THE CIRCULATION OF FLESH: REGIONAL FOOD PRODUCING/CONSUMING SYSTEMS IN SOUTHERN ENGLAND 1500BC - AD1086

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Thesis submitted for the degree of Doctor of Philosophy

Trinity Term 2016

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ABSTRACT

It has become an axiom of British archaeology that the results of developer-funded fieldwork are under-utilised in research and several projects carried out at British universities have attempted to redress this perceived imbalance. These projects, including those on British and Continental prehistory carried out by Richard Bradley, the Roman Rural settlement project, the Fields of Britannia project, John Blair's work on early medieval England and the EngLaId project, of which this thesis forms a component, have all demonstrated beyond doubt the transformative effect of the data produced by developer-funded work on our understanding. However, to date no project has sought to utilise artefact and ecofact data produced by developer-funded work on a similar scale. This thesis is partly an attempt to fill this gap, by using ceramic, animal bone and charred plant data from digital archives generated by developer-funded archaeology, to address a series of questions about food production/consumption over the later prehistoric and early historic periods in Southern England. These three datasets have very varied characteristics and their integration in a single database was, therefore, one of the major challenges of the thesis. However, this also provided the opportunity to ask new questions and to address old questions with new

data. The thesis argues that regional ecosystems had a long-term influence on processes of food production/consumption, which displayed considerable continuities across the boundaries of traditional archaeological periods. Landscape, settlement, ceramic, animal bone and charred plant data from three regional case studies, encompassing the Upper Thames Valley, the Middle and Lower Thames Valley and the route of HS1 in Kent were investigated using a Filemaker database and QGIS mapping. It is argued that, while there were long-term continuities in the use of plants and animals, the expression of social relationships expressed in fields, settlements and ceramics followed a cyclical pattern.

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LIST OF ABREVIATIONS

ADS	Archaeology Data Service
CAT	Canterbury Archaeological Trust
CSA	Case Study Area
ENGLAID	The English Landscapes and Identities Project
GIS	Geographical Information Systems
LTV	Lower Thames Valley
MLTV	Middle and Lower Thames Valley
MTV	Middle Thames Valley
MOLA	Museum of London Archaeology
OA	Oxford Archaeology
UTV	Upper Thames Valley
WA	Wessex Archaeology
BA	Bronze Age
MBA	Middle Bronze Age
LBA	Late Bronze Age
LTRBA	Later Bronze Age
IA	Iron Age
EIA	Early Iron Age
MIA	Middle Iron Age
LIA	Late Iron Age
RO	Roman
ER	Early Roman
MR	Middle Roman
LR	Late Roman

EMED	Early Medieval
EAS	Early Anglo-Saxon
MAS	Middle Anglo-Saxon
LAS	Late Anglo-Saxon

ACKNOWLEDGEMENTS

I would like to thank my supervisors Chris Gosden, Zena Kamash and Chris Green for their inspiration, ideas and endless practical and moral support, and for choosing me for the DPhil in the first place. The EngLaId team of Anwen Cooper, Miranda Cresswell, Letty Ten Harkel, Tyler Franconi, Roger Glyde, Victoria Donnelly and Sarah Mallet provided helpful criticism, a supportive atmosphere and lots of fun! For my transfer and confirmation papers Rick Schulting and Damian Robinson provided differing perspectives and much needed constructive criticism. The process of writing this thesis was also made much, much easier by the friendly and constructive criticism, help with statistics and with archaeobotany of Amy Bogaard. Also invaluable from an archaeobotanical point of view was the advice of Liz Stroud, Lisa Lodwick and Mark McKerracher. For early pointers and wise advice I'm grateful to Anwen Cooper, Jody Joy, Wendy Morrison, Linda Hulin, Duncan Garrow, Hugo Anderson-Whymark, Fraser Sturt and Matt Brudenell, who also provided data and introduced me to Dropbox. Julie Hamilton and Martyn Allen helped me with animal bones and Pete Bray and Alisdair Pike gave me useful tips on "Big Data". Alex Smith shared ideas, data and coffee and Kelly Gibbons helped me figure out the Cotswold Community archive. Steve Rippon provided me with an early copy of his *Fields of Britannia* book. At Oxford Archaeology Nicky Scott helped me find missing archives, Gill Hey, Tim Allen, Paul Booth, Chris Hayden, Ed Biddulph, Lena Strid and Andy Simmonds all provided data, while Paul Miles and Gary Jones helped with navigating OA's computer systems. Courtney Nimura saved my bacon by providing the metadata that unlocked the MOLA database and Karen Stewart helped me access that data. At Corinium Museum Alison Brookes

helped access the Thornhill Farm archive. Archaeological conversations with Richard Bradley on everything but my thesis were both enriching and a wonderful distraction and Tim Knowlson of the University of Oxford Counseling Service provided invaluable support with facing up to anxiety and sleep deprivation. Jody Joy read a first draft of chapter two and Duncan Garrow read the final draft, both provided very useful and improving feedback. I would also like to thank my family, particularly David and Angela Stansbie for thoughtful advice on the DPhil process and statistics, Tim Moger for sorting out my formatting, Ethne and Shaun Connor for providing hospitality and an excellent place to work on the West coast of Ireland, and the Kassows and Traynors for putting up with my work schedule during family visits, and looking after James. Finally, I owe the biggest debt of gratitude to my wife Sarah Connor for giving me the confidence to start in the first place and all her boundless support, which only she and I will ever know the true extent of.

1 INTRODUCTION

1.1 Questions, methods and data

The central research question of this thesis concerns regional change and continuity in food producing/consuming systems in Southern England over the longue durée, from later prehistory (c.1500BC) until the end of the early Middle Ages (c. AD1086). Framed as an hypothesis this question states that there were regional differences in food production and consumption and that these persisted across the boundaries of the time periods traditionally used to divide up English prehistory and history. The notion of a food producing and consuming region draws on the idea of the ecosystem, which was first applied systematically to archaeology by Clark (Trigger 2006, 360) and is associated with a degree of determinism running from natural systems to cultural systems. In contrast the arguments of this thesis draw on an idea of non-linear, complex systems (conceived as abstract-machines) that incorporate human and non-human agency on an equal footing, which derives from the work of De Landa (1997, 103–134) on European medieval "biological history", itself influenced by the work of Deleuze and Guattari (2011 [1987], 566). Theoretically the hypothesis is influenced by a second set of ideas, which is that economic production and consumption are best viewed as two sides of a coin, so that any economic system incorporates consumptive production and productive consumption (Marx 1973[1939], 90-93). The thesis was undertaken as a

component of the English Landscapes and Identities Project (EngLaId) at the University of Oxford, which has examined the development of English landscapes and identities from 1500BC -AD 1086 using developer-funded data.

On a more empirical level much recent archaeological work on food has sought to investigate aspects of regionality in consumption, with recent work on later prehistory (Champion 2011, 2014; Hambleton 1999, 2008), the Roman period (Cool 2006) and the early medieval period (Holmes 2015; Poole 2008) arguing for regional diversity in animal and crop husbandry and food preparation and consumption technologies. Much of this work has revealed a marked division in practices between Eastern and Western England (Champion 2014; Hambleton 2008; Holmes 2015), with differences particularly in favoured crop and animal species, but also in the use of particular technologies such as perforated clay plates (Champion 2014), which are argued to be associated with specific ways of processing grain into food (ibid.). However, all of these studies focus on specific temporal spans, which fall into traditional and arguably arbitrary period divisions, such as the LBA and IA, or the early medieval period. One consequence of this way of dividing up time is that processes of development, in, for example, the prevalence of a particular animal species, are not followed through from period to period: another is that differences which arguably relate to very long-term regional preferences may be seen as the product of cultural preferences specific to a particular time period, for example (Holmes 2015).

A contrasting approach can, however, be seen in the work of Rippon et al. (2015), which incorporates an investigation of Roman and early medieval

regional diversity in animal husbandry and crop cultivation in a transect running across Southern England from Cornwall to East Anglia (ibid. 68). Rippon et al.'s aim is specifically to investigate regional continuity from the Roman period into the early medieval period and to relate differing pastoral and agrarian practices to environmental factors. It therefore complements the aims of this thesis and provides a useful model for a multi-period study of this kind, using a dataset that is similar, but largely complementary rather than overlapping.

The benefits of taking a long-term approach to food in archaeology are threefold. Firstly, a long-term approach enables us to transcend the idea that "culture" played a determining role in the way that people produced and consumed their food in the past, allowing for a mixture of biological and social agencies in the construction of "foodways". More specifically such an approach enables researchers to get beyond the idea of "Iron Age", "Roman" and "Anglo-Saxon" foodways" common in some contemporary work, by demonstrating that food production/consumption was also profoundly influenced by long-term biological features of the environment. A long-term approach allows the drawing out of similarities in the organisation of food consumption and production between chronologically separate periods, for example between Roman and LAS London, which have previously been under-explored.

The research discussed above raises interesting questions about regional continuity in the use of food resources across the very long time span covered by this thesis and also about regional contrasts over the same period. The focus of the thesis will therefore be on two questions: firstly, what was the nature of

variation in animal husbandry, crop cultivation and the use of ceramics between regional systems and secondly to what extent was there continuity in food consumption/production systems within three case study areas (CSAs) located in the Thames Valley and South-East England (Fig. 1.1). These are the Upper Thames Valley (UTV), the Middle and Lower Thames Valley (MLTV) and the route of HS1 in Kent (HS1). The choice of CSAs was contingent upon a number of factors, which followed from one another, including access to large quantities of digital data, the presence of extensive areas of archaeological excavation and the presence of settlements from the three broad periods (later prehistoric, Roman and early medieval) under investigation. As part of the EngLaId project the thesis was conceived from the beginning as a "Big Data" project, which led directly to the requirement for large quantities of digital data. The choice of geographical location for the CSAs therefore initially reflected the availability of large digital data sets from extensive well excavated sites, and was also influenced by the professional contacts of the thesis author, which, it was felt would make the acquisition of such data more straightforward. These factors were linked directly to the presence of large-scale extensive excavation, which is a necessary precondition for the creation of large digital datasets. The choice of sites to be included within each CSA reflected both of the above factors, with a requirement for large sites, which included both settlement from all three periods of excavation and large ceramic and ecofact assemblages. The thesis also identifies cycles of social expression in aspects of the archaeological record relating to both production and consumption, such as field systems and ceramics. The analysis will address continuity and contrasts within each of three food related artefact/ecofact groups in turn, first examining the use of grain, then animal

bones and finally ceramics, using quantified data and GIS mapping. Previous investigations of these topics have tended to focus on relatively small datasets, which is one possible reason why their conclusions have tended to emphasize the traditional period divisions. The discussion will focus on bringing the evidence from the different artefact groups together to produce a big picture interpretation of regional food production/consumption systems.

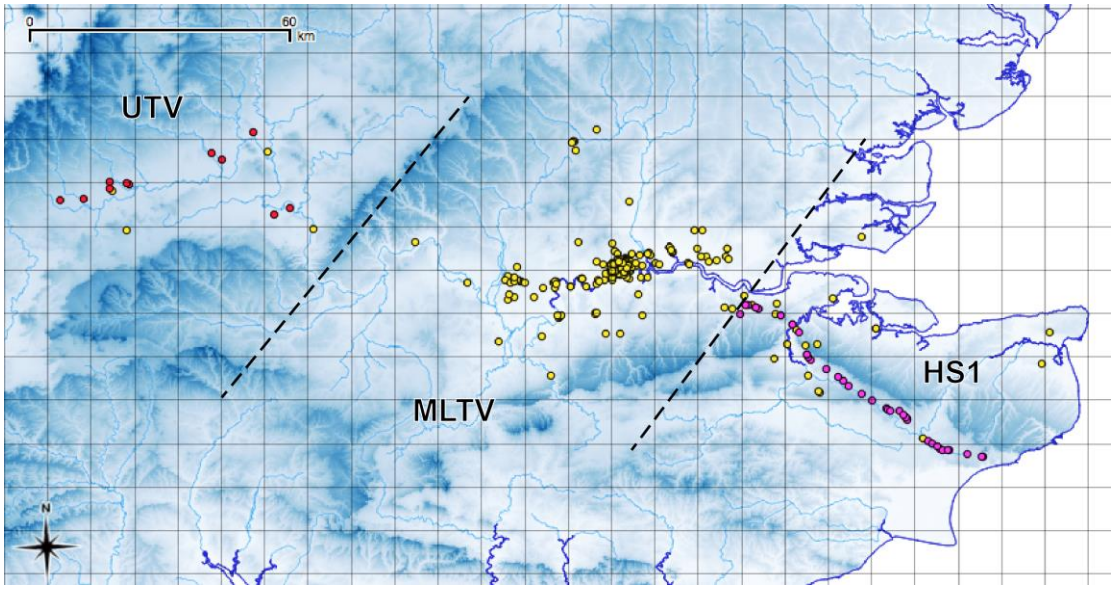


Figure 1.1: The distribution of the case study areas.

1.2 "Big-Data" and this thesis

The concept of "Big-Data" is well established in the wider natural and social sciences and is becoming more so in archaeology; however, the term can mean different things in different disciplinary contexts (Cooper & Green 2016; Jurgenson 2014). It is, therefore, worth discussing briefly what the concept has meant in its relatively short history within archaeology. Arguably the earliest archaeological "Big Data" projects were carried out by Bradley (2007) and Yates (2007) during their early 21st century surveys of developer-funded data relating to prehistoric Britain. However, these projects did not employ particularly

sophisticated computing and an archaeological concept of "Big Data" that would be more recognisable to researchers outside the discipline, did not therefore really develop until after 2010 with the start of three projects (The Fields of Britannia (Rippon et al. 2015), The Roman Rural Settlement Project (Smith et al. Forthcoming), and the EngLaId Project (Cooper et al. forthcoming) employing multidisciplinary teams of researchers, large databases and GIS. These three projects have largely defined the questions and methods of "Big Data" approaches in British Archaeology. Their questions have tended to be very large scale and coarse grained and have often taken the form: what new patterns will emerge if we gather together all of the data that we can access? The methods have necessarily followed from the questions, but have been slightly more varied, with the EngLaId project gathering data from a wide range of sources regardless of quality and the Roman Rural Settlement project being more selective (Alex Smith pers. comm.). This broad brush approach has heavily influenced the questions and methods adopted for this thesis, which is essentially an attempt to apply the methodology developed for these landscape projects to ceramics and ecofacts. The adoption of this style of methodology and approach to questions has led to a thesis that is concerned with the "big-picture" and takes a coarse grained and broad brush approach to the data.

1.3 The structure of the thesis

This thesis is an attempt to come to an holistic view of food production/consumption over the longue durée, using datasets generated during

the course of developer-funded archaeology since 1990. It is explicitly focused on artefact and ecofact data, although it views these data in their wider context of site and landscape. It also attempts to bring together innovative methodological and theoretical ideas based on the concepts of "Big Data" and "non-linear complex systems" respectively. Chapter 2 consists of a review of the empirical and theoretical literature on food, starting with the archaeological and anthropological literature, before moving on to discuss the theoretical underpinnings of the thesis. Chapter 3 deals with methodology, detailing how the different datasets were collected and integrated with one another, the construction and operation of the thesis database and the mapping of data using GIS, before moving on to explain the classification of settlement types and the quantification of charred cereals, animal bone and ceramics. Chapter 4 addresses questions of sample bias and taphonomy. In chapter 5 an investigation of cereal cultivation in the CSAs is undertaken. The first part of the chapter analyses continuity in cereal cultivation/consumption at a regional level, discussing each CSA individually before comparing them. The second part of the chapter moves on to consider the distribution of different cereal species at different kinds of settlement. Chapters 6 and 7 essentially replicate the structure of chapter 5, with chapter 6 investigating animal husbandry and meat consumption and chapter 7 analysing the consumption of ceramics. Chapter 8 considers all three datasets together, arguing for the regional distinctiveness of the CSAs, which showed a considerable degree of persistence through time and across the traditional period divisions of English prehistory and early history. The chapter also applies a theoretical model of complex non-linear systems (the abstract-machine) to the data, arguing for alternating cycles of social expression in

production/consumption linked to rank and status on the one hand and social solidarity on the other. Chapter 9 comprises final reflections considering the effectiveness of the methodological and theoretical approach and what can be learned about the way in which developer-funded finds data are collected and archived in particular. Finally, some ideas for future projects arising from this thesis and the dataset on which it is based are presented.

2 FOOD IN ARCHAEOLOGY: APPROACHES, MODELS AND QUESTIONS

2.1 Introduction

The following chapter consists of a review of the archaeological and anthropological literature on food production and consumption in Southern England from c. 1500BC - AD 1086. It also considers the global literature, but within a more selective and historiographical framework. The chapter moves from a review and critique of the more empirical literature, to a survey of various theoretical models that have been used by archaeologists and anthropologists to understand food, finishing by outlining a theoretical model to be used in the remainder of this thesis. Food is a "total social fact" (2.2.2), being imbricated into almost every aspect of human life; it is therefore open to a huge variety of methodological and theoretical approaches, only a small sample of which can ever be integrated into a single piece of academic work. The following literature review is therefore necessarily selective. Section 2.2 examines food in the archaeological and anthropological literature from an historiographical point of view starting with 19th and early 20th century archaeology, before moving on to consider some important anthropological texts from a more selective point of view, starting in the early 20th century. Section 2.3 consists of a review of the archaeology of food in England in the later prehistoric and early historic periods. Finally, section 2.4 examines potential theoretical models for the archaeological study of food, before developing a theoretical model for the thesis.

2.2 Food in the archaeological and anthropological literature

2.2.1 Archaeology

In the 19th and early 20th centuries food was of marginal importance to mainstream archaeological interpretation. Archaeologists at this time mostly concentrated upon surveying and excavating large and impressive monuments and recovering metalwork and pottery, which could be used to reconstruct relative chronologies (Trigger 2006, 214-15). Animal bone, if recovered, was often discarded and environmental sampling for charred plant remains was non-existent. The excavation of Mesolithic shell middens by Worsaae in the mid 19th century, along with experimental work on animal bones (ibid. 2006, 132–3); however, is evidence of an exception to this general indifference. Another exception is the work of Childe, who, in elaborating the idea of Neolithic and Urban revolutions in prehistory saw food production as an important component in the development of civilization (Childe 1952, 1–13). Childe; however, had little to say on the subject of food consumption.

By the mid 20th century food in archaeology was largely studied in terms of subsistence and was of particular concern to archaeologists studying Palaeolithic, Mesolithic and Neolithic societies, being used partially to define the latter period, one of the signatures of which was considered to be the adoption of farming. The work of Binford (1978; 1983) is perhaps the most widely known example of this approach. Binford focused on understanding the energy inputs derived by human societies from different food resources and how those inputs

articulate with technology to produce adaptive changes in social organization. This is an approach that is definitively not interested in variations in cuisine/consumption, preferring to focus on generalizations concerning the ways in which human culture has enabled adaptation to the environment/production. Binford's methodology was based on an ethnoarchaeological study (Binford 1978) in which he observed a group of Nunamuit hunter-gatherers obtaining food. During this fieldwork Binford observed hunting, butchery, consumption and discard of animal bone and attempted to calculate the quantity of energy obtained and expended. He also studied the taphonomic processes generated by hunting and by domestic activities in camps, and how these created patterns in the archaeological record (Trigger 2006, 405). Binford also supplemented these data with information gathered from ethnographic sources on several different living human societies (ibid. 406). The results of this work were a series of generalizations about hunting practices and the formation of an archaeological record in the present, which could inform the reliable interpretation of other archaeological records formed in the past. However, Binford's ethnoarchaeological generalizations were arguably flawed in being based on a limited number of ethnographic case studies, which tended to derive from societies whose hunting practices may have reflected recent behavioural patterns established, in some cases, through contact with the modern fur trade (Trigger 2006, 417; 441–2).

During the 1980s and 1990s archaeologists engaged more with food as cuisine and with the meanings embedded in food consumption. The theoretical context of archaeology at this time, including the "linguistic turn" in the social sciences

(Jones 2004, 328), the focus on the meaning of material culture and the influence of anthropological work on food, all contributed to this new focus. In Britain the work of Hill (1995) was central, representing an attempt to understand how ritual consumption played a role in social reproduction in IA Wessex. Hill's methodology focused on putting different categories of artefact, including pottery, animal bone and human bone back together with the contexts from which they came, in order to re-create sites and the depositional processes which formed them on paper. Hill analysed finds assemblages at three spatial scales, working up from individual pit fills, to whole pits and then the spatial distribution of deposits across sites (Hill 1995, 33). Artefacts were subjected to statistical analyses, which were designed to demonstrate that the co-occurrence of different categories, such as articulated animal bone groups and dumps of large unabraded sherds of pottery were statistically significant (Hill 1995, 34). Hill's approach to reconstructing the formation processes of IA Wessex was innovative, particularly in its attempt to interrogate deposits, which had previously been glossed as either rubbish, or ritual. But he perhaps imputed too much structure to the record and ignored certain elements of pre-depositional practice in the formation of deposits (Garrow 2012). In parallel to Hill's work on Wessex, Parker-Pearson (1999) examined the use of food as a symbol of social status in later prehistoric Yorkshire, arguing that portions of pork and mutton placed as grave goods in IA burials may have represented aristocrats and commoners respectively, with wealthier sword and chariot burials more likely to contain portions of pork. However, this argument has since been challenged by Giles (2012, 114), who points out that stable isotopes from human skeletons in

these burials show that they shared a set of dietary signatures in common and that pig bones have been found in unaccompanied burials.

In the early 21st century archaeologists concerned with food have continued to focus on the ways in which past peoples invested meaning in food, using food as a way to construct and convey identities. An example of this kind of work can be found in the studies of feasting carried out by Dietler (2001). In Dietler's view there are several kinds of feast, which can be used in different ways. For example, *empowering feasts* may be used to acquire power and social status, while *diacritical feasts* use different styles of consumption as a device to naturalise concepts of ranked difference. In this view the symbolic properties of food are central, feasts are seen as a form of ritual that creates a context for the symbolic representation of social relations (ibid. 69-75). Dietler's approach to feasting has; however, been criticised by Hamilakis and Sherratt (2012), who accuse him of over-simplifying a complex phenomenon by using a typological scheme to classify it (ibid. 187). In their view feasting as a form of consumption disrupts everyday temporality and has the role of producing social memory (ibid. 190). However, Fitzpatrick (2009) has built on and extended Dietler's discussion of feasting in the North-West European IA. Fitzpatrick argues for the use of *diacritical* and *commensal* feasting in changing chronological and geographical contexts: from funerary rites in Southern Germany and Eastern France, to ritual sanctuaries in Northern France, burials in South-East England and wetland deposits in Ireland. Fitzpatrick's central point is that feasting was used both to reinforce social solidarity *and* create distinctions of rank in different social contexts and in different times and places, but using a shared suite of

material culture, distinctively different from, but drawing on the culture of symposia common in contemporary Greek and Roman society.

Recent summaries of the study of food in archaeology, including those of Hastorf and Weismantel (2007) and Twiss (2007) have continued to emphasize the role of food in conveying meaning and in the construction of identity. Hastorf and Weismantel (2007) argue that food can form the basis for structural oppositions such as sacred: profane and nature: culture and that different foodways can represent different ethnic identities. They also argue that the consumption of food can be important in the creation of shared memory. Twiss argues that food is an unusually powerful symbol of identity because it is literally incorporated into the body and therefore involved in the biological construction of the person. For Twiss food is used to symbolize many aspects of human identity, including: age, gender, religion, ethnicity, wealth, and social status. The meanings attached to food are; however, changeable and contested (Twiss 2007, 2-3). It could be argued that by focusing so heavily on meaning Twiss and Hastorf and Wiesmantel miss the chance to examine the material qualities of food.

In many ways contrasting with this focus on meaning Gosden has written of how objects actively structure people's modes of sociality by educating their senses during childhood (Gosden 2005, 197). If this is so then the objects used in the preparation and consumption of food and the substances making up the food surely play a primary role. Gosden has examined changes in material culture that occurred during the transition from LIA-RO Britain, looking particularly at pottery, brooches and architecture, but including food (ibid. 198). New foods

imported into Britain during this period such as wine and olive oil, when combined with indigenous foods such as pork, must have made available a range of new sensations: smells, tastes and kinds of intoxication, which would have served, just as much as other more durable forms of material culture, to draw people into new social networks of trade and military domination.

Archaeological studies which focus exclusively on eating and drinking are still comparatively rare, although Robb's (2007) work on food in Neolithic Italy and Cool's (2006) work on Roman Britain are notable exceptions. Robb and Cool's methodologies are similar, both relying on drawing a wide range of artefactual and ecofactual data together in order to interpret a specific cuisine. Robb's methodology is based on the investigation of basic ingredients divided into four groups: starches (grains and legumes), flavours (fats, fruit, honey, herbs and salt), meat, and foods not regularly eaten. Empirically Robb's method involves the collection of quantified data on ecofactual and artefactual proxies for these food groups, for example, animal bones. These data are interpreted in their social context (herding and eating) and in its site-specific context, for example, the cooking of grains on hearths and meat in earth ovens. From these data Robb interprets Italian Neolithic cuisine as based on the consumption of starches at the household scale as a staple, supplemented by the community based consumption of meat for special occasions, and this ties in to Dietler's concept of *commensal* feasting (Dietler 2001, 75-6). The importance of cuisine for Robb lies in its meaning - communities choose cuisines and therefore economic strategies on the basis of what they mean; for example, different foods symbolise hunter-gatherer and farming ways of life. Robb's work is innovative and draws much

important data together in interesting ways; however, his interpretation is focused on understanding the meaning of food, with only a brief analysis of the sensory experiences associated with food consumption (Robb 2007, 224-5).

Cool's methodology is also holistic, relying on examining different categories of material culture and environmental evidence together, in order to elucidate a better understanding of food in Roman Britain. Categories of material include those conventionally associated with food, such as pottery, animal bones and charred and waterlogged grains, and those associated with food preparation such as fired clay and metal cooking utensils, along with human bone, which allows the examination of food consumption through the effects that different diets had on human bodies. Finally texts and inscriptions are used in order to enable the interpretation of the remains of meals within the context of Roman writings on cooking, lists of supplies on military bases and letters. Cool's method is to draw all of these different categories of evidence together by examining particular contexts at a variety of different scales, from the individual site, to regional analyses, to the entire province. The value of this approach is that it allows a very nuanced picture of food within Roman Britain to be built up. For example, Cool is able to show differences in consumption habits between officers and men within Roman forts (Cool 2006, 177-8), along with differences in consumption at rural sites in different parts of the province (ibid. 203-7), and regional differences between east and west (ibid. 168-9). However, her method of examining each artefact category and ingredient in turn tends to perpetuate conceptual divisions between production, distribution and consumption when thinking about the development of cuisines.

A third important recent archaeological study with a focus on food offers a global perspective. The work of Fuller and Rowlands (2011) compares the development of global cuisines since the Mesolithic, focusing on the differences between East Asia and Eurasia. The authors contrast the early development of ceramics and rice based agriculture in East Asia with the later development of ceramics and wheat and barley based agriculture in Eurasia. In China and Japan ceramic containers developed early (c. 6000-7000BC in China), possibly being used by hunter-gatherer communities to process nuts by boiling (ibid. 47). With the development of agriculture based around rice, a cuisine founded on boiling and concepts of binding and stickiness is argued to have developed. Fuller and Rowlands argue that this cuisine served as a material metaphor to bind human communities to their ancestors (ibid.). In Eurasia by contrast ceramics developed relatively late and agriculture was based around wheat and barley. Cuisine came to be dominated by the baking of bread and the roasting of meat and emphasised difference and division, both within human communities and between human and divine communities, which were communicated with through the smoke of roasting sacrificial meat (ibid.). This interpretative approach puts the functional processes of agriculture and animal husbandry alongside the semiotic processes of creating communities and symbolising social rank, viewing both kinds of process as mutually influential and also as material. The importance of cuisine as a material assemblage of functional and semiotic processes, with its own agency, is emphasised by the observation that even after the importation of wheat into China in the Neolithic, there was no development of a bread baking culture. Instead wheat was boiled in the form of noodles (ibid.).

Fuller and Rowlands argue that the stability of cuisine is related to how food is viewed as a material substance and how it is seen to transform human bodies and relate to other bodily substances. These last three approaches to food in archaeology are all important in different ways, and have all influenced the methodology adopted in this thesis. The following section moves on to discuss the anthropological literature on food.

2.2.2 Anthropology

The work of Cool draws on Goody's (1982) concepts of differentiated and undifferentiated cuisine: Goody's ethnographic and historical study of the LoDagaa and Gonja peoples of Northern Ghana from the mid 17th - mid 20th centuries formed the basis of a general theory about the relationship of cuisine to class. In Goody's view societies with stratified sub-cultures (societies where different social classes adopt different cultures) tend to have differentiated cuisine; the food of these groups differs fundamentally in style and composition. Whereas societies without stratified sub-cultures tend to have undifferentiated cuisine, food is the same everywhere and class differences are expressed through quantity rather than style. Drawing on wider ethnographic, archaeological and historical evidence Goody argues that these differences are represented by Asiatic and African societies respectively. While Goody's work has been influential in establishing that cooking and cuisine are heavily influenced by class, it could be argued that his views on African societies are influenced by primitivism (Kuper 2005) and the use of his work is therefore problematic. Cool interprets IA cuisine as undifferentiated and Roman cuisine as differentiated,

thus importing Goody's primitivist views uncritically into the study of Roman Britain.

A second important strand in the history of anthropological thought about food starts with the work of Mauss. In the mid 1920's Mauss published his famous essay on gift exchange (Mauss 1954 [1923-4]) in what were then commonly thought of in Western Europe as "primitive societies" (Kuper 2005). In the essay he argued that gift exchange is a "total social fact", by which he meant that gift exchange is embedded in all aspects of non-industrial human societies, such that understanding gift exchange can lead off into the understanding of many different aspects of human life. Since Mauss' time anthropologists and archaeologists have applied this idea to many different aspects of the archaeological and ethnographic record. More recently Appadurai (1981) has taken the notion of a total social fact and applied it to the study of food. Appadurai argues that food is entangled both socially and materially in many aspects of human life, including technology and relations of production, along with exchange and agriculture (ibid. 494). Appadurai examined food consumption in Hindu South Asia in the late 20th century, in three different contexts: private consumption in the home, consumption among the extended family at wedding feasts and public consumption at temples. In all three of these contexts, he argued, food simultaneously served two opposed semiotic functions, including the construction of social relations characterised by "equality, intimacy, or solidarity" and those characterised by "rank, distance or segmentation" (ibid. 507-8); although food always has the possibility of homogenising the actors who consume it (ibid. 507). The ingestion of food in

different settings, with different material characteristics can serve to bind together, or separate, members of human communities in a very visceral, material way and this is tied in to the expression of solidarity and status, and cyclical changes in the relative importance of both of these kinds of relations. This work elaborates and extends Goody's concepts of differentiated and non-differentiated cuisine, perhaps blurring the boundaries between them, but without invalidating them and has much the same impact on the work of Dietler (2001), nuancing his categorisation of the feast. Appadurai argues that food has these capacities both because it is ubiquitous and because it has the capacity to mobilize emotion (ibid. 494). Appadurai's work therefore allows for the possibility that food is both a semiotic and material resource, simultaneously both social and biological, although it is the social and especially the semiotic capacities of food on which he is most focused (ibid. 494).

A further example of an analysis of the agency of food within a dynamic social and biological system can be found in the work of Wiessner and Tumu (1998) on the Enga people of Papua New Guinea. This focuses on the importance of sweet potatoes and pigs in Enga history (ibid. 101-103), from the 17th-20th centuries, again drawing on ethnographic and historical evidence. Their work focuses particularly on the Tee ceremonial exchange cycle - a complex social institution involving the sequential distribution of pigs and other valuables. The introduction of the sweet potato allowed the production of more pigs; pigs and other valuables circulated through Enga, linking large numbers of people in networks of foodstuffs, big men, their families and cult and ritual practices (ibid.). This resulted in population growth, migration, warfare and the eventual

abandonment of pig exchange with the introduction of new religious cults. This network of sweet potatoes, pigs, cults and humans can be seen as an abstract-machine in the terms described by Deleuze and Guattari (2011) and elaborated by Connolly (2010, 135-6) (2.4.1) and can serve as a practical example of how similar abstract-machines in other times and places might be studied.

In addition, Gell (1998) has developed ideas about the agency of material culture, which can equally be applied to food. Gell argues that works of art should be seen as possessing agency. Art works in Gell's view are not bearers of meaning in the linguistic sense; rather they act in the world as persons, having effects on people. For example, carved Trobriand canoe prows, rather than having a meaning that can be read off by the informed viewer, act to bamboozle the viewer, attesting to the magical abilities and agency of the prow carver and thereby carrying the carver's agency abroad in the world (ibid. 69-72). Adapon (2008), closely following Gell's methodology, has argued that food can act as the carrier of similar kinds of agency, dazzling the consumer with the skill of the cook, entrapping consumers with unfamiliar flavours and carrying emotions such as love. Cuisine is therefore seen as a: "system of action intended to change the world, rather than to encode symbolic propositions about it" (ibid. 32). Having examined the broader historical context of archaeological and anthropological thought on food, the following section moves on to consider the literature specific to the study of food in England. The discussion will be confined to the period considered by the thesis (c. 1500BC-AD1086).

2.3 The archaeological study of food in England in later prehistory and the early historic period

2.3.1 Food in later prehistory

The study of food, conceived of primarily as the investigation of the material evidence for cereal cultivation and animal husbandry, was not widespread in British archaeology before the middle of the 20th century (2.2.1). Wheeler's (1943) excavations at Maiden Castle were among the earliest to include analysis of faunal remains in the report (ibid. 360-72). However, since the mid 20th century food and food production have been an important feature of major syntheses of the later prehistoric evidence in England, whilst playing a less significant role in the literature on Roman and early medieval Britain, but nevertheless featuring heavily in specialist literature dedicated to the study of food as a sub-discipline in these periods. Meanwhile, specialist literatures dedicated to plant and faunal remains grew steadily in importance through the mid-late 20th century in the sub-disciplines, of Bronze and Iron Age, Roman and Anglo-Saxon archaeology.

For the later prehistoric period the late 20th century work of Cunliffe (2005 [1974]) took an environmentally determinist view, focusing primarily on food production as conditioned by climate, soils and technology. Cunliffe's work examined evidence for the major varieties of cereals and animal species, arguing for a shift from emmer wheat to spelt wheat and from naked to hulled barley during the course of the late second and early first millennia, with evidence for diversification including bread wheat and the Celtic bean in the LIA. Cunliffe

argued that these changes were linked structurally to changes in animal husbandry, which saw a shift from cattle dominated to sheep dominated husbandry, providing manure for an agrarian expansion in the EIA-MIA. Changes in the organisation of the landscape were seen to be intimately linked to these processes of agricultural intensification and diversification, which were themselves seen as driven by climatic deterioration and the decline of soil fertility. Importantly Cunliffe (ibid.) recognised that later prehistoric agriculture in England was regionally diverse, with different regions producing evidence for slightly different ratios of the major crops and domestic animal species. The majority of Cunliffe's evidence came from Central Southern Britain (Wessex) and the Midlands (the UTV and Northamptonshire), with diversity in animal husbandry and crop preferences being attributed to differences in topography and soils. Cunliffe also argued that these regional differences were the basis for different supra-regional systems of agrarian organisation that he characterised as redistributive (the hillfort zone), sufficer (the North) and clientage economy (the South-West and Wales) (ibid.).

In contrast to Cunliffe who has little to say on the subject of food consumption, Sharples (2010) and Champion (2011, 2014) focus more on this topic, seeing food consumption as bound up with other aspects of economic production. For Sharples the development of field systems in the MBA-LBA in Southern England is not associated with agricultural intensification, but how communities viewed the ownership of resources and sought to control movement (Sharples 2010, 41–43). Sharples sees food as being bound up both in production and consumption, and as having both functional and symbolic components. Food for Sharples is a

means of exchange and a source of prestige as well as a means of binding communities together. Sharples views production and consumption as well as the control of food as intimately bound up in the construction of hillforts. The construction and elaboration of hillfort ramparts in EIA and MIA Wessex is viewed as a form of competitive consumption (of labour and food) in this model, with the process of consumption used as means of creating relationships between communities ordinarily resident in hillforts and those outside them (Sharples 2010, 120–22). The food provided by the hillfort building community is central to this process, and Sharples argues that it may have been displayed, in the form of stored grain in four-post granaries around the interior perimeters of some hillforts (ibid. 123-4). Like Cunliffe and Sharples, Champion (2011, 2014) sees a great deal of regionality in food systems in later prehistoric Southern England; however, unlike Cunliffe he places as much importance on consumption as on production. Champion sees the Thames Valley, the South-East and Wessex as distinct from one another in terms of the plant and animal species favoured, the use of wild resources and cooking technologies, and cuisine, which are linked to environmental factors such as topography and the extent of woodland cover. Champion (2014) argues that in the MBA-LTRBA MLTV the introduction of spelt wheat was associated with the baking of bread, for which perforated clay plates were used. Bread was consumed in feasting, particularly at ring-works where PDR pottery, including cups and bowls were also concentrated (Brudenell 2012; Champion 2014). In Champion's model, spelt, bread making and ceramic oven furniture, as well as a focus on sheep-husbandry were all features of the Wessex regional food-system from the LBA until the LIA. In contrast IA Eastern England, including the South-East, had a stronger focus on cattle and in the South-East on

emmer, which Champion suggests was consumed as porridge (Champion 2011, 175) and on woodland animal species such as pigs and wild animals (ibid.).

A specific study of a later prehistoric regional agrarian economy, which takes up many of the themes discussed above, has been carried out on the UTV and MLTV by Lambrick and Robinson (2009). They argue (ibid.) for a system of mixed farming, adapted to the particular environment of the river valley terraces, with cultivation on the upper terraces and pastoralism on the lower terraces. Intensity of production in this system fluctuated over time and space, with marked differences between the UTV and MTV. In many ways the model of production/consumption developed by Lambrick and Robinson (ibid.) fits the broader models for Southern England developed by others (see above): production/consumption of cattle is argued to decline in favour of sheep/goat over time; the major crops include spelt and hulled barley; beans and peas are consumed and the use of wild resources, including fish is minimal. However, there are also regional idiosyncrasies: fired clay plates without holes are argued to be an UTV equivalent of the MLTV perforated plates, being interpreted as for use in baking. There is also argued to have been some consumption of horse and dog meat in the UTV. Like Sharples, Lambrick and Robinson (ibid.) argue against the idea of widespread intensification of production in the MBA as a driving force in subsequent changes. Instead they argue that an increased reliance on arable farming and sedentism emerged gradually in response to growing population, with a more communal settled farming system emerging over the course of 500-700 years by the MIA, while continuing to coexist with transhumance and other more mobile ways of life.

The syntheses outlined above are all underpinned to differing degrees by specialist literatures concerned with later prehistoric botanical, faunal and ceramic materials, among other forms of evidence. Numerous publications in these fields have contributed to the debate in the course of the late 20th and early 21st centuries and these are too numerous to be discussed in detail here. However, several publications in each of these fields have been particularly influential for wider syntheses and these are summarised below. In the field of archaeobotany Van der Veen and Jones (2006) have developed a model of cereal consumption and production for the British IA in which the presence and extent of grain rich assemblages from later prehistoric sites are argued to be indicative of the scale of production/consumption, rather than of the kind of processing being undertaken, with large assemblages argued to be indicative of large scale production and small assemblages of the opposite. This is based on the assumption that the charring of processed grain is always accidental and therefore an index of the frequency of production/consumption (ibid.). Further Van der Veen and Jones argue that such assemblages occur more frequently in Southern England than elsewhere and are concentrated on sites with storage pits, four-post structures and in hillforts (ibid.). The use of pits is argued to relate to the storage of surplus, while four-post structures represent stores in daily use, contra to the arguments of Cunliffe, who sees storage pits as for the keeping of seed corn (Cunliffe 2005, 412-13). The surpluses stored in this way are viewed by Van der Veen and Jones (2006) as supplies for commensal feasting, along the lines envisaged by Appadurai (1981) and Dietler (2001). This last argument could be used to back up Sharples' (2010) views (above) about hillfort

construction as conspicuous consumption of labour and food. The variation in the scale of production/consumption and the self-sufficiency of individual settlements inherent in this model also fits with Lambrick and Robinson's views on the development of the later prehistoric agrarian economy in the Thames Valley.

Cunliffe (2005 [1974], 415) makes the point that the intensive production of cereals is entirely dependent on animal husbandry as large quantities of animal dung are required to fertilise the crops, and subsequent specialist work on later prehistoric faunal remains has demonstrated the importance of the major domesticates. The work of Hambleton (1999, 2008) emphasises the importance of these species, demonstrating the majority of British later prehistoric faunal material from settlements is made up of cattle, sheep/goat and pig bones with very little evidence for the exploitation of wild resources. Hambleton demonstrates, in line with Cunliffe's arguments (2005, 416), that cattle declined relative to sheep over the course of the first millennium BC, also emphasising along with Cunliffe the importance of regional ecosystems, with sheep tending to dominate upland topographies and cattle in lowland areas (Hambleton 2008, 45). Hambleton acknowledges that these relationships were not entirely deterministic, as sheep were sometimes dominant in the lowlands, as at Meare on the Somerset Levels (ibid.). Hambleton (1999, 14-15) defined six distinctive regions of animal exploitation with important differences between them in the balance of major domesticates. Of these, four are relevant to Southern England: Wessex and Central Southern England, the UTV and surrounds, the Midlands and Eastern England and East Anglia. Hambleton argues that in the first of these

regions herds of sheep were dominant, followed by cattle and that relatively little pig was present. In the UTV proportions of cattle and sheep were more evenly balanced and numbers of pigs were low. Animal exploitation in the Midlands is argued to have been similar to that in the UTV, but with more local variation in the proportion of pig. Finally in Eastern England and East Anglia cattle were dominant, but there was some local variation in the diverse landscapes of this region. Hambleton's views have been influential, establishing something like a standard model for later prehistoric animal husbandry, which has influenced Champion's work on the IA of South-East England in particular, along with Sharples' work on Wessex and Lambrick and Robinson's model of the Upper and MTV to a lesser extent.

Much important work has also been undertaken on later prehistoric ceramic repertoires, with the seminal work again being carried out by Cunliffe, who defined a series of ceramic style zones for Southern England (Cunliffe 2005). More recently the work of Hill (2002) has examined variation in ceramic repertoires in Eastern England for the MIA-LIA, linking variation in ceramic repertoires to variations in cuisine, but emphasising that the adoption of specific repertoires was linked to social contexts and the choices of strategies for social reproduction adopted by different groups. In Hill's model (ibid.) the relatively undifferentiated ceramic forms of the MIA were linked to forms of communal eating that reinforced social solidarity, these were replaced by more differentiated repertoires in the LIA linked to forms of elite consumption emphasising distance and rank. Importantly; however, some communities chose to adopt these more differentiated repertoires, while others with equal access to

them, did not. Hill's interpretation is influenced, like that of Van der Veen and Jones, by the work of Appadurai (1981) and this provides a theoretical link to the work of other specialists and the broader synthetic models of food production and consumption in the period.

2.3.2 Food in Roman Britain

Work on the food of Roman Britain has featured less prominently in major syntheses of the period than is the case for later prehistoric England and the focus of synthetic works which touch on food continue to be on production, rather than consumption. The importance of agricultural production to the economy of the province and that of the empire as a whole is; however, an important element of recent publications such as that of Mattingly (2006). In this view changes in the agrarian economy of Roman Britain, particularly an increase in surplus production of grain, and increased emphasis on beef at the expense of mutton, was driven by the expansion of the Roman Empire and attendant processes of colonisation. The needs of the army and processes of urbanisation are seen as bound up in these changes, with the presence of specialist butchers and larger concentrations of human population in towns making the regular consumption of relatively large beef carcasses more viable. These kinds of approaches and arguments, while useful, also reprise the functionalist and environmentally determinist views of later prehistory adopted by Cunliffe. More specialist work, specifically focusing on landscape, agriculture and food retains the importance of production and the wider imperial economy, while also focusing on consumption and regional variation. The work of Rippon et al. (2015,

42) introduces the concept of *Pays* from French historical geography. *Pays* are seen as landscape and agricultural regions that are the product both of ecological conditions and human uses of the landscape. Rippon et al (2015, 47) see a number of these regions in lowland Roman Britain, which correspond more or less to the regions identified by Cunliffe and Hambleton (among others) for later prehistory. While Rippon et al. (ibid. 78-83) acknowledge that the lowland agricultural economy of Roman Britain was dominated by cattle and spelt, they also argue that proportions of wheat to barley and of cattle to sheep/goat and pig varied by region. Some areas such as parts of the East Anglian coast and the South-West favoured barley or oats over spelt wheat and others favoured sheep/goat over cattle. These preferences, it is argued, related closely to prevailing soil conditions and topography (ibid. 84). The highly nuanced picture of regional production developed by Rippon et al. (ibid.) complements the regional approach taken by Cool, which is also highly specific. Cool's (2006)approach uses the evidence for food consumption to address differences of ethnicity, gender and class within Roman Britain, arguing, like Rippon et al. (2015), that the evidence no longer supports a simplistic division between native and Roman. Instead Cool uses the evidence of ceramics, animal bones, charred plant remains, isotopes and lipids to establish regional differences in consumption between, for example the South-East and South-West and the UTV and East Midlands. These regional differences include differences between communities of similar status, at both ends of the social spectrum. Cool also identifies differences in consumption within regions, between different parts of the military and in public and private consumption within towns and she also identifies the impact of religious practices in the LR period. Cool argues that:

"deep seated regional differences", present at the conquest, persisted well into the third century (ibid. 219-20).

Like the synthetic view of food production/consumption in later prehistory, our understanding of the situation in Roman Britain is based upon an extensive specialist literature in charred plant remains, animal bones, and ceramics. However, comprehensive syntheses of this material have proved harder to establish (van der Veen et al. 2007), perhaps because of the sheer scale of the material relative to earlier and later periods. Van der Veen et al. (ibid. 204) argue that while we know the range and type of crops grown in Roman Britain our understanding of the scale and type of production is flawed because of the small number of environmental samples relative to the number of sites excavated. However they also argue that the majority of samples come from the lowland zone and indicate broad continuity from the IA; and that horticulture (the growing of vegetables) may have been concentrated in South-East Britain near to towns (ibid.). It is possible that Van der Veen et al's pessimism is misplaced, as results emerging from the Roman Rural Settlement project seem to indicate a concentration of agricultural production in just these geographical zones (Alex Smith *pers. comm.*). In contrast knowledge of animal bones from Roman Britain is better established, although there is still a lack of regionally specific studies. Two papers by King (1989, 1991) deal, respectively, with animal bone evidence from villas and meat production/consumption in Roman Britain as a whole. King argues in both papers that percentages of cattle and pig increase as a proportion of site assemblages, both along the spectrum of settlement status, from rural farmsteads through villas, to urban settlements and finally legionary fortresses;

and over time at all levels of settlement. Urban and military settlements are argued to have higher proportions of adult animals than rural ones, indicating complex supply chains and emphasizing the importance of surplus production to the Roman economy in Britain. This pattern is the basis for wider synthetic arguments, like those of Mattingly, about the importance of beef to the Roman diet and also displays interesting parallels with the ceramic evidence (see below). The differentiation by settlement status apparent in the animal bone evidence is also apparent in ceramic assemblages, suggesting, unsurprisingly, that the different elements of food production/consumption operated as a package in the creation of social rank and difference through consumption. Work by Evans (2001, 27-32) has revealed a province wide pattern of differentiation in ceramic repertoires by settlement type. Ceramic repertoires at rural farmsteads were dominated by bowls and jars, whereas villas, urban settlements and military settlements had repertoires with higher proportions of eating and drinking related vessels, such as dishes, beakers, cups and flagons. The proportions of these eating and drinking related forms increased at all settlements over time; however, in parallel to the increasing importance of beef and pork in the diet. Together the package of beef, pork and specialist eating and drinking vessels could be interpreted as an indication of the increasing importance of differentiated cuisine and possibly *diacritical* feasting. Similar work on ceramic assemblages by Pitts (2005) based on LIA assemblages from the South-East emphasizes the differentiation in eating and drinking assemblages between different kinds of high status settlement and that the adoption of particular vessel types from the Roman and Gallo-Roman world was selective, and based on pre-existing needs (ibid. 157). In this sense Pitts' work

links to that of Hill (2002), on MIA-LIA assemblages from the same region. The changes and continuities in cereals, animals and ceramics outlined above come as a package and are linked to the huge increases in surplus production, technology and organisation of agrarian systems outlined by Mattingly; however, these linkages are rarely discussed in the specialist literature. Running through all this was a massive intensification of agricultural production/consumption; but one which developed elements of organisation (surplus production) and species (cattle/spelt) that were already present in later prehistory.

2.3.3 Early Medieval Food

The place of food in major synthetic studies of the early medieval period is more central than in equivalent studies relating to the Roman period and more similar to the later prehistoric period in this respect. Like the studies of food relating to the earlier periods the focus in early medieval syntheses is on food production over consumption, indicating a strand of continuity in research interest running through the later prehistoric, Roman and early medieval periods. The work of Hamerow (2012) stresses differences in modes of agricultural production and intensity between the 5th-6th centuries and the 7th-11th centuries. The intensity of agricultural production is argued to have increased from the mid 7th century, with evidence for specialist agricultural buildings, such as kitchens and barns and also an increase in the centralised storage and processing of grain including watermills (ibid. 150-55). These changes are also seen to be associated with the reorganisation of settlement and landscape, including increasing enclosure and nucleation of settlement and the increasing development of field-

systems and trackways. Cereal cultivation is argued to have undergone change from the beginning of the early medieval period, with a decline in the use of emmer and spelt and an increase in the use of bread wheat. Rye is argued by Hamerow not to have been taken up to the same extent as it was in the same period on the Continent. These changes in staple crops are; however, contested by McKerracher (2015) (see below). Similar differences between the EAS and MAS-LAS periods are argued by Hamerow to be shown by the evidence for animal husbandry, which was: "broad and unstructured" from the 5th to the 7th centuries, suggesting that the organising principle of animal husbandry was that of subsistence and that there was no market for meat (ibid. 155-6). From the 7th century animal husbandry became more structured, indicating increased production for the market. Cattle and sheep are argued to have dominated the major domesticates, with their importance being related to traction, dairy and wool as well as meat. Proportions of pig and game animals are argued to have increased from the 7th century and to have been associated with the increasing intensification and specialisation of agriculture. While Hamerow (ibid. 163-68) incorporates the evidence for agrarian production into a wider synthesis of Anglo-Saxon settlement, the work of Rippon et al. (2015) specifically addresses the evidence for continuity in cereal cultivation and animal husbandry over the LR and early medieval periods. Rippon et al. (2015, 74-84) stress the importance of topography and soils in influencing the balance of major cereal and domestic animal species in any given region. For example, cattle and barley are argued to be dominant on the gravel terraces of the Thames Valley because of the wetness of the soils, while sheep/goat and oats were favoured in the uplands of Devon and barley was again favoured in the saline environments of the East Anglian

coast (ibid.). All of these environments, which are seen to represent *Pays* with very long-term characteristics, are argued to have influenced agrarian production in similar ways in both the Roman and early medieval periods. Rippon at al (ibid. 83) have a similar view of the balance of major cereal species in the early medieval period to that held by Hamerow, in contradiction to the views of McKerracher.

As with the Roman period, there are specialist accounts focusing on Anglo-Saxon landscape, farming and food and these focus more on consumption than the synthetic works described above, taking a similar approach to that of Cool (2006), in systematically describing the evidence for production and consumption of different food stuffs, although they tend to rely more on historical sources than does the literature on the Roman period. The work of Banham and Faith (2014) on Anglo-Saxon farming is similar to that of Rippon et al. in focusing on cereal cultivation and animal husbandry and on production, both at the level of subsistence and on surplus production. Banham and Faith (ibid.), like Rippon et al., argue for the importance of *Pays* and see a similar pattern in the proportions of major cereal species. Banham (2004) and Hagen (2006) provide summaries of Anglo-Saxon food production and consumption from both archaeological and historical data, breaking down the evidence for different types of food and in the case of Banham (ibid.) discussing cuisine and presenting recipes.

The specialist literature on charred plant remains, animal bones and ceramics on which the above syntheses are based is varied, and in the case of the first two

categories more extensive than for the earlier periods. Despite the abundance of analytical work on charred plant remains, Van der Veen et al. (2013, 177) argue that the evidence base for medieval archaeobotany is inadequate and concentrated in Central Southern England because of a developer-led bias in the geographical focus of fieldwork. In addition, they argue that levels of sampling are in decline, a factor that they also link to the prevalence of developer-funding in fieldwork since the 1990s. Despite this Van der Veen et al. (ibid. 171) feel able to argue that the early medieval period in Southern England saw a shift in cereal crop preferences, from spelt and emmer, and barley, towards bread wheat, rivet wheat, rye and oats. In their view this was associated with the development of open fields and contemporary changes to settlement and ploughing. In this they agree with much of the more synthetic work described above and with the "bread wheat hypothesis" of Banham (1990), upon which much of that synthesis is based. This hypothesis argues that barley was the dominant cereal crop in England from the 5th-mid 7th centuries, when it was replaced by bread wheat, during a period of MAS agricultural intensification (ibid.). However, recent work by McKerracher has challenged this consensus (McKerracher 2015), arguing that there is no good evidence for this increase in ubiquity of bread wheat in the UTV, or East Anglia, during the EAS-MAS periods, but that instead rye and oats became much more important in the 7th-9th centuries. McKerracher concedes that there was increased diversity and intensification in agricultural systems from the MAS; however, and finds evidence for variation by soil type, with barley and rye being more ubiquitous on sandy soils in East Anglia and in the fenlands, and wheat having greater presence on the gravel and claylands of the Thames Valley (ibid. 8).

Animal husbandry is seen as entwined with cereal cultivation by medievalist faunal specialists in the same way as in the later prehistoric and Roman periods; however, as in the Roman period there is a greater focus on the effects of urbanism on faunal assemblages, as well as on ethnic signatures in the archaeozoological record. Poole has written on the consumption of major domesticates in Anglo-Saxon and Viking Age towns (Poole 2008, 2013a), finding that there was little variation in consumption of cattle, sheep/goat and pigs in urban contexts inside and outside the Danelaw (Poole 2008); and also that cattle and pigs were more common in urban contexts and sheep/goat in rural ones (Poole 2013a). Interestingly this echoes the pattern seen in the Roman period. Poole also argues, on the basis of data from Viking Age York, that pigs and domestic fowl may have been as much urban as rural animals, possibly being bred inside towns (ibid.). This suggests a series of factors influencing animal husbandry that were related to the nature of urbanism rather than regionality, or ethnically based preference. The work of O'Connor (2011) and Holmes (2015) deals with animal husbandry in early medieval England at a broader scale, focusing on regional differences, rather than those predicated on settlement type. O'Connor argues for a picture of early medieval animal husbandry dominated by cattle, sheep/goat and pig, which was broadly similar across Southern and Eastern England, but with some local variation and adaptation (O'Connor 2011). Holmes, in subtle contrast argues for a picture of animal husbandry including significant temporal change, and regional variation interpreted as representing ethnically specific styles of consumption (Holmes 2015). Holmes argues that domestic assemblages in Eastern England incorporate

higher proportions of cattle and pig than those in Western England during the EMED (ibid.) and that this pattern represents the expression of Anglo-Saxon and Viking foodways. Furthermore she argues for a shift in the importance of wild animals to the diet over time, with wild animal consumption increasing in the MAS-LAS and being associated with elite consumption (ibid.). This last view is echoed by Sykes (2011) who argues that in EAS England wild fauna were more common than they were to become in the MAS- LAS, but were nevertheless, less heavily exploited. By the LAS, Sykes argues, game had become the preserve of the aristocracy and was not consumed by the peasantry (ibid. 340-42).

Work on early medieval ceramics comparing the functional composition of assemblages, either by settlement type or region, is relatively rare when compared to the later prehistoric and Roman literature. However, one exception to this rule is the work of Blinkhorn (1997), which deals with the distribution of MAS-LAS Ipswich ware by functional vessel class. Blinkhorn (ibid. 99) argues that there was regional variation in the composition of Ipswich ware assemblages, with assemblages from within East Anglia being more varied in terms of vessel class, while assemblages outside East Anglia largely comprised pitchers and large jars. This distribution pattern is similar to the one identified for later prehistoric East Anglia by Hill (above), although the relative complexity of the variation is reversed and this perhaps suggests a similar pattern of selective uptake of vessels in different contexts of use. Blinkorn (ibid. 33-34) interprets the pattern differently; however, suggesting that the variation is due to ceramics being traded primarily as containers for other goods, rather than in their own right. Having examined the archaeological literature on food

production and consumption in England for the period c.1500BC-AD1086, the following section moves on to consider food consumption and production from a methodological and theoretical point of view.

2.4 Theoretical models

2.4.1 Theoretical background

Past approaches to the archaeology of food have tended to view food and the technologies used to process and consume it as passive substances or objects, to be manipulated by human agents in the construction of social relationships, but having no active role to play themselves. This view is part of a broader paradigm, which has tended to view the material world more widely as a stage, or passive backdrop to human action, and is linked to the linguistic turn in the human sciences (Rorty 1970). However, more recent work, particularly in the wider humanities and social sciences, but including that of some archaeologists has tended to view agency as distributed equally between the human and the non-human worlds, which are seen as interconnected assemblages of materials and energy. Connolly employs the concept of the world of becoming (Connolly 2010) in which the universe is conceived of as sets of force fields, which are open systems with varying degrees of agency dispersed within them. Connolly develops the idea of the "machinic-assemblage" (see below), coining the term "world resonance machine" to designate assemblages of agents as diverse as capitalist elites, evangelical Christians, climate change and the global media (ibid. 134).

Many of these developments within the wider human sciences can be traced back to the late 20th Century work of the philosophers Deleuze and Guattari, who based their understanding of the universe on the idea that difference is metaphysically and logically prior to identity, so that identity is produced by difference. If the universe is conceived of as comprising formed substances and flows of energy then form emerges from flow and not the other way around (Gosden & Malafouris 2015, 3). More specifically Deleuze and Guattari (2011) developed a series of linked concepts for thinking about material assemblages that can be usefully applied to the archaeological record. These concepts are notoriously difficult to define and many seem to have overlapping applications. However, it is clearly possible to relate several of them to aspects of the archaeological record and processes of food production and consumption evidenced by that record; as shown by Deleuze and Guattari themselves, who incorporate extensive discussions of Eurasian prehistory into their text and sometimes link their concepts (such as assemblage) to archaeological concepts (such as culture) (ibid. 449). There are six main concepts developed by Deleuze and Guattari which, it is argued here, can be used profitably in an archaeological context.

Strata are relatively stable assemblages of material, which constitute substantive elements of reality including, for example, social institutions as well as actual geological strata; they always articulate with other strata. Deleuze and Guattari (ibid. 553) distinguish three major strata: the physio-chemical, the organic and the anthropomorphic. Strata can be equated with form. *Deterritorialisation* is the process by which strata are dissolved, with their constituent elements becoming

separated and relatively free (ibid. 559); it can be equated with flow. *Reterritorialisation* is the process by which these relatively free elements are reincorporated into new strata (ibid. 559). *Machinic-assemblages* are assemblages of materials that perform a function, operating across and between strata and between states of deterritorialisation and reterritorialisation; they help to articulate different strata and are "the cutting edge of strata" (ibid. 562). *Abstract-machines* are the blueprints, or "engineering diagrams", for machinic assemblages and are in a sense synonymous with them. Abstract-machines can be dated and named, so that it would be possible to name, for example, a specific Roman villa estate production/consumption machine, but there are also general types - abstract-machines of stratification (ibid. p. 566). Strata are always an articulation of *content and expression*, with expression forming the outward facing, or visible aspect of the strata. Speaking metaphorically, on the organic stratum content can be likened to genotype and expression to phenotype.

De Landa has worked with these concepts and others of Deleuze and Guattari's, attempting to apply them to various empirical disciplines, including mathematics, physics (De Landa 2013) and sociology (De Landa 2006), and of particular relevance to this thesis, the history of Europe from AD 1000- AD 2000, including " biological history" and the history of food production and consumption (De Landa 1997). De Landa argues that food and the circulation of "flesh" in food chains can be seen as a flow of organic materials between the organic stratum on the one hand, and the anthropomorphic stratum on the other (ibid. 104). The food chain could then be viewed in Deleuze and Guattari's terminology as a "machinic-assemblage" (abstract-machine) deterritorialising

plants and animals on the organic stratum and reterritorialising them on the anthropomorphic stratum. Flows of matter/energy through an ecosystem are mainifested as plants and animals (ibid. 104), transformed/processed into foodstuffs and reincorporated in human bodies. In this way the food chain can be said to be articulating the two strata. Medieval cities in De Landa's view are a particular type of "machinic-assemblage" situated on the interface between the organic and the anthropomorphic stratum, they can be seen as islands in an ecosystem, at the centre of food webs and using domesticated animals as biomass convertors in order to convert food webs into food pyramids. The city is therefore both a deterritorialising and reterritorialising "abstract-machine/stratum" (ibid. 104). As well as food-web-islands De Landa sees medieval cities as cultural islands, places where cultural privileges could be expressed and new niches (for merchants) could be created. They therefore articulate both content and expression. De Landa elaborates a vision of a simultaneously social and biological history incorporating both human and non-human actors in complex non-linear systems. He sees reality as a single matter/energy undergoing phase transitions of various kinds.

Delanda's model divides European medieval cities into hierarchical central place cities and networked cities, or gateway ports (ibid. 126-8). Hierarchical cities, such as Paris, he argues, were dominated by aristocratic elites and relied for food and other materials on large hinterlands, worked by peasants who Delanda sees as analogous to the microfauna at the base of food chains (ibid. 126) and who provided flows of edible and non-edible biomass (grain, meat and timber) for consumption and trade. Networked cities such as Amalfi, Venice and Genoa in

contrast, were situated in marginal agriculturally unproductive environments and were often completely reliant on trade for all their resources, with Amalfi having to import drinking water (ibid. 127). According to Delanda networked cities such as Amsterdam did sometimes develop limited holdings of land into "agricultural machines" - but these were mostly used to produce food for export. Roman and to a lesser extent LAS London could be seen as networked cities in Delanda's sense.

A second strand of central theoretical importance in thinking about the archaeology of food is that of production and consumption. Marx (1973[1939]) is the social theorist who has done most to analyse the interrelationship of these two aspects of human life. Marx argued that while conventional 19th century political economy viewed production and consumption as two distinct spheres of activity, the correct view is to see them as two parts of the same process; or two sides of the same coin. While consumption was conventionally seen as singular (private) and production as general (public), in fact consumption initiates a whole new cycle of production, thereby being subsumed into the former process (ibid. 88-90). "Production is also immediately consumption" and "consumption is also immediately production" - the individual expends his abilities in the act of production and produces his own body in taking in food (ibid. p. 90), so that it is better to think of productive-consumption and consumptive-production than to separate these relations into two distinctive spheres of activity. Following from this, consumption is a process that makes things work; in Marx's example a house is not a house unless it is lived in (ibid. p. 91). Production and consumption are only made to seem separate, particularly in highly

industrialised societies by the process of distribution, which separates products from their producers. The nature of distribution, as well as production and consumption is highly historically specific: Marx argues that all production is social, specific to an historical era and dependent on stored labour (ibid. 85). The following section therefore examines processes of production and consumption in a specific historical context, with a view to developing a model, which can be applied to the societies studied for this thesis, by returning to the work of Goody.

In his analysis of the food-systems of the LoDagga and Gonja peoples of Northern Ghana, Goody (1982) applied the Marxist model described above to a particular ethnographic and historical situation. Goody's approach was developed partly in reaction to previous functionalist and structuralist approaches, which he perceived as ahistorical. Goody therefore sought to "reintegrate time/history and space", linking consumption and production (ibid. 34-37). Usefully Goody classifies production, consumption and distribution by process, phase and loci enabling a detailed understanding of how the former categories interrelate in any given situation (Table 2.1).

Table 2.1: Goody's classification of food production/consumption activities (After Goody 1982, 37).

Processes	***Phases***	***Locus***
Growing	Production	Farm
Allocating/Storing	Distribution	Granary/Market
Cooking	Preparation	Kitchen
Eating	Consumption	Table
Clearing Up	Disposal	Scullery

Goody argued for the need to see eating and drinking as part of the production process, so that differences in cooking must be related to differences in crop cultivation and animal husbandry (ibid. 40). In order to compare cooking among

the LoDagga and Gonja people Goody looked at food preparation as the end point of food production (ibid. 43). For example, the LoDagga situated geographically to the north of the Gonja in a less forested, less humid environment, with greater access to fresh water both produced and consumed more cattle and greater quantities of cereal crops than the Gonja. Lo Dagga settlement was more dispersed than Gonja settlement, with food storage within the village. In contrast the Gonja, situated in a more heavily forested zone, to the south, with higher levels of humidity relied more on wild meat, obtained by hunting, other wild resources and vegetables, principally yams. Food storage was away from the village in Gonja. Gonja society was more stratified than that of the LoDagga, with a military aristocracy that looked down on agricultural activities, but also had more economic specialisation, and higher levels of urbanism and trade (ibid. 95-6). Food exchanged at festivals and ceremonies among the LoDagga was generally raw, whereas among the Gonja it was more often cooked and Goody argues that communal cooking was related to the existence of nucleated villages (ibid. p. 96).

The challenge for an archaeologist seeking to develop a new theoretical/methodological approach to the study of food, is to find a way of bringing the active qualities of food as a collection of substances, technologies and practices to the fore, and to embed thinking about food into thinking about landscape, seeing production and consumption as part of complex non-linear systems. According to the theoretical insights discussed above, the central problem of any new research on the archaeology of food should be to move away from thinking of food in the archaeological record in terms of either subsistence,

or a set of symbols designed to convey abstract concepts, such as ethnicity or class, and instead to investigate how the material qualities of food acted in the creation of new identities and ways of life, and in relation to the environmental context of communities.

By situating the Marxist theory of productive consumption expressed by Goody, alongside the ontological theories of Deleuze and Guattari and De Landa, a model of food production and consumption in archaeology as an intertwined dynamic process can be developed. Food production and consumption are two sides of the same process: in Deleuze and Guattari's terms they correspond to content and expression. Farming, fields, soils, animals, plants, pottery and cooking all have a determining influence on one another; they are bound together in a state of becoming. The following section moves on to develop this model for this thesis.

2.4.2 A Theoretical Model for the thesis

Clearly the work of the social theorists and philosophers discussed above should be taken as a stimulus to thought, rather than the origin of a rigid scheme to be imposed onto the archaeological data. As has been widely observed the nature of archaeological evidence is distinctive and its material qualities often make theories derived from other social scientific disciplines difficult to apply (Lucas 2012). The following is therefore intended as a broad framework, rather than a prescriptive structure, for interpretation. In the terms of Deleuze and Guattari (2011[1987]) food production/consumption can be viewed as a machinic-assemblage/abstract-machine which functioned to transfer materials between

strata. Plants and animals existed as part of the physio-chemical/organic strata, becoming deterritorialised from these strata as harvested crops and butchered meat and reterritorialised into the anthropomorphic stratum as food. From c. 1500BC until c. AD1086 in Southern England food production/consumption can be seen as a series of regional machinic-assemblages linking landscapes, fieldsystems, crops, animals, humans and ceramics and expressing the same abstract-machine, or "engineering-diagram" in De Landa's terminology. These food production/consumption machinic-assemblages should be conceived as interlinked, capable of transferring materials from one to the other and as operating on a series of scales. So that as well as regional machinic-assemblages there were supra-regional machinic-assemblages, urban machinic-assemblages, machinic-assemblages of individual villa estates and farmsteads and even machinic-assemblages of individual fields. The machinic-assemblage of London in the Roman period and again the LAS period expressed a slightly different abstract-machine to that of the regions, acting to draw food and other materials in from a hinterland and channel them upwards in a pyramidal structure. And the machinic-assemblage of villa estates can be imagined operating in a similar way. In these complex, non-linear systems, crops and animals were most closely tied in to processes of production, and can be considered as content, articulating with means of expression/consumption such as field systems, enclosure boundaries and ceramics, which served at different times and in different contexts both to physically draw communities together and to separate them, indicating ownership of food resources and expressing relationships of solidarity and rank as explored by Appadurai (1981). These machines of consumption/expression (fieldsystems, enclosure boundaries, ceramics)

displayed patterns of a cyclical nature (Chapter 8), at times expressing relations of division and ranking in landscape and human communities, as in the LIA-Roman period and at others expressing relations of solidarity, as in the EIA-MIA. Having explored the history of archaeological approaches to food and investigated some potentially useful theoretical models the following chapter moves on to consider methodological approaches to the data, outlining a methodology and a set of computational tools, which can be used to explore these themes further.

3 METHODOLOGY

3.1 Introduction

The following chapter comprises a discussion of the methodology adopted in this thesis and covers four main areas of concern. As discussed in chapter 1 (1.1) the framing research questions of the thesis concern regional diversity and continuity in food systems in Southern England over the long-term, along with the cyclical nature of changes in ceramics and the operation of abstract-machines at various scales. The archaeological information collected in England since 1990 by the developer-funded units under the auspices of Planning Policy Guidence Note 16 (PPG16) and the National Planning Policy Framework (NPPF), provides a very rich and detailed dataset, which can be used to try and answer these questions. This project was therefore envisaged from the outset as a "Big Data" project, using large datasets derived from developer-funded work. The database constructed for the thesis comprises 1,588,338 records, including information on 582 sites, 145,302 contexts, 2,192,345 sherds of pottery, 503,507 animal bones and 20,519 environmental samples. The methodologies adopted have been designed to use such large datasets and these are set out in the chapter below, which is divided into six sections covering the following areas: an introduction to the CSAs (3.2), the criteria for selection of the datasets and the definition of the different categories of data (3.3), data acquisition and the construction and operation of the project database (3.4), methods of quantification (3.5), data

interrogation (3.6) and the use of GIS software (GIS) to create distribution maps (3.7).

3.2 The case studies: geography and topography

The following section will outline briefly the geography and topography of the three CSAs, along with the distribution and nature of the sites included in the case studies. Given that these matters have been extensively discussed elsewhere (Booth et al. 2007, 2011; Lambrick & Robinson 2009), an overview will be presented here.

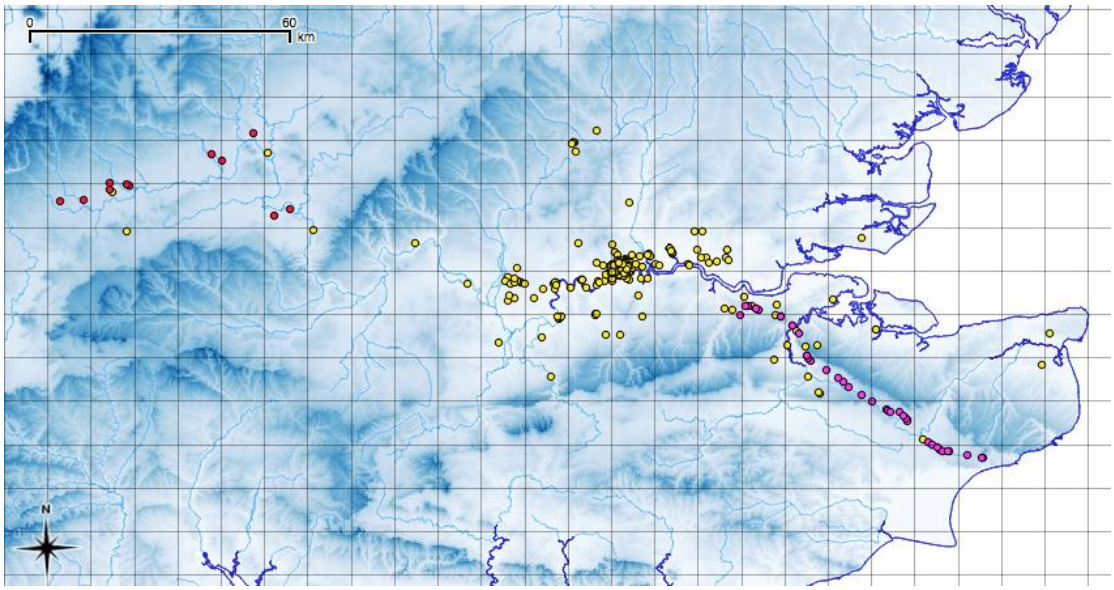


Figure 3.1: The distribution of sites referred to in the text.

3.2.1 Upper Thames Valley

Geographically, the UTV has been defined as the region between the dip-slope of the Cotswolds to the north and the escarpment of the Berkshire Downs to the south, and extending to the source of the Thames at Cricklade to the west and the point where the river cuts the escarpment of the Berkshire Downs and Chilterns

at the Goring Gap to the east (Lambrick & Robinson 2009, 17). Topographically, the eleven sites that constitute the UTV dataset all lie on the first or second gravel terraces (Fig 3.3), close to the Thames channel. The sites are distributed along the course of the UTV (Fig. 3.2) and the majority have evidence for occupation dating to most of the time periods under consideration (Table 3.1), if not always necessarily for direct continuity of occupation.

Table 3.1: Periods of activity and site types for sites in the UTV CSA.

SITE NAME	TYPE	PERIOD	REFERENCE
Cotswold Community	settlement	MNE-MED	(Powell et al. 2010 , xvii–xviii)
Horcott Quarry	settlement	PR- EMED	(Hayden et al. in prep)
Horcott Pit	settlement	BA - LIA	(Lamdin-Whymark et al. 2009)
Latton Lands	settlement	PR-RO	(Powell et al. 2009; Stansbie & Laws 2004)
Thornhill Farm	settlement	MIA-RO	(Jennings et al. 2004 p. xvii)
Claydon Pike	settlement, villa	MIA - RO	(Miles et al. 2007 p. xxv)
Gill Mill	nucleated-settlement	MIA - RO	(Simmonds & Booth forthcoming)
Gravelly Guy	settlement	IA - RO	(Lambrick & Allen 2004)
Yarnton	settlement, cemetery	NE-MED	(Hey 2004; Hey et al. 2011; Hey forthcoming)
Castle Hill	settlement, hillfort	LBA - RO	(T. G. Allen et al. 2010)
Appleford Sidings	settlement, field-systems	MBA, LIA - RO	(Booth & Simmonds 2008)

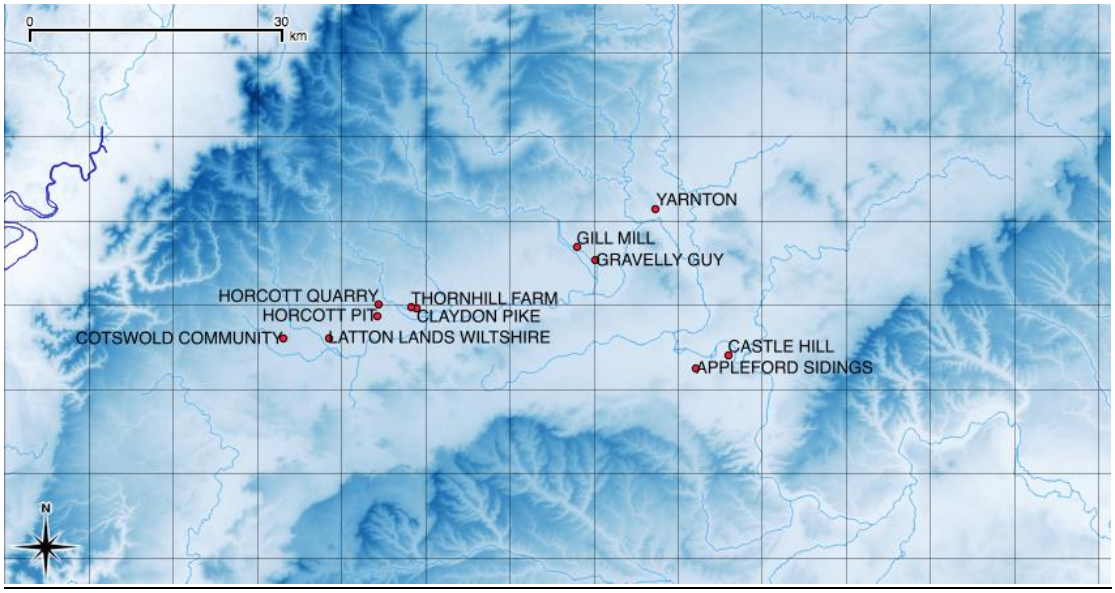


Figure 3.2: The UTV CSA.

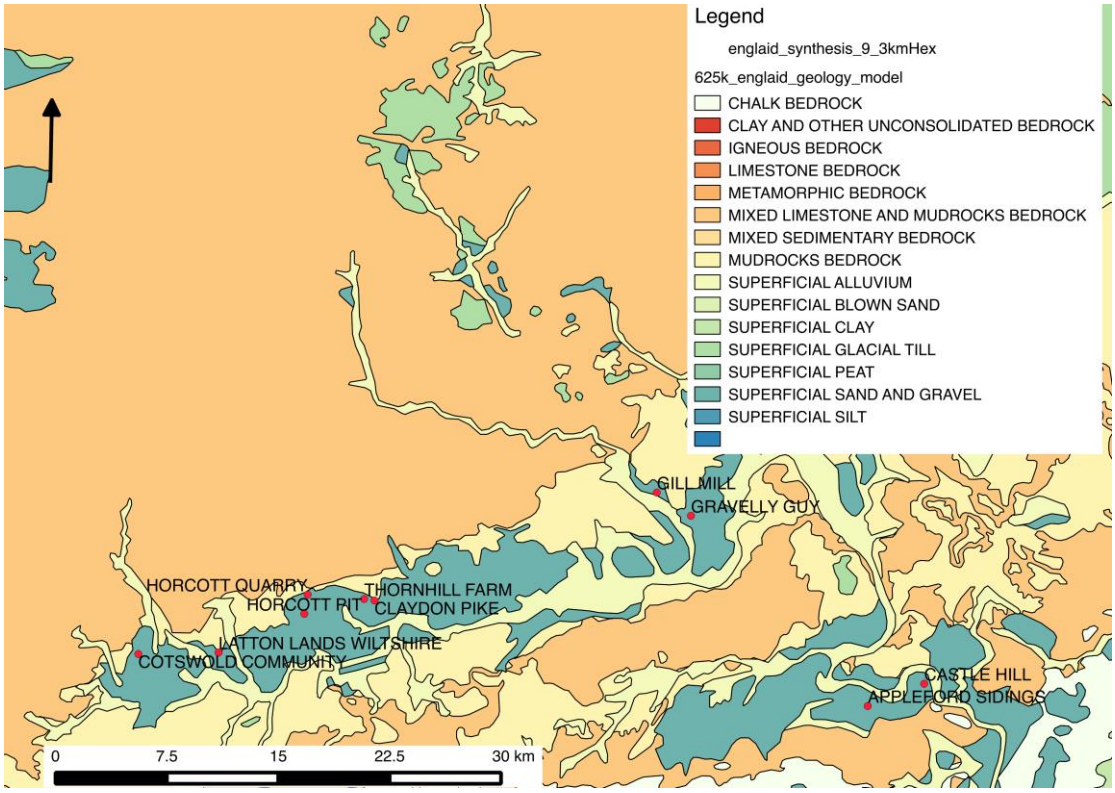


Figure 3.3 UTV Geology.

3.2.2 The Middle and Lower Thames Valley (Figs. 3.4 and 3.5)

The MLTV is defined as the landscape between the point where the Thames cuts the chalk escarpment of the Berkshire Downs to the northwest and the point where the estuary flows in to the North Sea, on the Kent and Essex coast to the southeast. To the south the region is bounded by the dip-slope of the North

Downs and to the north-west by the corresponding dip-slope of the Chilterns (Lambrick & Robinson 2009, 20); to the north-east the region merges into the boulder clay plateau of southern East Anglia. In geological terms the MTV comprises the London basin, a chalk syncline filled with tertiary sedimentary rocks, including the London clay. Overlying the London clay, extensive gravel terraces flank the river channel (ibid. 20). Given the number of sites in the MOLA database it would not be possible, or desirable to summarise them all here. The sites making up the CSA are distributed all over the region, but the majority are situated on the sand and gravel terraces of the area of modern London.

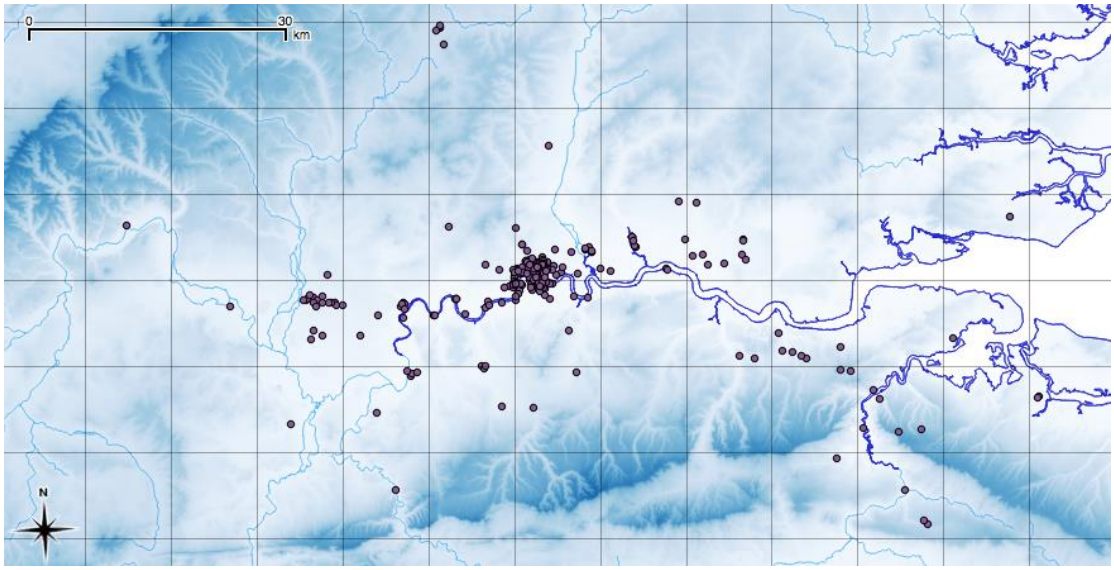


Figure 3.4: The MLTV CSA.

