The Intentional Destruction and Deposition of Bronze Age Metalwork in South West England
(Volume 1 of 3)

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I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

Signature: ……………………… …………………………..

Abstract

The intentional destruction of Bronze Age metalwork prior to deposition is frequently recognised within assemblages, but rarely forms the focus of study. Furthermore, most research focuses on *why* metalwork was deliberately destroyed without considering *how* this process was undertaken. This thesis therefore analyses how metalwork might have been intentionally damaged and uses this to better interpret why.

The material properties of bronze are considered alongside past research into the use of different implements, before a series of experiments are presented that explore how one might best break a bronze object. A better understanding of the methods by which Bronze Age metalwork might become damaged means one can identify intentional damage over that sustained accidentally, through use or post-deposition. This culminates in a Damage Ranking System, which can be utilised to assess the likelihood that damage observed on archaeological specimens is the result of intent.

The Damage Ranking System is applied to Bronze Age metalwork from South West England (i.e. Cornwall, Devon, Dorset and Somerset). The catalogue of metalwork from this region was recently updated, highlighting instances of deliberate destruction that would warrant further study (Knight et al. 2015). The present research builds on this catalogue and involved analysis of complete and damaged objects from across the study region and from throughout the Bronze Age. Approximately 1300 objects were handled and studied and set within the Damage Ranking System alongside a contextual analysis of the findspots. This allowed trends in damage and depositional practices to be observed, demonstrating increased intentional destruction throughout the Bronze Age.

It is shown that the deliberate destruction of metalwork throughout the Bronze Age related to the construction of personhood and emphasised links with other regions of Bronze Age Europe. This research demonstrates a new approach to the material that has wide-reaching applications in future studies.

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It is to everyone listed above, and everyone else I have forgotten, that I dedicate this thesis.

Matthew G. Knight

7th February 2018

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APPENDIX F:	ACCESS DATABASE OF METALWORK STUDIED

“Destruction leads to a very rough road,

but it also breeds creation”

Californication – Red Hot Chili Peppers

CHAPTER ONE

INTRODUCTION: FROM DOG COLLARS TO THE BRONZE AGE

1.1 Introduction

The aim of this thesis is to better understand the deliberate destruction of Bronze Age metalwork. This phenomenon is frequently recognised and has traditionally been interpreted in terms of a ritual-profane dichotomy, with damaged objects either considered a sacrificial offering, or the result of the scrapping and recycling process. Almost all studies on metalwork destruction focus on *why* this material was destroyed, with limited consideration given to *how*. This oversight means that subjective assumptions are inevitably applied to the archaeological record about what is the result of accidental breakage and what is deliberate manipulation based on preconceived ideas about object forms, though depositional context can also be a key indicator.

As this thesis will show, understanding how objects might be damaged through deliberate or accidental processes means one can more accurately interpret the archaeological data and better understand how people related to metalwork in the Bronze Age. A system for identifying and ranking different types of damage will be established (Chapter 6) and applied to an archaeological dataset. In this thesis Bronze Age metalwork from South West England (Cornwall, Devon, Dorset and Somerset, following Pearce 1983 and Knight et al. 2015) will be studied. This introductory chapter firstly examines the importance of destruction in the modern world, before considering the Bronze Age. Key terminology that underpins this thesis is defined and the main research questions of this thesis are addressed. Finally, a chapter-by-chapter layout is presented.

1.2 Modern Day Destruction

In 2007, the Archbishop of York, Dr John Sentamu, cut up his dog collar on *The Andrew Marr Show* in protest to the rule of President Mugabe in Zimbabwe (BBC News 2007). He argued that President Mugabe had "taken people's identity" and "cut it to pieces" (Sentamu on *The Andrew Marr Show* 2007); in response, he cut up his own sense of identity (his dog collar). When President Mugabe's reign ended in November 2017, the Archbishop was presented with the cut-up fragments of his collar, which had been retained for the intervening decade. When discussing the idea of putting the fragments back together with Andrew Marr, the Archbishop said:

> "I could attempt to put this one back together using superglue, but it would be a pretty ropey collar. And I actually think the message for Zimbabwe is the same. They just can't try and stitch it up. Something more radical, something new needs to happen" (Sentamu on *The Andrew Marr Show* 2017).

This situation highlights how the act of destruction can be an expression of personhood as well as individual and cultural identities. It was grounded in a specific social and political situation and was conducted as a public event, live on television, with a premeditated agenda.

Other acts of destruction permeate throughout the modern world, offering a means for expressing ideologies and emotional responses (Brubaker 2013, 13-14; Driessen 2013). Property is often deliberately defaced and destroyed by graffiti and vandalism as an expression of social unrest, or alternatively as an art form (Gamboni 1997, 327-328). Moreover, cultural heritage might be destroyed to control perceptions of the past (Bevan 2006); one need only consider the destruction of art by the Nazis (Gamboni 1997, 45-47), or recent acts of iconoclasm by ISIL in the Middle East to destroy cultural identity (Asfour and Scott 2015). Iconoclastic acts of destruction are particularly prevalent throughout history (e.g. Gamboni 1997; articles in Boldrick et al. 2013). The destruction of images and icons for political or religious purposes often involves the most extreme actions. The destruction of the Stalin monument in Budapest in 1956, for instance, involved pulling down the statue, followed by mocking and attacking it before it was "cut into pieces by people looking for relic-like 'tokens of remembrance of the heretic October day'" (Gamboni 1997, 60).

In other cases, an object that is inalienably linked with a person might be destroyed upon their death, such as the hammering and breakage of the Papal ring (aka the Ring of the Fisherman) upon the death of a Pope by the Cardinals. This latter situation, however, has seen a transformation of the role of destruction because Pope Benedict XVI resigned, rather than died, in 2013 and the ring signet was chiselled and cut, but not broken (New York Daily News 2013); the act of defamation was symbolic enough. Moreover, glasses are often broken at Jewish marriage ceremonies, which serves to ward off demons (Lauterbach 1925) as well as symbolically reminding the couple that relationships, like glass, are frail and by breaking the glass they are ensuring the marriage should never break (Diamant 2017). Objects are thus broken to strengthen a relationship between people as well as serving a supernatural function. Meanwhile a bottle will be smashed upon a boat to launch it as a christening act and a sign of good luck (McNamara 2017). It can thus be observed that destruction might be conducted for a variety of different reasons, but is almost always culturally-embedded based upon individual and societal perceptions of how the world might be managed through these acts.

1.3 Bronze Age Destruction

The above section highlights many of the key themes that will be dealt with in this thesis. Whilst traditional interpretations viewed Bronze Age destruction of metalwork as part of the scrapping process (e.g. Evans 1881), a more nuanced appreciation of contexts and broader practices is increasingly showing that the destruction and subsequent deposition of metalwork served a wider range of functions, for which catch-all interpretations are no longer applicable (Bradley 2005 145-164; 2017, 124-141; Chapman 2000; Chapman and Gaydarska 2007; Hansen 2016). It would be wrong, for instance, to consider the destruction of Middle-Late Bronze Age weapons deposited in the River Thames alongside broken grave goods in Early Bronze Age graves, or fragments of axeheads in Late Bronze Age hoards alongside incomplete material in settlement contexts (Brück 2004; 2006a; Turner 2010a; York 2002). Therefore, in the same way objects are broken for a variety of reasons in the modern periods, so objects in the past were likely destroyed for a variety of socially-situated reasons. However, in all examples presented above, destruction served as a mode for social reproduction and was linked to certain ideologies and expressions of personhood and identity. For this reason, a detailed analysis of deliberately destroyed Bronze Age metalwork can be useful for better understanding the relationships people held with their objects in the past and the motivations that may have necessitated destruction and deposition. This was inevitably influenced by other factors that might be inferred by associated material and the immediate context in which metalwork was deposited.

1.4 Defining the Bronze Age

Here the Bronze Age encompasses the period from c.2450-600 BC and incorporates what is now considered the Earliest Iron Age (Table 1.1). This latter period has been included because firstly it was previously considered part of the Bronze Age (e.g. Pearce 1983) and secondly it provides a contrast to the preceding Late Bronze Age in terms of treatment of metalwork and depositional practices. Furthermore, the idea of a British Chalcolithic has increasingly been explored recently (Allen et al. 2012), though there is still some debate. Therefore, whilst the concept of a British Chalcolithic is recognised, it is encompassed under 'Early Bronze Age' within this thesis for convenience. Evidence for changing attitudes towards the deliberate destruction of metalwork over the course of the Bronze Age (e.g. Hansen 2016; Rezi 2011; York 2002) means that in defining the parameters of this thesis it was most beneficial to encompass the whole period to achieve the fullest analysis of these practices and how they manifested in different ways over a long temporal span.

Table 1.1: The British Bronze Age chronology (following Needham et al. 1997; Roberts et al. 2013)

Bronze Age periods	Date
Early Bronze Age (Chalcolithic)	2450-2125 BC
Early Bronze Age	2125-1500 BC
Middle Bronze Age	1500-1150 BC
Late Bronze Age	1150-800 BC
Earliest Iron Age	800-600 BC

1.5 Terms of Destruction

Key terms that will occur frequently within this thesis must be clearly defined, especially those that are often used interchangeably or encompass numerous meanings. Objects are often described as 'broken' or 'damaged' with no clarification of what this means. Clearly defined terms surrounding the theme of destruction will thus strengthen any methodological considerations presented in this thesis.

Inspiration can be drawn from Rezi's (2011) study of destruction in Transylvanian hoards. He brought the categories '*damage*', '*break*' and '*destruction*' under the encompassing term of '*fragmentation*' as descriptors of intentional actions on metalwork. These categories were defined broadly (ibid., 308), but do not reflect the huge range of actions that can be inflicted upon objects as Rezi's focus was on object fragmentation in hoards, whereas this thesis is approaching metalwork from all contexts suffering all destruction indicators. One problem is that whilst it has its advantages as an overall term, '*fragmentation*' possesses a multitude of connotations. Moreover, Rezi's terms do not incorporate elements of use-damage, which will form a key consideration in building a methodology (Chapters 3-5); as will be shown, this can be fundamental in determining intentionality. Here, therefore, the same key words are used, but adapted to incorporate features of use-wear indicators and post-depositional considerations. '*Fragmentation*' is presented as a separate term, alongside '*breakage*' and '*destruction*', whilst '*damage*' is the all-encompassing category under which these three terms fall. *Damage*, however, is not defined by these terms, as it incorporates features beyond these; consequently, *damage* is defined separately following criteria that also apply when defining types of *breakage*, *fragmentation* and *destruction* (see Table 1.2).

Table 1.2: A summary of the four key terms related to destruction that will occur most frequently within this thesis.

<table>
<tr><th></th><th>Term</th><th>Definition</th><th colspan="2">Sub-types</th></tr>
<tr><td rowspan="2"></td><td rowspan="2">Damage</td><td rowspan="2">An object that has suffered material displacement, deformation or loss</td><td>Ancient</td><td>Use-related
Non-use-related/ decommissioning</td></tr>
<tr><td>Modern</td><td>Post-depositional
Recovery
Post-recovery</td></tr>
<tr><td rowspan="3">Damage</td><td>Breakage</td><td>An object separated into two or more pieces or fragments</td><td colspan="2"></td></tr>
<tr><td>Fragmentation</td><td>Broken to less than 25% of the original size of the object</td><td colspan="2">Recognisable
Indeterminable</td></tr>
<tr><td>Destruction</td><td>Rendering an object unusable through damage</td><td colspan="2"></td></tr>
</table>

Most importantly, these terms *are not* presented as a method for exclusive categorisation; rather they offer the most accurate portrayal of the state and treatment of an object and it must be stressed that an object should be described using a *combination of these terms*. It is a common problem in the literature trying to describe damaged objects that authors attempt to use different terms either exclusively of each other, or else so synonymously that they become indistinguishable and lose meaning. Here a balance is sought between incorporating the terms within each other, whilst also keeping them distinct. Terms depicting different forms of damage, breakage, fragmentation and destruction are considered 'destruction indicators' and the identification and categorisation of these are defined and explored in Chapter 5.

1.5.1 Damage

Damage is the broadest term to be defined here and whilst useful as a generic term, on its own it is insufficiently specific. It is a word with numerous connotations, not all of which are mutually exclusive, and consequently here it is the all-encompassing term that must be broken down and clarified. At its simplest, an object is considered damaged if it has suffered material displacement or deformation. 'Damage' can thus be as simple as nicks suffered through use, or as complex as a bent and broken sword, as well as referring to post-depositional corrosion or post-recovery processes. Consequently, it also follows that some damage is repairable, whereas some is not. Minor object wear occurring through manufacture and use (e.g. fine scratches, blade asymmetry, worn decoration) is also considered 'damage' here, as it does affect the overall performance of the object but it can be difficult to perceive.

Although this thesis is largely concerned with deliberate damage, it is essential to consider how other types of damage will be defined as a mode of comparison. The initial differentiation for defining damage is based on whether it is ancient, or 'modern' (incorporating post-depositional damage); these are then defined into further sub-types of damage.

1.5.1a Ancient Damage

Ancient damage refers to damage sustained during the Bronze Age and the presumed original lifecycle of the object. This can be divided into use-related and non-use-related damage.

1.5.1a.1 Use-related Damage

This is damage that has most likely been sustained through use. This is explored further throughout Chapters 3-5.

1.5.1a.2 Non-use-related/Decommissioning Damage

This is damage that leaves the object intact but could not have been inflicted through use and often deforms the object. This includes:

- Crushing;
- Blocking of sockets;
- Bending/folding; and
- Twisting.

These destruction indicators are examined in Chapter 5. Often this type of damage can be interpreted as a form of *decommissioning* the presumed functionality of an object; for instance, crushing the socket of a socketed axehead means it can no longer be hafted. The removal of this functionality is considered here as destruction (see below). The term 'decommissioned' was employed by Bridgford (2000, Section 7.3) to describe a destroyed object. Here it will be used to describe objects that remain intact but have had their presumed functionality removed. It is possible that repairs could have been undertaken of some objects suffering this damage (e.g. bent objects), but this is rarely observed.

1.5.1b Modern Damage

Modern damage refers to any damage suffered following object deposition in prehistory through to the modern day, including recovery and post-recovery processes. This incorporates modern damage, but also damage likely to have occurred while in the ground.

1.5.2 Breakage

The term 'breakage' has often been used with limited clarification and its large variety of connotations makes it difficult to apply meaningfully especially across a range of object types. Breakage of an object is a form of *damage*; although not all damaged objects are broken, all broken objects are damaged, highlighting the interwoven nature of these terms. Specifically, a broken object is defined here as one where, at one stage in the object life history it has separated into two or more pieces or a piece or fragment has broken off often rendering the object no longer usable for its original function. It is linked closely with the overall completeness of an object.

The term *break* can be used synonymously with the more mechanical term ‘fracture’ but a distinction here is made between breakage and fragmentation. For an object to be considered ‘broken’ at least 25% of the object must be present which will be a *piece* of the object; less than this is considered a *fragment* (see below). A break can occur in numerous ways and the methodology in Chapters 3-5 attends to *how* a break may have been inflicted. Signs of damage can be present on broken objects and used to describe a break.

1.5.3 Fragmentation

A fragment refers to a part of an object that represents less than 25% of the overall object were it complete and has broken off. Fragmentation refers specifically to the process of breakage that results in fragments. They can be isolated finds, or refit with other fragments to form part of an object. Fragments can either be *recognisable* (referring to the object type) or *indeterminable*.

1.5.4 Destruction

Destruction is perhaps the most essential word to describe within this thesis. It refers exclusively to any object that has been intentionally rendered unusable through damage, breakage or fragmentation. Human agency is implied through the use of this term and it is often closely linked with the decommissioning damage described above. The link with human agency has been chosen here to distinguish destruction from other forms of damage. A ‘destroyed’ object not displaying signs of intent is instead considered ‘damaged’, falling within one or more of the definitions presented already.

Whilst here destruction is linked closely with the rendering an object unusable in a functional sense, it must not be forgotten that the destruction of some objects may have been performed to serve an alternative function, such as breaking down for recasting. Deliberately broken objects indicating this potential function are still classified as having been destroyed.

1.6 Research Questions and Aims

The aim of this thesis is to better understand deliberate destruction in the Bronze Age. From the above discussion it is evident that this thesis must firstly address the destruction of Bronze Age metalwork as a technical process, and develop a working methodology for the identification of intentional damage. This is done through an analysis of past literature and a series of experiments on replica implements. This is then applied to an investigation of the material in South West England. The theoretical literature surrounding destruction has often suggested that the destruction of objects might be linked to concepts of lifecycles, social reproduction and personhood (e.g. Chapman 2000; Brück 2006a) – the appropriateness of these theories in light of destructive experimentation and new data collection will also be considered.

The research questions can be summarised as follows:

- Is it possible to identify evidence for the deliberate, rather than accidental, destruction and decommissioning of Bronze Age metalwork?
- What destructive techniques were used and do these require technical skills?
- Are there patterns in the deposition of deliberately destroyed metalwork, e.g. in associations or depositional contexts that suggest it was treated differently to complete or accidentally damaged metalwork?
- Is there a correlation between the treatment and the topographical context of metalwork deposits?
- How might a study of the deliberate destruction of metalwork inform archaeologists about the social, economic and/or ritual role of these practices?
- To what extent do the actions taken upon the objects and the subsequent depositions allow archaeologists to better understand the relationship between people and objects?

These research questions deal with both small-scale considerations and broader interpretative issues and are assessed through a consideration of a dataset of metalwork from South West England. However, the conclusions drawn and more importantly the approaches taken and the methodology presented are relevant to other investigations of deliberately destroyed Bronze Age metalwork in Britain and Europe.

1.7 Framing the Research

This is a thesis of two parts: the first half (Chapters 2-5) establishes a methodology for determining deliberate destruction of metalwork, whilst Chapters 6-10 apply this methodology to the material from South West England. In Chapter 2, an overview of theoretical perspectives is presented, drawing on those approaches that are most relevant to a study of the destruction of Bronze Age metalwork, including a consideration of ethnographic accounts as well as a review of the debates around agency, memory, object biographies and finally personhood. Whilst theoretical approaches to destruction are common, Chapter 3 highlights the lack of consideration that has been given to the practical processes needed to destroy a metal object in prehistory. Use-wear studies are particularly considered as an avenue that has yet to be integrated with an assessment of damaged metalwork. This gap is further addressed by the experimental activities presented and discussed in Chapter 4. Replica objects based on metalwork from South West England, including swords, spearheads and axeheads, are subjected to deliberate mis-use and intentionally destructive actions to determine what skills and knowledge were required to decommission Bronze Age metalwork. Chapter 5 builds on the previous chapters to construct a methodology for identifying signs of deliberate destruction in the archaeological record. This culminates in a Damage Ranking System, which considers a set of variables that can be utilised to determine the likelihood that an object was deliberately destroyed before deposition. This was applied during the data collection phase of the thesis, which extended from February 2015 to December 2016 (Chapter 7).

Chapter 6 establishes the appropriateness of the South West as a study region and summarises key elements of Bronze Age practices in the area, including burials, settlements, and depositional practices. This chapter also presents an overview of all Bronze Age metalwork in South West England, which is sampled as part of the data collection strategy in Chapter 7. A catalogue of the objects that were visited and studied can be found in Appendix A; this is supplemented by a catalogue of the publicly available Portable Antiquities Scheme (PAS) material (Appendix B). Throughout this thesis, any objects presented are referenced by their catalogue numbers.

Chapter 8 analyses the evidence for the deliberate destruction of metalwork in the Early-Middle Bronze Age (c.2450-1150 BC), which is largely confined to grave goods and hoards from Somerset. By contrast, there is extensive evidence for the deliberate destruction of metalwork in the Late Bronze Age (c.1150-800 BC), which forms the main focus of Chapter 9. Chapter 9 also considers the evidence from the Earliest Iron Age. Chapter 10 draws together the various aspects explored throughout the thesis by applying the theoretical perspectives outlined in Chapter 2 to material from South West England. This is contextualised alongside other studies of metalwork destruction across Britain and Europe. Furthermore, past approaches to the destruction of Bronze Age metalwork are considered in light of the experimental activities, and the evidence from South West England. Finally, Chapter 11 outlines future avenues for furthering the research presented in this thesis.

CHAPTER TWO

CONCEPTUALISING DESTRUCTION

2.1 Introduction

Destruction is an inherent human practice. It is conducted for a variety of reasons at different times and may serve economic, social and/or political purposes. The destruction of Bronze Age metalwork will be contextualised within a variety of theoretical perspectives to better understand how the destruction of objects related to people and specific cultural settings. This chapter begins with an overview of relevant ethnographic analogies to explore how the destruction of objects forms an integral part of small scale and non-literate societies across the world. Following this, the chapter presents a framework of theoretical perspectives that form the basis for the rest of the thesis and discusses how they have previously been applied to Bronze Age metalwork studies.

2.2 Ethnographies of Destruction

The application of ethnographic analogies to the archaeological record is widely debated (e.g. Cunningham and MacEachern 2016; David and Kramer 2001; Hamilakis 2011; Hamon 2016). A primary argument for exploring ethnographic studies is "the raising of the analogical consciousness of archaeologists" to conceptualise contexts beyond the archaeologist's contemporary background (David 1992, 352; Cunningham and MacEachern 2016). It is in this spirit that a selection of ethnographic case studies in which the deliberate destruction of objects has been recorded are presented here.

Broken objects, whether deliberately destroyed or not, form part of a complex set of practices. Ethnographic studies in Africa, Indonesia and India, for instance, have all identified situations where worn and broken objects form part of exchange systems (Lahiri 1995, 125-126; Rowlands 1971a, 211-212); old and damaged objects were traded with a metalsmith either as raw material or in exchange for new objects. Rowlands (1971a) highlighted the seasonality associated with these actions; worn out objects were often brought back towards the end of a season and Rowlands used this as a possible explanation for the accumulation of used and broken objects in Late Bronze Age hoards (ibid., 212). This scenario is useful for conceptualising hoards of fragmentary material, but cannot be applied wholesale to the innumerable objects that show signs of deliberate destruction in a variety of contexts in the Bronze Age.

Ethnographically, the deliberate destruction of objects is most commonly linked with the death of an individual (Grinsell 1961, 479-480; 1973). For instance, pots in Africa often embody people and relationships and the death of a person necessitates the destruction (or 'death') of their pot (Barley 1994). Hattingh and Hall (2009, 310) suggested that the practice of breaking pots expresses ideas about transformation upon death and subsequent rebirth. Reasons why objects may be ritually "killed" in mortuary situations are presented in Table 2.1 (following Grinsell 1961; 1973), though this list is not exhaustive.

Table 2.1: Summary of Grinsell's (1961; 1973) reasons for the ceremonial 'killing' of objects at funerals with an additional reason (in bold) based on ethnographic studies within this thesis.

Reason
Releasing an object's spirit
Reducing the risk of grave-robbing
Prevention of quarrels amongst the living
"Repugnance" of using them again
Fear of pollution (e.g. if the person died of a contagious disease)
To frighten away Charon (Aegean superstition)
Close association between the objects and the dead (e.g. swords)
Objects associated with the mortuary ceremony
Symbolising the destruction of enemies of the deceased
Objects too large for the grave
To preserve links between the living and the dead

For instance, in addition to those listed by Grinsell (1961; 1973), the destruction of possessions may also serve to bind the living and the dead. Among the Nuer in South Sudan, a man's metal armrings might be broken and distributed among the men and boys of the family upon his death (Evans Pritchard 1956, 152). More typically, other communities destroy possessions to sever links with the dead e.g. the Venda (South Africa), the Makah

(Washington, North America), and the Akwẽ-Shavante (Brazil) (Colson 1953, 274-275; Maybury-Lewis 1974 [1967], 280; Stayt 1931, 162). These objects include pots, personal ornaments, and weapons. The Haya in northwest Tanzania destroy everything a person owned at the end of a mourning period for fear that the dead might “torment a household if others were using their possessions” (Weiss 1997, 168); this also demonstrates how destruction may manifest belief systems.

In some societies, objects are destroyed as part of memory work with destruction assisting the process of forgetting, or acting as a memorialisation process. Both the !Kung in South West Africa and the Modoc in California destroy objects to eliminate painful reminders of the dead (Marshall 1965, 260; Ray 1963, 116-120). Lillios (2003) has proposed a similar reason for the fragmentation of engraved slate plaques in mortuary contexts in Late Neolithic/Chalcolithic Iberia. Meanwhile, in Melanesia *malanggan* art sculptures embodying the life force of an individual are created from memory of previous ceremonies and destroyed as part of a funeral (Küchler 1987; 2002). This serves as a “cultural stimulation of processes of social reproduction” (Küchler 1987); the destruction simultaneously results in an act of forgetting (i.e. removing the sculpture from existence), whilst also commemorating the process through a ceremony and forcing individuals to remember so that a new sculpture might be made at the next funeral (cf. Connerton 1989). Destruction is therefore part of a mnemonic practice.

Finally, the use of destruction as a religious and political tool is particularly prevalent throughout ethnographic studies. For example, when the Rugange in Nigeria converted to Islam they destroyed all anthropomorphic pots linked with previous belief systems and threw them in a river (Chappel 1973; Insoll 2015, 281); this iconoclastic practice can be paralleled with those outlined in Section 1.2. Alternatively, in Cameroon, potsherds are left with votive offerings on trails (Barley 1994, 76); as Barley (ibid.) noted, this would appear confusing archaeologically as one would encounter only single fragments of pots on potentially invisible trackways; it is therefore important to consider that isolated fragmentary finds may also have had a function.

Meanwhile, the Northwest Pacific potlatches involved the destruction of property, including canoes, blankets and ‘coppers’ (sheets of metal with forms embossed on them) to express power through the consumption of wealth between rival chiefs and clans (Boas 1897, 93), whilst also sacrificing gifts to spirits and deities (Mauss 1990, 53). The essence of a potlatch is to give, with the exchange of gifts necessary as part of an affirmation of one's wealth and power (Mauss 1990). However, the destruction of property similarly demonstrated one's wealth by emphasising that a chief had no need for it (ibid.). The destruction of coppers that were linked with specific individuals and ideas has been interpreted not only as an expression of political and economic power, but also as a form of alienating otherwise inalienable objects (cf. Gregory 1980). The sacrifice of an inalienable gift makes the object alienable by transforming it into a gift to the gods, which no longer has ties with any one person (Gregory 1980, 644-648; Mauss 1990).

In southern Ethiopia, the destruction of spearheads was integral to a peacekeeping ceremony between conflicting local tribes (Fig.2.1; Girke and Pankhurst 2011; Pankhurst 2006). Tribal leaders presented iron spearheads, which were then deliberately blunted (Girke and Pankhurst 2011, 234). The spears were removed from the main area of ceremony, the shafts were broken and the fragments were placed on a termite mound "to indicate their burial and destruction by insects" (ibid., 236). The spearheads were personified and blame for past conflicts was shifted from the actors to the objects; a curse was placed on whoever unearthed the objects from their burial site (ibid.). This case study is particularly interesting, as it emphasises the potential for destruction to be part of a peaceful process; here it is not an aggressive act, but rather one that entangled communities together through ceremonial practice. Furthermore, it is the only time this set of communities have performed this ceremony; archaeologically, one would encounter only an isolated 'hoard' of iron spearheads set away from the nearby ephemeral settlement.

This sampling of ethnographic studies is not intended as a comprehensive overview, and it is naturally biased towards those societies which intentionally destroy their material culture; there are inevitably many societies in which broken objects do not feature (or at least are not recorded). However, the deliberate breakage of objects in all cases is a culturally-embedded practice forming important elements of rites of passage, social reproduction and change, and life events for the individuals and communities involved. Archaeologically, it is important to be aware of the complex functions destruction may have had. Deliberately destroyed objects in burials in Bronze

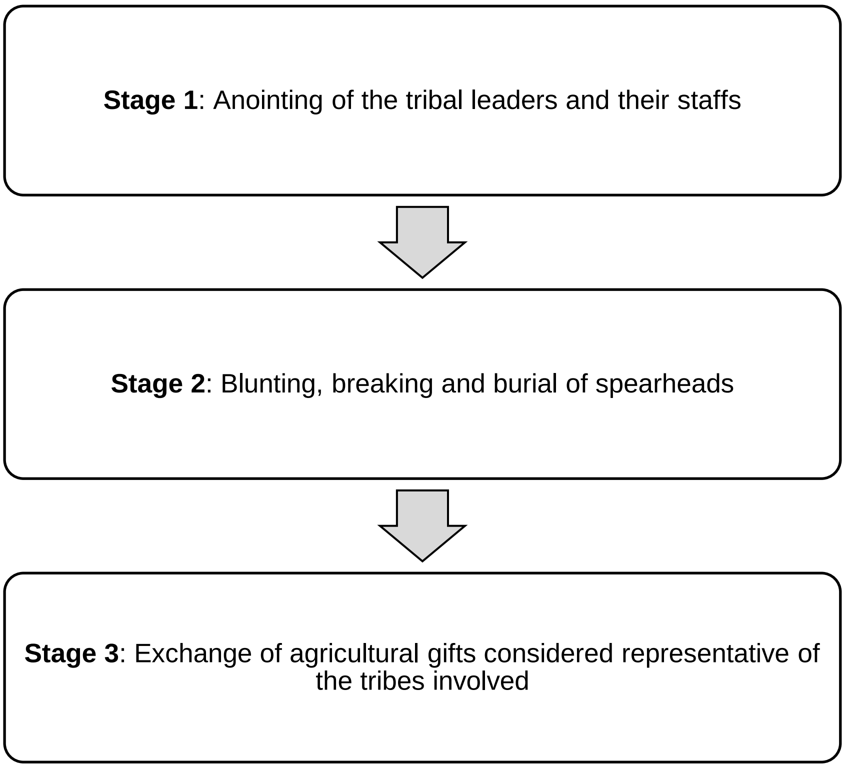

Fig.2.1: The three stages of the peace ceremony conducted in Ethiopia in 1993 (source: adaptation of Girke and Pankhurst 2011, 234)

Age Britain may have embodied similar ideas about death, whilst broken objects in other contexts (e.g. hoards and settlement contexts) might be considered part of a much larger set of processes, such as exchange systems, that were socially situated (see Brück 2004; 2006a). Overall, these studies demonstrate the importance of social actions and the histories associated with the objects; consequently, the destruction of objects is often intrinsically linked with the construction, embodiment, and deconstruction of identities and personhood. Exploring these theoretical perspectives will form the remainder of this chapter.

2.3 Agency/Material Agency

The concept of agency, specifically human social action, has recently been explored extensively in relation to archaeology (Dobres 2000; Dobres and Robb 2000a; 2000b; 2005; Gillespie 2001; Robb 2010). Agency is a multi-faceted concept with a variety of applications for studying human action, including the agency of groups vs individuals, the intentionality of agents, and contextual analyses (Barrett 2000; Dobres and Robb 2000b). A comprehensive definition for agency is problematic, but can be considered to encompass two main elements: materiality and social reproduction (Dobres and Robb 2005). Materiality refers both to the physical materials from which material culture is produced, as well as how materials are encountered, engaged with and experienced by human actors (cf. Alberti and Marshall 2009; Hurcombe 2007, 109ff.); meanwhile social reproduction refers to the transmission of cultural and social values between persons and social groups (cf. Bourdieu 1977). These two elements are interwoven and mean that it is possible to examine the agency of individuals and groups, firstly through study of the material culture, and secondly through the actions undertaken. In the context of this thesis, this is especially important as the deliberate destruction of material is an expression of human agency. Bronze Age metalwork possesses a materiality that allowed the objects to be destroyed in certain ways, but this was also likely performed for different socially-motivated reasons.

Dobres and Robb (2005, 162-163) presented a variety of “middle range interpretive methodologies” (ibid.) through which to ‘do’ agency, including the study of *chaîne opératoires* and technology (Dobres 1999; 2000; Pfaffenberger 1992; 1999; Sinclair 2000), object life-histories and biographies (Gosden and Marshall 1999; Schiffer 1972; see below), and phenomenologies (Owoc 2005; Tilley 1994), as well as assessing the significance of intentionality and context (Gardner 2004; Hodder 2000; Robb 2010). These methodologies are often implicit to many material culture studies and consequently, Robb (2010, 515) argues archaeologists now practice an inherent “archaeology with agency”.

This is the case for many studies of Bronze Age practices. Intentionality and contextual analysis, for instance, are integral to discussions on depositions of metalwork (e.g. Bradley 1998a [1990]; 2017; Fontijn 2002; Needham 2001; 2007a). In South West England, Owoc (2005) examined how past societies actively engaged with the construction and manipulation of the ritual landscape as a means of establishing shared mythical knowledge and ultimately social agency. Owoc (2005, 264) argued that past artefactual analyses, focusing on typologies, often fail to address changing practices over time and thus are less important for understanding human action. However, this ignores the agency involved in technological developments and how the construction of typologies might allow us to see this (Dobres 2000; Fogelin and Schiffer 2015). Similarly, studies of the lifecycles of metalwork have strived to understand human-object relations within a social context (Turner 2010a). How one might thus interpret broader concepts of personhood, identity and social relationships between people and objects are increasingly considered, particularly in relation to fragmented objects (Becker 2013; Brück 2006a; 2006b; Chapman 2000). Hoffman's (1999) study of deliberately destroyed metal objects in later prehistoric Spain demonstrated the changing social situations in which destruction was situated; a combined analysis of the destructive practices involved and the spatial and temporal context allowed insights into the expression of prehistoric social agency. Similarly, in South East Europe, Chapman (2000) suggested that clay, stone and copper objects were deliberately fragmented and kept as tokens by individuals engaged in social relationships or transactions; this concept of 'enchainment' is explored further below. Brück (2004; 2006a; 2006b) meanwhile has drawn on anthropological studies of gift exchanges (e.g. Mauss 1990; Weiner 1992) to suggest that objects and people were intrinsically linked, and objects may have acted as social agents in the British Bronze Age. Actions taken upon objects, such as destruction, curation and deposition, mirrored actions taken upon human bodies, and thus Brück suggests objects were metaphors for people.

Interactions between an individual and an object and the reactions a person may take *because* of the object, has led to a debate surrounding the agency of objects i.e. material agency (Alberti and Bray 2009; Joyce 2008; Latour 2005, 63-86; Robb 2010; Sillar 2009; Steiner 2001). This extends from Gell's (1998) *Art and Agency* in which he developed the idea that social agency might be attributed to things through their interactions with people. Robb summarised Gell's overall argument succinctly: "Material things can be agents as long as humans interact meaningfully with them" (2010, 505). Thus, objects by themselves do not necessarily exert agency, but the relationships formed with an object gives it agency. How one might define a *meaningful* relationship with an object is difficult though.

Relationships might be formed with an object at numerous stages, including during production, use or upon deposition (Dobres 1999; Gell 1998, 17ff.; Pfaffenberger 1999; Robb 2010). Such relationships may be broken or reconstituted at numerous times; it is this that makes objects inalienable. Inalienable objects are often "imbued with the intrinsic and ineffable identities of their owners" (Weiner 1992, 6), though this inalienability may extend to a network of others, especially if the object is used in an exchange e.g. as a gift

(Mauss 1990). The concept of the ‘gift’ (Gregory 1982; Mauss 1990) is typically juxtaposed with commodities, which do not establish relationships or bonds between people (cf. Kopytoff 1986). This distinction is important, as gift-based economies typically involve a concept of personhood that extends beyond the individual and becomes the result of a series of relationships with objects, people and places (Mauss 1990); this has been argued for the Bronze Age (e.g. Brück 2004; 2015). Furthermore, things might be anthropomorphised and thus given personal attributes (Gregory 1982, 45). Objects therefore have the potential to ‘act’ on people *because* of the social relationships they are part of; objects might cause a positive or negative emotional reaction, stimulate memories, or represent a person (cf. Robb 2017, 591; Thomas 1996, 80). The role of objects in certain exchanges, rites of passage or rituals may have been one way in which they became social agents (Brück 2006a; 2006b; Fogelin and Schiffer 2015).

This is emphasised by many of the ethnographic studies presented above, such as the Ethiopian peace ceremony and the destruction of African pots at funerals. Furthermore, when one considers mythologies and histories surrounding objects, it is clear these were also often treated as persons. For instance, in ancient Athens, the Prytaneum court tried inanimate objects involved in crimes as people if a culprit could not be identified (Carawan 1998, 100; Hyde 1917; Smith 1921). Meanwhile, numerous epic poems and Norse mythologies indicate weapons and objects were personified (Pearce 2013, 56-57). Pearce (ibid.) used these to argue that Iron Age weaponry may have also been attributed identities. Similar mythologies were used to contest that the destruction of Late Bronze Age and Iron Age swords may represent prehistoric iconoclasm (Chapman and Geary 2013).

Thus, the potential for objects to be personified and act as social agents becomes an interesting perspective to explore in relation to the deliberate destruction of Bronze Age metalwork, which may have been driven by emotional responses, such as the death of an individual (Brück 2006b). Whilst an object might not exert intentionality, the relationships in which such objects were involved may have contributed to their destruction and deposition. There is a danger however that objects might be imbued with “too much ‘power’” through this approach (Steiner 2001, 209f.). It is thus not suggested here that all objects possessed agency, but through careful analysis of individual or groups of objects, it may be possible to interpret significant objects. A key element to this is the analysis of object biographies.

2.4 Object Biographies

In 1986, Kopytoff posed the concept of the 'cultural biography of things' a.k.a. 'object biographies'. To achieve an object biography, Kopytoff (1986) suggested one should ask similar questions of objects that one might ask of people, regarding its use, origins, and production. This changed how archaeologists conceptualised objects (e.g. Fontijn 2002; Gosden and Marshall 1999; Joy 2009). Kopytoff's notion facilitated a reflexive understanding of the commoditisation and *de*-commoditisation of objects within their specific situations and as part of exchange networks. However, it is now applied more broadly in archaeology; biographies allow one to approach the social intricacies of the life of objects by interpreting their inherent value as a gift or commodity. Furthermore, object biographies seek to understand the relationships held between people and their objects through a consideration of an object's life history (i.e. its production, use, and end-life) and the implications of this. For instance, the production of an object is not simply a technological process, but also a culturally-situated one, which may be governed by economic, social and political situations. It is the result of a series of interactions between individuals and motivated by specific circumstances. A biographical approach to the data thus seeks to interpret this "interplay between people and objects" (Joy 2009, 542).

2.4.1 Constructing a Biography

A strategy for conceptualising the biography of archaeological objects was most clearly put forward by Gosden and Marshall (1999) who emphasised the need to focus on not only the use of an object, but also the context in which an object may be situated and the performances it was involved with to fully appreciate how objects and people were related. This was furthered by Joy (2009; 2010, 8-13) who emphasised the need to understand how objects constitute social relations and in turn become the sum of the relationships people form with their objects. Examples of this have already been indicated in the ethnographic examples. For instance, a biographic approach seeks to understand not only *how* spearheads were destroyed in the Ethiopian peace-keeping ceremony, but also engage with the symbolic human interactions with the spearheads, such as the personification of inanimate objects and subsequent deposition away from the settlement.

Understanding this for prehistoric artefacts, for which often only the final condition of the object is observable is difficult. Those techniques employed to ‘do’ agency (e.g. *chaîne opératoire*, use-wear analysis etc.) are the same techniques that can be used to construct biographies of objects (e.g. Chapman and Gaydarska 2007; Joy 2010; van Gijn 2010); by understanding objects in this way one can begin to establish if an object may have been imbued with agency or was part of social relationships. By recognising combat damage on a sword, for instance, one can infer details about how the sword was used, how often it was used, and how it was cared for. Evidence of use, repairs and reworking would all add to the biography of this hypothetical sword, indicating the length of time over which it was used, and the accrued importance it may have gained for the individual(s) using it. If it possessed an extended life one might infer an heirloom status and by extension the relationships and connections individuals made with the object. Objects might be constituted by multiple relationships (Gell 1998, 17-18; Joy 2009, 544) and therefore a biographical analysis can help assess how objects were situated socially.

For prehistoric objects the full set of relationships in which an object was involved is not knowable, especially as many objects in prehistory might endure beyond a human lifespan or be part of several relationships (Thomas 1996, 80; Joy 2009, 543). This limitation of the data must be accepted, but several studies have sought to address this by considering the wider processes involved in the aspects of the biographies that can be observed (e.g. Chapman and Gaydarska 2007; Fontijn 2002; Fontijn et al. 2012; Gosden 2008; Joy 2009; 2010; van Gijn 2010). Joy’s (2009) analysis of an Iron Age mirror from a burial in Portesham, Dorset, is a good example. As a starting point, Joy (2009, Figure 2) presented an extended sequence of processes for producing the mirror, highlighting the necessary involvement of different individuals and various exchanges that must have taken place at different times. Appreciating these necessary interactions allows insights into how metalworking might have been organised at the time (ibid). Joy (ibid., 550) also discussed the implications of owning a mirror in the Iron Age and how it informs archaeologists about prehistoric concerns with bodily appearance and engagements with the self. Despite not showing obvious signs of use-wear, Joy was able to draw conclusions about the social interactions that occurred as a result; as Joy noted, until the development of the mirror people relied on others to assist in bodily appearances. Furthermore, Joy posed questions about what *did not* happen to the mirror (e.g. damage) that can infer the care taken for this object. At the end of its life, the mirror was deposited alongside other grave goods in a burial. The mirror was considered in the context of the closed grave and wider practices to infer the significance of the mirror during the funerary ceremony and its connection with the mourners as well as the deceased. The production, use, and eventual burial of this object therefore all relied on multiple individuals and communities involving various spheres of knowledge, relationships and exchanges over an extended temporal span. A careful analysis of this object allowed an informed biography to be constructed, which is a useful for considering significant pieces of Bronze Age metalwork.

The Portesham mirror exemplifies the most common biography that is constructed: a *specific* biography, which is largely only applicable to single objects (Gosden and Marshall 1999, 170; Joy 2009, 542). Conversely, one may construct *general* biographies about commonly understood social relations that objects embody (Gosden and Marshall 1999, 170). To exemplify the differences, Fontijn (2002, 26) presented John Lennon's guitar as an example of a specific biography: the guitar is significant *because* it belonged to John Lennon. Meanwhile, wedding rings have a general biography of social significance as a symbol of union. Whilst specific biographies of prehistoric objects are more common (e.g. Gosden 2008; Fontijn et al. 2012; Joy 2009), a generalised biography can be applied to better understand the role of object types in gift and commodity networks. Fontijn (2002, 247-258) analysed the production, use and depositional practices associated with Bronze Age axes in the Netherlands to emphasise their general role in a commodity exchange network; the high level of use on many of them suggests that at a localised level they held a greater social significance and may have functioned more like gifts.

2.4.2 When is a biography not a biography?

As has been shown, the biographic approach is useful for engaging with the relationships that might have constituted an object. However, there is a danger in conflating the term 'biography' with others such as 'use-life' (York 2002), or ‘life-history’ (Schiffer 1972; 1983), which differ in their scale and outcomes (Joy 2009, 542f.; 2010, 8f.). Object biographies typically focus on situating individual artefacts in specific cultural settings and understanding social identities, whilst life-histories focus on broader analyses of artefacts to assess developments in technologies and changing practices across space and time (Fogelin and Schiffer 2015, 816; Joy 2009, 542).

Firstly, similarities between these various approaches should be noted. Techniques used to construct biographies, such as *chaîne opératoire* and use-wear analysis, are the same techniques used to develop life-histories and use-lives. Likewise, it is now common for all approaches to discuss the birth, life and death of an object. However, these approaches differ in the focus given to the relationships between people and objects and the appreciation of the social setting under analysis. Additionally, use-life studies typically focus on only one element of an object’s existence (e.g. its use) rather than considering the full set of interactions it was once engaged with. The value of this latter approach is that large sets of data can be analysed and compared over geographic regions or chronological periods (e.g. Horn 2013a; Wall 1987). York (2002) used this approach to assess the use and damage found on Bronze Age weapons recovered from the River Thames and showed that certain stretches of the river were a greater focus for deposition, and the deliberate destruction of objects before deposition increased over time. However, there was limited consideration of the relations between people and objects, which distinguishes it from the biographic approach.

The life-history approach, meanwhile, is often concerned with the technological implications of the data and operates on a macro-scale. A life-history approach would utilise *chaîne opératoires* and use-wear analysis to understand how objects were produced and developed over time; the benefits of this approach are observable in the numerous typological schemes, which chart how people developed ideas about object forms over time.

These differences can be exemplified by considering an axe used to chop down a tree. A use-life study would be concerned with the action of chopping down the tree and the resulting use-damage. A life-history approach would consider how people interacted with the axe (i.e. using it to chop down a tree), and the development of certain techniques for chopping a tree effectively. This approach would also consider the technological processes involved in the production and maintenance of the axe, and how it fits into the broader development of axes over time. However, neither approach focuses on the relationship between the person and the axe, the agency that the axe may gain from the action, nor the set of relationships that constitute the axe until that moment. This focus on the person-object relationship in a specific social or cultural setting is what distinguishes the biographic approach.

This does not deny the advantages of the other approaches presented nor their potential to be complementary (Fogelin and Schiffer 2015, 816). The life-history approach is beneficial for understanding broader social structures and the developments of concepts relating to artefacts over time (ibid.). Furthermore, these approaches have dominated many of the studies of Bronze Age metalwork identifying similar treatments of objects across broad geographic areas or throughout a chronological span (e.g. Kiss 2009; Turner 2010a; York 2002). Turner's (2010a) study of bronze objects in Late Bronze Age hoards in Essex and Kent paralleled the lifecycles and treatment of objects with the lifecycles and treatment of people (Fig.2.2; Turner 2010a, 95-96). This study thus drew on elements from both the life-history and the biographic approaches to understand the broader technological and ideological developments, alongside the potential relationships between people and objects.

2.4.3 Biographies of Destruction

Turner's study demonstrates the common approach to the fragmentation and destruction of Bronze Age metalwork. Elements of a biographic approach are often considered, but specific object biographies on destroyed objects are limited (though see Fontijn et al. 2012). Partly this is due to the lack of information surrounding *how* objects were broken. This is not to say that analyses of people-object engagements through fragmentation are not the focus of numerous studies (e.g. Brück 2006a; 2006b; Melheim and Horn 2014), but the specific practices involved are given limited attention. The production and use of objects is increasingly well-understood whilst there is less consideration of the practical elements of the final stages of the object's lifecycle, despite this being the most observable. Understanding exactly how destructive practices were performed would allow one to not only identify common destructive features, but also similar or dissimilar actions that were undertaken. Different destructive practices undertaken in different areas would

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Fig.2.2: Turner's (2010a) hypothetical model comparing the use-cycle of objects with the lifecycle of individuals (source: Turner 2010a, Figure 25)

reveal another element of the socially constructed relationship between people and objects and the differences that occurred geographically and temporally. A key consideration in an analysis of Bronze Age metalwork should thus be a biographic approach to destruction, situating it as a performative and cultural practice, extending from interactions and relationships established over the course of an object's life.

2.5 Memory

The biographies and life-histories of objects and their overall potential to act as social agents means that portable material culture can play a mnemonic function within societies, which is increasingly recognised in the archaeological literature (e.g. A.M. Jones 2007; Knight *forthcoming*(a); Lillios 1999; Rowlands 1993). Materiality is intrinsic to 'memory work' (the creation and experience of memories) (Mills and Walker 2008, 4), with portable objects constituted by the practices in which they are involved (A.M. Jones 2007). The enduring nature of objects means that “things can stand as evidence for past lives, identities and relationships” (Thomas 1996, 80); this quality contributes to their inalienability.

Investigations into object biographies in the Bronze Age have increasingly emphasised the role of heirlooms (Lillios 1999; McLaren 2016; Woodward 2002) and the mnemonic significance of depositional contexts (A.M. Jones 2007; 2010a; 2010b; Levy 2010). This builds on previous studies, which have traditionally focused on monumentality and landscapes as a key way of interpreting time and memory in prehistory (e.g. Bradley 1998b; 2002; Gosden and Lock 1998; Ingold 1993; Owoc 2005). When one considers that the destruction of objects and material culture is often linked to active processes of remembering, or conversely forgetting (e.g. Buchli and Lucas 2001, 80; Forty and Küchler 1999; A.M. Jones 2010a; Joyce 2003; Lucero 2008; Mills 2008; Rowlands 1993), destruction was likely a key part of memory work in the Bronze Age. This was further evidenced by the ethnographic studies.

In present day Maya communities, the death of an individual means that elements of their lives had to be destroyed, including inalienable possessions and their houses (Lucero 2008). This simultaneously de-animates the possessions, whilst also memorialising the place inhabited; this practice can also be observed archaeologically (Joyce 2003; Lucero 2008). Joyce (2003) suggested that the burning and crushing of Classic Mayan objects removed their mnemonic significance, whilst also creating a source of power amongst the nobility by removing the “material vehicle of historical memories” (ibid., 117); this allowed the nobility autonomy over their histories by destroying any physical manifestations of the past. Deposited and/or sacrificed objects thus possess power in their absence (Rowlands 1993). The very act of deposition may have served to negotiate memories, social relationships and the overall landscape (Fontijn 2002, 35; Levy 2010; Pollard 2008). As Rowlands states:

> “The opportunities for manipulating the possibilities of repetition are therefore abolished in an act of sacrifice or destruction that severs connection with its original status. In fact object deposition or object sacrifice exemplifies a very different kind of relation between memory and representation… They [objects] do not embody memories of past events but have themselves become embodied memories; objectified and condensed as a thing. Disposed or destroyed objects are remembered for themselves, not for what they might have stood for in terms of remembered pasts” (1993, 146-147).

In some respects, however, this oversimplifies the potential of a broken object as a mnemonic device. For instance, numerous cases have been highlighted in the Bronze Age where fragmented objects continued in circulation and may have been deposited as heirlooms (e.g. Brück 2004; Frieman 2012; Woodward 2002). Meanwhile, Chapman's (2000) enchainment theory relies on fragmented objects serving as a metaphor and a mnemonic for established social relationships; the absence of pieces is evocative.

Whilst destroyed material culture can thus be a key part of memory work, the physical performance of destruction and deposition as a mnemonic device is only infrequently considered (e.g. Fontijn 2002, 35, 275-276; A.M. Jones 2010a; 2010b; 2012, 144-170; Joyce 2008). Joyce (2008) drew on Connerton's (1989) concept of bodily practices (i.e. actions performed on a frequent basis to re-enact a sub-conscious conception of the past) to suggest that participation in structured deposits allowed social reproduction.

Bradley (2002, 12-14) similarly considered bodily practices as a mode for invisible memory creation through ceremonies and destruction of material culture in prehistory. Moreover, the biographical approach stresses the performance element of object deposition (Gosden and Marshall 1999, 174-175); the act of destruction that is sometimes associated with this means participants can only reexperience the object through memory, making the performance an important element (Fontijn 2002, 35; Rowlands 1993). This is also what makes the destruction of *malanggan* art so significant (Küchler 2002).

Similarly, A.M. Jones (2010a) highlighted the burning of Neolithic monuments in northern Britain and South West England as practices of memory formation. The destruction of structures was coupled with human sacrifice, which contributed to producing a mnemonic event that allowed a renegotiation of an area (ibid.). Elsewhere, A.M. Jones emphasised "the spectacular destruction" (2010b, 114) of Early Bronze Age metalwork, highlighting "the colour of objects, their biographies or exchange histories and their breakage or defacement act as vehicles for remembrance" (ibid.). The performance of destruction is thus central to understanding its mnemonic function, as much as its archaeological presence of the act.

The function of destruction as a mode of remembering or conversely actively forgetting means it was central to establishing and maintaining social relationships between people, objects and the places in which such events took place. Object histories imbued artefacts with mnemonic potential, which may have been widely understood or recognised by only a few individuals. The artefact thus became a medium through which personhood could be mediated.

2.6 Personhood

The extent to which objects can be linked to the concept of personhood is central to this thesis.

> "*Personhood* in its broadest definition refers to the condition or state of being a person, as it is understood in any specific context. Persons are constituted, de-constituted, maintained and altered in social practices through life and after death" (Fowler 2004, 7).

Personhood is increasingly considered a relational concept of the individual, which is expressed through social relationships and interactions with others and the material world (Fowler 2004; 2010; 2016). In this way personhood is intrinsically linked with agency. The actions one undertakes are socially situated and help develop a sense of self and personhood in relation to the world one interacts with, be that the space they inhabit, the material culture they engage with, or their interpersonal relationships (Fowler 2004); overall this forms part of an individual's identity. Personhood can be distinguished from the overarching concept of identity by considering 'personhood' as a "specific term for the condition of being a person conceptualised by a given community" (Fowler 2004, 155), which contrasts with the broad applications that 'identity' may have, the forms it may take, and the scale to which it may be applied to (e.g. martial identity, elite status, religious groups). Nonetheless both incorporate similar features, such as gender, class, ethnicity, and sex, which are all important considerations (ibid.). In this thesis, the concept of personhood is pertinent as the intrinsic link between social practices and the construction of the person means that an analysis of destructive actions undertaken upon metalwork can contribute to how one might understand personhood in the Bronze Age.

Firstly, it is important to conceptualise the role of a person in the past. Typically, assumptions about people in the past have drawn from the western concept of distinct, indivisible individuals i.e. people with a persistent, complete identity (Fowler 2004, 8, 17; see also Thomas 2004, 35-54). However, if one considers personhood as relational (i.e. constructed in relation to the world inhabited), it is possible to construct the idea of a person existing on a variety of axes, which are not mutually exclusive (Fowler 2004; 2016). Fowler (2004) originally presented personhood as a sliding spectrum, with a relational (or dividual) personhood at one end and a non-relational (individual) personhood at the other; typically, western individualism has been juxtaposed to the relational model. However, it is increasingly recognised that all forms of personhood are relational in some way (Fowler 2016; Garwood 2012, 300). Fowler (2010; 2016) has critiqued his original presentation of personhood, suggesting that personhood should be approached on a flexible set of axes, which are not necessarily opposed to or exclusive of each other, but operate in relation to each other (Fig.2.3).

Anthropological studies have extensively contributed to ideas on relational personhood particularly in its application to prehistoric societies (e.g. Brück 2006a; 2006b; Fowler 2004; A.M. Jones 2005; Kirk 2006). Anthropological analogies offer a mode for exploring alternative concepts for how personhood might be constructed (LiPuma 1998; Strathern 1988). Fowler (2004, 31-33) for instance presented the concept of a permeable person (i.e. someone comprised of and permeated by substances and qualities of those around them) drawing on the prevalent perception of personhood in India (Bushby 1997). Permeable personhoods have also been observed amongst the Melpa and Nuer in South Sudan (Strathern and Stewart 1998) and in Classic Maya (Jones 2005). Jones (2005) portrayed a Maya person as permeable with intra- and extra-bodily dimensions of materiality and immateriality.

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Fig.2.3: A diagrammatic representation of flexible multiple axes of personhood (source: Fowler 2016, Fig.2)

For instance, blood and bone link genealogies as these are transmitted from parent to child, whilst body modification expressed personhoods through deliberate selection of certain styles and adornments (Gillespie 2001; Jones 2005, 196ff.; Joyce 2000; Meskell and Joyce 2003). The interactions and relations between people are crucial for the construction of personhood.

However, the Melanesian concept of a person has particularly dominated the prehistoric literature (e.g. Brück 2006a; Chapman 2000). In Melanesia, people are constructed by their social relationships and are conceived as 'dividuals' rather than individuals (Busby 1997; Fowler 2004, 25-31; Strathern 1988). Their personhood is 'partible' and multiply-authored, which allows them to form multiple relationships that comprise their identity (Busby 1997; Strathern 1988). In this way, people can give away parts of themselves through the exchange of inalienable objects (Fowler 2004, 66). Partible people are the sum of their relationships, which may be expressed through their actions, and allows the concept of self to be reconfigured over time (Fowler 2004). Partible personhood has been applied to a variety of studies for prehistoric Europe (e.g. Brück 2006a; Chapman 2000; Chapman and Gaydarska 2007; Fowler 2004, 72-76).

The construction of relational personhood through material engagements has been explored for the Bronze Age (Becker 2013; Brück 2004; 2006a; Chapman 2000; Fowler 2004, 72-76; 2013). Becker (2013) demonstrated a link between the materiality of artefacts and certain places in the landscape, which she suggested were used in the construction of social personae. Similarly, Brück (2004) argued that people in the Bronze Age were the sum of social relationships and interpersonal connections; these were under constant negotiation through interactions with the material world and the place inhabited. The concept of gifts and objects as extensions of the self is central to Brück's (2004; 2006b; 2015) arguments; exchanges were thus crucial for constituting the person (cf. Brück and Fontijn 2013). Fragmented objects associated with settlements, burials and hoards have been considered a reflection of the partible personhood people assumed (Brück 2006a), with the variable treatment of objects expressing different social links and agencies. For instance, in discussing grave goods, Brück and Fontijn (2013, 206-207) suggested relational identity is emphasised by a variety of factors, including:

- heirlooms in the grave, inferring a mnemonic link;

- evidence of gifts from mourners highlighting the agency of the mourners (see also Barrett 1994, 121-123; Brück 2004; Fowler 2004, 72-73);
- the deliberate breakage and removal of certain elements of objects suggesting tokens were retained by the living and a link was maintained between the living and the dead;
- the accompaniment of the dead with accoutrements from the funerary rite; and
- the overall arrangement of artefacts in the grave, which might have referenced broader social understandings.

Personhood constituted through the treatment of material culture upon the death of an individual is evidenced from the Neolithic onwards (Jones 2005; Kirk 2006) and supported by ethnographic analogies (e.g. Evans Pritchard 1956, 152; Küchler 1987; Smith 1989, 61). For instance, among the Gurensi in Ghana a woman's eating bowl (*laar*) symbolises her persona, which is destroyed and buried with her upon her death, returning the pot and the person to the earth (Smith 1989, 61). The woman's other vessels are also broken, but maintained in circulation, for instance as grog in other pots or as sherds passed to other family members (ibid.). These practices preserve "a link between the woman and her family on the one hand, and the Earth on the other" (ibid.). Observing these processes has obvious difficulties when presented with a partial archaeological record, though by carefully analysing the context and assessing the biographies and life histories of objects as well as the social actions that were undertaken it is possible to gain insights into the construction of personhood.

This was shown particularly effectively by John Chapman (1996; 2000; Chapman and Gaydarska 2007) in his work on fragmentation and enchainment in the Mesolithic, Neolithic and Chalcolithic periods in the Balkan region. Enchainment refers to a chain of personal relationships made through the exchange of inalienable objects with distinctive biographies (Chapman 2000, 5); in prehistoric south-eastern Europe this includes stone, clay and metal objects and human remains. Enchainment involves two people establishing a transaction or social relationship represented by a specific artefact that is broken into two or more pieces, with the parts kept as tokens by participants until reconstitution of the relationship is necessary (ibid., 6). This might be finalised by the structured deposit of the respective objects, either together or separately; this kept intrinsically linked objects with people and specific places. Fragmented pottery vessels and clay figurines have been found across grave cemeteries and settlement sites, the majority of which are incomplete, suggesting the missing pieces must have been removed from site (ibid., 49ff.). Some refitting fragments have been identified across different contexts within Neolithic settlements in Hungary, Bulgaria and Greece, which Chapman (ibid. 61-64) uses to evidence of enchainment processes in action. Enchainment has also been suggested for two refitting Late Bronze Age sword fragments found in separate, but intervisible hilltop locations in Staffordshire, England (Bradley and Ford 2004). The work on enchainment has been greatly enhanced by biographical approaches undertaken on clay figurines and *Spondylus* rings in relation to gender, the construction of personhood, and agency (Chapman and Gaydarska 2007).

In contrast with enchainment by fragmentation, Chapman (2000, 43ff.) posited 'accumulation', which refers to the collection of 'sets' of typically complete objects that were deposited in graves or hoards. This might offer a mode for strengthening people-object relationships through the alienable value of the objects, namely the gathering of wealth, and metaphorically emphasising social integration rather than social fragmentation (ibid., 43-47). The temporal and spatial situation of the deposits becomes significant in these situations. The constitution of personhood in the prehistoric Balkans thus relies on actions involving people-object relations and the spatial situation of these actions.

Brittain and Harris (2010) suggested a cautious approach to adopting enchainment theory demonstrating that fragmentation of objects should not automatically be considered indicative of enchainment, and by extension relational personhood. They draw on Early Modern and Modern approaches to anatomy and dissection, organ donation, and extraction of DNA and cells to suggest fragmentation does not always act as an enchaining process (ibid., 586). Whilst these examples of anatomy and DNA extraction are not strictly applicable as analogies for the processes of prehistoric fragmentation, clearly fragmentation and enchainment are contextual; this is unsurprising if one considers that relational personhood is similarly multi-facetted (Fowler 2016). Chapman's work (2000; Chapman and Gaydarska 2007) has been supported by empirical study and experimentation, which Brittain and Harris (2010, 583) argued is lacking from many studies in which 'enchainment' is employed. For this reason, 'enchainment' as a social construct for understanding personhood will only be applied where a reasonable argument can be established, examining lifecycles of objects and their overall context.

This caution should be extended to the overall study of relational personhood. The use of anthropological analogies in understanding prehistoric personhood is inherently contextual; these are not concepts to be directly applied, but instead ways for identifying how "relational personhood was mediated through past treatments of human bodies, materials, objects, places, and landscapes" (Fowler 2010, 372). Fowler (2004, 156), for instance, argued the concept of the Melanesian partible dividual is more appropriate for understanding prehistoric societies based on the current archaeological evidence, which is supported by Brück's (2004; 2006a; 2006b; Brück and Fontijn 2013) investigations. However, A.M. Jones (2005) has demonstrated how different practices in different regions in Neolithic Europe expressed personhood in a variety of ways. Thus, whilst personhood is an important analytical concept, it must be used as a flexible framework for interpreting the data.

2.7 Interpreting Bronze Age Destruction

This chapter has so far considered a range of theoretical perspectives that are useful for analysing Bronze Age metalwork. This final section considers past interpretations of deliberately destroyed objects, expanding on the literature and case studies presented so far. These interpretations are wide-ranging and typically rely on the context of the find. Concepts of how destruction might be related to personhood (e.g. through enchainment or destruction of possessions upon death) have already been raised, so it is appropriate to consider alternative explanations. An outline of key perspectives is given here, which will be expanded in the discussion on the South West England metalwork in Chapter 10.

Botund Rezi (2011) summarised four key reasons explaining the fragmentation of objects in Late Bronze Age hoards:

1. Recasting;
2. Pre-monetary function;
3. Ritually damaged artefacts; and
4. Enchainment theory.

These offer a useful starting point as these explanations can be extended to damaged objects observed from other depositional contexts, such as burials or single finds (e.g. York 2002).

Evidence that objects might be deliberately destroyed for the purposes of recasting has been highlighted ethnographically (Rowlands 1971a, 211-212) and it is this theory of ‘founder’s’ or scrap hoards that has typically dominated the literature for Late Bronze Age hoards (e.g. Briard 1965; Burgess 1968; Eogan 1983, 3-4; Evans 1881). Many hoards during this period consist of fragmentary objects, casting waste (e.g. casting jets and slag) and ingots. Deliberately damaged objects have thus been seen as the result of reduction for the casting process with these hoards representing the stock of metalsmiths or the abandonment of worn out material. Problems have been raised with this idea though. For instance, why was so much material abandoned and never recovered (Bradley 1998a [1990]; Harding 2000, 355)? Similarly, the character of metalwork in these hoards, disproportionately including some objects more than others, suggests a deliberately selective process (Becker 2013; Bradley 2005, 155ff.; Fontijn 2002; Hansen 2016; Needham 2007a). Therefore, focus has recently shifted to seek a balance between ritual and functional explanations (Bradley 2005; Brück 2006; Dietrich 2014; Hoffman 1999; Nebelsick 1997; 2000; Turk 1997; Turner 2010a). Furthermore, growing focus on the nature of single finds is demonstrating that these were often treated similarly to material in hoards (e.g. Becker 2013), suggesting that interpretations applied to hoarded material may also be applicable to single artefacts. In support of the recasting theory, one would hope to observe evidence of the casting process at or near hoard sites, though such evidence in Britain is rare. A key indicator, however, is the occasional identification of objects melted into ingots, such as was observed on an ingot in the St Levan hoard, Cornwall (Ratcliffe et al. 2016, No.20). Destruction of objects may thus be related to this functionalist process, though it does not necessarily explain why these objects were redeposited rather than remelted or cast into new objects. Furthermore, this theory is largely only applicable to objects found in hoards, and clearly cannot be applied to those damaged objects found in burial situations or mixed settlement assemblages.

A similarly functionalist theory is the suggestion that objects were produced and broken according to a pre-monetary system, based on the weights of objects. The debate surrounding this theory for fragmenting bronze objects is summarised by Rezi (2011, 304-305) and Pare (2013), whilst evidence for bronze as currency in Britain is limited so this warrants only brief consideration. Evidence that fragmentation may be related to currency is taken from the potential presence of weight systems in parts of Central Europe (Pare 2013) and the standardised units of metal used to produce sickles in Central and Eastern Europe (Rychner 1987 in Bradley 2005, 149). However, Brück (2015) has argued against the commodification of bronze by fragmentation based on evidence that broken objects may have held significance post-breakage. Additionally, although some evidence in the Romanian hoards studied by Rezi (2011) supported a pre-monetary theory, no common weight system could be applied, raising questions about why such variations would occur. Finally, Pare (2013) has noted the lack of explicit widespread evidence for the weighing and commodification of bronze; this idea therefore requires careful consideration before it might be applied as a reason for destruction.

The ritual damaging of objects prior to deposition is widely applied to account for intentional destruction in the Bronze Age, often linked to an object's biography and its relationship with people (e.g. Brück 2006a; Fontijn et al. 2012; York 2002). The deliberate decommissioning and destruction of an object may have been a necessary part of making the object acceptable for deposition, perhaps linked with an associated person or community (Brück 2004; 2006a; Fowler 2004, 72-76). Hansen (1994; 2016), meanwhile, has suggested a *pars pro toto* theory for fragmented objects in hoards, paralleled with deliberately broken offerings at Classical Greek sanctuaries; this theory is increasingly suggested for Middle and Late Bronze Age hoards (e.g. Brück *forthcoming*; Fontijn 2002; Novak 2013). This theory might be particularly useful for explaining the presence of single fragmented finds in similar locales to hoards (see Becker 2013), though it does not necessarily account for the variety of object types and object conditions found in accumulated deposits, which can include complete and broken objects, as well as metallurgical waste (cf. Bradley 2017, 134-135).

Ritually damaged objects are also commonly linked to violent acts (e.g. Fontijn et al. 2012; Perea 2008; Nebelsick 1997; 2000; Rezi 2011). Deformed and broken objects across Europe have been argued to presence emotionally-charged ecstatic actions, resulting from a reaction to the current socio-political situations (Nebelsick 2000). Louis Nebelsick has particularly advocated the lack of a functional approach to breaking metalwork:

> “We are dealing with traces of violent behaviour which show no signs of formative or structural intentions. The coarse nature of this destructive process, its unsystematic, fleeting character, and its sometimes terrible intensity can hardly be connected with a well considered, carefully undertaken, competently performed, reductive or scrapping process. Even given the possibility that the perpetrators were technically incompetent, this would still not explain the signs of explosively exaggerated feats of strength, the evidence for interrupted and ill-considered sequences of action and the signs of hurried, blind violence. This evidence for egregious demolition all points to a context of uncontrolled rage, euphoric frenzy and ecstatic violence” (Nebelsick 2000, 163).

This interpretation is based on modern perceptions of what was or was not ‘functional’ in the past, but it is difficult to ignore the exaggerated actions taken on some objects. Objects in the Pila del Brancon hoard in Italy, for instance, were bent, broken and burnt before being deposited in a river bank (Bietti Sestieri et al. 2013); similar actions were undertaken on the Duddingston Loch hoard, Scotland (Callander 1921-2, 360-364). Meanwhile, socketed axes across Britain and south-eastern Europe were plugged and hammered (Dietrich and Mörtz *forthcoming*), and metalwork in numerous hoards across Europe were seemingly fragmented beyond a purely practical agenda (Hansen 2016; Nebelsick 2000). Evidence of ‘violence’, however, is not seen on all broken objects. Furthermore, little consideration is given in these interpretations to *how* exactly one might damage or destroy a bronze object and the material properties that condition the method used; a better understanding of these processes, e.g. through experimentation or consideration of the mechanical properties of bronze, offers the opportunity to reassess what is actually ‘violent’ behaviour.

Finally, the ‘ritual’ aspect of deliberately damaged objects is also inferred from the place in which they were deposited. Typically, complete and damaged objects recovered from wetland locations are attributed a votive significance (e.g. Bradley 1998a [1990]; Levy 1982; Yates and Bradley 2010a) from their depositional location. Deliberate damage observed on artefacts from these findspots is often considered part of a process for ‘killing’ the object and ending its life (York 2002). By extension, the presence of deliberately destroyed metalwork in certain places has been used to infer significance about that place, such as the roughly 300 bronze objects found at Flag Fen, including deliberately broken weapons (Coombs 2001). Meanwhile, hoards of complete and fragmentary material deposited in significant landscape locations, such as hilltops and river valleys may have been part of a system to manage the socio-political landscape by depositing offerings in significant places to claim the land and assert authority (Fontijn 2002; Needham 2007a).

This brief overview of theoretical perspectives has largely concerned deliberately damaged objects in hoards, as these objects have received most attention in the literature. Methodological identifications are inherent to these studies, but are rarely outlined, particularly in how one identifies a deliberately destroyed object. Furthermore, there is no widespread consensus between functional or ritualised interpretations for deliberately damaged objects, with deposits often displaying elements of both aspects; thus, they might be interpreted in both ways. As Bradley (2005, 164) states:

> "…it is no longer possible to maintain any clear distinction between the ritual and functional aspects of metal deposits, for both made considerable use of broken objects".

2.8 Summary

This chapter has presented a variety of ways in which the destruction of Bronze Age metalwork might be conceptualised. Ethnographic analogies offer a way of considering the broad range of reasons for which objects might be destroyed and deposited, whilst an overview of key theoretical concepts emphasised a means for better understanding the relationship between people and objects. Finally, the various interpretive approaches that have been taken for broken Bronze Age metalwork were summarised. These concepts underlie this thesis as attention now turns to practical methodological concerns surrounding deliberate destruction in the next chapter.

CHAPTER THREE

APPROACHES TO DESTRUCTION

> "It is, of course, fundamental to fragmentation research that all alternatives to deliberate fragmentation and deposition of fragments are explored before a conclusion in favour of that interpretation is reached" (Chapman 2012, 132)

3.1 Introduction

Chapter 2 explored some useful theoretical perspectives for considering the deliberate destruction of prehistoric objects. Interpretation, however, relies on first identifying deliberate damage, which is commonly noted in reports on prehistoric metalwork, but rarely expanded upon. A methodology for this has yet to be defined, but the processes for identifying intentional destruction and the significance of physically destroying Bronze Age objects has attracted growing attention in the last two decades (Becker 2006; Chapman 2000; Chapman and Gaydarksak 2007; Fontijn et al. 2012; Gabillot and Lagarde 2008; Horn 2011; Moyler 2007; Rezi 2011; York 2002). In this chapter, a critical analysis of past literature for studying metalwork and identifying destruction is presented. The need for experimental archaeology to enhance the identification of deliberate damage undertaken upon metalwork is raised, which is addressed in Chapters 4 and 5. This chapter ultimately offers a base for constructing a working methodology for identifying deliberate damage in Chapter 6.

3.2 Past Methodologies for Studying Bronze Age Metalwork

The ways in which metalwork has been studied in the past by different researchers should be considered to firstly determine a suitable methodology for undertaking the data collection presented in Chapter 7, and secondly to highlight key approaches that would contribute to the identification of deliberate damage. This involves both macroscopic and microscopic analysis. The role of experimental archaeology in better understanding features of the metalwork is also considered.

Traditionally, analysing a prehistoric metal artefact involves determining its type, measuring basic dimensions (e.g. length, width, weight), describing its context and condition, and providing an accompanying illustration (e.g. the *Prähistorische Bronzefunde* volumes). This represents the basic information gained from an object, though descriptions often lack further details, and one must rely instead on the variable quality of illustrations. These catalogues are nonetheless invaluable sources of information, but for a specialised investigation into damage and destruction (i.e. features that are frequently described poorly or not at all), a wider variety of approaches should be considered. In most object-based investigations concerned with similar research questions, methodological details are fleeting, but low-level magnification, optical microscopy, and metallographic analysis are among those techniques employed.

York (2002), for instance, used 10x magnification to assess object condition and use and destruction marks on Bronze Age metalwork from the River Thames, emphasising corrosion, manufacturing evidence, and casting flaws as important elements of object investigation. York highlighted various signs of destruction, and used her analyses to determine elements of the lifecycle of the objects. Horn (2013a; 2013b; 2015; 2017) has furthered this type of approach by using a 300x microscopic camera to perform use-wear analysis on Scandinavian weapons, which allowed him to catalogue a range of macroscopically invisible features. Horn (2013a) highlighted an awareness of destruction indicators (e.g. twisting), but this was not his focus and consequently there is limited discussion. Analysing features of use and/or destruction through magnification and/or microscopy has clear benefits for informing one's knowledge about metallic objects, helping to improve how certain features, such as corrosion (cf. Horn and von Holstein 2017) and use, can be understood and interpreted. This is explored further in Section 3.3.

Bridgford's (2000) investigations of the use of British Late Bronze Age weapons were particularly thorough in analysing damage. Bridgford compiled an experimental reference collection to determine edge damage, and prehistoric objects were subsequently studied using 5.8x magnification and metallography. Bridgford used metallography to highlight weapons displaying burnt microstructures, suggesting these had been burned deliberately before deposition. Bridgford attempted to link this to a specific pattern of damage, object type and/or depositional context, but was unable to prove a conclusive correlation between these factors (ibid., 222). Whilst Bridgford used this approach to better understand use damage on bronze weapons, this is significant as a method for approaching the destruction of metalwork in a way that has been rarely noted outside of individual metalwork reports.

Replica experimentation to better understand use-wear has dominated the literature on metalwork in the last two decades. These have predominantly focused on swords (Bridgford 1997; 2000; Colquhoun 2011; Horn 2013a; Kristiansen 2002; Matthews 2011; Molloy 2011; Quilliec 2008), but also, to a lesser extent, axes (Dolfini 2011; Kienlin and Ottaway 1998; Moyler 2007; 2008; Roberts and Ottaway 2003), halberds (Brandherm 2011; Horn 2013b; 2015; O'Flaherty et al. 2011) and spearheads (Anderson 2011; Horn 2013a; 2015). These include carefully controlled laboratory experiments, whereby machines were utilised to standardise the results (Bridgford 2000; O'Flaherty et al. 2011), as well as actualistic experiments, involving swords and spears in combat simulations (Anderson 2011; 2012; Molloy 2007), or axes for woodworking (Kienlin and Ottaway 1998; Roberts and Ottaway 2003). The used objects are then studied using macro- and microscopic methods to compile reference collections to be compared with the prehistoric material, allowing insights into the lifecycles of some objects (see Section 3.3.4 below).

Experimentation as an approach to destruction, however, is conspicuously absent in the literature. Use-wear experiments offer insights into the damage an object may sustain during use, and inherent weaknesses in object designs, but it has never been applied to better understand and identify destruction. Equally, experiments specifically interested in the destruction of replica objects are lacking, at least in published works. Only three could be identified, two of which are in unpublished theses: Moyler (2007, 134-9) attempted to destroy an Early Bronze Age flat axe, whilst Giardino and Verly explored how one could bend a sword (Bietti Sestieri et al. 2013, 167-9). Meanwhile, Hardman's (2016) undergraduate thesis specifically explored the effect of heat on breaking Bronze Age swords. These experiments are elaborated in Section 3.3.8. Gabillot and Lagarde (2008, 60) highlighted that analyses of destruction are hindered by the general lack of knowledge of *how* objects were destroyed, and ultimately these experiments begin to rectify this. Nonetheless, experimental approaches to destruction represent a clear gap in the literature and there is potential in this methodological avenue, especially when combined with use-wear approaches.

This section is by no means comprehensive in the methodological approaches available for studying metalwork, but the benefits of a more in-depth study of individual pieces incorporating elements of magnification and microscopy have been highlighted. Furthermore, the necessity of engaging with the experimental literature to improve interpretations has been stressed, especially in the context of studying destruction.

3.3 Identifying and Exploring Damage

The identification of deliberate damage over natural, accidental, use-related, or other post-depositional damage is perhaps the greatest problem faced in studying destroyed prehistoric material. Consequently, many authors approach identification cautiously. This section begins by considering the mechanical properties of bronze, followed by factors that will impact the determination of whether damage has been inflicted in the past or not.

3.3.1 Material Matters

In understanding deliberate damage, one must first be aware of the material properties of bronze, which involves understanding metallurgical compositions and the associated material science. Whilst these features are inherent to understanding *why* bronze performs the way it does, this consideration is only recently coming to the fore (e.g. Horn and von Holstein 2017; Sáez and Lerma 2015). By combining an appreciation of the mechanical attributes of bronze, with theoretical perspectives, one can gain new insights into how the objects may have been understood in the past.

Copper alloys behave in certain ways because of the mechanical properties of the material (Table 3.1). For instance, most bronzes display a degree of plasticity and ductility (i.e. they will bend under pressure), though this is dictated by the composition and post-casting processes, such as quenching and hammer-hardening. A bronze with a high tin content will be more brittle than one with a low tin content and thus less plastic. Meanwhile, hardening a sword edge will improve the toughness and tensile strength of the metal, whilst decreasing the plasticity and increasing the likelihood that it may fracture under duress. These factors are thus important for understanding how and why bronze objects broke in the past.

Table 3.1: Summary of the mechanical properties of bronze (following Horn and von Holstein 2017, 91)

Mechanical Property	Description
Plasticity	The ability to relieve stress on the microstructure by plastically deforming before breakage
Ductility	Plastic deformation under tensile stress causing bending
Malleability	Plastic deformation under compressive stress, leading to a smaller volume
Brittleness	The likelihood an object will break under stress rather than plastically deform
Hardness	The mechanical resistance to compressive force, e.g. how easily the surface of an object might be damaged
Fracture	Breakage of an object into two or more pieces, further divided into ductile fractures and brittle fractures (those with or without associated plastic deformation)
Tensile/Ultimate strength	The maximum stress a material can withstand before fracturing
Toughness/Impact	The ability to absorb energy and plastically deform without fracturing
Yield point/proportional limit	The point at which a material can no longer recover from plastic deformation

To explore this further, one can consider the copper-tin phase diagram (Fig.3.1), which shows the different 'phases' of bronze which occur at different temperature and/or different percentages of tin. A phase refers to part of an elemental alloy, which can have a variable composition within a phase, dictated by a distinctive type of atomic bonding and elemental arrangement (Scott 2012). Different phases will, however, form at different compositions because tin is only completely soluble in copper up to about 14-18% (ibid., 138); after this the properties begin to significantly alter because the tin and copper are not homogenous. The transition from the alpha (α) to the delta (δ) phase is particularly interesting because this increases the brittleness of the bronze. This is because in the delta phase, tin-bronze behaves as a solid without ductility (ibid., 139) so it is less likely to plastically deform; quenching at this phase can improve the hardness of the desired bronze, but increases the brittleness and the risk of fracture (ibid.). Most Bronze Age bronzes, however, maintain a composition below that for the delta phase. Keeping a tin-bronze object in the alpha phase allows greater control over the properties of the bronze, such as plasticity and tensile strength.

The composition of copper alloy objects in the Bronze Age shifts over time, which could be related to a variety of socio-economic factors, including availability of material, newly developed techniques, and/or aesthetic preferences. Northover (1991, 64-5), for instance, suggests a link between

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Fig.3.1: The copper-tin phase diagram showing the different phases a copper-tin alloy will enter depending on the temperature and the weight percentage of tin (source: Scott 1991, 122, Fig.198)

compositional changes in the Early Bronze Age and the emergence of seemingly localised industry centres and the development of implement typologies. Brown and Blin-Stoyle's (1959) analyses of Middle and Late Bronze Age British implements showed tin content ranged from 0.7-35% but averaged around 10%, with the remaining composition comprising largely of copper, some impurities (e.g. arsenic and antimony), and by the later Bronze Age lead (Tylecote 1986, 26-30). Figure 3.2 demonstrates the impact of tin on the mechanical properties of bronze, with more than 12-15% having sudden effects, such as a decrease in tensile strength and a corresponding increase in hardness.

In the Late Bronze Age, lead is commonly alloyed with tin-bronze; the percentage of lead ranged from c.1-15% (Allen et al. 1970; Brown and Blin-Stoyle 1959). Tylecote (1986, 30) suggested that whilst alloying 2% lead with tin-bronze makes it easier to cast due to a higher fluidity, more than this

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Fig.3.2: The impact hardness/toughness, Brinell hardness, elongation (malleability), and reduction abilities of tin-bronze up to 25% tin (source: Scott 2012, Fig.9.4)

probably only served to dilute the metal, perhaps for economic reasons (see also Scott 2012, 242ff.). More than 5% lead, however, can lower the tensile strength of the bronze, as lead is immiscible in copper, which would make the material more liable to break along the microstructural bronze-lead boundaries (Craddock 1991, 55; Tylecote in Allen et al. 1970, 22-3). As the alloy cools through the alpha phase, the lead is segregated and solidifies between the grains of the bronze (Fig.3.3), which creates planes of weakness (Scott 2012, 242). Furthermore, this results in a process known as ‘hot-shorting’ when the

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Fig.3.3: Lead droplets solidified on the grain boundaries and within the grains. Image 0.13mm. (source: Wang and Ottaway 2004, Fig.S18b)

bronze is heated. In engineering, an object is 'short' if it fractures after limited deformation (Salter and Gilmour n.d., 59); by extension, 'hot-shorting' occurs when the metal fractures while hot and results in a sharp, 'clean' break (Kuijpers 2014, 82). This is caused by "the presence of a low melting point phase at the grain boundaries" (Salter and Gilmour n.d., 59), which in this case is lead. Understanding this means that if Bronze Age artefacts are known to be composed of leaded bronze and present a clean, sharp break, it can be suggested they are the result of hot-shorting.

The compositional properties are thus significant to breakage because:

1. Although traditional tin-bronze is harder, it becomes more brittle as it is worked and therefore might be more prone to breaking (see for instance Coghlan 1975, 82-3; Neil Burridge pers.comm. 2016).
2. Leaded bronze, conversely, has a lower tensile strength, but an increased malleability (Copper Development Association Inc. 2017) so might be more resilient to breaking, tending to bend instead. If the lead percentage is too high, however, this can create very fragile objects.

Metallurgical analysis of objects is not a goal within this project, but where compositional data are available this will be considered. Furthermore, an awareness of the mechanical properties of bronze means that certain damage can be explained based on the material science, as well as the presumed way in which damage was sustained.

3.3.2 Ancient or Not? The Role of Patina and Corrosion

An initial step towards damage identification is the determination of the age of any damage seen on the object. For an accurate interpretation the authenticity of the object's condition must be verified, but complicated or unknown object histories post-recovery often render this difficult. Typically, reports on metalwork have not discussed this in any detail with authors simply stating if the objects were broken in antiquity or not (e.g. the Andover hoard, Hampshire: Varndell 1979), but it is a process undertaken inherently and thus warrants discussion. A simple method for identifying ancient damage is the assessment of the consistency between the corrosion of the object and the corrosion of the sustained damage (Becker 2006, 49; Horn and von Holstein 2017; York 2002, 79).

Corrosion is a three-stage geochemical formation process that occurs on bronze over time because of exposure to water and oxygen (Fig.3.4; Horn and von Holstein 2017; Tuck et al. 2010). The surrounding temperature, the pH of the environment, and the presence of different elements in the soil (e.g. silicon and chloride salts) all affect the formation process, including the speed at which it takes place, the destructive nature of the corrosion, and the colour (Horn and von Holstein 2017; Piccardo et al. 2007; Robbiola et al. 1998). Robbiola et al. (1998) define two types of corrosion of tin-bronze artefacts: Type 1 and Type 2.

Type 1 involves the preservation of the original surface by the formation of protective mineralised layers (Fig.3.5; Robbiola et al. 1998), which is commonly known as patina. The formation of this corrosion usually involves the depletion of copper ions from the surface layer (alternatively decuprification), resulting in tin enrichment (Robbiola et al. 1998). As the formation of Type 1 corrosion is stable and preserves the surface underneath, a fracture breaking through the patina, sometimes showing the original bronze colour, likely represents a fresher fracture, perhaps through rediscovery processes (e.g. ploughing or dredging). By extension, damage that is already patinated suggests that it could have occurred in antiquity (Bridgford 2000, 166; Kienlin and Ottaway 1998).

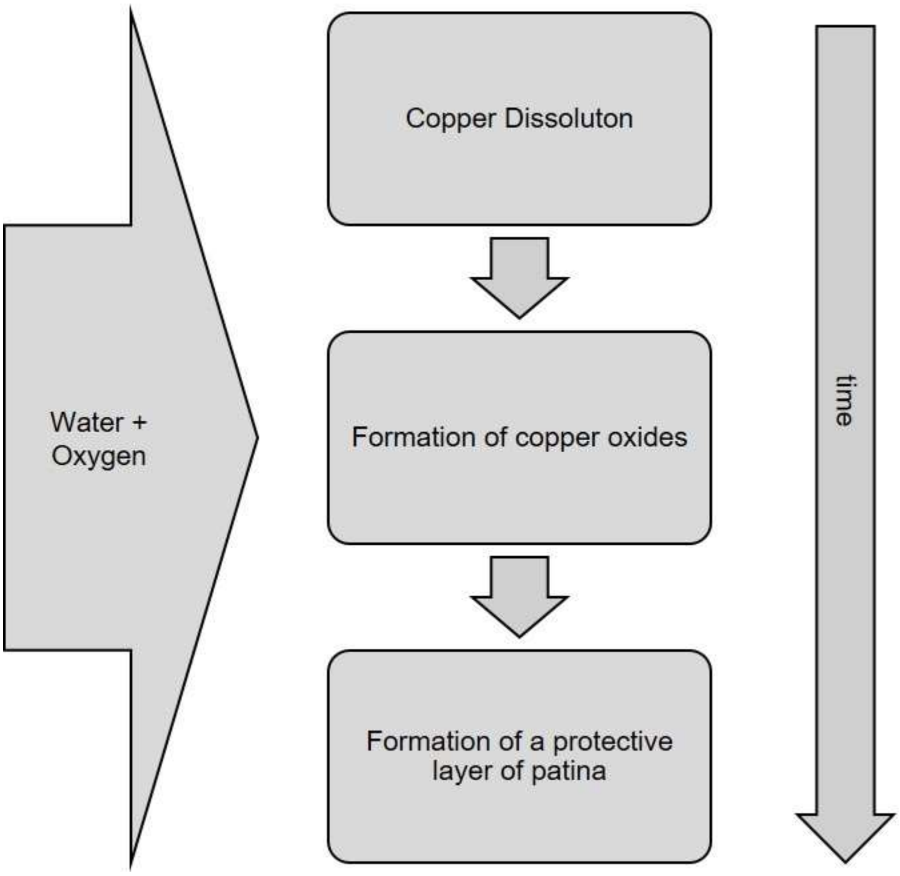

Fig.3.4: The three-stage process of corrosion formation on bronze over time caused by exposure to oxygen and water (source: author's diagram from information in Horn and von Holstein 2017)

Fig.3.5: Type 1 corrosion on a bracelet from Helston, Cornwall (SM-F001) preserving the original surface and decoration (source: Author courtesy of Salisbury Museum)

Figure 3.6 shows a piece of spearhead from Dorset, broken at both ends where each of the end breaks are patinated differently suggesting they broke at different times. The break at the top reveals some of the original bronze colour, indicating it is a more recent break.

Type 2 corrosion is more destructive however (Fig.3.7). The corrosion layers are typically coarser and the original surface is damaged or obscured by the corrosion (Robbiola et al. 1998). Corrosion deposits may form on top of the original surface, such as “crusts” (Robbiola et al. 1998, 2097) or the original surface may be damaged or destroyed by corrosive attacks, including pitting and delamination (ibid., 2098). In extreme cases, the overall object can decay over time so no original metal remains. Type 2 corrosion can thus hinder interpretations of manufacture and use-wear (Kienlin and Ottaway 1998, 271). For instance, Type 2 corrosion of the Norton Fitzwarren hoard, Somerset (TTNCM-F036), has caused most of the pieces to completely deform and fracture (Fig.3.8).

Significantly, the impact of the immediate environment can cause localised areas of corrosion on objects, which means both types of corrosion might be observed on the same object (Robbiola et al. 1998). Furthermore, because corrosion might cause objects to become fragmentary, it can create a false impression of antiquated damage (Turner 1998a, 64) or obscure the difference between modern and ancient breaks (Roberts et al. 2015). Alternatively, if poorly conserved or mistreated after recovery, corrosion and patination can form quickly, sometimes obscuring fresh breaks over the course of a hundred years (Bridgford 2000, 166; Kienlin and Ottaway 1998); Becker (2006, 44-45) aptly terms this “secondary corrosion”. This largely occurs on finds excavated during the 19th and early 20th centuries, which have been kept out of the ground for a long period of time; it is thus important to know when objects were discovered.

Despite these issues, this nonetheless is one of the best ways of highlighting the antiquity of destroyed metalwork (e.g. the Blackmoor hoard, Hampshire: Colquhoun 1979; the Dystrupgård swords, Denmark: Melheim and Horn 2013; or the Petters Sports Field hoard, Surrey: Needham 1990a).

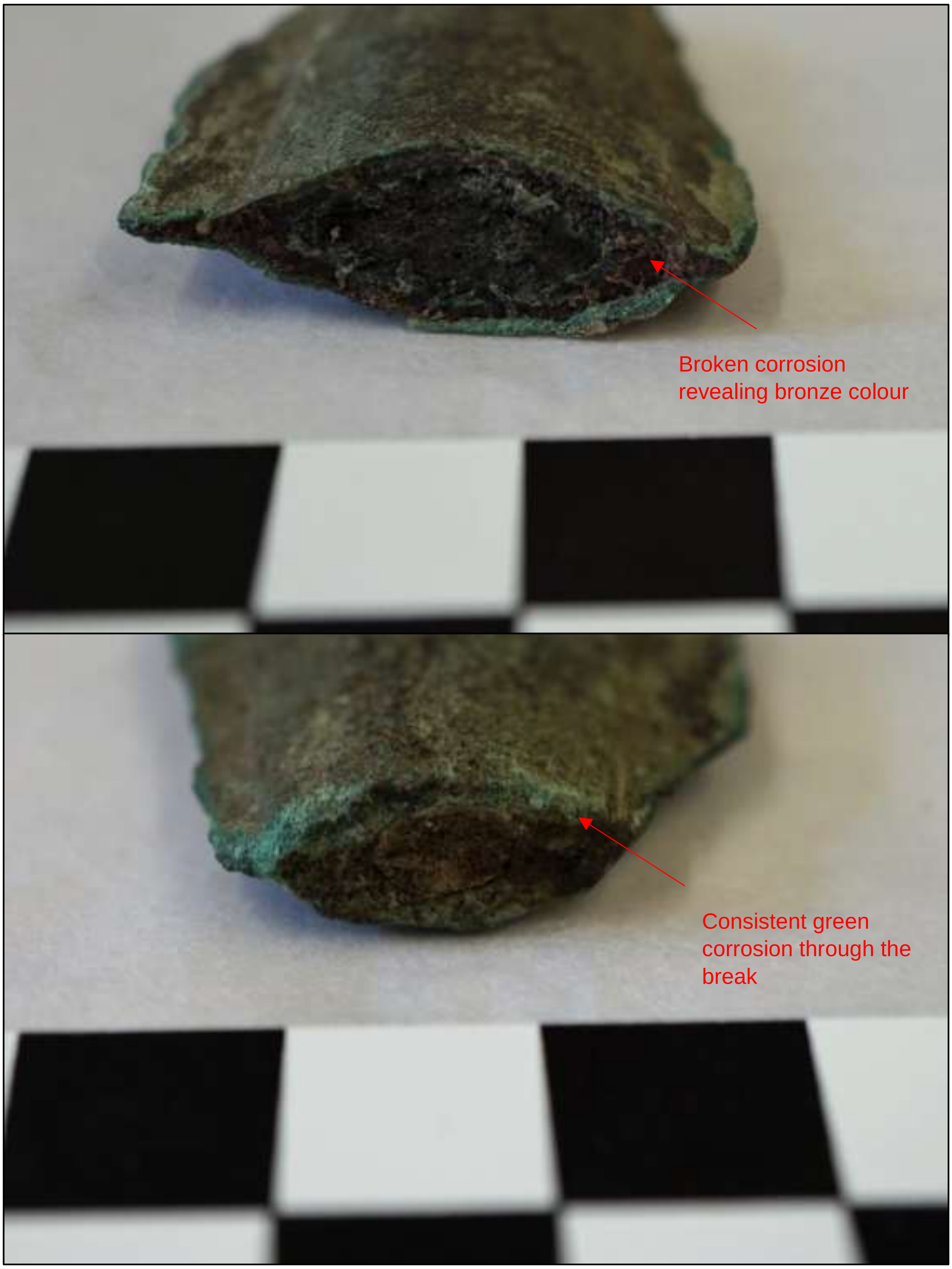

Fig.3.6: Opposite ends of a piece of spearhead from Dorset (PM-F002) with a modern break at one end (top) and an ancient break at the other (bottom) (source: Author courtesy of Poole Museum Service)

Fig.3.7: Type 2 corrosion on a dagger from Broad Down, Devon (RAMM-F009) (source: Author courtesy of the Royal Albert Memorial Museum (hereafter RAMM), Exeter)

Fig.3.8: The Norton Fitzwarren hoard, Somerset (TTNCM-F036) (source: Author courtesy of South West Heritage Trust (Museums Service) (hereafter SWHT)

In most cases, an ancient break is informed by the security of the context and the known object history post-recovery, but where this is unavailable it is important to be aware of the advantages (and disadvantages) of utilising the patina and corrosion.

3.3.3 Post-Depositional Damage

Further to corrosion, other post-depositional processes that may affect the condition of an object should be considered. The context in which an object was deposited or recovered can influence the decay of the object over time and/or the likelihood that it will become damaged through recovery processes; therefore, this is important for identifying damage.

Fontijn (2002, 43-47) discussed natural and anthropogenic processes that would impact the recovery and distribution of objects; many of these would also affect the condition in which an object was found and the likelihood that it would sustain damage (e.g. an object recovered from a ploughed field may have been struck by a plough). This is thus a useful starting point to which other considerations can be added (Table 3.2). A summary of the key processes is given in relation to the damaging effects, followed by a brief consideration of the post-recovery processes that also could impact on the identification of destruction.

Table 3.2: Post-depositional processes affecting the final condition of the objects (adapted from Fontijn 2002, 43-47)

Natural Processes	Anthropogenic Processes
Corrosion (Section 3.2.2) Sedimentation Water movement	Dredging and other river activities Extractive Industries e.g. mining, quarrying Agricultural Processes e.g. ploughing Reappropriation in later periods

3.3.3a Natural Processes

Three natural processes can affect the condition of an object: corrosion, sedimentation, and water movement. Corrosion was addressed in the previous section, though the remaining two warrant brief consideration here.

Whilst studying the findspots of Bronze Age metalwork in the Netherlands, Fontijn (2002, 43) argued sedimentation affected the likelihood of finding these objects (i.e. the greater the sedimentation the deeper they would now be buried) and thus impacted the overall distribution maps. Although one might consider it unlikely to damage the deposited objects, Horn (2013a, 13) posited transverse bending might occur through soil pressure post-deposition. The likelihood of this seems limited, but it remains possible under the right circumstances. Geological warping has not been noted in any excavation reports or regional catalogues of British Bronze Age metalwork so far encountered, but several copper alloy medieval objects recorded through the Portable Antiquities Scheme apparently show signs of soil pressure warping (Fig.3.9); this appears to be an independent judgement on the behalf of the identifier. These objects are all less than 5mm thick so it is most likely warping would be viewed on sheet metal and thin objects, rather than more substantial implements.

Similarly, the movement of objects through or by water might potentially cause some surface damage to the material and in extreme cases breakage, perhaps through collision with rocks in the river bed or on the coast, though one cannot envisage significant damage, such as bending or twisting being caused by this process.

Fig.3.9: A Medieval buckle displaying minor transverse warping attributed to soil pressure (source: Gilmore 2010)

3.3.3b Anthropogenic Processes

By contrast with natural processes, objects are more likely to suffer damage from anthropogenic processes. Four are highlighted here: dredging, extractive industries, agriculture, and reappropriation in later periods. Each has the potential to alter the deposited condition of an object and thus impact archaeological interpretation.

Firstly, the dredging of rivers, extraction of sand or gravel, and the reshaping of river courses and coasts all involve intrusive equipment that are likely to damage any objects uncovered in the process. Such damage might simply affect the object surface, or it could cause deformation and fracturing of the objects. The obvious problem is how to differentiate ancient damage from processes such as dredging (Needham and Burgess 1980, 447). If the object has been recovered relatively recently, modern damage could be indicated by a break in the patina, but this is not guaranteed as objects deposited in wet areas do not necessarily develop an extensive patina (Becker 2006, 41-2; Fontijn 2002, 40). York (2002, 79), however, noted she could use patina to differentiate "recent recovery (dredger) damage and ancient damage" on objects recovered from the River Thames, many of which were found while dredging. By comparison, few objects in South West England possess a context associated with dredging, though two swords (Pearce 1983, Nos.476 and 491; DCM-F040) demonstrate damage that is difficult to ascribe to prehistoric actions, whilst one rapier was certainly broken upon or after recovery (Pearce 1983, No.866). The context of damaged objects must be carefully assessed to determine the likelihood that dredging played a role.

Similarly, extractive industries, such as mining and quarrying, inevitably involve destructive processes that can damage metalwork. The exploitation of material resources in South West England over the last three thousand years, and particularly the impact of mechanical diggers and explosives in the modern period, means that many objects are likely to have been reclaimed and/or destroyed or broken. Unlike wetland deposits though, dryland metalwork finds develop clearer corrosive products and any surface damage should be clearly visible.

Thirdly, the impact of intensive agricultural processes involving machinery, particularly ploughing, on the context of finds across the country is commonly noted, but the damaging consequences are only briefly mentioned. Major damage can be caused to objects deposited at a shallow depth, inflicting damage and/or fragmentation in the process of bringing them to the surface. Damaged objects found on ploughed land thus should be analysed carefully to determine whether the damage could have been inflicted in the modern period.

Finally, Bronze Age metalwork is frequently discovered from a context not coherent with the expected typology, even within prehistoric sites (Hingley 2009; Knight *forthcoming*(a)). For instance, an Early Bronze Age axehead was discovered in a Late Iron Age/Early Roman period deposit at Cadbury Castle hillfort, Somerset (Fig.3.10A; TTNCM-F007d). It thus needs to be remembered that objects were rediscovered and reappropriated at different times and might have been reused, altered, or treated differently from how they were originally discovered. Objects may therefore be deposited in a different condition. For example, a broken Middle Bronze Age palstave was found in the Iron Age Lexden tumulus, Colchester, Essex, with irregular studs of silver adhered to one face, a groove worn into the same face, and evidence of having been wrapped in cloth upon deposition (Fig.3.10B; Foster 1986, 78-80). The palstave is broken below the stop so little of the hilt plate remains and the side-loop is broken; furthermore, the blade edge shows signs of extensive wear. It becomes difficult in this situation to determine exactly when and how the object suffered these damage and whether this object was retained from the Bronze Age into the Iron Age or was a rediscovered deposit. Occurrences such as this are relatively infrequent, but any damage linked with a reappropriation scenario must be carefully considered.

B

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Fig.3.10A: Early Bronze Age axe from Late Iron Age/Roman context on Cadbury Castle Hillfort, Somerset (TTNCM-F007d) (source: Author courtesy of SWHT)
Fig.3.10B: Middle Bronze Age palstave found in Late Iron Age Lexden tumulus, Essex. Not to scale. (source: Foster 1986, Fig.28)

3.3.3c Post-Recovery Processes

It is likewise important to be aware of the various post-recovery processes that might be undertaken. The most apparent is the cleaning process, which can damage the surface of the object and obscure details of use-wear. Object cleaning refers not only to the removal of dirt, but also to the removal of an object's patina and/or corrosion. Roberts and Ottaway (2003, 123) noted that 'cleaning' of the objects renders microscopic analysis "impossible". Notches or chips that could infer details about the object's life history might be removed or worn through cleaning. Some post-recovery acts can be more extreme. An Early Bronze Age flat axe from Kentisbeare, Devon (Fig.3.11; RAMM-F026), was struck with a chisel-like implement by the finder approximately 33 times across both faces, causing dents, notches and material displacement, before it was donated to the RAMM, Exeter in 1884. This damage was noticeably modern from the break in the patina, but demonstrates the unusual extent to which objects may become deformed following recovery. Other situations include the almost total destruction of metalwork, such as at Lovehayne Farm, Colyton, where a hoard of metalwork said to number "over 100" was discovered between 1760 and 1768 and subsequently sold as scrap metal and melted down (Pearce 1983, 438-9, No.217). The scrapping of metalwork found in the

Fig.3.11: An Early Bronze Age flat axe from Kentisbeare, Devon (RAMM-F026) (source: Author courtesy of the RAMM, Exeter)

18th, 19th and even 20th centuries is common and consequently, objects found during these periods showing signs of damage must be carefully judged to determine the genuine nature of the damage present.

3.3.4 The 'Common Sense' Approach – Utilising Use-Wear

The identification of deliberate destruction of metalwork frequently relies on patterns of damage within hoards, whilst identifying deliberate damage on single deposited pieces has largely relied on 'common sense' observations, which could not have occurred by accident or through use. For instance, 14 spearheads in the Bondesgårde hoard, Denmark, are fractured below the tip at approximately the same height, whilst 18 had a blow mark in the same position leading Melheim and Horn (2014) to conclude the hoard was intentionally destroyed. These damage might be regarded as natural or accidental on single finds, but in the presence of numerous others, it is taken as intentional action, suggesting that similar damage seen on individual specimens might require reconsideration. Deliberate damage on individual objects requires more obvious indicators to be considered absolute. For example, the Middle Bronze Age sword from Werkhoven, Netherlands, was bent and suffered damage by a blow from a metal object (Fontijn et al. 2012), whilst individual objects in the Cassiobridge Farm hoard, England, had crushed sockets or bent blades (Coombs 1979).

The most general assessment for identifying destruction is whether the damage could have occurred through use. If the damage could not have occurred through assumed utilitarian functionality, it is often considered intentional (e.g. Becker 2006, 55-6; Melheim and Horn 2014; Perea 2008; Quilliec 2008, 70-71; Turner 2010a, 60ff.; 2010b; York 2002, 80). This largely relies on one's subjective assumptions though, rarely informed by any specific data. This is not to deny that a crushed socket, for instance, was almost certainly the result of human agency, but the limitations of this subjective approach are rarely discussed. Use-wear analyses and experimental studies become essential for removing or limiting this subjectivity and consequently identifying destruction.

Breakage and damage of objects is often assumed to be a result of material failure following extensive use. It therefore becomes important to consider larger experimental projects in which bronze implements were used over a long period of time. Unfortunately, a survey of literature found few details have been published of bronze implements used in such experiments. One rare example is a reference to a broken bronze axe used during the construction of the Bronze Age Ferriby boat (Van de Noort et al. 2014, 302-303). This axe apparently broke during use across the narrowest part, though no further details are given. As tools during this project were handled by volunteers it is likely the axe broke through misuse. This nonetheless emphasises the ways in which experimental archaeology might usefully inform assessments of damage.

