UNIVERSITY OF SOUTHAMPTON

FACULTY OF ARTS

ARCHAEOLOGY

Doctor of Philosophy

EARLY ANGLO-SAXON CERAMICS FROM EAST ANGLIA: A MICROPROVENIENCE STUDY

by

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ABSTRACT

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EARLY ANGLO-SAXON CERAMICS FROM EAST ANGLIA: A MICROPROVENIENCE STUDY

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A history of Saxon ceramic studies precedes a proposed theoretical framework to replace the present chronology which is based on unreliable documentary sources.

The main body of the thesis details the programme of petrological analysis which was carried out on the ceramics from 36 East Anglian Early Saxon settlements. This involved a microprovenience study characterising the fabrics present on each site, and assessing changes through time in their production and distribution. Comparative samples were taken from 12 funerary assemblages, and theories were tested about the relationships of pottery from domestic and cemetery sites. No evidence was found for the existence of specialist producers of funerary pottery, there being little difference between settlement and cemetery ceramics. Analysis of settlement locations suggested a strong element of continuity of land units throughout the Saxon period.

Examination of the fabrics and their distribution suggests an evolution in pottery production, concomitant with a move from an acephalous to a ranked society. The wares of semi-specialist potters could be seen as belonging to the later stages of this evolutionary process, their distribution being confined to political or tribal units. On the basis of fabric and decoration, two such units were defined and two others indicated.

The final stage of the evolutionary process involved the appearance of a further tier in the political hierarchy, and the removal of the control of pottery production from the leaders of small rural political units to the head of the East Anglian Kingdom. Mass production of pottery by full-time specialists was then centralised in an urban context at Ipswich.

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This work is dedicated to the East Anglian archaeologists who have gone before me, in particular Basil Brown, without whom this work could not have been done.

Introduction

The aims of this research project were to examine the modes of production and distribution of domestic pottery of the Early Saxon period 350-650 AD. This has been carried out from the microprovenience viewpoint (Rice 1981); that is, the study of pottery within a particular and local area with the aim of identifying the evolution in ceramic production modes. This is the complement of the macroprovenience view which sets out to characterise the imports into the region, thus demonstrating the interaction between the region and its surrounding area.

The macroprovenience approach defines both a particular type to be studied, and its geographical and chronological distribution. This reveals the marketing systems and the hinterland involved in the production and distribution of that product. Researches of this type usually concentrate on decorated or readily identifiable pottery, the classic example being samian. The type under study can therefore be picked up rapidly from museum and excavation collections, and is often among the illustrated material in site reports, thus enabling the researcher rapidly to define both the area to be studied and the scale of the research project.

The biasing of research projects in this way has resulted in the accumulation of a large body of knowledge about the trade of mass-produced wares. These goods, however, form only a part of the total ceramic assemblage on any site on which they occur. Little work has been done to study a localised geographical area over time to examine how changes in ceramic production and distribution relate to social evolution and the rise and fall of production centres.

In order to accomplish this, we must choose an area with good geographical boundaries, to minimise 'edge effects' caused by possible trade with groups of producers outside the area of study.

The region chosen must also contain a density of settlement of the right period that would make ceramic trade or exchange possible; and those settlements must have produced enough pottery on excavation to be a representative sample of the probable total assemblage. Such an ideal area is of course not to be found, but the three counties of Cambridgeshire, Norfolk, and Suffolk fill these criteria to a reasonable extent. East Anglia is defined by the North Sea and the Wash on its northern and eastern sides, by the high claylands of the Essex-Suffolk border on the south, and by the Fens on the west, an area thought to be largely flooded during the period under study. Edge effects could be expected to occur on a line between Huntingdon and Haverhill passing through Royston, i.e. the southwest border of Cambridgeshire, which could result in a greater variety of fabrics in the south-west of the area.

Once the research area is defined, we must examine all the domestic pottery within that area and analyse petrologically every fabric that occurs on every site, gathering spatial and chronological information where possible. Once all fabrics occurring have been characterised, comparisons can be made between and within sites.

This study looks in detail at the total assemblage of pottery from a large number of sites in East Anglia to ascertain the level of production and the degree of interaction between them. Domestic pottery is the main subject of examination, though a number of cremation cemeteries have also been included. These were included with the intention of testing some of the theories formulated about the relationships between settlements and cemeteries, and between domestic and funerary pottery.

The Saxon era is not a neat or well-defined period, and any study of the relevant material remains must be placed in a wider historical and archaeological perspective. Accordingly, the first two chapters are concerned with the history of Anglo-Saxon pottery studies and an examination of the pre-Saxon period (the decline of Roman Britain).

A knowledge of the history of the ideas and theories formulated by past researchers is necessary as previous ideas condition later attitudes to the material, and unless the right questions are asked useful answers will not be forthcoming.

The second chapter examines the historical framework that exists for the Early Saxon and Later Roman periods, and finds it based on confused and conflicting evidence, prejudiced by the views analysed in Chapter 1. A theoretical framework for the period 350-650 AD is therefore proposed in its place, based on the model of systems collapse (Renfrew 1979). It is argued that the Saxon settlers did not play a significant part in the destruction of the Romanised culture of Britain, and the majority of the Saxons entered the country when it was in a sub-Roman phase.

Chapter 3 sets out the methods used to categorise and analyse the Saxon pottery from the region and includes a detailed review of quantification and characterisation techniques. The characterisation of pottery fabrics and their inclusions leads into chapter 4 which describes the geology of the region, both solid and drift, and examines the clays that would have been available to the Saxon potters. The morphological characteristics of lithic fragments resulting from natural and human agencies are described.

In Chapter 5 the location of the known Early Saxon settlements is studied and the data are compared with archaeological models previously proposed for the position of Saxon settlements in the landscape.

Chapters 6, 7, and 8 describe in detail the ceramics from the settlement sites of Cambridge, Norfolk, and Suffolk. The discovery is given, followed by macroscopic and microscopic analysis of the pottery. Fabric links to other sites are examined and the mode of production is defined where possible.

Chapter 9 is a detailed study of a single large settlement site, that of Grimstone End in Suffolk. The large amount of pottery recovered allows conclusions to be drawn from the ceramics with greater confidence than some of the sites in the preceding three chapters, where amounts of pottery were often small.

In contrast to the settlement sites, chapter 10 is a detailed petrological report on a cemetery site. Some 300 urns were thin-sectioned from the Illington cemetery, the bulk of the pottery, to enable theories about the relationship between domestic and funerary pottery to be tested.

Evidence from some of the settlement sites studied is synthesised in Chapter 11 and added to evidence from particular vessels in some East Anglian cemeteries to analyse the Illington/Lackford workshop. These standardised pottery products have been found in all three counties under study, and petrological analysis enables them to be grouped objectively, and the scale of the workshop assessed.

Chapters 12 and 13 draw together the evidence collected in previous chapters. Chapter 12 deals with the technology of Saxon pottery production and the problems of dating it. Chapter 13 contrasts traded and non-traded pottery, and examines the evidence for the evolution of craft specialisation in the study area.

Chapter 1

A History of the Study of Anglo-Saxon Pottery

The earliest known published work on Anglo-Saxon pottery is that of Sir Thomas Browne (1605-82), the Norwich writer and physician, who witnessed the destruction of the cremation cemetery at Great Walsingham in Norfolk. He recorded the discovery of 40 or 50 urns and provided illustrations of four of them in his Hydriotaphia or Urn Burial of 1658, giving details of the capacity, design and colouration of the urns. Although he knew of 'urns of no Roman original found in Norway and Denmark' he thought it most likely that the urns on the west side of the North Sea were probably post-Agricolan and pre-Christian.

Another cremation cemetery was found in 1711 at North Elmham, Norfolk by farm labourers who were hedging and ditching. The urns were immediately destroyed because they were assumed to contain coins. However local antiquarians soon heard of the discovery and employed the labourers to retrieve the urns, so that by 1713, when Le Neve reported the find to the Society of Antiquaries in London, more than 200 urns had been recovered. Le Neve remarked briefly on the size, shape, and decoration of the vessels, and dated them to the Roman period.

In 1752 similar finds were made at Caister-by-Norwich, where three urns disintegrated during lifting operations. This was reported to the Society of Antiquaries by Henry Baker in 1754, who described the first fabric analysis and comparative work. He wrote that Mr W. Arderon, the excavator, noted that 'the matter of clay they were made of was quite different from those of Elmham, being paler and much coarser'. Twenty years later John Ives published 'Remarks upon Gariannonum of the Romans', describing the Burgh Castle, Suffolk cemetery of 'Roman' urns. Again the fabric was mentioned and a source was even invoked 'coarse blue clay brought from the neighbouring village of Bradwell'.

Despite the numerous cremation cemeteries in East Anglia, the focus of attention soon shifted to Kent, where the Reverends Fausset and Douglas concentrated their attention on the more visible monuments of antiquity. The richly furnished Kentish burial mounds provided so many associations of artifacts that, in his Nenia Britannica; or a Sepulchral History of Great Britain (1793), Douglas was able to refute the Roman designation in favour of a post-Roman date. Unfortunately the Kentish urns were mostly decorated in a different manner from those of the East Anglian and Midland finds. The temporal and cultural connection was not made, and the latter urns remained classified as 'British', that is, pre-Roman. The grave goods could have pointed to European parallels in areas outside Roman influence. But they were probably burnt or broken and were therefore discarded by the excavator, as were any incomplete vessels.

The large Norfolk cemetery of Markshall was noticed in 1814, and Caister was rediscovered the following year, as the agricultural improvements of the 19th century got under way. Deeper and heavier ploughs, and the enclosure and sub-division of heath and common, further disturbed the ground. The numerous urns and their contents were now beginning to be recognised for what they were - something different from the Roman cremation urns and jewellery that were also turning up in equally large numbers.

The antiquary Roach Smith, then editing Fausset's notes for publication, came out strongly in favour of a Saxon origin for the cremation material in his exchanges with Professor John Henslow (1796-1861), who supported the Aboriginal British theory. But, in publishing Fausset's work, Smith did not wish to argue with or criticise Fausset's outdated views, and so retained the excavator's arguments for a late Roman date.

As the evidence for a Saxon origin mounted, Roach Smith's colleague Thomas Wright took the field in 1847. As editor of the journal of the British Archaeological Association, he congratulated Henslow on his 'decidedly Saxon' finds in a preface to an article in which Henslow described them as 'British'. (Henslow 1847).

In 1855 Wright contributed a distribution map to Roach Smith's publication of Fausset's work. In this he showed the 81 then known Saxon towns. Smith still backed Fausset's Roman date for the material, but such finds were then generally considered to be post-Roman, confirmed by Akerman's publication the same year of Remains of Pagan Saxondom.

The belated recognition of the post-Roman date gave the antiquaries of mainland Europe the chronological tool they needed. Most of the areas where similar material was being found, both pottery and metalwork, were outside those that had been under Roman control and therefore stratigraphic relationships were lacking. Finds that previously had been attributed to the aboriginal Slavs now could be sorted into pre- and post- Roman periods.

John Kemble, (1807-57), an Englishman better known for his philological work, first became interested in Saxon archaeology through his study of runic inscriptions in the 1840s (Wiley 1979, 222). In 1848 he advised the Archaeological Institute to turn from the study of architecture and churches to that of artifacts (Kemble 1849). He had possibly taken part in excavations in England, and after cataloguing the Hanover Museum's collection of artifacts, he conducted his own programme of excavations in Germany.

In 1853-4 he excavated and published over 70 German barrows, and in 1855 he compared urns from Germany with those from Eye in Suffolk, and put forward the theory that both were made by Saxons, the only people who occupied both areas simultaneously (Kemble 1855).

In the latter half of the 19th century a wealth of European finds was revealed, not only by industrial and agricultural activity, but also by the deliberate excavations of cemetery sites for research purposes. Standards of recording did not, however, keep pace with the enthusiasm of the archaeologists, and records were seldom made. The associations of objects were not recorded, and usually only undamaged pots and recognisable grave goods were kept.

In an attempt to bring order to this mass of finds, typologists set to work, but not on the pottery that had first aroused interest in, and then culturally defined, the period. Inhumation graves of the pagan period had produced large numbers of brooches and other personal ornaments, which could be easily compared with similar artifacts. Pottery was present, however, in only a few inhumation burials with other artifacts, and tended to be undecorated and of a different vessel type to the cremation urns. With associations of brooches and other metal objects a comparative typology could easily be constructed. Cremation urns, unfortunately, contained few intact objects, and as no stratigraphical associations had been recorded - which could have resulted in an urn typology being put forward- the ceramic evidence was all too often dismissed as 'crude handmade urns'.

Baldwin Brown in his Rhind lecture of 1910 spoke of an embarrassing number of publications '... notably on the different forms of fibula'. But the Continental work of Sålin and Aberg did enable accurate cross-dating where fibulae had been found with ceramic evidence.

British archaeologists lagged behind their Continental counterparts in Saxon studies. Historians on this side of the North Sea were still trying to fathom the available evidence on the 'obscure subject of the Teutonic invasions', (Brown 1910, 33) and the Victoria County Histories were just bringing the scattered evidence together, when the first synthesis was attempted by an Oxford archaeologist, E.T. Leeds.

Leeds called his work, published in 1913, The Archaeology of the Anglo-Saxon Settlements. Despite the title, no actual settlement site was then known and Leeds' chronology of 'settlement' - by which he meant invasion - was based on the distribution of certain types of brooch and other grave goods found in the cemeteries of southern and eastern England.

Leeds' work suffered, as J.N.L. Myres has pointed out, (Myres 1970), from his cavalier approach to the historical documents. Although this was no more imprudent than the approach of the historian to the archaeological evidence, it lowered the esteem in which Leeds' views should have been held. As a result, the historical works of H.M. Chadwick and Sir Charles Oman remained the main sources for the Anglo-Saxon period.

In 1921, Leeds discovered the Saxon settlement site at Sutton Courtenay, Oxfordshire; and his subsequent excavations there showed archaeologists exactly what they should be looking for in a settlement of this period. As a result, a shallow hollow in the ground, containing only a few undiagnostic sherds of coarse pottery, could be assigned with confidence to the Saxon period (Leeds 1923; 1927). However, pottery studies did not benefit greatly from the extensive collection of material recovered from the Sutton Courtenay excavations. This was because there were so few decorated examples compared with the yields from the average cremation cemetery; and the pottery was not fully studied until the 1970s when Berisford re-examined it as part of her study of Saxon settlement in the Upper Thames area (Berisford 1977).

The pioneering excavation work of Leeds in Oxfordshire was continued in the 1930s by Lethbridge at Cambridge, who conducted a number of excavations on threatened cemeteries in Suffolk and Cambridgeshire, and made a special point of including photographs of the ceramic finds (Lethbridge 1931).

This work, together with G.C. Dunning's excavations of a Saxon dwelling at Bourton-on-the-Water, Gloucestershire, in the early 1930s, began to provide a picture of the wide range of forms in the Saxon potter's repertoire, both domestic and funerary (Dunning 1932).

J.N.L. Myres, a colleague of Leeds at Oxford, also became interested in the pottery of the Saxon period and began his life's work, which emerged in 1977 as <u>A Corpus of Anglo-Saxon Pottery</u>. In this monumental work Myres collected together a vast quantity of mostly cremation urns which had survived in museums throughout the country, and classified them by their shape and decoration. Before the First World War, Continental scholars such as Plettke (1921) had already classified the German cremation urns on decoration alone, and Myres sought to bring further order by stressing the shape or form of the vessel in relation to its decoration. However, he himself admits that many crude handmade urns fall between his categories; and a computer analysis of a sample of Spong Hill urns has not revealed any patterns that would coincide with Myres' categories. (Julian Richards, pers. comm. and 1982).

The constraints on any corpus (mainly time) are obvious when one starts studying an area in detail. The present writer soon realised that the scarcity of domestic material of East Anglian origin in the corpus was due to the failure to sort through the often large sherd collections from the relevant sites and reconstruct the forms they contained. If time was short, it was obviously quicker for Myres and his helpers to record and draw the whole and easily accessible vessels, and thus his work was biased towards the cremation cemeteries.

Although Myres wished to stress the part that vessel shape played in constructing typology, decoration obviously remained an overriding criterion. Second to this came vessels of unusual shape that were visually distinctive even when only a small sherd was present. A sherd with a particular stamp would thus be included in the corpus, while often a larger sherd of an undecorated pot, although giving a larger profile for classification purposes, was ignored. Myres' attitude to domestic material can be seen in his introduction to the undecorated pottery:

> Much of the household pottery in use at this time was in any case of very poor quality, all of it hand-made, mostly amateurish in technique and finish, and lacking in those traditional stylistic features that make possible a meaningful archaeological classification. Vessels are frequently mis-shapen and ill-baked, and so irregular in their rim forms and base angles as to defy accurate portrayal by standard methods of formal draughtsmanship. (Myres, 1977, 1)

The Corpus therefore, conceived in the 1930s, has answered only the questions that were then considered to be significant what does Saxon pottery look like, and can it be dated? And while the Corpus does include some domestic material, it was written from an art-historical perspective, and clearly a true comprehensive corpus has yet to be established.

In the last ten years the study of Saxon pottery has been transformed. In whole or part it has become the subject of a number of researchers, who have examined both domestic and funerary pottery and also analysed fabric in order to give clues to the systems of production and distribution that existed in the early Saxon period.

Berisford, working in the Upper Thames region (1977), has claimed that a chronological development of fabrics can be seen on a number of settlements. Walker's work in the East Midlands (Walker 1978) followed by Gryspeerdt (Gryspeerdt 1981), has shown that undecorated domestic pottery could have been traded over a wide area, perhaps as far as 50 km from the source.

Brisbane's (1981) analysis of a number of Spong Hill urns from the recently scientifically conducted excavations (Hills 1977, 1981) has thrown light on the variety of fabrics in a single cemetery and suggested how ritual cremation containers may have been produced. Bradford has looked closely at the fabric of the Girton, Cambridgeshire urns to examine methods of production (Peacock pers comm).

Evison's work (1979) on the wheel-thrown pottery of the period, which occurs mostly in south-east England, was conceived at the same level as the Myres Corpus and sought to construct a typology. Fabric analysis was carried out and thin sections of many vessels were made, but unfortunately the full potential of the study was not realised. Perhaps she was unaware of the latest techniques used by ceramic petrologists. Textural analysis in particular might have pointed to common or widely differing sources, even if the exact source could not be pin-pointed geographically.

Chapter 2

The Historical Framework and a Theoretical Approach to 'The Dark Ages'

British archaeology in general suffers from an over-emphasis on periods - the study of one particular 'culture' as defined by Gordon Childe - to the point of ignoring what came before and after. This has been seen dramatically in the past where archaeologists (in the manner of Schliemann) hurriedly removed evidence of later occupation on a site to reach the period they were interested in, and did not bother to excavate further once they had the information they sought.

Until the 1930s, most European scholars, as Haselgrove (1979, 9) pointed out, were inevitably raised and educated under the influence of an imperialist admiration for the Roman Empire. They tended to see the Anglo-Saxons in the same light as the Romans had done - as destroyers and barbarians. Few scholars were prepared to make it their special subject.

In the 1930s, the desire of Hitler's Germany to seek out the 'noble savage' from whose loins the Third Reich had sprung, led to a re-appraisal of the evidence and a political ratification of the Saxon migrations as a search for lebensraum (room for living). The rest of Europe, which had been shaped by the propaganda of World War I, still retained a great deal of patriotic hatred for all things German, a feeling reinforced in World War II. As each generation interprets the past, basing its re-assessment on its own experiences of the present, the academics of non-German Western Europe could perhaps be forgiven for not seeing the fifth century AD in the same light as the Germans.

After 1945, British archaeologists and historians began to look more closely at the medieval period, and the early Saxon era became sandwiched between two specialist cells. On the one hand, it was seen as an adjunct to the Roman Empire, where the 'last cries of the Britons' were to be seen as a warning to the critics of empire; and on the other it was seen as the seed bed of the 'English Heritage'. Seldom did textbooks attempt to span the period, syntheses were few, and no theoretical framework was constructed to define areas that needed further study. This was due, undoubtedly, to the complexity of the period. As Haselgrove has stated (1979), 'the political and social structure was not a late Saxon "Early State Module" (Hodges 1978), but a web of contradiction, with Romano-British, Celtic and Germanic elements struggling for ascendancy'.

Historical Framework

Until recently most historians and archaeologists have worked within the historical and cultural framework provided by Bede's Ecclesiastical History of the English People (completed 731). Bede took early sources and combined them into a believable account of the Anglo-Saxon settlement. He did this by adding and rewriting the early sources, and most importantly he gave dates to particular events in the sequence. In particular he saw the coming of the English, the Adventus Saxonum, as a single event occurring in about 450 AD. This is probably based on his reading of Gildas, who mentions a Saxon invasion in the third consulship of Agitius. Agitius is probably meant to be Aegidius, who was never a consul but was the commanding Roman general in Gaul between 457 and 462 AD. Bede, however, assumed it meant Aetius, who was consul for the third time in 446 AD. This date became the cornerstone for the period as far as English archaeologists were concerned, and the evidence on which the German scholars had constructed their chronology was as little studied by the British as the British documents by the Germans (Morris 1974, 228).

In the last 30 years the British documents from which the historical framework had been constructed have been the subject of much scrutiny. The earliest source is the work of Gildas who wrote De Excidio et Conquesta Britanniae in the mid-sixth century. Gildas gives a history of Roman Britain, leading to the withdrawal of Roman help and the hiring of Saxon mercenaries to keep out the Picts by an unarmed superbus tyrannus (overlord). The mercenaries revolt and are finally controlled by Ambrosius Aurelianus, although the conflict continues until the battle of Mount Badon in the year of Gildas's birth, since when relative peace had ensued.

At first sight this would seem to be a good contemporary source. But modern scholarship has been employed (Thompson 1977) to relate Gildas to the events he was recording, and to assess why the work was written, and for what specific purpose. This has shown that Gildas was well informed about events in the north and west of Britain and was aware of the traditional history of the north. But his words can never be applied to post-Roman Britain as a whole, and 'the midlands, south-east and east are unknown land'. As these are the main areas of Saxon settlement, Gildas obviously sheds little light on the sequence of events in East Anglia.

Bede used Gildas extensively for his Ecclesiastical History, but he added a great deal more. Some of this was probably his own attempt to bring order to conflicting manuscripts and to provide an historical figure as a prime mover to explain why certain events took place. Bede expanded Gildas to such an extent that he has been censured ever since by scholars in the field of Early British history. As far back as 1845, Lappenburg stated that he 'may be not inaptly called the Walter Scott of the eighth century' for writing an historical novel around the writings of Gildas. Wade Evans (1959, 31) has shown the extent of these additions and embroideries by printing the Gildas and Bede versions of the invitation of the first Saxons side by side: De Excidio, cc 22-26, and Historia Ecclesiastica 1, 14. Bede gives Gildas's 'superbus tyrannus' the name Vortigern, literally the Welsh for overlord and therefore perhaps an epithet rather than a name, and places him as a ruler of southeast England, an invention of his own. Gildas had stated that a group of Saxons were 'admitted' into this island to beat back the northern nations, whereas Bede has them specifically invited as a nation.

Dumville (1977) assessed the quality of the various texts used to reconstruct the history of the fifth and sixth centuries, by applying the rigorous standards of modern historical research. His conclusions were that most of the documents were compiled in the ninth century or later, and were written mostly for ulterior motives, either dynastic, ecclesiastical, or scholarly. Therefore the text must be analysed and only data that survive testing should be used to write history. Applied to the English and Welsh documents, this method dismisses Arthur, leaves Vortigern a shadowy folk hero, and denies Magnus Maximus his position as founder of the Celtic client kingdoms. As the 'father of English history', Bede has had undue weight given to his views. Indeed Dumville contends that he is no more a primary source for late sixth century history than he is for the fifth century. He writes that '... we should not necessarily accept his view of those centuries as more reliable than that of a modern scholar'.

If we apply the same methods of criticism to the continental manuscripts, we reach the same conclusions. The various chronicles, primarily the Gallic Chronicles of 452 AD, report that Britain was attacked by Saxons in 409 or 411 AD, falling to them in 445 or 446 AD. These, however, are additions to an earlier chronicle, and the dates of the additions are unknown. Another text (Madrid University 134) records that in 440 AD Britain fell to the Saxons, but this has been shown (Miller 1978) to be a chronicle compiled by ninth century Carolingian research with a probable political bias, and the extant copy dates from the thirteenth century AD. It cannot therefore be considered a primary source. If these chronicles are discounted, there are no accurate references to Saxons coming to Britain.

In view of the shadowy nature of the historical sources, the onus is firmly on archaeology to bring some order or explanation to the period. The advent in the 1960s of the New Archaeology, with its emphasis on explaining the changes in the archaeological record, gives us just such an opportunity.

We can formulate theories that can be tested against the available archaeological evidence in an attempt to replace the present, but unreliable, historical framework.

One of the most widespread theories explaining the end of Roman Britain, is that which postulates a decline in the strength of the province caused by the withdrawal of manpower, that is, Roman soldiers (Kent 1979, Frere 1967, Collingwood & Myres 1937). Magnus Maximus took an army out of Britain in 383 AD; Stilicho withdrew troops in 401 AD for the defence of Italy; and in 407 AD Constantine III removed the army in an attempt to stem the Vandals, Alans, and Suevi in Gaul and Spain. Very few of these troops would have returned, so Britain would have been virtually defenceless against the barbarian hordes of Picts, Scots, and Saxons.

A scenario of this model is the use of Saxon mercenaries to protect the Roman British against such invaders. The mercenaries then turned against their paymasters to lead, rather than stem, the barbarian onslaught. This model is essentially Gildas, embellished by Bede, and has a civilized Christian Romano-British society (living in splendid isolation as Gaul fell and the empire crumbled), suddenly destroyed by the Saxons.

With this model in mind, archaeologists have sought the proof - and of course found it. Burnt layers marking the end of towns and villas were readily attributed to the Saxons; and any skeletons not found in an organised cemetery with grave gooods, were put forward as proof of Gildas' purple prose in chapters 22-26 of the De Excidio.

Other factors have been invoked to explain the decline of Roman Britain. Disease was one such factor, and instances of plagues in the chronicle have been used to argue that Britain succumbed to an epidemic that swept across Europe at the end of the fourth century. This is mostly conjecture, however. As Todd has remarked 'there is nothing in the archaeological record which points conclusively to the working of pestilence on any significant scale. The local breakdown of civic order and abandonment of Roman burial custom in many communities is as likely an explanation for ... intra-mural skeletons as the bacillus of Pasteurella pestis' (Todd 1977). The conditions for disease certainly existed, but its role as a major vector of Roman decline is not proven.

This historical model undoubtedly reached its zenith in the work of Myres. From his detailed study of pottery form and decoration, Myres attempted to define; 1. the origin and distribution of the settlers; 2. their relationship to the Romanised population; 3. their social and economic development; and 4, their ideas of religion and decorative art (Myres 1969). This led to his five-phase model, which is based on the assumption that all the historical documents recorded specific events, and that Bede and the Gallic Chronicles were accurate sources.

Myres' five phases are:

1. A phase of overlap and controlled settlement (360-410 AD), when barbarian troops were brought in to defend the province.
2. A phase of transition (410-450 AD), when the Imperial government broke down and barbarian settlements expanded.
3. A phase of uncontrolled settlement (450-500 AD), involving massive and uncontrolled land seizure by barbarian peoples.
4. A phase of reaction and British recovery (500-550 AD), the equivalent of Gildas' post-Badonic Hill period.
5. A phase of consolidation (post 550 AD), leading to the establishment of the Saxon kingdoms.

Each phase is linked by Myres to a specific form or decorative style of Saxon pottery. This involves an elaborate typology, which has been severely criticised (Morris 1974 ; Kidd 1974 ; Dickinson 1977). For the early phases, the model relies heavily on the finds of so-called Romano-Saxon pottery (Myres 1956), which is fairly securely dated to the late Roman period, but the interpretation of which is open to alternatives (Gillam 1979).

Myres saw this class of Romano-Saxon wheel-made pottery as having been produced for (and decorated under the influence of) Germanic taste. He supported this view by pointing to the distribution of this ware, which occurs mainly in eastern

England - the area of earliest Saxon settlement. However, as Gillam has pointed out, it is difficult to derive Romano-Saxon pottery from Free Germanic pottery of the same period. The bosses and dimples that mark Romano-Saxon wares are not common on Saxon pottery until the late fifth century. Gillam sees the style as purely Roman and derived from late Roman metal or glass vessels, and as having its roots in the third century AD.

Rodwell (1970) has used the occurrence in Saxon contexts of sherds of this style of pottery to claim continuity in Essex. But although Romano-Saxon pottery has been found stratified with Saxon material at Mucking, Essex (J. Lee pers.comm.), and at Caister-by-Yarmouth, Norfolk (Gillam 1979), it has always been residual. At Mucking, certainly, the style of Romano-Saxon decoration can be seen to be a gradual development from earlier forms that were produced on the site. For these reasons, 'Romano-Saxon' ware will be treated as a product of the Roman pottery industry and will therefore form no part of this thesis.

Theoretical Approach

An alternative modern approach is to define the various vectors and construct a model that we can test against the known facts. One such model is that of Systems Collapse, the general features of which have been listed by Renfrew (1979). Systems Collapse is the name given to the phenomenon of a highly structured centralised society disappearing rapidly from the archaeological record, to be replaced by a markedly less complex society, often known as a 'dark age period' in the history of that country.

Using Thom's (1975) theory of elementary catastrophe, we can model the condition of the organised society over time and show the relationship between; 1. the degree of centrality (the historical structure of control); 2. the investment in charismatic authority (the energy input to preserve that structure); and 3. the net rural marginality (an index of productivity that defines the standard of living of the agricultural producers). The relationship between these three variables can be modelled as a three dimensional surface, where

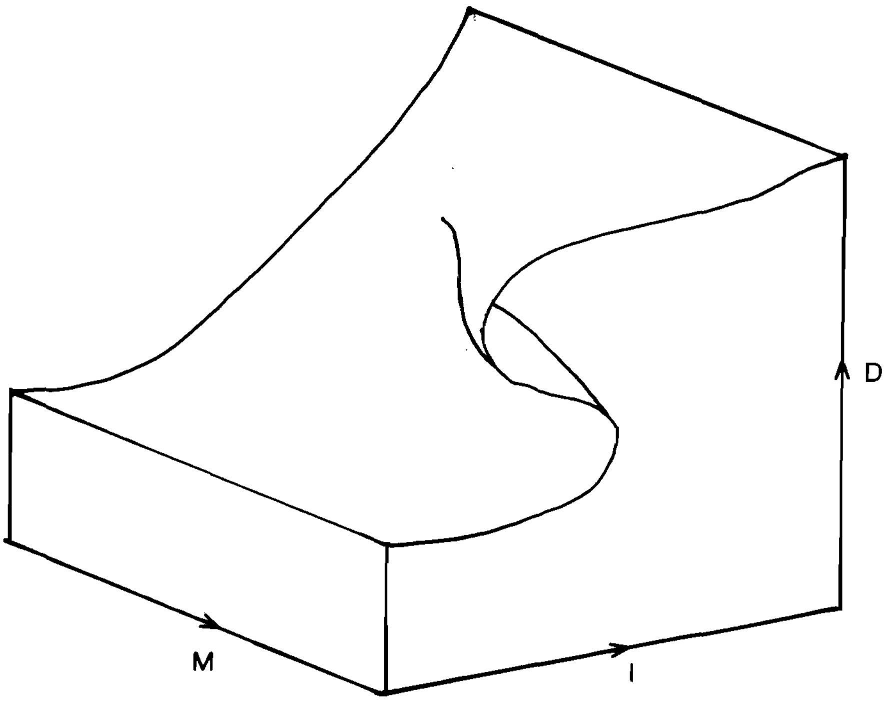


Fig. 2.1: showing the cusp catastrophe.

the degree of centrality is the vertical vector, and investment and marginality are the horizontal vectors (see fig 2.1).

This is simply a three-dimensional representation of the relationships of the variables, which would perhaps more normally be shown as two-dimensional graphs, i.e. slices through the cusp surface at right angles to either I or M. On the surface of the cusp, the level D can be found in two separate places for certain degrees of I and M; and it is when D passes from a high level to a lower one for the same I and M that the collapse of centralised control takes place. I decreases accordingly and marginality is reduced, thus preventing the total collapse of society, but allowing it to resume at a significantly lower level, from which it cannot recover except by the long process of rebuilding centrality.

The classic examples of Systems Collapse are the ends of the Mayan (Adams 1973) and Mycenean (Desborough 1975) civilizations. Renfrew (1979) includes the example of Britain at the end of the fourth century AD as a well-known example of a phenomenon which, although different, is related to Systems Collapse: that of the withdrawal of central imperial power from a province of empire, previously held under strong military rule. This assumes that the withdrawal of the imperial control is a reduction of centrality, in effect forcing the society over the cusp. However, it will be argued below the effect of withdrawing imperial control has been overstated. It forms a part of the degree of centrality and not the whole, and it is possible to regard the collapse in Britain as originating entirely from within.

It is pertinent here to list the features of Systems Collapse and marshal the evidence from the province of Roman Britain, under the headings given by Renfrew (1979).

Collapse

1 Collapse of central administrative organisation of early state

a. 'Disappearance or reduction in number of levels of central place hierarchy.'

Roman Britain: The decline of towns that served as administrative, social, economic, educational and protective centres and the reduction of the number of manned forts whose commanders acted as civil administrators in the late empire.

Reece (1980) has argued that the primary centres of the Roman Empire declined in the mid fourth century, and in Britain the administrative system shows evidence of decentralisation (Frere 1967, 236), with minor towns becoming more common and taking on the economic role of the first and second century administrative centres (Hingley 1982, 36-37).

b. 'Complete disappearance or fragmentation of military organisation into (at most) independent units.'

Roman Britain: Honorius' reply to the civitates in 411 AD shows that each civitas was by then responsible for its own defence. The walled town probably represents the smaller independant units of military organisation (Maloney and Hobley 1983).

c. 'Abandonment of palaces and central storage facilities.'
Roman Britain: Palaces here must be taken as the administrative centres, which existed within towns (see a). The abandonment of the market halls at Wroxeter and Leicester is suggested by the fact that timber buildings were erected within them during the late Roman period (Barker 1975). Central storage facilities are hard to identify in Roman towns, and the complex economy probably made them unnecessary.

d. 'Eclipse of temples as major religious centres (often with their survival, modified, as local shrines).'
Roman Britain: The temples of Roman Britain have not been closely studied, and there is a problem in dating their abandonment (Lewis 1965). Most temples within towns are of unknown dedication, and the temple at the centre of the imperial cult at Colchester was demolished at an unknown date, its base being later reused for the footings of the Norman keep.

The problem is compounded by the changing religions and cults during the third and fourth centuries. Truly Roman cults tended to be hybridised with local British deities, such as Mars Camulos, and worshipped by the native population for the British element. Moreover, the rising religion of Christianity did not require the manufacture and dedication of cult objects (Hunter Blair 1975), making it difficult to identify a building as a Christian religious centre.

The shrines that do survive often had their religious roots in the pre-Roman Iron Age and obviously related to the indigenous population rather than to the Christian upper class and urban population (Barley and Hanson 1968). Most temples on urban sites in southeast Britain were in decline by the mid-fourth century, although there is evidence for extra-mural temples having lasted longer, such as the one at Colchester. It may be relevant that the extra-mural temples tend to be of Romano-Celtic plan rather than the more official Italian-style temples within the walls. (Wacher 1974).

e. 'Effective loss of literacy for secular and religious purposes.'

Roman Britain: This is difficult to assess as inscriptions are rare but, given a b c and d, e is most likely to follow.

f. 'Abandonment of public building works.'

Roman Britain: The last major public-building works were the defensive bastions added to the late second century town walls in the mid-fourth century. The decline in power of the central administration is shown by the fact that some towns lost their basilicas because of fire or decay before town life actually ceased. At Leicester, for instance, the basilica forum and market hall were burnt in the late fourth century and not rebuilt (Mellor and Hebditch 1973). At Silchester, the basilica was turned over to iron production (Fulford 1981). And at Wroxeter the main forum and basilica were burnt in the late third century, and rather than rebuilding them, the administration apparently moved into part of the public baths (Barker 1975).

2. Disappearance of the traditional elite class

This is a difficult characteristic to define in late Roman Britain. The elite class must have consisted of rich landowners, business men and government officials (sometimes perhaps all three being one man).

a. ' Cessation of rich traditional burials. '

Roman Britain: The Romano-British population generally did not consign as many material goods to the afterworld as had been the custom in the pre-Roman Iron-Age period. The Roman elite did not have to rely on a tribal system to maintain their power but based their wealth on the agricultural surplus produced by their villas. Members of the Roman elite class would perhaps have taken part in greater (though subtler) competition with their peers than would their Iron Age counter-parts, but seem to have gone in more for visible monuments than lavish grave goods. The picture is further complicated by the changes in religious practices. The adoption of Christianity was essentially the cult of the elite.

b. ' Abandonment of rich residences or their use in impoverished style by squatters.'

Roman Britain: Both of these aspects of the decline have been well documented in modern excavations of Roman villas in rural areas. Many villas show signs of decay from the third century onwards, although some, such as Lullingstone, Kent, survived in splendour into the fourth century. At Shakenoak in Oxfordshire, the villa was reduced to a few rooms (Brodribb et al 1972), and at Orton Hall Farm, Cambridgeshire, the villa was abandoned by its owners, although farming was continued by a group of people living in the subsidiary buildings (Mackreth 1978).

As the economy declined, the landowners, who possibly also owned property in the towns, faced two options. They could remain in the urban environment, where they perhaps played a part in local politics, and had the protection of the town walls, or they could return to a subsistence economy in the countryside, where they might be at the mercy of the *Bacaudae*, the discontented peasantry and slaves. In Gaul, certainly, the actions of the *Bacaudae* became at times a full-scale insurrection rather than brigandage (Kent 1979, 17), and the 'squatters' in the villas in Roman Britain may well have liberated the land for their own use.

c. 'Cessation in the use of costly assemblages of luxury goods, although individual items may survive.'
Roman Britain: The loss of coinage to the province would have resulted in the rapid breakdown of all forms of trade in luxury goods, most of which were probably foreign imports. Cessation in the use of costly assemblages is indicated by their burial in hoards during the fourth century. This points to an increase in the pressure on the elite classes from whatever source.

The extent to which individual items survived is difficult to gauge. Luxury items that survived into the sub-Roman period cannot always be assigned to their original owners and may well be loot. Certain items of pottery do survive and seem to have been 'curated', or treasured, when it became obvious they could not be replaced, It is unlikely that the peasant farmers would have been unduly worried by a lack of fine pottery, and these items of pottery may have been the only possessions of the elite classes that we can now see, the others being perishables or recyclable. There is certainly evidence that pottery was being 'curated' when the supplies of samian ware began to decline in the second century (Orton 1980).

3. Collapse of centralised economy

a. 'Cessation of large-scale redistribution or market exchange.'
Roman Britain: This aspect of the collapse is most obviously seen in the pottery industry. The major pottery production centres of southern England - Alice Holt, (Lyne and Jefferies 1979), Nene Valley

(Howe, Perrin and Mackreth 1981), Oxford (Young 1977), and the New Forest - show that the fourth-century pottery industry was a specialised activity confined to large centres. The archaeological record reveals that there was a typological and quantitative decline in Romano-British pottery from about 350 AD onwards, with an abrupt halt around 400 AD (Fulford 1975a). The potteries were scattered, with wide market areas, a result of the late third and early fourth century economic structure, and could not cope when demand fell, in the late fourth century, below the level to which they had become adapted. However, there is some evidence (for example Wessex grog-tempered ware) that local potteries tended to make good the decline in pottery from the major centres of production (Peacock 1982, Fulford 1975b).

b. 'Coinage (where applicable) no longer issued or exchanged commercially, although individual pieces survive as valuables.'

Roman Britain: The coin evidence has been summed up by Kent (1979) as follows.

Gold: Coins of Constantine III. Examples exist of solidi of Arcadius and Honorius struck at Rome and Ravenna after 403 AD, but none have been found from the second half of Honorius' reign.

Silver: Up to about 400 AD, there are abundant issues of Arcadius and Honorius, issued by the Milan mint. There are a few examples of the rare URBS ROMA Trier issue of Honorius dating to circa 420 AD.

Bronze: The latest coins are probably the SALUS REI PUBLICAE of Rome and Aquileia, about 395 AD. The URBS ROMA FELIX issue of 404 AD has not been found in the United Kingdom. Furthermore, there is no evidence for any coinage struck in Britain by a Roman or sub-Roman government, thus showing that the need for coinage disappeared along with the coins.

c. 'External trade very markedly reduced and traditional trade disappears.'

Roman Britain: As Britain became a self-sufficient province, the economy and marketing system changed. Britain had depended on empire trade for luxury items, but in the fourth century luxuries were no longer imported, being produced locally instead. In fact, as Hingley has pointed out (1982, 38), Britain may have been an exporter of luxury goods in the form of woollen cloaks (Wild 1978, 79).

d. 'Volume of internal exchange markedly reduced.'

Roman Britain: As the isolation of Britain increased, each area within the province would have become self-sufficient. Moreover, as smaller economic exchange systems developed with the growth of minor towns, the volume of internal trade would undoubtedly have shrunk. This in turn followed the decline of the main centres of administration.

e. 'Cessation of craft specialist manufacture.'

Roman Britain: As the economy declined, the craft specialist would obviously have fewer people to purchase his products, and the volume of trade would eventually drop below the threshhold at which it was possible to exist as a specialist. The trades dependent on the elite classes would be the first to suffer; mosaic layers, jewellers and bronze smiths, for instance, would have found it hard to maintain themselves.

As we have seen above (3a), the number of potters employed by large industrial concerns must have dropped. With a declining economy, each village probably produced its own part-time specialists, thus putting further pressure on those full-time specialists who remained.

f. 'Cessation of specialised or organised agricultural production, with agriculture instead on a local "homestead" basis, with diversified crop spectrum and mixed farming.'

Roman Britain: Although this change-over occurred it is difficult to gauge the chronology of cessation. Nor is there any firm evidence to plot this aspect, While towns existed, there would be markets for surpluses, and places to obtain goods and foodstuffs. But, with the decline of the towns, large agricultural specialists must also have decreased in number. There is a corresponding growth of minor towns, spaced at 7km to 10 km intervals, becoming lowest order market centres where basic goods were haggled over (Hingley 1982).

Studies of the faunal remains at Exeter (Maltby 1979, 89), point to decentralisation of the stock marketing system and the growth of farms inside town walls, which indicates stagnation of the foodstuffs exchange system (Wacher 1974, 388).

4. Settlement shift and population decline

a. 'Abandonment of many settlements.'

Roman Britain: As landscape and environmental studies progress, it is becoming obvious that the abandonment of the Roman settlements cannot always be attributed to specific events. There is evidence for the complete abandonment of the Roman settlement pattern in some areas; for example, in the southwest of the country (Leech 1982), although in other areas continuity has been claimed (Mackreth 1978). Sometimes the boundaries between settlements seem to have survived even though there appears to have been continuity of site occupation (Bonney 1976).

b. 'Shift to dispersed pattern of smaller settlements.'

Roman Britain: Given the decline of towns and marketing systems, people would have returned to the countryside to grow their own food. Villa estates would probably have been divided among the remaining agricultural workers and any emigrating townspeople, resulting in a dispersed pattern, probably of homesteads.

c. 'Frequent subsequent choice of defensible locations - " the flight to the hills".'
Roman Britain: As more hilltop sites are excavated, the evidence is growing for this aspect of the collapse. There is evidence in the Southwest of reoccupation in the late fourth and the fifth centuries of the Iron Age hillforts of Cannington and Cadbury-Congresbury (Rahtz 1974). In Wales certain elements of the Romano-British population seem to have reoccupied similar sites in the third and fourth centuries (Alcock 1971, 180), prior to the sub-Roman reoccupation of the fifth to seventh centuries.

d. 'Marked reduction in population density.'
Roman Britain: Again, this aspect of the collapse is difficult to assess, due to lack of recognisable evidence. The difficulty in dating sites to within a generation, in a period of shifting settlement, makes any assessment of population difficult, if not impossible, but the general impression is one of declining population. Unless the urban population had simply moved back to the countryside, the decline of the urban centres must indicate a reduction in population density. There seems to be no evidence for an expanding rural population in the late fourth century however, and a real decline is therefore likely to have occurred.

Aftermath

5. Transition to lower level of sociopolitical integration.

The aftermath of the collapse is the most crucial period in the change from Roman Britain to Saxon England. If we accept the theory of Systems Collapse - and the evidence available will certainly support it - then the aftermath would have occurred, whether or not the Saxons migrated across the North Sea. In the past the Saxons have been assumed to be the main cause of the collapse, but we get a more accurate picture if we regard them as having played a subsidiary role. The archaeological evidence for invasion has, perhaps, been given too much weight, leading to the exclusion of other explanations. As a result, few people have sought to examine the decline of the Roman social system after the first few years of the fifth century.

Given the model, the following would be expected to occur:

a. 'Emergence of segmentary societies showing analogies with those centuries or millennia earlier in the formative level in the same area.'

Sub-Roman Britain: If this was true of sub-Roman Britain, the evidence possibly exists but so far remains undiscovered. Given the decline in the population, settlement sites in the countryside would be few, sparse, and scattered. In the towns, where the most intensive excavations have taken place, they would probably be non-existent. In the countryside, the sites would probably be visible from the air in the normal way, but would produce very little archaeological material when investigated at ground level. Sites of some pre-Roman farmsteads are recognised by their distinctive forms (i.e. banjo enclosures) but no distinctive sub-Roman features are known, and subsistence farming of whatever period will leave similar traces on the landscape. Given the lack of culturally diagnostic sub-Roman artifacts, it would be difficult to recognise a sub-Roman site by field walking, because little archaeological material would be found. Furthermore, the landscape of southern Britain is almost a continuum of archaeological material, so artifacts may be recovered that do not coincide with the sub-Roman phase of occupation. Investigation of a cropmark site may produce finds that relate to manuring of the land during other periods.

If no sites are known, then the next stages of analysis cannot be carried out and it becomes impossible to collect data to examine the form of society at that time.

b. 'Fission of realm to smaller territories, whose boundaries may relate to those of earlier polities.'
Sub-Roman Britain: The fission of the province can be seen to have begun in the collapse stage, when self-sufficiency reduced the part that urban centres played in administering the province. The late-Roman division of the province into five territories (Wade Evans 1959, 59), is perhaps evidence that this state of affairs was recognised in Rome.

If the tribal system was as rigorously forced upon the provincials as Hingley suggests, and there seems to be economic evidence to support this, then the pre-Roman Iron Age tribal boundaries might be expected to have survived. But it is difficult to reconstruct Iron Age tribal boundaries except on the basis of coins. So the boundaries are poorly defined, and one does not know if there were sub-systems operating within tribal areas. Again, the supposed sub-Roman tribal boundaries are unknown; but the five dominions of Britain and the names given to their inhabitants suggest that there were people within the province who considered themselves related in some way, either by kinship links or by residence.

If changes in political structure - rather than wholesale slaughter and resettlement - are recorded in the Anglo-Saxon Chronicle of the ninth century, then the sub-Roman boundaries might have survived as other estate boundaries seem to have done. The Iron Age and Saxon boundaries can be compared (fig 2.2), but one cannot press the point too far as there may be over-riding geographical reasons for boundaries being drawn in certain places over long periods of time.

The dyke systems of the Dark Ages in southern England perhaps belong to this stage of the aftermath - the result of territories trying to re-establish the boundaries as they had been under the Roman administration.

c. 'Possible peripheral survival of some highly organised communities still retaining organisational features of the collapsed state.'

Sub-Roman Britain: This aspect of the aftermath can really be assessed only from documents, although there are pointers, such as the life of St Patrick, to organised communities surviving in Wales and southern Scotland (Hanson 1968).

d. 'Survival of religious elements as folk cults and beliefs.'

Sub-Roman Britain: In the later Saxon period, the all-pervading and iconoclastic Christian religion probably removed all traces of folk cults that had been based on it. The disappearance of Pelagianism, which had a strong following in sub-Roman Britain, can perhaps be explained in this way. However, the religions of the Iron Age probably did last through into the sub-Roman period, and further excavation of cult centres may yield evidence of this.

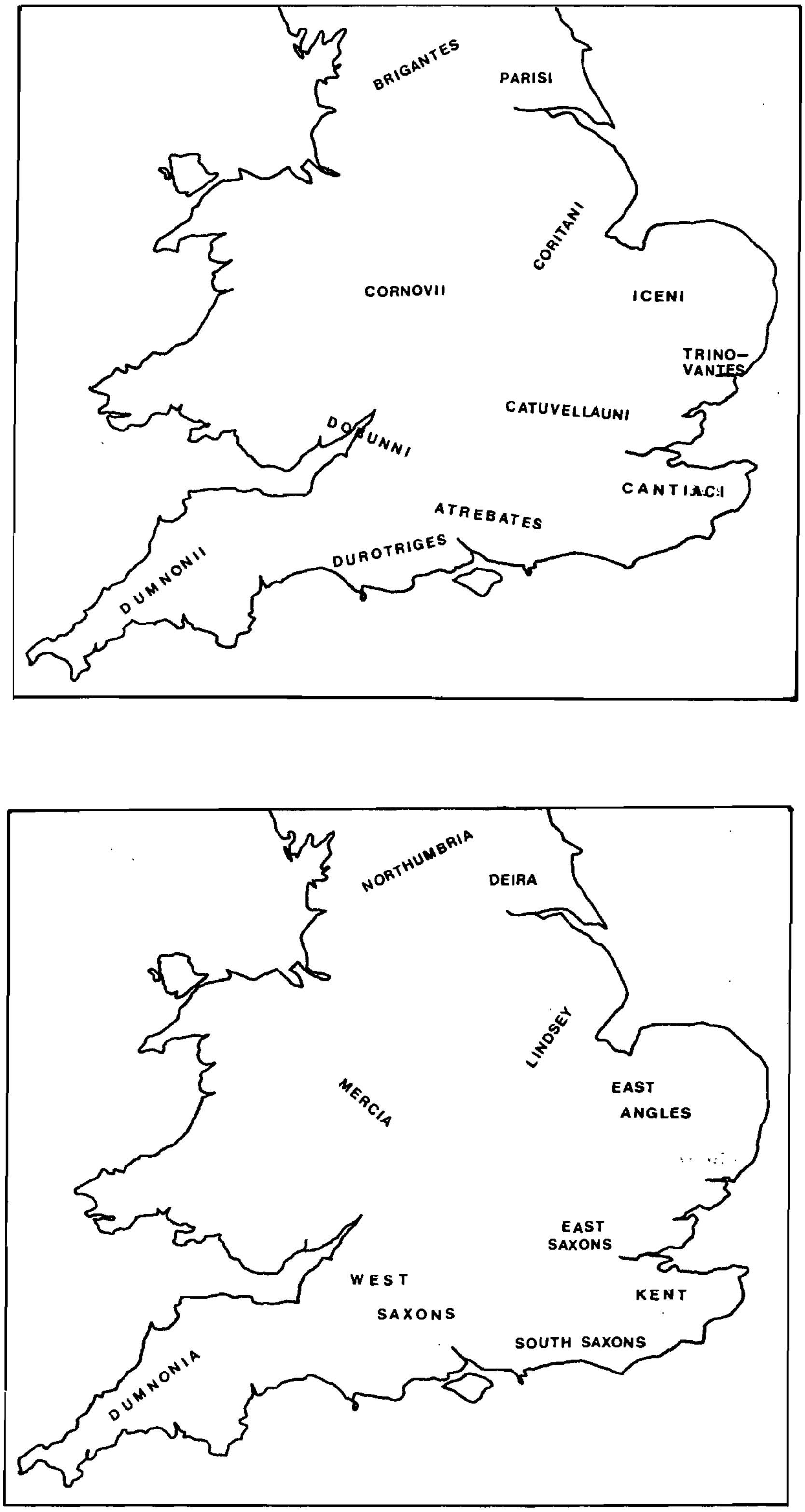


Fig. 2.2: showing the Iron Age (top) and Saxon (bottom) political divisions.

e. 'Craft production at local levels with peasant imitations of former specialised products (e.g. pottery).'
Sub-Roman Britain: Because excavations of sub-Roman settlement sites are lacking, it is difficult to assess this aspect. The only known peasant imitations seem to be of pottery, (Peacock 1982 ; Fulford 1975b).

f. 'Local movements of population groups resulting from the breakdown of order at the collapse of the central administration, leading to the destruction of many settlements.'
Sub-Roman Britain: This aspect may well be enshrined in the folk tales of tribes or groups being moved to new areas of the country by tribal overlords. At a more local scale, it may account also for the short life span of the few sub-Roman sites that are known in areas not directly influenced by the Saxons (Fowler 1982).

g. 'Rapid subsequent regeneration of chiefdoms or even state societies, partly influenced by the remains of its predecessor.'
Sub-Roman Britain: The Welsh and south Scottish historical sources seem to show this regeneration. Indeed, given that the Iron Age tribal system was encouraged by the Roman administrative sytem (Hingley 1982), and possibly survived into the late Roman period, a similar process should be expected elsewhere in the country.

6. Development of Romantic Dark Age Myth.

a. 'Attempt by new power groups to establish legitimacy in historical terms with the creation of genealogies either (a) seeking to find a link with the "autochthonous" former state or (b) relating the deeds by which the "invaders" achieved power by force of arms.'

Sub-Roman Britain: As an 'invasion' did actually happen - Saxons did cross the North Sea and settle in the province - the early genealogies we have for the south and east of the country are Saxon ones seeking their own legitimacy, having largely replaced the sub-Roman political structure. The sub-Roman genealogies have survived only in Wales and Scotland, where the elite class survived. The genealogies are therefore of the first type.

b. 'Tendency among early chroniclers to personalise historical explanation, so that change is assigned to individual deeds, battles, and invasions, and often to attribute the decline to hostile powers outside the state territories.'

Sub-Roman Britain: The arrival of the Saxons in eastern England was undoubtedly known to the early chroniclers. So they had good reason to attribute the decline to hostile powers, even if this was not the case. It is this fact, coupled with the legendary deeds of Arthur, Vortigern, and Ambrosius, that has misled historians and archaeologists ever since. The historical stories seem plausible; but they do not fit the known archaeological facts or agree with each other, without changing dates, people, or places.

c. 'Some confusion in legend and story between the Golden Age of the vanished civilization and the Heroic Age of its immediate aftermath.'

Sub-Roman Britain: The historical sources seldom confuse the two ages, because the Golden Age seems to have been forgotten. The influence of the Christian church may again be at work here. Most chroniclers were in religious establishments and would have found little to admire in the pagan Roman world. Gildas' confused history of Roman Britain may on the other hand contain elements of this, especially in his attribution of the second-century Hadrianic frontier system to the late Roman period.

d. 'Paucity of archaeological evidence after collapse compared with that for the preceding period (arising from loss of literacy and abandonment or diminution of urban centres).'
Sub-Roman Britain: see below.

e. 'Tendency among historians to accept as evidence traditional narratives first set down in writing some centuries after the collapse.'
Sub-Roman Britain: see below.

f. 'Slow development of Dark Age archaeology hampered by the preceding item and by focus on the larger and more obvious central place sites of the vanished state.'
Sub-Roman Britain: These last three items have been discussed under preceding headings and found to be present.

Diachronic aspects

7. The collapse may take around 100 years for completion (although, in the provinces of an empire, the withdrawal of central imperial authority can have more rapid effects).
Sub-Roman Britain: As far as Roman Britain is concerned, the collapse seems to have started around 360 AD, and should therefore have taken until about 460 AD to run its course. In fact, the withdrawal of imperial authority speeded the collapse from 410 AD onwards. The refusal of the emperor to resume responsibility for the province would have had three over-riding consequences: no new officials would have been appointed; no gold coinage would have been sent to the troops; and no small change would have arrived to keep the wheels of commerce turning.

This lack of hard cash, rather than the withdrawal of central authority, was probably responsible for the rapid decline of trade, and would have removed the power of the ruling classes and their towns. The Romano-British system of towns, which administered the province, collected taxes to be passed on to Rome, and controlled the markets and trade, was responsible for the prosperity of the province. Without the pressure to pay taxes in cash, the peasant farmers would have reverted to self-sufficiency and a local barter system. The towns would have had little to offer and without their social, economic, political, and administrative functions they would soon have atrophied.

8. Dislocations are evident in the earliest part of that period, the underlying factors finding expression in human conflicts - wars, destruction, and so on.
Sub-Roman Britain: see below.

9. Boundary maintainance may show signs of weakness during this period, so that outside pressures leave traces on the historical record.
Sub-Roman Britain: The date of 360 AD given above is based partly on these two aspects of the collapse. It is very difficult to say exactly when the collapse began because it had no single cause. It was the consequence of an interaction between a number of variables, but the results can be seen by the impact they made. The so-called 'barbarian conspiracy' was the first major upheaval in the province for 70 years, and undoubtedly had a profound psychological effect on ordinary people. The invasion of barbarians cannot have been on a large scale - it was apparently put down by Theodosius and four units of the field army (a maximum of 2,000 men) - but it caused social disruption as far south as London, and showed that Roman prosperity was perhaps not as safe or permanent as the Romans themselves had thought.

10. The growth curve for many variables in the system (including population, exchange, agricultural activity) may take the truncated sigmoid form (see fig. 2.3)

Sub-Roman Britain: The main problem in plotting the growth curves for variables in late Roman Britain is the lack of tight chronological evidence. One can certainly see the rise in the growth curve in the late third and early fourth centuries, but plotting the downward curve is more difficult. It is hard to compare and contrast the available published data, because this seems to depend on how different authors regard both the continuity problem and the role of the Saxons. If the Saxons are seen as gradually filling a vacuum left by the Roman decline, and integrating themselves with the existing social structure, then the downward curve takes on a more gentle gradient.

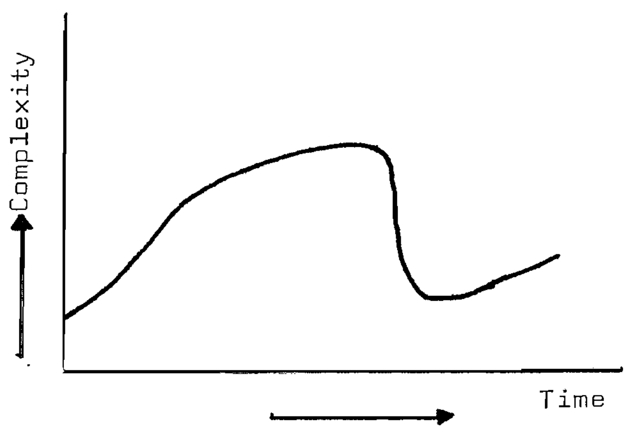


Fig. 2.3 System collapse: The sudden decline observed in several early state societies (After Renfrew)

Population and agricultural activity have yet to be accurately calculated, but it is possible to gauge exchange by the study of pottery production sites. The three major pottery industries of southern England - Farnham, New Forest, and Oxford - all introduced new types of pottery throughout their existence. The introductions of a new type suggests that someone had gambled on its proving popular and thus profitable. By calculating the number of new types introduced each century at each pottery production centre, we can draw a graph that must reflect the economic situation in southern England.

<u>No of New types</u>

Century	1st	2nd	3rd	4th	5th
Farnham	9	15	7	11	0
New Forest	0	0	39	67	0
Oxford	32	63	109	84	0
Total	41	78	155	162	0

Table 2.1 Information from Fulford 1975a, Young 1977, Millet 1979a.

By amalgamating the output of each centre we can allow for any variations which may be due to competition, and so get a more accurate picture of the state of the market in southern England. This fits the proposed sigmoid form fairly closely (see fig 2.4).

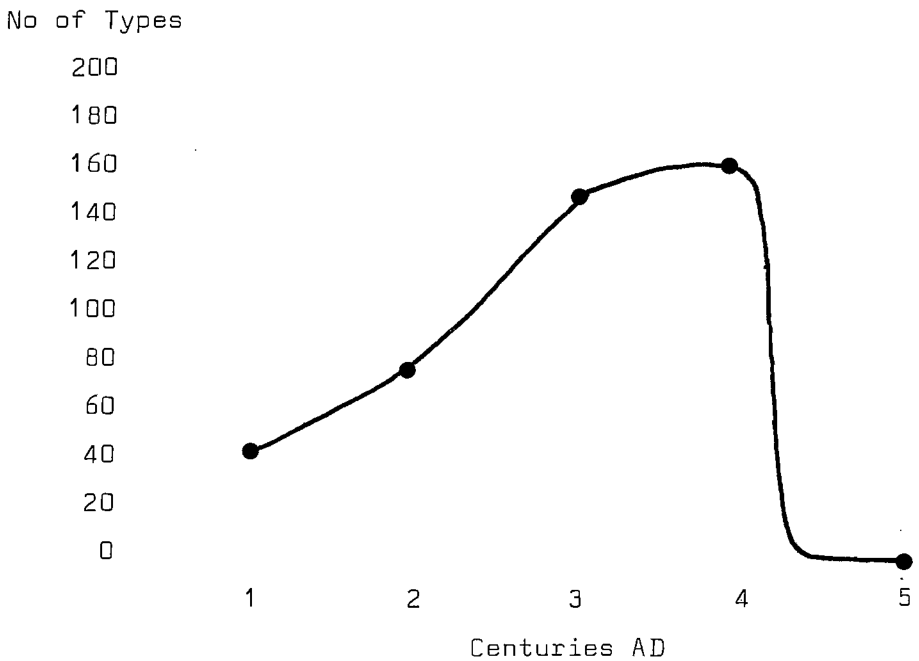


Fig 2.4 No of new types introduced in the three major pottery industries of southern England.

The curve does not resume an upward trend in the fifth century due to the complete collapse of the Roman economy. If it was to be continued it would record the introduction of new Saxon pottery types, a dated typology of which has not yet been agreed upon.

Other variables in the system probably follow the truncated sigmoid curve. Agricultural activity formed the basis of the Roman economy, and the majority of the population must have derived their income from it. There is ample evidence that the peak period of the villa system in England was in the fourth century (Percival 1981), and the pottery production curve must relate directly to the wealth of the agricultural producers who were the purchasers.

By the mid-fourth century, however, rural marginality had begun to increase in all the Roman provinces in northwest Europe. There is particularly good documentary evidence for this happening in Gaul and Italy. The mid-fourth century wars caused a shortage of manpower in the army, which presumably reflects a shortage of farm workers at that time, and there seems to have been constant anxiety over deserted fields (Kent 1979, 17)

The fiscal crisis of the late Roman empire undoubtedly put pressure on the rural population, because the central government would have been unwilling to accept a decrease in revenue in line with a decrease in population. This would have resulted in a significant drop in the investment in charismatic authority, which kept central government and its officials in their positions of power.

The worsening climate would have been a factor in increasing rural marginality, as is shown by the introduction of corn driers. The rise of household industries in once prosperous parts of late Roman Britain also points to deteriorating agricultural conditions, although the palaeobotanical evidence cannot substantiate this (F. Green pers. comm.)

11 Absence of single obvious 'cause' for the collapse Sub-Roman Britain: This aspect of the decline of Roman Britain has been covered in the preceding section on the historical framework. The literature on the subject of Roman Britain, from Bede onwards, contains many theories which put forward 'causes' for the collapse, but none has been proven to the satisfaction of the other theorists.

Conclusions

It can be clearly seen that the Systems Collapse model fits the events in Roman Britain, and it provides a better explanation for the transformation that took place than disease, climate, or invasion alone. The main point to be borne in mind is that once the Roman economic and political system had started on the downward curve of the cusp, the fact that the Saxons crossed the North Sea is irrelevant. The Romanised population would have declined as the economy collapsed, but the model predicts an upturn in the late sixth century; and new societies did emerge in areas where the Saxons did not gain political control. If anything, the Saxons administered the coup de grâce to the newly emerging social systems in southern England, rather than destroying the preceding Roman system.

Chapter 3

Approaches and Methods

This chapter will detail the methods used in this project to obtain the data-base on which the microprovenience analysis of the pottery was carried out. All previous discoveries of Early Saxon domestic material in East Anglia had to be located, and the pottery quantified before the fabrics could be analysed. Quantification is of vital importance, as is a sufficiently large data-base, if one is to draw reliable conclusions about changes through time in ceramic technology and modes of production.

The sites

The initial appraisal of Anglo-Saxon settlement sites was carried out by examining the gazetteer compiled by Rahtz (1976). This search revealed two sites in Cambridge (Grantchester, and Waterbeach), six sites in Norfolk (Hemsby, Caister-by-Yarmouth, Postwick, Snettisham, Thetford, and Witton), and nine sites in Suffolk (Little Bealings, Butley Church, Butley Neutral Farm, Grimstone End, Rickinghall Inferior, Rickinghall Superior, Wattisfield, West Stow, and Worlington).

The relevant county and national journals were then consulted to check that no sites had been missed by Rahtz, and to add any sites discovered since the compilation of his gazetteer. This resulted in the addition of Ridgeons Gardens in Cambridgeshire; Brandon, Spong Hill, and Thetford Redcastle in Norfolk, and Barham, Euston, Fakenham Magna, Hacheston, Ixworth; and Lakenheath in Suffolk.

The next stage of the investigation was to enquire at the local level, i,e. county museums, county archaeologists, and archaeological units. These enquiries revealed no more sites in Cambridgeshire, although two sites - Stonea and Linton - came to light through personal contacts, ten sites in Norfolk (Beachamwell, Caldecote, Foulden, Gayton Thorpe, Heacham, Hillborough, Merton, Narborough, North Barsham, and North Watton), and four sites in Suffolk (Barnham, Castle Hill Ipswich, Redcastle Farm Gt Barton, and Stanton Chair). This gave a total of five sites in Cambridgeshire, and 19 sites in both Norfolk and Suffolk.

The final stage was to assess the quantity of Early Saxon material from each site, and its availability for analysis. The Cambridgeshire sites provided a good sample but are rather dispersed, with the site of Stonea isolated in the Fens. However, Grantchester, Ridgeons Gardens, Waterbeach, and Linton are close enough to the West Suffolk group to have been within possible trading distance, as they are within the distribution area of the products of the 'Illington/Lackford potter' (Green, Milligan and West 1981), the study of which was to be included in this thesis.

In Norfolk the site of Caister-by-Yarmouth was being examined by Darling, who provided a selection of the Saxon material. All the sherds were Middle Saxon, Ipswich-type wares (650-850 AD), and were therefore not included in this thesis. The site at Thetford, where some features were thought to be of Early Saxon date, was in the process of being reappraised. The complex stratigraphy, with a high number of residual sherds, and a pottery chronology that appears to be the reverse of that accepted elsewhere, meant that the site had to be omitted (Hurst 1976). Domestic pottery had been found during the Spong Hill excavations (Hills 1977) and nearby (Hills 1981). This area was under investigation by a fellow student (Brisbane 1981) who made comparative material available. This brought the final total of Norfolk sites to 17.

In Suffolk, the sites at Wattisfield and Barnham had been re-examined (Balkwill pers. comm.) and the finds dated to the Iron Age. The sites at Rickinghall Superior were not known to the Ipswich museum and no finds could be located.

This resulted in a total of 16 Suffolk sites.

Over the whole of the area then, 35 sites had produced domestic pottery, and these formed the basis of the project. One aspect of the research programme was to correct the over-emphasis on cremation urns. However, it was felt that there was little point in being equally biased towards domestic pottery, because comparisons could not be made between domestic and funerary material, unless similar methods had been used on both kinds of material. The staff at Norwich museum therefore agreed to the sampling of urns from five cremation cemeteries. The sites chosen were mostly those producing a small number of urns, the exception being the large cemetery at Illington. Illington was chosen as being of importance for several reasons. The material was being worked on for publication; it was a large sample, but not too large to be included in the project time-scale; and the site had been reasonably well excavated and recorded. Finally, it contained a large group of Illington-Lackford urns, which merited special stüdy to see how they related to similar vessels in Norfolk, Suffolk and Cambridgeshire.

The Pottery

Most of the pottery from these sites had lain in museum stores since its excavation, and although the majority of the sherds had been washed, up to 40 years' build-up of dust meant that this process often had to be repeated. Very little pottery had been marked, and most sherds were in paper bags bearing only cryptic messages or containing torn pieces of card as clues to their provenance.

With smaller groups of material this problem was not too serious, but some large groups, such as that of Grimstone End. consisted of thousands of sherds; and before fabrics could be sorted and grouped the sherds had to be marked with their context. This was ascertained by relating bag captions back to original excavation records, and any un-labelled sherds had to be treated as unstratified material.

When all the sherds had been marked they were laid out to see the whole assemblage, and then sorted by eye into major fabric groups, based on the inclusions present. The fabrics were: sandy (sometimes divided into sandy, coarse sandy, and fine sandy); silty; chalk; limestone; shell (the three latter all being encompassed under the heading vesicular if the calcareous inclusions were leached out); vegetable-tempered; grog-tempered; and micaceous. Hybrids were often present, and it was sometimes difficult to decide whether the presence of a single inclusion of chalk justified the designation of the sherd as chalky. (Further descriptions are given later)

Once the fabrics had been decided upon, it was necessary to quantify the amount of each fabric present, so that meaningful comparisons could be made with the pottery from other sites, and so that a sampling strategy could be arrived at for the proposed programme of petrological analysis.

Estimation of quantity

In the past, archaeologists were content simply to display their pottery when the site was published. Usually a selection of the more complete material was drawn and the less diagnostic pieces were often discarded. The growth of studies (largely initiated by Peacock) analysing the production and distribution of pottery has resulted in the need for a more accurate quantification of the ceramic assemblage from an archaeological site.

The amount of pottery recovered from a site, and its relationship to 1. the size of the inhabited area, 2. the type and scale of the activities carried out there, 3. the length of occupation, and 4. the methods of rubbish disposal, must be known before between-site comparisons can be made. This is especially true of studies of distribution patterns where a single presence/absence of a particular fabric within a represented area tells one little about the scale of production through time, the complex distribution systems that may have existed, and the economic position of the purchasers.

The relationships between these variables can be calculated by constructing indices such as the Droitwich Salt Index (Morris 1981) by which the proportions of different types of ceramic container present on a site were compared. When plotted against the type of site and its distance from the source of the fabric, a fall-off curve was generated which suggested that the distribution of certain ceramic containers was controlled by a major hillfort 29km from the production area in the Malvern Hills.

The basis of a study such as this is the accurate measurement of the quantity of ceramics present on a site. The methods used can be divided into two schools, those which quantify by the physical presence of the ceramic assemblage from a site, and those which go beyond this in an attempt to provide a statistical estimate of the quantity of pottery that was used on the site. These methods will be reviewed here, their problems and drawbacks noted, and a method of statistical estimation that has not been used before on pottery will be introduced.

Methods of quantification based on physical presence

i Sherd weight: Each fabric is weighed so that comparisons can be made. The weight is relatively simple to measure and requires little equipment (Evans 1973). Differences between researchers will depend on equipment error, which can be allowed for.

ii Adjusted sherd weight: Some researchers have argued that the amount of clay used to make a vessel is of greater importance than how many vessels are present, and give large thick pots a greater role than smaller ones. Sherds of each fabric are divided into classes of different thickness and the gross weights of each sherd group are adjusted to a standard thickness by multiplying or dividing by the necessary factor (Hulthen 1974). This factor is first ascertained by calculating the density of the pottery under study. The equipment involved is simple, but the method is time-consuming. It is equivalent to the standardised sherd area method, and means that pots are usually being compared in relation to their size and volume.

iii Sherd counts: Merely counting the sherds of each fabric is a quick and simple method which requires no equipment (Evans 1973). This will, however, give a bias to vessels and/or fabrics that break into large numbers of pieces due to inherent weakness, or which have suffered greater damage due to their residuality. This could be allowed for if forms were fully known, by defining a modulus of rupture for each fabric, and an index of residuality to assess the number of breakage occasions they have been subjected to.

The process is sometimes speeded up by counting only rim sherds or some other diagnostic feature. The varying breakage factor will still apply, possibly to a greater degree, as fine wares will often have very delicate rims, whereas coarse wares will often have a strengthened rim, due to their size or function.

iv Surface area: Surface area has been suggested as a quantification method by some authors (Hulthen 1974), (Glover 1972), but is difficult to measure. Either all sherds have to be carefully measured individually, or else groups of sherds must have their approximate surface area calculated using a gridded surface. Large angular sherds will not fit together well, and since many pottery sherds are parts of spheres or frustrums further error will be involved in any marked divergence from a simple plane.

v Displacement volume: This has been tried by measuring the volume of water displaced by the sherds, but has been found to be messy (Hinton 1977). It would probably give similar results to the adjusted sherd weight method which also measures the amount of clay present, but it does not take into account the density and porosity of the fabric being measured.

Conclusion

These measurements of quantity can all be used for intra- and extra—site comparisons by straight ratios or percentages. They could also be used to give a figure for the number of vessels in a fabric, by dividing the total volume, weight or surface area (depending on the method used) by the volume, weight or surface area, of the vessels being measured.

The main drawbacks to the methods outlined above are that they quantify information from potsherds and therefore tell one only about the quantity of sherds present. A truer picture of ceramic production and exchange would be gained by calculating the number of vessels present. Weight and numbers of sherds will submerge individual pots or forms, whereas vessel counts will enable vessels and forms to be quantified directly. This is particularly true of small assemblages, which are the norm in the Saxon period (Foard 1977), where meaningless statistics will be generated.

Methods of quantification based on statistical methods

i Rim lengths: Fulford (1973, 23-4) uses a technique whereby the rim sherds of a form are measured around their outer circumference, summed, and divided by the main diameter of that form, i.e.

$$\text{MNI} = \frac{\sum_N^1 \text{Rim length}}{\left(\frac{\sum_N^1 \text{Diameter}}{N}\right)}$$

N= no of rim sherds present

This formula is based on Millet 1980, and will clearly give an answer three times larger than the number of sherds and their lengths would allow, because he divided by the diameter which should infact be replaced by mean circumference. This estimate will then give the minimum number of vessels that could have been present. The result will always be lower than the number of vessels originally present, and therefore this method has little advantage over weight of sherds divided by the mean weight of the form, or counts divided by the mean number of sherds that a vessel breaks into. It is, however, the basis for the estimated vessel equivalent method proposed by Orton (1975).

ii Estimated vessel equivalents: This is based on the same premise as that of Fulford, except that rim sherds are measured as a percentage of the circumference and summed (Orton 1975). This gives a figure that can be rounded up to the nearest integer to give the vessel equivalent, or v.e. The base sherds can be treated in the same way; the two equivalents summed and divided by two gives the estimated vessel equivalent, or e.v.e. Rims and bases do not always have to be used, handles and spouts would be just as appropriate. A number of indices could be used as follows.

$$\frac{v.e._1 + v.e._2 \text{-------} v.e._n}{n} = e.v.e.$$

One drawback is that as one adds further vessel equivalents for other attributes (which should be done to get the fullest picture) n increases also, and if certain portions of the vessel survive less well, the e.v.e. will be slightly reduced.

iii Number represented: The original number of vessels on the site, represented by the surviving sherds, can be worked out statistically using the hypergeometric distribution (Orton 1980). This involves sampling without replacement from a population of known size, whereas the more usually encountered binomial distribution involves sampling with replacement from a known or unknown population usually considered to be infinite.

If each vessel had been broken into two parts and 50% of the site was excavated, then half of the sherds would be recovered. They would not however come from 50% of the vessels.

The hypergeometric distribution predicts that one would have recovered sherds from 25% of the vessels. If the excavated sample was increased to 80% then sherds from 60% of the vessels would be represented. Calculation of the original number of vessels is based on the probability of the next sherd recovered being part of a vessel from which a sherd has already been recovered. This is found using the following equation:

$$P(x_i) = \frac{\binom{pN}{x_i}\binom{qN}{n-x_i}}{\binom{N}{n}}$$

Where N is the number of elements in the population, i.e. total number of potsherds

n is the sample size, i.e. number of potsherds excavated

p is the probability of success

q is the probability of failure, where $p = q = 1$

This equation depends on a number of criteria being true:

1. The number of pots involved is known.
2. The degree of breakage is constant (i.e. all pots break into a constant equal number of sherds). This could be true if weaknesses inherent in each pot type were equal, but the number of sherds created by breakage will be a direct result of the force applied to break the pot in relation to where that force is applied.
3. A single event must also be assumed because secondary refuse will have undergone further stresses, resulting in a greater number of sherds.
4. Another assumption is that the sherds of pottery will be randomly scattered across the site. This is unlikely to be the case on an archaeological site, and if it were true there would be little other information that could be gathered from excavation. The method will only work successfully if the total extent of the site is known beforehand, which is unusual in British archaeological work.

iv Petersen estimate: The hypergeometric distribution can also be used to calculate the number of vessels represented, by a simple method called the Petersen estimate. Devised originally and widely used in ecological investigations, this method estimates the number of animals N in a closed population, as follows: a sample of animals, n_1, is taken from the population, tagged and returned to the wild. After allowing time for the marked animals to mix thoroughly with the rest of the population, a second sample, n_2, is taken, and m_2 animals are found to be marked. The number of marked animals in the second sample will be related to the proportion they make of the unknown population, and one can therefore obtain an estimate of N, $\hat{N}$.

$$\hat{N} = \frac{n_1 n_2}{m_2}$$

This is the Petersen estimate.
The assumptions made are as follows:

1. The population is closed, so that N is constant.
2. All animals have the same probability of being caught in the first sample.
3. Marking does not affect the catchability of an animal.
4. The second sample is random.
5. Animals do not lose their marks.
6. All marks are reported on recovery.

This estimate of original population has been applied scientifically to archaeological vertebrate samples (Fieller and Turner 1982). The minimum number of individuals in archaeological samples has been calculated using various indices, but the raw data are arrived at by counting the most numerous skeletal elements present, dividing them into left and right elements, and then determining the number of pairs present.

The Petersen estimate has been applied to these data by letting n_1 and n_2 equal the number of right and left bones respectively, and m_2 equal the number of pairs present. This has given very good results in comparative studies (Fieller and Turner 1982), and there is no reason why it cannot be applied to other classes of archaeological material.

With pottery, we can substitute rim sherds and base sherds for left and right, and the number of rims and bases that are likely to belong together can be calculated.

The same assumptions are made as for the ecological model, but can be more easily met than those of the vessels represented method. In that case, N had to be known beforehand so that the number of vessels present in a particular percentage of the site could be calculated. The Petersen estimate actually gives this figure $\hat{N}$ for whatever percentage of the site is excavated.

The assumptions are as follows:

1. The population is closed, that is, the number of potsherds will not change.
2. All rim sherds have the same probability of being excavated.
3. All base sherds have a random chance of being selected.
4. All pairs will be recognised.

The pottery processor is the major source of error, but this should play no greater part than in other quantification methods. Item 3 will depend to a certain extent on the bias in collecting the original material, but again, a bias towards collecting rims or decorated sherds will be noticeable in the final assemblage and can be noted. If a bias is obvious in a collection, then any method of quantification will be suspect.

v Sherd groups: The sherd group method is based on a thorough study of the pottery assemblage and its fabrics, and involves grouping a number of sherds, from one to infinity, that are considered to come from the same vessel. It has sometimes been called the minimum number of vessels (Vince 1977, 63) and is termed number of vessels represented by Orton (1980).

In 1980 Orton described the method as 'positively dangerous' and a 'misleading statistic'. Since then, his own work on simulating pottery breakage and archaeological retrieval using a computer to model Kirby processes (Orton 1982), has shown that the method does have a variable bias when comparing proportions of two or more types of pottery that have different breakage rates. However it has a lower standard deviation of variability than sherd counts, sherd weights, or estimated vessel equivalents, when the proportions of the two types in the assemblage are equal, and it produces better estimates of the number of vessels than the other methods when the sampling fraction is high. Orton concluded that although only 'vessel equivalents' is unbiased under a range of conditions, vessels represented may often give the lowest sampling error. It is therefore not as misleading or dangerous as Orton at first suspected, and in fact enjoys popularity among many pottery analysts. Millet has found it successful on Roman pottery (1979), Freke and Craddock recommend it for dealing with the analysis of kiln assemblages (1980) and it is the method used at both Mucking, Essex and West Stow, Suffolk, the two largest assemblages of Early Saxon domestic pottery in the country.

The bias in the method, as calculated by Orton, only comes into play when quantifying and comparing two very different types of pottery. He compared the breakage rates of three types of post-medieval earthenware and tin-glazed plates. The three types of earthenware exhibited no significant variations throughout the different forms present, and as all Saxon pottery is earthenware the bias will not lead to large errors.

Conclusions

The number-of-vessels-represented method or sherd-group method will be employed throughout this study. It is the most sensible way of dealing with handmade vessels where variations in thickness and colour play a part in deciding on a sherd group. Straightforward measurement of a single attribute is difficult in such cases.

The matching of sherds was carried out by eye together with frequent checks using a binocular microscope at magnifications of x10 and x20. Matching depended partly on six variables: colour, thickness, surface finish, hardness, and type and density of inclusions.

As a check on the method used a note was made of the number and type of sherds present (i.e. rim, body, base) so that vessel numbers could also be quantified on those data. Using these, the Petersen estimate could be calculated for large enough groups.

Finally, the sherds in each assemblage were bagged up as sherd groups and returned to the museum store so that future researchers can check the validity of the results if they wish.

Sampling strategy

Once the pottery from a particular site had been sorted into sherd groups, the next stage was to take samples for thin-section analysis from within those groups. Here the major problems were time and resources; but aesthetic values were important when dealing with items normally displayed in public or private collections.

One of the basic questions concerned the variability and number of fabrics involved in a ceramic assemblage on any single settlement site. The best way of determining this would have been to sample for fabric analysis every single sherd group, and also to assess the validity of the sherd groups by taking multiple samples. But that would have involved an unacceptably large number of thin-sections, possibly doubling or trebling the actual final total of 1,400. This in turn would have greatly increased the time needed to manufacture and compare the finished thin-sections.

The problem could not be dealt with by a single sampling strategy that could be applied to all sites, so each site had to be treated as a particular case. If a site had not produced a large amount of pottery, it was often possible to thin-section every vessel. But if more than 70 vessels were involved - such as those from Grimstone End, with 708 - then fabric sampling was carried out. This involved taking a sample from each context where a fabric was found, and then taking samples to check the variability of the original fabric groups within those contexts. Wherever possible, samples were taken from rim sherds or, failing that, from the base sherds. This was done to minimise the errors caused by possibly mixing the less diagnostic body sherds from two vessels.

Analysis

If the ceramic assemblage is to be fully examined then analysis of a number of attributes must be made. In the past archaeologists have examined form and decoration, but one can go further and examine the fabric of the vessel itself. This can give information on how the vessel was made. The forming technique (coil, lump, or wheel) can leave tell-tale clues in the clay, and the firing methods and temperature will effect the clay and the minerals in the fabric. This can give information on the methods of production. Analysis of the geological material the vessel is made from (both clay and temper) and comparisons with clays (clay sources, and pottery from other sites) can enable traded pottery to be distinguished from local wares, and information will be provided about the mechanisms by which the pot arrived at the site, and the social systems behind its production and distribution.

It is the changes in the methods of production and distribution of Saxon pottery through time that are to be examined in this study, and therefore physical analysis of the pottery played a vital role in the project.

Physical analysis of the pottery was carried out at four levels - visual, petrological, textural, and statistical. This produced a hierarchical system, with each level providing checks on its predecessors.

The visual analysis divided sherds into broad fabric groups, which were then checked by petrological analysis. Textural analysis was then used to characterise the clays, and statistical methods employed on the data thus generated. In practice, the petrological and textural methods tended to subdivide the original macroscopic groupings, which the statistical treatments to some extent reconstitute.

Visual

Visual analysis of fabrics was carried out at the macroscopic level. This involved examining each sherd and assessing its matrix and inclusions. Sherds were first placed into two fabric groups - those with inclusions and those without. The group without inclusions (or inclusions of quartz only) could then be divided into the following three fabrics:

1. Sandy: no distinctive characteristics.
2. Fine sandy: sherds finer than fabric 1, often with a soapy feel and a distinctive lack of quartz grains.
3. Coarse sandy: sherds with a high density of quartz grains or with very large quartz grains. Large grains were often fragments of granitically derived rocks.

Other groups with distinctive inclusions were divided into an additional seven fabrics:

4. Limestone: characterised by oolites, or fragments of shelly limestone (often leached out leaving a vesicular fabric). Oolites seemed less resistant to weathering than the limestone, giving distinctive spherical vesicules.
5. Chalk: characterised by fragments of glacially rounded chalk, usually larger and softer than the oolites and less abundant.
6. Shell: characterised by fragments of shell, easily visible on a broken surface.
7. Grog: characterised by orange or red particles, usually rounded. Difficult to distinguish from iron particles when small.
8. Vegetable: A general term for 'grass'- or 'chaff'- tempered pottery, characterised by the laminate voids left by the combustion of plant material.
9. Yellow mica: characterised by large 'plates' of yellow or brown mica (biotite) visible on the surface of the sherd.

Usually at a low density per cm^2 compared with white mica.

10. White mica: characterised by small, abundant 'plates' of white mica (muscovite) visible on the surface of the sherd.

A number of hybrid groups were also present, and this led to a basic hypothesis which conditioned further work. The hypothesis was that there are two basic clay types in the study area - sandy clays and calcareous clays (Fabrics 1-6)- to which tempers such as grog, animal dung, or sand were added, to give fabrics 7 and 8.

Fabric 9 (yellow mica) can be seen as a subgroup of the sandy clays (fabrics 1-3) to which granitic temper had been added, or where surface finish has exaggerated the micaceous element. Burnishing will cause the particles of mica to lie parallel with the surface, thus reflecting light. A high firing temperature will also exaggerate the mica content because, once a certain temperature is reached, the granitic particles expand rapidly. Sherds with yellow mica showing were often found to be heavily pocked or dunted, fragments of clay matrix having been forced out of the body to reveal the mica below the surface. Fabric 9, therefore, is probably only a subgroup of the sandy fabrics. So, unless the whole matrix appeared different to that of fabrics 1, 2, or 3, it was not usually distinguished as a separate fabric.

Similar reasoning can be applied to fabric 10 (white mica), although certain clays in East Anglia do contain high concentrations of muscovite, giving a natural 'mica dusted' appearance. The Roman potteries at Wattisfield, Suffolk were based on a clay of this type. The presence of mica on the surface is dependent on the type of surface finish (burnishing causing enhancement, and schlickung, or slurry-coating, causing total masking) and the reflective surfaces of mica inclusions are not revealed to the same extent on a fracture. Sherds therefore were not assigned to this fabric group unless they were many times more micaceous than the norm in the sandy fabrics.

Hybrid groups could be treated in a similar manner. Sherds with vegetable matter and chalk or oolite present are a combination of calcareous clays and vegetable temper. Vegetable temper and grog in the same sherd are the product of two different tempering agents in a sandy clay. All the fabrics can in fact be taken as a combination of clay and temper, with the possible exception of fabric 2 (fine sandy). The problem of differentiating between a sandy clay and a silty clay tempered with sand will be dealt with later (chapter 4).

The complex relationships between elements in the local geological deposits, and their use by Saxon potters, points to broad, simple fabric groups being the most useful for preliminary analysis. Once this is done, a high sampling and thin-sectioning fraction must be used to clarify the finer details that are not visible to the human eye.

Petrological

Petrological analysis was carried out by removing a small sample from each sherd group, preferably from the rim. The best tool for this was found to be a pair of 16cm carpenter's pincers, the ground edges of which cut effectively through even thick and well-fired pottery. This tool can also be used to 'nibble' at a weathered fracture to reveal a fresh surface for visual analysis without removing too much of the sherd.

The samples were then impregnated with Carbowax 600, by placing them in molten wax for 2-4 hours, until all air bubbles had been driven off. This method results in a 10% failure rate, when the wax fails to impregnate the sample and the matrix remains friable at later stages. This was a problem, especially with low-fired sandy fabrics.

Towards the end of this project the Carbowax system was replaced by a Gallenkampf oven used in combination with an Edwardes vacuum pump in which the samples were placedin an epoxy resin (Araldite AY 18, hardener HZ 18) and subjected to a vacuum for four hours. The samples were then cured by baking them for a further four hours. This process took longer to carry out but produced only a 2% failure rate;

better still, the oven could take six times as many samples as the waxing method, which also required constant attention because of fire risks. The thin-sections produced with the vacuum oven were of considerably higher standard than the waxed examples, having a clarity that was most noticeable.

Once impregnated, the sherd samples were ground flat on one surface, using a diamond wheel, then checked for impregnation faults. If too faulty, the impregnation process was repeated. As soon as a satisfactory flat surface was achieved, the ground face was stuck to a clean glass microscope slide using 'Araldite Rapid' a two-part epoxy-resin glue. Unfortunately, mixing the two parts produces airbubbles in the adhesive, which remain in the glue between the sample and the glass surface. Attempts were made to remove these under vacuum, but without success. They seem to be the price one pays for the superior qualities of the two-part epoxy adhesive.

When set, the glass slides were mounted in the vacuum chuck of a cut-off saw and the surplus was removed, leaving approximately 1.5mm attached to the slide. The surplus was kept for future reference or reuse if the section was later ground too thin. The section was then placed in a mechanical slide holder and reduced to a thickness of 0.5mm on a diamond wheel. The section was then finished by hand on a thick ground glass plate, using 600-grade carborundum powder.

Once the thin-sections were reduced to approximately 30 microns, based on quartz interference colours, cover slips were mounted, using 'Eukitt' a non-endothermic mountant. The sections were then examined under the petrological microscope, and the matrix and inclusions were examined in both unpolarised and plane-polarised light.

The petrological assessment showed that there was great variety in the distribution and sizes of the quartz grains present, with grog and vegetable matter not correlated with any particular macroscopically defined fabric. The other inclusions present consisted of iron compounds, quartzite particles, detrital minerals, chalk and limestone fragments, grains from igneous rocks, and fragments of sandstones.

Their presence in varying combinations and densities pointed to a glacial till origin. For most of the clays, the standard technique of presence/absence could not therefore always serve to differentiate fabrics. This method can be used, however, in areas of less complex geology, and was successfully employed on the Saxon pottery from Ramsbury (Russel 1980).

If one cannot distinguish between clay fabrics by their inclusions, then the method of textural analysis, first used by geologists, must be used.

Textural

Textural analysis is a geological technique used to characterise sedimentary deposits and analyse the flow regimes that caused their deposition. This is done by measuring the size and shape of the constituent grains. The tabulating of the results, or their use in graphical form enables deposits to be 'finger printed' and compared. The method has been borrowed by archaeological ceramic-petrologists and applied to pottery by treating the fabric of a vessel as a partly metamorphosed sedimentary rock. Fabrics can then be compared objectively with each other and with clay sources in order to make deductions about distribution patterns and ceramic technology.

The use of textural analysis is still somewhat in its infancy and methods vary. A brief survey will be made here of the original geological applications and its subsequent development, since this is directly related to the confidence with which it can be used in ceramic petrology.

A sedimentary deposit consists of separate particles which can be characterised by their size, shape, roundness, mineralogical composition, surface texture and orientation (Krumbein 1941). Early work concentrated on visually assessing roundness and sphericity (Krumbein 1941, Rittenhouse 1943), but both could be calculated by more complex mathematical procedures involving direct measurement, i.e. the sphericity = the square root of the ratios of the shortest and longest diameters of a particle (Pye and Pye 1943). The search for more rapid measurements led to greater possibilities of error, and thin-section analysis for indurated deposits were soon found to be more accurate, as well as allowing more meaningful characteristics to be calculated (Pye 1943). Folk and Ward (1957) gave textural analysis a firm theoretical basis by relating grain-size parameters to depositional environments. They showed that, although previous work had been based on normal distributions, which gave a symmetrical graph, a substantial number of natural sediments were in fact composed of weathered grains in secondary contexts, and were therefore non-normal. Thus, more complicated equations than mean and standard deviation were needed, and greater emphasis was placed on skewness and kurtosis to characterise non-normal distributions. The moment statistics used were as follows:

Mean (M_z), mean grade size.
Standard deviation (6_I), the spread of grains over the different size classes.
Skewness (Sk_I), the symmetry of the distribution curve.
Kurtosis (K_g), the peakedness of the distribution curve.

Friedman (1958) carried out extensive experiments to assess the most accurate method for handling textural analysis, using thin-sections rather than the sieves previously used for most work. He found that thin-sections of deposits had to be made where sediments could not be disaggregated, but uncertainty remained about the accuracy of this method.

Friedman selected 500 grains using the point-counting method. Regular traverses were made across the thin-section using a mechanical stage, and the longest axis of the selected grains were measured. This assumed that the grains were randomly scattered in the section and that selecting them at set intervals would therefore give a random sample.

Friedman drew seven conclusions from this investigation, each having an implication for archaeological work.

1. Counts had to be spread over 75% of the area of the thin-section to obtain consistent results. (A standard

geological section measures 1 x 1.5cm).

2. Friedman's analysis of operator error showed that the total standard deviation was no more than 30%, which was not considered too inaccurate. If more operators counted the same slide, the standard deviation from the mean decreased by $1\sqrt{n}$ where n was the number of operators. Previously it had been claimed that operator error was large, and that one could not compare size distributions calculated by different operators (Griffiths and Rosenfeld 1954).

3. The difference between particular orientations of the thin-section relative to the sample was found to be negligible. Previously, it had been argued that grain orientation within a sample would influence the grain size distributions.

4. Thin-section measurement gave results that could not be readily compared with sieved measurements. If plotted graphically, the section curve was lower than the sieve curve for the same rock, except for the very fine fraction where a cross-over resulted.

5. The method became increasingly inaccurate as the grain size decreased, because it was very difficult to measure small grains accurately.

6. The number of grains needed for characterisation was assessed, and it was found that 100 to 200 grains gave the best results. Counting more grains than this increased the accuracy, but only marginally for the extra time involved, whereas counting fewer grains resulted in markedly greater inaccuracy.

7. Measurement in discrete intervals (size classes), rather than ungrouped frequencies, prevents accurate calculations of the moment statistics, so one must use graphical methods.

Van der Plas (1962) challenged the point-counting technique on a theoretical basis, and put forward instead the 'ribbon-counting' technique which has since been used on archaeological material (Betts 1982). This involves counting every grain whose centre falls between two parallel lines drawn across the thin-section. Unfortunately, Van der Plas failed to recognise the bias involved in counting disaggregated samples (for which the ribbon counting method was devised) rather than natural deposits (Kellerhals, Shaw and Arora 1973). Hilliard and Cahn (1961) proved that point-counting was the most accurate method, and that the grid-by-number counts were the same as volume-by-weight using sieves. Point-counting could therefore be compared with sieving studies, providing the bias of the sieves and the method used were calculated.

The first archaeological application of this technique was by Peacock (1971) who used it to characterise Romano-British sand-tempered pottery found at Fishbourne. The size intervals used for measurement were determined from the phi scale (based on the logarithm of the diameter) recommended by Krumbein, and the moment statistics were calculated using the formulae of Folk and Ward (1957). These, together with estimates of percentage of inclusions and a numerical code for roundness and sphericity, enabled products of unknown kilns to be distinguished.

Further work - mostly by students in the Department of Archaeology at Southampton University (Darvill 1982; Streeten 1982) - has supported Krumbein's findings that 100 to 200 counts are sufficient, and this has also been confirmed by Betts (1982). The mean size and standard deviation can be accurately assessed by 50 counts (Wandibba 1982); but the skewness and kurtosis require a higher count, as they involve calculations involving smaller numbers of grains. Krumbein and Rasmussen (1941) have shown that the counting error is equal to the reciprocal of the square root of the number of items counted.

$$e = \frac{k}{\sqrt{n}}$$

where k is a constant.

The counting error itself relates to sample size. If 200 grains are selected for measurement, that represents only one from an infinite number of ways of selecting 200 grains. To have an accuracy within 10% in a particular size class, 9% of the total count must be present in that class; and to achieve an accuracy within 5%, 30% of the total count must be in that size group. This means that those grains of the least abundant size are subject to the largest errors, and are therefore of least significance. This throws doubt on the conclusions of Betts (1982, 84). In archaeological terms, these are usually the coarser grains; and in some fabrics both the coarsest and the finest.

This shows that measurements of skewness and kurtosis are less accurate than those of mean and standard deviation, a fact that was demonstrated mathematically by Swan _et al_ (1978). They decided that using graphic representations to calculate moment statistics was less accurate than using ungrouped frequencies, so confirming suspicions Friedman had held in 1958 but had been unable to substantiate due to lack of a computer. Furthermore, they found that with graphical methods it may be impossible to differentiate two samples that do have significantly different grain-size distributions. This is because skewness and kurtosis respond erratically to significant deviations from normality in grain size distributions.

The method of point-counting used by the present writer was that described by Streeten (198), in which the grain nearest to each point in a particular direction is measured. The procedure was speeded up by placing the thin-section in a mechanical stage, operated by a foot switch. The image was projected from a Swift microscope with a high intensity light source downward onto a white Melamine surface, at x200 magnification for greater accuracy. A square drawn on the white surface defined the area in which the grain should lie to prevent it being remeasured on subsequent traverses, and the grain nearest to one corner was measured with a scale calibrated in the relevant size classes. Using a foot switch and a calibrated scale, 160 quartz grains could be recorded in about 15 minutes. As Streeten (1981) found, the use of unpolarised light does not hamper the analysis, because most inclusions in quartz tempered fabrics are visually distinctive in unpolarised light, and if not, do not normally constitute a meaningful percentage.

The results in phi classes were plotted as cumulative frequency curves on arithmetic probability paper, essential for quantative work on particle size distributions (Shackley 1975). One could then calculate the moment statistics by working out the percentile values and using Folk and Ward's equations. But the problem of interpreting the statistics remained.

Plotting graphs and calculating moment statistics is a time consuming process, and it is difficult to publish the results in a readily accessible form if many fabrics are present, (which was found to be the case with East Anglian pottery). This, coupled with the large number of samples to be processed, led to the use of computer techniques.

Statistical procedures

The archaeologist, when using textural analysis for comparative purposes, must find a method of analysing the variance between samples, and decide on boundaries that will enable fabrics to be grouped as similar or separate.

Moment statistics can be plotted as graphs; but, if all four moments are used, their inter-relationship produces an exceedingly complex helix (Folk and Ward 1957, fig 18) into which it would be difficult to fit a particular example for comparative purposes.

A simple plot in two dimensions, such as mean against standard deviation, can of course be used. But if a large number of samples is being processed an elongated scatter results, with each sample close to a number of others, but with the ends of the scatter remaining some distance apart. This method gives good results if one has non-textural information, such as stamps, decorative styles, or forms

(Darvill 1982); but it is of little help in dealing with large quantities of pottery of a similar nature. Some of the West Stow data is shown here to illustrate the problem. The very different clays can be assigned to specific fabric groups, but where - if at all - should one cut the chain? (see Fig. 3.1).

If mean and standard deviation are too coarse a measure, (and skewness and kurtosis can vary erratically), we must find a way directly to compare frequency curves over their whole length. This involves using a non-parametric statistical test, that is, a test that makes no previous assumptions about distribution but compares samples objectively.

The Kolmogorov-Smirnov two-sample test is an ideal solution for the problems encountered here. It was specifically designed to test whether two independent samples were drawn from the same population, and is more powerful than the chi-square or the median test.

According to Siegel, 'the two-tailed test is sensitive to any kind of difference in the distributions from which the two samples are drawn - differences in location (central tendency), in dispersion, in skewness etc' (Siegel 1956).

The two-sample test is concerned with the agreement between two cumulative frequency curves - in effect, their distance apart when plotted on the arithmetic probability paper. If the two samples being compared are of the same fabric, one would expect their curves to be close to one another and within the random deviation for that fabric. But if the two curves are too far apart at any point, this suggests that they come from two different populations. Thus, a large enough deviation between the curves of two samples enables one to reject the null hypothesis that 'there is no difference between the two samples' (Fig. 3.2).

The test is applied for each sample based on the phi interval classes. The number of grains in each class of one sample is compared with the number in the equivalent class of a second sample, and the largest difference (D) is recorded. This is compared with the critical value, calculated from

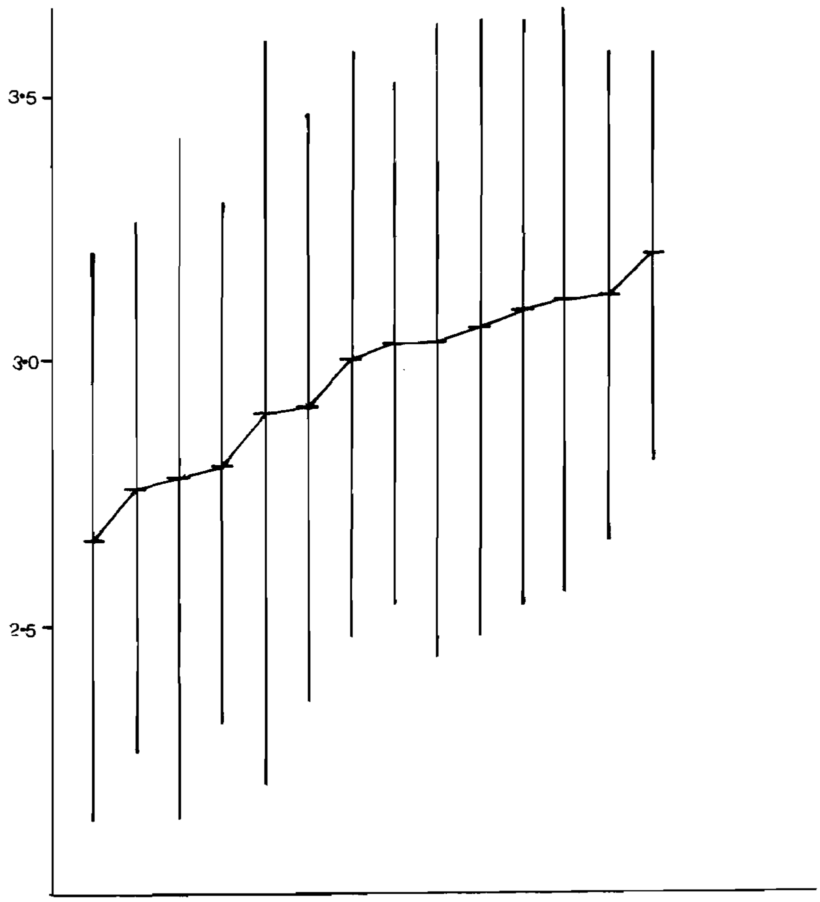


Fig. 3.1: Showing mean quartz grain size and one standard deviation, in phi units, of a selection of the West Stow fabrics. Means are joined if grain size distributions are similar according to the Kolmogorov-Smirnov test.

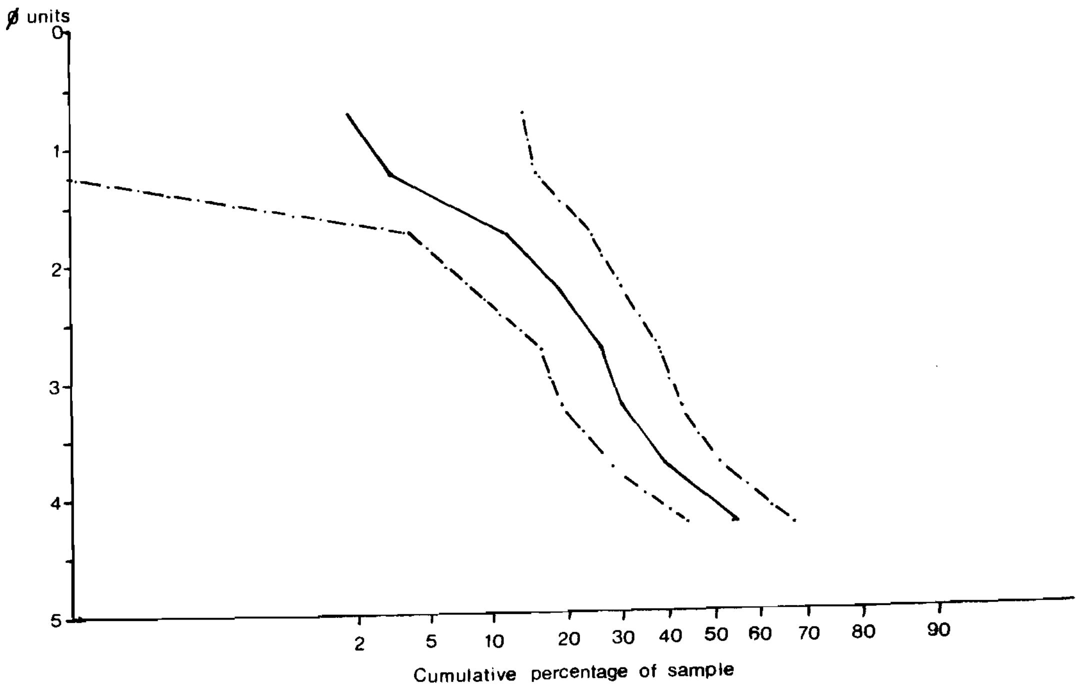


Fig. 3.2: Showing Kolmogorov-Smirnov test rejection boundaries.

tables (Smirnov 1948). If D exceeds or equals the critical value, then we may reject the null hypothesis at the level of significance associated with that expression.

A computer package for running Kolmogorov-Smirnov tests is available, but proved unsuitable for use on a large number of samples. So a programme was devised that enabled the cumulative number of counts in each class to be fed into the computer, and then calculations to be carried out to determine the figure D between all samples.

The following programme was used to process the data. Twelve size classes were used, Y equals the number of samples being processed.

```
        PROGRAM POT
        DIMENSION A(Y,12) B(Y,Y)
        INTEGER D, E, Q
        READ (5, 10)((A(D, E),E=1,12),(D=1,Y)
10      FORMAT (12 F 3 . 0
        DO 20 I=1Y
20      WRITE (6,15)(A(I,J),J=1,12)
15      FORMAT (12 F 5 . 0)
        DO 50 D=1,Y
        DO 100 Q-1,Y
        DMAX =0
        DO 80 E=1,12
        DIFF =ABS (A(DE)-A(Q,E)
        IF DIFF, GT, DMAX) DMAX=DIFF
80      CONTINUE
        B(D,Q) = DMAX
100     CONTINUE
50      CONTINUE
        DO 8 J=2,Y
        K=J-1
        WRITE (6,2000)(B(I,J),I=1K)
8       WRITE (9,1000)(B(I,J), I=1K)
2000    FORMAT (1 HO, 30F4.0/1X, 2F4.0
1000    FORMAT (20 F4.0/20 F4.0/19 F4.0)
        STOP
        END
```

Line '8' writes to a previously created file, which is then read by the Clustan package, which follows it. Details of this are not included, as they are readily available (Wishart 1978).

The previous line writes to the printer to provide a hard copy of the calculations.

The levels of D were recorded as a matrix, which was then processed by the Clustan package (Wishart 1978). The sub-routine Hierarchy processed the matrix to produce a dendrogram showing the successive fusing of the most similar clusters based on Ward's method. This fuses those two clusters whose fusion yields the least increase in the error sum of squares, defined as the sum of the distance from each individual to the centroid of the parent cluster. The matrix was also processed by hand, and Ward's method was found to be working in a very similar way to the Kolmogorov-Smirnov test at the 0.1 significance level.

This means that in 1 in 10 cases the null hypothesis is being rejected wrongly. This may seem a high level, but similar clusters are obtained using the Nearest Neighbour and the Median clustering methods, so it must reflect the nature of the pottery being processed. Clay suitable for pottery manufacture will always have a limited cumulative frequency distribution band. Therefore, the more samples that are processed, the more chance there will be of fabrics from different sources overlapping to such an extent that texturally they cannot be differentiated. For this reason, the microscopic examination of inclusions and the assessment of form and decoration will always be of paramount importance. At the same time, textural analysis should be used as a tool to check the fabric groups that have been decided upon by more 'traditional' petrological methods.

Chapter 4

Geology and Clay Studies

A knowledge of the geology of an area is essential if we are to understand the pattern of settlement, and the raw materials available to the population. This is especially true of the present work, which seeks to characterise geological deposits in order to differentiate between the ceramics produced from them.

Tectonics and structure

East Anglia owes its existence to the pressure of the Hercynian geosyncline, which elevated the northern edge of the London platform. This platform is the major massif, or upland region, in southeast England, and consists of a dome of Devonian, Carboniferous, and lower Palaeozoic rocks. These sediments do not outcrop at the surface, but they have governed the later sediments, which built up around and over them.

Solid Geology

The basin to the northwest of the London platform was slowly filled with Mezozoic rocks, which became thinner as they extended farther up the sides of the gradually submerging platform. This resulted in a sequence of deposits running, as follow, southeast from the Pennines (see Fig. 4.1).

Triassic:- Bunter sandstones, Keuper Marls and sandstones.

Jurassic:- Lias, and oolitic limestones. Oxford, and Kimmeridge clays.

Cretaceous:- Lower Greensand, Gault clay, Upper Greensand, and chalk.

The chalk, which reached a thickness of over 500 metres, finally covered the London platform, and now forms the solid

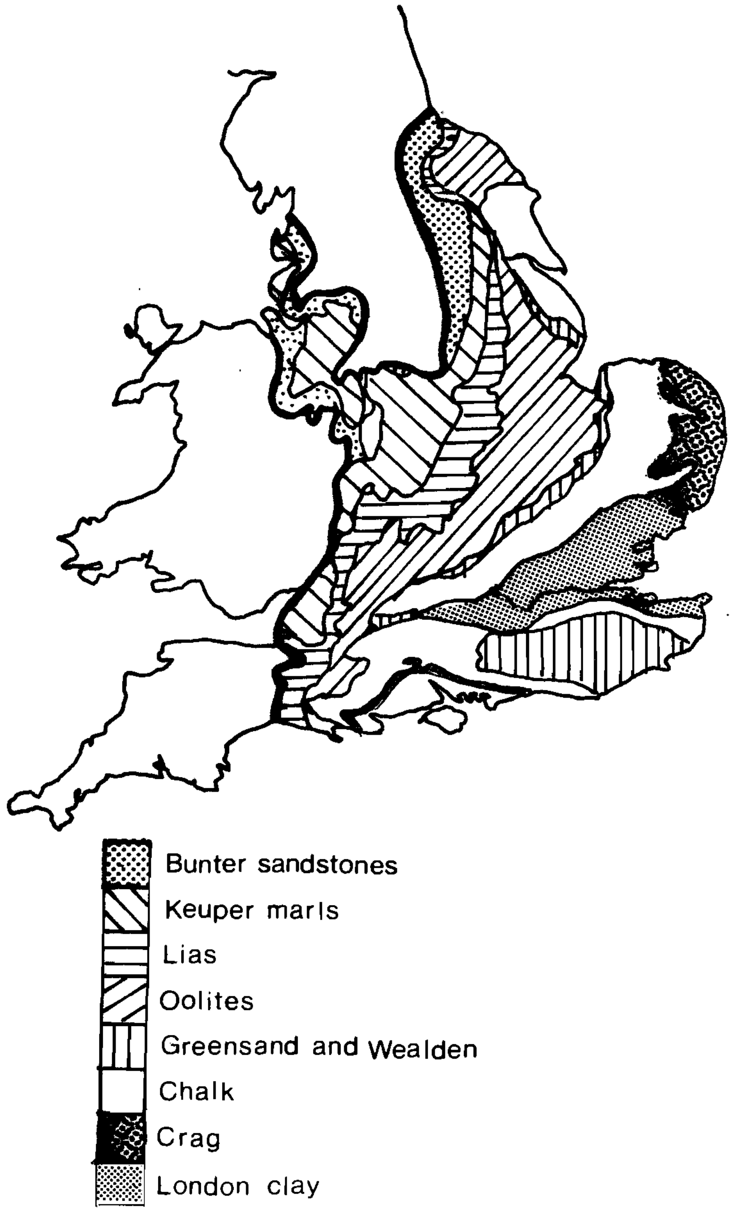


Fig. 4.1: Showing the solid geology of southern and eastern England.

geology of most of East Anglia.

After the recession of the Cretaceous seas, the British Isles were subject to warping and uplift; and when sedimentation recurred, the London basin, which included parts of East Anglia, formed a major area of deposition. Part of this depositional phase was the Eocene London clay, which extended as far north as Great Yarmouth, and reached depths of 150 metres in south Essex.

Because of subsequent erosion, the Miocene period has left no trace in East Anglia, and the next depositions occurred in the Pliocene period; indeed these are the only Pliocene deposits in this country. The Coralline crags were laid down in shallow seas around what is now Orford and Aldeburgh in Suffolk, and are made up of current-bedded sands, with heavy concentrations of molluscan shells and polyzoa. This was a warm-water deposit, but as the climate became colder at the beginning of the Ice Ages, the Weybourne, Norwich, and Red crags were laid down. These were of a similar nature to the Coralline crags, i.e. shelly sands, and covered the eastern coast of East Anglia, resting on the Eocene deposits on the immediate coast and directly on the chalk farther inland. Occasional seams of clay were formed, such as those at Chillesford and Easton Bavents, Suffolk.

Clay sources in the solid geology

A brief resume will be given of the clays available to potters from the solid geology of East Anglia, as listed in British Regional Geology: East Anglia (1975). Wherever the solid geology of East Anglia is exposed, potters have had access to a wide variety of clays. The most significant sources are:

Jurassic:

The Great Oolite limestone contains thin beds of clay.

The Blisworth, or Great Oolite, clay rests on the above. It is variable in colour and calcareous in places.

The Kellaways bed are a bluish clay, outcropping up to three metres in depth at Bedford.

The Oxford clay, interspersed with bands of limestone and nodules of calcareous stone, is a greenish or bluish-grey clay, turning brown when weathered. It is found in Bedfordshire and Cambridgeshire, and lies under the Fens, forming the islands of Ramsey, Wittlesey, and Thorney.

The Ampthill clay represents an incursion of muds into the Corallian seas. Dark or black in colour, it contains large crystals of selanite, a form of gypsum.

The Kimmeridge clay, a dark bluish grey, is found as Fen islands. It is considered too bituminous for modern brick and tile manufacture but may have been used in the past.

Cretaceous:

The Gault clay is found across Bedfordshire and into Cambridge, as far as Waterbeach, with outcrops at Wicken and Soham.

Eocene:

The Thanet sands are made up of beds of sandy loams, clays, and clayey sands. Olive-brown, green, grey, or pink in colour, they outcrop between Sudbury and the Gipping Valley, to the northwest of Ipswich.

The Reading beds consist of white or red sands, with lenticular masses of brown plastic clay, or coloured and mottled clay. They occur in the same area as the Thanet beds.

The London clay is the principal deposit in southern East Anglia. A bluish-grey clay, which turns brown when weathered, it contains occasional nodular masses of limestone or septaria.

Pliocene:

The Norwich crag contains bands of laminated clay.

The Chillesford beds consist of fine micaceous sands overlain by micaceous clays.

The Weybourne crag has lenses of clay within it.

The Cromer Forest bed series contains a green carbonaceous clay in the lower freshwater beds, and similar clays and loamy sands in the upper freshwater beds.

It can thus be seen that the solid geology contains a number of clays that would have been suitable for pottery manufacture, some of which contain distinctive inclusions that should enable them to be recognised in thin-section where they occur in an archaeological assemblage. The relatively simple picture of the solid geology is complicated, however, by the effects of the period of glaciation that East Anglia underwent. The result was that material from a wide geographical area was carried into the region, to be mixed with the solid geology and then deposited. This deposit is termed the drift geology and is probably of greater significance to the Saxon pottery than is the solid geology.

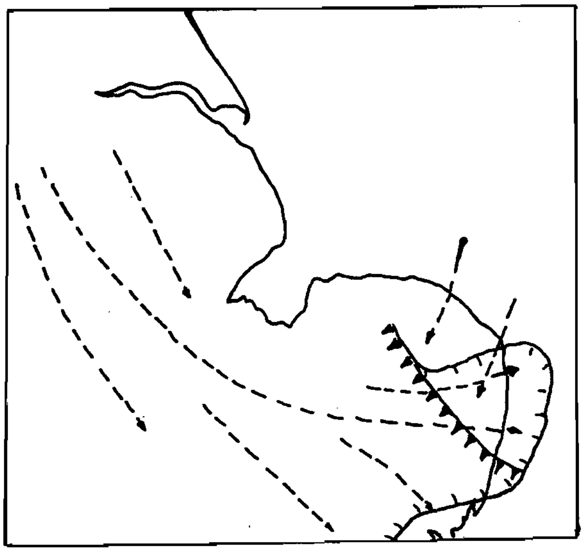
Drift geology

Superficial deposits cover most of East Anglia, and were undoubtedly the most likely source for potters operating in the area. For this reason they will be discussed at length.

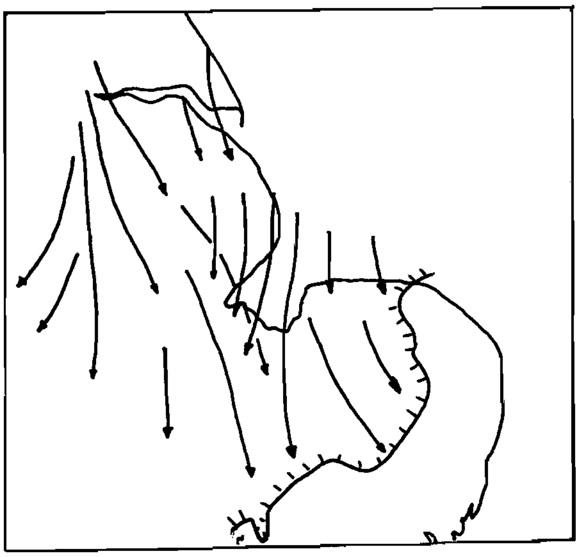
The drift deposits were laid down by two major phases of glaciation - the Anglian and the Wolstonian, each of which consisted of fluctuating periods of ice sheet advance and retreat. The earliest, the Anglian, was the most extensive, and the ice sheet spread as far south as Essex.

The exact sequence of glaciation in East Anglia is still under dispute, but the model followed here is that of Straw and Clayton (1979). They assign to one Anglian phase all the following drift deposits outside the later Wolstonian limits: the North Sea Drift of east Norfolk; the true 'Lowestoft' till of southwest Norfolk and east Suffolk; and the chalky boulder clays of High Suffolk and Essex (Fig. 4.2).

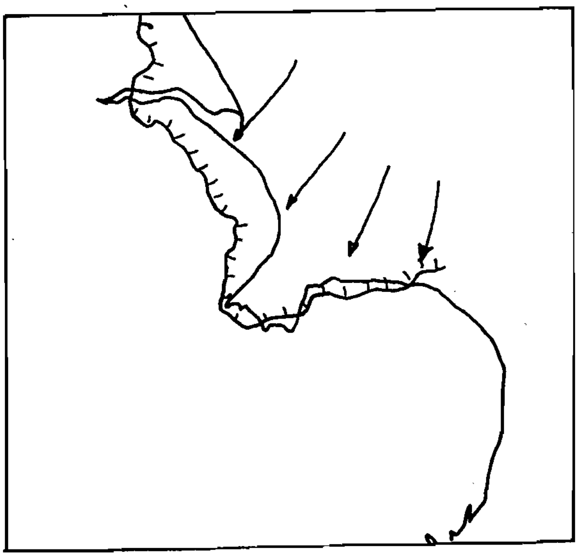
The earliest deposit of till is that now known as the North Sea Drift. A brown sandy till, this was deposited across the eastern side of East Anglia from ice sheets formed in the North Sea basin by glaciers from Scandinavia and northern Britain. It therefore contains erratics from both areas. It has been correlated with the Cromer tills, three successive grey tills



ANGLIAN



WOLSTONIAN



DEVENSIAN

Fig. 4.2: Showing the direction and extent of the ice sheets

found in the Cromer, Mundesley and Happisburgh areas (Reid 1882; Banham 1968); and with the Norwich brickearth, partly a shallow water deposit, which probably relates more closely to the sands and gravels of the Corton beds (a phase of ice withdrawal).

The final Anglian phase of glaciation was an invasion of ice from the northwest, i.e. the Nottinghamshire area, flowing successively across the Jurassic and Cretaceous cuestas. This resulted in the chalky till of Suffolk, between 30m and 50m in depth, which contains mostly Jurassic material in darker layers, and chalk in lighter.

Some geologists have claimed these chalky tills to be of different dates (Baden Powell 1948), but the ice sheet travelled over diverse bedrocks and the tills were subsequently eroded and intermixed, so one would not expect them to be of a uniform nature.

The Anglian stage was followed by the retreat of the ice and by the so-called Hoxnian stage, during which interglacial deposits were formed in the river valleys as the developing drainage systems reworked the tills.

When the ice sheet began to form in the Wolstonian stage, it was of a more composite nature, North Sea ice flowing south into north Norfolk and the Fens, mixing with inland ice that had travelled southeast along the strike of the Jurassic strata. This ice sheet has resulted in parallel belts of till with distinctive elements in Lincolnshire, but a mixture in the Fens and Breckland. These East Anglian tills can therefore contain Lower Lias clays and limestones, Middle Lias and oolitic material, as well as the reworkings of the Oxford, Corrallian, and Kimmeridge clays (Straw 1969). Most of the material in the drift is locally derived and did not travel long distances in the ice sheet, but the distinctive tabular grey flints of the Yorkshire Wolds are found in west Norfolk.

The dark grey clays of the Fens and Cambridgeshire were derived from Upper Jurassic clays that outcrop south of the Humber. The power of the ice sheet is shown by the large 'rafts' of parent rock, such as marlstone, limestone, and chalk, up to 200m acrosss and 10m thick, that have been found in the till.

