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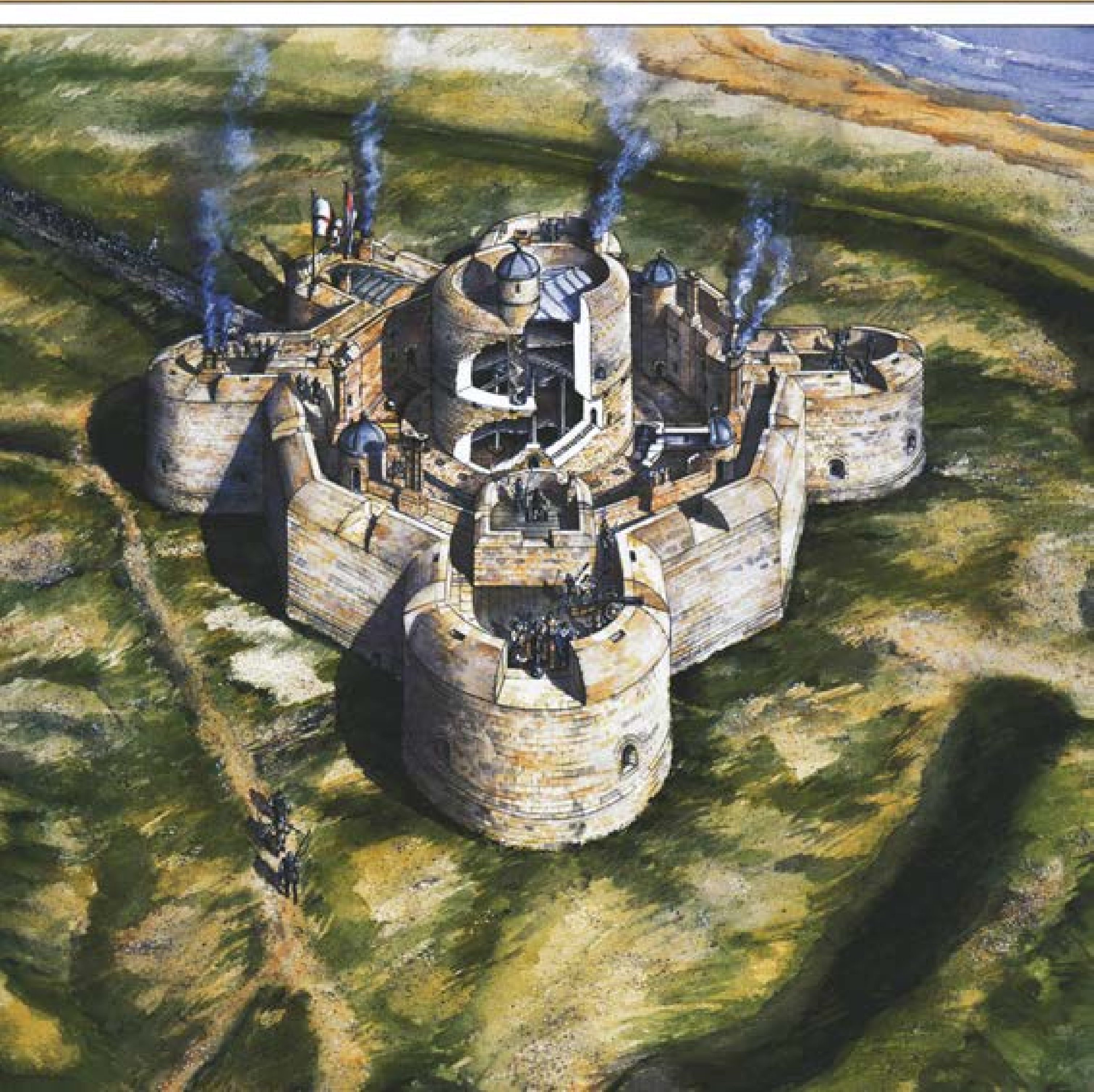
Henry VIII's Coastal Artillery Fort at Camber Castle, Rye, East Sussex

Martin Biddle, Jonathan Hiller, Ian Scott and Anthony Streeten



Henry VIII's Coastal Artillery Fort at Camber Castle, Rye, East Sussex

An archaeological, structural and historical investigation

Martin Biddle, Jonathan Hiller, Ian Scott
and Anthony Streeten

with major contributions by

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Published by the
Oxford Archaeological Unit
for English Heritage
2001

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SUMMARY

Camber Castle is situated 1.5 km to the south of the town and Cinque Port of Rye, and approximately the same distance to the north-east of the medieval town and Cinque Port of Winchelsea in the county of East Sussex on the south coast of England. Constructed between 1539 and 1543, it incorporated an earlier round gun tower built between 1512 and 1514. Camber Castle was an elaborate artillery fortification that represented an important element of Henry VIII's 'Device', or coastal defence network, put in place from 1539 as a response to the threat of invasion following England's breach with Rome. The castle was operational for 100 years. By the 1630s, the steady advance of the coastline had left it stranded well inland from the sea. This, combined with changes in the concept of artillery fortification, resulted in its decommissioning in 1637.

Camber Castle is particularly notable on two counts. Firstly, the retreat of the sea and the silting of the harbour meant that it was not adapted for continued use through the 18th and 19th centuries, and survives as an example of a largely unmodified Henrician artillery fort. Secondly, Camber is unique in displaying several clear and discrete phases of construction, which reflect changes in thinking about the design of fortifications.

The earliest structure (phase I) comprised an artillery tower which now forms the base of the keep of the present castle. Built between 1512 and 1514, it was one storey high, and its roof formed the gundeck for its main guns. Around the base of the tower there were ten narrow double-splayed gunports, which were probably mounted with guns for local defence.

The second phase (phases IIa and IIb), undertaken in 1539-40, saw the construction of the 'Device' fort. This was the work of Stephen von Haschenperg, who was also responsible for Sandgate Castle, and certainly represents the first attempt to build in England an artillery fortress of ultimately Italian inspiration. As he first intended it, the castle had a very low profile and was clad with sloping earthworks; the entire perimeter was commanded by flankers concealed in bastions, on the *terrepleins* of which the heaviest ordnance was mounted. There was a marked emphasis on internal security and close defence, and the design incorporated a complex system of concealed stairs and subterranean passages. Unforeseen problems, including the high groundwater level, clearly forced compromises in von Haschenperg's original intentions while work was in progress.

Von Haschenperg's fortification was complete by the autumn of 1540, and was fully garrisoned and armed by the end of that year. However, there seem to have been serious doubts about its effectiveness, and within only eighteen months a third and vastly more expensive building campaign began, involving the complete remodelling of the outer defences, and the heightening of internal structures (phase III, 1542-3). In its final form, the castle was able to mount heavy ordnance at two, or perhaps three, levels, and would doubtless have been highly effective against a hostile fleet. Nevertheless, the reconstruction of phase III represents an essentially conservative design, in keeping with the other Device forts, but already virtually obsolete by comparison with Continental developments in artillery fortification.

The castle is now in the keeping of English Heritage, and has seen numerous campaigns of research, excavation and survey in advance of restoration and consolidation work. Major investigations were undertaken during the 1960s and 1970s, and informed Martin Biddle's authoritative account of the design and building of Camber Castle, published in *The History of the King's Works* in 1982, which is republished in a revised version in the present volume. Subsequent work at the castle has largely added to, rather than altered, Biddle's original interpretations. The present volume draws together all available evidence from research, survey and excavation, to provide a full and synthesised account of the current state of knowledge regarding this monument.

The artefact assemblages are of considerable importance for the early post-medieval period, and are reported in full. The major elements are the extensive 16th- and early 17th-century assemblage of English and imported pottery, a German ceramic tile-stove, a wide range of 16th- and 17th-century military artefacts including artillery, musketry, hand weapons and armour, a significant collection of vessel glass including *façon de Venise cristallo*, and a useful group of clay tobacco pipes. The animal bone collection is a useful benchmark for the zoo-archaeology of post-medieval England, and provides evidence for early livestock improvement.

The building accounts for the construction of von Haschenperg's fortification were analysed and published in detail in *The History of the King's Works*, and are republished in the second chapter of the present volume. To this is added a continuation of the history of the castle during the 100 or so years of its occupation and use, and a discussion of the ordnance provision.

RÉSUMÉ

Le château de Camber est situé à 1.5 km au sud de la ville et de Cinque Port of Rye, et approximativement à la même distance au nord-est de la ville médiévale et de Cinque Port of Winchelsea, dans le conté de Sussex East, sur la côte sud de l'Angleterre. Construit entre 1539 et 1543, il comprenait une tour d'artillerie circulaire précoce, édifiée entre 1512 et 1514. Le château de Camber était une fortification d'artillerie élaborée qui représentait un élément important de la 'Devise' d'Henri VIII, ou réseau de défense côtière, mis en place depuis 1539 en réponse à la menace d'invasion qui suivie la rupture de l'Angleterre avec Rome. Le château fut opérationnel pendant 100 ans. Dans les années 1630, en raison de la progression constante du litoral, le château se trouvait en rade à l'intérieur des terres, éloigné de la mer. Cette situation, ajoutée aux changements intervenus dans le concept de fortification d'artillerie, entraina sa désaffectation en 1637.

Le château de Camber est particulièrement remarquable sur deux aspects. Premièrement, le retrait de la mer et l'ensablement du port ont rendu son utilisation continue à travers les XVIII et XIXe siècles non appropriée ; il a donc survécu comme un exemple de fort d'artillerie henricien, en grande partie non modifié. Sur un second plan, Camber présente un étalage unique de diverses phases de constructions, claires et distinctes, qui reflètent les changements de mentalités concernant les plans de fortifications.

La structure la plus précoce (phase I) comprend une tour d'artillerie qui forme maintenant la base du donjon du château actuel. Edifiée entre 1512 et 1514, elle s'élevait sur un seul niveau, et son toît formait la plateforme de tir pour ses principaux canons. Autour de la base de la tour se trouvaient dix canonières étroites à double ébrasures, qui étaient probablement équipées de canons pour la défence locale.

La seconde phase (phase IIa et IIb), entreprise à partir de 1539–40, voit la construction du fort de la 'Devise'. Ce travail était l'oeuvre de Stephen von Haschenperg, qui était également responsable pour le château de Sandgate, et représente certainement la première tentative de construction, en Angleterre, d'une forteresse d'artillerie fortement inspirée sur le modèle italien. Comme il en avait tout premièrement l'intention, le château présentait un profil très bas et était flanqué d'ouvrages de terrassement en pente ; le périmètre dans son entier était dominé par des ailes dissimulées en bastions, sur les terrepleins desquels se trouvaient les pièces d'artillerie les plus lourdes. Ceci représente une accentuation marquée de la sécurité interne et de la défense rapprochée ; le plan incorporait un système complexe d'escaliers dissimulés et de passages souterrains. Des problèmes imprévus, en particulier le niveau élevé de la nappe phréatique, entrainèrent des compromis obligatoires au cours des travaux, dans les intentions originales de von Haschenperg.

La fortification de Von Haschenperg était achevée à l'automne 1540, elle était armée et la garnison complète en place avant la fin de la même année. Cependant, il semble que de sérieux doutes soient intervenus quant à son efficacité, et dans les dix-huit mois qui suivirent, une troisième campagne de construction extrêmement coûteuse fut entreprise, entrainant la réorganisation des défenses extérieures, et le réhaussement des structures internes (phase III, 1542–3). Dans sa forme finale, le château était capable de supporter des pièces d'artillerie lourdes sur deux ou peut-être trois niveaux, et aurait était sans le moindre doute, d'une grande efficacité contre une flotte hostile. Néanmoins, la reconstruction de la phase III présente un plan essentiellement conservatif, en accord avec les autres forts de la Devise, mais déjà, en pratique, dépassé par les développements continentaux de la fortification d'artillerie.

Le château est à l'heure actuelle sous la garde de English Heritage et a fait l'objet de nombreuses campagnes de recherches, de fouilles et de relevés topographiques préliminaires aux travaux de restoration et de consolidation. Des études majeures furent entreprises dans les années 1960 et 1970 ; ces dernières constituèrent une source d'informations utilisées par Martin Biddle dans son compte rendu, qui fait autorité, sur le plan et la construction du château de Camber, publié dans *The History of the King's Works*, en 1982, lequel est réédité dans une version révisée dans le présent volume. Les travaux ultérieurs entrepris au château ont largement permis de compléter, plutôt que de modifier, les interprétations originales de Biddle. Le présent volume rassemble toutes les preuves disponibles concernant la recherche, le relevé et la fouille, afin de fournir un compte rendu complet et synthétique de l'état des connaissances sur ce monument.

Les assemblages d'artefact sont d'une importance considérable pour la période post-médiévale précoce, et sont ici rapportés dans leur ensemble. Les éléments majeurs sont : le lot extensif de poteries anglaises et d'importation des XVIe et début XVIIe siècles ; un poêle allemand en tuiles ; un large échantillon d'artefacts militaires des XVIe et XVIIe siècles comprenant artillerie, armes de tir, armes blanches et armures ; une collection significative de vaisselle de verre comprenant un *cristallo* "façon de Venise" ; et enfin un groupe intéressant de pipes à tabac en argile. La collection d'ossements animaux représente un repère utile concernant l'archéozoologie de l'Angleterre post-médiévale, et fournit des preuves d'amélioration précoce du cheptel.

Les compte-rendus de bâtiment pour la construction de la fortification de Von Haschenperg ont été analysés et publiés en détail dans *History of the King's Works*, et sont réédités dans le second chapitre du présent volume. A ceci, a été ajouté la suite de l'histoire du château au cours des 100 et quelques années de son occupation et de son utilisation, ainsi qu'une discussion concernant l'approvisionnement des pièces d'artillerie.

ZUSAMMENFASSUNG

Camber Castle liegt an der englischen Südküste 1,5 km südlich der Stadt und des Cinque Port von Rye und im annähernd gleichen Abstand nordöstlich der mittelalterlichen Stadt und des Cinque Port von Winchelsea im County East Sussex. Erbaut zwischen 1539 und 1543 integriert es einen früheren runden Geschützturm, der zwischen 1512 und 1514 entstand. Camber Castle war eine kunstvoll ausgeführte Artilleriebefestung, die ein wichtiges Element in Heinrich VIII. 'Device', seiner Küstenverteidigung darstellte. Das 'Device' wurde 1539 als Antwort auf eine drohende Invasion nach dem Bruch Englands mit Rom entwickelt. Die Befestigung wurde rund 100 Jahre lang genutzt. In den 30er Jahren des 17. Jahrhunderts lag sie durch das ständige Vorrücken der Küstenline schon weit vom Ufer entfernt. Dies führte, zusammen mit Änderungen im Konzept der Artilleriebefestung, zu seiner Aufgabe im Jahr 1637.

Camber Castle ist aus zwei Gründen besonders bemerkenswert. Erstens, weil es trotz zunehmender Entfernung vom Meer und Verschlammen des Hafens nicht zur weiteren Nutzung im 18. und 19. Jahrhundert angepaßt wurde und dadurch als Beispiel eines großen, unveränderten Artillerieforts aus der Zeit Heinrich VIII. erhalten blieb. Zweitens lassen sich in Camber Castle eindeutig klar getrennte Phasen des Aufbaus nachweisen, die Änderungen am Entwurfes der Befestigung wiederspiegeln.

Die früheste Struktur (Phase I) umfasst einen Wehrturm, der den Ausgangspunkt des Bergfrieds des jetzigen Festungsbaues bildet. Diese erste Phase wurde als eingeschossiger Bau zwischen 1512 und 1514 erbaut. Auf dem Dach standen die Hauptkanonen und rund um die Basis lagen zehn schmale, doppelt abgeschrägte Schießscharten, die vermutlich mit Gewehren verteidigt wurden.

Die zweite Phase (Phasen IIa und IIb) datiert in die Jahre 1539–40 und entspricht dem eigentlichen Aufbau des 'Device'-Forts. Es entstand unter der Leitung von Stephen von Haschenperg, der auch für Festung Sandgate Castle verantwortlich war und stellt zweifellos den ersten Versuch dar, in England eine Artilleriebefestigung zu errichten, die an italienischen Vorbildern orientiert war. Wie ursprünglich beabsichtigt, hatte das Schloß ein sehr niedriges Profil und war mit schrägen Böschungen verkleidet. Der gesamte Randbereich wurde durch die *flankers* bestimmt, die in den Bastionen verborgen wurden. Auf den *terrepleins* standen die schwersten Geschütze. Das Hauptinteresse galt der inneren Sicherheit und einer geschlossenen Verteidigung. Die Architektur enthielt ein komplexes System verborgener Treppen und unterirdischer Gänge. Unvorhergesehene Probleme, einschließlich des hohen Grundwasserniveaus erzwangen offenbar Kompromisse in den ursprünglichen Absichten von Haschenpergs während der Bauarbeiten.

Die Befestigung von Haschenpergs wurde im Herbst 1540 fertiggestellt und bis Ende des Jahres voll bemannt und bewaffnet. Es schien jedoch ernste Zweifel über ihre Wirksamkeit gegeben zu haben, denn nach nur achtzehn Monaten begann ein dritter und weitaus kostspieligerer Umbau, der eine komplette Umgestaltung der äußeren Verteidigungsanlagen und die Erhöhung der Innenbauten einbezog (Phase III, 1542–3). In seiner letzten Form konnte das Schloß schwere Artillerie in zwei oder möglicherweise drei Geschossen beherbergen, und war zweifellos sehr wirkungsvoll gegen eine feindliche Flotte. So stellt die Rekonstruktion von Phase III einen im Kern konservativen Entwurf dar, der im Vergleich mit kontinentalen Entwicklungen in der Artilleriebefestigung praktisch schon überholt war.

Das Schloß steht unter der Aufsicht von English Heritage und hat zahlreiche Kampagnen der Erforschung und Ausgrabung erfahren, die als Grundlage zur Wiederherstellung und für Sicherungsarbeiten dienten. Die Hauptuntersuchungen wurden während der 1960er und 1970er Jahre durchgeführt. Diese lieferten die maßgeblichen Informationen für das grundlegende Werk von Martin Biddle über das Aussehen von Camber Castle, veröffentlicht in *The History of the King's Works*, 1982, das in einer korrigierten Version in diesem Band neu aufgelegt wird. Nachfolgende Arbeiten am Schloß haben Biddles ursprüngliche Interpretationen eher bestätigt als geändert. Dieser Band trägt alle verfügbaren Forschungsergebnisse zusammen, um eine umfassende Synthese des Wissensstandes über dieses Denkmal vorzustellen.

Die Fundmaterial ist von beträchtlichem Aussagewert für die frühe Neuzeit und wird vollständig dokumentiert. Der Schwerpunkt liegt auf umfangreichen Komplexen englischer und importierter Keramik des 16. und frühen 17. Jahrhunderts. Außerdem werden ein deutscher Kachelofen, eine große Auswahl militärischer Funde des 16. und 17. Jahrhunderts behandelt, einschließlich der Artillerie, der Musketen, der Handfeuerwaffen sowie der Rüstungen. Ergänzt wird das Fundmaterial durch eine bedeutende Sammlung von Gläsern (u.a.*cristallo façon de Venise*) und eine aussagekräftige Gruppe von Tonpfeifen. Das Tierknochenmaterial ist eine wichtige Fundvorlage für die Archaeozoologie des frühen neuzeitlichen England und liefert Beweise für eine frühe Viehverbesserung.

Die Rechnungsbücher für den Aufbau der Befestigung von Haschenpergs wurden detailliert in *The History of the King's Works* analysiert und werden im zweiten Kapitel dieses Bandes erneut veröffentlicht. Ergänzend wird eine Geschichte der Befestigung während seiner hundertjährigen Benutzung und Bestimmung angehängt, sowie eine Diskussion seiner Artillerieausstattung.

ACKNOWLEDGEMENTS

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Thanks are due to John Parry of Winchelsea Museum for arranging to have Captain Lovegrove's reconstruction map of the 'Camber' in the mid 16th century photographed, and to David Bourne who took the photograph. Particular thanks are due to Captain Lovegrove's widow for permission to reproduce the map.

Rye Town Council, the Public Record Office, The National Maritime Museum, Cambridge University Committee for Aerial Photography, East Sussex Record Office and the Austrian National Library all supplied and gave permission to reproduce illustrations. Thanks are due to Philip Bye of the East Sussex Record Office for his help with locating illustrations and negotiating with Rye Town Council for permission to reproduce the Symondson map of 1594. Special thanks are due to Peter Dunn who produced the reconstruction painting of Camber Castle.

The production of a volume such as this results from the work of a team rather than individuals, and many people besides those named on the title page have contributed to its completion. The directors of the various seasons of excavation, named in Chapter 1, and their respective staffs and volunteers should be thanked. Professor Martin Biddle would like to give particular thanks to Professor Sir Howard Colvin, who co-directed the work at Camber Castle in 1963 and 1965, and to Alan Cook who undertook the survey and architectural recording of Camber Castle, and who prepared the plans and sections which illustrated the account of the castle published in the *The History of the King's Works*.

Dr Anthony Streeten would like to thank the site supervisors of 1982 and 1983, Mark Taylor, Elizabeth Lewis (née Eyden) and Richard Sheppard. The latter also assembled the photographic archive and took several of the photographs which illustrate this report. The finds supervisors, Vivienne Coad and Siriol Streeten (née Mynors) shouldered the burden of initial cataloguing of the rich assemblage of artefacts and faunal remains. The architectural fragments were catalogued by Martyn Carey. A particular debt of gratitude is owed to Richard Warmington whose site records and fine interpretative drawings were reproduced in the preliminary post-excavation design and have formed the basis for some of the illustrations accompanying this report.

The successive campaigns of excavation were commissioned by English Heritage and it predecessors. Following the preliminary post-excavation assessment completed in 1993, the OAU were commissioned by English Heritage to manage the post-excavation phase. Graham Keevill prepared the updated research design and programme of work, and instigated the post-excavation programme. The publication and post-excavation project has been funded by English Heritage and thanks are due to Dr Glyn Coppack, Jonathan Coad and Judith Roebuck. The latter commissioned the report and provided support during its production.

Special thanks are due to Professor Martin Biddle and Dr Anthony Streeten, who provided encouragement and advice during the course of the project and to all the contributors involved in the production of this report: Caroline Atkins (standing structure), Jackie Hall (architectural stone), Roy Shephard Thorn (geology of building stone), David Gaimster (ceramic stove tile), Mike Cowell (neutron activation analysis), Cecily Cropper (window and vessel glass), Nicholas Mitchell (ceramic building materials), Graham Morgan (mortar analysis), Lucy Whittingham (pottery), David Higgins (clay tobacco pipes), Brian Connell and Simon Davis (animal bone) and Alison Locker (fish bones).

The site plans and sections for publication are the work of several illustrators: Robert Read, Cilla Wild, Paul Hughes, Mel Costello. Mélanie Steiner drew most of the metal artefacts; other metal artefacts and small finds were drawn by staff of the English Heritage drawing office including Chris Evans and some additional objects were drawn by Mel Costello and Lisa Padilla, both OAU graphics office. Kate Morton prepared the illustrations of the ceramic stove tiles for David Gaimster.

Mrs J Eddison of the Romney Marsh Research Trust kindly provided a copy of her paper (Eddison 1998) on the development of the barrier beaches in Rye Bay in advance of publication.

Jackie Hall would like to thank Richard Morris and Anthony Streeten for reading and commenting on her report, and Caroline Atkins for comments on the architecture of the castle. David Gaimster is grateful to Dr Hans-Georg Stephan of the Seminar für Ur- und Frühgeschichte, University of Göttingen, for comments on the iconography of the Camber stove-tiles; to Ms Giulia Bartrum of the Department of Prints and Drawings, British Museum, for assisting with the identification of print sources; and to Mike R Cowell of the Department of Scientific Research, British Museum, who analysed the tiles. Lucy Whittingham would like to thank Anthony Streeten for comments and help with regional context of the pottery, also John Hurst for commenting on this text and David Gaimster for comments on the German Stonewares and Lead Glazed Earthenwares. Cecily Cropper would like to thank Rachel Tyson for reading and commenting on the report on the vessel glass and providing additional information.

Simon Davis and Brian Connell are grateful to Ian Scott for his help and advice at various stages of this project. Sebastian Payne kindly read and commented on earlier versions of the report and Umberto Albarella sent his unpublished data from Castle Mall, Norwich. Ian Scott would like to thank various members of staff in the AM Lab: Anna Czelick for the conservation of selected metal artefacts, Colin Slack for the conservation of the armour fragments and for providing information and advice and Jacqui Watson and Glynis Edwards, who provided specialist identifications of organic materials. Professor Richard Sharpe of Oxford University and Dr Pierre Chaplais, formerly of Oxford University, provided a reading of the inscription on a gold ring and their help is gratefully acknowledged. Robert Smith of the Royal Armouries read and commented on the artillery sections and on the reports on military equipment. Lindy Casson and Sarah Lucas, both of the OAU, undertook the quant:fication of the iron nails. Dr Jürgen Obmann, Köln, prepared the German summary and Valérie Diez the French summary.

Julian Munby of the Oxford Archaeological Unit read sections of text and provided informed comments and criticism. Andrew Saunders, as academic referee, read and commented on the draft report. The monograph was edited for publication by Anne Dodd of the Oxford Archaeological Unit

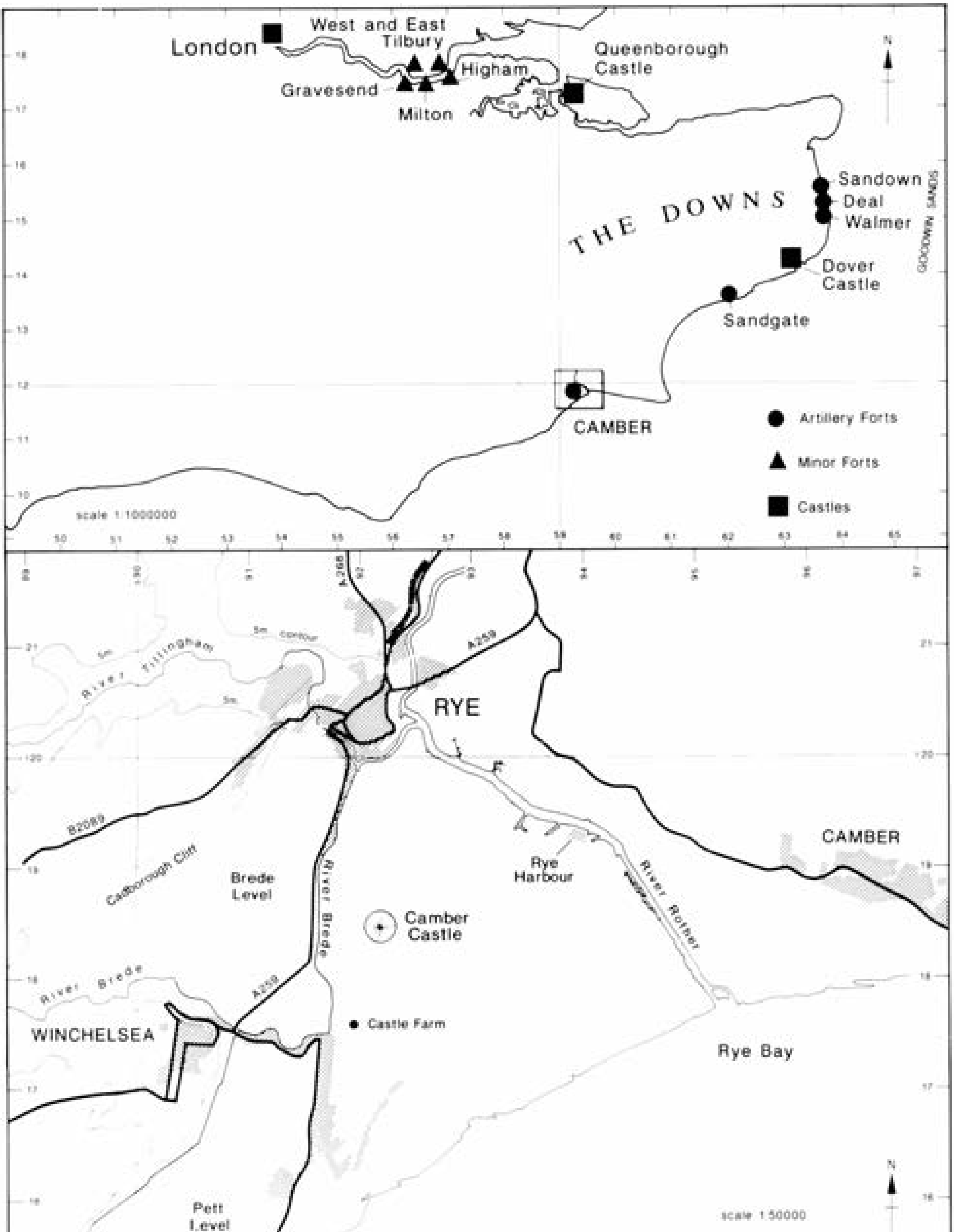

Figure 1.1: Location of Camber Castle and Device fortifications in the south-east of England

Chapter 1: Introduction

by Jonathan Hiller

INTRODUCTION

Camber Castle (Plate 1.1) was constructed between 1539 and 1543, incorporating an earlier round gun tower built between 1512 and 1514. In its final form it was an elaborate artillery fortification that represented an important element of Henry VIII's coastal defence network, put in place from 1539 as a response to the threat of invasion following England's breach with Rome. Camber Castle was operational for 100 years. By the 1630s, the steady advance of the coastline had left it stranded well inland from the sea (Plate 1.2). This, combined with changes in the concept of artillery fortification, resulted in its decommissioning in 1637. Thereafter it fell into decay and became a local curiosity, appearing as a picturesque ruin in late 17th- and 18th-century maps and engravings (Plates 1.3, 1.4). In the late 19th and early 20th centuries the surrounding area was turned into a golf course, but the castle appears to have seen a further brief period of military use during the Second World War. With the exception of a detailed description prepared for the *Victoria History of the County of Sussex* (Volume 9; hereafter *VCHS*, 9), serious study of the castle did not begin until the 1960s when it was surveyed and partially excavated for inclusion in *The History of the King's Works* (Volume IV 1485–1660 (Part II), hereafter *HKW*). Further survey and excavation, and clearance of rubble fills, took place during the 1970s and 1980s, resulting in a substantial archive of new information about the above- and below-ground remains, and a large collection of 16th- and early 17th-century finds. The present volume has been prepared on the initiative of English Heritage, to make the results of this work available and to present a synthetic account of the current state of knowledge regarding this monument.

THE LOCATION OF CAMBER CASTLE AND THE EVOLUTION OF THE EAST SUSSEX COAST

Location *(Figs 1.1, 1.2)*

Camber Castle (NGR TQ 922 185) is situated 1.5 km to the south of the town and Cinque Port of Rye, and approximately the same distance to the north-east of the medieval town and Cinque Port of Winchelsea, in the parish of Icklesham, East Sussex (Plate 1.5). Both towns are built on isolated hills formed of sandstone rock over Wadhurst Clay. Between them lie today the reclaimed marshes of the Brede Level, closed to the north-west by the 30 m (100 ft) bluff of Cadborough Cliff, and to the south-east by undulating shingle banks. The basin formed by the Rye and Winchelsea hills and Cadborough Cliff was formerly an area of open water known as 'the Camber' (*Camera, La Chambre*), at the mouth of the rivers Rother, Brede and Tillingham. The Camber was an important anchorage for both local and foreign shipping, providing a safe haven for ships in the English Channel during bad weather; it was thus of considerable strategic significance. The castle was built to protect both the anchorage and the towns, and was sited at the north end of a shingle spit known as Kevill, or Cobble, Point, one of the series that protected the seaward side of the Camber. Guns deployed here could close the entrance to the Camber and the port of Rye. The strategic positioning of the castle is clear from the late 16th-century map made of the area by Philip Symondson, reproduced below as Figure 1.4. An interpretation of the map is given in Figure 1.5.

