## 7.0 Making the Invisible, Visible: Iron Age and Romano-British Coastal Salt-Production in Southern Britain

## 7.1 Introduction

This chapter will discuss contextual trends and themes as evidenced by the results of this research project. This will include exploring the evidence using new approaches such as understanding the significance of site diversity and technological choice, as well as the use of space.

Evidence for regional trends and potential links to other contemporary saltproducing areas outside the study area will also be explored, as well as the significance of salt-production as a whole.

Table 1.1 Key Discussion	
	Chronological development of salt-production across Time and Space
	Technological Trends and Site Diversity
Common Themes	Site Biographies and Use of Space
	Site Organisation and Management
	Significance of Iron Age and Romano-British salt-production in the study area

#### Table 7.1 Key Discussion Themes

It is important to remember that the production and trade of salt would have involved many different individuals; from those organising and producing the salt (which could have included small families, or extended families, mixed community groups) to those transporting and exchanging salt or salted goods. This would have involved cooperation between individuals and groups and the dynamics of this process could easily have varied over time and space.

Identifying individuals and small groups is challenging, and archaeological evidence is commonly interpreted on the level of larger communities and societies. Often the evidence in this research project has been discussed by county and convenient archaeological categories such as site types. The challenge is to transform these results into meaningful observations of individuals over time and space.

This chapter will consider evidence of the 'everyday' decisions made by small groups of people by observing subtle differences in material culture.

As discussed in **4.0**, there were many decisions to make when creating a saltproduction site. Although it is easy to dismiss salt-production as merely a functional process that often operated in liminal locations, it cannot be divorced from cultural practice and beliefs. To date, much attention has been placed upon technology, including technique. In this chapter, these will be considered within the larger contemporary cultural 'arena'. That not all coastal areas in southern Britain were used for salt-production, even if environmentally suitable, is testament to the importance of cultural factors.

Much emphasis will be placed on the key areas of Somerset, South Dorset and Kent when looking for trends and making comparisons, as these areas have produced most of the archaeological evidence for salt-production. However, where possible, salt-production sites in other parts of the study area will also be discussed.

#### 7.2 Reflecting upon Research Approach and Outcomes

#### 7.2.1 Reality of Deconstructing Sites

This research concentrated on deconstructing the evidence and reconstructing it from the 'ground up'. This has meant a deliberate focus on individual choice, which reflects agency, identity and even socially embedded behaviour.

The term 'not running before you can walk' is particularly applicable to the approach used in this research project. The state of knowledge was so fragmented on even a simple level, that it was important to start from the scratch in order to form a solid foundation for a wider contextual study.

This involved deconstructing sites to their basic components, placing priority upon understanding the way in which a site was created and used, and which methods were used for salt-production. Deconstructing the archaeology of salt-production not only involved breaking each site down into its basic archaeological components, but also deconstructing previous methodologies, approaches and terminologies.

Creating new categories and using different approaches to the evidence, has inevitably had significant consequences for understanding the overall significance of salt-production in southern Britain, and has presented many challenges. The most important outcomes, consequences and challenges produced by this research are considered here.

#### 7.2.2 Quality over Quantity?

In reality, ascertaining the true significance of salt-production in Britain is a little more complex due to the nature of the evidence.

It is traditional at this point to contextualise salt-production across the study area in the wider context of contemporary salt-production in other key locations. This would normally begin with a comparison of site quantities between different areas, as was carried out in **3.0**.

That salt-production is more archaeologically visible (which has been taken to infer that there were more salt-production sites) in Somerset, Dorset and Kent, has been noted many times throughout this thesis. This has undoubtedly provided a good preliminary overview of salt-production sites in the study area, and identified the areas that appeared to be more heavily involved in salt-production. This can be considered a good guide to the study area. However, as has been shown by categorising the sites according to 'Site Type', comparing sites directly through site quantities, could be potentially biased, if using site totals that include uncertain sites.

#### 7.2.2.1 The consequences and limitations of comparing sites using 'Site Totals' and 'Site Types'

One of the most significant outcomes of this research, is the consequences of recategorising the sites according to the nature of the archaeological remains, and the implications this has for comparing total site quantities across the study area and beyond.

The regional evaluations have proved that considering site concentration on a more detailed, regional basis, reveals a great deal about the character and profile of salt-production, and provides important qualitative information. For example, without exploring the nature of the Central Somerset mounds further, it could have been assumed that every visible mound represented a true salt-production site; all containing working areas. However, in reality, it is now clear that not all mounds represent working areas, and are actually part of other working areas. This has greatly challenged what is meant by the term 'salt-production site', and has showed how ambiguous even this term could be, as it depends whether this is only used to describe sites with working areas, or all 'sites' with any evidence of salt-production, which inevitably includes debris deposition areas, that are not true salt-production sites in their own right.

Therefore, it would be technically incorrect, to state that there were 276 saltproduction sites in the study area. There are 276 separate records of sites with a possible association with salt-production, however, only 60 sites were identified as 'Actual Sites'; which means that only 60 sites (Figure 3.11) can be considered currently as 'Salt-Production Sites'. Therefore, if reducing the data down to quantitative results, this in reality shows a very low number of salt-production sites in the whole study area, when compared to the Fenlands and Essex, which apparently contain c.300-400 sites each (**1.6.5.1-1.6.5.2**).

However, this is a good example of how reducing these sites to simple quantitative comparisons provides a very limited outcome. It is also true, that 76 sites, are considered 'Briquetage Findspots', which proves a direct association with salt-production. This label can lead to two main conclusions. Either the 'site' is an extension of an existing, known 'salt-production site' (one of the 60/276) and therefore does not exist in its own right, or alternatively, it represents the remnants of hidden or damaged salt-production sites, which can be counted as a separate 'Salt-Production Site'. Although it was possible to explore this further for particularly concentrated sites in Kent (**5.0**), in reality, it is very difficult to differentiate between the two possibilities. In order to address this, further work on

451

plotting use of space on sites, and assessing distance between working areas and debris deposition for example, would be required.

As also shown in Figure 3.11, 33 'Mound Associated Briquetage' sites were also recorded. As shown in **6.0**, most of these occur in Somerset and to a lesser degree, Kent (**5.0**). Given that it has been shown that many of these mounds were used to create working areas in both counties, this means that this type of site has a high chance of representing 'Actual Sites' or 'Salt-Production Sites' compared with 'Briquetage Findspots'.

Clearly, for those 'Briquetage Findspots' that are represented by unstratified surface finds of briquetage, the way the briquetage had been originally deposited cannot be certainly known, but this is the only way of clarifying what the site actually represents. However, if briquetage is found in-situ, it is important to clearly record the context/features it originated from, even if the briquetage dump itself represents the feature, such as spreads or mounds. If this could be ascertained, then, by looking at other instances of debris deposition that is known to be related to working areas, potentially the significance of the site could be ascertained further. However in reality, as with the examples in Poole Harbour, some briquetage spreads especially are likely to have been created at some distance from the actual working areas, and could represent debris from several 'Salt-Production Sites'.

In reality, given the evidence for 'Site Types', only **169** sites across the study area can be considered as *certainly having evidence for salt-production*. This excludes 'Mound Only' and 'Unknown'.

If viewed over the three key areas of activity (Figure 10.5.1), quantities of 'Actual Site' appears, even more drastically low 'on paper', there are only 4 for Somerset, 18 for Dorset and 24 for Kent. However, when considering the total amount of sites with certain evidence for salt-production, according to the quantities shown in Figure 10.5.1, there are 50 in Somerset, 34 in Dorset and 54 in Kent.

However, as considered in **6.0**, if the four briquetage mound sites that have been investigated in the Central Somerset Levels are an accurate sample of all the mounds, then, there could be 119 sites associated with salt-production. Although

this has yet to be proven, it could be speculated that perhaps as many as half of the mounds contain working areas, which would mean that the number of 'Actual Sites' or actual 'Salt-Production Sites' would total c.38 for Somerset.

Clearly, the quantities can be manipulated and speculated upon, based upon probabilities for the presence of archaeology associated Salt-Production inferred by evidence from known sites and consideration of the county profile overall. It remains the case that for many sites, it may not be possible to get more information to determine whether they were definitely to 'Actual Sites' or merely 'Briquetage Findspots' associated with debris deposition areas, on the periphery of known 'Actual Sites'.

The creation of Site Types has been a useful, if at times frustrating exercise, as it has revealed the true nature and character of archaeological remains associated with salt-production across the study area. This has served its purpose in improving knowledge of salt-production, and has exposed inconsistencies in site labelling and terminology. However, as a way of reconstructing the significance of salt-production for societies, and comparing the scale and specialisation in production across different areas, using simple site quantities or Site Types, does not currently achieve this. Therefore, other approaches and methodologies are required.

#### 7.2.3 Moving away from the Traditional 'Briquetage Dominated Viewpoint': Rebalancing Studies into the Archaeology of Salt-Production

A tried and tested method for comparing these sites, and indeed many other types of archaeological sites, has been to compare quantity and quality of material culture or 'finds'.

The enthusiastic pursuit of briquetage by the few that show interest in this material and the use of briquetage to understand many factors about salt-production sites, including the skillset of the salt producers, has continued to dominate studies of coastal salt-production in Britain. As has been stated previously, this is not surprising, given that this material often preserves so much better than the archaeological features, and that it was consistently used to produce salt in Britain for such a long period time. It has been synonymous with salt-production from at 453 least the Bronze Age until the end of the Romano-British period, and perhaps even beyond. Even when it has been such a focus within studies, it has still been misunderstood and misinterpreted. One example being a recent publication on Iron Age salt-production (Kinory 2012), that despite being completely focused upon briquetage as the predominant evidence of salt-production, still incorrectly concluded that its use ceased in Britain during the second century AD. These problems arise particularly when older or unreliable briquetage reports and assessments are relied upon alone, instead of the combination of this and visiting archives/collections. In summary, there is no way of cutting corners or quick solution to researching this particular form of archaeological evidence.

The problems begin when these issues with bias and imbalance of research is not acknowledged and therefore allowed to diminish the whole picture of the saltproduction process and the technology of production.

In the past, when less sites had been formally investigated, this method was useful. However, with the number of salt-production sites being excavated and recorded growing drastically over the last 20 years, it is now time to shift the balance back to the 'whole site', incorporating briquetage into a wider picture, which also includes features, use of space and technological observations.

Much value about the identity of salt-producers in the Fenlands and Essex, has been placed upon the 'craftsmanship' of briquetage production and it has been inferred that some briquetage which appears less well made, represents a lack of skill. Past studies in Essex particularly, have placed dominant value upon observations of differences in 'aesthetics' across briquetage assemblages, including the presence or absence of decoration:

At Peldon...the whole operation of the site suggests a more meticulous attention to detail and probably a lower production...Several rims from...pans have been carefully finger-tipped while others have indentations as if made by sticks, possibly to support lids. ..All these refinements at Peldon suggest an earlier date than Osea Road, or possibly the absence of Roman influence; certainly it seems to us that the extension of an indigenous industry can lead to retrogression and a coarsening of the artifacts. (De Brisay 1975)

This is intrinsically linked to our modern viewpoint, including that of technology, and specifically, the question of what is considered 'craft' and what is considered 'industry'. This point is considered further in **7.4**.

Much value has also been placed upon the potential for briquetage typologies to date sites in both Essex and the Fenlands. The use of briquetage typologies to date sites in the Fenlands however, is still recognised as limited due in most part to a lack of information about briquetage manufacture (Lane and Morris 2001). Despite this, in the same volume it was stated that:

...that a typological succession exists in briquetage forms and fabrics and...this can be related to chronology (Lane and Morris 2001: 469)

It is plausible that some briquetage types could be related to chronology in the Fenlands, however, this is not the case in the study area, where versions of popular forms are spread across the Iron Age and Romano-British period. The only potential exception to this is the presence of support bars, which do appear to be more 'Romano-British' in date, and the introduction of lead containers, which similarly, appears to have been introduced in the same period. However, reliance upon briquetage typologies to reason upon the development of superior versus inferior forms, is a potentially damaging pursuit for these types of studies, and based upon the unstable ground of assuming the parameters of technological advancement (discussed further in **7.4**).

Although the aesthetic value of briquetage is of certain interest when comparing sites, especially when looking for regional variations, it varies so much across sites and time, and depends so much upon our individual perceptions of aesthetic quality, that this is not considered the best approach to understanding the salt producers and as a meaningful comparative tool. This does not mean to say that the choice of form across sites is not a useful comparative tool, as this has been frequently used to compare sites throughout this research project. It has also been shown that the surface colouration on some briquetage supports, can be used to infer the position in which they were used, and potentially the feature they were used within. The understanding of the intrinsic relationship between briquetage forms and hearth forms is considered a far more meaningful method for studying briquetage.

The limitations in many archaeological excavations for removing all briquetage, especially in PPG16 excavations where excavation area is often very limited, and post-excavation budgets and space for finds storage is also limited does not necessarily mean that there is no useful method for comparing debris deposition across sites. In ceramic studies, it is common to remove as much pottery as possible from a site, even if from a sample of complete feature fills, and to quantify the sherds using weights and fragment counts. This data can then be used to not only assess the way a site was used (and perhaps where more waste was deposited), but also as a way of directly comparing quantities of pottery across different sites, which is then often used to infer conclusions and the quantity of people using a space over time.

However, like ceramic building material, briquetage is significantly different from pottery, and where present, especially in salt-production sites, occurs in large quantities. Although the lack of weight counts encountered during the early stages of data collection for this research project was first deemed as frustrating and limiting, the reality is that for many sites, it is simply not possible to remove all of this material. The problem of storing bulk archaeological finds in general, is a significant issue for many archaeological contractors in the 21<sup>st</sup> century. Therefore, sampling sites is a compromise and other methods for meaningfully recording and comparing finds such as briquetage requires new approaches and methodologies.

The other significant issue when attempting to make conclusions about quantities of briquetage on a site and between sites, is that, it is probable, that different techniques across different sites, involved different methods for the use and disposal of briquetage. Large quantities of broken briquetage, could infer large scale salt-production, but it could equally mean that a site was used over long periods of time, or that a technique was in use that involved a higher use rate of briquetage. This also does not account for the potential use of organic objects in salt-production. Traditionally from a ceramicist approach, some salt-production sites have been quantified by comparing quantities of pottery and briquetage, as a way to ascertain evidence for domestic occupation of the site, and to infer evidence for specialism (Morris 1994a; 1994b; Lane and Morris 2001).

As was presented in **6.0**, it is possible to explore briquetage and other debris from salt-production using other, less invasive methods. Exploring the deposition by observing the nature of layers within the mounds, and by sieving samples of briquetage, whilst retaining diagnostic forms to record basic form presence, is considered to be a useful approach and addresses issues that rise from limitations in excavation and storage.

This means that it is still possible to gain much information from briquetage assemblages, whilst also allowing more time and opportunity to explore feature and briquetage relationships, as well as features such as hearths and tanks, and importantly, the use of space within a site.

The identification of archaeology associated with certain stages of salt-production, as well as the identification of 'Working Areas', has realised the value of features created in certain spaces, as a meaningful way of comparing sites and providing insights into the salt producers.

In fact, given the issues with comparing sites quantitatively using simple site numbers, it is proposed here, that identifying and comparing working areas, or at least certain hearths and tanks, is the only meaningful method for considering and comparing site quantities. Also, the number of hearths and tanks between sites, including whether some sites contain single or multiple working areas, offers the most potential for understanding the significance and even scale of salt-production not only in the study area, but for all salt-production sites.

This approach, has been used in general throughout Chapters **4.0-6.0**, and has also been used to create 'Site Modes', which address the organisation and scale of sites, based upon the presence of single or multiple working areas, and evidence for general site infrastructure. Presentation of these new 'Modes', provide the bulk of this chapter, and are outlined and discussed in more detail within **7.5**.

Before exploring evidence for site organisation, inferred by the overall selection of certain site attributes which includes groups of features and briquetage, it is first apt to provide an overview of the significance of site diversity and trends across the study area. Similarly to previous chapters, this involves approaching the sites 457

according to technology, which includes briquetage and feature choice. Comparing these technologies across sites remains an extremely useful tool for identifying diversity and trends across sites and regions which has been evidenced throughout previous chapters.

This will involve firstly exploring the significance of technological choice, and the identification of shared technologies across the study area and within the wider context of other salt-producing areas.

### 7.3 An Overview of Chronological Trends and Core Phases of salt-production in the Study Area, Central Britain and Eastern Britain

As outlined in **3.0**, the chronology of salt-production throughout the Iron Age and Romano-British periods within the study area varied regionally. This section will provide an overview of salt-production chronologically across the study area. This section will also present key chronological trends in the wider context of contemporary salt-production in Central, Southern and Eastern Britain. Emphasis will be placed upon the three key areas of activity (Somerset, Dorset and Kent).

A consideration of the significance of these chronological trends in the wider context of Iron Age and Roman Britain, as well as overall historical context, is provided at the end of this chapter (**7.6**).

The issues with dating many of the sites in the study area and beyond have been discussed throughout this thesis. As outlined in **3.1.2.2**, most sites are considered in this discussion according to 'Best Date' or more specific 'actual dates'. The 'Best Date' represents the most probable period when the main or most intense salt-production too place.

The discussion of site chronologies provided below, provides a good basic overview of the key chronological trends across the study area. However, it is acknowledged that this is a very general survey, and provides a guide to overall trends in the study area, as opposed to providing a detailed chronological profile on a site by site basis. Although generalised 'period' dating is limiting, it should still be noted that our knowledge of dating salt-production sites in the study area is much better than for similar sites in Essex and the Fenlands.

# Overview of Iron Age (c.700BC-AD50) Salt-Production in other Key Contemporary Areas

As highlighted in **1.6**, there are a small number of known salt-production sites that pre-date the Iron Age in Britain. Somerset, is the only region of the study area that has certain evidence for Bronze Age salt-production. The thin scatter of potential sites in the western coastal edge of the Fens (Lane 2005a; 2005b; 2005c) and possibly Essex (Wilkinson and Murphy 1986), as well as the single site of Brean Down in Somerset (Bell 1990), suggests sporadic, scattered, small-scale local salt-production.

There are substantially more salt-production sites known for the Iron Age across the study area (Figure 3.5) and in the Fenlands (Bell *et al.* 1999; Lane and Morris 2001), Essex (Fawn *et al.* 1990), Worcestershire (Hurst 1997) and Cheshire (Nevell 2005; Williams and Reid 2008). Most of these sites date to the latter part of the Iron Age or the Late Iron Age/Early Romano-British period (Figure 4.5).

The evidence for pre-Roman salt-production in Cheshire, is still scarce in terms of definite production sites (Nevell 2005) and its existence is mostly inferred through the distribution of Very Coarse Pottery (VCP). These large, rough 'briquetage type' vase forms were used to dry and transport salt from Worcestershire and Cheshire, from as early as the 5<sup>th</sup> century BC (Morris 1985). Studies of Iron Age VCP distribution show that salt from the Cheshire and Worcestershire area was distributed across north-west England and also reached Herefordshire, Shropshire, Staffordshire and North Wales (Morris 1985; Nevell 2005). Significantly, it is not found in the south-west beyond the Severn Estuary in Somerset or further south in Cornwall.

Most of the dating for Essex salt-production sites has been inferred from the dates recorded on a *limited number* of sites which therefore means that this potentially limits chronological comparisons and assumptions about the significance of salt-production in this region.

Many Essex Red Hills are known: estimated to be between 300-400 according to the Essex Historic Environment Records and information provided by Fawn (Fawn et al. 1990). However, as stated above, the number of sites that have been certainly dated remains relatively low and as suggested in the previous section, the true quantity of actual salt-production sites could be in reality lower, or potentially even higher. For many years it has been generally accepted that the majority of the Essex Red Hills most probably date to between c.100BC-AD100 (Late Iron Age-Early Romano-British). This is predominantly based upon typologies, including the similarity of the Red Hills and therefore technique of saltproduction, pottery assemblages, and limited radiocarbon dating (Fawn et al. Fawn et al, (1990) lists at least 40 dated sites; 24 sites of which were 1990). considered to have been Late Iron Age in date and 16 dating to between AD50 and AD100 (Early Romano-British) (*ibid*). Since this time, there has been relatively little advances in dating more of these sites more certainly, with the exception of Stanford Wharf, Thames Estuary, where, as was discussed in the 6.6, evidence for Middle Iron Age and Late Romano-British salt-production was revealed (Biddulph et al. 2012). This consisted of at least 5 contemporary Middle Iron Age Red Hills (*ibid*).

During the 'Fenland Survey', at least 300 Iron Age and Roman salt-production sites were identified (Lane and Morris 2001), although again, this quantity could be different, if the sites were subject to more rigorous scrutiny, which in reality is limited by site preservation. Dating sites in the Fenlands, especially in Lincolnshire, in comparison has progressed further, especially over the last 15 years, due to fieldwork and research encouraged by the Fenland Survey (Crowson *et al.* 2000; Lane and Morris 2001). The designing of a detailed briquetage typology has also meant that it has been possible to at least distinguish between the Iron Age and Roman periods on many sites (Lane and Morris 2001). However, a detailed chronology of salt-production in Lincolnshire, and the Fenlands in general, has still not yet been possible, and although Middle Iron Age and Middle-Late Roman salt-production sites have been identified, the dating of sites falling in-between these periods remains vague.

Middle Iron Age salt-production in the Fenlands is limited to the western Fen edge (Norfolk and Cambridgeshire), with at least three Middle Iron Age sites identified at Middleton (Crowson *et al.* 2000; Crowson 2001), Market Deeping and Deeping St 460

James (Crowson *et al.* 2000; Lane 2005a; 2005b; 2005c). Baker (1975) also suggests that there was potentially early salt-production activity within the Ingoldmells area of Lincolnshire which could date to as early as the 4<sup>th</sup> century BC (Middle Iron Age).

# Chronological Profile of Iron Age Salt-Production in the Study Area (Figures 10.5.2-10.5.4)

#### Early Iron Age-Middle Iron Age Salt-Production (c.700BC-100BC)

Evidence for Early and Middle Iron Age salt-production sites within the study area is sparse. There are four potential pre-Late Iron Age sites (Table 10.1.8 and Figure 3.5). Three of these sites are in South Dorset (Site 217: Wyke Regis, Sites 216 and 223: Isle of Purbeck) and one in Kent (Site 40: Thanet). The lack of a site archive or associated finds for Site 40 means that an early date for this site is unproven, and this early date does not currently fit with the current chronological evidence for salt-production in Kent.

#### Late Iron Age Salt-Production (c.100BC-AD50)

By the Late Iron Age, there is an explosion in salt-production across many coastal areas of southern and eastern Britain. The later British Iron Age heralded population increase in some areas, growth of production processes, organisation of the landscape, formation of larger communities, trade and economic growth. Production and craft activities became more nucleated and some regions of the UK became specialist zones or centres, which required well organised land and sea trade routes, and the exploitation of natural resources on a much larger scale (Champion and Collis 1996; Gwilt and Haselgrove 1997; Cunliffe 2005; Haselgrove and Moore 2007; Hill 2007).

Supply networks become more evident and these included the use of centralised areas for the storage of surplus foodstuffs and goods, often within oppida and some hillforts In the Late Iron Age. Some proto-urban centres emerged, in some cases, forming the basis for later Roman towns, particularly in southern Britain (Cunliffe, 2005).

Salt-production was one of several production processes that flourished and grew during the later stages of the Iron Age. An increase in the demand for material

culture such as pottery and also foodstuffs, led to a growth in the numbers of skilled, specialised crafts people, who could potentially work in different locations as required. Many specialist craft areas developed across the Late Iron Age of southern Britain (De Roche 1997).

Some sites in southern Britain became 'specialist hubs' for industrial activity and trade including Hengistbury Head, Dorset (Cunliffe 1978; 1987) which was a forerunner to the thriving Late Iron Age port that developed at Poole Harbour (Dyer and Darvill 2010). Areas like these were at the heart of extensive trade networks and could have potentially been particularly thriving areas for the sharing of ideas and innovation.

Coastal trade routes played a core role in the exchange of goods and the movement of people and ideas since the Bronze Age. By the Late Iron Age, a network of 'coastal nodes' (Wilkes 2004) had developed across southern Britain, providing safe areas for docking and access to trade of ingoing and outgoing goods and foodstuffs from Britain and mainland Europe (Carver 2001; Collis 2007; Cunliffe 1984; 2005).

Inland trade routes were also important, and in central southern and south-east Britain especially, were formalised in the 1<sup>st</sup> century AD to provide an artery road system linking urban centres and ports. Although not all coastal nodes had specialist production zones, the port at Poole Harbour, Dorset is an example of a node that successfully flourished and grew into a highly specialised centre for the production of pottery, iron, shale furniture and decorative items, worked stone and salt (Calkin 1948; Sunter and Woodward 1987; Markey *et al.* 2002; Dyer and Darvill 2010). The development of the Durotrugian pottery production and shale working industry especially, meant that these goods were traded extensively in Britain (Allen and Fulford 1996; Wilkes 2004).

Given this explosion of specialist industry and trade in this area, it is not surprising that Poole Harbour and the Isle of Purbeck were producing salt on a significant scale (beyond local provision) by the Late Iron Age. This area probably has the best evidence for the development of a salt industry prior to the point when most other areas are just beginning to specialise in other areas of southern Britain. The presence of at least two potential salt-production sites with possible Early Iron Age 462

origins in the Isle of Purbeck, suggests that production started in this area and then spread north across the shores of Poole Harbour.

By the Late Iron Age, there were at least 35 sites (Figure 3.5) across the study area (34 of which started in the Late Iron Age: Table 10.1.8), mostly all condensed in the three key areas of activity three: Somerset (4), Dorset (15) and Kent (8) (Figures 10.5.1-10.5.3). Even with the low number of confirmed Late Iron Age sites in Somerset, it is still probable that enough salt was produced here for local use given the lack of evidence for salt from Cheshire in the form of VCP vessels. It is also plausible the salt from Dorset could have supplemented Somerset salt supplies.

No certain Iron Age sites have been identified within Cornwall to date and only two sites have been found within West Sussex (Site 94 and 98: Chidham). Two new sites (Sites 220-221) were also created in the Isle of Wight during the Late Iron Age (Table 10.1.8).

Evidence for salt production in Hampshire is extremely fragmented, and as is commonly the case for these sites, probably due to particularly bad coastal site preservation. It is conceivable that production was an important part of the local economy during the Iron Age. There were at least nine 'Iron Age' sites (Table 10.1.8). One dates to the 'Late Iron Age'; six to the 'Iron Age/Roman' period; one to the 'Late Iron Age-Early Roman' period; one possibly to the 'Late Iron Age-Late Roman' period (although the later date is unlikely) and there were also at least three 'Early Roman' sites.

Despite the relatively low quantity of features associated with Stages 1-3 of the salt-production process in Poole Harbour and the Isle of Purbeck, there is no doubt that salt- was produced on a *substantial scale*. As highlighted in **4.7**, there are substantial thick spreads of briquetage covering large areas of the littoral fringe in Poole Harbour (Figure 4.80). This area was undoubtedly an important and prolific producer of salt within the study area during the Late Iron Age/Early Roman period.

During the Late Iron Age, salt-production sites in Kent also thrived, but unlike Dorset and possibly Hampshire, there does not appear have been much 463 significant salt-production activity before the 1<sup>st</sup> century AD. New sites were created in areas that do not appear to have previously been exploited for salt.

Late Iron Age salt-production in Kent is restricted in area, with sites clustered in the Romney Marsh and Medway Estuary environs (**5.0**). One of the eight Late Iron Age sites in Kent, is the large 'complex' at Lydd Quarry, Romney Marsh (Site 82) which contains multiple working areas. The significance of this site complex is discussed further in section **7.5.5.3**. Nearly all of the Late Iron Age sites in Kent continued into the Romano-British period.

In Somerset, salt-production in the Late Iron Age is restricted to the North Somerset Levels and the northern end of the Central Somerset Levels. It is likely that more sites existed as archaeology in this area is usually hidden by alluvial marine inundation and land reclamation (**6.0**).

## Overview of Romano-British (*c*.AD50-AD450) Salt-Production in other Key Contemporary Areas

The 1<sup>st</sup> century AD witnessed the continuation of many existing sites and saw a substantial number of new sites particularly within Dorset and Kent (Figures 10.5.2-10.5.4). This *increase was the greatest in the history of pre-medieval salt-production*. This coincided with similar substantial increases within Cheshire (Bestwick 1975; Nevell and Fielding 2005; Williams and Reid 2008), most probably the Fenlands (in Lincolnshire at least), (Gurney 1999; Lane and Morris 2001) and Essex (De Brisay 1975; Fawn 1986; Fawn *et al.* 1990; Biddulph *et al.* 2012), representing the true emergence of a salt industry.

The chronological profile of Romano-British salt-production in Cheshire was discussed in **6.0**, when compared with the chronology of salt-production in the Central Somerset Levels. As stated in **6.0**, dating appears to show that there was an intense period of salt-production, exploiting the inland salt springs, in the 1<sup>st</sup>-2<sup>nd</sup> centuries AD (which is a different chronological profile to Somerset). There is little evidence to suggest that the springs were exploited on the same level after the 2<sup>nd</sup> century AD. This is with the exception of Upwich, Droitwich, which is one of the few salt-production sites to have evidence for a new 'sub-Roman' period of activity (5<sup>th</sup> century AD), (Hurst 1997).

As stated earlier, certainly determining Romano-British salt-production sites in the Fenlands (as opposed to just 'Iron Age/Romano-British') remains difficult. Most sites have been investigated in Lincolnshire, where only Iron Age and Early Romano-British salt-production sites were excavated (Lane and Morris 2001). The Late Romano-British (3<sup>rd</sup>-4<sup>th</sup> century AD) salt-production site at Middleton, Norfolk, which has been well attested too previously in this thesis, remains the only certain site of this date in the Fenlands (*ibid*). Although it is plausible, given the chronologies in other key areas, that salt was produced most intensely in the Early Romano-British period, this remains to be proved.

Also stated earlier, 'blanket dating' has been applied to many Essex Red Hills sites, with assumption being that most were Early Romano-British, which seems plausible. This is supported further, by the discovery of Late Romano-British salt-production working areas at Stanford Wharf, *which did not include the creation of Red Hills* (Biddulph et al. 2012). Also of interest, is that the Early Romano-British salt-production activity at this site was limited (*ibid*). This suggests that either this site reflects the true chronology of salt-production in general across the area, or more probable, that this site was an exception and was influenced by other factors, perhaps indicated by its key position in the Thames Estuary.

## Chronological Profile of Romano-British Salt-Production in the Study Area (Figures 10.5.2-10.5.4)

#### Early Romano-British Salt-Production (AD50-AD150)

Of the *c*.35 Late Iron Age sites in the study area (Figure 3.5), 28 continued into the Early Romano-British period (Table 10.1.8) and beyond (3 sites potentially lasted into the Middle Romano-British period and 7 into the Late Romano-British period). In addition, *at least 49 new sites were created across the study area.* This increase from at least 35 sites in the Late Iron Age to a total of at least 94 sites by the Early Romano-British period, is indicative of a rapidly expanding industry.

This must have been a response to a significant increase in the demand for salt, stimulated by the rapidly growing population and changes in consumption patterns, influenced by the spread of new cultural practices associated with the arrival of the Romans.

Of the 49 new sites, 34 sites were created in Kent (Figure 5.1) and eight in South Dorset (Table 10.1.8), three in Hampshire, three in Cornwall and one on the Isle of Wight. Salt-production in the Isle of Wight however, appears to have been relatively short-lived, with the two sites that started in the Late Iron Age (Table 10.1.8) ending in the Early-Romano-British period and only one new site starting in the Early Romano-British period (Site 212).

No new salt-production sites appear to have been created in Somerset during the 1<sup>st</sup> century AD (Figures 10.5.2-10.5.4), although three of the four Late Iron Age sites did continue into this period (Table 10.1.8).

As stated earlier, there was a substantial development in salt-production exploiting inland brine springs in Cheshire in the Early Romano-British period (Nevell and Fielding 2005; Williams and Reid 2008; Biddulph *et al.* 2012). It is possible that salt from Cheshire/Worcestershire was providing salt to the south-west (Somerset, Cornwall and Devon) in the 1<sup>st</sup> century AD. It is also possible that Somerset continued to be supplied with Dorset salt in the Iron Age, and this is also plausible within the 1<sup>st</sup> century AD, although this cannot be proven.

The 1<sup>st</sup> century AD also saw an expansion of salt-production in Poole Harbour, with 10 sites continuing into this period, and the addition of at least eight new sites (Table 10.1.8). Four of these appeared on the northern shores of Poole Harbour, an area which had seen relatively little previous salt-production compared to the heathland on the southern shores. These sites would have been closest to mainland trade links, including a new road and a military supply base (Dyer and Darvill 2010). During the 1<sup>st</sup> century AD, South Dorset remained a significant producer of salt within the south-west of Britain.

Based upon current site numbers, the south-east and east saw the biggest increase in salt-production, with Kent, Essex and probably Lincolnshire, potentially producing more salt combined than any other areas of Britain. During the 1<sup>st</sup> century AD, the Medway Estuary grew into a thriving area for salt-production, and several new sites also appear across the North Kent mainland and within Romney Marsh (**5.0**). The large complex at Lydd Quarry continued into this period and potentially lasted until the Middle-Late Romano-British period.

#### Middle-Late Romano-British Salt-Production (AD150-AD450)

By the 2<sup>nd</sup> century AD. there appears to have been a drastic decline in the number of sites producing salt (although whether this also meant a lesser output, or less sites producing more salt will be explored later) across most of the key areas of activity including South Dorset, Kent, Essex, probably the Fenlands and Cheshire. However, it remains possible that more sites recorded as 'Early Romano-British', could have continued at least into the earlier half of the 2<sup>nd</sup> century AD, given that this period covers the time span 'AD50-150' (Table 1.2). There are very few *sites that appear to start operating after the Early Romano-British period across much of the study area, with the exception of Somerset.* 

However, at least 11 sites in Kent probably continued into the 2<sup>nd</sup> century AD (including the additional Kent Working Area I site at Sittingbourne with no assigned Site ID). Potentially six (including Kent Working Area I) start in the 2<sup>nd</sup> century AD. Two sites continued into the 3<sup>rd</sup> century AD and one new site possibly started in the 3<sup>rd</sup> century AD. The recently discovered site in Sittingbourne (Kent Working Area I) could represent significant 2<sup>nd</sup> century AD salt-production that was previously not represented (Dawkes 2011).

Of the 15 sites operating in the 1<sup>st</sup> century AD in South Dorset, only four were probably still producing salt in the 2<sup>nd</sup> century AD (Table 10.1.8), and a further four sites potentially produced salt in the 3<sup>rd</sup> and possibly late into the 4<sup>th</sup> century AD.

Kent appears to have remained a significant player in 2<sup>nd</sup> century salt-production, and there are known contemporary and later sites from central Britain and eastern coastal areas. These include a 2<sup>nd</sup> century AD site at Spalding, Lincolnshire (Wood 2007), 3<sup>rd</sup>-4<sup>th</sup> century production at Nantwich, a 4<sup>th</sup> century AD site in Middleton, Norfolk (Crowson 2001) and Late Roman salt-production activity in the Thames Estuary, Essex (Biddulph *et al.* 2012). However, the main focus of salt-production moved from the traditional south and eastern coastlines of Britain, to the Central Somerset Levels in the Middle-Late Romano-British period.

By this period, there were just under 100 debris mound sites in the Central Somerset Levels (**6.0**). This large complex of uniform working areas represents a substantial, intensive, sophisticated salt-production industry, on scale of organisation only seen previously within Lydd Quarry, and probably areas of 467

Essex. As discussed in **6.0**, the true quantity of working areas and debris mounds in the Somerset Levels is hidden by alluvium.

As also discussed in **6.0**, this sudden expansion of sites where previously there had been relatively limited activity, was probably aimed at supplying a particular and specific demand for salt. Therefore, the Somerset Levels not only represents the largest, single organised salt-production complex in the study area, and probably beyond, but also is one of the latest sites operating in Britain in the Romano-British period.

