modern language use rests upon how we perceive the world. The words we use to label things of the past have connotations and underlying constructs which help us understand the world, and cultural sphere, we live in (Baggini & Fosl, 2010). In this thesis, I was first reluctant to use 'original' to describe the relationship between skeuomorph and the object that it is thought to imitate. I did not want to use the word original, as the concept of originality in modern society is often equated to something of higher monetary or societal value. Hence, as I tried to utilise reflexive thinking when I wrote this thesis, I was wary to use 'original' as an antonym of skeuomorphs, as using 'original' and 'skeuomorph' in this way builds a false construct of complete linear progress. The use of terminology such as 'an original' consequently also completely shut the skeuomorph out from being able to be viewed as something more than a byproduct of progress.

As the reader might have noticed, I do use terminology such as 'original' in this thesis, and I also put the skeuomorph in relation to the perceived original artefact. Does this mean that this thesis also put the skeuomorph into a linear narrative of progress? I would argue that this is the importance of a reflexive methodology that stresses the importance of being *aware* of the words and connotations of the modern cultural sphere which are applied to past material culture. If one is aware of these, you can use and apply original and the concept of originality to past materials, however, one has to be critical and open to the mindset that the people of the past which we study did not have the very same mindset. Skeuomorphs being presented with a relationship to an 'original' should in that case not be considered a downfall, but rather a strength. As a part of the modern cultural sphere, I can then be critical of how modern connotations in terminology affect the view of past materials. I as an archaeologist of the modern era have to understand the world I live in, I do this by using terminology such as

original to structure the world and impressions around me. I can then not escape the use of ‘original’ in this thesis, but I can be aware of how it can affect the research I put forward.

The skeuomorph sometimes makes a more or less obvious effort to imitate another material and object that we know existed in their cultural sphere before the skeuomorph. It is then important to acknowledge this ‘original’, but with the mindset that the people of the past might not have viewed the original or the skeuomorph as mutually exclusive. One can then, through the study of skeuomorphs, enrich past material preference and categorisation, and view past material culture as enriching variation in coexistence as opposed to linear progression.

5.2. Original centres and skeuomorphic peripheries

Skeuomorphs are often interpreted as boundary objects: objects which are made in a periphery to better understand a technology or material with origins from an original located at the centre of a specific cultural area (Frieman 2012a, 2012b). I would argue that this is an expression of how the ‘original’ artefact becomes a large part of how we relate to the skeuomorph, even if the skeuomorph is the main focus of the research. When we view a skeuomorph as a boundary object it is seen as a carrier of technological or aesthetical meaning, something that is only made to be phased out when the technology and material of the original are fully adopted into society. This reasoning, however, is a construct of modern ideas of how technology and materials always need to be improved, and that the peripheries in modern societal constructs are most often not the place of innovative thinking (Graffenberger & Vonnahme, 2019). Urbanisation is a strong argument for this modern relationship between centre and periphery, especially during the industrial revolution. Opportunities and innovation are viewed to be most often generated or realised to the full potential in the cities. Hence becomes the ‘rural’ peripheries something lesser than the centre of cultural and societal city ‘centres’. When originals are viewed as a place of origin and innovative new technologies and materials, the skeuomorphs outside of the original centre cultural sphere then become an object of the periphery where new materials and technologies are pushed into, from the centre. Such periphery or fringe boundary objects are then put in a less than or in a *sub-material* relationship to the centre-conceived original. There is then a substantial subjectivity when labelling something as a centre or a periphery.

Then concerning skeuomorphs, what relationship can be discerned between ‘centre’ and ‘periphery’? In this thesis, I have presented two skeuomorphs; the shell bead skeuomorphs

made from ivory, and the metal dagger skeuomorphs made from flint. Both skeuomorphs have different relationships with what we perceive as the ‘original’, both in location and production technique. The flint daggers have traditionally been perceived as periphery, and boundary objects of the metal daggers, mostly when considering the geographical distance between the two places of ‘origin’. However, as discussed in chapter 4.3 *Meaningful materials* the geographical distance between the origin of the ‘dagger idea’ and the core area of production of flint daggers, does not have to affect the dagger as a lesser imitation of metal, but rather a manifestation of the cultural importance and appreciation of flint as a material for that kind of object (Frieman, 2012a). One can also consider the idea of the reverse material relationship; in LNII southern Scandinavia had no substantial production of metal on its own, so what is to say that the people of the flint dagger cultural sphere saw the metal as a fancy stone? A stone with very weird functional properties, as it did not function in the way flint tools with sharp edges should function, but a reddish stone nonetheless. There are problems with reasonings such as these as well; the most prominent being that one put people of the past in a position of being less knowledgeable and not able to understand the world around them. People in the LNII might have very well understood and been able to differentiate metal properties from other more familiar materials. Which would make the study of the past, and especially, skeuomorphs even more interesting. Because then we do not study a cultural sphere with less understanding of the material, but we study a conscious act and intention of choosing another material above fast-tracking the adoption of new material.

Another way in which the flint daggers have been divided into ‘periphery’ and ‘centre’ is when discussing the societal structure in LNII. The flint mining and the early stages of production was carried out *outside* of the ‘centre’ of society, before the later stages of production were moved into the centre (Apel, 2001). Yet again most weight is put on the centre, as that is where the flint dagger was finalised. In some instances, this can be viewed as when the finalised object emerged, it also started its ‘life’, and it was then that it could start to affect the surrounding cultural sphere. But is that really the case? When the flint was mined out of the earth it had already affected the cultural sphere around it. The people of LNII did make the conscious decision and effort to find and mine the flint and then turn it into objects. The realisation and generation of material culture then started outside of the perceived ‘centre’. The flint daggers seem to not adhere to ‘centre’ or ‘periphery’, so why should we apply this construct onto them?

This is further shown in the Aurignacian at Castel Merle's cultural sphere, in which the shell skeuomorphs and the natural occurring shells coexist. One might argue that the 'centre' is the Castel Merle site, whereas the periphery could be from whichever place the natural shells and the mammoth ivory were sourced. However, we cannot discern the direct, or indirect, source of the ivory, and the shells can only be determined as Atlantic or Mediterranean, not which beach they were sourced from. Neither can we truly know how the people producing the beads at Castel Merle travelled, nor where they 'originated' from. Perhaps the people who sourced the ivory, the Atlantic shells, and the Mediterranean shells all converged at Castel Merle and produced the beads – as White (1997) suggests. The cultural sphere of the people at Castel Merle can then be thought of as more mobile than in the case of the flint daggers. Hence the cultural sphere of the Aurignacian people at Castel Merle includes both 'original' and skeuomorph, both a perceived 'centre' and 'periphery'. And how could this mindset affect the material perception at Castel Merle?