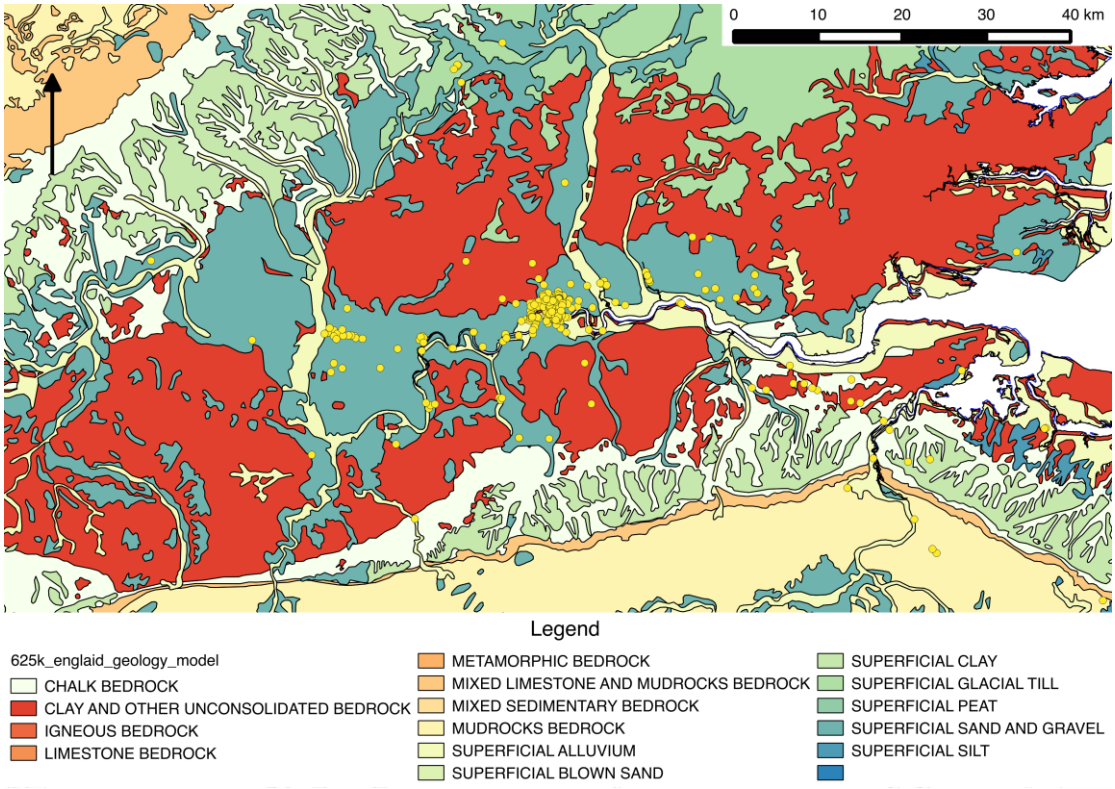


Figure 3.5 MLTV Geology.

3.2.3 HS1

The route of section 1 of the HS1 railway line (Figs 3.6, 3.7, 3.8 and 3.9) (the archaeological excavation of which provided most of the data for the HS1 CSA) extends from the Ebbsfleet valley at Springhead in the north, across the dip-slope of the North Downs, before descending into the Weald and running south-eastwards to Folkestone (Foreman 2011, 15). In geological terms, therefore, it mostly runs across upper chalk, gault clay and greensand (ibid.). Given the number of sites (Table 3.2) from the HS1 transect included in the project database it would not be desirable to summarise each one individually and in any case detailed summaries are given in the HS1 excavation report (Booth et al. 2011). A broad outline of the HS1 archaeology from the MBA until the LAS period reveals extensive settlement and field systems in the MBA, followed by a decline in settlement activity into the EIA and especially MIA periods (Foreman 2011,

24). Following the relatively sparse settlement record of the IA period, activity appears to have increased in the LIA-ER, before declining again in the LR. Settlement activity was also sparse in the EMED period, not picking up again until the 11th century (ibid.).

Table 3.2: Periods of activity and site types for sites in the HS1 CSA.

SITE NAME	TYPE	PERIOD	REFERENCE
Beachbrook Wood	settlement, metalworking, cremation cemetery, field system	MBA - LBA, MIA - MR	(Booth et al. 2011)
Bower Road, Smeeth	settlement, field system, cremation burial	LIA - LR	as above
Chapel Mill, Lenham	boundary ditches, cremation burials	IA	as above
Cobham Golf Course	settlement	MBA - LBA	as above
Cuxton Anglo-Saxon Cemetery	settlement, cemetery	EIA - MIA, EAS - MAS	as above
East of Boarley Farm	settlement	LIA - ER	as above
Land South of Snarkhurst Wood	pits, settlement, cremation burial	MBA, LIA - MR	as above
Little Stock Farm	settlement, burials	LBA - EIA, IA - ER, EAS - MAS	as above
Mersham	metalworking site	MAS - LAS	as above
North of Saltwood Tunnel	settlement, field systems, cremation burial, inhumation cemeteries	MBA - MIA, ER - EAS	as above
North of Westenhanger Castle	settlement, field systems	BA, IA	as above
Northfleet	agriculture/occupation, villa, quayside	LIA - LR	(Andrews et al. 2011)
Parsonage Farm, Westwell	brushwood platform on stream bank	LIA - ER	(Booth et al. 2011)
Pepperhill Roman Cemetery	Cemetery	MIA - LR	as above
Pilgrim's Way, Boxley	settlement, trackway, human burial	MBA, EMED/LAS	as above
Sandway Road, Lenham	ditch	LIA - RO	as above
South of Station Road	field system	ER	as above

South-East of Eyhorne Street	settlement	EIA - MIA	as above
Springhead	ditches, settlement - small town, inhumation cemetery, field systems	EIA, ER - LR	as above
Stone Farm Bridleway	field system, cemeteries, hollow-ways, tracks, inhumation cemetery	LBA - EIA, LIA - RO, EAS	as above
Thurnham Roman Villa	waterhole, settlement, temple, villa, industry/agriculture	MBA, LIA - LR	as above
Tollgate	settlement, field systems	LBA - LR	as above
Tutt Hill Westwell	barrow cemetery, field system, metalworking, cremation burial	MBA - LBA, MIA - ER	as above
West of Boarley Farm	settlement, animal burials	UN, MAS	as above
West of Northumberland Bottom	settlement, field system, cemetery	MBA - ER	as above
White Horse Stone	settlement, field systems, plough soil, human burials	LBA - MIA	as above
Whitehill Road Watching Brief	enclosure, field systems	LIA - ER	as above

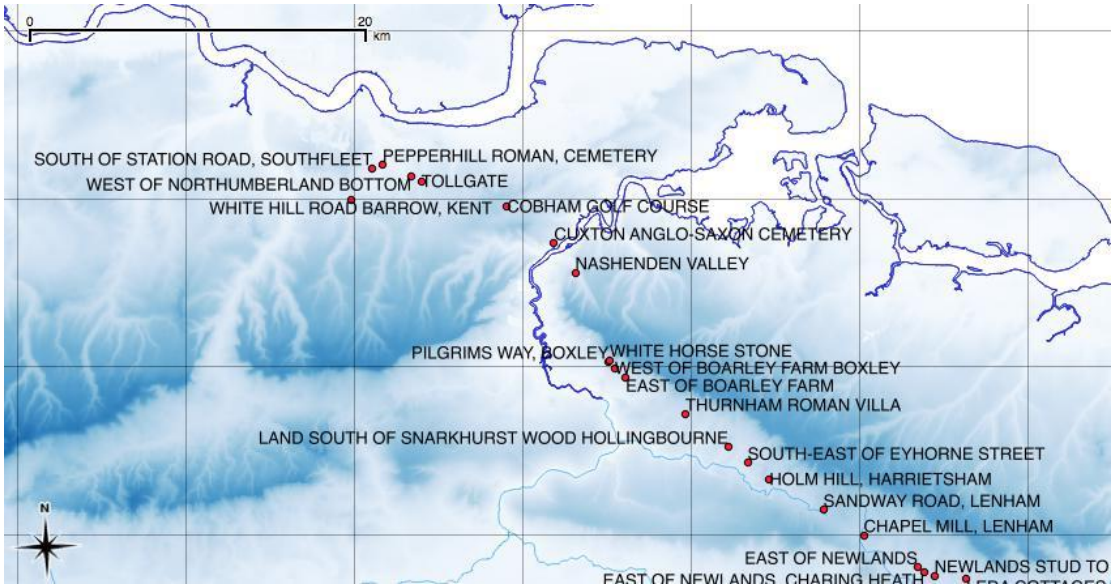


Figure 3.6: The HS1 CSA northern section.

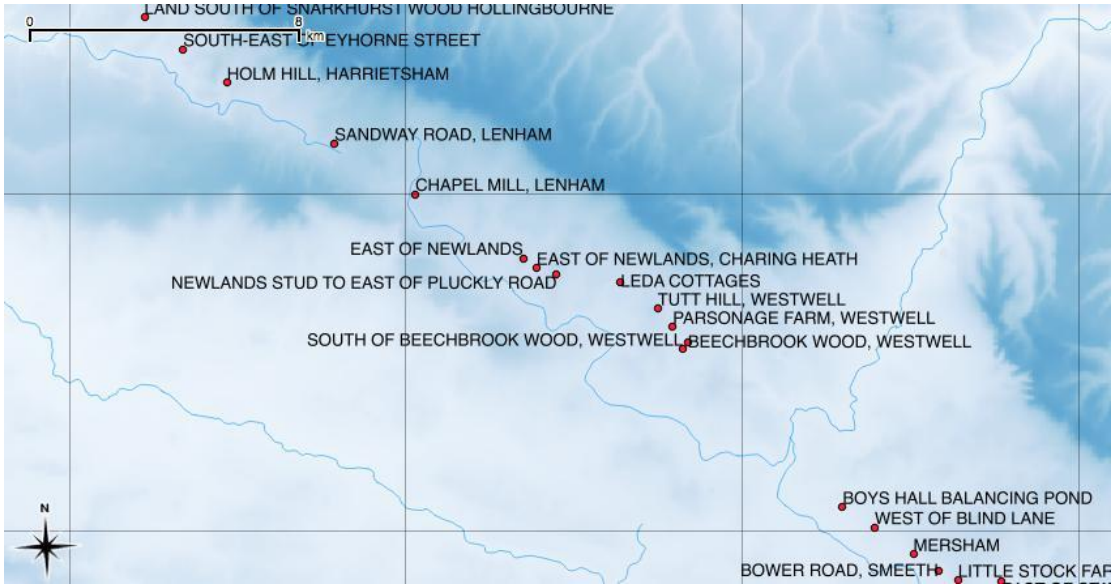


Figure 3.7: The HS1 CSA middle section.

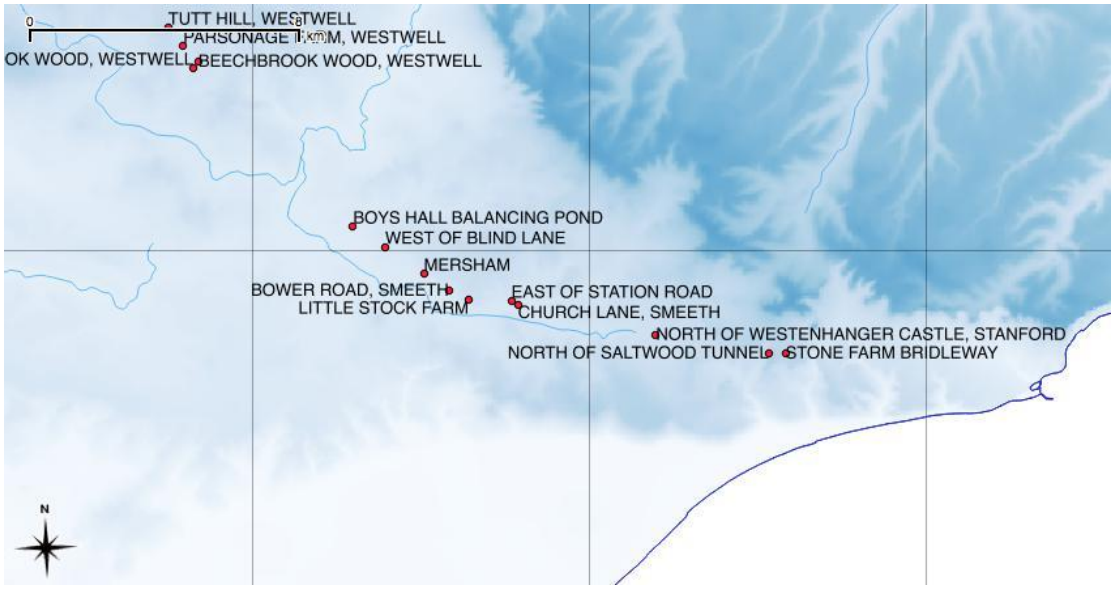


Figure 3.8: The HS1 CSA southern section.

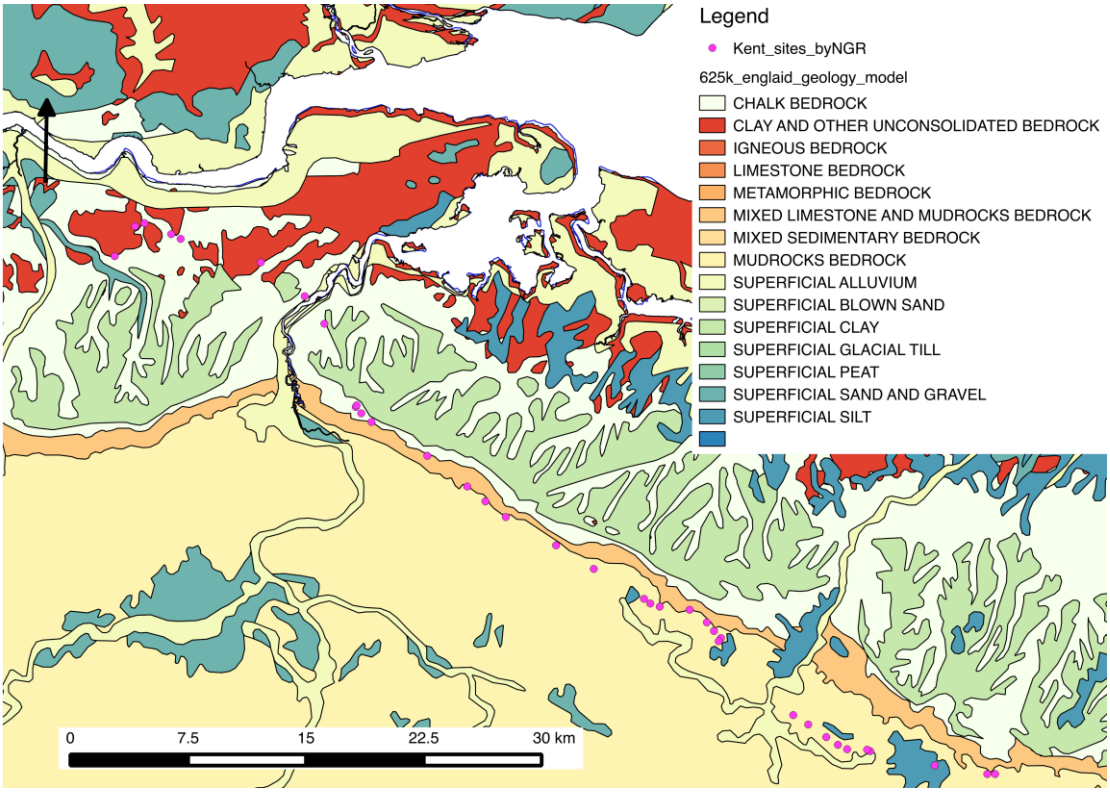


Figure 3.9 The HS1 CSA Geology.

3.2.4 The Thames Valley and HS1 CSAs compared

The three CSAs provide contrasting environments for analysis, both environmentally in terms of geology and topography and archaeologically in terms of their settlement records and the nature of excavation work carried out on them. Nevertheless, there is less of a contrast between the two Thames Valley case studies than there is between the Thames Valley and the HS1 region. The UTV is relatively homogeneous in environmental terms, with a low lying and flat topography overlain by homogeneous deposits of river sands and gravels (Lambrick & Robinson 2009 , 17–20).

The MLTV is topographically similar to the UTV, with a similar sequence of gravel terraces to the UTV but overlying a larger catchment of London clay and chalk (ibid. 20-22) and with an estuarine environment and topography to the

southeast of modern London. In contrast the route of HS1 takes in three main geological/topographical environments, from the low lying sands and gravels of the LTV to the north, through the more elevated chalk of the North Downs and descending to the greensand and gault clay of the Weald at the southern end of the route (Foreman 2011, 15). In terms of settlement the UTV is dominated throughout the period 1500BC-AD1086 by extensive and shifting rural settlements, like that at Yarnton in Oxfordshire (Hey 2004; Hey et al. 2011), with relatively little evidence for differences in social status. These settlements have been revealed by large-scale excavations in the extensive gravel quarries of the region (Booth et al. 2007; Lambrick & Robinson 2009), which have afforded an understanding of the shifting nature of settlement foci over time. The settlement record of the MTV shows a degree of contrast with the UTV. The region appears to have been more extensively settled and provided with field systems in the MBA-LBA, but less extensively settled in the EIA and MIA, without the same clustering of IA settlement as seen, for example, at Gravelly Guy. In the LIA-Roman period and again in the MAS-LAS the MTV was dominated by London and this had a distorting effect on settlement in the rest of the region, which was again relatively empty. In the EAS there were extensive settlements on the lower gravel terraces, as at Mucking in Essex (Hamerow 2012, 10). The evidence for settlement in the MLTVs has been revealed during the course of a wide range of different development projects. Much of the evidence comes from urban excavation of a variety of scales carried out by MOLA within Greater London. Other important excavations include extensive open area work carried out at Heathrow Terminal 5, and in advance of the construction of port facilities at London Gateway. In addition, there has been a wide range of rural and urban

excavation in advance of urban and industrial infrastructure in the wider MLTV. The route of HS1 offers a settlement record for the same period that is more varied, both in terms of settlement function and status. Settlement on the route of HS1 incorporates later prehistoric, Roman and early medieval rural settlement, part of a small town, Roman villas and cemeteries of later prehistoric, Roman and early medieval date. Excavation on the route of HS1 was carried out within what was effectively a linear transect, which was narrow relative to the large open area excavation in the UTV and parts of the MTV. Consequently the scope for encountering multi-period settlement with shifting foci was somewhat lower than in the latter two case studies and this may explain the relative lack of continuity across period boundaries within individual sites on HS1. The environmental and archaeological contrasts between the case studies are clearly relevant to the nature of the finds assemblages recovered from them in diverse ways. The nature of the soils may have influenced choice of crop and animal species, with low-lying regions favouring cattle and wheat, and more upland areas showing a bias towards sheep/goat and barley. Woodland cover may also have affected choice of agricultural regime, with more wooded areas favouring pigs and wild animals. Finally the range of settlement function and status will have influenced the amount of functional variation in ceramic assemblages.

3.3 Criteria for the selection and categorisation of the data

3.3.1 Criteria for the selection of regional case studies

The research questions and aims of this thesis and its position within the larger EngLaId project led to it being envisaged as a "Big Data" project from the outset. This combination of large-scale research questions and methodologies requires a large dataset, covering a number of different regions and time periods and leads almost organically to a focus on specific regions and datasets. In addition, the time constraints of a DPhil project preclude the study of the entirety of England and necessitate a focus on CSAs. The choice of regional case studies was therefore driven primarily by these considerations, but there were also several other factors of importance including the nature of archaeological fieldwork and archiving, the presence of suitable digital archives and personal connections with researchers in the developer-funded sector. The choice of CSAs and the factors affecting these choices are discussed below.

For comparative purposes the case studies needed to cover at least two distinct regions. It was also considered important that each contained a rich and extensively excavated settlement record, with large assemblages of ceramics and animal bones and have been subject to extensive programmes of environmental sampling for the recovery of charred plant remains. The acceptance of these criteria leads to two groups of considerations, one largely negative and the other largely positive. The first group rules out quite large areas of England, such as large areas of the north-west, which were mostly aceramic during much of later

prehistory (Cunliffe 2005) and areas of acidic soils, again in the north, but also in the west, and parts of the south with non-chalk superficial geology where animal bones, are not well preserved (Sharples 2010). The second group directs attention towards the major areas of developer funded archaeological fieldwork in the South-East and the Thames Valley, which for reasons to do with the development of late 20th and early 21st century economic infrastructure, have been subjected to a greater intensity of archaeological fieldwork than other areas (Cooper 2012, 318). Areas within the south-east of England with continuous ceramic sequences and good preservation of animal bone and plant remains, that span the MBA through to the early medieval period include the Wessex chalklands, the Thames Valley and much of Kent. The Wessex region has been intensively studied during the course of the 19th and 20th centuries and has often performed the function of a testing ground for theories about British later prehistory, which have gone on to direct research agendas in other quite different regions (Sharples 2010, 9–12). For this reason the EngLaId project has attempted to direct attention away from Wessex, towards other less researched areas and it was decided that this thesis would follow suit. Other regional possibilities for this project included East Anglia and parts of Yorkshire, but personal connections with archaeological organisations in the South-East meant that the Thames Valley and Kent were chosen in order to enable the quick acquisition of data.

Two additional factors made the Thames Valley and Kent an attractive choice for the location of regional case studies. The first is that they provide an extensive fieldwork dataset, which has mostly been collected by a handful of large

organisations, including OA, WA, CAT and MOLA. Crucially the results of this fieldwork are therefore collated in a few, large, digital archives, such as the MOLA database and the servers of OA that are relatively easily accessible. The second is that the topographical boundaries of the Thames Valley suggest a natural transect, linking a relatively insular and isolated area of West-Central England (the UTV), to a less insular area of South-Eastern England with more extensive geographical connections to the continent. The addition of the HS1 dataset, extends the transect with the addition of another extensive fieldwork project with a centrally stored digital archive on the ADS website.

Having chosen a geographical focus for research, the study area had to be broken down into regional case studies for comparison. Once again these emerged partly organically from the nature of the organisation of fieldwork and from the geography of the region. The transect formed by the course of the Thames Valley and HS1 can be broken down geographically and according to the organisation of fieldwork as follows: the UTV, the MLTV and the route of HS1. The UTV, whilst forming a unified topographical region (Lambrick & Robinson 2009), has also been the focus for extensive open area excavation, preceding gravel extraction, by OA and the data used in the CSA was therefore accessible and collected in a single location. The MLTV forms a similar unified topographical region, which has also been extensively excavated, in this case by MOLA whose data, both context and artefact related is collated in a single database. The route of HS1, whilst not as geographically unified as the other two case studies and not dominated in fieldwork terms by a single organisation, does constitute an extensive sample, with a dataset that is collated in a single digital location.

Having thus established the geographical scope of the project and divided the study area into regional geographically based case studies the next section deals with the criteria for the selection of types of site.

3.3.2 Site type criteria

Site type is an important variable in any archaeological dataset, with different kinds of settlement widely noted as producing different material assemblages, for example, Evans (2001, 27-32). The scale of the dataset assembled for this thesis means that a wide range of site types was incorporated and a standardised way of describing these was needed, both to make comparisons across CSAs practical and to facilitate interoperability within the thesis database. Fortunately, a standard way of describing site type using alphanumeric codes (the monument thesaurus) has already been devised by Historic England (http://thesaurus.historicengland.org.uk/thesaurus.asp?thes_no=1). This has been adapted for use by the EngLaId project (Table 3.3) and it was decided to use this to provide basic descriptions of site types and their codes, within the thesis dataset. In practice only four different classifications were eventually used for the comparison of data and these comprised the following: unenclosed settlements, enclosed settlements, villas and complex settlements. The first three of these are fairly self-explanatory, but the fourth requires more definition. The definition chosen follows that of the Roman Rural Settlement Project, which defines complex farmsteads thus: "settlements where there appears to be significant differentiation of space, either as a system of conjoined enclosures or as a principle outer enclosure with many internal sub-divisions"; in addition "the

differentiation of space tends to reflect different activity areas" (Smith et al. forthcoming, 57-58).

For the UTV and HS1 CSAs site classification was based on the site type assigned in the excavation report where possible and where a clear interpretation had not been made in the excavation report, on an interpretation of the site plan. For the MOLA dataset site codes were sourced from the EngLaid database and from the English Heritage excavations index database; however, only 417 of 532 sites had types assigned in these sources. Unfortunately, given that the MOLA database does not contain bibliographic references the scale of work involved in locating reports for these 117 sites and interpreting their types from plans and/or text was too great and only 78% of the MOLA sites have therefore been assigned a type.

Table 3.3: The EngLaId site type thesaurus.

- 01 - Agriculture and subsistence
  - A - Coaxial field system
  - B - Linear field system
  - C - Aggregate field system
  - D - Strip field
  - E - Unspecified / other field system
  - F - Other arable farming evidence
  - G - Linear earthwork
  - H - Pit alignment
  - I - Post alignment
  - J - Waterhole / pond / well
  - K - Corn drying oven
  - L - Granary
  - M - Fishpond
  - N - Stock enclosure / animal husbandry
  - O - Cross dyke
- 02 - Religious, Ritual and Funerary
  - A - Inhumation burial
  - B - Cremation burial
  - C - Unspecified burial
  - D - Inhumation cemetery
  - E - Cremation cemetery
  - F - Unspecified cemetery
  - G - Other funerary
  - H - Barrow
  - I - Cairn
  - J - Temple
  - K - Shrine / sanctuary
  - L - Church
  - M - Abbey / Monastery / Minster
  - N - Standing stone
  - O - Stone circle / cove
  - P - Cross / slab / grave marker
  - Q - Timber platform
- 03 - Domestic and Civil
  - A - Town / Small town
  - B - Burh
  - C - Civitas Capital / Colonia
  - D - Hamlet / Village
  - E - Vicus
  - F - Canabae Legionis
  - G - Oppidum
  - H - Hillfort / promontory fort
  - I - Unenclosed settlement
  - J - Enclosed settlement

K - Linear settlement
L - Palisaded settlement
M - Riverside settlement
N - Dispersed settlement
O - Nucleated settlement
P - Road-side settlement
Q - Midden
R - Timber platform
S - Unspecified settlement

04 - Architectural forms
A - Villa
B - Mansio
C - Roundhouse
D - Longhouse
E - Farmstead / farm enclosure
F - Ringwork
G - D-shaped enclosure
H - Sub-rectangular enclosure
I - Banjo enclosure
J - Aisled building
K - Other rectilinear building
L - Burnt mound
M - Grubenhaus

05 - Industrial
A - Metal working site
B - Bronze working site
C - Iron working site
D - Mineral extraction site
E - Quarry
F - Pottery manufacturing site
G - Tile works
H - Lime kiln
I - Salt production site
J - Mint
K - Textile manufacturing site

06 - Communication and Transport
A - Road
B - Trackway
C - Hollow Way / Ridgeway
D - Drove road
E - Quay / Jetty / Harbour
F - Bridge
G - Canal
H - Aqueduct
I - Causeway
J - Walkway

07 - Defensive
A - Hillfort
B - Fort (castellum), inc. non-Roman forts
C - Fortress (castrum)
D - Fortlet
E - Burh
F - Ringwork

08 - Other
A - Mound
B - Ditch
C - Pit
D - Find(s)
E - Hoard
F - Metalwork deposit
G - Watercraft
H - Flood defences
I - Enclosure
J - Gully
K - Building
L - Midden
M - Linear earthwork
N - Boundary / land division
O - Timber structures
P - Manor
Q - Dyke
R - Ring ditch

The criteria for selecting site types for study varied with the regional CSAs and like them was influenced by the nature of fieldwork within the region, and the nature of the curation of the digital archive. The overall aim was to gather data from as many different sites as possible within the CSAs, in order to develop as broad a picture as possible of variation in food production/consumption between different types of site. For the UTV, sites were selected on the basis of two main criteria: firstly, the availability of digital archives and secondly the presence of as many periods of occupation within the time frame 1500BC-AD1086 as possible. The nature of the archaeological record of the UTV, in combination with the recent history of fieldwork in the region therefore resulted in a dataset that was fairly homogeneous in terms of site type, with little evidence for hierarchy.

For the MLTV CSA the defining criteria for the selection of site types was that the site archives were contained in the MOLA database. This constraint means that the MOLA dataset for the Roman and late Saxon periods is biased towards urban occupation. An additional constraint is that the amount of information pertaining to the Roman period that could be downloaded using excel files was limited, because that dataset is so large (3.1). This meant that particular kinds of context thought likely to be rich in food remains were targeted, namely: ditches, pits, wells, graves, floors and demolition rubble. This in turn is likely to have increased the bias towards urban settlement. However, the sheer scale of the MLTV CSA, which consists of 532 different sites, mitigates against these biases to

some degree and the bias towards urban sites is not present for the later prehistoric or EAS periods.

For the route of HS1 site selection criteria were similar to those for the MLTV, in that the sites were all excavated as part of the archaeological mitigation programme carried out in advance of the construction of the railway and were all archived on the ADS website. The biases in site types for the HS1 CSA were therefore similar in origins to the MOLA biases, but nevertheless different in effect. In contrast to the MLTV the constraints of the dataset biased the sample towards rural settlement and away from urban sites. Settlement hierarchy was also more visible on the route of HS1, which included two Roman villa sites, at Northfleet and Thurnham. For the later prehistoric period the sample was predominantly biased towards rural settlement and for the early medieval period towards cemeteries.

3.3.3 Chronological and phasing criteria

Although the datasets for the CSAs were not gathered from a particularly wide range of different sources there was still a lot of variability between them in the criteria used to assign dates to stratigraphic contexts. It was therefore necessary to define a chronological scheme in order to facilitate cross CSA comparisons. The choices of phasing scheme available were; however, constrained by the nature of the dataset. Those sites excavated by OA, including many on the route of HS1, had a phasing scheme applied to them that uses alphanumeric codes to define broad periods, such as, for example, LBA (late Bronze Age) or ER (early Roman). In contrast sites in the MOLA dataset used a phasing scheme based on calendar dates, so that each context excavated was assigned a start date and an end date in years BC or AD. The latter scheme is not necessarily more precise than the former, as the use of calendar dates does not necessarily preclude the use of wide date ranges. However, while the latter scheme can easily be translated into the former, the reverse is not the case, as it is impossible to know the precise calendar date range indicated by an alphanumeric code. The use of an alphanumeric based phasing scheme on the OA excavated sites therefore dictated the adoption of such a scheme for this thesis. Accordingly a series of broad phases was adopted as set out in Table 3.4 below, based loosely on chronological criteria which have become widely accepted by archaeologists (Hurst 1976 , 284–286; Rippon et al. 2015, 30; Sharples 2010, 320–324). Where a given context in the thesis database had been assigned an alphanumeric phase code, the date of that context was assumed to fall within the relevant date range as set out in Table 3.4; where a given context had been assigned a calendar date range, that range was translated into an alphanumeric code based on Table 3.4,

using a Python script. The chronological criteria used in this thesis are therefore the result of a certain amount of translation of disparate methodologies; however, the scheme adopted has the merits of being simple to apply and is accurate within the limits of the original datasets.

Table 3.4: Chronological phasing scheme.

Broad_PERIOD	Sub_PERIOD	Minimum_YEAR	Maximum_YEAR
BA	MBA	-1500	-1151
BA	LBA	-1150	-801
IA	LBA-EIA	-800	-601
IA	EIA	-600	-401
IA	MIA	-400	-101
IA	LIA	-100	42
RO	ER	43	125
RO	MR	125	249
RO	LR	250	410
EMED	EAS	411	649
EMED	MAS	650	849
EMED	LAS	850	1065

3.3.4 Ceramic typology criteria

The following three sections describe criteria adopted for the description of the different types of artefact and ecofact used in the thesis, starting with ceramics. Like the criteria for phasing described above these criteria had to be broad enough to cover a wide range of descriptive methodologies within the original dataset. The ceramic typology was designed to capture the functional attributes of the vessels, with the ultimate aim being a shorthand description of what the vessel could have been used for; as this kind of information was deemed more pertinent to the topic of food consumption than, for example, a typology based on decoration. This approach is based on the idea of functional analysis, which is well established in Roman archaeology (Evans 1993, 2001, 27-32; Millett 1979). The specific functional typology adopted was adapted from that used by OA (Booth 2007) set out in Table 3.5 below, which has the advantage of being simple, clear and already applied to a large section of the dataset. This typology was developed primarily for use with Roman ceramics, which tend to have much more functional diversity than prehistoric or early medieval ceramics; however, it is also applicable to the latter two periods.

Table 3.5: Ceramic functional typology.*

Code	Vessel Type	Description
A	Amphorae	
B	Flagons	
C	Jars	Usually closed vessels: ratio of height to rim diameter is more than 1:1.
D	Jars/Bowls	A category for types where insufficient survives to estimate height:diameter ratio.

E	Beakers	
F	Cups	
G	Tankards and Mugs	
H	Bowls	Open vessels: ratio of rim diameter to height between 1:1 and 3:1.
I	Bowls/Dishes	A category for types where insufficient survives to estimate height:diameter ratio.
J	Dishes	Vessels in which ratio of rim diameter to height is greater than 3:1.
P	Platters	Vessels in which ratio of rim diameter to height is greater than c 7:1.
K	Mortaria	
L	Lids	
M	Miscellaneous Types	
U	Urns	Cremation urns (MOLA type)
Z	Uncertain Types	

*Adapted from Booth (2007)

3.3.5 Animal species criteria

A greater degree of standardisation was evident in the criteria used to define animal bones across all three CSAs than that seen in either ceramics, or plant remains and this is not surprising as animal classification is based upon well established zoological criteria (Reitz & Wing 2008). Animal bones from all assemblages were identified to species (Table 3.6) as listed by Reitz and Wing (ibid. 353–362), as this was the major form of information required to establish differences in food consumption practices between CSAs.

Table 3.6: Animal species.

Species	**Description**
Cattle	
Horse	
Sheep	

Goat	
Sheep/Goat	Bones of sheep or goat size with insufficient diagnostic features to identify them as either sheep or goat.
Pig	
Domestic fowl	
Goose	
Large mammal	Bones of cattle or horse size with insufficient diagnostic features to identify them as either cattle or horse.
Cattle Size	Bones of cattle or horse size with insufficient diagnostic features to identify them as either cattle or horse.
Medium mammal	Bones of sheep, goat or pig size with insufficient diagnostic features to identify them to species.
Sheep Size	Bones of sheep size with insufficient diagnostic features to identify them as sheep.
Small mammal	Bones smaller than sheep or goat size, with insufficient diagnostic features to identify them to species.
Domestic Cat	
Dog	
Auroch	
Deer	
Fallow deer	
Red deer	
Roe deer	
Hare	
Hare/Rabbit	
Rabbit	
Duck	
Pigeon	
Water fowl	
Bird	Category collating all bird species other than those identified above.
Fish	Category collating all fish species.
Unidentified	Unidentified fragments.

3.3.6 Plant species criteria

The criteria used to identify plant species in each different region were not always specified in the archaeobotanical reports; for example, reports on the material from the route of HS1 do not specify which system of nomenclature was

used for identification. On the other hand reports on the material from the UTV usually followed the nomenclature of Stace (1991, 1997) (Greig et al. 2004, 351; Hey et al. 2011, 523). In the case of datasets derived from the MOLA database plant remains were also identified to species using Stace's criteria (Karen Stewart, Senior Archaeobotanist MOLA, pers. comm.).

3.4 Data acquisition and the project database

3.4.1 The sources of the data

There is not enough time within the scope of a DPhil thesis to digitize a large enough dataset to answer research questions on the scale of those investigated here. Data collection therefore had to focus on data that had already been digitised. The main organisations within English archaeology that collect and curate digital data at the requisite scale are the developer-funded archaeology units, the ADS and Historic England. Arguably none of these organisations focus on research as their primary activity, although the ADS curates data generated by academic researchers as well as data created during the course of developer-funded fieldwork, and many would argue that developer-funded excavation counts as research. It was therefore decided to focus data collection on three of these organisations, the ADS, OA and MOLA, with some smaller amounts of data being gathered from two other organisations (WA and CAT), via the ADS website. As well as influencing the kinds of questions asked, the decision to use large datasets also influenced the organisations picked to provide the data, as the scale of archaeological operations is important in determining whether large digital

datasets are generated. The developer-funded organisations chosen therefore included the three biggest organisations in England, along with a medium sized organisation (CAT) that had been involved in at least one very large infrastructure project (the construction of HS1). These organizations were also chosen because they had either carried out (or aggregated in the case of the ADS) the majority of post PPG 16 fieldwork in the three CSAs that form the geographical focus of the thesis.

3.4.2 The structure of the data

Each of the organisations which provided data for this thesis structures and stores their data in different ways and these different practices have to an extent determined the type and quantity of data gathered for the project. The following section briefly describes the structuring and storage of data gathered from each relevant organisation. This information on digital data storage is partially based on the data gathered for the project, partly gleaned from visits to the relevant organisations and partly derives from the author's experience working as a post-excavation project officer for OA.

3.4.2.1 The Archaeology Data Service

Data storage at the ADS is internet based and the web site is curated at the University of York. Data are stored by project in a hierarchical structure through which users can move from overall site reports, through specialist reports to primary context data. Metadata are archived along with each individual project, usually in the form of a table integrated into a specialist report. The character of

these datasets are largely determined by choices made within contracting units about what kind of data merit deposition and therefore archives are often not exhaustive. For example, data deposited as part of the HS1 archive did not include primary finds data (scanned datasheets/databases containing information on sherd count, decoration, bone count, etc.) which therefore had to be accessed from a different source (the data servers of OA).

3.4.2.2 Oxford Archaeology

Storage of digital data relating to contexts and finds at OA, unlike that at the ADS, is not centralised. Digital context and finds data generated by OA tends to be generated on a project by project basis and in the case of much of the data generated by finds specialists, on an individual basis.

Some data, including digital photographs and shapefiles are stored centrally, being curated by the archives department and the geomatics department respectively. There is a central context database, but it is often not used in the post-excavation process, with individuals preferring to construct their own tailor made databases. Context and finds data are therefore stored in a range of different databases, using a variety of software and on several different servers and are often stored in a non-hierarchical ad hoc manner (Backhouse 2006, 55). Metadata are not stored centrally, but in the case of finds, data are curated by researchers in the relevant specialism. These practices may reflect the internal institutional history of OA, with departments that are required to curate data for external stakeholders (archives), or for internal stakeholders (geomatics) developing their own centralised storage systems and policies, and departments

such as post-excavation for which data are viewed primarily as a resource for internal use in the creation of a product (publication) for external consumption, having no centralised data storage policy at all.

3.4.2.3 Museum of London Archaeology

Storage of digital data at MOLA provides a third contrasting case study, different from the ADS and OA. At MOLA all data, including context data, finds data and shapefiles are stored in a single database with data queries created using Microsoft Query. The data are therefore stored centrally and easily accessible. Data on specific classes of finds, or aspects of finds from different archaeological sites can be aggregated and downloaded into spreadsheets for export. Metadata are stored centrally in a series of Microsoft Excel spreadsheets. The database is relational rather than hierarchical in structure so that all aspects of the archive from a particular archaeological site, or from multiple archaeological sites can be related to one another (Karen Stewart, Senior Archaeobotanist, MOLA pers. comm.). The only disadvantage of this system is its potential to produce vast and therefore unwieldy datasets, although the size of the dataset created is obviously dependent on the nature of the research for which it is created.

3.4.2.4 Wessex Archaeology and Canterbury Archaeological Trust

The data storage systems of WA and CAT were not directly encountered during the course of this research, as the data provided by these organisations was accessed via the ADS website. However, experience suggests that data storage in these organisations is more likely to be akin to that at OA than MOLA.

Table 3.7: The character of data accessed from different sources.

Organisation	Context Databases	Pottery Databases	Animal Bone Databases	Charred Plant Databases	Number of Records
ADS	36	-	-	-	33, 211
OA	7	30	20	-	140, 042
MOLA	1	1	1	1	1,415,085

3.4.3 The different characteristics of the datasets from different organisations

The degree of fragmentation in data storage among the three organisations that provided the bulk of the data for this project is illustrated in Table 3.7, which compares the number of different databases accessed with the total number of records, with one record corresponding to a single line in the database. It is clear from the table that the most fragmented dataset came from OA, where 140,042 records were spread among 57 different databases. The data accessed from the ADS were also fragmented, with 33,211 records stored in 36 databases. The least fragmented dataset was that from MOLA which provided 1,415,085 records all from a single database. When comparing the datasets from the ADS and from OA; however, it should be borne in mind that although the ADS data were divided among fewer databases than that from OA, there was also less data overall.

There are two major consequences of this data fragmentation. The first of these is that differences in fragmentation of data between organisations, alongside differences in the degree to which data are organised hierarchically clearly profoundly affect the accessibility of the data. The most time and effort was expended in gathering data from OA, with data accessed from the ADS being the

next most expensive in terms of time, and data gathered from MOLA being the least expensive. The second consequence is the degree of interoperability between datasets, with the datasets that exhibited the greatest degree of fragmentation having the least interoperability; so that, for example, datasets accessed from the OA servers required the greatest amount of additional work in order transform them into a single dataset. In contrast to the OA datasets the holistic nature of the MOLA dataset generated some problems of its own which related to the sheer scale of the data. In this case cleaning the dataset of duplicate records, for example, had to be automated using a Python script because of the large number of records involved.

3.4.4 Methods of data gathering

Data gathering involved a triple strategy of downloading material directly from the ADS Website, visits to the offices of OA (South) and MOLA and entering data by hand from published sources at the Sackler Library, Oxford. Data entered by hand included context data for the MBA to EMED settlement at Yarnton (10,847 contexts), near Oxford, which was entered directly from the context sheets held in the project archive at OA South. In addition, some context databases for sites on the route of the HS1 railway did not contain complete phasing information. Supplementary phasing information was therefore entered by hand into the context database for these sites using the stratigraphic narratives contained in the relevant site reports, which were accessed from the ADS website. With the exception of the information accessed from the MOLA database, digital charred plant remains data tended to take the form of tables relating to individual sites,

or phases of sites. These data were also entered by hand from published site reports, as this was felt to be less time consuming than reformatting the digital tables for uploading into the database.

3.4.5 Data issues and resolutions

The existence of the diverse practices of data production and storage described above threw up a number of problems requiring resolution before analysis of the data could proceed. The largest of these was the construction of a database to store the data captured during the project and related to this were issues of data cleaning and the creation of standard terminologies to describe the data. A high degree of standardisation of data is required in order to construct queries to extract data from any database. The following section describes the solutions adopted for these issues and also the structure of the database.

3.4.6 Data cleaning

Some pruning of the dataset gathered from MOLA had to be undertaken prior to uploading into the project database. This was because the process of exporting data from the MOLA database involved the creation of duplicate data in the resulting spreadsheets. Data exported from the MOLA animal bone and plant remains table included dates derived from the context table and from the pottery table. Where the dates from the context table disagreed with the dates from the pottery table for a given context, a duplicate record was created. This resulted in an animal bone dataset of 689,577 records and a plant remains dataset of 51,123 records. After the removal of duplicates using a Python script these were

reduced to 203,048 records and 44, 556 records respectively. The removal of duplicates was handled slightly differently in each case. In the case of animal bones the Python script looked for the narrowest date range assigned to a given context and deleted duplicate rows with wider date ranges. In the case of the plant remains the Python script took the earliest date assigned to a context along with the latest date assigned to the same context and created a new date range from both. The reason for adopting these slightly different strategies was to minimise the number of contexts in the animal bone table being assigned to the unphased category - as a large proportion of contexts in the animal bone table had date ranges which spanned one or more phases when date ranges were constructed using the second Python script.

3.4.7 The structure of the database

All of the data gathered for this thesis was entered into a single relational (Filemaker) database. The database comprises 16 linked tables seven of which contain primary data on sites, contexts, and artefacts and nine of which contain supporting data, including lists of pottery types, animal and plant species and translations of the different dating and phasing schemes employed into a single overarching phasing scheme. While the primary job of the seven tables containing primary data is data storage, the job of the nine tables containing supporting data is more complex, mostly revolving around making the primary data-tables interoperable. These supporting tables therefore contain lookup instructions and calculations, which are described below.

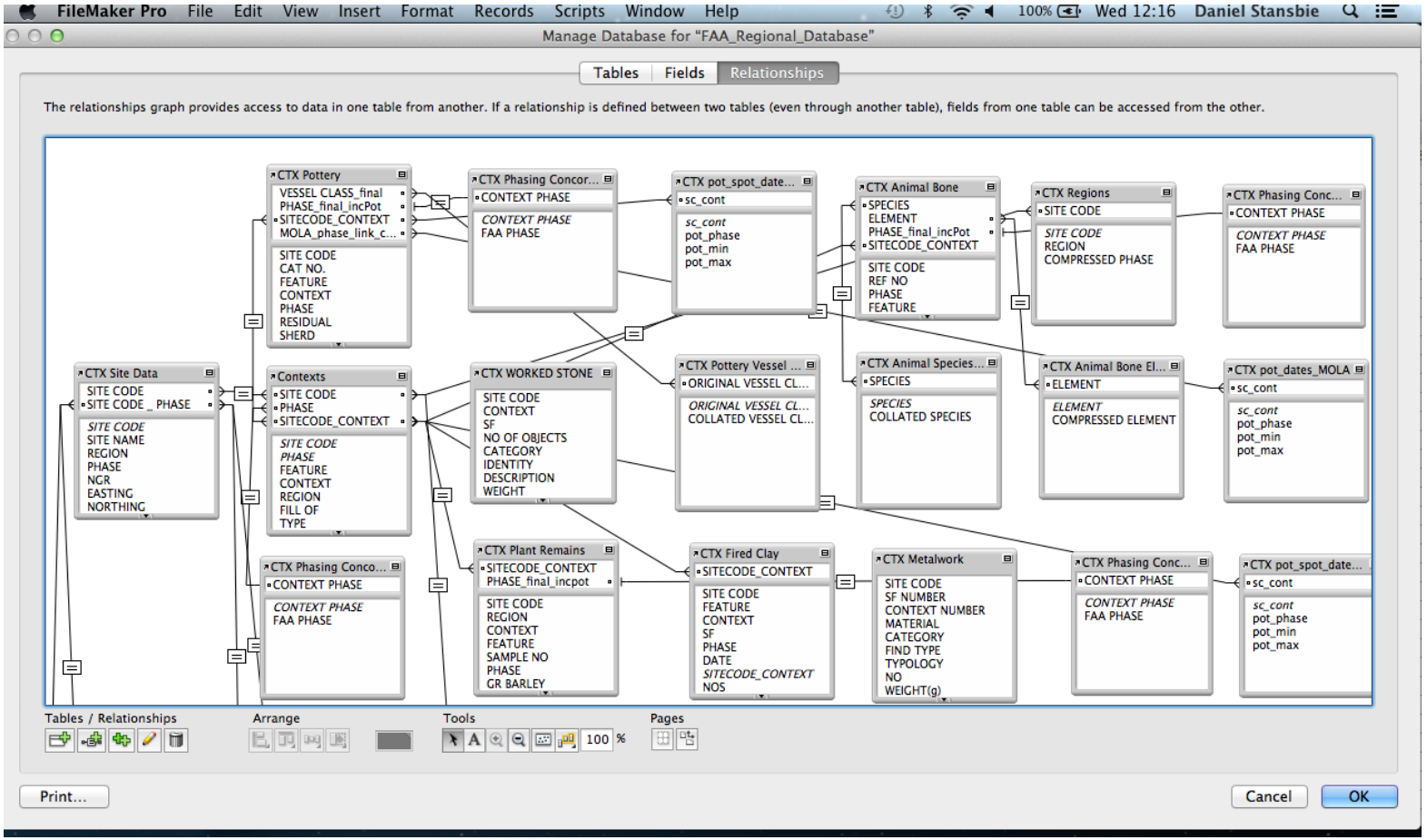


Figure 3.10: Screen Shot of thesis database.

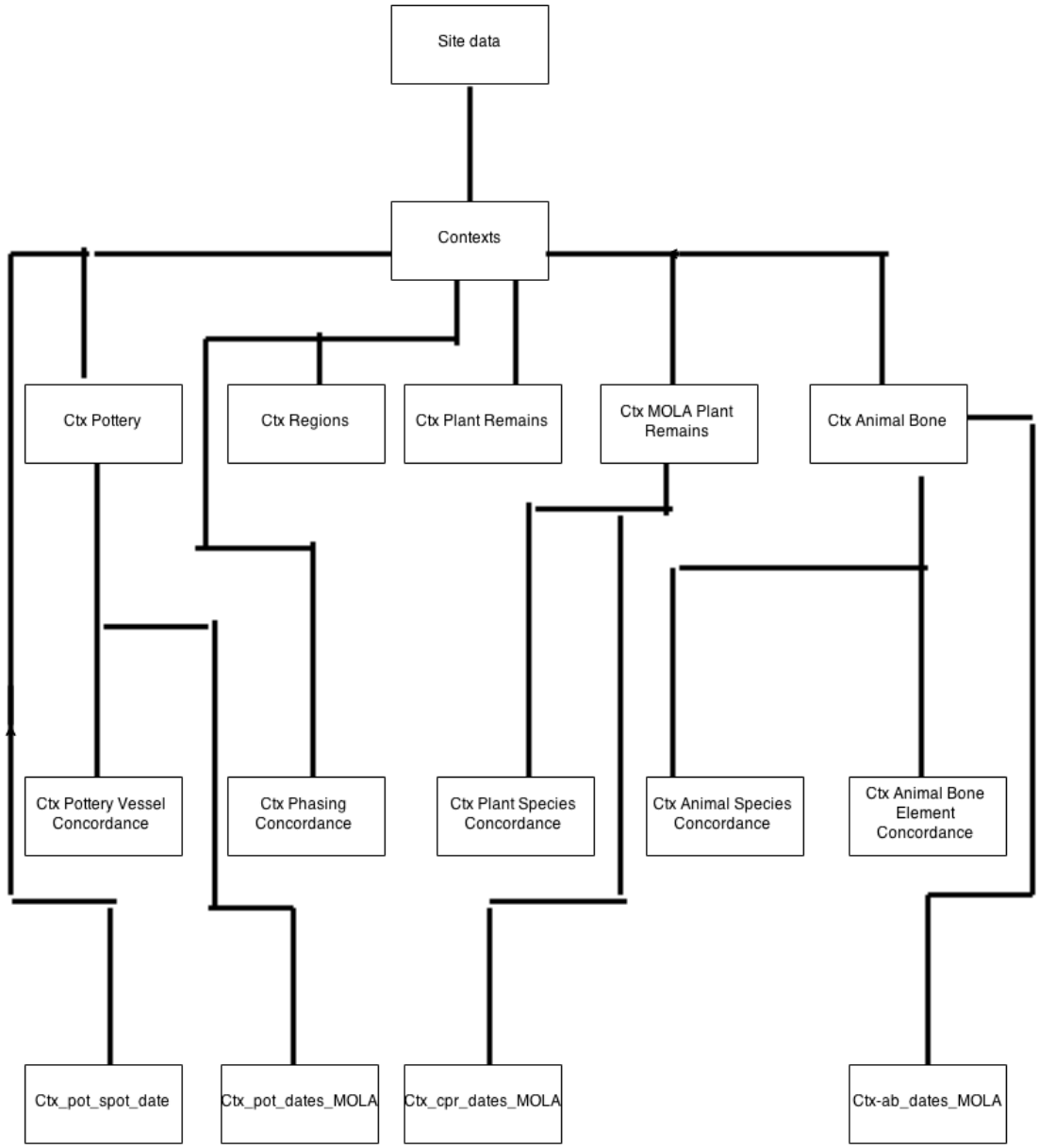


Figure 3.11: The structure of the database.

A schematic representation of the structure of the database and the functions of the different tables are shown in Figure 3.11. The following text therefore concentrates on the function of the supporting tables. As described above data comprising five main categories including site data (location, type, etc.), context data, ceramic data, animal bone data and charred plant remains were collected. These data were split into seven tables: charred plant remains data are divided into two tables, one labelled Ctx Plant Remains and the other labelled Ctx MOLA

plant remains. Information on the CSA that the data comes from is stored in a separate table labelled Regions. The tables illustrated in the lower half of Figure 3.11 all contribute to enhancing the interoperability of the data contained in the tables illustrated in the top half of the figure. Tables labelled as concordance tables function to translate abbreviations and alphanumeric codes encountered in the primary data into standardised terms devised for the thesis database. So, for example, the phasing concordance table contains two fields: context phase and FAA[1] phase, the function of which is to narrow down 288 different phasing terms from the primary data into a list of 29 standard terms (see above). The FAA phase field, having been imported from the phasing concordance table into the primary data tables (context, pottery, animal bone and charred plant remains), can then be used to sort the data by phase for the purpose of analysis. The four tables illustrated at the very bottom of Figure 3.11 and labelled Ctx_pot_spot_date, Ctx_pot_date_MOLA, Ctx_cpr_date_MOLA and Ctx_ab_dates_MOLA translate numerical date ranges assigned to individual contexts as start and end dates in the OA Roman pottery datasets, and in the MOLA datasets, into standard terms for the thesis database. This operation was carried out in a separate program using a Python script and the resulting data were imported into the database from a csv (comma separated values) file.

The sequence of calculations that are carried out by the database in order to arrive at a phase for any given context can involve choosing among contradictory dates for the same context. This process can be demonstrated by the description of the sequence of calculations carried out in the pottery table, as the operation

[1] FAA = food and agency, the original name for the thesis.

is very similar in the other primary data tables. The sequence of calculations is illustrated in Figure 3.12. Phasing data are divided into that which is internal to the table and that which is external to the table. In the case of pottery, external phasing is taken from the context table via the phasing concordance table. If there is no external phase assigned to a context in the context table, then the internal phase assigned in the pottery table is used. In this way a "final" phase is generated for the context. This procedure assumes that a phase assigned in a context database is always preferable to that assigned in a pottery database, because more complete information on the phase and date of the context would have been available to the archaeologist assigning the overall context phase, than to the pottery specialist. In addition, much of the phasing data in the context table was entered by hand from published reports by this author. The next stage of the process is to create a "Pot_Phase" using the sequence of numerical start and end dates assigned to some contexts. Dates of this kind have been assigned to some contexts by OA Roman pottery specialists on the basis of ceramics and to all contexts excavated by MOLA. The date is looked up from the supporting tables described above. The final stage in the process is to use the "Pot_Phase" to assign phases to those contexts when no other phasing information is available, generating as near as possible a complete phasing list in a new field labelled "Phase_final_incPot".

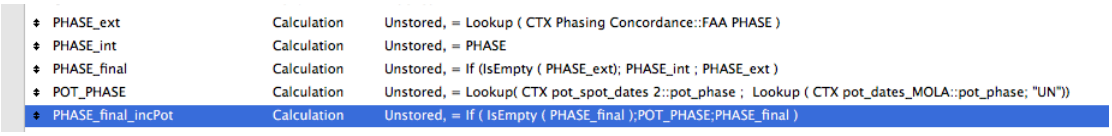


Figure 3.12: The sequence of calculations used to assign phases to contexts in the pottery table.

3.4.8 The qualitative nature of the data in the database

The qualitative attributes of the data uploaded to the thesis database varied according to CSA and to the organisations that had curated it. Data derived from sites in the UTV CSA curated by OA South comprised context, ceramic and animal bone databases, along with charred plant remains tables. Data on site type, location and region were entered by hand. Data were mostly uploaded as complete databases, but not all sites had databases available for all categories of data. Plant remains data were entered by hand from published reports. Some context data for the prehistoric to EMED settlement at Yarnton was entered by hand as the digital catalogue was not available and the site was considered too important to leave out of the analysis. In the case of Yarnton therefore, a sample of context data was uploaded, with certain types of feature considered more likely to contain evidence for food consumption being selected: these feature types comprised enclosure ditches, pits and structural features such as beam-slots and postholes. Data derived from sites on the route of HS1 curated by the ADS and OA South comprised the same categories of data as that uploaded for the UTV, was generally more complete and therefore was uploaded without being sampled. Data derived from sites in the MLTV CSA and curated by MOLA had slightly different qualities from the other two datasets because of the quantity of the data. The same data categories were selected as for the UTV and HS1 CSAs, and these were largely uploaded as complete databases for each

context data and artefact category. However, it proved impossible to export the entirety of the Roman pottery dataset as it was too large for a single spreadsheet and the time available to carry out the export was limited. In this case, therefore, only Roman pottery data derived from certain types of contexts was accessed, these being: ditches, pits, wells, graves and cremations, floors and demolition rubble. This section has described the basic architecture of the database constructed to store the data gathered during the course of this thesis. The next section will move on to describe the ways in which data have been extracted from the database for analysis.

3.5 Interrogating the database

In addition to the challenges of collating large amounts of information and making diverse datasets with different histories interoperable, the use of large datasets also entails the analysis of the data that has been gathered together. Such analysis inevitably involves a degree of selectivity in extracting subsets of the data and putting questions to it and therefore certain aspects, or subsets of the data will remain uninvestigated. The central questions addressed in this thesis have been described above and will not be repeated here. The next section will, therefore, move on to examine the different scales at which the data have been interrogated, how these scales relate to the geographical and chronological scope of the thesis, the different types of artefactual material investigated and how the data have been represented and quantified.

3.5.1 Extracting data for different scales of analysis

Data analysis was carried out at two spatial scales and three chronological scales. The largest spatial scale was the regional scale and corresponded to the three CSAs and the smallest was the site scale. The three temporal scales chosen for analysis were divided along the lines of conventional period boundaries for the sake of convenience, although it was intended that the analysis would ask questions that crossed these boundaries.

The data were therefore divided into two "packets" corresponding to the two different spatial scales using the "find" function in Filemaker. For the regional scale, data were sorted using a field in the regions table that assigned a "region" to each context, group of finds, or environmental sample in the database. For the site level scale, sites were sorted using a field in the "site data" table called site type, which assigned a "type" to each site using the EngLaId site type thesaurus. At each level of analysis the distinctions between different regions, i.e. UTV, HS1 and MLTV were maintained. Parallel to sorting by spatial scale, data were sorted into broad chronological groups, also using the "find" function. Sorting was carried out using the FAA phase field in the phasing concordance table and divided the data into three broad phases: later prehistory, the LIA-RO period and the EMED period, by searching for the chronological phases that make up those broader groups in the thesis database.

Having been established, these "packets" of data were further sorted by artefact type, as each of the three main categories of artefact data collected for the thesis has differing qualities that require separate analysis. At each further stage of

analysis the spatial and chronological sorting of the data described above was maintained. Initially, ceramic data were sorted by broad functional vessel class using the field "collated vessel class_final" in the pottery table. This operation produced lists of vessel classes present for each broad period at each of the three spatial scales described above. Animal bone data and plant remains data were sorted by species using the field "collated species" in the animal bone table and by fields containing data on individual plant species in the plant remains table and the MOLA plant remains table. This operation produced similar lists of animal and plant species present for the same periods and spatial scales.

3.5.2 Quantifying and representing the data

The divisions of the data described above, which consisted primarily of records of artefacts collected together in very large numbers had to be quantified and represented graphically in order for analysis to proceed. The quantification of each artefact category differed and quantification of plant remains was particularly different from pottery and animal bone. The quantification of each artefact type will therefore be described separately below.

Ceramics were quantified using the "estimated weight" field and graphed by period and vessel class for each region and settlement type. The use of estimated weight rather than weight in this case was necessitated by the fact that some records in the primary data which recorded the presence of ceramics, nevertheless failed to record the weight of sherds present; a minimum count of one gramme was therefore assumed for each blank weight cell and an estimated weight was generated in a separate field in the pottery table using the following calculation:

= if(IsEmpty(Weight);1;Weight)

Animal bone was quantified using number of identified specimens (NISP) and graphed by period and species, again for each region and settlement type. Robb's estimates for the ratio of meat provided by cattle in a given diet, to the percentage of NISP taken up by that species in a given assemblage (Robb 2014,

142) were taken into account when discussing the data. Plant remains data were quantified by grain count or estimated grain count and exported into an Excel spreadsheet. Grain counts were then converted to presence/absence for each sample, collated by phase and species in Excel and divided by the number of environmental samples taken to provide a percentage estimate of the "ubiquity" of a given species in each phase. Once again these calculations were carried out for each region and settlement type.

Having described above the sources of the data used for this thesis, the ways in which different datasets had been stored and structured in different organisations, the nature of the data collected, the methods of data collection, the nature of the database constructed to analyse the data and the methods of analysis applied to the data the next section will describe methods of quantification for the different artefact types.

3.6 Methods of quantification

As with much archaeological methodology, methods of quantification have a tendency to vary between sub-disciplines, regions and even between individual researchers. Different kinds of artefacts and ecofacts are also necessarily quantified in different ways. The following section therefore sets out the specific methods used to quantify the finds data gathered for this thesis.

3.6.1 Quantification of ceramics

There are three major methods of ceramic quantification used by archaeologists, each of which has its advantages and disadvantages (Orton & Hughes 2013, 203–18). The first two, sherd count and weight are fairly universally adopted, whereas the third, estimated vessel equivalents (Eves) is less widely used, but tends to be common among Roman and medieval ceramicists. Sherd count and weight are straightforward methods, which need no clarification; estimated vessel equivalents; however, are more complex. These are a measure of vessel rims, where the surviving portion of an inferred complete vessel rim is measured on a chart comprising a series of concentric rings of different diameters. The resulting measurement is recorded as a proportion of one complete vessel rim (ibid.). For example, a rim sherd comprising 10% of a vessel rim might be measured as 0.10 Eves, or 10%. The ceramic datasets collected for this thesis, including the prehistoric assemblages, were generally quantified using all three of these measures, but the means of quantification of Eves often varied. So, for example, 1 Eve could be variously recorded as 1 or as 100% and although Eves can be argued to be the least biased measure for determining relative proportions of vessel types within and between assemblages (Orton & Hughes 2013, 207), this variation within a very large ceramic dataset comprising approximately 760,000 records effectively rendered Eves redundant as a means of quantification for this thesis. This is because the presence of percentages within a summed column could lead to massive errors, for example, a single vessel being recorded as 100 vessels. Quantification of proportions of vessel types within assemblages therefore had to rely upon either sherd count, weight or both. However, Orton and Hughes (2013 , 206–7) argue that sherd count

cannot be reliably used to compare proportions of vessel types within an assemblage, as sherd count is a measure of the degree of "brokeness" of a vessel, so that an assemblage with a greater number of broken vessels of a particular type may appear to have been made up of more vessels of that type than an assemblage with fewer broken vessels. It is arguable that the analysis of very large assemblages, such as that used for this thesis, which included approximately 2 million sherds, may serve to "smooth out" local variations in "brokeness" within the assemblage as a whole, but, this argument would require detailed testing beyond the scope of a DPhil thesis. Weight is therefore the preferred means of quantification chosen for measuring the number of vessels and calculating the proportions of vessel types; as although heavier types will be more frequent than lighter ones, within a given assemblage, this bias does not vary according to context and weight can "therefore be reliably used to compare proportions of types in different assemblages" Orton and Hughes (2013, 206–7).

3.6.2 Quantification of animal bone and estimation of meat weight

All animal bone within the dataset gathered for the thesis was quantified in two ways, by number of identified specimens (NISP) and by weight. Quantification by NISP involves counting the number of bone fragments of a given animal species from each stratigraphic context and summing the total. The measurement of weight simply involves weighing each bone and summing the total. NISP and MNI (minimum number of individuals) are the preferred method for comparing animal species within or between assemblages for most specialists (O'Connor 2000). However, given that MNI data were not available for many of the

assemblages used in this thesis, NISP was chosen as the default method of quantification. This is not as straightforward as it sounds; however, as slightly different approaches to measuring NISP may be used by different specialists. For example, some count refitting bones as 1 and others do not, and some count central pig metapodia as half numbers (Reitz & Wing 2008, 167). Unfortunately the sheer number of assemblages on which the thesis dataset is based make it impractical to assess the different methods used and then control for them, even if the methodology used had been made explicit in every site report. The NISP figures presented in the thesis must therefore be taken as estimates, although these estimates are likely to be very close to an accurate count. It should not be thought; however, that NISP can be used as a straightforward proxy for the measurement of proportions of meat weight from different animal species within an assemblage (O'Connor 2000, 54–57). Several different and mathematically complex methods are available for the estimation of meat weight from NISP (O'Connor 2000 , 61–62; Reitz & Wing 2008, 233–242). However, notwithstanding these objections a common method for comparing species within and between assemblages used by many specialists (Holmes 2015; Poole 2013b) is simply to convert the NISP values for each taxa to percentages and use the results as a proxy for the relative importance of each species to a particular group or community, without making specific claims about the quantities of meat consumed. A note of caution about the use of this method is sounded by O'Connor, who points out that percentages are interdependent, so that: "a high value for one taxon inevitably depresses the others in the same sample"(O'Connor & Addyman 2003, 135–6). Interdependence should therefore

always be borne in mind when interpreting percentages. However, the method has the merit of being easy to apply to large datasets and is the one adopted here.

3.6.3 Quantification of charred plant remains

Charred plant remains data gathered for this thesis were quantified in a range of ways, by a range of different archaeobotanical specialists working in the region of each CSA and founded upon a range of different archaeobotanical sampling strategies. In general grain and chaff were quantified separately by fragment count for each sample, but for the purposes of the thesis counts of chaff were discarded, as the focus of food consumption is argued to be more directly related to grain, than to the by-products of crop processing. Grain counts for each species were converted to presence/absence by sample and the results summed for each phase; this figure was then divided by the number of samples for each phase to give a percentage of samples containing a given species in each phase (% samples where present). This measure, known as species ubiquity to archaeobotanists (Pearsall 2014), has the advantage of correcting for huge variations in counts of grain between samples, which can occur due to accidents of preservation and is arguably the best method for comparing large datasets, hence its adoption for this research.

3.7 Geographical Information Systems

GIS mapping of finds and site distributions was carried out using QGIS. Finds distributions were mapped in 3km hexagonal bins using summed counts; sites were mapped as points using national grid references converted to eastings and northings. Background mapping including topography was provided by the EngLaId project.

3.8 Conclusions

This chapter has sought to describe the methodology adopted in this thesis by elaborating four main methodological elements. The first element to be described (3.2) was the criteria for the selection and categorisation of the data. The second element (3.3) was methods of quantification and statistical methodologies applied to the data. Thirdly (3.4) data acquisition, including a detailed discussion of the sources of the data and the nature of data storage in the originating organisations was discussed and a description of the database constructed to collate and organise the data was provided. Fourthly methods of interrogating the database were discussed (3.5). Finally the GIS methodology (3.6) was described. The merits and demerits of the methodological approach taken including a consideration of the pros and cons of using large datasets in the study of archaeological finds assemblages is considered in chapter 9, along with a critical evaluation of the concept of "Big Data" as an organising principle

for this methodology. Having described the methodology adopted for use in this thesis the following chapter moves on to consider an area of equal concern for the analysis of the data, dealing with sample bias and taphonomy.

4 THE NATURE OF THE DATASET, SAMPLING BIAS, TAPHONOMY AND THE MATERIAL RECORD

4.1 Introduction

Chapter 3 set out a methodology for the analysis of large charred plant, animal bone and ceramics datasets generated through developer-funded archaeology using computational "Big Data" techniques. The production of such data entails the use of numerous and varied sampling techniques with different biases. These biases are generated by the adaptation of archaeological fieldwork methodologies to commercial engineering requirements, and the interactions of the sampling techniques with the taphonomic processes that formed the archaeological record. Chapter 4 therefore sets out to understand these biases, taking each CSA in turn. Sections 4.2, 4.3 and 4.4 examine, for each CSA, the completeness of the finds record for each site, variation in occupation density by phase, site type variation by phase, feature type variation by phase, environmental sample distribution by phase and finally, CPR, animal bone and ceramic distribution by phase. Finally, section 4.5 considers the biases in each CSA together. The next section begins with the UTV.

4.2 Upper Thames Valley

The types of dataset contained in the thesis database for the UTV are listed by site in Table 4.1. All of the sites shared a similar landscape context (3.2.1), which

has shaped the nature of excavation and the sampling strategies employed at them. All the sites were excavated in advance of gravel extraction with the exception of Castle Hill (Allen et al. 2010), which was subject to extensive excavation on behalf of the Northmoor Trust, meaning that all were subject to extensive open area excavation, revealing in most cases complete settlement plans. In the case of Yarnton an extensive landscape survey, including excavation, trial trenching, geophysical survey and documentary research was carried out (Hey 2004; Hey et al. 2011). The extensive nature of the UTV excavations generated large finds assemblages, but also tended to uncover multi-period landscapes, with contiguous or overlying occupation of later prehistoric, Roman and sometimes early medieval date. However, early medieval occupation, was least common, perhaps because occupation dating to later than the mid 7th century may cluster around and within modern settlement centres (Rippon et al. 2015, 37-41) and 5th and 6th century occupation is, in general, hard to find (Hamerow 2012, 7-10). These conditions, along with the digital nature of much of the archive, were the major factors that led to the selection of these sites for study.

Table 4.1 : UTV sites in the database

Site Name	Contexts	Pottery	Animal Bone	Charred Grain
Appleford Sidings				✓
Castle Hill	✓	✓	✓	✓
Claydon Pike				✓
Cotswold Community	✓	✓		✓
Gill Mill	✓	✓	✓	
Gravelly Guy				✓
Horcott Pit	✓	✓	✓	✓
Horcott Quarry	✓	✓	✓	✓
Latton Lands	✓	✓	✓	✓
Thornhill Farm				✓
Yarnton	✓	✓	✓	✓

Although, for reasons of time, budgetary constraint and scale, excavations carried out by developer-funded archaeologists tend to adopt less intensive sampling strategies than research-led excavations, within the commercial sector there are wide variations. This is clearly the case for the commercially excavated sites selected for the UTV CSA, although, this being said, there are some thoroughly excavated sites, for example Yarnton, within that CSA. The following section explores the excavation and sampling strategies adopted for this CSA, and the nature of the record that they have produced: starting with the broad patterns of occupation by period and moving through the different scales of site type, feature type and samples taken, before examining the nature of the ceramic, animal bone and charred plant assemblages in the context of the these different sampling strategies.

4.2.1 Upper Thames Valley occupation by period

Occupation was fairly common in all periods in the UTV CSA, being present on over 40% of sites for all periods apart from the EMED and the RO and MR (Fig. 4.1). BA occupation was less frequent than IA occupation, but from the EIA occupation was very frequent, rising to a peak in the ER period. In the LR period frequency of occupation was still high, but by the EAS period it had begun to decline to below 30%. This clustering of settlement of different periods, while no doubt partly reflecting the real nature of past occupation is also likely to reflect the extensive nature of excavation, which gives a greater probability of finding the dispersed settlement characteristic of certain periods.

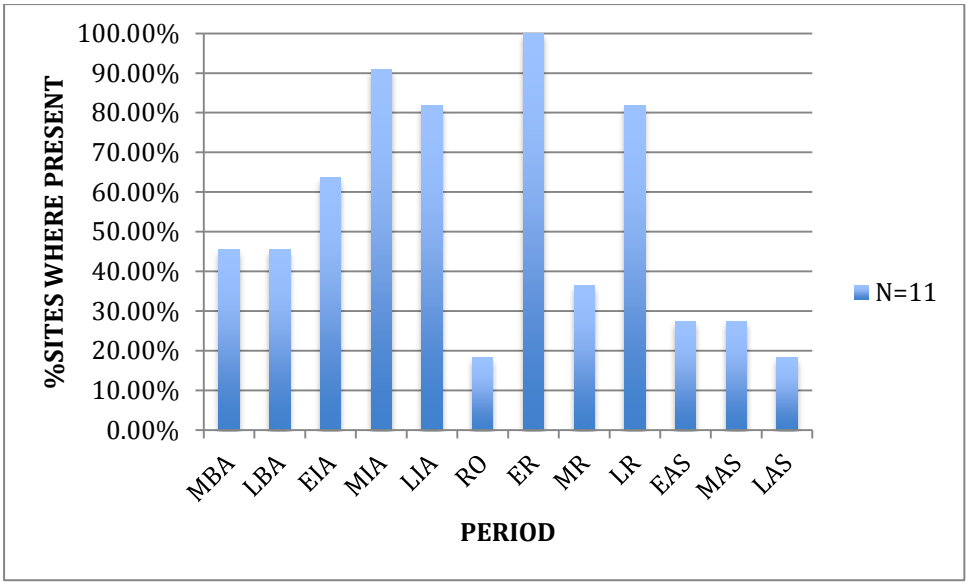


Figure 4.1: Occupation on UTV sites by period.

4.2.2 Upper Thames Valley site types by phase

Changes in site type (3.2.2) in the UTV CSA reflected both changes in intensity of occupation (Fig. 4.1) and changes in feature type (Fig 4.3). As might be expected site type varied by period, with sites dating from the MBA to the MIA period being dominated by open settlement, with very little enclosed settlement and field systems present only in the MBA. Cemeteries containing both cremation and inhumation burials were also present in the MBA, MIA and LIA periods. From the MIA until the ER period there was a switch in the dominant settlement form from open to enclosed, with the later coming to dominate. Also starting in the ER period and continuing particularly into the LR phase there was increasing diversity in site type, with complex settlement and villas contributing. Cemetery diversity also increased in the Roman period. From the end of the Roman period into the MAS period sites were once again dominated by open settlement, with enclosed settlement being re-established in the MAS period and field systems dominating the LAS phase.

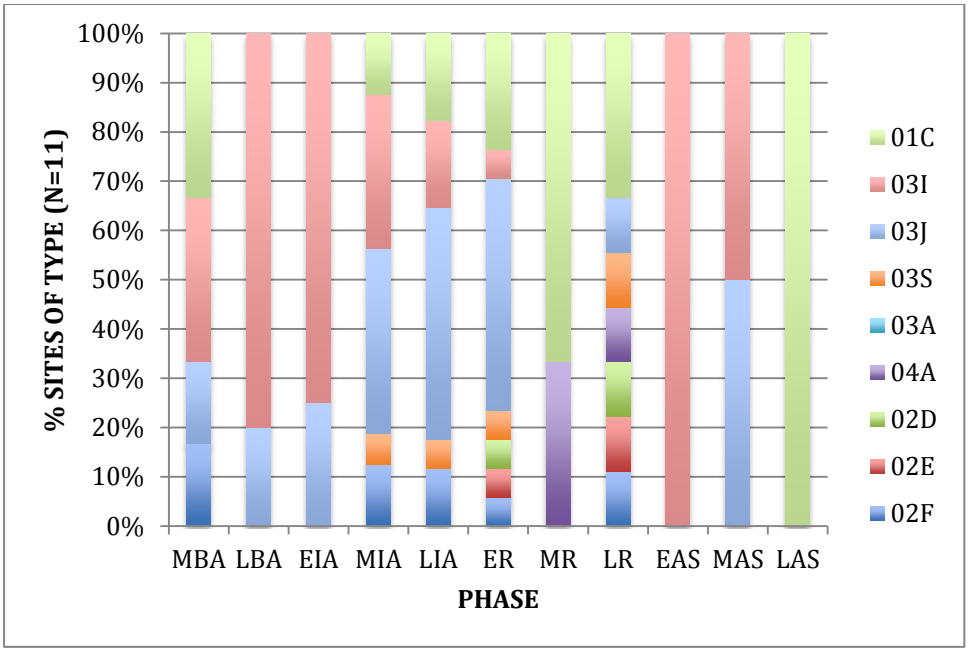


Figure 4.2: Proportions of sites of different type in the UTV CSA.
* 01C = Aggregate Field System, 03I = Open Settlement, 03J = Enclosed Settlement, 03S = Complex Settlement, 03A = Small Town, 04A = Villas, 02D = Inhumation Cemetery, 02E = Cremation Cemetery, 02F = Unspecified Cemetery

4.2.3 Upper Thames Valley Feature types by phase

Figure 4.3 and Table 4.2 break the UTV CSA down by feature type, with Table 4.2 giving a broad breakdown of features from all periods by type, along with a quantification of finds and samples and Figure 4.3 breaking features down by phase, using five categories of which the broadest (structural) refers to features which were part of, or associated with buildings. Figure 4.3 demonstrates that from the MBA until the MIA the dominant feature type was pits, correlating with the dominance of open settlement as opposed to enclosed settlement. The exception to this broad observation is the LBA to EIA phase, when structural features and postholes were most frequent and this is most likely a consequence of the high proportions of LBA to EIA post-built roundhouses, particularly at Cotswold Community. From the MIA until the LR ditches became the most frequent feature type, correlating with the growth of enclosed settlement and the decline of open settlement shown in Figure 4.2; although the range of different feature types also became more diverse in the LIA-RO period, again correlating with the increased diversity of site types seen in the same period. For the EMED period the breakdown of feature types was heavily influenced by the settlement at Yarnton, with the EAS period features consisting entirely of sunken featured buildings and the MAS heavily dominated by postholes relating to post-built halls at the same site. In the late Saxon period the influence of boundary ditches, also at Yarnton can be seen.

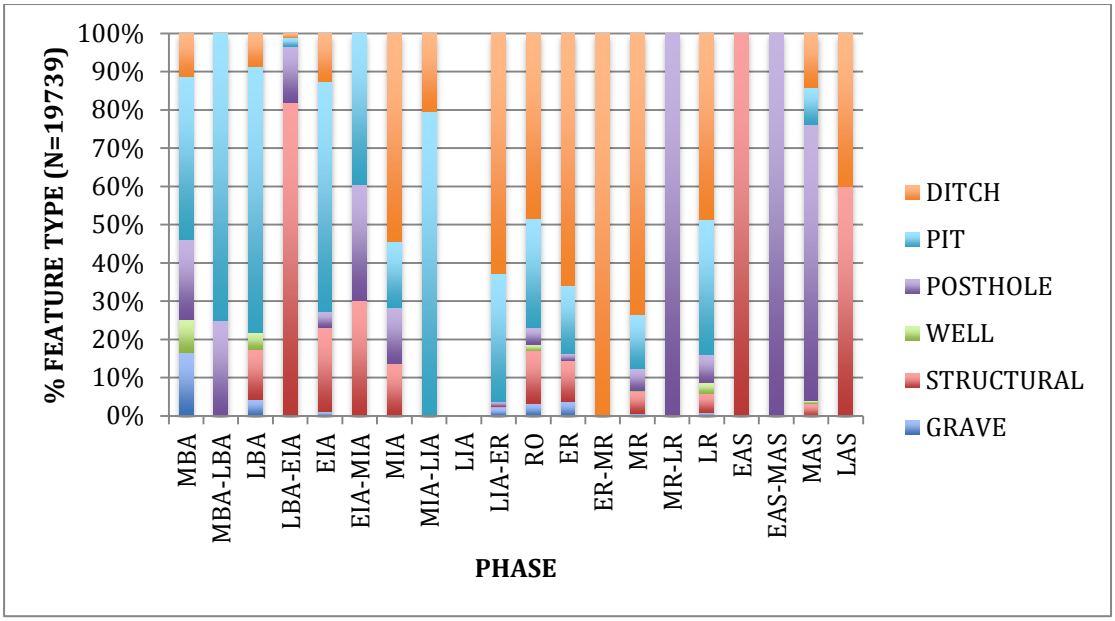


Figure 4.3: UTV feature types by phase.

Table 4.2: Quantification of features, pottery, animal bones and environmental samples excavated from UTV sites in the thesis database.

Features	
Ditches	4469
Pits	2914
Postholes	1383
Wells/Waterholes	78
Structures	527
Graves	159
Finds	
Pottery	131,890 sh
Animal Bone	100,000
Environmental Samples	313

4.2.4 Upper Thames Valley Environmental Samples by Phase

Figure 4.4 breaks down the proportion of environmental samples taken in the UTV by phase, showing that numbers of samples were highest for the EIA and MIA and in the MAS period. This pattern partly reflects the availability of suitable deposits for sampling, which were often well preserved in EIA and MIA storage pits at sites such as Gravelly Guy, along with the settlement at MAS Yarnton (Hey 2004). However, other peaks in sampling for the LIA-RO periods, particularly in the ER period show a strong evidence base for an understanding of cereal cultivation/consumption in general.

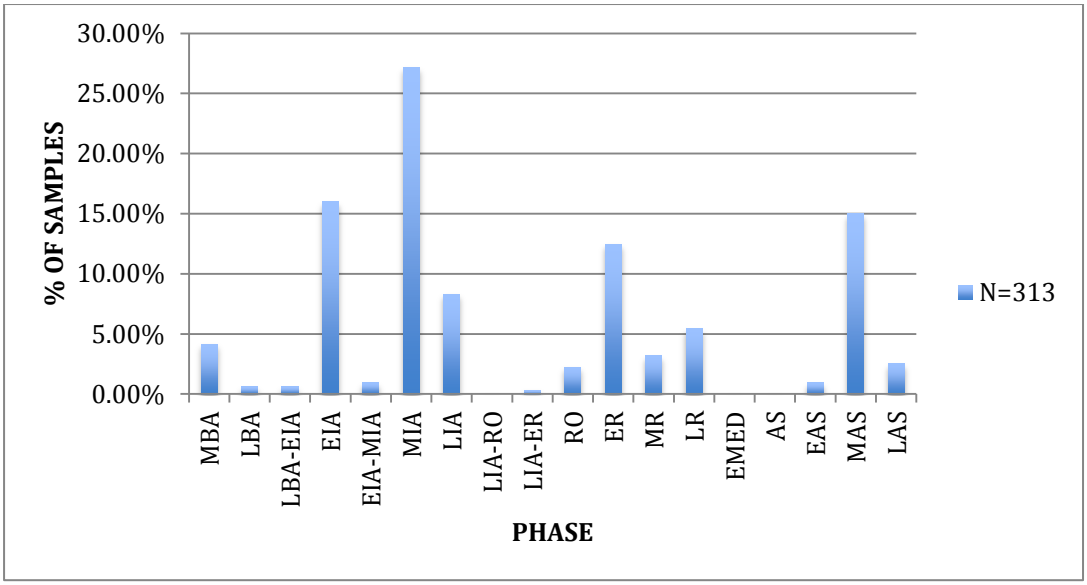


Figure 4.4: UTV % of environmental samples by phase.

4.2.5 Upper Thames Valley charred plant remains, animal bones and ceramics by phase

Figure 4.5 breaks down charred plant remains, animal bones and ceramics by phase for the UTV in order to assess the impact of sampling bias and site choice on the dataset. The measurement of all three categories is based on raw data converted into percentages for purposes of comparison. It should be borne in mind that this use of percentages creates interdependence in the sample, so that a high percentage in one phase inevitably depresses other phases in the same sample (O'Connor & Addyman 2003 , 135–6). The MBA to LBA assemblages and the EMED assemblages appear sparse for all three material types and this probably relates to the relative lack of sites of these periods (Fig. 4.1). Charred plant remains are strongly represented in the EIA and MIA, probably partly because of the prominence of storage pits in these phases (Fig. 4.3) and in the MAS and LAS, possibly because of good preservation at the MAS settlement at Yarnton. Animal bone and ceramics also have small peaks in the EIA and MIA, which may also relate to deposition in pits. Deposition of all three material categories is relatively scarce in the LIA and ER periods, despite the greater frequency of occupation in these periods than in later prehistory and the relatively high proportion of environmental samples belonging to the ER. Quantities of animal bones and ceramics are relatively high in in the LR period and this probably relates to a number of factors, including the relative availability of ditches (Fig 4.3) for receiving large dumps of material, as well as the diversity and status of settlement types, which include the complex settlement at Gill Mill (Simmonds & Booth forthcoming). Overall it is possible to

see how site and feature type and the relative density of occupation have all influenced the nature of the ceramic and ecofactual record. However, these statistics also make clear the broad coverage of different types of site and feature in the UTV and the very extensive programme of environmental sampling carried out on them, generating confidence about the representativeness of the UTV dataset.