To the west of the Fens, the Upper Jurassic and Lower Cretaceous rock are overlain by chalk-rich tills, often over 60m thick, of a bluish-grey colour. As well as chalk these contain flint, Jurassic rock, Bunter pebbles, and some far-travelled erratics (Edmonds and Dinham 1965). Large rafts of Kimmeridge and Ampthill clay have also been reported.

The Breckland area did not receive its sand cover in this period, and the tills below it are of various types. The greyish-brown Mildenhall till contains both Jurassic and Cretaceous material, but in other areas it is more sandy, due to the incorporation of sandy material from northwest Norfolk (Perrin 1961). The erratics certainly point to an ice movement from this direction (Holmes 1971).

West Norfolk is covered by two tills which can be differentiated by their erratic components. East and northeast of Kings Lynn, Upper Jurassic and Lower Cretaceous clays occur, while to the east of the Cretaceous scarp the solid chalk is directly overlain by a thin sheet of chalky till, known locally as Marly Drift. This contains the tabular and black flints from the north mentioned above.

These tills in the west of East Anglia and especially their erratics, often contain rocks peculiar to Lincolnshire (such as the Elsham and Spilsbury sandstones and red chalk), which show that they are all of one period and result from the conjunction of North Sea ice and inland ice.

The limit of the ice sheet in the southeast is not fully known; but it seems that the ice gradually lost momentum and therefore no definite terminal moraine was formed. The site at Hoxne has revealed that the ice sheet did not reach that far, and the deposits there of Wolstonian age are all outwash material (Gladfelter 1975).

With the retreat of the ice, the present-day landscape of much of the area appeared, to be modified slightly by the periglacial structures of the Devensian glacial stage. The Breckland areas, with their lacustrine hollows and gravel mounds (probably due to the oscillating ice sheet), are most likely to have been created during the Devensian stage.

The Devensian stage did not affect the whole of the East Anglian area directly, because the ice sheet reached only the northern and eastern coasts. But the periglacial conditions caused changes in the top few metres over much of East Anglia. Stripes and polygonal ice-wedge patterns cover large parts of western Norfolk and the Brecklands (Watt, Perrin and West 1966). Cryoturbation has been seen in many exposures, causing sorting of the drift materials, and on slopes of more than a few degrees solifluction has caused the surface layers to flow to lower levels. Large single features, 10-20m in diameter and commonly known as pingos, are found in western East Anglia, and were caused by the melting of ground ice lenses, in which the solifluction processes again caused sorting of the material.

The ice sheet of this glacial phase deposited a mostly sandy till along the western coast of East Anglia, forming a more easily worked soil than the heavier chalky boulder clays of the east and central areas. The till is of varied lithology, as shown by the bouldery gravels of the Hunstanton Esker. Particles over 2cm in diameter have been analysed, and 80% of the assemblage was found to be made up of local rock from less than 3-4km away (Boulton 1977), while some 12% of the assemblage consisted of Scandinavian erratics such as rhombporphyry, anorthosite magnesite, and Trondheimite.

Raw materials for pottery production

The basic raw material for pottery production, clay, is widely available in East Anglia. The glacial and periglacial regimes that affected the region will have resulted in clay deposits formed under widely differing depositional environments, which will affect the physical characteristics and the inclusions in the pottery fabrics. The different regimes will be examined here.

The majority of the material that is incorporated in the moraines is local, but the erratics found in East Anglian tills show that some material was carried for long distances in the glaciers and ice sheets. The material was probably incorporated in the glaciers during their formation in glacial valley environments. Supraglacial morainic till (Boulton and Eyles 1979) falls onto the glaciers surface as a result of rockfalls and avalanches. The material is buried and transported englacially, with the result that grain contacts are rare, little erosion takes place, and the grain size distribution remains that of the parent rockfall. When the glacier deposits this debris, it will usually have a silt/clay content of less than 15% but will contain occasional lenses of sand, silt, and clay (Whalley and Kinsley 1974).

Glaciers also pick up material from the beds they pass over, by shearing off the frozen upper layer of rock. This material is dragged up into the glacier, along sheer planes in the ice, where abrasion takes place. The ice sheets that reached East Anglia passed across mostly Cretaceous and Tertiary deposits that were generally poorly consolidated. These are unlikely to have survived in the coarser fraction of the moraines and are generally found in the sand and clay fractions (Dilabio and Shilts 1979).

The sand fraction will contain the heavy mineral component from both the supraglacial, interglacial and subglacial deposits, and will consist mostly of monomineralic particles dominated by quartz and feldspar, and most common minerals from the parent rocks. Work on modern ice sheets has revealed two important facts: 1. the heavy minerals are sorted to some extent, so contours can be drawn through points of similar mineral density within moraines; 2. the mineral assemblage of glaciers will remain separate even when those glaciers combine to form an ice sheet (Dreimans _et al_, 1957) This may have important implications for heavy mineral analysis of ceramics in East Anglia because broad bands across the country (parallel to the direction of the ice flow) will probably have similar heavy mineral components; and pottery that is traded could be noticed mineralogically only if it travelled across the boundaries.

The trace elements of the clays also seem to be linked to this phenomenon. Dilabio and Shiltz found that the trace elements of morainic clays related strongly to the glacier's catchment area. In particular they realised that, although continuous dilution by subglacial rocks increased with distance from the catchment area, the trace element suites remained so distinct that they were able to contrast moraines and assign them to particular glaciers.

The down-ice dilution is caused by the glacier picking up deposits from the base. This was so, for instance, with the Byht Island glaciers, where although a high proportion of components originated several kilometres up-ice, significant amounts of debris came from within a few hundred yards of the find spot (Dilabio and Shilts 1979). This continuous incorporation and deposition will produce very mixed clays when the ice sheet melts.

Quaternary geologists who have intensively studied the depositional environment of glaciers can thus throw valuable light on the processes by which the East Anglian tills and clays were formed. The major problem when using techniques of petrological examination on ceramic material is how to tell the difference between the clay and its temper, or filler. Many clays can of course be used untempered, but potters often added other materials to improve the clay's working characteristics. If one cannot differentiate a clay from its temper - and a number of potters have used different tempers with the same clay - then each resulting fabric could be taken as having come from a different source. Alternatively, if a distinctive mineral or rock type occurs sporadically in different areas of the drift and in the pottery itself, then this might be taken to prove a widespread trading pattern or a cultural tradition.

Just such a problem occurs in East Anglia with granitically derived grains, which are found often in the Saxon pottery. It is possible that these grains were present in the parent clay and not added as temper. Recent work, by Slatt and Eyles (1981) for instance, has shown that lithic fragments can survive prolonged subglacial weathering. They compared primary and recycled glacial sand to determine the type and make up of sediments in the ice and to assess the processes of degradation which resulted in recycled lithic fragments.

First-cycle sands were found to be coarse- to medium-grained and poorly sorted, with an average composition of 21% quartz, 6% feldspar, and 73% lithic fragments. It was also found that coarser-grained rocks contributed less lithic fragments than fine-grained, because they were more likely to break into monomineralic grains.

Second-cycle sands were medium-grained and poorly sorted, with an average composition of 19% quartz, 40% feldspar, and 41% lithic fragments. Again, the coarser-grained rocks had suffered more weathering than the fine-grained.

It followed, therefore, that the lithic fragments suffered less from englacial or subglacial transport than from the processes of recycling once they became morainic material and were exposed to fluviatile and freeze-thaw conditions. As the fragments travel in the ice, they are steadily reduced to the size of silt particles, mainly by the grinding action of the glacier moving along its bed (Boulton 1979). The lithic fragments will survive encapsulated under pressure in the ice which protects them from fracture.

Once the rock particles are free of the ice mass, glacio-fluvial transport at high velocity results in saltation, where grains bounce along the stream bed, placing considerable stress on the intercrystal planes. This results in the higher percentages of monomineralic grains, and the decline in numbers of lithic fragments.

Lithic fragments will survive, however, and some of these will be incorporated in the glacial sandy clays. The second-cycle sands should be of a more monomineralic nature, and recognisable fragments of granitic rocks should therefore occur rarely in the ceramic material.

If a higher proportion of lithic fragments showing breakage along intrecrystal planes of weakness is present in the pottery, this points towards a crushing process. It is unlikely to be the result of first-cycle sands having been incorporated in the fabric as these are rarely exposed at the surface; it can therefore be taken as an indication of tempering by the addition of crushed coarse-grained rocks (see Fig. 4.3).

Analysis of clay samples taken from the fluvial till of East Anglia supports this conclusion. No large lithic grains were seen in the thin-sections made from an extensive number of samples, although monomineralic grains were very common.

Most inclusions in the clay samples were of local origin, whereas an analysis of pebbles gathered from the surface of weathered tills showed that the pebble sized component of the till was mostly non-local. Glacially rounded rock fragments were collected from the weathered till surfaces in the Ixworth, Suffolk area. No attempt was made to sample in a rigorous manner to assess the erratic composition, but as many visually different erratics as possible were collected to examine the broad spectrum of tempering agents available to potters working in the area of glacial till deposits.

Rock type	Possible provenance
Quartz sandstone	Bunter Beds, Midlands.
Feldspar sandstone	Bunter Beds, Midlands.
Flint	Local, Yorkshire, Lincoln.
Metamorphosed sandstone 1.	Scotland or Scandinavia.
Metamorphosed sandstone 2.	Scotland or Scandinavia.
Sandstone (coarse)	Bunter Beds, Midlands.
Sandstone (fine)	Bunter Beds, Midlands.
Orthoclase Feldspar	Scotland or Scandinavia.
Slate	Scandinavia or N.Wales.
Chert Breccia	Bunter Beds, Midlands.
Siliceous metamorphosed silt	Scandinavia or N.Wales.

Table 4.1 Sample of glacial erratics in the Ixworth area, taken to assess the population variability.

Similar finds of erratics reported elsewhere in East Anglia give a picture of a very complex process of transportation and deposition:

1. Westleton gravels: quartz and quartzite are the most common erratics, with some Bunter pebbles present (Hey 1977).
2. Pastonian gravels: contain quartz, quartzite and Bunter pebbles (Hey 1977).

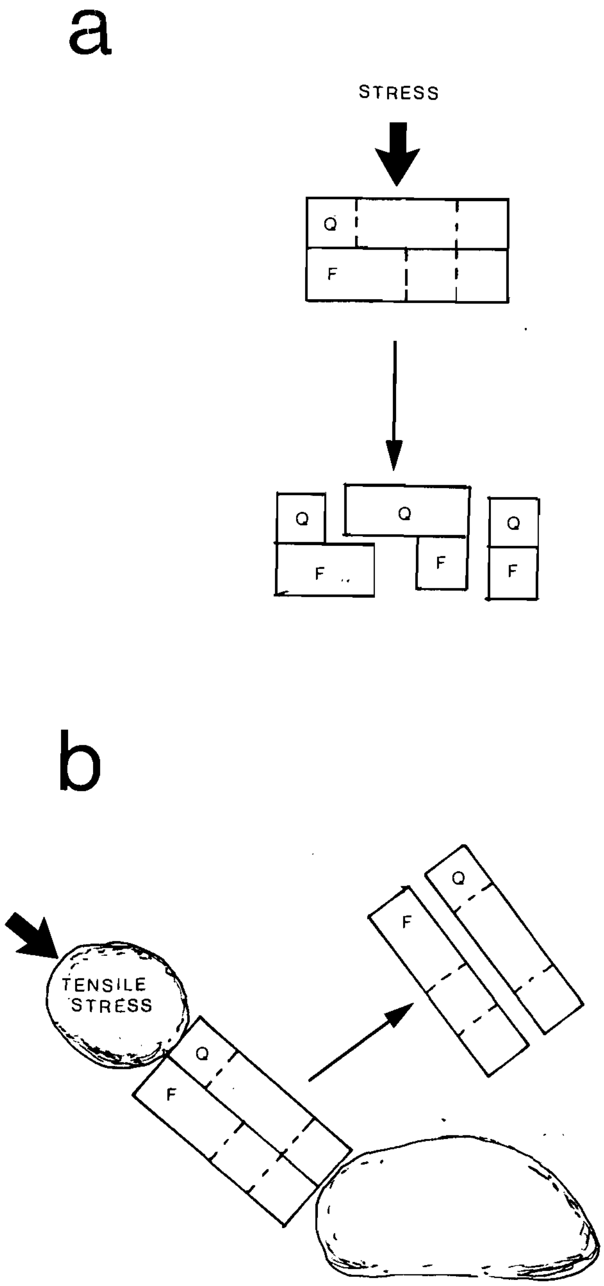


Fig. 4.3: Showing the resulting distinctive fracture products from the crushing for temper (a) and saltation (b) of a lithic fragment composed of quartz (Q) and feldspar (F), along intracrystal (dashed lines) and intercrystal (solid lines) planes of weakness. (After Slatt and Eyles 1981)

3. Cromer tills: mostly small round flints with rare Scandinavian erratics present (Perrin et al 1973).
4. Sheringham gravels, Cromer type: Dolerites, various lavas, gneisses, and schists are found in the coarse grade (200mm). Studies of 8-32mm range show that flint and quartzite pebbles dominate, i.e. over 95% (Ranson 1968).
5. Blakeney Esker: 97.5% of 8-32mm is flint of Anglian date, (Ranson 1968).
6. Breckland: either non-calcareous drifts or else up to 80% chalk. The flints can be local or far travelled and other erratics are present (Perrin 1977).
7. Barham: 37% of the Kesgrave gravel is of distant provenance, including material from north Wales, which was transported into the region by the early river Thames in the Beestonian period (Rose 1977).
8. Gt Blakenham: Kesgrave gravels are rich in quartz pebbles and micaceous sands possibly from the Thanet beds. The Lowestoft till at this point contains mostly chalk and flints (Rose 1977).
9. Hunstanton Esker: Scandinavian erratics of rhomb-porphry, anorthosite magnesite, and Trondheimite comprise 12% of all erratics (Boulton 1977).

The diverse lithic sources which have contributed the erratics will also have provided similarly diverse minerals in the silt-sized particles of the till. The minerals cannot however be related back to their parent rocks in many cases due to the effect of weathering. At depths of up to 1.5m, partial to complete breakdown of micas can occur, resulting in vermiculite of fine clay size (Madgett 1977). Chamosite, apatite, chlorite, pyroxene, and collophane also break down. This will make it difficult to be certain if pottery fabrics share a common source as the degree of weathering will be variable, depending on very localised conditions of groundwater and vegetation cover.

The Bunter beds may have been the original source of much of the Saxon tempering materials, as Bunter erratics occur widely in East Anglia. The Bunter pebble beds were formed in water in the Triassic period by erosion of upland regions. They consisted of local and distant rock types such as quartzite, vein quartz, chert, limestone, and volcanic rocks. These can be matched in the Cambrian outcrops of Nuneaton, the Llandovery sandstone, Carboniferous limestones, and in Devon, Cornwall and Normandy.

One great problem in dealing with the Saxon pottery found in East Anglia is how to differentiate between locally produced wares and those imported from the settlers' homelands across the North Sea. The North European plain, which was on the receiving end of the Scandinavian ice sheets, is covered by very similar drift deposits to those found on the east coast of England.

In central Holland analysis of the erratics has shown that the coarse gravel fraction is made up of 35% sedimentary rock and 65% crystalline rocks, with most of the crystalline rocks being granites (Achterops and Brongers 1979). This is a higher proportion of granitic rocks than is found in the East Anglian drift, and European pottery would perhaps be expected to contain more igneous inclusions than the British. Analysis of the Frechen Saxon pottery bears this out. Inclusions of granite were found in the clay, and it appeared that the potters had used the local moraine as a source (Steeger 1948). The coarse gravel fraction will not, however, always be reflected in the clay (as shown by the clay sampling programme below), and until full analysis of hand-made migration period pottery has been carried out on the European mainland the extent and nature of any East Anglian imports in the Early Saxon period will remain an unknown factor.

Clay sampling programme

In order to assess the inclusions in the East Anglian clay deposits a programme of clay sampling was carried out. This involved visiting the majority of the sites from which Saxon pottery had been analysed and collecting samples from local clay deposits. It rapidly became obvious that the drift geology was more varied than even the geological sources allowed, and to sample the clays which could be found within the 1km boundary of preferred clay exploitation suggested by Arnold (1981) would involve hundreds of samples for each site. The landscape at each site was therefore assessed from a potter's point of view, and samples were taken from those deposits that were closest to the site, and were accessible. Where the glacial clays were covered by deposits of sand, full use was made of modern ground disturbances, such as marl pits and drainage ditches, and the samples were often collected from the banks of water courses.

The following catalogue lists the samples and a brief description of the clay, The numbers refer to the thin-sections which are to be deposited with Southampton University Archaeology Department for use by future students who carry out work in this area.

Norfolk

Beachamwell:

38. A silty clay matrix with dense, sorted, sub-rounded (majority fine) quartz grains, and comminuted chalk.
50. A silty clay matrix with dense, sorted, rounded quartz grains (majority coarse). Comminuted chalk, large chalk, and flint particles are present.

East Wretham:

36. A silty clay matrix with very sparse, unsorted, rounded quartz grains, and chalk fragments.
41 A sandy matrix with moderately sorted, sub-angular to rounded quartz grains, chalk and iron particles.

Foulden:

35. A silty clay matrix with sparse, unsorted quartz grains, flint and chalk particles.
42. A silty matrix with unsorted rounded quartz. Large flint and chalk fragments are present.
48 Fine, well sorted silty clay matrix.

Gayton Thorpe:

30. A silty clay matrix with coarse, partly sorted, sub-rounded quartz grains with flint and chalk.

Heacham:

13. A silty clay matrix with fragments of freshwater fauna and flora.
14. A silty clay matrix with rounded chalk and shell fragments.

Hemsby:

24. A sandy clay matrix with dense, unsorted, sub-angular quartz grains, some larger rounded grains are present.
25. A sandy clay matrix with dense, unsorted, sub-rounded quartz grains.

Hillborough:

52. A sandy clay matrix with poorly sorted, dense, fine, sub-rounded quartz grains.

Hunstanton:

3. A sandy clay matrix with sparse, fine quartz grains, limestone and comminuted chalk.
4. A sandy clay matrix with sparse, fine quartz grains, iron-stone, and chalk.
28. A silty clay matrix with dense, coarse quartz grains, iron, flint, and red chalk.

Merton:

40. A sandy clay matrix with dense, coarse, moderately sorted, rounded quartz grains. Rounded flint also present.
49. A silty clay matrix with sparse, sub-rounded, unsorted quartz grains and chalk.
51. A silty clay matrix with sub-angular, unsorted quartz grains, with rounded chalk and flint.
44. A silty clay matrix with very sparse, rounded, quartz grains (majority coarse) with comminuted chalk.

Mundesley:

19. A silty clay matrix with very sparse, fine, unsorted, sub-angular quartz grains.

21. A sandy clay matrix with dense, unsorted, sub-rounded quartz grains (majority fine), with occasional rounded chalk grains.

27. A silty clay matrix with sparse, large, rounded quartz grains, with occasional rounded chalk grains.

Narborough:

15. A fine silty clay matrix with very sparse quartz, and comminuted chalk grains. Foraminifora fragments are present, probably from an Eocene limestone.

29. A fine silty clay matrix with sparse, unsorted quartz grains. Rounded red and white chalk, and foraminifora fragments are present.

North Barsham:

18. A silty clay matrix with dense, unsorted, sub-rounded quartz grains (majority medium), with abundant large rounded iron and sandstone fragments.

Postwick:

31. A silty clay matrix with dense, large, sorted quartz grains, and rounded flint and sandstone of similar size.

9. Fine sandy clay matrix with dense, unsorted, sub-angular bimodally distributed quartz grains, with angular and rounded flint fragments.

Thetford:

32. A silty clay matrix with very sparse, unsorted, rounded quartz grains and occasional rounded chalk fragments.

45. A silty clay matrix with very sparse, unsorted, rounded quartz with comminuted chalk.

Tottenhill:

2. A sandy clay matrix with unsorted quartz grains, red chalk, flint, and iron.

Snettisham:

1. A silty clay matrix with well sorted medium, dense, sub-angular quartz grain. Occasional rounded larger grains are present.
6. An iron-rich sandy clay matrix with unsorted, dense quartz grains. Abundant inclusions of ironstone, red chalk, and flint.
10. An iron-rich sandy clay matrix with unsorted, dense quartz grains, large ironstone fragments, white and red chalk fragments and flint.

Watton:

33. A fine sandy clay matrix with dense, sorted, sub-rounded quartz grains (majority fine), with comminuted ironstone and chalk.
39. A silty clay matrix with very sparse, well sorted, fine, sub-angular quartz grains, and occasional rounded chalk inclusions.
47. A sandy clay matrix with unsorted, sub-angular quartz grains (majority coarse). Rounded chalk and flint inclusions are common.

Witton:

11. Fine sandy clay matrix with dense, sorted, sub-rounded quartz grains, rich in garnets.
12. A fine sandy clay matrix with dense, moderately sorted, sub-rounded quartz grains. Abundant muscovite mica particles are present.

Wolterton:

53. A silty clay matrix with unsorted, large round quartz grains and large flint fragments.
58. A silty clay matrix with unsorted, large round quartz grains.

Suffolk

Bury St Edmunds:

5. A sandy clay matrix with poorly sorted, fine, dense, sub-rounded quartz grains. Rounded chalk, iron, and flint are present.
7. A silty clay matrix with poorly sorted, dense, sub-rounded quartz grains (majority coarse), with chalk and shell fragments, rounded iron, and flint.
8. A fine sandy clay matrix with poorly sorted quartz grains (majority fine), with flint and rounded iron.

Fakenham Magna:

64. Pure quartz free silty clay.
66. A sandy clay matrix with unsorted, sub-rounded quartz grains, with rounded chalk and occasional flint and foraminifera fragments.

Great Bealings:

59. A silty clay matrix with dense, unsorted, coarse, sub-rounded quartz grains, with occasional chalk fragments.
65. An iron rich silty clay matrix with dense, sorted, fine-sub-rounded quartz grains. Rounded, iron-rich clay pellets are common.

Grimstone End:

61. A silty clay matrix with very sparse, unsorted quartz grains. Abundant inclusions of rounded chalk are present.
62. A silty clay matrix with dense, coarse, rounded quartz grains, with flint and sandstone.
63. A silty clay matrix with sparse, unsorted, sub-rounded quartz grains. Chalk inclusions are common, with occasional fossil shell fragments.
67. A fine sandy clay matrix with dense, very fine, sorted quartz grains. Ironstone, chalk, and shell are present in small quantities.

Lakenheath:

16. A silty clay matrix with fine, very sparse quartz grains, with abundant comminuted chalk and chalk fragments.

17. A silty clay matrix with common unsorted quartz grains, with abundant shelly chalk, comminuted chalk, and occasional flint.

Stanton Chair:

68. A silty clay matrix with sparse, unsorted, sub-angular quartz grains. Rounded chalk present in large quantities, out-numbering the quartz grains.

Wattisfield:

60. A silty clay matrix with well sorted, sub-rounded quartz with scattered large rounded quartz grains. The iron-rich clay is unusual because of the abundance of muscovite mica it contains.

West Stow:

26. Alluvium: A silty clay matrix with medium to large sub-rounded quartz, grains and chalk. Abundant fragments of freshwater fauna.

59. A fine sandy clay matrix with well sorted, sub-angular quartz grains (majority fine). Occasional fragments of rounded chalk are present.

60. As above but iron-rich.

Cambridgeshire

Stonea:

34. A fine sandy clay matrix with dense, unsorted, sub-rounded quartz grains, chalk, and ironstone.

37. A fine sandy clay matrix with dense, unsorted, sub-rounded quartz grains. Limestone fragments, both shelly and oölitic, are present.

43. A fine sandy clay matrix with dense, unsorted quartz grains (majority fine). Abundant inclusions of comminuted chalk

and large fragments of chalk, with iron and flint.

46. A fine sandy clay matrix with unsorted, sub-rounded quartz grains with iron and sparse chalk and limestone.

Linton:

54. A fine silty clay matrix with large sparse, rounded quartz grains and rounded chalk and iron fragments.(Alluvium)
55. A fine silty clay matrix with abundant-rounded chalk fragments.
56. A fine sandy clay matrix with sparse, unsorted, sub-rounded quartz grains, with sparse rounded iron and chalk.

Analysing the texture of these clays in thin-section and comparing them with the work of geologists on East Anglian tills and Breckland sediments (Perrin et al 1973) shows that most of the clays sampled had major additions of sand and silt and were not pure glacial clays. The clays closest to the Lowestoft till or chalky boulder clay (a finer deposit) are as follows:

		Depth in metres
19	Mundesley	4.0
48	Foulden	2.0
11	Witton	1.0
44	Merton	0.2
36	East Wretham	2.0
39	Watton	2.0
35	Foulden	1.5
67	Grimstone End	3.0
63	Grimstone End	3.0
61	Grimstone End	0.5
45	Thetford Red Castle	2.0+
32	Thetford	2.0+
16	Lakenheath	2.0
15	Narborough	2.0

Table 4.2: Showing the depth in metres of the sampled clays closest texturally to the Lowestoft till.

Most of the samples listed in Table 4.2 were taken from a greater depth than the others due to the presence of ground disturbances such as drainage or civil engineering projects. The majority of the clays sampled are sandier than these pure till deposits, because of periglacial action and weathering, which has resulted in the incorporation of coarser material. The coarser material was probably derived from the extensive sheet of windblown sand that covered eastern England in the immediate post-glacial period (Perrin et al 1974).

Conclusion

A thorough study of the geological literature is necessary before one can use ceramic petrology in a microprovenience study of the region. East Anglia has a complex geology due to the thick deposits of mixed glacial tills, but precisely because of this it has attracted intense study by geologists since the 1960s, both on pre- and post--glacial deposits.

The programme of clay sampling resulted in the collection of clays from a broad spectrum of depositional environments. The clay samples were especially revealing in the lack of granitically derived material they contained, in contrast with the pebble and coarse gravel grades of the glacial till. They were also useful in that they revealed a wide range of textural types, ranging from unsorted to well sorted and occasionally bimodal, quartz grain components. These could be compared with the thin-sections of the ceramics from the East Anglian sites, to assess whether the fabrics of the Early Saxon potters were naturally occurring clays or had been altered by sieving, settling, or levigation. In fact the natural processes of glaciation and fluvial deposition appear to have created a range of clays that were very suitable for pottery production, as most of the fabrics used for the Saxon pottery can be paralleled by naturally occurring deposits.

It is unfortunate that no comparative work is available on the east side of the North Sea in the homelands of the Saxons, which could assist in recognising the ceramic containers carried with the settlers, or even if they were brought.

Various museums offered samples from vessels that have counterparts in Britain and German cremation cemeteries, but it was not felt that these should be analysed until a firm base has been achieved, assessing the variability of clays and pottery fabrics on both sides of the North Sea.

Chapter 5

Ceramic Ecology and Settlement Location Analysis

This chapter assesses the variables that determined where Saxon settlements were located in the landscape, and their resources for pottery manufacture. This can provide an explanation of some ceramic distributions, as a settlement that lacks a suitable raw material within its territory will often develop trade to secure a supply of either raw materials or finished goods. With pottery, the preference is usually for the finished product because pottery, although bulky, requires less effort to transport than clay.

A second aspect of site location studies, which is specific to the Early Saxon period in England, concerns the relationship of settlements and cemeteries to present-day villages and their parish boundaries. Claims have been made for Roman estate boundaries surviving into the Medieval period via an Early Saxon phase (Sawyer 1974; Bonney 1976); but others, however, have argued for a major change in land unit boundaries occurring in the 7th and 8th centuries (Arnold and Wardle 1981).

The positions of 34 Early Saxon settlements are analysed to see if a pattern exists in East Anglia that can aid interpretation of the Saxon settlement pattern elsewhere in the country.

Ceramic ecology

Metson (1966, 203) applied the principle of cultural ecology to ceramics and their production, and defined ceramic ecology as the attempt to relate the raw materials and technologies that the potter has available to the functions in his culture of the products he fashions. The aim of these studies is to assess whether raw materials for pottery production were present or not at given locations.

Ethnographic evidence has shown that potters prefer to obtain their raw materials, clay and temper, from within 1km of their workplace (Arnold 1976, 1980, 1981). The fuel for clamp-firing is generally that used for normal domestic cooking purposes (Nicklin 1979, 446; Saraswati and Behura 1966), and its procurement does not usually present problems for primitive potters.

Analysis of the areas around each Saxon settlement site revealed that clay was to be found within 1km of every site. In many cases, this was a chalky boulder clay with significant amounts of incorporated sand. This clay is not particularly suitable for pottery manufacture due to its highly calcareous nature, and the Saxon potters often seem to have preferred a fine, less chalky, clay. The less calcareous clays seem generally to be found at lower depths (see Chapter 3), which would have entailed the excavation of clay pits.

Temper was commonly added to Saxon pottery and took a number of different forms; mineral, organic, or re-cycled pottery. Re-cycled pottery in the form of grog would be available to any potter, as would the organic material, which seems to have been mostly cow or horse dung. The most common tempering materials were apparently igneous rocks or sandstones, fragments of both of which are found in the drift (see Chapter 3).

Fuel would not have been a problem for any Saxon settlement as, although there is evidence for the denudation of woodland in the region from the Neolithic onwards (Darrah 1974), wood is seldom used for pottery firing unless kilns are used. Clamp firing depends on a large quantity of fast-burning material such as grass and scrub, rather than a long, slow bonfire (Nicklin 1981, 347-359).

Conclusions

The raw materials were available for all Saxon settlements in East Anglia to manufacture pottery, but not necessarily pottery of the same standard, due to the variability of the clays available. Chalky clays do not produce good pots as the calcareous inclusions can leach out. If fired to above 800°C the $CaCO_3$ will later rehydrate and crack the pot. It is therefore possible that some settlements would have obtained their pottery from another community because of a paucity of suitable raw materials.

Site location

The implications of the relationship between Saxon cemeteries and parish boundaries in southern England was first noted by Bonney, who was studying Middle Saxon (650-850 AD) and Late Saxon (850-1066 AD) land charters. It had attracted the attention of scholars as far back as 1857, but had been studied from a philological rather than an archaeological viewpoint (Kemble 1857, 119-139). The charters often gave pagan - and thus often Early Saxon - burial places as landmarks, on which the boundaries of estates and parishes were aligned. In Wiltshire and northeast Dorset, Bonney found that pagan Saxon cemeteries were frequently located on, or within, 500ft (152m) of the parish boundary (Bonney 1966). This evidence was used to argue that the parish boundaries dated from the Early Saxon period rather than from the Late Saxon or Medieval periods, as most archaeologists had assumed. Later work by Bonney claimed that one could show continuity of land use right back to the Roman period, because the distribution of Roman villas coincided in places with the land units of the parishes.

The siting of cemeteries on, or very near, the boundaries was interpreted as agreeing with the concept of least-cost locational analysis, the cemeteries often being located on marginal land (Chisholm 1969, 108). However, Arnold and Wardle have claimed (1981) that there is an increasing number of excavated Early Saxon settlements that occupy the same position as the cemeteries. These settlements were situated on light, well-drained soils, and in fact often had cemeteries adjacent to them. The settlements were all deserted in the 7th and 8th centuries, and Arnold and Wardle have put forward a new model of settlement location, which they claim satisfies the topographical and place-name evidence. This evidence can be broken down into five elements:

1. Early known Saxon settlements are adjacent to cemeteries in relatively poor locations.

2. Early place-name elements are found in more agriculturally suitable locations, particularly valleys, not closely associated with pagan cemeteries.

3. Charter evidence points to cemeteries occurring on parish boundaries.

4. A major shift in settlement location must have taken place, because Early Saxon settlements are now deserted.

5. New centres developed in the 7th and 8th centuries.

This model proposes that the whole system of land use altered from hill-top (light soil) farming to lowland (heavy, fertile soil) farming, with a contemporaneous shift of settlement locus from the hills to the river valleys. The parish boundaries were then redrawn along the watersheds rather than the rivers (see Fig 5.1).

This model was empirically based on eight excavated Saxon settlements in southern England, and will here be statistically tested as recommended by Hills (1979) on 34 of the known 37 settlement sites of East Anglia. The exceptions are Cambridge Ridgeons Gardens, Brandon, and Ipswich Castle Hill, where it is impossible to reconstruct the old boundaries. The relationship between site and boundary, and parish church and boundary, will

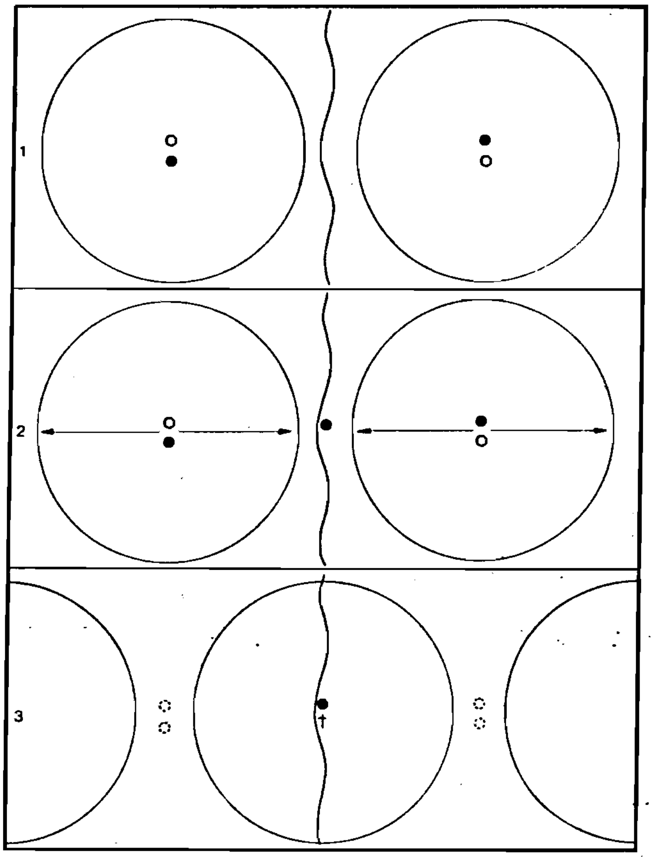


Fig. 5.1: Showing Arnold and Wardle's proposed process of desertion in the 7th century AD, and the relationship between settlements, cemeteries, deserted settlements/ cemeteries and land units.
(After Arnold and Wardle 1981)

be measured to test the model, and other topographical variables will be considered.

It could be argued that the modern civil parish boundary has little in common with the Saxon boundary, but there does seem to be a close correspondence between the lines described in Saxon charters and those existing today (Hooke 1981). Each element of the Arnold and Wardle model will be discussed in turn, beginning with the generation of the data and the analysis of the location of sites in relation to landscape and boundaries.

All measurements were calculated to the nearest 0.1km, that is, 328ft, as opposed to Bonney's single measurement of 500ft, and were taken from the Ordnance Survey 1: 50,000 First Series maps, sheet numbers 132, 133, 134, 143, 144, 154, 155, 156, and 169.

Where parishes were situated on the Fen edge, the parish boundary has been taken as the boundary of the dry land, because the parish boundaries in the now drained fens are unlikely to have been delineated until after drainage of the fens in the 17th to 19th centuries.

Six measurements were taken:

1. The site to the boundary.
2. The parish church to the boundary.
3. The central point of the parish to the boundary.
4. The site to the church.
5. The site to running water.
6. The church to running water.

The land grade was also recorded, using the Agricultural Land Clasification maps of England and Wales produced by the Ministry of Agriculture, Fisheries and Food (1977), (see Table 5.1)

A random sample of 34 Saxon cemeteries taken from Clough and Green (1973) was also processed to determine the relationship of Saxon cemeteries in East Anglia to parish boundaries.

The measurements have been plotted on graphs for easy visual comparison (see Fig. 5.2 and Fig. 5.3); but to assess objectively the relationships, cumulative frequency distributions were calculated for each of the six classes of measurements.

CAMBRIDGE

SITE NAME	1	2	3	4	5	6	Land Grade
GRANTCHESTER	0.3	0.4	1.5	0.3	0.3	0.6	2
LINTON	1.3	1.5	1.8	1.2	0.1	0.1	3
STONEA	0.2	1.0	2.2	3.5	0.1	1.9	2
WATERBEACH	0.1	0.7	0.9	0.7	0.2	0.7	2

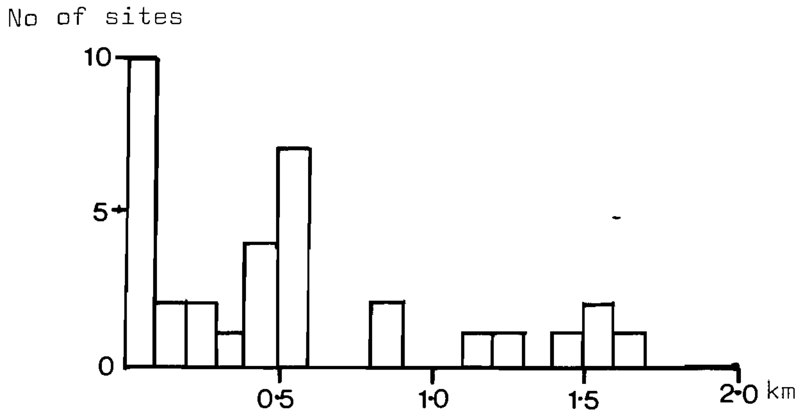
NORFOLK

SITE NAME	1	2	3	4	5	6	Land Grade
BEACHAMWEL	0.5	1.8	2.5	0.8	0.2	0.7	3
CALDECOTE	0.5	1.8	2.5	2.2	0.3	0.7	3
FOULDEN	0.9	1.2	1.2	1.6	0.9	0.6	3
GAYTON THORPE	0.3	1.3	1.6	1.4	0.1	0.3	4
HEACHAM	1.6	1.2	1.6	0.2	0.4	0.3	3
HEMSBY	0.9	0.7	0.9	0.6	1.0	1.3	2
HILLBOROUGH	0.5	0.5	1.6	0.1	0.1	0.1	4
MERTON	0.1	0.6	1.0	1.1	0.7	0.2	4
NARBOROUGH	1.6	0.5	1.5	1.3	0.3	0.3	3
NORTH BARSHAM	1.5	1.8	2.1	0.3	0.1	0.2	3
POSTWICK	0.1	0.9	0.9	1.0	0.1	0.3	3
SNETTISHAM	0.1	1.2	1.3	1.1	0.1	1.0	2
THETFORD	1.7	1.7	2.5	0.1	0.1	0.1	4
WATTON	1.2	1.0	1.2	0.4	1.2	1.0	3
WITTON	0.6	0.8	1.0	1.3	0.4	0.3	3

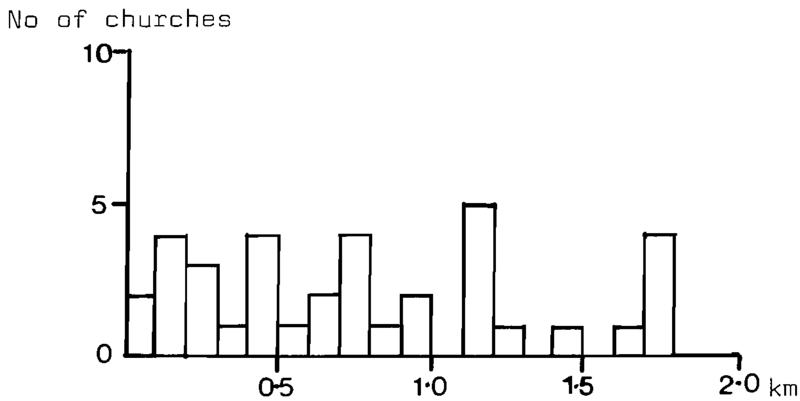
SUFFOLK

SITE NAME	1	2	3	4	5	6	Land Grade
BARHAM	0.6	0.5	1.2	0.1	1.2	1.2	3
BUTLEY CHURCH	0.6	0.8	1.0	0.2	0.6	0.8	4
BUTLEY NEUTRAL	0.6	0.8	1.0	0.8	0.3	0.8	4
BUTLEY NEUTRAL FM	0.6	0.8	1.0	0.8	0.3	0.8	4
EUSTON	0.6	0.5	1.8	1.0	0.3	0.3	4
FAKENHAM	0.1	0.3	1.0	0.6	0.1	0.1	4
GREAT BARTON	0.1	1.2	1.5	3.5	2.1	0.8	3
HACHESTON	0.6	0.2	1.0	1.7	0.4	0.2	3
IXWORTH	0.2	0.2	1.0	1.0	0.2	0.2	3
LAKENHEATH	0.6	0.2	1.2	1.5	0.4	0.2	3
LITTLE BEALINGS	0.1	0.3	1.3	1.6	0.1	0.4	4
MILDENHALL	0.1	0.3	1.8	2.7	0.1	0.3	3
PAKENHAM	0.4	0.2	1.8	2.3	0.1	0.3	3
RICKINGHALL INF.	0.1	0.1	0.6	1.0	0.1	0.1	3
STANTON CHAIR	0.5	0.8	1.5	0.8	0.1	0.5	2
WEST STOW	0.1	0.1	1.1	2.3	0.1	0.1	4

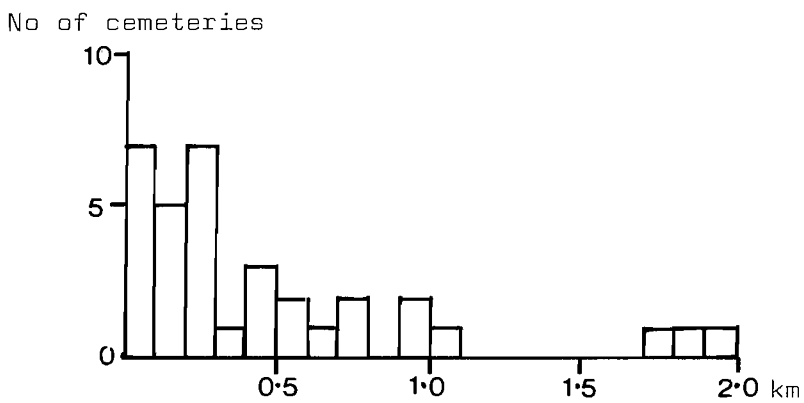
Table 5.1: Showing the measurements taken to assess the relationships between topographical features, boundaries, and settlements.



Distance from Early Saxon site to parish boundary



Distance from church to parish boundary



Distance from Saxon cemetery to parish boundary

Fig. 5.2: The data from Table 5.1 in the form of bar charts.

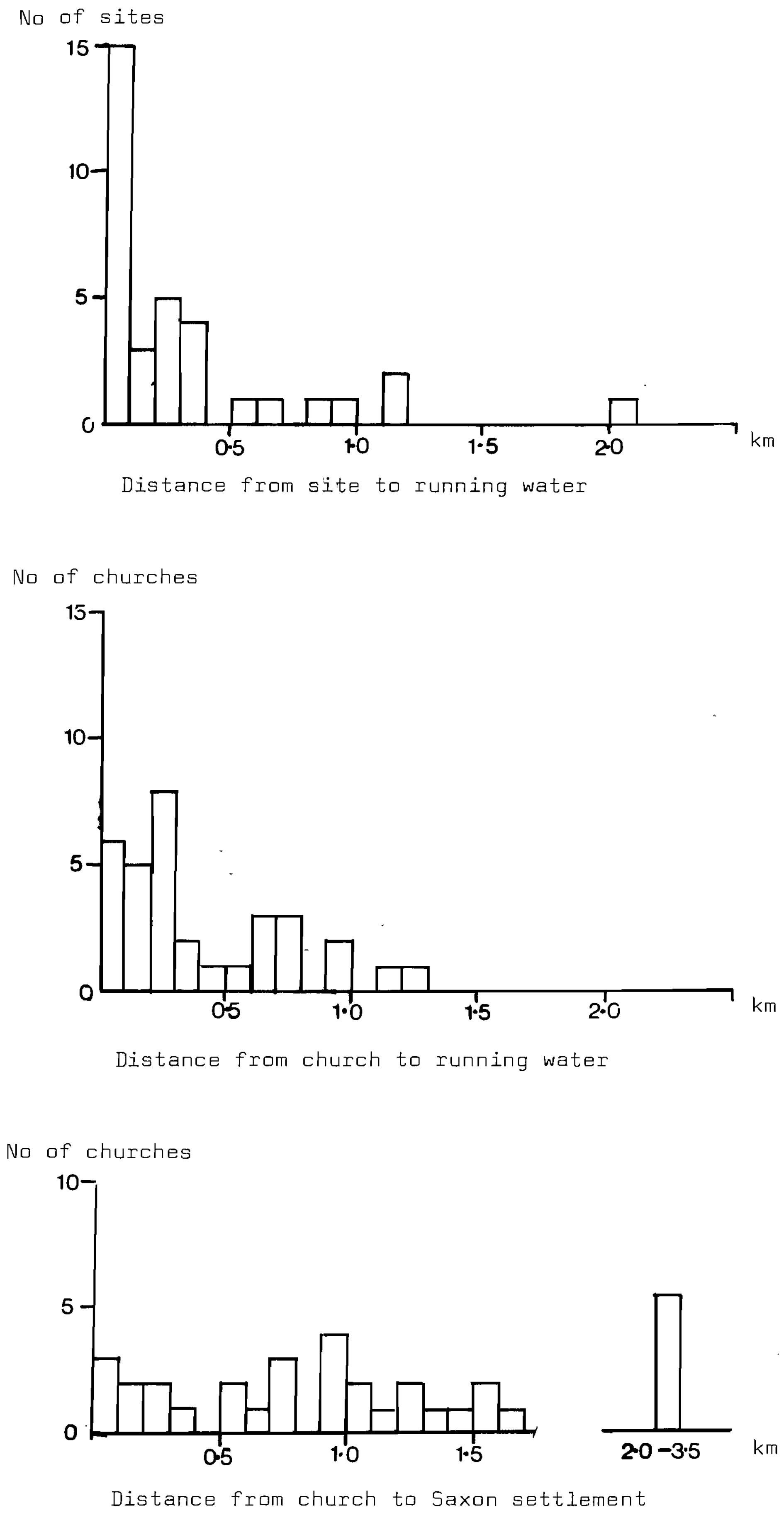


Fig. 5.3: The data from Table 5.1 in the form of bar charts.

The Kolmogorov-Smirnov one-tailed test was used to find if one type of site was closer to the parish boundary or running water than another, and to decide which was closer to the centre of the parish land unit. The one-tailed test has as its null hypothesis that there is no difference between the position of the sites. When 34 samples are used, the difference D, between the cumulative distributions must equal or exceed 11 for the null hypothesis to be rejected at the .05 significance level. This means that if D is more than 11 there is a difference between the positions in the landscape of the two types of site under comparison. This was checked with a chi-square approximation, with two degrees of freedom for small samples (Goodman 1954, 168), which ensures that each rejection is safe (Siegel 1956).

<u>Null hypothesis</u>

1. Early Anglo-Saxon settlements are not closer to the boundary than the churches are. D=11
2. Early Anglo-Saxon settlements are not closer to water than the churches are. D=9
3. Early Anglo-Saxon settlements are not closer to the boundary than the centre points. D=25
4. The churches are not closer to the boundary than the central points. D=20
5. Early Anglo-Saxon cemeteries are not closer to boundaries than churches are. D=10

From these results it can be seen that:

a. Anglo-Saxon settlements are closer to the parish boundary than the churches are (null hypothesis 1).
b. Anglo-Saxon cemeteries are not closer to the parish boundary than the churches are (null hypothesis 5).
c. Anglo-Saxon settlements and the churches are similar distances from water (null hypothesis 2).
d. Neither church nor Anglo-Saxon settlements are in the centre of the parish (null hypothesis 3 and 4).

These conclusions can be used to examine the five elements of the Arnold and Wardle model.

1. Early known Saxon settlements are adjacent to cemeteries in relatively poor locations.

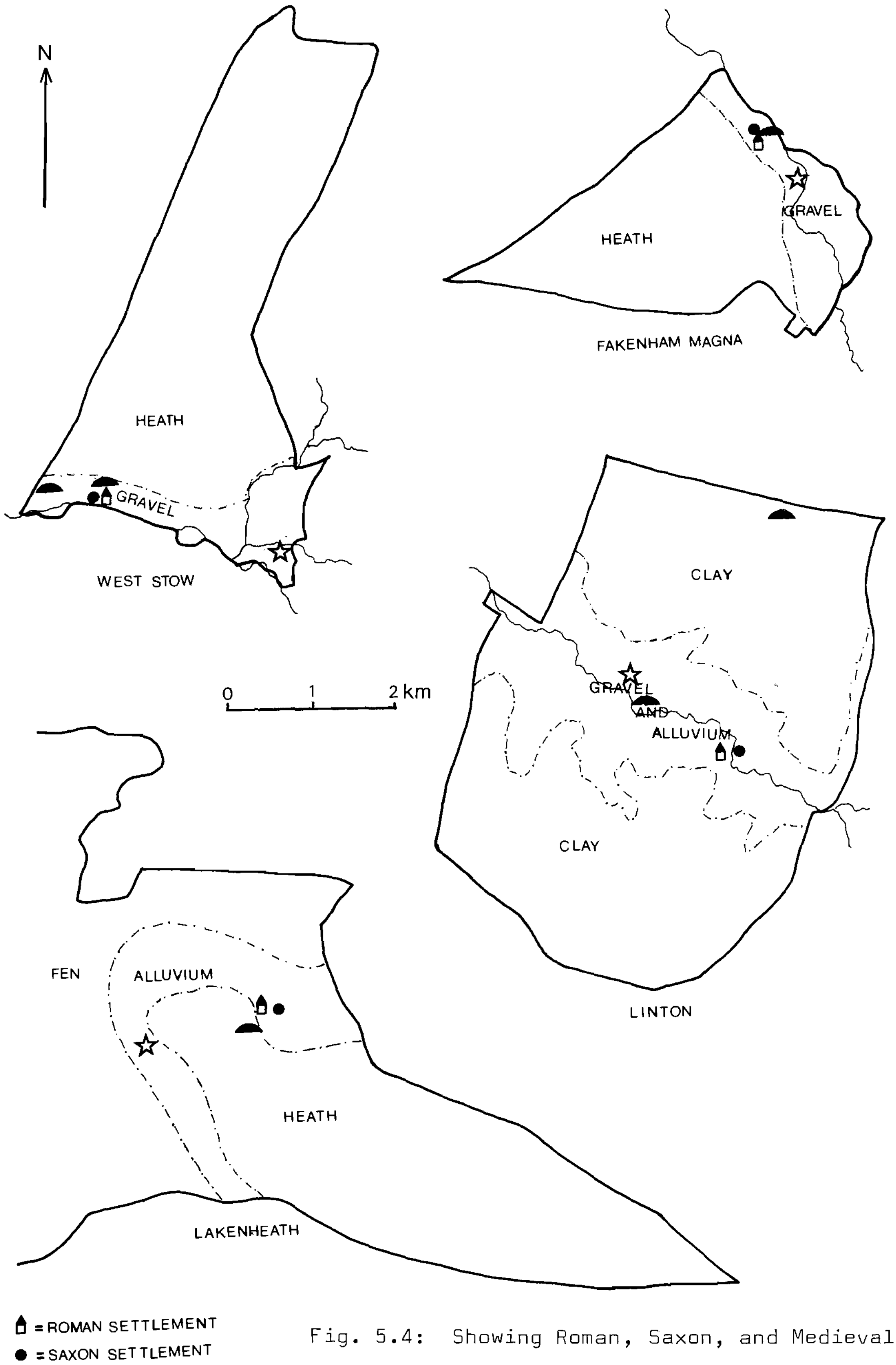
The over-riding location factor in most of the parishes used in this survey seems to have been the need to locate settlements near a source of running water, and it is often along this running water that the parish boundary was drawn in the Medieval period.

Arnold and Wardle's model, with settlements shifting from upland to lowland locations, does not therefore fit the East Anglian evidence. The alternative model put forward here is that the position of settlements in East Anglia is controlled by environmental and ecological factors. Most of the Saxon settlements and the later Medieval ones are placed in river valleys, where spreads of plateau gravels and alluvium provide narrow strips of land that are suited to arable agriculture. The settlements were not situated on hilltops, as Arnold and Wardle suggested, because these areas are far from water and were fit only for permanent pasture.

This conditioning of settlement location by the topography can be seen in all areas of East Anglia. West Stow and Fakenham are examples in the Breckland region. Here, the river valleys provided a level terrace on which people settled during the Roman, Saxon and Medieval periods. The light fertile soils provided them with good yields, and the sandy upland heaths, devoid of water, made ideal sheep pastures (see Fig. 5.4).

In Saxon times, farmers tended to avoid the boulder clays for settlement. However, the rare examples of settlement in such areas are again located in the valleys, as at Linton, where Roman, Saxon and Medieval settlements are all situated along the river terrace.

On the Fen edge, as at Lakenheath, people of all periods chose locations from which the fen and the heath could be exploited to best advantage, and settlements are usually found in the areas between these two ecosystems.



= ROMAN SETTLEMENT
= SAXON SETTLEMENT
= SAXON CEMETERY
= PARISH CHURCH

Fig. 5.4: Showing Roman, Saxon, and Medieval settlement sites in four East Anglian parishes, and their relationship to the topography.

Clearly, this conditioning of settlement location goes against Arnold and Wardle's statement that in eastern England the settlement pattern was not controlled by topography. Arnold and Wardle draw a parallel between southern and eastern England in the distribution of cemeteries in relation to land grade, because both areas have most of their cemeteries on land of grades 3 and 4 (Arnold and Wardle 1981, 147). Figure 5.5 shows the distribution of settlements, cemeteries, and churches in the three counties of East Anglia, and the estimated total area of each county occupied by different grades of land. It can readily be seen that the settlements and cemeteries were on grades 3 and 4 in Norfolk and Suffolk, but that there was a marked preference for grade 2 in Cambridgeshire. The distributions, however, are so closely related to the relative proportions of the land types that it can safely be said that the distribution of settlements across land types is random.

2. Early Saxon place-name elements are found in more agriculturally suitable locations, particularly valleys, not closely associated with pagan cemeteries.

Place-names have in the past been studied in an attempt to provide a chronology of settlement between the 5th and the 8th centuries. The names usually considered significant for this purpose are those ending in -ham, -tun, and -ingas. The relationship of these place-names to the 34 known Saxon sites will be examined to see if a meaningful pattern is present.

In 1966 Dodgson showed that the early date ascribed to -ingas place-names as indicative of 5th and 6th century settlement was not tenable. The distribution of Early Saxon cemeteries and the -ingas names were in fact complementary, and Dodgson postulated that the distribution of -ingas names related to a phase of expansion from the early settlement areas in the later 6th and early 7th centuries (Dodgson 1966).

Cox (1973) examined the distribution of -ham and -ingas name elements in the Midlands and East Anglia, and proposed that their close proximity to Roman roads, Romano-British settlements,

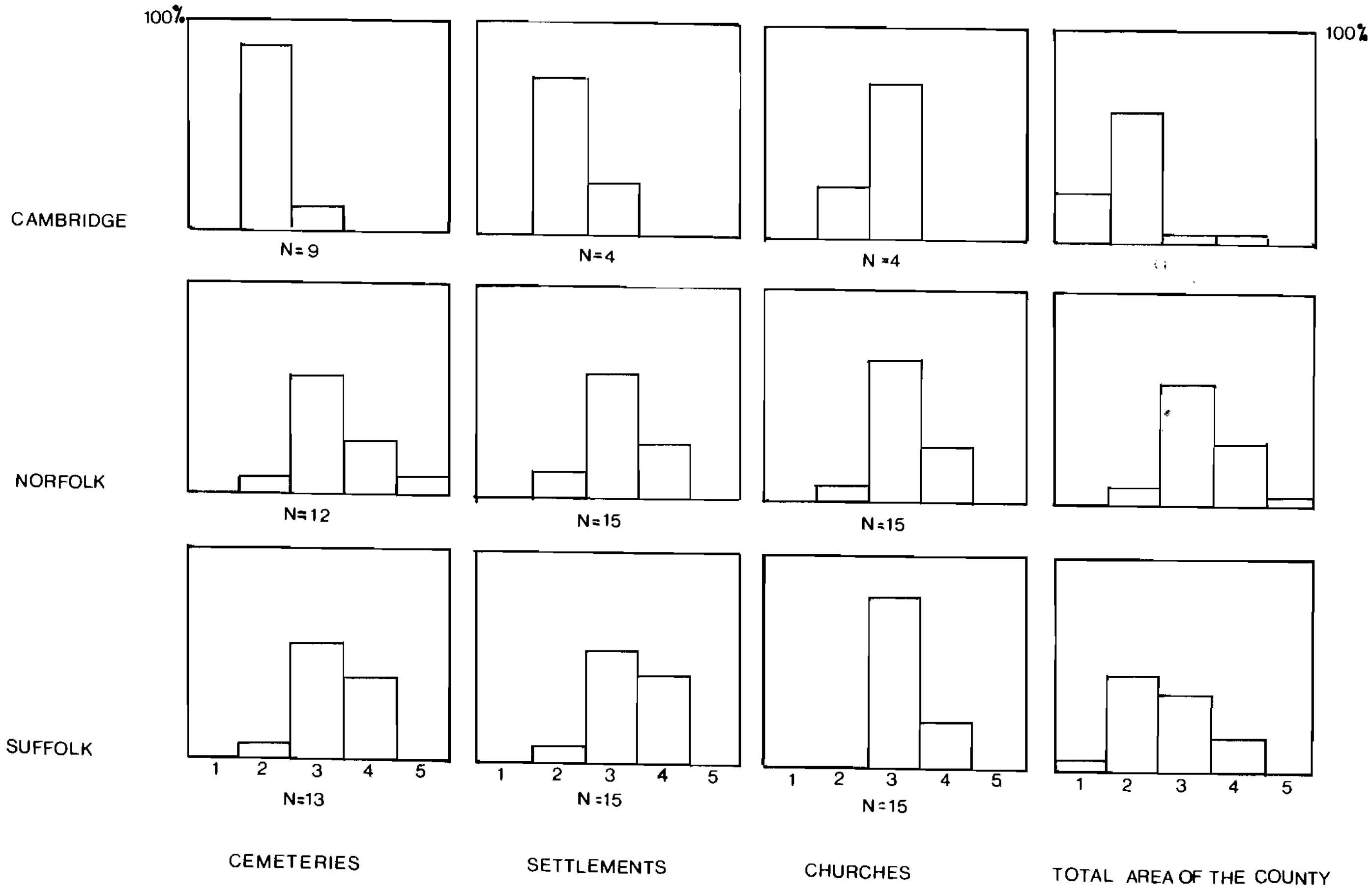


Fig. 5.5: Showing the relationship of settlements, cemeteries, and churches to land grades in East Anglia.

and ancient trackways indicated primary Saxon settlements. He saw -_ham_ as preceding -_ingaham_ with a progression to -_ingas_ and -_inga_. The -_ham_ names did in fact coincide better with the distribution of Early Saxon cemeteries in East Anglia, but not, however, in Sussex (Arnold 1977).

In Norfolk the field survey programme in the Launditch Hundred revealed that the -_ham_ element was associated with sites producing Ipswich ware (Middle Saxon), and was therefore probably an Early Saxon place-name element, although there was no firm evidence for a pre-7th century date (Wade-Martins 1980 84-5).

Also in the Launditch area were a number of -_tun_ villages, two thirds of which were deserted settlements, and these were seen as being the result of a phase of expansion onto marginal land which became depopulated in the late Medieval period.

The study of place-names has therefore not produced a clear-cut chronology of settlement. Accordingly, the 34 Early Saxon settlement sites discussed in this chapter were analysed to see if certain elements were closely associated with them in East Anglia, or if the distribution was random.

Eighteen of the 34 parishes that are known to contain Early Saxon sites incorporated one of the elements -_ham_, -_inga_, or -_tun_ when they were listed in the Domesday survey (Darby and Versey 1975). The proportion of the elements were as follows; -_ham_ 6 occurrences, -_inga_ 3 occurrences, -_tun_ 9 occurrences.

If the distances between the Saxon sites and the Medieval parish church can be used to assess the degree of proximity, then -_ham_ names are on average 0.7km from the Saxon sites, and -_inga_ and -_tun_ are both twice that distance, at 1.4km. This perhaps reinforces Cox's theory that -_ham_ names belong to an early phase, with the early Saxon names surviving to become the settlements, founded anew in parishes where early Saxon settlements had been deserted.

Part of Cox's evidence was the occurrence of Roman roads and settlements close to -_ham_ elements. Measurements carried out on these East Anglian parishes show that 66% of the -_inga_ names, and 55% of the -_tun_ names are similarly associated;

and in fact 50% of the total 34 Saxon sites studied are associated with Roman settlements, no matter what the place-name ending is. The relationship between -ham elements and Roman occupation is therefore unlikely to be significant. The relationship of place-name elements to late Roman occupation might prove more significant, but the data base is not sufficient to allow this to be calculated.

There is therefore no decisive evidence for a chronology of place-names in East Anglia. In general -ham place-name elements are closer to early Saxon and Roman areas of occupation than -inga and -tun in East Anglia, and Wade-Martin's work suggests that the -ham villages were in place by the 7th century. The -tun villages were later, 8th and 9th century settlements and may indicate a phase of expansion onto marginal land.

In the Arnold and Wardle model it was argued that the early place-name elements are found in the valley bottoms, not associated with Early Saxon sites, and were the villages founded in the 7th and 8th centuries when the early settlements were abandoned. This sequence is perhaps indicated in East Anglia by the fact that -tun and -inga place-names were situated some distance from the Early Saxon settlements; but the -ham element is apparently associated with Early Saxon sites and the -tun villages (which do seem to be 8th century foundations) are on marginal land, not the heavy fertile soils that Arnold and Wardle predict (see Fig. 5.6).

3. Charter evidence points to cemeteries occurring on parish boundaries.

It must be remembered that there may well be other burial grounds not situated on the boundaries, and therefore not mentioned. The fact that burial grounds occur on boundaries can be seen from charter evidence, but it does not necessarily explain the siting of all burial grounds. There is also the question of which came first, the boundary, on which later burials were placed; or the burials, which acted as a marker for a later boundary (Hooke 1981).

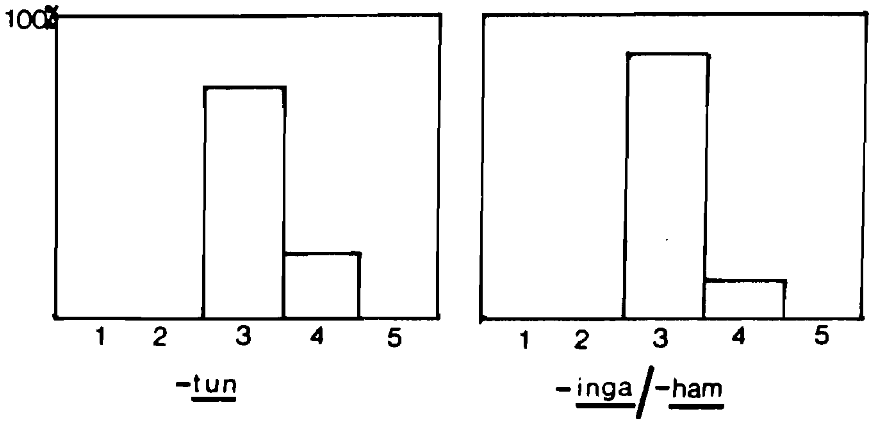


Fig 5.6: Showing that tun villages are more likely than inga/ham villages to be on land of grade 4 in East Anglia. This is based on those parishes with Early Saxon settlement sites.
Wade Martin's work in the Launditch area produced similar results. This is the opposite to what the Arnold and Wardle model would predict.

Bonney has shown in Wiltshire that 42% of the cemeteries he studied were within 500ft (152m) of the boundary. This can be compared with an East Anglian figure of 20.5% of the cemeteries selected being within 100m of the boundary. This agrees well with an independent analysis of 83 Norfolk and Suffolk burials (Goodier 1984) where 21.9% of the cemeteries were within 100m of a parish boundary.

However, if one compares the distances from Early Saxon burials to the boundary with the distances of the churches (Medieval burial grounds) from the same parish boundaries there is no significant difference between the two, with 17% of the churches being within 100m of the boundary. Therefore one can say that cemeteries are 'frequently' found near parish boundaries in East Anglia, but how significant the fact is, is debatable. What is perhaps more interesting is that 29.4% of the Early Saxon settlement sites are within 100m of the boundary. This would indicate that settlements and their burial grounds occur freqently on parish boundaries and probably do occur frequently together.

4. A Major shift in settlement location must have taken place, because Early Saxon settlements are now deserted.

If the major shift in settlement location had taken place as Arnold and Wardle argue, one would expect the Saxon settlements to be located at a considerable distance from the new centres that became the Medieval villages (see Fig. 5.1): but plotting of the actual distances (Fig. 5.2) shows that this is not so, in fact, 23% of the Saxon settlements are within 400m of the Medieval church, which is no greater distance usually than from the church to the edge of the Medieval settlement area. The maximum length of the Grimstone End and Mucking Saxon settlements for instance, were at least 300m, and West Stow was 200m. It is possible therefore that some Saxon settlements developed in a linear manner through time, with the position of the church becoming fossilised in the Early Medieval period. Alternatively a partially dispersed settlement pattern coalesced, as has been argued for the Midlands (Foard 1977).

Only 17% of the Saxon settlements are more than 2km from the parish church, so it would seem that a minority of the sites are located at a considerable distance from the new centres.

5. New centres develop in the 7th and 8th centuries

Arnold and Wardle argue for a major shift in settlement location (in the 7th and 8th centuries) following a change in land-use requirements. This is based on the dates assigned to the decline of excavated settlement sites, such as Mucking (early-8th), West Stow (mid-7th), Chalton (late-7th), Bishopstone (late-6th) and Eynsham (early-8th). In contrast to this the example of Catholme is given, where radiocarbon dates show that occupation continued into the 10th century.

The new settlements are illustrated by the examples found by Wade-Martins in East Anglia, and Bell in Sussex. One exception to the rule is said to be Chalton, Hants where Early Saxon pottery has been found in the modern village (Arnold and Wardle 1981, 147).

These sites are seen to form a pattern from which their model is proposed, but the evidence has not been viewed critically enough. The reasons put forward for the desertion of settlements is a change in land-use requirements, but no evidence of change, or reason for it, is given, apart from the desertion of the settlements themselves.

Climatic changes could result in a widespread shift in settlement location from hilltops to river valleys, but it has already been shown that in East Anglia the majority of Saxon sites do not occupy hilltop or watershed locations with over 50% of them being within 100m of running water.

Wade-Martin's work in north Norfolk has revealed that many Medieval villages there have their origins in the 7th century, and no Early Saxon pottery was found despite intensive field-walking. However, the areas searched were around the parish churches. If the settlements were continuously shifting across the landscape, or coalescing from a dispersed settlement pattern, searching a small area will produce finds mostly of one period of occupation, with only traces of its predecessor and its successor.

This is shown in a simplified way in Fig 5.7, where each successive phase of settlement leaves its cultural debris in an area which varies in size according to the size of the settlement and the intensity of occupation. Finds of all periods will not be found unless the search area is wide enough to cover all settlement sites. The diagram is simplified in that the continuously shifting settlement is not to be seen as a series of discrete jumps but rather as a gradual process with no firm boundaries. It is archaeologists who have created boundaries between the phases of settlement; the original inhabitants would probably have been unaware of them.

The place-name evidence does perhaps point to new centres developing in the 7th and 8th centuries; but there is little evidence for them being replacements for abandoned Early Saxon settlements, rather than part of the pattern of shifting settlement, or a response to such factors as the growth in population, agricultural innovations, or political or social developements.

Conclusions

The model for Saxon settlement location proposed by Arnold and Wardle obviously does not apply in East Anglia. While Saxon settlements are found in the regions of lighter soils in East Anglia, these areas attracted an equally high density of occupation in the prehistoric and Roman periods, and the Saxon settlement pattern was probably governed by similar constraints. There is no evidence of central places, or other hierarchy of settlement, and site-catchment analysis (Dunnell 1971, 34) is a more meaningful way of examining the location of settlements. It is probable that settlement location depended more on the availability, abundance, spacing, and seasonality of plants, animal, and mineral resources. Given a similar subsistence level economy and a similar environment, people of all periods will settle in similar locations within the landscape.

What is interesting in relationship to the model is that

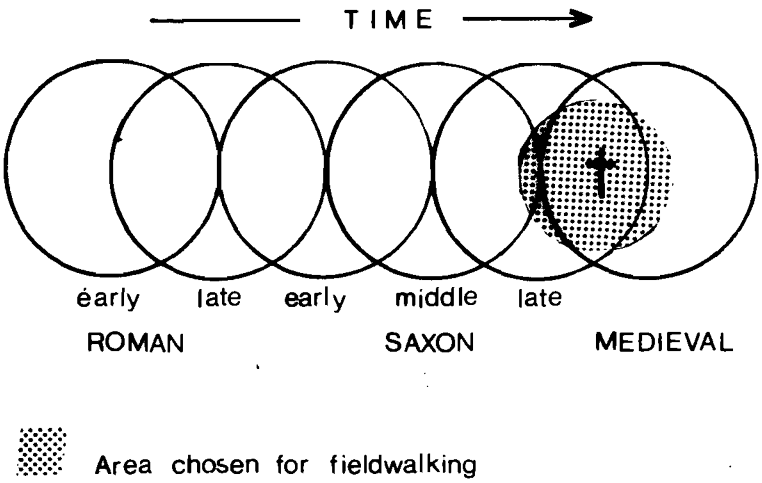


Fig. 5.7: Showing the author's proposed model for settlement shift in East Anglia. The process should be seen as a continual movement rather than the discrete intervals shown here for ease of illustration. Given this model, fieldwalking and surface collection in an area centred on the medieval parish church will recover only a limited sample of earlier material, and may even suggest that there was no previous settlement in the area.

although there is no great evidence for settlement shift from hilltop to valley, or from light soil to heavy, there is strong evidence for settlement shift per se. Arnold's original study (1977) was carried out in areas of Sussex and Hampshire which were both of high relief, i.e. downland. These factors are part of the geomorphology, and the settlement pattern would have been affected by them. The incidence of burials on boundaries in this region is higher than the national average (Goodier 1984), and a model can be drawn up that fits the available evidence.

Arnold and Wardle are correct in stressing that burial grounds and settlements are close together in the Early Saxon period and are often close to parish boundaries. In East Anglia, however, the Early Saxon settlements are closer to the parish boundaries than the cemeteries are. If this is taken as a model for territorial unit organisation, the settlement shift appears to have been from the edge of an Early Saxon unit towards, but seldom reaching, its centre in the Medieval period. This would argue in favour of the land unit continuity approach of Bonney. Sawyer (1976) has argued that the documentary evidence shows that the rural resources in the 7th and 8th centuries were almost as fully exploited as in the 11th, and the great feudal estates with their variety of resources were already fully developed by the 7th century. It is unlikely that such a system could have been operating in a period of major settlement location, involving the reorganisation of territorial units, as put forward by Arnold and Wardle.

It has been stated (Chisholm 1968, 102-3) that water, arable land, grazing land, fuel, and building materials, are essential to settlers; and the majority of the Saxon settlements appear to have been located with these criteria in mind.

The organisational pattern that the settlements formed is likely to have been a heterarchical structure of the type proposed by Crumley (1979), that is, an open cultural system extending over a varied terrain whose boundaries fluctuated through time and space, and whose settlements have the potential of being ranked and can be ranked in a number of different ways.

Not until all aspects of the Saxon settlements in East Anglia have been closely studied can the ranking system be identified, if it existed, and further study is needed into artifact distribution and the economy of the sites. This evidence could then be integrated with the results of the present research.

A site-prospecting programme on similar lines to that detailed by Foard is also needed before it will be safe to assume that the Early Saxon sites so far discovered are a random sample of the total settlement pattern. The processes by which the sites were discovered is given in Fig. 5.8. The influences of a dedicated field worker, Basil Brown, can be readily seen. He reported 22% of the known Saxon sites in the region and it is probable that, had he not worked in the Breckland area, the distribution of known sites would be very different.

Twenty-three per cent of the sites were directly discovered through archaeological excavation; but, of these eight, seven were discovered during the excavation of Roman villas or settlements. A worrying aspect for archaeologists is that fewer sites are now being discovered (Fig. 5.9). The decline in the number of sites found from agriculture, quarrying and civil engineering is probably due to mechanisation. In agriculture, the deep-ploughing schemes of the two decades following the Second World War brought many finds to the surface, but in the lighter soil regions where the Saxon settlement appears to have been densest, topsoil erosion became a serious problem and the land is now treated with greater respect. Fields where extensive Roman and Saxon sites were revealed in the past by deep ploughing have been examined by the author and have produced very few artifacts.

The advent of agri-business has resulted in fewer farmworkers, and only one site has been revealed by agricultural activity during the last twenty years. One has only to see ploughing and harvesting using vast tractors taking place at night under floodlights to understand why. The replacement of the ground-work crews on building and civil engineering projects by mechanical excavators, and the use of larger plant in quarrying

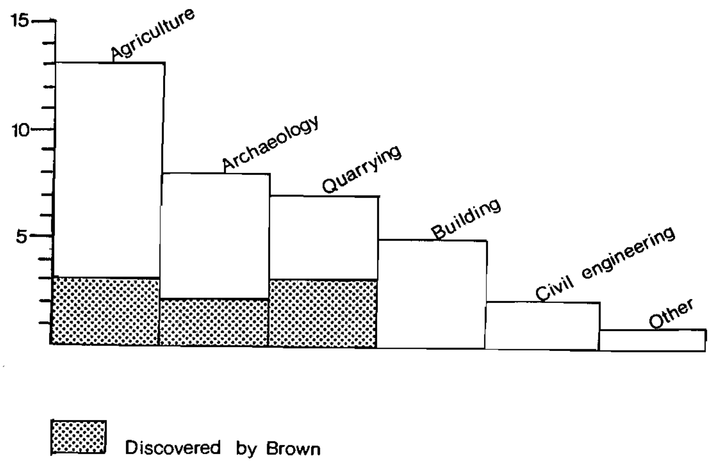


Fig. 5.8: Showing the agencies by which the early Saxon settlements have been revealed.

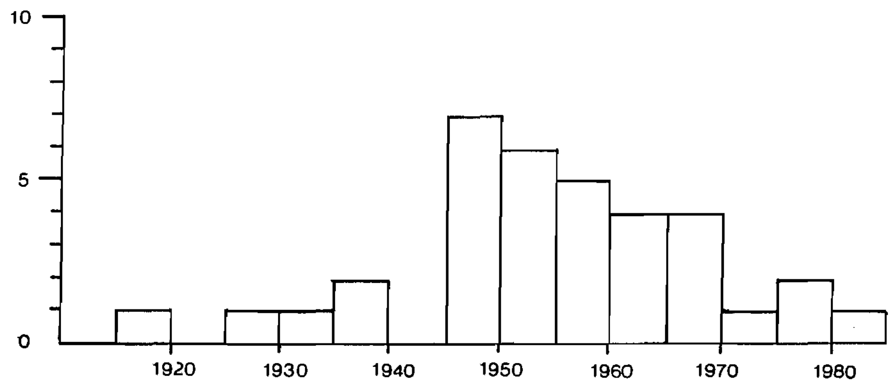


Fig. 5.9: Showing the number of sites discovered in each 5 year period since 1910.

operations will inevitably result in loss of the archaeological record. Unless archaeologists actively search for the settlements of the Saxon period, they are unlikely to be found.

Chapter 6

The Settlement Ceramics of Early Saxon Cambridgeshire

Five Early Saxon settlement sites are known in the county of Cambridgeshire. For the purposes of this thesis, Huntingdonshire, an area to the west of the Fens, which only became part of Cambridgeshire after recent government reorganisation of the county boundaries, has been excluded.

The sites are as follows.

1.	Cambridge, Ridgeons Gardens,	TL 443592
2.	Grantchester, Fiddlers Close,	TL 433556
3.	Linton, Barham Hall,	TL 574460
4.	Waterbeach, The Lodge,	TL 491653
5.	Wimblington, Stonea Grange,	TL 447935

The geographical position of each site is shown in Fig. 6.1 on the following page.

Each site is dealt with in this chapter in a standard format, which will be used for each county that follows. First the circumstances of discovery, and a description of the site are given, followed by analysis of the pottery, first macroscopically, and then microscopically. The characteristics of the pottery are then listed, followed by fabric similarities to other sites. Finally the survey ends with the writer's conclusions, and the illustrations. In this way the reader can rapidly locate the information required, and can compare and contrast one site with another.

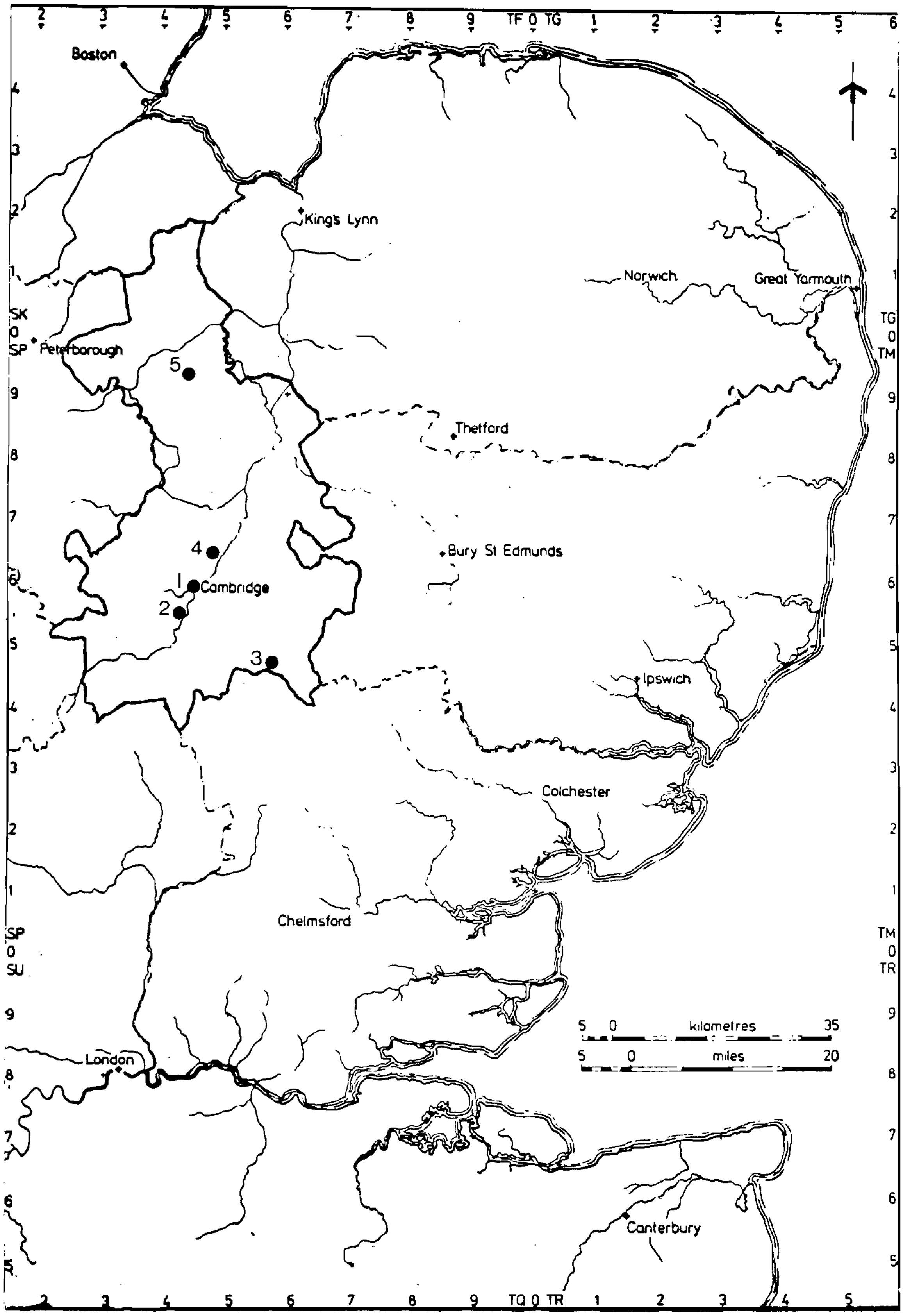


Fig. 6.1: Showing the Cambridgeshire settlement sites.

Cambridge, Ridgeons Gardens

Between 1972 and 1976 an area within the Roman town on Castle Hill, Cambridge, was excavated by Dr John Alexander and the Archaeological Research Group of the Cambridge Antiquarian Society under the Direction of J. Pullinger (Current Archaeology 1979), (see Fig. 6.2).

Early Saxon pottery was recognised in the fill of a Saxo-Norman ditch, and six small sherds were found in a sunken featured building. A number of pits was discovered, but all were dated to the Saxo-Norman period through the presence of St Neots ware (J. Pullinger pers. comm.). The Saxon pottery was sorted, on stylistic attributes alone, from the medieval and Iron Age material by volunteers, so it is probable that more Saxon material is present, but as yet unrecognised. Post-excavation work is in progress at present (1983), and it was only possible to examine and sample the decorated sherd from the ditch fill.

Macroscopic analysis

The single decorated sherd (see Fig. 6.3) was of a sandy fabric, with small red inclusions of either grog or iron, and larger inclusions of a presumed granitic origin.

Microscopic analysis

The fabric consists of a fine, well-sorted sandy clay matrix, with a coarser component of sub-angular to sub-rounded quartz grains, derived from a moderately ferruginous, calcareous sandstone, which includes occasional conjoined crystals of mica, quartz, and feldspar. The small red inclusions were seen to be rounded iron compounds.

Pottery characteristics.

The single rim sherd is decorated with three grooves above a row of stamps. Unfortunately, the sherd had broken along the row of stamps, making it difficult to decide their original form. They were probably D-shaped grid stamps inclined to the right (see Fig. 6.3). The sherd was dark grey and had smoothed surfaces. The rim itself had been roughly moulded between the fingers, giving a slightly corrugated outer surface.

Date

Traditionally, a 6th century date would be assigned to this vessel on the evidence of shallow grooves and stamped decoration. This date is perhaps supported by a 6th century filigree brooch of Continental origin found near the site (J. Pullinger pers. comm.).

Similarities

This fabric has not been found on any other Saxon site in the region under study; but Cambridgeshire is on the edge of the study area, and there may be links with sites to the west. Given our present knowledge, therefore, the evidence indicates a localised production system.

Conclusions

The single sherd sampled from Ridgeons Gardens is probably a small sample of the Early Saxon pottery from the site. Domestic settlement sites have an average of 7.5% decorated vessels, (see Chapter 12, Table 12.4) which would indicate that at least another 13 undecorated vessels were probably present in the archaeological assemblage.

There were no similarities to the Waterbeach or Grantchester material at 4km and 8km distance respectively, but parallels could perhaps be found in the abundant cemetery material in the locality.

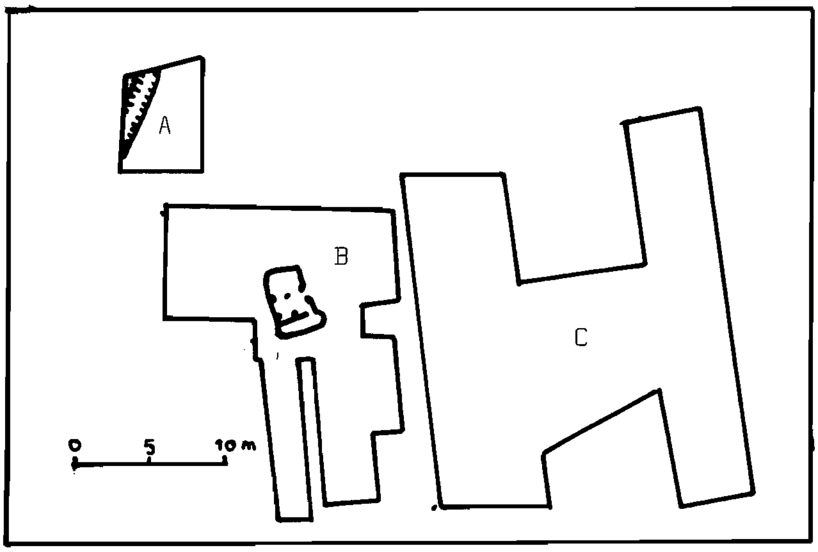


Fig. 6.2: Showing the ditch in area A and hut in area B from which decorated Saxon pottery was recovered. Area C contained Middle and Late Saxon artifacts.

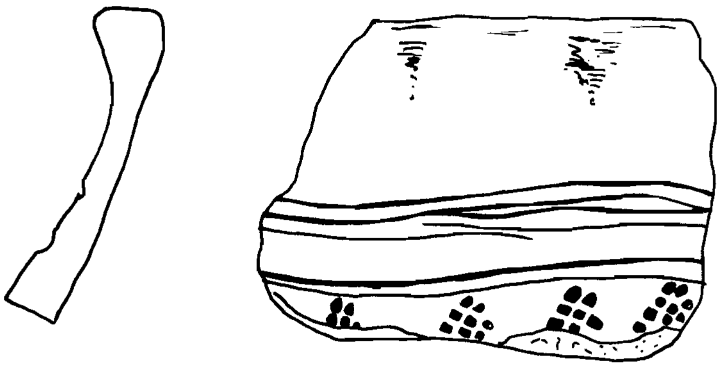


Fig. 6.3: Showing the decorated Saxon sherd sampled for petrological analysis.

Grantchester, Fiddlers Close

In 1971, a Saxon Grubenhaus was excavated at Fiddlers Close, Grantchester (Alexander 1972). The pottery from the structure was processed by members of an archaeology evening class, but can no longer be located. All that survives are the sherds from areas surrounding the structure; from trenches I, IV, and VII, layers 1 and 2.

The pottery was sorted by the writer, and the sherds from handmade vessels were separated from the wheelmade, Thetford and St Neots type pottery. The probable Early Saxon component - 23 sherds - was sorted into seven fabrics, and then into 16 sherd groups, all of which were sampled for thin-section.

Macroscopic analysis

The sherds were divided into seven fabric groups:

Fabric Type	No of sherd groups
Coarse sandy	1
Fine sandy with shell	1
Sandy with flint	1
Sandy	10
Silty with vegetable temper	1
Silty with sand temper	1
Limestone	1

Microscopic analysis

The thin sections showed that there were 10 fabrics involved, because the sandy fabric can be divided into four fabrics on the basis of texture and inclusions (see Table. 6.1)

Fabric 1

Coarse Sandy: A fine clay matrix, with an unsorted quartz component consisting of sub-rounded to rounded grains, the degree of rounding generally increasing with size. Some grains bear traces of siliceous cement, and clusters of cemented grains point to derivation, in part, from a sandstone parent rock. Clay pellets are also present.

FAB. NO	SAM. NO	GROG/PELS.	VEG.	S'STONE	FLINT	CHK.	L'STONE	SHELL	IRN.
1	FC1	X		X					
2	FC2	X						X	
3	FC9				X	X			X
4	FC7					X			X
	FC16					X			X
5	FC4	X							X
	FC5				X	X			
	FC14		X		X	X			
6	FC3			X					
	FC6			X					
	FC8			X					
	FC10			X					
7	FC15			X					
8	FC11		X			X			
9	FC12								
10	FC13			X			X		

Table 6.1

		OUTER SURFACE		INNER SURFACE	
FABRIC	SAMPLE NO.	COLOUR	FINISH	COLOUR	FINISH
1	FC1	Black	Smoothed	Black	Natural
2	FC2	Brown	Natural	Black	Smoothed
3	FC9	Red/brwn	Natural	Red/brwn	Natural
4	FC7	Black	Natural	Black	Natural
	FC16	Red/brwn	Smoothed	Red/brwn	Smoothed
5	FC4	Black	Smoothed	Black	Smoothed
	FC5	Black	Burnished	Black	Burnished
	FC14	Black	Natural	Black	Natural
6	FC3	Grey	Natural	Grey	Natural
	FC6	Grey	Natural	Grey	Natural
	FC8	Orange	Smoothed	Gry/Bff	Smoothed
	FC10	Gry/Bff	Smoothed	Gry/Bff	Smoothed
7	FC15	Grey	Natursl	Grey	Natural
8	FC11	Gry/Bff	Natural	Gry/Bff	Natural
9	FC12	Black	Burnished	Black	Natural
10	FC13	Grey	Smoothed	Grey	Smoothed

Table 6.2

Table 6.1: Showing the presence/absence of inclusions.

Table 6.2: Showing the pottery characteristics of the Fiddlers Close, Grantchester pottery.

Fabric 2

Fine sandy with shell: A clay matrix, with a well-sorted fine quartz component. A coarser quartz component is present, as well-sorted rounded grains, which do not appear in the pellets of clay matrix scattered through the fabric. This points to the coarse quartz being added as temper. The shell fragments are of a fossil nature with predominantly rounded edges. The occasional angular fractures are probably the result of manipulation during the forming process.

Fabric 3

Sandy with flint: A clay matrix, with abundant unsorted quartz grains of sub-rounded form. The large sub-rounded flint and abundant small well-rounded chalk fragments point to this clay being derived from the glacial till. The sample contains small, well-rounded iron granules and a single rounded fragment of quartz-rich ironstone.

Fabric 4

Sandy: A till-derived clay, similar to fabric 3 in composition, but lacking the large flint particles, and with a higher proportion of quartz grains to matrix, some of which show signs of being derived from a calcareous sandstone.

Fabric 5

Sandy 2: A clay matrix with a bimodel quartz component, the finer grains being more abundant and moderately well-sorted, the larger poorly sorted and well-rounded. Rare rounded inclusions of chalk, fossil shell, and flint point to a source in the glacial till.

Fabric 6

Sandy 3: A clay matrix with scattered fine quartz grains, with a coarser component of well-sorted quartz grains derived from a ferruginous sandstone. Fragments of this are present, consisting of up to 24 united quartz grains, the mode being three.

Fabric 7

Sandy 4: A fine clay matrix very similar to fabric 6, with a moderately sorted quartz component of sub-rounded quartz grains. The fabric appears to have been tempered with a crushed highly calcareous sandstone, which is present as numerous angular fragments. A bryozoa fragment in one of the sandstone fragments perhaps signifies a crushed sandy limestone rather than a cacareous sandstone.

Fabric 8

Silty with vegetable temper: A silty, almost quartz-free clay matrix, with sparse comminuted chalk grains and occasional larger rounded quartz grains. The presence of vegetable matter is shown by slightly curved laminate voids. The clay matrix contains a number of microscopic skeletons similar to those found by the writer in samples of freshwater silt. The silty nature of the clay is therefore explained as having been deposited in a slow-moving or stagnant environment, either a glacial lake or pond, or possibly the bed of the river Cam.

Fabric 9

Silty with sparse sand temper: This fabric consists of a silty clay matrix, with abundant fine quartz grains with occasional large rounded grains.

Fabric 10

Limestone: A sandy clay matrix, with an unsorted quartz component with abundant oolites and occasional fragments of calcareous sandstone.

Pottery characteristics

The surface finish and colour of the sherd groups is set out in Table 6.2. The number of vessels in each fabric is too small to draw meaningful conclusions. Only three rim sherds were found and it is therefore not possible to say what vessel forms were present.

Similarities

No similarities were found between the Grantchester fabrics and those of other sites in the area.

Conclusions

The ratio of fabrics to sherd groups, 1 to 1.6, indicates either an assemblage from a long period of occupation, or the exploitation of a variety of clay sources. The former is certainly possible, as the presence of Saxon stamped pottery suggests a sixth-century occupation phase, while the St Neots type pottery and the Thetford type sherds must be three centuries later.

The two stamped sherds - sample numbers 7 and 8 - are both sandy fabrics; but apart from this there is no indication of a relationship between fabric and function, due to the small size of the sherds which makes it impossible to assign vessel forms.

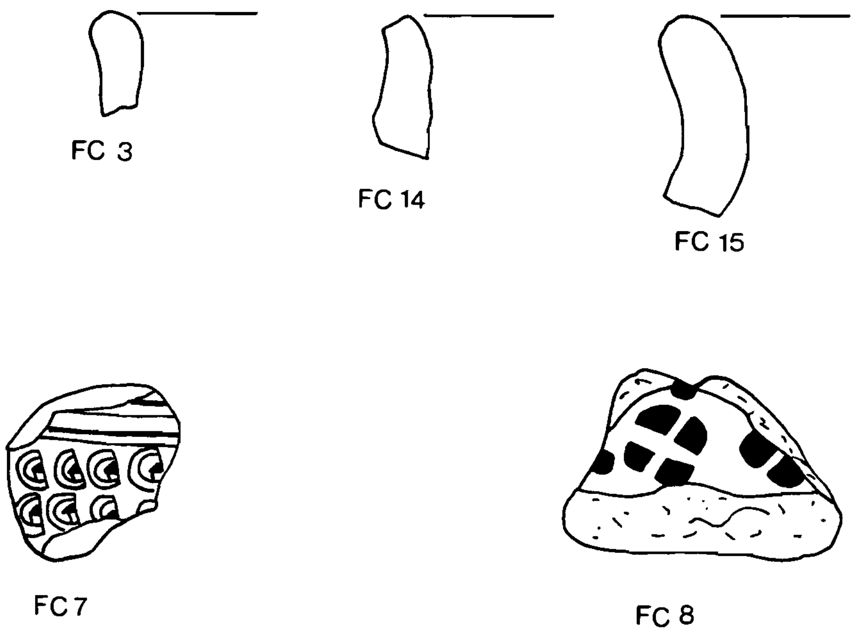


Fig. 6.4: Showing the pottery from Fiddlers Close, Grantchester.

Linton, Barham Hall

During civil engineering works for a gas pipeline in 1979, the Great Chesterford Archaeological Group observed a sunken featured building at TL 574460. The pipe-trench was extended to uncover the whole plan, (see Fig. 6.5).

The sunken area consisted of a vertically sided, flat-bottomed pit, 2.8m wide by 3.1m long by 0.42m deep; the long axis being aligned NW-SE. On the southeast side the remains of a clay wattle-and-daub wall and a single central post-hole were located. Most of the feature was excavated except for the northwest central portion. A concentration of ash and hearth stones was located slightly off centre, and associated with this were pottery sherds, a triangular bone comb, a bone needle, an awl, and other, metal, objects. A date in the first half of the sixth-century has been suggested (M. Jones pers. comm.).

Macroscopic analysis

The sherds were sorted into seven fabric groups, then into sherd groups. Classification was done by eye and hand lens, with occasional use of a binocular microscope, and produced the following results.

Fabric type	No of sherd groups
Limestone	2
Oolitic limestone	6
Sandy/oolitic limestone	1
Sandy	21
Granitic sandstone	1
Fine sandy	11
Yellow mica	1

This gave a total of 43 sherd groups, and is the number of vessels represented. A Petersen estimate of the assemblage would be 40, but the number of bases is perhaps too small to be reliable. Only six bases were present to 15 rims, and it is possible that some rounded base sherds were indistinguishable from thick body sherds. Further definition of the sherd groups

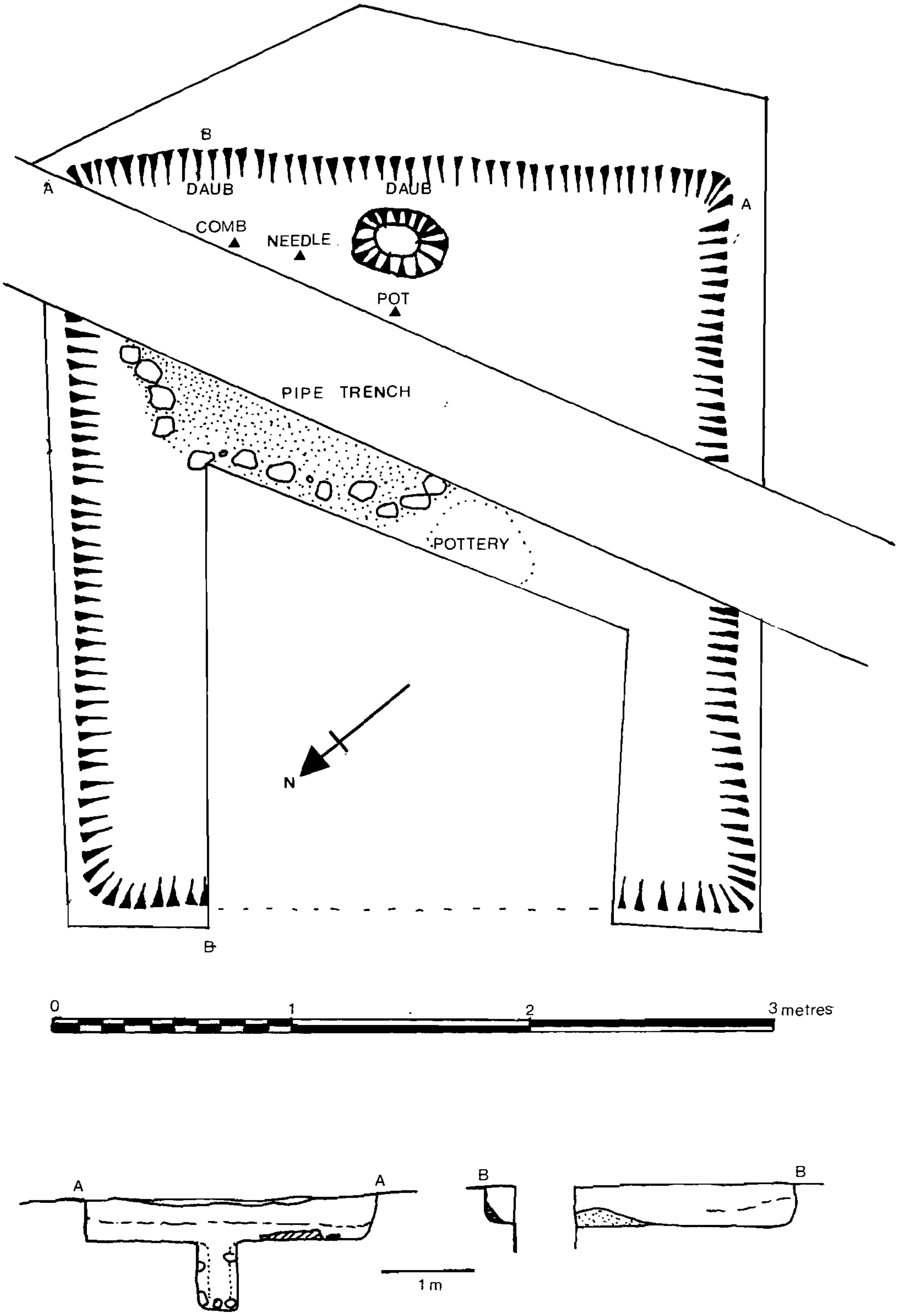


Fig. 6.5: Showing plan and sections of the Linton grubenhauser.

after microscopic examination showed that the Petersen estimate could be as high as 60, but the margin of error increased so far as to be unacceptable.

Microscopic analysis

Microscopic analysis of the 43 samples showed that 10 fabrics were present. The three limestone fabrics were reduced to two, the oolite fabric being equally divided between the limestone and the sandy oolite fabrics. The sandy fabric was found to consist of two major fabrics, to which four of the fine sandy sherd groups belonged. The remaining fine sandy and sandy groups formed five separate fabrics. The yellow mica fabric remained a separate unit (see Table 6.3)

Macroscopic Fabrics	Microscopic Fabrics									
	1	2	3	4	5	6	7	8	9	10
Limestone							2			
Oolite							3	3		
Sandy oolite								1		
Sandy	7	1	1	12	1					
Granitic sandstone	1									
Fine sandy	2	3	2	2	1				1	1
Yellow mica						1				

Table 6.3 Showing the relationship between the microscopic and the macroscopic fabrics.

The fabric descriptions are as follows:

Fabric 1

A fine sandy clay matrix with common unsorted angular to sub-rounded quartz grains. Common fragments of comminuted chalk. The larger quartz grains are mostly derived from a sandstone with calcareous cement.

Fabric 2

Similar to fabric 1, and possibly a sub-group. The difference is that this fabric exhibits a higher degree of sorting.

Fabric 3

Fine sandy clay matrix with abundant unsorted quartz grains. There is a higher ratio of quartz to clay matrix than in fabrics 1 and 2. Chalk is present, both as comminuted grains and large rounded fragments, with occasional rounded fragments of flint. The larger quartz grains are derived from calcareous and siliceous sandstones of finer grain size than fabrics 1 and 2.

Fabric 4

A fine clay matrix with dense angular to sub-angular fine quartz grains. Muscovite mica is present in some quantity, as well as comminuted chalk and feldspar grains of the same size range as the quartz component. One sample, sandy 14, also has large rounded quartz grains present and a rounded flint grain of the same size and shape.

Fabric 5

A fine sandy matrix with abundant angular quartz grains derived from a siliceous sandstone.

Fabric 6

A fine iron-rich sandy clay matrix with an unsorted quartz component. The fabric is macroscopically characterised by yellow mica, which is present in fragments of the same size as the larger quartz grains.

Fabric 7

A silty clay matrix with scattered unsorted quartz component. The fabric is marked by fragments of limestone, most commonly single oolites, with occasional shell fragments and pieces of intact limestone.

Fabric 8

This contains the same limestone inclusions as fabric 7, but the quartz component is more abundant and more sorted, lacking the large grains of fabric 7.

Fabric 9

A sandy clay matrix with a sub-angular unsorted quartz component derived from a disaggregated calcareous sandstone.

Fabric 10

A clay matrix with a well-sorted fine quartz component and a coarser component derived from a moderately sorted calcareous sandstone.

The presence/absence of inclusions in each fabric is shown in Table 6.4.

Pottery characteristics

The pottery characteristics are listed in Table 6.5 . The sandy non-calcareous fabrics are all similarly finished and fired, with the majority of them burnished or smoothed on the inner and outer surface and well reduced.

The calcareous fabrics 7 and 8 exhibit a better degree of finish with no surfaces left natural, and the majority of the outer surfaces burnished.

Decoration was found on four vessels, three of which were in fabric 3 (see Fig. 6.6). Sandy 17 was probably an everted rimmed vessel with pairs of linear neck lines with stamping between them; sandy 4 was a carinated vessel carrying four neck lines above the carination; sandy 5 was a bossed thin vessel with diagonal grooves on the bosses and a continuous frieze of vertical grooving between them. Because of their position and small size, the bosses were probably non-funtional. Two other vessels in fabric 3 bore a schlickung coating, which may have been decorative in the manner of rustication, or functional, providing a roughened surface for ease of handling.

The other decorated vessel was in fabric 9 and carried

FABRIC	IG ROCK	GROG	VEG.	S'STONE	FLINT	CHALK	L'STONE
Fabric 1							
Sandy 1				X		X	
Sandy 2				X			
Sandy 7				X			
Sandy 9				X		X	
Sandy 15				X		X	
Sandy 16				X			
Sandy 21				X		X	
Sandy 22				X		X	
Fine sandy 10		X		X		X	
Fine sandy 11				X		X	
Fabric 2							
Sandy 13				X		X	
Fine sandy 2			X	X		X	
Fine sandy 5			X	X		X	
Fine sandy 9			X	X		X	
Fabric 3							
Sandy 3	X	X				X	
Sandy 4						X	
Sandy 5	X			X			
Sandy 6						X	
Sandy 8				X		X	
Sandy 10				X	X	X	
Sandy 11				X	X		
Sandy 12		X		X		X	
Sandy 17		X		X		X	
Sandy 18				X		X	
Sandy 19				X		X	
Sandy 20							
Fine sandy 3	X			X	X		
Fine sandy 4				X	X	X	

Table 6.4a: Showing the presence/absence of inclusions in the Linton pottery.

FABRIC	IG ROCK	GROG	VEG.	S'STONE	FLINT	CHK.	L'STONE
Fabric 4							
Sandy 14					X	X	
Fine sandy 7						X	
Fine sandy 8					X	X	
Fabric 5							
Fine sandy 9				X			
Fabric 6							
Yellow mica						X	
Fabric 7							
Oolite 1			X			X	X
Oolite 2						X	X
Oolite 3							X
Limestone 1							X
Limestone 2							X
Fabric 8							
Oolite 4				X	X	X	X
Oolite 5						X	X
Oolite 6			X			X	X
Sandy oolite 1						X	X
Fabric 9							
Fine sandy 1			X	X	X		
Fabric 10							
Fine sandy 6							

Table 6.4b: Showing the presence/absence of inclusions in the Linton pottery.

			OUTER SURFACE		INNER SURFACE	
FABRIC 1		DECORATION	COLOUR	FINISH	COLOUR	FINISH
Sandy	1		Black	Burnished	Black	Burnished
Sandy	2		Black	Smoothed	Black	Natural
Sandy	7		Black	Natural	Black	Smoothed
Sandy	9		Black	Burnished	Buff	Smoothed
Sandy	15		Black	Burnished	Black	Smoothed
Sandy	16		Buff	Smoothed	Black	Burnished
Sandy	21		Black	Burnished	Black	Burnished
Sandy	22		Black	Smoothed	Black	Smoothed
Fine sandy	10		Black	Smoothed	Grey	Smoothed
Fine sandy			Buff	Burnished	Buff/Grey	Smoothed
FABRIC 2						
Sandy	13		Black/Buff	Natural	Black	Natural
Fine sandy	2		Black	Burnished	Black	Eroded
Fine sandy	5		Black	Burnished	Black	Burnished
Fine sandy	9		Buff	Smoothed	Black	
FABRIC 3						
Sandy	3	Bossed, grooved	Black	Burnished	Black	Natural
Sandy	4	Grooved	Black	Burnished	Black	Natural
Sandy	5		Black	Schlikung	Black	Smoothed
Sandy	6		Buff	Schlikung	Black	Smoothed
Sandy	8		Black	Smoothed	Black	Smoothed
Sandy	10		Black	Natural	Eroded	Eroded
Sandy	11		Black	Smoothed	Black	Burnished
Sandy	12		Red/Buff	Smoothed	Black & Red	Smoothed
Sandy	17	Grooved, stamped	Black	Burnished	Black	Burnished
Sandy	18		Black	Burnished	Black	Eroded
Sandy	19		Buff	Burnished	Black	Burnished
Sandy	20		Buff	Eroded	Black	Eroded

Table 6.5a: Showing pottery characteristics of the Linton pottery.

			OUTER SURFACE		INNER SURFACE	
FABRIC 3		DECORATION	COLOUR	FINISH	COLOUR	FINISH
Fine sandy	3		Buff/Black	Burnished	Buff	Burnished
Fine sandy	4		Black	Natural	Eroded	Eroded
FABRIC 4						
Sandy	14		Grey	Natural	Grey	Natural
Fine sandy	7		Brown	Burnished	Orange	Natural
Fine sandy	8		Black	Burnished	Black	Smoothed
FABRIC 5						
Fine sandy	9		Buff	Smoothed	Black	
FABRIC 6						
Yellow mica			Buff	Smoothed	Buff	Natural
FABRIC 7						
Oolite	1		Grey	Smoothed	Grey	Smoothed
Oolite	2		Black	Smoothed	Black	Smoothed
Oolite	3		Black	Burnished	Black	Burnished
Limestone	1		Black	Burnished	Black	Smoothed
Limestone	2		Buff	Burnished	Grey	Smoothed
FABRIC 8						
Oolite	4		Black	Burnished	Black	Smoothed
Oolite	5		Black	Burnished	Black	Burnished
Oolite	6		Black	Burnished	Black	Burnished
Sandy oolite	1		Buff	Smoothed	Black	Eroded
FABRIC 9						
Fine sandy	1	Grooved	Black	Burnished	Black	Burnished
FABRIC 10						
Fine sandy	6		Black	Smoothed	Black	Smoothed

Table 6.5b: Showing the pottery characteristics of the Linton pottery.

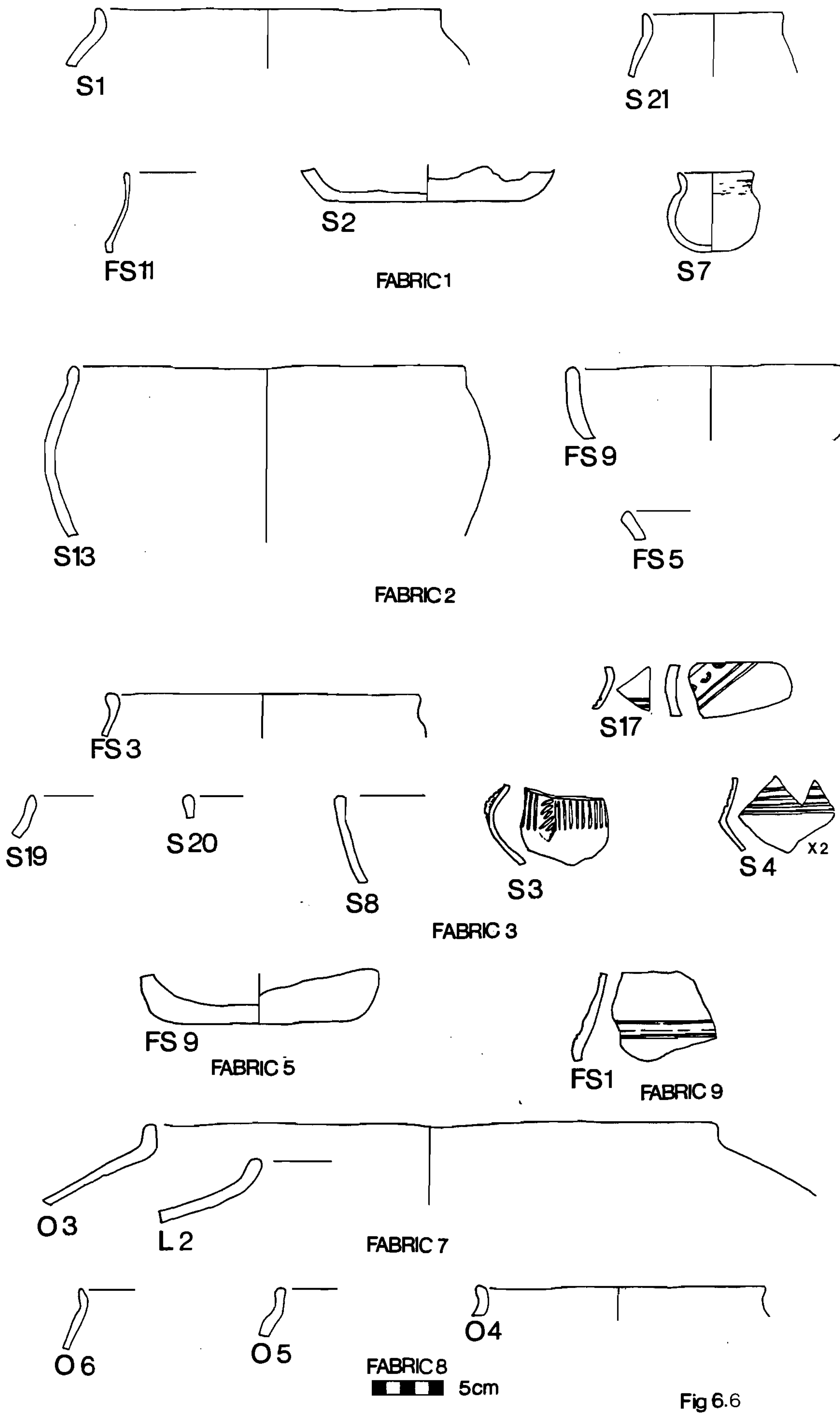

S1
S 21
FS11
S2
FABRIC 1
S7
S13
FS 9
FS 5
FABRIC 2
S17
FS 3
S19
S 20
S8
S 3
S 4
X 2
FABRIC 3
FS 9
FABRIC 5
FS1
FABRIC 9
O 3
L 2
FABRIC 7
O 6
O 5
O4
FABRIC 8
5cm

Fig 6.6

two linear grooves at the maximum girth, and another, possibly, below the rim (now missing).

The relationship between the fabrics in terms of form, function, and date is not clear. The fabric 1 forms are all similar, with slightly everted rims, but in widely differing sizes. The fabric 2 vessels - possibly from the same parent clay as fabric 1 - seem to complement fabric 1, providing bowl-shaped pots which fabric 1 lacks. Fabric 3 seems to provide a finer class of pottery, with thin-walled vessels. Some 75% of the decorated pottery is in this fabric group.

Fabric 7 possibly consists of a single vessel of large size (rim diameter 40 cm), and the coarse inclusions in the clay perhaps made this a suitable fabric for storage vessels. The fabric 8 vessels, which are probably from a related clay, could all be cooking or storage vessels. Fabric 9 consists of a single vessel, thin-walled and decorated, in a fine sandy clay.

Similarities

There are no similarities between the Linton fabrics and those of other sites in the study area.

Conclusions

The pottery from Linton falls into two fabric groups- sandy and calcareous - the latter probably coming from Jurassic drift deposits.

The sandy fabrics cover the whole range of domestic forms, whereas the calcareous fabrics are all undecorated, large, utilitarian forms. These may have been acquired by trade, perhaps because the local sandy clays were less suitable for larger vessels. However, if trade was not involved, local potters could have collected different clays for different vessel functions. Accordingly, the author took clay samples locally to look for Jurassic inclusions in the drift, but found that all calcareous matter was of Cretaceous origin. This strengthened the trade theory; and links should perhaps be sought to the west of the study area.

Waterbeach

The Waterbeach settlement was discovered by T.C. Lethbridge, while he was attempting to ascertain the date of the Car Dyke by excavating a stretch of it where it ran through the grounds of his house. Details of the site were published (Lethbridge 1927; Lethbridge and Tebbut 1933), and it can be synthesised as follows:

Hut	Length	Breadth	Depth
1	6'9"(2.02m)	10'0"(3.04m)	2'6"(0.76m)
2	6'0"(1.82m)	6'0"(1.82m)	3'0"(0.91m)
3	10'0"(3.04m)	8'0"(2.44m)	2'0"(0.61m)

	Hut 1	Hut 2	Hut 3
Pottery	X	X	X
Silver disc	X		
Ivory ring	X		
Bone pins	X		
Loomweights		X	
Nails	X		
Spindle whorls	X	X	

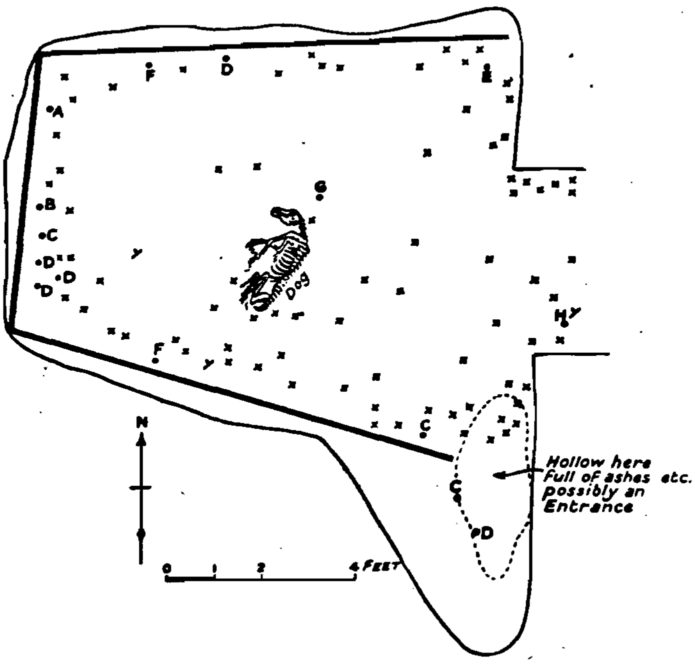
Plans of huts 1 and 3 exist, showing the positions of the finds, mostly around the hut edges,(Lethbridge and Tebbut 1933, Fig 1). (see Fig. 6.7)

Hut 1 was trapezoid in plan, situated on the bank of, and facing onto, the partially filled Car Dyke. No post-holes were found, the hut having a hollow dug down into the firm gravel subsoil. The 'occupation layer' spread down into the Car Dyke; and it is probable that this layer in the Dyke itself is the other half of the building which had settled to a lower level when the Dyke fill (over which it was constructed) compacted.

Hut 2 was a sunken-featured dwelling, apparently 6'(1.82m) in diameter.

Hut 3 was a sub-rectangular sunken-featured dwelling of normal Saxon type, with single post-holes in the centres of the shortest sides.

Lethbridge discussed the pottery in some detail, claiming



Plan of Anglo-Saxon Hut.

A, armlet; B, bronze needle; C, bone needle; D, glass bead; E, silver disc; F, spindle-whorl; G, iron nail; H, glass; X, Saxon pottery; γ, Romano-British pottery.

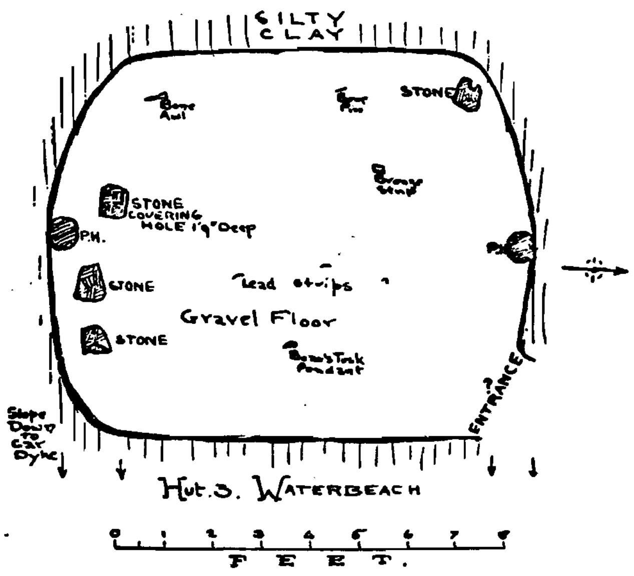


Fig. 6.7: Showing Huts 1 and 3 at Waterbeach, from Lethbridge and Tebbut 1933, and Lethbridge 1927.

that the presence of Roman sherds, and the form of two of the 12 rims, pointed to a date intermediate between the Roman and Saxon periods. One of the Roman sherds is from a samian bowl which is most unlikely to have been still in use in the late 4th century; and Lethbridge's 'intermediate' forms are closer to forms of the Middle/Late Saxon period, probably from the St Neots region, as they are both in shelly fabrics.

The artifacts from the site are now with the Cambridge Museum of Archaeology and Anthropology, but seem to consist of finds only from the first season's excavations: that is, the material from hut 1 as illustrated by Lethbridge. A few other rim sherds are present apart from those he illustrated, but their small size probably accounts for their absence from the original report (Fig. 6.8). This petrological analysis will therefore be based only on the artifacts from this single hut.

Macroscopic analysis

Macroscopically, the pottery was divided into five fabrics:

Fabric Type	No of sherd groups
Sandy	13
Coarse sandy	5
Limestone	5 (+ 3 spindle whorls)
Sandy/vegetable tempered	1
Limestone/vegetable tempered	1

Petersen estimate

The Petersen estimate can be calculated from the figures below.

	Rims	Bases	Pairs	N	Sherd groups
Fabric 1	8	8	4	16	18
Fabric 2	2	3	1	6	6
Fabric 3	0	1	0	1	1
Total				23	25

Table 6.6 Estimates of vessel numbers, by the Petersen and sherd group methods.