5.3. Skeuomorphic mentalities

Metaphoric and meaningful materials, ivory and flint, represent two different mindsets in skeuomorphs to approach and perceive materials. These mindsets, or mentalities, are affected by how the skeuomorph was created and the relationship it has with the material which it is supposed to imitate. The differences in material perception in these mindsets can then be seen in the following propositions: the relation to the perception and production of the imitated 'original' material, how the raw material of the skeuomorph was acquired, and the willingness to imitate the material and object in full.

5.3.1 Ivory as a metaphoric material

A metaphorical material, such as ivory, heavily relates to seashells by thoroughly trying to incorporate both the form and visual attributes of shells through the ivory material. Could this have affected the fact that the natural shells and the skeuomorphs were both being produced and consumed within the same cultural sphere? That the perceived 'original' and the skeuomorph were consumed within the same cultural sphere enabled an understanding of both the shells and the ivory's material properties, where nothing was hidden behind geographical distance or different cultural spheres. As the perceived 'original' and the skeuomorph were consumed within the same cultural sphere, an understanding of *both* the shells and the ivory's material properties was enabled. Nothing was then hidden behind geographical distance or different cultural spheres. The seashells and their lustre were not foreign concepts, but rather an established and important cultural expression at Castel Merle, even if they had to import

the shells from far away. When making a seashell skeuomorph it then became important to acquire a material capable of imitating a seashell with the capability to be formed into a seashell shape and evoke the desired visual attributes such as lustre. Ivory seems to have been preferred for skeuomorph production over other more closely available materials, such as teeth, that could produce similar aesthetics. It did not matter that the ivory potentially had to be acquired from far away, as this was also the case with the seashells. Both the seashells and the ivory were then a part of the cultural sphere of Castel Merle, and it would have been increasingly hard to utilise the ivory as a meaningful material, a material which relies on the cultural meaning of the skeuomorph as a stand-alone from the material of the original, as the people that was the consumer of the shell skeuomorph already had a deep understanding and connection to the seashells.

Hence, to be a metaphorical material the area of production of both 'original' and skeuomorph needs to overlap as there must be an understanding of both the materials used in the 'original' and also in the skeuomorph. There must also be a *willingness* to imitate both the material and form of the perceived 'original' to create a convincing metaphorical skeuomorph. If these statements are then considered, what does then differentiate a metaphorical skeuomorph from a copy? As I discussed in chapter 1.2.1. *The entanglement of imitation and copy in archaeological contexts*, the terminology concerning copy and imitation is unclear when used in archaeological contexts. When Stockhammer (2017) partly defines copies as needed to be produced outside of the 'originals' area or place of production, but still within the same cultural sphere as the meaning of the raw material and knowledge of the production process is still intact in the copy. A criticism of such reasoning can be that if the criteria of a copy are to leave the main production area of the 'original' a lot of possibilities are excluded when considering raw material use. Sørensen (2012) does take into account that copying can also render some features of the original non-functional and purely aesthetic, as the common definition of skeuomorphic features is. The most glaring difference between the definition of copy and skeuomorph is the relationship to the original through material use; the copy utilises the same raw material as the 'original', whereas the skeuomorph does not. A skeuomorph can then not be a copy in the sense that the different material use is experienced as a too big differentiating factor between the skeuomorph and the original. Vickers (1999) argued for a hierarchy of material value, in which skeuomorphs strive to enter a higher material value by imitating materials higher up in the hierarchy. I would argue that this idea fits better with the modern concept of copies rather than skeuomorphism. Modern copies try to achieve the

impossible and become one with the ‘original’, however, it always fails – which is why we can identify it as a copy. Michael Taussig (1993) concludes through his ethnographical research, that visual similarity is not a requirement of an effective copy as one born in a society native to photocopies and mass-produced plastics might assume. Rather is tactility and sensuality of the experience more important when experiencing copies outside a society raised on carbon copies en masse (Taussig, 1993). The skeuomorphs of Castel Merle, even as they try to be as similar as they can be to the shells, are still mainly recognisable as a shell skeuomorph through the emphasis on tactile and sensual experiences of lustre, punctuation décor and warmth of touch that can be evoked in the ivory. Through this positive imitational relationship between the shells and the ivory, no material is conceded to the other, and both the skeuomorph and the shells can coexist in the material repertoire. Metaphorical skeuomorphs such as the shell skeuomorphs of Castel Merle become not modern copies, but perhaps akin to *successful* ‘copies’ in past material perception, as they can bridge the gap between original and copy through the metaphorical essence of shells within the ivory material. This would lead to the view that the production of skeuomorphs at Castel Merle is not a production en masse of skeuomorphs to satisfy an aesthetic need of shells, but rather an expansion of the concept of shells within the Aurignacian cultural sphere.

5.3.1.1. Natural or not natural?

The main theme for this thesis is to understand and analyse how we can better perceive material categorisation in past societies by challenging the modern perception of materials. It is then prudent to discuss how this categorisation could be viewed in the Aurignacian cultural sphere at Castel Merle, with the perspective of ivory and shell. How can then the perception of past materials has been experienced in the Aurignacian cultural sphere? If ivory is an expansion of the conceptual perception of shells, one has to look at how the shells were considered and with consideration apply this to the ivory. It is easy to attribute a sense of modern ‘naturalism’ to the shell beads, as they were collected fully realised in form and visual attributes from the environment. The only human impact on the shell beads is when the perforation to enable the shell as a hanging ornament is made, the shell beads then have next to no human interference in the ‘making’ of said beads. But this is yet again a modern perspective on the shell. A shell can also be considered alive and organic as it is ‘grown’ from a natural environment, and often housed alive marine beings. Ivory in turn can also be viewed as a natural material on its own, natural as it is harvested from animals that are a part of the natural environment. However, if it is considered alive or not can be hard to determine. In the

act of acquiring ivory for bead production, one must kill a mammoth. Is the ivory collected from the carcass then considered dead as well? It has been theorised by White (1995) that the property of ivory to be warm to the touch might have given the material a sense of animacy and being alive. Both the shell material and the ivory material then gain a sense of being a part of nature and being alive and living materials. But again, is this a modern misconception of the material perception at Castel Merle, or can it be considered a viable interpretation of past material use and perception? The question of material perception of the ivory then becomes dependent not only on the perception of shells, as this is the material which it is supposed to imitate but might also be dependent on the overarching sphere of beliefs of the Aurignacian.

Some decorative aspects of the skeuomorphs, such as the punctuation décor, might shed some light on the material perception of the shells and the skeuomorphs. The man-made punctuation décor has been recorded across materials and forms; on rock slabs and walls, a mammoth tooth plaque, fish-like pendants, and shell skeuomorphs (Bourrillon, 2018). This might indicate that the material perception of the Aurignacian people at Castel Merle was more *fluid* contra how we experience materials today. Maybe it was not a question of materials being natural or unnatural in their final form, alive or dead, but rather that materials could be fluid in their perception and enriching the material perception through variation in coexistence. The material categorisation at Castel Merle is then influenced by material perceptions that differ from modern material categorisation. These perceptions can be discussed more openly through the study of skeuomorphs, and a more conscious application of terminology charged with modern connotations and meaning.