In summary, there are three important periods for the development of saltproduction in the study area:

- In the Late Iron Age and Early Romano-British period, there is an *increase* in saltproduction within Dorset and Kent representing the emergence of an *industry* by the 1<sup>st</sup> century AD. This is the most prolific period for coastal salt-production in most of southern, central and eastern Britain
- 2. In the 2<sup>nd</sup> century AD nearly all areas of salt-production in central, southern and eastern Britain saw a *significant decrease* in salt-production including South Dorset, Essex and Cheshire (and probably Lincolnshire) with the exception of Kent (lesser decrease) and Somerset (considerable increase)
- **3.** The 2<sup>nd</sup>- 4<sup>th</sup> centuries AD saw the creation of a large area of clustered salt-production sites in the Central Somerset Levels. becomes the main focus for Romano-British coastal salt-production

It appears that given the latest possible date of  $4^{th}$  century AD, within the study area at least, salt-production ceased before the actual end of the Roman Empire in Britain (*c*.mid 5<sup>th</sup> century AD). This will be considered further in **7.6.** .

# 7.4 Salt Producers Making Choices: Revealing Individuality through Technological Innovation, Trends and Diversity (Figures 10.5.5-10.5.11)

Chapter **4.0** outlined different methods of producing salt that included a variety of different briquetage forms and feature types. The main techniques were outlined using a simple visual format of diagrammatic illustrations in order to reconstruct the process in simple terms.

However, this underplays the importance of the subtle variations between sites, and almost excludes the salt producers themselves, who made important decisions about each site. Although all salt producers share a common goal of making salt, how this is achieved differed between each individual, group and therefore site, from the size and form of briquetage and features, to the way in which the site space is organised and used.

This diversity is best viewed using the concept of technological choice; a term defined by Lemonnier (1993:6), as the rejection or adoption of 'certain technical features (principles of action, artefacts, gestures)'. The use of the term 'choice' infers that there was more than one option, or 'technical feature' to choose from. In the context of this research project, this could be for example, the choice between constructing different types of hearths. This assumes that salt producers (at least by the 1<sup>st</sup> century BC) operating in the study area would have been aware of these different technical features, and could choose their preferred option. In some areas, there might just have been certain limited ways of acting out events such as salt-production, using a limited set of traditional technical factors. Choice could also involve adapting a general technical factor such as an enclosed hearth that used direct heat by applying preferred form and depth.

If choice was in action, it could be socially embedded and heavily based upon not only individual preference, but also the traditions and social 'norms' of the group/family/community. These decisions could have been made with more emphasis on the technical features fitting already existing traditions and preferences, as opposed to what could be perceived from the modern viewpoint as the 'best' technology.

Technology in the modern world advances so quickly that often we cannot easily attribute changes to specific individuals, and for many, technology becomes an 'abstract', automated, mechanised industry. We know that changes in modern technology nearly always *appear* to be for *better*, *more efficient*, *more suitable*, *more tailored* and more appropriate than before. This leaves us with an expectation that technology will always be, and always has been, progressive and focused upon the quickest and most proficient method of achieving a goal.

469

This viewpoint can perhaps be seen in the view of briquetage technology. It has been common in most studies of salt-production to assume that briquetage becomes more 'elaborate' and 'superior' through time (especially in the Romano-British period).

...technological developments in salt-related equipment can be identified and again relate to chronology (Lane and Morris 2001: 469)

This could plausibly be the case in some areas (and could be the case for the larger Type 6 pedestal supports seen in Somerset), but as can be seen in the study area, many apparently' basic' support forms especially, continue into the Romano-British period, demonstrating that perhaps this viewpoint can only be explored on a smaller, regional basis using a decent sample of sites.

It is also perhaps often assumed that technology has been designed purely because there was a *functional need* for it; it was to fill a gap that needed filling, so it was filled. Chapter **1.0** (**1.4**), addressed this issue in relation to the earliest origins of salt-production; asking questions as to whether innovation occurred because of a need or a want. In this context, the term 'need' is attributed to a functional biological requirement and 'want' as a socially embedded choice. Pfaffenberger (1992) also addresses the motivation behind innovation of new technology in general, challenging the modern viewpoint that necessity is the mother of all invention. He argues similarly to Lemonnier (1993), that, contrary to this, there are many complex social reasons as to why innovation takes place.

This modern perception of technological necessity and the need to produce products cheaply and quickly can be seen in the work of Nenquin when discussing the similarity of salt-production sites in France and Britain:

...it is logical to suppose that the increasing demand for salt necessitated a product which must have been fabricated as cheaply as possible. (Nenquin, 1961: 157)

However, both Pfaffenberger (1992) and Lemonnier (1993), argue that in order to understand past technologies, it is important to consider that technology is completely socially embedded. Therefore, modern perception of technology can potentially limit our understanding and definition of past technologies and means it is often easy to divorce technology from human innovation and action. If modern views of technology are applied, they could greatly 'play down' the importance of human thought and action. Understanding the impact that technological perception (and potentially technological determinism) can have on our ability to interpret and define archaeological evidence, is therefore an important consideration.

A good example of this problem can be identified in the 'labels' or 'terms' that have been used to classify salt-production sites in the archaeological record (as outlined in **3.3.1**). This assessed the use of the most popular terms applied to sites associated with the production of salt and clearly showed that there was often no link between the archaeological remains and the site 'label'. Further to this, it was also possible to identify that perhaps some terms appeared more 'technologically influenced', whilst others invoked more of a generalised or even emotive perception of the sites.

For example, 'Salt-Boiling Site', 'Salt-Extraction Site' and 'Salt-Making Site', all quite clearly refer to technique incorporating human action, whilst 'Salt Works', implies a whole process or a system, with perhaps more emphasis on the physical and material. 'Salt-Manufacturing Site' involves a modern sense of product creation, a systematic and almost automated, 'sterile' process. 'Salt-Winning Site' has the most 'humanised' meaning, with emphasis upon human action and impact, and is a more 'emotive' term, suggesting a competition where success was measured in the winning of salt from seawater.

...the project has been carefully measured in its determination of how the salt might have been won from seawater...(Lane and Morris 2001: 470)

Therefore technology in this context, encompasses not only the material tools that have been designed to aid production, but also the decisions and actions involved in innovation, as well as the combination of technical factors that provide the process and technique of production. The process of innovation can involve the original creation of something new (invention) or it can involve giving shape to a new technique or adapting an existing technique or artefact (Lemonnier 1993). The bulk of the primary and basic original innovation (i.e. the basic understanding of seawater content in different areas; understanding of heat temperatures and the use of clay vessels over hearths to produce salt) had already taken place by the Late Iron Age in most key coastal areas in southern Britain. However, that does not mean that innovation did not continue and examples of this can still be seen throughout the Romano-British period.

Subtle innovation would have taken place on most if not all sites, with producers adapting and altering aspects of the process as a response to becoming more skilled in production and developing their own tradition.

Site diversity, incorporating episodes of innovation/adaptation as well as technological choice, can provide the most insight into the individuals and communities involved in salt-production.

#### 7.4.1 'Mix and Match' (Figures 10.5.5-10.5.11)

As stated above, technological choice incorporates a decision made between more than one technical feature, and this feature can then potentially be adapted/altered later (innovation). Salt producers were making technological choices on a regular basis and evidence of this can be seen on every site in some form, resulting in inter-site trends or differences in technical features adopted. Identifying these episodes of choice and innovation is relatively straight-forward, however understanding why some sites are different/similar to others is perhaps more complex.

As outlined in **4.0**, there were many decisions that needed to be made from the start, when individuals decided to start producing salt. How many options were known, probably greatly depended on the length of traditional salt-production within the region involved, and whether there was frequent contact with other areas producing salt. How much of the similarities especially between early sites, is due to shared technologies or to coincidental innovation is difficult to ascertain. Ultimately though, the understanding of heating technology would have been enough to warrant the development of simple techniques to evaporate brine including the use of clay for supports and containers.

Several examples of innovation and technological choice can be identified across the study area, including examples of shared technology across Britain and mainland Europe (**7.3.2**). This can be seen in the raw materials used to create technical features, the form of the features, the relationship between the features, and the way in which these features have been used over the space of the site.

This diversity leads to on an important conclusion. There was no single 'best method to produce salt', and no single 'best site'. Ultimately, there is no 'typical Iron Age or Romano-British salt-production site'. A point highlighted by Akridge (2008):

No one evaporation method can be considered superior since other factors such as fuel availability, sunshine intensity, brine concentration, and even the cultural value placed on human labor make the choice of evaporation technique unique to each culture. (Akridge 2008: 1461)

Although all sites incorporate the essential elements to produce salt, the frequency and variety of features and briquetage forms are dependent on the preferences of the salt-producers as well as the local environs. No one site is the same and this is indicative of the strong individuality of salt producers at that time.

Similarly, there is no technical feature (including briquetage, hearths and water management features) that is considered in this research to be more significantly 'advanced' than another. There are so many different types/grades of salt that can produced, determined by crystal form and the removal of impurities (which also depends on the quality of the source), that it would be expected that a variety of techniques have been developed in response.

There are significant and identifiable differences in the way a site was organised however, and understanding this is important when considering the 'bigger questions' about the scale of production and the intended consumers.

To discuss briquetage and feature types according to which is more 'advanced' or 'efficient', would be to grossly underestimate the ability and skill of salt producers to make informed decisions. It would also 'grade' the technical features according to modern perceptions of technology. It is possible to observe that some briquetage forms and some features are perhaps created with a little more attention to aesthetics, and symmetry than others, but to infer that somehow this suggests a more 'primitive' creation with less thought process or skill would be incorrect. It would also be incorrect to compare the aesthetics of briquetage compared to pottery forms for example. They were very different materials, with different functions, embodying different uses and often different groups of people.

There were clear trends in basic technical factors chosen, however, and the use of rounded pedestals, squared bars, flat slabs and flat or curved clay containers, was commonly seen in the 'briquetage toolkit' within the study area (**3.4.3**). There was however, much variation in the form of rounded pedestals across the study area, including height and thickness (Figures 10.5.4-10.5.5). There was generally much more variation in pedestal forms within Dorset and Hampshire (based upon Site 11), where the traditional smaller pedestals were favoured (Figure 10.5.6) and this is linked to an earlier increase in salt-production sites in these areas, generating a longer period of innovation.

Similarly, there was variation in the thickness and form of slabs, (Figure 3.55-3.56) (although they were usually highly fragmented making discussion on form very limited). Bars also varied in form but lesser so than pedestals, with the square profile bars being the most common (Figures 10.5.6-10.5.8) but triangular forms used predominantly in Kent and Essex.

The use of rounded pedestals, bars, slabs with briquetage containers within briquetage toolkits is also recorded within contemporary inland and coastal salt-production sites in France (Nenquin 1961; Riehm 1961; Gouletquer 1974; Daire 2003). There are many common shared salt-production technologies between the north-west coast of France and the southern as well as north eastern coasts and marshlands of Britain, and this is discussed further in **7.42**.

The basic combination of supports and containers was a tried and tested technique found across Britain and mainland Europe. Their form and fabric dependent solely on the preference of the individuals creating it and upon the size of the hearth they were used within.

The study of most briquetage forms including containers can be limited given the high fragmentation rate, as emphasised throughout this research; an overview of

all containers across all key areas of activity is provided in Figure 10.5.9. However, the study of briquetage pedestal supports, which preserve very well, can provide particularly good insight into technological choice and individuality, as shown in **4.6.3**.

A simple briquetage pedestal typology was created for the study area (Figure 3.42) in order to provide a means of comparing different sites. However, the typology was shown in order of change in size, as opposed to any particular reference to an 'advancement of technology' or even chronology.

Clearly however, briquetage pedestal size increased during the Late Iron Age onwards *on some sites* (Figures 10.5.5-10.5.6). However, this does not represent a universal increase in pedestal size, as smaller pedestals continued to be throughout the same period, and the Romano-British period. The size of briquetage pedestals was often closely tied to the size and forms of hearths (**4.6.3**). The increase in size was also on some sites, linked to the adoption of larger lead containers in the early 1<sup>st</sup> century AD. This date is based upon evidence from Cheshire (Nevell and Fielding 2005) and at Site 239, North Somerset (Cox and Holbrook 2009).

The introduction of metal containers clearly represents a significant decision to change the long traditional use of clay containers for brine evaporation. As shown in **3.4.3.2**, evidence for the use of lead containers is primarily based upon the absence of briquetage containers. It is possible that some areas could have employed pottery vessels in production; however the form of briquetage supports will allude to the use of larger containers. Only one site could be directly linked to using lead containers (Site 32 in Kent: Table 4.5) as there was lead globules within a hearth base.

As stated in **3.4.3.2**, although lead was used in on Site 82 for fishing and textile making equipment, the presence of briquetage containers and a lack of lead from the main working areas producing salt, does not suggest that lead containers were used. This could be a good example of technological choice in action, with producers choosing not to use lead in salt-production, despite its availability. Equally, this could have been at least partially determined by the fact that larger

quantities would be needed for containers, and that most of the hearths on the site were so small that lead containers were not required.

Most evidence for the use of lead containers (indirectly) can be found in Somerset, although this is based mostly upon a lack of briquetage containers and the use of very large 'building column' style pedestals at Site 239 (Figures 3.42 and 3.47: right), probably designed specifically to support large lead containers (Figure 6.33). The only other region that commonly employed lead containers is Cheshire/Worcestershire, where there is strong evidence, in the form of sometimes near complete, lead containers (Nevell and Fielding 2005). Both of these salt-producing regions were close to natural sources of lead, including mines established in the 1<sup>st</sup> century AD in the Mendips (*ibid*). In both regions, lead containers were used in combination with the more traditional briquetage supports, therefore mixing the old with the new.

The use of enclosed hearths (mainly using the direct heat method) also dominated the majority of salt-production sites in the study area (Figures 10.5.10-10.5.11). This technological choice was perhaps the most universal technical feature used within the study area. However, there was great diversity between hearth types. As stated earlier, the forms of hearth and briquetage were intrinsically linked and it is possible to infer a hearth type, even if it is missing, by carefully observing briquetage supports (**4.6.3**).

Similarly to briquetage, it is considered that there was no 'more advanced' enclosed hearth type. However, there are some significant trends in the form of hearths employed on some sites. Significantly, there is no evidence for the chronological development of hearths into ovens, as suggested for the Fenlands (Lane and Morris, 2001). In the Fens, it is suggested that the use of ovens was indicative of advances in heating technology, representing larger scale, more advanced and better organised sites (*ibid*). However, hearths continued to be commonly used for all scales and modes of salt-production throughout the Iron Age and Romano-British period in the study area.

In Kent there is particular evidence for innovation with the creation of efficient working areas (**5.3.1**), which combined hearths and tanks, as well as the remarkable, if short-lived, portable hearth invention. All of these innovations were

tailored to meet the needs of the local environment, the space within a site and individual preference. For example, the creation of partitioned hearths with small areas for the storage of brine, would have probably meant that the brine was concentrated a little more quickly, and would have meant less time walking back and forth to tanks. However, these innovations were not taken up nationally by all salt-producers. It worked well in the chosen areas, but did not represent a widely adapted advance in salt-production technology. They represent responses to individual requirements probably resulting from experimenting on-site.

Like the Fenlands and Essex, most hearths used in the study area during the Iron Age and Romano-British period were *multiple container* hearths (**4.6.1**). It is probable that in most areas, hearths developed from small single container hearths, to larger multiple container hearths later in the Iron Age and into the Early Romano-British period. This reflects a change in scale of production and site organisation. There was also evidence for preference in different hearth forms in different parts of the study area, with Kent favouring round or oval hearths, rarely observed in the rest of the study area, except for Site 228 in Poole Harbour (see below). In Somerset, limited evidence suggests that rectangular hearths were exclusively employed (Figure 10.5.10).

However, there are at least two sites that used small, single container hearths, with the main phase of salt-production, probably dating to between the Late Iron Age and Early Romano-British period (Site 82: Lydd Quarry and Site 228: Furzey Island). Significantly, these two sites are different in that they include multiple working areas associated with these hearths, and as opposed to being used with equally small pedestals as might be expected, at Site 82, the small hearths are used with larger rounded pedestals (Figure 4.63).

Therefore on these two sites, the incorporation of multiple working areas with single hearths, means that the output of salt would have been very high. The main difference with these two sites, is the way in which they were organised. Many workers, using compact working areas with single hearths (often with attached brine storage tanks) was key to the sites' overall function.

There is also evidence for the appearance of much larger hearths on at least three sites in the study area in the Romano-British period. Similarly to pedestals, the 477

more common smaller multiple container hearths were also still used on other contemporary sites.

Two of these large hearths occur within Somerset. One, from Site 239 in North Somerset (*c*.mid 1<sup>st</sup> century AD) was a large hearth which was *inferred* by a large burnt area and large Type 6 pedestals (Cox and Holbrook, 2009). The other, (Figure 4.39), was at Site 166, East Huntspill (c.2<sup>nd</sup>-3<sup>rd</sup> centuries AD) and was used in conjunction with bars and slabs. The third hearth is from Sittingbourne, Kent (1<sup>st</sup>-2<sup>nd</sup> centuries AD), (Dawkes 2011). This working area was unique to the study area in that it consisted of four large parallel hearths placed side by side (Kent Working Area I: Figure 5.32). The side to side placement of the hearths is comparable with the huge parallel 'furnaces' used during the Late Iron Age in the Seille Valley, France (Olivier and Kovacik, 2006), (Figure 7.1).



Figure 7.1 Group of Late Iron Age salt producing 'furnaces' at Marsal 'Pransieu', Seille region, France (Olivier and Kovacik, 2006: 563)

All three hearths share a significant common link; they were all very probably used with lead containers. The ability to create much larger containers using lead, would have meant much larger hearths would be required. One example of a large Romano-British lead container found in Cheshire, measured 1.11m x 0.84m x 0.12m (Rippon 2000c: 107).

There is also a possible fourth large rectangular hearth at Site 82, Lydd Quarry (see the bottom left of Figure 5.15), however this was not investigated further and only recorded in plan.

There were a many possible hearth and briquetage combinations, and therefore as suggested in the section title, there were much evidence for 'mix and match' of equipment and features. All of the equipment and features used to produce salt, were linked to the most important choice on any salt-production salt; which technique to use.

As outlined throughout **4.0** and summarised in **4.8**, there were a variety of technical features that could be used to produce salt, dependant on the technique used to produce salt. Some techniques involved more process 'events' than others, but ultimately, on the simplest level, a site could just have utilised an open hearth or ground surface hearth that mainly functioned as a cooking area and placed a cooking pot containing seawater within it to boil. This could have produced a very basic salt.

The technique used would have potentially impacted the types of salt produced (if different types of salt were recognised and valued), and clearly different techniques involved more 'investment' and perhaps even skillsets, than others. The basic stages of salt-production basically would have remained the same across most techniques, however, as highlighted in **4.0**, creation and preliminary processing of brine varied in investment across sites. It has been argued Lincolnshire, that the more complex the water management system, the more 'advanced' a site. This is presumably based upon the premise that these systems (especially the use of connected channels and tanks), automated some parts of the process, which is basically correct. These systems do suggest more investment into site infrastructure which does infer greater investment in the organisation of the salt-production process, and could suggest larger scale salt-production.

However, not all salt-production could have had these systems, especially if the topography was not suitable (i.e higher ground and pebble beaches), and, some sites have potentially lost this evidence to erosion. Therefore, although value can be placed on water management systems when considering scale of and investment in, salt-production, separating sites in a 'hierarchy' according to this, is still limited. It would have been easy to create 'modes of site organisation' with this factor in mind, however, due to the limitations in site preservation and

479

investigation, this has not been used to define the mode of sites in this research project. This is considered further in **7.5**.

By the early 1<sup>st</sup> century AD, there was the greatest variety of sites and technical factors, meaning that there were potentially plenty of options to choose from as there would have been more sites visible in popular salt-producing areas. As opposed to sites becoming generic, and all incorporating what was considered the 'best' or 'most advanced' technology, as perhaps is expected in modern times, it is the complete opposite, with the greatest amount of diversity at this time across the study area and in Britain.

However, observing subtle variations within smaller regional and local groups of sites, it is possible to see some common trends, as with the 'slotted lumps' in Kent, the preference for smaller, squat pedestals in Poole Harbour, and most clearly, the use of very similar supports, including the hobnail impressed slabs in the Central Somerset Levels.

Profiling salt-production in these three key areas of activity, best presents the clearly different characters and profiles of salt-production in these areas, with every area being distinctively different.

The exceptional uniformity in briquetage 'toolkits', the use of debris mounds, and presumably the creation of similar working areas in Central Somerset (Group 3), is unique, and represents a large, single site complex (the concept of 'complex' is explored further in **7.5**). However, even in this wonderful uniformity, it has still been proved that there are subtle differences in the way mounds are created and used. It has also been shown, that North Somerset (Group 2) has a very distinctly different character of salt-production, therefor showing that even in this region, with closely similar environs (Groups 2 and 3), there can still be different characters and identities of salt-production. In this case, separated by time, however within the groups, there is still uniformity.

Where uniformity is the distinct salt-production 'character' of Somerset, diversity is the character of salt-production in Dorset and Kent. Although features associated with salt-production are still relatively unknown in Poole Harbour/Purbeck, those that are known, are very different to one another. The contrast between the 480

circular tanks and hearths spread across Furzey Island, and the angular, deep rectangular hearths in Poole is clear. Currently, no one site is the same, with the exception of the deep rectangular hearths at Sites 213 and 215 in Poole (discussed further in **7.4.2.2**). Although this variety could be due to chronological difference, the shared use of distinctive squat pedestals continue across most sites (**7.4.2.1**). Similarly, in Kent, there are a variety of working area formations, however, there is more evidence for 'pockets' of shared trends across features when compared with Dorset (**5.3.1**). However, there is more variety in the briquetage, most visible within the single site complex at Site 82, where rounded pedestals prevail, but vary hugely in form and size.

All three key areas have evidence for shared technology with other salt-production areas in the wider context. It has also been possible to identify trends across larger geographical areas, as was explored across the regional evaluations (**5.0-6.0**). This has particularly emphasised shared technologies/techniques between Somerset, Kent and Essex, as well as Somerset and Cheshire. Similarly to the evidence within the Somerset mounds, these shared trends are very similar, but usually not exactly the same'; again, evidence for interpretation and adaption of these different technologies. It is perhaps significant, that most of these shared trends have occurred within the Romano-British period when there were more sites, and presumably more competition.

The following section will present evidence for shared technical factors in the wider context of Britain and mainland Europe, and will again, show the subtle differences in and interpretations of these shared technical features.

## 7.4.2 The French Connection? Identifying shared technical features between mainland Europe and Britain

All three key areas of salt-production activity in the study area (Somerset, Dorset and Kent) have trends in technological choice that are potentially linked to areas outside the study area in Britain and mainland Europe.

This section will highlight and examples of shared technologies across the study area, the eastern coast of Britain, and France, including the following:

- The use of distinct squat pedestals often known as 'handbricks' (Figure 3.42 :Pedestal Type 2)
- 2. The use of deep, thickly lined rectangular enclosed hearths
- 3. The creation of covered workshops
- 4. The creation of grouped tanks
- 5. The use of very narrow long linear hearths

The character of all five technical features is so distinct, that it strongly suggests the potential communication of shared technology.

#### 7.4.2.1 Pedestal Type 2 (Dorset, Fenlands and France)

The 'hand-brick' type pedestal (Figure 3.42: Pedestal Type 2 and Figure 7.2) is distinct because of all the briquetage pedestals, it reveals the most evidence for the way it was formed, and a link to the individual that created it.





As shown in **4.3.1**, (Figure 4.3), this form is created by simply twisting and squashing a sausage of clay into shape. Although this is the method used for the formation of most squat pedestals across Europe including Britain, this form is unique because there is no attempt to smooth over the twists and thumb prints

made in the clay after creation. This pedestal type appears to be unique to Poole Harbour, Dorset (Figure 7.2: bottom) and Lincolnshire (Figure 7.2: top) in Britain. However, it is also found in France (Figure 7.2: top).

The similarity between the first illustrated pedestal in Figure 7.2 (top: g) and the far right pedestal photographed in Figure 7.2 (bottom) is remarkable. This 'quirky' emphasis of the twist, with an often 'curved' angle does suggest a strong technological link.

It has been suggested that these pedestals in contrast to the smoother, straighter pedestals could represent the difference between briquetage (and potentially salt) that was produced by salt-producers versus potters (Lane and Morris, 2001: 371).

#### 7.4.2.2 Deep, Thickly-lined, Rectangular Enclosed Hearths

The briquetage examples shown in Figure 7.2 (photograph), were all discovered within the fill of a deep, rectangular hearth at Hamworthy, Dorset (Site 213: Figure 6.3: left), the form of which is also similar to examples in France.

This hearth is one of three similar 1<sup>st</sup> century AD rectangular enclosed hearths within the Hamworthy and Poole area. Previously described in **4.0**, they were distributed across two separate sites and it was suggested the contemporary sites were linked due to the hearths being so uniform in form (Figure 7.3).

These hearths are distinct in that they are deep, vertically sided, neat rectangular pits that have been lined with thick blocks of pre-prepared clay. There was little attempt to smooth the upper surface and therefore the edges of the blocks are still clearly visible, especially in the hearth in Site 213 (Figure 7.3: left). These distinct hearths are not common anywhere else in the study area. They are most like the deep rectangular hearths observed in areas of coastal Gaul (Figures 7.4-7.5).

However, clearly, there are also key differences, in that the French hearths are nearly all found within traditional 'workshop' structures, and are nearly all constructed with stone blocks (Figure 7.5: right).


Figure 7.3 Rectangular deep cut hearth with associated clay pit (and probable open hearth) at Site 213, Hamworthy, Dorset (Terrain Archaeology Site Archive: 2004) Right: Site 215, Poole, Dorset (Poole Museum Site Archive: 2004)

Of interest however, is the possibility that clay blocks in used for hearth construction in Poole Harbour, were deliberately left to look aesthetically like stone blocks, perhaps mimicking hearths from Gaul.

### 7.4.2.3 Covered Workshops (Cornwall and France)

Although there is no evidence for the construction of enclosed workshops at Sites 213 and 215 in Poole Harbour, as highlighted in **4.6.1.7**, there is a possible workshop in Ower (Site 225: Figure 4.57) and as well as two in Cornwall (Site 14: (Figure 4.52 and Site 15: Figure 4.53-4.54). Sites 14 and 15 are the most convincingly similar in layout to the workshops of Gaul, France (Figures 7.4-7.5).

Both Sites 14 (Figure 4.52) and 15 (Figures 4.53-4.54) are rare examples of single, probably semi-domestic buildings that contained salt-production working areas.

The building in Site 15 was better preserved than 14 and although internally, it lacked the stone-divided storage tanks within many of the French examples, Site 15 did contain stone-lined rectangular hearths, tanks and storage pits. The unique nature of Sites 14 and 15, especially in the use of stone for the creation of technical features, makes these sites more like the workshops in France, as no parallels currently exist elsewhere in Britain.



Figure 7.4 Example of a c.1<sup>st</sup> century BC salt-production 'workshop' in France (L'atelier de Landrellec), (Daire, 2003: 83)



Figure 7.5 Left: Plan of the salt producing 'workshop' at Enez Vihan, France Right: Central stone-lined rectangular hearth within the workshop (Daire, 2003: 84-85)

# 7.4.2.4 Groups of Multiple/Divided Tanks (Kent, Essex, Fenlands and France)

Examples of multiple closely grouped water management tanks in Kent were outlined previously (**5.3.1**). This included consideration of how and why grouped tanks were used, at least in the case of clay tanks.

As outlined in **5.3.2.1**, at least three sites in North Kent grouped water management tanks (consisting of three of more), (Figure 7.7). Site 30 had a rare group of four tanks (Figures 7.6: top, centre). Site 30 was also the only site to have both triangular bars and a group of tanks (both closely linked to Essex).



Figure 7.6 Comparison of brine tanks in Essex, Kent, Norfolk and France (Biddulph *et al.* 2012: 162)

Circular and rectangular grouped/combined tanks are common in Essex, and also occur in the Fenlands and areas of the Atlantic coast in France (Figure 7.6). Sites 61 and 30 contained circular tanks, whilst Site 90 contained rectangular tanks.

Examples within workshops in France, often consisted of stone and clay lined rectangular pits which were divided (Figures 7.4, 7.5 and 7.7: centre lower two examples). Of note however, is that the example shown for Enez Vihan, France in Figure 7.6, is in fact depicting the central hearth, as opposed to the divided tanks (see the original site plan in Figure 7.5).

As explored in **5.3.2.1**, one scenario for the reason why grouped tanks were used, could be that each tank could have been part of a 'tank rotation' process. The reason why divided stone tanks were used in France, is less obvious, as the scenario suggested for the Kent examples, only is applicable to clay tanks. Given that many of the French examples were within enclosed structures, this limits their use to storage and sediment settling. Although it is not clear from the French examples, it seems probable that saltwater was first allowed to partially solar evaporate in the sun, and then the concentrated brine stored inside for use.

It is probable that more sites across the study area also employed groups of tanks in this way; and just the creation of two tanks, would have enabled one of the tanks to be used for Techniques II and III. There was a pair of joined tanks at Site 62 and 82 in Kent, as well as a pair of tanks connected with a small channel, at Sites 228, Furzey Island, Poole Harbour, Dorset and at Site 166 in Central Somerset. The connected tanks could have been linked to a filtering process, where one tank was set slightly lower than the other.

These particular features in brine tanks, alludes to a mode complex process in Stage 1 than perhaps previously thought. Perhaps experimental archaeology in the future can explore this further.



Figure 7.7 Kent Working Areas with multiple grouped water management tanks (Kent Working Areas C, F and G)



Figure 7.8 Left: Early Romano-British combined tanks at Site 61 (Kent Working Area C), (Ian Jackson personal archives) Middle: Late Romano-British combined tanks from Stanford Wharf, Essex (Biddulph *et al.* 2012: 134) Right: Late Romano-British combined hearth from Middleton, Norfolk (Lane and Morris 2001: 175)

# 7.4.2.5 Narrow, Long Linear Hearths (Dorset, Essex, Fenlands and France)

The use of long very narrow hearths in salt-production has been observed in France, especially within Gaul (Daire 2003), where they are can associated with covered workshops (Figure 7.9).

These exceptionally narrow hearths would have been very restricted in terms of access and use. If containers were used within them, then they presumably would have been very narrow also, as shown in the French reconstruction (Figure 7.9). The hearth in 7.9 has raised walls, and three stokeholes; one at the side, and one at either end.

These forms are unusual in Britain, where wider hearths were far more common.

However, the possibility that Site 229, Corfe River, Poole Harbour contained a 'grilled hearth'; a form only seen outside this site in France, was outlined previously (**4.6.1.5**). This site also contained a very narrow hearth (Figures 4.38 and 7.10: A) similar to the French example in Figure 7.9, further supporting a strong link with France.

There is also another potential example of this type of hearth within the study area, at Site 30, Cooling, Kent (Figure 7.10: B).

Four other similar examples of narrow hearths have also been identified outside the study area in Britain. Three were recently discovered on same site at Stanford Wharf, Thames Estuary, Essex, (Figure 7.11: C and E). The other was found at Middleton, Norfolk (Figure 7.11: F).

There was also a possible seventh example at another Red Hill site in Essex in Peldon, where a long narrow deep hearth was recorded (De Brisay 1978), (Figure 7.13).

The French example in Figure 7.9 dates to the 1<sup>st</sup> century AD. The site in Dorset (Site 229) is the closest in date (c.1<sup>st</sup> century BC-1st century AD). All three of the other examples are dated much later to the 3<sup>rd</sup> or 4<sup>th</sup> century AD.



Figure 7.9 Left: c.1<sup>st</sup> century AD salt-production workshop, post-excavation at Ebihens, France (Daire 2003: 38) Right: Reconstruction of the same workshop (Daire 2003: 145)



Figure 7.10 A: Late Iron Age/Early Romano-British hearth at Site 229, Dorset (Cox and Hearne 1991: 38) B: Late Romano-British hearth from Site 30, Kent (Miles 2004: 29)

This chronology indicates that although this type of hearth is not common in Britain, it was used over a long period, with perhaps gaps in their use.

It is difficult due to truncation, to ascertain whether any of the British examples had similar raised walls with side access stokeholes. However, the hearths in Site 229 (Figure 7.10: A) and one of the Essex examples (Figure 7.11: C) both could have had raised walls based upon the photographs. Example (Figure 7.11: C) also could have slight evidence for a side stokehole, but it is hard to determine whether the irregular nature of the clay lining is due to truncation.

The hearth at Site 229 (Figure 7.10: A) appears to be very similar in terms of width to the French example, and appears to have a slight wider stokehole at the exposed end, however the other end continued out of the excavation parameters.

The examples from Essex and Lincolnshire were all narrower in width.

All of the examples from Essex (Figure 7.11: C-E) appeared to have a single stokehole at one end, the truncated hearth (Figure 7.11: D) appears to have been the most similar in length to the French example.



Figure 7.11 (ctd from 7.14) C-E: Late Romano-British hearths from contemporary salt-production working areas on the same site, Stanford Wharf, Essex (Biddulph *et al.* 2012: 115, 126 and 142) F: Late Romano-British narrow hearth from Middleton, Norfolk (Lane and Morris 2001: 174)

The example at Middleton was the most similar to the French example, with a stokehole at each end. This hearth was so well preserved that it still contained a complete arch that divided the main hearth area from the stokehole (Figure 7.12).



Figure 7.12 Narrow hearth with a complete arch leading into a stokehole at Middleton, Norfolk (Lane and Morris 2001: 174)

All of the British examples had been created within much larger hearth pits, which had then been heavily lined to create a narrow opening. This is visible within the truncated example in Figure 7.11: D (darker area).

The hearth in Figure 7.11: F, was exceptionally thickly lined with clay which is unusual, and it is not clear why this was the case, although presumably, this would have kept in more heat.

At least two of the British examples were also within working areas that employed grouped tanks (**7.4.2.4**). The Stanford Wharf, Essex hearth in 7.11: E, was used with the tanks shown in Figure 7.6: right, bottom, and the Middleton, Norfolk hearth was used with the tanks shown in Figure 7.6: top, left and Figure 7.8: right (in plan: the hearth is labelled as Oven '097').

The example from France in Figure 7.9, was used in conjunction with *pre-inserted flat triangular wedges* that extended into the hearth, but left a gap in the centre. The reconstruction of wedges used within this hearth could shed light on the way

in which similar briquetage wedges (more commonly found in Essex and Kent) were used in Britain.

The working area at Site 30 was associated with briquetage wedges, and it is therefore plausible that this hearth was used similarly. The Essex hearths were also used in conjunction with triangular wedges or bars which were found within the site environs (Figure 7.13), although there does not appear to be any evidence for their insertion into the hearth lining.



Figure 7.13 Left: Triangular wedges from Stanford Wharf, Essex (Poole 2012: Plates: Figure 8.5) Right: Reconstruction of wedges embedded within a deep narrow salt-production hearth at Peldon, Essex (De Brisay 1978: 46)

The use of wedges in this way was also thought to have occured at the Red Hill in Peldon, Essex (Figure 7.13) where this hearth was shown using fires directly inside as opposed to being within a stokehole area.

No briquetage was identified as being directly associated with the hearth at Site 229, Dorset. However, bars were found in the general site environs. However, the hearth at Site 229 appears to have been constructed with internal raised divisions which could have been used to support containers.

A reconstruction of the Site 229 narrow hearth in Figure 7.14, shows a different scenario; with the hearth being used with support bars straddling the top, because bars were found with the general environs of the site (but not within the hearth).



Figure 7.14 Reconstruction of the narrow hearth at Site 229 (Corfe River, Poole Harbour) in use for salt-production (Hearne and Cox 1991: 17)

It is possible, given the narrow hearth dimensions, that bars or even just containers, could have straddled the top of some of these hearths. However, containers used alone (with no supports) is very unlikely, as this would result in the containers being unevenly heated from below. The areas of container resting on lining, would presumably remain colder, which could have potentially affected the heating of brine.