Much work has been done on use-related edge damage to metal artefacts (e.g. swords, axeheads and spearheads). A common form of damage – ‘notching’ – warrants specific focus. Notching refers to plastic deformation of an edge when the damage is deeper than it is wide (Bridgford 2000; O’Flaherty et al. 2011) and occurs when a blade edge is struck against another blade edge (e.g. sword on sword). This can occur in two forms on weapon edges: v-shaped or u-shaped, depending on whether the opposing object is static or yielding when struck (Fig.3.12; O’Flaherty et al. 2011).

This warrants attention because of the destructive potential of this action. Notching is a potential mode for decommissioning metal artefacts, either through regular occurrence along the blade edge creating a serrated effect (Appleby 2005, 44) or on a blade face, which would weaken the blade on a transverse plane (Mörtz 2010; 2014). It is possible one would avoid edge-on-edge sword-fighting in a genuine combat scenario to avoid damaging the blade (Harding 2007, 111-112). Following this argument, repeated edge-notching of any form could reflect intent to damage the sword; it is perhaps more likely, however, that it reflects the inadequacy of the sword-wielder. Idealised fighting styles are of course different from actual combat situations.

Horn (2013a) noted notching as a decommissioning feature on weapons (halberds, swords and spearheads) whilst unusual notching around the hilt on the Werkhoven sword has been taken as potentially deliberate (Fontijn et al. 2012, 207). Although notching on the blade edge through use must be considered differently from more regular notching or notching in unlikely locations on the object, the term is still used generically for this type of damage; therefore, caution must be taken in how it has been used in the past and how it is applied here. Bridgford (1997, 106-7), for instance, presented notching measured on swords studied indicating use, but also highlighted that her

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Fig.3.12: V- and U-shaped notches (source: O'Flaherty et al. 2011, Figs.3 and 4)

tabularised results hid a few swords that were deliberately "hacked" (ibid.). The point at which notching might be considered intentional has never been detailed or discussed, though this is addressed in Section 5.2.6.

It remains possible that other use-wear indicators could have been deliberately inflicted upon weapons, but at present experimental research indicates they must largely be taken as the result of use, perhaps through combat. Simple repairs were not always conducted on sword edge damage before deposition (Kristiansen 1999; 2002), and occasionally, used objects have suffered additional deliberate damage (Mörtz 2010, 156; 2014), which could hold significance as an insight into the non-functional purpose of deposition. Thus use-wear results become an essential tool in identifying and analysing deliberate damage.

3.3.5 Features of Destruction: Bronze Tools and Weapons

Destruction is commonly identified through obvious features. York considered deliberate destruction "probable" when an artefact had been:

- "chopped across at right angles to its length once or more"
- "struck and crushed in a manner inconsistent with its primary use"
- "bent to breaking point (always a sword)"
- "burnt and maybe twisted, distorted and fused to other objects" (2002, 80).

Although broad, these categories largely represent the identification techniques considered by other authors for various objects. Nebelsick (1997; 2000), for instance, does not detail his criteria for what can be identified as 'destruction' but lists numerous Late Bronze Age hoards in Central Europe in which destruction has been identified in similar ways. The Crévic hoard in north-eastern France contained a median-winged axehead that was struck "just below the onset of the haft", breaking, but not completely severing, the blade from the wings (Nebelsick 2000, 160), as well as a bent and broken spearhead and "dismembered" spiral bracelets, from which the terminals had been removed (Fig.3.13; Nebelsick 2000; Wiegmann 1997). Similar destructive actions have been identified across Britain and Ireland such as: crushed socketed axeheads and bent and broken blades and spearheads in the hoards from South East England (Turner 2010b); 79 bent and broken ornaments and tools deposited in a ceramic vessel near Lewes in Sussex (Capper et al. 2011); and the numerous bent, burnt, broken and/or notched swords identified by Bridgford (2000) and Quilliec (2008).

Horn (2011, 53-5) specifically analysed the potentially deliberate removal of halberd handles, which rendered the object unusable. This was identified by the twisting and/or bending of the hafting plate of a halberd, as well as the destruction of several rivet holes, which could indicate a "violent separation" of the handle (ibid.). Destruction enacted through removal of a long handle is applicable to a variety of weapons, including axes and spearheads, and could also apply to removing the hilt grip from a sword or dagger. Similarly, Woodward and Hunter (2015, 27-39) used damage on dagger hilts in Early Bronze Age graves across England to argue that some hilts were intentionally removed before deposition (ibid. 28-30, 32-4). Specific examples of artefacts

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Fig.3.13: The Crévic hoard, France (source: Wiegmann 1997, 122)

are not highlighted however, and any damage that might be associated, such as breakage, bowing or twisting, could not be identified by the present author based on the description provided. Furthermore, Horn (2013a, 13) later advised caution in using “twisting” as a destruction indicator, due to the potential that it could be caused through forceful removal of an implement (for instance from a body) in a twisting motion. It is difficult to judge the possibility that a blade could twist under the pressure of wrenching from a body.

York’s (2002) four criteria offer a useful stand-point from which to identify destruction though it is limited to an analysis of those objects she was studying (primarily weapons). The identification of destruction on other types of objects is comparatively limited and at present lacks any quantifiable methodology. Turner (2010b) highlighted numerous instances of deliberately broken and crushed socketed axes in Late Bronze Age hoards in Kent and Essex, though she relied almost exclusively on the obvious nature of the destruction. Alternatively, common patterns of damage have been frequently noted, such as the breakage of socketed axes across the body (see Bradley 2005, 145-164), though the significance of this has not been fully explored. The decommissioning of other objects also requires further attention, such as: swords and spears through blade or shaft removal (Bridgford 2000, 222); or the blocking of socketed tools with fragments of other objects (Hansen 1996-8; Dietrich 2014; Dietrich and Mörtz *forthcoming*). Only limited attention has been paid to this sort of destruction, or indeed destruction of other bronze tools and implements, but further exploration into the deformation of these objects, and the removal of their assumed functionality, could hold important insights linked with the theme of intentional destruction.

3.3.6 Features of Destruction: Bronze and Gold Ornaments

Destruction on bronze and gold ornaments is frequently identified (e.g. Wilkin 2017). The Crévic hoard contained “dismembered” bracelets, rendered unusable by the act, but Nebelsick (2000, 160) offered no quantifiable reasoning behind his identification. Similarly, Perea (2008) contested that the carefully removed sections on gold bracelets in Late Bronze Age hoards in Iberia also represented a destructive act, carried out through a more measured, ordered approach than the ecstatic violence demonstrated in the hoards described by Nebelsick (2000); she again relies on obvious indicators.

Meanwhile, Gwilt et al. (2005) have suggested that gold bracelets may have been deliberately divided according to a pre-determined weight system.

The fragmentation or deformation of gold objects occurs relatively frequently, which is unsurprising given the malleability of the material. Gold objects are occasionally found fragmented and packed within the sockets of axes as part of the decommissioning process (Dietrich and Mörtz *forthcoming*; Gwilt et al. 2005) and consequently this link between fragmentation and decommissioning might bear significance. In Britain, several decommissioned gold bracelet hoards have been recovered. The hoards from Priddy, Somerset, and Heyope, Wales, were both compressed prior to or upon deposition (Minnitt and Payne 2012; Savory 1958, 7-8, 55-56), whilst two gold torcs in the Ellesborough hoard, Oxfordshire, were folded and rolled (Tyrell 2009).

In Ireland, Cahill (2005) highlighted the prehistoric rolling and/or folding of up to sixteen lunulae. These objects show signs of repeated manipulation during their use-life, as well as at the time of deposition. Cahill (2005, 58-59) noted other examples in Scotland and England, suggesting this practice was part of a wider understanding of these objects. This action should be considered decommissioning rather than destructive as it does not necessarily render the ornament unusable. In some instances, one or both terminals are absent but given the stress repeated rolling would place on the gold, and the fragility of the lunulae, these could have broken off by accident through material failure. The nature of gold makes it difficult to identify fresh over antiquated breakages.

Identifying destruction of ornaments is perhaps done slightly more readily than other objects, given the obvious deformation of some of them. However, the malleability of gold lends an ambiguity to identification, as does the often frail nature of many ornaments. As with the bronze implements a more measured approach is required.

3.3.7 Taking Destruction Too Far? The Need for Caution

In contrast to the literature presented so far, there are rare cases where authors too readily identify deliberate destruction. Woodward and Hunter (2015, 27-39) noted various damage observed on the Early Bronze Age daggers from British burials, linking the conditions to actions of manufacture, use and intent. In addition to deliberate hilt removal (see above), they also highlighted daggers with “deliberate bowing or twisting” as seen from the longitudinal profile (ibid.), but offered no criteria for distinguishing intent from accidental or post-depositional processes. The bowing or twisting is only very slight, and in the examples discussed almost completely unobservable, leaving it open to debate whether this is truly intentional or simply the result of soil pressure warping over time (see Section 3.3.3a). Few quantifiable factors for other forms of damage, such as breakage, were discussed, often presented only as modern or not, presumably based upon patina and wear. The potential for breakages to be intentional, especially if the objects *were* intentional bowed and twisted, is not mentioned.

It is worth considering an assessment made regarding a broken dagger in a Beaker burial (2245) on Site D (Ferry Fryston), North Yorkshire. Needham (2007b, 279) suggested that a tanged and riveted dagger was deposited complete but broke post-deposition, “possibly when some overlying material collapsed, perhaps following the decay of a wooden coffin” (ibid.). He based this assessment on the differential corrosion build-up and the proximity of the two pieces, as well as the lack of associated marks (e.g. bending or deformation) (ibid.). This case study emphasises firstly the fragility of these items, and secondly the importance of understanding the condition and context of the object. Without offering further specific information on their methodology, or details of the individual objects, it is difficult to definitively take Woodward and Hunter’s conclusions about the intentional destruction of daggers and other grave goods, demonstrating the cautious approach that must be taken.

3.3.8 Exploring Experimentation

The need for experimentation with the deliberate destruction of Bronze Age metalwork has already been mentioned. The minimal experimentation that has so far been conducted and written up comprises three case studies by Moyler (2007), Giardino and Verly (Bietti Sestieri et al. 2013, 167-169) and Hardman (2016). Whilst the methods encompass limitations, they ultimately demonstrate the potential of this approach.

Moyler’s (2007) PhD thesis investigated the use-wear on Scottish Early Bronze Age axes, but incorporated an experiment in which he attempted to destroy a replica axe. During his data collection, he noted fragmentation on several prehistoric examples, assigning “deliberate breakage” to those that were broken in half (ibid. 134). Moyler (ibid. 134-139) attempted to destroy one of his replica flat axes to test the ease with which one could be broken in half. This experiment, however, is given limited description and analysis in-text, as it is not one of the primary aims within the project. The replica axe was clamped vertically between two stones and the projecting butt was struck repeatedly with stone hammers; when this failed, modern steel hammers were employed, which also failed to break the axe cleanly (Fig.3.14). Hammer marks were visible on the replica, as well as transverse bending and some fracturing, though the clean fragmentation seen on the prehistoric examples was not reproduced, leading Moyler to suggest that no deliberate breakage had occurred on the axes he studied.

There are issues with this approach, however. Firstly, only one destructive method was utilised, and no explanation was offered for why this one was chosen over others; for instance, why was the axe not laid flat and struck with a chisel or another axe? Furthermore, the replica axes were produced using modern techniques and refined raw materials to save time and money and to overall improve production efficiency (ibid., 50-54). Consequently, the replicas were faultless examples of Early Bronze Age flat axes, which was

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Fig.3.14: Moyler's attempts to deliberately break a bronze flat axe (source: Moyler 2007, Fig.7.1)

the desired outcome for the use-wear experiments. The broken prehistoric examples however all possessed “casting flaws, such as cracks, hollows and air bubbles” (ibid., 147), and it is thus unsurprising that it was difficult to inflict substantial damage upon the replications. The inherent prehistoric flaws ultimately would have affected an object’s predisposition to breakage, and Moyler (ibid., 140) even suggests that those with obvious flaws might have been chosen for destruction. Nonetheless, this experiment does emphasise the tensile strength of the material.

A second experiment, in which object destruction *was* the main aim, was conducted by Giardino and Verly who tested whether the “reverse quenching” of a sword following annealing would improve its malleability to transversely bend into a ‘U-shape’ (Bietti Sestieri et al. 2013, 167-169). The quenched sword (S1) was bent over the conical section of a steel anvil to approximately 90 degrees before breaking at the bending point. The unquenched sword (S2), meanwhile, was bent manually over the metallurgist’s thigh in short stages to more evenly distribute the pressure; this enabled the sword to bend to a u-shape without fracturing.

Whilst there are again issues with this approach, the experimenters could build upon their technique for achieving the desired outcome and suggest that the bending of a sword required at least some specialist knowledge of the composition and capabilities of the material. However, whether reverse-quenching assisted the bending could not be concluded as two different methods for bending were implemented.

In his undergraduate thesis, Hardman (2016) investigated the temperatures required to break tin-bronzes to determine differences in deformation patterns. The hypothesis was that these differences might then be utilised to determine at what temperature archaeological bronzes were fragmented. Hardman’s experiments involved heating bars of 12% tin-bronze to different temperatures and striking them with a steel hammer and anvil to bend and break them (ibid., 13ff.). The extent of transverse bending was measured and the correlation between increasing temperature and reducing angle of deformation was found to be statistically significant (Fig.3.15). Through his experiments and subsequent comparison with two key Late Bronze Age hoards from Wales (Glascoed and St Nicholas), Hardman suggested various temperature ranges at which different bronzes were broken.

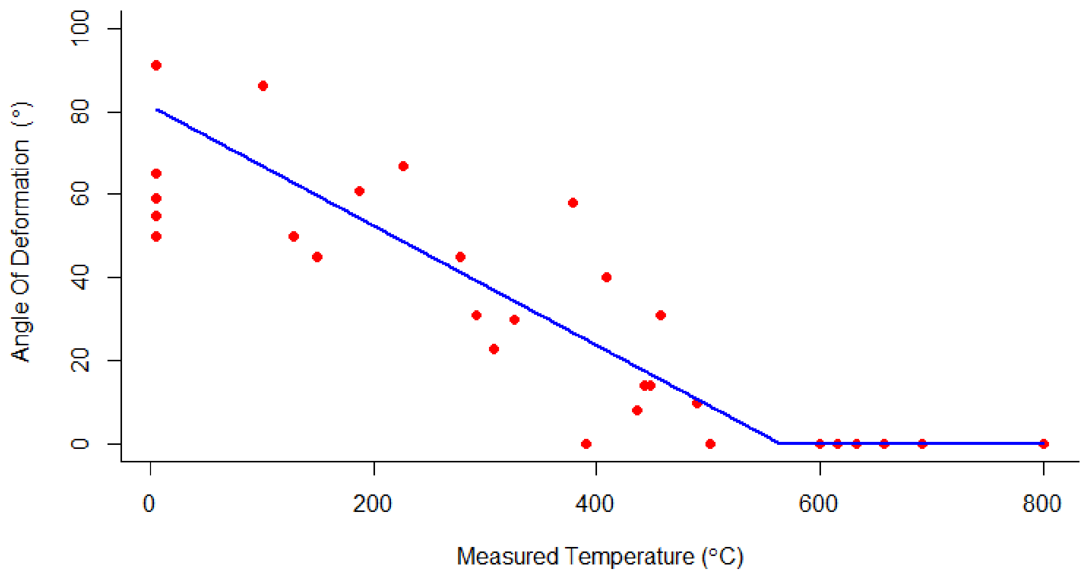

Fig.3.15: The correlation between the increase in temperature and a decrease in the angle of deformation (source: Hardman 2016, 18, Figure 13).

However, there are two key limitations to Hardman's (2016) study. Firstly, the use of steel tools may have affected the resulting deformation; the steel hammer is much harder than tools that were likely used in the Bronze Age (e.g. a bronze or stone hammer) and this may have a different effect on the extent to which the bronze may bend under a given strike. It may also produce different marks on the surface of the material. Secondly, the composition of the bars (12% tin/88% copper) is not archaeologically comparable within the Late Bronze Age. Compositions in this period typically contain a small percentage of lead, and a lower percentage of tin (Northover 1980). The inclusion of lead is an essential part to understanding fragmentation due to the effect of lead on the microstructure (Section 3.3.1). The addition of lead would thus affect the results of Hardman's experiments, by lowering the temperature at which the bronze is prone to break and the angle of deformation. The results of Hardman's experiments are thus difficult to compare with fragmented Late Bronze Age metalwork. Nonetheless, his experiments demonstrate a clear correlation between the increase in temperature and the reduction in tensile strength of bronze, demonstrating that associated damage (such as bending) might indicate the mode of breakage.

These three experiments represent starting points for understanding the processes by which objects might become broken or damaged in antiquity, but the application to the archaeological record has yet to be attempted on any grand scale. Repeated and repeatable experiments with carefully coordinated aims are required to advance this (Reynold 1999). As Giardino and Verly's experiment highlighted, the destruction of objects could represent a skilled activity. Clearly, experimental destruction is an untapped field of investigation, which is explored in the next chapter.

3.4 Categorising Fragmentation and Damage

The indicators and identifiable traits listed so far represent a sporadic collection of approaches, built largely upon general observations following the study of metalwork. It becomes clear that a synthesis of these approaches is required when developing a methodology (Chapter 5). Some authors have, however, attempted to categorise fragmentation, which also has benefits for understanding the likelihood of destruction. This section considers five approaches, beginning with those concerned with use linked with damage (Bridgford 2000; York 2002), followed by those with a more specific focus on destruction (Čivilytė 2009; Rezi 2011), and finally a more all-encompassing approach (Needham 1990a).

Bridgford's (2000) thesis closely analysed the condition and use-wear of swords and spearheads from across the British Isles, in comparison with her experimental reference collection. Throughout her study she highlighted destructive damage not conducive with the use of the weapon, though had limited focus on this. Consequently, her categorisation of fragmentation is based on the link between completeness and use-wear. She presented a scale of completeness for swords and spears based on their estimated original size. This method was appropriate for swords, for which the approximate overall size can be estimated with relative certainty, whilst for spearheads the variations in types and size can be so extensive that establishing the proportion of a spear a socket or tip truly represents is problematic (ibid., 168). For Bridgford, broken pieces of less than 100mm are considered to constitute pieces of scrap, perhaps intended for re-smelting, whilst those that are larger than this, might have been broken deliberately for an alternative purpose, especially if the damage is not consistent with combat wear. From a critical standpoint, there are issues with this methodology; Bridgford does not justify the reason for the 100mm parameter (for instance, to accord with the average size of a crucible?), and since some spearheads are less than 100mm when complete, it might thus be more appropriate to develop an alternative scale of completeness for different implements. This would, of course, have its own issues of cross-comparison between objects.

York (2002), alternatively, used more encompassing terms in her study of Bronze Age metalwork recovered from the River Thames, electing for “used” or “unused” and “destroyed” or “not destroyed” and combinations of the terms, which allowed different objects to be compared easily. Like Bridgford, York built her analysis on a study of object completeness, object condition, and use and destruction marks. This approach allowed a generalised view of the artefacts to be gained. The problem, however, is that a used sword, for instance, that has been bent to a right angle is categorised similarly to an unbent used sword that has been broken into several smaller pieces because both have been ‘destroyed’, negating the biographic potential of the sword to inform about social relations. Importantly, though, neither Bridgford nor York were specifically focused on destruction; rather, York was concerned with inferring a lifecycle of the metalwork, whilst Bridgford offered a technological viewpoint on the functionality of Bronze Age weapons. It would, therefore, be interesting to develop a classification system based on signs of destruction as a key feature, such as that done by Čivilytė (2009, 47-66) and Rezi (2011).

Čivilytė (2009, 47-66) categorised fragmented weapons (swords, spears and daggers) from northern Europe into 37 groups. These groups were not object-specific, but aimed to cover the full range of types of fragmentation (and various combinations) that could occur on the range of studied objects. For instance, a distinction was made between blade pieces that have broken into two or more pieces but are otherwise complete (“Klinge zerbrochen”), and single pieces that have had a piece break off (“Klinge abgebrochen”). This is furthered by combining these characteristics either with each other (whereby the top of the largest of the adjoining blade pieces is broken off), or with other characteristics, such as missing blade tips (“Spitz fehlt”) or broken hilts (“Griff defekt”). These are largely only applicable to bladed objects, such as swords, and consequently Čivilytė also developed categories for spearheads. Although one cannot fault the thoroughness of this approach, it inevitably becomes so specific that only small percentages of Čivilytė’s large object samples appear in some of the groups and overarching conclusions become difficult to make (e.g. only 6 of 1321 swords (0.5%) have their upper part missing but no other fragmentation is present). If one wished to expand this to consider aspects of the use-life of an object before deposition, or indeed tools or ornaments, the study would become convoluted and difficult to manage. Čivilytė (ibid., 58) noted this issue and consequently much of her analysis groups several different categories together to make sample sizes large enough to be significant. Regardless, this study represents one of the most thorough investigation into object fragmentation in Europe at present.

Rezi's (2011) examination of fragmentation and destruction in Late Bronze Age hoards in the Carpathian Basin, Romania, demonstrated a more manageable approach. He split fragmentation into three core categories: *damage*, *break* and total *destruction* (ibid., 108; see Section 1.5), which were then applied to different object types and various areas on the objects where fragmentation occurred was recorded (see Fig.3.16). Although this method likely has a similar number of groups to Čivilytė's, by establishing three core categories for grouping object-specific fragmentation patterns Rezi was more easily able to bring together synonymous data. The core element of Rezi's paper was the comparison of fragmentation data collected from two Bronze Age periods: the BzD (*c*.1325-1200 BC) and HaA1 (*c.*1200-1125 BC). He found that the number of fragmented (damaged or distorted) objects increased in the later period, as well as the degree and diversity of fragmentation methods used (ibid. 308-9, 314-5, 318). This conclusion has likewise been drawn from the British and Irish material (Bridgford 2000; York 2002). Like Čivilytė's approach, a drawback of Rezi's analysis is once again the inability to link these destructive features to other aspects of the metalwork, such as use-damage.

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Fig.3.16: Common fragmentation areas on a socketed axe (source: Rezi 2011, 310 Fig.1)

A useful categorisation system offering a balance of approaches was presented by Needham (1990a) in his analysis of the metalwork from Petters Sports Field, Surrey. Needham utilised a coded system for classifying different features of the metalwork and succinctly present information about each individual object. This system incorporated the completeness, use, condition, metallurgical flaws, and non-edge damage, allowing one to easily cross-reference the ways different objects have been treated prior to deposition and any patterns that might emerge are easily visible. Needham's approach is designed to record as much information as possible in the simplest possible form. This could naturally be expanded to have a greater focus on destructive and fragmentation modes, whilst retaining the other elements of completeness and use. This method has only been applied within a single contextualised hoard though; when trying to cover objects from a variety of contexts and time periods, it might become more complicated to manage a coded system in a meaningful way.

These five attempts represent ways in which authors have tried to categorise destructive features of metalwork, largely relating to fragmentation. Often there is a tendency to over-complicate the procedure, making it unusable by other academics, or else over-simplify, rendering the study too general to extract more specific information. Destruction and fragmentation of objects as the focus of structuring information is done infrequently, with more attention often paid to the functionality of the objects. This is often linked to the questions being asked by the researcher. It is noticeable that none of the studies presented attempt to draw on use-wear experiments in their classification, in part because most of those studies presented were conducted prior to the more recent experiments that are beginning to define use-wear. For this thesis then a more cohesive approach is desirable and a system of identification and classification should be developed building upon these studies and others while also utilising the various methodological aspects that have also been touched upon. This forms the focus of Chapter 5.

3.5 Summary

This chapter has largely concentrated on understanding the processes of destroying a bronze object, through an appreciation of its material properties and the past research that has been conducted. Methods for identifying and exploring damage has been varied, with limited consensus. Clearly, a methodology for identifying deliberately destroyed objects would be of benefit to future investigations. One key aspect that has been raised in this chapter is that understanding the processes of destruction through experimentation would give a more nuanced perspective of prehistoric action. Consequently, Chapter 4 presents a set of destruction experiments, ahead of the development of a methodology in Chapter 5.

CHAPTER FOUR

GOING TO PIECES: EXPERIMENTAL DESTRUCTION

4.1 Introduction

So far, this thesis has tackled theoretical perspectives and past approaches to destruction. Chapter 3 highlighted the need for and value of experimentation for exploring destructive processes to enhance how the practice might be understood. Consequently, experiments were designed and conducted to explore a variety of factors to offer insights into how and why certain objects became damaged/or broken in the past. This is only one aspect of this study and thus the research aims of these experiments were designed to contribute broad answers to overarching questions surrounding metalwork destruction to further this investigation.

A research aim of this thesis is to better understand the processes by which Bronze Age metalwork was destroyed in the past. Simply put, this can be phrased: *How does one destroy a Bronze Age bronze object?* Furthermore, how might one recognise prehistoric deliberate destruction? To answer these questions, it can be hypothesised that different methods and processes of damage and breakage will result in specific physical changes that can be used to identify characteristics and means of damage.

The research questions and overarching hypothesis presented above are investigated through actualistic destruction experiments. Replica axeheads, swords and spearheads were produced by an experienced experimental bronzesmith (Neil Burridge) and the experiments were informed and guided by data collected from South West England (see Chapter 7). Destruction experiments explore the breakage and plastic deformation of axeheads, spearheads and swords (Table 4.1); these are supplemented by actualistic combat experiments involving swords and spears to investigate damage that might be sustained through use-related activities. Experiments specifically focusing on destructive actions have only been undertaken infrequently in the past (e.g. Hardman 2016); therefore, this chapter offers a vital contribution for exploring the processes by which bronze swords, spearheads and axeheads

Table 4.1: A summary of the Destruction Experiments

Experiment ID	Object(s) Involved	Destructive action	Tools used	Result	Figure
1	Socketed axehead	Unheated and hammered	Granite hammerstone	Surface deformation but no breakage or significant crushing	4.15
2	Two socketed axeheads	Heated to c.500°C and hammered	Bronze hammer	Fragmentation of both axeheads into multiple small pieces	4.18
3	Socketed axehead	Unheated and hammered	Bronze hammer	Plastic deformation causing crushing but no breakage	4.27
4	Sword	Heated to c.500°C and hammered	Bronze hammer and chisel	Fragmentation of sword into twelve fragments	4.58
5	Sword	Unheated and bent	None	Sword bent into a u-shaped bend	4.60
6	Sword	Unheated and hammered	Bronze hammer	Plastic deformation and fragmentation into seven fragments	4.63
7	Spearhead	Heated and hammered	Bronze hammer	Breakage into three pieces	4.67
8	Spearhead	Unheated and hammered	Bronze hammer and chisel	Plastic deformation and bending resulting in breakage	4.70

might have been deliberately damaged in the Bronze Age. The results from these investigations are used to inform a methodology for identifying deliberate destruction on prehistoric artefacts culminating in a Damage Ranking System presented in Chapter 5 and illustrate the potential for furthering these experiments in future studies.

4.2 Undertaking Experimentation

Archaeological experiments should answer research questions with clear aims, methodologies and an appreciation of the variables involved (Cunningham et al. 2008). Furthermore, results should be related back to the archaeological record (Cunningham et al. 2008, v; Mathieu 2002; Outram 2008).

In answering the research questions presented above, any approach needs to firstly consider damage observed on archaeological specimens, such as bending and breakage, and how these might be achieved, e.g. using tools and application of heat and force. Additionally, the material qualities of the bronze need to be considered, such as its hardness and composition. The composition of the bronze is particularly important as the proportions of tin alloyed with copper changes during the Bronze Age and by the Late Bronze Age lead is a significant component; variations in the composition will affect the toughness and hardness of the bronze (see Section 3.3.1). Experiments exploring destruction could therefore consider the quantifiable physical qualities of the material and processes through laboratory-based investigations, such as the force required, or alternatively develop an actualistic approach in which methods for *how* the materials were broken are tested using authentic tools and methods. Ideally, a combination of these two approaches would be used to combine a detailed understanding of specific material properties with an experiential element of physically conducting the experiments. However, due to limitations of the facilities available when designing the experiments and financial costs involved in producing replicas, it was decided that actualistic experiments would be the most beneficial to the overall research aims, providing an insight into specific bodily actions, the types of tools and the processes required to break the objects. The infancy of experiments investigating deliberate destruction of Bronze Age metalwork means that the experiments presented here are largely exploratory and have value in addressing key questions about how metalwork was destroyed in prehistory.

4.3 Experiments Outside the Academic Literature

Experimentation utilising Bronze Age metal objects has increased in the past twenty years, particularly developing how tools and weapons might have been used (e.g. Anderson 2012; Molloy 2006; Roberts and Ottaway 2003). Destruction as an experimental process, meanwhile, has received little documented study (Section 3.3.8). To develop hypotheses several metalworkers and experimental facilities were consulted to discuss destructive processes. It became clear that the fragmentation of metal objects was well-understood by metalworkers at a general level and often conducted on an informal basis with no quantified approach. The purpose for destruction in all cases, specifically fragmentation, was for recasting.

For instance, the team of metalworkers at the Montale Terramare open-air archaeological park, Italy, frequently perform public sword casting displays for the public after which they break down the sword into fragments for recasting (Fig.4.1; Knight 2015). They deliberately fragment the freshly cast sword by heating and striking it; the temperature at which the sword should be broken is judged by the colour of the metal in the fire (red and glowing) and for this team there is an inherent knowledge of how the material will behave.

Experimenters also publish videos testing the use and endurance of replica weapons online (e.g. Gehrig RFC 2014; Skallagrim 2014; ThegnThrand 2015a; 2015b; 2016). The quality of these tests varies, lacking the rigour of a scientific experiment, but they are useful experiences which emphasise the resilience of the objects and any weaknesses they possess. For instance, Skallagrim's (2014) abusive testing of a replica Ewart Park sword against tree branches and a steel sword produced transverse bending of the blade and caused deep notching on the sword edge but the sword did not break. Clearly, this sword would never have been used against a steel weapon nor is it likely to have been used to chop down tree branches, however its resistance to breaking illustrates the tensile strength of the material whilst also emphasising its ductility and dispensation towards plastic deformation. ThegnThrand (2015a; 2015b; 2016) has similarly shown the effectiveness of Late Bronze Age swords and Middle Bronze Age spears against ballistic gel human heads and steel obstacles; the objects rarely show signs of irreparable, decommissioning damage.

Fig.4.1: Fragments of a deliberately broken sword following casting (source: Author)

Although these experiential experiments are conducted without a specific research agenda in mind, they nonetheless demonstrate how one might understand the material properties of bronze and the processes by which destruction might be achieved. These are elements that are rarely considered in the academic literature with assumptions typically made about the endurance and use of bronze objects.

4.4 Refining the Research Aims

The overall research question was posited above: How does one destroy a Bronze Age bronze object? This requires refining for the purposes of planned experimentation according to a set of aims. From engaging with metalworkers, it became clear that initial questions that might be answered through this research (e.g. understanding the best method for fragmenting a sword) were already largely understood outside of the academic sphere. Nonetheless, since so few destruction experiments had been conducted with research questions in mind, key questions still required a more rigorous approach than the experiential methods reported at experimental facilities. Furthermore, it is of interest to explore multiple object-types within this research because firstly, different objects possess different properties in their varied forms and secondly, destruction is seen across a broad range of object types in the archaeological record. The aims of these experiments are thus inevitably broad as they encompass various factors and destructive elements, as well as three different object types. These are:

- To better understand how likely damage, breakage or failure is through the use of an object;
- To intentionally decommission and/or destroy reproductions of Bronze Age metalwork to replicate the damage seen on prehistoric objects or to test theories of how the object might have broken (e.g. through use, intent or other processes);
- To explore the effect of temperature and composition on the disposition of an object to break; and
- To understand the techniques required to damage an object and to what extent breakage can be controlled (e.g. by skill, using specific tools, or temperature).

4.5 Pilot Experiments (Appendix C)

Before the production of replica objects, pilot experiments were conducted exploring different aspects of destruction specifically relating to fragmentation (Table 4.2; Appendix C). These experiments were undertaken at different experimental facilities and relied on the materials available at the time. Similarly, the objects involved in the pilot experiments were graciously offered by different metalworkers in support of this project but there was no regulation over the condition, form or composition of the objects. Nonetheless, the destruction of these objects was conducted with specific research questions in mind, testing out different methods of breaking objects. This set of experiments was therefore useful for formulating the direction of the planned experiments presented below (Sections 4.7 and 4.8). Indeed, experiments of this type have their value in generating hypotheses though exist outside of an extended experimental program and might be termed “first generation” experiments (Mathieu 2002, 7).

Table 4.2: A summary of the pilot experiments undertaken indicating the types of objects, compositions and damage inflicted.

Pilot Experiment ID	Object Type	Condition	Composition	Damage Inflicted
1	Dagger	As-cast	Cu 88%; Sn 12%	Fragmentation – cold (Fig.4.4)
2	Hallstatt C sword	Unworked, mis-cast	Cu 90%; Sn 9%; Pb 1%	Bending and breakage – cold (Figs.4.2, 4.3)
3	Sword	As-cast	Cu 90%; Sn 9%; Pb 1%	Fragmentation – hot
4	Ewart Park sword	As-cast	Cu 90%; Sn 8%; Pb 2%	Fragmentation – hot
5	Wilburton Sword	As-cast	Cu 88%; Sn 12%	Fragmentation – hot

A full account of these experiments is presented in Appendix C, though key observations resulting from this pilot testing are given here.

4.5.1 Key Observations from the Pilot Experiments

1. A bronze object is most easily broken when it is heated (a.k.a. hot-shorting) but the best temperature is dependent on the composition of the metal. This is elaborated further below.
2. Identifying the correct temperature for breaking a metal object with a certain composition is informed by the colour of the object and ultimately by experience.
3. An unworked, leaded bronze sword can be bent over one's knee but the pressure applied should be evenly distributed and gradually applied to reduce the likelihood of breakage (Figs.4.2, 4.3; cf. Bietti Sistieri et al. 2013).
4. Striking an unheated object causes transverse bending (Fig.4.4).
5. Striking a heated 12% tin-bronze object at insufficient temperatures will cause transverse bending before fragmentation (q.v. Hardman 2016). Striking heated leaded bronzes, however, causes limited associated deformation and almost instant breakage.

Fig.4.2: The process of bending an as-cast sword by hand in Pilot Experiment 2 (source: Author)

Fig.4.3: The resulting 'u-shaped' bend of the sword in Pilot Experiment 2 (source: Author)

Fig.4.4: An as-cast dagger subjected to fragmentation during Pilot Experiment 1. A) Condition pre-fragmentation; B) The fragmented dagger; C) A side profile showing the transverse bending caused during fragmentation (source: Author)

6. Antler, wood and stone hammers do not leave any impact marks that would be archaeologically visible on thin-bladed objects during fragmentation.
7. The thickness of an object is inversely proportional to its dispensation to break when unheated: the thicker the object, the less likely it is to break.

Although straightforward, the conclusions drawn from these pilot experiments thus begin to answer the overall aims presented above, demonstrating their importance to this research. Furthermore, they offer guidance for how best to approach the destruction of objects.

4.6 Object Types Produced

Three different object types were produced to encompass the widest range of destructive practices (Table 4.3). Each object was based upon an example from South West England. These objects were:

- a socketed axehead from the St Buryan hoard, Cornwall (RCM-F035a);
- a sword from the St Erth I hoard, Cornwall (RCM-F037a); and
- a barbed spearhead from the Bloody Pool hoard, Devon (RAMM-F005a).

Four replica axeheads, two replica swords and two replica spearheads were commissioned but in each case Neil Burridge cast additional objects to increase the likelihood of successful castings. Metallurgical compositions were informed by past analyses of these specific artefacts or similar contemporary artefacts (Appendix D). The replica Bloody Pool spearheads, for instance, were produced using compositional analysis by Peter Northover (n.d.), whilst the composition of the replica swords utilised comparable analysis on contemporary swords (Northover 1988). The compositions of the socketed axeheads were based on the available X-ray fluorescence analysis (Tyacke 2012), as well as the averages of contemporary socketed axeheads from South West England (Northover n.d.).

Importantly, the composition of broken artefacts parallels the composition of complete artefacts; this indicates that the cause of breakage does not necessarily lie in the composition of individual objects. Each replica was produced in a sand mould and limited post-casting working was undertaken to reduce the variables that might affect breakage. Eight socketed axeheads were successfully cast comprising three compositions (Fig.4.5; see Table 4.3). Meanwhile, four swords were cast though only two were prepared for use

Table 4.3: A summary of the replicas produced, the compositions and the post-casting processes

Object ID	Object Type	Copper	Tin	Lead	Post-casting Processes
1.1	Socketed axehead	84%	15%	1%	Unquenched Casting jets/flash removed Edge left unworked
1.2	Socketed axehead	84%	15%	1%	
1.3	Socketed axehead	84%	15%	1%	
1.4	Socketed axehead	90%	8%	2%	
1.5	Socketed axehead	90%	8%	2%	
1.6	Socketed axehead	90%	8%	2%	
1.7	Socketed axehead	88%	8%	4%	
1.8	Socketed axehead	88%	8%	4%	
2.1	Ewart Park sword	90%	9%	1%	Unquenched Casting jet removed Edge ground, cold-hammered and sharpened Ash hilt riveted on
2.2	Ewart Park sword	90%	9%	1%	
2.3	Ewart Park sword	90%	8%	2%	Unquenched Casting jet removed Left as-cast
2.4	Ewart Park sword	90%	8%	2%	
3.1	Barbed spearhead	88%	10%	2%	Unquenched Casting jet removed Clay core inserted 2 metre ash shaft inserted and riveted
3.2	Barbed spearhead	88%	10%	2%	
3.3	Barbed spearhead	88%	10%	2%	Unquenched Casting jet removed Core removed

(Fig.4.6); the edges of these were ground and sharpened and ash hilts were riveted on. The spearheads were more difficult to cast and only one (Spearhead 3.1) was cast without casting flaws in the blade walls; this is due to the thin nature of the socket walls. Two further castings with minor casting flaws were produced and ashwood shafts were inserted into Spearheads 3.1 and 3.2 (Figs.4.7, 4.8). The sword hilts and spear shafts were attached so that these objects could be used in the combat experiments (Section 4.8.3). Full details of the rationales and production processes for each of these object types are provided in Appendix D.

An inherent problem with the selection of objects for this experimental work is that the main interest is in those that have been broken but this means that reproductions are based on incomplete objects. Complete specimens of incomplete objects have been produced according to similar contemporary complete artefacts and the expertise of the metalcaster: Neil Burridge.

Fig.4.5: The eight replica axeheads produced (1.1-1.8) comprising 3 different compositions (source: Author)

Fig.4.6: Swords 2.1 and 2.2 (source: Author)

(left) **Fig.4.7:** Spearheads 3.1 and 3.2 hafted on 2m long ash shafts (source: Author)

(above) **Fig.4.8:** Spearhead 3.1 with tapered shaft inserted and pegged into the spearhead (source: Author)

4.7 The Deliberate Destruction of Socketed Axeheads

Socketed axeheads across Britain frequently show signs of deliberate decommissioning by crushing and blocking sockets and breaking the body (e.g. Needham 1990a; Turner 2010b). In South West England 253 socketed axeheads were studied during data collection (Chapter 7) of which 197 (77.9%) were incomplete; some consist of only cutting-edge fragments or socket pieces whilst others are more complete but with damage to key areas (e.g. the socket) rendering them unusable.

A Type Welby/Southern English socketed axehead was selected for experimentation (Fig.4.9). Welby axeheads are present across South West England and Britain, encompassing a broad range of ribbed socketed axeheads (Needham 1990a; Schmidt and Burgess 1981). These axeheads are often found damaged making this generic form an appropriate type to reproduce for the purposes of broad experimentation. In South West England, complete and broken Type Welby or ribbed socketed axeheads have been found in at least 22 findspots comprising c.39 examples (Knight et al. 2015; Pearce 1983). This number is likely to be larger due to the number of indeterminate fragments of socketed axeheads in this region.

The replica axeheads were produced based upon a largely complete Type Welby axehead from the St Buryan hoard, Cornwall (Fig.4.10; RCM-F035a). This hoard dates to the Ewart Park phase (920-800BC) when deliberate destruction of material was a common practice (Turner 2010a); the hoard also includes a fractured socketed axehead and nine ingot fragments. This example was thus suitable for exploring deliberate destruction.

Socketed axeheads are found damaged and fragmented in a variety of ways. The most common form of breakage involves the separation of the cutting-edge from the body of the axehead though crushing of the socket and fragmentation of the axehead body is also observed. The following experiments were thus designed to investigate how these processes might be best achieved and to identify marks and characteristics that can then be compared with the archaeological record. Eight axeheads were successfully cast, though as only four socketed axeheads were commissioned for these experiments, only four were subjected to damage here. The four axeheads comprise the three compositions and represent the best castings produced. The remaining four were retained by Neil Burridge.

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Fig.4.9: An example of a Type Welby/Southern English socketed axehead (source: Needham 1990a, 33, Fig.6)

Fig.4.10: The St Buryan socketed axehead with damage on one face (source: Author courtesy of the Royal Cornwall Museum)

Three experiments were conducted to explore methods of deliberate destruction relating to socketed axeheads, including heated and unheated methods (Table 4.1). These were conducted at Neil Burridge's workshop in Cornwall and utilised an unhafted granite hammerstone and a replica bronze hammer to perform the destructive acts (Table 4.4). The hammerstone (Fig.4.11) was an oblong granite pebble retrieved from Budleigh Beach, Devon, and thus potentially of a form available in Bronze Age South West England. Meanwhile, the bronze hammer (Fig.4.12) was designed by Neil Burridge. The sides of the hammer tapered slightly to a broad, sub-rectangular flat end which had suffered some minor wear marks, though the exact use-history is unknown. This object was hafted on a knee-joint piece of commercial ashwood.

When it was necessary to heat the socketed axeheads, these were placed in Neil Burridge's portable 'kiln', which is usually used for pre-heating clay moulds for casting. This is constructed from clay packed around a wire fencing frame and covered with sheep's wool to create a small rectangular box long enough to fit a sword. Internal rods support objects above a bed of charcoal. The temperature was monitored using a temperature probe and a target temperature of 500°C was selected for heating the axeheads following the results of the pilot experiments (Section 4.5).

Table 4.4: Details of the tools used in Destruction Experiments 1-3.

Tool	Dimensions (mm)			Material
	Length	*Width*	*Weight (g)*	
Hammerstone	111.3	63.9	493	Granite
Hammer	87.6	35.5	1013	Tin-bronze (12% Sn; 88% Cu)

Fig.4.11: The granite hammerstone (source: Author)

Fig.4.12: The bronze hammer (source: Author)

4.7.1 Destruction Experiment 1: Striking an unheated socketed axehead

Aim: To break an unheated axehead across the internal opening and crush the socket using an unhafted hammerstone.

Setup: Axehead supported against a wooden block (Fig 4.13)

Objects and equipment used: Axehead 1.5 (8% tin; 2% lead); granite hammerstone

Actions: Blows delivered from the elbow aimed at the cutting-edge and the internal opening of the axehead.

Outcomes and observations: After 25 minutes of hammering, this method failed to achieve breakage or crushing and was ceased as no results that could be considered archaeologically comparable were being produced. Hammering indented large depressions in the surface of the axehead (Fig.4.14), though the thickness of the socket mouth made it difficult to achieve any damage through cold hammering (Fig.4.15).

Upon reflection, this method was limited by several factors:

1. Firstly, experience of the correct approach to achieve maximum damage and utilise the tool most efficiently was lacking. It must be assumed that if such a technique was used, the person utilising the tool would have more experience (e.g. through metalworking).
2. The socketed axehead was not fully secured (e.g. by a clamp) which meant the full force of the blow was not always absorbed by the axehead. Instead it transferred into the arm holding the axehead down.
3. The stone hammer would have benefited from being hafted allowing a greater leverage and thus transference of force upon impact. This adjustment may have enabled fragmentation or at least a method for inflicting damage that required less energy.

Nonetheless, Experiment 1 has value in offering insights into how fragmentation *was not* achieved.

Fig.4.13: Striking Axehead 1.5 with the hammerstone (source: Author)

Fig.4.14: Damage on the surface of Axehead 1.5 (source: Author)

Fig.4.15: Surface damage on Axehead 1.5 following 25 minutes of hammering with a granite hammerstone (source: Author)

4.7.2 Destruction Experiment 2: Striking heated socketed axeheads

Aim: To strike heated socketed axeheads and break the cutting-edge from the main body and achieve crushing of the sockets.

Setup: Axeheads heated in Neil Burridge's portable 'kiln' and held with tongs on a wooden block (Fig.4.16).

Objects and equipment used: Axeheads 1.3 (15% tin; 1% lead) and 1.6 (8% tin; 2% lead); a hafted bronze hammer; a portable 'kiln' typically used for heating clay moulds; temperature probe.

Actions: Both axeheads heated in 'kiln' until 500-600°C and then struck with the hammer. Blows were initially aimed at the cutting-edge of Axehead 1.6 and then the socket. For Axehead 1.3 blows were aimed at the socket first (Fig.4.17)

Outcomes and observations: This method was successful in fragmenting both axeheads though required hotter temperatures than expected. Axehead 1.6 broke into nine fragments, whilst Axehead 1.3 broke into sixteen fragments having both been heated to approximately 560°C over fifty minutes (Figs.4.18, 4.19, 4.20).

The extreme fragmentation was unexpected and caused fragments to land up to two metres away, illustrating the brittleness of the material at this temperature. A comparison of the weights before and after showed that some bronze was lost through fragmentation (Table 4.5). In a contained environment it would be possible to minimise bronze loss.

Before successful fragmentation was achieved, Axehead 1.6 was removed from the 'kiln' after 25 minutes at 490°C and struck with the hammer, but this failed to inflict any damage so the axehead was returned to the 'kiln'. More charcoal was added to raise the temperature, which quickly rose to 670°C, and the axeheads were left in the kiln until they cooled closer to the originally planned temperature. Crushing the sockets was not achieved but the cutting edge of Axehead 1.3 suffered some compression.

Table 4.5: A comparison of the weights of Axeheads 1.3 and 1.6 before and after fragmentation

Axehead	Weight before fragmentation (g)	Weight after fragmentation (g)
1.3	246	240
1.6	267	253

Fig.4.16: Striking the socket end of Axehead 1.6 following separation of the cutting-edge (source: Author)

Fig.4.17: Striking the socket end of Axehead 1.3 causing fragmentation (source: Author)

Fig.4.18: The fragmentation of Axehead 1.6 (source: Author)

Fig.4.19: The fragmentation of Axehead 1.3 (source: Author)

Fig.4.20: The crushed and cracked lower body of Axehead 1.3 (source: Author)

4.7.3 Destruction Experiment 3: Striking an Unheated Socketed Axehead with a Bronze Hammer

Aim: As Experiment 1, but utilising a hafted bronze hammer

Setup: Cutting-edge of axehead clamped between two heavy stones (Fig.4.21)

Objects and equipment used: Axehead 1.8 (8% tin; 4% lead); bronze hammer

Actions: Blows delivered one-handed from the elbow in a kneeling position with the hammer held midway along the haft; this technique was based on what felt most natural. The position of the axehead was repeatedly altered so both sides were struck roughly an equal number of times and with a similar variety of strikes. Damage was recorded incrementally.

Outcomes and observations: 105 blows were delivered to the axehead but failed to fully compress or break it. Table 4.6 presents the results of the experimental process whilst Figures 4.22-4.27 show the cumulative effects of hammer blows on the axehead. Much of the damage suffered was to the surface causing flattening of the ribs and deformation of the socket. Small cracks eventually began to form around the side loop and down one side (Fig.4.28) but stress fractures were otherwise largely invisible. Additional blows would eventually achieve complete compression and probably breakage though the ineffectiveness of this method meant the experiment was terminated.

Fig.4.21: The clamping system and set up for Experiment 3 (source: Author)

Table 4.6: Results of Experiment 3

Cumulative no. of blows	Face of axe	Axehead position	Strike location	Effect	Additional Notes
5	Side loop right	Clamped, set above the ground	Socket rim	Slight bowing of the socket, but only at the rim; aesthetic surface deformation; minor counter impact on opposite face	
10	As above	As above	As above	As above	
15	As above	Clamped, set on ground	As above	As above	Lack of effectiveness prompted change in tactic; the socket rim may be too thick.
20	As above	Clamped, set above the ground	Body	Minor bowing of the body; flattening of ribs; minor counter impact on opposite face; sides of axe around the socket beginning to bow outwards.	
25	As above	Clamped, set on ground	As above	As above	
30	Side loop left	As above	Socket rim	Continued bowing of the socket; surface deformation.	
35	As above	Clamped, set above the ground	Body	Minor bowing of the body; flattening of ribs.	Due to lack of significant difference, blow increments increased.
45	As above	As above	Socket rim	Increased socket compression to a semi 'peanut' section.	Still no associated fractures or cracking.
55	Side loop right	As above	As above	As above, but still no cracking.	Blow increments reduced again to observe any gradual effects.
60	As above	Clamped, set above the ground	Body	Minor compression of the body; flattening of ribs.	
65	Side loop left.	As above	As above	As above	Blow increments increased to 20 (10 on each side).
85	Both	As above	As above	Increased bowing into definite 'peanut' section.	
105	Both	As above	Socket rim	Minor cracking beginning around the sides and the side loop.	Axe still not broken nor fully compressed. Experiment terminated.

Fig.4.22: Axehead 1.8 after 5 hammer blows (source: Author)

Fig.4.23: Axehead 1.8 after 30 hammer blows (source: Author)

Fig.4.24: Axehead 1.8 after 45 hammer blows (source: Author)

Fig.4.25: Axehead 1.8 after 60 hammer blows (source: Author)

Fig.4.26: Axehead 1.8 after 85 hammer blows (source: Author)

Fig.4.27: Axehead 1.8 after 105 hammer blows (source: Author)

Fig.4.28: Cracks around the socket of Axehead 1.8 (source: Author)

4.7.4 Discussion of the Socketed Axehead experiments

The socketed axehead destruction experiments highlight several points. Most significantly, heating and striking a socketed axehead is clearly the most effective method for fragmenting it. Although the extreme fragmentation of the axeheads was unexpected at the time, subsequent discussions with Morgan van Es, an experimental bronzecaster at Bronzezeithof Uelsen, Germany, revealed that this is a common occurrence when socketed axeheads are exposed to heat over a prolonged period. The extended exposure over fifty minutes and high heat in excess of 600°C likely caused the tensile strength, toughness and the plasticity of the bronze to lower and inversely increased the brittleness. Furthermore, the inclusion of lead meant the material was always prone to hot-short. This ultimately caused material failure and fragmentation.

Unlike Experiments 1 and 3, heating the axeheads first was successful in achieving separation of the cutting-edge from the main body of the axeheads. Axehead 1.6 broke unevenly across the internal socket aperture (Fig.4.29), whilst Axehead 1.3 broke above this point leaving about 45mm of the socket above the aperture. However, Experiment 2 failed to crush the sockets of the axeheads. Although the surviving socket on the cutting-edge of Axehead 1.3 was slightly compressed, the high temperatures meant both replica sockets fragmented rather than plastically deformed. Lower temperatures may achieve

Fig.4.29: The broken lower body and cutting-edge of Axehead 1.6 (source: Author)

the desired effect as indicated by the compression of Axehead 1.5 in Experiment 3.

The hammer blows left on all the replicas are more pronounced than the South West examples studied, potentially indicating a finer hammer or a hammer of a different material was used in prehistory. Extensive associated cracking around the breakage on Axeheads 1.3 and 1.6 could also be observed, which might be attributed to the size of the hammer or alternatively the heat at which the axeheads were broken; higher temperatures may have caused more extensive fracturing. Meanwhile, the methods used in Experiments 1 and 3 were less effective, which appears to be a consequence of not heating the replicas, as well as using inappropriate tools; the unhafted granite hammerstone was especially ineffective.

Through these experiments it was difficult to identify the impact of metallurgical composition on breakage patterns. One indicator may be the number of fragments produced: Axehead 1.6 broke into ten fragments whilst Axehead 1.3 broke into seventeen. The higher tin content in Axehead 1.3 may have increased the brittleness causing a larger number of fragments to be produced.

4.7.4a Comparisons with the archaeological record

It is difficult to parallel the results from Experiments 1 and 3 with archaeological artefacts because the limited deformation and fracturing combined with the extensive surface damage is not typically observed. By contrast, Experiment 2 was more successful at elucidating how some axehead fragmentation in the past was achieved. The breakage of Axeheads 1.3 and 1.6 just above the internal socket aperture can be considered similar (Fig.4.30), and the replica fragments have multiple parallels in some larger hoards (e.g. the Stogursey hoard, Somerset: TTNCM-F058), indicating that these were exposed to a sustained heat (Fig.4.31). The implications of this are discussed in Section 4.9.3 and further archaeological comparisons are drawn in the analysis of the metalwork from South West England (Chapter 9).

Fig.4.30: The broken lower body and cutting-edge of a socketed axehead from the Stogursey hoard, Somerset (TTNCM-F058uu) (source: Author courtesy of the South West Heritage Trust (Museums Service).

Fig.4.31: A comparison of the fragments of Axehead 1.3 with fragments of axeheads from the Stogursey hoard (TTNCM-F058) (Author courtesy of South West Heritage Trust (Museums Service)

4.8 The Deliberate Destruction of Swords and Spearheads

This section presents the experimental destruction of replica swords and spearheads alongside each other as these implements were both used in combat scenarios before attempting methods for damaging the objects. The Destruction Experiments involve the bronze hammer used to damage the socketed axeheads (see above) as well as a bronze chisel (Table 4.7; Fig.4.32). Like with the socketed axehead experiments, some of the swords and spearheads were heated in Neil Burridge's 'kiln' in order to assess the effect of temperature on fragmentation.

In this section, object rationales are presented ahead of the combat experiments, followed by Destruction Experiments 4-8. Like the socketed axehead experiments, it was hoped it would be possible to identify archaeologically comparable marks and characteristics on the resulting experimental sword and spearhead pieces.

Table 4.7: Details of the bronze chisel used in Destruction Experiments 4 and 8.

Tool	Dimensions (mm)			Material
	Length	*Width*	*Weight (g)*	
Chisel	216.6	54.0	390	Tin-bronze (12% Sn; 88% Cu)

Fig.4.32: The bronze chisel (source: Author)

4.8.1 Ewart Park Swords

The sword is the artefact most commonly found suffering prehistoric destructive practices. In Britain, no complete, undamaged sword has yet been recovered from a dryland context (Roberts *forthcoming*) with short mid-blade fragments often found. Similarly, when recovered from watery contexts, swords frequently show signs of deliberate damage such as bending and breakage (York 2002, 86-87). This suggests two possibilities:

1. Swords break more readily through accident than other objects – if this is the case then there appears to have been some significance in leaving the sword damaged rather than repairing or recycling it; or
2. Damaging swords was more common and perhaps more significant than damaging other object types.

The Ewart Park type (Fig.4.33) was chosen for its widespread distribution, with over a thousand known from Britain and Ireland (Colquhoun and Burgess 1988). Despite this, only 47 Ewart Park swords and fragments are known from thirty findspots in South West England. There are, however, numerous indeterminate sword fragments which likely represent a greater number of Ewart Park swords. Nonetheless, this is the most prolific sword-type in the region with most pieces seemingly indicating deliberate breakage (e.g. St Michael's Mount, Cornwall: NT-F001; and Long Bredy, Dorset: DCM-F024). This reflects the situation across the country: of the 411 Ewart Park swords from Britain depicted by Colquhoun and Burgess (1988), 253 (or 61.5%) are broken or damaged.

The four replicas were based upon an incomplete Ewart Park sword from St Erth Hoard I, Cornwall (Fig.4.34; RCM-F037a). This hoard dates to c.1000-800 BC and contains 27 pieces of broken metalwork, four of which refit to form the hilt and upper blade of a sword. The remaining fragments comprise socketed axeheads, a socketed gouge, another sword, and several ingots. Much of the Ewart Park sword is absent and the surviving pieces are corroded; a complete example thus had to be reconstructed by Neil Burridge based on the surviving pieces and complete examples elsewhere. The decision to replicate this incomplete example rather than a complete one was partly due to the availability of the material for study as well as the evidence that this sword had been deliberately fragmented, which offered the opportunity to test methods for reproducing comparable damage.

Fig.4.33: A Ewart Park sword from Cranborne I, Dorset (BM-F016) (source: Author courtesy of the British Museum)

Fig.4.34: The St Erth Hoard I sword (RCM-F037a) (source: Author courtesy of the Penlee House Gallery and Museum)

The fragmentation of the sword bears no associated marks such as impact marks or bending. From the pilot experiments, it can be suggested that this is because the sword was broken when hot, but by trying to replicate the fragmentation of an archaeological example which was broken in certain places the potential for controlling the damage inflicted upon the sword can be explored.

The experiments involving swords thus sought to investigate damage a sword might sustain through use in a combat scenario, as well the processes by which it may be bent or broken.

4.8.2 Barbed Spearheads

Barbed spearheads are frequently found in damaged and incomplete conditions across Britain (Burgess et al. 1972; Davis 2015). These spearheads are defined by long or short broad blades with projecting barbs at the base of the blade (Fig.4.35). Damage includes single piece breakages (e.g. the removal of the tip), crushing and fragmentation. These objects were predominantly produced during the Blackmoor phase of the Late Bronze Age (c.1020-920 BC) (Davis 2015, 191). Although finds of this object type are not common in South West

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Fig.4.35: Complete and broken barbed spearheads from the Broadness hoard, Kent.
Not to scale (source: Davies 2015, Pl.122)

England, those that are found demonstrate signs of deliberate destruction (e.g. Stogursey, Somerset: TTNCM-F058b5-d5). Of significance is the Bloody Pool hoard, Devon (Fig.4.36; RAMM-F005) which presently constitutes the only pure weapon hoard in the region.

This hoard contained three barbed spearheads, represented by five fragments, alongside an incomplete plain pegged spearhead, and four ferrule fragments. Only two of the five barbed spearhead fragments and two of the four ferrule fragments now survive with the lost pieces depicted in drawings; it is suspected that the spearheads were deliberately broken. After breakage, the hoard was deposited in a bog, which contributes to the potential significance of this activity. The replica spearheads were based on examples from this hoard to explore deliberate destruction directly comparable to archaeological examples. Due to the incomplete spearhead fragments, a complete example was reconstructed by Neil Burridge based on a thorough observation of the surviving pieces, as well as complete examples.

Similarly to the replica swords, these spearheads were involved in combat and destruction experiments to explore the types and extent of damage that might be sustained.

Fig.4.36: The Bloody Pool hoard, Devon (RAMM-F005) (source: Author courtesy of the RAMM, Exeter)

4.8.3 Combat Experiments

In July 2016, experiments were conducted investigating the effectiveness and endurance of two Ewart Park swords and one barbed spearhead. Previous experiments have adequately demonstrated the complexities in the use of swords and spears (cf. Anderson 2012, 90-93; Molloy 2006, Ch.8), so the present experiments focused instead on exploring how objects may have suffered damage through use in the past to contribute to the wider investigation of understanding deliberate destruction. The implements were subjected to both appropriate and inappropriate actions that could simulate accidental misuse and damage during a combat incident in the past. The results of these experiments thus assist in identifying damage that might occur unintentionally but which might otherwise be considered deliberate when studying archaeological artefacts (e.g. notching or bending).

If damage comparable with the prehistoric examples were sustained during use then ancient damage could be linked with usage rather than intentional damage or destruction. There are many reasons why bronze objects may have broken in the past though, with use putting strain on the material over time; some breakage might be the result of metal fatigue and material failure over a period of extended use, or casting flaws might encourage an object to break. The experiments presented here are short periods of use whilst breakage through metal fatigue is likely to have occurred over a longer period of time that is not replicated here. This is a limitation of this experiment and must be considered when interpreting the results. Nonetheless, an analysis of evidence of mis-use and accidental damage will be informative in developing the methodology for identifying and interpreting damage in Chapter 5.

4.8.3a The Combatants and Use of the Objects

A key factor in any experiment utilising replicas is the prior experience of the participants as this can affect the way the objects are used (Callahan 1999, 5). Together the two volunteers (T. Chadwick and K. Lake) possessed eighteen years of weapons and stage combat experience. Even though they were not familiar with Bronze Age weapons they understood the implements conceptually and how one may have used each object. Safety regulations dictated that the combatants be suitably protected. Tom Chadwick wore replica medieval chainmail armour and a helmet with thick leather gloves whilst Kelly Lake wore a motocross jacket, paintball helmet and steel wool gloves (Fig.4.37). Whilst this protection slightly restricted the movement of the combatants, it ensured the experiments were conducted safely.

Past experiments were consulted to consider the most appropriate strikes (e.g. Anderson 2012; Molloy 2006; Skallagrim 2014). Ewart Park swords are considered effective as a cutting and slashing weapon based on the form and weight of the object (see Molloy 2006, 94-96, 177-180). Meanwhile, the size and weight of the spear inclined the volunteers to suggest it was more likely a thrusting weapon rather than thrown as a javelin. The combatants' greater familiarity with swords rather than spears, as well as safety restrictions surrounding thrusting the spears towards combatants, meant a greater number of actions were undertaking involving the swords than spears.

Ideally, the objects would have been tested against a replica Bronze Age shield which may have been used against this sword but one could not be obtained. Instead, Tom Chadwick provided a kite-shaped Medieval shield; this shield was made of 3-4 thin layers of curved planks of ash wood coated with linen on the front and with rawhide leather around the rim. Despite archaeological inaccuracies, this offered a shield model against which to test the effectiveness of the swords and to identify damage that might be sustained through use against a wooden shield.

Fig.4.37: The combatants in safety gear using the replica swords (source: Author)

4.8.3b Experimental Combat Procedure

Aim: To produce use-related damage that could be compared with archaeological specimens.

Setup: Combatants in protective gear and swords were held one-handed either with all fingers wrapped around the handle or with the index finger extended and resting on the ricasso notch (Figs.4.38, 4.39). The extended finger allowed greater control over the manoeuvring of the sword, whilst a full grip maximised the power that could be exerted (see Molloy 2006, 178). The spear was held two-handed.

Fig.4.38: The sword grip with all fingers wrapped around the handle (source: Author)

Fig.4.39: The sword grip with one finger extended and resting on the ricasso notch (source: Author)

Objects and Equipment Used: Swords 2.1 and 2.2 (both 9% tin; 1% lead); Spearhead 3.1 (10% tin; 2% lead); replica Medieval shield.

Actions: A variety of actions were conducted involving more traditional edge-on-edge strikes, as well as inappropriate actions involving the flat of the sword blades and the body of the spearhead (summarised in Table 4.8). Actions were conducted at differing forces (e.g. full strength, half strength) and angles (e.g. overhead, side swing). These actions are inevitably conditioned by the individuals wielding the implements and thus precise forces and angles could not be measured, but ensured a realistic set of bodily actions.

Table 4.8: Actions involved in the combat experiments

Sword Actions	Spear Actions
Edge-on-edge	Overarm throw
Edge-to-flat (of the blade)	Sword edge-to-spear edge
Flat-to-flat	Sword edge-to-spear flat
Edge-to-shield rim	Sword edge-to-shaft
Flat-to-shield rim	
Edge-to-shield face	

Safety regulations constrained the extent this could be explored with thrusts and swinging blows towards individuals forbidden. Instead, the volunteers concentrated on simple edge-on-edge motions (Fig.4.40), supplemented by deliberate misuse of the swords which might have occurred unintentionally in combat. Mistimed or misplaced strikes may have caused damage, such as edge damage or bending, that are identifiable in the archaeological record. Although difficult to predict and explore, it is important to consider that even in the past the expertise of the individuals wielding the swords likely varied making it conceivable that some swords may display signs indicative of individuals misusing their weapons due to inexperience or accident. Furthermore, weariness over the course of combat may also have factored.

Fig.4.40: The combatants recreating an edge-on-edge strike (source: Author)

4.8.3c Outcomes and Observations of the Combat Experiments

The experiments caused various use-related damage on the swords and spear. A summary of the actions and damage-sustained is presented in Table 4.9. Both swords 2.1 and 2.2 suffered edge damage and became bent during the experiments (Fig.4.41), whilst only minimal damage was inflicted on Spearhead 3.1.

Initial edge-on-edge strikes between the swords caused small, shallow nicks (c.0.5mm deep) on both swords over about 32mm of the blade edge (Fig.4.42). The force of the strikes was increased as combatants became more confident resulting in greater plastic deformation of the sword edges.

Table 4.9: A summary of the actions undertaken as part of the combat experiments and the damage sustained

Action	Damage
Soft blows, edge-on-edge, Sword 2.1 hitting Sword 2.2	Swords 2.1 and 2.2: Small 'v-shaped' nicks c.0.5mm deep over a 32mm spread (Fig.4.42)
Edge-on-edge, Sword 2.2 held out with Sword 2.1 swinging down (Soft)	Swords bit into each other causing tearing/bowing of Sword 2.2 and u-shaped notch (1.6x1.1).
Edge-on-edge, Sword 2.2 held out with Sword 2.1 swinging down (Hard) – Disarmed combatant	Tearing of metal, U-shaped notches on both swords. Sword 2.2 notch: 4.5x2.5 (Figs.4.43; 4.44)
Sword 2.2 swung across at upright Sword 2.1	Glancing strike, left no significant mark
Edge-on-edge, Sword 2.2 swinging down at Sword 2.1 (Hard)	Sword 2.2: shallow u-shaped notch
Edge-on-edge, Sword 2.1 down onto Sword 2.2	Sword 2.1 bit into damage previously sustained on Sword 2.2 expanding a u-shaped notch and causing tearing (2.7x2.7mm)
Sword 2.1 swung down, Sword 2.2 swung up – limited damage to both blades (slightly glancing) – not as hard	Sword 2: 'U-shaped' notch: 3.8x1.2mm
Flat-on-flat, Sword 2.1 down onto Sword 2.2	Sword 2.1 bent to c.4°; Sword 2.2 bent to c.6°
Both swords bent back into shape over the knees of the combatants.	No visible marks (Fig.4.45)
Sword 2.1 edge onto Sword 2.2 flat	Scar across flat of Sword 2.2 (27.7mm long, bowing of edge) (Figs.4.46; 4.47); Sword 2.2 bent in both directions (Fig.4.48); Flattening of Sword 2.1 edge
Sword 1 onto shield rim	Cut into shield c.5mm
Sword 2.1 soft edge-strike on wooden shield	Some damage to paintwork and marks on shield; limited damage to Sword 2.1
Sword 2.1 flat versus shield edge	10° transverse bend (Fig.4.49)
Spearhead 3.1 thrown three times; max reach was c.10 metres	No significant damage; dug into ground on second throw causing slight blunting of the tip
Sword 2.1 edge swung down onto spear edge	Deep tearing sword edge; V-shaped notching on Spearhead 3.1 (Fig.4.50)
Sword 2.1 edge swung down onto Spearhead 3.1 obverse face	Sword scar left along face of Spearhead 3.1 (Figs.4.51; 4.52; 4.53); Sword edge flattening (Fig.4.54)
Sword 2.1 edge swung down onto spear shaft	Initial notch created in shaft, second strike broke shaft

A downward swing of Sword 2.1 onto the edge of Sword 2.2 disarmed one of the combatants and caused tearing and material displacement of both blade edges (Figs.4.43, 4.44). Further edge flattening was caused by subsequent side strikes of Sword 2.1 against the wooden face of the shield and the face of the spearhead (see below), whilst downward strikes against the leather shield rim caused little damage to the edge but cut into the shield about 5mm.

Fig.4.41: The condition of Swords 2.1 and 2.2 following the experiments (source: Author)

Fig.4.42: Small notches on Sword 2.1 (c.0.5mm deep) (source: Author)

Fig.4.43: Paired edge-on-edge damage causing deep notching on Sword 2.2 (top) and Sword 2.1 (bottom) (source: Author)

Fig.4.44: Notching on the edge of Sword 2.2 (source: Author)

Three less conventional tests were conducted using the flat of the blades to explore inappropriate (and potentially accidental) use of the swords. The flat of both blades were swung against each other, causing minor transverse bowing as the swords curved over each other. This bending was rectified in the field by straightening over the knees of the combatants (Fig.4.45). No residual marks were left. The second test involved swinging the edge of Sword 2.1 down onto the upwards swing of the flat of Sword 2.2 in a simulated parry, which caused edge-flattening on Sword 2.1 and produced a negative scar on the flat of Sword 2.2, bowing the edge (Figs.4.46; 4.47). Additionally, Sword 2.2 transversely bent in both directions causing a wave-like profile (Fig.4.48). Finally, the flat of Sword 2.1 was struck down against the leather rim of the shield as the shield was moved up to parry the incoming strike, causing the sword to transversely bend (Fig.4.49).

Meanwhile, experiments involving the spear caused limited damage. Throwing Spearhead 3.1 as a javelin produced no significant damage, whilst strikes against Sword 2.1 produced damage that was not comparable with the archaeological specimens. Sword strikes to the spear edge caused some notching, tearing and bowing of the edges (Fig.4.50). A sword strike against the spearhead body caused a long negative scar (32.9mm long) across the spear up to the midrib (Fig.4.51) which deflected much of the blow and there are remnants of the blow on the opposite spearhead edge where the spear slightly rolled at impact (Fig.4.52). The spearhead edge also became bowed from this action (Fig.4.53) and the sword edge flattened where it made contact (Fig.4.54). This demonstrates the effectiveness of parrying a sword with such a weapon as well as its resilience to breaking under duress. Further strikes to the spearhead were not undertaken because none of the marks left so far had been archaeologically comparable. Final strikes were taken against the wooden shaft which proved weak and broke after two strikes from the sword. However, weaknesses in the wood probably encouraged the breakage. Moreover, the tip of the shaft was not fire-hardened as it may have been in prehistory.

Overall, these combat tests with the spears had a limited effect on enhancing our understanding of how such spears may have been used or, more importantly, how they might be broken. More skilled combatants may have enabled greater insight into these spears as well as the involvement of hunting simulations to explore the range of motions possible with this spear.

Fig.4.45: Tom Chadwick correcting the bend on Sword 2.1 by applying pressure over his knee (source: Author)

Fig.4.46: A negative scar left on the flat of Sword 2.2 from Sword 2.1 (source: Author)

Fig.4.47: A side profile of Sword 2.2 showing edge bowing caused by Sword 2.1 striking the flat of the blade (source: Author)

Fig.4.48: Sword 2.2 transversely bent in both directions following a strike to the flat of the blade from Sword 2.1. The arrow indicates the point of contact (source: Author)

Fig.4.49: Transverse bending on Sword 2.1 after contact with the rim of the shield (source: Author)

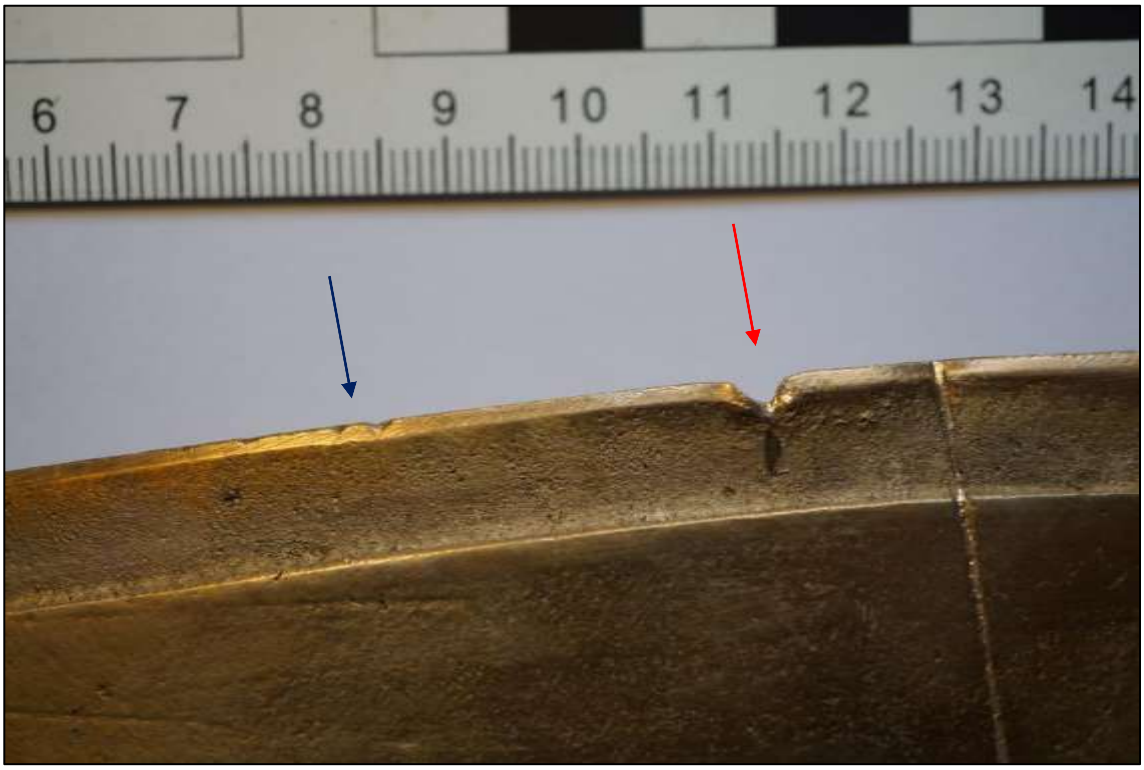

Fig.4.50: Notching on the edge of Spearhead 3.1 (red arrow) and rebound chips (blue arrow) (source: Author)

Fig.4.51: A scar left on the flat of Spearhead 3.1 following a sword strike (source: Author)

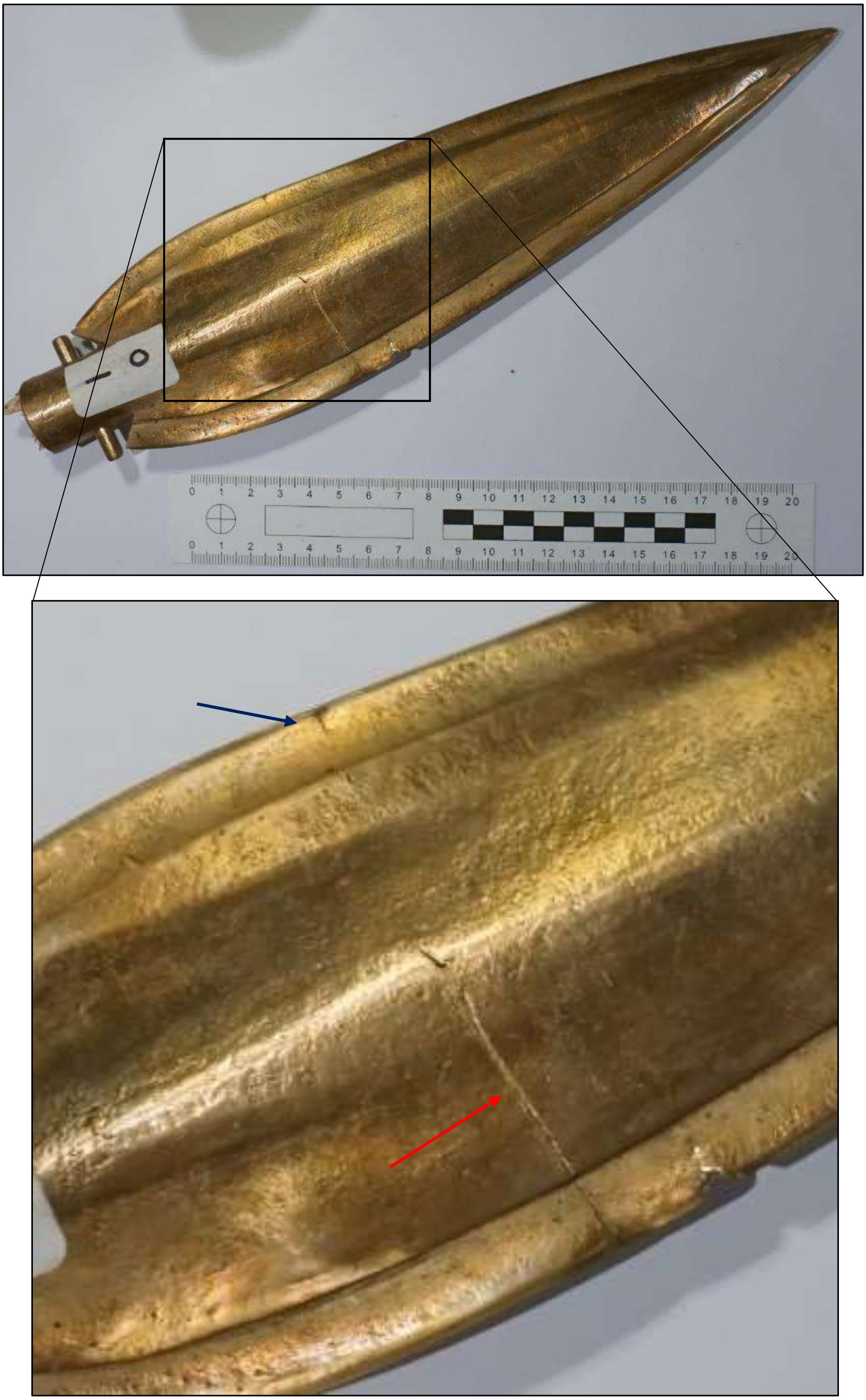

Fig.4.52: The negative scar on Spearhead 3.1 (red arrow) and the rebound damage onto the opposite edge (blue arrow) (source: Author)

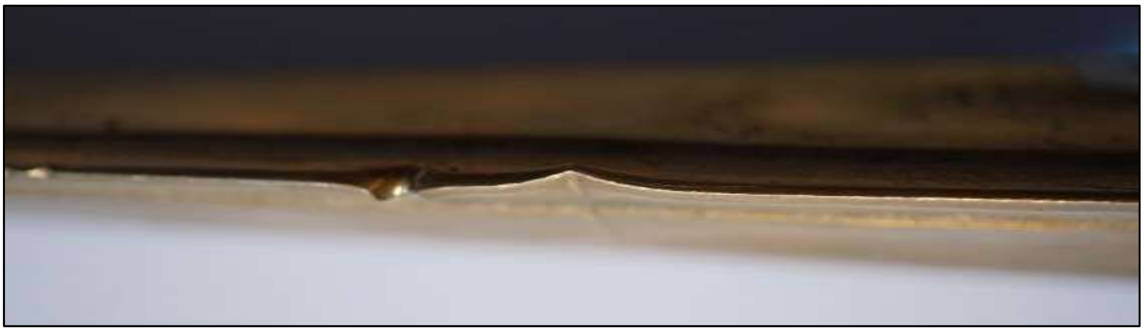

Fig.4.53: The bowed edge of Spearhead 3.1 linked with the negative scar (see Fig.4.35) (source: Author)

Fig.4.54: The flattened edge of Sword 2.1 after contact with Spearhead 3.1 (source: Author)

4.8.3d Discussion

Although brief, the combat experiments offer some important aspects in considering prehistoric use-related damage. Firstly, during the experiments, the sharpened sword edges became increasingly dull and initially shallow nicks or notches became deeper as latter strikes caught in the same location. Although the shallow damage is comparable to the archaeological examples, the deep notching and tearing of the sword edges is rarely seen to the extent sustained on the replicas. This suggests several possibilities:

1. Prehistoric edges were harder than the replica edges and thus more resilient to damage.
2. Prehistoric swords were not utilised in similar ways to those presented in these combat experiments. Edge-on-edge combat may have been deliberately limited in the Bronze Age to preserve the swords.
3. Damage inflicted to blades and blade edges in prehistory could have been repaired prior to deposition. Upon presenting the replica damage to Neil Burridge, he suggested that much of it could be repaired, which would leave only limited evidence that such damage had ever been inflicted. This could infer prehistoric maintenance practices.

As it is typically considered that at least some edge-on-edge combat was conducted (e.g. Bridgford 1997; 2000; Colquhoun 2011; Kristiansen 2002;

Molloy 2011) and evidence of this is visible through small nicks and notches on prehistoric blades, it is perhaps most likely that the edges of the replicas were simply not hardened enough. Both Anderson (2012, 84) and Molloy (2006, 177) hardened the edges of their swords twice, with a process of annealing in between that would strengthen the edges against more severe damage. Additionally, there is repeated evidence of repairs undertaken upon broken swords (e.g. a sword from near Weymouth; Fig.4.55) and thus it is likely that edge damage was also repaired though this would be less archaeologically visible. An investigation of the microstructure of bronze edges may, however, be able to give some insight into the biography of working and repairs. The issue of edge-hardening should also be considered in relation to the spearhead edge-damage, which could not be compared with archaeological artefacts.

Significantly, despite abusive testing neither the swords nor spearhead broke during the experiments though the short nature of the combat means this is unsurprising. One might anticipate that extensive use over a long period would cause breakage like that seen on many archaeological examples (e.g. tip and hilt breakage) because of material failure.

Fig.4.55: A repaired break on a Wilburton sword from Near Weymouth, Dorset (ASH-F007b) (source: Author courtesy of the Ashmolean Museum)

The bending of the sword blades is particularly interesting in this respect as much of what was sustained might be considered deliberate if found on a prehistoric example. The transverse bending sustained through deliberate misuse in the experiments may have occurred through accidental misuse in prehistory. Although in an experimental context one could take the time to correct the bend, it is unlikely that one's opponent would allow the opportunity to fix the sword mid-combat and it would be in the combatant's best interest not to sustain such damage. Comparable bowing and bending of the blade can nonetheless be observed on several British examples presented by Colquhoun and Burgess (1988) though this is often associated with blade breakage. Furthermore, there are two examples of Wilburton swords found with a wave-like profile (Fig.4.56), resembling a similar effect to that seen on Sword 2.2 which was caused by parrying a sword edge with the flat of the blade.

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Fig.4.56: Two swords from the River Thames with wave side-profiles (source: Colquhoun and Burgess 1988, nos.197, 220, Pls.32, 35)

Anderson (2012, 89) also achieved transverse bending of an experimental sword in both directions after several strikes against the leg bone of a pig carcass demonstrating the variety of ways this bending might be achieved. The flats of the blades of Swords 2.1 and 2.2 were not work-hardened which may have decreased the likelihood of a sword suffering transverse bending through some of these actions, but could increase the likelihood of breakage.

Overall it is clear that further work exploring use-related damage on swords and spearheads is required, involving a more rigorous set of actions and a greater range of strikes against more materials, including bone and wooden targets.

4.8.4 Destruction Experiment 4: Hot-shorting a Sword

Aim: To explore the use of a hammer and chisel for controlling the size of the fragments when breaking a heated sword.

Setup: Sword heated and held at a downward angle with the tip projecting over a wooden block (Fig.4.57).

Objects and equipment used: Sword 2.2 (9% tin; 1% lead); a hafted bronze hammer; an unhafted chisel; a portable ‘kiln’; temperature probe.

Actions: The wooden hilt was removed from the sword to reduce the amount of smoke when heating the sword. The sword was heated in the ‘kiln’ to a target temperature of 500-600°C and then struck with a hammer and chisel. Blows were delivered from the elbow and aimed at the area were the sword projected from the wooden block. The sword was moved along as it broke.

Outcomes and observations: This method was successful in fragmenting the sword into twelve fragments (Fig.4.58). The sword was removed from the ‘kiln’ for fragmentation after forty minutes having reached a recorded temperature of 575°C. Few strikes were required to fragment the sword initially, and while additional strikes were required as the sword cooled, the object remained brittle and it was possible to hot-short the sword.

The chisel allowed greater control over where strikes were placed and allowed a concentrated point of impact. During fragmentation, it was necessary to strike the sword over the edge where it lacked support underneath; strikes to the projecting area were more successful than those to the area on the wooden block. Breaking the hilt tang could not be achieved with the chisel; instead the hammer was struck against the hilt directly, which resulted in fragmentation.

Fig.4.57: Experiment 4 using a hammer and chisel on Sword 2.2 (source: Author)

Fig.4.58: Sword 2.2 after fragmentation (source: Author)

4.8.5 Destruction Experiment 5: Bending an Unheated Sword

Aim: To understand the extent to which a bronze sword might be bent before breakage.

Setup: Sword placed with the middle over the author's knee.

Objects and equipment used: Miscast Ewart Park sword (12% tin; 88% copper) donated to the project (Fig.4.59).

Actions: Pressure applied using the author's hands to both the hilt and tip ends simultaneously, moving the sword along as pressure was applied to reduce intensive stress in any one location (cf. Bietti Sestieri 2013, 167-169; see also Pilot Experiment 2 in Appendix C.3)

Outcomes and Observations: The sword was bent into a U-shape without breaking it or causing any stress fractures (Fig.4.60). However, the hilt was too thick and offered too little leverage to bend this section of the sword.

Fig.4.59: The as-cast sword used in Experiment 5 (source: Author)

Fig.4.60: The as-cast sword after Experiment 5 (source: Author)

4.8.6 Destruction Experiment 6: Hammering a Sword to Cause Plastic Deformation

Aim: To explore whether hammering a bronze sword to bend it would cause material failure and breakage, contrasting the gentle pressure applied in Experiment 5.

Setup: Sword positioned over a wooden block.

Objects and equipment used: Sword 2.3 (8% tin; 2% lead) (Fig.4.61); a hafted bronze hammer.

Actions: Blows were delivered to the projecting sword blade and it was gradually moved over the edge and continually hammered (Fig.4.62).

Outcomes and Observations: The sword was broken into seven fragments (Fig.4.63). Hammering the projecting blade caused the sword to bend into a broad curve though there were no macroscopic signs of material weakness. The sword was then turned over and hammered back on the curve into a wave-like profile (Figs.4.64, 4.65). This process caused scuffs to the surface and some bowing of the edges, but there were no impact marks that might be archaeologically recognised. Eventually different sections of the sword had to be hammered and bent back and forth three or four times before the sword began to fracture.

Fig.4.61: Sword 2.3 before Experiment 6 (source: Author)

Fig.4.62: Hammering Sword 2.3 in Experiment 6 (source: Author)

Fig.4.63: Fragmentation of Sword 2.3 after Experiment 6 (source: Author)

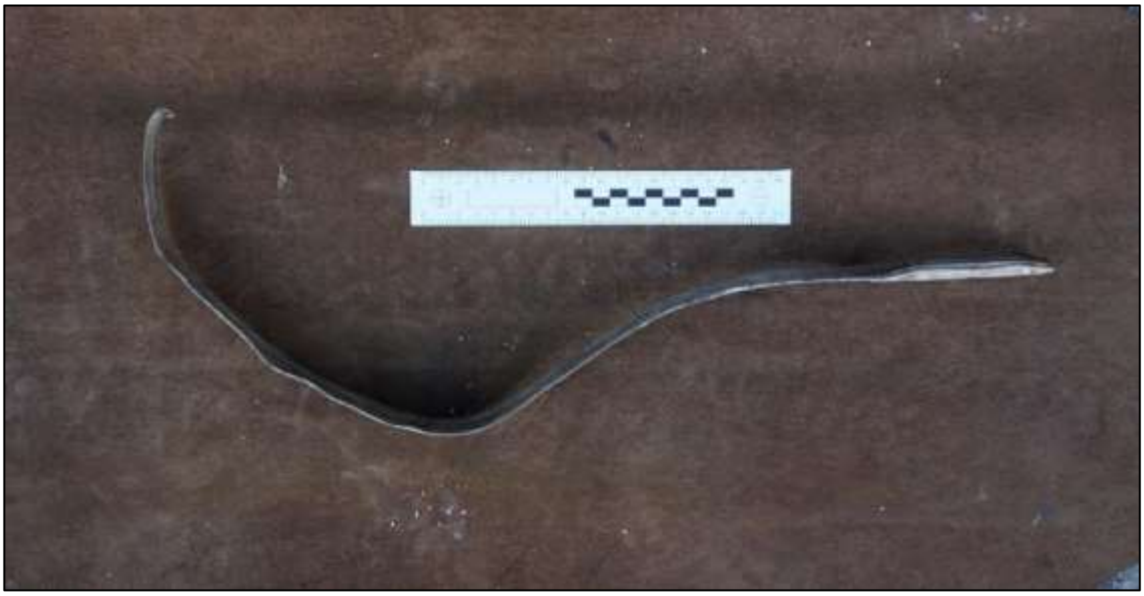

Fig.4.64: Side profile of Sword 2.3 in Experiment 6 (source: Author)

Fig.4.65: Plastic deformation of Sword 2.3 in Experiment 6 (source: Author)

4.8.7 Destruction Experiment 7: Striking a Heated Spearhead

Aim: To break a heated spearhead.

Setup: Spearhead heated and held at a downward angle with the tip projecting over a wooden block.

Objects and Equipment Used: Spearhead 3.1 (9% tin; 2% lead); a hafted bronze hammer; a portable 'kiln'; a temperature probe.

Actions: The spearhead was heated in the 'kiln' to a target temperature of 500-600°C and then struck with a hammer. Blows were delivered from the elbow and aimed at the area were the spearhead projected from the wooden block. The spearhead was moved along as it broke (Fig.4.66).

Outcomes and Observations: The spearhead broke into three pieces with few strikes and minimal effort (Fig.4.67). It was removed from the kiln after thirty minutes at a recorded temperature of 560°C and broke unevenly at approximately the point where the spearhead became unsupported by the wooden block. Therefore, breakage was broadly controllable depending on how far the spearhead was protruding.

There are only limited indicators of the hammer blows on the pieces with no associated damage. On the piece that required two strikes to separate the midrib was slightly flattened and scuff marks were left on the surface of the bronze (Fig.4.68); how archaeologically visible this would be is uncertain.

Fig.4.66: The heated fragmentation of Spearhead 3.1 in Experiment 7 (source: Author)

Fig.4.67: Spearhead 3.1 after fragmentation in Experiment 7 (source:

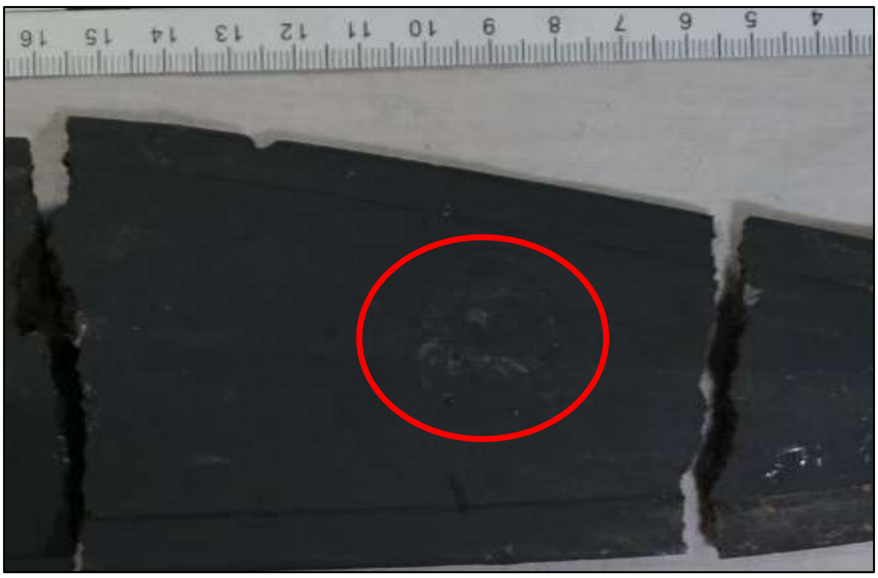

Fig.4.68: Minor scuff marks on surface of a piece of spearhead 3.1 (source: Author)

4.8.8 Destruction Experiment 8: Striking an Unheated Spearhead

Aim: To explore how easily an unheated spearhead could be broken and crushed.

Setup: Spearhead positioned on a wooden block.

Objects and Equipment Used: Spearhead 3.3 (9% tin; 2% lead); a hafted bronze hammer; an unhafted chisel.

Actions: The spearhead was struck with a hammer and chisel against the wooden block, with the chisel initially lined up over the casting hollow in the spearhead (Fig.4.69). The object was then hammered without the chisel.

Outcomes and Observations: The spearhead was broken into eight fragments (Fig.4.70). When using the chisel, it bit into the blade and the wall caved into the socket hollow but marks were only left on the blade wall and not on blade edges due to the concentrated area of impact (Fig.4.71). Sustained chiselling using this method proved ineffective at breaking the spearhead but chisel marks were easily identifiable on the blade.

Spearhead 3.3 was then struck directly with the bronze hammer to bend the tip projecting over the edge of the block, which caused the spearhead to bend to almost 90° before eventually breaking over the chisel marks, which had caused a weak point in the metal for fragmentation (Figs.4.72, 4.73). It was clear that this method lacked the effectiveness of heating the spearhead.

Hammering along the blade and socket caused the object to become crushed (Fig.4.74) and the socket fragmented (Fig.4.75). This was followed by additional cracking along the blade faces. The lower blade eventually split and fragmented due to material failure though it was difficult to break the larger section of body, which was crushed completely (Figs.4.70, 4.76).

Fig.4.69: Positioning the chisel on Spearhead 3.3 for Experiment 8 (source: Author)

Fig.4.70: Spearhead 3.3 after Experiment 8 (source: Author)

Fig.4.71: Chisel marks across the blade of Spearhead 3.3 (source: Author)

Fig.4.72: Transverse bending of the tip of Spearhead 3.3 after hammering (source: Author)

Fig.4.73: Breakage of the tip of Spearhead 3.3 after hammering (source: Author)

Fig.4.74: Hammering and crushing of Spearhead 3.3 along the socket and blade (source: Author

Fig.4.75: Further hammering and crushing causing cracks around the socket of Spearhead 3.3 (source: Author)

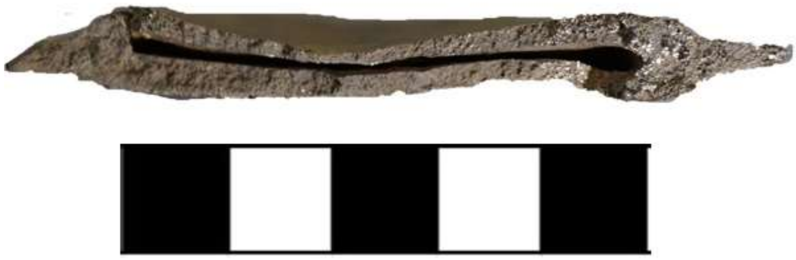

Fig.4.76: The crushed lower body of Spearhead 3.3 after Experiment 8 (source: Author)

4.8.9 Discussion of the Sword and Spearhead Destruction Experiments

The sword and spearhead experiments raise a series of important factors. Like the destruction of socketed axeheads, heated fragmentation was the most effective method for breaking the swords and spearheads. Temperatures between 500 and 600°C enabled the author to break the objects efficiently, with minimal effort and little associated deformation. By contrast, Experiments 6 and 8, in which Sword 2.3 and Spearhead 3.3 were not heated, demonstrated that extensive plastic deformation is caused, including bending and crushing, as well as damage to the surface of the objects.

Upon analysis of Sword 2.3, it was clear these fractures are not as clean as those resulting from heated fragmentation and the fragments do not refit as easily which is likely due to the loss of small fragments of bronze. This experiment was limited by two significant factors which were the lack of work-hardening and, like Experiment 1, the lack of a clamp to hold the object securely. The work-hardening would have meant the bronze was harder yet more brittle and therefore less plastic to begin with, whilst a clamp would have concentrated the apex of the bending and the force being delivered into the sword, possibly resulting in a quicker, easier breakage. However, plastic deformation of the sword was achieved in a manner not yet seen on a heated sword i.e. a wave-like profile. Similar effects were demonstrated when striking a heated tin-bronze sword in the pilot experiments (Appendix C.5), but the composition of that artefact differed. It is possible that swords demonstrating signs of bending and breakage in the archaeological record may not have been heated prior to fragmentation. However, Hardman's (2016) experiments showed that tin-bronze will bend to different degrees before breaking at varying temperatures so bent and broken artefacts could clearly be the result of either. Further experiments are needed to clarify this.

The impact of casting quality on the disposition of an object to break was also explored in these experiments. Most of the objects produced were of high casting quality, ensured by the skill of Neil Burridge. However, Experiment 5 involved bending a mis-cast sword. Ahead of the experiment, it was predicted that it would be difficult to bend this sword without causing breakage because of the porosity of the casting, evident from the surface condition of the sword. However, this experiment demonstrated the overall plasticity of even miscast tin-bronze, which is useful for understanding its likelihood of deforming rather than breaking under pressure. A key limitation of this experiment though, like that in Appendix C.3, is the lack of hardening that has been undertaken which would increase the brittleness of this metal making it more liable to material fatigue and breakage under this strain.

These destruction experiments also explored the use of different tools, specifically the involvement of a chisel. As noted above, this allowed some control over the fragmentation process of Sword 2.2 in Experiment 4, though was not essential for achieving breakage; striking the hilt directly with the hammer achieved similarly effective fragmentation. Interestingly, mis-hits with the chisel that did not fragment the sword left chisel marks on the blade, though successful strikes (i.e. those where the sword fragmented upon impact from the chisel) left no evidence that a chisel had been used to fragment the blade (Fig.4.77). Skilled metalworkers thus may not leave any chisel marks or have no need for a chisel at all.

Fig.4.77: A fragment of Sword 2.2 with chisel marks at one break (red arrow) but not at the other (blue arrow) (source: Author)

By contrast, Experiment 8 showed that a chisel had limited effect in breaking Spearhead 3.3, though created a useful weak point which could be exploited to break the object through hammering and bending. The limited effect of the chisel meant the aim of Experiment 8 was changed during the process to involve only the hammer. Breaking an unheated spearhead ultimately required more effort than that exerted in Experiment 7 though still only took twenty minutes with no prior skill involved. If fragmentation of a spearhead could be achieved without utilising fuel then it is possible that economic factors may have influenced how objects were fragmented. Alternatively, minimal heating (e.g. to 100°C) might aid the fragmentation process, still producing marks consistent with hammering and crushing the spearhead. Further experimentation with the effects of temperature on the objects would be useful to understand these elements better. Overall, however, this fragmentation process offers key insights into the potential effects of conducting crushing and fragmentation cold and offers a basis from which further experiments might be developed.

4.8.9a Comparisons with the archaeological record

These experiments offer the opportunity to directly compare the replicas with the broken artefacts on which they were based. From this, one can begin to suggest how the artefacts were broken in the past. The fragmentation of the St Erth sword and Bloody Pool spearheads was hypothesised to have been deliberate; these experiments not only confirm this theory, but also demonstrate how this was likely achieved.

The heated fragmentation of Sword 2.2 in Experiment 1 is most closely comparable with the St Erth sword fragments upon which it was based. There is similar breakage over the hilt tang through the rivet holes (Fig.4.78) and while an exact parallel was always unlikely, the similarity in results illustrates that heating and striking the sword was the process by which the St Erth I sword was broken. The lack of chisel marks on the surviving pieces could suggest that either chisel strikes were successful first time, or that no chisel was used.

Fig.4.78: A comparison of Sword 2.2 (top) and the St Erth I sword fragments (bottom) (source: top: Author; bottom: Author courtesy of the Royal Cornwall Museum)

Likewise, the breakage of Spearhead 3.1 through the blade walls and the clay core in Experiment 7 is the most directly comparable result with the Bloody Pool spearheads (Table 4.10; Fig.4.79). There can be little doubt that the Bloody Pool spearheads were broken in the method demonstrated in this experiment.

Table 4.10: A comparison of the dimensions of the replica broken spearhead piece and a spearhead piece from the Bloody Pool hoard, Devon (RAMM-F005b)

Dimensions (mm)	Replica lower blade and socket piece	RAMM-F005b
Length	94.9	93
Breakage W.	70.4	64.6
Breakage Th.	18.2	15.8
Socket Diam. Ext.	26.1x26.2	25.9x23
Weight (g)	223	121

Fig.4.79: A piece of Spear 3.1 (left) alongside a spearhead piece from the Bloody Pool hoard (right) (source: (left) Author; (right) Author courtesy of RAMM, Exeter)

By contrast, the extreme plastic deformation and surface damage on Sword 2.3 and Spearhead 3.3 is hard to parallel archaeologically, suggesting that the method of cold-hammering using a bronze hammer was considered inappropriate. However, the resulting spearhead fragments from Experiment 8 showed some characteristics observed on spearhead fragments in the

Stogursey hoard (Fig.4.80), possibly indicating that the breakage of unheated barbed spearheads also took place in the Bronze Age. Hammer marks and bowing of the surface can be seen on both the replica and the archaeological specimens, though it seems likely that a finer hammer with a smaller point of impact was used in prehistory.

Finally, comparisons for the bent mis-cast sword in Experiment 5 are difficult to find. Many swords illustrated in Colquhoun and Burgess' (1988) *Prähistoriche Bronzefunde* volume are bent, but these are also broken. The reason for this discrepancy between the replica sword and the archaeological artefacts might result from the higher plasticity of the replica sword, which is a consequence of the optimal tin-bronze composition and the lack of post-casting hardening and working. However, a bent, unbroken sword was recovered from Duddingston Loch, Scotland, alongside burnt and unbroken bronze objects (Callander 1922, 360–4). Experiment 2 means it is possible to suggest that implements like the Duddingston Loch sword were probably bent by hand while unheated.

Fig.4.80: A crushed and fragmented barbed spearhead fragment from the Stogursey hoard, Somerset (TTNCM-F058z4) (source: Author courtesy of the South West Heritage Trust (Museums Service)

4.9 Discussion

The research aims and hypotheses of the destructive experiments began from a simple question: how does one destroy a Bronze Age bronze object? The simplicity of this question was necessary as a concentrated set of destructive experiments has never been undertaken. The eight destructive experiments presented begin to answer this question, encompassing three different object types, and supplemented by the Pilot Experiments in Appendix C. For each object type it was possible to produce archaeologically comparable destruction whilst also demonstrating less likely ways in which damage may have been inflicted in the Bronze Age. This was further supported by combat experiments, which not only explored how objects might have been used but also how accidental damage may have been inflicted through ‘mis-use’. The experimental destruction thus offers the beginnings of a reference collection against which archaeological artefacts can be compared. As with any experiments there were limitations that must be considered; these are presented below followed by the key outcomes of the experiments.

4.9.1 Limitations of the Experiments

The main limitation of the experiments undertaken was the author’s lack of specific skills related to metalworking. This became evident during several of the experiments with difficulties in knowing how best to strike or secure the objects to achieve the most efficient and effective outcomes. However, this experience deficit was partly negated by firstly the pilot experiments working with experimenters at Butser Ancient Farm and the Montale Terramare archaeological park, and secondly by undertaking the experiments with the assistance of Neil Burridge. Mr Burridge was an invaluable source of expertise throughout the experiments and although destroying objects might not initially seem a skilful activity, knowledge of metalworking techniques, the properties of the material and a familiarity with the tools and technology is of great benefit to the processes. Furthermore, the lack of experience meant it was possible to highlight the skillsets that would have been necessary in the Bronze Age to achieve effective fragmentation.