5.3.2 Flint as a meaningful material

In contrast to metaphorical materials does meaningful materials relate differently to the three propositions mentioned at the beginning of this chapter: the relation to the perception and production of the imitated material, how the raw material of the skeuomorph was acquired, and the willingness to imitate the material and object in full. In a meaningful material, such as flint when used to create fishtail daggers, the inherent cultural importance of a certain material overrides the need for a metaphorical connection between the original's material and the skeuomorph's material. Hence does the fishtail daggers set themselves irrevocably apart from the bronze daggers in material perception, but not in form. The form of the metal daggers was accepted into the object repertoire in LNII, when the metal itself was not commonly used or adopted into the local production of material culture (Frieman, 2012a). Does this mean that

the ‘dagger idea’, or the ‘dagger form’, did not encroach on another meaningful cultural expression within the LNII sphere, or was it a novel form which was introduced as a cultural expression in LNII? Both of these explanations do rely on exclusivity. That the fishtail daggers then become symbolically ‘charged’ with an air of prestige, and social importance, in the modern perception of them. Skak-Nielsen (2009) points out that daggers made out of either flint or metal became the prevalent prestige item deposited in grave contexts during the Late Neolithic and early Chalcolithic and the Bronze Age. The dagger form was preceded by battle axes in earlier lithic periods and replaced by swords in the Bronze Age. If the dagger form was indeed desirable in the LNII cultural sphere, to the point in which it becomes an object of ‘prestige’, then the fact that it was created in flint attracts even more attention. The willingness to achieve a ‘metal look’ among the fishtail daggers was so low, that the flint knapping technique became so complex to enhance the ‘flintness’ of the material. A conundrum then emerges; should the prestige label be applied on the fishtail daggers because of the newly adopted form factor, or the culturally important material? Or even both? This highlights the problematic nature of the application of prestige onto artefacts from past cultural spheres. What we would consider prestigious today, such as a new form factor, or a technology which requires a high level of skill, might not have been a source of prestige in the past. What we can understand today is the role flint had as a culturally significant and *meaningful* material, as it was painstakingly sourced from the earth and the need for both verbal teaching and practical training to be able to acquire the appropriate flint knapping skill needed.

The flint could sustain its place as a meaningful material in the LNII cultural sphere, as it did not share a cultural sphere with the metal daggers, as is why the fishtail daggers have been interpreted as boundary objects (Frieman, 2012a; 2012b). Boundary objects do in name assume that there is a boundary to cross, that there is a centre or periphery, or a boundary separating two centres. I think it is more rewarding to think of boundary objects as objects bridging two cultural spheres, an attempt from within the cultural sphere to expand and look outwards through the cultural layers of the sphere. I would then not reject the fishtail dagger as a boundary object, but I would reject the connotations of the use of boundary objects which insinuate a social and cultural centre and periphery. The fishtail daggers do spread outwards from their specific cultural sphere; some fishtail daggers can be found as far as into the cultural sphere of the classical Únětice culture, Bohemia, Moravia and the eastern parts of Austria, which were the cultural sphere of the metal daggers (Apel, 2001). As both flint

daggers and metal daggers are found in each other's cultural sphere, I find it plausible, that not only was the flint dagger a 'boundary object' to understand a foreign cultural sphere for the LNII, but it can also be the case that the metal and flint daggers acted as a bridge of understanding for the classical Únětice cultural sphere. Flint then might have gained its importance as a meaningful material not as a hierarchical 'better' material, but rather as a signifier of cultural belonging. To take this reasoning further one might consider the implications that mimicry and colonial theory might have on the cultural decision of the people of LNII to promote and develop 'old' techniques and materials when faced with foreign incursion on their cultural identity. In the case of the flint daggers, the increased complexity of the flint dagger production might not be an attempt at a 'joke' or 'humorous gesture' in order to relate to the colonial influx, as Harrison (2003) speculates might be the case in post-colonial Aboriginal communities, but rather an attempt at material competition. The flint dagger functionality had already in some form been present in the LNII cultural sphere, it was merely a new 'fishtail' form factor that was introduced with the bronze daggers. By converting the flint material into the new dagger form, the fishtail daggers also spread far into the continent and Únětice dominated areas, as noted by Apel (2001), which might indicate a mutual flux of influence. The fact that the flint knapping technique also increased in complexity with the making of the fishtail daggers would support the assumption that the relationship between flint and metal was that of competition. This in contrast to Aboriginal communities which revived old techniques from a century back to be able to assert themselves and protect their cultural identity when faced with cultural oppression by a colonial power.

The perception of flint as a signifier of cultural belonging, and the product of cultural competition, could also help explain why the flint daggers disappeared at the beginning of the south Scandinavian Bronze Age. Maybe it was not because a more prestigious material, metal, came along, but rather that a new form was adopted into the cultural repertoire, the sword (Skak-Nielsen, 2009). Flint as a meaningful material is then explained not by the lack of interaction with the 'original' metal material, but rather it became a meaningful material as the people of LNII had at least a conceptual understanding of metal and its properties, which could be equated to flint in the LNII sphere. To fully understand and adopt the form of the metal daggers into the artefact arsenal of the LNII, flint became increasingly culturally important. When another form of object, the sword-form as Skak-Nielsen (2009) suggests, were introduced by other cultural spheres in the late LNII, attempts to make this new form in

flint were made. As is exemplified in the skeuomorphic scimitars made of flint from Favrskov on Funen, Denmark (Skak-Nielsen, 2009). However, the flint daggers still retained some functional properties, and were clearly used in some instances as the resharpening shows – whilst the swords retained their function. One could then argue that it was not a linear progression towards a ‘better’ or ‘newer’ material that phased the flint daggers out of existence, but rather a change of favourable forms through the influence of other nearby cultural spheres. A form which lent itself better to metal than it did to flint, and the producers of the material culture of LNII took artistic liberty by changing material to metal instead of flint. Almost as if it was with skeuomorphic intent. The people of the LNII cultural sphere, viewed the flint daggers as culturally meaningful artefacts on their own, which could be interpreted in how the fishtail daggers were traded far and wide. When the flint daggers were changed into daggers of metal, one could interpret this not as a progression to newer and fancier material, but as a skeuomorphic change of the flint material into a material which was able to perform the desired functions of the new sword-form. The early production of metal daggers in southern Scandinavia could then be perceived as an expression of a metal skeuomorph. By discussing material preference in past material culture through the study of skeuomorphs one can then open up the discussion of the material perception of meaningful materials.

5.4. Conclusions

The aim of this thesis was to, through the study of skeuomorphic artefacts of the past, discuss and analyse how the raw material properties affect the reception of the skeuomorph in past societies, and how this perception may differ from our modern perception of material preference and categorisation. In this thesis, I hope to have shown that a consciousness towards terminology that we, as archaeologists of a modern western cultural sphere, use in the archaeological field can open up the discussion of past material preference, value and categorisation.