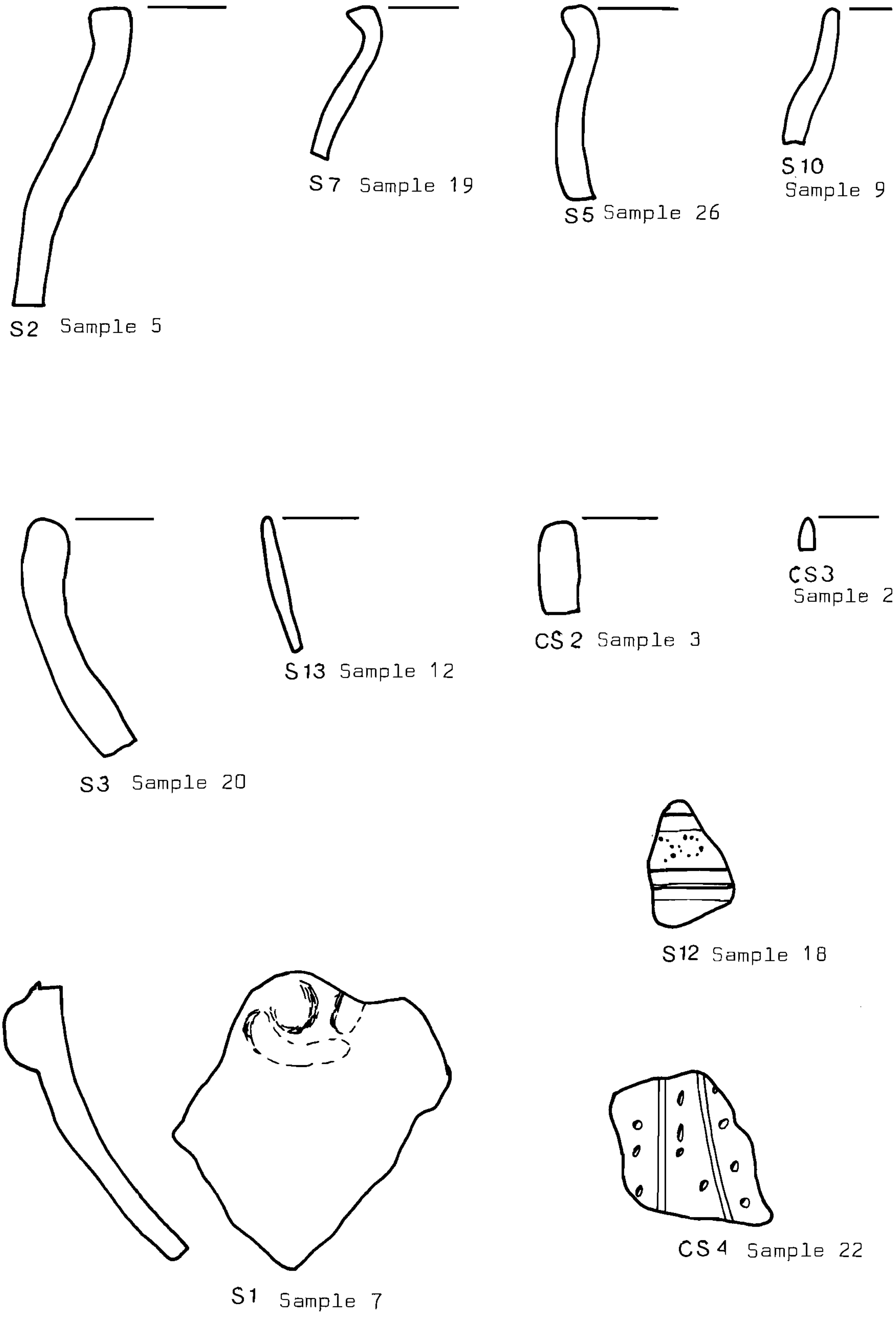
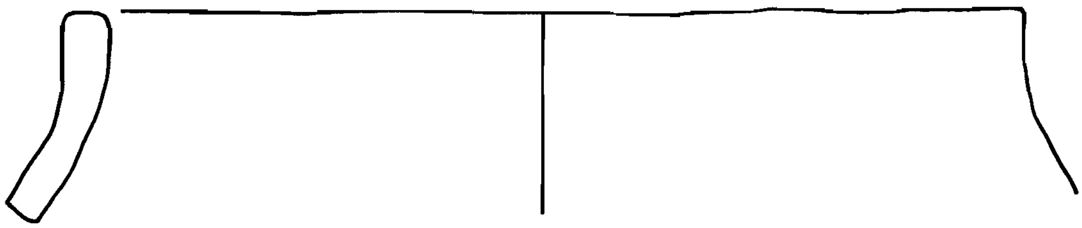
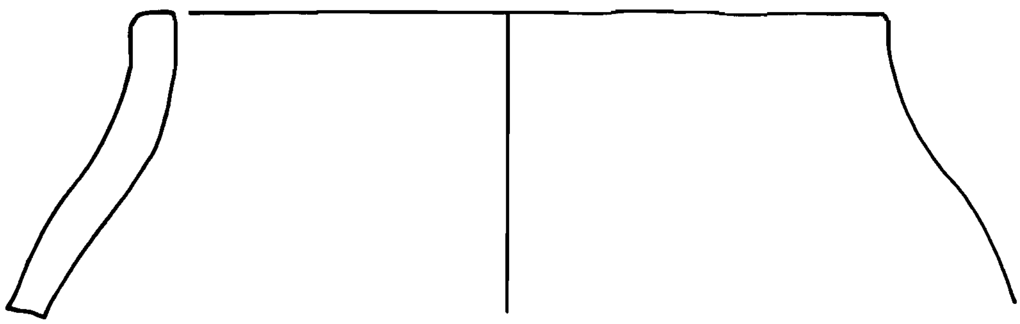


Fig. 6.8: Showing the vessels of fabric 1 at Waterbeach. 1:1



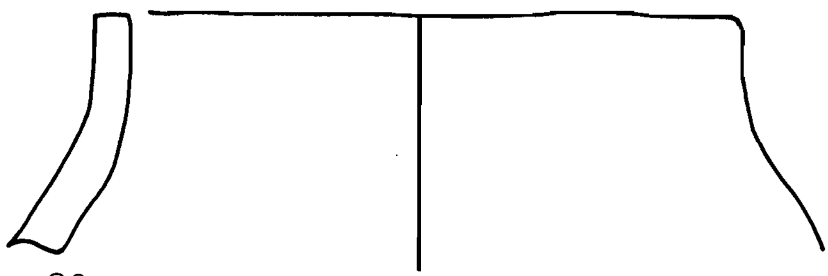
O 4

Sample 4



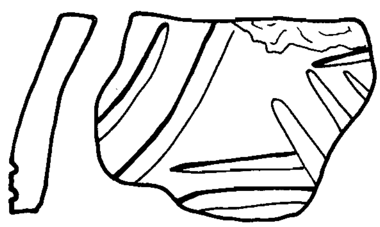
O 5

Sample 17



O3

Sample 10



O2 Sample 1

Fig. 6.8: Showing the vessels of fabric 2 at Waterbeach. 1:1

It can be seen that the Petersen estimate gives a very close result to the sherd group method, even though the number of pairs is low and the Petersen estimate is therefore less accurate.

Microscopic analysis

Microscopic examination showed that the coarse sandy group was the same as the sandy group. Examination of the pottery characteristics for the 'coarse sandy' vessels showed that they all had smoothed or burnished surfaces which had resulted in the inclusions being accentuated.

The limestone group did contain fragments of calcareous material mostly derived from an oolitic source; but the fabric matrix, the quartz component, and other inclusions were so similar to the sandy fabric that they probably came from the same source.

The vegetable-tempered fabrics were based, as thought, on the sandy and limestone-rich clays. The source for all these fabrics is undoubtedly a glacially derived boulder clay, containing a small amount of limestone fragments.

The limestone group will be treated as a separate fabric, a decision backed by the presence of small quantities of vegetable matter in four of the five vessel groups. Together with the definitely vegetable-tempered vessel, this gives five out of six vessel groups containing a proportion of vegetable matter, whereas few of the sandy group do (see Table 6.7).

Within the sandy group there is one sample with a different fabric from the main group, which will be dealt with below (see fabric 3).

Table 6.7 shows the presence/absence of inclusions.

Fabric 1

A silty clay matrix, with scattered, fine, moderately sorted quartz component. The coarser component consists of mainly large, unsorted, scattered grains of quartz derived from a calcareous sandstone, fragments of which are usually present, as are occasional small rounded fragments of chalk.

FABRIC + SAMPLE NO.	GROG	VEGETABLE	SANDSTONE	CHALK	OOLITE	IRON
FABRIC 1						
2	X	X	X			X
3	X		X			
5	X		X			
6	X			X		X
7			X	X		X
12	X	T				
14	X					
16			X	X		X
21			X	X		X
22	X	T		X		X
23	X	T	X			
26			X	X		X
FABRIC 2						
9	X		X			X
11	X		X			
15	X		X			X
18	X		X			
19	X		X			
20			X		X	X
FABRIC 3						
1 & 8	X	T		X	X	X
4	X	T	X	X	X	
10		T	X	X	X	
13		T		X	X	
17		T	X	X	X	
25		X	X	X	X	X
FABRIC 4						
24	X	T	X	X		

X = Present

T = Trace

Table 6.7: Showing the presence/absence of inclusions in the Waterbeach pottery.

Fabric 2

A similar matrix to fabric 1, but a coarse component is present of abundant, unsorted, angular to sub-angular quartz grains, derived from a calcareous sandstone.

Fabric 3

A similar matrix to fabric 1, but with the addition of fragments of oolitic limestone and traces of vegetable matter. Only one sample, number 25, has large enough quantities of vegetable matter for it to be considered a deliberate tempering addition.

Fabric 4

A fine silty clay matrix, with fine scattered quartz grains, and a coarser component consisting of abundant quartz grains, There are also inclusions of rounded chalk and calcareous sandstone, and the fabric is undoubtedly related to fabrics 1 and 2.

Most fabrics also contained clay pellets or particles of rounded iron. It is possible that the rounded iron particles are in fact clay pellets that have trapped iron salts in solution in the soil. Many of the clay pellets are of the same fabric as the pottery matrix but contain more iron.

Pottery characteristics

As can readily be seen in Table 6.8 there is no significant difference in surface finish, colour or presence of decoration between the three main fabrics. Fabric 4 is too small a sample to draw conclusions from but it does not contradict the results of the rest of the fabrics.

Twenty-three per cent of the vessels have some degree of surface finish on the outer surface, and a similar number had treatment on the inner surface, Only two vessels were treated on both surfaces, giving a total of nearly 39% of the vessels with treatment of some description.

Three vessels bore more elaborate decoration with linear

			OUTER SURFACE		INNER SURFACE	
FABRIC	SAMPLE NO	DECORATION	COLOUR	FINISH	COLOUR	FINISH
1	2		Black	Natural	Black	Smoothed
	3		Grey	Nst/Sm rim	Grey	Natural
	5		Buff	Natural	Buff	Natural
	6		Grey	Natural	Black	Natural
	7		Buff/Dk Grey	Natural	Grey	Smoothed
	12		Buff/Grey	Smoothed	Buff	Natural
	14		Grey/Black	Natural	Grey/Black	Natural
	16		Black	Natural	Black	Smoothed
	21		Black	Smoothed	Black/Grey	Natural
	22	Stamped + grooved	Black	Burnished	Black	Natural
	23		Black	Smoothed	Black	Smoothed
	26		Buff/Grey	Natural	Buff/Black	Natural
2	9		Grey	Natural	Black	Natural
	11		Grey	Natural	Black	Natural
	15		Buff/Black	Natural	Black	Natural
	18	Stamped + grooved	Black	Natural	Black	Smoothed
	19		Black	Natural	Black	Natural
	20		Buff	Natural	Buff	Natural
3	1 & 8	Grooved	Black/Buff	Smoothed	Black	Smoothed
	4		Black	Natural	Black	Natural
	10		Buff	Natural	Buff	Natural
	13		Black/Buff	Natural	Black	Natural
	17		Black	Natural	Black	Natural
	25		Black	Natural	Black	Natural
4	24		Grey	Natural	Grey	Natural

Table 6.8: Showing the pottery characteristics of the Waterbeach pottery.

or curvilinear grooves, used once in conjunction with a stamp, and once with stabbing.

No vessel could be reconstructed fully, but they seem to be a standard domestic assemblage ranging from large vessels (some of them decorated) to small bowls. The vessel with the applied lug, sample 7, has it placed apparently at the maximum diameter of the vessel, which would make it suitable for suspension. It is therefore not classed as a decorated vessel.

Eighty-three per cent of the limestone group, fabric 3, showed evidence of coil joins as opposed to 21% of the sandy fabrics. This is probably due to the difference in plasticity between the sandy and calcareous clays, and does not signify different methods of production (see chapter 12).

Similarities

The Waterbeach fabrics were compared with those from other sites in the area and no fabric matches were found.

Conclusions

All the pottery from this hut site probably originates from a nearby source. There is no evidence of trade with any of the known sites in the vicinity, but the number of sites known is small, so the picture may be incomplete. The position of the site on the fen edge, in an isolated position, would however, back up the evidence of its being an isolated community as far as pottery exchange is concerned. The presence of silver and ivory artifacts does indicate trade of some sort, but these are prestige artifacts that would have great value, both social and economic, whereas pottery would not perhaps have been able to command a price high enough to justify its transport and marketing.

The fact that three main fabrics were found may relate directly to the three huts excavated, with each household having a different but geologically related clay source, and all fabrics finally being deposited in negative features that served as refuse areas.

Wimblington, Stonea Grange

The site at Stonea Grange was discovered fortuitously in 1981 during excavation of a large Roman stone building, unique in the Fens region. Traces were found of a Saxon rectangular post-built timber building, of at least three phases, and two clay-lined kilns or ovens (Potter 1982). (Fig. 6.9).

The excavators kindly allowed access to the material from the 1981 season for inclusion in this thesis. The sherds were divided macroscopically into 13 fabric groups, which were considered by the writer to be Saxon. A small proportion of vessels had more similarities to vessel forms of the Late Iron Age or Early Roman period, and three samples were taken from these for comparative purposes. Statistics of fabric quantities and characteristics are not given as this was a pilot study to assess fabric variability and source.

Macroscopic analysis

The macroscopic fabrics were as follows:

1. Sandy, copious quartz, occasional chalk fragments, iron.
2. Harsh sandy, with copious black quartz and iron ore.
3. Sandy, with igneous rock inclusions.
4. Chalk/limestone, with igneous rock.
5. Fine clay, with large occasional fragments of rock.
6. Fine sandy, with grog.
7. Shelly.
8. Fine vesicular clay.
9. Fine sandy, with oolitic material.
10. Silty clay, with igneous rock.
11. Rounded chalk/oolitic material, with igneous rock.
12 Silty vesicular clay, with igneous rock.
13. Sandy vesicular clay.

Microscopic analysis

Macroscopic fabric groups 1, 2, 5, 6, 7, and 8 were distinct and separate fabrics, but there were links between the other groups, due to common inclusions (see Tables 6.9, and 6.10). This gave a total of ten fabrics,

MACROSCOPIC	MICROSCOPIC 1	2	3	4	5	6	7	8	9	10
1									X	
2										X
3	X	X	X							
4	X	X	X	X						
5								X		
6							X			
7						X				
8					X					
9		X	X							
10	X									
11	X									
12				X						
13		X								

Table 6.9: Showing the relationship between the macroscopic and microscopic fabric.

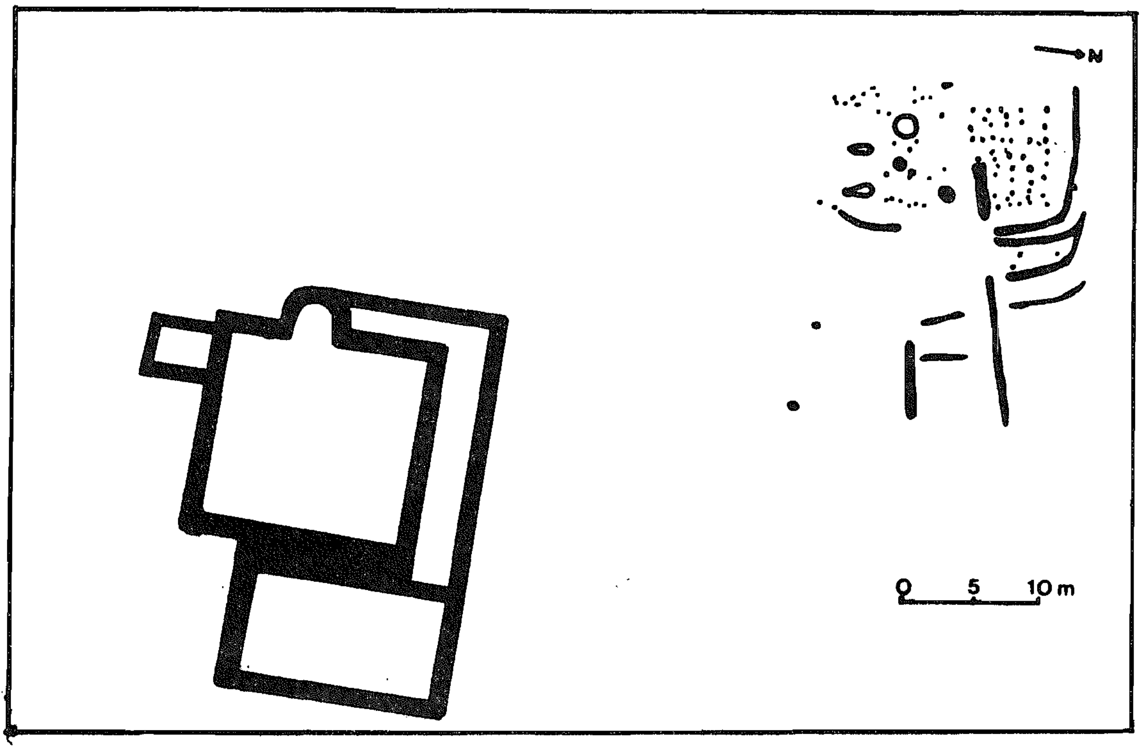


Fig. 6.9: Showing site plan of Stonea Grange with Roman and Saxon buildings.

MICRO FABRIC	MACRO FABRIC	SAMPLE	IG ROCK	GROG	S'STONE	FLINT	CHK.	OOLITE	SHELL	IRON
1	4	11			X		X	X		
	4	12	X				X	X		
	4	19	X				X	X		
	3	21	X				X	X		
	11	23	X				X	X		
	11	24	X				X	X		
	11	25						X		
	10	28	X							
2	9	8			X		X			
	4	10	X			X	X			
	3	15			X					
	3	20	X				X			X
	13	27			X			X		
3	3	5			X					
	3	7			X			X		
	4	9			X					
	9	17			X				X	
4	4	6	X					X		X
	12	26						X		X
5	8	3							X	X
6	7	2							X	X
7	6	18		X						X
8	5	13			X					
9	1	14						X		X
10	2	4			X					X

Table 6.10: Showing the presence/absence of inclusions in the Stonea pottery.

Fabric 1

A clay matrix with a well-sorted, fine quartz component, and a coarser quartz component of sub-angular to rounded grains. Inclusions of well-rounded chalk, oolites, and fragments of oolitic limestone and large scattered fragments of igneous rock.

Fabric 2

A silty clay matrix with an unsorted fine quartz component. The coarser component consists of unsorted sub-angular quartz grains, derived from a quartz sandstone with ferruginous cement. Inclusions of iron-rich clay pellets, and igneous rock fragments. Chalk and oolitic limestone inclusions are present but quantities vary from sample to sample.

Fabric 3

A clay matrix with an abundant, unsorted fine quartz component, and a coarse component derived from a quartz sandstone with a calcareous cement. Occasional inclusions of rounded chalk and shell are also present.

Fabric 4

A silty clay matrix with very few quartz grains. A coarser component is present of scattered sub-rounded grains. The fabric is distinguished by the presence of abundant particles of oolitic limestone. These appear either as single ools, fragments thereof, or fragments of limestone with oolites held in a calcareous matrix. Two separate fabrics may be involved here, as sample 26 contains fragments of fossil shell, whereas sample 6 has fragments of granitic rock present, in addition to the oolite material. A sample of two slides is too small to judge the population variability; but the similarity of the matrix points to a similar source.

Fabric 5

An iron-rich clay matrix with an unsorted, sparse, fine quartz component. There is no coarse component, the only larger inclusions being abundant fragments of shelly limestone, present predominantly as shell fragments, but occasionally as shell fragments cemented with a calcareous matrix.

Fabric 6

An iron-rich clay matrix with a well-sorted, abundant, coarse component of quartz. There are occasional larger quartz grains, usually rounded. This fabric is marked by the presence of shell fragments, less abundant than in fabric 5 but still of fossil origin. Some fragments have an iron-rich calcareous matrix adhering to them. This points to a source in the Lias ironstones of Northamptonshire, Lincolnshire, or Yorkshire, although the material was probably deposited locally by glacial action.

Fabric 7

A silty clay matrix with a sparse, unsorted, quartz component. The fabric is marked by the presence of grog particles, which are sparse and up to 2mm in diameter. The grog is the same fabric as the clay body, and appears to be crushed pottery rather than clay pellets.

Fabric 8

A fine silty clay matrix, almost quartz-free with large grains of quartz up to 2mm in diameter. Many of the larger grains are composite fragments of rock composed of up to 20 smaller grains. The finer grained rock is probably the source for the scattered smaller quartz grains that are present in this fabric.

Fabric 9

A fine silty clay matrix, with a sparse, well-sorted, fine quartz component and an abundant, rounded, coarse component, with iron compounds present in the same size range.

Fabric 10

This fabric consists of a sandy clay matrix, with an unsorted scattered fine quartz component. The coarse component consists of quartz grains of a sub-rounded form, derived from a calcareous sandstone. Particles of iron are present, but they appear mostly to be filling microscopic cracks in the matrix caused by stress during firing, so they are probably iron salts deposited from ground water during the time spent by the sherd below ground.

The Late Iron Age/Early Roman fabrics

None of the possible pre-Roman ceramics had fabrics that were identical to those above, although they would all appear to be local clays of glacial origin.

Local clay deposits

Four samples of the clay sub-soil were taken by the writer during the excavation of the site.(sample numbers refer to Chapter 4 clay sampling programme).

1. Natural clay context 599, sample 34.
2. Natural clay with higher chalk content, sample 43.
3. Grey clay context AEQ553, sample 37.
4. Natural clay 599, sample 46.

The last two samples contain calcareous material similar to the pottery sectioned; that is, rounded chalk, shell fragments, and calcareous sandstone fragments. None of the samples, however, contain oolite or fragments of shelly limestone, and they all contain higher proportions of quartz to matrix than any of the pottery. The clay for potting therefore was not gathered from the immediate vicinity.

Similarities

There are no similarities to fabrics from other sites in the study area.

Conclusions

Of the calcareous clays - fabrics 1, 2, 3, 4, 5, 6, and 9 - fabrics 1, 2, and 3 have the greatest similarity and are difficult to differentiate macroscopically. They are probably, therefore, different facies of the same clay deposit derived from one locality. The less sandy fabric 4 is perhaps a reworking of this clay or else another facies deposited in slower moving water.

Fabrics 5 and 6 contain abundant shell fragments, so a source in the St Neots area might be possible. Comparison in thin-section with Late Roman shell-tempered fabrics from East Anglia, and Medieval St Neots-type ware from the Cambridge region, show that of the two fabrics only fabric 5 contains shell fragments of similar nature and abundance. Only five body sherds of this fabric were present in the assemblage, and it is possible that these are in fact body sherds of the Roman shell-tempered wares included in the 'Saxon' assemblage by accident, their abraded condition concealing their true identity as wheel-thrown vessels.

Little can be said about fabrics 7 to 10, because of their lack of diagnostic features and the low sample size.

Out of a total of 131 sherds examined, it is probable that 116 belong to fabrics 1 to 4, including three of the four stamped vessels. This is another indication of the similarity of these fabrics.

The presence of possible pre-Roman material makes it difficult to draw concrete conclusions until a larger assemblage is available, preferably from well-stratified deposits. But the presence of a variety of fabrics and the lack of fabric links to other sites examined, points to a low level of complexity of pottery production, and reflects the isolated nature of the site. Analysis of pottery of similar date to the west of the site may prove more fruitful in the search for trading patterns.

Chapter 7

The Settlement and Cemetery Ceramics of Early Saxon Norfolk

This chapter details the known finds of Early Saxon domestic pottery in Norfolk. It also includes the analysis of four groups of cremation cemetery material. The sites are dealt with in alphabetical order with the settlements first, followed by the cemeteries. (This format follows that of the preceding chapter on Cambridgeshire.)

The sites are as follows:

1.	Beachamwell	TF 757049
2.	Brandon	TF 780866
3.	Caldecote	TF 745034
4.	Foulden	TM 781994
5.	Gayton Thorpe	TF 735180
6.	Heacham	TF 683381
7.	Hemsby	TG 494171
8.	Hillborough	TL 825990
9.	Merton	TL 907970
10.	Narborough	TF 748117
11.	North Barsham	TF 919351
12.	North Watton	TF 918007
13.	Postwick	TG 294068
14.	Snettisham	TF 692332
15.	Thetford Redcastle	TL 860830
16.	Witton	TG 336320
17.	Mundesley	TG 318362
18.	Hunstanton	TF 696411
19.	Tottenhill	TF 635108
20.	Wolterton	TG 147323

See Fig. 7.1

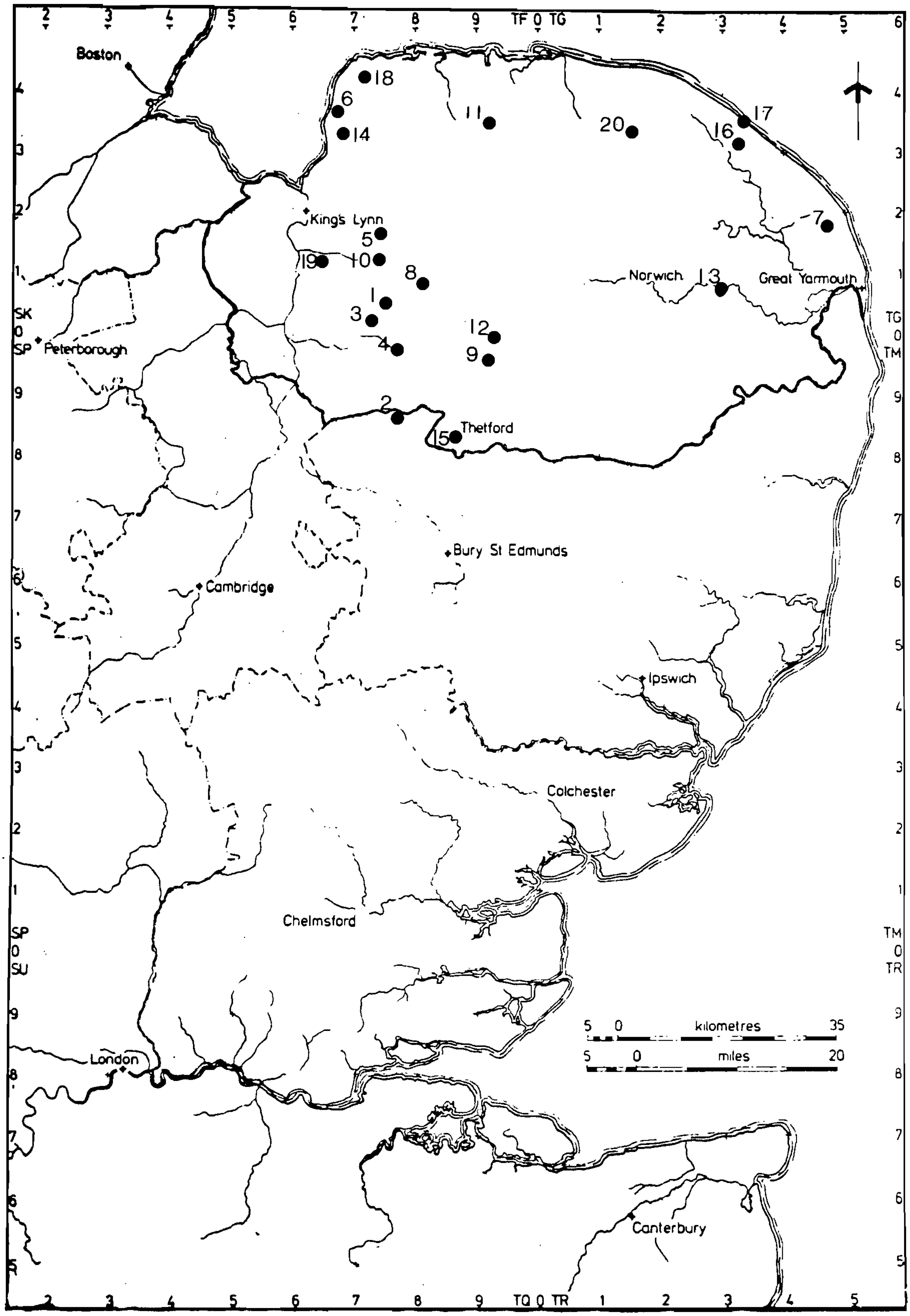


Fig. 7.1: Showing the Early Saxon settlement and cemetery sites of Norfolk, discussed in this chapter.

Beachamwell

There are two separate sites in Beachamwell parish. In 1915, a group of skeletons was found in Decoy Piece (TF 75750495), and two sherds were found in association. Another sherd was found at Furze Hill, 2.25km to the southwest, in 1948 (Norwich Museum Acc. Nos 73, 15; 103,948). (See Fig. 7.2)

The two Decoy Piece sherds are both feature sherds, one a rim and the other decorated, and it is likely that other sherds were found and discarded. The single Furze Hill sherd is an undecorated body sherd and undatable as such; but the fact that the three sherds are of the same fabric suggests that they are all of the same date.

Macroscopic analysis

All three sherds appeared to be of the same sandy fabric. Samples were taken from both the Decoy Piece rims and the Furze Hill sherd.

Microscopic analysis

Fabric 1

The fabric is composed of a fine clay matrix, with scattered sub-angular to rounded quartz grains. The quartz component is bimodal, with a fine and a coarse group. The coarser sub-group is the residue of a weathered micaceous quartz sandstone, for some of the large quartz inclusions are polycrystalline with silica cement binding the grains together. The size, and occasionally the shape, of the single grains are mirrored in the polycrystalline clusters. This indicates that these single grains are not the result of the crushing of larger crystals by human means, or by relatively recent natural agencies, but are probably the remnants of a pre-Pleistocene sandstone. The quartz grains in the Furze Hill sherd are more rounded, perhaps because they came from a deposit farther down-stream and had therefore been subjected to more erosion. But they could equally well represent the different types of grain that formed the parent material before englaciation. The Furze Hill sherd also contains vegetable matter, but the low density of this material points to it being an accidental inclusion. Both sherds also contain naturally occurring iron-rich clay pellets.

Pottery characteristics

Both the Decoy Piece sherds are smoothed outside and natural inside, which suggests that they belong to the same tradition of manufacture. The body sherd is decorated with zones of stamps between narrow grooves. The rim sherd is an undiagnostic upright form. The Furze Hill sherd is highly burnished outside and smoothed inside.

Similarities

This fabric is unique to the Beachamwell area. There are no similarities to the local clays sampled, both of which were chalk-rich glacial clays.

Conclusions

The discovery of sherds from the same clay source 2km apart suggests trade, but could be explained by two communities exploiting the same clay source. There is also the possibility that the Decoy Piece site is the cemetery for the settlement at Furze Hill and the sherds are from broken cremation vessels.

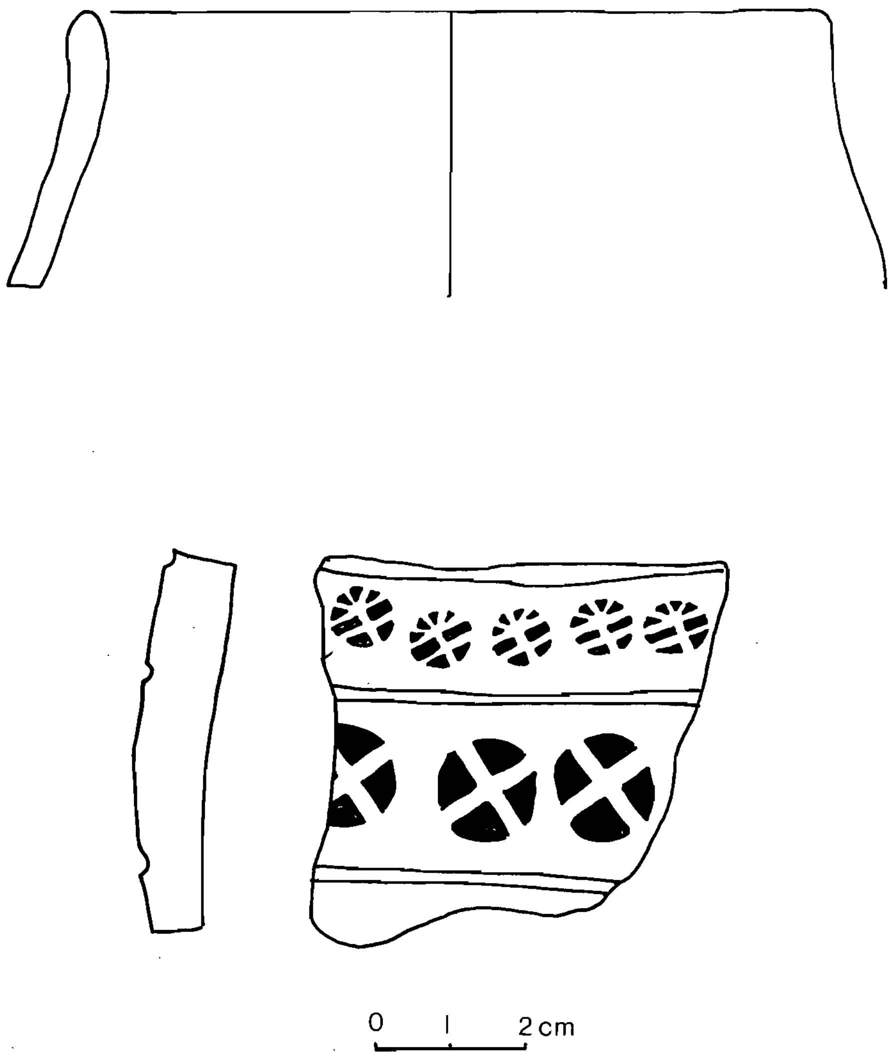


Fig. 7.2: The Decoy Piece, Beachamwell pottery.

Brandon

Agricultural activity at Brandon revealed a large number of human and animal skeletons in the 19th century. Excavations were carried out in the 1950s, when at least six areas of unknown size were opened up. Excavations in the last five years have produced evidence of a Middle to Late Saxon settlement of high status (Carr 1983).

The finds (Norwich Museum Acc. No 6.32.958) were examined and found to consist of mostly Middle to Late Saxon Ipswich-type and Thetford-type wares, with a few sherds of Roman pottery. Five sherds were present (four body and one base) which were handmade and more likely to be Early Saxon. These sherds were sampled for thin-section analysis.

Macroscopic analysis

Macroscopically four fabrics were identified, with two sherds present in the chalky fabric. The fabrics were as follows:

1. Vesicular
2. Chalky
3. Fine sandy
4. Coarse sandy

Microscopic analysis

The microscopic analysis bore out the macroscopic fabric divisions (Table 7.1 presents the presence/absence of inclusions).

Fabric 1

A silty clay matrix with moderately sorted, small to medium sized, sub-rounded quartz grains, derived from a quartz sandstone. Inclusions of chalk, grog and oolitic material were present.

Fabric 2

A silty clay matrix with fine quartz grains. Occasional larger rounded grains. Abundant voids, with occasional traces of calcareous material. Scattered grog/clay pellets.

Fabric 3

A fine silty clay matrix with abundant, unsorted sub-rounded quartz grains, probably derived from a highly calcareous sandstone, one fragment of which is present.

Fabric 4

A sandy clay matrix with abundant angular quartz grains. A secondary coarse component consists of grains and fragments of highly micaceous sandstone, probably crushed and added as temper.

Pottery characteristics

The sample is too small to draw more than general conclusions, but it does seem that the calcareous vessels in fabrics 1 and 2 are less well finished than the sandy fabrics. (see Table 7.2)

Similarities

There are no fabric matches with sherds from other sites in the region. No clay sources could be found in the immediate vicinity, because Breckland sandy drift covers the glacial deposits.

Conclusions

The fabrics at Brandon are unique to the site, and the fact that five sherds resulted in four quite different fabrics shows that pottery production at the site was not standardised. The different fabrics may relate to different functions as the degree of finishing varies between the two clay types, calcareous and non-calcareous. Non-calcareous clays appear to be more likely to carry decoration in East Anglia and sherds 4 and 5 may have come from decorated vessels, as shown by the greater degree of surface treatment (Table 7.2).

FABRIC	SAMPLE NO.	IG ROCK	GROG	VEG.	S'STONE	FLINT	CHK.	L'STONE	SHELL	IRON
1	1		X		X		X	X		X
2	2		X				X		X	
	3		X				X			
3	4				X					
4	5				X					

Table 7.1: The presence/absence of inclusions in the Brandon pottery.

		OUTER SURFACE		INNER SURFACE	
FABRIC	SAMPLE	COLOUR	FINISH	COLOUR	FINISH
1	1	Orange	Natural	Orange	Natural
2	2	Grey	Natural	Grey	Natural
3	3	Buff	Smooth	Black	Smooth
3	4	Black	Burnish4d	Grey	Smooth
4	5	Buff	Smooth	Buff	Smooth

Table 7.2: The pottery characteristics of the Brandon pottery.

Caldecote

This parish no longer exists, and has been amalgamated with Oxborough.

In the mid-19th century, brooches and an iron knife were found in Oxborough at an unknown site. In 1960, a scatter of pottery was found to the southwest of Caldecote Farm on the site of a deserted Medieval village. Most of these sherds (Norwich Castle Museum Acc. No 411.960) appear to be of a later Saxon or Early Medieval date.

Macroscopic analysis

Three fabrics were recognised macroscopically:

1. Vegetable-tempered, 2 sherds.
2. Flint-tempered, 1 sherd.
3. Sandy, with occasional flint, 11 sherds.

A sample was taken of each for petrological analysis.

Microscopic analysis

All three samples were based on the same clay, with either flint or vegetable matter added as a temper.

Fabric 1

A silty clay matrix with abundant, unsorted, sub-rounded to rounded quartz grains, with either flint or vegetable matter in addition. The flint shows signs of having been calcined and crushed before its addition to the clay which points to its being a deliberate addition and not a naturally occurring part of the boulder clay.

Pottery characteristics

All the sherds are reduced with natural surfaces, except one, which is a neck sherd with shallow smoothed corrugated decoration. The vegetable tempered and flint tempered sherds show signs of coil building but not the sandy. The corrugated decoration on on one sandy sherd reinforces a Saxon date for some of this material (Fig. 7.3).

Similarities

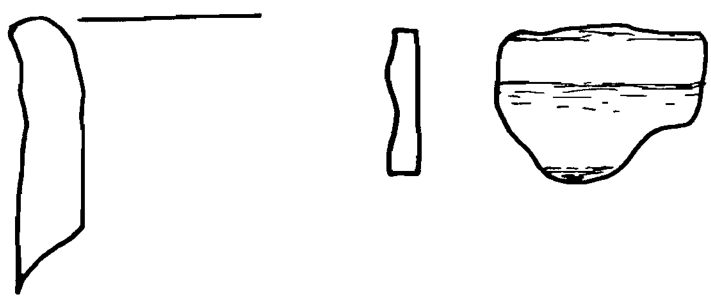
This fabric is found at Snettisham, where it is designated fabric 7.

There were no similarities found between the Caldecote fabrics and any other sites in the area or between Caldecote fabrics and local clay deposits that were sampled. The area is covered by calcareous rich tills and no clays suitable for pottery manufacture were noted.

Conclusions

All three macroscopic fabrics are base on the same clay, with either flint or vegetable matter added as temper. This suggests that the fabrics are contemporary. The differences in tempering methods may be related to the function of the different vessels.

It has been claimed that this pottery is of Iron Age date (Rahtz 1976), possibly because of the presence of flint temper. Although flint temper is more common in Iron Age pottery, it does occur as temper in Saxon pottery on other sites in the region, and the same fabric has been found at the Early Saxon site of Snettisham 32km to the north. The presence of the same fabric on two sites 32km apart is unusual in East Anglia. A river and sea journey between the two would have been comparatively easy though and any vessels would thus only need to be transported 6km overland between the two sites.



Sample 3 **Sample 1**

Fig. 7.3: Showing the Caldecote pottery sherds.

Foulden

At least 18 Saxon inhumations were found between 1958 and 1962 in a gravel pit at Foulden (Meaney 1964). Because of the lack of grave goods in this cemetery, a possible date in the 7th century was suggested (Myres and Green 1973).

Two sherds of pottery were found in the pelvic region of one skeleton within the grave fill, not apparently in any position of ritual significance. It therefore seems likely that there was a settlement nearby and that the sherds are domestic in origin (Norwich Museum Acc. No. 250.962).

Macroscopic analysis

Both sherds appeared to be from one vessel in a fine sandy fabric. One sherd was sampled for petrological analysis.

Microscopic analysis

Fabric 1

A fine sandy clay matrix with an unsorted medium quartz component of sub-rounded to rounded grains. Sub-rounded large particles of flint and large rounded clay pellets were also present.

Pottery characteristics

One of these sherds belongs to a vessel with an upright rim, like that of a cooking pot, another indication of a domestic origin for this material. Funerary pottery is usually of the storage vessel shape, with a narrow opening and everted rim for keeping ashes or grave goods secure.

The outer and inner surfaces of both sherds are reduced and devoid of any surface finish.

Similarities

There are no similarities with the pottery examined from any other sites in the area. No similarities were found to any of the three local clay deposits sampled.

Conclusions

Although the small sample makes it difficult to reach meaningful conclusions, there is no evidence of this vessel having been traded from any other of the sites examined. Even though it does not match any of three samples of local clay, it was probably produced locally.

Gayton Thorpe

A single sherd of Early Saxon pottery was found in Gayton Thorpe in 1946 (Norwich Museum Acc. No. 79.946), close to the site of the Gayton Thorpe Roman villa.

Macroscopic analysis

Macroscopically the sherd appeared to be of a fine sandy fabric.

Microscopic analysis

Fabric 1

A silty clay matrix with sparse fine quartz grains. The moderately sorted coarse component is derived from a sandstone.

Pottery characteristics

A neck sherd with two decorative grooves. The sherd was reduced, burnished on the outer surface, and smoothed inside.

Similarities

There are no similarities with pottery from other Early Saxon fabrics looked at in the region, nor with any of the samples of chalky boulder clay obtained locally.

Conclusions

There is only one Early Saxon site, Narborough, within 10km of Gayton Thorpe, which perhaps explains why no fabric links were found. The find spot is close to a Roman villa and this may be another instance of Saxon occupation of such a site, an apparently common phenomenon in East Anglia.

Heacham

In 1956, Saxon sherds and a bead were found at Church Nursery, TF 683381. Only one sherd remains in Norwich Museum (Acc. No. 14.956), which was sampled.

In 1961 the field north of and adjoining the Broadway Road, at TF 683374, was developed for housing and Saxon pottery was discovered when the foundation trenches were excavated. The pottery came from three vessels (see Fig. 7.4).

Macroscopic analysis

All sherds were considered to be a coarse sandy fabric. Vegetable matter was present in vessel 3 from the Broadway Field site.

Microscopic analysis

Three fabrics were present, (see Table 7.3).

Broadway Field sherds:

Fabric 1

An iron-rich clay matrix with fine well-sorted quartz grains. A coarse component of unsorted sub-rounded to angular quartz grains. Some of the larger grains are composite.

Fabric 2

A clay matrix with unsorted quartz sand. The largest grains are rounded with iron-stained cracks. Some organic material is present.

Church Nursery sherd:

Fabric 3

A fine clay matrix with scattered small quartz grains, and a coarse component similar to vessel 1.

Pottery characteristics

The Broadway Field pottery represents three vessels, all of a similar form, a flat base and a short upright rim above a globular body. All the vessels are well made and well fired, with smoothed inner surfaces and smoothed or burnished outer surfaces. The vessels are very uniform although coil-made, and a turntable may have been used to trim the vessels during manufacture. This probably points to a date late in the Early Saxon period, possibly in the first half of the 7th century, although there is considerable argument about dating the introduction of the turntable (Hurst 1976).

The Church Nursery sherd comes from a well-reduced lugged pot and has natural surfaces.

Similarities

No suitable clay could be found in the immediate vicinity, the soil being very sandy to a depth of at least 1 metre. At TF 684375, samples were taken of river deposits and at TF 684378 at a depth of 2 metres, but only chalky alluvium was located, totally unsuitable for pottery manufacture. The iron-rich fabric has similarities to Snettisham fabric 1 which also appears in the cemetery at Hunstanton. The other fabrics are unique to the site.

Conclusions

The small number of vessels makes it difficult to draw any conclusions about vessel form and function; but the fabrics show links with other sites in the area, particularly with Snettisham. The iron-rich clays of fabric 1 are not found north of Snettisham, so the Heacham potters either collected clay from a distance of 4km to 5km to the south, or the vessels were imported to the site. The high degree of technical competence, as shown by the use of a turntable to finish the vessels, would point to a semi-specialist; and this would be an argument in favour of a workshop in Snettisham, as it is unlikely that semi-specialists would choose to use a clay source 5km from their base, when suitable clays were probably available within a closer range.

FABRIC	SAMPLE NO	IG ROCK	GROG	VEG.	S'STONE	FLINT	CHK.	L'STONE	SHELL	IRON
1	1				X					
2	2									X
	3			X						X
3	4				X					

Table 7.3: showing the presence/absence of inclusions.

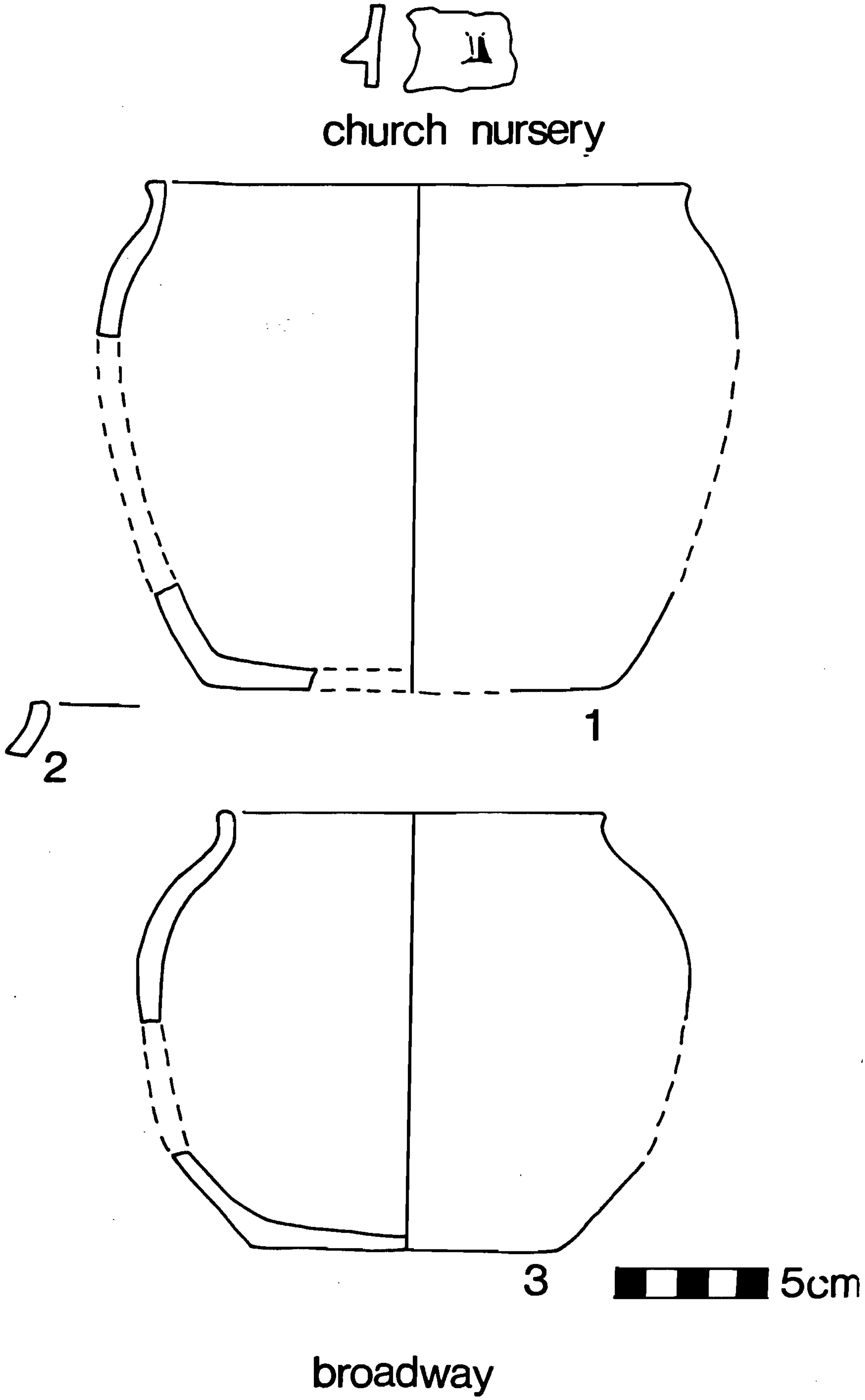


Fig. 7.4: showing the Heacham pottery with their sample numbers.

Hemsby

Twelve loomweights of Saxon type were found in the garden of the Cables Guest House in 1960. In 1963, a trial hole was excavated on the spot, and two Saxon sherds and a Mayen lava quern were recovered (Medieval Archaeology 1964 : Norwich Museum Acc. No 211.963).

Macroscopic analysis

One sherd was macroscopically of a coarse sandy fabric, with red and white grits. The other was of a fine sandy fabric tempered with vegetable matter.

Microscopic analysis

The macroscopic analysis was confirmed by microscopic analysis.

Fabric 1

A coarse sandy clay matrix, with an unsorted quartz component. The largest grains (1-3mm) were very rounded, as were the fragments of red flint present.

Fabric 2

A fine sandy clay matrix, with dense fine quartz grains. Occasional scattered larger grains are present. The voids left by the combustion of vegetable matter are up to 5mm long.

Pottery characteristics

All fabrics are well reduced and all surfaces had been smoothed, apart from the inner surface of the vegetable tempered vessel.

Similarities

There are no matrix similarities with local clay sources, but the larger grains in the coarse sandy fabric are similar in nature, although larger, to those in the clay samples. It is possible that the larger rounded grains are derived from the coastal dunes, at present 1.4km to the northeast, as the high degree of rounding points to an aeolian abrasion process. Fabric 2 has some close similarities with Witton fabric 1.

Conclusions

The two sherds from Hemsby can tell us little about the ceramics in use at the site, but trade with Witton does seem a possibility, as fabric 2 is very similar to the most common Witton fabric 1. The use of dune sand as tempering is common to both sites, being found also in Witton fabric 8. The fact that Hemsby is separated from Witton by the marshy areas of the Ant and Thurne rivers, and a distance of 23km need not preclude pottery exchange, as both sites are within 2.5km of the coast.

Hillborough

In 1957 a sherd of Early Saxon pottery was found in Hillborough on the site of the deserted medieval village, (Norwich Museum Acc. No 114.957).

Macroscopic analysis

Macroscopically the sherd was of a fine sandy fabric.

Microscopic analysis

Fabric 1

A clay matrix with an unsorted fine quartz component, with some grains derived from a coarser, quartz-rich sandstone.

Pottery characteristics

The single rim sherd is smoothed on the inside and outside, and is uniformly reduced black. The form is probably an inturned rim from a large bag-or bowl-shaped vessel.

Similarities

There are no similarities with pottery from any other Saxon sites in the region and none with local clay deposits.

Conclusions

The single rim sherd from Hillborough is too small a sample to draw conclusions from, although the fact that the potters did not choose to use the clay on which the site is situated is perhaps a pointer to a more distant source.

Merton

A single sherd of probable Saxon pottery was recovered in 1954 from a gravel pit on Sparrow Hill, on the Merton side of the parish boundary with Thompson (Norwich Museum Acc. No 212.954).

Macroscopic analysis

The sherd was made in a sandy fabric.

Microscopic analysis

Fabric 1

A clay matrix with a dense, unsorted, sub-rounded quartz component, tempered with vegetable matter. Some of the grains are composite, pointing to derivation from a sandstone, probably crushed by glacial action.

Pottery characteristics

The sherd is reduced, burnished on the outer surface and smoothed on the inner surface.

Similarities

There are no similarities to other Saxon fabrics from the region, but the fabric is very similar to the clay found at TL 906988, at a depth of 40cm in the centre of the present-day settlement.

Conclusions

This fabric appears to be a product of the local drift deposit and there is no evidence for it being exchanged with other sites.

Narborough

In 1955, when bungalows were being constructed in Roman Field, Narborough, two sherds of Saxon pottery were discovered and given to Norwich Museum (Acc No 126.955).

Macroscopic analysis

Both sherds appeared to be of a fine sandy fabric, and from the same vessel.

Microscopic analysis

A fine silty clay matrix with an unsorted, sub-rounded to rounded, medium-sized quartz component. The thin section exhibits an S-shaped area of quartz free matrix. This appearance could be due to clay and sand having been insufficiently mixed, or the section may perhaps show a coil join; the S-shaped curve of the fine clay could be slip applied to help lute on the next coil.

Pottery characteristics

These sherds are probably from the same vessel. The sherds consist of a neck sherd and a body sherd, the neck being decorated with two broad grooves. The outer surface of the vessel is burnished, the inner surface smoothed, the whole being reduced to a black colour.

Similarities

There are no similarities with pottery from other sites in the region, but the fabric was very similar to the clay samples taken downstream from the find spot at TF 743127. The clay is a fine chalky boulder clay and was sampled at a depth of 80cm.

Conclusions

The pottery found at Narborough was probably made from a local clay, such as that found at TF 743127, with the addition of quartz sand temper.

North Barsham

In 1965, sewerage work was carried out on two cottages near the now-demolished railway bridge over the North Barsham - Walsingham road. Eleven sherds of Early Saxon pottery were found (Norwich Museum Acc No 574.965), but there were no bones or other finds which would suggest a cemetery.

Macroscopic analysis

Macroscopically the sherds were divided into two groups:

1. A shelly fabric
2. A coarse sandy fabric

Seven body sherds and two rim sherds are present in the shelly fabric, constituting 60% of the circumference of a vessel at the shoulder. One body sherd and one rim sherd are present in the coarse sandy fabric.

Microscopic analysis

Microscopically the pottery fell into the same fabric groups.

Fabric 1

A fine clay matrix, with an unsorted quartz component. Most of the quartz grains are fine and sub-rounded. The larger grains are well rounded, some are still cemented together with a ferruginous compound, and many show iron staining in the intercrystalline fractures of individual grains. These larger grains are probably derived from an iron-rich sandstone. The shell component comprises abundant laminae of fossil-shell fragments of a similar size range to that of the quartz component. The smaller fragments are rounded, while many of the larger have angular ends. It is most unlikely that the shell had been added as temper, personal experience having shown that it is very difficult to reduce the shell to the size of the smallest particles present. So the shell is probably derived from the Kimmeridge clays of the Fenland region, and the angular fractures on the larger particles are probably the result of manipulating the clay during manufacture. A small amount of vegetable matter is also present.

Fabric 2

A clay matrix, with a dense scattering of unsorted quartz grains, the majority sub-rounded. The macroscopic 'coarse sandy' description was given because fragments of granitic sandstone up to 2.5mm in length were present. The larger rounded quartz grains were probably also derived from the same material. The disaggregated state of the rock particles and the brownness of the micas point to a considerable degree of weathering, and it is unlikely that these fragments are crushed rock added for tempering purposes. Small fragments of quartz-rich ironstone are present, but these are of a totally different character to those of fabric 1, and none of the larger quartz grains shows any degree of iron staining.

Pottery characteristics

The inner surface of the fabric 1 vessel is dark buff, the outer being red to buff. Both surfaces are smoothed, but the lower part of the inner surface was no longer present, and it is possible that smoothing was confined to the rim portion only.

The coarse sandy vessel had a smoothed external surface, buff with black patches on the body, black at the rim. Internally it was a dark buff, with no evidence of surface treatment.

Both vessels showed signs of having been constructed by the coil method. (see fig 7.6).

Similarities

There were no similarities with the nearest local clay source, a sandy drift clay on the hill 200m to the northwest, except in the iron staining of the quartz grains.

There were no similarities with fabrics from other sites in the area.

Conclusions

The presence of two vessels of cooking pot form, and the absence of cremated bone fragments, points to a domestic site, but as the nearest known site with which exchange could occur is 23km to the east at Hemsby, it is not surprising that no fabric matches were found.

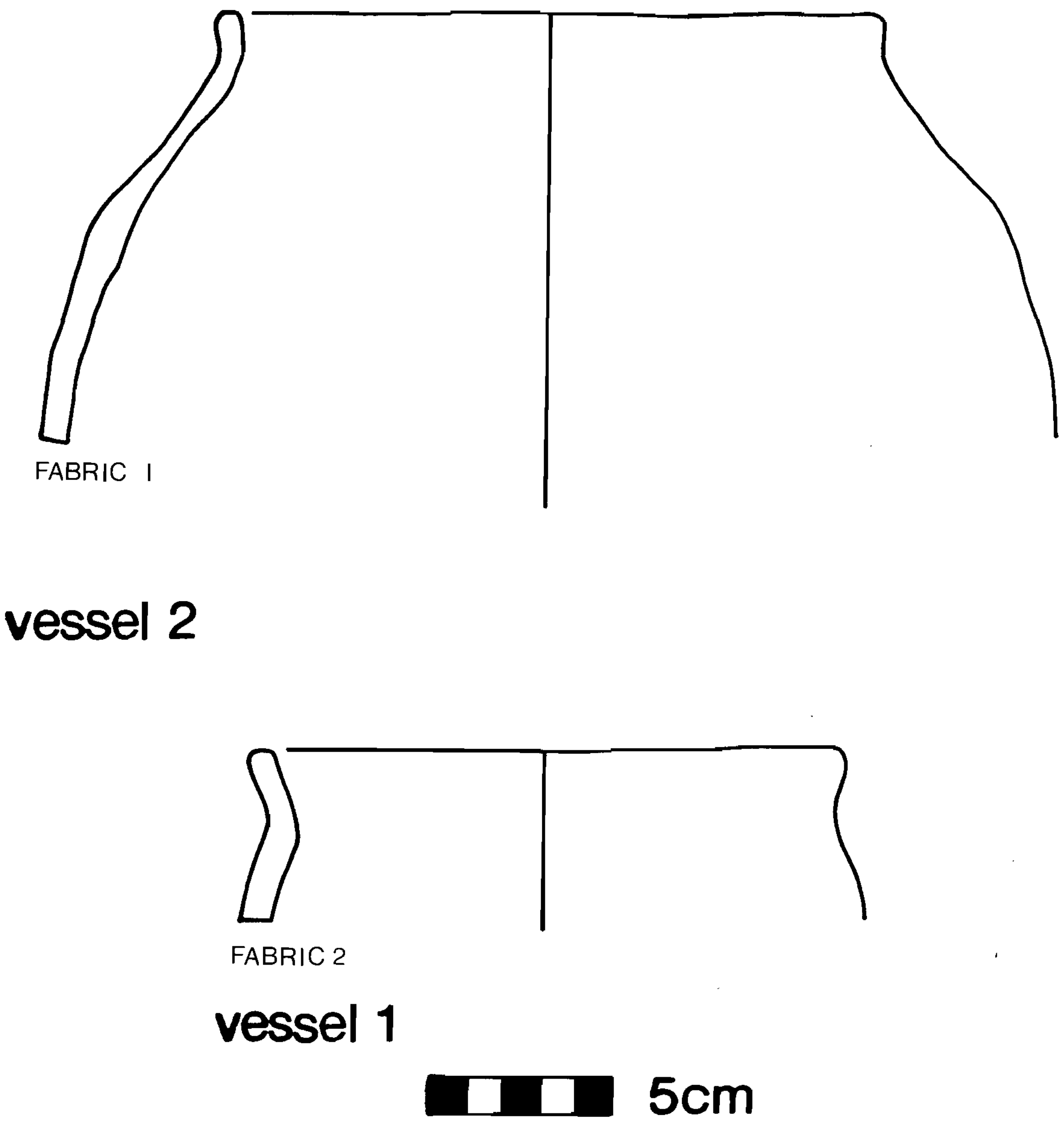


Fig. 7.6: Showing the North Barsham pottery.

North Watton

In 1952, an inhumation burial was discovered outside number 35 Norwich Road, North Watton, during the construction of a sewer. In the grave was a single pot sherd from a large decorated vessel (Norwich Museum Acc. No. 143.952). This may be from a disturbed cremation cemetery; but no other signs of a cemetery have been discovered, and it is here argued that this sherd is domestic rubbish, accidentally included in the grave fill.

Macroscopic analysis

The sherd was macroscopically of a coarse sandy fabric.

Microscopic analysis

Fabric 1

An iron-rich sandy clay matrix with a scattered, unsorted quartz component. A few scattered grains of granitically derived material are present, notably muscovite mica (1mm in length) and large quartz grains (1.5mm maximum diameter). These are unlikely to be deliberately added as temper, because of their scarcity and degree of erosion.

Pottery characteristics

The vessel is black and smoothed on the exterior, buff and lacking in surface treatment on the interior.

The exterior is decorated with at least two neck grooves, a line of flattened 'S' stamps, followed by a zone of 4-line chevrons enclosed by a groove at top and bottom. Below this is a line of triangular cross-hatched stamps above two more grooves, the whole design being symmetrical about the centre chevron zone (see Fig. 7.7).

Similarities

There are no similarities either with pottery from other East Anglian sites or with local clay samples.

Conclusions

The vessel is possibly a cremation vessel and, as it does not match local clays, it may have been imported as such. However, the stamps have not been recorded from any published cemeteries in the region and the vessel must be assumed to be locally produced.

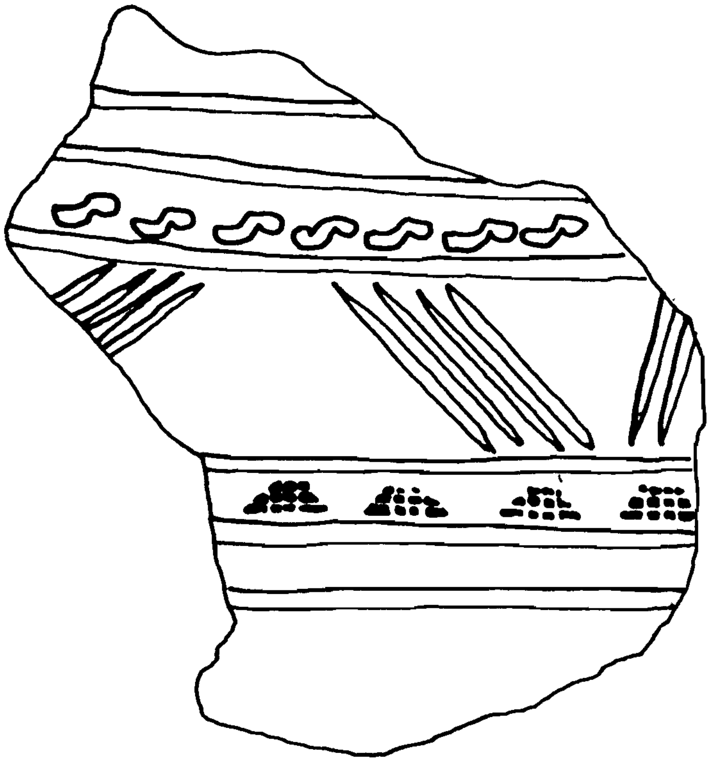


Fig. 7.7: showing the North Watton pottery sherd.

Postwick

The hut site at Postwick was discovered in April 1935, and excavated in the following July by Rainbird Clarke (Clarke 1938). The hut was noticed in the exposed face of a small gravel quarry on the edge of the terrace, immediately above the flood plain of the river Yare. The site was excavated in three spits each six inches (15cm) in depth. The top two spits were disturbed by ploughing activity, but beneath them there was a floor of rough cobblestones, which lay above another six to nine inches (15-20cm) of soil. The cobble floor had been disturbed by a single post. The building measured 13ft (4m) from east to west, and 6ft (2m) from north to south; but because of quarry damage this is probably a minimum measurement.

The cobble floor was taken to be the floor of a second hut rebuilt after the destruction by fire of the first, as evidenced by lumps of burnt daub and charcoal. When Clarke examined the pottery from both layers, he decided that the coarse handmade nature of the sherds and the presence of Roman pottery from the 1st to 4th centuries in the upper fills identified the dwelling as late Iron Age. He dated the destruction of hut 1 to the mid-1st century AD, possibly by Roman troops. Later, to his credit, he realised that the site was Saxon (Clarke 1957).

When examined in 1981, 143 sherds were present of a Saxon date (Norwich Museum Acc. No. 83.936). Clarke (1938) recorded 161 non-Roman sherds, so there is an inexplicable shortfall of 18 sherds. However, all the illustrated rims are still present.

Macroscopic analysis

The pottery was divided macroscopically into four fabrics:

Fabric		No of vessels
1.	Coarse sandy	19
2.	Sandy	10
3.	Vegetable tempered	1
4.	Calcareous	1

Four samples were taken from the coarse sandy group, three from the sandy group, and one each from the vegetable-tempered and calcareous groups.

Petersen estimate

Fourteen rims were present and eight bases. Four of the sherd groups contained both a rim and a base. The Petersen estimate for the population would therefore be 23 as opposed to the author's 31 groups. This suggests that some of the less diagnostic bases and body sherds belong together and are not from separate vessels. But, when only four pairs are present, the estimate will have a high standard deviation which would allow for the 31 groups.

Microscopic analysis

The nine samples were found to be four fabrics as the macroscopic analysis had indicated. However, all the coarse sandy and sandy samples belonged to one fabric, (fabric 1), apart from one sandy sample which was in fabric 2 and was related to the vegetable-tempered fabric (fabric 3). The calcareous fabric (fabric 4) was very different from the others.

Fabric 1

An iron-rich clay with a fine sandy matrix. The iron is often present as abundant fragments of carstone, consisting of rounded unsorted quartz grains in an iron-rich matrix. The quartz grains in the clay matrix are similar in size and shape, and the clay is therefore probably derived from a glacial till which contained the carstone, brought from west Norfolk. Most samples had larger rounded grains of quartz present, some of which appear to have been derived from a granitic sandstone with a siliceous cement. Two of the samples contain granitic sandstone, and two others contain grog, possibly alternative methods of tempering.

Fabric 2

A fine sandy clay matrix with scattered larger grains, single and composite, of a fine-grained quartz sandstone.

Fabric 3

A fine sandy clay matrix with quartz sandstone inclusions. This may be related to fabric 2, but contains less quartz grains. The vegetable matter may have been added to compensate for the lack of natural temper.

Fabric 4

A silty clay matrix with scattered, large, rounded quartz grains. There are numerous elongated voids where shell fragments have leached out.

The presence/absence of inclusions is shown in Table 7.4

Pottery characteristics

As fabric 1 comprises at least 86% of the assemblage only general conclusions about the whole assemblage will be made. None of the vessels are burnished outside or inside. Of the 31 vessels, 38% were smoothed outside, whereas 58% were smoothed inside. All the vessels were handmade, four showing coil joins. In two cases these were seen in the basal sherds, perhaps because the clay had undergone less manipulation in the lower halves of the vessels.

Most of the rims are of a simple upright form that would denote a vessel where ready access was important. The small size of the sherds makes it impossible, in all cases but one, to determine the diameter of the vessel. Three everted rims are also present, again from vessels of unknown size. Two rims showed signs of sooting, both on the inside.

Two decorated sherds are present. One has the end of six grooves, probably from chevron decoration, while the other carries slight finger pinching (see Fig. 7.8).

Similarities

There was no similarity to the clay samples taken locally, both of which contained well-rounded quartz and large well-rounded flint particles.

There is a similarity between fabric 1 and the iron-rich fabric of the Spong Hill Urn 1502, fabric 6. The ironstones

FABRIC + SAMPLE NO.		IG ROCK	GROG	VEG.	S'STONE	FLINT	CHALK	SHELL	IRON
Fab. 1	3								X
	4	X				X			X
	5		X						X
	6	X							X
	7		X						X
	8								X
Fab. 2	2				X				
Fab. 3	1			X	X				
Fab. 4	9							X	

Table 7.4: showing the presence/absence of inclusions in the Postwick pottery.

possibly come from the same deposit, and both fabrics contain granitic grains. On the other hand, while the Spong Hill ironstone contains little quartz, the Postwick ironstone contains abundant quartz. The amount of quartz present in the clay matrix reflects this difference and suggests that the only similarity is that both clays had the same parent ice sheet.

Conclusions

The Postwick site appears to be in an isolated position on the edge of the marshes of the Yare river. This site may represent an outlying dwelling at some distance from the main settlement, however Early Saxon settlement sites are frequently situated on the flood plains of East Anglian valleys. Whether the settlement was large or not it appears to have been isolated as far as ceramic trade was concerned.

Eighty-five per cent of the assemblage is of one fabric, which suggests either a short period of occupation or a continuous exploitation of a single clay source.

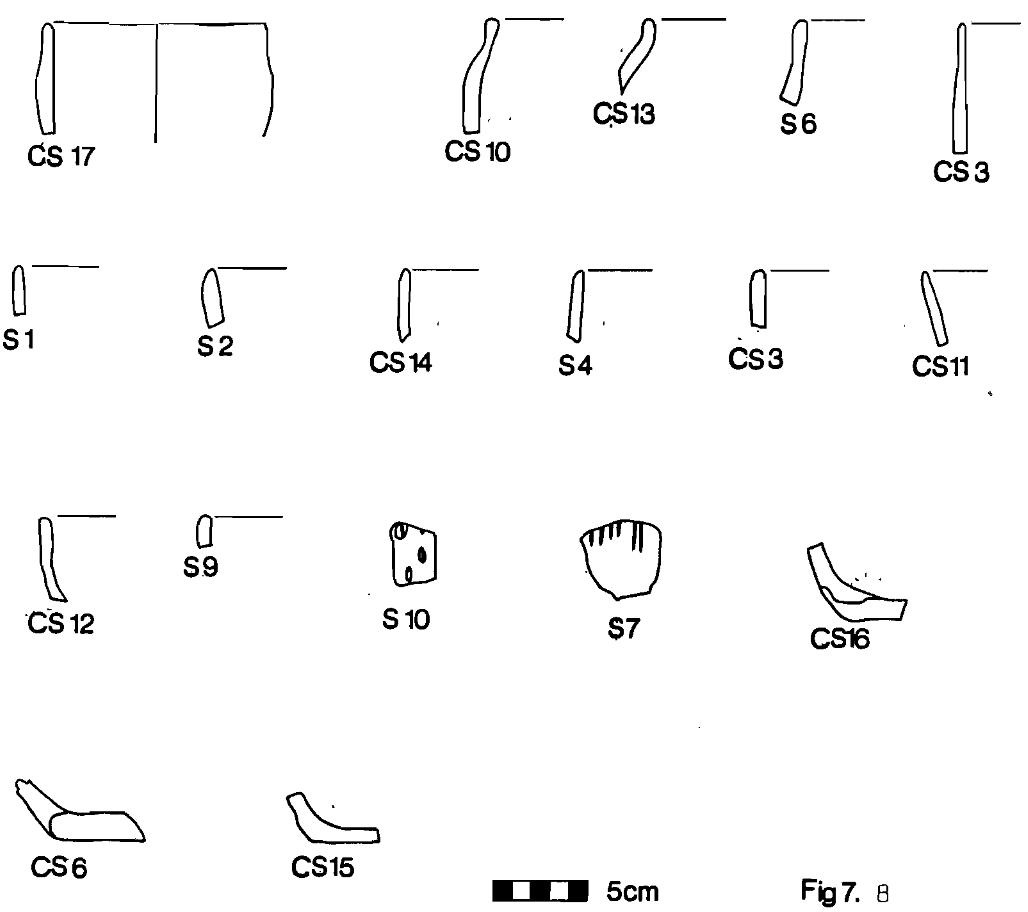


Fig 7. 8

Snettisham

Snettisham has produced two separate finds of Saxon material. The most recent was a pot containing a cremation discovered at TF 68243425 in 1961, (Myres 1977 CN 3389). The other site was a field near Park House Farm, where sherds were collected in 1950 and presented to Norwich Museum (Acc. No. 34.950). In 1951 six small areas were excavated to ascertain the nature of this site, but no records of the excavation exist, although the pottery from five of the areas survives in the Norwich Museum (Acc. No. 225.951). (See Fig. 7.9).

The pottery analysis was carried out with two objectives; to ascertain if the discoveries of 1950 and 1951 formed part of the same settlement; and to characterise the pottery and compare it with other sites in the region.

The pottery was therefore grouped solely by excavated area. The distance between the areas is now unknown, and vessel groups were therefore not extended across area boundaries, on the assumption that the areas would be farther apart than sherds of one pot could normally be expected to travel. If this assumption is incorrect, the minimum number of vessels would then be too high. In practice, the only fabrics common to all the areas were the sandy fabrics, which formed the majority of the assemblage. The other fabrics occurred in mutually exclusive areas. This evidence supports the assumption about the distances between the individual areas.

On examination, the 1951 pottery from areas B, D, E, F, and 'surface' was found to consist of small abraded sherds, mostly featureless, and these were discounted for the purposes of this study. Work was concentrated on areas A and C which provided 12 and 17 sherd groups respectively. The surface sherds of the 1950 discovery were also processed and divided into 36 sherd groups, thus giving a total of 65 vessels.

Macroscopic analysis

The sherd groups and macroscopic fabrics related to each other as shown in Table 7.5.

Fabric	Area A	Area C	1950 Area	Total Vessels
Sandy	11	10	18	39
Coarse sandy		1	5	6
Mica	1			1
Grog			1	1
Vegetable		3	5	8
Chalk/shell		3	7	10
Total sherds	50	32	70	

Table 7.5: Showing the relationship between the sherd groups and the macroscopic fabrics.

Petersen estimate

The rim/base/pairs counts for calculating the Petersen estimate were as follows:

Area	Rim	Base	Both	Petersen Index	Sherd groups
A	9	1	0	9	12
C	5	3	2	8	17
1950	17	8	4	34	36

Table 7.6: showing the rim and base counts for Areas A, C and 1950.

The figures for area A are suspect. Such a high proportion of rims to base sherds is unlikely to occur naturally, and the rim sherds were probably collected preferentially by the excavators. The figures for area C are too small for the index to be accurate, but the figure for the 1950 pottery agrees well with the sherd groups. Because some sherds from the 1950 group joined to vessels in areas A and C, the total of sherd groups was reduced to 63.

Sherds were selected from each fabric group in each context under study, as shown in Table 7.7.

Fabric	Area A	Area C	1950 Area	Total
Sandy	2	2	2	6
Coarse sandy		1	1	2
Mica	1			1
Grog			1	1
Vegetable		2	1	3
Chalk/shell		1	3	4
Total	3	6	8	17

Table 7.7: Showing sherds selected for thin-sectioning from each fabric group.

This produced 17 samples, taken from a population of 63 sherd groups; a sample of nearly 27%. The sampling strategy was biased against the sandy fabric, only 11% of which was sampled, and in favour of the other macroscopic groups. These were sampled as follows:

Sandy	15%
Coarse sandy	33%
Mica	100%
Grog	100%
Vegetable tempered	37%
Chalk/shell	40%

This bias for the latter fabrics was due partly to their small populations and partly to the great similarity between the sandy fabrics from each area.

A sample of loomweight from area A and one of daub from the 1950 material were also analysed as probable clues to the nearest clay deposits.

Microscopic analysis

The similarity between the sandy fabrics from each area was proven by microscopic examination, all six samples being of identical clay. The single grog-tempered vessel, the single mica vessel, and one of the vegetable-tempered vessels were also of this clay, with their own distinctive inclusions.

The two coarse sandy sherd groups from area C and the 1950 material were of an identical clay, possibly related to the sandy clay. The other samples were all of different fabrics. This gave a total of 10 fabrics. The presence/absence of inclusions is shown in Table 7.8.

Fabric 1

This clay is characterised by its fine silty matrix with very abundant round particles of iron, and a usually well-sorted quartz component consisting of medium-sized, rounded to sub-rounded grains, obviously derived from a quartz sandstone. In six of the samples, the crushing process had not completely disaggregated the grains.

The fabric designated as grog-tempered, belongs to the same group, tempered with particles of fired quartz-rich clay. This is not the same clay as fabric 1, nor any other pottery fabric sampled, but it does bear similarities to the sample of daub. One other sample contained daub, and a number contained clay pellets.

The micaceous sample contains abundant biotite mica crystals, of distinctive lamina shape, with larger sparse crystals of muscovite mica. The biotite is also present conjoined with quartz grains. The orientation of the mica crystals argues against a schist, and makes a gneiss or granitic sandstone the likely source. The general similarity of this fabric to the rest of the fabric 1 samples, in terms of grain size and distribution, argues against a gneiss or other rock having been crushed for use as a tempering agent, and for its occurrence as a natural component of the clay.

The vegetable-tempered sample is the same fabric with the addition of coarse fragments of organic material, the presence of which is indicated by large soot-filled voids up to 4mm long.

Fabric 2

The two coarse sandy samples are formed from a similar clay to fabric 1, and consists of a fine sandy iron-rich matrix, but with a coarser quartz component. The quartz grains are between

FABRIC + SAMPLE NO		IG ROCK	GROG	VEG.	S'STONE	FLINT	CHK.	L'STONE	SHELL	IRON
Fab. 1	3				X					X
	6		X		X	X				X
	8									X
	11		X		X					X
	14				X					X
	15	X				X				X
	16				X			X		X
	18							X		X
	19			X	X			X		X
Fab. 2	9				X					
	10			X	X					
Fab. 3	2			X			X	X		
Fab. 4	12		X					X		X
Fab. 5	7			X				X		
Fab. 6	17			X						
Fab. 7	1					X	X			
Fab. 8	13								X	X
Fab. 9	4									X
Fab. 10	5							X		X

Table 7.8: showing the presence/absence of inclusions in the Snettisham pottery.

0.5mm and 4.0mm in size, the larger being composite grains of a quartz sandstone bound with a siliceous cement.

Fabric 3

Probably related to fabric 1, but lacking the abundant rounded iron present in that clay. Fragments of unsorted rounded chalk and oolitic limestone up to 2mm in diameter are present, as are voids from vegetable tempering. The fact that oolitic limestone is present in two of the nine samples from fabric 1 strengthens the link between them.

Fabric 4

The iron-rich matrix of fabric 1, but lacking the sorted quartz component. A few fragments of rounded to sub-angular limestone are present.

Fabric 5

A clay matrix with a fine, moderately sorted, quartz component. There are abundant voids owing to the combustion of vegetable-tempering. Other voids present indicate leached-out calcareous inclusions probably of shelly limestone.

Fabric 6

A clay matrix containing a dense well-sorted fine quartz component, with occasional voids produced by vegetable temper. A very micaceous fabric.

Fabric 7

A silty clay matrix with abundant unsorted quartz grains, their degree of rounding increasing with size. This, plus the large sub-rounded flint fragments, suggests the chalky boulder clay as a source.

Fabric 8

A fine micaceous sandy clay matrix with occasional clay pellets of the same nature, and abundant fragments of fossil shell. This indicates a Jurassic source, either in the boulder clay or else in the southeast Midlands. This sample was compared with St Neots ware fabrics and the latter provenance seems more likely.

Fabric 9

The loomweight sampled was made from a micaceous clay with a silty matrix and a well-sorted quartz component. The density of quartz to matrix varies considerably across the section, indicating a badly mixed fabric, such as would arise from gathering the clay and forming it immediately into a loomweight.

Fabric 10

A sample of daub was taken for comparative purposes. This fabric consists of a micaceous sandy matrix, with abundant, unsorted, sub-angular to rounded grains of quartz. The presence of rounded flint particles points to a boulder clay source. Also present are larger (up to 2.25mm diameter), circular, and therefore probably spherical, voids partly filled by quartz grains similar in sizes to those in the clay fabric. These are probably voids left by dissolved oolitic material. In addition, there is a single fragment of fine quartz sandstone with a silica cement.

This is probably a local boulder clay, formed after passing over the iron-rich sands to the south of the site.

Pottery characteristics

It can safely be assumed that all the pottery macroscopically designated as sandy is of fabric 1, while all that designated coarse sandy is of fabric 2. It can also be assumed that all the vegetable-tempered material from 1950 is fabric 5 except the one example of fabric 1.

The vegetable-tempered material from area C is a different fabric again. The chalky fabric group from C is probably related to fabric 1, but it is listed here as a separate fabric as it probably represents a different production moment. The chalky fabric from 1950 is dissimilar. The surface characteristics (Table 7.10) are grouped as shown in Table 7.9.

	Microscopic Fabrics	Macroscopic Fabrics	Area
A	1	Sandy	A, C, 1950
		Mica	A.
		Grog	1950
		Vegetable	1950
B	2	Coarse sandy	C, 1950
C	3	Chalk	C.
D	6	Vegetable tempered	C.
E	5	Vegetable tempered	1950
F	4,7,8,	Chalk/shell	1950

Table 7.9.

The most obvious characteristic of the whole assemblage is the fact that decoration is confined to the sherds of the sandy group, fabric 1. The vessels with chalk, grog, and vegetable inclusions are not decorated, even when of fabric 1. Perhaps this signifies a difference in function, with tempered vessels being used for cooking, a function that does not usually accompany decoration. Sooting on vessels could provide useful evidence, but unfortunately only two sherds bear soot traces (both on the inner surface), one in a sandy fabric, the other in a vegetable-tempered one. The forms of the different fabrics cannot be ascertained, because the sherds are too small.

Coil joins were discernible on only two vessels, one grog-tempered, and the other vegetable tempered. It is likely that all the vessels were made in the same fashion; but only when heavy tempering and/or low firing occurred would a vessel break along a coil join.

Similarities

There was no similarity between any of these fabrics and clay collected near the stream to the south of the site, except in the iron component.

Snettisham fabric 1 is identical to fabric 1 at Hunstanton, and to fabric 1 at Heacham. Snettisham fabric 7 is identical to Caldecote fabric 1.

VESSEL	SAMPLE	CONTEXT	DECORATION	OUTER SURFACE		INNER SURFACE	
				COLOUR	FINISH	COLOUR	FINISH
A							
FABRIC 1							
Definite							
Sandy 1	3	A	Stamped & Grooved	Red	Sm/Burnish	Grey	Smoothed
Sandy 2	16	A		Black	Natural	Black	Natural
Mica	15	A		Black	Smoothed	Black	Smoothed
Sandy 1	14	C		Brown	Smoothed	Black	Smoothed
Sandy 2	8	C		Black	Natural	Black	Natural
Sandy 1	11	1950		Black	Smoothed	Black	Smoothed
Sandy 7	18	1950		Grey	Natural	Grey	Smoothed
Grog 1	6	1950		Brown	Natural	Black	Smoothed
Veg. 3	19	1950		Brown	Natural	Brown	Natural
Assumed							
Sandy 4		A		Black	Natural	Black	Natural
Sandy 5		A		Black	Smoothed	Black	Smoothed
Sandy 6		A		Black	Smoothed	Black	Natural
Sandy 7		A		Brown	Eroded	Black	Eroded
Sandy 8		A		Black	Smoothed	Black	Smoothed
Sandy 9		A		Black	Smoothed	Black	Smoothed
Sandy 10		A		Black	Smoothed	Black	Smoothed
Sandy 11		A	Stamped & Grooved	Gry/Brwn	Natural	Grey	Natural
Sandy 3		C		Grey	Smoothed	Black	Natural
Sandy 4		C		Black	Natural	Black	Natural
Sandy 5		C	Stamped & Grooved	Black	Smoothed	Black	Smoothed
Sandy 6		C		Black	Burnished	Grey	Natural
Sandy 7		C		Black	Natural	Black	Smoothed
Sandy 8		C		Black	Natural	Grey	Natural
Sandy 9		C		Red/brwn	Natural	Black	Natural
Sandy 10		C	Stamped & Grooved	Black	Smoothed	Black	Natural
Sandy 2		1950	Stamped & Grooved	Dk/brwn	Smoothed	Black	Smoothed
Sandy 3		1950		Red	Natural	Br/Black	Natural
Sandy 4		1950		Buff	Eroded	Black	Smoothed
Sandy 5		1950		Black	Smoothed	Black	Natural
Sandy 6		1950		Black	Burnished	Black	Smoothed
Sandy 8		1950		Black	Burnished	Black	Smoothed
Sandy 9		1950		Black	Natural	Black	Natural
Sandy 10		1950	Stabbed	Black	Natural	Black	Smoothed
Sandy 11		1950		Black	Smoothed	Black	Natural
Sandy 12		1950		Grey	Natural	Black	Smoothed
Sandy 13		1950		Red/Black	Natural	Red/Black	Natural
Sandy 14		1950		Black	Natural	Black	Natural
Sandy 15		1950	Grooved	Black	Smoothed	Black	Natural
Sandy 16		1950		Black	Burnished	Black	Natural
Sandy 17		1950	Stamped	Black	Natural	Black	Natural
Sandy 18		1950	Stamped & Grooved	Grey	Eroded	Black	Eroded

Table 7.10: showing the surface characteristics of the Snettisham pottery.

VESSEL	SAMPLE	CONTEXT	DECORATION	OUTER SURFACE		INNER SURFACE	
				COLOUR	FINISH	COLOUR	FINISH
B							
FABRIC 2							
Definite							
Coarse sandy 1	9	C		Black	Smoothed	Black	Burnished
Coarse sandy 2	10	1950		Buff	Smoothed	Buff	Smoothed
Assumed							
Coarse sandy 1		1950		Black	Smoothed	Black	Burnished
Coarse sandy 3		1950		Black	Smoothed	Black	Smoothed
Coarse sandy 4		1950		Black	Natural	Black	Smoothed
Coarse sandy 5		1950		Blck/Buff	Natural	Red/Black	Smoothed
C							
FABRIC 3							
Chalk/Shell 3	2	C		Black	Natural	Black	Natural
Chalk/Shell 1		C		Grey	Smoothed	Black	Smoothed
Chalk/Shell 2		C		Brown	Eroded	Grey	Eroded
D							
Area C vegetable tempered							
Fabric 6 Vg 1	17	C		Grey	Eroded	Grey	Eroded
Vg 2		C		Grey	Eroded	Black	Natural
Vg 3		C		Black	Natural	Red	Natural
E							
1950 vegetable tempered							
Fabric 5							
1		1950		Buff	Smoothed	Buff	Smoothed
Vegetable 2	7	1950		Black	Natural	Black	Natural
4		1950		Black	Smoothed	Black	Smoothed
5		1950		Black	Natural	Black	Natural
F							
CHALK/SHELL							
Fabric 7 1	1	1950		Black	Smoothed	Black	Natural
Fabric 8 2	13	1950		Black	Smoothed	Black	Eroded
Fabric 4 3	12	1950		Brown	Natural	Black	Smoothed
4		1950		Buff	Natural	Brown	Natural
5		1950		Black	Smoothed	Black	Smoothed
6		1950		Black	Natural	Black	Smoothed
7		1950		Brown	Eroded	Brwn/Grey	Eroded

Table 7.10b: The surface characteristics of the Snettisham pottery.

Conclusions

The Snettisham pottery is an important group for several reasons. It is the largest domestic assemblage in west Norfolk and therefore throws light on other sites where less material has survived. The high percentage of fabric 1 (63%) indicates that this site was the production centre for the fabric, with vessels traded both to Hunstanton (8.5km away) and to Heacham (5km distant).

It is possible that fabric 7 had its origin at Caldecote, 31km to the south. This is a considerable distance for pottery to travel overland, but both sites could be served by water transport *via* the river Wissey and the Wash.

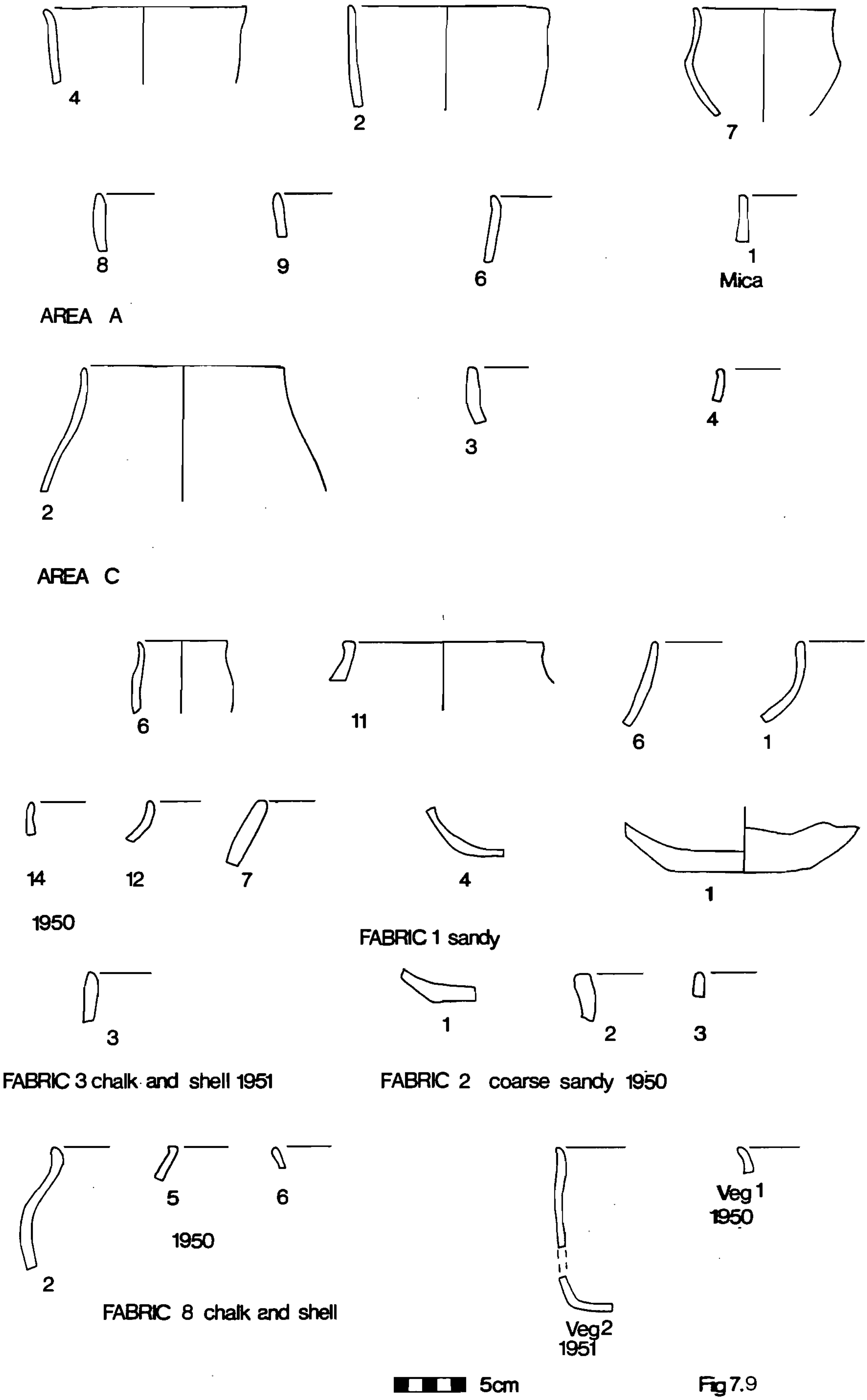
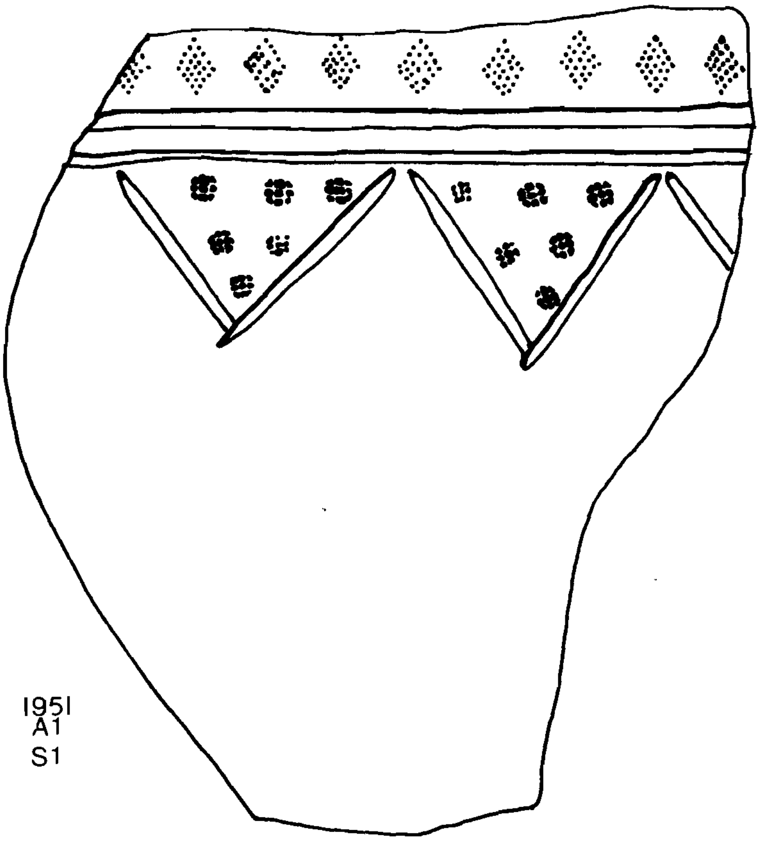
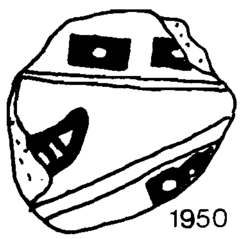

4
2
7
8
9
6
1
Mica
AREA A
2
3
4
AREA C
6
11
6
1
14
12
7
4
1
1950
FABRIC 1 sandy
3
1
2
3
FABRIC 3 chalk and shell 1951
FABRIC 2 coarse sandy 1950
2
5
6
1950
FABRIC 8 chalk and shell
Veg 1
1950
Veg2
1951
5cm

Fig 7.9

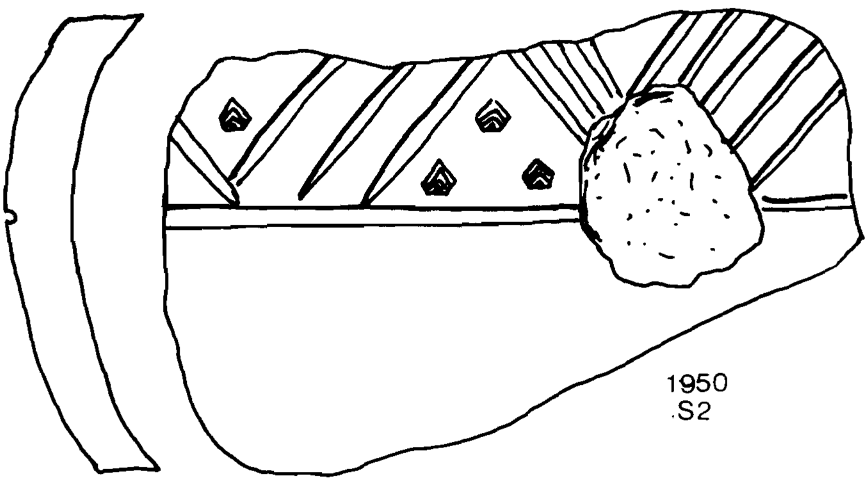


1951
A1
S1

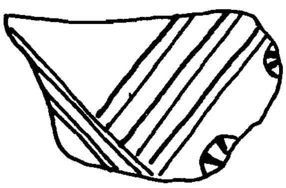
Fabric I



1950
S18

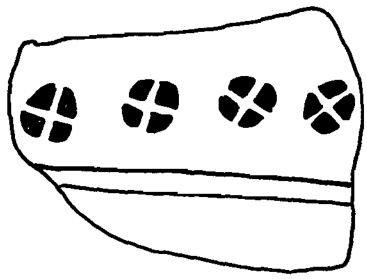


1950
.S2

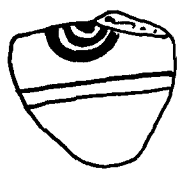


1951 surface
S1

not sampled



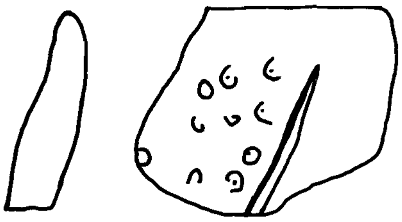
1951 C
S10



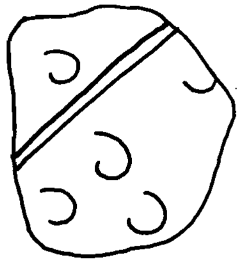
1951 C
S5

Fig 7.9

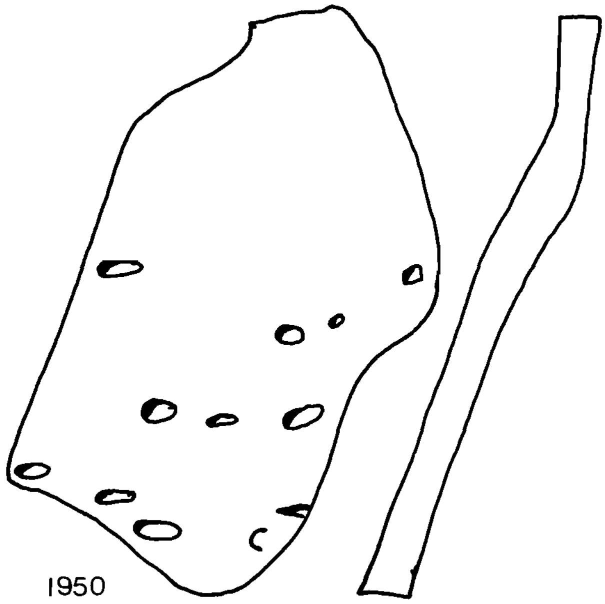
Actual size



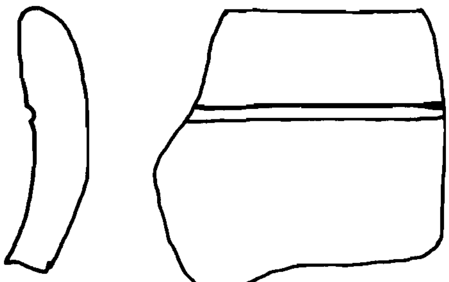
1951 A1
S11



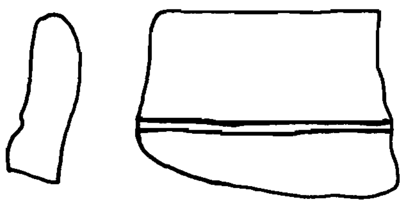
1950
S 17



1950
S 10



1951 A1
S 10



1950
S 15

not sampled

198b

Actual size

Fig 7.9

Thetford Redcastle

In 1966, Group Captain G.M. Knocker carried out excavations in Redcastle Furze in the search for the origins of Thetford. An 11th-century church was located below the castle ringwork, and beneath that was a scatter of Romano-British and pagan Saxon pottery (Knocker 1967). (Fig. 7.1 0)

Some 99 sherds are labelled as pagan Saxon in Norwich Castle Museum from Redcastle even though a figure of 50 is given in Group Captain Knocker's report. The report also lists nearly 200 sherds of Middle Saxon pottery; and it is possible that the sherds have since been re-sorted with more now being considered to be pagan Saxon.

All sherds have a code number, which presumably relates to their position on the site, but the relevant information is lacking to relate them to their context. The presence of Thetford ware in the pagan Saxon group suggests either mixing of the finds or, more likely, contamination of the pagan Saxon levels by later material. For these reasons detailed locational analysis of fabrics was not undertaken.

Macroscopic analysis

The sherds were macroscopically divided into chalky, grog, fine sandy, coarse sandy, sandy, and vegetable-tempered; and 25 samples were taken. Thus 25% of the assemblage was sampled.

	No of sherds	Percentage sampled
Chalk	6	33%
Grog	3	66%
Fine sandy	8	12%
Sandy	40	15%
Coarse sandy	34	26%
Vegetable-tempered	8	62%

It was not possible to amalgamate sherds into sherd groups because contextual information was lacking. Sampling was therefore carried out, taking into account the variability of each macroscopic group.

Microscopic analysis

Microscopically the groups were not discrete entities, especially those determined by the presence of vegetable matter and grog, which proved to be temper added to a number of different clays. The samples were therefore divided on textural criteria (defining the matrix of the fabric), which resulted in the threefold division - sandy clays, silty clays, and calcareous clays. These could be further sub-divided into fabrics by textural criteria and by the presence or absence of inclusions (see Table 7.11).

Fabric 1

An unsorted sandy clay matrix with sub-rounded to rounded grains of quartz. Large rounded fragments of flint are present. The fabric has been tempered with grog of a similar nature to the fabric itself: but it is usually oxidised, rather than reduced as the fabric is. Other samples have vegetable matter or granitically derived material. The fabric always has some tempering material. The only sample possibly without temper is sample 12, which contains quartz grains derived from an iron-rich quartz sandstone. This is probably the source of the quartz in the other samples, with the iron cement weathering away except in this example. Alternatively, the sandstone could have been added as temper, because some grains have angular fractures, and there is no grog or vegetable matter present. The presence of flint, fossil shell, and sparse sandstone fragments in fabric 1 indicates that the clay is a weathered derivation of a glacial till.

Fabric 2

A similar matrix to fabric 1 but with abundant angular to rounded particles of flint. This fabric may be fabric 1 tempered with a flint-rich quartz sand, as the flint does not appear to have been calcined and crushed before addition.

Fabric 3

A similar clay matrix to fabric 1, with a similar quartz

FABRIC	SAMPLE NO	IG ROCK	GROG	VEG.	S'STONE	FLINT	CHK.	L'STONE	SHELL	IRON
SANDY CLAYS										
1	1		X	X		X				X
	2		X			X				X
	7	X								X
	8	X		X	X				X	
	11		X	X	X					X
	12				X	X				X
	13	X				X				
	22		X			X				X
2	10					X				
	20				X	X	X			
3	3	X			X	X				X
4	18				X					
5	15				X					X
SILTY CLAYS										
6	6				X					
	9				X					
	23				X					
	25				X	X				
7	5	X	X		X			X		
8	19				X		X			
CALCAREOUS CLAYS										
9	4			X		X	X			X
	14			X			X			X
	17			X	X		X			X
	21			X			X			X
10	16			X	X		X	X	X	X
	24				X		X		X	
11	26				X		X		X	

Table 7.11: The presence/absence of inclusions in the Thetford Redcastle pottery.

component. A second coarser component is also present in the form of large grains (up to 1.5mm diameter) of calcareous sandstone and granitic sandstone. Again this may be fabric 1 clay with a different temper.

Fabric 4

A similar clay matrix to fabric 1, but has a dense, coarse quartz component derived from a ferruginous sandstone, particles of which still remain. This is probably a naturally occurring sandy clay and not the result of tempering, because there is more quartz sand present than in any other of the fabric 1 derivations, and it is unlikely that a hand-operated crushing process could have reduced a ferruginous sandstone to its component grains.

Fabric 5

A fine sandy clay matrix (containing a higher ratio of quartz to matrix than fabric 1) almost totally obscured by abundant, well-sorted sub-angular to angular quartz grains. Particles of muscovite mica of similar size are also present in a considerable quantity. Occasional larger more rounded quartz grains are present, as well as a single large rounded fragment of ironstone with fine quartz inclusions.

Fabric 6

A fine clay matrix containing few fine quartz grains, with a scattered larger quartz component derived from a calcareous sandstone. A single particle of rounded flint in sample 25 points to a derivation from a glacial till.

Fabric 7

This fabric is comprised of a silty clay matrix with a quartz component of angular to sub-rounded grains derived from a calcareous sandstone. Granitically derived particles are also present, as well as limestone and grog.

Fabric 8

A fine almost quartz-free matrix with a scattered, moderately well-sorted component of sub-rounded to rounded quartz grains, derived from a mineralogically texturally mature sediment.

Fabric 9

A clay matrix with an abundant, fine, well-sorted micaceous quartz component, with occasional larger rounded quartz grains. Also present are particles of flint an comminuted chalk. All four samples have a varying amount of vegetable matter added as a tempering agent.

Fabric 10

A clay matrix with an abundant unsorted quartz component, with comminuted chalk and shell of a similar size range. Sample 16 contains fragments of oolitic limestone, both in the form of oolites, and a fragments of calcareous matrix with casts of oolites, and a few voids from the combustion of vegetable matter. The larger quartz grains in both samples show evidence of being derived from a calcareous sandstone.

Fabric 11

A clay matrix, with abundant predominantly fine, unsorted micaceous quartz component, with larger rounded grains derived from a calcareous sandstone. Particles of chalk are present of a similar size range to the quartz.

Pottery characteristics

The number of samples is too small to be significant in each fabric; but, in terms of the broad fabric groups, the sandy group has surface treatment on the inner or outer surface, usually the inner, but seldom both. The silty group usually has no surface finish inside or out, and the chalky group ranges from no treatment to burnished on both surfaces (see Table 7.12).

			OUTER SURFACE		INNER SURFACE	
FABRIC	SAMPLE NO	SITE NO	COLOUR	FINISH	COLOUR	FINISH
1	1	1963	Dk Brown	Eroded	Black	Smoothed
	2	1547	Dk Brown	Natural	Dk Brown	Smoothed
	7	1532	Black	Smoothed	Dk Brown	Smoothed
	8	1854	Black	Smoothed	Black	Smoothed
	11	1456	Brown	Natural	Brown	Natural
	12	1860	Red/Brown	Eroded	Black	Eroded
	13	1690	Black	Smoothed	Black	Natural
	22	1442	Brown	Smoothed	Grey	Natural
2	10	1468	Brown/Black	Natural	Black	Smoothed
	20	1861	Pink	Smoothed	Black	Natural
3	3	1465	Brown	Natural	Black	Natural
4	18	1858	Brown/Black	Natural	Black	Smoothed
5	15	1908	Brown	Natural	Dk Grey	Smoothed
6	6	1445	Brown	Natural	Black	Smoothed
	9	1896	Brown	Natural	Grey	Natural
	23	1549	Black	Natural	Black	Natural
	25	1438	Brown/Black	Natural	Brown	Natural
7	5	1525	Black	Smoothed	Grey	Natural
8	19	1708	Grey	Natural	Grey	Natural
9	4	1582	Black	Natural	Orange	Natural
	14	1503	Grey	Natural	Black	Eroded
	17	1595	Grey	Natural	Black	Eroded
	21	1995	Dk Brown	Smoothed	Black	Natural
10	16	1859	Black	Burnished	Black	Burnished
	24	1532	Brown	Smoothed	Black	Smoothed
11	26	1938	Black	Natural	Black	Smoothed

Table 7.12: showing the pottery characteristics of the Thetford Redcastle pottery.

A number of decorated sherds were present. These showed evidence of stamped and grooved decorative schemes but the sherds were too small to allow reconstructions to be made.

Similarities

No surface deposits of clay could be located in the Redcastle area because Thetford has grown so much in the last 25 years. All exposures of surface deposits appeared to be of Breckland sandy till, of which the Redcastle mound is also composed. Deep piling for civil engineering projects at Redcastle Bridge and in Thetford town centre did bring blue clay to the surface, both of them similar to the silty clay fabrics. A sample of Thetford ware from Grantchester is of a similar type of clay, and presumably clay pits in the river valley would have reached this clay deposit below the alluvium.

There were no similarities with pottery from other sites in the area, apart from the sherd of Illington-Lackford pottery. This is the same fabric as fabric 3 at West Stow. Even though the large cremation cemetery of Illington is only 5km distant there is no evidence for urns being taken from Thetford for burial there.

Conclusions

Because of the fragmented nature of the pottery, it is difficult to draw any conclusions about form and function, or its relationship to fabric. What can clearly be seen is the technological aspects of the manufacturing process, with vegetable matter being added to the finer sandy clay and fine chalky clay, but not to the silty clay which instead has inclusions of calcareous sandstone. Granitic inclusions are confined, with one exception, to the sandy clay, which points towards the granite being a deliberate addition, reinforced by the fact that samples with granite tend not to have had grog or vegetable matter added.

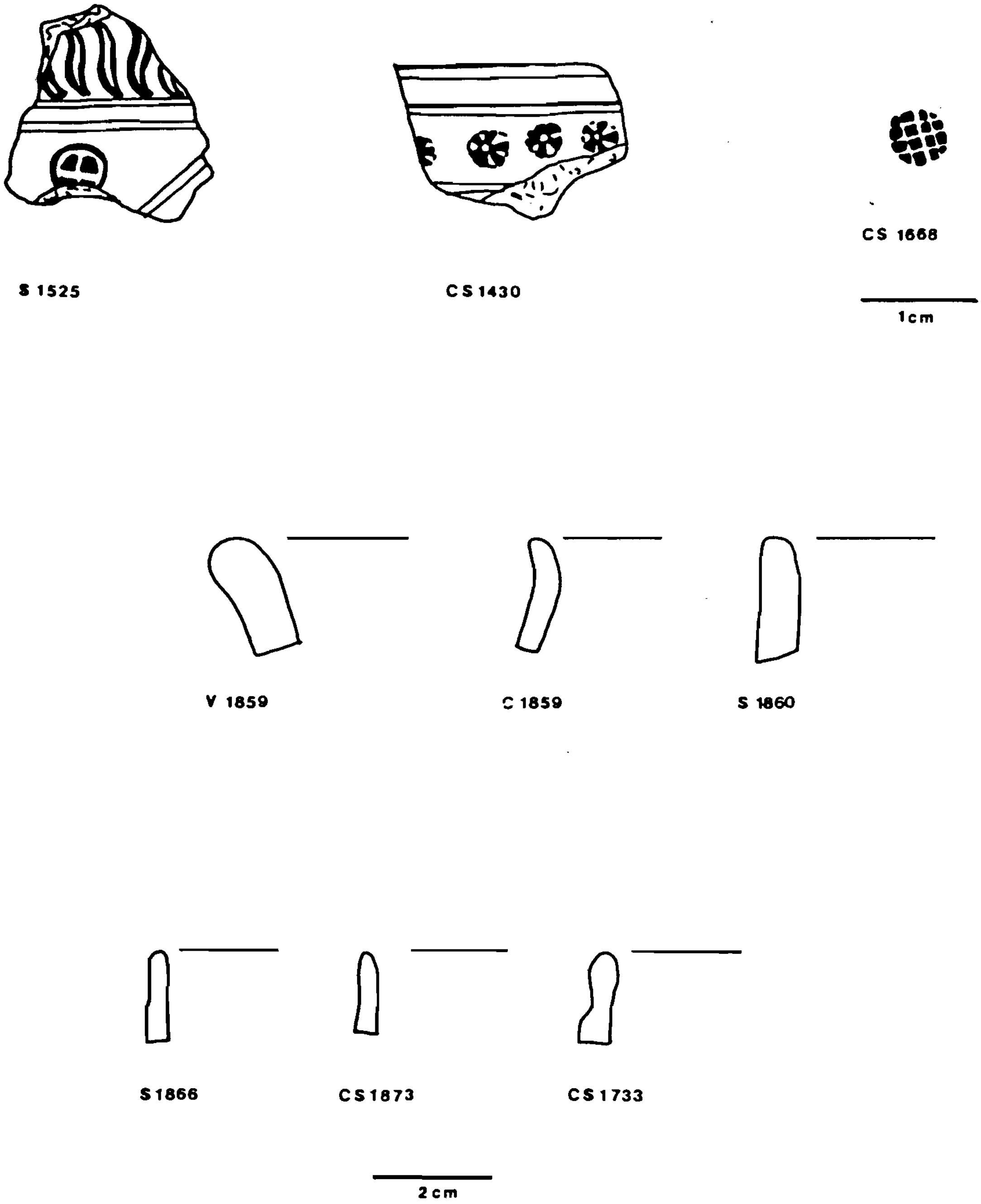


Fig. 7.10: The Thetford Redcastle pottery.

Witton

The Witton site was revealed by ploughing during the early 1960s. Four Saxon sunken huts were discovered, and two were excavated in 1962 by Owles and Turner (Medieval Archaeology 1962, 1964, 1965). Excavations continued until 1965, but were abandoned then until 1973, when Wade opened up further areas and re-excavated some of the earlier sites (Medieval Archaeology 1978). In all, 12 structures were revealed, mostly of grubenhaus form with some post-built. Many had associated cooking hearths, both internal and external, and there was evidence of iron smelting in the form of roasting hearths and slag. Pierced beach pebble loomweights and clay spindle whorls were found, indicating that weaving was carried out on the site. Iron knives and glass beads were also present. The evidence is therefore domestic, with a possible surplus production of iron, made from the iron-rich concretions which occur locally in the Norwich crag series.

Over 3,000 pottery sherds were found, representing at least 320 vessels, which Wade divided into nine fabrics (Wade 1983).

Macroscopic analysis

Wade divided the pottery into nine fabrics, forming the following percentages of the total.

1. Sandy mica specks, sparse large quartz grains, 61.5%
2. Gritty, larger mica specks, frequent large quartz grains, 26.6%
3. Soft gritty, dense multi-coloured quartz, dense pot grog, 1.2%
4. Grass-tempered, 0.3%
5. Soft sandy, grass-tempered with pot grog, 0.1%
6. Gritty with flint inclusions and sparse pot grog, 0.1%
7. Calcite tempered, sandy with voids, 0.9%
8. Flint tempered, as 2, with dense quartz, 0.8%
9. Sandy with pot grog, 8.4%

Fabric 1 dominated all structure assemblages (50-69%) followed by fabric 2 (15-38%), and fabric 9 (up to 22%).

Microscopic analysis

A thin section was made from a sample of each fabric provided by the excavator. This showed that only six fabrics were present, Table 7.13 shows the presence/absence of inclusions.

Fabric 1

This encompasses Wade's fabrics 1 and 6.

A fine sandy matrix with a dense, unsorted, sub-rounded quartz component. The larger grains present are fragments of feldspathic sandstone. The mica in the thin-section is present as small tabular fragments probably not large enough to be seen with the naked eye. The mica noted by Wade may point to a granitic sandstone, but no mica conjoined to quartz or feldspar was present in the section. The grog in Wade's fabric 6 was identical to the clay matrix. Small flint particles were present, which were rounded and presumably therefore a natural component of the clay.

Fabric 2

Wade's fabric 2.

A sandy clay matrix with abundant, moderately sorted quartz grains of sub-angular form, possibly derived from a feldspathic sandstone, three grains of which were present. The large mica specks are due to the presence of rounded fragments of granitic sandstone. These consist of quartz/mica/feldspar fragments, the mica considerably weathered, and often occurring as separate grains.

Fabric 3

Wade's fabric 3.

A silty quartz-free matrix, with a quartz component of sub-angular to sub-rounded sandstone derived grains, which occur occasionally as composite grains with a siliceous cement. The grog particles are formed from the same clay, but do not exhibit the microscopic cracks and laminae present in the vessel body. This suggests that they were added in a partly baked, perhaps

Wade's Fabric	Igneous Rock	Grog	Vegetable	Sandstone	Flint	Calcareous	Iron
1, 6,		X		X			
2	X			X			
3		X		X			
4, 5, 9,		X	X				
7				X		X	
8					X		

Table 7.13: showing the presence/absence of inclusions in the Witton pottery.

Structures		A	B	C	D	E	F	G	H	J	L	M	N	% of total A.S. pot
Prehistoric		7	10			6	27		5	7		44	8	
Romano-British		1		21	3	12	56	14	24	16+7*		12	4	
Handmade Anglo-Saxon Fabrics	Fabric 1	172	2	579	110	261	169	196	268	55	11	228	37	61·5
	Fabric 2	73		281	28	119	129	46	92	28		90	18	26·6
	Fabric 3					2	38							1·2
	Fabric 4			1		1						2		0·3
	Fabric 5											2	1	0·1
	Fabric 6											5		0·15
	Fabric 7			4	1		1	2	18			5		0·9
	Fabric 8											26		0·8
	Fabric 9	4		140	39	33	1?	7	33	2		24	2	2·4
	Total	249	2	1005	178	416	338	251	411	85	18	382	58	100
	% oxidised	45	50	38	34	45	17	38	18	12	78	39	52	39
	% burnished	25		6		18	5	19	11	19		8	14	10

* = imported amphora

Table 7.14: showing the relationship between fabrics and structures at Witton (source Wade).

sun-dried state, possibly as crushed daub, rather than crushed sherds from a broken vessel.

Fabric 4

Wade's fabrics 4, 5, and 9.

A clay matrix, as fabric 3, with the addition of vegetable matter and small quantities of grog. The grog in Wade's fabric 4 is of a different nature from the matrix, consisting of a fine sandy unsorted clay. In all of Wade's three fabrics, the quartz component is different from that of fabric 3, which has sandstone-derived grains. This indicates that crushed sandstone was added as temper to fabric 3.

Fabric 5

Wade's fabric 7.

A fine sandy matrix with a dense, unsorted, sub-rounded quartz component derived from a quartz sandstone. Large grains of quartz and feldspar are perhaps derived from a coarser sandstone. This is probably a sub-group of fabric 1.

Wade's fabric 7 was differentiated macroscopically by the presence of voids. In the thin-section these can be seen as elongated or irregular rectangular gaps in the matrix, sometimes filled with a calcareous deposit. The shape of these voids is similar to those in the fabrics around the Ipswich area, where crag clays seem to have been the source. This fabric therefore probably comes from the local Norwich crag series.

Fabric 6

Wade's fabric 8.

Wade's fabric 8, the flint tempered fabric, consists of a clay matrix with abundant, well-sorted, fine micaceous sand. The flint temper is present as large, very rounded grains. These grains are the same size, range, and shape as the coarse quartz component, which indicates that the flint particles are naturally weathered, perhaps derived from an originally aeolian deposit. The finer grades of quartz are unsorted and of sub-angular to sub-rounded form, suggesting the presence of two separate quartz components, the finer being a natural component, the coarser added as temper.

A loomweight from structure C was also sectioned for comparison. This clay contained abundant unsorted quartz, with a higher ratio of quartz to matrix than any of the pottery fabrics.

Pottery characteristics

Analysis of the quantity of pottery from each structure shows that cooking-pot shapes are the most common type of pottery, forming over half the pottery in all but one structure. This structure, D, possessed an abnormally low number of rim sherds, considering the total number of sherds excavated, and possibly excavation or post-excavation processing may have caused a bias. If structure D is ignored, then the ratio of cooking pots to jars and bowls is fairly constant, averaging six cooking pots to four jars and bowls. This indicates a higher breakage rate for cooking pots (in constant rough use) and a lower rate for (a) storage vessels (seldom used roughly) and (b) bowls (possibly personal possessions).

The decorated sherds formed on average 1.5% of the assemblage in each structure, with the proportion of each ranging from 4% to 0.2%. The decorative elements present include corrugated necks, broad grooved chevron and dot, incised line, rustication, and stamping. Continental parallels were used by Wade to date these styles. The results showed that the assemblage fell into a late 4th century group and a 6th century group, with vessels of both groups occurring in structures A, E, F, G, and J. Structures B, D, and L were undated; H and N contained only early pottery; and C and M contained pottery that could not be closely dated. The wide range of dates from some structures points to the presence of a considerable quantity of residual pottery, so the fills of the sunken-featured dwellings should perhaps be seen as rubbish deposits used over a long period of time. If they are not such deposits, but result from a single phase of occupation, then the Continental parallel dating method obviously does not provide reliable dates. The low number of fabrics compared with other Saxon sites examined points to two models: either the pottery is of one date and the site short-lived; or the same clay deposit was exploited over a long period of time.

Similarities

Apart from fabric 1, which has strong similarities with fabric 2 at Hemsby, there are no similarities with pottery from other sites. Local clays sampled proved to be unsimilar to the pottery, but were similar to the loomweights.

Conclusions.

The potters were obviously choosing clays that were best suited to their particular purpose. The loomweight is identical to two samples collected from the surface boulder clays at various depths, neither of which contains the sandstone inclusions common to the pottery. This indicates that the potters deliberately added crushed rock as temper, and certainly prospected for clay deposits, which are rare in the area.

The author's amalgamation of some fabrics does not alter significantly the ratios of fabrics worked out by Wade, all of which were based on the presence of inclusions.

Considering the pottery in terms of original clay sources leaves only four fabrics, the percentages of which are as follows:

Fabrics 1, 6, 7.	Fabric 2.	Fabrics 3, 4, 5, 9.	Fabric 8.
62.6%	26.6%	10.0%	0.8%

This reduces the nine fabrics noted by Wade from nine to four, with the fourth comprising less than 1% of the assemblage. It also explains the anomalous figures for Wade's structure F, where the figures for fabrics 3 and 9 (see Fig. 7.14) are the opposite of what one would expect from other contexts.

In one sense, of course, the nine fabrics still exist as pottery-making fabrics; that is, mixtures of different quantities of raw materials destined to became ceramic containers. In the end an explanation of the various recipes must be sought in the working characteristics of the clays, and their intended use.

Fabric 9 clay is a very fine pure clay, with little naturally occurring sand, and would, unless tempered, be unsuitable for pottery manufacture at the level of Saxon technology. Grog and vegetable matter were the most common tempers added, and the addition of sand in the structure F pottery does not seem to be widely followed. This type of temper, crushed sandstone, seems to have been used only in conjunction with clays of fabrics 1 and 2.

Mundesley

In 1965, a group of burial urns was discovered while sewer trenches were being dug at Mundesley. At least 12 cremation urns were recovered, along with beads and fused glass (Norwich Museum Acc. No. 286.965). Four other urns are in private ownership and were unavailable for study.

Macroscopic analysis

The cremation urns were divided macroscopically into three fabric groups:

1. Vegetable-tempered (five vessels).
2. Chalk-and-vegetable temper (one vessel).
3. Sandy (one vessel).

Some 84 body sherds were also recovered, which were divided into sandy and vegetable-tempered fabrics, with 24 and 60 sherds respectively. The sandy sherds did not appear to be of the same fabric as the surviving sandy vessel, and one was a sherd of a corrugated neck; but the vegetable-tempered sherds seemed to be identical to the two urns of the vegetable-tempered group. This gave a minimum number of eight vessels from the total assemblage.

Microscopic analysis

Examination of eight thin sections taken from six urns and two body sherd groups, confirmed the visual examination. The sandy vessel and the sandy sherds are not of the same fabric, and both are different from the group tempered with vegetable matter. The vegetable-tempered body sherds are identical to the two urns considered to be their sources, and the chalk-and vegetable-tempered fabric is different from the other vegetable-tempered vessels. The overall picture is, however, more complicated than it had at first appeared, as the four vegetable-tempered urns sampled belong to two different fabrics, (see Table 7.15 for presence/absence of inclusions).

Fabric 1

This fabric consists of an unsorted quartz component in a fine clay matrix. The quartz grains are sub-angular to sub-rounded, and are probably derived from a quartz sandstone, fragments of which are present in all the thin-sections. There are abundant voids caused by the burning out of seeds up to 4mm and plant fragments up to 7mm in length.

Sample 1 was a better fired example of the fabric, with the combustion products of the vegetable matter burnt out.

Fabric 2

This fabric was macroscopically described as chalk with vegetable temper, a description borne out by the thin-section. The fabric has an iron-rich silty clay matrix, with abundant sub-rounded to rounded chalk fragments, maximum diameter 0.5mm, with soot-filled voids from the combustion of the vegetable matter. The quartz component is an unsorted quartz sand, with sub-rounded to rounded grains. This is probably a naturally occurring clay of glacial origin.