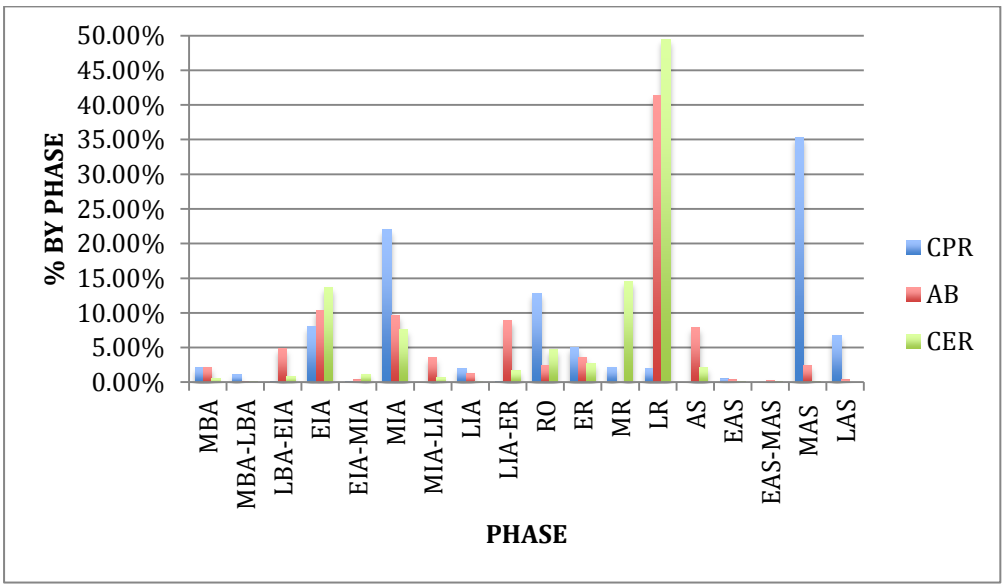


Figure 4.5: UTV CPR, animal bone and ceramics by phase.

4.3 Middle and Lower Thames Valley

For the MLTV CSA the thesis database contains full context, pottery, animal bone and charred grain records for 532 sites and given the completeness of this dataset, tabulation of these figures is not necessary. The geographical and topographical context of the CSA (1.2.1) is more diverse than that of either the UTV, or the HS1 region, but in practice the concentration of most of the sites in the area of modern London means that many share a landscape context. In addition, the spatially constrained nature of excavation in central London and

the deeply stratified nature of many of the sites means that the character of the data from different sites is very similar. In particular, the small scale of many excavations in London means that appreciation of settlement type is more difficult than in the UTV, and many sites are therefore characterised as collections of pits and ditches, or single buildings and enclosures.

4.3.1 Middle and Lower Thames Valley occupation by period

Occupation by period varied more widely in the MLTV CSA than it did either in the UTV or on the route of HS1 (Fig. 4.6). Later prehistoric occupation occurred at less than 20% of sites and EMED occupation at less than 10% of sites. There was; however, little variation between sub-phases within the later prehistoric and EMED periods. The majority of MLTV sites had occupation belonging broadly to the Roman period and over 20% had occupation of ER or LR date. This relative dispersal of occupation of different periods compared to the UTV dataset is probably a consequence of the greater number of sites in the MLTV dataset, but perhaps also relates to the concentration of Roman sites within the modern city. The broad pattern of occupation is also similar to the UTV pattern; however, in that later prehistoric occupation was more frequent than EMED occupation and RO occupation was most frequent of all.

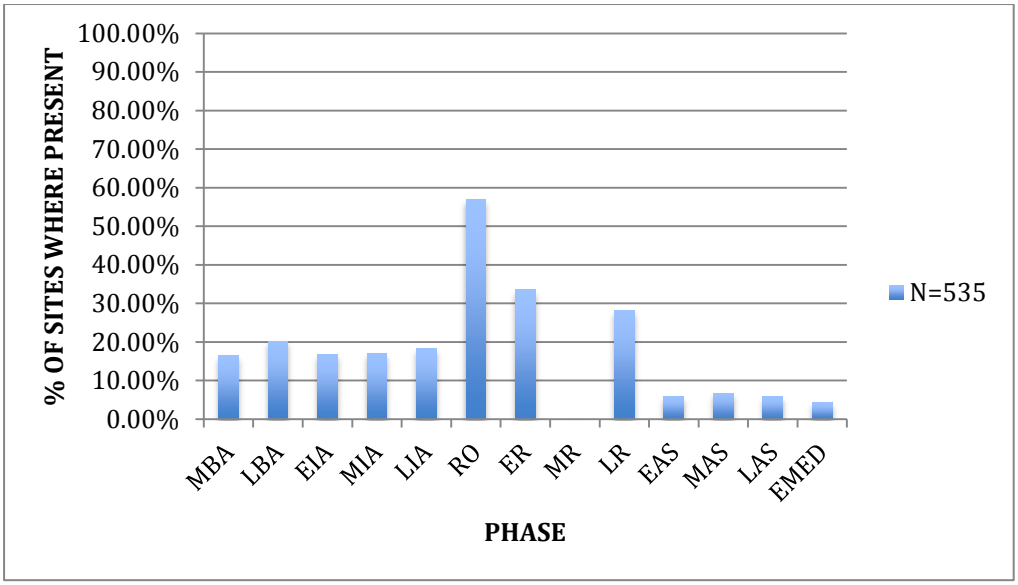


Figure 4.6: Occupation on MLTV sites by period.

4.3.2 Middle and Lower Thames Valley site types by phase

The relative proportions of sites of different type in the MLTV CSA (Fig 4.7) are, like the distribution of occupation by phase, strikingly different from the other two case studies. From the MBA to the ER period the dominant site types were ditch/pit groups and unspecified settlements, with enclosed settlements, enclosures and buildings making up a relatively small proportion until the MIA, and field systems entirely absent. From the beginning of the Roman period site type diversity increased, with the addition of cremation, inhumation and unspecified cemeteries, although ditch/pit groups were still dominant. In the EAS period ditch/pit groups declined slightly, with unspecified settlement becoming more important, but from the MAS and into the LAS, buildings became much more important. This MLTV pattern is probably partly a product of the nature of excavation in modern London, in which excavation is rarely carried out on a large enough horizontal scale to determine the limits and therefore the enclosed or unenclosed nature of settlement. However, it also probably reflects the real nature of urban occupation in Roman and MAS to LAS London, where

settlement would most likely have comprised densely packed small-scale buildings and single enclosures.

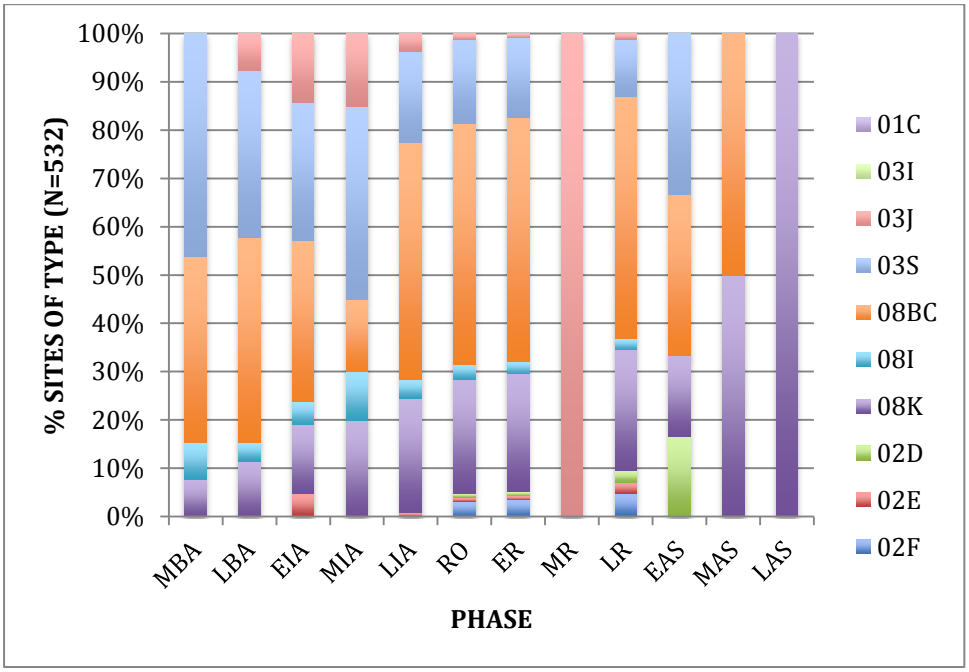


Figure 4.7: Proportions of sites of different types in the MLTV CSA.* 01C = Aggregate Field System, 03I = Open Settlement, 03J = Enclosed Settlement, 03S = Complex Settlement, 08BC = Ditches/Pits, 08I = Enclosure, 08K Building, 02D = Inhumation Cemetery, 02E = Cremation Cemetery, 02F = Unspecified Cemetery.

4.3.3 Middle and Lower Thames Valley feature types by phase

The breakdown of feature types from the MLTV CSA by phase (Fig. 4.8 and Table 4.3) reveals that for the later prehistoric period the dataset is dominated by ditches and for certain sub-phases such as the MIA by pits. This reflects the ditch/pit group dominated site type distribution. From the LIA period onwards feature types became more diverse, with the proportion of ditches declining relative to postholes, wells, structures and particularly in the LR period graves. Again this pattern reflects changes in site type in the same period, with a greater number of buildings and wells in the Roman period probably reflecting the nature of urban occupation within the CSA. EAS to MAS feature types were dominated by structures, postholes and ditches, reflecting a decline in diversity and probably also the predominance of sunken featured buildings in the EAS. From the MAS to LAS wells, structures and postholes predominate, probably representing the growth of mid and late Saxon London.

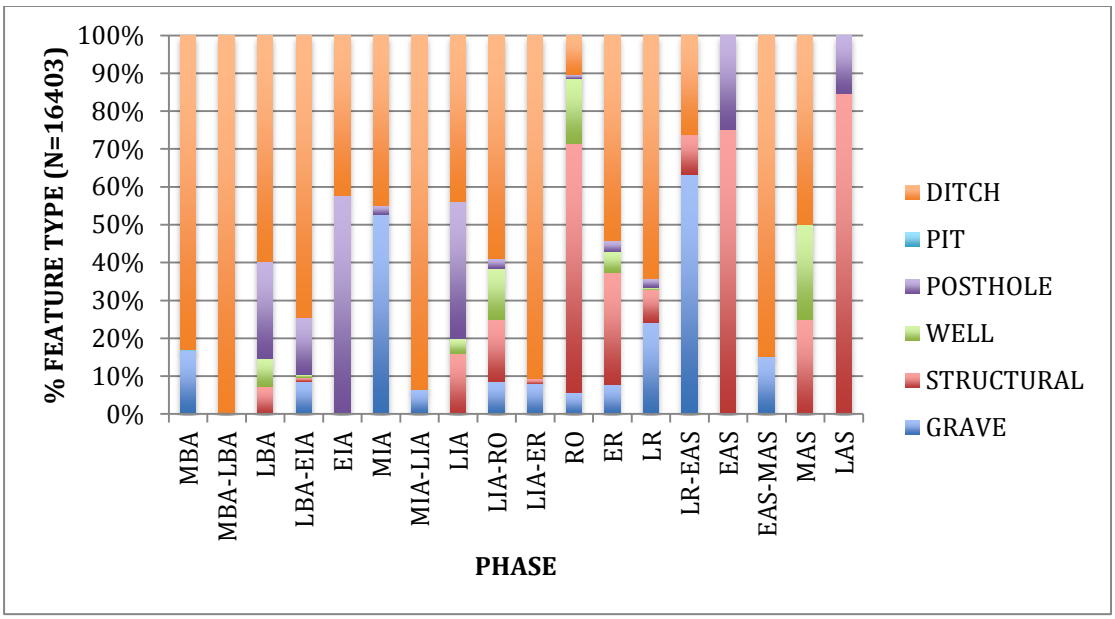


Figure 4.8: MLTV feature types by phase.

Table 4.3: Quantification of features, pottery, animal bones and environmental samples excavated from MLTV sites in the thesis database.

Features	
Ditches	6975
Pits	14668
Postholes	1248
Wells/Waterholes	1208
Structures	7523
Graves	1897
Finds	
Pottery	1,876,853 sh
Animal Bone	354,704
Environmental Samples	20,072

4.3.4 Middle and Lower Thames Valley samples by phase

The breakdown of MLTV samples by phase (Fig. 4.9) shows a very strong bias towards the Roman period (80% of samples), with no samples dating to earlier than the MIA. The majority of Roman samples belong to the broad Roman and ER sub phases, although substantial numbers of samples were also taken from LR deposits. Numbers of samples from EAS deposits are relatively low with slightly more samples from MAS and LAS deposits. Despite the fact that the majority of this dataset comes from Roman deposits its large size means there is good evidence for MIA and LIA, and EMED grain use. In addition, the use of percentages to represent the data arguably over emphasises those periods with large numbers of samples over those with lower numbers.

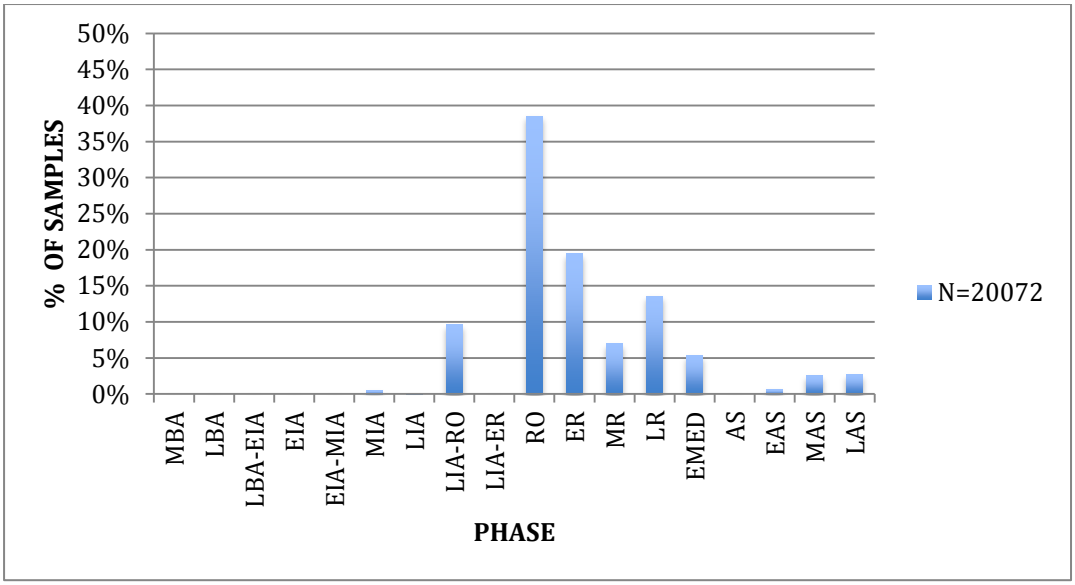


Figure: 4.9 MLTV % environmental samples by phase.

4.3.5 Middle and Lower Thames Valley CPR, animal bones and ceramics by phase

Figure 4.10 breaks down the charred grain, animal bone and ceramics assemblages from the MLTV dataset, with the aim of assessing their composition against the data on phase, site type, feature type and sampling strategy detailed above. The methods of quantification used were identical to those described for the UTV dataset. Charred grain assemblages cluster in the LIA-RO, Roman and ER periods in a direct reflection of the sampling strategy (Fig. 4.9), a pattern which itself probably relates to an increased rate of deposition of burnt grain in pits, ditches and structures in RO London, and reflects a relative decline of such contexts in LR London. The deposition of animal bone is similarly clustered around a peak in the Roman and ER periods, building up from the LIA and declining slightly into the LR and reflecting peaks in buildings and in features associated with buildings, such as wells. EMED animal bone deposition appears to have peaked in the MAS and LAS, again probably reflecting suitable contexts for deposition in MAS-LAS London. Deposition of ceramics was overwhelmingly

clustered in the Roman phase, reflecting partly the ubiquity of ceramics in this period and also the same opportunities for deposition reflected by the other two datasets. There were also small peaks of ceramic deposition in the MBA, LBA-EIA and MIA, perhaps reflecting a high proportion of ditches, preserving larger assemblages, as opposed to other feature types in this period. Very low levels of ceramics in the EMED period partly reflect low levels of supply and fragility, rather than lack of opportunity for deposition, as proportions of charred grain and animal bone are higher in this period. Overall the MLTV dataset reflects overwhelmingly the influence of suitable depositional contexts in Roman and to a lesser extent MAS and LAS London in its formation, although the concentration of material in the Roman period (Fig. 4.10) is also heavily influenced by the interdependence of the variables. The pattern probably also expresses a real pattern of increased food consumption in these periods.

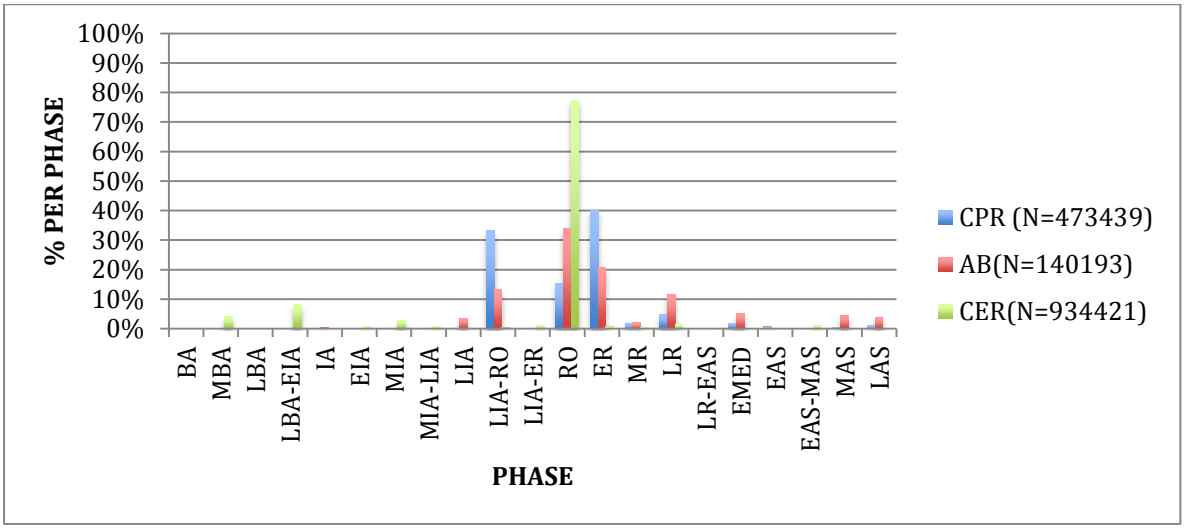


Figure 4.10: MLTV CPR, animal bone and ceramics by phase.

4.4 HS1

The types of dataset contained in the thesis database for the HS1 region are listed by site in Table 4.5. In contrast to the UTV sites, the sites in the HS1 region, which represent a single large infrastructure project, were all subject to an overarching excavation methodology (Foreman 2011, 15). However, sampling strategy, in terms of proportions of features excavated and numbers of soil samples taken is likely to have varied on a site by site basis. Unlike the Thames Valley CSAs the geological and topographical context of the sites in the HS1 CSA was not homogeneous (4.2), with particular variations in drift geology and elevation between the LTV, the North Downs and the Weald, all of which were traversed by the HS1 route. However, the transect like nature of the HS1 development constrained the nature of excavation for all sites equally, resulting in a series of relatively long and narrow investigations, such as those at Pepperhill and Springhead, which were more similar to the small-scale MOLA excavations, than the more extensive UTV sites and failed to reveal the limits of settlements, and therefore whether they were bounded or not, to the same degree as the UTV excavations. In addition, the linear nature of the HS1 transect seems to have afforded the interception of sites of a single period such as the Cuxton EMED cemetery, or the MBA-LBA settlement at Cobham Golf Course, rather than allowing the investigation of clusters of multi-period occupation in single locations. In terms of assemblages the HS1 CSA produced relatively small quantities of material (Table 4.6); this was clearly due partly to the acidic nature of soils in the Weald and partly the lack of availability of some finds datasets on

the ADS website. Ultimately the choice of HS1 as a CSA, as with the MLTV, was conditioned partly by its coherence as a single digital archive and partly by its geographical scope.

Table 4.5: HS1 sites in the database.

Site Name	Context Catalogue	Pottery Catalogue	Animal Bone Catalogue	Charred Grain Catalogue
Beechbrook Wood	✓	✓		✓
Bower Road, Smeeth	✓	✓	✓	
Boys Hall Balancing Pond	✓			
Chapel Mill, Lenham	✓	✓		
Cobham Golf Course	✓	✓		✓
Cuxton Anglo-Saxon Cemetery	✓	✓	✓	
East of Boarley Farm	✓	✓		
East of Newlands, Charring Heath	✓			
East of Station Road	✓			
Holm Hill, Harrietsham	✓			
Land South of Snarkhurst Wood	✓	✓		
Leda Cottages	✓			
Little Stock Farm	✓	✓	✓	✓
Mersham	✓	✓	✓	✓
Nashenden Valley	✓			
North of Saltwood Tunnel	✓	✓		
North of Westenhanger Castle	✓	✓		✓
Northfleet	✓	✓	✓	

Parsonage Farm, Westwell	✓		✓	✓
Pepperhill Roman Cemetery	✓	✓		
Pilgrim's Way, Boxley	✓	✓		
Sandway Road, Lenham	✓	✓		✓
South of Station Road	✓			✓
South-East of Eyhorne Street	✓	✓	✓	✓
Springhead	✓			
Stone Farm Bridleway	✓	✓	✓	
Temple East of Springhead	✓			
Thurnham Roman Villa	✓	✓	✓	✓
Tollgate	✓	✓	✓	✓
Tutt Hill Westwell	✓	✓		✓
West of Blind Lane	✓			
West of Boarley Farm	✓	✓		
West of Northumberland Bottom	✓	✓	✓	✓
White Hill Road Barrow	✓			
White Horse Stone	✓	✓	✓	✓
Whitehill Road Watching Brief	✓	✓	✓	

4.4.1 Occupation on HS1 sites by period

A breakdown of occupation by phase for the HS1 CSA (Fig. 4.11) shows a relatively even distribution, with over 40% of sites having MBA-LBA and MIA occupation. Occupation levels peaked in the LIA and ER periods, with over 70% of sites occupied and then declined into the MR and LR phases. In common with the other case studies the EMED period had the lowest levels of occupation, with

fewer than 20% of sites occupied throughout the period. The HS1 CSA is also notable for a hiatus in occupation in the EIA and a steep decline from the ER into the LR. The overall pattern of occupation has similarities with the other two case studies, particularly in the relative weights of later prehistoric and EMED occupation and therefore probably reflects an underlying reality in the settlement pattern to some extent; however, peaks in Roman settlement particularly, must also reflect a degree of happenstance in the intersection of two Roman villas by the route of the railway.

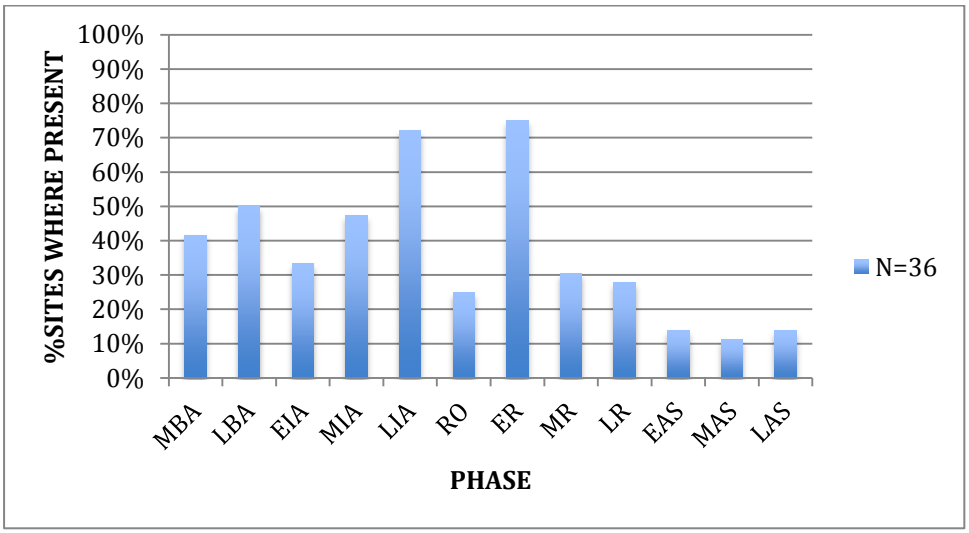


Figure 4.11: Occupation on HS1 sites by period.

4.4.2 HS1 site types by phase

The breakdown of site types for the HS1 CSA (Fig. 4.12) shows that complex settlement dominated from the MBA to the LBA, with a relatively small proportion of sites classified as open settlement, enclosed settlement, field systems and unspecified cemeteries. Identifiably open settlements were restricted to the MBA to EIA periods. Site type in the Roman period, although still dominated by complex settlements is more diverse than in later prehistory, with

the addition of villas, small towns and cemeteries. In the EMED period site type returned to a less diverse pattern, but was now dominated by cemeteries. This pattern probably relates to the relatively narrow width of the HS1 transect, which increases the difficulty of determining whether the spatial limits of a settlement have been found and therefore whether that settlement is open or enclosed. However, as in the other CSAs similar patterns of increasing diversity in the Roman period reflect an underlying reality.

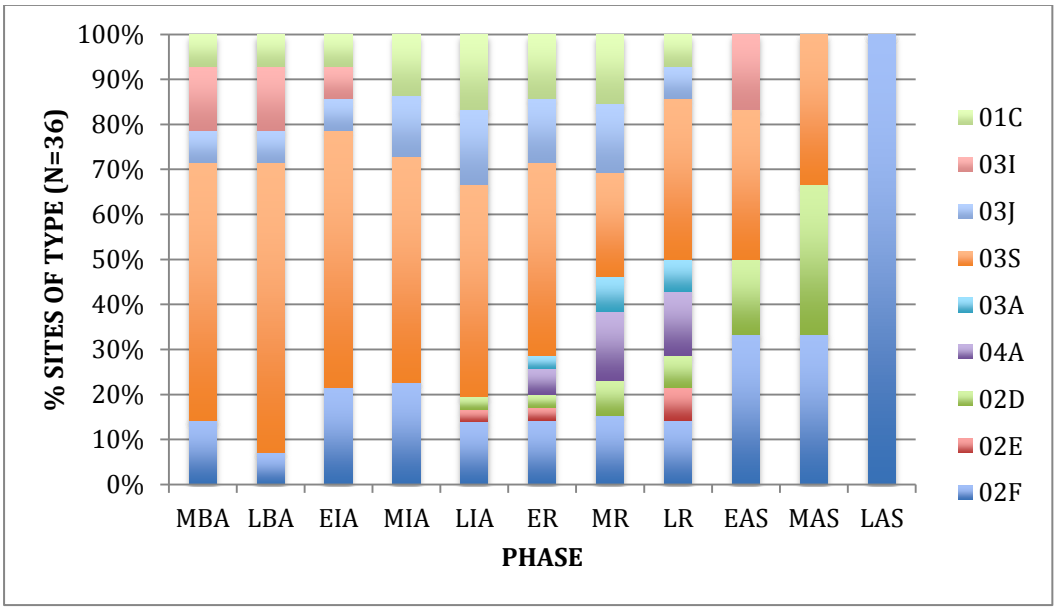


Figure 4.12: Proportions of site of different types in the HS1 CSA.
01C = Aggregate Field System, 03I = Open Settlement, 03J = Enclosed Settlement, 03S = Complex Settlement, 03A = Small Town, 04A = Villas, 02D = Inhumation Cemetery, 02E = Cremation Cemetery, 02F = Unspecified Cemetery.

4.4.3 HS1 feature types by phase

A breakdown of feature types from the HS1 CSA (Fig. 4.13) shows that the majority of features in most phases were pits, although some phases including the LBA-EIA, MIA-LIA and LIA-RO were ditch dominated and postholes and structures made up a small proportion of many phases. Pit dominance in the later prehistoric period possibly reflects the high proportion of complex

settlement. Diversity of feature types increased in the Roman period mirroring diversity in site types in the same period. EMED feature types were dominated by graves, ditches and postholes again reflecting the breakdown of site types.

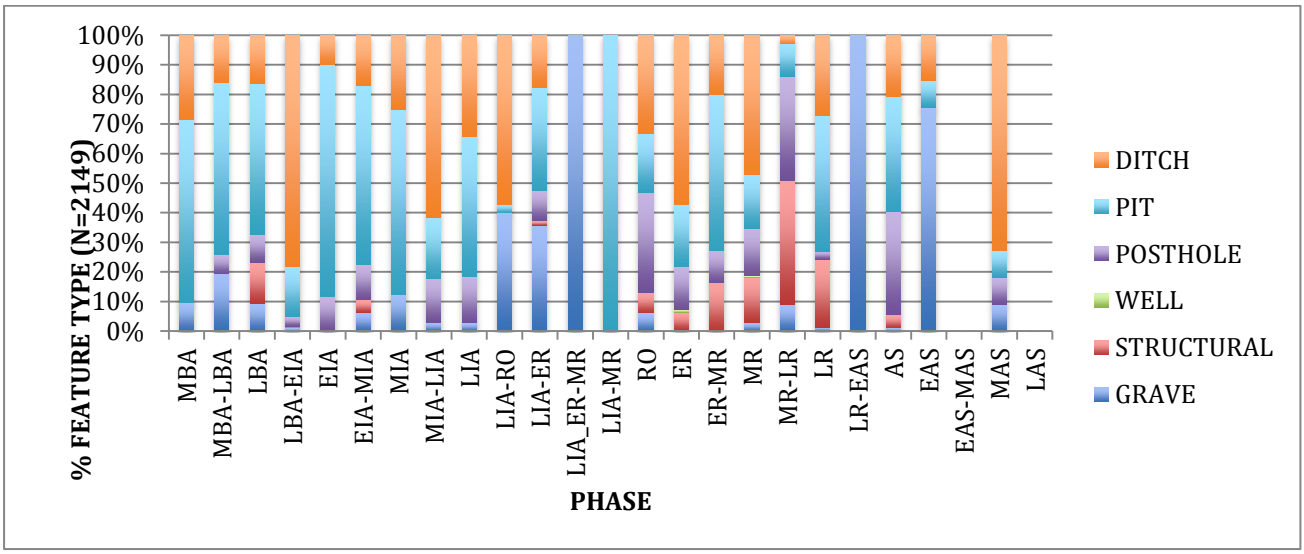


Figure 4.13 HS1 feature types by phase.

Table 4.6: Quantification of features, pottery, animal bones and environmental samples excavated from HS1 sites in the thesis database.

Features	
Ditches	3352
Pits	1762
Postholes	2518
Wells/Waterholes	5
Structures	254
Graves	662
Finds	
Pottery	75,950
Animal Bone	19,452
Environmental Samples	180

4.4.4 HS1 environmental samples by phase

Figure 4.14 shows HS1 environmental samples by phase and demonstrates a relatively consistent sampling strategy across the different phases, when compared to the other CSAs. The most heavily sampled phases were the EIA and EIA-MIA phases, the ER phase and the LR phase. The least sampled phases

included the BA to EIA and the EMED phases. The LIA and Roman fell in between. These peaks in sampling clearly do not relate straightforwardly to peaks in the numbers of sites occupied (Fig. 4.11), as some phases, which occur on relatively large numbers of sites, such as the LIA, do not feature strongly in the sampling record. However, the pattern of samples is influenced by the presence of the major EIA settlement at White Horse Stone (Champion 2011, 212) and the major MIA settlement at Beechbrook Wood (ibid.) along with the Roman villa at Thurnham (Booth 2011, 292).

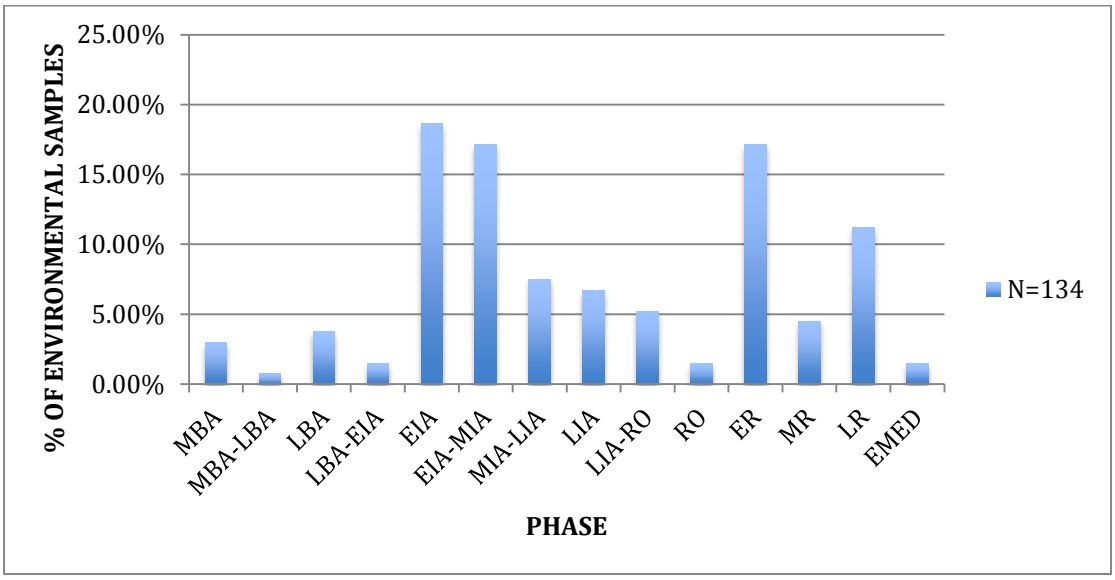


Figure 4.14: HS1 % of environmental samples by phase.

4.4.5 HS1 CPR, animal bone and ceramics by phase

Percentages of charred grain, animal bone and ceramics by sherd for the HS1 CSA (Fig. 4.15), have been used to assess the impact of the sampling biases outlined above on the nature of the assemblages. The methods of quantification were identical to those used for the UTV and MLTV case studies. Overall materials of different kinds were distributed slightly differently, with ceramics particularly clustering in the Roman period, and charred grain and animal bone

in the other periods; this is partly a result of the ubiquity and robust nature of Roman ceramics as well as the nature of affordances for the recovery of the material. Charred grain was concentrated in the EIA, the LIA and ER, the MR and the EMED, a pattern which does not appear particularly to reflect the pattern of site types (Fig. 4.12) for those periods; but which does seem to correlate with the presence of high proportions of ditches relative to pits (Fig. 4.13), possibly suggesting different patterns of deposition for burnt plant remains to those seen in the UTV. Interestingly peaks in charred plants do not correlate exactly with peaks in numbers of environmental samples (Fig. 4.14), with the EMED period in particular being relatively low in sample numbers. Animal bone was strongly represented in the MBA, EIA, EIA-MIA periods and the AS period, with relatively small proportions through the Roman period, until the LR. Like charred grain animal bone does not seem to correlate strongly with a particular site type (Fig. 4.12), but unlike grain it seems to have been more prevalent in phases with pits (Fig. 4.13), which were perhaps subject to more rapid infilling and therefore provided better conditions for bone preservation than more slowly filled ditches. The LR peak in animal bone probably relates to the villas at Thurnham and Northfleet. The deposition of ceramics had a different pattern; apart from small peaks in the EIA and EIA-MIA, ceramics were concentrated in the Roman period, with peaks in the LIA-RO, Roman and MR periods. This pattern does not seem to reflect the distribution of site types (Fig 4.12) or feature types (Fig 4.13) particularly, although it may reflect relative numbers of features. Ultimately it is probably partly related to the relative robustness and ubiquity of the Roman pottery itself, as well as being an effect of interdependence. Overall, there seems to have been some overlap between affordances for deposition and peaks in

material, but also peaks in material with no obvious correlation with sample bias, site type, or feature type, so that it is possible to hold a degree of confidence about the relationship of the dataset to real peaks in food consumption/production.

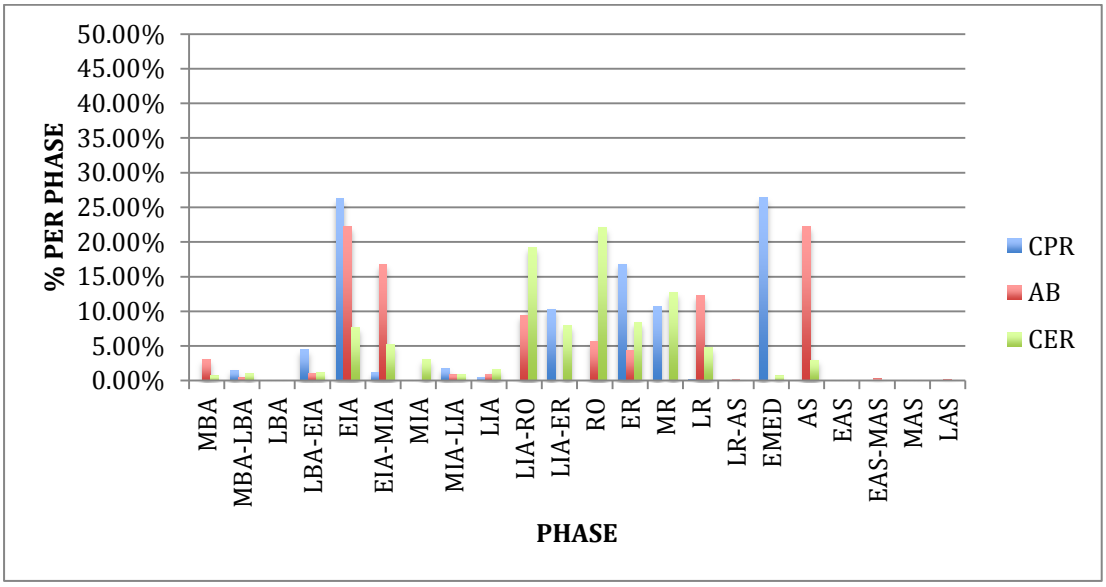


Figure 4.15: HS1 material culture by phase.

4.5 Sample bias and taphonomy in the Thames Valley and HS1 case studies compared

The analysis shows that there were considerable similarities in sample bias and taphonomy between each of the three CSAs investigated for this thesis. However, there were also differences and these affect the interpretation of the data in several ways. The following section will therefore discuss the similarities between each of the CSAs, analysing each area of potential bias in turn, while simultaneously considering the implications of these potential biases for the interpretation of the data.

Occupation by period was relatively consistent across all three case studies, in all of which peak occupation occurred in the LIA and ER periods. The case studies were also similar in that all three saw a fall off in the proportion of settlements occupied at the beginning of the EMED period and this decline persisted until the end of the LAS. Later prehistoric occupation was also similar in all the case studies in being higher than in the EMED period, but lower than in the LIA-RO period. Differences were also apparent: while in the UTV peaks in later prehistoric occupation occurred in the EIA and MIA phases, in the MLTV and HS1, MBA and LBA occupation was more frequent than IA occupation. There was also a fall off in occupation in the EIA on the route of HS1 and generally low levels of occupation, relative to the Roman period in the MLTV throughout later prehistory. Other differences included much lower levels of LIA occupation in the MLTV compared to the other case studies and differences in the degree to which occupation levels fell away in the MR and LR which were more pronounced in the MLTV and on the route of HS1. Differences in MBA-LBA occupation levels may reflect real differences in the settlement record between the east and the west, with the MLTV and Northern Kent having experienced more intensive Later Bronze Age occupation than the UTV (Yates 2007) and the UTV having gone through an EIA-MIA settlement boom relative to the SE. Similarly the peak in occupation in the Roman period in all three CSAs is likely to represent real relative levels of settlement, with the Roman period landscape being particularly well settled relative to the other periods. The relative emptiness in the EMED occupation record is also likely to reflect the real settlement pattern to a significant degree.

The types of site present were more varied by CSA than the levels of occupation by phase and this is likely to be partly the result of different affordances for site reconstruction offered by the different styles of fieldwork carried out in each CSA. However, the patterns of site type described above were also partly the result of responses to the different landscapes of the CSAs by people in the past. Settlement type appears to have been diverse in later prehistory, with UTV settlements being predominantly open until the MIA, while MLTV settlements were largely either complex, or comprised pit/ditch scatters and HS1 settlements were mostly complex. LIA-RO site types were also diverse, with the UTV CSA dominated by enclosed settlements in the LIA-ER and having a diversity of different types in the LR, while the MLTV became even more dominated by ditch/pit scatters and buildings and the route of HS1 continued to be dominated by complex settlements in the LIA-ER, becoming more diverse in the MR-LR. This continuity of diversity between case studies reinforces the perception that the pattern is partly due to affordance; however, the shared diversity between the UTV and the route of HS1 in the LR period again indicates that genuine settlement patterns are at least partially represented. Settlement types were at their most diverse in the EMED period, with a shift back to unenclosed settlement in the UTV in the EAS, followed by enclosed and unenclosed settlements and field systems in the MAS-LAS. In contrast in the MLTV site types continued to be dominated by complex settlements and pit and ditch scatters in the EAS, but came to be dominated more and more by buildings through the EMED period. In a third contrast the route of HS1 was dominated by complex settlement and cemeteries in the EAS-MAS, and completely dominated by cemeteries in the LAS. The importance of cemeteries in the eastern CSA in this

period seems to be founded on more than just the affordances of different excavation styles, as there seems to be no reason why any of the differing excavation styles should be more likely to encounter graves. Site reconstruction is probably more affected by sample bias than any other data category employed in this chapter, with the possibilities for accurate identification of site type being restricted by the relatively small excavation areas employed in the MLTV when compared to the UTV. However, excavation areas in the former CSAs were not so small as to make site type identification completely subjective, and some diagnostic features of sites, such as building types do not need large open area excavation to identify.

Feature types were more uniform across the case studies than were site types. Between the MBA and MIA feature types in both the UTV and HS1 case studies were dominated by pits and to a lesser extent postholes, with ditches making up a relatively minor proportion of features. In contrast the MLTV pattern was more mixed, with ditches dominating the MBA-LBA and pits and postholes being more prevalent in the EIA and MIA. This pattern provided similar affordances for the recovery of later prehistoric artefacts and ecofacts across all three CSAs, with the prevalence of pits providing good opportunities for the recovery of pottery, animal bone and samples of charred plant remains. The presence of greater numbers of ditches in the MLTV sample does not seem to have resulted in the recovery of larger proportions of material in this CSA, but this may be because of the relative size of the sample when compared to the LIA-RO period. All three case studies were much more ditch dominated in the LIA-RO period in a reflection of the domination of enclosed and complex settlements in these

periods. In the case of the MLTV and HS1 case studies this ditch heavy pattern started slightly earlier (in the MIA-LIA), again perhaps reflecting the nature of settlement organisation. In the LR period all three CSAs became more diverse, with more structures, wells and postholes. The ditch dominated nature of the LIA-RO record may be directly related to the increased proportions of certain types of artefacts and ecofacts from this period in all of the CSAs; however, the peaks in soil samples from the later prehistoric and EMED periods demonstrate that this relationship was not always straightforward.

The proportion of environmental samples taken in each phase varied considerably according to CSA, a fact which relates both to affordances for collecting samples from particular phases and the contingencies of the sampling strategies adopted for individual excavations. Later prehistoric samples taken in the UTV were concentrated in the MIA and EIA phases, with a small peak in the MBA. In contrast later prehistoric samples from the MLTV were scarce and concentrated in the MIA phase. On the route of HS1 samples from the same period were more evenly divided between the MBA, LBA and MIA phases. Sample proportions were more even in the LIA-RO period, being concentrated in the LIA-ER, or ER and then falling away in the MR-LR in all three CSAs. The reasons for this contrast with later prehistory perhaps related to the similarity of settlement and feature types across Southern England during the Roman period, and also the wider availability of suitable features to be sampled. For the EMED period the proportion of samples by phase was again varied, with samples concentrated in the MAS and LAS phases in the Thames Valley case studies and relatively evenly across the EAS-LAS on the route of HS1. These differences again

seem likely to relate to differences in site and feature types and also the number of samples taken, with the HS1 CSA in particular providing relatively few samples. Despite the variations described above because charred cereals are compared in this thesis using presence/absence rather than overall numbers, the unevenness of the coverage in some phases has had a relatively small effect on interpretation.

Variation in the proportion of artefacts and ecofacts assigned to each phase in the different case studies was similar to the variation in environmental samples, on which it was partially dependent. In later prehistory finds in the UTV and on the route of HS1 were concentrated in the EIA and MIA phases, whereas in the MLTV later prehistoric coverage was more even, if lower. LIA-RO finds clustered in the LR, but in the other two CSAs were more concentrated in the LIA and ER phases, showing that proportions of finds did not necessarily relate straightforwardly to proportions of sites and features. EMED finds were concentrated in the MAS and LAS in the Thames Valley case studies, but dated more generically to the AS or EMED phases on the route of HS1. The analysis of finds proportions by phase in general shows a relationship between higher proportions of sites and features and higher proportions of finds, as might be expected. However, proportions of charred plant remains form something of an exception to this pattern, being concentrated instead in phases which had high proportions of features related to grain storage or processing, such as MIA storage pits.

4.6 Conclusions

This chapter has investigated the nature of the dataset used in this thesis, attempting to bring together evidence for variation in the occupation of the landscape by phase with the evidence for variation in site and feature types and the nature of the artefactual and ecofactual record. The chapter has demonstrated a great deal of variation over time in all of these aspects and argues that proportions of finds in different phases usually related to affordances provided by the nature and quantity of sites and features. Therefore where artefact and ecofact evidence is present it is usually in proportion to numbers of sites and features, which in turn necessarily relate to opportunities for excavation. The only partial exception to this pattern is the case of charred plant remains, which generally follow a different taphonomic pathway to animal bones and ceramics, in that charred plant remains generally only enter the archaeological record when they are accidentally burned, whereas animal bones and ceramics generally only enter it when they are deliberately buried. Patterns of deposition of charred plant remains in the dataset collected for this thesis therefore do not tally exactly with animal bones and ceramics. However, there were still important overlaps between them and it is to charred plant remains in the form of cereal cultivation/consumption that the next chapter turns.

5 CEREAL CULTIVATION

5.1 Introduction

This chapter consists of a regional and settlement scale analysis of cereal cultivation and consumption in Southern England, focusing on the three regional case studies outlined in Chapter One. While focusing on cereal cultivation the chapter advances the hypotheses of the broader thesis (Chapter 1) that food production/consumption was realised by regionally distinctive abstract machines, and that there were considerable continuities of practice, as well as differences across the major period divisions, as traditionally construed, from the MBA to the end of the EMED period around AD 1086. The chapter also investigates the related hypothesis that there were distinct patterns of cereal cultivation and consumption at different settlement types, which constituted abstract machines of production/consumption in their own right, albeit on a smaller scale. Patterns of production/consumption of cereals at a regional scale and on the level of settlements are tied in to patterns of animal husbandry (Chapter 6), which exhibited similar continuities of practice. However, cereal cultivation was less strongly linked to variations in ceramics, which were more tied to the consumption side of the production/consumption duality and more cyclical.

The methodology used in the chapter, including for the quantification of charred grain is described above (3.3.3).

Section 5.2 investigates regional patterns in cereal cultivation and consumption, starting with an analysis of the UTV, proceeding to analyse the MLTV and

finishing with the route of HS1. Section 5.3 compares the regional cultivation/consumption patterns for the Thames Valley and HS1 as a whole. Section 5.4 investigates the same patterns at settlement level, contrasting different kinds of settlement within and between CSAs. In section 5.5 the analysis of variation in cereal cultivation and consumption by site type is compared for the different CSAs and finally section 5.6 provides conclusions.

5.2 Regional patterns in cereal cultivation

5.2.1 Cereal cultivation in the Upper Thames Valley 1500BC-AD1086

Cereal cultivation in the UTV showed considerable continuity in the varieties of major crops grown from later prehistory to the Roman period, but began to show signs of change in the EMED period (Fig. 5.1).

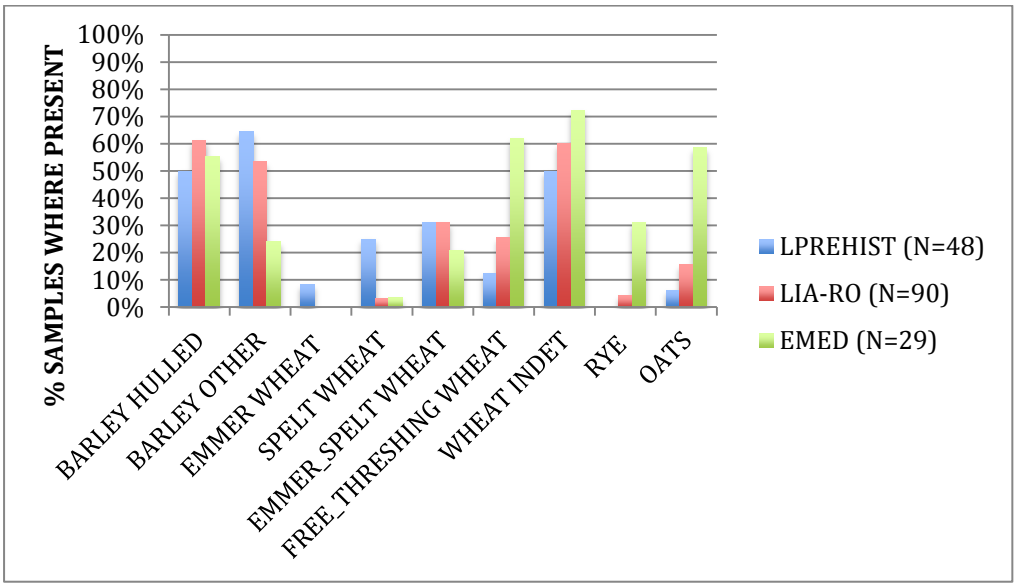


Figure 5.1: UTV charred grain by presence/absence.

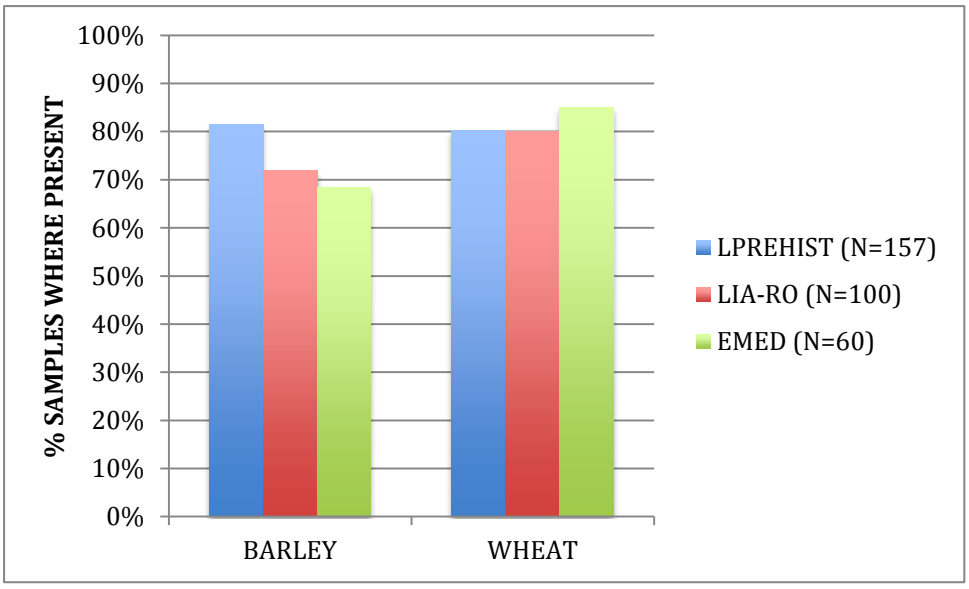


Figure 5.2 UTV charred barley and wheat totals by presence/absence.

In the later prehistoric period, from the MBA until the end of the MIA barley and wheat were about equally present in most deposits, if the different sub-species of wheat and barley are amalgamated (Fig. 5.2). Otherwise barley and hulled barley were most common, being present in 65% and 50% of samples respectively. Emmer/spelt and spelt were the most common species of wheat, with emmer wheat being comparatively rare at under 10%; rye was absent and oats were rare. This high barley and low emmer wheat and oat regime is characteristic of

the region and distinctively different from the route of HS1 and the MLTV. There is no straightforward relationship to sampling bias, although a high proportion of MIA storage pits at sites like Gravelly Guy may have favoured the preservation of staple arable crops and therefore excluded oats. However, this would not account for the high presence of barley, or low levels of emmer. The relatively high levels of barley and spelt wheat may reflect the influence of well-drained sands and gravels on the valley terraces (Fig 5.1), but also a distinctive later prehistoric set of cultivation practices (Rippon et al 2015, Lambrick and Robinson 2009).

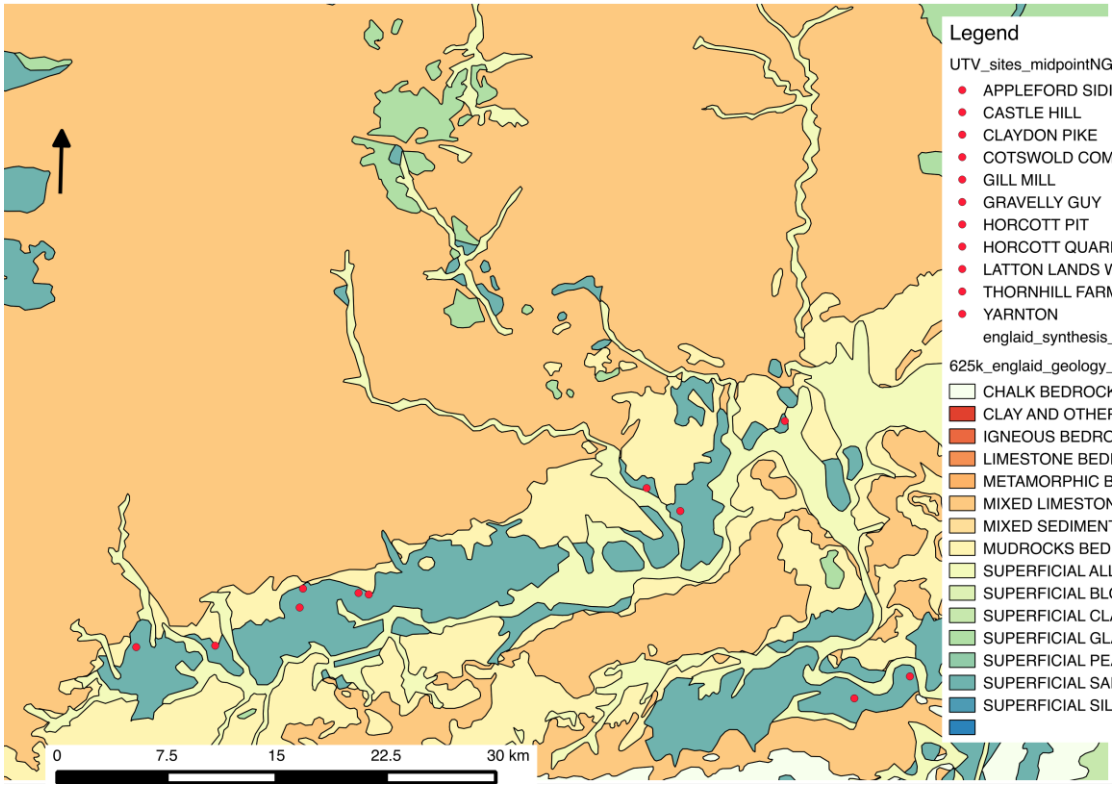


Figure 5.3: Superficial geology of the UTV CSA with sites indicated in red.

In the LIA-LR periods there was an increase in the presence of hulled barley (61%) and a decline in other species, but overall the ratio of barley to wheat slightly favoured wheat. This slight increase in wheat ratios may suggest that the UTV experienced a shift in arable regime towards a set of cultivation practices

geared more towards the Roman economic abstract-machine. This is typical of lowland Roman Britain as a whole (Rippon et al. 2015, 129). Part of this shift may have included the introduction of free-threshing wheat (26%), which seems to be present in small quantities in all CSAs in this period. Other wheat species, such as emmer/spelt seem to have remained fairly constant, although individually emmer and spelt seem to have declined. The presence of oats increased and rye also seems to have been introduced. Once again there is no clear evidence for the influence of sampling bias on these patterns, with the presence of more enclosed settlement and therefore ditches in the Roman period not obviously favouring the preservation of one species over another. Overall, despite some important changes the region seems to have retained some characteristics from later prehistory, particularly in the distinctively low levels of emmer wheat and oats.

The biggest changes in arable cultivation regimes seem to have occurred in the EMED period, which was characterised by large increases in the presence of free-threshing wheat (62%), rye (32%) and oats (58%), and a significant decrease in the presence of barley, with ratios of barley to combined wheat species significantly lower. Interestingly, emmer/spelt wheat was still present in this phase, but had declined markedly from the LIA-RO period. Again there are no straightforward relationships between these patterns and sample bias. Nevertheless, it should be borne in mind that most of the EMED data derives from the settlement at Yarnton and this may account for some of the distinctive patterns. Given that these changes in crop regime cannot be attributed to changes in soil type (Fig 5.3), they may be explained by changes in the human-

influenced aspects of the production/consumption system. The increasing proportions of rye and oats in the EMED period confirm patterns discovered by McKerracher in a survey of PPG16 data from the UTV and MTV, and East Anglia (McKerracher 2015). They also back up his argument that previous models of a bread wheat dominated MAS-LAS crop regime, argued for most prominently by Banham (1990), are not straightforwardly applicable to the UTV.

5.2.2 Cereal cultivation in the Middle and Lower Thames Valley 1500BC-AD1086

Cereal cultivation in the MLTV was distinctively different from that in the UTV in some ways, but also shared some characteristics with the latter region, particularly in the EMED period (Fig. 5.4 and 5.5). Rippon argues (2013, 132-35; see also Rippon et al 2015, 84) that choice of crop is heavily influenced by soil type, with wheat favouring clay soils and these differences and similarities may therefore partly have been related to the soil types of the MLTV, which incorporate large tracts of London clay in contrast to the exclusively sand and gravel geology of the UTV river terraces. On the other hand mapping the sites from the MLTV CSA over superficial geology downloaded from the British Geological Survey (Fig. 5.6) indicates that most, although not all of them, are situated on valley terrace sands and gravels. However, differences and similarities also related to human dominated aspects of the production/consumption system, such as the urban system of Roman and LAS London, which must have stimulated the creation of large agricultural surpluses in the surrounding region for consumption in the city, regardless of soil type.

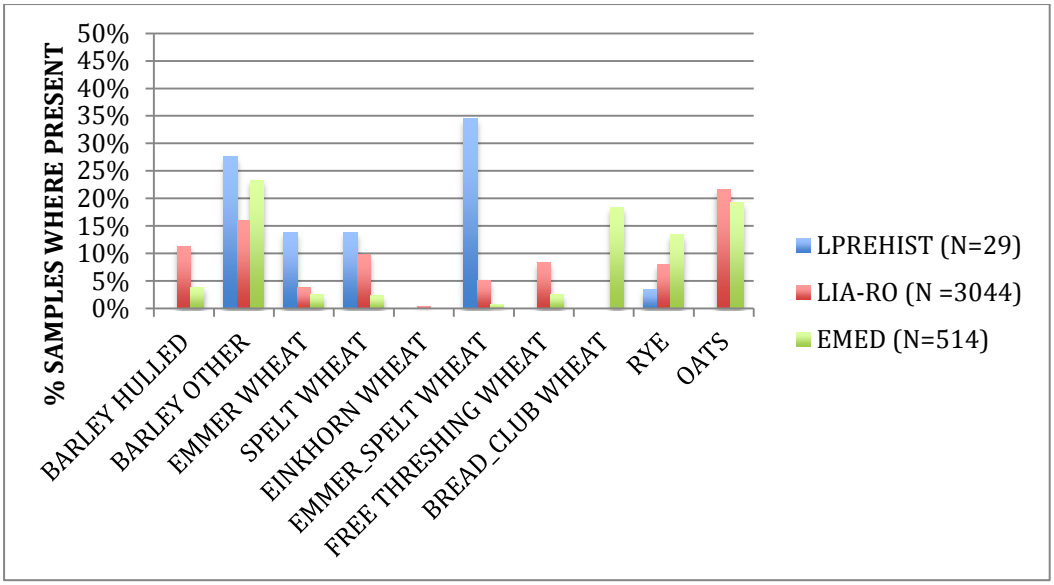


Figure 5.4: MLTV charred grain by presence/absence.

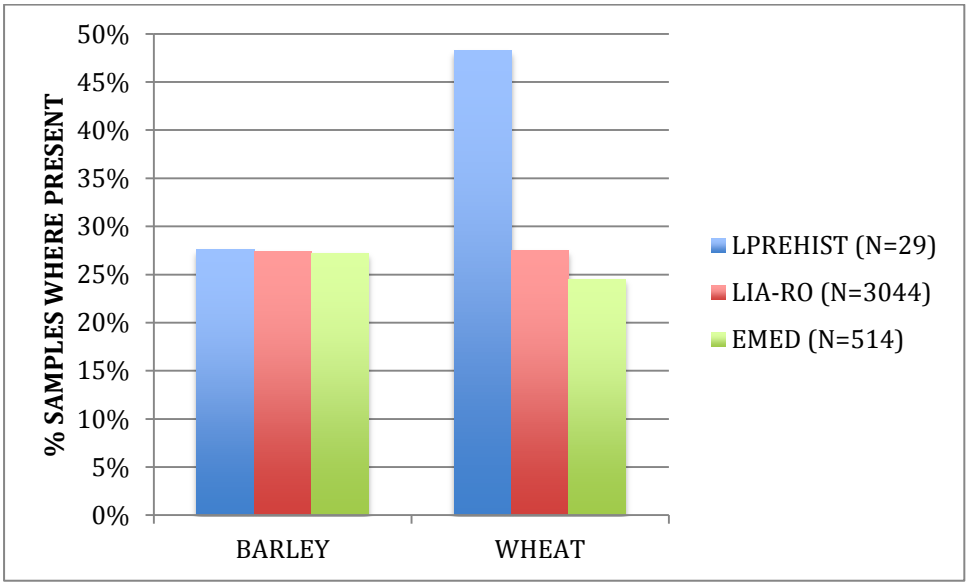


Figure 5.5: MLTV charred barley and wheat totals by presence/absence.

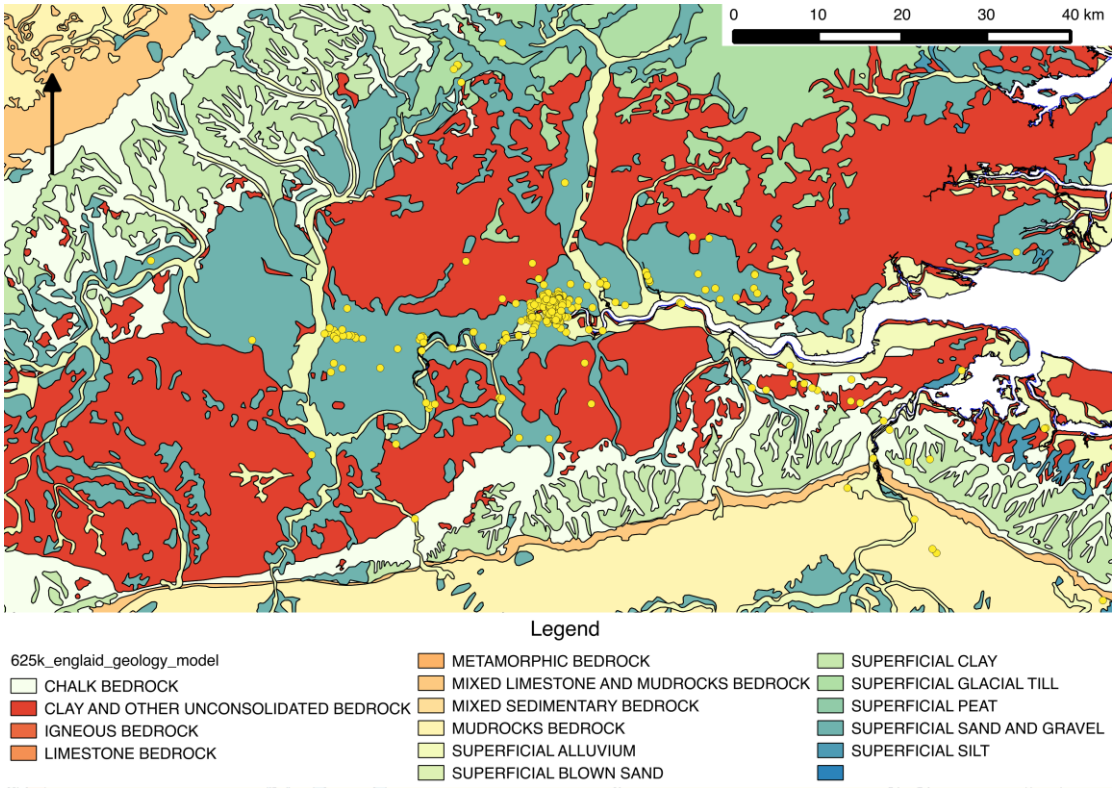


Figure 5.6: Superficial Geology of the MLTV CSA with sites indicated in yellow.

All later prehistoric cereals had a relatively low presence in the MLTV CSA, and this is probably a result of sampling bias - deriving from the concentration of the MOLA dataset on sites from Roman and medieval London. It should also be noted that the number of later prehistoric samples was particularly low relative to the number of LIA-LR and EMED samples. In contrast to the UTV, wheat was more common than barley in later prehistory, with hulled barley being the only barley species recorded (possibly also a result of the small overall numbers of samples). Emmer/spelt wheat was the most common wheat species, being present in 34% of all samples and in another contrast to the UTV material, emmer wheat was as common as spelt wheat. Rye was also present, but in <5% of samples.

In the LIA-LR period the presence of barley increased relative to wheat so that the ubiquity of total barley and total wheat was identical, meaning that the

pattern in the MLTV was in conformity with the other two case studies. For this period the urban production/consumption system and the Roman economic machine would have had a huge impact, as wheat for bread making would have been imported into the city. Of the 532 MLTV sites in the thesis database 159 were located inside the landward wall of the city, which was constructed in the late 2nd or early 3rd century (Milne 1995, 77-78), or in Southwark. In a reversal of the later prehistoric pattern spelt wheat had become more common than emmer, although the presence of any emmer wheat at all in this period represents a marked difference from the UTV, although this too may be interpreted in terms of imported grain for baking, as spelt may have been the preferred crop for consumption as bread (Cool 2006, 70, Champion 2011, 175, 2014, 290). Free-threshing wheat (present in 8% of samples) was nearly as common as spelt wheat and this could also relate to an increase in baking. Rye and oats were also reasonably common and in the case of rye this seems to indicate some continuity from the later prehistoric period, although given the proportion of samples from sites in Roman London there is also the possibility of intrusion of oats, rye and free-threshing wheat from medieval deposits. The distribution of LIA-RO oats (Fig 5.7), although heavily concentrated in Roman London was also fairly widespread in the MLTV more generally. This suggests that Roman London must have drawn in and concentrated oats produced in a wider hinterland, and that urbanism was possibly a factor in the relatively high concentrations of oats in this CSA.

The EMED period in the MLTV saw similar large scale changes in cereal cultivation to those seen in the UTV, suggesting that this period saw the greatest

degree of change of all the time periods considered in this thesis. Total barley (27%) was now slightly more ubiquitous than total wheat (25%), so conforming to expectations for the period (Hamerow 2012, 149-50). The period also saw large increases in the presence of bread/club wheat, rye and oats, seemingly representing a significant change in crop preferences. The spatial distribution of oats in this region can be seen in Figure 5.8 and although as in the LIA-RO period they were heavily concentrated in London, their distribution is also evident in the wider MLTV. This pattern can be interpreted as an illustration of the similarities between the operation of the urban system, which seems to have stimulated production in the wider valley in both the LIA-RO and EMED periods.

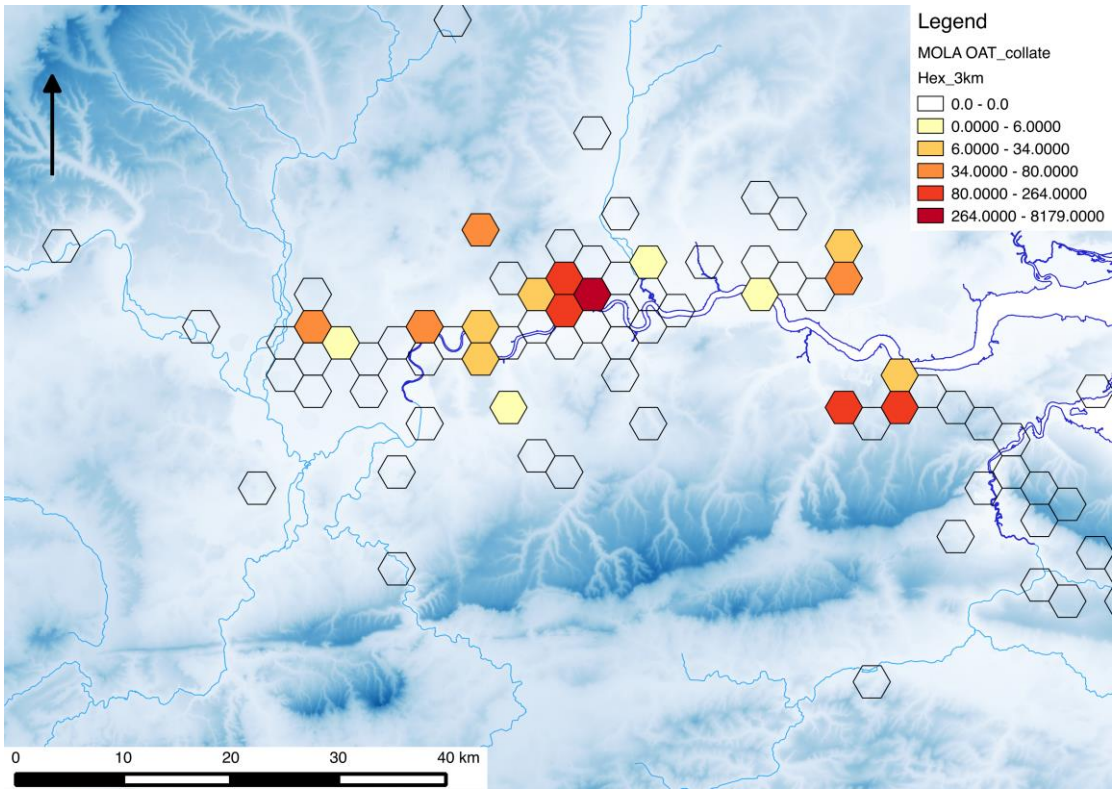


Figure 5.7: MLTV LIA-RO distribution of oats (grain count summed by 3km hexbin).

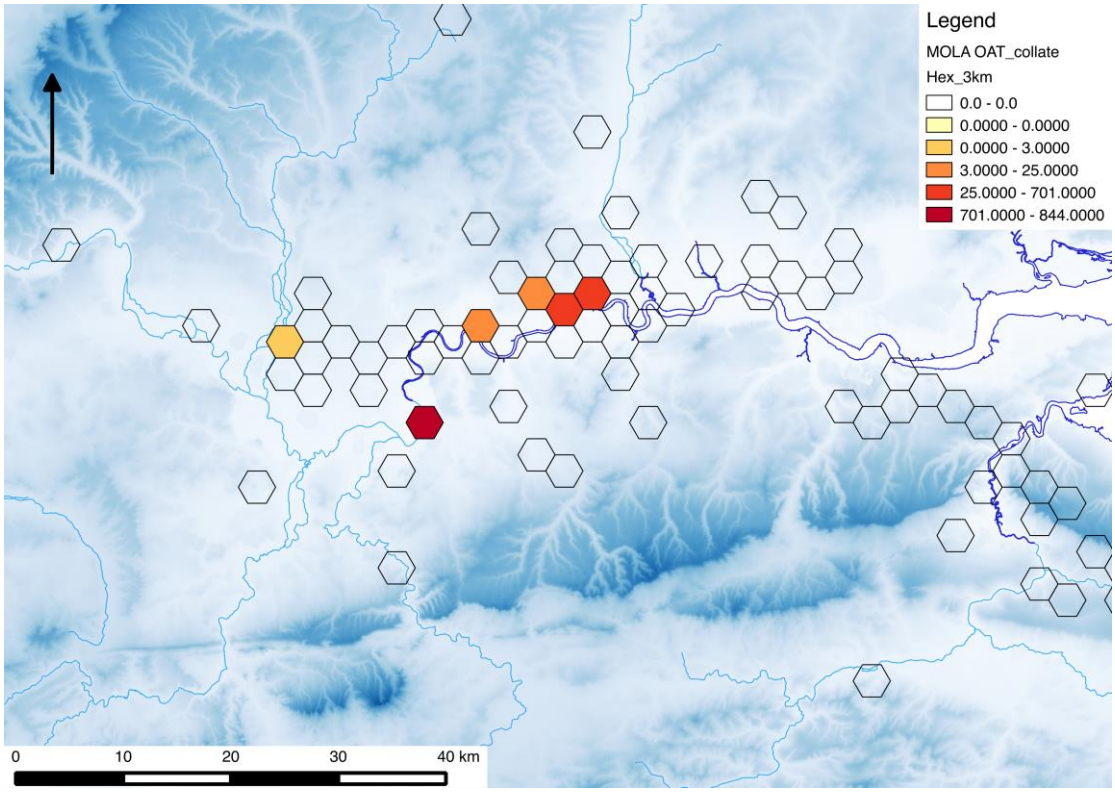


Figure 5.8: MLTV EMED distribution of oats (grain count summed by 3km hexbin).

5.2.3 Cereal cultivation on the route of HS1 1500BC-AD1086

Patterns of cereal cultivation on the route of HS1 (the North Downs and the Weald) show similarities to those in the Thames Valley, but also a regional distinctiveness (Fig. 5.9 and 5.10).

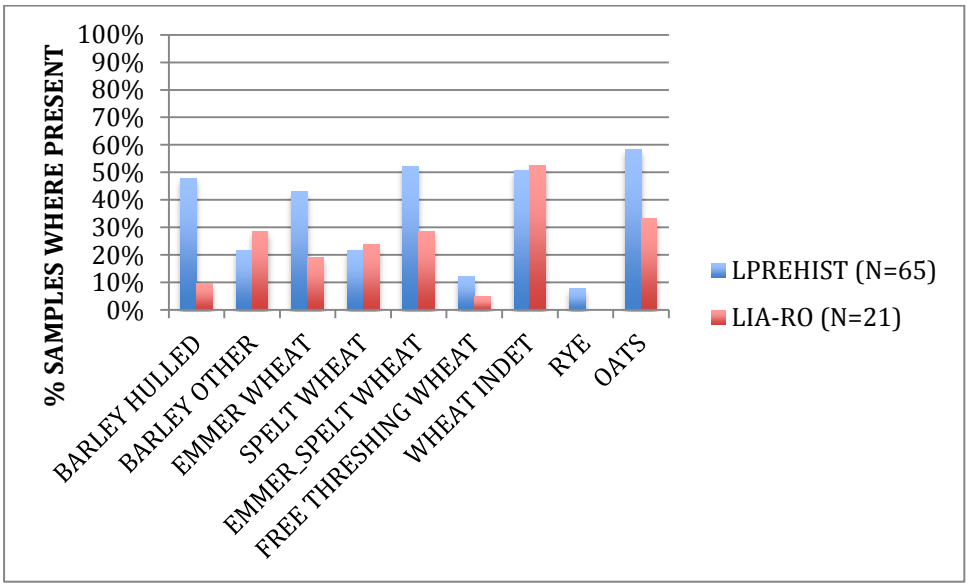


Figure 5.9: HS1 charred grain by presence/absence.

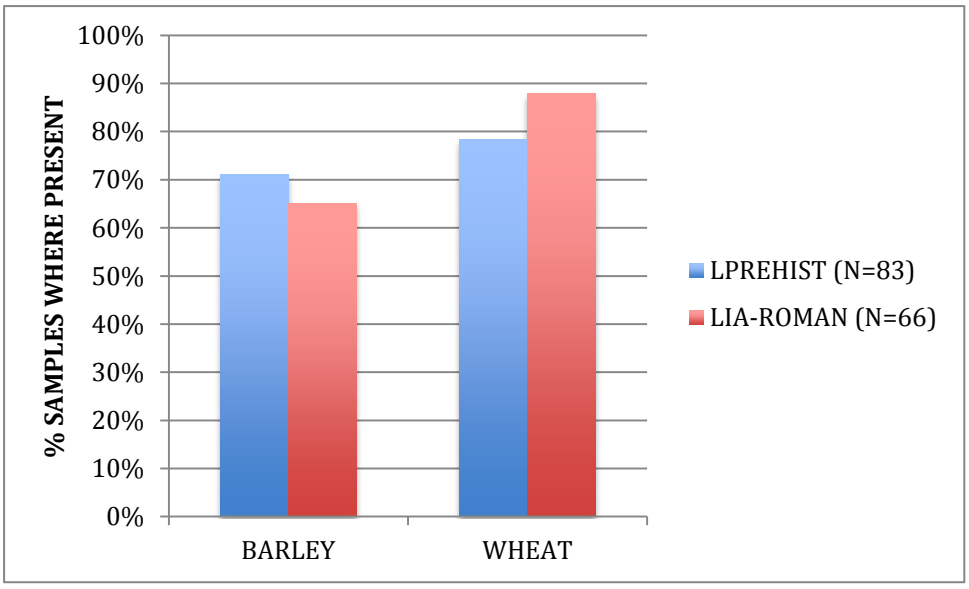


Figure 5.10: Charred barley and wheat from the route of HS1.

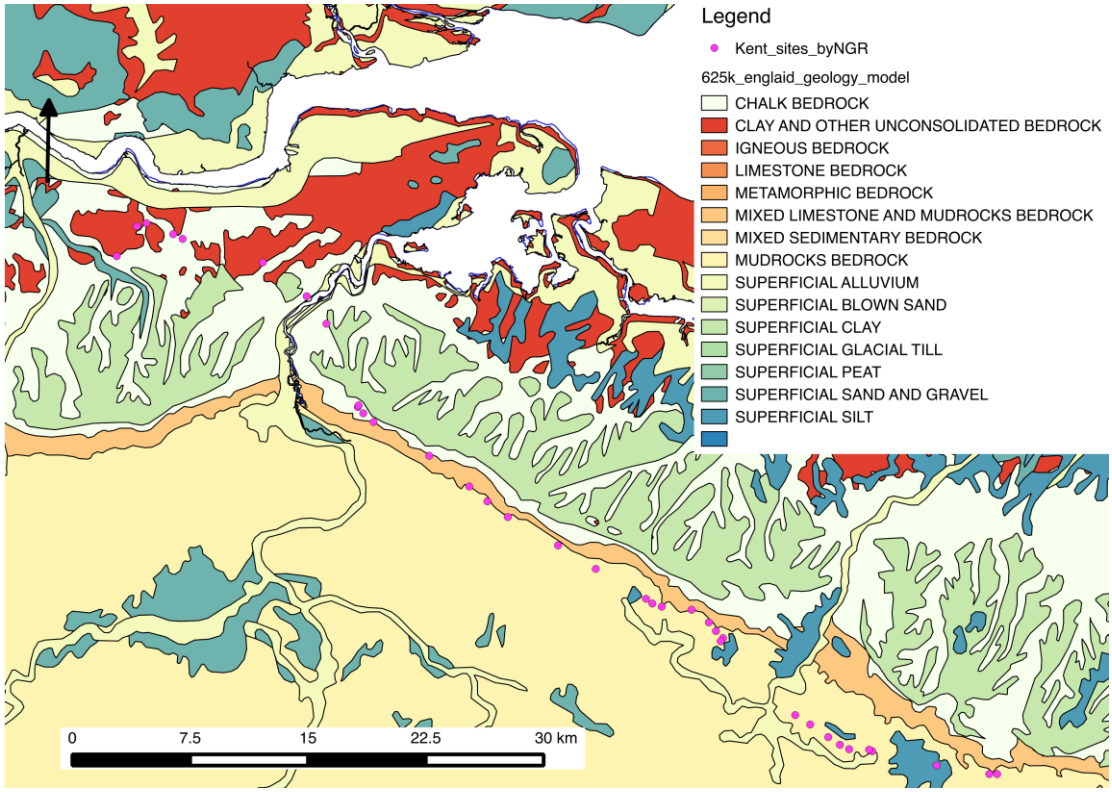


Figure 5.11: HS1 CSA superficial geology with sites marked in purple.

As with the Thames Valley case studies there was no clear relationship between sampling bias and the patterns revealed in the data, although the numbers of EMED samples taken were too low for this period to be included in the analysis (Fig. 4.14), so are consequently not discussed any further. In the later prehistoric period barley (71%) was less ubiquitous than wheat (78%), if all the wheat species are counted together (Fig. 5.9). Hulled barley was more ubiquitous than indeterminate barley and emmer/spelt and indeterminate wheat seems to have been more important than indeterminate barley. Emmer wheat was about twice as common as spelt wheat, in stark contrast to the pattern in the UTV (Fig. 5.1). This preference for emmer wheat in later prehistory in eastern parts of England and on the route of HS1 has been remarked on by Champion (2011, 175), and may relate to the operation of a distinctive South-Eastern abstract-machine of production/consumption combining the chalky soils of the North Downs and

lighter sandy soils of the Weald, with local culinary preferences. However, this preference is not restricted geographically to the HS1 excavation (ibid.), being found more widely in the South-East (Champion 2011, 175) and therefore operating with a variety of different soil types in different contexts. Champion interprets the preference in terms of porridge eating versus bread making (ibid.), with spelt seen as preferable to emmer for bread making.
However, it should be born in mind that the use of emmer does not preclude the possibility of bread making. Rye and free-threshing wheat were also present but less common than the other species and oats were very common, unlike in the UTV.