Figure 7.15 Round briquetage pedestal bases found in-situ within hearth lining on either side of the Phase 1 salt-production hearth at Middleton, Norfolk (Lane and Morris 2001: 172)

The hearth from Middleton provided the best evidence for briquetage use in the presence of small rounded pedestal bases which were found *in-situ* on either side of the hearth (Figure 7.15).

The potential association of the linear hearth at Site 30 (Figure 7.10: B) with a covered structure, could also suggest a link to examples in France.

Although it is considered that these hearths in Britain were set within the ground, the French hearths appear to have been set above ground, similar to the large furnaces in the Seille Valley (Figure 7.1). The raising of hearths would have meant easier access as the salt producer would not have needed to bend down as much whilst attending the containers. However, clear evidence that the British examples were set above ground is generally lacking.

### 7.4.2.6 Overview of the French Connection

This section has shown many examples of shared salt-production technologies between Britain and France. Chronologically, salt-production activity in France (in the coastal Gaul and inland at the Seille Valley at least) appears to have been equally as intense during the 1<sup>st</sup> century BC to Early 1<sup>st</sup> century AD. However, there is evidence for intense production of salt from inland brine springs much earlier in the 8-6<sup>th</sup> centuries BC, which is not paralleled in Britain.

Similarities between salt-production sites in France and Britain during the 1<sup>st</sup> century BC to 1<sup>st</sup> centuries AD has also been observed and discussed by Nenquin (1961) and Gouletquer (1974a).

It is with a certain feeling of respect... that we see how with a minimum of effort a maximum of results are obtained, be it on the coast of England, in Central Germany or in Lorraine." (Nenquin, 1961: 126

Nenquin (1961: 133) states that '...it is...possible to say that chronologically as well as technically, the sites of La Panne, Leiden and Vlaardingen are almost exactly similar to the coastal sites of England and France'.

He then goes on to add:

Even more remarkable is the great similarity between the ceramic material found on the different sites where salt was made by evaporation of brine, whether they were near the sea or near the brine-springs. It is sometimes very difficult to distinguish between the briquetage from Halle for example and that from Lorraine or the Red Hills in England. (Nenquin, 1961: 157)

Gouletquer (1974a), when making the same observation, attributes this to a spread in people and technological knowhow across Europe. However, he also concluded that very probably the bulk of the technological developments associated with salt-production occurred *away from Britain* and only reached the UK at *the end of this development*. This was, however, based upon the premise that salt-production did not 'spread' to Britain until the Late Iron Age and since this work, there have been discoveries of much earlier salt-production sites in Britain.

To attribute the similarity in sites and technique directly to a spread or migration of people and ideas could now be considered over-simplistic and deterministic. This thought was mirrored by Nenquin (1961:157), who viewed the similarities more as common episodes of innovation linked to the common goal of attempting to produce salt in the easiest, quickest and most efficient way. That view could be perceived as a little 'technocentric', however, episodes of innovation have been evidenced throughout the archaeology assessed for this research project. And it is probable that there will be at least some coincidental similarities.

However, the technological links do in some cases, potentially suggest shared communication, and in the case of Poole Harbour and Site 229, could potentially represent a movement of people. Given that Poole Harbour was such a busy port by the Late Iron Age, it would not be surprising that producers from France and Britain could have migrated in small numbers. It is also possible that with the increase in the movement of traders, these people would have observed new technologies in new places, and brought ideas back with them.

# 7.5 Site Biographies, Organisation and Use of Space: Defining New 'Modes' of Salt-Production

Throughout this thesis, the technology used to produce salt has been explored, explained and reconstructed. Sites have been classified according to archaeological evidence and the concept of working areas has been introduced, providing an insight into the use of space on a site. As previously shown, each site would have had its own unique *biography or lifecycle* as created by the salt producers. As has been well attested throughout this chapter, individuals working on the sites had their own preferences to the way in which a site was created and the techniques and technical factors that were employed.

The use of space is key to understanding the wider organisation of salt-production. Site organisation will be initially explored, taking into consideration 'modes of production', scale and site type based upon use of space: location, site size and scale. In addition to this, the demands of consumers, taking into account population size as well as potential changes in diet and availability of salt will be considered. Consumers range from single individuals, local families and the residents of rural settlements, to those inhabiting towns and military establishments. Some sites may well have produced salt for all consumers and all uses, whilst others perhaps specialised in supplying a more restricted range of consumers with specific products. Therefore, the scale and nature of salt-production is directly linked to the consumer.

This section therefore focuses upon evidence for the social and spatial organisation of salt-production. This will be firstly achieved by defining 'modes of organisation' and will then discuss and compare key examples of these modes, and ways in which organisation can be identified through archaeological remains.

## 7.5.1 Deconstructing and Defining Existing 'Modes of Production': Peacock and DeRoche (Table 7.2)

It is traditional to assess production sites in terms of how well organised they were. Factors in this assessment include their size and location, the degree of technological sophistication, the skill of the labour force and the overall quantity and quality of output (product).

One way in which this has been applied to production sites is using defined 'modes of production'. This is a 'sliding scale' of how well organised and specialised a site is perceived to be in order to assess the organisation and output. The most commonly used and cited modes were defined by Peacock (1982),

(Table 7.2), based upon pottery production, which has heavily leant on relevant ethnographic examples.

 Table 7.2 Modes of Prehistoric and Roman Pottery and Iron Age Textile Production (After

 Peacock 1982: 8-11 and DeRoche 1997: 19)

Peacock: Pottery	Summary/Description	De Roche: Textile	Summary/Description
Household Production	Simplest mode of production. Sporadic, little organisation or plan. Carried out by women?	Universal Domestic Production	Family craft activity with little or no division of labour
Household Industry	More craft specialisation. Simple technology. Carried out by women?	Restricted Domestic Production	Household based with 'semi-specialists'
Individual Workshops	Similar to Household Industry but more focused organisation and larger consumption networks	Individual Industry	Specialist working alone and full-time, relying upon the craft for subsistence.
Nucleated Workshops	Grouped 'individual workshops'Production is major and main activity and priority. Male only activity?	Workshop Industries	Full-time. Primary means of subsistence. More division of labour
		Village Industry	Still greater investment in equipment/ structure. Larger work force- part or full-time.
The Manufactory	Pre-18 <sup>th</sup> century factory stage. Large areas of space used. Buildings and process broken into very visible 'chunks'. Specialists.	-	-
The Factory	Post- Industrial Revolution.	Factory	Mechanism. Seen as of little relevance to prehistoric production processes-more recognisable in the Romano-British period?
Estate Production	Applicable to Roman estates controlling –in- house production	-	-
Military and other Official Production	Military acquisition of resource. Potentially could have resulted in some sites supplying military only	-	-

These modes have also been used in the discussion of other production processes (e.g Wild 2002), but with some caution as *each production process is different*.

De Roche (1997) equally used ethnographic parallels when considering modes of cloth production and adapted Peacock's modes of pottery production to cloth production in his discussion of Iron Age production processes (Table 7.2).

Both are summarised in Table 7.2 and are further detailed below. Importantly, both make a distinction between household production mode and larger scale industrial or other complex production modes.

Although as described earlier, these modes do represent a 'sliding scale' of more simple to complex production modes, Peacock recognised that this hierarchical scheme should not be used to view some sites as 'primitive' and others as 'advanced'. Peacock recognises that this 'scheme' is very generic, and will be different dependant on the context:

It must be stressed that the modes of production and their variants cannot be seen as the 'stages' of an evolutionary system, for industrial arrangements merely reflect social and economic organisation...On the other hand industries do change with the passage of time...(Peacock 1982)

De Roche (1997: 20) also emphasised that context is key when considering modes of production, including economic and social factors, as well as the relative level of technology used.

There has been no previous attempt to design 'modes of production' specifically for salt-production in Britain. There has been little attempt to define Iron Age or Romano-British salt-production sites according to levels of organisation in general. However, this has been attempted for the Fens. Where Lane and Morris (2001) attempted to identify modes of salt-production according to Peacock or DeRoche's modes. An overview of this will also be incorporated when outlining modes of production in more detail.

#### Household Production/Universal Domestic Production

This is the simplest mode of production based upon a basic level of organisation and site investment. Both Peacock (1982) and DeRoche (1997) define this mode as a sporadic or part-time craft practised by family members within a household setting. Both consider that labour was only divided based upon family role, age and sex (*ibid*). Peacock (1982) goes on to state that this activity was probably carried out by women as part of everyday domestic activities. DeRoche (1997) emphasises that the process would have involved the use of locally available raw materials with very little investment in equipment and that the product was intended only for local consumption.

When applying this mode directly to salt-production, Lane and Morris (2001: 396) concluded that there is very little evidence for this in Britain, with only one possible contender being the Middle Bronze Age site at Brean Down, Somerset. Although the feasibility of directly applying this mode to salt-production is questioned (Lane and Morris 2001: 396), the application of this mode to Brean Down is based upon evidence that salt-production was carried out within covered structures, within a settlement (Bell, 1990). The ratio of pottery to briquetage (pottery greatly outweighed briquetage) is also taken to indicate that this was a domestic settlement where 'salt production may have been one of many domestic or household production activities...' (Lane and Morris 2001: 396).

The term 'Household Level' production, was also applied to debris mound sites in the Central Somerset Levels (**6.0**), during a discussion within a briquetage assessment report for Site 166:

...it is clear from both the scale and widespread distribution of saltern mounds within the Somerset Levels that salt-making, though practised on a household level (Peacock 1982), was of significant economic importance and formed part of a carefully managed pattern of marshland exploitation...(Percival 2005: 8)

Although it is not clear whether this was referring to 'Household Production' or 'Household Industry', this interpretation is somewhat surprising given the potentially industrial nature of these sites. However, this conclusion was based primarily upon a direct comparison with a contemporary salt-production site in Middleton Norfolk, as opposed to considering the character of salt-production in a local, regional context. Defining 'household' levels of production to salt-production is discussed further in **7.5.2.1** and **7.5.5.1**.

#### Household Industry/Restricted Domestic Production

This mode is evidenced by larger scale, part-time craft specialisation. It was still household-based and probably seasonal (Peacock 1982; De Roche 1997). There is clear evidence for 'semi-specialists' (De Roche 1997: 20) who investigated more

in technology and probably supplied either local markets or people outside 'their domestic unit' (*ibid*).

Peacock (1982) again emphasises that women probably carried out production at this level. Lane and Morris (2001) also addressed the issue of gender division in salt-production and also concluded that woman would have probably carried out salt-production when carried out on a local, smaller scale. However, this changed when:

...production of a commodity represents the majority of a household income, then production will usually be in the hands of the male members of that household. (Lane and Morris 2001: 403)

The reason for this assertion is not given.

Kinory (2012: 24) suggests that many areas of salt-production reached this level by the end of the Middle Iron Age, with the implication being therefore that there was ' production in excess of domestic consumption requirements'. Kinory (*ibid*) also considers the identity of salt producers at this time 'may have been transitioning...from being the province of magicians and sorcerers to being the work of ordinary people'.

#### Individual Workshops/Individual industry

This mode is more focused and both Peacock (1982) and DeRoche (1997) concluded that this mode represents a major if not the main source of subsistence. Although Peacock states that this was still part-time and carried out by small teams of skilled individuals, DeRoche views this mode as full-time, and carried out by a 'specialist working alone' (DeRoche, 1997: 20) and by the very definition, appears to suggest the first evidence of industrial scale activity at this stage, at least in the case of textile production.

Lane and Morris (2001: 396) concluded that the previous mode of 'Household Industry' and this mode of 'Individual Workshops', are most applicable to salt-production sites in Britain. Importantly, for salt-production sites, they differentiate between those sites employing hearths for brine evaporation, and those employing ovens, as representing different modes. Lane and Morris (2001: 397) concluded that most 'late prehistoric' (and pre-Roman) salt-production sites in the Fenlands

at least, were operating on the level of 'household industry'. By the Late Iron Age, the 'system of production' in the Fenlands appears to change and this is viewed as key to recognising the transition from household industry to 'individual workshops' (*ibid*: 397). This is characterised by:

...the introduction and adoption of new techniques of briquetage manufacture, a new range of briquetage types and an increased investment in the construction of heating systems (Lane and Morris 2001: 397)

#### Nucleated Workshops/Workshop Industries/Village Industry

All three of these modes require a similar level of organisation, skill and labour force and importantly all meant that production was a major, if not main form of subsistence. However DeRoche (1997) suggests that in the case of textile production at least, that there are two subtly different modes (workshop industry and village industry, equivalent to Peacock's single 'nucleated workshop' mode.

Although similar, Peacock's 'nucleated workshop' mode, places more emphasis on the grouping of workshops and workers into larger site complexes (as opposed to the growth of a single workshop into a larger working area which appears to be suggested in DeRoche's (1997) modes). All three modes appear to incorporate more workers from outside the 'domestic unit' (ibid: 20) thus it could incorporate workers from different families/extended families in the larger local community. However, it is not clear whether this could also potentially include the incorporation of producers from outside the local community and region.

All three modes would have required far more organisation and cooperation, which Peacock (1982) suggests is highly influenced by competition from other external sites. He suggests that production now becomes an important priority with phases of production that lasted longer, that were more intensive in focus and carried out by highly skilled *male* workers. However, DeRoche (1997) again as with all his other modes, makes no suggestion that gender was important in the division of labour.

Significantly, Peacock (1982) suggests that there is much more focus and organisation in product distribution, and it could focus upon specific consumers, developing a niche market. He also suggests that not only are the salt producers and their families 'profiting', but also the wider community.

DeRoche (1997) also suggests that there was greater investment in product distribution and the growth of gaining important network contacts. He also emphasis that there would have been a far greater investment in tools and procurement of raw materials.

The subtle difference between DeRoche's (1997) 'workshop industry' mode and 'village industry' mode, is that there was an even greater investment in equipment and site structure. Presumably, this would have developed naturally at workshop industry level as the 'mix' of workers developed sound working relationships and learned to work together as a team in a 'whole site'.

In summary, both DeRoche (1997) and Peacock (1982) emphasise that by this level of organisation and mode, there was considerable investment in the 'whole site' and site structure, which now includes greater consideration of distribution networks and more 'catering' for specific consumers. There is still some debate as to whether at this level, production was full-time. Peacock appears to suggest that this mode represents a substantial increase in labour hours, but there is no clear suggestion that production was full-time at this point. DeRoche (1997) however, suggests that by the level of 'workshop industry', production would have been full-time, although, it could have been full or remain part-time for 'village industry'. All three modes allude to the emergence of industrial production sites.

Lane and Morris (2001) highlighted the difficulties that arise when attempting to apply this mode to salt-production sites in the Fenlands specifically. Only one site (the Late Romano-British site at Middleton, Norfolk) is identified as a potential 'Workshop Industry' contender due to the '...greater investment in tools and plant...'(Lane and Morris, 2001: 397).

Kinory (2012: 24) concludes that by the Late Iron Age, there is clear evidence for the emergence of 'industrial scale' salt-production, with most emphasis being upon the Red Hills of Essex, which she concludes is on a level most similar to Peacocks' Workshop Industry.

Although Kinory (*ibid*) did not state how this mode is evidenced, Lane and Morris (2001) emphasise changes in technical factors as well as site structure, as a method of identifying changes in site mode. The use of 'improved heating 515

structures' as highlighted earlier, alludes to the use of more oven type heating features (indirect heat), as opposed to the 'simpler' enclosed hearths (direct heat). As highlighted earlier, this technological change did not occur within the study area and there is little evidence for a 'hearth heirearchy' based upon efficiency or apparent advancement. This presents a problem when attempting to identify evidence for changes in modes of production within the study area, if applying the same principles as used in the Fenlands.

However, the use of metal containers, as was also highlighted earlier, is a significant technological change and does represent change in scale on some sites.

In the case of Lincolnshire, it is also acknowledged that modes of salt-production could potentially be included within more complex modes 'above' Workshop Industry' as described above. Despite the difficulty in identifying this mode for salt-production sites in the Fenlands and indeed beyond, it is concluded that there is enough archaeological evidence in the way that the structure and technical features of sites change, for more complex modes 'above' Workshop Industry' to have existed:

The difference in salt-production facilities between those of earlier and later Roman date are dramatic enough to suggest that not only the methods but also the management of and the markets for the product could actually range beyond simply that implied by workshop industry...(Lane and Morris 2001: 398)

#### Manufactory/Factory

Both these modes refer to mechanisation and are irrelevant to prehistoric and Romano-British salt-production.

#### **Estate Production**

In the case of pottery production, Peacock (1982) identifies two further modes of production, the first being 'estate production'. This mode is exclusive to the Romano-British period and refers mostly to economies created by villa estates which consisted of large areas of private land that were centrally owned and controlled. Production is seen as exclusively for the purpose of supplying the estate owners. Significantly, this mode can potentially incorporate most previous modes, from 'household industry' and higher.

This mode is difficult to identify as it involves the careful assessment of villa distribution and production sites in the landscape. The nature of the production sites may look like other non-villa production sites and therefore would be difficult to certainly attribute to villas. In relation to salt-production, there are similar issues with identifying this mode in the archaeological record as highlighted by Lane and Morris (2001: 398).

Only one example from the Fenlands is proposed as a possible 'estate production' at Stonea, Cambridgeshire where a substantial Roman building was excavated (Jackson and Potter 1996). It is proposed that Stonea could have represented a market for locally produced salt or as a central hub for bringing salt from several producers to further distribute (Lane and Morris 2001: 398). However, it is acknowledged that this still remains speculative and would need further assessment of pottery and briquetage assemblages in the local vicinity (*ibid*).

#### **Military/Other Official Production**

This is Peacock's (1982) final mode of pottery production and refers to the Roman military taking control of organisation/and or distribution of production in order to create a supply for the military. This could also have involved the acquisition of natural resources, although clearly this would be very difficult in the case of salt production! It is also plausible that some production sites chose to change from traditional supply routes and supply the military as these consumers were presumably reliable and required larger amounts of produce.

As with 'estate production', applying this mode to production sites is difficult, and would require careful consideration of site structure including a comparison of technical features, as well as considering distribution networks. Sites may not have had to be located close to military structures for example, to be supplying them with the product.

For Fenland salt-production sites, again, it was difficult to identify definite militaryrelated sites, however, again, the site at Middleton, Norfolk, is proposed as a potential contender (Lane and Morris 2001: 398). This is not based upon direct evidence for military in the locale (e.g in the form of forts or supply bases), but instead based upon the Late Romano-British date of the site, as well as technological factors, site structure and the fact that there were excellent water 517 transport routes nearby (the Wash). Lane and Morris (2001: 398-402) suggest that identifying the more elaborate modes of production can be better achieved by identifying and understanding salt distribution and the quantity of site output. This method for understanding mode of production is discussed further shortly.

### 7.5.2 Problems Applying Existing 'Modes' to Salt-Production

At the core of all seven main mode 'levels' described above, is evidence for input (producers, labour, technology and site organisation) and output (product type, trade, distribution networks and consumers). It is also important to remember that although many of the core factors used to define these modes are universal to most production processes, they were specifically designed for pottery and textile production. The relevance of these specific modes for salt-production requires further consideration, especially in the light of the issues that arose when applying these modes in the Fenlands (Lane and Morris 2001).

Applying these modes to archaeological remains is also completely dependent on the quality and quantity of the archaeology and given the often fragmentary state of salt-production sites, this is clearly a major problem.

Another obvious issue that arises when considering modes, is the lack of evidence for 'output', and the lack of evidence for the product: salt. This issue is also applicable to textile production. The absence of this, makes attempts to identify distribution patterns and consumers very difficult.

A third issue relates to the issue of seasonality, and to deciding whether production was a part-time or full-time activity. Both Peacock (1982) and DeRoche (1997) place emphasis on full-time production as a method of inferring greater investment, an increase in scale and evidence that it was a major or main source of income.

However, given that it is assumed that salt-production was predominantly limited to the summer months, it is difficult to identify whether investment was important. Presumably, during the given working season, however long that was each year, workers could either have worked full or part time dependent upon the required quantity and the weather conditions. The 'given season' was likely to be different in the 'seasonal calendar' even if subtly, between different sites and regions. Assuming all salt producers worked at the same time of the year, for the same period of time, for the same amount of hours is too generic, and does not account for different 'agendas' held by individuals and sites. This is of course also linked to the difference between sites in terms of specialism and how much of saltproduction was part of a family and community subsistence, as well as local and regional economies. The consideration of how our understanding of 'full-time' and 'part-time' relates to salt-production is explored further in **7.4.2.2**.

The fourth issue concerns the evidence for site infrastructure and technology. As already highlighted, in the Fenlands, Lane and Morris (2001) identify the change from hearths to ovens, as a change in mode (i.e simple to complex). Similarly, evidence for water management in the Fenlands was also deemed as indicative of site 'advancement' and therefore signified a more complex mode. However, as has been outlined previously, water management systems although representing significant site organisation, do not necessarily link directly to mode hierarchy. Similarly, there is no obvious evidence for advancement in hearth types in the study area, other than evidence that they do become larger and lead containers are adopted on some sites. However, this does not necessarily directly relate to mode either.

The final and perhaps most fundamental issue, is the significance and definition of domestic versus industrial sites. Peacock (1982) especially, emphasises the contrast between production that is based within the domestic habitus and production within non-household sites. This is used as a tool to provide a hierarchy of site organisation.

## 7.5.2.1 Defining Domestic Versus Industrial Salt-Production (Figure 10.5.11)

Both Peacock (1982) and DeRoche (1997) therefore emphasise the separation between 'household' (Peacock) or 'domestic' (DeRoche) and 'industry. The use of the term 'household' relates to production that occurs within a home environment such as a 'house', a farmstead, or other types of settlement.
However, the term 'domestic' is more ambigious, as this could apply to any space that is even partially used as a domestic space, including areas external to the built 'household'. Therefore, 'household' and 'domestic' are different in that domestic could be more 'transferable' as a perception of space; a space where domestic activities take place, but not necessarily indicative of a household.

This is important when attempting to define salt-production site modes. If the term 'domestic' is to be used, it requires careful consideration. If production took place in the domestic environment, it would be expected that there would be evidence of production activity to be associated with evidence of domestic activity, such as pottery and food waste.

This was the premise used when assessing evidence for production modes in the Fenlands. Changes in technology (briquetage and features) were considered, as well as the *degree of domestic activity in the form of pottery waste* (Lane and Morris 2001), (see Table 10.1.42).

Firstly, Lane and Morris concluded that the use of water management features (i.e brine tanks/feeder channels) and the change from ceramic to metal containers signalled more complex site organisation and therefore an advance on the 'ladder' of production modes.

Secondly, the presence or absence of pottery, was also used to define modes (Lane and Morris 2001). Most sites in the Fenlands contained little pottery waste. This was interpreted as representing small-scale temporary, short-lived salt-production as the sites where more intense salt-production took place would produce more pottery, as more people would generate more occupation waste.

These conclusions were mainly reached by comparing the ratio of pottery to briquetage on the relatively small number of excavated sites (Lane and Morris 2001). This method had also been previously used by Morris (1994a, 1994b) on potential salt consumer sites, quantifying finds of briquetage, away from production sites.

Although it was not central to the aims of this research project, the presence or absence of evidence of domestic activity on sites in the study area was recorded.

Evidence of domestic activity was recorded if domestic waste such as pottery and faunal assemblages were present.

At least 120 (43%) sites in the study area had some form of archaeological evidence for associated domestic activity (which had been inferred mostly from the presence of pottery), whilst 81 had no recorded evidence and no information was available for 75 sites (Table 10.1.3 and Figure 10.5.11).

Dorset had the highest percentage of sites with domestic activity (73%) and in this case, this indicated that salt-production was being carried out very close to or within settlement environs. The evidence for Somerset is less clear given the lack of excavation. However, as discussed in **6.0**, pottery discovered from some sites has been interpreted as suggesting that probable settlements or summer camps were located nearby.

However, general conclusions about modes of production based on the absence or presence of domestic waste on a salt-production site is overly simplistic, as the sites are so varied in location and type. The presence or absence of domestic activity/waste, greatly depends on the *social use of space* on a site.

It is plausible that the presence of significant quantities of domestic waste at a site indicates that a temporary camp was located very close to the site, inferring that 'domestic space' overlapped with 'production space'. Conversely, a lack of domestic waste could infer that most domestic activity took place away from the site. However, it is also possible that 'domestic' and 'industrial' space were kept deliberately separate within the production site. It is possible that domestic activity did take place within or close to the site, but that the debris was deposited elsewhere, outside the production site environs.

Given that most salt-production sites in the study area have not been subject to large scale open excavations, there is a distinct possibility that the domestic waste was deposited outside the main working area, and that these dumps, as well as evidence for temporary camps/settlements with not have been found.

In conclusion therefore, although it is possible that some salt-production sites could be 'fitted' within the household or domestic modes, in terms of them being 521

incorporated into 'home space', this does not necessarily infer they were small or primitive as inferred by Peacock (1982) and DeRoche (1997) modes.

Therefore, defining a site based upon evidence for household or domestic space, including assessing presence or absence of pottery assemblages, and the ratios of pottery to briquetage, is perhaps useful for exploring the social use of space, but too limited an approach for the application of modes of production.

Further consideration of 'domestic' use of space can be found in 7.4.8.

# 7.5.2.2 Labour and Mode: Part Time Versus Full-Time

The concept of measuring the significance of a production process dependant on whether people worked full or part time, or whether their main income/subsistence was achieved through this activity, is problematic when applied to Iron Age and Romano-British salt-production. Technically, when Peacock's modes of production are directly applied to salt-production, the salt-production could never have reached beyond the mode of 'Individual Workshops' or in De Roche's criteria 'Individual Industry'. This is because salt-production was not a full-time all year round activity, and even when carried out in a seasonal 'window', weather conditions would have presumably mean that production was technically part-time.

Kinory (2012) also considers this point:

...an expectation of continuous salt production for 12 months of the year is probably erroneous. Stormy, windy coastal areas are likely to have been equally insalubrious for saltmaking during winters as they are now. This suggests that 'full-time' is not synonymous with 'full-time' in terms of actual salt production even at its prehistoric maximum output, although it is possible that the non-production months might have been devoted by the salt maters to ancillary activities. (Kinory, 2012: 13-14)

As also highlighted by Kinory (2012) and suggested by Morris (Morris and Lane, 2001), it would have been the case that even when salt crystallisation could not take place, workers would have filled their time with other relevant activities, such as briquetage creation and repair, feature creation and repair, and perhaps secondary processes such as food salting. So, if production was full-time during the given season of work, perhaps then the mode could potentially reach higher

levels on Peacock and De Roche's modes, regardless, again, the difficulties applying existing modes is clear.

Emphasis is also placed by Peacock and DeRoche upon a process being the main source of income for a family or individual. It is possible that if enough salt was produced during the summer months, it could provide a substantial proportion of income, even though it was only a part-time occupation. This point is also raised by Lane and Morris (2001), highlighting that in later periods (medieval) salt produced in the summer months was enough to provide a sufficient income. It is also important to remember that during these summer months, individuals were probably tied to this work full-time.

Much emphasis is also placed upon output by Peacock and DeRoche, but we can never truly know how much salt was produced. The significance of output was also considered by Lane and Morris (2001:398) for Fenland salt-production sites, and it was concluded that it was essential to firstly better understand the distribution and consumption of salt.

One method of exploring output further for salt-production sites, is to record and compare hearth types and sizes. Chapter **4.0** (**4.6.2**) provided a simple example of this, by presenting hearth types in order of how many containers they could hold. This also needs to be considered alongside the nature of the working area they sit within as a whole; including number of contemporary hearths (for example several single container hearths are equal to a single multiple container hearth), as well as further evidence for waste disposal.

#### 7.5.3 Defining New Modes of Salt-Production for Southern Britain

The previous section highlighted the limitations when applying pre-defined modes of production for pottery (Peacock 1982) and cloth production (De Roche 1997) to salt-production, which clearly has its own unique set of criteria to be considered. Therefore, these existing modes of production have been transformed to create a completely new set of modes applicable for prehistoric and Roman salt-production sites in the study area (Table 7.3). These modes are primarily based upon the consideration of four main factors:

- 1. Organisation and Use of Space
- 2. Site Location
- 3. Focused Industrial Activity
- 4. Site Infrastructure

Although these modes can be generically applied to most sites exhibiting similar evidence for relevant organisation, it is important to emphasise that no sites are identical. It is also not possible to certainly assign modes to sites that are very incomplete or damaged.

Eight main modes relating specifically to salt-production sites are listed below, with the addition of one other probable related mode (**a**), which considers the small possibility of external briquetage-producing sites.

Site Mode		Mode Description	Current Date Range	Current Study Area Locations
а	Briquetage- Production Site	This mode of site is difficult to certainly identify in the archaeological record. Could be external or within a salt-production site. No certain evidence for this mode currently exists in the study area and its probable that briquetage was created on-site seasonally as required	Prehistoric- Roman?	?
1	Household Production	<b>No clearly defined separate Working Area</b> . Salt-production carried out within the environs of a domestic settlement/household	Prehistory? Late Iron Age- Early Roman?	South Kent
2	Single Working Area	<b>Single Working Area</b> containing 1-2 brine evaporation hearths, at least one brine tank, and associated briquetage. No structural infrastructure (buildings). Sites most often located in liminal, coastal areas separate to permanent occupation areas, representing single, seasonal enterprises. <b>Most common mode</b> .	Prehistoric- Roman	Somerset, South Dorset, Hampshire, Sussex and Kent
3	Single, Specialised, Working Area	<b>Single Working Area</b> . As Mode 2, but specialisms in a specific and exclusive product and/or consumer. This would most commonly have been salted meat. Salt would also probably be traded as a secondary product. Single working area. No structural infrastructure (buildings)	Late Iron Age/ Roman	Poole Harbour and North Kent(?)
4	Site Complex	<b>Multiple Contemporary Working Areas</b> . The difference between this and Mode 2 is that there are <i>multiple</i> contemporary and <i>centrally organised working areas</i>	Late Iron Age/ Roman	Central Somerset Levels and Kent

5	Integrated Salt and Pottery Production Site	<b>Single/ Multiple Contemporary Salt Working Area/s.</b> These sites could be potters producing salt, or salt producers making pots, or salt and pottery producers sharing a site. All products likely shared the same trade networks	Late Iron Age- Roman	Poole Harbour, North Kent
6	Enclosed, Industrial Workshop	<b>Single Main Working Area</b> . Similar to Mode 2, but with the addition of buildings/structures that are only used predominantly for industrial purposes.	Roman	Cornwall, South Dorset and Kent
7	Enclosed, Industrial Settlement	<b>Multiple/Single, Working Areas</b> . This mode represents semi-domestic 'industrial settlements' where the primary focus of the settlement is using the space for industrial activity. Industrial activity nearly always incorporated more than one production activity (for example salt, pottery, shale objects and iron production).	Late Iron Age- Roman	South Dorset and Kent
8	External, Salt Processing and Distribution Site	<b>Defined Working Areas</b> . This mode of site has not been specifically assessed for this research project. However there are finds of briquetage inland and external to salt-production sites and this could represent trade in salt and/or final processing of salt (complete drying and for taste). Also could be potential regional distribution centres	Iron Age- Roman	Somerset, Dorset? and Kent

The eight main modes vary in the way space was used and in their organisation and management, but all employed similar technology and there is no particular chronological development or 'advancement' of site.

However, clearly Mode 4 sites have more complex organisation when compared to Mode 2 sites, as they incorporated multiple as opposed to single working areas. Mode 7 sites, are also a development of Mode 5 sites, with the addition of better site infrastructure (Figure 7.16).



Figure 7.16 Potential relationships between modes of salt-production

The different modes overlap each other chronologically, and it is likely that Modes 5 and 6 developed separately from Mode 2 sites as they were combined with other production processes (Figure 7.16).

Evidence for Mode **a**, has not been identified within the study area, but remains a plausible option, as highlighted in the case of the Essex Red Hills, where:

...convincing evidence that the equipment was made at the Hills is lacking and the possibility that it was made at inland sites and transported to the salterns should be borne in mind. (Fawn 1986: 40)

It is probable that a more a basic form of 'Household Production', perhaps defined as 'Informal, Casual Salt-Production' also existed. This would have consisted of simple, multi-function surface hearths that were used to produce salt in pottery bowls. This would probably be more applicable to pre-Iron Age salt-production, and would be very difficult to identify, although it remains just as possible that this mode could have existed in any period. However, given that the new modes defined for this research dataset and study area, are applicable to Iron Age and Romano-British sites, it is considered that technologically, salt-production sites would be employing more formal and specific technical features by this period. However, as stated above, that non-specialist individuals continued to make salt on a very small-scale using simple technology and simple techniques is very plausible.

The identification of Mode 8 sites has not been specifically targeted as part of this research due to the emphasise on production areas. However, it is likely that some existed, and potential examples not within the dataset will be presented shortly. The possibility that this 'mode' of site existed, is also supported by the work of Fawn on the Essex Red Hill sites:

The drying stage may also have been carried out elsewhere. As the salt, once dried would have tended to become damp again, it may have been distributed in the moist state after draining and the customer then dried it, according to requirements, in front of the domestic fire. (Fawn 1986: 40)

All these modes are further discussed below. This includes an overview of the 'archaeological character' of each mode, as well as further discussion about the most likely organisation of labour (Tables 7.4-7.10), based upon De Roche's 'Factors of Mode Organisation' (1997: 19). This is then followed by the application of these new modes to sites in the study area.

# Mode 1: Household Production (Table 7.4)

This mode represents small-scale, household salt-production that would have been carried out within coastal settlements. It could have been carried out using a domestic hearth inside or outside the 'home', dependent on the use of space within the settlement. Water management would have been basic; seawater was probably carried from the sea, and stored in a simple pit, or larger reservoir.

This mode will most often only be identifiable by the presence of briquetage as there would be little investment in site infrastructure.

Salt would have been produced on an ad-hoc basis as required and there is unlikely to have been a formal set schedule. Any family member including children could have carried out this activity. Salt produced in Mode 1 sites will most probably only have supplied the settlement and local markets.

Mode 1: Household Production

#### Table 7.4 Mode 1: Household Production

Factors	Description	
Total individuals involved	1-2 people as required	
Organisation of labour	Family based	
Schedule/Time Taken	Ad-hoc and casual. Seasonal	
Raw material procurement	Locally available clays and fuel. Seawater carried from source to the settlement	
Investment	Little investment potentially using domestic hearths and pots. Briquetage made as required, using a kiln pit. Possible creation of a small tank or reservoir. Production not a priority, fitting in to other activities such as food procurement.	
Output/Consumers	Small-scale basic salt for general use. Local consumption.	

Although this mode is most probably more relevant to prehistory, coastal settlements could have easily carried out ad-hoc salt-production for their own use throughout the Romano-British period, especially if there were difficulties acquiring ready-made salt. This mode is further explored in 7.5.5.1.

# Mode 2: Single Working Area (Table 7.5)

This mode is the most commonly found in the study area and very probably across other areas in Britain. Many sites of this nature were explored within in 4.0-5.0. Despite being the most common mode, these sites have suffered the most as they were at the mercy of changes in sea level or coastline erosion and are therefore typically very damaged.

These sites are nearly always located away from settlements and therefore producers could have had temporary camps nearby. Although there is currently no archaeological evidence for temporary camps, once produced, the salt would have required storage within a dry location, preferably within a covered structure.

However, the construction of a building/structure on-site for this purpose would have been a great investment and was probably not appropriate for most smaller scale sites (see Mode 7). Therefore salt was probably taken elsewhere for storage and final drying (Mode 8).

Mode 2: Single Working Area		
Factors	Description	
Total individuals involved	Most probably small groups of 2-3	
Organisation of labour	Individuals from the same settlement or family unit	
Schedule/Time Taken	Annually during the warmer season. Full time for c.3 months dependant on the weather	
Raw material procurement	Locally available clays and fuels. Seawater managed using tanks and where suitable, feeder channels or natural inlets	
Investment	More investment in site infrastructure, including debris management. Well-defined use of space including the creation of working areas. More skilled workers. Investment in trade network contacts	
Output/Consumers	Anybody within the traditional trading area. Some sites could have produced different types/grades of salt	

#### Table 7.5 Mode 2: Single Working Area

This type of site has been found across the southern and north-eastern coastlines and marshlands of Britain and can typically contain a distinct working area which would contain 1-2 brine evaporation hearths and potentially a separate open hearth, as well as a brine storage/processing area consisting of at least one tank, or partitioned hearth, and briquetage. This mode is further explored in **7.5.5.2**.