Other limitations of the experiments included attempting to change too many variables at once. Therefore, whilst different experiments can be considered against each other, the results cannot be directly compared. In most of the experiments, both the method of destruction and the tool were changed, which meant that some research aims, such as the effect of metallurgical composition on breakage patterns, could not be fully explored. The lack of prior experiments into destruction was a contributing factor here. The relative infancy of these types of experiments meant that certain outcomes could not be predicted. For instance, the approach taken upon the unheated barbed spearhead during Experiment 8 was altered in reaction to the experiment as it was being undertaken. This meant it was necessary to react and alter experimental plans accordingly as different conclusions were drawn during the activities. However, as the first of their kind, these experiments illustrate the potential for future hypotheses to further explore deliberate destruction.

Finally, these experiments would benefit from a complementary set of laboratory experiments, designed to measure the forces applied and the hardness of the metal, followed by a set of metallographic analyses. This aspect was not considered in these experiments, but would allow some quantification of the results. For instance, hardness could be measured before and after breakage and compared with archaeological specimens to help determine the method of breakage and any differences between the working of the experimental and the archaeological pieces. Similarly, metallographic analyses of the resulting pieces looking at the microstructure would allow one to investigate the effects of temperature on the structure of the bronze. Laboratory investigations would ultimately allow more nuanced interpretations of the processes observed based on the microstructural properties of the bronze objects. This is a key element that should be furthered in future research (Section 11.3).

These limitations, however, did not prevent key conclusions being drawn, nor the advancement of better understanding prehistoric metalwork destruction.

4.9.2 Key Findings

The eight experiments conducted, as well as the combat experiments, present a series of conclusions, which have important implications for understanding the archaeological data (Section 4.9.3). These expand on those presented following the pilot experiments in Section 4.5.

1. Simulation of potentially unwanted or accidental strikes with two swords produced marks that might otherwise be considered deliberate (e.g. wave-shaped side profiles).
2. Prolonged exposure to heat (e.g. in a fire) causes the metal to become very brittle and thus extreme fragmentation occurs, such as seen in Experiment 2.
3. No signs of hammer marks could be observed on heated axeheads, swords or spearheads following fragmentation.
4. A chisel may have allowed controlled fragmentation of objects, such as swords, but it was not a necessary part of the process. Fragmentation of both heated and unheated objects could be achieved with a hammering tool.
5. The most effective method for breaking a leaded bronze object is by heating and striking it. This was true of all object types tested and results from the process called hot-shorting.
6. Breaking an unheated object required more effort and took longer than breaking a heated object, but was possible. However, it caused extensive surface damage and plastic deformation. Breakage of an unheated socketed axehead could not be achieved during these experiments.
7. The composition of the objects did not have discernible effects on breakage processes. However, the impact of composition could be observed on the heated swords broken in the pilot experiments (Appendix C).
8. An unworked, unheated sword could be bent with relative ease over one's knee to produce a U-shaped bend.

4.9.3 Implications for the Archaeological Record

The set of findings presented above encompass a range of observations, some of which require further investigation whilst others challenge basic assumptions that have been made about the material in the past. For instance, claims that "snapping of a sword blade across the knee" (Moyler 2007, 150) was easy can now be reconsidered. Similarly, Wiseman (2018, 43) has recently argued that some socketed axeheads remained intact in hoards because they were more difficult to fragment. This is certainly true if one had no means of heating the objects, but these experiments have shown that fragmenting a socketed axehead was relatively simple if one had the means to heat the objects first. As many of the other objects in the Late Bronze Age hoards considered by Wiseman (2018) show signs of heated fragmentation, it can be argued that the decision to leave the socketed axeheads unbroken was conditioned by something other than practical reasons. This final section now outlines some key considerations for the archaeological record that will be developed further in Chapter 5.

Firstly, in this chapter much emphasis has been placed on the importance of heating the objects prior to breakage. The implications of this require further consideration though. As a starting point, heating an object for fragmentation required a fire or hearth into which the objects could be placed and subsequently removed and broken. Effective temperatures required to break leaded bronze objects were shown to be 500-600°C, though experiments by Hardman (2016) demonstrated that breakage could be achieved from about 100°C or more. A basic conclusion that can be drawn initially is that clearly a metalsmithing set-up was not required for metal destruction. Fire was an integral part of Bronze Age life required for cooking, warmth and for cremating the dead; thus, it can be considered that knowledge of constructing a fire was widespread. Experiments reconstructing cremation pyres have found that temperatures may reach as high as 1000°C in certain conditions (Dodwell 2012; Marshall 2011, 14-15, 25-26; McKinley 1997, 132-134, Fig.2; Snoeck and Schulting 2013). This therefore indicates that provided a fire was constructed correctly, no specialist metalworking equipment, such as bellows or tuyères, would have been necessary to raise the fire to temperatures required for fragmenting an object. This does not necessarily indicate that such equipment was not used but a metalworking specialist was not required to fragment metalwork; rather, one needed a good working knowledge of constructing fires. However, a series of other considerations are important.

The destruction experiments demonstrated that whilst fragmentation *could* be achieved without any prior metalworking skill or knowledge, possessing metalworking skills would have been advantageous for maximising results. Metalworkers likely had a good working knowledge of the material and discussions with experimenters at the Montale Terramare archaeological park indicated that their understanding of the material was largely based on sensory aspects, such as colour and smell. This allowed them to understand compositional properties of the metal and the temperature of the metal when in the fire. Furthermore, if one takes a functionalist approach to fragmenting metalwork, that is for reducing for a crucible and recasting, one might question at a basic level: what use did a non-metalworker have for fragmenting objects? Of course, this assumption is too simplistic and Chapter 2 demonstrated that breakage of metalwork likely happened for a whole variety of reasons. Nonetheless, the destruction experiments raise interesting questions about the nature of the individuals involved in fragmenting metalwork.

The experiments also explored methods which demonstrated how the destruction of metalwork *was not* achieved. The hammering of a socketed axehead with an unhafted hammerstone was clearly ineffective and produced extensive deformation of the surface, which bears no archaeological parallels. A hafted bronze hammer proved similarly ineffective at fragmenting a socketed axehead. Furthermore, the experiments breaking unheated swords and spearheads suggested these were also ineffective methods. The negative results thus have value in generating future hypotheses. Some unusual instances of metalwork destruction may have been achieved in this way but few archaeological parallels could be identified.

By contrast, heated fragmentation, or hot-shorting, produced results which could be directly paralleled with archaeological examples. It is hard to contest, for instance, that the Bloody Pool spearheads were broken by any method other than that shown in Experiment 7. Furthermore, the reproduction of multiple sword and axehead fragments, which are frequently seen in hoards and as single finds, illustrates the idea that such pieces were the result of intent rather than accidental breakage (see Knight *forthcoming*(b)). However, accidental breakage of axeheads or swords (or indeed spearheads) could only rarely, if ever, be identified in the experimental literature studied and thus it is not possible to say how intentional damage might be compared with material failure of these objects through overuse. Regardless, the experiments have demonstrated that intentional breakage by heated fragmentation can produce comparable pieces. One way in which this might be investigated further is an analysis of the microstructure of archaeological artefacts to see if this displays signs of burning, or alternatively stress through overworking. This is one of several avenues for future work, which are developed further in Chapter 11.

Further implications of these experiments for interpreting the archaeological record will be raised and developed throughout the rest of this thesis.

It is clear from the above discussion that understanding the material properties and the practical elements involved in the intentional destruction of Bronze Age metalwork has much to add to better understanding this prehistoric process. These ideas, and the experimental results, enhance the approaches described in Chapter 3 and offer new perspectives for the theories presented in Chapter 2. These contribute to the development of a methodology for how one might identify deliberately destroyed metalwork archaeologically, which forms the focus of Chapter 5.

CHAPTER FIVE

THERE'S METHOD IN THE FRAGMENTS: A DAMAGE RANKING SYSTEM FOR IDENTIFYING DELIBERATE DESTRUCTION

5.1 Introduction

Chapter 3 highlighted the absence of precise methodologies for identifying signs of intentional destruction on damaged Bronze Age metalwork. Past approaches have lacked a uniform methodology and often relied on subjective assumptions about how material was damaged in the past. Chapter 4 presented experimental research that sought to examine some of these assumptions and better understand how metalwork may have been broken in the past. This chapter thus brings together the research presented in Chapters 3 and 4 to develop a working methodology for identifying deliberate destruction. Firstly, seven destruction indicators are presented with associated criteria for making an informed interpretation about archaeological artefacts. This is followed by a Damage Ranking System, whereby damage observed on objects might be ranked within a system based on the likelihood that damage is intentional. This is then applied to a dataset from South West England in Chapters 7-9.

5.2 Destruction Indicators

A starting point for developing a methodology is to assess what might be considered an indicator of deliberate destruction (hereafter 'destruction indicators'; Table 5.1). A systematic approach to destruction indicators seen on Bronze Age objects has never been undertaken before and is thus necessary for categorising deliberate destruction. This section draws on past and ongoing research as well as the 'obvious' nature of some features (i.e. those that could not have occurred through unintentional processes) and supported by the experimental results presented in Chapter 4. Although each of the indicators

Table 5.1: Destruction Indicators

Destruction Indicator	Description
Bending and Folding	Plastic deformation of the material from the expected trajectory of an object
Breakage	Separation of two or more pieces of an object
Crushing	Removal of an object's functionality by plastic deformation and compression
Twisting/Torsion	Plastic deformation along the longitudinal axis
Burning	Exposure of an object to high temperatures causing damage to the microstructure; sometimes evident from charred corrosion
Notching	Plastic deformation of an edge or surface resulting in an indentation
Plugged Sockets	The filling or blocking of a socket with objects other than hafting material removing the functionality of the object

listed may be the result of intent, the potential for such damage to be inflicted through use or accident must also be considered. Some modes of damage are inevitably object-specific and this is indicated, whilst other modes have been separated according to contributing factors. Much of this discussion relates to bronze objects, though gold objects are also considered. Of importance to all indicators is an awareness of the context in which objects were found as well as associated objects and damage that can strengthen the determination of intent. This establishes a platform for developing a Damage Ranking System in Section 5.3. The criteria for identifying deliberate damage associated with the destruction indicators are summarised in Table 5.2.

5.2.1 Bending and Folding

'*Bending*' refers to any plastic deformation along the object from the expected trajectory of an object (e.g. a sword that is no longer straight in profile). '*Folding*' refers to plastic deformation resulting in an object bent over itself (e.g. a folded lunula or sword). Where folding is present it is considered an inherently deliberate act as it is hard to envisage an unintentional process that would result in folding, though a thorough consideration of post-recovery processes must be applied before this conclusion is drawn. Bending and folding can occur along two planes: *transverse* and *longitudinal*; these two planes are discussed in detail below following a general consideration of plastic deformation.

Table 5.2: A summary of Destruction Indicators and criteria for identifying intentional damage.
Key: Y = Indicator of deliberate damage; Y* = Refers specifically to fragments that are mid-sections of objects; N = Not an indicator of deliberate damage; P = possible indicator – determined by a set of factors and/or other destruction indicators; nd = no additional damage; ad = additional damage or contextual information necessary to determine intent. Some indicators are qualified by statements in brackets. See full discussion for further details.

Object(s)	**Destruction Indicators**									
	Transverse Bending	Longitudinal Bending	Transverse and Longitudinal Folding	Breakage	Individual Fragments	Crushing	Twisting	Burning	Notching	Plugged Sockets
Swords, rapiers, dirks, daggers and halberds	**Y** (45°)	**Y**	**Y**	**P**	**P** **Y***	-	**Y** (45°)	**ad**	**P**	**-**
Knives	**P** (45°)	**Y**	**Y**	**P**	**P** **Y***	-	**Y** (45°)	**ad**	**P**	**-**
Tanged spearheads	**Y** (45°)	**Y**	**Y**	**P**	**P** **Y***	-	**Y** (45°)	**ad**	**P**	**-**
Socketed spearheads	**Y** (30°) (tip 45°; nd)	**Y**	**Y**	**P**	**P** **Y***	**Y**	**Y**	**ad**	**P**	**Y**
Flat and flanged axes	**Y**	**Y**	**Y**	**P**	**P** **Y***	-	**Y**	**ad**	**P**	**-**
Palstaves	**Y**	**Y**	**Y**	**P**	**P** **Y***	-	**Y**	**ad**	**P**	**-**
Socketed axes	**Y**	**Y**	**Y**	**P**	**P** **Y***	**Y**	**Y**	**ad**	**P**	**Y**
Chisels and gouges	**Y**	**Y**	**Y**	**P**	**P** **Y***	**Y**	**Y**	**ad**	**P**	**Y**
Copper alloy ornaments	**P**	**P**	**Y**	**P**	**P** **Y***	**Y**	**P**	**ad**	**P**	**-**
Miscellaneous copper alloy objects (e.g. awls, razors, saws, sickles, tweezers)	**N** **P** (sickles)	**P**	**Y**	**P**	**P** **Y***	**-**	**Y**	**ad**	**P**	**-**
Goldwork	**P**	**P**	**Y**	**P**	**P** **Y***	**Y**	**P**	**ad**	**P**	**-**

The likelihood of an object plastically deforming and the degree to which it might deform before fracturing is ultimately dictated by the metallurgical composition, thickness and hardness of an object (Section 3.3.1; see Molloy 2011 for a discussion of this in relation to swords). The plastic nature of copper, copper alloys and gold means they are more likely to deform than break (Sáez and Lerma 2015, 174). Plastic deformation occurs on a wide variety of artefacts, including spearheads, swords, rapiers, daggers, sheet objects and ornaments. Due to the thickness of tools, however, evidence for this on objects such as axes, chisels and hammers is uncommon or unknown. It therefore follows that the thicker the object, the more force is necessary to bend or fold it. This was illustrated in the pilot experiments where a 3mm-thick sword blade could be bent more easily than a 9mm-thick dagger hilt (Appendix C). This evidences that the position of the bend (e.g. the blade or the hilt) is crucial in determining intent. The potential impact of post-depositional processes, such as soil warping (Section 3.3.3a), means thinner objects displaying minor degrees of bending cannot be taken as deliberate without further evidence. There is also the potential for some bending to have occurred through anthropogenic processes, such as dredging or ploughing (Section 3.3.3b).

Consequently, bent objects thicker than 7.5mm will be considered the result of intentional human action. This figure has been determined based on the current available information, such as the thickness of ‘warped’ copper alloy medieval buckles (all >5mm on the PAS website; see Section 3.3.3a), and the thicknesses of the objects involved in the experiments. Although further experimentation would refine this number, 7.5mm offers a useful starting point. The two forms of bending are now considered.

5.2.1a Transverse (or lateral) bending

This is the most common form of bending that occurs. It is seen to some extent on most swords (Colquhoun and Burgess 1988; Kristiansen 2002, 320), but it is also present on numerous types of other types of object. Consequently, this section has been divided according to broad copper alloy object-types, followed by goldwork:

1. Blades (encompassing swords, dirks, rapiers, halberds, daggers, knives);
2. Spearheads;
3. Axes;
4. Chisels and gouges
5. Copper alloy ornaments (rings, bracelets, torcs, pins)
6. Miscellaneous copper alloy objects (awls, razors, saws, sickles, tweezers)
7. Copper alloy sheet metal
8. Goldwork (rings, lunulae, bracelets, torcs, basket-shaped ornaments)

5.2.1a.1 Blades

This group refers to thin-bladed weapons, including swords (Fig.5.1), dirks, rapiers, halberds and daggers. These have been grouped together because each implement consists of a double-edged blade and a riveted hilting mechanism. Additionally, one can include knives though these also occur in socketed forms. The form and thickness might vary but the mechanism for plastic deformation is consistent across each object type.

The deliberate bending of a sword was explored in Chapter 4 and is supported by the experiments presented by Bietti Sestieri et al. (2013, 167-169) and Hardman (2016). Bietti Sestieri et al's experiments demonstrated that bending the object without snapping it required some skill and awareness of the capabilities of the material. Applying concentrated pressure to a single area of the sword meant it broke at about 90° but evenly spread pressure achieved a successful U-shape bend. Similar results were reproduced in Section 4.11.3b.

Bending is not solely intentional, however. Use experiments on swords exploring their combat potential (Gehrig RFC 2014; Andrea Dolfini pers.comm. 2016) and the overall resilience (Skallagrim 2014) of these objects have found that the blade can bend along the transverse plane during use. This was also found in the combat experiments outlined in Section 4.10.3a. The blade can be quickly and easily straightened again either through unassisted force (see Fig.4.24) or by altering the use of the weapon (e.g. turning the sword over in one's hand) (Skallagrim 2014). The plastic properties of bronze allow this process to occur.

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Fig.5.1: A bent Ewart Park sword from the Blackmoor hoard, Hampshire (source: Colquhoun and Burgess 1988, Pl.42)

Barry Molloy argued that swords that have bent “can only be straightened once or twice without the aid of heat treatment before fatigue and internal flaws cause a fracture” (2011, 75), though Skallagrim’s (2014) tests demonstrated that a sword bent through use can be corrected repeatedly through altered use, i.e. turning the sword over in one’s hand. Of course, prehistoric examples of different compositions would have a lower endurance and might be more prone to plastic deformation or mechanical failure. Additionally, a blade can be hardened by bending it back and forth, which may have been performed in prehistory (Burridge 2014). There is thus a careful balance to harden the blade without over-working it and causing failure (Burridge pers.comm. 2016).

At Newcastle University, a sword engaged in combat experiments suffered transverse bending when it was used to parry a blow from another sword with the flat of the blade (Raphael Hermann pers.comm. 2016). Additionally, scratch marks were left on the blade; both features were duplicated when the experiment was repeated with another sword and identified on prehistoric examples (Fig.5.2). Additionally, one can consider the transverse bending caused through misuse (Section 4.10.3a). The transverse bending in both directions of Sword 2.2 caused by parrying a sword with the flat of the blade (Fig.4.27) also indicates how bending of archaeological artefacts might not be as straight-forward as it first appears.

Horn (2013a, 13) and Kristiansen (2002, 320) both noted the *curvature* of some sword blades (equal to bending here). Horn (2013a) linked this to either post-depositional soil pressure generally deforming the blade or force exerted upon the end of the weapon (e.g. by thrusting into a shield). Regarding the latter proposition, one might expect corresponding damage elsewhere on the blade,

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Fig.5.2: A comparison of a bend on a prehistoric Ewart Park sword (A) (NEWMA1929.67 Great North Museum) with a bend produced through experiments by Newcastle University on a replica Ewart Park sword (B) (source: photos courtesy of Raphael Hermann)

such as a flattened tip. Kristiansen, meanwhile, suggested that blades were intentionally bent slightly to "point towards his opponent's heart" (2002, 320) – a feature he identified in modern-day sword production. As not all swords are bent, it is difficult to identify this as a widespread functional feature rather than deliberate or accidental damage. Identifying this would rely, for instance, on inferring information from patterns of contemporary swords within a region or multiple curved swords that appeared to have been produced by a single smith or workshop.

Bending of swords, at least to some extent, thus appears common and the presence of this 'damage' alone cannot be taken as intentional especially considering recent experiments. Unfortunately, most experimenters do not mention the furthest extent to which the blade bends during use. From observing videos of their experiments, it appears that swords never bend more than approximately 30° from the straight trajectory (e.g. Skallagrim 2014). During the combat experiments in Section 4.10, the swords did not bend further than about 10°. Anderson (2012, 36) initially used the degree of the bend as a criterion for identifying purposeful bending as well as swords suffering bending in two directions. However, like the experiments in Section 4.10, her experiments produced sword bending in both directions (ibid., 89), requiring reconsideration of this latter criterion. She further noted that the deliberately decommissioned prehistoric objects she studied suffered bending over 50°, whilst those bent through post-depositional activity were rarely bent more than 30° (ibid. 104-5).

Considering these factors, it is therefore proposed that any sword with a transverse bend of 45° or more should be considered intentional damage. A 45° angle has been selected based on past and present research; it appears unlikely that a sword would bend further than this through use. Moreover, no swords in South West England displayed bending over c.15° that was not also associated with breakage, strengthening this criterion. It follows that folded swords are the result of intentionality. This does not exclude bladed objects bent to less than 45° from being the result of intentionality but associated marks will be necessary to surmise intent.

The above reasoning can also be applied to other thin-bladed implements, such as rapiers, dirks, halberds, daggers and knives, but experimental research on these is limited; it is thus difficult to decide whether the properties of these thin-bladed weapons are strictly comparable. For example, some dirks can be larger and thicker than swords and these implements might be more resilient to bending through use and post-depositional processes. Bending a larger object, such as the dirk from East Rudham, Norfolk, likely took some skill to implement (Fig.5.3). Rapiers, on the other hand, are generally less substantial and might be more susceptible to bending.

Meanwhile, the thin nature of daggers and knives makes them more prone to plastic deformation so the impact of post-depositional or heat warping must be considered. Attribution of intentional bending of these objects is thus more difficult to prove, especially given the limited discussion in the literature on the bending of these items. Bent knife blades were found in later Bronze Age hoards such as Grays Thurrock, Essex (Fig.5.4). These pieces were associated with breakages leading Turner to suggest they were “bent and snapped by hand” (2010b, 30, 02/136). Associated damage allowed Turner to draw conclusions about intent, but complete bent knives and daggers require a set of criteria. Nonetheless, a 45° angle remains appropriate.

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Fig.5.3: The bent dirk from East Rudham, Norfolk (source: BBC News 2014)

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Fig.5.4: Bent and broken tanged knives from Grays Thurrock, Essex (source: Turner 2010b, Illus.14)

5.2.1a.2 Spearheads

The variability in the use of spearheads and limited previous experimental research mean that the deliberate bending of a spearhead is more difficult to quantify, especially compared to swords. Generally, a spearhead is thicker than a sword blade. Earlier Bronze Age tanged versions might suffer bending anywhere along the object (e.g. the tang, blade or tip) whilst later versions are socketed, which means that bending is less likely due to the socket hollow extending into the blade; it is perhaps more likely that the face of the blade might fracture or crush under pressure.

Even socketed versions suffer bent tips, however, which Bridgford (2000, 145) argued is the most likely area to suffer damage. Horn (2013a, 13) suggested that spearheads, like swords, might bend from force exerted on the tip, though a spear tip might be thicker than a sword tip and perhaps less likely to suffer bending through impact. Bridgford (2000, 145) argued damage would be expected if the spear was thrust or used for stabbing but the action failed or was deflected. In her combat experiments with spears, Anderson (2011, 604; 2012) found that spear points suffer limited damage when thrown or thrust. It is thus debatable whether a spearhead might bend through functional use. Experiment 8 (Section 4.11.4b) involved hammering the tip of a spearhead to deliberately bend it, which also caused crushing of the socket and material failure. This suggests that deliberate bending of a spearhead might require additional damage in order to be conclusively identified as deliberate rather than accidental.

However, based on this past research (Anderson 2012; Bridgford 2000), it is proposed here that deliberate bending of a socketed spearhead might be indicated by a 30° angle or more. In the case of thinner, tanged spearheads 45° is taken as an indicator of intent. Where the tip is bent, a 45° angle should be present *without* the tip showing additional signs of having been blunted through striking another material. No quantifiable tests have been conducted into assessing spearhead bending and thus the measurements have been decided based upon the discussion above and in lieu of any further evidence.

5.2.1a.3 Axes

Bronze Age axes encompass a range of forms including Early Bronze Age flat or flanged axes, Middle Bronze Age palstaves, and Late Bronze Age/Earliest Iron Age socketed axes. These axes are generally thicker than most other implements and have a broad edge of impact rather than a concentrated tip. The bodies of flat and flanged axes can be up to a centimetre thick whilst some palstaves can be two or three centimetres thick at the stop ridge. Earlier forms of axes were sometimes made of copper, which Kienlin and Ottaway (1998) demonstrated would suffer damage more quickly than their bronze successors. Copper is more plastic than bronze and thus more prone to deformation.

Socketed axes, like socketed spearheads, possess a hollow body, which might be more likely to crack or crush than bend. Their thickness makes socketed axes less likely to bend although their mouths and walls are thin enough to bend and bow under pressure. This would of course put stress on other elements of the axe (see Section 4.11.2c). Experimental use-wear analysis of socketed axes strongly suggests that their most likely use (i.e. chopping and trimming wood) would not cause the blade to bend (Kienlin and Ottaway 1998; Moyler 2007; Roberts and Ottaway 2003). The difficulty in bending and breaking a flat axe was illustrated by Moyler's (2007, 144-149) experiments, even when modern tools were utilised (see Fig.3.14).

Consequently, any bent axe can be considered to have been deliberately damaged unless sufficient contextual evidence indicates otherwise. One would expect other damage to be associated with bent axes, such as hammer blows.

5.2.1a.4 Chisels and gouges

Chisels and gouges were craftworking tools; their multifunctional nature meant they may have been subject to numerous uses, largely on wood. These two object types come in a variety of forms, including socketed and tanged, but could suffer bending through use due to their presumed function of applying pressure to other materials. A socketed gouge from the Late Bronze Age Cottesmore hoard, Rutland, appears to have been deposited slightly bent with associated stress fractures (Fig.5.5; Clough 1979), which may be related to use-pressure. Only limited attention has been given to these tools within wider studies (e.g. Coombs 2001, 288) so it is difficult to make any assumptions about their predisposition to bend, and any examples that occur will be assessed independently.

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Fig.5.5: A slightly bent socketed gouge displaying some stress cracking from the Late Bronze Age Cottesmore hoard, Rutland (source: Clough 1979, 120, Fig.5.2(9))

5.2.1a.5 Copper alloy ornaments

Copper alloy ornaments include rings, bracelets, torcs and pins. These various forms have been grouped together here for convenience. Identifying bending on rings, bracelets and torcs must rely on the assumed original shape of the ornament. Meanwhile, the slight nature of pins means these ornaments might become bent accidentally. Well-known typological styles should make identification of bending on ornaments easier (see Appendix E.6), but this becomes more difficult where only fragments survive. Each instance must be determined individually based on contextual information and associated damage.

5.2.1a.6 Miscellaneous copper alloy objects

This section considers a small group of miscellaneous tools and items of personal adornment, including awls, razors, saws, sickles and tweezers. This diverse group are presented together due to their similar thicknesses, as well as the multi-functional nature of most of these objects. Slighter implements (e.g. awls, tweezers) may have bent easily through use or by accident, whilst sickles were probably more resilient as they are thicker. Razors are occasionally found slightly bent, which could be accidental given their thin nature or, rarely, folded, which cannot have been anything but intentional (e.g. the razor from Routh, Yorkshire; Fig.5.6). Post-depositional processes could cause these items to bend or bow. Once again, limited investigation into these various objects means that currently any bending cannot be taken as intentional unless other indicators are present.

5.2.1a.7 Goldwork

All gold objects have been grouped together here because gold has different properties from copper alloy and because there is only a limited range of object types to consider. This section includes rings, lunulae, bracelets, torcs, basket-shaped ornaments and miscellaneous gold objects, such as the Rillaton gold cup. Gold has similar properties to copper, being softer and more malleable than copper alloys. This means that gold objects are more prone to accidental bending and warping. Consequently, deformed gold objects will be more

Fig.5.6: An Early Bronze Age razor found in Routh, Yorkshire (source: Griffiths 2013)

cautiously interpreted than their copper alloy counterparts. Of particularly interest is the bending and folding of gold ornaments, such as lunulae (Cahill 2005), which is seen on various objects throughout the Bronze Age.

5.2.1b Longitudinal Bending and Folding

Longitudinal bending is less common than transverse bending but is more evident of deliberate destruction. The form of most objects does not allow for much, if any, bending on this plane and would usually apply great strain on the material resulting in stress fractures. Again, folding along this plane is considered deliberate and thus bending is the focus of the discussion.

The width and thickness of most bronze objects makes them resilient to bending along the longitudinal axis. Swords may suffer from slight longitudinal bending through use though there is no mention of this damage in the experimental literature and it is improbable longitudinal bending would occur without associated fractures. A sword from Poles Sands, Devon (RAMM-F40), shows minor longitudinal bending, as well as some transverse bending (Fig.5.7) which is associated with some use-marks along the blade edge; however, because it was probably a coastal deposition recovered through dredging, damage inflicted by water movement or machinery cannot be ruled out.

Fig.5.7: A Ewart Park sword from Pole Sands, Exmouth, Devon, displaying longitudinal bending (source: Author courtesy of the RAMM, Exeter)

The intention of bending an object along its longitudinal axis is thus difficult to ascertain. An assessment of the images in Colquhoun and Burgess' (1988) Prähistorische Bronzefunde volume identified at least three potential examples from Bow Creek, London; Carnedd Llewelyn, Caernarfon; and Brentford, Middlesex (ibid., nos.170, 445 and 711). All show evidence for cracking, which was probably caused by pressure occurring during longitudinal bending. It is perhaps appropriate to consider bending in these cases as potentially linked with use or post-depositional processes.

Thicker objects, such as axes and spearheads, are unlikely to bend this way without extreme force. A median-winged axe from the Crévic hoard, Meurthe-et-Moselle, France, exemplifies this case: the axe appears to have been struck repeatedly from the side to separate the blade from the haft, causing a longitudinal bend and cracking along the side of the object in the process, though the separation was never completed (Nebelsick 1997, 160-2; Wiegmann 1997, 123).

As with transverse bending, slighter objects (e.g. tweezers, awls etc.) suffering longitudinal bending cannot be conclusively determined as destroyed or decommissioned because they are more prone to accidental damage. Without further experimental work it is difficult to make any absolute conclusions, but at present this type of damage on larger bronze objects and tools will be regarded as intentional unless there is other evidence to the contrary.

The variability of copper, copper alloy and gold ornaments and sheet objects in style and thickness and the malleable nature of the materials means that intentional longitudinal bending may be more difficult to identify over accidental or taphonomic damage on some objects. Where bending appears to have rendered the object unusable, and a secure context and post-depositional history is known, the bending can be considered deliberate.

5.2.2 Breakage

Broken objects are very common in the archaeological record. The term 'breakage' and the mechanical properties that might cause bronze to break, have already been explored (Sections 1.5 and 3.3.1). Here parameters must be set that might help identify an intentionally broken object, rather than one that has broken by accident, use, or post-depositional factors. Different objects will of course break differently though basic principles will apply and therefore a series of more general considerations are presented below that will ultimately influence the breakage of objects and the identification of intentionality.

5.2.2a Composition

The effects of compositions and casting flaws on the mechanical properties of bronze were explored in Section 3.3.1, with different proportions of lead and tin increasing or lowering the hardness, toughness and tensile strength of copper alloys. Experimental research demonstrated that the composition will also impact how easily an object will break when heated (Section 4.5).

5.2.2b Casting flaws

Flaws during the casting process, such as impurities in the metal, unintended mineral inclusions or air trapped in the mould (Fig.5.8) would weaken the object. For instance, casting flaws have been highlighted in broken Scottish flat axes suggesting these breakages were unintentional (Moyler 2007, 147). Consequently, any break in which casting flaws can be observed without additional damage suggesting human agency cannot be taken as intentional, especially if such breaks have occurred at weak junctions in the object (e.g. a palstave stop or a sword hilt).

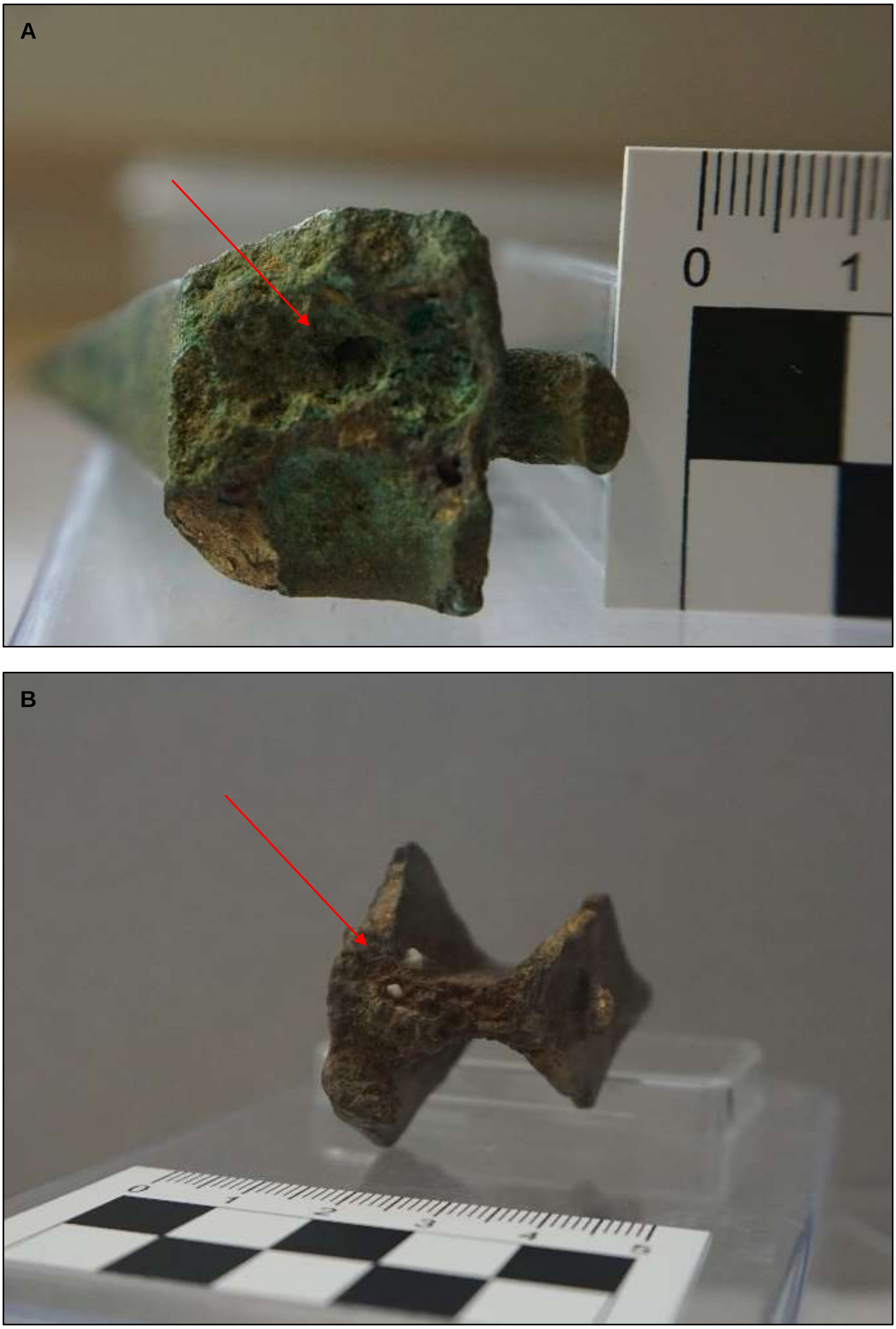

Fig.5.8: Two types of casting flaws causing a break. **A** shows where an air bubble in the metal has weakened the point of break. **B** shows where mineral inclusions have become embedded in the metal (source: Author courtesy of the RAMM, Exeter)

5.2.2c Patterns of breakage

'Patterns of breakage' refers to instances where the same types of object are suffering from similar breakages in similar places. Where patterns of breakage occur, two possible explanations are offered here:

1. There was an inherent design flaw that predisposed these objects to breaking at the same point during repeated types of activity; or
2. there was a reason for breaking certain objects in certain places.

The former suggestion can be evidenced on palstaves, which were frequently found broken at the stop ridge through the hafting plate and flanges (Fig.5.9). Figure 5.9A, for instance, shows a diagonal break through the side-loop, flange and stop-ridge, whilst Figure 5.9B shows a break across both flanges. The palstave in Figure 5.9C meanwhile has broken below the stop-ridge across the blade. This pattern of breakage occurs at a crucial point of hafting suggesting that during use the palstave may be prone to breaking at this point.

Fig.5.9: Common breakage patterns across the stop of a palstave. **A** (RAMM-F035a-b); **B** (RAMM-F037c); **C** (TTNCM-F053m) (source: Author courtesy of RAMM, Exeter, and South West Heritage Trust (Museums Service)

Experiments involving palstaves are limited (Mathieu and Meyer 1997) or ongoing (Miriam Andrews pers.comm. 2017; Newcastle University 2015; Roland Williamson pers.comm. 2016) so the likelihood of these objects breaking through use is unknown at present.

This issue might be resolved if one considers how the internal structure of the metal is affected by the way in which the palstave is cast. Discussions with Carmelo Catalanotto, a mechanical engineer, highlighted that casting palstave flanges rather than hammering them up makes the structure inherently weak. Figure 5.10 illustrates how the structure of palstave flanges differs depending on whether it is cast or hammered. Cast flanges (A) are inherently weak, with a simple arrangement of the metallic structure that would be more liable to break under pressure, whilst hammered flanges (B) create a folded, overlapping structure that provides strength to the flanges and is more resilient to fracturing. Therefore, although palstaves have not been shown to break through use experiments, breakages should not be automatically considered the result of intent. Other potential weak points on other objects include side-loops (e.g. spearheads, socketed axes), rivet holes (e.g. daggers, swords) and blade tips (e.g. spearheads, rapiers).

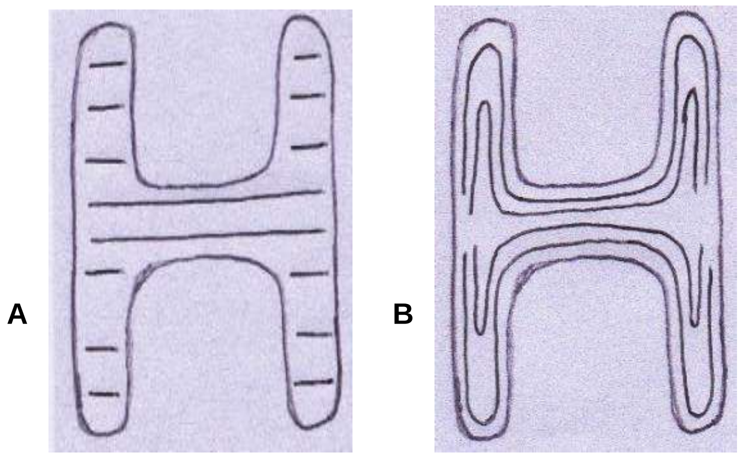

Fig.5.10: Two hypothetical cross-sections of a palstave through the flanges and hilt-plate demonstrating the arrangement of the micro-structure of the metal depending on the method of manufacture (source: Author)

Alternatively, if the second proposition is considered, objects that have repeatedly broken in the same place but demonstrate no inherent design weaknesses and/or have limited likelihood of having broken through use could be considered the result of intentionality. For instance, the separation of an axe blade edge from the body of the axe could be considered an unlikely break to have occurred through use yet is seen on several examples (Fig.5.11). One would hope to see associated damage (such as hammer marks) that could aid this interpretation, but the experimental work demonstrated that separation of the cutting-edge from the body generally left no associated damage (Section 4.11.2b). It would of course be necessary to ensure that casting flaws, which might occur repeatedly through similar inefficient metalworking methods, did not play a factor in breakage patterns.

Fig.5.11: Four socketed axe cutting-edge fragments. All represent isolated finds from across Devon: **A**: Chumleigh (MBND-F002); **B**: Whiddon Valley (MBND-F007); **C**: Bishopsteignton (TOR-F001); **D**: Bradley Barton (TOR-F002). (source: Author courtesy of The Museum of Barnstaple and North Devon and Torquay Museum)

Additionally, experiments on hot and cold-working of a tin-bronze palstave have shown that over-working of the material can lead to failure and breakage, though this is more likely when hot-working than cold-working. Even when cold-worked an object can withstand up to 52% reduction without completely failing (Coghlan 1975, 82-83). However, a skilled metalworker would probably be aware of this and it seems unlikely that similar breakages were the result of multiple metalworkers overworking the metal throughout the Bronze Age without this knowledge being passed on.

5.2.2d Multi-piece breaks

Any object broken into two or more pieces could indicate intent. Some objects may break through use, but one might expect only a single breakage perhaps at the location of a casting flaw. The general plasticity and toughness of bronze means that although it is possible an object may break in half, it is less likely that a bronze artefact would fracture into several pieces through use. Multi-piece breakage has typically been considered for swords because of the numerous instances where refitting pieces are found together (Fig.5.12). Quilliec (2008, 70) argued that the breaking of a sword into more than two pieces cannot be accidental especially when some swords were broken into eight to ten pieces (cf. Hansen 1991, 19, Note 128). Multi-piece breaks are always noted when some or all of the refitting pieces are present though it is often overlooked (or at least goes largely un-noted) that the discovery of a mid-section of a sword blade or the body of an axehead automatically implies that the object was once in three or more pieces.

Some multi-piece breaks were possibly the result of post-depositional processes, which could be verified through analysis of the consistency of the corrosion. Additionally, all pieces of the objects would need to be present to confirm this. There is unfortunately no general methodology that can be applied to the study of objects broken into two or more pieces and use-wear experiments have yet to demonstrate that this would occur through use. However, the experiments in Chapter 4 showed how easily archaeologically comparable multi-piece fragmentation could be replicated, suggesting that this is how such fragmentation may have occurred in the past. Therefore, any object

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Fig.5.12: Swords from the Cassiobridge Farm hoard, Watford, demonstrating multi-piece breaks (source: Coombs 1979, 202-205, Figs.11.3, 11.4)

indicating a multi-piece break into three or more pieces will be considered as a potentially destroyed object. A close analysis for the presence of casting flaws, consistency of patina and associated marks will help verify or refute this interpretation.

5.2.2e Thickness

This factor was raised when considering an object's capacity to bend and will have equal effect on an object's likelihood to break. In theory, the thicker the object the harder it is to break and it is almost certainly more likely to break than bend, though the plasticity of bronze means that provided the casting quality is good thicker objects may bend before breaking. Meanwhile, Experiment 7, in which a barbed spearhead was heated and struck (Section 4.11.4a), showed that even very thick objects might be broken when heated. No criteria for thickness in relation to breakage will therefore be offered here at present.

5.2.2f Associated Marks

Marks associated with breaking are defined here as marks that can demonstrate the process by which the object was broken (e.g. hammer blows or chisel marks). Furthermore, they must occur close to the break (within 10mm). This latter measurement is, however, an arbitrary parameter that would benefit from quantification. Where marks are found, it will be taken here as a definite indicator of intent; that is not to say, however, that breaks without marks are not intentional as demonstrated by the destructive experiments.

Associated marks depend on the method used for breaking the object. Heating an object before breaking it, for instance, might only require a single strike of limited force to fracture the object and consequently no marks would be left. Alternatively, if broken while cold the section that was struck or chiselled may be missing. The marks, or lack of, can give valuable insights into *how* the objects were broken. Turner, for instance, suggested that the lack of hammer marks and the bowing or bending related to breaks on knives and a sheet fragment in the Grays Thurrock hoard, Essex, indicates that the pieces were likely snapped by hand (1998b, 36-37, 54-55).

Multiple strikes to a replica bronze dagger with a large stone produced only limited evidence of the repeated hammering it suffered and despite having been bent several times during the process of breakage limited evidence of this bending can be seen on the resulting pieces, except near the tip (Fig.5.13; Appendix C.2). The microstructure of the metal probably indicates these stresses though. By contrast, chisel marks that failed to break a sword in Experiment 4 remain visible on the fragments (Fig.4.61).

Finally, if, as has been suggested by some scholars (e.g. Hoffman 1999; Melheim and Horn 2014; Nebelsick 2000), deliberate destruction was the work of skilled metalworkers who had a developed understanding of the material and objects, the object may have been broken with no other indicators. The value of associated marks has been clearly emphasised here, but broken objects without marks may also have been the result of intent. Identifying these pieces as deliberate will, however, be more problematic.

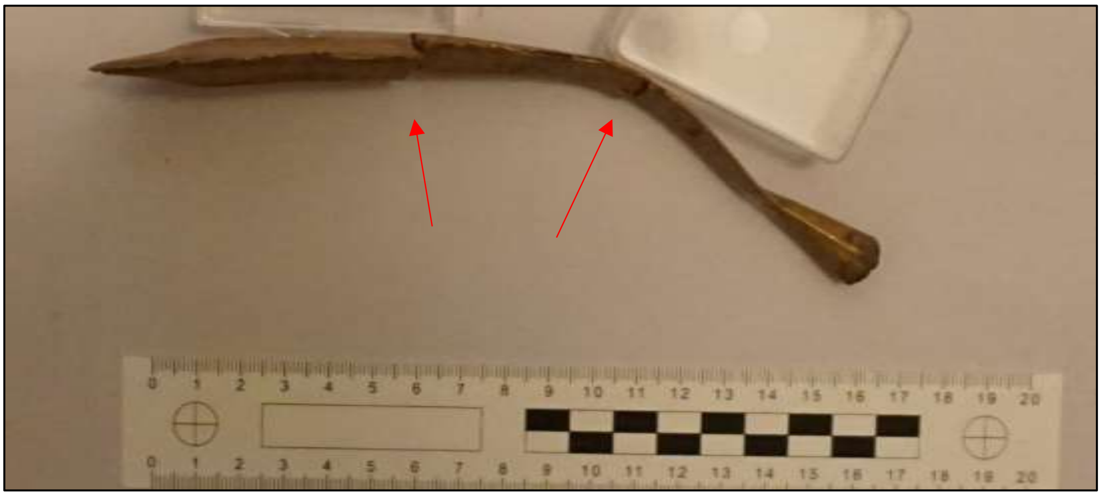

Fig.5.13: A replica dagger broken into three pieces. Arrows indicate the breaking points (source: Author)

5.2.2g The Accumulation of Individual Pieces and Fragments

Despite incorporating elements of the previously mentioned factors, the accumulation of individual pieces and fragments (i.e. incomplete objects) is considered separately because it relies on the grouped nature of the finds. An accumulation of pieces and fragments of similar proportions could be used as an indicator of intentionality building the deposit. Similarities in weight or the size of fragments in relation to a crucible could suggest their intention to be recycled.

The general size of crucibles throughout the Bronze Age is not known. Larger, heavier objects would have required large crucibles to hold the volume of metal or else several smaller ones. However, the evidence is lacking and the collective data on crucibles has only recently been brought together through an as-yet unpublished project by Joanna Brück, Leo Webley and Sophia Adams (Adams pers.comm. 2016). The style and size of the crucible seems dependent on the region and period but often smaller forms are used by current experimenters (Claude Cavazzuti pers.comm. 2016). The crucibles recovered from Dainton, Devon (Fig.5.14) are some of the best examples of surviving crucibles in England though these are incomplete. They are approximately 160mm wide and no more than 40mm deep; their incomplete nature means the length cannot be calculated. This does, however, suggest that pieces prepared for recycling needed to be small to fit within these types of crucibles.

Fig.5.14: A reconstruction of some of the Dainton crucible, Devon (source: Author courtesy of RAMM, Exeter)

Accumulations of fragments could thus be used as a potential indicator of deliberate reduction for recycling (e.g. Turner 2010a).

Not all fragments are found in accumulations though, and an analysis of those in hoards could offer insights into isolated finds of fragments and pieces. If these pieces fall within a size/weight range as defined by those in hoards, then plausibly these pieces may have been deliberately broken for a similar purpose (e.g. economic), but were discarded or lost, or alternatively deposited singly. Individual fragments indicate that the refitting piece is elsewhere which could be linked with other social processes (cf. Chapman 2000). Collections of individual pieces and fragments can thus be particularly informative not only in terms of patterns of breakage, but also in relation to wider practices and functions of these hoards.

5.2.3 Crushing

Crushing is the plastic deformation of an object rendering the presumed function of an object obsolete through compression. It is a form of non-use-related decommissioning and might be applied to socketed implements or ornaments (Figs.5.15; 5.16). Crushing an object is related to the composition of the material; gold and leaded bronze, for instance, can have a higher malleability than tin-bronze and thus are more prone to being crushed.

An object is unlikely to be crushed through use. A socketed axe, for instance, cannot be crushed if it is hafted with a wooden haft providing support to the object. Likewise, gold bracelets might suffer some damage from general use but are unlikely to become crushed without intention; even if bracelets were crushed by accident, gold can easily be reworked. This view does, however, rely on subjective assumptions. Other than human action, post-depositional processes may cause crushing. Objects might be inadvertently crushed and deformed by, for instance, large modern machinery. This is often indicated by a break in the patina and/or knowledge of the context from which the find derived.

With these factors in mind, where crushing is observed and where it would have removed the presumed functionality of the object, it will be considered intentional. Cases where the object has suffered from crushing but could plausibly remain functional will be assessed on an individual basis.

5.2.4 Twisting

Twisting is the plastic deformation of an object along the longitudinal axis (Horn 2013a, 13). This section proposes guidelines for identifying twisting that has occurred beyond reasonable expectation. For this, it is best to assess different forms of objects separately, though it should be considered that minimal twisting on any of the following object groups could probably have been easily rectified by a competent metalworker; the fact that some twists were left uncorrected might be significant. As a starting point, six categories of twisting can be set out (Table 5.3). Bladed implements and ornaments form the focus of this discussion.

Fig.5.15: A crushed socketed axe from Greylake, Somerset (TTNCM-F019) (source: Author courtesy of South West Heritage Trust (Museums Service)

Fig.5.16: The Priddy hoard of bracelets found crushed in a ball (TTNCM-F040) (source: photo courtesy of Steven Minnitt of South West Heritage Trust (Museums Service)

Table 5.3: Categories of Twists

Category	Degree of twist
Untwisted	No twist
Partially twisted	1-90°
Semi-twisted	91-180°
Significantly twisted	181-270°
Fully twisted	271-360°
Multi-twisted	More than one full twist

5.2.4a Bladed Implements

The twisting of bladed implements (e.g. spearheads, swords, dirks, rapiers, halberds, daggers) decommissions these objects and is consequently an important factor when looking at destruction. Twisted hafts, hilts and blades are repeatedly observed in the archaeological record (e.g. Horn 2013a) and in several cases multi-twists are present that could only have occurred through intent and probably required heating the object as part of the process (e.g. Colquhoun and Burgess 1988, no.192).

In studying the deliberate destruction of halberds, Horn suggested twisted hafting plates and blades indicated wrenching in the process of removing the handle of a halberd (2011, 53). Twisting was thus likely to be associated with bending and torn rivet holes (ibid.). This action would have required force and intent though Horn offers no experimental evidence to suggest to what extent this might have been the case and does not qualify the extent to which these objects have twisted. Horn later suggested that twisting could also be caused by accident “if the weapon became stuck somewhere, for example, between bones, and it was removed by force in a twisting motion” (2013a, 13). This scenario seems unlikely because whilst bronze is plastic it is also hard and it is perhaps improbable an object would become so stuck in bone that the force necessary to twist the blade would be exerted in removing the object. If this is possible, one might expect only a partial twist, possibly alongside bending or fracturing due to the stress placed on the object. However, combat and use-wear experiments do not describe any twisting of weapons. Other uncertainties, not use-related, concern the extent to which a blade might suffer torsion because of heat-warping (e.g. on a pyre) or through post-depositional processes underground.

Experiments are required to qualify a set of criteria, but for now any hilt/haft and/or blade that is twisted beyond 45° along the longitudinal axis will be considered the result of intent. The position of the twist may also indicate the likelihood of intent or accident and one would expect other destruction indicators to be present. Partial twists will need to accord with other qualifying factors to be classed as deliberate.

5.2.4b Ornaments

Determining twisting as a destruction indicator on ornaments is more complex than for bladed implements or tools because many ornaments were fully twisted intentionally for, presumably, decorative purposes which would have enhanced the desired functionality of the object rather than remove it (Fig.5.17). Multi-twisting as a feature of decoration on bracelets, torcs and armrings means that for these objects full-twisting *cannot* be taken as a destruction indicator.

Gold ornaments present a problem as gold is more malleable than bronze and could be deformed more easily by accident or warped through post-depositional processes, which could result in partial-twisting especially if the object is thin. Semi- and significant twisting may be a more realistic destruction indicator as most ornaments could not then be worn or used if twisted to these extents.

Fig.5.17: A broken torc from Sandford Hill, Somerset (BCMAG-F014) demonstrating a multi-twist as a form of decoration (source: Author courtesy of Bristol Museum and Art Gallery)

Perhaps the most important consideration here is the intentionality in twisting an ornament. The process of twisting is intentional, whether destructive or not, and this may hold insights for other objects as well as ornaments. Semi- and significant-twisting will be considered indicative of an attempt to remove the functionality of an ornament, but the context of the deposition must be considered alongside any additional destruction indicators.

5.2.5 Burning

Some Bronze Age metalwork shows evidence of burning, such as the Wilburton hoard, Cambridgeshire (Bridgford 2000, 183-184), even though bronze does not actually burn. Some objects show burning macroscopically with a charred appearance, which is the result of the corrosion process (Mary Davis pers.comm. 2017); this might appear on only one part of the object or on the whole object (Fig.5.18). Analysing an object's microstructure could indicate whether it had suffered burning prior to deposition (Bridgford 2000, 51-52); Bridgford (ibid.) argued that the microstructure of examples where burning is macroscopically visible (e.g. the weapons from Duddingston Loch, Scotland) may be used as a guideline for determining if other weapons had been burned. This was also demonstrated in an experiment investigating cremation pyres (Marshall 2011). Pieces of bronze were included in the pyre and the microstructure was analysed after the cremation, which demonstrated that high

Fig.5.18: A burnt and broken sword from Bristol Bridge (BCMAG-F005) (source: Author courtesy of Bristol City Museum and Art Gallery)

temperatures (700°C) had destroyed the dendritic structure of the bronze (ibid., 32). Further microstructural analysis is not intended within this thesis, but this is an important avenue for future investigation.

If evidence of burning can be identified, several issues become obvious. Objects may have burned by accident, such as unintentionally falling into a fire. Alternatively, objects may have been placed on a funeral pyre and suffered fire damage as Marshall's (2011) experiments illustrate. The bronze microstructure might evidence burning but leave no macroscopic trace. These factors make the presence of burning difficult to assess as a definite form of destruction.

Bridgford (2000, 184) argued that where burnt objects are found in a wet context these must have been burnt prior to deposition, such as at Duddingston Loch. This still does not indicate intentionality though – an object burnt accidentally could still be deposited in a wet context. A suggestion put forward for the Duddingston Loch hoard is that it is the result of a crannog that burnt down while the weapons were still inside (Callander 1921-2, 363). The exact number of burnt objects in this hoard is not noted in any of the published (or unpublished) literature (e.g. Bridgford 2000; Callander 1921-2), but multiple objects displaying the same signs makes it less likely that the burning was accidental and, similarly to the patterns of breakage and accumulation of pieces, this could be used to indicate intent. Furthermore, the fact that fire can be used to fragment objects (see Chapter 4) means some objects may display signs of burning from this practice. Regardless, burning observed on single objects or one object within a broader context or hoard cannot be applied here as an indicator of intent without additional destruction indicators to validate this idea.

5.2.6 Notching

Notching was a common result of use, particularly on weapons, though it may also be used as a potential destruction indicator. Even notching resulting from use in combat is the product of an intentional action from an opposing party though, so the criteria for identifying *destructive* notching requires refining here. The following discussion will refer to the possible ways non-combat-related notching may occur and how it may appear on objects.

Firstly, notching cannot be considered ‘destructive’ in the same manner as bending or breaking. A notch causes material displacement and plastic deformation (cf. Horn and von Holstein 2017) but does not ‘destroy’ an object even if an object has suffered repeated notching. Notching is thus better described as intentional damage. Initial observation of a notch should be concerned with consistency of the patina, which may be macroscopically visible or require low-level microscopy, but it is essential that the antiquity of the notch be verified before further conclusions can be made. Furthermore, a combination of the position, distribution, shape and depth of notches should be considered when determining intentionality.

5.2.6a Position

The position of notches on an object can indicate the intent behind the damage. Notches across a weapon face or blade edge might be the result of the implement being used in combat against another weapon. Various use-wear analyses have been conducted exploring this (Bridgford 2000; Molloy 2007; 2011; O’Flaherty et al. 2008; 2011). Notching on the hilt, however, or areas that might have been covered by a haft, could be considered more intentional due to the lower likelihood this would have occurred through combat (e.g. the Werkhoven sword: Fontijn et al. 2012, 207, Fig.2). Anderson draws attention to this, stating that even when one of her swords was struck at the hilt by a spear, chipping the wood and exposing the shoulder, “at no point was the metal component of the hilt damaged” (2012, 95). One experimental result should not be taken conclusively but it does illustrate the significance of finding notching, or indeed any form of damage, in the hilt region.

Likewise, notching on axehead cutting-edges may occur through use in woodworking, but notches on the axehead faces are less likely to occur. Neither Moyler (2007) nor Roberts and Ottaway (2003) note damage on the axe blade faces during their experiments. Axes were likely multi-functional tools for which recorded experiments have largely focused on chopping rather than a variety of activities and notching on the blade face might be inflicted through other means. Regardless, it is conceivable that this position of notching might be indicative of intent.

If a notch is made intentionally, it is likely to have been performed using a sharp stone or metal implement, such as a chisel, axe or sword, perhaps with the intention to break the object being struck. Some notches might represent failed attempts to break an object; therefore, one could therefore expect an irregular array of notches near a break.

5.2.6b Distribution

The spread of the notches is an important consideration. Regularly spaced notching along blade edges creating a 'serrated' effect has been noted on swords, halberds and spears within Britain (Fig.5.19; O'Flaherty et al. 2011, 45). Regular notching is unlikely to have resulted from use and can be taken as an indicator of intent. Where three or more notches occur in regular succession and are of similar form on any part of an implement, this will be considered deliberate damage.

Irregularly spaced notching is harder to judge; even when multiple notches are present, it is difficult to conclusively identify the action as deliberately inflicted without other destruction indicators to support it. A spearhead from Bradley Fen, Cambridgeshire, England, shows evidence of extensive irregular notching on both blade edges, which could be intentionally inflicted damage, though Appleby (2005, 44) argued it could be combat damage, the aesthetics of which influenced the selection of the spearhead for deposition (Fig.5.20).

The deep notching caused on the experimental replicas during the combat experiments shows that it would be possible for edged implements to sustain heavy notches. However, intent might be ascertained from the condition of the accompanying objects if the irregularly notched object is discovered within a hoard. One of Appleby's arguments against the Bradley Fen spearhead having been deliberately destroyed is that "the other spearheads in the hoard assemblage were not treated in a similar manner" (ibid.); however, many of the associated spearheads and swords are notched, bent and/or broken (see Appleby 2005, Appendix A).

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Fig.5.19: Regular notching creating a serrated effect (source: O'Flaherty et al. 2011, Fig.6)

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Fig.5.20: A spearhead from Bradley Fen, Cambridgeshire, with extensive notching on both edges (source: Appleby 2005, Fig. A.15)

5.2.6c Shape

Combat intent and destructive intent might also be distinguished by the shape of the notches. O'Flaherty et al. (2011) argued that 'u-shaped' notching is the result of a blade edge being struck under yielding circumstances, whilst a 'v-shaped' notch occurs when the blade edge is static (see Fig.3.12). This could indicate whether an object was static when struck, which might suggest if notching was the result of combat. If the shape of the notches is consistent, this could serve as an indicator of intent, especially if the notch is consistently 'v-shaped', which would suggest the object was held in place as it was notched.

5.2.6d Depth

A final consideration is the depth of a notch, which Mörtz (pers.comm. 2015) has suggested as a criterion. Mörtz proposed a notch that is deeper than 5mm is a 'deep notch' and was unlikely to have been caused by accident or through combat. O'Flaherty et al. (2011, 43) presented the typical depths of a v-shaped notch to be between 1-6mm. O'Flaherty et al. conducted experiments on halberds whereby they struck the edges of replicas against other halberds, a copper axe, a stone axe and a timber shaft (ibid., 45). They argued that due to the comparable nature of their results, their experiments do not indicate that the studied prehistoric examples were deliberately destroyed (ibid., 49-50). Notches seen on museum specimens can be compared to notches produced through their experiments, particularly the halberd on halberd blade notching (ibid.). Furthermore, O'Flaherty et al. suggested that more extreme force would be required to produce destructive qualities that are not observed on the prehistoric specimens (ibid. 50); however, the authors do not give the dimensions achieved from their experimental notches to allow independent assessment. O'Flaherty et al's study was only concerned with halberds and comparable studies are needed on the notch-depth of swords, spearheads and other implements. Nevertheless, considering their experiments, Mörtz's notch-depth criterion needs revising. Here, any notch that is 7mm or deeper will be considered intentional.

5.2.7 Plugged Sockets

Plugged sockets as a form of destruction or decommissioning damage naturally relies on an object having a socket into which an organic haft would have been inserted. Socketed objects in the later Bronze Age include axes, spearheads, gouges and knifes. The blocking of socketed axes has been noted across Europe (Dietrich 2014; Dietrich and Mörtz *forthcoming*; Hansen 1998). These sockets can be filled or 'plugged' with a variety of object fragments and different materials and occasionally display fracturing around the socket mouth where it appears the objects have been hammered into the sockets (e.g. an axe from Guşteriţa II, Romania; Dietrich 2014, 275). This act is significant as it requires not only the decommissioning of the socketed implement, but it often necessitates the fragmentation of other objects to fit them into the socket. This feature must be unequivocally considered intentional when it occurs.

5.2.8 Summary of Destruction Indicators

Considerations of these destruction indicators have been necessarily thorough to accommodate the variation in which destruction occurs, both intentionally and unintentionally, as well as how they may differ according to object type. Destruction indicators typically occur at the end of an object's use-life but this does not always mean the object goes out of circulation (see Chapters 8-9). Accurately identifying and understanding the various destruction indicators seen on objects is thus a crucial element for understanding the biography of an object and the interactions Bronze Age communities may have had with it (cf. Section 2.4). This is further informed by the depositional process which is almost always another intentional action. The destruction indicators thus offer a benchmark from which to approach damage seen on many prehistoric examples, drawing on the material properties of the material as well as the specific context in which the objects were found. The final section of this chapter establishes a Damage Ranking System, which builds on these indicators and offers a method for ranking the likelihood that damage might be considered intentional.

5.3 Damage Ranking System

The destruction indicators highlighted the various ways in which one can determine intentional damage. They also demonstrated the uncertainty that surrounds some of the determinations. For this reason, and to make a process of analysis easier, a ranking system is proposed here which draws on the above considerations. This system works on a simple six-category coded system corresponding to a scale of likelihood that damage might be considered intentional (Table 5.4). Some damage is object-specific, though the criteria have been presented as a set of considerations applicable to most Bronze Age metalwork (Table 5.5). A 'not applicable' ranking has been included on the scale, which applies to those objects that do not demonstrate any damage and thus an assessment of intent is not necessary; by definition, damage must be present to rank it. The other categories are now discussed with the relevant criteria and illustrated with examples from South West England. Significantly, this system is designed to rank individual damage, not an overall object. This is because many objects display multiple unassociated damage and thus an object may be attributed multiple rankings.

Table 5.4: A summary of the Damage Ranking codes

Presence of Damage	Damage Ranking	Description
Definitely present	0	Definitely not deliberate
	1	Probably not deliberate
	2	Probably deliberate
	3	Definitely deliberate
Uncertain	Uncertain	Uncertain damage
Definitely not present	n/a	Not applicable

Table 5.5: A summary of the criteria and considerations for applying the Damage Ranking System

Damage Ranking	**Criteria/Considerations**
0 – Definitely Not Deliberate	Post-depositional/post-recovery processes causing damage, such as: • Corrosion • Anthropogenic processes (e.g. ploughing, dredging) • Cleaning Knowledge of the context/post-recovery history
1 – Probably Not Deliberate	Damage indicative of use that can be supported by experimental research: • Irregular edge damage (e.g. nicks, notches, bowing etc.) • Transverse bending associated with other use-marks • Notches of varying depths and/or single notches Objects repeatedly broken in similar locations that might indicate structural weakness (e.g. palstave stops, side-loops, blade tips, rivet holes etc.) Breakage showing signs of casting flaws or common casting errors (e.g. shrinkage hollows in palstave septums) Transverse bending up to 45° with no associated marks or breakage (thin-bladed implements, spearheads) Transverse bending on tools which required compression force (e.g. axes, chisels, gouges, pins) Objects *thinner* than 7.5mm suffering bowing, possibly from soil warping Longitudinal bending of any tools, ornaments and sheet metal that might have occurred through use (e.g. a bracelet deformed to fit better; an awl bent under pressure) Twisting up to 45° with no associated damage (thin-bladed implements and tanged spearheads)
2 – Probably Deliberate	Breakage without associated plastic deformation (e.g. straight breaks across spearheads; no bending of sword blades) – as indicated by the experiments, such damage can be achieved by heating the object and striking it Breakage or fragmentation of an object with hammer or chisel marks that are not in immediate proximity of the break (i.e. beyond 10mm from the break) Breakage associated with transverse bending Patterns of breakage unlikely to be the result of use or structural weakness (e.g. bracelet terminals; socketed axe cutting-edges) Fragments and pieces associated with other objects that were definitely deliberately damaged (e.g. in a plugged socket or in a hoard) Edge/end fragments with no associated marks or casting flaws (e.g. socket rims, blade tips) Multiple broken pieces of different objects conforming to a similar size and/or weight within a single accumulation Transverse bending up to 45° *with* associated marks (e.g. hammer blows)

	Longitudinal bending of any tools, ornaments and sheet metal that is not related to use or function and would render the object unusable Deep notches (over 7mm), or regular, repeated notching Notches in unusual positions (e.g. a hilt plate or an axe face) Twisting up to 45° with associated damage (thin-bladed implements and tanged spearheads) Twisting of ornaments that does not appear to have served a decorative purpose
3 – Definitely Deliberate	Breakage or fragmentation with associated plastic deformation (e.g. crushed socket or intentional bending) Objects in three or more pieces (except where post-depositional processes can be identified e.g. corrosion) Mid-section fragment of an object indicating it was once in three or more pieces Breakage or fragmentation of an object with associated hammer or chisel blows Transverse bending over 45° and *thicker* than 7.5mm (thin-bladed implements, all axes, spearheads) Any transverse bending of axes Any longitudinal bending of thin-bladed implements, spearheads, axes, chisels and gouges Folding (both transverse and longitudinal) Twisting of socketed spearheads, all axe types, chisels, gouges and other tools Twisting over 45° of thin-bladed implements and tanged spearheads Crushing (with consistent corrosion) Plugged Sockets Burning associated with other burnt material and/or associated damage (e.g. bending, breakage, notching)
Uncertain	Applied when objects cannot be classed within the ranking system and it would be misleading to do so. This includes: • Evidence of burning with no associated context or damage • Damage to objects for which there are no indicators of how it may have broken (e.g. unused broken objects with no destruction indicators) • Damage to objects for which there is limited understanding of how such objects were used. • Objects for which breakage and damage is not clear, such as those obscured by corrosion or object forms that are overall uncertain

5.3.1 Definitely Not Deliberate (0)

This ranking refers to any damage observed on objects that can be discounted as the result of intent. This largely refers to post-depositional/post-recovery damage, which is usually informed by assessment of the patina and corrosion products, as well as knowledge of the context in which an object was found and the post-recovery history. By extension, it follows that the criteria presented for the other rankings assume the antiquity of the damage has been confirmed.

5.3.1a Case Study 1: Broad Down (Barrow D) dagger

In 1870 a fragmentary dagger (RAMM-F009) was recovered from Barrow D of the Seven Barrows group at Farway, Devon (Kirwan 1870). The dagger survives in three fragments with a rivet, which are covered in mottled green corrosion (Fig.5.22). The extent of the corrosion suggests that this has caused fragmentation of the dagger. This is supported by two further factors. Firstly, the soils at Farway are acidic, which means that bronze would not survive well in the ground. Secondly, Kirwan's (1870, Pl.5, Fig.1) original depiction of the dagger showed that it was recovered in at least seven fragments, suggesting pieces have been lost or have decayed since recovery. The combination of these factors means that the damage cannot be considered intentional and thus should be ranked 0.

Fig.5.21: The Broad Down (Barrow D) dagger (source: Author courtesy of the RAMM, Exeter)

5.3.2 Probably Not Deliberate (1)

This ranking includes damage deemed likely to be the result of unintentional damage. For instance, breakage at points of structural weaknesses (e.g. palstave stops) or breakages displaying casting flaws should be considered unintentional. Additionally, damage that can be linked to use, such as notches or transverse bending up to 45°, can also be considered within this ranking.

5.3.2a Case Study 2: Winterhay Green palstave

A Middle Bronze Age hoard, including two palstaves, a broken bracelet and fragments of a gold ribbon torc, was recovered from Winterhay Green, Somerset, in unknown circumstances (ASH-F013; Pearce 1983, 517, No.675). One of the palstaves (Fig.5.22; ASH-F013a) has suffered several damage; one of the blade tips has broken away, whilst three of the flanges and the butt have suffered material loss and the side-loop is broken. This palstave appears to have been prepared and possibly used, with casting seams removed and possible working around the cutting-edge. The damaged blade tip reveals a poor casting quality, which may have disposed the metal towards failure over time (Fig.5.23). Similarly, the damage to the butt appears to be the result of excessive wear, such as being hammered into a handle. The flanges and side-loop would have suffered material stress through hafting and use. This combination of factors, and most importantly, the lack of any damage that could be unequivocally associated with intentional actions, suggests the damage are likely the result of accident through use over time or post-depositional and post-recovery processes. However, due to the uncertain circumstances of discovery this cannot be assessed. Therefore, it is appropriate to rank the damage on this object as Probably Not Deliberate.

Fig.5.22: The Winterhay Green palstave (ASH-F013a) (source: Author courtesy of the Ashmolean Museum)

Fig.5.23: Damage to the blade tip of the Winterhay Green palstave (ASH-F013a) (source: Author courtesy of the Ashmolean Museum)

5.3.2b Case Study 3: Herrison House dagger

An Early Bronze Age dagger (DCM-F018) was recovered from Herrison House, Dorset, in uncertain circumstances (Fig.5.24; Gerloff 1975, 46, No.46). This dagger is largely complete with three rivet holes in the hafting end, though one rivet hole has broken through. Consistent patina across the object and the breakage indicates that the damage occurred in antiquity though there are no associated marks. The thinness of the metal at this point (0.5mm) as well as the material stress that may have been sustained through hafting over time indicates that this was probably accidental breakage and thus can be damage-ranked 1.

Fig.5.24: The Herrison House dagger, Dorset (DCM-F018) (source: Author courtesy of the Dorset County Museum)

5.3.3 Probably Deliberate (2)

This ranking is perhaps the most difficult to qualify. It includes objects that display damage which is more likely to be intentional than unintentional, although they cannot be unequivocally assigned Damage Ranking 3. Many of the criteria within this ranking rely on inference from the context or associated damage to strengthen the idea that damage was inflicted intentionally. This includes patterns of breakage that might indicate certain objects were repeatedly broken in similar locations (e.g. the recurrence of bracelet terminals or socketed axe cutting-edges in the archaeological record); transverse bending that falls below the threshold for intent (i.e. 45° for blades), but with associated damage marks; and notches that indicate intent from their distribution, positioning, shape and/or depth.

5.3.3a Case Study 4: Mount Batten socketed axe fragment

Numerous Bronze Age metal artefacts in various conditions were recovered from Mount Batten, Plymouth (PCMAG-F004). Several fragments of Late Bronze Age-Earliest Iron Age socketed axes were recovered and here a socket rim fragment is considered (Fig.5.25; PCMAG-F004d). This fragment has broken on three sides in antiquity through the socket wall and the socket rim; the antiquity of the breaks is indicated by a consistent brown and green patina across the object. There are no macroscopic casting flaws visible in the breaks and no associated destruction indicators, such as plastic deformation. The socket wall is approximately 3.5mm thick whilst the socket rim is 6.7mm thick; the thicker nature of the metal could indicate the piece was less likely to break through use. Moreover, this fragment can be compared with the experimental axes that were broken by heating and striking, indicating this may have been the method of breaking. Other fragments of socketed axe cutting-edges and rims were also recovered, as well as fragments of other objects, suggesting deliberate fragmentation may have been undertaken at this site. The combination of these factors means that the socket rim fragment can be damage-ranked 2.

Fig.5.25: A socketed axe fragment from Mount Batten, Devon (PCMAG-F004d) (source: Author courtesy of Plymouth City Art Gallery and Museum)

5.3.3b Case Study 5: Sandy's Farm spearhead

Two refitting pieces of a Middle Bronze Age socketed spearhead (Fig.5.26; RAMM-F044) were recovered while metal-detecting at Sandy's Farm, Devon (Knight et al. 2015, 46, No.180). This spearhead has broken across the middle of the blade and the tip is missing. Both side-loops are broken and the mid-blade break is consistently patinated with the rest of the object. There are no macroscopic casting flaws in the break and the break has not occurred over a socket hollow. Analysis of the refitting break showed no apparent blow marks, but when the pieces were refitted, a notch is missing from the blade edge at the point of the break. This notch is v-shaped and about 11.2mm long and 9.2mm deep. The corrosion of the notch suggests this also happened in antiquity. The depth of the notch suggests intent and that the breakage was the result of this notching meaning this object should be damage-ranked 2.

Fig.5.26: The Sandy's Farm spearhead, Devon (source: Author courtesy of the RAMM, Exeter)

5.3.4 Definitely Deliberate (3)

This ranking comprises any damage that can be definitely attributed to intent. Many of the criteria within this ranking rely on a combination of destruction indicators that mean there is no alternative consideration for the damage. Furthermore, fragments indicating a multi-piece break, such as a mid-section of a sword, are considered to be the result of intent where the breaks are consistently patinated and can be compared with the experimental work undertaken. The experiments indicated that deliberate fragmentation by heating and striking an object does not always leave associated marks (e.g. bending or hammer marks). Therefore, definitely deliberate damage can be supported by the experimental parallels, especially as other experimental work has yet to produce any comparable results.

5.3.4a Case Study 6: St Michael's Mount Plugged Socketed Axe

A Late Bronze Age hoard was recovered from St Michael's Mount, Cornwall in 2009 (NT-F001; Knight et al. 2015, 34, No.43). This hoard contained complete and fragmentary objects displaying a variety of signs that can be considered intentional, including fragmentation and crushing. One socketed axe within the hoard (Fig.5.27; NT-F001b) has broken unevenly across the middle of the body and fragments of two other objects were lodged in the socket. On one face it is possible to detect a slight bowing in the socket wall, representing an impact blow just above the point of breakage. Meanwhile the plugging of the socket is a deliberate action as part of the depositional process and two fragments inside the socket also appear to have been deliberately fragmented. One represents a side-loop and socket fragment of another socketed axe, whilst the second fragment has been crushed and the specific object type cannot be identified. This is thus a clear example that can be considered intentional destruction. Furthermore, the presence of this within the hoard strengthens the idea that other fragments within the hoard may also be the result of intent.

Fig.5.28: The broken and plugged socketed axe in the St Michael's Mount hoard, Cornwall (source: Author courtesy of the National Trust)

5.3.5 Uncertain

The criteria and considerations presented for the four damage rankings are as comprehensive as present research allows, though there will inevitably be cases in which damage is observed that cannot be ranked conclusively. In these situations, it is most appropriate to consider the damage as ‘Uncertain’, which will limit conclusions being drawn based on subjective assumptions.

5.3.5a Case Study 7: The East Weare spearhead

Two pieces of a Middle-Late Bronze Age spearhead were recovered from the Isle of Portland, Dorset (Fig.5.28; DCM-F019), during construction work pre-1868, though the exact context is unclear (Buckman 1868, 49). The spearhead survives in two non-refitting pieces consisting of a tip fragment and a piece that comprises most of the blade down to the blade-socket junction. Both pieces are covered in a rough, green corrosion that has delaminated much of the surface, meaning details of manufacture and use are largely obscured. The tip of the spearhead has broken from the main body at an angle across the upper blade; the break is corroded consistently with the rest of the object indicating it happened in prehistory. The asymmetrical coring that is apparent from the break likely influenced the tip breaking through one of the thin sections of the socket wall (c.1.6mm thin), though there are no associated marks or casting flaws. Meanwhile, the upper break of the larger spearhead piece is near the break, and not corroded suggesting this may be the result of post-recovery processes. Similarly, the break across the blade-socket junction is black with limited corrosion and has occurred diagonally across the spearhead with some of the blade wing having broken away. Interpretation of these various breakages is thus unclear and coupled with the confusion surrounding the context, it is appropriate to class it as ‘Uncertain’.

Fig.5.28: The East Weare spearhead, Dorset (source: Author courtesy of the Dorset County Museum)

5.3.6 Additional Remarks

There is inevitably flexibility within these rankings. For instance, an object that has broken across a structurally weak point (i.e. Damage Ranking 1), but also displays deliberate impact marks associated with the breakage (Damage Ranking 2) might be more appropriately considered within Damage Ranking 2 than Damage Ranking 1. Similarly, a sword fragment evidencing a multi-break (Damage Ranking 3), but which has been cleaned of any patina and has a contested post-recovery history must be considered ‘Uncertain’, as the post-recovery processes hinder the determination. It should be stressed that this represents a working methodology, subject to alteration and refinement as new research is conducted or new analyses are performed on objects.

Finally, it is perhaps noticeable to the reader that no attempt has been made to incorporate metallurgical compositions or specific parameters of measurable properties, such as hardness, into this Damage Ranking System. This is because of the variability in these features. For instance, one can make the generalisation that a high tin-bronze would be harder than a low tin-bronze, but to set parameters around the effect of this would also require a metallographic analysis. Furthermore, the techniques used to examine the metallurgical composition (e.g. intrusive or non-intrusive) can sometimes produce different results meaning one may draw conclusions based upon inaccurate data. An appreciation of these factors is, of course, essential and should be drawn into the discussion wherever possible, in much the same way context should be considered for determining the nature of the damage.

5.4 Summary

This chapter has presented a thorough assessment of seven destruction indicators, establishing parameters for what might or might not be considered intentional damage on Bronze Age metalwork. This culminated in a Damage Ranking System, which is designed to structure how damage is assessed and interpreted when encountered in the archaeological record; case studies were presented demonstrating how the system works in practice. This chapter thus offers a crucial contribution to the study of deliberate destruction in Bronze Age metalwork. To enhance this further, the rest of this thesis now applies the Damage Ranking System to a case study region – South West England – to enhance how deliberate destruction and subsequent depositional practices might be better understood.

CHAPTER SIX

BRONZE AGE SOUTH WEST ENGLAND AND ITS METALWORK

6.1 Introduction

Chapter 5 presented a methodology for identifying destruction using carefully considered destruction indicators and a damage ranking system, supported by past research (Chapter 3) and experimental work (Chapter 4). This methodology must now be applied to an archaeological dataset to better understand how destructive processes might be viewed in the context of Bronze Age societies. The destruction of Bronze Age metalwork is seen across much of Europe, which clearly represents a data collection task beyond the confines of this thesis. Therefore, a specific study region was selected: South West England (comprising Cornwall, Devon, Dorset and Somerset following Knight et al. 2015; Pearce 1983). Although modern boundaries bear no impression on the movement and practices of prehistoric peoples, they are used here to contain and organise the data. This chapter presents the rationale for selecting South West England as a relevant study region to assess the destruction of Bronze Age metalwork, focusing on the topography, geology and geography of the area, as well as the evidence for material exploitation and inter-regional connections. This is followed by an overview of the Bronze Age metalwork that has been recovered, as well as the depositional practices observed to support the selection of the South West as a study region. This emphasises the value of studying the deliberate destruction and deposition of Bronze Age metalwork in South West England ahead of Chapter 7, which discusses the data collection phase.

6.2 South West England as a Study Region

There are undoubtedly several regions that would be appropriate for a study of the destruction and deposition of Bronze Age metalwork. Knight et al. (2015, 7) highlighted the potential fruitfulness of focusing on deliberately damaged material within the South West, but no analysis of deliberate destruction has ever been undertaken, making this a valuable dataset to be explored.

Furthermore, the South West comprises a variable topography, with metalwork deposits recovered from a range of situations, which allows the conditions and locations of deposits to be compared. This is underpinned by a complex geology that means the South West has numerous metal resources including gold, copper and particularly tin, the exploitation of which likely made it an important region in Bronze Age Europe. Practices and depositions may have been undertaken within different social conditions or for different reasons in this area, linked with the extraction and exploitation of materials. Finally, the geographical positioning of the south-western peninsula occupies an interesting location in Europe, situated between southern England, Wales, Ireland and north-western France. Throughout the Bronze Age, metalwork of South West England demonstrates numerous connections with both immediate and distance regions through its material culture (see for instance the typologies presented in Appendix E) and in some cases the completeness or damage of objects might be linked to this.

Factors influencing the decision to select South West England as a study region can thus be summarised under four broad headings:

1. Availability of data;
2. Topography, geology and geography;
3. Material exploitation; and
4. Insularity and inter-regional connections.

Integral to this is the nature of settlements, monuments and burial practices that developed throughout the Bronze Age. These factors combine to contextualise the exploitation, circulation, destruction, and deposition of metalwork. In the past, case studies on the deliberate damage of metalwork have largely been undertaken in specific areas in which destruction can be observed as part of a cohesive practice (e.g. south-eastern England: Turner 2010a; or the River Thames: York 2002). By contrast, South West England offers a larger geographic region, demonstrating a diversity of situations in which metalwork destruction was undertaken, whilst also providing a manageable area for investigating the relationship between single finds, hoards, and related structures, and landscape features. A summary of the four factors are provided in Tables 6.1 and 6.2, accompanied by a brief discussion below.

Table 6.1: A summary of the main factors for selecting South West England as a study region

County	**Factors**		
	Availability of data (No. of metal objects)	*Topography, Geology and Geography*	*Material Exploitation*
Cornwall	702	- Upland igneous and metamorphic granite outcrops (e.g. Bodmin Moor) - Lowland Devonian and Carboniferous sandstones - Long north and south coastlines with close proximity to North West France, South East Ireland and South West Wales - Extensive river valleys (e.g. River Fal, River Tamar)	Gabbroic clay Granite Greenstone Flint Tin Copper Gold
Devon	941	- Upland igneous and metamorphic granite outcrops (e.g. Dartmoor) - Lowland Devonian and Carboniferous sandstones - Long north and south coastlines with proximity to North West France and South Wales - Extensive river valleys (e.g. River Exe; River Otter; River Dart)	Granite Greenstone Tin Copper Flint
Dorset	1677	- Upland Jurassic limestone (Cotswold Hills) and clays (Blackmore Vale) - Lowland chalk and greensand (Dorset Downs and Wessex) - Long south coastline with close proximity to northern France - Extensive river valleys (e.g. River Stour; River Avon; River Frome)	Clay Kimmeridge shale Minor flint exploitation
Somerset	894	- Devonian and Carboniferous sandstone (Exmoor uplands) - Permian, Triassic and Lower Lias clays and limestones across much of the county - Chalk and greensand (Blackdown hills) - Low-lying coastal zones and floodplains - Long north coastline with close proximity to Wales - Extensive river valleys (e.g. River Avon; River Parrett)	Flint Copper Lead

Table 6.2: A summary of the insular and inter-regional traditions as evidenced by metalwork and other practices

County	**Period**		
	Early Bronze Age	*Middle Bronze Age*	*Late Bronze Age*
General Trends Across South West England	- Influx of the Beaker tradition from Europe e.g. ceramics (Needham 2009) - Copper exploited from Ireland, and later Wales, across the country (O'Brien 2013) - Influx of Baltic amber (Beck and Shennan 1991) - Development of insular dagger styles (Camerton-Snowshill) (except in Cornwall) (Gerloff 1975) - Links between Cornwall and Ireland, Scotland, Brittany and Central Europe (through tin/gold analyses and object styles) (Ehser et al. 2011; Mattingly et al. 2009; O'Connor 2010, 257; Penhallurick 1997; Standish et al. 2015) - Cornwall-Devon Trevisker ceramic tradition (Quinnell 2012), though with some far-reaching connections e.g. Kent (Gibson et al. 1997) - Links between Wessex (Dorset) and Armorica through barrow construction, grave goods, and dagger styles (Gerloff 1975, 82-92) - Somerset barrow styles/grave goods linked with South East Wales and Wessex (Lewis and Mullin 2012) - Links with Central Europe (e.g. bulb-headed pins) (Gerloff 1975, 119; O'Connor 2010, 598) - Connections with northern Europe through faience bead styles (Sheridan and Shortland 2004)	- Continental Europe increasingly supplying raw material to southern Britain (Northover 1982) - Metalwork developments largely consistent across southern Britain – influenced by Ireland and northern Europe as well as insular regionality (Rowlands 1976) - South-western palstaves (Devon, Somerset) > Crediton style (Cornwall) (Smith 1959a; see Appendix E.3.2) - Possible trade routes into areas along the south coast (McGrail 1993) - Settlement similarities between southern England and north-western Europe (Brück and Fokkens 2013; Mordant 2013; Needham 2009; Roberts 2013) - Cornwall-Devon Trevisker ceramics continue (Quinnell 2012) - Central southern England Deverel-Rimbury ceramic wares (Gibson 2004)	- Less individuality, growing inter-regional conformity (settlements, deposition practices etc.) (Fitzpatrick 2007) - Continental metalwork supplies (Northover 1980; 1982) - Plain Ware/Post-Trevisker pottery across southern Britain - Localised metal production - Cross-channel trade routes (O'Connor 1980)

Cornwall	- Largely insular barrow and cairn construction (Andy Jones 2011) - Trevisker ceramic tradition (Quinnell 2012)	- South-western palstaves, Variant Crediton - Trevisker ceramic tradition continues - Links with Continental Europe through pin styles e.g. Picardy pins (O'Connor 1980, 122) - Hollow-set roundhouses (Jones and Quinnell 2011, 217-218)	- Hoarding practices possibly linked with north-western France - Gold deposition linking France and Ireland (e.g. Towednack hoard) (Jones and Quinnell 2011, 224) - Production of South Welsh style axes (Needham 1981a)
Devon	- Largely insular barrow and cairn construction (Andy Jones 2011) - Trevisker ceramic tradition (Quinnell 2012)	- South-western palstaves - Trevisker ceramic tradition continues - Metalwork brought in from northern France (Salcombe Bay) (Needham et al. 2013) - Field systems and stone reaves (Fleming 1988)	- See General Trends
Dorset	- Biconical urns (Gibson 2004)	- Breton/Normandy style palstaves imported (Lawson and Farwell 1990; O'Connor 1980) - Development of Deverel-Rimbury ceramics - Links with Continental Europe through pin styles (e.g. Picardy pins) (O'Connor 1980; n.d.) - "Ornament Horizon" (Smith 1959a; Roberts 2007) - Numerous circular structures with granaries, ponds and fences forming settlements (Fitzpatrick 2007, 117-118)	- Gold penannular rings indicating links between Ireland and eastern England/northern Europe
Somerset	- Biconical urns (Gibson 2004)	- South-western palstaves - Some insular metalwork styles (e.g. double-knobbed sickles; double-looped palstaves) (O'Connor 1980) - Development of Deverel-Rimbury ceramics - "Ornament Horizon"	- Practices influenced by South Wales

6.2.1 Availability of Data

The corpora by Pearce (1983) and Knight et al. (2015) mean South West England presently has one of the most complete catalogues of Bronze Age metalwork of any British region, with over 4000 pieces recorded (Table 6.1); this data can thus be easily sampled and a greater focus can be given to the condition and treatment of the objects. From the published details, finds from a variety of contexts can be readily identified as showing signs of deliberate destruction, making it clear that damaging the metalwork was often part of the depositional process.

6.2.2 Topography, Geology and Geography

The varied topography, geology and geography of South West England is another reason for selecting it as a study region. Recent studies of the area have demonstrated that Bronze Age communities formed relationships with the landscape in which they resided, expressed through a variety of meaningful interactions including settlement and monumental construction, burial practices and depositions (Bender et al. 2007; Owoc 2005); such conclusions have been drawn for other regions across Britain (e.g. Yates and Bradley 2010a; see also papers in Brück 2001). Other studies have shown that the destruction of objects was likely related to topographic features, such as damaged metalwork deposited in the Thames river valley (York 2002), or large fragmented hoards deposited on hilltops and coastlines (Knight *forthcoming*(a); Turner 2010a). Understanding the landscape of the south-western region is thus important for understanding the situation in which practices were enacted. The peninsula comprises a mix of upland and lowland areas, reaching a maximum height of 621m above sea level, whilst also encompassing a varied geology including granite outcrops, limestone promontories, and low-lying chalklands (Fig.6.1; Webster 2007, 3).

The diversity of landscapes across the region makes it possible to observe a variety of practices influenced by the landscape that is being inhabited. For instance, the granite uplands of Cornwall and Devon have preserved similar evidence of extensive barrows, cairns and settlement structures (Johnson 1980; Andy Jones 2005), whilst the chalk geology of Dorset is closely comparable with Wiltshire and Hampshire to the east, meaning burial practices can be more closely linked with these central counties (Gerloff 1975).

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Fig.6.1: The geology of the south-western peninsula (source: Webster 2007, 4, Fig.1.2)

Social groups occupying the uplands of Devon and Cornwall thus likely had a very different relationship with the place they occupied, compared to those living in the chalklands of Dorset or the Somerset wetlands.

This can partly be observed through metalwork depositions. For instance, metalwork depositions in the Middle Bronze Age are relatively rare on the uplands of Dartmoor, occurring instead on the lower areas where major reave systems and settlements have also been found (Fleming 1988; Pearce 1983, 152-155). Likewise, metalwork is more commonly found at lowland settlements in Cornwall than in upland occupational contexts (Andy Jones in Jones et al. 2015, 178ff.). Conversely, numerous Late Bronze Age fragmentary hoards have recently been found on hilltops in Cornwall, signifying the importance of these locations (e.g. St Erth, Breage, and St Michael's Mount; Knight et al. 2015, Nos.5-6, 20-22, 43), whilst in Somerset, the low-lying wetlands offered a significant environment in which metalwork deposition could take place from the Middle Bronze Age onwards (e.g. thirteen complete and broken metal objects recovered from the Glastonbury turbaries; TTNCM-F054).

Significantly, the South West is largely bound by water. The north-western coast faces the Irish Sea and to the east forms the lower half of the Bristol Channel, which faces the southern coast of Wales. Additionally, there is easy access into the estuary of the River Severn and several other rivers (e.g. the River Avon), which may have represented important transportation routes. To the south coast lies the English Channel and northern France. As a result, the south-western region has traditionally been considered as a "trading path… linking Ireland to Brittany and the Continent" (Shell 1978, 259); the recent discovery of the Salcombe sea bed assemblage strengthens the idea that the South West was likely part of an exchange network (Needham et al. 2013). Similarly, the long-lived coastal settlements in the region, such as Gwithian, Cornwall (Nowakowski et al. 2007), Brean Down, Somerset (Bell 1990), and Mount Batten, Devon (Cunliffe 1988), indicate the importance of these places at various periods of the Bronze Age. Furthermore, metalwork depositions are frequently found along the extensive coastline (Fig.6.2).

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Fig.6.2: The distribution of metalwork depositions in South West during the Taunton phase (c.1400-1275 BC) with concentrations along rivers and coastlines (source: Pearce 1983, 150, Fig.4.12)

Finally, the numerous river valleys and water systems that penetrate the South West must be considered. The Avon, the Exe, the Stour, and the Tamar may all have formed significant natural boundaries or locales that encouraged certain interactions with the landscape. Previous studies have emphasised the importance of river valleys and catchment areas, linked with a variety of practices, regarding not only which objects were deposited, but also how and where (e.g. Poyer 2015; Yates and Bradley 2010a; York 2002). Pearce (1983, 146ff; see Fig.6.2) similarly highlighted the significance of river valleys as depositional areas during the Middle Bronze Age with concentrations of metalwork recovered around the River Fal, the River Exe, and the valleys of the Stour and Frome. Such concentrations may be part of a broader set of understandings, perhaps for maintaining socio-political relationships, such as territory boundaries, or in accordance with ideologies about what should be deposited where (Fontijn 2002; Needham 2007; Yates and Bradley 2010a).

6.2.3 Material Exploitation

The South West is significant for its diverse range of resources available during the Bronze Age, including metal, clay and stone (Fig.6.3). The available clay and stone generated extensive material culture remains, whilst also proving vital to the metal production process, as indicated by the mould remains at Tremough, Cornwall (Jones et al. 2015); Dainton, Devon (Needham 1980a); and Sigwells, Somerset (Knight et al. 2015, No.428); and the isolated finds of greenstone moulds from Chudleigh Knighton, and Holsworthy, both Devon (Pearce 1983, Nos.244 and 263).

Significantly, the deposits of gold, copper, lead, and tin that exist in the peninsula likely made it an important location in the Bronze Age, with Cornwall being particularly metalliferous in Britain and Ireland (O'Brien 1999). Copper is the most prolific of the metals that occur in this region, with outcrops across Devon and Cornwall (Pearce 1983, 92). Recent isotopic analyses suggest that the sources of copper were being exploited in Cornwall, at least in the earliest Bronze Age periods (Bray 2012). Despite this, no Bronze Age copper mines have yet been identified in the region, perhaps due to the extensive copper-mining in the modern era (Penhallurick 1997) or else due to the abundant supplies from more substantial Bronze Age mines in Wales and Ireland (O'Brien 2013, 445).

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Fig.6.3: The distribution of metalliferous ores and veins in Cornwall and Devon (source: Dunham et al. 1978, Fig.10)

Instead of copper sources, the South West may have utilised its supplies of tin and gold for trade purposes. Recent work has strengthened the idea that Cornwall may have traded gold on a wide geographic scale. Standish et al.'s (2015) geochemical analysis of lead isotopes in Irish gold artefacts compared against known signatures of Irish and European gold deposits found that the Cornish deposits were the most likely source for many of the gold artefacts. Similarly, minor and trace elements in the gold used to produce the Early Bronze Age Nebra Sky Disc closely matched gold ores from the Carnon stream, Cornwall (Ehser et al. 2011). Gold may thus have become important to local communal groups, not only as a valuable commodity, but as a symbol for connections with other areas. The same might be said of the areas receiving the gold. Somerset and Dorset, for instance, have no source of gold but numerous gold objects; it has not yet been established whether gold in these counties was sourced from Cornwall or elsewhere (e.g. Wales or Ireland) (Northover pers.comm. 2017), but the importation of materials may have increased their inherent value.

Gold exchange in Cornwall, however, could have been a by-product of tin exploitation, which likely occurred in Devon as well. Gold is commonly associated with tin and may have been found while collecting cassiterite ores (see Penhallurick 1986, 160-163; 1997). Of the materials exploited, it is tin that makes the South West unique within the British landscape as this is the only substantial source of tin within Great Britain (Shell 1978). Despite the lack of extractive evidence, it is generally accepted that tin was exploited in this region from the late 3rd millennium BC onwards (Northover 2004; Penhallurick 1986; Standish et al. 2015, 164). This is illustrated by numerous discoveries including: tin beads in the Whitehorse Hill cist, Devon (Andy Jones 2016); cassiterite pebbles at the settlement sites at Trevisker, Higher Besore and Truro College, both Cornwall, and Dean Moor, Devon (ApSimon and Greenfield 1972; Fox 1957; Gossip *forthcoming*); tin slag at Caerloggas Down, Cornwall (Miles 1975); and tin ingots recovered from Bigbury Bay, Salcombe B, both Devon, and off St Mawes, Cornwall (Knight et al. 2015, Nos.50, 109, 163). Furthermore, the tin in the Nebra Sky Disc may have originated from Cornish ores (Haustein et al. 2010).

Therefore, if Devon and Cornwall did supply tin to other regions, this may have represented a significant industry, especially given the volume of tin required to produce the number of copper alloy artefacts seen by the Late Bronze Age. Numerous pieces of Bronze Age metalwork and other prehistoric artefacts have been found associated near or in the Cornish streams suggesting their exploitation by prehistoric societies (Penhallurick 1986, Chapter 25). The objects deposited largely include tools, as well as weapons and ornaments (e.g. a chisel and spearhead found in the Wheal Virgin streamworks in St Austell, Cornwall: PHGM-F053). Depositions associated with tin streams could be symbolic, emphasising links with the land, or offering thanks to the source of the material.

Finally, the lead supplies in the Mendip Hills must be briefly considered. No Bronze Age lead mines have yet been identified in this region (Fowler 1976, 64-65), but lead is a key component of Late Bronze Age and Earliest Iron Age metalwork, indicating that a source must have been utilised. Lead isotopes analyses have indicated that lead from the Mendips and Bristol area was possibly used during the Late Bronze Age (Rohl and Needham 1998, 103, 107).

6.2.4 Insularity and Inter-Regional Connections

The geographical positioning of South West England, coupled with the available material resources, encouraged far-reaching inter-regional connections in the Bronze Age. Conversely, periods of the Bronze Age demonstrate regional insularity in the use of metals and the developments in practices and material culture (Needham 2009; O'Brien 1999); this was also the case in the South West. It is important to be aware of changing prehistoric practices and regional developments in material culture as these indicate the potential movement of ideas and populations in and out of areas such as South West. In turn, this may have affected how different objects were treated and deposited at different times. The main trends of connectivity and regional developments during the Bronze Age are presented in Table 6.2, but it is worth outlining each period here.

6.2.4a Early Bronze Age

Needham (2009) synthesised evidence for the development and movement of different practices and metalworking for the Copper and Early Bronze Ages in southern Britain (Fig 6.4). His work highlighted key changes in funerary rites, ceramic styles, lithic production and metalworking traditions, and how these

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Fig.6.4: A summary of maritime connections between southern Britain and other regions during the late 3^{rd} and early 2^{nd} millennia BC (source: Needham 2009, 32, Fig.2.8).

relate to cross-channel relations with northern Europe and what he terms 'maritories'. Considering South West England specifically, the overall trend portrayed by Needham holds true. In the earliest period (i.e. the Beaker phase), the lack of copper metalwork or barrows in Cornwall and Devon indicates there was limited concurrence with the traditions emerging in other parts of the country at the same time (Andy Jones 2011; 2012; Northover 1999, 214ff.; Timberlake 1999, 99-100). However, an "epoch of barrow-building and cairn construction… around 2100 cal. BC" (Andy Jones 2012, 177) suggests increasing influence from other areas.

Although there was clearly influence from the Wessex Culture to the east – Dorset forms part of this Culture with comparable barrows and grave goods (Gerloff 1975; Woodward and Hunter 2015) – traditions elsewhere in the South West represent localised trends or links with other regions. For instance, the Mendip barrows in Somerset have been paralleled with developments in South East Wales (Lewis and Mullin 2012), whereas the comparable geology and topography of Devon and Cornwall likely influenced similarities in the character and positioning of monument constructions in these two counties, such as stone rows and cairns (Andy Jones 2005; 2011). This illustrates the variety of contemporary practices within this geographic region.

Furthermore, the increasing desire for tin likely encouraged supra-regional connections. Although mines have yet to be identified, tin was likely recovered and used locally (e.g. the tin bead bracelet in the Whitehorse Hill cist burial: Andy Jones 2016) and possibly exploited as far as Central Europe (Haustein et al. 2010). The populations of the South West during this period thus become integrated with a far-reaching network of people. This is evidenced by the varied material culture that developed with different areas of the South West holding different connections. Irish and Scottish style axes, for instance, occur early in the Bronze Age in different contexts, indicating connections between South West England, Ireland and northern Britain; this included an influx of ideas, if not people. Furthermore, links between Ireland and Cornwall are strengthened by Irish-style lunulae found at Harlyn Bay, which were likely produced from local alluvial gold (Mattingly et al. 2009; Penhallurick 1997). Recent metallurgical analyses suggest Cornish gold was used in lunulae in Ireland (Standish et al. 2015) and the Nebra Sky Disc (Ehser et al. 2011); consequently, the South West is increasingly considered to be a major production centre of gold in the later 3rd millennium BC (Penhallurick 1997; Standish et al. 2015). Meanwhile, the Armorico-British daggers from barrows in Dorset in the early 2nd millennium BC evidence the links between Armorica in north-western France and the Wessex region, which is further supported by burial monuments and other grave goods (see Gerloff 1975, 82-92). However, Armorico-British daggers are not adopted in Devon and Somerset, where an insular style known as the Camerton-Snowshill type developed (ibid., 115ff.).

Trends of insularity and inter-regional connections are further evidenced by non-metal objects, including ceramics, amber and faience. Trevisker ware ceramics emerged in Devon and Cornwall around 1700 BC (though possibly as early as 2000 cal. BC: Jones and Quinnell 2011, 216) and continued in use into the Middle Bronze Age. Although its distribution is concentrated in Devon and Cornwall, and to a lesser extent Somerset and Dorset (see ApSimon and Greenfield 1972, 371-375; Quinnell 2012), Trevisker-style urns recovered from Ireland, France and South Wales indicate this pottery was transported over longer distances, either carried with individuals, or recreated in other locations (ApSimon and Greenfield 1972, 375; Quinnell 2012). For example, a Trevisker urn from Monkton-Minster, Kent, was of a Cornish style and produced with Cornish clay, suggesting transport of either raw material or, more likely, the finished product across some 500km (Gibson et al. 1997). This pottery style is thus indicative of the inter-regional connections and movements that were increasingly well-established during this period. Likewise, Baltic amber has been found at numerous sites across the four counties, largely confined to burials, and often found with metalwork (Beck and Shennan 1991, 143ff.; Pearce 1983, Nos.432, 498, 499, 508). Finally, Sheridan and Shortland (2004) have argued the introduction and working of faience originated and spread from the Wessex region around 2000 BC. Faience beads from North Molton, Devon and Boscregan, Cornwall, are particularly indicative of links between the South West and north-western Europe (Sheridan and Shortland 2004, 273, Fig.21.9.2). For Needham (2009, 29), the faience evidence furthers the idea of a Channel/southern North Sea maritory.

From the Early Bronze Age, South West England was clearly integrated with wider regional traditions and connections, whilst also developing insular traditions of material culture. As will be seen later, this period offers a noticeable contrast from the developments that occur by the Late Bronze Age.

6.2.4b Middle Bronze Age

The emergence of regionality noted in the Early Bronze Age continued into the Middle Bronze Age, and connections with northern Europe are increasingly apparent with Continental Europe gradually becoming the main supplier of raw material to Britain (Northover 1982). However, regionally distinct styles of metalwork and pottery emerge, which are useful for indicating the spread of influence into and out of the south-western region.

Early Bronze Age Trevisker wares in Devon and Cornwall continue to develop alongside biconical urns and Deverel-Rimbury wares in Somerset and Dorset in the later second millennium BC (Gibson 2004). The pottery styles thus indicate a division within the region. More broadly, however, ceramic developments occurred alongside relative conformity in settlement patterns seen in both southern England and northern France (i.e. small dispersed villages of round structures and individual farmsteads), beginning in 1750BC and continuing through much of the Middle Bronze Age (Brück and Fokkens 2013; Mordant 2013; Needham 2009; Roberts 2013).

Although general trends in settlement organisation emerge, the topography and geology of South West England means regional differences occur. Circular structures, sometimes in villages, and accompanied by granaries, ponds and fences, develop in Dorset and Wiltshire during this period (Fitzpatrick 2007, 117-118) which contrasts with the various stone structures and reave systems on the granite uplands of Devon and Cornwall (Fleming 1988; 2007; Johnson 1980). Furthermore, hollow-set roundhouses in the Cornwall lowlands indicates a regional variation of a broader structural form; twenty of these structures are currently known from across thirteen sites (Fig.6.5; Jones and Quinnell 2011, 217-218). Conversely, occupation in Somerset is largely limited to small enclosures, artefact scatters, ditches and pits (Fitzpatrick 2007, 118).