Plate 1.1: Aerial view of Camber Castle, 24 July 1948 (Cambridge BU 77) (Cambridge University Collection of Air Photographs: Copyright reserved)

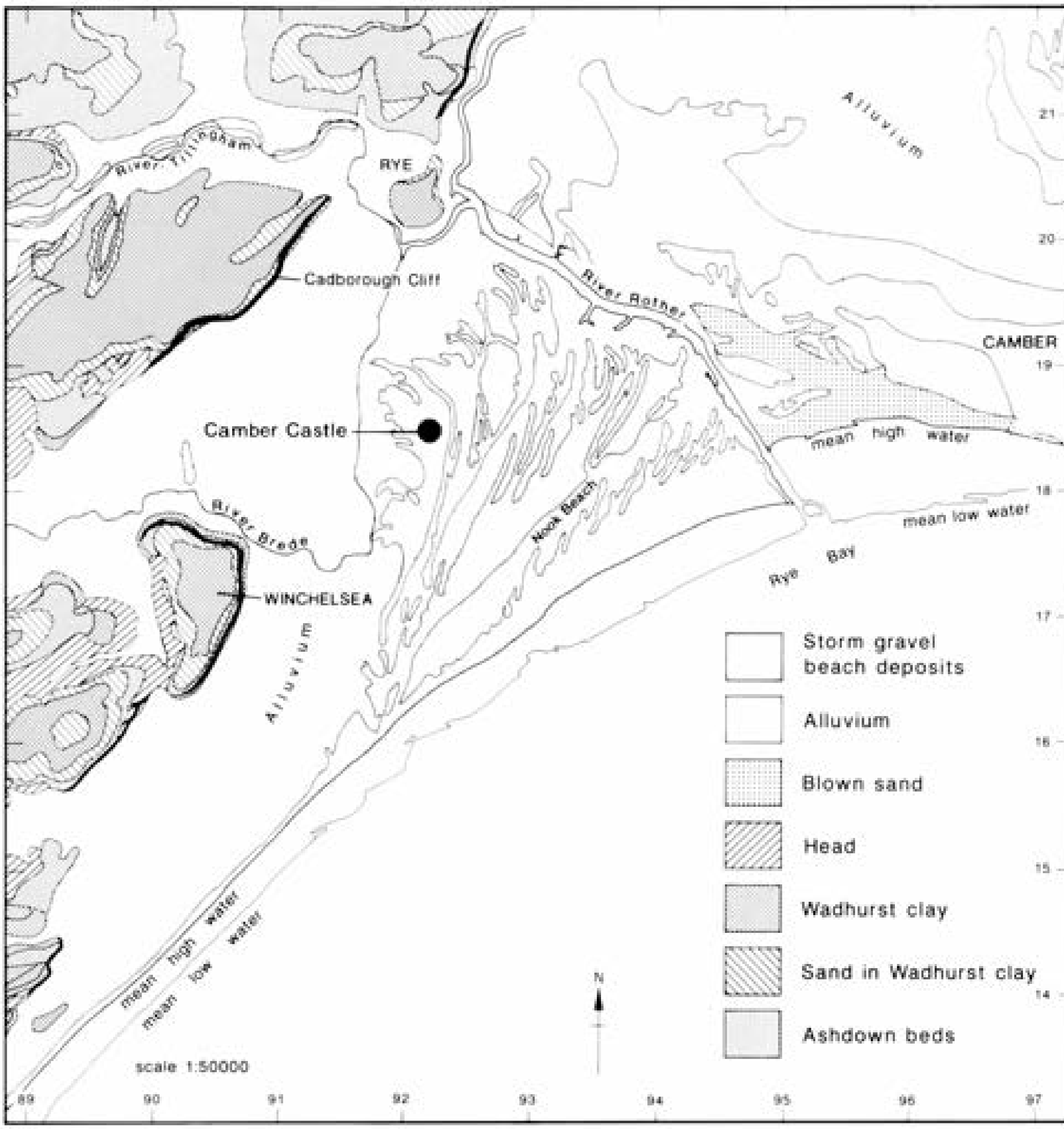

Figure 1.2: Geology

Today the castle stands over 1.5 km from the sea, surrounded by extensive shingle ridges (storm gravel beach deposits) and areas of marsh and alluvium. The complex evolution of this coastline has been studied extensively, and can only be summarised in the present volume. Readers are referred to the specialist literature for more detailed information. The work of Lewis (1932; 1937; Lewis and Balchin 1940) is generally regarded as the most authoritative on the evolution of the coast, and other well regarded early accounts are those of Steers (1964) and Smart (1966) and the Soil Survey Memoir on Romney Marsh (Green 1968). The depth of the Dungeness shingle, observed during the construction of the power station, has been discussed by Hey (1967). More recently, Eddison has published a detailed account of the development of the barrier beaches between Fairlight and Hythe (1983), and discussed the medieval history of the drainage of the Rother Levels (1985). Two major volumes by the Romney Marsh Research Trust (formerly the Romney Marsh Research Group), which was formed in 1987, contain extensive research on the development of Romney Marsh and its coastline (Eddison and Green, 1988; Eddison 1995). Eddison (1998) has recently summarised the evolution of the barrier beaches of Rye Bay, and this provides the most up-to-date analysis of this part of the Sussex coastline.

Plate 1.2: View of Camber Castle across the reclaimed Brede Level, looking south-east (English Heritage August 1998)

Topography and Geology; the development of the East Sussex and South Kent coastline

The following account summarises the research relating to the formation of this part of the coast, placing the site of Camber Castle in its geographical context. In ancient times the East Sussex and South Kent coastline between Fairlight (East Sussex) and Hythe (Kent) was a wide, open bay with tributaries extending inland. The subsequent advance of the coastline has resulted from two processes: longshore drift, leading to the creation of shingle barriers, and reclamation of land by human agency.

The effects of longshore drift *(Figs 1.3, 1.4, 1.5)*

The process of longshore drift is thought to have begun as long ago as the Neolithic period (Steers 1964, 323). Shingle was carried in the sea, with the direction of the wave fronts controlled by the winds, and was deposited in long spits parallel to the coast extending from Fairlight to Hythe. This created a protective barrier allowing the development of salt marshes in areas that had previously been tidal sand flats (Eddison 1983, 39). Behind this barrier now lie over 33,000 ha of reclaimed marshland, collectively called Romney Marsh and including the Pett

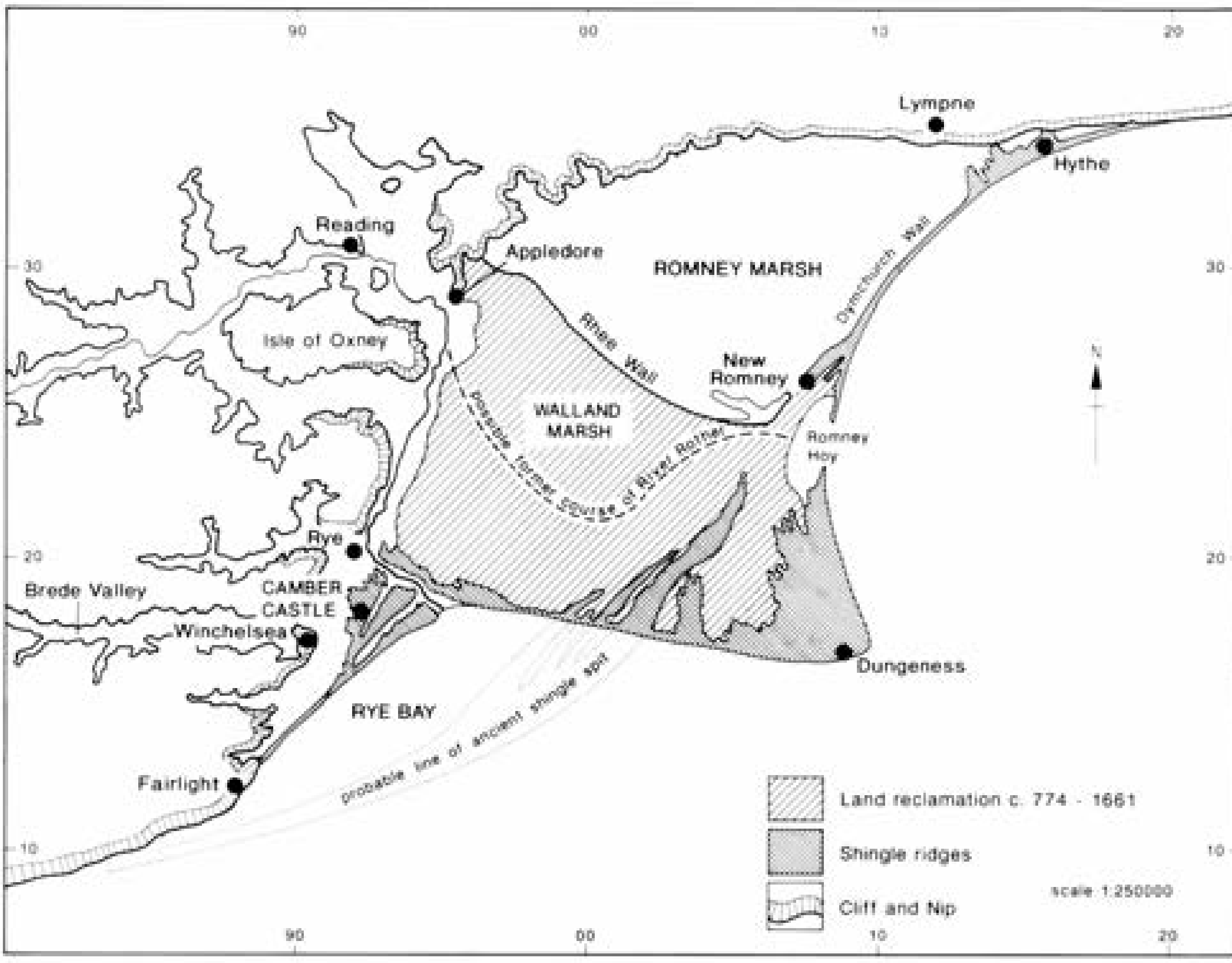

Figure 1.3: The evolution of the East Sussex Coastline

Level to the south-west. Rapid longshore drifting of shingle is believed to account for the 'ridge-and-trough' structure of Dungeness, consisting of some 500 shingle ridges, which formed after the barrier became established. Erosion of feeder shingle spits in Rye Bay 'provided material to be deposited at the ness and beyond it, thus projecting the feature further away from the land' (Eddison 1983, 51). Over the last 2000 years there have been three principal breaches of the barrier, near Hythe, New Romney and Rye (Tooley 1995), where inland estuaries were formed.

The medieval ports of Winchelsea and Rye exploited the estuary at Rye, at the mouth of the river Rother, but the towns were precariously sited and very vulnerable to the effects of storms, and their early topography remains unclear. Domesday records the presence of 100 salt pans at Rye, which suggests that there was already, by that date, a substantial area of marshland sheltered from the sea but with access to saltwater. The river Rother itself is thought originally to have flowed south-eastwards from the Isle of Oxney to meet the sea at Romney (see Fig. 1.3). Its change of course, to meet the sea in Rye Bay, was critical for the development of Rye and Winchelsea, but the precise date at which this occurred remains uncertain. A persistent tradition, perpetuated by Camden, has it that the river changed course in the mid to late 13th century (*Britannia*, ed. Holland). However, Tatton-Brown (1988) has argued from compelling evidence that the change of course must have occurred earlier, to account for the prosperity of Rye and Winchelsea by the late 12th century. What seems likely is that Camden was writing of a widening of the river Rother, resulting from the great storms and inundations of the late 1280s.

The original port of Winchelsea ('Old Winchelsea') was one of the most prosperous and important of the Cinque Ports along the south coast by *c* 1250, and is assumed to have been sited on a continuous shingle spit extending from Fairlight Cliff to the Dungeness shingle in Rye Bay (as suggested by Symondson; Figs 1.4–1.5). It was frequently damaged by violent storms in the mid to late 13th century, and Matthew Paris records that in October 1250, 'more than three hundred buildings were destroyed in that same district by the violent surge of the sea', and that 'rivers issuing into the sea were so thrust back that they swelled, and destroyed meadows, bridges and crops' (*Chronica Majora*, v, 175–6). The town and its port were finally inundated in a storm in the late 13th century and have never been found, indicating a severe breach of the natural beach barrier at this time. The breakdown of the barrier appears to have resulted from a temporary failure of longshore supply of shingle, combined with violent weather conditions, probably in 1287–8. Widespread flooding occurred north of the barrier, sending a great volume of seawater along the local river channels. In 1283 Edward I founded New Winchelsea as a replacement, in its present and much more sheltered position on Iham Hill.

After Old Winchelsea was destroyed, secondary shingle barriers reformed north of the earlier barrier, creating the entrance to the Camber, which developed into a safe haven for shipping. Thereafter, however, shingle barriers continued to form and reform, and extended progressively across the mouth of the inlet. In 1594 the distance between the two headlands was approximately 2 km, but by 1693 the gap had narrowed to just 375 m or 410 yards (Eddison 1998). Studies of the beach ridges south of Camber Castle show that they too continued to form episodically along the coast in the centuries after the castle was built (Lovegrove 1953; Eddison 1998), thus deflecting the sea-coast away from the castle (see also local topography, below). The shingle has been moved progressively north-eastwards along the coast towards the entrance to the present day harbour of Rye, which is located nearly 2 km south-east of the town.

The process of land reclamation *(Figs 1.3–1.5)*

Central to the development of the coastline was the reclamation (inning) of the salt marshes that had formed behind the barrier beaches. It is likely that the Rhee Wall, generally accepted to have been built in the Roman period, was the first attempt to reclaim the marshland, and it enclosed the whole of Romney Marsh as it is known today. The wall extended from Appledore at the original cliff face, to what was to become New Romney. Land reclamation to the south-west of the Rhee Wall began in the Saxon period and continued throughout the medieval period. By 1479, nearly all of Walland Marsh south-west of the Rhee Wall had been reclaimed, and by 1661 all the marshland had been inned (Steers 1964, 327). The effects of land reclamation were twofold. On the one hand it increased the area of land available for farming. On the other, land reclamation on the margins of the rivers and channels on the marsh greatly reduced the water flow and thus the effectiveness of the tidal scour; as a result the rivers and channels along the coast began to silt up. The combined processes of silting and longshore drift eventually led to the demise of Rye harbour and the port at New Winchelsea .

Enclosure and inning of the marshes adjacent to the rivers was underway by the late 12th century and as early

Plate 1.3: 'Winchelsea Castle in Sussex', from an 18th-century print (ESRO PDA 511/33)

Figure 1.4: 'The decayed harbour of Rye' by Philip Symondson, 1594 (reproduced with permission of Rye Town Council, copyright reserved)

as 1357 it was recorded that the port of New Winchelsea was becoming increasingly clogged with sediment (Gardiner 1995, 130–134). The effects of enclosure were exacerbated in the late 13th and early 14th century by drainage projects and by the construction of sea walls along the length of the Brede valley, in response to increasingly stormy weather conditions. Land in Cadborough Marsh near Winchelsea, for example, was submerged in 1341 and 1344 (ibid., 135). By 1539, when Camber Castle was under construction, the outfall of the river Brede into the Rye estuary was being deflected progressively to the north into the reclaimed marshland by accumulating shingle ridges, and the river was becoming narrower (ibid., 128). The scale of the problem in the vicinity of the river Rother was identified in an enquiry of 1561, which found a rapid increase in the

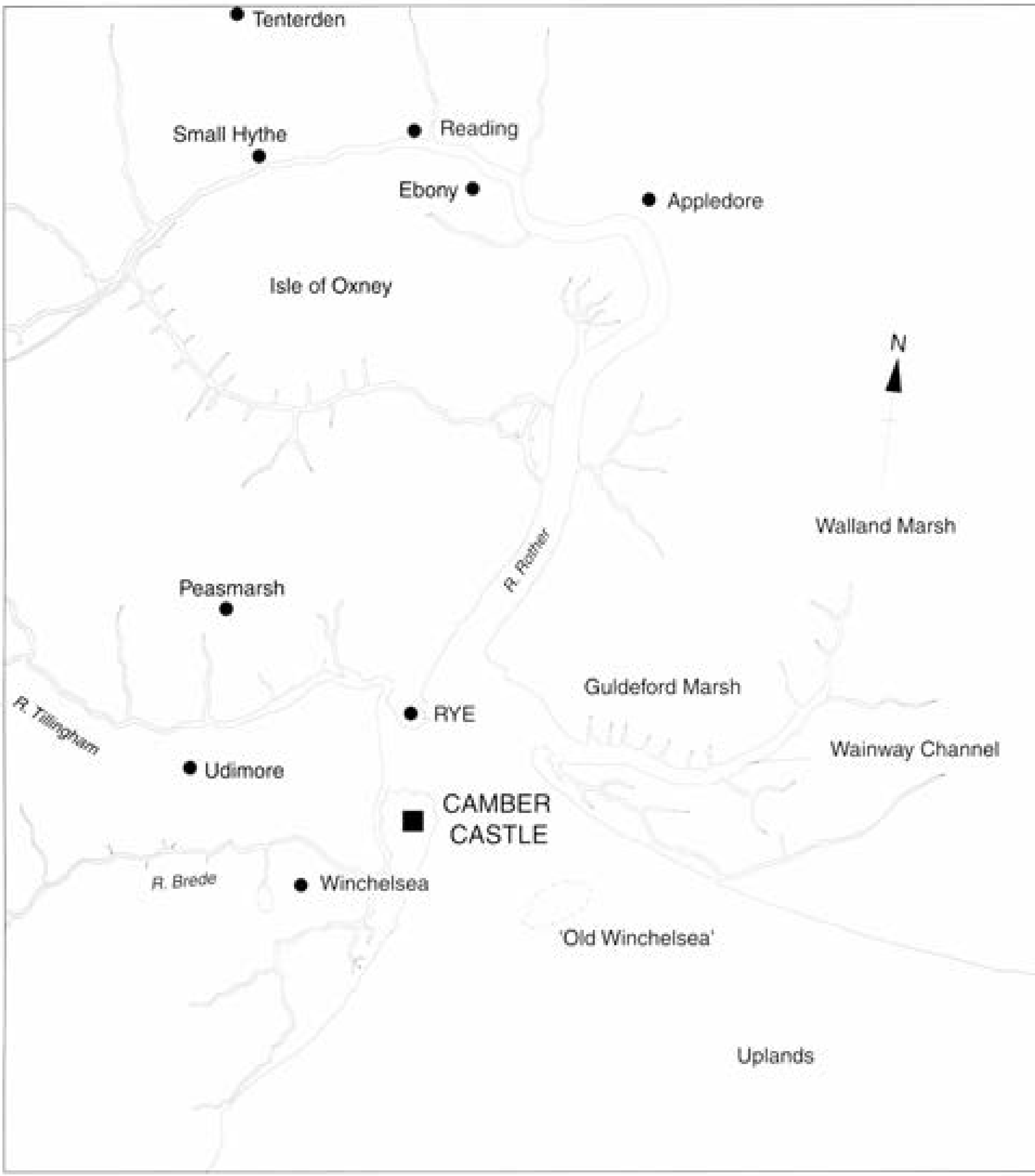

Figure 1.5: An interpretation of Symondson's map

number of reclamation projects. Inning had been taking place over the previous 30 years 'on ground every side [of the Rother] up at least 12 miles or more'. As a result, it was said, 'Appledore, which hath been a goodly town [is] now decayed by reason of the water gone from it, and also from Reading....'.

Ships dumping ballast in the harbour added to the problem, and as early as 1548 the Commons had before them a bill for amending the Camber and the havens of Winchelsea and Rye:

> ...the Channell is so choked swared and fylled uppe, that there cannot lye in the same Harborowe above thirtie or fortie saylle of Shippes, and yet the same Shippes cannot come into the same harborowe withowte greate daunger... (2 & 3 Edw VI, cap 30; quoted in Cooper 1850).

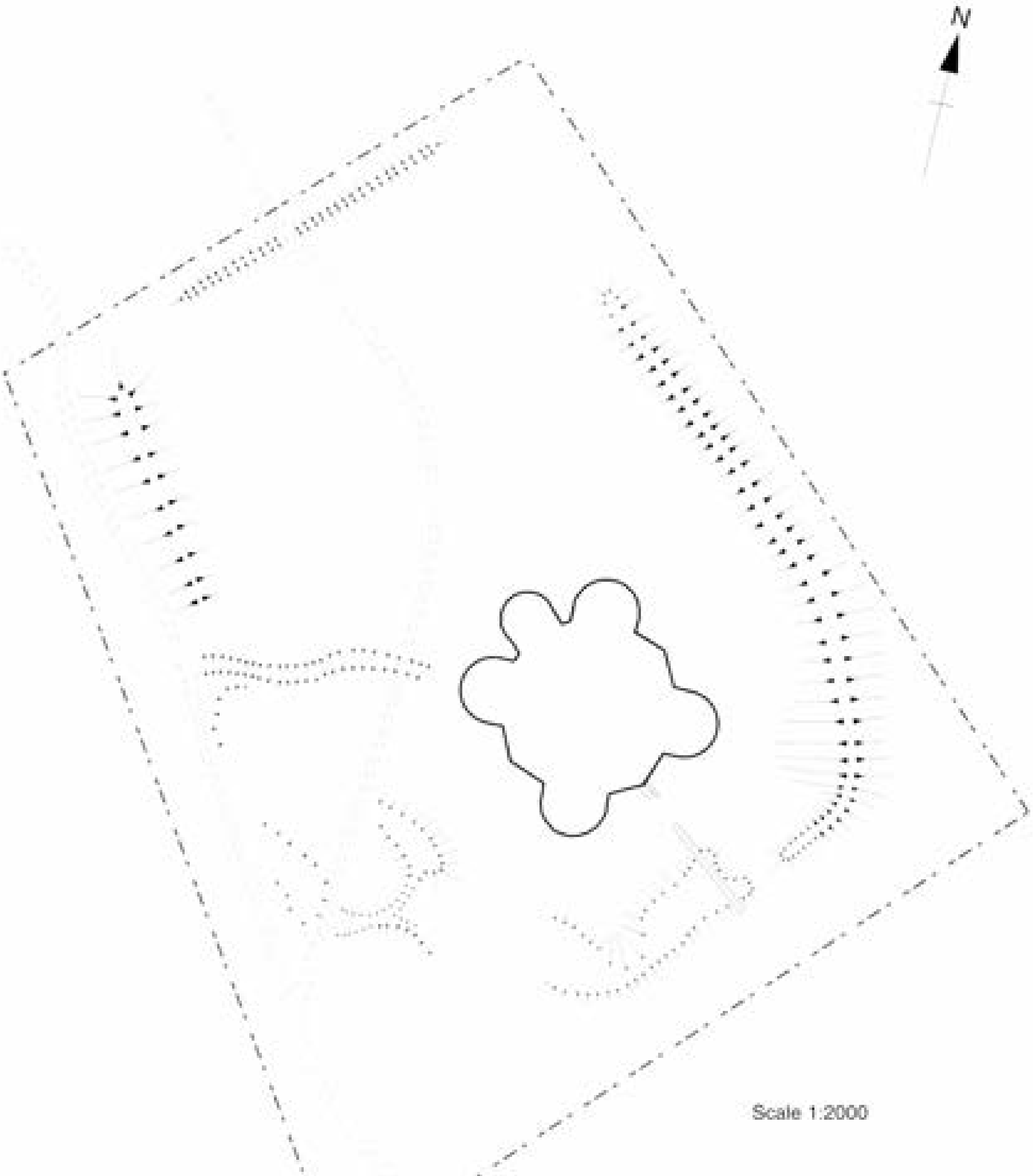

Figure 1.6: Earthworks surrounding Camber Castle, showing the locations of trenches dug in 1973 at the south-east of the castle to investigate the earthworks

By the late 16th century Winchelsea had all but ceased to function as a port (*VCHS*, 9, 69). Symondson's map of 1594 (Figs 1.4–1.5) shows that vast tracts of land had been reclaimed adjacent to the river Rother. The rivers Brede and Tillingham had narrowed to the size of small tributaries. The volume of tidal water in the Rye estuary and the rivers Rother, Tillingham and Brede was so reduced that the townsmen of Rye, when asked in 1638 to explain the deterioration of the town's harbour, declared that

> the inning of salt marshes from time to time, for private men's gain and profit, hath been the utter decay of the harbour of Rye, which had certainly been good to this day if the salts had never been inned. (East Sussex Record Office, Rye, 47/129)

The decay of the Camber is graphically illustrated by Celia Fiennes' description of the site on her travels in the area between 1682 and 1712:

> a pretty steep hill I ascended...this hill on the top gave the view of the sea and a great tract of land on each side that is choak'd up with sand, which formerly was a good haven for shipps; the sea does still come up to Rhye town as yet but its shallow, and the Castle which stands a little distance a mile is also left of the sea at

Plate 1.4: 'Inside of Winchelsea Castle, Sussex', from an 18th-century print (ESRO PDA 511/31)

> least 4 mile; this is Winchelsea [Camber] Castle but all between it and Winchelsea is nothing but quagmire and marshes drained in some places by ditches... (Fiennes (ed. Morris 1982), 129)

The geology of Romney Marsh and Pett Level is a direct reflection of the repeated incursions of the sea, successive drainage regimes, and variations in the effectiveness of the protection of sea walls and groynes constructed along the coast. In general there is a deeply stratified sequence of layers of clay, alluvium and peat, interspersed with shingle ridges. For example beneath the Hythe shingle there lies 0.91 m of clay, in turn overlying 3.81 m of low-level shingle. There is evidence at Fairlight and Pett Level of the submerged forest exposed below half tide. A sequence of at least four peat beds is intercalated with blue clay. It is likely that the peat developed in the shelter of a shingle bed, which broke periodically to permit deposition of marine silt (Eddison 1983, 44).

By the mid 1980s it was estimated that nearly 50% of this coastline was walled, with the shingle beaches groyned or banked to prevent further erosion (ibid., 52). By the 1990s the natural defences against the sea consisted of shingle banks south of Rye Harbour, at Dungeness and Dengemarsh, and south of Hythe, and sand dunes at Camber Sands near the village of Camber.

Local topography of the castle and topographical survey evidence *(Figs 1.1, 1.2, 1.3, 1.6)*

The castle occupies an approximately central position within the parish of Icklesham, and is situated within a triangular area of flat land, almost at sea-level, some 5.6 km long and 4 km wide. Pett Level, the river Brede and the Royal Military Road (A259) bound the area on the west. To the north and east is the river Rother, with the sea to the south. To the north and east of the river Rother are the great tracts of reclaimed land, Walland Marsh and Romney Marsh. Camber Castle can today be reached from Rye by a farm trackway that runs parallel to the river Brede.

The terrain surrounding the castle varies in height between *c* 3 m OD and *c* 4.4 m OD. A study of the beach ridges surrounding the castle in 1948 traced the evolution of these former shore lines from the late 13th century to the present day (Lovegrove 1953, 200–207). The ridges, termed 'fulls', formed three series (see Fig. 1.2). To the south-west of the castle, in the vicinity of Castle Farm, the first series fulls extend from east to west before changing to a south-east/north-west alignment. These fulls are sandy with shells but little shingle, and are covered by the fulls of the second series, which swing rapidly from a north-north-east alignment towards the north-west. The second series, known locally as Nook

Plate 1.5: The Town of Rye: a 16th-century map, showing Rye and Winchelsea, with Camber Castle, labelled Winchelsea Castle, in the foreground (PRO SP Dom. 46/36 1 MPF 3)

Beach, have a higher shingle component. The third series fan out seawards east of the castle, and are separated from the second series by a narrow reclaimed channel called 'the Nook' (formerly 'Greedy Guts'). The fulls have remained virtually undisturbed since the castle was built, except for the construction of a golf course in the vicinity in the late 19th century. The course was apparently still in use in the mid 1930s (*VCHS*, 9, 184, 187). The shingle ridges on which the castle stands are covered by a thin layer of rich loam soil, upon which grow lichens and short grass, together with plants such as stonecrop. The land is now used for pasture.

The castle is bounded on its south and east sides by a raised earthwork (Fig. 1.6). Evidence from aerial photographs and topographic surveys, together with excavation evidence, suggests that the feature was man-made and was created either when the castle was under construction, in order to protect the site from attack, or later when the garrison was stationed there. Although there is slight evidence for a stone platform on top of the earthwork, which might suggest a military defensive feature, it is more likely that the earthwork was built as a defence against the sea, perhaps with a wall on top, to protect the castle at high tide or in violent weather. The earthwork clearly truncates or overlies the shingle ridges that extend from the south-west. It is noticeable that the bank does not extend around the front of the Entrance Bastion, the side of the castle least threatened by the tide. An earlier date, making the bank contemporary with the primary tower of 1512–14, is not impossible. If the bank was built to resist the sea, the need for protection would have been much more urgent in the early years of the century; by the late 16th century the shingle ridges to the south and east of the castle were forming, and the sea was already beginning to recede.

The filling of the North and South Bastions to create solid mounts, and the construction of the 'Rampire' adjacent to the south mount, required vast quantities of soil and beach material. Numerous irregular soil marks within the boundary of the earthwork are probably evidence of this activity. To the north-west of the castle a further series of earthworks may represent the archaeological remains of lodgings and work sites created by the builders (see also Chapters 2 and 3). Other elements of the earthworks may derive from landscaping for the late 19th- and early 20th-century golf course.

COASTAL DEFENCE IN THE LATE MEDIEVAL AND EARLY POST-MEDIEVAL PERIOD

The history of coastal defence has been summarised in numerous accounts of the period, most recently by O'Neil (1960), Kenyon (1981), Saunders (1989), Crossley (1990), Hughes (1991), and Coad (1997). Henry VIII's defensive scheme, or Device, is considered in greater detail by Hale (*HKW*, 367–401). This summary outlines the political and military context of the development of coastal defence of the period.

England's coastal defences were paid small regard during the reign of Henry VII, whose kingdom was seldom threatened from abroad. Henry maintained a small navy, serviced by a dry dock at Portsmouth (built between 1495 and 1497), but was little concerned with France, apart from maintaining the independence of Brittany, preferring to secure Spain as an ally in case of a French threat. His more politically ambitious successor, Henry VIII, moved England into the 'Holy League', whose purpose was to defend the Papacy from its enemies. As a result, a successful campaign in France in alliance with the Spanish led to the capture of the town of Tournai in 1513. An imposing fortified tower, the Tour Henri VIII, formed part of a planned defensive citadel within the newly captured city. The tower, with its two superimposed vaulted chambers each containing three gunports, anticipated the greater destructive force of siege artillery.

Defences around the coast of England were on a smaller scale. Gun towers at Dover pier, and Sir Edward Guldeford's original tower at Camber, were modest structures by comparison with the tower erected at Tournai, as were similar gun towers protecting the harbour entrances of Dartmouth, Portsmouth, and Hartlepool. Political developments were to change Henry's attitude to national defence, however. International political unrest caused by the breach with Rome, and Henry's assumption of the title of Supreme Head of the Church of England, was to leave England isolated. By early 1539 the threat of invasion from Europe appeared real and imminent, with the French and Spanish allied under the Catholic banner.

The policy of national defence responding to these events anticipated invasion from France. The 'Device by the King', which was drawn up in February 1539, called for commissioners' advice on improving the defence of England's territory in France and securing portions of the English coast and south Wales, shire by shire. In 1539, the French Ambassador Marillac wrote to Francis I stating

> the English continue to fortify the frontiers in all haste and take musters everywhere…5 or 6 ships do nothing but circle round the kingdom in order to explore and correspond, if need be by fires, with those who watch by night upon certain gardes of wood [ie earth and timber bulwarks] lately erected; so that no foreign vessel could show itself without the whole country being warned (*LP 1539* xiv (1), 770)

The threat of invasion receded rapidly during and after 1539, but the scheme to make the realm strong was nonetheless implemented. Some 30 new forts and castles (see Fig 1.1 for those in the south-east of England) were erected along the coast with money and resources gained from the disposal of monastic property. These structures were a mixture of large and small fortresses and blockhouses, with fortifications intended for harbour and river defence. The most imposing works, the ten 'great castles' of Deal, Walmer, Sandown, Sandgate, Camber, Calshot, Hurst, Portland, Pendennis and St. Mawes, shared similar characteristics of plan and detail. All were modelled on concentric plans, with massive low walls and bastions designed to provide all round fire against enemy shipping. Ordnance was mounted at several levels. The castles were equipped with central towers, though only at Camber was an original freestanding tower incorporated into a grander design. Hale (*HKW*, 381) has suggested that it may well have been Camber that inspired the Henrician style of fortifications, based around a circular central tower. The tower at Calshot Castle, Hants, bears a striking resemblance to the tower at Camber, with Tudor arched windows and embrasures and clearly defined string-courses.

Some 16 smaller works were constructed as part of the Device. These blockhouses, or bulwarks, were designed to resist approaching ships and comprised either stone towers with gunports or earthworks revetted with timber. Three bulwarks were constructed at Dover and five were built along the Thames estuary. The latter included three bulwarks built at Gravesend in Kent. Four further earthen bulwarks were built as part of a scheme of entrenchments linking the large castles at Deal, Sandown and Walmer. These castles covered 'the Downs', the sheltered waters between the Kent coast and the Goodwin Sands, which provided a strategically very significant anchorage (Kenyon 1978; Saunders 1989, 38–9).

Of the few named engineers associated with the Device forts, the Moravian Stephen von Haschenperg is the best known. He was responsible for the fortresses at Sandgate, the middle stages (phase II) of the development of Camber, the earth bulwarks in the intervals between the Kent Downs castles, and work on the defences at Carlisle. B. H. St John O'Neil (1945) has documented the career of this extraordinary engineer in detail, and von Haschenperg's contribution to the development of Camber Castle, which was not known to O'Neil, is described in Chapters 2 and 3 of this volume. The Device castles were otherwise the products of Henry VIII's team based at Hampton Court, of whom Richard Benese (Comptroller and Surveyor) appears to have been a key figure.