Fabric 3

This was designated a vegetable-tempered fabric upon macroscopic examination. But the thin-section shows a very low density of soot-filled voids, and the inclusion of vegetable matter may have been of an accidental nature: such a small amount is unlikely to have affected the working of the clay to any great extent.

The clay used has a fine silty matrix, with an unsorted quartz component of sub-angular to rounded grains. A flint component, which is also present, is identical in size and shape to the quartz, pointing to a source in the glacial till.

Fabric 4

This fabric described as sandy on macroscopic examination, consists of a sandy clay matrix, with an abundant unsorted quartz component of sub-rounded to rounded grains, the larger grains being rounded. Occasional grains of rounded flint are present, as well as two fragments of ferruginous sandstone composed of very angular quartz grains. The quartz component of this fabric is very similar (in respect of size, roundness, and the flint component) to a sample of sand taken from the beach below the site.

Fabric 5

This sample, taken from the body sherds designated as sandy, is very different from the sandy vessel present (fabric 4). The iron-rich silty clay matrix contains none of the fine grade of quartz that is present in fabric 4, and the coarse quartz component is derived from a quartz sandstone, resulting in irregular-shaped grains and conglomerate clusters of quartz crystals of an angular nature.

Pottery characteristics

The characteristics of the vessels and sherd groups are summarised in Table 7.16

Macroscopic and microscopic analysis both suggest a division of the pottery into two groups - those with vegetable temper added to the clay, and those without - the latter being decorated. The undecorated vessels tend to have less surface finish. Only one example is burnished on the inside and one on the outside, while the sandy decorated vessels are better finished. The burnishing on the interior of Urn 5 in the vegetable-tempered group perhaps has a functional purpose. It is possible that the vegetable-tempered vessels were used for cooking, because the temper protected them against thermal shock. A different temper (sand) was used, however, when decoration was to be added, probably for storage vessels. The only vessel that may show signs of having been used for cooking is vessel 8, a vegetable-tempered pot that had spalled in two places on the base. (No sampling could be done on this vessel because it is complete).

An alternative interpretation could be that vessel 8 had not been dried sufficiently before firing and was a waster used for burial, as it was not fit for normal domestic use due to the resulting thinness of the base. This alternative is reinforced

Fabric	Ig Rock	Grog	Veg	S'Stone	Flint	Chalk	L'Stone	Shell	Iron
Fabric 1									
1			X	X					
2			X	X					
3			X	X					
5			X	X					
Fabric 2									
7			X			X			
Fabric 3									
4				X					
Fabric 4									
6					X				
Fabric 5									
8				X					X

Table 7.15: showing the presence/absence of inclusions in the pottery from Mundesley.

Fabric	Sample No	Urn No	Outer Surface Colour	Outer Surface Finish	Inner Surface Colour	Inner Surface Finish	Vegetable Tempered	Sandy	Decorated
1	1	4	Buff/Gry	Smooth	Buff/Gry	Smooth	X		
	2		Buff/Gry	Smooth	Buff/Gry	Eroded	X		
	3	7	Buff	Natural	Grey	Smooth	X		
	5	5	Brown	Smooth	Grey	Burnish	X		
2	7	3	Black	Burnish	Black	Smooth	X		
3	4	9	Black	Burnish	Black	Burnish		X	X
4	6	2	Black	Smooth	Buff	Wiped		X	X
5	8		Dark/Gry	Burnish	Grey	Smooth		X	X
Unknown		8	Brwn/Bff	Smooth	Black	Natural	X		

Table 7.16: showing the pottery characteristics of the Mundesley pottery.

by the presence of vertical cracks in the pot probably caused during firing.

The pottery used for burials would therefore appear to be purely domestic in character and source. The variety of fabrics (five from eight vessels) points to a mode of production based on the household.

The three decorated vessels, samples 4, 6, and 8, are all in sandy fabrics. Only Urn 2 (sample 6) is complete enough to be sure of its decorative scheme. This is a horizontal scheme with two bands of chevrons and two rows of stamps. The lower band of chevrons is more complex forming stehende bogen (standing arches).

Urn 9 (sample 4) consists of the upper part of a vessel with a triple row of stamps enclosed by three lines at top and bottom. The stamping has been applied so closely that it almost forms a wavy line.

Only a single decorated sherd is present from the third decorated urn, a fragment of the neck with corrugated decoration. (See Fig. 7.11 for illustrations).

Similarities

There were no fabric links to pottery from other sites in the area.

Conclusions

The cremation urns at Mundesley are vessels extracted from a domestic context for use as containers for human ashes. The probable use of cooking pots and wasters suggests that the dead were not always buried in specially made containers but rather in those vessels that could be most easily spared. The occasional use of wasters and damaged vessels has been noted by the author in the cremation cemeteries of Lackford and Illington, and in the inhumation cemeteries of Tuddenham and Holywell Row.

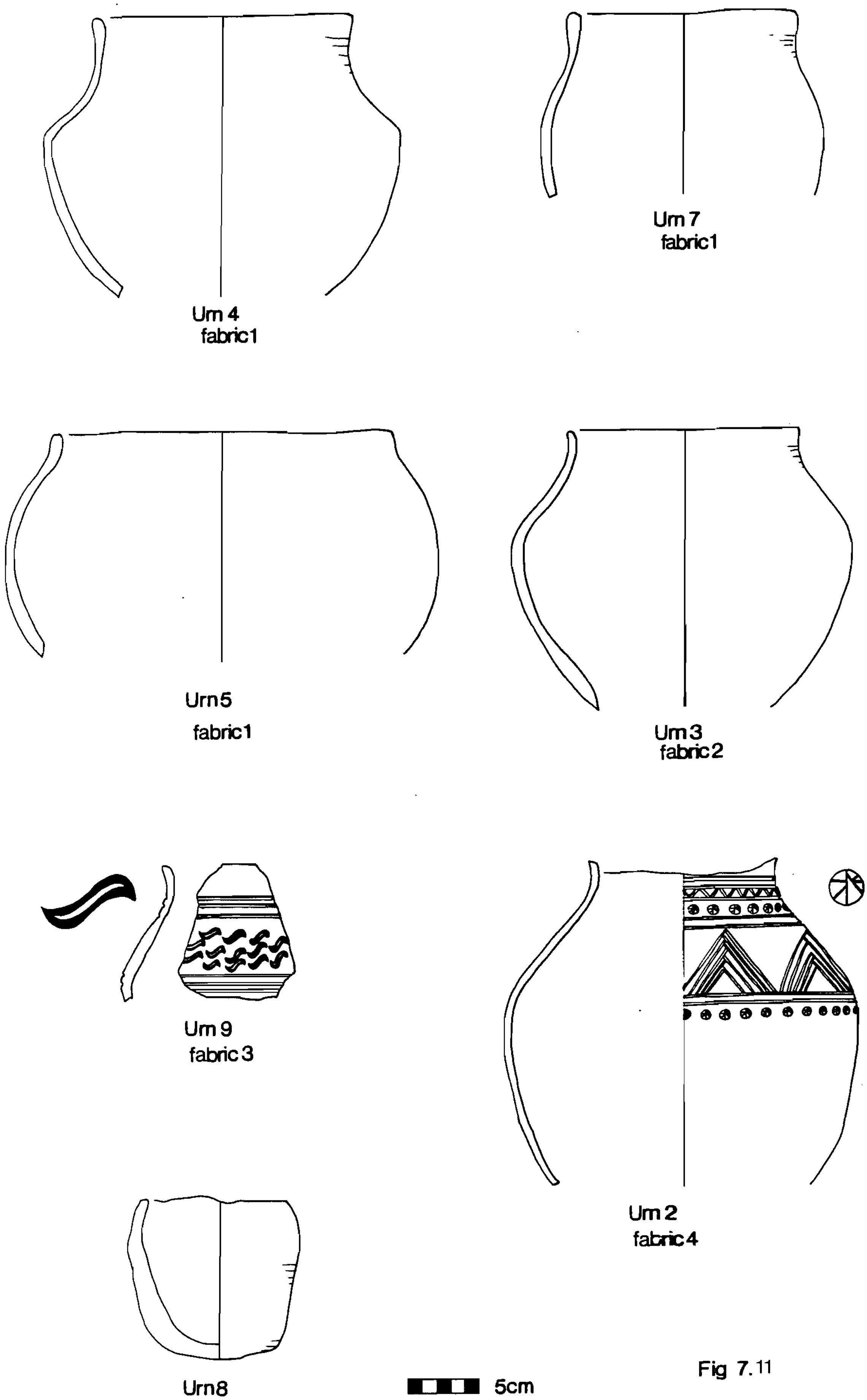

Urn 4
fabric 1
Urn 7
fabric 1
Urn 5
fabric 1
Urn 3
fabric 2
Urn 9
fabric 3
Urn 2
fabric 4
Urn 8
5cm

Fig 7.11

Hunstanton

In 1860, an inhumation burial accompanied by a spear and knife was found in the grounds of Hunstanton Park. Between 1900 and 1902, a cemetery was investigated and 12 graves were excavated. Two urns, together with pottery sherds and beads, are recorded to have been deposited in Norwich Museum (Acc. No. 2.950). There are in fact sherds from two decorated pots, and one rim sherd from a bowl or upright-rimmed vessel (see Fig. 7.12)

Macroscopic analysis

All the sherds appeared to be composed of the same sandy fabric.

Microscopic analysis

Petrological examination showed that there were two fabrics present.

Fabric 1

Both the decorated vessels are made from the same clay, which consists of a clay matrix with a well-sorted fine quartz component, and a coarse component of well-rounded grains of quartz and iron compounds. Some inclusions of conglomorate iron compounds are present, which are formed of well-rounded iron and quartz grains in a ferruginous matrix. The clay is probably derived from the glacial erosion of the carstone deposits to the south. Clay samples taken in the near vicinity were of iron-free till, which overlies chalk; but clays with abundant carstone inclusions were located at Ingoldthorpe, 8km to the south.

Fabric 2

The fabric of the bowl-like vessel consists of an almost quartz-free clay matrix, with an unsorted quartz component of sub-angular to sub-rounded grains. There are numerous voids in the fabric, the result of the burning out of vegetable tempering, as well as a few clay pellets and even fewer small rounded flint particles.

Pottery characteristics

All vessels were well reduced to a black colour and smoothed or burnished outside (see Table 7.17).

The two cremation urns are both decorated with horizontal grooves and stamps, but in different decorative styles. On one vessel, grooves were used to create zones, which are filled with single rows of stamps, whereas on the other vessel triple grooves form a line around the rim from which triangular stamped panels hang (see Fig. 7.12). Both these styles would be dated to the second half of the 6th century on conventional dating, with the second later in the relative dating sequence. But the fact that both vessels are in the same fabric indicates that they were in fact made at the same time.

Similarities

The fabric used for the decorated vessels is identical to one of the fabrics at Snettisham. As this type of clay does not occur in the immediate locality of the Hunstanton site, the pottery had probably benn transported to the spot where it was found.

Conclusions

Comparison with the Snettisham assemblage shows that the decorated vessels at Hunstanton come from near that source, and these pots have travelled a distance of 17km, either as items of exchange or else as containers for the ashes of the Snettisham dead who were buried at Hunstanton. The former is more likely as similar vessels were traded to the Heacham settlement, half-way between the two sites.

Fabric	Sample	Outer Surface		Inner Surface		Decoration
		Colour	Finish	Colour	Finish	
1	1	Black	Smoothed	Black	Natural	Grooves/Stamps
2	2	Black	Burnished	Black	Natural	None
3	3	Black	Burnished	Black	Burnished	Grooves/Stamps

Table 7.17: Showing pottery characteristics of the Hunstanton vessels.

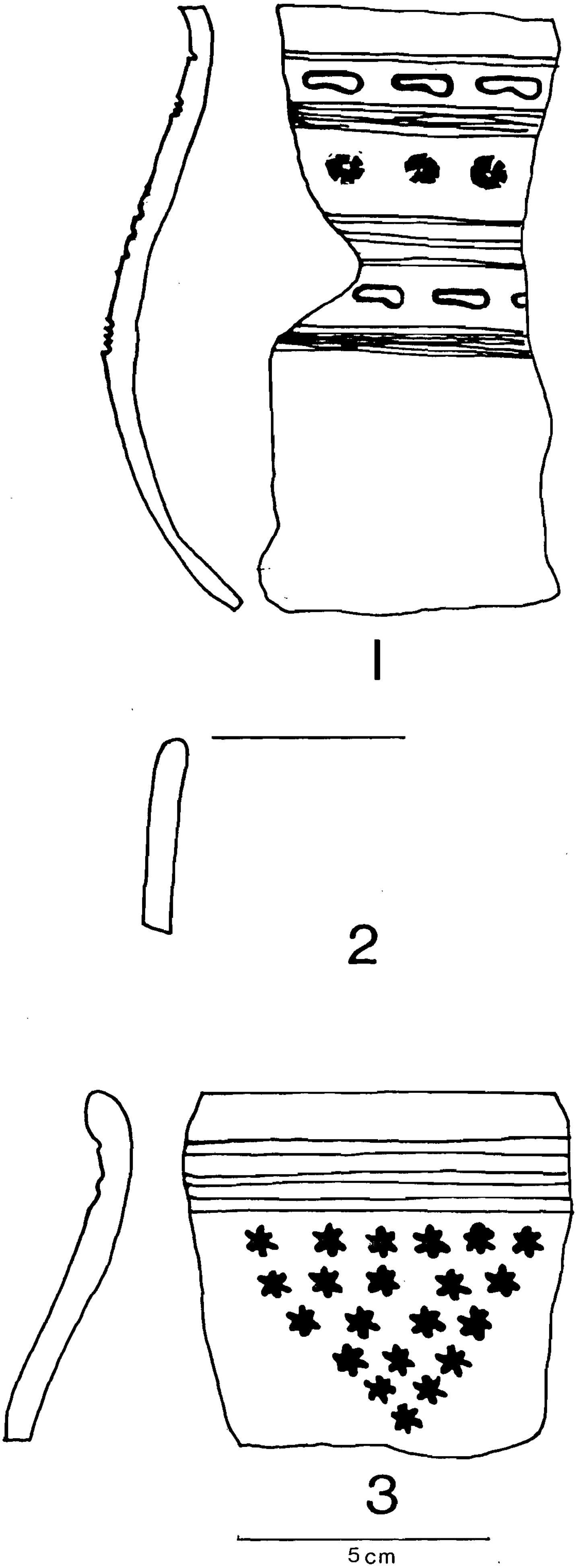


Fig. 7.12

Tottenhill

A mixed cremation cemetery was found at Tottenhill in 1890 during gravel extraction. In 1908, pottery was recovered from the same or a nearby working. In 1937, a short long brooch of about 600 AD was discovered at TF 63511066 (Norfolk Archaeology 1947). In 1942, the cemetery was rediscovered, and 40 cremation urns were excavated, at TF 63701070 (Meaney 1964). A single sherd was found in isolation in 1946, and this was sampled (Norwich Museum Acc. No. 22.164. 946).

Macroscopic analysis

The fabric was macroscopically described as fine sandy with vegetable temper, and this was borne out by the section.

Microscopic analysis

Fabric 1

The clay consists of a fine sandy matrix with scattered medium to large grains of sub-rounded to rounded quartz. Clay pellets, present in some quantity, mirror the fabric exactly; the majority are fine sandy matrix but a few contain larger quartz grains. This makes it likely that the clay as seen is natural, and the only temper added is the vegetable matter, the presence of which is indicated by voids up to 4mm long.

Pottery characteristics

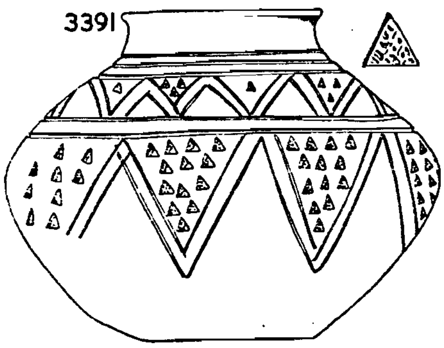
The sherd is buff coloured, with a smoothed outer and natural inner surface. The outer surface is decorated with grooves, but the exact decorative scheme is not certain (see Fig. 7.13).

Similarities

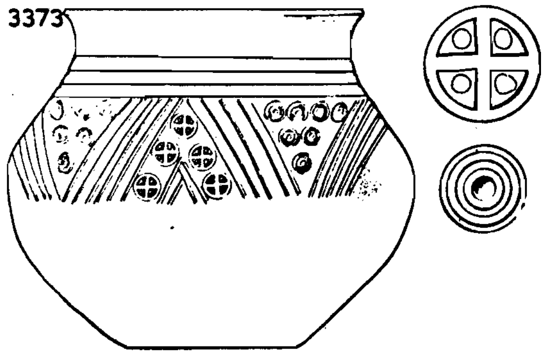
No identical fabrics have been found on any other sites in the region, but the fine clay matrix with scattered rounded grains and clay pellets is very similar to the fabrics of the Snettisham area. This may point to ceramic exchange with the area to the north of Tottenhill.

Conclusions

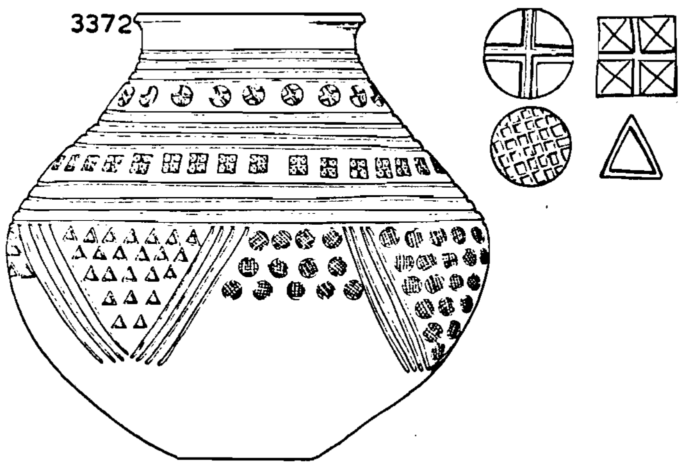
This sherd possibly comes from a cremation vessel rather than the settlement associated with the cemetery, as it would be unusual to find only decorated pottery in a settlement context. If it does come from a cremation container, it may show that the Snettisham potters traded to the south as well as to the north of their settlement. Further analysis of the other cremation vessels will be needed to prove this.



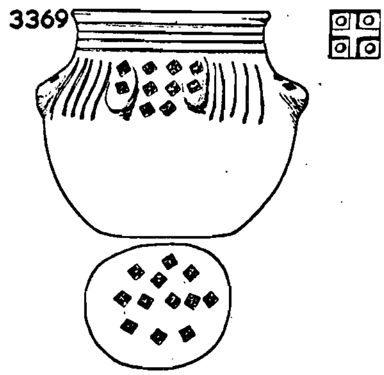
3391 Norfolk. TOTTENHILL



3373 Norfolk. TOTTENHILL

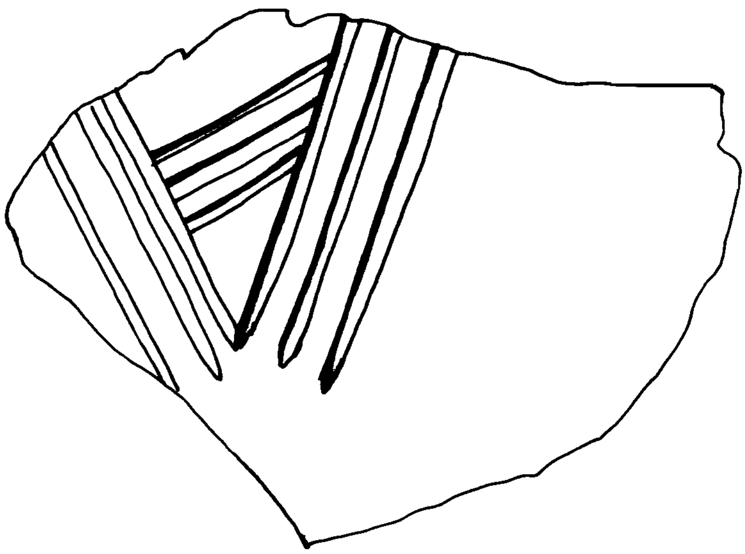


3372 Norfolk. TOTTENHILL



3369 Norfolk. TOTTENHILL

Scale 1:4



Scale 1:1

Fig. 7.13: showing the Tottenhill pottery. The whole urns are after Myres. The single sherd was the one sampled.

Wolterton

The Wolterton cemetery was discovered in 1915 and reported on by Lethbridge (1931). The bulk of finds are held by the Norwich Castle Museum (Acc. No. 34.16, 45.16), but some of the pots went into private ownership and were not available for study.

Macroscopic analysis

The ceramic finds were sorted into 10 sherd groups, ranging from one to 13 sherds, and then divided into four fabrics:

1. Coarse sandy
2. Sandy
3. Fine sandy
4. Vegetable-tempered

Nine of the 10 sherd groups were then sampled for thin-section analysis. One sherd group was not sampled, because it consists of a decorated sherd which the museum would not allow to be damaged.

Microscopic analysis

Analysis of the thin-sections showed that the macroscopic division of the sandy sherds into three fabric sub-groups was not really justified. Two of the fine sandy sherd groups could be called fine sandy, but the third was more similar to the sandy sherd groups, and the three sandy sherd groups themselves fell into two fabrics. The coarse sandy sherds had been so designated because of the large inclusions added as temper. But one sherd group was found to be the same as one of the fine sandy clays, with the addition of crushed rock temper. (Fig. 7.18) Vegetable matter was also present in varying quantities in four of the sandy sherd groups.

Division on microscopic characteristics therefore gave a total of six fabrics, with the following characteristics.

Fabric 1

A fine, silty, iron-rich clay matrix with a sparse, unsorted

		MICROSCOPIC					
SAMPLE NO.	Machrosopic	1	2	3	4	5	6
1	Vegetable 1	X					
2	Coarse Sandy 2	X					
4	Sandy 2		X				
8	Sandy 1		X				
9	Fine Sandy 1			X			
7	Sandy 3				X		
5	Fine Sandy 2					X	
6	Coarse Sandy					X	
3	Fine Sandy 4						X

Table 7.18: showing the relationship between the microscopic and macroscopic fabrics at Wolterton.

FABRIC	IG ROCK	GROG	VEG.	S'STONE	FLINT	CHALK	IRON
FABRIC 1							
1			X		X		X
2					X		X
FABRIC 2							
4		X	X			X	
8			X		X	X	
FABRIC 3							
9			X		X	X	
FABRIC 4							
7			X	X			
FABRIC 5							
5	X						
6	X		X				
FABRIC 6							
3							X

Table 7.19: Showing the presence/absence of inclusions in the Wolterton pottery.

sub-angular to rounded quartz component, the degree of rounding increasing with size. Occasional fragments of flint are present up to 3.5mm.

Fabric 2

A fine, silty clay matrix, with an abundant unsorted rounded quartz component. The small rounded chalk grains point to a chalky boulder clay source.

Fabric 3

Similar to fabric 2, but with a denser quartz component. Again, a chalky boulder clay is the likely source.

Fabric 4

A fine sandy matrix, with a medium to sparse, sub-angular to rounded quartz component. The larger grains are derived from a calcareous sandstone.

Fabric 5

A fine sandy clay matrix, with occasional larger quartz grains. One sample, no 6, has had vegetable temper and rock temper added. The rock appears to have been a granitic sandstone, as one composite grain consists of quartz, biotite mica, and feldspar crystals, while the other contains single grains of biotite and plagioclase feldspar.

Fabric 6

A fine sandy micaceous clay, with occasional large quartz grains and rounded particles of quartz-rich ironstone.

The presence/absence of inclusions is presented in Table 7.19

Pottery characteristics

The surface finish and colour of the vessels are given in Table 7.20 . The number of vessels in each fabric group is too small to draw any conclusions from, but there does seem to be an inverse relationship between vegetable tempering and decoration throughout the assemblage (see Fig. 7.14). This is perhaps because vegetable tempering was used for cooking vessels, which ethnographic parallels suggest are usually undecorated.

Similarities

No fabric links were found with other sites in the region. The local geology was sampled but was found to be composed of sand and gravel to a depth of at least 50cm, and no clay was located.

Conclusions

The nine vessels sampled had all been used as containers for cremation burials. Three of them were decorated, and with one exception the others were either smoothed or burnished externally. These may have been specially produced cremation containers: alternatively better quality vessels were taken from the household supply and used for burial.

The diversity of fabrics points to household semi-specialists being responsible for the production of such vessels.

FABRIC	SAMPLE NO.	OUTER SURFACE		INNER SURFACE		DECORATION
		COLOUR	FINISH	COLOUR	FINISH	
1	1	Buff	Smooth	Black	Natural	
	2	Brown	Burnish	Black	Smooth	Stamps & Grooves
2	4	Black	Burnish	Black	Smooth	
	8	Black	Burnish	Black	Smooth	
3	9	Red	Burnish	Grey	Natural	
4	7	Buff	Natural	Black	Smooth	
5	5	Black	Smooth	Black	Natural	Grooves
	6	Black/Buff	Smooth	Black	Smooth	
6	3	Orange	Burnish	Orange	Natural	
Unknown	Not Sampled	Dark Buff	Burnish	Dark Buff	Smooth	Stamp & Grooves

Table 7.20: showing the pottery characteristics of the Wolterton pottery.

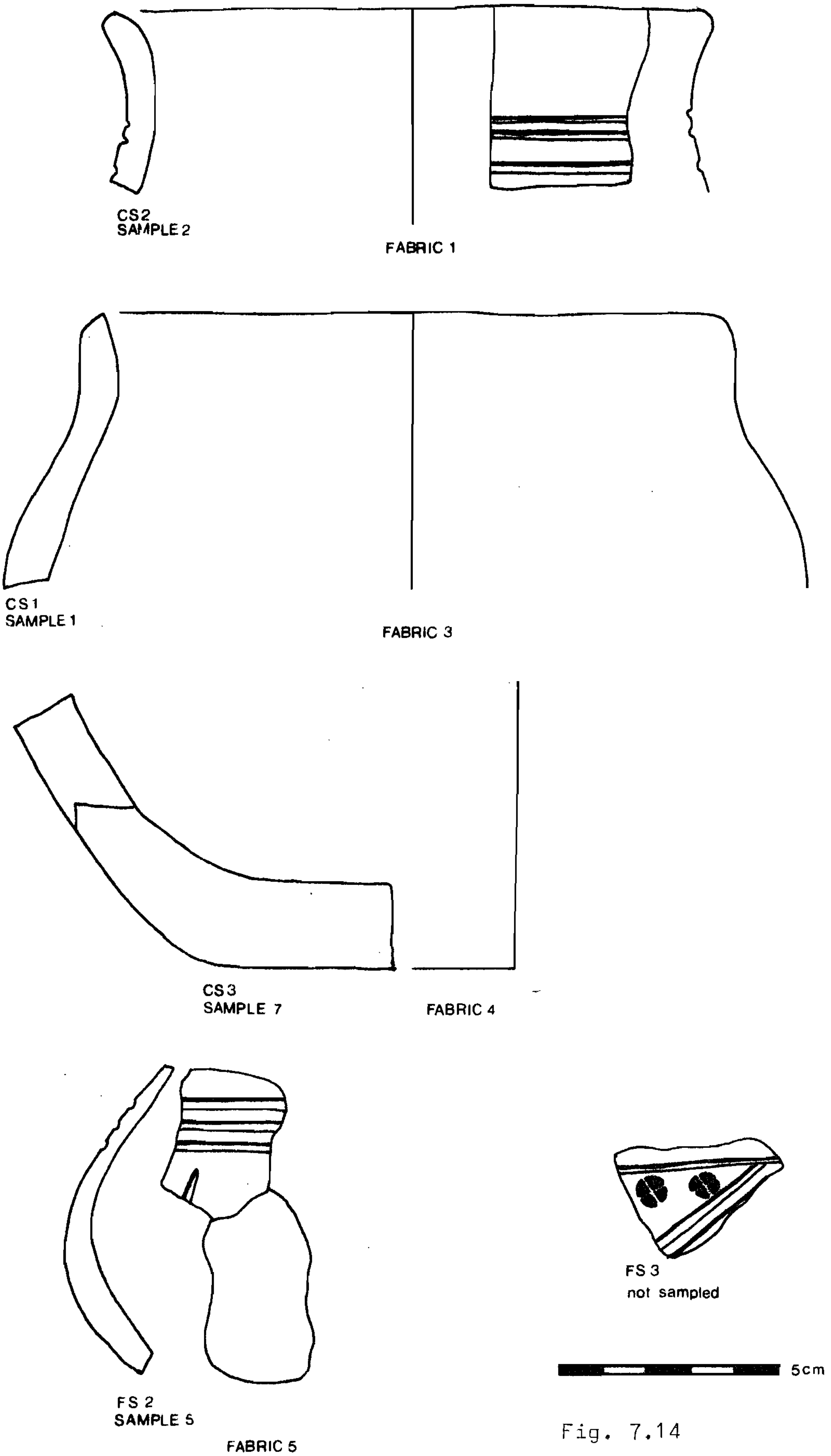

CS2
SAMPLE 2
FABRIC 1
CS1
SAMPLE 1
FABRIC 3
CS3
SAMPLE 7
FABRIC 4
FS 2
SAMPLE 5
FABRIC 5
FS 3
not sampled
5cm

Fig. 7.14

Chapter 8

The Settlement and Cemetery Ceramics of Early Saxon Suffolk

Sixteen sites were examined in Suffolk: five settlements and one cemetery in the southeast of the county, and nine settlements, two of them with cemeteries in the northwest - mostly in the Breckland region. The Breckland sites relate more closely than the others to those discussed in Chapters 6 and 7. Accordingly, they will be dealt with first. These sites are numbered 1 to 9, while the sites around Ipswich in the southeast are numbered 10 to 16. Otherwise the layout of this chapter follows that of Chapters 6 and 7.

1.	Euston	TL 899795
2.	Fakenham	TL 907772
3.	Great Barton	TL 899696
4.	Ixworth	TL 935701
5.	Lakenheath	TL 733834
6.	Mildenhall	TL 685748
7.	Rickinghall Inferior	TM 043760
8.	Stanton Chair	TL 956743
9.	West Stow	TL 797714
10.	Little Bealings	TM 228464
11.	Barham	TM 137512
12.	Butley	TM 374500
13.	Hacheston	TM 313567
14.	Ipswich (Castle Hill)	TM 142477
15.	Ipswich (Hadleigh Rd)	TM 146445
16.	Sutton - unknown, modern settlement at TM 305465	

See Fig. 8.1

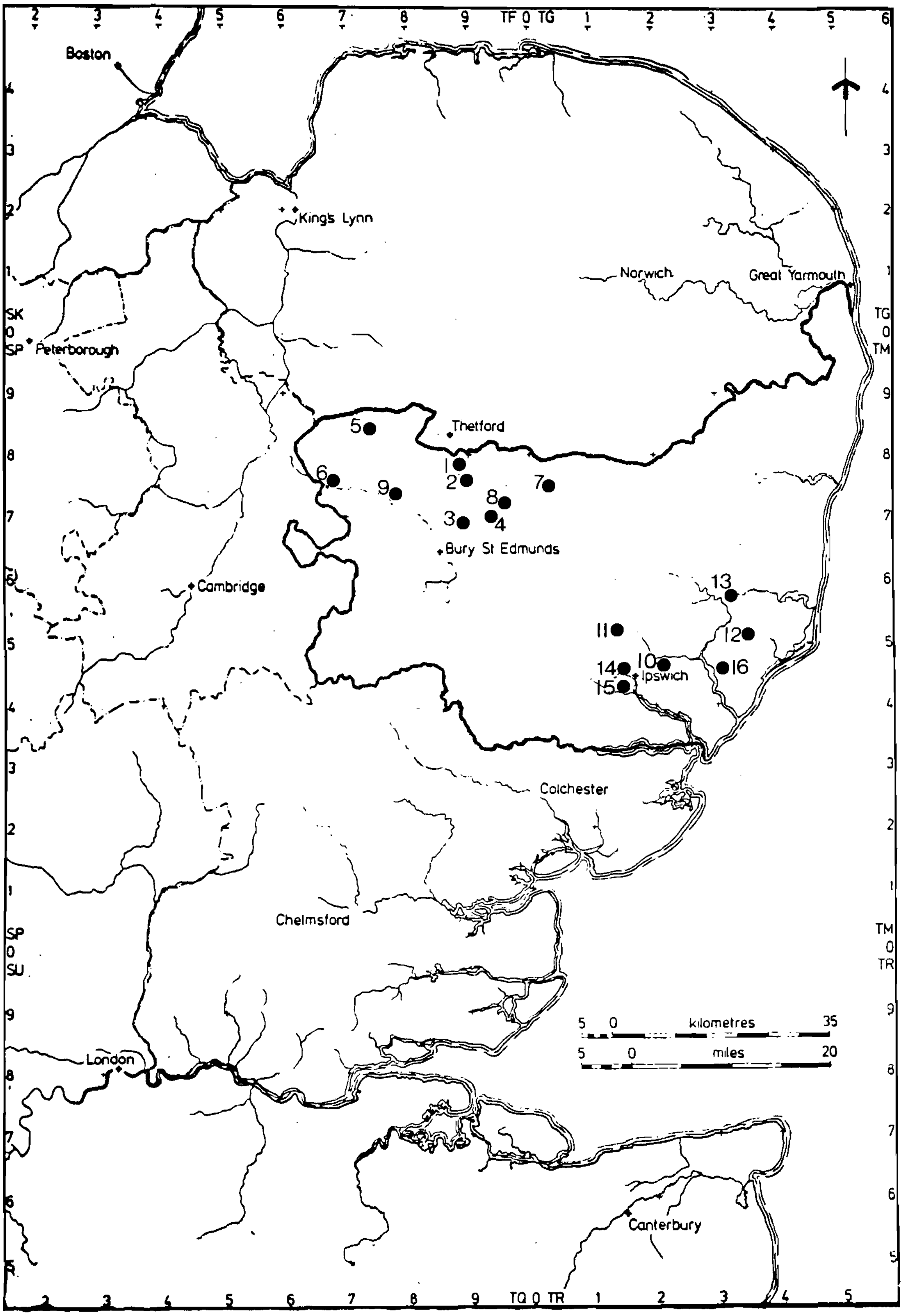


Fig. 8.1: showing the settlements and cemeteries of Early Saxon Suffolk.

Euston

On the 17th of July 1956, Basil Brown visited a site in Euston where pottery had been found. Ploughing revealed a chalk-lined pit, with sloping sides, 45cm deep and 1m north-south by 1.30m. Sixteen sherds of pottery were collected and accessioned to Ipswich Museum (Acc. No. 461.147). The site was described as a 'pottery making hollow'.

Macroscopic analysis

On examination the pottery was found to consist of parts of three vessels. All three were tempered with vegetable matter, but one also contained fragments of flint. A sample was taken from each of the vessels.

Microscopic analysis

All three samples are made of the same clay: they are marked by an unsorted quartz component, the largest sizes of which are rounded, whereas the intermediate and fine fraction are sub-angular to angular.

The presence/absence of inclusions is shown in Table 8.1

Pottery characteristics

Vessel 1 is represented by three body sherds. The outer surface is black with brown patches, and smoothed, while the inner surface is black and brown and has been left natural.

Vessel 2 is represented by one base sherd, diameter 7cm, orange and brown in colour, with a natural surface on the outside of the vessel. The interior is brown and black and has also been left natural. Fragments of flint are visible in the fabric.

Vessel 3 is represented by 11 body sherds and one base sherd. The outer surface is dark brown and has been wiped with the fingers while the clay was wet. The inner surface is black and smooth.

Similarities

No similarities were found with pottery from other sites in the area, or with local clay deposits sampled.

Conclusions

The low level of skill shown both in the variation in surface treatment and firing conditions, and the lack of decoration, points to household production.

Although the site is described as a pottery-making hollow, there is no concrete evidence to support this, as there is no reference in the excavation records to high concentrations of charcoal or traces of burning. Moreover, the small number of vessels represented would mean that, even if this had been a firing pit, it had never been heavily used.

Vessel	IG Rock	Clay Pellets	Vegetable	Sandstone	Flint round	Flint angular
1			X			
2		X	X		X	
3		X	X			X

Table 8.1: showing the presence/absence of inclusions in the Euston pottery.

Fakenham

The site at Fakenham was discovered in 1946 during gravel extraction, and a relation of one of the workmen informed Ipswich Museum that Roman urns had been discovered. Basil Brown, the Museum field worker, negotiated with the owners, who allowed excavation to proceed provided it did not interfere with the extraction process. Visits were made at intervals over the next five years, including periods of excavation when significant features were revealed.

Evidence of occupation during the Bronze Age, Iron Age, and Roman and Early Saxon periods was found, but no traces of the Middle and Late Saxon periods. The Early Saxon settlement seems to have been abandoned, possibly for an alternative site on the eastern side of the river Blackwater, where remains of the deserted medieval village of Fakenham Magna have been found. It appears that the site was then covered by a layer of sand. This is a very similar sequence to events at West Stow (West 1971).

Brown noted a total of 71 dwellings, but the records are not complete enough to show how many of them belonged to the Saxon period. The majority were described as 'huts', and when details are given they describe a sunken circular or sub-rectangular feature excavated into the gravel. This type of domestic structure is most common in the Saxon period in Britain, so it may reasonably be assumed that most of the dwellings were Saxon.

Only two areas of the site were properly watched, and destruction of settlement areas took place both before, and during, the watching brief (Fig. 8.2). The total number of dwellings might therefore be doubled to perhaps 150. Brown's numbers reached 166 but these included other features.

Details were recorded of the following huts:

1. Hut C 16ft x 12ft 6in (4.87m x 3.81m). Central hearth; door in the longest side; sunken feature 2ft 10in (0.86m) deep with gently sloping sides.

2. Hut 21 18ft x 15ft (5.49m x 4.57m). Central hearth; sunken feature 3ft 6in (1.07m) deep.

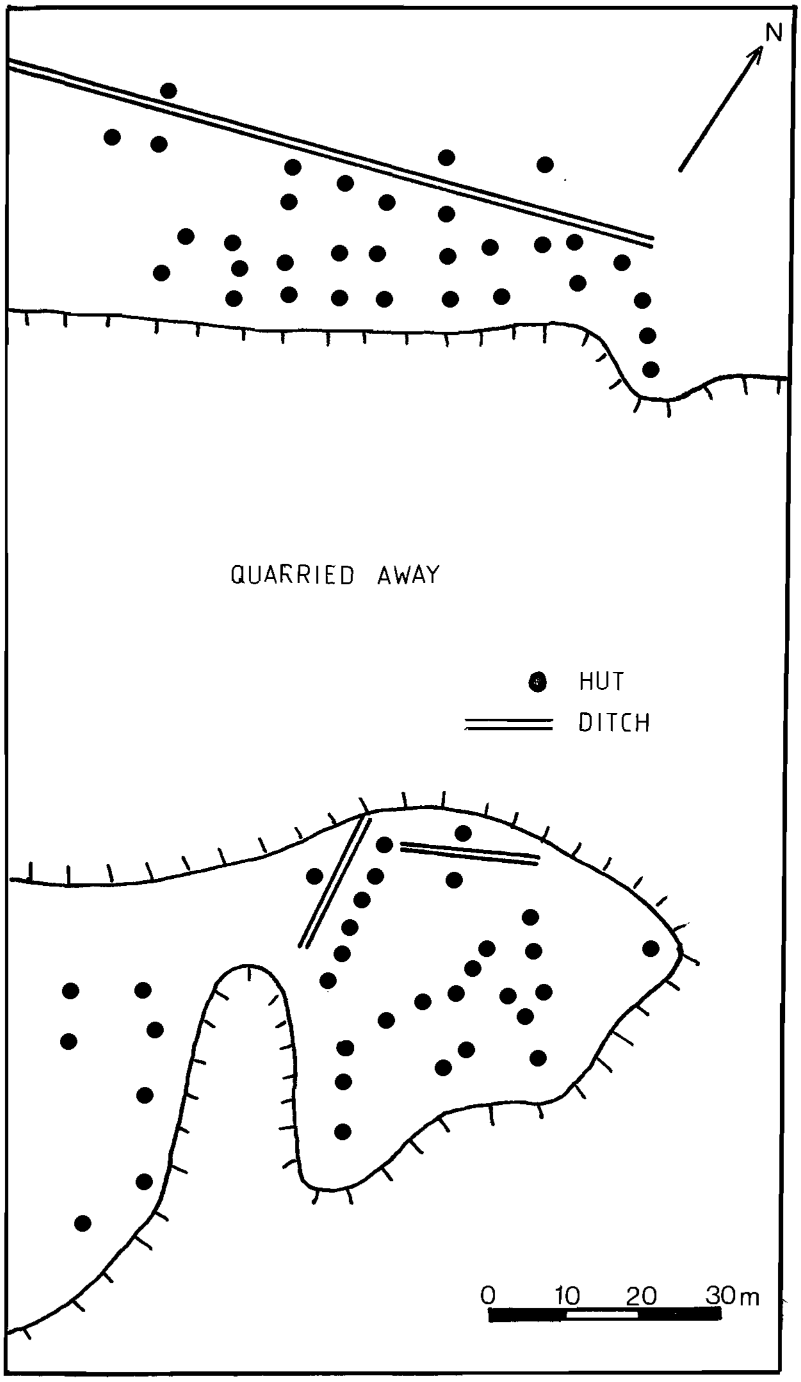


Fig. 8.2: showing the Fakenham Magna quarry and the hut sites and ditches plotted by Basil Brown. According to the information given to him by the workmen the site continued across the quarried areas.(Source: Brown's field notebook.)

3. Hut 25 12ft x 12ft (3.66m x 3.66m). Central hearth; sunken feature of unknown depth with gravel around it.

4. Hut 61 12ft x 12ft (3.66m x 3.66m). Central hearth; opening in centre of one side; sunken feature of unknown depth with 1ft 6in (0.46m) wide gravel bank.

5. Hut 43 Half removed by machine; remainder 12ft (3.66m) across; central hearth; sunken feature 2ft (0.60m) deep with vertical sides and flat base.

6. Hut 121 Sub-rectangular; 2ft 6in (0.76m) deep.

7. Hut 166 13ft 6in east-west x 18ft north-south (4.11m x 5.49m) Entrance in centre of west side.

8. Hut X 10ft (3.05m) diameter; central hearth.

<u>Summary</u>

Hut No	Length	Breadth	Depth	Hearth
C	16' (4.87m)	12' (3.66m)	2'10" (0.86m)	present
21	18' (5,49m)	16' (4.57m)	3'6" (1.07m)	present
25	12' (3.66m)	12' (3.66m)		present
43		12' (3.66m)	2' (0.60m)	present
61	12' (3.66m)	12' (3.66m)		present
121			2'6" (0.76m)	absent
166	18' (5.49m)	13'6"(4.11m)		absent
X	10' (3.05m)	10' (3.05m)		present

The volume of Fakenham material stored in Ipswich Museum was considerable, and there had been no attempt at post-excavation assessment of the site. The difficulty in distinguishing Saxon from Iron Age ceramics was a major problem, both probably being made locally and manufactured with similar technology. The collection was examined by C.J. Balkwill, the Keeper of Archaeology, who had been studying the Iron Age ceramics of Suffolk, and by the author; but a large proportion of sherds could not be allocated with certainty to a particular period. This proportion was considered to be too large to allow it to play a major role in the thin-section programme, and the hut groups were selected on the following grounds.

Hut No	Criterion	Vessels represented
19	Decorated sherds	10
21	Decorated sherds	2
43	Decorated sherds	1
97	Shell-tempered pottery	1
166	Sealed Saxon burial	11
Unstratified	Decorated sherds	1

A single sherd was the only find from hut 97, which was chosen to broaden the fabric series. Three sherds were also selected from unstratified material, as they were obviously the work of the Illington/Lackford potter (Green, Milligan and West 1981), and would therefore complement other aspects of this thesis.

The small groups of pottery from huts 21, 43, and 97 could be due to bias by the excavator in selecting sherds, especially as these are all either rim sherds or decorated. However, both the meticulous collection of small body sherds from other features and the general standard of recording weigh against this. It must also be noted that half of hut 43 had been destroyed before excavation. Records exist for three of the five huts, and the fact that huts 21 and 43 (with low pottery counts) had hearths, whereas 166 (with a high concentration of pottery) had none, may indicate a relevant functional difference.

Two sherds of Roman coarseware and one of prehistoric pottery were also sampled to help in defining the Saxon fabrics.

Macroscopic analysis

Macroscopically six fabric groups were present:

1. Sandy (19 sherd groups)
2. Fine sandy (one sherd group)
3. Vegetable (three sherd groups)
4. Chalk (two sherd groups)
5. Shell (one sherd group)
6. Flint (one sherd group)

Microscopic analysis

Twenty-two thin-sections were made from the 27 sherd groups, and these were sorted microscopically into six fabric groups, which were then checked by textural analysis. The presence/absence of inclusions are shown in Table 8.2.

Fabric 1

This fabric comprised 11 of the 22 thin-sections. The five vessels not sectioned probably belonged to this group also. The fabric consists of a clay matrix containing moderately sorted, medium-sized quartz grains, and inclusions of flint, quartz sandstone, igneous sandstone, igneous rock, grog and ironstone.

Fabric 2

Five of the samples belonged to this group. The fabric is appreciably finer than fabric 1 and can be distinguished macroscopically. The quartz component consists of fine angular to sub-angular grains with larger rounded grains. The clay contains chaff, grog, flint, and shell.

Fabric 3

This comprised two samples, both containing sparse, medium-sized and moderately sorted quartz grains, angular to sub-rounded, with inclusions of crushed rock. It cannot be macroscopically distinguished from fabric 1.

Fabric 4

Two samples were present in this fabric. Microscopically, the fabric is mostly clay matrix, with very sparse unsorted quartz

Fabric	Ig rock	Grog	Veg	Sandstone	Flint	Chalk	Shell	Ironstone
<u>Fabric 1</u>								
Sample 2				X	X			
3	X	X						
4		X			X			
5								X
7	X							
12				X	X			
13			X		X			
20					X			
21	X			X				
22			X		X			
23			X		X			
<u>Fabric 2</u>								
Sample 1			X		X			
6		X			X			
9		X	X					
11			X					
15		X	X					
<u>Fabric 3</u>								
Sample 8	X							
25	X							
<u>Fabric 4</u>								
Sample 18					X	X		
20						X		
<u>Fabric 5</u>								
Sample 14		X	X					
<u>Fabric 6</u>								
Sample 24					X			

Table 8.2: Presence/absence of inclusions in the Fakenham pottery.

grains of sub-angular to sub-rounded shape. The presence of chalk in fragments of up to 3mm gives the fabric a silty feel. Irregular rounded voids indicate that larger pieces of chalk have been leached out by acid soil conditions.

Fabric 5

Only one sample was present of this fabric. The fabric is macroscopically similar to fabric 2, with a fine sandy texture; but it is microscopically different, with dense fine quartz grains, angular to sub-angular in shape, and without the larger rounded grains present in fabric 2. Inclusions of vegetable matter and grog were identified.

Fabric 6

This fabric was also represented by only one sample, and is characterised by dense, well-sorted, medium-sized quartz grains, sub-angular to sub-rounded. The only inclusions are of flint, their rounded shape indicating that they are a naturally occurring part of the sand component.

Textural analysis

Sherds of each fabric were subjected to point-counting and textural analysis. Four sherds were analysed from fabric 1, in order to check on the variation within the fabric, with two each from fabrics 2 and 3, and one from fabric 5. Fabrics 4 and 6 were not analysed, because of the unsuitable quality of the thin-sections, the result of impregnation problems.

The small number of samples makes analysis by matrix feasible. The numbers listed in Table 8.3 represent the highest differences between the number of counts in each size class of each pair (see Chapter 3).

Low numbers around the central line of symmetry and high numbers elsewhere show that each fabric is more similar to itself than to others. The smallest difference lies between fabrics 1 and 3. The average difference here is 24.5, which means that the null hypothesis (no difference between the fabrics) can be rejected at the .05 significance level. Differences of 30 or more

Fabric	1				2		3		5
Sample	3	4	7	22	9	11	8	25	14
3	0	3	15	12	66	70	15	20	90
4	3	0	7	10	64	60	19	22	94
7	15	7	0	3	52	55	28	35	83
22	12	10	3	0	54	58	25	32	84
9	66	64	52	54	0	4	75	86	46
11	70	60	55	58	4	0	83	90	45
8	15	19	28	25	75	83	0	7	106
25	20	22	35	32	86	90	7	0	116
14	90	94	83	84	46	45	106	116	0

Table 8.3: showing the similarity matrix for the main fabrics at Fakenham.

Fabric	Hut 19	Hut 21	Hut 43	Hut 97	Hut 166	U.S	Total	%
1	5	2	1		7	1	16	59.0
2	2			1	1	1	5	18.5
3	2						2	7.5
4	2						2	7.5
5					1		1	4.0
6					1		1	4.0
Total	11	2	1	1	10	2	27	100.5
%	40	7.5	4	4	37	7.5	100	100.5

Table 8.4: showing the number of vessels in each fabric in the Fakenham huts.

would allow rejection at the 0.1 level of significance, and the majority of differences exceeds that.

Pottery characteristics

Table 8.5 gives details of surface finish, colour and decoration. Figures 8.3 and 8.4 show the pottery.

Fabric 1

The outer surfaces are either black (eight examples), brown (two examples), or buff (one example). Four examples are burnished externally; five are carefully smoothed; one is coarsely wiped; and one left natural. The inner surfaces are either black (six examples) or grey (four examples) with one eroded. Two examples were burnished internally, six were smoothed, and two left natural. All the sherds were well-fired.

Fabric 2

The outer surfaces are normally grey - only one of the five being black - and seldom burnished (one example , compared with two smoothed and two natural). The inner surface is eroded in one example; but of the others, three are black and one grey, with one example each of smoothed, burnished, wiped, and natural surfaces. Three examples are fired hard and two soft.

Fabric 3

The outer surfaces of the two examples are either black or grey and smoothed, the inner surfaces being grey or black, the opposite to the interiors, and smoothed. Both samples are well-fired.

Fabric 4

The outer surfaces are either black or buff, the inner surfaces grey and black respectively. The surfaces are burnished and smooth on the exterior, and natural or smoothed inside. Both examples are low-fired and soft.

Fabric + Vessel	Sample	Outer Surface Colour	Outer Surface Finish	Inner Surface Colour	Inner Surface Finish	Hard/Soft	Decoration
Fabric 1							
Sandy 1	2	Black	Burnished	Black	Burnished	H	Stamped
Sandy 3	3	Black	Burnished	Black	Smoothed	H	Stamped
Sandy 5	4	Black	Smoothed	Grey	Smoothed	H	Stamped
Sandy 4	5	Black	Smoothed	Grey	Smoothed	H	Stamped
Sandy 2	7	Buff	Natural	Black	Burnished	H	Bossed
Sandy 13	12	Brown	Burnished	Grey	Smoothed	H	
Sandy 12	13	Black	Burnished	Black	Natural	H	
Sandy 16	20	Buff	Wiped	Black	Natural	H	
Sandy 7	21	Black	Smoothed	Grey	Smoothed	H	
Sandy 18	22	Black	Smoothed	Black	Smoothed	H	
Sandy 19	23	Black	Smoothed	Black	Smoothed	H	Combed
Fabric 2							
Shell 1	1	Grey	Natural	Grey	Smoothed	H	
Fine sand + flint	6	Black	Burnished	Black	Burnished	S	
Fine sandy	9	Grey	Natural	Black	Wiped	S	
Vegetable	11	Grey	Smoothed	Black	Natural	H	
Vegetable 3	15	Grey	Smoothed	Black	Natural	H	Combed
Fabric 3							
Sandy 6	8	Black	Smoothed	Grey	Wiped	H	
Sandy 8	25	Grey	Smoothed	Black	Smoothed	H	
Fabric 4							
Chalk 2	18	Black	Burnished	Grey	Natural	S	Stamped
Chalk 1	10	Buff	Smoothed	Black	Smoothed	S	Stamped
Fabric 5							
Vegetable 2	14	Black	Smoothed	Orange	Natural	S	
Fabric 6							
Sandy 17	24	Orange	Smoothed	Black	Natural	S	

Table 8.5: showing the pottery characteristics of the Fakenham pottery.

Fabric 5

The single example is black and smooth on the exterior, orange and natural inside, and low-fired.

Fabric 6

The single example is orange and smooth outside, black and natural inside, and was low-fired.

Little can be said about the forms of each fabric because rim sherds were present only in fabrics 1 and 2. These were all everted rims.

Stamped decoration was the most common form of decoration, and the majority of the decorated pots were probably decorated in the 'panel' styles (Myres 1969), with areas of stamping demarcated by lines and grooves. Two vessels had been combed on their outer surface, though this may be functional rather than decorative.

The stamped decoration of fabric 1 indicates a date in the second half of the 6th century. This conclusion is supported by the connection with the Illington/Lackford workshop, the pottery from which has been dated at West Stow to the late 6th century (West pers. comm.). Evidence provided by hut 166 (containing 70% fabric 1) lends further support to this dating. The dwelling overlay what is probably a 6th century grave (Myres and Green 1973), which contained a male burial with a scramasax.

Similarities

No similarities were found with fabrics from other sites in the region, apart from fabric 1 which was widely traded, being Illington/Lackford vessels.

Fabric 4 was found to be very similar to local clay collected on the valley side to the west of the site.

The relationship between fabric and context is shown in Table 8. 4 on page 243.

Conclusions

Fabric 1 is the major fabric group, occurring in four of the five huts sampled, and comprising 59% of the total number of sherd groups. It contains sherds decorated in the style of the Illington/Lackford potter; in fact six of the sherd groups are from decorated vessels, five stamped and one combed. This is two-thirds of the decorated pottery from the site. The fabric is identical to the fabrics of the majority of the Illington/ Lackford sherds from West Stow; it is well-fired and decorated; and it is likely therefore to represent traded pottery valued presumably for its high quality and craftsmanship.

Fabric 2 is a fine clay, probably unsuitable for pottery manufacture untempered, and has usually had animal dung or flint added. The shell fragments in sample 1 may have been mixed in for similar reasons, but they have rounded edges and are more likely to have been present naturally, although it is possible that shell sorted from the drift by fluvial erosion had been collected. Fabric 5 may be a sub-group of this fabric. It consists of a fine clay with added vegetable tempering; but it has more angular quartz and a higher concentration of mica.

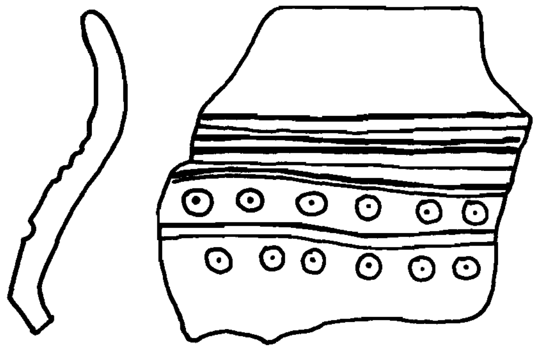
Fabric 4 is a low-fired fabric with much chalk present. The chalky drift clays cannot be fired to high temperatures without risk of rehydration of the calcareous inclusions, which would cause disintegration, and the potters may well have erred on the side of safety. The fabric carried stamped decoration; but the large inclusions prevent ease of decoration, and once again suggest lack of craft skills. Fabric 6 is also low-fired and less well-finished than the traded products. Fabric 3, a better product with a high-fired fabric, shows evidence of some selection of raw materials. Either a clay with natural igneous rock fragments was chosen, or these were deliberately added.

The ceramics on the site can probably be divided into fabric 1, which was imported; and fabrics 2-6, which were indigenous. The latter appear to have been made with whatever clays were available in the locality. Indeed fabric 4 is very similar in comparison to clays outcropping today on the hillslope above the site, between it and the Saxon cemetery on Fakenham

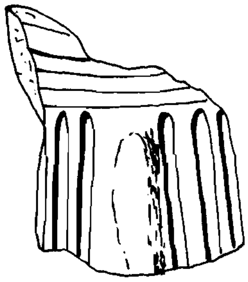
Heath.

The earliest Saxon period - the 5th century - is probably not represented in this sample of fabrics, almost certainly because the hut groups were chosen by reference to a style of pottery decoration that was most common in the late 6th century. The settlement itself probably existed earlier, because a 5th century urn has been reported from Fakenham Heath (Myres 1969)

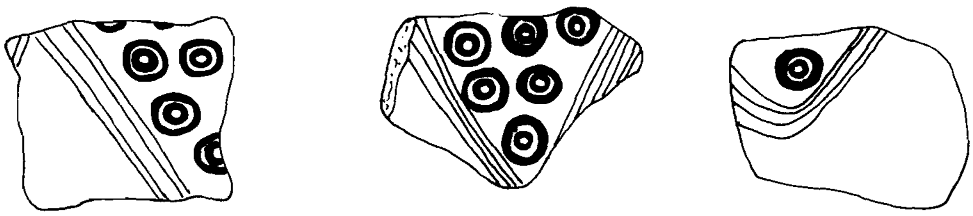
Therefore, although there is no evidence for the mode of production in the 5th century it is obvious that by the second half of the 6th century ceramics were being imported to the site in considerable quntities. These vessels were all possibly the decorated products of the Illington/Lackford workshop and show signs of standardisation in finish and firing technology that contrast with the other, locally made, vessels.



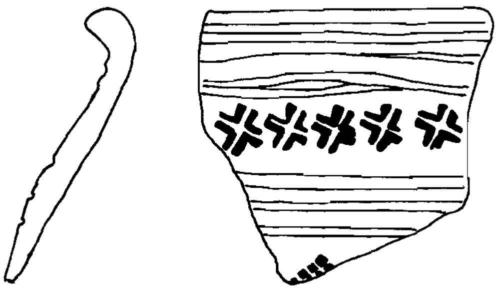
S1



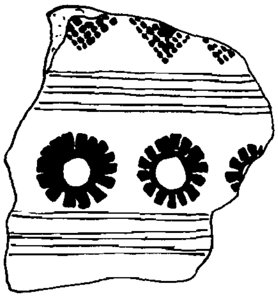
S2



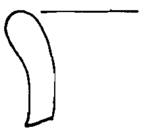
S3



S4



S5



S12

Fig. 8.3: showing the sherds of fabric 1 at Fakenham. Scale 1:1

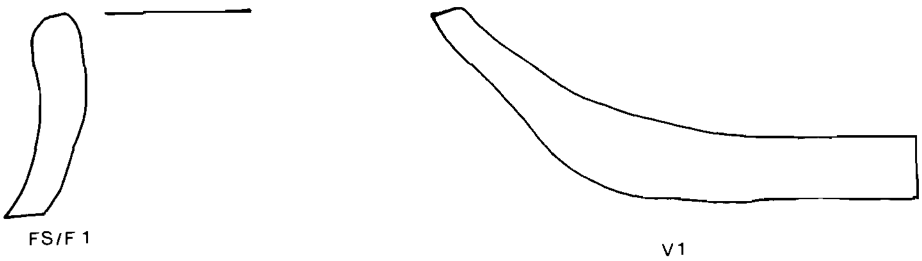


Fig. 8.4a: The sherds of fabric 2 at Fakenham. Scale 1:1

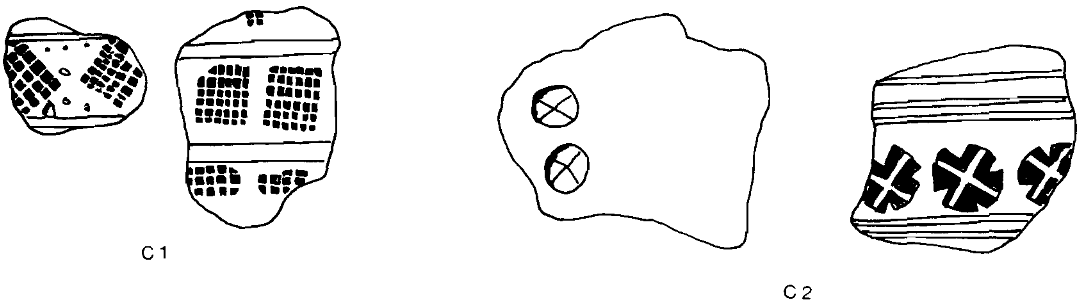


Fig. 8.4b: showing the sherds of fabric 4 at Fakenham. Scale 1:1

Great Barton

On the 23rd of January 1952, Basil Brown visited Red Castle Farm, Pakenham, to observe the first deep ploughing of the farm, He was particularly interested in the Roman villa known to be beside the farm house; however, the plough turned up Saxon remains on the other side of the road to the villa site, in Great Barton parish. Basil Brown wrote of this site,

> Many animal bones are strewn about. At a depth of one foot black earth of occupation layer with several hut sites and some pot hearths... hardly fired ring loom-weight was found in a pot hearth and a large quantity of reddish clay ash in association. (Basil Brown).

The finds that had been stored at the Ipswich Museum could not be traced, but one stamped sherd is illustrated in the notebook (see Fig. 8.5). Limited field walking by the author produced two sherds of handmade pottery from the site, one rusticated, the other a rim sherd.

Microscopic analysis

Both the sherds were sectioned and found to be of different fabrics.

Fabric 1

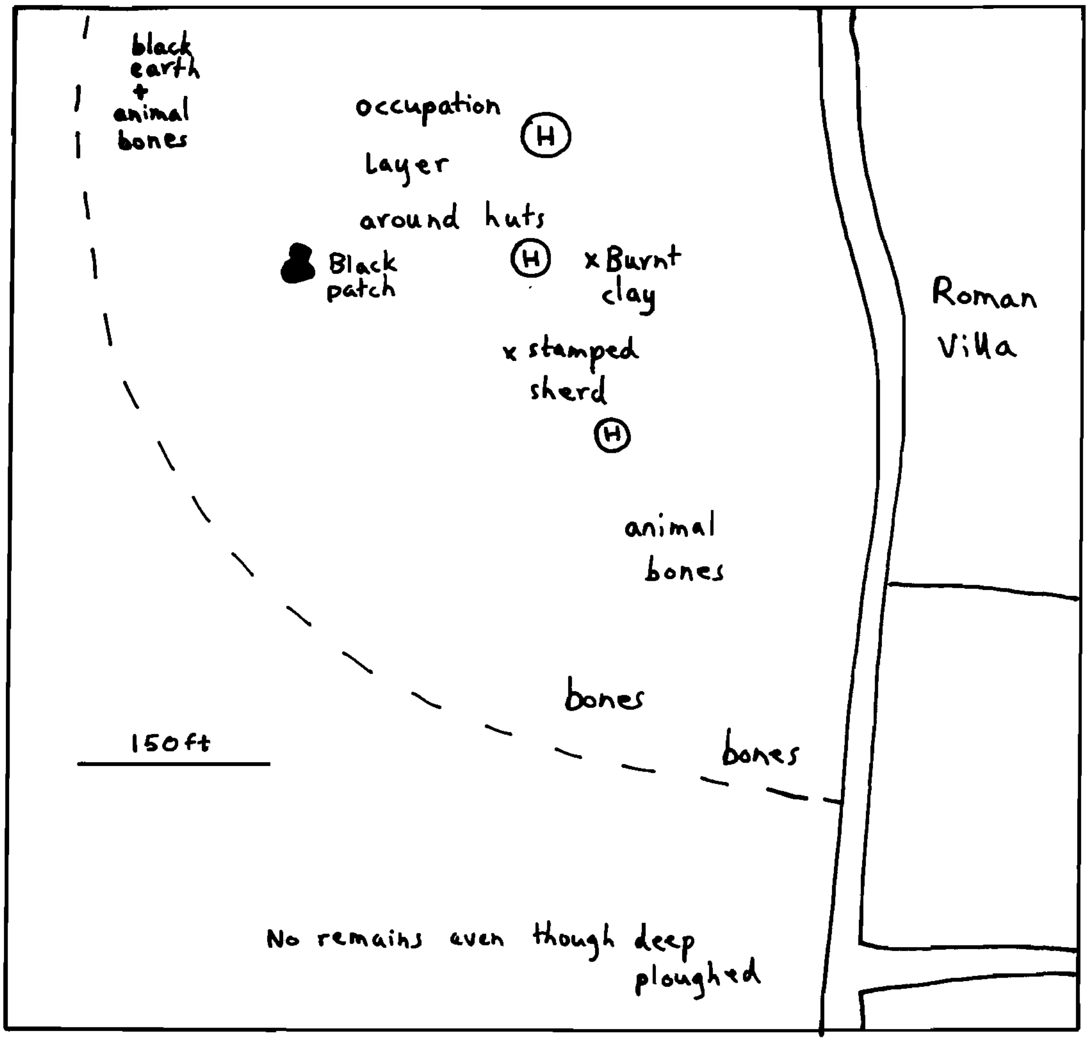
The rusticated sherd is composed of a silty clay matrix containing a quartz component derived from a ferruginous sandstone, fragments of which are present. The quartz grains are sub-rounded to rounded in form, and moderately sorted.

Fabric 2

The rim sherd is composed of a fine sandy clay matrix with abundant unsorted quartz grains of sub-angular to sub-rounded form. Occasional clay/grog pellets and large rounded quartz grains are present.

Pottery characteristics

The sherds were both too eroded for the surface finishes to be discerned.



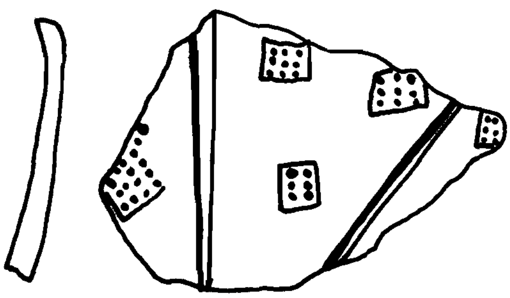


Fig. 8.5: showing illustrations from Basil Brown's field note-book. The upper drawing shows the remains revealed by deep ploughing, the lower a single sherd of stamped pottery.

Similarities

Fabric 2 is the Illington/Lackford fabric 5 at West Stow. Fabric 1, however, has not been found on any other site in the area. No clay deposits were located in the area to compare the pottery with.

Conclusions

Although only a small sample of this site's potential ceramic assemblage could be analysed, it does suggest that it falls within the distribution pattern of the Illington/Lackford vessels from West Stow.

The fabric 1 clay may be a more local clay although none could be found to match it in the vicinity. The drift in this part of Suffolk is mainly calcareous and it is probable that fabric 2 also comes from further away.

Fig. 8.6: showing the pottery from Barton. 1:1

Ixworth Cemetery

A group of Saxon cremation urns were excavated in Ixworth in 1950-51 by Basil Brown (site 22 in the Brown field notebook). Seven vessels were recovered, which are now in Ipswich Museum (Acc. No. 1951-81-6). Jewellery and other artifacts of Saxon origin have been found in Ixworth over the last 100 years, and many of these are now in the Cambridge Museum of Archaeology and Anthropology. In 1868 a skeleton with red enamel cruciform brooches was found in the cemetery area (Meaney 1964). In his Corpus, Myres lists a vessel from Ixworth (CN 2921) as being in the Cambridge Museum, which is of considerable interest because it is almost identical to a vessel from Lackford (CN 998), also in the museum. However, the museum deny all knowledge of the Ixworth vessel, and their accession register contains no reference to pottery vessels of any kind from Ixworth. Even without this link, the Ixworth cemetery is significant in its own right, and it is puzzling why Myres did not include it all in his Corpus.

It is discussed here because Ixworth is the nearest cemetery to the large settlement of Grimstone End (see Chapter 9), and may have formed part of a larger cemetery serving that settlement. To test this theory, a sample was taken from six vessels for comparison with the samples from Grimstone End.

Macroscopic analysis

Macroscopically, five fabrics were present;

1. Sandy (two vessels)
2. Coarse sandy (one vessel)
3. Chalky (two vessels)
4. Grog (one vessel)
5. Vegetable-tempered (one vessel)

A sample was taken from each fabric group, as well as two samples from the chalk group, because there appeared to be a considerable difference between the fabrics of these two vessels.

Microscopic analysis

Microscopic analysis of the six samples revealed the presence of five fabrics. The grog sample proved to be composed of the same clay as the coarse sandy fabric, whereas the two chalky samples proved to be separate fabrics.

Fabric 1

This fabric comprises the vessel tempered with grog and the vessel described as coarse sandy. It consists of an iron-rich silty clay matrix, containing rounded particles of iron compounds, with a dense unsorted quartz component, individual grains being sub-rounded to rounded. Some of the larger grains bear traces of calcareous cement.

Fabric 2

This fabric comprises the sandy fabric. It consists of a silty clay matrix, with sparse, unsorted quartz grains of sub-angular to rounded form. The larger grains bear traces of siliceous cement, and some grains are still together.

Fabric 3

This was the first of the chalky vessels, represented by a single sherd. The fabric consists of a sandy clay matrix with fine quartz component, and a coarse component of a more angular nature. Similar angular grains appear in a fragment of granitic sandstone, and other large granitically derived grains are present. The calcareous component consists of unsorted fragments of chalk and fossil shell, which indicate a source in the Jurassic drift deposits.

Fabric 4

This fabric which comprises the second chalky vessel, consists of a fine sandy clay matrix with abundant well-sorted quartz grains, with a scattering of larger sub-rounded grains. There are a considerable number of clay pellets of an amorphous character and a smaller number of grog particles, which are of similar size but have a well-defined boundary. The calcareous component consists of small scattered particles of well-rounded chalk and some flint. Also present are fragments of sandstone (with individual grain sizes of a similar range to the larger quartz grains in the fabric) held together with a siliceous cement.

Fabric 5

This fabric comprises the vegetable-tempered macroscopic fabric, and consists of an iron-rich silty clay matrix with a few scattered fine quartz grains. In addition there is a coarse component of much larger angular particles of siliceous sandstone. The vegetable temper revealed itself as soot-filled elongated voids, sometimes curved.

Ixworth Villa

The Ixworth Roman villa was excavated in 1948 by Kilner and Brown, but the only records of the excavation appear in Brown's notebooks. The villa was a substantial structure, of which only the west wing was fully excavated. A separate bath house had been uncovered in the 1840s (Procedings of the Suffolk Institute of Archaeology Vol 1). The villa had an apsidal extension, tiled floors, and painted wall plaster. The excavation produced late 3rd century coins including some of Honorius (Brailsford 1948).

During the excavations, Brown scoured the surrounding fields for archaeological debris, and his site plan records Saxon pottery to the west of the villa, Saxon occupation to the south-east, and a possible hut site to the south. Brown made no drawings of the Saxon finds, but there is a reference to 'nail-decorated pottery' (Brailsford 1948) meaning decoration by finger-nail pinching or rustication, a common motif on Saxon pottery. No Saxon finds survive.

The author has walked the site on a number of occasions, but found no Saxon material. There is little evidence, however, of the villa or even of Roman occupation, possibly because the hillside is no longer deep ploughed, for fear of topsoil erosion. Deep ploughing first brought the site and its Saxon material to the surface, and it is possible that most of the artifacts have been reburied in the fine sandy soil.

Field-walking was carried out by the author on fields in the area, and the opportunity was taken to examine a field, known as Crossfield, on the flood plain between the villa site and the Saxon cemetery, when it was ploughed and later developed. There was a scatter of Roman sherds in the topsoil, and a single rusticated sherd of probable Saxon date turned up in spoil from a modern post-hole.

This sherd was thin-sectioned to add to the fabric series from the Ixworth cemetery.

Fabric 6

A fine silty clay matrix, with scattered larger rounded quartz grains. Also present are large fragments, both rounded and angular of oolitic limestone, rounded chalk, and flint. This points to a source in a Jurassic glacial till.

Pottery characteristics

Most of the vessels were probably originally decorated as they were chosen for cremation containers. However, ploughing had removed the majority of each vessel. The pottery characteristics are shown in Table 8. 6 , and the vessels are illustrated in Fig. 8. 7 .

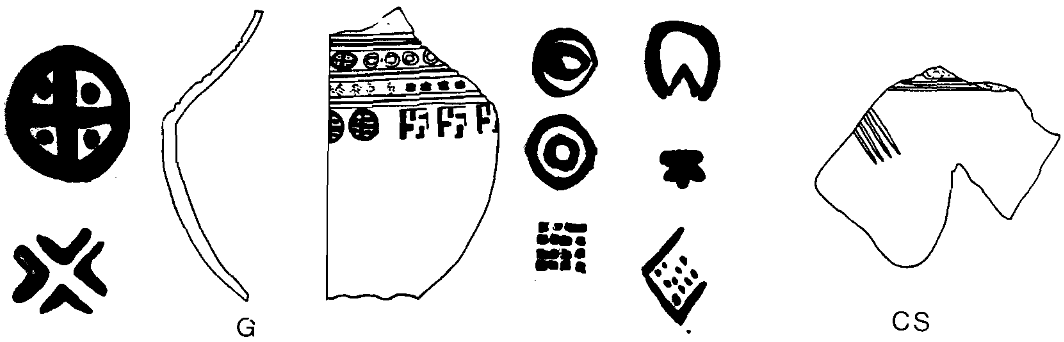
Similarities

If the Crossfield sherd is part of the cemetery assemblage then four out of the six fabrics in the cemetery are identical to those in use at Grimstone End 1km to the south. These matches are as follows:

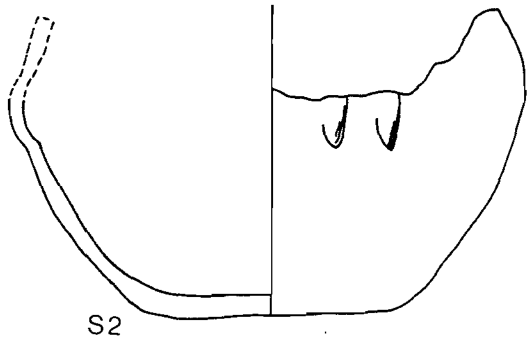
Ixworth	Fabric 2	= Fabric 27	Grimstone End
	Fabric 3	= Fabric 62	
	Fabric 5	= Fabric 42	
Crossfield	Fabric 6	= Fabric 55	

Fabric	Outer Surface Colour	Outer Surface Finish	Inner Surface Colour	Inner Surface Finish
Fabric 1				
Grog	Black/brown	Burnished	Grey	Smoothed
C. Sandy	Buff/red/grey	Smoothed	Grey	Natural
Fabric 2				
Sandy 1	Dk red/Brown	Smoothed	Buff	Smoothed
Sandy 2	Black	Smoothed	Black	Smoothed
Fabric 3				
Chalky 1	Grey	Natural	Buff/grey	Natural
Fabric 4				
Chalky 2	Buff/grey	Smoothed	Grey	Natural
Fabric 5				
Vegetable	Brown/red	Smoothed	Dark/grey	Smoothed

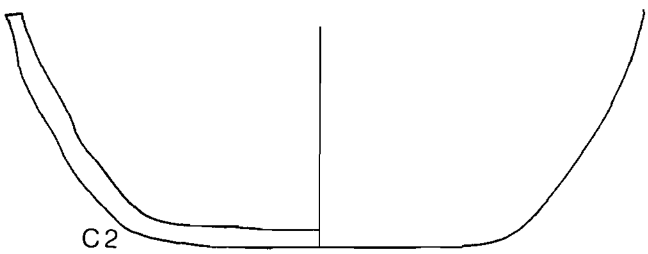
Table 8.6: showing the pottery characteristics of the Ixworth pottery.



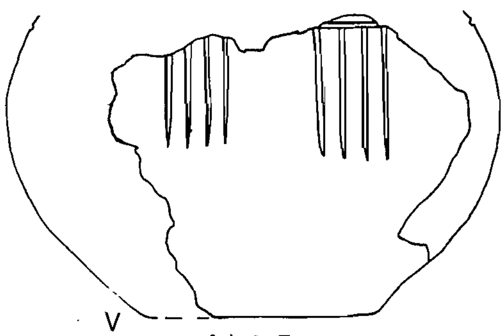
fabric 1



fabric 2



fabric 4



fabric 5

5cm

Fig 8. 7

Conclusions

This suggests that either the Grimstone End dead being buried in vessels from their own settlement, at the Ixworth cemetery, or vessels were being obtained from Grimstone End by the Ixworth inhabitants. Alternatively both communities shared the same clay sources. Further excavations in Ixworth are needed to examine the fabrics in use on the assumed Ixworth settlement site before these theories can be refined.

Lakenheath

Since the end of the last century Saxon finds have been recorded from the Lakenheath area. The remains of seven vessels were accessioned to the Cambridge Museum of Archaeology and Anthropology in 1879, and a further two in 1901. Another seven sherd groups were added in 1944 from excavations carried out at Lakenheath Warren by Lethbridge. These are presumed to be from a cemetery at grid reference TL 732809 (Meaney 1964). Further finds in the area are detailed in Briscoe (1979).

In 1949, G. Briscoe published Saxon pottery from a site known as No 1 field and Sahara; more recently finds were made as reported by Briscoe 1979. These were made available for analysis by kind permission of R. Morley and T. Briscoe, the finders. Samples were also taken from the cemetery finds for comparison. None of the pottery is provenanced, so it will be treated here as an unstratified collection.

Macroscopic analysis

The pottery was divided into six fabrics, with 45 sherd groups present.

Fabric		Sherd groups	Percentage
1.	Sandy	31	69%
2.	Fine sandy	6	13%
3.	Granitic	3	7%
4.	Vegetable	3	7%
5.	Granitic & vegetable	1	2%
6.	Grog	1	2%

Of the 45 sherd groups, 40 (91%) carried some form of decoration. Such a high percentage of decorated sherds is unlikely to occur naturally in an Early Saxon assemblage. This points to a bias in the collection process, which makes it impossible to compare the assemblage with other groups in terms of vessel form and date range. A Petersen estimate cannot be calculated either, due to the bias in collection, because only one base sherd is present and that is one of an unusual nature.

One advantage of this collection is that it enables us to compare the domestic fabrics with those of the nearby cemetery as well as those on surrounding sites. The assemblage contains sherds bearing the distinctive motifs of the Illington/Lackford workshop, so the settlement may have been obtaining ceramics from outside the immediate locality.

Microscopic analysis

Thirty-two samples were taken, with high sampling fractions (often 100%) for the smaller groups. There was only a 60% sample in group 1, because there appeared to be a greater uniformity of fabric. Two samples each were taken from sherd groups Sandy 1, and Fine sandy 1, in order to check the accuracy of the sherd groupings. Both were found to be consistent. The sample size would have been greater in some groups but for the small sherd size and the resulting risk of damage to the decorated surfaces when removing samples.

On microscopic examination, by direct comparison of texture and inclusions, a total of 15 fabrics was found. For example, fabric 1 contained eight of the macroscopic sandy samples, one of the fine sandy, two of the granitic, and one of the vegetable. (see Table 8.7).

From the Table it can be seen that there is no such thing as an exclusively granitic clay; it is a component of fabric 1 and probably represents tempering. Apart from fabric 1, which contains samples from four macroscopic groups it is clear that the macroscopic groups do represent real differences in the fabrics, even if the human eye cannot see finer differences within each group.

A presence/absence of inclusions table was drawn up (see Table 8. 8).

Fabric 1

A fine sandy clay matrix containing a moderately sorted quartz component with few grains over 0.25mm. The grains are mostly sub-rounded in shape, the degree of roundness increasing

MICROSCOPIC FABRICS	MACROSCOPIC FABRICS						
	FABRIC	SANDY	FINE SANDY	GRANITIC	ORGANIC	GRANITIC/ORGANIC	GROG
SANDY	1	8	1	2	1		
	2	2					
	3	2					
	4	2					
	5	2					
	6	1					
	7	1					
	8	1					
FINE SANDY	9		2				
	10		1				
	11		1				
ORGANIC	12				1		
	13				1		
GRANITIC/ORGANIC	14					1	
GROG	15						1

Table 8.7: showing the relationship between the microscopic and macroscopic fabrics. The figures give the number of sherd groups which fall into each category.

Fabric/Vessel	IG Rock	Grog	Clay Pellets	Organic	Sandstone Siliceous	Calcareous	Flint	Chalk
Fabric 1 Sandy 2							X	X
Sandy 3							X	
Sandy 4	?					X		
Sandy 5	X							
Sandy 6							X	
Sandy 13	X				X			
Sandy 14	X						X	
Sandy 15							X	
Sandy 18	?							
Fine Sandy 2					X			
Granitic Sand 2	X		X	T				
Granitic Sand 3					X		X	
Vegetable 3				T				
Fabric 2 Sandy 9		X						
Sandy 10		X						
Fabric 3 Sandy 8				X		X	X	
Sandy 11				X		X		
Fabric 4 Sandy 1						X	X	
Fabric 5 Sandy 7		X			X		X	X
Sandy 16	X				X			
Sandy 20								X
Fabric 6 Sandy 12				X	X			
Fabric 7 Sandy 17						X	X	X
Fabric 8 Sandy 19					X			
Fabric 9 Fine Sandy 4							X	
Fine Sandy 5							X	
Clay							X	
Fabric 10 Fine Sandy 3					X			
Fabric 11 Fine Sandy 1						X	X	
Fabric 12 Vegetable 1				X			X	
Fabric 13 Vegetable 2			X	X				
Fabric 14 Granitic/Veg.	X			X				
Fabric 15 Grog 1		X						

T = Trace
X = Present

Table. 8.8: showing the presence/absence of inclusions.

with size.

Fabric 2

An iron-rich sandy clay matrix with common fine quartz grains, and a coarser, moderately sorted, sub-angular quartz component.

Fabric 3

A silty clay matrix with abundant fine quartz grains and a coarser, moderately sorted sub-angular component.

Fabric 4

A fine sandy matrix with a dense, well-sorted coarse component of sub-angular grains of quartz and flint particles.

Fabric 5

A fine silty clay matrix with scattered fragments of disaggregated sandstone.

Fabric 6

A sandy clay matrix with scattered fragments of disaggregated siliceous sandstone. Conjoined fragments of up to 25 quartz grains are present.

Fabric 7

A sandy clay matrix with a coarse component of scattered, rounded quartz grains, and angular fragments of calcareous sandstone. Many small rounded particles of chalk, and one large rounded fragment of flint are present.

Fabric 8

A silty clay matrix with an unsorted, rounded quartz component. Many of the larger grains bear traces of siliceous cement, and two fragments of siliceous sandstone are present.

Fabric 9

A fine sandy clay matrix with scattered, unsorted, sub-rounded quartz grains. Particles of rounded flint point to a source in the drift material. A lump of fired clay was also found in this fabric.

Fabric 10

A fine sandy clay matrix with abundant, rounded and sub-rounded, sorted quartz grains. Possibly a siliceous sandstone was the source of these quartz grains as one fragment with similar-sized quartz grains is present.

Fabric 11

A sandy clay matrix with a scattered, unsorted quartz component. The larger grains are rounded and are derived from a calcareous sandstone.

Fabric 12

A sandy clay matrix with abundant fine quartz grains, with occasional larger scattered grains, often well-rounded. The vegetable matter is present as carbonised plant remains in elongated voids aligned with the vessel walls.

Fabric 13

A fine clay matrix almost totally obscured by abundant, well-sorted, sub-angular to rounded quartz grains. Occasional larger quartz grains are present, well-rounded in form. Unaligned voids show the presence of vegetable tempering material. A single clay pellet of untempered matrix is present, which, judging by the void around it, suffered from a high shrinkage rate.

Fabric 14

A silty clay matrix with a scattered fine quartz component. A coarser component is present consisting of larger, sub-angular, single crystal grains, of quartz and feldspar, with small particles of weathered biotite mica. Vegetable matter is present as soot-filled voids aligned with the vessel walls.

Fabric 15

A clay matrix with an unsorted quartz component typical of a boulder clay. Large abundant particles of grog are present, both oxidised red and reduced grey.

Pottery characteristics

The bias towards decorated vessels in the collection of these sherds would be likely to lead to a higher proportion of well-finished and carefully produced pottery than would normally be expected. Indeed, very few of the vessels are unsmoothed or unburnished. With all fabrics, most of the pottery was well-fired and black or grey, the occasional oxidised sherds probably being sherds burnt after breakage. (see Table 8.9).

The decoration can be divided into two groups - those with finger-and-thumb-pinched 'rustication', and those with grooved zones and stamping. Six of the sherd groups bear rusticated decoration. These consist of four sherd groups in fabric 1, and the single sherd groups of fabrics 4 and 15, both of which are sandy fabrics, the latter containing grog. (see Fig. 8.8).

The four fabric 1 sherd groups could be only three vessels, because groups 3 and 5 were pinched in a similar fashion, i.e. medium-sized pinches, widely spaced. Sherd group 5 is probably a base angle, the finger-pinching on the base having been flattened, when the decoration was finished, after the 'green' pot was placed back on its base.

Sherd group Sandy 2 has large finger pinches, widely spaced, while Sandy 4 has small pinches and was burnished after the pinching process, thus to some extent flattening the pinched-up portions back into their hollows.

The single example in fabric 4 bears very large shallow pinches, with the abundant quartz grains giving the hollows a striated appearance. This has been attributed elsewhere to a textile wrapped over the fingers (Briscoe 1979).

The single sherd group of fabric 15 - the grogged fabric- bears closely spaced finger and thumb pinches in regular rows. The pinch was executed at an angle to give a zig-zag effect, though whether this was deliberate or not is a matter for

Fabric	Outer Surface Colour	Outer Surface Finish	Inner Surface Colour	Inner Surface Finish
1				
Sandy 2	Grey/Brown	Smoothed	Grey/Brown	Smoothed
3	Grey	Smoothed	Grey	Smoothed
4	Grey	Burnished	Grey	Burnished
5	Brown	Smoothed	Brown	Smoothed
6	Black	Smoothed	Black	Smoothed
13	Black/Buff	Burnished	Black	Smoothed
14	Grey/Black	Natural	Grey	Natural
15	Grey	Smoothed	Grey	Eroded
18	Black	Smoothed	Black	Natural
FS 2	Black	Smoothed	Black	Smoothed
GS 2	Brown	Natural	Brown	Natural
GS 3	Brown	Smoothed	Brown	Natural
Veg. 3	Black	Natural	Black	Natural
2				
Sandy 9	Brown	Smoothed	Brown	Smoothed
10	Dark Grey	Natural	Dark Grey	Eroded
3				
Sandy 8	Brown	Burnished	Brown	Smoothed
11	Buff	Smoothed	Buff	Smoothed
4				
Sandy 1	Brown/Black	Natural	Brown/Black	Natural
5				
Sandy 7	Black	Burnished	Black	Burnished
16	Brown	Smoothed	Black/Brown	Burnished
20	Pink	Smoothed	Pink	Smoothed
6				
Sandy 12	Black/Grey	Burnished	Black/Grey	Smoothed
7				
Sandy 17	Black	Burnished	Grey	Natural
8				
Sandy 19	Black	Burnished	Black	Smoothed
9				
Fine sandy 4	Eroded		Eroded	
6	Grey	Smoothed	Grey	Natural
10				
Fine sandy 3	Brown	Natural	Brown	Smoothed
11				
Fine sandy 1	Brown	Natural	Brown	Smoothed
12				
Vegetable 1	Brown	Natural	Brown	Natural
13				
Vegetable 2	Grey	Natural	Grey	Natural
14				
Granitic/Veg. 1	Black	Smoothed	Grey	Natural
15				
Grog 1	Brown	Smoothed	Brown	Natural

Table 8.9: showing the surface characteristics of the Lakenheath pottery

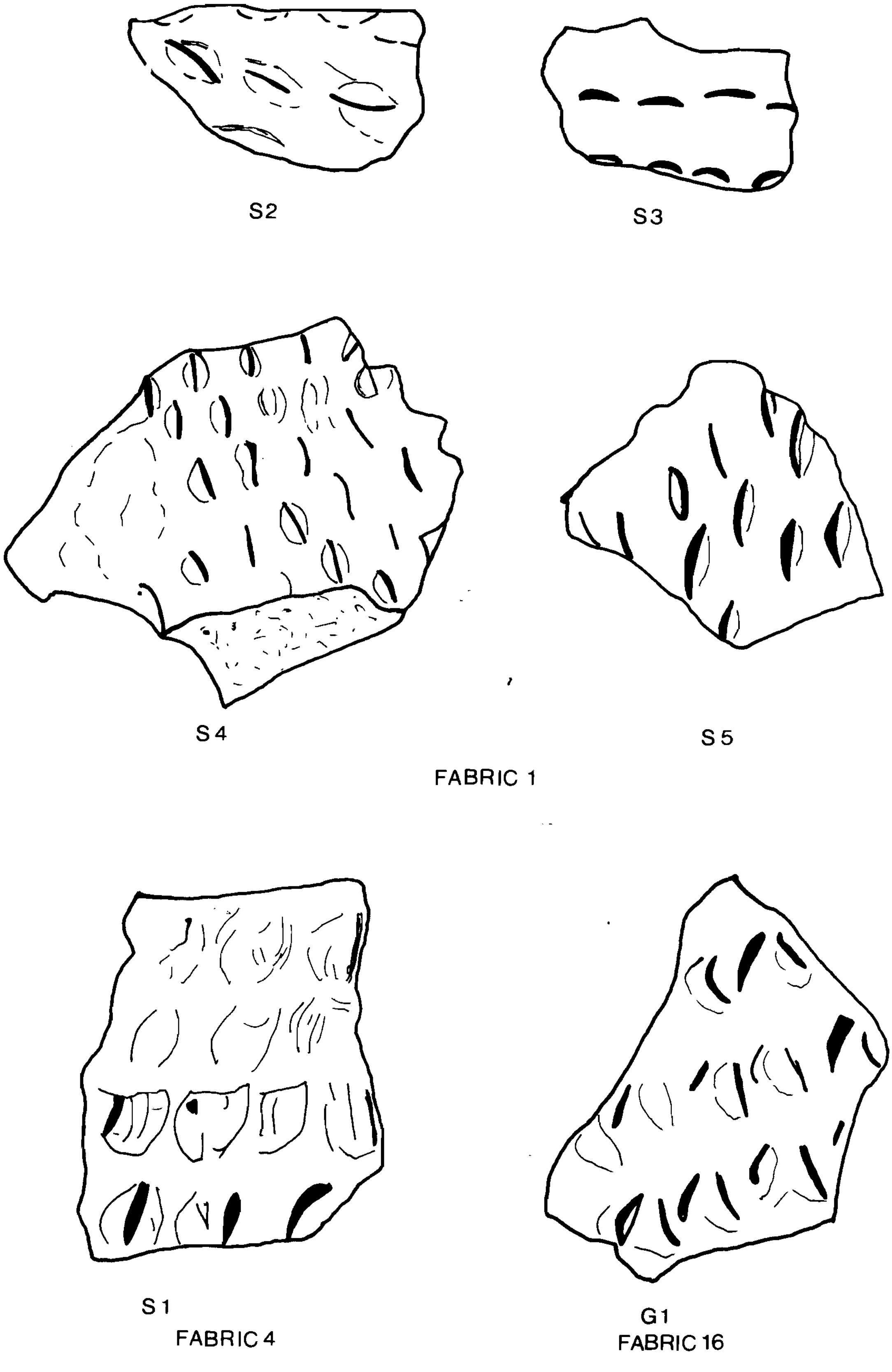


Fig. 8.8: showing the rusticated sherds from Lakenheath, grouped by sherd group and fabric. Actual size.

conjecture.

The stamped vessels have been illustrated by Briscoe (1979) and are therefore not illustrated here. Figure 8.9 shows the stamps grouped by fabric, which probably indicates stamps in contemporary use, possibly parts of individual potter's stamp-kits.

Lakenheath Warren cemetery

Finds from a Lakenheath cemetery were given to the Cambridge Museum of Archaeology and Anthropology in 1897, 1899, and 1901. The findspot of this material is unknown, but it was probably from the area to the southwest of the No1 field and Sahara sites on the hill where the 1836 Ordnance Survey map has the legend 'The Old Churchyard' (Briscoe 1979).

Further finds were provided by Lethbridge who donated Saxon pottery from ditches observed on Lakenheath Warren (Cambridge Museum of Archaeology and Anthropology Acc. No. 74.401, 403).

This material was examined and sampled to compare with the material from the No 1 field Sahara site.

Macroscopic analysis

The pottery was divided into three fabrics macroscopically:

1. Fine sandy
2. Vesicular
3. Vegetable-tempered

The vegetable-tempered vessels were only present among the 74.401 material.

Macroscopic fabric	Acc No	Corpus No
Fine sandy 1	97.73	
" " 2	97.73	
" " 3	97.73	
" " 4	R 1897.144	2915
" " 5	R 1897.143	2914
Vesicular 1	97.73	
Fine sandy 1	1901-46	2739

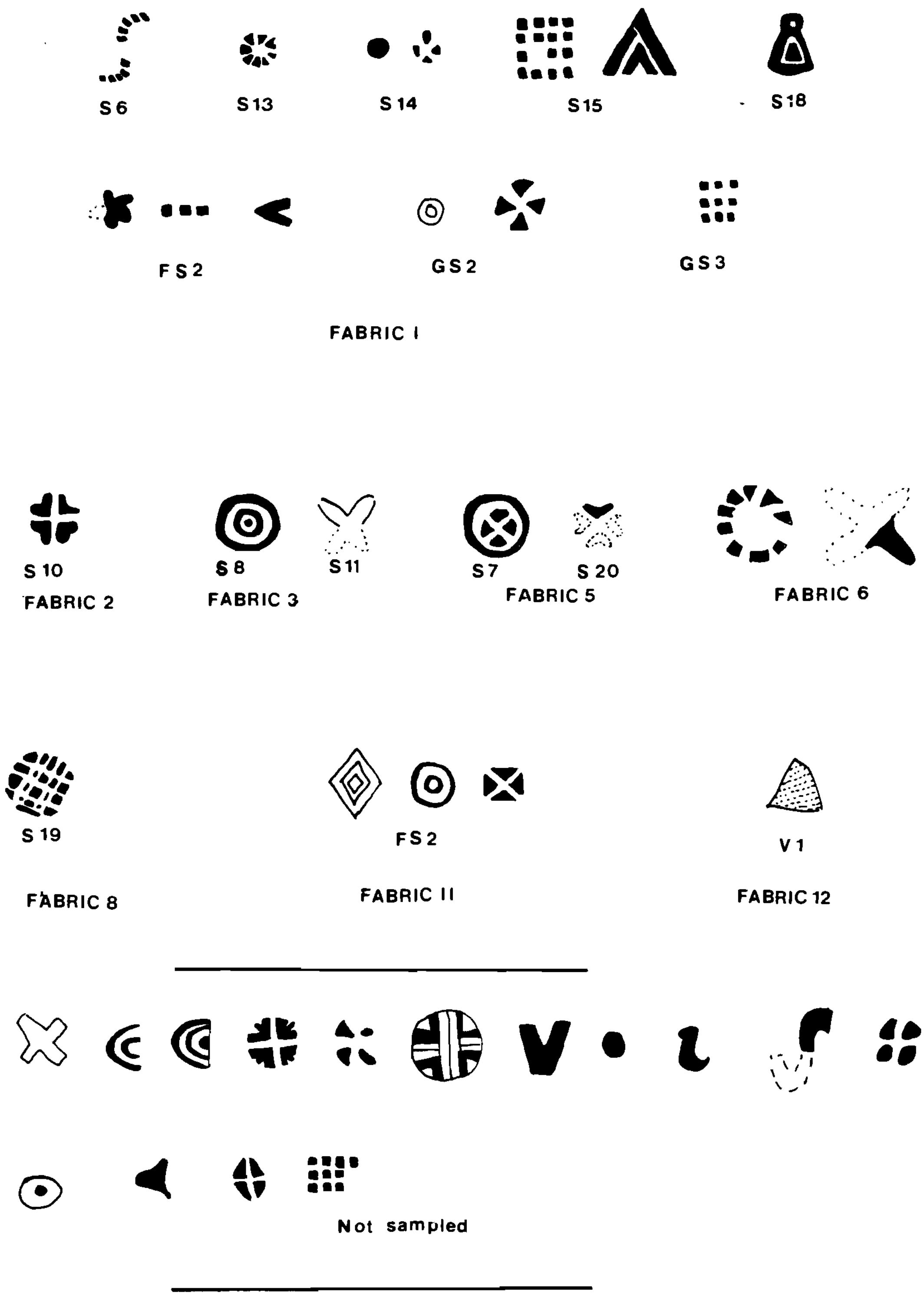


Fig. 8.9: showing the stamps that appear in each fabric at Lakenheath.

Macroscopic fabric	Acc No	Corpus No
Fine sandy 2	99.80	2913
Fine sandy 1	74.401	
" " 2	74.401	
" " 3	74.401	
" " 4	74.401/403	
Vesicular 1	74.401	
Vegetable 1	74.401	
" 2	74.401	

Also from the site was an imported vessel 97.152 (Evison 1979) and CN 2443 from the same site which was found to be missing in 1978.

Samples were taken as follows for petrological analysis:

Acc. No. 74.401: Vesicular sherd group 1; sample 1
Fine sandy sherd group 3; sample 2
Vegetable tempered sherd group 1; sample 3

Acc. No. 97.73: Vesicular sherd group 1; sample 4
Fine sandy sherd group 3; sample 5

Microscopic analysis

Microscopic analysis showed that all five samples were of different fabrics.

Fabric 1

Sample 1: A silty clay matrix with unsorted sub-angular quartz grains. Large (maximum diameter 2.5mm) grains of granitic sandstone are present, their sub-angular to rounded form suggesting that they are a natural component of the sand. The voids that gave this fabric its macroscopic name appear to have contained a calcareous sandstone.

Fabric 2

Sample 2: This was identical to fabric 3 on the settlement site, an Illington/Lackford fabric.

Fabric 3

Sample 3: An unsorted sandy clay with abundant quartz grains, their degree of rounding increasing with size. The long thin soot-filled voids mark the position of vegetable matter added as temper.

Fabric 4

Sample 4: Identical to fabric 6 on the settlement site. Partly leached inclusions of calcareous sandstone resulted in a vesicular description for this fabric.

Fabric 5

Sample 5: Identical to fabric 13 on the settlement site.

Pottery characteristics

Nine out of the 17 vessels known from this site are decorated, a high proportion that is common on cemetery sites. The colour and surface finish of the vessels is shown in Table 8.10.

Conclusions

The sample is too small and fragmentary to draw conclusions about the cemetery material.

There does appear to be a difference between the two sets of finds. The 1897 group have definite links with the Lakenheath settlement site, whereas the Lethbridge finds 74.401, are linked to the settlement site by the Illington/Lackford fabric which is widely traded. It is possible therefore that these groups come from different findspots. There is also a difference in that the pottery found in 1897 shows less evidence of standardisation than the Lethbridge finds. This may be due entirely to chronological factors, however, with the 1897 group perhaps coming from a different part of the cemetery to the Lethbridge finds.

There is, therefore, definite evidence that the cemetery contains identical fabrics to the No 1 field Sahara pottery and it is probable that it was the cemetery for that settlement.

		Outer Surface		Inner Surface		
Acc No.	Macroscopic fabric/vessel	Colour	Finish	Colour	Finish	Stamped
97.73	Fine sandy 1	Grey	Smoothed	Grey	Smoothed	X
	2	Grey	Smoothed	Grey	Natural	X
	3	Gry/Buff	Smoothed	Grey	Smoothed	X
R1897.144	4	Gry/Buff	Smoothed	Gry/Buff	Natural	
R1897.143	5	Blk/Buff	Natural	Black	Eroded	
	Vesicular 1	Grey	Smoothed	Grey	Smoothed	
1901-46	Fine sandy 1	Black	Natural	Black	Natural	X
99.80	2	Buff/Gry	Smoothed	Buff	Natural	X
74.401	Fine sandy 1	Black	Burnished	Black	Smoothed	X
	2	Black	Smoothed	Black	Smoothed	X
	3	Black	Smoothed	Black	Burnished	
	4	Black	Natural	Black	Natural	
	Vesicular 1	Buff/Gry	Burnished	Grey	Burnished	
	Vegetable 1	Buff/Gry	Smoothed	Buff	Natural	
	2	Black	Smoothed	Black	Smoothed	
	Wheel-thrown import	Buff Gry	Natural	Buff Gry	Natural	X
	CN 2443	-	-	-	-	X

Table 8.10: showing the pottery characteristics of the Lakenheath cemetery pottery.

Similarities

The presence of flint in most of the settlement fabrics points to a source in the drift deposits. The geology is chalk, covered with the very sandy Breckland drift, and no clay deposits could be located nearby. A source of boulder clay was discovered at Claypits (TL 710817), in the drained fen, where a highly calcareous, chalky boulder clay was found. Samples were taken at depths of 60cm and 200cm. The first contained a high sand content, showing signs of contamination by the sandy drift, whereas the second had very few quartz grains of that size, being composed of comminuted chalk and silty quartz in a fine clay matrix. Neither fabric was similar to those used by the Saxon potters. They seem to have chosen non-calcareous clays, and a lump of fired clay found on the site turned out to be identical to the fine sandy vessels of fabric 9. This definitely points to pottery production at the settlement, although certain vessels were also imported.

The Illington/Lackford vessels are made in fabrics that all occur at West Stow 14km distant, which was the possible centre of production. Lakenheath fabric 2 is the West Stow Illington/Lackford fabric 4; Lakenheath fabric 3 is West Stow Illington/Lackford fabric 5; and Lakenheath fabric 5 is West Stow Illington/Lackford fabric 1.

There are also fabric links with the Lackford cemetery, 13km away. Lakenheath fabric 14 is the same as a sample of fine sandy fabric taken from surface sherds from Lackford (now in Cambridge Museum of Archaeology and Anthropology). Both samples consist of a silty matrix containing granitic inclusions with vegetable tempering material.

Lakenheath fabric 6 is very similar to that of one of the vessels from the West Row, Mildenhall settlement site, 10km to the southwest, which is now in the Cambridge Museum (Z14796). The sole difference is that in the West Row, Mildenhall fabric the sandstone grains are no longer held together with cement. This could indicate a different clay source, but might equally well result from differential weathering of the same clay source.

The other four sites within a 20km radius - Brandon, Euston

Fakenham, and Thetford - were also compared with the Lakenheath fabrics, but there were no similarities except with the Illington/Lackford fabrics which also occur at Thetford and Fakenham.

Conclusions

The fact that 60% of the cemetery pottery can be matched on the No 1 Sahara site suggests that both sites were being used by the same population. Fabric 3 on the settlement is a traded fabric, but this does not seriously weaken the argument for simultaneous use by a single group of people, , one would expect these pots to occur on both settlement and cemetery belonging to the same community.

The pottery collected from the Lakenheath settlement is heavily slanted towards decorated sherds, and thus sandy fabrics, because vegetable tempered and chalky fabrics tend to be less decorated. The sample is sufficient, however, to show that the site was involved in ceramic exchange, as Illington/Lackford fabrics are present and there are other links to Mildenhall and Lackford.

It is unlikely that ceramic exchange was taking place due to an imbalance of raw materials, because lumps of clay were discovered at the Lakenheath settlement. Another reason must therefore be sought. Lakenheath and Lackford both fall into the Illington/Lackford distribution area and it is possible that this area represents a political unit in which pottery could be traded, or else was distributed by a central authority. This is further discussed in Chapter 11, which deals in detail with the Illington/Lackford workshop.

Mildenhall

A sunken-featured hut was found in 1931 at West Row, Mildenhall by workmen erecting a fence. Major Gordon Fowler, a local archaeological enthusiast, excavated the site; and the results were published by Lethbridge in 1936. He reported the discovery of 'much pottery', including a large proportion of Romano-British type. The hut measured 11ft 9ins by 8ft (3.68m x 2.44m), and Lethbridge lists the artifacts found. The Cambridge Museum of Archaeology and Anthropology holds the material, unfortunately now reduced to the two nearly complete vessels, (Acc. Nos. Z14796 and Z14797). The vessels are illustrated in Fig. 8.10. The whereabouts of the undecorated pottery, both Saxon and Roman, as well as the glass, nails, two bone pins, two chalk spindle whorls, and the bones of _bos_, _capra_, and _sus_ is unknown.

Macroscopic analysis

Both pots appeared to be made of a micaceous sandy clay.

Microscopic analysis

The vessels were found to be of two different fabrics:

Fabric 1

A fine silty clay matrix with little quartz. The quartz component is of an unsorted nature, predominantly sub-angular, with traces of calcareous cement on some grains.

Fabric 2

A fine sandy matrix with abundant, moderately well-sorted quartz grains. Most, if not all, of the sand grains are derived from a ferruginous quartz sandstone, fragments of which are present up to 1.25mm in diameter.

Pottery characteristics

One vessel (fabric 1) is a small bossed bowl, reduced to a black colour, with a smoothed outer surface and natural inner surface. The five small bosses were either applied or pinched up from the surface of the vessel.

The second vessel (fabric 2) is a small jar with pushed-out bosses and a pedestal foot. It is reduced to a black colour, and is smoothed on both the interior and exterior surfaces.

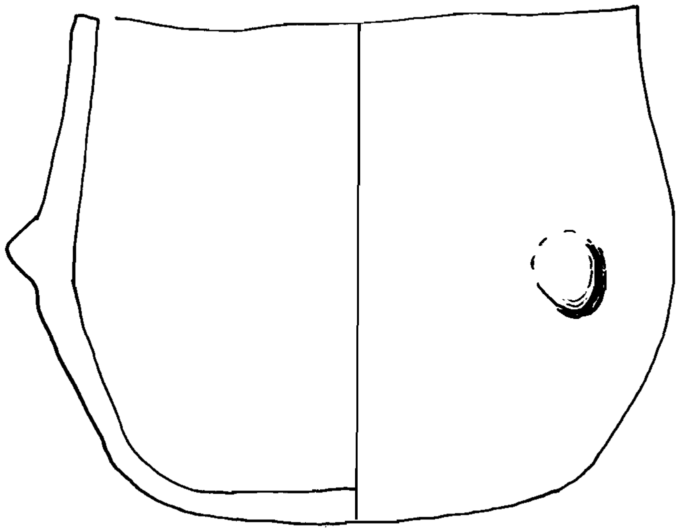
Similarities

No comparisons can be made with any local clays, since none could be located. The whole area is covered in a chalk-rich sandy till. The chalk which is often just below the surface, was cut into by the hut.

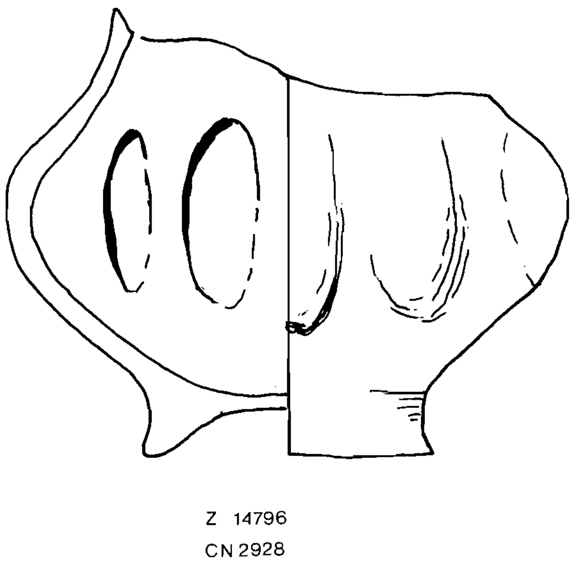
Comparison with other fabrics from other sites in the region, was made and a close match was found for fabric 1 with fabric 6 at Lakenheath.

Conclusions

With only a small proportion of the original assemblage present it is difficult to draw meaningful conclusions, but there is evidence of possible trade with Lakenheath 10km to the northeast.



Z 14797



Z 14796
CN 2928

Fig. 8.10: showing the surviving Mildenhall pottery. 1:2

Rickinghall Inferior, Broomhills

The site of Broomhills lies in the parish of Rickinghall Inferior, but was accessioned by Ipswich Museum as being in Botesdale, because of confusion over the line of the parish boundary.

The site was discovered by Basil Brown on information given by an agricultural worker, who noticed soil differences at the side of a field on the edge of the river terrace. The site was excavated between 1964 and 1967 by Brown using a volunteer labour force. His interpretation of the site - as reported in the local press - varied from Roman through to Saxon and to Viking. But his field notebooks make clear that three sunken-featured buildings were found and at least one post-built structure.

The site had a long history of occupation. Flint flakes and 17 sherds of abraded pottery point to a prehistoric settlement there, while fragments of Roman pottery and painted wall plaster are evidence of a Roman building in the near vicinity. The notion of Viking occupation arose probably from Brown's reluctance to date a large post-built structure as Saxon, for there were no artifacts that would point to a Viking presence.

Macroscopic analysis

The sherds were divided into 44 sherd groups in six macroscopic fabric groups.

1. Sandy: 13 sherd groups, (6 samples)
2. Fine sandy: 9 sherd groups, (4 samples)
3. Coarse sandy: two sherd groups, (1 sample)
4. Grog: three sherd groups, (3 samples)
5. Vesicular: 10 sherd groups, (3 samples)
6. Vegetable: seven sherd groups, (3 samples)

These fabrics were sampled as shown above, giving a total of 20 samples.

Petersen estimate

Fourteen rims, and 11 bases are present in the assemblage, and six pairs were considered to be present. This would give a Petersen estimate of 26 vessels, compared with the author's 44 sherd groups. This difference is due to the uneven distribution of rims and bases among the fabrics. There is only one rim and two bases in the sandy group, the largest single macroscopic group, which suggests that the sample is drawn from a much larger population than the Petersen estimate allows. If each fabric is considered separately then none of them is a large enough group for the Petersen estimate to be used.

Microscopic analysis

Microscopic analysis of the thin-sections revealed that there were six fabrics present. These were related to the macroscopic fabrics as follows:

	Macroscopic					
	Sandy	F.Sandy	C.Sandy	Grog	Vesicular	Veg
Microscopic						
1	6				1	1
2		3				1
3		1				
4			1			1
5				3		
6					2	

Table 8.11: Showing the relationship between the macroscopic and microscopic fabrics at Rickinghall Inferior.

From the Table it can be seen that a vegetable-tempered fabric does not exist as a separate fabric, and is a method of tempering employed in three different clays. The fine sandy fabric is split into two separate fabrics, while the vesicular pottery is also divided between two groups, one of the three samples being identical to the sandy vessels. The grog fabric is a separate fabric and this method of tempering was only found in one clay.

The presence/absence of inclusions is given in Table 8.12

Fabric +	Sample No.	IG Rock	Grog	Veg.	S'stone	Chk.	L'stone	Flint	Iron
1	3				X			X	
	8				X				
	15				X				
	16				X				
	17				X				
	18				X				
	19				X				
	20				X				
2	1								X
	2				X				X
	7								X
	12			X	X				X
3	6				X				
4	4				X				
	10			X	X				
5	9		X	X					
	13		X						
	14		X						
6	5			X			X		X
	11						X		X

Table 8.12: showing the presence/absence of inclusions in the Rickinghall pottery.

Fabric 1

A fine sandy clay matrix with abundant sub-rounded quartz grains derived from a disaggregated micaceous sandstone, polycrystalline fragments of which are occasionally present. One sample, 3, also contains fragments of flint.

Fabric 2

A fine sandy iron-rich clay matrix with common unsorted rounded quartz grains. These are possibly derived from a calcareous sandstone, fragments of which are present in two samples.

Fabric 3

A fine sandy clay matrix with scattered large grains of quartz. These are of a similar size and shape to those present in a fragment of siliceous sandstone (2mm diameter), and in other smaller pieces.

Fabric 4

A fine silty quartz-free clay matrix tempered with crushed micaceous sandstone. One sample has vegetable matter in addition.

Fabric 5

A fine sandy clay matrix with a well-sorted, sub-rounded, medium sized quartz component. All three samples have grog as temper, the grog being dissimilar to the clay of the pottery having abundant fine well-sorted quartz grains.

Fabric 6

A fine sandy clay matrix with an unsorted quartz component, the roundness of the quartz grains increasing with size. Both samples have a number of voids present, which appear from the traces within them to have been caused by the leaching out of a calcareous substance. This does not appear to have been chalk but fragments of sandy limestone are a possibility.

Fabrics 1, 2, 5, and 6 contain minute traces of vegetable matter in some samples. This is possibly derived from ash and probably does not represent a deliberate tempering technique.

Pottery characteristics

As the microscopic examination largely confirmed the macroscopic analysis the pottery characteristics are set out by their macroscopic groups (Table 8.13a and 8.13b).

The characteristics do differ between groups with the fine sandy vessels being very uniform in colour, surface treatment, and firing temperature. Two of the three decorated vessels are in this group.

At the opposite extreme are the vegetable-tempered vessels. Although these probably belong to a number of different clays, they exhibit similar characteristics. Their surfaces are usually unfinished and the vessels all seem to have been fired in an oxidising atmosphere.

The vesicular and sandy groups are similar in terms of their characteristics, apart from hardness, the vesicular group being better fired.

Similarities

Comparisons were made with fabrics from other sites in the region. Fabric 4 was found to be identical to fabric 4 at Stanton Chair 6km to the east. Both these fabrics form a small percentage of the total assemblage at each site, so the direction of exbhange remains unknown, and both sites may have obtained this fabric from elsewhere.

Conclusions

There does seem to be some evidence for ceramic standardisation at this site, particularly in the fine sandy group which is well finished and decorated. Together with the evidence for trade provided by fabric 4 this points to a well-organised system of pottery production.

There are basically three fabrics forming the coarse ware assemblage, sandy, vesicular, and grog, with two finer sandy

Coarse Sandy	Outer Surface Colour	Finish	Inner Surface Colour	Finish	Hardness	Sample
1	Gry/Buff	Burnished	Gry/Buff	Burnished	H	4
2	Black	Natural	Black	Smooth	H	
Grog						
1	Dk. Grey	Smoothed	Black	Natural	H	13
2	Gry/Buff	Natural	Buff	Natural	H	14
3	Buff	Burnished	Black	Eroded	H	9
Vesicular						
1	Dk. Grey	Natural	Buff/Grey	Natural	H	5
2	Dk. Grey	Burnished	Black	Burnished	H	
3	Blsck	Smoothed	Buff	Smoothed	S	
4	Dk. Grey	Natural	Dk. Grey	Smoothed	S	
5	Orange/Gry	Natural	Black	Burnished	H	8
6	Buff	Smoothed	Grey	Natural	H	
7	Red/Brown	Burnished	Dk. Grey	Burnished	H	11
8	Red/Brown	Smoothed	Grey	Smoothed	H	
9	Blk/Brown	Burnished	Black	Burnished	H	
10	Buff	Smoothed	Black	Smoothed	H	
Vegetable tempered						
1	Grey	Natural	Grey	Natural	S	3
2	Orange	Smoothed	Orange	Smoothed	H	12
3	Grey	Smoothed	Black	Natural	H	
4	Grey	Natural	Buff	Natural	S	10
5	Dk. Red	Natural	Dk. Red	Natural	S	
6	Bkl/Grey	Natural	Blk/Grey	Natural	S.	
7	Grey/Buff	Natural	Grey	Natural	H	
Sandy						
1	Blk/Buff	Smoothed	Dark Red	Smoothed	H	15
2	Dk. Brown	Combed	Brown	Smoothed	S	
3	Blk/Buff	Natural	Blk/Buff	Natural	S	
4	Red/Buff	Natural	Black	Burnished	H	16
5	Buff	Smoothed	Grey	Smoothed	H	17
6	Black	Natural	Buff	Burnished	H	18
7	Blk/Grey	Burnished	Black	Burnished	H	19
8	Buff	Natural	Blk/Buff	Burnished	S	20
9	Buff/Gry	Natural	Blk/Grey	Burnished	S	
10	Buff	Smooth	Black	Natural	S	
11	Buff/Blk	Natural	Brown	Eroded	S	
12	Buff	Natural	Grey	Burnished	S	
13	Buff	Smoothed	Buff	Eroded	S	

Table 8.13a: showing the pottery characteristics of the Rickinghall pottery.

Fine Sandy	Outer Surface		Inner Surface		Hardness	Sample
	Colour	Finish	Colour	Finish		
1	Grey/Orange	Smoothed	Grey	Smoothed	H	1
2	Dark Red	Smoothed	Black	Burnished	H	2
3	Black	Burnished	Grey	Smoothed	H	
4	Black	Smoothed	Black	Smoothed	H	6
5	Black	Smoothed	Black	Natural	H	
6	Black	Smoothed	Black	Smoothed	H	
7	Black	Burnished	Black	Smoothed	H	
8	Black	Smoothed	Grey	Natural	H	7
9	Black	Burnished	Black	Burnished	H	

Table 8.13b: showing the pottery characteristics of the Rickinghall pottery.

fabrics being used for fine wares. This indicates a degree of standardisation that has rarely been seen on the sites in this study.

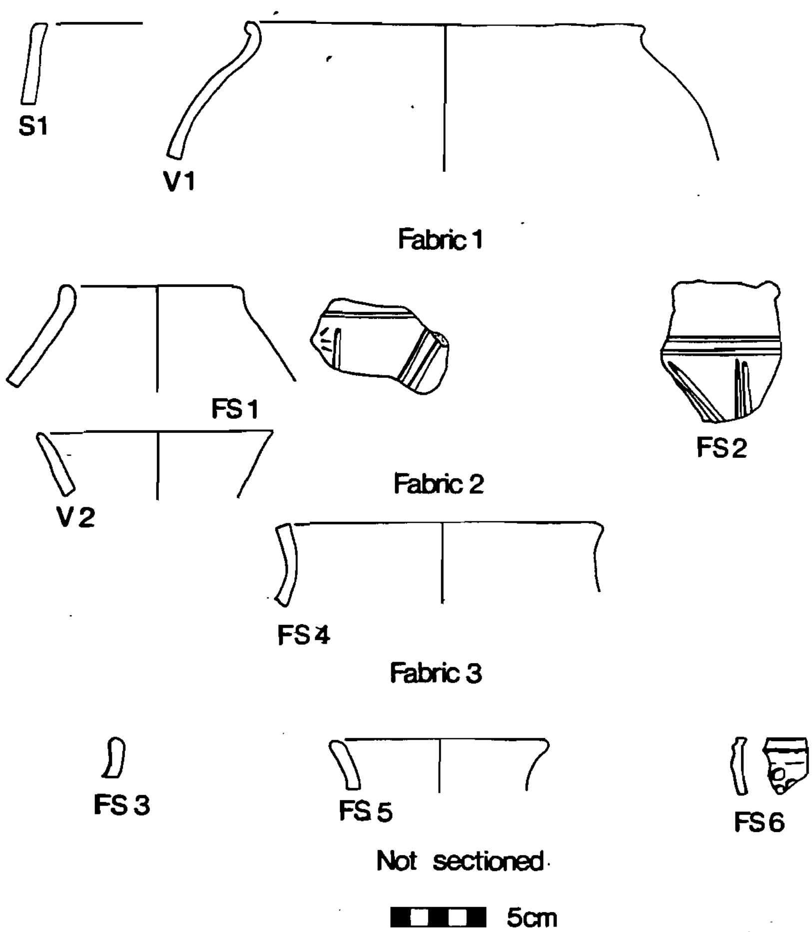


Fig. 8.11: showing the Rickinghall Inferior pottery.

Stanton Chair

The site of Stanton Chair, a Roman villa, was excavated before World War II, which terminated the excavations. Work was carried out by Basil Brown and Major Kilner a local amateur archaeologist. The finds were deposited with Ipswich Museum in 1939, but do not seem to have been worked on until the late 1970s when C.J. Balkwill sorted and marked the material with a view to publication. The site is difficult to interpret because some of the excavated areas are as yet unlocated. Nevertheless all the pottery is from known contexts that can be associated with general areas of the villa complex even if the finds are not stratigrphically related to each other.

The villa consisted of three elements, south, east, and west, arranged in a U-shape. Outbuildings and rubbish-dumping areas were located nearby, one of the latter being a pond-like feature. Although the date of the end of Roman occupation is not known, there is a great deal of late Roman pottery, including flanged bowls and large quantities of shell-tempered wares. This pottery contains a high percentage of fossil shell inclusions, and is the last indicator of long-distance Roman trade into East Anglia, this ceramic type having originated in the Oxford and Kimmeridge clay areas of the Midlands. It is commonly found on sites with late Roman occupation in the area, such as Fakenham, West Stow, and Castle Hill, Ipswich.

All contexts with Saxon pottery in them also contain Roman shell-tempered pottery except those in the east wing, where such pottery was presumably stratified below the Saxon. No evidence of continuity exists and there is no proof that the Saxon occupants used this type of pottery, although the gap between late Roman and Saxon occupation may not have been long. For instance, the pond that was used as a rubbish dump in the late Roman period, appeared to have been used for a similar purpose in the Saxon period.

Macroscopic analysis

Some 41 sherds of Saxon pottery are in the Ipswich collection, 19 of these being rims, two being almost complete vessels. However, this is likely to be a sample biased towards rims, with other sherds being discarded by Brown and Kilner, and the number of vessels present on the site was probably a great deal larger than the 35 given here. The Petersen estimate for the assemblage would be 57, as there are 19 rims and 6 bases with only two paired.

Macroscopically the pottery was divided into eight different fabrics:

1. Fine sandy (one sherd group)
2. Sandy (18 sherd groups)
3. Coarse sandy (one sherd group)
4. Chalk (five sherd groups)
5. Vegetable tempered (seven sherd groups)
6. Oolite (one sherd group)
7. Grog (one sherd group)
8. Flint (one sherd group)

Microscopic analysis

The divisions based on tempering agents of vegetable, grog or flint proved to be erroneous once thin-sections had been made; as grog, flint and vegetable matter had been used as temper in a number of different clays. In all, seven fabrics were present. The presence/absence of inclusions is shown in Table 8.14

Fabric 1

A fine sandy clay matrix with a well-sorted coarse quartz component of sub-rounded quartz grains derived from a sandstone, of which some composite fragments are present. Fragments of chalk of a similar size and roundness are present which points to the sandstone having been crushed during glacial transportation.