Metalworking traditions similarly develop with South West England representing a degree of regional preference coupled with clear connections to other regions. This is particularly demonstrated by the development of palstaves. The earliest British palstaves develop during the Arreton-Acton Park phase (c.1600-1500 BC) and are widespread across Europe. Some examples

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Fig.6.5: The distribution of Middle Bronze Age hollow-set roundhouses in Cornwall (source: Jones et al. 2015, 178, Fig.11.6)

in the South West were likely developed and imported from North Wales, where a large source of copper was being exploited; a palstave from Drewsteignton, Devon, for instance, consists of Welsh metal (Pearce 1983, 105). A distinctive South-Western palstave style emerged during the Taunton phase with high, angular flanges (Fig.6.6), possessing a confined distribution. Most examples have been found across Devon and Somerset, though some are known from Dorset (Fig.6.7). This style appears to have little influence from other regions, nor vice versa, and limited continental connections, with only the Crediton hoard, Devon, containing both a South-Western palstave and a continental form (O'Connor 1980, 56). A variant of this palstave type known as the Crediton variant (Figs.6.7, 6.8) developed and circulated within Cornwall, with a few examples having been found in Devon. Breton and Norman type palstaves are increasingly identified in Dorset, and central southern Britain (Lawson and Farwell 1990; O'Connor 1980, Lists 5 and 7A-B; 2009, 274), which contributed to the development of Transitional and Late palstaves in the Middle-Late Bronze Ages. Palstaves thus illustrate both insular and inter-regional traditions, frequently each other. It is rare, for example to find continental forms with other

Fig.6.6: A South-Western type palstave from Sherford, Taunton (source: Author courtesy of South West Heritage Trust (Museums Service)

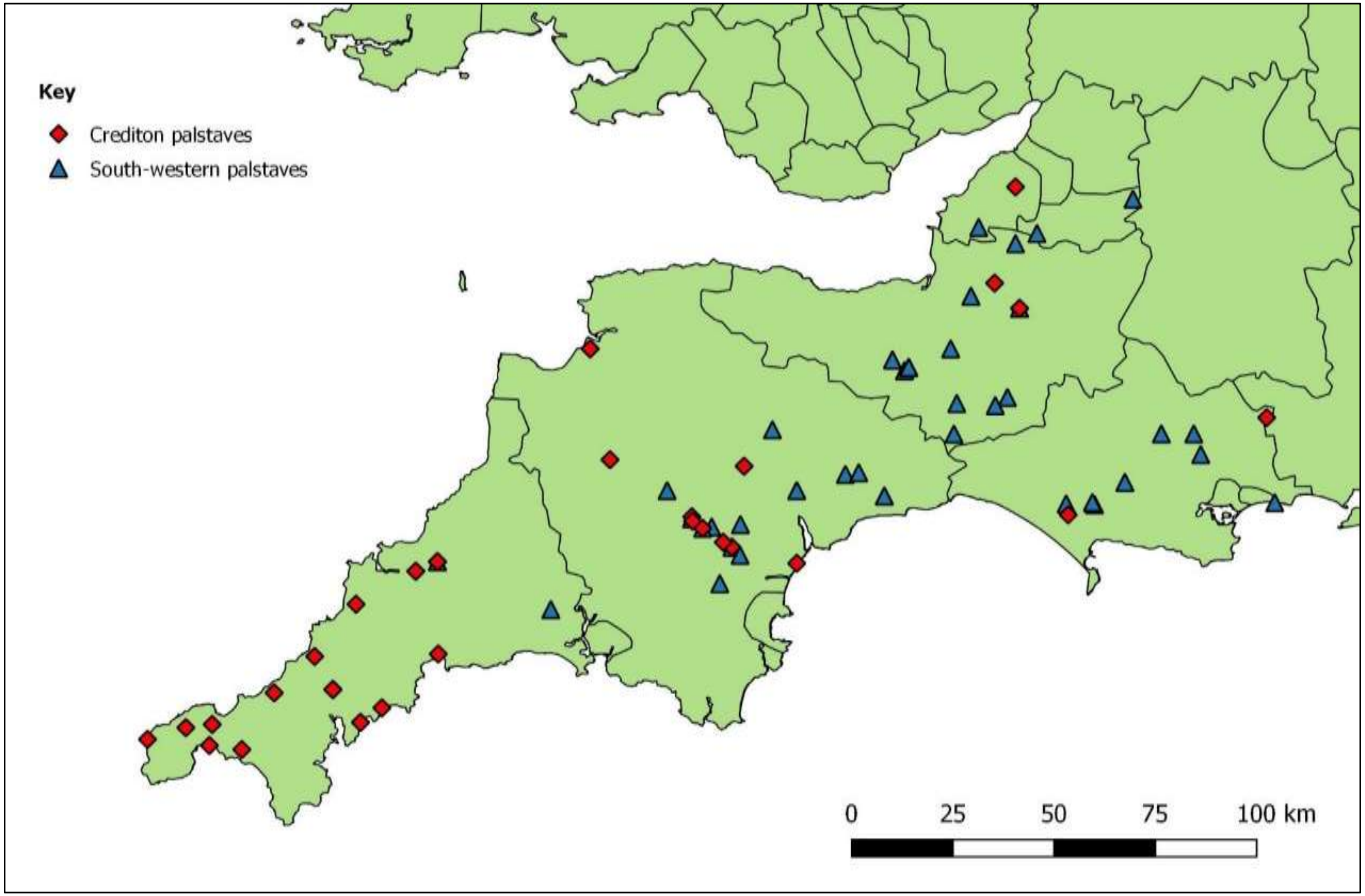

Fig.6.7: Findspots of Crediton and South-Western palstaves in South West England (source: Author created using QGIS and OS data from EDINA Digimap).

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Fig.6.8: A Crediton variant of a South-Western type palstave from Crediton, Devon (source: Smith 1959b, GB.45)

associations, although local South-Western palstaves occur with a variety of objects. Interestingly, palstaves are rarely found broken or damaged, regardless of the type. Any damage that does occur can often be linked to accidental, use or post-depositional processes. It seems inter-regional connections did not impact how objects from different areas were treated pre-deposition.

The Salcombe Bay assemblage, Devon, is particularly significant for understanding how South West England related to the Continent in the late Middle Bronze Age. Approximately 400 pieces of metalwork have been recovered from Salcombe Bay (Knight et al. 2015, Nos. 163, 164), which originated from a variety of sources, including northern France, and the Central Mediterranean (Needham et al. 2013, Table 5.2). The presence of this assemblage close to the southern fringes of Dartmoor indicates that interactions with other regions was likely linked to the supply of tin (Needham et al. 2013, 18). Similarly, depositions along river valleys in the South West might now indicate trade routes. Both single and hoarded objects in a variety of conditions found in these areas could be linked to the importance of this transport system.

Metallurgical analysis of other material has demonstrated that during the Taunton period there was conformity in the metal used across southern Britain, drawing on Welsh copper sources and imports from northern France and Central Europe (Northover 1982, Figs 6, 7; Pearce 1983, 106). McGrail (1993) suggested three possibility cross-channel seafaring routes in the mid-2^{nd} millennium BC, based on the distributions of artefacts, as well as the evidence for routes in later periods. He argues for a key route from western France up to the South West, possibly harbouring in the bays at Poole and Christchurch, from which material would then travel westwards to the Plymouth Sound and Mounts Bay (Fig.6.9). Although speculative, this theory predates the discovery of the Salcombe material, which surely strengthens these ideas.

Other objects inferring inter-regional connections, or at least the import of ideas, include a variety of pins found across the South West. Pins from Gwithian, Cornwall, have links with Reinecke D burials in Switzerland, and

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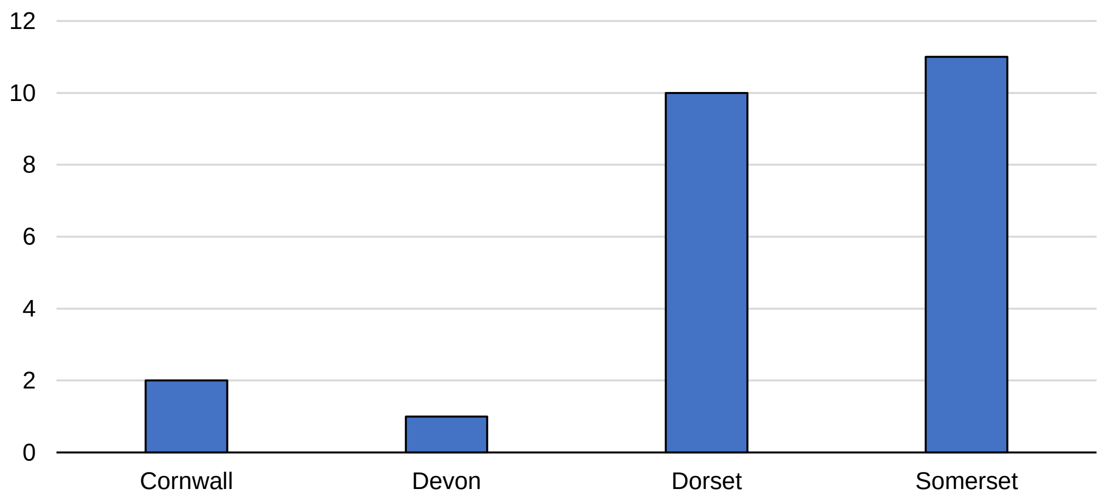
Fig.6.9: Cross-channel prehistoric routes as suggested by McGrail (1993). Routes 5, 7 and 9 were probably used from the 2^{nd} millennium BC, whilst 3, 5, 7, 8 and 9 and associated coastal routes were used in the late 1^{st} millennium BC (source: McGrail 1993, Fig.20.1).

eastern France (O'Connor 1980, 122), whilst two pieces of wheel-headed pin recovered from Gussage St Michael 2 (PRIV-F029) indicate a connection with the Tumulus Culture of Central Europe (O'Connor n.d.). Furthermore, Picardy style pins have been found at Tredarvah and Fowey, Cornwall (RCM-F043f; Pearce 1983, No.53) and Gussage St Michael 2, Dorset (PRIV-F031), whilst true Picardy pins have found in South East England (O'Connor 1980, 76-77, 457-459, Lists 36 and 37), suggesting that pins from the Picardy region in North East France were imported via South East England and the style was adopted and copied further west.

One final tradition to consider is the purported 'Ornament Horizon', which defines the practice of depositing bronze and gold ornaments in hoards in southern Britain during the Taunton-Penard phases (c.1400-1120 BC) (Smith 1959a; Roberts 2007; Wilkin 2017). 24 'Ornament Horizon' hoards are currently known from the South West, with the majority from Somerset and Dorset (Fig.6.10). From the eastern neighbouring counties of Gloucestershire, Hampshire and Wiltshire, seventeen hoards are known (following Wilkin 2017, Appendix 2), indicating an inter-regional connection that aligns Somerset and Dorset closer with the counties of southern central England, rather than the south-western peninsula.

This hoarding of ornaments is particularly relevant in selecting the South West as a study region as some ornament hoards show signs of deliberate manipulation and damage of objects. The Priddy hoard, Somerset, for instance, consisted of nineteen gold ornaments crushed into a ball (TTNCM-F040), whilst

Fig.6.10: The number of Ornament Horizon hoards in each county of South West England (n=24)



the pins and bracelet in the Taunton Union Workhouse hoard, also Somerset, were deliberately broken and bent (TTNCM-F053; see Section 8.3.1). The distribution of this tradition represents an internal division within the study region between communities undertaking different practices, as well as offering a broader link between Somerset and Dorset and nearby counties. Comparable depositions were also being enacted in eastern England, demonstrating a wide spread of practices and ideas. Developments occurring during the Middle Bronze Age in South West England are thus a mix of insularity and broader interconnectivity.

6.2.4c Late Bronze Age

By the Late Bronze Age continental supplies of metalwork were the dominant raw material with a mixture of recycled material and ingots being used (Harding 2013, 372; Northover 1980; 1982). This is indicated by metallurgical analyses, though in terms of pieces of metalwork there is limited evidence of insular traditions within the south-western counties compared to preceding periods.

Several sites of small-scale metal production are known across the South West (e.g. Tremough, Cornwall: Jones et al. 2015; Dainton, Devon: Needham 1980a; Sigwells, Somerset: Skowranek 2012), suggesting a degree of insularity with no conclusive evidence of industrial practices supplying other regions. The emerging styles of socketed axe illustrates this. Whilst several areas of Britain have characteristic forms of socketed axes (e.g. Yorkshire and South Wales), South West England appears to lack any particular style, making this region an interesting case study for studying destruction. When destructive practices are observed, they are typically linked with external influences, as is evident in the fragmentary hoard from Stogursey, Somerset, which has the character of a South Wales hoard (McNeil 1973; see Section 9.2.2d).

Possible links between north-western France and Cornwall have been strengthened recently by discoveries of fragmentary hoards (e.g. St Erth, St Michael’s Mount, and St Levan), which are reminiscent of the Carp’s Tongue deposits in South East England and North West France (Briard 1965; Burgess 1968). Hoards of this variety do not exist elsewhere in the south-western peninsula and it is most likely this tradition was transferred across the English Channel. This theory is reinforced by three Earliest Iron Age hoards of Armorican socketed axes in Cornwall, which Boughton (2015, 262) considered indicative of influence from North West France. Furthermore, goldwork associated with the two Late Bronze Age hoards recovered from St Erth (RCM-F039-F040), as well as the gold hoards from Towednack and Madron (BM-F003; Knight et al. 2015, No.40) have all been argued as indicating contacts between the south-western region and Ireland and along the Atlantic façade (Jones and Quinnell 2011, 224). The South West region thus becomes pertinent for this study during the Late Bronze Age because the select nature of the fragmentation seems to be intrinsically linked with certain influxes of people and ideas.

6.2.4d Summary of Insularity and Inter-Regional Connections

This section has broadly demonstrated the interconnectivity between the South West region and other areas, highlighting how at different periods links appear to have been stronger with different regions, either within Britain or across the Channel. Certain elements of material culture, predominantly metalwork and metallurgical analyses, have been essential to understand the transfer of ideas and materials across wide areas. These are important considerations in selecting the South West as a study region. Many elements are comparable with other regions though there are also significant developments demonstrating the emergence of insular traditions and interactions with the material culture at different times. The diversity of these interactions relating to both the form of objects and the broader exchange networks clearly influenced the motivations behind certain deposits as well as the deliberate destruction of metalwork. Indeed, most recently Bradley (2017) has argued that the exotic nature or histories of objects may have influenced how they were treated; the South West provides ample evidence for exploring this.

6.2.5 Summary of the South West as a Study Region

Undoubtedly, the South West has many similarities with other regions, which may also have been appropriate for investigating metalwork destruction. However, the combination of an up-to-date corpus, the complex topography of uplands, lowlands, river valleys and coastlines, a well-connected geographic positioning, and the only tin resource in Britain alongside other resources makes this region a prime candidate for studying the destruction of metalwork in a region that has seen relatively little analysis in recent years, except on localised scales. Cornwall, Devon, Dorset and Somerset offer a complex region in which the changing nature of practices over the Bronze Age may reflect various renegotiations between people and their material culture. This is further emphasised now by consideration of the character of the metalwork and depositional practices.

6.3 The Character of Bronze Age Metalwork in South West England

The character of the metalwork in South West England must be considered to understand how destroyed objects fit within broader patterns. The last synthesis was conducted by Susan Pearce in 1983; since then significant work has been conducted on metalwork typologies (e.g. various *Prähistorische Bronzefunde* (PBF) volumes), the overall chronological understanding of the Bronze Age (Needham 1996; et al. 1997; Roberts et al. 2013) and the role of depositional practices (Bradley 1998 [1990]; 2017; Fontijn 2002; Needham 1988; 2001; 2007). In this section, the current metalworking chronologies and typologies used to structure the data are considered (see also Appendix E). The overall character of the metalwork is then summarised focusing on the various copper, copper alloy and gold objects that have been recovered from the South West. This establishes the variety and quantity of material that is available for study and ultimately compliments the factors for selecting the South West as a study region. This precedes a discussion of depositional practices associated with the metalwork (Section 6.4).

6.3.1 Metalworking Chronologies (Table 6.3)

The chronological understanding of Bronze Age Britain, particularly in relation to metalwork, has repeatedly been revised over the last century (e.g. Burgess 1980; O'Connor 1980). Developments in absolute chronologies have resulted in a periodisation of the Bronze Age (Needham 1996), as well as a chronology specific to metalwork (Needham 2017; Needham et al. 1997) (Table 6.3). The chronology utilised in this thesis follows that presented for metalwork by Needham et al. (1997), which offers a means for charting the developments of different objects although future developments will inevitably refine these phases; as Roberts et al. comment, an absolute Bronze Age chronology "remains a work in progress rather than a finished product" (2013, 17).

Table 6.3: Two chronological schemes for the British Bronze Age. Needham's (1996) periodisation of the Bronze Age is shown on the left, and Needham et al.'s (1997) Metalworking Phases are shown on the right.

Date (cal. BC)	Period
2500-2300	Period 1
2300-2050	Period 2
2050-1700	Period 3 (Wessex I)
1700-1500	Period 4 (Wessex II)
1500-1150	Period 5
1150-950	Period 6
950-750	Period 7
750-450	Period 8

Date (cal. BC)	Metalworking Assemblage (MA)/ Phase
2450-2125	MA I/II
2125-1950	MA III Migdale
1950-1875	MA IV Aylesford
1875-1725	MA V Willerby
1725-1500	MA VI Arreton
1500-1400	Acton Park (Acton 2)
1400-1275	Taunton
1275-1150	Penard
1150-1020	Wilburton
1020-920	Blackmoor
920-800	Ewart Park
800-600	Llyn Fawr

6.3.2 Typologies

Typologies are typically used to structure Bronze Age metalwork, with frequent reassessments and reinterpretations. The range of objects under study in this thesis means that reconciling different typologies is useful for understanding which objects were in use at different times. A full reconciliation and discussion of different types in presented in Appendix E, which is summarised in Figures 6.11-6.14 under the headings: *Weapons*, *Tools*, *Axes,* and *Ornaments*. These functional divisions are purely subjective (cf. Rowlands 1976) and have been set against the current chronological understanding. The arrangement/dating of object types is approximate and abutting types should be used to indicate how different objects align chronologically, rather than as developments of each other. Furthermore, the typologies used are those most relevant to the region, incorporating typologies from different regions or countries when beneficial for the typological assessment or discussion. Gaps within object classes indicate that no objects from the South West have yet been found dating to the relevant metalworking phases though some form was probably in existence/use.

These typologies allow the material to be structured, but ultimately neglect the context of the find; typologies must thus not be relied upon too heavily. They nonetheless allow one to observe technological developments within a given area or period, whilst offering chronological structure to the material. Where typology does not add to the discussion, it will not be heavily considered further.

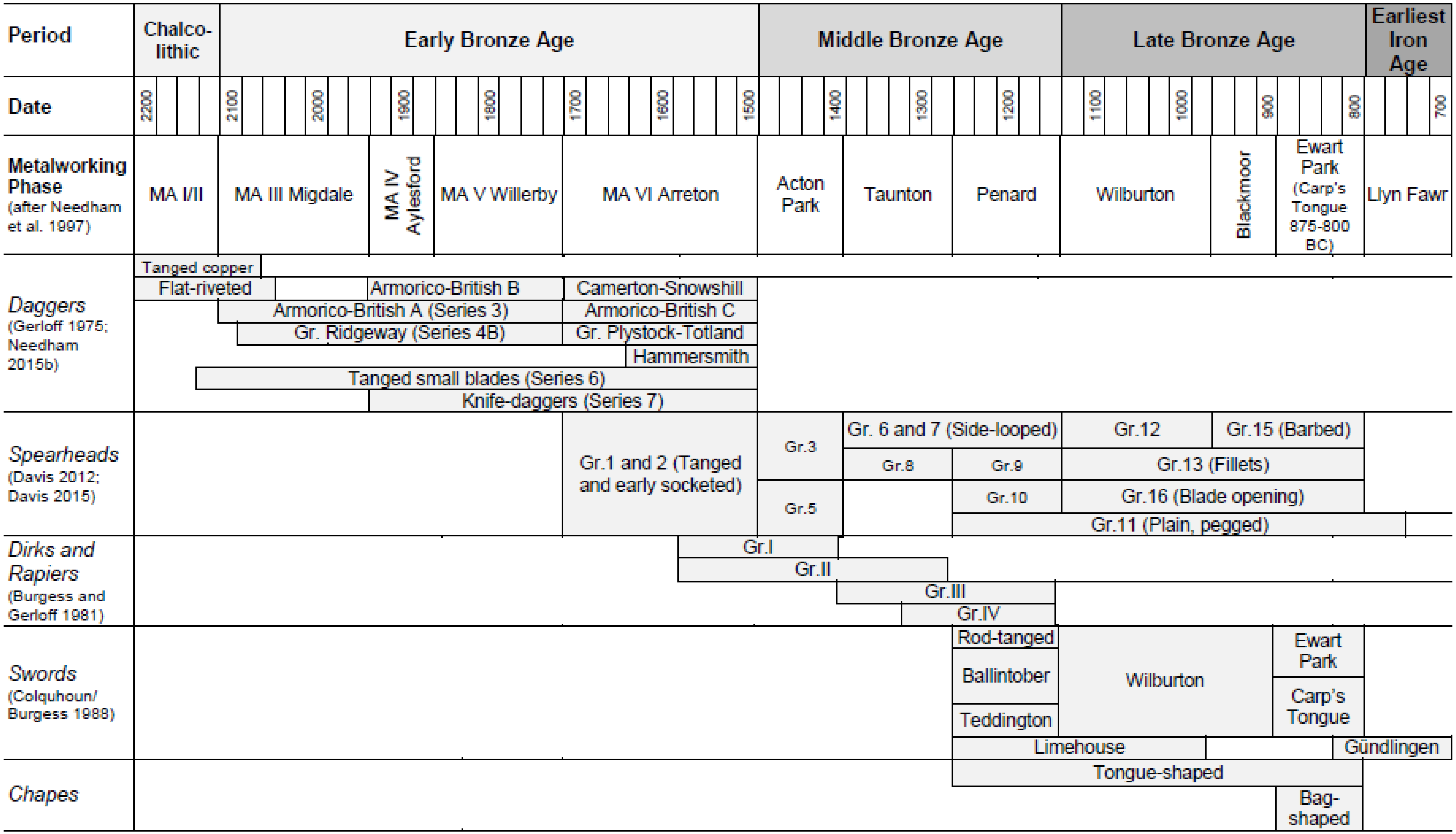


Fig.6.11: A typo-chronological scheme for the development of weapons throughout the Bronze Age drawing on the typologies presented in Appendix E.

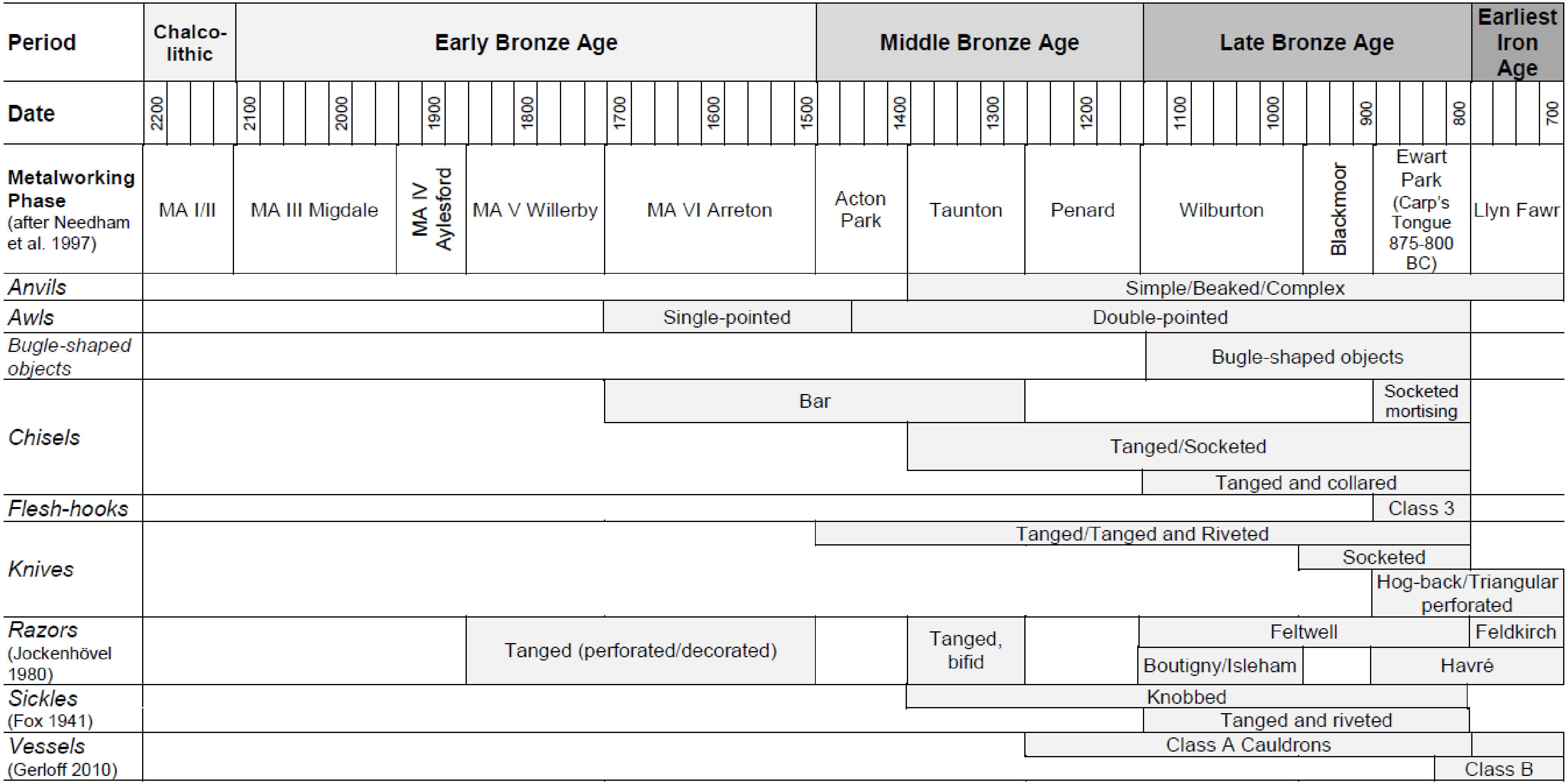


Fig.6.12: A typo-chronological scheme for the development of tools and equipment throughout the Bronze Age drawing on the typologies presented in Appendix E. Socketed tools are presented in **Fig.6.13** alongside axes due to constraints on space.

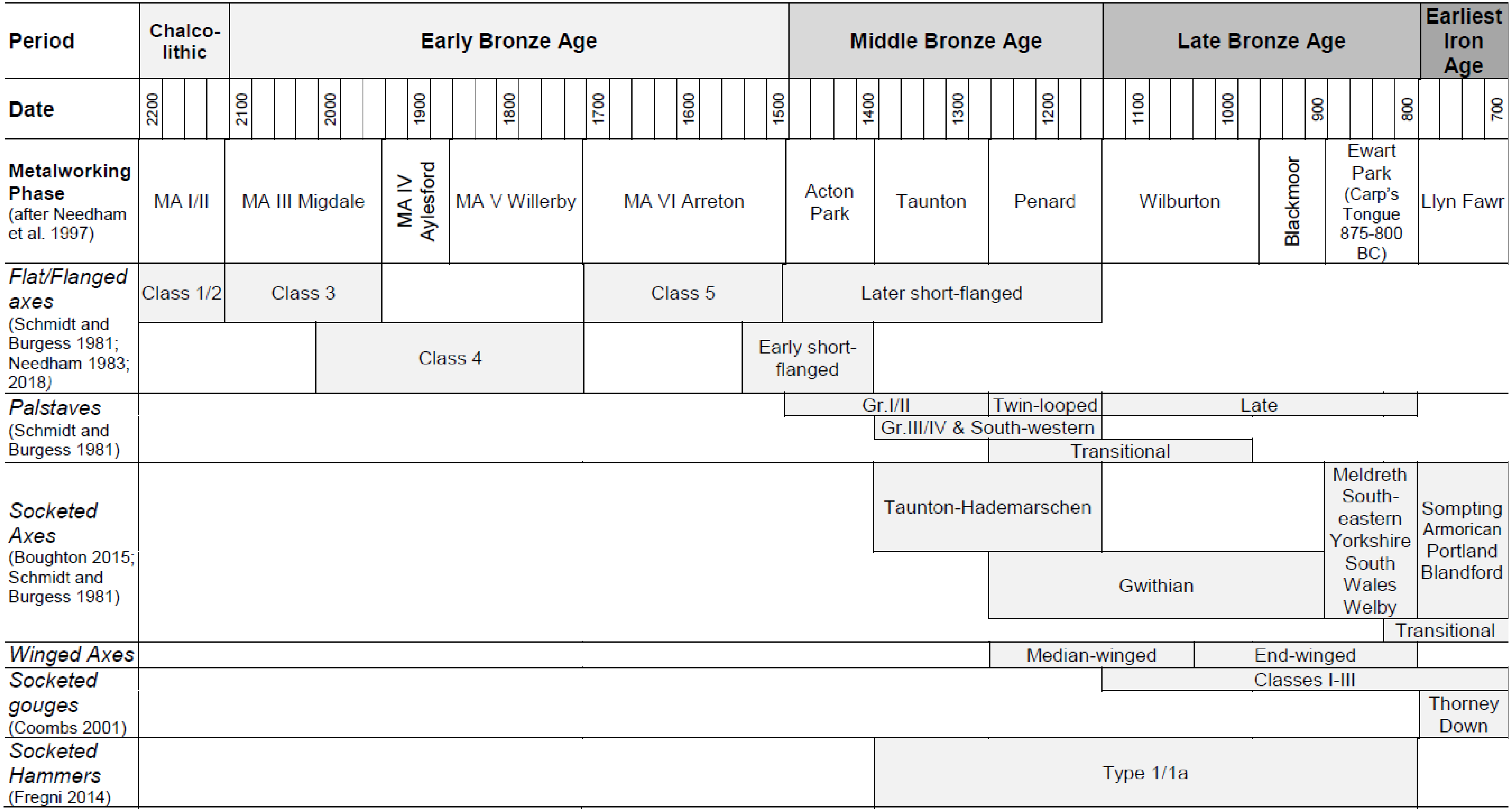


Fig.6.13 A typo-chronological scheme for the development of axes and socketed tools throughout the Bronze Age drawing on the typologies presented in Appendix E.

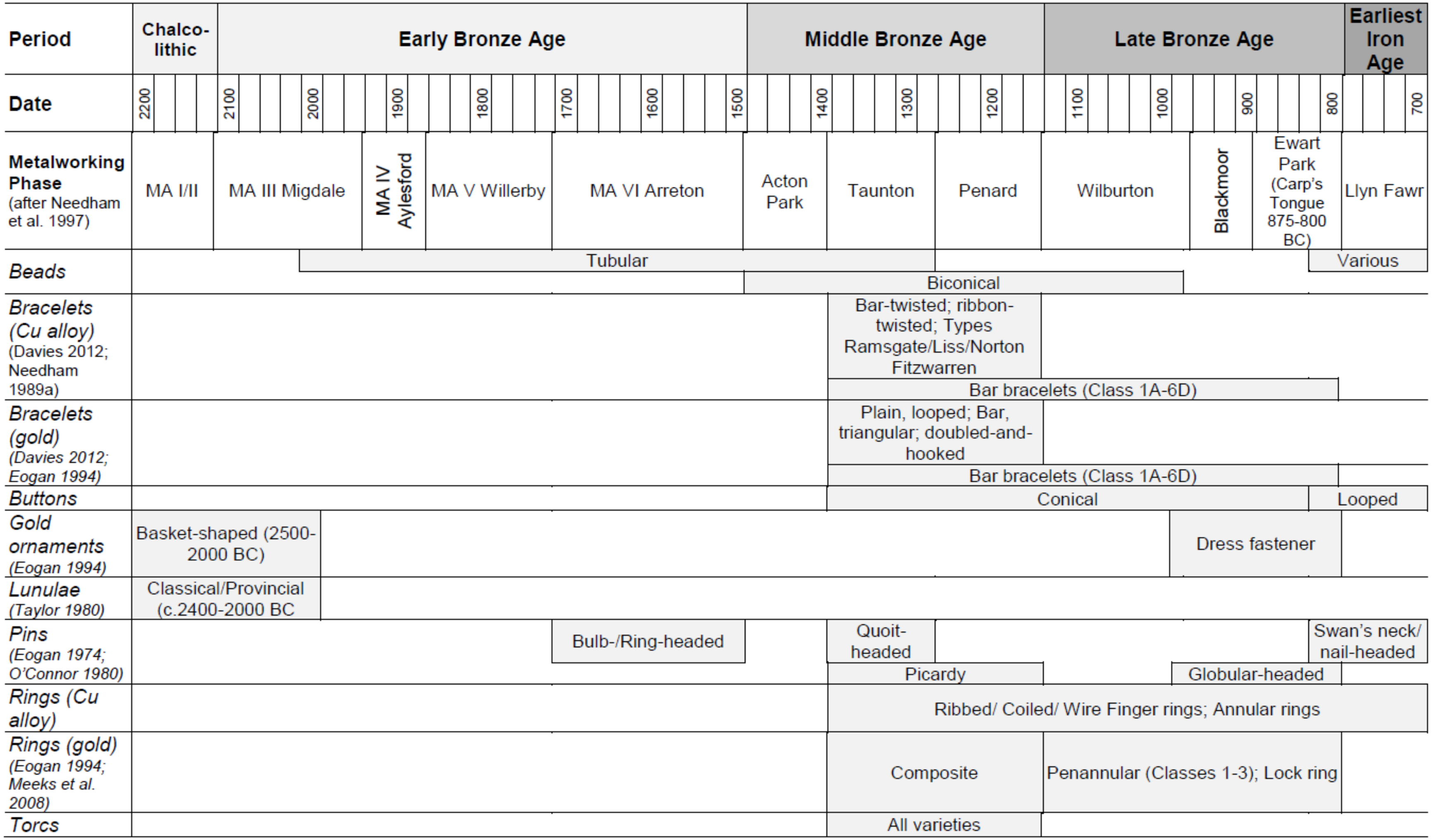


Fig.6.14: A typo-chronological scheme for the development of copper alloy and gold ornaments throughout the Bronze Age drawing on the typologies presented in Appendix E.

6.3.3 The Metalwork

Figures 6.11-6.14 illustrated the range of object types present in the South West, though it is worth considering their individual representation, as this can indicate which objects might have held significance to Bronze Age populations and consequently which objects are worth investigating. Approximately 4200 pieces of Bronze Age metalwork are currently known from the South West, accurate as of 28th March 2017. This presents a large dataset (Fig.6.15) and includes an updated corpus of material building on Pearce (1983) and Knight et al.'s (2015) catalogues. The exact number of finds from the region cannot be calculated due to losses and poor antiquarian records of large 18th and 19th century finds. This analysis broadly assesses the overall character of the metalwork with copper/copper alloy objects separated from gold ones. The depositional context of each find (e.g. single find, hoard, burial etc.) is considered following this analysis.

6.3.3a Copper/Copper alloy Objects

Figure 6.16 presents 4071 copper/copper alloy Bronze Age objects across 45 object types. Socketed axes dominate the numbers, followed by ingots and palstaves. These numbers are partially distorted by large finds, with 777 socketed axes from Langton Matravers, Dorset (Roberts et al. 2015); over 300 ingots from Salcombe B, Devon (Needham et al. 2013); and 90 palstaves from the Marnhull hoard, Dorset (Lawson and Farwell 1990). Even omitting larger deposits, the overall trend remains the same.

Spearheads and swords are also numerous and ten additional object types tally between 50 and 100 objects, with the highest numbers being flanged axes and daggers/knife-daggers, armrings/bracelets and pins. Tools other than axes (e.g. gouges, chisels and hammers) occur infrequently and fourteen of the object types comprise fewer than ten objects. When divided into broader functional categories, tools clearly dominate the archaeological record, whilst weapons and ornaments combined represent less than 20% of the total (Fig.6.17). Although simplistic, this breakdown clearly highlights the character of the material in South West England.

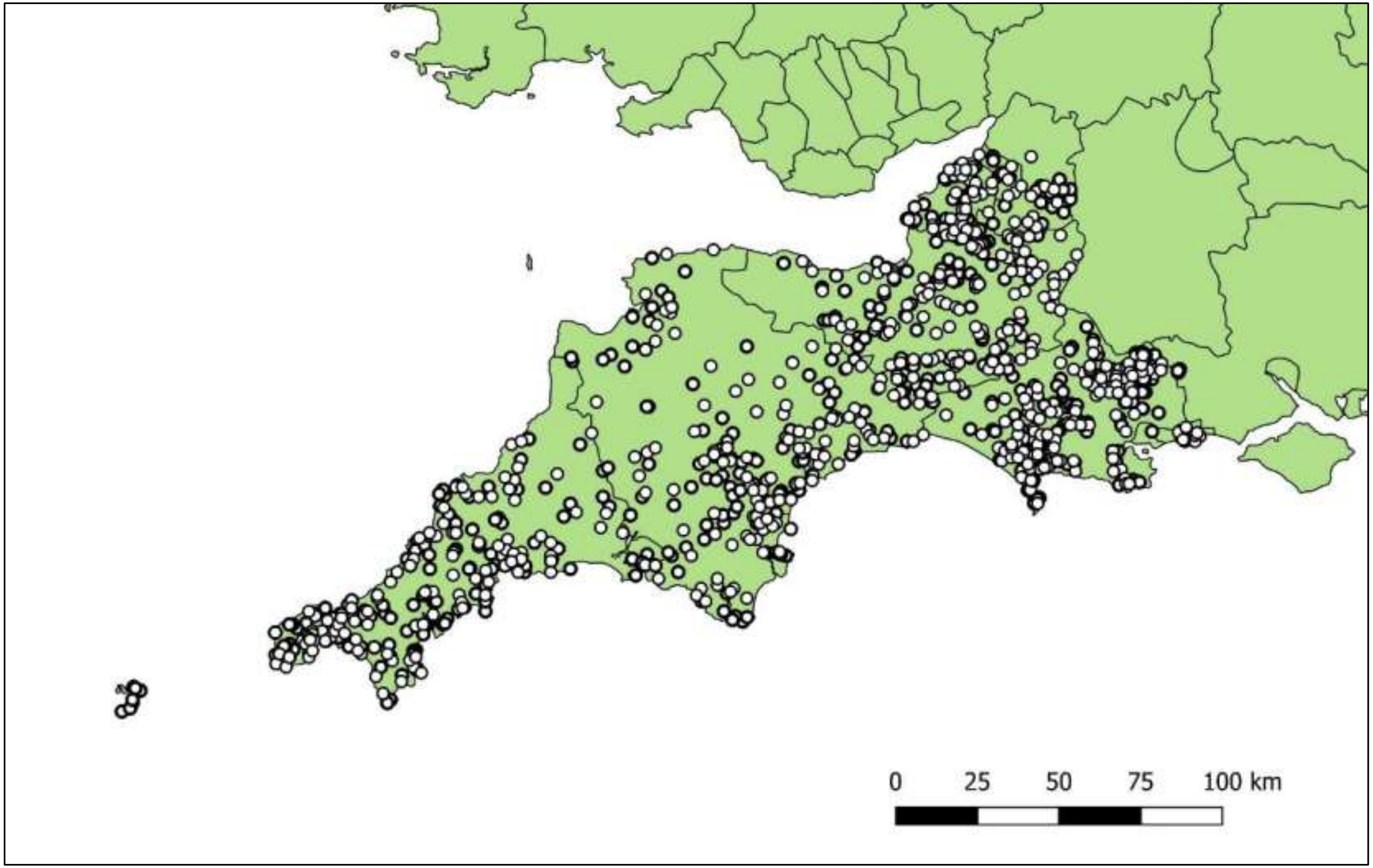


Fig.6.15: All Bronze Age findspots from South West England (source: Author created using QGIS and OS data from EDINA Digimap).

Fig.6.16: The relative frequencies of all copper/copper alloy objects from South West England (n=4071)

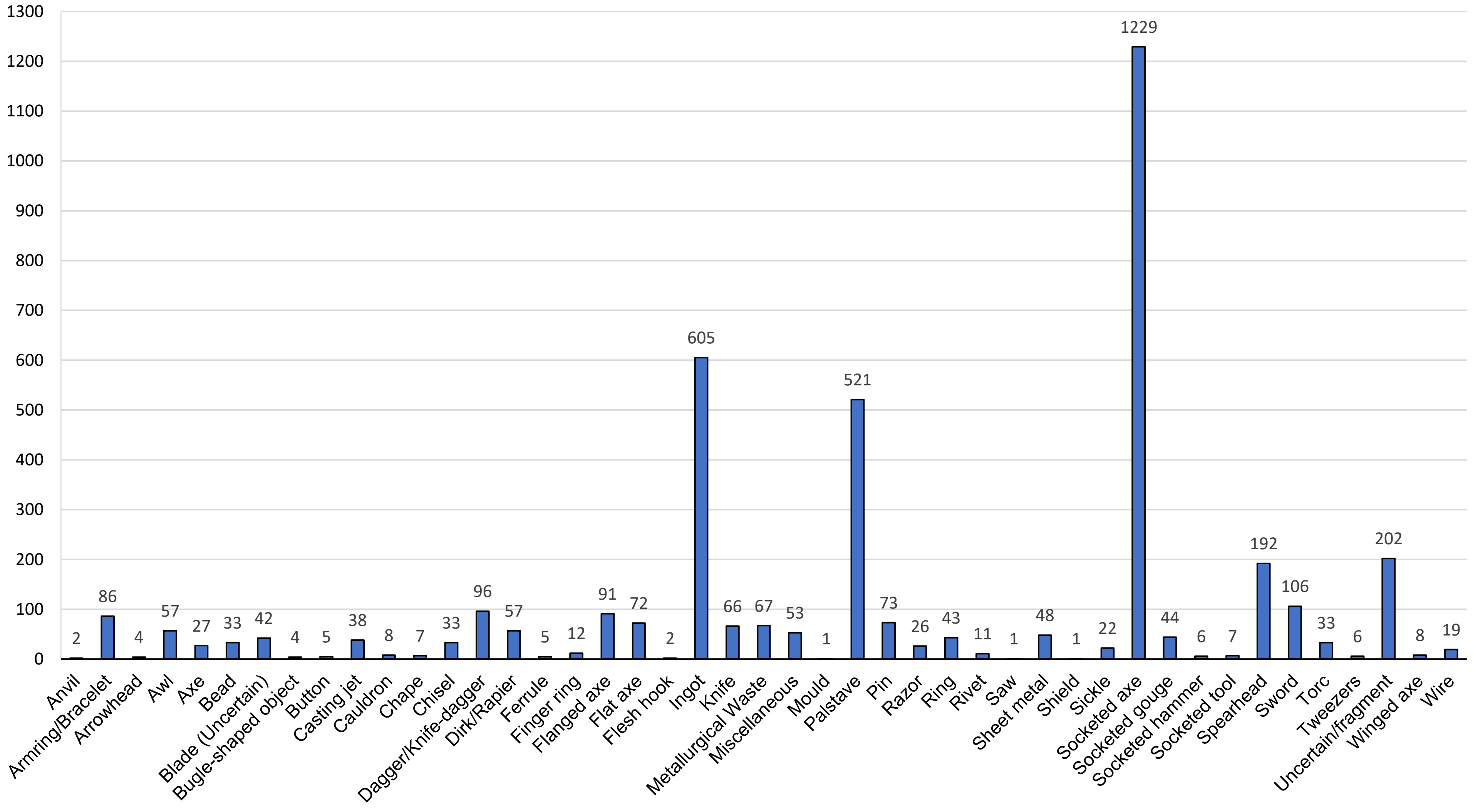
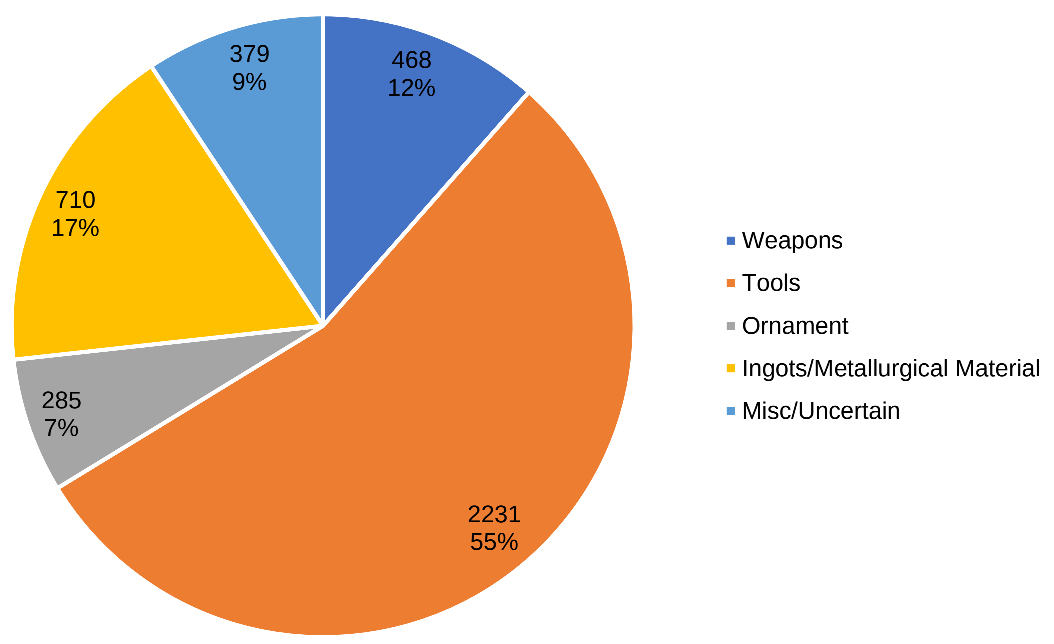


Fig.6.17: The relative proportions of Bronze Age copper/copper alloy objects in South West England divided by broad function (n=4071)



This, however, does not account for the typo-chronological changes of objects. Of all copper/copper alloy objects, 3527 (c.87%) could be classified within the four main periods (Fig.6.18). Due to uncertainty around dating or classifying some objects, c.6% was grouped under broad transitional phases. Finally, 284 (c.7%) were classed as “Bronze Age” or “Uncertain”; these latter objects have been excluded from the subsequent analysis to focus on those that can be broadly dated. This overview emphasises the potential for this material to be analysed as a dataset.

Throughout the Bronze Age, there is an overall rise in object diversification followed by a shift to low variation in the Earliest Iron Age (Fig.6.19). This is unsurprising as depositional practices also change in this latter period.

Table 6.4 divides object frequencies within each type by period, offering further resolution of the key objects deposited. For instance, daggers/knife-daggers and flat and flanged axes comprise over three-quarters of all copper/copper alloy objects dating to the Early Bronze Age, whilst most other objects number fewer than ten.

Fig.6.18: The numbers of Bronze Age copper/copper alloy objects in South West England split by period (n=4071)

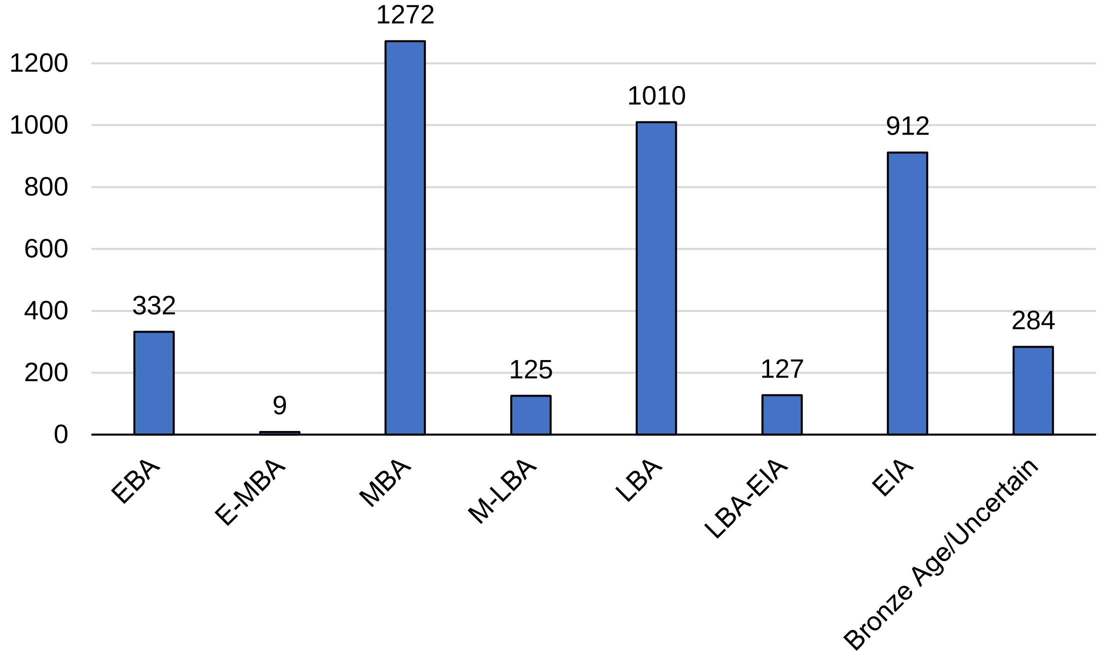
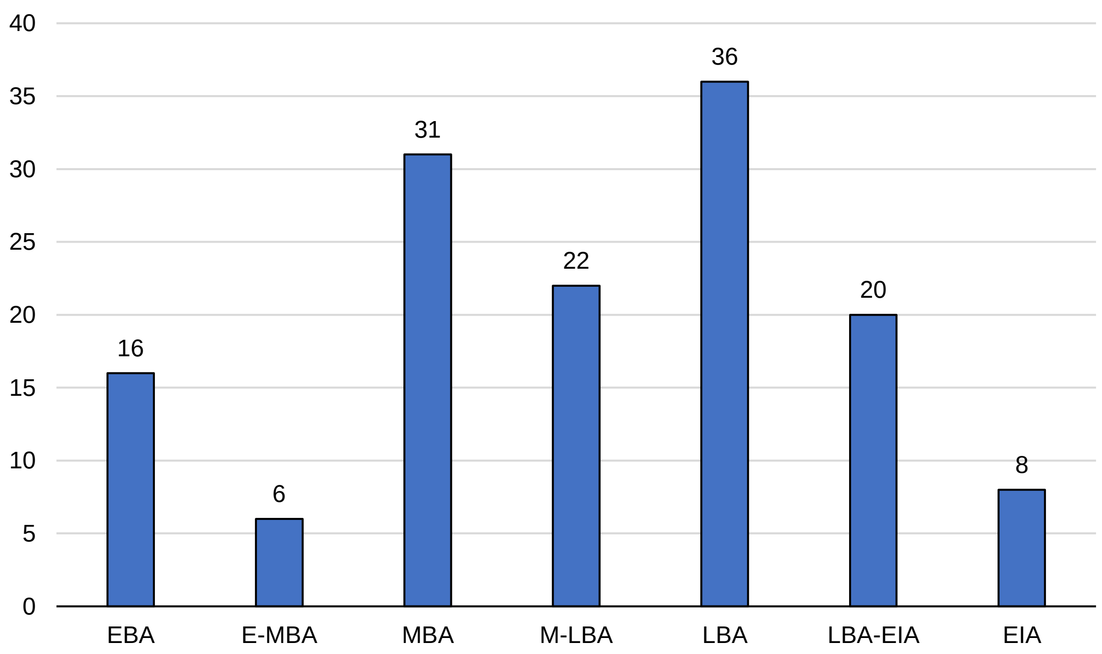


Fig.6.19: The number of different object types identified for copper/copper alloy objects in South West England split by period (n=139)



Meanwhile, there are 1272 Middle Bronze Age copper alloy objects, a large majority of which are palstaves (41%). The high number of ingots known from this period (320) come from a single site: Salcombe Bay B; without this find, ingots would be completely absent from Middle Bronze Age contexts. Almost all other object types number fewer than thirty, with many represented by only one or two examples (e.g. the South Cadbury shield, the Shepton Mallet mould, or the Taunton and Wrington socketed hammers, all Somerset). Exceptions, however, include dirks/rapiers, spearheads, armrings/bracelets and torcs, which are increasingly common in the period (Rowlands 1976).

The Late Bronze Age also sees a greater variety of objects. However, nearly 50% of the total number of objects comprise socketed axes (268) and ingots (211), whilst over half of the types are represented by fewer than ten objects. The number of ingots is complimented by a rise in fragmentary material, metallurgical waste and casting jets, all of which might be considered material associated with production processes. It is also noteworthy that the largest volume of moulds, crucibles and other casting material is deposited at this time in South West England (Knight 2014b). Copper alloy ornaments, however, are relatively few, with armrings/bracelets, torcs and finger rings tallying nine objects combined. A shift away from depositing copper alloy personal adornments towards weapons and production waste can thus be observed.

The Earliest Iron Age offers a contrasting situation. Only copper alloy objects are known during the Llyn Fawr period (800-600 BC), tallying 942 objects across eight object types. Of these objects, 889 (c.94%) are socketed axes, of which 777 are from Langton Matravers, Dorset. The remaining material largely constitutes tools (four razors and seven socketed gouges), ingots and metallurgical waste. There is clearly a strong concentration on the production and deposition of axes in this latest era (Boughton 2015).

Table 6.4: All object types divided according to broad chronological period.

Object	EBA	E-MBA	MBA	M-LBA	LBA	LBA-EIA	EIA	Bronze Age/ Uncertain	Total
Anvil	-	-	-	2	-	-	-	-	2
Armring/Bracelet	-	-	54	14	6	4	-	8	86
Arrowhead	-	-	2	1	-	-	-	1	4
Awl	23	1	3	9	14	-	-	7	57
Axe	-	-	5	5	2	-	-	15	27
Bead	3	-	-	-	27	-	-	3	33
Blade (Uncertain)	1	-	13	7	13	2	-	6	42
Bugle-shaped object	-	-	-	-	4	-	-	-	4
Button	-	-	1	-	-	3	-	1	5
Casting jet	-	-	3	1	29	2	1	2	38
Cauldron	-	-	1	-	1	6	-	-	8
Chape	-	-	-	-	6	-	-	1	7
Chisel	1	-	5	12	11	1	-	3	33
Dagger/Knife-dagger	88	1	-	-	-	1	-	6	96
Dirk/Rapier	1	2	53	-	-	-	1	-	57
Ferrule	-	-	-	-	5	-	-	-	5
Finger ring	-	1	5	3	3	-	-	-	12
Flanged axe	69	3	17	-	-	-	-	2	91
Flat axe	71	-	-	-	-	-	-	1	72
Flesh hook	-	-	-	-	2	-	-	-	2
Ingot	-	-	320	2	207	9	7	60	605
Knife	3	-	7	11	41	3	-	1	66
Metallurgical Waste	-	-	8	1	40	3	1	14	67
Miscellaneous	32	-	4	-	3	1	-	13	53
Mould	-	-	1	-	-	-	-	-	1
Palstave	-	-	511	8	2	-	-	-	521
Pin	8	2	30	2	21	3	-	7	73
Razor	7	-	2	1	8	3	4	1	26
Ring	1	-	8	-	30	2	-	2	43
Rivet	1	-	1	-	3	1	-	5	11
Saw	-	-	-	-	1	-	-	-	1
Sheet metal	-	-	-	-	12	33	-	3	48
Shield	-	-	-	1	-	-	-	-	1
Sickle	-	-	13	5	2	2	-	-	22
Socketed axe	-	-	16	14	269	38	887	5	1229
Socketed gouge	-	-	-	-	31	4	9	-	44
Socketed hammer	-	-	2	3	1	-	-	-	6
Socketed tool	-	-	5	-	2	-	-	-	7
Spearhead	6	-	86	15	72	-	-	13	192
Sword	-	-	19	3	81	-	-	3	106
Torc	-	-	31	-	1	-	-	1	33
Tweezers	-	-	-	-	6	-	-	-	6
Uncertain/fragment	16	-	41	-	38	6	2	99	202
Winged axe	-	-	-	-	8	-	-	-	8
Wire	-	-	5	5	8	-	-	1	19
TOTAL	331	10	1272	125	1010	127	912	284	**4071**

This overview emphasises several trends in the deposition of metalwork in South West England. For each period axes are dominant deposits, regardless of technological shifts. Given the multi-functionality of this tool, this is unsurprising. Assessing the practices associated with these various objects across the Bronze Age and the conditions in which they were deposited should thus be the focus of any investigation into south-western metalwork. Furthermore, shifts in the variety of metalwork being produced and deposited indicates elements of social practices and decisions about both technological developments as well as what was important, or conversely unimportant, to place in the ground; the combinations of certain objects types may also be significant.

6.3.3b Gold Objects

Figure 6.20 presents 163 gold objects across 15 types from the Bronze Age. Determining broad object types for gold items is difficult as many are fragmentary or indeterminable. This is illustrated by the “ornament” type, which comprises objects which likely functioned as some form of adornment, such as pendants or ribbon strips, but cannot be assigned a definitive ‘type’. Fifty-eight of the objects (c.36%) are armrings/bracelets, 19 are rings, and 17 are torcs/neckrings. Many of the object types comprise just one or two rare or unique objects (e.g. the Rillaton gold cup).

One-hundred-and-forty-four objects (c.88%) could be assigned a broad period within the Bronze Age, whilst 19 (c.12%) were classed as Bronze Age or Uncertain (Fig.6.21). The limited numbers in the Early Bronze Age makes it difficult to identify any trends. Instead, the individualistic nature of the gold objects seems significant, representing rare and unusual forms. The sparse nature of gold objects is juxtaposed against the relatively high numbers of copper alloy objects in the same period.

Fig.6.20: The relative frequencies of all Bronze Age gold objects from South West England (n=163)

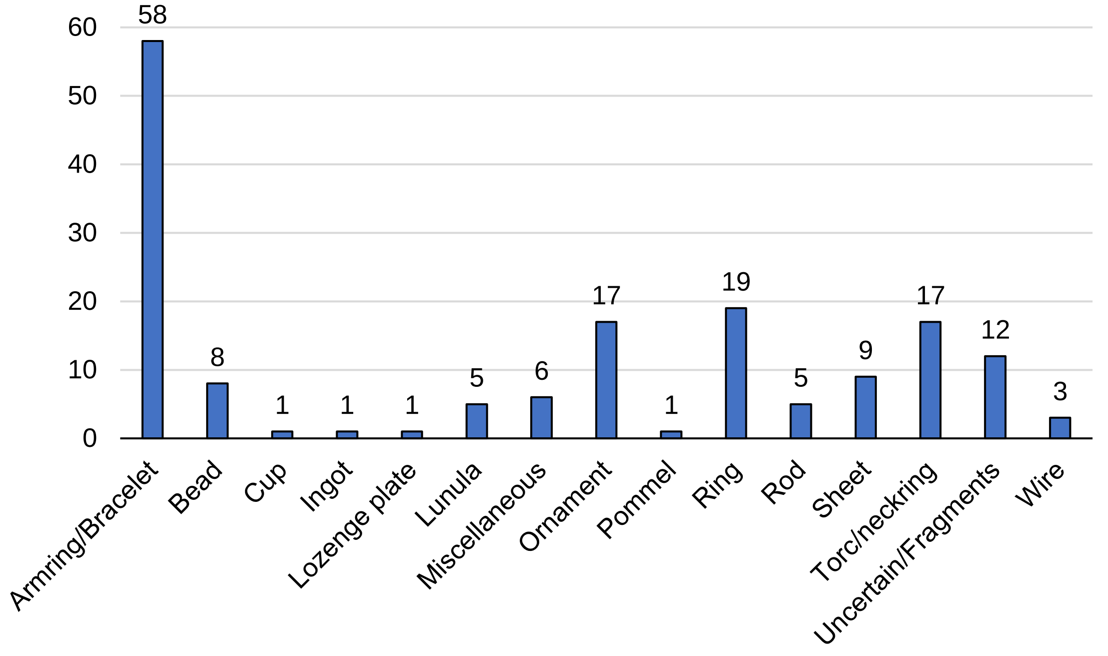
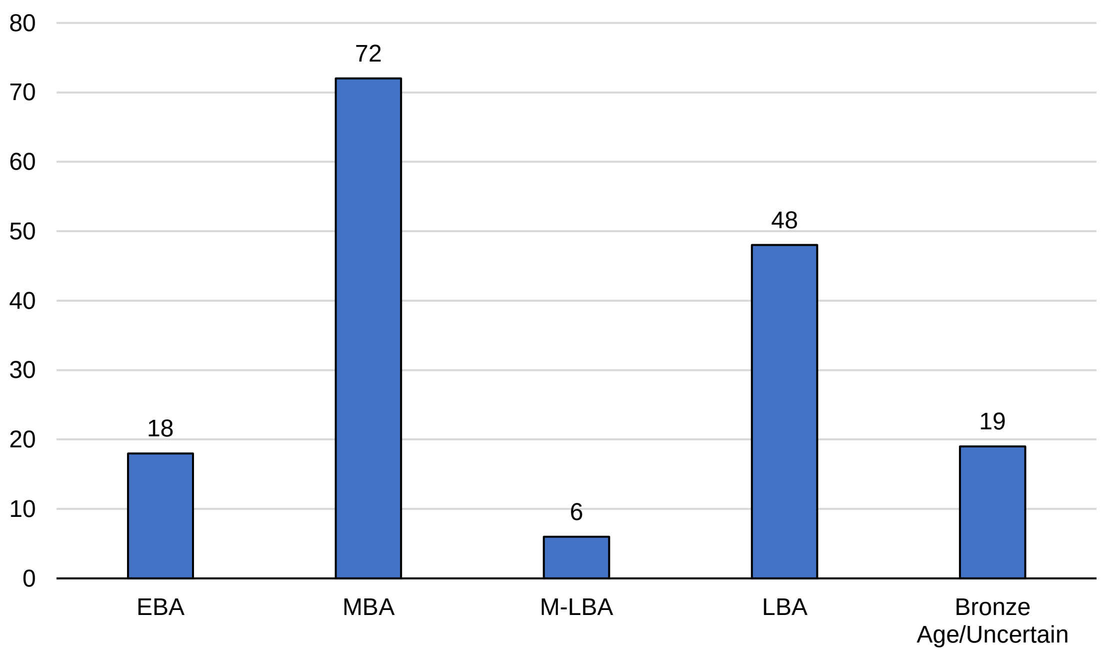


Fig.6.21: The Bronze Age gold objects in South West England according to broad period (n=163)



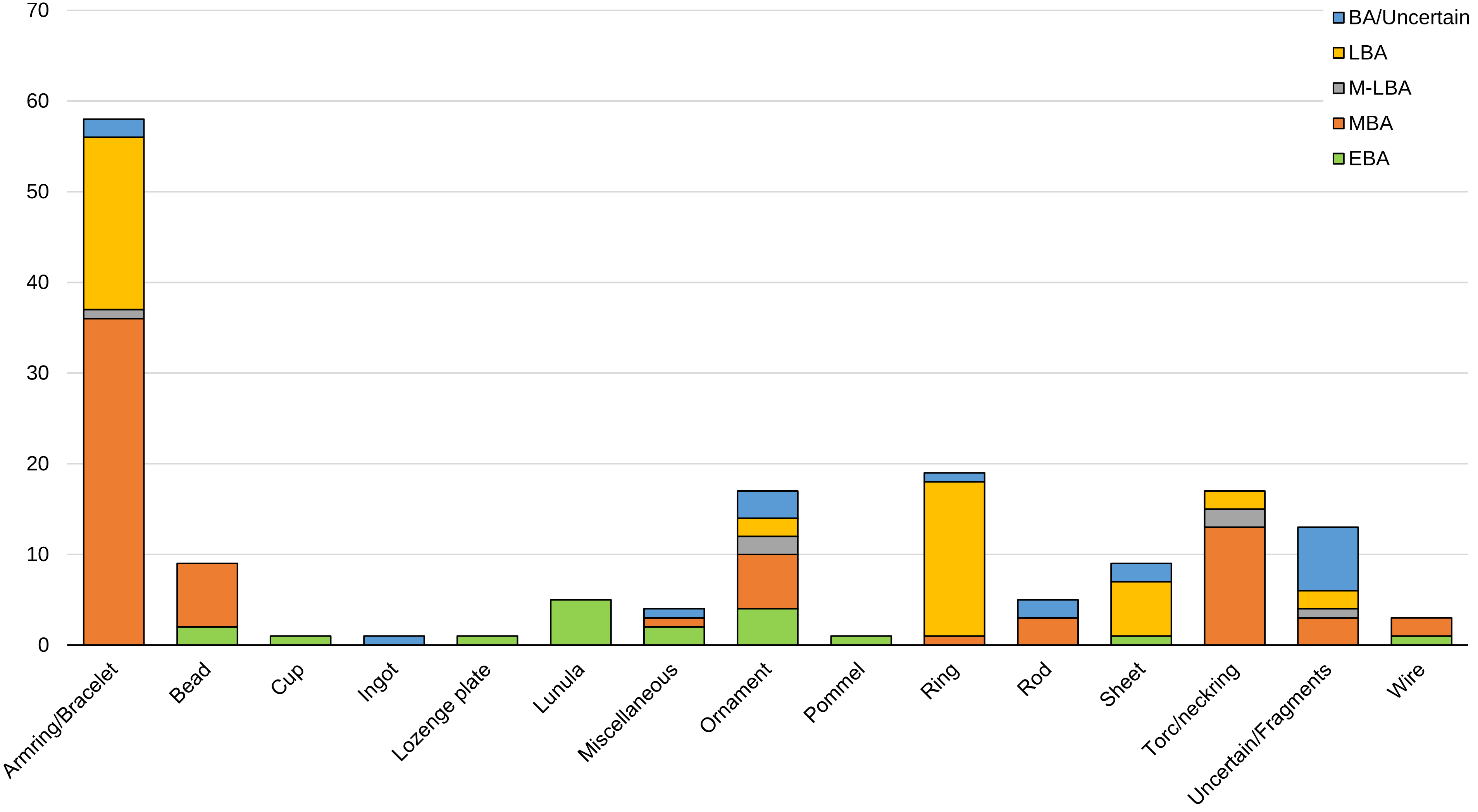
Seventy-two gold objects were recovered from Middle Bronze Age contexts, whilst 48 date to the Late Bronze Age. Armrings/bracelets dominate both periods, indicating a greater industry in producing ornaments (Fig.6.22). In the Middle Bronze Age, this is mirrored by the numbers of copper alloy armrings/bracelets and torcs also produced, though bronze and gold ornaments traditions possibly did not occur simultaneously (Roberts 2007). The smaller number of gold objects recovered from the Late Bronze Age, and reduced range of object types, indicate a reduced production from the Middle Bronze Age, with the concentration on body adornments. This is particularly interesting, as contemporary copper alloy counterparts are limited.

No gold was recovered from the Earliest Iron Age, reflecting a broader trend across the country (Northover 1993). The reasons for this are uncertain, though may result from recycling practices and the limited deposition of this type of material.

6.3.3c Summary of the Metalwork

This section on copper-based and gold objects has necessarily been descriptive establishing the principle object types and developments present in the South West, ahead of a broader discussion during the material analysis (Chapters 8 and 9). Establishing overarching trends in object production and deposition is vital for conceptualising key objects that require analysis, and which may have held significance to Bronze Age communities. Furthermore, these statistics allow one to place the South West in relation to the wider context of Britain. It is, for example, well-established that there is a rise in both copper alloy and gold ornaments during the Middle Bronze Age in southern Britain (cf. Rowlands 1976), and fragmentary metallurgical material is a feature across England in the Late Bronze Age (Needham 1990a; Turner 2010a). By establishing that the South West England region accords with wider trends offers the opportunity to extrapolate ideas beyond the South West and relationships between people and their metalwork might thus be understood on a broader scale. However, understanding the material in isolation is inappropriate; the context in which such material is found equally as important, if not more so, than the objects themselves (Bradley 1998a [1990]; 2017; Fontijn 2002; Needham 2007).

Fig.6.22: The relative frequencies of all gold objects from South West England divided by broad period (n=163)



6.4 Depositional Practices

This thesis has yet to deal with the overall question of deposition, namely its intentionality and function. To what extent can one identify deliberate deposition over loss or discard, for instance? When was deposition performed for ritual or profane purposes? How might one interpret different functions of deposits? Such questions have formed the topic of extended debates (e.g. Bradley 1998a [1990]; 2017; Brück 1999b; Fontijn 2002, 13-22; Garrow 2012; Needham 1988; 2001; 2007).

The term 'Depositional practices' here covers a broad range of activities. Defining these practices is influenced not only by the number of finds within a deposit, but also by the presumed functionality of the objects (e.g. tools, weapons, ornaments etc.), and the overall context in which the deposit was made (e.g. dryland or wetland, settlement, burial etc.). The full debate is beyond the confines of this thesis, but the approaches towards understanding depositional practices, particularly *selective* deposition (Fontijn 2002; Needham 1988) and *structured* deposition (Garrow 2012; Richards and Thomas 1984), will be summarised here.

Much debate has focused on defining hoard deposits, which has been dominated by three main classes (following Evans 1881, 457-459) based on function:

- Personal – collections of objects likely to have belonged to an individual;
- Merchant/Trader's – collections of complete objects ready for use; and
- Founder's – accumulations of broken objects, scrap material and ingots.

There have been subsequent amendments and reinterpretations, which have, for instance, considered distinctive votive deposits, or hoards containing specialised metalworking tools (Rowlands 1976, 100). A major reinterpretation divided hoards according to the various combinations of object types present (i.e. weapons, tools and ornaments) (Rowlands 1976, 100-102; Bradley 1998a [1990]). This was advantageous for studying Middle Bronze Age metalwork, which largely lacks metallurgical material or casting waste. However, these theories have limited appreciation of single finds, other than those found within burial situations. For South West England, Pearce (1983; Knight et al. 2015) avoided the term 'hoard' and instead referred to 'unassociated' isolated finds and 'associated' finds, which incorporated single finds from archaeological contexts (e.g. burials), as well as metalwork hoards. There was limited assessment of the purposes of associated finds though.

A key issue of the debate around depositional interpretations has been understanding what constitutes a ‘ritual’ or ‘utilitarian’ deposit. Fontijn (2002, 115ff., Table 2.3) emphasised that from its conception in the mid-19th century through to the 1990’s, there was an unwavering approach to how one should define such ritual and non-ritual deposits. This incorporated the contents of deposits, such as the types of objects and their treatments and associations, as well as distinguishing between wetland and dryland deposits (ibid.). However, more recent studies have advocated a more nuanced approach (e.g. Becker 2013; Bradley 1998a [1990]; 2013; 2017; Fontijn 2002; 2008a; 2008b; Needham 1988; 2001; 2007). Becker (2006; 2013), for example, argued that the importance of the deposit may lie in the treatment and functionality of the object(s), as well as where and how the deposit was conducted, and the overall social motivations behind it, rather than, for instance, the size of the deposit. The deposit of a single sword may have held as much value (or more) than the deposit of a larger accumulation (ibid.). Meanwhile the context should be defined beyond the simplistic terms of ‘wet’ or ‘dry’, with different types of locations utilised for different purposes (cf. Bradley 1998a [1990], 9-10; 2000, 47-63; 2017, 23-27; Fontijn 2002, 211-212, Table 10.1; 2008b; Yates and Bradley 2010a). Furthermore, the biographies and life-histories of the objects should be a key focus (cf. Bradley 2017; Fontijn 2002; Woodward and Hunter 2015). Most importantly, emphasis has been placed on not applying terms of ‘ritual’ or ‘profane’ *a priori*, but rather to use a data-led approach to determine the interpretation of the hoard (Arnoldussen 2015; Fontijn 2002; 2008a; Needham 2001). This approach has been demonstrated particularly effectively by Fontijn’s (2008a) re-evaluation of the Voorhout hoard.

The Middle Bronze Age Voorhout hoard, Netherlands, consisting of eighteen axes and a chisel, has traditionally been considered an example of a ‘trader’s’ or utilitarian hoard. This definition has often been applied to hoards of axes deposited during the Middle Bronze Age, especially in non-metalliferous region such as the Netherlands, referring to their assumed function as a store of tradeable material. However, Fontijn (2008a) identified several atypical features of the hoard. It consisted of worn and broken objects rather than freshly cast artefacts and included a mixture of Welsh, English and French objects, whilst the overall accumulation was deposited in a marshy location near the coast. The foreign nature of the objects suggested they were imports, but their deposition in a marsh indicates that they would not have been easily retrievable (ibid., 13ff.). Drawing on the ethnographic work of Bloch and Parry (1989), Fontijn (2008a, 15) argued this hoard represents a process of symbolic conversion, where foreign 'alienable' commodities were viewed as 'polluted' and required symbolic transformation by culturally-understood processes such as deposition. Consequently, the Voorhout hoard represents a token deposit of a larger set of imported cargo material; the process of deposition transformed alienable commodities into inalienable property for use in local manufacturing processes (ibid.). This hoard thus exemplifies the issues surrounding outright definitions of ritual or profane.

Simultaneously to these developments in hoard studies, questions arose surrounding the appropriateness of the term 'ritual', particularly in relation to structured deposits at prehistoric settlements and monuments (Bradley 2005; Brück 1999b; Hill 1995; Richards and Thomas 1984). A 'structured deposit' refers to objects that have been deliberately arranged and deposited in the ground. A comprehensive summary and critique has recently been addressed by Garrow (2012) and supplemented by a variety of responses (Berggren 2012; Chapman 2012; Fontijn 2012; Hansen 2012; Thomas 2012). Most notably the debate has surrounded what might be considered 'ritualised' deposits, and what might have been part of everyday accumulations. As Brück (1999b, 329) highlighted, what appears 'odd' to us may not have been conceptualised as such in prehistory. This of course should not deter from the significance of the acts but removes the loaded implications of the term ritual (Garrow 2012, 106). Indeed, Brück (1999b), and later Fontijn (2012), suggested an abandonment of the term, though it has generally been retained to juxtapose mundane and everyday practices with a more critical application (see Fontijn 2002, 21; Garrow 2012). These should not be seen as two static opposing concepts but rather as a sliding scale to conceptualise deposits (Thomas 2012). The human and object agency behind depositions and indeed the actions undertaken prior to deposition is an important part of understanding the deposits; as Chapman stated: "people making the structured deposit were positing relations between places, persons and things" (2012, 131). Inherent to this is the increased focus on the performance of deposition (Bradley 2005; A.M. Jones 2012, 144-170;

Pollard 2008). Moreover, like his work on hoards, Fontijn (2012, 121f.) called for a greater focus on the pre-deposition biographies of the objects and to incorporate that story into discussions on depositional practices.

Historically, structured deposits have been considered separately from hoard deposits and isolated single finds. However, increasing focus on the deliberate arrangement of hoard deposits from the Bronze Age means that hoards should also be considered structured deposits (e.g. Fontijn 2002; Hansen 2012; Needham 1988, 232; Wilkin 2017). Moreover, the deliberate destruction of objects is increasingly identified as part of these processes, becoming part of the performance of deposit as well as a key structural element, and an expression of agency and social reproduction (e.g. Brück 2006a; Chapman 2000; Chapman and Gaydarska 2007; Hansen 2013; A.M. Jones 2010a).

The current theoretical positioning is important for approaching the south-western material as it emphasises that whilst finds may be separated into individual categories, such as single or multiple finds, there are other elements that might be significant, such as the topographical location in the landscape (on a coastline, in a river valley, on a hilltop etc.), the treatment of the objects (e.g. destruction), and the life-histories of the objects. Furthermore, this overview promotes a data-led approach; terminology describing deposits as ‘founder’s hoards’ or ‘votive’ are increasingly unhelpful (cf. Hansen 2013) and thus metalwork depositions will be approached from an objective perspective not based on prior assumptions about the nature of deposits. This is not to deny that some depositions may in fact be best classed as an offering or as a stockpile of goods, but rather that past interpretations will be critically analysed within this study.

Depositional practices have therefore been separated into six main categories: Single Finds; Scatters; Associated Objects; Hoards; Burials; and Occupational Contexts (Table 6.5). These categories offer a simple method for presenting an overview of the main depositional practices associated with metalwork throughout the Bronze Age in South West England, without applying loaded terminology. They are by no means exclusive of each other, however, and are adjusted according to individual case studies, with some sub-categories offered.

6.4.1 Single Finds

Single finds are those objects lacking any associated material or observable context. This therefore excludes any single metalwork finds made in burials for example. As Pearce (1983, 197) noted however, this serves a purely practical purpose as seemingly isolated finds once had a known context whether that was in a deposit for which there is no longer evidence or as a loss or casual discard. Comments on this category are thus made broadly, highlighting trends evident in the data. In some cases, multiple single finds have been made within a certain area perhaps whilst metal-detecting, but are otherwise seemingly unrelated; it is possible that such discoveries may infer a significant landscape location.

One-thousand-and-seventy-five single, unassociated metalwork finds are currently known from South West England, incorporating most object types. Isolated finds are routinely made by chance and recorded through the Portable Antiquities Scheme (PAS) with recent use of metal detectors increasing the odds and resulting in finds recovered from a variety of landscape contexts and in a variety of conditions.

The number of single finds tends to rise from west to east (Fig.6.23), though these numbers should be taken cautiously as this may be influenced by modern activities. Extensive metal-detecting in Cranborne Chase, for instance, from the late 1980s to the present day has contributed more than fifty single finds to the tally for Dorset. Additionally, detailed findspots for many of these single finds are unknown or otherwise protected by the PAS, making it difficult to identify trends in deposition situations.

The highest number of single finds date to the Middle Bronze Age, followed by the Late Bronze Age (Fig.6.24). However, the condition of objects alters through the Bronze Age, with many of the isolated finds being largely complete in the Middle Bronze Age but fragmentary in the Late Bronze Age. It is noticeable that this pattern is reflected in the same objects types found in other contexts (e.g. hoards or burials).

Some object types, such as swords, are typically found incomplete, often represented by small fragments. The un-diagnosable nature of many fragments (e.g. socket rims or mid-blade sections) may have influenced their recovery, with the focus of finders on identifiable and more complete specimens.

Table 6.5: A summary of the various depositional practices discussed in-text with the number of findspots and volume of metalwork that can be attributed to each practice within South West England.

Depositional Practice	Description	No. of Findspots	Total No. of Metalwork
Single Finds	Objects lacking any known context or associated material.	1075	1075
Scatters	Objects found within close proximity in an area, such as a field, sharing a typo-chronological span	31 + 9 possible	198
Cave Scatter	Objects found in a cave site alongside a variety of other material	2	16
Seabed Scatter	Associated objects found on the seabed	3	422
Associated Objects	Two objects assumed to have been deposited together	35 + 11 possible	86
Hoards	Three or more objects found deposited together in a single location	85 + 26 possible	1873
Burials	All metalwork deposits made in association with human remains	146 + 24 possible	221
Occupational Contexts	Objects deposited in contemporary features indicating occupation (e.g. field systems, roundhouses)	28 + 4 possible	66
Occupational Scatters	Objects loosely associated with contemporary occupational layers, but lacking a specific context	7 + 2 possible	166
Occupational Hoards	Accumulations of three or more objects found in closed deposits within a settlement (e.g. a pit or boundary ditch)	3 + 2 possible	23
Uncertain/Unknown	Objects for which find records are unknown, incomplete or lost	40	56
	TOTAL	1533	4202

Fig.6.23: The number of Bronze Age single finds in South West England divided by county (n=1075)

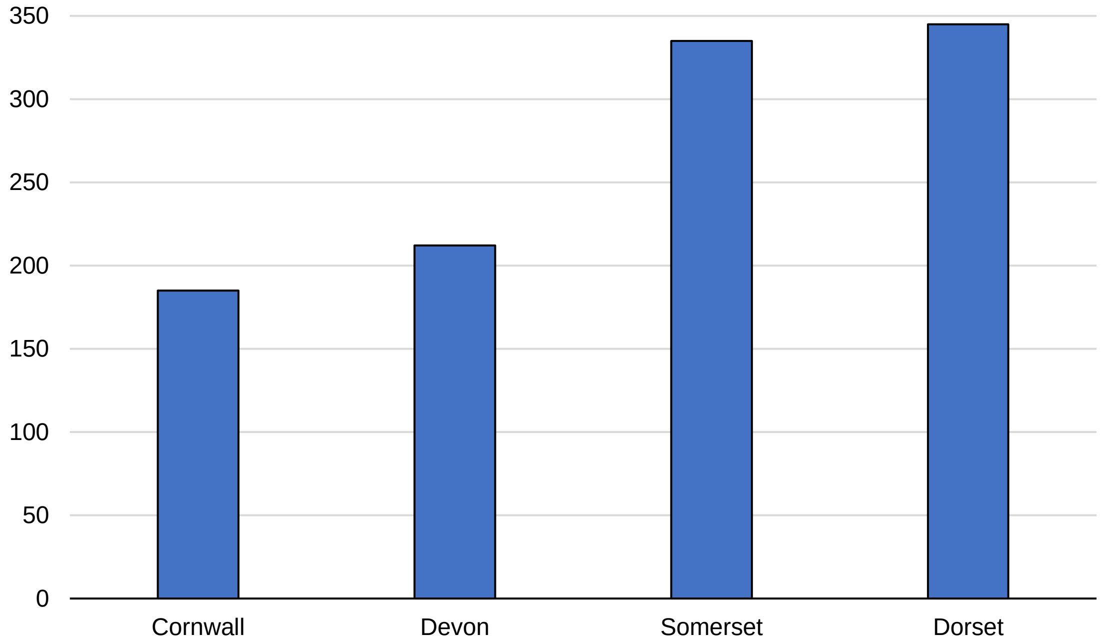
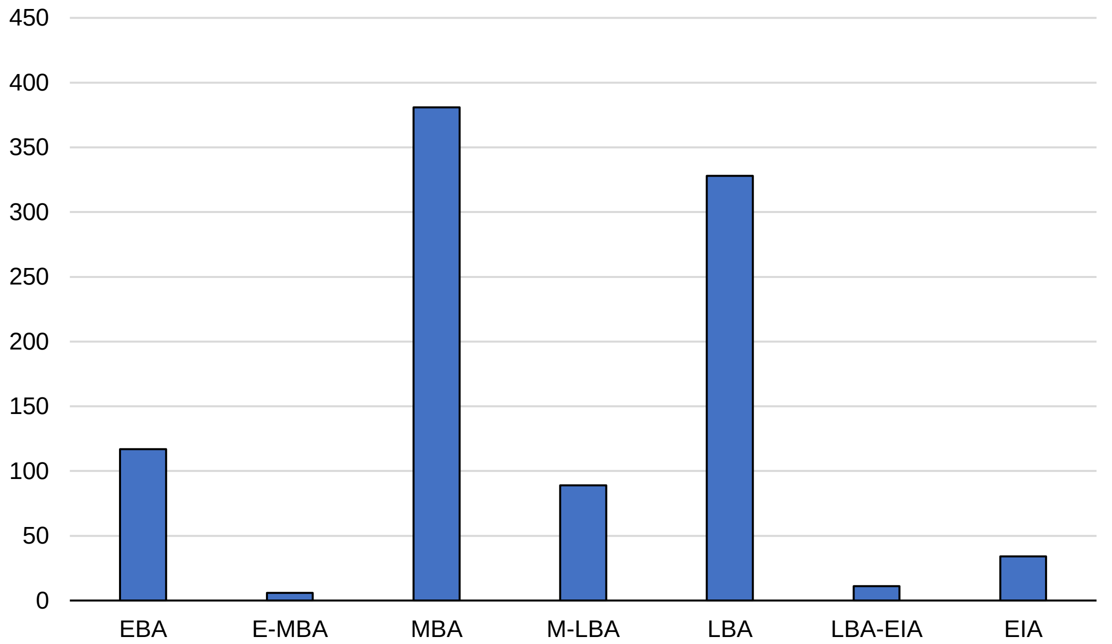


Fig.6.24: The number of Bronze Age single finds in South West divided by broad period (n=1075)



However, complete examples of swords and blades in South West England are only found deposited in water, such as from Pole Sands (RAMM-F040) and Sennen Cove (RCM-F033). This trend is consistent across the country (Brück *forthcoming*; Roberts *forthcoming*) and reflects the impact of Bronze Age practices on artefact recovery. The significance of the condition of objects related to context is explored further in Chapters 8 and 9.

6.4.2 Scatters

Pearce (1983, 204) loosely presented the "find style" *scatter,* defined as "pieces of metal strewn haphazardly over an area of at least a 0.5sq. metre, without signs of deliberate arrangement" (ibid.). In practice, it comprised all material that could not be defined as a *grave* or *closed find*. The term has been appropriated here due to several findspots possessing a spread of likely associated finds but without any corresponding context, such as a pit or a burial. It would thus be inappropriate to define them as a 'hoard' or as 'multiple single finds', since an association may be inferred from their similar typo-chronological nature. However, the term is employed more rigorously here to avoid describing all objects that are not part of a closed find or a grave as a *scatter*. This means that whilst Pearce listed 77 scatter sites, only 31 are presented here with a further nine sites representing possible scatters. Objects previously considered part of a scatter, such as the flat axe from Mount Pleasant henge (Pearce 1983, No.371) or the spearhead from Hod Hill (ibid. No.443) are now considered within the other categories.

Only objects with a known recovery from a certain area (e.g. within a field or later hillfort) and possessing a similar chronological span are considered under this term, though in many cases the chronological span across a single site might be quite long, and often occupational debris or finds of other material (e.g. pottery or stone) are recovered alongside the scattered metalwork, suggesting a temporary site of ephemeral activity or occupation. For instance, several hundred pieces of flint, including arrowheads and a scraper, were recovered from series of fields at Harberton, Devon, along with a perforated whetstone and a copper flat axe, suggesting possible occupation (Miles 1976). This term is particularly useful for those areas of extensive metal-detecting that have recovered numerous objects that were likely once related. At Gussage St Michael 2, Dorset (PRIV-F019), nearly a hundred pieces of predominantly Late

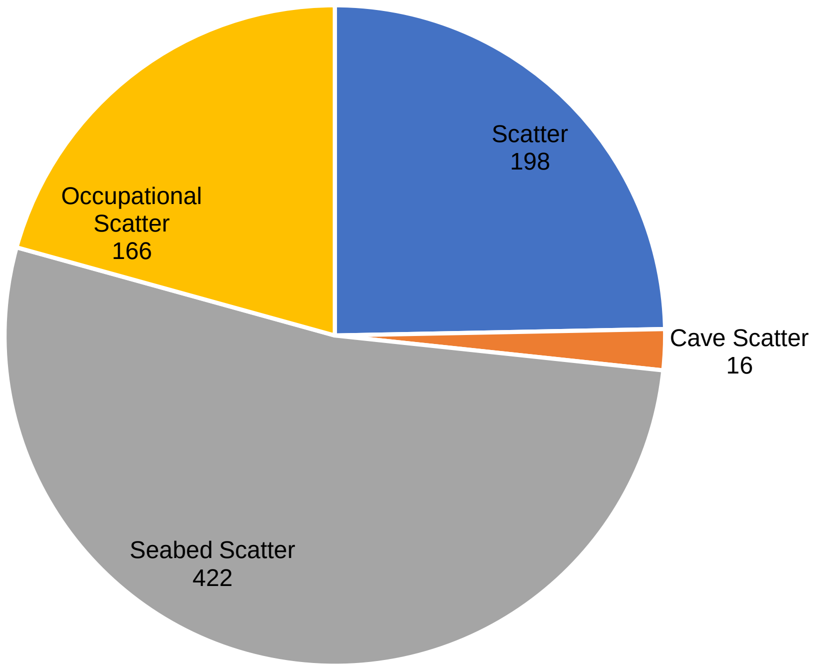
Bronze Age metalwork have been recovered from one field alone with more material from adjoining fields, though there is no other evidence of activity. Occasionally, scatters may be the result of later activity such as ploughing; this is difficult to distinguish and each findspot has been considered individually.

Where there is evidence of occupation and finds have been found loose in layers within the site, the term *Occupational Scatter* can be used (e.g. the metalwork from Tredarvah, Cornwall: RCM-F043; see *Occupational Contexts* below). There are two further sub-categories, which otherwise cannot be adequately ascribed a category. *Cave Scatter* relates to material that has been recovered from a cave site alongside a variety of other material. Only two sites from South West England fall within this category comprising sixteen objects. An Early Bronze Age knife was found in a cave at Castle Hill Quarry, Somerset (TTNCM-F009), from which Neolithic, Bronze Age and Romano-British finds were recovered. Similarly, Late Bronze Age metalwork was recovered from Kent's Cavern, Devon, along with Bronze Age pottery and amber, and Iron Age and Romano-British material (Pearce 1974a; BM-F005/TOR-F010). The chronological accumulation of material from both these sites, makes it worth defining them within a separate sub-category, to differentiate the depositional practice from a regular scatter of finds.

The second sub-category – *Seabed Scatter* – applies to three south-western sites: Bigbury Bay, Moor Sand and Salcombe, Devon (Knight et al. 2015, Nos.109, 163, 164). The material recovered from these sites are indicative of accidental loss, perhaps through shipwrecks, rather than deliberate deposits and thus cannot be considered a standard depositional practice (Needham et al. 2013). The unique character of these sites means it would be inappropriate to consider them alongside other scatters and hoards as they may skew more general analyses.

Indeed, of the 802 objects from scatters, 422 come from seabed scatters (Fig.6.25) and over 86% of those are ingots. The remaining 380 objects have been recovered from largely dryland situations though again interpretation should be approached with caution. One-hundred-and-thirty-four objects have been recovered from two adjoining fields at Gussage St Michael, Dorset (PRIV-F019; PRIV-F035), which means broader considerations will be affected by the disproportional volume of this metalwork. Of the 34 uncertain objects recovered

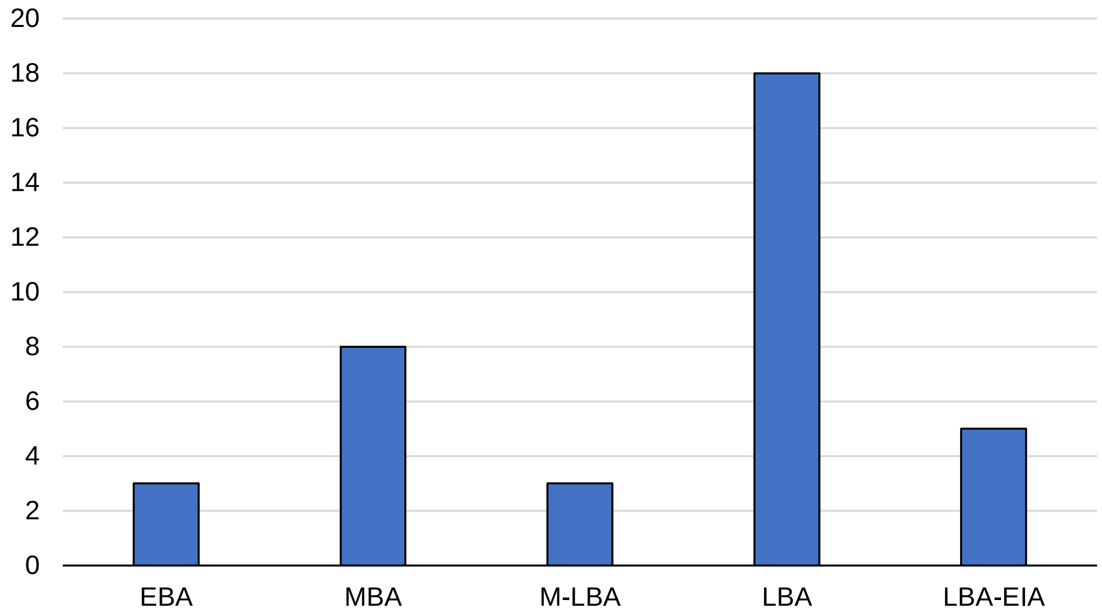
Fig.6.25: The relative proportions of Bronze Age objects from different types of scatter sites in South West (n=802)



from scatters, 31 come from Gussage St Michael, whilst 30 of the 31 annular rings recovered were from this site. It thus seems that analysing the individual object types within this category is fraught with too many complications to be useful.

However, when assessed chronologically, scatters (including seabed scatters) are clearly a feature of later Bronze Age sites, with the majority including a chronologically diverse range of metalwork, dating from c.1300 BC onwards (Fig.6.26). At least five sites have produced metalwork of the Llyn Fawr tradition suggesting a Late Bronze Age/Earliest Iron Age presence. This observation is useful as it might assist in understanding patterns of occupation during this period.

Fig.6.26: The increase in sites with scatters throughout the Bronze Age in South West England (**N.B.** Only sites that could be attributed a period are plotted here)



6.4.3 Associated Objects and Hoards

Associated Objects and *Hoards* are grouped together as both categories comprise findspots where more than one object (including copper alloy, gold and non-metal objects) has been recovered, though a distinction is made in terms of numbers and context. The debate around what constitutes a 'hoard' is not the focus here but grouping two objects found together in a field (e.g. the two palstaves from Week, Devon: RAMM-F052) in the same category as larger accumulations in significant landscape locations (e.g. St Michael's Mount, Cornwall: NT-F001) clearly requires some distinction. The term 'hoard' comes with a loaded meaning implying an intended deposit and is thus sometimes avoided (e.g. Pearce 1983). Nonetheless, alternative terminology (e.g. accumulation or assemblage) is often cumbersome and can have other applications (cf. Needham et al. 1997; Needham 2017); consequently, the term hoard is used, as deposits of more than one object were more likely intentional in most cases.

Richard Bradley provided a broad definition of hoards "as collections of buried objects that were apparently deposited together on the same occasion" (2013, 122). In this thesis, a hoard consists of three or more objects found deposited together in a single location (excluding those in burial contexts).

There is no restriction on the type of object, or location, though ideally a hoard would be a closed deposit. However, this situation is rare.

Two objects found together are classed as *Associated Objects*. This distinction has been chosen here purely as a guiding definition. Associated objects may be associated with metal or non-metal objects and rarely come from a closed deposit, but are typically found near each other and have a chronological similarity.

There are 35 definite and eleven possible findspots with associated objects and 85 definite and 26 possible hoards in South West England. Over 1959 metal objects are represented across these deposits although it is recognised that numerous hoards have been lost, discarded, or destroyed since discovery. Associated objects and hoards have been divided by county and period to give a greater impression of the nature of practices across the South West (Figs.6.27; 6.28). For this analysis, only definite findspots are considered to avoid skewing the interpretation with uncertainties.

The main period of deposition occurred in the Middle Bronze Age for much of South West England, with only one deposit of associated objects and four hoards in the Early Bronze Age. Middle Bronze Age associated depositions are most frequent in Somerset and Dorset and become less common further west. Across the South West associated finds and hoards are dominated by palstaves and ornaments, either exclusively or mixed, a trend seen in various regions across southern England (Roberts 2007; Rowlands 1976).

Despite prolific Middle Bronze Age deposition in Somerset only four Late Bronze Age associated deposits are known from the county. Nonetheless, Somerset has the largest Late Bronze Age hoard in the South West (the Stogursey hoard). The only other metalwork hoard is from an occupational context (the Brean Down bracelet hoard; TTNCM-F005), though a significant non-metalwork hoard of ceramic sword mould fragments at Norton Fitzwarren (Needham 1989b) dating to this period may infer a practice linked with metalwork hoarding. Dorset, similarly, has fewer hoards and associated objects in the Late Bronze Age. Conversely, Cornwall has three instances of associated objects and eleven hoards. Six hoards have been discovered since 1998 and as Knight et al. (2015, 6) note, these recent hoards reflect discoveries previously only known from antiquarian notes; furthermore, they indicate the influx of material from north-western France (see Section 6.2.4d). Similarly, numerous

Fig.6.27: The number of findspots with associated objects and hoards in South West England divided by broad period (n=120)

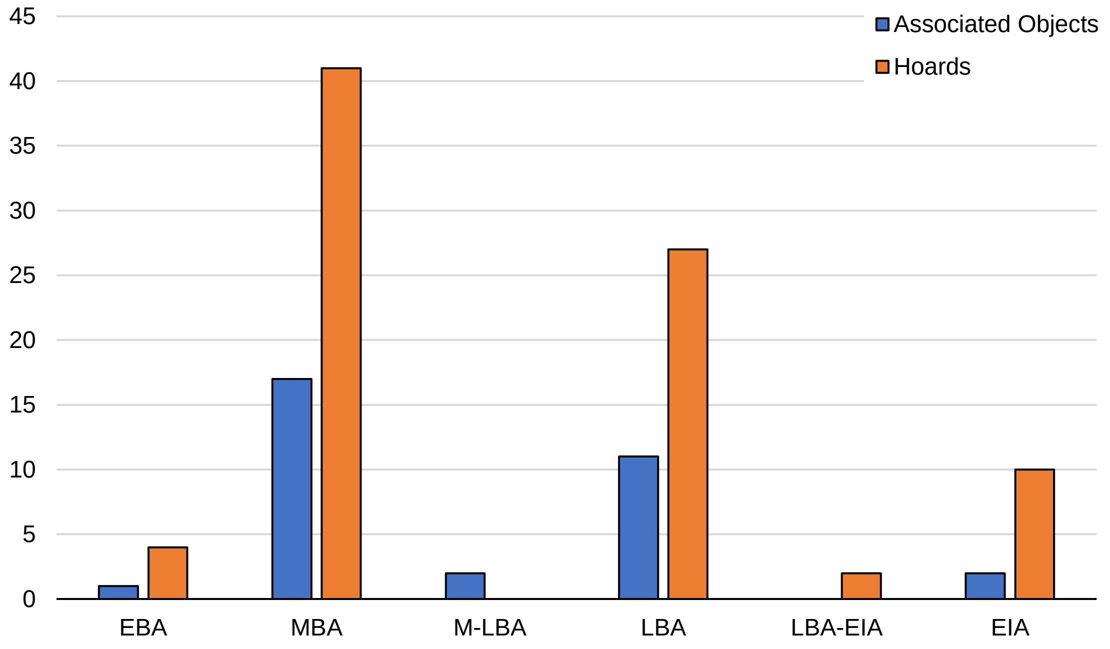
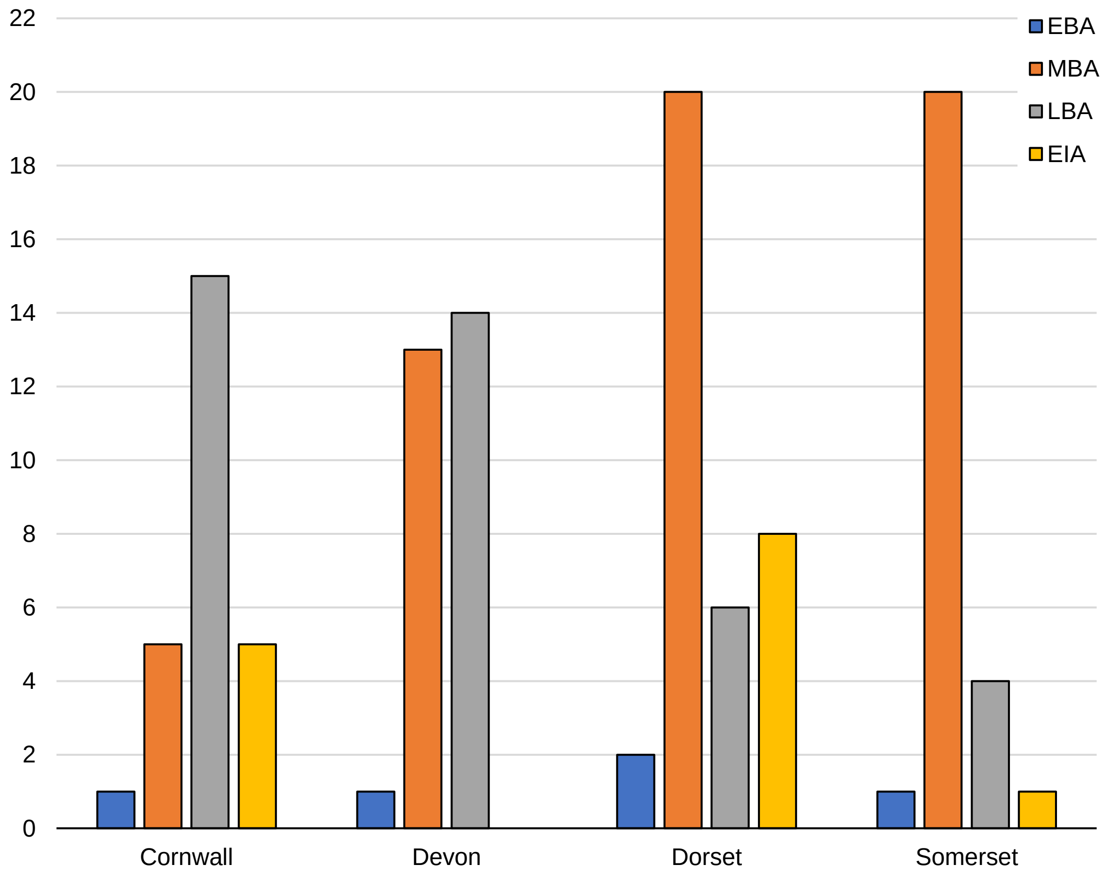


Fig.6.28: Combined total findspots of associated finds and hoards in South West England for each county divided by broad period (n=120)



larger hoards have recently been found in Devon, dominated by hoards of ingots in the Late Bronze Age (e.g. Ash Farm, Newton Abbot I and Otterton I and II; RAMM-F001; PAS-F074; PAS-F076; PAS-F077).

Many formerly Late Bronze Age hoards have now been dated to the Earliest Iron Age, with Boughton's (2015) re-evaluation offering a potential chronological distinction indicated partly by changing depositional practices. In this period only two associated finds are known from the region, whilst the known hoards are limited Dorset and Cornwall with one in Somerset, which straddles the transitional period from the Late Bronze Age-Early Iron Age (King's Weston Down). The hoards from Dorset are dominated by regional axe types (Portland and Blandford faceted axes) often with socketed gouge associations; the number of objects ranges from six (Eggardon Hill: Pearce 1983, No.336), to potentially eighteen (Tincleton: DCM-F038). This, however, does not include the anomalous hoards from Langton Matravers containing 777 axes and fragments.

No axe-dominant hoards are seen in Somerset or Devon in the Earliest Iron Age, with evidence limited to single finds, occupation scatters, and the aforementioned King's Weston Down hoard. It is thus surprising that axe-dominant hoards appear again in Cornwall. Three of the hoards consist of Armorican axes, a type commonly found as single finds, which Boughton (2015, 262) suggests is an indicator of the influx of material from north-western France. It would thus seem that regionally specific practices appear in the Earliest Iron Age, with populations in Cornwall continuing hoarding practices from the Late Bronze Age, albeit to a limited extent, and Dorset producing regional object forms.

6.4.4 Burials

The burial category encompasses all metalwork deposits made in association with human remains and is unrestricted by monument style (e.g. barrow, cist, etc.). A diverse range of non-metalwork objects are associated with metalwork in burial scenarios and finds predominantly date to the Early Bronze Age. There are 146 recorded burial findspots, comprising at least 190 metal objects, with a further 24 possible burial sites, comprising 34 objects.

However, burial findspots present difficulties for analysis. Firstly, many burial monuments were investigated before modern excavation techniques;

consequently, records are often inadequate making it difficult to determine associations or even types of sites. Secondly, many objects were secondary deposits in burial mounds, either associated with later burials or as single deposits. Jones and Quinnell (2008) noted that in the Farway barrow complex, Devon, at least five Early Bronze Age barrows have had Middle or Late Bronze Age metalwork inserted at a later date. This makes interpreting the chronology of such sites difficult. A combination of these two factors has led to c.15% of burial findspots to be dated as ‘Bronze Age’ or ‘Uncertain’.