How can then the language used in the archaeological discourse pertaining to skeuomorphs affect the understanding of skeuomorphs as manifestations of past material preference and categorisation? Through the use of language does modern humans make sense of their perception of the world. There is no escaping the use of language and the perceptual connotations it has, as it is part of the very cultural sphere we live in. The conclusion of this thesis is then that modern perception of material properties of skeuomorphs does affect the research outcome of ancient material categorisation and preference. But by adopting the

perspective that past humans and modern humans reside in different cultural spheres, which generate their very own cultural expressions and relations to the world around them, it then becomes a necessity to critically reflect on how we perceive past material culture through terminology, and how a lack of awareness can be detrimental to the diversity of archaeological research outcomes. This is shown in this thesis by how labelling something ‘original’ can exclude material perception of the past, as the skeuomorph becomes a byproduct of the linear progress that the original implies. When such ‘boundaries’ is set up by the use of a linear progression mentality between terminologies such as original and skeuomorph, original and copy, and centre and periphery, it limits the interpretations that can be made concerning past material categorisation and preference. For example, in the case of the relationship between ivory and shell, there might not be a matter of differentiating copies from skeuomorphs, but rather how copies and skeuomorphs can coexist without boundaries within the same cultural sphere. The same could be said about perceiving a skeuomorph as something set apart from other material expressions, to view the skeuomorph as a fringe or periphery object. To view the skeuomorph as an object outside or at the ‘border’ of a cultural sphere is then detrimental to the representation of past material culture, which in this thesis can be seen when discussing the flint daggers. To discuss flint as part of different centres and peripheries, rather than a more inclusive discussion of the flint daggers in their own sphere, excludes the possibilities of viewing flint as a meaningful material, and metal as the potentially skeuomorphic charged material in the cultural sphere of LNII.

By instead viewing the individual relationships different skeuomorphs create together with other objects and humans within their cultural sphere, or how the skeuomorphs interact with and bridge to other cultural spheres, have the potential to dampen imposed modern constructs and open up for a more varied discussion. In this thesis, the two case studies of ivory and flint have done that by using terminology such as metaphorical and meaningful materials. The application of skeuomorphic mentalities, such as metaphorical and meaningful skeuomorphs, does not negate other forms of skeuomorphic relationships between other cultural spheres, but rather encourage the diversification of the study of past material culture. The different relationships that emerge between the skeuomorph and a material’s form, visual properties and attributes could then be used to analyse the relationship between humans and skeuomorphs within a cultural sphere – and challenge the interpretation and perception of the object, and past cultural spheres, in the modern research. The metaphorical relationship between ivory and shell is one such perception, which has influenced how the relationship

between copy and skeuomorph can have been perceived in the past. One of the research questions of this thesis is, how can we differentiate copies from skeuomorphs in the ancient material? The perspective of a metaphorical relationship between ivory and shell which is presented in this thesis presents the interpretation that perhaps the relationship between copies and skeuomorphs is more fluid. Maybe it is not a question about how copies and skeuomorphs differ, but rather how they can be perceived as similar? In the cultural sphere of the ivory, the lines we draw between copy and skeuomorph might have been blurred, or most probably non-existent in the way that we perceive copies today.

6. A broader application and further research

This thesis presents a fragment of identified skeuomorphs in the ancient material and should be considered more as a proof of concept rather than a blueprint ready to be applied to all skeuomorphs. But the conclusions drawn in this thesis do raise interesting questions when considering the material categorisation and preference in other skeuomorphic materials. When I first started to write this thesis the ambition was to include more case studies than that of flint and ivory. I still believe that these other case studies can be worthy of further study in the sense of a broader application of more self-aware reflections pertaining to skeuomorphs and past material categorisation and preference. For example, in early to middle Minoan contexts in the Mediterranean, both woven baskets and metal vessels were imitated in clay pottery. These relationships between organic baskets and clay, and metal vessels and clay are extremely interesting as the clay material does not only have a skeuomorphic relationship with one material in a cultural sphere, but with several. It would then have been interesting to further study how these multi-relational perceptions within a cultural sphere would affect our perception of material categorisation and preference. Another material which would have been interesting to study is the Jadeite and Nephrite axes in Chalcolithic continental Europe, and how the imitational relationship can be viewed in a skeuomorphic way between the greenstone axes and the copper axes. The contemporariness and closeness of the two cultural spheres can be traced in both the greenstone and the copper axes – as they have imitational, or skeuomorphic, elements borrowed from each other. Can this relationship between the greenstone and the copper be deemed skeuomorphic or is it more symbolical in nature? Then what becomes the difference between a meaningful skeuomorph and a symbol? Skeuomorphism and size are also an interesting perspective to challenge modern conceptions of what a skeuomorph should be. Could miniatures such as child toys in the Greenlandic Thule culture be viewed as skeuomorphs? The toys are after all miniatures of equipment made for adults, often made in other materials than their larger counterparts. Could this be viewed in a skeuomorphic way as material conservation in harsh conditions, but also the want to express forms of function in the cultural sphere from a young age?

The above-mentioned potential case studies are all very interesting perspectives on which the study of skeuomorphs, and a broader and more open-minded application of skeuomorphs could provide interesting alternative interpretations of past material categorisation and preference. These studies might never ‘solve’ the problematic nature of modern perceptions and perspectives applied to past materials, nor was it meant to be a solution. This thesis was

meant to point out the complexity of past human cultural spheres, and how we might better understand them by turning a critical eye toward ourselves. Perhaps then can we focus less on the boundaries which engulf past materials, but rather on the potential of variation in coexistence?

7. Summary

This thesis sets out to study the perception of material categorisation and preference in the past by analysing two different skeuomorphs; Aurignacian shell bead skeuomorphs and Late Neolithic flint daggers. The aim of this thesis is to study these two skeuomorphic objects, with a focus on the affordance of the skeuomorph's raw material. Especially what specific properties these raw materials have. This is to further the modern understanding of how material preference and material categorisation, could have been viewed in the past. To achieve this a theoretical framework which builds upon the notion of cultural spheres was applied onto the past, but with careful consideration by applying a reflexive methodological framework. This resulted in the conclusion that being self-critical of the modern perceptions we attribute to past material culture could enable the separation the modern cultural sphere from potential spheres in the past. This promotes a more open and inclusive material interpretation of past material categorisation and preference, based on variations in coexistence rather than a linear progression through time.