The underlying inspiration for the style of the Device forts was probably the *Etliche Underricht zu Befestigung der Stett Schloss und Flecken* by Albrecht Dürer, first published in Nuremberg in 1527. This book presented concepts of fortification prevalent at the time in Germany and other parts of Europe, paying particular attention to the role of the D-shaped bastion, which incorporated widely splayed gunports and casemates within thick walls, and the mounting of tiers of guns at successive levels (cf Biddle 1970). Many of these ideas were incorporated in the castles constructed in England between 1539 and 1545, with Henry VIII himself taking a keen interest in the progress of the works. Contemporaries described Henry as 'a perfect builder as well of fortresses as of pleasant palaces' (William Thomas, *The Pilgrime*, 1546). In Richard Morrison's preface to his translation of Frontinus, *The Strategemes, Sleyghtes and Policies of Warre* (1539), Henry was hailed as constantly working for his country's good, devising

> in time of warre, plattes, blocke howses, bulwarkes, walles, castelles…and fortresses…Lorde, how may al englyshemen reioyce that your grace neyther spareth to vysiye with your owne eyes the ruinous places of the see quostes, by which our enemies myght sodeynley invade us, nyther letteth to worke with your own handes, continually manegyne tooles, continually inventyng newe sortes of weapons…

Between 1539 and Henry's death in 1547, some £376,500 was spent implementing the Device, a total expenditure exceeding that on non-military buildings. The cost of each new fortification was considerable: the 1539–40 works (phase II) at Camber came to £5660, comparable to the amount spent on constructing other forts of the period, for example St Mawes (£5018), Portland (£4964) and Sandgate (£5584). The remodelling of Camber Castle in 1542–3 (phase III) cost nearly £10,000.

The Device castles were technically the most advanced fortresses constructed to that date in England, but were out of fashion with new ideas on the continent. Before they were finished and commissioned (by 1540 the names of 24 new works were listed as garrisoned), the concentric plan of fortification was obsolete. However, for their purpose, which was to provide mounts for concentrations of ship killing artillery, they were well-suited (Coad 1997, 162). The weakness of the circular fort against attacking forces in the immediate vicinity of the walls led to the adoption of the Italian system of angled bastions in the early post-medieval period. Forts with angled bastions were built at Sandown and Yarmouth on the Isle of Wight, between 1545 and 1547, in response to the invasion scare of 1544–1545; in July 1545 the French fleet attacked Portsmouth Harbour and the Isle of Wight. Over 200 ships entered the Solent and 4 galleys took on Henry's ship, the *Mary Rose*, which sank with the loss of 500 men together with Vice-Admiral Sir George Carew. The adoption of the angled bastion as a defensive concept owed much to the campaigns in France in 1543 and 1544 (*HKW*, 384), and heralded the start of post-medieval fortifications in England. In particular the new defensive concepts were seen in the English works at Boulogne by John Rogers (Shelley 1967).

THE HISTORY OF RESEARCH AT CAMBER CASTLE

The History of the King's Works

The earliest detailed historical and architectural description of Camber Castle (*VCHS*, 9, 185–6) was compiled without the benefit of archaeological excavation, or detailed documentary research, and essentially described the architecture of the castle in its final form, noting the presence of the primary tower and suggesting, rightly, that there had been more than one phase of construction. Extensive research into the castle was initiated as part of the detailed survey published as *The History of the King's Works*. This was commissioned in 1951 by the then Ministry of Works as a comprehensive survey of the buildings traditionally managed by the Office of the King's Works, which dated from 1378. The entire survey, comprising 6 volumes, took over 30 years to complete, and studied the interrelation of government and architecture in England from the Middle Ages to the mid 19th century. The general editor of the survey, Howard (now Sir Howard) Colvin, oversaw the collective work of distinguished academic researchers. The final volume (Volume IV, 1485–1660, Part II) was completed and published in 1982, and includes a history of royal fortification in England from 1485 to 1603.

Over 400 castles, palaces and public buildings for which the department was responsible were investigated. Extensive archives held by the Ministry of Works (later the Ministry of Public Building and Works, latterly the Department of the Environment and now English Heritage) were studied. The survey included research in the Public Record Office and elsewhere into the records of other government departments including the Exchequer and the Treasury. Building surveys and selective archaeological excavations were undertaken on sites of national importance, and in the case of some buildings, for example the Tower of London and Hampton Court Palace, prompted reappraisal of their architectural history and structural sequence. This was also the case at Camber Castle, where extensive documentary research followed by excavation resulted in a thorough discussion and description of the castle, and identified three principal building phases and a variety of defensive and architectural styles. The account of Camber published in *The History of the King's Works*, written by Martin Biddle, remains the most authoritative account of the design and building of the castle, and has been reproduced in the present volume (Chapter 2, below). Professor Biddle has made some minor amendments, some sections of structural description have been removed or reduced in length, and the story of the castle has been continued up to the present day.

Excavations and surveys at Camber Castle 1963–83

(Figs 1.7, 1.8; Plates 1.6–1.9)

The castle seems to have escaped significant antiquarian intrusion, although areas of modern disturbance were identified during the earliest excavations. There were no systematic surveys of the castle before the 1960s, and the complexity of the castle's interior remained unsuspected for many years. In 1804 Lt Col. John Brown undertook a survey of the castle with the intention of converting the central Keep into a Martello tower (Plate 1.6). His survey established that there were stirrup-shaped towers to the rear of three of the main bastions, though he incorrectly shows a similar tower at the rear of the Entrance Bastion. In 1931 a plan (now in the keeping of English Heritage) was prepared for an elaborate scheme to convert the central Keep into a golf clubhouse (Plate 1.7), with facilities for dining and entertainment at ground and first floor levels, and basement stores and cellars. Windows were to be inserted into the existing openings, and the floor levels suspended on a central octagonal stanchion. The roof was to be glazed. Interestingly this survey revealed several structural features within the tower, including a spiral stair in the wall core, which is drawn ascending to the level of the first floor. Access was evidently possible through part of the Vaulted Ring Passage surrounding the Keep at basement level. The conversion was not carried out. The plan reference number 379/1 (monument number 379, drawing 1) suggests that this is the first survey of modern times at the castle. In the event, the golf clubhouse appears to have been established at Castle Farm by 1937 (*VCHS*, 9, 184).

The Victoria County History survey of the site was undertaken by W M Homan in 1935, and it contains a fine description of the parts of the castle that were visible at the time (*VCHS*, 9). The survey noted blocked 'earlier portholes' in the Keep, and described the variety of openings in the walls, particularly the arched windows at ground level, with arched recesses or seats in their splayed reveals. The survey states specifically that all the gunports in the main bastions were blocked (*VCHS*, 9, 186). A photograph (*VCHS*, 9, 187) taken in the mid 1930s shows the north-west-facing port in the W Bastion blocked, but the opening is clearly much larger than other gunports visible in the other bastions. This suggests that this port was used as an access point sometime in the castle's history (see Chapter 3 below). The simplified plan of the castle (*VCHS*, 9, 185) shows structural detail of the south-south-west gallery (see Chapter 3 below), the first hint that there was an intramural component to the castle walls.

Aerial photographs taken before the site was cleared by large-scale excavation show that the stirrup towers, courtyard and galleries were not clearly visible. An aerial photograph taken in 1948 (Plate 1.1) shows the castle encumbered with rubble fill. Visitors through the centuries had created pathways that can be clearly seen, but few of the internal structures are visible. The stirrup-shaped towers can be seen in outline behind the main bastions, but the courtyard was buried.

In 1963 the castle was closed to the public for the first excavations. Further excavations took place intermittently until 1983, first under the auspices of the Ministry of Public Building and Works and later the Directorate of Ancient Monuments and Historic Buildings within the Department of the Environment. The first excavations were undertaken in order to elucidate the structural sequence of the castle for presentation in *The History of the King's Works*, and were carried out by the Ancient Monuments Branch of the Ministry of Public Building and Works. Colvin, Biddle and J R (now Sir John) Hale undertook a preliminary reconnaissance of the castle in 1962. It was overgrown with vegetation and covered with debris formed by demolition, structural collapse and casual use over the centuries, and they concluded that no coherent account could be written, nor the ground plan elucidated, without archaeological clearance of parts of the building, together with a new survey of the remains. The Ministry agreed to undertake the necessary work and in April 1963 Alan Cook began the architectural survey. Cook, who was on the staff of the Ancient Monuments Architects Branch, was in charge of the preparation of drawings needed for the History. Colvin and Biddle directed the excavation of trenches

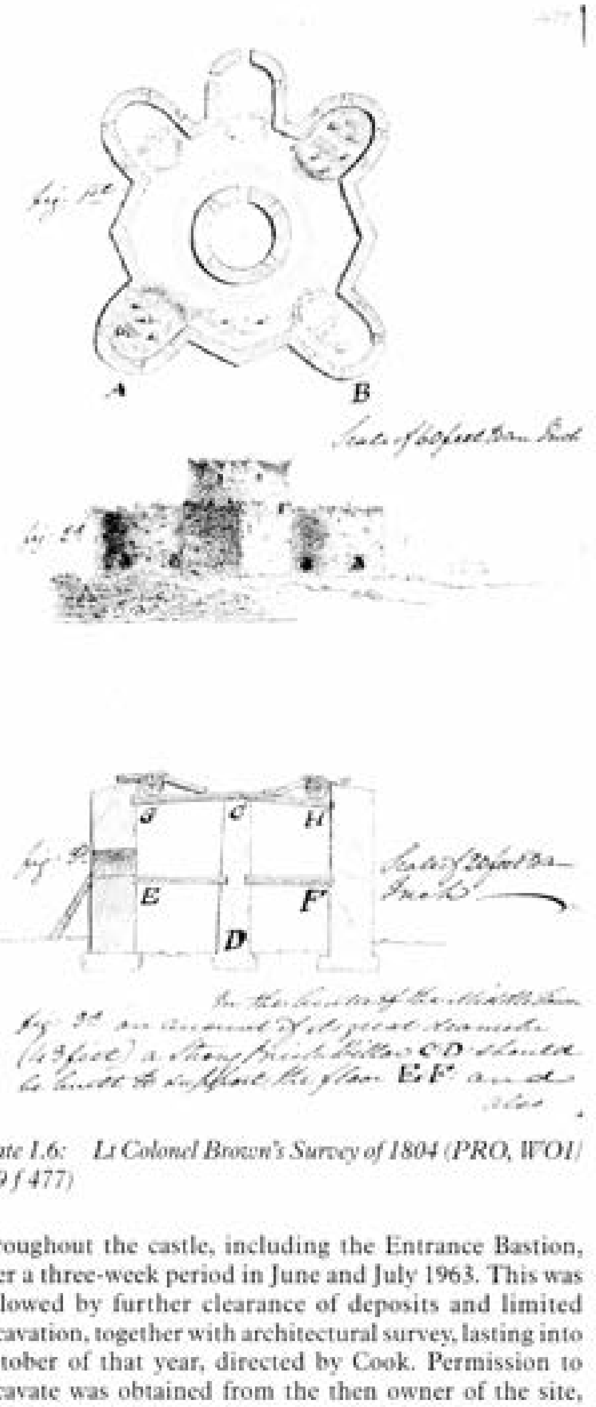

Plate 1.6: Lt Colonel Brown's Survey of 1804 (PRO, WO1/629 f 477)

throughout the castle, including the Entrance Bastion, over a three-week period in June and July 1963. This was followed by further clearance of deposits and limited excavation, together with architectural survey, lasting into October of that year, directed by Cook. Permission to excavate was obtained from the then owner of the site, Mr Arthur Piper, and his tenant farmer Mr M W Catt. The fieldwork was undertaken with the help of volunteers and Borstal boys. In this instance boys from HM Borstal, Dover, helped with the excavations, together with senior history pupils from the County Secondary School, Rye. A brief note on these early excavations appeared in *Medieval Archaeology* (Volume 8, 1964, 259–60).

A second two-week season took place in March and April 1965, principally to clarify the problems that had been encountered in understanding the construction and ground plan of the Entrance Bastion. The work was again under the direction of Colvin and Biddle, and the castle building survey was revised and extended as new discoveries were made. Student volunteers from the

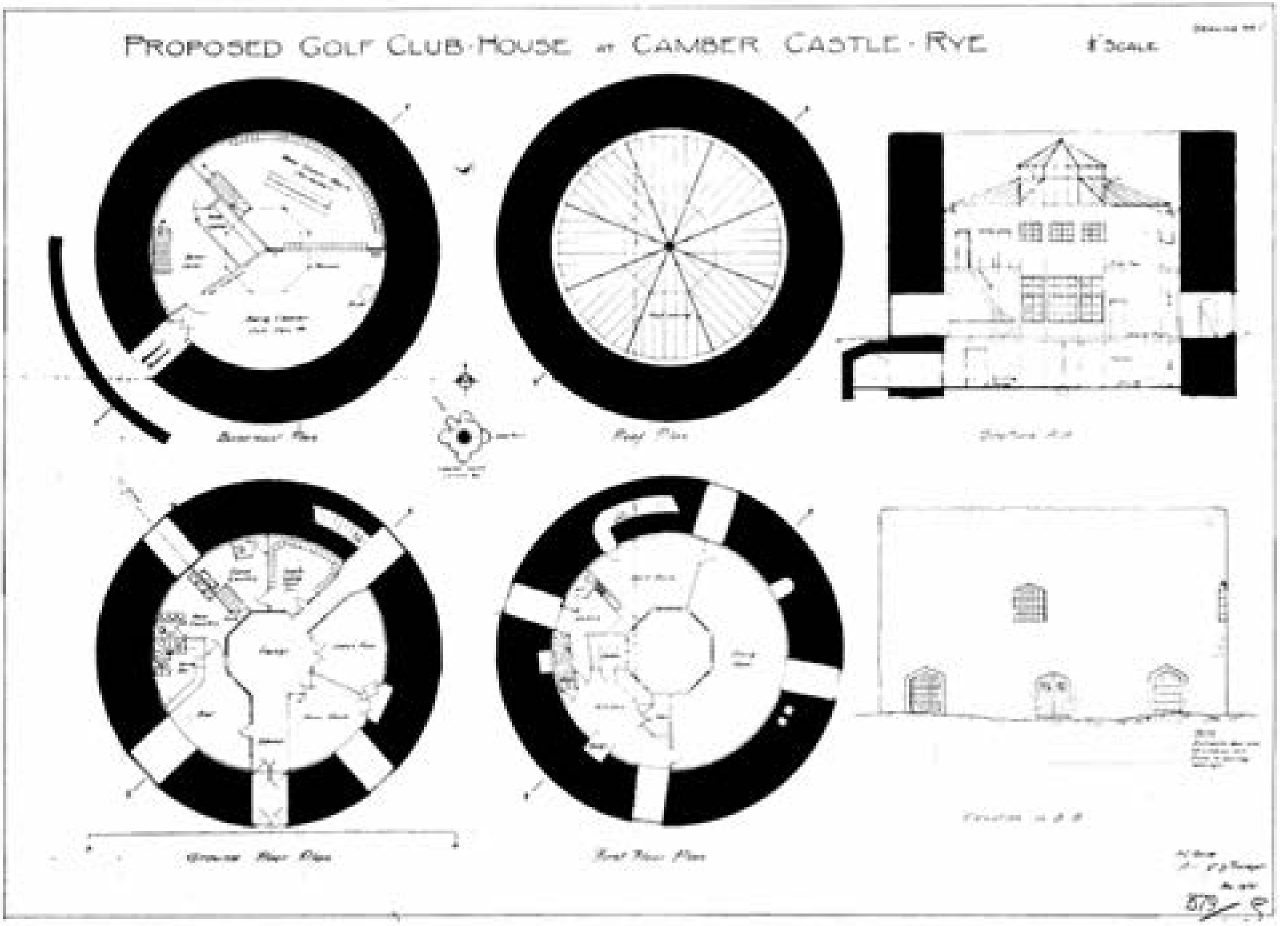

Plate 1.7: Plans for the conversion of the Keep to a golf clubhouse in 1931 (drawn by H C Gower; English Heritage Plan 379/1s)

Department of History at the University of Exeter and from Oxford University helped to carry out the work. No interim report of the 1965 season was prepared.

A total of 39 trial trenches were excavated in the first two seasons (Fig. 1.7). These were typically 6ft (1.83 m) wide, and usually excavated down to the latest floor levels, although deeper excavations were undertaken in several places, within the Vaulted Ring Passage (AII), across the courtyard (AI) and particularly in the Entrance Bastion (CIV). A letter prefix and a Roman numeral identified each excavation trench in 1963. These trenches comprised: trenches AI–VII, forming the main NE-SW transect; an incomplete E-W transect, trenches BI–BXII; the Entrance Bastion (CI–CVI); and trenches outside the Entrance Bastion (DI–II). Trenches in the area of the S Bastion were not allocated codes, though interpretative notes were made of the structures exposed. The trench codes allocated in 1965 consisted of Roman numerals from I to XIII, and in most cases were extensions of the trenches started in the first campaign. For example, Trench IV was a further investigation of Trench CIV inside the Entrance Bastion.

After the initial archaeological investigations, the monument was subject to a campaign of restoration. Progress by the Ministry of Public Buildings and Works was slow, and in February 1970 the *Daily Telegraph* reported

> After 18 months' work on Camber Castle, the weather beaten ruin dominating Romney Marsh, the Ministry of Public Building do not yet know when they will be able to open it to the public. So far as possible, they are restoring it to the picturesque state into which it sank after its abandonment in 1643.

At around the same time Jeremy Haslam carried out minor excavation work within the W Bastion and in 1972 David Sherlock excavated the upper levels in the N Bastion and continued clearing demolition debris in the W Bastion. Photographs and finds from the 1972 excavations are held in the archive, but the finds are unstratified.

Biddle had completed the first version of the chapter on Camber for *The History of the King's Works* by 1973. By then, however, it was clear that there were a number of unresolved problems with regard to the original form of the four bastions. The Department of the Environment, successor body to the Ministry of Works, was also anxious to continue the clearance and preservation of the monument with a view to eventually opening the castle to the public. Susan Ames, herself a student volunteer in the 1965 season, was asked by the Department to supervise further work in the E Bastion, and she led extensive excavations on the site on behalf of the Department of

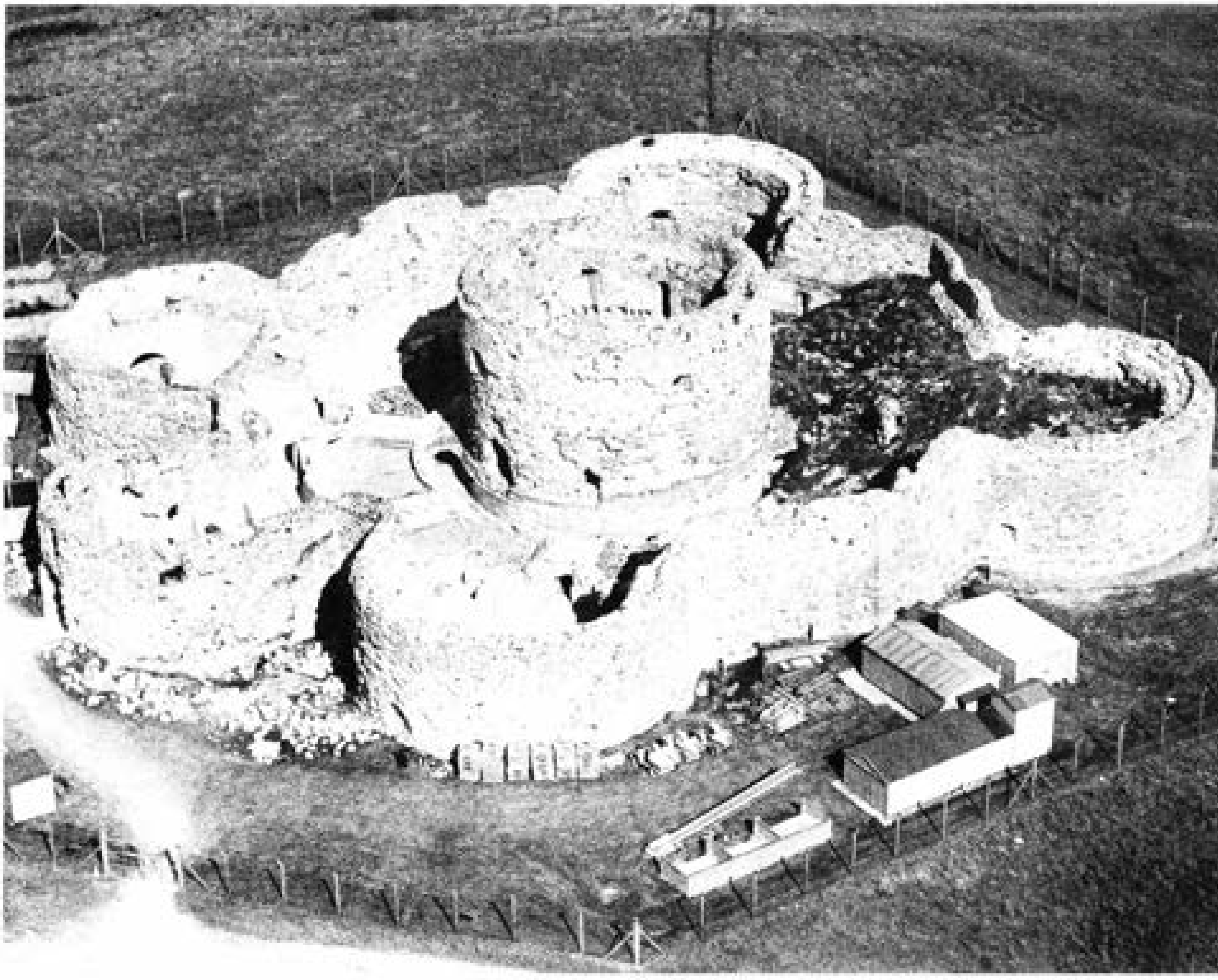

Plate 1.8: Aerial view of the castle, 1983 (English Heritage/Streeten)

the Environment over four seasons between 1973 and 1976 (Fig. 1.7). This work was dedicated to the full excavation of the principal structures and selective removal of debris with a view to the eventual display of the castle. Research-orientated investigation was carried out to enhance understanding of structures predating the final layout of the castle. Trenches were identified by abbreviations of castle structures (for example, NB for N Bastion), and the interior of the Keep was divided into four quadrants (Q I–IV). The E Bastion was fully excavated (EBA) together with the E Stirrup Tower (EBB), and further trenches were dug outside (EBX, EBY, EBZI–IV). Excavation of the W Bastion was completed, though no work was undertaken in the W Stirrup Tower. External trenches were excavated beside some of the bastions (WBX, NBX and WBY), and a small trench (NEX) was positioned on the exterior of the N curtain wall. Limited area excavation of the courtyard and the SSW Gallery (SBC/G) took place immediately west of the S Bastion. Of note was a trial trench excavated (1973) through the earthwork to the south-east of the castle, which provided information about the surrounding area. A note on results from this period of excavation appeared in *Post-Medieval Archaeology* (Volume 9, 1975, 233–6). Biddle revised his chapter on Camber for *The History of the King's Works* in the light of the information provided by Ames' excavations, and in its final published form his chapter represented a combination of ideas, concepts and structural interpretations worked out over a considerable length of time, and with important input especially by Colvin and Cook.

The final programme of work (Fig. 1.8; Plates 1.8–1.9) began in 1978–9, when Vivienne Coad and Susan Davies undertook further excavation of the N Bastion (NBi and ii), and also opened up areas of the E Courtyard (CT I and II). In 1982–3, Anthony Streeten undertook the last excavations, under the aegis of the Directorate of Ancient Monuments and Historic Buildings within the Department of the Environment. These investigations sought to expose the full extent of the ground plan for public display, leaving an unexcavated sample of strata in the area of the S Bastion and SE Courtyard. Streeten completed the excavation and clearance of the Entrance Bastion, the courtyards and galleries (CT II–VI and G II–VI), and the N and W Stirrup Towers (NBiii/iv and WBi/ii). A further small trench (NBX) was dug at the east side of the N Bastion, and another external trench (NBY; not on the area of Fig. 1.8) was excavated for

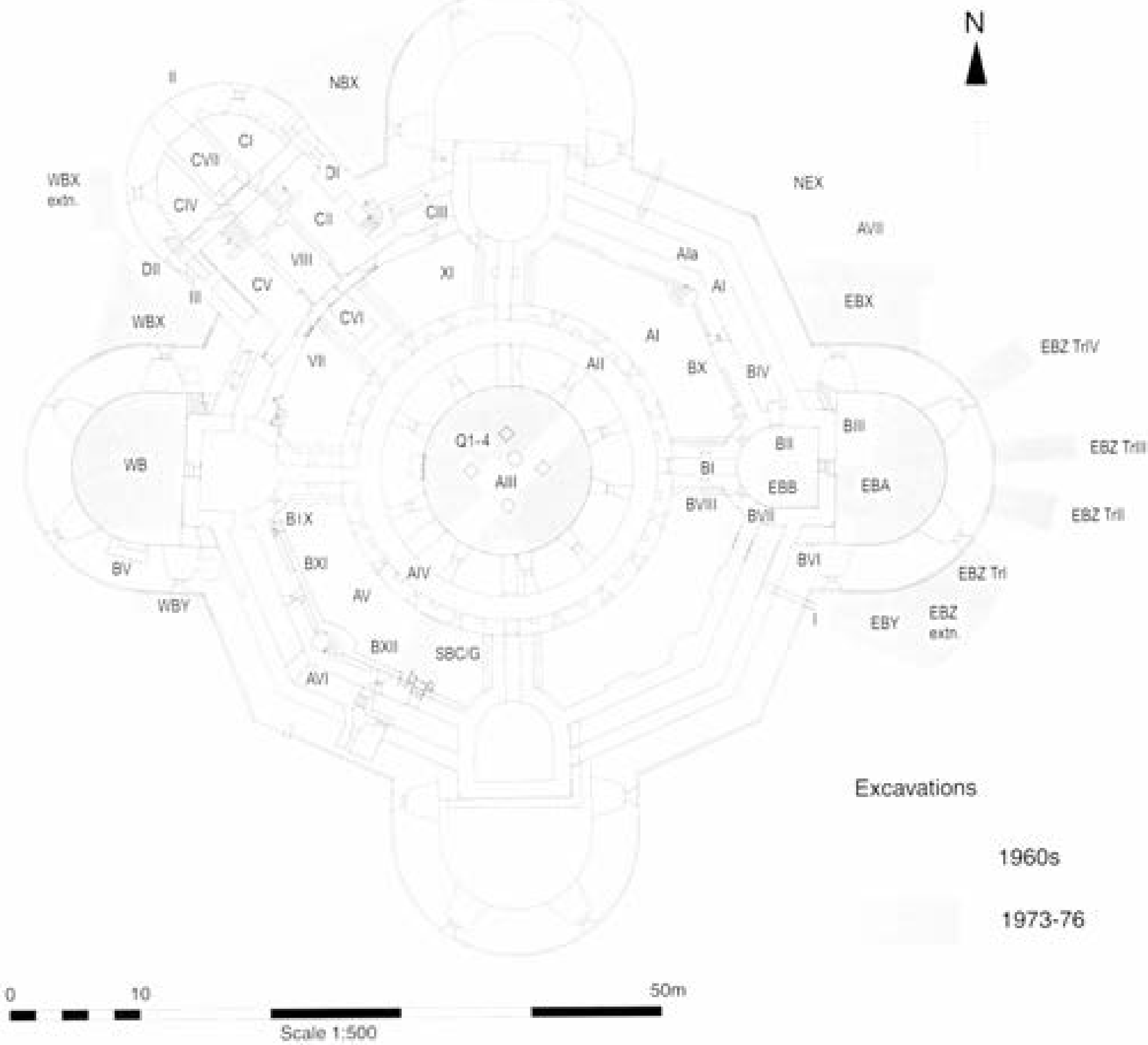

Figure 1.7: Excavations at Camber Castle in the 1960s and early 1970s

reburying architectural fragments from the site. Streeten compiled an interim report on the excavations (1983b; 1983c). The newly founded English Heritage assumed responsibility for the monument after 1984. Subsequently, detailed surveys have been commissioned for selected areas of the surviving structure, targeting areas where consolidation and repairs to the masonry have been necessary. The results of this survey programme are incorporated into the structural and stratigraphic description of the castle in Chapter 3.

A preliminary post-excavation assessment was prepared by Streeten, who proposed a four-stage programme for the completion of the project (1993). This included the reopening of the site to the public, the compilation of a fully indexed and cross-referenced site archive, and the re-evaluation of earlier site interpretations following analysis of the artefactual and environmental evidence. It was clear that the archives created by the excavations offered an opportunity to analyse the sequence, methods and materials of construction, the internal fittings and the diet and material culture of the garrison. It was also proposed to publish a report presenting a succinct description of the excavations, within the structural sequence presented in *The History of the King's Works*.

In April 1995 the Oxford Archaeological Unit (OAU) was commissioned by English Heritage to carry the project through to publication, and a full post-excavation assessment commenced in May of that year. A revised research design was completed by Graham Keevill (OAU 1996). A site narrative compiled from all the excavation data, prepared by Graham Keevill, Jonathan Hiller, Alan

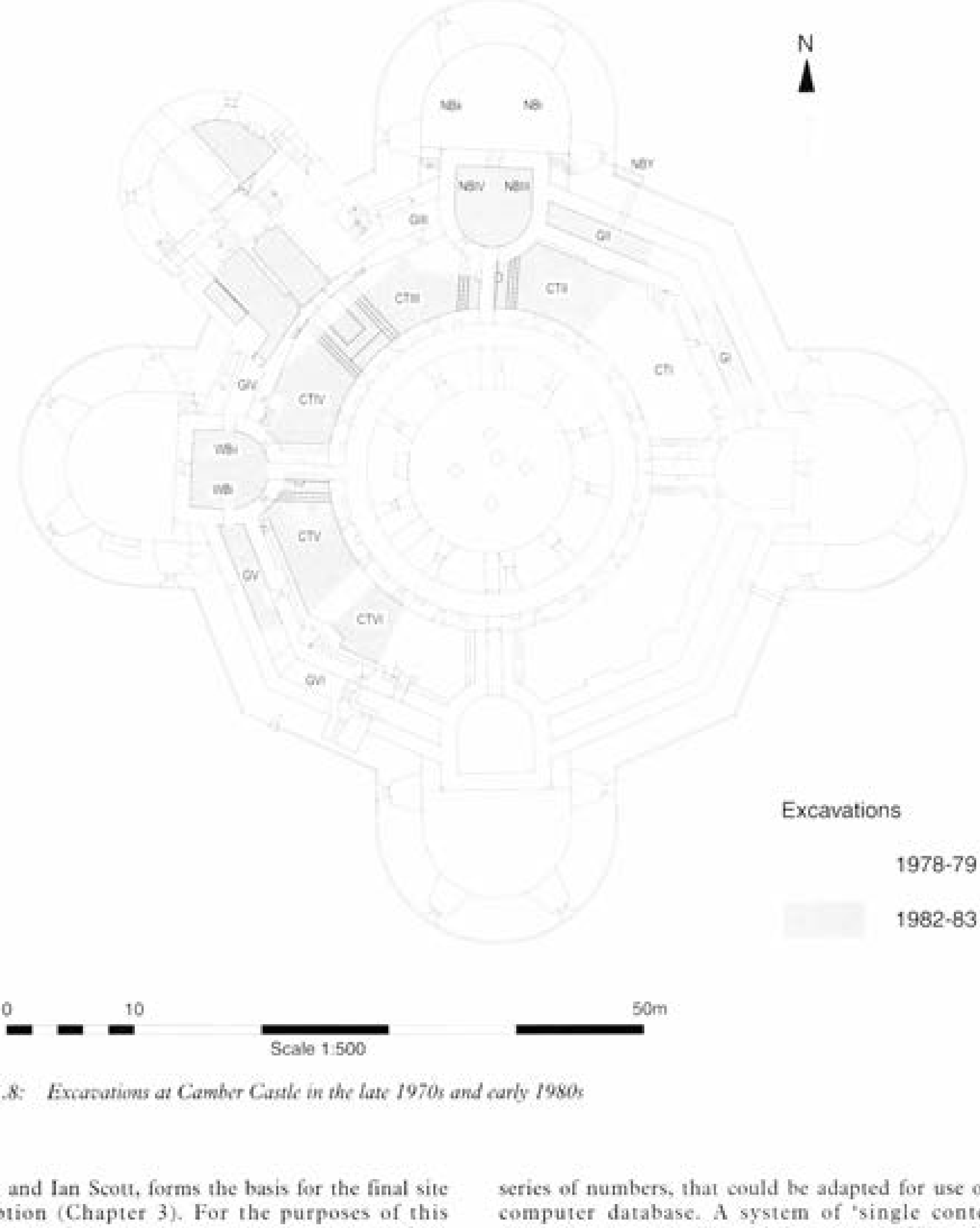

Figure 1.8: Excavations at Camber Castle in the late 1970s and early 1980s

Lupton and Ian Scott, forms the basis for the final site description (Chapter 3). For the purposes of this publication, information from structural surveys and from the analysis of the architectural stone fragments has been incorporated into the site description, to present as full an account as possible of both the above- and below-ground remains.

Note on the context data

A variety of recording systems were employed during successive excavation seasons. For the earlier excavations this resulted in the repeated use of the same few context numbers. It was therefore necessary to create a unique series of numbers, that could be adapted for use on a computer database. A system of 'single context' numbering was started in 1978–9 (contexts 1–37), and was maintained in 1982–83 (contexts 38–390). The system was expanded (by Streeten) by allocating concordance numbers to all pre-1978 finds groups (Nos. 501–981). At the final post-excavation stage, additional concordance or PRN numbers were allocated to all contexts in the site record, with new context numbers assigned to deposits, features or structures as appropriate (PRNs 982–1479), to facilitate the generation of stratigraphic matrices. Context numbers from the building surveys in part duplicated those of the concordance series, and these have been renumbered (2000s) where they are included in Chapter 3.