Finally, clearly evidence is either missing (through destruction or lack of recording) or has not yet been discovered. There are 4209 barrows known from Devon, Dorset and Somerset (Grinsell 1959; 1969; 1970; 1971; 1978; 1982; 1983), plus more recent discoveries, in addition to those known from Cornwall. Concentrating only on those sites with associated metalwork risks failing to recognise broader practices. Quinnell (1988) highlighted this issue by summarising excavated barrows from the four counties and displaying the proportion of different object types that have been recovered. Fig.6.29 shows that metalwork associated with burials was only a marginal practice, but one that was proportionally consistent across South West England.

Datable burial findspots of metalwork have been divided by county and period (Fig.6.30). There are 105 Early Bronze Age findspots, with roughly half in Dorset; by contrast, Cornwall and Somerset represent 19 and 24 sites respectively, whilst only ten burial findspots of metalwork are known in Devon. At first glance, this indicates a higher level of deposition in burial monuments in Dorset, although it must be considered that Dorset has a significantly higher number of burial monuments than Devon. Without exact numbers, however, it is impossible to determine to what extent deposition in burial monuments differs. Furthermore, these figures only allow for those burials found with metalwork and do not account for those with finds of other materials.

The Early Bronze Age burials across all counties are dominated by deposits of daggers and small-bladed implements (e.g. knives), accounting for c.52% of all metalwork. This trend reflects the broader situation of burials in Wessex and indeed much of Britain (Gerloff 1975; Woodward and Hunter 2015; but see Jones 2011); and highlights that daggers and knives are more likely to survive in the archaeological record and to be recovered than other metal objects found in Early Bronze Age burials. Pins, awls and beads are all fragile,

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Fig.6.29: A summary of excavated barrows in Cornwall, Devon, Somerset and Dorset, from which pottery, metalwork and bones, pins and beads have been recovered. S = No. of barrows sampled (source: Quinnell 1988, Fig.2)

prone to corrosion damage (especially in the acidic soils of Devon and Cornwall), and more likely to be missed during excavation. Additionally, Marshall's (2011) experimental cremations suggested slighter pieces of metalwork (e.g. pins) are more likely to be destroyed in the process than more substantial objects (e.g. daggers).

Only seventeen burials with metalwork have been identified from the succeeding periods, reflecting the diminishing archaeological visibility of burial practices. Whilst some deposits appear to be primary inclusions (e.g. a side-looped spearhead fragment in a cremation urn at Launceston Down, Dorset:

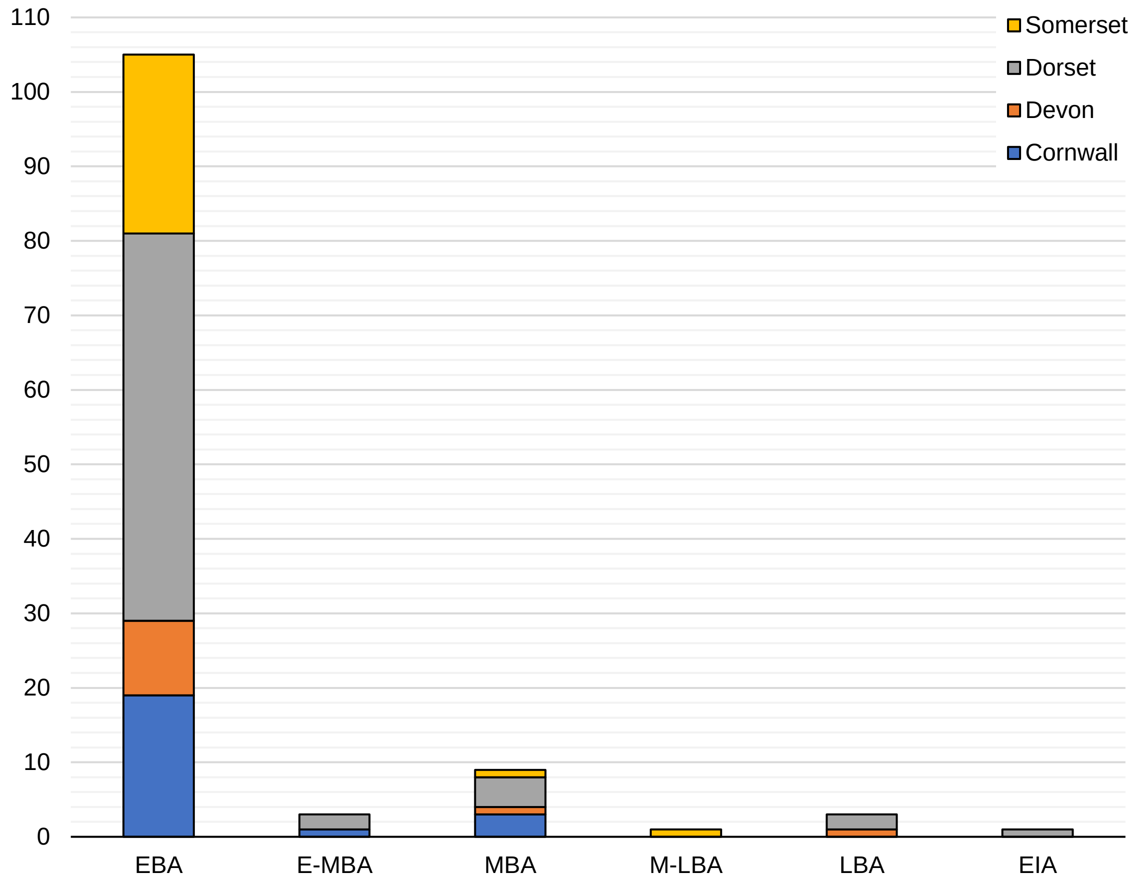


Fig.6.30: The certain, datable findspots of Bronze Age metalwork associated with burials in South West England divided by broad period (n=146)

DCM-F023), the majority represent secondary interments (e.g. a tanged chisel deposited on top of a cairn at Court Hill, Somerset, that contained two burials from the 14th and 8th centuries BC; Pearce 1983, No.758), or deposits made in reference to earlier burials (e.g. a south-eastern socketed axe deposited with charcoal close to Barrow C on Broad Down, Devon; RAMM-F008). Although not representing direct associations, these referential deposits nonetheless offer an important insight into how prehistoric populations interacted with landscapes of their past (cf. Bradley 2002).

6.4.5 Occupational Contexts

Compared to the other categories, metalwork found in occupational contexts is limited though offers some unique complexities which will be considered ahead of a summary of the South West material.

Firstly, defining an 'occupational context' is difficult. For instance, should metalwork associated with a field system be considered an occupational context? Should it be considered differently to that found associated with structures? Likewise, metalwork is often found at sites of earlier or later occupation, but with no contemporary evidence indicating Bronze Age occupation. Pearce (1976a; 1983) repeatedly emphasised the presence of Bronze Age metalwork at later hillfort sites, though it is unclear to what extent this represents prior occupation. Bronze Age metalwork incorporated into later occupational features adds further complexity, such as the various Bronze Age finds buried in Iron Age and Roman contexts at Cadbury Castle, Somerset (TTNCM-F007). In these situations, should the metalwork be defined as having come from an occupational site, albeit one that is not contemporary?

A broad approach is adopted here as any context potentially indicating occupation or nearby occupation could be significant. Objects deposited at contemporary field systems will be considered alongside those deposited at contemporary structures. Metalwork found at earlier or later occupational sites will be addressed on a site-by-site basis, considering the reliability of the provenance and overall chronological span of the site. Such metalwork will be considered differently when subjected to detailed analysis.

Another issue is the extent to which metalwork found on occupational sites is truly representative of occupational material. Most Bronze Age settlements lack any associated metalwork and when found, no more than two or three pieces are recovered. The lack of general characteristics makes the identification of definite occupational contexts more difficult. The unique site at Must Farm, Cambridgeshire, evidences that metalwork was probably an integral part of everyday life at settlements (Mark Knight pers.comm. 2016). This means that the lack of archaeological evidence for metalwork directly associated with occupation sites in other locations may be a circumstantial effect of prehistoric abandonment processes i.e. metalwork was deliberately removed from settlements when they were left or abandoned (cf. Knight 2012). This problem of representation is, of course, not unique to occupational contexts, and extends to Bronze Age metalwork generally (Pearce 1983, 10-11; Knight et al. 2015, 5); however, assessing occupational contexts solely on the surviving metalwork is clearly inadequate.

Furthermore, when metalwork is found at definite Bronze Age occupation contexts, it often indicates a variety of forms of structured depositions. At some sites deliberate deposits might be found buried in pits, whilst at others metalwork is present scattered in the occupation layers with no defined context.

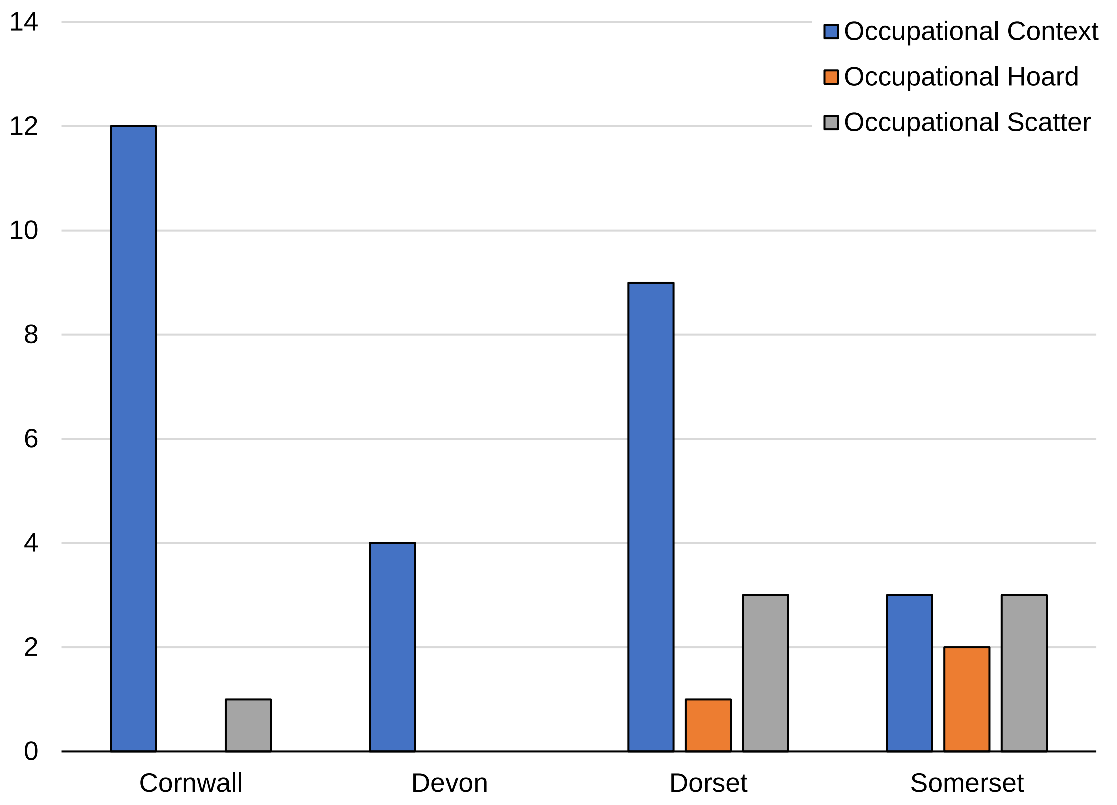
Some sites have a combination of deliberate deposits alongside objects without any observable context. As the aim with these categories of depositional practices is simply to characterise the type of findspot rather than define individual contexts, the term *Occupational Context* is broadly used. However, some of the variety can be remedied by utilising the terms already defined, thereby creating the sub-categories: *Occupational Hoard* and *Occupational Scatter*. A combination of different practices (e.g. a scatter of objects alongside deliberate depositions as at Bestwall Quarry, Dorset: O'Connor 2009) remains under the broader term *Occupational Context*.

Finally, a diverse range of material tends to be recovered from occupation contexts often indicating different crafts. Particularly significant here is the material that indicates metalworking, even when no metalwork is present, such as whetstones, moulds and casting debris (see Knight 2014b, Table 1). Although it is not the focus of this project metalworking debris should be considered. Depositional practices at occupation sites were not exclusive to metalwork (Brück 1999a; 2006a), and the deposition of other materials should be considered equally especially where they indicate metalworking. A pertinent example is the Late Bronze Age deposition of sword mould fragments in a pit at Norton Fitzwarren, Somerset; as noted above, Somerset is relatively devoid of hoards and associated objects in this period. The deliberate deposition of metallurgical waste material could thus be significant for indicating social practices. A catalogue of all material deposited at settlements is beyond this project, but metalwork at settlements should not be considered in isolation. Occupational contexts clearly present a range of challenges in interpreting metalwork finds in South West England, and indeed other sites across Britain, making the above review necessary ahead of a summary of the material.

Metalwork has been recovered from 38 occupational contexts (Fig.6.31), representing 182 objects. To these, eight *possible* occupational contexts might be added. Of the 38 contexts, there are three occupational hoards and seven occupational scatters with over a third of definite associations found in Cornwall, starkly contrasting the four sites known from Devon. The only known hoards, meanwhile, are from Somerset and Dorset.

Occupational scatters also appear to be a feature of these latter counties, though this is slightly skewed by the way the data has been divided. Other sites have material that might be considered a 'scatter', but this is

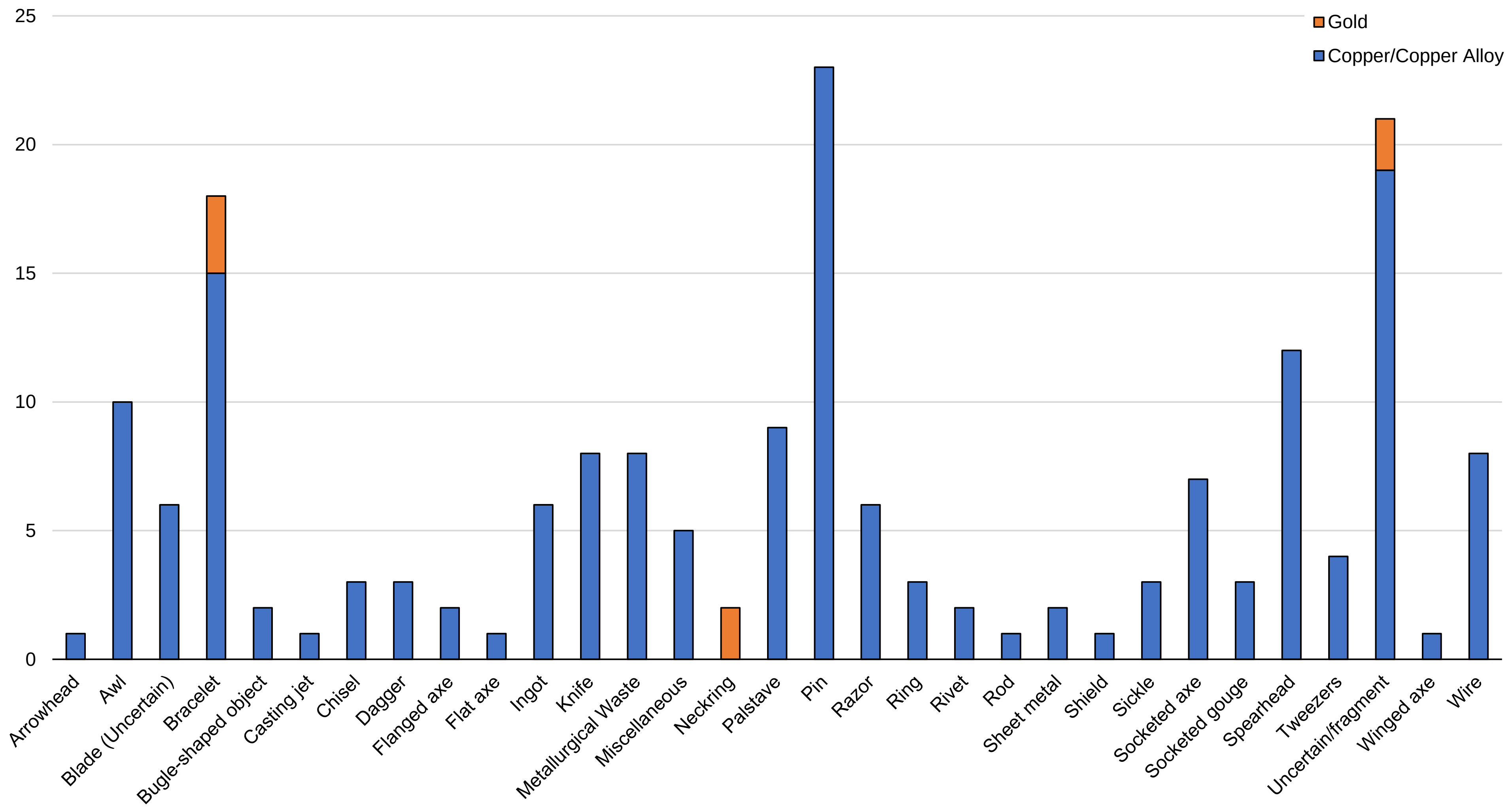
Fig.6.31: The number of certain metalwork associations with occupation contexts in South West England divided by county (n=38)



coupled with deliberate deposits elsewhere on the same site and thus has been combined under ‘occupational context’. At Trethellan Farm, for instance, several metalwork pieces were found associated with Bronze Age land surfaces (e.g. a spearhead, socket fragments and blade fragment), whilst others were deliberately deposited (e.g. a socketed point found in Ritual Hollow 136/2021) (Nowakowski 1991; RCM-F048).

The range of 182 metalwork pieces from occupational contexts emphasises the lack of a general character that might be expected though a high number of ornaments is represented by pins and bracelets (Fig.6.32). However, over half the pins come from just three occupational contexts. Nonetheless, the diverse spread of tools alongside the ornaments, including gouges, awls and axes, is noteworthy especially when compared to weapons. Only fifteen objects (8%) can be considered ‘weapons’ represented by twelve spearheads, three daggers and no swords or rapiers, though six blade fragments and an arrowhead might be added to this.

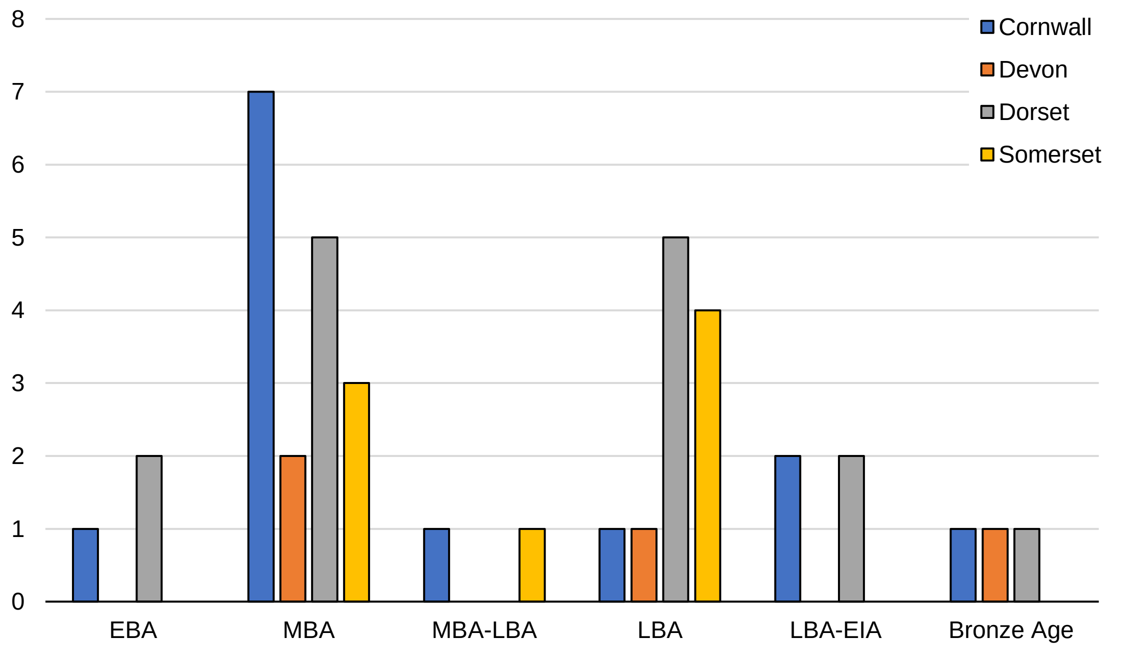
Fig.6.32: The frequency of Bronze Age copper alloy and gold objects from definite occupational contexts in South West England (n=182)



Only three Early Bronze Age occupational contexts have produced metalwork (Fig.6.33). The Middle Bronze Age has the greatest number of sites, with much material recovered from the numerous roundhouses recently identified at Cornwall as well as at significant sites in Dorset and Somerset. Almost half (48%) of all metalwork however comes from Late Bronze Age sites which comprise a mixture of scattered material, including evidence of metalworking and metal objects (e.g. Kenidjack Castle, Cornwall: RCM-F018; Dainton, Devon: Needham 1980a; and Everley Water Meadow, Dorset: Knight et al. 2015, No.266). The few deliberate Late Bronze Age deposits recorded, such as the gold bracelets at Brean Down, Somerset (TTNCM-F005), thus stand out as even more significant. Problems in accurately defining the chronology of certain sites means that some material has been classed as broadly straddling the Late Bronze Age-Earliest Iron Age transitional period, particularly where there appears to have been an overlap in occupation and/or an incorporation of typologically earlier material into later contexts (e.g. Higher Besore, Cornwall, and Chalbury Camp, Dorset). This only applies to four sites, but highlights some of the complexities of metalwork associated with occupational contexts.

Finally, it is appropriate to also consider sites from which no metalwork has been recovered but which indicate evidence of metalworking. About 1250 ceramic and stone mould fragments have been recovered from the South West

Fig.6.33: The frequency of certain occupational contexts for each county in South West England divided by period (n=38)



as well as 44 fragments of crucibles and c.50 hammerstones and whetstones that may have been involved in metalworking. This drastically outweighs the volume of metalwork and contributes a further ten settlement sites largely dating to the Late Bronze Age.

Several factors require consideration. Firstly, large numbers of ceramic fragments tend to represent a small number of original moulds; at Sigwells, Somerset, for instance, 117 fragments of Late Bronze Age moulds represent a minimum of eight objects (Knight et al. 2015, No.428). Similarly, 43 crucible fragments represent only 3 incomplete crucibles from Dainton, Devon (Needham 1980a). Secondly, the number of sites represented by these finds is minimal with over a thousand of the ceramic mould fragments having been recovered from the two sites at Sigwells Farm (Knight et al. 2015, No.428). Finally, the potential multi-functional nature of stone tools such as whetstones, means they cannot be directly attributed to metalworking in every case (Kuijpers 2008; Knight 2014b). These elements, however, are important factors alongside the presence of metalwork in South West England as they potentially embellish the view of how societies interacted with metalwork in everyday life (Knight 2014b).

6.4.6 Summary of Depositional Practices

This section has presented a series of broad categories for classifying the range of depositional practices seen in South West England. These are by no means exhaustive, nor are they exclusive of each other. The wider location of the findspot (e.g. on a hill, in a river valley, on a coastline), as well as the immediate situation of the deposit (e.g. in a pit or a ditch) should be considered along with depositional practices going beyond the detail of these categories. The categories were selected to offer a means for classifying large numbers of findspots under relatively meaningful interpretations, that might then be subdivided under further analysis of damaged metalwork in Chapters 8 and 9. The overview has however highlighted the diversity of practices undertaken and the material involved. Clearly, metalwork was associated with different practices at different periods within the Bronze Age and the selective nature of these actions (e.g. what was deposited by what means and when?) is what ultimately offers an insight into how Bronze Age societies interacted with their material culture.

6.5 Chapter Summary

This chapter began by presenting the factors that made South West England a relevant study region for studying the deliberate destruction of metalwork. This was furthered by an overview of Bronze Age metalwork from the region as well as an analysis of different depositional practices. Approximately 4200 pieces of metalwork have been noted from throughout the Bronze Age, which provides a large dataset to be sampled and analysed in Chapters 7-9 (Appendices A, B and F).

CHAPTER SEVEN

BREAKING DOWN THE DATA

7.1 Introduction

The metalwork summary in Chapter 6 demonstrated the volume and diversity of Bronze Age metalwork in South West England as well as the range of depositional practices and the overall chronological span encompassed. This dataset was thus appropriate for sampling and undertaking a detailed analysis at museums across southern England (see Appendices A, B and F). This chapter presents the methodology for data collection followed by an overview of the material studied from South West England.

7.2 Data Collection Methodology

7.2.1 Strategy

Approximately 4211 metal objects have been recorded from South West England. These numbers include individual fragments from different objects, as well as fragments from the same implement. Where the fragmentation could be demonstrated as ancient, individual fragments were classed as individual objects, though it was rare to encounter multiple fragments from a single implement. More commonly, fragments of a single object resulting from post-depositional processes (e.g. corrosion) were encountered; these were classed as a single object as they were likely deposited in a more complete condition. Due to the numbers involved, it was not feasible to attempt a comprehensive study of material so a series of criteria was established for sampling as much material as possible. The aim was to collect information on the following groups of objects:

- All weapons;
- Incomplete or broken objects, particularly those for which deliberate destruction has been noted;
- Objects in hoards, burials, scatters or occupational contexts; and
- Single finds with a known provenance held at the museums visited.

Past studies have shown that weapons (e.g. swords and spears) are most commonly subjected to deliberate destruction prior to deposition (e.g. Bridgford 2000; York 2002). Sampling this object class was thus important. Approximately 372 bladed implements (i.e. swords, dirks, rapiers, daggers, knives and indeterminate blade fragments) and about 193 spearheads are currently known from South West England. Weapons thus constitute less than a quarter of the Bronze Age metalwork in South West England, and it was decided a full analysis of these objects would be achievable.

The remaining material was studied based on the remaining criteria which comprises around 3700 objects including tools, ornaments and metallurgical material. Nearly 2000 of these are axes occurring in a variety of contexts and conditions, which the second and third criteria cover. The final criterion was included as it was possible that single complete finds would be disproportionately represented. Overall this sampling strategy was intended to contribute to the thesis research questions. Data collection began in February 2015 was concluded in March 2017. 22 museums and one private collection were visited (Table 7.1).

Table 7.1: The museums visited and number of objects studied

Museum Visited	No. of Objects studied
Ashmolean Museum	21
Bristol City Museum and Art Gallery	30
British Museum	81
Blandford Town Museum	1
Dorset County Museum (Dorchester)	102
Museum of Barnstaple and North Devon	7
Museum of Somerset (Taunton)	402
National Trust (St Michael's Mount)	48
Plymouth City Museum and Art Gallery	30
Penlee House Gallery and Museum (Penzance)	6
Priest's House Museum and Garden (Wimborne)	1
Poole Museum	8
Royal Albert Memorial Museum (Exeter)	119
Russell-Cotes Art Gallery and Museum (Bournemouth)	1
Royal Cornwall Museum (Truro)	171
Red House Museum and Gallery (Christchurch)	10
Salisbury Museum	12
Torquay Museum	23
Totnes Elizabethan House and Museum	1
Wells and Mendip Museum	9
Weston-super-Mare Museum	5
Wareham Town Museum	2
Private collection	200
TOTAL	1290

In practice, which objects were analysed was governed by locating objects and museum access. Pearce (1983) and Knight et al. (2015) indicated 468 objects are lost, uncertain, destroyed or currently in private collections but with no further detail. These were therefore automatically excluded from the possible sampling process. However, approximately 1290 objects were studied in collections and compiled into a primary catalogue (Appendix A). Those objects of interest that could not be studied will be considered in broader discussions based upon published details.

Another issue was how to approach the Portable Antiquities Scheme (PAS) online database.[1] Many objects are recorded online and returned to the finder. The records note basic information about the object form and dimensions, supplemented by a photo; occasionally an interpretation is offered. The find location is accessible if one possesses a researcher status, but can only be published with the parish name, and a four-figure grid reference. These finds are nonetheless some of the most significant in this study as many are fragmented. In March 2017, the data collection cut-off, 705 Bronze Age metal objects were listed for the South West. Of these, 204 objects had been acquired by museums and were encountered during data collection. Of the remaining 501 objects, 393 were incorporated into an additional catalogue (Appendix B); the remaining PAS objects were excluded as they lacked an accompanying image. From the available photos it was mostly possible to determine the level of completeness and damage and enhance the information on the find record (e.g. in terms of patina, object type etc.). An inevitable issue is that most objects could not be handled and thus specific details (e.g. about use-wear) were limited; it remained nonetheless possible to attribute a damage ranking. The remaining 108 PAS objects had insufficient information for a useful assessment to be made and were thus excluded from the catalogue.

Overall, this strategy allowed 1683 objects to be assessed, the details of which are presented in Appendices A and B; an overview of the coverage is presented in Section 7.3.1.

[1] Available www.finds.org.uk.

7.2.2 Object Analysis

All objects were studied macroscopically aided by a 20x magnification jeweller's lens. A variety of features were analysed to establish the object type and understand each object's life-cycle by recording observable indicators of production, use and pre-depositional treatments. The information gathered was recorded using a specifically created record sheet (Fig.7.1; see catalogue in Appendix A) and then inserted into a database using Microsoft Access 2016 to make the information more accessible for answering specific research questions (Appendix F).

The object record sheet had a broad layout making it adaptable to different objects. The completeness of each object was grouped under five general categories: *0-25%*; *26-50%*; *51-75%*; *76-99%* and *100%*. Occasionally, two further categories were used: *n/a*; or *Uncertain*. *N/a* applied predominantly to metalworking material, such as casting jets and casting waste, which could not be considered parts of any specific object whilst *uncertain* applied to object fragments of an indeterminate type and thus an estimation of completeness could not be made.

Signs of manufacture and use of each object were noted relying on macroscopic observation. The level of detail recorded here depended on the preservation and completeness of the object alongside the academic understanding of manufacture and use-wear. Much more work has been conducted on the manufacture, preparation and use of swords, for instance, than on other object types. Indicators of poor manufacture, lack of preparation or overworking may all have contributed to the significance and condition of the object upon deposition.

Finally, *Damage* was recorded encompassing both ancient and modern damage as well as accidental and deliberate. Damage was recorded objectively avoiding interpretive descriptions and instead focusing on the observable factors that might indicate *how* damage was sustained. Key features of damage were noted (e.g. the degree and direction of a bend) as well as any associated marks, casting flaws and corrosion damage (see Section 3.3). When damaged objects were inserted into the database, damage rankings were attributed following the system established in Chapter 6 (Table 7.2).

REF.F0XX Site Name, County

Grid Ref.		**Altitude (m)**	**-**
☐ **Dryland**	☐ **Wetland**	☐ **Uncertain**	
Find Circumstances			
Reference(s)			
Additional Notes			

Object Type and Description			
Museum Ref.		**Period**	
Completeness		**Details**	
Dimensions (mm)			
Patina/Corrosion			
Manufacture/Use			
Damage			

Fig.7.1: A blank record sheet used to record objects studied in this thesis.

Table 7.2: A summary of the Damage Ranking system and key criteria.

Damage Ranking	Description	Criteria
0	Not deliberate	Evidence of corrosion and post-depositional processes or casting flaws that would have caused damage
1	Probably not deliberate	Damage combined with use-wear or consistent with unintentional damage
2	Probably deliberate	No associated marks but consistent with damage one would expect from intentional practices informed by experiments
3	Deliberate	Damage that could only have been sustained intentionally, typically with associated marks
n/a	Not applicable	Complete objects
Uncertain	Uncertain	Objects displaying several features that cannot be conclusively determined.

No metallurgical analysis or metallographic study of the objects was undertaken. This is because this study was intended as a non-destructive survey of the material to see what features might be observed macroscopically. A large proportion of objects from South West England have been analysed in the past (Northover n.d.) and when available, this data was utilised to strengthen interpretations of damage. By identifying objects of interest during this study it is possible to highlight avenues of future work for which metallographic analysis would be able to contribute.

7.2.3 Context

The context of each find was investigated in detail. Circumstances of discovery and recovery were described based on the available literature and notes were made on the surrounding landscape (e.g. orientation of slopes or nearby natural water sources). Where a six-figure grid reference (or greater) was known the altitude of the findspot above sea level was recorded. For PAS finds information was recorded as presented on the publicly accessible online record. Landscape details might be significant for understanding the deliberate location of different objects in different arenas (cf. Fontijn 2002; Bradley 2017).

The significance of specific topographic locations, such as hilltops, or certain landscape features, such as bogs, rivers and springs, is an important consideration when analysing metalwork depositions (Becker 2013; Bradley 1998a [1990]; Fontijn 2002; Needham 2007; Yates and Bradley 2010b). A full analysis of the landscape contexts of all finds is beyond the scope of this thesis, but where objects were deposited and how destruction may relate to this is an important consideration. Broad categories can be established (Table 7.3) firstly to determine general trends and secondly because PAS findspots are protected and cannot be given; however, a PAS findspot can be generally assigned a landscape locale without endangering the specific location (e.g. coastal, hilltop etc.). This assessment was conducted using modern maps so some findspot locations would have been different in the Bronze Age either because the natural environment has altered (e.g. rising sea levels) or because of anthropogenic processes (e.g. ploughing or land reclamation).

Table 7.3: A summary of the geographic/topographic features

Geographic/Topographic Feature	Description
Bog/marsh/low-lying moor	Areas of land with high water-saturation
Cave	Natural features in the local geology, typically coastal
Cliff	High areas overlooking a beach or coast
Coastal	Finds made on a beach or on or near a coastline
Confluence of waterways	Findspots on land at or overlooking a confluence of waterways, typically tributaries and rivers
Dry valley	Natural dip between hills with no evidence of a current waterway
Estuary	Finds recovered from around the estuary of a river but not from within the river
Headland	Projecting sections of land on the coast
Headwaters	Findspots at or near the headwaters of waterways typically near hill summits
Hillslope	Slope of a hill; no distinction made between different gradients or positions on the hill slope (e.g. the crest of the hill vs the base of the slope)
Hilltop	Hill summits
Island	Landmass separate from the mainland
Minor water valley	Findspots on land in or overlooking a minor water valley (e.g. a tributary, stream or brook) typically on hillslopes
Near mines	Findspots on or near mines
Near natural springs	Findspots at or near natural springs typically within about 250 metres
River	Finds recovered from within a river
River valley	Findspots on land in or overlooking a river valley typically on hillslopes
Sea	Finds recovered from the seabed
Wetland	Low-lying areas, prone to flooding, but for which no exact feature (e.g. a bog) could be identified
View of coast	Findspots with a view of the coastline and the sea

Furthermore, as this was conducted using maps some findspots are recorded as having 'No significant feature' i.e. no feature that could be highlighted on a map. This does not deny that were the findspot investigated further a defining feature or detail might not be identified e.g. intervisibility with other landscape features. Additionally, a distinction has been made between River Valleys and Minor Water Valleys, the latter pertaining to streams, brooks, and tributaries; this was to determine whether depositions were made only in relation to main riverways, or if smaller water courses also played a role in depositional practices. Finally, the features should not be taken as exclusive of each other; a coastal location may also be a hilltop and indeed most findspots in river valleys are also on hillslopes.

Elements of research involved in determining the findspots and contexts were noted. Every effort was made to establish an accurate record of where the object(s) were discovered as well as noting any confusion that might surround the context (e.g. multiple place names or dubious grid references). This undertaking, although time-consuming, was essential for establishing a secure database for interpretation and enabling accurate maps.

7.2.4 Data Collection Summary

Overall, this methodology for compiling a database of finds to study has resulted in a catalogue of 388 findspots comprising 1290 objects (Appendix A). This is supplemented by a further 278 PAS findspots comprising 393 objects (Appendix B). The data has been inserted into a database (Appendix F),[2] which has enabled easy manipulation of the data for interpretation.

7.3 Overview of Objects Studied

Overall, 1290 objects were handled and studied as part of this thesis establishing a database that includes damaged and undamaged objects from the four south-western counties from different contexts. This has been supplemented by an analysis of all PAS material for which photographs or drawings were available (a further 393 objects). It was possible to firstly assess the overall completeness of these objects and secondly, use the damage ranking system established in Chapter 6 to categorise the objects. This chapter

[2] This database is available on the accompany data disc.

thus analyses this data to establish a variety of destructive practices linked with different scenarios.

7.3.1 Sampling Coverage

First, it is important to establish that the data sampled can be considered broadly representative of the overall region. Figures 7.2 and 7.3(A-D) show the spread of sites from across the whole of the South West, with those considered within the thesis marked. The objects studied cover a chronologically and geographically diverse spread of the south-western findspots.

In relation to the sampling criteria presented in Section 7.2.1, three-quarters of south-western weapons were analysed as well as over 1000 incomplete/broken objects (Table 7.4). The total of incomplete metal objects was uncertain so a proportional figure cannot be given. Meanwhile, over half of all single finds were studied; this criterion was the least targeted, relying largely on what was available at museums so 55% seems an appropriate sample.

41.9% of objects from findspots with associated material were analysed. This figure initially seems low but is affected greatly by three sites. The hoards from Langton Matravers and Marnhull, both Dorset, comprise 867 objects, while the Salcombe Bay seabed scatter, Devon, consists of a further 378 pieces of metalwork. Of the remaining material, the sample represents 75.1%. The three larger assemblages were not studied as they were either inaccessible or because the time necessary to analyse them would not justify the potential contributions they would make to this thesis; this latter judgement was based on published reports (Lawson and Farwell 1990; Needham et al. 2013; Roberts et al. 2015).

Finally, the prolific nature of Bronze Age axes in South West England was highlighted in Section 7.2.1. Of the 1802 axes with a known location, 536 (29.7%) were studied from the Bronze Age, though this is skewed by the Langton Matravers and Marnhull hoards which comprise 48.1% of all axes.

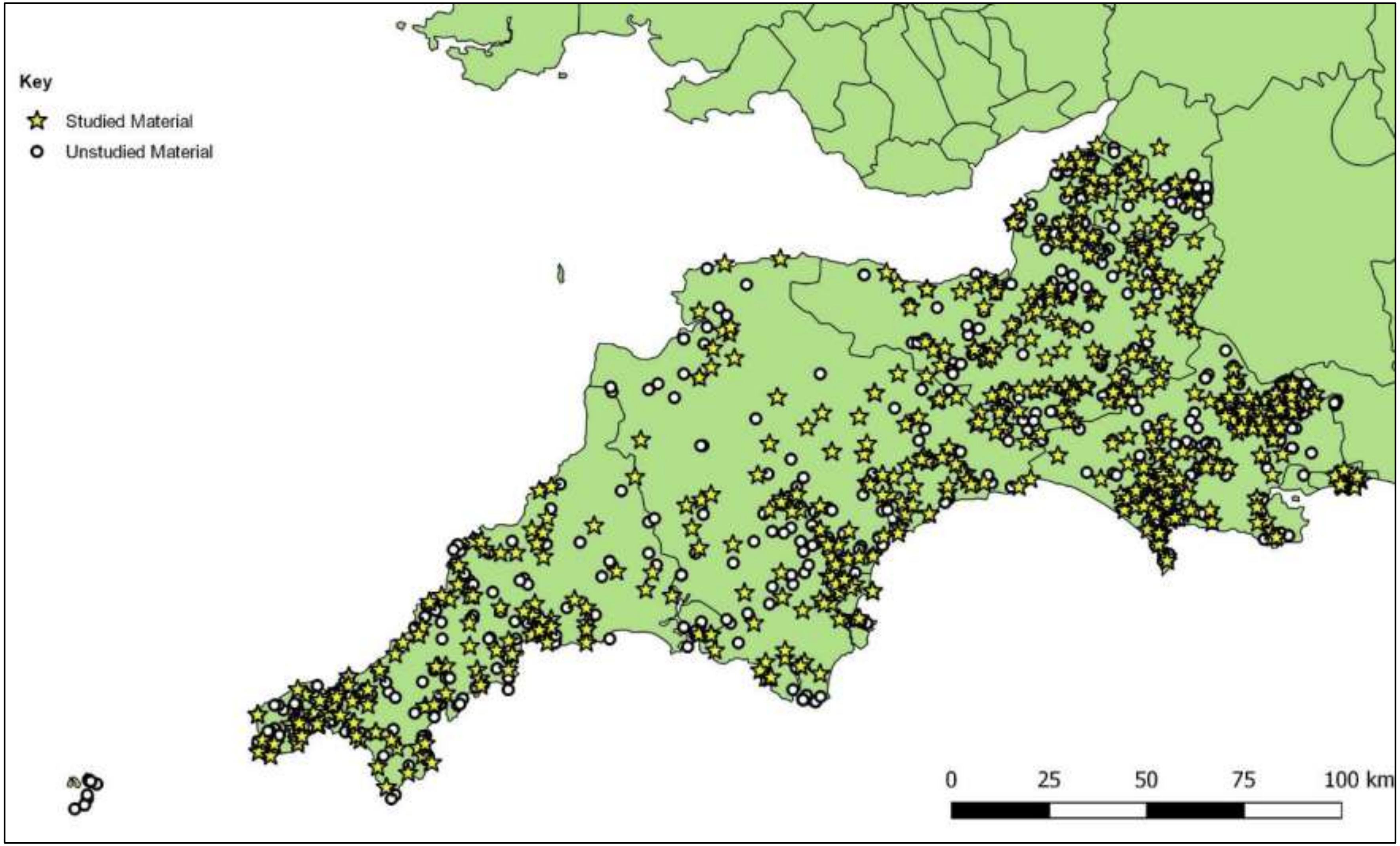
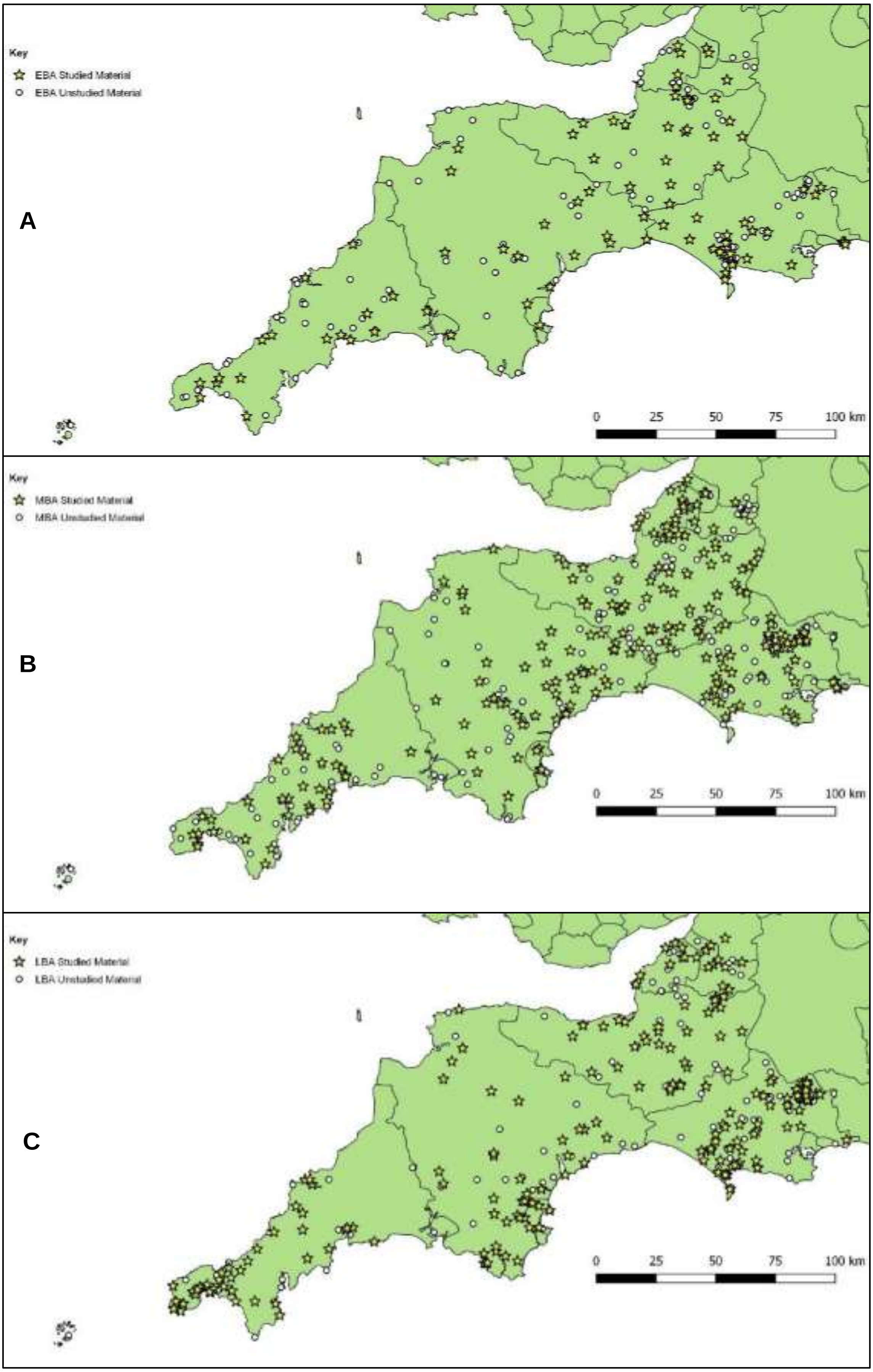


Fig.7.2: A map of all Bronze Age findspots from South West England (source: Author using QGIS using OS data from EDINA Digimap).


Key
EBA Studied Material
EBA Unstudied Material
A
0 25 50 75 100 km
Key
MBA Studied Material
MBA Unstudied Material
B
0 25 50 75 100 km
Key
LBA Studied Material
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C
0 25 50 75 100 km

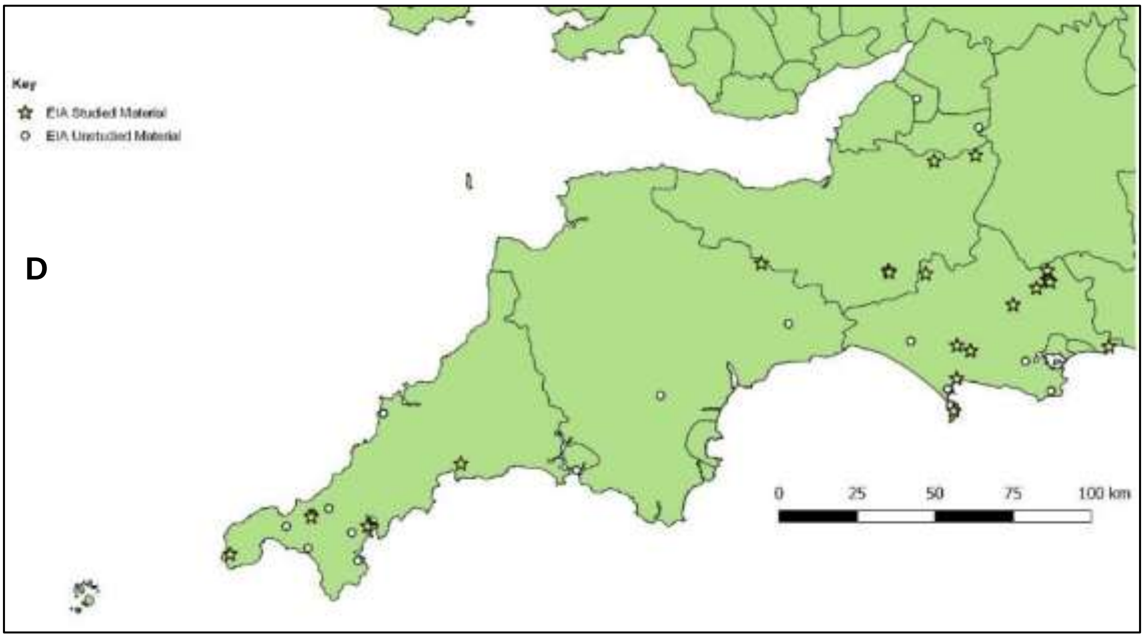


Fig.7.3: Maps of Bronze Age findspots divided by broad period from South West England. **A**: Early Bronze Age; **B**: Middle Bronze Age; **C**: Late Bronze Age; **D**: Earliest Iron Age (source: Author using QGIS using OS data from EDINA Digimap).

Table 7.4: The objects sampled in relation to the sampling criteria

Sampling criteria	Overall Total	Total with known location	Total sampled	% sampled (with known location)
Weapons	565	484	365	75.5%
Incomplete/broken objects	Uncertain	Uncertain	1099	-
Hoards/burials/scatters/ occupational contexts	3134	2813	1178	41.9%
Single finds	1085	966	552	55.4%
Axes	1940	1802	536	29.7%
All Objects	c.4211	3843	1683	43.7%

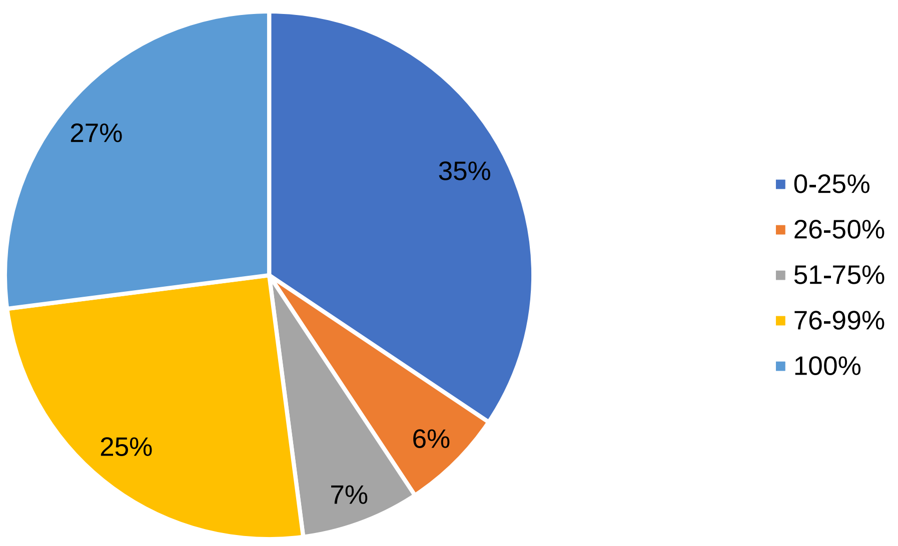
7.3.2 Completeness and Damage Ranking

Figure 7.4 displays the number of objects that fall within each completeness category. Overall there is a strong tendency towards depositing objects as fragments or as mostly complete with few objects falling within the 26-75% completeness categories. Twelve percent (197) of the objects were classed as “n/a” or “Uncertain” and are not presented in Figure 7.4 to enhance the clarity of the data. Additionally, these categories indicate the current state of the object rather than the deposited state because post-depositional processes have hindered the interpretation of whether some objects were deposited complete; it is thus likely that the number of objects deposited 100% complete was higher. When divided by period, almost all objects deposited in the Early and Middle

Bronze Age are 76% or more complete whilst nearly half of all Late Bronze Age objects are deposited 0-25% complete (Fig.7.5). This suggests a shift in the practice of depositing complete objects. Additionally, this later period also contains most objects within the "not applicable" completeness category, which predominantly applies to casting jets and other metallurgical material. These objects could be considered fragments of as-cast objects having been broken off yet retained. In the Earliest Iron Age, the focus is again on depositing complete objects; despite the small sample of objects studied, objects that are 76% or more complete are far more frequent. This can be strengthened by considering unstudied hoards from this period, such as the Mylor hoard, Cornwall, of 33 complete socketed axes (Knight et al. 2015, 35, No.54).

This trend throughout the Bronze Age has also been identified in other European regions. York (2002) found that incomplete objects were more frequently deposited in the River Thames from 1100BC onwards. Huth (1997, 149-150) noted that in the Late Bronze Age c.70% of all hoarded material in Britain is fragmented and incomplete, which is broadly similar to the situation in France. In Switzerland, Germany and the Netherlands, the degree of breakage is lower, but still consists of around 45-50% of all objects. For the Earliest Iron Age, Huth (ibid.) noted a decrease in both hoarding and fragmentation though only by about 10%.

Fig.7.4: Number of objects studied within each completeness category (n=1506)



Although the decrease into the Iron Age presented by the South West data is much greater than that for the rest of the country, this is partly the result of the data sampling. If the Langton Matravers hoards were included (Roberts et al. 2015), this would alter data representation; one could also add the from Mylor (Knight et al. 2015, 35, No.54), and the Late Bronze Age-Earliest Iron Age transitional hoard from King's Weston Down, Bristol (Everden n.d.). The South West thus broadly conforms with the overall picture, at least for the Late Bronze Age.

Although the completeness of objects indicates the state of objects when deposited, it does not indicate intent. Incompleteness could be the result of use, accidents or post-depositional damage, whereas some objects may have been deliberately decommissioned but left overall complete.

Approximately a quarter (440) of the 1683 objects studied were deliberately damaged, and a further 190 objects probably deliberately damaged (Fig.7.6). However, 351 objects were completely undamaged (i.e. damaged-ranked n/a), while 345 objects presented accidental, use-related, or post-depositional/recovery damage. 405 objects demonstrated damage that was damage-ranked 2. Only 179 objects studied had damage which could not be categorised at all.

Most objects ranked 2 or 3 were 0-25% complete whilst almost all of those ranked n/a or 0 were 76-99% or 100% complete (Fig.7.7). Few objects with a higher completeness rating were considered to have been deliberately damaged with the majority damage-ranked 1 (see particularly objects rated 76-99% complete).

Finally, the highest number of objects ranked 2 or 3 occurred during the Late Bronze Age (Table 7.5). When combined with what has already been demonstrated for the completeness and damage rankings, clearly this analysis should focus on those objects that are 0-25% complete dating to the Late Bronze Age. However, the other periods and more complete objects are important to consider alongside this as this can offer insights into the shifting social practices throughout the Bronze Age, as well as whether there was a focus on certain object types. Furthermore, the geographical distribution and context of the finds must also be drawn into these discussions.

Fig.7.5: The completeness of the studied objects across each chronological period (n=1683)

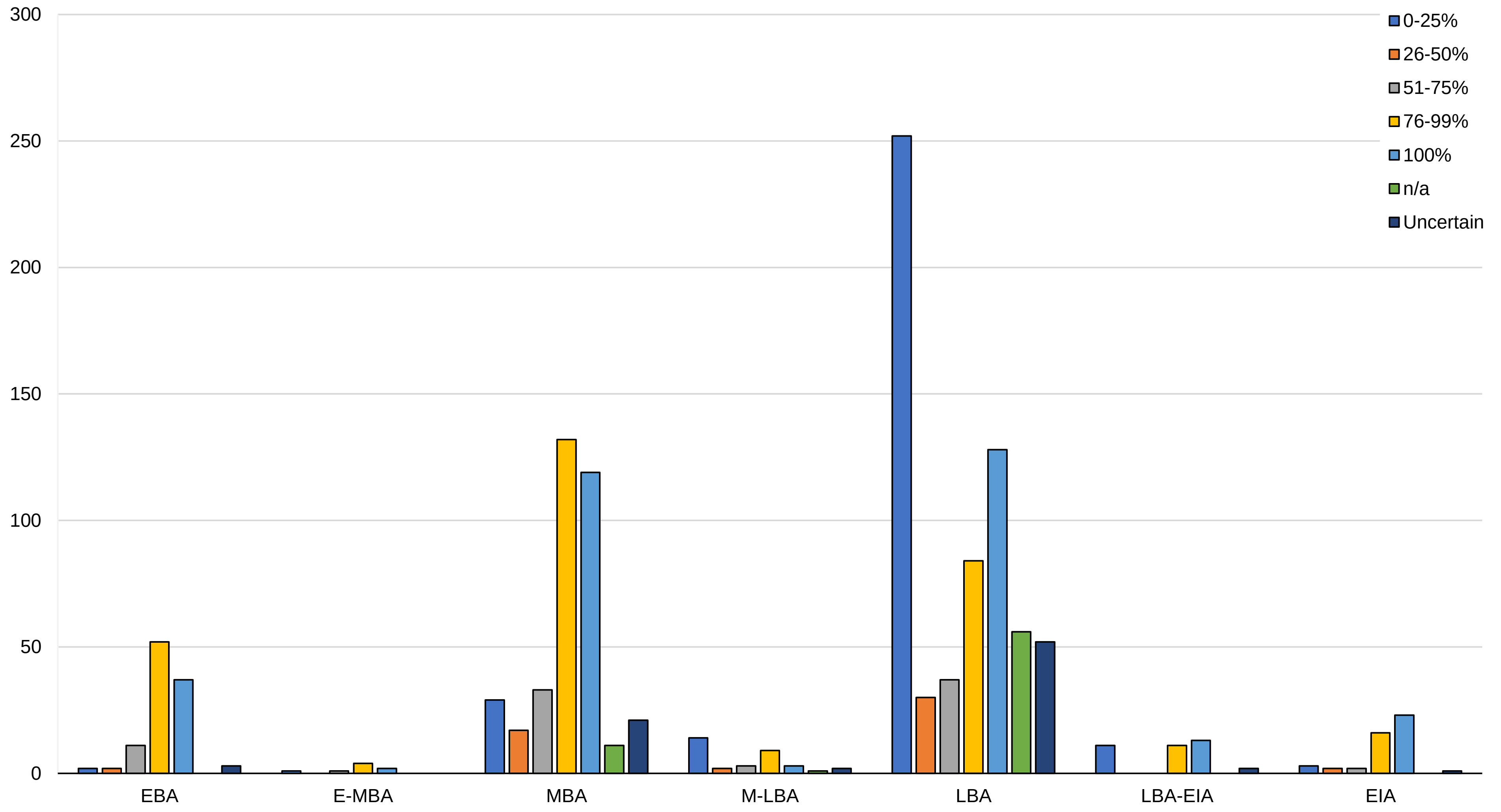


Fig.7.6: The total number of instances that each damage ranking was recorded (n=1683)

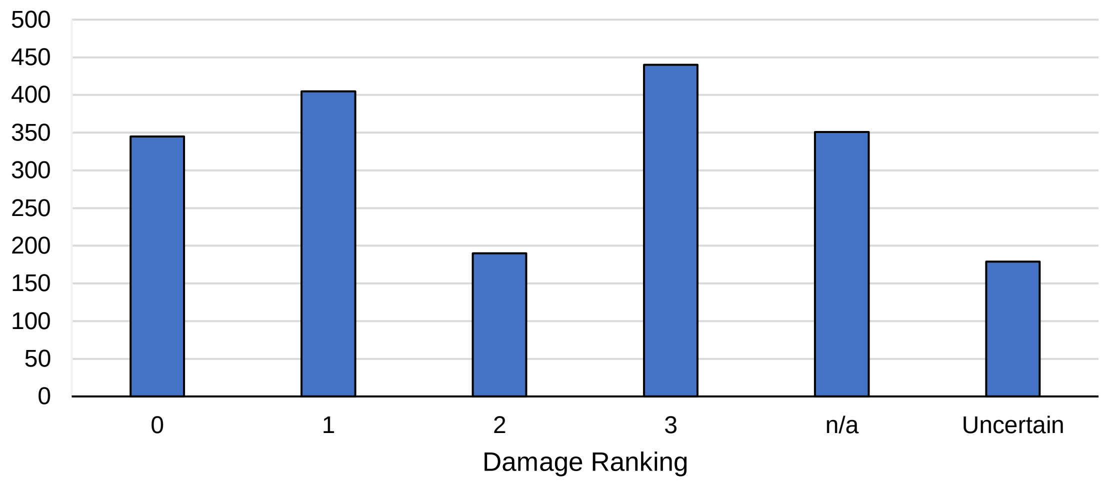


Fig.7.7: The objects within each completeness category divided by damage ranking (n=1683)

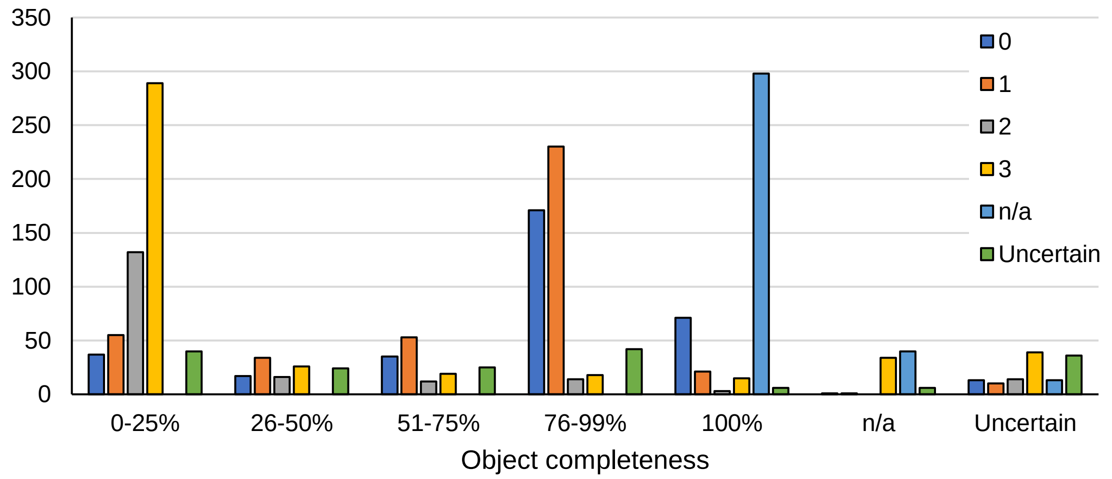


Table 7.5: Frequency of objects categorised under damage rankings 2 and 3 within each broad period

Broad period	Damage Ranking	
	2	**3**
Early Bronze Age	3	7
Early-Middle Bronze Age	1	0
Middle Bronze Age	34	47
Middle-Late Bronze Age	13	6
Late Bronze Age	109	357
Late Bronze Age-Earliest Iron Age	8	5
Earliest Iron Age	1	0
TOTAL	170	422

7.3.3 Forms of Destruction

In analysing the data, two fields for damage were created entitled: *Deliberate/ Decommissioning Damage* and *Other/Uncertain Damage* (Table 7.6). This allowed a simple distinction for interpreting the data later.

Sixteen categories were established for *Deliberate/Decommissioning Damage*, plus two further categories which were ‘None’ and ‘Uncertain’. The sixteen categories broadly correspond with the seven destruction indicators presented in Chapter 5, though some have been sub-divided to provide greater specificity (e.g. differentiating between a broken piece and a fragment). Additionally, a specific type of damage has been added to the destruction indicators: stabbed. This incorporates a single find (TTNCM-F031) because the other indicators were inadequate for categorising this destruction.

Table 7.6: A list of the various damage categories under which objects were classified.

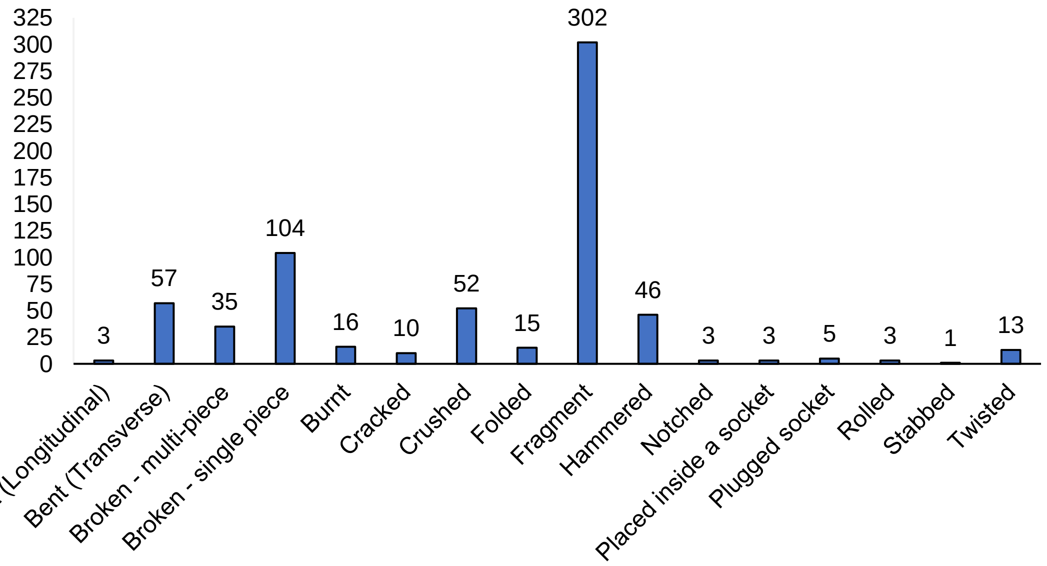
Deliberate/Decommissioning Damage	Other/Uncertain Damage	
Bent (Longitudinal)	Bent	Fragment
Bent (Transverse)	Blade edges/faces damaged	Hafting damage
Broken - multi-piece	Bowing	Impact/blow marks
Broken - single piece	Broken (multi-piece)	None
Burnt	Broken (non-refitting pieces)	Notched
Cracked	Broken (refitting pieces/fragments)	Post-depositional
Crushed	Broken (single piece/fragment)	damage
Folded	Broken across socket aperture	Post-recovery
Fragment	Broken at stop ridge/socket	damage
Hammered	junction	Repaired damage
None	Broken blade	Rivet/peg holes
Notched	Burning	broken
Placed inside a socket	Butt/hilt/socket damage	Rolled
Plugged socket	Casting damage	Scratched
Rolled	Casting flaws	Shaft broken
Stabbed	Chisel marks	Shoulder(s) broken
Twisted	Corrosion damage	Side-loop broken
Uncertain	Cracking	Terminals damaged
	Creased	Tip broken
	Flanges damaged	Twisted
	Folded	Uncertain

A longer list of categories, some very specific, was established for the *Other/Uncertain Damage* to accommodate the diversity of damage, not all of which could be intentional. There is some overlap in the lists (e.g. multi-piece breakage) because sometimes the same damage could be classed as deliberate or non-deliberate depending on other contributing factors. For instance, a multi-piece break demonstrating post-recovery damage fell within *Other/Uncertain Damage,* while the same damage but with associated hammer marks was *Deliberate*.

The specificity of the *Other/Uncertain* list assisted the identification of specific trends in how and where objects were broken, which might inform potential patterns in damage that could infer intent. An example of this is the number of socketed objects broken across the socket aperture but which otherwise lack marks (numbering 33). This could signify a natural weak point in the objects, but when coupled with the experimental evidence and the number of objects broken at this point that *do* show signs of intent, one can argue that such breakage might be considered deliberate. Overall, this spread of categories provided a quick system for identifying trends in different damage forms.

Every damage category was observed on the metalwork of South West England at least once (Fig.7.8). Fragmentation and breakage was most commonly observed with bending, hammering and crushing of objects also frequent. Other damage, such as rolling, notching and plugged sockets, occur infrequently suggesting tendencies towards certain types of destruction over others. Where these occur, however, may be particularly interesting as they could indicate the influence of practices from other areas. Over 60 examples of plugged sockets are known across Britain, for instance (Dietrich and Mörtz *forthcoming*), indicating that those known from the South West contribute to a wider practice despite its infrequent occurrence within the region.

Fig.7.8: The frequency of deliberate destruction indicators recorded (n=668)



7.4 Summary

This chapter has offered an outline of the methodology used for sampling and collecting data on the metal objects found in South West England. This was followed by an overview of the data collected to demonstrate the key observable trends. However, a more specific analysis of the material is needed. Chapter 8 presents an analysis and discussion of the material collected for the Early and Middle Bronze Age highlighting key case studies, whilst Chapter 9 presents the information for the Late Bronze Age and Earliest Iron Age. The case studies selected in the following chapters are those that most clearly illustrate deliberate destruction. These chapters form the basis for a theoretical analysis of all the material in Chapter 10.

CHAPTER EIGHT

MINOR DESTRUCTION: THE EARLY-MIDDLE BRONZE AGE IN SOUTH WEST ENGLAND

8.1 Introduction

This chapter presents an analysis of the Early and Middle Bronze Age metalwork studied during the data collection and discusses the observable elements of destruction by drawing on comparable evidence within and outside the south-western region. Key case studies are highlighted, which have been chosen based on the presence of deliberately destroyed objects linked with significant depositional practices. These will form the basis for a theoretical discussion in Chapter 10 about how approaches to destruction changed across the Bronze Age.

8.2 Early Bronze Age

Table 7.5 indicated limited evidence for the deliberate destruction of Chalcolithic and Early Bronze Age metalwork (hereafter encompassed under 'Early Bronze Age'). Only seven Early Bronze Age metal objects assessed for this thesis showed signs of deliberate destruction. To these one can add three objects that were probably deliberately destroyed; this still only accounts for 7% of the material studied.

There are several reasons for the disproportionate number of destroyed objects compared to later periods. Firstly, although the Early Bronze Age covers a much longer span of time than the Middle and Late Bronze Age, fewer metal objects were deposited. This is partly due to the absence of hoards in the later 3rd and early 2nd millennium BC. It thus becomes important, firstly to date objects to specific metalworking phases where possible, and secondly to assess the nature of non-metal objects during this period, particularly those associated with metalwork. This will enhance how one may interpret metal objects alongside other materials.

A further issue surrounding the destruction of Early Bronze Age metalwork is how one might define deliberate destruction in this period. For instance, many objects are associated with cremations, and may or may not show signs of burning. It must be considered whether objects that may have been burned with a body are consciously 'destroyed', or if their destruction is a 'by-product' of cremation. Here it is taken to represent intentional destruction due to the deliberate and conscious placement of the object on a burning pyre with an individual.

Bronze, as a material, does not burn though some metal objects display evidence of charring which results from the formation of corrosion products when charred organic materials, such as textiles, leather, or wood, are in contact with the object (Mary Davis pers.comm. 2017). Therefore, objects that do not appear burned but are associated with cremations may have been subjected to heat though the burial conditions did not preserve any associated charred material. Unless it is macroscopically evident objects have not been assessed as 'burned', though microstructural analysis may further this interpretation in the future. This latter point is important as 27 of the metal objects were associated with seventeen cremation burials, but only five show macroscopic burning evidence.

Five of the seven definitely destroyed objects are copper-alloy daggers, as well as the three objects damaged ranked 2. These are discussed ahead of the remaining deliberately destroyed objects, which comprise pieces of goldwork.

8.2.1 Daggers

The deliberate damage of Early Bronze Age daggers is often noted but rarely forms the focus of a discussion (Jones and Quinnell 2013, 19; Needham 2000, 44; Woodward and Hunter 2015, 27). Gerloff (1975), for instance, noted eight daggers distorted by heat but did not explore this further. All five south-western daggers damage-ranked 3 demonstrate evidence of burning (Fig.8.1) whilst there is also possible burning evidence on the daggers from Broad Down, Devon, and Winterborne Came 38, Dorset (RAMM-F009; DCM-F045a). Daggers from Angrouse I, Wall Mead I and Yettington also demonstrate bending, breakage, twisting and cracking (Table 8.1; Fig.8.2). The bending on the Angrouse dagger refers to the warping and distortion caused by heat

Fig.8.1: The five Early Bronze Age daggers demonstrating signs of burning. (from left to right) BCMAG-F014a; DCM-F043a; DCM-F043b; RAMM-F055; RCM-F001 (source: Author courtesy of Bristol City Museum and Art Gallery (BCMAG), Dorset County Museum (DCM), Royal Albert Memorial Museum and Art Gallery (RAMM), Exeter, and Royal Cornwall Museum (RCM)).

Table 8.1: A summary of the details of deliberately destroyed daggers from South West England

Thesis No.	Site	Dagger	Destruction Indicators	Context and associated objects
RCM-F001	Angrouse I, Cornwall	Camerton-Snowshill	Bent (transverse) Burnt Twisted	Cremation in stone-lined pit under barrow Biconical urn fragments and iron pyrites
BCMAG-F015a	Wall Mead I, Somerset	Camerton-Snowshill	Bent (Longitudinal) Broken – multi-piece Burnt Cracked	Cremation in stone cist in chambered long barrow Perforated whetstone/pendant, bulb-headed pin (BCMAG-F015b) and Aldbourne-type cup
DCM-F043a	Weymouth 8, Dorset	Armorico-British A	Burnt	Secondary cremation interment within a barrow that contained three other burials Flanged axe (DCM-F043c), dagger fragments (DCM-F043d), and gold pommel (DCM-F043e)
DCM-F043b	Weymouth 8, Dorset	Armorico-British A	Burnt	
RAMM-F055	Yettington, Devon	Type Milston	Burnt Twisted	In a barrow Lump of stone, a piece of burnt wood and a broken perforated stone axe

Fig.8.2: The warping and twisting caused to a fragment of the Yettington dagger (source: Author courtesy of RAMM, Exeter)

around the heel, though it is possible the blade was also deliberately bent (cf. Jones and Quinnell 2013, 19). Similar suggestions have been put forward for the bowing and twisting of daggers from New Inns (Derbyshire), Sittingbourne (Kent), and Wilsford G5, (Wiltshire) (Woodward and Hunter 2015, 39, Fig.3.1.12), but distortion is so slight in these other cases that it is difficult to distinguish intent from natural causes. If caused by burning, the distortion suggests it was exposed to a high heat, perhaps accompanying the cremation on the pyre.

Other damage, including breakage, were observable on all five examples but most could not be conclusively attributed as destructive. One dagger from Weymouth 8 (DCM-F043a), for instance, appears to have broken into multiple pieces because of corrosion rather than deliberate human action. The exception is the Wall Mead dagger, which has broken near the tip into two pieces in antiquity, associated with longitudinal bending. The bend is about 5-10° and caused two cracks along the external edge and one along the internal edge of the bend. The two pieces do not refit neatly, with the tip fragment bending away from the main blade indicating the point of breakage, which is associated with minor material loss. Although there is a small casting flaw in the break, which would have encouraged the damage, it seems the dagger may have been struck against something to incur the bending and breakage.

Four of the daggers were deposited with cremations, suggesting they were burnt with the body. The bulb-headed pin, perforated pendant and ceramic cup associated with the Wall Mead dagger are intact however, suggesting that whilst the dagger was burnt with the body other grave goods were included afterwards. The Angrouse dagger, meanwhile, was found with fragments of a biconical urn. The dagger survives in four fragments and the incomplete ceramic sherds may support the idea that the dagger was deposited fragmented too. No human remains were found with the Yettington dagger but it was interred in a barrow with burnt wood and a broken stone axehead. The wood and the condition of the dagger indicates that the objects were burnt. The stone axe may have broken accidentally but the decision to include a fragmented object indicates the intentional selection process behind interments.

The Weymouth 8 context is more complex and warrants detailed consideration (Fig.8.3). The two daggers were found lying on top of a secondary cremation interment (No.3) along with fragments of a third dagger, a low-

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Fig.8.3: The internal structure of the Weymouth 8 (Ridgeway 7) barrow (source: Drew and Piggott 1936, Pl.IV)

flanged axe and a sheet gold pommel. The pommel is largely complete and a small piece of textile is preserved on the flanged axe suggesting it had been wrapped upon deposition.

Secondary Interment No.3 was deposited in the earthen mound of the barrow which covered a stone cairn which in turn covered a subterranean stone cist. The cist contained decayed human skeletal remains and two secondary interments had been made into the stone cairn above it. One of the secondary interments (No.1) also had an associated dagger (DCM-F042) though with no signs of deliberate damage. This interment consisted of incomplete skeletal remains of a 21-year-old individual represented by “almost all the upper jaw and teeth… seven broken bones, and the upper part of the skull”, but none of the vertebrae (Cunnington in Drew and Piggott 1936, 21). The incomplete nature may suggest that pieces of the skeleton were deliberately selected or else removed, suggesting a fragmentation of the body. Secondary interment No.2 was a cremation with no associated finds. Additional non-metallic finds were

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Fig.8.4: Non-metal finds from the Weymouth 8 cairn: 7. stone mace-head; 8. sandstone tablet; 9. bone dagger-pommel; 10. polished flint axe; 11. bone pin; 12-14. Flint scrapers; 15-16. chert scrapers (source: Drew and Piggott 1936, Pl.VI)

recovered from the cairn, including animal bones, stone and bone tools and pottery (Fig.8.4).

Interpreting the Weymouth 8 barrow is challenging as there were multiple phases during which interments and other deposits were made, and several elements to consider. The associated artefacts can be considered roughly contemporary but due to the broad nature of relative dating one cannot determine if the interments were made days, years or centuries apart. The combination of both inhumations and cremations within the barrow indicates changing practices and/or personal preferences towards interments. Similarly, the various objects found within the cairn but not associated with any of the individuals could have been incorporated during construction of the cairn or included later. These practices may have been a form of veneration or ongoing interaction with the monument.

These five examples thus demonstrate that the destruction of Early Bronze Age metalwork associated with burials was part of a wider scheme of practices that cannot be generically summarised. The inclusion of damaged and incomplete objects, even where intent cannot be demonstrated, seems to have been a key part of burial practices. It is therefore important to consider all fragments, not just of metalwork, that have been deliberately chosen for interment with a burial. Daggers seem to have been linked, at least partly, to the cremation of an individual though some daggers show no evidence of burning despite being associated with a cremation (e.g. Dewlish 8, Dorset: DCM-F009) emphasising the variation in the practices.

8.2.2 Rolled gold

A sheet gold basket-shaped ornament from Stogursey, Somerset (PAS-F253), was rolled tightly into five layers before deposition with the tang wrapped around the body or ‘basket’. It was unrolled after recovery revealing punched dot decoration and a pressed groove adorning the circumference of the object. Additionally, there are the remains of creases adjacent to the direction in which it was rolled suggesting it may have previously been folded. The object has broken into pieces at two right angles indicating it split across weaknesses caused by the creasing (Fig.8.5). The ornament can be dated to c.2500-2000 BC (the Chalcolithic-Early Bronze Age) and was found while metal-detecting in 1999, with or close to a scattered hoard of 1096 3rd Century AD Roman coins (Treasure Annual Report 1998-9, 10).

Basket-shaped ornaments are typically found in pairs and with burials (Needham 2011, 131-133) and over twenty British examples are now known (following Needham 2011 and PAS data), though the Stogursey example is the only one currently known from South West England. Many basket-shaped

Fig.8.5: The Stogursey basket-shaped ornament (source: Author courtesy of the British Museum)

ornaments are deliberately decommissioned. One of the two ornaments found with the Amesbury Archer burial, Wiltshire, was "severely crushed" and the tang had broken off (Needham 2011, 130). Single finds from Calbourne parish, Isle of Wight, and the Cholsey area, Oxfordshire, were both found crushed and folded (Basford 2005; Byard 2012) (Fig.8.6) and a pair from Whitchurch, Hampshire, were found folded one inside another (Byard 2015a). These examples may strengthen the idea that the Stogursey ornament had previously been folded.

Other Chalcolithic-Early Bronze Age goldwork is also deformed. Sixteen Irish gold lunulae were rolled or folded either prior to or upon deposition (Cahill 2005). A rolled clipped gold band from Tom Tivey's hole, Somerset (BCMAG-F014; Fig.8.7) can be paralleled with other examples associated with Beaker burials in western Europe including France and Iberia and three additional British sites: Pendleton, Lancashire; Kingsmead Quarry, Berkshire; and Chilbolton, Hampshire (Barrowclough 2014; Nicols 2013; Taylor 1994, 51-53). An unassociated rolled gold band has also recently been found at Little Baddow, Essex (Richardson 2017).

The deformation of sheet gold objects was therefore widespread during the later 3rd Millennium BC. Such objects are typically assumed to have held a 'personal' element, which is certainly strengthened by the numerous associations of pairs of basket-shaped ornaments with burials. The death of an individual may have necessitated a destruction of their possessions, or objects linked with them. The deliberate decommissioning of basket-shaped ornaments may have been a metaphor for the ending of an individual's life (Brück 2006b). However, many deformed gold objects are not found with individuals; this extends to the Irish lunulae and other sheet goldwork. The removal of these objects from circulation by burying them and the disassociation from their owner(s) may have been a physical expression of severed ties between individuals and objects. These objects may have expressed certain rites, relationships or life stages and if any of these ceased to be relevant it was necessary to remove this object from circulation. Deliberate deformation and removal of functionality emphasised that the object no longer served a purpose.

Fig.8.6: Basket-shaped ornaments from Cholsey (above) and Calbourne (left) (source: the Portable Antiquities Scheme (PAS)/Trustees of the British Museum).

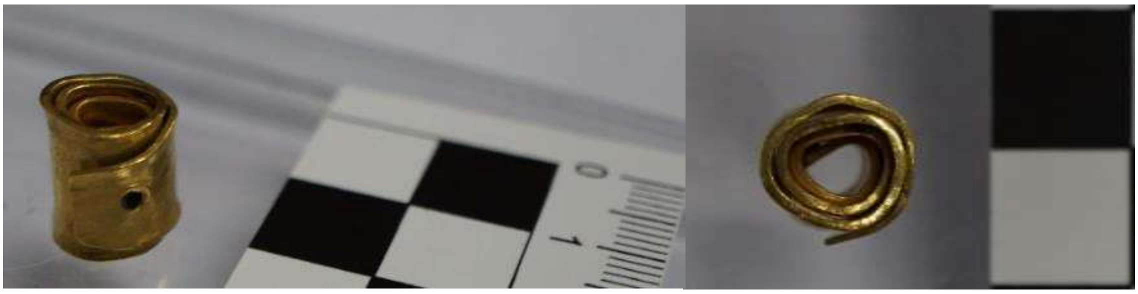


Fig.8.7: The rolled gold band from Tom Tivey's Hole (BCMAG-F014) (source: Author courtesy of BCMAG)

The rolling of lunulae has also been viewed as a method of safe-keeping the precious nature of the material (Cahill 2005). This is hard to argue for basket-shaped ornaments though as they would have been easily concealed without burying them. Additionally, their link with burials does not imply a safe-keeping procedure but rather that they served a role as an offering. Instead deposition of basket-shaped ornaments without individuals may have been symbolic for the death of an individual whose remains were deposited elsewhere or left no archaeological trace.

There is only limited contemporary metalwork from South West England. To the Tom Tivey's Hole ornament, five gold lunulae and copper and early copper alloy flat axes can be added. None of the lunulae display evidence of rolling or folding and the axes studied showed no deliberate damage. The Stogursey and Tom Tivey's Hole ornaments thus stand out as the earliest forms of metalwork destruction observed in South West England.

8.2.3 Use after breakage

The inclusion of broken objects in burials has already been mentioned, though it is worth considering more broadly accidentally damaged or broken objects that may have continued in circulation post-breakage. Flat axes found while metal-detecting in Landulph and Madron, both Cornwall (PAS-F011; PAS-F013; Fig.8.8), broke across the body in antiquity. Casting flaws on the Landulph axe suggest the break was accidental, perhaps through use, whilst the Madron axe may have broken while incising grooved decoration. The cutting edges and breaking points on both axes are worn suggesting they potentially continued in use or circulation after breakage. Moyler's (2007) destruction experiments demonstrated the resilience of flat axes to breakage and thus it may have been significant when one of these objects did break.

Similarly, a broken dagger recovered from Gussage St Michael, Dorset (PRIV-F024), was reworked into a flanged axe form (Fig.8.9). The dagger broke across the lower blade in antiquity; towards this end the dagger edges have been hammered up on one face to form low flanges. Additionally, the hilt end has been hammered and ground, removing the original shape and creating an uneven crescentic edge; this suggests the dagger piece was worked into a makeshift axe or chisel.

Fig.8.8A: The Landulph flat axe piece (PAS-F011) (source: image courtesy of the PAS/Trustees of the British Museum)
Fig.8.8B: The Madron flanged axe piece (PAS-F013) (source: Author courtesy of RCM)

Fig.8.9: The Gussage St Michael 2 South IV dagger(PRIV-F024) (source: Author courtesy of Mr Martin Green)

Gussage St Michael has a dense concentration of Late Bronze Age and Early Iron Age metalwork (see for instance PRIV-F019), with the dagger representing one of the few pieces dating to the Early Bronze Age. The dagger may represent a rediscovered deposit that was reworked in the Late Bronze Age or reworking following breakage during the Early Bronze Age. The latter view might be favoured as flanged axes were contemporary with this type of dagger and a fragment of one was found nearby (PRIV-F012). The breakage of objects thus does not always necessitate the end of their use-life.

This theory is supported by other evidence of object curation and the possibility of heirlooms. Worn ancient breaks have been identified on Early Bronze Age grave goods including dagger pommels, belt and pulley rings, jet buttons and bones pin (Woodward and Hunter 2015). Furthermore, worn Beaker sherds deposited in the Lockington burial, Leicestershire, suggest they may have been circulated as heirlooms, prior to deposition (Woodward 2000, 58-60; 2002). Likewise, a curated broken jet spacer bead was incorporated into an assemblage at Almondbank, Scotland (Frieman 2012, 344; Sheridan 1999, 57). At Mount Pleasant Henge, Dorset, meanwhile there appears to have been a deliberate selection and accumulation of Beaker sherds deposited in ditches (Woodward 2002). This is not to imply that all broken objects held significance, rather that breakage may not have diminished the importance of an object nor necessitated its immediate disposal. Evidence of this is also visible in the Middle Bronze Age.

8.2.4 Early Bronze Age Summary

Few metal objects in South West England indicate conclusive evidence for deliberate destruction. What does occur, however, aligns with traditions seen across Britain at the time. The practice of cremation offered a means not only of destroying the body but also the equipment that adorned the individual on the funerary pyre; it is likely the archaeological record omits macroscopic indicators of burning and that other objects were likely destroyed in the process (e.g. organic material). Unburnt broken objects are also observed with burials suggesting this was not the only mode of destruction.

The deformation of gold objects was observed from the earliest stages of metalworking in the later 3rd millennium BC, and this appears to have manifested in a variety of ways for different objects. Finally, the significance of accidentally broken objects has been suggested. Reworked and reused objects can indicate that breakage did not always signify the end of an object's usefulness with some objects acting as heirlooms. This all furthers the significance of occasions when deliberate damage was undertaken whilst also emphasising that even accidentally broken objects still maintained a role in Early Bronze Age societies.

8.3 Middle Bronze Age

The number of metal objects damage-ranked 2 or 3 increases in the Middle Bronze Age (Fig.8.10; Fig.8.11; 8.12). Overall this only represents about 19% of the objects deposited in this period (Fig.8.13). This latter analysis excludes 28 'Uncertain' objects to illustrate the overall trend more clearly. Increased object destruction is coupled by the increased variety of object types (see Fig.6.19) and the range of depositional situations. The association of metalwork with human remains largely ceases.

Many objects can be dated to specific metalworking phases of the Middle Bronze Age to view changing practices over time (Fig.8.14). No South West England hoards date to the Acton Park phase which aligns with much of the rest of the country (Needham et al. 1997, 56), but the deposition of two or more objects becomes more widespread from c.1400 BC onwards. Additionally, recognisable occupational contexts occur more frequently. Most deliberately destroyed objects date to the Taunton phase, which is also the phase to which many the Middle Bronze Age objects studied can be attributed. For instance, only 21 objects dated to the Acton Park phase whilst 185 dated to the Taunton phase.

Breakage, fragmentation, transverse bending, and crushing were the most frequently recognised destruction indicators (Fig.8.15). All seventeen crushed objects are from the Priddy hoard (Section 8.3.2) but the remaining indicators are present on various objects and contexts and in combinations with other indicators (Fig.8.16). Isolated instances of destruction indicators occur in the form of a notched spearhead from Glastonbury Turbaries (TTNCM-F054b) and the struck and stabbed shield from South Cadbury (TTNCM-F031), both Somerset. The spearhead was complete apart from a series of significant notches along the blade edges creating an irregular serrated effect (Fig.8.17).

Fig.8.10: A comparison of the number of objects damage-ranked 2 and 3 in the Early and Middle Bronze Age (n=91)

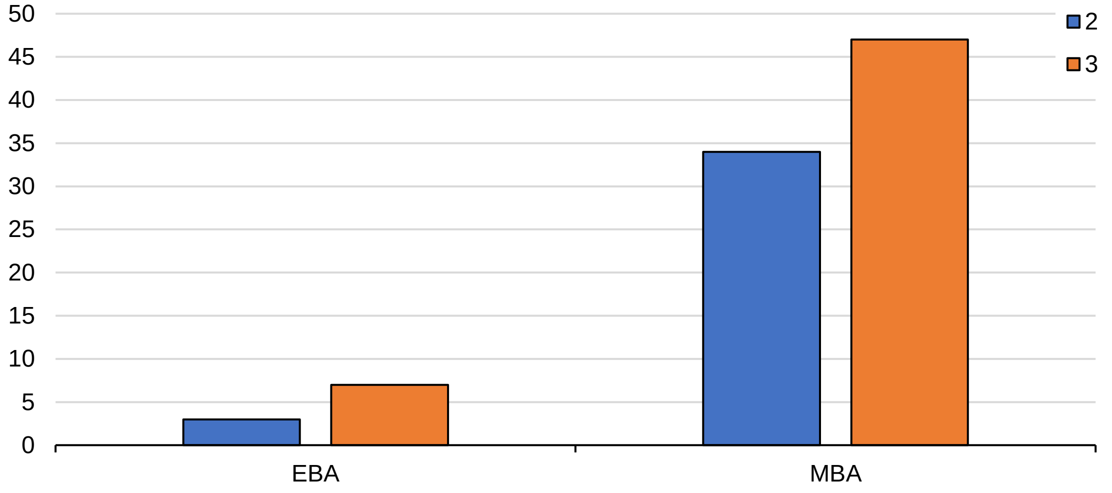


Fig.8.11: Deliberately destroyed Middle Bronze Age objects divided by material (n=47)

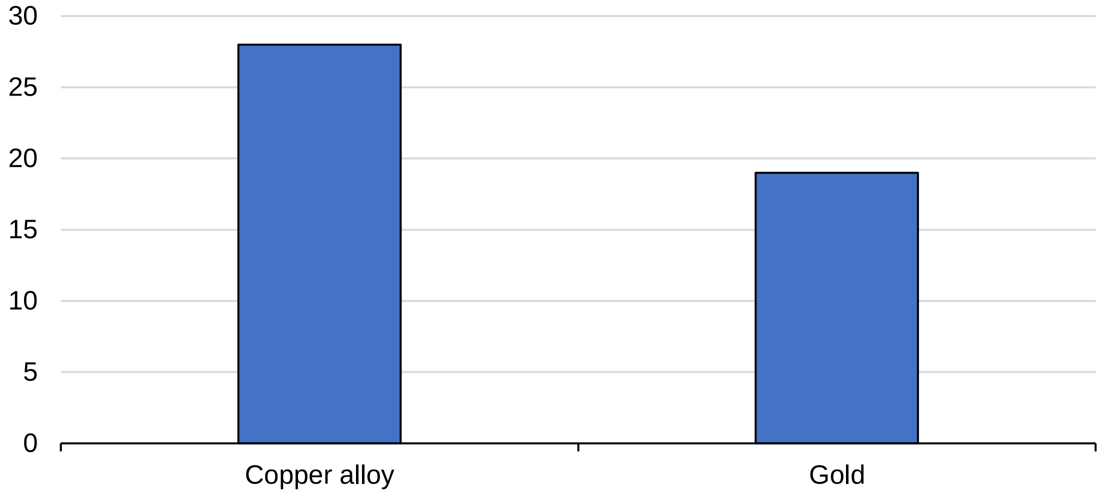


Fig.8.12: A proportional analysis of Middle Bronze Age deliberately destroyed (Yes) and non-deliberately destroyed (No) copper alloy and gold objects

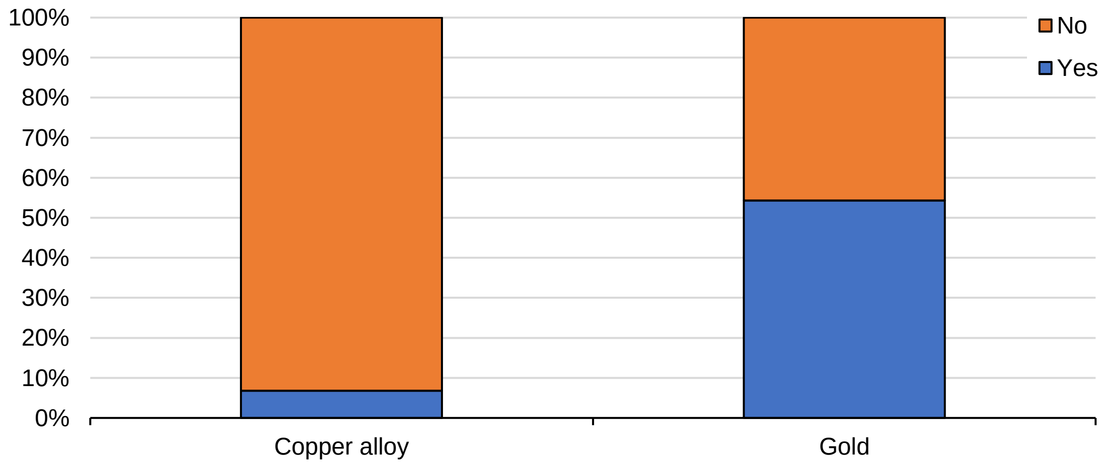


Fig.8.13: Number of Middle Bronze Age objects within each damage ranking (n=420)

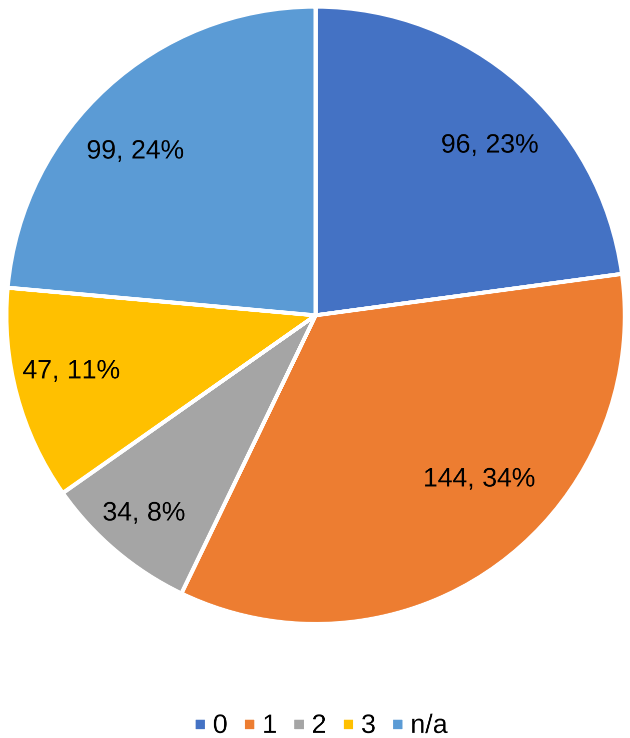


Fig.8.14: Deliberately destroyed Middle Bronze Age metal objects divided by phase (n=47)

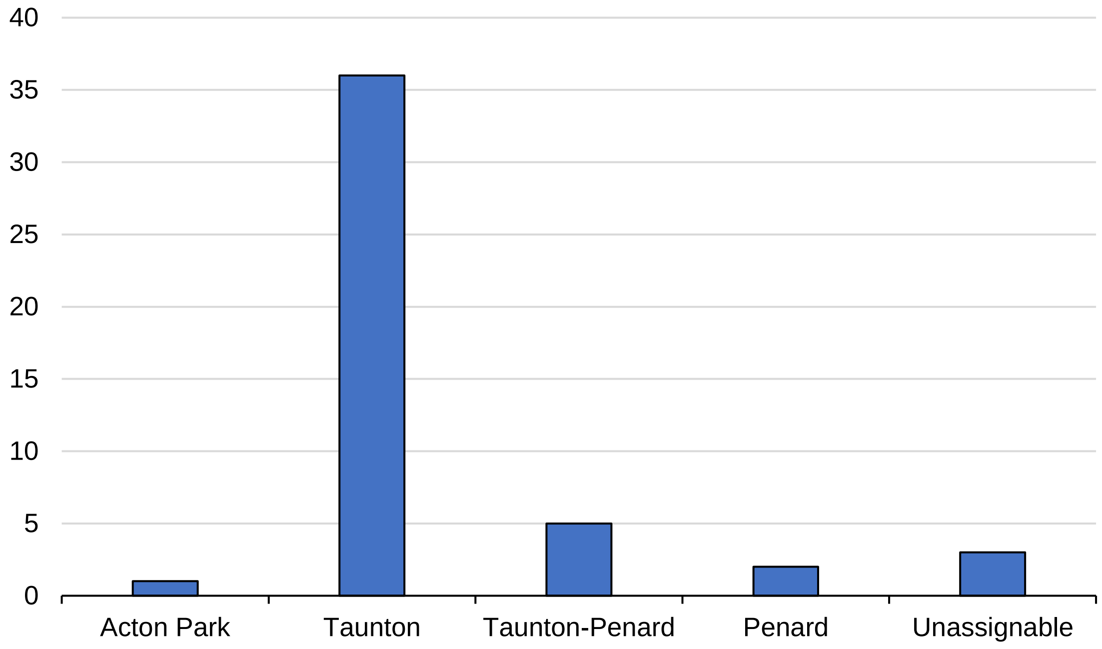
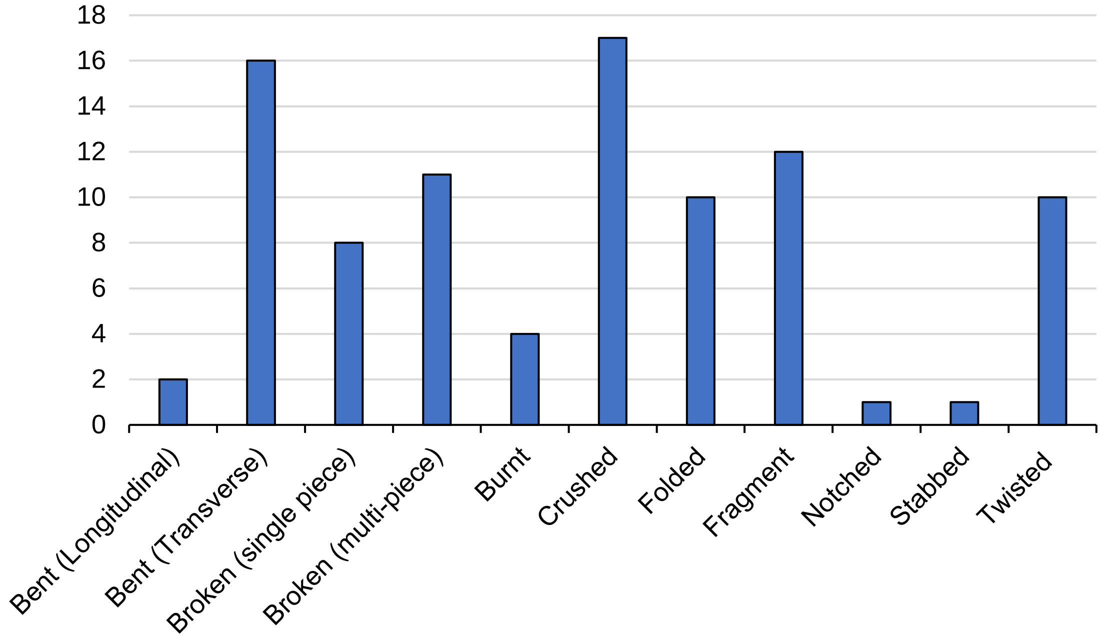


Fig.8.15: The relative frequencies of destruction indicators on the Middle Bronze Age objects studied (n=92)



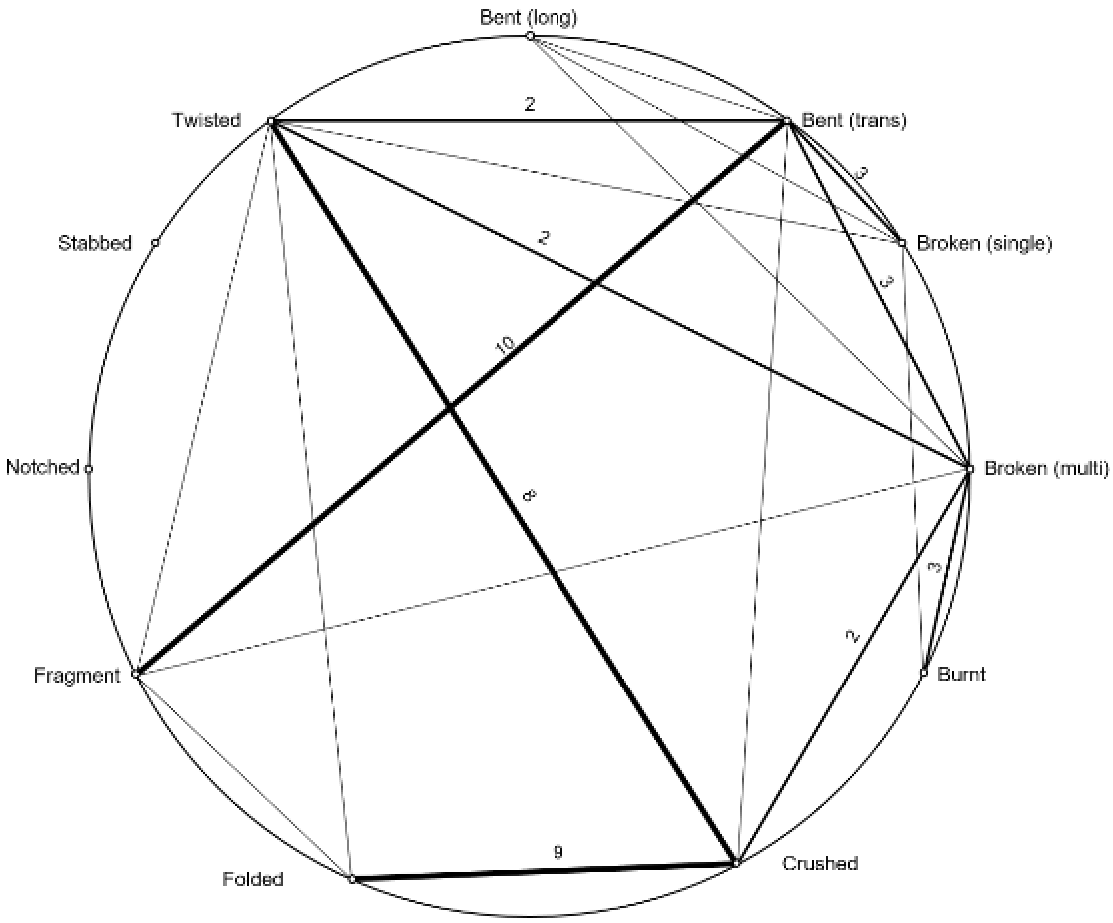


Fig.8.16: Associations of destruction indicators across all deliberately destroyed Middle Bronze Age objects. Lines without numbers indicate a single association of that damage, whilst damage without lines were identified in isolation.