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References

- Alvesson, M., & Sköldbörg, K. (2018). *Reflexive methodology: New vistas for qualitative research*. Sage. (original work published 2000)
- Arch Halle. (2012). [Photograph of the blade of a Únětice bronze dagger]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Klinge_eines_Bronzedolches.jpg
- Apel, J. (2001). *Daggers, knowledge & power* [Doctoral dissertation, Uppsala University].
- Baggini, J. & Fosl, P.S. (2010). *The philosopher's toolkit: a compendium of philosophical concepts and methods*. (2nd ed.) Wiley-Blackwell.
- Barrowclough D. A., & Lister, A. R. (2004) The Secrets of the Craft Production of Scandinavian Late Neolithic Flint Daggers, *Lithic Technology*, 29(1), 75-86, [10.1080/01977261.2004.11721013](https://doi.org/10.1080/01977261.2004.11721013)
- Bhabha, H. (1984). Of Mimicry and Man: The Ambivalence of Colonial Discourse. *October*, 28, 125–133. <https://doi.org/10.2307/778467>
- Blitz, J. H. (2015). Skeuomorphs, Pottery, and Technological Change. *American Anthropologist*, 117(4), 665–678, <https://doi.org/10.1111/aman.12349>
- Bourrillon, R., White, R., Tartar, E., Chiotti, L., Mensan, R., Clark, A., Castel, J.C., Cretin, C., Higham, T., Morala, A., Ranlett, S., Sisk, Ma., Devière, T., & Comeskey, D. (2018). A new Aurignacian engraving from Abri Blanchard, France: Implications for understanding Aurignacian graphic expression in Western and Central Europe. *Quaternary International*, 491, 46-64, <https://doi.org/10.1016/j.quaint.2016.09.063>
- Childe, V.G. (1956). *Piecing together the past: the interpretation of archaeological data*. London: Routledge.
- Cipolla, C., Crellin, R. J., & Harris, O. J. (2021). Posthuman archaeologies, archaeological posthumanisms. *Journal of Posthumanism*, 1(1), 5-21.
- Colley March, H. (1890) The meaning of ornament: or its archaeology and its psychology. In

- C. W. Sutton (Eds.), *Transactions of the Lancashire and Cheshire Antiquarian Society*: Vol. 7. (pp. 160-192) Manchester Press co. limited.
- Conneller, C. (2013). Deception and (Mis) representation: Skeuomorphs, Materials, and Form. In A. Alberti & A. M. Jones & J. Pollard (Eds.), *Archaeology after Interpretation: Returning Materials to Archaeological Theory* (pp. 119-134.) Routledge.
- Delsing, J. (2016). [Photograph of *Nassarius gibbosulus*]. Wikimedia Commons.
https://commons.wikimedia.org/wiki/File:Nassarius_gibbosulus_001.jpg
- Dobres, M. A. (1999). Technology's links and chaînes: the processual unfolding of technique and technician. In M. A. Dobres & C. R. Hoffman (Eds.), *The social dynamics of technology : practice, politics, and world views* (pp. 124–146). Smithsonian Institution Press.
- Dobres, M. A. (2010). Archaeologies of technology. *Cambridge Journal of Economics*, 34(1), 103-114.
- Fekadu, K. (2014). The paradox in environmental determinism and possibilism: A literature review. *Journal of Geography and Regional planning*, 7(7), 132-139.
- Fortuna, R., & Ursem, K. (n.d.-a). *Flintdolk fra Ø. Hjerridslev* [Photograph]. National Museum of Denmark. <https://samlinger.natmus.dk/do/asset/4149>
- Fortuna, R., & Ursem, K. (n.d.-b). *Flintdolk fra Østergård* [Photograph]. National Museum of Denmark. <https://samlinger.natmus.dk/do/asset/4136>
- Fortuna, R., & Ursem, K. (n.d.-c). *Flintdolk fra Randerseggen* [Photograph]. National Museum of Denmark. <https://samlinger.natmus.dk/do/asset/3839>
- Fortuna, R., & Ursem, K. (n.d.-d). *Flintdolk uden findested* [Photograph]. National Museum of Denmark. <https://samlinger.natmus.dk/do/asset/4133>
- Fortuna, R., & Ursem, K. (n.d.-e). *Hindsgavldolken* [Photograph]. National Museum of

- Denmark. <https://samlinger.natmus.dk/do/asset/4144>
- Fredengren, C. (2013). Posthumanism, the transcorporeal and biomolecular archaeology. *Current Swedish Archaeology*, 21(1), 53-71.
- Frieman, C. (2012a) Flint Daggers, Copper Daggers, and Technological Innovation in Late Neolithic Scandinavia. *European Journal of Archaeology*, 15(3), 440-464.
[10.1179/1461957112Y.0000000014](https://doi.org/10.1179/1461957112Y.0000000014)
- Frieman, C. (2012b). *Innovation and imitation: stone skeuomorphs of metal from 4th-2nd millennia BC northwest Europe*. BAR Publishing.
- Frieman, C., (2021). *An archaeology of innovation: approaching social and technological change in human society*. Manchester University Press.
- Gell, A. (1998). *Art and agency: an anthropological theory*. Clarendon Press.
- Gibson, J.J. (1966). *The senses considered as perceptual systems*. Houghton Mifflin.
- Girard, R. (1990). Innovation and Repetition. *SubStance*, 19(2/3), 7–20.
<https://doi.org/10.2307/3684663>
- Graffenberger, M., & Vonnahme, L. (2019). Questioning the ‘periphery label’ in economic geography. *ACME: An International Journal for Critical Geographies*, 18(2), 529-550. <https://acme-journal.org/index.php/acme/article/view/1557>
- Harrison, R. (2003). ‘The Magical Virtue of These Sharp Things.’ *Journal of Material Culture*, 8(3), 311–336. <https://doi.org/10.1177/13591835030083007>
- Heckel, C. (2009). Physical characteristics of mammoth ivory and their implications for ivory work in the Upper Paleolithic. *Mitteilungen der Gesellschaft für Urgeschichte*, 18(7), 71-91.

- Heckel, C. E. (2018). Reconsidering production organization in the Early Upper Palaeolithic: The case for specialized production of Aurignacian beads. *Quaternary international*, 491, 11-20. <https://doi.org/10.1016/j.quaint.2017.02.002>
- Hodder, I. (2012). *Entangled: An Archaeology of the Relationships between Humans and Things*. Wiley-Blackwell.
- Hodder, I. (2015). The Asymmetries of Symmetrical Archaeology. *Journal of Contemporary Archaeology*, 1(2), 228–230. <https://doi.org/10.1558/jca.v1i2.26674>
- Hodder, I. (2016). *Studies in Human-Thing Entanglement*. Creative Commons: Ian Hodder.
- Huddart, D. (2006). *Homi K. Bhabha*. Routledge.
- Hughes, R. E., Högberg, A., & Olausson, D. (2010). Sourcing flint from Sweden and Denmark: A pilot study employing non-destructive energy dispersive X-ray fluorescence spectrometry. *Journal of Nordic Archaeological Science*, 17, 15-25.
- Högberg, A. & Olausson, D. (2007). *Scandinavian flint: an archaeological perspective*. Aarhus University Press.
- Högberg, A., & Olausson, D., & Hughes, R. (2012). Many different types of Scandinavian flint: visual classification and energy dispersive X-ray fluorescence. *Fornvännen*, 107(4), 225-240.
- Ingold, T. (2007). Materials against materiality. *Archaeological dialogues*, 14(1), 1-16.
- Ingold, T. (2011). *The perception of the environment: essays on livelihood, dwelling and skill*. Routledge.
- Ingold, T. (2018). Back to the future with the theory of affordances. *HAU: Journal of Ethnographic Theory*, 8(1-2), 39-44.
- Keeling, D., & Lehman, M. (2018). Posthumanism. In *Oxford Research Encyclopedia of Communication*. Retrieved 10 Aug. 2022, from <https://oxfordre.com/communication/view/10.1093/acrefore/9780190228613.001.0001/acrefore-9780190228613-e-627>