Plate 1.9: Aerial view of the castle, 1983 (English Heritage/Streeten)

THE STRUCTURE OF THIS REPORT AND THE ARCHIVE

Martin Biddle's detailed account of the construction and design of Camber Castle was published in 1982 (*HKW*, 415–47). It combined information from nearly two decades of survey and excavation with the results of detailed work on documentary sources for the construction campaigns of the years 1539–40 and 1542–3, and for the garrisoning of the castle. The arguments advanced by Biddle for von Haschenperg's original conception of the fortification, and for the subsequent redesign of 1542–3, remain the most authoritative account of this complex process, and his text is reproduced here with minor revisions, as Chapter 2. In the context of the present volume, this chapter offers an incisive analysis of the military strategy underlying the design of the fortifications, and a detailed account of the construction works drawn from contemporary records. Subsequent work at the castle has largely added to, rather than altered, the interpretations advanced by Biddle. The major excavation and clearance campaigns undertaken in 1982–3 under Streeten's direction have contributed more archaeological evidence for the form and development of important areas of the castle, and targeted surveys carried out over the last 15 years have further elucidated parts of the standing structure. In Chapter 3, all available evidence from survey and excavation has been amalgamated to present as detailed an account of the evolution of the castle as is possible today, and to offer suggestions as to the likely form and function of parts of the building that are no longer surviving. In order to work a mass of detail from a wide variety of sources into a coherent narrative, the information has been presented at several levels. General summaries of each identifiable phase of use are followed by descriptions of individual buildings or parts of the castle; these are supplemented by detailed archaeological and architectural descriptions as appropriate. The evolution of the castle has been divided into six main phases (I–VI), with identifiable sub-phases in certain cases: the early gun tower (phase I), von Haschenperg's fortifications of 1539–40 (phases IIa and IIb), the reworking of the castle to a more conventional design in 1542–3 (phase III), occupation (phase IV and IVa), selective infilling of remodelled structures during the lifetime of the castle (phase IVb), late occupation (phase IVc), decommissioning and demolition in the 17th century (phase V) and later activity (phase VI). The need to present a comprehensive account of the appearance and function of the castle in each phase means that there is some unavoidable repetition of information contained in Chapter 2; every effort has been made to keep this to a minimum.

The *King's Works* account was inevitably undertaken without the benefit of detailed analysis of the large archive of finds and animal bone recovered during the different phases of excavation and clearance. The study and publication of this material has been a major aim of the post-excavation programme. A considerable number of loose architectural fragments have been studied for evidence of the sequence of construction, and the design and appearance of the castle, and this information is presented along with reports on glazing, roofing and flooring tiles, mortar and structural metalwork in Chapter 4. An exceptional collection of tiles from an imported German tile-stove is also reported in Chapter 4. The large and varied assemblages of military finds and pottery are catalogued and discussed in Chapters 5 and 6 respectively. Chapter 7 contains the reports on other categories of finds, comprising metalwork (personal and decorative items, and tools), a good assemblage of glass vessels, and a small group of clay pipes. Chapter 8 deals with the animal bone, which has proved to be of considerable value for the study of the transition from medieval to post-medieval livestock husbandry.

Chapter 9 has been designed to reflect the advances in knowledge since the publication of Biddle's original report, and a number of themed discussions are presented, drawing particularly on the information now available from the finds assemblages, and considering in greater detail the appearance, function and day to day life of the castle while it was in use.

The archive

The finds and the site and research archives are in the keeping of English Heritage, and copies of the records on microfilm have been deposited with the National Monuments Record.

Chapter 2: History and Development

by Martin Biddle
with contributions by Ian Scott and Jonathan Hiller

INTRODUCTION

In 1486 Sir Richard Guldeford, Master of the Ordnance, was entrusted with the construction of a great ship, later called *The Regent*, at Reading on the River Rother in Kent, about nine miles upstream from Rye (Oppenheim 1896, 35). In September of the same year he was granted the manor of Higham (Cooper 1850, 168–88), and the land there recovered from the sea, in return for the service of maintaining a tower in his marsh at the port of Camber, to be built at his own cost within the next two years.[1] There was a sound enough reason for the construction of such a tower for defence against the king's rebels and enemies at a time when the Camber was still much in use and Guldeford was engaged on *The Regent* upriver, but there is nothing to show whether it was ever built. A stone tower would probably have been incorporated in the later structures, but a wooden tower might have left no trace.

PHASE I: THE FIRST TOWER (1512–14)

Twenty-six years later in 1512, at a time of increasing tension which led to Henry VIII's first war with France, Sir Richard's son, Edward Guldeford, began the construction of a tower at the Camber. Edward, who was Master of the Armoury and knighted at Tournai, received his first payment of £200 for building a new tower and bridge in the Camber in March 1512.[2] In the following two years he spent a total of £694 9s. 3½d. on the work, and during the course of 1514 received a further £344 17s. 7d., making a total recorded expenditure of £1309 6s. 10½d. between 1512 and 1514.[3] Of this sum, the first £200 was provided by the Chamber, and £609 6s. 10½d. by Sir John Daunce, presumably in his capacity as paymaster of the war: the source of the remaining £500 is unknown.

The works are variously described as a new bridge and a new tower for the defence of the Camber beside Winchelsea or at Winchelsea harbour, and in June 1514 Guldeford was asking Daunce for money for finishing them.[4] Guldeford's final surviving receipt the following December refers to the provision of timber and stone and to the wages of masons, carpenters, smiths, sawyers and labourers, and thus makes it clear that masonry was involved.[5]

There seems little doubt that Sir Edward Guldeford's tower still survives as the lower part of the central tower or Keep of Camber Castle. It consisted of a circular stone tower, 64 feet (19.5 m) in diameter and perhaps 30 feet (*c* 9 m) in height, with walls some 10 feet (3 m) thick, pierced just above ground level by ten narrowly splayed brick-vaulted gunports. The tower was entered by a door at ground level, and contained only a single storey below the leads. This ground floor was heated by a large fireplace and access to the roof seems to have been by means of a stair in the thickness of the wall. There is no evidence that there was a ditch or any other external work around the original tower of 1512–14.

The tower of 1512–14 can best be compared with the Round Tower at Portsmouth, built in 1416-22 (*HKW*, 792–93), the round towers on Dover pier of *c* 1500 and *c* 1518 (*HKW*, 764) or the still surviving 'Tour Henri VIII' at Tournai, built in 1516–19 (Colvin et al. 1975, 381–82, fig. 38, but this was set in a continuous curtain). As an isolated gun-platform it could do little to defend itself, and although such towers remained a feature of the later Henrician style of artillery fortification, they were henceforth nearly always only the central element in a concentric and defensible system.

A bridge is mentioned in all Guldeford's payments and receipts. Like the tower the bridge is described as 'new', but in neither case does this necessarily indicate the existence of an earlier structure. The bridge in question was apparently rebuilt in 1539 when it was described as 'the bridge at Winchelsea' and is probably to be interpreted as linking the south end of the shingle ridges on which the castle stands with the higher ground in the Strand Gate area of the town (see below). The scouring effect of the inshore currents not only built up the ridges with shingle from further west along the coast, it also subsequently began moving the deposited material yet further east. In this process the south-western ends of the ridges, which will originally have reached as far south as Cliff End or even Fairlight, were removed. The Camber Castle ridges were thus cut off from higher ground, the river Brede probably entering southwards into the sea immediately east of Winchelsea (Lewis 1932). The passage to the castle from the town would thus need to be secured by a bridge across the Brede, or at least across the other water-channels and marshy ground in this area. Nothing is known of the bridge which Guldeford was paid for constructing in 1512–14, but it may already have been replaced by 1528 when the town of Winchelsea made a bridge over 'Dynesdale' towards the tower.[6]

Although the tower was probably more or less completed in 1514, it was apparently not provided with ordnance and played no part when hostile ships entered the Camber in 1522 and 1528.[7] In December of the latter year Guldeford wrote to Wolsey for six pieces of artillery 'to finish' the blockhouse, also pointing out the weakness of Rye which would not be able to resist ships anchored beneath the town walls.[8] It was probably as a result of this approach that someone in Wolsey's entourage made a note to ask the cardinal's view on a number of matters concerning the defence of Rye, including the dispatch of artillery.[9] Probably nothing was done, since Guldeford was making the same request five years later in 1533,[10] but in the meantime the king's interest had been engaged. In December 1530 Vincent the king's painter was paid £3 10s. for a 'plat' of Rye and Hastings,[11] probably to be identified as 'the discription of Rye and Winchelseye of stayned clothe' which was later listed in the inventory of Henry VIII's possessions.[12] When he wrote to Cromwell in 1533 Guldeford asked that the blockhouses should be 'made up according to the plot',[13] and by 1536 action had been taken. By May that year there was a bulwark at Rye, and there and in the town there were twenty pieces of ordnance, the necessary gunpowder, and other weapons.[14] Even so there was little to stop Flemish depredations the following year[15] and in September 1538, when the bruit of war was in the air, the Imperial ambassador reported that attempts were being made to repair the Camber and other ports.[16] The difficulties which were eventually to ruin the Camber, and to cause it to silt up entirely, were even now apparent, for in 1537 there had been some question of moving John Thompson, the Master of the Maison Dieu at Dover (*HKW*, 732), to Winchelsea where his experience as surveyor of the harbour works at Dover might have been put to use in improving the Camber.[17] Despite such worries about the viability of the haven, vast amounts of money were about to be spent on its defence, in the construction of military works which were to be of very little effect, and would be abandoned just a century later.

PHASE II: THE FIRST CASTLE (1539–40)

Works at the Camber were already envisaged in the king's 'device' of February 1539, and included in Cromwell's memoranda of about that time.[18] Later that year Rye (meaning the Camber) was included among a list of castles and blockhouses newly built, whose cost was urged in the preamble to the Act for the Subsidy.[19] Work seems to have started on 22 March 1539 and to have continued, with an interval of perhaps eighteen months in 1540–2, until the late summer of 1543, a period of about four and a half years.[20] The total expenditure is recorded as £15,759 9s. 1d.[21] Since Camber took so long to build, and cost about three times as much as comparable forts such as Sandgate, Portland, or St Mawes, it is clear that some extra factor was involved in its construction.

The payments shown in Table 2.1 account for about £12,200 of the known total expenditure of approximately £15,800.

The figures seem to show that the work fell into two more or less equal periods, from 22 March 1539 to the autumn of 1540, and from March or April 1542 until the autumn of 1543. There is no evidence of any activity in the eighteen months between the autumn of 1540 and the spring of 1542, and the arrangement of Oxenbridge's receipts appears to confirm that there was a break in the latter part of 1540 (see Table 2.1).

The receipts of William Oxenbridge, Paymaster of the works, as we have them, are incomplete and lack any record of payments received before 1 March 1540. By contrast, the particular accounts (an example of which can be seen in Plate 2.1) are essentially intact for 1539, but missing for 1540. By combining these two sources it is possible to obtain an accurate idea of the total expenditure incurred during the first period of the works in 1539–40, and of the sources from which they were financed. The particular accounts record expenditure of £2324 6s. 2 ¼d. in the twelve pays up to 27 December 1539; to this about £120 must be added for expenditure during the first and second pays, the accounts of which are missing, and a further £14 to cover expenditure recorded on three missing pages of the twelfth pay.[22] The cost of the first twelve pays was therefore about £2460. To set against this expenditure there are only the two payments of 6 September 1539, Camber's share of which amounted to about £1000 (Table 2.1). The particular accounts reveal, however, if not the amounts received, at least the occasions on which money was obtained, and the source from which it came. During the time of these accounts (22 March to 27 December 1539), William Oxenbridge rode away from Camber eight times in search of funds: five times to Dover, twice to the Court or to London and back to Dover with the money, once, as far as the particular accounts record, to the Court alone.[23] But on this latter journey, which took him from 23 August to 14 September 1539, he must have secured the warrants for the payments from the Augmentations and the Chamber made on 6 September, and these payments were specifically to be delivered to Richard Dering and Thomas Wrake at Dover Castle. These details suggest that the works at the Camber were paid for in 1539 exclusively through the finance office at Dover Castle (Table 2.1, n.3).

The surviving pages of Oxenbridge's receipts begin with two entries relating to March 1540 (for the form of this document, see Table 2.1, n.3). These probably formed the end of a list of payments from Dering and Wrake covering all the funds received during the first twelve pays. These entries are followed by two lists, one of payments from the Augmentations, the other of payments from the First Fruits and Tenths, both complete and both relating to 1540 alone. The following page and a half are blank, showing that the end of the receipts has been reached. There are thus good grounds for believing that this is a complete record of the funds Oxenbridge obtained in 1540. A small payment from Dering and Wrake in January or February 1540, not exceeding £100, may have occurred at the foot of the previous page, but expenditure over the winter months was very low, and the March receipts may have been the first of the new season. Receipts in 1540 amounted to £3200 (Table 2.1). If the figures for expenditure in 1539 (£2460) are combined with those for receipts in 1540 (£3200), the total of £5660 must be very close to the cost of the works of 1539–40. As will be seen, these works were complete in themselves, the renewed campaign of 1542–3 being a further remodelling of the castle, rather than the completion of a project left unfinished in 1540 (see below). The works at the Camber in 1539–40 cost therefore very much the same as other forts of the period, such as Pendennis (£5614), Portland (£4964), St Mawes (£5018), or Sandgate (£5584) (*HKW*, 569–87).

Since at least one of the payments Oxenbridge received via Dover in 1539 came from the Augmentations, the fact that in the following year he received money direct from that treasury, and that after 16 March 1540 funds no longer reached him through Dover, suggests that the activity of the local finance office at Dover Castle came to an end in the spring of 1540. This conclusion is also suggested by the evidence of payments relating to Sandgate Castle (*HKW*, 573).

Table 2.1: Payments for works at Camber Castle, 1539–43

Date	Source	To whom paid	Amount £	Notes
6 Sept 1539	Augmentations[1]	Ric. Dering and Thos. Wrake via Ric. Keyes and Wm. Oxenbridge	1000	For Sandgate and Winchelsea
6 Sept 1539	Chamber[2]	As above	1000	As above
1 March 1540	?[3]	Wm. Oxenbridge from Ric. Dering and Thos. Wrake	200	-
16 March 1540	?[4]	As above	150	-
9 April 1540	Augmentations[5]	Wm. Oxenbridge	350	-
9 April 1540	First Fruits[6]	Wm. Oxenbridge	400	-
12 May 1540	First Fruits[7]	Wm. Oxenbridge	700	-
11 June 1540	First Fruits[8]	Wm. Oxenbridge	1000	Warrant, 3 June
8 August 1540	Augmentations[9]	Wm. Oxenbridge	400	Warrant, 6 August
7 April 1542	Augmentations[10]	Wm. Oxenbridge	300	Warrant, 31 March
28 April 1542	Augmentations[10]	Wm. Oxenbridge	300	Full payment of above warrant
1 June 1542	Augmentations[10]	Wm. Oxenbridge	400	Full payment of above warrant
28 June 1542	Augmentations[11]	Wm. Oxenbridge	1200	Part of £2000; warrant, 20 June
18 July 1542	Augmentations[12]	Wm. Oxenbridge	800	Full payment of above
26 April 1543	Augmentations[13]	Wm. Oxenbridge	2000	Warrant, 17 April
9 July 1543	Augmentations[14]	Wm. Oxenbridge	1000	Part of £2000; warrant, 23 June
26 August 1543	Augmentations[15]	Wm. Oxenbridge	1000	Full payment of above
Total			12,200	Less two part payments for Sandgate totalling about £1000

Notes

1. E323/1, pt. II, m 24 (*L.&P.* xiv (2), 236 (10)).
2. BM Arundel MS 97, f 90v (*L.&P.* xiv (2), 781 (p. 314)). Both this and the previous payment for another sum of £1000 from the Augmentations on the same day were for Sandgate and Winchelsea. The Sandgate pay ending on 14 September 1539 cost £469 odd, while that ending on 12 October 1539 cost a little under £361 (BM Harl MS. 1647, ff 139, 157), so it seems that rather over half the £2000 was available for Camber.
3. El01/491/31. f 1[v]. This bifolium appears to contain the last part of the receipts or charge of William Oxenbridge's account for the works at the Camber in 1539–40 for the lower part of f.2[r] and all f. 2[v] is blank. The previous folio and the upper part of f.2[r] is occupied by the entry of a series of memoranda of receipt and copies of indentures of receipt grouped according to the sources of the money, the groups separated in the text by a larger than normal space and introduced by a large initial capital. Thus f. 1[r] contains the last two entries of a series of receipts from Richard Dering and Thomas Wrake: followed by a group of three entries relating to receipts from John Gostwick, treasurer of the First Fruits and Tenths; followed by two entries of receipts from the Augmentations. The latest receipt is dated 6 August 1540. From this information it can probably be deduced a) that Oxenbridge's first account period ended in the latter part of 1540; b) that he received in 1539–40 £2100 in all from the First Fruits and Tenths, and £750 in all direct from the Augmentations; c) that up to mid-March 1540 he was receiving most if not all of his monies from Dering and Wrake in the *ad hoc* local finance office in Dover Castle, whatever its original source and whatever part he had played in the first place as an intermediary in getting it from the various treasuries into Dering and Wrake's hands.
4. E101 491/31, f. 1[v].
5. ibid f. 1[v]; *cf* E315/249, f. 46 (*L.&P.* xvi 745 (vi)), and E323/2B, pt I (*L.&P.* xviii (2), 231 (11)).
6. E101/491/31, f 1[v]: *cf* SP1/159 ff. 262[v]-3 (*L.&P.* xv, 642 (1)).
7. E101/491/31, f. 1[v]: *cf* B M Roy MS App. 89, ff. 130[v]-1 (*L.&P.* xv, 642 (2)), which gives the sum paid to Oxenbridge since 7 November 1539 as £1100, ie. the sum of payments of 9 April and 12 May 1540.
8. E101/491/31, f. 1[v]. There appears to be no other record of this payment.
9. E101/491/31, f. 2[r]: *cf* E351, 249, f.47 (*L.&P.* xvi, 745 (vi)), and E323 2B, pt 1 (*L.&P.* xviii (2) 231 (11)).
10. E 315/251, f.82 (*L.&P.* xviii (1), 436 (vii)); *cf* E323/2B, pt 1 (*L.&P.* xviii (2), 231 (11)).
11. E351/251, f.83, otherwise as in note 10.
12. E315/151, f.84, otherwise as in note 10.
13. E351/252, f.51 (*L.&P.* xix (1), 368 (v)): *cf* E323 52B. pt I (*L.&P.* xviii (2), 231 (11)).
14. E351/252, f.53, otherwise as in note 13.
15. E315/252, f.54, otherwise as in note 13.

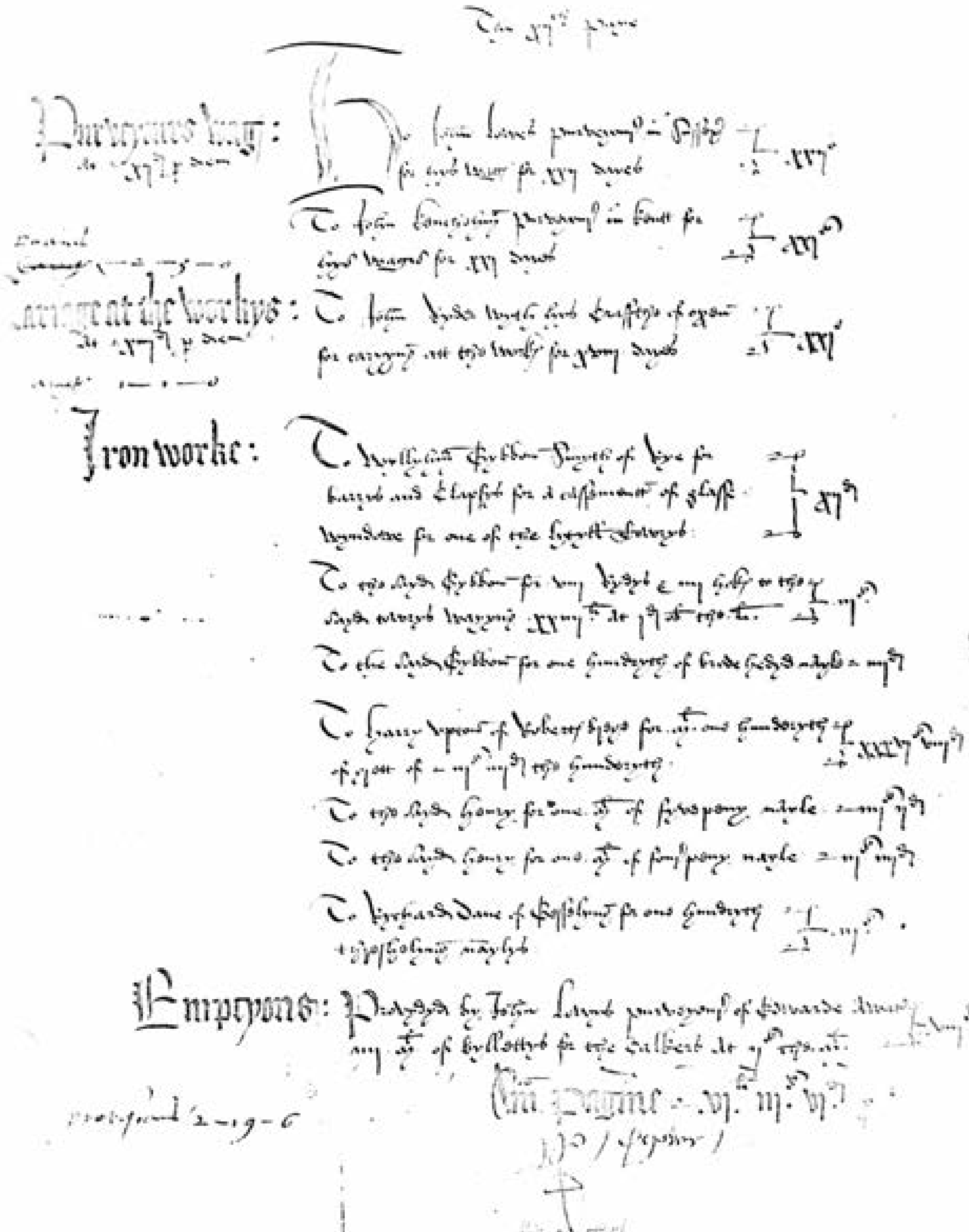
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Plate 2.1: A page from the building accounts (PRO E101/481/30) (see endnote 22)

A simple subtraction of the cost of the works of 1539–40 from the total expenditure of about £15,759 over the years 1539–43, shows that the second campaign at the Camber in 1542–3 must have cost about £10,000. Towards this sum the Augmentations contributed £7000 (Table 2.1), but the source or sources of the remainder are now unknown.

The works of 1539 can be examined in some detail, thanks to the survival of the particular accounts. For 1540 and for 1542–3 there is very little written evidence, other than that concerning the provision of money, already described. But the structure itself reveals, if sometimes darkly, the sequence and achievements of the two campaigns, and this evidence will be introduced where appropriate.

The king's device of February 1539 had suggested that Thomas Canner should be the paymaster of the Camber works, with John Molton and John Russell as master mason and master carpenter respectively.[24] This team was actually in operation at Cowes the following April, with Canner as surveyor rather than pay master (*HKW*, 488–569),[25] but there is no sign that they were ever concerned with the Camber. The remodelling of 1539–40 was evidently designed by Stephen von Haschenperg, who was simultaneously engaged on the works at Sandgate and on the earthen forts in the Downs (*HKW*, 462, 570). He is repeatedly mentioned in the accounts as 'Master Stevyn the devysour' and he visited the Camber on at least four occasions between May and September 1539.[26] He was ill at Rye in May, when a physician had to be called in, but he subsequently left for Dover, returning in the sixth pay, and making further visits in the seventh and eighth pays, before departing for London in September. Almost at once one of the commissioners had to ride after him for a consultation, and he was in turn followed by a letter 'to advertyse Master Stevyn in whate case the workes were in'.[27] He had an office at the works, 'the devisours chamber', and his riding costs and the expenses of accommodation for himself, his servants and his horses feature regularly in the accounts.

The commissioners were Philip Chute, John Fletcher and William Oxenbridge. Their names were entered under a heading for their wages in each of the surviving pays, but their wages were never given and must have been entered elsewhere. Philip Chute and John Fletcher signed every page of the accounts, the former with his name, the latter with his mark across which a scribe wrote 'Fletcher'. Chute, a yeoman of the Chamber, was appointed captain of the castle at Rye (ie the Camber) early in 1540,[28] a post he was to hold for over twenty-five years.[29] Fletcher, later mayor of Rye, was a member of a well-known Rye family, an important merchant, and an ancestor of the great Jacobean dramatist (Holloway 1847, 549–50). William Oxenbridge was also paymaster of the works, and is specifically described as such in many of the payments made to him (Table 2.1).[30] He was a prominent local figure, with his seat at Brede Place, and the accounts which still survive appear to have descended in his family (Cooper 1856, 213–33; 1860, 203–20).

The master mason, Thomas Puckyll, described as upper warden, worked for 5s. a week until the middle of September, after which he does not reappear.[31] His position was apparently taken over by Nicholas Andewe, the warden, who had been associated with him from the beginning, and who earned 4s. a week. The bricklayers were headed in the third pay by Gilbert Drynkherst, who earned 7d. a day. He appeared in the next pay as a brickmaker at 8d. a day, and in the fifth pay at the same wage, as warden of the bricklayers, retaining this position until the twelfth pay, when he turns up as a lodgeman at 3s. a week. The master carpenter, Nicholas Andrewe, earned 10d. a day. The master smith, William Gybbon of Rye, first received his title in the eighth pay, when he still received 6d. a day, but in the next pay and afterwards he earned 7d. The master diker, Thomas Anenell, earned 7d. a day. There were two purveyors, each at 1s. a day, one in Kent and the other in Sussex, four clerks (for the ledger, the check, the paymaster, and the call), the two overseers (one each for the works and the quarry), later increased by a second and then a third overseer for the works. The clerks and overseers all earned 6d. a day initially, but from the fifth pay onwards the paymaster's clerk, and the clerks for the ledger and the check, each earned 8d.

The stone for the works was obtained from local quarries, from the demolition of buildings at Winchelsea, and by purchase. The quarry was operated as a part of the works organisation, and was in full production until the beginning of September 1539 (Table 2.2), by which time 5909 loads of stone had been quarried and carted to 'the Tower'. The quarry was probably at Fairlight, on the limestone outcrop about five miles south-west of the castle, but this is only specified on one occasion, when Saltcote is also named.[32] The latter, an alternative name for Playden, immediately north of Rye (Mawer and Stenton 1930, 533), seems to have had a brief life as a quarry in the sixth pay and to have contributed only two freights of stone.[33] In the spring of 1540 quarries were open at Hastings and Fairlight and were being worked on a slightly larger scale than in the previous year.[34]

Labourers 'to tere tyle and breke stone' were active at Winchelsea from April to July, probably on the demolition of one of the religious houses (Table 2.2).[35] Their efforts contributed 6 tons and 90 freights of stone, plus three freights of tile.

Chalk was needed in quantity for making lime: 1363 tons were brought from Dover at a cost of 1s. the ton, plus 4d. the ton for digging, subsequently for 1s. 8d. the ton all in.[36] There were special arrangements for the finer stones. Two hundred tons of freestone were purchased from the king's quarry at Mersham, near Ashford, squared, rough hewn and delivered, for 3s. 4d. the ton.[37] The purchase of Caen stone was more complicated. It was obtained from five different suppliers in Normandy (Peter de Hamell, Jacques Tardu and Jacques Lamedu, all of Tréport; Antony Lucas of Fécamp; Collyn Dusard of Quillebeuf, Seine-Maritime) and paid for partly in cash and partly with wooden billets. The latter were purposely bought at 2s. the thousand with the intention of exchanging them for the stone, but when handed over they were priced at 3s. 4d., 3s. 8d., or even 4s. the thousand. In this way the works obtained 129 tons of Caen stone at slightly over 3s. 8d. the ton, instead of at the asking price of 4s. 5d., 5s., or 5s. 8d.[38]

Immense quantities of wood were required, for the structure and fittings, for scaffolding, for making baskets and hurdles, and for fuel. The source or sources of the less important timber is not always made plain in the accounts, but a good deal of it came in the earlier pays from Lord Windsor's wood at Udimore.[39] Later on, as felling gathered pace at Knell, the logs needed for the lime and brick kilns became a by-product of that activity.[40] Timber was sometimes purchased rather than cut, such as that needed at the start of the works (perhaps before Appledore or Knell were in production) for Winchelsea Bridge and Brede crane; timber for the floor of the great tower, seasoned planks for doors, walnut planks, and even scaffold poles, logs, and the billets to exchange for Caen stone were also bought.[41] Wainscot was purchased, as was ash for stocking the guns, billets for the calkers, and masts to scaffold the great tower.[42] But the greater part of the timber needed for the structure was obtained from Horne Wood near Appledore in Kent, and subsequently from Knell Wood in Beckley parish, Sussex, both about eight miles distant by water from the Camber. It is possible that Horne Wood was owned by Philip Chute who was one of the commissioners appointed to oversee the works at Camber, and who was subsequently appointed as captain of the castle. His house was later known as Horne Place. The operations at Appledore and Knell were run as part of the Camber works organisation, and were successively under the direct control of the master carpenter Nicholas Andrewe, who spent the third and fourth pays at Appledore, the fifth to eleventh pays at Knell, and only moved to the tower in the twelfth pay in mid-winter. The short-lived activity at Appledore saw the preparation of a major frame, the principals of which required a special cart, or 'cogge', and two 'crafts' (teams) of oxen to draw them to the waterside. This was probably the frame for the new floor in the central tower.[43]

The operations at Knell began in the fourth pay and soon developed on a very large scale (Table 2.2). Nicholas Andrewe arrived in the fifth pay, by which time there were two sawstages, and seven crafts of oxen were at work dragging the felled timber from the wood to the sawyers.[44] Framed timber was already being transported by wain from Knell to Rye in the sixth pay, and the principals of the great tower, perhaps for the roof, were transported by lighter in the following month.[45] It is not possible to calculate how much timber was obtained from Knell in 1539, but the wood certainly provided the greater part of the structural timber required that season. Whether it continued to do so is not clear: in the sixteenth pay, in March-April 1540, there were only four men at work there, but this number could have been rapidly augmented in the following weeks (see Table 2.2).[46]

Timber and stone were both to a greater or lesser extent prepared at the wood or quarry, and reached the site in a relatively finished condition. The two other materials of which great quantities were needed, lime and brick, were normally manufactured on site. Some lime was purchased,[47] but most of it was prepared from the 1383 tons of chalk brought from Dover. Limeburners were already at work by the third pay, continuing until the tenth, for a day and night wage of 14d. (Table 2.2). Five thousand bricks were bought in the fourth pay to make a new lime kiln, and in the sixth pay a further 11,000 were purchased from Francis Dosse, a Fleming, for mending the lime kilns.[48] The kilns were fired with logs, great quantities of which were provided.

The making of bricks was under way by the third pay and was supervised throughout by Alexander King, brickmaker.[49] The first, second, and third kilns were burnt in the eighth pay, the fourth in the ninth pay, and the fifth and sixth in the tenth pay.[50] These six clamps or brick-holts apparently represented the season's work, for the brickmakers were laid off after the tenth pay, and did not reappear until the following spring.[51] No indication is given of the number of bricks produced, but it cannot have been much less than 400,000 and may have exceeded half a million. The raw materials were brick-earth and straw. The former came from Winchelsea, or at least from that direction, and straw arrived in load after load throughout the season.[52] The kilns or clamps were presumably fired with logs.

By comparison, most other materials were required in relatively small quantities. Tile was little used on the building. Four freights of tile were obtained from Winchelsea in the sixth pay apparently from demolitions, and nine tons were brought in by water in the tenth pay.[53] Five burden of steel were purchased for 3s. 4d. the burden, some of it from Richard Rede, a London merchant and one sheaf of steel was bought for 10d. from Henry Upton of Robertsbridge, in the Wealden iron-working area a few miles west of the Camber.[54]

Three bars of iron for the smiths to work on in the forge at the tower were provided by William Gybbon of Rye in the fourth pay at no cost; presumably because he was to be paid by weight for the ironwork which the smiths produced.[55] The smiths were active throughout the season from at least the third pay (Table 2.2), William Gybbon himself leading them from the seventh pay (see above). A further half ton of iron was purchased from Sir William Finch of Netherfield in the seventh pay for 53s. 4d., and in the same pay 42 bars of iron weighing eleven cwt were bought from John Stonstret of Robertsbridge for 5s. 4d. the cwt.[56] Another ton of iron, consisting of 55 'endes', was bought in the ninth pay from Michael Martyn of Dallington at a cost of £5 6s. 8d.[57]

In the campaign of 1542–3 iron was bought from Henry Westall's Robertsbridge forge; 377 pounds was delivered in 1542 and paid for by William Oxenbridge at a cost of £1 2s. the following year (Crossley 1975, 51).[58] During 1543 Oxenbridge purchased 3 tons 7 cwt 26 lbs of iron at £5 6s. 8d. the ton, and 2 tons 13 cwt of cast iron at £2 13s. 4d. (4 marks) the ton (Crossley 1975, 50–51, 57–58).