Fabric 2

A fine, well-sorted sandy matrix with large scattered sub-rounded to rounded quartz grains derived from a calcareous sandstone. A fragment of oolitic ironstone is present in one sample, similar to material collected by the author from the Ely ironstone, which outcrops 45km to the northwest. This

Fabric + Vessel	Sample No	IG Rock	Grog	Veg.	S'stone	Flint	Chk.	L'stone	Iron
Fabric 1									
Fine Sandy 8	9	X					X		
Fine Sandy 9	10	X				X			X
Fine Sandy 2	12	X				X	X		
Fine Sandy 4	13						X		X
Vegetable 1	14		X	X	X			X	X
Fine Sandy 2	15					X	X		
Vegetable 4	17		X	X					X
Fabric 2									
Coarse Sandy 1	1	X							X
Fine Sandy Fab 2	11	X						X	X
Fabric 3									
Fine Sandy 16	8								
Fabric 4									
Fine Sandy 7	6	X				X			
Fabric 5									
Fine Sandy 14	7	X					X		
Vegetable 2	16	X		X		X	X		
Vegetable 3	18			X		X	X		
Chalk 5	20	X					X		
Chalk 3	21	X					X		X
Chalk 4	22	X					X		
Fabric 6									
Chalk 1	2	X					X		
Chalk 2	3	X				X	X		
Grog 1	4		X			X	X		X
Flint 1	5					X	X		
Fabric 7									
Ool/Veg. 1	19			X			X	X	

Table 8.14: showing the presence/absence of inclusions in the Stanton Chair pottery.

indicates a boulder clay source.

Fabric 3

A fine silty clay matrix with abundant well-rounded and moderately well-sorted quartz grains.

Fabric 4

A fine silty quartz-free clay matrix, tempered with large scattered angular grains of crushed calcareous sandstone.

Fabric 5

A silty clay matrix with abundant calcareous inclusions of limestone, chalk, fossil shell, and micaceous calcareous sandstone.

Fabric 6

A fine sandy matrix with similar inclusions to fabric 5.

Fabric 7

A fine sorted sandy matrix, with a moderately sorted sub-rounded quartz component, and abundant fragments of chalk and limestone.

Pottery characteristics

The pottery characteristics are shown in Table 8.15

Fabric 1 is an iron-rich clay with few chalk inclusions, which were very small and formed a very low proportion of the non-matrix component. The flint occurs as a natural element in the clay, all fragments being small and rounded. Three examples show evidence of tempering with crushed sandstone, with two with grog and animal dung. The vessels did not show any evidence of standardisation in size and little evidence of special surface treatment. Only one vessel shows evidence of internal burnishing, and none were burnished externally. There is no evidence of attempted standardisation in the firing: half the vessels are fired hard and the others soft, while the colours range from orange through to black.

		Outer Surface		Inner Surface		
Fabric	Sample No	Colour	Finish	Colour	Finish	Hard/Soft
1	9	Grey/Black	Smoothed	Black	Eroded	H
	10	Black	Natural	Black	Natural	H
	12	Dark Brown	Smoothed	Black	Burnished	S
	13	Or/Brown	Smoothed	Dk. Orange	Natural	S
	14	Orange	Natural	Black	Smoothed	H
	15	Dark Brown	Smoothed	Black	Burnished	S
	17	Black	Natural	Black	Natural	H
2	1	Black	Natural	Black	Wiped	H
	11	Buff	Natural	Buff	Natural	H
3	6	Buff	Smoothed	Black	Burnished	H
4	8	Grey Brown	Natural	Grey/Black	Natural	H
5	7	Or/Brown	Natural	Black	Burnished	S
	16	Buff /Grey	Smoothed	Black	Smoothed	S
	18	Black/Red	Wiped	Dark Brown	Natural	S
	20	Black	Burnished	Brown	Eroded	H
	21	Black	Burnished	Black	Smoothed	S
	22	Buff/Grey	Burnished	Grey	Eroded	S
6	2	Buff	Smoothed	Black	Burnished	S
	3	Buff/Red	Smoothed	Dark Grey	Smoothed	S
	4	Black	Smoothed	Dark Grey	Smoothed	H
	5	Dark Red	Natural	Black	Natural	H
7	19	Red/Brown	Smoothed	Brown/Black	Burnished	H

Table 8.15: showing the pottery characteristics of the Stanton Chair pottery.

Fabric 2 is a fine clay with sandstone inclusions. These may have been derived from crushed drift erratics; but they are monomineralic and rounded, and thus are more likely to be derived from a fluvial deposit. They either occurred naturally in the clay therefore, or were perhaps sieved from a local sand in order to be used as temper. Both vessels in this fabric are fired hard but no attempt had been made at surface finish or control of firing conditions.

Fabrics 3 and 4 contain only one example each, and do not contradict the conclusions reached for fabrics 1 and 2.

Fabrics 5, 6, and 7 are all chalk-rich clays. Fabric 5 was predominantly low fired. Three vessels (samples 20, 21, and 22) showed evidence of attempts at standardisation, with burnished exteriors, fired uniformly black or grey. Fabric 6 contained four vessels, two high-fired and two low-fired, but there is no uniformity in other aspects.

Fabric 7 is a calcareous fabric with fragments of shelly or oolitic limestone. The single example is a well finished pot, uniformly oxidised and well-fired.

In general the sandy clays, fabrics 1-4, were fired higher than the calcareous. This may be because the potters knew that high firing temperatures would cause the calcareous inclusions to expand later and perhaps shatter the pot.

None of the pottery was decorated in any way, and, apart from the bowl and the handled cup, the forms appear to be those of large vessels with straight, slightly inturned, or everted rims. There seems to be no discernable difference in form between the fabrics, with both types occurring in sandy and calcareous fabrics.

Similarities

Analysis of the local calcareous boulder clay showed that fabric 7 was probably produced at the site.

No similarities were found with fabrics from other sites in the region except for fabric 4 at Rickinghall Inferior, which is identical to fabric 4 at Stanton Chair. Both are a fine silty clay with large angular particles of crushed rock added as temper, sometimes with vegetable matter in addition.

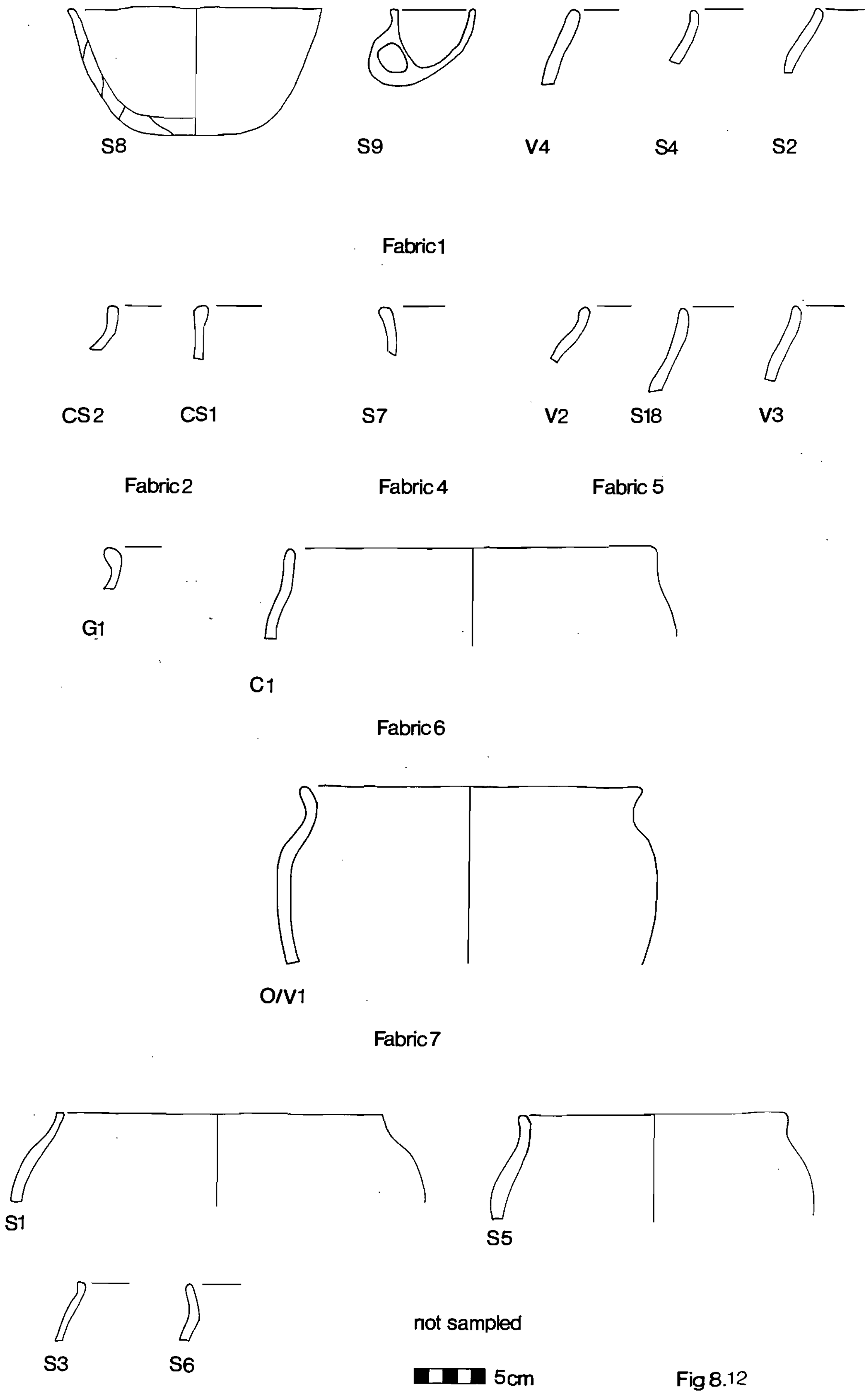

S8
S9
V4
S4
S2
Fabric 1
CS 2
CS1
S7
V2
S18
V3
Fabric 2
Fabric 4
Fabric 5
G1
C1
Fabric 6
O/V1
Fabric 7
S1
S5
S3
S6
not sampled
5cm

Fig 8.12

Conclusions

The general similarity between the fabric groups in all aspects indicates that the pottery was all produced to a mental template (Arnold 1981), while the high number of fabrics suggests either households using different clay deposits or a haphazard method of clay collection, resulting in a single household having produced a number of fabrics.

Only one fabric shows evidence of ceramic exchange, and this forms a low proportion of the fabrics on both the sites where it occurs, so the source and direction of the exchange are not at present known.

West Stow

The settlement site of West Stow was discovered in 1947 by Basil Brown, the Ipswich Museum field worker, and excavated between 1965 and 1972 by a team led by Stanley West. A large number of Saxon features was uncovered, both sunken-featured dwellings and halls, and a complex of pits and field ditches, all complicated by the presence of earlier Iron Age and Roman features. The spatial layout of the structures suggests that the village consisted of a number of separate family units, each based on a hall, with ancillary sunken-featured buildings clustered around them (West 1969).

Macroscopic analysis

It was not possible to carry out a detailed analysis of the pottery fabrics based on personal examination, because the material was undergoing post-excavation processing. The excavator, however, kindly agreed to supply samples of each of his fabric sub-groups. He had divided the pottery into seven fabrics, using a hand lens:

1. Fine - a prepared clay with little or no inclusions
2. Sandy - clays with added sand
3. Micaceous - visible white or yellow mica
4. Chalky - possibly not added but boulder clay
5. Shelly - possibly added, or fossiliferous clay used
6. Chaffy - probably added in the form or cow or horse dung
7. Red grog - fragmented pottery or possibly tile added

These were further sub-divided into a total of 31 sub-groups, based on frequency, size, and abundance of inclusions.

Microscopic analysis

A total of 58 sherds were supplied, averaging two per fabric sub-group. These were impregnated with Carbowax 600, and thin-sections were made in the standard manner.

A presence/absence of inclusions was drawn up (Table 8.16a/b). This did not show any great difference between the groups except

Sample	IG Rock	Felspar	Mica	Grog	Veg.	Quartzite	Chalk	Shell	Iron	Fab
1Ai	X		X							1
1Aii			X						X	6
1Bi				X					X	1
1Bii			X						X	5
1Ci			X			X	X			1
1Cii			X			X			X	11
2Ai			X			X				1
2Aii			X			X				
2Aiii	X	X	X							2
2Bi			X						X	1
2Ci			X						X	13
2Cii			X			X			X	6
2Ciii			X			X			X	6
2Di			X			X	X		X	11
2Ei			X	X		X	X		X	1
2Eii						X			X	1
2Eiii			X			X	X		X	2
2Fi			X				X			1
2Fii						X	X		X	
2Gii				X					X	11
2Hi			X				X		X	
2Hii			X				X			1
2Ii						X				1
2Iii			X						X	1
2Ji						X	X			13
2Jii						X			X	11
2Ki			X			X	X			6
2Kii						X	X			1
2Kiii			X		X				X	12
3Ai		X	X			X			X	10
3Aii		X	X			X			X	
3Bi		X	X		X	X	X			2
3Bii		X	X						X	2
3Ci		X	X			X			X	1
3Cii		X	X			X			X	11
3Di	X	X	X		X	X				7
3Dii	X	X	X			X			X	1
3Ei		X	X		X	X			X	1
3Fi	X	X	X			X	X			13
3Fii	X	X	X	X		X	X		X	13
3Fiii	X	X	X		X	X	X		X	13
3Fiv		X	X			X			X	13

Table 8.16a: showing the presence/absence of inclusions in the West Stow pottery.

Sample	IG Rock	Felspar	Mica	Grog	Veg.	Quartzite	Chalk	Shell	Iron	Fabric
4Ai							X			17
4Ci			X		X		X			18
4Di			X			X		X		15
4Dii			X		X	X	X		X	19
5Ai			X					X	X	16
5Aii			X		X			X	X	15
5Bi			X			X		X	X	14
5Bii			X					X	X	14
6Ai		X	X		X				X	8
6Aii		X	X		X	X				3
6Ci			X		X	X			X	11
6Cii			X		X	X			X	9
7Ai				X		X			X	1
7Aii	X	X	X	X	X	X	X		X	4
7Bi			X	X		X	X		X	1
7Bii			X	X					X	1
KD Roman 1		X	X			X	X		X	
KD " 2		X	X				X		X	
KB " 3						X	X		X	
LWi			X						X	
LWii		X	X		X		X		X	
Clayi		X	X			X			X	
Clay ii		X	X			X	X		X	

Table 8.16b: showing the presence/absence of inclusions in the sample of the West Stow pottery.

for their macroscopic inclusions, and even then the groups were not exclusive.

There were, however, considerable differences in the quartz components of the samples, so a textural analysis was carried out on the pottery , on samples of loomweight, and on Roman kiln fabrics.

The textural analysis results, when processed by computer (Fig. 8.13) can be taken as indicating nine fabric groups, whose relationship can be plotted on a factor diagram (Fig 8.14). Groups 1, 4, 5, and 8 were considered in 1981 to probably represent the local clay in its various grades; groups 2 and 6 to be a separate clay, with a more sorted quartz component; and groups 3 and 7 to be three separate clays, all with fine quartz components (Russel, West Stow report forthcoming).

Further work by the author on the clays and Saxon ceramics of East Anglia, however, has modified these conclusions, and has resulted in the sub-division of the 1981 fabric groups into 20 fabric sub-groups. These 20 sub-groups can be amalgamated into four main fabric groups: a sandy fabric of 10 sub-groups; a silty fabric of three sub-groups; and two broader groups, one containing shell fragments, the other fragments of limestone.

These last two groups coincide with West's groups 4 and 5, but the other fabrics are spread across all the other groups. The fabrics and their inclusions are listed below:

Fabric 1

A sandy clay matrix with common fine quartz grains and an unsorted sand content. The presence of comminuted chalk in 30% of the group points to a boulder clay as the parent source.

Fabric 2

A sandy clay matrix with abundant fine quartz particles, with large sub-angular to angular quartz grains, many with traces of calcareous cement.

Fabric 3

A sandy clay matrix with an unsorted quartz component, the

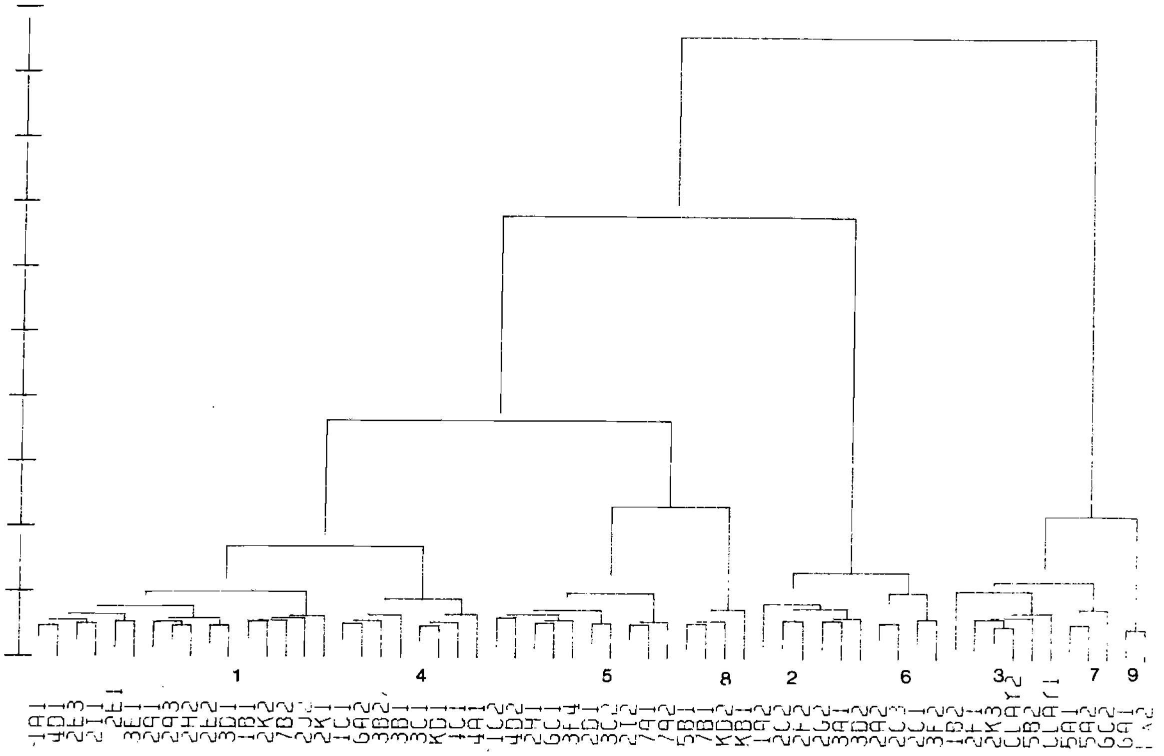


Fig. 8.13: showing dendrogram resulting from the textural analysis. The vertical scale is one of increasing dissimilarity.

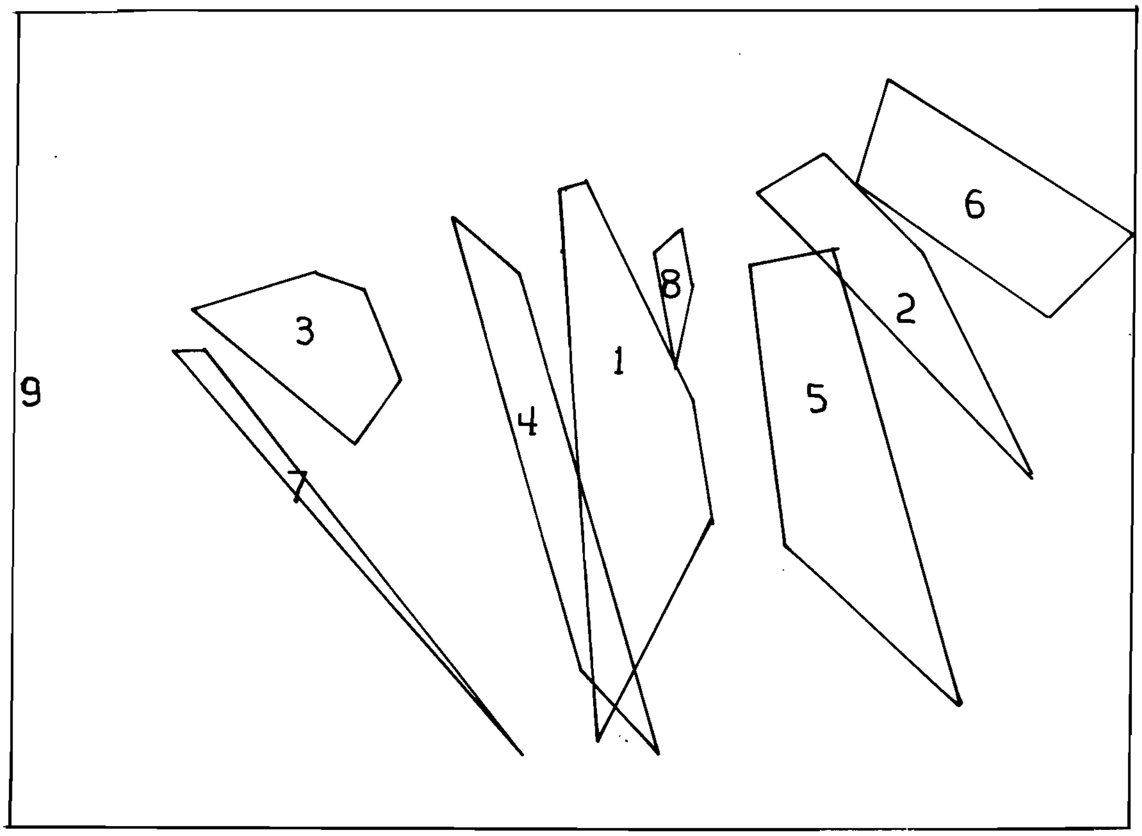


Fig. 8.14: showing computer generated factor diagram showing the relationships between the fabric groups.

majority being fine sub-angular quartz grains.

Fabric 4

A similar matrix to fabric 1, but tempered with large angular fragments of granitically derived material.

Fabric 5

A fine sandy clay matrix composed of well-sorted, dense, angular quartz grains, with many small slivers of muscovite mica.

Fabric 6

A distinctive fabric with a markedly bimodal quartz component. It consists of a fine, dense sandy clay with scattered, well-sorted, sub-angular quartz grains derived from a ferruginous quartz sandstone.

Fabric 7

A very similar clay matrix to fabric 6, but the crushed, well-sorted sandstone, is absent. In its place is a scatter of medium, sub-rounded quartz grains, and occasional soot-filled voids, which are the result of the combustion of vegetable temper.

Fabric 8

A fine sandy clay matrix with vegetable temper.

Fabric 9

A sandy clay matrix with a very fine quartz component, and a few scattered grains of quartz derived from a calcareous sandstone, with the addition of vegetable temper.

Fabric 10

A sandy clay matrix very similar to fabric 9, but tempered with abundant quartz grains derived from a crushed feldspathic sandstone.

Fabric 11

An iron-rich, silty clay matrix with sparse fine quartz grains, and an unsorted quartz component principally derived from a calcareous sandstone.

Fabric 12

The same fabric as 11 but without the sandstone-derived quartz grains. This is probably the clay of fabric 11, with vegetable matter added as temper instead of crushed sandstone.

Fabric 13

A quartz-free silty clay to which has been added crushed rock, either granitic or calcareous sandstone, the latter giving a well-sorted quartz component. One example (3 Fiii) contains both.

Fabric 14

A fine sandy clay matrix with abundant, moderately sorted, angular to sub-angular quartz grains, and a scatter of larger rounded grains. The shell fragments present are well-rounded and of a similar size range to the large quartz grains. The rounding of the shell fragments points to a physically mature sediment, perhaps in the glacial till.

Fabric 15

A silty clay matrix with a sparse unsorted quartz component. The shell fragments are present in all sizes up to 4mm and range in shape from angular to rounded.

Fabric 16

A silty clay matrix with moderately sorted, fine quartz grains and occasional larger grains. Shell is present as abundant, rounded to angular fragments of fossil shell. The shell is present in much higher density in this fabric than in the others, and bears a great similarity to that in the Roman shell-tempered pottery found in East Anglia. A source in the St Neots/Nene Valley area is therefore probable. It is possible that this is a sherd of Roman pottery erroneously included in the Saxon material. A kiln producing shell-tempered pottery during the Roman period has been reported at Lakenheath (Plouviez pers. comm.) and samples from this kiln group were thin-sectioned. These contained shell derived from a shelly limestone, some fragments still cemented in their calcareous matrix. This suggests that the potters were using clay from a raft of glacially displaced Jurassic clay, alternatively this was not a production site at all.

Fabric 17

A moderately well-sorted, fine sandy clay matrix with fragments of well-rounded chalk and limestone.

Fabric 18

A sandy clay matrix with an unsorted sub-angular quartz component. The fabric contains abundant, rounded fragments of chalk and oolitic limestone. A single soot-filled void probably represents an accidental inclusion of vegetable matter.

Fabric 19

A sandy clay matrix with sparse fine quartz grains and abundant larger grains, sub-rounded to rounded in form. Oolitic limestone is present, both as single ools and as fragments of the parent rock.

Elongated voids, some soot-filled, show the presence of vegetable matter; although some of the voids not filled with soot may be due to leached out fragments of shell from the limestone. Large rounded voids are probably caused by the leaching out of chalk (a less resistant rock) or oolitic limestone.

Other fabrics

The grog fabrics were all Illington/Lackford fabrics and will be dealt with in chapter 11.

Comparative samples

Six samples of ceramic, but non-vessel, fabrics, were used for comparative purposes, and clay samples were taken from the local boulder clays to the north and northwest of the site.

Two Saxon loomweights were sampled, as being probable local clays and unlikely to have been tempered. A sample was also taken from the 'Saxon clay dump' material, a quantity of clay found, surrounded by a circular ditch, in the settlement area. A Roman pottery industry had existed on the site, and samples were taken from the kiln domes and a kiln brick to see what clays were being used by the earlier industry, and how they related to those of the Saxons.

The clay samples were taken from the disused brick pit on the edge of the present arable land to the north, 0.75km from the site, and from the pit at Weatherhill Farm, 1km to the northwest.

The samples were composed of clays as follows:

1. Roman kiln material 1

A silty clay matrix with a scatter of unsorted rounded quartz grains and abundant chalk and shell.

2. Roman kiln material 2

A chalky boulder clay with abundant unsorted rounded quartz grains, chalk, and flint.

3. Roman kiln brick

A fabric identical to sample 2

4. West Stow claypit

A fine sandy boulder clay with occasional larger rounded grains, most of the fine fractions being angular. Comminuted chalk is present, with small sparse fragments of rounded flint.

5. Weatherhill Farm pit

A coarse chalky boulder clay with unsorted rounded quartz grains, and chalk, shell, and flint present.

6. Loomweight 1

A fine sandy clay matrix with much comminuted chalk.

7. Loomweight 2

Identical to sample 6.

8. Clay dump

A very fine silty clay matrix with occasional larger rounded quartz grains. Particles of rounded grog, up to 1.25mm in diameter, are present. These contain more quartz grains than the fabric.

These samples showed the range of raw ceramic materials to be found in the vicinity of the site. The Roman kiln materials, samples 1, 2, 3, and the clay sample 5, were too chalky to be of use for pottery manufacture, but the clay sample 4 could have formed the basis for fabric 1, to which sand was added as temper.

The clay used for the loomweights, samples 6 and 7, is identical to fabric 8, which formed group 9 in the computer analysis (see Fig. 8.14).

The clay sample 8 from the 'dump' is very similar to the matrix of fabrics 9 and 10, but it contains such a fine quartz component that any addition of sand as temper would probably mask it completely, and this clay could have been widely used as a basis for any of the sandy fabrics. Such a fine clay must have been deposited in near-stagnant water.

Similarities

There were no similarities found with other sites in the region, apart from the Illington/Lackford fabrics, which were analysed at a later date and the results will be found in chapter 11.

For local clay samples see above.

Conclusions

The majority of the pottery was probably manufactured on the site, using clays obtained from the chalky glacial deposits that occur within 1km of the site. Sand for tempering purposes would have been freely obtainable on the Breckland areas to the north - the same sand that engulfed the site in the 7th century (West 1971).

Little Bealings

The site of Little Bealings was excavated in 1958 in advance of gravel extraction. Two huts, two hearths, and an intermediate feature were examined. A total of fifteen sherds - one an almost complete vessel - and part of a loomweight were recovered.

The breakdown of the pottery was as follows:

Feature	No of sherds	No of vessel groups
Hut 1	3 sherds	2
Hut 2	2 joining sherds	1
Hearth 1'BJ'	5 joining sherds	1
Hearth 2'No 15'	1 sherd	1
Feature GG	4 sherds	4

Macroscopic analysis

The nine sherd groups were divided into two groups macroscopically, a sandy group, and a vegetable-tempered group, with findspots as follows:

Sandy:

Vessel No	Context
7	GG
8	GG
9	GG
4	Site 15

Vegetable:

Vessel No	Context
1	Hearth BJ
2	Hut 2
3	Hut 1
6	Hut 1
5	GG
Loomweight	Hut 2

This pointed to a difference between the hut sites and hearth BJ, and the feature GG. A thin section was made from each vessel group and the loomweight, and the 10 samples were found to consist of seven fabrics.

Microscopic analsysis

A presence/absence of inclusions is shown in Table 8.18

Fabric 1

A sandy clay matrix with an unsorted quartz component of sub-rounded grains, with occasional angular grains in the smaller sizes.

Fabric 2

A sandy clay matrix with an unsorted quartz component, with most grains sub-rounded. The larger grains are clusters of quartz crystals from a weathered sandstone, and the majority of single grains in the matrix appear to be derived from a similar source. Small amounts of vegetable matter are present, but are probably not deliberate tempering.

Fabric 3

A sandy clay matrix with moderately well-sorted, fine, angular to sub-rounded quartz grains. There is some evidence of vegetable matter, but not enough to show macroscopically and it is therefore unlikely to have been a deliberate inclusion.

Fabric 4

A micaceous clay matrix with scattered quartz grains sub-rounded to rounded, the roundness increasing with size. There are abundant voids due to the combustion of vegetable matter.

Fabric 5

A fine sandy micaceous matrix with densely packed, fine angular quartz grains. A number of larger grains are present with a high degree of roundness, many of them cracked and with red-brown staining. Abundant elongated voids containing combustion products of vegetable matter are present, as well as wider rounded voids, probably due to the leaching out of calcareous inclusions.

Fabric 6

A fine sandy clay matrix with abundant well-sorted angular quartz grains, similar to fabric 5 but of a coarser grade. Evidence of vegetable and calcareous inclusions are present, as in fabric 5.

Fabric 7

A fragment of baked clay loomweight from hut 2. An iron-rich micaceous clay matrix containing a very fine quartz component with scattered, large rounded grains. Voids, due to the combustion of vegetable matter, and calcareous inclusions leaching out, were visible, the vegetable matter probably of an accidental nature, and the calcareous inclusions part of the clay.

Textural analysis

Textural analysis of all the samples apart from the loomweight fragment gave the following results:

Fabric			1		2	3	4		5	6
	Sample	8	9	10	7	6	5	3	1	4
	8	X	X		X			X		
1	9	X	X	X	X		X	X		
	10		X	X	X		X			
2	7	X	X	X	X					
3	6					X			X	
4	5		X	X			X	X		
	3	X	X				X	X		
5	1					X			X	X
6	4								X	X

X = similar

Table 8.17

This reinforces the fabric divisions arrived at by macroscopic examination of the thin-sections. The great similarity between samples 8, 9, 10 and 7 (fabrics 1 and 2), perhaps indicate that they are in fact the same fabric, fabric 2 possibly being a less weathered version of fabric 1 and therefore containing still aggregated sandstone grains.

Vessels 3 and 5 (fabric 4) are similar to certain vessels in fabric 1, but not consistently enough to be considered the same clay.

Fabrics 5 and 6 are texturally similar and probably come from the same clay deposit.

Pottery characteristics

The individual fabrics contain too small a number of vessels to draw any conclusions other than general ones. Details of colour and surface finish are set out in Table 8.19.

All vessels except vessel 1 (fabric 5) show evidence of exterior surface finish although only one has been burnished (vessel 7, fabric 3); and all except two, vessels 7 and 2, lack internal finish.

The function of the vessels is only indicated in the case of vessels 1 and 4 which both had sooting, on the inner and outer surfaces respectively. The forms of vessels 4 and 5 are suitable for cooking or general storage vessels, and the similarity of the other sherd groups makes this their likely function also. Vessel 7 could be an exception being burnished on the outside and smoothed inside, and this is possibly a serving or storage vessel.

Similarities

Comparison with fabrics from other sites in the locality showed a general similarity of clay types, all probably deriving from the shelly crag deposits. A fabric match, however, only occurred with Butley, where fabric 3 matched the Little Bealings fabric 6.

No similarities were found between the Little Bealings fabrics and local clay deposits sampled.

Conclusions

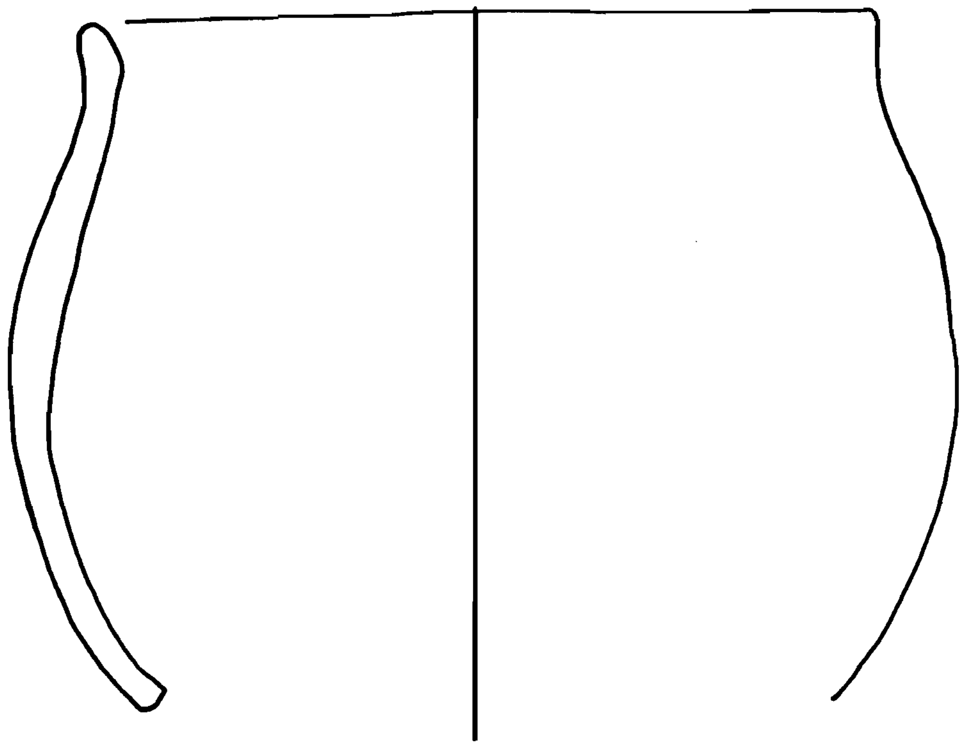
The macroscopic division into vegetable and non-vegetable tempered fabrics, is borne out by the microscopic and textural results. Only one vegetable tempered vessel (vessel 5) was made out of the same clay as the non-tempered vessels. The vegetable tempered fabrics 5, 6, and 7, are all fine clays, probably from the Crag or Chillesford clay deposits, which occur locally. Fabric 6 matches fabric 3 at Butley; and links with the Butley site are also present in the form of vessels 4 and 9, which are almost identical in form to the vessels from Bütley. This points to a similar date for both settlements, probably in the early 7th century.

Fabric	Sample No.	Vessel No.	IG Rock	Grog	Veg.	S'stone	Veg.	Chalk	Voids	Iron
1	8	9							X	
	9	5							X	
	10	4							X	
2	7	8				X				
3	6	7							X	X
4	5	6					X		X	
	3	2					X		X	
5	1	1					X		X	
6	4	3					X		X	
7	loomweight	10					X		X	

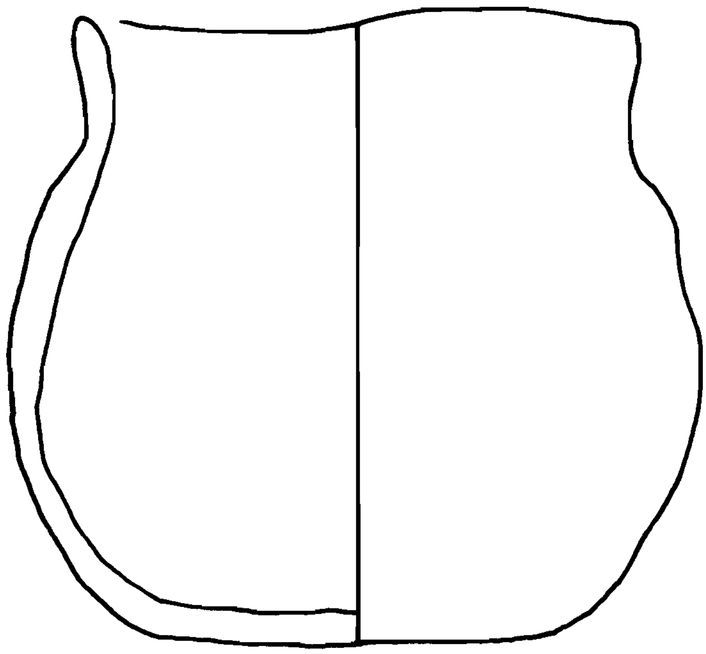
Table 8.18: showing the presence/absence of inclusions.

		Outer Surface		Inner Surface	
Sherd Group	Fabric	Colour	Finish	Colour	Finish
9	1	Dark Grey	Smoothed	Grey	Natural
5	1	Dark Brown	Smoothed	Grey-orange	Natural
4	1	Orange & Grey	Smoothed	Light Grey	Natural
8	2	Dark Grey	Smoothed	Dark Grey	Natural
7	3	Black	Burnished	Grey	Smoothed
6	4	Grey	Smoothed	Orange	Natural
2	4	Grey	Smoothed	Buff	Smoothed
1	5	Orange	Natural	Black	Natural
3	6	Buff	Smoothed	Dark Grey	Natural

Table 8.19: showing the pottery characteristics of the Little Bealings pottery.



vessel 4



vessel 5

5cm

FIG 8.15

Barham

Pottery was discovered in a gravel pit at Barham in 1947, and donated to Ipswich Museum (Acc, No. 1947.156). In 1949 an area producing Roman pottery was excavated by Brown. In 1978 and 1979, 4th century coins and pottery were recovered, indicating occupation at least until 364 AD (P.S.I.A. 1978, 1979).

The two sherds made available to the writer, one a rim, and the other a body sherd, from a stamped bossed vessel, were both sampled. (see Fig 8.16).

Macroscopic analysis

Neither sherd contained any visible inclusions other than quartz, and both were categorised as sandy.

Microscopic analysis

The two sherds were found to be of different fabrics.

Fabric 1

A fine sandy clay matrix with a coarse component of well-sorted sub-angular grains, derived from a calcareous sandstone, fragments of which are present. The presence of residual carbon in the section points to a low-temperature firing and a reducing atmosphere.

Fabric 2

A clay matrix with a dense, unsorted, mainly fine quartz sand of sub-angular to rounded form.

Pottery characteristics

The rim sherd (fabric 1) was grey and burnished on both sides, whereas the decorated sherd (fabric 2) was grey on the outer surface, and buff and grey on the inner. Both surfaces were smoothed. The outer surface was decorated by stamping with a simple 'hot cross bun' stamp around pushed-out bosses demarcated by two grooves. Because the sherd is so small its angle remains in doubt, so the decorative scheme cannot be known with certainty.

Similarities

There were no similarities found between the Barham fabrics and other sites in the region.

Conclusions

Barham seems not to have been in the area where fabrics derived from the crag series are found. These fabrics are found at Hadleigh Rd, Ipswich 6km away, and at Little Bealings 9km away. Barham, however, probably obtained its clay from the immediate locality. Evidence of a late Saxon pottery industry has been found at Ashbocking, 6km to the northeast, in 1950 (P.S.I.A. 1951), so the clay in this region is suitable for pottery manufacture.

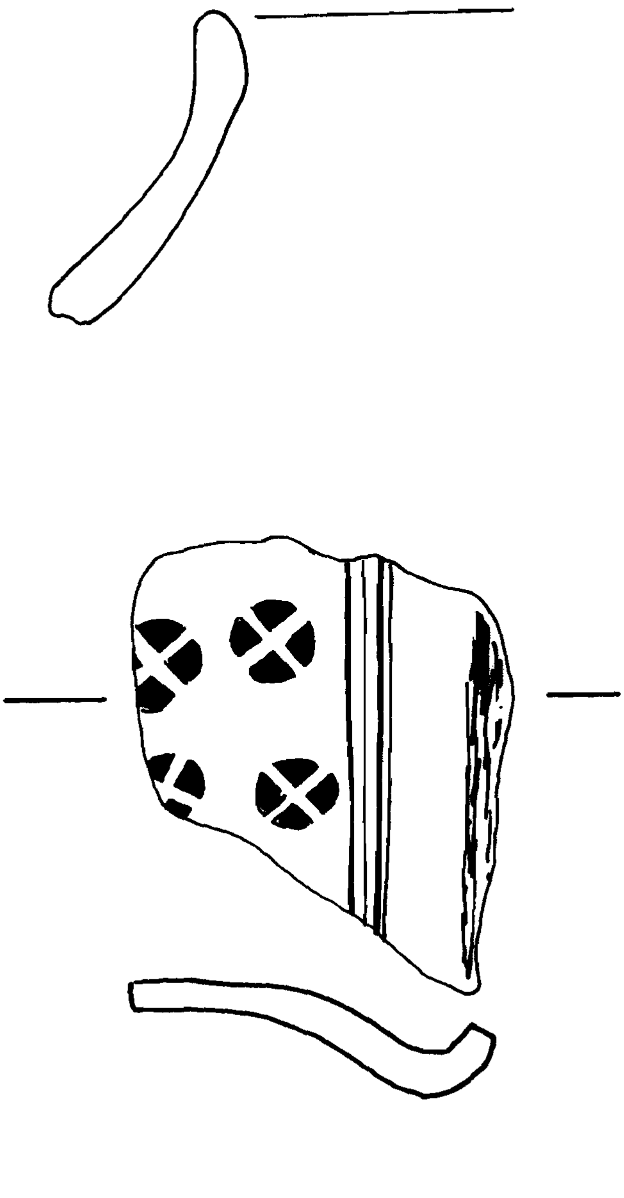


Fig. 8.16: showing the Barham pottery. Scale 1:1.

Butley

The Butley Church site was excavated in 1950, when a hut site and pottery scatter were discovered. The groups of material were accessioned to the Ipswich Museum (Acc. No. 29, 30, 87, and 112), but their relationship is not now clear. Groups 78 and 112 are bagged together in the museum, and there are fabric links between 87/112 and 29, between 87/112 and 30, and between 29 and 30. The whole assemblage has therefore been considered as a single unit for the purposes of this thesis.

Macroscopic analysis

The pottery was sorted macroscopically into seven fabrics, totalling 58 sherd groups, as follows:

1. A sandy iron-rich clay, usually oxidised: 19 sherd groups
2. A fine reduced fabric: one sherd group
3. A fine sandy fabric tempered with vegetable matter: eight sherd groups
4. A fine sandy vesicular fabric: 18 sherd groups
5. A sandy fabric found only in the 30 group: four sherd groups
6. A fine sandy fabric found only in the 87/112 group: four sherd groups
7. A fine sandy fabric only found in the 29 group: four sherd groups

Microscopic analysis

A total of 19 thin-sections was made, covering all the macroscopic fabrics and the possible differences within them. Under the microscope it could be seen that there were in fact nine fabrics present. The relationship between the macroscopic and microscopic fabrics is shown in Table 8.20, on the following page.

From Table 8.20 it can be seen that only macroscopic fabrics 1, 2, 6 and 7 are discrete fabrics. Macroscopic fabrics 3, 4 and 5 are in fact made up of five microscopic fabrics, with 3 representing a tempering technique rather than a true clay fabric There are three calcareous crag clays, microscopic fabrics 3, 5, and 9, and two non-calcareous clays, 4 and 7.

Microscopic fabric 4 is composed of macroscopic fabric 5 with some vegetable-tempered vessels, while microscopic fabric 7 only occurs with vegetable temper. Of the three calcareous fabrics one, fabric 3, occurs with vegetable temper in some, but not all, the vessels.

	Macroscopic						
	1	2	3	4	5	6	7
Microscopic							
1	X						
2		X					
3			X	X			
4			X		X		
5				X			
6						X	
7			X				
8							X
9				X			

Table 8.20 Showing the relationship between the macroscopic and microscopic fabrics at Butley.

The presence/absence of inclusions is shown in Table 8.21

The fabrics were as follows:

Fabric 1

An iron-rich micaceous clay matrix, with a fine quartz component, mostly sub-rounded, but with some angular grains. Also present are rounded and tabular particles of ironstone having very similar quartz and mica inclusions to the fabric.

Fabric 2

An iron-rich micaceous clay matrix with a fine well-sorted angular quartz component. The medium to large rounded sparse quartz grains were possibly added as temper. The large rounded ironstone inclusions present contain almost no quartz grains. One sample contained vegetable matter.

Fabric	Sample	Vessel	Mica	Pellets	Vegetable	Flint	Calcareous	Ironstone	Iron
1	1		X					X	
	4		X					X	
	5		X					X	
	7		X					X	
2	2+3		X						
3	12		X		X		X		
	15		X		X		X		X
	18		X		X		X	X	X
	22		X		X		X		
4	9				X		X		X
	10				X		X		
	13						X	X	X
	14					X	X		X
	23				X	X	X		
5	11						X		X
	16				X		X		X
	17				X		X	X	X
6	6			X		X			X
7	8				X			X	
9	19						X	X	

Table 8.21: showing the presence/absence of inclusions in the Butley pottery.

Fabric 3

An iron-free micaceous clay matrix with a well-sorted, fine, angular quartz component, and a coarser component of occasional large grains of rounded quartz. Numerous large rounded tabular voids, due to the presence of crag deposits leached out in the acid soil conditions, are visible. Three examples are tempered with vegetable matter.

Fabric 4

A fine sandy clay matrix with angular to sub-angular, grading to large sub-rounded, grains of quartz. Occasional large voids, probably due to the leaching out of calcareous inclusions, are present. Two of the three samples showed voids caused by the combustion of vegetable matter.

Fabric 5

A fine sandy clay matrix containing scattered, well-sorted, angular to sub-rounded quartz grains. Voids are present, the result of both calcareous and organic inclusions.

Fabric 6

A silty clay matrix with little quartz, tempered with grog or clay pellets of an identical fabric and colour to the matrix, and therefore not readily visible macroscopically.

Fabric 7

A silty clay matrix with a well-sorted bi-modal quartz component. The fine is angular and abundant, with a rounded scarce coarser component. Voids are present, the result of the combustion of vegetable temper.

Fabric 8

An iron-rich clay matrix coarser than fabric 9, but having similar characteristics, such as the degree of rounding of the different size elements and iron staining, the main difference being the presence of large, rounded, iron-stained calcareous inclusions.

Fabric 9

A silty clay matrix with a rounded, unsorted quartz component, the larger grains having a greater degree of rounding. Inclusions of rounded quartz-free iron compounds and rounded flint are also present.

Pottery characteristics

The microscopic analysis and the presence/absence listing (see Table 8.21) suggest a division into two basic clay groups:

1. Fabrics 1 and 2 with their abundant ironstone inclusions.
2. Fabrics 3, 4, 5, 6, 7, 8, and 9 which are all components of a fine sandy clay facies.

Clay group 1 (Fig 8.17)

This clay was used almost exclusively to make pots of a form similar to those of the Ipswich ware series - short-necked cooking pots with evidence of knife trimming around the base. The fabric is, however, totally different from the sandy fabrics used to manufacture true Ipswich ware, and as far as the writer knows, it has been found only at this location to date. Unlike Ipswich ware, there is no evidence of its having been traded widely.

These pots could represent an attempt at a local copy of Ipswich ware, which would reinforce the theory that Ipswich ware had high status value. An alternative interpretation is that the general evolution of pottery forms was leading to Ipswich ware, and that these pots are the rural forerunners.

The large number of vessels in this fabric does point to an increase in production rates and possibly to craft specialisation. Butley is most likely to have been a production centre, because lumps of fired clay of this fabric were found there (sample 1).

The vessels are mostly oxidised, with a buff or orange outer surface, and were usually smoothed or scraped vertically to disguise the uneven surface of the pot. This unevenness may have occurred because the potters used the coiling method, or else because they were attempting to adapt to the use of a turntable. The latter possibility is unlikely because all the vessels are irregular, especially at the rim, and a turntable properly used produces a regular profile.

The smoothing outside is usually vertical, while the marks inside run in a horizontal direction, with one example exhibiting horizontal burnishing on both surfaces. Fourteen of the 19 sherd groups have rims present, of which nine are large enough for the diameter to be measured with accuracy. These nine show a range of between 6cm and 16cm, with a preference around 9cm to 13cm. The majority of the rims are everted. The wide-necked openings on the vessels of this group suggest that they were intended for cooking purposes or for short-term storage.

Eight bases are present, their sagging form showing evidence of their having been pushed out from the inside during the knife-trimming process. This made meaningful measurements difficult, and the only three measurable examples gave diameters of 4.5cm, 10cm, and 12cm which suggests that at least two different vessel sizes were being produced. The majority of the vessels seem to have been in the larger size, judging by the curvature of the body sherds.

Clay group 2 (Fig 8.17)

Group 2 consists of seven fabrics that probably have a common origin although they are different texturally. Of the 13 samples sectioned, 11 contained calcareous inclusions. The leaching out of these has left distinctive rounded voids in the fabric. Occasionally the inclusions survive and can be seen to be fragments of rounded shell. These survivors indicate that the Chillesford clay, a laminated grey silty clay, a facies of the crag series, was the source for this fabric group. The variation within the group probably reflects that of one natural deposit.

There were 25 sherd groups and one ceramic spoon in this group, eight of them being vegetable-tempered. The seventeen untempered vessels will be dealt with first. These vessels are mostly reduced to a grey colour, only four showing evidence of oxidisation. Inner and outer surfaces are predominantly smooth, only two samples lacking surface treatment on the exterior, and none on the interior. There is no evidence of knife trimming around the basal angle, but only three bases survive, which may not be a large enough sample.

The vegetable tempered sub-group contains eight sherd groups, again mostly reduced, but less carefully finished. Five examples lack surface finish on the outside, and four on the inside.

The reason for adding vegetable temper to a clay that could have been used to produced pottery without any temper, probably relates to the intended function of the finished vessel. It is significant that the vegetable-tempered group has a higher incidence of burnt deposits on the inner surface (37.5%) than the others(23%). This suggests that the potters added the temper to provide protection against the thermal stresses that inevitably occur when a cooking pot is unequally heated during everyday use.

Fabrics 6 and 8, being non-calcareous and non-vegetable-tempered, may belong to a separate sub-group, which was macroscopically identified as being fine sandy, fabrics 6 and 7. The characteristics of those five vessels in fabrics 6 and 8 are most similar to those of the vegetable-tempered group, being predominantly reduced, with a high proportion of vessels lacking surface treatment. Two of the five show sooting and one has lugs for suspension, both of which indicate a cooking function.

<u>Butley Neutral Farm</u> (Fig 8.17)

This site, 1km to the north of the church site, was excavated in 1950 by Brown and Page for Ipswich Museum. A sunken hut was found, which had two sherds in the hearth (Maynard 1952, 207). Each sherd comes from a different vessel but both are made of clays identical to those in use at the church site. One of the sherds, which consists of a single rim, is identical to fabric 4 in the church site series, and the other, a single body sherd with internal sooting, is similar to fabric 3. There is no evidence of vegetable temper, but the large rounded quartz grains scattered throughout the fabric may have been used as temper instead. They appear to be from a disaggregated sandstone with a recrystalised silica cement.

Similarities

The fabrics from other sites in the area were compared with those from Butley and fabric matches were found. Butley fabric 3 was found to be identical to Little Bealings fabric 6, and Butley fabric 7 was found to be identical to the Ipswich, Hadleigh Road cemetery fabric 2. Butley is 25km from the Hadleigh Road site but both sites are within 1km of navigable water in the Ore and Orwell river systems.

Conclusions

Both Butley sites have identical fabrics to each other and possibly obtained their pottery or clay from the same source. Butley church has all the appearance of a pottery production site, with large lumps of fired clay of fabric 1 occurring at the site. However the links between the two sites are in fabrics 3 and 4 and a source for this fabric is not definitely known. Butley fabric 3 is also found at Little Bealings 15km away so a more distant source is possible.

All three sites may have been involved in an incipient marketing system arising during the Early Saxon/Middle Saxon interface, when ceramic exchange and specialisation arose with growing political and social complexity.

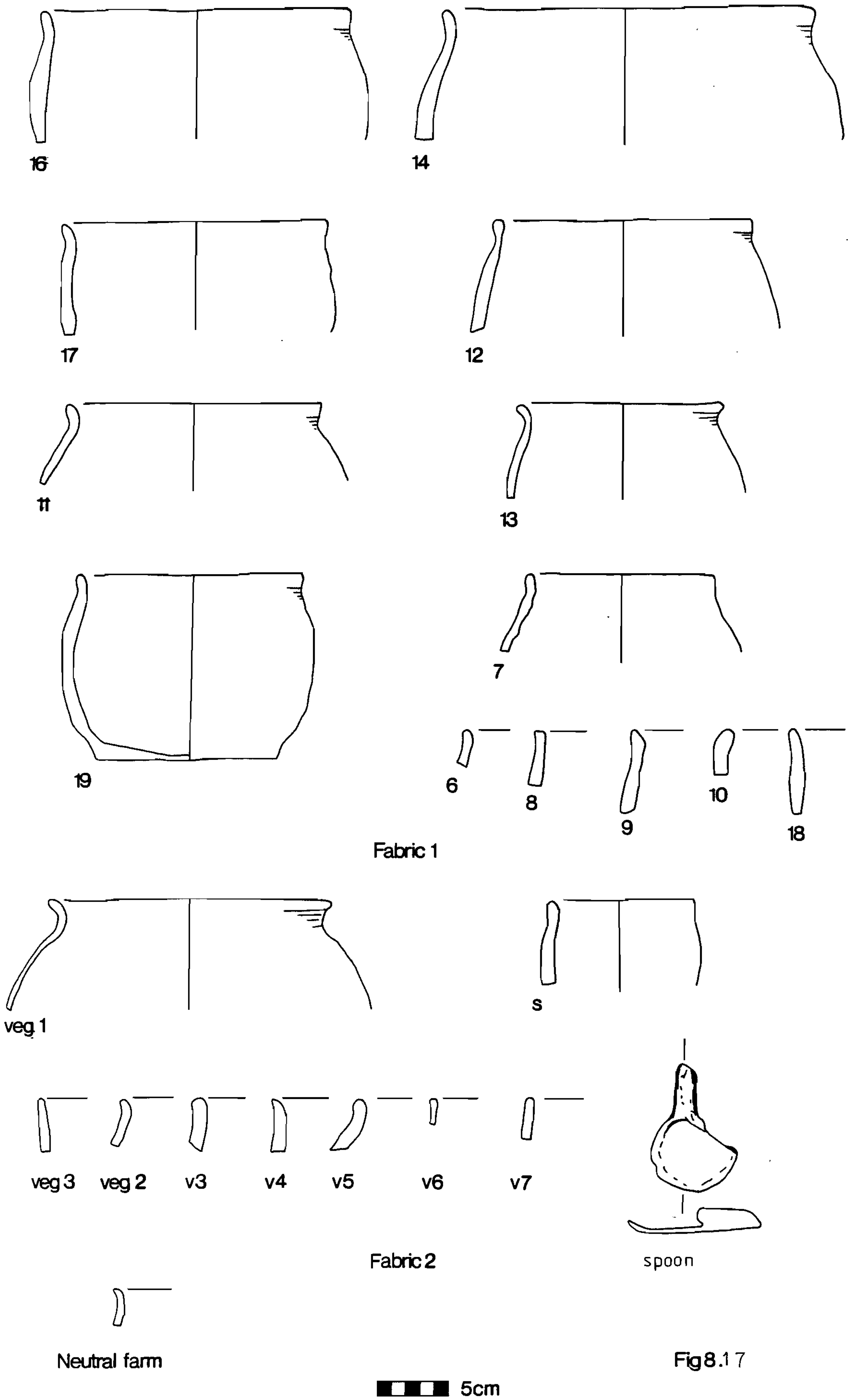

16
14
17
12
11
13
19
7
6
8
9
10
18
Fabric 1
veg 1
s
veg 3
veg 2
v3
v4
v5
v6
v7
spoon
Fabric 2
Neutral farm
5cm

Fig 8.17

Hacheston

During excavations of the Roman settlement at Hacheston, Saxon pottery was recovered from a pit in field 4b. This pottery is now in Ipswich Museum (Acc. No. 965.4). The pit contained three sherds of prehistoric pottery, and two of Roman, as well as four sherds of Saxon. (See Fig. 8.18)

Macroscopic analysis

The Saxon pottery consisted macroscopically of two fabrics.

1. Sandy: three sherds
2. Vegetable-tempered: one sherd

A sample of each fabric was sampled.

Microscopic analysis

Microscopic analysis proved that the macroscopic analysis was correct.

Fabric 1

A fine micaceous clay matrix with a bimodal quartz component. The finer grade consists of abundant angular to sub-angular grains; the larger is made up of sub-rounded to well-rounded, grains, showing iron-staining in the cracks. Large rounded fragments of quartz-rich ironstone are present in small quantities.

Fabric 2

A similar clay to fabric 1 as far as the quartz grain size is concerned, but with a higher proportion of large grains. The finer grains are less densely packed in the clay matrix. The fabric also contains more iron, of smaller individual particle size, than does fabric 1. The clay is liberally tempered with vegetable matter, present as voids up to 3mm in length.

Pottery characteristics

The three sandy sherds (fabric 1) all belong to different vessels. The single rim sherd with its inward sloping form probably comes from a general purpose vessel. Of the two body sherds, one is from a thin-walled, facetted carinated vessel, for which the rim sherd is too heavy, and the other has a *schlickung* coating. There is a possibility that the rim sherd could come from the *schlickung* vessel, and that the *schlickung* itself was confined to the lower half of the vessel.

The single vegetable-tempered sherd cannot be assigned to a vessel form, but its thickness (at 10mm, it is 2mm thicker than the other sherds) suggests that it may have been intended for heavy domestic use.

The surface treatment of the sherds is given in Table 8. There is obviously no great difference in surface treatment between the different vessels or fabrics. The sample, however, is probably too small to be meaningful and the ratio (3:1) of feature sherds to body sherds points to a selective collection procedure either during or after excavation.

Both the *schlickung* sherd and the facetted carinated sherd point to a date early in the Saxon period - 350-425 AD, by traditional dating methods. There is no other evidence from the site to support or deny this date range.

Similarities

The Hacheston fabrics were compared with fabrics from other sites in the region, and a fabric match was found between fabric 1 at Hacheston and Sutton fabric 2.

Conclusions

The Hacheston fabrics are derived from the crag deposits which are found locally at no great depth, Hacheston being on the edge of an area where the crag is exposed. The fabric link with Sutton may, however, indicate trade, Sutton being 10km away.

However the Sutton vessel was a container for a hoard of Roman coins and may have been carried some distance before burial. It does possibly reinforce the early date for the Hacheston ceramics however.

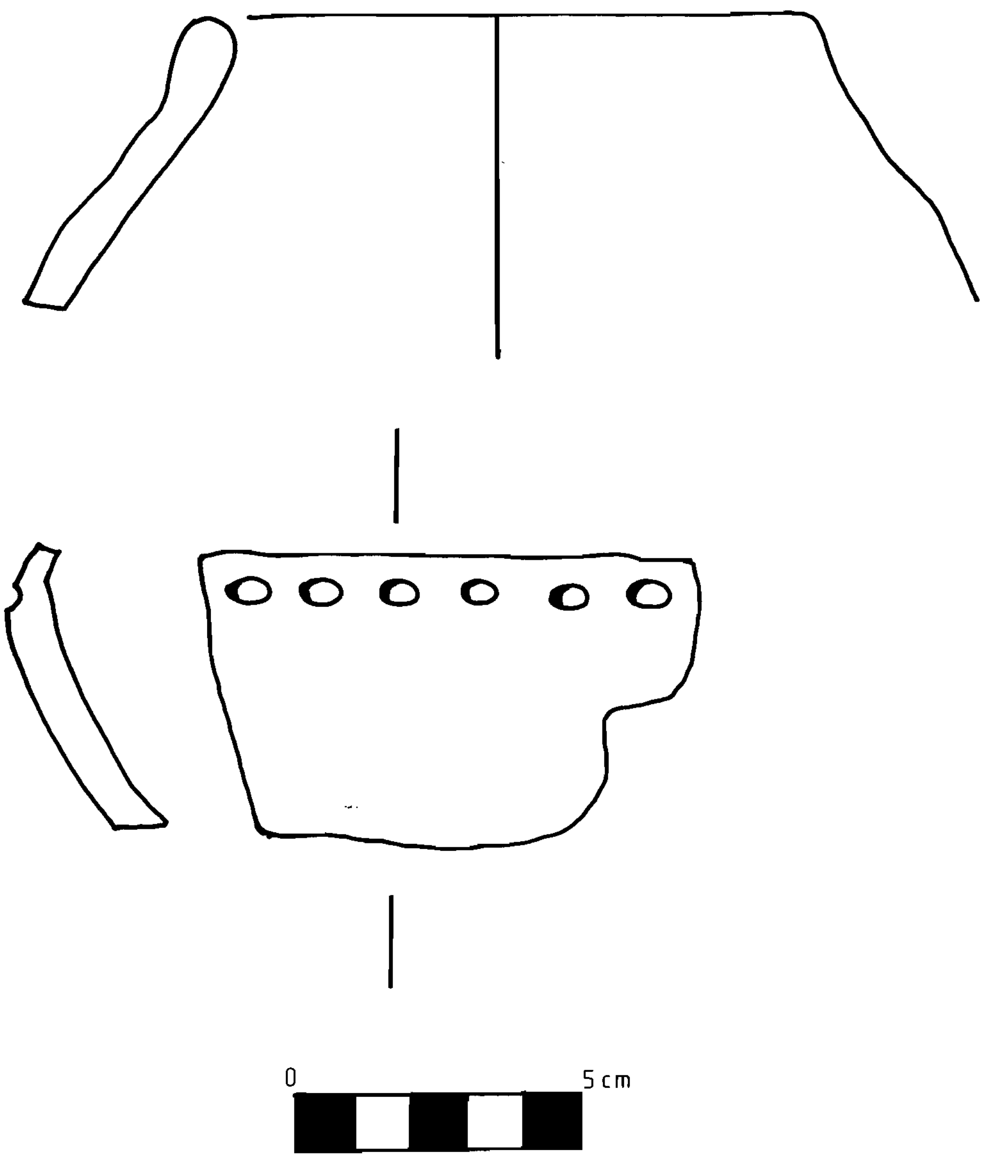


Fig. 8.18: showing the Hacheston pottery.

Ipswich, Castle Hill

The Castle Hill site used to be in Whitton parish before its amalgamation with Ipswich as the town expanded. A Roman villa was discovered there in 1854, from which a mosaic floor was removed to Ipswich Museum. Redevelopment of the site for housing was planned in the 1930s and excavations were carried out by Reid Moir in 1932 and again in 1949-50 (Maynard 1952). Saxon pottery was not reported from the site, but a bag of hand-made coarse-ware sherds were present in the site archive from area M9. These were not considered to be of prehistoric date (Balkwill pers. comm.) and the single rim sherd present was sampled to see if links to other Saxon sites in the area could be found. (See Fig. 8.19).

Macroscopic analysis

The rim sherd was of a sandy fabric.

Microscopic analysis

Fabric 1

A sandy clay matrix with abundant unsorted quartz grains, of sub-rounded form. Some of the larger grains are polycrystalline and probably derive from a sandstone. Many whiskers of muscovite mica are present, possibly also derived from the same sandstone. There are no signs of the rock having been crushed as temper.

Pottery characteristics

The single rim sherd comes from a vessel with a rim diameter of approximately 14cm. The short upright rim indicates that the vessel was suitable for ready access and this vessel was probably a cooking pot. The coarse sandy fabric would be suitable for such a purpose. The pot was smoothed outside and inside, and reduced to an even black colour.

Similarities

No clays could be located nearby due to the urban nature of the surroundings, but clays exposed by ploughing in fields to the northwest are all highly calcareous and unsuitable for pottery manufacture.

Conclusions

The Castle Hill sherd has no similarities with the sites to the northeast and southwest of Ipswich which all have ceramics made from the fine sandy clays of the crag series. The coarse sandy clays appear to be more common to the northwest such as at Barham. If the inhabitants of Whitton did obtain their pottery from elsewhere it would probably have been from that direction, rather than towards the coast.

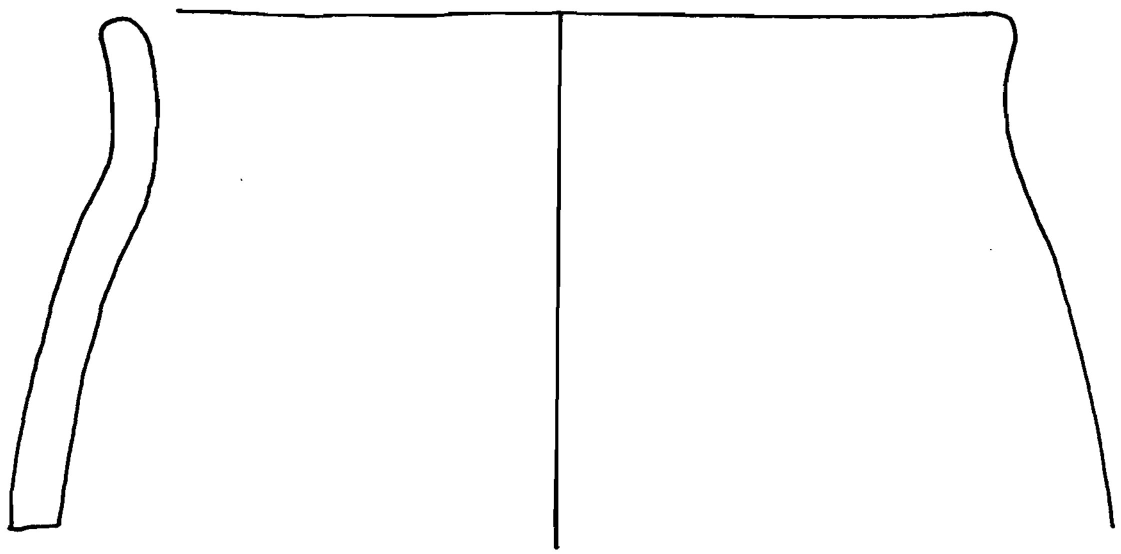


Fig. 8.19: showing the Ipswich Castle Hill rim sherd.
Scale 1:1.

Ipswich, Hadleigh Road

Skeletons were found in 1905-06 when an area south of Hadleigh Road, Ipswich, was being levelled. No grave goods were noticed; and since the skeletons were thought to be fairly modern, they were reburied. In 1906-07 Miss Layard, who visited the site, recognised that it was a Saxon cemetery and conducted excavations (Layard 1907; Ozanne 1962). All finds are now in Ipswich Museum.

Macroscopic analysis

The pottery appeared to consist of three fabrics macroscopically:

1. Sandy
2. Vesicular
3. Vegetable tempered

A sample of each fabric was taken from a quantity of unstratified material.

Microscopic analysis

Microscopic analysis showed that there were two fabrics, a sandy fabric, and a calcareous fabric to which the vegetable-tempered fabric belonged.

Fabric 1

A silty clay matrix with a quartz component of mostly coarse grain size, derived from a calcareous quartz sandstone, a few composite grains of which are present. The clay pellets that are present do not contain any of these sandstone-derived grains.

Fabric 2

A fine, dense sandy micaceous clay matrix, with occasional larger, rounded quartz grains. The fabric contains voids caused by the leaching out of rounded shell fragments. Occasional larger well-rounded quartz grains are present. The vegetable-tempered fabric was identical to this fabric apart from the voids caused by the combustion of the organic inclusions.

Similarities

The fabrics from the Hadleigh Road cemetery were compared with others in the region. There are strong similarities with fabrics from other sites situated in the area of the crag deposits, but the only identical fabric was fabric 7 at Butley which matched Hadleigh Road fabric 2.

Conclusions

The vesicular and vegetable-tempered fabrics are formed from the same clay. The vesicular fabric contains quartz grains of such marked sphericity as to indicate an aeolian deposition, possibly dune or desert sand.

The vegetable-tempered fabric lacks this sand fraction, and the sand and vegetable matter perhaps represent two different methods of tempering. Alternatively, if the sand is a naturally occurring component of the clay, the vegetable matter may have been added as a replacement in facies of the clay that lacked the necessary coarser grains.

There is strong evidence of the beginnings of ceramic exchange in this area. This was probably taking place in the early 7th century with the growing social and political complexity that led to the rise of the Kingdom of East Anglia which was based in the Ipswich area.

Sutton

In the 19th century a hoard of Roman coins, contained in two Saxon vessels, was found at Sutton, Suffolk. The only record of the find is on a label stuck to one of the pots which notes that 'many coins (brass) of Constantine' formed the hoard. Originally both vessels were in Colchester Museum (Acc. No. 354), but they were given to Ipswich Museum in 1952 (Acc. No. 1952 17, 18)

Macroscopic analysis

Both vessels were of a sandy-vegetable tempered fabric.

Microscopic analysis

Microscopic analysis showed that each vessel had been made from a different fabric.

Fabric 1

A fine sandy micaceous clay matrix, with a well-sorted, angular to sub-rounded quartz component. The fabric is tempered heavily with vegetable matter.

Fabric 2

Similar to fabric 1 but with a finer matrix, less micaceous, and with fewer angular grains. The finer component is well-sorted but a scatter of larger grains are present, sub-rounded in character. Vegetable matter is present, less profusely than in fabric 1.

Pottery characteristics

Vessel 1, the larger vessel, has black outer and inner surfaces, although the outer surface of the base is a buff colour. The pot is well-fired and the inside is smoothed.

Vessel 2 is black inside, while the outer surface is black at the rim but becomes orange towards the base, again the inner surface is smooth.

Both vessels were obviously chosen for storage, but this is not definitely reflected in their form. A complete profile is only available for vessel 2, but vessel 1, although it lacks its rim, is probably a larger version of the same form (Fig. 8.20). This form would be suitable to uses requiring ready access, such as cooking or short-term storage. There is no evidence of external or internal sooting, and the oxidised outer surface points to use as a storage vessel.

The presence of vegetable tempering could be an indicator of the intended purpose as a cooking vessel, but if so, it seems not to have been carried out.

Similarities

Comparisons were made with fabrics from other sites in the region, but no similarities were found, apart from fabric 1 at Hacheston which was identical to fabric 2 at Sutton.

No clay could be found in the Sutton area because of the thick layer of sand cover that blankets this region of East Anglia.

Conclusions

It is likely that both of these vessels came from the same household source, and their different fabrics are an indicator of a lack of uniformity in potting practices. As both vessels were hoard containers they may have travelled some distance before being buried, although the clay for both probably originates in the crag region around, and to the northeast of, Ipswich. The similarity with the Hacheston fabric perhaps signifies a source in that area, as clays are scarce in the Sutton region.

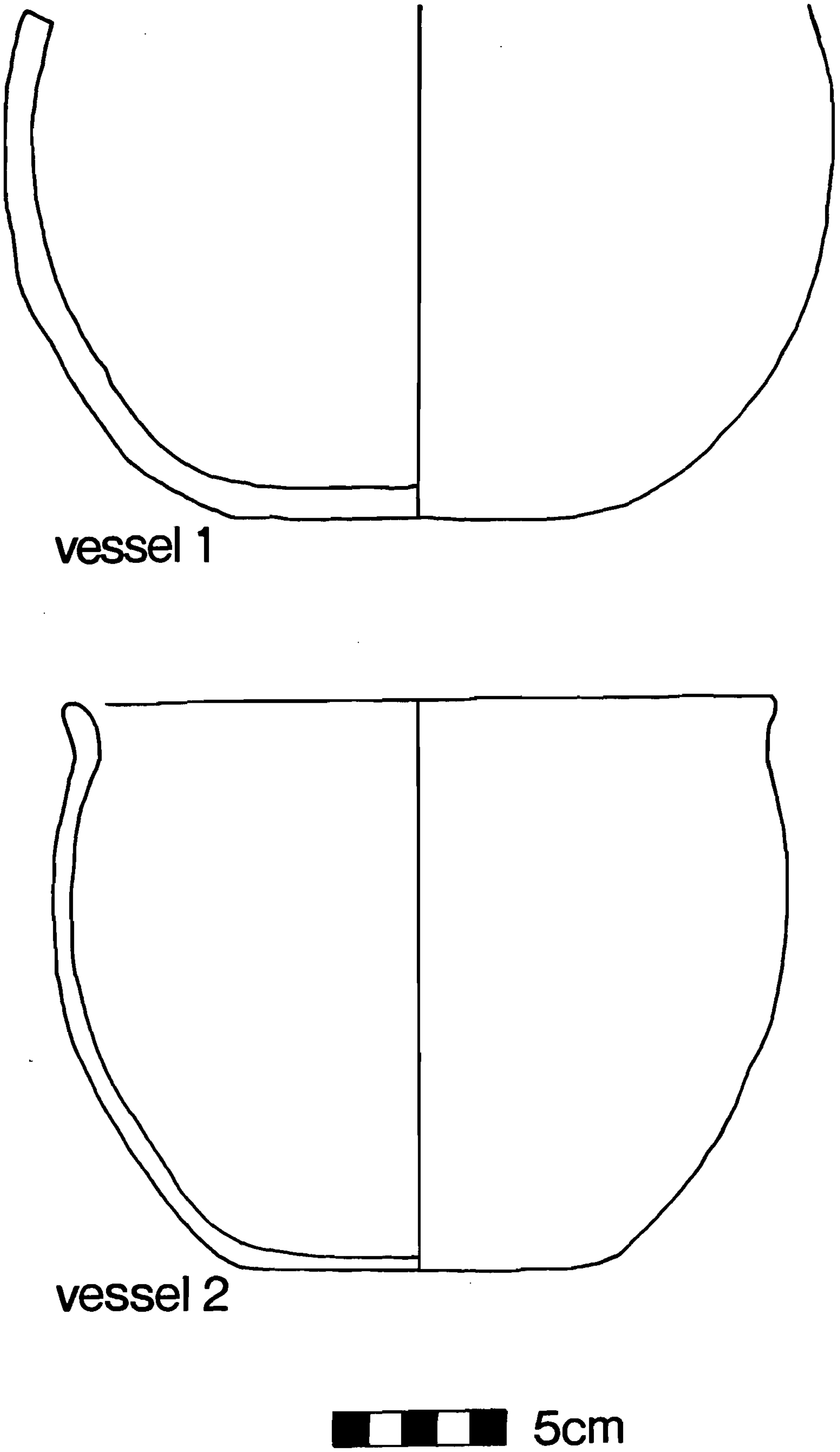


Fig. 8.20: showing the Sutton pottery.

Chapter 9

The Early Saxon Settlement Site at Grimstone End, Pakenham

This chapter deals, in a similar way to the previous three, with a single settlement site, that of Grimstone End, Pakenham, Suffolk, situated at Tl 9366930.

The site has produced over 700 vessels and therefore provides a larger data base than the other individual settlements that have been dealt with previously. This larger sample of vessels enables the organisation and production of Saxon ceramics to be modelled with greater confidence.

The hamlet of Grimstone End is situated in the parish of Pakenham in northwest Suffolk. Archaeological material was first discovered there in 1946 during gravel extraction. Ipswich Museum was contacted when human remains were found, and Basil Brown their field worker was sent to investigate. His involvement led to the excavation of a Roman pottery production centre with a number of kilns (Smedley 1951).

In 1953 full-scale excavation began on a ring ditch that had been visible on aerial photographs (Brown *et al* 1955, Plate XX). This work continued in 1954, and finally revealed a Bronze Age barrow with later Romano-British and Saxon burials. Saxon occupation, of both a domestic and industrial nature, was found in the silted-up ditch of the barrow.

The industrial features consisted of hearths with iron working debris, and five features described as clay floors and thought to be the bases of clamp kilns. According to the excavators, the floors consisted of a layer of burnt clay with fragments of fused and overfired pottery on and around them (*op.cit.*).
No Saxon pottery of this description was in Ipswich Museum when the present research was carried out, and none was there when West processed the material for publication in 1956 (West pers. comm. 1980). The only pottery of such a nature in the

collections are wasters from the Roman kilns, which were producing colour coat wares in the 3rd century AD. Similar features to the clay floors were found at West Stow in the bases of the sunken-featured buildings, and West, who was present at both excavations, considers that the Grimstone End examples were also the remains of such buildings (West pers. comm. 1980).

Brown continued to visit the site over the next four years, (1954-57), excavating and planning features as they were uncovered, and the plan of an extensive settlement was revealed (see Fig. 9.1).

The field note books of Brown (Ipswich Museum, Basil Brown Collection) give details of 8 huts and thirty other features, all of which the present writer considers to have been Saxon. This attribution is based mostly on artifact evidence, usually pottery or metalwork; and it is probable that a number of other features designated by Brown as Roman should in fact be dated to the Saxon period.

Brown appears not to have differentiated between hut types or their structure. All the 'Roman' and 'Saxon' huts were drawn and described as being of circular form, but apparently Brown was convinced that all huts were circular unless they had corners that met at right-angles (West pers. comm.). Brown therefore described all the Saxon sub-rectangular sunken featured buildings as being circular. Some of the circular huts may have been of Roman date, but a number of his 'Roman' huts were considered to be Roman from the presence of sherds of samian, despite the presence of Saxon pottery and loomweights in primary contexts. Most of the 'Roman' huts have two opposing postholes, placed on a diameter of the sunken area, which is a very Saxon attribute, often found in grubenhäuser (Fig. 9.2).

Later observation work on the quarry in 1964-5 resulted in the recovery of further pottery, both from unstratified contexts and from two hut groups each with an associated pit (Corrie 1965).

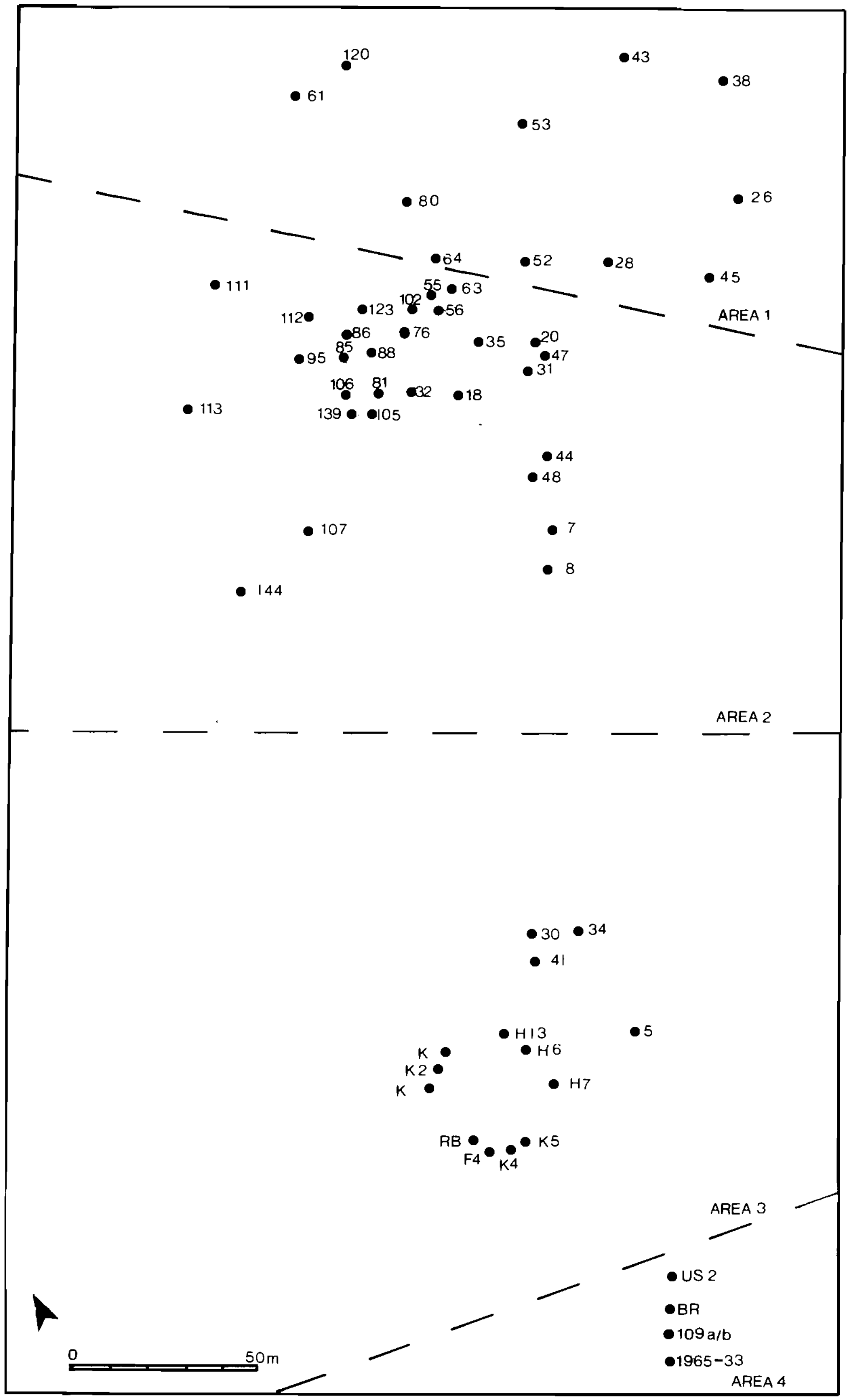


Fig. 9.1: Showing the settlement site of Grimstone End, based on plans made by Brown. The areas are divisions of the author's used for analysis of the ratios of fabrics. No plans exist for area 4 which therefore contains only a list of the contexts in that area.

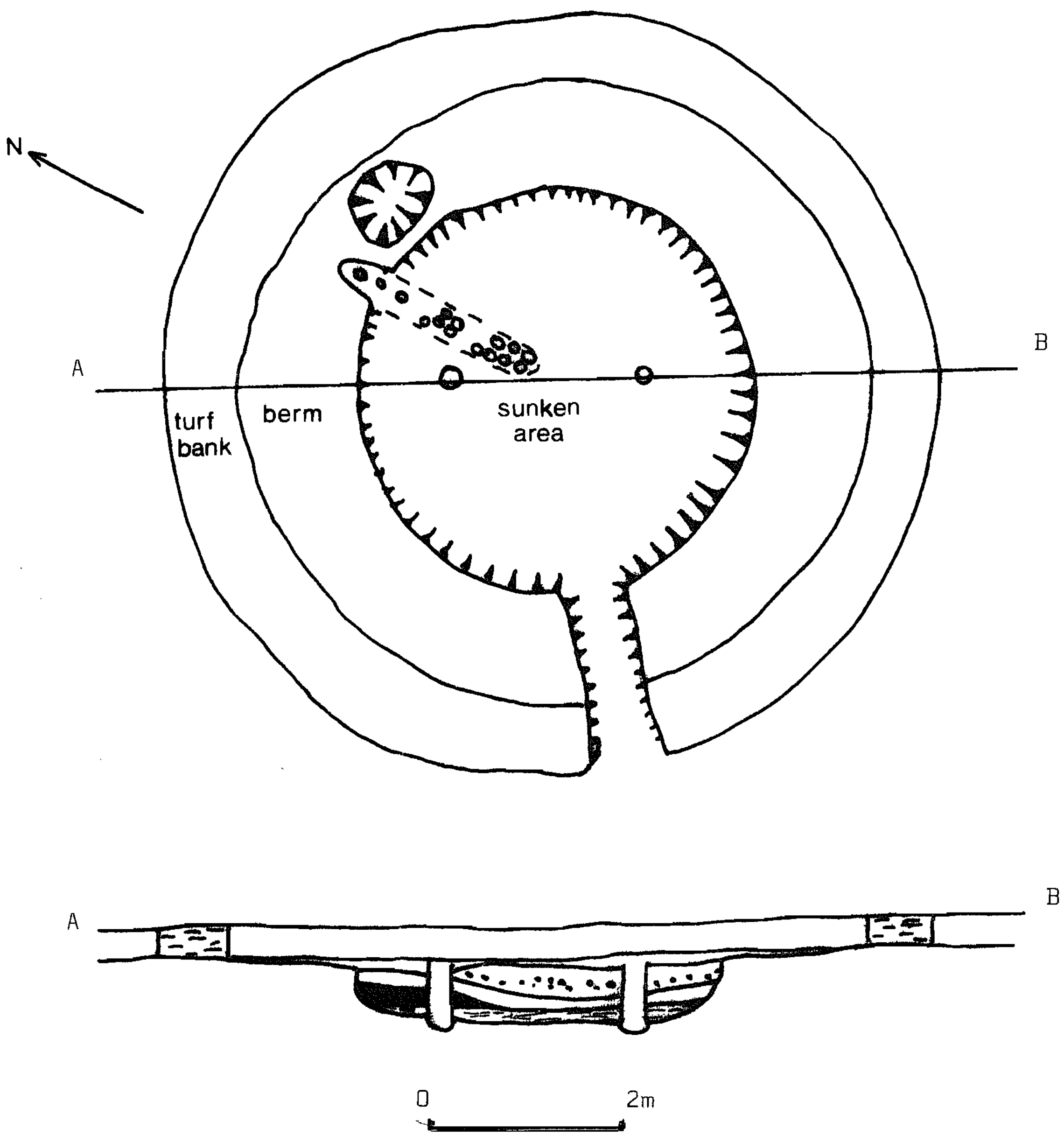


Fig. 9.2: showing Hut -18 at Grimstone End, termed by Brown as a Roman weaving shed.

The hut is probably Saxon, being of typical grubenhauser form. The plan and section suggest that the hut had a wooden floor over the sunken area, which had an opening in it to allow loomweights to hang through from an upright loom.

Copied from Brown's site notebook.

The pottery

The pottery was found as deposited by the excavators in the Ipswich Museum store. The material was unmarked and had accumulated the dust of at least 23 years. All groups that contained Saxon pottery were removed from the collection, washed, and marked with their context numbers. There was only a single group of unprovenanced pottery, although there was some confusion over the find spot of the largest single group. This was marked as having come from clay floors 1, 2, and 3; and it seems that the material from all three was bagged up as one at the start of the excavation, although material was later assigned to the separate features.

Once the pottery had been sorted into context groups, it was laid out and sherd groups were reconstructed. These were then designated as one of 14 fabric groups.

	Fabric	No. of vessels	
1.	Sandy	234	
2.	Coarse sandy	71	
3.	Yellow mica	6	
4.	White mica	7	
5.	Grog	12	
6.	Vegetable temper	54	
7.	Grog and vegetable	1	
8.	Chalk	172	
9.	Chalk and vegetable	5	
10.	Oolitic limestone	139	
11.	Limestone and vegetable	1	
12.	Limestone and grog	1	
13.	Shell	4	
14	Red flint grit	1	
		708	Total

Table 9.1

Sampling strategy

Samples were taken from every macroscopic fabric that occurred in each context, with further samples being taken to assess the variability in each fabric and give a larger data base. Extra attention was paid to the grog- and vegetable-tempered fabrics as these were examples of definitely tempered clays. Analysis of these fabrics, it was hoped, would throw light on the reasons for such additions. The macroscopically defined chalk fabric appeared more homogenous than the others. Due to this factor and the fact that 45% of the vessels in this fabric came from uncertain contexts, fewer samples were taken. The percentage of the total sample that each fabric contributed, and each fabric's percentage of the total vessel assemblage is shown in Table 9.2.

Fabric		Assemblage	Sample
1.	Sandy	33.0%	29.4%
2.	Coarse sandy	10.0%	10.5%
3.	Yellow mica	0.8%	1.0%
4.	White mica	1.0%	1.7%
5.	Grog	1.7%	5.0%
6.	Vegetable temper	7.6%	10.5%
7.	Grog and vegetable	0.1%	0.5%
8.	Chalk	24.3%	9.0%
9.	Chalk and vegetable	0.7%	1.0%
10.	Oolitic limestone	19.6%	17.5%
11.	Limestone and vegetable	0.1%	0.5%
12.	Limestone and grog	0.1%	0.5%
13.	Shell	0.5%	1.5%
14.	Red flint-grit	0.1%	0.5%

Table 9.2 Proportions of assemblage and sample contributed by each fabric.

Undecorated and undiagnostic sherd groups were sampled, as well as decorated and diagnostic vessels. In order to minimise any errors that might have been made during the construction of the sherd groups, rim sherds were sampled in preference to body sherds. A total of 241 samples were taken, three of these being from loomweights and one from daub.

The thin-sections were compared with each other under the binocular microscope, using transmitted light, and divided into fabric groups that were then checked and characterised using a petrological microscope. A total of 74 fabrics was arrived at, which could be grouped into 9 main fabric divisions:

Fabrics 1 to 5	Silty non-calcareous clays.
Fabrics 6 to 28	Non-calcareous clays with a fine sandy matrix.
Fabrics 29 to 41	Non-calcareous clays with well-sorted quartz grains.
Fabric 42	Calcareous silty clay.
Fabrics 43 to 53	Calcareous clays with a fine sandy matrix.
Fabrics 54 to 63	Calcareous medium sandy clays.
Fabrics 64 to 67	Calcareous sandy clays with well-sorted, rounded quartz grains.
Fabrics 68 to 72	Shelly clays.
Fabrics 73 to 74	Oolitic clays.

A small programme of textural analysis was conducted on a sample of sherds to test the exclusiveness of these main fabrics (see Table 9.3).

The analysis shows that - as far as the calcareous fine group and the sandy fine group are concerned - there is a greater similarity between samples in groups than across groups. The sandy, fine sandy, and calcareous well-sorted groups are all texturally similar, which suggests that their coarser components come from a similar geological regime. The visual differences between them are based more on the matrix, or presence/absence of inclusions than on the texture. Textural analysis is therefore useful on this site only in checking certain aspects of fabric identification, and cannot be relied on for finer differentiation.

Main fabric	Sample	Chk. LW	Veg. LW	Sandy LW	Clay samp.	90	105	110	49	53
Calc. fine	Chk. LW	X	19	7	19	40	62	63	56	64
Calc. fine	Veg. LW		X	50	27	22	33	40	27	68
Calc. fine	Sandy LW			X	23	44	63	60	58	54
Calc. fine	Clay samp.				X	21	47	47	46	45
Calc. fine	90					X	31	31	29	32
Sandy fine	105						X	14	14	22
Sandy fine	110							X	19	15
Sandy	49								X	27
Calc. sorted	53									X

Table 9.3: textural analysis matrix for a sample of the Grimstone End pottery. A figure of more than 30 indicates a dissimilarity at the .01 significance level.

The Fabrics

The presence/absence of inclusions in each sample is set out in Tables 9.4 to 9.14. The calcareous inclusion columns have been omitted in fabrics 1 to 41, as they are not present in any of these fabrics.

Fabrics 1 to 5 Silty non-calcareous clays.

Fabric 1

An iron-rich fine silty clay matrix with added grog.

Fabric 2

A fine silty clay matrix with disaggregated cälcareous sandstone.

Fabric 3

A fine silty clay matrix with abundant quartz grains from a disaggregated quartz sandstone. Fragments of sandstone up to 3mm in diameter are also present.

Fabric 4

A fine silty clay matrix with well-sorted abundant rounded quartz grains. Voids from the combustion of vegetable matter are also present.

Fabric 5

A silty clay matrix with scattered angular to sub-rounded quartz grains; maximum diameter 1.5mm, derived from a coarse quartz sandstone.

Fabrics 6 to 28 Non-calcareous clays with a fine sandy matrix.

Fabric 6

A fine clay matrix with well-sorted rounded quartz grains, with occasional flint grains of similar size and shape.

Fabric 7

A fine sandy matrix with sub-rounded quartz grains and larger fragments of coarse quartz sandstone.

Fabric 8

A fine sparse sandy matrix with sub-angular quartz grains, and scattered larger grains of coarse feldspathic sandstone.

Fabric 9

A fine sandy matrix with rounded to sub-angular quartz grains derived from a calcareous sandstone.

Fabric 10

A fine sparse sandy matrix with sub-rounded to rounded quartz grains.

Fabric 11

A fine sandy matrix with abundant sub-rounded quartz grains, and large rounded inclusions of iron-rich feldspathic sandstone, up to 4mm diameter, composed of sub-rounded grains.

Fabric 12

A fine sandy matrix with common sub-rounded quartz grains, probably derived from a quartz sandstone.

Fabric 13

A fine sandy clay matrix with unsorted sub-angular to angular quartz grains.

Fabric 14

A fine sandy clay matrix with unsorted sub-angular to angular quartz grains and lithic fragments.

Fabric 15

A fine sandy clay matrix with a coarse component derived from a medium grained micaceous sandstone.

Fabric 16

A fine sandy matrix with unsorted flint grains and abundant soot filled voids where vegetable matter has been carbonised.

Fabric 17

A fine sandy clay matrix with common quartz grains and sub-angular fragments of sandstone.

Fabric 18

A fine sandy clay with scattered sub-angular inclusions of siliceous sandstone.

Fabric 19

A fine sandy matrix with abundant fine quartz grains and an unsorted coarse rounded quartz component.

Fabric 20

A fine sandy matrix with a coarser rounded quartz component and abundant grog particles.

Fabric 21

A fine sandy matrix with unsorted quartz component, some grains being derived from a calcareous sandstone.

Fabric 22

A fine sandy matrix with an unsorted quartz component, and fragments of calcareous sandstone.

Fabric 23

A fine sandy matrix with abundant sub-angular quartz grains and fragments of calcareous sandstone.

Fabric 24

A fine sandy matrix with abundant inclusions of crushed granitic sandstone.

Fabric 25

A fine sandy clay matrix with abundant inclusions of crushed calcareous sandstone.

Fabric 26

A fine sandy clay matrix with unsorted quartz component, and soot-filled voids from the combustion of vegetable matter.

Fabric 27

A fine sandy matrix with unsorted quartz component, and a few monomineralic lithic grains.

Fabric 28

A fine abundant sandy matrix with scattered large rounded quartz grains. Occasional large monomineralic lithic grains.

Fabrics 29 to 41 — Non-calcareous clays with well-sorted quartz grains.

Fabric 29

A very sandy matrix with sub-angular to rounded quartz grains, derived from a quartz sandstone.

Fabric 30

A very sandy matrix with unsorted sub-angular to rounded quartz grains.

Fabric 31

A fine sandy matrix with a coarse component of unsorted sub-angular to rounded quartz grains and abundant grog particles.

Fabric 32

A coarse well-sorted sandy matrix with abundant fragments of sub-angular to rounded iron.

Fabric 33

A medium coarse well-sorted sandy matrix with abundant fragments of angular to sub-angular iron, and scattered rounded quartz grains.

Fabric 34

A well-sorted sandy matrix with a well-sorted coarser quartz component derived from a quartz sandstone. Traces of vegetable matter are present.

Fabric 35

A fine sorted sandy matrix with a well-sorted coarse component derived from a feldspathic sandstone.

Fabric 36

A well-sorted abundant sandy matrix with large scattered grains derived from a coarse grained quartz sandstone.

Fabric 37

A well-sorted abundant angular micaceous sandy matrix, with numerous voids from the addition of vegetable matter.

Fabric 38

A well-sorted abundant fine rounded sandy matrix with scattered large quartz grains derived from a quartz sandstone, and sub-angular iron grains.

Fabric 39

A clay matrix with sorted quartz grains. Smaller grains are angular and the rounding increases with size. One large rounded flint inclusion is present in one section.

Fabric 40

A fine well-sorted micaceous sandy matrix with scattered large sub-angular monomineralic lithic grains, derived from a feldspathic calcareous sandstone.

Fabric 41

A fine well-sorted sandy matrix with a moderately sorted coarse quartz component of sub-angular to sub-rounded grains.

Fabric 42 Calcareous silty clay.

Fabric 42

A silty clay matrix with scattered large grains of quartz derived from a granitic sandstone; grog and vegetable matter usually present in addition.

Fabrics 43 to 53 Calcareous clays with a fine sandy matrix.

Fabric 43

A fine sandy matrix with fragments and grains of calcareous sandstone.

Fabric 44

A fine sandy matrix with fragments of calcareous sandstone and rounded particles of shelly limestone.

Fabric 45

A fine sandy clay with comminuted chalk.

Fabric 46

An iron-rich fine sandy clay matrix with abundant rounded particles of limestone, and sub-angular to rounded grains of chalk.

Fabric 47

A fine sandy clay matrix with sub-rounded quartz grains derived from an iron-rich sandstone. Abundant comminuted chalk is present.

Fabric 48

An iron-rich fine sandy clay matrix usually streaky grey and brown if reduced, light and dark red if oxidised, with occasional clay pellets. Large rounded chalk grains, and sub-angular quartz sandstone fragments are present.

Fabric 49

A fine sandy matrix with sub-rounded unsorted common quartz grains. The grog particles are derived from a coarser clay with a well-sorted quartz component.

Fabric 50

An iron-rich fine sandy matrix with unsorted sub-angular to angular quartz grains. Comminuted chalk and fragments of limestone are present.

Fabric 51

An abundant fine sandy matrix with unsorted quartz component with the larger grains more rounded. Abundant comminuted rounded chalk.

Fabric 52

An iron-rich, abundant fine sandy matrix with unsorted sub-angular to angular quartz grains; the larger derived from a calcareous sandstone.

Fabric 53

An iron-rich abundant fine sandy matrix with unsorted sub-angular quartz component. Abundant rounded fragments of chalk of equivalent and larger sizes are present. Also one large angular fragment of flint.

Fabrics 54 to 63 Calcareous medium sandy clays.

Fabric 54

A medium sandy clay matrix with abundant unsorted quartz grains. The fabric contains numerous rounded chalk grains and occasional fragments of shelly limestone. Occasionally vegetable or igneous rock temper has been added. Fragments of fine-grained sandstone appear in two samples.

Fabric 55

A medium sandy matrix with abundant unsorted sub-angular quartz grains; occasional fragments of fine-grained sandstone are present.

Fabric 56

A medium sandy matrix with abundant unsorted sub-angular to rounded quartz grains. Fragments of rounded chalk and limestone are present. Vegetable matter, calcareous sandstone and igneous rock appear in a few samples.

Fabric 57

A medium sandy matrix with unsorted sub-angular quartz grains. Common fragments of rounded chalk and limestone with fragments of calcareous sandstone are present.

Fabric 58

A medium sandy matrix with unsorted sub-rounded quartz grains. Occasional rounded flints and angular limestone inclusions are present. The larger more rounded quartz grains are derived from a calcareous sandstone.

Fabric 59

A medium sandy matrix with abundant unsorted sub-angular to rounded quartz grains, with abundant unsorted rounded fragments of limestone and chalk.

Fabric 60

An iron-rich medium sandy clay with abundant sub-angular quartz grains. Rounded chalk and limestone fragments of identical size range are present.

Fabric 61

An abundant medium sandy clay matrix with abundant unsorted sub-rounded quartz grains. The calcareous inclusions are mostly limestone.

Fabric 62

An abundant medium sandy matrix with sparse unsorted angular to sub-angular quartz grains with larger grains of calcareous sandstone from which the quartz grains are probably derived. Shelly limestone and chalk fragments are uncommon but always present.

Fabric 63

An abundant medium sandy matrix with dense moderately sorted quartz grains.

Fabrics 64 to 67 Calcareous sandy clays with well-sorted rounded quartz grains

Fabric 64

A fine silty clay tempered with crushed quartz sandstone. In a number of cases the temper and clay have been badly mixed leaving areas of temper-free matrix.

Fabric 65

An abundant medium sandy matrix with well-sorted quartz sandstone grains. Fragments of igneous sandstone are present in one sample, the others are all calcareous. Grog had also been added to over half the sample although not in any great quantity.

Fabric 66

An abundant medium sandy clay matrix with abundant well-sorted quartz grains derived from a micaceous sandstone. The temper has been badly mixed, leaving areas of untempered clay especially in sample 201 which also has vegetable matter added.

Fabric 67

A medium sandy clay matrix with abundant rounded moderately sorted quartz grains, probably derived from a quartz sandstone. Both samples contained limestone and vegetable matter, although sample 84 has more limestone and 192 has more vegetable matter.

Fabrics 68 to 72 Shelly clays

Fabric 68

A fine sandy matrix with abundant fragments of fossil shell, and sub-angular to angular moderately sorted quartz grains. One large fragment of sandstone from which the quartz grains are derived is present in sample 100.

Fabric 69

A fine sandy matrix with fragments of rounded fossil shell limestones, and chalk, with an unsorted sub-rounded quartz component. Vegetable matter is present in both samples but not in any great quantity.

Fabric 70

A fine sandy matrix with abundant fragments of fossil shell and occasional pellets of grog. The sub-rounded moderately well-sorted quartz component is probably derived from a calcareous sandstone.

Fabric 71

A medium sandy matrix with abundant particles of fossil shell and rounded chalk grains, with a moderately sorted sub-rounded quartz component.

Fabric 72

An iron-rich medium sandy clay matrix with an unsorted rounded quartz component and common fragments of rounded fossil shell and limestone.

Fabrics 73 to 74 Oolitic clays

Fabric 73

A dense coarse well-sorted angular sandy matrix with large rounded quartz grains and numerous ools, some still cemented together into groups of three or four.

Fabric 74

A dense coarse unsorted sandy matrix with numerous fragments of limestone, predominantly oolitic, but some shelly.

Two thin-sections were not suitable for analysis, 211 and 226. Sample 27 proved to be a shelly fabric that matched Roman material from the site.

The thin-sections showed that the macroscopic fabrics were not discrete microscopic fabrics. This was partly due to either vegetable matter or grog being used as a temper in several different clays, and the yellow mica and white mica being a naturally occurring component of the boulder clays.

The chalk and oolitic limestone fabrics had been separated by the presence/absence of macro-fossil fragments, very rounded inclusions, or their voids. This was found to have been an unreliable characteristic, as much of the limestone was in fact shelly limestone and had been reduced to microscopic fragments, often masked by the chalk.

Most of the macroscopically defined calcareous fabrics proved to be composed of either one or the other macroscopic groups, that is, either chalk or limestone. Only five of the 31 calcareous fabric groups proved to contain samples of both macroscopically defined fabrics, and the majority, over 70% of the vessels designated as oolitic limestone, fell into the medium sandy calcareous fabric division. This demonstrates that one can to some extent distinguish finer calcareous groups macroscopically.

	SAMPLE	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	IRON
(1)	97		X				X
	98		X				X
(2)	235				X		
(3)	87				X		
	89				X		
	109				X		
	185				X		
(4)	196			X			
	200			X			
	220			X			
	224			X			
	227			X			
	236			X			
(5)	61	X			X		
	179				X		
	180				X		
(6)	141					X	X
(7)	107			X			
	116			X			
	127			X			
	128			X			
	137			X			
	142			X		X	
	144			X		X	
	151			X		X	X
	153			X			
	161			X		X	X
	178			X			
	183			X			

Table 9.4 Grimstone End, presence/absence of inclusions (Fabrics 1 to 7).

	SAMPLE	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	IRON
(8)	33	X			X		
	51				X		
	130	X					
	140				X		
	143				X		
	149				X	X	
	164				X		
	174				X		
	175				X		
	181				X		
(9)	50				X		
	78				X		
	83				X		
	108				X		
	123				X		
	132				X		
	135				X		
	158				X		
	162				X		
	171				X		
	188				X		
(10)	121	X	X		X	X	
(11)	104				X	X	
	170			X	X	X	
(12)	122					X	X
	126			X		X	X
	213			X		X	X
(13)	82						
	113						
	163						X

Table 9.5 Grimstone End; presence/absence of inclusions (Fabrics 8 to 13).

	SAMPLE	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	IRON
(14)	172						
(15)	105				X		X
(16)	229			X		X	
(17)	124				X		
(18)	165				X		
(19)	187		X	X		X	
	195			X			
(20)	62		X				
	76	X	X				
	93		X				
	95		X				
(21)	115				X		
(22)	91				X		
	136				X		
(23)	119				X		X
(24)	49				X		

Table 9.6 Grimstone End; presence/absence of inclusions (Fabrics 14 to 24).

	SAMPLE	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	IRON
(25)	110				X		
(26)	204			X		X	
(27)	117				X		
(28)	81			X			
	125			X			
	133						
	199			X			
	203			X			
	232			X			
(29)	131						
(30)	186			X			
(31)	190		X		X	X	
(32)	112						X
(33)	189						X
	221			X			X
(34)	118			X	X		X
	166			X	X		X

Table 9.7 Grimstone End; presence/absence of inclusions (Fabrics 25 to 34).

(35)	SAMPLE	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	IRON
	169				X		
	173				X		
(36)	182				X		
(37)	197			X			
	218			X			
	219			X			
(38)	138				X		
(39)	54						
	75					X	
	237			X			
(40)	145					x	
	148				X		
	198						
	205			X			
	206			X	X		
	207			X	X		
	208			X			
	209			X	X		
	212			X	X		
	214			X			
	215			X	X		
	217			X			
	228			X			
	231			X			
	233			X			

Table 9.8 Grimstone End; presence/absence of inclusions (Fabrics 35 to 40).

	SAMPLE	IG ROCK	GROG	VEG.	S'STONE	FLINT	OOLITE	CHALK	IRON
(41)	230			X					
(42)	65			X	X			X	
	96		X				X	X	
	129		X					X	
	139							X	X
	191	X	X					X	
	193			X	X			X	
	194			X				X	X
	210			X	X			X	
(43)	118				X			X	X
	150				X			X	X
	155				X			X	
	168				X			X	
	176				X		X	X	
(44)	167				X		X		
	202				X		X	X	

Table 9.9 Grimstone End; presence/absence of inclusions (Fabrics 41 to 44).

	SAMPLE	IG RCK	GROG	VEG.	S'STONE	FLINT	SHELLY	OOLITE	CHK.	IRON
(45)	LW Chalk								X	
(46)	1							X		X
(47)	35								X	
	77				X			X	X	
	223	X	X	X					X	
(48)	15			X	X				X	X
	19				X		X		X	X
	134				X				X	X
	LW Veg.				X	X			X	X
	BR Daub				X				X	X
(49)	55		X	X					X	
	90		X	X					X	
	92		X	X					X	
	102		X	X	X				X	
(50)	22			X	X				X	X
	25			X			X	X	X	X
	36				X	X	X		X	X
	45				X	X	X		X	X
	63			X	X				X	X
(51)	LW Sandy								X	

Table 9.10 Grimstone End; presence/absence of inclusions (Fabrics 45 to 51).

	SAMPLE	IG RCK.	GROG	VEG.	S'STONE	FLINT	SHELLY	OOLITE	CHK.	IRN.
(52)	64			X	X				X	X
	80			X	X				X	X
	157				X				X	X
(53)	72					X			X	X
(54)	17						X		X	X
	18						X		X	X
	28						X		X	X
	37	X					X		X	X
	40				X		X		X	X
	41				X		X		X	X
	47			X			X		X	X
	48						X		X	X
	67			X			X		X	X
	69			X		X			X	X
	70						X		X	X
	71						X		X	X
	73						X		X	X
	88						X		X	X
	177						X		X	X
	216			X		X			X	X
(55)	7						X	X	X	
	10		X				X	X	X	
	14				X		X	X	X	
	20						X	X	X	
	24				X		X	X	X	
	30						X		X	
	31						X	X	X	
	234			X	X		X	X	X	

Table 9.11 Grimstone End; presence/absence of inclusions (Fabrics 52 to 55).

	SAMPLE	IG RCK.	GROG	VEG.	S'STONE	FLINT	SHELLY	OOLITE	CHK.	IRN.
(56)	9						X	X	X	
	13						X		X	
	26	X					X		X	
	34						X	X		
	42				X		X		X	
	52			X			X		X	
	66						X		X	
	101				X				X	
(57)	3				X		X		X	X
	38				X		X		X	X
	43				X		X	X	X	X
(58)	39				X		X		X	X
	111						X		X	X
	184				X		X		X	
(59)	5						X	X	X	X
	25						X	X	X	X
(60)	6						X		X	X
	8						X		X	X
(61)	64						X		X	
(62)	21				X		X		X	X
	32				X		X		X	X
	60				X		X		X	X
	86				X		X		X	X
	120				X		X	X	X	X

Table 9.12 Grimstone End; presence/absence of inclusions (Fabrics 56 to 62).

	SAMPLE	IG RCK.	GROG	VEG.	S'STONE	FLINT	SHELLY	OOLITE	CHK.	IRN.
(63)	4						X		X	
(64)	16				X	X			X	X
	35				X				X	X
	68				X				X	X
	94				X	X			X	X
	106		X		X				X	X
	146					X			X	X
	152				X				X	X
	156				X		X		X	X
	160								X	X
(65)	59		X				X		X	X
	74				X				X	
	79		X		X				X	
	99		X		X	X	X		X	X
	103		X		X	X			X	
	147	X	X				X		X	
	159								X	
	222		X	X			X		X	
	225			X	X		X	X	X	
(66)	53								X	X
	154				X				X	X
	201			X					X	X
(67)	84			X			X	X		X
	192			X			X	X		X
(68)	56						X			X
	100	X			X	X	X			X

Table 9.13 Grimstone End; presence/absence of inclusions (Fabrics 63 to 68).

(69)	SAMPLE	IG RCK.	GROG	VEG.	S'STONE	FLINT	SHELLY	OOLITE	CHK.	IRN.
	44			X			X		X	X
	57			X			X		X	X
(70)	23		X				X			
(71)	58						X		X	
(72)	12						X			X
(73)	2			X				X		
(74)	11						X	X		

Table 9.14 Grimstone End; presence/absence of inclusions (Fabrics 69 to 74).

Tempering agents

The two most readily visible tempering agents were fragments of grog and vegetable matter. These were related to the fabric divisions as shown in table 9.15 .

This shows that both tempering agents were used for widely differing clays. By expressing the tempered fabrics as a percentage of the calcareous and non-calcareous fabrics, it can be seen that there was a slight preference for vegetable matter when non-calcareous clays were used, and a slight preference for grog when employing calcareous clays. Of the calcareous fabrics 21% contain grog, as opposed to 12% of the sandy fabrics. Of the sandy fabrics 48% contain vegetable matter, as opposed to 42% of the calcareous fabrics.

Grog and vegetable matter were seldom used together. Only seven examples out of a total sample of 237 thin-sections, and only six fabrics out of 71, contain both. Even in these six, the two types of temper usually occur in different vessels. Fabric 49 therefore is unusual in having both types of temper in the four vessels it contains.

This suggests that the potters were deliberately choosing either vegetable matter or grog before they began the potting process, so the inclusion of these two ingredients was not haphazard or accidental.

The disaggregated sandstones that occur in the fabrics present more of a problem than do the grog and vegetable temper. It is possible that the sandstone is a natural component of the clays, and that these are naturally occurring sandy clays selected by the potters. The arguments against this are 1. that the extensive clay-sampling programme carried out for this project (and detailed in Chapter 4) did not locate any naturally occurring clays of this type; and 2. that much of the sandstone does not exhibit to any significant degree the type of rounding to be expected if the crushing took place in an englacial environment.

The author's analysis of drift deposits indicates that lithic fragments are usually present either as pebbles or as scarce microscopic fragments, a fact that has been noticed by

Fabric Division	No of vessels	S	G	V	S/G	S/V	G/V	S/G/V	Tempered	Untempered	Fabric type
1 - 5	16	50.0	12.5	37.5					100.0	0.0	Silty
6 - 28	68	63.2	6.0	15.0	1.5	1.5	1.5		88.0	12.0	Sandy fine
29 - 41	34	15.0		4.0	3.0	20.5			79.5	20.5	Sandy sorted
42	8		37.5			37.5			75.0	25.0	Calc. silty
43 - 53	26	57.5		4.0		19.0	15.0	4.0	100.0	0.0	Calc. sandy fine
54 - 63	49	32.5		10.0		2.0			45.0	55.0	Calc. sandy medium
64 - 67	23	35.0	8.5	13.0	17.5	4.5	4.5		82.5	17.5	Calc. sorted
68 - 72	7	14.0	14.0	28.5					57.0	43.0	Shelly
73 - 74	2			50.0					50.0	50.0	Oolitic

S = Sandstone
G = Grog
V = Vegetable

Table 9.15: showing the percentage of vessels in each major fabric division that contained sandstone, grog, vegetable matter or a combination of these.

other ceramic petrologists working in this region (H. Howard pers. comm.). This points to the sandstone having been added as temper in the majority of cases at Grimstone End.

Analysis of the occurrence of crushed sandstone with the other tempering agents shows that it tends to be used by itself in the sandy fabrics, but that it is often used mixed with other tempering agents in the calcareous clays (see Table 9.16).

Clay type	N	S	S/G	S/V	S/G/V
Calcareous	33	18%	3%	21%	18%
Non-calcareous	41	44%	5%	7%	0%

Table 9.16: The percentage of fabrics in each clay type which contain sandstone, or sandstone and additional temper, where N = number of fabrics, S = sandstone, G = grog and V = vegetable.

The relationships between the different fabric divisions and the tempering agents is shown in Table 9.15, which gives the percentages of vessels of each clay type that contains, sandstone, grog, or vegetable matter, or combinations of these.

Of the sandy vessels, 81% are tempered, as opposed to 68% of the calcareous vessels. There are, however, appreciable differences between the fabrics within the two clay groups. Although 12% of the sandy fabrics and 42% of the calcareous fabrics contain a mixture of tempers, such mixtures are in only 17% of the vessels. This indicates that, though potters usually employed one particular temper for a pot or batch of pots, they occasionally used a different temper, even though utilising the same clay. This phenomenon could also be explained by the tempering of pots according to their intended function even though manufactured at the same time. Cooking pots need more temper, for instance, than drinking vessels, due to the greater stresses involved during their use.

The addition of more than one temper to a clay occurs twice as often in the calcareous group (17.5%) as in the sandy group (9%). On the other hand, there are more untempered vessels in the calcareous group (32%) than in the sandy group (12.5%). The mixing of tempers may, therefore, be due to culturally determined factors rather than to functional ones. To assess whether the type and occurrence of a temper is related to vessel form and function, the characteristics of the fabrics were examined.

Pottery characteristics

In most cases the fabrics are represented by too few vessels for a meaningful comparison to be made of the vessel's characteristics. See Fig. 9.3.

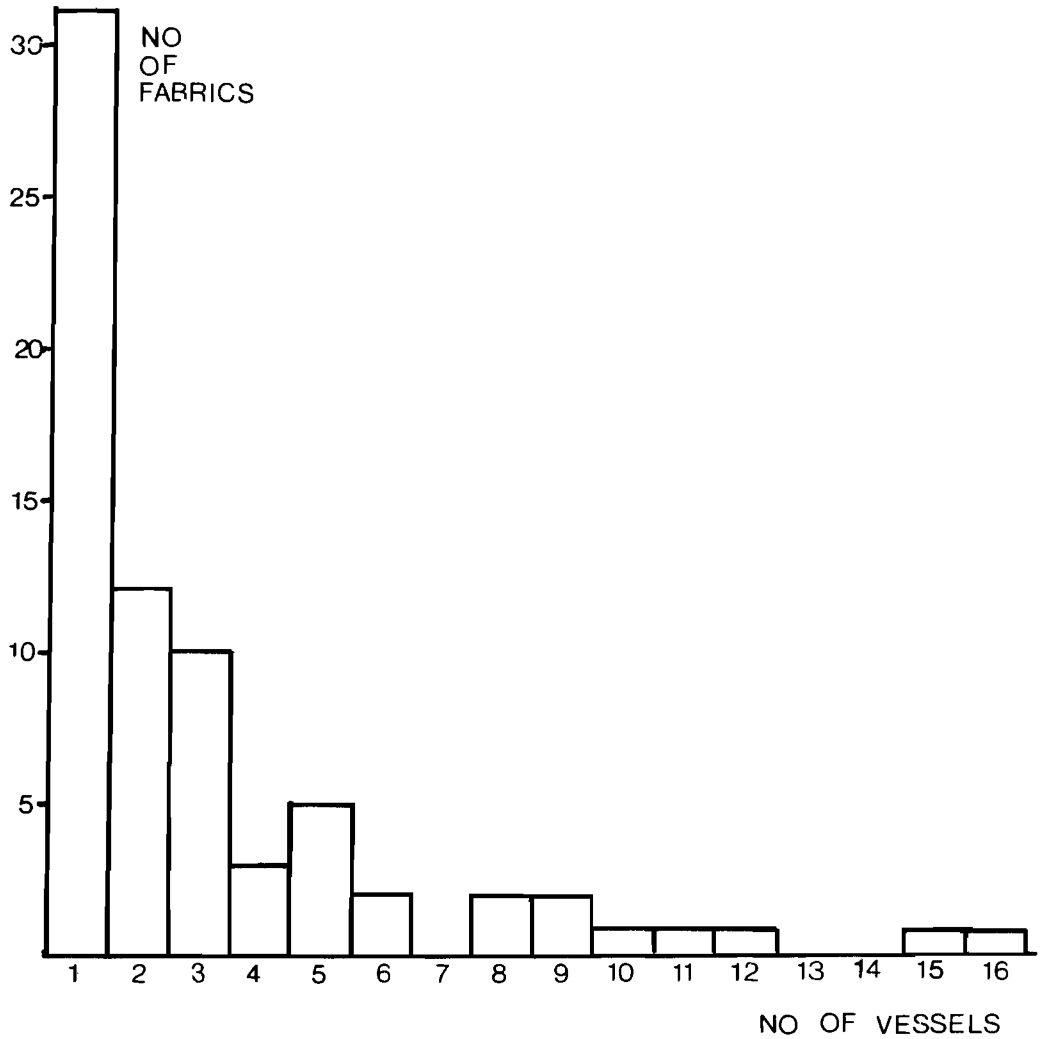


Fig. 9.3: showing how the majority of the fabrics are represented by one or two vessels.

The pottery characteristics will therefore be given only for those fabrics that are represented by more than five thin-sections. Sixteen fabrics fall into this category with at least one in each of the main fabric divisions, (see Tables 9.18 to 9.22). The total number of vessels thus listed is 138, which is 56% of the vessels that can be confidently assigned microscopic fabrics i.e. those thin-sectioned, and 15% of the total assemblage of 708 vessels. The information is synthesised in Table 9.17. Illustrations of the vessels in each fabric are also given, see Figures 9.8 to 9.10.

The calcareous clays tend to be better fired than the sandy ones, but in all fabrics the majority of vessels are well-fired. All vessels appear to have been fired in bonfires or clamp kilns resulting in occasional patchy black-and-red surfaces. There is little difference between the two clay types as far as the outer and inner surface colours are concerned; but the higher incidence of reducing conditions inside the vessels, with the blackening of rims, suggests that the pots were fired upside down. This is especially true of the sandy group where, although 36% of the pots are oxidised on the outside, 90% were well-reduced inside. There are some exceptions to the rule, such as fabrics 62 and 48, both calcareous, where both the inner and outer surfaces are predominantly oxidised.

As far as the surface finishes are concerned, a simple smoothing operation seems to have been the most common method of finishing off a pot; followed in order of preference by no treatment, burnishing, and wiping. Wiping is the term used here to describe the action that resulted in the surface exhibiting narrow shallow grooves. The same effect can be duplicated by wiping the fingers across the surface of damp clay. Wiping should therefore probably be classed as a natural finish as it was not necessarily a deliberate technique. The use of schlickung - a coating of coarse sandy slip - is confined to fabric 40. There are only five vessels bearing schlickung from the site and they occur predominantly in the non-calcareous clays.