- Knappett, C. (2002). Photographs, skeuomorphs and marionettes: some thoughts on mind, agency and object. *Journal of material culture*, 7(1), 97-117.
<https://doi.org/10.1177/1359183502007001307>
- Kuhn, T. S. (1970). *The structure of scientific revolutions*. (2nd ed., enlarged) University of Chicago Press.
- Lazo-Wasem, E. A. (2014). [Photograph of *Nucella lapillus*]. Wikimedia Commons.
[https://commons.wikimedia.org/wiki/File:Nucella_lapillus_\(YPM_IZ_032551\).jpeg](https://commons.wikimedia.org/wiki/File:Nucella_lapillus_(YPM_IZ_032551).jpeg)
- Lomborg, E. (1973). *Die Flintdolche Dänemarks: Studien über Chronologie und Kulturbeziehungen des südsandinavischen Spätneolithikums*. [Doctoral dissertation. Copenhagen University].
- Madsen, T. (1978). Perioder og periodeovergange i neolitikum. *Hikuin*, 4, 51-60.
- Mellars, P. (1989) Technological changes at the middle-upper palaeolithic transition: economic, social and cognitive perspectives. In P. Mellars, & C. Stringer (Eds.), *The human revolution: behavioural and biological perspectives on the origins of modern humans*. (pp. 338-365). Edinburgh University Press.
- Mensan, R., Bourrillon, R., Cretin, C., White, R., Gardère, P., Chiotti, L., Sisk, M., Clark, A., Higham, T., & Tartar, É. (2012). Une Nouvelle découverte d'art pariétal aurignacien *in situ* à l'abri Castanet (Dordogne, France): context et datation [Context and dating of newly discovered Aurignacian rock art from Abri Castanet (Dordogne, France)]. *PALEO. Revue d'archéologie préhistorique*, (23), 171-188.
- Merriam-Webster. (n.d.). Copy. In *Merriam-Webster.com thesaurus*. Retrieved April 28, 2021, from <https://www.merriam-webster.com/thesaurus/copy>
- Merriam-Webster. (n.d.). Imitation. In *Merriam-Webster.com thesaurus*. Retrieved April 28, 2021, from <https://www.merriam-webster.com/dictionary/imitation>

- Merriam-Webster. (n.d.). Metaphor. In *Merriam-Webster.com dictionary*. Retrieved July 25, 2022, from <https://www.merriam-webster.com/dictionary/metaphor>
- Musée cantonal d'archéologie et d'histoire. (2020). *Bronze dagger from Lausanne - 2000 BC* - Download Free 3D model by Musée cantonal d'archéologie et d'histoire (@mcah). Sketchfab.
https://sketchfab.com/3d-models/bronze-dagger-from-lausanne-2000-bc-0abc114cf14a40b485401d734e9de357?utm_medium=embed&utm_source=website&utm_campaign=share-popup
- Myres, J. L. (1929). Geometrical Art in South-east Europe and Western Asia. *Nature*, 123 (3096), 321-322.
- Myres, J. L. (1933). The Cretan Labyrinth: a retrospect of Aegean research. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland*, 63, 269-312.
- Nash, L. (2005). The agency of nature or the nature of agency?. *Environmental History*, 10(1), 67-69.
- O'Hara, J. F., White, R., Garrett, Z. S., Higham, T., & Roussot, A. (2015). Le site aurignacien de l'abri de la Souquette (commune de Sergeac, Dordogne) : son histoire archéologique [The Aurignacian Site of the Abri de la Souquette (commune de Sergeac, Dordogne): A History of Archeology]. *Palethnologie. Archéologie et sciences humaines*, (7). <https://doi.org/10.4000/palethnologie.768>
- Olausson, D., Hughes, R., & Högberg, A. (2012). A New Look at Bjurselet. The Neolithic Flint Axe Caches from Västerbotten, Sweden using non-destructive energy dispersive x-ray fluorescence analysis for provenance determination. *Acta Archaeologica*, 83(2012), 83-103.

- Pfeifer, S. J., Hartrampf, W. L., Kahlke, R. D., & Müller, F. A. (2019). Mammoth ivory was the most suitable osseous raw material for the production of Late Pleistocene big game projectile points. *Scientific reports*, 9(2303), 1-10.
<https://doi.org/10.1038/s41598-019-38779-1>
- Price, T.D. (2015). *Ancient Scandinavia: an archaeological history from the first humans to the Vikings*. Oxford University Press.
- Rama. (2017). *Dagger 2200–1600 BCE-MCAH Lausanne-On display 1* [Photograph].
Wikimedia Commons. <https://commons.wikimedia.org/wiki/File:Dagger-P4140344-black.jpg>
- Ray, K. (2018). Material Metaphor. *The Encyclopedia of Archaeological Sciences*, 1-5.
- Read, D. W. (2009). *Artifact classification: a conceptual and methodological approach*.
Left Coast Press.
- Skak-Nielsen, N. V. (2009). Flint and metal daggers in Scandinavia and other parts of Europe. A re-interpretation of their function in the Late Neolithic and Early Copper and Bronze Age. *Antiquity*, 83(320), 349-358.
- Stensköld, E. (2004). *Att berätta en senneolitisk historia: sten och metall i södra Sverige 2350-1700 f. Kr.*[Doctoral dissertation, Stockholm University].
- Stockhammer, P. W., & Forberg, C. (2017). The dawn of the copy in the Bronze Age. In C. Forberg, & P.W. Stockhammer (Eds.), *The transformative power of the copy: a transcultural and interdisciplinary approach* (pp. 169-189). Heidelberg University Publishing.
- Sørensen, F. T. (2012) Original copies: seriality, similarity and the simulacrum in the Early Bronze Age. *Danish Journal of Archaeology*, 1(1), 45-61.
<https://doi.org/10.1080/21662282.2012.750446>