By far the greater part of the ironwork needed for the works in 1539 (tools, machinery parts, window and door fittings, hooks, locks, and nails) was provided by William Gybbon of Rye, the payment he received presumably representing the material value, his labour and that of his fellow smiths being carried on the wages bill.[59] Richard Dane of Guestling sharpened quarry tools, and provided nails, including 'dentyd naylys for dorys',[60] while Henry Upton also provided nails.[61] Tinned nails for doors were obtained from St Bartholomew's Fair in London, and some locks and nails were bought at Playden Fair in the same August.[62]

Table 2.2 The numbers of workmen employed at Camber 1539–40, by pays for which information is available (National Library of Scotland, MS. 2830)

Types of workman	3	4	5	6	7	8	9	10	11	12	16
The Tower											
Masons (inc. setters & lodgeman)	23?	25	34	40	40	33	33	23	19	10	55
Bricklayers	23?	29	54	77	86	71	60	16	8		188
Carpenters	6	5	8	9	4	2	1	11	11	13	59
Sawyers							3				16
Joiners											2
Scavelmen (inc. dikers)	19	19	11		5	7					82
Labourers	96?	106	155	172	231	222	190	96	36		669
Brickmakers (inc. servers, earthworkers & strekers)	7	11	17	28	27	17	16	16			9
Limeburners	2	3	7	5	3	3	3	2			2
Plumbers (inc. carpenters & labourers)			15								4
Smiths	1	2	3	4	4	3	3	3	2		12
Calkers (inc. shipwrights)									13	2+?	
Scaffold-makers				1	1	1	1	1	1		
Mortar-makers				1	1	1	1		1		
Thatcher	1	1	1								
Ferrymen	?	?	?	?	4	5	5	5	3	2	15
The Quarry (-ies)											
Masons	9?	9	10?	10	10	8					10
Labourers (inc. miners)	36	36	31	42	28	25					50
Knell Wood											
Carpenters		12?	30	27	17	40	29	24	16	3	2
Sawyers			6	8	6	18	16	14	8	2	2
Fillers		2	2	2			5	2			
Appledore (Horne Wood)											
Carpenters	10?	16									
Sawyers		4									
Winchelsea Bridge											
Carpenters	7	7	7	3							
Sawyers	?	2	2								
Winchelsea											
Labourers	2	2	5	3							
Small carts	5	4	4								
The Crane											
Carpenters	4										
General											
Commissioners	3	3	3	3	3	3	3	3	3		(3)
Clerks	4	4	4	4	4	4	4	4	4		23
Overseers	2	2	2	3	3	4	3	3	2		
Purveyors	2	2	2	2	2	2	2	2	2	2	4
Small carts	14	14	18	29	32	33	33	10	4		68
Total	276	320	431	473	511	502	411	235	133	34	1272 [+3]

During the 1539 season the plumbers were active only in the fifth pay (Table 2.2). During that month the plumbery was put in order, wooden moulds were made for casting lead, an iron casting pan and drawing hooks were purchased, and 3000 billets were brought in for fuel.[63] The lead itself was purchased at a cost of £4 6s. 8d. the fother from Richard Rede, the same London merchant who had provided some of the steel.[64] At some later date William Oxenbridge obtained a warrant for lead which would probably have come, as for most of the other coastal forts, from one of the dissolved religious houses.[65]

Although wood was the normal fuel used, some of the metal-working required coal or charcoal. Four chauldrons of coal were purchased, two for 8s. 6d., and two more, specifically Newcastle coal, for 7s. 6d. the chauldron.[66] Some eighty sacks of 'wod Colys' or 'Schorre Colys' were bought for 3½d. or 4d. the sack.[67] The transport of this mass of materials, and of the many other items purchased, as indeed of the workmen themselves from day to day, posed considerable problems in an area criss-crossed by rivers and water-channels, especially since the Cobble spit on which the castle stood was only accessible by land from the south-west, and this route was itself probably cut close to Winchelsea by the Brede river (see above). Nevertheless hundreds of cart-loads of stone from the quarry were reaching the tower during the third and fourth pays.[68] The passage of this material emphasises the importance of the bridge at Winchelsea whose construction was the first major project of the 1539 season (Table 2.2). The components were apparently made at Winchelsea: some forty tons of timber were purchased, 4500 planks were sawn, and the planks and one arch of the bridge were carried by water from Winchelsea to the bridge in the fifth pay.[69] During that and the fourth pay a boat was hired 'to helpe sett uppe the brege'.[70] Three carpenters were still working there for three days in the sixth pay, but the use of a lighter the previous month to carry to the tower the materials left over from the bridge suggests that it was essentially complete by the middle of June, about three months after the start of work.[71]

Access was only one of the problems; handling was another and especially time-consuming where, as here, changes from land to water-transport were necessary. In the third pay (Table 2.2) carpenters at Brede were making a crane that was transported that month, a freight of 10 tons.[72] It was presumably set up on a quay somewhere near the works and served as the main off-loading point for the lighters coming from the adjacent parts of Kent and Sussex, and sometimes from Dover, London, or Normandy. Carriage by water and land of men and materials occupies a great deal of the accounts. Ferryboats to carry the workmen between Rye and the Kevill or Cobble were on hire throughout the season, and in the third and fourth pays, when there was work at Winchelsea on the bridge, a Winchelsea ferry was in use as well.[73] Many carts and carters were employed in the works (Table 2.2), and many more were taken up, presumably by virtue of the commission held by the officers, to carry stone from the quarry at 8d. the load. The origin of these wains was carefully laid out parish by parish and hundred by hundred in the accounts and reveals that they came from within a radius of some ten to twelve miles of the Fairlight quarry.[74]

The progress of work on the tower can be seen in the rise and fall in the number of workmen employed, in the changing composition of the workforce, and in the rate of expenditure. It may also be deduced to a lesser extent from the relatively few references in the accounts to specific parts of the building and special tasks. The fluctuation in numbers shows clearly the seasonal pattern characteristic of contemporary building works, with a peak in July and August, followed by a rapid decline to something like a tenth of the force in December. This pattern is closely followed by expenditure (for a very close parallel to these patterns, cf. works at Sandgate in 1539–40, *HKW*, 576–77). Although the information is less full for the 1540 season, it is possible to plot the provision of funds (cf. Table 2.1) and deduce the probable pattern of monthly expenditure. These patterns conform closely to the employment figures available for the sixteenth pay (March-April 1540) which show a striking increase in the men at work to a total of 1272, two and half times more than in the seventh and eighth pays of July and August the previous year.[75] There can be no doubt that activity at the Camber reached a frantic pitch in the spring of 1540 - there were twenty-three clerks, a sure sign - and that it then declined rapidly, to end perhaps with the twenty-first pay early in September.

More detailed evidence of particular activities is provided by the employment at certain times of specialist workers. The scavelmen and dikers of the third to fifth, seventh, and eighth pays were probably excavating foundations; the plumbers of the fifth pay were perhaps casting lead ingots into convenient-sized sheets; the calkers of the eleventh and twelfth pays were active on the roof of the great tower, at the little towers, and in the galleries (however the latter are to be identified), where they were perhaps pitching the basement floors as well as the roofs (see below and notes 82, 86 and 89).

The provision of so large a labour force, its gathering at speed, and its equally rapid disbandment for winter or at the end of the works, must have placed a great strain on the surrounding countryside. Identification of some of the masons has already shown that they were recruited from Sussex or Kent. The pressed men came from exactly the same area, within twenty to forty miles,[76] but the bulk of the labour force, like most of the carts for carrying stone, must have come from the neighbouring parishes over a radius of some ten to twelve miles.

One of the first tasks on site was the construction of offices and working lodges. The devisor's chamber, the counting house, the plumbery, masons' lodges and other lodges and houses all appear in the accounts, and the thatcher who was employed until the fifth pay was engaged in covering these site offices and workshops.[77]

Unfortunately references to specific parts of the building are few and usually difficult to identify with the surviving structure. It is clear that a good deal of work was devoted in 1539 to what the accounts call the great tower, which must be the round tower or Keep, built in 1512–14. Fifty-one tons of timber for its floor were bought in the fifth pay,[78] and in the seventh pay the 'princypall' and other framed timber for the great tower were brought by lighter from Kent, and a frame and a special rope were provided 'to wynde upp the tymber on the greatt towre'.[79] Two pays later masts were used to make bridges up to the great tower,[80] probably scaffolding ramps,[81] perhaps to ease access for the caulking and pitching of the tower which was in progress in the twelfth pay.[82] This latter must imply that the roof was in position: two levels are thus defined, the floor of the fifth pay and the roof, the frame of which may be identified with the framed timber wound up the tower in the seventh pay. The frame for the floor was thus perhaps the frame prepared at Appledore in the third and fourth pays, the carriage of which to the tower with its 'princypales' took place in the fourth pay (see above).[83] On this interpretation the fifty-one tons of timber purchased in the fifth pay would have been for the planking rather than for the elaborate framing needed to support a floor over so large an area (see below).[84]

Other references to the structure are even less specific. From the eighth pay there are several mentions of 'the small towre',[85] 'the towres',[86] and 'the lytyll towrys'[87] which had apparently reached roof level, had perhaps been pitched, and had been fitted with doors and windows by the twelfth pay. These must presumably be identified with the four stirrup-shaped towers (hereafter 'stirrup towers') set around the central Keep.

There are several mentions of the gallery or galleries, for which large quantities of planks were brought to the tower in August and September,[88] and which were caulked in November.[89] The references to planking and caulking suggest that the gallery should not be identified with the vaulted passage constructed around the central tower; it is much more likely that it was the term used to describe the ranges which linked the small towers in a continuous octagonal curtain. These were certainly roofed with timber in their original form. Caulking and pitching may, however, refer equally to the water-proofing of the basement floors. Traces of pitch or tar were noticed during the excavations on the original floor level in the quadrant room in the phase IIb extension to the Entrance Bastion (1965 Trench V) (see Chapter 3 below).

If the galleries were in the octagonal curtain, the 'vawtys' of the accounts, for one of which a lock was bought in the eighth pay,[90] probably refer to the basement passages encircling the central tower and radiating from it to the outer towers. They may also refer to the vaulted compartments which fronted each of the stirrup towers in the original design of 1539–40.

There remain the references to the gatehouse and the foundation. In the eighth pay labourers were paid for working by night to 'lade owte water fro the foundacion of the gatehouse', and in the tenth pay they were working day and night to 'lade water at ye fundacion'.[91] There seems little doubt that these passages refer to the large and very deep rectangular foundation which formed the first stage of the gatehouse or Entrance Bastion.

The structure itself displays three main periods of construction: first, the central tower or Keep which has been attributed to 1512–14 (see above); second, an elaborate concentric structure consisting of four bastions backed by stirrup towers linked to each other by an eight-sided curtain and to the ring passage around the central tower by radiating vaults; third, the replacement of the earlier bastions by four massive semi-circular bastions, linked by their own eight-sided curtain, the whole added like the skin of an onion over and around the towers and outer walls of the previous phase. These successive additions in plan were related to successive heightenings of the structure, so that the whole sequence of the three main periods can be seen in the central tower. Elsewhere only the two later periods are present, but in the north-western or Entrance Bastion and in the buildings against the curtain restless innovation resulted in up to three successive remodellings during the second period alone.

The massive rounded bastions of the third and final period are examples of the developed form of Henrician military architecture seen, for example, at the Hurst in 1541–4, or at St Mawes in 1540–5 (*HKW*, 539–44, 595–97). They provide a sharp contrast with, and in some sense a curious regression from, the ideas of the previous period, but there can be no doubt that they should be dated to the works campaign of 1542–3, together with the external curtain, the final heightening of the galleries, the Keep and the stirrup towers, and the latest phase of the Entrance Bastion.

This leaves the works of the second main period to the campaign of 1539–40, for which Stephen von Haschenperg was responsible (cf. O'Neil 1945 and also see above). The various parts of this structure can be identified with the limited number of specific references to the building in the particular accounts of 1539 (see above and Chapter 3).

The remodelling of the Keep was a major undertaking. The structural evidence for the remodelling of the tower at this period agrees well with the evidence of the accounts for what was actually happening in 1539. All ten gunports, the entrance, staircase opening, and the fireplace of the original arrangement of 1512–14 were blocked, and the floor-level inside the tower was lowered some two to three feet and at basement level openings were formed to north and south leading to the external ring passage, also built at this period. A new ground floor was inserted into the tower about level with the top of the original gunports. At the new ground-floor level the tower was entirely remodelled with new openings to north, east, south and west, on the axes of the new design. The opening to the north (above one of the two basement openings to the ring passage) was the principal entrance to the tower in this period (but see also Chapter 3 phase IIb, The Keep). The three other openings were windows, but from the south opening a new flight of stairs, inserted in the thickness of the wall, led up from the ground floor to the new roof level. A fireplace was also inserted on the new ground floor at this stage. Externally there were hood-mouldings (a feature of this period only in the Keep) over the east, south and west window openings, and over all four openings there were recessed rectangular panels, later blocked. These were presumably designed to take the royal arms.[92] The insertion of a basement and the raising of the ground floor meant that the Keep had to be heightened, and this was probably also required to provide a field of fire over the stirrup towers and their connecting curtain. The mounting of ordnance, for which the massive construction of this roof was certainly intended, would have required the provision of the kind of wooden platforms of which so much is heard in later surveys of the castle.

The caulking and pitching of the great tower, and of the smaller towers and galleries is a very curious feature. It was normal practice to cover such roofs with lead, and very much safer in a fortification. Nevertheless von Haschenperg had already tried to use canvas, pitch and tar at Sandgate, and had only been prevented by a disagreement among the officers that went as far as Cromwell. At Camber, at any rate in 1539, he seems to have got his way, although there was plenty of lead available (*HKW*, 576–77). Nevertheless, while 'the pyching of the grett towre' seems, from its position in the accounts,[93] certainly to refer to the roof, pitch was apparently also used to seal the basement floors of other parts of the building (see above).

The main effort of the second period consisted in turning Camber into a concentric fortification. The outer works were linked to the tower by four radiating passages at basement level, communicating with a ring passage constructed around the foot of the tower, and reached from inside the tower itself by two basement openings. The ring passage was vaulted in brick, and provided with sixteen gun-loops raking upwards to command the courtyards with handgun fire. There were lockers in the outer wall and smoke-vents in the roof behind each loop. Doors open onto the four radial passages leading to the basement level of the four stirrup towers, and each passage is provided with two recesses, perhaps for lights. The passages open without doors into the basements of the towers.

The stirrup towers were originally of two storeys like the remodelled Keep: a basement and a ground floor, with a parapet at roof level. When complete they can have been only slightly lower than the central tower itself and may almost have obscured the line of sight of guns on its roof. The basement was identical in the four towers and had two upward-raking and widely-splayed loops to command the inner courtyards. There was an opening from the radial passage, doorways to each of the adjacent mural galleries, and a doorway in the centre of the straight front giving access to a vaulted compartment set across the outer face of each tower. There is no evidence for direct access from the basement to the ground floor of the towers, unless it was by moveable wooden ladder. The ground floor arrangement was also similar in each tower: a doorway onto the causeway over the raised vault of the radiating passage, two windows onto the courtyard, and two windows or openings in the forward part of the towers, looking in either direction along the exterior of the adjacent curtain; the front wall contained two lockers flanking a central and perhaps blind recess. The lateral doorways opening onto the galleries were a subsequent modification. There is again no known means of internal communication with the next level, the parapet, all details of which have been lost owing to the heightening of the towers by the addition of a further floor in the third period of 1542–3.

Set across the front of each of the stirrup-shaped towers at basement level was a long, narrow compartment originally roofed with a half barrel-vault and connected to the tower basement by a doorway. There was a locker to either side of the doorway. The front walls of these four vaulted compartments each carried a circular projection 8 feet in diameter, perhaps containing a newel stair, and a rounded projection at each front corner. In front of each vaulted chamber was a curving wall foundation of some 41 feet radius. These foundations are comparable to a wall which has been traced running outside the third period curtain between the East and North Bastions. The foundation of the latter lies with its outer face 8 feet in advance of the present curtain, whose salient angle towards the north-east it duplicates. This wall is best explained as retaining the toe of a shingle glacis piled up against the outer face of the original octagonal curtain. If, as seems probable, the curving walls outside the bastions also served to retain a shingle glacis, then the wall against which this glacis was piled has entirely vanished. The glacis cannot, on grounds of geometry alone, have been piled against the straight outer face of the vaulted compartments. These considerations lead inevitably to the conclusion that a wall defining a semi-circular platform or bastion in front of the vaulted compartment has been removed by the construction of the later bastion in 1542–3. This lost wall would have carried the parapet of the original bastion and against it the glacis would have been piled.[94] It seems probable that the returns of this wall to either side of the bastion were linked at basement level to the outer ends of the vaulted compartment, while at ground-floor level they provided the parapets of walk-ways leading from the gallery parapets onto the platform over the vaulted compartment. Thence access was obtained, perhaps by the descent of a few steps, over the outer wall of the vaulted compartment, and on to the *terreplein* of the bastion, where the largest guns were probably mounted *en barbette*. Externally the bastion thus appeared to have been arranged at three levels: the parapet of the stirrup tower rose as a cavalier above and behind the whole complex; in front of the tower there was a long platform above the vaulted compartment; and in front of this, at a still lower level, the solid mass of the semicircular bastion.

There was, however, a fourth level, in the long vaulted compartments at the basement level of the bastion. Granted the existence of the semi-circular bastions, and of the glacis there and along the adjacent curtains, the vaulted compartment can be presumed to have housed flankers covering the curtains to either side of the bastion. These flankers would have been concealed from the field not only by the glacis of the bastion, but more especially by the rounded projections at the angles of the vaulted compartments, which would thus have functioned as orillons.

The thorough destruction of the original bastion in 1542–3 makes it difficult to reconstruct its arrangement in detail. The flankers at basement level were entirely enclosed in the vaulted compartment, but there may have been an upper tier of open flankers mounted on the platform over the vault. Indeed, this may have been the principal function of the platform. Likewise, the windows to either side of the stirrup tower at ground floor level, which look out over the glacis, may have served as flankers for use with small arms, and may themselves have been duplicated by embrasures at parapet level. But access to these parapets is one of the unsolved problems; certainly, the towers appear too slight ever to have been intended to carry heavy ordnance. Access from the basement level of the bastion, including the flankers, to the ground floor is also at present unclear. The circular projection on the front of the vaulted compartment is large enough to have held a small newel stair descending from the *terreplein* of the bastion, or from the platform over the flankers, or both, to the vaulted flankers below, but it cannot be certain that it did so. In the third period of 1542–3 access to the new bastions was provided as before to either side of the stirrup towers, but one side led up to the parapets and the other down to the gun room. This was not, however, the arrangement in the earlier bastions, where both passages seem to have led direct to the platform over the vaulted compartment.

There is, lastly, the question of the circular projections now interpreted as orillons. Were these solid at all levels? Did they serve at *terreplein* level as *echaugettes*, reached by a narrow wall passage, perhaps carried on a squinch over the corner of the flanker mouth? Or did some at least (and there were eight in the castle, all told) also contain newels leading to concealed sally-ports? The evidence of the East Bastion, which has been given here in some detail, corresponds whenever it can be checked with the situation in the other three bastions.

This, it seems, was the design of the bastions as von Haschenperg intended them in 1539–40. The four bastions were linked to each other and to the Entrance Bastion by a communicating gallery at basement level within the circuit of the octagonal curtain. In 1539 the Entrance Bastion or gatehouse was commenced as a massive rectangular foundation with a low-level mural passage; curtain wings were begun to either side. This design was modified by the addition of a rounded front, whose internal floor level was nearly as low as that of the passage. The revised design was again modified when the floor level was raised 4 feet 6 inches, the interior of the gatehouse finally completed, and a vaulted chamber added to the rear, below the courtyard. All these stages belong to the works of 1539–40. In the final campaign of 1542–3 the floor level was raised to its final position and complicated modifications were undertaken which still, however, preserved the essentials of the layout finally achieved in 1539–40.

The castle of 1539–40 underwent one further major modification, when the octagonal curtain linking the four bastions and the gatehouse was heightened by a full storey. The effect of this first remodelling was to raise the parapet of the curtain all around the castle to the same level as the parapet of the stirrup towers. Access to the curtain parapet was by means of newel stairs set in the salient angle of each stretch of the curtain. Access to the parapets of the stirrup towers could now be gained direct from the curtain parapets. At the same time doors were inserted at ground level on both sides of each stirrup tower to give direct access from the curtain galleries into the towers. The reason for this heightening of the curtain is not far to seek. Internally, to reach the parapet walk on the original curtain, it was only necessary to take four steps up from the courtyard. Even with the presence of a parapet, the curtain can have given little protection to those in the courtyard. By the same token, the parapet was so low to the field that it must almost have been possible to run up the glacis and jump over. This would not, of course, have been possible if there had been an external ditch. It was, perhaps, the discovery that it was impracticable to dig such a ditch in shingle, which led to the need to present a heightened curtain to the foe. It is also possible that the level of the ground water-table had been misjudged and that in part at least the changes to the floor levels in the Entrance Bastion were needed to keep the floors dry; this may also have been the case in the basement galleries and flankers.

Such was the castle completed in the autumn of 1540. The works of the 1540 season must have been principally concerned with the bastions, and with the heightening of the gatehouse and curtain ranges, for the accounts suggest that the Keep, the stirrup towers, and the original curtain with its basement gallery were essentially complete by the end of 1539. The vast numbers of men at work in the spring of 1540, and the financial and administrative evidence for frantic activity at this moment, must reflect the urgency caused by the decision to heighten the curtains; and the employment of large numbers of scavelmen and treble the previous year's total of workmen perhaps indicates the completion of the external earthworks (Table 2.2). Apparently, the structure was now finished, for by the end of 1540 it was fully garrisoned and armed.

It was in many ways a most remarkable building, the product without doubt of the devising of Stephen von Haschenperg. As he at first intended it, the castle had a very low profile and was clad with sloping earthworks above which only the stirrup towers and the Keep projected to any extent. Furthermore, the entire perimeter was commanded by flankers concealed in bastions, on the *terrepleins* of which the heaviest ordnance was mounted. It had, of course, many weaknesses. The bastions were rounded rather than angled, so that there was dead ground in front of each, while the flankers beside the Entrance Bastion fired only on the bastion itself. It was also horrifyingly over-complex in its internal circulation, the result presumably of a wish to divide the castle into self-contained sectors in the event of enemy penetration.[95] For all its faults, however, it certainly represents the first attempt to build in England an artillery fortress of ultimately Italian inspiration: the flankers[96] and the surrounding earthworks[97] are sufficient evidence of this, but it seems clear that von Haschenperg had never seen, or at least appreciated, the vital significance of the angled bastion. It was his fate too, to have to alter his original concept before it was even complete, compromising the low profile with which he began. He had attempted, however, the most advanced design of its kind in the country; yet he so far failed to achieve a convincing solution that his work was replaced within eighteen months by a structure which marked both the apogee and the obsolescence of the Henrician style of fortification. The works of the final period at Camber looked only backwards: von Haschenperg had at least forestalled the future.

There is evidence, indeed, that left to his own devising von Haschenperg would have built a fort even closer to the Italian model. When the original rectangular form of the gatehouse bastion was first extended to a curved front, its foundations were laid so as to project as unmistakable orillons to either side. These works were never taken above foundation level, so that when the level of the Entrance Bastion was raised over 4 feet in its third phase, the front of the work was brought round on either side to meet the angles of the original rectangular front in a D-shaped curve. The orillon foundations were ignominiously reused as well-like sumps outside the somewhat extended ends of the subterranean passage of the original rectangular foundation (Plate 2.2).

In this situation lies the clue to the awkward relationship between the Entrance Bastion and the other bastions of the fort, a difficulty which endured through all the subsequent alterations. Von Haschenperg clearly began his work with a concept for the outer defences which was never achieved. Of this original concept he built first the rectangular gatehouse, probably together with the brick-built stretches of the galleries immediately adjacent to it on either side. Changing his plan, probably still before

Plate 2.2: Entrance Bastion exterior looking north; sump 1267. 1975 (English Heritage)

the laying out of any further part of the octagonal curtain, he turned his rectangular gatehouse into something very like an Italian bastion, of that early form which is not angled but rounded, but which is nevertheless provided with orillons - with all that they imply for covered flanks. Had he continued on this design, the other bastions on the curtain would presumably have been more logically disposed into relation to that already begun. As it was, something or someone changed the design radically, with the result that the Entrance Bastion was always wrongly sited in relation to the bastions to either side. Some remnant of von Haschenperg's understanding - or lack of it – of Italian military architecture survived in the four other bastions he went on to build, in the low profile of the fort, and in the use of an earthwork glacis, but these features were not, it seems, as close to Italian ideas as the concept with which he began.

As we have seen, the tower of 1512–14 was probably already gunned by 1536. Further ordnance was supplied from London in April 1539[98] when, while the tower was being remodelled, guns must either have been stored or mounted in temporary earthen bulwarks, an expedient adopted elsewhere while works were in progress.[99] Cromwell was engaged on the establishment of the garrisons for the new castles and blockhouses including Rye (ie the Camber) early in March 1540,[100] and in the next few months the figures were gradually worked out.[101] When wages were paid for 1 October to 31 December 1540 there were sixteen gunners and a porter in addition to the captain, Philip Chute.[102] By January 1542 this had been increased to a total complement of twenty-nine at an annual cost of £307 4s. 2d.[103]

PHASE III: THE CASTLE ENLARGED (1542–43)

From April 1542, after an interval of some eighteen months, payments for works at the Camber appear again in the records of the Augmentations (the first payment was on a warrant of 31 March, cf. Table 2.1). During the rest of 1542 and up to late August 1543 £7000 was provided from this source, but it is possible to calculate that the total expenditure was about £10,000 (see above). One single reference survives to tell anything of what was being done: the payment which William Oxenbridge received on 18 July 1542 was for the water works at Camber Castle (the payment of 7 April 1542 'towards edifying' Camber Castle simply shows that building works, and not only water works, were involved; cf. Table 2.1). Apart from the fact that he remained paymaster, and may also have acted as surveyor or master of the works (see n. 30), little else is known of their organisation, finance, provision or progress (see above for the provision of iron in 1542–43), but the final payment on 16 August 1543 probably indicates the approximate date of their completion. When all was done considerable quantities of material remained on site and in 1551 this was released to the mayor of Rye at his request

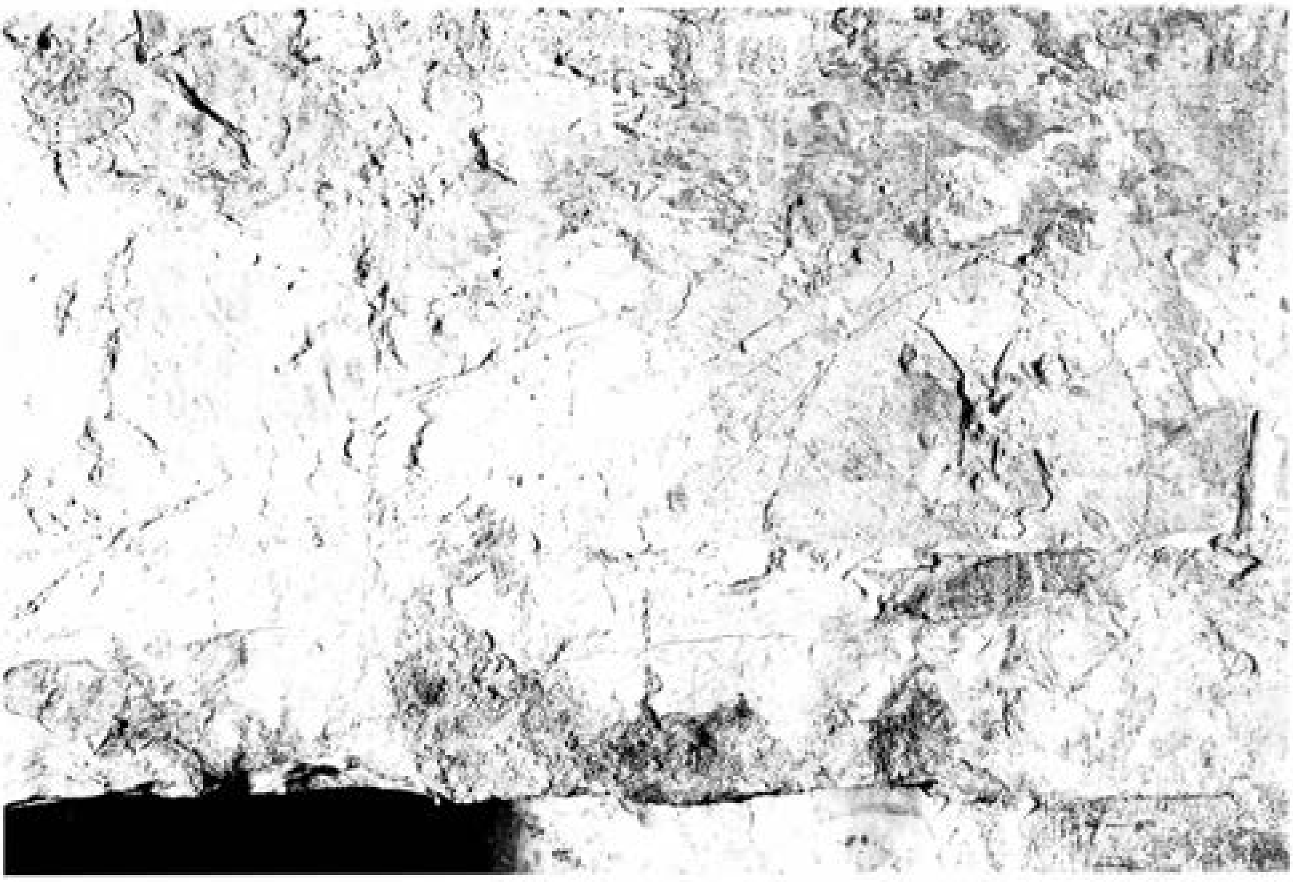


Plate 2.3: Vaulted Ring Passage; possible graffito of Henry VIII. 1998 (English Heritage)

for making the platform at the Strand, quays, and other water works.[104]

Enough has already been said in isolating the works of 1539–40 from the structure as it now survives to show the main components of the works of 1542–3. They involved the heightening of the Keep, the four stirrup towers and the curtain gallery, the addition of a new curtain, the complete rebuilding of the four great bastions, and the final reconstruction of the gatehouse. The detailed account presented in Chapter 3 of this volume shows the scale of these works, and the mass of masonry involved by comparison with the castle of 1539–40, and explains well enough the greatly increased expenditure of the final campaign - nearly twice that of the previous period. The occasion for the inception of so massive a reconstruction is unknown. It is the kind of initiative that one would expect from the king himself, but there is little evidence that he visited the Camber in these years, at least until after the start of the final campaign,[105] but there is no evidence that he did so, unless a graffito portrait, curiously like the king, on the plaster of the ring passage around the central tower can be taken as evidence of his presence at Camber during some stage of the works (Plate 2.3). Henry could have taken a decision from drawings or a model, and increasing worries about the effectiveness of the castle of 1539–40 may have played a part in von Haschenperg's downfall, but they were not a consequence of it, for he was called to account only in the summer of 1543 when the final works at the Camber were nearing completion (see above and O'Neil 1945, 137–55).

In its final state the castle was able to mount heavy ordnance at two or perhaps three levels, in the gun rooms of the bastions, on the bastion parapets, and possibly on the cavaliers formed out of the stirrup towers. The payment of July 1542 suggests that the castle may have been surrounded by a moat, but no trace of this has been discovered, although a careful search has been made. It was an immensely strong fortress, and would doubtless have been effective in denying a hostile fleet entrance to the Camber. Its position on a narrow point probably secured its own defence, for an attacker would have had no protection from the force of its guns. If he did succeed in making an entrance, the arrangements for defence of the courtyard were daunting.