In the widest terms the calcareous vessels, in comparison with the non-calcareous vessels, have less smoothing and wiping

Fabric		Outer surface							Inner surface						Hardness		Sherd groups
Group	No	Ox'd	Red'd	Schlick	Brnshd	Smthd	Wiped	Nat	Ox'd	Red'd	Brnshd	Smthd	Wiped	Nat	H	S	No
Silty	4	0	100	0	50	33	17	0	0	100	0	33	33	33	66	33	6
	7	58	42	0	17	58	0	25	17	83	17	50	0	25	75	25	12
	8	67	23	0	11	22	0	66	22	78	11	33	0	55	78	22	9
Sandy	9	27	73	0	0	64	0	36	9	91	9	55	9	27	100	0	11
	28	33	67	0	33	50	0	17	0	100	17	50	0	33	67	33	6
S. Sorted	40	21	79	14	21	43	7	14	14	86	36	14	14	36	93	7	14
Calc. silt	42	25	75	0	12	50	12	25	0	100	0	25	25	50	75	25	8
	43	40	60	0	20	40	0	40	20	80	60	20	0	20	80	20	5
Fine	48	0	33	0	33	66	0	0	66	33	66	33	0	0	100	0	5
sandy	50	20	80	0	0	60	20	20	40	60	0	20	40	20	80	20	5
Calc	54	37	63	0	31	25	19	25	25	75	12	56	6	19	94	6	16
medium	55	63	37	0	25	63	0	12	12	88	25	50	0	12	100	0	8
sandy	56	37	63	0	12	37	25	25	12	88	12	50	12	0	75	25	8
	62	100	0	0	0	0	0	100	80	20	0	60	20	20	80	20	5
Calc	64	33	77	0	0	0	0	100	22	78	11	56	11	22	100	0	9
sorted	65	33	77	0	44	33	0	22	0	100	22	33	0	44	100	0	9
Shelly	68-72	14	86	0	28	14	0	43	29	71	0	86	0	0	86	14	7
Oolitic	73-74	50	50	0	50	50	0	0	0	100	50	50	0	0	100	0	2

Table 9.17: synthesis of the pottery characteristics given in tables 9.18 to 9.22

Silty sub-group

Fabric 4

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
196	Gry/Brown	Burnished	Lt. Grey	Natural	H	US?
200	Dk. Brown	Burnished	Lt. Grey	Natural	S	US
220	Grey	Burnished	Black	Wiped	H	US?
224	Dk. Grey	Smoothed	Black	Smoothed	H	K123
227	Blk/Brwn	Wiped	Dk. Grey	Wiped	S	H13
236	Grey	Smoothed	Dk. Grey	Smoothed	H	-144

Sandy sub-group

Fabric 7

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
107	Brown	Smoothed	Black	Smoothed	H	-113
116	Blk/Buff	Burnished	Black	Burnished	H	-113
127	Black	Smoothed	Brown	Smoothed	H	- 35
128	Brown	Smoothed	Red	Eroded	S	- 44
137	Black	Smoothed	Black	Smoothed	H	K
142	Dk. Red	Natural	Dk. Red	Natural	S	- 61
144	Black	Natural	Black	Smoothed	H	- 61
151	Black	Smoothed	Black	Natural	H	964-1091
153	Red/Blk	Smoothed	Black	Natural	H	+ 5
161	Buff/Blk	Burnished	Grey	Smoothed	H	- 111
178	Brown	Natural	Black	Smoothed	H	- 43

Fabric 8

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
33	Black	Smoothed	Dk. Grey	Natural	S	K5B
51	Org/Gry	Natural	Dk.Gry/Blk	Natural	H	-144
130	Buff/Blk	Natural	Black	Natural	H	- 61
140	Buff	Smoothed	Black	Smoothed	H	-123
143	Dk. Brown	Natural	Brown	Natural	H	- 61
149	Red	Natural	Black	Smoothed	H	+ 34
174	Dk.Rd/Brn	Natural	Black	Burnished	S	- 43
175	Black	Natural	Black	Smoothed	H	- 43
181	Blk/Buff	Burnished	Pnk/Bff	Natural	H	-48

Table 9.18: showing the pottery characteristics of the Grimstone End pottery.

Fabric 9

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
50	Dk. Gry/Buff	Smoothed	Black	Smoothed	H	K5
78	Black	Natural	Black	Smoothed	H	H6
83	Buff	Natural	Black	Natural	H	-38
108	Black	Natural	Black	Smoothed	H	-113
123	Dk. Brown	Smoothed	Black	Burnished	H	-31
132	Black	Smoothed	Black	Natural	H	-76
135	Blk & Buff	Smooth	Black	Smoothed	H	-26
158	Black	Smoothed	Black	Natural	H	-111
162	Black	Smoothed	Black	Smoothed	H	+ 7
171	Black	Smoothed	Black	Smoothed	H	-43
188	Dk. Brown	Natural	Brown	Wiped	H	-112

Fabric 28

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
81	Buff/Orange	Smoothed	Grey Brown	Smoothed	S	K4B
125	Black	Burnished	Black	Burnished	H	+107
133	Buff	Smoothed	Black	Natural	H	+30
199	Dk. Grey	Burnished	Dk. Brown	Natural	S	-113
203	Grey	Smoothed	Dk. Grey	Smoothed	H	K123
232	Dk. Grey	Natural	Black	Smoothed	H	F2

Sandy well sorted

Fabric 40

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
145	Black	Natural	Black	Burnished	H	-61
148	Buff	Natural	Grey	Natural	S	+34
198	Lt. Grey	Smoothed	Lt. Grey	Natural	H	K5
205	Dk. Grey	Burnished	Dk. Brown	Wiped	H	-113
206	Lt. Grey	Schlickung	Black	Burnished	H	K1D
208	Lt. Brown	Smoothed	Dk. Grey	Burnished	H	K2B
209	Lt. Or./Gry	Smoothed	Dk. Grey	Smoothed	H	K123
212	Brown	Wiped	Or./Brown	Wiped	H	K1DK3A
214	Dk. Grey	Smoothed	Black	Smoothed	K	K123
215	Lt. Grey	Smoothed	Dk. Grey	Burnished	H	K3A
217	Lt. Grey	Smoothed	Black	Natural	H	K123
228	Grey	Schlickung	Black	Burnished	H	-144
231	Dk. Grey	Burnished	Grey	Natural	H	H6
233	Black	Burnished	Black	Natural	H	TT1A

Calcareous silty sub-group

Fabric 42

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
65	Black	Smoothed	Grey/Blk	Wiped	H	-111
96	Black	Smoothed	Black	Natural	H	K123F4
129	Grey	Natural	Grey	Natural	H	19653PA1
139	Black	Burnished	Black	Smoothed	H	-26
191	Gry/Brown	Natural	Black	Natural	S	-144
193	Grey+Red	Smoothed	Blk+Brwn	Natural	S	+34
194	Gry+Orange	Smoothed	Lt. Grey	Smoothed	H	H5NFAK5D
210	Blk/Grey	Wiped	Lt. Grey	Wiped	H	K5B

Table 9.19: showing the pottery characteristics of the Grimstone End pottery.

Calcareous fine sandy sub-group

Fabric 43

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
118	Black	Smoothed	Black	Smoothed	H	-80
150	Buff	Neutral	Black	Burnished	H	-123
155	Black	Burnished	Black	Burnished	H	-111
168	Red Brown	Smoothed	Red Brown	Burnished	H	+7
176	Black	Natural	Black	Natural	S	-43

Fabric 48

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
15	Black	Smoothed	Black	Burnished	H	-113
19	Dk. Brown	Smoothed	Dk. Red	Smoothed	H	-51
134	Brown + Blk	Burnished	Brown + Blk	Burnished	H	-105
LW Veg.						H5
BR Daub						BR

Fabric 50

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
22	Orange	Natural	Brown	Wiped	H	-43
25	Grey	Smoothed	Black	Natural	H	+41
36	Dk. Grey	Wiped	Orange +Blk	Wiped	H	K45
63	Black	Smoothed	Buff	Eroded	S	-26

Calcareous medium sandy sub-group

Fabric 54

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
17	Black	Smoothed	Grey	Natural	H	-113
18	Black + Red	Wiped	Black	Natural	H	-144
28	Black	Natural	Red Brown	Wiped	H	-111
37	Grey/Black	Burnished	Black	Burnished	H	K5
40	Black + Or.	Smoothed	Pnk/Red/Blk	Eroded	H	K3
41	Orange Red	Natural	Orange Red	Natural	S	-144
47	Dark Grey	Burnished	Black	Smoothed	H	BR
48	Black + Or.	Wiped	Black	Smoothed	H	-111
67	Black	Wiped	Black	Smoothed	H	BR
69	Buff	Natural	Black	Smoothed	H	K5B
70	Red Brown	Smoothed	Red Brown	Smoothed	H	K1
71	Black	Burnished	Black	Smoothed	H	-144
73	Red	Burnished	Black	Burnished	H	K2B
88	Buff	Natural	Black	Smoothed	H	-144
177	Red Brown	Smoothed	Grey	Smoothed	H	-43
216	Dk. Grey	Burnished	Black	Smoothed	H	H7A

Table 9.20: showing the pottery characteristics of the Grimstone End pottery.

Fabric 55

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
7	Buff	Smoothed	Black	Smoothed	H	K1C
10	Black	Smoothed	Red	Smoothed	H	BR
14	Black	Burnished	Black	Natural	H	H13
20	Buff	Smoothed	Dark Grey	Eroded	H	123
24	Orange	Smoothed	Black	Burnished	H	+7
30	Brown	Burnished	Black	Burnished	H	H7A
31	Buff	Smoothed	Black	Smoothed	H	K123
234	Black	Natural	Black	Smoothed	H	-144

Fabric 56

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
9	Black	Natural	Grey	Wiped	H	BR
13	Lt. Grey	Smoothed	Black	Smoothed	H	17
26	Dk. Grey	Smoothed	Red	Smoothed	S	-113/11
34	Black	Burnished	Dark Grey	Eroded	H	K
42	Orange	Wiped	Black	Eroded	H	-43
52	Grey Black	Smoothed	Grey Brown	Smoothed	H	-113
66	Orange + Gry	Wiped	Grey	Smoothed	H	BR
101	Black	Smoothed	Black	Burnished	H	K4

Fabric 62

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
21	Orange + Brwn	Natural	Brown	Natural	S	-113
32	Buff	Natural	Buff + Blk	Smoothed	H	K123
60	Buff	Natural	Grey	Wiped	H	-144
86	Buff	Natural	Buff + Blk	Smoothed	H	-31
120	Buff	Natural	Buff	Smoothed	H	-44

Calcareous well-sorted sub-group

Fabric 64

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
16	Orange	Natural	Orange	Natural	H	-61
68	Grey	Natural	Grey	Smoothed	H	H6
85	Black	Natural	Black	Wiped	H	-111
94	Buff	Natural	Black	Smoothed	H	K5B
106	Orange	Natural	Black	Smoothed	H	-113
146	Black + Red	Natural	Black	Smoothed	H	+34
152	Grey + Buff	Natural	Grey	Natural	H	1969-109A
156	Black	Natural	Black	Smoothed	H	-111
160	Buff	Natural	Buff	Burnished	H	-111

Table 9.21: showing the pottery characteristics of the Grimstone End pottery.

Fabric 65

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
59	Black	Burnished	Grey	Smoothed	H	BR
74	Buff	Natural	Grey	Natural	H	H7B
79	Buff	Burnished	Black	Smoothed	H	K2A
99	Black	Burnished	Black	Burnished	H	BR
103	Black	Burnished	Black	Burnished	H	+41
147	Black + Red	Natural	Black + Red	Smoothed	H	+34
159	Grey	Smoothed	Black	Natural	H	-111
222	Grey + Brwn	Smoothed	Black + Brwn	Natural	H	K123
225	Buff	Smoothed	Black	Natural	H	BR

Shelly limestone fabrics

Fabrics 68-72

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
56	Lt. Grey	Natural	Buff + Lt.Grey	Smoothed	H	K1C
100	Buff	Natural	Buff	Eroded	H	K123
44	Grey	Natural	Black	Smoothed	H	+5
57	Grey	Eroded	Grey	Smoothed	S	K
23	Lt. Brown	Smoothed	Black	Smoothed	H	BR
58	Black	Burnished	Dk. Grey	Smoothed	H	-144
12	Black	Burnished	Grey	Smoothed	H	K1E

Oolitic sub-group

Fabrics 73-74

Sample No.	O.S. Colour	Finish	I.S. Colour	Finish	Hardness	Context
2	Dark Red	Smoothed	Black	Smoothed	H	F2
11	Black	Burnished	Black	Burnished	H	BR

Table 9.22: showing the pottery characteristics of the Grimstone End pottery.

on their exterior surfaces, with a high incidence of natural surfaces. The inner surface of the calcareous vessels is more likely to be oxidised, and to be smoothed or burnished, than that of the non-calcareous vessels.

Form and function

The function of a vessel is usually related to its form; although, in a society where pottery is scarce, vessels are likely to be used for a number of different purposes. The intended function of a vessel will play an important part in the shape of the finished article, and also may determine the composition of the fabric. To examine the relationship between form and fabric, the rim forms of the vessels in these fabrics used in analysing the pottery characteristics were recorded. The rims can be divided into five catagories:

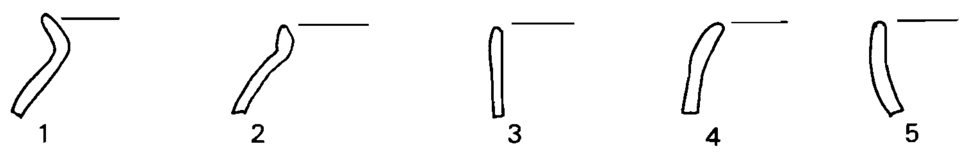


Fig. 9.4: Rim-types used in analysis of Grimstone End pottery forms. 1. an everted rim; 2. a short upright rim rising from a globular body; 3. a straight upright rim; 4. a straight inturned rim; and 5. a concave rim.

There appears to be a preference for certain rim-types in some fabrics - rim-type 2 in fabric 9, for instance - which might point to household industry as a mode of production with a potter producing a surpus of vessels of one form. Generally speaking, however, each fabric appears to have been used for a variety of rim-types and thus vessel functions. Each fabric therefore probably represents the output of a single household.

It is possible that the high number of fabrics, each with a small number of vessels, are the result of many manufacturing occasions, at each of which the vessels needed by the household were produced.

The fabrics contained rim-types as follows:

Fabric	1	2	3	4	5
7		2	1	3	
8	3		1	1	1
9	1	6			
40	1	3			
42		2			
43		1		1	1
48	1				1
50		1	1		
54	2	4	2	2	
55	1	1		2	
56				1	
62		1	1		
64		1	1	1	1
65	3				
Total	12	22	7	11	4
Total %	21.5	39.5	12.5	19.5	7.0

Table 9.23 : Grimstone End: the number of rims of each type plotted against fabric.

If the rim-types are grouped into everted (types 1 and 2), and non-everted (types 3, 4, and 5), and the clays are grouped as calcareous and non-calcareous, the chi-square test can be used to see if there is a preference for certain rim-types in the two clay groups. The grouping of rim-types is necessary, due to the low numbers involved. This reveals that there is a significant relationship in rim-type distribution between everted rims and the sandy fabrics, and non-everted rims and the calcareous fabrics, at the .05 significance level.

The use of temper will have an important bearing on the function of a vessel. We have seen that the clays could be used solely with the addition of sand: so the admixture of vegetable matter or grog, as an addition or a replacement, must have been a deliberate act intended further to improve the working and/or firing characteristics of the clay. The latter function is usually more important, and temper is commonly added to clays to increase their resistance to thermal shock. This makes them more suitable for use as cooking vessels.

The incidence of extra temper is confined predominantly to vessels with rim-types 1 and 2. Twenty-five per cent of the everted rim-types contain additional temper, in contrast to 4% of the other types. In fact, rim-types 4 and 5 (inturned and concave), although comprising 27% of the rims present, contain no added temper.

The total assemblage from the site was analysed in a similar fashion to see if what was indicated in the sample was true of the whole population.

Fabric	Rim types	1	2	3	4	5
Non-calcareous		29	51	28	14	25
Calcareous		14	21	19	37	11
Total		43	72	47	51	36

Table 9.24 Grimstone End: Number of vessels of each rim type in the two clay types.

The figures for each rim-type are now large enough to be used ungrouped. The chi-square test reveals a significant link between rim-type 2, the everted upright style, and the non-calcareous clays. It is the correlation between these that was probably responsible for that found in the sample.

This would seem to indicate that there was a tradition of manufacturing everted rimmed vessels, and particularly ones with short upright necks, in sandy clays with the addition of extra temper. Therefore, these vessels probably comprised the majority of the cooking vessels.

One would also expect the function of a vessel to be reflected in its surface finish. The rim-types were therefore plotted against the four finishes (that is, burnished, smoothed, wiped, and natural) as follows:

Rim-type	burnished	smoothed	wiped	natural
1	25	66	0	8
2	23	45	4	27
3	14	28	14	42
4	9	18	0	72
5	25	25	0	50

Table 9.25a Outer surface finish: percentages of each rim-type with a particular surface finish.

Rim-type	burnished	smoothed	wiped	natural
1	25	58	0	17
2	18	32	18	32
3	0	71	0	28
4	18	63	9	9
5	25	25	0	50

Table 9.25b Inner surface finish: percentages of each rim-type with a particular surface finish.

From these figures - expressed as percentages of each rim-type present with a particular attribute - the following conclusions can be drawn.

1. Exterior surfaces:

Type 1 vessels have a higher incidence of burnishing and smoothing than other vessel types.

Type 2 vessels have a slightly lesser incidence of burnishing and a considerably lesser incidence of smoothing than type 1, with 27% being untreated.

Type 3 and 4 vessels continue this trend away from exterior surface treatment with 42% and 72% respectively being untreated.

Type 5 vessels return to a higher incidence of burnishing and smoothing than 3 or 4, but 50% are still untreated.

2. Interior surfaces:

Type 1 vessels again have the highest incidence of burnishing and smoothing.

Type 2 vessels are less well finished with only 18% burnished.

Type 3 vessels are not burnished at all, but they have a higher incidence of smoothing than other types.

Type 4 vessels return to a higher level of surface treatment, 18% being burnished and only 9% being left natural.

Type 5 vessels have a similar incidence of burnishing to type 1; but taking the group as a whole 50% are untreated.

One would expect the function of a vessel to be closely linked to vessel form, fabric, and decoration, and ethnographic evidence suggests that this is so. As recorded by Braun, in the South-western United States, storage vessels had narrow mouths for security, and eating vessels had wide mouths to facilitate access (Braun quoted in Plog, 1980, 85). Wobst (1977) has demonstrated that vessels used for eating and serving purposes which were more visible to other members of the community, were likely to be of a finer fabric and to carry decoration. Cooking pots, on the other hand, did not usually carry decoration, because sooting would obscure the design (Plog, 1980, 84).

The frequency of the occurrence of a vessel type in the assemblage may also relate to the function fulfilled. In Mexico and Africa, it has been shown that vessels used for cooking and serving food suffer the highest breakage rates (Foster 1960; David and Henig 1972). This is because they are frequently handled, whereas storage vessels tend to have fixed positions.

The archaeological assemblage will thus reflect the frequency of the replacement of vessel types, and not necessarily the proportions of vessels in use at any one time (Schiffer 1972, 162-63).

The total number of identifiable rims from the site was 243, spread between the rim-types as follows:

Rim-type	No of vessels	percentage of total
1	43	17.2
2	72	28.8
3	47	18.8
4	51	20.4
5	36	14.4

Table 9.26: Number of vessels in each rim category.

By drawing together the available information from the variables of temper, surface treatment, and frequency of occurrence, and applying the ethnographic models, a model can be constructed to explain the function of each vessel.

Theoretical vessel function

The type 1 vessels tend to have fairly narrow necks and form the most decorated part of the assemblage. Of a total of 17 rims with decoration, 13 are of type 1. They comprise the fourth highest number of vessels present, and were therefore probably subjected to a fairly low degree of handling. It is thus likely that these vessels were used for storage in a prominent part of the dwelling where they were constantly in use. A possible function would therefore be water storage jars or containers for small quantities of foodstuffs in daily use, perhaps grain.

Type 2 vessels have short open upright necks on globular bodies and contain the highest incidence of added temper. Only one out of the 17 decorated rims is of this rim type. The sherds of these vessels comprise nearly 30% of the archaeological assemblage and may therefore have undergone the greatest degree of handling. It is probable that these were primarily cooking vessels.

Type 3 vessels are large, open, bucket-shaped forms, occasionally with added temper. No decorated examples were found. Sooting is seldom found on any vessel, but this class has the highest incidence of this, usually on the inside. These may therefore have been general purpose vessels for food preparation, storage and cooking (Howard, 1981, Table 1). They are the smallest category, numerically, of the tempered vessels; and, as one would expect their breakage rate to be similar to that of the cooking vessels, it is probable that they did not make up as large a proportion of the original assemblage as did the cooking vessels.

The type 4 vessels were probably bowl-shaped, but they tend to be larger and heavier than the similar type 5 vessels. Out of 17 decorated rims three were of this type, the decoration in each case being rustication. The external surfaces were seldom smoothed or burnished, 72% being left natural; but 81% of the internal surfaces had been smoothed or burnished, which would obviously help to keep the vessels clean. The only other vessel type to receive more attention to the internal surface is the type 1. Some 20% of the assemblage consisted of vessels of this type, and they may therefore have received rougher handling, or been more numerous than the type 3 preparation vessels. It is suggested that these vessels would have been used for food preparation, eating, or washing.

Type 5 vessels comprise the smallest part of the assemblage— 7% and 14% of total and sample. These small cup-shaped vessels contain no added temper, and were therefore not intended to be subjected to extremes of temperature. The inner and outer surfaces are often smoothed or burnished, but 50% of the inner surfaces are left natural. Were it intended to eat from these vessels, one would expect a higher proportion to be smoothed or burnished internally, as in type 4 vessels. Although none were decorated, the presence of external burnishing points to their having display value, as with type 1 vessels, and it is probable that these vessels were intended for drinking purposes, perhaps being personal items. Other uses are of course possible, such as vermin-proof lids for storage jars, ladles or scoops for handling food, or lamps.

Ceramic technology

Visual analysis of the sherd breaks revealed a number of distinctive fractures, that could sometimes be reconstructed with their adjoining sherds. These appear to be where the potter failed to join the coils of clay properly as the pot was constructed, leaving a line of weakness in the fired vessels. All coil joins were S-shaped in section, indicating that the clay on the inside of the pot had been pulled upwards to seal the join while the clay outside was smoothed downwards.

Where two coil joins survive on opposite edges of a sherd, it is possible by use of the following formula to calculate the coil size:

$$D = 2\left(\sqrt{\frac{A}{\pi}}\right) + X$$

Where A = cross-sectional area of the sherd.
X = shrinkage factor.

The shrinkage factor for the Grimstone End material is not known, but can be assumed to be fairly equal for each fabric because the addition of temper shows the potters were creating fabrics that did not shrink excessively.

Fig. 9.5 shows that the diameter of the coil the potters were aiming to achieve was 1.85cm $\pm$ 0.15cm after shrinkage, and therefore probably 2cm when being worked. The graph is skewed towards the larger size of coil, and whereas coils smaller than 1.7cm were obviously not considered suitable by the potters, larger sizes were acceptable.

This selection of coils of about 2cm diameter occurs throughout the assemblage and indicates that the potters probably had common forming patterns. It has been claimed that forming patterns are often learned as a child and are 'cultural', just

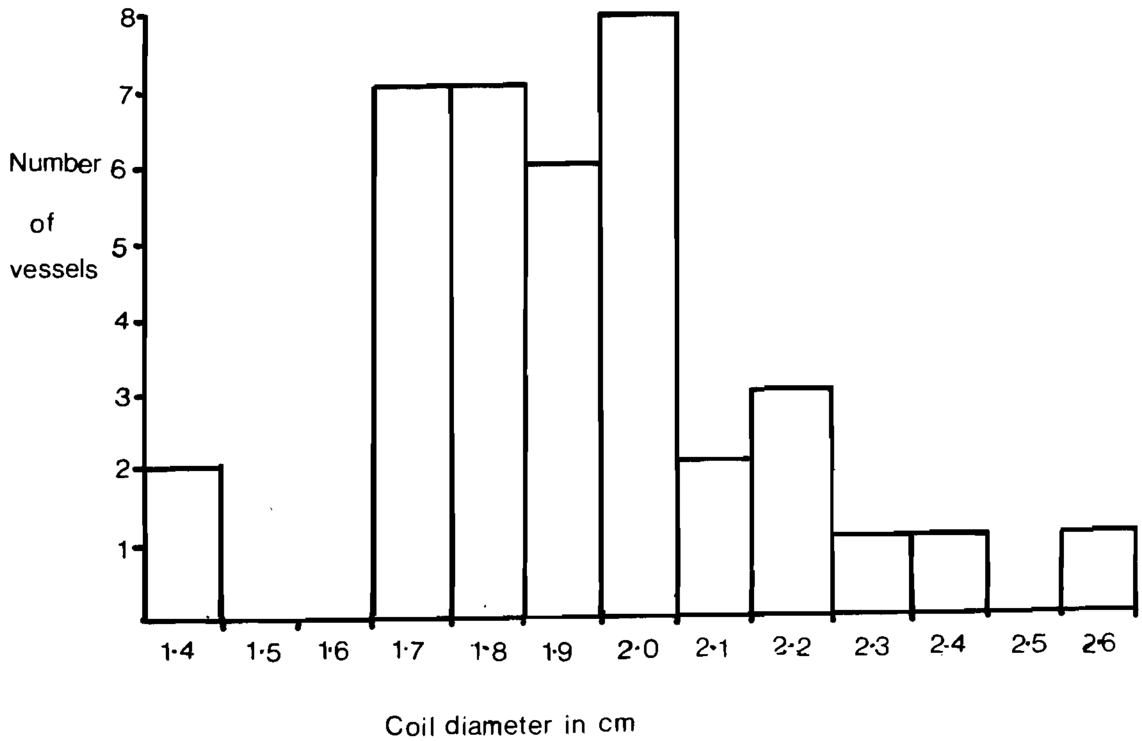


Fig 9.5: showing coil diameters present in the Grimstone End pottery.

as attitudes and values are cultural (Arnold 1981, 37). A common ethnic background may be the reason for the narrow range of coil sizes at Grimstone End, but an alternative explanation may be found in the physical characteristics of the clays themselves, which made coils over 2cm in diameter impracticable,

It is probable that, apart from the smaller cups, all the ceramic containers at Grimstone End were produced by the coiling process, and it is only the badly joined examples that are now obvious. This is based on the difference in frequency of coil occurrence between the calcareous and the non-calcareous clays. Of the non-calcareous clays, 12% of the vessels show evidence of coiling, contrasting with the 24% of the calcareous group. This is likely to have been due to lack of cohesion in the calcareous clays which tend to be aplastic.(Hodges 1964).

Similar physical constraints may explain the weight of the loomweights. Three different shapes were noticeable in the small sample of 10 weights taken from five contexts, but the weights all averaged 335gm ± 53gm. This is probably the weight necessary to give the correct tension on an upright loom, rather than evidence of specialist production of loomweights leading to standardisation, and the present writer would favour a similarly simple explanation for the pottery.

Clay sources

Clays immediately to the east of the site were sampled, both from surface deposits and from a depth of 2m in the water courses. The clay in this locality was utilised for brick manufacture in the 19th century (Warren 1849), and probably for the production of fine wares in the Roman period (Smedley 1951).

The clay samples proved to be similar to a number of the archaeological fabrics. Three of the four samples were calcareous clays that were similar to fabrics 43-53, calcareous clays with fine sandy matrices. The non-calcareous samples, taken from what is probably a re-worked boulder clay found in the stream bank, was very similar to fabric 39, having well-sorted, rounded quartz grains.

As this is only a small percentage of the total fabric population, other clay sources must have been exploited, or else a large proportion of the ceramics on the site are non-local. No clays rich in limestone have been located within 1km of the site, the preferred range of most peasant potters (Arnold 1981).

The now silted-up Pakenham Fen to the south of the site may have been a source for the clays that formed the matrices of the sandy group, as fluvial sorting appears to remove the calcareous fraction of the glacial till.

Pottery production site

A probable firing area was discovered in 1957 at Grimstone End. Brown reported as follows:

> Two circular hearths similar to those in the ring ditch but small, 3ft 3ins in diameter in depression on a laid gravel floor, 10ft between centres, a quantity of soft, partly baked Saxon pottery sherds found on floors. 68ft from Roman kilns. Superimposed by 3ft of dark soil. (Brown weekly report dated 6/7/1957).

The pottery found with this context number (-48) confirms Brown's attribution of a pottery-baking hearth. The majority of the sherds were partly baked and soft, and had in many cases split apart into inner and outer surfaces as the centre had not been baked and had dissolved. The sherds came from a minimum of two vessels, one a small facetted carinated vessel, the other a large vessel with an everted rim. Sherds from three other vessels were found, all were well-fired, and it is not possible to say whether these are wasters or secondary refuse. Samples taken from each of the two partly baked vessels proved to be of fabric 5, a silty clay matrix with scattered quartz grains derived from a coarse quartz sandstone. One of the other vessels was fabric 36 and was similar in that it consisted of a clay matrix with scattered crushed quartz sandstone added as temper. It can probably be said with confidence that this is another vessel from the same household unit. The two other vessels were in sandy fabrics 7 and 8, which were relatively common fabrics and are probably secondary refuse. However, all five vessels showed coil joins and may all be products of one, possibly rather unskilled potter.

If all these fabrics were the work of a single potter, it is possible that incipient specialisation is indicated; and, as the facetted carinated style is usually dated to the early 5th century, this may be occurring at an early date in the Saxon period. The repeated use of a particular area for firings on the downwind side of the settlement, and the construction of firing hollows with gravel linings, would all point to a shift from household production towards household industry.

Pottery quantification

The sherd-group method gives a figure of 708 vessels for this site. The raw data will be used here to assess other methods of quantification.

If the rim-count-only method had been used, the figure would have been considerably reduced, as only 263 rims were present. The base count was 140, and 38 of these two groups were paired. This would give a figure of 365, using rim and base counts. However, the largest number of sherd groups (343) had neither rim nor base, and usual quantification methods would ignore these, unless weights or counts were used. Weight was not recorded because of equipment difficulties, but counts were. The counts of the numbers of sherds in each fabric agree closely with the number of sherd groups in each fabric:

Fabric	% of sherds	% of sherd groups
Sandy	31.8	33.0
Chalk	22.5	24.0
Oolitic limestone	18.0	19.6
Coarse sandy	13.7	10.0
Vegetable	8.9	7.6
Grog	1.4	1.6
Mica (muscovite)	1.4	1.0
Other	2.3	3.2

Table 9.27: showing how sherd groups or sherd counts quantify the pottery in a similar fashion.

The Petersen estimate can be applied with accuracy only when there are five or more pairs. This method gives the following results:

Fabric	No of rims	No of bases	Pairs	Result
Sandy	105	40	12	350
Coarse sandy	30	20	5	120
Chalk	58	52	13	232

Table 9.28: Figures used for calculating the Petersen estimate for the main fabrics at Grimstone End.

This compares with the sherd group total for those fabrics of 234, 139 and 172 respectively. The Petersen estimate is between 25% and 40% higher than the sherd-group method, suggesting that a large proportion of the ceramic assemblage in use in the Saxon period had not been recovered by the excavators. There may be an element of differential recovery involved, as one would expect the number of bases to be higher in other fabrics, as in the chalk fabric. The Petersen estimate can therefore provide a useful check on degree of recovery as well as giving an indication of the proportion of the Saxon assemblage that has not survived to become the archaeological assemblage.

Spatial analysis

The diversity of fabrics suggests a domestic mode of production, where each household produced the vessels it required (Sahlins 1972). Rice (1981, 222) gives four expectations or test implications for non-specialised production, here simplified. They are: 1. diverse fabrics; 2. variation of pottery characteristics; 3. lack of elite pottery; 4. small (e.g. household) fabric concentrations. Forty-two per cent of the fabrics consist of single vessels. This fulfills expectations 1 and 4. There is little pottery that could be recognised as elite, which fulfills expectation 3. The pottery is varied, but there is little to measure variability against.

In contrast, those fabrics that contained five or more vessels from known contexts (comprising nearly 22% of the fabrics) were found to be present across the whole site (Table 9.25), and perhaps point to a semi-specialised production mode.

The matrix gives only the occurrence of fabrics from the Saxon huts, which have been grouped into four areas, running from north to south (Fig. 9.1). The addition to the matrix of all other contexts with Saxon pottery does not alter this pattern.

Whallon's (1973) dimensional analysis of variance, when applied to the spatial positioning of the huts, suggests a division of the site into only two areas, 1 and 2, and 3 and 4, Although this might be due to a differential recovery rate in these two areas rather than reflecting a difference in the density of occupation, it does show that in each of the two halves the distribution of huts is random. The result of the analysis of variance may be backed up by the differences in the presence and quantity of fabrics in the two areas (Table 9.25).

The division is also supported by analysis of the calcareous/ non-calcareous clay patterning. This shows that there is a fall-off in the amount of calcareous fabrics, with a complementary rise in the non-calcareous fabrics, from the south to the north across the site.

Fabrics that are confined to households are therefore present but so too are wider distributions of fabrics that suggest incipient specialisation. However, the depositional environment must be analysed in the interpretation of spatial positioning, because it is important to differentiate primary from secondary refuse (Schiffer 1972, 161). The pottery from Saxon sunken-featured huts is usually assumed to be contemporary with the occupation of the structure; but modern excavation techniques have shown that one can often differentiate between primary and secondary refuse in the filling (West 1969, 178; Jones 1979, 31 and 1969, 147). Few sections were drawn at Grimstone End, but the sketch of hut 18 (see Fig. 9.2) does seem to show a layer of primary silt, probably built up under a timber floor, followed by successive tips of rubbish. It was these tips of rubbish that caused a Roman date to be given to the structure, as they contained three sherds of Samian pottery.

	FABRIC													
Area	7	8	9	28	40	42	43	50	54	55	56	62	64	65
1														
-26			X			X		X						
-38			X											
-43	X	X	X				X	X	X		X			
2														
+7		X	X				X			X	X			
-31			X										X	
-111	X		X			X	X		X				X	X
-112			X											
-113	X		X	X	X				X		X	X	X	
-123		X					X							
3														
K1					X				X	X				
K2					X				X					X
K3					X				X					
K1,2,3	X			X	X	X				X	X	X		X
K4				X				X			X			
K5		X	X	X		X		X	X				X	
+5	X													
+41								X						X
4														
BR	X								X	X	X			X
1964-109A	X												X	

Table 9.29: showing the presence/absence of the larger fabric groups in relation to their contexts in the four areas of the site.

The field notebooks of the excavators give details of 30 huts and 32 other features that were considered to be Saxon from their form or artifact association (Fig. 9.1).

The number of vessels represented in each of these structures and non-structural contexts is shown below (Fig. 9.6). It can be seen that there is little difference between the two graphs, and that the Kolmogorov-Smirnov test affirms this at the .05 significance level.

There is an average of 8.3 vessels from the structures and 5.7 vessels from other contexts, which at first sight would seem reasonable but an average hides the great variation. Huts contain up to 73 vessels, and other contexts up to 59. The writer thinks it most unlikely that a hut would contain sherds from 79 vessels as a result of a single phase of occupation, and it is most probable that the huts producing large quantities of pottery were being used as refuse areas. In fact, there is some evidence to show that all features producing pottery were used as such, since the 11 huts in the centre of the settlement (which produced Saxon artifacts) contained either no pottery at all, or in one case a single sherd. The contexts (both structural and non-structural) that produced high quantities of pottery are on the periphery of the settlement.

It is possible that most of the sunken-featured huts had been used as rubbish tips once the superstructures were no longer in place, and such negative features would have trapped any rubbish that fell into them. Any later layers containing cultural debris would have sunk into the feature as the soil compacted. When the rest of the layers were removed by the dragline during quarrying operations, an apparently secure group of material would have been left.

A number of other features such as pits, graves, and ditches were excavated on the site, and it is probably safe to assume they contained only secondary refuse. Comparison of the quantity of pottery between 1. the pits, graves and ditches, and 2. the sunken-featured structures , suggests that there is little difference between them in terms of quantity of ceramics. It is likely, therefore, that most if not all of the pottery

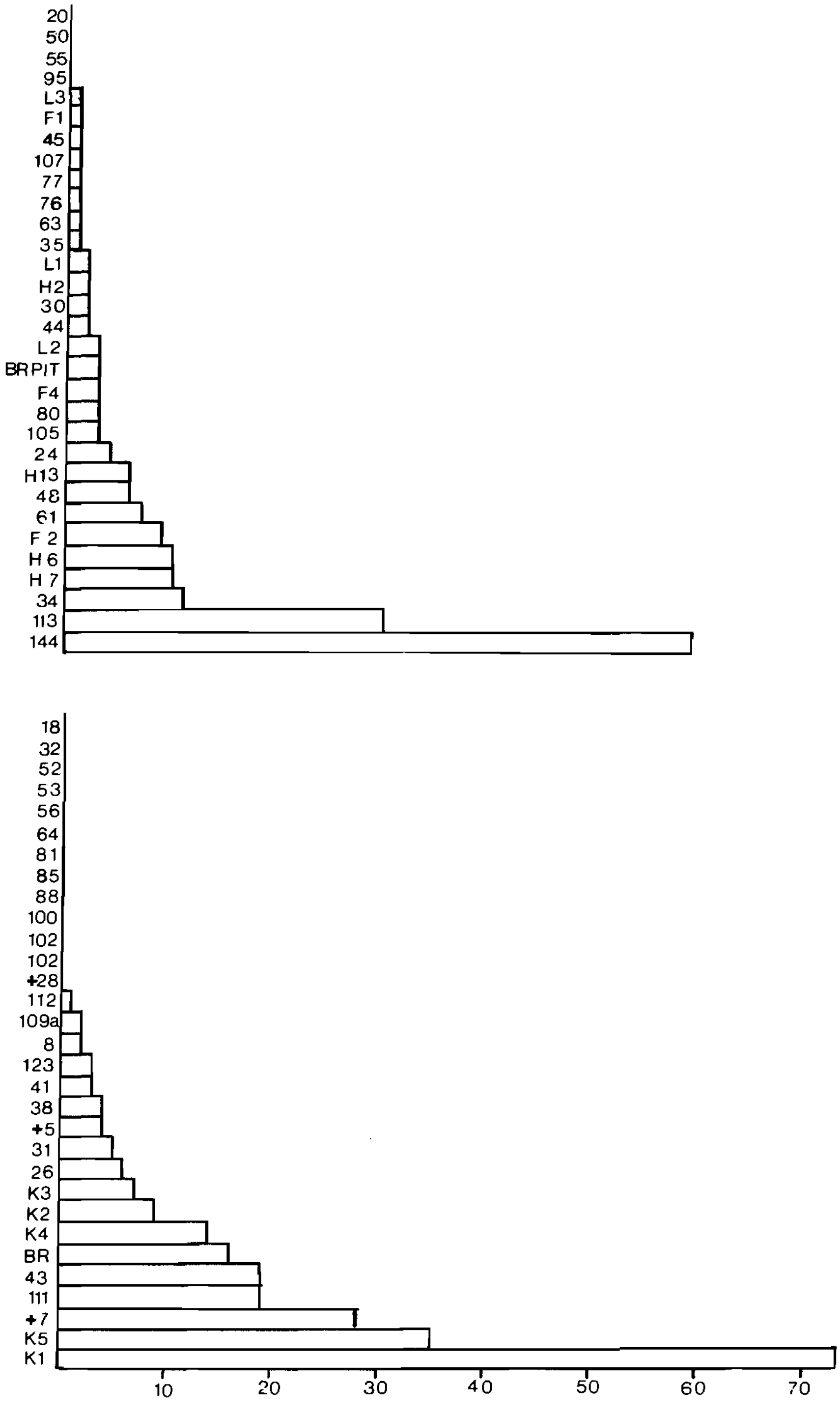


Fig. 9.6: showing the numbers of vessels present in the huts (bottom) and other contexts (top).

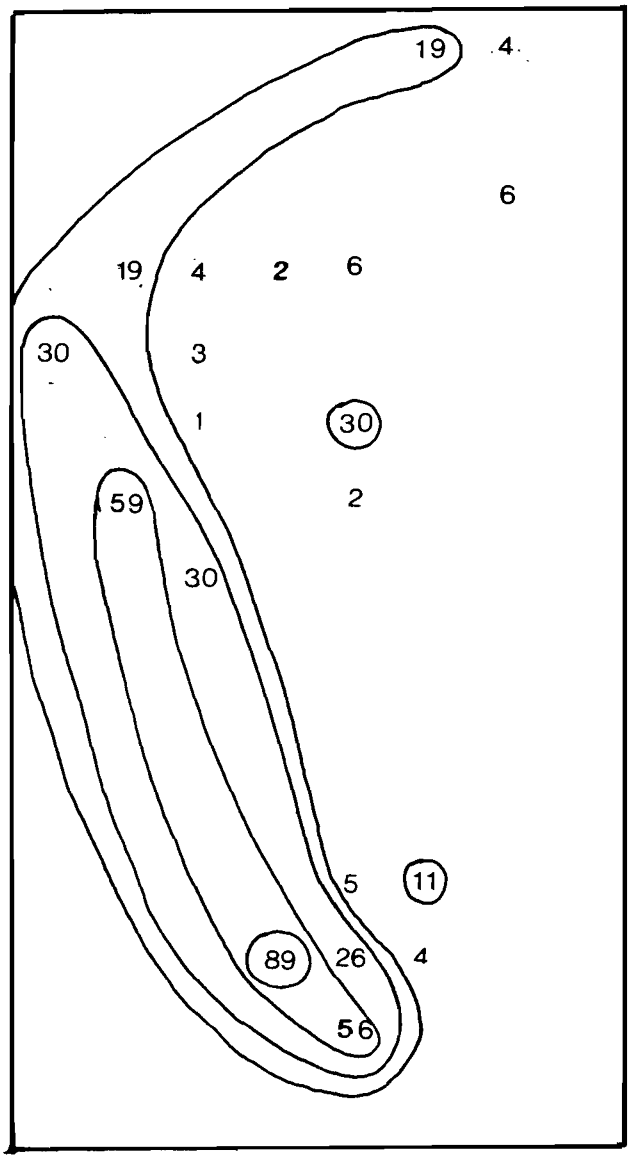


Fig. 9.7: showing the pattern of ceramic finds at Grimstone End, possibly related to refuse dumping areas. The figures are the number of sherd groups present in each portion of a 25m grid superimposed on the site. This map covers the same area as fig 9.1.

from the huts is also secondary refuse. For example, the high number of vessels in grave +34, with its remains of 11 vessels, suggests that the grave was dug through an area previously set aside for refuse disposal. Similarly, hut K1 contained sherds from at least 73 vessels. The southern half of the site (the area of the Bronze Age barrow) was set aside by the Saxons for iron-working during one period of the site's occupation, and it is possible that it served as a refuse area at other times. A contour plan of the number of pottery vessels represented in each feature indicates that the main settlement area was kept clean and that refuse was dumped in an arc around its periphery (Fig. 9.7). It is possible this gave rise to the dispersal of the vessels of individual fabrics, rather than their exchange within the settlement.

Only one other site in Britain - a Neolithic site at Windmill Hill, Wiltshire - has been analysed in a similar way (Howard 1981). The small number of fabrics found there pointed to an incipient level of specialist production, but the distribution of fabrics and functional attributes could not be used to define activity areas, as the whole archaeological assemblage had again been recovered from secondary refuse contexts.

Evidence for ceramic exchange with other sites

The Grimstone End thin-sections were compared with those from other sites in the locality, and were found to match examples taken from the Ixworth material (see Chapter 8). The Ixworth samples consisted of the sherd mentioned in Chapter 8 (recovered from the Crossfield site by the present writer) and pottery from the cremation cemetery. The Crossfield site appears from the finds recovered in the 19th century (Meaney 1964) to be the southern end of the Ixworth cemetery. If the Crossfield site is part ofl the cemetery site, four of the six fabrics occurring in a funerary context at Ixworth can be matched at Grimstone End.

Grimstone End; Fabric 27 = Fabric 2: Ixworth
Fabric 42 = Fabric 5
Fabric 62 = Fabric 3
Fabric 55 = Crossfield sherd.

Two explanations may be offered for this: either the pots were transported or the clay was. In the first case, the pots could have been exchanged between the two settlements, or the Ixworth cemetery was the burial place for the inhabitants of the Grimstone End site. Alternatively, the two settlements may have shared a common clay source. If the Ixworth cemetery were the burial place of the Grimstone End settlement, it would be proof of either a change or a dichotomy in burial practice, since a Saxon inhumation cemetery was discovered during the excavation of the settlement itself.

The explanation will probably be provided only by the recovery of a domestic assemblage from Ixworth, so that comparisons can be made between the two settlements and the single cemetery.

Conclusions

The Grimstone End ceramic assemblage does provide a large enough sample to allow conclusions to be drawn about the organisation and production of Saxon pottery.

The predominant mode of production seems to have been domestic, as is evidenced by the diversity of fabrics. The average number of thin-sections found to be in each fabric was 3.1. This ratio agrees well with those of other sites examined, where similar conclusions were reached.

The lack of standardisation of the decorative schemes also points to a domestic mode. Although most pots display a common decorative scheme of neck lines and chevrons, each vessel has been decorated as an individual piece.

Although predominantly domestic and non-standardised, the production of pottery does show evidence for an understanding of ceramic technology in the selection of clays and tempers. Most Saxon potters knew what they were trying to achieve, and the lack of symmetry in vessel form and decoration, which offends the modern observer, does not affect the functional qualities of a vessel. The pottery was the product of the society and reflects the environment of the period in which it was produced.

Both the scarcity of stamped decorated pottery and the lack of artifacts datable to the 6th and 7th centuries contrast with the presence of ceramic forms and decorative styles that are generally accepted to be early in the Saxon sequence; for example, facetted carinated vessels (which were definitely being produced at this site), and schlickung coating.

This early date for the site is reinforced by the finding of a number of bone combs of a distinctive style that was common in the first half of the 5th century (Myres and Green 1973, 93).

The domestic mode of production for Saxon ceramics can therefore be placed in a context that is at the beginning of the Saxon period in this country, pointing to largely self-sufficient and isolated communities, as far as ceramics are concerned. Trade networks for more costly items may well have existed, and the evidence for ceramic exchange with the presumed Ixworth settlement should perhaps be seen in this context. The position of Ixworth, where a major routeway crosses the river, would have made it a natural focus for exchange networks, and it is possible that, even at this early stage in the Saxon settlement, exchange systems were beginning to emerge, along with specialisation.

The pottery illustrations

The pottery has been illustrated in the groups in which it was excavated. This is to avoid subjective typological classifications, a procedure recommended by the Early-Saxon Pottery Research Group in their Principles of Publication for Anglo-Saxon cemeteries (1984).

The context groups are preceded by figures 9.8 to 9.10 which show the pottery in each of the larger fabric groups. The sherds in these figures are thus illustrated twice.

All rims and decorated sherds are shown and also those bases where enough of the vessel was present to be certain of the base angle.

The illustrations are followed by Table 9.31 which lists the samples, their fabric and sherd group number and the context from which they came.

Table 9.30 is a key to Figs. 9.8 to 9.10, the fabric groups.

Fig. 9.8

Fabric 7

a	C	172
b	S	211
c	S	209
d	S	200
e	S	198
f	C	163
g	S	196
h	CS	55

Fabric 8

a	CS	62
b	CS	59
c	CS	18
d	YM	6
e	CS	68
f	CS	69
g	CS	99
h	CS	63

Fabric 9

a	S	216
b	V	52
c	S	89
d	S	191
e	CS	156
f	S	194
g	S	226

Fabric 40

a	V	47
b	V	27
c	V	7
d	V	21
e	V	16

Table 9.30 a

Fig. 9.9

Fabric 42

a	CS	61
b	V	22

Fabric 43

a	S	180
b	S	208
c	C	169

Fabric 48

a	S	193
b	O	41

Fabric 54

a	O	43
b	O	46
c	O	33
d	C	171
e	C	134
f	O	47
g	C	98
h	O	25
i	C	1

Fig. 9.10

Fabric 55

a	O	38
b	O	13
c	O	27

Fabric 62

a	CS	14
b	S	21

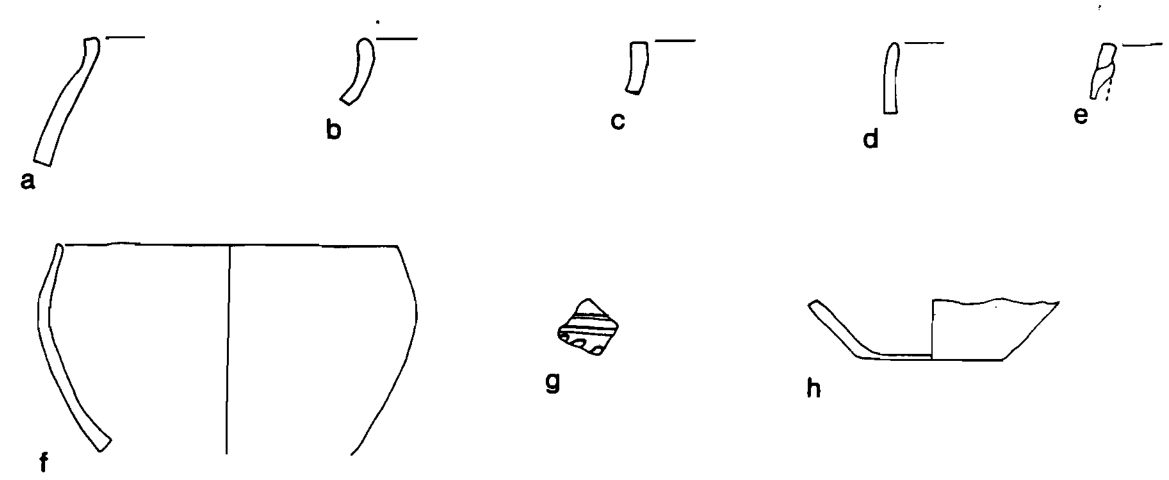
Fabric 64

a	C	166
b	C	119
c	O	42
d	S	210

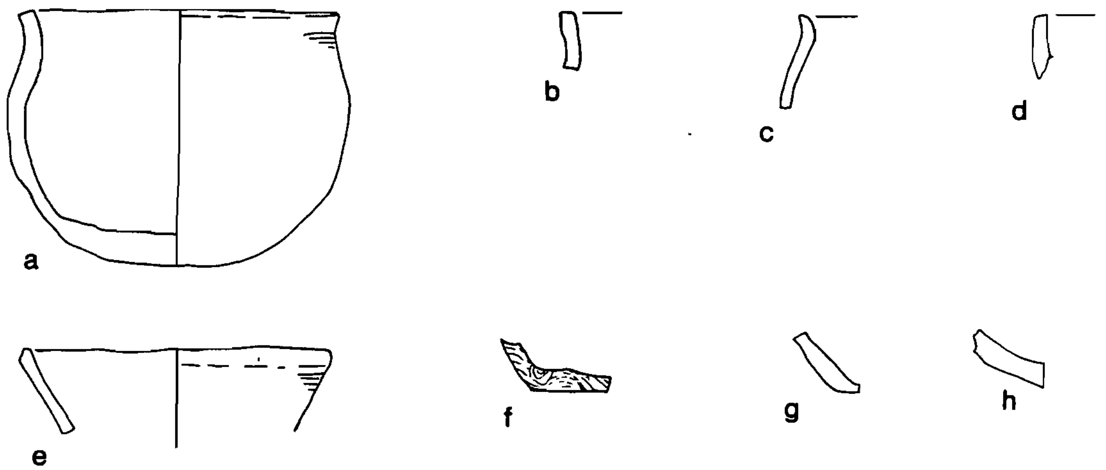
Fabric 65

a	S	87
b	S	56
c	S	119
d	S	55

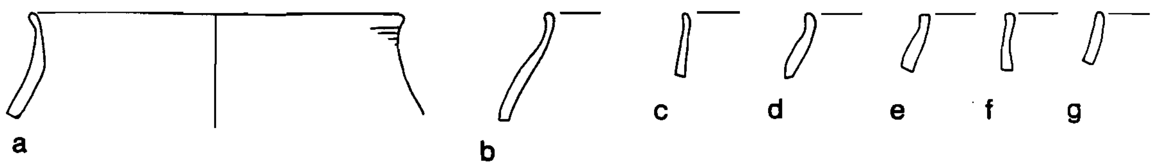
Table 9.30 b



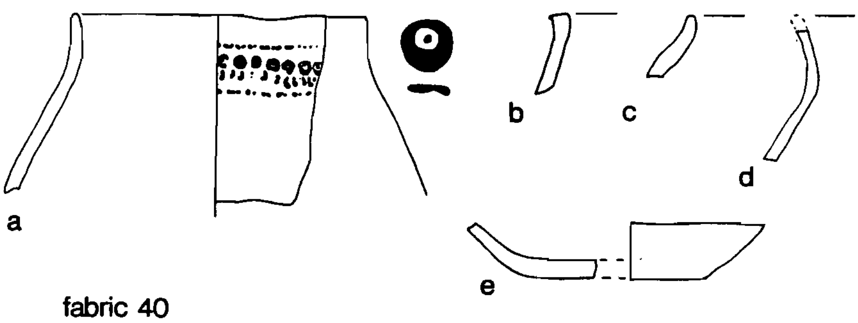
fabric 7



fabric 8



fabric 9



fabric 40

Fig 9.8

5 cm

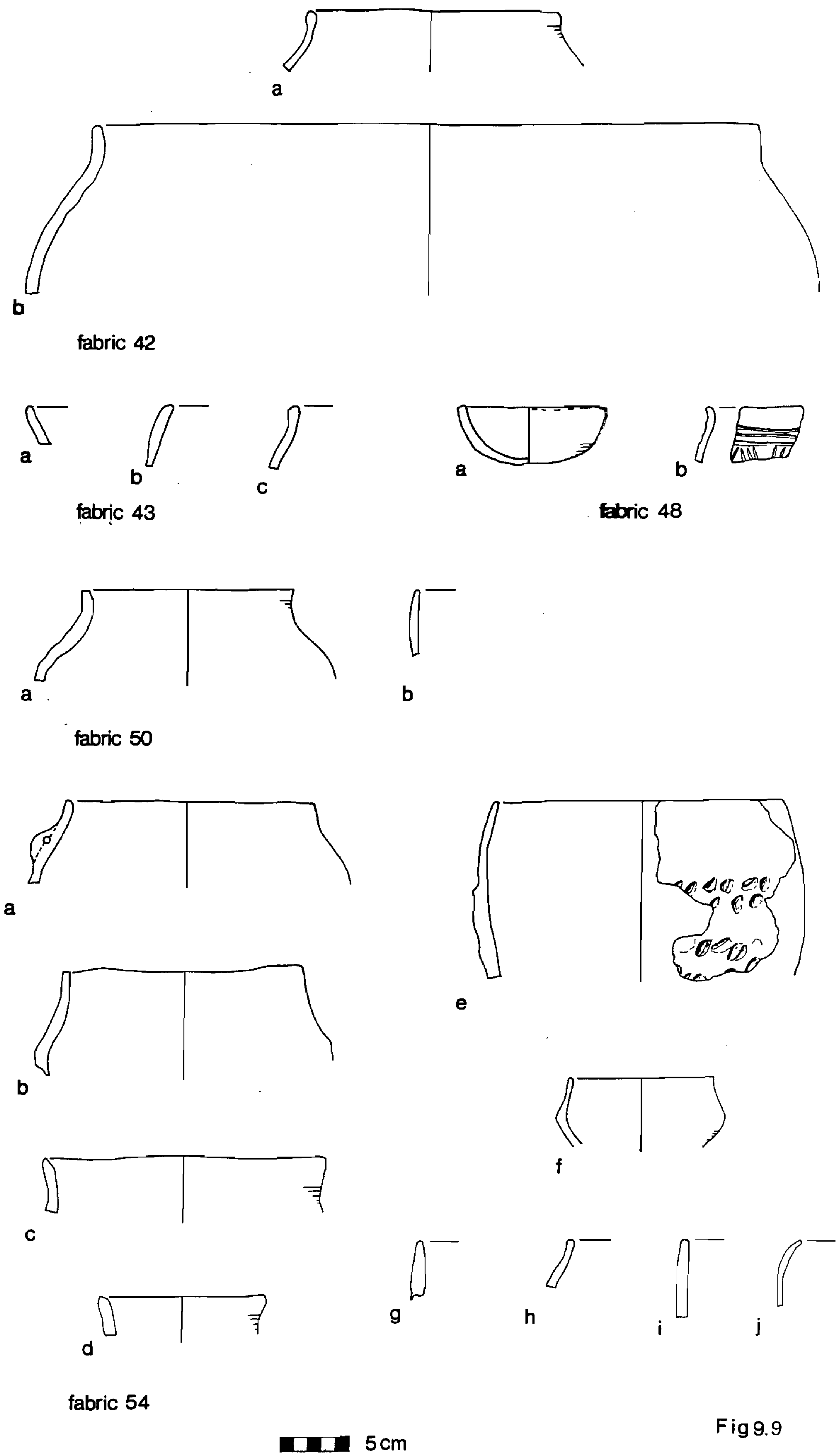
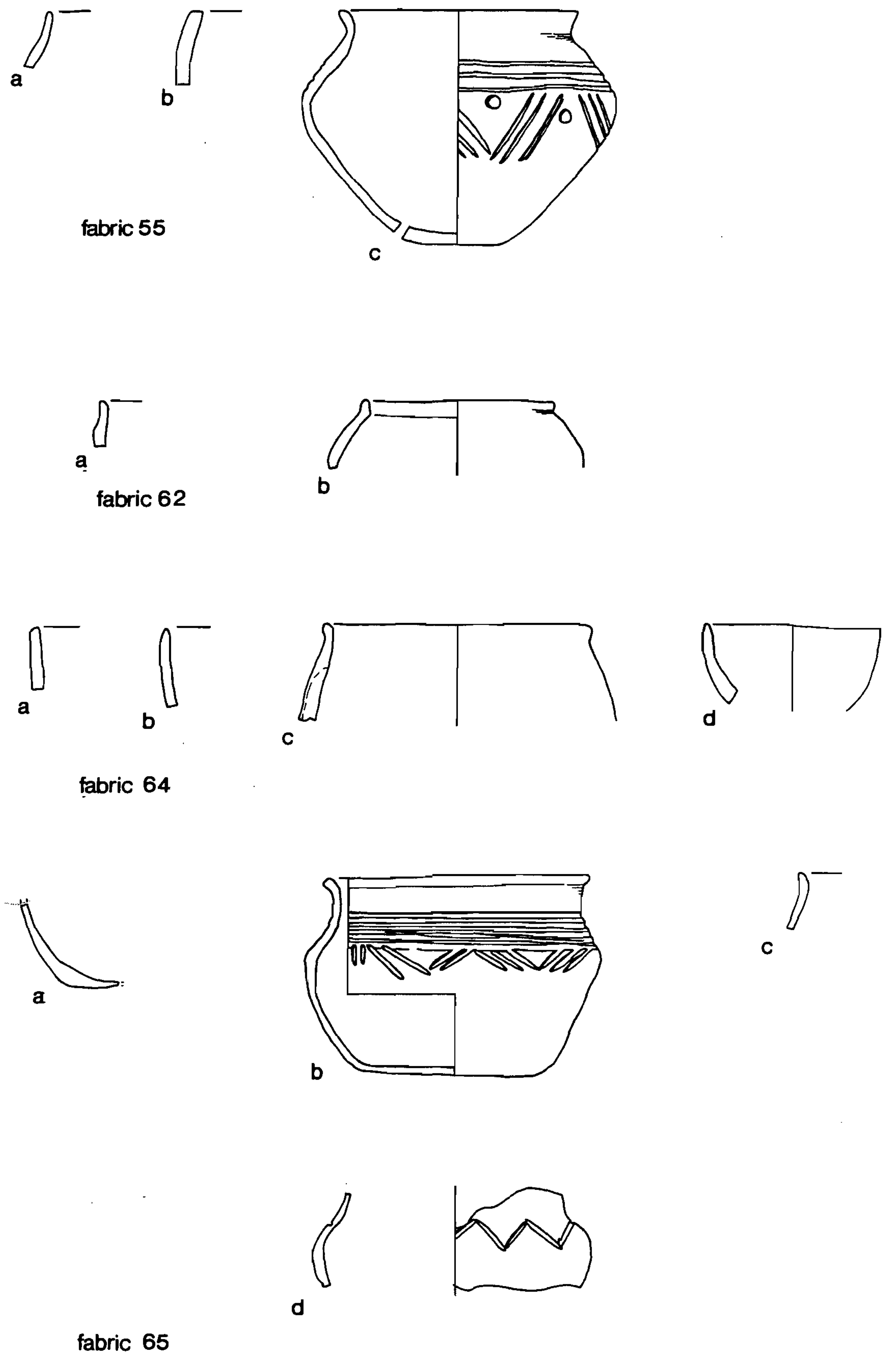

a
b
fabric 42
a
b
c
fabric 43
a
b
fabric 48
a
b
fabric 50
a
e
b
f
c
g
h
i
j
d
fabric 54
5cm

Fig 9.9



5cm

Fig9.10

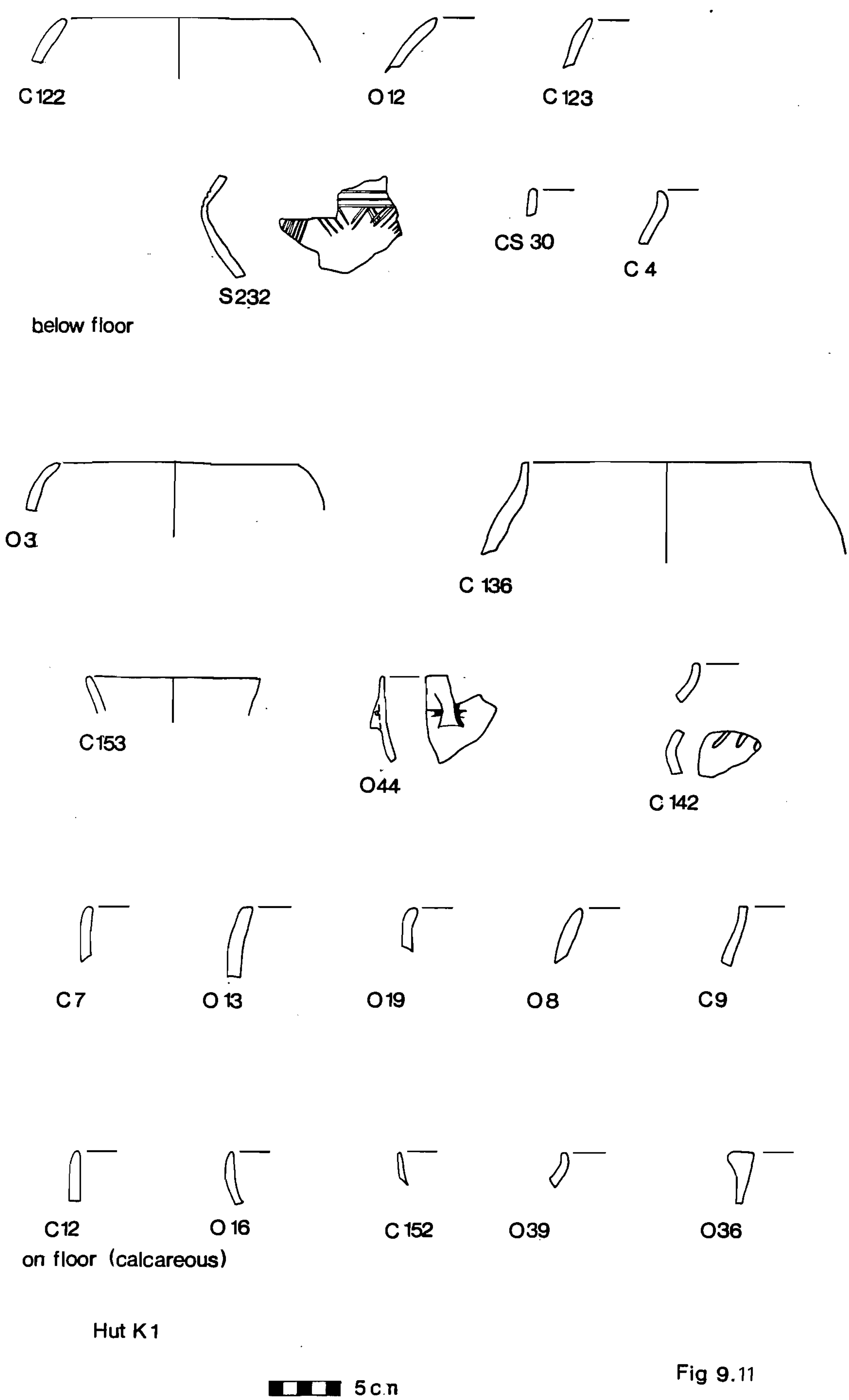

C 122
O 12
C 123
S232
CS 30
C 4
below floor
O3
C 136
C153
O44
C 142
C7
O 13
O19
O8
C9
C12
O 16
C 152
O39
O36
on floor (calcareous)
Hut K1
5 c.n

Fig 9.11

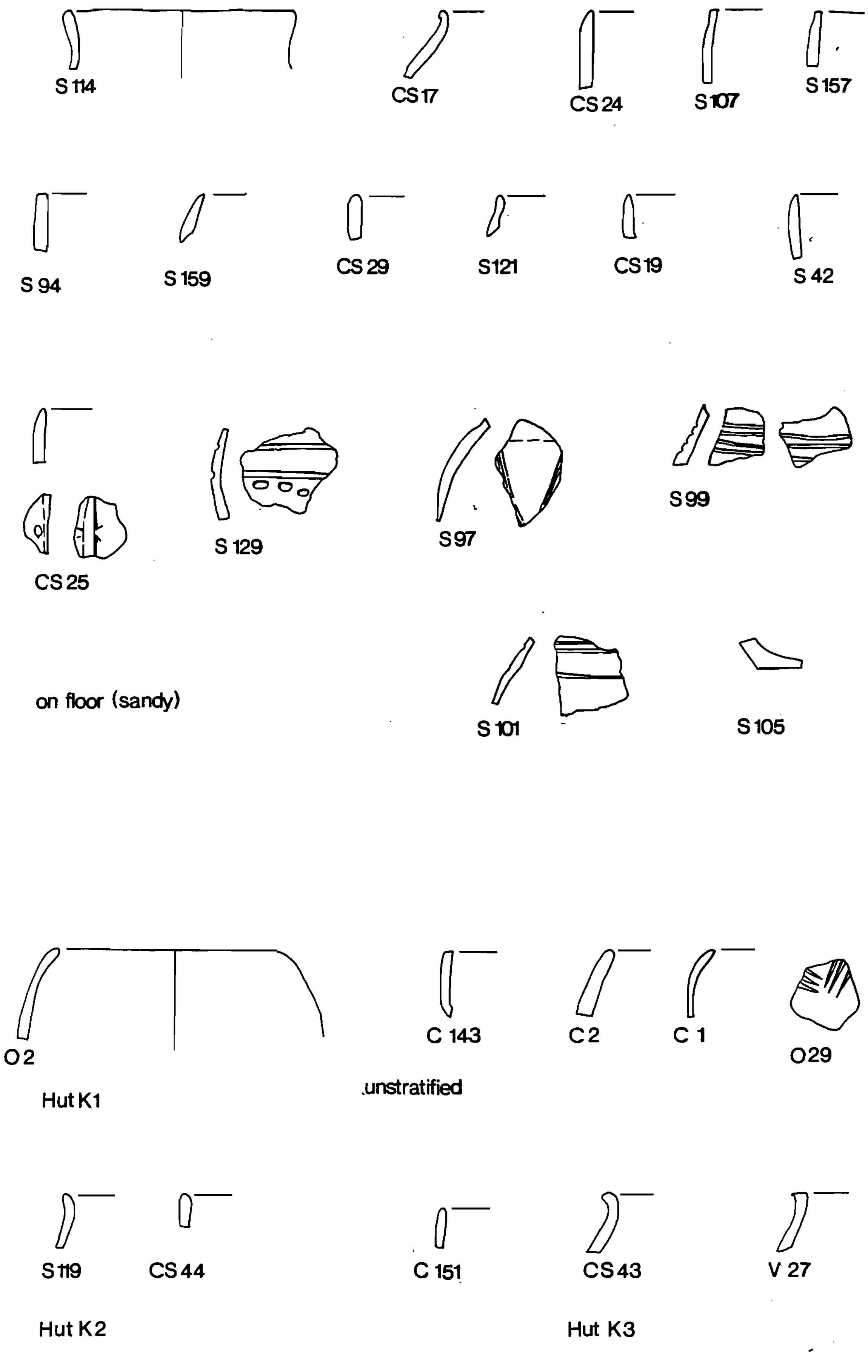
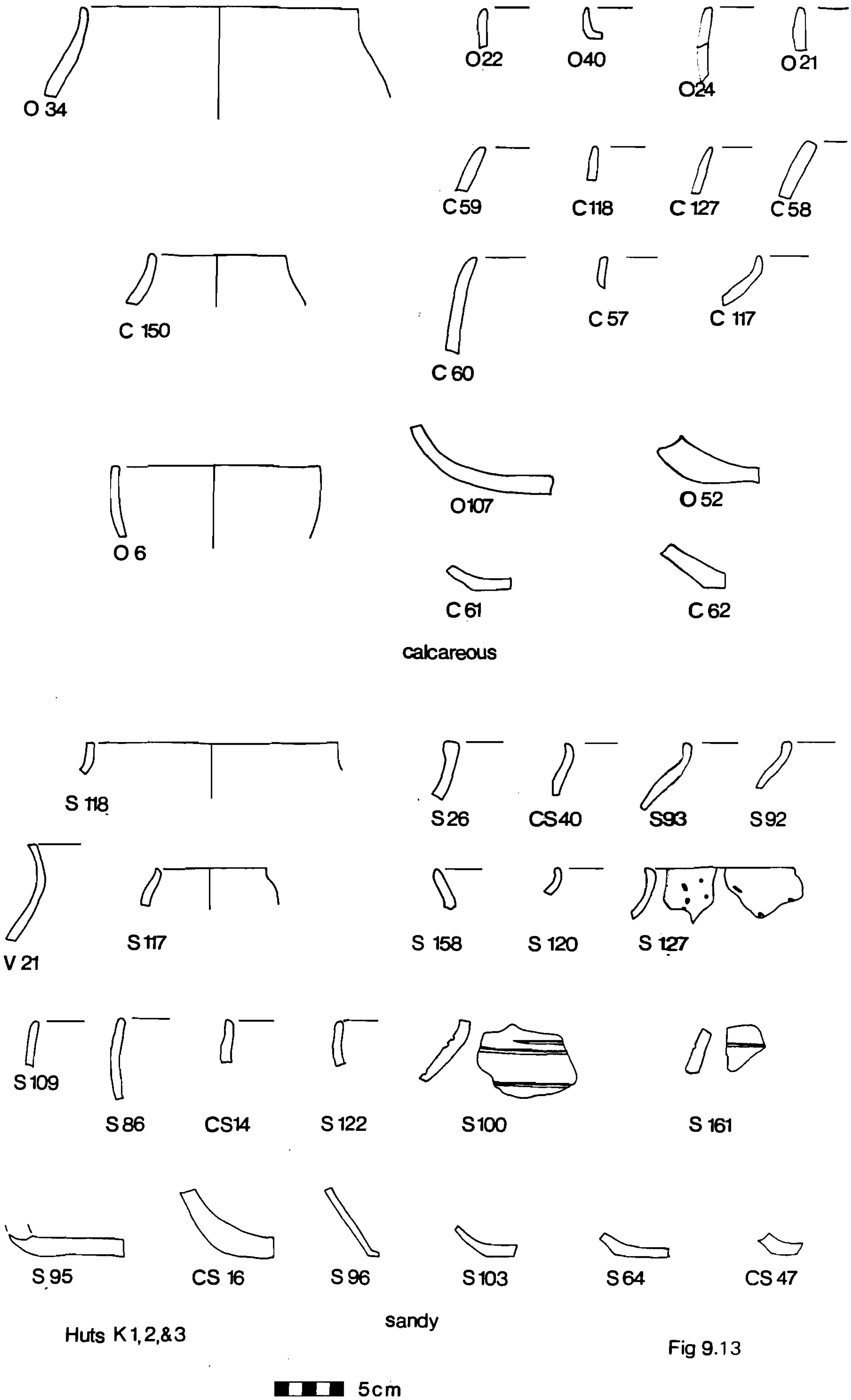

S 114
CS 17
CS 24
S 107
S 157
S 94
S 159
CS 29
S 121
CS 19
S 42
CS 25
S 129
S 97
S 99
on floor (sandy)
S 101
S 105
O 2
Hut K1
C 143
C 2
C 1
O 29
unstratified
S 119
CS 44
C 151
CS 43
V 27
Hut K2
Hut K3
5cm

Fig 9.12



Huts K 1, 2, & 3

Fig 9.13

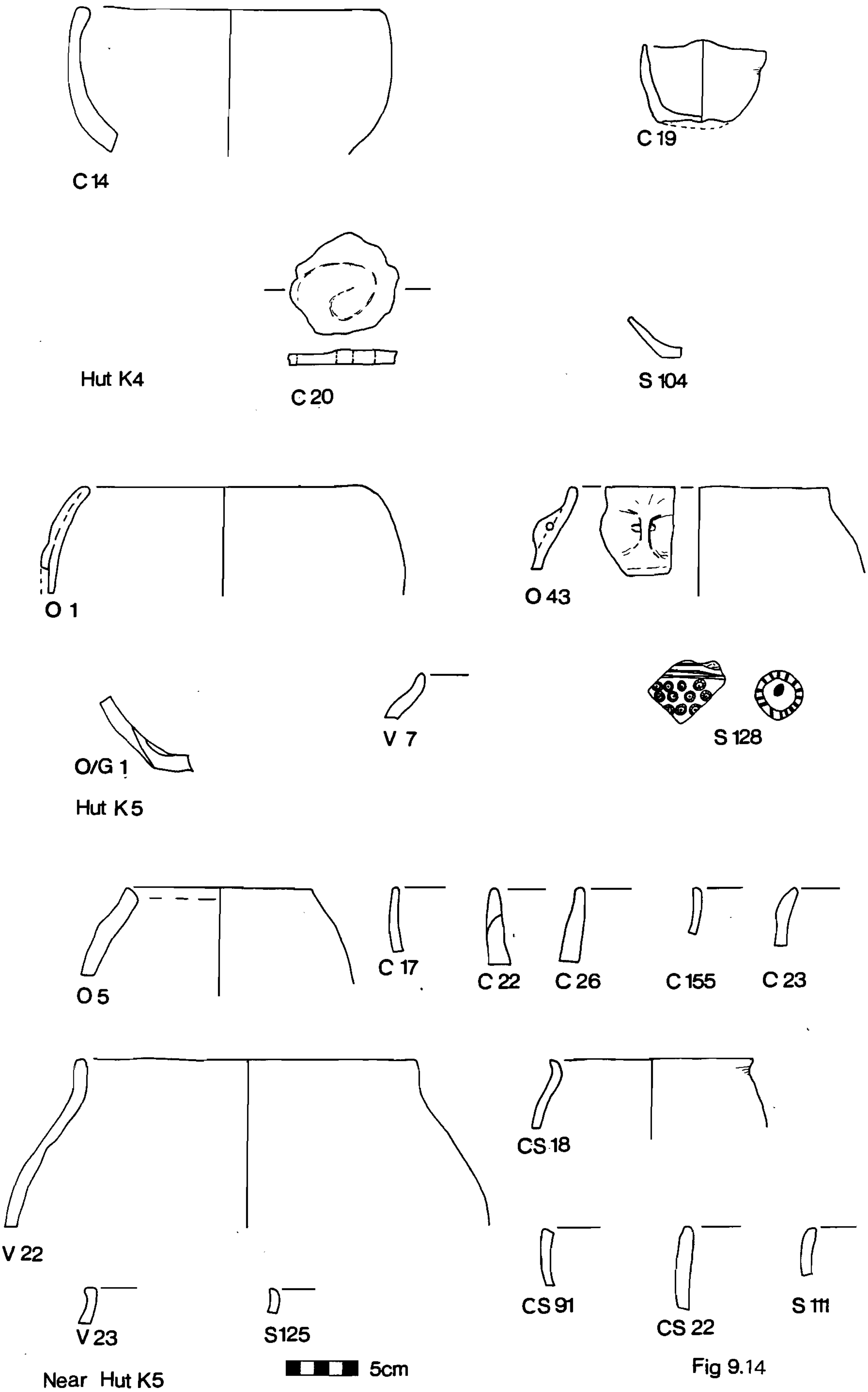

C 14
C 19
Hut K4
C 20
S 104
O 1
O 43
O/G 1
V 7
S 128
Hut K5
O 5
C 17
C 22
C 26
C 155
C 23
V 22
CS 18
CS 91
CS 22
S 111
V 23
S125
Near Hut K5
5cm

Fig 9.14

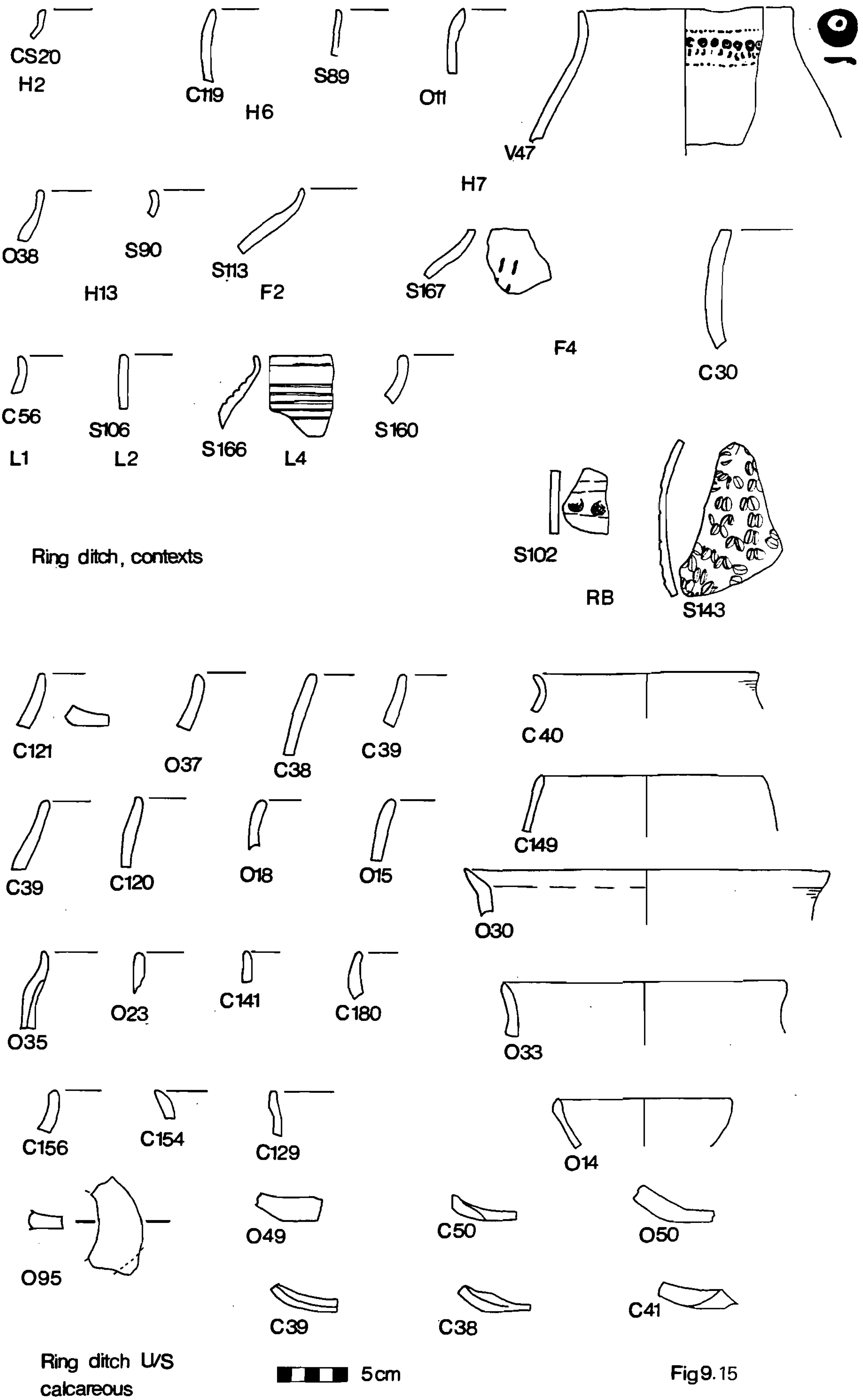

CS20
H2
C119
H6
S89
O11
V47
H7
O38
S90
H13
S113
F2
S167
F4
C30
C56
L1
S106
L2
S166
L4
S160
Ring ditch, contexts
S102
RB
S143
C121
O37
C38
C39
C40
C39
C120
O18
O15
C149
O30
O35
O23
C141
C180
O33
C156
C154
C129
O14
O95
O49
C50
O50
C39
C38
C41
Ring ditch U/S
calcareous
5cm

Fig 9.15

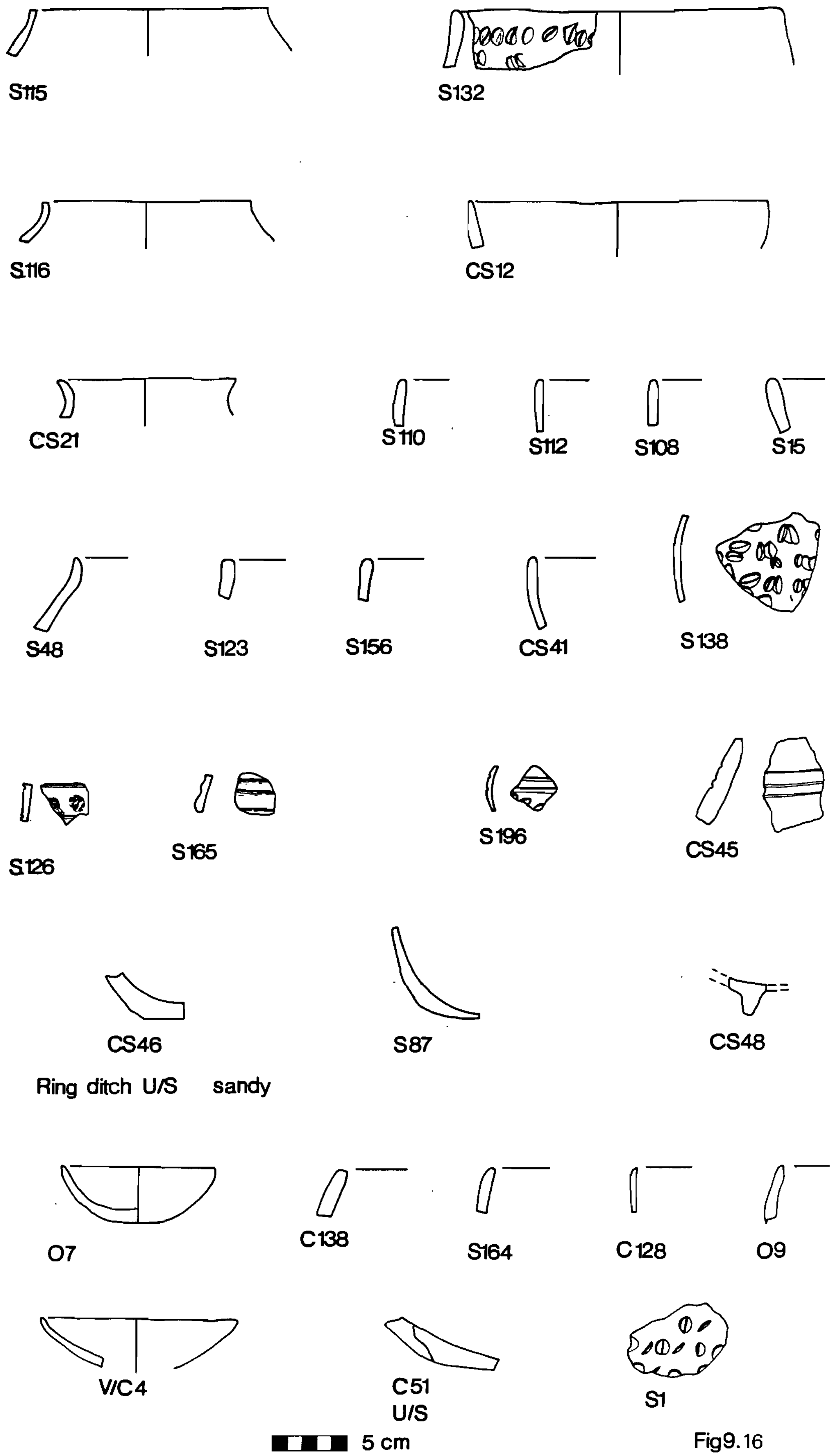
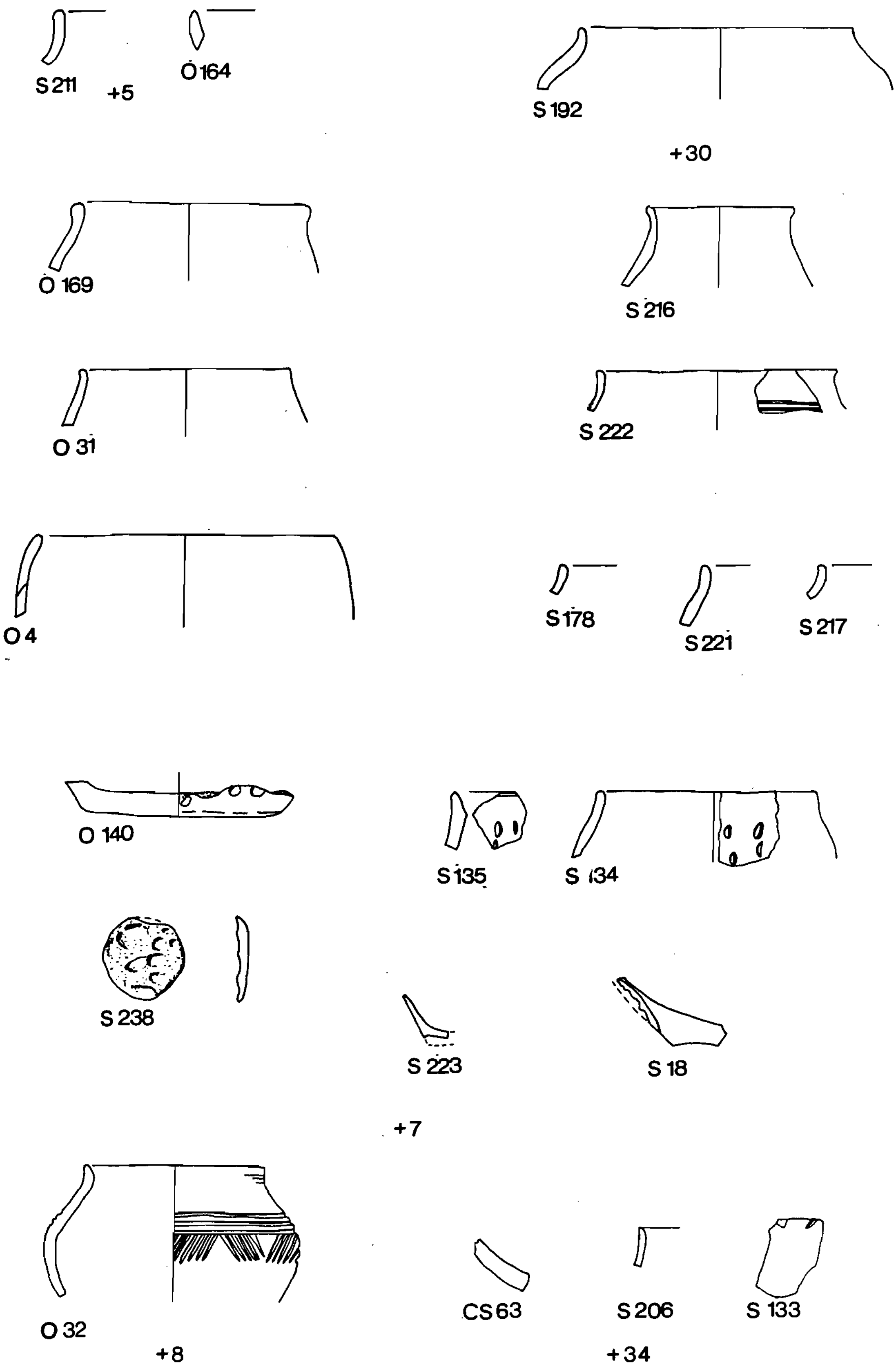

S115
S132
S116
CS12
CS21
S110
S112
S108
S15
S48
S123
S156
CS41
S138
S126
S165
S196
CS45
CS46
S87
CS48
Ring ditch U/S
sandy
O7
C138
S164
C128
O9
V/C4
C51
U/S
S1
5 cm

Fig9.16



S 211
+5
O 164
S 192
+30
O 169
S 216
O 31
S 222
O 4
S 178
S 221
S 217
O 140
S 135
S 134
S 238
S 223
S 18
+7
O 32
+8
CS 63
S 206
S 133
+34

5cm

Fig 9.17

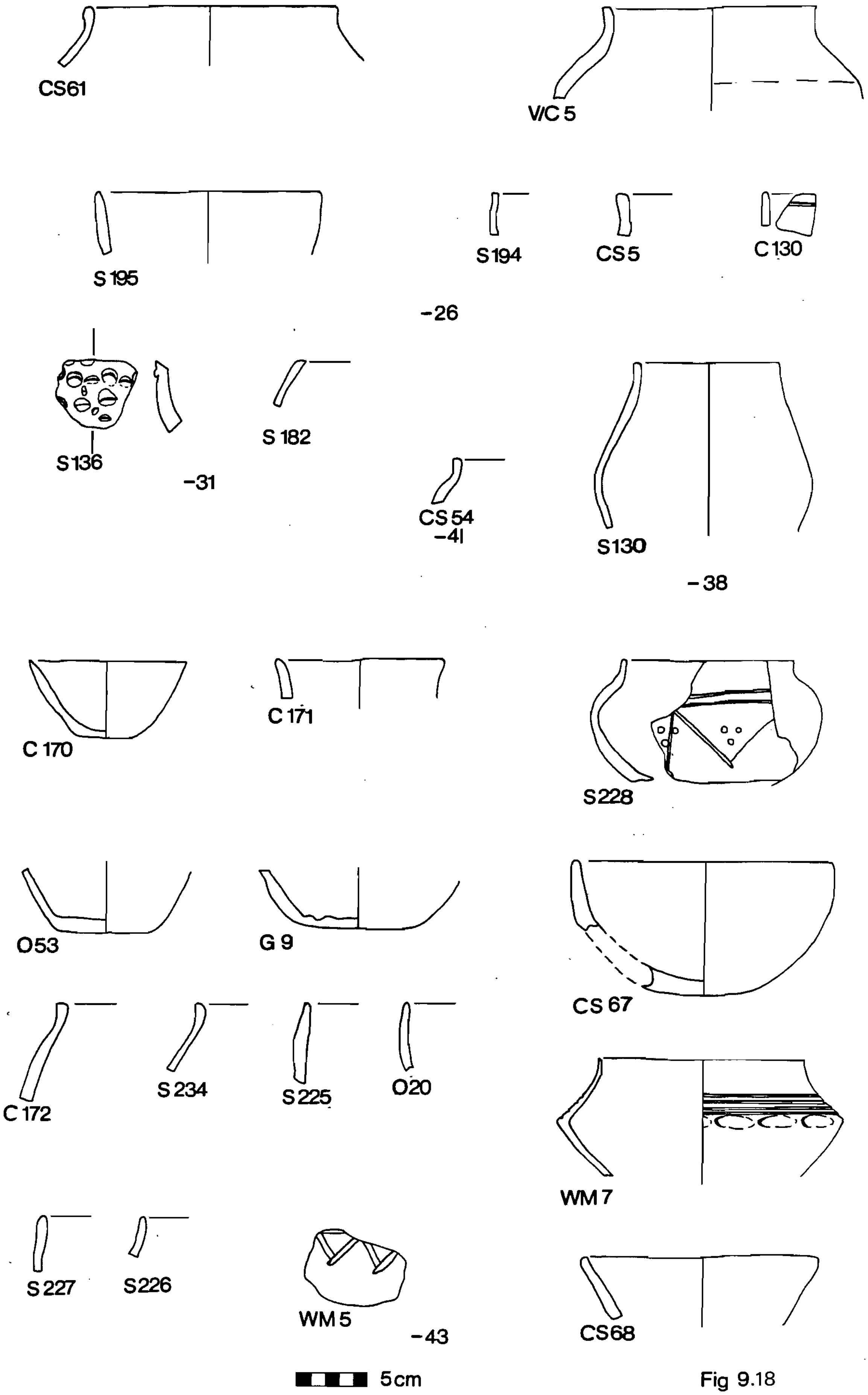

CS61
V/C 5
S 195
S 194
CS 5
C 130
-26
S 136
-31
S 182
CS 54
-41
S130
-38
C 170
C 171
S 228
O53
G 9
CS 67
C 172
S 234
S 225
O20
WM 7
S 227
S 226
WM 5
-43
CS68
5cm

Fig 9.18

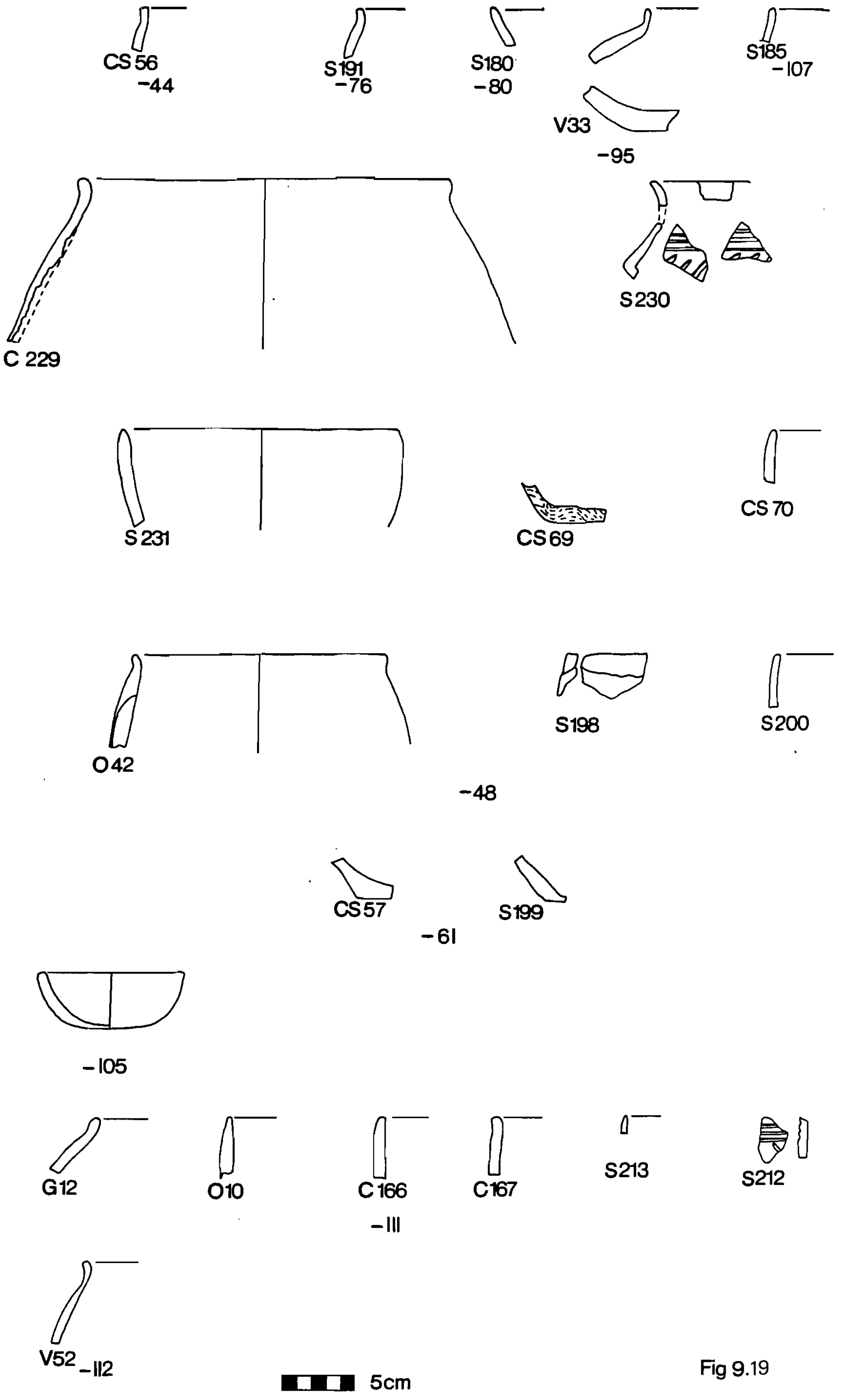

CS 56
-44
S191
-76
S180
-80
S185
-107
V33
-95
C 229
S 230
S 231
CS 69
CS 70
O 42
S198
S200
-48
CS 57
S199
-61
-105
G 12
O10
C 166
C 167
S213
S212
-111
V52
-112
5cm

Fig 9.19

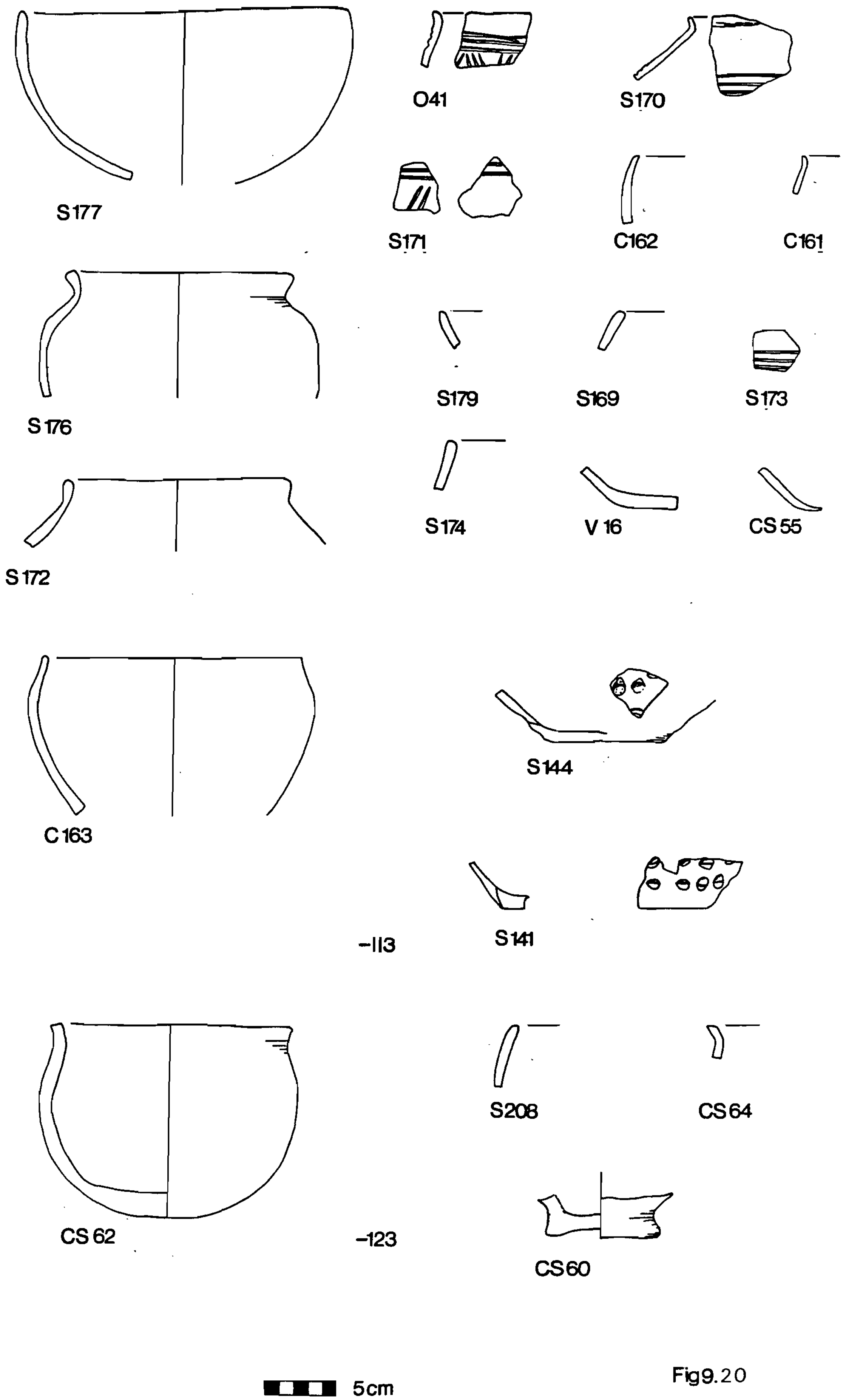

S177
O41
S170
S171
C162
C161
S176
S179
S169
S173
S172
S174
V 16
CS 55
C 163
S144
-113
S141
S208
CS 64
CS 62
-123
CS60
5cm

Fig9.20

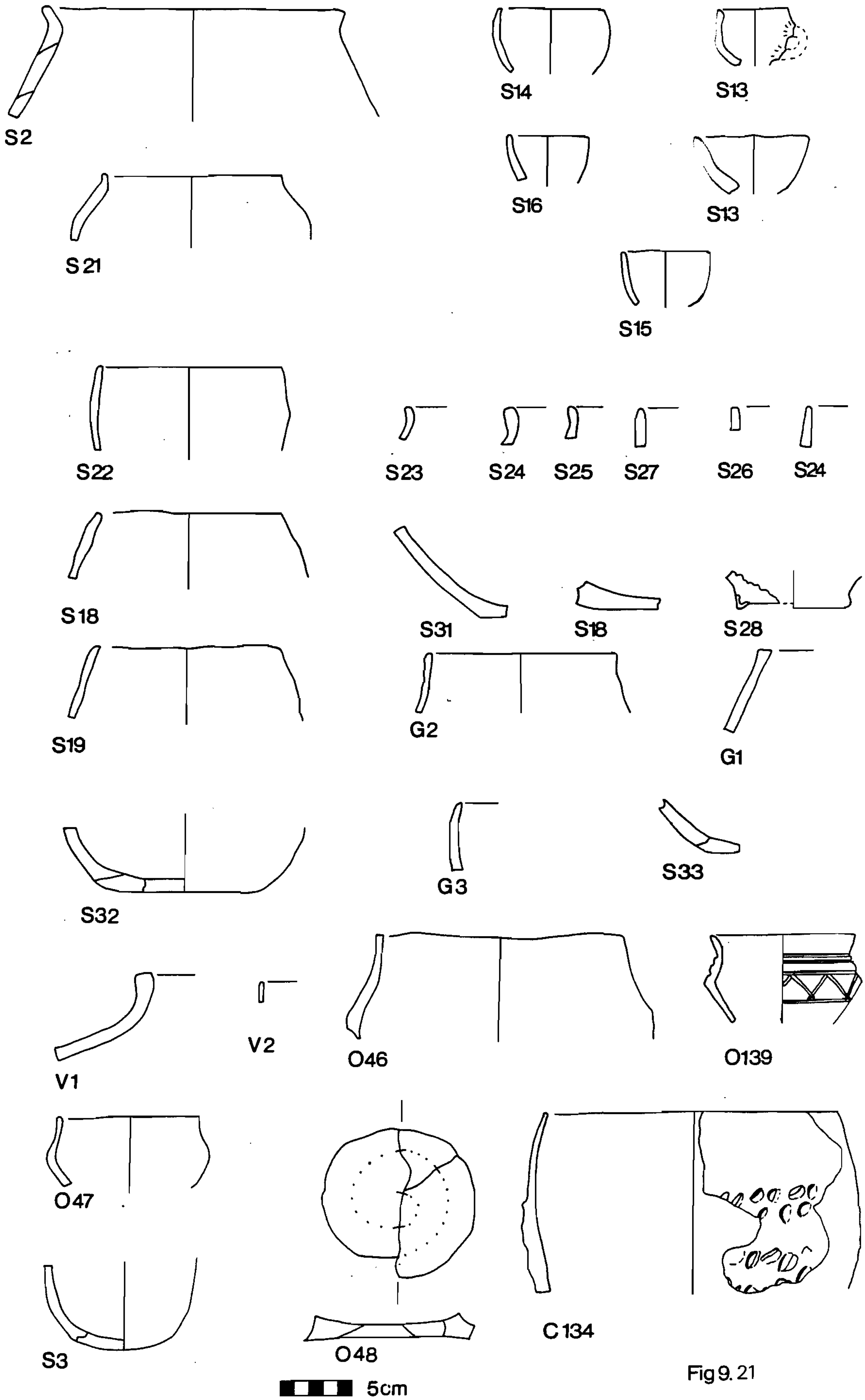

S2
S14
S13
S16
S13
S 21
S15
S22
S23
S24
S25
S27
S26
S24
S 18
S31
S18
S 28
S19
G2
G1
S32
G3
S33
V1
V2
O46
O139
O47
S3
O48
C 134
5cm

Fig 9. 21

-144

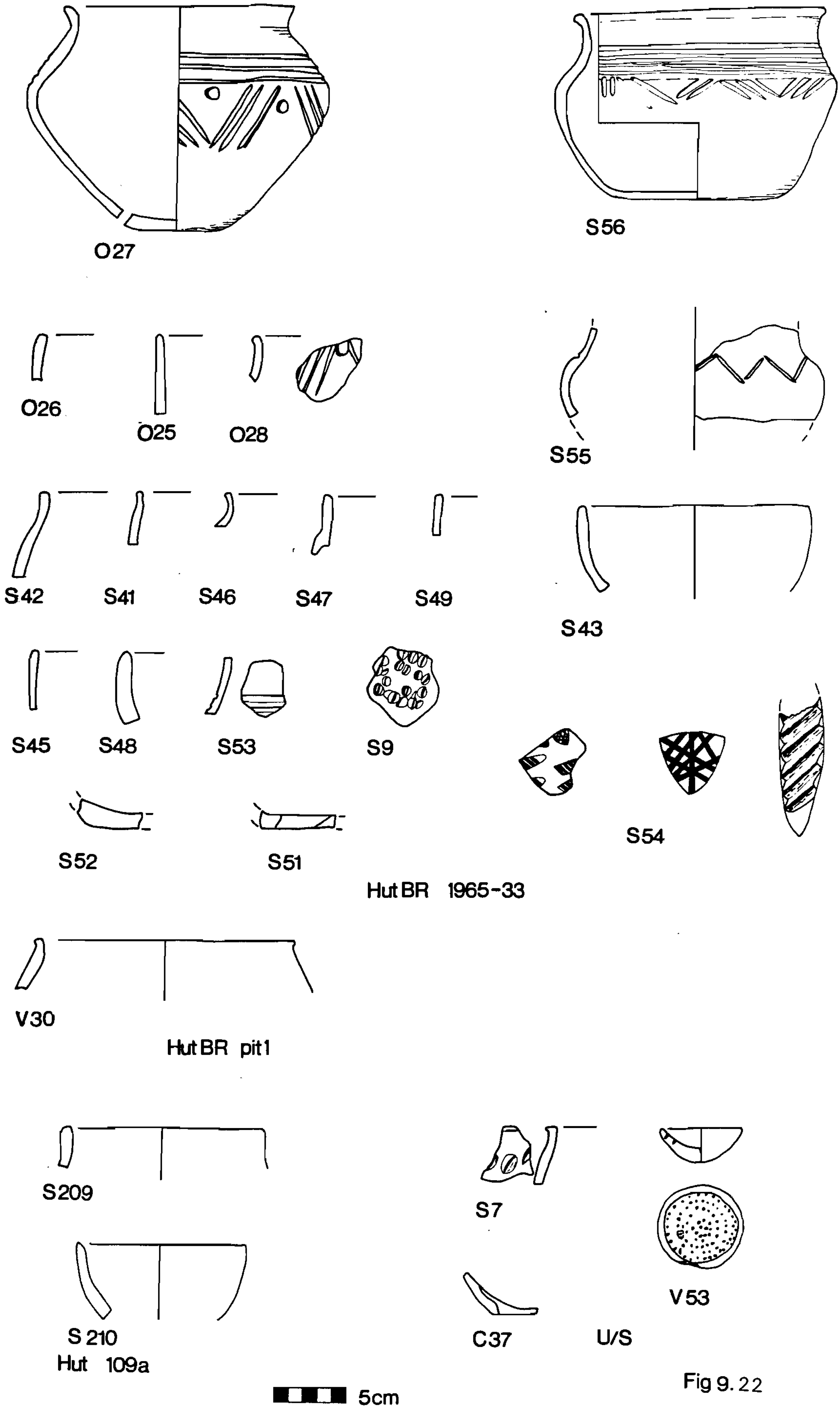

O27
S56
O26
O25
O28
S55
S42
S41
S46
S47
S49
S43
S45
S48
S53
S9
S54
S52
S51
Hut BR 1965-33
V30
Hut BR pit1
S209
S7
V53
S 210
Hut 109a
C37
U/S
5cm

Fig 9. 22

Sample	Fabric	Context	Sherd group
1	O/G	K5	1
2	O/V	F2	1
3	O	K16	3
4	O	+7	4
5	O	K5B	5
6	O	H7B	11
7	O	K1C	13
8	O	K5B	17
9	O	BR	26
10	O	BR	27
11	O	BR	28
12	O	K1E	29
13	O	+7	31
14	O	H13	38
15	O	-113	41
16	O	-61	42
17	O	-113	45
18	O	-144	46
19	O	-31	54
20	O	K123	55
21	O	-113	56
22	O	-43	58
23	O	BR	60
24	O	+7	63
25	O	+41	68
26	O	-113	121
27	O	-113	122
28	O	-111	125
29	O	-111	127
30	O	H7A	129
31	O	K123	133
32	CS	K123	14
33	CS	K5B	18
34	CS	K	48
35	CS	K1	28
36	CS	K4/5	6
37	CS	K5	43
38	O	K1	2
39	O	K5B	51
40	O	K3	33
41	O	-144	47
42	O	-43	124
43	O	+7	111
44	O	+5	123
45	O	-43	20
46	O	-144	48
47	O	BR	25
48	O	-111	10
49	YM	-144	5
50	YM	K5	4
51	YM	-144	6
52	WM	-113	1
53	WM	-111	2
54	WM	K	3

Table 9.31

Sample	Fabric	Context	Sherd group
55	V/G	-144	1
56	Shell	K1C	1
57	Shell	K	3
58	Shell	-144	4
59	S	BR	55
60	S	-144	28
61	S	BR	44
62	S	-144	21
63	V/C	-26	5
64	V/C	K	1
65	V/C	-111	3
66	C	BR	34
67	C	BR	35
68	C	H6	119
69	C	K5B	101
70	C	K1	1
71	C	-144	98
72	C	-264	Fired clay
73	C	K2B	13
74	S	H7B	87
75	S	K1	94
76	S	H13	61
77	S	K3A	78
78	S	H6	89
79	S	K2A	119
80	S	K1D	121
81	S	K4B	63
82	S	-38	130
83	CS	-38	50
84	C	-26	130
85	CS	-111	51
86	C	-31	131
87	CS	-61	52
88	C	-144	134
89	S	+7	140
90	G	-144	1
91	G	-144	2
92	G	-144	3
93	G	US	4
94	G	K5B	5
95	G	K5B	6
96	G	K123	7
97	G	TT1A	8
98	S	K4	155
99	S	BR	56
100	Red flint	K123	1
101	CS	K4	53
102	G	-43	9
103	S	-41	168
104	CS	-41	54
105	WM	-43	7
106	G	-113	10

Table 9.31

Sample	Fabric	Context	Sherd group
107	CS	-113	55
108	CS	-113	56
109	S	-113	170
110	S	-144	20
111	S	-113	172
112	C	-113	160
113	S	-113	173
114	S	-113	174
115	S	-113	176
116	C	-113	163
117	S	+7	178
118	S	-80	180
119	CS	-31	57
120	CS	-44	58
121	S	-63	181
122	S	-31	182
123	S	-31	183
124	S	+30	184
125	S	-107	185
126	S	+8	186
127	S	-35	187
128	S	-44	188
129	S	1965-33 Pit 1	189
130	CS	-61	59
131	S	-80	190
132	S	-76	191
133	S	+30	192
134	S	-105	193
135	S	-26	194
136	S	-26	195
137	S	K	196
138	CS	-61	60
139	CS	-26	61
140	CS	-123	62
141	S	-80	197
142	S	-61	198
143	S	-61	199
144	S	-61	200
145	S	-61	201
146	S	+34	202
147	S	+34	203
148	S	+34	207
149	CS	+34	63
150	S	-123	208
151	S	1969 109A	209
152	S	1969 109A	210
153	S	+5	211
154	C	+5	164
155	C	-111	165
156	C	-111	166
157	C	-111	167
158	S	-111	212
159	S	-111	214

Table 9.31

Sample	Fabric	Context	Sherd group
160	S	-111	215
161	CS	-111	65
162	S	+7	216
163	S	+7	217
164	CS	+7	66
165	S	+7	218
166	S	+7	222
167	C	+7	168
168	C	+7	169
169	S	+7	223
170	S	-43	225
171	S	-43	226
172	S	-43	227
173	S	-43	228
174	CS	-43	67
175	CS	-43	68
176	C	-43	170
177	C	-43	171
178	C	-43	172
179	S	-48	229
180	S	-48	230
181	CS	-48	69
182	CS	-48	70
183	S	-48	231
184	O	-144	139
185	S	K1A	232
186	V	-111	49
187	V	-111	50
188	V	-112	52
189	V	-48	11
190	V	-111	12
191	V	-144	1
192	V	-144	3
193	V	+34	4
194	V	H6	5
195	V	K2A	6
196	V	US2	8
197	V	-113	9
198	V	K5	7
199	V	-113	10
200	V	US	11
201	V	BR	12
202	V	K4	13
203	V	K123	14
204	V	-105	15
205	V	-113	16
206	V	K1D	17
207	V	K123	18
208	V	K2B	19
209	V	K123	21
210	V	K5B	22

Table 9.31

Sample	Fabric	Context	Sherd group
211	V	+34	23
212	V	K1D	24
213	V	-111	25
214	V	K123	26
215	V	K3A	27
216	V	H7A	28
217	V	K123	29
218	V	1965-33 Pit 1	30
219	V	-43	31
220	V	96429	32
221	V	-95	33
222	V	K123	34
223	V	K5A	35
224	V	K123	36
225	V	BR	37
226	V	-113	38
227	V	H13	39
228	V	-144	20
229	V	+7	40
230	V	+7	42
231	V	H6	44
232	V	F2	46
233	V	TT1A	47
234	V	-144	54
235	S	-54	234
236	V	-144	2
237	V	1964 109A	51
238	C	US	Loomweight
239	V	US	Loomweight
240	-	BR	Daub
241	S	US	Loomweight

Table 9.31

Chapter 10

The Illington Cemetery

The Illington cemetery has been included in this thesis so that data collected from the settlement sites can be compared with those from a large cremation cemetery. This enables us to answer two very important questions:

1. Was urn manufacture in the hands of specialists, as Brisbane (198) and other writers have suggested?
2. Were large cemeteries shared by a number of communities, as Arnold C(1981) and others have claimed?

If the first theory is correct, the number of different fabrics present in the cemetery would indicate the number of specialists present in a community. Arguing from the low number of fabrics at Spong Hill, Brisbane (1981) envisages a single specialist producing urns within each community. The production of pottery for domestic use is seen as remaining in the hands of each household, so a settlement site should have a greater number of fabrics than a cemetery. Given the religious aura attached to the cremation specialists, it might even be possible that their fabrics would not occur in the domestic assemblage.

If the second theory is correct, large cemeteries shared by a number of communities would have a greater number of flabrics than small cemeteries, but the number of urns in each fabric would be no greater than in the smaller cemeteries. This assumes that the dead person was placed in a vessel made by his own community's cremation vessel manufacturer, and not in one made by the specialist from a community controlling the burial place. If the latter situation were true, one would expect to find a large number of urns in a small number of fabrics. Hitherto, the main drawback to applying these models has been the lack of settlement data with which to compare the cemetery results; but the amount of new information collected by the present writer enables this chapter to compare, for the first time, the Illington fabric results with those of settlements and smaller cremation cemeteries in the region.

Cremation vessels have a number of attributes, such as form, decoration, date, content, and position in the cemetery, which are used to assess the cemetery and social systems behind it, in terms of families and potters. Previous assessments have usually been confined to finding continental parallels and constructing potter or workshop groups, based on similar designs or identical stamped motifs. Vessels that were undecorated or unreconstructable played a lesser part. In contrast, the present programme of thin-sectioning all the cremation vessels enables pots to be grouped together on purely objective criteria, based on 1. the clays, and 2. the tempering agents employed. In the past, fabric analysis has been carried out macroscopically, which in areas of complex geology is inevitably very subjective and unreliable. The distinctive characteristics of a fabric will be masked by differences in surface finish and the degree of weathering, which leads to confusion in selecting criteria for the indicators of a fabric. The result is either large general fabric groups such as 'sandy', 'grog', and 'vegetable temper'; or myriad sub-groups based on attributes that occur naturally in the clay, but have been exaggerated by differences in surface treatment of firing temperatures. A third alternative is to give very general descriptions such as 'red-brown smooth ware', which have no practical meaning whatsoever.

An important aspect of the thin-sectioning programme was to integrate the undecorated urns into the dated sequence of decorated urns, and possibly to match large sections of broken urns with their missing rims or bases. The integration of the undecorated and decorated pots would allow further checks on the validity of the dating, provided the undecorated urns contained datable artifacts, because urns of identical fabric are likely to be contemporary. Chronology would be further tightened up by allowing 'heirlooms' to be recognised, and by demonstrating the range of artifacts in use at one time.

In this way, it was hoped to answer further significant questions in addition to the two already outlined above:

1. Did potters have exclusive clay sources?
2. Do the stamps or decorative schemes occur in more than one fabric?
3. Is there a link between fabric and ritual aspects of burial as shown by grave goods?
4. Is there a correlation between fabric and the age, sex, and class of the individual concerned?
5. Where 'workshops' are concerned, did the potters move or did the pots?

To clarify this, urns from Earsham, Markshall, and Caistor-by-Norwich, which bore identical stamps to those present at Illington, were sectioned.

The cremation cemetery

The cemetery to the south of Illington church was excavated by Knocker in nine days during the spring of 1949 (Knocker's unpublished notes in Norwich Castle Museum). The area of the urnfield revealed by deep ploughing measured 87ft E-W (26.5m) by 60ft N-S (18.3m), and a strip 120ft (36.6m) E-W by 20ft (6.1m) N-S was excavated. Thus the western and eastern boundaries were exposed but two-thirds of the cemetery remained unexcavated. A total of 224 urns and a considerable number of fragments were collected. Some of the urns lifted as a group of sherds were later found to have come from up to five separate vessels. The whole cemetery may therefore have contained about 1,000 cremation urns, with a number of inhumations - three of which were recovered - representing the latest phase of interment.

Recent field-walking on the area which is still under plough has recovered sherds that belong to urns previously excavated. This points either to considerable damage having been done to some of the urns before the 1949 excavations or else to poor excavation recovery; but there is no evidence that the site had been extensively looted by warreners or antiquarians.

The pattern of burials is likely therefore to have been relatively undisturbed and the clusters of urns likely to be discrete groups, with some clusters having a marked linear arrangement. A similar pattern was also present at Lackford (Lethbridge 1951, Fig 1), Caistor-by-Norwich (Myres and Green 1973, map 2), and Spong Hill (Hills 1977, Fig 193) with clusters of urns ranging from four to 20, including a number of paired urns.

The fabrics

Samples were taken from all the cremation vessels excavated by Knocker, others from more recent field-walking, and from a scatter of possibly domestic refuse found 30m ENE of the cemetery.

The samples were all prepared by impregnation with a consolidating agent, and sections were made using standard techniques.

Examination of the sections revealed a total of 123 fabrics from the 314 samples. These fabrics could be grouped into three major divisions, based on a sandy clay, a silty clay, and a limestone-rich silty clay, and then into similar groups based on broad textural characteristics. Fabrics 1 to 32 were all members of a generally sandy group; 33 to 43 were similar to but coarser than 1 to 32; 44 to 53 were sandy clays with a quartz component possibly derived from sandstones, as the quartz grains were well-sorted; and 54 to 62 were all finer than the other sandy fabrics. Fabrics 63 to 103 all used a silty clay or clays, with few fine quartz grains; fabrics 104 to 116 were silty clays with a well-sorted quartz component; fabrics 117 to 120 had a silty clay matrix with well-sorted coarser quartz sand. Finally, three samples made up the limestone group, all in a silty clay.

The division of the samples in this way is similar to the taxonomic system of classification used in biology, with clays relating to the level of phylum, the groups such as 1-32 being classes, and the individual fabrics acting as species.

This classification system was not derived from a statistical test of similarity with set levels of confidence. Instead, a small programme of textural analysis was carried out on a sample of 13 urns beforehand, and this proved that the division of the individual fabrics was in the main correct (Fig. 10.1). Textural analysis is not particularly suited to the silty clays, because one is really analysing the temper, which will have a greater variability than the quartz grains in the homogeneous clay. So the classification system relies on the more traditional, but no less reliable, methods of ceramic petrology to divide fabrics: that is, the size, shape, and frequency and category of inclusions. The writer is inclined to distrust computerised clustering methods for large groups of material, as they can be pre-set to find patterns which may not exist, and after the first few clustering junctions have taken place, the average fabric that has been created bears little relation to any of the actual fabrics present. (Aldenderfer 1982)

The spatial patterning of the fabrics, and their relation to urn decoration and other attributes, can be investigated at the various levels of the classification system.

A brief description of each fabric will be given here followed by dendrograms showing the relationships between the fabrics (Figs. 10.2 to 10.10). Tables 10.2 to 10.26 give the presence/absence of inclusions.

Fabrics 1-32: sandy clay matrix

Fabric 1

Dense quartz grains, with the majority 0.5mm in diameter but some larger than 1mm.

Fabric 2

Sparse quartz grains with the majority over 0.5mm but less than 1mm in diameter (see fabric 3)

Fabric 3

Sparse quartz, the majority 0.5mm diameter, all less than 1mm. Probably the same as fabric 2 but with extra igneous rock temper.