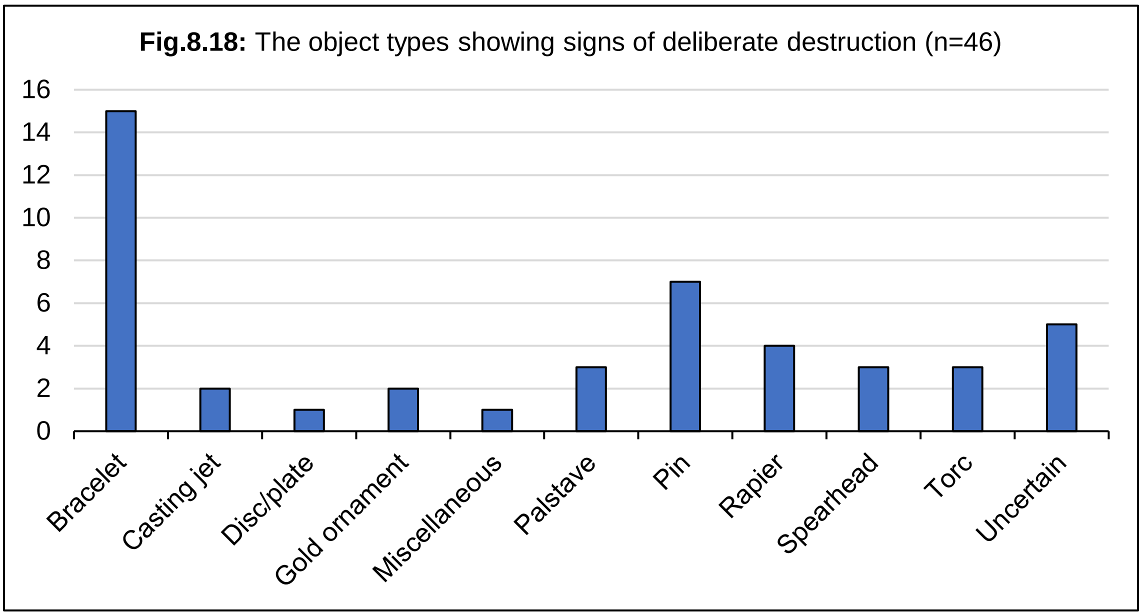
Fig.8.17: The Turbaries spearhead, Somerset (TTNCM-F054b) (source: Author courtesy of South West Heritage Trust (Museums Service) (hereafter SWHT(MS).

The notches are all U-shaped and range in size from 4.3x2.3mm to 8.5x3.8mm, indicating they were sustained by repeated strikes from a thick blade, perhaps that of an axe.

The stabbing of the South Cadbury shield is the only clear instance of a 'stabbed' object in South West England and other examples are largely attributable to use-damage. This object is further interesting as it is a Middle Bronze Age object deposited in a Late Bronze Age context (Knight *forthcoming*(a)); it is discussed further below (Section 8.3.4).

Most of the destroyed objects are weapons and ornaments (Fig.8.18). The emergence of bladed implements, such as dirks, rapiers and the earliest swords, no doubt affected social practices. The extent to which warfare emerged during this period has been widely discussed (Harding 2007; Osgood et al. 2000; Thorpe 2013) and it seems likely that shifts in social organisation, perhaps relating to competition over territories and/or prestige, may have encouraged new ways of interacting with objects.

Two rapiers from Shillingstone, Dorset (PAS-F148; Fig.8.19), for instance, were bent and fragmented though most pieces were still present. This contrasts not only with contemporary deposits of complete rapiers elsewhere (e.g. Badbury Rings, Dorset: BM-F009; and Pen Pits, Somerset: SM-F004), but also fragmentary examples where only individual pieces or fragments survived (e.g. North Crofty, Cornwall: RCM-F026; and Gussage St Michael 8, Dorset: PRIV-F039). Although traditionally one might interpret fragments as pieces for recycling and complete examples as votive offerings, the deliberate damage of a rapier whilst also leaving it largely complete implies another process.



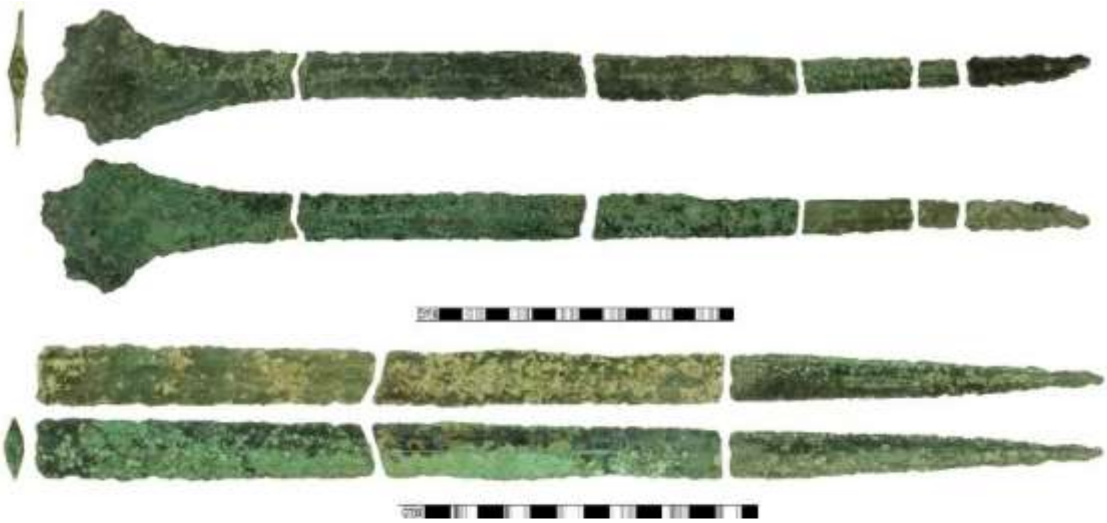


Fig.8.19: The two broken rapiers from Shillingstone (PAS-F148) (source: courtesy of the PAS/Trustees of the British Museum)

Damaging the object before deposition was inherent to this process and can also be observed outside the study region (e.g. Bix hoard, Oxfordshire: Byard 2015b). Even where damage is likely use-related, it is possible the damage itself was attributed significance *because* it broke, as suggested for the bent and broken Broadsands rapier, Devon (TOR-F004; Fig.8.20; Knight and Chandler *forthcoming*).

The same might be argued for damaged spearheads. The Taunton Union Workhouse spearhead (TTNCM-F053a) appears to have been deliberately broken (Section 8.3.1a) whilst the spearhead from Tarrant Monkton I, Dorset (BM-F026a), has a combination of breakages related to intent and

Fig.8.20: The bent and broken rapier from Broadsands (source: Author courtesy of Torquay Museum)

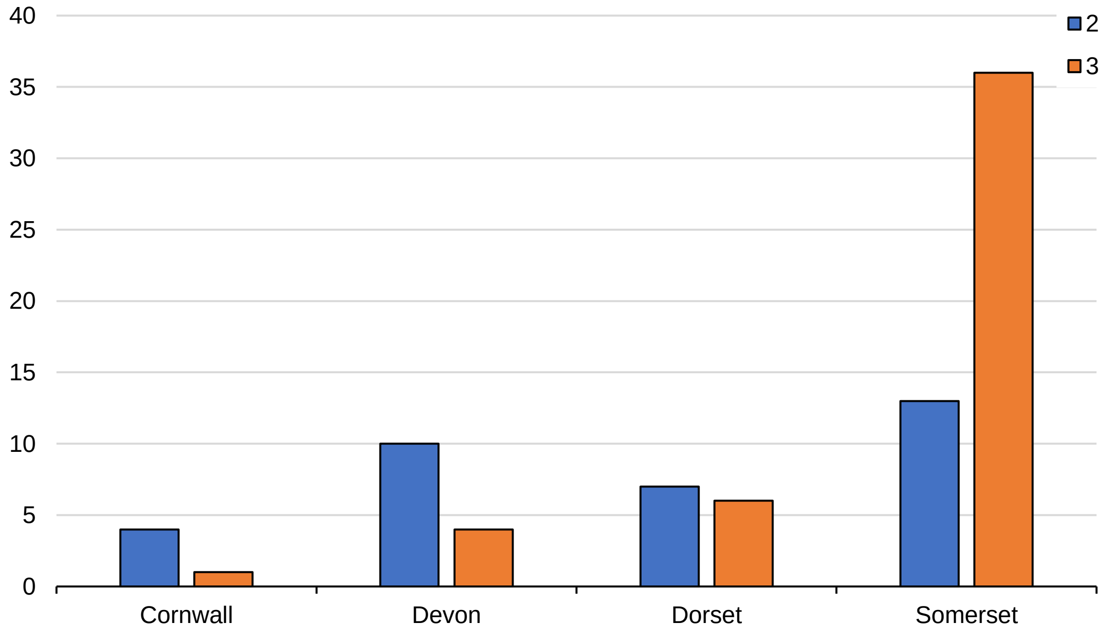
casting flaws. Even after the latter broke, potentially by accident, further damage was inflicted. Both examples were found with complete palstaves, signifying a difference in how various object types were treated. The involvement of weapons in physical actions against other individuals, literally becoming a matter of life and death, may have heightened their importance.

Ornaments comprised gold and copper alloy objects, particularly bracelets and pins. The destruction of ornaments is seen across southern Britain during the Middle Bronze Age (Wilkin 2017) and can be observed in the Taunton Union Workhouse (TTNCM-F053) and Priddy (TTNCM-F40) hoards, Somerset (see Sections 8.3.1 and 8.3.2). Another Somerset hoard from

Monkswood also contains deliberately destroyed ornaments (Smith 1959b, GB.42) though it was not possible to study this hoard during data collection. The destruction of ornaments in these hoards, however, can be used to suggest that fragmentary ornaments seen in other hoards might also have been the result of intent. For instance, the Pinhoe hoard, Devon (RAMM-F037) contained several broken bracelets which demonstrated no other signs of intent but by incorporating these into a wider analysis of breakage patterns associated with ornaments, it can be argued these objects were likely deliberately broken.

When analysed geographically, the concentration of deliberate destruction in ornament hoards is evident, with only one object showing signs of deliberate destruction from Cornwall compared with the 36 from Somerset (Fig.8.21). Of those 36, 31 are from the Taunton and Priddy hoards and would be increased if one included the Monkswood hoard. The Taunton and Priddy hoards are now considered in greater detail as key case studies for the Middle Bronze Age in South West England. Following these analyses, the destruction of other materials in occupational contexts will be addressed before considering the South Cadbury shield and its destruction as part of a complex set of wider practices.

Fig.8.21: Deliberately destroyed Middle Bronze Age metalwork divided by county and damage ranking (n=81)



8.3.1 Taunton Union Workhouse Hoard (TTNCM-F053)

In 1877, a hoard of approximately 40 objects was recovered during work at the Taunton Union Workhouse (Fig.8.22; Table 8.2; Smith 1959b, GB.43). The hoard was found about 3 feet below the modern surface; the area around and beneath the hoard was stained a dark colour, which Pring (1880, 94) attributed to the slight decomposition of the surface of the objects. The hoard contained complete and incomplete objects largely consisting of palstaves and pins. It is the largest hoard dating to the Taunton phase in South West England.

Other object types are represented by singular inclusions (e.g. a socketed hammer, two sickles, and a bracelet). All damage rankings and seven destruction indicators are represented within this hoard, demonstrating the variety of ways objects were treated. Fourteen objects were deliberately destroyed, and a further two artefacts were damage-ranked 2.

Fig.8.22: Objects from the Taunton Union Workhouse hoard (source: Author courtesy of SWHT(MS).

Table 8.2: A summary of the Taunton Union Workhouse hoard.
Key: Y = Yes; N = No; (L) = Longitudinal; (T) = Transverse.

TTNCM-F053	Object	Completeness	Use Evidence	Damage Ranking	Destruction Indicators
a	Spearhead	26-50%	Y	0, 3	Broken (multi), Burnt
b	Socketed axe	76-99%	Y	Uncertain	None
c	Palstave	76-99%	Y	0, Uncertain	Uncertain, poss. burnt
d	Palstave	76-99%	Y	0, Uncertain	Uncertain, poss. burnt
e	Palstave	76-99%	Y	0, Uncertain	Uncertain, poss. burnt
f	Palstave	76-99%	Y	0, 1, Uncertain	Uncertain, poss. burnt
g	Palstave	76-99%	Y	0, 1, Uncertain	Uncertain, poss. burnt
h	Palstave	76-99%	Y	0, 1, Uncertain	Uncertain, poss. burnt
i	Palstave	100%	N	0, Uncertain	Uncertain, poss. burnt
j	Palstave	100%	N	0, Uncertain	Uncertain, poss. burnt
k	Palstave	100%	N	n/a	None
l	Palstave	76-99%	Y	0, 1, Uncertain	Uncertain, poss. burnt
m	Palstave	76-99%	N	0, 1, Uncertain	None
n	Palstave	26-50%	Y	1	None
o	Palstave	0-25%	N	0, 1	None
p	Socketed hammer	76-99%	Y	1	None
q	Sickle	51-75%	Y	0, 1	None
r	Sickle	51-75%	Y	0, 1	None
s	Torc	76-99%	Y	0	None
t	Bracelet	51-75%	N	0, 3	Broken (single)
u	Ring	100%	N	n/a	None
v	Ring	76-99%	N	0, 1	None
w	Razor	51-75%	Y	1	None
x	Pin	51-75%	N	0, 2	None
y	Pin	51-75%	N	0, 3	Bent (L), Bent (T), Broken (single)
z	Pin	26-50%	N	0, 3	Bent (L), Broken (multi)
aa	Pin	0-25%	N	0, 1	None
bb	Pin	0-25%	N	1	None
cc	Pin	0-25%	N	0, 2	None
dd	Pin	0-25%	N	3	Bent (T), Fragment
ee	Pin	Uncertain	N	3	Bent (T), Broken (multi), Fragment
ff	Pin	Uncertain	N	0, 3	Bent (T), Broken (multi), Twisted
gg	Pin	0-25%	N	3	Bent (T), Fragment
hh	Pin	0-25%	N	3	Bent (T), Fragment, Twisted
ii	Rod	Uncertain	N	3	Bent (T), Broken (single)
jj	Rod	Uncertain	N	3	Bent (T), Fragment
kk	Rod	Uncertain	N	3	Bent (T), Fragment
ll	Rod	Uncertain	N	3	Bent (T), Fragment
mm	Rod	Uncertain	N	3	Bent (T), Fragment
nn	12x rod fragments	n/a	N	Uncertain	Uncertain

8.3.1a The Objects

Destruction indicators are observable on the incomplete basal-looped spearhead, a bracelet piece, and all pins. The spearhead, in four refitting pieces, bears a combination of post-recovery and intentional damage (Fig.8.23). The fragmentation of this artefact was probably deliberate and with no associated marks or casting flaws the object was likely hot-short (i.e. heated and struck) to separate the blade and socket. The absent socket is unlikely to have been deposited with the hoard as the excavators recovered smaller fragments. This suggests a deliberate selection of an incomplete spearhead for deposition. Additionally, there is mottled pale turquoise patina across the blade of the spearhead (see Fig.8.23) which is also visible on other pieces in the hoard and possibly linked to burning (Mary Davis pers. comm. 2017).

Similarly, the surviving bar-twisted bracelet (Fig.8.24; TTNCM-F053t) in three refitting pieces represents a combination of post-recovery and ancient damage. The external breaks appear to be ancient and although these show no incontrovertible signs of intent, the fact that both ends have broken and neither terminal survives could suggest this deliberately decommissioned the bracelet ensuring it could no longer be used. Furthermore, the twists on the bar are worn suggesting an extended use-life before deposition. The removal of terminals

Fig.8.23: The incomplete spearhead from the Taunton Union Workhouse hoard (source: Author courtesy of SWHT(MS).

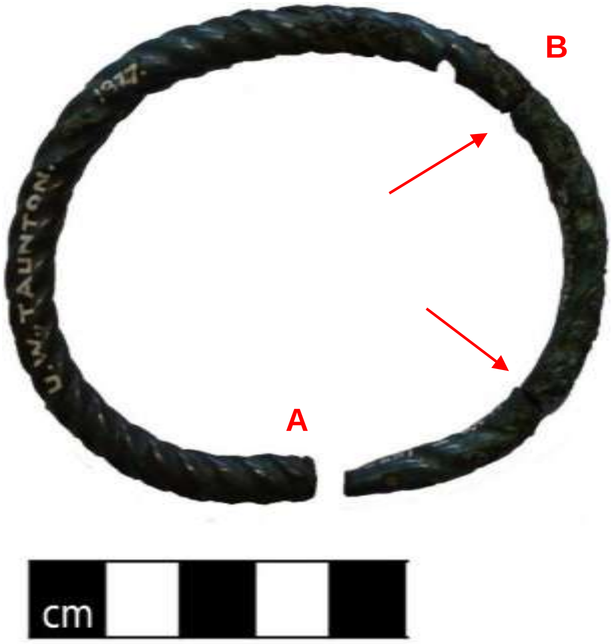


Fig.8.24: (above) The incomplete bracelet (TTNCM-F053t) from Taunton with arrows indicating the refitting breakages. (below left) **A**: Breakage showing consistent corrosion indicating the break occurred in antiquity; (below right) **B**: Breakage showing differential corrosion, indicating the break is more recent (source: Author courtesy of SWHT(MS).

was possibly inflicted upon penannular ornaments with a longer use-life. A worn bar-twisted torc from the Edington Burtle hoard, Somerset (TTNCM-F015k), lacks terminals (Fig.8.25), whilst four bracelets in the Pinhoe hoard (RAMM-F037) are represented by mid-sections lacking terminals and a terminal fragment from a different bracelet (Fig.8.26). Single finds from Castleton, Powerstock, and Bradford Peverell, all Dorset (PAS-F137; PAS-F145; PAS-F179) also lack one or both terminals.

All pins in the Taunton hoard were damage-ranked 2 or 3. Three pins demonstrate extensive bending of the shafts. Although the recurved shaft of TTNCM-F053x could be functional, it is highly likely the shafts of pins TTNCM-F053y-z were deliberately bent. The shaft of one pin (TTNCM-F053y) is bent transversely about 25° and longitudinally 180°, whilst another pin (TTNCM-F053z) is longitudinally bent 270° almost into a full circle towards the absent head, contrasting with complete examples elsewhere (Fig.8.27). The shafts might have been easily bent by hand given the malleability of bronze, though the removal of the heads would have required force perhaps through heating and striking the objects. Examples of bent and/or broken quoit-headed pins are also present in hoards from Monkswood (Smith 1959b, GB.42.1, 2), Wylye, Wiltshire (Ellis et al. 2013), and Bix, Oxfordshire (Byard 2015b; 2016), and as individual finds from North Dorset (PAS- F178) and Witton, Norfolk (Robbins 2008), indicating the spread of this practice.

A functional explanation for the curvature of the shafts cannot be discounted but the breakages across the heads and lower shafts (i.e. removing the tips) again suggests a deliberate selection of a portion of the object. Furthermore, the remaining pin and rod fragments were broken at both ends and suffered varying degrees of plastic deformation (bending and torsion).

These damage can be compared with the undamaged objects in the hoard particularly the palstaves. Eleven palstaves survive largely intact (Fig.8.28); those rated 76-99% complete have either suffered post-depositional damage or the side-loop has broken. In other words, they were deposited in a predominantly complete condition. The two incomplete pieces of palstave are particularly interesting as one represents the hafting end broken through the septum and flanges above the stop ridge (TTNCM-F053o) whilst the other represents the blade of a palstave, broken across the stop ridge (TTNCM-F053n). These two pieces have previously been illustrated as part of the same

Fig.8.25: A torc from the Edington Burtle hoard missing both terminals (source: Author courtesy of SWHT(MS).

Fig.8.26: The Pinhoe hoard (source: Author courtesy of RAMM)

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Fig.8.27A: The bent and broken quoit-headed pin from Taunton Union Workhouse (source: Author taken courtesy of SWHT(MS).
Fig.8.27B: Complete quoit-headed pins found elsewhere in Southern Britain (source: Rowlands 1976, Plate 20)

Fig.8.28: The palstaves, socketed axe and spearhead in the Taunton hoard. The non-refitting pieces of palstave (TTNCM-F053n and o) can be seen in the bottom right (source: Author courtesy of SWHT(MS).

palstave (Pearce 1983, No.752bb; Smith 1959b, GB.43(28)) but they do not refit. Both pieces have broken accidentally resulting from casting flaws and structural weaknesses; the stop ridge junction and flanges are particularly vulnerable points on palstaves and thus material failure is a likely cause. Significantly though, together the two pieces form a complete composite palstave; this again appears to represent a deliberate selection process.

Despite displaying no obvious destruction indicators, the palstaves may still have been subjected to some damage, namely burning. Twelve palstaves have areas of the same turquoise corrosion observed on the spearhead. This corrosion is more intense on some palstaves than others and mottled with other corrosion products. One palstave (TTNCM-F053l) is corroded dark grey and turquoise, whilst another (TTNCM-F053g) is covered in a dark brown patina across one face and pale turquoise patina across the opposite face (see Fig.8.29A) suggesting this latter palstave was in contact with two different conditions on either face. Furthermore, this second palstave is slightly twisted and warped, which may be the result of intense heat. This is also observed on the Taunton-Hademarschen socketed axe and accounts for the high number of objects in this hoard with an ‘Uncertain’ damage ranking. Blue patina linked with burning has been observed on some Late Bronze Age hoards (Gwilt 2004, 121; Gwilt et al. 2012) informed by ongoing studies into the presence of this feature (Mary Davis pers.comm. 2017), though the colour of corrosion is also influenced by contributing elements in the soil (Robbiola et al. 1998, 2094ff.). Similar blue corrosion is also observable on bracelet and palstaves in the hoard from Pinhoe (Fig.8.29B). This indicator might be a useful way to identify objects for future metallographic investigations (cf. Bridgford 2000). That the pins, bracelet and

Fig.8.29A: Turquoise patination on a palstave from the Taunton hoard (TTNCM-F053g)
Fig.8.29B: Blue corrosion on a palstave in the Pinhoe hoard (RAMM-F037c) (source: Author courtesy of the RAMM, Exeter, and SWHT(MS).

spearhead in the Taunton hoard might have been broken through hot-shorting could strengthen the idea the hoard was burnt.

8.3.1b The Context and Broader Landscape

The broader landscape context of the hoard must also be considered. The Taunton Union Workhouse hoard was recovered from below the topsoil, indicating it was in its original depositional spot. The dark stain surrounding the hoard was originally attributed to corrosive decay of the objects (Pring 1880, 94) though the corrosion of the objects is minor; a better explanation might be that the hoard was deposited in an organic container that has since decayed. This idea is strengthened by the nearby contemporary hoard at Edington Burtle (TTNCM-F015) which contained a similar array of items and was found in a small wooden box (Fig.8.30; Smith 1959b, GB.44).

Fig.8.30: The Edington Burtle hoard (Author courtesy of SWHT(MS).

The Taunton hoard findspot is about 17m above sea level on a north facing slope overlooking the River Tone about half a mile to the north. However, the current waterways have likely altered since the Bronze Age especially considering the urban developments around Taunton, and it cannot be accurately determined if this was a dryland or wetland deposit without environmental analysis. Nonetheless, investigations of metalwork hoards in south-eastern England found that Middle and Late Bronze Age hoards were usually located along water courses (Yates and Bradley 2010b) so the position of the hoard is in keeping with broader trends.

Figure 8.31 shows the immediate landscape around the hoard with contemporary sites and metalwork deposits marked. Two hoards have been found nearby. The Sherford hoard (TTNCM-F047) consists of six palstaves and a basal-looped spearhead but no ornaments and none of the objects show signs of deliberate damage. This hoard was deposited two feet below the surface close to a series of modern streams also in sight of the River Tone. It lies south-east of the Taunton hoard on the opposite side of a low hill about 23m above sea level. It is unclear whether the two findspots were intervisible, but their positioning on opposite sides of a hill may have been significant. Although lacking ornaments, the inclusion of a single spearhead alongside complete palstaves may represent similar practices in object selection.

The second hoard was deposited at Norton Fitzwarren hillfort during its occupation as a Middle Bronze Age enclosure (TTNCM-F036). At least eleven objects were recovered from a dich outside the enclosure including nine bracelets, two palstaves and one socketed axe as well as some pottery sherds. The objects in this hoard were seemingly deposited complete possibly “in a bundle tied with a string” (*Current Archaeology* 1971, 120), but have suffered extensive corrosion damage due to the soil conditions. The character of the objects again indicates similar practices to those at Taunton Union Workhouse. The situation of this hoard is potentially significant as hoards linked with occupational contexts are rare, though the hoard was deposited in a ditch *outside* of the enclosure suggesting a segregation of the practices. The findspot is 53m above sea level and the hill is surrounded by streams and brooks that feed into nearby rivers, most noticeably the convergence of two tributaries into the River Tone to the south. The settlement at Norton Fitzwarren in a

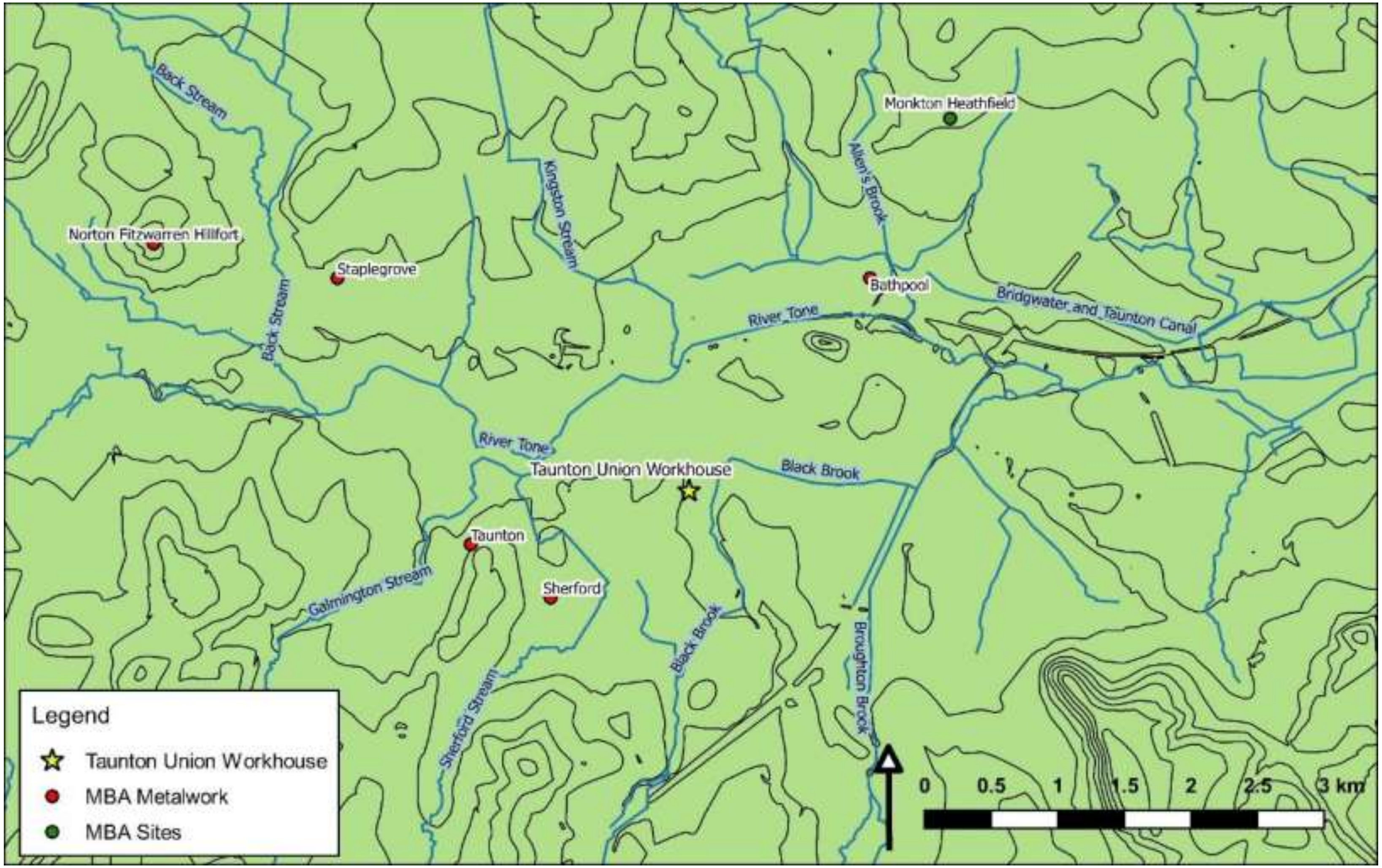

Fig.8.31: The Taunton Union Workhouse hoard in its immediate landscape context with contemporary sites and deposits marked. 50m contours have been mapped (source: Author using QGIS and OS data from EDINA Digimap)

prominent locale at the convergence of tributaries could indicate this enclosure was occupied by a key social group in the area and the hoard of bracelets and axes was part of an ephemeral social practice; theories for the reason behind the deposit could include: a legitimisation of place; the maintenance of social relationships; or demonstration of autonomy through the consumption of wealth.

The Norton Fitzwarren enclosure is the only certain settlement currently known near the Taunton hoard, though an enclosure and Middle Bronze Age pottery was found at Monkton Heathfield (HER 2017 [1993]). No doubt other occupational contexts once existed. Single finds of Middle Bronze Age metalwork include a sword from Bathpool (Fig.8.32; TTNCM-F002) and a palstave from the Taunton area (Pearce 1983, No.754), whilst a possible hoard of two palstaves and a dagger was recovered from Staplegrove (ibid., No.743). The palstaves from the Taunton area and Staplegrove are complete and undamaged. Meanwhile, the incomplete Bathpool sword has suffered use and possibly intentional damage; this sword dates slightly later than the Taunton hoard though. These findspots all lie within the River Tone valley suggesting this area was a focal point for depositions. The River Tone leads out into the Bristol Channel to the north and it is possible this was part of a trade route or offered a means for mobility.

Of course, the timescale and indeed social scale on which these depositions occurred is uncertain and ultimately dictates how one might understand the various deposits. Were they all deposited within a matter of years or over a longer period? Similarly, were the deposits made by social groups or individuals? The inclusion of one or more complete palstaves is the common trait in many Taunton phase deposits suggesting a broad social understanding of what needed to be included.

Fig.8.32: The Bathpool sword (source: Author courtesy of SWHT(MS).

The surrounding landscape and how it might relate to other nearby deposits is important to understand for the interpretation of the Taunton Union Workhouse hoard. This hoard is at one of the lowest points in the Tone valley and topographically the findspot is unspectacular. However, this is the largest hoard of the Taunton phase in South West England. It consisted of deliberately selected tools, ornaments and a single spearhead with specific objects destroyed (e.g. pins, bracelets) whilst others, namely palstaves, were left intact. The destruction of objects in this hoard is an unusual feature not seen in other nearby deposits. It has no comparisons in terms of size or composition but incorporates features of various other deposits.

Numerous complete palstaves have been recovered from hoards and single deposits across southern Britain (see Rowlands 1976); the collection within the Taunton hoard is typical for the period and region. Similarly, the combination with ornaments is a common trait of the 'Ornament Horizon' hoards (Smith 1959a). However, the number of pins in this hoard is unusual, as is the extent to which they have been damaged. Furthermore, a range of objects is represented by singular inclusions, in both damaged and undamaged states.

Overall, this indicates a deposit brought together by one or more social groupings incorporating a variety of practices in a location that clearly held significance, perhaps as a transport route. Clearly it was necessary to damage or decommission some of the material, perhaps because of the corresponding use-lives and human-object relationships. The possibility that some of the hoard was heated and broken before deposition infers at least one, if not several, events in which fires were set and objects were damaged. The skills involved in these destructive acts need not have been particularly great, nor the acts spectacular, but the practice itself was significant deliberately selecting portions of the objects to be involved in some acts whilst excluding others.

8.3.2 Priddy Hoard (TTNCM-F040)

The Priddy hoard, comprising seventeen bracelets in nineteen pieces, was found while metal-detecting in 2005 and dates to the Taunton-Penard phases (c.1400-1120 BC) (Table 8.3; Fig.8.33; Minnitt and Payne 2012). The bracelets were deposited in a "tight ball" but were disentangled by the finder before the find was reported to the Portable Antiquities Scheme (ibid., 109). An archaeological excavation and geophysical survey revealed no further contextual information and the hoard was probably lying in topsoil. Two complete palstaves were found separately about 50m from the hoard when the area was subsequently metal-detected (Fig.8.34). It is unclear whether these palstaves are associated with the hoard, but they are roughly contemporary with the bracelets. No other contemporary metalwork depositions are known within the parish; it is thus most likely the palstaves formed part of the overall depositional practice. The bracelets are largely complete, though the deposition in a ball indicates deliberate deformation and decommissioning of the objects.

Table 8.3: A summary of the Priddy hoard. All objects are gold unless otherwise stated.

TTNCM-F040	Object	Completeness	Damage Ranking	Destruction Indicators
A	Bar-twisted bracelet	76-99%	3	Broken - multi-piece, crushed, twisted
B	Bar-twisted bracelet	100%	3	Crushed, twisted
C	Bar-twisted bracelet	100%	3	Crushed, folded
D	Ribbon-twisted bracelet	100%	3	Crushed, twisted
E	Bar-twisted bracelet	100%	3	Crushed, twisted
F	Type 5D bracelet	100%	3	Bent (transverse), crushed
G	Doubled-and-hooked ribbon bracelet	100%	3	Crushed, folded, twisted
H	Doubled-and-hooked ribbon bracelet	100%	3	Crushed, folded, twisted
I	Doubled-and-hooked ribbon bracelet	100%	3	Crushed, folded, twisted
J	Doubled-and-hooked ribbon bracelet	100%	3	Crushed, folded
K	Doubled-and-hooked bar bracelet	100%	3	Crushed, folded
L	Doubled-and-hooked bar bracelet	100%	3	Crushed, folded
M	Doubled-and-hooked bar bracelet	100%	0, 3	Crushed, folded
N	Doubled-and-hooked bar bracelet	100%	3	Crushed, folded
O	Ring ornament?	100%	3	Crushed
P	Ring ornament?	100%	3	Crushed
Q	South-Western palstave (Cu alloy)	100%	0	None
R	Gr.IV palstave (Cu alloy)	100%	0	None
S	Bar twisted bracelet	76-99%	3	Broken - multi-piece, Crushed, Twisted

Fig.8.33: The Priddy hoard (source: Steven Minnitt (SWHT(MS).

Fig.8.34: The two palstaves found near the Priddy hoard (source: Author courtesy of SWHT(MS).

Destructive actions against gold ornaments have already been noted for the Early Bronze Age and are similarly common in the Middle Bronze Age. Numerous examples of gold objects manipulated prior to deposition have been identified in contemporary contexts (Wilkin 2017, 29ff.). Alongside defunctionalizing actions, such as breaking, coiling and compressing, this includes: nesting objects within other objects; specifically arranging ornaments spatially; and ‘threading and looping’ rings, bracelets and torcs (e.g. Norton Fitzwarren and Edington Burtle; Fig.8.35). Of note is the Heyope hoard, Wales, which consists of three ribbon torcs that were also deposited in a tangled ball (Fig.8.36; Savory 1958, 7-8, 55-56), indicating a likeness of ideas despite being geographically separate. The Capel Isaf hoard, Powys, may also have conformed to this pattern; a torc and four bracelets were deposited in a “tight mass” and “wrapped round each other” (Savory 1977, 37); Wilkin (2017, 32) took this to imply the objects were nested though there is no reason why it might not imply a greater entanglement.

Fig.8.35: The interlinked bracelet and rings from Edington Burtle (TTNCM-F015l-o) (source: Author courtesy of SWHT(MS).

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Fig.8.36: The Heyope hoard (source: Savory 1958, Pl.II)

Deliberate manipulation and deformation of ribbon objects is increasingly recognised. Two folded and coiled ribbon bracelets were recently found at Ellesborough, Buckinghamshire (Fig.8.37A; Tyrell 2009), whilst a broken bracelet or ring from Freshwater, Isle of Wight, had been folded over “with a bundle of compressed gold ribbons wedged within the fold” (Fig.8.37B; Basford 2014). Furthermore, at Winterhay Green, Ilminster, Somerset, an incomplete hooked ribbon torc, now lost, was reportedly found “rolled up into a knob” (Dobson 1931, 89; see ASH-F013). Rolled gold bracelets were also recovered from the Salcombe Bay assemblage, Devon (Fig.8.37C). The ease with which gold ribbon might be deformed made gold ornaments key objects for damage. Furthermore, rolling and folding recalls Early Bronze Age deformation practices.

Conversely, bronze ribbon ornaments are rarely found damaged though two examples from South West England warrant attention. Firstly, a ribbon twisted torc fragment from Sherborne, Dorset (PAS-F137; Fig.8.38) was broken at both ends and bent into a u-shape. It appears the breaks lack any associated marks and the bend could have been part of the original shape of the torc. However, the lack of either terminal is suggestive of the process of deliberate selection highlighted already. Secondly, two copper alloy ribbon-twisted finger rings and a bar-twisted finger ring were threaded onto a penannular bracelet/armring in the Edington Burtle hoard (Fig.8.35). Both the ribbon-twisted rings only have one narrowed terminal whilst the opposite end was a cut

Fig.8.37A: The folded Ellesborough ribbon bracelets;
Fig.8.37B: The Freshwater gold bracelet/ring, folded over a compressed ball of gold ribbon
Fig.8.37C: One of the coiled gold bracelets from the Salcombe Bay assemblage
(source: courtesy of the PAS/Trustees of the British Museum)

Fig.8.38: The bent and broken ribbon twisted torc from near Sherborne, Dorset (PAS-F137) (source: courtesy of the PAS/Trustees of the British Museum)

section. It is therefore possible the finger rings were once part of a larger ribbon ornament or even part of the same object and were cut into small sections that were then bent into a ring form. This situation offers an insight into potential functions for destruction. Broken fragments were incorporated into other practices; the use of these fragments as rings or links threaded onto another object could be interpreted as a materialisation of other intangible connections. The single terminals present on each of these rings may indicate these rings were produced from terminal fragments of larger objects.

Returning to the Priddy hoard, perhaps the most striking element of the hoard in comparison to these other examples is the number of gold objects within a single deposit. Minnitt and Payne (2012) present the deposit as that of an individual burying personal adornments. However, the number of bracelets and various styles might more accurately indicate a variety of participating individuals or communities with the overall hoard indicating a collective deposition as part of a specific event. Furthermore, the compressing into a tight ball may represent a symbolic ‘entanglement’ of ideas or people.

It is worth considering the possibly associated palstaves. Specific spatial arrangements of ornament hoards are noted elsewhere (Wilkin 2017, 33-34). Palstaves arranged in relation to ornaments at Gosport, Hampshire, and South Dumpton Down, Kent, may strengthen the possibility that the complete palstaves were deposited in reference to the crushed Priddy bracelets.

As a Treasure Case, the precise location of the Priddy hoard must remain protected. However, the situation of the Priddy parish in the Mendip Hills is important. The Mendip Hills were a focus for barrow construction in the Early Bronze Age (Lewis and Mullin 2012), with numerous linear arrangements present in the Priddy parish. Similarly, four Neolithic earthwork enclosures – the "Priddy Circles" – are situated nearby. The destruction and deposition of the Priddy hoard was therefore conducted in an area that had an extended temporal significance and may have been done so in reference to the pre-existing landscape.

The Priddy hoard is currently unique in South West England, though parallels have been identified elsewhere in the country. This, coupled with the eclectic nature of the objects, suggests that this may represent a gathering of several individuals to make a communal or social sacrifice. The position of the hoard in an already ancient landscape may strengthen the idea of a symbolic deposition, and fits into the broader contemporary trend of deliberate manipulation of gold objects.

8.3.3 Destruction at Occupational Contexts

The deliberate destruction of metalwork in contexts other than hoards during the Middle Bronze Age is limited to associated objects or single finds. However, deliberate deposition and destruction of non-metal objects including stones, ceramics, animal bones, and human remains associated with occupational contexts are known across southern England; these were often incorporated into important social practices (Brück 1999a; 2006a). A comprehensive overview of these non-metallic materials is beyond the capacity of this discussion but it is worth raising some case studies within the South West to contextualise the metalwork.

Firstly, broken metalwork has been recovered from a variety of occupational contexts but none can be considered deliberate (Table 8.4). Only one object could be damage-ranked 2 (RCM-F048c) though this was not available to handle and is based on a description. The remaining material largely represented a combination of use and post-depositional damage and was predominantly found scattered within occupational layers making it difficult to interpret. However, accidentally broken metal objects may have served other functions at occupational areas. To emphasise this, the following discussion draws on unstudied but published metalwork from additional occupational contexts.

At Rowden, Dorset, a knife fragment was found recovered from a hut wall, whilst an incomplete arrowhead was found with flints, loomweight fragments and faunal remains in the infill of the same hut (Gingell 1991, 104). Similarly, a ribbed bracelet fragment was found in a roundhouse at Bestwall Quarry, Dorset, and another fragmentary bracelet was recovered from a pit associated with a burnt mound (O'Connor 2009). Fragmentary and incomplete metalwork in infill deposits of roundhouses and ditches has also been recovered at Ivyton, Somerset, and Tremough, Cornwall (Jones and Quinnell 2015; Roffey et al. 2004). These objects appear to have broken accidentally but the various infills and deposits with which they are associated have been linked with abandonment processes and the overall lifecycle of roundhouses; this suggests broken metalwork continued in significance post-breakage (Brück 1999a; 2006a; Nowakowski 2001). At Penhale Moor, Cornwall, a broken spearhead seemingly played a role in the closing of the roundhouse; the spearhead was found at a 70° angle, tip down in the upper layer of a roundhouse indicating it may have been thrust in to "kill the house" (Nowakowski 1998, 237-238; 2001, 145). Likewise, postholes of a roundhouse at Boden Vean, Cornwall, contained a used knife (RCM-F003; Fig.8.39) and two perforated clay weights, which have again been linked to the process of abandonment (Gossip 2008; 2013).

Broken metalwork is rarely found in isolation though; many infills also contained fragmentary stone and ceramic objects. For instance, deliberately destroyed and deposited quernstones are commonly encountered at Middle Bronze Age sites in South West England and fragments have been found burnt and strewn in occupation layers at Trethellan Farm, Gwithian, Penhale Moor and Trevilson, all Cornwall (Watts 2014).

Table 8.4: A summary of the Middle Bronze Age metal objects studied from occupational contexts

Findspot / Thesis No.	Objects	Context	Completeness	Damage ranking	Other damage
Hambledon Hill, Dorset					
BM-F020	Palstave	Uncertain	26-50%	0, 1	Broken at stop ridge and blade, corrosion damage
DCM-F017	Spearhead	Uncertain	76-99%	0	Hafting damage
Kites Farm, Dorset					
BTM-F001	Palstave	Uncertain	100%	n/a	None
Boden Vean, Cornwall					
RCM-F003	Knife	Posthole of roundhouse	76-99%	0	Corrosion damage
Tredarvah, Cornwall					
RCM-F043a	Flanged axe	Scattered domestic layer	100%	n/a	None
RCM-F043b	Spearhead	Scattered domestic layer	76-99%	0, Uncertain	Broken (multi), broken blade, post-recovery
RCM-F043c	Knife	Scattered domestic layer	51-75%	0, Uncertain	Broken (multi), broken tip and hilt, burning, post-recovery
RCM-F043d	Blade	Scattered domestic layer	Uncertain	0, Uncertain	Broken (multi), broken blade, post-recovery
RCM-F043e	Pin	Scattered domestic layer	0-25%	0, 1	Broken (multi), corrosion damage
RCM-F043f	Pin	Scattered domestic layer	76-99%	0, 1	Broken (multi), corrosion damage
RCM-F043g	Uncertain	Scattered domestic layer	Uncertain	0	Broken (multi), corrosion damage, fragment
RCM-F043h	Pin	Scattered domestic layer	Uncertain	0	Broken (multi), corrosion damage
RCM-F043i	Pin	Scattered domestic layer	Uncertain	0, Uncertain	Corrosion damage, fragment
Trethellan Farm, Cornwall					
RCM-F048a	Spearhead	Bronze Age land surface	51-75%	0, 1	Broken (multi), broken tip, socket damage, corrosion damage
RCM-F048b	Socketed point	Ritual hollow	Uncertain	0, Uncertain	Broken (single), socket damage, corrosion damage
RCM-F048c	Blade	Bronze Age land surface	Uncertain	2	Broken (single), broken blade, tip broken

RCM-F048d	Bracelet	Floor of roundhouse	26-50%	1	Broken (single)
RCM-F048e	Cu alloy rod	Bronze Age field system	Uncertain	Uncertain	Broken (single)
RCM-F048f	Cu alloy object	Roundhouse	Uncertain	Uncertain	Broken (single)
RCM-F048g	Stone mould	Ritual hollow	Uncertain	1	Broken (single)
Ham Hill, Somerset					
TTNCM-F020m	Palstave	Uncertain	76-99%	1	Blade edges damaged, Post-recovery damage, Use-damage
Norton Fitzwarren Hillfort, Somerset					
TTNCM-F036a	Bracelet	Pit	76-99%	0	Broken (multi), corrosion damage
TTNCM-F036b	Bracelet	Pit	0-25%	0	Broken (multi), corrosion damage
TTNCM-F036c	Bracelet	Pit	76-99%	0	Broken (multi), corrosion damage
TTNCM-F036d	Bracelet	Pit	0-25%	0	Broken (single), corrosion damage
TTNCM-F036e	Bracelet	Pit	51-75%	0	Broken (multi), corrosion damage
TTNCM-F036f	Bracelet	Pit	76-99%	0	Broken (multi), corrosion damage
TTNCM-F036g	Bracelet	Pit	76-99%	0	Broken (multi), corrosion damage
TTNCM-F036h	Bracelet	Pit	76-99%	0	Broken (multi), corrosion damage
TTNCM-F036i	Bracelet	Pit	76-99%	0	Broken (multi), corrosion damage
TTNCM-F036j	Palstave	Pit	76-99%	0	Corrosion damage
TTNCM-F036k	Palstave	Pit	51-75%	0	Broken (single), broken blade, corrosion damage
TTNCM-F036l	Socketed axe	Pit	76-99%	0	Broken (single), broken blade, corrosion damage, cracking
TTNCM-F036m	Uncertain	Pit	n/a	n/a	Corrosion damage

Fig.8.39: The Boden Vean knife (RCM-F003) (source: Author courtesy of RCM)

At Trethellan Farm, Truro College and Scarcewater, quernstone deposits have also been associated with the abandonment and destruction of the roundhouses (Jones and Taylor 2010, 13, 23; Nowakowski 1991, 25, 145-148; 2001, 141; Watt 2014, 84ff.). Furthermore, at Scarcewater a Middle Bronze Age pit contained six stone rubbers of different materials whilst an adjacent stone-lined pit contained a saddle quern split in two with a rubber and several other stone fragments; furthermore, two halves of a deliberately broken muller were found in neighbouring roundhouses (Jones and Taylor 2010, 28, 115; Watts 2014, 90ff.).

Meanwhile, at Gwithian a quernstone fragment, mussel shells, a cow's molar and a fragment of animal bone were found in a posthole associated with an Early-Middle Bronze Age structure (Sturgess and Lawson 2006, 388). Additionally, a 'gully' on one side of this structure was partially lined with broken querns and contained finds including "a pottery ring, a bronze awl and a dog whelk which had been pierced many times" (Fig.8.40; ibid., 20). At Sigwells, Somerset, a bone tool, quernstone fragment, hammerstone and decorated pottery were found in the centre posthole of a structure (Watts 2014, 82.). Furthermore, burnt human skull fragments were found in a posthole of the same structure illustrating the intentionality of these deposits (ibid.). Quern fragments have also been found in pits and postholes at Trethellan Farm, Scarcewater, Hayne Lane (Devon) and Rowden (Butterworth 1999, 126; Jones and Taylor 2010, 13, 23; Nowakowski 1991, Watts 2014, 80; P.J. Woodward 1991, 45-46).

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Fig.8.40: The perforated dog whelk from a gully alongside structure 1642 at Gwithian (source: Nowakowski et al. 2007, 34, Fig.8)

Fragmentary mould material is also found associated with settlements. The fragmentation of clay moulds to remove the metal object is inherent to the production process and scatters of this material are found at Tremough and Sigwells (Pearce 2015; Skowranek 2012, 109-111). However, at Sigwells Tabor suggested the mould fragments "were far more fragmentary than necessary to extract the finished product" (2008, 67); these may have been subjected to further intentional breakage. Conversely, stone moulds are more durable though will break through extensive use. Two refitting pieces of a Middle-Late Bronze Age stone socketed axe mould were found in two separate houses at Gwithian (Megaw 1976, 51-52) perhaps reflecting a link between the two houses through the pieces. The complete mould may have had an extended use-life increasing their significance. A stone mould fragment for casting an uncertain object was also found in Ritual Hollow 2765 at Trethellan Farm, alongside layers of large sherds of pottery, animal bones, various burnt material and other fragmentary pieces (Nowakowski 1991, 93-96). The mould may also have functioned as a whetstone (ibid., 155-156), indicating that the object continued in use beyond breakage.

The Middle Bronze Age evidence from occupational contexts in South West England indicates deliberate destruction was not a practice exclusive to metalwork. Additionally, incomplete objects, whether deliberately broken or not, continued to be incorporated into other practices e.g. the infilling of roundhouses. Occasionally the metalwork may have formed part of refuse layers. However, elsewhere the damage sustained to an object, perhaps through use, contributing to its overall life history, may have heightened its significance. These are themes that will be explored further in Chapter 10. Such practices at occupational sites are prevalent across southern Britain during this period, and form the basis for important theoretical discussions (Brück 1999a; 2006a). Furthermore, the metalwork recovered from occupational contexts starkly contrasts with the other metalwork presented so far, with the immediate contexts and associations offering important information about how one might interpret the relationship between people and metal objects and the practices with which they were associated.

8.3.4 South Cadbury Shield (TTNCM-F031)

In 1997, a Yetholm-type shield was found during archaeological excavation in the junction of two boundary ditches of a Middle-Late Bronze Age enclosure at Milsoms Corner, South Cadbury, Somerset (Fig.8.41; Coles et al. 1999; Needham et al. 2012). The shield is adorned with 25 ribs alternating with 25 rows of c.6030 bosses (Fig.8.42). The main body has been hammered from a single piece of bronze to about 0.4-0.6mm thick, with a central boss and a riveted handle. Upon deposition the shield was positioned face down in the ditch and penetrated three times from the back with a blunt, non-metal object (Coles et al. 1999, 38-9, 45-6; Knight *forthcoming*(a)). This destructive act occurred *in situ*, indicated by bronze fragments that were carried into the soil below the shield (Coles et al. 1999, 38-39, 45-46); the central boss of the shield was set into a stakehole immediately below the shield, which contained a red deer or cattle hip bone (Needham et al. 2012: 478–9).

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Fig.8.41: The location of the Milsoms Corner enclosure on the slopes of Cadbury Castle hillfort (marked A on left image) (sources: Needham et al. 473, 2012, Fig.1; Tabor 2008, 58, Fig.26)

Fig.8.42: The South Cadbury shield (source: Steven Minnitt (SWHT (MS).

Compositional analysis of the shield indicated a Penard phase date (c.1275-1120 BC) which is consistent with the main currency of Yetholm shields (Uckelmann 2012, 49), but the radiocarbon date of the animal bone (1058–843 cal. BC (1σ) or 1208–810 cal. BC (2σ)) suggested that the shield may have been in circulation and/or curated for up to two hundred years (Coles et al. 1999, 37; Knight *forthcoming*(a); Needham et al. 2012). The destruction of the shield may have been linked with ending the potentially long lifecycle of the shield, ceremonially signifying the end of a social practice or the death of a significant individual (e.g. the end of a lineage) (Knight *forthcoming*(a)). The destruction was no doubt a significant action.

However, it should not be viewed in isolation. The enclosure ditches were a focus for deposition throughout occupation (Fig.8.43). Initial construction of the enclosure ditch cut an Early Bronze Age burial pit that contained at least two individuals, in the process removing the lower half of one skeleton (Cole et al. 1999, 35-37). The lower leg bone of this skeleton was found in a Late Bronze Age posthole packed with burnt stones approximately one metre west of the

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Fig.8.43: A schematic plan of the Milsoms Corner Bronze Age enclosure ditch, showing the various depositions. Phases 1 and 2 date to the Middle Bronze Age, while Phase 3 dates to the Late Bronze Age (source: Tabor 2008, 60, Fig.28)

stakehole over which the shield was set (ibid., 37). It has subsequently been suggested that the depositions in the posthole and stakehole, and the destruction of the shield, were linked (Tabor 2008, 91). This would place the destruction of the shield in the Late Bronze Age.

The enclosure ditches went through two phases of enlargement and infilling with the shield deposited in the final phase (Phase 3). In Phase 3 contemporary areas of burnt stones have been identified in and near the ditches. The stones packed with the lower leg bone are described as “burnt blue stones” (Tabor 2008, 91), which have also been highlighted as sealing other deposits in and around the ditches. However, burnt *red* stones lined the base of a contemporary “scoop” south of the enclosure, which was covered by a charcoal-rich deposit, a single burnt flint, a bowl sherd, and a single cattle rib “snapped into two roughly equal halves” (Tabor 2008, 84-85). The stones were carefully selected for their specific colours and the act of burning is inherently destructive. The selection of specifically coloured stones was also observed at the nearby enclosure at Sigwells (ibid., 90). The range of evidence has led Tabor (ibid.) to suggest that the Phase 3 actions at Milsoms Corner, including the destruction of the shield, were all broadly contemporary, perhaps occurring within a matter of days and linked to feasting activities.

The destruction of the shield thus forms part of a tradition of deposition within the ditches but also forms only one of several destructive acts. The hip bone of the red deer/cattle found underneath the shield and the human leg bone represent the fragmentation of animals and humans and the deliberate selection of specific pieces (cf. Brück 2006a), even if the leg bone may have been found inadvertently during ditch construction. The human leg bone was found in "a state of arrested decay" (Tabor 2008, 85), whilst the animal bone had been "gnawed" (Coles et al. 1999, 37); the snapped cattle rib may have also been deliberate, though details of the fracture that might determine if this was an ancient break are unknown. The combination of all these features offers a rich case study that contextualises destruction of a variety of objects and materials alongside depositional practices and in relation to a temporally-situated landscape.

8.3.5 Middle Bronze Age Summary

What becomes clear from the case studies presented is that although destruction of metalwork in the Middle Bronze Age was not a common practice, that which did take place occurred in significant landscapes and involved atypical objects.

The contemporary occupational contexts demonstrated destruction is not exclusive to metalwork and extended to other materials, including stones and ceramics. The abandonment and sometimes destruction of roundhouses necessitated deposits of damaged and broken material, some of which may have had a significant life history.

Destruction was probably not widespread but may have been undertaken in relation to certain events. Destruction may also have finalised the life-cycles of people and the objects, heightened the significance of the deposit, or served to enforce wider understandings through dramatic actions. There is a strong argument that the hoards from Taunton and Priddy, and the undertakings at occupational sites, involved several individuals or communities which means these deposits may have operated as ways of managing a series of relationships. This continued into the Late Bronze Age.

CHAPTER NINE

MASS DESTRUCTION: THE LATE BRONZE AGE AND EARLIEST IRON AGE IN SOUTH WEST ENGLAND

9.1 Introduction

An analysis of data in the Early-Middle Bronze Ages in South West England highlighted a variety of case studies but only limited destruction that could be seen to fit within a widespread set of practices. By contrast, the Late Bronze Age material (c.1150-800 BC) is dominated by deliberately destroyed metalwork which aligns with the rest of southern Britain during this period, particularly in the Ewart Park phase (c.920-800 BC). The treatment of objects abruptly changes in the Earliest Iron Age (c.800-600 BC) which contrasts the preceding centuries. This chapter presents an overview of each period and key case studies within the Late Bronze Age to allow an in-depth analysis of destructive practices in this period. The case studies selected are those showing the greatest indicators of destruction.

9.2 The Late Bronze Age

There is a shift in the Late Bronze Age towards the deliberate decommissioning of metalwork before it was deposited. Of the 897 objects studied, 356 (c.40%) were identified as deliberately destroyed (damage-ranked 3), and a further 109 were damage-ranked 2 (Fig.9.1).[1] This accounts for over two-thirds (c.68%) of all *damaged* Late Bronze Age objects (Fig.9.2) and can be coupled with the high number of fragmented objects in this period (Fig.7.5). 290 destroyed objects were studied within seventeen different hoards across the South West, whilst 83 single finds were damage-ranked 2 or 3 (Fig.9.3). Objects ranked 2 and 3 were identified at most Occupational Contexts studied, but the total number is relatively low (22); these are typically found alongside

[1] 63 objects ranked ‘Uncertain’ were excluded from this analysis for clarity of the observable trends.

Fig.9.1: The frequency and proportion of Late Bronze Age metal objects within each damage ranking (n=834)

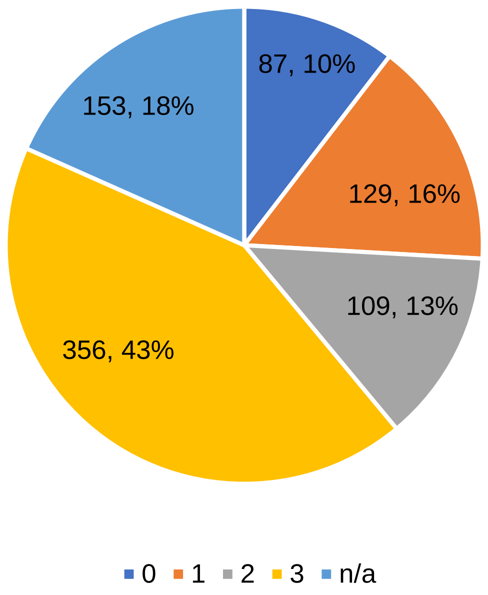


Fig.9.2: The frequency and proportion all damaged Late Bronze Age metalwork (n=681)

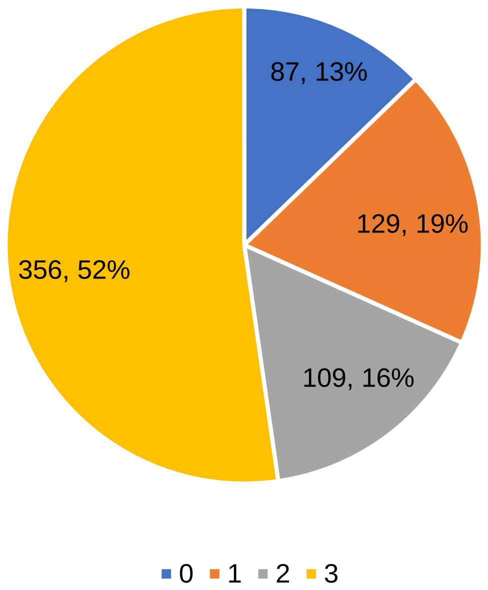
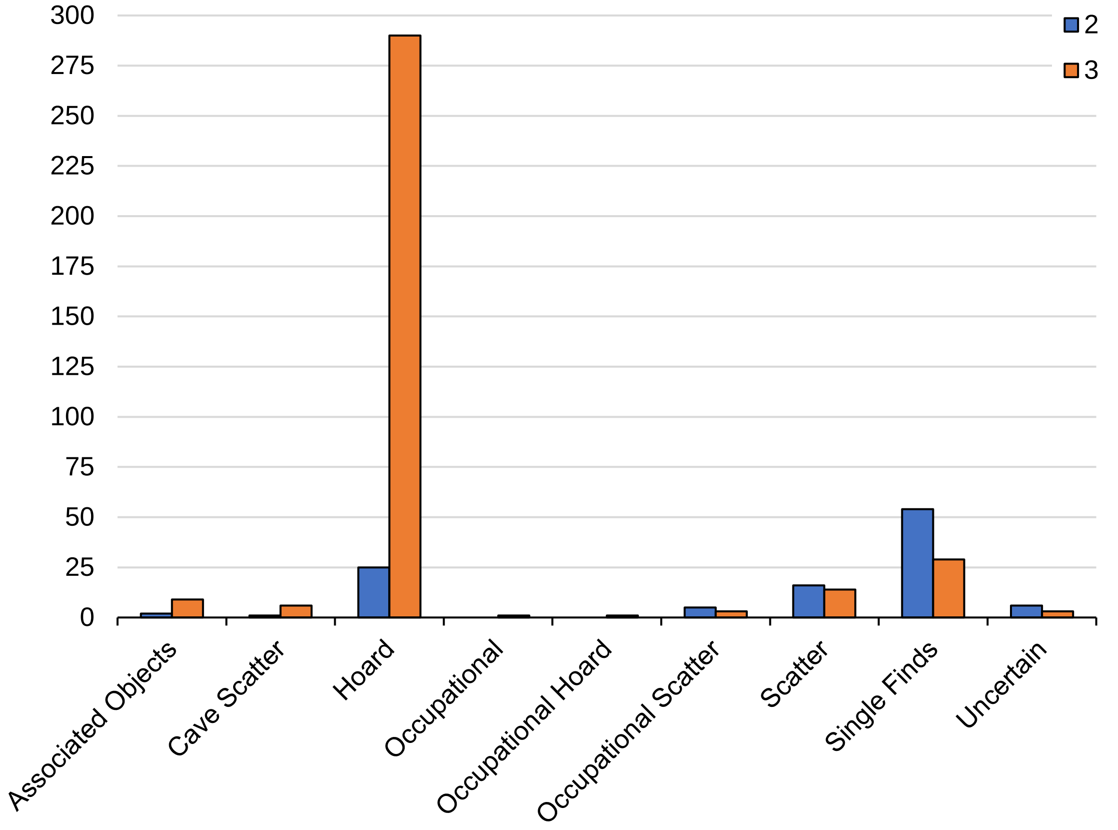


Fig.9.3: Late Bronze Age metalwork damage-ranked 2 or 3 divided by depositional practice (n=465)



accidentally damaged or intact objects from closed contexts and occupational layers. Similarly, deliberately damaged objects are frequent components of scatters but form only 31% of scattered objects.

Approximately 48% (170) of the copper/copper alloy objects studied are deliberately broken ingots and substantially outnumber the other objects extending above the parameters of Figure 9.4. Many of the remaining objects comprise socketed axes, casting jets, spearheads and swords (Figs.9.4). Other object categories are represented by five or fewer objects. Only two ingots studied were found intact or with non-deliberate damage (i.e. ranked n/a or 0). Several object categories, including pins, awls and rings, showed limited or no damage. These latter object types are most commonly recovered from occupational areas or scatters but rarely from hoards.

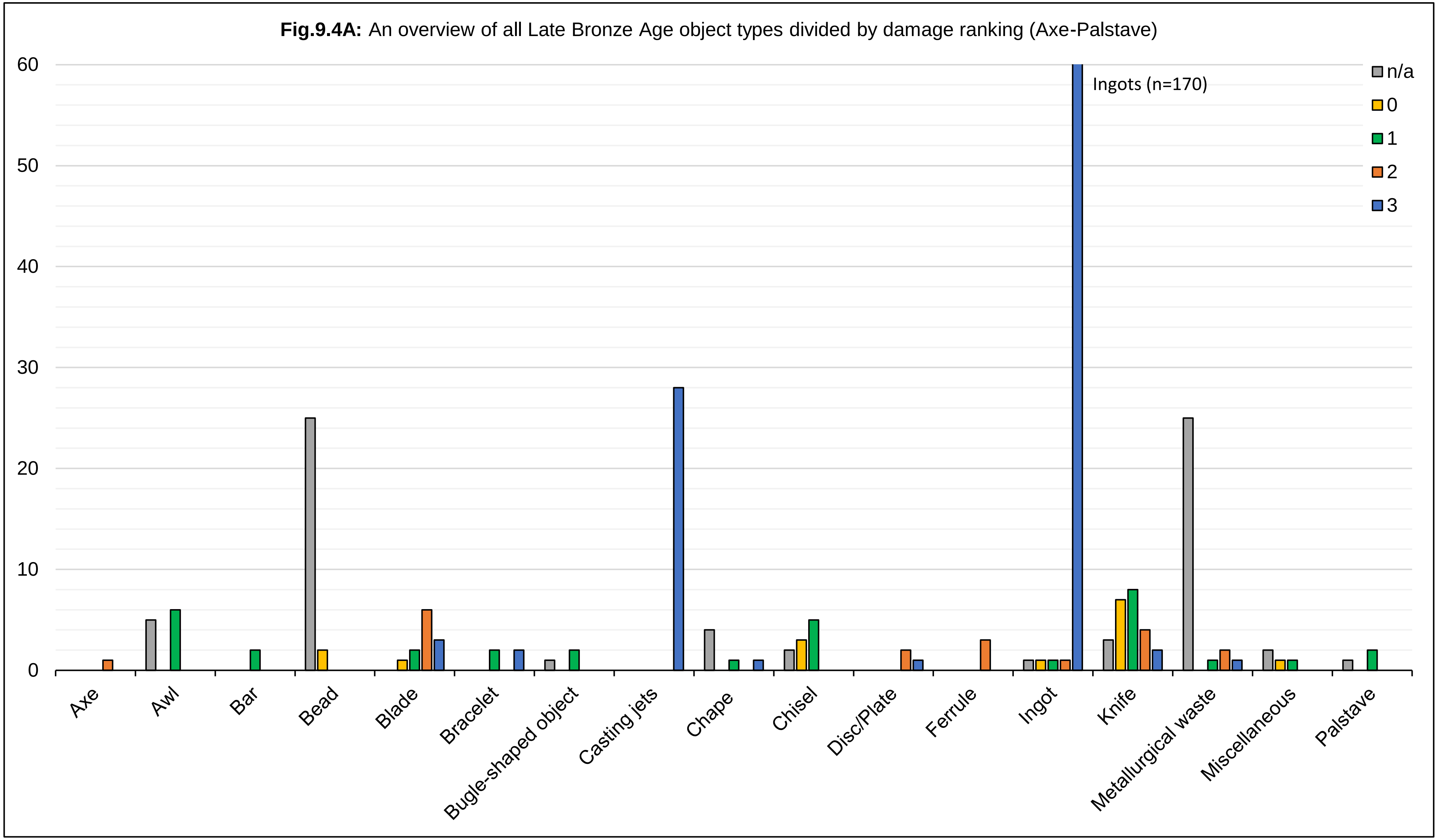


Fig.9.4A: An overview of all Late Bronze Age object types divided by damage ranking (Axe-Palstave)
60
50
40
30
20
10
0
Ingots (n=170)
n/a
0
1
2
3
Axe
Awl
Bar
Bead
Blade
Bracelet
Bugle-shaped object
Casting jets
Chape
Chisel
Disc/Plate
Ferrule
Ingot
Knife
Metallurgical waste
Miscellaneous
Palstave

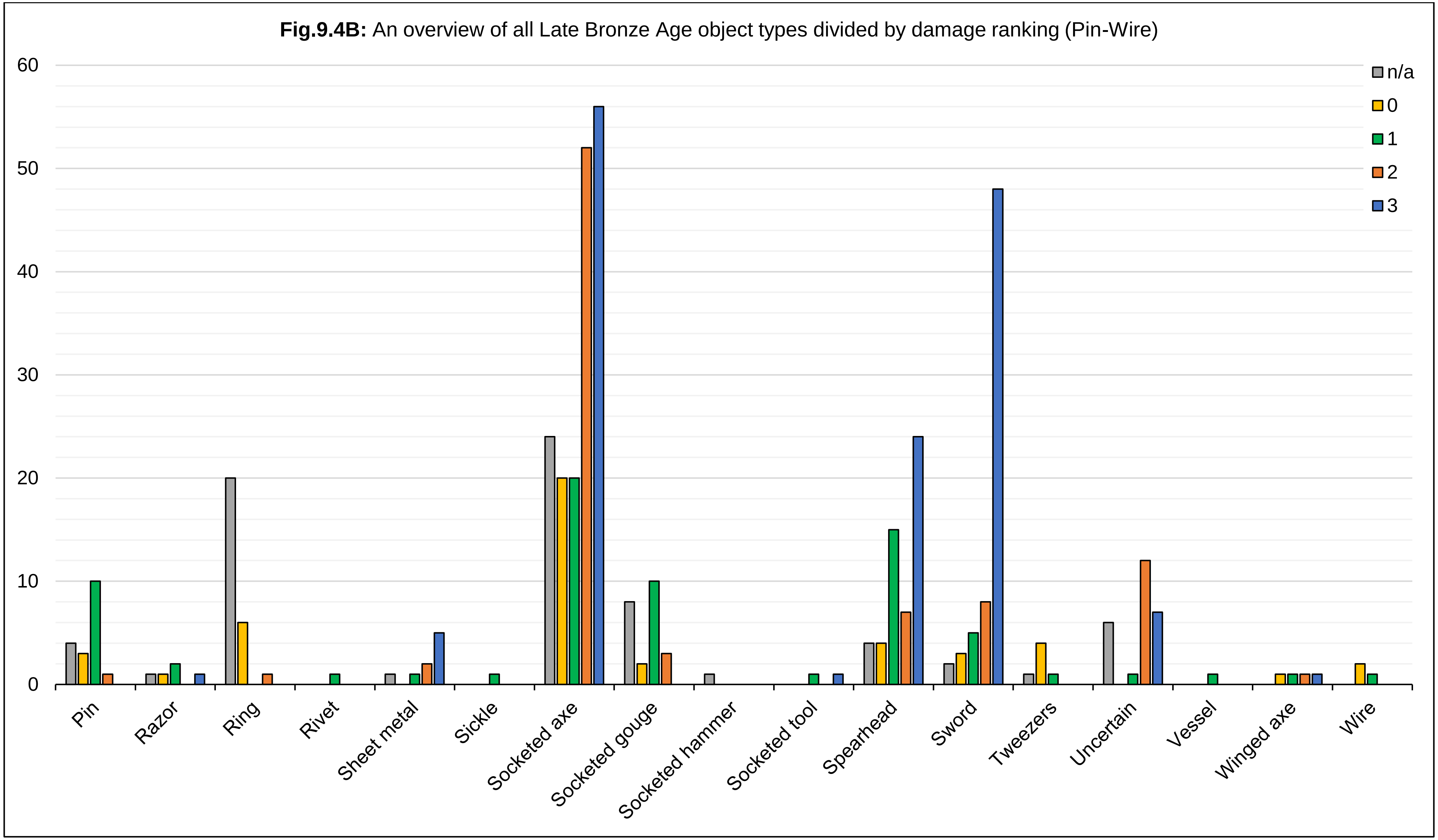


Fig.9.4B: An overview of all Late Bronze Age object types divided by damage ranking (Pin-Wire)
60
50
40
30
20
10
0
n/a
0
1
2
3
Pin
Razor
Ring
Rivet
Sheet metal
Sickle
Socketed axe
Socketed gouge
Socketed hammer
Socketed tool
Spearhead
Sword
Tweezers
Uncertain
Vessel
Winged axe
Wire

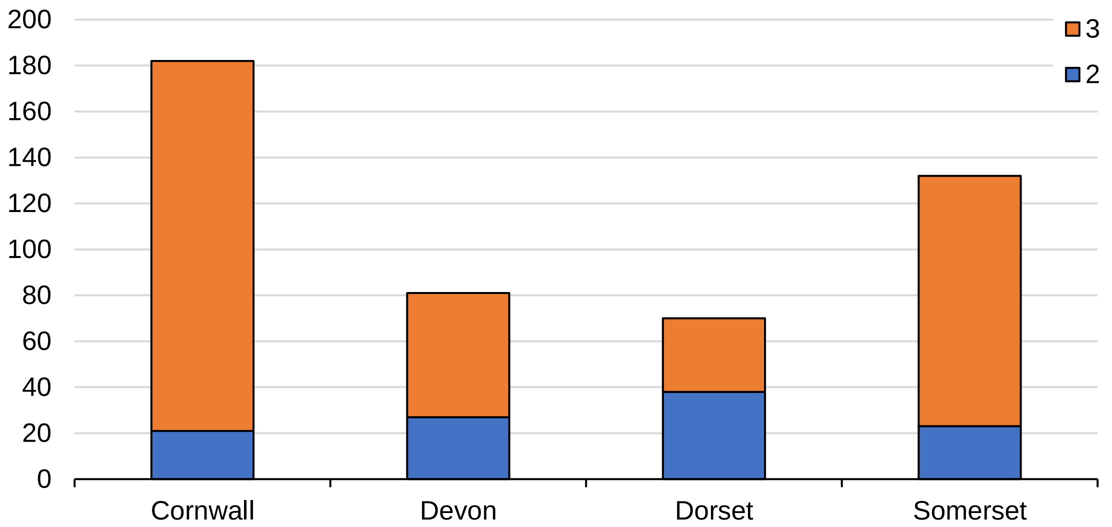
Therefore, it can be argued that certain types or objects were selected for destruction. However, Late Bronze Age hoards of fragmentary material are typically viewed as the accumulation of scrap (Briard 1965; Burgess 1968), ready for inserting into a crucible for remelting; this scenario could explain the reduction of larger objects into small pieces (e.g. swords and spears) whilst leaving smaller objects (e.g. pins) largely intact. The average lengths and widths of broken and fragmented objects during this period are less than 100mm which could be linked with crucible sizes (Table 9.1; Northover pers.comm. 2017). However, one must be cautious using this analysis divorced of contextual information such as landscape location and associated objects.

Geographically, deliberately destroyed objects occur more frequently in Cornwall than in Devon or Dorset (Figs.9.5; 9.6). Somerset also has a high number though 97 (89%) of these are from the Stogursey hoard. If this hoard is omitted Somerset has the lowest number of deliberately damaged artefacts. When objects damage-ranked 2 or 3 are compared to those ranked n/a, 0 or 1, a clear geographic separation emerges (Fig.9.7).

Table 9.1: The average dimensions of all objects which could be assigned a completeness status

Completeness	Av. L	Av. W	Av. Th	Av. Wt (g)	Total No. of Objects
0-25%	43.75	34.4	13.64	100.05	371
26-50%	79.1	45.02	18.22	240.52	54
51-75%	93.74	32.22	10.33	95.46	46
76-99%	137.37	32.38	8.14	147.61	100
100%	107.76	21.28	5.7	100.37	148

Fig.9.5: Objects damage-ranked 2 and 3 divided by county (n=465)



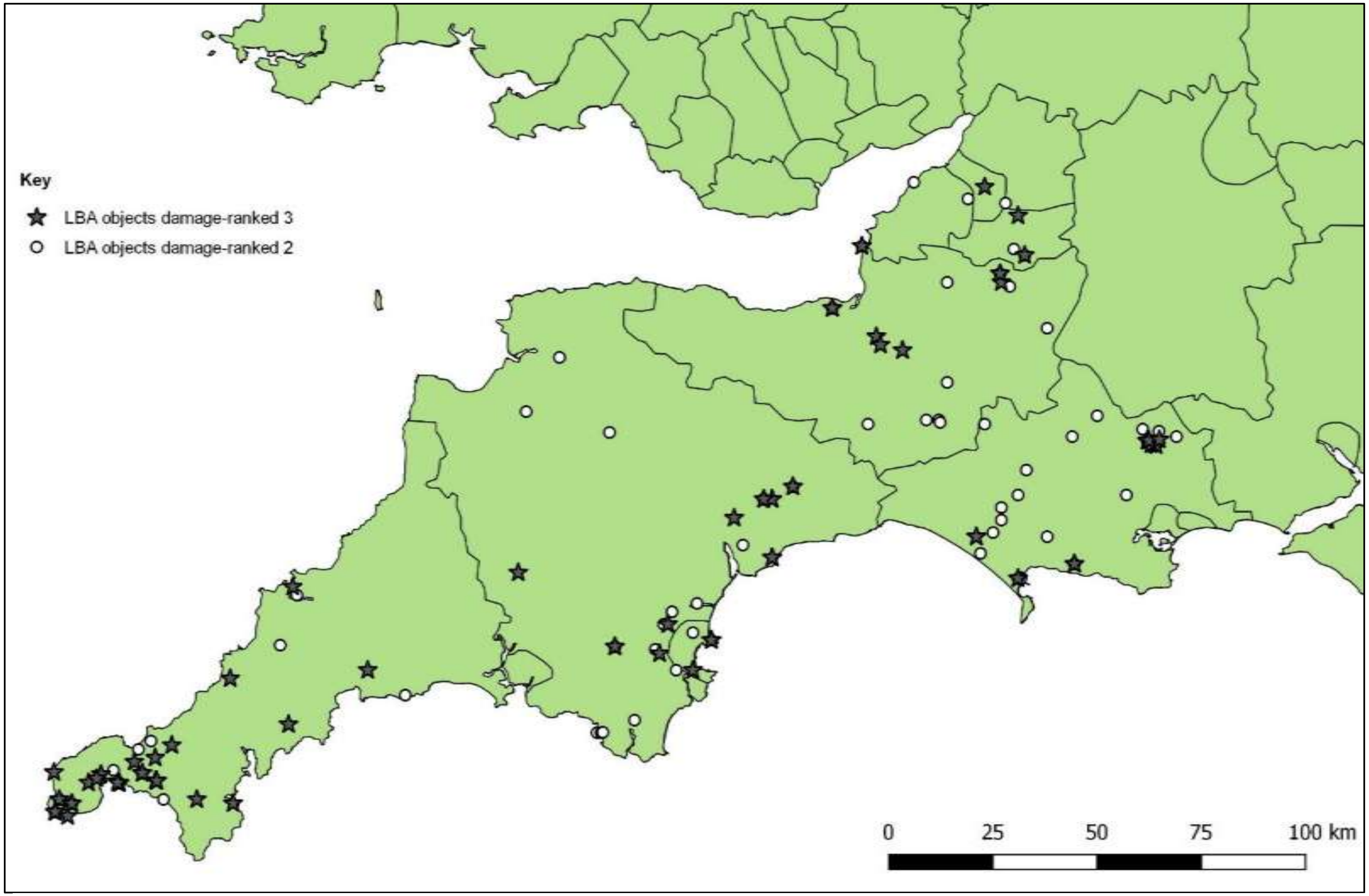
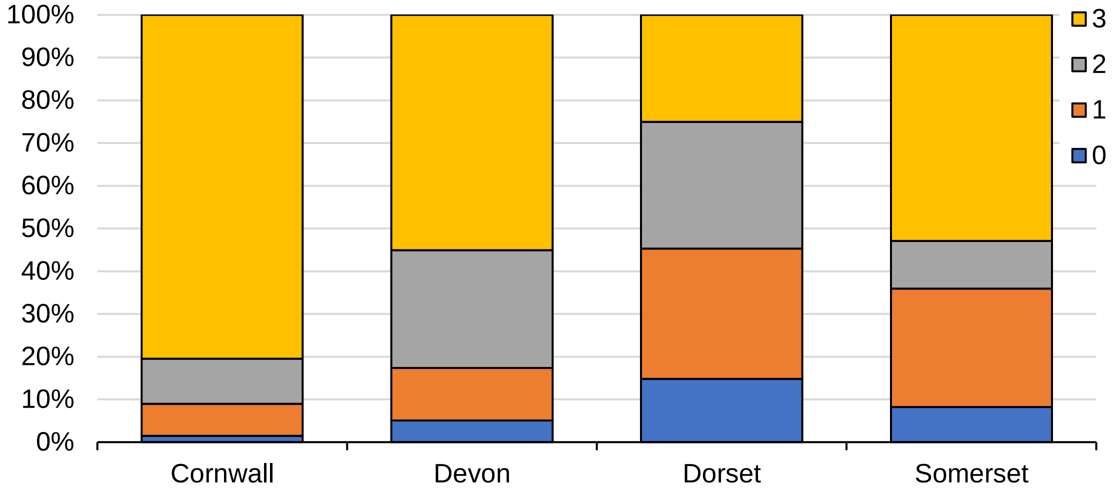


Fig.9.6: Late Bronze Age findspots with objects damage-ranked 2 and 3 (source: Author using QGIS and OS data from EDINA Digimap).

Fig.9.7: A proportional representation of Late Bronze Age objects with damage-ranking 2 and 3 divided by county



Over 70% of Late Bronze Age finds studied in Cornwall are deliberately damaged, though this drops to less than 35% in Dorset and just over 50% in Somerset (though without the Stogursey hoard the percentage of objects would be less than 20%). Therefore, there is a greater tendency towards the deliberate destruction of finds in the west of the region than in the east reflecting a possible separation in regional practices.

When explored by findspot rather than by objects, however, there is an almost equal number of findspots with deliberately destroyed objects in each county reflecting that deposits of destroyed objects are generally larger in Cornwall and Devon (Fig.9.8). There are far fewer Cornish and Devonian findspots at which no deliberately destroyed objects have been found. Meanwhile, Dorset has over double the number of findspots showing no destruction. This supports the notion that deliberate destruction of objects occurred more commonly in the west which is explored further below. The volume and variety of the Late Bronze Age data means it is approached by considering the associated depositional practices and individual case studies. As with the Early and Middle Bronze Age case studies, these are approached here based on their contribution to the overall research aims.

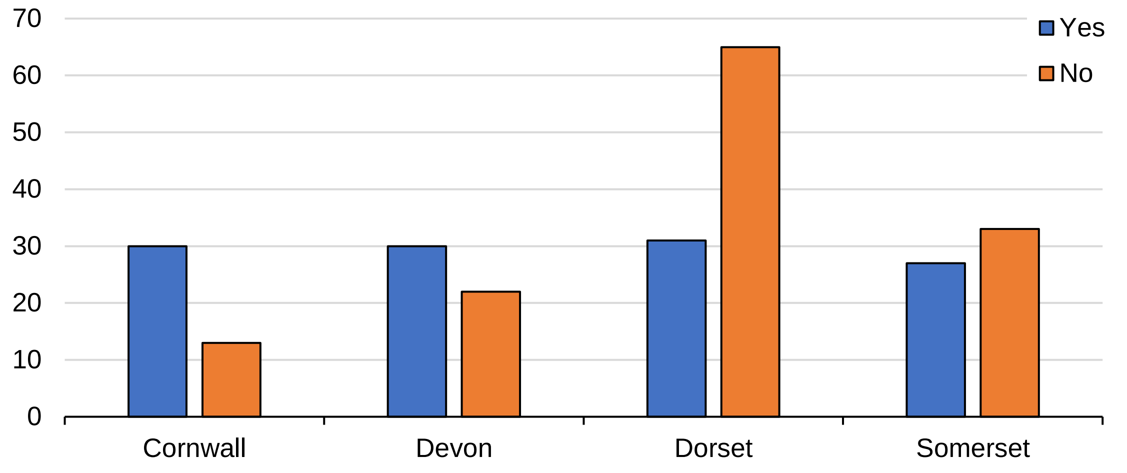


Fig.9.8: A comparison of findspots containing deliberately destroyed objects (Yes) with findspots that contain no deliberately destroyed objects (No) divided by county (n=251)

9.2.1 Topographic and Geographic Trends

Late Bronze Age findspots have been divided according to topographic/ geographic features as defined in Section 7.2.3 (Table 9.2). 186 findspots (c.74%) including all depositional contexts could be attributed at least one topographic/geographic feature (Fig.9.9) whilst 55 findspots could not be identified due to imprecise records. Findspot locations are concentrated on hilltops or hillslopes; there is also a distinctive link with features connected to water including river valleys and coastlines (i.e. locations in sight of water) and in wetland locations (e.g. bogs, moorlands). Objects damage-ranked 2 or 3 were found at 95 (51%) of the 186 findspots; this need not indicate that the whole deposit had suffered destruction, only that damaged objects were present.

Deliberately damaged objects are more commonly found at coastal or hilltop findspots whilst the opposite is true of water valleys (Fig.9.10). Similarly, although relating only to a relatively small number of findspots, deliberately destroyed objects are more commonly recovered from confluences, estuaries and headwaters, possibly reflecting importance attributed to the origins and junctions of waterways. Depositions in wetland locations show an overall positive relationship with deliberately damaged objects though complete objects also featured in these practices. This analysis does not consider the object types or overall completeness but is important for highlighting trends that might be explored further.

Table 9.2: A summary of the geographic/topographic features

Geographic/Topographic Feature	Description
Bog/marsh/low-lying moor	Areas of land with high water-saturation
Cave	Natural features in the local geology, typically coastal
Cliff	High areas overlooking a beach or coast
Coastal	Finds made on a beach or on or near a coastline
Confluence of waterways	Findspots on land at or overlooking a confluence of waterways, typically tributaries and rivers
Dry valley	Natural dip between hills with no evidence of a current waterway
Estuary	Finds recovered from around the estuary of a river but not from within the river
Headland	Projecting sections of land on the coast
Headwaters	Findspots at or near the headwaters of waterways typically near hill summits
Hillslope	Slope of a hill; no distinction made between different gradients or positions on the hill slope (e.g. the crest of the hill vs the base of the slope)
Hilltop	Hill summits
Island	Landmass separate from the mainland
Minor water valley	Findspots on land in or overlooking a minor water valley (e.g. a tributary, stream or brook) typically on hillslopes
Near mines	Findspots on or near mines
Near natural springs	Findspots at or near natural springs typically within about 250 metres
River	Finds recovered from within a river
River valley	Findspots on land in or overlooking a river valley typically on hillslopes
Sea	Finds recovered from the seabed
Wetland	Low-lying areas, prone to flooding, but for which no exact feature (e.g. a bog) could be identified
View of coast	Findspots with a view of the coastline and the sea

Findspots were divided according to those deposited on hilltops and slopes, in river valleys and minor water valleys (MWVs), and combinations of, all exclusive of each other (Fig.9.11). Several elements can be considered here. Firstly, 17 (65%) Cornish findspots were found on hilltops and slopes but there is limited association with water valleys. Somerset findspots display a similar trend. By contrast, Devon and Dorset findspots are more closely linked with water valleys. However, the number of MWV sites in Dorset is skewed by the results of concentrated metal-detecting in Gussage St Michael around the same tributary.

Fig.9.9: The frequency of findspots associated with each topographic feature (not necessarily exclusive of each other) (n=282)

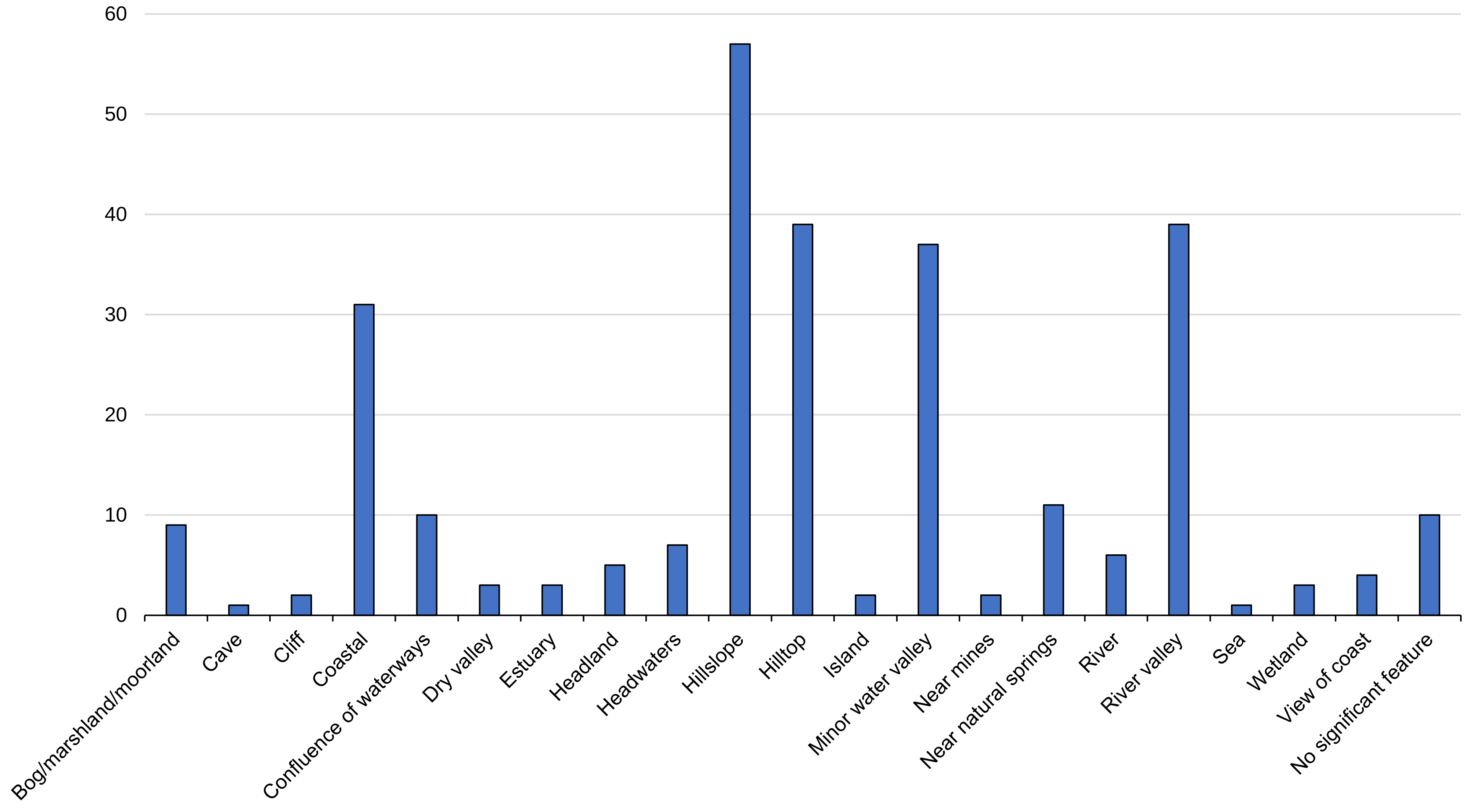


Fig.9.10: A comparison of landscape features where deliberately destroyed objects have been found (Yes) with features where no deliberately destroyed objects have been found (No) (n=282)

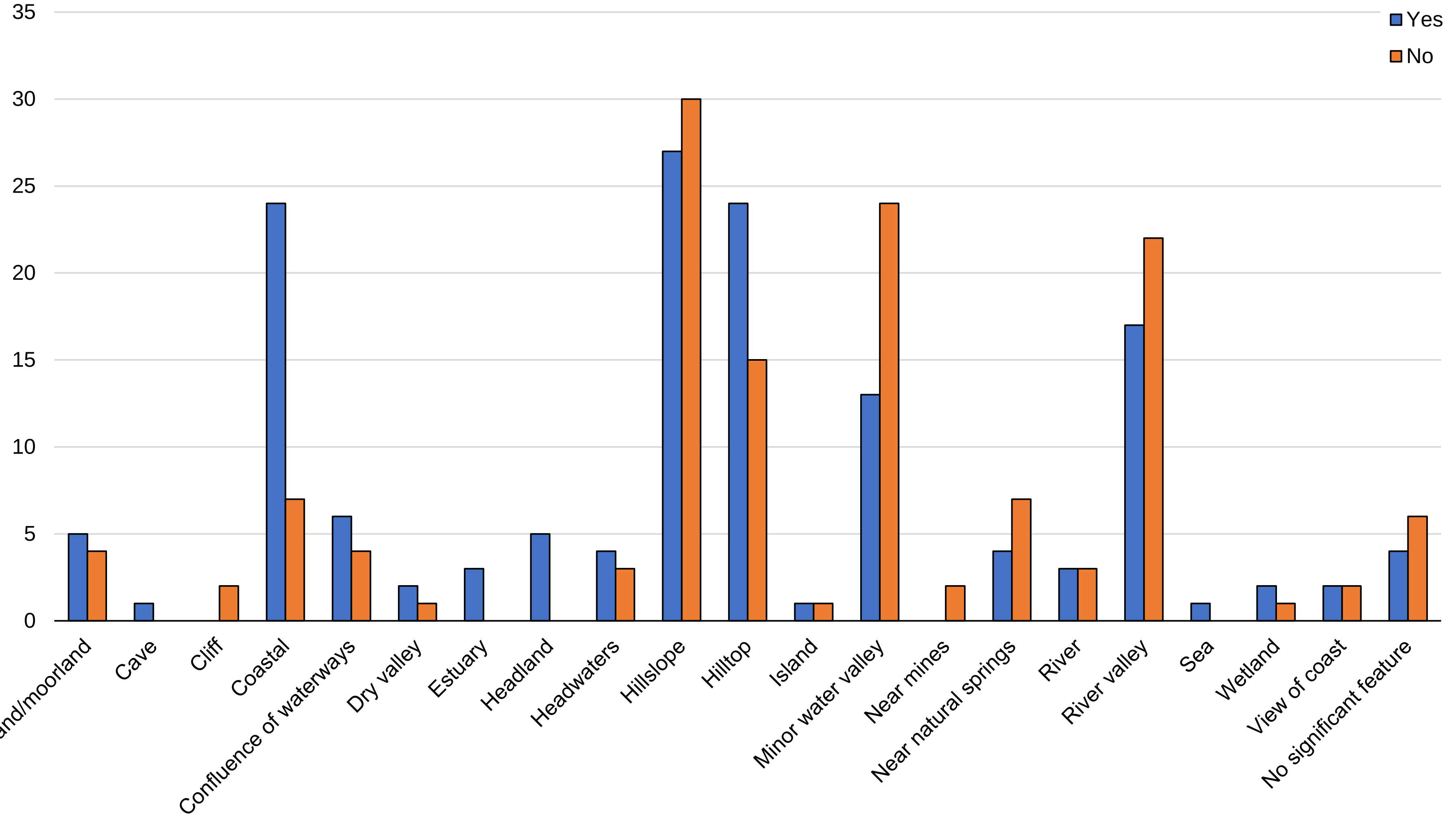
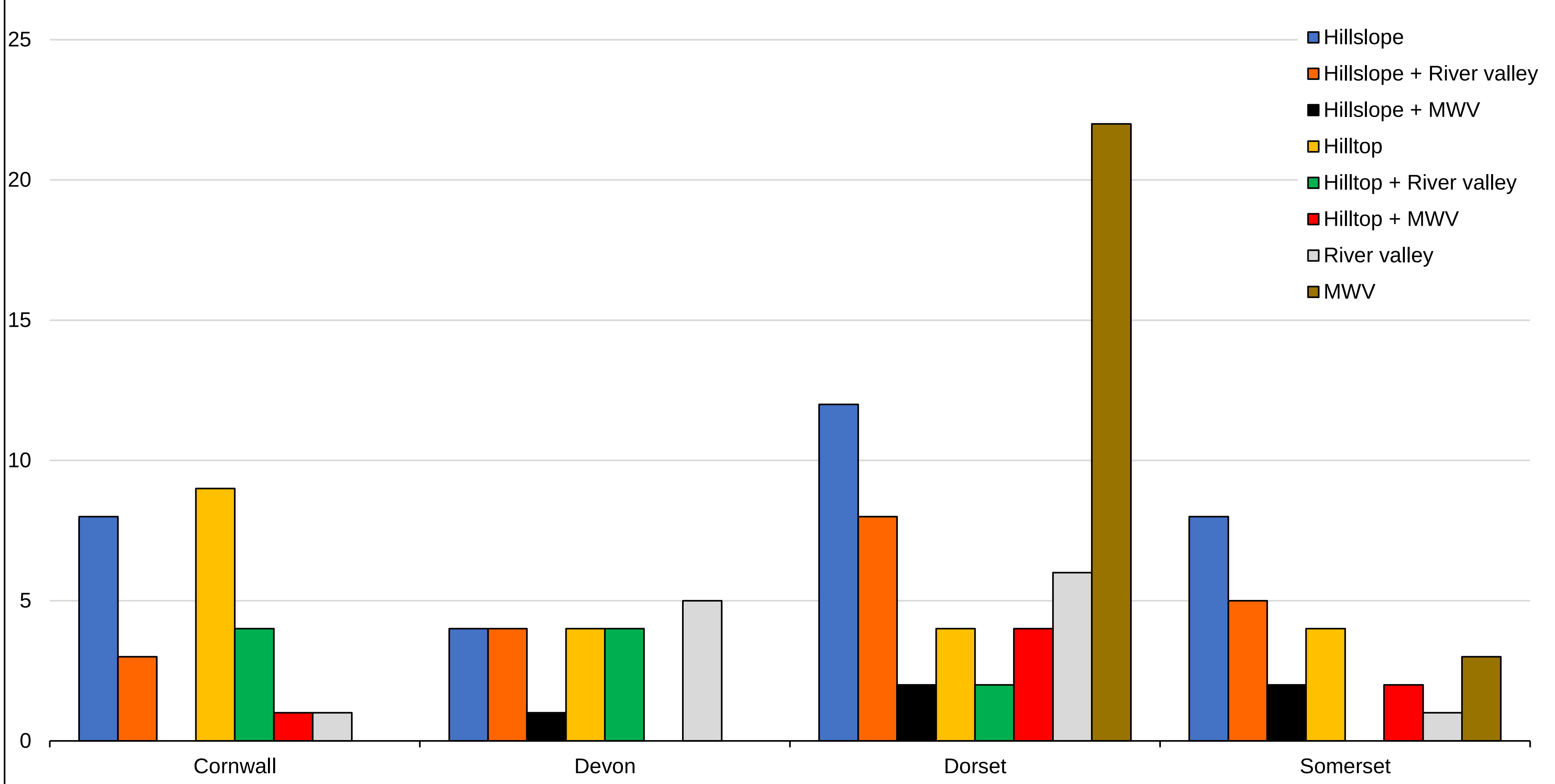


Fig.9.11: A summary of Late Bronze Age findspots located in hilltops and water valleys divided by county (n=133)



Almost half (48%) of coastal findspots are in Cornwall (Fig.9.12) and deliberately destroyed objects have been recovered from 86% of these. Devon presents a similar picture. Conversely, the main distribution of wetland findspots is in Somerset (Fig.9.13). Here there is an equal split in finds that have suffered deliberately destruction. Brought together, this analysis reveals that different counties had different focal points for deposition governed in part by the inhabited landscape. The extensive coastline of Cornwall was a focus for depositions whilst hillslopes and water valleys were predominant in Devon and Dorset. Finally, the low-lying wetlands of Somerset meant more finds were deposited in those locations than in others. It is important to highlight these trends for the Late Bronze Age when destruction of metalwork was most prolific as this can be linked to different object-selection practices and the treatment of objects.

Fig.9.12: Late Bronze Age coastal findspots with deliberately destroyed objects (Yes) and non-destroyed objects (No) divided by county (n=31)

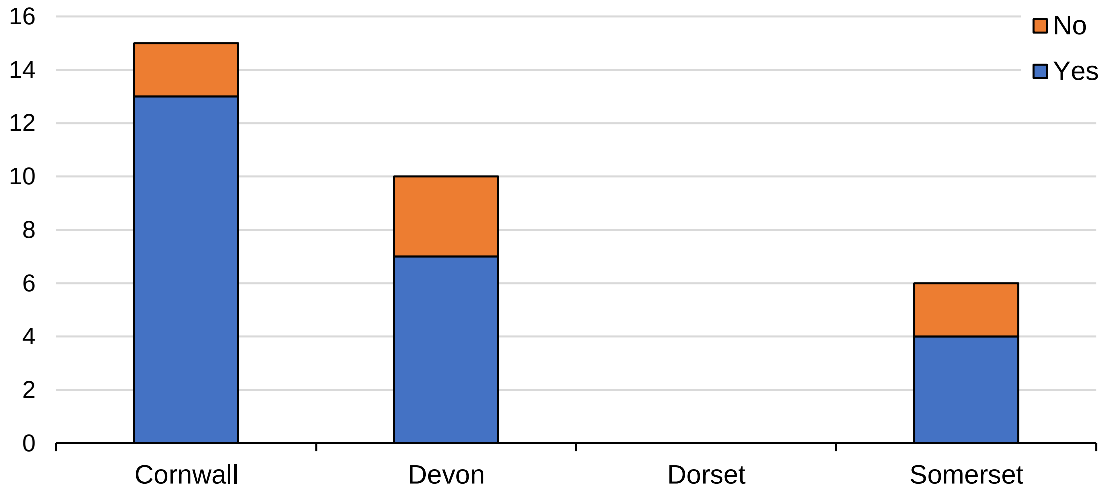
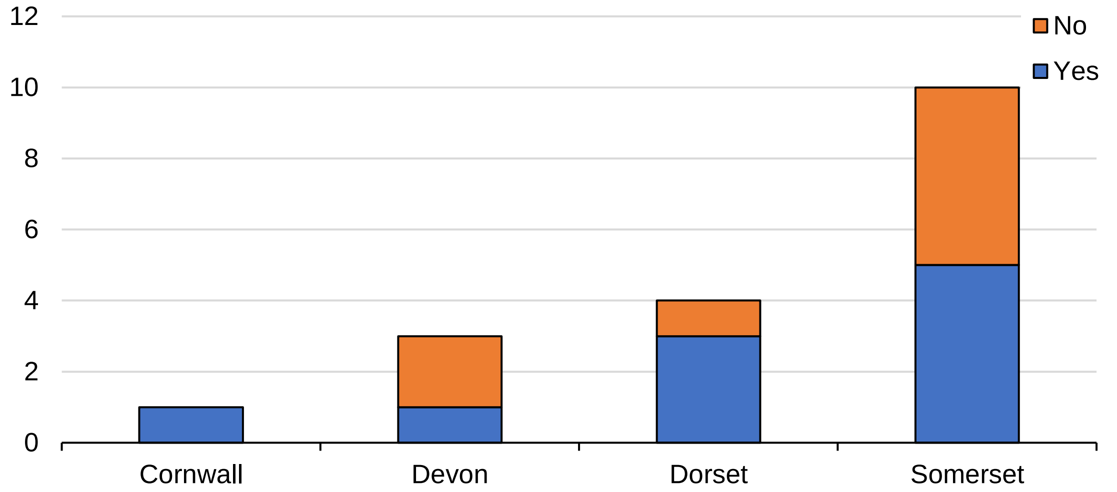


Fig.9.13: Late Bronze Age wetland findspots with deliberately destroyed objects (Yes) and non-destroyed objects (No) divided by county (n=18)



9.2.2 Late Bronze Age Associated Finds and Hoards

Deliberate fragmentation is most commonly observed in Late Bronze Age hoards, particularly those dating to the Ewart Park phase (c.920-800 BC). In parts of Britain regional traditions in practices emerge, such as the hoards of south-east Wales (Gwilt 2004), or the Carp's Tongue hoards of south-east England and northern France (Brandherm and Moskal-del hoyo 2014; Briard 1965; Burgess 1968; Turner 2010a). Most hoards in South West England were deposited on the south coast (Fig.9.14), but otherwise demonstrate limited uniformity in the character and associated practices (Table 9.3). Consequently, certain areas and case studies are assessed separately.

9.2.2a The Bloody Pool Hoard, Devon (RAMM-F005)

The Bloody Pool hoard (Fig.9.15) has already been highlighted as a significant case study owing to its distinctive 'weapon-only' character within the South West, as well as the evidence for deliberate destruction followed by deposition in a significant watery context (see Section 4.9). The hoard dates to the Blackmoor phase (c.1020-920 BC) (Davis 2015, 190-191) meaning it predates other destroyed hoards in South West England. Analysis can also be informed by the experimental activities.