# Mode 3: Single Specialised Working Area (Table 7.6)

This mode is very similar to Mode 2 sites but also has evidence for the development of a specialism in a secondary product, probably for a niche consumer.

These sites can typically appear archaeologically as Mode 2 sites, and evidence for specialism could be difficult to evidence, although this is made easier on sites that have the addition of animal bone assemblages typical of salting meat or fish and/or are closely associated with the military. Therefore, these particular sites require good preservation and careful excavation in order to obtain good animal bone assemblages.

Mode 3: Single Specialised Working Area

Factors	Description	
Total individuals involved	Most probably small groups of 2-3	
Organisation of labour	Individuals from the same settlement or family unit	
Schedule/Time Taken	Annually during the warmer season. Full time for c.3 months dependant on the weather	
Raw material procurement	Locally available clays and fuel. Seawater managed using tanks and where suitable, feeder channels or natural inlets	
Investment	More investment in site infrastructure, including debris management. Well-defined use of space including the creation of working areas. More skilled workers. Investment in trade network contacts	
Output/Consumers	Focus upon salted meat, with salt also traded. Some sites could have produced different types of salt for different use. More exclusive consumers? Possibly supplied to urban areas and/or military sites	

#### Table 7.6 Mode 3: Single Specialised Working Area

The development of a niche supply is not limited to Mode 3 sites as similar production could also have been associated with Mode 5-7 sites. However, Mode 3 is distinctive because there is no evidence for more investment in site infrastructure associate with the specialism. It is possible that for some Mode 3 producers, this specialism developed into larger scale supply which required the sites to grow and become more complex in infrastructure, such as seen in Mode 7 sites.

This type of site would probably be located close to established trade networks, routes, roads, waterways and potentially to the Roman military. Examples of this Mode in the study area are Sites 213 and 215 in Hamworthy and Poole, Dorset, where distinctive particularly well-constructed deep enclosed hearths and full water management systems are closely associated with a military supply base.

## Mode 4: Site Complex (Table 7.7)

There are only three examples of this site mode within the study area: including at least 91 mound sites across the Central Somerset Levels, at least 19 working areas at Site 82, Kent and several working areas at Site 228, South Dorset. This mode is rare in Iron Age and Roman Britain and represents large sites that incorporated several working areas.

Mode 4: Site Complex		
Factors	Description	
Total individuals involved	Potentially several working groups combined, comprising 1-2 individuals within each working area and some individuals carrying out other central tasks. For example 10 working areas could have been used by c.20 workers	
Organisation of labour	More division of labour with workers potentially having different roles on a site	
Schedule/Time Taken	Annually during the warmer season. Dedicated and full time for duration of season, dependant on the weather. Decisions determined by a few 'managers'	
Raw material procurement	Raw materials could be obtained from wider environs. Much more investment in management of fuel resource. Seawater possibly subject to more extensive processing	
Investment	Much investment in site infrastructure, including debris management. Well-defined use of space including the creation of working areas. More skilled workers. Investment in trade network contact. More management of workers including potentially including the provision of income	
Output/Consumers	Large quantities of salt. Anybody within the traditional trading area including specific consumers. Potentially the use of multiple trade routes and distribution networks	

Table	7.7	Mode	4:	Site	Com	nlex
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Mode 4 represents a substantially greater investment in site size, labour, organisation and output. It is defined archaeologically as areas that contain three or more, contemporary working areas. These working areas can, for example, include grouped hearth and water management features or hearths and shared central, debris deposition areas or well managed discreet debris deposition areas.

Although there are not enough examples to define more specific characteristics, contemporary working areas will be typically related to each other technologically and/or spatially. What is apparent is that each complex is very different in character and this will be discussed further shortly.

Workers could have come from various locations to produce salt.

The organisation of space and labour is important for this mode and it is probable that some individuals were producing salt, whilst some were concerned with overall management of water, or debris and distribution. This would have been likely at Site 82, Lydd Quarry. However the organisation of space at the other main complex in the Somerset Levels is very different, with little evidence for centralised management of saltwater systems. The relatively uniform nature of the mound working areas however, including the use of debris mounds, does at least suggest that individuals were working together in some way.

Understanding use of space is core to reconstructing and defining Mode 4 sites. This includes understanding phasing and the quantity of working areas that were in contemporary use, which can be challenging. This mode is further explored in **7.5.5.3**.

### Mode 5: Integrated Salt and Pottery Production Sites (Table 7.8)

This mode of salt-production is restricted to Dorset and Kent and was evident across eight sites.

Both regions specialised in pottery production and this resulted in some cases, in combined pottery and salt-production sites. These mostly occur around Poole Harbour and North Kent. It is likely that many of the integrated sites identified in Poole Harbour are linked, and potentially represent centrally organised large sites. In Kent, the sites appear to represent single, separate zones of pottery production. This combining of production processes can result in a blurring between technologies, particularly if similar kilns/hearths and equipment (kiln furniture/briquetage) is employed. Potentially some salt-production features may have been missed in some sites and hearths wrongly assigned.

Factors	Description	
Total individuals involved	Most probably small groups of 2-3	
Organisation of labour	Individuals from the same settlement or family unit	
Schedule/Time Taken	Annually during the warmer season. Either full time during the summer by salt producers, or if salt is produced by potters or vice-versa, then potentially part-time with shared time between the two	
Raw material procurement	Shared with pottery production-both processes required same fuels, quantities of local or clay from further afield. Saltwater source nearby. Salt could be used to temper clay	
Investment	Working areas, shared debris deposition therefore requiring collaboration (if potters and salt producers were different individuals).	
Output/Consumers	Possibly similar quantities as Mode 2 site if one working area used. Shared trade networks. Pottery could be used to transport salt	

#### Mode 5: Integrated Salt and Pottery Production Sites

The character of Mode 5 sites in Dorset and Kent is very different and the blurring of technologies appears to be more prevalent in Dorset, which might explain the lack of associated features for salt-production, but large quantities of briquetage. The working areas for salt-production in Kent (Site 30) were much clearer in definition and were obviously different from the pottery kilns, although the briquetage and kiln furniture were still similar in some cases.

It is probable that in most instances of Mode 5, the kilns and salt working areas were arranged spatially to respect one another's boundaries. However, if similar technical features were employed for both processes, this would not be the case.

Ascertaining whether salt and pottery production was contemporary is important, but again, challenging. It is possible that a site could have changed focus towards another production process. However, this could be investigated potentially by looking closely at stratigraphic relationships. Mode 5 is further discussed in **7.5.5.4**.

#### Mode 6: Enclosed Working Area (Table 7.9)

This mode differs from coastal settlements of farmsteads in that they are probably not occupied all year round. They are not considered as fully domestic abodes, and are primarily focused upon production and perhaps seasonal coastal exploitation for farming and seafood.

These sites can either involve the creation of entire working areas within a covered structure or building, or can appear as Mode 2 sites, but with associated 'light' buildings/structures that were probably used to store materials and salt, as well as providing an area to camp.

These structures could have meant that the site was re-used over several seasons.

Mode 6: Enclosed Working Area

#### Table 7.9 Mode 6: Enclosed Working Area

Factors	Description	
Total individuals involved	Group of c.2-3?	
Organisation of labour	A small group formed together from different locations, or family units/extended families	
Schedule/Time Taken	Dedicated seasonally or possibly longer. Full time during season, potentially part-time during other periods	
Raw material procurement	Locally available clays and fuel. Seawater managed using tanks and where suitable, feeder channels or natural inlets	
Investment	Buildings suggest more permanent investment in salt- production, or a mix of production processes. Need to renew some features and re-line others. Building upkeep.	
Output/Consumers	Potentially larger quantities than Mode 2, but smaller than Mode 4. Local and wider trade networks	

Ethnographic studies in Mexico (Contreras 2011) have shown that light wooden structures were created at salt-production sites (associated with springs), and were repaired/cleaned before each new season was about to start (Figure 7.17).

Only three examples of this mode have been identified in the study area and are all Romano-British: Sites 14 and 15 in Cornwall (Early/Middle Romano-British), and Site 34 in North Kent (Middle Romano-British). Sites 14 and 15 were built from stone, and Site 34 had a timber building, perhaps similar to the examples in Figure 7.17.



Figure 7.17 Light wooden structures usedin salt-production sites associated with brine springs, in Mexico. Left: Abandoned during most of the year Right: Site cleaned/repaired before the new season of salt-production (Contreras 2011: 52)

It is uncommon to find this mode in most areas of coastal salt-production, however, the recent excavations at Stanford Wharf, Essex, have revealed evidence for more than one contemporary, Late Romano-British enclosed saltconsisted of light wooden huts, and were constructed with wattle walls. Although this area appears to be more typical of a Mode 4 complex, but perhaps this complex also used covering structures.

# Mode 7: Enclosed, Industrial Settlement (Table 7.10)

This mode differs from Mode 6 in that it has more investment in site infrastructure was probably occupied all year round for various industrial activities.

Similar to Modes 5 and 6, this mode is not common; evident at five sites, in Dorset (Sites 215 and 225), Somerset (Sites 272 and 276) and Cornwall (Site 297). All the sites are Romano-British, except Site 216 at Rope Lake Hole, Dorset, which had possible Iron Age origins, but probably only became a Mode 7 site during its use in the Romano-British period.

This mode is typically evidenced by one or more buildings that are arranged and used for industrial purposes, but which could also be used for domestic purposes by the workers as needed. Briquetage is observed within floor layers, pits and, on some sites, re-used and incorporated into yard and building fabric. This mode is further explored in **7.5.5.5**.

Factors	Description		
Total individuals involved	Groups of 2-3, or more		
Organisation of labour	A small community, mixed mostly local individuals		
Schedule/Time Taken	Potentially all year round, between other production processes. Either full time during summer, or potentially part-time during other periods		
Raw material procurement	Raw materials could be obtained from wider environs. Much more investment in management of fuel resource. Seawater possibly subject to more extensive processing.		
Investment	Permanent investment in salt-production and industrial activity. Need to renew some features and re-line others. Building upkeep. Management of space		
Output/Consumers	Larger quantities than Mode 6 and potentially on a par with Mode 4. Local and much wider trade networks		

#### Mode 7: Enclosed, Industrial Settlement

# Mode 8: External Salt-Processing/Distribution Sites

Further definition of this mode is limited, due to the need for further research of these particular sites, and also due to them probably being significantly different in organisation when compared to the main production sites. These sites were probably re-distribution 'hubs' that each had their own character, dependent upon the organisation of the sites and the quantities of goods they were 'processing' and trading.

As shown in Figure 7.16, they could have been linked to multiple salt-production sites with different modes. It is probable that not all salt-production sites were linked to these Mode 8 sites, in that some, perhaps smaller sites, would have distributed salt directly to the consumer, who could dry the salt within the domestic habitus if required.

However, in general, preliminary observations indicate that Mode 8 sites are potentially very similar in nature archaeologically to Mode 7 sites, and separating the two would require a more detailed assessment of regional site distribution. This mode is further explored in **7.5.5.6**.

# 7.5.4 Application of 'Modes of Salt-Production' to the dataset

The new modes have been applied to the dataset (Tables 10.5.1-10.5.2 and Figures 7.18-7.22). It was not possible to assign a mode to 41 sites.

The most common mode, as expected, was Mode 2 and this mode of site is typical of most prehistoric-Romano-British salt-production sites with 114 examples; Modes 3, 5 and 6 all were of a similar number (5, 7 and 6). Modes 4 and 7 were the least represented of the main seven modes, at three each.

It is possible that some sites could be assigned more than one mode or lie somewhere between two; the most dominant mode was assigned in these cases.

Figures 7.20-7.21 show the prevalence of modes within the study area; there was far less variety in Hampshire, Isle of Wight and West Sussex (although Sussex in general has produced very little evidence for sites) which all exclusively contained Mode 2 sites.

Kent and Dorset had the most variety of modes, with Somerset dominated by the Mode 4 complex in the Central Somerset Levels. The variety of modes in Dorset and Kent is significant, and could suggest salt-production played a more complex role in the regional economy, utilising various trade networks, supplying a variety of consumers.



# Modes of Salt-Production in the Study Area

Figure 7.18 Percentage of Salt-Production Modes represented within the Study Area



# Modes of Salt-Production in the Study Area through time





# Modes of Salt-Production in the Study Area through time (Simplified)

Figure 7.20 Modes of salt-production in the study area plotted chronologically (Simplified Chronology)

# Modes of Salt-Production in Cornwall, Somerset, Dorset and Kent I



Figure 7.21 Modes of salt-production across Cornwall, Somerset, Dorset and Kent showing the dominance of Mode 2 in Kent and Dorset (with addition of Springhead, Kent and Crandon Bridge, Somerset and with Mode 4 shown as single sites (Somerset Mode 4=94 combined sites, Kent Mode 5=2 sites combined)



# Modes of Salt-Production in Cornwall, Somerset, Dorset and Kent II

Figure 7.22 Modes of salt-production across Cornwall, Somerset, Dorset and Kent showing the variety of modes in Dorset and Kent (with addition of Springhead, Kent and Crandon Bridge, Somerset; Mode 4 shown as single sites (Somerset Mode 4=94 combined sites, Kent Mode 5=2 combined sites)

# 7.5.5 Exploring the New Modes of Salt-Production

This section explores the most significant modes further and includes key examples of newly defined sites.

# 7.5.5.1 Mode 1: Blurring the lines between 'Domestic' and 'Industrial'?

As discussed earlier, it is unclear as to whether this mode can be clearly separated and identified for salt-production sites. The term 'household' has been deliberately used, as it links to a 'home' structure, as opposed to more general 'domestic' space.

There would have been little investment in site infrastructure for Mode 1 and significantly, little space dedicated to this activity (as opposed to Modes 6 and 7). Potentially, briquetage supports could have been used with larger pots to heat brine.

Ethnographic examples of salt-production from springs, has revealed some interesting points about salt production at the source, and salt-production away from the source:

With \*huscă production at the spring located at a more remote distance from the user settlement, the advantages involved the presence of fuel in that precise place and the transport of a larger quantity of re-crystallized salt; the disadvantage consisted of a longer stay, difficulties in supply and diseases generated by the low comfort of seasonal settlements. When *huscă* was produced in the user localities the advantage was the comfort specific to stable settlements could be organised, while the disadvantage lay in the transport of larger quantities of salt water and in the additional effort for fuel transportation. \*loose salt (Alexianu *et al.* 2011a: 15)

The removal of brine from some salt springs in containers in Moldavia, Romania, that is then transported to homes in order to produce salt, is the perfect example of a Mode 1 site, where salt-production is literally produced at a household level.

Brine was transported in large containers on a cart to a settlement that averaged c.5-7km from the spring, and people would crystallise the salt in their yards using metal cauldrons over a simple surface hearth (Figure 7.23).



Figure 7.23 Modern salt-production in Moldavia, Romania. Brine is transported away from a spring and is heated using a metal cauldron over a simple surface hearth to crystallise salt (Alexianu *et al.* 2011a: 14)

Although this example is a little different, as the source is more limited in location (springs versus sea), it still gives some idea of how this mode of production might have appeared in practice.

The only strong contender for Mode 1 currently, is the Late Iron Age-Early Romano-British coastal settlement at Dickens Corner, Dover (Site 39) (Parfitt 1980). This appears to have been a seasonally occupied settlement (supported by finds of shellfish and fish). The site was in a relatively remote location, and although no features definitely associated with salt-production were found, there were fragments of sub-rounded briquetage containers. It was also suggested that re-fired pottery on the site could have been used in salt-production.

# 7.5.5.2 Mode 2: Traditional Iron Age and Romano-British Salt-Production Sites

Archaeologically, these sites commonly share the presence of a single working area that is completely open to the elements or partially enclosed using temporary 'wind-breaks'. However, the 'contents' of the technical features within these working areas can vary. The archaeological character of these sites can range

from simple to more elaborate working areas, and this mostly links to the number of individuals producing salt on the site as opposed to the scale of output.

Importantly, they are defined by the use of technologically and *production-specific technical features*, which will at the very least, include *dedicated hearths and equipment*.

The simplest Mode 2 site could have consisted of a well-defined, single, enclosed hearth, placed just outside the tidal range with no other features other than briquetage deposits. Water management features may not have been required and saltwater was taken directly from the sea and heated. The hearth could be used for both Stages 2 and 3 of the salt-production process.

Therefore, there are some sites that only have certain evidence for Stages 2 and 4 of the salt-production process, and this could be either an accurate overview of the site, or due to a lack of preservation. A probable example of this is Wyke Regis, Dorset (Site 217), and there were probably similar sites in Hampshire.

Although these sites required minimal investment, creation of formal hearths specifically for salt-production (as opposed to less specific 'domestic hearths') and the presence of briquetage means that they can be defined as Mode 2.

On other sites, the range of technical factors can increase, and include one main Stage 2 hearth, or a separate hearth for Stage 2 and for Stage 3, or more rarely, two main Stage 2 hearths (as seen on Site 214). These sites can also include simple water management features such as brine tanks. They can also have the addition of feeder channels and reservoirs and similarly, will contain briquetage. The creation of these sites required more preparation and effort in creation; and could have involved more workers, and produced more salt.

This raises an important issue, about whether the range of technical factors on a site should be used to split Mode 2 into further more specific modes. As stated earlier, the presence of water management systems as well as the size and type of hearth (enclosed hearths or more elaborate ovens) in the Fens, has been defined as representing a more advanced mode, when compared to sites with

fewer features and simple or no water management systems (Lane and Morris 2001).

Although the levels of investment are different across these sites, and potentially the quantities of salt produced, as argued previously, water management systems may not have been viable, or even preserved, on some sites. Similarly, there have not been enough 'whole' site excavations to provide a more certain basis upon which to split Mode 2 into further sub-modes. This would also be at danger of trying to over-categorise these sites, making it more difficult to apply the modes to other regions.

As noted in **7.5.4**, Mode 2 sites are the most common (Figure 7.18) and varied of all the modes, and all have their own individual character. Mode 2 sites occur across the study area in Somerset, Dorset, Hampshire, Isle of Wight, West Sussex and Kent (Table 10.5.1 and Figures 7.21-7.22); but are most prevalent in Kent and Dorset.

Hampshire, West Sussex and the Isle of Wight, currently only exclusively appear to contain Mode 2 sites, which could be due to smaller sample sizes, rather than to differences in the way salt-production was organised in these areas.

Mode 2 sites are most likely to have been single enterprises that were created, managed and used by members of the same family or by individuals. It is possible that producers were individuals who exploited the coast seasonally and who were probably from the same farmstead, settlement or community.

Therefore Mode 2 sites have the most potential to reflect traditional technological choice and inform about identity at an individual level. There is no evidence that these sites were controlled or managed centrally. If that was the case, more uniformity between sites would be expected.

Many of these sites were probably one-off 'events' that were used for a single season. They are represented by low quantities of briquetage and associated waste, as well as little evidence for the re-use of the site or the re-lining of hearths. Many sites would have been short-lived because of the dynamic, unpredictable nature of peripheral coastal locations. However, this does not mean that salt 547

producers would not have continued to produce salt in other years, as they could have created new sites. However, it is important to note that there is little evidence for the repeated reproduction of similar working areas as all sites appear to have been different. Also, it is possible that some sites may have been in longer use, but have been partially destroyed.

There is evidence for longer-term use of certain popular areas and sites, especially in Kent, where there are several working areas with re-lined hearths and significant dumps of associated waste, especially in the Medway Estuary.

If sites were re-used, they were probably re-created each year by the same individuals and families.

At least one Mode 2 site (and one Mode 7: Site 30) did provide evidence for the intention to return for the next season and it is possible with further assessment that similar evidence will be revealed on other sites. The identification and challenge of understanding the formation of 'Kent Working Area E' at Site 62 was discussed in **5.3.1**. The issues with feature identification were raised because all three features appeared to have evidence for burning. However, as stated previously, this was deceptive as the larger cuts had been filled with burnt material after-use. This act, combined with the careful filling of the smaller feature and the burial of a pottery jar within it (a jar that had probably been used as a brine transfer vessel, as also seen at Osea Road, Essex), as well as the deposition of complete perfectly functional slotted lump material in the base of the larger features, suggests a probable intent to return. It is probable that the site was carefully filled in order to protect and preserve it for the following season, and for some reason, the site was not used again. Although it also remains a possibility, that this was associated with a 'ritual closure' event.

The best example of Mode 2 sites can be seen in the Medway Estuary and the surrounding environs, where several sites with well-defined working areas can be observed.

Most sites consist of well-defined working areas, containing at least one main hearth, usually enclosed and using direct heat, plus water management features which ranged from elaborate systems, to simple storage tanks. The sophistication 548

of some water management systems in these modes, is indicative of carefully planned site organisation, and could suggest that there was more investment in production than other Mode 2 sites without such systems.

However, as previously stated, in some site locations the use of these systems would not have been appropriate, and therefore unlike the Fens, water management is not currently used as a tool to separate more advanced sites. Similarly, technology and technique could range from simple and limited technical features, to an elaborate network of different technical features. Perhaps in time, with more research, it would be possible to separate these site further according to key technical features, however, at this time, this is not considered essential as this could over overly categorise sites and serve to divorce them from individuality and push them back towards being 'generic', 'sterile' production sites.

It remains probable, that given the context of Mode 2 in comparison with the other modes, that Mode 2 sites were largely local endeavours that provided local and regional salt, supplementing the substantial quantities of salt produced by Mode 4 and 7 sites. This is not to underestimate the role of Mode 2 sites, as they provided the consistent backbone to salt-production and supply since potentially the Bronze Age. Because these sites were mostly single enterprises linked to local communities, they were the most free and flexible to react to changing needs and consumers.

# 7.5.5.3 Mode 4: Organisation of the Site Complex: Collaboration and Site Management

Three complexes have been identified across the study area, one represented within each of the key areas of activity (Somerset, Dorset and Kent), two of which have been discussed previously in **5.0-6.0**, (Sites 82 and the Central Somerset Levels debris mounds and working areas (Group 3)).

All three of these Mode 4 sites, have strong evidence for multiple, contemporary salt-production working areas that collaborated and/or organised centrally.

The complexes at Site 82, Lydd Quarry (Complex 1) and Site 228, Furzey Island, Dorset (Complex 3) are similar in probable date of origin (Late Iron Age), and in 549 the working areas they contain. The identification of the complex at Furzey Island was a late addition, and only recognised because of the close similarity between the features at this site, and the features at Site 82 (discussed further shortly).

The complex within the Central Somerset Levels (Complex 2) is very different in character and technology, and is of a later date spanning hundreds of years (2<sup>nd</sup>-4<sup>th</sup> century AD). This has been explored in detail, within the previous chapter (**6.0**), which highlighted the importance of organisation and planning in Mode 4 sites.

These complex sites probably provided substantial quantities of salt producers to potentially more specific consumers.

Mode 4 sites required a great deal of collaboration between multiple salt producers. However, whether this was voluntary or enforced, is unclear, perhaps this was influenced by the date of these sites and whether they remained in the hands of the producers, or were 'tied into' Roman control or specific consumer control. Whatever the case, these sites therefore represent collaborative attempts to produce large quantities of salt and all included multiple 'self-sufficient' working areas.

The identification of working areas within Complex 1 was less challenging than Complex 2, as fortunately, the site had been subject to open strip excavation over a large area. However, as already attested in **6.0**, the layout and formation of Complex 2 is less clear due to issues of visibility and lack of large-scale excavation.

This has resulted in the two sites being recorded differently in the archaeological record, as the mounds within the Somerset Levels have been recorded as separate sites within the Somerset Historic Environment Record (HER).

An overview of all three complexes will be provided here, where they will be compared, to show the different characteristics these sites can potentially present.

# Site Complex 1: Site 82 (and probably Site 13), Lydd Quarry, Kent

550

The extensive archaeology primarily associated with salt-production at Site 82 has been discussed throughout this thesis, with the site providing very good archaeological examples of Stages 1, 2 and 4.

The use of shared briquetage spreads, alongside evidence for shared water management, supports the interpretation that this is a Mode 4 site. There is evidence for some diversity across the site in hearth and briquetage dimensions. Significantly, however, all the briquetage pedestals are of the same form (rounded with a slightly splayed base) and just vary in height and thickness. Similarly, although hearths range between oval and round in form, and some appear larger than others, they all still appear to have been used as single container hearths.

This indicates some shared technological choices, however, there was clearly still freedom for individual producers to employ their own choice of technical factors.

This is significant in understanding how the site was centrally organised, and suggests that this could have been more of a collaboration between producers, as opposed to a single individual creating and managing the site. It is therefore probable that this site represents a seasonal collaboration between many salt producers (supported by the diversity in hearths and briquetage) that probably were producing salt for the same consumers.

As stated earlier, it is also important to define the difference between a combined Mode 4 complex, and a closely concentrated group of Mode 2 sites. At first sight, the complex at Lydd, would appear to have the appearance of multiple Mode 2 sites concentrated together. However, their close proximity and apparent sharing of the overall space, with no obvious attempt to create well-defined separate complete sites, is the factor that places this as a combined Mode 4 complex.

#### Site Complex 3: Site 228, Furzey Island, Dorset (Figure 7.24)

Due to poor preservation and limitations accessing the complex at Furzey Island, understanding of the overall site layout and quantity of features is limited.

However, as highlighted previously (**4.0**), there is a remarkable similarity between the form of tanks and hearths at this site, with those at Site 82 which suggest a shared technological choice. Also at Site 228, there appear to be many more 551 tanks in relation to hearths, as also seen at Site 82 (although the plan of the 'whole site' remains unclear). However, there are also differences, in the presence of tanks with connecting channels (Figure 7.24), which are only evidenced elsewhere in the study area, at Site 166 in Complex 2 (Figure 6.7).

The distribution of these multiple, very closely spaced relatively uniform features across the shoreline with no obvious evidence that they represent separate sites, suggests that this site is also a strong contender for Mode 4.

The addition of this complex is of interest as it not only provides more evidence that salt-production in Poole Harbour was carried out on a significant scale, but also results in this being a major site complex located in the south-west, the central southern coast, and the south-east.

Furzey Island would have provided an ideal area for salt-production, with the island providing a natural defined space for industrial production and distribution. Salt could have been transported straight from the island by boat over sea and waterways.

# Site Complex 2: Central Somerset Levels

The extent of this complex was previously explored in great detail in 6.6.

The way in which Complex 1 and 3 were created, used and managed, is very different from Complex 2. The differences include chronology, the number of working areas, the space covered by working areas, technique, debris deposition, equipment (briquetage forms) and salt resource management.

It is difficult to directly compare the working areas at Complex 2 with Complex 1 and 3, as only two have been recorded (Sites 166 and 198). However, the consistent use of well-defined debris mounds, and mounds for the creation of working areas, of very similar technology (bars and slabs), over a significant area, suggests slightly more uniformity and conformity at this complex when compared to Complex 1. The organisation of space especially, appears to have more 'order'. Although, whether there was a difference in the working area types as seen at Site 82 remains to be ascertained as only one working area dating to the main period of production (3<sup>rd</sup>-4<sup>th</sup> centuries AD) has been found (Site 166).



Figure 7.24 Dorset Working Areas A-C, from Site 228 at Furzey Island, Dorset

An earlier mound in this complex (Site 198: 2<sup>nd</sup>-3<sup>rd</sup> century AD) had different multiple working areas with groups of smaller hearths as opposed to the use of a single large hearth (Site 166).

As was explored in detail in **6.6**, the apparent use of mounds exclusively for debris deposition (as opposed to spreads), does suggest that there was no central place for the deposition of waste, and that each working area had separate, defined areas for waste disposal. There is no evidence that smaller mounds eventually grew in size to 'link together' creating large raised spreads (as was probably the case at Site 30 for example) which also supports the view that this site was subject to particularly careful and well-planned organisation, over a potentially considerable amount of time. There were two main scenarios suggested for site organisation and mound formation (**6.6**), that either way, required collaboration and a respect of different spaces used for producing salt.

Unlike Complex 1 however, the saltwater source was far more diverse in the exploitation of hundreds of small river inlets, which provided natural concentrations of working areas, as oppose to Complex 1 where the source was more concentrated within a smaller area of gravel spits.

Therefore overall, the main way that this complex differed from the complex at Lydd (Complex 1), was in the way that it was organised, due to the differing topographies, techniques, and potentially, consumer network and producer identities.

In conclusion, at Complex 2 there is a particularly sophisticated and careful longterm plan for the distribution and management of salt-production sites within the Central Somerset Levels. There is a strong sense that the individuals organising and producing salt in this area were greatly concerned with creating neat, welldefined spaces. Evidence for selective debris deposition, the well-defined consistent nature of the mounds, the hobnail decoration on the slabs, all suggest a sense of pride in the appearance of these sites.

# A Comparison of Complex 1 and 2

Issues preventing more detailed dating and phasing at both the main complexes in Somerset and Kent means that it is difficult to ascertain the scale and significance of the sites at any one moment in time. However, the general lack of stratigraphy suggestive of continued re-use and reforming of the sites, such as intercutting working areas, supports the premise that large parts of the sites were contemporary, and that the use of space was probably phased.

It is speculated that the both complexes probably developed gradually over time, perhaps with some areas going out of use. This is perhaps more certain for Complex 2, where there is evidence for earlier mound working areas in the complex (Site 198).

The complexes differ the most in the technology employed and in the periods they were in use. It is probable that the main period of activity within Complex 1, was the Early Romano-British period, thus it was operating during the most intense period of salt-production in Britain. In contrast, the Somerset complex was operating at a time when salt-production was in decline in Britain (3<sup>rd</sup>-4<sup>th</sup> centuries AD).

These chronological and contextual differences are considered key to understanding the significance and role of these two complexes. Complex 1 was operating at a time when there could have been substantial competition for the supply of salt. This site was probably formed as a response to an increase in salt consumption, and this could have been greatly influenced by the dietary requirements of the military and their families.

The location of Complex 1 would have been ideally placed to provide salt within the south-east, and especially well placed for potentially supplying the Roman navy based in the area (Figure 7.25). The complex would also have probably been in competition from sites producing substantial quantities of salt in neighbouring Essex and North Kent. The diversity of briquetage and working area formations across the site, as well as the scattered nature of the tanks, suggests that unlike Somerset, that there was less formal planned use of space. As suggested earlier, there is a sense that multiple salt producers came together as a collaboration, which contrasts significantly with the Somerset complex.

In contrast, the Somerset complex could have potentially dominated supplies of salt in the south-west and potentially Wales, the north-west and beyond. It could 555
have potentially supplied more specific markets (such as large towns and military sites). This will be discussed further in **7.5.5.6**.



Figure 7.25 Distribution map showing finds of brick and tiles stamped with the insignia of the *Classis Britannica* (with position of Complex 1 added), (Adapted from Peacock 1982: 145)

The consistent uniformity in the *organisation of space*, *the limited briquetage forms*, the probable *use of lead containers*, and *large hearths*, strongly supports a highly specialised salt-production complex not previously seen in the study area and on a scale potentially only comparable with the 1<sup>st</sup> century AD 'Red Hill' areas in Essex.

# 7.5.5.4 Mode 5: Making Pots and Salt: Integration of People, Technology and Space?

Lane and Morris (2001:402) concluded that in the case of the Fenlands at least, in prehistory there 'must have been a close relationship between potters and saltmakers...'. This is predominantly based upon the use of the same tempers in pottery and briquetage in the Iron Age, and the creation of cylindrical containers in the technique of pottery building.

That some briquetage supports appear more aestethically 'finished' than others is also seen as a possible indication for potters taking the time to consider form and to smooth the support on the exterior when created (*ibid*: 371). Distinction is made between the uniform, smooth larger pyramid shaped pedestals at Middleton, Norfolk and the 'rustic hand-squeezed varieties' (the hand-brick type pedestals, as discussed in **7.4.2.1**). It is suggested that this represents the difference between those individuals that had a knowledge of pottery-production, and those that did not. Therefore potters would naturally have 'finished' off pedestals and taken pride in their appearance.

Discovering certain evidence for the integration of contemporary pottery and saltproduction is challenging. There is no certain evidence for Mode 5 currently within the study area. However, there are two areas that could be strong contenders: Poole Harbour, Dorset and the Medway Estuary, Kent.

The omission of Site 30 (Cooling, Kent) could appear an oversight, given that this site has the strongest evidence for contemporary Romano-British pottery and salt-production in a single site. However, this site on closer inspection appears to represent a Mode 7 industrial settlement.

Mode 5 is suggested as a mode of salt-production, because there are so many similarities between the technologies of pottery and salt-production, that there is a strong possibility for some combined production sites to exist. However, in reality these are difficult to identify. This is further complicated by the creation of 'industrial zones' or settlements, where multiple activities can take place, including salt. These are more likely to be Mode 7 sites, which also invested in permanent or semi-permanent buildings/structures, and established particularly well-defined zones of production and evidence for signifcant trade activity.

As it stands, some areas of Poole Harbour, specifically the area in Poole Harbour to the west of Ower are closely associated with both pottery and salt-production, evidenced in the presence of truncated combustion structures, kiln furniture, large quantities of briquetage and working platforms. In reality, it may be impossible to separate pottery and salt-production due to a blurring of technologies and truncation of remains. The Medway Estuary also presents another blurred area, where there appears to be extensive evidence for both salt and pottery production, in the form of large spreads/layers of mixed briquetage and pottery waste, frequently observed exposed in the mudflats (**5.0**).

Technological similarities remain between these two industries, most significantly in the form of kiln furniture and briquetage. Both processes employ similar support bars and pedestals. One of the main differences between Romano-British kiln technology and salt-production hearth technology in the study area, is the adoption of kilns with permanent floors, as commonly seen in North Kent. This resulted in the permanent embedding of kiln furniture into kilns including bars and raised floors. In comparison, briquetage remained portable, and this even extended to the creation of portable hearths in the Medway Estuary. It is of interest that this innovation should have taken place in the Medway Estuary, where, as shown in **5.2.6**, there is such a close link between salt and pottery production. This area provides the most potential for the integration of both processes, and potentially the salt and pottery producers, in this area at least, could have been one and the same.

In the past few decades, in fact, there has been a tendency to dismiss as salting briquetage the fired-clay furniture of other material found in the Upchurch Marshes in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, and doubt has been cast on claims of a substantial pottery industry there. A more balanced view of the simultaneous operation of both industries is now emerging, thanks to careful and persistent observation and salvage excavation...(Swan 1984: 49-50)

There is also a Late Romano-British salt-production working area in Stanford Wharf that could potentially represent a typical 'keyhole' shaped Romano-British pottery kiln, but was apparantly used to produce salt (and was even used for metal-working later in its lifecycle), (Figure 7.26).

This feature was built from large tiles, and was assumed to have been used for salt-production primarily because there was evidence it had been used with lead containers, in the presence of white residue on the structure, and because it was within an area with other contemporary salt-production sites (Biddulph *et al.* 2012).

If this is the case, then it is a perfect example of how different technical features from different production processes could have been borrowed and intergrated/adapted.



Figure 7.26 Tile-built 'saltern hearth' from Stanford Wharf, Essex (Biddulph et al. 2012: 128)

As to the identity of individuals working within these integrated areas, as suggested by Lane and Morris (2001) confidently suggests that the scenario was one of potters producing salt during the summer months, especially if they could use the pottery to transport the salt over the same trade routes. Kinory (2012) also supports this scenario. Both make this assumption based predominantly on perception of aestethic 'value' as discussed above, and the premise that briquetage creation and use was technologically little different from domestic cooking vessels.

This conclusion could very well be the case for some sites, however, it does bias the percieved specialist knowledge of potters against more simplistic saltproducers. This is especially the case when considering the aestethic qualities of briquetage, and does perhaps assume a biased view of the abilities and skill of pottery producers versus salt producers. It assumes that salt producers were perhaps not as invested in the creation of objects, and percieved briquetage as simply, functional tools that were 'acted upon' opposed to representing more integral relationships between producer and product. This perception is perhaps the product of both modern ideas of what is deemed as 'quality' as well as the specialism and archaeological background of the individual.