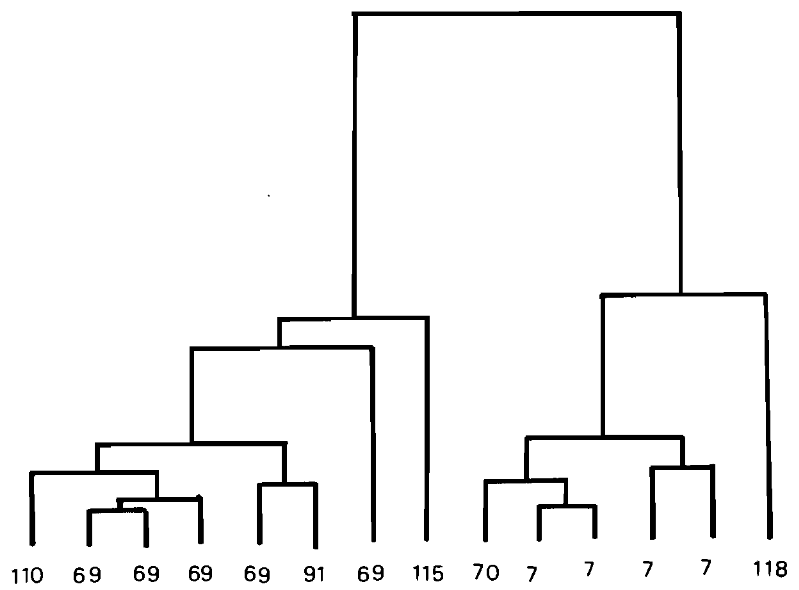


Fig. 10.1: showing the dendrogram produced by the Clustan programme when used on the textural analysis data from a sample of Illington Urns.

Fabric 4

Quartz grains occasionally over 1mm in diameter, but the majority 0.25mm or smaller.

Fabric 5

Sparse rounded quartz grains, maximum diameter 0.75mm, in a dense fine quartz matrix.

Fabric 6

Dense quartz grains 1mm maximum diameter, but the majority o.25mm, in a sparse fine quartz matrix.

Fabric 7

Quartz grains of maximum diameter 1mm, in a dense coarse sandy matrix.

Fabric 8

Quartz grains maximum diameter 1mm, majority 0.01mm, in a dense fine sandy matrix.

Fabric 9

Quartz grains maximum diameter 1mm, majority less than 0.5mm, in a coarse sparse sandy matrix.

Fabric 10

Dense quartz grains, maximum diameter 0.5mm, in a fine dense sandy matrix.

Fabric 11

Dense rounded quartz grains, maximum diameter 0.75mm, in a dense fine sandy matrix.

Fabric 12

Sparse rounded quartz grains, maximum diameter 0.75mm, in a fine sparse sandy matrix.

Fabric 13

Sparse rounded quartz grains, maximum diameter 1mm, in a dense fine sandy matrix.

Fabric 14

Sub-angular quartz grains, maximum diameter 1mm, in a dense sandy matrix.

Fabric 15

Rounded quartz grains, maximum diameter 0.5mm, in a dense sandy matrix.

Fabric 16

Sparse quartz grains, maximum diameter 1mm, in a sparse sandy matrix.

Fabric 17

Sparse quartz grains, maximum diameter 1mm, majority 0.5mm, in a sparse sandy matrix.

Fabric 18

Sparse rounded quartz grains, maximum diameter 0.75mm, in a dense sandy matrix.

Fabric 19

Sub-angular quartz grains, maximum diameter 0.75mm, in a sparse sandy matrix.

Fabric 20

Dense sub-angular quartz grains, maximum diameter 0.5mm, in a dense sandy matrix.

Fabric 21

Sparse rounded quartz grains, maximum diameter 1mm, majority less than 0.5mm, in a sparse sandy matrix.

Fabric 22

Sparse sub-angular quartz grains, maximum diameter 0.5mm, in a dense sandy matrix.

Fabric 23

Dense sub-angular quartz grains, maximum diameter 1mm, in a sparse sandy matrix.

Fabric 24

Sparse rounded quartz grains, 0.5mm maximum diameter, in a sandy matrix.

Fabric 25

Dense quartz grains, maximum diameter 0.75mm, in a sandy matrix.

Fabric 26

Sparse rounded quartz grains, maximum diameter 0.75mm, in a dense sandy matrix.

Fabric 27

Dense rounded quartz grains, maximum diameter 0.75mm, in a sandy matrix.

Fabric 28

Dense sub-angular quartz grains, maximum diameter 1mm, in a dense coarse sandy matrix.

Fabric 29

Dense sub-angular quartz grains, maximum diameter 0.75mm, in a dense sandy matrix.

Fabric 30

Sparse rounded quartz grains, maximum diameter 0.5mm, in a dense sandy matrix.

Fabric 31

Dense sub-angular quartz grains, maximum diameter 0.5mm, in a sparse fine sandy matrix.

Fabric 32

Dense sub-angular quartz grains, maximum diameter 0.5mm, in a dense sandy matrix.

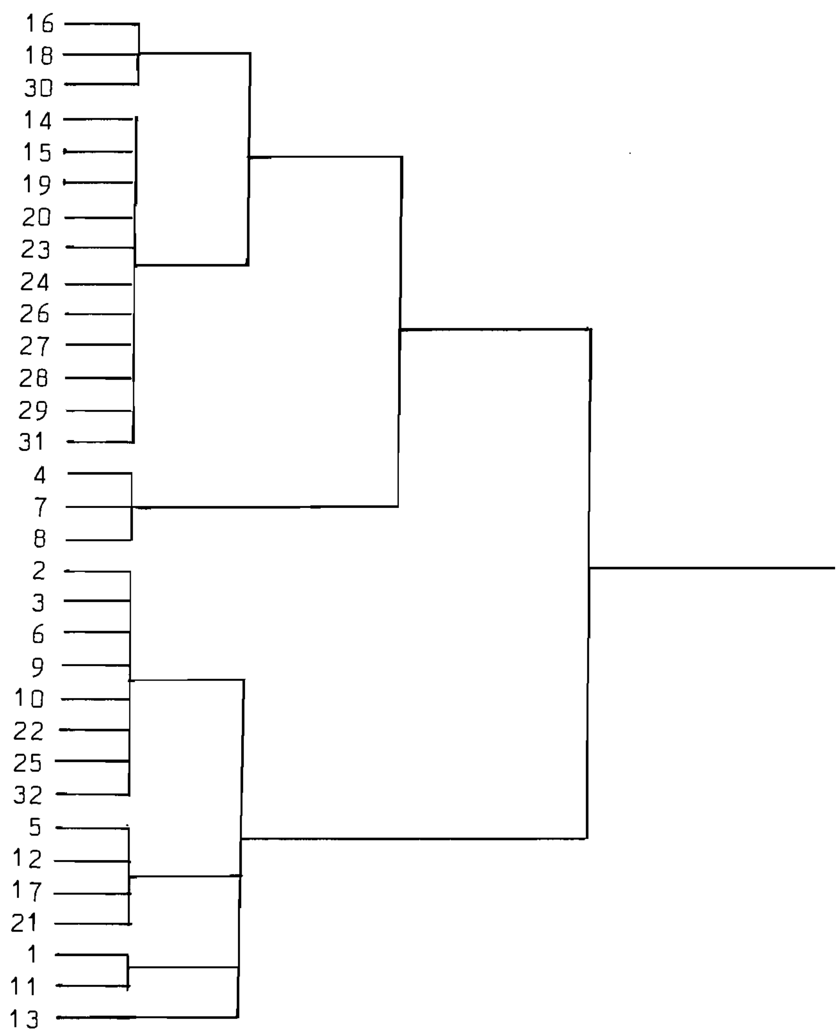


Fig. 10.2

Fabrics 33-43: fabrics similar to fabrics 1-32 but coarser, containing larger quartz grains.

Fabric 33

Dense sub-angular quartz grains, maximum diameter 0.75mm, in a fine sparse sandy matrix.

Fabric 34

Sparse sub-angular quartz grains, maximum diameter 0.5mm, in a sparse sandy matrix.

Fabric 35

Dense sub-angular quartz grains, maximum diameter 1mm, in a dense sandy matrix.

Fabric 36

Dense rounded quartz grains, maximum diameter 1mm, in a sparse sandy matrix.

Fabric 37

Dense sub-angular quartz grains, maximum diameter 1mm, in a sparse sandy matrix.

Fabric 38

Dense rounded quartz grains, maximum diameter 1mm, in a sparse sandy matrix.

Fabric 39

Dense sub-angular quartz grains, maximum diameter 0.75mm, in a dense sandy matrix.

Fabric 40

Sparse rounded quartz grains, maximum diameter 1mm, in a sparse sandy matrix.

Fabric 41

Sparse rounded quartz grains, maximum diameter 0.5mm, in a sparse sandy matrix.

Fabric 42

Dense sub-angular quartz grains, maximum diameter 0.75mm, in a sparse sandy matrix.

Fabric 43

Sparse sub-angular quartz grains, maximum diameter 0.75mm, in a sparse sandy matrix.

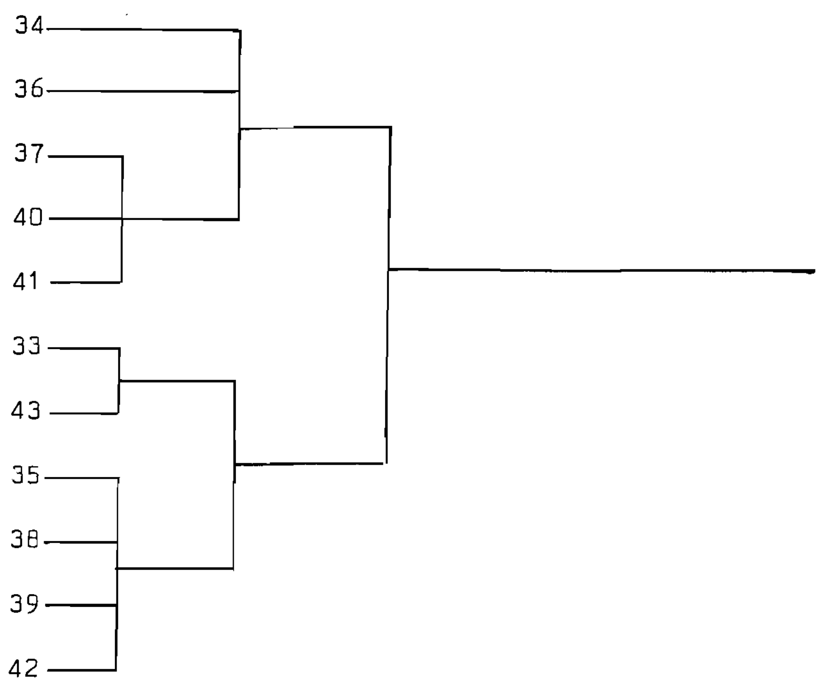


Fig. 10.3.

Fabrics 44-53: These fabrics all have well-sorted quartz components probably indicating a derivation from a disaggregated sandstone.

Fabrics 44 to 46 have a sandstone temper, in the case of 45 completely disaggregated to individual grains. Fabrics 47 to 53 have matrices with well-sorted quartz components, resulting in a markedly bimodal distribution. The relationships between the fabrics are shown in Table 10.

Fabric 44

Sub-angular quartz grains, maximum diameter 0.75mm, in a fine dense sandy matrix.

Fabric 45

Dense quartz grains, maximum diameter 0.75mm, mean 0.25mm, in a sparse sandy matrix.

Fabric 46

Sparse sub-angular quartz grains, maximum diameter 1mm, mean 0.25mm, in a sparse sandy matrix.

Fabric 47

Rounded quartz grains, maximum diameter 0.75mm, in a dense coarse well-sorted matrix.

Fabric 48

Sub-angular fragments of crushed granitic rock added to a dense coarse sandy matrix.

Fabric 49

Rounded quartz grains, added to a dense coarse sandy matrix.

Fabric 50

Rounded quartz grains, maximum 1mm, added to a dense fine sandy matrix.

Fabric 51

Occasional quartz grains, maximum diameter 0.5mm, with dense less well-sorted sandy matrix.

Fabric 52

Sparse rounded quartz grains, maximum diameter 0.5mm, in a dense coarse sandy matrix.

Fabric 53

Sparse quartz grains, maximum diameter 0.75mm, in a dense fine sandy matrix.

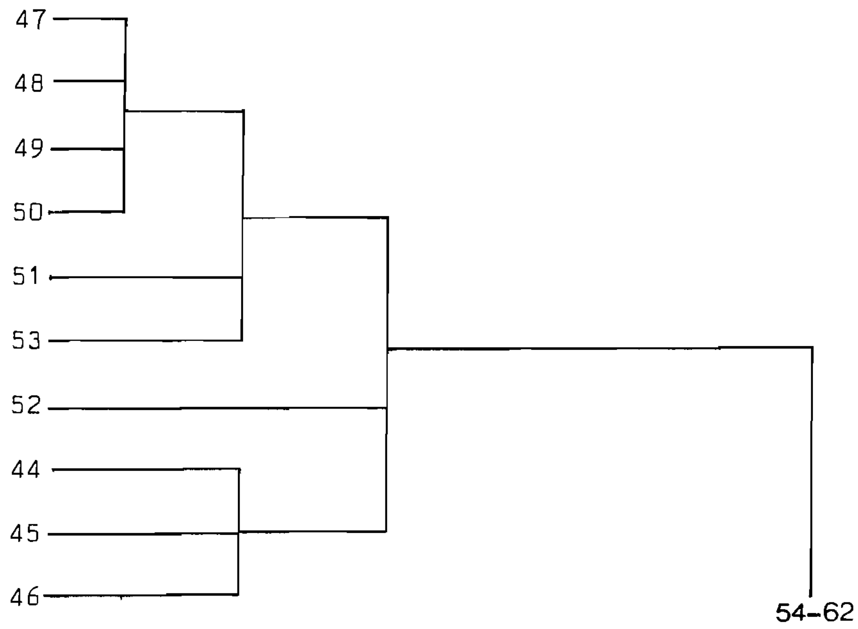


Fig. 10.4.

Fabrics 54-62: All these fabrics have a very fine well-sorted sandy matrix.

Fabric 54

Sparse quartz grains, maximum diameter 0.5mm, in an iron-rich sandy matrix.

Fabric 55

Sparse sub-angular quartz grains, maximum diameter 0.5mm, in a sparse sandy matrix.

Fabric 56

Sub-angular quartz grains, maximum diameter 0,5mm, in a dense sandy matrix.

Fabric 57

Igneous temper in a sparse fine sandy matrix.

Fabric 58

Igneous temper with sparse quartz grains, maximum diameter 0.5mm, in a sparse fine sandy matrix.

Fabric 59

Rounded quartz grains, maximum diameter 0.4mm, in a dense fine sandy matrix.

Fabric 60

Angular calcined flint temper with sparse quartz grains, maximum diameter 0.5mm, in a fine sandy matrix.

Fabric 61

Sparse rounded quartz grains, maximum diameter 0.8mm, in a fine sandy matrix. Iron is present as fragments of carstone-like material.

Fabric 62

Dense quartz grains, maximum diameter 1.25mm, mean diameter 0.5mm, in a dense coarse sandy matrix.

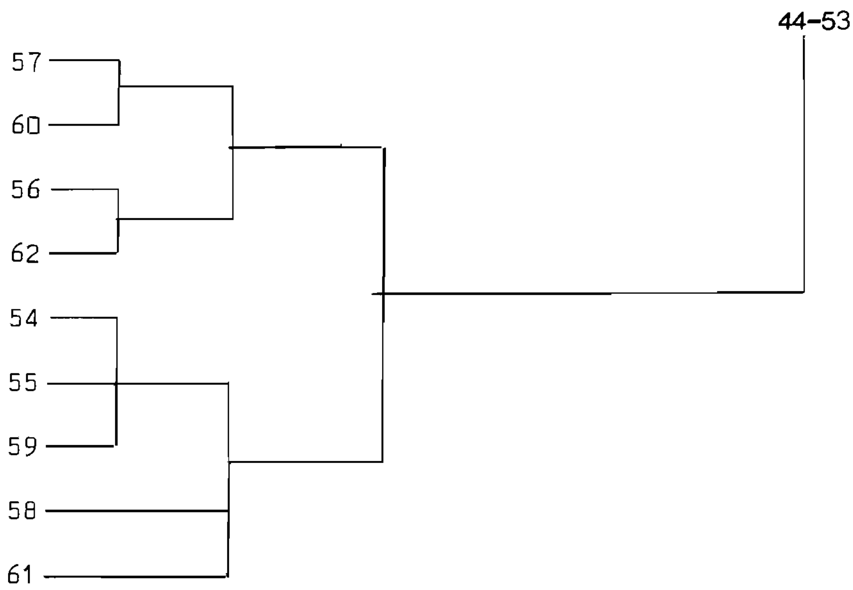


Fig. 10.5.

Fabrics 63-103: The relationship between these fabrics is more complex than the sandy groups, see Fig. 10.6 . All fabrics have a similar silty clay matrix.

Fabric 63

Quartz grains, maximum diameter 1mm, mean 0.25mm, in a fine silty matrix.

Fabric 64

Sub-angular quartz grains, maximum diameter 0.75mm, in a silty clay matrix.

Fabric 65

Sparse sub-angular quartz grains, maximum diameter 0.75mm, mean 0.2mm, in a silty clay matrix.

Fabric 66

Sub-angular quartz grains, maximum diameter 0.6mm, mean 0.2mm, in a silty clay matrix.

Fabric 67

Dense sub-angular quartz grains, maximum diameter 0.75mm, mean 0.3mm, in a silty clay matrix.

Fabric 68

Dense sub-angular to rounded quartz grains, maximum diameter 0.5mm, mean 0.25mm, in a silty clay matrix.

Fabric 69

Sparse sub-angular to rounded quartz grains, maximum diameter 0.5mm, majority 0.2mm in a silty clay matrix.

Fabric 70

Dense sub-angular to rounded fine quartz grains, maximum diameter 1mm, majority 0.2mm, in a silty clay matrix.

Fabric 71

Dense rounded to sub-angular quartz grains, maximum diameter 0.5mm, mean 0.2mm, in a silty clay matrix.

Fabric 72

Sub-angular quartz grains, maximum diameter 1mm, in a silty clay matrix.

Fabric 73

Sparse quartz grains, maximum diameter 0.75mm, in a streaky silty clay matrix.

Fabric 74

Dense quartz grains, maximum diameter 1.25mm, majority 0.4mm, in a silty clay matrix.

Fabric 75

Rounded to sub-angular quartz grains, maximum diameter 0.8mm, in a fine silty clay matrix.

Fabric 76

A silty clay matrix, tempered with crushed sandstone consisting of rounded to sub-angular quartz grains, maximum diameter 0.8mm.

Fabric 77

Sparse rounded quartz grains, maximum diameter 0.6mm, in a silty clay matrix.

Fabric 78

The C3 sherd carries a similar stamp to Y2 at Caistor-by-Norwich. Sparse rounded to sub-angular quartz grains maximum diameter 1.25mm, in a silty clay matrix.

Fabric 79

Dense sub-angular quartz grains, maximum diameter 1.25mm, in a silty clay matrix.

Fabric 80

Rounded to sub-angular quartz grains, maximum diameter 1.2mm, in a silty clay matrix.

Fabric 81

Sparse rounded to sub-angular quartz grains, maximum diameter 1.2mm, in a silty clay matrix.

Fabric 82

Dense rounded quartz grains, maximum diameter 0.8mm, in a silty clay matrix.

Fabric 83

Sparse sub-angular quartz grains, maximum diameter 0.6mm, in a silty clay matrix.

Fabric 84

Sparse rounded quartz grains, maximum diameter 1.5mm, in a silty clay matrix.

Fabric 85

Sparse sub-angular quartz grains, maximum diameter 1mm, in a silty clay matrix.

Fabric 86

Dense rounded quartz grains, maximum diameter 1.5mm, in a silty clay matrix.

Fabric 87

Sparse sub-angular quartz grains, maximum diameter 1mm, in a silty clay matrix.

Fabric 88

Sparse sub-angular quartz grains, maximum diameter 0.5mm, with much rounded flint, in a silty clay matrix.

Fabric 89

Dense sub-angular quartz grains, maximum diameter 1.75mm, majority 0.5mm, in a silty clay matrix.

Fabric 90

Dense rounded quartz grains, maximum diameter 1mm, in a silty clay matrix.

Fabric 91

Sparse sub-angular quartz grains, maximum diamter 0.5mm, in a silty clay matrix.

Fabric 92

Sparse sub-angular quartz grains, maximum diameter 0.5mm, in a silty clay matrix.

Fabric 93

Sparse rounded quartz grains, maximum diameter 0.75mm, in a silty clay matrix.

Fabric 94

Dense rounded quartz grains, maximum diameter 0.75mm, with much flint, in a silty clay matrix.

Fabric 95

Rounded quartz grains, maximum diameter 0.75mm, in a silty clay matrix.

Fabric 96

Sparse sub-angular quartz grains, maximum diameter 0.75mm, in a silty clay matrix.

Fabric 97

Sub-angular quartz grains, maximum diameter 0.75mm, in a silty clay matrix.

Fabric 98

Sub-angular quartz grains, maximum diameter 0.6mm, in a silty clay matrix.

Fabric 99

Sparse sub-angular grains, maximum diameter 0.75mm, in a silty clay matrix.

Fabric 100

Sparse sub-angular quartz grains, maximum diameter 0.6mm, in a silty clay matrix.

Fabric 101

Sparse sub-angular quartz grains, maximum diameter, 1mm, in a silty clay matrix.

Fabric 102

Dense rounded quartz grains, maximum diameter 1.25mm, in a silty clay matrix.

Fabric 103

Dense rounded quartz grains, maximum diameter 0.75mm, in a silty clay matrix.

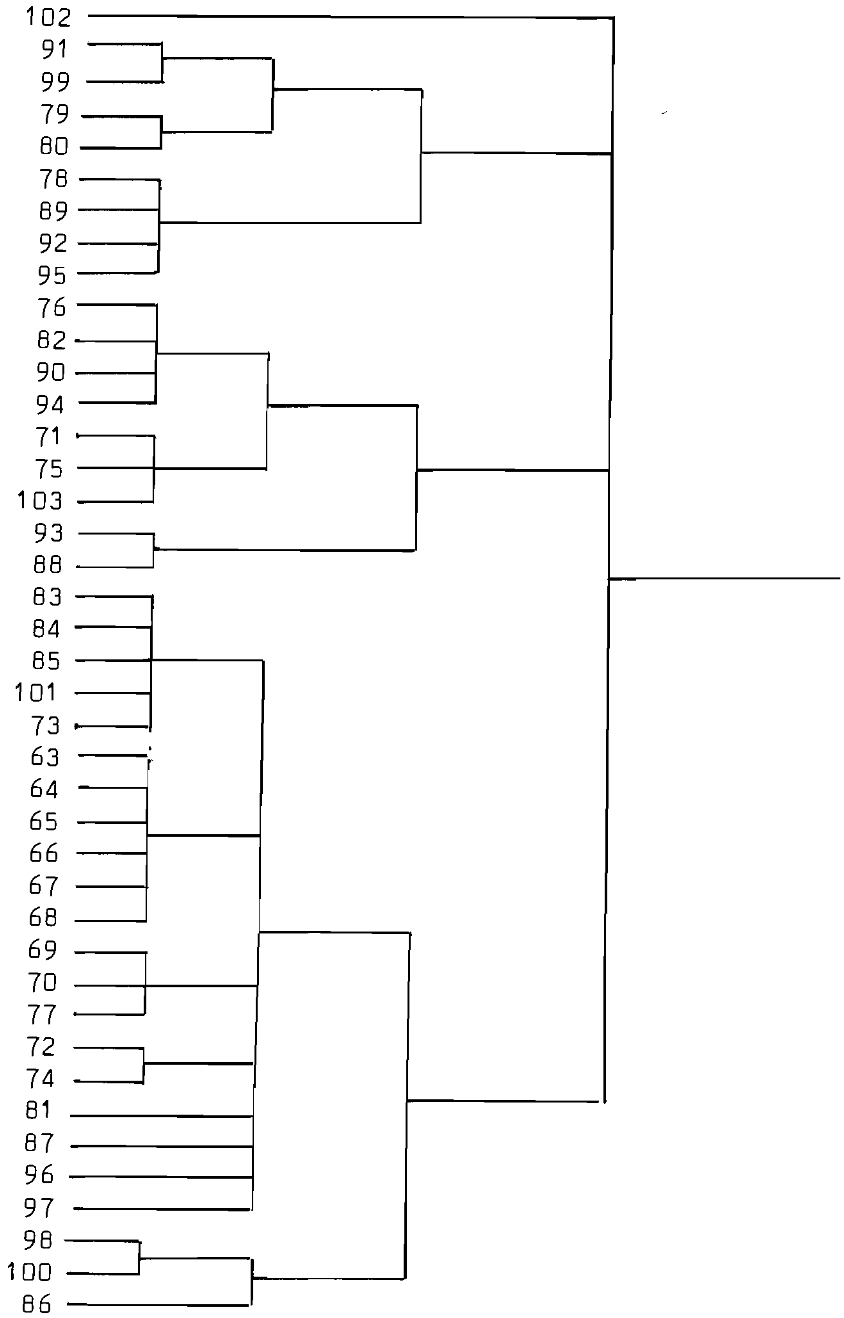

102
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Fig. 10.6.

Fabrics 104-116: These fabrics all have the silty clays of fabrics 63 to 103 as a matrix, but also contain well-sorted fine quartz grains, probably derived from sandstones.

Fabric 104

Dense rounded quartz grains, maximum diameter 0.75mm, majority 0.4mm, in a silty clay matrix.

Fabric 105

Rounded quartz grains, maximum diameter 1mm, majority 0.3mm, in a silty clay matrix.

Fabric 106

Dense rounded quartz grains, maximum diameter 0.75mm, majority 0.3mm, in a silty clay matrix.

Fabric 107

Sparse, rounded quartz grains, maximum diameter 0.6mm, majority 0.3mm, in a silty clay matrix.

Fabric 108

Dense rounded quartz grains, maximum diameter 0.6mm, majority 0.2mm, in a silty clay matrix.

Fabric 109

Sparse rounded quartz grains, maximum diameter 0.7mm, majority 0.25mm, in a silty clay matrix.

Fabric 110

Sparse sub-angular quartz grains, maximum diameter 1.5mm, majority 0.3mm, in a silty clay matrix.

Fabric 111

Sparse sub-angular quartz grains, maximum diameter 1mm, majority 0.3mm, in a silty clay matrix.

Fabric 112

Sparse sub-angular quartz grains, maximum diameter 0.8mm, majority 0.2mm, in a silty clay matrix.

Fabric 113

Dense rounded quartz grains, maximum diameter 0.4mm, majority 0.2mm, in a silty clay matrix.

Fabric 114

Sparse sub-angular quartz grains, maximum diameter 0.8mm, majority 0.2mm, in a silty clay matrix.

Fabric 115

Dense sub-angular quartz grains, maximum diameter 0.25mm, majority 0.2mm, in a silty clay matrix.

Fabric 116

Sparse sub-angular quartz grains, maximum diameter 0.6mm, majority 0.2mm, with fragments of carstone, in a silty clay matrix.

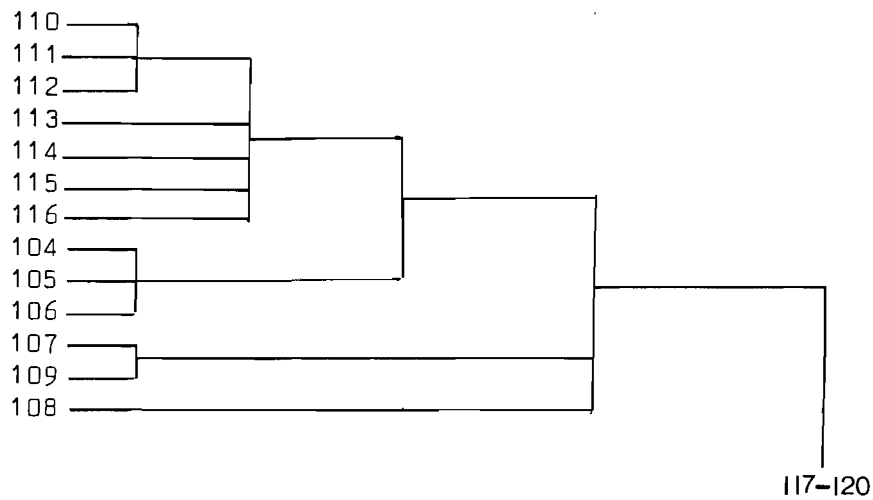


Fig. 10.7.

<u>Fabrics 117-120</u>: All as 63-103 but with well-sorted coarse sand.

Fabric 117

Rounded quartz grains, maximum diameter 0.8mm, majority 0.3mm, in a silty clay matrix.

Fabric 118

Sparse angular quartz grains, maximum diameter 0.8mm, majority 0.5mm, in a silty clay matrix.

Fabric 119

Sparse sub-angular quartz grains, maximum diameter 0.6mm, majority 0.1mm, in a silty clay matrix.

Fabric 120

Very sparse angular quartz grains, majority 1.2mm diameter, in a silty clay matrix.

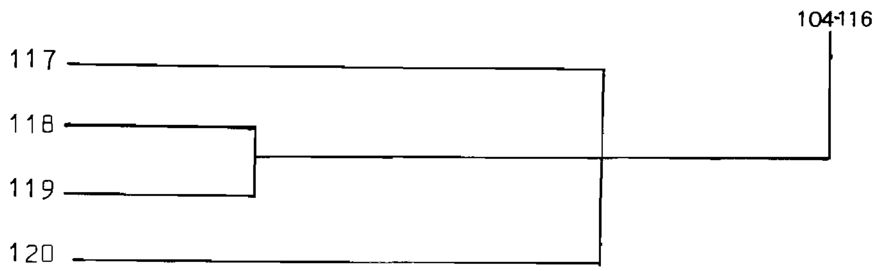


Fig. 10.8

Fabrics 121-123: All these three fabrics consits of a silty clay matrix with fragments of limestone.

Fabric 121

Sparse quartz grains, maximum diameter 0.75mm, with sparse rounded fragments of limestone.

Fabric 122

Sparse quartz grains, maximum diameter 1mm, in a well-sorted fine silty matrix with abundant oolites.

Fabric 123

Sparse sub-angular quartz grains, maximum diameter 0.6mm, with abundant round voids 0.6mm to 0.8mm diameter.

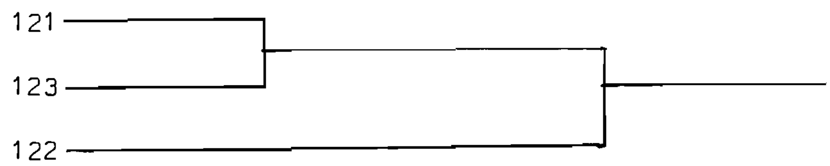


Fig. 10.9.

The fabrics can be divided into two main clay groups, the silty fabrics, and the sandy fabrics. There is an equal number of fabrics, 62, in both the sandy and silty clays; but the sandy fabrics seem to have been more standardised. There is an average of three sections per fabric in the sandy clays, and two per fabric in the silty clays. Of a total of 315 sections, 128 (40.6%) are in silty clays, and 104(59.4%) are in sandy clays. There was no bias in the sampling procedure, so this should approximate to the original ratio, either of urns in the ground, or their recovery by the excavator. An archaeological explanation for the predominance of sandy samples could be that it is due to a higher fragmentation rate, with a resultant higher sampling rate when rims and bases were sampled in an attempt to reconstruct vessels. This higher fragmentation rate could be due to the sandy vessels being less well made, or their being earlier in date than the silty fabrics, and therefore having been subject to greater disturbance when the silty vessels were buried.

If the original ratio in the ground is reflected in the above figures, then there does seem to have been a bias on the excavator's part towards recording the urns of silty fabrics, as of the 183 urns on the cemetery plan 43.2% are silty and 56.8% are sandy. This bias seems to have been amplified by Myres in his Corpus as of the vessels illustrated 45.5% are of silty and 54.5% are of sandy fabrics. The reason for this bias is probably the fact that the silty urns are more often decorated. In fact, 88.6% of the silty urns are decorated, whereas only 73.8% of the sandy ones are. Decorated vessels, even when fragmented, must have attracted more attention during excavation and post-excavation work and therefore were more likely to be illustrated in the Corpus.

The silty fabrics

This greater status accorded to decorated vessels by archaeologists does seem to parallel that of their original Anglo-Saxon owners. The Illington/Lackford urns are probably not indigenous to the site (see Chapter 11), and are predominantly decorated. Some 98% of these vessels are in silty fabrics and they formed 39% of the silty sample. This perhaps indicates that all the silty vessels were imported into the locality, and that they are predominantly decorated vessels acquired by the local people in preference to their own sandy wares. (A few instances of possible traded sandy fabrics are discussed below.)

If the silty urns are non-local, they may represent grave goods of higher status than sandy urns. If high-status individuals were buried in silty (and often Illington/Lackford) vessels, one would expect these urns to contain other indicators of higher status. Sixty urns of the total assemblage were accompanied by grave goods (Knocker, unpublished grave plan), which is 19% of the sample. This contrasts with the deposition of grave goods at Caistor-by-Norwich, 35km to the northeast, where grave goods in general were missing from the 6th century stamped urns (Myres and Green 1973, 85). Twenty-one per cent of those with grave goods were Illington/Lackford vessels, although those vessels formed only 13.6% of the total assemblage.

Overall, there were 14 Illington/Lackford vessels with grave goods, and 46 non-Illington/Lackford vessels with grave goods. The chi-square test at the .05 significance level with 1 degree of freedom shows that this distribution is unlikely to have occurred by chance, and there is a definite correlation between Illington/Lackford urns and grave goods. The correlation between the whole silty group and grave goods is less strong, at the .20 significance level.

This correlation can also be seen in the incidence and types of grave goods deposited in urns of the two major fabric groups, see Table 10.1 on the following page.

The silty urns contained 13 types of grave goods, whereas the sandy urns contained nine types. Bronze tweezers, workbox, glass vessels, bone casket and two-sided comb are all lacking from the sandy group, whereas the only classes not present in the silty group are iron buckles and bone pins, neither likely to be significant indicators of status.

The silty urns may have been a high-status grave good even when undecorated. Urn 101 containing a brooch and the bronze workbox was undecorated, but it was in a silty fabric.

	Sandy	Silty
Bronze brooches/fragments	6	8
Bronze tweezers	0	2
Bronze workbox	0	1
Beads	6	7
Glass vessel	0	1
Counters	1	2
Iron shears	1	2
Iron buckle	1	0
Ivory ring	4	3
Bone casket	0	1
Bone pin	1	0
Bone comb, one-sided	5	8
Bone comb, two-sided	0	2
Incised bone	0	1
Spindle whorl	1	3

Table 10.1 : Showing the types and numbers of grave goods present in the two clay groups at Illington.

<u>The sandy fabrics</u>

The sandy fabrics comprise 60% of the total assemblage, but contain 73.3% of the undecorated urns. This indicates that the sandy fabrics are more likely to be a sub-section of a truly 'domestic' assemblage as opposed to the silty wares, which can perhaps be seen as 'fine wares'. The sandy fabrics are also more likely to contain vegetable tempering material (18 fabric groups as opposed to 11 in the silty clays), and vegetable matter may be associated with cooking vessels.

There are, however, a number of sandy fabrics that are possibly the products of 'workshops', because similar vessels are found on other sites. Fabric 3, urn 367, and fabric 45, urn 163, both have stamp links with Markshall XCIV (Myres and Green 1973, 239). Of these three urns, 367 and XCIV are the same fabric, whereas 163 is different. Fabric 10, urns 281 and 286, bears five stamps, four of which are shared by both urns. Three of these four stamps occur on Caistor-by-Norwich urn W90 (Myres and Green 1973, 58 note 5, Fig 39). The vessels from both sites are in the same fabric.

Fabric 34 is a single urn of the Sancton-Baston potter, a 'workshop' whose urns are found widely in eastern England. Most of them have been thin-sectioned by the writer (Arnold and Russel 1983, 22-25). The Illington and Spong Hill urns are closely related, judging by the inclusions and textural parameters, and are possibly from the same source. Further work will be needed to assess the Spong Hill fabric variability before this point can be definitely made.

Fabric 4, urn 229, is an Illington/Lackford pot of West Stow fabric group 5. Fabric 4 is a broad sandy group and this urn is probably the only true Illington/Lackford vessel in that fabric.

It is therefore evident that other urn manufacturers were exchanging their products in a similar manner, but on a smaller scale, to the Illington/Lackford potter (see Chapter 11). Three of these four sandy fabrics have links with cemeteries to the north and east of Illington, as opposed to the Illington/Lackford urns in silty fabrics, which have links to the south and west. This perhaps points to Illington having been on the border between two mutually exclusive exchange zones from both of which it could have drawn its high-status ceramics.

Spatial patterning

Analysis of the spatial patterning of the fabrics across the Illington cemetery is obviously not possible when a fabric is represented by only a single vessel, and this reduces the 123 fabrics by 76 to 47. Of these fabrics, only 33 have more than one urn marked on the excavation plan.

The degree of dispersion or clustering of the urns can be simply gauged by measuring the distances between each urn in a fabric and its fellows, and averaging the figure. For several reasons, however, it is not relevant to use higher powered tests to ascertain the relationships between urns and fabrics. Not all the urns are marked on the cemetery plan, and 'edge effects' are present around most of the periphery of the excavated area, especially to the north, where the cemetery continued but was not excavated. Sixty-six of the urns are within 1m of the edge of the excavation, so 30% of the total could relate to other urns as yet unexcavated.

If the average distance between urns is calculated for all fabrics having between 2 and 11 urns, and is plotted on a graph, the following pattern emerges.

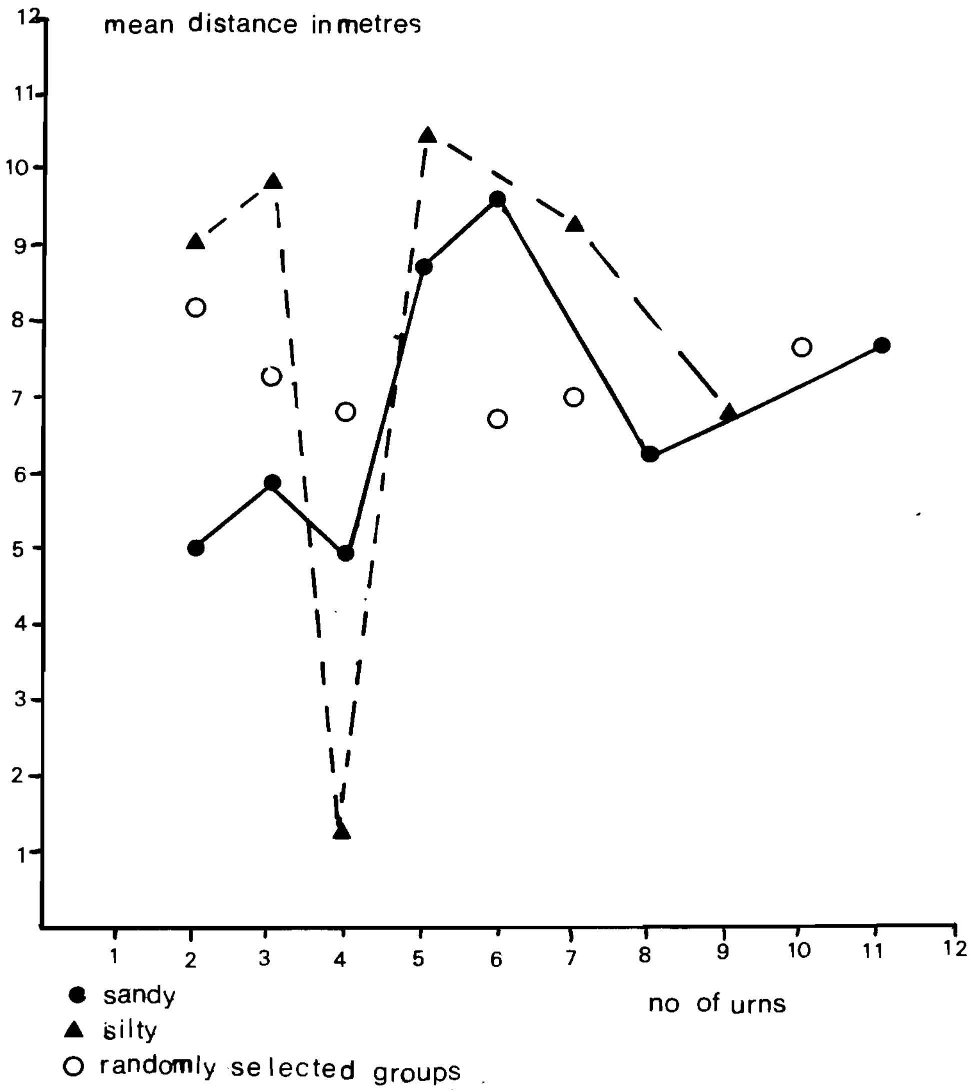


Fig. 10.10 : showing degree of dispersion in the urn groups. Sandy and silty urns are compared with the dispersion of a random selection of urns.

The graph shows that the silty fabrics generally have a dispersion higher than would be expected for a random distribution. This in turn reflects the distribution of the silty urns, which seem to be bi-polar, with urns of any one fabric being present in the western and eastern ends of the excavated area but not in the centre. The only exception to this is the four-urn fabric 63, which is only present in the western part. The fact that this was the only silty fabric with four urns means that too much weight must not be placed upon it.

The 15 sandy fabrics that have two, three, and four urns are more tightly clustered than the random fabrics; but once more than five urns are present the figures become closer to those of the silty fabrics.

This clustering of the sandy fabrics may be due to each fabric having been the product of a particular household and used exclusively by that household for burials in its own 'family plot'. The silty fabrics, on the other hand, may have been higher status vessels sought by all households that could acquire them. They are therefore likely to be dispersed widely across the cemetery.

This is especially so with the vessels of the Illington/ Lackford workshop. The individual vessels of each fabric are dispersed across the site, and are found usually in a group of sandy urns (see Fig. 10.11).

Conclusion

The object of studying a cremation cemetery such as the one at Illington was to obtain data for a comparison with the settlement ceramics, and so evaluate the different models that have been suggested for the formulation of Anglo-Saxon cemeteries.

The settlement sites are characterised by a higher number of fabrics, indicating a fragmented pottery production system that was probably based on the household. This system appears to be paralleled in the sandy fabrics at Illington; but the silty fabrics there point to a more specialised production system that is less noticeable in the settlement assemblages, but present nevertheless. There is therefore no evidence for a specialist group of cremation vessel makers.

The spatial positioning of vessels of identical fabrics suggests a number of urn clusters thay may be linked by kinship ties. If so, the low numbers of clusters goes against the theory that a number of settlements shared a cemetery, as far as Illington is concerned. This in turn is reinforced by the lack of fabric links with the known Saxon settlements in the region.

The most important result of this work is that it indicates that perhaps up to 40% of the pottery in a Saxon cremation cemetery was non-local in origin and that these pots were obtained and used by wealthy individuals or their relatives.

It is not yet possible to carry out detailed research into the socio-cultural systems behind the uses of different fabrics, their spatial position and the age and sex and status of the individual buried in the urn. Studies of attributes such as these have so far only been carried out on inhumation cemeteries where the evidence of grave ritual and the deposition of artifacts enables one to assign scores to the graves, and make inferences about the social structure of the population (Arnold C. 1981; Welch 1980). However, Pader has shown (1982) that a universal fixed meaning, or value, for each artifact, should not be assumed, and the symbolic and ritual nature of certain artifacts may be important in certain periods or localities and not in others.

The simplistic explanation of wealthy individuals being buried in certain types of pottery because of the presence of grave goods with those types may therefore reflect a ritual difference between social or cultural groups, but it is an explanation that makes the least assumptions, and provides a theory that can be tested in other cremation cemeteries in the future. The analysis of the Illington urns has shown that detailed petrological examination of all the cremation urns adds a new dimension to the understanding of Anglo-Saxon social systems.

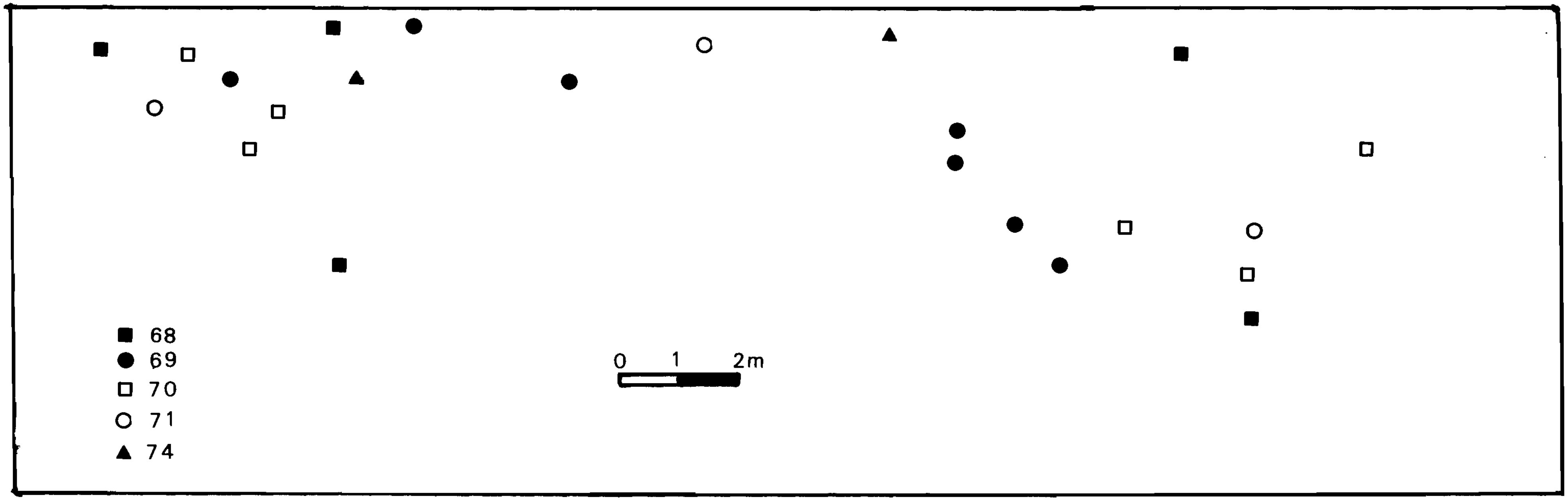


Fig.. 10.11; Illington/Lackford fabrics. This shows how the individual Fabrics are widely dispersed across the cemetery.

Fabrics 1-132

Fabric 1

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
148	X						X
270	X				X		X
294					X		X
303	X				X		X
314	X				X		X
338			X		X	X	X
346	X		X			X	X
348			X		X		X
414	X				X		X
420			X		X		X
428					X	X	X

Fabric 2

49							X
62	X						X
84	X						X
130	X						
Ex141b		X			X		X
147C	X				X		X
227	X						X
232	X				X		
304	X						

Table 10.2: Presence/absence of inclusions in the Illington pottery.

Fabric 3

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
41B	X						X
129	X						X
158	X				X		
161	X						X
271	X						
293	X				X		X
319	X						
344	X				X		
367	X						
36B	X						
372	X						X
378	X						X
416	X				X		

Fabric 4

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
14	X						X
61		X	X				
124					X	X	
139A							X
155							X
160							X
168A	X	X					X
229							
230	X				X	X	
239							X
269	X					X	X
295			X			X	
308	X						X
311	X				X		X
316							
341	X	X					X
404	X						X
405					X		X
407					X	X	X

Table 10.3: Presence/absence of inclusions in the Illington pottery.

Fabric 5

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
82				X			X
89					X		X
127	X				X		X
128							X
300i							X
300ii			X	X			X
306	X						X
345				X			X
371							X
402	X				X		X
403			X	X	X		X
406	X			X			X

Fabric 6

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
201	X						X
222							X
302							X
307	X						X
381							X
408	X				X		X

Fabric 7

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
6							X
1047=6					X		
WITH81			X		X		X
138							
318							X
326	X						X

Table 10.4: Presence/absence of inclusions in the Illington pottery.

Fabric 8

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
21	X			X			X
409	X		X				X
410	X		X	X			X
341	X						X
357							X
Fabric 9							
27		X			X		X
47			X		X		X
121			X		X		X
122			X				X
122/C2	X		X				X
263A					X		X
Fabric 10							
281	X	X		X	X		X
286	X				X		X
299							X
317	X	X		X	X		X
401	X						X
Fabric 11							
5			X				
WITH89			X				
135			X				

Table 10.5: Presence/absence of inclusions in the Illington pottery.

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
Fabric 12							
228			X		X		X
353							X
Fabric 13							
187	X				X		X
296					X		X
419					X		X
Fabric 14							
70	X		X			X	X
71			X			X	X
96/97	X					X	X
223	X				X		X
336	X		X			X	X
Fabric 15							
51			X				
Fabric 16							
81	X						X

Table 10.6: Presence/absence of inclusions in the Illington pottery.

Fabric 17

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
85	X						X

Fabric 18

139B	X						X

Fabric 19

147D	X						X

Fabric 20

156	X			X	X		X

Fabric 21

168C							X

Fabric 22

189A	X					X	X

Table 10.7: Presence/absence of inclusions in the Illington pottery.

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
Fabric 23							
220							X
Fabric 24							
237							X
Fabric 25							
240	X						X
Fabric 26							
263B					X	X	X
Fabric 27							
185					X		X
Fabric 28							
292	X				X		X

Table 10.8: Presence/absence of inclusions in the Illington pottery.

Fabric 29

URN NO	IG. ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
340	X			X			X

Fabric 30

URN NO	IG. ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
352	X					X	X

Fabric 31

URN NO	IG. ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
421				X	X	X	X

Fabric 32

URN NO	IG. ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
430					X	X	X

Table 10.9: Presence/absence of inclusions in the Illington pottery.

Fabrics 33 to 43

Fabric 33

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
8				X			X
36				X			X
91	X			X			X
93	X						X
153					X		X
162					X		X
389	X						X

Fabric 34

151	X				X	X	X
429				X	X		X
431					X	X	X

Fabric 35

315	X				X		X
426	X				X		X
427	X				X		X

Fabric 36

276		X			X		
276B		X			X		
281i					X		X

Table 10.10: Presence/absence of inclusions in the Illington pottery.

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
Fabric 37							
92	X						X
Fabric 38							
189B	X						X
Fabric 39							
146A					X		X
Fabric 40							
277				X	X		X
Fabric 41							
278	X						X
Fabric 42							
425	X		X				
Fabric 43							
190	X						X

Table 10.11: Presence/absence of inclusions in the Illington pottery.

Fabrics 44 to 53

Fabric 44

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
1				X			X
4				X			X
50							X
63				X			X
132				X			X
424			X	X			X

Fabric 45

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
140							X
143				X			X
163							X

Fabric 46

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
154				X			X
157				X			X
174				X			X

Fabric 47

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
133			X				X
320			X				X

Table 10.12: Presence/absence of inclusions in the Illington pottery.

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
Fabric 48							
221	X		X				X
226	X	X					X
Fabric 49							
45							X
Fabric 50							
61A							X
Fabric 51							
134							X
Fabric 52							
182			X				

Table 10.13: Presence/absence of inclusions in the Illington pottery.

Fabric 53

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
413	X						X

Fabrics 54 to 62

Fabric 54

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
15							X
152B							X
225			X				X
325							X
415							X
417							X

Fabric 55

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
43	[illegible]						
94	X						
224	X		X				
244	X						X
323	X						
412							X

Table 10.14: Presence/absence of inclusions in the Illington pottery.

Fabric 56

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRO N
234					X		X
273	X				X		X
274		X	X		X		X
275	X	X	X				X

Fabric 57

65	X						

Fabric 58

171	X						

Fabric 59

349							X

Fabric 60

356					X		

Table 10.15: Presence/absence of inclusions in the Illington pottery.

Fabric 61

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
374							X

Fabric 62

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
383					X		X

Fabrics 63 to 103

Fabric 63

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
3	X		X		X		X
9B	X		X				X
24	X		X		X		X
140			X				X
305i	X		X				X

Fabric 64

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
95	X		X				X
164	X		X				X
113		X					X

Table 10.16: Presence/absence of inclusions in the Illington pottery.

Fabric 65

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
22	X						X
169	X						X
181	X		X				X
312					X		X
411	X				X		X

Fabric 66

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
48				X			X
185		X		X			X
358				X			X
375			x	X			X

Fabric 67

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
290	X						X
291	X				X		

Fabric 68

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
23					X		X
41	X			X	X		
41a		X		X			X
E141a				X			
235	X						
262	X						
280	X						X
301				X			X

Table 10.17: Presence/absence of inclusions in the Illington pottery.

Fabric 68 continued

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
327i				X			X
327iii				X	X		X
373	X			X			X
384				X			X

Fabric 69

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
10	X						X
44	X						X
68	X						X
123	X						X
126	X						X
141	X			X			X
144	X			X			X
170	X	X	X				X
271	X						X
327ii	X						X
350	X				X		X
377	X						X
418	X						X

Fabric 70

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
28		X		X			X
34b		X					X
35		X					X
173		X		X			X
287		X					X
288		X					X
297		X		X			X

Table 10.18: Presence/absence of inclusions in the Illington pottery.

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
<u>Fabric 71</u>							
25				X			X
87				X			X
264	X						X
298	X						
376	X			X			
<u>Fabric 72</u>							
69	X			X			X
281ii	X						X
321	X			X			X
<u>Fabric 73</u>							
177		X				X	
385		X			X		
386		X			X		
<u>Fabric 74</u>							
46				X			X
102							X
172							X

Table 10.19: Presence/absence of inclusions in the Illington pottery.

Fabric 75

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
305	X	X			X		X
322	X						X
363	X			X			X

Fabric 76

146	X			X			
364				X			

Fabric 77

167		X					
300	X	X					X

Fabric 78

284				X			X
C3				X			X

Fabric 79

339				X			X

Table 10.20: Presence/absence of inclusions in the Illington pottery.

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
Fabric 80							
7							X
324	X						X
Fabric 81							
9A	X						
Fabric 82							
101	X				X		X
Fabric 83							
131	X		X				
Fabric 84							
137							X
Fabric 85							
140A	X						X

Table 10.21: Presence/absence of inclusions in the Illington pottery.

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
Fabric 86							
147A	X						X
Fabric 87							
165				X			X
Fabric 88							
175					X		X
Fabric 89							
180				X			
Fabric 90							
231							
Fabric 91							
238		X	X		X		

Table 10.22: Presence/absence of inclusions in the Illington pottery.

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
Fabric 92							
279							
Fabric 93							
283					X		X
Fabric 94							
305X					X		
Fabric 95							
310							
Fabric 96							
313	X						X
Fabric 97							
328	X						
Fabric 98							
336	X	X		X			X
Fabric 99							
337		X					X

Table 10.23: Presence/absence of inclusions in the Illington pottery.

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
Fabric 100							
C3/349		X					
Fabric 101							
365	X						
Fabric 102							
380					X		X
Fabric 103							
422	X	X	X				X
Fabrics 104 to 116							
Fabric 104							
42				X	X		X
309							X
Fabric 105							
388			X				X
390			X		X		X
Fabric 106							
400	X						X
423	X						X
Fabric 107							
32					X		X

Table 10.24: Presence/absence of inclusions in the Illington pottery.

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
Fabric 108							
90				X	X		X
Fabric 109							
1431id	X			X			
Fabric 110							
147B				X			X
Fabric 111							
186				X			
Fabric 112							
202				X			X
Fabric 113							
243			X	X			X
Fabric 114							
282	X						X
Fabric 115							
289				X			

Table 10.25: Presence/absence of inclusions in the Illington pottery.

URN NO	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
Fabric 116							
330							X
Fabrics 117 to 120							
Fabric 117							
166	X	X			X		X
184	X						
305	X						X
262A	X						X
Fabric 118							
26	X						X
136	X						X
268	X						X
Fabric 119							
382	X					X	
Fabric 120							
13			X				X
34A			X				X
Fabrics 121 to 123							
Fabric 121							
125							X
Fabric 122							
145							X
Fabric 123							
33							X

Table 10.26: Presence/Absence of inclusions in the Illington pottery.

Chapter 11

The Illington/Lackford Workshop

'To date no pattern has emerged. It is clear that a more systematic study, perhaps using a different technique, must be carried out.' (Green, Milligan, and West 1981, 192).

The Illington/lackford workshop first came to light in 1937, when Myres published three vessels, with markedly similar stamp decoration, from Lackford and West Stow. He attributed them to a possible 'miniature commercial industry, perhaps mass production on a limited scale'. This was the first time it had been appreciated that identical stamps existed, thus starting the search for 'workshop groups'.

In 1951, in his report on the Lackford cemetery, where 23 vessels were of this distinctive style, Lethbridge coined the term 'Icklingham' type. He believed the production centre had been situated at Icklingham, where a Roman pottery industry (and thus suitable clay) was known to have existed on the opposite bank of the river Lark.

Most of these 'Icklingham'-type vessels, said Lethbridge, were'globular jars or bowls, ornamented with several neck grooves. One or more horizontal zones of stamped ornament were seperated by three or four grooves, and below that either shield-shaped stamped panels, or incised chevrons... It can be shown that identical stamps were used at Lackford, Little Wilbraham, West Stow Heath and the St John's College cemetery at Cambridge'. Lethbridge's 'Icklingham' group was more general than the Illington/Lackford workshop defined more than three decades later by Green *et al*.

In 1950, the Illington cemetery was excavated by Knocker, and more than 40 vessels of the Icklingham type were recognised, forming 20% of the decorated pottery and approximately 15% of the total (Green et al 1981, 187).

Myres returned to the subject in 1969. He noted that nearly 100 specimens were known that could be attributed to the Illington/Lackford potter, a term formed from the names of the two cemeteries that had produced most of the vessels (Myres 1969).

In 1977, in his Corpus of Anglo-Saxon Pottery, Myres was able to add little more, but illustrated over 50 of the more complete vessels, grouped by decorative schemes. He remarked that the Illington/Lackford workshop was 'the nearest to mass production on a commercial scale that the Anglo-Saxon pottery industry is known to have achieved in the Saxon period.' Myres expanded on the local differences he had noted in 1969, but he could not quantify them because the West Stow excavations, then in progress, were producing large quantities of material.

In 1981, Briscoe resurrected the term Lackford/Illington Potter, which had been used by West (1969), because the earliest finds were at Lackford; but, although this nomenclature is perhaps more logical, Illington/Lackford Workshop has become the accepted title, and was used by Green, Milligan, and West (1981) in their thorough survey of the available evidence.

This chapter follows the format of Green, Milligan, and West (here abbreviated to Green et al). Indeed it could not have been produced, had that work not been done.

Green et al catalogued in great detail all the known examples of the Illington/Lackford workshop. The decorative scheme was listed in a standard format, and 49 different stamps and 10 different fabrics were identified. These were arrived at by macroscopic examination, and a set of type specimens were compared with each vessel. Variants of fabrics 1, 2, and 3 brought the total number of fabrics to 13.

All three authors examined each of the vessels in order to characterise its fabric, relying on a majority decision when disagreement occurred. Problems were, however, encountered with sherds that had abraded and weathered edges, and with vessels that had been restored. Illington/Lackford vessels are normally burnished, which makes visual analysis difficult.

Green, Milligan and West were convinced that all the 222 vessels and sherds they examined were the products of one workshop. However, two distinct groups were discernible. The first was a northern group represented at Illington, and perhaps Thetford, while the second, a southern group, had come from the sites at West Stow, Lackford, West Garth Gardens, Icklingham, Little Wilbraham, and St Johns Cambridge. These groups were distinguished by the presence or absence of certain decorative schemes and particular stamps, but the distinction was not borne out by the fabrics themselves. Three models were put forward to explain the production and distribution patterns:

1. An itinerant potter evolving different decorative styles over a period of time.
2. A group of itinerant potters evolving styles over a period of time.
3. A single fixed centre of production, and again with evolving styles, but coinciding with a change in trading patterns,

The main drawback to models 1 and 2 is that similar fabrics were found over wide areas, which indicates a single source. The drawback to model 3 is that the decorative styles can be divided into two groups, which argues against a single source. Moreover, spectrographic and X-ray diffraction analysis points to there having been two or more centres of production (Myres 1969).

The failure of spectrographic and X-ray diffraction analysis to provide satisfactory answers left thin-section analysis as the most promising solution.

Since macroscopic differences were visible, it should be possible to characterise fabrics using a petrological microscope. The present writer set out therefore to sample as many of the Illington/Lackford vessels as possible in order to redefine the fabrics more objectively. The programme relied on the work of Green _et al_ for descriptions of almost all the vessels, a few exceptions being made where the descriptions were considered to be inaccurate.

Quantification

Quantification is important because without knowing the numbers of vessels one cannot assess the scale of production. With cemetery material, quantification is generally a matter of counting the number of urns with a distinctive decorative style, because urns usually survive in a relatively complete state. The real problem arises with settlement sites. Here the final deposition of a sherd in an archaeological context may have been preceded by a number of stages of deposition and disturbance, each one increasing the risk of breakage, and thus decreasing the size of the sherd.

In practice this was not a problem at either Fakenham Magna, Suffolk, or Thetford Red Castle, Norfolk, due to the small number of sherds of this type. At West Stow, however, sherds have been recovered from 23 contexts, and there was the probability of a single vessel having been broken and scattered. Green et al oount each sherd, or group of joining sherds, as a separate vessel, But this writer would argue strongly for the amalgamation of sherds to form sherd groups, at least within contexts, if not across the whole site. Problems arose in sampling the West Stow material, first because the excavators failed to provide half of one of the largest groups (the material from Hut 45), and secondly because the rest of the material had been divided into groups of sherds bearing the same stamp. The descriptions by Green et al had not been recorded with the material, and sometimes it was difficult to assign a sherd to its number within a context.

A number of factual errors were found. A sherd labelled Hut 44, for instance, had been placed with the Hut 49 material (Hut 49(5) Green et al) and a sherd was present from Hut 58, not mentioned in Green et al. Three extra Illington/Lackford sherds were also present in addition to those recorded from Hut 49. Hut 53 (2) could not be located, but as its description is almost identical to 53 (1) it is possible that it was included twice by mistake.

The West Stow sherds available were therefore grouped by the writer into sherd groups by using the sherd group method described in Chapter 3. This reduced the Illington/Lackford vessel count, for vessels from structures, from 67 to 47. Sixty-nine sherds were present from less secure contexts, and it was felt unsafe to section a large number of these without first attempting a sherd group regrouping. Unfortunately, it was not possible to do this within the post-excavation programme, so a sample of 12 sherds was selected for thin sectioning instead. These were taken mostly from vessels whose decorative scheme was recognisable, because it was felt this would assist the writer in further work on the relationship between fabric and decorative style.

One fact to be borne in mind in studying the West Stow material is that the excavator had selected only sherds that recognisably belonged to the Illington/Lackford workshop. This meant that the undecorated portions of the vessels' lower halves and rims were not present. For this reason the Petersen estimate could not be calculated to check the number of sherd groups.

Two other aspects of this workshop could not be studied by the writer. These concerned the presence or number of undecorated vessels in the Illington/Lackford fabrics, and the extent to which such fabrics were used for vessels carrying other decorative styles. The overall fabric sample points (see Chapter 8) to a large number of fabrics being present at West Stow. As a result, the true picture is probably too complex and too difficult to resolve without undertaking a full-scale thin-sectioning programme.

The sites

Illington/Lackford pottery has been claimed from 13 sites in East Anglia.

Norfolk:

1. Castle Acre: TF 797156

An unpublished cremation cemetery discovered in 1857. A note by J.N.L. Myres in Norwich Castle Museum states that a sherd of Illington/Lackford pottery is in the H. Houseman Collection in New Place Museum, Stratford-upon-Avon (Green *et al* 1981, 210). But the Museum claims (1982) that it does not hold, and never held, a collection by H. Houseman (Levi Fox pers. comm.). So, until this sherd can be traced, it is probably better to disqualify it from the count.

2. Illington: TL 948898

Cremation cemetery; publication by Norwich Castle Museum in progress. Excavated in 1950 by Group Captain Knocker (see Chapter 10).

3. Rushford: TL933834

An unpublished cremation cemetery of more than 200 urns, found between the late 17th and mid-19th centuries. The Illington/Lackford vessel was identified by Myres in the G. Burton MSS in Maidstone Museum, (Myres 1969), but no Illington/Lackford urns survive.

4. Thetford, RedCastle: TL 860830

Published domestic settlement (Knocker 1969). Pagan Saxon sherds, including one from the Illington/Lackford workshop were found below the 11th century ringwork (see Chapter 7).

Suffolk:

5. West Stow cemetery: TL 799715

Unpublished inhumation/cremation cemetery excavated 1849 onwards.

6. West Stow settlement: TL 797714

A settlement site discovered by Brown in 1948. Excavated from 1957-61 by Evison, and from 1965-72 by West. Interim report by West in 1969 (final report in press).

7. Icklingham: TL 783719

Published stray sherd from Romano-British site (West and Plouvier 1976, 102, Fig 44, 95). This sherd was not available for sectioning.

8. Lackford: TL 774715

Published cremation cemetery excavated by Lethbridge in 1947.

9. West Garth Gardens, Bury St Edmunds: TL 845633

Unpublished inhumation cemetery with some cremations, excavated in 1972 by West, (site discussed in Pader 1982).

10. Fakenham Magna: TL 908772

Unpublished settlement excavated by Brown 1949-51 (see Chapter 8). Illington/Lackford sherds originally classified as Roman, until recognised by the present writer.

11. Lakenheath: TL 733834

Domestic settlement material discovered by field walking and minor excavations in 1950s and 1960s (Briscoe 1979, 161). (See Chapter 8).

<u>Cambridgeshire</u>:

12. Little Wilbraham: TL 560577

Cemetery discovered before 1847, excavated in 1851. Published by Neville in 1852. One Illington/Lackford vessel recognised.

13. Cambridge, St Johns: TL 441588

Unpublished cremation/inhumation cemetery discovered in 1888. One Illington/Lackford vessel recognised.

Between 194 and 228 vessels were available for thin-sectioning; the differing figures depending on how one quantifies the settlement material at West Stow and Lakenheath, using either minimum or maximum number of vessels. Because the writer was assessing the total population of fabrics, as large a sample as possible was taken. It was not possible to sample the material from Castle Acre, Rushford, and Icklingham, because the vessels could not be tracked down. Only partial sampling was possible with 1) West Stow, because the bulk of unstratified and unquantifiable sherds had to be ignored; 2) Lackford, because some pots (in the Ashmolean) were not available, and the C.M.A.A. could only locate 10 vessels in their stores; and 3) West Garth Gardens, because the surviving sherds were too small.

This left the writer with 116 thin-sections from the total population of between 194 and 228, West Stow having accounted for most of the shortfall (see Table 11.1).

Site	Existing Vessels	Sectioned
Castle Acre	?	0
Illington	42	42
Rushford	0	0
Thetford, RedCastle	1	1
West Stow cemetery	3	2
West Stow settlement	116-147	51
Icklingham	1	0
Lackford	23	10
Bury St Edmunds, West Garth Gardens	2	1
Fakenham Magna	1	1
Lakenheath	3-6	6
Little Wilbraham	1	1
Cambridge, St Johns	1	1
	194-228	116

Table 11.1: showing the number of vessels and sections at each site.

Microscopic analysis

All the thin-sections were prepared following standard techniques. A binocular microscope with transmitted light at x10 and x30 magnification was used for preliminary sorting, followed by confirmatory checking with a petrological microscope. This showed that a large number of fabrics were present and that the complete picture was more complicated than hitherto suspected.

The results of the analysis are set out on the following pages, each of the 10 sites being presented in accordance with the number of Illington/Lackford vessels that were available for sectioning. Sites that had the largest amount of material come first, since they provide the most reliable samples for interpreting the overall situation. No single site provides a complete explanation, but all combine to give a clearer picture of the workshop.

Illington

A total of 314 sections were made from the complete Illington assemblage, and these were then divided into eight main fabric groups and 123 fabric sub-groups. Table 11.2 below shows these groups and the relationship of the Illington/Lackford vessels to them.

Fabric	No. of sub-groups	No. of sections	No. of Illington/Lackford
Sandy	32	121	1
Coarse sandy	11	23	0
Fine sandy	10	22	0
Sorted sandy	9	20	0
Total	62	186	1
Silty	41	98	39
Silty & fine sorted quartz	13	16	2
Silty & coarse sorted quartz	4	10	1
Total	58	124	42
Limestone	3	3	0
Total	3	3	0

Table 11.2: Showing the relationship of the Illington/Lackford vessels to the main fabric groups.

It can be seen that all but one Illington/Lackford vessel is made in a silty clay. This sandy vessel is composed of a clay that is identical to some of the West Stow vessels, which fact explains the decorative motifs employed on the vessel, it being the only vessel at Illington on which a J stamp appears (Green et al 1981, 193), J stamps being very common in the southern group.

Fabric descriptions

Fifteen fabrics were found in the Illington cemetery (see Table 11.3). The fabric numbers are those of the Illington sequence (see Chapter 10).

Fabric No	Urn Nos
4	229
66	375
68	23, 41a, 262, 235, 280, 327i, 327iii, 384.
69	10, 44, 68, 123, 141, 144, 327ii, 350.
70	28, 34b, 35, 173, 287, 288, 297.
71	25, 87, 264, 298, 376.
73	177
74	46, 102.
80	7, 324.
91	238
96	313
101	365
110	1478
115	289
118	268

Table 11.3: Showing Illington/Lackford Urn Nos and their fabrics.

Fabric 4

A sandy clay matrix with common fine quartz grains and a coarser moderately sorted quartz component.

Fabric 66

A silty clay matrix with scattered, sub-angular quartz grains. Some fragments of quartz sandstone are present, as well as a few traces of organic matter. Similar to West Stow Illington/ Lackford 1, but without calcareous inclusions.

Some fragments of quartz sandstone are present, as well as a few traces of organic matter. Similar to West Stow Illington/Lackford 1, but without calcareous inclusions.

Fabric 68

A silty clay matrix containing dense, rounded to sub-angular quartz grains (diameter 0.25mm) with particles of sandstone.

Fabric 69

A silty clay matrix containing sparse, sub-angular to rounded quartz grains with particles of igneous rock.

Fabric 70

A silty clay matrix containing dense, rounded to sub-angular fine quartz sand, (maximum diameter 1mm, mode 0.2mm). All samples contain grog.

Fabric 71

A silty clay matrix with dense, moderately sorted, sub-angular quartz grains. Similar to fabric 68 but considerably lower inclusion to matrix ratio. Two samples contain sandstone, two contain igneous rock, and one contains both.

Fabric 73

A badly mixed, banded, silty clay matrix with sparse sub-angular quartz grains (maximum diameter 0.75mm). The fabric contains particles of sandy grog and quartz-free clay pellets.

Fabric 74

A silty clay matrix with dense, rounded to sub-angular quartz grains (maximum diameter 1.25mm, mode 0.4mm).

Fabric 80

A silty clay matrix with abundant, unsorted, rounded to sub-angular quartz grains.

Fabric 91

A streaky silty clay matrix with sparse sub-angular quartz grains. Flint, grog, and vegetable matter are present.

Fabric 96

A silty clay matrix with sparse sub-angular quartz grains with fragments of granitic rock. Similar to West Stow Illington/Lackford fabric 1.

Fabric 101

A silty clay matrix with sparse, sub-rounded quartz grains, and large fragments of granitic rock.

Fabric 110

An iron-rich silty clay matrix with well-sorted sub-angular quartz grains, (maximum diameter 1.5mm, mode 0.3mm). Abundant fine grains.

Fabric 115

A silty clay matrix with abundant, well sorted, rounded quartz grains (maximum diameter 0.25mm, mode 0.2mm), derived from a siliceous sandstone, fragments of which are present.

Fabric 118

An iron-rich silty clay matrix with angular fine quartz grains, and large rounded to angular granitic grains.

Inclusions

The inclusions in the various fabrics are shown in Table 11.4. The nine types listed can be divided into two categories; natural and added. Grog of course does not occur naturally, and has been added to fabrics 70, 73, and 91.

Large fragments of biotite mica occur in all fabrics only when igneous rock fragments are present, and they must be a component of crushed granitic rocks added as temper. Only in one example, Urn 41a of fabric 68, does grog occur in a fabric where igneous rock is used, and thus the use of these two forms

FABRIC	URN	IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
66	375			X	X			X
68	23					X		X
	41A		X					X
	262	X						
	235	X						
	280	X						X
	327i				X			X
	327iii				X	X		X
	384				X			X
69	10	X						X
	44	X						X
	68	X						X
	123	X						X
	126	X						X
	141	X			X			X
	144	X			X			X
	327ii	X						X
	350	X				X		X
70	28		X		X			X
	34B		X					X
	35		X					X
	173		X		X			X
	287		X					X
	288		X					X
	297		X		X			X
71	25				X			X
	87				X			X
	264	X						X
	298	X						
	376	X			X			
73	177		X				X	
74	46				X			X
	102							X
80	7							
	324	X						X
91	238		X	X		X		
96	313	X						X
101	365	X						
110	147B				X			X
115	289				X			
118	268	X						X

Table 11.4: showing the presence/absence of inclusions.

of tempering seems to have been mutually exclusive. Fabrics 69 and 70 provide the best examples of this.

The use of vegetable matter in large enough quantities to affect the working characteristics of the clay is found only in two fabrics, 66 and 91, in both cases represented by a single urn.

The sandstone inclusions are harder to judge. Often they are probably a naturally occurring component of a clay, as the crushing process has been extremely thorough. The disaggregated grains may, however, have been collected as wind- or water-sorted sand, and although naturally occurring, do constitute a method of tempering. This is confirmed by the fact that when this sand appears in a fabric it usually replaces igneous rock, grog, or vegetable temper. Out of 41 samples it occurs only in conjunction with another tempering agent seven times - three times with igneous rock and grog respectively, and once with vegetable temper, and then only within four of the 14 fabrics.

Conclusions from the fabric analysis

The large number of fabrics and the variety of tempering methods point to an equivalent number of pottery manufacturing occasions and possibly to the presence of several potters. The almost exclusive use of a similar silty clay, however, when half the Illington vessels were made from a sandy fabric, indicates a well-organised pottery production system with either access to long-term clay storage facilities, or else maintenance of a clay pit. We can perhaps best explain the large number of fabrics as being the products of firings carried out in different years, with pottery being made only on one occasion each year.

Decoration

To the modern eye, these vessels are the most carefully decorated and well-executed urns in the cemetery. But we cannot tell how they were viewed by their makers. However, the fact that they represent 20% of the decorated pottery and 7% of the total urns in the cemetery, indicates that they were perhaps used by more than a single family group. Most of the other 'workshops' at Illington are seldom represented by more than a pair of urns.

The decorative schemes of the Illington/Lackford potter have been divided (Green et al 1981) into six categories with some sub-division (Table 11.5). The schemes present at Illington relate to the fabrics as follows

	No of pots	1	2	3A	4A	3A/4A	2/4	5A	Scheme Unknown
Fabric									
66	1		1						
68	8	1		2	3	2			
69	9	3	2	1	2		1		
70	7	2		2	2	1			
71	5				3	2			
73	1	1							
74	2	1 or1		1					
80	2			1					1
91	1				1			1	
101	1								1
110	1	1							
115	1					1			
118	1		1						
Total	4	8/9	4/5	7	11	6	1	1	2

Table 11.5: Relationship between fabric and decorative scheme.

Unfortunately, the numbers of vessels of each decorative scheme in the respective fabrics are too low for meaningful statistical analysis. But, if we concentrate on those fabrics with five or more vessels, a simple pattern emerges. This is further emphasised if we amalgamate schemes 3A and 4A (with pendant swags or triangles) and 1 and 2 (without).

Fabric	1/2	3A/4A
68	1	7
69	5	3
70	2	5
71	0	5

Table 11.6:

This indicates that there was a bias towards certain schemes of decoration each time pottery was manufactured.

Stamps

The relationship between decorative styles, fabric, and the use of stamps is too complex to be resolved without using a computer. Twenty-eight different stamps were used to decorate the Illington vessels. The stamps can be present in up to four zones, with variable numbers of lines between them, on 40 vessels in some 14 fabrics.

Plotting stamps versus fabric groups (see Table 11.7) shows that a relationship does exist at the simplest level. The Table can be arranged in such a way that the eight stamps in use at both West Stow and Illington appear at the top, with 20 used only at Illington below them. The fabrics have been arranged into three groups based on the presence/absence of stamps of those two types.

Fabrics 73, 66, 96, and 110, are decorated only with West Stow/ Illington stamps, while fabrics 2, 80, 91, 101, 115, and 118 carry only Illington stamps. Fabrics 74, 68, 69, 70, and 71 carry both types of stamp.

The first and last groups consist of fabrics represented by only one vessel, and it could be argued that the result is distorted by too small a sample of pots. Moreover, an increase in the number of vessels in that fabric would lead to more stamps being present, and the chance of both types being present would increase. Although more pots do mean more stamps (see Fig. 11.1) this does not explain the present division. If the pots in the larger fabric groups are treated as a whole, 52% of those vessels bear stamps of both West Stow and Illington groups, and obviously that would be reflected in smaller sample fractions.

Conclusions

The Illington pottery suggests that a potter or potters were producing pottery using the same clay source on subsequent occasions, although making up a slightly different fabric each time. It is probable that stamps were made each time that potting was to be carried out, and were often kept for subsequent use.

	Fabric Groups													
Stamp types	73	66	96	110	74	68	69	70	71	80	91	101	115	118
A8b	X				X		X	X	X					
B2	X							X						
A8a		X	X	X			X		X					
C		X					X	X						
D2Var1		X		X	X	X	X	X	X					
A7						X								
E						X								
H						X								
I					X									
G						X		X	X					
CVar						X			X					
F4						X	X		X		X		X	
M						X				X	X	X		
A11						X						X		
B3						X			X		X			
D2						X	X							
F5							X		X					
D1							X	X	X					
A10										X				
D5							X							
Group 1							X							
A2							X							
H3							X							
F2								X						
D1var								X						
D2var?									X					
F1														X
B1														X
No of vessels	1	1	1	1	2	8	9	7	5	2	1	1	1	1
	4				31					6				

Table 11.7: showing the relationship between stamps and fabrics at Illington.

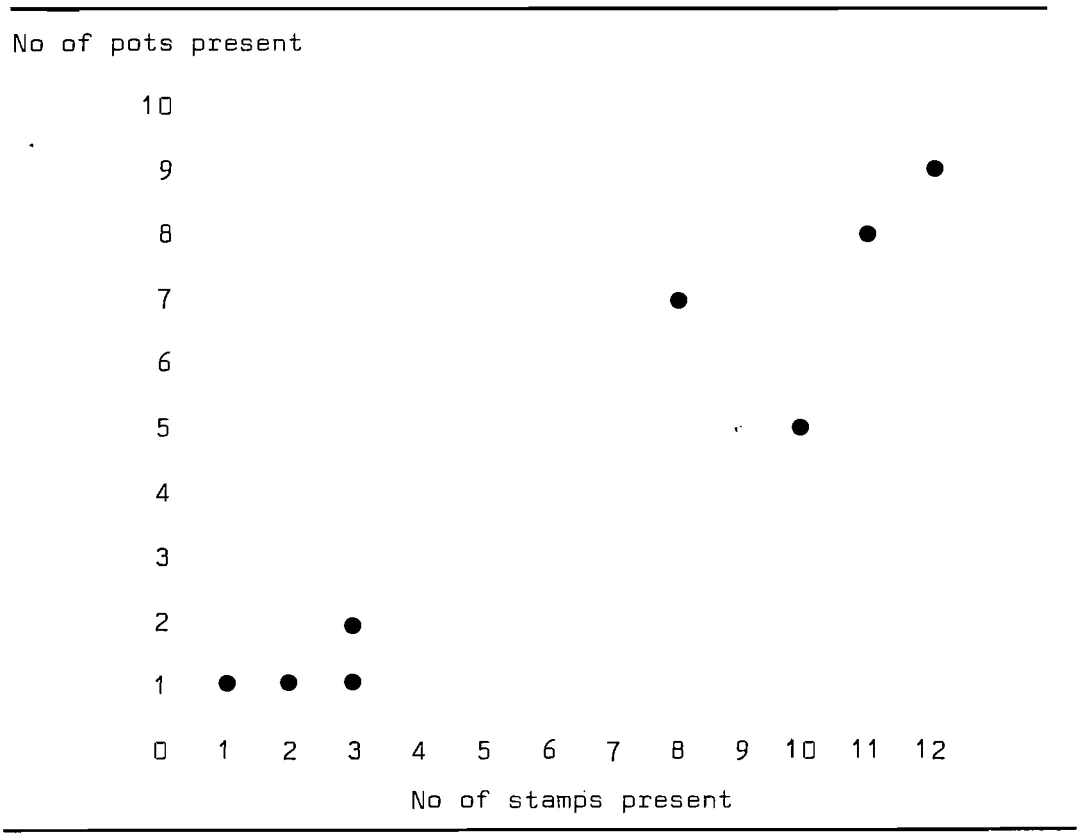


Fig. 11.1 : Showing the relationship between the number of pots in a fabric and the number of stamps present.

West Stow settlement and cemetery

Sherds from Illington/Lackford vessels have been recovered from numerous contexts at West Stow. The material was regrouped into sherd groups by the author and sampled, 50 samples being taken in an attempt to cover all the contexts and the decorative schemes and stamps found in them, (Table 11.8). Complete coverage was not always possible, because of the small size of some sherds, and because of the excavator's failure to provide some material for analysis.

The thin-sections revealed the presence of seven fabrics.

Fabric descriptions

Fabric 1

A silty clay matrix with scattered sub-angular quartz grains. Calcareous inclusions, usually well-rounded, are common in most samples.

Fabric 2

A silty clay matrix with common fine quartz grains. Scattered large sub-rounded grains are probably derived from a disaggregated siliceous sandstone.

Fabric 3

A silty clay matrix, coarser than that of fabrics 1 and 2, giving a grainy appearance, with scattered sub-rounded to rounded grains.

Fabric 4

A sandy clay matrix with common fine quartz grains, and a coarse, moderately sorted, component of sub-rounded to angular quartz grains, probably derived from a calcareous sandstone.

Fabric 5

A sandy clay matrix with common fine quartz grains, and a coarser, moderately sorted, component. Similar to fabric 4, but withabetter sorted, and usually smaller, coarse component, again

Context	Author's sherd group	GMW Number	Scheme	Sample No	Fabric
Hut 45	1	(1)	3a/4a	X27	4
	2	(2)			
		(4)	5b	X29	4
		(10)		X30	4
	3	(3)	3a	X28	5
	4	(5)	3a/4a	not present	
		(6)		not present	
		(7)		not present	
		(8)		not present	
	5	(9)	?	not present	
Hut 49	1	(1)	6a	X31	1
		(2)			
		(3)			
	2	(5)	3a/4a	X32	5
		(6)			
	3	not mentioned		X33	1
Sherd 1925	4	not mentioned		not sampled	
Sherd 2290	5	not mentioned		not sampled	
	6	(4)	3a/4a	not sampled	
		(7)			
Over Hut 50	1	(1)	3a	X34	5
	2	(2)	5b	X35	4
	3	(3)	5bVar	not sampled	
	4	(5)	?	not sampled	
	5	(4)	?	not sampled	
Hut 53	1	(1)	3a/4a	X36	5
Hut 57	1		Marginal	X37	6
Hut 58	1	not mentioned	3a/4a/6a	X38	6
Hut 66	1		4b	X39	1
Ditch 54		401D54	3a/4a	X9	5
Pit 63		WS 291	?	X47	4
Pit 64	1		3a	X51	7
	2		?	X52	5
F104 WH3	1	(2)	5a	X48	5
	2	(1)	5a	X49	5
	3	(3)	?	X50	2
WE4L2		CN 824	5b	X41	6
WG5L2	1	(1)	3a	X42	5
WE6L2	1	WS46	3b/4b	X43	2
L2	1	WS12USS	?	X44	5
WE6L2	1	WS66	3a/4a	X45	1
WC/6L2	1	WS66(1)	3a/4a	X46	4
Cemetery	1	CN 4002	5b	X53	5
	2	CN 4005	3b	X54	5

Table 11.8a: showing details of the West Stow Illington/Lackford vessels.

Context	Author's Sherd group	GMW Number	Scheme	Sample No	Fabric
Hall 5	1	(1)	6a	X2	1
	2	(2)	?	X3	5
Hut 3	1	(1)	?	not sampled	
	2	(2)	?	X1	5
Hut 6	1	(1)	3a/4a	X4	4
Over Hut 12	1	Missing	6XB2	X5	1
	2		6a	X6	1
Hut 16	1		3a/4a	X7	5
Over Hut 17	1	(1)	?	X8	5
		(2)	Not present		
		(3)	Not present		
Hut 19	1	(1)	6a	X10	4
	2	(2)	6a	not sampled	
		(4)			
	3	(6)	6a		
		(8)			
		(9)			
	4	(10)	?	X11	5
	5	(3)	6a	X12	5
	6	(7)	3a/4a	X13	5
	?	(5)	Not present		
Over Hut 22	1	(1)	3a/4a	X14	5
		(3)			
	2	(2)	?	X15	5
Hut 34	1	(1) (2) (4)	3a/4a	X17	5
	2	(3)	6a	X18	3
Hut 35	1	(1)	3a/4a	X19	5
		(2)			
Hut 36	1		?	X20	4
Hut 40	1	(1)	6a	X21	5
	2	(2)	6a	X22	2
	3	(3)	?	X23	3
Hut 42	1		?	X24	5
Hut 44	1	(3)	5b	X25	4
		(4)			
	2	(2)	5b	not sampled	
		(5)			
	3	(1)	4a	X26	5

Table 11.8b: showing details of the West Stow Illington/Lackford vessels.

derived from a calcareous sandstone. Fabrics 4 and 5 could be sub-groups of one fabric. But the difference is reinforced by the greater incidence of chalk, flint, and vegetable matter in fabric 5.

Fabric 6

A sandy clay matrix with common unsorted quartz grains, angular to sub-angular in shape. Rounded flint and biotite mica are present in both samples.

Fabric 7

A fine sandy clay matrix with abundant fine quartz grains and a coarser component of sub-rounded to rounded grains similar to those of fabric 5.

Table 11.9 , shows the presence/absence of inclusions for all fabrics. It can be seen that igneous rock or grog was used as a tempering medium in all fabrics except 6 and 7. Vegetable matter does not appear in large enough quantities to affect the working and firing characteristics of the clay except in fabric 7, which also contains grog. The presence of calcareous sandstone fragments in fabrics 4 and 5 (those in 1 and 2 are siliceous sandstones), may indicate a secondary temper, but it could be explained as naturally occurring in the clay or in a sand used to prepare the fabric. This again demonstrates the close similarity between fabrics 4 and 5.

Conclusions from the fabric analysis

If fabrics 4 and 5 are sub-groups of one fabric, then over 70% of the pottery is made from one clay source. This is a considerable contrast to Illington, where no single group comprised more than 40% of the total. Also in contrast to Illington is the scarcity of fabrics represented by single vessels. Only one fabric at West Stow has a single vessel, and the average is seven vessels per fabric, compared with Illington's nine single-vessel fabrics and an average of 2.8 vessels per fabric. The differences suggest that a more concentrated period of production coupled with a more

FABRIC	SAMPLE	IG ROCK	GROG	VEG.	S'STONE	FLINT	CHALK	SHELL	IRON
1	X2	X			X		X		
	X5	X	X				X		
	X6	X	X				X		
	X31	X		T			X		
	X33	X					X		
	X39				X	X			
	X45	X							
2	X22	X	X		X		?		
	X43		X		X		?		
	X50		X	T			?		
3	X18		X						
	X23		X						X
4	X4		X		X	X	X	X	X
	X10		X	T	X				X
	X20		X	T	X		X		X
	X25		X						X
	X27		X	T		X	X		X
	X29		X						X
	X30		X						X
	X35		X	T	X				X
4	X46	X			X				X
	X47		X					X	X

X = present

T = trace

Table 11.9a: showing the presence/absence of inclusions in the Illington/Lackford vessels at West Stow.

FABRIC	SAMPLE	IG ROCK	GROG	VEG.	S'STONE	FLINT	CHALK	SHELL	IRON
5	X1		X	T					X
	X3		X	T			X		X
	X7		X			X	X		X
	X8		X	T	X	X	X		X
	X9			T	X		X		X
	X11		X	T			X		X
	X12	X	X				X		
	X13		X		X				X
	X14		X	T	X				X
	X15		X		X		X	X	X
	X16		X	T					X
	X17		X						X
	X19		X	T	X				X
	X21		X			X			X
	X24		X	T			X		X
	X26		X	T	X	X	X		X
	X28		X			X	X		X
	X32		X			X	X		X
	X34		X		X	X	X		X
	X36		X	T			X		X
	X38				X	X	X		X
	X42		X				X		X
	X44		X	T	X		X		X
	X48		X	T	X		X	X	X
	X49	X	X	T	X				X
	X52		X	T	X				X
	X53	X	X				X		
	X54	X					X		X
6	X37					X			X
	X41					X			X
7	X51		X	X			X		

X= present
T= Trace

Table 11.9b: showing the presence/absence of inclusions in the Illington/Lackford vessels at West Stow.

organised system existed at West Stow. The fact that West Stow fabrics are found on a number of other sites in the area provides substantial support for this interpretation.

Decoration

Of the six decorative schemes of Green et al, and their sub-divisions, all are present at the West Stow cemetery except schemes 1, 2, and 3b. The relationship between fabric and scheme is shown in Table 11.10

Fabric	Scheme								
	3a	4a	4b	3a/4a	3b/4b	5a	5b	6a	6b	?
1			1	1				3		2
2					1			1		1
3								1		1
4				3			3	1		3
5	3	1		9		2		2	1	8
6							1			1
7	1									

Table 11.10

The table can be further refined in the same way as the Illington fabric/scheme relationship; that is, by combining schemes 3 and 4, which are very similar, and by ignoring sub-divisions in schemes 5 and 6. The relationships between fabric and form then become clearer: see Table 11.11 on the following page.

From Table 11.11 it can be seen that scheme 5 is marked by its presence in only three fabrics, and it is predominantly present in fabrics 4 and 5 (another similarity between them). Scheme 3/4 is concentrated in fabric 5, although it is found in nearly all fabrics. Scheme 6 is also common to five fabrics but is present in higher proportions in fabric 1 than one would expect. There it makes up 50% of the vessels in that fabric, whereas scheme 6 comprises 18% of the total assemblege.

Fabric	Scheme	3/4	5	6	?	Total
1		2		3	2	7
2		1		1	1	3
3				1	1	2
4		3	3	1	3	10
5		13	2	3	8	26
6			1		1	2
7		1				1
Total		20	6	9	16	51

Table 11.11

In all fabrics, the number of vessels of unknown decorative scheme is never less than 33%. So it could be argued that the sample taken for this analysis is too small to draw conclusions about the total population, and that the inclusion of all other Illington/Lackford vessels would alter the proportions. To assess the validity of the sample, the proportions of the schemes present in the sample can be compared with those of the total assemblage.

	3A	4A	4B	3A/4A	3B/4B	5A	5B	6A	6B	?
1	4%	1%	1%	29%	2%	2%	7%	15%	1%	38%
2	8%	2%	2%	25%	2%	4%	8%	16%	2%	31%

1) is the percentage of each scheme present in the total assemblage.
2) is the percentage of each scheme present in the sample.

Table 11.12

The sample is biased towards 4A, 4B, 5A, 5B, and 6B due to the small number of vessels present and the need to have a large enough sample within each scheme. The bias towards 3A is a reflection of the low number of vessels assigned to this scheme from the non-structure material, which was not sampled as heavily. This probably is due to the smaller size of non-structure sherds which made identification of the scheme harder. This is reflected again in the size of the 3A/4A figure for the total. In general the sample can be considered adequate, as the chi-square test (if applied to the data from which Table 11.12 was produced) shows that there is no meaningful difference between the sample and the total assemblage at a significance level of 0.05.

Stamps (stamp codes given as in Green *et al*).

Twenty-two stamps were used to decorate the West Stow Illington/Lackford vessels, and 19 of these were present on the pottery sampled. A8a and D2 Var 1 were not sampled due to decoration/size reasons, and the L-stamped sherd was not present when samples were taken.

The relationship between stamp and fabric is shown in Table 11.13. The stamps have been arranged with those five common to West Stow and Illington at the top. The lower group has been set out in order to bring together the stamps common to a single fabric.

It can be seen that the stamps that appear on both West Stow and Illington vessels are found predominantly in fabric 1; moreover, none of the other stamps occur in this fabric. Fabrics 3 and 5 each contain a single stamp of the West Stow/Illington group, which shows that links between fabric 1 and the other fabrics at West Stow do exist.

Fabrics 2, 4, 6, and 7 with stamps A3, A4, A5, J1, J2 and A6 could be considered as being the West Stow group proper; but these stamps occur also in fabrics 3 and 5, which contain the West Stow/Illington stamps as well. Also of interest is the fact that there are groups of stamps that are used only in a particular fabric. This would indicate that specific stamps were being produced for a particular batch of pottery.

	Fabric						
	1	2	3	4	5	6	7
Stamp							
A7	⊠						
A8a	X				X		
B2	⊠						
C			⊠				
E	⊠						
A1a					⊠		
A1b					⊠		
D4					⊠		
N					⊠		
F3					⊠		
J3					⊠		
A3				X	X		X
A4		X	X	X	X		
A5				X	X		
J1				X	X		X
J2		X	X		X		
A6					X	X	
D3				⊠			
H2				⊠			

X = stamp occurs in this fabric

⊠ = stamp occurs only in this fabric

Table 11.13: Showing the relationship between fabric and stamp types at West Stow.

Conclusions

The West Stow evidence shows that pottery was manufactured at definite intervals, and that a certain number of stamps were made for each potting occasion, with some degree of curation of stamps for reuse at the next manufacturing occasion.

Lackford

The Lackford cemetery had produced urns for antiquarian collections, but the exact whereabouts of the cemetery was unknown until 1945, when it was rediscovered by T. Briscoe after ploughing had taken place. The site was excavated in 1947 by Lethbridge, working with the Mildenhall Archaeological Society, and later published (Lethbridge 1951).

About 500 urns were uncovered in the cemetery, which was used purely for cremation. Including finds made before 1947, a total of 22 definite Illington/Lackford vessels have been found. In addition, there are a number of marginal vessels very similar to the Illington/Lackford styles. Green et al include two marginals - CN 2845, urn no 50.167; and CN 2846, urn no 49.55 - which do not bear stamps known on any other Illington/Lackford vessels. Lethbridge considered that Urn No 50.151A (CN 894) might belong to the group on the basis of similar stamps if not identical layout; and other vessels have varying degrees of similarity. Urn No 49.57 has a stamp of Illington/Lackford type, and there is a vessel in the British Museum that is closely related (Smith 1923, Plate II, no 5). CN 3399 could be an unstamped version of decorative scheme 5, and CN 2826 another version of the same scheme with extra stamping. The only way to prove or disprove the suggestion that all these marginal vessels are Illington/Lackford or not would be to thin-section the whole population of urns. But this was impracticable for this thesis, so marginal vessels were ignored.

Of the total of 22 vessels, three are in the Ashmolean (Myres 1977) and 19 are in the Cambridge Museum of Archaeology and Anthropology. The Ashmolean vessels were not available for sampling, and nine of the C.M.A.A. pots could not be located in the stores, which were then being recatalogued. This left a sample of 10 vessels, 45% of the total.

When examined, the 10 thin-sections were found to consist of three fabrics. Most of the pots, seven in all, were in a silty clay, fabric 1, with common fine quartz grains and a coarser moderately sorted quartz component. One vessel, CN 937, was composed of a sandy clay matrix, (fabric 2), with similar quartz inclusions, derived from a calcareous sandstone. Another CN 2872, was in a sandy clay with abundant fine quartz and vegetable temper (fabric 3). A presence/absence table was constructed (Table 11.14

FABRIC	CN	URN NO	IG ROCK	GROG	VEG.	S'STONE	FLINT	CHK.	SHELL	IRON
1	930	48.2478	X	X				X		X
	930	48.2475	X	X				X		
	938	48.2477	X	X	T					X
	939	50.86		X		X				
	2760	48.2474	X	X	T					
	2791	50.233	X	X	T			X		X
	2839	50.118	X	X	T			X		X
		50.153		X	T	X				X
2	937	48.2481			T	X			X	
3	2872	50.9[illegible]			X					X

T = Trace
P = Present

Table 11.14: showing the presence/absence of inclusions in the Illington/Lackford vessels from the Lackford cemetery.

Conclusions from fabric analysis

Direct comparison of the Lackford thin-sections with those from West Stow proved that fabrics 1, 2, and 3 at Lackford are the same as fabrics 5, 4, and 7, respectively at West Stow.

Decoration

Six of the Illington/Lackford schemes occur at Lackford - 3a, 3b, 4a, 4b, 5b, and 6b. At least one vessel of each scheme was sampled for thin-sectioning, with three extra from 3a and one extra from scheme 4a.

The relationship between fabric and decorative scheme can be seen in Table 11.15

Fabric	3a	3b	4a	4b	5b	6b
1	3	1	1	1	1	1
2	1					
3			1			

Table 11.15

If this relationship is simplified, as on the other sites discussed (Table 11.16) fabric 1 dominates all vessel schemes. But this may be partly because no more than half the pottery had been sampled.

Fabric	3/4	5	6
1	6	1	1
2	1		
3	1		

Table 11.16

Stamps

Table 11.17 shows the relationship between stamps and fabric. The top two stamps are those common to West Stow and Illington. The rest are ordered in the same sequence as at West Stow (above), with the addition of two stamps, D2V3 and K, the second found only at Lackford.

Stamps	1	2	3
A8	☒		
E	☒		
A1a	X		X
A1b	☒		
N	☒		
4A3	☒		
5A4	☒		
A5	X	X	
J1	X		X
J2	X	X	
D3	X		X
H2	☒		
D2V3	☒		
K	☒		

X = stamp occurs in this fabric

☒ = stamp occurs only in this fabric

Table 11.17

From this we can see that all the stamps are found in fabric 1, and that the stamps used on fabrics 2 and 3 were different subsets of the stamp assemblage.

Comparison with the Lackford thin-sections with those from West Stow showed that fabrics 1, 2, and 3 at Lackford are equal to fabrics 5, 4, and 7 at West Stow.

Conclusions

The Illington/Lackford fabrics at this site are all paralleled at West Stow. The most common fabric at Lackford is also the most common at West Stow, which suggests that the two sites were closely linked in terms of ceramic exchange.

Lakenheath

Saxon pottery has been collected from the No 1 field/Sahara sites since before 1948, and some of that material appears to be the work of the Illington/Lackford potter (Briscoe 1949, 109, Fig 16 a, c). Unfortunately, the present whereabouts of these sherds is no longer known. Further sherds have been discovered since then (Briscoe 1979), and the owners kindly made the material available for inclusion in this thesis.

The relevant sherd groups (see Chapter 8, Lakenheath) were sandy 9 and 10, forming fabric 2; sandy 8 and 11, forming fabric 3; and sandy 7, 16, and 20, forming fabric 5.

Fabric descriptions

Fabric 2

An iron-rich sandy clay matrix with common fine quartz grains and a coarse moderately sorted sub-angular component.

Fabric 3

A silty clay matrix with abundant fine quartz grains and a coarser moderately sorted quartz component.

Fabric 5

A fine silty clay matrix with scattered fragments of disaggregated sandstone.

Inclusions

The presence/absence of inclusions is set out in Table 11.18

Conclusions from fabric analysis

Direct comparison with the West Stow thin-sections shows that all three fabrics were present at that site, fabrics 2, 3, and 5, at Lakenheath being identical to Illington/Lackford fabrics 4, 5, and 1 at West Stow.

FABRIC	IG ROCK	GROG	VEG.	SANDSTONE	FLINT	CHALK	IRON
2							
Sandy 9		X					
Sandy 10		X					
3							
Sandy 8			X	X	X		
Sandy 11			X	X			
5							
Sandy 7		X		X	X	X	
Sandy 16	X			X			
Sandy 20						X	

Table 11.18: showing the presence/absence of inclusions in the Illington/Lackford vessels from Lakenheath.

Decoration

The fragmentary condition of the pottery makes it difficult to draw any conclusions about decorative schemes. Only one sherd of fabric 2 (sandy 10) gives a clue to its scheme, which could be either 1, 2, 4a, or 4b, The six horizontal grooves it bears are rare on Illington/Lackford vessels between two zones of stamps. They have been found only on scheme 4a, on one Lackford vessel (CN 2872), on one Illington vessel (CN 2134), and on one West Stow vessel, which is either a 2 or a 4. This points to the likelihood that its scheme is a 4a. See Fig. 11.2.

The fabric 3 material comes from either a single vessel of scheme 3 or scheme 4. If it derives from separate vessels, however, sandy 11 could be from scheme 1, 2, 3, 4, or 5. The same qualification applies to fabric 5.

Stamps

The stamps on the fabrics were as follows:

Stamp	Fabric		
	2	3	5
D2Var1			X
A5	X	X	X
J2		X	
	WS/IL4	WS/IL5	WS/IL1

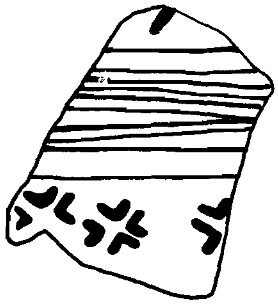
Table 11.19

The D2Var1 stamp is found at West Stow and Illington, but the A5 and J2 stamps occur only at sites in the southern group.

The sherd found by Briscoe in the 1940s seems to bear the two stamps A5 and J2 (Briscoe 1949).

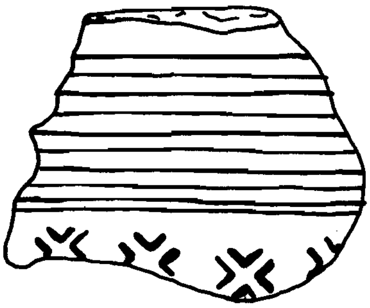
Conclusions

The Illington/Lackford pottery at Lakenheath can all be paralleled at West Stow. The site is of special relevance in assessing the position of fabric 1 in the system, because this fabric occurs at only three sites - Illington, West Stow and

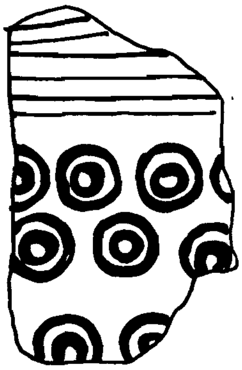


SANDY 10

FABRIC 2

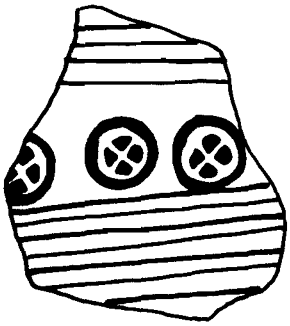


SANDY 11

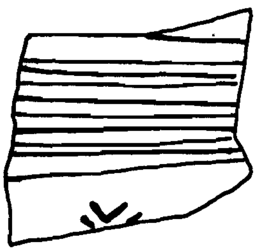


SANDY 8

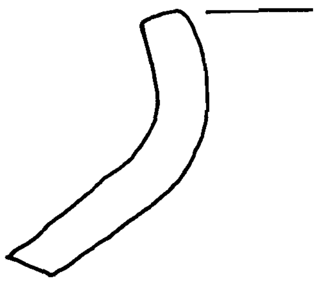
FABRIC 3



SANDY 7



SANDY 20



SANDY 16

FABRIC 5

Fig. 11.2; showing the Illington/Lackford sherdsfrom the Lakenheath site.1:1

Lakenheath. Lakenheath is the only site where the A5 stamp is found on this fabric, which strengthens the link between this fabric and the West Stow assemblage.

Thetford

A single Illington/Lackford sherd (fabric 7) is known from Redcastle, Thetford (see Chapter 7). Unlike others found at this site, it consists of a silty clay matrix with a quartz component of scattered angular to sub-rounded grains, derived from a calcareous sandstone. Granitically derived particles are present, together with particles of grog and rounded calcareous fragments.

Decoration

The scheme is either 3A or 4A, with a B2 stamp above two horizontal grooves, and below them a one-line swag enclosing a D1 stamp. The D1 stamp is found only at Illington, while B2 occurs at Illington and West Stow, where it is found only in association with fabric 1.

Direct comparison with the West Stow material showed that the Thetford fabric was identical to that of West Stow, namely Illington/Lackford fabric 3.

Bury St Edmunds, West Garth Gardens

The cemetery at West Garth Gardens at Bury St Edmunds was excavated by the West Suffolk Archaeological Unit in 1972. The finds are all in the Moyses' Hall Museum, Bury St Edmunds, which kindly allowed sampling to be carried out. Two Illington/Lackford vessels were recovered, both from grave 1, (Green et al 1981, 220). Only one vessel - Grave 1(1) - could be sampled, because of the small size of the other sherd, but both appeared to be of identical fabric. Three samples were taken from other vessels in order to gain a wider view of the fabrics in use, giving a total of four samples. These were: 1. from a pot base in Grave LVI; 2. from Illington/Lackford vessel (1) in grave 1; 3. from grave II; and 4. from XLIII SE1.

Fabric descriptions

Three fabrics were present:

Fabric 1 (sample 1)

A fine silty clay matrix with unsorted sub-angular abundant quartz grains. Many soot-filled voids show use of abundant vegetable temper.

Fabric 2 (samples 2 and 4)

A silty clay matrix with large rounded particles of grog from two fabrics, one identical to the fabric of the vessel, the other a fine sandy clay. Particles of chalk and flint point to a boulder clay source, with angular igneous fragments probably used as temper.

Fabric 3 (sample 3)

A fine silty clay matrix with a fine quartz component, tempered with large sub-angular minerals of granitic origins and abundant fragments of biotite mica. The granitically derived material has probably been added to the clay as it is not present in the clay pellets that occur in the fabric.

Conclusions from fabric analysis

The fabric of the Illington/Lackford vessel (sample 2) does not match any of the West Stow or Illington fabrics.

Decoration

Green et al describe the stamps as A8b and J2. But the quality of both vessels and their decoration are so poor that the present writer would not consider these to be the products of the Illington/Lackford workshop. The stamp types are common - a St Andrew's Cross and a 'dot in circle' - which means that they may be Illington/Lackford copies rather than genuine vessels.

Conclusions

The fabric and decoration are not similar to the other Illington/Lackford vessels examined, but the fabric is similar to that of another vessel (sample 4) from the site. This suggests that the so-called Illington/Lackford vessels from West Garth Gardens are in fact local copies of highly valued vessels produced in the region to the northwest.

Little Wilbraham

A single Illington/Lackford vessel is known from this cemetery, excavated in 1851 (Neville 1852). The vessel (CN 2625) is in the C.M.A.A. and was sampled.

Fabric description

The fabric was a sandy clay matrix with common fine quartz grains and a moderately sorted sub-angular coarser component.

Inclusions

The following inclusions were present. Table 11.20

IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
	X	X	X		X	X

Decoration

The vessel is decorated with scheme 3b, incorporating two stamps, A5 and J2, which are common at West Stow, Lackford, and Lakenheath.

Conclusions

The thin-section was compared directly with those of the West Stow series, and proved to be of West Stow Illington/Lackford fabric 5, the most widespread and common fabric.

Fakenham Magna

Four sherds of Illington/Lackford decorated pottery are known from this site (see Chapter 8). Other decorative schemes were also present in the same fabric, fabric 1, which has a sandy clay matrix with moderately sorted medium-sized quartz grains.

Decoration

Three stamps were present - J2, H2, and A4. The decorative scheme was unusual, starting immediately below the rim. If the sherds all came from one vessel, that vessel would have been of decorative scheme 4a and is reconstructed as such in Fig. 11.3

Conclusions

The thin-sections were compared directly with the West Stow series and found to be fabric 5.

Icklingham

A single stray sherd is known from the Icklingham Roman villa site, (West and Plouvier 1976, 102, Fig 44, 95). This was not available for thin-sectioning.

Decoration

The scheme is either 3b or 4b, with a J1 stamp in two-line triangles.

Conclusions

The J1 stamp shows the fabric to be part of the West Stow series, and the presence of grog (Green et al 1981, 220) points to fabrics 2, 3, 4, and 5. But, as the J1 stamp is known only from fabrics 4 and 5, the Icklingham vessel probably belongs to one of these two, fabric 5 being the most likely.

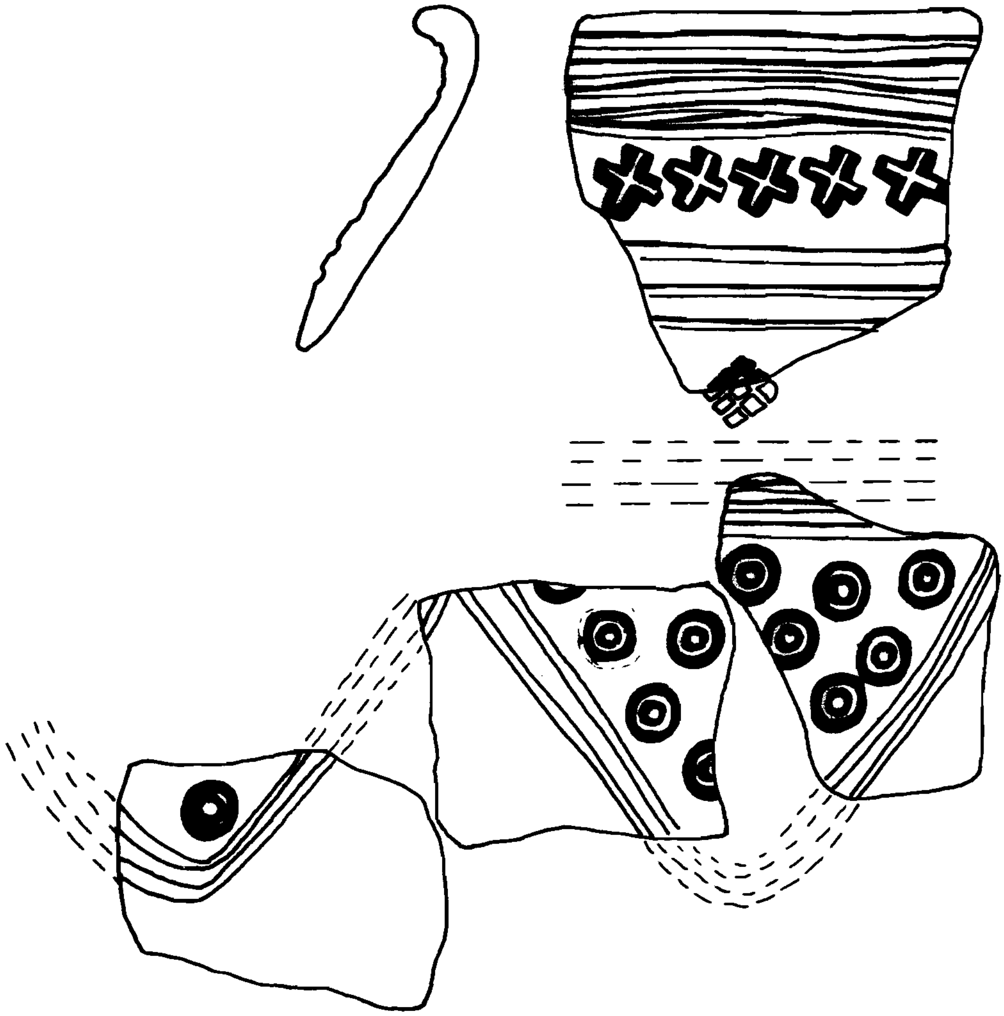


Fig. 11.3: showing conjectural reconstruction of the Illington/ Lackford sherds from Fakenham. 1:1

Cambridge, St Johns

A single Illington/Lackford vessel is known from this cemetery, found in 1888. The C.M.A.A. kindly allowed it to be sampled.

Fabric description

The fabric was found to be a sandy clay matrix with common fine quartz grains and a moderately sorted sub-angular coarser component.

Inclusions

The following inclusions were present:

IG ROCK	GROG	VEGETABLE	SANDSTONE	FLINT	CHALK	IRON
	X	T	X	X	X	X

Table 11.21

Decoration

The vessel is of scheme 6a, incorporating the stamps A1b, D4 Var, H1, N, and J2. D4 Var, and H1 are found only on this vessel; but the other stamps appear on the West Stow, Lackford, and Lakenheath pottery.

Conclusions

The thin-section was compared directly with the West Stow fabric series, and found to be fabric 5. Cambridge St Johns is the farthest known site from the main area of distribution where this fabric has been found.

Rushford

The vessel from Rushford has disappeared, but is known from a drawing in the G. Burton MSS, in Maidstone Museum.

Decoration

The drawing shows a vessel of scheme 4b with an A stamp and a J stamp. The presence of a J stamp points to a source shared by the West Stow fabrics 2, 3, 4, 5, 6, and 7. The J stamp is most common in fabrics 4 and 5, 5 having the widest distribution, so the Rushford vessel probably belongs to this fabric.

Overall conclusions on the Illington/Lackford workshop

This section synthesises the data gathered, assesses the function of the vessels, and offers an explanation of the modes of production and distribution of the Illington/Lackford workshop.

Function

Illington/Lackford vessels occur on 10 sites in East Anglia. Five sites are cemeteries: Illington, Lackford, Rushford, Little Wilbraham, and Cambridge St Johns. Four are settlement sites: Fakenham Magna, Icklingham, Lakenheath, and Thetford Red Castle; and one - West Stow - is both settlement and cemetery.

There are 156 known burial sites in the study area (Clough and Green 1973) and 33 settlement sites. Illington/Lackford vessels are found on some 4% of the burial sites, and on 15% of the settlement sites. This suggests that Illington/Lackford vessels were not produced for use as cremation vessels, but were made for domestic use. At Illington, another 14 undecorated Illington/Lackford vessels are present, which suggests a ratio of decorated to undecorated vessels of 3:1. Unfortunately, there is no comparable group of Saxon data with which to compare this figure.

None of the vessels examined by the present writer bore traces of sooting (although this may have been removed by post-excavation cleaning), which suggests that the vessels were not used for cooking. The shape, that of a globular body with a narrow neck and an everted rim, indicates a vessel that would be best suited for storage. In most vessels, the ratio of body diameter to neck diameter is 1.6:1, except for the larger vessels of scheme 6, where it is 2:1. The re-use of many vessels as cremation containers indicates that they were considered to be of suitable form for storage.

Some vessels may well have been acquired primarily for use as cremation vessels, but that would depend on their being available when a death took place. It was suggested earlier (p490) that the number of fabrics present indicates a similar number of manufacturing occasions, perhaps no more than one a year. Potting would probably have been a late-summer/autumn occupation, when the pressures of the agriculturally based economy would be least. Furthermore, the weather would allow both adequate drying of the pots and a sufficient supply of dry fuel.

Distribution

As already stressed, vessels of Illington/Lackford type are known from 10 sites in East Anglia. They occur in 20 fabrics, if we equate fabrics 66 / 69 at Illington with fabric 1 at West Stow.

The fabrics can be divided into 1. those based on a silty clay - used for fabrics 1, 2, and 3 at West Stow, the vessel from Thetford, and most of the Illington vessels; and 2. a sandy clay - used for fabrics 4, 5, 6, and 7 at West Stow, which are also found at Fakenham, Lackford, Lakenheath, Little Wilbraham, St Johns Cambridge, Illington, and probably at Rushford and Icklingham (see Table 11.22).

The production centre of the industry is not clear. No early Saxon pottery kilns are known in the area, and all evidence from the pottery points to firing in clamps, which leave little trace in the archaeological record. Only one site, West Stow, has been excavated in such a manner that evidence of pottery making could be recognised. A stockpile of clay was discovered there; but this does not appear, after analysis, to have been used for pottery making, and the antler die that could have been used for decorating

Fabric Number	W STOW	ILLNGTN	THTFRD	LACKFRD	LAKNHTH	FAKNHAM	LTTLEWILL	ST JOHN	RUSHFRD	ICKLNGHAM
Silty	1	66,69			X					
clays	2									
	3		X							
		68								
		70								
		71								
		73								
		74								
		80								
		91								
		96								
		96								
		101								
		110								
		115								
		118								
Sandy		2								
clays	4			X	X					
	5	4		X	X	X	X	X	?	?
	6									
	7			X						

Table 11.22: showing the relationship between the sites and the fabrics.

vessels has not been proved to be a potter's tool.

In terms of the absolute numbers of Illington/Lackford vessels, a production centre at West Stow seems likely. But if the distribution is analysed in terms of percentage of Illington/ Lackford vessels in the total site assemblage, the picture changes, as the following table demonstrates.

Site	No of Illington/ Lackford vessels	Percentage of total assemblage
West Stow	119	2+
Illington	42	15
Lackford	21	4
Lakenheath	3	7*
Cambridge St Johns	1	1
Fakenham Magna	1	4*
Little Wilbraham	1	1
Thetford	1	1
Rushford	1	?
Icklingham	1	?

* The assemblages at Lakenheath and Fakenham Magna may be biased towards decorated vessels

\+ Based on West 1969

Table 11.23: showing the number of Illington/Lackford vessels on each site as a percentage of the total assemblage.

Out of 20 fabrics, five appear on more than one site, Either these communities were using a common clay source or the pots were being traded. Identical stamps appear on widely dispersed vessels, which points to the latter explanation. Distribution of each clay type (sandy and silty) and its fabrics and stamps will now be examined in detail in an attempt to determine the marketing system behind them. See Fig. 11.4.

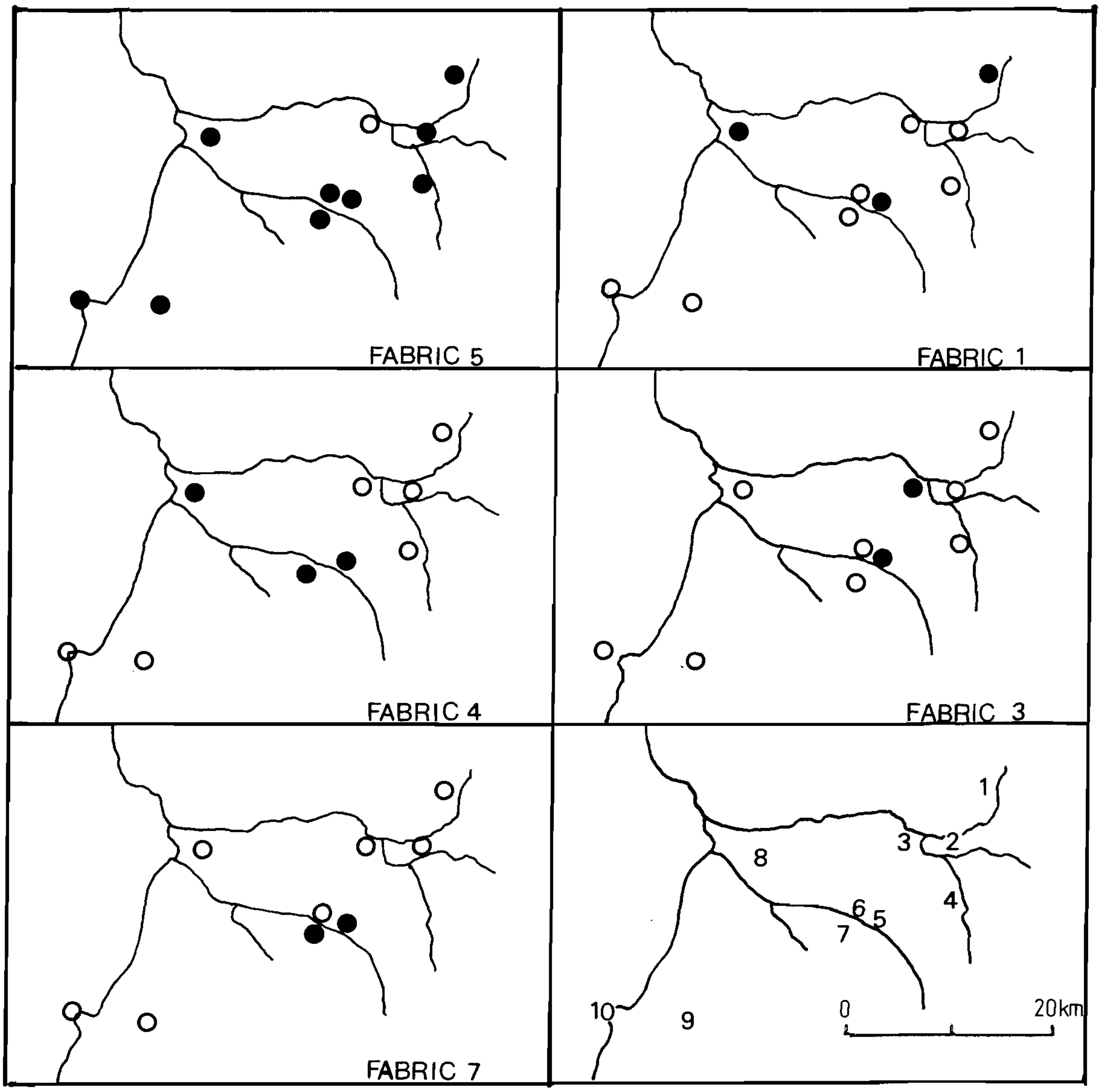


Fig. 11.4: showing the distribution of the West Stow Illington/ Lackford fabrics. Solid circles equal present, negative absent.