In the LIA-RO period wheat (88%) was considerably more ubiquitous than barley (65%), if wheat species are counted together and this represents a considerable increase in the difference between the two from the later prehistoric period. This change probably related to the development of the Roman economic machine and its preference for wheat over barley in the lowland zone (Rippon et al. 2015, 81). Hulled barley was less common than other barley species and spelt wheat had become more important than emmer wheat by this period, a pattern which may also be related to the growth of the Roman economic system and possibly a preference for bread over other ways of preparing grain (Champion 2011, 2014), although this interpretation is also subject to the caveat expressed above. LIA-RO emmer wheat was found on fewer sites than it had been in the later prehistoric period and these were quite widely distributed in comparison to the earlier period (Figs. 5.12 & 5.13).

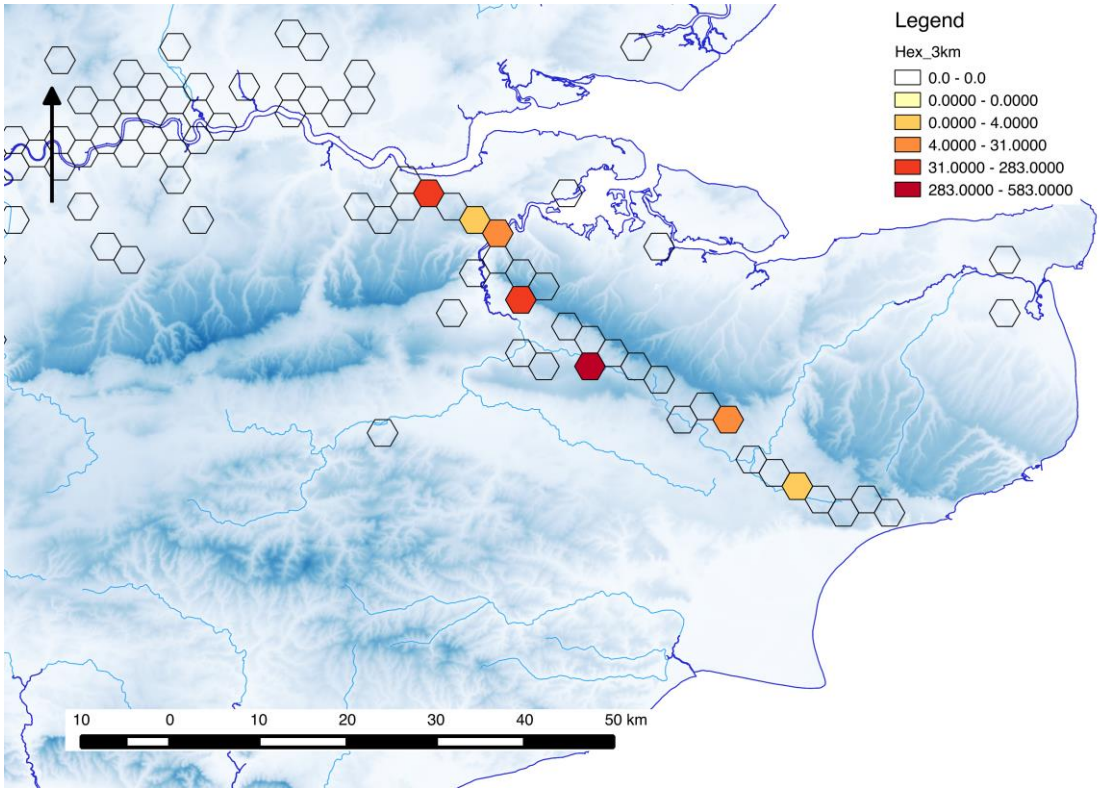


Figure 5.12: HS1 Later Prehistoric emmer wheat distribution (grain count summed by 3km hexbin).

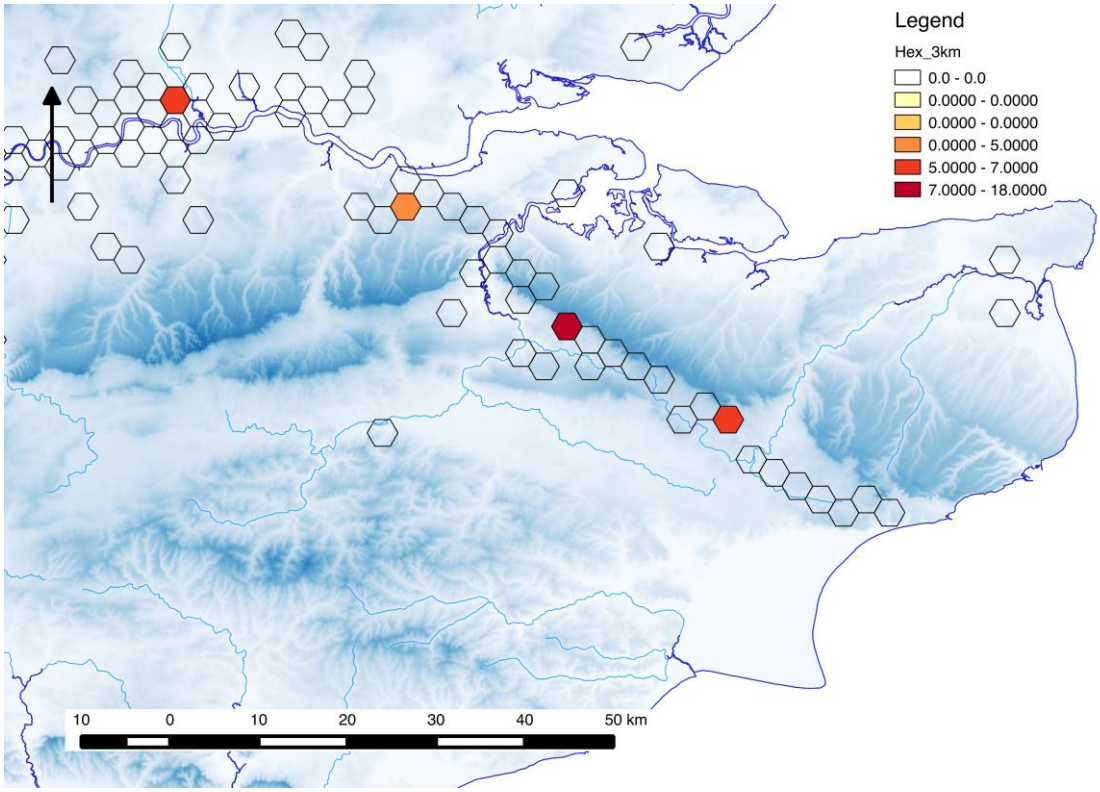


Figure 5.13: HS1 LIA-RO emmer wheat distribution (grain count by 3km hexbin).

5.3 Cereal cultivation in the Thames Valley and on the route of HS1 compared 1500BC-AD1086

There were similarities as well as distinctions in cereal cultivation between all three CSAs, as well as continuity and change across time (Table 5.1). The greatest differences between CSAs were present in the later prehistoric period and the greatest similarities in the Roman period, although there were also subtle continuities from the later prehistoric to the LIA-RO period in all CSAs. Given the paucity of much of the EMED charred grain data acquired for this thesis (Chapter 4) a regional comparison of EMED cereal grain cultivation in all three CSAs is not possible. However, taking the site of Yarnton in the UTV as proxy for that region it is possible to compare the UTV with the MLTV. It seems that changes in cereal cultivation in the EMED period represent the most profound shift, an argument that is backed up by other recent archaeobotanical work on the period (McKerracher 2015). The broad continuities between later prehistory and the LIA-RO period and the changes introduced in the EMED period were influenced by different aspects of regional environments, such as soils and topography, but not determined by them, so that the preference for different species of wheat in later prehistory, for example, were at least partly cultural and urban systems had an influence in the LIA-RO and EMED periods in the MLTV.

Table 5.1: The ubiquity of cereal species by period and CSA.

	Later Prehistory		LIA-Roman		Early Medieval	
UTV	Barley Naked	65%	Barley Hulled	61%	Wheat Indet.	72%
	Barley Hulled	50%	Wheat Indet.	60%	Free-Threshing Wheat	62%
	Wheat Indet.	50%	Barley Naked	53%	Oats	52%
	Emmer/Spelt	31%	Emmer/Spelt	31%	Barley Hulled	55%
	Spelt	25%	Free-Theshing Wheat	26%	Rye	31%
	Free-Threshing Wheat	13%	Oats	16%	Barley Naked	24%
	Emmer	8%	Rye	4%	Emmer/Spelt	21%
	Oats	6%	Spelt	3%	Spelt	3%
MLTV	Emmer/Spelt	21%	Oats	53%	Oats	62%
	Emmer	18%	Barley Hulled	28%	Bread/Club Wheat	58%
	Spelt	14%	Spelt	26%	Rye	43%
	Oats	14%	Free-Threshing Wheat	21%	Barley Hulled	14%
	Barley Hulled	13%	Emmer/Spelt	14%	Free-Threshing Wheat	11%
	Free-Theshing Wheat	4%	Rye	20%	Emmer	9%
			Emmer	10%	Spelt	8%
					Emmer/Spelt	2%
HS1	Oats	58%	Wheat Indet.	52%	N/A	
	Emmer/Spelt	52%	Oats	33%		
	Wheat Indet	51%	Emmer/Spelt	29%		
	Barley Hulled	47%	Barley Naked	29%		
	Emmer	43%	Spelt	24%		
	Spelt	22%	Emmer	19%		
	Barley Naked	22%	Barley Hulled	10%		
	Free-Threshing Wheat	12%	Free-Threshing Wheat	5%		
	Rye	8%				

The differences between the UTV and the other two regions in terms of barley to wheat ratios in later prehistory do not seem to be influenced straightforwardly by environment, as although the soils of the Thames gravel terraces may have been more suited to barley and the North Downs to wheat (Rippon et al. 2015, 81-82) this cannot explain the MLTV pattern, especially given that the majority of MLTV sites were situated on the gravel terraces rather than the London clay (Fig. 5.6).

Other differences, for example in the ubiquity of emmer wheat and oats between the MLTV and HS1 region on the one hand and the UTV on the other may have been more influenced by culinary practices than by soils. The contrast in the ubiquity of oats between the Thames Valley and the HS1 region maybe interpreted as supporting Champion's (2011, 175) argument that porridge or potage may have been an element of cuisine in the South-East as the common oat is a grain that lends itself to pottage or porridge making, perhaps more than emmer wheat.

The shift towards more clearly wheat dominated cereal regimes in all three regions in the LIA-RO period indicates an alignment of the economic regimes of the three regions around a set of staple crops, possibly centred on bread consumption, with spelt wheat becoming more important on the route of HS1 and in the MLTV. This alignment should be seen as neither purely environmental, nor purely cultural, being instead the result of the operation of an abstract-machine combining environment and culture, production and consumption. However, subtle regional differences and temporal continuities persisted, with the ubiquity of emmer wheat and oats continuing to be slightly lower in the UTV than on the route of HS1 and the lower ubiquity of emmer wheat persisting in the Thames Valley more broadly. One possible way of interpreting these LIA-RO changes to cereal cultivation regimes is as an expansion of later prehistoric MLTV practices to the other two regions via the mechanism of the expanding Roman economic system, so that the expansion of Roman economic practices can partially be seen as the expansion and intensification of later prehistoric regionally specific practices.

Although a regional comparison of cereal cultivation is not possible for the EMED period for all three CSAs, questions of temporal continuity and regional difference can be addressed using the MLTV and using Yarnton as a proxy for the UTV. In many ways the EMED period sees the most dramatic changes in cereal cultivation, with large increases in some species, both at Yarnton and in the MLTV. In both case studies although the ubiquity of free-threshing or bread/club wheat rose sharply in the EMED period it was already present in the Roman period, suggesting that the dramatic changes in agrarian regimes, arose from the emphasis of elements that were already present, but playing a minor role. The changes seen in the cultivation of rye, oats and bread wheat in this period have been associated with the shift to an Anglo-Saxon food culture, paralleling wider shifts in the use of certain animal species (see Chapter 6) and in material culture and architecture more generally (Hamerow 2012).

These changes cannot be explained by changes in soil type and therefore must be related to changes in human influenced agricultural and urban systems, which together with the soils and other environmentally influenced systems constituted a series of regional production/consumption systems. A decline in surplus production engendered by the decline and collapse of Roman economic systems (Faulkner 2001, 137-49) might be argued to account for the changes, at least partially; and this might be seen to link that change to longer-term processes and even continuities. Indeed Hamerow (2012) links continuity in food and agricutural systems in the fifth to ninth centuries to continuity in some segments of the population, contrasting such continuity with changes in material

culture and architecture which may have been linked with less numerous immigrant segments (ibid. 147). However, in one respect, such continuities are not substantiated by the results of this thesis. Hamerow (2012) following Banham (1990) argues that bread wheat predominated over rye in English contexts and that this contrasts with the pattern elsewhere in northern Europe (Hamerow 2012, 149). However, the results discussed above support those of McKerracher 2015, which call this pattern into question. It is also worth considering that the starkness of these increases in EMED crop species such as rye and oats may be partially a result of sample bias relating to the concentration of MOLAs excavation efforts on urban contexts. However, the fact that such increases can also be seen in the UTV data (Fig. 5.1) argue against this.

5.4 Cereal cultivation at settlement level: variations between different kinds of site

Having examined cereal cultivation and consumption at the regional level, the following section will investigate variations in the distribution and use of cereal crops according to settlement type. Analysis of variation in animal bone and ceramic assemblages between different classes of site in England has proved fruitful, with significant differences in patterns of consumption having been revealed in major studies addressing the later prehistoric period, the Roman period and the early medieval period, (for example, Brudenell 2012, Evans 2001, King 1989, 1991, 1999, 2005, Poole 2008). Less work of this kind has been done on charred plant assemblages, although Van der Veen and Jones' 2006 paper

represents a notable exception. The methodology adopted in this thesis for classifying settlements by type and for quantifying the variation in cereal remains by site type is discussed in Chapter 3 above (3.3.2).

5.4.1 Cereal cultivation on unenclosed, enclosed and complex sites in the Upper Thames Valley

5.4.1.1 Unenclosed settlement

Figure 5.14 compares the presence of different cereal species from unenclosed settlements in the UTV for later prehistory, the LIA-RO period and the EMED period. Figure 5.15 compares total barley to total wheat for the same dataset.

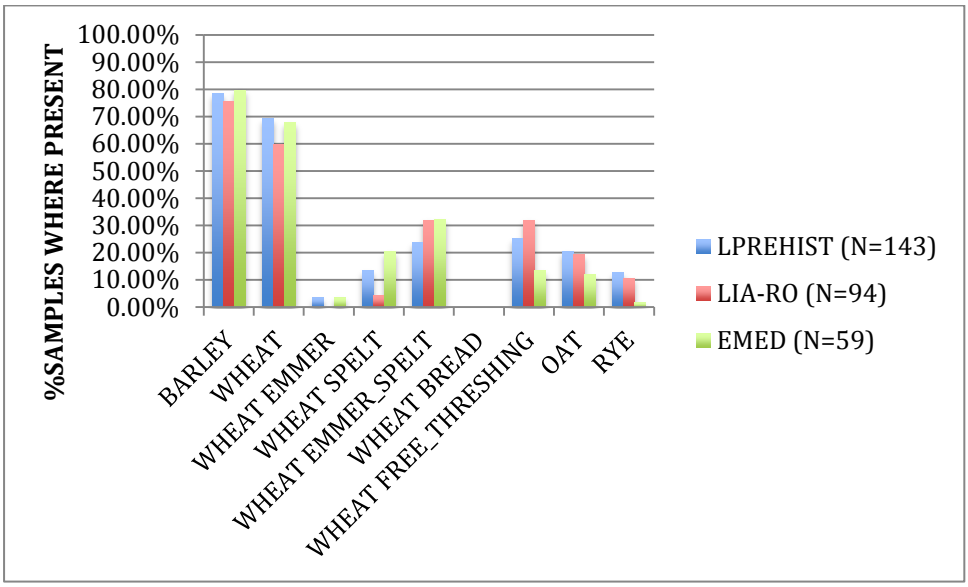


Figure 5.14: Charred grain from unenclosed settlements in the UTV.

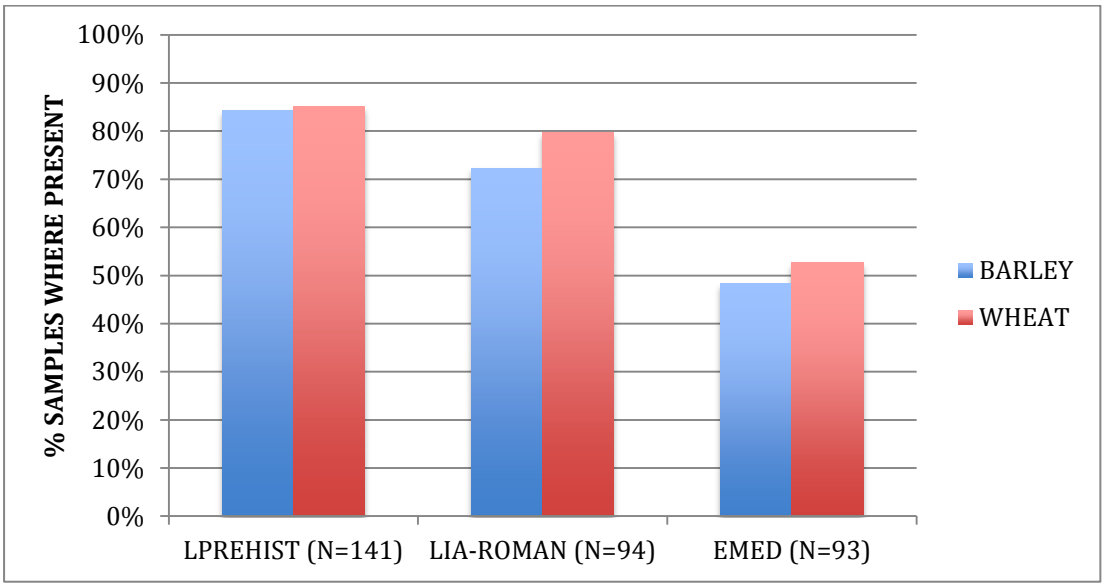


Figure 5.15: Charred wheat and barley from unenclosed settlements in the UTV.

As with the regional pattern indeterminate barley was slightly more ubiquitous at unenclosed settlements than indeterminate wheat in later prehistory, although the ubiquity of total barley and total wheat is very similar (Fig. 5.15). As with the regional pattern this may be linked to the predominantly sand and gravel superficial geology of the CSA (Fig. 5.3). Of the different species of wheat, free-threshing wheat was the most ubiquitous, being present in 25% of samples, with emmer/spelt wheat being next most frequent in 24% of samples. Spelt wheat was less common being present in 13% of samples and emmer wheat was present in less than 5% of samples. Oats and rye were also reasonably ubiquitous, being present in 20% and 13% of samples. The relatively high frequency of free-threshing wheat, oats and rye are in contrast to the regional pattern for this period, although the very low proportions of emmer wheat fit with that pattern.

The LIA-RO period pattern was similar to the later prehistoric pattern in many ways, with indeterminate barley being slightly more frequent than

indeterminate wheat. However, total wheat (80%) was significantly more ubiquitous than total barley (72%) (Fig. 5.15). Free-threshing and emmer/spelt wheat were again the most common wheat species both being present in 32% of samples. Spelt was present in very few samples and emmer was not present at all, while oats and rye were present in similar proportions of samples to the later prehistoric period. The slight dominance of wheat over barley is in contrast to the regional pattern, although the presence/absence of the remaining species broadly fits that pattern.

EMED cereals from Yarnton (used as a proxy see 5.2) (Fig. 5.14) were again dominated by indeterminate barley, which was present in 80% of samples and marginally more frequent than indeterminate wheat, present in 68% of samples, although, once again total wheat (53%), was more ubiquitous than total barley (48%). In contrast to the regional pattern, free-threshing wheat, oats and rye were present in relatively low numbers, while emmer/spelt wheat was the most frequent wheat species and emmer wheat was present in a small number of samples. This latter pattern may relate to the fact that most of the EMED unenclosed settlement at Yarnton belongs to the EAS phase (Fig. 5.16), prior to the development of oats and rye as a staple crop (McKerracher 2015). Figure 5.17 also demonstrates parity in total barley and total wheat in the EAS phase, in line with the arguments of Hamerow (2012) and Banham (1990); however, these figures are based on very small numbers of samples.

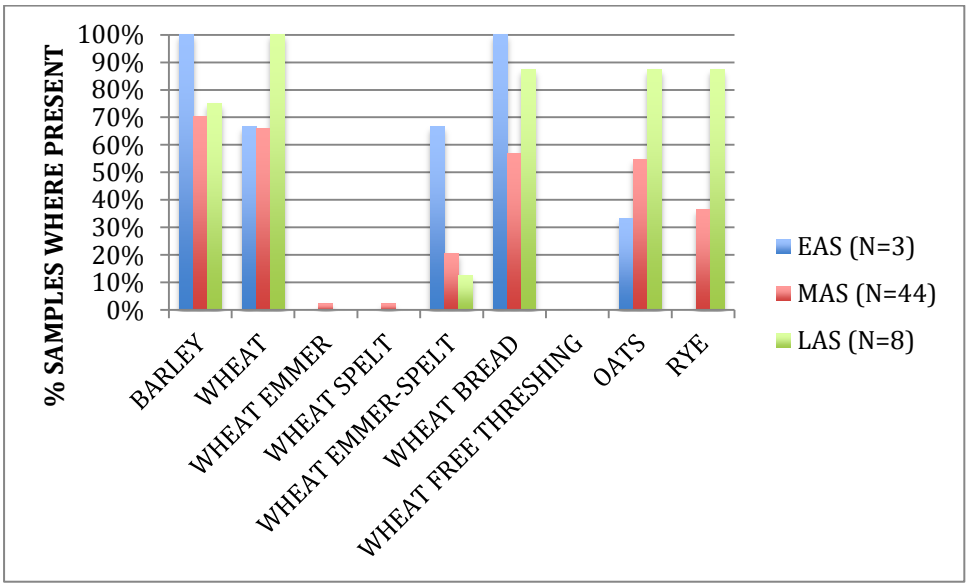


Figure 5.16: Charred grain from EMED unenclosed settlement in the UTV by phase.

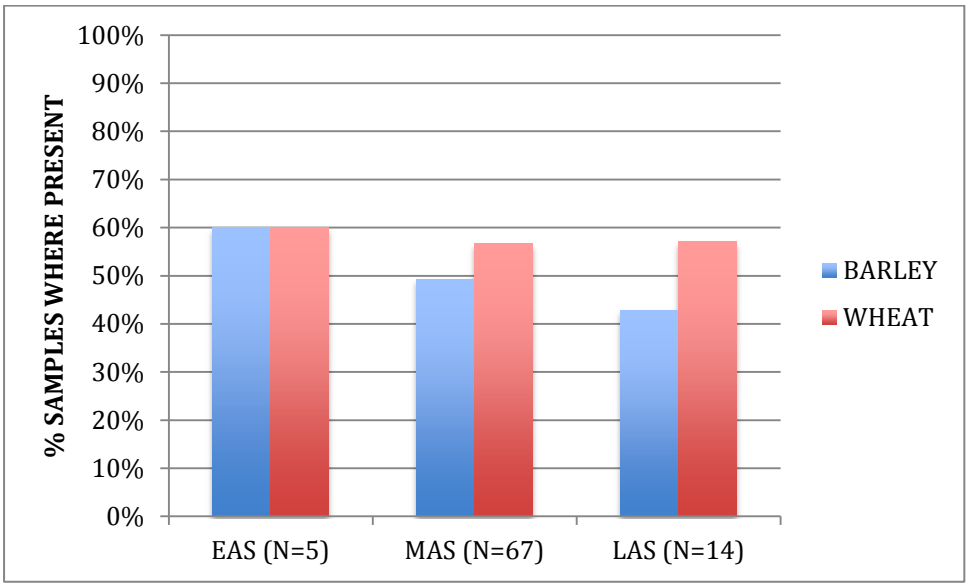


Figure 5.17: Charred wheat and barley from EMED settlement in the UTV by phase.

5.4.1.2 Enclosed settlement

Similarities and differences are both clearly evident when charred grain from enclosed settlements in the UTV (Figs. 5.18 & 5.19) is compared to that from unenclosed settlements.

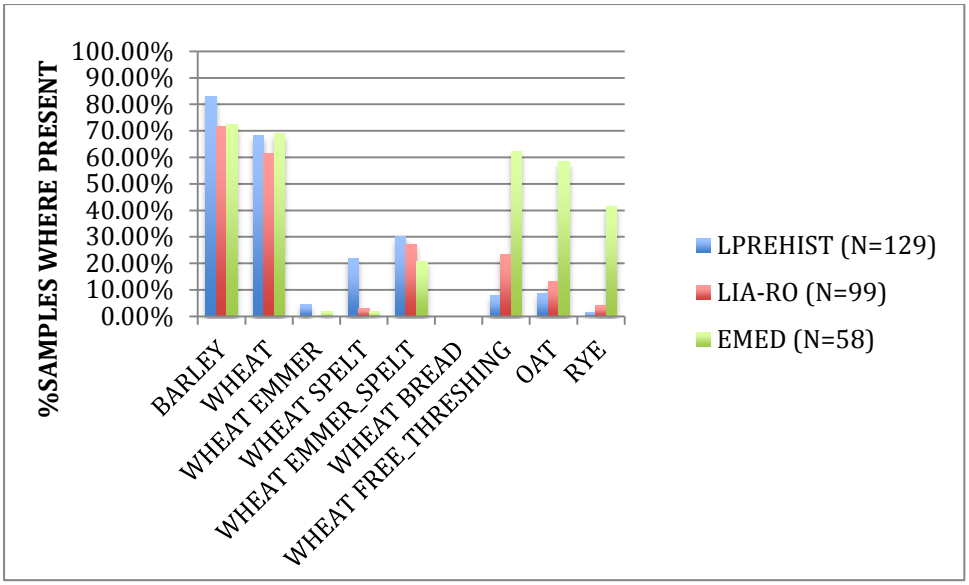


Figure 5.18: Charred grain from enclosed settlements in the UTV.

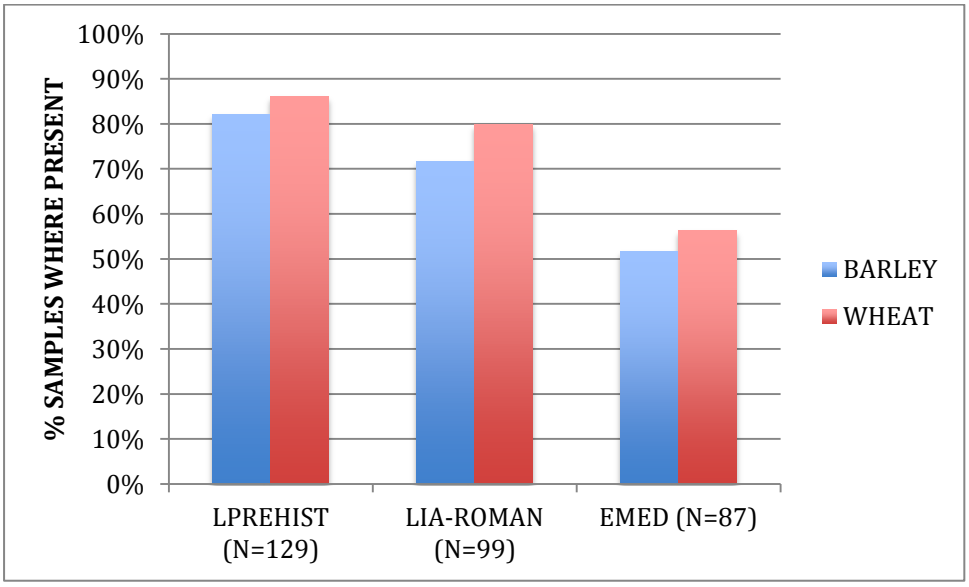


Figure 5.19: Charred wheat and barley from enclosed settlements in the UTV.

In later prehistory indeterminate barley was more ubiquitous than indeterminate wheat in an echo of both the larger regional pattern (Fig 5.1) and the pattern seen at unenclosed settlements (Fig 5.14); although in the case of enclosed settlements the difference is more pronounced, with indeterminate barley present in 83% of samples compared to indeterminate wheat, which was present in 68% of samples. However, comparison of the ubiquity of total barley (82%) and total wheat (86%) offers a different picture in which wheat was more

frequent at enclosed than unenclosed settlements. Wheat was therefore slightly more common at enclosed settlements than at unenclosed settlements, possibly indicating a link between settlement status - with boundary ditches serving partly to reinforce the status of the inhabitants (Sharples 2010, 120) - and the consumption of wheat. Unlike in the unenclosed settlements the most ubiquitous wheat species was emmer/spelt wheat, with free-threshing wheat being much less common than in unenclosed settlements. The next most common wheat species was spelt. Emmer was present in very few samples (< 5%). Oats and rye were also present in relatively few samples, being present in fewer samples than in the unenclosed settlements, but being more ubiquitous than in the regional pattern as a whole.

In the LIA-LR period indeterminate barley continued to be present in around 10% more samples than indeterminate wheat. However, the dominance of total wheat (80%) over total barley (71%) increased from the later prehistoric period. In addition, there were changes in the ubiquity of the various different species of wheat on enclosed settlements from the later prehistoric period to the LIA-LR, with declines from a low starting point in the ubiquity of emmer and spelt wheat, but a much lesser decline in emmer/spelt wheat. This difference is perhaps more likely to result from a change in processing technology than diet, with grains perhaps being more severely distorted by burning in the later period and therefore becoming less easy for archaeobotanists to identify to species. These changes in wheat species were very similar to those that occurred on unenclosed sites in the same period and this reinforces the idea that they may have had more to do with processing than different consumption preferences. In contrast to the

decrease in spelt and emmer wheat the ubiquity of free-threshing wheat increased from just under 8% in the later prehistoric period to 23% in the LIA-LR period. This is a lower ubiquity than that seen in unenclosed settlements (Fig 5.14); however, the contrast with enclosed later prehistoric settlements is much greater. Oats (13%) and rye (4%) both increased at enclosed settlements from later prehistory to the LIA-RO period in contrast to the pattern seen at unenclosed settlements, with the scale of the increase being much greater than the corresponding decrease at unenclosed settlements (Fig. 5.14).

For the EMED period the dataset again uses the settlement at Yarnton as a proxy for the UTV (5.2) making the comparison of enclosed and unenclosed settlements meaningless as this would in reality be a comparison of different phases (EAS/MAS-LAS) of the same settlement. The ratio of indeterminate barley to indeterminate wheat is much closer for this period than for either later prehistory or the LIA-RO period and this mirrors the regional pattern (Fig. 5.1), although total wheat (56%) was more ubiquitous than total barley (51%) (Fig 5.19). Free-threshing wheat (62%) was the most ubiquitous wheat species once indeterminate wheat is excluded, having increased substantially from the LIA-RO period (Fig. 5.18). Free-threshing wheat was also far more ubiquitous than emmer wheat, spelt wheat or emmer/spelt wheat, which were all less common than they had been in either later prehistory or the LIA-RO period. Oats and Rye, like free-threshing wheat, also saw substantial increases in ubiquity from the LIA-RO period and this again mirrors the regional pattern (Fig. 5.1) and the work of McKerracher (2015).

5.4.1.3 Complex settlement

Figure 5.20 shows charred grain from complex settlements in the UTV, for which the number of samples is small compared to enclosed and unenclosed settlement. There are no charred plant data from LIA-RO and EMED complex settlements in the thesis database.

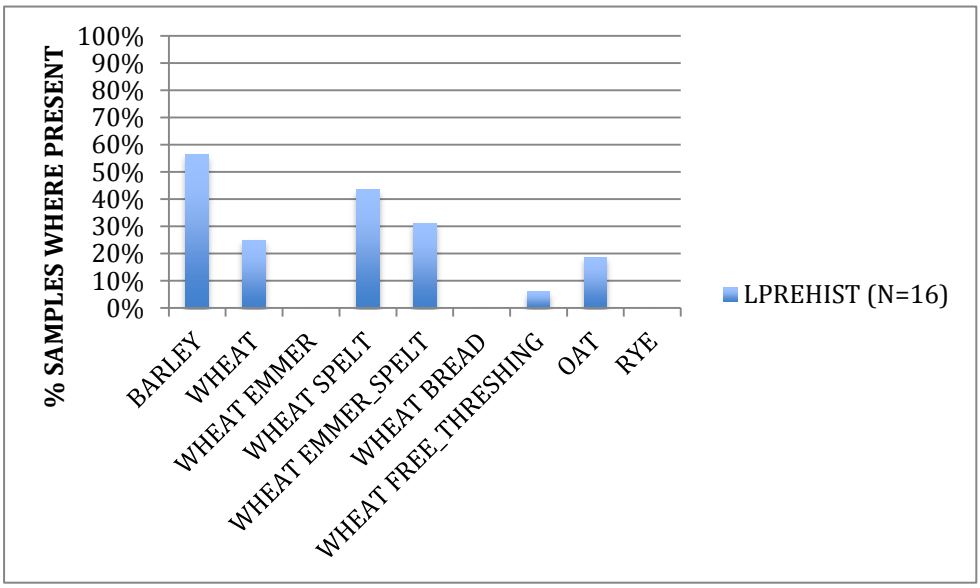


Figure 5.20: Charred grain from complex settlements in the UTV.

Indeterminate barley (Fig. 5.20) with a ubiquity of 56% was considerably more ubiqitous than indeterminate wheat at 25%. Among the different species of wheat, emmer wheat was absent, but spelt wheat at 43% was considerably more ubiquitous than in the equivalent period at either unenclosed or enclosed sites. Emmer/spelt wheat was also frequently present, but free-threshing wheat was relatively infrequently present. Rye like emmer wheat was absent and this fits with the pattern from enclosed settlements, but interestingly not with that from unenclosed settlements, where rye was present in 13% of samples (Fig. 5.14). Oats (19% ubiquity) were more frequently present at complex settlements than

at enclosed settlements, but marginally less frequent than at unenclosed settlements.

5.4.2 Upper Thames Valley unenclosed, enclosed and complex settlement compared

Similarities and differences in cereal cultivation and consumption between settlements of different types can be traced across the different periods under consideration in this thesis. Having set out the differences in the evidence for cereal cultivation at different types of UTV site in the previous section, the following section will compare the two principle types of site: unenclosed and enclosed settlement for the later prehistoric and LIA-RO periods. The EMED data (from Yarnton), will be compared by phase rather than site type, as unenclosed settlement was only present in the EAS phase (5.2). Following this later prehistoric cereal cultivation at unenclosed and enclosed sites will be compared to complex sites.

Similarities between enclosed and unenclosed sites in terms of cereal cultivation are more clearly evident in the record than differences, which are more subtle and in need of teasing out. In the later prehistoric period the ratio of total barley to total wheat was very similar on unenclosed settlements, but very slightly divergent on enclosed settlements, where wheat was slightly more ubiquitous. Indeterminate barley was; however, more ubiquitous than indeterminate wheat at both kinds of settlement, but the difference between indeterminate barley and indeterminate wheat was greater at enclosed settlements. These patterns

suggest a possible preference for wheat at settlements with enclosures. The similarities between these settlement types reflect the use of two staple crops, one of which (barley) is overrepresented in the record in comparison to other regions (London clay, chalk downland), so that the specific environment of the UTV river terraces can be suggested to have had an influence on crop choice. There were also similarities between unenclosed and enclosed settlements in terms of the different wheat sub-species, with the ubiquity of emmer wheat being low, but spelt and emmer/spelt having a relatively high ubiquity at both kinds of settlement.

In the LIA-RO period total wheat was more ubiquitous than total barley at both enclosed and unenclosed sites with the difference between wheat and barley only varying by 1% between the two. This represents a significant shift of approximately 10% from later prehistory in favour of wheat. When indeterminate barley is compared to indeterminate wheat for the LIA-RO period there is a difference of approximately 10% between unenclosed and enclosed sites, with more indeterminate wheat at enclosed sites. The higher presence of indeterminate wheat at enclosed sites may again be linked to settlement status, with enclosed settlements producing and consuming greater quantities of wheat than unenclosed sites possibly because they were more closely integrated in the Roman abstract-machine of production/consumption. However, there was a big decline in both emmer and spelt from later prehistory to the LIA-RO period at both enclosed and unenclosed settlements in the UTV, which suggests some underlying similarities in dietary preferences. Emmer/spelt on the other hand remained relatively high at both kinds of settlement, and increased at

unenclosed settlements, indicating changes in crop processing from later prehistory linked to those preferences, and perhaps involving higher risk of charring. A corollary of the decline in emmer and spelt wheat as separately identified species was the increase in the ubiquity of free-threshing wheat, which also occurred at both enclosed and unenclosed sites, but to differing degrees. The increase in free-threshing wheat was greater at unenclosed sites, but the disparity between later prehistoric and LIA-RO levels of free-threshing wheat was greater at enclosed sites, again suggesting a relationship between status and wheat, possibly resulting from closer integration into the Roman economic system. Another difference between unenclosed and enclosed sites in the LIA-RO period is that the ubiquity of oats and rye declined marginally from later prehistory at unenclosed sites but increased at enclosed sites. There would not seem to be an obvious relationship between either of these crops and integration into the broader economy, although oats may have been used for feeding animals and rye may be have been viewed as an exotic crop.

For the EAS period at Yarnton the ubiquity of total barley and total wheat was identical being present in 60% of contexts, but indeterminate barley dominated indeterminate wheat. The importance of barley in this phase relative to both the preceding and succeeding phases may result from the combined effects of soil types and cultural preferences. Barley may have prospered most easily on the damper first and second terrace gravels (Rippon et al. 2015, 81-82), whilst also being a particularly favoured crop in the EAS period (Hamerow 2012, 149-50). In contrast to the later prehistoric and LIA-RO periods emmer and spelt wheat were negligible in all three EMED phases, although they were most ubiquitous in

the EAS. Bread wheat seems to have increased in ubiquity to replace spelt and emmer in the EAS phase, a pattern that has been widely remarked upon for Anglo-Saxon England in general (Banham 1990; Hamerow 2012, 149-50). However, there was also an increase in the ubiquity of rye and oats in the EMED period, the presence of which increased substantially in the MAS and LAS phases, in line with the findings of McKerracher for the UTV and East Anglia (2015, 8).

Cereal cultivation data for complex settlements, i.e. neither unenclosed nor enclosed are only available for the later prehistoric period, for which they give a broadly similar picture to the unenclosed and enclosed settlements. However, there are some differences in ubiquity, which may be due to variations in sample size, or the chronology of the complex settlements. These differences include relatively low presence of indeterminate wheat - the ubiquity of indeterminate barley is twice that of indeterminate wheat - and relatively high ubiquity of spelt wheat (43%). The presence of emmer and free-threshing wheat, oats and rye was in line with those of the same species at later prehistoric unenclosed and enclosed settlements. Individual settlements in the UTV and elsewhere can be interpreted as abstract-machines of production/consumption in their own right, tied into broader regional or supra-regional abstract-machines in different ways and therefore showing differences in the balance of species that they produced/consumed.

5.4.3 Cereal cultivation at different kinds of settlement in the Middle and Lower Thames Valley

5.4.3.1 Introduction

The nature of the excavations carried out by MOLA and the way in which the digital archives relating to those excavations are structured (3.4.2) means that the classification of site types in the following section is different to that for the UTV and the route of HS1. Sites have been classified into urban (London) and non-urban, rather than according to whether they were enclosed, unenclosed or complex. In order to define sites from within London the outline of the 3rd Century landward wall of London, along with Southwark was plotted using QGIS (Fig. 5.21). Sites that lay inside the walls were then divided from those lying outside, using national grid reference numbers given in the MOLA database (3.5). Charred grain from MLTV sites has therefore been graphed according to the following categories: urban and non-urban.

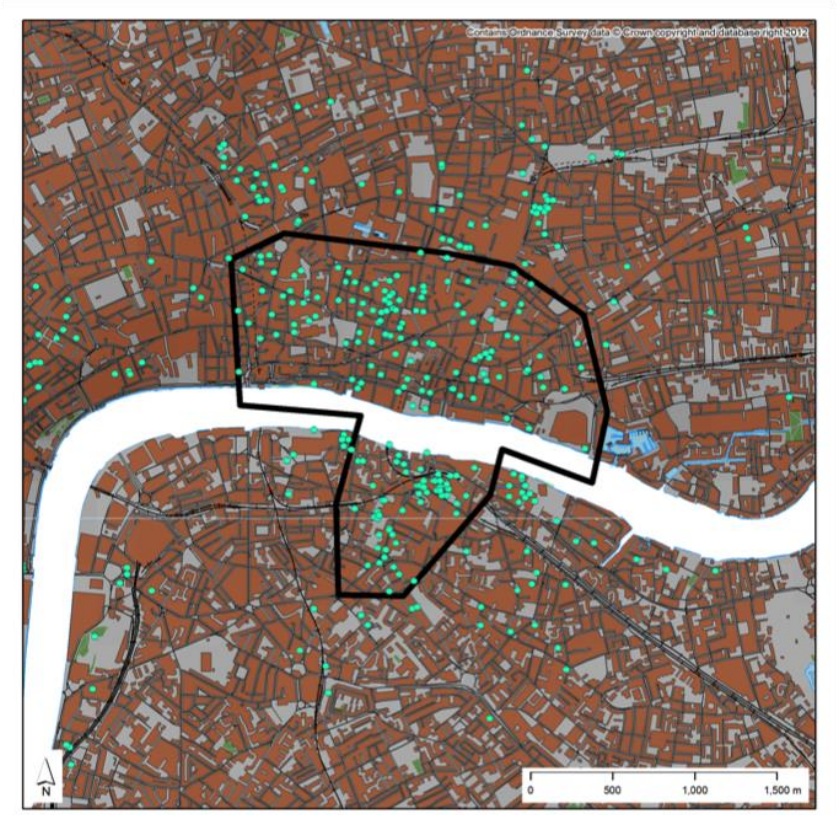


Figure 5.21: The outline of the 3rd century walls of RO London used to define settlements within and without the city for the LIA-RO and EMED periods (After MOLA, 2011).

5.4.3.2 Londinium

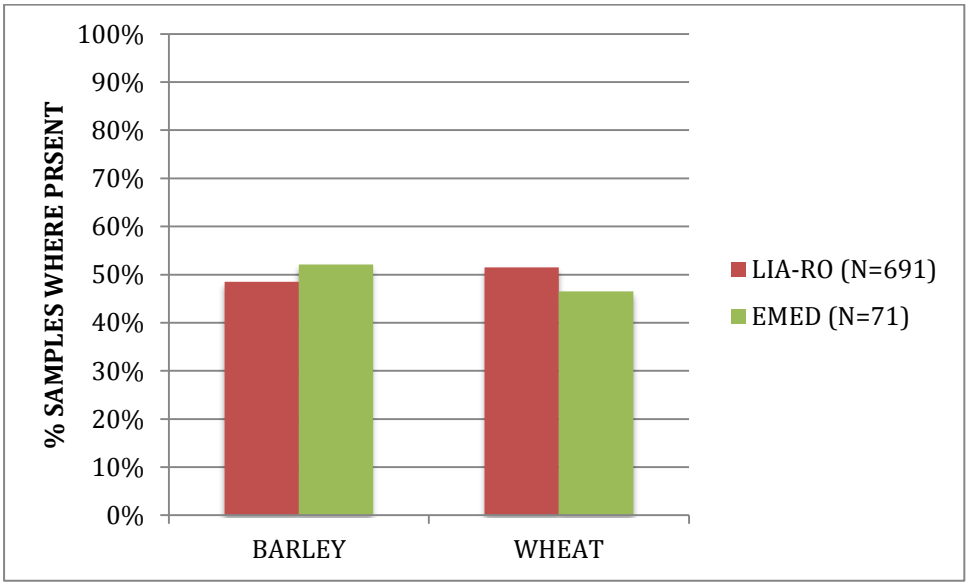


Figure 5.22: Charred wheat and barley from sites located within the walls of 3rd century London.

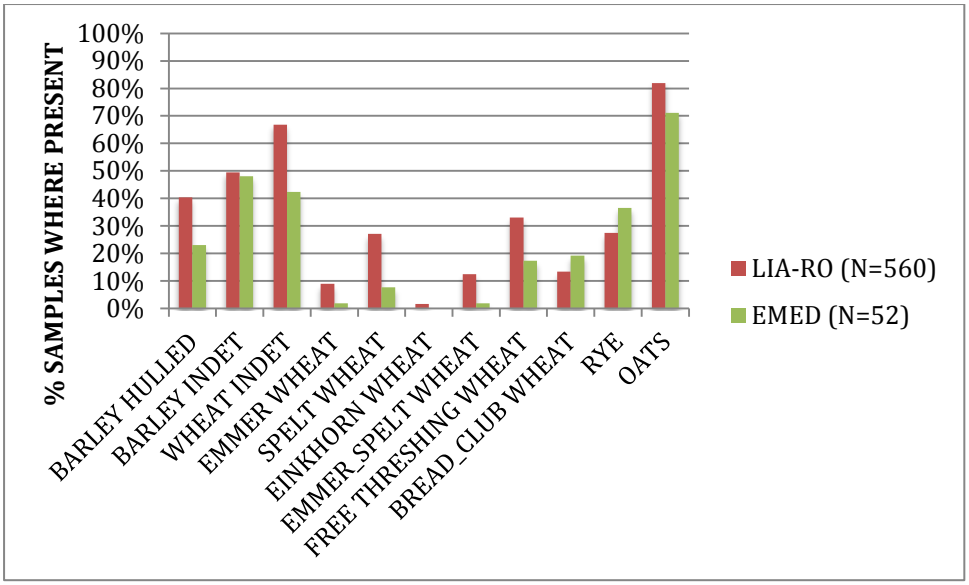


Figure: 5.23: Charred grain from sites located within the walls of 3rd century London.

LIA-RO

Overall wheat was slightly more ubiquitous than barley in samples from sites within Londinium (Fig 5.22) in the line with the LIA-RO pattern from the other regional CSAs. The charred grain from these sites was dominated by indeterminate wheat (66%) and oats (82%). This dominance of wheat is not surprising given the LIA-RO pattern in the UTV and the arguments rehearsed above regarding the development of the Roman economic abstract-machine. However, the importance of oats is more surprising, and seems to be a distinctive feature of the MLTV and not just in Roman Londinium (Fig. 5.23). Indeterminate barley (49%) was more common than hulled barley, but this pattern possibly results from taphonomic processes specific to the city, or to the way in which barley was processed within the city causing hulled barley to be identified as indeterminate barley (Liz Stroud pers. comm.). Such processes may have been related to brewing, although this is admittedly speculative. Among the sub species of wheat free-threshing wheat (33%) was the most ubiquitous in this period, with spelt (27%) also important. Emmer wheat and emmer/spelt were

much less ubiquitous, but emmer wheat (9%) was more important than in the UTV in the same period. The dominance of spelt and free threshing wheat over emmer in the sample is in line with expectations for Roman Britain more generally, although it is perhaps surprising that free-threshing wheat is more ubiquitous than spelt, given that this species is more often associated with the EMED period (Banham 1990; McKerracher 2015, 8). Bread/club wheat (13%) was also relatively ubiquitous, but again probably represents a subset of free-threshing wheat, which was more securely identified due to taphonomic factors. Rye (28%) and oats (82%) were also unusually ubiquitous for this period, showing levels of presence similar to the EMED period, with oats being more ubiquitous than in the EMED period. The high ubiquity of cereals usually associated with the EMED period may be the result of intrusion into Roman contexts caused by the reworking of deposits, which is a relatively common occurrence on urban sites (Roskams 2001). On the other hand these species were present on a smaller scale in non-urban contexts and they may result from the greater connectivity of the Roman urban abstract-machine drawing in more exotic crops from further afield, possibly from continental Europe.

Early Medieval

Total barley (52%) was slightly more ubiquitous than total wheat (46%) in EMED London (Fig. 5.22) in a reversal of the pattern seen in the previous phase. This is in line with the slight increase in ubiquity of barley seen in the EMED period generally (Hamerow 2012, 149-50). The EMED London assemblage was dominated by indeterminate barley (48%) and oats (71%), with indeterminate wheat (42%), hulled barley (23%) and rye (37%) also featuring strongly. The

strong ubiquity of indeterminate barley may have arisen from a similar set of factors as in LIA-RO London and this highlights the similarity between the urban abstract-machine in both periods. Among the sub-species of wheat bread/club wheat was dominant at 19% ubiquity, with free-threshing wheat at 17% and spelt, emmer and emmer/spelt much reduced from the LIA-RO period. Surprisingly the ubiquity of free-threshing wheat was lower than it had been in the LIA-RO period, although that of bread/club wheat was higher, suggesting that the difference may be one of identification, possibly caused by factors similar to those involved in the high ubiquity of indeterminate barley in the previous period. However, in this case, the difference in processing was probably not related to brewing. The importance of rye and oats is in line with the bigger regional picture, but is probably exaggerated by the dominance of LAS contexts within the EMED London sample, as high ubiquity of rye and oats is more a feature of MAS and LAS assemblages (McKerracher 2015, 8).

5.4.3.3 Outside Londinium

Figure 5.24 shows the total ubiquity of barley and wheat for MLTV sites outside Roman and medieval London and Figure 5.25 shows all species for the same dataset.

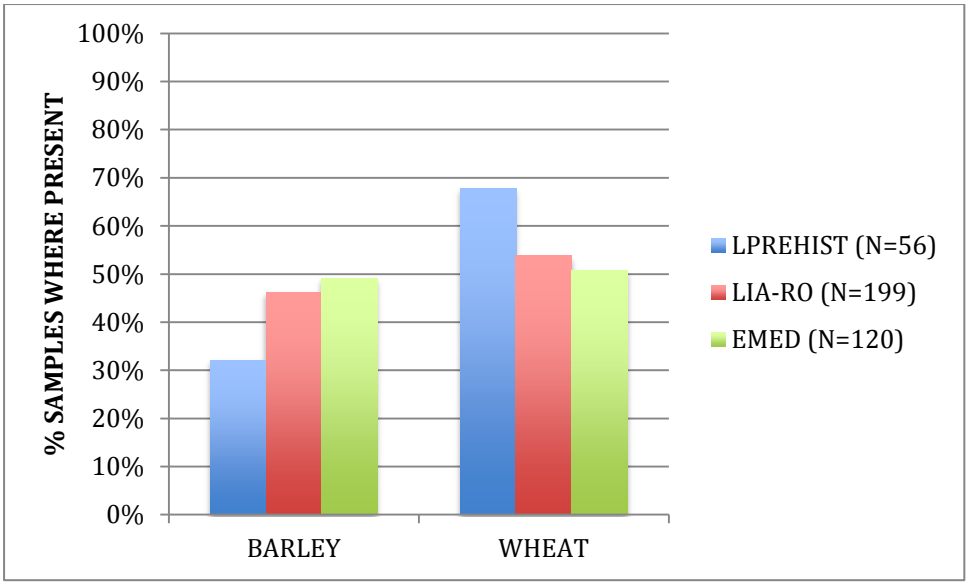


Figure 5.24: Charred wheat and barley from MLTV sites outside the walls of 3rd Century London by presence/absence.

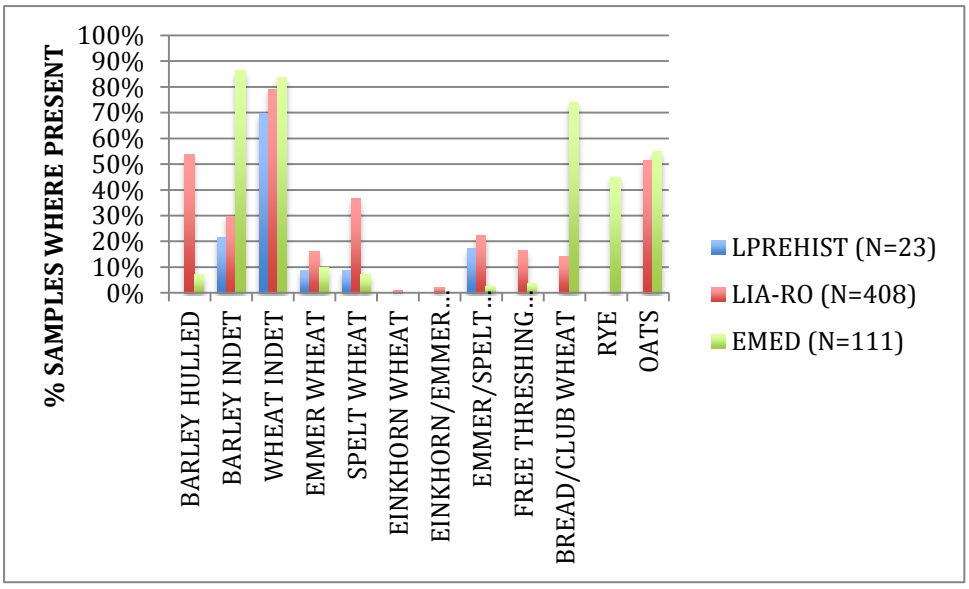


Figure 5.25: Charred grain from MLTV sites outside the walls of 3rd century London by presence/absence.

Later Prehistory

At MLTV sites outside the walls of 3rd century London total wheat (68%) was more than twice as ubiquitous than total barley (32%) in stark contrast to the pattern in the UTV. The later prehistoric assemblage was overwhelmingly dominated by indeterminate wheat (70%) in a reflection of the total barley/total wheat pattern. No hulled barley was present, and the ubiquity of indeterminate

barley was only 22%. Among the sub-species of wheat emmer and spelt were equally represented at 8% ubiquity, again in contrast to the UTV. However, the dominant category was emmer/spelt (17%). The complete absence of hulled barley, rye, oats and free-threshing wheat is striking and again in contrast to the UTV pattern. The wheat dominated nature of this assemblage is important and suggests that the Middle and Lower part of the Valley were more closely connected to regional systems based in the east, including agricultural practices, soils and topography, than they were to the UTV. Having said this it should also be borne in mind that, while not tiny, the number of samples dating to the later prehistoric period is considerably smaller than for the later periods.

LIA-LR

By the LIA-LR period total wheat (54%) and total barley (46%) had become much closer (Fig. 5.24), but the gap between the two was still greater than it was within Londinium. This is perhaps a reflection of the inter-relationship between the urban abstract-machine and that of the rural settlements, with surplus barley production being directed into the city. The assemblage outside Londinium was again dominated by indeterminate wheat (84%) showing continuity from later prehistory, but also a degree of similarity with the pattern inside Londinium. Other important species included hulled barley (54%) and oats (51%). These two species were both absent from the later prehistoric assemblage and also differ in terms of ubiquity from the Londinium assemblage, with oats being far more ubiquitous within Londinium, but hulled barley less ubiquitous. In fact the ratios of hulled to indeterminate barley within the city and outside it were almost a mirror image of one another, and given that the barley within the city

was most likely produced in its immediate rural hinterland the difference is probably one of taphonomy or processing (5.3.3.2), perhaps to do with the scale of production. Among the sub-species of wheat, spelt was dominant at 37%, with emmer (16%) also fairly frequent. Emmer/spelt (22%), free-threshing wheat (16%) and bread/club wheat (14%) were all present, but less ubiquitous than spelt. The latter two species seem to be new introductions in the MLTV in this period, in contrast to the UTV, but free-threshing wheat was far more ubiquitous within Londinium than outside it, whereas for emmer/spelt the reverse is true. Rye appears to have been completely absent from sites outside Londinium in contrast to sites within the city and in contrast to the UTV in the same period.

Early medieval

In the EMED period the difference between total barley (49%) and total wheat (51%) was closer than in either of the preceding periods, although looked at over the long-term ratios of barley to wheat from non-urban sites had shifted significantly in favour of barley, suggesting that more and more wheat produced in the hinterland was being imported into London. The continuity in this pattern from the LIA-RO period shows that the urban abstract-machine operated in similar ways in both periods, although there were also subtle differences, with the LIA-RO abstract-machine sourcing some of its materials from further afield than the EMED one. The dominant species within the EMED charred grain assemblage was indeterminate barley (86%), with indeterminate wheat (84%) and bread/club wheat (74%) also being very important. Indeterminate barley was more frequent than in London, but hulled barley was less so, reversing the differences of taphonmy/processing discussed above. Bread/club wheat was far

more ubiquitous in this assemblage than in London and there was far more difference between this species and indeterminate free-threshing wheat, reinforcing the perception of a difference in taphonomy/processing between the urban and non-urban systems. Oats (55%) and rye (45%) were also dominant species in this period, this time in a similar way to the pattern seen inside London, although the difference between the two was less great. Among the sub-species of wheat, emmer, spelt, free-threshing wheat and emmer/spelt were all present, but in relatively low frequencies of < 10%. With the exception of indeterminate free-threshing wheat this pattern matches that seen in London quite well. Overall the EMED pattern marks a more significant break with the LIA-RO period than that seen between the later prehistoric and LIA-RO periods, although there are still some significant continuities in the way that the two urban abstract-machines operated, particularly in the importation of crops from a hinterland.

5.4.4 Middle and Lower Thames Valley urban and non-urban settlement compared

As in the UTV CSA there were similarities and differences between settlement types, classified in this case into urban and non-urban settlements. In the LIA-RO period total wheat was slightly more prevalent than total barley in both urban and non-urban settlement, although in both cases the difference in ubiquity between the species was slight. These similarities in ratios of barley to wheat relate to the development of the Roman abstract-machine of production/consumption in the lowland zone, as discussed above and in Chapter 8 (below). From the LIA-RO period the regional abstract-machine of the MLTV

was integrated with the urban abstract-machine of London - so that production in the non-urban abstract-machine was linked to consumption in the urban abstract-machine. Both kinds of settlement also had relatively high ubiquities of indeterminate wheat and oats. The high ubiquity of oats appears to be more of a regional characteristic of this CSA and of the route of HS1, and is in contrast to the pattern in the UTV, perhaps in the MLTV being related to the foddering of animals for consumption in the city. Differences between urban and non-urban cereal production/consumption were more pronounced than similarities, or at least involved more different species. The difference in ratios of hulled to indeterminate barley between urban and non-urban systems are of particular interest, suggesting the possibility of important differences in the way in which hulled barley was processed (into beer?) and consumed between the two types of abstract-machine. In particular these differences hint that processes of brewing might have differed between the two systems, perhaps because of differences of scale, although this is admittedly speculative. Interesting differences were also evident in the ubiquity of the various sub-species of wheat and rye, with urban settlements characterised by high ubiquities of free-threshing wheat, club wheat and rye relative to non-urban settlements. In contrast non-urban settlements were characterised by very high ubiquity of indeterminate wheat and higher ubiquities of emmer, spelt and emmer/spelt than urban settlements. These differences in the ratio of free-threshing wheat to bread/club wheat may be interpreted in the same terms as that of hulled to indeterminate barley, with the higher ratio of identifiable bread/club wheat outside the city suggesting differences in taphonomy/processing. Similarly the presence of rye within the city and its absence from outside, and the higher

ubiquity of free-threshing wheat within, indicates differences in the operation of the two abstract-machines of production/consumption, with the urban machine perhaps drawing in some crops (rye) from outside the immediate hinterland of the MLTV and a disproportionate quantity of others (free-threshing wheat) from its immediate environs.

For the EMED period the comparison of urban and non-urban sites involves a comparison of EAS-LAS data from the non-urban area to LAS data from within in it, as the focus of MAS London lay outside the limits of the 3rd Century Roman walls at Lundenwic (Leary et al. 2004, 3). However, some comparison of overlapping data is still possible and again some similarities and differences can be seen. Total barley was marginally more ubiquitous within London than in the rest of the MLTV and the discrepancy between total barley and total wheat was slightly greater within London than outside it. Looked at from a long-term perspective the ratio of total barley to total wheat on non-urban settlements had been coming closer together, suggesting the importation of more wheat by the urban abstract-machine, which was thus behaving in a very similar way to that of the LIA-RO urban abstract-machine. Other differences included a far higher discrepancy between hulled barley and indeterminate barley in the wider MLTV than in London, in a reversal of the pattern seen in the LIA-RO period. And this suggests a difference in the operation of the two systems between LIA-RO and EMED, which must reflect the consumption/processing of barley in some way. Ubiquity of indeterminate wheat was also higher outside London, while free-threshing wheat was more ubiquitous within London and bread/club wheat was found more frequently outside London. In contrast this pattern was reminiscent

of the LIA-RO situation. Similarities between the urban and non-urban assemblages are harder to identify than differences, but include similar ubiquities of oats, and rye and similarly very low ubiquities of spelt wheat. Relatively high presence of oats relative to the UTV is a feature of the MLTV and of the route of HS1 in all periods and a lack of spelt is not surprising given that it was primarily a prehistoric and Roman crop. However, the similarity in ubiquity of rye is more surprising given the inclusion of EAS data in the MLTV sample and that rye features more strongly in MAS and LAS assemblages.

5.4.5 HS1

5.4.5.1 Introduction

Settlement types on the route of HS1 were broadly comparable to those in the UTV, despite differences in emphasis and diversity, unlike those excavated by MOLA in the MLTV (see 4.4.3). In the following section, for the purpose of analysis HS1 sites are divided into four types (3.22; 5.3). For reasons discussed in Chapter 4 complex settlements are more numerous on the route of HS1 as proportion of sites overall, than in the Thames Valley and this means that the results for unenclosed and enclosed settlements for the LIA-RO and later prehistoric periods respectively are based on relatively small numbers of samples. As in the Thames Valley CSAs the data from HS1 sites indicates relationships between particular cereal species and specific settlement types and these are elaborated below.

5.4.5.2 HS1 Unenclosed Settlement

Later Prehistory

The charred grain assemblage from later prehistoric unenclosed sites on the route of HS1 (Fig 5.26) was dominated by indeterminate barley (72%), emmer/spelt wheat (62%) and oats (62%). This reversal of the regional pattern of wheat dominance over barley is not common to all HS1 settlement types in the later prehistoric period and may be an indication of an association between relative lack of wealth/status, barley and lack of boundary ditches.

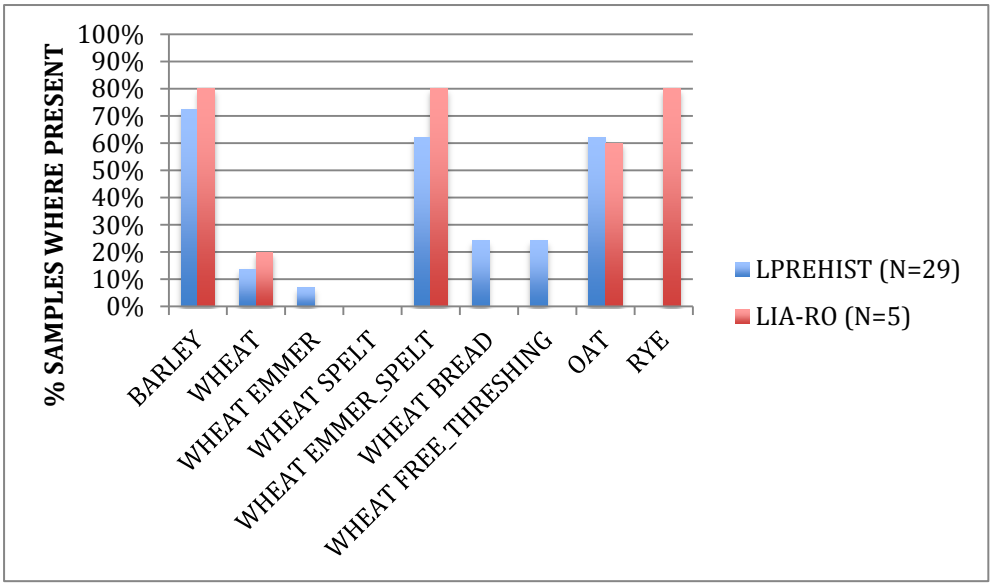


Figure 5.26: Charred grain from unenclosed settlements on the route of HS1.

Wheat sub-species at unenclosed settlements were dominated by emmer/spelt, (62%) with emmer wheat (7%) having a surprisingly low ubiquity and spelt wheat not being present at all. The contrast between the low ubiquity of both spelt and emmer wheat and the high frequency of the hybrid category suggests that these patterns are to some extent a product of taphonomy, which may have made species identification difficult in some way. Both bread wheat (24%) and free-threshing wheat (24%) were unusually frequent for the later prehistoric

period and this may relate to processing or taphonomy in some way. In contrast to the pattern among sub-species of wheat the frequent ubiquity of oats fits with the regional pattern for later prehistory, as does the absence of rye.

LIA-RO

The LIA-RO assemblage from unenclosed HS1 settlements (Fig. 5.26) was recovered from only 5 samples and no firm conclusions can therefore be drawn from it. However, the breakdown of species is described below for completeness. The assemblage was again dominated by indeterminate barley (80%), along with emmer/spelt wheat (80%); however, in this period rye (also 80%), along with oats (60%) were also very frequent. Wheat sub-species were dominated by spelt/emmer wheat, with relatively low frequencies of indeterminate wheat (20%) and a complete absence of emmer, spelt, free-threshing and bread wheat. These results are not readily comparable to other sets of LIA-RO results either within the HS1 CSA or outside it and are in some ways more comparable to MAS or LAS assemblages. The peculiarity of this pattern is probably related to the fact that the assemblage is derived from such a small number of samples.

5.4.5.3 HS1 Enclosed settlement

Later Prehistory

The nature of the later prehistoric assemblage from enclosed HS1 sites was very homogenous in terms of the ubiquity of the species present (Fig. 5.27), but again the material was derived from a relatively small number of samples (nine in this case). The differences in species composition and ubiquity between these

settlements and unenclosed settlements from the same period are so large, that the suspicion that they are a function of sample size is unavoidable. Firm conclusions on the basis of this dataset are again impossible, but again the data are described below for completeness.

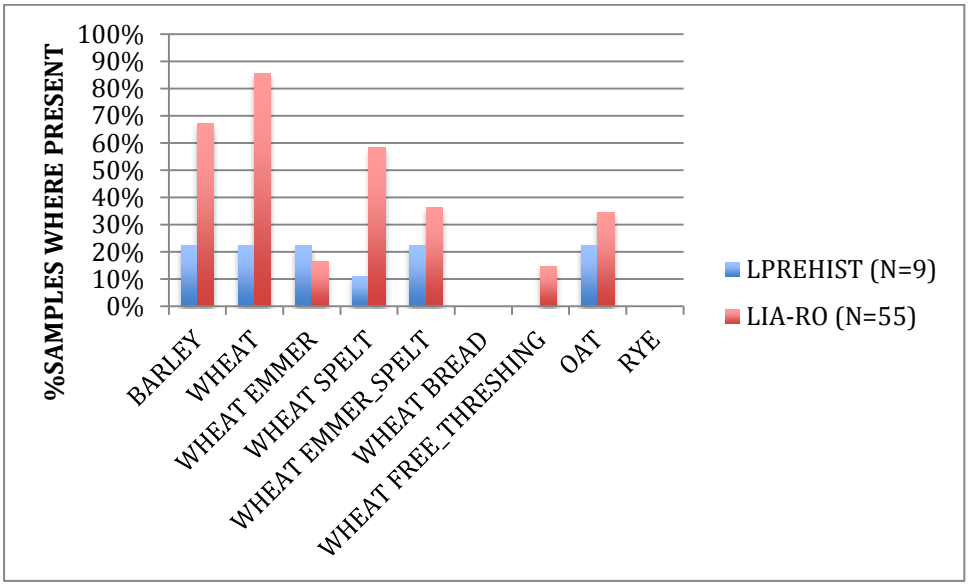


Figure 5.27: Charred grain from enclosed settlements on the route of HS1.

In the later prehistoric assemblage indeterminate barley, indeterminate wheat, emmer wheat and oats were all present in 22% of samples. Typically EMED crops such as rye, bread wheat and free-threshing wheat were all absent. Among the crops present in the assemblage the only species not at 22% ubiquity was spelt (11%). Interestingly therefore spelt was approximately half as ubiquitous as emmer at enclosed settlements.

LIA-LR

The LIA-LR assemblage from enclosed settlements (Fig. 5.27) on the route of HS1 was dominated by indeterminate wheat (85%), with indeterminate barley (67%) being significantly less ubiquitous in a reflection of the broader chronological and regional pattern. Among the sub-species of wheat, spelt (58%) was

dominant, being significantly more ubiquitous than emmer (16%), in a reversal of the later prehistoric pattern. And although the presence of emmer had declined from later prehistory, it continued to be more ubiquitous than it was on contemporary unenclosed sites. Emmer/spelt (36%) was much lower than on contemporary unenclosed settlements. Free-threshing wheat (15%) had greater presence than on unenclosed settlements in later prehistory and greater presence than on LIA-LR unenclosed settlements, a pattern that is again in line with broader regional and chronological trends. Oats (35%) as in later prehistory were less ubiquitous than on unenclosed settlements and rye was absent, again in stark contrast to the pattern on unenclosed settlements. The ubiquity of species on LIA-RO enclosed settlements indicates relatively high production/consumption of wheat in comparison to other species. This compares well with the pattern from LIA-RO enclosed settlements in the UTV, reinforcing the impression of the association of wheat, boundaries and higher status and the link to the wider Roman economic abstract-machine.

5.4.5.4 HS1 Complex Settlement

Later Prehistory

For the later prehistoric period (Fig 5.28) the greatest number of environmental samples come from complex settlements and the most accurate picture of the relative ubiquity of species for this period therefore comes from these settlements.

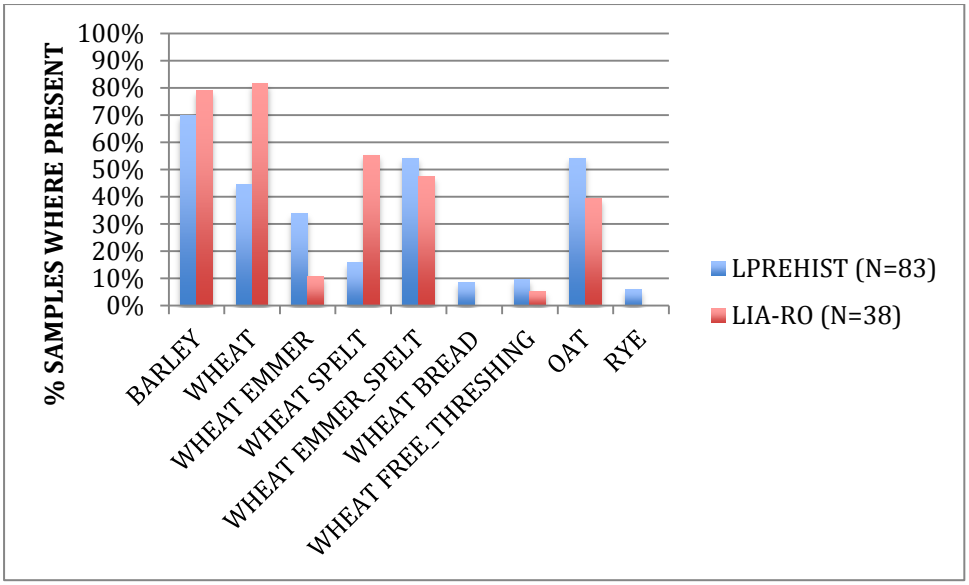


Figure 5.28: Charred grain from complex settlements on the route of HS1.

The later prehistoric assemblage from complex sites was dominated by indeterminate barley (70%) in contradiction of the regional pattern and the pattern on enclosed sites, but tallying with the pattern on unenclosed settlements. The sub-species of wheat were dominated by emmer/spelt (54%), with emmer (34%) having a very high ubiquity, in line with expectations from the regional pattern and being more ubiquitous than on either unenclosed or enclosed settlements. The next most ubiquitous wheat sub-species was spelt (16%), which was again more ubiquitous than on unenclosed or enclosed settlements. Bread wheat (8%) and free-threshing wheat (10%) were also present but not in large numbers of samples again in contrast to both of the other main settlement forms. Indeterminate wheat was fairly frequent at (45%). The presence of oats (54%) was in line with the regional pattern for later prehistory and rye (6%) was present, but was the least ubiquitous species. The presence of rye, bread wheat and free-threshing wheat at any level is interesting, given the relative absence of EMED samples from this CSA and the association of these species with the EMED period at the regional scale. This suggests that all

these species were being produced/consumed in later prehistory, or at least in the LIA-RO period in the region, if not in particularly significant numbers and implies that later developments, although significant were based on already extant cereal species.

LIA-RO

In contrast to the later prehistoric period the LIA-RO assemblage from complex settlements was dominated by indeterminate wheat (82%), with indeterminate barley accounting for 79%. This pattern fits well with the regional picture, showing that as the largest category of settlement complex sites were incorporated into the wider Roman economic abstract-machine. Wheat species were dominated by spelt (55%) and emmer/spelt (47%), with the ubiquity of emmer (10%) having declined from later prehistory. This apparent switch from emmer to spelt was bound up with the development of wider Roman economic systems, and may indicate a change in consumption practices. Interestingly; however, free-threshing wheat, which might been preferred for bread was only present in 5% of samples and had therefore declined in ubiquity from later prehistory. Oats which were present in 40% of samples had remained relatively ubiquitous; however, and were in line with regional patterns.

5.4.5.5 HS1 Roman Villas

The charred grain assemblage from Roman villas (Fig. 5.29) on the route of HS1 derived from 18 samples, which is a relatively large number for a single category of site. The overall pattern of ubiquity at villas while not completely divorced from the other categories of LIA-RO settlements, was distinctively different.

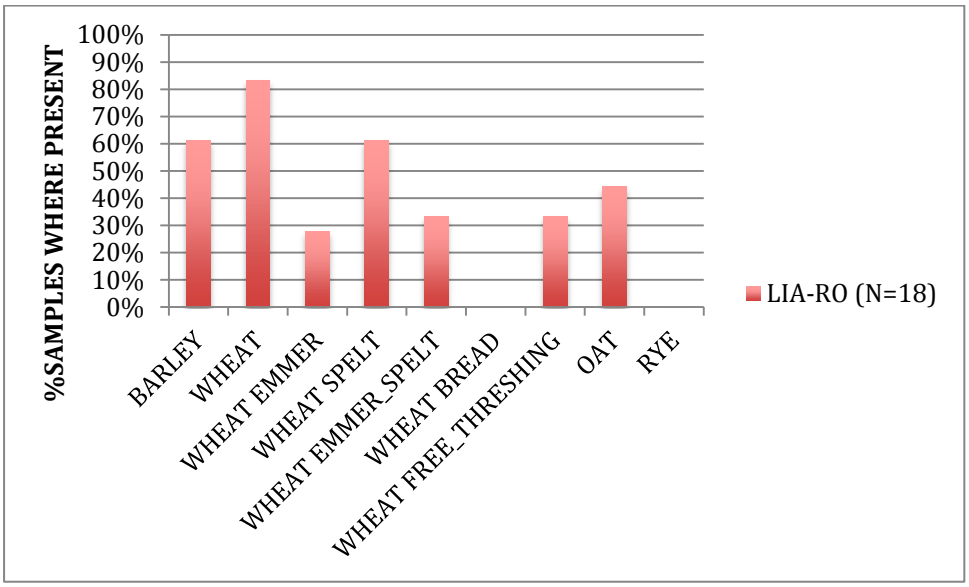


Figure 5.29: Charred grain from Roman Villas on the route of HS1.

The assemblage was dominated by indeterminate wheat (83%) and this tallies with the bigger regional and chronological picture in which wheat came to dominate the crop assemblage as the Roman economic abstract-machine developed and expanded. Indeterminate barley (61%) was also a significant crop, but was present in a lower percentage of samples than on contemporary complex settlements, suggesting that the inhabitants of villas had less use for barley than people on other kinds of settlement, or that they processed it differently. Wheat species were dominated by spelt (61%), with emmer (28%), emmer/spelt and free-threshing wheat (both 33%) also being fairly ubiquitous and this pattern also tallies with expectations set by the regional picture for this period. Oats (44%) were significant, as with all HS1 LIA-RO sites and rye was not present at all. The ubiquity of wheat species does not fit closely with unenclosed or complex settlements, comparing most closely to the pattern seen at enclosed settlements, perhaps because there is some overlap with the latter category. This suggestion is strengthened by the high ubiquity of emmer at both kinds of settlement, which may also be an indication of high status consumption.

5.4.6 ***Cereal cultivation at settlements on the route of HS1 compared***

Settlements on the route of HS1 were classified into similar types to those in the UTV, in contrast to the MLTV. However, the number of samples from each type varied and this variation was different for each period. In contrast to the UTV the most common site type was complex settlement (Fig 4.12). However, as in the other case studies similarities and differences were evident between unenclosed, enclosed and complex sites, with villas creating an extra dimension of variability not really present in the UTV.

In the later prehistoric period cereal cultivation at unenclosed and enclosed settlements was characterised by difference rather than similarity, although there were strong similarities between unenclosed and complex settlements. Both unenclosed and complex settlements were characterised by relatively high frequencies of indeterminate barley, emmer/spelt wheat and oats, while both types of settlement had relatively low frequencies of rye. Differences between unenclosed settlements and complex settlements were also apparent: unenclosed settlements were characterised by moderate frequencies of free-threshing and bread wheat and low frequencies of emmer wheat, while the situation at complex settlements was the reverse of this. Differences between unenclosed and enclosed settlements were apparent across all species, with ubiquity being under 30% in all species at enclosed settlements, while unenclosed settlements had relatively high frequencies of indeterminate barley, emmer/spelt wheat and oats (see above). However, these differences, must in

part be due to the small later prehistoric sample size (N=9) at enclosed sites. The association of emmer wheat with complex settlements may possibly taken as relating to enhanced social status, with the abstract-machines of different types of settlement producing/consuming slightly different suites of crops.

In the LIA-RO period the relationship between enclosed and unenclosed sites continued to be characterised by difference, with unenclosed sites continuing to show high ubiquities of indeterminate barley, emmer/spelt and oats, but with the addition of high frequencies of rye. Enclosed settlements, on the other hand, had higher frequencies of indeterminate wheat than indeterminate barley, higher frequencies of spelt wheat than emmer/spelt, some free-threshing and emmer wheat and relatively low frequencies of oats and rye in comparison to unenclosed settlements. Again one of these datasets (enclosed settlements) was characterised by very low sample numbers (N=5) and no firm conclusions should be drawn from these data. However, complex settlements were most comparable to enclosed settlements, from which they differed principally by having slightly higher ubiquities of emmer/spelt, a higher ratio of indeterminate barley to indeterminate wheat and no rye. There were strong similarities between these latter two settlement types in ubiquity of spelt and emmer/spelt. Villas were most similar to enclosed settlements. Similarities between these settlements types lay principally in emmer, spelt and emmer/spelt wheat, which were all reasonably ubiquitous, and indeterminate barley and indeterminate wheat. Villas had particularly high frequencies of emmer wheat and free-threshing wheat, which were more frequent than on any other settlement type and especially more frequent than on complex or unenclosed settlements.

Differences between LIA-RO settlement types therefore divide fairly neatly between high and low status settlements as expressed by the complexity of boundaries and architecture, with the abstract-machines of complex settlements and villas perhaps being more closely tied in to the wider Roman economic system.

5.5 Cereal cultivation at different kinds of site in the Thames Valley and on the route of HS1 compared 1500BC-AD1086

The comparison of cereal cultivation by site type, has proved fruitful, revealing patterns of similarity and difference as well as continuity and change between settlement types across all three CSAs, which extend and complement those revealed in the regional scale analysis. The differences were largely associated with the trends discussed in the regional analysis (5.2), particularly the divergence between the UTV and HS1 case studies in favoured cereal species and the changes in preferred cereals introduced in the EMED period, but were also influenced by the nature of affordances for identifying different settlement types (Chapter 4), particularly the lack of EMED settlements from HS1. In contrast the similarities were more often linked with the association of particular settlement morphologies with specific cereal species. Both enclosed and unenclosed settlements in the UTV had slightly higher frequencies of indeterminate barley than indeterminate wheat, relatively high ubiquity of spelt wheat and emmer/spelt and low frequencies of emmer wheat. All of these patterns reflect the regional pattern (5.3), but the difference in ubiquity between indeterminate

barley and indeterminate wheat was slightly greater at enclosed than unenclosed settlements suggesting a possible association between cultivation/consumption of wheat and boundaries. Sharples (2010, 101, 120) has argued that the elaboration of boundaries and the display of stored grain was associated with status and competitive boundary construction (ibid. 122-23) in later prehistoric Wessex and it is arguable that this may also have been true of settlement within the Thames valley and SE England. On the route of HS1 differences in cereal cultivation between later prehistoric unenclosed and enclosed sites were more pronounced, being seen right across the spectrum of cereal species and this may be seen as a regional pattern in its own right, so that the association of settlement types with specific species could be argued to have a regional inflection. Nevertheless, it should be borne in mind that this pattern is based on a very low number of samples from enclosed sites and could therefore be an effect of sample bias. However, when unenclosed settlements are compared to complex settlements on the route of HS1, similar differences in the ubiquity of different wheat species to those seen between unenclosed and enclosed settlements in the UTV emerge. So that moderate ubiquity of free-threshing and bread wheat and low ubiquity of emmer wheat at unenclosed settlements contrasts to low frequencies of free-threshing and bread wheat, and moderate frequencies of emmer wheat at complex settlements. Given the possibility that many complex settlements on the route of HS1 were enclosed, there is therefore the suggestion that the regionally specific use of emmer may have also had a link to boundaries and status in this period, similar to the more generic UTV link between wheat and boundaries.