It is probable that for some areas, potters and salt producers were one and the same, or in collaboration, whilst for others, and indeed other modes, that they were completely separate. If there was some collaboration in areas where the two processes were particularly close geographically, such as in Poole Harbour and North Kent, which is highly probable, then we shouldn't assume this was always a comfortable working relationship. This chosen alliance could have been influenced by either competition for local areas or resources in some regions, as well as potential economic difficulties.

Perhaps most significantly, there is a high probability that salt could have been transported in the pottery vessels produced on some of these sites, if the primary product was loose salt. Potentially therefore, for those sites producing pottery that is stylistically distinctive, it might be possible to reconstruct the distribution of salt by mapping the distribution of the pottery.

### 7.5.5.5 Mode 7: Specialist Production 'Hubs'

As stated above, Mode 7 represents a development of Mode 5 with more investment and organisation in site and production.

It has been stated that salt-production in Britain, did not progress much past 'household industry' or 'individual workshop level' (roughly comparable with Modes 1-2), (Lane and Morris, 2001: 396-397). Similarly, it has been previously assumed that there were 'no major building or salthouses associated with this industry directly...' (*ibid*).

The development of a single, specialised mode of salt-production site, exclusively producing salt on a large-scale, all year round and employing buildings, does not appear to have occurred until centuries after the Roman period (with the emergence of 'salt houses' etc). However, the identification of Mode 6, has shown that salt was being produced within buildings in the Roman period, although, these were probably semi-domestic, as opposed to 'industrial

production' buildings or 'salthouses'. Mode 7 differs in that the buildings appear to have been more 'industrial' in nature. These buildings are closer to the 'salthouses' evident in much later medieval/post-medieval 'salterns' but still differ in size and use, in that they could still potentially be semi-domestic. This is the reason that Mode 7 is labelled as an 'industrial *settlement*'.

Mode 7 also differs in that these represent multi-process production 'hubs', which appear to involve the merging of multiple specialists as opposed to focusing upon one product. This predominantly applies to pottery, salt and iron production, but also could include the production of secondary products, and other more local crafts such as shale working for example, in Poole Harbour.

There are currently six Mode 7 sites identified within this research project. Three of the sites that are potential contenders for Mode 7 (Sites 272, 276 in Somerset and Site 297 in Cornwall) have problems of interpretation because as of the limited archaeological evidence. Site 216 at Rope Lake Hole, Dorset is a strong contender for this mode. This site contains buildings associated with industrial activity and briquetage (Figure 4.56). However, unfortunately there were no definite associated features due to severe plough damage.

The two remaining sites: Site 30, Cooling, Kent and Site 225, Ower, Poole Harbour, Dorset, are more certain examples and will be discussed further here. Mode 7 is a predominantly Romano-British development; however, it is possible that Sites 225 and 216, both in Dorset, have Iron Age origins.

Sites 30 and 225, represent very similar Mode 7 sites, in that they both have rectangular buildings associated with salt-production and both contain related features.

#### Site 225: Ower, Dorset

The large site at Ower appears to have developed from an agricultural Late Iron Age settlement into a 1<sup>st</sup> century AD specialised pottery production and trading settlement and then during the 3<sup>rd</sup>-4<sup>th</sup> centuries AD into a mixed industrial trading settlement (Woodward 1987a; Cox and Hearne 1991). All three of these main phases have associated finds of briquetage, whilst pottery production is evidenced in the two later main phases. A Black Burnished Ware I industry developed at this 561

settlement between the Late Iron Age and Early Romano-British period, and it has been suggested that this growth could be mainly attributed to supplying the newly arrived Roman military forces (Woodward 1987a).

Extensive evidence for trading with mainland Europe was evident from the Late Iron Age onwards, and by the 1<sup>st</sup> century AD the presence of large quantities of amphorae is indicative of successful long-distance trading (*ibid*). The original excavations at this site appeared to suggest that salt-production was restricted to the 1<sup>st</sup> century AD and 3<sup>rd</sup>/4<sup>th</sup> century AD (Woodward 1987a). However, it was later proven that this could be extended back to the 1<sup>st</sup> century BC when this settlement was established (Cox and Hearne 1991). Both phases of archaeological investigation appear to show that salt-production was most prevalent in the last main phase of the site, judging from the large quantities and concentrations of briquetage across the site.

The last phase of activity at this site  $(3^{rd}/4^{th}$  century AD) is also of particular interest as it appears to represent the site becoming limited in one area of intense and specialised industrial activity, including metal and pottery production, as well as salt-production.

The previous layout of the settlement with neat boundary enclosures defining different uses of space was completely altered at this stage. This involved backfilling many of the enclosure ditches, and, rather than using neat enclosed well-defined spaces, the space was opened up, with pottery kilns frequently found blocking earlier trackways (Woodward 1987a). Space at the site therefore was transformed and most of the available ground surface was needed for the creation of larger differently defined industrial working zones.

New rectangular buildings were created during this period, which were simple in form and designed for industrial use (*ibid*). Yards and working areas were created, often re-using building material from the previous occupation, suggesting that the area was redesigned relatively quickly. This included the use of broken briquetage in the floors and fabric of yards and buildings (Woodward 1987a).

Many of the buildings lacked evidence for 'domestic' use of space internally and appear to be mainly dedicated to the production and storage of pottery, salt and worked stone (Purbeck marble). Small-scale iron working was also evident.

As outlined previously in **4.6.1.7**, (Figure 4.57), one particular building (Building 707) was closely associated with salt-production, with crushed briquetage found on the floors and concentrated in the outside yard surface. The lack of evidence for working areas used in salt-production is disappointing. However, the hearth inside building 707 was very probably used for some part of the salt-production process, at least in the last stages of its lifecycle. There is abundant evidence that salt was produced in some quantity, judging by the size of the briquetage spreads, which were also mixed with pottery waste (Figure 7.27). The distribution of waste from pottery and salt-production clearly shows that most salt-production was on the north-west shores of Cleaval Point.

There is evidence that the rectangular buildings were modified and altered as required *during their use*. However, the conclusions reached based upon the quality of the buildings are of particular interest in discerning the character of this late phase of production activity. They are described as being very basic, with no evidence for improvement of building quality or for the expansion of these built-up areas (*ibid*).

Thus the somewhat basic appearance of this industrial settlement was interpreted as an indication that any wealth that was made from production and trading activity, was distributed elsewhere (Woodward 1987a: 68). This was then used to suggest that the buildings and therefore the nature of this site, had the 'character of a low status peasant accommodation...' (Woodward 1987a: 68). It was finally concluded that this phase of activity at Ower, was...'that of a small-supply industry, run on a seasonal basis within an 'estate', with the workers and organisers living elsewhere for much of the year (Woodward 1987a: 66).

In summary, the overall interpretation of the later phase of this site appears to have been torn between it either representing a small, seasonal settlement used to produce salt and pottery on a relatively small scale, or an industrial, specialised large-scale semi-domestic settlement (Woodward 1987a).

563



Figure 7.27 Site plan and finds distribution at Site 225, Ower, Dorset (Woodward 1987a: 47)

This 'settlement' is particularly distinct because of the strong evidence for planning, definition and management of space, using enclosures, structures and in the creation of industrial zones (Cox and Hearne 1991). Geophysical surveys of the site have supported this view (Figure 7.27: top left).

They revealed a highly organised settlement that did not appear to expand substantially to the east or west, as might be expected by a 'normal', naturally expanding purely *domestic* settlement.

Therefore is probable that this site was originally created with the intention of providing a *domestic* settlement with a specialism in industrial production and trade. After the first phase of site use (1<sup>st</sup> century BC-1<sup>st</sup> century AD), the site was abandoned. However, in the 3<sup>rd</sup> century AD, the site was re-used and re-inhabited, with the intention of again, using the space for large-scale specialised industrial production.

By this stage, the site became *semi-domestic*, with as much space as possible, dedicated to the production of pottery and salt. The assumption that workers did not live here, based upon the character of the buildings is perhaps a little simplistic, and it is highly probable that some workers lived here permanently. Whether or not entire families lived here is less certain, and it is possible that the majority of workers represented single individuals.

As has been suggested previously (Cox and Hearne 1991; Woodward 1987a), it is highly probable that salt was traded within the pots produced at this site, and that they used the same trade routes. This clearly has implications for studying the distribution of salt according to the distribution of BBWI pottery from this area.

The site also produced shale armlets (Woodward 1987a), which as an industry in its own right, and is often underestimated as this was an incredibly skilled process. The production of shale, salt and pottery, would have integrated very well on a site, given that the technologies of salt and pottery production were similar, and importantly, that shale waste could be used as a fuel for salt-production. This was supported by the large quantities of shale ash across the site (Woodward 1987a: 176-177). The formation of this fuel ash slag, was interpreted as indicating that

shale had been burned in oxidised areas, probably open hearths (*ibid*). The use of exposed enclosed hearths for salt-production at this site, is therefore indirectly evidenced in this way.

Therefore, similarly to Mode 4 and Mode 5, Mode 7 would have required a great deal of collaboration and organisation, as well as the sharing of space with multiple working areas and workers.

Finally, of note, is the proximity of the 1<sup>st</sup> century BC-1<sup>st</sup> century AD settlement East of Corfe River (Site 229). Although this settlement appears to have been separate to Ower, it was also associated with salt-production, which included strong evidence for the use of hearths that are similar to examples in France (**7.4.2.5**). Unfortunately, this site was truncated and only subject to linear stripping for excavation (Cox and Hearne 1991). However, it is possible that this site is linked to Ower, and the proximity of this site to a freshwater river, could suggest it was used within the later stage of the salt-production process.

The overall character of the sites at Rope Lake Hole (Site 216), East of Corfe River (Site 229) and Ower (Site 225), strongly indicates that multiple, often contemporary industrial semi-domestic sites were created across Poole Harbour and the Isle of Purbeck, utilising the rich natural resources and excellent, established trade links. It is possible that each site was a separate entity, and managed by separate producers, however, it is also highly plausible, that in the later Romano-British period especially, it could have been centrally managed. It supports the idea that the production of salt in Dorset, would have been most prolific between the 1<sup>st</sup> century BC and 1<sup>st</sup> century AD, and then again in the 3<sup>rd</sup>/4<sup>th</sup> century AD.

#### Site 30: Cooling, Kent

Site 30 also has similarly convincing evidence for being categorised as a Mode 7 site, with the presence of a large, multi-phased, well-organised site containing defined working areas for the production of salt and pottery, with associated rectangular, probably industrial buildings. Also, and perhaps most significantly, this site has a chronological profile similar to Site 225 at Ower.

There is an intense 1<sup>st</sup> century AD phase of salt and pottery production (Miles 2004). However, unlike Ower, there is also evidence for continued industrial activity during the late 2<sup>nd</sup>-early 3<sup>rd</sup> century AD (*ibid*). The period of activity after the 2<sup>nd</sup> century AD appears to have been more limited in nature, and *mostly dedicated to smaller scale pottery production* as opposed to salt-production (*ibid*). Then, just as with Site 225, there was a later, 3<sup>rd</sup> century AD intensive phase of pottery and salt-production.

In plan (Figure 5.9), this site contains at least four working areas associated with salt-production, if these were all contemporary, this site would be a contender for Mode 4, however this does not appear to have been the case.

The first phase of salt and pottery production in the 1<sup>st</sup> century AD, resulted in the creation of an earth mound to provide a higher hardstanding (Miles 2004), within which Kent Working Area G was created (Figures 5.9 and 5.30). The twin rectangular stoke-hole hearth is a very unusual form, not seen anywhere else in Kent or the study area. It is possible that the technological knowledge used to create this distinct hearth, was gained from pottery-production which is perhaps to be expected on a site where pottery and salt where produced in such close proximity.

Just to the north of Working Area G, the remains of 1st century AD rectangular buildings were observed, *the floors of which had been constructed from crushed briquetage*, as seen at Ower (Miles 2004). Inside the building there was a small sand-lined pit which contained the remains of a human baby. The placing of burials within industrial areas appears to have been common in Kent (as outlined in **5.0**).

This phase is also significant because there was evidence of cheese production (ceramic cheese 'wrings') within which salt was probably used (*ibid*). There are ethnographic parallels for traditional salt producers in Moldavia, Romania, making local cheese in their homes, using salt and brine obtained from springs (Figure 7.28).

Therefore this site could also have been using salt to create secondary products to trade, this is significant, as there is also evidence for the salting of meat for trade 567

at Ower (Late Iron Age), (Maltby 2006) as well as possible salting of seafood later at Ower (Woodward 1987a).



Figure 7.28 Traditional cheese made using brine from local salt springs in Moldavia, Romania (Alexianu *et al.* 2011a: 13)

Although the 2<sup>nd</sup> century AD activity was limited, during this stage the large earth mound was revetted and repaired using waste from salt and pottery production (Miles, 2004). Significantly, there is also evidence for the production of Black Burnished Ware II pottery at Cooling during this time, very similar to the forms produced at Ower (Swan, 1984). This is significant, when considering the hiatus in Black Burnished Ware in Ower during this period.

In the late 3<sup>rd</sup> century AD, salt and pottery production intensified, and a new working area for producing salt (Kent Working Area H: Figures 5.9 and 5.31) was created next to the older mound. There are also two further potential, but less distinct working areas at Site 30 (Figure 5.8: lighter blue highlighted areas). Although these areas have not been discussed in detail previously due to limited information, they could have either been separate working areas, or areas where salt could have been dried.

# A Note about Sites 225 and 30

There are two important issues when applying the definition of Site 30 and Site 225 as Mode 7 sites that require further consideration:

- 1. Potential Mode 5 origins
- 2. The production of Black Burnished Ware

As stated at the beginning of this section, Mode 7 could represent a development of some earlier Mode 5 sites, that later expanded. Given that the only strong contenders for Mode 7 are Sites 30 and 225, then this was very probably the case, at least in the case of Poole Harbour (Site 225). It is also possible, that some sites were created originally as large Mode 7 type sites, and this could be more the case for Site 30, which does not share the long history of pottery production that is known in Poole Harbour to have originated in the Bronze Age (Ladle and Woodward 2009).

Therefore, it remains a strong possibility that the earlier, 1<sup>st</sup> century BC-1<sup>st</sup> century AD phase of specifically BBWI pottery, could have originally been a Mode 5 site. Although not every potential Mode 7 site necessarily specialised in the production of specific pottery styles, the creation of BBW in both Sites 30 and 225 is significant.

Although there have been attempts at reconstructing the distribution zones of salt production (Figure 7.29), in key areas of Britain during the Iron Age, there has been no real tangible attempt to reconstruct Roman salt distribution.

This is not surprising given the complex networks that were very probably in use by this period, however, it is probable, given the theory about BBW and salt distribution, that the distribution zones from different regions was strongly linked to the site 'Mode'.

This would potentially create a complex system of distribution, which could have been completely different to the restricted local networks of the Iron Age. Although attempting to reconstruct the distribution of salt in the Romano-British period is beyond the parameters of this research project, the distribution of BBW pottery does provide a tempting potential insight (Figure 7.30: BBWII distribution).





The production of BBWII vessels at Colchester, Essex, is also of interest, and it would be useful in future research to look at the potential links between pottery and salt-production in this area further. Discerning the difference between the pottery distributed from Colchester and North Kent has not been possible however, therefore this 'theory' would require further work to verify.

Given the evidence at Sites 30 and 225, there is another site also of interest outside the study area which is a contender for Mode 7, and an example of the possibilities for the application of the new modes to other salt-production sites in Britain.





The Black Burnished Ware industry has been confidently linked to Roman military supply (Peacock 1982; Allen and Fulford 1996; Millett 2007; Russell and Laycock 2010).

# King Street, Cheshire

This potential Mode 7 site at King Street, represents an *inland* salt-production site in Cheshire (Williams and Reid 2008).

Chronologically, this site is similar to salt-production activity at Site 30, Cooling, with salt produced from at least AD 70 until the early 2<sup>nd</sup> century AD. There is no evidence for a later intense phase of production, as seen at Ower and Cooling.

This site was close to a Roman settlement and was significantly, considered to be 'one of the industrial centres in Cheshire established to process and produce supplies for the Roman army for their northern campaigns...' (Williams and Reid 2008: 176).

As at both Ower and Cooling, a rectangular building dated to the 2<sup>nd</sup> century AD was found to have a crushed briquetage floor (*ibid*). Buildings at this site had an industrial purpose, and similarly to Ower, the buildings were altered and used for different production processes, in this case, for later iron working.

There was difficulty in determining the exact functions of the many buildings excavated at this site. However, it is probable that they were used for a mix of semi-domestic and industrial activity as was probably also the case at Ower and Cooling. The strong links with the Roman military at this site could be significant when considering the organisation and supply chains at other Mode 7 sites. This could suggest that some if not all Mode 7 sites, were responding to the need to supply to this particular market, at least in their earlier 1<sup>st</sup> century AD phases. This is also supported by the production of Black Burnished Ware pottery at Ower and Cooling, which is also well-known to have had links with military supply across Britain.

It is assumed, that salt production was associated with buildings within these Mode 7 sites predominantly because of their close association with large quantities of briquetage. Only one building, in Ower, represents a probable internal enclosed salt-production hearth. It remains plausible that salt-production did take place indoors, perhaps during the winter and at times when the weather was not suitable.

However, the external working areas at Site 30, Cooling, clearly indicate that salt was also produced outside in these sites and therefore it is also possible, that some sites used the buildings for the storage of salt, or for the final stage of processing, as opposed to full production.

Therefore, in this respect, these sites differ from the later, medieval saltens where the main stages of production were always carried out internally, often in 'salthouses'. The difference could be due to full-time salt-production (and all year

round production) as opposed to seasonal, extended seasonal or periodic parttime production.

## 7.5.5.6 Mode 8: External Processing Sites and/or Re-distribution hubs? Evidence for Stage 5 of the Salt-Production Process?

Only two sites within the study area, and in the original dataset, were recorded as possible Mode 8 sites (Sites 236 and 307: Table 10.5.1). However, this remains very speculative and based upon their inland location. They could just represent salt consumer sites. Therefore, more research is required into the character of these sites.

Two other sites within the study area, but not in the original dataset, due to them being published after data collection (and not being identified as 'salt-production' sites) provide much stronger examples of a 'typical' Mode 8 site.

These two sites are at Crandon Bridge, Somerset and Springhead, Kent. Although not previously considered in any detail, distribution and supply are equally important to production, and overall mechanisms of production, distribution and supply, as well as consumption, will be considered in **7.6**.

Distribution of salt is a tricky area to study, and usually includes the study of inland briquetage finds. These inland finds of briquetage could also potentially be linked to the external processing of salt as well as transport (although as will be discussed later, this was not a common way to transport salt after the 1<sup>st</sup> century AD).

In order to contextualise all of the main modes, and to consider the overall organisation of sites and distribution of salt/secondary product, Mode 8 has been created and defined. This includes the consideration of possible evidence for further drying of salt external to the production site.

It is probable that there were Iron Age examples of Mode 8 sites; the most obvious being hillforts, which could have acted as re-distribution and processing centres.

However, the two examples presented here are Romano-British. Both are closely associated with industrial buildings and are located within close proximity to intense contemporary salt-production activity.

# Crandon Bridge, Somerset

This site represents a probable 1<sup>st</sup> century AD trans-shipment port (Figure 7.31) that later redeveloped into a 4<sup>th</sup> century AD industrial settlement (Rippon 2008).



Figure 7.31 Reconstruction of the Somerset Levels during the Roman period showing the location of the trans-shipment port at Crandon Bridge and its proximity to the branches of the River Siger in the Brue Valley (Central Somerset Levels) feeding Complex 2 (Mode 4), (shown by dashed orange line) (Adapted from Rippon 2008: 91)

The site appears to have started as a trading settlement during the 1<sup>st</sup> century AD with evidence for the supply of BBWI vessels from Poole Harbour, Dorset (potentially from Site 225 at Ower). The evidence for activity at this site is somewhat fragmentary, due to it being the subject of several amateur

investigations and findspot observations within the 20th century, followed by more formal investigations in 1988 (Rippon, 2008: 93-94).

The site contained a series of 1<sup>st</sup> century and 2<sup>nd</sup>-3<sup>rd</sup> century AD timber buildings. The latter had evidence for substantial charcoal spreads across red clay floors (Rippon 2008: 101), suggesting that, by this phase at least, industrial activity was a key function of this site.

Later, a series of at least nine rectangular stone buildings were created in the early-mid 4<sup>th</sup> century AD (*ibid*). Building 2, contained a hearth or furnace probably associated with iron working, which was associated with a paved stone surface and 'burnt clay' (Rippon 2008: 101).

Building 2, contained a hearth or furnace probably associated with iron working, which was associated with a paved stone surface and 'burnt clay' (Rippon 2008: 101). A replacement of Building 2 was found to contain a possible hearth and further charcoal. There was also an external cobbled surface associated with Buildings 1 and 2 and Building 4 contained a 'bowl-shaped hearth' internally. Although industrial activity is clearly suggested, it remains unclear as to what was being produced:

All of the excavated buildings appear to have been used for food processing, storage, or industrial production but the absence of military metalwork suggests that this was not a *fabrica* (arms and munitions factory)...(Rippon 2008: 131)

As to the overall function of the site, it has been convincingly argued that it was a trading trans-shipment port, with emphasis on industry (Rippon 2008) plus evidence for *occupation and domestic activity*. Although the site's layout appears to suggest it was a traditional Romano-British small roadside town, it lacks evidence for buildings such as shops, domestic houses, roads and trackways. It could be alternatively argued that it was of a similar character and function to Ower (Site 225).

The finds assemblage suggested that iron-working was taking place, as well as lead-working and textile-working. Assessment of pottery assemblages from the site have also confirmed that this waste debris did not match the profiles of other domestic Romano-British occupation areas (Rippon 2008).

Evidence for salt-production is slight, with only small quantities of briquetage recovered from earlier excavations. However, the true quantity and nature of the briquetage was probably not recorded as it would have been considered of no informative value. It is possible, that as seen on many other salt-production sites, a lot of briquetage was just noted as 'daub' or 'clay'.

Briquetage slabs have been identified from this site (*ibid*). However, they did not appear to match briquetage slabs used within the nearby 3<sup>rd</sup>-4<sup>th</sup> century AD salt-production complex (Complex 2), with no mention of the distinct hobnail impressions. Therefore they could date to an earlier phase of production (1<sup>st</sup>-2<sup>nd</sup> century AD), as evidenced at Site 198, where plain slabs were present. There were also probable fragments of briquetage containers, which again, is unusual given the general lack of containers from this area, however again, this could signify a link to an earlier phase of production.

Dating is unclear, but given the briquetage evidence, it does suggest a link to the earlier phase of salt-production at Complex 2. It is also possible that this represents salt trade from Dorset (Figure 7.31). However, it is more probable that if salt was transported here from Dorset, it was contained within pottery vessels, especially given that BBWI pottery was distributed to this site.

Therefore, it is possible that the container fragments were in fact broken slabs. The presence of slabs would be a little odd at this site given that it has no evidence for salt-production features such as hearths, or evidence for the distinctive large debris mounds. However, the lack of features could be due to lack of preservation as opposed to lack of presence.

Although this site could appear to be a Mode 7 site, the location of the site, and the proximity to salt-production sites, could indicate that it had a slightly different function.

It is possible that salt was transported here and further processed before redistribution, which would define this site as Mode 8. Salt potentially from the coastal sites (Group 1) and Group 2 (Complex 2) nearer to Crandon Bridge, could have been further processed and dried here. Therefore, Mode 8, could infer an

additional salt-production stage; a post-production stage that involves further processing of the salt: 'Stage 5'.

It is also significant that lead was worked at this site, given that lead containers were probably used within many local salt-production sites and this could suggest another link between these sites and Crandon Bridge.

Significantly, Crandon Bridge was abandoned by the AD 370's (Rippon 2008: 137) and this probably coincided with the ceasing of local salt-production in the Central Somerset Levels. It is probable therefore, that Crandon Bridge acted as a distribution centre for locally produced salt that was further processed before being packed and transported (Figure 7.31).

#### Springhead, Kent

This area of natural springs has been a focus of human activity, including occupation, industry and use as a symbolic sanctuary from prehistory until the medieval period (Williams, 2007). The most recent excavations of an area next to the Ebbsfleet River (post-data collection for this research project), initially, appeared to have revealed evidence for a potential Mode 7, Romano-British industrial settlement (Andrews *et al.* 2011).

As at Ower and Cooling, the main phases of activity associated with industry were within the 1<sup>st</sup>-2<sup>nd</sup> century AD and then in the later c.3<sup>rd</sup> century AD (*ibid*). Again, a series of stone rectangular buildings were associated with both phases, which had clearly been used for industry as opposed to a domestic settlement (Andrews *et al.* 2011: 106-111).

One particular area of interest was recorded as 'Property 4' (Figures 7.32-7.33); an area of waterfront activity close to the Ebbsfleet River (Andrews *et al.* 2011: 106-111).

Both phases, (Early Romano-British and Middle Romano-British) in this particular area, had a single rectangular building associated with features including large 'tanks' (*ibid*). The earlier building (F400167/F300568) was associated with a number of pits, ditches and at least one tank and a well (Figures 7.32-7.33).







Figure 7.33 Tank 16831 at 'Property 4', Springhead, Kent (Andrews et al, 2011: 107)

This basic building had no preserved floor layers but did reveal evidence for two internal hearths.

This building was associated with a cobbled yard, and within a few metres there was an associated rectangular clay, timber and lead-lined tank (F16831: Figures 7.32-7.33), a well, and a U-shaped ditch (F17536).

The second phase had another, narrower, smaller rectangular building a few metres to the north-east, (F400170) and an associated larger rectangular tank (F16371) replacing the earlier tank (F16831). The building also had evidence for an internal truncated hearth and for an internal division at one end.

The narrow nature of this building was interpreted as 'most likely that it served an ancillary purpose, perhaps for storage' (Andrews *et al.* 2011: 111).

The buildings were not associated with large quantities of crushed briquetage as seen at Ower and Cooling (although briquetage was discovered in the surrounding area), but the nature of the tanks is of interest.

The profile and character of the tanks closely resemble brine tanks excavated at contemporary inland salt-production sites exploiting the Cheshire salt springs (Dodd *et al.* 2005; Williams and Reid 2008). This research project has also shown that U-shaped ditches were commonly associated with saltwater management systems. This ditch is only 3m from the tank, and originally reached within the edges of the River Ebbsfleet nearby (c.10m). The association of these two features is described as most likely acting as a storage for waste fluid, that could then somehow drain away using the ditch. The ditch appears to have entered the river during this period, as shown by the original extent of the river's edge (Figure 7.32).

It is possible that salt was produced at this site, given these features and the presence of briquetage. However, as at Crandon Bridge, the quantities of briquetage at this site appear to have been low, which could suggest that salt was further processed here, as opposed to being produced here. This site is relatively close to the intense salt-production areas in the North Kent mainland and the Medway Estuary. Therefore, this further supports an interpretation for a Mode 8 site (completing 'Stage 5': further processing and drying). This interpretation was supported in the publication report:

There is...some slight evidence for salt processing, though drying and packing rather than its actual production, which would have been restricted to the margins of the Thames Estuary (Andrews *et al.* 2011: 204)

It is very plausible that salt was further processed here using the clean freshwater springs. Maybe this site received salt produced in North Kent and the Medway Estuary, at least in the earlier phases, and further processed it and packaged it for transport and trade. However, whether this would have also been the case for Site 30 at Cooling is uncertain, given that this site probably packed salt into pots that were distributed further afield.

However, this has presumed that salt was supplied here from North Kent predominantly due to the close proximity. It is also possible that salt was

distributed to this site from Stanford Wharf, Essex, at least during the Early Romano-British period. Evidence for 'South Essex Shelly-Ware' is limited outside the parameters of Essex, but it is found at Springhead (Andrews *et al.* 2011). This, combined with evidence for this pottery type within Early Romano-British deposits associated with salt-production at Stanford Wharf (Biddulph *et al.* 2012), is suggested as possibly inferring that this pottery was used to transport salt from Stanford Wharf to Springhead (ibid). Further work would be required to confirm this, however it is a very plausible option, and would support the Mode 8 status for Springhead.

There are clear similarities between Mode 7 and 8 sites, and this reflects the potential 'blurring' between some of the modes of production. However, these sites are a result of an emerging industry that required sophisticated organisation and collaboration between producers, distributors and consumers.

These Mode 7 and 8 sites were all active during the main phases of saltproduction within the three main areas of activity (Somerset, Dorset and Kent). It is probable that Mode 7 sites were specialising in not only the production of different grades of salt, but also of secondary products such as salted meat, and in the supply to specific consumers. During this time, it is probable that most Mode 2, 3, 5 and 6 sites continued to produce and supply salt for more general use and general consumers. Mode 8 sites provided a hub for the further processing and distribution of salt, as a response to a large increase in production and demands for salt.

Further research and identification of these sites could help in the reconstructing of salt distribution and trade networks in Roman Britain.

One final potentially significant aspect of Springhead, is the presence of symbolic dog burials within a 'ritual shaft' at the site, associated with a part of the site used as a temple throughout the entire Romano-British period (Grimm 2007). As outlined in **6.0**, there are several dog burials and cremations associated with salt (and possibly pottery) production site in the Hoo Peninsula and Medway Estuary areas of North Kent.

# 7.5.6 Potential Sub-Definitions for Modes

The new modes have been designed to provide a relatively simple method of defining salt-production sites in the study area (and potentially beyond). There are other potential sub-definitions of the current modes, which could be used in the future to provide more detailed mode definition. This is not considered here in any detail, and is simply recommended as a potential line of future research, but a possible scenario is provided in Figure 7.34.

This would take into account, the evidence or absence of domestic activity, and might act as a method of further exploring the way that salt producers lived and worked. However, as discussed in **5.2.5**, the concept of a villa estate may in fact not be a productive way to explore the control and management of production processes.



Figure 7.34 Possible Sub-Definitions for new Modes of Salt-Production

### 7.5.7 New Modes of Salt-Production as a Valuable Tool: Re-Balancing Studies and Understanding of Salt-Production, Distribution and Consumption

The creation of new modes of salt-production for southern Britain was only made possible by first assessing the technology of production, including technique and importantly, the identification of working areas. The identification of working areas has been key to exploring site organisation, use of space and scale. Significantly, the choice of technical factors within a site, including sites that appeared to contain more elaborate systems and features, has not been used as a tool to directly define mode. Therefore, mode is not exclusively defined by technology, or hierarchical ladders of 'advanced' technology. Instead, the emphasis for mode definition has deliberately been based upon evidence for the use of space and site organisation.

This is because, as has been highlighted many times previously, there is not a 'neat' or obviously well-defined advancement of technology across the sites, over time. There are some trends, as was shown in **7.3**, that can be used to potentially explore scale and chronology on some sites. This includes the presence of larger briquetage pedestals and larger, multiple container hearths. However, this is limited, and only useful if placed in *regional context*, comparing to other local sites. However, as has been clearly shown, the nature of technical factors, including form, is directly linked to producer tradition and preference and is not necessarily linked to 'advancing technological norms'.

Importantly, this means that the form of technical features will not provide a suitable basis for dating a site. For example, unlike many pottery typologies, briquetage and hearth typologies, will not provide a convenient dating tool, other than perhaps to suggest a general period, but only in the regional context. The only exceptions are lead containers, which appear to have been only of Roman date.

The definition and comparison of technical features (tools and all features used to produce salt such as hearths and tanks) has enabled a detailed insight into technological choice in salt-production. Importantly, this has revealed a rich diversity across sites, regions and time, and enabled a more detailed reconstruction of production; achieving the main aim of this research project.

The success of the new archaeological definitions, and reconstruction of the saltproduction process, has also enabled this study to move one step further and assess sites in the wider context. This has focused upon the way in which sites were organised and managed. All of this new information has shed significant new light onto the salt producers through the archaeological evidence, including evidence for individual technological choice, use of space, and even perhaps wider belief systems (**7.4.8**).

These production sites are not as sterile as they may have first appeared, and can actually greatly inform on individuals, groups and communities, even when in damaged and fragmented states.

There is great potential for the modes to inform on the wider context of not only salt-production, but also distribution and consumption trends. Although this study has predominantly focused upon the production sites themselves, the salt had to leave these sites and would have been subjected to various distribution mechanisms.

Previous studies of salt-distribution have been heavily based upon the mapping and quantifying of briquetage vessels, *away from the production sites* (Morris 1985; 1994b; 1994a; Lane and Morris 2001). Although this has greatly assisted in opening up debates about salt production and distribution, our knowledge is still greatly limited in most areas, given that it was probably not common to transport salt in cumbersome briquetage containers. Therefore exploring the output of production sites through distribution and supply networks requires much deeper consideration and different approaches.

Discussion of how much salt was being generated by different regions of Britain overall and where it was going, remains elusive and remains mostly speculative. The significance of the 'Salt Industry' has been based upon limited information and unsupported assumptions. Statements about salt production and consumption in most core Iron Age and Roman literature, is still limited to 'salt' popping up on trade and distribution maps/models.

As discussed earlier, ascertaining the true significance of salt-production in Britain is limited by biased site quantities, and therefore comparing regions based upon site quantity does not work. If sites in all the main salt-producing regions could all be defined by mode, then this, along with comparison of working areas, would be a better way to compare sites and ascertain true chronological trends. The difference between separate Mode 2 sites, and combined Mode 4 sites, is key to better understanding site distribution across different regions. Currently, only the 584 study area is defined using these modes, and therefore only trends and significance areas of activity within this geographical area have been discussed here. It is currently not possible to directly compare the significance and scale of salt-production between the study area, and other key areas such as Essex and the Fenlands.

These new modes, predominantly Modes 2 and 4, provide so much more potential for exploring previously ambigious aspects such as organisation of distribution, and they will be used to explore deeper aspects of historical and economic trends further shortly. Another important factor about Modes 2 and 4 in particular, is that they represent Modes that are particularly responsive and therefore indicative of, change. Given the significant extent of the historical changes that occurred between the 1<sup>st</sup> century BC-5<sup>th</sup> century AD in Britain, the use of these modes as a tool to explain how these changes effected and were responded to by Britons is extremely useful.

Before outlining the way in which these modes indicate change, alongside other important identifiable factors, a brief overview of the main chronological trends in salt-production will be provided. This will then provide the basis for further discussion on historical and chronological trends in salt-production.

# 7.6 The Cultural, Historical and Economical Significance of Salt-Production, Distribution and Consumption, in Late Iron Age and Roman southern Britain: Contextualising changing mechanisms of manufacture and supply

The aim of this final section of discussion, is to pull together all of the main outcomes of this thesis, and to create meaningful interpretations when making sense of the *overall significance of this industry during this key period in history*.

Previous discussions have predominantly focused upon decisions made at a site level, and archaeological evidence for production only, so have focused upon an approach that involves 'looking in', and deconstructing the archaeological evidence to meaningful chunks of information, components and stages. This section attempts to 'look out' more, asking deeper questions of how and why, including a contextual assessment of the trends evidenced in salt-production

during the 1<sup>st</sup> century BC-4<sup>th</sup> century AD. This will include consideration of cultural factors, such as perception of salt in general, historical factors, including the most important of all, the arrival of the Roman Empire in Britain, and the resulting changes in economy and therefore distribution and supply mechanisms.

Exploring mechanisms of distribution and consumption remains challenging:

As an object of archaeology, salt leaves evidence fairly abundant for its production, and scarce for its consumption (Adshead 1992, 4)

However, it is possible to identify potential indicators of trends in distribution and consumption, and this will be explored shortly.

Key events in the Roman Empire and Britain, alongside the key trends in Iron Age and Romano-British salt-production are shown in Table 10.5.5.

The main trends identified chronologically for salt-production during this key period of history are summarised below (see also Figure 7.35), based upon the information provided in section **7.3**.