PHASE IV: OCCUPATION AND ALTERATIONS

by Martin Biddle and Jonathan Hiller

On 1 January 1544 Philip Chute was appointed as Captain of the castle at 2s. a day (Table 2.3). The following year in July 1545 the French fleet made a concerted attack along the south-east coast after its successful engagement at Portsmouth where the *Mary Rose* was sunk. On 21 July 1545, with the French fleet off Brighton, the Rye chamberlains' accounts record the provision of a barrel of beer for the soldiers that 'came owte of the contrey when

Table 2.3 The captains of Camber Castle, 1540–1637 (significant mentions only) (compiled by Martin Biddle)

Date	Name	Notes
?March 1540[1]	Philip Chute	First mention as captain; formerly one of the three commissioners of the works. Of the house later called Horne's Place, Appledore
1 October –31 December 1540[2]		Mentioned
1 January 1544[3]		Appointed Keeper and Captain of Camber and Keeper of the Waters of Camber and Puddle at 2s. the day
3 July 1565[4]		Last mention
23 December 1570[5]	Thomas Wilford	First mention as captain
1584[6]		Mentioned
19 December 1599[7]	Sir Thomas Wilford	Probably in office until 1604 (see note 7), or 1609/10
2 January 1610[8]	Peter Temple	Grant for life of the office of Captain of Camber Castle and Keeper of the Waters
17 May 1613[9]		Mentioned
2 October 1614[10]		Mentioned
19 July 1615[11]	Sir John Temple	Grant of keepership on surrender of Peter Temple. No evidence has been found to show that Sir John ever took up office
31 October 1618[12]	[Robert] Bacon	First mention as captain
1625?[13]		Mentioned
23 July 1627[14]	Robert Bacon	Last mention as captain
5 October 1633[15]	Thomas Porter	First mention
22 April 1635[16]		Mentioned
21 February 1637[17]		Mentioned
25 December 1637[18]		Termination of office

Notes

1. BL, Royal MS. App. 89, ff. 22–7 (cf. *L. & P.* xv, no. 323, p. 131).
2. *L. & P.* xvi, no. 372 (1), (2), pp. 168–9.
3. *L. & P.* xix (1), no. 1035 (142), p. 635. For a transcript of Chute's letter patent of appointment, see BL., Add. MS. 34,150, ff 52–3.
4. *Cal Pat Rolls 1563-6*, n. 1158, p. 237.
5. *Acts PC*, 7 (1558–70), p. 406. Wilford had been granted the reversion of the captaincy on 3 July 1565, during the tenancy of Philip Chute (*Cal Pat Rolls, 1563–6*, n. 1158, p. 237). Chute had presumably either died or surrendered his office between July 1565 and December 1570.
6. PRO, SP12/168/10, f. 22v (cf. *Cal S P Dom 1581–90*, p. 158).
7. Wilford's surrender of his life grant of the reversion of the offices of keeper and captain of the castle of Camber and keeper of the waters of Camber and Puddle on 19 December 1599 is noted on the patent of his grant of 1565 (*Cal Pat Rolls, Elizabeth I (1563–6*, n. 1158, p. 237), but this does not mean that he ceased to be captain. The reversion of the offices after Wilford was granted on 30 January 1604 to Sir Richard Preston (*Cal S P Dom 1603–10*, p. 71), but there is no sign that he ever entered into office.
8. *Cal S P Dom 1603–10*, p. 579.
9. PRO, SP14/84/51.
10. PRO, SP14/78/3.
11. *Cal S P Dom 1611–18*, p. 295.
12. HMC *13th Report*, Appendix, pt. iv, p. 51.
13. PRO, SP16/13/87, petition of Capt. Bacon (not dated, but probably 1625) for payment of arrears due to himself and his soldiers, last paid in 1623 and 1622, respectively (cf. *Cal S P Dom 1625–6*, p. 201). See below, note 18. Bacon was Remembrancer of the City of London (ibid. p. 384).
14. *Acts PC*, Jan.-Aug. 1627, pp. 437–8, petition of Robert Bacon, captain of Camber Castle, for arrears due to himself and his 8 soldiers and 6 gunners. See below, note 18.
15. T. Rymer, *Foedera*, 19, 5.28, patent of 5 October 1633 appointing Thomas Porter to the reversion for life of office of Keeper and Captain of Camber (cf. BL, Add. MS. 6344, col. 609). W.D. Cooper, *History of Winchelsea* (1850), p. 179,

gives the date as 8 October 1632. On 10 October 1633 Thomas Porter was reported as captain in place of Capt. Bacon (*Cal S P Dom 1633–4*, p. 242).

16. PRO, SP16/287/33, which notes that the repair of 'the ruynes of this Castle with the platformes will cost by Estimate' £720. See also SP16/290/72 and SP16/291/115 of 11 June 1635 (*Cal S P Dom 1635*, pp. 40–1, 118, 166–7).
17. PRO, SP16/347/76 (*Cal S P Dom 1636–7*, p. 455).
18. BL, Add. MS. 33,278, f. 13, payment to Robert Bacon and Thomas Porter, 'late Captens', of arrears of fee for 14½ years 'ended at Christmas last 1637'. The arrears for Camber were by far the worst: at most other castles and forts payments were only one, two, or three years in arrears. As Porter is described as late captain, his tenure must have ended at Christmas 1637.

the Galles and French Shippes were before this Towne'. On 22 July a French force landed at Seaford, near Newhaven, east of Brighton. Whether Camber Castle saw action in the raid is unclear, but Rye had to reimburse the Captain for the loss of three bows 'att the tyme of the contrey commyng in for the defence of our enymyes'. There was a request to London from Rye for more gunpowder in April 1546 and 8 cwt were brought from London (Mayhew 1984, 115), which might suggest that powder had been used in an engagement at Rye the year before.

The raid of 1545 may account for the increased size of the garrison recorded in 1546 (Table 2.4). On 1 January 1544 the garrison comprised the Captain, 6 gunners and 8 soldiers, a total of 15 personnel. Between 1 October and 31 December 1546 the garrison had risen to include a Captain's deputy and soldier, a porter and a soldier, 16 gunners and 8 further soldiers giving a total of 28 and the Captain. Thereafter the garrison levels remained more or less constant throughout the second half of the sixteenth century. Philip Chute is last mentioned at Camber on 3 July 1565, and there are no details of a new appointment until Thomas Wilford is mentioned in 1570.

There is little information concerning the castle's role in national defence in the later 16th century, though in the 1580s it was 'the object of the treacherous design of the Jesuit, Father Darbysher, in France' (*VCHS*, 1, 519). In March 1588 Darbysher attempted to coerce an English spy, Roger Walton, into contriving a plan whereby 'the blockhouse between Rye and Winchelsea should be given up to the Prince of Parma…for the small ships of France and Flanders to land men. One Wylforde [Thomas Wilford] is the governour, and by report a man that might be dealt with…'.[106] According to Darbysher there were many French sympathisers in Sussex (*VCHS*, 1, 519), and an earlier government survey had recorded the presence of 1,500 French and Fleming immigrant refugees in Rye in 1573.[107] The planned subterfuge never occurred, although the south-east coast and the Camber were certainly an invasion target. Part of the Duc de Guise's plan was to land troops from France and Flanders using the smaller ships of the Armada. The 'Chart of the Narrows' (Plate 2.4) was commissioned by the Duke of Medina Sidonia in preparation for the Armada's invasion attempt, and the copy reproduced here, which is in the National Maritime Museum at Greenwich, may have been taken from one of the captured ships (Martin and Parker 1988, 265–77 and fig. 43).

The probable last mention of Sir Thomas Wilford occurs in 1599, and on 2 January 1610 Peter Temple was granted the office of Captain of Camber Castle and Keeper of the Waters for life. He was to surrender the position to Sir John Temple on 19 July 1615. Sir John's guardianship appears to have been short, as a Captain called Bacon (probably Robert Bacon) is mentioned in 1618 and again in 1628. Thomas Porter is mentioned as Captain in 1633, and held office until the castle's disestablishment. Porter presided over a much reduced garrison of just 11 soldiers.

Phase IVb: the infilling of the N and S Bastions and the creation of the Rampire

by Martin Biddle and Jonathan Hiller

At some date in the late 16th or early 17th century the N and S Bastions were filled to create dead mounts and possibly as part of the same operation a rampire was created in the south-east quadrant of the castle. Documentary research has sought to date these works, and the following account is a summary of the evidence uncovered.

By 1568 the four gun platforms upon the main bastions were in 'utter Ruing and decay'.[108] The cost of repairs was £60 for the purchase of 50 tons of timber, lead, solder and ironwork. No record exists of the repairs being carried out, though the report seems to suggest that the bastions were still roofed in lead with gun platforms on the leads. The invasion threat of 1584 led to a call from Elizabeth I for the repair of castles in Sussex, 'the castles in the Cinque ports and Combre' (Holsfield 1835, 474). In that year just over £171 was spent on repairs at Camber.[109] By 1594 an estimated £95 was needed for further repairs,[110] though the records do not suggest that anything was actually done.

A survey carried out in 1607 suggested work on the 'E and N platforms', but in 1615 this had still not been carried out.[111] In 1616, a further survey indicates that the E and W Bastions still carried, or were intended to carry, ordnance on the leads. The 'Platforme uppon the South Mounte' was to 'be made servicable for the Ordnaunce either tymber or hewen paving stone being an earth or dead mounte', and the 'North Mounte or platforme for Ordnaunce to be made of stone or tymber being a dead mounte'.[112] The first mention of the Rampire occurs as an addition to the document of 1613 relating to the 'East mount';[113] the addition may date to either 1615 or 1616.

The excavations have not resolved the problem of when the operation to fill the bastions and create the Rampire was carried out, nor is it certain that the filling of the N and S Bastions and the building of the Rampire were even necessarily simultaneous events. The work almost certainly took place after the report of 1568, and

Table 2.4 The garrison of Camber Castle, 1540–1637 (compiled by Martin Biddle)

Date	Captain at 1s 4d	Deputy at 8d	Porter at 8d	Gunners at 6d	Soldiers at 6d	Totals Capt.+men
?1540[1]	1	1	1	12	10	1 + 24
mid 1540[2]	1	1	1	12	10	1 + 24
1 Oct.- 31 Dec. 1540[3]	1	-	1	16	-	1 + 16
1 Jan. 1542–30 Sept. 1553[4]	1 (at 2s. from now)	1 (+1 soldier)	1 (+1 deputy)	16	8	1 + 28
1553[5]	1	1	1 (+1 under at 6d)	17	9	1 + 29
1553–9[6]	1	1	1 (as above)	17	6	1 + 26
1584[7]	1	-	1	17	9	1 + 27
1608–9[8]	1 (at 2s 6d)	-	1 at 6d	17	9	1 + 27
29 Sept. 1610[9]	1 (at 2s)	1 (+1 at 6d each)	-	4 (capt.'s men at 6d)	8	1 + 14
1614[10]	1	1 lieut (+1 as above)	-	4 (as above)	8	1 + 14
1618[11]	1	1 lieut (+1 as above)	-	4 (as above)	8	1 + 14
1623/7[12]	1	1 (at £20 p.a. incl. +1)	-	4	8	1 + 14
1637[13]	1	-	-	11	1 + 11	
1637	Disestablished					

Notes

1. BL, Royal MS. App. 89, ff. 22-7 (cf. *L. & P Henry VIII*, xv, no. 323, p. 131).
2. *L. & P Henry VIII*, Add. i (2), no. 1446, p. 495.
3. *L. & P Henry VIII*, xvi, no. 372 (1), (2), pp. 168–9; cf. *L. & P Henry VIII*, xvi, no. 456, pp. 223–4.
4. PRO, LR6/112/8. Wages continued to be paid on this establishment at a cost of £307 4s. 2d. a year from 1 January 1542 until 31 December 1552 and for the next nine months to 30 September 1553 at the slightly reduced figure of £229 15s. 6d. (PRO, LR6/112/9–11; *Acts P C, 2* (1547–50), pp. 205–6; SC6/Edw VI/723, m. 39; LR6/113/1–5), although Chute's patent of appointment dated from 1 January 1544 (*L. & P Henry VIII*, xix (1), no. 1035 (142), p. 635; cf. BL, Add. MS. 34,150, ff. 52–3) gives the lower figure of 6 gunners and 8 soldiers.
5. Cooper, 1850, 177, quoting a MS in Dulwich College Library.
6. PRO, SP11/11/72, ff. 153-55v, shows that wages due on the slightly reduced establishment of £229 15s. 6d. had not been paid throughout Mary's and then Philip and Mary's reign, 1553–8, 'bycause the patent is not renued'.
7. BL, Add. MS. 6344, col. 609.
8. BL, Add. MS. 38,444, f. 10 (perhaps c.1608–9, but limits are 1604–14). The captain's fee has increased and the annual cost is now given as £272 17s. 6d. From 8 August 1604 the wages were to be paid under warrant dormant by the Receiver of Kent: *Cal S P Dom 1603–10*, p. 141 (cf PRO, SP38/7, f. 222).
9. Cooper 1850, 178, quoting MS. in Dulwich College Library and Burr MSS. The establishment had thus been reduced to half and the annual cost to £142 for the year from 29 September (or perhaps from the start of the year with the appointment of Peter Temple as captain on 2 January 1610, but as the next entry shows the castle's year had also now been changed to begin on 29 September rather than 1 January).
10. PRO, SP14/78/3, the muster roll of the garrison for the year to 29 September 1614. Of the 8 soldiers, two were absent in London at the time of the muster on 2 October 1614.
11. PRO, SP14/98/19, the muster roll of the garrison for the year to 29 September 1618. The muster was taken on 14 July 1618.
12. PRO, SP14/157/56, ff. 10–11v, a survey taken in 1623 (cf. National Maritime Museum, MS. LAD/15; and BL, Harl. MS. 1326, ff. 37v-9), lists only twelve names, including the 'lieutenant', Robert Butler, whose fee of £20 a year must include his man (presumably the Thomas Butler named after him). Capt. Bacon's petition of 1625 shows however that the establishment was unchanged at the captain plus 14 soldiers and gunners (PRO, SP16/13/87). The annual cost of £136 17s. 6d. given in the 1623 survey suggests that two posts were then vacant, since Bacon gives the annual cost as £165 5s. In a second petition in 1627 Capt. Bacon claimed that by his letters patent he had 2s. a day as captain and 6d. a day for each of 8 soldiers and 6 gunners (*Acts P C* (Jan.- Aug. 1627), pp. 437–8), suggesting that the lieutenant and his man counted as gunners.
13. PRO, SP16/347/76, a tabular list of 21 February 1637 giving the name of the captain (Thomas Porter), the number of men (11), their pay (£136 17s. 6d.), their reformed number (nil) and pay (nil), part of a general reduction of garrisons (cf. *Cal S P Dom 1636–7*, p. 455).

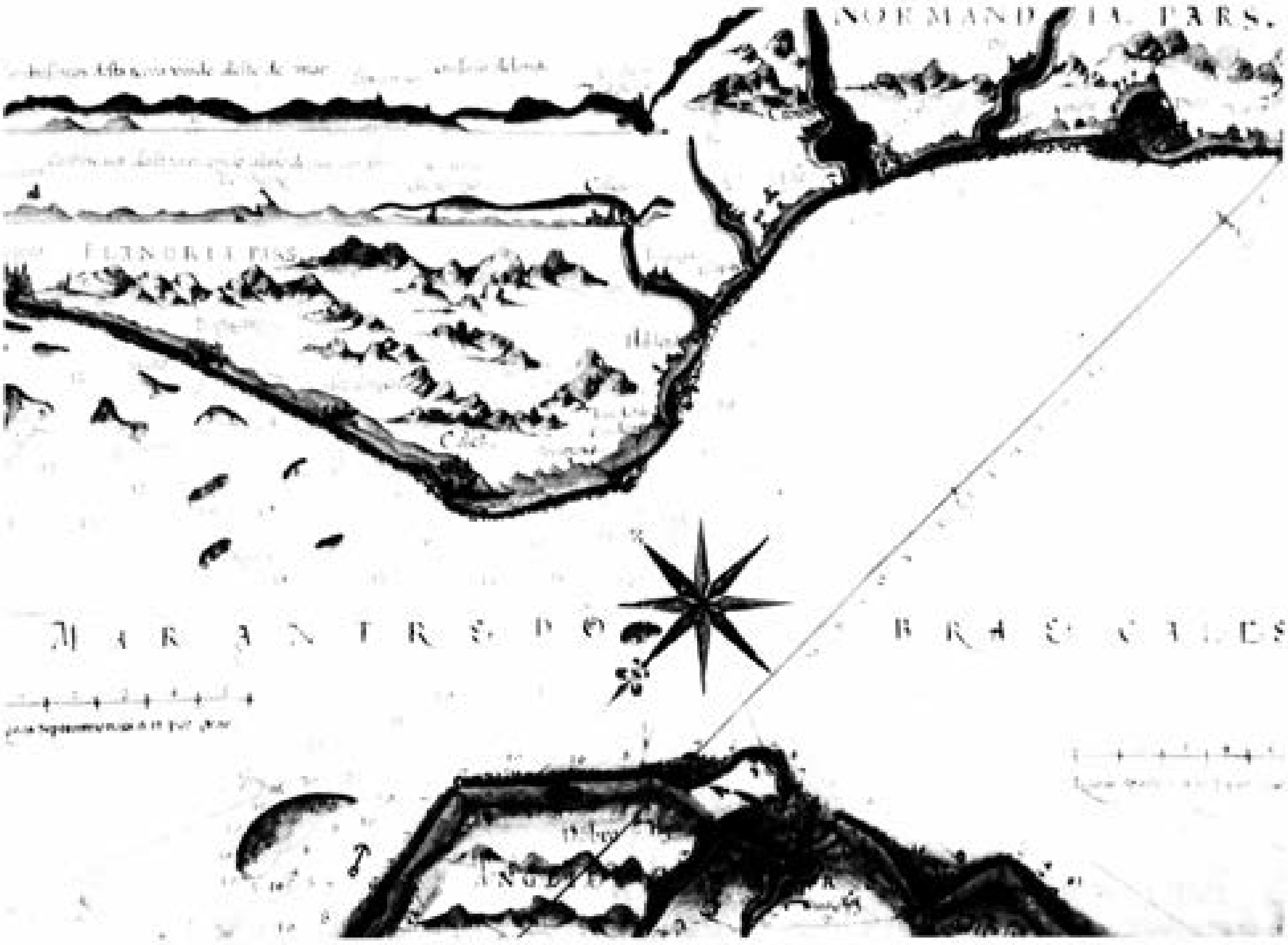


Plate 2.4: Chart of the Narrows between Dover and Calais, commissioned at Lisbon by the Duke of Medina Sidonia (National Maritime Museum, Greenwich, London)

may have been as early as 1584, when the recorded expenditure at the castle could well have been for this purpose. A similar operation had already been undertaken at Deal. However, a number of factors combine to suggest the possibility of a rather later date for the infilling at Camber, perhaps around 1613–1615. Some evidence for dating comes from the pottery assemblages of the N Bastion, and from limited work around the Rampire. Within the N Bastion, soil layers stratified beneath the bulk infills (layers 10 and 26) included sherds of Seville Olive Jar (dating to the 17th century, or at the earliest *c* 1588) and 17th-century Martincamp Type III flasks. In the SE Courtyard (CTI), a layer (30) sealed beneath the base of the collapse from the Rampire contained part of a Siegburg Schnelle marked with the date [15]75. In the SW Courtyard, pre-infilling deposits (layers 763 and 835) contained fragments of a Werra bowl datable to the period 1580/90–1625, 17th-century Martincamp Type III flasks and more Seville Olive Jar. Within the bulk fills of the N Bastion was a Cologne Frechen rosette medallion of a type known to have been current in England by 1629, and a late face mask with painted blue eyes and beard from a Bellarmine (Fig. 6.4.21) dated 1595–1605. Rampire collapse deposits in CTI (context 17) contained Low Countries/N Holland Slipware datable to the period 1600–1625. Unfortunately there is little further dating information available from other finds assemblages. The two early fragments of stamped clay pipe that would have been contemporary with the castle's occupation come from contexts unrelated to the infilling process, and no closely datable coins or jettons can be linked with the bastion fills and the Rampire. Moreover, the pottery evidence is in itself far from conclusive, as the deposits, particularly in the N Bastion, showed evidence of disturbance by both animal and human agency. However, the presence of late pottery in the fills and the Rampire, and in the layers they sealed, suggests that a 17th-century date for the infilling must be considered a distinct possibility.

The pottery evidence for an early 17th-century date supports the documentary sources, which show that the N and S mounts and Rampire were in existence by 1616. The list of ordnance stores at the castle for the year 1613 (Table 2.5) records the presence of 9 pick axes, 40 shovels and spades, four iron crows and 24 baskets. Lifting equipment included a windlass, a 'ginne', and hand and draught rope (coil). None of these items was present in the record of stores of 1568, nor interestingly in 1615, although in 1623 the records suggest that most of these items were still at the castle. The implication seems to be that in these years there was equipment present at the castle of the kind that might have been used at some earlier date for the huge bulk filling operation needed to fill the

Table 2.5: Ordnance stores at Camber Castle, 1568–1623 (compiled by Martin Biddle)

Stores	1568[1]	1613[2]	1615[3] (old store in the Keep)	1623[4]
Equipment and supplies for cannon				
Double base chambers	2	-	-	-
Field carriages for:				
demi culverins	-	3	-	3
sakers	-	4	-	4
minions	-	-	-	1
fawcons	-	-	-	1
Rammer heads	-	-	14	-
Ladles for:				
demi culverins	-	4	-	4
sakers	-	3	-	2
fawcons	-	-	-	1
spare staves	-	7	-	1
Moulds	-	6	-	Yes
Iron shot for:				
demi cannon	69	-	-	-
culverin	90	-	-	-
demi culverins	50	300	-	320[5]
sakers	180	100	-	206
fawcons	40	20	28[6]	-
waste shot	140	-	-	-
Stone shot 7½ in	-	-	41	-
Sacre wheel	-	1	-	-
Axletree	-	4	-	Yes[7]
axletree plates	-	-	9	-
Serpentine powder:				
herring barrels	3	-	-	-
humber barrels	2	-	-	-
half barrels	1	-	-	-
firkin	1	-	-	-
Corne powder	-	16 cwt[8]	-	5 cwt
Match (rolls)	-	28	2	-
Match (cwt)	-	10	-	4½ cwt
Sheep skins	-	6	-	2[9]
Sandehides	-	1	-	-
Hand guns				
Hagbuss / Harquebus	9	26	38	20
Muskets	-	20	-	Yes
Equipment and supplies for hand guns:				
Bandeleers	-	20	-	Yes
Horn flasks	-	-	6	-
Flasks and touch box	-	17	9[10]	17
Lead for shot	-	1 cwt	-	Yes
Edged weapons				
Pikes	68	72[11]	-	22
Black bills	380	20	-	Yes
Brown bills	-	-	20	?
Halberds	-	20	-	Yes
Bows				
Whole	130	18	13	18
Broken	10			
Arrows (sheaf)	560	10	76	18
Strings (firkin)	½	-	-	-

Table 2.5: Ordnance stores at Camber Castle, 1568–1623 (continued)

Tools				
Boudgebarrels	-	3	-	1
Iron crows	-	4	-	Yes
Pick axes	-	9	-	Yes
Shovels and spades	-	40	-	Yes
Lifting gear				
Windlass	-	1	-	-
Ginne with 2 brass shevers	-	4	-	Yes[12]
Hand and draught rope (coil)	-	1[13]	-	1
Small baskets	-	24	-	1
Lights				
Cressets	-	1	-	2
Cresset lights	-	3 cwt	-	Yes
Cresset staves	-	3	-	-
Lanthornes	-	2	-	Yes

Notes:
1. PRO, SP12/46/77.
2. PRO, SP14/84/51.
3. PRO, SP14/81, f. 109.
4. PRO, SP14/157/56.
5. ?For demi culverins and/or fawcons.
6. Iron shot 2 in and 2¼ in ? for fawcons.
7. 'Field extrees'.
8. 14 ½ barrels.
9. Tanned hides.
10. 'For calivers'.
11. Long pikes.
12. 'Complete'.
13. 114 lbs

N and S Bastions. Moreover, between 1610 and 1614 the garrison was cut by half, to 14 men, from its 1584 and 1604 strength of 27 (Table 2.4). The number of gunners fell from 17 in 1604 to just 4 in 1610/1614. No direct link can be proved between the reduction in the castle's manpower and the reduction in its working and living accommodation represented by the infilling and the creation of the Rampire, but the two seem likely to be associated. After 1610/1614 the garrison remained constant at 14, with the number of gunners ultimately reduced to 2 by 1623/5.

From 1568 until the final removal of the ordnance in the mid 17th century the number of guns at Camber was nine or ten. What these figures hide is a major change in the ordnance provision at Camber dating from about *c* 1593. Six brass pieces, which included the five largest guns, were removed and replaced by additional cast iron demi-culverins and sakers and a minion (Tables 2.7, 2.8). After 1593 there were no culverins or cannon; the largest guns retained were three demi-culverins. It is probable that the change in the ordnance provision was a response to the government's demand for brass guns for the navy at a time of international crisis (see 'The ordnance establishment of Camber Castle', this chapter, below). The change in gun provision probably just predates the creation of the dead mounts and Rampire and is therefore not in any way connected with these works.

THE DECLINE OF THE ANCIENT TOWNS AND THE ABANDONMENT OF THE CASTLE

by Jonathan Hiller

In 1548 the Commons had before them a bill for amending the Camber and the havens of Winchelsea and Rye: 'the Channell is so choked swared and fylled uppe, that there cannot lye in the same Harborowe above thirtie or fowtie saylle of Shippes, and yet the same Shippes cannot come into the same harborowe withowte greate daunger.'[114] The inning of the marshes reduced the scour of the rivers in keeping open the entrance to the Camber, and the nuisance was aggravated by the dumping of ballast in the harbour. It was a problem that would not be solved. In 1573 the Mayor and Jurats of Rye wrote that the silting-up Camber was 'past recovery' and referred despairingly to the 'puddle and creek of Rye' (Plate 2.5).[115] The situation had not improved by 1594 when Philip Symondson drew his map of the 'decayed harbour' of Rye (Fig. 1.4). Symondson was the 'Expeditioner' of the Wardens of Rochester Bridge from 1592, and Mayor of Rochester for the year 1597/8, and is known to have stayed in Rye for the express purpose of making the map (Vidler 1935, 161–3). The problems that beset the Camber were shared by many of the Cinque Ports along the south-east coast in the second half of the 16th century. Pevensey harbour had begun to silt up in the later medieval period, and the Norman castle erected within the original fortress was left to ruin in the late 16th century, as the sea receded (Harries 1997, 13). At Hastings, a promontory protected the two river valleys separated by the narrow hill on which the castle was built. By the end of the 16th century the promontory had been washed away by the sea; an artificial harbour was created

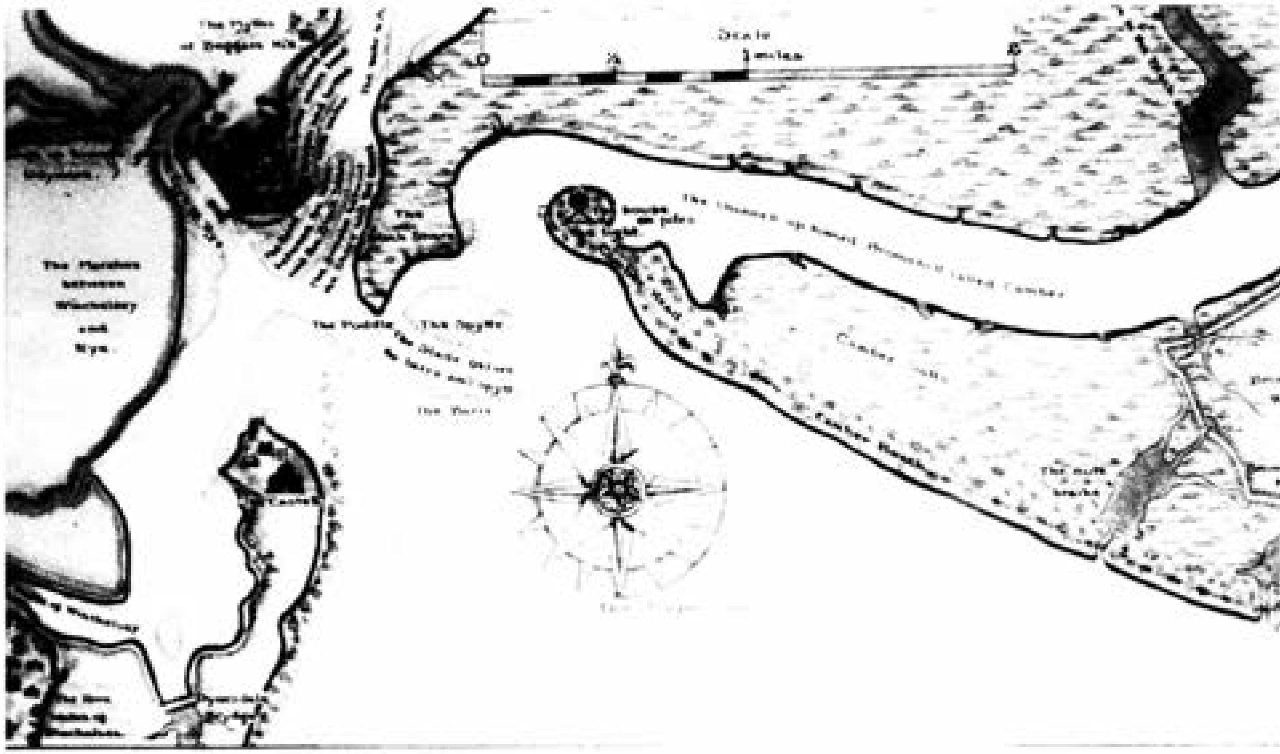


Plate 2.5: A reconstruction of the ports of Winchelsea and Rye in the mid 16th century by Captain H Lovegrove, based on a contemporary Plot of Rye Harbour by John Prowez, found with a petition of 1571 (PRO MP8, 212; Photograph David Bourne from the original drawing by Lovegrove in the Winchelsea Musuem)

in response, but this too was damaged in 1597 and Hastings gradually declined into a fishing village (Harries 1997, 15).

Winchelsea's economic fortunes had gone into decline in the early part of the 16th century due partly to the loss of trade occasioned by the decay of its harbour. The last significant contribution it made to the defence of the realm was in 1524 when it provided four ships and 15 mariners (*VCHS*, 9, 69). The population fell, and in 1573 the Winchelsea Corporation admitted to the 'poor and most lamentable state of the town' prior to the visit by Queen Elizabeth I (*VCHS*, 9, 69).

Economic problems beset Rye at the end of the 16th century. The export of cloth dropped away in the 1580s as a result of trade going direct from London. The fishing industry, hitherto the mainstay of the local economy, was affected by the silting of the harbour and by fierce competition from other fishing fleets, including French vessels. Rye's fishing fleet declined by a third between 1585 and 1600 (Hipkin 1995b, 243–4). Rye Corporation was forced to levy taxes on its dwindling population, including its fishermen, after 1602. The town's population of around 3500 in the late 16th century dropped to below 2000 in the late 1620s (Hipkin 1995b, 253).

Although conflict with France made the south coast vulnerable to attack, towns like Rye had also profited significantly from these wars. Rye Corporation stood to gain financially from the capture of prisoners and the ransoms paid for them. Moreover, during the French wars, a major role was played by privateers acting out of both French and English ports such as Rye, which benefited directly from the spoils of war, the provision of ships and soldiers, and the associated trade and revenues. The decline of Rye and Winchelsea therefore owed as much to the ending of two centuries of Anglo-French hostilities (when Calais was ceded to the French in 1558) as to their own economic misfortune. Mayhew (1984, 124) has argued that the wars with Spain in the latter part of the 16th century saw the shifting of focus of England's naval operation to the larger western ports such as Plymouth, thus ending the significance of the Cinque Ports. This may partly explain why Camber Castle was never refortified; theoretically it should have formed a useful part of the east Sussex coastal defences, even though it was distant from the sea. Despite repeated raids in the first half of the 17th century on fishermen and coastal property, Parliament gave little help to Sussex to strengthen its defences. The gun house at Seaford was out of repair by 1640, and as Fletcher (1980, 192) has observed 'the defence of the Sussex coast in the early seventeenth century was...a makeshift and haphazard affair'.

The earliest known proposal to abandon the castle dates from 1623.[116] In 1626 a commission directed to the Lieutenant of Dover Castle and the Mayors of 'Dover, Romney, Hide and Lid' mentioned that the king had been

Plate 2.6: Drawing of Rye, showing Camber Castle in the background, commissioned for the Van der Hem Atlas, c 1660. Pen and brown ink wash. (Austrian National Library, Vienna)

informed that: 'our Castle of Camber, in or [our] county of Sussex, is grown into great decay, being forsaken by the sea and left distant from ye water two miles at the least, so as the same is now of no further use for defence...' (quoted in Cooper 1850, 178–9). The lieutenant of Dover Castle wrote to the Lord Warden that the materials [from the castle] would not sell for much, while the townspeople thought themselves in danger if it were to be pulled down. There was petitioning against the destruction of the castle from the people of Rye, Winchelsea and Hastings.[117] Nevertheless, in 1636, on the orders of the king, a decision was taken to demolish Camber Castle and '[the king] will decide what to do with the materials'.[118] The garrison was disbanded in 1637,[119] and the ordnance later removed,[120] but the castle remained in use as a weapons store.

THE CIVIL WAR

by Jonathan Hiller

The Puritans were strong in Rye, and on the outbreak of the Civil War in 1642 the townspeople sided with Parliament against the Crown. In Parliament, intervention by Herbert Morley (Deputy Lieutenant, pro-Parliament) resulted in a Commons' order of 29 August 1642, proposing that ordnance, muskets and powder in Camber Castle, 'exposed to the surprise of any ill-affected or malignant persons', should be removed to Rye 'for the use and service of the county'.[121]

In the same year, Captain Richard Cockeran on behalf of Parliament removed guns and stores to Rye with the aid of the townspeople of Rye, and the castle was dismantled by the Parliamentary forces (*SCM* iv, 144). In 1643 the lead was stripped from the roof and the castle left to decay into the state in which it stands today.[122] The gallery was demolished and its basement purposefully infilled. If the bastion gunports were also blocked up at this time, which seems likely, then it suggests that there was a deliberate policy to render the castle militarily useless, to prevent it being used by the Royalists. Further along the coast, Walmer, Deal and Sandown castles were occupied in 1648 by large numbers of men who sided with the king (Coad 1998, 31). This insurrection, which followed the Kentish Uprising crushed at Maidstone in June 1648 by Fairfax and the New Model Army, lasted for four months, at the end of which £500 was required for the castles' repair.