In the LIA-RO period specific settlement morphologies and crop species continued to be associated in the UTV and HS1 case studies, while for the MLTV CSA comparison of settlements within Roman London and settlements outside of Roman London show up contrasts, but also links between the rural and urban abstract-machines of production/consumption. Differences were again evident in the regionally specific crop preferences identified in the regional scale analysis. In the UTV indeterminate wheat was more ubiquitous than indeterminate barley at both unenclosed and enclosed sites, in line with the regional pattern and the ubiquity of emmer and spelt had declined from the later prehistoric period, while the frequency of free-threshing wheat had increased, indicating underlying similarities in the operation of the regional abstract-machine. However, enclosed settlements had approximately 10% higher ubiquity of indeterminate wheat than indeterminate barley in comparison to unenclosed settlements, and the ubiquity of free-threshing wheat also increased to a greater degree at enclosed settlements. This suggests that any association in the region between boundaries, wheat production/consumption and status in the later prehistoric period continued into the LIA-RO period. In the MLTV there was no distinction in the ubiquity of wheat between London and the rest of the Valley; however, indeterminate barley was more frequent than hulled barley in the urban area and hulled barley more frequent than indeterminate barley on rural sites. This pattern can be interpreted as resulting from taphonomic differences between the assemblages (see above) and may therefore still indicate a difference in the operation of two interrelated complex systems, with hulled barley in the urban area being used in ways more likely to cause charring. Additionally, total wheat declined on rural settlements in the long-term as total

barley increased, suggesting increasing quantities of wheat being drawn in by the urban abstract-machine. The urban system also had a higher ubiquity of free-threshing wheat, club wheat and rye than the non-urban area, which may also be interpreted as related to the higher social status of some inhabitants. Rye was not present on the rural settlements in the immediate hinterland of Roman London and its presence in the urban system therefore illustrates the long-distance connectivity of that abstract-machine. On the route of HS1 there were striking differences between unenclosed settlements, enclosed settlements and complex settlements in the LIA-RO period, which continued the pattern from later prehistory, as in the UTV. Enclosed sites displayed higher ubiquities of indeterminate wheat than indeterminate barley, higher frequencies of spelt wheat than emmer/spelt, some free-threshing and emmer wheat and relatively low frequencies of oats and rye, all of which is in contrast to unenclosed settlements. This being said enclosed settlements were characterised by low numbers of samples, as in the later prehistoric period in the same region; however, complex settlements had very similar species ubiquity to enclosed settlements. Furthermore villas on the route of HS1 had higher frequencies of emmer and free-threshing wheat than any other settlement type and this gives arguments about the relationship of wheat production/consumption to status a regional inflection, given the relationship of the region to higher levels of emmer use (5.2, 5.3). It is arguable that unenclosed, enclosed and complex settlements and villas all operated as distinctive kinds of production/consumption abstract-machines, similar to the urban system in the MLTV CSA, but on a smaller scale, some of which, such as villas would have been more tied in to the wider Roman production/consumption abstract-machine than others.

For the EAS phase at Yarnton the ubiquity of indeterminate barley and indeterminate wheat was approximately equal and enclosure was absent. This may be interpreted as indicating a lack of status difference. In the MAS and LAS phases the frequency of indeterminate wheat increased relative to indeterminate barley and enclosures were present and this together with the increased ubiquity of rye perhaps hints at a return to modes of social expression seen in earlier periods such as the MBA-LBA or LIA-RO. For the MLTV there are similar problems of comparison to those seen in the UTV, as the data from within London is exclusively LAS in date, while the data from outside London also includes EAS and MAS material. However, as long as this is born in mind then the comparison remains useful. Both urban and non-urban settlement have similar relatively high ubiquities of oats and rye, which is a feature of MAS and LAS assemblages as discussed above (McKerracher 2015) and very low frequencies of spelt. However, differences between the urban and non-urban abstract-machines were more significant, with higher ubiquity of indeterminate barley than indeterminate wheat inside London and a reversal of the ratios between hulled and indeterminate barley seen in the LIA-RO period, with hulled barley more ubiquitous inside London and free-threshing wheat more frequent than bread/club wheat. This again suggests differences in processing/taphonomy and the operation of production/consumption systems, with a long-term perspective suggesting that wheat was being imported into London from the MLTV in a similar pattern to that seen in the LIA-RO period.

In summary there appears to be an association between enclosure and higher ubiquities of wheat and more varieties of wheat sub-species and between unenclosed sites and higher ratios of barley to wheat. This is not associated with a specific period or region, but comes and goes at times appearing more strongly in one region than another. This may be interpreted as relating to a wide array of different taphonomic processes and practices including differences of social expression, which seem to have arisen, disappeared and then returned at different times in different contexts. However, this interpretation is nuanced by different regional affordances (opportunities for research determined by different kinds of sample bias), including a relative lack of identified enclosures in the HS1 region and urban/rural differences in the MLTV. Finally, region-wide differences in cereal cultivation identified in the regional scale analysis run through this pattern, so that, for example, villas in the HS1 region appear to have higher frequencies of emmer wheat than sites in other regions.

5.6 Conclusions

This chapter has attempted to adopt a novel approach to the study of cereals and food production/consumption in Southern England, making the case for regional cereal production/consumption systems, which displayed considerable continuity, both in their consumption of staple crops and in their more idiosyncratic elements, across the chronological boundaries that have traditionally been used to divide up English history and prehistory, particularly from later-prehistory to the LIA-RO period. These continuities have been

examined alongside changes introduced as the result of the development of Roman socio-economic systems/abstract-machine(s) and particularly changes in cultivation/consumption during the EMED period. The chapter also examined variation in the cultivation/consumption of crops at different kinds of settlement in the different regions, comparing and contrasting practices at different settlement types both over the long-term and between differing regional ecologies/systems of production/consumption. Links between suites of crops and the presence or complexity of boundaries were identified. Continuity and change in cereal cultivation was linked to variations in soil types as well as the operation of human dominated systems, with environmental and human elements being argued to have been linked in non-linear complex systems, or abstract-machines, which were not determined by any one set of elements. The relationship of the continuity and change in cereal cultivation systems seen at the scale of regions and of settlement types in this chapter was also tied in to variations in other elements of the food production and consumption system. The next chapter will therefore examine variation in animal husbandry using the same regional case studies and addressing the same scales of system organisation.

6 ANIMAL HUSBANDRY

6.1 Introduction

This chapter is designed to complement Chapters 5 and 7 by providing a regional and settlement scale analysis of animal husbandry and meat consumption in Southern England, focusing on the three regional CSAs outlined in Chapter One. Three related hypotheses, reprising those of the broader thesis (chapters 1 and 2) are advanced in the chapter. The first is that animal husbandry/consumption was regionally distinct and that there were considerable continuities of practice, as well as differences across the major period divisions from the MBA to the end of the EMED period. The second is that there were distinct patterns of animal husbandry and meat consumption, of both game and domesticated species at different settlement types in the different regions and that sometimes these were related to social status. The third is that regions, urban centres and settlements operated as non-linear complex systems or abstract-machines at different scales. Section 6.2 investigates regional patterns in animal husbandry and meat consumption, starting with an analysis of the UTV, followed by the MLTV and finishing with the route of HS1. Section 6.3 compares the regional husbandry/consumption patterns for the Thames Valley and HS1 as a whole. Section 6.4 investigates the same patterns at settlement level, contrasting different kinds of settlement within and between CSAs. In section 6.5 the analysis of variation in animal husbandry and meat consumption by site type is compared for the whole of the Thames Valley and the route of HS1 and finally section 6.6

provides a brief summary and conclusions. The following analysis is based upon a database of 474,156 animal bone fragments (NISP) from 582 sites.

6.2 Regional patterns in animal husbandry

6.2.1 Animal husbandry in the Upper Thames Valley 1500BC-AD1086

Variations in animal husbandry, like those in cereal cultivation, were shared between the CSAs, but also distinctively different in some respects. The differences are represented here as subtle variations in proportions of major domesticates (cattle, sheep/goat and pig) and minor domestic and wild species (Figs. 6.1 & 6.2).

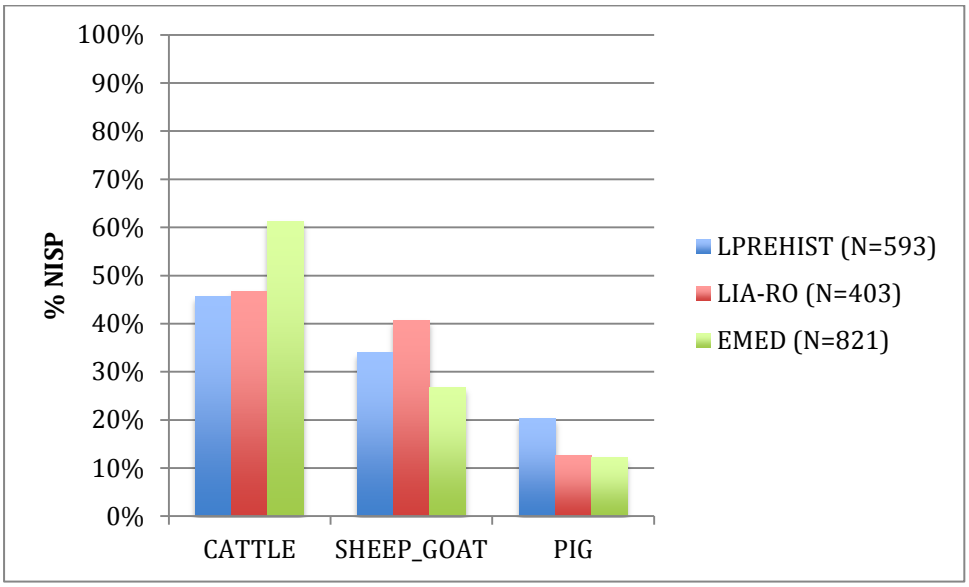


Figure 6.1: Major domesticates in the UTV by % NISP.

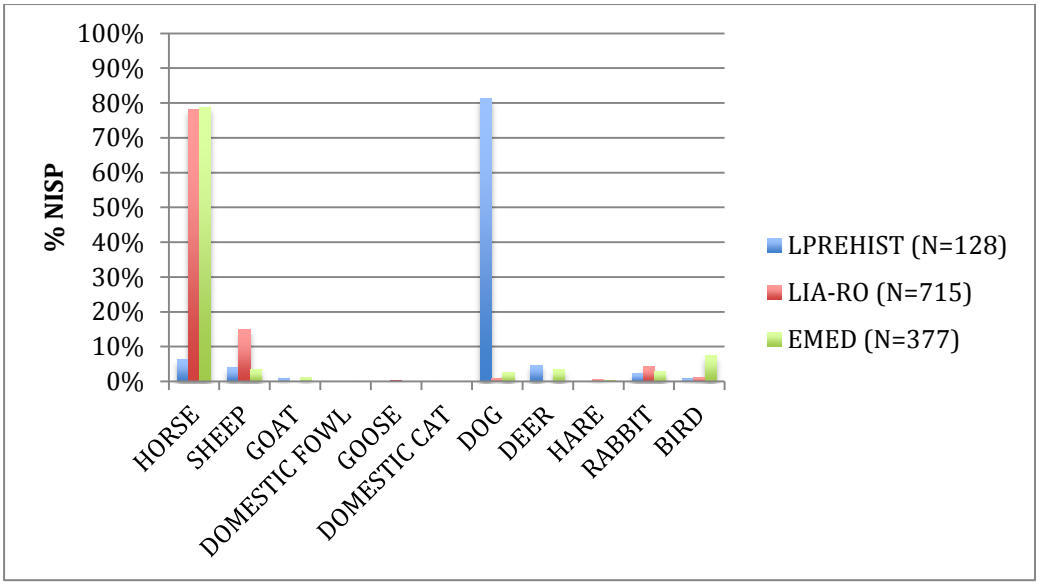


Figure 6.2: Other animal species in the UTV by % NISP.[1]

In the UTV in the later prehistoric period cattle were the dominant domesticates (Fig. 6.1) at just over 40% of NISP, with sheep/goat at just over 30% and pigs relatively high at 20%. However, it should be borne in mind that this dominance of cattle is probably exaggerated by the use of NISP, which tends to over emphasise the larger species (O'Connor 2003, 135-6). This species breakdown is in contradiction to the normal pattern for Wessex, in which sheep/goat is dominant (Hambleton 2008, 41), but is to be expected for lower lying gravel terrace environments (Sharples 2010, Rippon et al. 2015, 78), such as those incorporating the UTV sites. The relatively high proportion of pigs is distinctive to the UTV CSA, being much higher than that seen in the MLTV and slightly higher than that seen on the route of HS1. Higher proportions of cattle are to be expected on the sands and gravels of the river terraces (Rippon et al. 2015, 78), but the relatively high proportions of sheep/goats and pigs may also be partially

[1] The presence of rabbit bones in all three datasets from later prehistory is anomalous as rabbits are thought to have been introduced after the late 11th century. Hambleton (2008, 29) argues that pre 11th century rabbit remains must therefore be intrusive; however, the number of rabbit bones in the thesis database remains intriguing.

a result of taphonomic factors, as later prehistoric settlement on the UTV gravels tended to be open with fewer ditches and more pits, which would afford the preservation of bones from smaller species (Figs. 4.2 and 4.3). In later prehistory dog dominated the minor domesticates, with very few horses or wild animals. Evidence of butchery on dog bones (Hambleton 2008, 75; Lambrick & Robinson 2009, 155-6) suggests that dogs may have been eaten and dog consumption may therefore be seen as a distinctive practice of the UTV region, an idea that is backed up by the spatial distribution of dog bone (Fig. 6.3).

In the LIA-RO period cattle remained the dominant major domestic animal in the UTV, with a slight increase in overall NISP, but sheep/goat increased relative to cattle at the expense of pig (Fig 6.1). This pattern is regionally distinctive contrasting strongly with the MLTV and is unexpected in the context of lowland Roman Britain, where cattle and pig are generally seen to increase at the expense of sheep/goat (Rippon et al. 2015, 78, Cool 2006, 80, King 1999, 180). Furthermore this pattern seems unlikely to be the result of sample bias, as enclosed settlements and therefore ditches, good for the preservation of larger cattle bones, increased in this period (Figs. 4.2 and 4.3). Minor and wild species were dominated by horse with very few wild animals. The UTV has been argued to have been a horse breeding region in later prehistory (Lambrick and Robinson 2008) and if so it is possible that this pattern continued into the LIA-RO period.

EMED animal husbandry in the UTV was dominated by cattle, which increased as a proportion of major domesticates to 61% by NISP, mostly at the expense of sheep/goat and despite a return to more open settlement and a decline in the

number of ditches (Figs. 4.2 and 4.3). Proportions of pig bone were only marginally lower than they had been in the LIA-RO period at 12% of NISP. Among the minor domestic and wild species horse remained dominant and there were few wild animals. Nevertheless, the profile of major domesticates seen in the UTV in this period fits into broader regional patterns (Holmes 2015, Hamerow 2012, 155-7) and the dominance of cattle can be related to the dominant soils. The changes in species in this period were more extreme than in previous periods. This pattern fits with changes in cereal cultivation, suggesting the possibility of important changes in the food production/consumption system. Such a change is generally interpreted in terms of a cultural shift, or change in population in the 5th century (Hamerow 2012, 149-50, Rippon et al. 2015, 7). However, the significant changes may not have taken full effect until the MAS-LAS, suggesting a longer-term transformation (Hamerow 2012, 155-6).

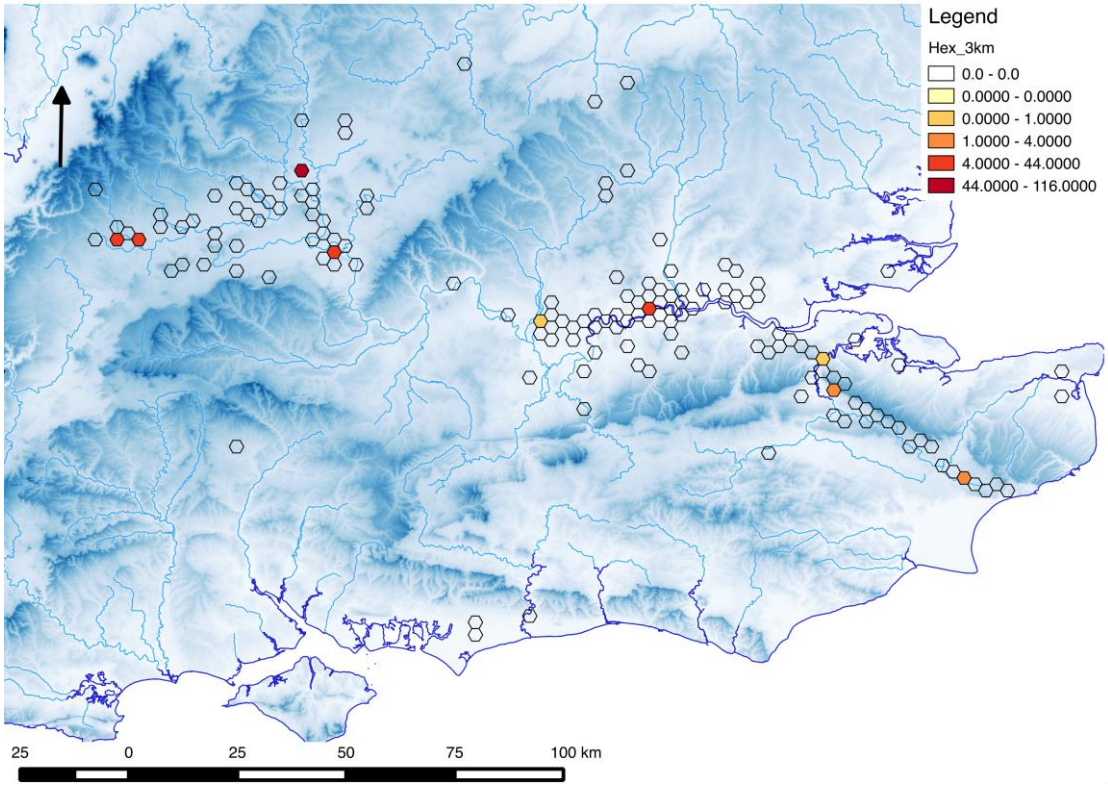


Figure 6.3: Later prehistoric dog bone distribution in all three case studies (NISP summed by 3km hexbin).

6.2.2 Animal husbandry in the Middle and Lower Thames Valley 1500BC-AD1086

Regional patterns of animal husbandry in the MLTV, although sharing broad parameters with the other two case studies were very different in proportions of major domesticates (Figs. 6.4 & 6.5).

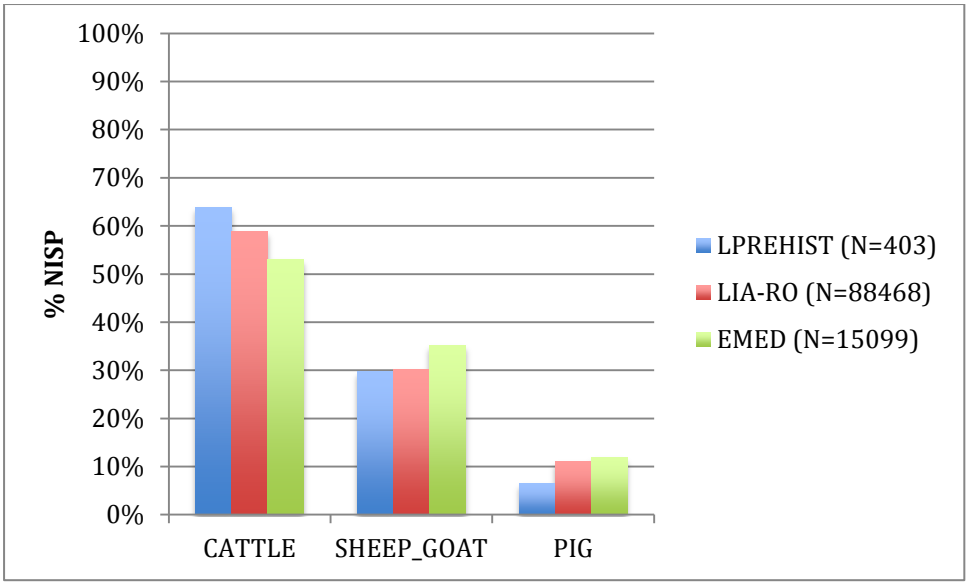


Figure 6.4: Major domesticates in the MLTV by % NISP.

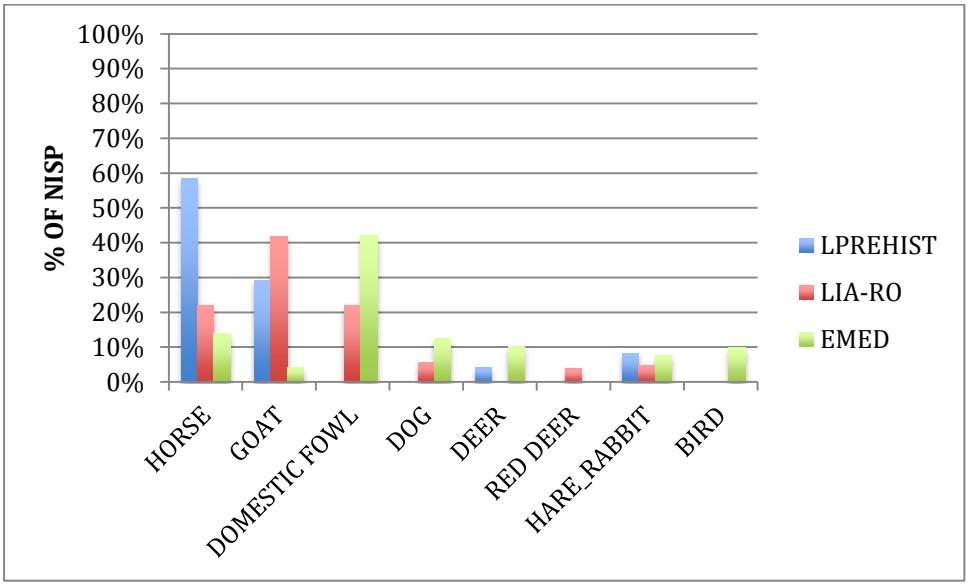


Figure 6.5: Other species in the MLTV by % NISP.

These patterns are likely to be a result of the interaction of the MLTV geology, particularly the relative importance of river terrace sands and gravels and London clay and the lack of accessible chalk uplands, with human dominated systems, including increased connectivity with the eastern regions of England and the related presence of the Roman and MAS-LAS urbanism. In the later prehistoric period cattle were by far the dominant major domesticate by NISP at 64%, with sheep/goat accounting for 30% and pig less than 10%. This kind of

pattern is fairly typical of the eastern regions of England in this period (Sharples 2010, Hambleton 2008, 41, Champion 2011, 174), representing a mixture of local geological and cultural factors. Nevertheless, it should also be noted that later prehistoric contexts and site types in this CSA were quite ditch heavy (Fig. 4.8), offering good opportunities for the preservation of larger cattle bones. Minor domesticates in this phase were dominated by horse, with few wild species and no dogs, in marked contrast to the UTV.

In the LIA-RO period the major domesticates in the MLTV continued to be dominated by cattle (59%) (Fig. 6.4), at the expense of sheep/goat (30%) and pig (11%) although the relative importance of cattle had declined since the later prehistoric period entirely in favour of pig. This pattern may derive partly from increased pig consumption in Roman London, as Roman urban contexts often show evidence for relatively high levels of pig consumption (Cool 2006, 80; King 1999, 180). Patterns in minor and wild species saw a decline in the relative importance of horse in contrast to the pattern in the UTV, but also relatively high proportions of domestic fowl, which, like the higher proportions of pig, is a consequence of Roman urbanism. Wild species and dogs made up a small proportion of the assemblage. Sample bias and taphonomic factors seem to have had little distorting effect on this breakdown of species, as most sites in the CSA were made up of pit and ditch scatters (Fig. 4.8), which would arguably preserve more bones of the smaller species.

Interestingly the EMED assemblage from this region is the least cattle dominated (53%) of all three periods in marked contrast to that from the UTV. Sheep/goat

(35%) and pig (12%) were all more important in the EMED period than they had been in the previous period, with pigs representing a higher share of NISP than they had done in either prehistory or the LIA-RO period. This pattern is seen in other studies of animal bones from contemporary contexts in eastern England (Holmes 2015) and argued by some to be related to the development of Anglo-Saxon culture (ibid.). However, part of the explanation for this pattern in the MLTV CSA probably relates to the presence of the MAS and LAS urban abstract-machine in London, and EMED pig bone in the region is most intensively distributed in precisely this region (Fig. 6.6). Minor and wild species were dominated by domestic fowl, with dogs and wild species including deer also relatively important. Given the dominance of cattle bone in this assemblage it might be argued that sampling bias has not had a major impact on the pattern, as context and site types were dominated by structural evidence, including postholes, and floor surfaces, neither of which would be biased towards preserving larger animal bones.

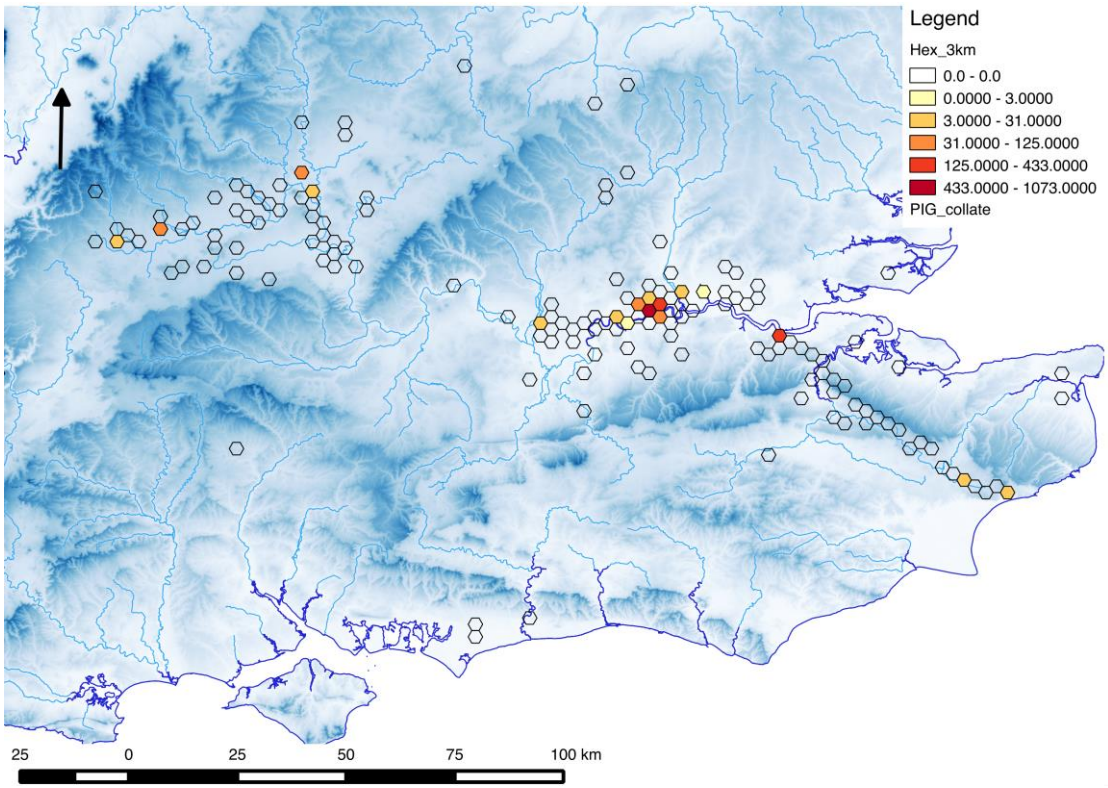


Figure 6.6: EMED pig bone in all three CSAs (NISP summed by 3km hexbins).

6.2.3 Animal husbandry on the route of HS1 1500BC-AD1086

Patterns of animal husbandry on the route of HS1 like that in the Thames Valley case studies followed a regionally distinct pattern whilst also sharing some broad characteristics (Figs. 6.7 & 6.8).

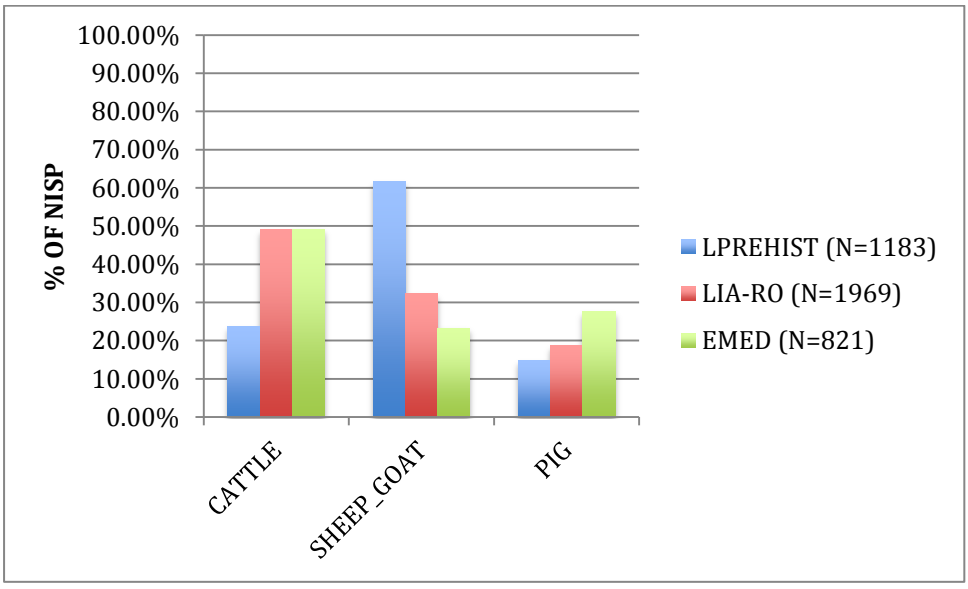


Figure 6.7: Major domesticates on the route of HS1.

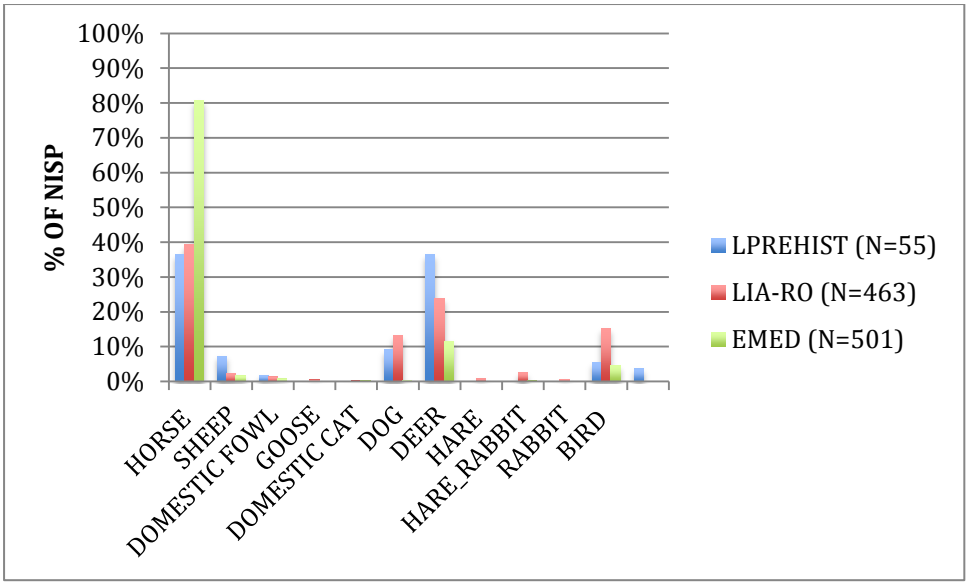


Figure 6.8: Other animal species on the route of HS1.

Like patterns in cereal cultivation this is likely to have been the result of topography and soils to a certain extent (Rippon et al. 2015, 78-79). However, it is also likely to have been the result of the interaction of these geological conditions with the distinctive nature of regional food production/consumption systems. In the later prehistoric period the major domesticates were dominated by sheep/goat, which accounted for >60% of NISP; this distinctive regional pattern is in sharp contrast to the Thames Valley CSAs and contradicts the pattern for Eastern England as a whole (Hambleton 2008, 41, Champion 2011, 174), in which cattle dominate assemblages. This sheep/goat dominance may be partially explained by the fact that the route of HS1 crosses the North Downs, an area of chalk upland unusual in Eastern England. Pig bone also formed a relatively high proportion of the assemblage: although not as high as in the UTV CSA, pigs formed a much higher percentage than they did in the MLTV in the equivalent period. The importance of pig is also partially explicable by reference to areas of woodland on the slopes of the North Downs and in the Weald (Champion 2011, 173), although these ecological factors may have interacted

with cultural preferences to create a particular trajectory of consumption. Minor and wild species were dominated by horse and deer, with wild species in general being more important than in the other case studies.

In the LIA-RO period the sheep/goat dominance of later prehistory was reversed with cattle now accounting for nearly 50% of major domesticates, a pattern more in line with expectations for lowland Roman Britain (Rippon et al. 2015, 78), which with increased proportions of wheat (5.2.1.3) shows the effects of the introduction of the Roman economic abstract-machine. Pigs as a proportion of major domesticates increased from prehistory, which may also be an effect of changes wrought by the introduction of Roman economic systems and particularly the presence of villas at Northfleet and Thurnham. Horse and dogs continued to be important among the minor and wild species, along with deer. Wild species seem to have formed a greater component of the LIA-RO assemblage than they did in the Thames Valley CSAs and this perhaps relates partly to sample bias in the CSA, with a more wooded landscape and villa estates that were more likely to consume game than other settlements (Allen 2014, 177).

In the EMED period changes in animal husbandry patterns were not as dramatic as those seen in the UTV, with cattle as a proportion of major domesticates remaining at a similar level to that seen in the LIA-RO period and sheep/goat declining in favour of pig, with pig now dominant over sheep/goat. This increase in pig fits into a wider pattern seen in Eastern England in this period, which has been explained with reference to the introduction of Anglo-Saxon foodways

(Holmes 2015) (2.3.3); however, the fact that the EMED pig distribution clusters towards the southern end of the route of HS1 in the Weald (Fig. 6.6) suggests that environmental conditions, perhaps including larger areas of woodland (Champion 2011, 171) were interacting with the human dominated aspects of the system to create this effect. Horse and deer continued to be important among the minor and wild species in the EMED period and this importance of game as in the LIA-RO period is distinctive to the CSA, emphasising the importance of regional continuity.

6.3 Animal husbandry in the Thames Valley and on the route of HS1 compared 1500BC-AD1086

As with cereal cultivation there were regional differences as well as temporal continuities in all three CSAs and these continuities and differences seem to mirror those in cereal cultivation to a degree. Once again the greatest regional differences were present in the later prehistoric period and the greatest similarities in the LIA-RO period (Tables 6.1 & 6.2). As with cereal cultivation the EMED period in the Thames Valley saw the greatest changes in the relative numbers of different species, but the route of HS1 saw less significant change. Temporal continuities within the UTV and HS1 regions tend show up in the consumption of minor and wild species rather than proportions of major domesticates, although the reverse was true in the MLTV and some combination of the three major domesticates remained dominant in all three CSAs through time. Unlike the charred grain dataset, animal bone assemblages from all three

CSAs are extensive and derive from more than one site, so that a great deal of confidence can be placed in them.

Table 6.1: Major Animal species (% NISP) by period and CSA.

	Later Prehistory	LIA-Roman	Early Medieval
UTV	Cattle 46% Sheep/Goat 34% Pig 20%	Cattle 47% Sheep/Goat 41% Pig 20%	Cattle 61% Sheep/Goat 27% Pig 12%
MLTV	Cattle 64% Sheep/Goat 30% Pig 6%	Cattle 59% Sheep/Goat 30% Pig 11%	Cattle 53% Sheep/Goat 35% Pig 12%
HS1	Cattle 24% Sheep/Goat 62% Pig 15%	Cattle 49% Sheep/Goat 32% Pig 19%	Cattle 49% Sheep/goat 23% Pig 28%

Table 6.2: Minor Animal Species* (%NISP) by period and CSA.

	Later Prehistory	LIA-Roman	Early Medieval
UTV	Dog 81% Horse 6% Deer 5% Rabbit 2%	Horse 78% Rabbit 4%	Horse 79% Bird 7% Deer 3% Rabbit 3% Dog 3%
MLTV	Horse 58% Hare/Rabbit 8% Deer 4%	Horse 22% Domestic Fowl 21% Dog 6% Hare/Rabbit 5% Red Deer 4%	Domestic Fowl 42% Horse 14% Dog 13% Deer 10% Bird 10% Hare/Rabbit 8%
HS1	Horse 36% Deer 36% Dog 9% Bird 5% Domestic Fowl 2%	Horse 39% Deer 24% Bird 15% Dog 13% Hare/Rabbit 3% Domestic Fowl 1%	Horse 81% Deer 12% Bird 5%

* Species contributing <1% are not shown.

In later prehistory the balance of major domesticates in the CSAs was quite different; the dominant species in each case seeming to be favoured by the environment in the region. However, the relative abundance of pigs seems to be less strongly related to environmental conditions in later prehistory. Pigs were

more common in the UTV than on the route of HS1 and very much less common in the MLTV than in either of the other two regions. However, pollen sequences taken during the course of the HS1 fieldwork suggest that the later prehistoric environment included extensive areas of woodland (Champion 2011, 171), which would have been favourable for pig husbandry, while the dominant soils for the two Thames Valley CSAs were very similar. Environmental aspects of the systems therefore seem to have been dominated by human ones at certain points. Later prehistoric contrasts in minor and wild species seem to suggest that the route of HS1 was more favourable for game than the Thames Valley CSAs, with wild species more common on the route of HS1 than in the Thames Valley, and this may have been more influenced by woodland cover. Another contrast is the difference in abundance of dogs in the record, which would seem to relate to a specific cultural preference for the butchery and deposition of dogs in the UTV (Fig. 6.3).

In the LIA to RO period animal husbandry practices seem to have undergone a degree of homogenisation similar to that seen in cereal cultivation, with cattle becoming dominant on the route of HS1 and remaining dominant in the Thames Valley. Cattle husbandry requires a greater degree of organisation than the cultivation of either sheep/goat or pig, which can be left to browse in woodland and on upland pasture more freely, and this homogenisation can therefore be seen as linked to the organisational properties of the Roman abstract-machine, albeit operating with ecological conditions inherited from later prehistory. However, as in cereal cultivation there was continuity among the more minor species, with wild animals continuing to be more important on the route of HS1

than in the Thames Valley. This regional contrast in the prevalence of wild animals in the faunal record as well as relating to variations in woodland cover between the Thames Valley and HS1 may also relate to variations in social status between the inhabitants, as wild animal remains are more commonly found at villas and military sites (Allen 2014, 177) and the majority of Thames Valley settlement within the CSAs is either relatively low status and rural, or urban.

Contrasts were also apparent in the early medieval period. The balance of the three major domesticates was subtly but significantly different in each of the three regions. In the UTV there was a significant shift from sheep/goat to cattle, with a very slight decline in pig, whereas in the MLTV the shift between cattle and sheep/sheep-goat was in the opposite direction, while pigs increased slightly. On the route of HS1 there was a decline in sheep/goat, while the numbers of cattle appeared to remain approximately the same, but the increase in pig was much steeper than in the Thames Valley CSAs. Overall this adds up to an approximately 10% difference in cattle between the west of the study region and the east, with cattle being higher in the west. Conversely there was a 16% difference in pig NISP between east and west, with the greater numbers this time being found in the east. An emphasis on cattle and pig in the eastern regions of England has been interpreted as the signature of specifically Anglo-Saxon eating habits (2.3.3) (Holmes 2015); however, the contrast between cattle and pig in the dataset gathered for this thesis complicates this picture. It may therefore be better to think of the pattern as a result of the interaction of long-term production/consumption practices and the environment, with soils (Rippon et al. 2015) and woodland (Champion 2011) both playing a role. There was also

subtle variation between the CSAs in minor and wild species with the UTV and the route of HS1 having high levels of horse and the MLTV showing larger numbers of domestic fowl than the other two. Numbers of deer and wild bird appear to have been greater on the route of HS1 and in the MLTV. The importance of domestic fowl in the MLTV relates to the presence of the urban abstract-machine in London. The emphasis on wild animals toward the east of the study region reflects a similar pattern to that seen in the LIA-RO period and is again likely to relate to a mixture of factors including environmental ones, although in this period differences in the status of settlements would not seem to be so pertinent. Having examined the evidence for regional patterns of animal husbandry across the CSAs the next section will move on to analyse differences in animal husbandry at different types of site, both within and between regions.

6.4 Animal husbandry at settlement level: variations between different kinds of site

6.4.1 Introduction

Having examined animal husbandry at a regional level, the following section investigates variations in the distribution and consumption of animal species. Analysis of variation in animal bone assemblages between different classes of settlement in England has proved fruitful in the past, with significant variations in consumption of species having been revealed in major studies of later prehistoric, Roman and medieval settlements, for example, (Hambleton 1999, 2008; Holmes 2011; King 1989, 1991, 1999; Poole 2013a, 2013b). The

methodology adopted in this thesis for classifying settlements by type and for quantifying the variation in animal bones by site type is discussed above (3.2.2; 3.3.2) and the former is summarised in Chapter 5 (5.4.1).

6.4.2 Animal husbandry on unenclosed, enclosed and complex settlements in the Upper Thames Valley

6.4.2.1 Introduction

The analysis in this section follows the methodology used in the regional analysis (6.1). For the analysis of the UTV data individual sites known to be of a particular type were extracted from the animal bone table by Filemaker query, rather than using the EngLaId site type thesaurus, in order to avoid the overlap in sites of different date created by the former method (3.2.2; 5.4.2.1).

6.4.2.2 Upper Thames Valley unenclosed settlement

In the UTV the ratio of major domesticates at unenclosed settlements (Fig. 6.9) remained remarkably stable, being dominated by cattle in a reflection of the regional pattern (6.2). However, there were subtle differences in the ratios of cattle to sheep/goat and pig over time.

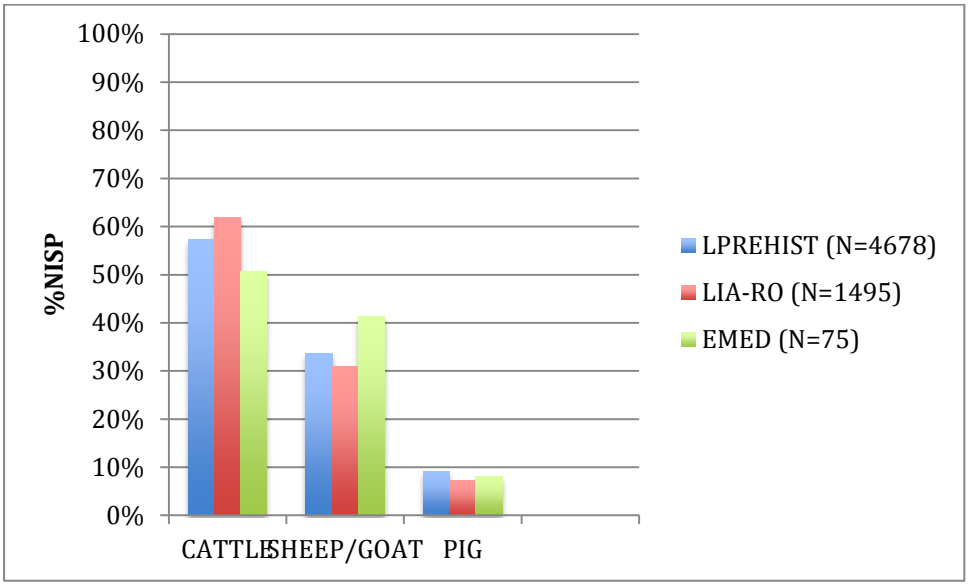


Figure 6.9: Major domesticates from unenclosed settlements in the UTV.

Interestingly the ratio of cattle to the other main domesticates seems to have been higher at unenclosed settlements than in the CSA as a whole.

For the later prehistoric period, cattle (57%) from unenclosed settlements are nearly twice as abundant by % NISP as sheep/goat (32%), with pig accounting for just under 10% of major domesticates. As with the regional UTV pattern this does not reflect the composition of IA domestic animal bone assemblages in Hambleton's Central Southern England CSA (1999, 87-88 2008, 41-45), which are sheep/goat dominated, or in her UTV and surrounds CSA, in which proportions of cattle and sheep/goat are evenly balanced (ibid.). There are also significant differences in the ratio of cattle to sheep/goat at Hambleton's unenclosed sites from Central Southern England and the UTV and the data from unenclosed sites in the UTV collected for this thesis, with sheep being significantly more abundant than cattle in the former dataset (ibid.). The reasons for the differences in these results are no doubt partly related to the dominance of sand and gravel on the river terraces of the Thames (Rippon et al. 2015) (6.2),

and differences in ecological conditions may be reflected in the choice of sites in each CSA, with the datasets from the UTV CSA for this thesis being restricted entirely to gravel terrace sites, but Hambleton's case study including sites situated on other geologies. However, Hambleton's (1999, 2008) argument that sheep were more common on unenclosed sites would fit with the argument put forward in Chapter 5 that settlement boundaries and wheat were associated with settlement status in the region in later prehistory; if sheep are viewed as a less desirable for feasting than cattle and if Robb's (2014 , 144–45) argument that cattle are more likely to be consumed during large scale communal feasts is accepted. In this case the overall pattern, like that in the wider region is best seen as the result of the interaction of human dominated systems and environmental systems.

In the LIA-RO period the abundance of cattle (62%) in the assemblage from unenclosed sites was over twice that of sheep/goat (31%), although the proportion of sheep/goat had increased slightly from the later prehistoric period in line with the regional pattern and sheep/goat formed a greater proportion of the assemblage in this period than in either later prehistory or the early medieval period. Pig accounted for 7% of the LIA-RO assemblage from unenclosed sites, lower than in either the later prehistoric or early medieval periods. The LIA-RO assemblage from unenclosed settlements reflects the broader regional pattern and can be accounted for by the arguments put forward above (6.2), concerning the development of Roman agrarian/economic systems in Britain (Cool 2006; Rippon et al. 2015, 81-85). However, as in the later prehistoric period the pattern contradicts to some degree those observed by

King for rural settlements in Roman Britain (1989, 1991, 1999), in which rural settlements tend to have a higher abundance of sheep/goat than other types of site. This may be due to the proximity of the UTV CSA sites to the river, as King (ref) acknowledges that sites in these environments tend to have a higher abundance of cattle. Again high sheep/goat abundance at unenclosed sites in the UTV would have strengthened the arguments advanced in Chapter 5 regarding the association of wheat with bounded sites and barley with unenclosed sites. However, cattle appear to have been the preferred choice of meat at these settlements, suggesting that in this particular case local conditions, perhaps including the environment were influencing production/consumption.

In the early medieval period cattle (51%) remained more abundant than sheep/goat (41%), but had declined substantially as a proportion of the assemblage from the LIA-RO period. The proportion of the assemblage taken up by sheep/goat was, substantially higher than in either of the preceding periods. The abundance of pig (8%) was very similar to the preceding periods, being slightly higher than in the LIA-RO period and slightly lower than in the later prehistoric period in a pattern similar although not identical to the regional picture (Fig 6.1), but contradicting the national pattern in this period (Holmes 2015). Overall these patterns do not contradict those found in other large-scale studies of contemporary faunal material to the same degree as those for the other periods. However, it should be borne in mind that unenclosed settlements were restricted to the EAS in this CSA and the data therefore reflect a chronological bias. Evidence gathered by Holmes indicates that lower status rural sites were characterised by greater abundances of sheep/goat than higher

status sites, although cattle still seem to have accounted for 40% or more of assemblages at these settlements (Holmes 2011, 487, Fig. 4.43). However, cattle from the UTV CSA are still considerably more abundant than this and an explanation for this contradiction may, as in the two preceding periods, relate to the extreme proximity of the sites in the thesis database to the River Thames, with the local interaction of environmental and human dominated systems continuing to creating different patterns to the those seen in the broader picture.

Despite the contradictions between wider studies of faunal assemblages for all three time periods and the data gathered for this thesis there seems to be a consistency in the pattern of abundance of major domesticates across all three periods in both the thesis datasets and the wider faunal assemblages, indicating that these patterns arose from the interaction of humans with the local ecosystems of which they formed part and not being particularly strongly influenced by either supra-regional patterns, or by temporal changes in the organisation of social/economic systems such as those introduced by the Roman Empire. Additionally, the choice of species may have related to the number of people requiring to be fed and the amount of feasting involved, so that cross cultural factors such as meat weight may have been influential in determining the way that social status was expressed, perceived and reproduced.

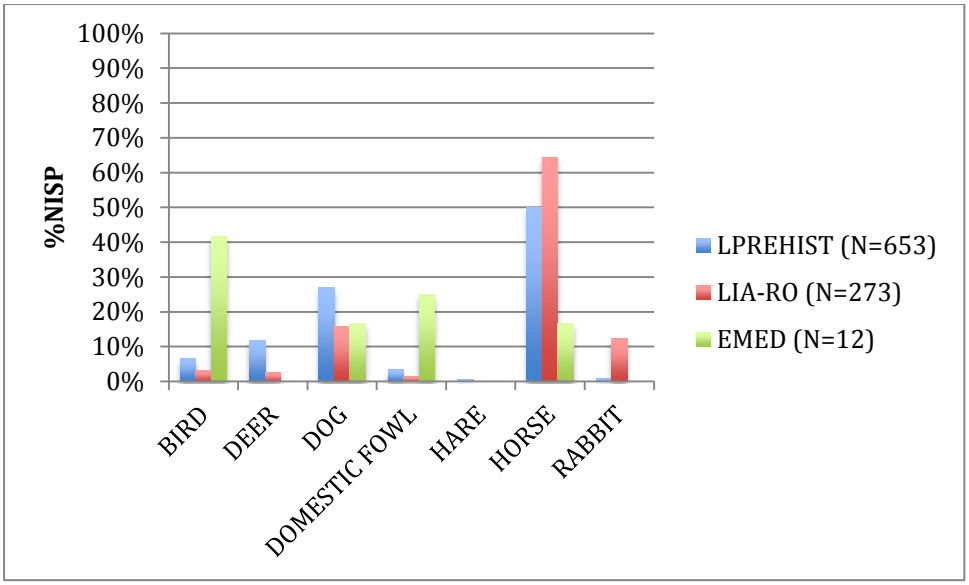


Figure 6.10: Other animal species from unenclosed settlements in the UTV.

An examination of minor domesticates and wild species from unenclosed sites in the UTV (Fig. 6.10) reveals much more temporal variation than that seen in the major domesticates and, in this, agrees with the regional pattern (Fig. 6.2). In the later prehistoric period the assemblage was dominated by horse (50%), with dog (27%) and deer (12%) also relatively abundant. Wild birds accounted for 7% of the assemblage, with the remaining species all accounting for <5%. This pattern is different to the regional pattern in many ways, with a much greater emphasis on horse and deer and less abundance of dog, although in general the abundance of wild species was similar, being low. The relationship of the dominant species to site status is not particularly clear-cut, with deer in particular being associated in later periods with high status consumption. The abundance of dog, although relatively high, is less than half of that of the regional assemblage, leading to the suggestion that use of dogs may have been associated with status.

In the LIA-RO period horse (64%) became even more dominant and dog declined to 16% of the assemblage, with rabbit accounting for 12% and domestic fowl

<5%. Wild species including deer, hare and wild bird all at <5% were less abundant than in later prehistory. This pattern, with the exception of dog and rabbit is more similar to the regional picture (Fig. 6.2) than the previous period and the relative lack of domestic fowl may be argued to reflect a low status pattern of consumption. The percentages of dog at these sites may reflect continuity from the IA in consumption, or at least deposition of dog carcasses. The early medieval minor and wild species assemblage comprised 12 bones and is too small for analysis.

6.4.2.3 Upper Thames Valley enclosed settlement

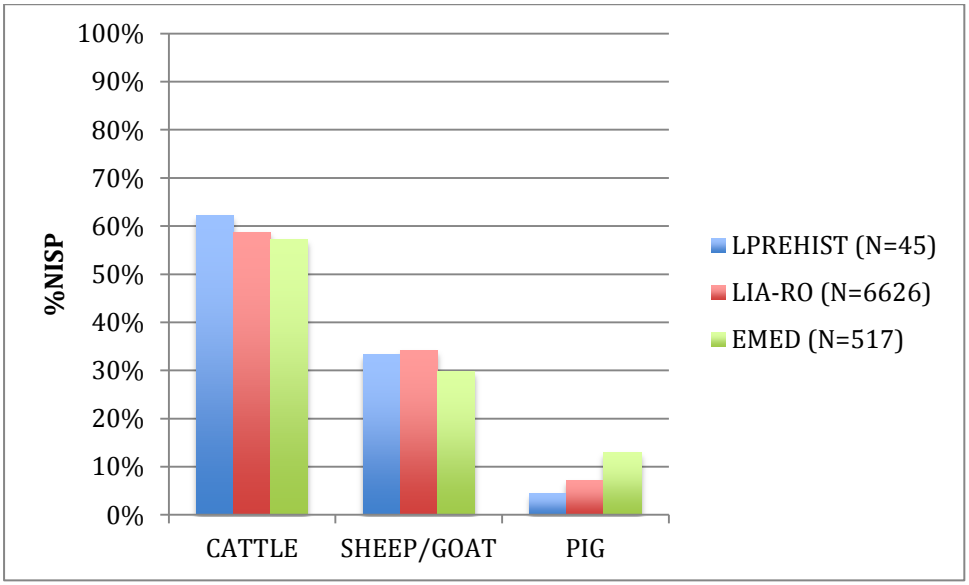


Figure 6.11: Major domesticates from enclosed settlements in the UTV.

Major domesticates from enclosed sites in the UTV (Fig. 6.11) were dominated by cattle across all three periods, in contradiction of standard models for rural sites in Southern England (Hambleton 2008; Holmes 2015; King 1989). However, ratios of cattle to sheep/goat were slightly higher on enclosed sites than on other settlement types, particularly in the early medieval period. In the later prehistoric period cattle (62%) were around twice as abundant as

sheep/goat (33%), but pig (4%) was relatively scarce. As with unenclosed settlements these proportions are both contradicted and supported by the evidence from Hambleton's research (1999, 87-88), which shows lower ratios of cattle to sheep/goat for Central Southern England and the UTV but higher proportions of pig (ibid. p. 56) at open sites than enclosed sites in the UTV region. In terms of high status consumption the slightly higher proportions of cattle at enclosed sites might be seen to link these settlements to more wealth, more feasting (Robb 2014 , 144–45) and more commensal politics (Dietler 2001); however, the relatively low abundance of pig contradicts this to some extent. Taphonomic factors must also be a consideration, with more ditches available for the deposition of large portions of cattle carcasses at enclosed sites than at unenclosed sites, meaning that there was more opportunity to dispose of cattle bone in a way that would ensure its survival in the archaeological record.

In the LIA-RO period the ratio of cattle (59%) to sheep/goat (34%) was slightly lower than it had been in the later prehistoric period, but cattle were still close to twice as abundant as sheep/goat. Pig (7%) was more common than it had been in the later prehistoric period. These abundances are very similar to the pattern for the UTV as a whole in the same period (Fig. 6.1) and not hugely dissimilar to the pattern for unenclosed settlements (Fig 6.9), although in contradiction to the later prehistoric pattern, abundance of cattle is slightly lower than at unenclosed sites and abundance of sheep/goat slightly higher. The ratios of cattle to sheep/goat from these settlements are again in contradiction to the expected pattern from Roman rural settlements, which King describes as having lower average cattle and pig percentages than higher status sites, such as towns and

forts (King 1999, 180). These patterns are explained by King in terms of ethnicity and social status (ibid.), with high status and military status having similar faunal profiles. However, in the case of the UTV, high cattle percentages at both unenclosed and enclosed sites seem to be a long-term pattern linked both to local ecological systems and human ways of life, with the similarity between unenclosed and enclosed settlements and the regional pattern being compounded by the operation of the Roman economic machine, which promoted the production/consumption of cattle at a large scale across Southern England.

In the early medieval period the abundance of cattle (57%) and sheep/goat (30%) at enclosed sites was lower than in the later prehistoric and LIA-RO periods, but pig (13%) contributed much more to the assemblage. The ratio of cattle to sheep/goat is different to that seen for the region as a whole, with slightly less cattle and slightly more sheep/goat, but the percentage of pig is very similar. The patterns from enclosed early medieval sites contrast more strongly with unenclosed sites (Fig. 6.9) than was the case in the earlier periods. In the early medieval case these patterns conform more strongly to expectations of higher percentages of cattle and pig being associated with enclosures. However, the patterns are again complicated by taphonomic factors, as at the settlement at Yarnton, which is one of two key early medieval sites for the UTV, ditched enclosures were restricted to the MAS and LAS, introducing a temporal element to the patterning. Additionally, the absence of ditched enclosures from EAS settlement England is widespread (Hamerow 2012, 70-72). The proportions of major domesticates from enclosed early medieval settlements are more in line with national patterns than those of the earlier periods, with a high proportion of

pig fitting with Holmes' (2015) argument that high proportions of cattle and pig are a feature of Anglo-Saxon assemblages. However, it should be born in mind that in the Roman Period the same signature is argued to represent Gallic/Germanic communities (King 1999, 182), and in this case the relatively low proportion of cattle may suggest that the pattern again relates more to local ecological conditions, combined with the operation of long-term agricultural practices.

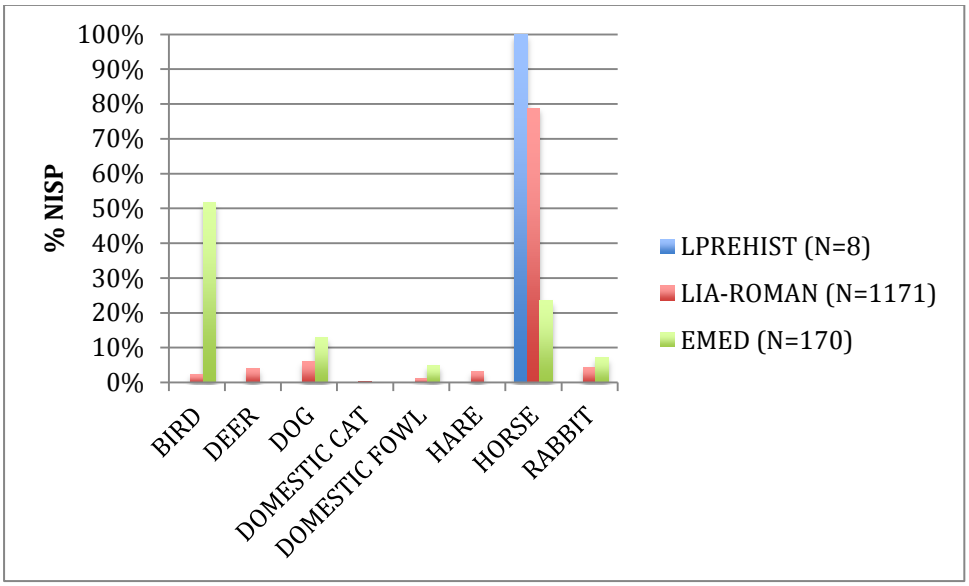


Figure 6.12: Other animal species from enclosed settlements in the UTV.

The abundance of minor domesticates and wild species from enclosed sites in the UTV (Fig. 6.12) was similar to that at unenclosed (Fig. 6.10) sites in being more chronologically varied than the distribution of major domesticates and in this sense it also echoes the regional pattern (Fig. 6.2).

The later prehistoric assemblage comprised 8 horse bones and is therefore too small for further analysis. In the LIA-RO period the assemblage was dominated by Horse (79%), with dog contributing 6% and all other species including domestic fowl representing < 5%. As at unenclosed settlements these

proportions closely reflect the regional picture in the UTV. Comparison to unenclosed settlements of the same period reveals some differences, principally a greater abundance of horse, fewer dogs and fewer wild species, with the percentage of domestic fowl being very similar. These differences do not seem likely to be linked to status, as the enclosed sites have lower proportions of game animals, than the unenclosed sites, in a distribution opposed to the expected pattern (Allen 2014, 177). Indeed the higher proportions of horse at enclosed sites may be linked to taphonomic factors in the same way as higher percentages of cattle at the same sites, with ditches providing more opportunities for larger bones to enter the archaeological record. The major difference between unenclosed and enclosed sites lies in the proportion of dogs, with unenclosed sites having a noticeably higher proportion than enclosed sites. Again the reasons for this pattern do not seem likely to link to social status, but are perhaps associated with the differential preservation of regional traditions at different kinds of settlement.

The early medieval assemblage comprising 170 fragments is small and should be treated with caution. It is also problematic to compare this assemblage to that from unenclosed sites, which only comprised 12 fragments and was therefore not analysed. However, it is probably worth noting that the patterns generated by both kinds of site are quite similar. Early medieval minor domestic and wild species from enclosed sites were dominated by wild bird (52%), with horse (24%) and dog (23%) also making up a substantial percentage. Rabbit accounted for 7% and domestic fowl 5%. The remaining species all represented <5%. These patterns were considerably different from the regional UTV pattern (Fig. 6.2),

being much less dominated by horse and having a much higher proportion of wild animals, particularly birds, but also domesticates such as dog. The early medieval assemblage is also quite different from assemblages at enclosed sites in the preceding LIA-RO period, again with a far higher proportion of wild animals. These patterns are therefore more in line with expectations, as wild animals are also associated with high status in the early medieval period (Sykes 2011, 340-42), although they may also partly be an effect of small sample size.

6.4.2.4 Upper Thames Valley complex settlement

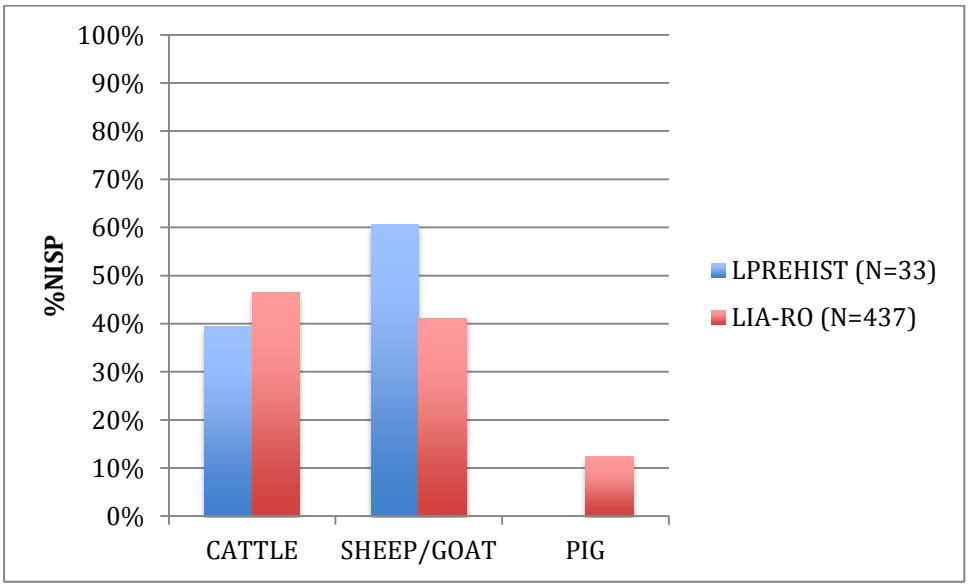


Figure 6.13: Major domesticates from complex settlements in the UTV.

The ratios of major domesticates at complex settlements in the UTV were more temporally varied and demonstrated different patterns to those from unenclosed and enclosed sites; however, the data are based on small samples (Fig. 6.13) and no early medieval material is present. The NISP from later prehistoric contexts (N=33) is too small for meaningful analysis, but that from LIA-RO contexts seems to mirror the regional breakdown of species closely (Fig 6.1). In the LIA-RO period the ratio of cattle (46%) to sheep/goat (41%) was very close and the

percentage of pig (12%) was very similar to that from the region as a whole. In contrast to both unenclosed and enclosed settlements the higher ratio of sheep/goat to cattle was more in line with the expected profile from Roman rural settlements (King 1989 , 53–4, 1999, 180). However, the abundance of pig was nearly double that of the other two site types in contradiction of the same model (ibid.) giving a mixed picture in terms of social status and suggesting that the complex LIA-RO settlements from the UTV could have been relatively high up on the status spectrum.

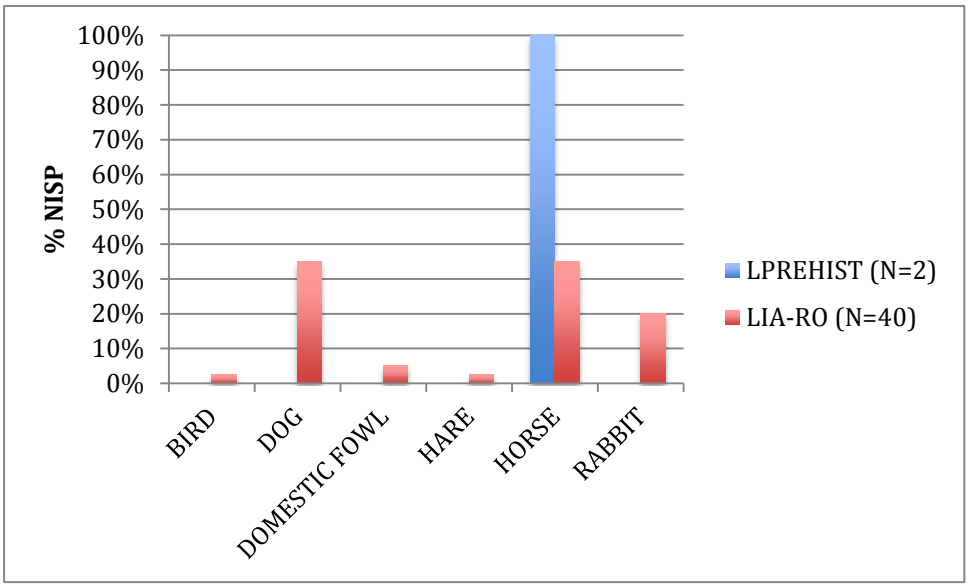


Figure 6.14: Other animal species from complex settlements in the UTV.

Numbers of minor domesticates and wild species from complex settlements (Fig 6.14) were too small for analysis, with the later prehistoric assemblage comprising 2 specimens and the LIA-RO assemblage consisting of 40 specimens. However, despite this the species abundances within the LIA-RO assemblage still appear to have been dominated by horse (35%) and dog (35%), with a relatively high percentage of domestic fowl (5%). In line with what would be expected from a more robust sample.

6.4.3 Upper Thames Valley animal husbandry at unenclosed, enclosed and complex settlements compared

Like the regional pattern of animal and cereal species abundances the distribution of major domesticates showed both similarities and differences between different kinds of settlement, as well as continuity and change across the chronological span of the study period. As with cereals and the regional picture the early medieval period appears to be most associated with change and differences of status between types of settlement, although these differences of status are chronological rather than spatial, while the preceding later prehistoric period and to an extent the LIA-RO period are more associated with continuity and lack of settlement hierarchy. The distribution of minor domestic and wild species mirrors this pattern with the later prehistoric and Roman periods showing similar patterns between different kinds of site in one or two dominant species and the early medieval period showing more differentiation both between site types and from the earlier period, despite being mostly based on very small numbers of specimens. In the later prehistoric period abundances of cattle and sheep/goat were very similar between unenclosed and enclosed sites. Cattle were slightly more abundant at enclosed sites than unenclosed sites, but ratios of cattle to sheep/goat between these site types were very similar and pigs were slightly more abundant at unenclosed sites. The consumption of major domesticates at later prehistoric unenclosed and enclosed settlements was therefore not sharply differentiated and there does not seem to be clear evidence of an association of cattle and pigs with bounded settlements and therefore with sites of higher social status. There was some differentiation between later prehistoric unenclosed and enclosed sites in terms of minor and wild species,

with enclosed sites dominated entirely by horse, whereas unenclosed sites also produced dog, domestic fowl and wild species. However, the sample from enclosed sites was extremely small and the pattern should therefore be treated with caution.

There seems to have been broad continuity in the pattern of major domesticates from later prehistory into the LIA-RO period with ratios of cattle, sheep/goat and pigs broadly equivalent at unenclosed and enclosed sites. The LIA-RO patterns of abundance at both these kinds of site also confound the expectations for Roman rural settlements established by King (1989, 1991, 1999) to some extent, with cattle and pig being relatively abundant. Once again there does not seem to be a link between cattle, pigs and enclosed sites, with higher percentages of cattle at unenclosed sites and greater
abundance of sheep/goat on enclosed sites. Pigs were roughly equivalent on both kinds of site. The relationship between species consumed, enclosure and social status was therefore somewhat equivocal. However, the signature of LIA-RO enclosed and unenclosed sites was different to that from complex settlements at which cattle were less abundant and sheep/goat were more abundant, but pig was roughly twice as abundant as on the other kinds of site. There is still no obvious and straightforward relationship of species to social status at complex sites; however, given the abundance of sheep/goat it may be that the pattern from these sites reflects surplus production, particularly of cattle, for consumption elsewhere and this in itself may be a reflection of social status. The possibility of surplus production of cattle at complex settlements such as Gill Mill

(Simmonds & Booth forthcoming) highlights the differences inherent in the husbanding of the three main domesticates.

Interestingly abundances of minor domesticates and wild species from unenclosed and enclosed LIA-RO sites mirrored the pattern from later prehistory, despite being based on a far larger sample. For example, in the LIA-RO period there was both continuity from later prehistory and a dominance of horse over all other species at enclosed sites, a pattern that does not indicate a straightforward relationship between enclosures and social status. This pattern may relate more to the opportunities for deposition of larger bones provided by the presence of ditches. Abundances of minor domesticates and wild species from complex LIA-RO sites were closer to those at unenclosed than enclosed sites, despite again being based on relatively small samples.

The early medieval data displayed the most notable differences between types of settlement, with abundances of major species at enclosed and unenclosed settlements starting to diverge. Unlike in the preceding LIA-RO period unenclosed early medieval settlements had greater abundances of sheep/goat and enclosed settlements had higher percentages of cattle and pig. This pattern would be the expected one if higher abundances of cattle and pig and enclosures were associated with higher social status. However, there is also a chronological element to this patterning, with enclosures along with higher abundance of cattle and pig relating to the MAS and LAS periods and unenclosed sites along with a higher abundance of sheep relating more to the EAS. Abundances of minor domesticates and wild species from early medieval period unenclosed and

enclosed sites were less divergent than the major domesticates, with more wild birds at enclosed sites, but more domestic fowl at unenclosed sites. Again these patterns are based on low NISP and are also the outcome of chronological divisions within the early medieval period as much as contemporaneous divisions between types of settlement.

6.4.4 Animal husbandry at different kinds of settlement in the middle and lower Thames Valley

6.4.4.1 Introduction

The analysis of animal bone from the MLTV used the same methodology as that for the UTV (6.2.4.1). The dataset was divided between sites lying within the walls of 3rd century *Londinium* and sites lying within the MLTV outside the walls, using the methodology described above (5.4.4.1).

6.4.4.2 Londinium

The percentages of major domesticates from within London remained remarkably stable over time (Fig 6.15), with only slight increases in cattle from later prehistory into the early medieval period, slight decreases in sheep/goat over the same time period and a small peak in pig abundance in the LIA-RO period. This is in marked contrast to the regional pattern for the MLTV (Fig. 6.4), leading to the inference that the nature of urban settlement lead to more homogeneous forms of meat production/consumption in the LIA-RO and early medieval periods than in the wider hinterland of the valley. However, while the

sample of LIA-RO and early medieval material is robust, it should be noted that the later prehistoric sample is very small and should probably, therefore, be discounted.

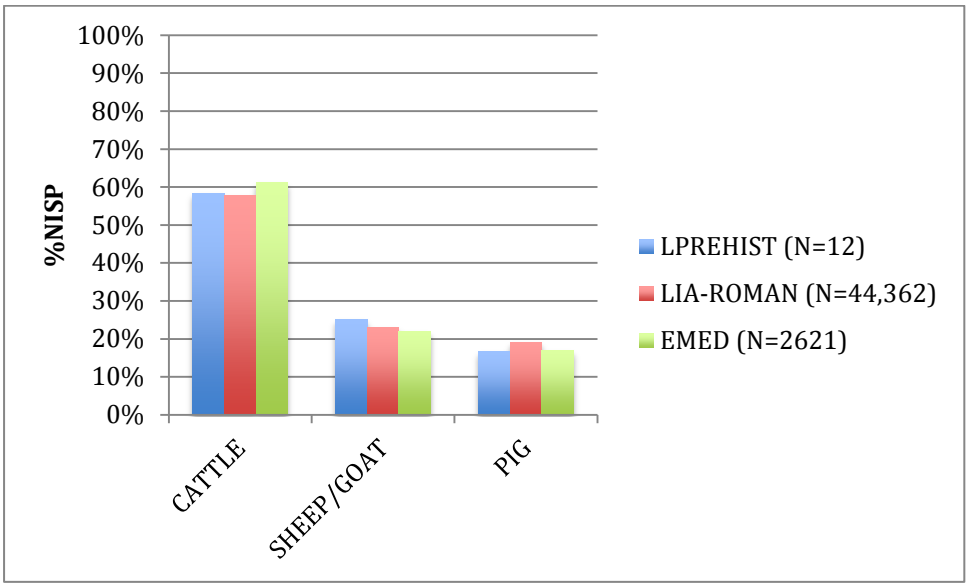


Figure 6.15: Major domesticates from sites located within the walls of 3rd century London.

Given the small size of the later prehistoric sample and the fact that urbanism is not a relevant category of analysis for the period in England the later prehistoric assemblage will not be discussed further. In the LIA-RO period (Fig. 6.15) cattle (58%) dominated sheep/goat (23%) and pig (19%). The proportion of the assemblage taken by cattle was not hugely different to that for the regional picture (Fig. 6.4), but the abundance of pig was substantially higher and the percentage accounted for by sheep/goat correspondingly lower. This pattern of abundance among the major domesticates conforms to King's models of urban Roman consumption, with relatively low sheep/goat and high cattle and pig (1989, 1991, 1999). However, the relationship of this pattern to modes of consumption within the Roman city is worth unpacking, as pigs accounted for most of the difference with the regional pattern, suggesting that in addition to

the larger more socially connected urban population being a more efficient consumer of large amounts of meat than the rural one (Albarella 2005), the relationship of animal species to status and identity was also important. Pig consumption was associated particularly with high status urban populations and officer accommodation within legionary fortresses (Cool 2006, 80-82), as well as providing large quantities of meat. The difference in the pattern therefore seems partly to relate as much to perceptions of status and identity as quantity, although not all the inhabitants of the Roman city will have been high status individuals and the pattern may therefore also relate to the functional qualities of the urban abstract-machine. LIA-RO minor domestic and wild species (Fig. 6.16) were dominated by domestic fowl (47%), with dog (21%) and domestic cat (17%) also making strong contributions. Duck, goose and hare were also present, but wild animals were scarce, with wild species all contributing <5% of the assemblage. This pattern contrasts with the regional picture (Fig. 6.5), which although characterised by low abundance of wild species and relatively high domestic fowl, has much higher percentages of horse. The *Londinium* minor domesticate and wild assemblage is typical of urban assemblages in both the Roman (Cool 2006, 99) and medieval worlds (Poole 2013a, 151), which are high in domestic fowl, (easily kept in cities) and also cats and dogs which may have been processed for their secondary products (ibid. 151-2).

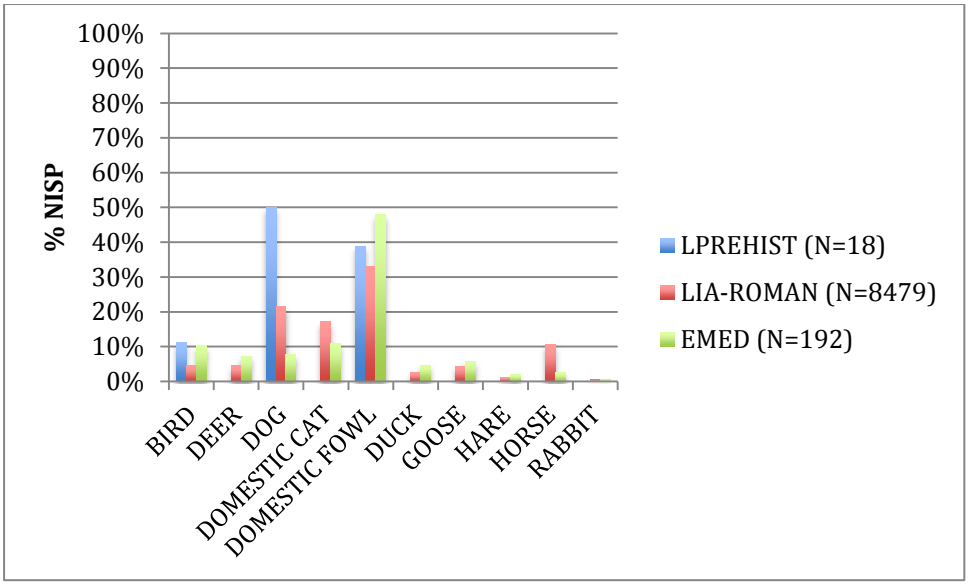


Figure 6.16: Other animal species from sites located within the walls of 3rd century London.

In the early medieval period the abundance of cattle (61%), sheep/goat (22%) and pig (17%) showed a remarkable degree of continuity from the preceding period (Fig. 6.15), again in marked difference to the regional picture. Cattle remained the most abundant species, but in this case were notably more abundant than in the wider region and the contribution of sheep/goat remained relatively low, with pigs continuing to be highly abundant. These patterns are more remarkable given the gap in urbanism in the EAS period and the fact that the focus of MAS settlement lay outside the Roman walls (Leary et al. 2004 Fig. 4); although this may be partially accounted for by the fact that the majority of the material in the thesis dataset dates to the MAS and LAS phases. Early medieval urban assemblages are consistently dominated by cattle and pigs, with lower percentages of sheep/goat than other settlement types (Poole 2013a , 147–8) and high abundance of pig is associated by some faunal specialists with high status in the early medieval period (Hamerow 2012 , 161–2). However, LAS London was not just occupied by high-status individuals, and the causes of the early medieval pattern, like those of the LIA-RO one, may relate as much to

functional processes within urban settlements as status. Certainly Crabtree (1996, 64-65) argues that the high abundance of cattle and pigs in the assemblage from the emporia at MAS Ipswich is related to functional aspects of supply to urban centres. And Poole (2013a, 151) argues that pigs may have been husbanded in early medieval towns, as they can be fed on scraps and require less space than other major domesticates, an interpretation which would neatly explain the high percentage of pigs in the London assemblage. Additionally, some mixing of the LIA-RO and early medieval data may have occurred due to the way in which the database is structured (3.2.2; 5.4.1).

Domestic fowl (48%) dominated the minor domestic and wild species assemblage (Fig. 6.16) from early medieval London to an even greater degree than the LIA-RO assemblage, with dog (8%) and cat (11%) again prominent. Goose and duck were present, but horse made up an even smaller percentage of the assemblage than in the previous period and wild animals once more accounted for <5%, except in the case of wild birds (10%). This pattern is more similar to the regional picture (Fig. 6.5) than is the case for the LIA-RO period, but, there is still a considerable degree of continuity in the relative abundance of species, which is best accounted for by similarity of production/consumption in urban environments. As Poole (2013a) argues early medieval urban assemblages tend to be high in domestic fowl and geese, which can be kept in back yards, and ageing data suggests that they were primarily kept for egg production (ibid. 151). Cats and dogs are also prominent as they were processed for fur (ibid. 151-2) and towns tended to have their own distinctive ecosystems, with dominant

fauna, so wild animal species common on rural sites are largely absent (ibid. 147).

6.4.4.3 Outside Londinium

Major domesticates from the MLTV outside the walls of 3rd century London showed a strikingly different pattern of abundance from those within. Rather than the broad similarity in the balance of species and continuity across periods, displayed by the former dataset (Fig. 6.15), the assemblage from outside *Londinium* showed a steep decline in the proportion of the assemblage accounted for by cattle over time and a corresponding increase in sheep/goat and pig, with sheep/goat increasing sharply in the LIA-RO period and pig increasing similarly sharply in the early medieval period (Fig. 6.17). These patterns seem to reinforce the inference drawn from the former dataset, that the nature of production/consumption in the urban environment had an homogenising effect on the LIA-RO and early medieval material, perhaps as a consequence of the functioning of a similar urban abstract-machine, with the assemblage from outside *Londinium* being more similar to the regional assemblage (Fig. 6.5). Once again it should be borne in mind that the later prehistoric assemblage (N=89) is too small for analysis and should be discounted.

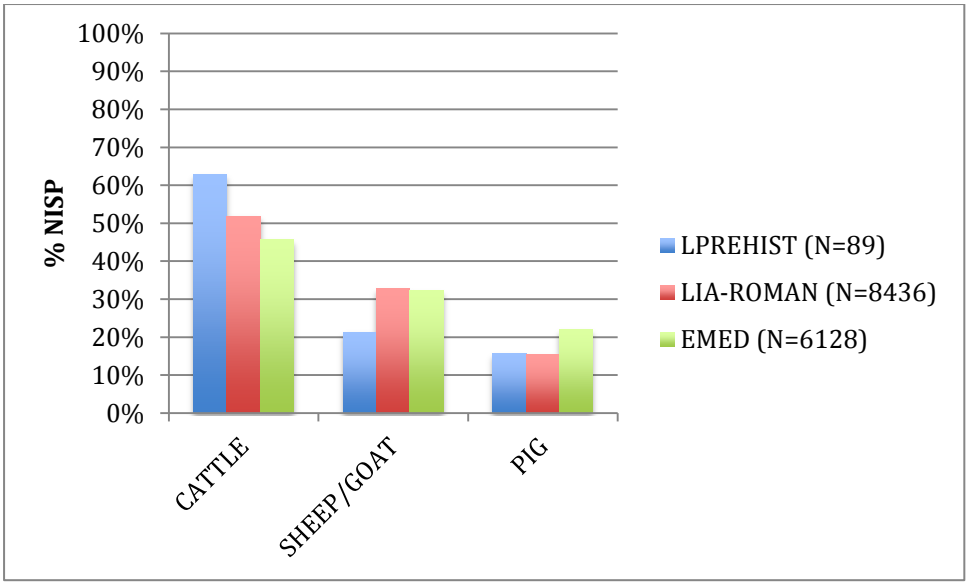


Figure 6.17: Major animal species from MLTV sites outside 3rd century London.

Cattle (52%) dominated the LIA-RO assemblage, with sheep/goat and pig accounting for 33% and 15% respectively (Fig. 6.17). The percentage of cattle in this assemblage was lower than in the *Londinium* assemblage; however, the significant difference lay in the proportion of sheep/goat, which was much higher in the non-urban assemblage. The proportion of pig in the non-urban assemblage was also lower than in the *Londinium* assemblage. Overall the rural assemblage displayed a similar breakdown of species to the wider MLTV assemblage, although sheep/goat was slightly higher and cattle and pig slightly lower. The relative importance of sheep/goat on sites outside *Londinium* is interesting, as this trend is aligned with King's model of species breakdown at rural sites (King 1989, 1991, 1999). However, the contribution of cattle and pig is still higher than expected for a predominantly rural assemblage. Predominant soil types and soil moisture may offer a partial explanation for the high abundance of cattle, but this does not explain the still relatively high proportions of pig. And the overall pattern is more likely to have been a function of the relationship between the rural and urban systems of production/consumption,

in which cattle produced by the rural abstract-machine would have been consumed in the urban abstract-machine, resulting in higher percentages of sheep/goat and pig from the rural settlements. As with the major domesticates the patterns of abundance for minor domesticates and wild species (Fig 6.18) from non-urban sites are closer to the regional pattern than to the *Londinium* pattern. The assemblage is dominated by horse (37%) and domestic fowl (34%), with goose and rabbit both accounting for 6%. Dog, cat and the remaining wild species all contributed <5%. As with the major domesticates the profile of the minor and wild species was similar to the regional profile (Fig 6.5), which was also dominated by horse and domestic fowl. However, there were also interesting contrasts and similarities with patterns from inside *Londinium*. Horse was much more common in assemblages outside *Londinium,* perhaps reflecting lack of human consumption of horse meat in general and dog and domestic cat were both less common, suggesting that processing of these animals was not occurring at the same scale on rural sites as in the city (Poole 2013a, 151-2). Domestic fowl were, surprisingly, more abundant outside *Londinium* than within it, in contradiction of Poole's (2013a) model for Anglo-Saxon and Viking Age towns, which in contrast works well with the early medieval data. This suggests that in addition to being important to the economy of Roman London, abundance of domestic fowl was a wider MLTV phenomenon in this period, even when the *Londinium* assemblage is discounted. A further interesting aspect of these data is that the abundance of wild species is similar in both datasets, suggesting that urbanism did not have a significant effect on the quantity of game consumed.