- Tanner, G. (2012). *Dolk (typ II flintdolk) av flinta* [Photograph]. Historiska Museet.
<https://historiska.se/upptack-historien/object/1087844-dolk-typ-ii-flintdolk-av-flinta/>
- Tartar, É., White, R., Chiotti, L., Cretin, C., & Mensan, R. (2014). Quel(s) Aurignacien(s) á l'abri Blanchard (Sergeac, Dordogne, France)? Données des collections d'industrie osseuse conservées aux États-Unis et retour sur le terrain [Which Aurignacians were at Abri Blanchard (Sergeac, Dordogne, France)? Data from bone and antler artifacts in American collections and from new field operations]. *PALEO. Revue d'archéologie préhistorique*, (25), 309-331. <https://doi.org/10.4000/paleo.3019>
- Taussig, M. T. (1993). *Mimesis and Alterity*. Routledge.
- Vandkilde, H. (1996). *From stone to bronze: the metalwork of the late Neolithic and earliest Bronze Age in Denmark*. (Doctoral dissertation, Aarhus University).
- Vandkilde, H. (2005). A review of the early late Neolithic period in Denmark: practice, identity and connectivity. *Journal of Neolithic Archaeology*.
<https://doi.org/10.12766/jna.2005.13>
- Vandkilde, H. (2017). *The metal hoard from pile in Scania, Sweden: place, things, time, metals, and worlds around 2000 BCE*. Aarhus Universitetsforlag.
- Vanhaeren, M., & d'Errico, F. (2006). Aurignacian ethno-linguistic geography of Europe revealed by personal ornaments. *Journal of Archaeological Science*, 33(8), 1105-1128.
<https://doi.org/10.1016/j.jas.2005.11.017>
- Vedwan, N. (2006). Culture, climate and the environment: Local knowledge and perception of climate change among apple growers in northwestern India. *Journal of Ecological Anthropology*, 10(1), 4-18.
- Vickers, M. (1985). Artful Crafts: The Influence of Metal Work on Athenian Painted Pottery. *The Journal of Hellenic Studies*, 105, 108–128. <https://doi.org/10.2307/631525>

- Vickers, M. (1989). The Cultural Context of Ancient Greek Ceramics: an Essay in Skeuomorphism. In P. McGovern & M. D. Notis (Eds.), *Cross-craft and Cross-cultural Interactions in Ceramics*. (pp. 45-63). The American Ceramic Society.
- Vickers, M. (1999). *Skeuomorphismus oder die Kunst, aus wenig viel zu machen*. Mainz: von Zabern.
- Wengrow, D. (2001). The Evolution of Simplicity: Aesthetic Labour and Social Change in the Neolithic Near East. *World Archaeology*, 33(2), 168-188.
- White, R. (1989). Production complexity and standardisation in early Aurignacian bead and pendant manufacture: Evolutionary implications. In P. Mellars, & C. Stringer (Eds.), *The human revolution: behavioural and biological perspectives on the origins of modern humans*. (pp. 366-390). Edinburgh University Press.
- White, R. (1992). Beyond art: toward an understanding of the origins of material representation in Europe. *Annual Review of Anthropology*, 21(1), 537-564.
- White, R. (1995). Ivory personal ornaments of Aurignacian age: Technological, social and symbolic perspectives. In J. Hahn., M. Menu, Y. Taborin, Ph. Walter & F. Widemann (Eds), *Le Travail et l'Usage de l'Ivoire au Paléolithique Supérieur* (pp. 29-62). Centre Universitaire Européen pour les Biens Culturels.
- White, R. (1997) Substantial acts: from materials to meaning in Upper Palaeolithic representation. In M. W. Conkey, O. Soffer, D. Stratmann & N. G. Jablonski (Eds.), *Beyond art: Pleistocene image and symbol*. (pp. 93-121) California Academy of Sciences.

- White, R. (2007). Systems of personal ornamentation in the Early Upper Palaeolithic: Methodological challenges and new observations. In P. Mellars, K. Boyle, O. Bar Yosef & C. Stringer (Eds.), *Rethinking the human revolution: new behavioural and biological perspectives on the origin and dispersal of modern humans* (pp. 287-302.) McDonald Institute for Archaeological Research.
- Zell, H. (2012a). [Photograph of *Columbella rustica*]. Wikimedia Commons.
https://commons.wikimedia.org/wiki/Columbella_rustica#/media/File:Columbella_rustica_01.jpg
- Zell, H. (2012b). [Photograph of *Littorina littorea*]. Wikimedia Commons.
https://commons.wikimedia.org/wiki/File:Littorina_littorea_02.JPG
- Zell, H. (2013a). [Photograph of *Littorina obtusata*]. Wikimedia Commons.
https://commons.wikimedia.org/wiki/File:Littorina_obtusata_01.jpg
- Zell, H. (2013b). [Photograph of *Tritia mutabilis*]. Wikimedia Commons.
https://commons.wikimedia.org/wiki/File:Tritia_mutabilis_01.jpg
- Zell, H. (2015a). [Photograph of *Homalopoma sanguineum*]. Wikimedia Commons.
https://commons.wikimedia.org/wiki/File:Homalopoma_sanguineum_01.JPG
- Zell, H. (2015b). [Photograph of *Tritia neritea*]. Wikimedia Commons.
https://commons.wikimedia.org/wiki/File:Tritia_neritea_01.jpg
- Zell, H. (2017). [Photograph of *Tritia corniculum*]. Wikimedia Commons.
https://commons.wikimedia.org/wiki/File:Tritia_corniculum_01.jpg

Appendix A.
Mediterranean and Atlantic seashells

Mediterranean shell species



A1



A2



A3



A4



A5



A6



A7



A8

Atlantic shell species



A10



Note: Plate covering all the shell species noted by Vanhaeren & d’Errico (2006) and White (1997) as possible ‘originals’ for the Aurignacian shell bead skeuomorphs. For visual reference of the high spire seashell skeuomorphs refer to O’Hara et al. (2015) fig. 3. *Cyclops neritea* (A6 synonym to *Tritia neritea*) is especially attributed as original inspiration to the ivory basket beads as seen in Heckel (2018) fig. 1. Sizing of the individual shells are not to scale.

Legend:

A1: *Columbella rustica* dorsal view.

A2: *Tritia corniculum* (Synonym: *Nassarius corniculum*) dorsal view.

A3: *Tritia mutabilis* (synonym: *Nassarius mutabilis*) dorsal view.

A4: *Nassarius gibbosulus* dorsal view.

A5: *Homalopoma sanguineum* back view (left) and dorsal view (right).

A6: *Tritia neritea* (synonym: *Cyclops neritea*) back view (left) and dorsal view (right).

A7: *Littorina littorea* back view (left) and dorsal view (right).

A8: *Nucella lapillus* dorsal view.

A9: *Littorina obtusata* back view (left) and dorsal view (right).

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Fig. A2 is adapted from “[Tritia Corniculum](#)” by [H. Zell](#). (2017). Licensed under [CC BY-SA 3.0](#) / Image cropped, and background removed, put into a plate by the author of this thesis.