- An increase in site quantity during the 1<sup>st</sup> century BC providing the foundations for the Romano-British industry to come
- 2. Dramatic increase in 1<sup>st</sup> century AD
- Dramatic decrease in the 2<sup>nd</sup> century AD and a continuing limited quantity of sites within the 3<sup>rd</sup>/4<sup>th</sup> century AD with the exception of Central Somerset Levels
- Dramatic increase of salt produced in Central Somerset (Mode 4) between the 2<sup>nd</sup>-4<sup>th</sup> centuries AD
- The ceasing of archaeologically visible/recognisable traditional salt-production after the 4<sup>th</sup> century AD

The chronological trends highlighted here, were all the result of differing responses to changes in the wider arena of Britain and beyond and it is important to place these in historical/cultural/political/economic context and discover what changes they represent, and ways in which responses differed across time and space.

On a basic level, these trends all occurred due to changes in requirement for salt and/or changes in the mechanisms of production and supply of salt, which cannot be divorced from cultural perceptions of salt at this time. Therefore firstly, some particularly significant socio-cultural aspects of salt-production and consumption will be considered.



Figure 7.35 Simple timeline of significant chronological trends/events for salt-production in southern Britain

# 7.6.1 Consideration of socially embedded actions and perceptions associated with the production, distribution and consumption of salt in prehistory and the Romano-British period

This research project has predominantly considered the 'pragmatic' when exploring salt-production in the study area. Throughout this thesis, the archaeological evidence for technology, techniques, modes of organisation and use of space has been considered. All of these elements continue to highlight a great deal about the significance of salt-production, and will be revisited again in this discussion. However, it is also important to not divorce this evidence, and especially chronological trends and changes in production mechanisms, from cultural perception and actions. The exploring of 'technological choice' can be included in this as it represents individuality and decisions made at site level which inject personhood into the evidence. There are also many other facets of human behaviour and actions that are also associated with any forms of archaeology, and that includes behaviours, decisions and perceptions which are socially embedded as those that somehow transcend the 'everyday'. Whilst it could be argued that all actions and decisions are socially embedded and meaningful, there are some acts that appear particularly meaningful and symbolic. There is some evidence for this in the archaeology associated with salt-production and distribution.

Some of this evidence, as well as consideration of ethnographic parallels, was considered in a conference paper given by the author in 2008 (Hathaway 2008) entitled 'Take it with a Pinch of Salt? Thinking about the Cultural Significance of Producing and Consuming Salt'. In this paper, the consumption of site, salt and briquetage was considered. A summary of this will be provided here, because the evidence could provide some context to changes and trends seen in the overall evidence for salt-production in the Iron Age and Romano-British period.

During this research project, many ethnographic and historical, as well as some archaeological examples were discovered, which implied there was a symbolic meaning attributed to salt across many cultures, many of which are shown in Figure 7.36. The term 'trade/exchange' refers to both salt and to knowledge transfer.

It is widely known that many cultures throughout history have found the preservation qualities of salt, alongside its transformative powers (invisible to visible; temporary to permanent by preserving of foods) fascinating. This has led to the creation of many folklores, taboos and long-standing traditions associated with all aspects of production, consumption and distribution (Kurlansky 2002; Roud 2006).

We can still see a variety of superstitions and folklore (symbolically and traditionally socially embedded behaviours) in modern culture (Roud 2006). This includes within this country, the practice of throwing salt over the shoulder (to blind the devil) is carried out if salt is accidentally spilt (*ibid*), and a Somerset folklore of spreading salt on a front door-step as a deterrent to evil people visiting or entering the house (Palmer 1976).



Figure 7.36 Uses of salt, derived from ethnographic and historical literature (left: traditional themes, right: practical uses) (Hathaway 2008: 51)

No doubt these rich and diverse symbolic attributes, as well as associated behaviours evidenced ethnographically/historically, would also have been present within the core beliefs of some prehistoric communities in Britain, as well as later Roman communities. The importance of this consideration, is that it means potentially that salt was not always treated simply in a pragmatic, logistical way, governed by normal mechanisms, or perceived as simple commodity with monetary value. This could have also have meant that salt consumption and perhaps even production, had negative and positive attributes, and importantly for this final discussion section, this could provide context for some of the trends in production/consumption evidenced during the Iron Age

Of most relevance here, is that there is evidence predominantly in the Romano-British period, and perhaps a little indirectly in the Iron Age, that not only salt was symbolic, but also the containers it was held and transported within, as well as the production sites themselves.

There are nine examples of behaviour that will be briefly considered here (see Table 10.5.4). As shown in Table 10.5.4, the first is more indirectly connected to

Iron Age salt-production and consumption, and relates to a lack of fish consumption within some communities leaving around the North Sea (Dobney and Eryynck 2007). This could provide some explanation for the relatively low number of salt-production sites in the Early-Middle Iron Age when compared to mainland Europe. Perhaps this apparent taboo extended to anything taken from the sea in some communities. This may also run alongside symbolic perception of some water sources at this time (see Bradley 1998; 2000) where objects were deliberately placed within springs, lakes and rivers (and perhaps the sea?) as an offering. Perhaps in this sense, *giving* to water sources was *acceptable*, but *taking* was *unacceptable*, for some communities at least.

Most of the other 'acts' were carried out in the 1<sup>st</sup> century AD, and associated with deliberate deposition/breakage of artefacts (containers) associated with salt-production. Whilst the rest were associated with the insertion of human and dog cremations or full burials into or surrounding a salt-production site, predominantly also dated to the 1<sup>st</sup> century AD. The apparent concentration of symbolic behaviour associated with c.1<sup>st</sup> century AD salt-production and consumption is particularly interesting given the historic context of this period. Although it is not possible to certainly state whether this was concentrated before or after the AD43 conquest, or consistently occurring throughout this period, it could well have been a response to the changes brought by the Roman conquest.

This will be revisited again later, when considering how and why there was such an explosion of new salt-production sites during the 1<sup>st</sup> century AD.

Most of these acts can be separated into those that were carried out in the 'Domestic' habitus, those within the 'Salt-Production Site' habitus, and those carried out in the 'Surrounding Salt-Production Landscape' (Figure 7.37). Furthermore, these acts are all representative of closure and 'end', as well as temporality and permanence. They all appear to be on the boundary between life and death. Life is temporal, and death is permanent, in the sense that death is the ultimate end, however, given the preservation properties of salt, and that it was symbolically associated with permanence, perhaps it was seen as enabling transcendence of life or death as well as cleansing and protecting (as seen in many cultures). Perhaps this permanence was associated with the fixing or and maintaining of, memory. This is a powerful association, and for some, perhaps

the consumption of salt was associated with a longer life, or even immortality, although ironically high quantities in the diet can actually mean the opposite.



### Figure 7.37 Symbolic acts associated with salt-production and consumption

The deposition of lead containers in the Cheshire area (Penney and Shotter 1996; Shotter 2005) is of interest as it appears to reflect an ancient prehistoric practice described above whereby objects were deliberately broken and 'offered'. Symbols related to paganism have been found on some of these containers, along with probable early Christian symbols (Shotter 2005). This potentially also suggests an early transition and merging between paganism and early Christianity. Perhaps this could be related to the beliefs of local salt-producers. However, it is not without significance that salt often appears in biblical texts used within symbolic behaviour and language. Jesus is said to have viewed his disciples as salt from
the earth, which is thought to have meant that they were seen as 'the symbol of lasting things, valuable and durable' (Paraschiv 2011: 222).

The burying of human and dog remains in and around salt-production sites in this context is also of particular interest as it focuses upon the deposition of death in and around salt-production sites (Figure 7.37). In general, when plotting all of the acts associated with salt-production, the trend is that they represent closure events, however it would appear more unlikely that this also extended to the 'closing' of surrounding landscapes. In that arena, perhaps it actually represented continuation and permanence of use; perhaps protection, and preservation of identities, cultural marking of landscape and continuation of memories as well as continuous lifecycles.

Alternatively of course, there are also practical considerations for explanation, such as the fact that wet, marshy landscapes were more 'empty' for the creation of burial areas, and that the soft fills of features were easier to place burials within. However, given the particularly symbolic deposition of adults dogs and puppies in Kent (outlined below), this strongly suggests a deeper meaning.

There are at least 24 Romano-British burials; consisting of at least six human cremation burials, five human inhumations, three infant inhumations, 13 dog inhumations (three of which were juveniles) spread across nine sites. Most of the sites were within the Medway Estuary, Kent (**5.2.3**), (Table 10.5.3) and most were dated to the 1<sup>st</sup> century AD.

There are also at least five 1<sup>st</sup> century AD adult inhumations that have been placed within salt-production sites *after-use*. Four are in Dorset; two at Site 214, Hobarrow Bay, Isle of Purbeck excavated into a briquetage mound (Figure 4.78), and placed within stone cists (commonly found locally) and the other two at Site 213, Hamworthy, Poole Harbour, placed within a probable reservoir and across parallel feeder channels (Figure 4.12). The other inhumation was placed at Site 98 in Chidham, West Sussex and was placed in a very similar location to Site 213, within parallel feeder channels (Figure 4.13) suggesting a possible link.

The act of placing adult and dog cremations within salt-production sites was more common in Kent (Table 10.5.3), however infants appear to have been treated

differently, and were buried as inhumations. In general, North Kent and the Medway Estuary continue to produce a significant quantity of scattered (i.e not placed within specific designed cemeteries) adult and dog burials, with many dogs and puppies found buried in pots (Rudling 2008). An example of a recent assessment of a puppy cremation from North Kent, commissioned by the author, can be found at the end of Appendix **10.5** (Report 10.5.1).

As stated above, this could be a potentially significant practice in Kent related to salt and possibly pottery-production. At least 20 dogs were also deliberately and symbolically deposited in a ritual shaft at Springhead, Kent (Mode 8), which also had salt-processing activity (**7.5.5.6**), (Grimm 2007). The shaft was dated to the  $2^{nd}$  century AD, which is later than similar symbolic behaviour in the Medway Estuary, but was contemporary with the use of an important sanctuary at Springhead (Grimm 2007).

Although other species were also deposited in the shaft (including sheep and pig), dogs were by far the most represented species, with a MNI of 20, representing 36% of the total individual animals deposited (Grimm 2007: 56).

An adult inhumation burial was also found within a Romano-British Red Hill at Peldon, Essex (Denston 1975) and an adult cremation burial was found close to small-scale Early Romano-British salt-production at Stanford Wharf, Essex (Biddulph *et al.* 2012).

Finally, there was also the burial of a very well made Type 1 (Figure 3.34) briquetage container (and one of the largest 'fragments' found within the study area) at Site 315 in the Hoo Peninsula, Kent (Figure 3.37). This appeared to have contained cremated bones. Although unfortunately the bones were not assessed or retained, it is probable, that they were the cremated remains of a dog, in the context of the burials discussed above.

The concentration of this activity around the Medway Estuary does suggest that the community here were particularly concerned with maintaining socially embedded symbolic acts associated with salt-production and consumption. This could also perhaps be linked to the community of salt producers in this area originally coming from other cultures in mainland Europe. This may well be 593

supported by the pocket of unique technology here (embedded slabs) which as opposed to be being a pocket of native innovation, could represent technology brought from another country. This will be revisited again later into this discussion.

Finally, most of the symbolic evidence described here, was linked to the environs in and around the salt-production site. This is where, in a sense, the magic happened, where salt was 'birthed' and transformed from the visible to the invisible. These sites may have been perceived as separate, special places, and this is not only potentially supported by the symbolic deposition of burials and deliberate deposition of artefacts, but also by a predominant lack of domestic debris. Although there are practical issues that could account for this, as living within wet liminal areas would have been difficult, the lack of this debris on many Iron Age and Romano-British salt-production sites remains significant, as humans tend to leave even small amounts of 'everyday' detritus anyway they occupy for even short amounts of time. Therefore many Iron Age salt-production sites could have been viewed areas where it was not acceptable to bring in the 'everyday'.

Kinory (2012) also briefly considers the common pattern of 'segregation from habitation' in Iron Age salt-production sites, where two factors are suggested as being possible explanations. One is functional, as was raised above, with there being practical and logistal difficulties arising from living on exposed coastal areas (Kinory 2012). This would certainly have been the case. The other was social, and it was suggested, might be linked to issues of control and taboo (*ibid*), which equally would have been at play in at least some communities.

Perhaps the lack of domestic debris on many Iron Age sites is simply the result of seasonality and short-lived sites, even if the site was occupied for just a few months, there would have presumably been at least some domestic fires/eating debris? The same lack of domestic debris also continues into the Romano-British period, and it is far more certain that this is due to a deliberately short-lived sites that were a quick response to the Roman conquest. Although this does demonstrate well, the difficulties when dealing with similar evidence across different periods, and the importance of historical context.

For those Iron Age sites that did contain domestic debris, as with some ethnographic examples, perhaps this represents areas where it was acceptable for

domestic 'home space' to have temporarily transcended into the 'industrial space' for the summer season. This could also represent longer-term sites, and areas that were revisited across many seasons (although there is often little stratigraphy to support this)

Ethnographically, families observed in Mexico were found to transport their 'domestic households' temporarily to inland salt-production sites each year,...'In this way, the domestic space maps into the salt-procurement context' (Contreras 2011: 50).

Differences in perception are most likely attributed to individual, community and regionally based beliefs of salt producers and associated families. It is also plausible that on some sites, pottery was also used in the salt-production process, and this could confuse matters even more.

There is also limited evidence for the transcending of salt symbolism from the production space into the domestic space. Two northern sites have convincing evidence for similar symbolic acts associated with areas outside of the production habitus, and within the 'domestic' (see Table 10.5.4).

Alongside this evidence for socially embedded behaviours, it is also possible that the exchange of salt between individuals, communities and even countries could have also been symbolic, as well as the direct consumption of salt. Especially if just the ownership of salt (or perhaps certain types or locations of salt) and consumption was linked to symbolic ideas, superstitions and taboos.

### 7.6.2 Mechanisms of production, distribution and consumption in the Iron Age

This section will consider the evidence for low-level salt-production and consumption in the British Iron Age. This will include considering why salt-production and consumption was so apparently low, especially when compared to contemporary mainland Europe. Section **7.6.2.3** will then consider the 1<sup>st</sup> century BC-1<sup>st</sup> century AD transition, and whether a change of scale, led to a change in transport containers and trade mechanisms, by observing changes in briquetage use. Section **7.6.3** will then go on to explore this transition further, as well as 595

explore how salt-production and consumption changed during the 1<sup>st</sup> century AD, in context of the Roman conquest.

# 7.6.2.1 Invisible consumption, low consumption, conspicuous consumption and/or import of salt? Consideration of pre-Late Iron Age salt-production and consumption

As it stands, and as supported by the results of this research project, evidence for pre-Late Iron Age salt-production in Britain remains limited. Equally, identifying salt distribution is also limited. In fact, evidencing salt distribution before the medieval period in Britain remains a grey area, not helped by salt being intrinsically invisible as a product.

As has also been stated previously, the limited evidence for pre-Late Iron Age saltproduction in Britain is considered a true representation. This is indicative of small-scale production and distribution of a limited product that was simply not widely used before *c*.1<sup>st</sup> century BC. The reasons for this cannot be certainly known, but in light of the previous section, it is possible that this reflects a deliberate choice not to consume salt, embedded in deeper taboos and perhaps restricted use? In light of the ample opportunity to crystallise salt from the surrounding sea this would appear the most likely explanation.

When compared to mainland Europe, where there was an apparently thriving salt industry by as early as the 5<sup>th</sup>-4<sup>th</sup> centuries BC (Olivier and Kovacik 2006), Britain was producing on a significantly smaller scale. Nothing like the industrial Late Iron Age furnaces found in the Seille Valley is evidenced in Britain during this period. The nearest contenders are much later, in the 2<sup>nd-</sup> 3rd centuries AD sites in Sittingbourne, Kent (**5.0**) and the Central Somerset Levels, although the hearths never reach 'furnace' scale. This difference could simply be due to differences in population and land size, but there must also have been deeper differences politically and economically, as well as choices in how salt was consumed, as stated above. Perhaps salt remained in the sphere of both limited practical use (preservation) and restricted or even conspicuous symbolic use, when a 'taste' for salt had either not yet naturally developed, or it was not allowed to develop.

The apparent oddly small-scale salt consumption is *only* viewed as such, when directly comparing to contemporary mainland Europe. This area had a much longer history of larger-scale salt-production, where not only saltwater was exploited, but also rock salt and brine springs, unlike Britain. There is currently no significant evidence for the inland salt springs/rock deposits of Britain, being exploited before the 1<sup>st</sup> century AD. In short, salt does not appear to have been anywhere near as popular and intensely extracted in Britain, which may be simply linked to a geographically cultural difference. There is no doubt however, that salt played a significant part in the social values held by communities across mainland Europe. The rich evidence in Germany and Austria in particular, shows how much status and power, as well as conspicuous consumption of salted meat (Halstatt especially) was linked to salt.

Perhaps it is not useful to compare with mainland Europe and this comparatively very long-standing culture of consuming salt. This area had far longer to evolve a diverse perception and symbolic attribution to salt and salt consumption, and Britain in comparison, only really got similarly started at the very end of the Iron Age. If not compared with mainland Europe, and considered as a liminal island with its own unique identity, perhaps this simply represents a natural, low-level consumption due to an as of yet, un-acquired taste.

It is also plausible, that the low evidence for salt-production is not linked to a lowlevel of consumption, in that, for whatever reason, some salt could have been obtained from the thriving industry in mainland Europe. Perhaps importing salt remained an important method of maintaining important relationships, trade links and status perception. It is also possible that this symbolic exchange system also involved other 'socially symbolic and embedded' goods within and outside Britain.

However, the most favoured explanation here, is that salt was little consumed, and that it was kept within the realms of symbolic as opposed to everyday consumption. When it was consumed, it was in the realms of conspicuous consumption.

Therefore it would seem that salt consumption was initially limited in Britain during prehistory, over time, this then apparently diversified and grew, perhaps in a response to a growing Iron Age population as well as changing consumption 597

practices and diets, which, given strong trade links, could have been influenced by mainland Europe. In the context of the discussion presented at the start of this research project (**1.4.1**), in late prehistory, there was a probable gradual transition between a limited 'need' for salt, to a 'want' for salt. This assumption works, if indeed increased site quantity from the Late Iron Age, can be directly attributed to an increase in salt consumption at this time. This then suggests that this important transition occurred in the Late Iron Age. By the Early Romano-British period, there is evidence for the development of a strong symbolic association with salt as discussed above, and it is not coincidental, that this occurred at a time when salt was produced in Britain on a scale never previously seen. By the 1<sup>st</sup> century AD, salt had become an important part of consumption and trade in Britain, and with this grew a rich cultural belief system (perhaps mostly within coastal communities?).

The dramatic increase of salt-production in the Late Iron Age requires some explanation, given the contrast to the apparently low-level production beforehand. There is no evidence for a natural and gradual increase over time suggestive of a simple response to population increase and a development of a 'taste' and move from 'need' to 'want'.

### 7.6.2.2 The Late Iron Age: Cross-channel supply and a growing taste for salt?

As summarised in **7.3**, there is a significant increase in general production and trade activity during the Late Iron Age in southern and eastern areas in of Britain in particular. This appears to represent the creation of new and more complex, as well as further reaching trade networks, including the creation of specialised craft and production 'hubs', as well as the emergence of proto-urban centres and markets to consume and redistribute the resulting products. Poole Harbour Dorset, in the context of this study, is particularly important, as during this time it is a thriving and diverse area for cross-channel trade and production activity (Dyer and Darvill 2010).

Salt-production is just one of many enterprises that grows and flourishes during this time. The increase in salt-production not only reflects the changing and

growing consumption practices of communities inside of Britain, but also, and perhaps more significantly, external changes and supply needs.

Export and cross-channel trade must have played a significant part of this change.

Given the established Roman presence in Gaul by the early 1<sup>st</sup> century AD (Table 10.5.5), it is plausible that the many more communities in Britain chose to produce salt (perhaps overcoming traditional taboos in some areas) in order to *supply* this geographical area.

By the time Rome invaded Britain in 43, northern Gaul had been under Roman rule for almost a century...(Russell and Laycock 2010: 130)

This could also reflect the re-affirmation of older symbolic exchange systems with mainland Europe and especially Gaul, as a way of responding to the threat of Roman invasion in Britain. This may have included salted meat, as is evidenced at Ower, Poole Harbour (Maltby, 2006). In fact the salting of pork on a larger scale in general within Britain may have been predominantly instigated by supplying of the Roman military across the channel. This form of foodstuff would have been ideal as a long-lasting foodstuff for armies and no doubt remained traditionally high up on a soldier's shopping list. However, this is controversial as it suggests some form of agreement between this area of Briton and some of the occupying army in mainland Europe (considered again shortly). This is even more probable given the lack of evidence for salt consumption before the Late Iron Age, and there is little evidence that salt was such a key part of the diet and meat preservation archaeologically before this time. Perhaps 'catering' for 'exotic' tastes such as these, led to the incorporation of salt more into the diet and everyday consumption of Britons who grew to like the taste of such foodstuffs.

Given the number of sites in operation during the 1<sup>st</sup> century AD in Britain, they could well have produced enough salt to supply north-west areas of mainland Europe by this time, a reversal of the possible earlier scenario (pre-Late Iron Age) where salt could have been obtained from mainland Europe. Since the 1<sup>st</sup> century AD explosion can be predominantly evidenced in southern Britain, it is very plausible that salt was being produced and supplied to mainland Europe (predominantly Gaul?) in the later 1<sup>st</sup> century BC and the first half of the 1<sup>st</sup> century AD, at a time where, for coastal salt-production at least, there appears to be a

decline (Daire 2003). Poole Harbour would have been especially well-placed for this, with healthy and busy cross-channel trade here and a longer history to the east at nearby Hengistbury Head (which contains briquetage during this period but apparently no certain associated features suggesting production took place here but salt clearly did pass through here).

The attempted invasion by Caesar in the mid-50s BC must have affirmed the inevitable, that the Roman Empire was heading Britain's way, and that at some point there would be future attempts at conquest. This situation may have served to encourage exporting if producers had decided to continue supplying in the hope that this would stand them in better stead if such an invasion took place. Although in literature, most emphasis is placed upon Iron Age trade between eastern Britain and the Continent (evidenced in Gallo-Belgic wares and coins) (Webster 1993), there was also a strong trade route operating between Hengistbury Head and Poole Harbour, Dorset.

It is just possible that producers in Dorset saw that they could do well from supplying the geographical area in and around Gaul. Especially at a time when there was so much unrest and instability in Gaul caused by Caesar's gradual conquest of the area, and could have exploited a breakdown in supply mechanisms there. It is plausible that some supplies from southern Britain were reaching the 'rich Rhineland market' which formed after Ceasar's conquest of Gaul. If salt was reaching military especially in this area, then this has farreaching implications for the potential relationship between communities in this part of southern Britain and the Romans.

Whether this trade link infers ongoing 'acceptance' of the Roman Empire (if salt was being exported directly to 'Romans' or not) or whether it was almost 'out of site out of mind', and that little thought was given over to where the salt was going, or who too, is hard to ascertain. However, this does perhaps suggest some level of cooperation, which would appear in contrast to those communities living in Kent, which were apparently far more adverse to the encroaching Roman Empire, especially after Caesars arrival in Kent in 55/54 BC. Dorset, from a trade and industry perspective, seems little affected by this event, and although this remains speculative, perhaps they were already aligning themselves to Rome.

The point of interpreting the meaning behind cross-channel trade activity is important, as just because trade is occurring between southern and eastern Britain *before* the Roman conquest of AD43, does not mean that this therefore implies 'acceptance' of the Roman Empire, as highlighted above. It remains controversial that there could be the suggestion of a mutually benefiting trade relationship between southern Britain and the Roman Empire before the AD43 conquest. Especially as it is suggested that the Durotriges were hostile to Rome because of Caesar's devastating conquest of Gaul and the breaking down of communities that no doubt had links to Britain also through trade:

...destruction of the Veniti, their trading partners on the other side of the Channel (Webster 1993: 61)

Perhaps Caesar's apparent destruction of traditional trading partners across the channel for the Durotriges, led to producers having to submit to trading with him and his armies, and was not as agreeable, amicable and choice based decision as implied here.

Cross-channel trade activity between southern Britain and mainland Europe could have also been linked to aid and help being given by British southern communities (including leaders), such as the Cantiaci in Kent, and the Durotriges in Dorset, to native communities and leaders in Gaul, who were suffering at the expense of Caesar's military push in this area (Webster 1993). It is also possible that this help and aid, was one of Caesar's reasons for wanting to invade Britain (although both Caesar and his successor Claudius were both ultimately trying to prove their 'worth' and strength in the main) (*ibid*).

By the time of the Roman conquest, there is evidence that there were already a rich mix of groups from mainland Europe living in Britain, no doubt some of them escaping the spread of the Roman Empire. In the 1<sup>st</sup> century BC, this included people from the Danube and Rhine areas, as well as Gaul (*ibid*). Salt producers specifically from Gaul appear to have only settled in the Isle of Purbeck/Poole Harbour area during this period, but did later spread into the north-east.

These close links with Gaul are evidenced by the distinctively 'Gaulish' saltproduction technology in the Poole Harbour/Isle of Purbeck area during the Late Iron Age (as discussed in **7.4.2**). The technological evidence suggests that saltproducers from Gaul were travelling to work in southern Britain *before* and probably *after* AD43, as a way of responding to Britain becoming a key producer and supplier of salt and as a way of presumably escaping troubles in Gaul. This would have been particularly helpful during the second half of the 1<sup>st</sup> century AD when Britain saw a 'Golden Age' for salt-production as a response to its inclusion within the Roman Empire.

That there is strong evidence for Gallo-Belgic settlers moving in large groups to Kent and Essex in the British Iron Age (Webster 1993: see Map I: 32), and this of interest when considering key areas of activity for salt-production, especially when considering that there significant settlements (as evidenced by particular types of coins) in North Kent and the Medway Estuary. This area was clearly ideal for saltproduction not only because of the estuary and mudflats, and no doubt higher salinity levels, but also because of its geographical location for water-based trade networks. However, curiously, unlike Dorset which has certain evidence for Gaulish salt producers working there in the 1<sup>st</sup> century BC at least, there is no contemporary similar evidence (to date) in North Kent or Essex. The Gaulish technology identified there, does not appear until the 1<sup>st</sup> century AD and can still be evidenced in both Essex and Kent in the 3<sup>rd</sup>-4<sup>th</sup> centuries AD, in contrast to Dorset. However this fits in with the larger picture of their being comparatively little salt-production carried out by Britons in the 1<sup>st</sup> century BC, in Kent especially. This is with the exception of the large complex in the Romney Marsh (Site 82) which does appear to have 1<sup>st</sup> century BC activity, but there is no evidence for technology associated with Gaul at this site.

Whatever the case was for cross-channel relations before the AD43 conquest, no doubt after this, and the reality of its success when compared to Caesar's previous attempt, would have massively impacted existing links. Whether certain tribes/communities were aligned already to the Roman Empire, would clearly have also massively impacted the way in which they were incorporated into the Empire when it arrived in Britain. The situation in Poole Harbour and Hengistbury Head, Dorset, is of particular interest in this context, as this area gets 'hit hard' after the AD43 invasion, with what appears to be a direct military offensive by Vespasian shortly after in AD45 (Peddie 1987). This is considered further in **7.6.3**.

Before exploring the later evidence for 1<sup>st</sup>-2<sup>nd</sup> century AD salt-production, it would first be useful to explore evidence for earlier mechanisms of salt distribution, in order to identify any other possible indicators of change during this period.

In this context, it will be useful to examine the most 'visible' (although this does not necessarily equate to predominantly used) prehistoric (and to a far lesser degree) Romano-British mechanism for salt distribution in the form of the distinct briquetage cylindrical salt cake containers. This is useful because the use of these containers could have been linked to specific identities and gift exchange, and represents a point of reference, that decrease use of, could indicate a transition between, or merging of, prehistoric and Roman distribution, supply and consumption mechanisms. This will be considered further shortly.

#### 7.6.2.3 Briquetage salt cake containers as indicators of gift exchange: Decline in use as an indicator of changing mechanisms and new modes of transport

Logistically, transporting and distributing salt would have involved a great deal of organisation and care as it would have been easily 'spoiled' or tainted, especially if in contact with moisture or other foodstuffs for example. If it *was* indeed transported across the channel, it would certainly have required suitable containers.

As has been alluded to several times during this research project, there have been detailed attempts to ascertain salt distribution mechanisms through the tracking of briquetage and VCP containers away from the production sites in the north-western, north eastern and central southern regions of Britain (Morris 1985; 1994a, 1994b; Kinory 2012). However, as stated in **7.5.7**, due to the invisibility of salt, this has inevitably meant that it has been heavily restricted to the mapping of inland briquetage distribution. However, the VCP containers remain the earliest and strongest evidence for Early-Middle Iron Age salt distribution and consumption, unfortunately however, evidence for the associated production sites in Cheshire/Worcestershire is still slight, limiting interpretation of the significance of this mechanism. It is possible that the heavy exploitation of the inland springs from the 1<sup>st</sup> century AD obliterated these earlier sites, or even extended and adapted existing sites. Of particular interest with the VCP containers, is that they

are similar to the chalice and vase type vessels used to transport salt in contemporary and earlier mainland Europe. Also unlike the later, well-formed cylindrical salt cake vessels in the north-east and Wessex, they are very large, particularly friable and uneven in appearance, but nonetheless, *very distinct in appearance*. Perhaps their distinct form was an important part of salt/gift exchange, having such a vessel would have clearly shown the owner had access to 'previous' salt.

The form and use of briquetage, or any type of container for salt distribution would have differed chronologically and regionally, for not only practical reasons, but also socially embedded reasons.

With the exception of VCP containers, that appear to be limited to north western areas of Britain, most focus has been upon the tracking of the distinct cylindrical vessels as explored previously. This not only provided the ideal container for drying salt, but also appeared to have acted as containers for the creation of set sizes of salt cakes for transport. This pre-determined salt cake size is an important point, as presumably it indicates that the producers themselves were in control of the size of cake and distribution (within the same containers). This point will be revisited shortly as it could help to ascertain changes in distribution mechanisms from c.1<sup>st</sup> century AD. These distinctive containers appear to have been popular particularly in Wessex and the Fens between the 1<sup>st</sup> century BC-1<sup>st</sup> century AD at least (Morris 1985; 1994a, 1994b; Lane and Morris 2001; Kinory 2012).

Given the decrease in, but not complete disappearance of, cylindrical briquetage salt-cake containers from both production sites and inland sites during the 1<sup>st</sup> century AD, it is clear that this mode of distribution and measurement of salt continued albeit on a small-scale, and within restricted north-eastern and central southern areas, during the Romano-British period. If indeed these distinct, traditional containers were representative of deeply socially embedded mechanisms and acts of exchange, then it is probable that this would continue in at least some regions to reinforce 'native' perhaps political status in the Romano-British period. Although it is impossible to say whether their continued use was because they just acted as convenient vessels in which to dry salt over an open

hearth (which they were ideal for), or whether they did also continue to symbolise deeper meanings.

With the explosion of salt-production sites in the 1<sup>st</sup> century AD especially, if these containers continued as primary mode of transport, it would then be expected that there would be far greater quantities of this material over more non-production sites, which is not the case.

Therefore the primary mode of transport for salt by the 1<sup>st</sup> century AD at least, was non-briquetage containers. This could have been not only due to a change in exchange/trade systems and the way in which salt was perceived culturally, but also due to logistical factors linked to a change in scale of production and output. If it remained the case that salt was only travelling to local areas, such as markets for bartering, and was required in relatively modest quantities, then heavy friable briquetage would not have been so much of a problem. However, if this changes, and the distance travelled becomes longer, quantities become larger, populations increase and a change in politics and consumers for example, then these existing containers as well as simple mechanisms, would require reconsideration.

If as a result, there is development of an increasingly complex trade system (incorporating not only traditional exchange but also trade associated with monetary value of product), then briquetage becomes less and less useful. If these developing mechanisms also grew to include more water-based transport links to distribute larger quantities more easily, then bulky, heavy, friable briquetage would not be a viable option for storage.

If water did indeed become an important part of the distribution mechanism for salt, this likely signalled the end of using heavy small containers for transport. In order to be transported by water; stackable, easily moved and most importantly, sealable containers would have been required. In this sense, amphora jars would have been perfect and in some areas it is possible they were recycled after being imported containing another commodity, and used to transport salt.

However, organic sacks or lined baskets may also have been used, as stated earlier. This would have depended upon whether it was essential to keep the salt completely dry to enable ease of decanting and trading, for example if an 605

intermediary distribution hub (Mode 8?) was used to further refine, process and dry salt.

Also, as inferred earlier, the use of briquetage salt cake containers presumably meant the salt producers had control over the measure of salt as it left the site (and thus the 'value'). In this way, trade would have been easier, as the person/s receiving the salt would have immediately recognised and understood the size and 'value' of whole or half cakes. In this sense perhaps salt cakes were linked to individual salt producers, as they could have been sealed or tied with material that symbolised the producer.

If other types of containers were used, this could have represented a move away from the identities of individual salt producers forming a significant part of the finished product.

No doubt the other types of non-briquetage container would have differed regionally, and topographically (land-based versus water-based) based upon available forms/raw materials, different types of consumer, scale of output and overall distribution mechanism. In short, this makes 'tracking salt' inland, extremely limited, and at best only possible on a regional basis, and perhaps by examining other modes of distribution for other products. The fact that apparently there was no one type of container singularly used for salt distribution across time and space, does support the premise that mechanisms of distribution and supply, varied regionally, and probably between individual production sites.

Types of container would also have been linked to the modes of distribution. For example the difference between salt that was distributed straight from producer to end-consumer, and salt that was taken to an intermediary area such as a market, and then traded could have meant the difference between temporary or permanent containers. Salt could have been either packed into specific and perhaps smaller containers that could have been used by the end consumer to directly store and access their salt, or transported in large sacks and then poured re-distributed in permanent containers as determined by consumer and intermediary trader.

If we assume that the use of pre-defined and measure salt cakes became less practical, then it is probable that instead of carried out at source, salt was

quantified/measured down the line at the source of redistribution. Those using larger quantities of it for more commercial purposes, such as butchers salting meat in urban towns, would presumably have sought to have the salt transported directly from source, and then stored it within large containers, even sacks. For some consumers, there could have been an arrangement directly with the production site, for others, they may have had to wait for the salt supply to come through various other areas, i.e. down the line, and be content with what was left, after the main consumers had taken their dues.

However, even with the impracticalities of briquetage, a stated earlier, the limited continuation of use for these containers in the Romano-British period shows that changes in mechanisms did not involve completely cutting out older versions. In some areas, no doubt older exchange mechanisms continued, linked to deeper culturally embedded traditional beliefs and acts, despite the wave of new Roman culture.

Evidence for traditional exchange systems versus more monetary based economy is also of interest here as it is generally considered that a more modern monetary based trade system would have been in-use in the Romano-British period. This is potentially supported by the reduction in the use of briquetage salt cake containers. It is has also been suggested, that a breakdown in this more 'modern' system was a significant contributor to the decline of the Roman Empire in Britain, during the 4<sup>th</sup> century AD (Esmonde Cleary 2000), and as a result, at this time:

Exchange will not have ceased, but it had to revert to non-coin-using modes and so presumably became re-embedded in social relations of exchange rather than mediated through an independent, monetised system. (Esmonde Cleary 2000: 140)

Therefore, this suggests that older traditional exchange systems could have been revisited, some three centuries down the line, however there is no evidence for the use of briquetage containers being used once more as the primary mode of transport. This doesn't mean to say that older exchange systems were not revisited however, as it is probable that by this stage salt could have been distributed in any 'handy' containers that were available, including organic vessels.

Overall, this does raise an interesting point about how the older exchange systems can be perceived by archaeologists. There is perhaps a common assumption that that once these systems were pushed to the side in favour of large scale, more complex and 'modern' monetary based economy, that it meant it also become socially 'sterile' and outside of the realms of symbolic belief systems (see the quote above). Although this could be true on one level, it is highly improbable that salt, salt-production, distribution and supply, suddenly and completely passed out of the realms of deeper meaningful socially embedded beliefs and perception. The evidence discussed in **7.6.2** has all been testament to a continuation of this belief and behaviour. It is clear that the Romans also carried certain similar belief systems which were acted out (for example the inscribing, breaking up and burial of lead containers used in salt-production).