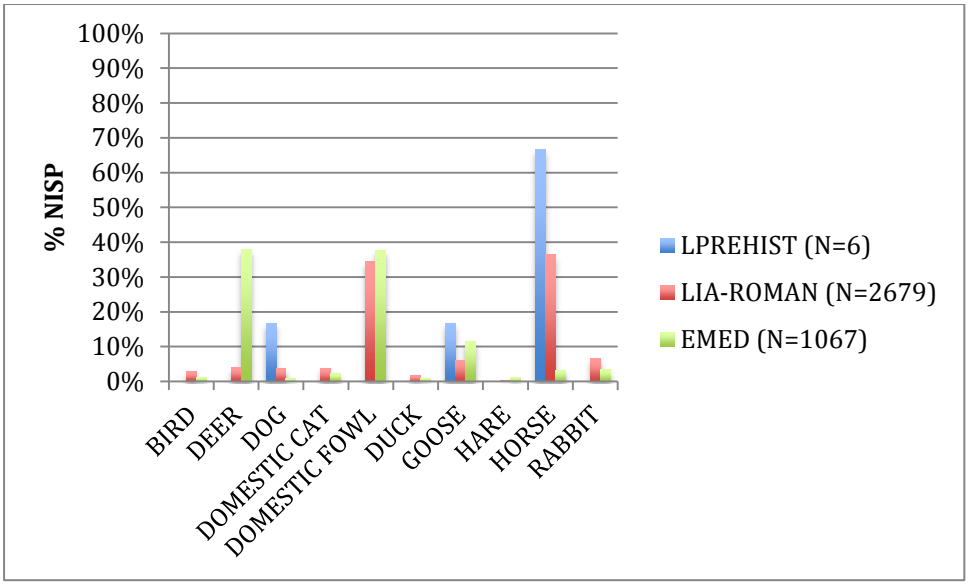


Figure 6.18: Other animal species from MLTV sites outside London.

The early medieval assemblage from non-urban sites continued to be dominated by cattle (46%), although the proportion taken by cattle was lower than in either of the preceding periods (Fig. 6.17). Sheep/goat accounted for 32%, (a similar proportion to the preceding LIA-RO period) and pig for 21%, (which is much higher). This pattern contrasted with both the regional picture, in which sheep/goat and cattle were both more abundant and pig much less so, and with the picture from within the LAS town, in which cattle was much more abundant, sheep/goat much less abundant and pig slightly less abundant, although still high. The reasons for this distribution are complex, relating partially to a contrast in animal husbandry, production/consumption between the urban and rural abstract-machines and partly to long-standing regional traditions. The arguments rehearsed above about cattle production in the rural hinterland for urban consumption are clearly relevant to the early medieval period as well, highlighting the role of urban agency. These also connect to Poole's (2013a, 151) arguments about the possibility of pig husbandry within urban contexts, which are relevant here; as are Albarella's (2005) and Crabtree's (1996, 64-65)

arguments about the effects of population scale on the consumption of cattle. However, Holmes' (2015) arguments about the cultural significance of pig to Anglo-Saxon and Viking diets also come into play - given the very high abundance of pig, even when LAS urban contexts are removed, nevertheless these arguments have greater salience when it is remembered that higher abundances of pig are a long-standing regional tradition in eastern England (Hambleton 1999, 89-90, 2008, 41-5). There were no doubt also elements of social status at play in producing these patterns, with a larger high status and ecclesiastical population of consumers subsumed within the urban data than within the non-urban data.

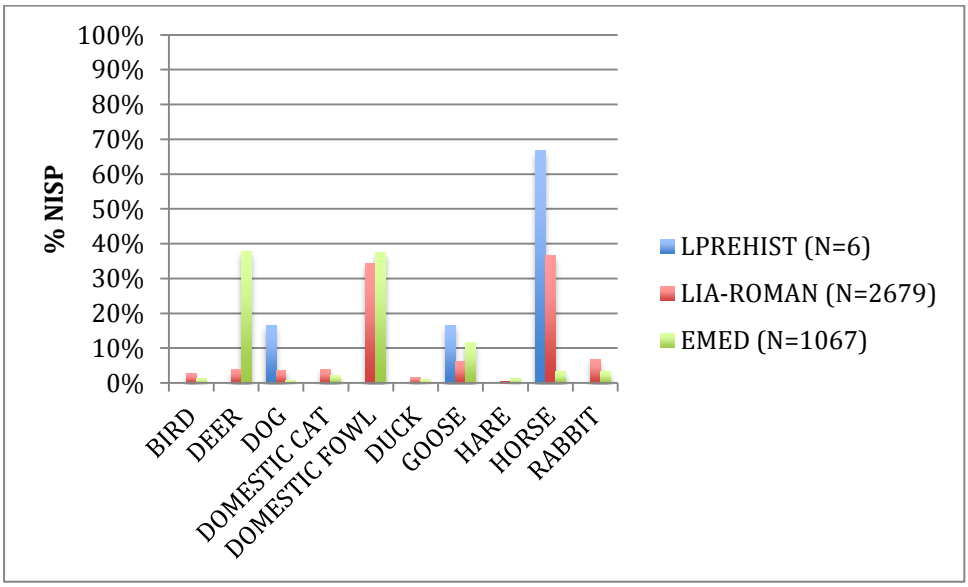


Figure 6.19: Other animal species from MLTV sites outside 3rd century London.

Early medieval minor domesticates and wild species from outside London displayed very different ratios to the preceding LIA-RO period (Fig. 6.19). The assemblage was dominated by deer (38%) and domestic fowl (37%), with goose (12%) also making a relatively substantial contribution. The other species including horse, dog, domestic cat and the remaining wild species all accounted

for <5%. Unlike in the LIA-RO period this pattern was different both from the MLTV pattern (Fig 6.5) and from the urban pattern (Fig 6.16). In terms of the regional pattern deer was much more abundant in the non-urban dataset, while horse was more frequent in the regional dataset. Domestic fowl was similarly abundant in both data sets. This pattern shows both similarities to and differences from the preceding period, with high percentages of domestic fowl again being common in both urban and non-urban environments, although urban contexts had the highest percentages. In terms of contrasts deer was far more abundant in the non-urban medieval dataset than in either LIA-RO dataset, and horse much less frequent in the early medieval non-urban dataset than the equivalent LIA-RO one. Therefore, although higher percentages of domestic fowl were clearly associated with urban functions, the extraordinarily high frequency of the species must also be related to long-term regional preferences extending through the LIA-RO and early medieval periods. The apparent early medieval penchant for deer and disdain for horse can also be linked to cultural preference(Poole 2013b) in addition to any effect of the agency of urbanism, with deer perhaps being seen as a high status (Sykes 2011, 340-42) and rural food, rather than just a high status food. The relative lack of domestic cat and dog reinforces the conception that these species were being processed for secondary products such as fur, rather than food within the urban environment (Poole 2013a, 151-2).

6.4.5 Middle and Lower Thames Valley animal husbandry at urban and non-urban settlement compared

Continuity and change, as well as clear distinctions between different kinds of settlement are evident when urban and non-urban datasets from the MLTV are compared. The settlement type distinctions are necessarily defined by the urban/non-urban dichotomy, but differences in the degree of continuity are also polarised between the urban and non-urban sites. The quantity of later prehistoric data from within the walls of 3rd century London was too small for meaningful analysis (6.4.4.2) and urbanism as a category is also irrelevant to this dataset. The following discussion therefore concentrates on the LIA-RO and early medieval data, only bringing in the later prehistoric material where it seems to be backed up by the more robust later samples. Continuity across period boundaries was most pronounced in the urban dataset. The proportions of all three major domesticates were particularly stable, varying only by approximately 3% between the later prehistoric period and the early medieval period. By contrast change was particularly pronounced in the non-urban dataset, with a decline of 16% in the proportion of cattle from later prehistory to the early medieval period and a corresponding increase in the proportions of sheep/goat and pig by approximately 11% and 7% respectively. Overall sheep/goat was more important on the non-urban sites and cattle on the urban sites, with pig being important in both datasets and the location of the highest proportions of pig shifting over time. In general temporal change was more evident in the minor domestic and wild animal assemblages with a steep decline in the proportion of dog and an increase in the proportion of domestic fowl in the urban dataset from later prehistory to the early medieval period. Both similarities and contrasts were evident between urban and non-urban settlement in this assemblage. Urban sites generally produced higher

proportions of dog, domestic cat and domestic fowl than non-urban sites, although domestic fowl were relatively frequent on such sites. Deer was more frequent on non-urban sites in the early medieval period and horse was more frequent in both the LIA-RO and early medieval period, but in general wild species were equally scarce between both kinds of site, reinforcing the idea that urban abstract-machines have their own specific fauna.

The patterns of abundance seen in these two datasets are, like those from different types of site in the UTV, both the product of long-term trajectories in regional human/ecosystems and of more short-term change. However, one very significant difference between the MLTV and UTV CSAs is the influence of urbanism on the dynamics of the system, which seems to be very substantial. Chapter 2 discusses concepts of material agency (Gell 1998) and abstract-machines (Connolly 2010; Deleuze & Guattari 2011) and these ideas seem particularly relevant to the understanding of the differences in animal production/consumption seen in the London dataset. These theories all ascribe varying degrees of agency to objects and/or material systems and are mostly either drawn on or prefigured by Delanda (1997), who developed a theory of medieval cities as abstract-machines, complex systems comprising streets, buildings, animal species (including humans), microbes, plant species and many other elements, with the organic elements all generating and/or consuming energy conceived of as "flesh" or "biomass". Certain features of the urban animal bone assemblage from LIA-RO and early medieval London can be explained using this theory, with the continuity of species abundance across period boundaries being interpreted as originating in the agency of the urban system

itself, viewed as an abstract-machine, which worked to draw in animals, particularly cattle from its MTV hinterland, resulting in higher proportions of cattle across time within the urban system and declining proportions relative to sheep/goat in the rural system. Additionally, high percentages of pig, domestic fowl, dog and cat as seen in both LIA-RO and early medieval London are interpreted by Poole (2013a, 151-2) as being generated by affordances specific to the nature of urban systems, which favour species adaptable to small spaces and which can feed off scraps and re-cycled human food. In both these ways we can perhaps see the agency of urbanism imposing itself on the networks of humans and animals within the city and outside it, and overriding to an extent, although not completely, preexisting regional and cultural patterns.

6.4.6 Animal husbandry at enclosed, unenclosed and complex settlements and Roman Villas on the route of HS1

6.4.6.1 Introduction

The methodology for analysis of the HS1 animal bone assemblage by settlement type follows that used in the regional analysis (6.1) and for the Thames Valley assemblages (6.4.2.1; 6.4.4.1). However, the nature of the HS1 excavations (Chapter 4) means that most of the HS1 data comes from complex settlements and villas, so that while assemblages from unenclosed and enclosed settlements are analysed, their small size means that the results should be treated cautiously.

6.4.6.2 HS1 unenclosed settlements

Major domesticates from unenclosed settlements on the route of HS1 differed from those in the UTV in being dominated by sheep/goat (Fig 6.20) rather than cattle in both the later prehistoric and LIA-RO periods, in line with the regional picture (Fig. 6.7). No data were available for the early medieval period for this settlement type. Cattle dominated pig in both periods, but ratios of cattle to pig were much closer in the later prehistoric period than in the LIA-RO period.

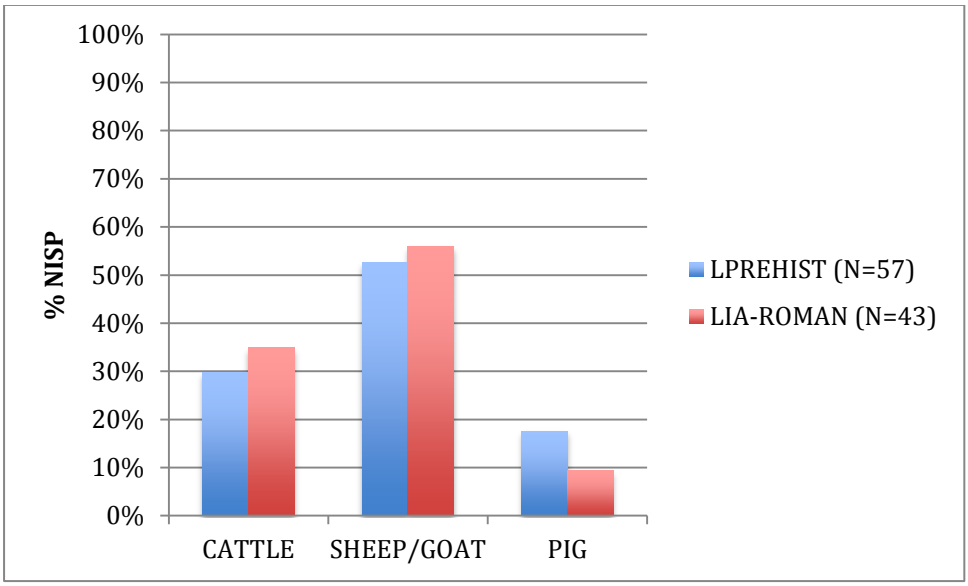


Figure 6.20: Major domesticates from unenclosed settlements on the route of HS1.

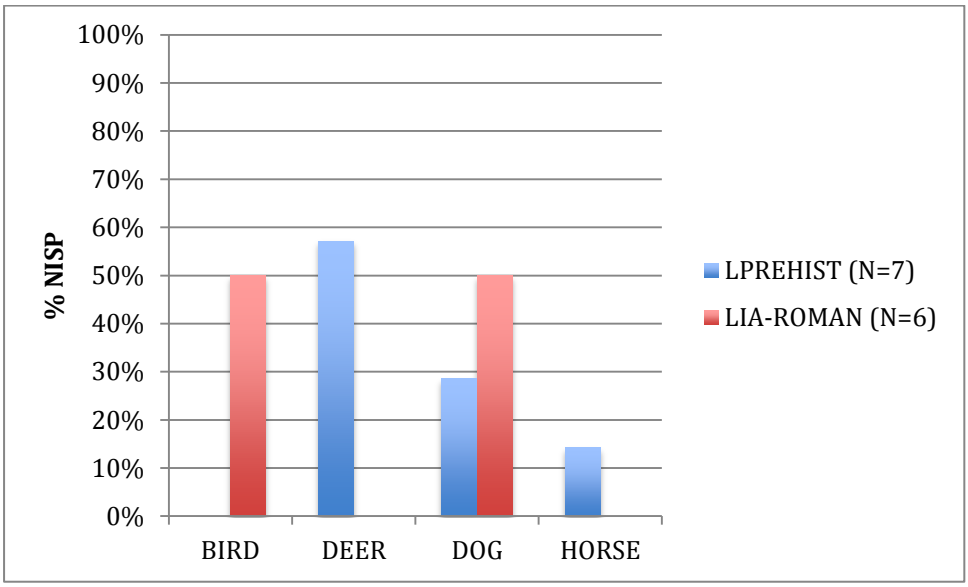


Figure 6.21: Other animal species from unenclosed settlements on the route of HS1.

In the later prehistoric period sheep/goat (53%) were nearly twice as abundant as cattle (29%) and pig (18%) was highly abundant when compared to equivalent sites in the UTV. These proportions are in agreement with the regional pattern (6.2.3) but contradict Hambleton's (1999, 56) model of animal husbandry for open settlements in later prehistoric Eastern England and East Anglia, which shows cattle dominating at all site types. However, the relatively high proportions of pig are in agreement with Hambleton's model, which sees high numbers of pig at open settlements, although pigs in general are more common later in the IA and Hambleton's category of open settlement includes oppida (ibid. p. 56). Minor domesticates from unenclosed settlements are present in very small amounts (N=7), but comprise in order of abundance: deer, dog and horse. However, the NISP of these species is too low for any discussion of the pattern to be meaningful. The dominance of sheep/goat over cattle at these settlements in this period would fit with the idea that the inhabitants were

of lower social status; however, the abundance of pig and topographical and geological factors favouring sheep/goat complicate this picture.

LIA-RO major domesticates from unenclosed sites continued to be dominated by sheep/goat (56%), which had increased slightly as a proportion of the assemblage from later prehistory, with cattle (35%), which had also increased slightly. Pig (9%) was half as abundant as it had been in the preceding period, indicating that environment and topography were not the sole determinants of species proportions. These percentages are more in line with models of Roman animal husbandry advanced by Cool (2006, Table 9.1) and King (1989, 1991, 1999), which see sheep/goat as dominating low status rural sites and in that sense offers a contrast to the preceding later prehistoric period. LIA-RO minor domestic and wild species (Fig. 6.21) were again present in very small quantities (N=6) and comprised wild bird and dog in equal proportions.

6.4.6.3 HS1 enclosed settlements

Enclosed settlements on the route of HS1 were, interestingly, also dominated by sheep/goat (Fig 6.22), although at these sites the ratio of sheep/goat to cattle was much closer than on unenclosed settlements. Again no data were available for the early medieval period and cattle dominated pig, although there was a significant increase in the proportion of pig in the LIA-RO period and a corresponding fall off in sheep/goat. These patterns were again in line with the regional picture (Fig. 6.7).

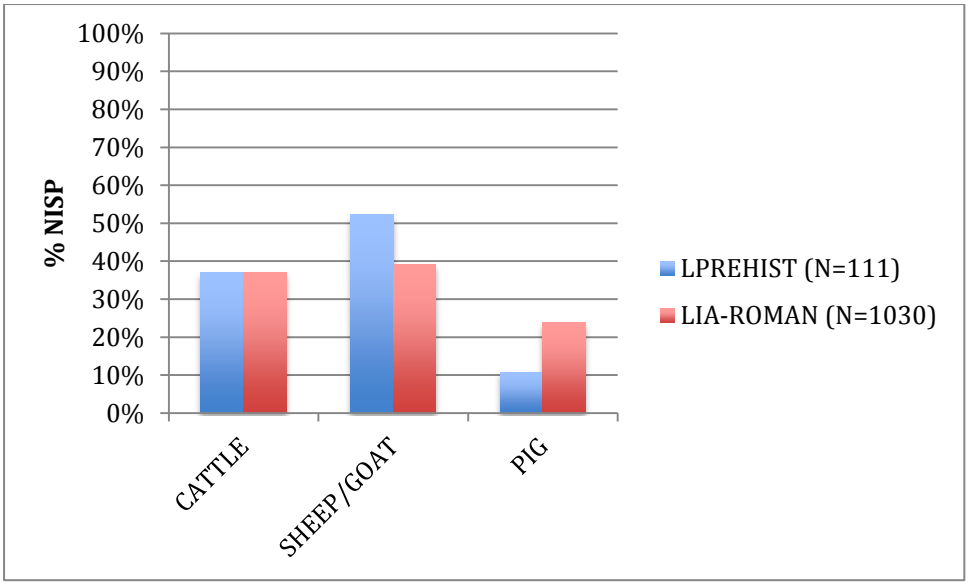


Figure 6.22: Major domesticates from enclosed settlements on the route of HS1.

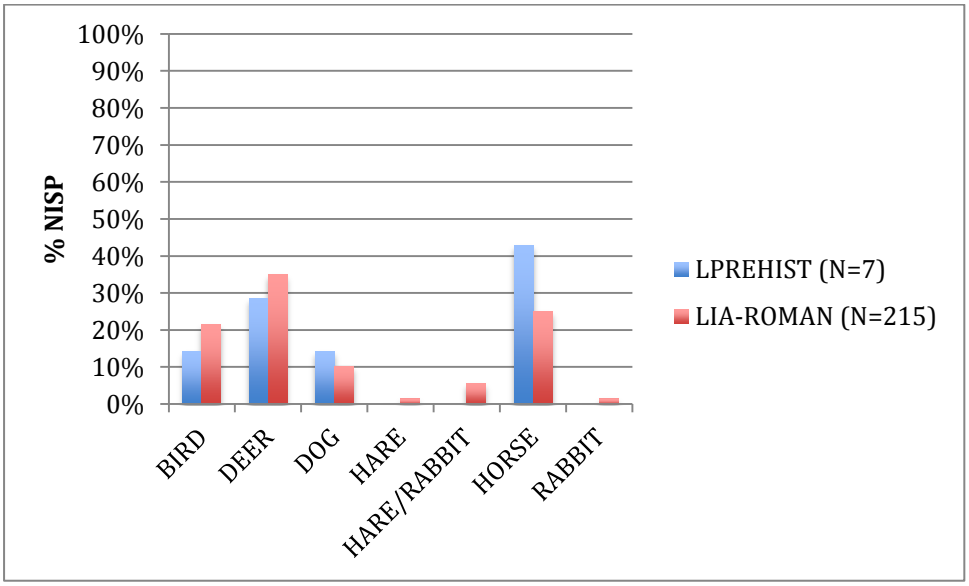


Figure 6.23: Other animal species from enclosed settlements on the route of HS1.

The later prehistoric assemblage from enclosed sites was dominated by sheep/goat (52%), with cattle (34%) also making a substantial contribution and pig (11%) taking a less substantial, although still significant share. These percentages represent a greater abundance of cattle relative to sheep/goat than seen at unenclosed sites, but a significant decline in the proportion of pig. The picture is in many ways more contradictory of Hambleton's (1999, 56) findings for eastern England than the pattern for unenclosed sites, which was in

agreement with her results over the abundance of pig if not sheep/goat. The association of enclosed settlements with the consumption of higher status animals than unenclosed settlements is again equivocal, given the slightly higher ratios of cattle to sheep/goat but lower proportions of pig. Minor domestic and wild species (Fig. 6.23) were present in very low numbers (N=7), comprising horse, deer, dog and wild bird in descending order of importance.

In the LIA-RO period the abundance of the major domesticates underwent more change than was the case on unenclosed sites, bringing the percentages more into line with expectations for Roman period settlements in eastern England. Sheep/goat (39%) was still the dominant species, although it was only marginally more abundant than cattle (37%) and pig (23%) had increased dramatically as a proportion of the assemblage from later prehistory. These proportions, like those from unenclosed settlements, align well with the results of Cool's (2006, Table 9.1) and King's (1989, 1991, 1999) findings for animal bones on Roman rural settlements, and are in line with the regional picture (Fig. 6.7). However, the picture of relative social status indicated by these results is more complex. The relatively low proportions of cattle argue against frequent cattle based feasting, but cattle may have been replaced by pig, which was relatively very abundant. On balance, given the rural nature of the settlements and the topographical position of many of them on chalk downland, the greater abundance of cattle at enclosed than unenclosed sites and the high percentage of pig probably points towards higher status meat consumption at enclosed sites. The minor domesticate and wild assemblage on enclosed sites was larger than on LIA-RO unenclosed sites and therefore fit for analysis. The assemblage was

dominated by deer (35%), horse (25%) and wild bird (21%), with dog accounting for 10% and the remaining species for 5% or less. The importance of both deer and wild bird in this assemblage supports the contention that more high status consumption was occurring at enclosed than unenclosed sites in this period, given the well established association of game with Roman high status settlement (Allen 2014, 177; Cool 2006, 114). However, it also shows that environmental aspects of the system were important, given the more wooded nature of this CSA.

6.4.6.4 HS1 complex settlements

Complex settlements were by far the most numerous settlement category (Fig. 4.12) on the route of HS1 and the assemblages from them were therefore usually more robust in terms of sample size. In addition, early medieval assemblages were present in large enough quantities for analysis. Assemblages from HS1 complex settlements were dominated by sheep/goat in later prehistory (Fig 6.24), thereafter switching to cattle. Abundance of pig was high throughout, unlike in the UTV, dipping slightly in the LIA-RO period before climbing to a peak in the early medieval period.

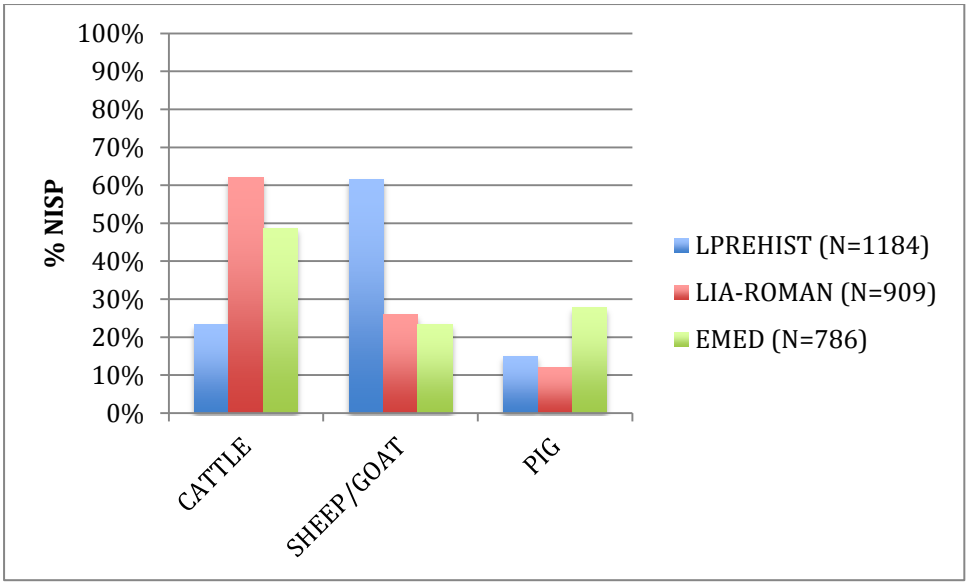


Figure 6.24: Major domesticates from complex settlements on the route of HS1.

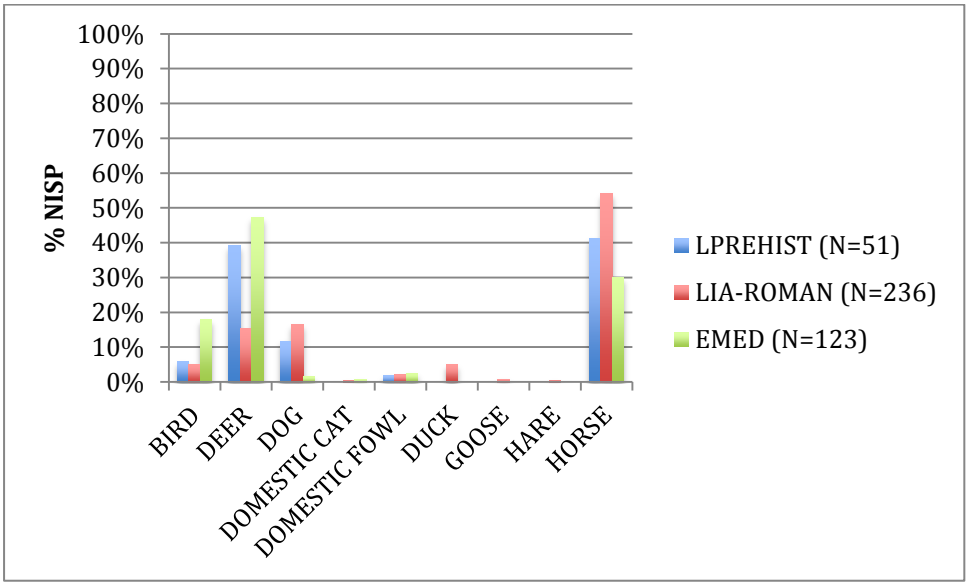


Figure 6.25: Other animal species from complex settlements on the route of HS1.

In the later prehistoric period the major domestic assemblage was dominated by sheep/goat (62%) to a greater degree than were either unenclosed, or enclosed settlements; cattle contributed a mere 23%, but pig (15%) was fairly robust. These patterns are in agreement with the regional later prehistoric pattern (Fig. 6.7), but form the starkest contrast of all the HS1 settlement types, with the model for animal husbandry in eastern England established by Hambleton (Hambleton 1999, 89-90, 2008, 41-45), although, it should be born in mind that

there is no exact parallel for "complex settlement" in Hambleton's settlement typology (Hambleton 1999, 17). The relationship of this assemblage to social status was complex, with relatively very low levels of cattle to sheep/goat perhaps indicating less large scale feasting, but once more abundance of pig potentially making up for this. Minor domesticates and wild species were present in greater numbers than on the other site types (N=51), being dominated by horse (41%) and deer (39%), with dog accounting for (11%) and wild bird 6%. The remaining species all accounted for < 5%, but among these were domestic fowl, the early presence of which can be taken for a sign of status and domestic cat, the presence of which may indicate surplus grain storage, also possibly related to high status redistribution of food and feasting.

LIA-RO animal husbandry on complex sites underwent a major reversal in the ratio of sheep/goat to cattle. Cattle (62%) were more than twice as abundant as sheep/goat (26%) in contrast to the pattern seen at unenclosed and enclosed sites, whilst pig (11%) had declined from the previous period, being less frequent than on enclosed settlements, but more abundant than on unenclosed. These species ratios are, like their later prehistoric equivalents, in agreement with the regional picture, but also broadly agree with Cool's (2006, Table 9.1) and King's (1989, 1991, 1999) models of animal husbandry for Roman sites, depending on how complex settlements are seen to fit into their settlement typologies. Given that neither King, nor Cool have a category of complex settlement, these sites could be seen as equivalent to vici, or small towns, in which case their cattle heavy profiles fit with the data, or as rural non-Romanised settlements, in which case they do not. However, unpublished data

from the Roman Rural Settlement Project from complex farms (Alex Smith pers. comm.) seem to suggest a similar species profile. Minor domesticates and wild species from complex settlements on the route of HS1 (Fig 6.25) were dominated by horse (30%), but were also high in dog (17%) and deer 15%, with remaining domestic and wild species including cat and domestic fowl at < 5%. This pattern is similar to that from enclosed settlements and the abundance of deer may be taken to indicate status (Allen 2014, 177), as well as a more wooded environment.

The early medieval assemblage of major domesticates from complex settlements was dominated by cattle (49%), which were about twice as abundant as sheep/goat (24%). This period also saw a very substantial increase in the proportion of pig (28%). These percentages are in accordance with the regional picture (Fig. 6.7), which was cattle and pig dominated in this period. However, while the breakdown of major domesticates from complex settlements fits with our understanding of animal husbandry in early medieval eastern England in general (Holmes 2015), the pattern is more like that from urban than rural settlements (Poole 2013a,151). However, this suggests that early medieval complex settlements on the route of HS1 were situated at the higher end of the status spectrum. Minor domesticates and wild species were dominated by deer (47%), horse (30%) and wild bird (18%), with domestic fowl contributing a further 3%, all of which further reinforces the impression of high status consumption, as well as relating to the environmental characteristics of the regional abstract-machine.

6.4.6.5 HS1 Roman Villas

Roman villas differ from the other categories of settlement in the CSA in representing a type of site that properly only refers to one of the time periods under consideration, but nevertheless has produced datasets from all three. The later prehistoric dataset is too small (N=98) for consideration and the following analysis will therefore concentrate on the LIA-RO period, but discuss the early medieval period, as post villa settlements may have been influenced by the status of the settlement in the preceding period. Villa assemblages (Fig. 6.26) differed from the regional picture (Fig. 6.7) in being dominated by cattle throughout, with a large increase in sheep/goat in the LIA-RO period and large increases in pig in both the LIA-RO and early medieval periods.

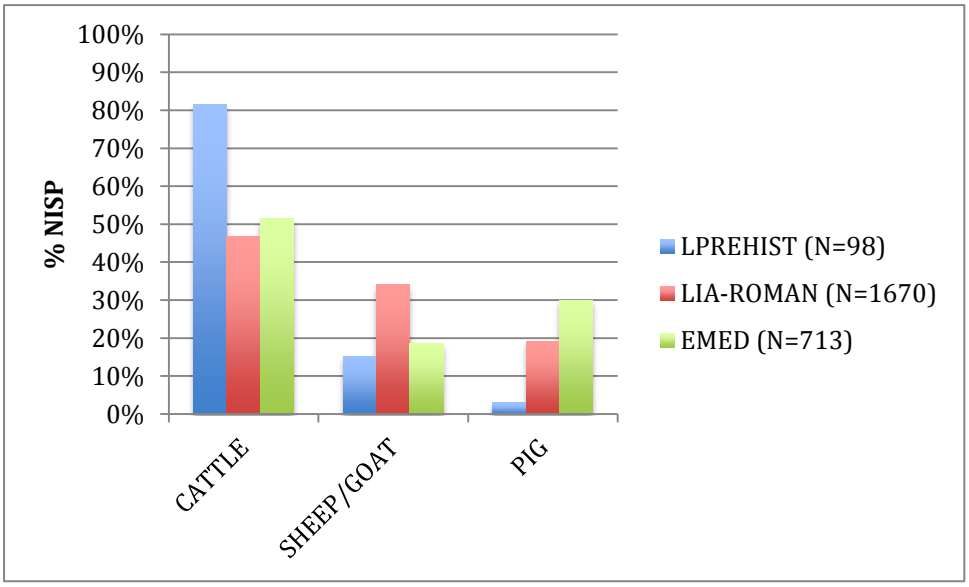


Figure 6.26: Major domesticates from Roman villas on the route of HS1.

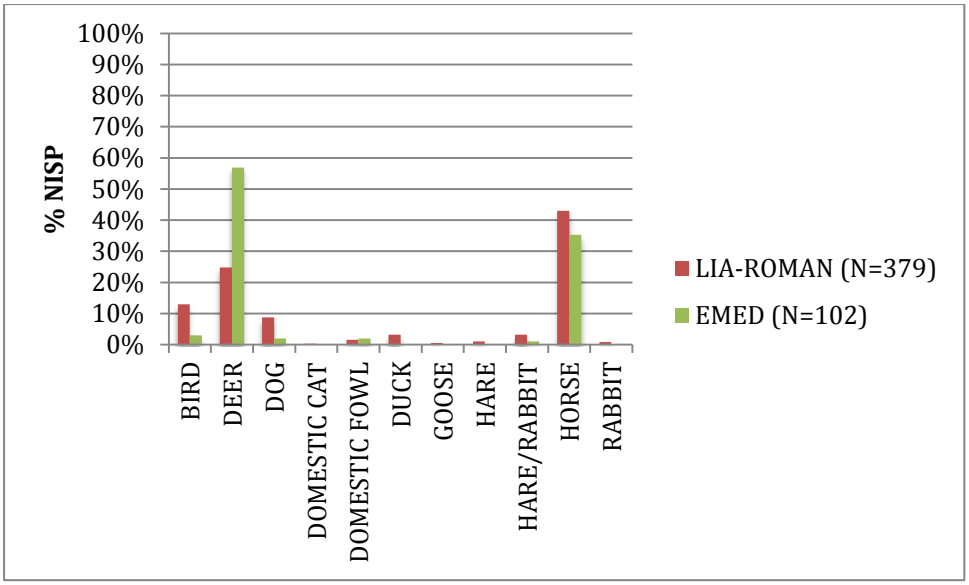


Figure 6.27: Other animal species from Roman villas on the route of HS1.

In the LIA-RO period the assemblage was dominated by cattle (47%), but with substantial proportions of sheep/goat (34%) and pig (19%). This pattern is in accordance with the regional picture (Fig. 6.7), which remained relatively sheep/goat dominated. The species profile does not fit particularly closely with King's (1989, 53-4) findings for villas, which tend to have higher percentages of cattle, or with his broader findings for settlements of high status in Roman Britain (King 1991, 1999). However, these settlements do have high percentages of pig, which does fit with King's model and the sheep/goat heavy profile is explicable given the topographic and geological context of one of the sites (Rippon et al. 2015, 80). Minor domestic and wild species were dominated by horse (43%), deer (25%) and wild bird (13%), with the wild animal contribution being more typical of high status villa consumption (Allen 2014, 177).

Early medieval major domesticates from HS1 villas (Fig. 6.26) were dominated by cattle (51%) in similar proportions to the preceding period, but sheep/goat (19%) had declined as a proportion of the assemblage in favour of pig (30%),

which had climbed to unprecedented levels within the assemblage. This pattern of consumption is in accordance with both the regional CSA (Fig. 6.7) and the broader pattern for Eastern England (Holmes 2015), in which high pig consumption is argued to be characteristic of Anglo-Saxon and Viking diaspora communities. However, like the material from complex settlements with which the villa category had some overlap, the species profile is more characteristic of high status and urban assemblages (Poole 2013a) than rural ones. The assemblage of minor domestic and wild species is dominated by horse (35%) and deer (57%), with the remaining species all <5%. These species are also associated with status in the early medieval period, with horse associated with pagan ritual consumption in Germanic communities (2013b, 322). Overall the early medieval villas assemblage from HS1 hints at a continuation of high status consumption, in the context of a relatively wild landscape.

6.4.7 Animal husbandry at settlements on the route of HS1 compared

Like their counterparts in the Thames Valley different forms of settlement on the route of HS1 displayed continuity, change, and inter-site variation in forms of animal husbandry across the period 1500BC-AD1086. While degrees of status differentiation as represented by choice of species for consumption varied between periods, all three periods were characterised by varying degrees of reliance on a regionally distinctive suite of animal species, in which sheep/goat, pig and wild game usually featured heavily. All three periods also showed variation between settlement types, even if that variation did not always resolve

itself into straightforward differences in status. In the later prehistoric period unenclosed and enclosed sites bucked the trend common in Eastern England (Hambleton 1999, 89-90, 2008, 41-45), but followed the more local regional pattern by having more sheep/goat than cattle. These settlement types are therefore difficult to separate in terms of status, especially as pig was more abundant on unenclosed settlements, but cattle was more abundant on enclosed settlements and neither had large numbers of minor or wild species. Later prehistoric complex settlements were also sheep/goat dominated, but had reasonably high percentages of pig and abundant deer. Interestingly the only settlement type which showed signs of high status animal consumption in this period were sites that would later become Roman villas, which were heavily dominated by cattle. However, this pattern is based on very small assemblages and should be treated with caution. The obvious conclusion is therefore that status differences in animal consumption were not clearly demarcated by settlement type in the region in this period and this maybe partly due to the way in which sites were excavated and therefore classified (Chapter 4).

In contrast the LIA-RO period was characterised by status differences between settlement types. From the LIA unenclosed sites were much more sheep/goat dominated than enclosed sites, which had a greater abundance of cattle and pig, and higher percentages of wild species. Complex sites were differentiated from both unenclosed and enclosed sites, being much more cattle dominated than either and having higher abundance of deer. Nevertheless, they also had a lower abundance of pig than enclosed sites. Cattle abundance at villas lay in between enclosed and complex sites, but had relatively high percentages of pig and deer.

In the development of these differences of species abundance in the LIA-RO period, we can perhaps see the interaction of the expanding Roman economic abstract-machine, and particularly the development of surplus production, with autochthonous regional systems of production/consumption. Species such as pig and deer that expand as a proportion of assemblages and are particularly marked on higher status sites are also often species that had a long-tradition of consumption in the region.

For the early medieval period comparison between settlement types is more difficult, because of the scarcity of early medieval settlement in the CSA (Chapter 4) and for this reason no data from unenclosed and enclosed early medieval settlement is available. However, a comparison of complex settlement and former villa sites shows that both types are dominated by cattle, pig and deer. Such a profile is frequently interpreted as representing high status (Poole 2013a, 148, Sykes 2011, 340-42), which seems appropriate for the settlement types. Interestingly sites formerly occupied by villas have slightly higher abundances of cattle, pig and deer than complex sites, suggesting some sort of continuing influence across the Roman/early medieval transition. However, it is also worth noting that the high status signatures of these early medieval settlements are again based on species such as pig and deer that had a long history of being favoured in the region.

6.5 Animal husbandry at different kinds of site in the Thames Valley and on the route of HS1 compared 1500BC-AD1086

The comparison of animal husbandry by settlement type has, like the comparison of cereal cultivation, proved fruitful and complementary to the patterns revealed by the former analysis and although differences between settlement types of different status are perhaps not quite as clear-cut in the animal bone assemblage, they are nevertheless observable. Patterns of similarity and difference as well as continuity and change within and between settlement types have been revealed, which again extend and complement those seen in the regional analysis. However, unlike in Chapter 5, the early medieval assemblage for the UTV is sufficiently large for analysis to be undertaken, whereas the assemblage from the route of HS1 is more limited. However, in the case of HS1 there is sufficient material for limited analysis to be undertaken.

The pattern of animal husbandry at different kinds of settlement in the later prehistoric period displayed differences and similarities between the regional case studies and also patterns of activity, such as the consumption of similar species at both unenclosed and enclosed settlements that appear to have continued into the LIA-RO period at least in the UTV. As with cereal cultivation the patterns of difference were largely associated with the regional trends discussed above (6.2) and the similarities were linked to the association of particular animal species with particular settlement morphologies. So, for example, in the UTV and where data were present for the MLTV, later prehistoric settlements of all kinds were dominated by cattle, but on the route of HS1 the

same kinds of settlement were dominated by sheep/goat. Where HS1 settlements could be argued to be of higher social status; however, they produced higher abundances of cattle and pig. Minor domesticates and wild species followed a more regionally idiosyncratic pattern, with high abundance of dog associated with higher status sites in the UTV and equivalent sites on the route of HS1 more likely to be associated with game. In general, evidence for differentiation of animal husbandry by site status was less forthcoming on the route of HS1 than in the Thames Valley in later prehistory.

The LIA-RO pattern of animal husbandry at different settlement types, in common with the Roman evidence, generally showed more evidence of similarity cross-cutting the different regions, with differentiation of sites of different status by species being more pronounced across all three regional case studies. In the UTV both unenclosed and enclosed settlements continued to be dominated by cattle, but complex settlements were characterised by more abundance of sheep/goats and pig. Meanwhile in the MLTV urban settlement in London maintained high proportions of cattle, pigs and domestic fowl, but rural settlement was characterised by more abundant sheep and goat. In this case the different patterns are likely to have been mutually influential, with cattle and sheep/goat consumed in London having been produced in the wider MLTV. On the route of HS1 LIA-RO unenclosed sites were more dominated by sheep/goat than enclosed sites and complex sites were more cattle dominated and had a greater abundance of deer. So while complex sites on the route of HS1 were similar to those in the UTV in having a more high status species profile, the mix of species was still regionally distinctive. In contrast to the later prehistoric

period, the LIA-RO period on the route of HS1 and in the MLTV was one of more clear status differentiation by settlement type than the UTV.

Early medieval patterns of animal husbandry by settlement type, like patterns of cereal cultivation (Chapter 5), seem to have undergone more change than was the case over the Iron Age to Roman transition. In the UTV enclosed settlements were more clearly differentiated in having greater abundance of cattle and pig, while unenclosed settlements had a greater frequency of sheep/goat, although the identification of this pattern is subject to the caveat that some of it may have been due to chronological differences within the early medieval data set (6.4.2.3). Early medieval complex settlements and settlements that were previously occupied by villas on the route of HS1 had a similar profile to complex settlements in the UTV, with greater abundance of cattle and pig, suggesting inter-regional similarity in this period, although there were no data from unenclosed settlements with which to compare in this CSA. The MLTV in the early medieval period was characterised by a stark dichotomy between the animal bone profiles of settlement within and without London, and in this sense it was the region that showed the greatest continuity with the preceding periods. In particular the urban profile was almost indistinguishable from the LR period, being characterised by abundant cattle, pig, domestic fowl, dog and domestic cat. This pattern in particular provides strong evidence for the operation of an urban abstract-machine that worked in similar ways in different periods. Throughout the periods distinctions in animal husbandry between settlement types were expressed through regionally distinctive species preferences that had long

histories in the different regions, so that, for example, there was always greater abundance of pig on early medieval settlements in the HS1 region and the MLTV.

6.6 Conclusions

Like chapter 5 this chapter has attempted to adopt a novel approach to its subject matter, making the case for regional production/consumption systems or abstract-machines, which displayed considerable continuity, both in their consumption of major domesticates and minor domestic and wild species, across the chronological boundaries that have traditionally been used to divide up English history and prehistory. These continuities have been examined alongside changes introduced as the result of the development of Roman socio-economic systems and changes in husbandry during the early medieval period. The chapter also examined variation in animal husbandry at different kinds of settlement in different CSAs, comparing and contrasting practices at different settlement types, both over the long-term and between the differing regional systems. At a regional level, as with cereal cultivation/consumption there was broad continuity between later prehistory and the LIA-RO period. Again, as in cereal cultivation/consumption more significant changes were associated with the beginning of the early medieval period, although there were still some regional continuities, particularly in the production/consumption of pig and wild species. It is arguable that the mirroring of patterns in cereal cultivation in the animal bone assemblages demonstrates how closely intertwined arable and pastoral agriculture were. Variations in production/consumption of species by

settlement type were more similar between different regions, than was the regional pattern, especially in the LIA-RO period. Section 6.4 looked for variations in animal husbandry by settlement status finding a degree of variation, but not in all times and places. The same section assessed the impact of urbanism on animal husbandry in the MLTV, arguing that the urban abstract-machine transformed patterns of species abundance not only in the city in similar ways in the LIA-RO and LAS periods, but also in the wider valley. Continuity and change in animal husbandry was determined by the imbrication of human dominated and environmental systems, being linked to variations in soil types as well as the operation of Roman and medieval urbanism. However, the relationship of the continuity and change in agricultural/pastoral systems seen at the scale of regions and of settlement types in this chapter was also tied in to variations in other elements of the food production and consumption system. It is therefore to one of these other elements (ceramic repertoires) that the next chapter turns, focusing more on the consumption elements of the production/consumption systems.

7 CERAMIC REPERTOIRES

7.1 Introduction

Unlike the charred cereal and animal bone assemblages examined in chapters 5 and 6, ceramics have long been central to the study of the archaeological record of the British Isles. For the periods under consideration in this thesis syntheses of ceramic material have played an important role since at least the mid 20th century, if not earlier (Abercromby 1912; Blinkhorn 1997; Cunliffe 2005; Hawkes & Hull 1947; Myres 1969; Tyers 1996; Woodward & Hill 2002). However, there are large regions of England that appear to have been aceramic during later prehistory and the early medieval period and recent work by the EngLaId Project (Cooper et al. forthcoming) has involved mapping these at a national scale (Figs. 7.1, 7.2 and 7.3). On a global scale Fuller and Rowlands (2011) have suggested that ceramics may have been a much more important component of eastern than western cooking and cuisine, with eastern cuisine possibly having been based around boiling since before the advent of agriculture, and western cuisine having been more concerned with grinding, baking and roasting (2.2.1). It is worth considering the probability, then, that ceramics were not thought of as essential to cooking and consumption in all times and places in the English later prehistoric and early historic periods, but may have been seen as an addition for certain kinds of cooking/consumption, either to do with displays of communal solidarity or individual status (Dietler 2001; Hamilakis 1999). Ceramics may, therefore, have been used only for the

preparation/consumption of certain kinds of foods, such as stews, casseroles, pottages and porridges and for the consumption of alcohol; and may not have been so important for large parts of the cuisine, which may have been focused on bread and roasted or baked meat and vegetables for much of the time. Unlike charred cereals and animal bone assemblages, therefore, ceramics appear to have undergone cyclical changes (Chapter 8), both in popularity and complexity of variation and these will be explored below. The following chapter sets out to think about English ceramics from 1500BC to AD1086 in a decentred way; asking questions about the role of ceramics and their importance for regional cuisines in the period.

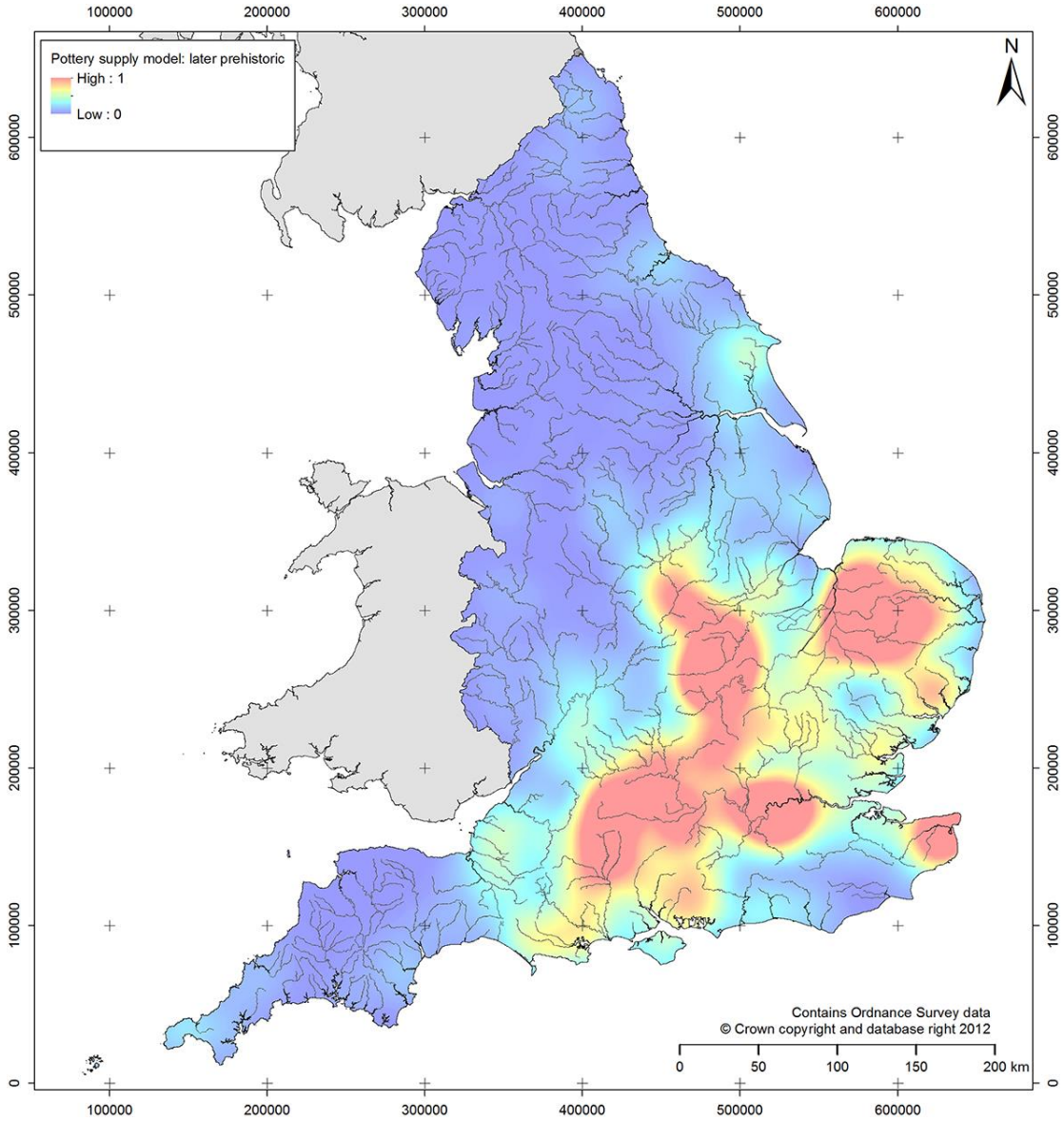


Figure 7.1: Map of the density of later prehistoric pottery records in England (After Cooper et al. forthcoming based on Earl et al. 2008), values are expressed as a decimal from 0 (lowest) to 1 (highest) (the density of records is normalised to vary from 0 to 1 by dividing by the maximum value to allow cross-comparison).

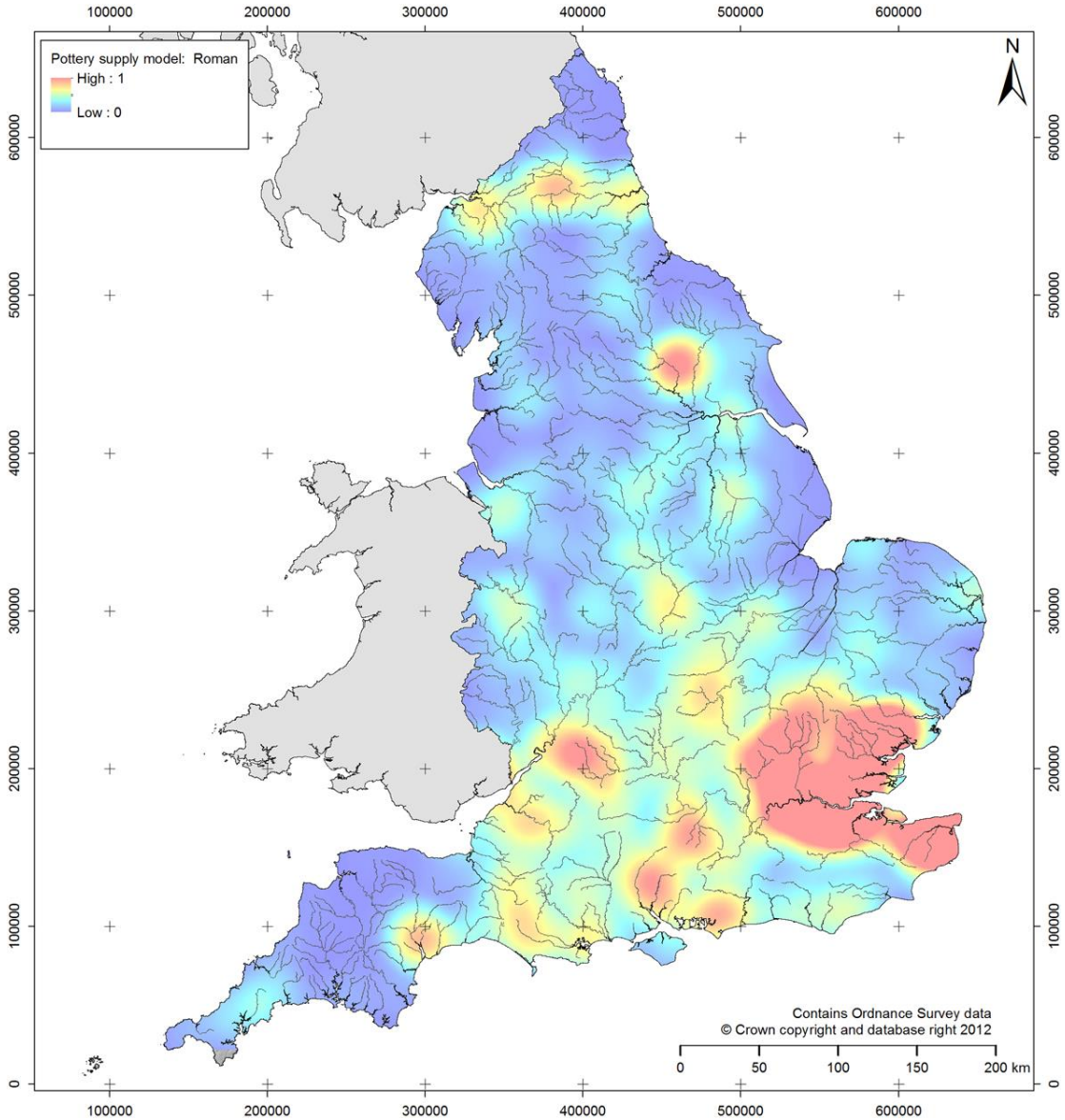


Figure 7.2: Map of the variety of Roman Pottery fabrics in England (After Cooper et al. forthcoming, based on Tyres 2014) (values expressed as in Fig. 7.1).

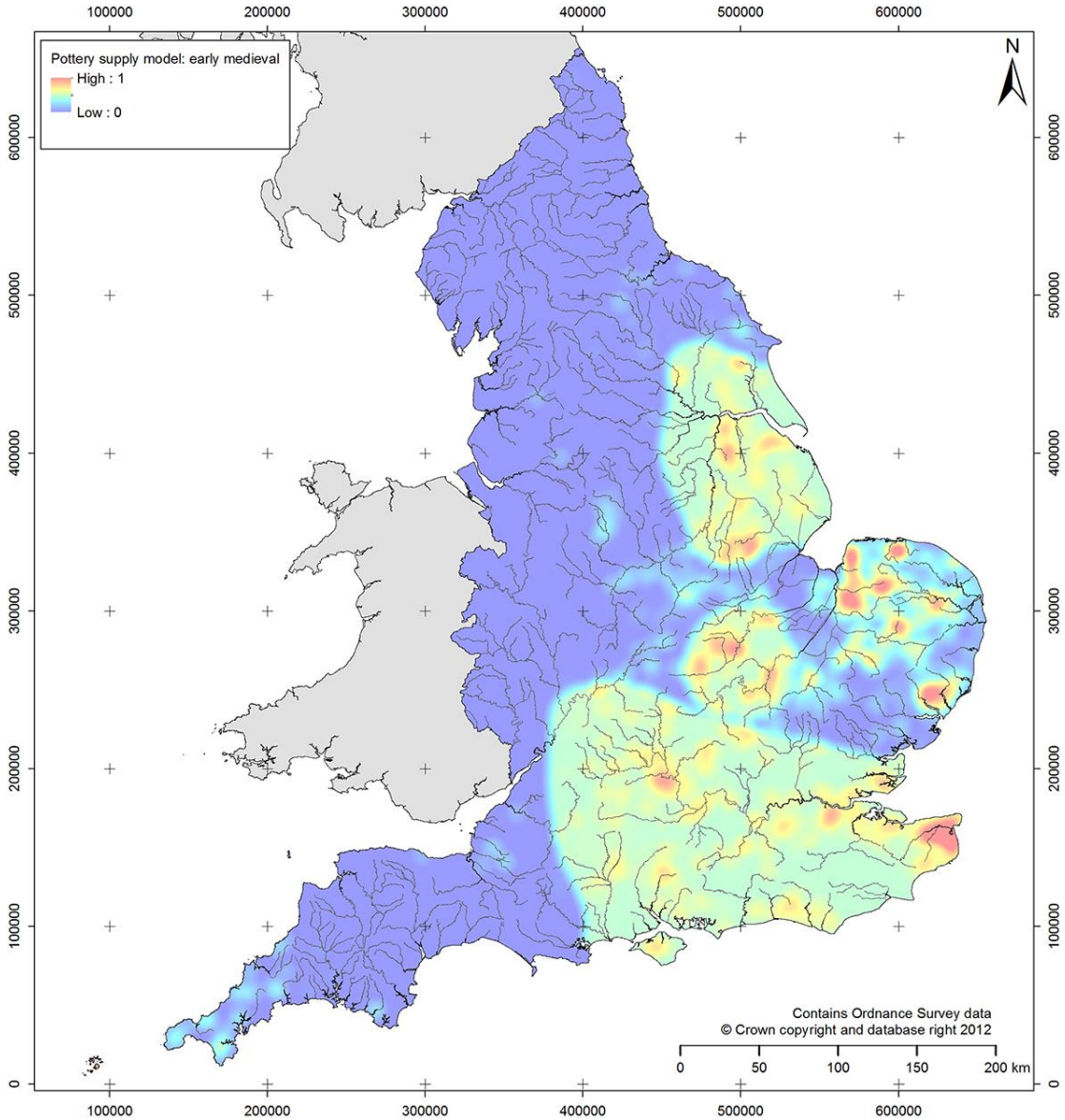


Figure 7.3: Map of distributions of early medieval pottery records/industries in England (After Cooper et al. forthcoming, based on Blinkhorn 2012 fig. 36; Martin 2015; Myres 1969 map 1; Vince 1993 Fig. 1; Wood 2011 Figs. 4.1 and 4.15) (values are expressed as in Fig. 7.1).

The ceramic data collected for this thesis shows a cyclical pattern over the long-term in the make up of ceramic repertoires by vessel class. These are always dominated by jars and bowls from the MBA until the end of the LAS period, but in the Roman period diversify into a repertoire with more individualised serving vessels, before returning to a jar and bowl dominated pattern in the early medieval period. However, this cyclical pattern has a regional inflection with jar/bowl dominance being strongest in the UTV and weakest on the route of HS1

and in the South-East more generally, where individual serving vessels such as cups and small bowls are present from the LBA-EIA. Section 7.2 therefore investigates these regional patterns of ceramic repertoire using the same three CSAs used to investigate cereal cultivation (Chapter 5) and animal bones (Chapter 6) and attempts to link them to the regional ecological systems established through the investigations detailed in chapters 5 and 6.

Having postulated the occurrence of cyclical patterning in the use of ceramic repertoires the question that arises in the context of this thesis is: what does this pattering mean for our understanding of food consumption? Following Fuller and Rowlands (2011) and Haaland (2007) we might interpret the use of jars and bowls as primarily being involved in the preparation of wet and sloppy foods, such as stews, casseroles, pottages and porridges, which involve the mixing and homogenisation of ingredients, possibly from several different animals and/or plants. Foods prepared in this way may, therefore, have served as a material metaphor (Tilley 1999 chap. 2) for the mixing and binding of the community, as well as acting to literally bring together groups and sub-groups within the community through acts of communal eating (Dietler 2001; Fuller & Rowlands 2011). In contrast individual serving vessels allow not only individual servings, but also the consumption of distinct and recognisable parts of individual plants and animals, so that a sense of individuality rather than community may be reinforced and incorporated into the body through the consumption of food. Some individual serving vessels, often those used for the consumption of alcohol, can be incorporated into both communal and individualised rituals of consumption. Individual serving vessels in England in the later prehistoric and

early historic periods were often more highly decorated than jars and bowls, possibly having cognitive and emotional effects in setting some consumers off from others in settings of formalised and ritualised consumption and playing a role in educating different tastes in different groups (Gosden 2005, 197). Cycles of consumption in ceramic repertoires over the long-term, oscillating between the almost exclusively jar/bowl dominated and those incorporating individual serving vessels, may then, be an indication of changes in the importance of different styles of consumption and may link to long-term oscillations in forms of expression (Deleuze & Guattari 2011 chap. 11) across a range of different material culture, including architecture and field systems (Chapter 8).

The distinctive sets of material culture represented by exclusively jar/bowl ceramic repertoires and those incorporating individual serving vessels were often partially exclusive, being associated with different sections of communities and/or different sets of individuals within communities. These differences are often manifested in assemblage differences between different kinds of settlement and there is a long history of investigation of these in the literature on ceramics. Section 7.3 therefore sets out to investigate differences in the composition of assemblages by vessel class at different kinds of settlement in the three CSAs, using the same settlement typology as used in chapters 5 and 6. The following section begins with the investigation of ceramic repertoires at a regional scale.

7.2 Ceramic Repertoires

7.2.1 Ceramic repertoires in the Upper Thames Valley 1500BC-AD1086

At first sight ceramic repertoires (the varying composition of ceramic assemblages according to vessel class) seem to bear surprisingly little relationship to the variations in cereal cultivation and animal husbandry described above, given that ceramics constituted one of the primary technologies for processing and consuming food in the CSAs. However, as with crops and animals, there were distinctive regional patterns of ceramic consumption, with nuanced continuities between the regions. This distancing of ceramics from changes in charred cereal and animal bone assemblages is bound up with the role of ceramics in social expression described above; so that the use of ceramics is as much about distinguishing between different people as it is about eating and drinking. Ceramic vessel class was compared using weight as a measurement, as estimated vessel equivalents were not available in useable form and sherd count is argued by Orton and Hughes (2013a , 207–8) to be biased towards fragile vessels, such as beakers, which fracture into a greater number of sherds more easily than more robust ones such as jars (3.3.1).

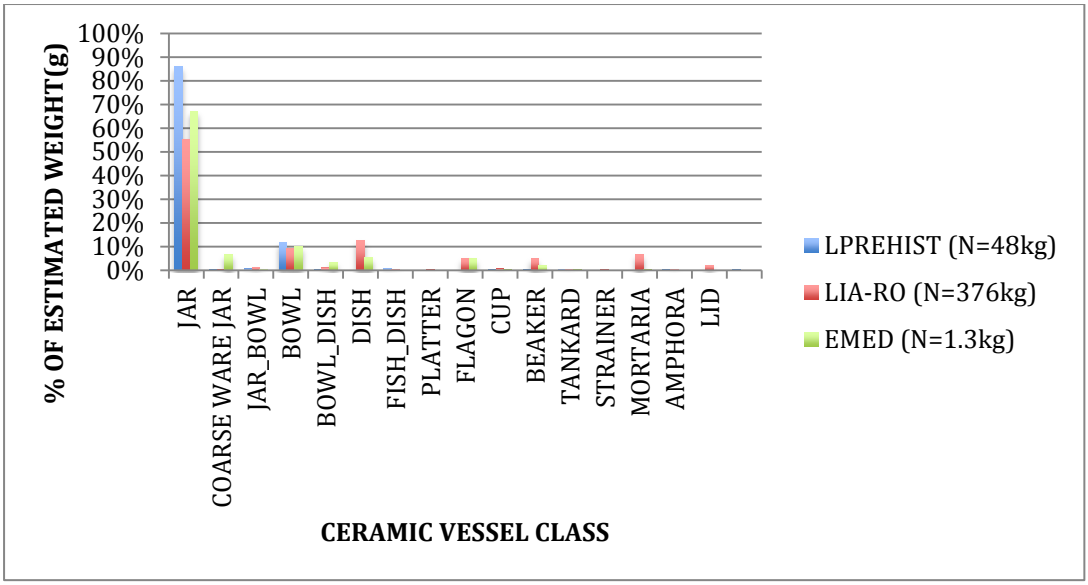


Figure 7.4: UTV ceramic vessel class by % of estimated weight.

In the later prehistoric period in the UTV ceramic repertoires were heavily dominated by jars, which accounted for over 80% of the assemblage by weight, with bowls supplying much of the remainder of the assemblage (Fig. 7.4). This very heavy jar dominance suggests a ceramic tool-set oriented towards communal cooking and consumption of wet/sloppy foods and is not distinctive to the region, being a common feature of later prehistoric ceramic assemblages across southern England (Cunliffe 2005, appendix A). The jar-dominated nature of the material suggests a lack of distinction between vessels for cooking and vessels for eating and therefore, arguably of gender and age differences in styles of consumption (Hill 2002, 148). Such a pattern may also perhaps be explained by the UTV sample bias, in that the dataset comprises sites of a fairly uniform type, without much evidence for status differentiation. Had the sample, or indeed the region, included a greater number of hillforts and ringworks, for example, then ceramic repertoires may have been more diverse; as is the case in LBA-EIA East Anglia, where Brudenell (2012) has recorded a number of ringwork assemblages with high proportions of fine ware bowls and cups and high

proportions of decorated material, as at Mucking North and South Rings in Essex (ibid. 292–3).

Strikingly there was a significant degree of continuity in the composition of the UTV later prehistoric and LIA-RO assemblage, with the LIA-RO assemblage continuing to be very heavily dominated by jars, a pattern typical of low status rural assemblages in Roman Britain as a whole, according to Evans (2001, 28). Some eating-related forms were present in the assemblage, including bowls, dishes and mortaria, but in general these forms were comparatively rare (Fig. 7.4). Drinking-related forms were rarer still and this is a distinctive feature of the UTV assemblage in this period, in comparison to the HS1 CSA. This distinctive UTV pattern has been recognised by Cool, and contrasted to similar rural assemblage patterns in the Nene Valley and the East Midlands more broadly (Cool 2006, 192). The composition of the LIA-RO assemblage suggests that the dominant function of ceramics continued to be cooking and possibly some form of communal serving, but in addition a small amount of pottery was required for individualistic forms of consumption, perhaps among the higher status members of the community. This pattern may, as in later prehistory, also reflect sample bias to a degree, with the relative lack of high status sites in the sample (Fig. 4.2) perhaps reducing the number of drinking related forms.

Ceramic repertoires in the early medieval period do not seem to have undergone the same degree of change as cereal cultivation and animal husbandry, with the relative proportions of different vessel types instead returning in a cyclical manner to a pattern more like that seen in later prehistory. Jars and bowls once

again dominated the assemblage (Fig. 7.4), with relatively few eating and drinking-related types. This suggests a return to more communal forms of eating and drinking at those sites that did have specialist eating-vessels in the Roman period and less individualistic forms of display in consumption.

7.2.2 Ceramic repertoires in the Middle and Lower Thames Valley 1500BC-AD1086

As with cereal cultivation and animal husbandry regionally distinct patterns of ceramic consumption were present in the MLTV throughout later prehistory, the Roman period and the early medieval period (Fig 7.5). If graphed by context date (Fig. 7.5) then all phases appear dominated by amphorae. However, graphing the material by ceramic date (Fig. 7.6) clearly demonstrates that this pattern is the result of taphonomic factors, as the proportion of amphorae and other Roman vessel types in the later prehistoric phase is close to zero in the latter graph and the proportion of early medieval vessels of these types much reduced. The pattern illustrated in Figure 7.5 must therefore be an effect of intrusion and residuality on deeply stratified urban sites in London and result from the recycling of material through the intercutting of features, which spread amphorae through the later prehistoric and early medieval phases. The disadvantage of graphing the data using ceramic dates is that the quantity of pottery included is much reduced (Figs. 7.5 & 7.6), meaning that rarer forms such as fish-dishes and spouted strainers are not included. Both kinds of graph are therefore included in this section.

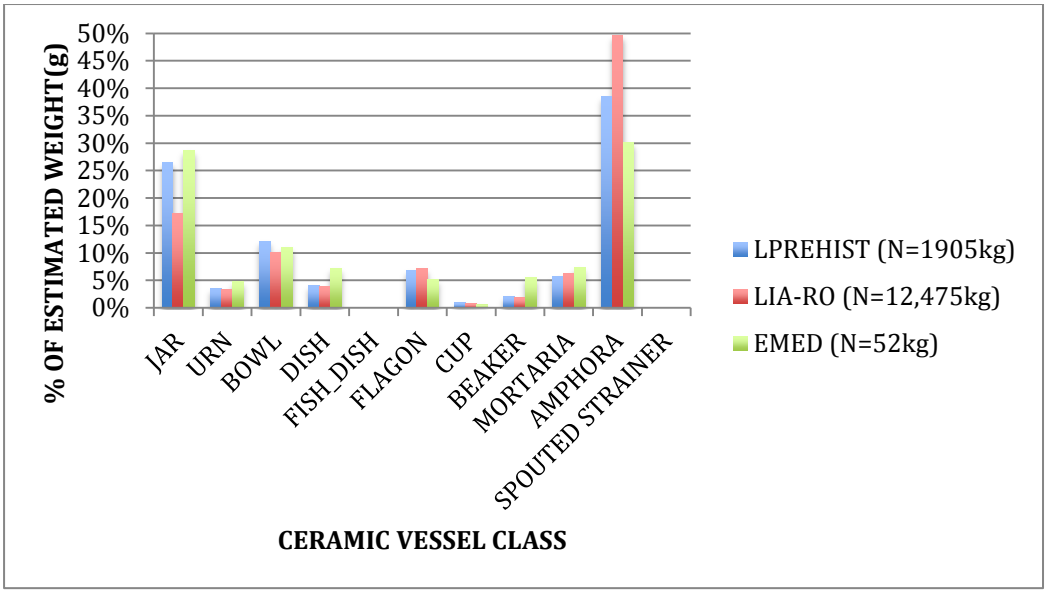


Figure 7.5: MLTV ceramic vessel class by estimated weight (context dates).

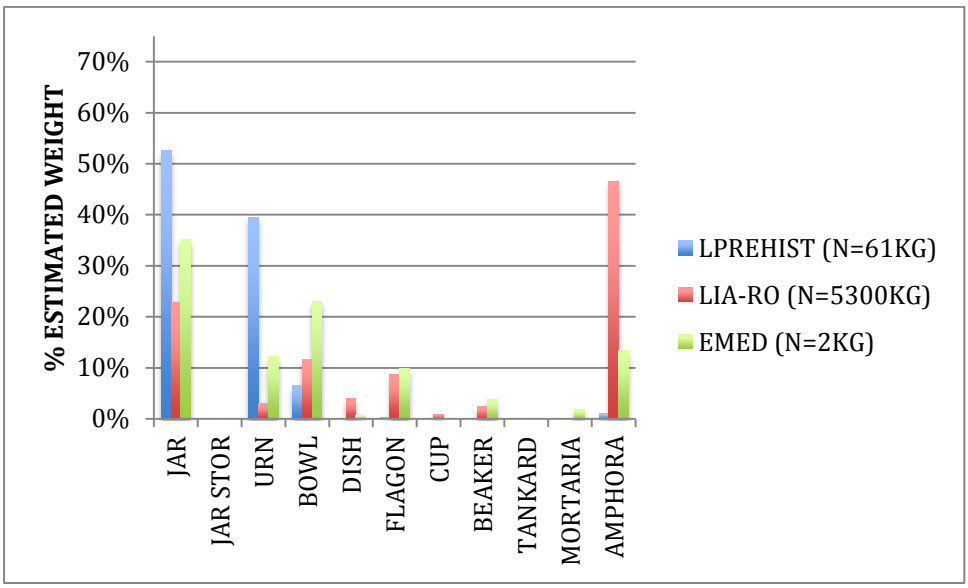


Figure 7.6: MLTV ceramic vessel class by estimated weight (ceramic dates).

For the later prehistoric period once amphorae and other intrusive forms are stripped out then the pattern is similar to that seen in the UTV, with jars and bowls dominating the assemblage and suggesting practices of communal cooking and eating, again with little element of individual display (Hill 2002, 149-50). This pattern, like that seen in the UTV is a common one in later prehistoric southern England (Cunliffe 2005, appendix A). The eating and drinking related

forms shown in Figure 7.5 relate to the patterns of residuality and intrusion discussed above.

The LIA-RO ceramic repertoire was heavily dominated by amphorae, which accounted for 46% of all vessel types by weight, when graphed by ceramic date (Fig. 7.6). However, it is worth noting that the use of weight to compare vessel forms works to exaggerate amphorae as a proportion of all vessel types, (Orton & Hughes 2013 , 207–8)(3.3.1). Despite this the proportion of amphorae is so much greater than the next most common form (jars) that we can be confident in the pattern. This pattern is regionally distinct, relating to the dominance of Roman London within the CSA, which evidently consumed elevated numbers of amphorae in common with other Roman towns (Cool 2006, 18 Table 3.1; Evans 2001, 33). After amphorae, jars and bowls were again the next most dominant forms at 23% and 12% by weight, although they were much less dominant than they had been in the later prehistoric period.

Dishes, flagons, cups and beakers all made up relatively minor proportions of the assemblage when graphed either by context date or ceramic date, with mortaria being virtually absent on the latter graph (Fig. 7.6). These relatively low proportions of eating and drinking vessels run contrary to expectations in a large Roman urban settlement (Cool 2006 p. 18 Table 3.1; Evans 2001, 28-31), but this can be explained by the interdependence (3.1.8) of the variables when expressed as percentages, with these forms effectively being crowded out by amphorae. The overall pattern of LIA-RO ceramics in the MLTV CSA, as with cereal cultivation and animal husbandry, seems to relate partly to changes initiated by

the introduction of the Roman economic/urban abstract-machine, involving the homogenizing of practices to an extent, but with subtle regional variations. So, for example, drinking vessels such as tankards and beakers on a broad level enabled similar practices of elite display related to dining (Hill 2002, 146-7) across Roman Britain, but also included regionally distinctive variation (Cool 2006). Examples of this regionally distinctive variation include the tankards produced by the Severn Valley and Black Burnished ware industries in the west and south-west of England and disproportionally consumed in these regions, and the beakers produced by the Nene Valley and Oxfordshire industries, which probably served a very similar function, but were more popular in central and eastern England, and on urban and military settlements (ibid.).

In the early medieval period there was a return to the later prehistoric pattern of jar and bowl dominance similar to that seen in the UTV CSA, with jars accounting for 35% by weight when graphed by ceramic date (Fig 7.6) and bowls for 23%. Other forms including urns (12%), flagons (jugs) (10%), beakers (4%) mortaria (2%) and amphorae (13%) were present, when graphed by ceramic date, but generally in lower proportions than when graphed by context date. The presence of the latter three categories is probably best explained by transcription errors in the original data, either in dating or identification, although it is also possible that some 5th or 6th century amphorae are present in the London dataset. Ceramic repertoires in the early medieval period in this region, therefore once again suggest a move away from individual display in dining and a return to more communal forms; although the importance of flagons (jugs), most of which probably belong to the MAS and LAS periods suggest that alcohol consumption

retained an important role and in this respect the assemblage is different to that of the later prehistoric period.

7.2.3 Ceramic repertoires on the route of HS1 1500BC-AD1086

Ceramic repertoires on the route of HS1 demonstrated the greatest differences between periods of all three case studies (Fig. 7.7). This is perhaps partly due to the use of the jar/bowl category employed as part of the OA ceramic typology, which appears to have been used particularly frequently to describe the HS1 material. This category is designed to describe vessels of which insufficient material remains to determine the height to diameter ratio of the vessel (Booth 2007); however, it is not clear why it was employed so frequently in this case. Later prehistoric ceramic repertoires in the HS1 region were almost entirely dominated by this category, which accounted for almost 100% by weight. Other vessel types included jars, fine-ware jars and two cups from South-East of Eyhorne Street and White Horse Stone, respectively (Champion 2011, 223), but in contrast to the other case studies, vessels made for eating and drinking were largely absent. The pattern (of difference) may, perhaps, also be explained by the relative lack of settlement continuity on the route of HS1, when compared to the other regions.

This pattern contrasts with the surrounding regions of Eastern England, in which cups (Champion 2011, 241) and other forms of specialist and highly decorated ceramics (Brudenell 2012) are more common and presents an interesting parallel with the animal bone data (Chapter 6), which is also unusual for the

region. These patterns are perhaps related to the specific upland (North Downs) and Wealdean environment.

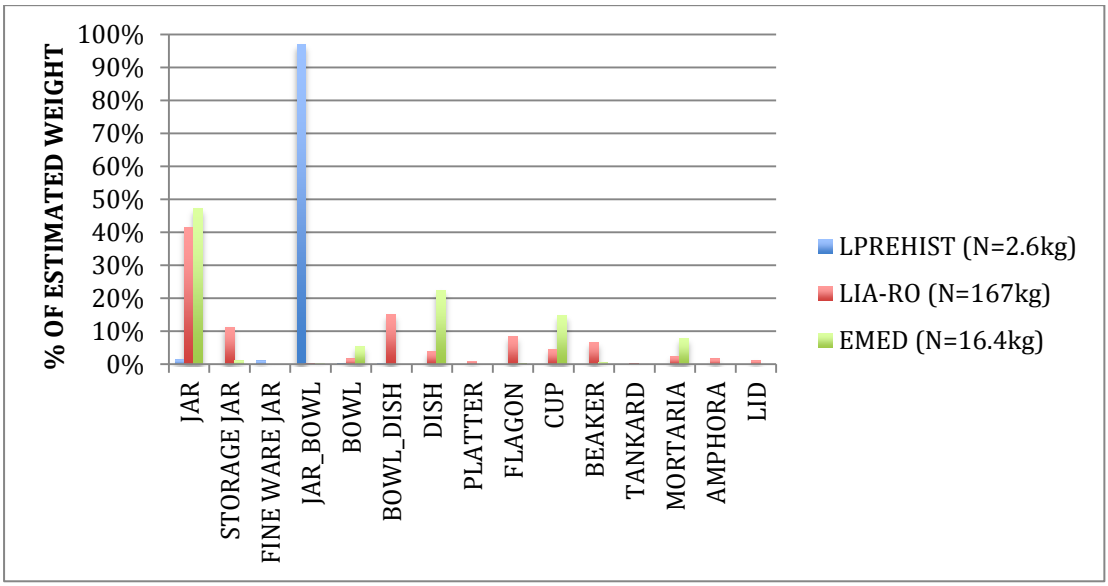


Figure 7.7: HS1 ceramic vessel class by % of estimated weight.

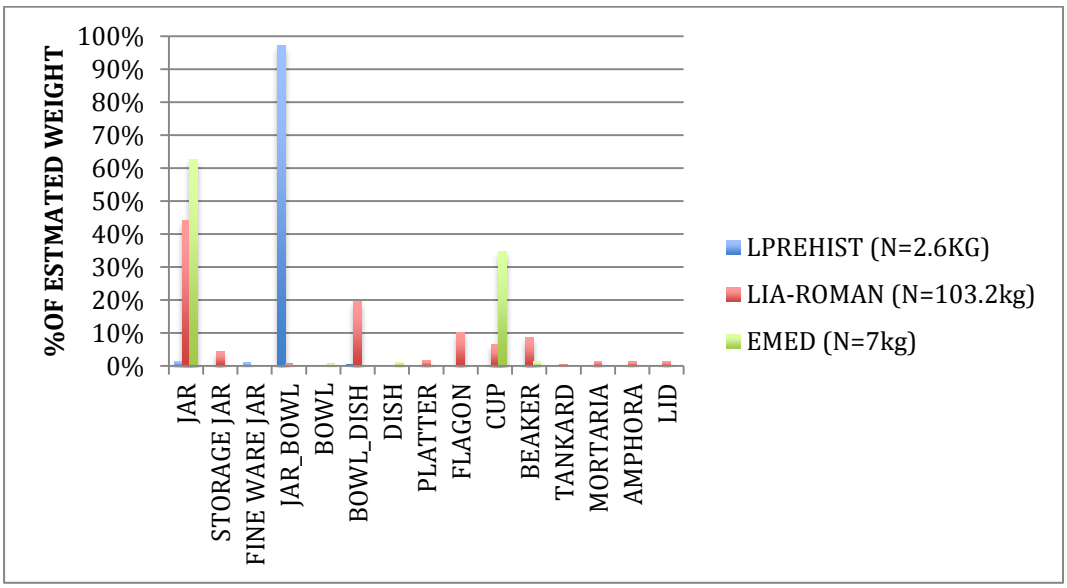


Figure 7.8: HS1 ceramic vessel class by % of estimated weight with Northfleet, Thurnham and Pepperhill removed.

LIA-RO ceramic repertoires on the route of HS1 (Fig. 7.7) were distinctive, differing from those in the UTV by having higher proportions of bowl/dish (15%) and storage jar (11.3%) and a lower proportion of jars (44%). HS1 ceramic repertoires were also made up of a relatively high proportion of

drinking-related types. Forms related to alcohol consumption such as flagons, beakers and cups were notably more common than in the UTV. These differences in ceramic form no doubt relate in part to differing practices of consumption, but are also filtered through the distinctive sample bias of the HS1 CSA, which includes Roman villas at Thurnham and Northfleet and a large cemetery at Pepperhill. However, when the HS1 ceramic assemblages are graphed without the material from these sites the proportion of flagons, beakers and cups increases slightly in percentage terms (Fig. 7.8). This effect is due to the interdependence of the variables when expressed as percentages (3.1.8), which factor in drops in the percentages of storage jars and amphorae. This is shown by the fact that, for example, while the percentage of flagons increases from 8.36% to 10.04 % of the assemblage, the weight of flagons is reduced from 22,336 g to 10, 357 g. Overall the presence of more villas and cemeteries in the sample is probably a factor in the higher proportions of drinking forms in the CSA, but may not account for all of the variation in these forms between the CSAs.