A survey of the castle undertaken by Sir Denny Ashburnham in 1664 (Cooper 1850, 180) reported a ruined castle sited on worthless ground. In the same year Captain William Carr obtained the lease for the castle for 31 years with permission to demolish the structure,[123] although the demolition clearly did not take place, and the castle eventually passed to the Manor of Higham (Cooper 1850, 180). The ruins were continually exploited for building materials. The castle appears, albeit remotely, in a Dutch drawing of Rye, of *c* 1660, produced for the Van der Hem Atlas and attributed to Jacob Esselens (1626–87) (Plate 2.6). In 1668 the Rev. John Allin (minister of Rye) was evidently keen to acquire saltpetre from the castle, and wrote 'there hangs in very many places under the...arch great icicles, as it were of peter, which hath sewered through the earth. I pray gett mee as much of it as can be gotten...' (Adams 1907, 129).

In 1690 the English and Dutch fleets did battle with the French fleet off Beachy Head. The allied forces lost and retreated to Rye. A dismasted man-of-war was run ashore off Pett Level and fired to avoid capture, and her crew assisted the townspeople of Rye in preparing for a possible invasion. A breastwork of deal boards was erected on the beach near the castle (*VCHS*, 2, 159), though it is not known if the castle was in any way made ready to repel the anticipated invasion. Quite a substantial number of clay tobacco pipe fragments from the excavations and clearance operations (Higgins, Chapter 7) are datable to the late 17th century, and could suggest that there was more happening at this time than casual visiting and occasional stone-robbing. Numerous late 17th-century glass bottles were also recovered, although these have not been catalogued for the purpose of the present report.

The next known mention of the castle in a military context is in 1804, when it was surveyed by Lt. Col. John Brown as part of his survey of the neighbourhood of Rye (Pl.1.6).[124] The survey was part of a Defence Committee plan to erect a system of Martello towers from Eastbourne to Dover and then from Clacton to Aldeburgh (Hughes 1991, 146). The towers were positioned 550 m apart so that the arcs of fire could cross. There is no structural evidence that Camber Castle was reused at this time, and Rye and its harbour were fortified instead with two new Martello towers. Finds of 18th- and 19th-century date are common among the excavated assemblages, and the presence of late drinking vessels, bottles and clay tobacco pipes can readily be explained as rubbish left behind by picnickers, casual visitors and occasional stone-robbers. However, the presence of 18th- to 19th-century tile amongst the cleared rubble at the castle can hardly derive from this kind of activity, and may suggest that some form of consolidation was indeed undertaken at this time, using building debris imported from one of the nearby towns.

THE ORDNANCE ESTABLISHMENT OF CAMBER CASTLE

by Ian Scott and Martin Biddle

There is good documentary evidence for the ordnance establishment of the castle for most of its active life (Tables 2.6, 2.7, 2.8); this can be reconstructed for the period 1547 to 1638. Finds of military objects, including items of ordnance equipment, from the excavations and clearance operations in the castle are catalogued and discussed by Ian Scott in Chapter 5, with accompanying accounts of the form and function of the different types of weapon represented. The present discussion addresses the ordnance establishment of the castle; the likely distribution of guns within the castle is considered in Chapter 9.

From 1547 to 1568 the armament of the castle comprised 26 or 28 pieces of ordnance, which can be divided into four groups. These groups comprise larger muzzle-loading pieces of 4 inch bore or greater, medium muzzle-loaders, or field pieces, of 2½ inch to 3¾ inch bore, breechloading stone-throwers, and finally small bore breech loaders. There were six brass guns of 4 inch bore or greater (two demi-cannon, three culverins and a demi-culverin), up to three medium brass guns: one or two sakers (3½–3¾ in) and a falcon ('fawcon') (2½–2¾ in). Six stone-throwing iron breechloaders of approximately 5 inch bore ('portpieces') and 12 or 13 small bore breech loaders ('bases', 'double bases' and 'slings') are recorded. In 1547 six double bases and six slings are listed; in 1568, four double bases, three single bases and six slings. The 1568 survey lists the latter as 'fforged yron ordinance (sic)'. The portpieces and small breech loaders are absent from listings after 1568 and their removal has clear implications for the organisation of the defence of the castle.

For most of the period after 1568 the total number of guns based at Camber was ten. From 1568 to 1593 the larger guns consisted of a 'curcan cannon', a demi-cannon, a cannon perrier, a culverin and two demi-culverins. 'Curcan cannon' must be a corruption of 'curtall cannon', or less probably 'curtow' which was the term used in the 15th and early 16th century for large guns equivalent to the later cannon (Blackmore 1976, 225). The artillery state of the castle in 1587 is given as '1 canone (60 lbs); 2 curtall canone (42 lbs), 1 demi canone (30 lbs), 1 culverin (18 lbs); 2 demi culverins (9 lbs), and 2 sacres (5 lbs)' (*Adams' Guide*

Table 2.6: Brass ordnance at Camber Castle, 1547-1635 (compiled by Martin Biddle)

Date	Cannon	Curcan (Curtall?)	Demi-cannon cannon	Cannon perier	Culverin	Demi-culverin	Saker	Falcon
28 Dec 1547[1]	-	-	2	-	3	1	1	1
14 June 1568[2]		-	2	-	3	1	1	1
1568-93[3]	-	1	1	1	1	2	2	1
1583	survey missing							
1587[4]	1	2	1	-	1	2	2	-
1593[5]	6 brass pieces removed; 6 iron pieces in return							
1603?[6]	-	-	-	-	-	-	2*	1*
1607	survey missing							
1613[7]	-	-	-	-	-	-		3
1615[8]	-	-	-	-	-	-		3
1623[9]	-	-	-	-	-	-	2	1
1634	survey missing							
1634[10]	-	-	-	-	-	-	2	1
1635[11]	-	-	-	-	-	-	2	1
1635[12]	-	-	-	-	-	-	removed; 3 iron in return	

* carriages required

Notes:

1. BL, Add. MS. 46,348, p. 521 (First part of the Inventory of King Henry VIII; cf Kenyon 1982, 175).
2. PRO, SP12/46/77.
3. BL, MS. Cotton Titus B. V, f. 144.
4. M. A. Lower (ed.), *A Survey of the Coast of Sussex, made in 1587, with a view to its defence against Foreign Invasion, and especially against the Spanish Armada* (Lewes, 1870). Taken by Sir Thomas Palmere and Mr Walter Couerte, the survey was then in the possession of W. E. Baxter, Solicitor, Lewes. Either it, or a copy of it, is now BL, Add. MS. 57, 494, with maps by Nicholas Reynolds of London, dated May 1587. The ordnance listed at Camber Castle in the survey was presumably all of brass, but this is not stated.
5. PRO, SP12/245/43.
6. PRO, SP15/35/70.
7. PRO, SP14/84/51
8. PRO, SP 14/84/51, 'new store' added in 1615.
9. PRO, SP14/157/56.
10. PRO, SP16/279/33.
11. PRO, SP16/535/52.
12. PRO, SP16/287/33.

to Rye, 8th edition, 1907, 128–9). This is a total of seven larger pieces and two medium pieces.[125] The curtall cannon are stated to fire 42 lb shot which would suggest they were 7 inch cannon. Cannon perrier were stone-throwing guns of similar bore to other cannon. They were chambered, that is the section of the bore at the breech end was narrower and took a smaller charge of powder than ordinary cannons. Because of the smaller charge cannon perrier could be made with less metal than other cannon.

The guns listed after 1568 differ from those listed earlier and are generally larger in bore. However, the number of guns is the same. Given the lack of standardisation of gun sizes it is quite possible that the same guns were simply listed with different names. However, there is a possibility that larger guns were brought in when the breech loaders were removed.

In 1593 significant changes to the artillery dispositions were recorded. All the larger calibre brass pieces - the cannon, curtall cannon, demi-cannon, culverin and demi-culverins – which were present in 1587 were gone by 1593 and had been replaced by smaller bore pieces comprising three demi-culverins, three sakers

Table 2.7: Iron ordnance at Camber Castle, 1547-1642 (compiled by Martin Biddle)

Date	Double base	Port-piece	Single base	Sling	Demi-culverin	Saker	Minion
28 Dec 1547[1]	6	6	-	6	-	-	-
14 June 1568	4	4	3	6	-	-	-
1568-93	-	-	-	-	-	-	-
1583	survey missing						
1593	-	-	-	-	?3	?3	?[2]
1603?	-	-	-	-	?3	?3	?
1607	survey missing						
1613	-	-	-	-	3	3	1
1615	-	-	-	-	3	3	1
1623	-	-	-	-	3	3	1
1634[3]	survey missing						
1634[4]	-	-	-	-	?	?	?
1635[5]	-	-	-	-	?	?	?
1636[6]	-	-	-	-	3	6	1
1638[7]	-	-	-	-	3	4	1
1642[8]	-	-	-	-	removed		

Notes:

1. References for 1547-1623, as for Table 2.6
2. 6 new iron pieces in return for 6 brass pieces removed (Table 2.6, 1593).
3. PRO, SP12/276/52, a note of iron ordnance in several castles, forts and towns, dated 31 October 1634, but not including Camber Castle.
4. PRO, SP16/279/33, exchanging 3 brass pieces for iron, not specified.
5. PRO, SP16/535/52, exchanging brass pieces for iron sakers.
6. PRO, SP16/326/59, f. 121, including 3 additional iron sakers in return for the last 3 brass pieces removed in 1635 (Table 2.6).
7. PRO, SP16/397/66, remaining iron pieces to be removed.
8. *Commons Journals*, **2**, 742 and 746 (26 and 29 August 1642): order to remove ordnance and ordnance stores from Camber to the town of Rye: cf. BL, Add. MS. 6344, col. 609.

and a minion. The new guns were cast iron. In February 1590, the captains of castles on the Channel Coast had been ordered to surrender brass guns, which were to go to arming ships; the brass guns were to be replaced by iron ordnance (Mayhew 1984, n.13; *VCHS*, 2, 152–53). This was probably the occasion for the major change from brass to iron guns recorded at Camber between 1587 and 1593. The revised ordnance complement at Camber was significantly different in terms of the weight of metal that could be fired.

It is an easy matter to compare the weight of shot which the changing ordnance establishment could fire (Table 2.8). For the purposes of the comparison a minimum shot weight for each class of medium and larger guns has been assumed. The figures in Table 2.8 exclude the portpieces and the other breechloaders. The guns listed for 1547, 1568 and 1568–93 could fire a total weight of shot of between 112 lb and 122 lb. Using the same figures the guns listed for 1587 could fire 172 lb. In fact the 1587 list quoted by *Adam's Guide* gives shot weights and the total weight of metal was actually 220 lb. After 1593, the new ordnance could fire a total weight of shot of no more than 67 lb, which represents a very significant reduction in the castle's ship-killing capability.

From 1593 to 1623 and probably until 1635, the artillery establishment remained stable with three iron demi-culverins, two brass sakers, three iron sakers, an iron minion and a brass falcon. In 1636 the remaining three brass pieces were removed and replaced by three more iron sakers. By 1638 two iron sakers had been removed and shortly afterwards the remaining ordnance was removed.

In addition to the weight of metal the guns could fire, the ranges and rates of fire must be considered. Precise figures are not readily obtainable, and few of the contemporary ordnance lists give information regarding maximum range. Indeed Guilmartin has argued (1974, 279) that range figures given by most contemporary authorities are completely unreliable, and that the maximum range figures were not based on observed data. For this reason figures for maximum range in particular should be treated with extreme caution. Guilmartin has also stressed (ibid., 281) that there is a difference between maximum range and maximum effective range. Sheriffe (*c* 1590) and Ward (1639) (Blackmore 1976, 393–6) give figures as does Norton (1628, 52) (Table 2.9). The ranges given by Ward and Sheriffe are similar, although the maximum range quoted by Sheriffe for culverins and demi-culverins is notably greater than the figure given by Ward. This reflects the different ranges that they are illustrating. The ranges given by Norton are generally longer, with a maximum range in excess of 2.5 km. They

Table 2.8: Camber Castle ordnance 1547–1638[1] *(compiled by Ian Scott)*

	1547	1568	1568–93	1587	1593, 1603	1613, 1615	1623	1634, 1635	1636	1638
cannon (brass)				—|						
curcan (curtall?)			|—	—|						
cannon (brass?)				—|						
cannon perrier brass)			|—|	—|						
demi-cannon (brass)	—	—	—	—|						
	—	—|								
culverin (brass)	—	—	—	—|						
	—	—|								
	—	—|								
demi-culverin (brass)	—	—	—	—|						
			|—	—|						
demi-culverin (iron)					|—	—	—	-?-?-?-	—	—|
					|—	—	—	-?-?-?-	—	—|
					|—	—	—	-?-?-?-	—	—|
Sub totals (no.)	**6**	**6**	**6**	**7**	**3**	**3**	**3**	**3**	**3**	**3**
Weight of shot (lbs)	**104**	**104**	**108**	**158**	**27**	**27**	**27**	**27**	**27**	**27**
saker (iron)	—	—	—	—	—	—	—	—|		
		|—	—	—	—	—	—	—|		
saker (iron)					|—	—	—	-?-?-?-	—	—|
					|—	—	—	-?-?-?-	—	—|
					|—	—	—	-?-?-?-	—	—|
									|—	—|
									|—|	
									|—|	
minion (iron)					|-?-?-?-	—	—	-?-?-?-	—	—|
falcon (iron)	—	—	—	-?-?-?-	—	-?-?-?-	—	-?-?-?-|		
Sub totals (no.)	2	3	3	3	7	7	7	7	7	5
Weight of shot (lbs)	8	14	14	14	36	36	36	36	40	28
Total weight of shot (lbs)[2]	**112**	**118**	**122**	**172**	**63**	**63**	**63**	**63**	**67**	**55**
portpiece (iron)	—	—|								
(breech loader)	—	—|								
	—	—|								
	—	—|								
	—	—|								
	—	—|								
Sub totals	**6**	**6**								
sling (iron)	—	—|								
(breech loader)	—	—|								
	—	—|								
	—	—|								
	—	—|								
	—	—|								
double base (iron)	—	—|								
(breech loader)	—	—|								
	—	—|								
	—	—|								
	—|									
	—|									
single base (iron)		—|								
(breech loader)		—|								
		—|								
Sub totals (no.)	**12**	**13**								
Totals (no.)	**26**	**28**	**9**	**10**	**10**	**10**	**10**	**10**	**10**	**8**

Notes:
1. References as for Tables 2.6 and 2.7.
2. The total weight of shot which could be fired in one salvo; they are minimum weights based on the lowest shot weights regularly recorded in 16th-century sources: cannon 40 lb; curtall cannon 30 lb; demi-cannon 25 lbs; cannon perrier 20 lb; culverin 15 lb; demi-culverin 9 lb; saker 6 lb, minion 4 lb; falcon 2 lb; falconet 1.25 lb. The breech loaders are omitted from the calculations of shot weights.

are comparable to the figures given in William Eldred's *Gunner's Glass* of 1646. Eldred gives different ranges for falcons, sakers, demi-culverins and full culverins, dependent on the degree of elevation. According to Eldred, a falcon firing level, ie. with no elevation, would fire 320 yards (292 m) and at 10 degrees of elevation 1920 yards (1755 m); the figures for sakers are 360 yards (329 m) and 2180 yards (1993 m), for demi-culverins 400 yards (365 m) and 2400 yards (2194 m) and for culverins 460 yards (420 m) and 2740 yards (2505 m). Eldred had been Master Gunner of Dover Castle and it might be expected that his range figures were based on empirical observation, but his tables of ranges appear to be rather formulaic in presentation which raises doubts about their real worth.

The figures given by Sheriffe, Ward and Norton may differ but a pattern is discernible with the very largest guns (cannons and demi-cannons) firing out to a shorter range than the culverins and demi-culverins. These figures reflect the contemporary perception that culverins could fire further than cannons because they were proportionally longer. Most cannon were *c* 12 ft in length (the equivalent of *c* 18 calibres); most culverins were 12 or 13 ft long (the equivalent of *c* 24 or 26 calibres), while demi-culverins were 11 ft long (equivalent to *c* 29 calibres). Guilmartin (1974, 279–83) has shown convincingly that culverins with proportionately longer barrels would not necessarily have fired to greater ranges than cannons. Black powder burns at a more or less constant rate unaffected by changes in temperature or pressure, unlike modern propellants that burn faster as pressure and temperature increase. Modern guns are designed to utilise this property to ensure that the gas pressure in the barrel is maintained as the projectile accelerates down the barrel. In a black powder weapon a pressure threshold is rapidly reached and as the cannon ball moves down the barrel, expanding the volume behind it, the pressure drops. For this reason there is an optimum length of barrel which gives the maximum muzzle velocity and therefore range. Experimental work in the 19th century quoted by Guilmartin (1974, 282–83) suggests that the optimum length of barrel is about 12 to 15 calibres. A longer barrel will actually reduce the muzzle velocity of the cannon ball and hence the range.

In the 16th and 17th centuries, firing guns was more an art than a precise science, and figures for ranges must be treated with some care. The ranges shown in Table 2.9 give some indication of the limitations of land-based artillery firing on ships. A further limitation was the slow rate of fire that could be maintained. Although in 1568 Giordano Orsini fired 108 rounds from a 70 lb cannon in five hours, this was in a competition (Pepper and Adams 1986, 198–9 n.20). Clearly for short periods quite high rates of fire could be achieved. By contrast, William Eldred made an allowance of 8 shot per cannon *per day*, 10 shot per demi-cannon *per day*, and 14 shot per demi-culverin or saker *per day* when estimating the quantity of shot to provide for a train of artillery. The rate of sustained fire seems to have been very low. Eight shots an hour was a good rate, which could only be maintained for a short time, because of the need to allow the guns to cool or risk bursting. These slow rates apply to large brass, or cast iron, guns. Wrought-iron guns were more prone to bursting and could fire at a slower sustained rate.

Table 2.9: Ranges of guns (from Sheriffe c 1590, Norton 1628 and Ward 1639) (compiled by Ian Scott)

Name (weight of shot)	After Sheriffe c 1590 'at random range'		After Norton 1628[1] '6 poyntes of the gunner's quadrant'		after Ward 1639 maximum range	
	paces	Metres[2]	paces	metres[2]	paces	metres[2]
Cannon royal (66 lb / -)	1930	1470	-	-	-	-
Cannon of 8 (60 lb / 64 lb)	2000	1524	3600	2743	1500	1143
Demi-cannon (30.25 lb / 32 lb)	1700	1295	3120	2377	1700	1295
Culverin (17.3 lb / 19 lb)	2500	1905	3600	2743	2100	1600
Demi-culverin (9 lb / 11.75 lb)	2500	1905	3480	2651	1800	1371
Saker (5.3 lb / 5.25 lb)	1700	1295	3000	2286	1500	1143
Minion (3.25 lb / 3.25 lb)	1600	1219	2440	1859	1400	1066
Falcon (2.5 lb / 2.3 lb)	1500	1143	2640	2011	1200	914
Falconet (1.25 lb / 1.14 lb)	1400	1066	1800	1371	1000	762
Robinet (1 lb / 0.75 lb)	1000	762	-	-	700	533
Base (- / 0.33 lb)	-	-	-	-	560	427

Notes:

1. Based on a table of 'Alexander Bianco', *recte* Alessandro Capobianco, *Corona e palma militare di artiglieria ...* (Venice, c. 1598);
2. Measurements in metres are based on the 'comon (sic) pace' of 30 in (= 0.762 m) (see Norton 1628, 52)

Chapter 2 Endnotes

1. *Cal. Pat. Rolls* 1485–94, 151.
2. *L. & P.* ii (2), p. 1455; warrant, PRO, E101/417/7, no. 34.
3. BL, Stowe MS, 146. ff. 117, 126; PRO, SP1/230, f. 316 (*L. & P.* i (2), 2825, 3042, 3564).
4. BL, Stowe MS, 146, f. 126.
5. PRO, SP1/230, f. 316.
6. *L. & P.* iv (2), 5031.
7. *L. & P.* iii (2), 1925; iv (2), 3887.
8. *L. & P.* iv (2), 5031.
9. *L. & P. Add.* i, 445. This paper is undated, but attributed to 1524. The more likely date is 1529–30 during one of the years of office as mayor of Rye of Thomas Ensyng who is described in the text as mayor. One of the items on which Wolsey's views were sought was in connection with the execution of the will of John Ashenburnam who had had 'great goods' issued to him for building a blockhouse (the Camber tower). Ashenburnam was indeed the recipient of most of the monies paid to Guldeford in 1514 and may have acted as paymaster (*L. & P.* i (2), 2825, 3042, 3564).
10. *L. & P.* v, 377, repeated vi, 1012, where the letter in question is dated 21 August (1533), probably correctly.
11. BL, Add. MS. 20, 030, f. 48f. (*L. & P.* v, p. 752).
12. BL, Harl. MS. 1419A. f. 134.
13. *L. & P.* vi, 1012.
14. PRO, SP1/103, f. 245v (*L. & P.* x, 807).
15. *L. & P.* xii (1), 718 (4), 1095.
16. *L. & P.* xiii (2), 349.
17. *L. & P.* xii (2), 645.
18. *L. & P.* xiv (1), 398, 655, p. 330.
19. Statute 32 Henry VIII, c. 50, cf. *L. & P.* xv, 502 (2).
20. The date of commencement of the first pay can be calculated from the dates for the fourth pay; the earliest surviving dated pay in the particular accounts for 1539. National Library of Scotland, MS. 2830, f. 15.
21. 'Charges of the kings wars and fortifications', PRO, SP10/15, no. 11.
22. The particular accounts (National Library of Scotland, MS. 2830 henceforth *Accounts*) break off after the first folio of the twelfth pay. A subsequent folio of this pay in the PRO (E101/481/30) bears the contemporary Arabic number '6' on the verso which continues the similar pagination of the twelfth pay of *Accounts*, and shows that one folio with pages 3 and 4 is lost. The contents of page 6 show that only a part of page 7, now also missing, would have been needed to complete the record of this pay. The page totals of the surviving leaves account for an expenditure of £23 0s. 3d. and suggest that about £14 would have been accounted for on the lost pages. Similarly *Accounts* now begin on page 1 of the third pay, so that all record of the first and second pays is lost. It is possible, however, by graphing the totals of men at work and the expenditure during pays 3 to 12, to read back to a reasonable estimate of expenditure in pays 1 and 2. Since these two pays, like pays 3 and 4, each cover only a fortnight (by contrast with the four-week period of all subsequent pays), the lost period amounts to only one tenth of the 1539 season.
23. *Accounts*, ff. 27, 44v, 89, 119 and 158 (Dover); 90 and 148v (the Court of London and back to Dover); 119 (Court only).
24. *L. & P.* xiv (1), 398.
25. *L. & P.* xiv (1), 899.
26. *Accounts* ff. 26, 45, 46, 63, 63v, 90, 119, 138v.
27. *Accounts* f. 138.
28. *L. & P.* xv, 323; xvi, 372 (1), 456; Add., 1446.
29. He was still captain in July 1565, having received his patent of appointment in July 1544: *Cal. Pat. Rolls 1563–6, 237*: cf. *L. & P.* xix (1), 1035 (142). By December 1570 the captain was Thomas Wilford (*Acts P C* vii, 406).
30. He was once described as 'surveyor or master of the works': PRO, E323/2B, pt. 1 (cf. *L. & P.* xviii (2), 231 (11), p. 130, where the full description is not given).
31. For Puckyll or Pokyll see Harvey 1954, *209*. Of the two setters who were associated with him in building the steeple of Bolney Church, Sussex, in 1536, John Corker appears as a setter throughout the surviving Camber accounts, earning 3s. 8d. a week. Of the other Camber setters, Richard Mawndy was perhaps related to Robert Mawnde of Mayndy, mason of Maidstone (Harvey 1954, *270–1*), while Martin Wastell is probably to be identified with the mason and quarry owner of Boughton Monchelsea, near Maidstone (Harvey 1954, *287*).
32. *Accounts*, f. 56v: for reference to 'the quarry', see ff. 2–115, passim.
33. *Accounts*, ff. 44v, 61. This was water-carriage, but stone was usually moved by carts and these were provided by places lying mostly in the Hastings-Fairlight direction: ibid. ff. 8, 9, 23–4, 42–4, etc. The employment of only one overseer for the quarry is an added argument against the existence of two quarries for more than a short space of time.
34. PRO, E36/143, f. 34. The sixteenth pay, to which this document refers, ran from 20 March to 17 April 1540, if the dates may be calculated from those given for the twelfth pay in *Accounts*, f. 159.
35. *Accounts*, ff. 6v, 10v , 20, 20v , 39v , 56, 61, 61v , 88v .
36. *Accounts*, ff. 9v , 22v , 63v , 87v , 88, 111v , 136, 136v .
37. *Accounts*, f. 118v .
38. *Accounts*, ff. 118v , 137, 137v .
39. *Accounts*, ff. 10, 22v , 62v , a total of 403 loads.
40. *Accounts*, ff. 90v , 118, 146.
41. *Accounts*, ff. 11v , 45, 45v , 63, 89, 89v , 118, 118v , 136v , 137.
42. *Accounts*, ff. 138, 139v , 148v , 157v ; cf. PRO, E101/481/30, f.1.
43. *Accounts*, ff. 2v , 15v , 16, 25v .
44. *Accounts*, ff. 16v , 31, 31v .
45. *Accounts*, ff. 49v , 50, 62, 71, 71v , 90, 95–6v , 118, 121v–2, 146, 153v , 154, 159v .
46. PRO, E36/143, f. 34.
47. *Accounts*, ff. 46, 64, 90, 117, 117v : 86 loads in all, most of which came from Brightling in Netherfield Hundred, Sussex.
48. *Accounts*, ff. 21v , 63, at 4s. 6d. and 3s. 4d. the thousand, respectively. The carriage of 'earth' from Winchelsea for the limekiln (*Accounts*, f. 24v) may refer to clay for bonding the bricks instead of lime mortar which

would be useless under heat: cf. also *Accounts*, ff. 3, 11v, 16, 31, 40v.

49. King earned 4s. a week, the other brickmakers and the earthworkers 3s. 4d., and the brickmakers' servers 5d. a day. In the tenth pay (*Accounts*, f. 149), King was described as a 'brickstreker' at the same wage. In the fourth pay, eight moulds were shod with iron for the brickmakers (*Accounts*, f. 25).
50. *Accounts*, ff. 118v, 139, 148v. King and members of his company were paid 3d. a night for watching the kilns while they were fired.
51. When they were again called 'bryckestreckers': PRO, E36/143, f. 34.
52. There are relatively few references to the carriage of 'erthe' amounting to only 22 tons and 14 freights (*Accounts*, ff. 39v, 135v, 146v), a fact which is hard to explain. Perhaps it is silently passed over as part of the regular activity of the small carts on the pay roll. Straw for the brickmakers appears more often (*Accounts*, ff. 41, 45 (ter), 63, 89 (brome), 89v, 137) and much of the other straw provided was probably for the same purpose.
53. *Accounts*, ff. 61v (cf. f. 6v), 146v.
54. *Accounts*, ff. 12v, 63, 157.
55. *Accounts*, ff. 25.
56. *Accounts*, f. 89.
57. *Accounts*, f. 137.
58. Kent Archives Office, U 1475/375/1 (formerly De L'Isle and Dudley 275/1). I am indebted to Dr David Crossley for this reference.
59. *Accounts*, ff. 12, 12v, 25, 44, 44v, 62, 90, 90v, 136v, 147v, 156v; cf. PRO, E101/481/30, f.1v.
60. *Accounts*, ff. 12, 147, 156v; cf. PRO, E101/481/30, f.1v.
61. *Accounts*, f. 157; cf. PRO, E101/481/30, f. 1v.
62. *Accounts*, ff. 117v, 118.
63. *Accounts*, ff. 34, 39v, 44, 44v, 45v.
64. Its purchase was entered in the sixth pay and its carriage from the waterside to the king's storehouse at Rye in the eighth pay (*Accounts*, ff. 63, 117v), but this probably reflects only the date when the bills were submitted. Presumably the lead was acquired in the fifth pay, stored at Rye, and 7 fother of it (whose carriage from Rye to the tower is also entered in the eighth pay: *Accounts*, f. 115v) taken to the castle for immediate use. The total amount purchased was 285 pieces amounting to 44 fother 267 lbs.
65. PRO, E101/504/6.
66. *Accounts*, f. 11v, 89.
67. *Accounts*, ff. 11v, 64, 90, 118v, 148.
68. Third pay, 226 loads; fourth pay, 600 loads; fifth pay, 1343 loads; a total of 5909 loads in pays 3–8.
69. *Accounts*, ff. 3, 11v, 16, 31, 40v.
70. *Accounts*, f. 45v.
71. *Accounts*, ff. 40, 49.
72. *Accounts*, ff. 3, 10v, 11v, 12v. The crane was occasionally repaired or modified later in the season: *Accounts*, ff. 90, 117v, 138.
73. *Accounts*, ff. 8–9, 23–4, etc.
74. *Accounts*, ff. 12v, 13, 26v, 46v, 65v, etc.
75. PRO, E36/143, f. 34. The figures provided by this document are so large that there might seem to be a possibility that they refer not to the 1539–40 campaign, but to the sixteenth pay of the 1542–3 programme. They are, however, fully supported by the increase in the provision of money (Table 2.1). Moreover, the same sheet has been used for a series of memoranda in Cromwell's hand, so that unless the memoranda are primary and the Camber figures a later addition (and the reverse seems more likely), the latter must date from before Cromwell's execution in July 1540. In fact the memoranda appear to belong to April 1540 and thus to agree exactly with the date of 20 March to 17 April assignable to the sixteenth pay: see above, note 34 and *L. & P.* xv, 598. A French sea-captain, who put into the Camber early in 1540 to await a fair wind, noted that the work was continuing very slowly, and Marillac assiduously reported his comment to Francis I (*L. & P.* xv, 289). But he wrote on 3 March, just two weeks before the massive expansion of the sixteenth pay.
76. *Accounts*, ff. 46v, 64v, 65, 91, 139v. Seventy-eight men were involved, 55 in the fifth and sixth pays, 14 in the seventh and nine in the ninth (when one came from Tonbridge and another from Aylesford); they were paid travelling money at the rate of 3d. for 10 miles.
77. *Accounts*, ff. 10, 10v, 25, 44, 44v, 45, 62v, 89v. There was a chamber over the counting house, which seems therefore to have been a two-storey structure.
78. *Accounts*, f. 45. They were purchased from Anthony Auger (Auchar), at this time paymaster of the king's works at Dover harbour (*HKW*, 742).
79. *Accounts*, ff. 89v, 90v.
80. *Accounts*, f. 128.
81. *Accounts*, f. 157v.
82. PRO, E101/481/30, f. 1v.
83. *Accounts*, ff. 25v–26v.
84. The eight iron bolts purchased for the great tower in the eleventh pay and weighing 112 lbs (perhaps 14 lbs each) were possibly to help bind the frame of either the roof or floor: *Accounts*, f. 156v. The stairs, for which steps were sawn in the ninth pay (Accounts, f. 138v), may be those inserted into the thickness of the tower wall and leading from the new ground floor to the roof.
85. *Accounts*, f. 115 (carriage of two freights of framed timber for).
86. *Accounts*, ff. 156v (nails for), 157 (an old sail for the shipwrights to lay by, possibly during caulking and pitching).
87. PRO, E101/481/30, f. 1 (window fittings for one, and door furniture for them all).
88. *Accounts*, ff. 115, 135, 135v.
89. *Accounts*, ff. 157, 157v.
90. *Accounts*, f. 118.
91. *Accounts*, ff. 108v, 144, at a wage of 6d. the day and 6d. the night.
92. In the sixth pay Antony Chowt (Chute) was paid 30s. for riding to London 'for the molde to cast the kynges Armys be ye devisers appoyntmentt' (*Accounts*, f. 63v). These are very unlikely to have been cast in lead, but the materials were available for casting in plaster or stucco, 6 loads of stone lime having been acquired in the fifth pay (*Accounts*, f. 46v) and a further 18 in the sixth (*Accounts*, f. 64). The blocking of all four panels

in what looks like stonework of the third period may suggest that the plaster stucco had not survived the sea air.