1. Illington
2. Rushford
3. Thetford
4. Fakenham
5. West Stow
6. Icklingham
7. Lackford
8. Lakenheath
9. Little Wilbrhams
10. Cambridge

Sandy clay

This clay type was that used for fabrics 4, 5, 6, and 7 at West Stow. Fabric 5 is the most widespread, occurring on all sites except Thetford. It was found at Illington (where it was designated part of fabric 4, a generally sandy group) as only one vessel. At the other sites it appears in small numbers, except for West Stow and Lackford, where it formed the majority of the Illington/Lackford assemblage. Of the 20 stamps that occur on this fabric, seven are exclusive to it, nine also occur on fabrics 1, 2, 3, 4, 6, and 7, and four occur on the Illington fabrics. This distribution is based on the author's view that certain stamps of the Green et al groupings are the same, mamely, A1 and A1b; A8a and A8b; and J2 and J3. They are very similar, and each of the two variations has the same distribution across the fabrics.

The dispersal pattern of these vessels indicates a mature exchange system. The large number of stamps used, many of them repeated editions of a perhaps discarded or redundant stamp, and the seven stamps that occur only on this fabric may point to its being the last to be produced, and probably over a longer period of time than any other single fabric.

Fabric 4 occurs at West Stow, Lackford, and Lakenheath, all sites within the Lark Valley. Only seven stamps occur on the vessels of this fabric, all of them being found also on fabric 5.

Fabric 7 was found at West Stow and Lackford, sites 2km apart. Only four stamps occur on this fabric, all of them also being found on fabric 5, and three of them on fabric 4.

Fabric 6 was found only at the West Stow site, and carried a single A6 stamp, which was otherwise present only on fabric 5.

Silty clay

The silty clay was used for the majority of the Illington/ Lackford pots at Illington, and for the minority at West Stow. Only one silty fabric was found at both sites, that designated fabric 1 at West Stow and fabrics 66 and 96 at Illington. If it were not for this connection, a shift in production centre would be a feasible explanation for the difference between the sites. This would have involved a period of manufacture using silty clays near Illington, and another using sandy clays in the West Stow area. But fabric 1 was probably produced near West Stow, because on that site it was used predominantly for the large vessels of decorative scheme 6. These were probably too large to be traded, and only the smaller vessels travelled as far as Illington, and Lakenheath.

Fabric 3, a possible sub-group of fabric 1, follows the same north-biased pattern, with vessels at West Stow and Thetford. These fabrics have two stamps in common out of a total of nine used. Six of these stamps have close links with the West Stow fabrics 2, 4, and especially 5; but three have closer ties to the Illington series. West Stow fabric 1 is the real tie between the sites, however, as of the seven stamps common to West Stow and Illington, six of them occur in that fabric.

Fabric 2 is another possible sub-group of fabric 1, but it has only been found at West Stow, and there is no evidence that it was exchanged widely.

The remaining silty fabrics, 13 in all, have turned up only at Illington. There is a much greater variation in the stamped decoration used on these vessels. Two fabrics carry only West Stow/Illington stamps, five have West Stow/Illington and Illington stamps, while six carry Illington stamps. Four of the fabrics have stamps used exclusively on those fabrics (see Table 11.24).

This aspect of the decorative motifs, that is, their linking together all fabrics and urns, suggests they were all the product of a single centre. The geographical position of this centre is not known, but the distribution pattern points to it being in the block of land defined by the Lark, Wissey, and Black Bourne rivers. The higher concentrations of pottery at Lakenheath and Illington suggest a production centre in the Little Ouse Valley, where fine silty clays are known to exist (see Chapter 4).

The distribution area of these vessels across this small part of East Anglia is bounded by three linear earthworks (Fig. 11.5) that are known to be of Dark Age date. So, it is possible that the marketing system was based either on reciprocity or redistribution of a commodity by the leader of a political unit. The vessels at Cambridge and Little Wilbraham can be seen

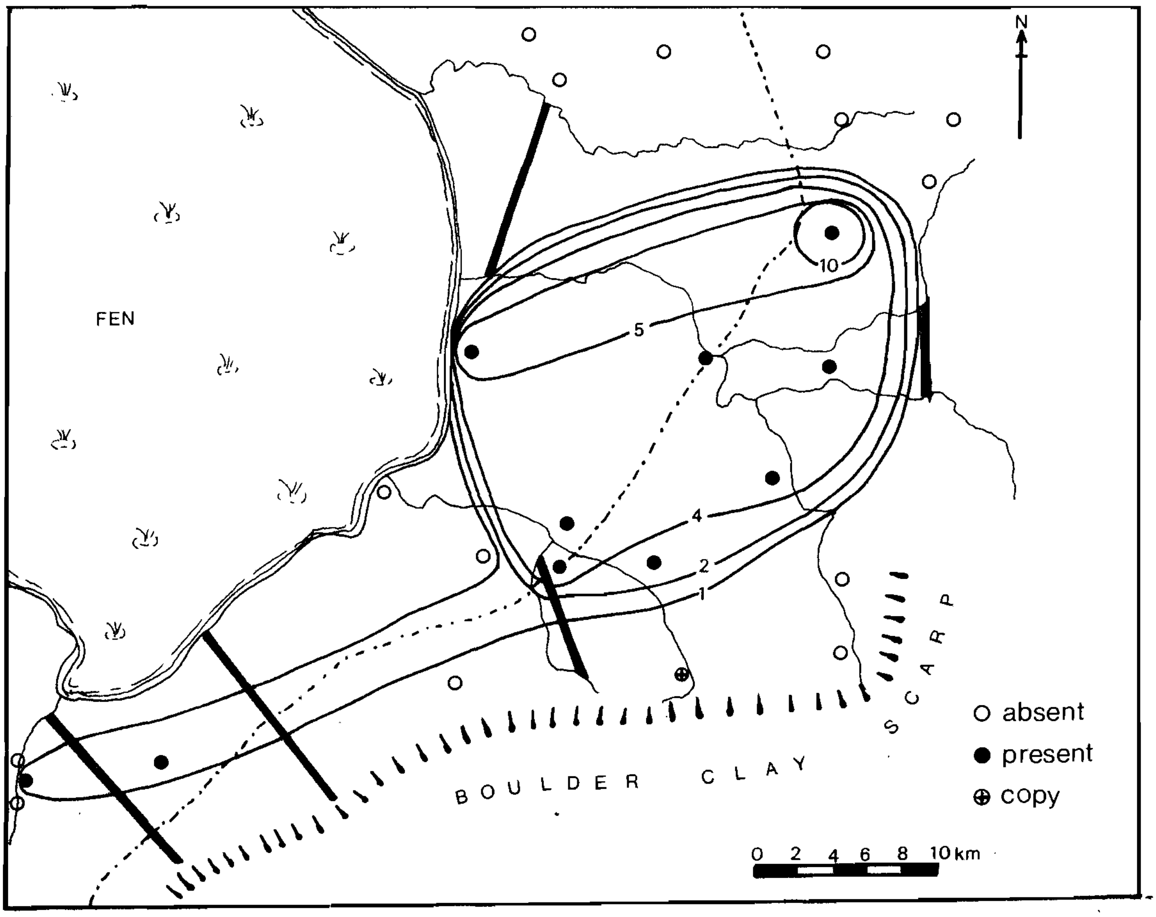


Fig. 11.5: showing the distribution of Illington/Lackford pottery in the Breckland region, at its relationship to the Dark Age Dyke sytem, the Icknield Way, and other topographical features.
The contours give the proportion of Illington/ Lackford vessels in the total assemblage at 1, 2, 4, 5, and 10% intervals.

STAMP TYPE	7	6	5	4	3	2	1	2	68	69	70	71	73	74	80	91	101	110	115	118
A1a/b	X		X																	
A2										X										
A3	X		X	X																
A4			X	X	X	X														
A5			X	X																
A6		X	X																	
A7			X						X											
A8a/b			X				X			X	X	X	X	X				X		
A9			X																	
A10								X							X					
A11									X								X			
B1																			X	
B2			X		X		X				X									
B3									X			X				X				
C1					X		X				X									
Cvar									X			X								
D1/D1var						X				X	X	X								
D2/var 1,2,3			X				X		X	X		X		X						
D3	X		X	X																
D4/var			X																	
D5										X										
E			X				X		X											
F1																				X
F2											X									
F3			X																	
F4									X	X		X				X			X	
F5										X		X								
G									X		X	X								
H1			X																	
H2			X	X																
H3									X	X										
I														X						
J1	X		X	X																
J2/3			X	X	X	X														
K			X																	
M									X						X	X	X			
N			X																	
Gp1										X										

Table 11.24: showing the complex interelationship between stamps and fabrics.

perhaps as prestigious gifts used to maintain relations with neighbouring political units controlling the trade routes along the Icknield Way. The West Garth Gardens vessels, on the other hand, might well have been copies of prestigious goods imitated by close neighbours.

Within this territory, which measures some 900 square kilometres, we can perhaps make out the first stages of an early state module. The site of Thetford was of importance in both the Iron Age and Roman periods (Potter 1982), and again in the Late Saxon period, when it had a recorded population of more than 4,000. Besides, its natural position on a routeway must have always made it a focus for political power.

The Lark Valley was densely populated in the Saxon period, and a 'Lark Valley Brooch' has been claimed (Briscoe 1979), which would reinforce the concept of a real political unit, which has been put forward here.

One aspect that has not yet been explained is the difference between distributions of the two clay fabric groups. This involves the sandy fabrics having a more general distribution, and the silty fabrics being biased towards the northern part of the area, with a parallel distribution in stamps. In fact, the stamps are not really significantly different - they are all variations on a number of basic motifs.

However, the fabric change does seem to coincide with a change in marketing regions. The position of the Illington cemetery, on the north side of the Little Ouse river system, may have made it more vulnerable to political changes. Presumably, the linear ditch system was constructed to serve a purpose, and it may have been only partly successful in preserving a peaceful situation in which ceramics were easily exchanged. The smaller marketing area may have forced the potter to specialise more, and fabric 5, the most widespread, may have been the result of increased standardisation and production.

If the potter/workshop is seen as being in operation near Illington and near West Stow then a change from silty to sandy fabrics can be charted. The reverse could also be the case. The different models are plotted in Figs. 11.6 and 11.7 .

The curation of stamps is suggested by the vertical lines, which indicate that the die was in the potters tool kit but not used on that fabric. Both figures have been drawn to give the least number of suppositions, with those fabrics containing the same stamps being assumed to be closest together chronologically.

It is interesting to note that at one end of the sequence the Illington/Lackford potter is employing stamps that are not normally associated with the workshop. It is possible that the workshop began or continued with a different set of stamps, and that other vessels in related fabrics have yet to be found.

This aspect of Early Saxon pottery workshops, i.e. the constantly changing stamp kit, must be taken into account when other workshop groups are examined. Fabrics must be analysed microscopically because relying on similar stamps will not give the full picture of the complex nature of the production process and the systems behind it.

80	A10
101	M A11
115	F4
91	M F4 B3
71	M F4 B3 F5 G CV D1 D2 A7
68/74	M A11 F4 B3 G CV D2 A7 E I H3
69	F4 F5 C1 D1 D2 A7 H3 Gp1 A2 D5
118/110	D2 A7 D5 B1 F1
70	G C1 D1 D2 A7 F2 B2
73	A7 B2
1	C1 D2 A7 E B2 A5
3	C1 D1 B2 A4 J2
2	A4 J2
5	D2 A7 E B2 A5 A4 J2 A3 D3 J1 H2 A6 A1 N K H1 F3 D4 A9
4	A5 A4 J2 A3 D3 J1 H2
7	A3 D3 J1 A1
6	A6

Fig. 11.6: showing the possible order of Illington/Lackford fabrics given a shift from Illington to West Stow.

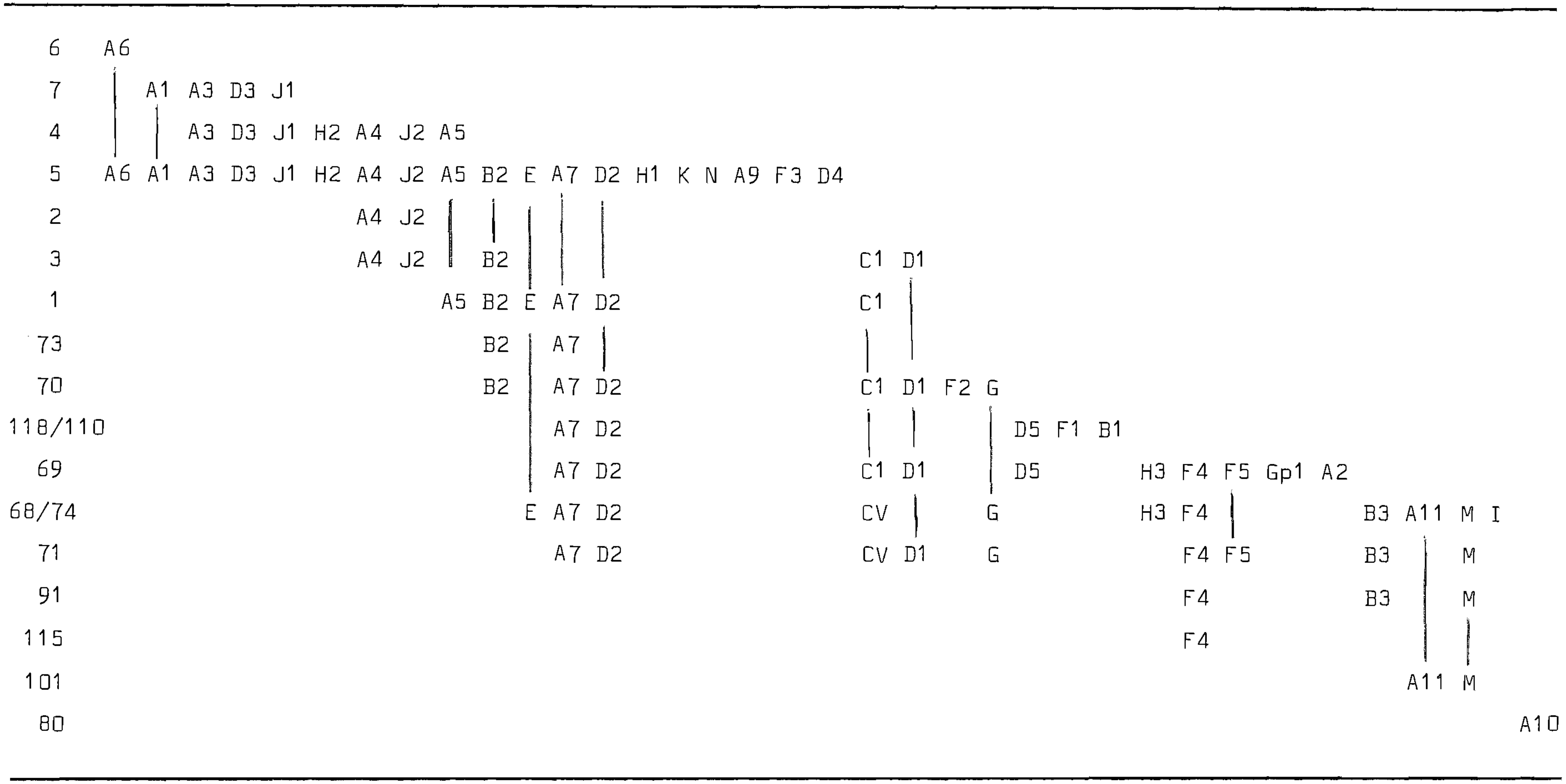


Fig. 11.7: showing the possible order of Illington/Lackford fabrics given a shift from West Stow to Illington.

Chapter 12

Technology, Typology, and Dating of Early Saxon Ceramics

This chapter synthesises the data collected from the assemblage of Saxon ceramics in East Anglia, and brings together information about technical processes of production and dating of the pottery forms. The technological processes are dealt with first, covering the selection of the clay, its preparation and tempering, shaping, decorating, and its firing.

Ethnographic parallels are used where possible to illuminate certain aspects, although the author is wary of quoting parallels, as there is seldom enough information to be sure that a parallel exists for the whole culture, and not just for one technical aspect which may have arisen in diverse areas for different reasons.

Technology

The technological processes involved in the production of Early Saxon ceramics must be understood in order to interpret the archaeological evidence for the evolution of pottery systems within the Saxon period. The diversity/standardisation of the pottery and fabrics will give important clues as to the mode of production. This begins with the selection of raw materials.

Selection of the clay

Arnold's (1981) survey of the ethnographic literature has shown that ceramic raw materials are generally gathered from a preferred territory of exploitation, within which the returns are greater than the costs. A maximum range of exploitation exists where costs rise sharply towards a maximum limit. This was based on Brownman's (1976) exploitable-territory-threshhold model. In 29% of 85 cases, the preferred territory for clay exploitation ranged up to 1km from the settlement. The maximum range appears to be 7km, as 82% of the communities obtained their clay within this distance.

The clays of East Anglia are varied and cover large areas of the region (see Chapter 4). Suitable clays exist within 1km of the majority of the sites, and an exploitation area of 7km would give 154 square kilometres of territory, most of it clay-covered. Comparison with clay samples taken from the glacial clays around the sites shows that the majority of clays are calcareous, but it seems that the potters often avoided these clays and sought sandy ones instead.

There is a good technical reason behind this, because if calcareous clays are fired to above 750°C the calcareous inclusions will later rehydrate and expand. This can cause a vessel to split and even disintegrate (Rye 1981, 33). A sample of chalky boulder clay was heated to 800°C in an electric kiln and although the briquette was hard and dense after firing, within a week at room temperature and normal air conditions it had become a pile of dust.

It was also found that it was difficult to use a clay containing chalk nodules, because they tend to work their way to the surface and drop out of the clay, making joining of the coils difficult. The lack of adhesion between the chalk and the clay matrix does mean that the chalk particles can be picked out easily by hand, and it is possible (although time-consuming) to produce a workable clay from the chalky till.

If the firing conditions can be controlled and remain below 750°C, then calcareous clays will produce good cooking pots. This is because the inclusions' expansion rate up to 600°C is very similar to that of the clay, and in certain parts of the world calcareous inclusions are deliberately added as temper for cooking vessels (Rye 1976, 167). It is possible that the highly calcareous oolitic fabrics that occur in small quantities on a number of sites in the region being traded as high-quality cooking pots.

The sandy clays favoured by the Saxon potters were probably secondary clays, reworked by rivers or streams, in which the calcareous fraction had been washed out.

This of course makes a present-day sampling programme to detect original sources a rather haphazard affair, as the Saxon clay sources are likely to have been either eroded or covered in the last 1300 years. Other areas of East Anglia have been covered by wind-blown sands, which may have masked the earlier exposed clay deposits. It is therefore not surprising that few matches were found between the local geology and the Saxon fabrics. Where matches did occur it was often with the daub or loomweights. In these cases, the working and firing characteristics were not crucial and the nearest available clay could be used, even though it was not necessarily suitable for making vessels.

Preparation of clays

The attraction of clay for vessel manufacture is its malleability. Its receptivity to being shaped, and its ability to retain that shape upon drying are known as plasticity. This depends on three factors: 1. the evenness of the particles; 2. the size of the particles; and 3. the degree of penetration of water between the particles, that is, its efficiency as a lubricating agent.

The plasticity is directly linked to the other important characteristics - porosity and shrinkage. The degree of plasticity also affects the strength of a vessel when it has been manufactured, as the more plastic the clay, the stronger the leather-hard vessel will be.

Naturally occurring clays are usually either over-plastic or aplastic, and therefore need to be modified by the addition of temper before they are used. A temper is any material that does not become plastic in water and can stand the temperature at which it is intended to fire the wares without undergoing violent change (Hodges 1964). Sometimes tempers are referred to as binding agents, but in fact the clay is the binding agent and the addition of temper weakens the fabric. Despite this disadvantage it is used because it reduces shrinkage and increases porosity, helping uniform drying and therefore lessening the risk of cracking. When a clay is highly plastic, the addition of temper renders it less sticky and easier to work, and certain tempers can increase the plasticity of short aplastic clays. Temper will also reduce the firing shrinkage, which occurs when the clay reaches a temperature of 500 C, and the chemically combined water is driven off.

The weakening effect of a temper can reduce the plasticity of a clay to the point where it becomes lean or short and loses the adhesive qualities necessary to hold the shape required. The potter must therefore balance the advantages and disadvantages of adding temper, and it is usually a positive feedback system that operates, as a potter seeks to achieve the perfect balance of clay and temper for a particular vessel function. This is due to pressure from the consumer (even if the potter and the consumer are one), who desires a vessel that will fulfil its intended purpose for as long as possible.

Early Saxon potters in East Anglia appear to have added three types of temper to their clays: 1. naturally occurring minerals; 2. processed minerals ; and 3. naturally occurring organic matter.

Naturally occurring mineral tempers

The East Anglian glacial till contains considerable quantities of non-local lithics transported by the glaciers and deposited in sub-glacial or morainic environments. In Chapter 4, the different processes of weathering were listed, as well as the resulting distinctive characteristics of the mineral components of the drift.

Mineral tempers would have been available to the Saxon potters in a number of forms derived from unsorted or reworked glacial morainic material. The unsorted material from the glaciers consists of thick deposits of clay, which formed the raw material for pottery manufacture. This seldom contains the large quantities of quartz sand that the pottery contains, and no sand seams were noted by the author in the clay-sampling programme.

The glacial till does, however, contain sizeable erratics from a number of distinctive geological areas. The erosive action of the ice across the Bunter Beds and the Pennines has resulted in sandstones being deposited in East Anglia, and these can be picked up on the surface of ploughed fields (see Chapter 4).

East Anglian Saxon pottery frequently contains sandstone fragments, often quartzite sandstone, which could be derived from the Bunter Beds. A great deal of the pottery, however, contains fragments of granitic sandstone, comprised of grains of quartz, mica, and feldspar, eroded out of granitic rocks and recemented after undergoing a degree of weathering and rounding. (An exact source for this material has not been found but the north of England seems the most likely.) The large, coarse sandstone fragments in the pottery exhibit crushing fractures in a number of cases, which suggests that the sandstone was being collected from the drift deposits and pounded for use as temper. These sandstone fragments could perhaps be sorted from the drift because of the presence in them of biotite mica, which gave them a distinctive dark colour.

In the Bomborat Valley in Pakistan, white river pebbles were sought out as temper because they were found to give better results. Scientific examination showed that these pebbles contained a higher proportion of quartz than the other local rocks (Rye and Evans 1976). In East Anglia, it may have been the ease with which such coarse-grained rocks could be crushed that resulted in their preferential collection. The finer grained feldspathic sandstones do not exhibit signs of extensive weathering.

Another source for naturally occurring mineral tempers would be the sands of the Breckland and crag regions. The author's analysis showed that most of this windblown sand was composed of quartz grains of sub-rounded and rounded form. Where rivulets had further sorted the surface deposits, small quantities of well-sorted material of different grades could be collected. Alternatively, sand could be collected and sieved, as is the practice in Zakhel Bala in Pakistan, where windblown sand is passed through a leather sieve (with 1mm holes) to remove the coarser fraction (op. cit.).

Ethnographic work suggests that most potters prefer to gather their tempering material within 1km of their place of work, and 96% of Arnold's (1981) sample of 29 settlements obtained it within 8km. Most Saxon settlements, 91%, were within 1.2km of running water (see Chapter 5), where water-sorted sands were probably available. The well-sorted, rounded nature of the quartz grains in many fabrics indicates river valleys as a major source of temper as well as clay.

Processed mineral temper

Although crushed rock could be classified as a manufactured temper, it is the result of crushing a naturally occurring substance. Processed tempers will therefore be confined to that type of temper usually termed grog, and consisting of crushed fired clay.

Sometimes it was difficult to distinguish between grog and the addition of unfired pellets of clay; and these pellets may relate more to poor preparation of the raw materials rather than to a tempering technique. There are instances in the ethnographic literature of dry clay being added to prepared clay if the latter proved too plastic (Rye and Evans 1976), which would have the same visual result.

Clay pellets in a clay are usually indicative of clays being dried and pounded before use. The raw clay is sun-dried and crushed, and often sieved to remove impurities. The resulting dust is then reconstituted with water. If the pounding is not carried out efficiently, hard dry lumps of clay (clay pellets) will become incorporated in the fabric because they do not absorb enough water to become fully plastic before the forming stage is finished. The only criterion to distinguish between clay pellets being added as temper, or inadvertently, will be their number and their ratio to the clay. At Lakenheath, for instance, the presence of a single clay pellet in a fabric implies accidental inclusion.

The incidence of grog and clay pellets in Saxon pottery on East Anglian sites is shown in Table 12.1, from which it can be seen that there is little difference between the two types of temper across the region.

Counties	Clay pellets	Grog
Cambridgeshire	40%	40%
Norfolk	25%	30%
Suffolk	35%	41%

Table 12.1: The incidence of grog and clay pellets on Saxon sites in East Anglia.

The very similar figures for clay pellets and grog suggests that clay pellets were being used as temper and were seen by the Saxon potters as being equivalent to grog. A possible source for non-fired clay could have been daub from buildings or ovens. In Nigeria, for instance, potters used crushed potsherds, daub, or both, to temper their clay, (Nicklin 1981). At Snettisham the grog in fabric 1 is identical to a sample of daub from the site.

There is some evidence, revealed by the Illington/Lackford workshop, for semi-specialist potters using grog. It seems that either crushed granitic sandstone or grog was being used, and occasionally both together. The potter may perhaps have been looking for a tempering agent that did not need as much time or energy to prepare as crushed rock. An alternative could be that grog was being used a a standby temper. In Assam, grit is the favoured tempering agent; but if this is not available, crushed potsherds are ulitised instead (Saraswati and Behura 1966).

There is some evidence in the ethnographical literature for the incorporation of grog into the pottery fabric by unintentional means, and this should be borne in mind when assessing the presence of grog. In South America, at La Victoria, grog is used not as a temper but to reduce friction during the pottery-making process. The pots are formed in a molde (often the base of a broken vessel) from a pancake of clay over which grog has first been scattered to prevent it from sticking too firmly. While the pot is formed, the molde is spun on a rock or another inverted molde, and grog is here used to reduce friction between the molde and its pivot. Since the vessel is built up from coils of clay, and more grog is thrown under the molde as it is needed, the potter's hands become covered with grog, which is inadvertently incorporated into the clay of the vessel (Litto 1976). The presence of grog in Saxon pottery could therefore point to the use of a distinct technical process unconnected with the fabric itself.

Naturally occurring organic temper

Organic temper is the deliberate introduction of vegetable matter to the clay. This may be added as chopped plant material or else in the form of chaff or animal dung. Organic temper will here be referred to as vegetable temper. It is commonly referred to as 'grass temper' in archaeological publications, but this term is not recommended. Although the author has examined large quantities of material (from sites in East Anglia and elsewhere in southern England) he has noted no pottery tempered with grass. The term 'organic tempering' would be an alternative, but it fails to differentiate between the inclusion of vegetable matter, shell, ash, or bone, all organic substances; and in America the term is also applied to pottery fabrics that have had organic gums added to bind the constituents of a fabric together (Shepard 1956). Confusion also arises with pottery that is 'grass-marked', a mistake made by Gordon Childe when he apparently coined the term 'grass-tempered', when describing the pottery from Larriban, Ireland (Childe 1936).

Vegetable temper is used here, and throughout this thesis, to mean the deliberate inclusion into the clay of grass, chaff, or other organic matter derived from plant material.

Although vegetable tempering is commonly considered to be culturally diagnostic of the Anglo-Saxon people, in fact it has a wide chronological and geological spread in Britain and on the Continent (Russel 1977) and also in Eurasia.

In Britain, the earliest finds of vegetable-tempered pottery date from the Neolithic at Jarlshof in the Shetlands, and it is also common in Holland during this period (Kooijman pers. comm.) It then appears to have gone out of use in Britain until the Iron Age, when it was employed almost exclusively for industrial wares used in the salt industry. The one exception is Little Waltham in Essex which has produced domestic pottery, apparently tempered with either grass or chaff (Drury 1978).

With the advent of the Roman period, vegetable tempering was no longer used in Britain, presumably because it produced fabrics that were not acceptable to Romanised tastes. Although its appearance has been claimed in sub-Roman phases, that is, post-Roman and pre-Saxon (Rahtz 1974), it is usually assumed to be an indicator of Saxon settlement, and is normally dated as such.

In East Anglia, it is the commonest form of recognisable tempering, being present on 60% of the sites in Cambridgeshire and Norfolk, and 76% of those in Suffolk. The sites where it is absent are commonly those where very little pottery was recovered, and it is probable that if larger samples had been collected it would have been found, as vegetable tempered vessels do not usually form a large percentage of the total ceramic assemblage.

The reason for the addition of vegetable matter, and the exact type used, have been investigated by the author (Russel 1977), and it was found that it gave a number of advantages.

Five types of vegetable temper were added in different proportions to two clay types. Grass, chopped hay, cow dung, horse dung, green fern, and dry bracken, were added as 1%, 10% 20%, 50%, 70%, and 100% of the weight of the clay. Two tiles were made from each mixture and the shrinkage rate was recorded when air-dried and when fired. The strength of each tile was measured by calculating the modulus of rupture of each tile using the method and formula of Shepard (1956).

Apart from the usual merits of temper (in terms of countering shrinkage and increasing porosity), it was found that, although the strength of the fired clay was reduced, the air-dry clay was not seriously weakened; indeed in some cases it could withstand greater stresses than the fired clay (Fig. 12. 1). Similar results were obtained by London (1981). The increase in strength results from the organic fibres absorbing stress. In a similar way, although not as successfully, the voids left in the fired clay also spread the load. (This effect was utilised by Papanek in producing 'Fibergrass' a system of glass-fibre bonding designed for the Third World, where the expensive glass-fibres are replaced by native grasses (Papanek 1971).)

Experiments with the different types of temper showed that chopped hay and horse dung produced the best results, giving a decrease in shrinkage without undue loss of strength in the fired clay. The majority of Saxon pottery from Suffolk was examined by Green of Southampton University, and in his opinion the tempering material used was horse dung. This was based on study of comparative material from Winchester (Green in press), and the material analysed by Renfrew from Brooklands, Weybridge and the Worthy Down cemetery (Russel 1977).

Animal dung is commonly used elsewhere in the world as a tempering material. It hastens the breakdown of the particle size of the clay and thus increases plasticity due to the action of gel-forming hydrated organic polymers (London 1981).

All the evidence, therefore, points to the Saxon potters adding animal dung, probably from their horses, to the clay to take advantage of its physical properties. The resultant vessel will have an open porous fabric and will thus be able to withstand thermal shock, and also allow liquids to evaporate slowly through the walls. The second attribute may have been chosen specifically by the Illington/Lackford potter for certain vessels. These highly decorated vessels have globular bodies

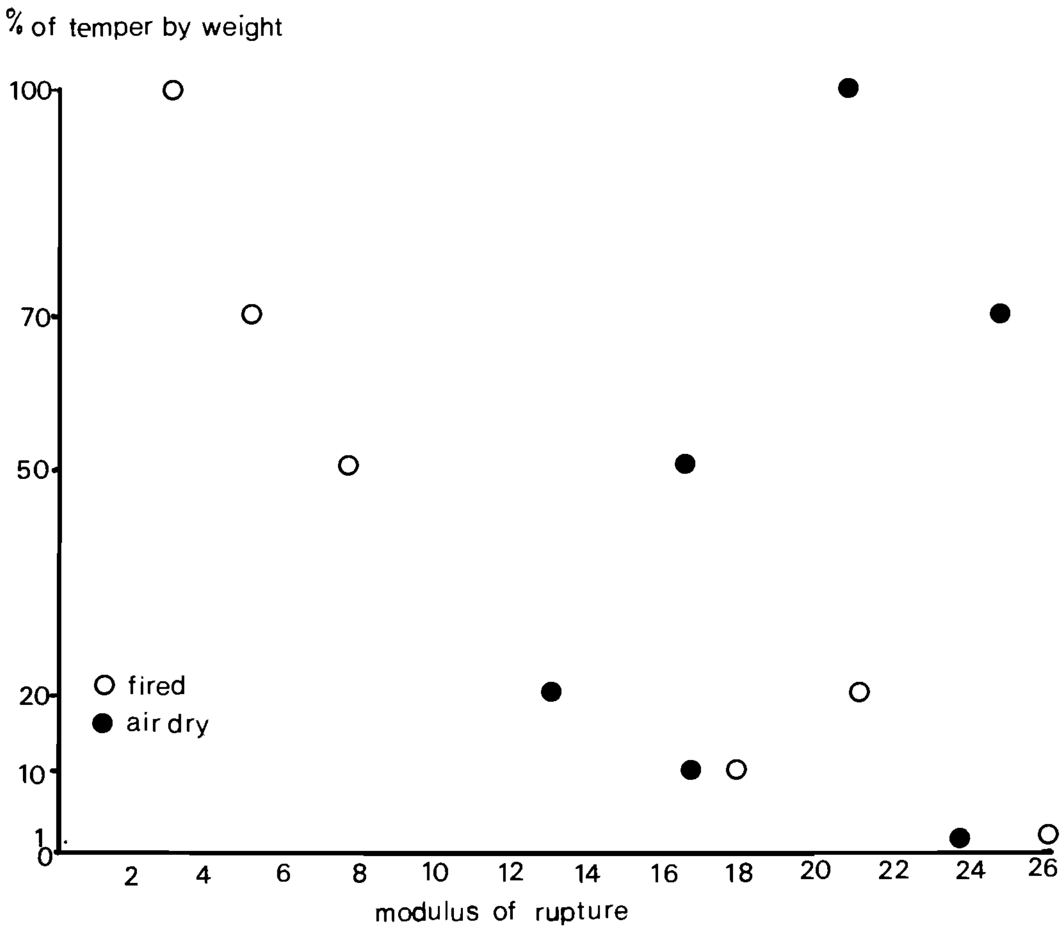


Fig. 12.1: showing how the addition of increasing quantities of horse dung temper affects the strength of clay both air-dry and fired. The air-dry strength is not greatly reduced with high proportions of temper but once fired the fabric loses its strength.

and narrow everted necks, and thus are unlikely to be cooking vessels. Instead they were probably intended for storage, perhaps for liquids. At West Stow, it is common for two or three Illington/Lackford vessels to be found in a structure (Chapter 11), and they were probably present to hold water or another type of frequently used commodity.

Ethnographic parallels for the use of dung as temper are common in India and Pakistan, but it is not dung alone that is used. Ash, saw dust, bran, the chaff of millet or paddy, and coir were all employed; and the use of dung from donkey, horse, cow and elephant is recorded, often with set recipes for specific functions. At Kshipra, one part of horse dung was used to four parts of clay. At Dewas, 20km from Kshipra, the four parts of clay were mixed with two parts of dung and one of ash. At Dhor, clay and donkey dung were mixed in equal volumes for cooking pots, but the quantity of dung was halved for water pots (Saraswati and Behura 1966).

There is some evidence to show that the technique of vegetable tempering is not common in the Early Saxon period but increased in popularity in the 6th century. At Canterbury, Frere's excavations of the 1950s and 1960s showed that straw-tempered (sic) pottery was later than that dated to the 6th century. The sequence has been more accurately defined by petrological analysis of the material from the Marlowe excavations. This shows that vegetable tempering in the early phases approximated to 12% of the total sherds, and rose suddenly to become the most abundant fabric in the phases dated to the 7th and 8th centuries (Mainman 1982 and pers. comm.). A similar sequence has been deduced in the Upper Thames region. The early phases of sites such as Sutton Courtenay and New Wintles contain assemblages with high percentages of gritted fabrics; whereas fabric ratios are reversed in the 7th century and later with house IX (dated by an 8th century comb) containing exclusively vegetable tempered vessels (Berisford 1977).

A similar sequence has been noted at Mucking, Essex, to the south of the area studied here, where early vessels tend to contain calcareous inclusions, and vegetable tempering is more common in the later 6th and 7th century (Lee pers. comm.).

This chronology of tempering methods is at odds, however, with the Continental evidence. Vegetable tempering in Holland is not common in the early Roman period but by the 3rd and 4th centuries it forms up to 40% of the pottery on some sites (Van Tent 1978). This perhaps suggests that the earliest migrations came not from the Frisian coasts but from further north.

During the Middle Saxon period, vegetable tempering was largely replaced by fabrics that employ mineral tempers, especially where wheel-made pottery was introduced. This is possibly a change that evolves through improved firing technology. Mineral tempers will act as a flux within the fabric, lowering the temperature at which vitrification begins, and giving a stronger fabric.

If potters were changing from clamp firings to kilns, they may have discovered that the vessels tempered with vegetable matter were not as robust as those tempered with sand, when both were fired at higher temperatures. Differences in fabric strength would probably not be noticeable in the lower temperatures achieved in clamp firings, as the clay minerals do not begin to break down and vitrify until about 850°C (Hodges 1964).

In the past Hamwic (Saxon Southampton) has been claimed as a site where the phasing out of vegetable tempering in the early eighth century could be seen (Hodges 1977). Recent analysis of the whole assemblage, which is considerably larger than that available to Hodges, has shown that vegetable-tempered pottery forms the fourth most common fabric, 7% by weight overall (J. Timby pers. comm.); and although it seems most common in the area of the supposed waterfront (30% of the pottery on some sites), it is found throughout the occupied area. Its use is therefore unlikely to be confined to the first years of the settlement.

In East Anglia there is little chronological control to help date the use of vegetable tempering, because the cooking and storage vessels that are most likely to be tempered in this way are seldom decorated and datable. The technique, however, is found on the majority of sites, which points to it being widespread chronologically as well as geographically.

Geographical aspects of tempering techniques

It is difficult in many cases to distinguish the addition of crushed sandstone from naturally disaggregated sandstone mixed into the clay by post-glacial weathering of the till deposits. But the addition of vegetable matter and grog can be easily recognised as definite evidence of tempering. Fifteen of the Early Saxon settlement sites studied produced a sample of 10 vessels or more, and the percentage of the pottery tempered with grog or vegetable matter can be readily calculated.

Site	No. of Vessels	Temper % Vegetable	% grog
Grantchester	16	6.5	12.5
Waterbeach	26	8.0	58.0
Linton	43	14.0	9.5
Postwick	31	3.5	13.0
Snettisham	63	13.0	2.0
Thetford Red Castle	200*	8.0	4.0
Witton	320	0.8	10.2
Butley	58	15.5	2.0
Fakenham	27	36.5	27.5
Grimstone End	708	8.0	2.0
Lakenheath	45	13.5	2.5
Little Bealings	10	60.0	0.
Rickinghall	43	16.5	7.0
Stanton Chair	35	20.0	3.0
West Stow	50*	16.0	8.0

*no. of sherds

Table 12. 2

It can be seen that there is usually a preference for one type of temper, but there is no simple relationship between the two (see Fig. 12.2).

Arnold (1981) has suggested that certain manufacturing techniques are culturally diagnostic, because they are learnt at an early age, and once the potter has adopted them it is difficult to change the habits of a lifetime. In order to see

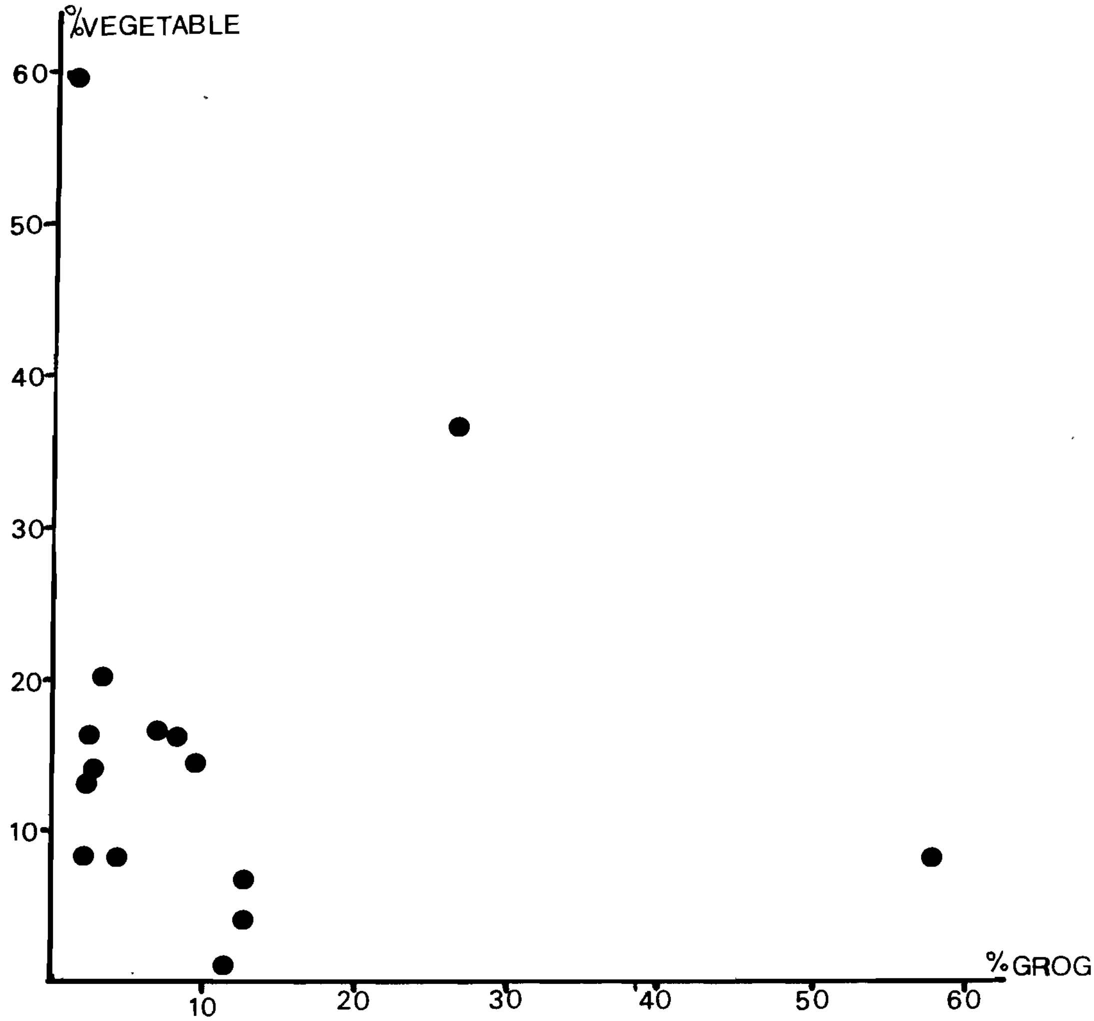


Fig. 12.2: showing the proportions of grog and vegetable tempered vessels on fifteen of the Early Saxon East Anglian sites.

if the tempering habits showed a geographical, and thus possibly cultural, distribution pattern, a contour map was drawn using the percentages in Table 12.2 (see Fig. 12.3).

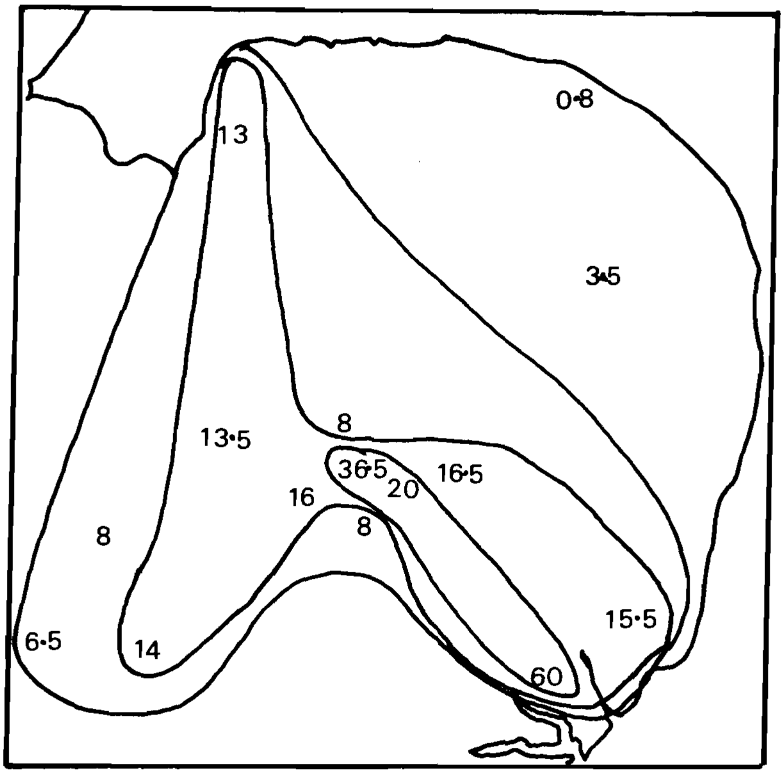
The pattern shows that there is a marked difference between the popularities of grog and vegetable tempering, the vegetable temper being most common on an axis that runs NW-SE across East Anglia, with the grog tempering forming a strong axis at right angles to it. Why the Breckland region, with its abundant sand resources, should have high levels of alternative types of tempering is puzzling; but the distribution does show that one cannot use the ratios of tempering techniques as a chronological yardstick in East Anglia.

The grog distribution pattern is interesting in that it centres on the region where the Illington/Lackford potter, who commonly used grog as temper, was operating. Because of the lack of chronological control, it is not possible to say, however, whether this potter was following a local tradition or setting a new standard.

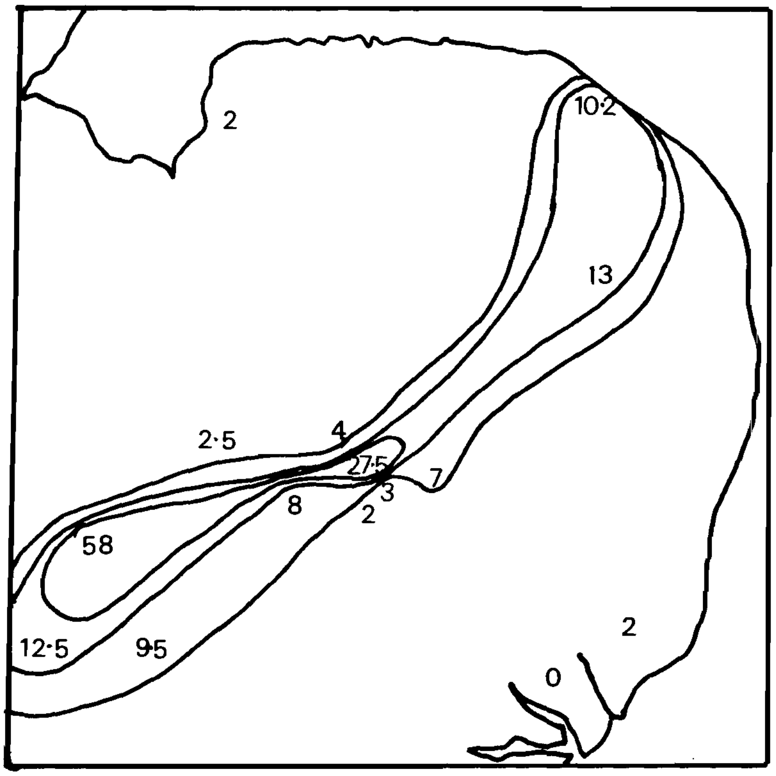
If the data from the two large East Anglian cremation cemeteries whose vessels have been examined petrologically, were to be included - Illington (see Chapter 10) and Spong Hill (Brisbane 198) - the picture does not greatly change, At Spong Hill, Norfolk, grog-and vegetable-tempered fabrics comprised 6% and 7% respectively of the total, and at Illington, on the edge of the Breckland, vegetable tempering was present in 16% of the sections and grog was present in 11%. This is another indication of the cremation urns being no different from the domestic vessels, as far as manufacturing techniques are concerned.

The incidence of grog tempering is also significant as it does not seem to occur elsewhere in southern England in Early Saxon pottery. None has been reported at Canterbury, Kent (Mainman 1982); Chalton, Hants (Addyman, Leigh, and Hughes 1972); Bishopstone, Sussex (Bell 1977); Portchester, Hants (Cunliffe 1970); or in the Upper Thames region (Berisford 1977).

The only published occurrences of grog tempering in the Midlands are at Northampton, and at Binham and Kingston-on-Soar both in Nottinghamshire (Williams 1979). A few sherds have also



%VEGETABLE TEMPER



%GROG TEMPER

Fig. 12.3: showing the distribution of grog and vegetable tempering agents in East Anglia. Contours are drawn at 5, 10, and 20%.

been found at Baginton near Coventry (Stokes pers. comm.)

Grog as a tempering agent in the Early Saxon period seems therefore to be confined to central eastern England, and may therefore represent a cultural tradition. It is unlikely to be inherited from the Roman or sub-Roman periods as grog is common not only in East Anglia but also in southern England in Late Roman ceramics (Fulford 1975b).

Manufacturing and shaping

The pot construction methods employed by potters can be of use to archaeologists by providing data that can relate to the ethnic and linguistic identity of the manufacturers, even if the vessels' forms and decorative motifs are similar (Arnold 1981). For instance, Austronesian speakers in New Guinea used the paddle-and-anvil technique, and non-Austronesian speakers used the coil-building method (Key 1973).

These studies, which relate ethnic groups and language to vessel-forming habits, have relied primarily on present-day anthropological studies, where the pottery-manufacturing process can be closely studied. When one has only archaeological material, it is harder to be certain about manufacturing techniques, as the broken state of the pottery and the lack of restorable vessels means that it is difficult to assign every sherd to a particular manufacturing method.

The two methods most widely used in the Early Saxon period in East Anglia appear to be coiling and drawing, and pinching. The coiling and drawing method involves a coil of clay being wound in a spiral to form a base, upon which further coils are placed to build up the walls. Each coil of clay is drawn upwards once firmly in place. This reduces the thickness of the walls and increases their height.

The drawing method can also be used without coils, in which case a lump of clay is opened by hand and pulled upwards and outwards to form a vessel. Drawing will leave characteristic marks on the surface of the vessel (Rye 1981) but a large proportion of the Saxon pottery analysed shows signs of secondary smoothing which will obliterate the tell-tale signs.

The main evidence for the coiling and drawing method is the distinctive S-shaped fracture where coils have broken apart. These invariably show that the coil was pressed into place by downward pressure on the outside of the vessel. The coil was then drawn upwards between the fingers smearing the coil join upwards on the inside of the pot. The outside was further smoothed downwards during the process and the actual join was thus elongated into an S-shape.

The pinching method is similar to the drawing method but is simpler in that it does not involve the preliminary manufacture of coils. A lump of clay is opened with the fist and the walls are pinched between finger and thumb or between the fingers of both hands. This method is usually only employed for smaller vessels such as cups and bowls, but it can be used for vessels up to 20cm in diameter (Rye 1981 Fig.53). Many of the Saxon vessels studied had diameters of between 16 and 20cm and this may have been due to such technological constraints.

It is impossible to be certain about the method usually employed in East Anglia in the Early Saxon period. At Grimstone End, Suffolk - the largest sample of pottery available for study - 18% of the vessels showed signs of coil-building, either in the edges of breaks, or by the coils having come apart when the pot was broken. In two cases flat bases had survived, which clearly showed that they had been formed from a spiral coil.

At Spong Hill it has been reported that the funerary vessels were coil-built, whereas the domestic vessels were not, as no signs of coil joins were visible (Brisbane 1980). But, as Hodges has pointed out, 'it should never be taken for granted that absences of visible joins in the fractures means that a pot must, therefore, have been formed by some other process; a clean plastic clay will often bond leaving little or no trace of the junction' (Hodges 1974, 27). Whether coil joins will show or not will depend partly on the skill of the potter, partly on the clay. At Grimstone End the incidence of visible coil joins was twice as high in the calcareous fabrics, 24.2%, as in the sandy fabrics, 12.5%, This is probably due to the aplastic nature of calcareous clays (Hodges 1974, 24). One reason for the lack of coil joins in the Spong Hill assemblage from domestic contexts may be the low presence of calcareous clays.

Even within the sandy clays the presence of coil joins varies from fabric to fabric. Vegetable tempering increases the plasticity of clays, so fewer visible coil joins would be expected. At Grimstone End, Suffolk, the vegetable-tempered fabrics had a 7% incidence of coil joins, which is the lowest of the sandy clays; and the Spong Hill domestic pottery assemblage contains a high proportion of vegetable-tempered pottery (Brisbane pers. comm.).

Where other large assemblages of domestic Early Saxon pottery have been closely studied with a view to determining the manufacturing processes, coil building has been found to be the favoured technique (Berisford 1977), so there is little hope of distinguishing ethnic or linguistic groups.
The identification of groups would probably be impossible because of the process that led to the Kulturmisch on the North Sea coast of Germany in the 4th and 5th century AD, where a number of Germanic tribes coalesced.

Decoration

The study of decoration on Early Saxon pottery has been predominantly studied in the past for clues to the ethnic identity of the potters; but studies are now underway into the relationship between the form and the decoration of cremation vessels, and the age, sex, and status of the individual concerned (Richards pers.comm.). These indicate that there is indeed a relationship, but whether an urn was produced for an individual's burial or was chosen because it was suitable for the burial of an individual of that status, is an as yet unanswerable question.

As far as the domestic pottery from East Anglia is concerned, the decorated vessels usually form a smaller percentage of the total, when compared with the assemblages from cremation cemeteries.

Ten of the settlement sites in East Anglia provide figures that can be reliably used in an analysis of the percentage of decorated pottery. The other sites have provided a sample that is either too small - fewer than 10 vessels - or else has a suspiciously high percentage of decorated wares; for example, Lakenheath with 91%.

The ten sites have the following percentages of decorated pottery:

Site	Percentage of Decorated pottery
Butley	0.0
Stanton Chair	0.0
Thetford	3.0
Postwick	6.5
Grimstone End	7.2
Witton	9.0
Waterbeach	11.5
Linton	11.6
Grantchester	12.5
Snettisham	14.0

Table 12.3 : Showing the percentages of decorated pottery from 10 of the East Anglian settlement sites.

The average is 7.5%, but it is not possible to say how good a sample of the site was excavated on each occasion, a situation complicated by the problem of secondary refuse areas. However, the average is closest to the site with the largest sample, Grimstone End, which perhaps points to it being correct.

This can be contrasted with Illington where approximately 66% of the vessels were decorated (Green *et al* 1981).

However, when dealing with a settlement site, it must be remembered that the pottery is usually very fragmented and only a few sherds survive from each vessel. The Saxon potters usually only placed decoration on the upper half of a vessel, probably because vessels normally stood on the floor and were thus below eye level. Again, the decoration does not always cover the whole upper surface, sometimes being confined to a series of parallel grooves around the neck. It follows, therefore, that if a decorated vessel were to be smashed the percentage of sherds that would carry decoration would probably be in the region of 10-50%. There is also a possible bias in the cemetery material towards decorated vessels, which are uncommon in domestic contexts, because they are normally used for storage. These are likely to have suffered a lower than average breakage rate in everyday use (David and Henig 1972), so the archaeological assemblage will not reflect the number of decorated vessels in use at any one time, but will be skewed towards undecorated cooking vessels, which had a shorter life (Schiffer 1972, 162-63).

Given these factors, an average figure of 7.5% for the percentage of decorated pottery on a site does not seem unrealistic. Moreover, a true ratio between decorated and undecorated vessels can only be guessed at until it is possible to model breakage-and replacement-rates in the average Saxon household unit.

Decorative techniques

The decorative techniques used on Early Saxon pottery can be divided into those where 1. the clay is cut to produce linear decoration, 2. the clay is modelled, 3. the clay is impressed with a die, 4. the clay is covered with a slip, and 5. the vessel is burnished.

1. Linear decoration.

Linear decoration is the simplest way of decorating a ceramic container. The circular form of a vessel, caused by the way in which it was constructed of spiral coils of clay, would have lent itself to linear decoration that passed around the pot. Because this is such a simple technique, it is unlikely to be of chronological significance, as has been claimed (Myres 1977). Where further linear decoration has been added below the lines around the neck or shoulder, it may be possible to date the style; but the settlement pottery is often too fragmented to do more than guess at the complete effect the potter sought. Linear tooling would presumably have been carried out with a simple tool, for instance, a bone needle or spatula such as those shown in Fig. 12.4. If pottery making was carried out only in one

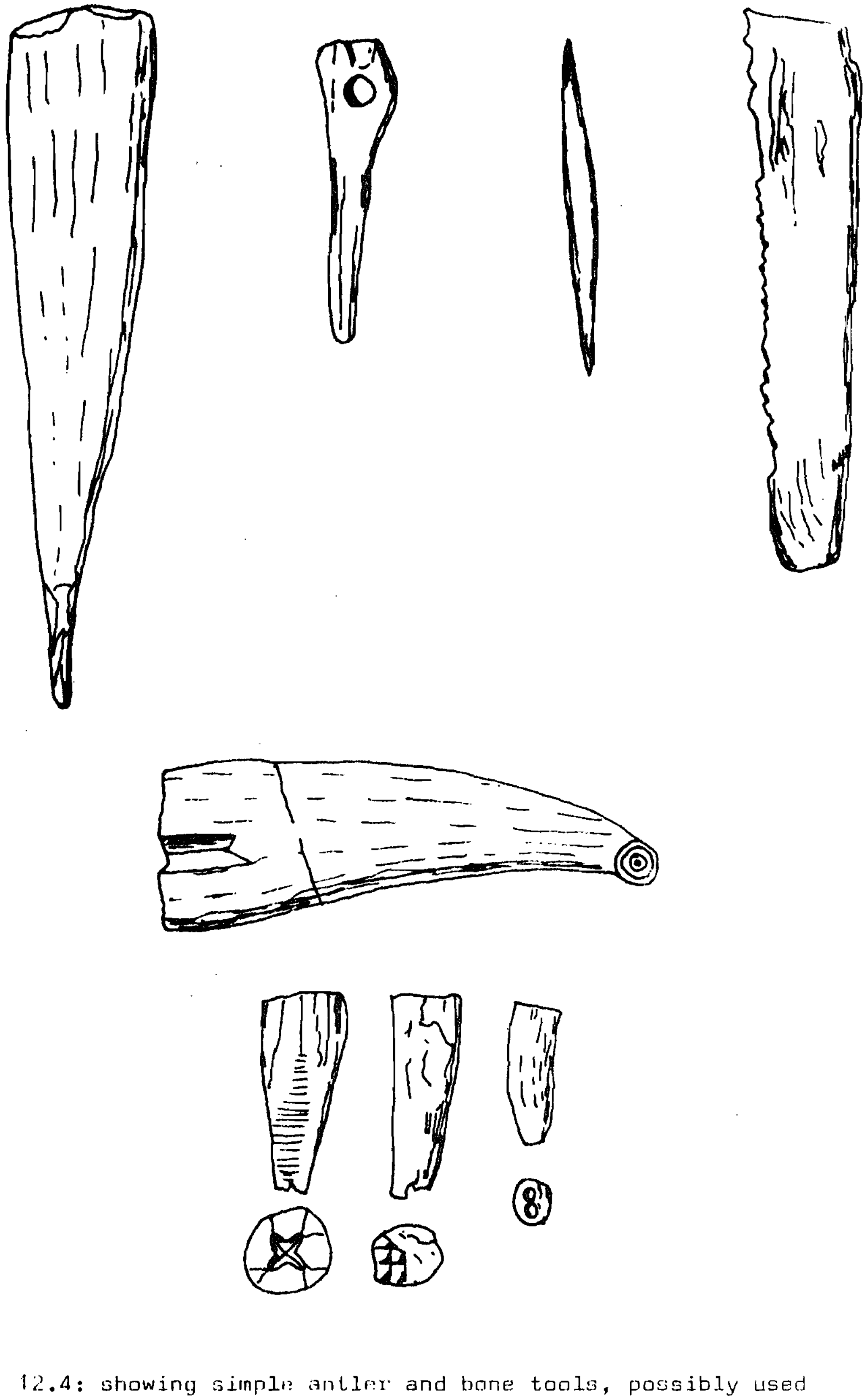


Fig. 12.4: showing simple antler and bone tools, possibly used for pottery production at Grimstone End (top). The possible pottery die from Lakenheath (centre), and three dies from West Stow. All full size.

season of the year, it is unlikely that potters would have kept tools specifically for decorating the small number of vessels made. Everyday household objects were probably pressed into service for this purpose when needed.

2. Modelling.

The most common form of modelling employed by Early Saxon potters was that of pushing bosses from the body of the pot, and this was usually done at the maximum girth of the vessel. Occasionally solid bosses were added to the pot, but it was obviously not always successful, because pots have been found where one or more bosses have become detached (Myres and Green 1973, Plate XII,d). It is not always clear whether bosses should be seen as decorative motifs, as in the Buckelurnen series, or have a functional purpose, such as lugs for hanging the pot over a fire, or for attaching organic covers. F.R. Mann, the excavator of the Markshall cemetery, conducted experiments in pottery manufacture and claimed that bosses were not ornamental but had a structural purpose, acting as buttresses to the clay. He believed that all pots were made with bosses, which were smoothed down if not needed (Mann, in Myres and Green 1973, Appendix 5). However, Mann's experiments were all carried out using a very soft river mud, which contained large sticks and beetles, and there is no evidence of the Saxon potters using such unsuitable material.

Bossed pots are rare occurrences in the East Anglian settlement material, but they formed less than 10% of the Illington urns, and so may not have been common at all in the Saxon period.

The lugs found on vessels in the settlements are often assumed to have come from cooking pots; the lugs being anchoring points for a system of cords enclosing the upper half of the vessel, or else being pierced for the direct suspension of the vessel. Lugged pots, like bossed vessels, are rare in funerary and domestic contexts and may have had a special function that required their suspension over a fire rather than being placed upon it, as would have been the case with ordinary cooking pots. If these were not cooking pots then another reason for their suspension must exist, and possibly they were ceramic versions of the metal hanging bowls found from this period. The spatial and stratigraphical controls available for the Early Saxon material from East Anglia are not sufficient for us to decide whether a specific function existed or not. The Mucking or West Stow material may, however, be able to answer this.

Lugs and bosses both involve convex ornamentation, while the opposite applies with the use of facets and dimples. Both these styles involve pushing the clay body inwards. Facets differ from dimples only in being executed on a sharp carination on the vessel. Both methods appear to be characteristically early in the Saxon sequence, if one relies on the Continental parallels (Myres 1977), and the archaeological evidence supports this at West Stow (West pers. comm.) and Mucking (Jones 1979). Facetted carinated sherds were found at Grimstone End in association with an early Frisian comb (Chapter 9). Only Grimstone End and Hacheston, both early sites, produced dimpled pottery.

Another decorative technique that involved modelling the surface was that of rustication. This involved pinching the clay at intervals between the thumb and fingertip to produce a roughened surface. Various degrees of rustication have been noticed by the writer, most strongly at Lakenheath and Grimstone End, where it is possible to see different-sized hands at work. Microscopic analysis of sherds of this type could provide clues as to the age and sex of potters; and perhaps, from the length of the fingernails, the degree of manual labour potters did. But the East Anglian material was too small a sample for meaningful analysis, which must be carried out over a wider geographical area. The very small size of some rustication does suggest the involvement of children in the process of decoration, if not in the forming of pottery.

3. Die stamping.

Stamped decoration on Saxon pottery has attracted more attention than any other form of decoration, because it can enable the products of a single potter to be identified. The first published report of identical stamps on different vessels was in

1937, when Myres first brought the Illington/Lackford potter to the attention of British archaeologists. The report on the Lackford cemetery, produced in 1951, gave the first large sample of accurately drawn vessels and their stamps. Moreover, it drew attention to a number of so-called 'workshops' (i.e. two or more vessels bearing identical stamps), particularly those of the Illington/Lackford potter and the 'S' potter (Lethbridge 1951).

The reports on Caistor-by-Norwich (Myres and Green 1973) showed that 11 potters could be identified, each responsible for up to 10 vessels, each potter's work being decorated with a combination of up to 11 different stamps.

The dies that were probably used to make the impressions are rare finds compared with the number of impressions known, and a total of only nine stamps is known from Early Saxon contexts. Four are from West Stow, Suffolk (Myres 1969, 133; and Evison 1979, Fig 34a); and single dies have been found at Lackford (Lethbridge 1951, Fig 17); Little Eriswell and Lakenheath (Briscoe 1979) all in Suffolk; Illington, Norfolk (Green forthcoming); and Shakenoak, Oxfordshire (Hands et al, Fig 60). All these dies are made of bone or antler, more commonly the latter (see Fig 12.4). The fact that none of the imprints of the dies has actually been found on a Saxon sherd indicates that the amount of pottery we possess is too small to be an adequate sample; alternatively these bone and antler stamps were not used for impressing pottery but served another purpose, such as stamping leatherwork or decorating articles of clothing with pigments.

The few surviving dies make it probable that the majority were made from perishable materials. Wooden dies carved on the ends of sticks are the most likely, as the greater part of the impressions were made by a circular die, and the detail shown by some impressions can be reproduced on fine-grained woods such as Box, which grows wild in East Anglia. Briscoe (1981) has suggested that resin or beeswax was used to take impressions of textiles, the impressions then being used as a die. Materials such as these would not survive a long period of burial.

An alternative material common in East Anglia is chalk, which is used by present-day potters to produce dies that can be easily carved with intricate motifs. When discarded these could have been crushed or destroyed by weathering, which means that they would not survive in the archaeological deposit. If such dies did survive carved on small pieces of chalk, they would possibly be overlooked in the excavation process.

A number of the dies appear to be the result of the potter using items that were lying around in the production area, such as combs, broken jewellery, or animal teeth and bones (Briscoe 1981). This is common among potters the world over, who collect objets trouvés to use later in decorating their products. The case of the workshop potters is perhaps different, because they seldom seem to have used anything but carefully carved stamps. The impressions on their wares show the stamps were frequently re-cut although the motifs remained the same. This is another indicator of the non-durable nature of the dies.

It has been suggested by Arnold (Arnold and Russel 1983) that the re-cut stamps of workshop groups were tribal or family motifs. Re-cut versions would have been made when a new branch of the family was created, through marriage for instance, so that each branch could decorate its vessels with the family totem. Soviet archaeologists such as Foss, Briusov, and Chernetrov, consider stamps on Neolithic pottery to have been clan signs (Lazlo 1974). Briscoe's ongoing research into the spatial distribution of stamp motifs in England does suggest that although many types are widespread, others are found in confined geographic areas (Briscoe pers. comm.), which may point to kinship ties. A more complete analysis of the stamps and the fabrics on which they appear will be needed before models can be put forward with confidence on which to test these theories.

4. Surface slipping.

Surface slipping is the technique of applying a thick slip of clay, usually containing coarse grit, to the outside of a vessel. The accepted term for this method in the United Kingdom is schlickung, from the German word for mud. In Holland it is called besmijting.

The technique of schlickung appears to be early in the Saxon sequence. It is found on the Continent in 4th century contexts (Van Es 1967, 273), but was in declining use during the Roman period (Van Tent 1978). In this country it is usually found in early contexts, such as at Mucking (Jones 1979) and Grimstone End. Previously this technique has been reported only at Mucking (Jones 1979); but five vessels at Grimstone End and one each at Hacheston, Linton, and Thetford, Redcastle had received schlickung treatment. On one vessel, at Grimstone End, where the schlickung had flaked off, it could be seen that it had been applied to a previously burnished surface. The reason for a schlickung coat is not known, but it may have a similar technological background to the slurry coating used in Pakistan. There cooking pots are coated on the base with a mixture of sand and clay to insulate the pot against thermal shock (Rye and Evans 1976). This is done after firing and has to be repeated at intervals during the life of the pot. The lack of adhesion noticed on the Grimstone End example suggests that the schlickung was added after firing, and possibly served a similar purpose.

5. Burnishing.

Burnishing is the technique of rubbing the leather-hard vessel with a smooth object in order to modify the surface, which becomes denser and thus reflective.

Rye (1981, 90) calls the overall treatment of a pot in such a manner polishing, confining burnishing to directional smoothing to produce a non-uniform lustre. The majority of the burnishing on the East Anglian pottery would be termed polishing by Rye, and there is no evidence of the Early Saxon potters using it to form patterns of burnished and unburnished areas.

Burnishing must be carried out when the clay is leather-hard, after the newly formed vessel has been allowed to dry for some time, and must therefore represent a separate stage during the manufacturing process.

Burnishing is undoubtedly the most common form of decoration on the Early Saxon pottery examined. However, there will always be some doubt as to whether it was intended as a decorative technique or was more a method of finishing a pot to prevent the seepage of fluids through the vessel walls. Where a vessel is burnished internally a functional purpose is more likely, except if the vessel is of an open form which would have left the internal surface open to view. Differentiating between functional and decorative burnishing is difficult when the pottery present is unreconstructable, and is further complicated by the fact that external burnishing was often carried over the rim and down the inner surface of the vessel. A large rim sherd is therefore needed to be certain whether the whole of the inside of a vessel was burnished or just the upper portions.

Burnishing was possibly used for its decorative qualities on stamped pottery which is frequently burnished. The majority of the Illington/Lackford vessels are burnished, often to an almost mirror-like sheen. However it has been argued in this thesis that the stamped vessels were probably used for transporting and storing liquids (see Chapter 9), and the burnish may be predominantly functional, with the stamping providing the decoration. In a few cases, such as at Grimstone End and Ixworth, the pots were stamped before being burnished which suggests that the burnish was of greater importance than the stamping, which again points to the former being functional.

The Grimstone End site provided the largest sample of domestic pottery. Within that group burnishing was more common on the inner surfaces of the vessels, and therefore it is probable that the Saxon potters saw it primarily as a functional method of vessel finishing, but also recognised its decorative qualities for certain classes of pottery.

<u>Non-decorative finishes</u>.

Two other categories of finish were employed by the Early Saxon potters in East Anglia, smoothing and wiping. Both techniques show a greater expenditure of energy than a natural finish, but are taken here to be purely functional and not forms of decoration.

Smoothing is the term given to the technique of passing a wet hand over the surface of the pot to remove irregularities, giving a semi-lustrous sheen as a result. Wiping is a cruder version of this technique with less care being taken. In certain cases the wiping seems to have been carried out with a handful of grass or other such fibrous material, giving a scratched surface.

At Grimstone End it was argued that the five different rim types represented different vessel functions. Each of these vessel types had a different degree of surface treatment. The everted-rimmed vessels had a higher incidence of burnishing and smoothing on the inner and outer surfaces than other types. The vessels with short upright rims had a slightly lesser incidence of surface finish. The bowl forms continued the trend away from surface finish on the exterior but 81% of the internal surfaces had been smoothed or burnished. Smoothing appeared to have been an alternative to burnishing with the coarser wiping being rare. A comb-roughened surface, found only at Fakenham and Rickinghall, both in Suffolk, may be related to the coarse-wiping technique.

Firing technology

Study of the pottery suggests that the Early Saxon potters fired their products in simple bonfires or clamp kilns which required no permanent structures and thus have left little trace in the ground. Early Saxon kilns or ovens have been recorded from a number of sites, such as Stonea, Cambridgeshire (Potter 1982) and Grimstone End, Suffolk (Brown's site notebooks in Ipswich Museum). These ovens usually consist of an elongated flue leading to a small firing chamber, but no evidence has been found to link them with the firing of pottery. However, a similar structure found at Cassington, Oxfordshire (Arthur and Jope 1963) did appear to have been used for firing pottery.

The only good evidence for a firing location in East Anglia is from Grimstone End, where Brown found partly baked sherds in patches of ash approximately 1m in diameter (see Chapter 9).

The low number of wasters recovered from Early Saxon contexts suggests that the Saxons had full control of their firing methods. The coarse nature of most of their fabrics would have helped to resist any thermal stresses. The wasters that are present in settlement and funerary contexts usually exhibit signs of rapid heating and insufficient drying, rather than overfiring, which suggests bonfire firings of short duration rather than the use of ovens or kilns.

Dating and typology

Even today the dating of Saxon pottery relies heavily on stylistic similarities and archaeological associations, which are then fitted into an overall historical framework. But before examining this system, which depends so much on the work of Myres and his supporters, the writer should explain why he wishes to challenge the over-reliance (in his view) on dates, cultural affinities, and Continental parallels.

The original chronological framework, which was published in 1921, was devised by Plettke, who had died in 1914. He relied on the statements of the *Gallic Chronicles* and of Gildas, and devised a yardstick based on those dates. Vortigern was said to have invited in mercenaries from Germany in 407. So, if a pottery type was found on both sides of the North Sea, it must date from after 407; but, if it occurred only in Germany, it dated from before 407 AD. The invaders of Britain were allowed about a century to develop their own styles, and thus a style found only in Britain must be sixth century or later.

This system was much modified and revised (Tischler 1954), but the revision was not universally adopted. Janssen, in publishing the Issendorf cemetery, used Plettke's system as late as 1972, and was criticised for so doing by Myres, who argued for revision by up to two centuries (Myres 1974).

Until 1954 the British chronology, followed by Myres, had relied on Bede's date of *circa* 450 AD for the arrival of the Saxons. But Tischler was able to show that a number of vessels in this country pre-dated Bede's *Adventus Saxonum*. Since 1954, Myres has sought to place increasingly early dates on the British pottery. In 1969, the Caistor-by-Norwich cemetery was dated to 'say 360 AD'; by 1974 it had been pushed back into the 3rd century. To fill the gap between this date and the *Adventus Saxonum*, Myres has postulated a phase of controlled settlement when barbarian troops and their families were given land in exchange for their protecting the Romano-British inhabitants. This theory - 'little short of revolutionary' (Dickinson 1978) - has met with severe criticism (Hawkes 1974, 412-14, and 1975, 334; Kidd 1974, 202—04; Morris 1974, 225-32) and has still not been satisfactorily argued for by its exponent. The Myres system of classification and dating by vessel-form and decoration is now enshrined in the Corpus of Anglo-Saxon Pottery (1977), and has been adopted as a standard (Early Anglo-Saxon Pottery Research Group 1984).

The writer tested the accuracy of the Myres system on the Illington vessels illustrated in the Corpus (Myres 1977). He found that 24 of the fabrics contained two or more vessels which were characterised and dated according to Myres' system. These 24 fabrics contained 91 vessels, which is just under 30% of the total assemblage, and should provide an adequate sample.

A date range was assigned to each vessel, according to Myres' dates for the different shapes and decorative schemes; in 10 of the fabrics it was found that the date brackets did not overlap, even though 35 of the vessels had a date range of a century or more. The discrepancies could be broken down into three categories: 1. a minority of vessels did not fit the date range of the majority; 2. an equal number of vessels had dates that did not agree with each other; or 3. the vessels formed a continuous sequence, covering a period of more than a century.

Five of the first category occurred, with four of them having the minority dated too early. This tendency of Myres to date pots as early as possible has been noted elsewhere (Dickinson 1977).

The single case of a vessel dated later than the others in its group occurs in fabric 9; but Myres' date may have been influenced by his assigning the brooch found with the vessel to Aberg's group III, when it is in fact probably group II (Myres and Green 1973, 112). Myres' erroneous dating of brooch types has also been commented on (Dickinson 1978), and he has misdated two of the four bronze brooches from Illington, and apparently other grave goods (Milligan pers. comm.).

In three cases there are an equal number of vessels assigned to different date ranges in one fabric. In fabric 2, one vessel is dated to the 3rd century onwards, one to the early 5th, one to the early 6th, and one to the 6th century. The fabric is very similar to fabric 3, the difference being that the latter has additional rock temper. If the two fabrics were combined, six out of the eight vessels would have 6th century dates, leaving the two vessels in fabric 2, dated to the 3rd century and early 5th century, as anomalies. Fabric 7 has two vessels, one 6th century, the other dated earlier because of its form. However, Myres does give other parallels for the second vessel, all dated be metalwork finds to the mid-6th century. Once more, this seems to be an instance of Myres favouring an early date against all the evidence.

Fabric 13 has one vessel dated to 350-425 AD, and a stamped vessel of the 6th century. Myres has assigned an early date to the former because of a single line incised on the pot's shoulder, which he designated a 'plain linear' style and therefore early.

Two fabrics have overlapping sequences, 33 and 65. Fabric 33 contained a plain, early 5th century pot, a stamped 6th century pot, and an undecorated 6th-7th century pot. There are other vessels in this fabric that are stamped, and it would seem that the dates that Myres gives to the undecorated vessels are not at fault.

Fabric 65 contains an early 5th century vessel with stehende bogen (standing arches), an undecorated vessel dated to the 5th-6th century, and a stamped vessel dated to the 6th century. This gives a time span of between 75 and 225 years, which, however, is unlikely. Either the dating of each phase of decoration must be stretched, or possibly two clays that are visually identical were used up to 150 years apart. In 1973 Myres allowed that stehende bogen designs continued to be used in the late 5th century, which would bring the group further together (Myres 1973, 47).

Conclusions

The traditional chronology for Saxon pottery is based on associations of burial urns with brooches and other types of metalwork. As Kidd has stressed (1974), these associations must be closely scrutinised: 1. to determine at what point in the life-span of a pot and brooch they became associated; and 2. how far can the individual dating be representative of the group as a whole. No archaeologist seems to have attempted this for the Saxon period, and there appears to be a tendency to date objects to the earliest part of their life-span.

In a number of cases Myres notes that vessels with 3rd and 4th century parallels are found in this country with 5th and 6th century metalwork. Caistor-by-Norwich, CN 1768, is a plain biconical that is dated to the 4th century on the Continent but is found here with a 6th century Group III brooch. A tall shouldered urn from Loveden is dated to the 6th century, although its closest Continental parallels are 4th century. The globular, everted-rim types are dated to the 5th and 6th centuries at Little Wilbraham, Londesbrough, and Sancton; but if they were at Westerwanna, they would be placed in the 3rd century. Of the accessory vessels illustrated in Fig 326 of the Corpus, Myres says 'their form suggests an early date' - but one of them is dated to 550 AD by the metalwork.

The typological chronology of Myres is further undermined when the practice of stamping vessels becomes common in the 5th and 6th centuries, because identical stamps are found on urns of widely differing styles.

The vessels from Kettering CNs 773, 775, and 4108 are bossed or unbossed with rows of stamps, some with necklines, some without. Typologically they are all of different periods but bear the same stamps.

At Caistor-by-Norwich, 'It is interesting to know that such a wide variety of different ceramic styles was in virtually simultaneous use at this date' (Myres 1973, 49). Eleven stamp-linked groups of pottery were present, six of these showing great variety of form and decorative style. Even when strong archaeological evidence for contemporaneity is present, the typology seems to overrule it. One group, 79, at Caistor-by-Norwich, contains two early pots and two late ones, and 'their contemporary burial is made certain by their enclosure within a surround of large flints' (Myres 1973, 73). But in discussing their date on stylistic grounds, Myres postulates that the flint cist was a re-used family plot. If this argument were applied to other vessels in cist groups, then their contemporary burial, which is often cited to support other parts of the typology, must also be in doubt.

The main drawback to Myres' system of classification and dating is his practice of assigning a broad date to a style or type, which is reasonable, but then claiming a specific date for certain vessels of that style. The whole typology is based on a belief that styles change from better to worse. If the decoration is 'slapdash', the vessel is late; if 'accomplished' then early. This can be reversed, however, in the case of Markshall LXX and Wehden 58. The Markshall pot is larger and the 'careful handling of the decoration indicates somewhat greater maturity', suggesting to Myres that the potter crossed the North Sea to Markshall and continued making this decorative type of urn.

Even where basic shapes are considered, Myres has his own typology. Bowls are 4th-5th century, globular vessels are early 6th century, plain tall vessels are 7th century. But this writer's research has shown that vessels of widely differing forms were made in each fabric, and that these probably represent the normal household assemblage. Just as Binford and Binford (1966) argued that the supposed cultural and typological chronology of Upper Palaeolithic material could be explained by different, but contemporary, tool kits, so this writer would argue that forms such as bowls, everted rim jars, and inturned pots have a functional rather than a chronological significance.

Certain forms, such as sharply carinated vessels, may well be of chronological significance, but a series of well-dated 'type fossils' must be built up before Saxon pottery can be dated more confidently. This is especially true of the 3rd and 4th century material, where there seem to be most argument and least datable metalwork. Possibly the improved thermoluminescence and radio carbon dating techniques could be used to test the longevity of certain styles and assess the accuracy of dating by association. It could certainly prove whether or not Myres' 3rd century dates for some of the Caistor-by-Norwich urns are feasible.

Chapter 13

Models and Explanations

The subject of this thesis has been the examination and microscopic analysis of the pottery from 34 settlement sites and 11 cemeteries, and an assessment both of the modes of production and of the traded ceramics at each site. This chapter is concerned with the synthesis of the data, and its testing against the Rice (1981) model of the evolution of specialised pottery production.

It is clear from the petrological analysis, and the subsequent comparison of fabrics between sites, that the majority of the pottery produced in the Early Saxon period in East Anglia was manufactured by individual households for their own personal consumption. Certain vessels may have been used for exchange on a small scale within the community, perhaps bartered for other goods; but little evidence has been found for this and therefore it must have been uncommon. The predominant mode of production is therefore domestic (Sahlins 1972); with pottery being manufactured within a similar social structure to that described by Balfet (1981) as being prevelant in North Africa. In the Maghreb, pottery production took place at the beginning of each summer when most of the women, or at least each house, combined together to collect clay and fuel in order to replace the vessels broken in the preceding year.

The tools necessary to produce pottery at this level are few and a wheel or turntable is seldom used. As the pottery making and firing season is short and takes place during a period of dry weather, kilns are not made. Archaeologically, household production will therefore leave little visible trace and is difficult to prove (Peacock 1982). However, at Grimstone End, Suffolk, some of the pottery fabrics were similar to the clay deposits within 100m of the site and there is evidence, in the form of shallow hollows in the ground containing wasters, for small-scale pottery production.

Although the majority of the East Anglian Early Saxon pottery was produced by, and for, the household, the few examples of traded ceramics point to other systems being in operation. It is seldom possible to date the traded fabrics, but the evidence points to these being late rather than early in the Early Saxon period. This is based on the presence of traded vessels bearing complex stamped decoration, traditionally dated to the second half of the 6th century (Myres 1977).

The stamps were possibly used as symbols that enabled workshops to be differentiated by their clients, but they may also have been symbols of social identity. The decoration may have carried an encoded message about the identity of the maker or user, their social group membership, status, wealth, religious beliefs and political ideology. Wobst (1977, 326) argues that the quantity of stylistic behaviour will increase as the size of the social network increases. The artifacts which carry such messages will be most widely broadcast and will enter into processes of boundary maintenance. This may have been the role of the decorated vessels, but there is evidence that undecorated wares were also being exchanged.

The most obvious instance of traded pottery is the Illington/Lackford workshop discussed in Chapter 11, but there is also evidence of ceramic exchange from a number of settlement sites, details of the pottery from which was given in Chapters 6, 7, and 8.

Ceramic exchange appears to have been taking place in four areas of East Anglia. These coincide with the areas of most fertile soil and maximum density of settlement, but how these factors relate to ceramic exchange is as yet unmeasured. Exchange will be more likely and possible if the distance between the two parties involved is small. Ceramic specialisation requires a threshold market population, which is controlled by the density and dispersion of the population (Earle 1981).

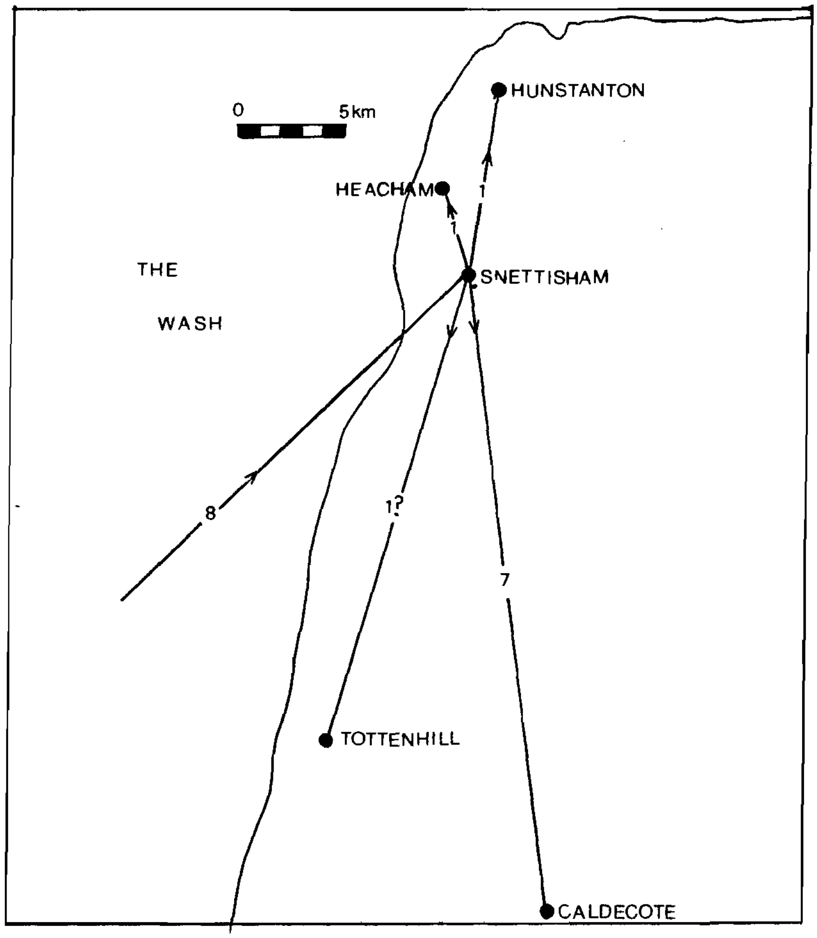
The first area to be dicussed will be that of the west Norfolk coast, where Snettisham is either the source, or a major consumer of a fabric that is found on certainly two, if not three, other sites. A second fabric, although in a minority at Snettisham, is found at Caldecote (see Fig. 13.1).

Snettisham fabric 1 forms the majority of the pottery and decorated vessels on that site. Two out of the three Hunstanton cremation urns were also in this fabric. It could be argued that this is ceremonial pottery, used in the burial ritual, but undecorated vessels of this fabric are also found at Heacham, and it is probable that a semi-specialist was at work producing a surplus of pottery for sale to neighbouring communities. The probable presence of the same fabric at Tottenhill, 24km to the south, raises the possibility of waterborne transport. However, it is not uncommon for pots produced at the semi-specialist level of production, that of household industry, (Peacock 1982) to be widely traded, often by middlemen (Steensberg 1940).

The Tottenhill fabric is not identical, but there do seem to be similar stamps on the Tottenhill and Snettisham cremation pottery. It is likely that further examples are present on other burial sites, but these were not examined for the purposes of this thesis.

A second area where ceramic exchange appears to have been taking place is in northeast Norfolk, between the sites of Witton (Wade 1983) and Hemsby. Fabric 1 at Witton formed approximately 60% of the assemblage there, which was over 3,000 sherds, so it is likely that Witton was the production centre: but as the Hemsby assemblage consisted of only two sherds, it is difficult to draw conclusions about the direction of travel or the mechanisms employed. Both sites are close to the sea coast and a 28km journey by water would have been easier than the 23km across the difficult terrain between the two sites, (see Fig. 13.2).

Waterborne transport is also a possible explanation for the distribution pattern of the Butley fabrics in southeast Suffolk. One of the Butley fabrics (fabric 3) is found in Little Bealings, and another fabric (fabric 7) at the Hadleigh Road cemetery to the west of Ipswich. There is strong evidence for Butley being a production site but not for these particular fabrics. Fabric 3 is, however, found on both the Neutral Farm and Church field sites



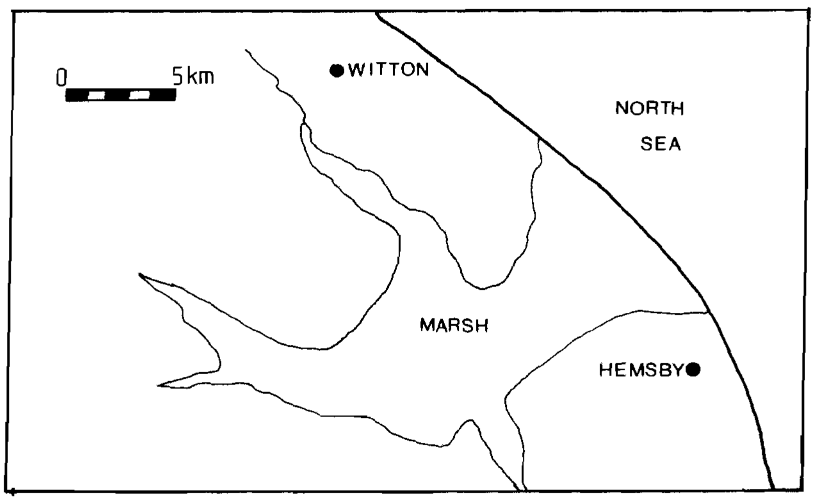


Fig. 13.1: (top) showing the evidence for traded pottery in northwest Norfolk. Fabric 8 probably comes from the Midlands.

Fig. 13.2: (bottom) showing the positions of Witton and Hemsby separated by marshland.

in Butley parish, and a source in this region is therefore likely.

The long distance that Butley fabric 7 has travelled either to or from Ipswich suggests sea transport, but whether the pottery was being carried for its own worth or as the container of a more valuable commodity cannot be ascertained (see Fig. 13.3).

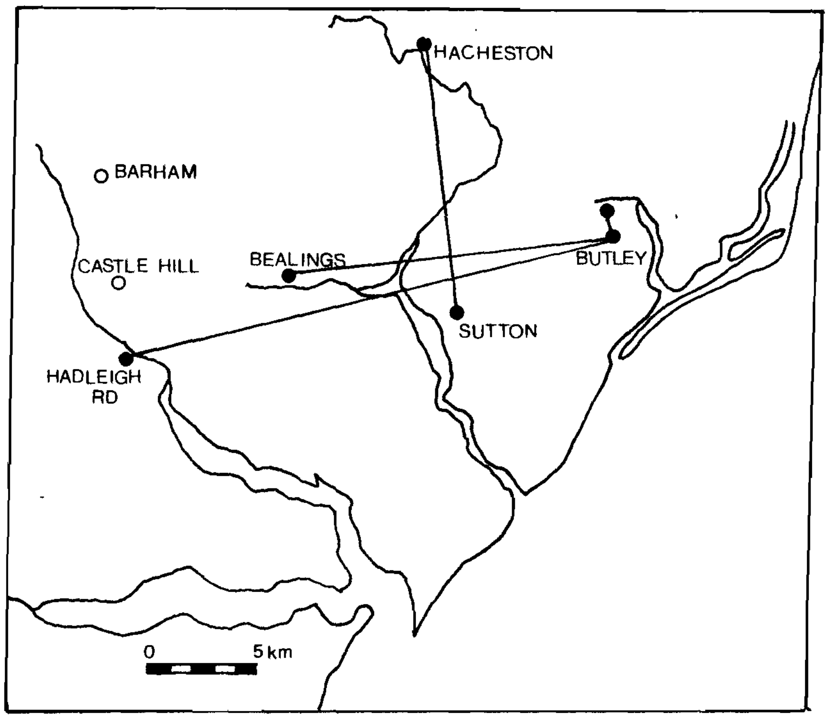
Another fabric in this area is found on the two sites of Hacheston and Sutton. The Sutton vessel was a container for a more valuable commodity, a hoard of Roman coins, and trade need not be involved for the distribution of this fabric. However, the vessel may have been traded prior to its use as a hoard-container, and the continuing excavations at Hacheston, a Roman settlement with Early Saxon occupation on its outskirts, may throw more light on the matter.

There is a great similarity among the fabrics in the Ipswich area, all being based on clays from the crag deposits (Chapter 4) and a common source of clay or pottery may be the explanation. A larger sample of pottery is needed from a number of sites before the variability of the fabrics can be assessed, and it is possible that ceramic trade and distribution was better organised in this area than our present knowledge allows.

The Breckland region is the fourth area where exchange in ceramics can be seen. There are links between Lakenheath and Mildenhall, Ixworth and Grimstone End, and Stanton Chair and Rickinghall Inferior. In all cases the scale of exchange appears to have been low but it certainly existed (see Fig. 13.4).

The links are only between two settlements, usually in close proximity to one another, and a semi-specialist mode of production is not necessarily the cause. Local barter and exchange does take place even when pottery making is based on the household (Belfet 1981), and such small-scale exchanges may be what is seen in the surviving archaeological assemblage.

Ceramic exchange may have been at a low level in the Breckland region due to the presence of a widely traded ceramic type, the products of the Illington/Lackford workshop. The evidence points to this workshop having been better organised and its products more widely distributed and it possibly supplanted the exchange of vessels of lesser quality. However, such products have not



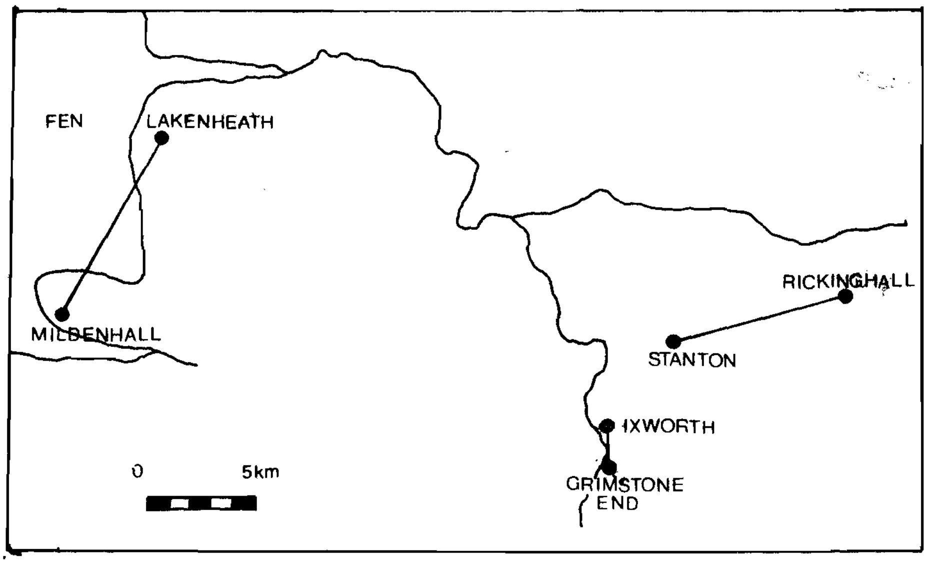


Fig. 13.3: (top) showing the sites in the Ipswich area and the Fabric links between them.

Fig. 13.4: (bottom) showing the fabric links between sites in the Breckland region.

been found on the Stanton Chair/Rickinghall or Grimstone End/Ixworth sites. These sites were probably early and the exchanges between them were perhaps small-scale exchanges that developed into a system that could support the semi-specialist potter.

The Illington/Lackford workshop (or potter) is the best known example of such semi-specialists. It is possible that the large quantity of widely distributed vessels are the products of a specialist rather than a semi-specialist potter, but it is difficult to differentiate between specialist and semi-specialist production from the archaeological record alone.

It is argued in this thesis that the Illington/Lackford workshop is in fact a larger concern than has hitherto been recognised, because other stamps appear on fabrics of this workshop that are not generally considered to be Illington/Lackford stamps (see Chapter 11). It can be argued that what is recognised as Illington/Lackford pottery is only one period in a larger production cycle. This would be further proof of a full-time specialist rather than a semi-specialist.

The pottery from the settlement sites has been examined and it is probably only further analysis of the cremation cemeteries, particularly Lackford, that will enable the full scale of production to be assessed.

There is evidence from the distribution pattern of the Illington/Lackford products in relation to the Dark Age boundary ditches of East Anglia (Clough and Green 1973), that pottery craft-specialisation is coincident with the growth of political units. It has been argued (Chapter 11) that the Illington/Lackford vessels were being distributed within an emergent socio-political unit. A similar unit can perhaps be seen on the west coast of Norfolk where rivers and boundary ditches demarcate the distribution area of the Snettisham pottery. Figure 13.5 shows this distribution; Figure 11.5 (page 526) shows that of the Illington/Lackford workshop.

The exact mechanisms behind the distribution of such workshop groups can only be guessed at. At the simplest level they may result from producer-consumer exchange. This involves pots

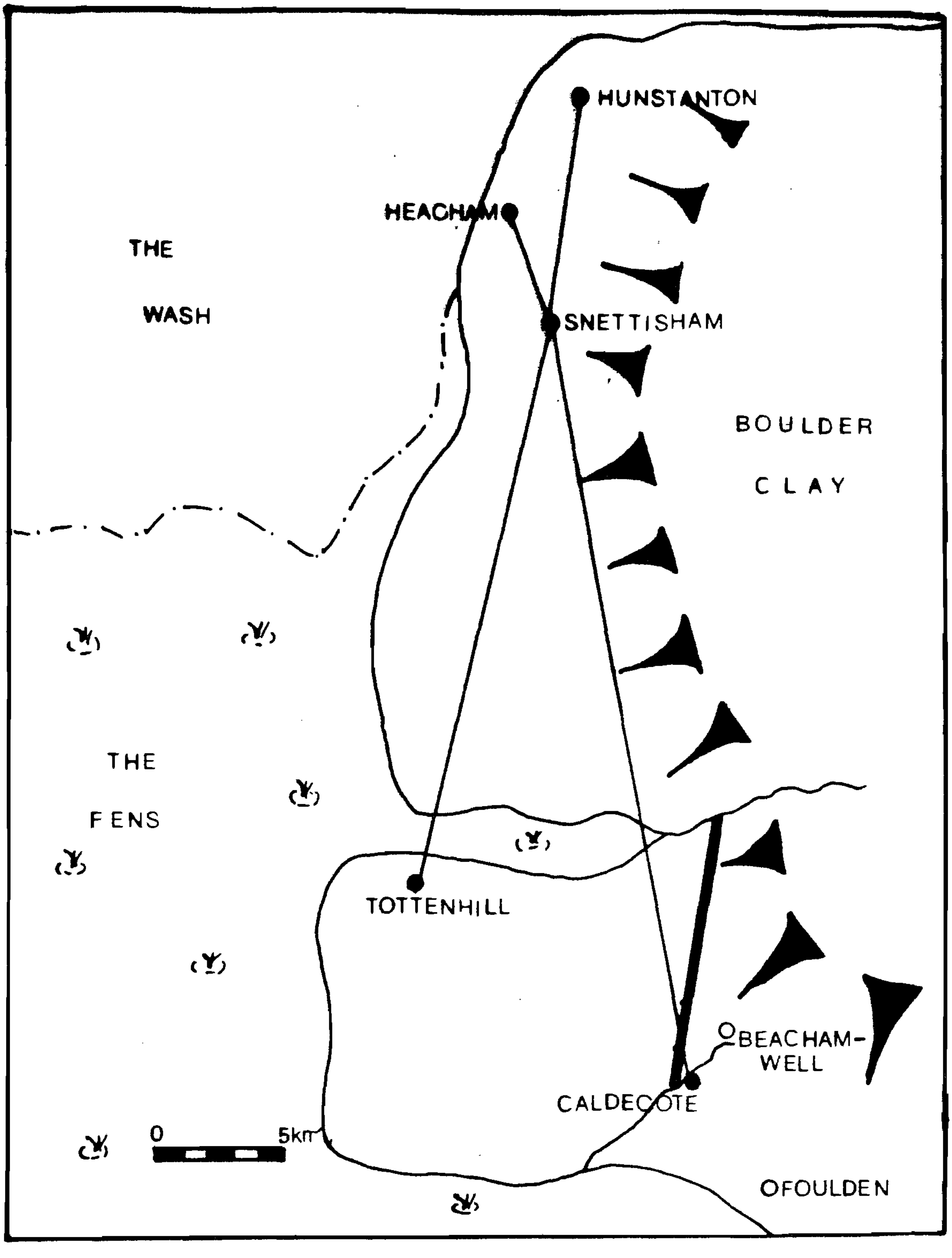


Fig. 13.5: The distritribution of pottery from Snettisham, defined by geomorphological and manmade boundaries. Snettisham fabrics were not found at Beachamwell or Foulden.

changing hands close to the place of production, and being transported by the purchasers back to their own settlements. However, this type of exchange usually results in a steep fall-off curve (Renfrew 1975) which is not present in the distribution pattern of the Illington/Lackford vessels, where the fall-off curve is more plateau-like (Fig. 11.5).

Hodder (1977) has argued that this type of fall-off curve is the result of gift exchange or reciprocally balanced transfer, which can also result in the appearance of occasional items at greater distances from the main area of distribution. It is thus possible that the distributions of workshop vessels in East Anglia relate to social groups.

The majority of stamped decorated vessels appear to stay within territiories which suggests the existence of regional well defined groups with strong social identities (Bradley and Hodder 1979), with further travelled vessels being involved in trade across the boundaries of such a group.

A more mundane reason for distributions may be that they were fashionable or were considered a superior product. The workshops produced decorated vessels, often of forms suitable for water-carrying and storage, and it is common among the ethnographic literature to find peoples who prefer a particular traded vessel for the taste it imparts to its contents. This is recorded both for cooking pots and water jars (David 1972; Foster 1960), which then travel as far as their reputations.

The correlation between the boundaries of the Illington/ Lackford distribution and the East Anglian Dyke systems, which must mark political boundaries, leads the present writer to favour the argument for a socio-politically based exchange system, possibly controlled by the leader of the political unit in the emerging elite class.

The evidence of craft specialisation, hand in hand with growing political and social complexity has been modelled by Rice (1981). Rice was able to measure diversity and standardisation in the ceramics of Central America, because they were present in large quantities on sites. The East Anglian Saxon material is not present in large enough quantities to allow for rigorous statistical analysis but the evidence from the settlement and cemetery ceramics examined can be tested against this model.

At the simplest level, and demonstrating the application of a simple technology, is the domestic mode of production - the production by a household unit for its own consumption (Sahlins 1972). This involves equal access to raw materials, with a minimal division of labour. Rice predicts that

1. There will be little uniformity in technological characteristics such as clays, tempers, and firing conditions.
2. Similar forms and decorative styles will be present, reflecting the current existence of a mental template for the ceramics, but there will be variations due to such factors as skill or amount of time invested.
3. Distinctions in form will be based on function, and elite high status pottery will not be present.
4. There will be uneven distributions of fabrics, forms, and designs across an archaeological site.

The pottery from most East Anglian sites corresponds with these four indicators of the domestic mode of production. The number of clays present on the settlement sites is usually high, each fabric being represented by only two or three vessels. Although there is a relative uniformity of temper, with only a small range having been utilised, the same temper was not always added to a particular clay, and sometimes two tempering agents were used together. All the evidence points to the firing of the pottery in simple bonfires; thus there was little uniformity in firing conditions. With such methods, skill was needed to produce pottery (Rye 1981, 96-98), but it would have been impossible to achieve complete control of the firing process, since, once the fire was lit, few changes could be made to it without adversely affecting the firing temperature (Rye 1981). The red and black marks visible on Saxon pottery are identical to those on vessels shown by Rye (1981, Fig 85) which had been fired in a small bonfire in Pakistan.

The Early Saxon range of pot-types is limited, and the fragmentary nature of the recovered assemblage makes it difficult to assess all but the rim forms. Although these are apparently based on mental templates, such as the five rim forms identified from Grimstone End (Chapter 9), it is clear that the potter was not concerned with the precise degree of inturning or eversion.

It cannot be claimed with any certainty that this relates directly to the time spent by a potter or to a potter's level of skill. A certain rim form might have been considered less important than the size of a vessel or its relevant temper/clay ratio. Nevertheless, it does indicate a lack of standardisation which is usually the mark of the non-specialist potter.

On average, 7% of the settlement pottery was decorated, and much else was probably removed from the settlement contexts for burial purposes. Even taking this into account, the relative lack of pottery on the settlement sites which presumably reflects high status fits Rice's model. Elite vessels would perhaps differ from non-elite in terms of unusual depositional contexts or unusual decoration. But the evidence from the settlement sites is that the decorative schemes commonly consist of stamping, or neck lines and chevrons; and (so far as this can be assessed) there is no noteworthy spatial patterning on the sites. These facts again point to the existence of an acephalous society.

Household concentrations of fabrics, forms, or designs were seldom found on the settlement sites. This, no doubt, was due to the limited size of the excavations, and because most of the pottery was recovered from secondary contexts, often in negative features. These would have trapped the rubbish involved in the depositional cycle, and sherds from a vessel could have become widely dispersed and incorporated in a number of features. At Grimstone End (where a large enough area was excavated for spatial patterning to be properly recognisable) the fabrics present in larger numbers were dispersed, but most other fabrics were found in only one feature. It is possible that the concentrations of a design were household-specific, but the number of decorated pieces is too small to support any firm conclusions.

The second stage of the Rice model predicts the occurrence of low-level specialisation, with the increased production of ceramics by those better able to accomplish this. There are various reasons for this phenomenon. The surplus can be used for exchange with other households: semi-specialisation can also be forced upon the socially disadvantaged. For example, in the absence of a supporting family infrastructure, an older person may need to produce surplus vessels in order to exchange them for the foodstuffs they cannot grow for themselves. (Balfet 1981, 259; David and Henig 1972). The existence of semi-specialisation may also indicate the beginning of the transformation of a basically egalitarian society into a more structured one, where certain kin groups have perhaps claimed sole use of a particular source of clay (Howard 1981).

According to Rice, semi-specialisation should leave characteristic evidence in the archaeological record. There should be an increasing standardisation of 1. fabric composition; 2. technology of manufacture and firing; and 3. decoration. Fourthly, accompanying these, there should be spreads (areal distributions) of the increasingly standardised products.

This is perhaps the hardest of Rice's stages to identify archaeologically, since the characteristics are all qualitative and difficult to quantify without large groups of material and good chronological control. In the absence of these, the first steps in the Rice model cannot be separated except through the fourth attribute of the wider areal distribution of ceramics. The extent of fabric distribution can, again, be best gauged at the Grimstone End excavations. Those fabrics which comprised over five vessels were scattered across the settlement. The fact that they are composed of five or more sherd groups, while the average for the whole assemblage is just over three, marks them out as fabrics of greater standardisation, produced in greater numbers. These fabrics form only 6% of the sampled sherd groups, and it is probable that most pottery was still being produced by individual households even when semi-specialists were in existence.

Step three in the Rice model is seen as a development that arose with greater socio-economic differentiation and the growth of a more strongly ranked society. Concomitant with such ranking is the development of a more competitive sector which accumulates and disposes of the resources of the society and uses them to strengthen its position.

The competition among social groups may result in a greater innovation in pot types and their elaboration. The demand for elite, ritual, or mortuary pottery will increase; and this in turn may increase the need for greater production. Being wealthier, the elite group creates a demand sooner than other groups in the society, and the specialist production of elite vessels will take precedence over increased production for members of the lower social levels. The elite group may use the increased quantity of goods to establish and maintain trade networks with neighbouring societies. These networks will be controlled by the elite members of the participating societies.

The 'test implications' for this stage are more complex, as befits the more complex social system. In the first place, there should be unequal distributions of classes of pottery, that is, an association of certain classes with elite and related lineages (the beginnings of 'social' functional or status-reinforcing distinctions in pottery) (Rice 1981, 223). This 'expectation' is hard to distinguish in the settlement pottery of East Anglia, but can readily be demonstrated at the Illington cemetery where the Illington/Lackford and other urns in related fabrics correlated with burials marked by grave goods, and thus were probably 'elite'.

Secondly, the elite class of goods should be discernible by its decorative characteristics, a greater variety of types (and complexity) of decoration, greater skill in decoration, and perhaps rare or exotic materials or motifs. The Illington/ Lackford workshop and the other workshop groups provide the evidence that this 'expectation' is true for Early Saxon East Anglia. The majority of decorated vessels exhibit better qualities of finish, and the variety and complexity of decoration are obvious in the profusion of stamps and their arrangements on the vessels. Certain stamps on vessels at Caistor-by-Norwich, Markshall and Lackford were possibly acquired from leather workers

(Myres and Green 1973, 61), and other stamps were possibly obtained from gold workers (Briscoe 1979, 165). Both of these industries would have been producing for the elite classes and it is possible that the elite's craftspeople were provided with shared quarters.

Thirdly, it should be possible to isolate the elite vessels through their standardisation of technology (forms and fabrics). Furthermore, imitation wares with similar decorative styles, but in different fabrics, may appear. The Illington/Lackford workshop again provides the best example of standardised forms and fabrics, the latter being easily recognisable on a number of sites. Most of the vessels were globular, narrow-mouthed pots The vessel from Bury St Edmunds, West Garth Gardens (sample 2), which is badly decorated in the Illington/Lackford style, but is in a totally different fabric, probably represents an imitation elite ware. A similar explanation may account for urn W39 at Caistor, which is thought to have been influenced by the Illington/Lackford style (Myres and Green 1973, 58).

Fourthly, the elite goods should be distinguished by their 'areal distribution', being restricted to particular areas of a site or a region; and they should be found in contexts associated with the elite. Elite residences have yet to be identified with any certainty in Early Saxon East Anglia. The methods of discovery and recovery of the Early Saxon material have not been conducive to the recognition of timber buildings associated with the elite. Timber halls which were possibly elite dwellings have been recognised only at West Stow (West 1971). Although Illington/Lackford vessels were found in Hall 5, they were also present in many of the grubenhäus which were probably ancillary buildings or dwellings of the non-elite. There is an apparent link in funerary contexts between Illington/Lackford vessels and high status goods, both at Lackford (Lethbridge 1951) and at Illington (see Chapter 10).

The fifth expectation of the model is that any comparison between the semi-specialist pottery assemblage and the assemblages of earlier modes of production should show a significant increase in diversity with more and newer forms being made. At the same time, there should be a decrease in technological variability, both in the elite and in the utilitarian pottery.

This increasing diversity can be clearly seen in the decorated wares of the later 6th century. A large number of fabrics were found which carry widely differing decorative schemes, in contrast with the simpler linear designs of the earlier Saxon period. Diversity of form is harder to quantify, due to both the fragmentary state of much of the evidence and the lack of dating evidence in domestic and funerary contexts alike. It is not really possible to quantify the change in the number of forms over time when the chronology of the period is based on a simplistic typology of those forms.

A decrease in technological variability can be seen on a number of settlement sites. Where large quantities of a fabric have survived they were probably the products of semi-specialists. At Grimstone End, fabric 9 consists of 11 vessels, with nine rims of markedly similar form. All are probably cooking pots with little evidence of surface finish apart from smoothing. Except for one vessel, they are all well-fired and reduced. Fabric 9 vessels are found throughout the settlement and therefore must represent something more than household production. At Butley Church, fabric 1 forms the majority of the assemblage with a series of 12 small, wide-mouthed, vessels which exhibit little diversity in form. Butley seems to have been late in the Early Saxon sequence and the forms mirror the specialist products of the Ipswich wares.

The fourth step of the Rice model is one where intensified production begins in response to the forcible extraction by the elite class of pottery as tribute, or for trade, or for both purposes. Rice places this in a rural context, but in Saxon East Anglia it appears to coincide with a phase of urbanisation as Ipswich developed.

The test implications for the stage should, according to Rice, include some of the following 1. the presence of standardised locations of pottery making; 2. indications of mass production; 3. a broad distribution of standardised forms and types; 4. standardisation of non-elite pottery fabrics; and 5. the elaboration of the decorative aspects of the elite or high value pottery.

As has been shown, the first characteristic is exemplified by the evidence from Ipswich, where the pottery industry appears to have been confined to what is now the Cox Lane area (Dunmore et al 1975). Such industrial zoning seems not to have applied to other industries in the town. Indications of mass production can be clearly seen in the pottery itself, which was made on a slow wheel or turntable, probably to speed production. There are also standardised forms. The cooking pots, which formed 83% of the total, had three basic rim forms, and 75% of those pots had a rim diameter of between 11cm and 17cm. Standardisation of technology is shown in the use of kilns for firing the vessels, and the fact that the three main fabrics identified at Ipswich can be readily identified on other sites and occur in the same proportions as at Ipswich itself (Hurst 1976). The wide distribution of such quantities of cooking pots with standardised forms suggests that this is non-elite pottery.

The first four implications are therefore present in Ipswich ware. The fifth implication deals with decoration, which should become more elaborate on the elite/high value pottery. In fact, in East Anglia the decoration appears to have become less elaborate as Continental forms (which often lacked decoration) were copied. It is probable that the spouted pitcher was seen as an elaborately decorated vessel, as it was a form previously unknown to the Saxons on this side of the North Sea. The decoration that does exist on the pitchers consists of a stamped decoration often employed with pendant triangles of incised lines (Hurst 1976, Fig. 7.11). Without doubt, this is closely related to the handmade Saxon pottery of the immediately preceding years, particularly the stamped swags and pendant triangles of the Illington/Lackford workshop.

It is possible that the elite class's control of the semi-specialists who produced handmade decorated pottery had increased to such an extent that they had forced a change both in the place of work and in the quantity and the forms produced. It has been suggested by Smedley and Owles (1967) that the establishment of the Ipswich ware industry was the result of royal initiative, and certainly the role of Ipswich as a port of trade (Hodges 1978)

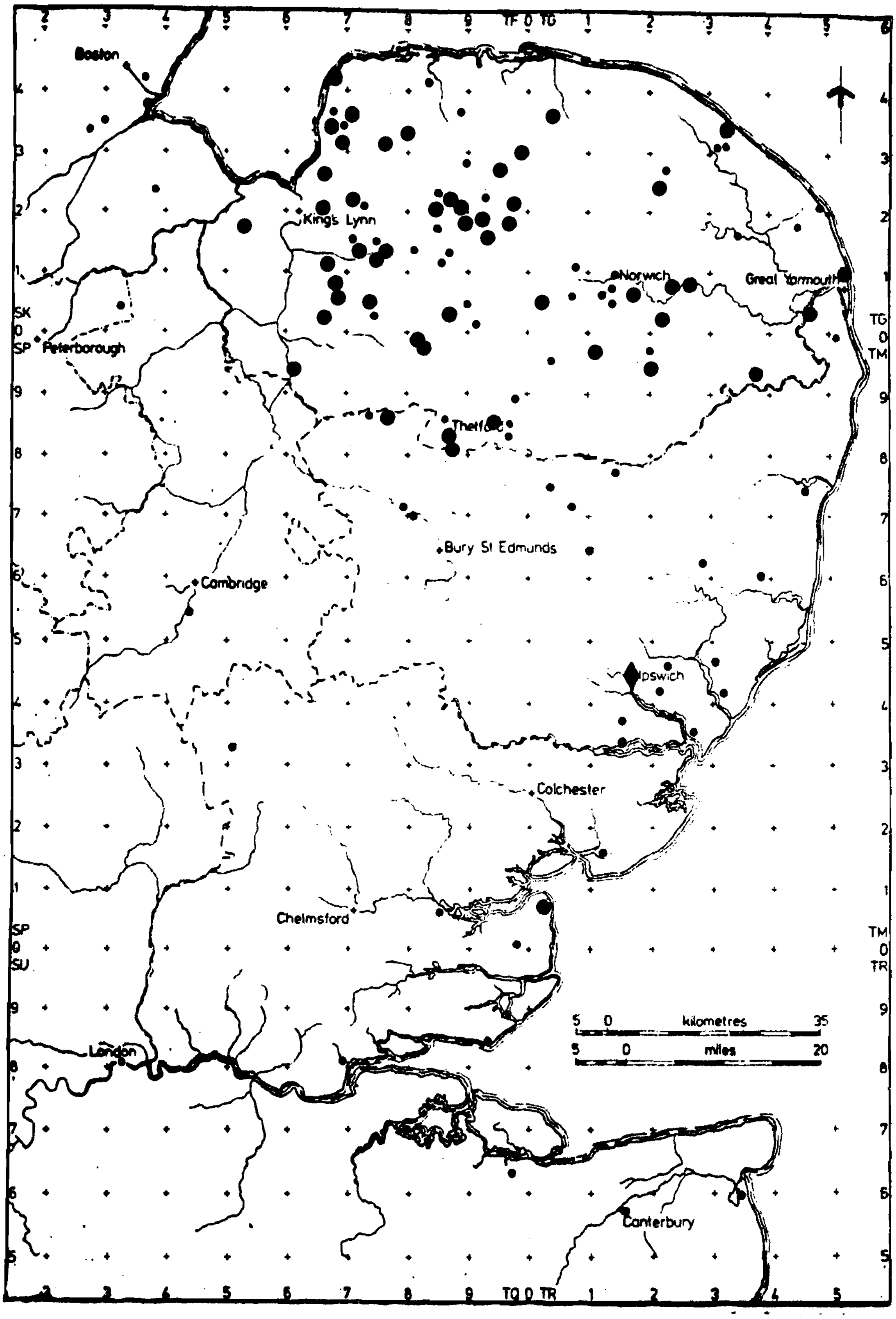


Fig. 13.6: showing the known distribution of Ipswich Ware (August 1982). Small circles are single sherds or vessels. Large are two or more sherds or vessels.

would support this theory. The widespread distribution (Fig. 13.6) of the Ipswich ware pitchers reinforces the supposition about their status as vessels of the elite class. Their distribution is much wider than that of the cooking pots, which are found almost exclusively within the boundaries of the Kingdom of East Anglia (Hurst and West 1957).

It is therefore possible that the spouted pitchers were being used as status-reinforcing items, the production and distribution of which were totally under the control of the ruler of the Kingdom of East Anglia. They perhaps played a role in exchange external to the political system. It has been argued in Chapter 11 that those rare vessels of the Illington/Lackford workshop which have been found outside the supposed political boundaries of the Breckland unit are evidence of the same sort of exchange at an earlier date.

One drawback to Rice's work on the Mayan ceramics is that, although her model fits the ceramic evidence, she could produce no documentary evidence of the growing political complexity which she claims should have been developing along with the evolution of pottery making. This can be seen in East Anglia, however. That the original settlement was one of people in an acephalous society is not proven; but it is likely given the circumstances, and arguing from the fact that the East Anglian Kingdom is not documented until the 7th century. The distribution of the Illington/Lackford vessels and the products of other workshops thus suggests the existence of smaller political units which eventually coalesced into the Kingdom of East Anglia.

The introduction of mass-produced Ipswich ware and its widespread distribution should therefore be seen not as a revolutionary step in political or technological terms (possibly linked to foreign workers or influence) but simply as the next evolutionary step in the continuing process of political and social centralisation that began in the Early Saxon period.

The systems collapse model, used in Chapter 2 to chart the decline of the Romano-British political system, remains relevant throughout the period being studied since the sigmoid curve models the variables of the later system. A rise in the investment in charismatic authority can be seen both in the new kingdoms of Saxon England with the establishment of urban and trading centres, and in a redistributive system based on kingship. This regal wealth would have been unrealisable without greater control of agriculture, the source of wealth, and it is probable that rural marginality also increased. The Middle Saxon socio-political system thus re-enters the cycle on the cusp surface, after some centuries at a low and fairly stable position.

The theoretical framework of Chapter 2 has indicated that it will be difficult, if not impossible, to trace continuity between Roman and Saxon Britain, and that the search for evidence of phases of transition or controlled settlement is likely to be fruitless. The invention of such phases is unnecessary to an understanding of the Early Saxon period. One should, anyway, seek explanations of the Saxon settlements in the Continental homelands rather than in Eastern England.

Settlement location studies in East Anglia show that continuity might have existed, with a number of Saxon sites located in very close proximity to, or coincident with, late Roman occupation sites. If interaction between the two cultures cannot be seen in this area, it will probably not be seen elsewhere.

Studies should now be concentrated on the physical and chemical examination of the artifactual evidence, and an attempt should be made through these studies to explain the changes in the social systems. It is likely that a study of the bronzework and other artifacts will provide evidence of a similar evolution of craft specialisation, and perhaps cast further light on the growth of political units in the Early Saxon period.

The Breckland region would be an ideal area for such studies, which would complement the results embodied in this thesis. It contains at least three large Saxon settlements which are close to each other: the positions of other, partly excavated settlements are also known. The high density of cemeteries in the region should enable the social and ritual systems to be studied together. Such an intensified study of a localised area must lead to a greater understanding of the whole Early Saxon period.

Bibliography

List of abbreviations.

Amer. Antiq. American Antiquity.

Antiq. Antiquity.

Antiq. J. Antiquaries Journal

Arch. J. Archaeological Journal.

B.A.R. Brit. Ser. British Archaeological Reports, British Series.

B.A.R. Int. Ser. British Archaeological Reports, International Series.

Bonner Jb. Bonner Jahrbucher.

B.R.O.B. Berichten van de Rijksdienst voor het Oubheidkundig Bodemonderzoek.

Brit. Mus. Occ. Paper. British Museum Occasional Papers.

C.B.A. Council for British Archaeology.

Cam. Antiq. Soc. Cambridge Antiquaries Society.

E.A.A. East Anglian Archaeology Reports.

Geol. Mag. Geological Magazine.

INQUA International Union for quaternary Research.

J.A.S. Journal of Archaeological Science.

J.B.A.A. Journal of the British Archaeological Association.

J. Ecology. Journal of Ecology.

J.E.P.N.S. Journal of the English Place-name Society.

J. Field Arch. Journal of Field Archaeology.

J. Geol. Journal of Geology.

J. Hist. Geog. Journal of Historical Geography.

J.S.P. Journal of Sedimentary Petrology.

Med. Arch. Medieval Archaeology.

Metall.Soc.Am.Inst.Mech.Engineers. Metallurgical Society of America Institute of Mechanical Engineers.

Proc. Cam. Antiq. Soc. Proceedings of the Cambridge Antiquarian Society.

Proc. Geol. Assoc. London. Proceedings of the Geological Association of London.

Proc. Hants Field Club Arch. Soc. Proceedings of the Hampshire Field Club Archaeological Society.

P.S.I.A. Proceedings of the Suffolk Institue of Archaeology.

Res. Rep. Comm. Soc. Ant. Research Reports of the Committee of the Society of Antiquaries.

Scot. Arch. Rev. Scottish Archaeological Review.

Sussex Arch. Colln. Sussex Archaeological Collections.

Trans. Lincs. Nat. Soc. Transactions of the Lincolnshire Naturalists Society.

World Arch. World Archaeology.

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