This raises an interesting point, as to how we perceive the 'everyday' and 'mundane' world, to the 'deeper, symbolic and socially embedded world' in prehistory and the Roman period. This was briefly considered by the author during a conference in 2008 (Hathaway 2008), as the two were likely never separated in the past. Although the two have been considered differently and separately in this chapter for ease of presentation and discussion, in reality it was probably not separate in many of these communities.

Their lives were lived in a massively differently understood and perceived world than in present times, and it is probable that although at times of stress, or change, that symbolic acts would have been intensified and amplified, that life was lived in both the mundane and symbolic simultaneously. This view is supported by Nenquin in regards to prehistoric salt consumption, where he suggests that the two intertwined:

The salt which preserves the food, automatically becomes a symbol of eternity, constancy and force (Nenquin 1961, 10).

Finally, although not discussed here, there is evidence for the use of inland sites such as hillforts in Wessex, as re-distribution hubs (also possible Mode 8 sites?) or markets (as highlighted previously), as evidenced by the presence of these distinct salt cake containers. It is important to also add, that secondary products using salt from the same sites, mainly in the form of salted meat, would also have followed exchange networks and routes. With this in mind, there is evidence in at least one important Late Iron Age trading settlement, for the trade in, and probable storage of, salted pork, in the form of meat bearing bones on the site (Maltby 2006).

#### 7.6.2.4 Overview

In summary, sections 7.6.1-7.6.2 have presented the following points:

- 1. Conspicuous, symbolic and low level salt consumption was in place up to the Late Iron Age in Britain
- 2. Salt, salt-production and consumption, continued to be symbolically and socially embedded in some Romano-British communities
- 3. Briquetage salt containers continued to be used in the 1<sup>st</sup> centuries BC-1<sup>st</sup> century AD in particular, as a predominantly symbolic act of gift exchange
- 4. Salt producers from Gaul came over to Britain (Dorset to start with) in order to help meet the greater production needs for salt due to a decline in Gaul
- 5. Increase of salt-production in 1<sup>st</sup> century BC Dorset (Poole Harbour) as well as specialisation in salted pork, linked to cross-channel supply, probably heavily focused upon the military
- New transport containers would have been required (if not in use already) by the 1<sup>st</sup> century AD to cope with larger scales of salt and an increase in the use of waterways and sea routes for transport
- 7. 1<sup>st</sup> century AD *increase* in symbolic acts associated with salt production and consumption as a cultural response to a period of change and probable stress, as well as an indicator of merging and new associations influenced by arrival of new cultures

These points all provided some contextual information for pre-1<sup>st</sup> century AD saltproduction, which included looking at the issue of different types of consumption, and their potential impact. This also considered the possibility that Britain was already supplying salt and salted foodstuffs to mainland Europe before the 1<sup>st</sup> century AD. This provided a good explanation for the increase in salt-production in Britain during this time, as well as considering the transition between 'need' and 'want' for salt. This included the travelling of salt producers from Gaul to Britain before and after the 1<sup>st</sup> century AD as a response to the need for substantially more salt than previous. Further evidence for the response to changing salt consumption and distribution, especially in the context of the inclusion of Britain in the Roman Empire in AD43 will be explored further next. This will include looking at changing mechanisms of production, distribution and supply during this significant period of change in Britain.

#### 7.6.3 Responding to Change: Exploring the Development of Production, Distribution and Supply Mechanisms between the 1<sup>st</sup> century BC and 2<sup>nd</sup> century AD

Firstly, and put simply, there was a strongly response in Britain during the 1<sup>st</sup> century AD for an increased requirement for salt. This could have been potentially met on a basic level two main ways: internally and/or externally (Table 7.11)

It is proposed that there is evidence for a 1<sup>st</sup> century AD (and post-Roman conquest) response internally and externally, with two of the methods in Table 7.11 certainly evidenced (Option 2 and 3), and a third (Option 1), only evidenced in a very restricted geographical area.

Table 7.11 Main methods available to meet the requirement for more salt in the Romano-British period

INTERNAL	EXTERNAL
<ol> <li>Response was met be existing salt</li></ol>	<ol> <li>Bringing in existing salt producers from</li></ol>
producers increasing scale of output	outside of Britain to boost site and
on existing sites	producer numbers
<ol> <li>Response was met by the creation of</li></ol>	<ol> <li>Importing of salt to boost quantities</li></ol>
new salt producers and sites	internally

Evidence for Option 1 (Table 7.11) in general, is little evidenced, there was such variety in hearth sizes and forms *before* the 1<sup>st</sup> century AD, including multicontainer hearths. However, there is one exception to this, and that is in the North Somerset Levels, this area remains a 1<sup>st</sup> century anomaly. As described in **6.0**, Site 239 in particular stands alone at this time, with the building-column style very large robust pedestals. Although the hearth evidence was heavily truncated, these pedestals were so substantial and robust that they *must* have been created in order to support very large (certainly lead) containers. This infers very large-scale salt-production not seen on a single site anywhere else in Britain at this time.

The fourth option would not really have been required given the number of sites in operation, however it is possible that a small-scale symbolic salt exchange across the channel in some areas to maintain deeper links.

First and foremost, the evidence shows that in the main, as opposed to increasing the scale significantly on existing sites, the strategy appears to have been to produce the same levels of salt, across significantly more sites (Option 2). This was completed alongside the incorporation of salt producers from areas external to Britain (predominantly Gaul) travelling over to boost numbers.

The period between the 1<sup>st</sup> century BC-1<sup>st</sup> century AD is highly significant and of interest, as it is an important period of transition and change in the history of Britain as a whole. It is the period when Britain *responds to*, and eventually *becomes part of*, the Roman Empire, however attempting to differentiate between the 1<sup>st</sup> century BC/1<sup>st</sup> century AD on archaeological sites, as has been highlighted previously, remains difficult.

As has been presented in sections **7.6.1-7.6.2** (also see Figure 7.38), there is evidence that Britain was already responding to significant changes in Gaul, which is best evidenced in Dorset especially. This includes evidence for specialising in the salting of pork in Poole Harbour and the moving of producers from Gaul to Poole Harbour. In fact, Gaulish salt-production technology continues to be evidenced in Britain throughout the Romano-British period (as outlined in **7.4.2**), indicating continued movement and response to change, and this will be considered further shortly.

Although it has been suggested that there were existing trade links with the Roman Empire before it officially spread to Britain in AD43, the reality of Roman conquest would still have had profoundly massive influence on Britain, and inevitably would have affected existing mechanism of supply, including the quantities of salt required.

Presumably, the new arrivals expected to have a salt supply quite quickly, and this would presumably have been far beyond the previous supply needs. Given the apparent decline in salt-production within Gaul alongside the arrival of the Romans, the inhabitants of Britain found themselves very much in the centre of a far more intense production and supply chain.



Figure 7.38 Timeline showing main responses to change (as evidenced in salt-production) during the 1<sup>st</sup> century BC-4<sup>th</sup> century AD (large yellow square shows period covered by Roman Empire in Britain and the vertical dashed green line shows the end of coastal salt-production in the study area

As summarised in Table 7.11, there were three main methods of response to this change, of which the most dominant, was to vastly increase the number of salt-production sites in the 1st century-*c*.mid 2<sup>nd</sup> century AD.

This quick response was the most effective in the first instance, and predominantly involved the creation of Mode 2 sites. These sites often have little evidence for domestic or general occupation debris, as well as a lack of stratigraphy, which supports their temporal short-lived nature. Mode 4 complexes also provided a significant role in salt supply at this time, but in contrast to Mode 2 sites, probably provided a longer term more sustained area for production. They also would have been easier to control and useful as areas within which new producers could be 'shown the ropes'.

The overall result would have been to saturate the market with salt, and probably similarly, other production processes would have followed suit.

### 7.6.3.1 Increase in Mode 2 sites as a 'quick and adaptive response' to the Roman conquest

These sites represent the ultimate salt-production site, the most popular form of site: the small, single, simple, enterprise with a single working area. These can typically contain single hearths and tanks, as well as multiple hearths and tanks.

This mode of site, is not only ideally suited to liminal coastal environs, but also represents the most flexible, adaptive, easy to reproduce, temporal/seasonal site. Most significantly for this discussion, it represents the mode that was best suited to responding quickly and reacting to a need for more salt, or changes in mechanisms leading to relocation of activity.

Although more exact dating is not possible, the drop-off in site numbers experienced during the 2<sup>nd</sup> century sometime (site numbers never recovered to the 1<sup>st</sup> century level) is good evidence for a short-lived responsive post-AD43 burst of salt-production, which for several reasons, was not sustainable longer term.

Therefore as highlighted in **7.5.5.2**, '....these sites were mostly single enterprises linked to local communities, they were the most free and flexible to react to

changing needs and consumer. This fits the profile of a quick and tailored reaction to the Roman conquest.

### 7.6.3.2 Mode 4 complexes as longer term, and sustainable supply areas: Poole Harbour, Dorset and Romney Marsh, Kent

In the study area, there are two Mode 4 sites predominantly being used during the 1<sup>st</sup> century AD and then one in the 2<sup>nd</sup>-4<sup>th</sup> centuries AD. It is considered that all Mode 4 sites shared the same basic reasons for creation, however the circumstances as to why they were created although relating to changes, was different. The first 'round' in the 1<sup>st</sup> century AD (Lydd Quarry, Kent and Furzey Island, Dorset) can be viewed as a response to a sudden increase in population and an increase in consumer types. The second round in the predominantly 3<sup>rd</sup>-4<sup>th</sup> centuries AD (Central Somerset Levels and potentially Stanford Wharf, Essex) were a response to a decline in salt-production which was either 'positive' i.e: a deliberate (an attempt to restrict and centralise production) or was 'negative' i.e: a reaction to a breakdown in supply mechanisms and unforeseen decline in production. This later 'agenda' and set of issues, will be explored further shortly (**7.6.4**).

They also differ to Mode 2 sites in that they required far more management and organisation, and were probably connected to specific supply chains.

#### Basic Reasons for creation of Mode 4:

- 1. To meet a requirement for more salt (because of a lack of existing sites or a decline in existing sites/scale of production)
- 2. To make control of salt-production and distribution easier
- 3. To create a consistent product (same grade/quality of salt)
- 4. To potentially supply specific consumers with a more consistent and stable supply of salt
- 5. To create an arena within which new salt-producers could easily be 'trained' and knowledge and technical skill shared
- 6. A quick and intense response to crisis or problems with usual supply

#### The outcome was also similar:

- 1. Most salt-producers had a reduction in the control and freedom they had and a small number of individuals controlled production and distribution
- 2. Probable consumer-led control and management
- 3. More salt was produced
- 4. Seasonality becomes less of an issue as large numbers of workers could exploit the short summer months
- 5. Created pressure upon and competition with, smaller sites (for example Mode 2 single enterprise sites)

As considered previously, discerning whether these sites were the result of chosen collaboration between multiple salt producers, or the result of Roman control is difficult. Given the evidence for use of space, it would appear that these sites were centrally managed, this could have been managed by a salt producer, or an intermediary, or even by consumers. The case of the later Mode 4 complex in Central Somerset is far more straight forward, as the location, uniformity, technology and scale of production is strongly linked to Roman military/higher authority involvement. The case for the 1<sup>st</sup> century AD Mode 4 sites in Dorset and Kent is less straight forward. They are less uniform with more evidence for individual preference (including freedom of technological choice) which perhaps does reflect more of a collaboration of individual salt producers. Perhaps multiple traditional salt producers came together as a way of protecting their interest, as well as making production and supply easier. It is also possible that these sites were deliberately instigated and managed by the larger consumers, such as urban centres and the military. This would explain technological uniformity between multiple salt production working areas, as the site 'manager' would probably 'set down' the desired technique/technology and this would have meant more consistent output and grade of salt across the whole site.

Importantly, the creation of Mode 4 sites meant that it would have been far easier to *control* not only production and producers, but also distribution, which, at times of stress and change, would have been highly preferable. This may have been particularly favoured by specific large consumers such as urban areas and the military and would have been ideal for creating consistent supply within presumably stable mechanisms of supply. Perhaps this would have been preferable to scattered liminal sites where access to trade routes may have been more difficult and taken longer. This control may have been by Roman authority or similar, or salt producers that took advantage of being able to supply higher quantities of salt.

The training of new salt producers in 1<sup>st</sup> century AD Britain would also have inevitably been required. Mode 4 sites would have created an ideal arena for knowledge transfer. This would have meant that individuals that un-skilled salt producers could effectively be 'trained' on a working area and then copy the same scenario in their own working area. Although speculative, it could also have meant competition between salt producers within these 'super-sites' could have been encouraged, especially with them all working in such close vicinity to each other, which presumably would have meant higher yields of salt. Alternatively, it could also served as a way of removing freedom to compete, and instead reduced saltproducers to manual labourers using uniform technology and techniques, with no distinction between salt produced as it all was just seen to represent a single common yield by the site.

One important consideration at this stage, is that the Mode 4 sites in Lydd Quarry, Kent and Furzey Island Dorset, were well-placed geographically for supply to the Roman military especially. As stated above, Mode 4 sites were an ideal arena in which technological knowledge transfer made. In contrast, although similarly created in a response to a significant need for more salt, Mode 2 sites were single enterprises that could be created far quicker and with greater ease. However, both modes (indeed all modes) would have required the establishment of new, or utilisation of old, supply routes in order to survive.

In summary, both Mode 2 and Mode 4 sites, have great potential to inform on response to significant changes in the requirement for salt such as an increase in population or in response to a need for more salt (within and potentially outside of Britain). Emphasis has often been placed on the supply of Roman authority/population/military in this chapter, however clearly there would have been a larger population outside of this arena that also would have wanted access to salt. Perhaps the Mode 4 sites were specifically set up to supply the limited higher status/authority/military members of the population, and Mode 2 supplied the rest of the population. This does appear very simplistic a view, and it was very likely not that conveniently 'clear cut', but the use of certain sites for restricted consumer markets is highly probable. This is considered further below.

616

### 7.6.3.3 Restricted consumer supply? Poole Harbour and Medway Estuary as mid-1st century AD supply hubs

The theory that the increase in salt-production over the 1<sup>st</sup> centuries BC-1st centuries AD was assisted by the movement of Gaulish salt-producers to southern and eastern Britain responding to a need for many more specialists is very plausible (as suggested in **7.6.3**). This would no doubt have been strongly supported and encouraged by the Roman administration once established in Britain. In fact it is also plausible that some Gaulish salt-producers in the 1<sup>st</sup> century AD came to southern Britain as part of the Roman Army. It was common in the Roman Empire for legionaries and auxiliaries to be recruited from one area and then were required to serve in another (Russell and Laycock 2010). This is further supported by evidence for '...the majority of auxiliary units sent to Britain...originally...raised in the areas of Germany, Gaul and the Danubian provinces' (Dyer and Darvill 2010: 133). Perhaps the evidence for Gaulish technology in Poole Harbour supports that recruits from Gaul especially, were placed in this area. It is also well known that a temporary military supply base was created in Hamworthy, Poole during the early stages of the Romans arriving and therefore Poole Harbour was clearly an important area utilised by the Roman Army (Peddie 1987; Dyer and Darvill 2010).

The use of Poole Harbour as a military supply hub in the 1<sup>st</sup> century AD is supported not only by the number of sites, as well the Mode 4 complex at Furzey Island, but also by the discovery of a military supply base at Hamworthy (Shapwick Road), (Bellamy 2003 a;b). This base is thought to linked to the Lake Farm fort by road (Smith 1932; Field 1992), which is considered to represent a base for the Second Legion Augusta, created during the early years of the conquest (Field 1992). However, this supply base was extremely close to the earlier salt-production site to the west (Site 231) which appears to have pre-dated and potentially been contemporary with this base, and Site 213 appears to have post-dated this supply base as it overlays some of the filled ditches (Bellamy 2003 a;b).

The potential pre-conquest 'trade relationship' between Poole Harbour especially, as well as Hengistbury Head, and the Roman Empire in Gaul, was considered in **7.6.2.2**. This included the potential that there was either an acceptance of sorts with the Roman Empire, by trading with it, or a potential 'out of sight out of mind'

strategy. This could have been completely by choice, or perhaps more probable. predominantly forced by Caesar effectively shutting down the previous and traditional trading partners with the conquest of northern Gaul especially. This remains a generic overview, and no doubt some leaders (kings) and communities chose to align with the Roman Empire, whilst others would have shunned it, even In this context, the Vespasian 'attack' on this within the same regions. geographical area (covered by the Durotriges) in AD45 is of particular interest (Peddie 1987). It has been painted as a brutal attack on the Durotriges as a way of forcing them to submit to Roman rule, this strategic move also appears to have put activity in Hengistbury Head into decline, and favoured Poole Harbour as the site of a planned supply hub for the military (*ibid*). Given Poole Harbour was so rich with production and trade activity before this time, rich in natural resources, as well as having a well-established trade link with mainland Europe, having a natural harbour, and being located centrally with southern Britain, made it an ideal area for a supply base (Dyer and Darvill 2010).

Vespasian's presence in the area could have been to force a violent submission upon locals, or perhaps, was less aggressive, and was there to re-inforce and preserve existing trade and personal relationships. The presence of the military in such large quantities so close (predominantly at nearby Lake Farm) would have no doubt felt particularly threatening, but the consequence of this was that Poole Harbour continued to grow and thrive, and salt-production similarly followed suit. Black Burnished Ware particularly thrived as an industry as it became a huge supplier of pottery to the Roman military (Allen and Fulford 1996; Dyer and Darvill 2010). Whether outside of industry and trade, the locals suffered more at the hands of this sudden presence is possible, but it is clear that whether it was forced or not, many locals would have presumably gained from working within a rich production zone.

The Medway Estuary, although not having evidence as yet of a similar supply base, and was also well-placed geographically, to supply the Roman military, including the navy, upon their AD43 invasion in Kent.

Although a parallel is yet to be found inside or outside of Britain, perhaps the unique technology exclusively seen in the Medway Estuary ('slotted lumps', as explored in **5.3.2.3**) is not due to a native innovative episode, but attributed to 618

technology used outside of Britain, and therefore indicative of travelling saltproducers. Perhaps in this case, salt producers from across the channel came to Britain with or even part of the Roman military, in order to quickly set up a salt supply in this area of the country, as Dorset was at some distance to the southwest. These apparent portable hearths, were perhaps part of a travelling 'kit' that meant very quick surface hearths could be created in any environs close to the sea.

The evidence for Kent is also even more compelling when considering that there is little significant evidence for pre-1<sup>st</sup> century AD salt-production. This is with the exception of Site 82 at Lydd Quarry, which does appear to have Late Iron Age origins, but it is probable that this was small-scale, and that it did not become a Mode 4 complex until the 1<sup>st</sup> century AD. This still represents a limited geographical coverage, and there is little evidence for similar activity in North Kent, contrasting massively with the 1<sup>st</sup> century AD evidence in the Medway Estuary especially. The impression in North Kent is one of a sudden beginning of salt-production in the 1<sup>st</sup> century AD, which cannot be divorced from its key geographical position in the Roman conquest of Britain. Neighbouring Essex would have also been a key player in providing salt to the new Roman population, evidenced in the dominance of sites also dating to this period.

The idea of creating supply hubs and/or new production sites, with the incorporation of producers from other countries can also apparently be extended to pottery production. It is also generally considered that pottery producers based in north Gaul relocated to Britain during the middle 1<sup>st</sup> century AD to be within 'greater proximity to consumers and new markets' (Mattingly 2007: 513-514). This can now be extended to salt producers also relocating from Gaul, possibly from the same region and communities. It is also possible of course, that the people were one and the same, and specialists in both pottery and salt-production.

This is even more significant when considering that both Poole Harbour and the Medway Estuary have evidence for contemporary salt and pottery production. Although there were no certain Early Romano-British Mode 5 sites in Dorset, but at least two potential Mode 5 sites in the Medway Estuary (Sites 299 and 311).

#### 7.6.3.4 Increased complexity of distribution and supply mechanisms

The bigger variety of modes from the 1<sup>st</sup> century AD supports the view that mechanisms changed significantly, and that more variation of site and ways of provision to consumers were required. This more complex 'tree' of site types, modes, distribution and consumers, meant that a more competitive and flourishing industry could develop, where producers had a variety of options on who to supply, where to supply, and what to supply (original product V secondary additional products). It is also assumed therefore, that there would have been more 'access' to salt by more people, with more competitive 'value' and less possibility of 'salt poverty'.

However, it is also possible that if there was specifically 'Roman' control of many sites, in terms of what happened when the salt left the production sites, meant that they prioritised themselves as the main consumers, including elite and military personnel for example, which left the general population having to take whatever was basically leftover. If as suggested by Kinory (2012: 29), in the Iron Age, that ...availability, in general, negatively correlated to distance from the production source', then those living furthest from the key areas of activity would find it hardest to obtain salt. However, the picture could have been potentially more complex than this, even before the 1<sup>st</sup> century AD, as it assumes that all the population had equal and free rights to obtaining and consuming salt. By the Romano-British period, especially in the earlier stages, it is possible that in order to immediately supply the incoming new population with their requirement of salt, that it was in the main re-directed and dominated by these few, leaving the rest of the population in shortage. This situation could easily have spurred a reaction to this crisis, with a guite sudden increase in salt-production output and site guantity, which is reflected in the site data for the study area.

It is also plausible, that if Mode 8 sites did indeed exist, that they represented a change in mechanism where intermediaries were used in the distribution of salt (see Figure 7.39), and more organisation and control was taken out of the hands of salt producers.





#### 7.6.3.5 Use of Intermediaries?

It is also possible that at this time more control and management over salt after it left the site was given over to intermediaries and traders as opposed to the previous system where producers had more control over the whole process. This would have meant the producers had more time to concentrate upon production and that more competition grow between sites and traders. Previously 'set' quantities and values for salt disappeared and value changed dependent upon consumer types, location of production sites, mechanisms of distribution and locations used to trade salt.

Whether the use of intermediaries was always optional, or in fact for many sites a compulsory enforced situation is unclear, however in most cases no doubt this

situation was advantageous (even if perhaps culturally/politically 'uncomfortable' for some) and enabled the product to reach potentially far reaching areas and certain consumers. It has been speculated that both direct producer-consumer relationships existed at the same time as the use of '*negotiatores*' to ease distribution (Esmonde Cleary 2000: 91). This would presumably have depended upon the level of freedom and choice available to the producer, individual preferences, location of producer in relation to consumer, markets and towns, as well as relationship between producer and consumer.

#### 7.6.3.6 Change in mechanisms to suit growing urbanisation and specialists working in towns? Urban Trade Hubs (Towns) V Rural Market Economies

There is good evidence for many types of producers, especially potters and butchers, accumulating far more in urban areas near and within towns, specialising in the supply of specific consumers, predominantly the more wealthy Romans and the military (Millett 1990; Esmonde Cleary 2000).

The economic structures of the Roman empire encouraged the rise of the specialist artisan and the production of goods in workshops close to markets. (Mattingly 2007: 515)

Discussions about differences between rural and urban market economies in terms of salt-production, is a little more difficult when compared with other production processes that could relocate closer to urban areas if required to 'tap in' to certain consumers and specialist production practice. Salt-production could only ever be directly within the area of saltwater, and for the primary salt crystallising, could not be located anywhere else. Therefore, there was no real option for 'urban specialised salt-production workshops' in the sense of being located within these key urban areas, other than perhaps those sites exploiting inland springs.

However, as has been emphasised several times previously, the nature of saltproduction means that unlike pottery workshops, where clay could be transported from original source inland wherever required, salt-production had to stay close to the source: saltwater. There would perhaps have been more scope for specialist 'urban' workshops with the inland brine spring sites across the Cheshire area, however coastal sites had to remain coastal. Therefore, it would seem more plausible, that many more liminal salt-production areas exploited growing rural markets:

The growth of rural production in southern Britain is also indicative of a marketbased economy (Mattingly 2007: 498)

However, as has also been shown by the creation of the modes of salt-production, there is also evidence that some sites specialised in the supply of specific consumers directly, perhaps with secondary goods such as salted meat and cheese.

Many salt producers likely responded to urbanisation and development of new towns by specialising in meeting their supply and consumption needs. With the development of these new urban centres, came specialists in butchery and meat supply, and it is entirely plausible that this could have meant collaboration with salt producers in order to flavour and preserve meat. There is also some evidence that a small number of salt producers chose to specialise in salting meat on-site as a secondary product. With such a change in the variety of consumer types, it is also probable that some producers specialised in the supply of salt and indeed secondary products such as salted meat to specific consumers, including the military. Becoming a supplier to urban centres and military units would have provided much stable and consistent work for salt producers, and this could be strongly linked to the evidence for collaboration between multiple salt producers to create 'super' sites (Mode 4) to meet the needs of these consumers.

In conclusion, there is strong evidence that there was a quick reaction to the arrival of the Romans in Britain running alongside attempts to create a more sustainable system (which did not come to fruition according to the 2<sup>nd</sup> century AD decline). Opportunistic native salt-producers 'jumped on the band-wagon' by starting up many new salt-production sites, which were short-lived and temporary. The lack of domestic debris, although also linked to site location, also likely reflects the presence of a short-lived, temporal site, as there was little time to collect the quantities of human detritus that is usually associated with any length of human occupation anywhere. It is probable that nearly all these producers carried out other activities and roles during the rest of the year, and simply chose to spend probably only a few months of a given year during the latter half of the 1<sup>st</sup> century AD, producing salt to fulfil a need for more salt.

#### 7.6.3.7 Overview

In summary, by exploring the evidence for trends in salt-production and supply during the 1<sup>st</sup> century AD, an overview of the general progression of gaining salt through a gradual strategy can be traced. This chronicles a huge expansion which is quickly followed by a retraction and decline in the 2<sup>nd</sup> century AD. The most likely strategy of action in the last half of the 1<sup>st</sup> century AD based upon the location and nature of sites is listed in Table 7.12.

	Action	Summary
1	Exploit existing salt- production and supply	Predominantly from Poole Harbour, Dorset and Lydd Quarry, Kent (as well as inland sites, and the Fens and Essex in general) Could also have exploited salt produced in coastal Somerset and North Somerset, as well as Hampshire (the Three Harbours) to a lesser degree if needed
2	Encourage an increase in the quantity of salt- production sites and salt producers	Predominantly in existing areas of activity (pre- AD43) across mostly Dorset and Kent (as well as the inland sites, Fens and Essex in general). For example, although still heavily restricted to the Isle of Purbeck and Poole Harbour, focus of salt-production spread from the southern shores of Poole Harbour to the northern shores, and Poole becomes main area of focus in this area. This strategy of creating more sites to increase the supply of salt, as opposed to increasing scale of production on existing sites, was common
3	Increase scale of production and output on limited sites	For some inland sites, and North Somerset, the scale of production as evidenced by the technology and features, was considerably higher than most other sites
4	Use of native <i>and</i> Gaulish population to create new salt producers	Predominantly created from native population, but also boosted by movement of Gaul salt-producers to Dorset and Kent
5	Exploit geographically new areas within existing salt-producing regions	For example, Kent previously had main focus in the Romney Marsh, southern Kent then new area of activity were created in North Kent, including Medway Estuary
6	Install a group of specialist (non-native) salt-producers that are within or strongly associated with the military, within the Medway Estuary?	(Perhaps conscripted salt producers?) Group could quickly produce salt in new environments as required using unique portable hearths
7	Create strategically placed supply hubs	Evidence within the inland sites, and within Essex, Dorset and Kent particularly prolific and led to the creation of supply hubs in at least Dorset (Poole Harbour) and Kent (north

Table 7.12 Post-conquest (1<sup>st</sup>-2<sup>nd</sup> centuries AD) mechanisms of salt-production and supply

		and south), as well as Cheshire (most directly linked to the military), potentially North Somerset and Essex. The inland sites were of particular interest to the military and exploitation on a larger scale inland can be evidence from at least AD70 at King Street, Cheshire (see <b>7.5.5.5</b> ) and probably earlier, in the marshland within the North Somerset Levels
8	Encourage multiple modes of sites to supply multiple types of consumer, and create regional as well as central mechanisms of supply	Initially mechanisms were geared towards the location of military bases and then overtime it was extended to suit settling of increasing Roman population
9	Create an even geographical coverage for supply	By the later stages of the 1 <sup>st</sup> century AD, multiple areas of salt-production, with focus predominantly upon the inland sites, North Somerset, Dorset, Kent, Essex and the Fens

This remains a generic overview of primary changes and trends in mechanisms, and it is also important to state that there could have been subtly differing mechanisms in different regions, perhaps dependent upon main consumer supplied. In the whole however, the overall scenario of change does appear the most likely explanation for transitional mechanisms of salt distribution and trade by the end of the 1<sup>st</sup> century AD.

In reality, the 'Golden Age' reached from the 1<sup>st</sup> century BC-1<sup>st</sup> century AD, but was still relatively short-lived and could have lasted as little as 50 years. This suits the scenario of response to the encroaching and eventual arrival of the Roman Empire and is further supported by the general lack of domestic debris on most sites suggesting temporality. Other evidence indicative of long-term site use such as different phases of features and general built up stratigraphy is also significantly absent on most sites, further supporting this temporary and short-lived 'responsive' sites.

As stated earlier, it is a real possibility that Britain became an important hub for salt supply reaching far wider than the shores of this country. Given the hundreds of sites across the Fens, Essex, Kent, Dorset and Cheshire in operation during the 1<sup>st</sup> century AD this remains plausible. However, more collaborative research on the chronology and technology of salt-production during this crucial period in France and Britain is required before exploring this potential scenario further.

Although emphasis has been placed here on the potential involvement of the military in the setting up of new mechanisms, certainly ascertaining whether were associated with certain sites also, is not clear cut. The evidence for inland sites is far more compelling, but ultimately discerning this for certain on most coastal sites is limited.

Mattingly (2006: 498) emphasises this issue, as when attempting to 'differentiate army-related production from other manufacturing', he states that 'in some cases they appear to be inseparable'.

As production expanded in the 1<sup>st</sup> century AD especially, it necessitated the creation of new mechanisms to suit the increased levels of salt produced and increased consumer and distribution point types as explored above. However, by the 2<sup>nd</sup> century AD, the situation changed.

This requires further consideration in the wider historical and geographical context. This will include considering whether the 2<sup>nd</sup> century site decrease was a response to a 'negative' situation or event or perhaps a deliberate response to a 'positive' situation or event evidence requires further consideration.

## 7.6.4 Responding to Change: A 2<sup>nd</sup> century breakdown in organisation or a deliberate centralisation and 'streamlining' of a successful industry?

After the intense salt-production seen in the 1<sup>st</sup> century AD, there inevitably would have been a period of re-adjustment and settlement. The drastic reduction in the number of sites by the 2<sup>nd</sup> century AD reflects this 're-adjustment' as well as a probable change and development in the mechanisms of production, distribution, supply and trade, which could either have been deliberate and planned, or was forced by unforeseen (negative?) circumstances.

In most literature where discussion of Romano-British trends in 2<sup>nd</sup>-4<sup>th</sup> century industries and distribution/trade mechanisms occur, it is pottery-production that dominates as the primary evidence and focal point. This is not surprising given that of all the production industries, pottery-production is the most archaeologically visible and understood. Some of the trends seen in the mechanisms of pottery

production and supply, could help to contextualise trends in salt-production, and this will be explored further shortly.

As stated earlier, the economic picture for industry between up to the 2<sup>nd</sup> century AD especially (predominantly based upon pottery production) was well-organised and prosperous with varied wide ranging local, regional and Continental trade networks.

The picture of 1<sup>st</sup> century AD salt-production appears as one dominated by many simple and temporary salt-production sites (Mode 2) springing up across key areas of the coast reacting to the newly arrived Roman population, as discussed previously.

However, as shown in **7.3**, there is a significant decrease in salt-production across most key areas of activity. During and after this time, the number of salt-production sites never reach anything like the heights seen in the 1<sup>st</sup> century AD.

Although in existence, evidence for salt-production in the Fens, Essex and Dorset is slight in comparison to the 1<sup>st</sup> century AD. Due to limited archaeological work in Poole Harbour, and an issue with the invisibility of related archaeological features, it is impossible to ascertain whether this area continued to be a significant player in 2<sup>nd</sup>-4<sup>th</sup> century AD salt-production. However as it stands, the available data has shown that, as stated in **7.3**, of '... the 15 sites operating in the 1<sup>st</sup> century AD in South Dorset, only four were probably still producing salt in the 2<sup>nd</sup> century AD'. Whether these remaining sites were producing higher quantities of salt to compensate for this is unknown so this area cannot be currently considered as a significant player in salt-production during the 2<sup>nd</sup> century AD.

As it stands, the evidence for continued and renewed production in 2<sup>nd</sup> century AD Kent is far more compelling. As also stated previously in **7.3**, in comparison to Dorset, '...at least 11 sites in Kent probably continued into the 2<sup>nd</sup> century AD (including the additional Kent Working Area I site at Sittingbourne with no assigned Site ID)'. Significantly, also, potentially six sites start within the 2<sup>nd</sup> century AD in Kent.
Similarly, Somerset also becomes a significant salt producing area from the 2<sup>nd</sup> century AD, but on a far larger scale, with the creation of the largest Mode 4 complex. Determining how large the Mode 4 complex was in the 2<sup>nd</sup> century AD is currently difficult, as outlined in **6.0**, dating many of these sites is currently not possible. However, with the plotting the few available dates and location of sites, does indicate that it is probable many of the 2<sup>nd</sup> century AD sites are under the alluvium, with the majority of the 3<sup>rd</sup>-4<sup>th</sup> century sites exposed, creating a bias.

Therefore it is considered that production in Central Somerset in the 2<sup>nd</sup> century AD, was either on an equivalent or larger scale larger than the inland sites, and far larger than any other key areas of activity, including Kent.

This suggests that whatever occurred in the 2<sup>nd</sup> century AD, there was a drastic condensing of large-scale salt-production to Somerset, perhaps to some inland sites, and to a lesser degree, Kent.

Since it is highly unlikely that there was a reduction in the requirement for salt, or that salt consumption reduced significantly, other factors must have been at work. Put simply, these factors could perhaps be best viewed as either positive or negative, and are shown in Table 7.13. This is a simplistic method of viewing potential changes, but is useful for ease of discussion, and it is important to consider that there could have been a mix of both negative and positive events/outcomes (i.e the columns and rows in Table 7.13 could be effectively mixed).

'Negative'	'Positive'
Result of breakdown in existing organisation and mechanism	Deliberate re-organisation/ centralisation after 'settling' period
Less sites producing less salt- Inadequate supply of salt (not fulfilling requirement)	Less sites producing more salt- Adequate supply of salt (fulfilling requirement)
A restricted supply of salt to limited consumers (Those in authority, elite, military?) resulting in salt 'poverty' for rest of population?	Good supply of salt to all types of consumer

Table 7.13 Possible contemporary explanations/outcomes for the 2<sup>nd</sup> century AD decrease in the quantity of salt-production sites in Britain

Given the strong evidence for a quick response to the Roman conquest of Britain with an explosion of salt-production sites (predominantly Mode 2), this is considered evidence for a *reactive*, *responsive*, *flexible* and *adaptive* overall mechanism for supply of salt.

It is probable that once the 'dust settled' by the 2<sup>nd</sup> century AD, there would have been some attempt to re-organise and tighten up the previous mechanisms in order to best suit consumption and supply needs. However, it would seem unlikely that it would have involved such a deliberate and drastic reduction of so many sites across most of the key areas of activity if there was choice and pre-planning involved.

Two lines of thought will be explored here, simply put, the 2<sup>nd</sup> century decline was either a planned centralisation of production, or a reaction to the breakdown in production, distribution and consumption network. This could have been due to a variety of potential cultural, political and economic factors, some contenders are listed in Table 7.14.