Fig.9.15: The Bloody Pool hoard (source: Author courtesy of the Royal Albert Memorial Museum, Exeter, hereafter RAMM)

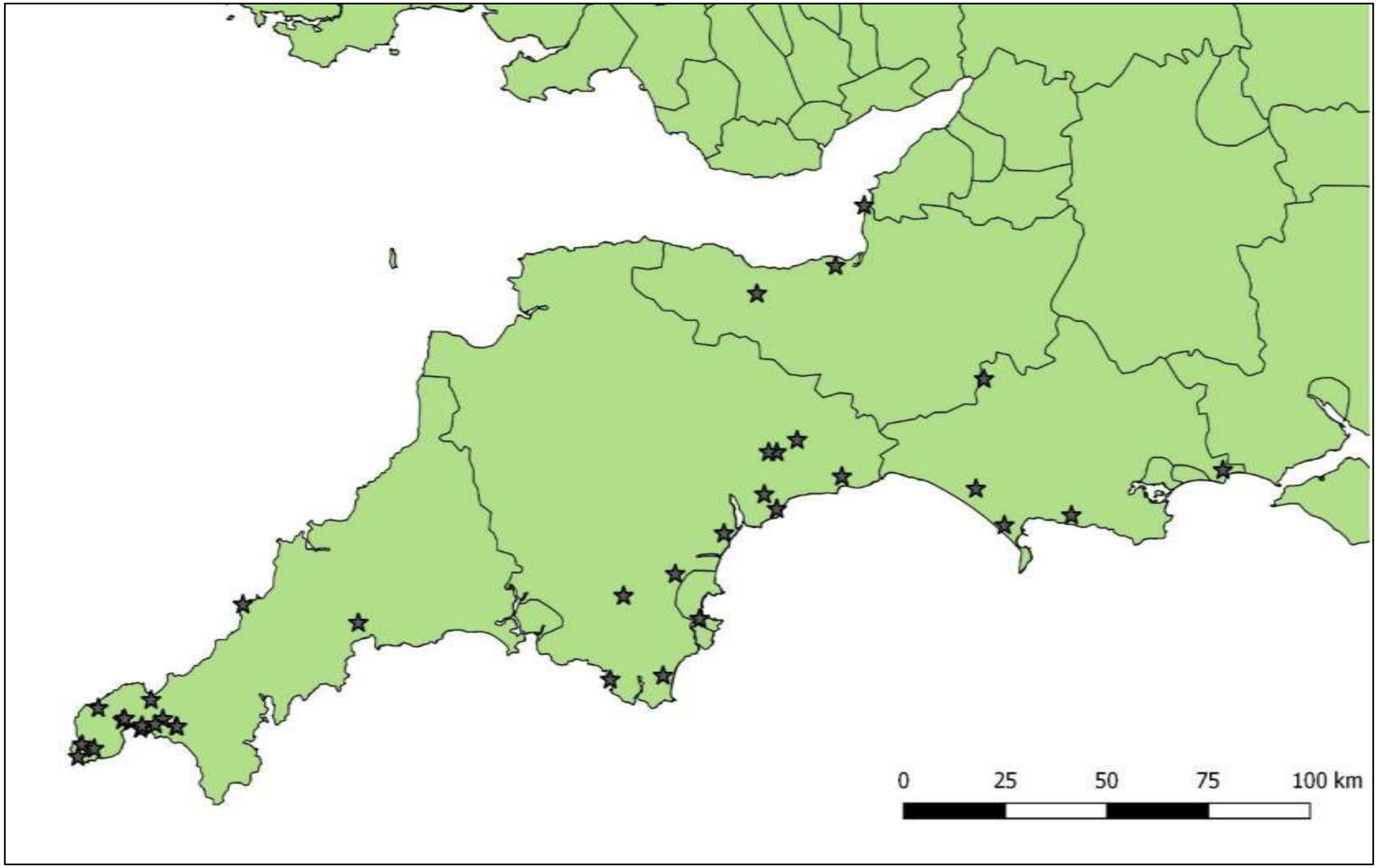


Fig.9.14: All Late Bronze Age hoards and associated finds in South West England (source: Author using QGIS and OS data from EDINA Digimap).

Table 9.3: A summary of all associated finds and hoards recovered from South West England, including those not studied as part of this thesis.
Key: MNO = Minimum number of objects.

Thesis No./Ref.	Hoard, County	MNO	Object types	Landscape location	Notes
Cornwall					
RCM-F002	Beacon Field	2	Swords	Uncertain	Two swords in three pieces
RCM-F005	Breage I	24	Socketed axes; sword; knife; bracelet; ingots; casting waste	Hilltop	Fragmentary; found close to Breage II
RCM-F006	Breage II	7	Socketed axe; sword; ingot	Hilltop	Fragmentary; found close to Breage I
PAS-F014	Madron II	2	Swords	Coastal, Confluence, Hillslope	Non-refitting fragments found associated.
PAS-F029	Sennen	3	Socketed axe; ingots	Coastal	All found in same field; ingots associated
RCM-F035	St Buryan	12	Socketed axe; ingots	Coastal, Headland, Hilltop	Found with a flint flake
RCM-F037	St Erth I	22	Sword; socketed axe; gouge; ingots; casting waste	Hilltop, River valley	Fragmentary; 22 objects in 27 pieces; found near St Erth II and two pieces of gold
RCM-F038	St Erth II	17	Winged axe; ingots	As above	Fragmentary; found near St Erth I and two pieces of gold
PAS-F036	St Levan	53	Socketed axe; winged axe; sword; knife; razor; casting jet; ingots	Hilltop, Overlooking coast	Fragmentary; buried in a container in a pit
NT-F001	St Michael's Mount	47	Socketed axes; knife; sword; chape; buckle; gouge; disc/plate; ingots; casting waste	Hillslope, Tidal island	Fragmentary; buried in a cavity under a boulder
Knight et al. 2015, No.15	Kelsey Head	3	Ring; buttons	Coastal, Headland	Possible hoard
Pearce 1983, No.82	Lanant	8+	Ferrule; swords; socketed axes; casting waste	Uncertain – near river estuary	Number of socketed axes unknown

Penhallurick 1986, 199	Luxulyan	3?	Cauldron	Tin stream?	One complete, one incomplete, one fragmentary
Knight et al. 2015, No.40	Rosemorran,	3	Gold bracelets	Uncertain – close to coast	Deposited interlinked
Pearce 1983, No.107	Morvah (Carne)	6	Gold bracelets/ armrings	Coastal	
Pearce 1983, No.67	St Hilary	Uncertain	Knife	Uncertain	Originally part of a hoard weighing 80 pounds, but melted down.
Devon					
RAMM-F001	Ash Farm	11	Ingots	Uncertain	Fragmentary
PAS-F045	Awliscombe I	1?	Sword	River valley	3 sword fragments
RAMM-F005	Bloody Pool	6	Spearheads; spear ferrules	Bog, Upland	Six objects in nine fragments
PAS-F073	Lower Frittiscombe	2	Gold rings	Uncertain	
PAS-F074	Newton Abbot I	7	Ingots	Hilltop	Fragmentary; all deliberately broken
PAS-F076	Otterton I	7	Ingots	Coastal	Fragmentary; all deliberately broken; found near Otterton II
PAS-F077	Otterton II	12	Ingots	Coastal	Fragmentary; all deliberately broken; found near Otterton I
PAS-F082	Stoke Gabriel I	2	Ingots	Overlooking coast	Two fragments
RAMM-F050	Talaton II	12	Socketed axe; gouges; ingots; casting waste	Hillslope, near natural springs, near waterways	
PAS-F088; PCMAG-F005	Thurlestone	11+	Spearheads; socketed axe; blade	Coastal, Cliff	Multiple finds made while metal-detecting along the beach
Knight et al. 2015, No.124	Churston Ferrers (Lupton Park)	3	Ingots	Overlooking coast	
Knight et al. 2015, No.125	Colaton Ralegh	4	Gold bracelets	Heathland	Found nested

PAS DEV-0D2AA0	Colyford	1?	Sword	PAS protected	Three fragments of sword blade
PAS SOM-81B00C	Dawlish	13	Ingots	PAS protected; possible bog	Found near gold bracelet hoard
PAS SOM-81B00C	Dawlish	4	Gold bracelets	PAS protected; possible bog	Found near ingot hoard
Dorset					
PAS-F109	Chickerell I	2	Gold bracelets	River valley	Interlinked
DCM-F024	Long Bredy	4/5	Sword; spearhead; gouge; razor	Hillslope, Overlooking river	4 or 5 objects in 6 pieces
DCM-F025	Lulworth	18	Sword; socketed axe; spearheads; decorated plaque; flesh-hook; rings; bugle-shaped object; pins; bracelet; casting jet	Dry valley, Hillslope	18 objects in 23 pieces
PAS-F140	Overcompton	2	Socketed axes	Uncertain	Two fragments found while metal-detecting
RHMG-F007	Somerford	2	Socketed axe; gouge	Uncertain	
Somerset					
TTNCM-F005	Brean Down II	3	Gold bracelets	Coastal settlement	Occupation layer also containing ceramic, bone and shell fragments
TTNCM-F023	Hayne	4	Flat axe; palstaves; socketed axe	Low on hillslope, tributary valley, edge of Exmoor	Possible multi-period hoard
TTNCM-F058	Stogursey	146	Socketed axes; palstaves; swords; spearheads; gouge; sword chape; knife; casting jet; ingot; casting waste	Low-lying dryland?	Large hoard; complete and fragmentary objects

Each spearhead shows a straight breakage across the widest part of the blade removing the upper blade and tip. The experimental activities demonstrated this could be achieved by heating and striking the spearhead (Section 4.11.4a). The spearheads had also suffered possibly intentional damage to the sockets and blade edges (Fig.9.16). All three barbed spearheads had rivets in place indicating they may have been deposited with a shaft still inserted or that the shaft broke during use and could not be removed. The ferrules are similarly fragmentary; although no replication experiments were conducted they were probably broken similarly to the spears.

The scenario surrounding the deposition of the hoard can thus be plausibly reconstructed. The spearheads were placed onto a fire, probably retaining at least some of the shaft within the socket; the presence of

Fig.9.16: Socket damage on one of the Bloody Pool spearheads (RAMM-F005a) (source: Author courtesy of the RAMM, Exeter)

the ferrules may imply the whole spear shaft was once present, possibly in multiple pieces. The lack of associated deformation damage suggests the spears were heated to around 500-600°C which would have been achievable with a well-constructed fire. This may have involved a metalworker but it is likely that knowledge of fire-making was widespread. The spearheads were removed from the fire and struck with a hard object or tool. Heating bronze causes the material to become very brittle and it would have been sufficient to strike the spearhead with any firm implement. The spears were broken into at least two pieces though the missing fragments of a third spearhead indicate that at least one of the spears was broken into multiple fragments (Fig.9.17).

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Fig.9.17: Lost pieces of the Bloody Pool hoard (source: Tucker 1861, 161)

Presently, it can only be speculated whether the spears were burnt and broken at the site of deposition or whether the pieces were brought to the site from elsewhere. If deposited hot, contact with water would have caused rapid cooling, which may be observable in the microstructure as quenching would have preserved the higher temperature structures. On an experiential level, the breakage would have been a loud, distinctive noise and the quenching, possibly *in situ*, would have resulted in steam.

Furthermore, some pieces of the spearheads were removed, namely the upper blades. These were possibly deposited with the spears and subsequently lost post-deposition. However, there are other broadly contemporary examples of spearheads broken across the blade also missing the upper blade e.g. Thurlestone, Devon (PAS-F087), Guilsford, Wales (Savory 1966), and Wilburton, Cambridgeshire (Davis 2015, No.710); these support the idea that the Bloody Pool spearheads was deposited without the upper blades. The tips were thus either retained, recycled, or deposited elsewhere.

Barbed spearheads are almost exclusively deposited intentionally, with 74 out of 78 Group 15 spearheads recovered from a known context (Davis 2015, 190). In the South West, barbed spearheads are currently only known from South Devon and Somerset (Table 9.4). One complete single find is known from the region (Godney, Somerset: Pearce 1983, No.672) whilst the rest comprise fragments within larger assemblages. Those from Somerset were recovered from dryland locations, and those from Devon were found either in a bog or on a coastline. In Britain, barbed spearheads are closely linked with wetland locations with the main distribution along the Thames river basin (Davis 2015, 190); the Bloody Pool hoard conforms to this trend.

Twenty-eight barbed spearheads are largely complete, whilst the remaining 70 were either broken across the blade or survive only as blade or socket fragments (Davis 2015, Pls.122-129). To these, one can add the incomplete spearheads from Thurlestone Beach (PAS-F088) found in a coastal location and possibly deposited in the sea. Of interest are spearheads in the hoards from Ashley, Hampshire, and Broadness, Kent, which display similar breakage patterns to the Bloody Pool spearheads (Fig.9.18). The deliberate destruction of these spearheads was thus a significant action, strengthened by the widespread association with riverine or coastal locations that would have served no functional purpose.

Table 9.4: A summary of all barbed spearhead finds in South West England

Thesis No.	Findspot	No. of barbed spearheads	Associated objects	Dryland/ wetland
RAMM-F005	Bloody Pool, Devon	3	1 spearhead 2 ferrules	Wetland
PCMAG-F005	Thurlestone Beach I, Devon	1	1 spearhead	Uncertain – poss. wetland
PAS-F088	Thurlestone	6	1 uncertain spearhead 1 socketed axe 1 blade	Uncertain – poss. wetland
TTNCM-F005	Cadbury Castle, Somerset	1	Settlement assemblage of 47 objects	Dryland
TTNCM-F058	Stogursey, Somerset	5	Hoard of c.150 objects	Dryland
n/a	Godney, Somerset	1	-	Uncertain

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Fig.9.18: Broken barbed spearheads from the Ashley hoard (No.1311) and the Broadness hoard (Nos.1303-1305) (source: Davis 2015, Pls.122, 123)

9.2.2b Ingot-dominant Hoards in Devon

Eight Late Bronze Age associated finds and hoards from Devon are dominated by plano-convex ingot fragments concentrated entirely in South Devon and positioned in coastal locations or along river valleys (Fig.9.19). These have largely been discovered by metal-detecting and may indicate routes by which material moved in or out of the South West. All ingots in these hoards were deliberately broken into fragments though none refit, representing the remains of larger pieces presumably used for casting. Many of the ingots contain large casting hollows though these would have created natural weaknesses for breaking the ingots.

The Talaton II hoard (Fig.9.20) is the only Devonian ingot-hoard containing other object types confirming its Late Bronze Age date. The associated objects include cutting-edge fragments of two socketed gouges and a socketed axe, all of which are heavily worn. The remaining hoards can be attributed a Late Bronze Age date by comparison with other southern British hoards containing ingots.

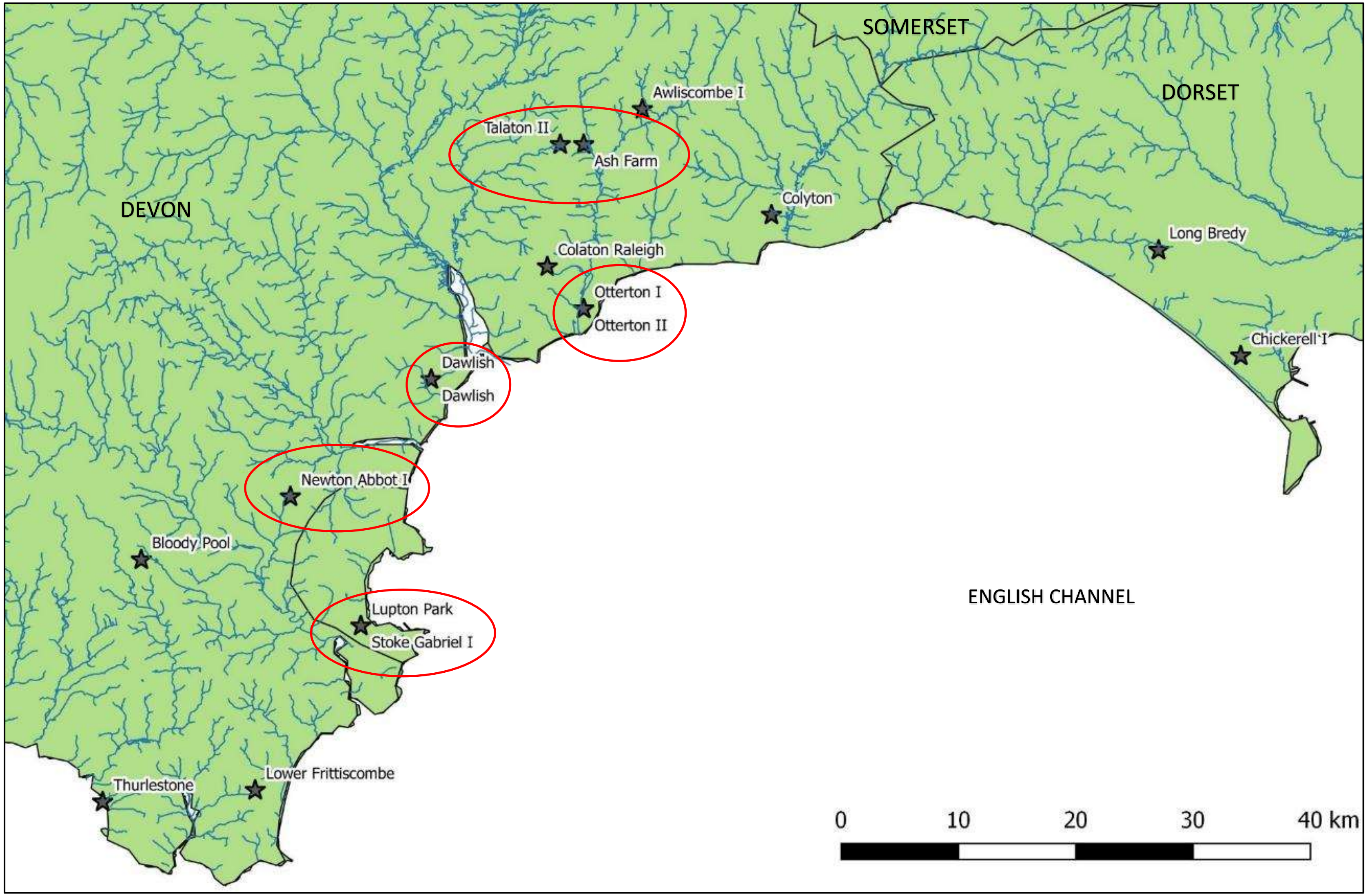


Fig.9.19: Late Bronze Age hoards in South Devon with ingot-dominant hoards circled (source: Author using QGIS and OS data from EDINA Digimap).

Fig.9.20: The Talaton II hoard, Devon (source: Author courtesy of the RAMM, Exeter)

This material was likely fragmented for recycling and would have required high temperatures to break these objects. The composition of the material is particularly significant here as ingots may be copper or copper alloy. Pure copper is very ductile even at high temperatures and difficult to fragment. Without experimentation, it is difficult to assess how exactly this might be achieved. Unfortunately, the ingot-dominant hoards in Devon have not be metallurgically analysed meaning it is currently unknown whether these represent copper or copper alloy ingots. Furthermore, this means the origin of the material has not been assessed. However, Bronze Age copper ingots are known from Ottery St Mary III (PAS-F081) and Gittisham (RAMM-F022).

Ingot hoards may have represented a cache of raw material, or alternatively symbolic deposits. Although the fragmentation may have been functional, the selection and deposition of pieces may not have been. For instance, locally sourced or imported material may have necessitated a *pars pro toto* offering. The position of these hoards in relation to the coast and waterways indicates that ingots were deposited in reference to trade routes and the means by which raw material was moved in and out of the areas.

Finally, it must be considered that the production of ingots was inherently destructive necessitating the smelting of ores or the reduction of other objects into an ingot form. The transformation process enabled by destroying previous forms through smelting or melting practices may have made ingots significant objects. The deposition of ingot fragments in significant parts of the landscape, perhaps as a symbolic offering, may have been an extension of this.

9.2.2c Hoards in Cornwall

Ingot fragments are also dominant components in hoards from Cornwall comprising 118 (61%) of the 194 objects studied (Fig.9.21). These typically occur alongside various other artefacts (Figs.9.22; Fig.9.23). Ten destruction indicators were identified across the objects studied (Figs.9.24; 9.25) and most artefacts are only 0-25% complete. Of the 118 ingots, 110 were broken or fragmented whilst other destruction indicators are observable on the remaining objects, such as crushed socketed axes and bent sword fragments.

Considering all Late Bronze Age Cornish hoards, including those that were not studied, a specific pattern can be identified. Nine of the sixteen hoards contain axes, ingots and casting waste (see Table 9.3). Of these hoards, six comprise more than twelve objects with St Michael’s Mount and St Levan containing 47 and 53 respectively. Almost all the axes in the hoards are socketed, the exceptions being the winged axes from St Erth II and St Michael’s Mount; meanwhile, six hoards contain incomplete swords and occasionally a knife or razor. To these, one might add the St Hilary hoard; only a Late Bronze Age knife survives, but the hoard originally weighed 80 pounds (c.36kg) (Pearce 1983, No.67) suggesting that this was probably a hoard of heavy material such as ingots and axes. Meanwhile, sword fragments have been found at Beacon Field (RCM-F002) and Madron II (PAS-F014), though without axes or ingots, suggesting these deposits may have been related to the broader hoarding practice.

Only eight (5%) objects were deposited over 50% complete (Fig.9.26). One (RCM-F005a) was deliberately destroyed with a plugged socket whilst five suffered non-deliberate damage and two are complete. The complete objects are a bag-shaped chape (Fig.9.27; NT-F001n), and an end-winged axe (RCM-F038a), whilst a possible buckle (Fig.9.28; NT-F001o), South Welsh socketed axe (NT-F001a) and hog-back knife (PAS-F036i) have suffered only minimal damage. These five objects represent non-local types that were likely traded or transported into the area from another region. Their ‘exotic’ origins may have meant they were excluded from destructive practices.

Fig.9.21: A comparison of ingots and other material found in Late Bronze Age associated finds and hoards in Cornwall (n=194)

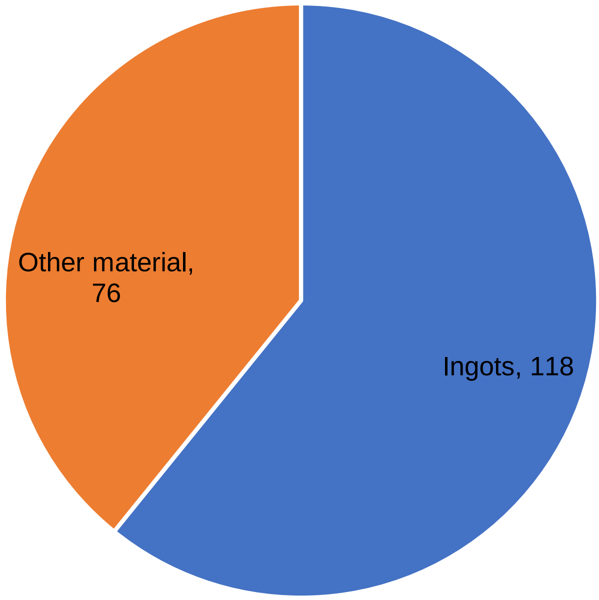


Fig.9.22: The number of each object type found in Late Bronze Age hoards in Cornwall (ingots have been excluded here) (n=76)

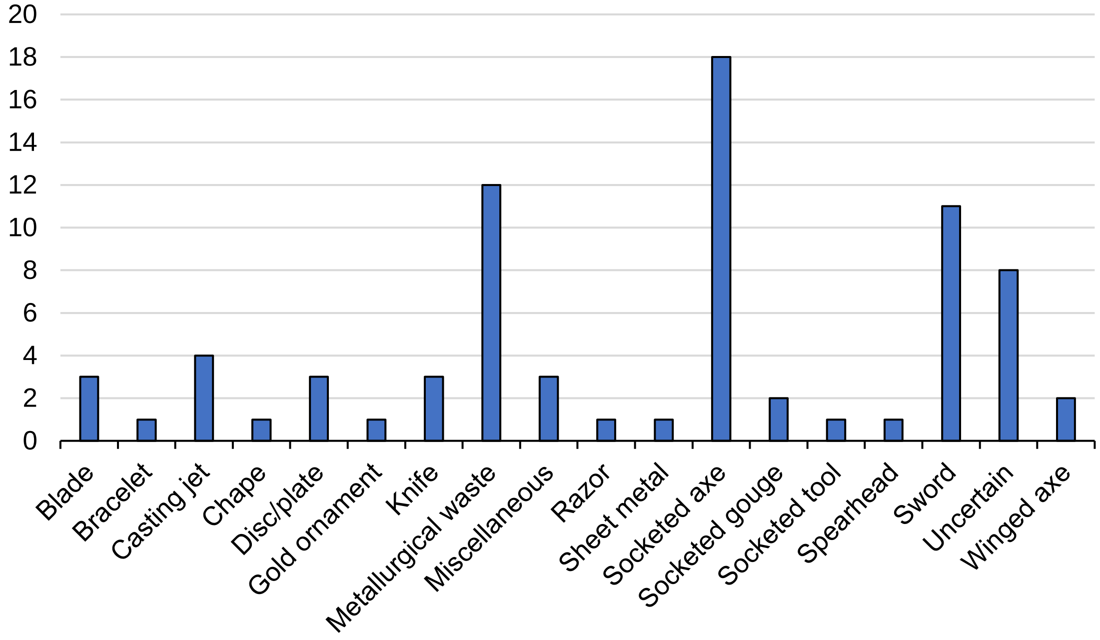
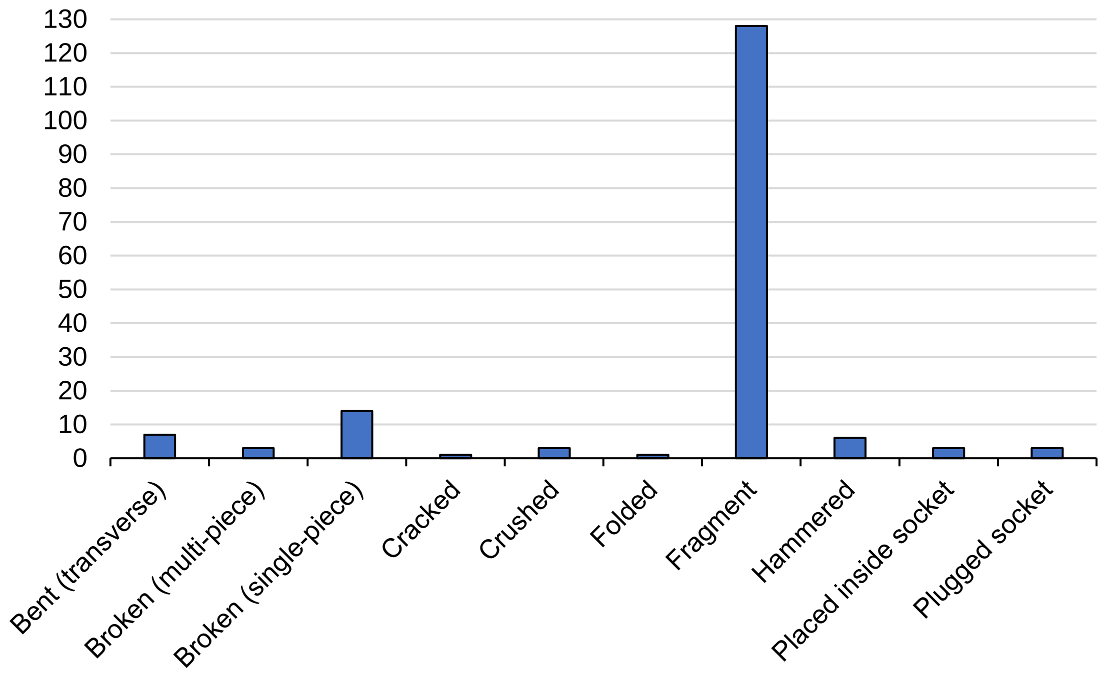


Fig.9.23: The Breage II hoard, Cornwall (source: Author courtesy of the Royal Cornwall Museum, hereafter RCM)

Fig.9.24: The frequency each destruction indicator was recorded (n=169)



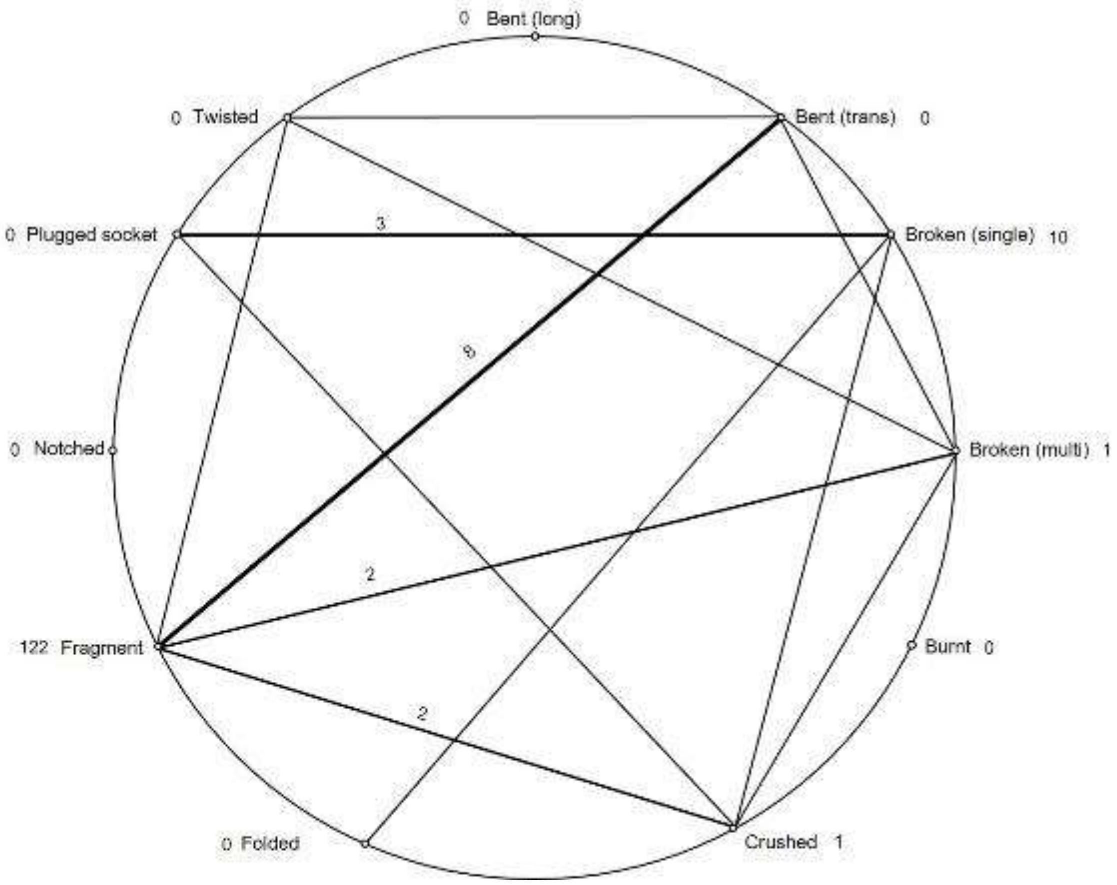


Fig.9.25: Associations of destruction indicators across the objects in the Late Bronze Age hoards from Cornwall. Numbers next to destruction indicators refer to the number of times these indicators occur in isolation. Unnumbered lines indicate a single association.

Fig.9.26: A comparison of object completeness within the Late Bronze Age hoards in Cornwall (n=157)

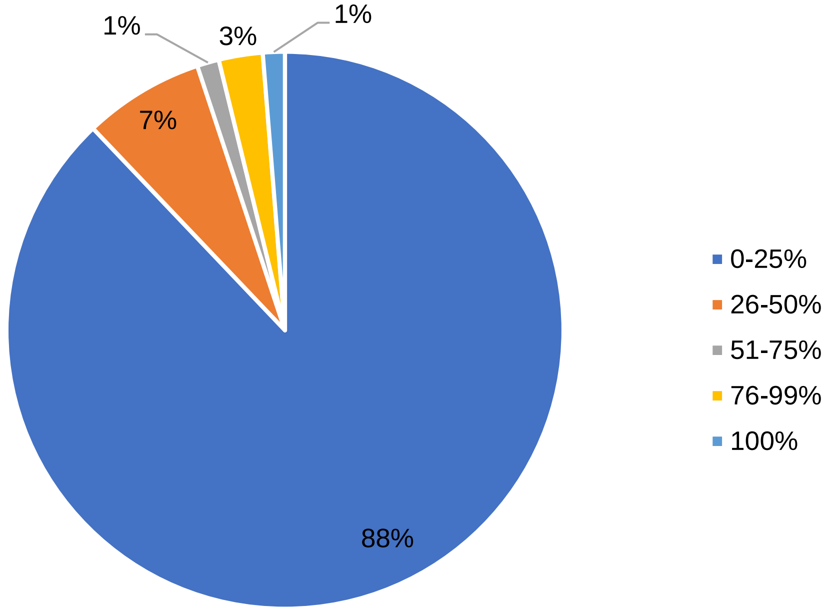


Fig.9.27: A bag-shaped chape from the St Michael's Mount hoard (NT-F001n) (source: Author courtesy of the National Trust)

Fig.9.28: A possible buckle from the St Michael's Mount hoard (NT-F001o). Length 81.4mm. (source: © National Trust)

Most deliberately destroyed, fragmented objects are ingots, swords and socketed axes though fragments of a bar-twisted torc and hog-back knife were found in the socket of an axe in the Breage I hoard (RCM-F005; Fig.9.29). Bar-twisted torcs are traditionally Middle Bronze Age objects suggesting the retention of an object past its typical typological span perhaps as a curated object or a rediscovered deposit. The practice of fragmenting Middle Bronze Age bracelets and torcs has already been highlighted and this might recall an already ancient practice.

The hog-back knife has wider implications. Hog-back knives are traditionally confined to the Carp's Tongue complex in south-east England (O'Connor 1980, 179). However, eight possible or definite examples have now been identified in Cornwall suggesting a possible influx of this tradition into the region. This is supported by other Carp's Tongue objects including the bag-shaped chape (NT-F001n), Carp's Tongue sword fragments (NT-F001l; RCM-F006b) and winged axes (PAS-F036e; RCM-F038a) and the similar character of material to that from south-eastern England and north-western France, namely highly fragmentary axes, swords and ingots (Brandherm and Moskal-del Hoyo 2014; Briard 1965; Burgess 1968; Turner 2010a). With no comparable hoards in Devon, Somerset or Dorset, Cornish hoards likely represent the influx of

Fig.9.29: The Breage I socketed axe (left) and the fragments of objects found within the socket (source: Author courtesy of RCM)

depositional traditions from north-western France. This theory is strengthened by the increasing number of deposits in South West Wales with Carp's Tongue affinities (e.g. Manorbier, Pembrokeshire: Gwilt et al. 2011). One can thus posit that material was travelling from north-western France along the west coast of Cornwall and into the Bristol Channel.

Consequently, one may interpret the destruction of the Cornish hoards in relation to hoards from these other areas. Such hoards have traditionally been regarded as 'scrap' (Briard 1965; Burgess 1968), though Turner (2010a) suggested the 'Carp's Tongue' hoards of south-eastern England represented an accumulation of different processes. Hoards from Kent and Essex comprise fragmentary material possibly destined for recycling as well as objects which have suffered less extreme breakage and complete and undamaged objects which are theoretically too large for a crucible (ibid.). The Cornish hoards are composed similarly. For instance, the complete axes from St Erth II and St Michael's Mount may have been too large for a crucible whilst the deposition of several complete, usable objects do not indicate 'scrap' e.g. the St Michael's Mount buckle and chape. Furthermore, the broad range in fragment size from 10mm to over 130mm might reflect that some objects were not fully reduced. Objects may have been removed at different stages of the reduction process for inclusion in the deposit (cf. Turner 2010a, 92).

The practice of blocking socketed axes offers an interesting contribution. This practice has been recognised across Britain and south-east Europe (Dietrich 2014; Dietrich and Mörtz *forthcoming*; Hansen 1998) and is often considered a functional method for utilising the open space in a socket. However, as Turner (2010a) and Dietrich (2014, 475-6) highlight, why not simply reduce the object acting as a vessel? The blocked axe from Breage I, for instance, contains a fragment of another axe whilst the two blocked axes from St Michael's Mount are deposited alongside complete and fragmentary axes (Fig.9.30). These combinations of practices within larger deposits indicate that the blocking of axes should not be interpreted simplistically. Furthermore, the fragments found in sockets in Cornwall belong to several different object types and none refit. This is a common feature of blocked sockets and Dietrich has posited such accumulations might be considered "miniature-hoards" (2014).

Fig.9.30: A blocked socketed axe from St Michael's Mount (NT-F001b) (source: Author courtesy of the National Trust)

Many of the objects in the hoards were likely fragmented while hot. Hot-shorting a sword (i.e. heating and striking it) was the easiest method of fragmentation producing fragments of comparable form and size (Section 4.11.3a). However, a chisel was used to reduce at least three of the artefacts studied (Figs.9.31; 9.32; NT-F001d; RCM-F005c; RCM-F037g) suggesting that not all objects were fragmented in the same manner. This also indicates fragmentation may have been a controlled and possibly skilled process rather than an ecstatic event (*contra.* Nebelsick 2000). If one considers that at least fifty objects are represented in the St Michael's Mount and St Levan hoards of which only fragments survive, one can envisage substantive destruction events.

This may have required a large fire or hearth in which all objects were heated, removed and broken, or alternatively a series of smaller processes after which various fragments were accumulated for a single deposit. This may support Needham's (2001) suggestion that hoards represented deposits that were regularly opened and closed with pieces constantly added and removed.

Fig.9.31: A broken socketed axe with chisel marks (red arrows) from the St Michael's Mount hoard (NT-F001d) (source: Author courtesy of the National Trust)

Fig.9.32: A sword fragment with chisel marks (red arrow) from the Breage I hoard (RCM-F005c) (source: Author courtesy of RCM)

The landscape situation of these hoards is also significant (Table 9.3). Seven hoards were buried on either hilltops or hillslopes and fourteen of the sixteen Cornish Late Bronze Age hoards are located on the western most peninsula in Penwith on or near the coastline (Fig.9.33). Penwith is one of the main tin and copper bearing lodes in South West England (Pearce 1983, 97) so the position of the hoards on or near mineral deposits could be significant. Meanwhile, the St Levan and St Buryan hoards both overlooked coastlines whilst the Breage and St Erth hoards might be linked with nearby river valleys. Similarly, the Lanant hoard was likely found on or near the river estuary. This all indicates a focus on natural landscape features that may have acted as boundaries or easily recognisable locations as well as the importance of accessing local resources of raw material.

The St Michael's Mount hoard (Fig.9.34; NT-F001) was deposited on a tidal island containing a diverse range of material. The objects included broken axes, swords and casting material as well as a decorated buckle which is so far unique in Britain and a bag-shaped chape possibly from north-western France. Metallurgical analysis of the copper ingots indicates the most likely source of the raw material is the Llanymynech (Powys)/Shropshire area of the Welsh borders (Young 2015). The potentially diverse origins of the objects and materials may have increased the significance of the hoard with more common objects broken into fragments whilst the unique items were left undamaged.

Metallurgical analysis of the St Erth I material has also demonstrated a combination of origins for the material with six ingot pieces showing comparable compositions with sources in Switzerland and Italy whilst much of the remaining material is typical of Late Bronze Age Britain (Northover n.d.). The various object forms and metallurgical analyses demonstrate that Cornwall was part of a wide trade and exchange network. The treatment of objects and depositional practices were likely influenced by external ideas and the 'exoticness' of the objects.

The proximity of many of the hoard findspots to river valleys and coastlines suggests that deposits were made in reference to these waterways, which may have been the means by which material was transported, as suggested for the Devonian ingot hoards. This is further supported by the discovery of numerous single finds in similar locations (see Section 9.2.3).

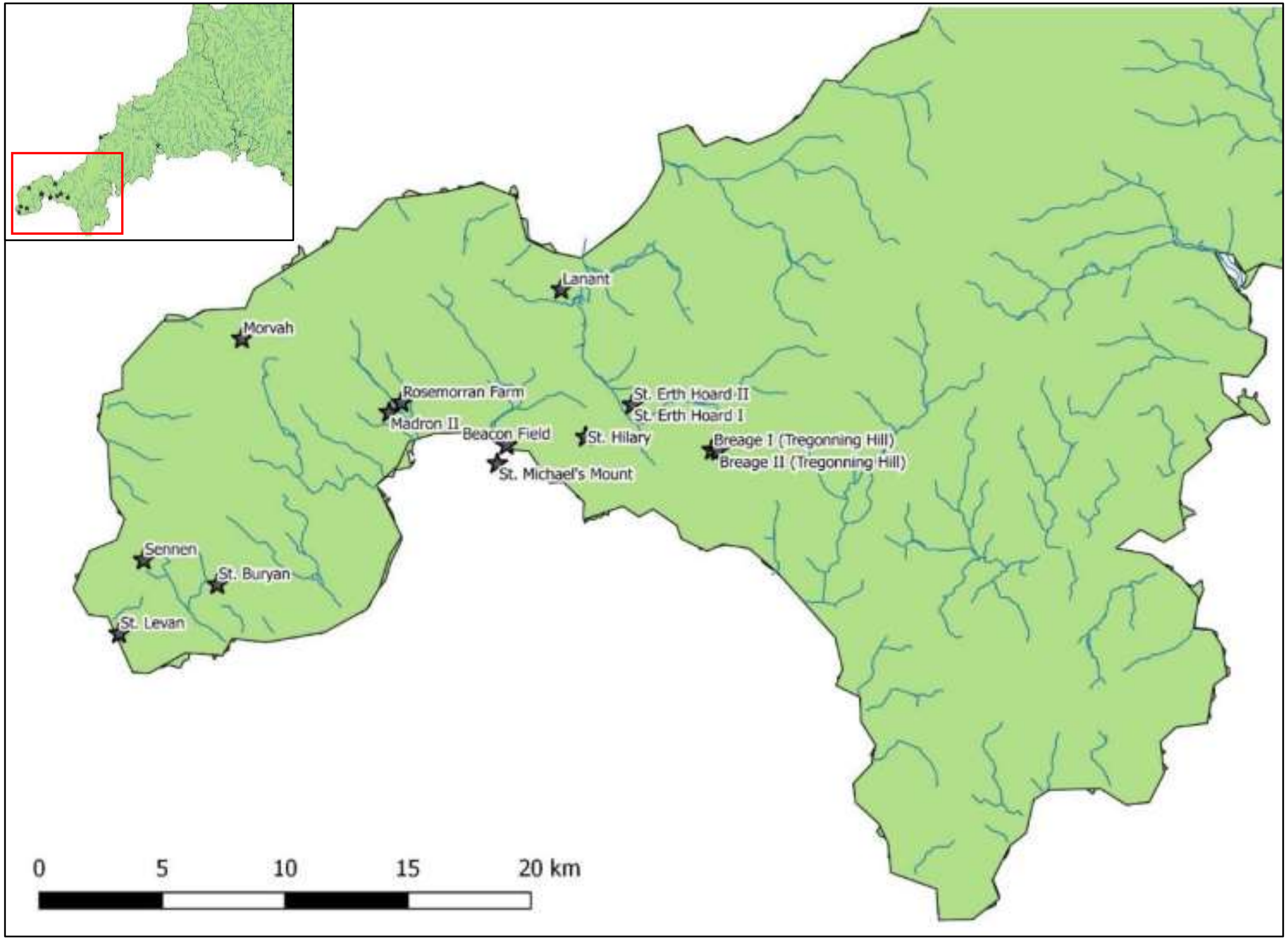


Fig.9.33: Late Bronze Age hoards in Penwith (western Cornwall) (source: Author using QGIS and OS data from EDINA Digimap).

Fig.9.34: The St Michael's Mount hoard (NT-F001) (source: © National Trust)

9.2.2d The Stogursey hoard, Somerset (TTNCM-F058)

The Stogursey hoard of 148 pieces of metalwork is particularly significant in the South West as 97 pieces show signs of deliberate destruction (Fig.9.35). Five destruction indicators are represented across eight of the eleven object types, as well as a series of damage indicative of intent such as hammering, cracking and the removal of blade edges. Breakage and fragmentation are the most common destruction indicators often associated with plastic deformation, though none of the objects were twisted, folded or deliberately notched (Fig.9.36). This is the largest metal hoard in the study region but only one of three hoards from Somerset. This hoard can thus be examined firstly as an isolated study assessing the internal features of the hoard and secondly in the context of other comparable hoards from a wider geographic area, most notably in south-east Wales.

The hoard was found in 1870 within a space of about "one foot cube, 2ft. below the surface of a field (which was being drained) to the N.E. of Wick Park plantation" (PSANHS 1907, 72). The exact findspot is unknown, but the plantation can be located on historic maps.

Fig.9.35: Complete and broken objects from the Stogursey hoard (source: Author courtesy of the South West Heritage Trust (Museums Service), hereafter SWHT (MS)

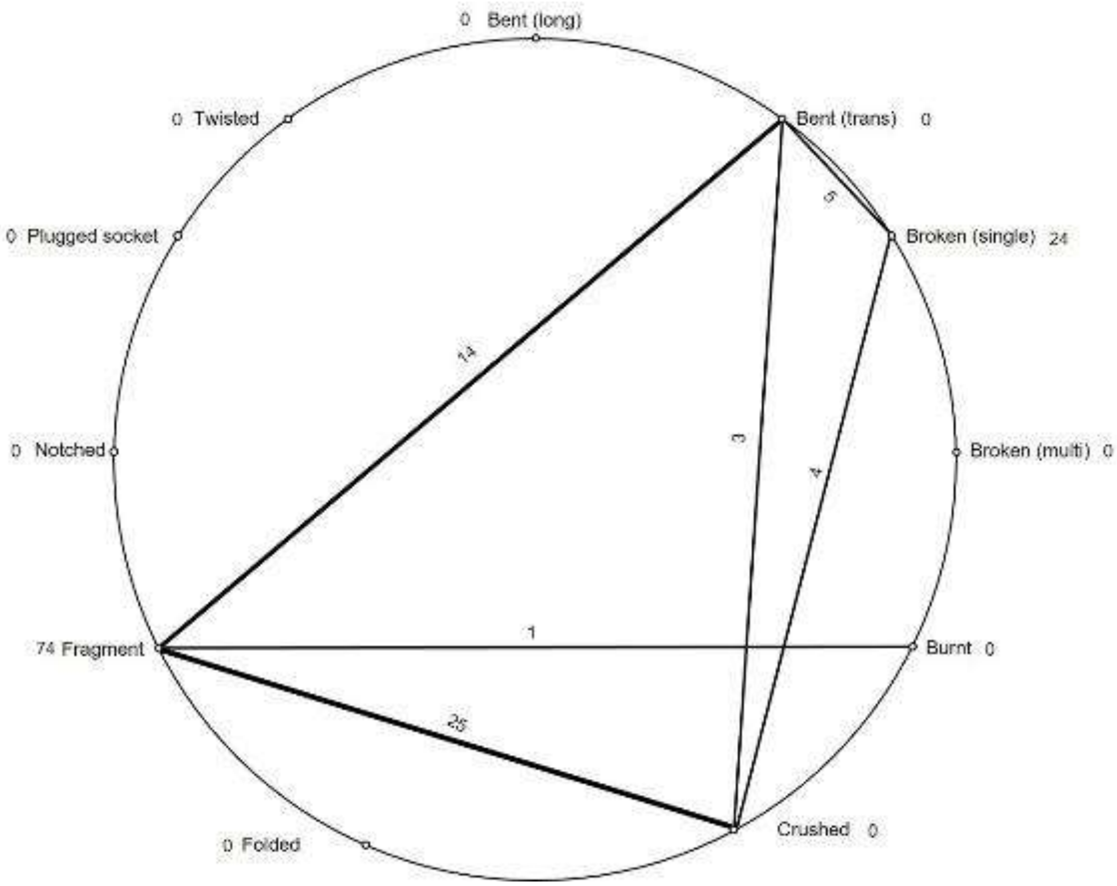


Fig.9.36: Associations of destruction indicators across the objects in the Stogursey hoard. Numbers next to destruction indicators refer to the number of times these indicators occur in isolation.

The largest component of the hoard is complete and fragmentary socketed axes, followed by spearheads, swords and casting material (Table 9.5; Figs.9.37-9.39). There are no ornaments within the hoard and only one tool that is not an axe. Sixty percent of the socketed axes and most of the swords, spearheads and casting material show signs of deliberate destruction.

Breakage is often coupled with crushing on axes and bending on swords and spearheads. Destructive experiments involving socketed axes indicated that crushing and breaking these objects was achieved through heating suggesting that some of the Stogursey objects must have been placed within a fire. Small axe fragments were produced during the experiments when heated to over 600°C, resulting in the shattering of the axe. Such extreme fragmentation can be closely compared with archaeological artefacts suggesting the method of destruction (Fig.9.40).

Similarly, although the bending and fragmentation of swords can be achieved while cold, it is most effective to heat the objects (Section 4.11.3; Hardman 2016). A comparison of experimental spearhead damage with barbed spearhead fragments in the hoard, however, could imply that some of the material was broken cold (Fig.9.41). The possible combination of cold and hot breakages within the assemblage indicates that not all objects were broken as part of a single activity.

None of the incomplete objects within the hoard refit, indicating missing pieces or fragments. This means that either pieces were deliberately selected for inclusion or multiple objects were accumulated over time with various fragments added and removed to the point that no refitting fragments now exist. This can be partly explored by examining the portions of the objects which are now represented. Cutting-edge fragments of socketed axes, for instance, are preferred over other axe portions representing a minimum of 23 objects (Table 9.6), implying a deliberate selection process. A similar preference is also observable in comparable hoards from St Nicholas and Tal-y-garn, Wales (see below). Meanwhile, the socketed axe types which are only represented by a small number (e.g. Yorkshire, Meldreth, Croxton and Welby) are largely complete and intact.

Table 9.5: A summary of the contents of the Stogursey hoard, Somerset (TTNCM-F058)

Object	No.	Completeness %						Use Evidence		Deliberate Damage		Destruction Indicators / Associated Damage
		0-25	26-50	51-75	76-99	100	n/a	Y	N	Y	N	
Socketed Axe												
Three-ribbed	12	6	-	1	3	2	-	1	11	6	6	Bent; crushed; hammered; fragment
South Welsh	13	-	1	1	4	7	-	-	13	3	10	Cracked; crushed; fragment; hammered; broken
Yorkshire	2	1	-	-	1	-	-	1	1	1	1	Crushed; fragment; hammered
Croxton	1	-	-	-	-	1	-	-	1	-	1	-
Welby	1	-	-	-	-	1	-	1	-	-	1	-
Plain/ribbed/uncertain	31	29	-	-	2	-	-	7	24	28	3	Crushed; fragment; hammered
Meldreth	4	-	-	-	4	-	-	2	2	-	4	-
Faceted	2	1	-	-	1	-	-	1	1	1	1	Fragment; hammered
Total	**66**	**37**	**1**	**2**	**15**	**11**	**-**	**13**	**53**	**39**	**27**	
Palstave												
Late	2	-	-	1	1	-	-	-	2	-	2	-
Total	**2**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**2**	**-**	**2**	
Socketed gouge												
Class I	1	-	-	-	1	-	-	-	1	-	1	-
Total	1	-	-	-	1	-	-	-	1	-	1	
Socketed knife												
Thorndon	2	-	-	-	2	-	-	-	2	1	1	Bent (transverse); broken; crushed; hammered
Total	**2**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**2**	**1**	**1**	
Sword												
Ewart Park	4	3	1	-	-	-	-	-	4	3	1	Bent (transverse); broken; fragment
Possibly Ewart Park	8	8	-	-	-	-	-	1	7	8	-	Bent (transverse); blade edges removed; burnt; fragment

Carp's Tongue	1	1	-	-	-	-	-	-	1	1	-	Bent (transverse); fragment
St Nazaire	1	1	-	-	-	-	-	1	-	1	-	Fragment
Uncertain	8	8	-	-	-	-	-	4	4	8	-	Bent (transverse); broken (single and multi-piece); fragment; hammered
Total	**22**	**21**	**1**	**-**	**-**	**-**	**-**	**6**	**16**	**21**	**1**	
Chape												
Tongue-shaped	1	-	-	-	-	1	-	-	1	-	1	-
Total	**1**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**-**	**1**	
Spearheads												
Type 11	9	2	-	4	2	1	-	4	5	6	3	Bent (transverse); broken; cracked; crushed; fragment; hammered
Type 15A	5	5	-	-	-	-	-	1	4	5	-	Crushed; fragment; hammered
Type 13	1	1	-	-	-	-	-	-	1	1	-	Fragment; hammered
Uncertain	3	3	-	-	-	-	-	-	3	3	-	Fragment
Total	**18**	**11**	**-**	**4**	**2**	**1**	**-**	**5**	**13**	**15**	**3**	
Casting jet												
Casting jets (SW axes)	7	-	-	-	-	-	7	-	7	7	-	Broken
Other	8	-	-	-	-	-	8	-	8	8	-	Broken
Total	**15**	**-**	**-**	**-**	**-**	**-**	**15**	**-**	**15**	**15**		
Ingot												
Plano-convex	6	5	-	-	-	1	-	-	6	5	1	Burnt; fragment
Other	2	2	-	-	-	-	-	-	2	2	-	Fragment
Total	**8**	**7**	**-**	**-**	**-**	**1**	**-**	**-**	**8**	**7**	**1**	
Casting waste												
Total	**11**	**2**	**-**	**-**	**-**	**-**	**9**	**-**	**11**	**2**	**9**	Broken
Overall Total	**146**	**78**	**2**	**7**	**21**	**14**	**24**	**24**	**122**	**100**	**46**	

Fig.9.37: Various complete and broken axes from the Stogursey hoard (source: Author courtesy of SWHT(MS).

Fig.9.38: Spearhead pieces and fragments from the Stogursey hoard (source: Author courtesy of SWHT(MS).

Fig.9.39: Sword fragments from the Stogursey hoard (source: Author courtesy of SWHT(MS)

Fig.9.40: A fragment of Axe 1.3 alongside a fragment of an axe from the Stogursey hoard (source: Author courtesy of SWHT(MS).

Fig.9.41: A fragment of Spearhad 3.3 alongside a fragment of a spearhead from the Stogursey hoard (source: Author courtesy of SWHT(MS)

Table 9.6: A summary of the frequency different portions of socketed axe occur in the Stogursey hoard

Portion of socketed axe	No.
Cutting-edge	23
Body	6
Socket mouth	11

The infrequent occurrence of these axes types in South West England led McNeil to portray Stogursey as “a key hoard, drawing together influences from the North, South, East and West” (1973, 52), situating Stogursey as a coming together of several traditions.

This is emphasised by the South Welsh axes. 48 South Welsh axes are currently known from South West England of which thirteen (27%) are from the Stogursey hoard. However, this axe type is most common in south-east Wales where over 150 are known (Gwilt 2004). Only two hoards in Britain contain more South Welsh axes than Stogursey: the St Mellons and Cowbridge hoards, both Vale of Glamorgan, Wales (Lodwick and Gwilt 2002a; Stanton 1984). The number of South Welsh axes in the Stogursey hoard alongside its atypical nature in the South West and its proximity to the south coast of Wales indicates this hoard represents an intrusion from South Wales.

Furthermore, the character of complete and broken axes, spears, swords and casting debris is comparable with other South Wales hoards. The St Nicholas hoard, Vale of Glamorgan, for instance, contained 39 objects also including socketed axes, swords, spearheads, casting jets and ingot fragments (Gwilt n.d.). Hoards from Glascoed and Llangwm, both Monmouthshire, Llancarfan 1 and Tal-y-garn 2, both Vale of Glamorgan, display a similar character (Gwilt and Lodwick 2003a; 2005; Lodwick and Gwilt 2001; 2002b). Some of these hoards also demonstrate a deliberate selection of incomplete objects. Five cutting-edge and three socket mouth fragments can be observed in the St Nicholas hoard whilst five of the nine axes in the Tal-y-garn 1 hoard are represented only by the cutting-edge (Gwilt n.d.; Gwilt and Lodwick 2003b). The comparable character of the hoards from South East Wales further supports the notion that Stogursey is in fact a hoard of South East Wales tradition deposited in Somerset.

The Stogursey hoard could represent the actions of an individual or community that travelled from South Wales to Somerset, and clearly represents a regional variation of contemporary Ewart Park practices elsewhere e.g. in Cornwall and south-eastern England. The combination of casting material and as-cast objects could indicate that some artefacts may have been produced close to the depositional site meaning this hoard could represent a store of material. The deliberately damaged objects may indicate a functional reduction of material for the crucible and recasting (McNeil 1973; Pearce 1983, 244ff.) but this becomes difficult to reconcile alongside the complete objects and the seemingly deliberate selection of portions of objects for inclusion. Additionally, there is a combination of as-cast, worn and broken elements, representing the full cycle of production, use and destruction which could relate to the stages of object lifecycles (cf. Turner 2010a). Finally, if the hoard represents an imported tradition the destruction and deposition of the hoard may have been a process for linking, or perhaps severing, individuals and objects with the region from which they originated.

9.2.2e The Long Bredy Hoard, Dorset (DCM-F024)

The Long Bredy hoard was found while metal-detecting in 2009 and contains a spearhead, socketed gouge, razor and three sword pieces (Fig.9.42; Table 9.7; Knight 2016; Trevarthen 2009a; 2009b; 2009c; 2009d). The sword was deliberately bent and broken (Fig.9.43) and the tip of the razor was bent over (Fig.9.44); conversely, the socketed gouge is intact and damage on the spearhead is probably use-related. Both the spearhead and gouge retain a piece of wood in the sockets which may suggest they were deposited with broken hafts; this could have been the method for decommissioning these objects. Associated weapons and tools within a hoard is typical of the Ewart Park period though is uncommon within Dorset. Similarly, the character and low number of the objects is hard to parallel; hoards of this nature are typically larger such as the Cassiobridge Farm hoard, Hertfordshire (Coombs 1979).

The transverse bending associated with the Long Bredy sword indicates the sword was snapped while cold contrasting with the sword fragments in the hoards from Stogursey and Cornwall. The missing sword pieces again suggest a deliberate selection or removal though incomplete swords are a regular feature in Late Bronze Age hoards (Roberts *forthcoming*). This sword was possibly destined for recycling whilst the other pieces had already been remelted; this idea is weakened by the surviving shafts in the spearhead and socketed gouge as one cannot remelt an object that is still hafted. Furthermore, use-damage on the objects, particularly the sword and spearhead, indicates an object-history which may have garnered significance to the owner(s).

If one considers the potential functions of these objects, the combination of objects seems eclectic. The gouge, for instance, indicates crafts activities whilst the razor may have been used for personal grooming. Meanwhile, the sword and spearhead have martial connotations though the spear may also be linked to hunting. This hoard may represent a variety of aspects of an individual’s life expressed through a repertoire of material and thus Long Bredy hoard might have been the deposit of a single individual.

Fig.9.44: The Long Bredy hoard (source: Author courtesy of Dorset County Museum, hereafter DCM)

Table 9.7: A summary of the Long Bredy hoard, Dorset (DCM-F024)

Thesis No.	Object/Type	Completeness	Use-evidence	Deliberate Damage
DCM-F024a	Ewart Park sword hilt	0-25%	Bevelled edges	Broken (multi-piece); transverse bending (c.70°)
DCM-F024b	Ewart Park sword blade	0-25%	Bowed edges; notches	Broken (multi-piece); transverse bending (c.70°)
DCM-F024c	Ewart Park sword blade	0-25%	Bowed edges; notches	Broken (single piece)
DCM-F024d	Class III socketed gouge	100%	Hafting/riveting evidence; striations (sharpening/working)	None
DCM-F024e	Type 11a spearhead	76-99%	Bowing; hafting/riveting evidence; notches	None
DCM-F024f	Type Dowris razor, Variant II	76-99%	Hammering; uncertain	Tip transversely bent 115°

Fig.9.43: A side profile of the two refitting sword pieces from the Long Bredy hoard. The arrow indicates the breakage point (source: Author courtesy of DCM)

Fig.9.44: The bent razor from the Long Bredy hoard (source: Author courtesy of DCM)

The razor is a particularly interesting component. Firstly, the mottled green and brown corrosion that covers this object differs from the tan-brown patina that is observed on the other objects. Elsewhere, I have suggested this may be the result of a possible wrapping or covering of the razor creating differential corrosion or that this may represent a rediscovered older deposit (Knight 2016). Alternatively, the composition of the object may be sufficiently different to cause a difference in corrosion. This might be supported by the anomalous form of the razor. The razor is a Type Dowris, Variant II (following Jockenhövel 1980), defined by a plain, butterfly-esque v-notched blade. The distribution of this type falls exclusively within Ireland making the Long Bredy example the first in Britain. The intrusive nature of this type may mean it was produced from metal of a different origin to the rest of the assemblage hence the differential corrosion.

Furthermore, significance may have been attributed to the ‘foreign’ object and thus it was an important component of the deposit. Much like the intrusive nature of the Stogursey hoard or the pieces in the Cornwall assemblages the razor may have been owned by an individual who was not local, with the object having a symbolic status linking the deposit with another region. The anomalous nature of the hoard in Dorset may strengthen this theory.

Regardless, the destruction of the objects was seemingly an inherent part of the depositional process. The bending and breakage of the artefacts was probably achieved while the objects were cold; similarly, if the hafts of the spearhead and gouge were broken prior to deposition this could also have been achieved without heat. Thus, unlike the other Late Bronze Age hoards analysed so far, the Long Bredy assemblage does not imply the involvement of a fire and may have been undertaken for reasons beyond a functional storage of metalwork.

9.2.2f The Lulworth Hoard, Dorset (DCM-F024)

The Lulworth hoard (Fig.9.45; Table 9.8) was found in 1903 while digging in a field system for road metal (Pearce 1983, No.502) and dates to the Ewart Park phase. It is typically considered a ‘scrap hoard’ (e.g. Needham and Bowman 2005). The hoard was stored at Lulworth Castle which suffered fire-damage in 1929 (Oliver 1936, 28), which poses interpretive problems because some objects appear to be have been deliberately destroyed but this may be attributable to the fire. For instance, only the tip of a sword now survives but Oliver notes that “when found the sword was complete although the point was broken off” (ibid.). It is unclear whether the breakage was the result of recovery operations or ancient damage, which is confused further by the modern damage sustained through the fire.

Similar notes on the completeness before and after the fire were not made for the remaining objects; therefore, the current condition of the hoard cannot be considered exactly as it was deposited. The two spearheads are both broken, with one (DCM-F025c) having also been bent and crushed suggesting prehistoric destructive action (Fig.9.46).

Meanwhile, multiple incomplete decorated sheet plaques survive in nine fragments some of which refit (Fig.9.47). These pieces were possibly deliberately broken, but the thin nature of the objects means one cannot conclusively demonstrate they were not broken by accident especially as there are no associated marks such as tearing or bending. Folding and bending has been observed on the decorated plaques in hoards from Boughton Malherbe, Kent (Fig.9.48; Adams 2016, 52, Fig.9) and Cassiobridge Bridge Farm, Hertfordshire (Coombs 1979, 208, Fig.11.6), emphasising the uncertainty around the Lulworth examples. If these were deliberately broken it was likely achieved while hot though the complete condition of many of the rest of the objects may strengthen the idea that the plaques were deposited intact and broke during the Lulworth Castle fire.

Fig.9.45: Most of the Lulworth hoard, Dorset (source: Author courtesy of DCM)

Table 9.8: A summary of the Lulworth hoard, Dorset

Thesis No	Object/Type	Completeness	Use-evidence	Deliberate Damage
DCM-F025a	Carp's Tongue sword	0-25%	Bevelled edges, polished, striations (sharpening/working), tip sharp, uncertain	None
DCM-F025b	Type 11 spearhead	51-75%	Bevelled edges, casting material prepared/removed, dents, flattening, grinding, polished	Broken – single piece
DCM-F025c	Type 11 spearhead	0-25%	Uncertain	Bent (transverse), broken - single piece, crushed, hammered
DCM-F025d	South Welsh socketed axe	100%	Casting material prepared/removed, hammering, uncertain	None
DCM-F025e	Class I socketed gouge	100%	Casting material prepared/removed, chips, polished	None
DCM-F025f	Bugle-shaped object	26-50%	Polished	None
DCM-F025g	Wire finger ring	100%	Uncertain	None
DCM-F025h	Swan's neck pin	100%	Uncertain	None
DCM-F025i	Twisted wire bracelet	Uncertain	Uncertain	None
DCM-F025j	Wire	Uncertain	Uncertain	None
DCM-F025k	Sheet metal	Uncertain	Decorated, hammering, polished	None
DCM-F025l	Decorated plaque	Uncertain	Decorated, hammering, polished, uncertain	Broken (multi-piece)
DCM-F025m	Decorated plaque	Uncertain	Decorated, hammering, polished, uncertain	Broken (multi)
DCM-F025n	Decorated plaque	Uncertain	Decorated, hammering, polished, uncertain	Broken (multi)
DCM-F025o	Decorated plaque	Uncertain	Decorated, hammering, polished, uncertain	Broken - single piece
DCM-F025p	Casting jet	n/a	Casting/metallurgical waste	Broken - single piece
DCM-F025q	Disc-headed pin	100%	Uncertain	None
DCM-F025r	Class 3 flesh hook	100%	Uncertain	None

Fig.9.46: The crushed, bent and broken spearhead piece from the Lulworth hoard (source: Author courtesy of DCM)

Fig.9.47: The broken decorative plaques in the Lulworth hoard (source: Author courtesy of DCM)

Fig.9.48: A bent and broken plaque from the Boughton Malherbe hoard, Kent (source: Adams 2016, 52, Fig.9)

The objects in the hoard are typical of Ewart Park hoards but individual objects indicate the influence of other regions. Carp's Tongue swords and bugle-shaped objects, for instance, are typically recovered from South East England in Britain (Brandherm and Moskal-del hoyo 2014; Colquhoun and Burgess 1988, Fig.133). Meanwhile, flesh-hooks, indicative of feasting, are typically found in Britain in North Ireland/East Scotland and East Anglia (Needham and Bowman 2005); the Lulworth example is the only known example from South West England. Flesh-hooks are occasionally found in 'scrap' hoards whilst isolated complete finds are found in bogs or unique locations (ibid., 119, Table 3). The complete Lulworth flesh-hook is not indicative of scrap material and its presence in a region outside the normal distribution may have been significant. Atypical objects, such as the Carp's Tongue sword and the flesh-hook, would have held connotations for those who owned and deposited it. Much like Long Bredy, the character of the objects has various implications including personal ornamentation, warfare, feasting and craftworking. The largely complete nature of many of the objects with relatively limited evidence or inconclusive evidence of deliberate damage suggests that the typical interpretation of this hoard as scrappage cannot be taken absolutely, especially when compared with more 'typical' scrap hoards such as Stogursey.

However, like Stogursey, there is a combination of production material, used objects and destroyed artefacts which may again contribute to the notion of hoards as embodied representations of lifecycles. The decision to destroy only the spearheads and possibly the plaques may have related to more widely understood notions of how such objects should be treated.

9.2.2g Late Bronze Age Associated Finds and Hoards Summary

Clearly there was no single cohesive practice of the treatment of hoards across South West England. A closer study of the character of the objects, the destructive methods undertaken and an overall analysis of individual findspots has, however, identified regional trends such as the ingot-dominant hoards of the west, and how hoards might be viewed within their contemporary landscapes and in relation to broader traditions elsewhere. There was an influx of ideas and probably people into all areas of the South West which may have related to destructive practices. The combinations of complete, worn and damaged objects, often with a variety of connotations, mean simplistic definitions of 'scrap' hoards cannot be applied to this material. This analysis is furthered by consideration of the single finds.

9.2.3 Single Finds

Of the 206 Late Bronze Age single finds that were studied, 32 were deliberately destroyed and 54 were probably deliberately damaged; most of these objects were socketed axes, swords and casting material (e.g. ingots, casting jets) (Fig.9.49). By comparison, more object types are represented by those suffering non-deliberate damage or are otherwise intact (i.e. damage-ranked n/a, 0 or 1) including awls, beads, chisels, gouges, palstaves and pins as well as swords, spearheads and socketed axes. This suggests two possibilities:

1) only certain objects were subjected to destruction; or
2) the present methodology for identifying deliberate destruction is insufficient for conclusively determining deliberate damage.

The latter may be possible due to the limited experimental work that has so far been conducted on many object types (e.g. awls, chisels and gouges) though 42 of the 56 objects showing non-deliberate damage also had signs of use-wear which likely contributed to the damage sustained (e.g. a bent tang or

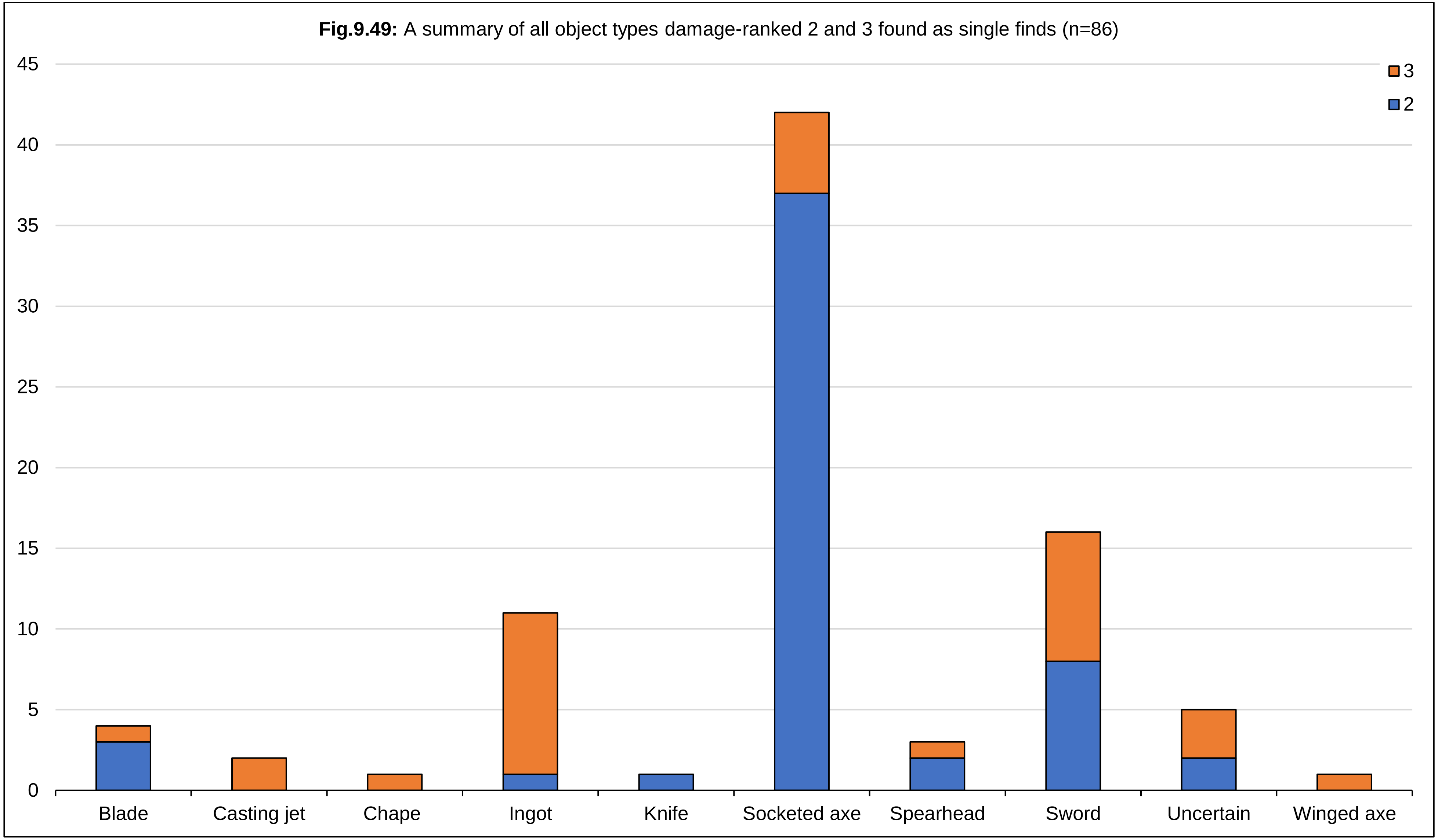


Fig.9.49: A summary of all object types damage-ranked 2 and 3 found as single finds (n=86)
0
5
10
15
20
25
30
35
40
45
3
2
Blade
Casting jet
Chape
Ingot
Knife
Socketed axe
Spearhead
Sword
Uncertain
Winged axe

damaged cutting-edge). Meanwhile, 48 objects had no damage at all; therefore, the second proposition can be discounted. The former supposition is, conversely, supported by the overall trend already presented for the Late Bronze Age (Fig.9.4), which shows that swords, socketed axes and ingots in hoards are overall more often deliberately destroyed. Therefore, the damage on single finds accords with the overall character of the Late Bronze Age.

Dorset has the greatest number of objects showing intentional damage and there has been a relatively consistent discovery of objects across the other three counties (Fig.9.50). Dorset has the lowest *proportion* of deliberately damaged objects, whilst single finds in Devon and Cornwall are more often damaged (Fig.9.51), indicating the practice of damaging objects prior to deposition was more prevalent in the western areas.

Fig.9.50: Late Bronze Age single finds damage-ranked 2 or 3 divided by county (n=86)

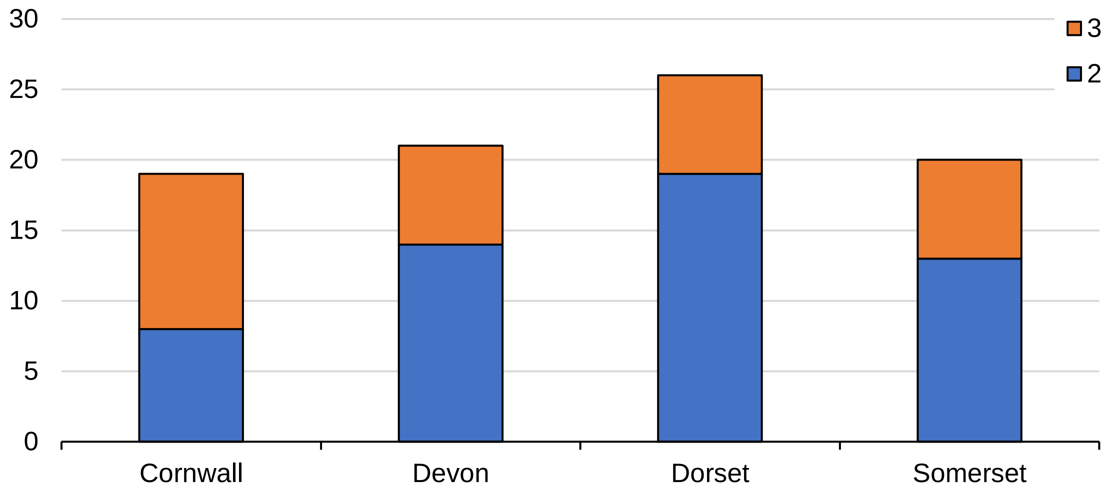
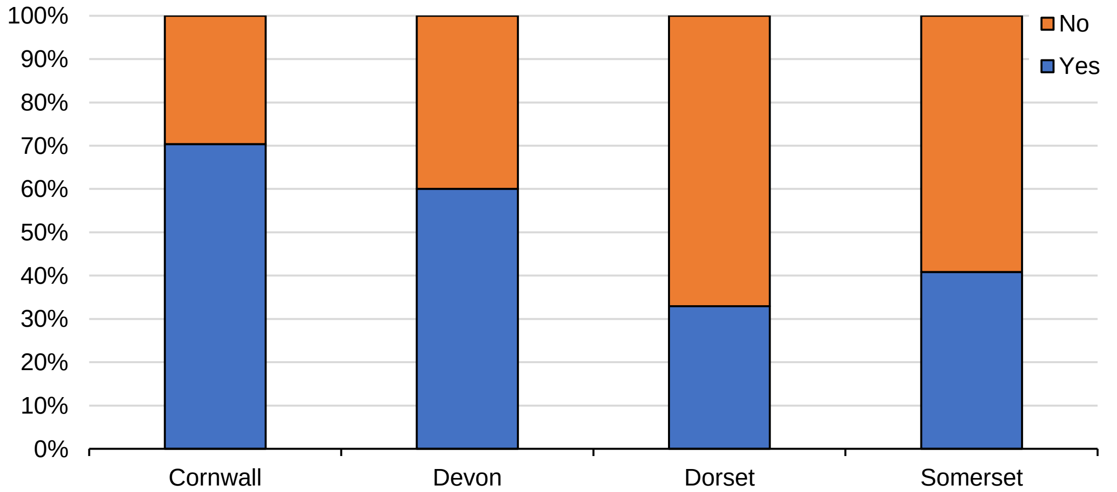


Fig.9.51: A proportional analysis of single finds showing signs of deliberate destruction (Yes) against those that do not (No) divided by county



The damaged single finds studied offered the opportunity to identify trends in the levels of completeness or portions of objects recovered. The advantage of this analysis is that one can assess the most commonly recovered portions of damaged objects which might then be compared with objects from a known context (e.g. a hoard) to assess the likelihood that such finds are the result of intentional selection rather than accidental loss. This has the potential to be applied to a broader range of finds beyond the South West which can inform the identification of deliberate practices linked to single finds. For this, only the object types most frequently encountered as damaged single finds will be considered (i.e. ingots, socketed axes and swords) as these are the forms which plausibly offer a representative sample.

Three explanations can be posited for why certain portions of objects might be more commonly encountered in the archaeological data:

1) Certain portions of objects may not be as recognisable as others and may thus not be identified or recovered by inexperienced finders;
2) Some object elements may constitute a greater proportion of the object, and thus are statistically more likely to occur in the archaeological record (e.g. sword blades vs sword hilts); or
3) There was a deliberate selection of certain elements for deposition.

Each of these will be assessed for the individual object types.

Firstly, ingots have been divided into edge and central pieces/fragments. Due to the typically round, plano-convex form, it is difficult to divide ingots into anything more complex. This simplified approach, however, allows a general overview to be achieved. Equal numbers of edge and non-edge fragments of ingot suggests no significance was attributed to the portions deposited (Fig.9.52). The issue of recognition and recovery is difficult to assess; it is uncertain whether amorphous lumps of ingots would be recognised as prehistoric; even if they were, antiquarian reports indicate that much was destroyed upon discovery. The surviving single finds are likely a poor representation of the original archaeological record as indicated by the eight examples that have been recorded through the PAS since 1997, coupled with those identified in hoards. The ingot-dominant hoards of Cornwall and Devon are matched in the greater number of single ingot finds in these areas (Fig.9.53).

Fig.9.52: A summary of the frequency of portions of ingots found as single finds (n=12)

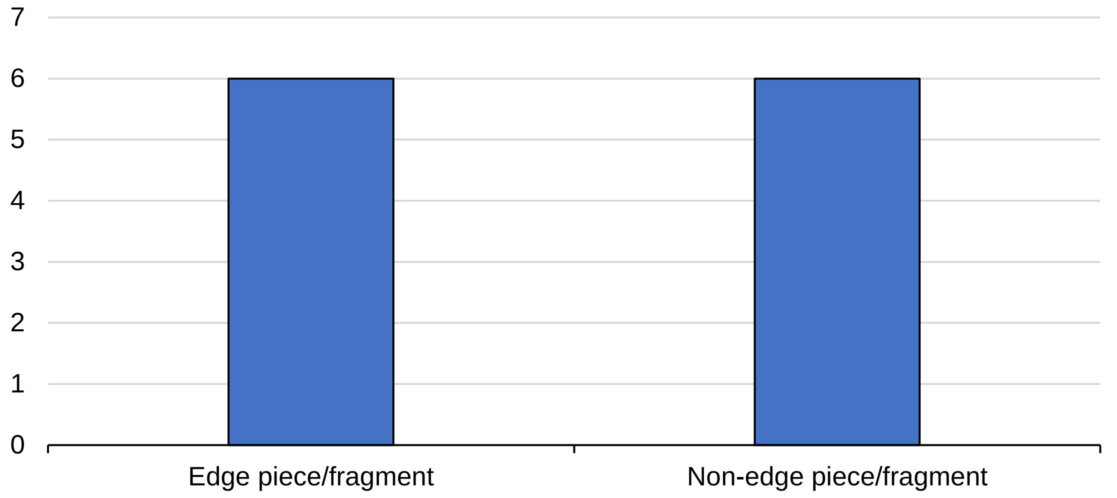
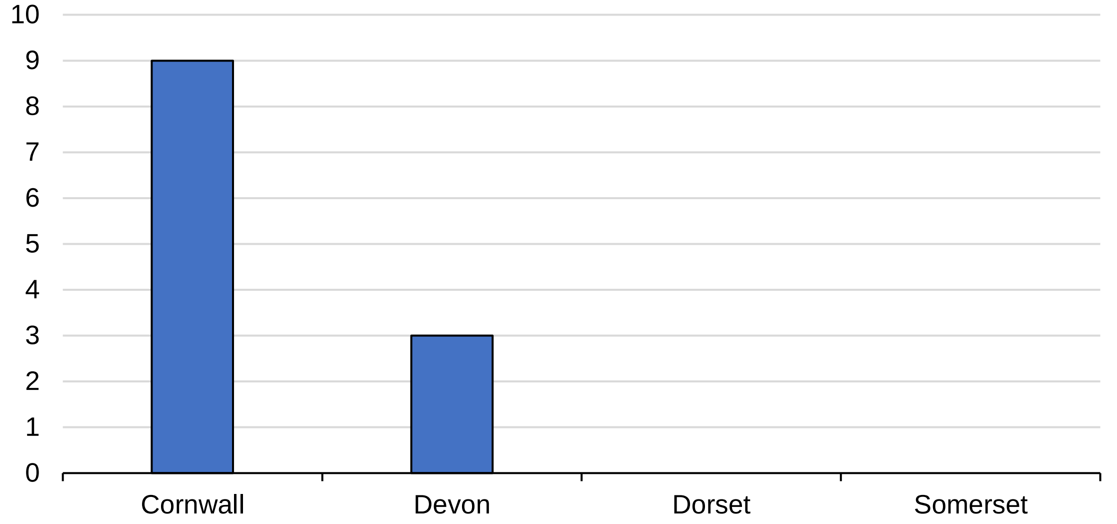


Fig.9.53: Single finds of ingots divided by county (n=12)



In both counties single finds are found in similar locations to hoards, namely river valleys in Devon and coastlines in Cornwall (Fig.9.54). The only non-coastal findspot in Cornwall is situated on a hilltop at the confluence of several tributaries forming the main waterway of the River Helford. That single finds may have been treated and deposited similarly to hoarded objects is furthered below by analyses of the damaged swords and socketed axes.

A sword consists of three key recognisable portions i.e. hilt, blade and tip. This could be refined further (e.g. hilt terminal, shoulders, upper/lower blade etc.) but such a resolution may render any analysis too precise for useful conclusions to be drawn. These categories should not, however, be taken to imply that complete hilts or blades are being recovered; almost all instances are represented by 0-25% of the original object.

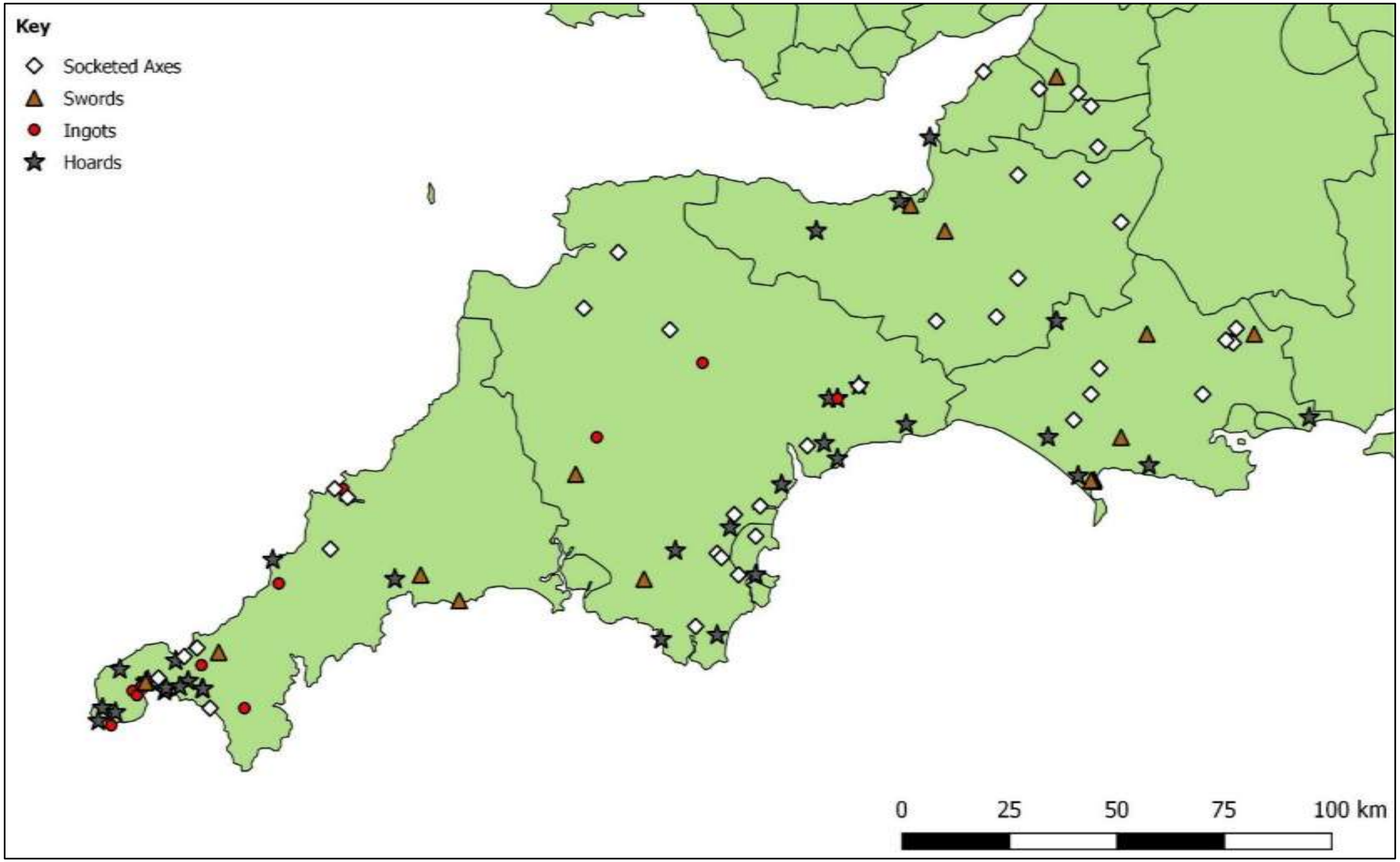


Fig.9.54: Late Bronze Age hoards and single finds of deliberately broken ingots, swords, and axes in South West England (source: Author using QGIS and OS data from EDINA Digimap).

Figure 9.55 shows that sword blades are overwhelmingly found more commonly than other portions of deliberately damaged swords. The first explanation given above can be discounted; mid-blade fragments are arguably the least recognisable portion of a sword essentially comprising a small rectangular piece of copper alloy. Conversely, the second explanation may be the most suitable due to the numerous blade pieces/fragments produced during fragmentation of a sword (e.g. potentially up to ten depending on the length of the sword and extent of fragmentation); therefore, it is more likely that mid-blade fragments should be found rather than hilt or tip pieces of which there would be fewer fragments. Over time there will inevitably be a greater number of mid-blade fragments entering the archaeological record.

Finally, mid-blade fragments of swords were possibly deliberate selected for deposition as single finds. These fragments can only be produced by the deliberate reduction of a complete sword, perhaps for fitting within a crucible; therefore, they may be the most susceptible to loss. However, mid-blade fragments are common components of larger hoards with hilts and tips occurring comparatively infrequently in South West England.

The most effective way of assessing the likelihood of these single finds as deliberate deposits over accidental loss is to again consider their landscape locations (Table 9.9). Almost all the artefacts over 26% complete were recovered from wetland locations where single finds of swords are commonly deposited (York 2002). Meanwhile, there is a link between individual fragments and hilltops, coastal, and riverine locations.

Fig.9.55: A summary of the portions of swords found as single finds (n=16)

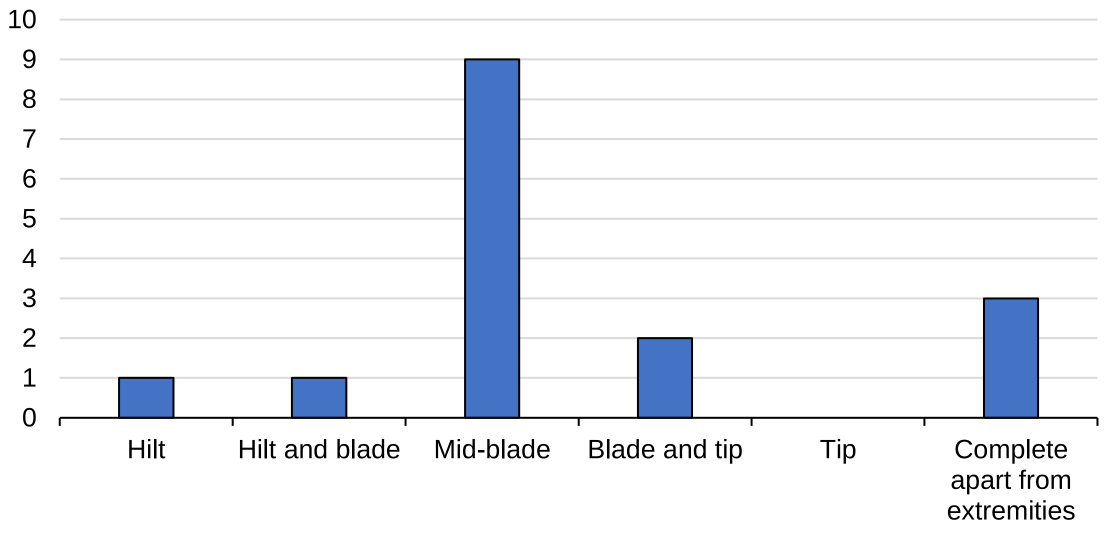


Table 9.9: A summary of all single finds of swords in South West England

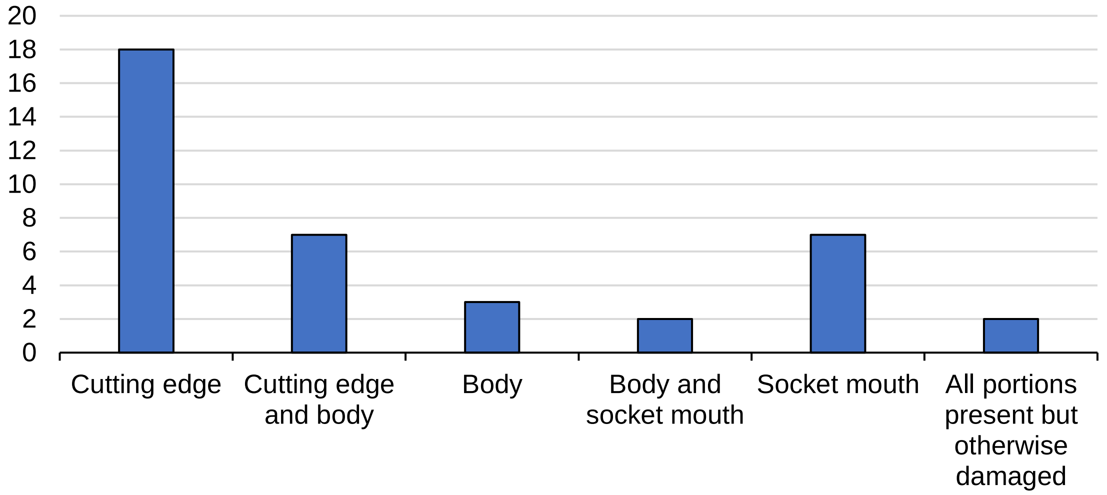
Thesis No.	Findspot	Sword portion	Completeness	Location
BCMAG-F005	Bristol Bridge, Bath Street, Bristol	Tip and lower blade	26-50%	Close to, possible in, the River Avon
BM-F017	Cranborne II, Dorset	Complete apart from one shoulder tip	76-99%	Uncertain, possibly wetland
DCM-F040	Westham Bridge, Weymouth Dorset	Complete, apart from hilt terminal.	76-99%	River bed
DCM-F044	Weymouth Backwater, Dorset	Mostly complete but missing hilt and tip	76-99%	River bed
PCMAG-F001	Brent Tor, Devon	Hilt, shoulders and upper blade	26-50%	Volcanic outcrop on Dartmoor
SM-F007	Weymouth II, Dorset	Lower blade and tip	26-50%	Uncertain, possibly wetland
PAS-F005	Camborne II, Cornwall	Mid-blade fragment	0-25%	Uncertain
PAS-F014a	Madron II, Cornwall	Shoulder fragment	0-25%	Hill overlooking confluence of two streams and coast
PAS-F014b	Madron II, Cornwall	Mid-blade fragment	0-25%	Hill overlooking confluence of two streams and coast
PAS-F027	Polperro, Cornwall	Mid-blade fragment	0-25%	Hill overlooking estuary/coast
PAS-F040	St Winnow, Cornwall	Mid-blade fragment	0-25%	Overlooking River Fowey estuary
PAS-F064	Holne, Devon	Mid-blade fragment	0-25%	Hill in Dartmoor overlooking the River Dart
PAS-F138	Okeford Fitzpaine, Dorset	Mid-blade fragment	0-25%	Hillslope in River Stour valley
PAS-F166	West Knighton	Mid-blade fragment	0-25%	Hill overlooking River Frome
PAS-F201	Chedzoy II, Somerset	Mid-blade fragment	0-25%	Uncertain
PAS-F237	Otterhampton I, Somerset	Mid-blade fragment	0-25%	Near marshlands, close to the coast

Although this could represent the locations in which metal-detectorists are exploring, it is borne out by the similar nature of the hoard findspots (Table 9.3) suggesting that these fragments are being deposited in similar locations. Single finds may thus have similar connotations to larger accumulations of material (cf. Becker 2013).

Forty single finds of socketed axes with signs of intentional damage have been studied. Socketed axes can be divided into three main components: cutting-edge/lower blade (i.e. below the internal socket aperture); body; and socket mouth (i.e. the rim and collar). Again, portions represented should not necessarily be taken as complete. In two instances, all portions of an axe survive but it is otherwise damaged (TOT-F001; PAS-F261). Cutting-edges are most commonly found as single finds (Fig.9.56) which could be related to recognition factors; cutting-edges are arguably more recognisable and thus more likely to be recovered than body or socket mouth fragments.

The second explanation proffered above is not supported by the represented portions of socketed axes. The experimental activities demonstrated that hot fragmentation of an axe likely produced multiple fragments of the body and socket mouth, whilst the density of the cutting-edge makes it more likely to survive as a single piece. The potentially extreme fragmentation may have caused smaller fragments to be lost and cutting-edge fragments more likely to be retained; these might therefore have been deliberately selected for deposition following fragmentation. This was discussed for the Stogursey axes, where the cutting-edge fragments

Fig.9.56: A summary of the portions of socketed axes found as single finds (n=39)

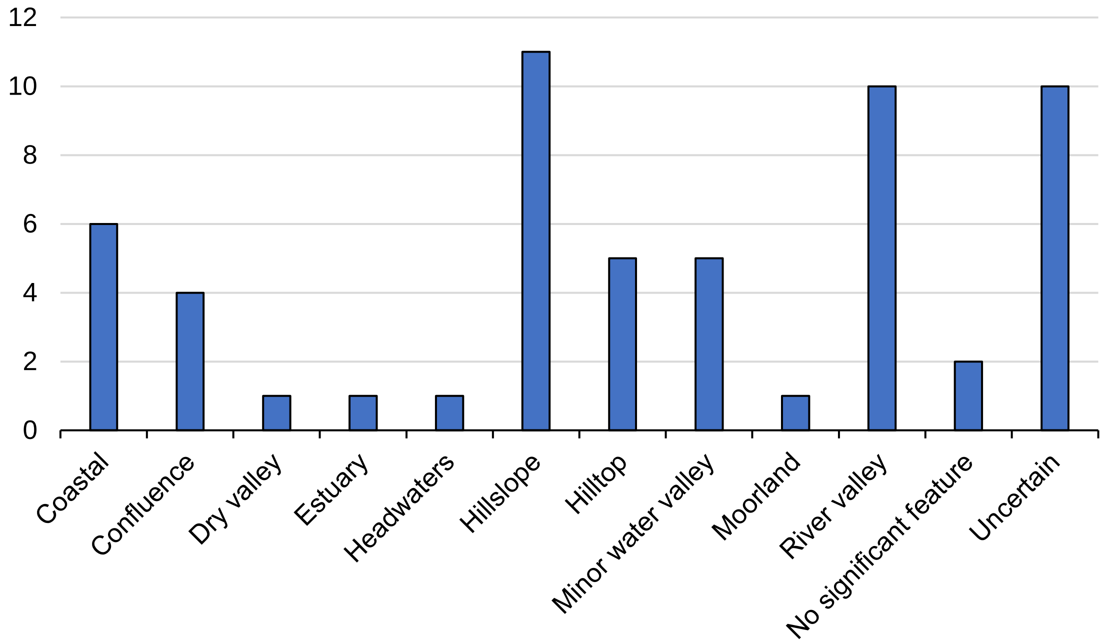


represented a greater minimum number of socketed axes than the other portions.

The depositional locations again are predominantly high locations and demonstrate a relationship with waterways often deposited in valleys (Fig.9.57). Three of the axes, for instance, were found in the River Frome valley and three findspots overlooked the River Avon. The former depositional area is strengthened by sword fragments that have also been found in the Frome valley. Only six single axes were found in coastal locations, all from Cornwall where coastal depositions were frequent. This suggests different regions deposited objects in different locations. More importantly, it infers that the single finds of deliberately damaged objects are not located randomly and cannot be readily attributed to accidental loss.

The reduction of swords and axes to small fragments alongside the spread of ingots may imply destruction of single finds related to a functionalist aspect (e.g. to fit in a crucible), particularly in Devon and Cornwall. However, that so many of the deliberately damaged objects show a cohesive placement in landscape, typically in view of a waterway, suggests an understanding about where such objects should be placed. These objects may have been remnants of functionalist practices that necessitated a token deposit in these locations.

Fig.9.57: Single finds of Late Bronze Age socketed axes in South West England divided by findspot location (n=57)



9.2.4 Occupational Contexts and Scatters

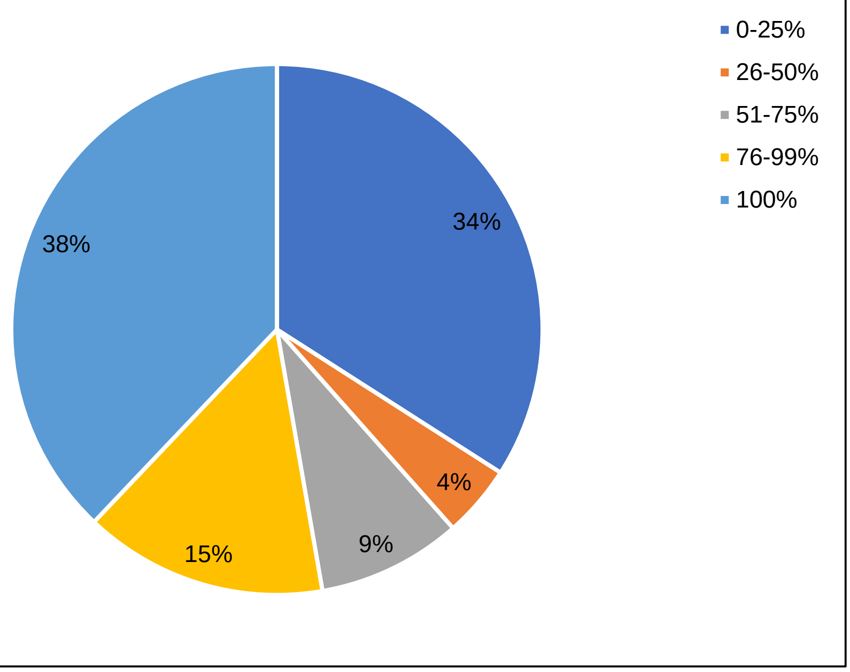
Overall, 208 metal objects were studied from 26 occupational contexts and scatters; 59 artefacts were damage-ranked 2 or 3 across fifteen findspots, typically found on the same sites from which accidentally damaged and intact objects had been recovered. Many of the objects lack a detailed context other than that they were recovered from an ‘occupational layer’ and, in the case of the scattered objects, the context is implied from the collective association. However, metalwork is rarely recovered in isolation and can thus also be contextualised by other material such as stone, bone and ceramic objects.

Occupational contexts and scatters are grouped together here as they form a cohesive group in the general types and conditions of objects found. Moreover, 58 objects are from the combined category “occupational scatters” but only nine objects are considered solely from occupational contexts (e.g. the objects from Kenidjack Castle; RCM-F018).

Objects are typically either found largely complete or fragmented (Fig.9.58). All objects damage-ranked 3 have suffered breakage or fragmentation associated with other damage including bending, crushing and folding (Fig.9.59). This applies to copper alloy and gold objects (Fig.9.60). Most objects are casting jets and ingots but a range of object types can be observed and when objects damage-ranked 2 are included socketed axes become prominent.

Casting waste and ceramic refractory fragments were found at several occupational sites whilst also forming part of the scattered material (Table 9.10). The treatment of this material after fragmentation (i.e. largely deposited in pits) and its associated material is significant for indicating how such material was viewed. The association of slag and metallurgical waste with the refractories found at Higher Besore, Stoneycombe Quarry and Everley Water Meadow, for instance, could indicate that these were deposits of waste. The objects could no longer be used and were consequently buried. Almost all deposits of Late Bronze Age metalwork in closed contexts are waste products whilst other objects are typically found loose in occupational layers or scatters.