Early medieval ceramic material from the route of HS1 was jar and dish dominated (47% and 22% respectively), with large numbers of cups also present at 14% of estimated-weight (Fig. 7.7). Like the contemporary ceramic repertoires from the other two CSAs, the assemblage does not seem to reflect the degree of change seen in cereals and animal bone in this period, but instead indicates a return to more jar dominated, possibly communal forms of cooking and eating. The exception to this pattern is the number of cups, which may again reflect the specific cemetery site bias of the route of HS1 in the early medieval period, or reflect intrusive LIA-RO vessels (Fig. 7.7).

7.3 Ceramic repertoires in the Thames Valley and on the route of HS1 compared

Like cereals and animal species, ceramic repertoires displayed both differences and similarities between CSAs and across time (Table 7.1). However, the strongest similarities were this time seen in the later prehistoric period, with the greatest differences in the LIA-RO period. In addition, changes in ceramic repertoires seem to have followed a cyclical pattern, with a return to similarity between the CSAs in the early medieval period, although in the latter period, the similarities were not quite as marked as they had been in later prehistory. In later prehistory and to an extent in the early medieval period ceramic repertoires were dominated by forms best suited to communal cooking and serving of foods with a high liquid content, with no strong variation between the Thames Valley and HS1 regions to lend support from the ceramic evidence to Champion's (2011, 2014) argument for more porridge/pottage consumption in the South-East. In the LIA-RO period all three regions displayed strong continuity from later prehistory, with dominant forms continuing to be related to communal cooking and serving. However, emphasis within the more specialised eating and drinking related forms was quite different between the CSAs, with the UTV producing a notably lower proportion of such vessels than the MLTV and the route of HS1, and having a greater focus upon eating-related and food processing vessels instead. In contrast the MLTV had a greater emphasis on drinking related forms, particularly flagons and on amphorae, while the HS1

region had an even greater emphasis on drinking related vessels. The early medieval period saw a return to similarity between the regional repertoires, which were again dominated by cooking and eating related forms in all three CSAs, although ceramic repertoires in the MLTV region also included higher proportions of flagons (jugs) and bowls and the route of HS1 included higher proportions of cups. Similarities between the LIA-RO period and early medieval repertoires in the MLTV indicate a partial exception to the pattern and are related to the agency of the urban abstract-machine which operated in similar ways in the LIA-RO and early medieval periods (5.1.2; 6.2.2).

Table 7.1: Ceramic repertoires* by period and CSA.

	Later Prehistory		**LIA-Roman**		**Early Medieval**	
UTV	Jar	86%	Jar	55%	Jar	55%
	Bowl	12%	Dish	13%	Bowl	10%
			Bowl	9%	Coarse Ware Jar	7%
			Mortaria	6%	Dish	6%
			Flagon	5%	Flagon	5%
			Beaker	5%	Bowl/Dish	3%
			Jar/Bowl	1%	Beaker	2%
MLTV	Jar	53%	Amphora	46%	Jar	35%
	Urn	39%	Jar	23%	Bowl	23%
	Bowl	7%	Bowl	12%	Amphora	13%
	Amphora	1%	Flagon	9%	Urn	12%
			Dish	4%	Flagon/Jug	10%
			Urn	3%	Beaker	4%
			Beaker	2%	Mortaria	2%
			Cup	1%	Dish	1%
HS1	Jar/Bowl	96%	Jar	41%	Jar	47%
	Jar	1%	Bowl/Dish	15%	Dish	22%
			Storage Jar	11%	Cup	15%
			Flagon	8%	Mortaria	8%
			Beaker	7%	Bowl	5%
			Cup	5%	Storage Jar	1%
			Dish	4%		
			Bowl	2%		
			Amphora	2%		
			Platter	1%		

*Vessel forms accounting for < 1% by weight are not listed.

7.4 Ceramic repertoires at settlement level: variations between different kinds of site

7.4.1 Introduction

Having analysed variation in ceramic repertoires by region, the following section moves on to investigate such variation at different kinds of settlement focusing on the three regional CSAs used in the rest of the thesis and using the same taxonomy of settlement developed for Chapters 5 and 6. Ceramicists were among the first finds specialists to study variation in the distribution of their data by settlement type and such studies, like those of faunal remains (Chapter 6) have had a long history of bearing fruit. For the later prehistoric period Brudenell (2012) has compared assemblages from LBA-EIA ring-works to those from other kinds of site in East Anglia, while for the LIA-RO period various authors including Evans (2001) and Pitts (2005) have compared ceramic assemblages from different kinds of settlement both on a national scale and at a regional level in the South-East of England. All three of these authors have linked variation in ceramic material to variations in consumption and social status. For the early medieval period no similar work has been carried out, probably because much EAS pottery derives from cemetery rather than settlement contexts (Myres 1969, 16). However, this makes the analysis carried out in the following section potentially more valuable. The methodology adopted for the quantification of pottery is discussed in Chapter 3 (3.3.1) and the methodology for classifying sites by type in Chapters 3 (3.2.2) and 5 (5.4.1).

7.4.2 Ceramic repertoires on unenclosed, enclosed, and complex settlements in the Upper Thames Valley

7.4.2.1 Introduction

For the purpose of analysis pottery has been divided into functional vessel classes (3.2.4; Table 3.3) and compared using percentage of weight (3.3.1) by CSA and site type following the regional analysis (7.1). In addition decorated and non-decorated sherds have also been compared as a percentage of weight by the same criteria. For the analysis of the UTV data individual sites known to be of a particular type were extracted from the ceramics table by Filemaker query, rather than using the EngLaId site type thesaurus, in order to avoid the overlap in sites of different date created by the former method (3.2.2; 5.4.2.1; 6.4.2.1). Again this was possible because the UTV CSA comprises fewer sites than the other case studies.

7.4.2.2 Upper Thames Valley unenclosed settlement

Later prehistoric unenclosed settlements in the UTV were dominated by jars, which accounted for 87% of the assemblage by weight and to a lesser extent by bowls, which accounted for 12%. Other vessel forms each comprised < 5% (Fig 7.9). Decoration was relatively common on later prehistoric material, with 45% of sherds having some form of decoration (Fig 7.10).

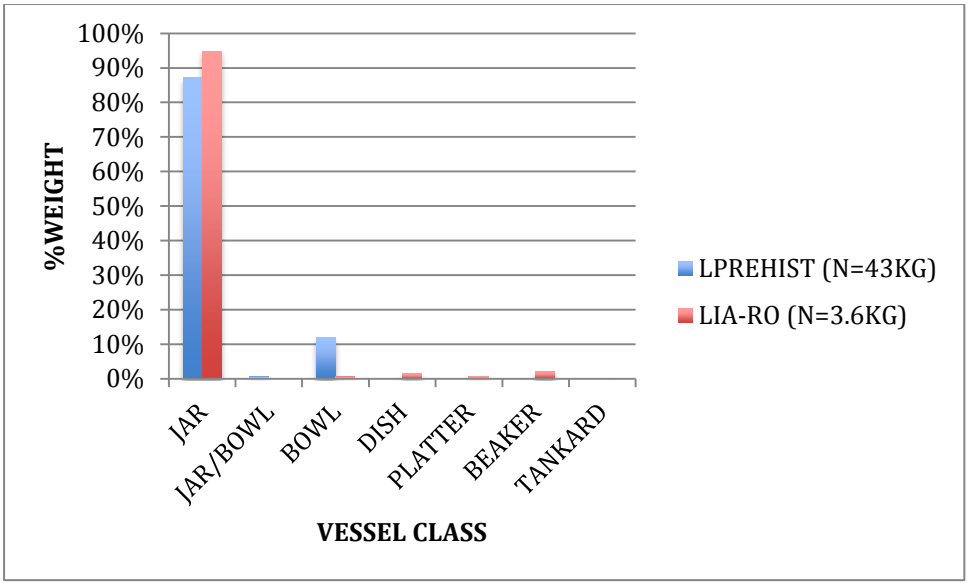


Figure 7.9: Ceramic vessel class at UTV unenclosed settlements by % of weight.

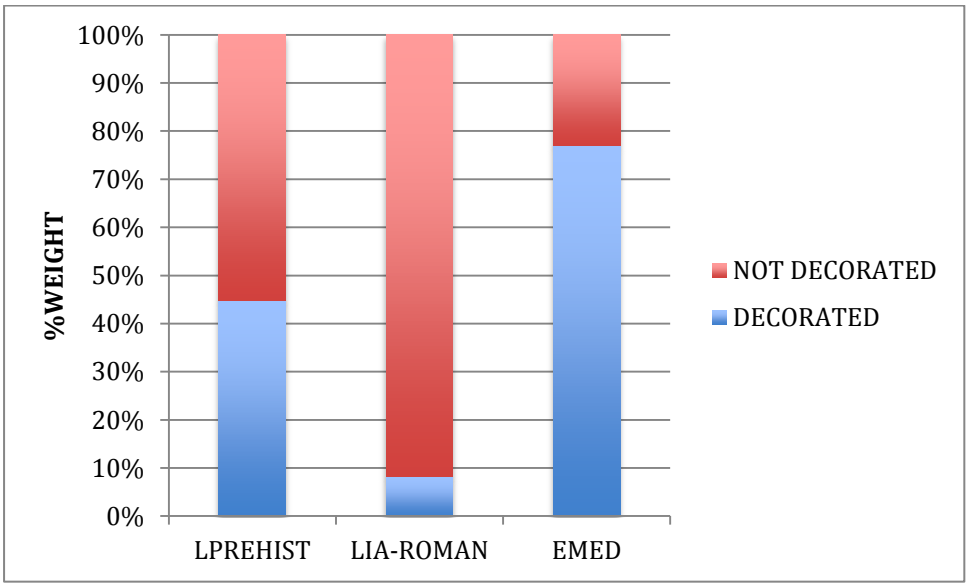


Figure 7.10: Decorated versus undecorated ceramics from UTV unenclosed settlements by % of weight.

The picture of jar and bowl dominance in later prehistory compares well with the regional pattern (Fig 7.4), which was the most jar and bowl dominated of all three CSAs. However, bowls were very marginally less common (3%) regionally than at unenclosed settlements alone, suggesting very slightly lower proportions of non-jar and bowl forms at unenclosed settlements. A jar and bowl dominated repertoire is also common for later prehistoric settlements more generally, being found across the Southern British ceramic using zone (Brudenell 2012; Cunliffe

2005; Sharples 2010). However, relatively little work has been carried out to relate ceramic repertoires to settlement status and the presence of boundaries. The high proportion of decorated material from later prehistoric unenclosed sites is somewhat surprising given the lack of variation in the repertoire of vessel forms and this perhaps demonstrates the lack of a strong relationship between decoration and form.

The picture of jar and bowl dominance seen at UTV unenclosed sites seems to have continued largely unaltered in the LIA-RO period, with jars comprising 95% of the assemblage by weight and the only other marginally significant vessel form being beakers, which accounted for 2% of the assemblage. This pattern of almost total jar dominance fits with the typical vessel profile of "basic rural settlement" according to Evans (2001, 28) and unenclosed settlements from the UTV certainly fit into this category. However, the fact that the proportion of jars in the LIA-RO settlement is greater than that from the same sites in later prehistory and the near total absence of individual serving vessels is interesting, reinforcing the perception of low status attached to these sites by their lack of boundaries and their botanical and faunal profiles. Furthermore, the proportion of the assemblage with decoration was much lower (8%) than in the later prehistoric period. No data on ceramic vessel class from unenclosed settlements is available for the early medieval period; however, a very high proportion of the material (76%) is decorated. This is most likely explained by the chronological breakdown of early medieval settlement and material culture, with most EAS settlement being unenclosed (Hamerow 2012, 70-72) and EAS ceramics often being highly decorated (Myres 1969).

7.4.2.3 Upper Thames Valley enclosed settlement

Later prehistoric enclosed settlements in the UTV were less jar/bowl dominated than unenclosed settlements, although jars (57%) still made up the largest proportion of the assemblage (Fig. 7.11), with bowls accounting for 15% of the assemblage. When graphed by context date (Fig 7.11) dishes appear to have made up 17% and beakers 6% of the assemblage, so the ceramic repertoire seems to have included a much wider range of vessels associated with the serving of individual portions. However, these vessels almost certainly comprise intrusive Roman material. Unfortunately the query which was used to extract data by settlement type from the database, which was different from that used for the MLTV and the route of HS1, relies on the use of context dates and so this hypothesis cannot be checked against a graph made using ceramic dates. Other vessel forms all accounted for < 5% of the assemblage by weight. Decorated later prehistoric material made up 42% of the assemblage by weight (Fig 7.12) a very similar proportion to that from unenclosed settlements.

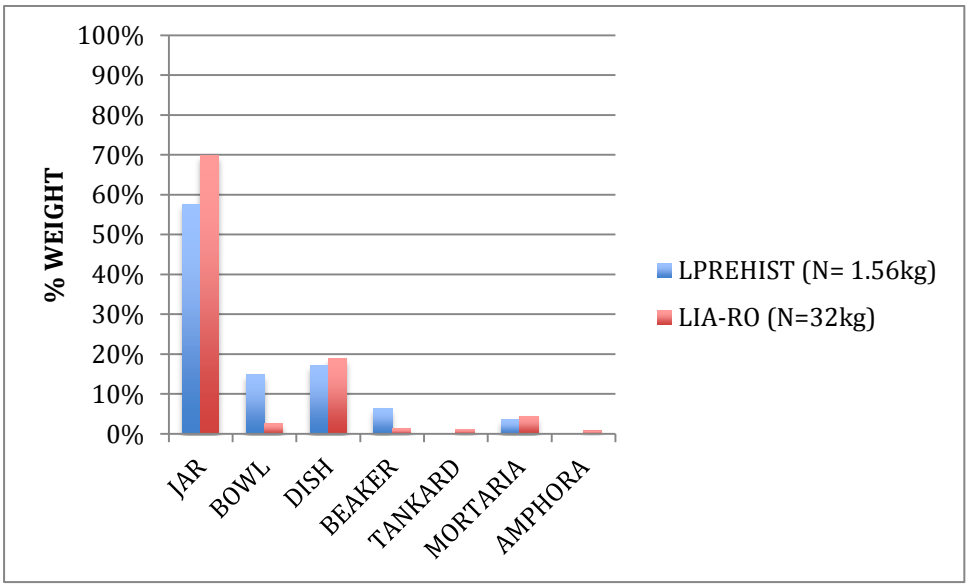


Figure 7.11: Ceramic vessel class from UTV enclosed settlements by % of weight.

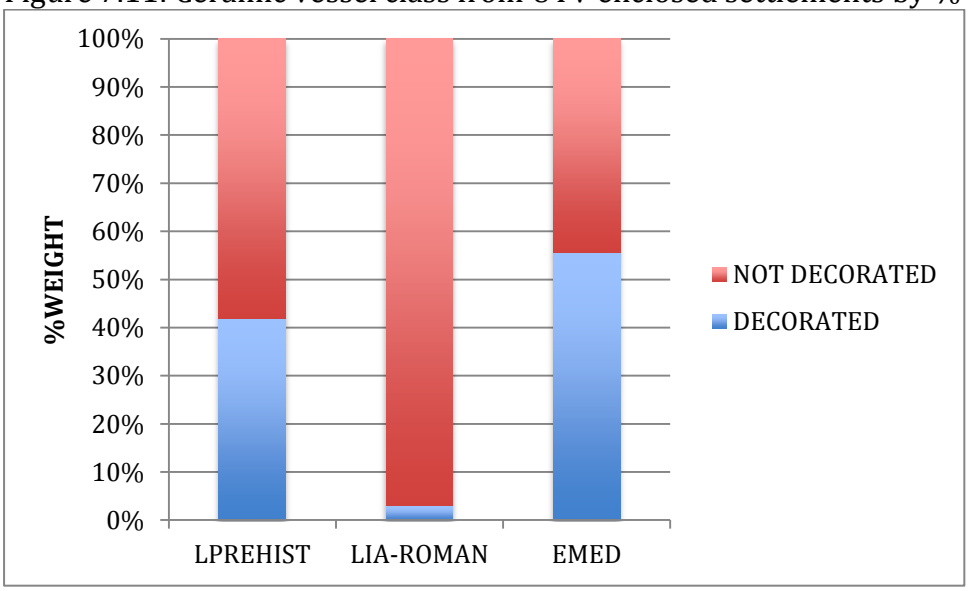


Figure 7.12: Decorated versus undecorated ceramics from UTV enclosed settlements by % of weight.

The later prehistoric picture of a more varied ceramic repertoire contrasts with the regional pattern (Fig. 7.4) to a much greater extent than the picture from unenclosed settlements. However, it should be borne in mind that the repertoire was still jar dominated, again in line with later prehistoric assemblages in general and would still have facilitated the cooking and consumption of wet stews and porridges more easily than drier individual portions. The slightly lower proportion of decorated material than seen on unenclosed settlements reinforces the perception generated by the data from those sites that decoration may not have been closely linked to variation in functional vessel class.

The LIA-RO assemblage from UTV enclosed settlements showed continuity, both with the broader chronological picture in actually being more jar dominated (78%) than the preceding later prehistoric period and with the LIA-RO regional pattern, in having a more complex repertoire in terms of individual serving vessels than contemporary unenclosed settlements. The LIA-RO ceramic

repertoire continues to fit within Evans' definition of "basic rural settlements"; however, in having a higher proportion of jars than dishes, bowls and drinking vessels (Evans 2001, 28). The proportion of decorated material from LIA-RO enclosed settlements (5%), also continued to fit the regional and chronological pattern by being much lower than that seen in later prehistory and marginally lower than that seen from unenclosed settlements. Once again no data on functional vessel class were available for the early medieval period, but much of the material (55%) was decorated.

7.4.2.4 Upper Thames Valley complex settlement

Later prehistoric assemblages from complex settlements in the UTV were positioned in between unenclosed and enclosed settlements in terms of jar/bowl dominance. Jars made up 62% of the assemblage by weight, bowls 34% and jar/bowls 5% (Fig 7.13). The remaining vessel forms each amounted to < 5%. The later prehistoric assemblage was less highly decorated (25%) than the contemporary material from unenclosed and enclosed settlements (Fig 7.13).

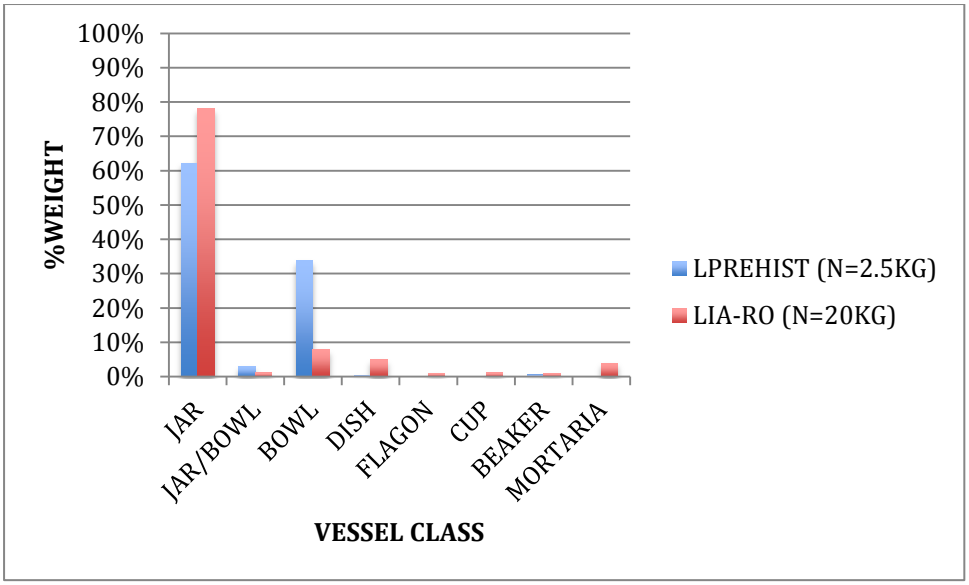


Figure 7.13: Ceramic vessel class from UTV complex settlements by % of weight.

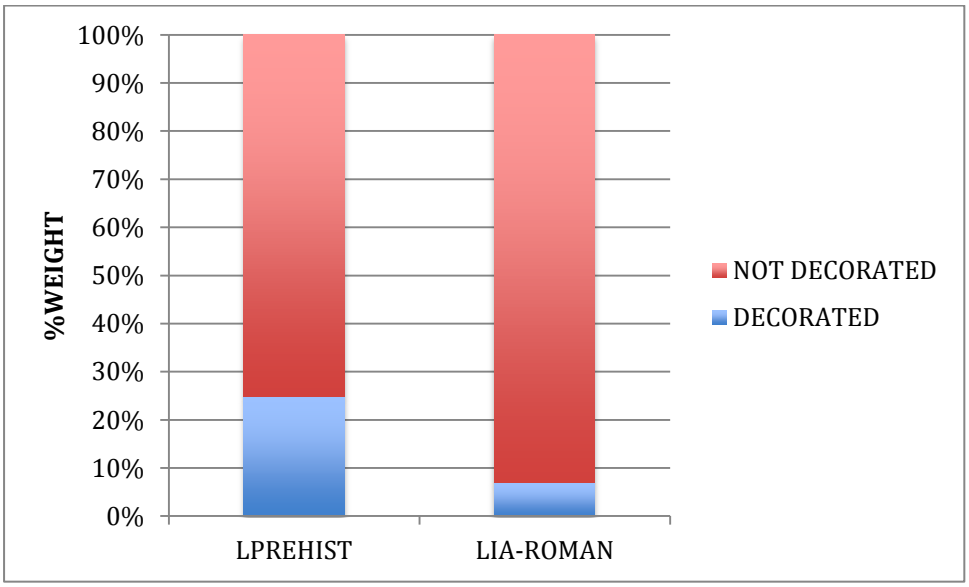


Figure 7.14: Decorated versus undecorated ceramics from UTV complex settlements by % of weight.

Later prehistoric ceramic repertoires from complex settlements included a relatively high proportion of jars, but also a high proportion of bowls and therefore conformed to the regional pattern for communal cooking and serving vessels in this period, whilst having a much higher proportion of serving vessels (bowls) than the two other kinds of settlement (Fig 7.4). Complex settlements could therefore be interpreted as having seen more commensal consumption (Dietler 2001), than other types of settlement, but with a communal rather than

individualist inflection. Again this fits with broader ceramic patterns for Southern Britain as whole (Brudenell 2012; Cunliffe 2005; Sharples 2010). The proportion of decorated material is interesting for being relatively low compared to unenclosed and enclosed settlement and again seems unrelated to the nature of the vessel repertoire.

LIA-RO ceramic repertoires from complex settlements in the UTV continued the regional trend seen at unenclosed and enclosed settlements, of producing a higher proportion of jars (78%) than similar settlements from the preceding period. The proportions of serving vessels at complex LIA-RO settlements like those in the later prehistoric period lay between unenclosed and enclosed settlements, suggesting a degree of continuity in consumption practices, although in the LIA-RO period these were characterised by more individualised serving vessels, such as dishes, flagons, cups and beakers. Once again consumption patterns fitted into broader province wide practices as discussed by Evans and Pitts (2001; 2005). Approximately 8% of LIA-RO material was decorated, in line with the pattern at unenclosed settlements, but slightly higher than the proportions at enclosed settlements, once again reinforcing the perception of a lack of relationship between variability in ceramic form and levels of decoration.

7.4.3 Upper Thames Valley ceramic repertoires at unenclosed, enclosed and complex settlements compared

The comparison of different kinds of settlement in the UTV in terms of ceramic vessel class and the proportion of decorated material in the different

assemblages reveals interesting contrasts between settlement types, but also a degree of continuity between later prehistory and the LIA-RO period. Unfortunately there are no data on ceramic vessel class from the early medieval period, although information on decoration is available. In terms of ceramic vessel class all three settlement types were jar dominated; however, the proportion of jars to other vessel types in each type of assemblage varied. In the later prehistoric period unenclosed settlements were the least varied in terms of vessel class, with bowls, which accounted for 6% of the assemblage by weight, being the only important form apart from jars and with just under half of sherds having some form of decoration. In contrast jars were far less dominant at later prehistoric enclosed sites, with bowls making up a larger proportion. However, the proportion of decorated material at enclosed settlements was slightly less than at unenclosed settlements. Overall, complex settlements were more varied than unenclosed settlements, but not as varied as enclosed settlements. Complex settlements demonstrated a lower proportion of jars than unenclosed settlements, but a greater proportion than enclosed settlements and bowls formed a greater proportion of vessels than they did at either unenclosed or enclosed settlements, but other kinds of serving vessel did not make up more than 5% of the assemblage by type. Decoration at complex settlements was only present on approximately 25% of the assemblage. Following the arguments advanced in section 7.1, it might therefore be suggested that more elaborate serving of food and drink, including individual portions, occurred at enclosed settlements, correlating with other markers of status, such as elaborate settlement boundaries, greater abundance of wheat compared to barley and more cattle/pig. Complex settlements would then have seen less of this activity

than enclosed settlements, but more than unenclosed settlements, which saw the least.

In contrast to the later prehistoric period the LIA-RO period actually sees less variation in ceramic vessel class and less decoration, but this may be an effect of the greater volume of material present in the latter period. The assemblage from unenclosed settlements in the LIA-RO period was very heavily dominated by jars, with other ceramic forms each accounting for <5% of the total and decorated material amounting to no more than 8% by weight. This assemblage is therefore less varied in terms of form and less decorated than its equivalent from the later prehistoric period. LIA-RO enclosed settlements were much more diverse than unenclosed settlements in ceramic terms, having a lower proportion of jars and a higher proportion of dishes than unenclosed settlements; although in a reflection of the regional pattern for the UTV, proportions of other forms of serving and processing vessel were still not particularly great. Enclosed LIA-RO settlements also had a slightly lower proportion of decorated sherds than unenclosed sites, suggesting a lack of direct correspondence between serving vessels and decoration, display and the senses. LIA-RO complex settlements are once again situated between unenclosed and enclosed settlements in terms of jar dominance and decoration, having a lower proportion of jars than enclosed sites but a higher proportion than unenclosed settlements and with the proportion of serving vessels occupying a similar position in the hierarchy. The proportion of decorated material from complex settlements, which represented approximately 8% of the total, was very similar to that from other kinds of settlement. All three

main forms of LIA-RO settlement in the UTV therefore showed a strong degree of continuity with their equivalents in the preceding period.

It is possible therefore to argue for a settlement hierarchy in the use of later prehistoric and LIA-RO ceramics, ascending from unenclosed settlements to complex settlements to enclosed settlements, with a greater reliance on communal cooking and serving vessels such as bowls and jars at unenclosed sites and a wider availability of serving vessels capable of being used for individual servings at enclosed sites. However, there does not seem to be a correlation between this pattern and occurrence of decoration. The pattern correlates with equivalent patterns in cereal cultivation and animal husbandry, in which wheat and cattle/pig are favoured at enclosed sites, but seems clearer cut than these. It suggests more community scale feasting may have occurred at enclosed settlements, with a certain amount of individual display, although the regional pattern means that this display was more focused around dishes and bowls, than, for example, vessels used for the serving of alcohol. Unfortunately no data on vessel class is available for the UTV in the early medieval period and so a continuation of the comparison is not possible. However, data on decoration does suggest some differences, with unenclosed settlements having far more decorated material as a proportion of the assemblage (78%) than enclosed settlements (55%). As with early medieval cereals and animal bones this is largely a result of chronology, with the unenclosed settlement relating largely to the EAS period and enclosed settlement to the MAS and LAS. EAS pottery in the UTV was evidently therefore more highly decorated than in the later periods.

7.4.4 Ceramic repertoires at different kinds of settlement in the Middle and Lower Thames Valley

7.4.4.1 Introduction

The analysis of ceramic repertoires from different types of site in the MLTV used a largely identical methodology to the analysis of data from the UTV. However, comparison between settlement types for this CSA followed Chapters 5 and 6 (5.4.4.1 & 6.4.4.1) in dividing the data between urban and rural rather than unenclosed, enclosed and complex settlements (3.3.1). In addition, vessel types were graphed by context date and ceramic date, for the same reasons as in (7.2.2) above.

7.4.4.2 Londinium

When graphed by context date (Fig. 7.15) assemblages from within the walls of 3rd century London are dominated by amphorae in all three periods (43%, 51% and 47% respectively) and when graphed by ceramic date (Fig 7.16) the results are identical. These results arise primarily from the huge discrepancy in volume of material available between later prehistory (2kg) and the early medieval period (11kg) on the one hand and the LIA-RO period (5126kg) on the other, combined with the tendency of weight measurements to exaggerate heavier fabrics at the expense of lighter ones (Orton & Hughes 2013, 206–7) (3.3.1). In this case the 12 amphorae sherds that dominate the later prehistoric assemblage come from a single context dated to the LBA-EIA and are probably either misdated or misidentified. Residuality and intrusion also affect the picture, even

when the material is graphed by ceramic date as many amphorae which have been assigned an LAS date in the MOLA database are indicated as Roman and residual in the comments field. Given these problems it is probably safe to assume that any LIA-RO forms (dishes, mortaria, amphorae etc) dated as either later prehistoric or early medieval on Figures 7.15 and 7.16 are either residual or intrusive.

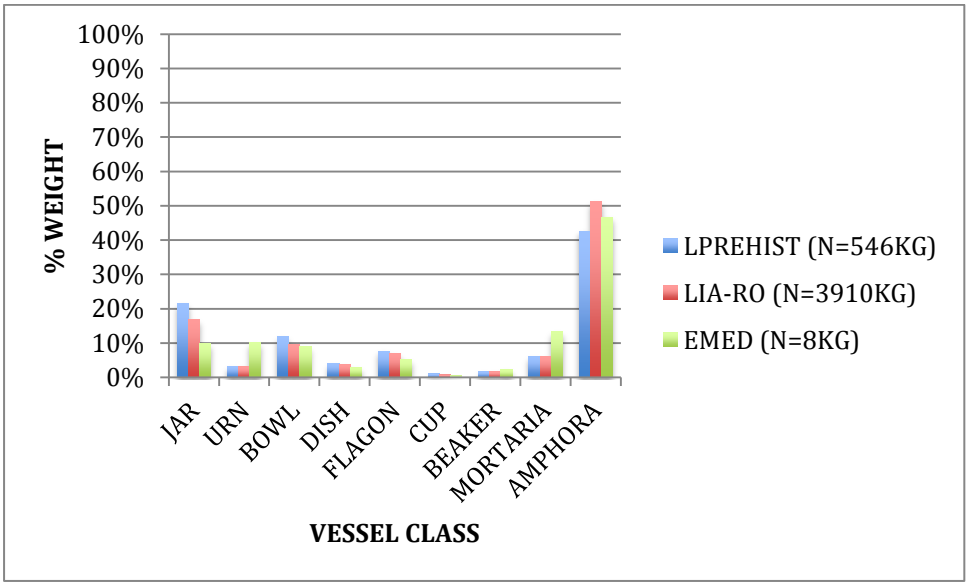


Figure 7.15: Ceramic vessel class from within the walls of 3rd century London by % of weight (context dates).

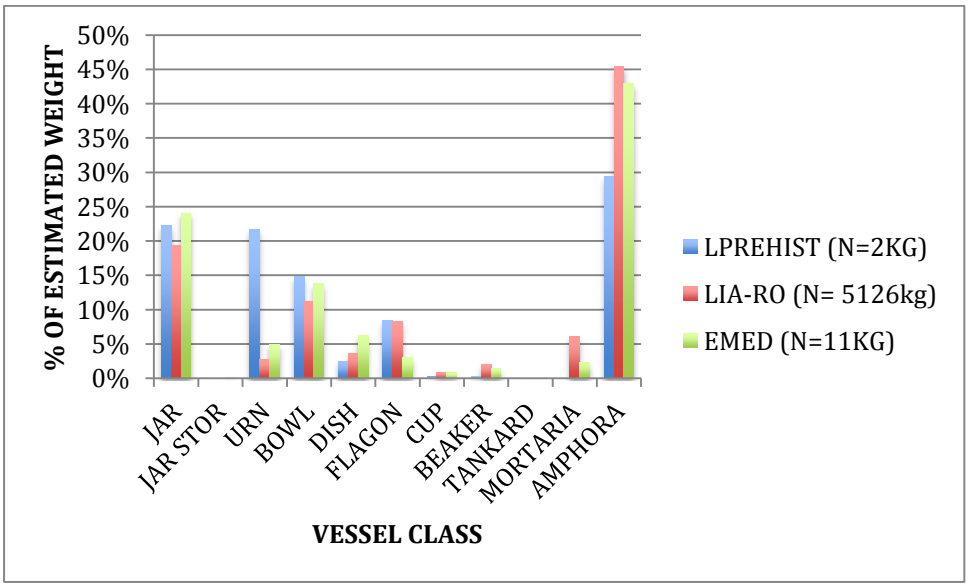


Figure 7.16: Ceramic vessel class from within the walls of 3rd century London by % of weight (ceramic dates).

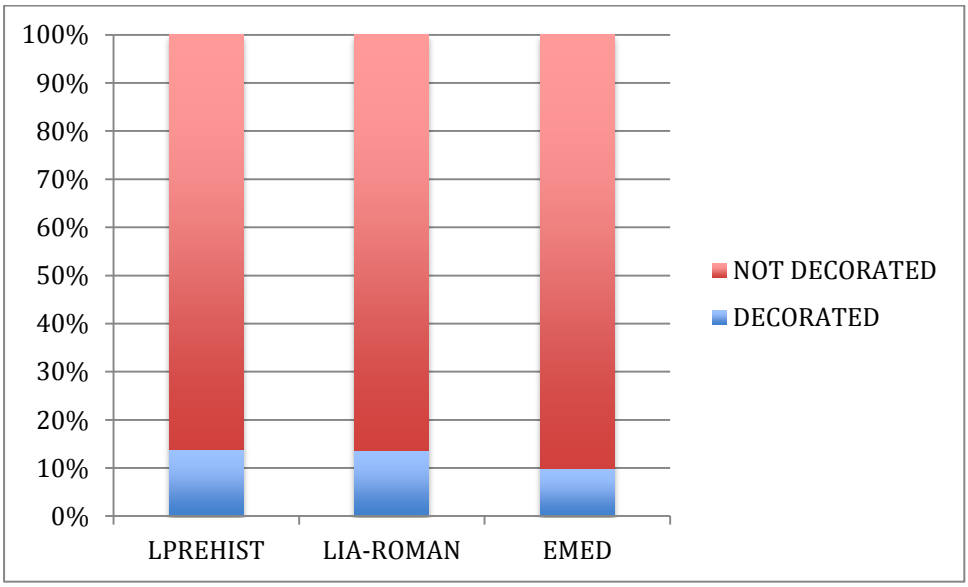


Figure 7.17: Decorated versus undecorated ceramics from within the walls of 3rd century London by % of weight.

Once amphorae, dishes and flagons are factored out, later prehistoric ceramic repertoires from settlements inside Roman London appear to have been dominated by jars (22%), urns (3%, 22%) and bowls (12%, 15%). Later prehistoric ceramics from within Roman London appear to have been less highly decorated than those from the UTV, with approximately 14% of sherds being decorated. The breakdown of ceramic repertoires from these settlements was not hugely different to the regional picture, with the same vessel forms dominating at a regional level in roughly similar proportions and this probably reflects the dominance of the London sample within the regional sample. At the wider level of Southern England the ceramic repertoire fits into the jar and bowl dominated communal cooking and serving pattern discussed above (7.4.2) (Brudenell 2012; Cunliffe 2005; Sharples 2010).

For the LIA-RO period amphorae are the dominant form, both by context and ceramic date (51% and 45% respectively). This pattern reflects the unique

position of London within the province, both in terms of consumption and trade, as well as the relative weight of the amphorae assemblage. If amphorae are stripped out the ceramic repertoire remains dominated by jars (17%, 19%) and bowls (9%, 11%), although to a lesser degree than in the preceding period, with the remainder of the assemblage consisting of flagons (7%, 8%) and mortaria (6%), with other forms each accounting for <5%.

The proportion of decorated material within the LIA-RO assemblage (Fig 7.17) was identical to that in the later prehistoric assemblage. Once again the picture from within London is very similar in terms of vessel proportions to the wider MLTV pattern, probably for similar reasons. However, in contrast to the later prehistoric pattern the London ceramic repertoire does not fit as well with the province wide picture, particularly when compared to Evans' (2001 Figs. 4, 6, 7 & 9) data on towns, which tend to have larger proportions of individual serving vessels. This pattern is probably due to two distinct factors: the first and possibly most important, is interdependence in the data created by their expression as percentages, which, combined with the use of weight as a measurement has had the effect of exaggerating the importance of amphora relative to other classes of vessel. The second is the size and complexity of Roman London, a city that would potentially have had a particularly large population of poorer inhabitants and therefore potentially less demand for high status table wares. Nevertheless, it is notable that proportions of flagons and mortaria from London settlements are still higher than on sites in the UTV, despite the amphora effect. In addition, Roman London would have experienced a high volume of trade and therefore high demand for amphorae.

If graphed by ceramic date (Fig 7.16) and once amphorae are stripped out, the early medieval ceramic repertoire from within London assumes a much more conventional pattern than the later prehistoric and LIA-RO assemblages, diverging from the picture seen when the same material is graphed by context date (Fig 7.15) to a significant degree. If dishes, beakers and mortaria are assumed to be misidentified or wrongly dated then the assemblage is jar dominated (24%), with bowls accounting for 14% and urns, flagons and cups each contributing 5% or less. Decoration was slightly rarer on the early medieval material than in the preceding periods, being found on approximately 10% of the material. The nature of ceramic repertoires from within London seems to indicate a return to jar and bowl dominated communal cooking and serving, from an LIA-RO model with slightly more capacity for individual serving. Nevertheless, as in the regional picture the presence of some jugs and cups indicates a ceramic means of alcohol consumption not present in the later prehistoric period.

7.4.4.3 Outside Londinium

In contrast to the assemblage from within London, that from rural settlement in the MLTV was not dominated by amphorae, being dominated by jars in all three periods instead, whether graphed by context date (Fig. 7.18) or ceramic date (Fig. 7.19). However, the proportion of amphorae in the LIA-RO assemblage was still much higher than in the UTV or on the route of HS1, perhaps indicating the degree to which the abstract-machine of the wider valley was integrated with that of the city in this period.

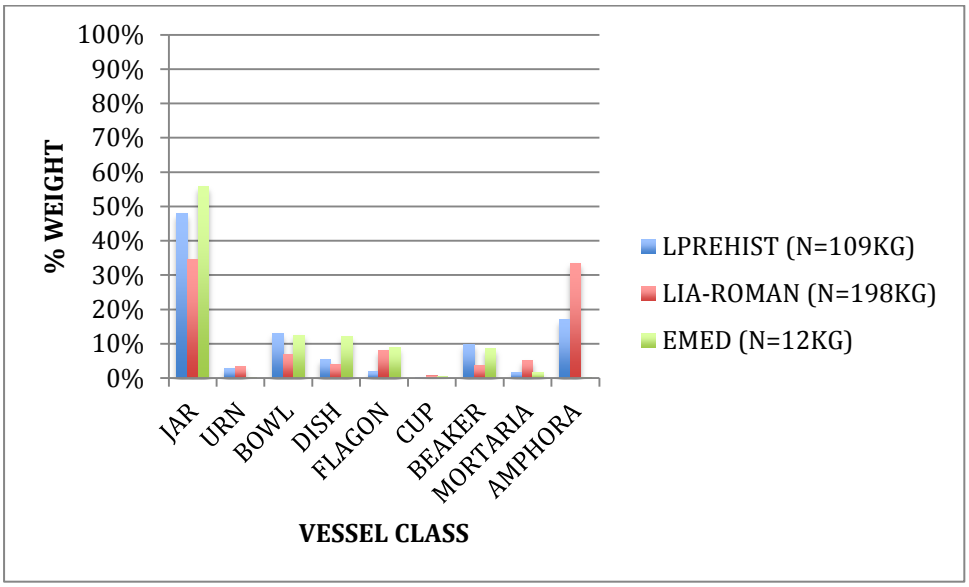


Figure 7.18: Ceramic Vessel class from non-urban settlement in the MLTV by % of weight (context dates).

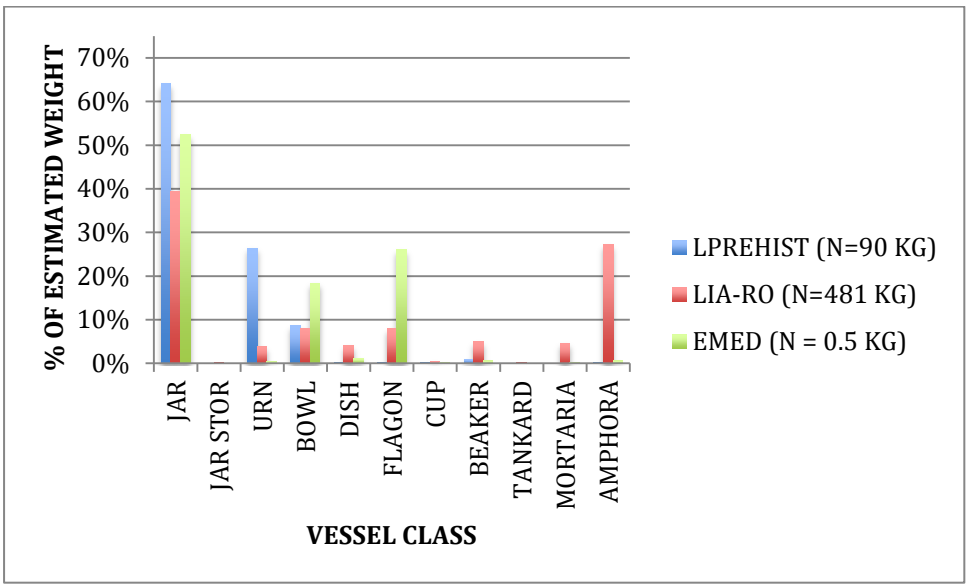


Figure 7.19: Ceramic Vessel class from non-urban settlement in the MLTV by % of weight (ceramic dates).

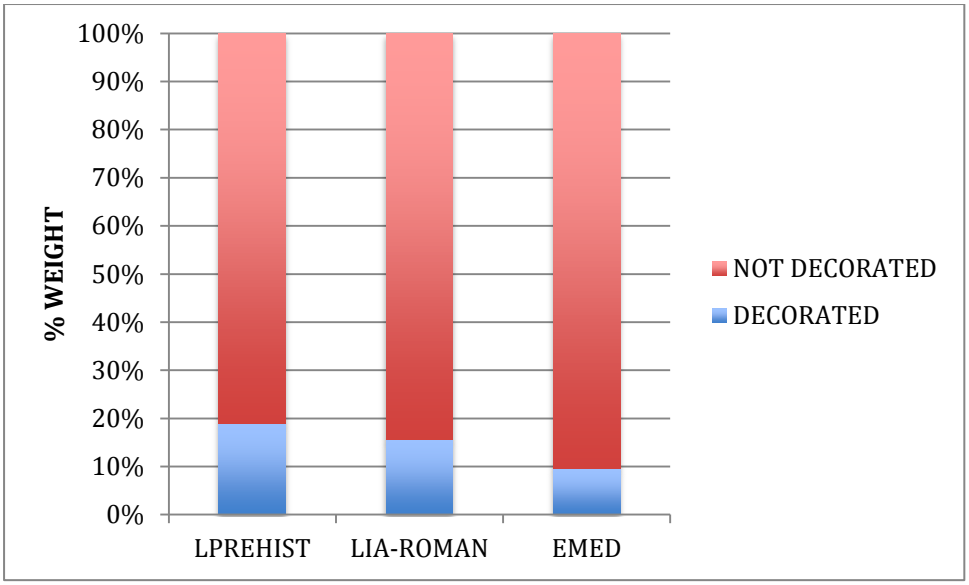


Figure 7.20: Undecorated versus decorated ceramics from non-urban settlement in the MLTV by % of weight.

Later prehistoric ceramic repertoires graphed by ceramic date from the MLTV outside London were dominated by jars (64%), and urns (26%). Bowls (9%) were also prominent, but the remaining vessel types each accounted for <5% by weight. Approximately 19% of later prehistoric material was decorated, a figure which, although greater than that for contemporary assemblages from London was still much lower than similar assemblages from the UTV and the route of HS1. Like the London assemblage the non-London assemblage compared well with the regional picture, confirming the impression that the London sample was particularly influential within that picture. The jar and bowl dominated pattern of later prehistoric repertoires in this sub-sample again conforms to the picture of assemblages dominated by communal cooking and serving vessels (Brudenell 2012; Cunliffe 2005; Sharples 2010).

The LIA-RO ceramic repertoire was dominated by jars (34%, 64%), both when graphed by context date (Fig. 7.18) and ceramic date (Fig 7.19). However, unlike the later prehistoric assemblage the LIA-RO assemblage also had a large

amphora component (27%) when graphed by ceramic date. This has the effect of depressing the values of eating and serving vessels (3.3.2), which each accounted for less than 10% of the assemblage; although it is notable that these vessel types formed a higher proportion of the rural assemblage than they did of the urban assemblage, a pattern which is no doubt partly due to the statistical methods and means of quantification used, but also reflects the interdependent nature of the agrarian and urban abstract-machines in the MLTV. Approximately 16% of the LIA-RO assemblage was decorated, a slight fall off from the later prehistoric period. Ceramic repertoires from the MLTV outside London therefore have two slightly different characteristics, on the one hand representing fairly typical jar dominated rural settlements (Evans 2001, 28), but on the other, clearly being tied in to patterns of consumption influenced by links to Roman London as evidenced by the high proportions of amphorae.

Early medieval ceramic repertoires from the MLTV outside London continued the jar dominated pattern seen in the two preceding periods. When graphed by ceramic date (Fig. 7.19) jars accounted for 52% of the assemblage, with most of the remainder being made up of bowls (18%), and flagons/jugs (26%). Other vessel classes each contributed<5% by weight. Decoration in this period (Fig. 7.20) was lower than in the two preceding periods, amounting to approximately 10% of the assemblage. These data largely indicate a return to jar and bowl dominated communal cooking and serving, from a more diverse LIA-RO assemblage. However the presence of large numbers of jugs reflects a more urban pattern of consumption and this probably relates to the presence of ceramics from MAS Lundenwic, which was located outside the Roman walls

(Leary et al. 2004, 3) in the non-London assemblage. In contrast to the LIA-RO period the early medieval data seem to indicate that the rural economy of the early medieval period was less closely bound up with the urban economy than it had been in the LIA-RO period.

7.4.5 Middle and Lower Thames Valley ceramic repertoires at urban and non-urban settlement compared

The comparison of urban and non-urban ceramic repertoires from the MLTV unsurprisingly touches upon many of the same themes as the equivalent discussion of cereal cultivation and animal husbandry (5.4.5 and 6.4.5). Chronological continuity and differences between the two types of settlement are evident once again, with continuity being more evident in the urban assemblage, especially in certain ceramic forms, such as flagons/jugs, although ratios of decorated to undecorated pottery did not differ hugely between the two forms of settlement. Connections between urban and non-urban settlement were apparent, with the extra-urban abstract-machine of the wider imperial economy producing much of the ceramic material consumed within the city, just as the regional abstract-machine of the MLTV produced many of the cereal crops and animals. In turn the urban abstract-machine pushed out certain ceramic forms such as amphorae in the LIA-RO period into the rural hinterland. In contrast to the cereal and animal bone assemblages quantities of later prehistoric ceramics from within the walls of 3rd century London were (just) present in sufficient quantities for analysis; however, given the lack of applicability of the concept of urbanism to English later prehistory this material will not be analysed any

further and the remaining discussion will concentrate on the LIA-RO and early medieval periods.

The urban assemblage appears to be characterised by a much greater degree of continuity in vessel type across period boundaries, than the rural assemblage and to have been dominated by amphorae in the LIA-RO and early medieval periods when graphed by context date and ceramic date. However, as discussed above there are good reasons for discounting these patterns as having been formed through residuality and intrusion in the archaeological sequence, except in the case of bowls, jars and possibly flagons/jugs. The urban ceramic assemblage therefore showed less continuity than did the animal bone assemblage, operating more in terms of cycles of jar/bowl dominance. In contrast to urban assemblages non-urban assemblages are dominated by jars in both the LIA-RO and early medieval periods. The remainder of non-urban assemblages were mostly made up of bowls, flagons, beakers and mortaria in the LIA-RO period and bowls and flagons in the early medieval period. So as with the regional picture (7.2) ceramic differences are more apparent in specialist serving vessels than in basic cooking equipment. Variation in ceramic decoration between urban and non-urban settlement was not great, with the majority of material being undecorated and slightly more decoration being present on LIA-RO than early medieval material in both urban and non-urban settlements. The proportion of decorated material was exactly the same at both kinds of settlement, but there was slightly more continuity between proportions of LIA-RO and early medieval ceramic decoration in the urban settlement.

Chapter 6 (6.4.5) discusses the effect of urbanism on the abundance of animal species in the MLTV and interprets the animal bone assemblage in terms of Deleuze and Guattarri's (2011 [1987]) and Delanda's (1997) concept of an abstract-machine, arguing that we can see the effect of the agency of the city in the relatively homogeneous patterns of species consumption between LIA-RO and early medieval London and although the patterns are less clear in the ceramic data it is arguable that the effects of urban agency can also be seen here, notably in the very high proportions of amphorae in the LIA-RO period. Amphorae were primarily used for the transportation of commodities, such as oil and wine and the huge proportions and absolute numbers of them from LIA-RO London point up the differences in the means of supply and the needs of people living in the urban system. The presence of relatively large numbers of amphorae in rural contexts in the LIA-RO period also highlights the effect of urban agency on the rural hinterland. At the same time the contrast between urban and rural assemblages in general, once again suggests that it was features of the urban system itself, such as the nature of transportation and storage systems and the density of elite networks within the city, which influenced the nature of the assemblage as much as human choices and concerns. The agency of urbanism also seems to have flattened out the difference between cooking and communal serving dominated assemblages on the one hand, and assemblages with an element of individual serving vessels on the other, seen in the UTV and HS1 case studies; with differences in proportions of individual serving vessels between urban and rural being fairly subtle and difficult to tease apart. In part this is an effect of the interdependence (3.1.8) of the variables when expressed as percentages. However, there are also reasons to think that the pattern may be a

real reflection of the differing social organisation of urban and rural communities. If jars and bowls reflect a preference for communal serving and consumption and dishes, beakers, cups and flagons a preference for individualised consumption, and if urban communities are seen as more internally differentiated and hierarchical than rural ones then greater proportions of individualised serving vessels might be expected in the urban than in the rural assemblage. However, the size of the lower strata of urban society is likely to have been much greater than the size of the upper strata and less use of individualised serving vessels among the former group may have acted to blur the difference between the two assemblages. The relative scale and organisation of different groups within a city is conditioned by the physical organisation of that city and this leads back to the agency of urbanism, which can be argued to have had an influence on the composition of ceramic assemblages in this way. Having discussed and compared ceramic assemblages from different forms of settlement in the MLTV CSA, the following section moves on to investigate ceramic assemblages from the route of HS1.

7.4.6 Ceramic repertoires at enclosed, unenclosed and complex settlements and villas on the route of HS1

7.4.6.1 Introduction

Analysis of ceramic repertoires from settlements on the route of HS1 used the same methods of quantification used for the Thames Valley case studies (7.4.4.1, 7.4.5.1, 3.3.1). However, the size of the HS1 dataset meant that it was not practical to extract data from the thesis database by entering the relevant sites

into the query by hand, and instead EngLaId thesaurus settlement type codes were used, meaning that there was a degree of overlap in the datasets (3.2.2, 5.4.1). Settlement types on the route of HS1 were classified using the same taxonomy as those in the UTV CSA with the addition of villas.

7.4.6.2 HS1 unenclosed settlements

Later prehistoric ceramic repertoires from unenclosed settlements on the route of HS1 were dominated by jar/bowls (62%) and storage jars (33%) (Fig 7.21). Conventional jars accounted for only 6% of the assemblage and the remaining vessel types each made up <5%. None of the later prehistoric material from these settlements was decorated. The profile of ceramic repertoires from HS1 unenclosed settlements compares very well with the regional picture, which is entirely dominated by jar/bowls (Figs. 7.7 and 7.8) and is also in line with expectations for Southern Britain as a whole (Cunliffe 2005, appendix A). Little work has been done on the variation in functional vessel types for the later prehistoric period; however, the profile from unenclosed settlements on the route of HS1 would fit with a low-status, communal cooking and serving food culture.

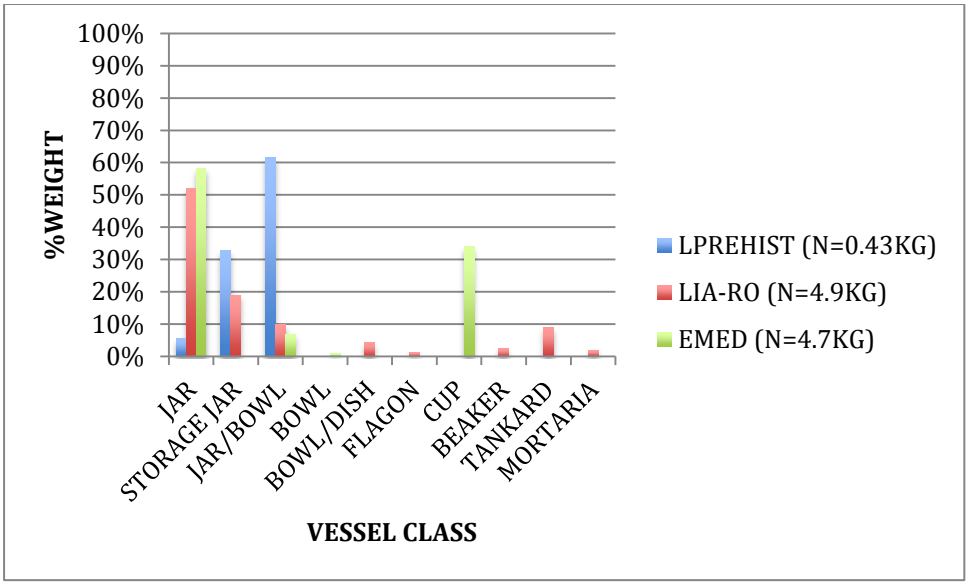


Figure 7.21: Ceramic vessel class from unenclosed settlements on the route of HS1 by % of weight.

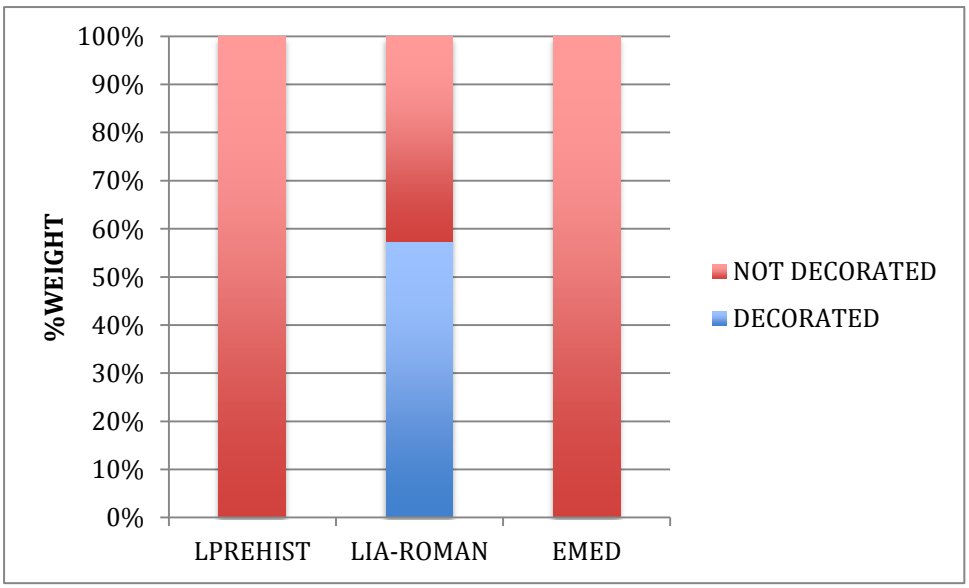


Figure 7.22: Decorated versus undecorated ceramics from unenclosed settlements on the route of HS1 by % of weight.

In the LIA-RO period ceramic repertoires were dominated by jars (52%) and storage jars (19%). Jar/bowls only comprised 10% of the assemblage by weight, in contrast to the preceding period, tankards made up 9% of the assemblage and the remaining vessel types each constituted 5% or less. Decoration (Fig. 7.22) was much more common than in the later prehistoric period, being present on 58% of the material, reinforcing once again the seeming lack of association

between variation in vessel form and decoration in this period. In contrast to the preceding period ceramic repertoires at unenclosed settlements differed from the regional pattern to some degree, in particular in having lower proportions of flagons, cups and beakers. This pattern would seem to reflect a cooking and serving culture offering less opportunity for individualistic display related to the consumption of alcohol at unenclosed settlements. This fits with the broader findings of this study and also the wider provincial picture (Evans 2001, 28; Pitts 2005). However, it is interesting to note the relatively large proportion of tankards, which could be interpreted as offering a less high-status alternative to cups and flagons.

Early medieval assemblages from the same class of settlements were again jar dominated (58%), with cups accounting for a very substantial (34%) of the assemblage, jar/bowls constituting 7% and the remaining vessel types <5%. The very high proportion of cups within this assemblage may well include residual LIA-RO vessels. As with the later prehistoric assemblage none of the early medieval material was decorated. Early medieval ceramic repertoires from unenclosed settlements were broadly similar to the regional picture (Figs. 7.7 and 7.8), having large proportions of jars and cups, although dishes were lacking. This repertoire does not fit particularly clearly into either a cooking/communal serving or an indivdualised serving pattern.

7.4.6.3 HS1 enclosed settlements

Later prehistoric assemblages from enclosed settlements on the route of HS1 were almost completely dominated by jars, which accounted for 99% of the assemblage by weight (Fig 7.23), with the remainder being accounted for by bowls (1%). However, approximately 34% of the assemblage was decorated, which was a considerably higher proportion than in the succeeding LIA-RO period. This breakdown fits well with the regional picture (Figs. 7.7 and 7.8), and with the broader picture from Southern and Eastern England (Brudenell 2012; Cunliffe 2005; Sharples 2010). It does not suggest the differentiated use of ceramics for different forms of serving and eating, suggesting a fairly homogenised consumption pattern, although the use of decoration may indicate some distinction between fine and coarse vessels and possibly between cooking and eating.

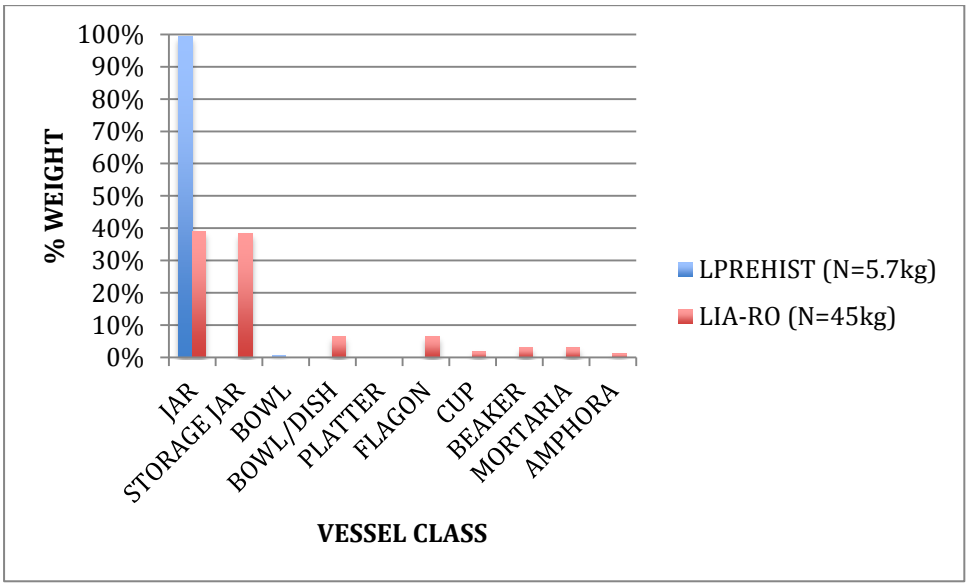


Figure 7.23: Ceramic vessel class from enclosed sites on the route of HS1 by % weight (context dates).

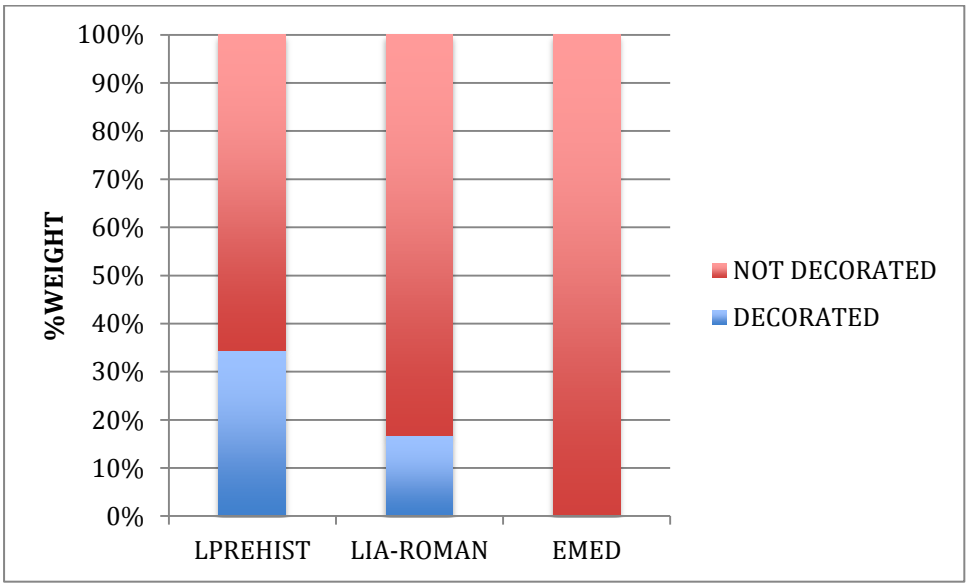


Figure 7.24: Decorated versus undecorated ceramics from enclosed settlements on the route of HS1 by % weight.

The LIA-RO ceramic repertoire from enclosed settlements in the HS1 CSA was dominated by storage jars (38%) and jars (39%), with bowl/dishes and flagons both comprising 6% by weight and the remaining forms each accounting for <5%. The extent of decoration had declined since the later prehistoric period, with 17% of the material having some form of decoration (Fig. 7.24). The assemblage conformed reasonably well to the regional picture, although there was a larger proportion of storage jars and slightly lower proportions of flagons, beakers and cups. This pattern again fits expectations concerning ceramic use at lower status rural sites in Roman Britain (Evans 2001, 28) and in South-East England more specifically (Pitts 2005), although the repertoire appears to have afforded more opportunity for individualised serving than that from unenclosed settlements. No data on early medieval vessel form were available for enclosed settlements in this CSA and none of the early medieval sherds were decorated.

7.4.6.4 HS1 complex settlements

Later prehistoric assemblages from complex settlements on the route of HS1 when graphed by context date (Fig 7.25 and 7.26) are dominated by jars (53%) and jar/bowls (45%), with the remaining vessel forms consisting of intrusive LIA-RO material, each comprising <5% of the assemblage. Only 6% of material from later prehistoric complex settlements was decorated. A comparison of later prehistoric assemblages from HS1 complex settlements to the regional picture reveals a close fit, in which assemblages from complex settlements conform in having a high proportion of jars and jar/bowls. This pattern also fits with wider syntheses of ceramic repertoires from Southern Britain and Eastern England (Brudenell 2012; Cunliffe 2005; Sharples 2010).

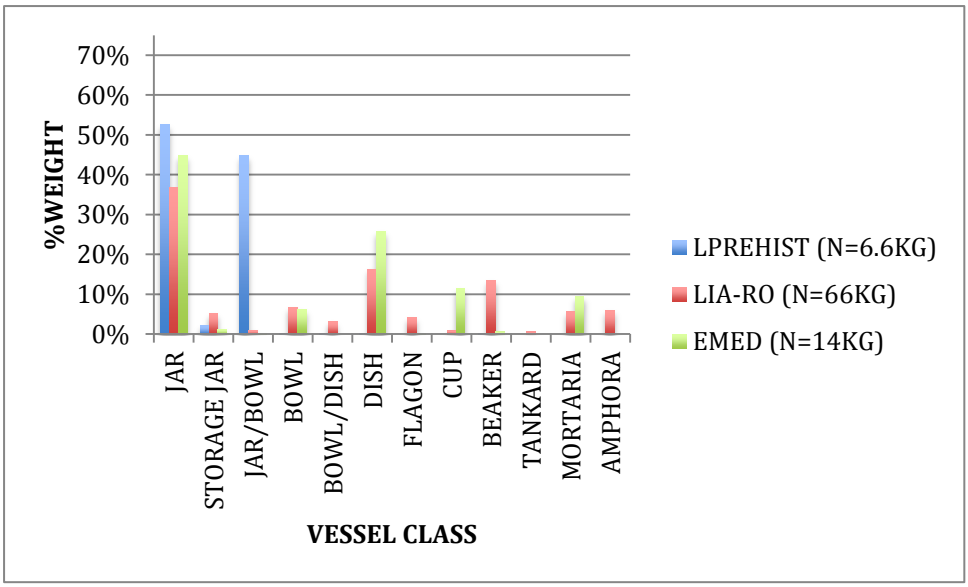


Figure 7.25: Vessel Class from complex settlements on the route of HS1 by % of weight (context dates).

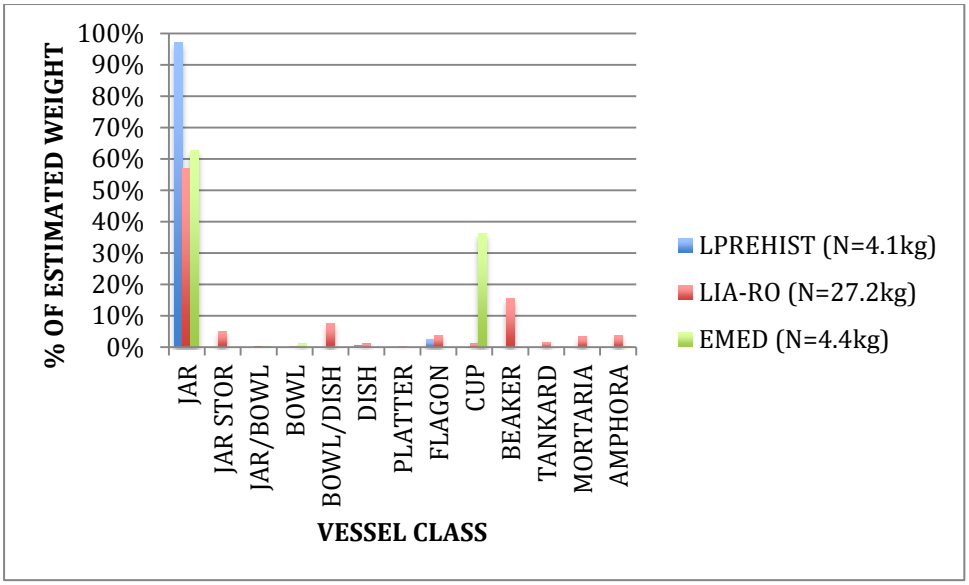


Figure 7.26: Vessel Class from complex settlements on the route of HS1 by estimated % of weight (ceramic dates).

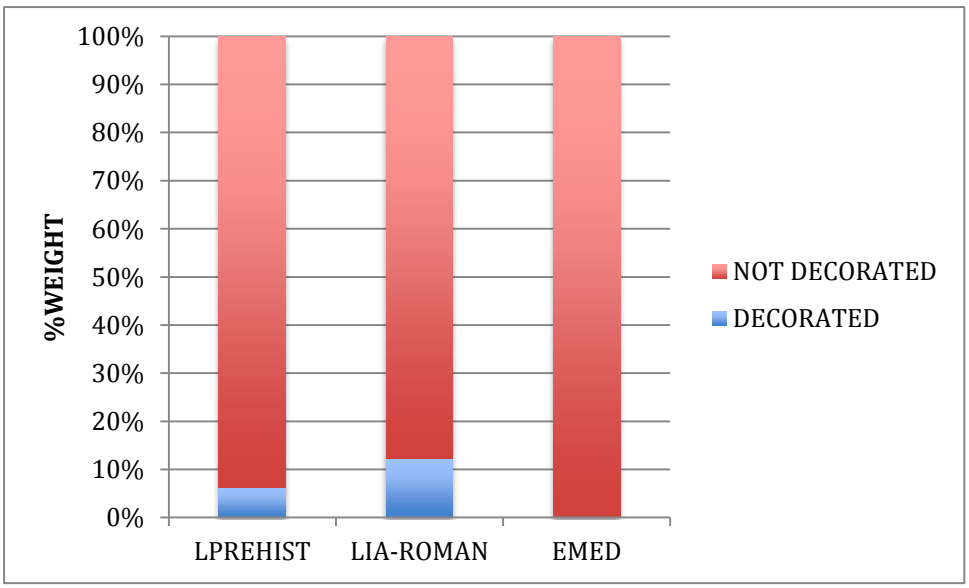


Figure 7.27: Decorated versus undecorated pottery from complex sites on the route of HS1 by % of weight.

LIA-RO assemblages from complex settlements (Figs. 7.25 and 7.26) were dominated by jars (37%), with the remainder of the repertoire comprising dishes (16%), beakers (14%), bowls (7%), along with mortaria and amphorae, both of which made up 6% of the assemblage by weight. LIA-RO material was slightly more likely to be decorated (Fig. 7.27) than later prehistoric material, but decorated LIA-RO sherds still only made up 12% of the assemblage. LIA-RO

ceramic repertoires fitted broadly within the regional pattern (Fig 7.3), but had slightly higher proportions of individual serving vessels. This pattern fits with expectations about the status of complex settlements, which should have seen more individualised consumption than unenclosed settlements, if ceramic diveristy is linked to settlement status and fits well with the broader provincial picture (Evans 2001, 28). The relatively high proportion of beakers also fits with the picture of higher concentrations of drinking vessels in Eastern England.

In the early medieval period ceramic repertoires from complex settlements, when graphed by context date, (Fig. 7.25) continued to appear jar dominated (45%), with dishes (26%) also making up a substantial proportion of the assemblage and the remainder comprising bowls (6%), cups (12%) and mortaria (9%), and other vessel forms accounting for <5%. However, graphing these data by ceramic date (Fig. 7.26) shows that the repertoire was in reality dominated by jars and cups, with the other forms shown in Figure 7.25 representing residual Roman material. Decoration (Fig. 7.27) was absent from early medieval material in these assemblages. The early medieval ceramic repertoire from complex HS1 settlements conforms more closely to the regional pattern than the picture at either unenclosed or enclosed settlements in the same period, and the presence of relatively high proportions of cups seems to indicate more individualised, higher status consumption practices at these settlements, including possibly the consumption of alcohol.

7.4.6.5 HS1 Roman Villas

Graphing ceramic material from Roman villas on the route of HS1 by context date (Fig. 7.28) suggests the existence of a substantial early medieval assemblage at these settlements; however, graphing by ceramic date (Fig. 7.29) demonstrates that this assemblage is entirely residual. The early medieval assemblage will therefore not be discussed further.

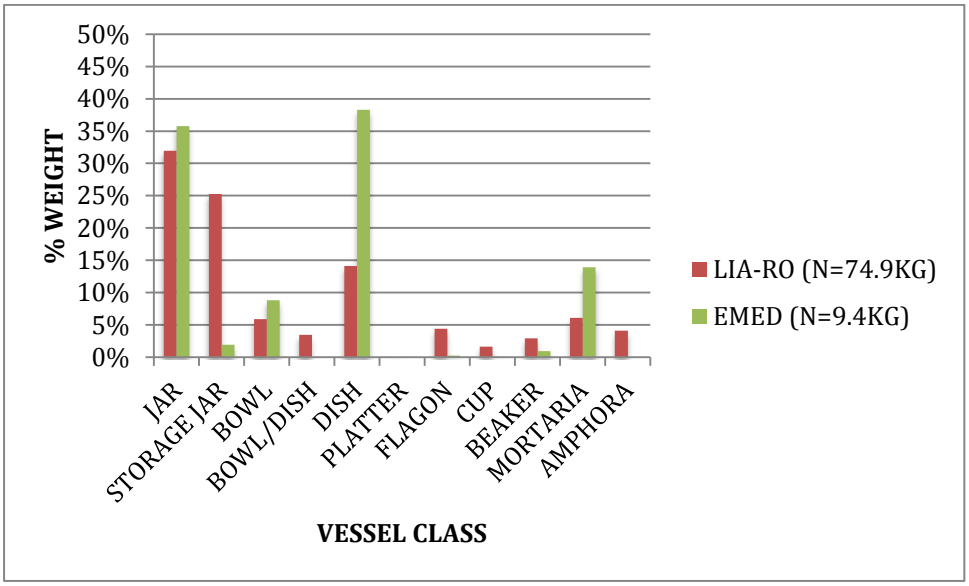


Figure 7.28: Ceramic vessel class at RO Villas on the route of HS1 by % weight (context dates).

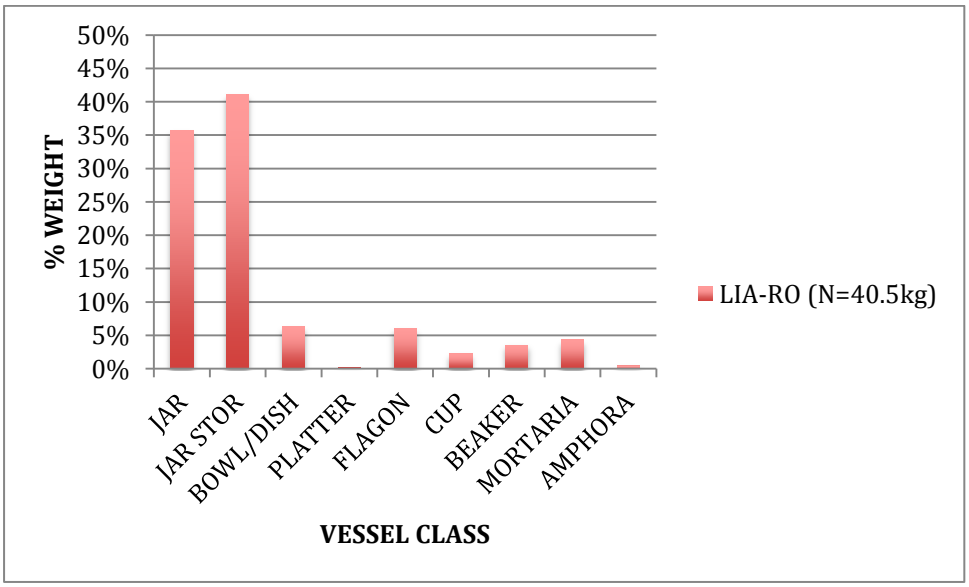


Figure 7.29: Ceramic vessel class at Roman Villas on the route of HS1 by % weight (ceramic dates).

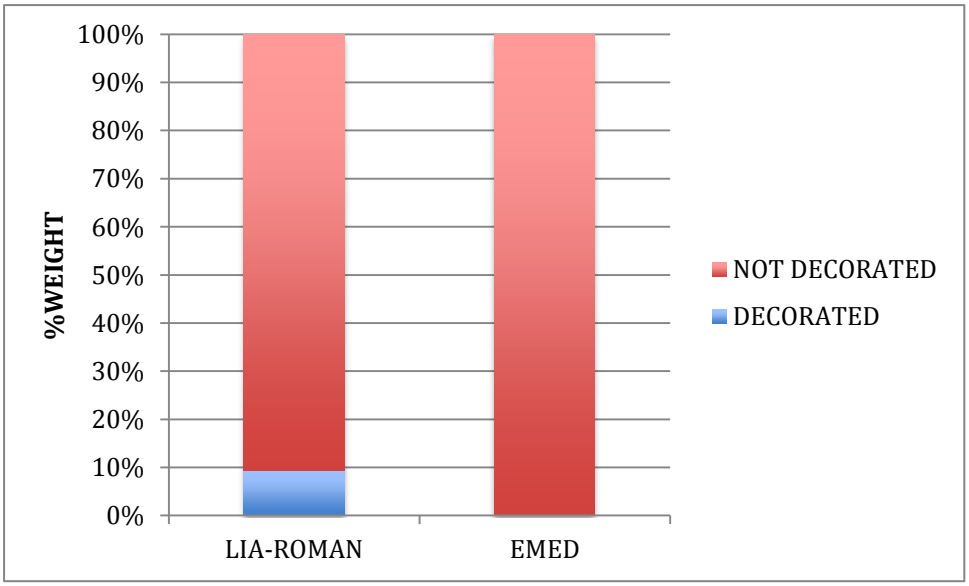


Figure 7.30: Decorated versus undecorated pottery from Roman villas on the route of HS1 by % weight.

Somewhat surprisingly the LIA-RO assemblage is dominated by jars (32%, 36%) and storage jars (25%, 41%). This is partly a result of the combination of the use of weight as a measure and interdependence (3.3.2), with heavy storage jars depressing the relative contribution of other forms. However, the importance of storage jars in the assemblage, may also relate to the role of villa estates, as abstract-machines of production/consumption in the redistributive consumption of food (Cunliffe 2013) (7.4.7). When graphed by context date bowls (6%), dishes (14%) and mortaria (6%) also featured relatively strongly. The remainder of the assemblage comprised vessel types each accounting for <5% by weight. However, when graphed by ceramic date, bowl/dishes (6%) and mortaria (4%) featured less strongly, although flagons (6%) were more prominent. Decoration was fairly sparse in the LIA-RO assemblage, only featuring on approximately 10% of the material (Fig. 7.30). Like ceramic repertoires from other types of LIA-RO settlements in the region, assemblages from villas fit broadly within the regional pattern, but with some minor

idiosyncrasies. At villa settlements these take the form of having higher proportions of serving vessels, particularly for the drinking of alcohol and this fits more generally with the provincial pattern for villas (Evans 2001). Consumption at these settlements probably had a more individualised focus, concerned with the display of status.

7.4.7 Ceramic repertoires from different types of settlement on the route of HS1 compared

Variation in the composition of ceramic repertoires from different kinds of settlement on the route of HS1 was in many ways very similar to that seen in the UTV CSA, with variation in the ratio of cooking/communal serving vessels to individual serving vessels along a spectrum from unenclosed settlements to villas in the LIA-RO period. This pattern probably reflected/participated in the creation of differences of social status, but again there does not seem to be a particularly strong link between individual serving vessels and decoration. Unlike in the UTV, data on ceramic vessel class is available for the early medieval period and this shows that the continuity in the nature of vessel type variation from later prehistory to the LIA-RO period seen in the UTV is also present in the early medieval period on the route of HS1. In addition, the regional inflection towards higher proportions of drinking vessels seen in the data from the route of HS1 comes through in the settlement type picture. Variation in ceramic repertoires by settlement type was different to that seen in the MLTV, but this is probably to do with the difference in the nature of the settlement types themselves, as much as differences in ceramic repertoire.

In the later prehistoric period there was no significant variation between settlement types, reflecting the situation in the UTV. Ceramic repertoires from unenclosed, enclosed and complex settlements were all dominated by jars, or jar/bowls to an equal degree. This pattern can be interpreted as comprising a ceramic tool set heavily associated with communal cooking, serving and storage, with very little evidence for individualised display in eating and drinking. Communal acts of consumption probably served to bind communities together through the ingestion of homogenous stews and casseroles (Fuller & Rowlands 2011), rather than offering opportunities for the differentiation of individuals through ingestion of individual portions of particular dishes with different status connotations. Variation in settlement type was evident in the proportion of decorated material, with 34% of the assemblage at enclosed settlements and 7% of the assemblage at complex settlements being decorated, in contrast to the total lack of decoration from unenclosed settlements. However, both of these settlement types were relatively scarce on the route of HS1 and contrasts between them may therefore be exaggerated.

More variation by vessel class and decoration was apparent in ceramic assemblages from LIA-RO settlements, indicating a significant degree of change in the use of ceramic repertoires at settlement level. Unenclosed LIA-RO settlements were dominated by jars and storage jars, but their repertoires also included bowls and tankards as well as small proportions of other vessels related to individual serving. In contrast LIA-RO enclosed settlements had greater proportions of individual serving vessels and a lower proportion of jars

and storage jars. However, Decorated sherds made up a relatively small proportion and a smaller one than in later prehistory. These differences between LIA-RO unenclosed and enclosed settlements can be interpreted as incorporating a greater degree of diversity in serving and consumption than their later prehistoric equivalents, with the greater range and differentiation of individual serving vessels perhaps allowing for greater variation of individual expression. It is interesting in this regard that drinking vessels at unenclosed settlements seem to have been dominated by tankards, whereas the preferred forms at enclosed and complex settlements were beakers and to a lesser extent cups. Ceramic repertoires from complex LIA-RO settlements followed a slightly different path from their equivalents in the later prehistoric period, showing greater variation in individual serving vessels and higher proportions of such vessels than seen at either unenclosed or enclosed settlements. However, this pattern may partly relate to an overlap in the database between complex settlements and villas. Indeed ceramic repertoires from villas were very similar to those from complex settlements, with the exception that villas showed a far higher proportion of storage jars, suggesting that in addition to a greater amount of individualised food consumption, villas were also abstract-machines of production/consumption, storing and perhaps redistributing food through feasting in aisled halls (Cunliffe 2013, 95-7).

Ceramic repertoires at early medieval settlements on the route of HS1 show continuity from the LIA-RO period in some ways, although there was also considerable change. In addition, less data are available for some categories of settlement and there is also possibly more residual material in the assemblage.

At unenclosed settlements repertoires were dominated by jars and cups, with some jar/bowls, indicating a pattern of consumption somewhere between the jar/bowl dominated one of later prehistoric unenclosed settlements and the individual serving vessel influenced pattern of LIA-RO complex settlements. This pattern shows a degree of discontinuity from the LIA-RO period, but may be the result of small sample size. The association of settlement status and higher proportions of individual serving vessels seen in the LIA-RO period, was also seen at early medieval complex settlements, which were dominated by jars, but with a relatively high proportion of cups, but was also present at unenclosed settlements, somewhat invalidating the pattern for this period.