Table 7.14 Potential contenders for determining whether changes in 2<sup>nd</sup> century AD saltproduction were due to a breakdown in mechanisms (negative) or deliberate re-organisation (positive)

2 <sup>nd</sup> century breakdown	2 <sup>nd</sup> century re-organisation/centralisation
If military were involved in distribution/supply mechanism-rebellion within the army was underway in Britain during this time and could have had negative consequences for trade and overall economy	After suitable settling period, mechanisms were 'tightened' up
Too much competition and site numbers created saturation and a 'crash'. Perhaps salt was produced in such large quantities it devalued?	Centralised and regional production sites produced salt on a larger scale
Decline in long-distance trade to the Continent (and beyond) as well as within Britain effecting mechanisms of trade and supply chains (as evidenced by pottery production)	A new strategy created in order to 'tailor' sites and supply to the needs of the now far more integrated, settled, and growing Romano-British population
Salt and pottery producers so closely linked that any changes in pottery locations and supply chains meant salt production 'followed suit'	
Heavier taxation upon salt as a response to political/military crisis/unrest?	Attempt to strictly control production in limited areas-for most areas it was prohibited
Salt production decreased in popularity as it wasn't viable, and producers chose to do other activities	

### 7.6.4.1 Response to a breakdown resulting in a reduction in output?

If it assumed here, that by the end of the 1<sup>st</sup> century AD (if not earlier) the established authority/administration was in full control of distribution and supply mechanisms, then a breakdown in this group would have directly affected these mechanisms. This no doubt will have been rooted in politics within the overall Roman Empire and within Britain specifically, and 'authority' would have included both 'Roman' individuals and native individuals, who by this time were jointly 'Romano-British'.

If there was a breakdown, then the results could have significant for the entire economy, and most importantly in this context, could have left salt and indeed other product producers 'high and dry'. By the 2<sup>nd</sup> century, salt-producers, as well as other producers, would have been used too, and reliant upon the well-oiled and organised mechanisms of distribution created by the Roman administration. This would have differed significantly from earlier and probably more simple networks pre-dating the 1<sup>st</sup> century AD.

# Out of their hands? External organisation of distribution and supply, and a loss of input by salt producers?

It is probable that across the first two centuries AD, most salt producers had increasingly less control or input into distribution, and effectively, mechanisms outside of their sites, and for some even within the sites, would have meant that many decisions and control would have been taken out of their hands. As suggested earlier, it is probable that the use of '*negotiatores*' would have been a reality for many salt producers. If there was a breakdown in communication and problems between these individuals and those managing them, and there was a breakdown in this 'externally controlled' supply network, it would have been very difficult for salt-producers to 'revert' back to earlier simple networks 'overnight'.

Perhaps as suggested for Late Romano-British pottery production, there were two mechanisms running side by side, whereby some sites had intermediaries or *'negotiatores'*, and others chose the direct approach from site to consumer (Esmonde Cleary 2000: 91). It would perhaps make sense that smaller sites handling smaller quantities of output, could have handled their own distribution, however for larger sites, intermediaries were very likely used. If this was the

case then perhaps it was these sites that were able to continue during the 2<sup>nd</sup> century AD, and re-organise themselves according to their own preferences.

The identification of potential 'Mode 8' sites (see **7.5.5.6**) could also be significant when considering a change in mechanisms, as both sites appear to have pockets of activity either side of the 2<sup>nd</sup>-3<sup>rd</sup> centuries AD. As outlined in **7.5.5.6**, Crandon Bridge has significant activity in the 1<sup>st</sup> century AD, and then not again until the c.4<sup>th</sup> century, and similarly Springhead, Kent, has activity within the 1<sup>st</sup>-2<sup>nd</sup> century AD, and then again in the later c.3<sup>rd</sup> century AD. Perhaps the apparent 'lull' in activity in the 2<sup>nd</sup> century (later 2<sup>nd</sup> century?) and 3<sup>rd</sup> century AD, is linked to a breakdown in distribution mechanisms at this time. Although the briquetage slabs at Crandon Bridge probably relate to 1<sup>st</sup>-2<sup>nd</sup> century AD salt-production, due to the lack of hobnail impressions as commonly seen on later sites nearby.

If they did indeed act as external processing sites, and even more significant, redistribution hubs, then their apparent re-use as such in the Late Romano-British period, could indicate that there was some recovery of mechanisms by this time.

Although others could still remain to be identified, the location of Crandon Bridge, Somerset and Springhead, Kent in relation to the key areas of 2<sup>nd</sup>-4<sup>th</sup> century AD salt-production activity is stark.

### Too much competition: Market saturation and 'devaluing' of salt?

Perhaps the encouragement of an increase of salt-production sites by Roman authority/administration/military in the 1<sup>st</sup> century AD eventually created an unsustainable situation. It is possible that it eventually resulted in a saturation of salt in the trade system, devaluing salt and making some, especially single small enterprises unsustainable.

A further potential explanation is in the wider picture of trade and supply in the Western Roman Empire.

### Decline in long distance trade and a change in the internal mechanisms of trade

The economic picture *up to* the 2<sup>nd</sup> century AD appears to be one of healthy regional and longer distribution networks, and also of sites (specifically pottery 631

producers) that specialised in the supply of specific consumers, predominantly the Roman military (Millett 1990; Esmonde Cleary 2000). However after this and especially by the 3<sup>rd</sup>-4<sup>th</sup> centuries AD this changes. Pottery production best evidences this change. Alongside a reduction in the use of longer distance trade networks to the Continent, there are fewer pottery workshops, but those continuing to exist in general start to become more focused upon supplying geographically smaller, more localised areas (Millett 1990; Esmonde Cleary 2000).

This shift in emphasis to an economy that was far more focused upon internal trade in Britain, also meant that:

...rurally located production centres expand at the expense of those productive units near the civitas centres which had been significant in the early Empire. (Millett 1990: 157)

In this sense, many pottery workshops become far less 'centralised' and industrial, withdrawing to smaller more 'individualistic' workshops (indicating a return to earlier craft activity?), (Esmonde Cleary 2000). This is clearly evidenced in the excavation of Late Roman-British kiln sites in the Nene Valley, New Forest and Oxfordshire, where working areas with single kilns, or small groups of kilns are found 'suggesting an organisation centred on the individual potter or group of potters rather than a rigorously centralised and directed factory system' (Esmonde Cleary 2000: 88).

It is difficult to directly compare trends in pottery and salt production, as although the activities are closely linked in Dorset and Kent especially, the locating of pottery workshops was far more flexible than for salt-production sites. This is evidenced in the clustering of pottery workshops around urban centres during the 1<sup>st</sup> century AD, which was not an option for pottery production sites. Although perhaps there was more flexibility for Mode 8 sites, if, similarly to pottery workshops, there was a source of water nearby. Similarly there is far more evidence for post-AD43 changes in the technology of pottery-production when compared to salt-production. However, as stated previously, their overall distribution and supply mechanisms could have been very similar or even the same for Mode 5 sites and areas of Dorset and Kent. There is strong testament to similarity in chronological and geographical trends for within the Medway Estuary, Kent for example, as discussed in **5.2.6**. The trends in more scattered less centralised and urban pottery workshops outlined above, was predominantly influenced by a decline in long-distance trade in the early 3<sup>rd</sup> century AD:

In the 2<sup>nd</sup> century there had been regular, large-scale movement of goods from the Continent into Britain....the main vehicle for this was the need to supply the army with grain and Mediterranean products... The first half of the third century saw...the decline of the established long-distance trade patterns.(Esmonde Cleary 2000: 83)

Therefore most emphasis during the 3<sup>rd</sup> century AD was upon the use of regional and local distribution networks in Britain, in-line with the 'patterns of the north-western provinces in general' (*ibid:* 85). Although as suggested earlier, it is possible that salt was exported to mainland Europe during the 1<sup>st</sup> century BC-1<sup>st</sup> century AD, it is unlikely that this continued into the 2<sup>nd</sup> century and beyond, given the reduction of sites in operation. It is probable that there was enough issues with reaching an adequate salt supply within Britain, and it is actually more probable, that salt was imported from further afield. However, the reduction of long-distance trade in the 3<sup>rd</sup> century could have greatly impacted salt supplies if this was the case. Perhaps in this context, the evidence for the substantial and unique Mode 4 complex in the Central Somerset Levels can be considered. Although it had strong origins in the 2<sup>nd</sup> century AD, this complex could have been greatly increased and output increased in the 3<sup>rd</sup>-4<sup>th</sup> century as way to respond to the inadequate supply of salt, from within and external to Britain.

### A salt tax?

Perhaps the control of Roman authority at this time extended to not only the mechanisms of supply, but also to the production of salt at all. It is possible that a salt tax could have been imposed as a response to some crisis in Britain and/or within the larger Roman Empire. This could have made production unsustainable for many salt producers (which would backfire on authority when supplies diminished as a result). Similarly, it is even plausible that legislation was placed upon the exploitation of coastal areas, including salt-production.

### The potential implications on perception of, and legislation over, the exploitation of land versus coast

It is of potential interest that the Roman Empire had differing perception, legislation and controls levied upon exploitation of land, coast and sea (Ørsted 1998).

Ørsted (1998) explored the difference in perception and legislation within the Roman Empire by firstly looking at fishing, where he concluded that fishing rights were parallel to understanding salt extraction rights. He showed that there was a difference in Roman legislation between fishing from lakes and rivers (inland) and fishing in the sea (coastal). This was then linked to the way that coast was perceived and indeed treated as 'public' areas with relatively free access when compared to terrestrial areas where access and use came under stricter control and 'land use legislation'. It was therefore suggested, that salt gained from the sea, was less controlled and perhaps taxed, than salt gained from inland sources, which was deemed more as farming (exploiting the land), due to this important difference in location type.

However it is important to note that the inland salt production sites originally referred to in the contemporary texts, could have just been linked to mines (which were certainly taking from land) as opposed to inland salt springs (water).

There often also appears to be a distinction between taking what was naturally provided by nature, and taking that using man-made methods (*ibid*). Similarly, this applied to salt-production, although importantly, there appears to have been a difference between salt taking from inland and that taken from the sea (and possibly inland salt water).

Perception of land, coast and sea is predominantly socially constructed, and no doubt the new Roman population would have had their own understanding, according to their respective traditions. Although the incoming Romans would have consisted of a diverse population of individuals from all other the empire (especially the military), with differing knowledge of how salt was produced, if the legislation was linked to central Roman authority, legislation employed in Italy could also have been applied to Britain. This is important, as this means that from this perspective, coastal salt-production would have been understood as the *natural evaporation* of salt using salt pans as opposed to *artificial evaporation*.

Therefore, there are two potential outcomes based upon whether there was distinction between natural and artificial evaporation of saltwater. Either coastal salt-production sites were in the realms of 'nature' and fishing, and not subjected to heavier control, or because they used artificial methods, they were under the same control as that exerted upon inland production sites. Inland sites were under a double problem as they were not only in the realms of 'land' but also presumably outside of 'natural' as artificial methods were also used here.

We can never know the full picture, however, one scenario could have been, that for the 1<sup>st</sup> century AD, levies were looser or even suspended in order to encourage increased production and competition, and that after the settling period, these were then tightened up, effectively putting many producers under too much strain (especially if there was a financial levy to be paid by producers to produce salt on the coast).

It is also of interest that there is far more evidence for direct Roman involvement in the 1<sup>st</sup> century AD at the inland salt springs of Cheshire and Worcestershire, than coastal sites. This is evidenced in the infrastructure at these areas, military involvement, and the widespread use of lead containers. It makes sense that the inland sites were more highly sought after by the Romans in the 1<sup>st</sup> century AD as these areas were better located for land transport links, easier to create permanent infrastructure, and had a higher yield of salt for less effort. These sites were also probably less at the mercy of weather and temperamental coastal climates.

### **Oppressed salt producers fighting back?**

So far the approach has been to consider a breakdown in external authority as detrimental to existing mechanisms, however it is equally possible that there was eventual resistance and negativity from the perspective of salt producers and they opted out, and were not forced out. Perhaps they became angry and the levels of control exerted over them, and the apparent losing of control over the mechanisms of distribution. This could be linked to the competition encouraged between sites, causing political problems and 'in-fighting' within condensed regions of activity. Although many producers may well have been able to still survive whilst paying taxes and levys, it is plausible that this caused so much resentment and frustration, that they made a 'statement' by opting out of production, throwing <sup>635</sup>

supply into chaos (which would have been a very effective way of 'voicing' resentment). Perhaps the tax on salt also hit too many consumers hard, and broke down chains of distribution as less and less could 'afford' salt.

### 7.6.4.2 Deliberate reorganisation and centralisation?

# Letting the dust settle: Tightening up temporary 1<sup>st</sup> century AD mechanisms?

It is probable that the first century of Roman occupation was changeable, dynamic, reactive and constantly adapting to the new culture, politics and economy which certainly would have taken some time to 'settle' down. Therefore in this setting, salt-producers would be similarly adapting and reacting to the new 'set-up', and within this arena sprung up multiple single, short-lived mainly Mode 2 sites. Russell and Laycock (2010)suggest that this natural period of settling for any new addition to the Roman Empire could have been many generations down the line, when traditional oral histories become weaker. Based upon evidence in other areas of the Empire, this settling period could have taken until as late as the early third century AD (*ibid*).

It is plausible that in the 2<sup>nd</sup> century decisions were made about creating longer term sustainable and more suitable production areas to suit the now fully established, settled and integrated Roman population. Perhaps it simply just took a long time to establish a stable and suitable supply network, and a more 'streamlined' approach where fewer sites (easier to control?) producing more salt, was preferred.

# Attempting to evidence centralisation in a process that was already concentrated in a few key areas of activity

Salt-production naturally appears to cluster in particular/traditional geographical areas, which is linked to the trade/exchange networks, populated areas and ideal waterscapes including estuaries and natural harbours. Therefore in this sense, it is always regionalised and even centralised, without the input of new Roman mechanisms. So any evidence for true centralisation of salt-production in the 2<sup>nd</sup> century AD, would presumably have resulted in a very restricted number of these areas actively producing, or at the least, a far lesser number of sites within most existing areas, and a substantial increase of sites within a few areas.

archaeological evidence supports this, as there appears to be continued production in all key areas of activity, including inland, but with a significant reduction of sites.

However, there is little historical context to suggest that that the situation in Britain was so stable and flourishing at this point, as to allow for a systematic overhaul and centralisation of salt-production. This is also not supported by evidence for pottery production. Therefore, the archaeological evidence needs to be scrutinised.

#### Less sites producing less salt or less sites producing more salt?

One theory that could explain the reduction in sites is that less sites produced more salt, meaning that the desired output at some level continued to be met. However, in reality, and for most sites, there is little evidence in the archaeology to suggest that existing or indeed new sites in the 2<sup>nd</sup> century AD utilised significantly larger hearths on most sites (multiple container hearths were in the main consistently used throughout the Romano-British period, as shown in **4.0**).

One issue with this is that are not many well-preserving examples of post-2<sup>nd</sup> century hearths in the study area (due to the lesser number of sites reducing the probability of preservation in at least some instances) which is an issue. Although there is a rare well-preserved example at Site 30, with a narrow linear (Gaulish style) hearth dating to the 3<sup>rd</sup> century AD of normal size, and interestingly an earlier phase very close by, dating to the 1<sup>st</sup> century AD, had two much larger joined hearths.

However, of significance is that the two largest examples of rectangular multiple container hearths in the study area date to the 2<sup>nd</sup> century (Sittingbourne, as discussed in **5.0**), 3<sup>rd</sup>-4<sup>th</sup> century (Site 166 in Central Somerset). There is also the exception of the 1<sup>st</sup> century site in the North Somerset Levels (Site 239) that utilised the large building column style pedestals which must have been within a significantly larger hearth, as discussed earlier. In general there is also little evidence for larger scale brine tanks on any sites suggestive of larger scale production.

Therefore it is considered that the evidence suggests for most modes other than Mode 4, less salt was produced by less sites, and for Mode 4, more salt was produced on a scale larger than elsewhere.

### Regional 2<sup>nd</sup>-4<sup>th</sup> century AD salt production and supply hubs?

In the 2<sup>nd</sup> century AD, as explained earlier, although on a lesser level, Kent continues as big player in salt-production, whilst Central Somerset becomes the main focus for coastal salt-production which increases by the 3<sup>rd</sup>-4<sup>th</sup> century (explored shortly). However, this appears archaeologically very differently, as most of the Kentish examples appear to represent separate, individualistic single enterprises, whilst the evidence in Somerset is far more uniform and indicative of the creation of a Mode 4 complex. This assumption could change in time however, if it could be proved that the Mode 4 complex at Lydd Quarry, Kent continued into the 2<sup>nd</sup>-4<sup>th</sup> centuries.

Geographically, both regions represent key areas for supply, as simply, one is based to the extent of the south-west, and the other in the furthest south-east. This could indicate that both areas were used as regional supply hubs during the  $2^{nd}$  century AD, and certainly beyond for Somerset, but lesser so for Kent.

Given this evidence, alongside a huge reduction in sites across other former key areas of activity, suggests that indeed Somerset and Kent were regional supply hubs for salt in the 2<sup>nd</sup> century AD.

This slightly alters in the 3<sup>rd</sup>-4<sup>th</sup> century, as although Central Somerset grows and intensifies, the evidence for Kent is far less clear, and at this time Stanford Wharf, Essex just across from the Medway Estuary appears to become a Mode 4 complex also.

The best way to look to explore this further is to one more look at the use of Mode 4 sites as a response to change.

### 7.6.4.3 Mode 4 sites as indicators of change in the 2<sup>nd</sup>-4<sup>th</sup> centuries AD: Deliberate centralisation or an attempt to gain back a broken supply?

As presented in **7.6.3.2**, the basic reason and agenda for the creation for Mode 4 sites was the same: to supply greater quantities of salt in response to a greater need for salt (either deliberate or due to a problem with supply). Importantly, they also provide a way of tightly managing the whole mechanism of production, distribution and supply, which in the context of response to change, makes clear sense.

These sites would have been particular suited to responding to periods of stress, as they were a way of least making sure that some supply of salt was maintained to specific consumers. In this way, it is unlikely they were used as a way of producing more salt for all, and it is suggested there that they were created in order to supply limited consumers only.

Whilst the use of Mode 4 sites for primary source of salt, could represent an attempt to centralise the production of salt regionally in Britain later in the Romano-British period, it still suggests that there was an issue with more scattered sites.

In the 1<sup>st</sup> century AD, it is probable that the single enterprise sites working alone (Mode 2 predominantly), would have had to compete with the Mode 4 complexes, however it is also possible that these large 'super-sites', had particular, differently organised and controlled supply networks. Although this remains speculative, it is possible that single enterprise Mode 2 sites exploited in the main, local rural markets to distribute and trade in salt. Larger super-sites could have had more opportunities and resource to tap into consumers further afield, and even bypass the rural markets for more urban distribution points and even straight to consumer trade.

However in the 2<sup>nd</sup>, and especially 3<sup>rd</sup>-4<sup>th</sup> centuries AD, this scenario appears greatly strained, with far less sites in existence outside of Somerset, and Essex. So this could suggest that, although it is still probable Mode 4 sites continued to supply limited consumers, circumstances did not allow for the existence of many sites outside this mode. This would support the view that there had been a <sup>639</sup>

breakdown in mechanisms, and that in the Late Romano-British period, Mode 4 sites were very much more a reaction to a problem with supply and a lack of adequate production in other areas.

The differences between the Mode 4 site at Lydd Quarry, Kent (Site 82) and the Central Somerset Levels, is significant. Although both represent collaborative centrally organised large-scale group enterprises, there is much more evidence for individualism across the working areas in Kent. Whereas in Somerset, the evidence is highly uniform and space is far more tightly organised, and also the hearths in Somerset are substantially larger.

The technology used, all has a feel of being completely geared towards that environment, and therefore making most efficient use of the area and gaining maximum return. The large deep hearths have an industrial 'feel' that is not seen on any other sites in southern Britain, with the exception of the newly discovered 2<sup>nd</sup> century AD site in Sittingbourne, Kent (see **5.0**). This combined with the uniformity of technology, and 'clean' and expertly managed use of space, suggests a highly specialist and particularly well organised group of salt-producers. The suggestion that the Central Somerset Levels were designated as a 'fall-back' option the later stages of the Romano-British period, is perhaps given more support, in Rippon's (2000a; 2000b) suggestion that this area was deliberately not drained and 'developed', in order to use it for salt-production. It suggests that there was a plan, perhaps some time before was needed, that this area would be used for large-scale salt-production. It is tempting to speculate that this area was intended for exactly such a day, as the time when there was a breakdown in administration, and ultimately, a breakdown in the Roman Empire within Britain.

As alluded to in **6.0**, it is considered that the military were completely involved with the 3<sup>rd</sup>-4<sup>th</sup> Mode 4 activity in the Central Somerset Levels. The technology and features used in the Central Somerset Levels, with the exception of the impressed slabs, most resembled the inland brine sites of Cheshire, and therefore could suggest a link to the military, and even military control, or at least Roman administration control. The use of lead containers meant that sites like this could employ larger hearths, no longer restricted by the limitations in briquetage size. Therefore, a possible scenario proposed for Central Somerset is that specialist salt-producers from the inland spring sites to the north, moved south in the 2<sup>nd</sup>-3<sup>rd</sup> 640

century AD and produced salt in Somerset. This is even despite the current evidence for limited 2<sup>nd</sup> century AD working areas in the complex, as it is considered that substantially more are currently hidden under alluvium or outside it, and are yet to be dated. This would suit the dating for the inland sites in the Cheshire areas, which appear to have largely decreased by the 2<sup>nd</sup> century AD.

The reason as to why the inland sites were largely not continued to be exploited, given the existing infrastructure, military involvement and high salt content, must lie with either a change in military organisation, and/or the need for production sites to be closer to another source further south. This could perhaps fit the proposal by Rippon (2000a; 2000b), that the Central Somerset Levels complex was created primarily to support military across the Severn Estuary in Wales. However, in light of the relatively small number of sites operating at this time, this area of Somerset could have supplied a far wider area and consumer market than the military in Wales, although probable still restricted to limited consumers.

Certainly deciding one way or the other, as to whether this change was due to a breakdown and stress, or a deliberate attempt to centralise and control remains difficult. However, given the evidence outlined here, it is suggested that both took place. is considered that the evidence lt suggests that centralisation/regionalisation did take place, but in response to a breakdown in the previous mechanisms, as opposed to a deliberate and planned systematised reorganisation. However, the evidence that the Central Somerset Levels were kept as a backup for when there was a problem, does suggest that some form of breakdown was expected and prepared for.

The initial breakdown clearly did not result in the complete ceasing of saltproduction or indeed pottery production, and this was simply another example of required adaptation. It remains certain though, that overall salt-production appeared to suffer far more than pottery production during problems in the 2<sup>nd</sup>-4<sup>th</sup> centuries AD, and for most salt producers, this work became unsustainable. If the 2<sup>nd</sup>-4<sup>th</sup> century complex in Central Somerset had not been created, the picture would appear far more bleak, but the fact that this complex has origins in the 2<sup>nd</sup> century and thrived for centuries, must mean that not all was lost and organisation and management survived.

641

That the military were almost certainly involved in the creation and management of the Mode 4 complex in Central Somerset, shows that despite some unrest and much rebellion, that the situation was still able to facilitate such large-scale organisation.

However, no matter how well organised, managed or even controlled, this situation was not sustainable, and sometime in the 4<sup>th</sup> century, Romano-British saltproduction from seawater ceased in Britain. This could have occurred at the end of the 4<sup>th</sup> century, and therefore only a decade or so away from the probable ceasing of the Roman Empire in Britain (considered in **7.6.5**).

In summary, there were many cultural and political factors at play during the 1<sup>st</sup>-4<sup>th</sup> century AD which impacted every aspect of salt-production and consumption at some level. The coming of the Roman Empire had a profound impact on salt-production and without this, salt production and consumption in Britain would have remained on a much steadier and smaller scale. Apparently before the move to supply salt from southern Britain in the Late Iron Age as a response to a need across the channel, salt was relatively little exploited and consumed in Britain. In this sense, the tradition of salt consumption already heavily underway across most of Western Europe, had not spread to Britain. Which demonstrates well, the unique position had culturally by being an island, with its own tradition and apparent taboos associated with salt consumption.

However, it was inevitable that the arrival of the Roman Empire in Britain would massively influence consumption and diet, exposing Britons to new practices. It is well evidenced that salt consumption played, and continues to play, an important part of the diet for many Mediterranean cultures. Being exposed to this would have meant for many 1<sup>st</sup> century Britons, exposure to not only new ways of consuming salt in the diet, but many other different foodstuffs consumption practices. Perhaps it is only at this time, that for many Britons, salt spread out more from the realms of restricted consumption practice, including basic practical preservation, as well as maintenance of symbolic exchange acts, and more diversely into the 'everyday', enabling higher consumption levels and a taste for salt to development.

### 7.6.5 The End of an Era

Discerning why salt-production, as it had traditionally operated for centuries, apparently came to an end by the 4<sup>th</sup> century AD is not straight forward. Any of the factors and scenarios discussed above could have contributed to this, forcing it into decline very early in the overall Romano-British period. Importantly, there is evidence for the thriving continuation of inland salt-production into the 5<sup>th</sup> and 6<sup>th</sup> centuries AD in Droitwich, and this remains the only certain evidence of continued salt-production at this time.

There are two main lines of thought here. Firstly, that there was a change in the character of sites, and that use of space, technology and technique changed enough to render salt-production after this time archaeology ambiguous and almost invisible. It is possible that we currently do not well understand how salt was produced after the 4<sup>th</sup> century AD, and that we need to use ethnographic examples of differing techniques to pursue new evidence for sites after this time, as well as more closely examine post 5<sup>th</sup> century AD evidence (considered in **7.6.6**). Although there was a change in technology (discussed in **7.6.6**) this does not appear until *c*.10<sup>th</sup> century AD. It is also plausible, that for some 4<sup>th</sup> century salt-production sites, that they continued to use 4<sup>th</sup> century pottery types into the 5<sup>th</sup> century as presumably with all production processes suffering by this point, the idea of 'mending and making do' was prevalent.

However as it stands, there is a long gap in salt-production, that no doubt best links to not only highly impacting political changes, but also, just as in the 1<sup>st</sup> century AD, to changes in culture that brought changes in consumption practices (**7.6.6**).

The fact remains that there are no specific dates available to provide a more detailed 'cut-off' point for salt-production sites, other than, according to predominantly pottery dating, sometime in the 4<sup>th</sup> century AD.

There is some debate over the 'official' end of the Roman Britain, especially since it is plausible that a letter apparently written by Honorius in 410 states that British cities should defend/protect themselves (Birley 2005). However, it has been argued that as with other similar sources, there had been a scribal error due to inaccurate understanding of geography and landmark/town/port names and that this warning was in fact for Italy (*ibid*, 461).

As so often in Romano-British studies, the fragmentary historical sources have been taken too much at face value...(Esmonde Cleary 2000: 137)

There is also some debate as to whether the 'Gallic Chronicle' can be trusted as a source for an end date. This apparently records that Britain was systematically 'devastated' by Saxons in 410/411 (Esmonde Cleary 2000), but as it was written in 452, it may be inaccurate.

He again questions the accuracy and truth of the Gallic Chronicle, which supposedly recorded that Britain was effectively brought down 410/411-but it was written in 452, supposedly in southern Gaul, and thus some 40 years after these events (*ibid*).

However, the systematic construction of the Saxon Shore Forts across the southeast before the end of the 4<sup>th</sup> century, does strongly suggest that there was serious concern and response to raids from the sea.

The archaeological evidence in Dover, Kent, speaks particularly well for the creation of these later forts as a quick response to perceived threat, and an attempt to protect (Britain in general or even perhaps just important supply routes?). Before the construction of a later fort, the area had apparently provided a comfortable fort and base for navy, with at least one highly painted *mansio* and an accompanying elaborate bathhouse on the edges of the fort for use by officials (Philp 2002). However, during the later 3<sup>rd</sup> century this comfortable complex, is quite brutally destroyed in order to impose a differently aligned fort over the top, and one of the rampart banks cuts right across the middle of the once well-used and elaborate *mansio* (*ibid*). This does have the feel of having to forgo comfort in order to respond to a serious problem. Later, after falling into disrepair and disuse, an Anglo-Saxon settlement consisting of simple wooden huts is constructed over the top, and wooden posts driven into the concrete floor remains of the earlier mansio for foundations. This juxtaposition of such different archaeology, represents a 'neat' discourse on the significant changes that occurred over just a few hundred years, and the simplicity of the Anglo-Saxon technology, overlying the elaborate painted walls, concreted floors and hypocaust system of the mansion, is really symbolic when understanding the fall of the Roman Empire, and this period of significant change in Britain's history.

Despite debate about the official end date for the Roman Empire in Britain, it is generally agreed that the end came in the first half of the fifth century AD, probably in the first decade or so:

At some stage, between AD 409 and 411, Britain passed out of the control of Roman forever. The actual date of the end of Roman Britain is controversial. (Russell and Laycock 2010: 174)

There have been several different suggestions about *how* the Roman Empire officially came to an end in Britain, the main arguments are well synthesised by Ken Dark (2000). Both a gradual and drastic decline in the Empire has been previously argued, alongside arguments for a continuation of cultural/political/technological aspects and a very distinctively different Anglo-Saxon culture in the 5<sup>th</sup> century (*ibid*).

Mattingly (2007) suggests that the 4<sup>th</sup> century decline '...can perhaps be best understood as the emergence of new forms of identity in response to combined political, economic and social changes.' (*ibid*: 326)

Esmonde Cleary (2000) suggests that despite a recession being evidenced in the last quarter of the 4<sup>th</sup> century, Britain was still very much part of the Roman Empire in terms of administration, economy and society, as had been the case for 300 years previously. This then collapsed in the 5<sup>th</sup> century AD (*ibid*). However, the evidence for salt-production at least, suggests there were serious problems in mechanisms of production and supply at this early stage, and the picture is more of a gradual decline from the 2<sup>nd</sup> century AD.

Although raids from groups inside and outside the Roman Empire aided in the deconstruction of the Roman Empire, it was a breakdown internally within the core organisation, structure, politics and economy that appears to have been the main cause of a systematic breakdown (Russell and Laycock 2010).

Both manufacturing and trade seem to decline dramatically after 410. There is little evidence of goods being moved around Britain and the large-scale industries 645

of the Roman period come to an end. Where there is continued manufacture of goods it is on a much smaller and much more local scale. (Russell and Laycock, 2011:176)

This interpretation is supported by the decline in salt-production.

There is good evidence that by the second half of the 4<sup>th</sup> century AD, there was the start of a significant and gradual decline in the whole economic and political structure of Britain (Esmonde Cleary 2000) which is highly relevant to trends seen in salt-production at this time. This is most evidenced in the decline of the larger towns (for example there is evidence of building disrepair and a reduction in the construction of new buildings) and reduction in production and distribution within some industries, especially in potteries (*ibid*).

The evidence both from the industries themselves and from their markets suggests, therefore, that the late fourth century was a period of stagnation at best, probably of overall decline. As yet our knowledge of other industries and aspects of late Roman Britain is not precisely enough quantified for us to be able to judge (Esmonde Cleary 2000: 135)

As also highlighted above, it remains unclear as to how all the other industries were directly affected; however fortunately it is now possible to place the evidence for the salt-production industry into this historical context.

Salt-production suffered a drastic decline and breakdown in the mechanisms of production, distribution and supply during the 2<sup>nd</sup> century AD. This decline continued, and access too, and availability of, salt, would have been significantly compromised as a result. By the 3<sup>rd</sup>-4<sup>th</sup> centuries AD, there was a large reliance upon salt produced in Central Somerset and inland in Droitwich. This appears to differ slightly from evidence for pottery production, that appears to suffer a later and more sudden 'collapse' in the 4<sup>th</sup> century, as opposed to an earlier, 2<sup>nd</sup> century collapse and continued decline.

This sudden collapse may be rooted in the fourth-century economy, and is most clearly seen in relation to pottery production. By the end of the fourth century there were only a handful of major pottery producers, alongside an increasing amount of local products. (Dark 2000: 54)

Perhaps of all the industries, salt-production is the most sensitive to times of stress and breakdown in the economy due to it being limited (with the exception of inland sites) geographically and liminal in nature. They would have been reliant on well managed and organised trade networks as once this started to suffer, they would have been effectively cut-off and very much on the 'edge'.

### 7.6.6 What happened next: A brief consideration of salt-production after the 4th century AD

Although all production activity was in decline at this point, salt-production was probably the worst affected and ceased sooner than most other processes, and as suggested above, would have been especially sensitive to change.

There is no evidence that large-scale manufacturing (and the province-wide distribution of products) known in the fourth century survived long into the fifth century. Although small-scale production and localised exchange of these products might have lasted for a century or more longer, the major 'industries' of Late Roman Britain had stopped large-scale production by the mid-fifth century at least, and probably earlier. (Dark 2000: 54)

Evidence currently suggests that there was a change in technique sometime after the 4<sup>th</sup> century AD, with a move to using the sleeching method of salt-production. This is best evidenced in the Adur Valley, East Sussex:

...a change in the extraction process had evolved in north-west Europe by the beginning of our Anglo-Saxon period, and the knowledge was probably brought here by immigrants. The new system superseded the direct us of sea-water: instead, salt-impregnated sand or silt was washed through with water, producing a strong brine, which was then heated to make salt (Holden and Hudson 1981: 123)

However, whether this would have been ideal for the environs and climate of Britain remains of interest, as methods of salt-production are intrinsically linked to specific environs and climate. This technique, would also presumably have greatly impacted the waterscapes and topography of the surrounding area, if vast amounts of silt were dredged up and washed through.

With the change in techniques, there is also therefore a change in how saltproduction is evidenced archaeologically. There appears to be far less features required (and infrastructure), with the only identifiable remains being the large silts mounds created by all the washed silt. These are distinctively different to their earlier counterparts, and as opposed to be red/brown and containing vast amounts of briquetage, other detritus and sometimes red silt, they are yellow and contain nearly all fine washed silt (*ibid*). The Adur Valley mounds appear to be no earlier than the  $c.10^{\text{th}}$  century. The mounds included within the database of this research project in Kent, remain undated, but could equally be of a similar or later date.

There have been ambiguous finds of briquetage found in this area and within Kent, also associated with later silt mounds left by this process. Although in the Adur Valley this is thought to relate to earlier, very small-scale Iron Age/Romano-British production (Holden and Hudson 1981), the evidence in Kent remains to be systematically investigated and explored. However, it would be really useful to discern whether the use of briquetage was incorporated into post-5<sup>th</sup> century sites as this reflects an interesting continuation of ancient technology.

As highlighted in **7.6.5**, there is still a substantial gap in evidence for saltproduction, and therefore a gap in the transfer of traditional technological knowledge and skill between the Romano-British and Anglo-Saxon/Early Medieval periods:

Evidence of salt-making in the Saxon period prior to the Domesday record remains elusive but it is unlikely that the knowledge and practice of such a vital industry would have ceased completely between the fourth and the eleventh century.(Bell *et al.* 1999: 99)

However, despite this, there are some similarities between technologies for saltproduction. Innovations such as the use of larger metal containers, systematic water management using feeder channels and the development of two distinct techniques for production (from brine and from organic material) occurred centuries before similar technologies were used in medieval salt-production.

It is also important to consider that there was a technique similar to the later sleeching, across some Late Romano-British salt-production sites, with evidence for the washing of marsh silt/burning of salt-impregnated marshland in the Central Somerset Levels and Stanford Wharf, Essex.

However these techniques and technology were also used in other areas of Europe, and there is no evidence to suggest that traditional prehistoric and Romano-British techniques and knowledge of salt-production continued.

Even in Droitwich ,which has the most certainly dated evidence for continuation of production, there is still evidence for new and innovative technologies employed supporting an early change in infrastructure (Hurst 1997; Dark 2000).

In conclusion, there is currently no convincing evidence that salt was produced in Britain until much later into the 10<sup>th</sup> century. Whilst salt could have been imported, it seems more plausible that in this context, there was a drop in salt consumption. Societies could gain salt naturally from eating meat, and by this period, a range of other techniques for preserving and adding taste to food would have been available, including the smoking of meat. However eventually salt consumption clearly did become very popular again, and by the post-medieval period, was heavily produced by Britain on a truly modern industrial scale.