Fig.9.58: The completeness of Late Bronze Age metalwork found in occupational contexts and scatters (n=182)



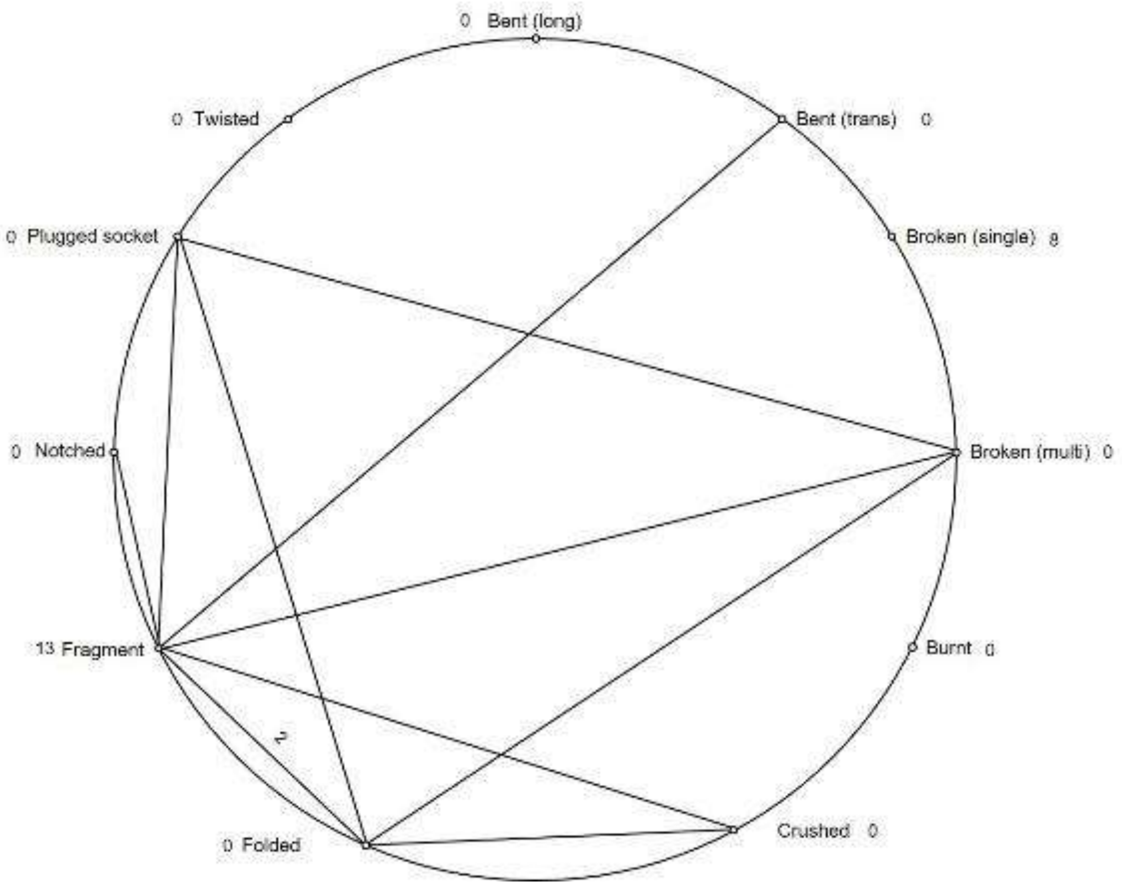
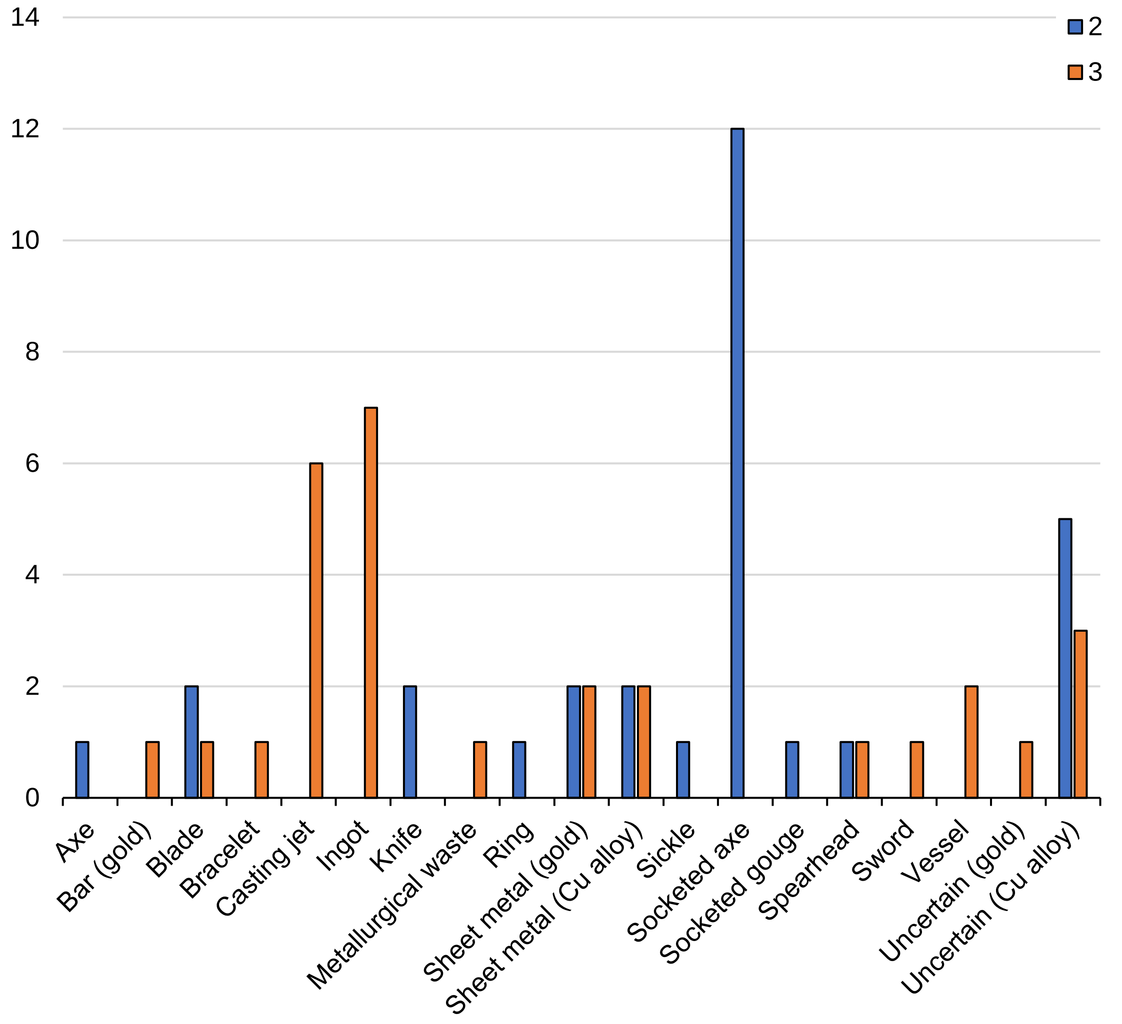


Fig.9.59: Associations of destruction indicators across objects from Late Bronze Age occupational contexts and scatters. Numbers next to destruction indicators refer to the number of times these indicators occur in isolation. Unless noted, each line represents one association.

Fig.9.60: The frequency of object types damage-ranked 2 or 3 in Late Bronze Age occupational contexts and scatters (n=54)



It is possible this view is too functionalist. The mixture of stone, clay and metal waste material rarely represents an entire process, i.e. it is rare to find all pieces of a mould or complete metalworking tools. It may be that certain parts of objects were deposited and others were reused or recycled into other objects in much the same way that pure metalwork hoards often comprise incomplete objects. Brück (2016) highlighted the transformative process of metal production linked with moulds suggesting they gained significance through involvement with the process.

Deliberately damaged ingots and casting jets were largely retrieved from scatter sites, which may indicate evidence of ephemeral occupation. Four ingot fragments were recovered from the cave scatter at Kent's Cavern, Devon (Fig.9.61; TOR-F010e-h), alongside a variety of other material indicating craft processes including bone and stone spindle whorls, fragments of pottery and amber beads (Pearce 1974a).

Table 9.10: A summary of casting waste material from occupational contexts and scatters in South West England

Site	County	Character of the site	Material	Depositional Context	Reference
Gwithian	Cornwall	Multi-period occupation site	4 fragments of clay mould	2 from general occupation layer; 2 with no context	Needham in Nowakowski 2007b, 66
Higher Besore	Cornwall	Four LBA posthole structures	Clay sword mould; whetstone fragments; slag	In pit [6500] alongside 56 pottery sherds	Gossip 2005, 16; *forthcoming*, 5-7
Kenidjack Castle	Cornwall	Small square hut outside promontory hillfort	Lumps of metal waste	Found in hut; M-LBA metalwork also found nearby	Pearce 1983, No.72
Tremough	Cornwall	Ditched enclosure containing pits and posthole structures	1 clay mould fragment for the tip of a blade; 15 fragments of possible moulds	Found in various pits	Jones et al. 2015
Trevalga	Cornwall	Roundhouse	Stone razor mould	In occupational layer (Deposit 107) with pottery sherds and worked flint	Gossip 2011; Jones and Quinnell 2011, 223
Trevisker Round	Cornwall	Two circular structures	Waste metal; cassiterite pebble	Waste metal found in posthole of a structure	ApSimon and Greenfield 1972
Dean Moor	Devon	Nine stone huts in enclosed settlement	Lump of tin ore and tin slag	Found associated with huts	Fox 1957; Knight 2014b
Mount Batten	Devon	Scatter	Metallurgical waste	General scatter with fragmented metalwork	Knight et al. 2015, No.158x
Stoneycombe Quarry (Dainton)	Devon	Occupation site and field system	43 clay fragments of 3 crucibles; 150+ mould fragments for swords, spearheads and possible rings	Mould and crucible fragments found in and around a pit near LBA pot fragments	Needham 1980a; Pearce 1983, 445-446
Bestwall Quarry	Dorset	Three 'farmsteads' consisting of seven structures and associated field systems	2 crucible and 3 mould fragments	1 crucible fragment from a pit; remaining material from another pit	Ladle and Woodward 2009; Needham and Woodward 2009
Everley Meadow	Dorset	Gully near a possible burnt mound	Fragments of a copper ingot, stone axe mould and clay plug	In a gully	Mercer 1985

Gussage St Michael 2 and Gussage St Michael 5	Dorset	Scatter	Metallurgical waste, casting jets	Scattered across two fields along with over 100 pieces of metalwork	Appendix A: PRIV-F019; PRIV-F035
Poundbury	Dorset	Ditched and palisaded enclosure with posthole structures	Possible crucible fragment	Occupation layer	Skowranek 2012, 105
Cadbury Castle	Somerset	Hillfort; limited evidence for round structures, fencelines and banks	Metallurgical waste	General scatter; c.44 pieces of metalwork also recovered on site	Appendix A: TTNCM-F007; Barrett et al. 2000
Norton Fitzwarren	Somerset	Enclosure ditch	c.70 clay mould fragments for swords	In a pit within the ditch	Ellis 1989; Needham 1989b
Sigwells	Somerset	Enclosure ditch and posthole structure	117 clay mould fragments for a minimum of 8 objects	Largely associated with structure	Knight et al. 2015, No.428b; Skowranek 2012, 109

Fig.9.61: Metalwork from the Kent's Cavern cave scatter, Devon (TOR-F010) (source: Author courtesy of Torquay Museum)

Meanwhile, three ingot pieces were found associated near a socketed axe at Gillan, Cornwall (Fig.9.62; RCM-F012), possibly indicating metalworking was undertaken nearby. Considering the other deposits from Devon and Cornwall the ingots may have been intentional deposits which is strengthened by the coastal location of both sites.

The remaining waste material, including fragments of gold and copper alloy sheet and five casting jets, was recovered from across two fields at Gussage St Michael, Dorset (PRIV-F019; PRIV-F035). Approximately 117 Late Bronze Age objects have been found from a series of fields in this area (PRIV-F013-F022, F025-F031, F033, F035-F037, F040-F041) alongside 610g of casting waste (PRIV-F019n4). The scattered material remains and character of the material, including small and deliberately damaged objects, suggests this might represent a midden or metalworking site; however, no associated context (e.g. a pit or hearth remains) has been identified. A small fragment of a stone axe mould was recovered from the Gussage Cow Down 5 II site nearby (PRIV-F015) strengthening the metalworking theory though no other recognisable refractories (e.g. crucibles) have yet been found. A possible Late Bronze Age enclosure was identified to the north of the main cluster of material at Gussage

Fig.9.62: A socketed axe and three ingots from Gillan, Cornwall (source: Author courtesy of RCM)

St Michael; a small section has been excavated from which Late Bronze Age pottery was recovered (Martin Green pers.comm. 2017). This could suggest a segregation of metalworking practices from occupational areas (cf. Knight 2014b).

However, deposits were also important social practices that may have acted as expressions of broader understandings. Two interlinked gold bracelets and a gold fragment were found at the Brean Down midden site (Fig.9.63; TTNCM-F005) possibly deposited in a ditch (Bell 1990, 6). Several pieces of pottery, bone and shell were found nearby and a ceramic rim sherd was associated with the bracelets (ibid.). Both bracelets were complete though the fragment had been deliberately clipped and broken on three edges. Bell (1990, 72) suggested this deposit may have been a dedicatory deposit aimed to establish boundaries or alternatively a ‘founder’s hoard’ as indicated by the gold fragment. However, the associated rim sherd suggests this is less likely.

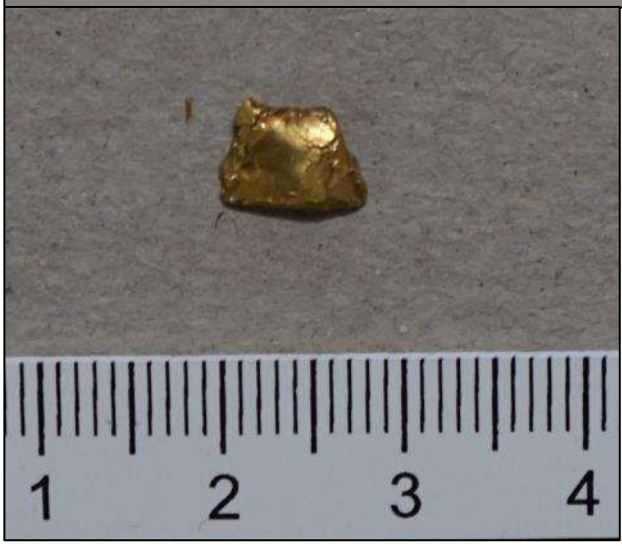


Fig.9.63: The Brean Down gold bracelet hoard (source: Author courtesy of SWHT(MS)

It is worth recalling the various fragmentary material deposited in the ditches at Milsoms Corner for a possibly symbolic reason. Scattered damaged copper alloy metalwork has also been recovered at Brean Down (TTNCM-F006) contrasting the specific association involved in linking the gold bracelets together. The bracelet association can be compared with other deposits of gold bracelets such as two interlinked ‘neck-rings’ at Chickerell, Dorset, possibly found within an enclosure (PAS-F109; P.J. Woodward 2000). Uncertain gold fragments were recovered from Gussage St Michael, one of which had been folded around another fragment (Fig.9.64; PRIV-F035a), whilst fragments of a deliberately chiselled gold bar (Fig.9.65) and a broken gold bracelet terminal were found at Cadbury Castle (TTNCM-F007a, c). The gold sheet fragments might indicate metalworking on site whilst complete gold bracelets may be linked with other processes, e.g. depositions as a way of managing the landscape.

None of the Late Bronze Age bronze objects studied during this thesis have been found in closed deposits in occupational contexts. However, of the unstudied objects, a complete socketed gouge with remnants of a haft was deposited tip up in a pit at the centre of the entrance to one of the roundhouses

Fig.9.64: Two gold fragments from Gussage St Michael 5 (source: Author courtesy of Martin Green)

Fig.9.65: A chiselled gold bar from Cadbury Castle (source: Author courtesy of South West Heritage Trust (Museums Trust)

at Bestwall Quarry, Dorset (Ladle and Woodward 2009); this was possibly part of a closing deposit for the abandonment of this building (ibid., 374).

Interpreting other metalwork is made problematic by either the lack of contemporary structures (e.g. Mount Batten; PCMAG-F004) or the conflation of periods by reoccupation at later dates (e.g. Cadbury Castle and Ham Hill; TTNCM-F007; TTNCM-F020). Much of the Bronze Age metalwork found at Cadbury Castle, for instance, was found within Iron Age and Roman contexts during the site's later occupation (O'Connor 1994). The objects thus represent rediscovered deposits and any treatment of the objects cannot be conclusively dated as a Late Bronze Age practice.

At Greylake, Somerset, a deliberately crushed, burnt and broken socketed axe (Fig.9.66; TTNCM-F019) was possibly associated with a timber platform. Deformation of the surface of the axehead indicates it was heated to a high temperature to break and crush it also causing grey, charred corrosion. Greylake is an area of low lying marshland in King's Sedgemoor drain and the deposition in a watery location recalls the Bloody Pool hoard. The timber platform was associated with twelve fragments of Late Bronze Age pottery, two sheep jaw bones and two human bones (Brunning 1997; 1998) indicating a focal area for deposition. Only broken and incomplete objects were found. Although the socketed axe cannot be definitively associated with material, the felling date of timber in the platform was c.900 BC making the axe and the platform contemporary. This is one of few cases in South West England where fragmented metalwork is possibly associated with a burial situation. No occupational evidence was identified, but clearly this was an activity area where

Fig.9.66: A burnt, broken and crushed socketed axe from Greylake, Somerset (source: Author courtesy of South West Heritage Trust (Museums Trust)

the fragmentation of objects was significant. Other metalwork depositions associated with human remains, wooden trackways and wetland locations were listed by Brück (1995, 276-277, Category H) demonstrating that the Greylake site accords with a broader tradition seen across southern Britain.

The destruction and deposition of other materials at occupational contexts is prolific. The fragmentary mould material at Norton Fitzwarren was deposited in a pit with fragmentary ceramic jars located near the entrance of the enclosure (Needham 1989b) which is comparable to the deposit of fragmentary material in ditch terminals at Springfield Lyons, Essex (Brown and Medlycott 2013). Brück (2016) interpreted the Springfield Lyons deposits as a means for delineating social spaces at entranceways; the Norton Fitzwarren deposits may have acted similarly (cf. Needham and Bridgford 2013, 72). Meanwhile, at Eldon’s Seat, Dorset, a group of pot sherds, refitting to form three complete vessels, and six other ceramic fragments were found in a pit within huts 2 and 3 (Cunliffe and Phillipson 1969, 199; Woodward 2009, 265); these were unweathered and probably deliberately broken for deposition. Roundhouses at

Eldon's Seat were repeatedly rebuilt and the deposit may have been linked to a reconstruction phase. Similarly, three vessels had been broken and "crushed" *in situ* in three separate pit and gully contexts at Brean Down (Bell 1990, 70). This juxtaposes the complete gold bracelets. At Bestwall Quarry, fragments of Late Bronze Age pots were deposited across a series of pits close to the roundhouses, some also containing burnt material (Woodward 2009, 247ff.). Outside the South West, Brück (2007, 29-30) suggested that various pottery sherds deposited in two pits at Broom Quarry, Bedfordshire, may represent the deliberate destruction of a household's inventory linked with abandonment of a roundhouse. It is therefore important to consider that the various fragmented ceramics linked with Late Bronze Age occupation contexts in South West England may not only represent refuse but also deliberately constructed deposits that were part of a series of social practices (cf. Hill 1995; Woodward 2009, 262ff.). Meanwhile, Late Bronze Age pits at Higher Besore Truro College, Cornwall, contained numerous stone tools including mullers, rubbers and saddle querns in various states of use and re-use produced from different materials and, in the case of the querns, fragmented (Gossip *forthcoming*; Watts 2014, 90ff.). Some were also associated with sherds of pottery. These deposits have again been linked with abandonment processes with the breakage of querns seemingly an integral component (Watts 2014). Clearly, deliberate destruction at occupational sites cannot be considered solely in terms of metalwork. Many of the depositional processes in South West England involve non-metal artefacts and it is striking to note that the pits and deposits of deliberately destroyed ceramics and stonework vastly outweigh the structured deposits of metal objects. This pattern has already been raised for the Middle Bronze Age and clearly continues into the later period.

Much of the deliberately destroyed metalwork that could be analysed represented casting waste often recovered from scatters. Structured metalwork deposits typically comprise complete objects (e.g. the Brean Down bracelets) suggesting a segregation of how different material was viewed and treated within settlements, though fragmentation of associated material may have also been important. Finally, metalwork destruction did have a role to play at some activity sites as indicated by the Greylake axe but this was part of a wider practice that involved the fragmentation and deposition of other materials and was seemingly not widespread in South West England.

9.2.5 Late Bronze Age Summary

This analysis of deliberate destruction in the Late Bronze Age divided case studies into broad depositional practices to elucidate differences and patterns in the data. An assessment of the topography and geographic features demonstrated different practices were linked with destruction in different areas influenced by the surrounding landscape. For instance, many deposits in Cornwall were in coastal locations; this conclusion was used to strengthen ideas about how one might view single finds. Many deliberately damaged single finds were treated similarly to hoarded objects, and deposited in similar topographic locations, indicating these were probably deliberate deposits rather than accidental losses.

Furthermore, the character and treatment of metalwork was paralleled with other regions to link the South West with contemporary sites elsewhere. The Stogursey hoard appeared anomalous in the context of other Somerset hoards, for instance, but can be closely linked with the hoards in south-east Wales, inferring the movement of ideas and people into the region from other areas. Meanwhile, ingot-dominant hoards in Devon and Cornwall are likely linked with influences from north-western France.

The experimental activities allowed new perspectives to be gained on Late Bronze Age practices on the combinations of processes that might be viewed (e.g. cold vs hot breakages) and the possibly functionalist aspects as well as the impact this may have had on the ceremonial elements of deposits.

Finally, the role of metalwork destruction in occupational contexts has been explored. There is limited evidence for deliberate deposition associated with fragmented metalwork and it is likely from the high amount of casting debris and lack of associated contexts that much of this was refuse or lost material representing temporary activities. At occupation sites the deliberate breakage and selection of non-metal objects seems to have been a more important process though objects linked with metalworking still formed key deposits. These various insights have been broadly put into the perspective of other sites and although some key theories have been alluded to, a discussion of how these practices might be interpreted forms the focus of Chapter 10.

9.3 Earliest Iron Age

Deliberate destruction of metalwork largely ceases in the Earliest Iron Age (the Llyn Fawr phase 800-600 BC) making it an important juxtaposition to the preceding period. The data is comparatively more limited and thus it is only given brief attention here. Fifty-one metal objects were studied as part of this thesis, of which only one was probably deliberately destroyed: an upper body and socket rim piece of socketed axe from Hemington (PAS-F215). The pattern of fragmentation suggests it may have been broken while hot. Alternatively, many objects from this period had a brittle metallurgical composition (namely high tin and lead components) which made them prone to breaking.

This is particularly evident in hoards from Blandford Forum, Portland, Thorney Down, and Tincleton, all Dorset (BM-F010; BM-F023; DCM-F037; DCM-F038) where high tin compositions have caused a silvery appearance to the axes and gouges as well as making the objects prone to fracturing (Fig.9.67). The Langton Matravers hoard similarly consists of large numbers of brittle axes. In total, 373 complete and broken socketed axes were found with 404 fragments deposited in four pits with further breakage having occurred upon recovery (Roberts et al. 2015). Clay cores survived in many axes, and high tin and lead percentages suggest that the axes were never intended for use and may have been produced solely for deposition (ibid.). Breakage observed on these objects is thus difficult to interpret; many probably broke as they were removed from the mould but their as-cast state is clearly part of their form and the breakage may also have played a part in this.

Fig.9.67: The Tincleton hoard (source: Author courtesy of DCM)

Axe-dominant hoards are absent in Devon and Somerset but occur in Cornwall: e.g. the Mylor hoard of 33 complete Sompting axes found in a pottery vessel (Knight et al. 2015, 35, No.54). Undamaged Armorican axes occur in associations (St Erth: Pearce 1983, No.44), at possible occupational sites (Carn Brea: Pearce 1983, No.129) and in hoards (Higher Roseworthy: Pearce 1983, No.60); these have been linked with material from north-western France (Boughton 2015, 262) suggesting that connections observable in the Late Bronze Age continued.

Deposits continued to be made in significant locations. The Langton Matravers and Portland hoards occupy a landscape of dense activity with a view of the English Channel (Pearce 1983, 325-326; Roberts et al. 2015, 384-386, Fig.1). Roberts et al. suggested the Langton Matravers hoard drew inspiration from hoards in north-west France (2015, 384-386); deposition in a location overlooking the Channel may have referred to this. Similarly, the Mylor hoard was deposited overlooking Mylor Creek, close to Carrick Roads which leads out to the Channel. The hoard may have been linked to transport routes. Although the treatment of objects appears to have changed, the criteria for landscape location seems to have remained consistent from the Late Bronze Age.

An important hoard was found on Kings Weston Down, Bristol, while metal-detecting in 1980. It consisted of one complete socketed axe and approximately 27 fragmentary objects including axes, casting jets, a sickle and casting waste (Everden n.d.; Locock 2001, 126) making it the most varied Llyn Fawr hoard in South West England. Furthermore, it is the only fragmentary hoard in Britain in this period (Boughton 2015, 331). This hoard was partially studied during this thesis but could not be fully analysed. Many of the objects were worn and deliberately fragmented; associated damage included hammer blows, bowing and tearing (Boughton 2015, Appendix A, No.56). A Blandford-type axe links with the Dorset hoards and chronologically positions the hoard in the Llyn Fawr period, but three Transitional-type axes suggest this may have been deposited close to the Ewart Park to Llyn Fawr transitional period (c.800 BC).

The hoard was found on a ridgeway just outside of Kings Weston Down camp – a Late Iron Age hillfort (Rahtz 1956) – and at the other end of the Down four possibly Early Iron Age barrows were excavated by Tratman in the 1920s

(Tratman 1922-23; 1926). The position of the hoard on a hilltop near a later hillfort and possibly contemporary burial cemetery suggests the significance of the location. The positioning and overall fragmentary character of the hoard indicates Ewart Park practices but in the Llyn Fawr phase. Therefore, the hoard offers an important insight into the transition of practices that occurred during the eighth century BC.

Overall, Earliest Iron Age metalwork was treated very differently to that in the Late Bronze Age. Fewer object types were deposited and no gold objects are currently known. Most of the artefacts were axes deposited complete or having suffered non-deliberate damage and often produced from a mechanically weak material. However, the locations chosen for deposition seemingly maintained consistency with the previous period and may have been done so in relation to wider connections.

9.4 Conclusions and Summary of Chapters 8 and 9

Chapters 8 and 9 have analysed the data sampled from South West England from the Early Bronze Age to the Earliest Iron Age (c.2500-600 BC). Key destructive practices and case studies for each period of the Bronze Age have been discussed in relation to depositional practices, the treatment of other materials, the landscapes in which objects were deposited and parallels elsewhere in the country.

In the Early Bronze Age, observable metalwork destruction was minimal, though it was possible to highlight case studies where daggers had been deliberately destroyed during cremation acts. Furthermore, early goldwork was deliberately manipulated prior to deposition. This latter practice continued throughout much of the Bronze Age, with examples highlighted in the Middle and Late Bronze Ages suggesting that the malleable properties of gold encouraged its destruction over a long period of time.

Similarly, the continued use of broken objects, perhaps as heirlooms or repurposed tools, could be observed in each period. Objects displaying signs of wear and reworking first appear in the Early Bronze Age, but continue to be incorporated into later hoards and occupational deposits. In the Middle Bronze Age, hoarding became a more common practice and the Taunton and Priddy hoards demonstrated that destruction was occasionally part of that process. This continued into the Late Bronze Age when depositing hoards was prolific and destruction became more common. However, analysing patterns of destruction and deposition demonstrated that this practice was not universal and different regions had links with other areas that influenced how destruction and deposition was undertaken.

Overarching trends in how objects were destroyed could be observed throughout the Bronze Age by investigating destructive practices. For instance, the burning that was associated with daggers in the Early Bronze Age continued to form parts of deposits as a means for fragmenting objects in the Late Bronze Age. A closer consideration of *how* destructive processes might have been undertaken, informed by the experimental activities, has allowed one to observe the combinations of different techniques within single deposits (e.g. the Taunton Union Workhouse hoard). Furthermore, by drawing together destruction indicators and an analysis of geographical and topographical features, similarities in Late Bronze Age single finds and hoards could be illustrated. This all contrasts the Earliest Iron Age in which deliberate destruction was not readily identifiable in the material studied. This latter period thus demonstrates a shift from practices that developed from the later 3rd millennium BC onwards.

Finally, throughout the Bronze Age deliberate destruction was not restricted to metalwork. Non-metal objects were subjected to fragmentation and destruction in Early Bronze Age burials, whilst in the Middle and Late Bronze Age similar material occurred in scatters and occupational contexts. Clearly these other objects had similar roles to play as metalwork and should be considered as part of overarching destructive practices.

These two chapters have brought together a large range of data to show how destructive practices upon metalwork developed and changed between 2500-600 BC. These elements have yet to be considered in light of the key theoretical approaches presented in Chapter 2. This thus forms the focus of the following chapter.

CHAPTER TEN

DESTRUCTION, DEPOSITION AND PERSONHOOD IN SOUTH WEST ENGLAND

> "Patterns do… occur but not as rigid statements of inclusion and exclusion. People do live their lives by formulae but they employ the cultural values available to them, sometimes in an imaginative way" (Barrett in Clarke et al. 1985, 106).

10.1 Introduction

In Chapter 2 theoretical explanations were suggested for the destruction of Bronze Age metalwork, though the analysis of the material in South West England demonstrated that a range of practices were occurring and no single explanation can be ascribed. In this chapter, the theory and data are brought together to better understand the construction of Bronze Age personhood through the acts of destruction and deposition. Although this chapter focuses on interpreting the metalwork from South West England, case studies from other areas of Bronze Age Europe are drawn in to better contextualise these practices. Moreover, the broader theme of destruction in the past is considered, as many other objects were deliberately destroyed during this period.

As no overarching interpretation can be applied, this chapter is divided according to a series of theories and practices that are often linked with the destruction of metalwork including its role as a functional practice, the enchainment hypothesis and the link between destruction and certain places. Furthermore, drawing on the experimental activities the performative aspects of destruction are considered. Finally, two 'biographies of destruction' are presented which apply the biographic approach to two case studies to emphasise the potential for viewing destruction as a practice through which ideologies were expressed and personhood was constructed.

10.2 Functional Destruction?

A suitable starting point for this chapter is what shall be termed here "functional destruction". This refers to necessary acts of destruction that were part of other processes typically during production and use. Trees, for instance, were felled in the process of erecting structures, stone cores were reduced to form tools, and crushed shells, stones and old ceramics were all utilised as temper for making ceramics. To produce bronze objects, it is first necessary to crush (and destroy) the ore, which is then smelted and transformed it into a liquid for casting into a stone, bronze, ceramic or sand mould. Although stone and bronze moulds have a relatively long durability (Wang and Ottaway 2004; Webley and Adams 2016), ceramic and sand moulds require destruction to remove the cast object. Ceramic moulds require irreversible fragmentation to release the object; such fragmentation can be observed on the mould material from Norton Fitzwarren, Dainton and Sigwells (Knight et al. 2015, No.428; Needham 1980a; 1989b). Thus, destruction in its simplest sense was integral to the creation of metal artefacts.

Recycling bronze objects similarly required destruction. Many larger bronze objects required breakage to fit within a crucible for recasting and thus destruction served a reductive process. It is this necessary destruction that has led to functionalist interpretation of founder's hoards in the past (Evans 1881, 457f.). The experimental activities demonstrated that the most effective way to do this was through heating the objects first. Fire was a necessary part of everyday life in the Bronze Age for heating food and providing warmth as well as intrinsic to the creation of ceramic and metal objects; however, it also had destructive potential as evidenced through, for example, the destruction of roundhouses (e.g. Nowakowski 2001) and the cremation of bodies (see Section 10.3).

Recycling metal objects was only possible through their destruction suggesting that destruction might better be understood as transformative; this view should also be considered for objects produced from other materials (see Brück 2006a). The destruction of past objects did not necessarily mean they were forgotten, though in some cases this may indeed have been an intended social outcome. If one considers that at least some objects were important because of their specific biographies or histories then the transformation into a new object may have served to extend and regenerate that biography (Brück 2006a). Needham (2007a, 282), for instance, suggested that an analogy might be drawn between the transition of a deceased individual to ancestral status and the impact of recycling objects in cementing their significance in memory.

Certain individuals or societies might recall the properties, qualities and actions of the former object and in this way destruction of the object served to commemorate it within oral traditions (ibid.). Furthermore, knowledge of the origins of the material prior to destruction could have impacted how people related to recycled material; Needham (ibid., 283) suggested that metal from a distance source may have held mythological connotations. Similarly, ingots or new objects formed from a variety of sources might come to represent a series of relations, offering a metaphor for the connections by which the material was acquired (ibid.). A similar theory has been suggested for the reuse of pottery as grog in new pots (Brück 2006a, 304). In this way the functional destruction of objects may have also served symbolic purposes in the construction of personhood, memories and social relations. This forms an important starting point for the consideration of metalwork destruction that should not be bound within exclusive functional or non-functional categories

10.3 Death and Destruction in the Early Bronze Age

Ethnographic studies emphasise the integral role of destruction of material culture with the death of an individual (Section 2.1); this link has also been made for the Bronze Age (Brück 2004; 2006b; 2009; 2014; Fowler 2004, 72-76; 2013, 219ff.). The deliberate destruction of grave goods may have served a variety of roles in constructing or deconstructing the identity of the deceased, as well as the relations between the living and the dead, the living and the objects, and the deceased and the objects. If one considers the potentially animate or embodied nature of objects during a funerary process, as is evident in many ethnographic situations (e.g. Barley 1994; Grinsell 1961; Küchler 2002), the death of an individual may need to be expressed through the 'killing' of their objects (cf. Brück 2004); therefore, the lifecycle of an object can be considered intertwined with that of an individual. A key expression of this may have been in the mortuary practice itself. In the Early Bronze Age two main practices dominate the record: individual inhumations and cremations. Both practices were often accompanied by the construction of burial mounds and the provision of grave goods. The dominant practice by the end of the Early Bronze Age was cremation, which will form the initial focus of this discussion as the destruction of metalwork in South West England largely accompanied cremations.

Cremation involves burning and destroying the body, the pyre and any adorning objects (McKinley 1997). It requires a range of socially-situated practices, technologies and ultimately human agency (Thompson 2015), as well as a set of preparations, including the collection of fuel, building of a pyre and preparation of the body. Additionally, there may be certain conditions necessary to perform the cremation (e.g. specific times of the day) (McKinley 2006, 81). Moreover, there is the transformative nature of fire (cf. McKinley 2006; Quinn et al. 2014; Thompson 2015). The act of cremation may have thus served to transform identities, transport people from this world to the next or sever ties between the living and the dead (Table 10.1). The inclusion of grave goods on the pyre, such as daggers, would have served to transform these as well.

Table 10.1: A summary of reasons why the dead may be cremated (adapted from Quinn et al. 2014, 14, Table 1.2).

Reason	Explanation
Functional	Disease control, transport, space saver, cleanliness, odour, accident
Social roles	Status, gender, age, outcast, cultural identity
Social process	Creating/destroying identity, transformation, ancestor creation/veneration, communal integration, destroying the past
Other	“Deliberately vague”

The two daggers associated with the Weymouth 8 cremation show signs of having been prepared and hilted probably for an extended period; however, there are no definitive signs of use. This suggests the objects may have served a symbolic, display function, perhaps conveying a social statement simply by their presence or that they were used in activities that left no damage on the blade – the sacrifice of an animal, for instance, would not necessarily leave any marks. Burnt daggers have been noted in numerous burial contexts across southern Britain (Section 8.2.1), and the potential that burning might not leave any macroscopic marks suggests ‘destruction’ of the object by fire might be archaeologically invisible. How then might the daggers be interpreted?

Symbolic connotations of daggers as symbols of martial identity or elite status have been extensively explored (e.g. Clarke et al. 1985; Gerloff 1975). Their comparatively limited presence in graves in South West England could indicate that either daggers were only bestowed upon certain individuals or that daggers were not in wide circulation. Certainly, there is a greater distribution of some grave goods than others across various regions; daggers are particularly common in burials in Wessex (Wiltshire and Dorset), eastern Scotland and

Yorkshire (see Gerloff 1975; Woodward and Hunter 2015). Meanwhile, burials in north-western Wales typically contain dagger pommels but no daggers (Lynch 1991, 164). There are no nationwide prescribed associations for daggers though and it should be remembered that the inclusion of grave goods is reliant on human agency and the social relations between people and objects. Furthermore, reasons for adorning a body with a dagger need not be linked with a warrior status or an elite position in society. If adorning a burning body with material culture is part of the construction of that person's identity (cf. Brück 2004; 2006b; 2014) one can posit the dagger may have been inalienably linked with that person. The dagger may have been a weapon but it is equally possible the dagger was part of a significant ceremony, such as a sacrifice, with which the deceased individual was involved; the importance of sacrificial implements is attested in numerous historical and ethnographic situations (Hubert and Mauss 1898). Destruction thus transformed the body and the dagger into an alternative state, perhaps establishing an ancestral status or rendering inalienable concepts alienable (cf. Tilley 1993, 331). Alternatively, the dagger may have been an heirloom possessing an identity linked with that person and their kinship; the deceased individual in such a situation might have been the last in a lineage and destruction was a conclusive process.

Additionally, the body was probably adorned with less tangible material culture. Clothes, for instance, were likely a valuable commodity, whilst organic jewellery (e.g. bracelets, earrings and necklaces), pouches, bags and belts may all have been present and burnt (McKinley 2006, 83). The Whitehorse Hill cist burial emphasises the diversity of organic objects that one may be missing from the archaeological record (Andy Jones 2016). The surviving archaeological evidence of a dagger should thus not be viewed in isolation, with the archaeologically invisible objects fulfilling their own expressions. A dagger may only represent one set of relations, either between the deceased and the object or the deceased and the practice represented by the object or both. Similarly, those grave goods not included on the pyre but added afterwards likely held their own significances. Objects 'worn' by the deceased upon burning or burial, and those added afterwards can represent expressions of the social belief of the afterlife, as well as the mourners' own views of appropriate gifts; the identity of the dead is thus partly constructed by the living (Barrett 1994, 113ff.; Brück 2004; 2009; 2014; McKinley 2006, 82; Woodward et al. 2005). This can be argued for the stone pendant, the ceramic cup and the bulb-headed pin found at Wall Mead, none of which show signs of deliberate damage. These may have been offerings from the living to accompany the dead enabling social reproduction through practice.

The inclusion of fragmented objects equally indicates a process of agency. Objects may be fragmented by accident or intent but their inclusion in a closed mortuary context is undoubtedly deliberate; by extension, the decision to *exclude* parts of the objects is intentional. Where, for instance, is the other half of the stone axe buried in the Yettington barrow or the remainder of the biconical urn at Angrouse? Similar questions can be asked for other burials across Britain including the missing pieces of the Lockington urns, the snapped jet pendants at Barns Farm in Fife, or an incomplete burnt bone dagger pommel from Bedd Branwen, Anglesey (Brück 2015, 48-49; Lynch 1991, 158ff; Woodward 2000, 58-60). Broken ceramic vessels are particularly common inclusions with incomplete Beaker vessels known from Boscombe, Wiltshire, Barrow 2, Crossington, Leicestershire, and Whitemoor Haye Quarry, Staffordshire (C. Gibson 2013, 104-105; John Thomas 2013, 80-81). This is especially common in Devon and Cornwall where few complete vessels are recovered from burial contexts (Andy Jones 2005; Jones and Quinnell 2008, 49; Quinnell 2003), such as at Harrowbarrow and Lousey Barrow, Cornwall (Christie 1985, 46-60; Thomas and Hartgroves 1990) and Sidmouth 9, Devon (Jones and Quinnell 2008, 39-41). The incomplete objects could be token inclusions with the remaining pieces perhaps kept for use in other practices, such as deposition elsewhere or curation as heirlooms (Brück 2015, 48-49; C. Gibson 2013, 104-105; John Thomas 2013, 94; Woodward 2002). A fragmentary Beaker was deposited with an inhumation at the centre of a ring cairn at Sidmouth 9 surrounded by pits and areas of burning (Andy Jones 2011, 68) suggesting this was a monument at which repeated practices and interactions took place. The combination of practices on different objects, as well as the variety of inclusions might be the expression of different agencies, whilst also reflecting that persons were not necessary fixed individuals but rather multiply constituted by a variety of relations, interactions and social engagements that was expressed through the inclusion and treatment of objects (Brück 2004; 2006b; Fowler 2004; 2016).

This is further supported by the treatment of the human remains. Cremated remains are often incomplete, not representing the full remains of an individual (McKinley 1997). Similarly, unburnt human remains are frequently found in fragmentary or incomplete conditions suggesting pieces of the bodies were removed either during burial or upon reopening of the grave or were added later (Brück 2006b, 81ff.; A. Gibson 2004 in Brück 2006b; C. Gibson 2013; *forthcoming*). At Boscombe, Wiltshire, an adult female skeleton in a Beaker grave had been disturbed and the bones relocated within the grave, whilst another Beaker-phase inhumation containing another female had been recut later and the skull had been "detached and replaced upside down on top of the cervical vertebrae" (C. Gibson 2013, 102-104). The most famous case of manipulation of human remains is the inhumation at Cladh Hallan, Scotland, which was composed of three separate bodies rearranged post-mortem (Parker Pearson et al. 2005). Such practices have been used to suggest partible personhood in the Bronze Age (Brück 2006b; Fowler 2004, 72-76). Fowler used the movement of people and circulation of objects as evidence that "bodies and objects do not belong to an individual, but the community" (2004, 75). Death was a transformative process that allowed a reconstitution of people and their objects by enabling fragments of persons and inalienable objects to form new relationships among the living (ibid.).

The continued circulation of objects after breakage is evidenced by objects such as the axeheads from Landulph and Madron, the reworked dagger from Gussage St Michael 2, and other objects highlighted in Section 8.2.3. Incomplete token objects may have served as mementos of the dead or enchained relations between the living and the dead. The object became a representation of the dead with the missing piece serving a mnemonic function by its very absence (cf. Chapman and Gaydarska 2007, 9). This was not exclusive to metalwork, incorporating ceramic, bone, stone and jet artefacts (e.g. Brück 2006b; Woodward 2002) and there were seemingly no uniform 'rules' for what should or should not be included with a body suggesting that it was the history of individual objects that was important. Thus, knowledge of an object's biography can be considered an essential element in determining how it should be treated. This is something can be considered true throughout the Bronze Age.

10.4 Humans as Objects, Objects as Humans

Over time there is evidence that human remains became further objectified. Token cremation deposits continued (McKinley 1997) and incomplete human remains were commonly deposited at settlement sites and other contexts across southern Britain during the Middle and Late Bronze Age often in boundary locations associated with other important practices (including the abandonment of houses) or within a specific significant landscape context, such as watery places (Brück 1995; 2006a; 2006b). The various artefacts and human remains recovered at Greylake, Somerset, suggest that here only incomplete objects and remains were appropriate for deposition perhaps as token offerings. Similarly, whilst it is likely the Early Bronze Age burial at Milsoms Corner was discovered accidentally during later ditch construction, the subsequent treatment of the human leg bone (i.e. retention and redeposition) indicates the objectification of human remains in parts of the South West (Section 8.3.4). At the Earliest Iron Age enclosure at Pimperne Down, Dorset, an intact femur was found in a structured deposit in a ditch along with ash and sealed with a flint capping whilst skull fragments had also been found nearby and in postholes (Brück 1995, 271; Harding et al. 1993, 19-21). Deposits such as these helped legitimise places, finalise previous practices, and allow new events to take place (Brück 1995). Thus, as Brück argued: “The dead became strong symbols of such concepts as liminality, continuity, identity, and renewal” (ibid., 264).

In all the south-western cases, the human remains were incomplete suggesting the original body had been ‘fragmented’ in much the same way as objects. This is important because objects such as querns, pots and metalwork – all of which are frequently found fragmented – did not exist outside of social relations. Production, for instance, involved intimate knowledge of a craft by an individual or group of individuals perhaps forever linking the object with its creator(s). Intensive use of objects such as a pot for everyday cooking or a quern used to grind food would similarly have established inalienable connections between the users and their objects. Through these interactions objects can be considered imbued with agency.

The lifecycle of metalwork has been linked with the human lifecycle, with the production, use and deposition/destruction of metalwork considered important parallels with the birth, life and death of a person (Turner 2010a, 95-96). However, as already been emphasised, the death of a person or an object was not necessarily the end of their social role. The deposition of objects in significant places expressed social understandings and may have reinforced ideas about legitimacy of land ownership or established socio-political boundaries (Fontijn 2002; Needham 2007a). Human remains in similar places may have emphasised similar ideologies. Objects and people took on new roles in different social contexts with objects considered 'persons' in certain contexts. It is for this reason that understanding an object's biography or lifecycle is so important; like a person, an object is the result of, and expresses, multiple relationships (Fowler 2004).

The potential for metal objects to be recycled into new objects perhaps symbolised ideas about rebirth and regeneration (Brück 2006a; Turner 2010, 95-96). The same can be argued for pots recycled as grog for new pots or the destruction and rebuilding of houses in the same locations (Brück 1999a; 2006a). The previous object may have broken accidentally but the importance of the object was preserved or transformed into a new form. Similarly, the incorporation of human remains into deposits, particularly at settlement sites, may have been a mode for rebirthing and reconstituting a person. The finding of broken objects in the archaeological record should thus not be seen as an inevitable consequence especially for metalwork. Even accidental breakage may have necessitated a renegotiation of spaces, practices and relations; consider, for instance, the western superstition of seven years' bad luck associated with breaking a mirror. By extension, deliberate destruction thus represents the conscious decision to renegotiate relations. This can be brought on by innumerable external factors, such as the death of an individual, a food shortage, or a birth or marriage. The treatment of the objects, however, served to convey this and allowed people to materially express their social situations.

10.5 Hoarding Destruction

A key debate surrounding destruction is why so many fragmented objects entered the archaeological record in hoarded deposits across Europe (Hansen 2016; Rezi 2011); this typically alternates between ritual and secular explanations often informed by the juxtaposition of complete and incomplete objects and the significance of the context (Section 2.7). Recently, however, investigation of hoards has incorporated the biographies and life histories of the objects to establish more nuanced interpretations (Bradley 2017; Brück 2016;

Chapman and Gaydarska 2007). The case studies from the South West clearly demonstrate a range of customs whilst broadly concurring with wider trends in depositional practices. This section approaches the variable trends observable in Middle and Late Bronze Age hoards to argue that destruction expressed different ideologies at different times and in different places.

10.5.1 Middle Bronze Age Hoards

Hoards containing both complete and broken objects emerge during the Taunton-Penard phases (c.1400-1120 BC) in South West England. These were deposited in significant locales in relation to the established landscape, be it natural (e.g. river valleys) or manmade (e.g. barrowscapes). The treatment of objects in hoards demonstrates that specific object types required certain practices. The fragmentation of both bronze and gold ornaments, for instance, is widespread across southern Britain and has been found in a variety of contexts and situations (Section 8.3). By understanding how metalwork may have been broken and deformed, such as by hot or cold processes, one can draw conclusions about other hoards displaying similar fragmentation practices with less obvious signs of destruction, such as ornaments in the Pinhoe hoard. This is one way in which the Damage Ranking System established in Chapter 5 has been beneficial to this study.

The typical juxtaposition of incomplete ornaments with complete tools suggests different values were attached to these various objects whilst still being appropriate to deposit them together. Ornaments, such as torcs, bracelets and pins, likely had personal attachments; the worn nature of some of these objects infers they had extended use-lives or circulated over longer periods of time. Consequently, they may have gained a mnemonic status perhaps as an heirloom as seen for some Early Bronze Age ornaments (Woodward 2002). In this way, they possibly functioned as inalienable gifts with destruction necessary to sever ties between objects and people. Conversely, the incomplete, potentially token, inclusion of pieces of ornaments may have enchained relations between people and the land or expressed a social element of the depositional practice (cf. Chapman 2000; Chapman and Gaydarska 2007). Retaining a piece of a broken object and depositing a conjoining piece may have permanently linked individuals with specific deposits offering a physical mnemonic of that relationship (Chapman 2000). This situation has been observed amongst the Nuer in South Sudan who break a man's armrings upon his death and distribute the pieces among the men and boys of the family (Evans Pritchard 1956, 152). By contrast, tools such as palstaves were often deposited as-cast (e.g. the Bournemouth Hospital hoard, Dorset: PM-F001; Fig.10.1) or with minimal signs of preparation and/or wear (e.g. the Truro hoard, Cornwall: RCM-F051) suggesting they may have been commodity items. When deposited broken palstaves show no signs of intent and often clear indicators of accidental breakage (e.g. the Ottery St Mary palstave, Devon: RAMM-F035a). Accidental breakage need not diminish the significance of these objects but the need to deposit palstaves complete is exemplified by the complementary pieces from two different palstaves in the Taunton Union Workhouse hoard (Section 8.3.1).

Hoards of complete objects are typically considered evidence that these are the deposits of itinerant traders burying their wares that were never recovered. However, deposition may also have served a symbolic conversion purpose transforming alienable commodities into inalienable material (Bloch and Parry 1989; Fontijn 2008a). Bloch and Parry (1989) argued that each society worldwide has different ways for acquiring and converting commodity objects into locally acceptable forms; this can be supported ethnographically by the destruction of wealth seen in the potlatch ceremonies of the Pacific northwest coast (Mauss 1990) or historically in the sacrifice and deposition of parts of objects at Roman and Greek temples (Hansen 2016, 185-186; Needham 2007a, 288). Drawing on Bloch and Parry (1989), Fontijn (2008a) argued that the deposition of 'trader's hoard' from Voorhout in the Netherlands

Fig.10.1: The Bournemouth Hospital hoard (source: Author courtesy of Poole Museum)

may represent this process. The Voorhout hoard consisted of metalwork foreign to the Netherlands that might have been viewed as polluted; to make the material acceptable for recycling a portion had to be sacrificed in *pars pro toto* style.

There are however significant differences between the Middle Bronze Age hoards of South West England and that from Voorhout. The objects in the south-western hoards are typically of local types and South West England is a metalliferous region whilst the Netherlands is not. One must consider though that the raw material used to produce objects in the South West was probably not locally sourced, as demonstrated by the Salcombe Bay shipwrecks for instance (Northover in Needham et al. 2013, 109-111) or the large Marnhull hoard of 90 French-type palstaves on the Dorset coast (Lawson and Farwell 1990). Meanwhile, regional palstave forms were deliberately arranged, such as stacking in the hoards from St Tudy, Cornwall (RCM-F042), and Plumley, Devon (RAMM-F038), or the containment in a box at Edington Burtle. This suggests that it was important to deliberately arrange and deposit local forms. Like importation, production of objects may have also required token deposits, so a certain proportion of objects produced were consigned to the ground. Ethnographic analogies of non-western approaches to metal production have demonstrated that it may be more appropriate to view metalworking as magical and ritualised rather than an economic process (Budd and Taylor 1995); therefore, the deposition of objects following production may have been part of a sacrificial process (Brück *forthcoming*). This may have been a necessary process to remove prior ideologies associated with the material. The inclusion of fragmentary, deliberately destroyed ornaments may have been part of this transformation process by juxtaposing the fragmentation necessary for recycling processes alongside the complete result.

The physical manipulation and decommissioning of ornaments in the Middle Bronze Age hoards may have been a manifestation of symbolic practices. The literal entanglement of gold ornaments in the Priddy hoard (Section 8.3.2) may symbolise real relationships with individual ornaments representative of individuals or communities. The Priddy hoard is the only hoard of this kind in the South West, comprising rare or otherwise unknown object forms which could represent a one-off event that sealed relations or a political status quo for an extended period. Other expressions might be the interlinked fragments of torc in the Edington Burtle hoard, the bundle of bracelets buried at Norton Fitzwarren or the nested ornaments found one inside the other in the Evershot hoard (BM-F030). Alternatively, Wilkin (2017, 30-32) has suggested the manipulation of ornaments may have animated and anthropomorphised them by evoking methods of how they were worn or arranged on the body.

Naturally, these theories cannot be applied wholesale as they ignore weapon-only hoards and various single finds that represent intentional depositions, though single finds could be smaller expressions of similar ideologies. However, by considering the hoards as multi-faceted practices, interlinked with, and expressions of, processes, such as production and trade, and the social relations involved, one can approach the damaged objects within some of these hoards from a fresh perspective and consider their role in constructing and constituting social relationships. This is undoubtedly enhanced by having a clear understanding of the different lifecycles and treatments of individual objects within the hoards and the overall depositional context.

10.5.2 Late Bronze Age Hoards

The above perspectives are especially useful for Late Bronze Age hoards which, as has been shown already, require reconsideration (e.g. Stogursey and Lulworth). Again, careful examination of individual objects, associated practices and depositional contexts highlighted a range of connotations; this is important as almost all Late Bronze Age hoards in South West England represent atypical practices within their respective areas.

Traditional interpretations of hoards of broken metalwork during the Ewart Park phase (c.920-800 BC) have been linked with the transition to iron, the collapse of the bronze industry and the abandonment of a now ‘useless’ material (Burgess 1979) though this perspective is increasingly found inadequate (Gwilt 2004, 119; Needham 1990a, 130-140). New forms of bronze objects continued to be developed during and after this period (Gwilt 2004, 119) such as the previously unseen axe-types in the Earliest Iron Age hoards (e.g. Langton Matravers and Mylor); meanwhile, Hansen (2012; 2013) has pointed to the selective fragmentation and inclusion of objects as a deliberate culturally-situated practice.

Chapter 9 argued that some Late Bronze Age hoards were in fact the result of individual or communal processes. The Long Bredy hoard contained four items, albeit in six pieces, that could have belonged to a single person. This hoard is atypical in the region in both size and character and the inclusion of a foreign razor suggests this may have been the result of imitating practices undertaken elsewhere. If the objects did belong to a single person the death of that person may have necessitated destruction of their objects as observed in the Early Bronze Age. The disassociation of these objects from evidence of other practices (e.g. settlements, deposits or burials) makes it difficult to conclusively link this hoard back to an individual or community but the combination of different degrees of use-wear and destruction, mixed object origins and the selective inclusion of different pieces highlights the agency that can be inferred from such a deposit and iterates the potential for this deposit to be linked with formative expressions of an event.

Extending this further, the mixed origins and mixed practices associated with the objects within the Stogursey hoard are indicative of the coming together of different traditions either through exchange networks or the physical movement of people; this is supported by the undeniably South Welsh character of the hoard. In his study of Middle-Late Bronze Age mixed origins hoards in northern Netherlands, Arnoldussen (2015) suggested different treatments of objects related to their specific origins with local forms kept intact whilst fragments of supra-regional forms were deliberately included as a *pars pro toto* sacrifice of foreign material otherwise intended for recycling into local forms (cf. Fontijn 2008a). In contrast to the hoards in northern Netherlands, supra-regional forms in the Stogursey hoard were deliberately left intact whilst more common objects were deliberately fragmented. Furthermore, certain object types were deliberately excluded from hoards (e.g. ornaments), a situation that is observable across Europe (Becker 2013; Hansen 2016). This final point is another argument against the theory of scrap hoards; it is reasonable to expect a full suite of object types to be present across hoards but this rarely occurs.

The concept of fragments as *pars pro toto* deposits has been increasingly posited as an explanation for why so many hoards are comprised of non-refitting fragments (e.g. Brück *forthcoming*; Fontijn 2002; 2008a; Hansen 1994; 2016; Novak 2013). Hansen (2016, 185-186) paralleled the ‘scrap’ hoards of Bronze Age Europe and the deliberately broken token offerings at Classical Greek sanctuaries and argued that despite no evidence of ritual structures in Central and West Europe, this practice may have been widespread. Therefore, deposits should be seen as votive offerings (ibid.). Although this interpretation explains the burial of fragments of different objects, it does not account for the diversity in the character and composition in hoards, nor does it explain why some hoards contain complete and incomplete objects. In much the same way that assuming all broken hoards are scrap, there is a danger in applying a votive explanation wholesale that does not allow for the scale and intricacies of deposits.

The inclusion of objects at all stages of their lifecycles, such as in the Carp's Tongue hoards of Essex and Kent, has been interpreted as a key element of hoarding, combining the full cycle of production, use and depositional practices (Turner 2010a). A metaphorical link is thus drawn between these hoards and the representation of human and object lifecycles encapsulated in a single deposit (ibid.). Again, this interpretation may be appropriate for some, but not all, hoards.

The ingot-dominant nature of hoards in Devon and Cornwall, for instance, suggests a different purpose behind deposition, possibly linked with a more economic function. Compositional analysis of the copper ingots from the St Erth I and St Michael's Mount hoards indicated the copper was potentially imported from other areas including the Welsh Marches and Switzerland (Northover n.d.; Young 2015). This means the material travelled a considerable distance and by extension may have been deemed valuable, both in terms of raw material and the supra-regional connections represented. Importantly, almost all ingots in these areas are deposited incomplete with no refitting pieces. One may consequently recall the theory that it was necessary to sacrifice portions of raw material to convert it from an alienable commodity. This does not explain the various elements of slag material though. In contexts in which copper alloy waste is found alongside ingots and complete and broken objects (e.g. St Michael's Mount, Breage I and St Erth Hoard I) it is possible to see the full set of processes metal objects might go through, evoking Turner's (2010a) theory of such hoards as metaphorical of the human lifecycle. In this way hoards may have symbolised regenerative processes and production practices; the deposition of these hoards in significant parts of the landscape may have been a way for commemorating and legitimising these ideas.

The similarity in character between many of the Cornish hoards, and the Carp's Tongue hoards of south-eastern England and north-western France means it is appropriate to consider these hoards in light of other theories that have been applied to such material. Whilst typically viewed as accumulations of scrap or material for recasting (Briard 1965; Burgess 1968), recent arguments have suggested Carp's Tongue material should be viewed beyond a purely utilitarian perspective (Adams 2016; Bradley 2013; Brandherm and Moskal-del Hoyo 2014; Turner 2010a). In explaining fragmentation in these hoards, Brandherm and Moskal-del Hoyo suggested that "…if objects were seen as animate, a symbolic 'killing' might have been required… to transfer them from the sphere of living material culture to that of lifeless raw metal" (2014, 35). Moreover, Adams (2016) emphasised the apparent need to transform the objects before deposition through destructive processes. These theories stress the biographies and material agency that objects may have possessed. The objects selected for decommissioning and destructive acts often show signs of wear and may have been important because of their interactions with, and use by, the people who owned the material. In historical epics, for instance, swords are often personified and given names (Pearce 2013, 56-57); destruction and deposition may have been a way of severing these links. The defunctionalizing acts of plugging axe sockets and fragmenting swords seen in several of the hoards from Cornwall may be a representation of this. The potentially multi-functional and essential role of an axe in prehistory, as well as the long history attached to this object type, may mean these objects also became intrinsically linked with events, people and places. However, whilst elements of the Cornish hoards are indicative of the broader Carp's Tongue tradition, the overall scale and character of the Cornish hoards suggests they may have been part of a periphery tradition; this was likely influenced by an influx of material from north-western France but was reappropriated and utilised in local ways. Depositions in significant places, sometimes in the same place repeatedly (e.g. St Erth and Breage), was likely an important decision in depositing the objects and doing so allowed the material to be incorporated into local ideas about place. The practice of destroying some of the objects whilst keeping others complete, however, was retained.

One final case study is the Bloody Pool hoard, which is anomalous in the South West as the only hoard consisting solely of martial material and also representing one of the few definite wetland deposits in the region. The process for breaking this hoard was demonstrated through experimentation by heating and striking the spears (Section 4.11.4a). The transformative properties of fire that were highlighted for cremation practices can be recalled here. Fire offered the means for producing bronze objects so it is fitting that it also enabled destruction. It thus had life-giving and life-taking properties. Obviously, metal objects could have been reduced to a liquid state with high enough temperatures though this was intentionally not undertaken. It is difficult to argue that the destruction and deposition of the Bloody Pool hoard was undertaken for a recognisably functional, economic purpose. The heating and fragmentation but not the complete obliteration of objects demonstrates the necessity of keeping at least some part of the object in existence for burial even if the rest was later recycled.

The variety of practices associated with hoards thus emphasises no commonly understood ideology in South West England. The combination of complete and incomplete objects, for instance, may represent the conflation of ideas or social relations in a single deposit. The infrequency of hoards in the South West, certainly when compared to areas such as south-eastern England or northern France, indicates that deposits were only made rarely and likely as the result of the influx of different ideas from other regions; it is impossible to identify a distinctive character of South West hoards in the Late Bronze Age. However, in most cases destruction was a crucial part of hoarding material with decisions about whether to destroy certain objects informed by the preceding biography of those objects and the relationships held between people and these objects. An important consideration in the decision to deposit was the landscape context, which will now be explored.

10.6 Objects and Special Places

The importance of specific places linked with deposition has been repeatedly noted in this thesis and is further illustrated by numerous studies of material across Europe (Becker 2013; Bradley 1998a [1990]; 2000; 2017; Fontijn 2002; Hansen 2016; Needham 2007a; Yates and Bradley 2010a; York 2002). For instance, the extensive coastal landscape of Cornwall was a key focus in the Late Bronze Age linked with high, intervisible places. Furthermore, analysing the geographic and topographic positioning of single finds and hoards indicated no clear distinction; this suggests the place was as important as the character of the deposit (Section 9.2.3). Deliberately broken single finds, deposited in similar places to hoards, might have been smaller expressions of similar social practices possibly linked with imports of smaller amounts of material, smaller metal production events or the results of individuals undertaking ephemeral practices. Here it is worth recalling the ethnographic study from Cameroon where single sherds of pots were placed on roadsides with votive offerings of food (Barley 1994, 76).

The main analysis of deliberately destroyed single finds was conducted by York (2002) on metalwork recovered from the River Thames who found the destruction and deposition of objects increased from the Middle to Late Bronze Age. By contrast, the South West has produced very few finds from watery contexts. Late Bronze Age swords recovered from rivers or the sea, such as Weymouth, Dorset (Pearce 1983, Nos.475, 476), Pole Sands, Devon (RAMM-F040), and Sennen, Cornwall (RCM-F033; Fig.10.2), show few or no signs of destruction. Furthermore, complete Middle and Late Bronze Age objects have been dredged from various harbours and docks (e.g. a socketed axe from Falmouth harbour: Pearce 1983, No.50; a rapier from Avonmouth docks, Bristol: BCMAG-F001) as well as various pieces from bogs and moorlands (e.g. Glastonbury Turbaries, Somerset: TTNCM-F054). Although special significance may have been attributed to deposition in watery places, destruction was seemingly not a part of this. A possible exception is a complete Late Bronze Age winged axe found in Poole harbour, Dorset (PM-F003), which had a broken bronze tube wedged into the wings (Fig.10.3). However, it is unclear whether the winged axe was deliberately deposited in the harbour or lost overboard during transportation. The condition of the axe indicates it would have been usable though the wedged tube suggests a decommissioning process recalling the blocking of contemporary socketed axes in dryland hoards. Consequently, what can be observed is a specific social understanding for depositing complete single finds in watery locations in the South West region.

Fig.10.2: The Sennen rapier (source: Author courtesy of Royal Cornwall Museum)

Fig.10.3: The Poole Harbour winged axe with a bronze tube wedged between one set of wings (source: Author courtesy of Poole Museum)

One significant case study of broken objects linked with a specific place is, again, the Bloody Pool hoard. Weapons deposited in bogs and wetland locations is also seen elsewhere in the country at the same time. A large hoard of deliberately burnt and broken swords and spears, human skulls and animal horns was recovered from Duddingston Loch, Scotland (Callander 1921-2, 360-364) whilst the Broadward hoard, Herefordshire, comprising c.100 objects was deposited beside a spring (Bradley et al. 2015; Burgess et al. 1972). The unique nature of the Bloody Pool hoard in South West England suggests the deliberate destruction and deposition of the spearheads was a one-off event much like the Priddy hoard. It may have been related to a specific event, such as the destruction of an enemy's weaponry as was observed in the Roman period (Todd 1975, 187ff.), or alternatively a peace-keeping process like the ethnographic situation observed in Ethiopia (Kirke and Pankhurst 2011). Destruction was a necessary part of making these objects acceptable for deposition and the placement in a bog clearly drew on more widely understood practices across Britain.

Depositions were not isolated, detached events but instead were intimately linked to the established landscape. This includes referencing past interactions. For instance, a bent and broken Middle Bronze Age rapier was found near Broadsands chambered tomb which had been used from the Neolithic to the Early Bronze Age (Knight and Chandler *forthcoming*; Sheridan et al. 2008). Similarly, four fragmentary Middle Bronze Age palstaves and a blade fragment were found close to a Neolithic quoit monument at Mulfra, Cornwall (Pearce 1983, 415-416, No.88). These deposits suggest deliberate reference to these pre-existing monuments and, whether deliberately destroyed or not, the broken objects were nonetheless suitable for these citational depositions. The broken state of the objects was not essential for deposits at pre-existing monuments though with complete Middle-Late Bronze Age metalwork inserted into earlier barrows at Farway, Devon (Jones and Quinnell 2008, 49).

Similar conclusions might be drawn for the fragmentary material deposited at settlements in ditches, pits and postholes, including broken artefacts of metal, ceramic and stone (Brück 2006a). These deposits were significant *because* of the place in which they were deposited linked with ongoing social processes such as the abandonment of houses (e.g. Trethellan Farm) or the legitimisation of boundaries (e.g. Milsoms Corner). At Bestwall Quarry the demolition of House 1 was followed by feasting and the smashing of pots (Ladle and Woodward 2009, 370) suggesting that destruction was intrinsic and inseparable from wider social events. Brück (2006a, 298-9) referred to these as “event-marking deposits” and they can be observed across Middle-Late Bronze Age settlements in southern Britain incorporating complete and incomplete objects. These deposits involved collective agency which contributed to the building of monuments and settlements within long-established landscapes and expressed communal ideas about life, death, identity, space and memory (Andy Jones 2013; Owoc 2005). Actions and specific activities were thus not isolated but were socially-constructed, culturally-embedded and referential, building on what came before and in response to ongoing social transformations of which understanding specific places was crucial.

10.7 Enchainment through Destruction

John Chapman's (2000; Chapman and Gaydarska 2007) theory of enchainment through broken pieces warrants brief consideration here. Although the removal of certain parts of objects from hoards, settlements or burials may have served an enchaining purpose between persons or communities, persons and objects, and/or persons and places, there is little evidence from South West England. Furthermore, evidence of enchainment in British prehistory is overall rare, typically indicated by unique situations (see Chapman and Gaydarska 2007 100-105, 108-109). In one remarkable case, two refitting sword fragments were found fifteen years apart on two intervisible hilltops across a Staffordshire river valley (Bradley and Ford 2004). The swords seemingly had different use-lives post-breakage, with one piece more worn than the other, but the histories of the object had been remembered and enchained through similar depositional practices (ibid., 176; Chapman and Gaydarska 2007, 108-109).

Only one example could be identified from the South West at the settlement at Gwithian, Cornwall. Two refitting fragments of a stone socketed axe mould were deposited in two neighbouring houses (Burgess 1976a). These two pieces form one half of a bivalve mould for a Late Bronze Age socketed axe. This mould may have broken following extensive use allowing the potential for the object to gain significance through its longer lifespan. Significantly, the time and energy required to produce a stone mould can exceed 30 hours (Monia Barbieri pers. comm. 2015). One can thus envisage a situation in which the mould was not owned by a single person or household but rather an object possessed by a community. The deposition of two fragments in neighbouring houses may have been a physical manifestation of an enchained relationship between these two households perhaps representing joint ownership of the mould. This does, however, raise the question of where the other half of the mould was deposited. It is rare to recover both halves of Bronze Age stone bivalve moulds (see examples in Needham 1981) suggesting that the two pieces were deliberately separated after use of these objects had finished. The other half of the Gwithian mould may have been deposited elsewhere linked with another connection between people or the events the mould was involved in. It is therefore possible to view evidence of a possible enchainment process in South West England though application to other contexts, such as incomplete pieces in hoards, burials and settlement sites remains speculative.

10.8 The Performance of Destruction

The experiential component of destruction is rarely considered in discussions of fragmentation. In the context of breaking a wine glass, Hoffman highlighted that "the experiential component of intentional breaking is important – the noise, the mess, the unpredictability" (1999, 104). This is viewed as an integral part of the 'technological agency' that is constructed and expressed through the actions and knowledge inherent to breaking an object (ibid.). However, in his subsequent discussion of destroyed material from Chalcolithic, Bronze Age and Iron Age contexts Hoffman (ibid.) does not mention the experience of destruction, possibly due to the perceived intangible nature of the sensory elements of prehistoric actions.

The experimental activities, however, demonstrated that the destruction of some objects required fire, material knowledge and specific bodily actions which all would have contributed a performative element. Whilst it is impossible to conclusively determine the specific acts or practices in prehistory from the material culture alone, a better understanding of the experiential qualities of destruction can have benefits. For instance, the colour of bronze at different temperatures or compositions or the sound of an axe being fragmented is an objective property of the material, not a subjective variable. Such elements might be emphasised or reduced, however, by the conditions in which destruction was conducted; colours would be more vivid if the metal was heated at night, whilst sounds associated with the process might be amplified or more dynamic in a roundhouse rather than in an open landscape.

An experiential understanding of the material naturally relies on phenomenology (Tilley 1994). However, experience is socially-situated and the author's experience of destroying objects is a construct of the modern world so is highly unlikely to be accurate (for a full discussion of this issue see Brück 2005). The experiments produced archaeologically comparable fragments suggesting a similar method of heating and breaking might have been used in the past and by extension would have produced similar sensory stimulations such as noises and sights, albeit in an entirely different context. The reactions to these would have differed according to the significance of the breakage, the location in which this took place and individual or communal ontological conceptions.

A focus on the performance element of destruction emphasises this was not merely a functional action (although the outcome may have served a functional purpose), but rather the production and result of embodied practical knowledge, such as when to remove something from a fire or where best to strike an object to achieve the desired fragmentation process, and would have generated an emotive response. This would have been intertwined with one's own social identity. A similar argument has been proposed for metalworking (Kuijpers 2015) and thus destruction may have been an important element of this stage of an object's lifecycle. It perhaps served to generate memories, reinforce certain practices, or sever ties with the object, whilst also highlighting the skills, social roles and significance of individuals and communities, all of which contributed to a social ontology for those involved. As Kuijpers (2015) argued for metalworking, it was an embodied understanding of the material properties of bronze that allowed individuals to experience objects rather than a rational understanding of precise compositions or details of hardness. Although this cannot provide definitive answers to *why* objects were treated in different ways, the performance of the destruction and the stimulation of senses through actions should nonetheless be considered an inherent part of the process that allowed people to construct a sense of identity.

10.9 Biographies of Destruction

A key section in Chapter 2 emphasised the importance of understanding object biographies to culturally situate the objects. This involves a detailed understanding of the production, use and deposition of objects. By situating the process of destructive practices within the context of a biography, it is possible to enhance how one might understand an object or objects and how objects were entangled with people. The archaeological record preserves the final actions undertaken upon an object and destruction is frequently a key part of this. Thus, understanding destructive actions allows an insight into the final processes in which an object was involved. Often lifecycles of metalwork note destruction as part of the process (see Fig.2.2) but the actual practice is never considered despite the contribution to understanding agency in the past (though see Gosden's (2008) discussion of the Kirkburn sword). Although it would be impossible to achieve this to an adequate standard for all objects, here the potential for this approach is presented firstly by constructing the general biography of an axe fragment followed by a detailed analysis of the South Cadbury shield.

10.9.1 The Life of a Fragment

As a starting point for better understanding the biographies of objects through the scope of destruction, it is appropriate to select a generic, prolific object for which this thesis has contributed a more detailed understanding. Thus, a cutting-edge fragment of a hypothetical axe has been selected. By establishing a generalised approach to an object commonly encountered in the archaeological record one can see how different fragments may have been important. This is especially useful for large hoards, which typically contain lots of fragments that are frequently ignored or not considered to possess social significance other than as scrap or contributing to the overall weight of the deposit. As has been shown these are common finds in the Late Bronze Age both singly and as hoards across Europe and consequently, this approach can be widely applied to better understand these objects.

10.9.1a Production and Use

The production and use of socketed axes has been explored through a variety of experimental and theoretical approaches (e.g. Fontijn 2002, 248-250; Roberts and Ottaway 2003; Webley and Adams 2016). Production required access to raw materials, either as ores to be smelted, or ingots and objects to be remelted. Intrinsic to this were connections of exchange through which to acquire such material; whilst local ores were available in the South West, metal was still brought in from the Continent (Needham et al. 2013) and it has already been suggested that a process of transformation from alienable to inalienable forms might have been necessary. The production process required a range of materials and expertise, including models of the desired object, the preparation of a sand, stone, ceramic or bronze mould and the construction of a casting fire and associated equipment (e.g. bellows and tuyères), as well as knowledge of bronze-casting (Knight 2014; Kuijpers 2008). Furthermore, production required pre-conceived notions and knowledge of specific forms of socketed axes and a desire for those forms.

Following production, most socketed axes show some signs of post-casting preparation, even if this only extended to the removal of casting jets and casting seams. The form of the axe ultimately dictated the level of preparation an axe received, with South Welsh types, for instance, receiving less treatment than others (Burgess 2012). Often socketed axe cutting-edges show signs of wear, asymmetry and resharpening, as well as minor nicks (Fig.10.4; Roberts and Ottaway 2003). For instance, some form of wear could be identified on at least 32% of the socketed axes studied in South West England. The processes in which these objects were used, such as tree felling and the construction of structures and vehicles, would have attributed significance to these objects as a group. Socketed axes of course have their origins in earlier axes which would have contributed to the relationship between people and axes. The maintenance of these tools, and the ways in which they should be used, both require embodied practical knowledge that was the result of the longevity of axes over time.

10.9.1b Destruction

Potential reasons for destroying an object in the Bronze Age have been explored throughout this chapter so here the aim is to focus on the physical process. Experimental work has demonstrated that the easiest way to destroy a socketed axe is by heating it and striking it. This has produced archaeologically comparable cutting-edge fragments and thus it is reasonable to assume that a

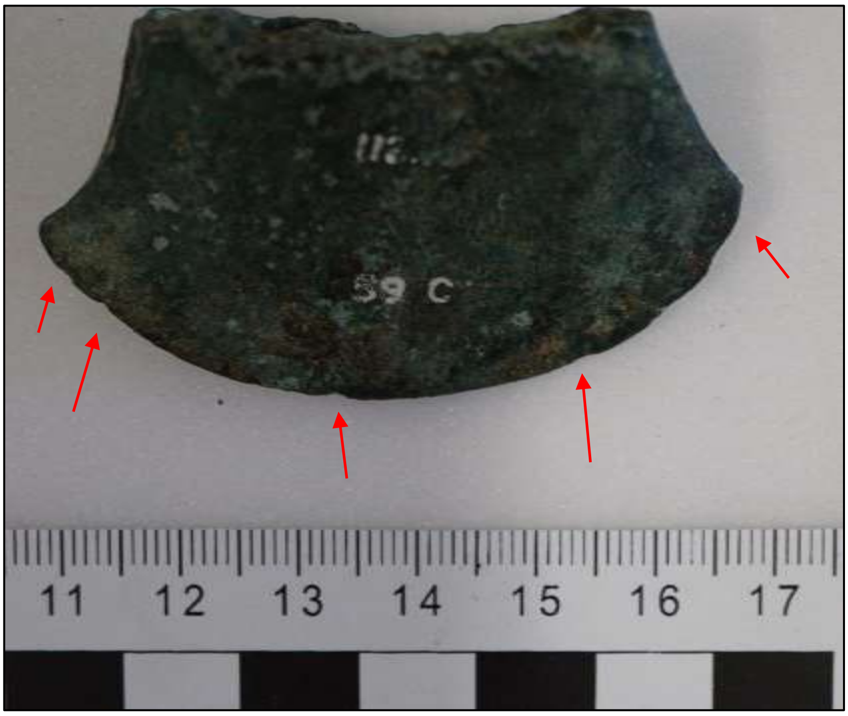


Fig.10.4: A cutting-edge fragment from the Stogursey hoard showing nicks and dents indicating use-wear (TTNCM-F058c3) (source: Author courtesy of the South West Heritage Trust (Museums Service)

similar method was used in the Bronze Age. Destruction in this way would have required the construction of a fire or pyre capable of achieving temperatures around 500°C; as fires were an essential part of everyday life in the Bronze Age, knowledge of fire construction was probably widespread and non-specialised. The axe would have been selected perhaps as a worn-out object or because of its known biography and placed onto the fire; this may have been the only object or one of many. The scale of the event probably would have varied, depending on the involvement of a single individual, multiple people, or a community. This is one of several ephemeral elements within this process.

When deemed hot enough the axe would have been removed and struck with a hammer of some sort. If the axe was removed before it had heated sufficiently, it would be difficult to achieve breakage; thus, knowledge of the colours, sounds and smells of the fire and the metal would have been essential. The process of destruction would have been a stimulating event with a certain level of performance, involved even if this was an inherent unconscious performance, relying on specific understandings and bodily actions (Section 10.8). The destruction of a socketed axe would have reinforced ideas and knowledge and in this way enabled social reproduction.

The experiments demonstrated that although most of the axe might fragment into smaller pieces, the cutting-edge typically stays intact as the densest part of the object. This is observable in the hoards from Stogursey, south-east Wales (Section 9.2.2d) and south-east England (Turner 2010a), and as single finds from across the study region (e.g. Bishopsteignton and Barton Bradley, both Devon: TOR-F001; TOR-F002). Following destruction, all parts of the object were still together. However, pieces and fragments were separated, either immediately, or over time. This might have been a conscious or unconscious process, with certain elements of objects selected for recycling or deposition or for reuse in other practices. It is at this point that the object begins to have multiple life-histories, for which it is only possible to chart the piece that was deposited and recovered in the archaeological record. Absent pieces may have been deposited elsewhere or were subsequently recycled into new objects.

10.9.1c Deposition

The deposition of cutting-edge fragments, either singly or as part of hoards, seems to have been a selective process in at least some cases. The place of deposition was important (Section 10.6) and there is currently no evidence that destruction and deposition took place in the same location though this should not be ruled out; this raises the possibility that fragments were transported to their final depositional site. Cutting-edge fragments are rarely found deposited at Late Bronze Age settlement or monumental locations, suggesting a deliberate removal of axes from these areas with which they might once have been involved in constructing; this point has also been made for axe deposition in the Netherlands (Fontijn 2002, 250). However, single and hoarded fragments of axe cutting-edges have been recovered from similar geographic and topographic locations indicating that deposition was governed by similar ideologies, regardless of the scale.

Destruction was a key part of these ideologies, as evidenced by the numerous fragments recovered, not only of socketed axes, but also of swords, spearheads and ingots in the Late Bronze Age. By charting the general biography of a cutting-edge fragment with a focus on the destructive practices involved it has been possible to show how one might better understand the prehistoric agencies and embodied knowledge.

10.9.2 The South Cadbury Shield

Contrasting with the general perspective presented above, here the focus will be on a single object: the South Cadbury shield. This has been selected as it has a secure archaeological context, an unusual mode of destruction, and ultimately demonstrates how destruction and personhood may have been intricately linked. Furthermore, this case study draws on the themes presented so far in this chapter. The destruction of the South Cadbury shield has already been highlighted as a significant event, potentially associated with a variety of other depositions, including human and animal bones, pots and burnt stones. Here a more nuanced biography of the shield will be presented to better understand its role as an inalienable object.

10.9.2a The Lifecycle of the Shield

Firstly, the full lifecycle should be considered (Fig.10.5). The procurement, production and use of the shield must remain speculative, but manufacturing processes are increasingly well-understood, building on studies by Coles (1962), Needham (1979a), Molloy (2009) and Uckelmann (2012, 108ff.).

Furthermore, a shield replica was recently produced for Newcastle University which took about a month to produce, requiring high levels of material knowledge and physical exertion (Neil Burridge pers.comm. 2016). The shield production required repeated sessions of coldworking and annealing to reduce the strain on the metallic microstructure and limit the risk of unwanted fragmentation; this process is supported by a metallographic analysis of the Cadbury shield (Needham et al. 2012, 484). These studies indicate that the production of a shield was a specialised activity.

The earliest bronze shields appeared in Britain during the Taunton-Penard metalworking phases (c.1400-1120 BC) though production of organic shields (e.g. leather or wood) in Ireland began as early as the Willerby phase (c.1800 BC) (Uckelmann 2012, Abb.27). The distribution of bronze shields suggests that knowledge of the production of bronze shields was not widespread in western Britain (Fig.10.6) and it is possible such objects were specialised objects, linked to specific smiths, or representative of certain social relations or areas.

The Cadbury shield thus infers two possibilities:

1. A metalsmith capable of producing a shield was present in the area; or
2. The shield represents an import from another region.

Although aspects of the processes involved in the production and circulation of the shield can be postulated, the human agency must not be ignored: an individual or group in the area *wanted* the shield at some point. No doubt the specialised production and potentially rare nature of shields in this region increased the inherent economic and cultural value of the object (cf. Needham et al. 2012). However, Molloy (2009, 1061) argued for caution in overstating modern perceptions of their value as a rare object in the archaeological record: organic examples may have been in greater circulation than presently indicated and metal forms were likely recycled.

Procurement of raw materials/shield

Two possibilities for procurement:

- Ingot blank for shield acquired through recycling old objects or imported raw metal. Shield then produced locally by a metalsmith; OR
- The shield was an imported product from elsewhere

Both require a trade/exchange network as well as locally motivated agency to acquire the shield

Manufacture:

Location/workshop needed in which to produce the shield

Possible a lengthy process (c. 1 month)

Necessary metalworking processes:

- Repeated cold-hammering and annealing to expand the ingot and produce a shield blank
- Rows of ribs and bosses hammered in
- Shield rim folded over a reinforcing wire
- Handle riveted on

Use

- Probably display functions
- Perhaps retained over several decades from production to deposition

Deposition and Destruction

- Post removed from posthole OR posthole purposefully dug within silted up ditch
- Cattle/deer hip bone inserted into posthole
- Shield laid over the top of the posthole, face down, with the central boss within the depression of the posthole
- Shield stabbed three times with a blunt, non-metallic instrument
- Shield rim damaged perhaps as part of this process
- Variety of concurrent depositional and destruction activities

Post-deposition and Archaeological Recovery

- Shield left *in situ* and either buried at the time or ditch left to continue silting up
- Archaeological discovery in 1997

Fig.10.5: The lifecycle of the South Cadbury shield (source: Author; photo of Cadbury shield taken courtesy of South West Heritage Trust (Museums Service); photo of Yetholm shield © National Museums Scotland)

This image has been removed by the author of this thesis/dissertation for copyright reasons.

Fig.10.6: Distribution of different types of Bronze Age shields in Europe (source: Uckelmann 2011, Fig.1)

Uckelmann (2011) argued that shields may have served three core functions – defence, display and dedication – and that the purpose of shields likely transformed over time because of their social involvements. Two shields from the River Thames, for instance, show damage that may have been inflicted by swords or spears (Uckelmann 2011, 193-194; 2012, Nos.9 and 43) suggesting their involvement in combat; their deposition in the Thames may have served a dedicatory purpose. The poor condition of the Cadbury shield makes it difficult to identify signs of combat damage and it is possible it may have served a display function (Tabor 2008). This might be supported by the probable low hardness value of the metal (c.60-90 VPN), which would not have been effective for resisting weapon strikes (Needham et al. 2012, 484).

Within this, one must consider the sensory aspects of a metal shield. In terms of form and size, the object type has no bronze parallels, and the bright and reflective bronze colour would have made for an impressive and mnemonic object (Knight *forthcoming*(a)). The ribs and bosses may have functionally strengthened the shield (Molloy 2009), but it cannot be ignored that the décor is remarkably like that seen on the ribbed and bossed bracelets from Norton

Fitzwarren (Fig.10.7), suggesting a decorative function. If for display purposes the Cadbury shield may have been reserved for certain ceremonies or rites of passages, incorporating these sensory elements; alternatively, knowledge of the shield may have been restricted with only limited access to certain people within the community. The potentially extended period over which the shield was retained, indicates that it was a treasured object within the community. It may have become inalienable to the community in which it was situated.

Fig.10.7: Fragments of the ribbed and bossed bracelet from Norton Fitzwarren (source: Author courtesy of South West Heritage Trust (Museums Service)

10.9.2b Destruction and Deposition

Details of the deposition of the shield were provided in Section 8.3.4, but it is worth reiterating four key points:

1. The shield was the only metal object recovered from the site.
2. It was probably already several decades old when deposited.
3. It was one of several long-term depositions in a boundary ditch.
4. The deliberate destruction was a carefully constructed act.

To recount, the shield was laid face down over a posthole and penetrated *in situ* three times from behind with a non-metal, blunt implement, possibly a wooden stake (Coles et al. 1999, 38-9, 45-6; Needham et al. 2012). There are various considerations within this set of actions. Firstly, the posthole indicates that a post of some kind was once present which means that to position the shield the post had to be removed. Even if no post was ever present the posthole had to be dug. A posthole within a ditch is unusual though another is present one metre to the west. Furthermore, prior to the deposition of the shield a red deer or cattle hip bone was placed within the hole. If one considers the probable life history of this bone, it requires the killing of a domesticated or wild animal, the portioning of the animal, perhaps the stripping of the meat from the bone, and a variety of other actions. The bone showed signs of animal gnawing (Coles et al. 1999, 37) which implies it already had a taphonomic history. It is inevitably difficult to determine if one should consider this bone significant *prior to* or *because of* the deposition.

The shield was specifically placed above the bone with the central boss set into the hollow “thereby preventing any risk of it being crushed” (Needham et al. 2012, 478). As Needham et al. (2012, 478f.) commented, this appears paradoxically opposed to the fact that the shield was subsequently stabbed from behind three times. Furthermore, part of the rim had been damaged probably upon deposition maybe by hammering (Needham et al. 2012, 479). At a performative level this act of destruction raises some possibilities. Firstly, the nature of the implement used for stabbing the shield is unclear but the physical action of stabbing the shield would have required a specific set of bodily actions. If one assumes that this was a wooden stake of some kind, it is possible to envisage two scenarios:

1. A long wooden staff with a sharpened tip driven in from a standing position; or
2. A shorter stake that required the wielder to kneel or crouch next to the shield to penetrate it, perhaps with the aid of a hammer.

The mechanical properties of the metal required to achieve this have been considered by Needham et al. (2012, 489). Firstly, the low hardness would have been an enabling factor. Needham et al. (ibid.) also posited that the age of the shield may have meant processes of corrosion had already begun and thus the shield was weaker as a result; alternatively, the shield may have been heated to annealing temperatures (c.650-700°C) prior to deposition which would have softened the metal for destruction (ibid.). At a maximum thickness of 0.6mm it is unclear what level of force would have been required but experimentation may help understand the bodily actions and the tools required to penetrate the shield.

The potentially late date of deposition is also significant. If the shield was deposited during the transitional period from the Penard-Wilburton phases (c.1100 BC), this concurs with the increased deposition of deliberate destroyed martial equipment in other areas of the country. Although the deliberate destruction of shields is uncommon, Uckelmann (2012, 178-179) suggested that the deliberate removal of handles may have been a form of destruction, as seen on a Yetholm shield from the River Thames (ibid., No.42). Moreover, two shields from Herzsprung, Germany, dating to c.1000-900 BC were found apparently folded and buried under an oak tree (Uckelmann 2012, Nos.75 and 76). Although post-dating the deposition of the Cadbury shield, the Herzsprung shields emphasise that later forms might be subjected to decommissioning damage.

The performance of destruction in the Milsoms Corner ditch was probably a public action observable by a wide audience and therefore might be considered an open expression of a set of beliefs or changing circumstances. The lifecycle of the shield may have been widely known; its potentially long life means the deposition and destruction of the shield could have been an act of transformation linked with a kinship or communal identity metaphorically ending the identity of the shield. The public performance can be seen both as a mnemonic act, establishing a memorable event, and also a process of forgetting ending the life of the object and any relations attached to it (Knight *forthcoming*(a)); the destruction of *Malanggan* art in Melanesia serves a similar function (Küchler 1987; 2002). Following destruction, the shield was left *in situ* though it is unclear whether it was immediately covered up, or allowed to bury naturally. It is possible that its position was preserved in social memory and thus achieved a mythological status.

As stated in Section 8.3.4, it is important not to see this as an isolated incident but rather as part of a series of actions that were culturally situated. The multiple phases of ditch formation meant the shield was deposited in a temporally significant context. This is furthered by the possibly contemporary posthole to the west filled with burnt blue stones and an Early Bronze Age, possibly ancestral, leg bone. Whilst the burning of stones was probably linked to cooking or bathing processes, the colour could have influenced the selection of the stones. Meanwhile, the elements of various animals (e.g. cattle jawbones) as well as potsherds indicates a variety of other selective processes; pieces may have been chosen for the significance of the individual objects or for their role in wider communal activities such as feasting. These may have been elements of refuse but the individual fragments in specific locations could represent token deposits.

This discussion has demonstrated the biographic potential for a study of destruction. The shield, an object atypical for the region, likely had inalienable qualities emphasised by its aesthetics and display function. The long length of time over which it was kept indicates its role as a communal symbol, perhaps with an heirloom status. The destruction of this object could thus be linked with the end of a certain set of beliefs or the death of a lineage; the destruction of the shield was a constructed event situated in a settlement boundary alongside a variety of other coordinated practices. It is possible to envisage an accompanying feasting event (cf. Tabor 2008) with a public ceremony that severed the relationships between the people and the object whilst also serving to establish a prolonged memory, thus enabling construction of a communal personhood.

10.10 Summary

This chapter has addressed a broad range of considerations for better understanding the deliberate destruction of metalwork in South West England drawing on ethnographies, previous Bronze Age studies and experimental activities. The appropriateness of theoretical approaches, such as enchainment and the dichotomous divide between functional and non-functional destruction, has been assessed, finding that no single approach should be utilised. Instead comparative and contextual analyses are necessary to determine the significance of not only the objects involved but also the places and practices. Destruction may have been part of a process of token sacrifice for some Late Bronze Age hoards and single finds, whilst throughout the Bronze Age some objects may have been destroyed as part of an expression of the death of an individual. Experiential qualities of destruction have also been considered to emphasise the sensory elements of this practice though one must be careful of applying these without due consideration of one's own social situation. It is the materiality of objects that would have allowed them to be experienced and destruction would have served its own purposes perhaps as a mnemonic device. In these ways objects can be linked with concepts of personhood and social reproduction through the processes undertaken upon them. This was emphasised by a general biography of axe cutting-edge fragments followed by a detailed biographic analysis of the South Cadbury shield, which combined the themes presented throughout the thesis. This demonstrated the essential nature of considering the processes and performances of destruction that accompany the deposition of metalwork.

CHAPTER ELEVEN

CONCLUSIONS: BREAKING IT DOWN

> "(a) Can the identification of deliberate object fragmentation contribute to the understanding of specific deposits, sites or landscapes? (b) To what extent does the agency of humans and objects relate to structured deposition and deliberate object fragmentation?" (Chapman 2012, 130).

11.1 Introduction

In many respects the two questions above reflect the core aims of this thesis. The deliberate destruction of Bronze Age metalwork needs to be approached from both a theoretical and a practical perspective to better understand the relationship between people and their objects, which has been a key motivation throughout. Questions surrounding *why* objects were destroyed have typically superseded *how* objects were destroyed, thus ignoring a key process that has much potential to inform archaeologists about prehistoric practices. Consequently, this thesis has focused as much on the material aspects of destroying Bronze Age metalwork as on interpreting reasons behind these actions. Following a review of past approaches to destruction, experiments were devised to explore and answer basic questions about destroying metalwork. Past studies were then combined with the experimental procedures to devise a Damage Ranking System for identifying damage based on a variety of contributing factors.

This scheme was applied to a study of metalwork from South West England to investigate the significance of destruction in this region. By better understanding the combination of practices that preceded and influenced the deposition of metalwork it was possible to assess how Bronze Age personhood was constituted and expressed through the practices undertaken. This final chapter summarises the outcomes and wider impact of the research considering the overall research aims, before presenting future avenues for research.

11.2 Research Outcomes

This thesis addressed a series of research questions and aims designed to enhance the identification and interpretation of the deliberate destruction of Bronze Age metalwork (Table 11.1; see Section 1.6). A key aim was to challenge assumptions about how one might identify deliberately destroyed metalwork and determine whether destruction required skill and knowledge; this might consequently help archaeologists to better understand the relationship between people and objects. Furthermore, the questions emphasised the need to consider various contextual elements associated with deliberately destroyed metalwork. Answers to these questions also formed the basis for better understanding how deliberately destroyed metalwork might be approached and understood taking into consideration theoretical approaches.

Table 11.1: The research questions presented in Chapter 1.

Research Questions
Is it possible to identify evidence for the deliberate, rather than accidental, destruction and decommissioning of Bronze Age metalwork?
What destructive techniques were used and do these require technical skills?
Are there patterns in the deposition of deliberately destroyed metalwork, e.g. in associations or depositional contexts that suggest it was treated differently to complete or accidentally damaged metalwork?
Is there a correlation between the treatment and the topographical context of metalwork deposits?
How might a study of the deliberate destruction of metalwork inform archaeologists about the social, economic and/or ritual role of these practices?
To what extent do the actions taken upon the objects and the subsequent depositions allow archaeologists to better understand the relationship between people and objects?

Chapters 3-5 addressed the more practical elements of the research questions, demonstrating that a combination of understanding evidence of manufacture, use-wear, post-depositional elements (such as corrosion) and how damage might be sustained all contribute to the identification of deliberate, rather than accidental, metalwork damage. No overarching methodology has ever been constructed for identifying the deliberate destruction of Bronze Age metalwork, which means that previous studies have typically used a ‘common sense’ approach for identification. Chapter 3 critiqued these past approaches and highlighted the benefits of incorporating wear studies into an analysis of damaged metalwork. A series of experimental activities was designed to better understand the process of destruction and replicas of swords, spearheads and axeheads were produced with the intention of testing different methods for destruction (Chapter 4). The swords and spearheads were utilised in combat experiments and participants were encouraged to deliberately misuse the objects to produce a variety of damage that might occur by accident. By producing unintentional damage on replicas, these experiments offer the opportunity to reassess damage seen on archaeological artefacts. Damage previously interpreted as ‘deliberate’ is increasingly being demonstrated during use experiments; there are thus wide implications for recognising how objects may become damaged in a variety of ways.

The destruction experiments, meanwhile, were conducted with simple aims. The main question to be answered was: what is the best way to break a bronze object? Variables explored included compositions, tools and temperatures. It was conclusively found that the easiest way to break a bronze object was to first heat it to around 500-600°C and then strike it with a blunt tool, which is enabled by a process called ‘hot-shorting’. Objects that were struck while cold were difficult to break and caused plastic deformation of the material that is not archaeologically comparable to many of the artefacts studied in South West England. These conclusions form a fundamental understanding of how Bronze Age metalwork was probably destroyed. This understanding can be incorporated into future studies and reassessments of older material. A fire or hearth would have been required, as well as material knowledge of the properties of the object. However, limited skill would have been necessary to break the objects; skill would, however, be necessary to construct a suitable fire into which the metalwork could be placed, as well to identify when the bronze object had reached the right temperature. Previously, these processes have been speculated (e.g. Turner 2010a), but the demonstration of this through experimentation means one can refine interpretive discussions of deliberate destruction and object biographies. The *practice* of destruction can be incorporated, expanding on studies that would normally only focus on the production and use of the objects. The destruction and deposition of the objects should be seen as an important narrative to be explored.

The results of the experiments, alongside an analysis of previous metalwork studies, enabled seven destruction indicators to be defined (Chapter 5). Although each of these indicators may be the result of destructive practices, they are not inherently the result of intent. An objective assessment of the destruction indicators for all object types was presented (Table 5.2; Section

5.2), followed by a Damage Ranking System (Table 5.5; Section 5.3). This system is one of the main contributions of this thesis as it allows damage on individual objects to be ranked according to the likelihood that the damage was intentional; one can consequently make informed assessments of the damage observed on metalwork. Based on objective research and criteria that can be refined over time, this system offers a starting point for the classification and interpretation of damage that is not reliant on assumptions about the material. This system has a wide applicability which could contribute to material studied in larger site reports as well as assessing individual finds that are recovered, for instance through the Portable Antiquities Scheme. As it is the first of its kind, there are inevitably still refinements that could be made to this methodology but it is presented here as a framework to be enhanced as the destruction of metalwork is better understood through future investigations.

This system was successful in enhancing how the metalwork of South West England might be interpreted, and also illustrated its potential to be applied to other areas. Firstly, metalwork was ranked and grouped which meant damaged metalwork that was not the result of intent was easily excluded from analyses; the focus could then be placed on contextual features, such as topographical and geographical locations, associated objects and the depositional situation (e.g. settlement, burial etc.). This formed the focus of Chapters 8 and 9. Like other areas of Britain and Europe, it was found that the deposition of deliberately destroyed metalwork largely occurred in burial contexts in the Early Bronze Age, but became more common in other contexts in the Middle-Late Bronze Age. By analysing a large geographical area, differences in where and how deliberately destroyed metalwork was deposited could be observed. This was partly the result of the connections between different parts of the South West with other areas of Europe, with the Stogursey hoard displaying affinities with hoards from south-east Wales (Section 9.2.2d) and the Carp’s Tongue material in Late Bronze Age hoards from Cornwall indicating influence from north-western France (Section 9.2.2c). Indeed, the geographic positioning of the South West was one of the key reasons for choosing this region (Chapter 6). It was posited that the metalliferous nature of the region, particularly Devon and Cornwall, may have meant a different set of practices were performed in comparison to other regions. Although there is some evidence for this, especially when compared to areas such as the

Netherlands (Fontijn 2002) or the River Thames (York 2002), there is little to suggest that the South West had a more or less distinctive relationship with the metalwork. Indeed, the South West appears instead to have been increasingly influenced by its connections with other regions, with specific south-western styles expressed through material culture and associated practices decreasing over the course of the Bronze Age (Chapters 6-9). Destruction across the region was infrequent, limited to significant case studies which perhaps represented significant isolated events for controlling or expressing social situations (e.g. the Bloody Pool hoard).

It was especially important to understand the relationship between people and metalwork during the Bronze Age. Chapter 10 clearly presents the numerous ways in which the deliberate destruction of objects, specifically metalwork, was utilised at various times for different situations. Crucially, no single interpretation was applicable to all case studies, or even similar groups of objects, and the need for a case-by-case investigation was important. This is a necessary consideration for broader studies incorporating large geographic regions; the focus on individual finds, sites and assemblages meant interpretive issues could be disentangled and closely assessed. Even where destruction and deposition may have been conducted for functional processes (e.g. reduction for recycling), there may have been non-functional elements to the process, such as a *pars pro toto* sacrifice of material (Hansen 2016). This interpretation is supported by the general absence of refitting pieces and fragments within Late Bronze Age hoards, and the seemingly deliberate selection of certain parts of objects, alongside consideration of non-western and historical economies (e.g. the importance of gift giving: Bloch and Parry 1989; Brück 2015; Mauss 1990). Moreover, an analysis of single finds of destroyed Late Bronze Age swords, ingots and axeheads found they were often deposited in similar locations to hoards; similar elements of the objects were also represented, suggesting that a distinction between these single and hoarded items may not be appropriate. This point has been raised in other studies (e.g. Becker 2013) and the research conducted here has value in contributing to this overall narrative for the Bronze Age.

In the Early Bronze Age, the destruction of some objects could be linked to the death of individuals, which is also observable in other parts of Britain at the same time (Brück 2004; 2006a). However, the destruction of objects was not exclusive to metalwork, and often non-metal objects were included incomplete, as indeed were the human remains. This suggests that humans and objects may have been treated similarly, with pieces perhaps taken by different parts of the community at different times to enchain the living and the dead, as is seen in many ethnographic studies (Section 2.1). Alternatively, the destruction of possessions may have served a mnemonic function, linked with forgetting or commemorating the dead through their absence and transforming them and their possessions to a mythical status (cf. Küchler 2002). Many Bronze Age burials include a combination of complete and incomplete objects, which likely reflects different responses to different objects in different areas; no single ‘pattern’ of what was destroyed and what was left intact could be identified. Each practice undertaken upon the objects served to reinforce ideologies and beliefs held by the community and about the deceased individual; it was in this way that personhood was constructed over time. The continued manipulation of human remains alongside broken objects in the Middle and Late Bronze Age suggests these ideologies transformed over time and manifested as a variety of practices (Brück 1995; 2006a).

One of the main considerations throughout regarded the biographies and histories of objects. The potentially long ‘afterlife’ of broken objects has been shown for a variety of objects, which complements several other studies (e.g. Chapman 2000; Woodward 2002). A detailed analysis of different objects and their depositional contexts showed that breakage did not necessitate the end of an object’s lifecycle and often they continued in circulation, perhaps as heirlooms or tokens of relationships. Section 10.9 demonstrated the importance of understanding the destruction of objects as a way of not only gaining insight into an object’s biography, but also the accompanying practices and beliefs that may have been inherent to the process. The effectiveness of this ‘biography of destruction’ was illustrated generally for a cutting-edge fragment of a socketed axe, and for the South Cadbury shield; there is potential for undertaking this approach on other objects or indeed hoards of objects. A better understanding of the experiential elements and bodily practices that go into destroying an object can allow archaeologists to gain more nuanced interpretations of the material under study.

11.3 Future Directions

As with any extended project, this thesis has raised a series of avenues for future research that warrant consideration.

- **Application of the Damage Ranking System to other areas**. The established Damage Ranking System was beneficial in identifying the likelihood that metalwork had been deliberately destroyed. Previous studies have often made assumptions about the damaged material under study, whilst the system here sets out a series of considerations that can be used as characterising factors. This allowed a more nuanced consideration of deliberately destroyed metalwork in South West England, such as a greater understanding of single finds and mixed practices within hoards. Future work should be conducted applying this system to other regions and situations to enhance understanding of deliberate destruction elsewhere.
- **Refining the Damage Ranking System**. Despite the benefits of the system, there remain elements of subjectivity that require refining. Further experimental work exploring a greater range of variables, such as temperature, composition, tools, and object types, would be beneficial for not only reaffirming some of the conclusions within this thesis, but also expanding the reference collection available for comparing with archaeological destruction. Furthermore, the actualistic experiments conducted here would benefit from a complementary set of scientific experiments measuring the forces required and the hardness and metallography of objects before and after destruction, which would only enhance the reference collection. This would refine the Damage Ranking System and make it increasingly applicable to a range of objects and situations.
- **Expanding the geographic region.** A benefit of South West England was the broad geographic area that it encompassed. This allowed different destructive and depositional practices to be observed that were influenced by variations in geography and topography as well as adjacent areas. For instance, Devon and Cornwall often showed affinity, whilst Dorset demonstrated closer links and influences with central southern England. By expanding the region under investigation, one could explore this further. A complementary study in neighbouring

counties, such as Wiltshire, Hampshire and Gloucestershire, or regions, such as Wales, would enable interpretation of Bronze Age interconnectivity as evidenced through destructive and depositional practices.

- **Broader analysis of destructive practices and materials**. The destruction of material culture in the Bronze Age is not exclusive to metalwork. Although this has formed the focus of this thesis, this should be contextualised alongside other ongoing destructive practices, such as that undertaken on human and animal remains, stone tools and ceramic artefacts. The materiality of different objects may have required different methods for destruction. Furthermore, a comparative regional analysis of destructive practices would highlight different treatments of different objects in different areas; this may be linked to social responses to the immediate landscape and political environment. The variations in burial practices across Britain in the Early Bronze Age demonstrates that this was the case, as well as the variations in depositional locations in South West England in the Late Bronze Age.

11.4 The Final Fragment

The aim of this thesis was to better understand the deliberate destruction of Bronze Age metalwork. This was achieved through a reappraisal of past approaches to the data, coupled with experimental activities to produce a Damage Ranking System for better understanding intentionally damaged objects. This was applied to metalwork from South West England spanning the Bronze Age and coupled with a detailed contextual analysis to better understand how destruction expressed aspects of social reproduction in a wider social situation. The more nuanced interpretations presented through this study demonstrate the value in considering destruction not only as a social process but also a technical one, that required a set of bodily practices, skills and knowledge that has previously not been explored for the Bronze Age.

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Journal Abbreviations

Ant. J. = Antiquaries Journal

Arch. Camb. = Archaeologia Cambrensis

Arch. J. = The Archaeological Journal

CA = Cornish Archaeology

JRIC = Journal of the Royal Institution of Cornwall

PDAS = Proceedings of the Devon Archaeological Society

PDAES = Proceedings of the Devon Archaeological Exploration Society

PDNHAS = Proceedings of the Dorset Natural History and Archaeology Society

PPS = Proceedings of the Prehistoric Society

PSANHS = Proceedings of the Somerset Archaeology and Natural History Society

TDA = Report and Transactions of the Devonshire Association for the Advancement of Science, Literature and Art

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