7.5 Ceramic repertoires at different kinds of site in the Thames Valley and on the route of HS1 compared

The comparison of ceramic repertoires by settlement type is reasonably well established in the wider ceramic literature, at least for the later prehistoric and Roman periods (Brudenell 2012; Evans 2001; Pitts 2005), and the analysis undertaken here has proved complementary, both to those studies and to the analysis undertaken on cereal cultivation and animal husbandry above. In contrast to the picture generated when comparing regions at a macro-scale, differentiation by settlement type is one aspect in which ceramic repertoires link quite well with differentiation in charred plant remains and animal bones, with the above analysis suggesting a link between enclosure boundaries and higher proportions of individualised serving vessels in the UTV and on the route of HS1

that complements the link between enclosure boundaries and higher proportions of wheat and higher proportions of cattle and pig in the same regions. For the MLTV the differentiation between a relatively homogenous charred cereal and animal bone assemblage in Roman and early medieval London and more variation by period in the non-urban assemblage is replicated to a degree in the ceramics. One area of difference between ceramics and the other materials that is maintained; however, is the cyclical nature of the variation between heavily jar and bowl dominated assemblages and assemblages with greater proportions of individual serving vessels. Indeed regional variations, such as the greater proportions of drinking vessels seen on the route of HS1 show through in the settlement type picture throughout all three case studies in the majority of periods.

The pattern of ceramic repertoires at different kinds of settlement in the later prehistoric period displayed both similarity and difference by region and to later periods. The similarities were largely linked to the association of particular ceramic repertoires with particular settlement morphologies and the differences largely showed up in the regional pattern, discussed above (7.2). The variation in proportions of individual serving vessels in the repertoire of particular settlement types was least evident in the later prehistoric period. Anthropologists have argued that in societies with weak social stratification cuisine tends to be undifferentiated so that when food is used to demonstrate power and status, this is achieved through quantity, rather than elaboration (Goody 1982) (2.2.2). An undifferentiated cuisine has little use for elaborate serving vessels and the relative scarcity of these in later prehistoric Southern

England, along with other indicators of lack of status suggest that this model may be applicable to the CSAs in later prehistory.

The LIA-RO period sees a great deal of repetition in the differentiation of ceramic repertoires by settlement type across CSAs, in common with the pattern seen in cereal cultivation and animal husbandry. Differentiation of settlements by ceramic repertoire was more pronounced in all three regions in this period than it had been in later prehistory, or was to be in the early medieval period. In addition, the degree of difference was greater between unenclosed, enclosed and complex settlements and urban and non-urban settlements in terms of the cooking/communal serving and individual serving dichotomy. Similarities and differences in LIA-RO ceramic repertoires were present on two registers: in the first were similarities and differences between the UTV and the HS1 region and in the second differences between these two regions and the MLTV. Similarities between the UTV and HS1 can be seen in the association of specific ceramic repertoires with specific settlement types, with settlement boundaries, settlement complexity, social status and individual serving vessels all being associated. However, regional differences are apparent within the data, so that the nature of the individual serving vessels present on bounded and complex sites is different in each region. The differences between the UTV and HS1 regions and the MLTV derive in part from the different way the data are compared, with contrasts in ceramic repertoire between urban and non-urban settlement being flatter and less differentiated by vessel type, than differences between settlements of different form in the other case studies. In Goody's (ibid.) terms LIA-RO ceramic repertoires may represent the existence of a more

differentiated cuisine than that seen in the later prehistoric period in the same regions, with differences between individual portions and styles of food being used more often to demonstrate and reinforce status distinctions. Variations in the foodstuffs themselves may therefore have been part of the cycles of social expression represented by variation in ceramic repertoires. This kind of pattern may have been more common on the route of HS1 than in the UTV and may have involved the drinking of alcohol more in this region. The use of cuisine to differentiate between status groups was less visible in the urban context of Roman London, as the urban abstract-machine meant that, although present, individual serving vessels were overwhelmed in the assemblage by vessels associated with the transportation of commodities.

The early medieval period is the most differentiated by ceramic repertoire. The difference in patterns of ceramic repertoire by settlement type for the early medieval period is greater than that between later prehistory and the LIA-RO period. The early medieval period also has the greatest differences in terms of ceramic repertoire between regions, with no data on vessel class being available for the UTV, an urban/non-urban dichotomy in the MLTV and more continuity with the LIA-RO period on the route of HS1. In the UTV differences between settlement types in this period may be shown by ceramic decoration, with unenclosed settlements having a higher proportion of decorated sherds than undecorated sherds. In contrast the MLTV was dominated by an urban assemblage that was more similar to the LIA-RO urban assemblage than to contemporary assemblages in either the UTV or on the route of HS1. Like the pattern in the LIA-RO period this picture was heavily influenced by the agency of

the urban system. But like the pattern in the LIA-RO period the nature of ceramic repertoires may reflect the density of elite networks and their use of alcohol to differentiate their culinary habits from those below them on the social scale. Early medieval repertoires on the route of HS1 provide a second contrast, in this case showing a degree of continuity from the LIA-RO period in the use of cups. In terms of the presence or absence of Goody's (ibid.) differentiated cuisine the picture is more regionally biased than in either of the preceding periods. There seems to be more influence of differentiated cuisine and therefore social hierarchy in the East of England then in the West, and this may be associated with the influence of "Germanic" culture, although all three case studies are in geographical areas traditionally associated with chronologically early "Germanic" activity (Hamerow 2012, 10-16).

7.6 Conclusions

This chapter has investigated change and continuity in ceramic repertoires in three case-study regions, identifying long-term inter-regional continuities, as well as persistent differences between regions. These processes have been examined alongside systemic changes introduced as the result of the development of Roman socio-economic systems and the operation of urban abstract-machines in the MLTV in both the LIA-RO and early medieval periods. The chapter also examined variation in ceramic repertoires at different kinds of settlement in the different regions, comparing and contrasting practices at different settlement types both over the long-term and between differing regions. Ceramic repertoires were divided broadly between those very heavily

dominated by jars and bowls, and those with an element of individual serving vessels, with an oscillation over time in the means of social expression (Deleuze & Guattari 2011 chap. 11) between these two types of assemblage, which may map on to the use of differentiated and undifferentiated cuisines (Goody 1982) in all three periods. Continuity and change in ceramic repertoires was, therefore, more cyclical than in cereal cultivation and animal husbandry, with the greatest ceramic variation being present in the LIA-RO period. The previous two chapters (Chapters 5 and 6) investigated cereal cultivation and animal husbandry respectively; together with ceramics these material types make up much of our evidence for food producing/consuming systems in England in later prehistory and early history. The next chapter will therefore attempt to synthesize these three datasets and produce a model for regional food production/consumption in the period

8 SYNTHESIS: PRODUCTION AND CONSUMPTION OF FOOD IN THREE REGIONAL ECOSYSTEMS IN SOUTHERN ENGLAND 1500BC - AD1086

8.1 Introduction

Chapters 5, 6 and 7 of this thesis have examined the importance of different sets of evidence for food production and consumption in the later prehistoric period and early historic period in Southern England and it is clear that, as in every human society, food was central to many different aspects of life, including landscape management, field systems, settlement organisation, social status and display (Appadurai 1981) (2.2.2). Food has to be produced as well as consumed if human communities are to reproduce themselves and these two aspects of the social and material relations of food are of equal importance in understanding these datasets (Marx 1973 [1939]) (2.4.1). Processes of production and consumption can be seen as combined in abstract-machines or complex systems of production/consumption (2.4.1) (De Landa 1997; Deleuze & Guattari 2011[1987]), which are themselves embedded in larger abstract-machines of connectivity/organisation/stratification. These larger abstract-machines function in a cyclical, non-linear manner; at times drawing people, animals and materials into highly organised, gridded and connected systems and at others adopting a more loosely organised, less stratified and more fluid structure (De Landa 1997, 15–16; Deleuze & Guattari 2011 chap. 12). The cycles of these non-linear systems or abstract-machines operate on and through processes of

production and consumption, but find expression most clearly in aspects of material culture that mark territory (Deleuze & Guattari 2011 chap. 11), or rank, helping to form relations of social stratification and solidarity, such as field systems, metalwork and ceramics. These cycles should therefore be seen in some sense as cycles of "social expression" founded on processes of production/consumption. Three possible historical examples of these systems are the highly connected Later Bronze Age societies of North-Western Europe, the Roman Empire and the early medieval 9th-11th century societies of North-Western Europe.

In the following chapter the first highly stratified/organised cycle of the abstract-machine(s) will be labelled A and the second more fluid/open cycle will be labelled B. The chapter sets out to bring together the different sets of evidence, for cereal cultivation, animal husbandry and ceramic repertoires and examine them holistically, treating food in England from 1500BC-AD1086 as a "total social fact" in the way advocated by Appadurai (1981)(2.2.2) and as the product/fuel of complex non-linear systems/abstract-machines in the way advocated by Deleuze and Guattari (2011) and De Landa (1997) (2.4.1). Abstract-machines of production/consumption and the wider abstract-machines of which they form part are themselves "plugged in" to ecological systems and are both constituted by and constitutive of those systems. Abstract-machines of production/consumption therefore arise out of and help to constitute distinctive regional ecological systems. A second thing that this chapter will attempt to do, therefore, is to bring out the regional inflections in the processes described above, as detailed previously in a less holistic manner in Chapters 5, 6 and 7.

Finally, patterns in the archaeobotanical, archaeozoological and ceramic data collected for this thesis are linked to the later prehistoric and early historic sequence of Southern England more generally. The consumption and production of food is therefore instrumental in our understanding of wider aspects of this sequence, and can stand alongside more thoroughly understood parts of the record, such as technology and craft, settlement and landscape, monuments, and ritual activity.

In establishing the theoretical ideas described above as a framework for the interpretation of the data examined in this thesis, the intention is not to create a new "model" of how ecological systems and human societies "worked", but to work through an interpretation that has value as an heuristic device, not a fixed explanation. The evidence does not fit the interpretation perfectly and does not always hang together, neither should it be thought that the idea of abstract-machines indicates directionality from ecological systems to cultural systems. Instead abstract-machines should be thought of as a theoretical means of drawing disparate elements together. Abstract-machines are non-linear complex systems, with no direction, but capable of bringing about entirely novel situations (Connolly 2010) formed of assemblages of humans, plants, animals, soils etc., influenced by all of these elements, but controlled by none of them. Having established a theoretical framework for the discussion the following section turns back to the archaeological sequence itself, attempting to establish a narrative of production/consumption as an aspect of complex systems in Southern England during the timeframe of the thesis.

8.2 Cycles of production/consumption and social expression in the Thames Valley and on the route of HS1 from 1500BC -AD1086

The study of the long-term history of production and consumption has been of interest to British archaeologists since at least the 1970s (Rowlands 1976), but has probably had a stronger impact on the study of later prehistory (Sharples 2010; Yates 2007) than other periods. Among later prehistorians there has been disagreement about the degree to which there is evidence for agricultural intensification, and about the role which agriculture may have played in creating a basis for the bronze exchange networks characteristic of much of Europe in the MBA and LBA (Harding 2000). Starting in the 1970s one school of thought has argued for intensification of food production in the MBA as the basis for these networks (Bradley 2007, 223; Rowlands 1976; Yates 2007), with Bradley wondering whether textiles and hides were exchanged for metals (ibid.). However, from the early 2000s another tendency among British prehistorians has been to question the evidence for agricultural intensification in the period (Brück 2000; Lambrick & Robinson 2009; Sharples 2010). For Sharples (2010) the absence of large deposits of charred grain from MBA-LBA settlements, along with the absence of grain storage facilities and nitrogen fixing legumes suitable for crop rotation from the MBA-LBA record, all point towards a more social or even aesthetic purpose for field systems (ibid. 41). Both Brück (2000) and Sharples (2010, 41) suggest that the fact that MBA and LBA field systems do not seem to fill up the landscape, argues against the idea of pressure on land and Lambrick and Robinson (2009) see the development of permanent settled farming in the UTV as a more gradual process, developing over the course of 7-

500 years by the MIA (ibid. 385). On the other hand Romanists and early medievalists remain more accepting of arguments for agricultural intensification in the LIA-ER and MAS-LAS periods, with most major syntheses of these periods, for example Mattingly (2006) and Hamerow (2012) accepting that intensification played some role. It seems therefore that for later prehistory at least, it is no longer considered that there is good evidence for a linear progression from less intensive to more intensive agriculture, or for cycles of agricultural intensification and de-intensification. Instead agricultural production may have been carried out at low intensity for most of the period, perhaps only really becoming more intensive in the MIA-LIA, with the more widespread use of peas and beans (Cunliffe 2005, 408; Sharples 2010, 163).

However, the evidence collected for this thesis, combined with a reading of the wider literature does suggest that processes of production/consumption gave rise to alternating cycles (A and B) of social expression within regional abstract-machines, both in the landscape and in portable material culture, which can be traced beyond later prehistory into the Roman and early medieval periods (Table. 8.1). Abstract-machines of production/consumption and expression operated at a series of scales. At the largest scale we can conceive of a single abstract-machine operating across Southern England and perhaps beyond. However, regions such as the UTV, the MLTV and the South-East exhibited significant variation and being based in specific social/ecological systems can be considered abstract-machines in their own right. At a smaller scale still Roman and medieval towns also functioned as abstract-machines (Chapters 5, 6 and 7), and ringworks, hillforts, villas, manorial estates and monasteries can all be

interpreted in a similar way. Each of these types of settlement would have drawn in "biomass" in the form of plants and animals from a wider hinterland and channeled it up a food chain for human consumption, or stored and redistributed it for later consumption, directing it back into the productive process. At the same time each would have formed part of an abstract-machine of social expression of a different type, depending which cycle (A or B) was current.

The social expression of abstract-machine cycle A was characterised by the construction of extensive field systems (division of space), greater variation/elaboration in ceramic form, particularly in forms which can be used for consuming alcohol, or individual portions of food, more metalwork deposition and more evidence for settlement hierarchy, including bounded settlements. In Southern England this cycle could be argued to characterise the MBA and LBA (Bradley 2007, 181), the LIA to ER period (Creighton 2006; Sharples 2010) and possibly the LR period, and the MAS-LAS period (Hamerow 2012). However, it should be borne in mind, that in the first two of these periods some of these characteristics belong primarily to the MBA and others to the LBA, so that, for example, field systems were mostly laid out in the MBA and some may have gone out of use in the LBA, while ring-works and most enclosed settlements were a firmly LBA phenomenon (Table 8.1). Metalwork deposition took place in both the MBA and LBA (Yates 2007, 20-21).

Table 8.1: Cycles of Social Expression based on Production/Consumption in Southern England 1500BC-AD1086.

	MBA	LBA	EIA-MIA	LIA-RO	EAS	MAS-LAS
Field-Systems	Co-axial and aggregate field-systems. Large-scale land boundaries	Co-axial and aggregate field-systems cease being constructed in Wessex, but some constructed in Thames Valley and SE - others continue in use. Large-scale land boundaries.	Hiatus in construction, old field-systems possibly used, large-scale land boundaries.	Co-axial and aggregate field systems.	Hiatus in construction, old field-systems possibly used.	Open-fields develop at end of period, drove-ways and paddocks around settlements.
Settlement Enclosure Boundaries	Domestic enclosures.	Domestic enclosures.	Open-settlements, hill-forts.	Domestic enclosures, oppida.	Open-settlements.	Farmsteads, manorial complexes and towns enclosed.
Houses	Some small round-houses but rare.	Large round-houses, ring-works.	Smaller round-houses in MIA	Stone-built houses, villas.	Smaller long-houses, Grubenhauser.	Larger long-houses Manor-houses, Monasteries.
Ceramic Repertoires	Large jars, minimal decoration.	Diversity of forms, jars, bowls and cups and decoration, poss alcohol consumption.	Simple jar and bowl based repertoire. Saucepan pots highly decorated	Diversity of forms for consumption of alcohol and individual food portions.	Simple jar and bowl based repertoire, sometimes elaborately decorated.	Diversity of forms for consumption of alcohol and individual food portions.
Metalwork	Metalwork deposited in hoards.	Metalwork deposited in hoards.	Metalwork reused and recycled.	Metalwork deposited in variety of ways including in	Elaborate Metalwork deposited in graves.	Metalwork deposited in hoards.



= Cycle A

= Cycle B

In Southern England all three of these periods saw the extensive construction of new field-systems (Bradley 2007; Hamerow 2012; Sharples 2010), and the construction of new settlement hierarchies, characterised by boundaries and architectural elaboration. Nevertheless, in the case of the later Bronze Age (1500-800BC) the MBA field systems were largely constructed earlier than the LBA settlement hierarchies (Yates 2007). The LBA/EIA was characterised by ringworks/large houses and hillforts and the LIA by oppida (Sharples 2010), while the Roman period had a well developed settlement hierarchy from rural farmsteads to villas (Mattingly 2006). Finally, elaborately enclosed settlements including high-status settlements and monasteries were also present in the MAS-LAS (Hamerow 2012, chap. 3). Alongside these developments portable material culture was elaborated, probably with the aim of distinguishing individuals according to rank and status. Fine metalwork was created and deposited in large quantities in much of Britain in the MBA-LBA and the LIA (Bradley 1998; Sharples 2010; Yates 2007) and this continued into the ER period (Garrow & Gosden 2012). Ceramic repertoires were also diversified and highly decorated in these periods. In the LBA and EIA Southern English ceramic assemblages were often characterised by highly polished and sometimes haematite coated bowls, designed to mimic bronze vessels and also often by drinking cups (Brudenell 2012; Champion 2014; Cunliffe 2005; Sharples 2010). Ceramics were also characterised by diverse forms of serving vessel and highly decorated from the LIA (Cunliffe 2005; Sharples 2010) and through the Roman period (Tyers 1999). In the MAS-LAS pottery once again became more diverse in terms of the variety

of serving vessels, with the Ipswich ware industry producing pitchers, bottles and bowl/dishes as well as jars (Blinkhorn 2012, 26).

The social expression of abstract-machine cycle B beginning in the EIA was characterised by a hiatus in the construction of new field-systems, the possible abandonment of field-systems, or the use of old BA field-systems (Bradley 2007; Rippon et al. 2015; Sharples 2010). The first two scenarios imply a change in the use and perception of space, from a highly divided and controlled landscape to a much more homogeneous and mobile one. Settlement hierarchy and architecture became less elaborate, and was often characterised by open settlements, comprising domestic structures of roughly equal size. Where monumental boundaries were employed these tended to emphasise large-scale communities rather than sub-groups, as with the MIA hillforts (Sharples 2010, chap. 3, 120-1). There was often a decline, or complete hiatus, in the manufacture and deposition of fine metalwork and ceramic repertoires tended to become simplified, with less diversity in vessel form and a focus on the cooking and eating of undifferentiated foods, suited to communal production and consumption. As with abstract-machine/cycle A, all three periods under consideration in this thesis saw times where new field-systems ceased to be constructed. From the EIA until the beginning of the LIA, fields either went out of use, or at least ceased to be constructed across Southern England (Bradley 2007; Sharples 2010), with land-boundaries instead being made on a more monumental scale (ibid). Similarly the creation of new field-systems may have slowed, or ceased (Booth et al. 2007; Rippon et al. 2015, 316) in the LR, with LR linear boundaries in the UTV enclosing much larger areas, in a manner akin to those of the MIA. Meanwhile

many fields employed in the EAS phase were reused Roman constructions (Rippon et al. 2015, 329). Non-hillfort settlements in large parts of Southern England including parts of Wessex (Sharples 2010) and the Thames Valley lacked enclosing boundaries in the EIA and MIA, and many settlements on the Wessex chalk had their boundaries removed (ibid. p. 120). Similarly EAS settlement tended to be unenclosed, as at Mucking in Essex (Hamerow 2012 , 68–9) and with little evidence for internal differences in status expressed in, for example, building size (ibid. 38). While the manufacture and deposition of fine metal work largely ceased in the EIA and MIA in parts of Southern England, notably Wessex (Bradley 1998; Sharples 2010), the same cannot be said of the EAS, which sees the widespread deposition of elaborate metal objects in graves (Martin 2015) and this is one point at which the theory of cycles of expression fails slightly. However, ceramic repertoires appear to follow the pattern set out above in both the EIA-MIA and EAS periods. In the EIA and MIA ceramic assemblages are largely characterised by bucket or barrel shaped jars and bowls which do not tend to become elaborately decorated until the introduction of Saucepan pots in the LMIA (Sharples 2010, 323) and EAS ceramic material is similarly dominated by bowls (Myres 1969). Neither of these assemblages shows much evidence of variation in ceramic form and neither seems to have much capacity for the serving of individual portions of food.

8.3 Cereal cultivation and animal husbandry in the abstract-machine of production/consumption

Both cycle A and cycle B were founded upon the production/consumption of cereals for bread and porridge and domestic animals for meat and dairy. However, while agrarian and pastoral production/consumption were intimately linked neither seemed to vary in the cyclical manner seen in the ceramics and other material culture, although both were clearly drawn on for feasting events, which would have been more closely linked to the cycles. Animal husbandry was dominated by cattle in the MBA and LBA, particularly in South-Eastern England (Hambleton 1999, 2008), but by the EIA and MIA much of Southern England was sheep dominated (Hambleton 1999, 2008), with the period even referred to as the sheep age by one specialist (Albarella 2007). In the LIA-RO period in certain regions pig and cattle had become dominant again (Cool 2006; King 1991); although there seems to have been an increase in the importance of sheep in the UTV in the LR and the results of the Roman Rural Settlement Project show that sheep retained their importance in much of Wessex (Alex Smith pers. comm.). However, EAS animal husbandry seems to retain a preference for cattle and pig, certainly in Eastern England. Similarly in the MAS and LAS cattle and pig are the dominant species, particularly at higher status settlements and in towns (Holmes 2015; Poole 2013a).

In terms of cereal cultivation the earliest radiocarbon dates for spelt wheat are currently MBA or LBA (Stevens & Fuller 2012, 717) and Champion (2014) argues that this introduction was associated in the Lower Thames and South-East with the use of perforated clay plates and long saddle querns, which were used in baking and grinding flour, respectively, and concentrated at ringworks (ibid.). According to Champion the baking of bread may therefore have been part of high-status feasting. A preference for spelt wheat continued through the EIA-MIA, although ratios of barley to wheat, or emmer to wheat are higher for later prehistory than for the LIA-RO period, perhaps marking a difference in consumption. In the LIA-RO period, in the lowland zone, spelt and indeterminate wheat were more ubiquitous than barley, although there were the beginnings of change in cereal cultivation with the introduction of free-threshing wheat by the LIA. For the EAS period Banham and Faith (2014) argue that consumption of barley was high relative to wheat, which increased into the MAS and LAS and was associated with high-status consumption. Hamerow (2012) concurs in seeing high levels of barley early on in the EMED period, but argues that it was mostly consumed in brewing and for fodder. However, both of these models have been criticized by McKerracher (2015), who has shown convincingly that ratios of wheat to barley were very close throughout the early medieval period in parts of the South Midlands and East Anglia. However, this in itself does mark a shift in favour of barley in comparison to the preceding period. MAS-LAS crop preferences were probably more associated with diversity, particularly with the increasing ubiquity of rye and oats than with a preference for wheat over barley (McKerracher 2015), although there is disagreement about this (Banham & Faith 2014; Hamerow 2012) (see below).

A chronological model of these cycles of social expression in abstract-machines of production/consumption for Southern England, in the period examined by this thesis can thus be sketched out (Table 8.1). The MBA and LBA is characterised by Cycle A, the EIA and MIA by Cycle B, the MIA-LIA/LIA-ER period sees a return to Cycle A, which then gives way to Cycle B at the LR to EAS transition, finally there is a return to Cycle A in the MAS-LAS period. Having established an overarching theoretical framework the remainder of this chapter will examine the regional inflections on this model before returning to the wider picture in a final discussion. The next section starts with the UTV.

8.4 An abstract-machine of food production/consumption in the Upper Thames Valley 1500BC - AD1086

The distinctive geology and topography of the UTV, along with its geographical location, has been described above (1.2.1) and in more detail elsewhere (Lambrick & Robinson 2009). However, it is worth considering the landscape of the regional food producing/consuming system in more detail, before moving on to consider the role of plants, animals, humans and material culture in producing that system.

8.4.1 The environment of the Upper Thames Valley in the later prehistoric period

Lambrick and Robinson (2009, 53–56) argue that very extensive clearance of woodland had already occurred in the UTV by the MBA, and that the process of clearance was probably largely complete by the end of the IA. The later prehistoric landscape is likely to have been characterised by a "mosaic of intensively grazed open land, rough pasture and scrubby grassland or wood pasture", with areas of woodland and relatively small fully enclosed areas (ibid. 56). This process had afforded the widespread settlement of the valley terraces and the adoption of mixed agriculture, with pastoralism on the floodplain by the LBA or EIA (ibid. 26). It is therefore surprising that the evidence for the construction of later prehistoric field-systems in the UTV is distinctly patchy. Evidence for MBA-LBA field-systems is largely restricted to the Vale of the White Horse (ibid. 79-80), which may have had better geographical connectivity with social networks in the MLTV. However, even here they seem to have been constructed on a much smaller scale than further down the valley. The relatively small scale and patchy distribution of these field-systems seem to correlate with other aspects of the evidence for food production/consumption, particularly the jar/bowl dominated nature of the ceramic assemblage. The MBA-LBA UTV regional system of food production/consumption, on the basis of this evidence was less highly organised/structured during cycle A than other similar abstract-machines along the valley to its south-east, but nevertheless it was sometimes characterised by gridded and controlled spaces, along with material culture that had similar grading/sorting effects (on people) through differentiation/decoration. During the EIA-MIA period the expressive aspects of

the UTV system, like those elsewhere had moved into cycle B, becoming more fluid, with less highly gridded and structured spaces and correspondingly less structuring of human relationships via the medium of ceramics.

8.4.2 The environment of the Upper Thames Valley in the LIA-RO period

The landscape of the UTV in the LIA-LR period demonstrated a great deal of continuity from the MIA (Booth et al. 2007, 284). The gravel terraces of the catchment were characterised by grassland and arable, with grazing and probably hay meadows on the floodplain, which was no longer settled by the LIA-ER period (ibid.). This geographical shift in the use of the gravel terraces is associated with the UTV abstract-machine moving into cycle A, and represents a shift from year round to seasonal use of the floodplain. Tributary valleys, the clay slopes between terraces and areas beyond the gravel terraces were probably characterised by scrub with rough grazing in places and it can be assumed that there was some woodland on the clay (ibid. 20). The extent of field boundaries including hedges is unclear, but it is possible that the floodplain and gravel terraces remained very open landscapes (ibid.). The extent of LIA-LR field-systems in the UTV region was in many ways continuous with the later prehistoric period and field-systems were certainly less developed here than in other regions, such as South Essex, for example (Rippon et al. 2015, 143-160). However, Booth et al. (2007) argue for some increase in the number of field-systems in the LIA to ER period, representing the shift of the UTV abstract-machine back into cycle A, with gridding of the landscape by trackways, which may have doubled as agricultural boundaries, and small ditched enclosures

probably serving as plots for horticulture around settlements (ibid. 21, 284). While there is no evidence for a network of small ER fields, in general ER settlements tended to have more extensive ditched enclosures around them than their IA predecessors (ibid. 22-24). This picture of agricultural homogeneity and continuity with the later prehistoric period concurs, in many ways, with the data collected for this thesis, which display considerable continuity in cereal cultivation, animal husbandry and ceramic repertoires. The abstract-machine of production/consumption in the UTV in this period can, therefore, be argued to display continuity with that of the preceding period; it sought to organise and divide landscape and people, with trackways and ceramics, but not to the same degree of intensity as similar systems downstream. In the LR period Booth et al. (ibid. 26-27) argue that the floodplain probably continued to be used for grassland despite an increase in flooding and the gravel terraces are likely to have been divided into very large fields for cereal cultivation, with little or no woodland on the gravel terraces and horticultural plots and paddocks around the settlements, similar to arrangements characterising the LIA-ER (ibid. 298).

8.4.3 The environment of the Upper Thames Valley in the early medieval period

Evidence collated in Booth et al. (2007) indicates that there were no sudden environmental changes in the EAS period in the UTV (ibid.). This evidence comes from a far smaller selection of sites than that for the LIA-RO period; however, it suggests that there was no large-scale abandonment of land on the floodplain and gravel terraces and no regeneration of woodland, although there may have

been a reduction in grazing animals (ibid. 29); and hence there may have been a reduction in the intensity of exploitation for pasture (ibid. 30). There is then, as in the transition from the MIA to the LIA-RO period, substantial evidence for environmental continuity in the early medieval UTV. As in earlier periods there is no real evidence for enclosed field systems in the EAS period, and this also indicates regional continuity with the later prehistoric and Roman periods, although it is a feature of EAS England more generally. The MAS-LAS periods, Booth et al. (2007) argue, were a period of agricultural re-intensification of the UTV landscape, with the extent of cultivation on the floodplain and gravel terraces reaching the same extent as Roman agriculture by the beginning of the 11th century (ibid. 329). However, the evidence for field-systems is relatively small-scale relative to other regions of MAS-LAS England and in this sense displays continuity with the MBA-LBA and LIA-RO periods in the same region. The switch from an open unbounded more fluid landscape in the EAS, to a more gridded/controlled landscape in the MAS-LAS may be argued to represent a shift in social expression from cycle A towards cycle B and back again.

8.4.4 Food production/consumption in the Upper Thames in later prehistory

In the UTV the later prehistoric abstract-machine of food production/consumption seems to have been based around barley, spelt and emmer/spelt, and cattle, with a complete absence of emmer wheat and low levels of rye and oats, but also relatively high proportions of sheep/goat and pig. There seems to have been very little consumption of wild resources, either plants or animals, but dogs and horses were eaten (Lambrick & Robinson 2009,

155–6), perhaps as part of ritual practices associated with hunting, as with the Gonja (Goody 1982, 71). These characteristics can be linked to the topographical/geological aspects of the UTV regional system to a degree, with high proportions of cattle tallying with the river terrace environment of the settlements and high proportions of sheep/goat and pig attesting to the proximity of chalk upland and woodland environments respectively (Rippon et al. 2015, 81). On the other hand the slight dominance of barley over wheat species in the charred plant assemblage does not fit well with the free draining soils of the gravel terraces. Rippon (2013, 141-2) argue that the preference for barley was related to the need to adapt to alluvial soils on the floodplain; however, the work of Lambrick and Robinson (2009) and Hey et al. (2011) shows that arable agriculture was probably confined to the gravel terraces by the beginning of the period. There was relatively little difference in food production and consumption between settlements of different kinds in this region in later prehistory (Lambrick & Robinson 2009), suggesting that the abstract-machines of production/consumption of the different site types produced a largely undifferentiated cuisine, corresponding in some ways to the relatively undifferentiated landscape. However, subtle differences were apparent with slightly higher ratios of wheat, cattle and horse at enclosed settlements and slightly higher ratios of barley, pig and dog at unenclosed settlements. These mixtures of species might be taken to indicate more roasting and baking at enclosed settlements and more stewing and consumption of porridge/potage at unenclosed settlements and complex settlements.

Later prehistoric ceramic repertoires in the UTV were strongly dominated by jars and bowls, with less variation in ceramic form in the assemblage than typically seen in assemblages with a more eastern geographical distribution, such as the one from HS1, or those from Southern East Anglia (Brudenell 2012), at least between the MBA and the EIA. These broad characteristics of later prehistoric ceramic assemblages from the UTV show very little variation across the region. However, there are some slight indications of differentiation by settlement type, with the EIA hillfort at Castle Hill producing some small bowls or possibly cups in association with feasting debris from a pit (Lambrick & Robinson 2009, 164). In general ceramic repertoires from unenclosed settlements were more dominated by jars and bowls than assemblages from enclosed settlements, with repertoires from complex settlements positioned somewhere in between. Ceramic repertoires that included provision for the serving of individual portions of food or drink, such as the assemblage from EIA Castle Hill (ibid.) were more likely to be associated with higher proportions of certain kinds of foodstuff, such as cattle, pig and wheat and with settlements with more impressive boundaries. While more jar and bowl dominated assemblages with more provision for communal serving were more likely to be associated with unenclosed settlements and higher proportions of sheep/goat and barley.

The UTV later prehistoric ceramic repertoire represents an assemblage largely geared to cooking and eating in a communal manner, whether at the scale of small domestic groups or larger communities, in a way that cannot differentiate between the portions assigned to individuals, except through the quantity of

food served. There was thus little scope for making fine distinctions between individuals based on food. However, the material qualities of these repertoires would have been ideal for the manipulation of an undifferentiated cuisine of the sort that Goody (1982, 207) argues characterises societies relatively lacking in class divisions . The foods cooked, served and eaten with these vessels are likely to have comprised soups and porridges or pottages, and stews or casseroles. If the cuisine was made up of the plants and animals which dominated the assemblages described above then they would have been largely grain-based, possibly with meat added as flavouring or relish on occasion. This would have been an homogeneous cuisine in which one portion is much the same as any other. It would therefore have been best suited to serving the first of Appadurai's (2.2.2) semiotic functions of cuisine: the construction of social relations characterised by equality, intimacy or solidarity (Appadurai 1981, 496). There is also evidence for other aspects of cuisine in the UTV in this period, not registered by the datasets collected for this thesis, which would perhaps have been more suited to Appadurai's second semiotic function of sustaining relations characterised by rank, distance, or segmentation (ibid.). This includes evidence for cooking pits, in which meat could have been steamed or roasted (Lambrick & Robinson 2009, 159–60) and ceramic plates (ibid. 164) which could have been used for baking bread. The evidence for consumption is therefore nuanced, with some foods that could have emphasised rank as well as solidarity through the serving of portions capable of more differentiation. However, overall, the evidence suggests that the UTV complex system was in cycle B, rather than cycle A in later prehistory.

8.4.5 Food production/consumption in the Upper Thames in the LIA-RO period

During the LIA-LR period the UTV food production/consumption abstract-machine showed some signs of shifting into a more intensive phase, linked to its ties with the wider Roman economic system. Cereals were now more dominated by wheat, with fewer barley species, and there was greater dominance of cattle over sheep/goat and pigs. Wheat species remained dominated by spelt, with very little emmer and proportions of rye and oats remained low. The use of wild resources continued to be negligible, although horses made up a very large proportion of minor domesticates/wild animals and the proportion of dogs remained relatively high. As in later prehistory these characteristics relate to the regional topographical/geological aspects of the abstract-machine, in that the dominant species are ones that are suited to river terrace environments, or relatively nearby alternative environments. However, the increases in proportions of wheat species and cattle were clearly also closely related to the development of the wider abstract-machine of the imperial Roman economy. The slightly higher ratios of cattle and spelt wheat seen in the UTV in this period when compared to later prehistory suggest that agrarian practices in the region were becoming more like those seen in the MLTV in a process that also seems to have been taking place on the route of HS1. This seems likely to have related to the development of processes, which would have involved the production of an agrarian surplus for the payment of taxes and for the provisioning of towns and the army, not necessarily located in the region. Cattle, as well as being culturally favoured by the Roman elites (King 1999), afforded a greater weight of meat per animal slaughtered than sheep or goats, and it may have been this material

quality, and its importance for the reproduction of the wider Roman system, as much as their cultural meaning which drove the increase in proportion of cattle. In addition to the changes brought about by these wider economic processes; however, there were also considerable continuities. These included a continued aversion to emmer compared to the rest of the valley and particularly the route of HS1, the continued importance of spelt, a seeming lack of interest in wild species compared to the other regions and a continuing focus in the faunal record on horses and dogs. These continuities seem to relate to the parts of the UTV abstract-machine of production/consumption that articulated least well with the broader Roman economic system, so that we can perhaps view the UTV system as functioning on two distinct planes, one regional and one supra-regional. There was therefore a simultaneous connecting up of different regional abstract-machines of consumption/production in the LIA-ER and an emphasis on regional difference perhaps stimulated by this connecting up. Differences between enclosed and unenclosed settlements in the UTV possibly play into this picture, with enclosed settlements seemingly producing/consuming more unidentified wheat than unenclosed settlements. From the perspective of cereal cultivation enclosed settlements were, therefore, perhaps more closely tied into the wider Roman economic abstract-machine than unenclosed settlements, which were more closely tied in to the regional system. And this is, possibly, partly reflected in animal husbandry, where although ratios of cattle to sheep/goat at enclosed and unenclosed settlements are similar the proportion of pigs at complex settlements is higher than at the former categories of settlement.

Striking continuities in the UTV abstract-machine were also evident in ceramic repertoires, which remained the same in their basic building blocks of jars and bowls, but with the addition of small numbers of specialist eating vessels. These assemblages are notable for their lack of vessels associated with drinking, such as cups, flagons and beakers, when compared to assemblages from the rest of the Thames Valley and the route of HS1, but do include increased proportions of vessels such as dishes in comparison to later prehistory. This indicates a ceramic repertoire still more suited to an undifferentiated cuisine than a differentiated one (Goody 1982). The cuisine prepared and consumed using this repertoire was probably still heavily based around grain-based pottages, soups and porridges, with stews and casseroles forming a component. However, some more individualised consumption mostly revolving around dishes and possibly mortaria was evident and may have related to the consumption of drier foods, such as bread and individual portions of baked or roasted meat. Again the pattern of the LIA-LR UTV ceramic repertoire indicates a connecting up of the regional abstract-machines with other systems further down the valley and the wider Roman economic system, but a simultaneous emphasis on regional diversity. Enclosed settlements were more varied than unenclosed settlements in terms of ceramic vessel form as were complex settlements, suggesting something of a hierarchy in styles of consumption, again possibly related to the degree to which different elements of the settlement hierarchy were tied into the regional and wider Roman abstract-machines of production/consumption. This combination of ceramic complexity and enclosure boundaries is indicative of the A cycle of the abstract-machine of social expression, but suggests that this cycle was more apparent in some aspects of the regional system than in others.

8.4.6 Food production/consumption in the Upper Thames in the early medieval period

The early medieval period in the UTV saw the greatest set of changes in terms of staple crops and animal species, with huge proportional increases in free-threshing wheats, rye and oats, and a related decline in the importance of spelt wheat, with proportions of emmer wheat continuing to be very low. Domesticates were now more dominated by cattle than ever before, with a fall off in the proportion of sheep and pig, and horse proportions remaining fairly similar. There was also a slight increase in the presence of wild animals. However, these changes were all based around intensifications of the use of plants and animals that had already been present in the Roman period, or at least later in that period, rather than on new introductions. Booth et al. (2007) in common with many other writers on the period, argue for a decrease in the intensity of agricultural production and this maybe reflected in the relative paucity of archaeobotanical, faunal and ceramic evidence available in comparison to the preceding period. The evidence comes from fewer sites than available for the later prehistoric or Roman periods and it is therefore difficult to compare settlements of different type. However, enclosed settlements, which in this case largely belong to the MAS and LAS, did have higher proportions of cattle and pig than unenclosed settlements, which were largely EAS in date. This reduction in agricultural production/consumption does seem to be bound up with changes in the balance of the major faunal and plant species, but not necessarily in ways that might be expected if the later prehistoric period were to

be taken as a model. Rather than a reversion to higher ratios of sheep/goat to cattle, the proportion of cattle as a percentage of the assemblage increased in the early medieval period; however, the ratio of barley to wheat did become much more balanced in a partial return to later prehistoric patterning.

On balance the UTV early medieval production/consumption system does seem to have been constituted by a partially different set of materials, with cattle and pig perhaps providing meat for larger communal gatherings, but more of a balance in consumption between barley and oats based porridges or pottages, and possibly bread made from free-threshing wheats. The UTV abstract-machine did not simply revert to the way it was in later prehistory. Interregional connections were loosened in the EAS and the system became less highly organised/stratified, less "plugged in" to other systems, but it nevertheless operated in a slightly different way from the pattern of later prehistory. The changes of the early medieval period are doubly interesting partly because they clearly occurred without a change in underlying nature of the topographical/geographical elements of the system and partly because while some species proportions changed, others such as pig stayed more or less the same. In the EAS in Southern England the wider abstract-machine of social expression moved back towards cycle B, with a loosening of linkages between regional systems and more fluidity. In the MAS-LAS period the abstract-machine became more highly organised and more widely connected once again. However, in the UTV region in particular it is harder to trace these processes, as there is less ceramic evidence overall and less evidence for enclosures/boundaries than in other regions.

8.5 An abstract-machine of food production/consumption in the Middle and Lower Thames Valley 1500BC-AD1086

The landscape elements of the MLTV abstract-machine have been described above (1.2.3) and, as for the UTV, in more detail elsewhere (Lambrick & Robinson 2009). However, the extent of woodland clearance and development of field-systems differed from the UTV to varying degrees and is described briefly below.

8.5.1 The environment of the Middle and Lower Thames Valley in later prehistory

The environment of the MTV, like that of the UTV was largely cleared of woodland by the MBA, but Lambrick and Robinson suggest that some tributary valleys such as the Lower Kennett remained more wooded (2009, 39). Unlike in the UTV there were areas of alder-carr on the floodplain and possibly some heathland, along with areas of rough grassland and scrub between settlements on the gravel terraces by the EIA-MIA, perhaps indicating that the MTV was not managed as intensively as the UTV during the EIA-MIA (ibid. 41, 49). The MTV abstract-machine differed from that of UTV in the extent of field systems, which were both more widespread and more developed in the MBA-LBA (Lambrick & Robinson 2009; Yates 2007) and may have survived into the EIA-MIA (Lambrick & Robinson 2009, 49). It was therefore more highly organised than the UTV system, with more gridding of space/control of movement and more connections

to the South-East. In terms of the abstract-machine of social expression the MTV landscape of the MBA-LBA was therefore more clearly part of the A cycle.

8.5.2 The environment of the Middle and Lower Thames Valley in the LIA-RO period

As in the UTV the landscape of the MTV continued to be open, with both arable and pasture in the LIA-LR period, although as in later prehistory the environmental evidence is much more limited in extent (Booth et al. 2007). As in later prehistory it is possible that there was some heathland with gorse scrub on the gravel terraces, with cultivation being concentrated on the gravels (ibid.). The paucity of environmental evidence continues into the LR period, although there is some indication of an open landscape with grassland and cultivation and an increase in hay meadow (ibid.). The increase in flooding also seen in the UTV may have led to the abandonment of lower lying arable (ibid.). Despite the evidence for continued agrarian use of the landscape there is a dearth of evidence for LIA-LR field systems in the MTV, in contrast to the situation in the UTV (ibid.). These differences in organisation of space may relate to the way that the regional abstract-machines operated in relation to the wider Roman economic system, and the urban abstract-machine in London. Thus the MLTV regional system was probably organised around production/consumption for London and this resulted both in closer ties to the wider Roman economic abstract-machine and greater regional distinctiveness.

8.5.3 The environment of the Middle and Lower Thames Valley in the early medieval period

Evidence for the EMED period suggests that environmental conditions continued to remain open, with grassland on the floodplain, although there was probably a reduction in the intensity of farming and some regeneration of woodland. In the MAS and LAS periods there is evidence for open landscapes of grassland and cultivation on the gravel terraces, with woodland on the Chiltern dipslope (ibid.). Once again there seems to be little evidence for field-systems in the early medieval period, despite the other evidence for widespread cultivation and in this we can perhaps see the renewed effect of the London abstract-machine on its hinterland, so that in the MLTV the gridding/ranking effects of the A cycle of social expression were concentrated in the city itself.

8.5.4 Food production/consumption in the Middle and Lower Thames in later prehistory

Patterns of cereal cultivation and animal husbandry were different within the MLTV regional system from those in the UTV from the beginning of later prehistory. However, the production/consumption of ceramics was largely similar, going through the same cycles of social expression as seen in the UTV. Later prehistoric cereal cultivation was dominated by hulled barley, emmer and spelt wheat, and oats, with emmer being more common than spelt in contrast to the UTV. Cattle was dominant among the major domesticates, being far more common than sheep/goat, with pig being particularly rare, again in stark contrast to the pattern in the UTV. These patterns in basic subsistence again may

relate to the interaction of environmental aspects of the abstract-machine including soil types, without being directly caused by them, as although sand and gravel terraces are present in the region, the MLTV also has extensive areas of London clay, which are not as good for sheep and pig husbandry, or cereal cultivation. In addition the region is relatively distant from areas of chalk upland, which would be more suitable for sheep. The regional system also had relatively large proportions of horse, but little use for wild resources. In later prehistory, from the EIA until the LIA the region seems to have been relatively sparsely settled and to have lacked the intensity of agricultural exploitation seen in the UTV. In other words the regional abstract-machine was less structured, perhaps less well connected and had less energy flowing through it. These factors may partly explain the relatively small size of the later prehistoric charred cereal and animal bone assemblages, when compared to the other case studies and later periods. They may also help to explain the relatively strong emphasis on cattle, which may have been better suited than sheep/goat to the clay.

Later prehistoric ceramic repertoires like those of the UTV were jar and bowl dominated. As in the UTV the assemblage therefore represents a set of ceramic tools best suited to cooking and serving an undifferentiated cuisine (Goody 1982) and one which promoted social solidarity (Appadurai 1981) (2.2.2) representing the B cycle of the abstract-machine of social expression. The only difference with the UTV repertoire is a slightly stronger emphasis on bowls, perhaps suggesting greater focus on serving rather than cooking. The relative lack of intensity and stratification seen in the landscape elements of the B cycle

of the abstract-machine of social expression therefore also come through in the ceramics.

8.5.5 Food production/consumption in the Middle and Lower Thames in the LIA-RO period

The LIA-RO period in the MLTV saw wheat species remain the dominant crop, although spelt became more important than emmer and free-threshing wheat became important. There were also large increases in rye and oats in anticipation of the early medieval pattern. Cattle remained the dominant animal species, so that it can be argued that the Roman economic abstract-machine built on what was already present in the MLTV to an even greater degree than it did in the UTV. The foundations of the LIA-RO agricultural economy in this region were cattle and wheat but these elements were already dominant in later prehistory. However, sheep/goat and pig, along with domestic fowl were more common in the MLTV in the LIA-RO period than they had been in later prehistory, possibly meaning that local soils were becoming less important in influencing choice of species, with more sheep, pigs and fowl being imported into Roman London. The effects of the London abstract-machine, which was connected to and amplified the effects of the wider Roman economic abstract-machine, can then be interpreted as overriding the effects of the regional system.

In comparing urban and non-urban settlement in the MLTV in the LIA-RO period the operation of two distinctive but interlinked abstract-machines of production/consumption must be borne in mind. Wheat was slightly more

prevalent than barley in both these systems and this tentatively supports the idea that the MLTV abstract-machine was responsible for the production of most of the grain consumed by the London abstract-machine. Both the wider MLTV and London also had relatively high ubiquities of indeterminate wheat and oats, again suggesting connections between production in the wider valley and the provisioning of the urban system. However, differences in the ubiquity of sub-species of wheat and rye, in which non-urban settlements were characterised by higher ubiquities of the species favoured during later prehistory (emmer, spelt and emmer/spelt) while London was characterised by higher ubiquities of bread wheat, club wheat and rye suggest a more subtle interpretation. Possibly the London abstract-machine was engendering specialist production in its MLTV hinterland, or drawing in cereal resources from much further afield. Differences were also apparent in the species ubiquity of indeterminate and hulled barley between London and the wider MLTV, with the London abstract-machine producing/consuming more indeterminate barley. This difference perhaps derives from systematic differences in organisation of production/consumption between the two abstract-machines.

The relationship between the urban abstract-machine of London and the wider non-urban system in the LIA-RO period is particularly evident in animal husbandry. The proportions of cattle, sheep/goat and pig produced/consumed by the urban abstract-machine were stable, varying by only 3% between the later prehistoric and early medieval periods. In contrast the non-urban abstract-machine was characterised by instability, with a 16% decline in the proportion of cattle over the same period. Sheep/goat was therefore a more important

component of the non-urban abstract-machine and cattle of the urban abstract-machine in the LIA-RO period. Given the difficulty of raising cattle within an urban environment this pattern suggests a very close intermeshing of the two abstract-machines, with the non-urban settlements supplying the cattle consumed in the city. Certain species suited to urban life, such as domestic fowl, increased in the urban dataset and dogs and cats were also more common.

LIA-RO ceramic repertoires from the MLTV were clearly influenced by the London abstract-machine, with the dominant class being amphorae, and mortaria and flagons also being important; although jars and bowls were still considerably more frequent than vessel types other than amphorae, and changes in ceramic forms as in other regions did not show a particularly close relationship to changes in available food stuffs. The ceramic repertoires of this region are clearly indicative of cycle A of the abstract-machine of social expression. The importance of amphorae in this assemblage is a sign of the unique nature of the urban abstract-machine as an amplifier of connectivity, in which commodities from the wider empire would have been gathered and presumably transferred to other forms of container before being sent onwards to the rest of the province. The urban abstract-machine therefore changed the nature of the regional system in the process of making these connections. However, the high proportions of amphorae are possibly also a marker of the unique nature of consumption within the city (amphorae form a much greater proportion of the urban assemblage than the non-urban assemblage - Chapter 7, Figs. 7.15, 7.16, 7.18 and 7.19), which may have included forms of elite consumption and also cuisines unavailable elsewhere in the province. Within the

city bowls, flagons and mortaria formed a much greater proportion of the assemblage in comparison to jars than they did in the contemporary non-urban assemblage, suggesting the importance of alcohol consumption, possibly associated with the drawing of social distinctions. Outside the city dishes, flagons, beakers and mortaria formed a far lower proportion relative to jars, suggesting a cuisine that still relied heavily on communal forms of serving and consumption; although these were still present in greater abundance than had been the case in the preceding period. As in the UTV the A cycle of social expression was therefore more influential in certain settlement types, in this case in the urban context.

8.5.6 Food production/consumption in the Middle and Lower Thames in the early medieval period

The early medieval period in the MLTV, like its equivalent in the UTV, showed a huge transformation in many ways, particularly in cereal cultivation. There was a big increase in proportion of bread/club wheat, rye and oats and a big decline in other species of wheat and barley. Proportions of cattle declined further, in contrast to the patterns in both the UTV and on the route of HS1, with numbers of sheep and pig increasing and proportions of horse lower than at any other time in this region, but domestic fowl, dog and wild species increasing. A number of conflicting factors may be responsible for this pattern including MAS and LAS urbanisation, woodland regeneration and changes in cultural preferences towards sheep and pigs. However, if the latter is the case, then it contrasts strongly with the culture of the UTV. Ceramic repertoires saw a return to

preferences for jars and bowls, similar to that seen in the UTV. Differences between the urban and non-urban abstract-machines in the early medieval period (which relate to the MAS and LAS phases in the urban context) show considerable continuity with their LIA-RO equivalents, demonstrating the similarities of social expression between two phases of cycle B. In the early medieval period indeterminate barley was once again more common than hulled barley within the urban abstract-machine, suggesting the possibility of systematic differences in processing between the two abstract-machines as in the LIA-RO period. Differences in the ubiquity of wheat species, rye and oats between urban and non-urban abstract-machines are less marked in the early medieval period than they had been in the LIA-LR, suggesting a slightly different articulation between the two systems, perhaps with less grain imported from beyond the region. The similarities in the operation of the urban abstract-machine between the LIA-LR and MAS-LAS periods are most obvious in the faunal dataset, where there was essentially very little change between the LIA-RO and early medieval periods. Both Roman and medieval urban abstract-machines seem to have drawn in higher quantities of cattle than were used in their hinterlands, perhaps for reasons of meat weight and industrialized butchery. They also both produced/consumed higher proportions of species that could be husbanded within urban environments, such as domestic fowl and pigs than their hinterlands.

The ceramic repertoires of the urban and non-urban abstract-machines were not particularly divergent, being dominated by jars, bowls and jugs/flagons with the only real difference being a higher proportion of dishes within the urban

assemblage, which might again be taken to indicate the stronger expression of cycle A with the city than without, as in the LIA-RO period. This pattern of similarity between assemblages was itself a divergence from the Roman pattern, but it strikes a chord with the analysis of cereal cultivation, where again there was divergence in the LIA-RO period, but similarity in the early medieval period. Both similarity and divergence may be related to the functioning of the urban abstract-machine in relation to the non-urban abstract-machine in the two periods. Supplies of ceramics and grain in the LIA-RO may have been partially accessed through an interrelationship with the wider Roman economic abstract-machine in the first period, causing divergence between the urban and non-urban machines, but primarily provided by the regional hinterland in the second causing a convergence in vessel types and cereal species.

8.6 An abstract-machine of food production/consumption on the route of HS1 1500BC-AD1086

The landscape elements of the HS1 abstract-machine, like that of the Thames Valley are described in more detail above (1.2.4) and elsewhere (Booth et al. 2011), so their description in the following section is brief.

8.6.1 The environment of the route of HS1 in later prehistory

The environmental and agricultural sequence in Kent contrasts quite strongly with that of the Thames Valley. Unlike in the latter region woodland clearance seems to have taken place primarily in the MBA-LBA, rather than getting

underway in the Neolithic and EBA and areas of extensive woodland seem to have survived until the MIA or later in some areas. However, there is evidence for extensive open country with field systems by this period (Champion 2011, 171). The regional abstract-machine in the parts of Kent transected by the route of HS1 seems then to have bypassed cycle A in the MBA-LBA and the region perhaps played something of a peripheral role to the North Kent coastal plain, and the LTV, which were extensively occupied by field-systems and settlement, including ringworks (Yates 2007, fig. 3.3) and therefore more fully involved in the A cycle. However, the probability that woodland clearance did occur during the MBA-LBA, suggests that the region was drawn into the periphery of the highly organised and connected regional abstract-machine centered in the lower reaches of the Thames estuary and the North Kent coastal plain, perhaps being used to provide upland pasture and woodland, and wild resources.

8.6.2 The environment of the route of HS1 in the LIA-RO period

By the LIA-LR there was probably much less woodland, with open country characterised by cereal cultivation and grassland, and only parts of the landscape occupied by scrub or woodland (Booth 2011, 252). During the LR period there may have been woodland regeneration, but the evidence for this only really comes from the villa at Thurnham, and may therefore represent localised activity (ibid. 253). In general the northern and southern coastal zones were largely open with mixed agricultural activity, and there was probably more pasture on the upper slopes of the North Downs, with occasional woodland. In the Weald there was more extensive woodland (ibid. 254). There is an absence of evidence

from the North Downs and Weald for widespread, extensive field systems, like those seen in other regions of England (ibid. 292). This may be a real pattern related to the extent of woodland cover and the importance of pastoralism on the downs, rather than an artefact of archaeological fieldwork techniques. And therefore the influence of cycle A in terms of the gridding and structuring of the landscape was less in the areas transected by the route of HS1, as in later prehistory. However, the presence of villa estates on the route of HS1 transect shows that the area was now more connected into the regional system, which was itself more connected to the wider Roman economic abstract-machine.

8.6.3 The environment of the route of HS1 in the early medieval period

The environment and landscape on the route of HS1 in the early medieval period is poorly attested, probably because much of the evidence encountered on the route related to cemeteries rather than agricultural or settlement activities (Reynolds 2011). However, given that Booth (2011, 254) argues that LIA-RO woodland cover was similar in extent to the modern day picture, it is not unreasonable to assume that landuse and cycles of social expression in the early medieval period followed a similar pattern. At different times during the period from 1500BC-AD1086 the North Downs and the Weald were on the edge of more highly organised and connected abstract-machines, probably being most closely connected during the LIA-LR period, but always playing a specialist role related to their distinctive environment.

8.6.4 Food production/consumption on the route of HS1 in later prehistory

Cereal cultivation and animal husbandry on the route of HS1 in later prehistory differed both from the UTV and the MLTV case studies, having slightly more reliance on wheat than barley, with emmer being significantly more important than spelt and high proportions of oats being present. Particularly significant was the fact that sheep/goat was present in higher proportions than cattle and that pigs accounted for more than half of the proportion of cattle. These local idiosyncrasies run counter to what is usually expected for Eastern England (Hambledon 2008, Champion 2011, 2014), and arose from the interaction of regional soil types (which consist of chalk on the slopes of the North Downs and greensand in the Weald) and relatively extensive woodland (Champion 2011, 170-71) with animal species and modes of human occupation. There were also surprisingly high levels of wild animals, including deer in this period and together these combinations of crops, animals and landscape add up to a distinctive upland/woodland/pastoral abstract-machine. Ceramic assemblages were typically dominated by jars and bowls, in a pattern very similar to that seen in the Thames Valley (8.3) and more widely in Central Southern England (Cunliffe 2005) in later prehistory. Nevertheless, there was also a distinctive regional tradition of drinking cups in the LBA-EIA, some examples of which were present in the HS1 later prehistoric assemblage (Champion 2011, 241). These ceramic repertoires like their equivalents in the Thames Valley were largely well suited to the cooking and serving of an undifferentiated cuisine, but the presence of some cups in the LBA-EIA suggests opportunities for the expression of social differences through alcohol consumption. The later prehistoric ceramic assemblage therefore represents two cycles (A and B) of social expression.

8.6.5 Food production/consumption on the route of HS1 in the LIA-RO period

In the LIA-RO period the regional abstract-machine became more connected to the wider Roman economic system, in a process that in some ways mirrored the one that occurred in the Thames valley. Wheat became more important than barley, spelt overtook emmer, although emmer remained more important than in the other case studies and the proportion of oats declined. In animal husbandry cattle, became more important than sheep/goat, wild species remained important and the proportion of pigs increased. These processes reflect the higher degree of structuring and connectivity of the Roman economic system, rather than the influence of soil types. However, some distinctive regional patterns such as the growing of emmer, the use of wild animals and the husbanding of pigs clearly persisted. These persistences were both like and unlike those seen in the UTV in the same period, in that they partly comprised forms of production/consumption that were less tied in to the Roman economic abstract-machine (emmer wheat, wild animals), but also included those that were (pigs). Ceramic repertoires on the route of HS1 were less jar dominated than the other regions, with particularly high proportions of drinking equipment such as beakers and cups, which in itself probably reflects the presence of high-status settlement along with a large Roman cemetery in the sample, but also the extent to which forms of social expression were influenced by the wider Roman abstract-machine as the system moved back into cycle A.

8.6.6 Food production/consumption on the route of HS1 in the early medieval period

Early medieval animal husbandry continued to be dominated by cattle, with pigs accounting for nearly 30% of major domesticates and horses also contributing a significant amount. The scale of emphasis on pigs is distinctive of early medieval practices and shows that this region did not escape the changes seen in the other two case studies; although, this emphasis on pigs, along with the similar emphasis seen in the preceding period must also be related to the extent of woodland cover and the upland/woodland/pastoral abstract-machine. Early medieval ceramic repertoires on the course of HS1 were jar dominated like those in other regions, although some drinking and eating related vessels also appear to have been present, albeit with forms that suggest some of them could have represented residual Roman material. The early medieval ceramic repertoire from the route of HS1 is therefore a something of a mixed bag. Overwhelmingly the dominant forms represent an assemblage suited to the preparation and serving of an undifferentiated cuisine, as with the other early medieval assemblages examined for this thesis with the exception of that from MAS and LAS London. However, the presence of early medieval drinking equipment, which is not all residual indicates some small scale opportunity for social ranking in consumption and although this material comes from funerary contexts it also sits within a regional tradition of drinking equipment and a regional abstract-machine of hierarchy/stratification, going back to the later Bronze Age. The abstract-machine of social expression during this period therefore involved both A and B cycles.

8.7 Discussion: Food as a total social fact: productive consumption in Southern England 1500BC-AD1086

8.7.1 Regionality

These apparent regional differences between food production/consumption abstract-machines in the Thames Valley and HS1 regions may be set in the context of broader regional differences within England, which have been noted by many authors and seem to persist through later prehistory, the Roman and early medieval periods. Eastern England shows a distinctive pattern in its archaeological record through all of these periods, indicating a greater degree of interaction with communities from Northern Europe than that seen in Central Southern England (Bradley et al. 2015). In the later prehistoric period Sharples (2010, 312) argues that groups in eastern England had a lot in common with the societies of the Continental Iron Age, contrasting this region with the insularity of Wessex (ibid. 311), of which the UTV could be argued to form a fringe; and similar arguments have been made about Kent by Champion (2011, 241). The persistence of this regional difference into the Roman period is noted by Cool (2006), although in this case the picture is slightly more complex, with internal differentiation within the eastern and central-southern regions and more connectivity with, and influence from the Roman Imperial system. The regional division is perhaps most obvious in the early medieval period, for which it has become a particular focus of research around the nature of ethnicity and the geographical origins of the population (Hamerow 2012).

8.7.2 Cycles of productive consumption - the abstract-machine

Marx (1973 [1939], 90-93) argues that production and consumption are two sides of the same coin (2.2.2) and that all modes of production/consumption have an historical specificity. At the same time food is a total social fact (Appadurai 1981) (2.2.2) and leads off into all aspects of human societies, so that artificial boundaries have to be drawn around the questions to be investigated. The boundaries drawn around this investigation have resulted in three main sources of data being consulted: charred cereal grain, animal bones and ceramics. These have been employed as evidence for three significant sets of historical practices: cereal cultivation, animal husbandry and the use of ceramic repertoires in food consumption. These practices were part of broader food producing/consuming complex-systems, which were themselves part of broader human/landscape abstract-machines of production/consumption; constituting parts of regional ecological systems and cycling between different degrees of stratification/ranking in social expression. While all three necessarily involve elements of production and consumption it is arguable that the first two are more strongly involved in the productive elements of the system, while the third is more closely aligned with the consuming parts of the system.

Changes in cereal cultivation and animal husbandry through later prehistory, the Roman and early medieval periods seem to be closely aligned, with changes in the proportions of cereal species, such as wheat and barley and animal species such as cattle and sheep/goat occurring broadly in step with one another, as, for example, at the IA-RO transition. On the other hand changes in ceramics appear to have had a more cyclical character, with an oscillation between repertoires

dominated by jars and bowls and those with more individual serving vessels such as cups, beakers and flagons. This cereal/animal: ceramic dichotomy is the difference between what Deleuze and Guattari label the content and the expression of the abstract-machine (2011[1987]). There is then a sense in which changes in ceramic repertoires were somewhat divorced from changes in cereal cultivation and animal husbandry regimes, which goes back to the contrasting emphases on production and consumption in the different practices explored above. Ceramics are tools for cooking, serving and eating, but also for the construction of social differences of rank and hierarchy and for the construction of social solidarity. Ceramics are an artistic medium and a medium for the creation of territories, which is not to say that they are purely cultural: "art is not the privilege of human beings" (ibid. 349). Different ceramic forms can afford the differentiation of portions of food and drink by kind, by elaborateness of preparation and by quantity, but they can also homogenise and bring together, mingling ingredients and breaking down the form of, for example, recognizable cuts of meat from a particular species. On the other hand cereal cultivation and animal husbandry are technological/nurturing practices, which produce the raw material for the production of food, but also mark and divide territories, for example in the creation of field systems. What connects these two elements might be labeled cuisine (an abstract-machine of social differentiation/solidarity), the specific combination of ingredients and methods of cooking resulting in distinctive textures, flavours, bundles of sensations and memories experienced by the consumers of the food (2.2.1, 2.2.2).

The abstract-machine of food production/consumption in Southern England expresses continuities and divisions from east to west as explored in detail above (Chapters 5, 6 and 7). In all three periods the UTV abstract-machine, in the interior and possibly relatively inaccessible (Bradley 2007), had a distinctive trajectory - highly productive, but relatively lacking in stratification, either of uses of the landscape, settlement types, ceramic repertoires, or human communities. This remained largely the case from the beginning of the study period c.1500BC to the end c. AD1086. In contrast on the route of HS1, in the east and highly connected both with other areas of England and with the Near Continent, stratification was more evident. Here there was stratification in settlement (villas), landuse between the north and south of the route and the North Kent coastal plain, animal species (more consumption of wild animals, more exotic animals such as fowl earlier in prehistory), ceramics and human communities. Again this remained the case in many aspects from the MBA until the EMED, although for some material types the evidence is less secure than for others.

Connecting the UTV and the route of HS1, the MLTV abstract-machine also exhibited certain distinctive characteristics throughout the study period. While the Lower Thames shared some of the hierarchical characteristics of the route of HS1 the defining characteristic of the MLTV, after the end of the BA was a degree of emptiness. Large-scale field-systems were not in evidence here and much of the settlement and agriculturally productive capacity of the valley was confined to the relatively narrow strip of gravel terraces flanking the river. The exception from the beginning of the Roman period was the Roman city of London and then

the MAS wic and LAS city. This urban abstract-machine seems to have drawn in food from the surrounding rural areas in remarkably similar ways in both the Roman and early medieval periods, creating a much more stable pattern of animal species and ceramic consumption and at the same time altering the production/consumption patterns in the surrounding settlements, so that certain animal species, for example, domestic fowl and ceramic forms such as amphora were much more widespread in these settlements than elsewhere. The MLTV abstract-machine was therefore simultaneously both highly structured in London and relatively un-structured elsewhere.

The make up of the production/consumption systems characteristic of these three regions in terms of species of cereals and animals seems to have been fairly heavily influenced by the nature of regional ecosystems (Table 8.2). The Thames gravels seem to have given a strong impetus to cattle husbandry over other animal species through later prehistory, the Roman period and into the early medieval period. Similarly the chalk of the Downs and the probable extent of woodland on the route of HS1 seem to have favoured sheep/goat husbandry and pigs respectively, the latter regardless of time period, but the former being replaced with cattle during the LIA-RO period. Similarly crop preferences may have been partly influenced by the nature of topography, woodland cover and soils with higher ratios of barley to wheat in the lower lying UTV and lower ratios of the same species in the more elevated environment of the North Downs, on the route of HS1. At the same time each region also displayed idiosyncratic forms of crop/animal consumption/production seemingly not closely linked to the specific nature of soils, sometimes displaying long-term continuities and

other times being relatively short lived. Examples of these idiosyncrasies include a preference for dog consumption in the later prehistoric period in the UTV, which seems to have continued into the LIA to ER period, a long-term preference for wild animals in all three periods on the route of HS1, a preference for domestic fowl in the LIA-RO and early medieval periods in the MLTV and a preference for emmer in later prehistory on the route of HS1, which extended into the LIA-RO period. Both the idiosyncrasies and continuities can be seen as the product of the operation of long-term regional abstract-machines of production/consumption, which expressed themselves in a synchronised way through cycles of highly stratified, highly connected organisation on the one hand and more mobile, more fluid less connected organisation on the other.

Table 8.2: Regional characteristics of production-consumption abstract-machines in the three case studies.

	UTV	**MLTV**	**HS1**
Later Prehistory	*Charred Plant Remains*: Total barley v.slightly more frequent than total wheat, Indet barley dominates indet wheat, hulled barely equals indet wheat, spelt dominates emmer, free-threshing wheat, rye and oats all present in small proportions.	*Charred Plant Remains*: Emmer and emmer/spelt wheat dominate, oats and hulled barley important, free-threshing and rye present.	*Charred Plant Remains*: indet wheat dominates indet barley by about 7% dominated by oats, indet wheat, +emmer/spelt also v. frequent, hulled barley + emmer wheat important, indet barley, spelt wheat, free-threshing wheat, rye present in smaller amounts.
	Animal Bone: Cattle dominated 9% diff between cattle and S/G pig v important 20%, Dog most dominant minor species, horse and	*Animal Bone:* Cattle dominated sheep/goat 66% to 18%, pig v low 4%. Horse dominates minor species, deer and	*Animal Bone:* Sheep/goat dominate cattle 62% - 23%, pig 15%, deer and horse dominate minor species, dog + bird also present.

	deer present	hare/rabbit present	
	Ceramic Repertoires: jars dominate overwhelmingly, bowls important but other types not really present	*Ceramic Repertoires:* Jar and bowl dominated, range of RO forms which must be intrusive.	*Ceramic Repertoires:* Overwhelmingly jar/bowl dominated.
LIA-RO	*Charred Plant Remains*: Indeterminate wheat dominates indeterminate barley, hulled barley nearly as common as indet wheat, emmer/spelt dominates emmer and spelt, free-threshing wheat nearly as important as emmer/spelt oats present.	*Charred Plant Remains:* Oats dominate, hulled barley, spelt wheat, free-threshing wheat and rye all important.	*Charred Plant Remains:* Indet wheat dominates indet barley by 22% - dominated by indet wheat, oats, emmer wheat, spelt wheat, emmer/spelt wheat, indet barley also important, hulled barley present.
	Animal Bone: Cattle dominates sheep/goat by 6%, pig down to 13%, horse is dominant minor species.	*Animal Bone:* Cattle dominates sheep/goat 59% -30%. Pig 10% - domestic fowl and horse dominant minor species, deer, dog and hare/rabbit present.	*Animal Bone*: Cattle dominates sheep/goat 49% - 32%, pig high at 19%, minor species dominated by horse, deer also significant, dog, hare/rabbit and bird also present.
	Ceramic repertoires: Still jar dominated, but bowls, dishes, flagons, beakers and mortaria now more important.	*Ceramic Repertoires:* Amphora dominated, jars and bowls important, flagons and mortaria slightly less so.	*Ceramic Repertoires:* Jar and storage jar dominated, bowl/dishes also important, flagons, beakers and cups important - dishes, platters, tankards, amphorae.

Early Medieval	*Charred Plant Remains:* Wheat indet dominates barley indet, free-threshing wheat, hulled barley and oats nearly as important as indet wheat, rye important, emmer/spelt present in relatively small proportions.	*Charred Plant Remains:* Oats and bread/club wheat dominate, rye nearly as important, free threshing wheat, spelt wheat, emmer wheat and hulled barley all present in smaller proportions.	*Charred Plant Remains:* No data.
	Animal Bone: Cattle dominates sheep by 34%, pigs stay about the same at 12%, horse overwhelmingly dominates the minor species.	*Animal Bone:* Cattle dominates sheep/goat 50%-36%, pigs up to 13%, domestic fowl dominates minor species, dog, deer, hare/rabbit and bird all present.	*Animal Bone:* Cattle dominates sheep/goat 49% to 23%, pig very important 27%, horse overwhelmingly dominates the minor species, deer and bird also present.
	Ceramic Repertoires: Jar dominated with bowls, dishes and flagons, must be residual RO vessels.	*Ceramic Repertoires:* Jar dominated, bowls, dishes, flagons and urns important, beakers, amphorae and mortaria important but must be residual.	*Ceramic Repertoires:* Jar dominated, dishes and cups also important, mortaria and bowls present, but dishes and mortaria must be residual.

8.8 Conclusions

This chapter has attempted to address the question of continuity and change in food producing/consuming systems/abstract-machines on a regional scale in Southern England. The results of the analysis show a complex picture, which

reveals both change and continuity, but also genuinely distinctive regional processes operating with varying degrees of continuity through later prehistory, the LIA-RO period and into the early medieval period. Each of the three regional case studies under consideration had similarities with the other two in terms of cereal cultivation, animal husbandry and ceramic repertoires, but also strong and distinctive variations, which persisted throughout the time period under consideration. Variations in cereal cultivation and animal husbandry seem to have been fairly closely linked, so that the most radical changes in both datasets seem to have occurred in the early medieval period. In contrast changes in ceramic repertoires appear to have occurred without much direct relationship to either cereal cultivation or animal husbandry and also seem to have had a somewhat cyclical nature, leading to the suggestion that changes in food, in terms of basic ingredients do not have a direct relevance to changes in ceramic vessel form. In all three case studies variation in cereal cultivation and animal husbandry can also be linked to variation in dominant soil types and topography (cf. Rippon et al. 2015), through the operation of regional abstract-machines, although variation between case studies with similar soil types (i.e. the UTV and MLTV) demonstrates that this relationship is in no way deterministic. The variation in all three material types between case studies can also perhaps be linked to regional contrasts in geographical connectivity, with the relatively insular UTV in the west contrasting with the more connected regions of eastern England, which seem to have been more influenced by practices originating on the European continent.

The collection of data and assimilation of archaeological literature from such a wide geographical area and relating to such a long time span has been difficult, but as the preceding chapters demonstrate also very fruitful. The wide geographical scope has enabled the collection of data of sufficient diversity to properly address the question posed in Chapter 1 of whether food producing/consuming systems in England had distinctive regional characters during the period from c.1500BC-c.AD1086. And the long-term approach has enabled the making of interpretations not constrained by the questions of the traditional period specialisms. Having offered a synthesis and discussion of the data analysed in this thesis, the following chapter moves on to discuss the approach of the thesis and potential refinements of the methodology in the context of potential future work using similar datasets.

9 FINAL REFLECTIONS

9.1 Introduction

This thesis represents an attempt to apply some innovative methodological and theoretical tools to a very large dataset culled from developer-funded archaeology. The methodological tools relate to the concept of "Big Data", which has been applied to landscape scale and settlement data by a handful of projects in Britain, which have either only recently been completed (Bradley et al. 2015; Rippon et al. 2015), or are in the process of coming to a conclusion (The Roman Rural Settlement Project, EngLaId), but has not really been applied to finds data on an appreciable scale. The theoretical tools are derived from Deleuzean or relational approaches, which have a longer history of application to archaeology (Harris In Press), but have not been widely brought together with "Big Data" methodologies. The lack of a link-up between these methodological and theoretical elements is surprising, as they go well together, being concerned with the interrelationships of complex assemblages of people, objects and information. The following chapter therefore comprises a brief review of the application of these concepts to the datasets used in the thesis, followed by the discussion of some future research directions to which they could be applied. Section 9.2 comprises a discussion of the approach taken to data gathering and analysis in this thesis, bringing forward some ideas on what could be done differently in future projects. Section 9.3 provides some recommendations on digital archiving and data storage and section 9.4 discusses three possible future

research projects that could be developed from the datasets and approaches discussed in this thesis.

9.2 Methodological recommendations

9.2.1 The use of large finds datasets in English archaeology: problems and opportunities

The use of "Big Data" in the social sciences and humanities has been lauded as a kind of panacea for perceived problems of relevance and objectivity. Very large social scientific and humanistic databases have been seen as giving access to a clearer and more objective understanding of social reality through the sheer "weight" or size of the datasets involved and therefore as doing away with the need for interpretation (Guldi & Armitage 2014). However, "Big Data" has also been criticised as a form of ideology, which seeks to advance the interests of elites, particularly governments and the large social media organisations, by both covering up inadequacies and biases in the understandings of society advanced by these elites and by aggregating large amounts of personal data in order to manipulate and control society (Jurgenson 2014). While the latter view could be seen as slightly paranoid, it is possible to view the use of "Big Data" in archaeology in terms of elements of both of the arguments described above; however, it would be a mistake to adopt one of these points of view to the wholesale exclusion of the other. A more useful approach might be to try and steer a middle course between them, accepting that the use of "Big Data" allows archaeologists to address familiar problems and questions with much more

complete datasets and to glimpse previously unsuspected patterns in the archaeological record, but also increases the risk of glossing over the role of interpretation, because of the coarse grained approach that must necessarily be adopted and therefore of adopting a "scientistic" approach. In this view the idea that "Big Data" is a panacea and that interpretation and context are no longer important should be resisted. The aggregation of larger and larger datasets, while offering important new avenues for research also risks losing sight of important nuance and detail. As well as huge benefits, "Big Data" approaches come with considerable costs. The following section therefore discusses the methodology adopted in this thesis in terms of costs and benefits and finishes by making recommendations for the future creation and archiving of digital finds datasets in English archaeology.

9.2.2 The costs of using large finds data sets in archaeology

The experience of gathering and analysing data for this thesis has shown that the use of large finds datasets involves overcoming a number of considerable difficulties, which can be seen as costs in terms of time and effort. These costs include the following: the data have to be accessed, they can be difficult to find, or withheld for commercial or research purposes. In addition, the different interests of varying organisations, which stem from their different roles within the discipline, may have to be reconciled in order to obtain access and this process may involve a considerable amount of negotiation. Widely varying standards of digital recording and archiving between organisations have to be reconciled, either through amending data by hand, or through automated

processes. Datasets have to be made interoperable; this may involve considerable volumes of work to translate widely varying coding systems. Finally, it is difficult to address qualitative issues such as formation processes when using very large datasets, as the scale of the data gathering exercise makes it difficult to capture data at a sufficient level of detail.

9.2.3 The benefits of using large finds data sets in archaeology

Having set out the problems encountered when using large datasets above, the following section will deal with the benefits to be gained. These benefits are very great, both for the research process and for the wellbeing of the discipline as a whole and far outweigh any difficulties. There are three broad benefits for the archaeological discipline as a whole, which stem from the use of "Big Data". The first of these is the use of data generated by the application of planning policy guidance note 16 (PPG16) and the National Planning Policy Framework (NPPF), which superseded it, for research, which helps to justify the existence of developer-funded archaeology at a time of economic stress, when it is arguable that the resource represented by the results of this work needs to be seen to be "used" by researchers. The second is the scope that it offers for the integration of the activities of the different kinds of archaeological organisation (academic, governmental and developer-funded), which arguably has the potential to strengthen both research and education across the sector. Thirdly "Big Data" approaches promote the transfer of expertise within the wider discipline, both from academia to developer-funded organisations, in the form of theoretical and computational expertise, among other things and from developer-funded

organisations to academia in the form of knowledge of artefacts and regional archaeological records. Benefits to the research process itself are also very great and also fall into three main patterns. The first of these is the ability to revisit old questions using much larger and more integrated datasets, so that questions about: for example, the prevalence of certain animal species in the herds of a specific region at a particular period of prehistory, which might have been addressed using a sample of 40 sites, e.g. Hambleton (2008), can now potentially be addressed using a very substantial proportion of all the developer funded assemblages from Southern England. Regardless of whether or not such an approach changes the answer given to the question, it is arguable that the process is more rigorous. Secondly, the opposite process of question formation is promoted by "Big Data" approaches, whereby new previously un-thought of questions emerge from new patterns seen in the data: for example, where there are seen to be previously unrecognized discrepancies in pig consumption between different regions of England in later prehistory, prompting questions about land management and regional histories of animal husbandry. Finally "Big Data" approaches may be argued to promote greater integration of theory and data with databases themselves offering empirical proxies for the theoretical assemblages envisaged by Deleuzian/relational archaeologists in the manner advocated by Lucas (2012).

9.2.4 Recommendations for the digital archiving of finds datasets in archaeology

This section sets out some brief recommendations for the archiving and processing of digital finds datasets. There are four main recommendations; firstly, the creation and storage of metadata is essential to avoid the expenditure of large amounts of time and effort in the location and understanding of data. Digital finds data should be archived centrally and preferably relationally rather than hierarchically for the same reasons. Digital archives should be treated with the same importance as paper archives, for which sector wide practices and standards are in place and which are generally curated to a high professional standard. Finally all developer-funded archaeological organisations should consider the creation of single relational databases for context data and for finds. The creation of such databases would have several advantages, including but not limited to the mandating of a degree of standardisation in finds recording. They would also represent an extremely powerful resource for research as shown by much already published work, for example, Orton et al. (2014).

9.3 Future methodologies

The data collection and analysis carried out for this thesis involved the collection of digital finds datasets from several different organisational contexts (3.4.1) and the collection and standardisation of the data involved a considerable investment of time (3.4.5; 3.4.6; 3.4.7; 3.4.8). The capture of the data was focused on maximising the detail available for research and much of this detail has

proved superfluous to the analysis carried out for the thesis. At the same time much of the investment of time involved in data gathering related not to the initial accessing of the data, but to the tasks of standardisation and cleaning up of the digital data involved in making the different datasets interoperable. In addition, certain CSAs, particularly the UTV CSA would have benefitted from a wider geographical dataset with a lower level of detail. It is therefore recommended that any future project of this type takes a more mixed approach to the gathering of digital and non-digital data. Specifically, charred grain and animal bone data can be gathered respectively as raw counts of chaff and grain and NISP by species from published sources. This approach would save considerable amounts of time, particularly in the gathering and processing of animal bone data on, for example, pathology or specific bones relating to different parts of animals. Ceramic data are, unfortunately, not generally published in a sufficiently standardised way and geographically complementary digital ceramic archives would therefore have to be sourced using procedures similar to those used for this thesis. The most user friendly digital archive accessed for this thesis was the one produced by MOLA and although the process of downloading the MOLA dataset created issues of duplication which had to be addressed, the scale of the dataset was such that the additional time expended was fully justified by the results. It is therefore recommended that any future project take full advantage of any developer funded integrated context and finds databases, such as the MOLA database.

9.4 Future Questions

The combination of developer-funded data with "Big Data" approaches to analysis and innovative theoretical approaches of different kinds has exciting potential for future research. The following section briefly discusses some ideas for future potential research questions that have grown out of this thesis. The first is methodological and concerns the use of databases and keyword searching software for the automation of the process of making Roman ceramics data interoperable. This would allow the much more effective use of Roman ceramic datasets in "Big Data" research. The second extends the investigations undertaken in this thesis to the "context" scale of analysis, by examining the evidence for regional traditions of structured deposition in later prehistory and the Roman period, examining the long-term persistence, or otherwise of modes of structured deposition using the CSAs studied in this thesis and again cutting across period boundaries. The third idea seeks to extend the investigatory context of the thesis spatially by adding a series of new case studies on Northern England, specifically Yorkshire, and thereby investigating the relationship of South-East England to another region with different histories, environmental contexts and cultural traditions. The following paragraphs investigate these ideas in slightly more detail.

Keyword searching software packages using natural processing languages, such as Paper Machines have had a growing impact on research in the humanities (Guldi & Armitage 2014), allowing researchers to investigate the interrelationships between large bodies of scanned texts. This software could

potentially be used to scan developer-funded grey literature reports for links between descriptive terms for, for example, ceramic fabric types or vessel types and the codes used by individual ceramicists to describe them in databases. If successful this method could be used in a variety of "Big Data" projects using ceramic data.

This thesis has focused on two scales of analysis when investigating long-term trends in food consumption/production: the regional scale and the settlement scale. However, the context scale seems to follow on logically from these investigations and a new project could take this scale as its primary focus of analysis. One refinement of this idea would be to collect evidence for structured deposition, of animal bones, ceramics and other food processing tools such as querns in a database similar to the one used in this thesis, focusing on the same CSAs. It would then be possible to investigate whether the long-term trends in food production/consumption visible at a regional and settlement scale were replicated in regional traditions of structured deposition.

A related investigation forms the third and final potential research question discussed in this chapter. Rather than extending the project down the spatial scale, the investigation could be extended upwards to take in a supra-regional scale. In this case adding an additional CSA, or case studies, based on developer-funded data from Northern England could extend the analysis. Analysis would then focus on comparing the new data with data from the Thames Valley case studies to investigate how closely the regions were linked in terms of food production/consumption.

This thesis has shown the potential of "Big Data" approaches when applied to finds datasets generated by developer-funded archaeology, but it has only scratched the surface of what could be achieved by bringing together increasingly sophisticated computational techniques, with the increasingly large quantities of data generated by developer-funding of archaeological investigation.

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