Fig. A3 is adapted from “[Tritia mutabilis](#)” by [H. Zell](#). (2013b) Licensed under [CC BY-SA 3.0](#) / Image cropped, and background removed, put into a plate by the author of this thesis.

Fig. A4 is adapted from “[Nassarius gibbosulus](#)” by J. Delsing. (2016). Public domain / Image cropped, and background removed, put into a plate by the author of this thesis.

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Fig. A8 is adapted from “[Nucella lapillus](#)” by E. A. Lazo-Wasem. (2014). Public domain / Image cropped, and background removed, put into a plate by the author of this thesis.

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Appendix B.
South Scandinavian flint daggers



Note: Flint daggers after Lomborg's (1973) typology, note that these daggers should perhaps not be viewed as a linear progression from type to type, but rather they coexisted in a time space.

Legend:

B1: Lanceolate flint dagger type I found in Hjerridslev, Tolstrup parish, Denmark.

B2: Lanceolate flint dagger type II found in Trollemåla, Blekinge county, Sweden.

B3: Flint dagger type III found in Østergård, Mern parish, Denmark.

B4: The Hindsgavl flint dagger of type IV, found in Fænø, Middelfart Municipality, Denmark.

B5: Flint dagger type V found in Randerseggen, coordinates unknown, Denmark.

B6: Flint dagger type VI without known find coordinates or context, Denmark. Sizing of the individual daggers are not to scale.

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Fig. B1 is adapted from "[Flintdolk fra Ø. Hjerridslev](#)" by R. Fortuna & Kira Ursem. (n.d.-a). National Museum of Denmark. Licensed under [CC BY-SA 4.0](#) / Background removed and put into a plate by the author of this thesis.

Fig. B2 is adapted from "[Dolk \(typ II flintdolk\) av flinta](#)" by G. Tanner. (2012). Licensed under [CC BY 2.5 SE](#) / Background removed and put into a plate by the author of this thesis.

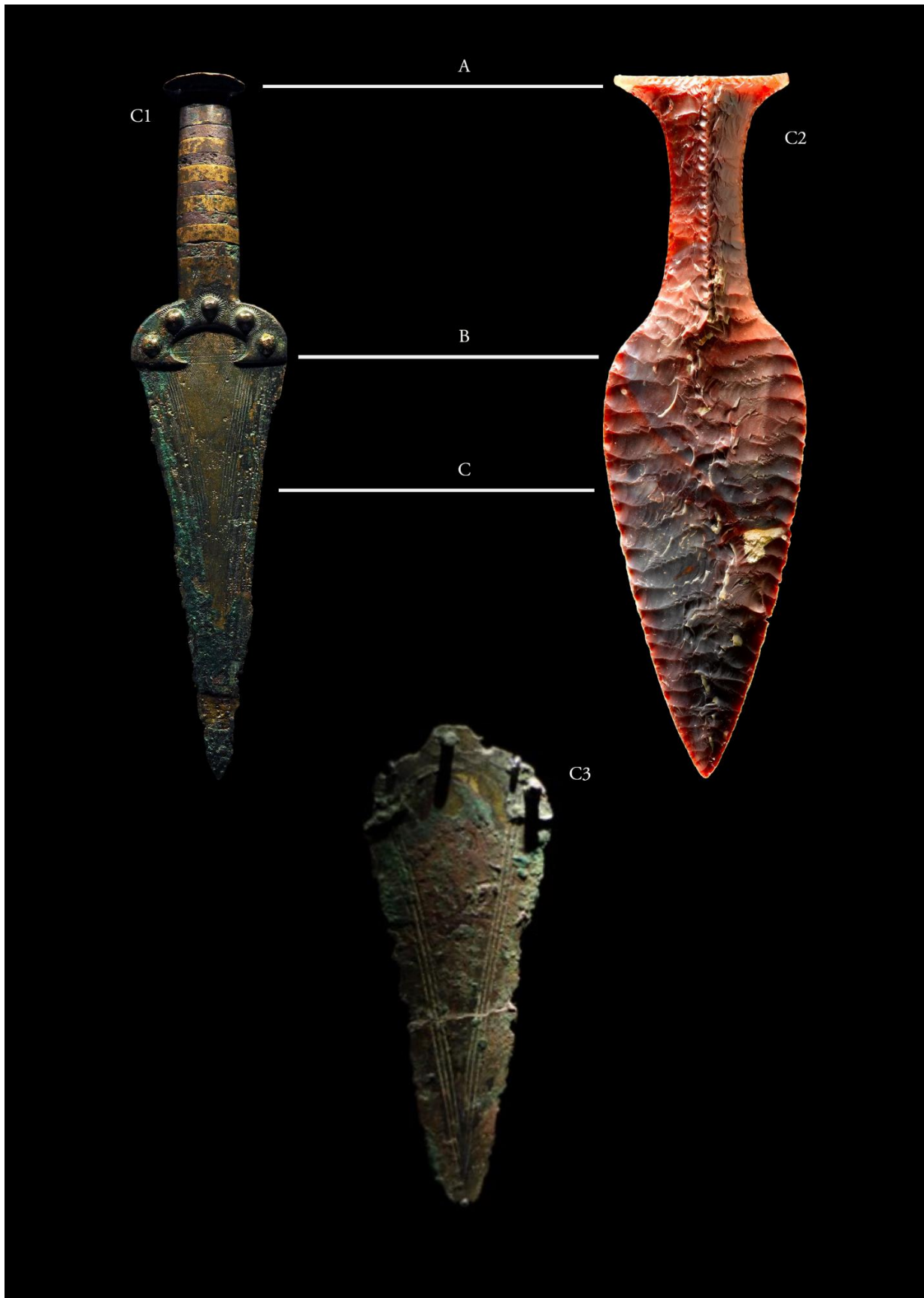
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Appendix C.
Comparison of a flint dagger and a metal dagger



Note: Comparison of the dominant skeuomorphic features between a metal dagger (fig. C1) and a fishtail flint dagger from Hindsgavl (fig. C2). A: Distinct raised and flared pommel. B: Hilt and blade curling inward and form distinct shoulders. C: Triangular or leaf-shaped blade, also illustrated in fig. C3. C3 depicts an Únětice blade with missing handle from the Leubingen tumulus located in Thuringia, Germany (Arch Halle, 2012). The metal dagger (C1) was found near Lausanne, Switzerland, and are attributed to the Únětice adjacent, Rhône culture (Musée cantonal d'archéologie et d'histoire, 2020). Sizing of the individual figures are not to scale

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Fig. C1 is adapted from: “[Dagger2200-1600 BCE-MCAH Lausanne-On display 1](#)” by [Rama](#). (2017). Licensed under [CC BY-SA 3.0 FR](#) / Background removed and put into a plate by the author of this thesis.

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Fig. C3 is adapted from [[Blade of a Únětice bronze dagger](#)] by Arch Halle. (2012). Licensed under [CC BY-SA 3.0](#) / Background removed, and image slightly rotated, put into a plate by the author of this thesis.