93. In the twelfth pay, following the positioning of the timber work for the new roof in the seventh pay: PRO, E101/181/30, f. 1ᵛ, and see above.
94. The glacis would have been about 13 feet wide and 7 feet high against the curtain, and would thus have lain at an angle of 28 degrees, well within the 40 degree angle of repose normally quoted for shingle. The stability of this material, even when turfed, would however have been poor by comparison with soils of high cohesion, such as clay, normally preferred for the construction of earthworks.
95. It seems, for example, to have been possible to enter the basement passages only from the Keep or from the Entrance Bastion, yet the roofs of the curtain gallery and of the stirrup-basements, to say nothing of the Keep, were of timber, which could easily be sapped or fired by an enemy who had penetrated the passages and who would have been very hard to dislodge.
96. For orillons comparable in their external aspects, cf. for example the fortresses of Castrocaro (1504) or less exactly Nettuno (1501–3) by Antonio da Sangallo: Severini 1970, 38–9, 45–7, pls. 36–9, 56.
97. Von Haschenperg was also at work in 1539–40 on the four bulwarks on the Downs, circular earthen structures of which no trace now survives (*HKW*, 457–9, 462). His knowledge of earthworks may have been considerable. The reference in the sixth pay at Camber (*Accounts*, f. 63ᵛ) to a payment of 2s. 6d. to 'Mastyr Steven for an instrumentt brought wyth hym from Dover to ley torffe [turf]' is the only direct written evidence for the use of earthworks at the Camber in 1539–40. They were swept away by the remodelling of 1542–3, so that no sign of them, other than their supposed retaining walls now remains.
98. *Accounts*, ff. 9ᵛ, 10ᵛ, 41ᵛ, 115.
99. Ash for stocking the 'greatt gunnys' was purchased in the tenth pay (*Accounts*, f. 148ᵛ) and, as powder had already been provided (*Accounts*, f. 117ᵛ), the ordnance must have been usable by the end of the year.
100. *L. & P.* xv, 321, 322.
101. *L. & P.* xv, 323; xvi, 327 (2); *Add.* i (2), 1446; xvi, 372 (1); in chronological order.
102. *L. & P.* xvi, 456. For Chute, one of the commissioners of the Camber works, see above and notes 28–29.
103. PRO, LR6/112/8, including a gunner at Rye, presumably in the bulwark opposite Camber Castle. This establishment remained unchanged until Mary's reign (PRO, LR6/112/8–11; PRO, SC 6/Edw. VI/723; PRO, LR6/113/1–5; cf. *Acts P C* ii, 205–6).
104. PRO, SP10/7/20 (*Cal S P Dom 1547–80*, 16); *Acts P C* iii, 284; BL, Roy. MS. 18.C.xxiv, f. 102ᵛ.
105. Henry was in Kent in May 1542 inspecting the fortifications, and spent 3–6 May at Dover Castle, probably in connection with the harbour works at Dover. He stayed at Westenhanger on 1 May and again on 7 May, and could have made the journey of 16 miles to the Camber (*L. & P.* xxii, 286, 362 (15), (35), (48), 880 (ff. 11ᵛ, 13ᵛ, 14)).
106. S.P.Dom., Elizabeth, ccix, 57.
107. PRO, SP12/187/1.
108. PRO, SP12/46/77, f.169.
109. BL, Dept. of MSS, Lansdowne MS 39, nos. 60–1; MS40, nos.77–8; MS48, no.30.
110. PRO, SP12/250/42, f.89; SP12/250/44, f.93ᵛ, cf. SP12/250/43)
111. PRO, SP14/81, f. 109.
112. PRO, SP14/87/19, p.4.
113. PRO, SP14/84/51, Column 1.
114. *Statutes* 2 & 3 Edw. VI. cap. 30; Cooper 1850, 181–8.
115. S.P. Dom., Elizabeth, xciii, 22.
116. PRO, SP14/157/56, f.11, 11ᵛ.
117. S.P. Dom., Charles I, lᵛ, 75, 76.
118. S.P. Dom. CCCXXVI no. 14, 555.
119. *Cal S P Dom* 1637–8, 81–2; PRO, SP 16/347/76.
120. PRO, SP16/397/66 (*Cal S P Dom* 1637–8, 601); BL, Add. MS., 6344, col. 609 (from *Commons Journals*, ii, 742, 746).
121. *Commons Journals* 2, 742.
122. *HMC* 13th Report, App. pt. IV, 213–14.
123. BL, Add. MSS, 5705, 12.
124. PRO, WO1/629, 469–80.
125. A survey of 1587 states that 'There are but three people dwelling at Camber Castell; her Majesty's castell is in good repayre, and well furnished with ordinance and munition, viz., one canon, two curtall canone, one demy canon, one culverin, two demiculverin, and two sacres' (Blaauw, 1859, 152).

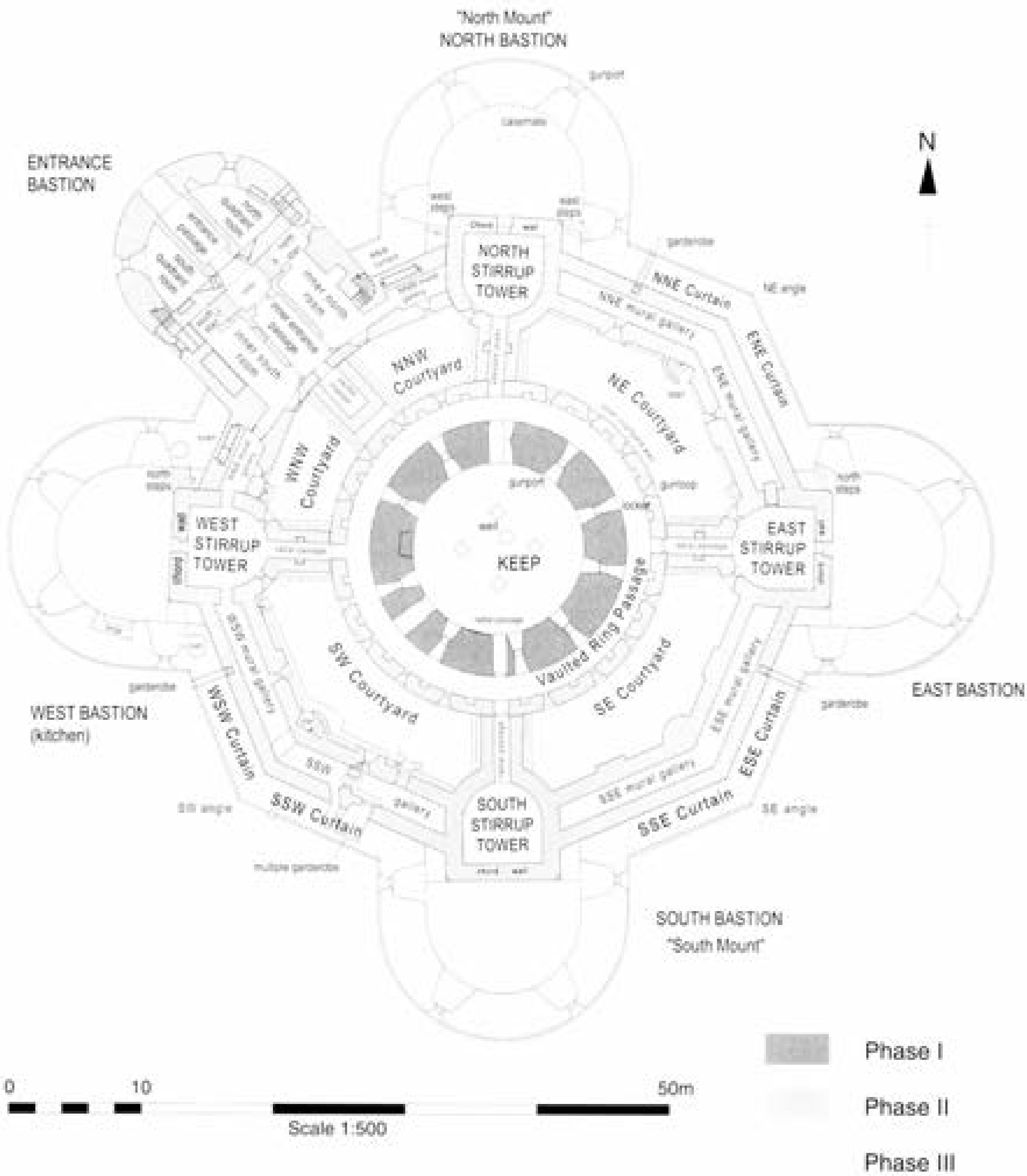


Figure 3.1 Standard names for structures and areas

Chapter 3: Structural and Stratigraphic Analysis

by Caroline Atkins, Martin Biddle, Jonathan Hiller, Graham Keevill and Anthony Streeten

Throughout this chapter, individual structures and areas of the castle are referred to using the standard names shown in Figure 3.1. Figure 3.2 shows the location of cross-sections, elevations and section drawings.

PHASE I: THE FIRST TOWER (1512–14)

Summary

The first known building constructed on the site was Sir Edward Guldeford's circular gun tower, which formed the central core of all later developments. It was considerably modified during the major building campaigns of 1539–43, but much of the primary structure survives as the base of the extant Keep (Plate 3.1), and stands to a height of at least 6.7 m (22 ft). Further elements of the original fabric are preserved where they were re-set during subsequent heightenings.

The first building was a circular, stone tower, 19.5 m (64 ft) in diameter and perhaps 9.14 m (30 ft) in height, with walls some 3.05 m (10 ft) thick. It was of a single storey below the leads, with a parapet above. The walls were pierced just above ground level by 10 narrowly splayed brick-vaulted gunports probably intended for local defence.

The tower was entered by a door at ground level. The ground floor was heated by a large fireplace and access to the roof seems to have been by means of a stair in the thickness of the wall, the carefully blocked opening for which may be seen just to the west of the entrance to the present stair, itself a later insertion. The brick- and stone-lined well towards the centre of the tower may also have been constructed at this time.

The exterior was embellished with a single string-course at parapet level, punctuated by a series of sixteen ornamental carvings, including at least five lion-head or gargoyle spouts which served to carry the rainwater off the roof. The other carvings were shields carrying a Tudor badge or other armorial symbol: a rose, the St. George's Cross, a fleur de lys (?) and in two cases possibly the Fleece. The original parapet was incorporated in a later

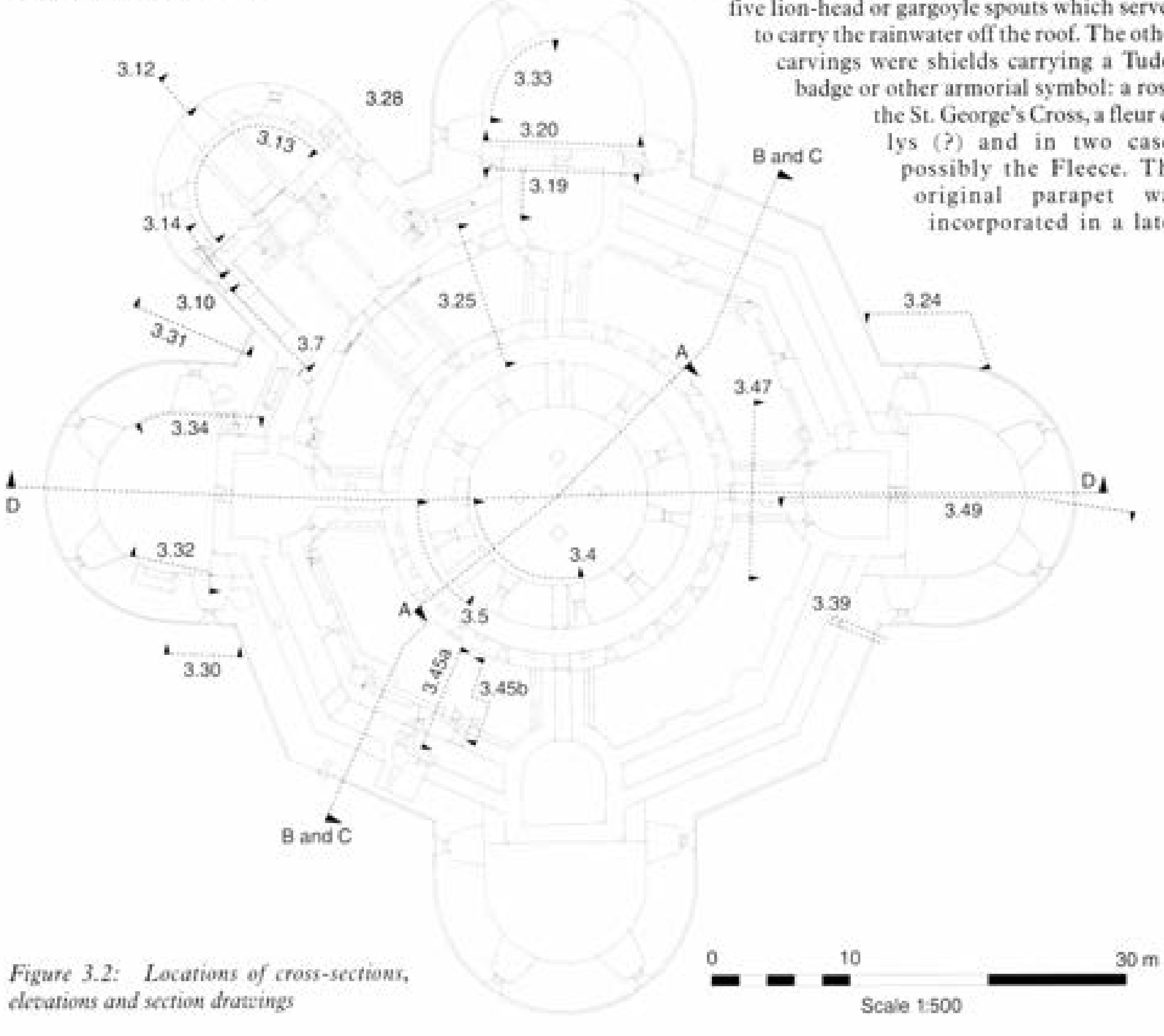


Figure 3.2: Locations of cross-sections, elevations and section drawings

heightening of the tower, when the stringcourse and two courses below it were re-set at a higher level, some of the spouts being set in unusable positions. A corbel table around the interior of the tower seems to indicate the level of the underside of the original roof, but the rebuilding of the wall from the course immediately above the corbel table has destroyed all signs of the housing for its timbers. This roof, like that of the first heightening of the tower, was probably designed to carry heavy guns. Indeed, the main armament may have been mounted at this level, the narrow gunports at ground level being intended for local defence with small calibre flat-bed guns. These ports can never have provided more than a very restricted field of fire: their arcs of traverse do not cross or even meet, and the area at the foot of the tower was thus dead ground and largely unprotected. Guldeford's repeated requests to Cardinal Wolsey for the supply of ordnance (see Biddle, Chapter 2, above) suggest that it was not until around 1536 that this was finally installed.

Description (Figs 3.3–3.5)

The primary walls, roof and parapet

The interior and exterior faces of the primary tower walls were constructed of large yellow sandstone ashlar blocks, over a core of rubble. On the internal face of the wall (Fig. 3.4), the original roof level is marked by the corbel table (2202), which supported the roof timbers. The corbel table is shallow, which suggests that there may have been additional support for the roof timbers in the form of central posts, particularly if the roof was intended to

Plate 3.1: The Keep, external view, from the north. The possible phase IIb entrance, aligned with the Entrance Bastion, can be seen in the centre of the Keep wall. In the foreground is the abandoned Vaulted Passage or Cellar, blocked in phase III. 1963 (English Heritage/Biddle)

support the weight of heavy cannon. However, there is no evidence of central posts, and the joist holes for the roof timbers do not survive. Above the level of the corbel table on the interior face, there remains a single course of primary sandstone blocks. Externally, the parapet level is marked by a stepped break in the core-work of the wall above the level of the corbel table. The remains of the parapet are indicated by five courses of primary wall face rising from the level of the corbel table, and below a change of build of a later phase (Fig. 3.5; Plate 3.1). The string-course that can be seen on the exterior of the tower was a feature of the primary tower, and would have been set at parapet level, at a point marked now by a double course of bricks. It was clumsily relocated to its present level when the tower was heightened in phase IIb (see below). Below the original line of the string-course are regularly spaced sockets in the ashlar, which are found in the south-east and south-west quadrants of the tower but not on the north side even where the ashlar survives. These sockets were later filled with brick.

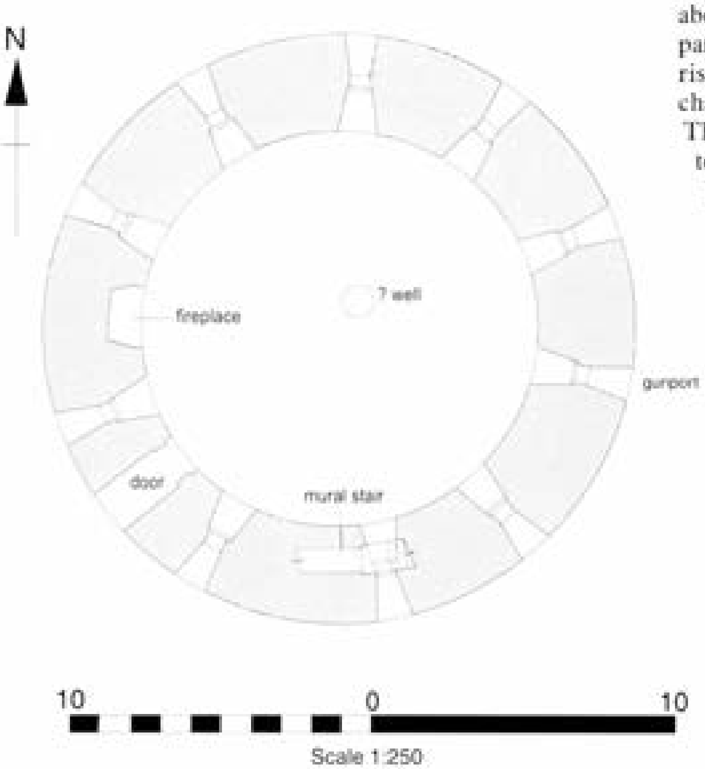


Figure 3.3: The phase I tower: basement level plan

Primary openings

All the primary openings of Sir Edward's tower were blocked during subsequent building operations, when new openings were inserted. This was skilfully done and as a result the original openings can prove hard to detect in the modified fabric.

The original doorway (2185) is visible on the internal and external faces of the south-west wall (Fig. 3.5), but it has been carefully blocked with ashlar. In its original form its internal width was *c* 1.45 m (4ft 10in.), and the threshold lies *c* 0.38 m

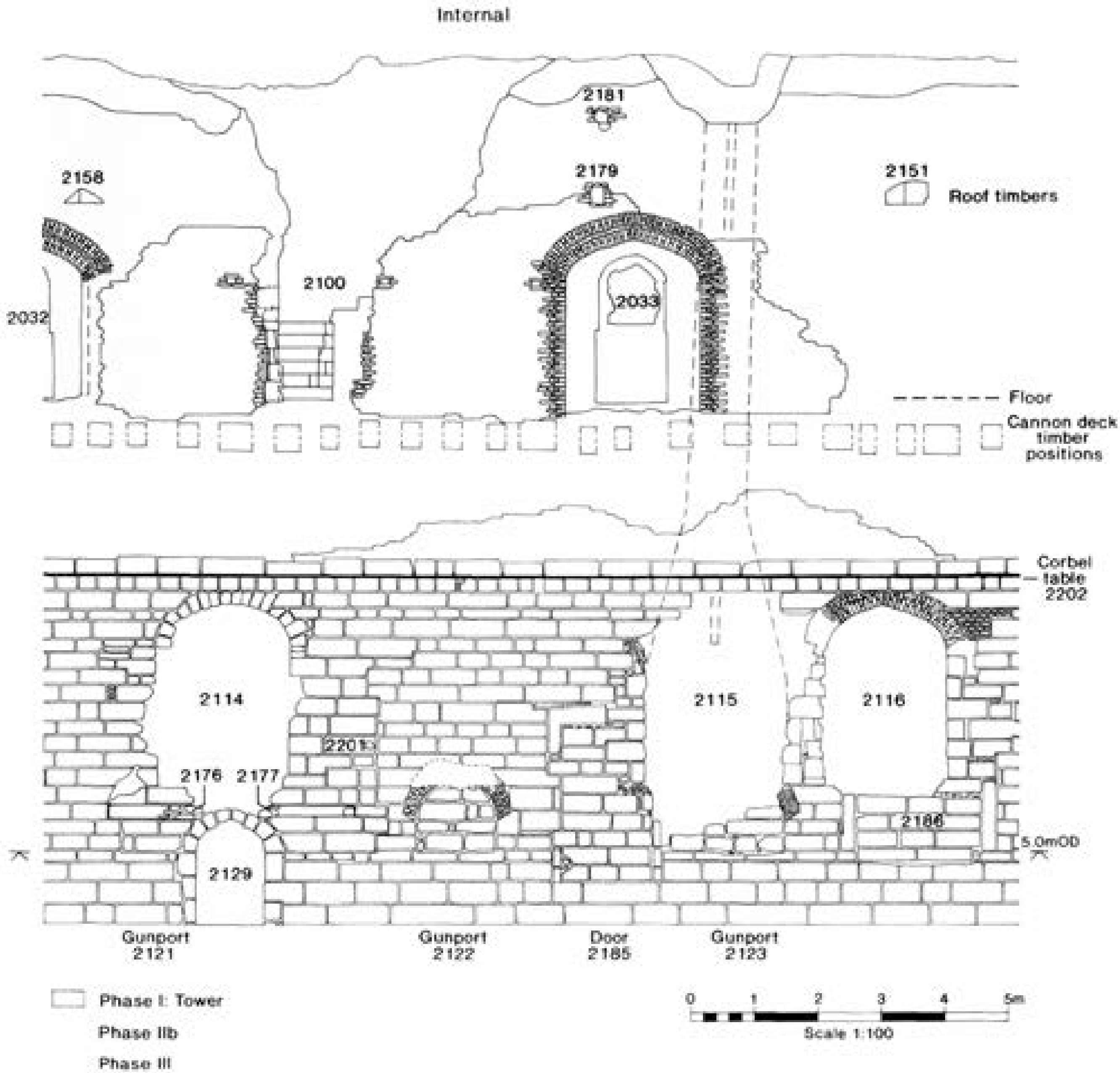


Figure 3.4: The Keep; simplified drawing of internal elevation of WSW sector

(1ft 3in; 4.37 m OD) below the level of the gunport sills (4.75 m OD). The original door jambs were preserved on the south side but mostly removed on the north. The surviving remains suggest that the door had a square head formed, both internally and externally, from pairs of large rectangular blocks and possibly incorporating a recessed arch below, although any evidence for this has been concealed by later blocking. The north half of the door head and the northern door jambs were cut away to insert the jambs of a later fireplace (2115, phase IIb below).

A mural stair led up to parapet level through the thickness of the wall. The lower part of this stair was subsequently blocked, although the upper part was modified and extended upwards through the wall of the tower in subsequent heightenings. The original door to the stair (2201) can be seen as a blocking in the interior wall face, situated some 6 m (19 ft 7 in) to the south-east of the primary entrance.

At the west side of the tower, a former large rectangular recess (2186) in the wall, now blocked, is

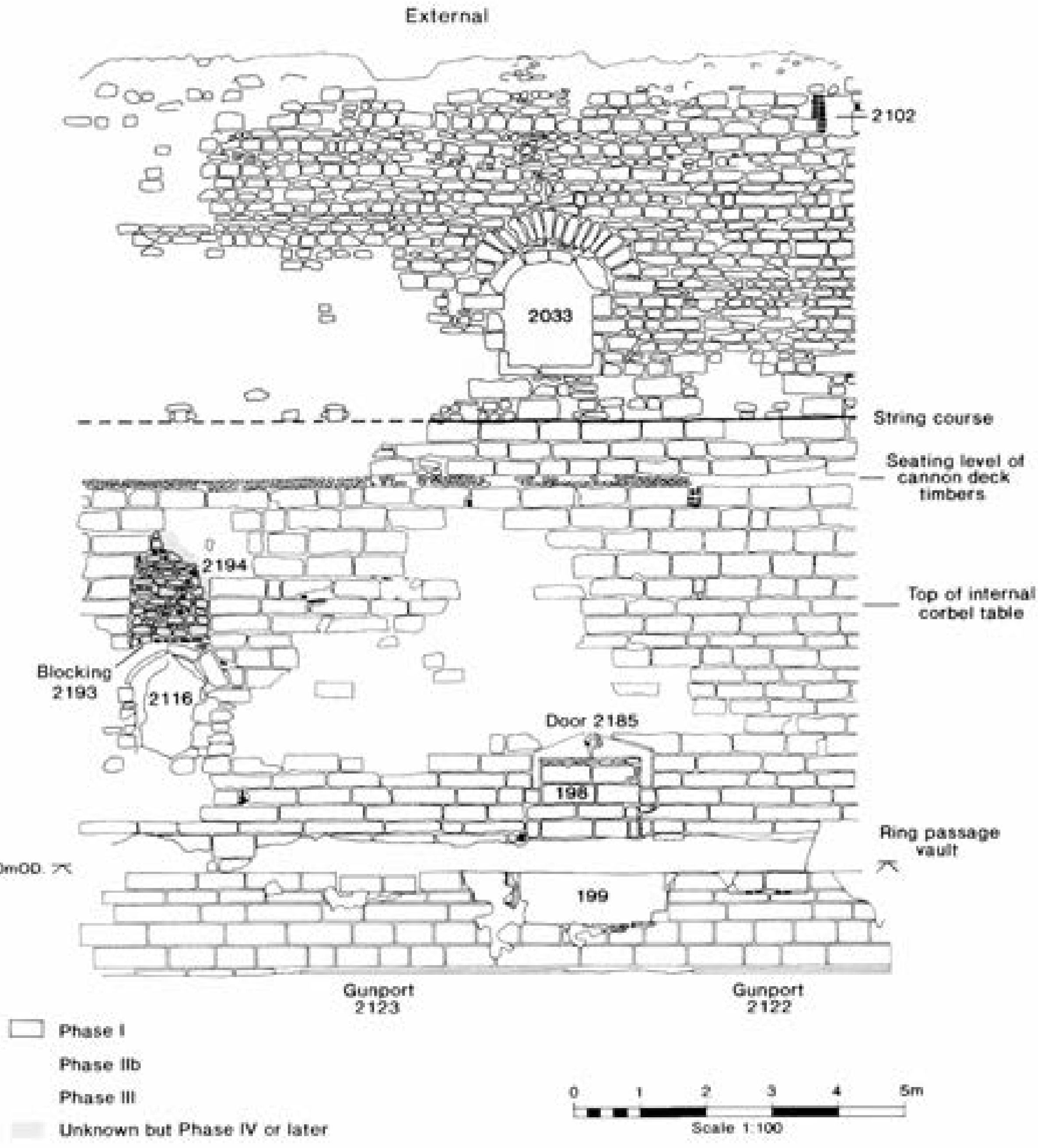


Figure 3.5: The Keep; simplified drawing of external elevation of SW sector

located between two gunports. The recess extends just over 1.1 m (3 ft 7 in) into the wall and is 1.95 m (6 ft 5 in) wide. The opening is not splayed, but straight sided within the wall. The sill of the recess lies 0.15 m (6 in) below the sills of the adjacent gunports. During survey in the 1960s it was recorded that the stone jambs of this feature were decorated with simple roll mouldings, most of which had been destroyed; traces survived on the north jamb, but these have since disappeared. The back of the recess, a reddish-grey colour indicating burning, suggests that it was the fireplace and cooking facility of the primary tower. Hall's study of the architectural stone fragments (see Chapter 4) has identified almost half of a four-centred fireplace arch with a sloping top and moulded bottom with some delicate foliage carving in the spandrel; this may have derived from an original phase I tower fireplace, reused in phase IIb (Hall, Chapter 4, Group 18).

Ten blocked gunports survive in varying degrees of completeness, three of which can be seen in the south-western quadrant of the internal elevation (Fig. 3.4, nos. 2121–2123). The gunports are stone-dressed with brick arches. The bricks measure on average 0.15 x 0.075 x 0.04 m (6 x 3 x 1½ in). The wall ashlars either side of each arch have been cut to form the inclined base of the spring (skew-backs) (see *2122*). Internally the gunports measure 1.25 m (4 ft 2 in) across, narrowing to 0.75 m (2 ft 6 in) within the wall thickness before splaying to 1.25 m (4 ft 2 in) at the outer face of the tower wall. Internally the ports measure on average 1.2 m (4ft) from sill to soffit. The description of the gunports is based on a section through the gunport beside the later doorway to the Vaulted Ring Passage (see Phase IIb below). The blocking of this gunport was emptied by Martin Biddle in 1963. The lintel and east jamb of this gunport are of stone, and it was closed by shutters on iron pintles. The shutters were on the inside of the embrasure and opened inwards. Externally the height of the ports is uncertain due to later structural additions around the tower, but given the unaltered primary stonework above and below the phase II vault, the external height of the gunports cannot have been greater than 0.62 m. The bases of the gunports are at 4.75 m OD.

Water supply and drainage

There is no evidence to suggest that the primary tower was equipped with garderobe facilities, nor is there any definite evidence for a phase I well. Given the need for a water supply in this isolated building, it is possible that the brick and stone-lined well (1329) towards the centre of the tower was constructed in phase I. (The well is described in Phase III below.)

Foundations

The walls of the tower were constructed upon a narrow offset course of stone built upon wider footings. Following construction of the footings, layers of shingle and sand to a depth of 0.6 m (c 2 ft) were dumped against the base of the tower on the outside, to consolidate the ground level. They included a thin layer of construction debris, comprising mortar and stone chips, which had accumulated during building work. No artefacts were recovered from these layers.

Original floor level

The exact level of the original floor is unknown, as there is no evidence for timber sockets in the walls to house joists or floorboards, or marks on the internal tower wall to indicate a suitable level. It is probable that the ground floor was set at or near to the level of the doorway threshold, in which case a level of between 4.3–4.4 m OD can be suggested. There is no sign of steps below the thresholds to the door or the stairs to suggest a lower level. If this level is correct, then the internal floor level was higher by c. 1.3 m (4 ft 3 in) than the external ground level, which lay at *c* 3.1 m OD at the time the tower was constructed. What seems certain is that the primary floor was totally removed and a basement created when the tower was later modified (see Phase IIb below).

Occupation of the primary tower

No finds have been certainly identified as deriving from the construction or occupation of the earliest tower, or from any earlier activity on the site. Almost all finds assemblages contained one or two items of medieval date, including fragments of stained glass window, pieces from the hilts of 13th-century swords, and 14th-century slip-decorated floor tiles. It is highly likely that all these early items were imported accidentally to the site along with the large quantities of reused stone and lead brought from the suppressed religious houses of the area during the castle's construction. There is very little that is specifically datable to the early 16th century, and with the single exception of the medieval jug already noted, all the earliest pottery is of types current from the late 15th century until around 1550. Although some of this material may, therefore, derive from phase I occupation, none of it need do so. A single possibly contemporary object occurs amongst the personal items studied by Scott (Chapter 7, below); this is a gold decorative link from a collar with filigree work and an inlaid cross, which Scott suggests on stylistic grounds is likely to be late medieval or early Tudor in date. Unfortunately, this is equally likely to have been imported accidentally from a dissolved religious house. A number of pieces of brigandine were recovered (Chapter 5, Nos 167–170), a type of armour that was going out of common use around the end of the 15th century. It is possible that the soldiers or gunners were simply equipped with old armour. However, it is clear that the late 16th-century jack of plate armour also found at the castle was constructed in part from reused pieces of brigandine, which suggests that the brigandine may have been imported from anywhere at more or less any point in the castle's occupation, for reuse in this form. Three bills or halberds of late 15th- or early 16th-century form (Chapter 5, Nos 144–146) may be survivals from phase I.

PHASE IIA: THE FIRST CASTLE (1539)

Summary

The reconstruction of Sir Edward's gun tower as Henry VIII's artillery fort of Camber Castle began in March 1539, and its design was the responsibility of Stephen von Haschenperg. The main effort of the building campaign of 1539–40, as Biddle has established (Chapter 2, above), was to turn Camber into a concentric fortification, and the original tower (hereafter referred to as the Keep) was incorporated in the new design. Work started on a large but low-level rectangular Gatehouse to the north-west of the Keep, and the first stages of a Curtain Wall were constructed to either side of the Gatehouse. The Curtain comprised an inner and an outer wall, enclosing a gallery at basement level, which was roofed with timber forming the deck of a shooting platform at parapet level above. A complex system of concealed stairs and subterranean passages was incorporated into the design of these structures, and there was no means of access between the Gatehouse and the Curtain Wall. This phase of work was never completed, and was soon to be substantially modified (phase IIb).

As first built, the Gatehouse appears to have been of a single storey, with an Entrance Passage and rooms to either side. A Vaulted Passage, or Chamber, was constructed leading from the Entrance Passage towards the Keep. This was designed to be a subterranean structure, beneath a raised courtyard, but its original purpose remains uncertain, since its inner part was subsequently blocked by means of a cross-wall, and rubble infilling between the end of the Vaulted Passage and the Vaulted Ring Passage surrounding the Keep (see Phase IIb below). It may therefore originally have been intended as a tunnel running directly between the Keep and the Entrance, although it would have been at a lower level than any point of direct access to the Keep; alternatively, it may always have been intended to serve simply as a secure underground storage room or cellar. If the chamber beyond the Entrance Passage had been intended to give access to the Keep this would have been a weakness giving attackers direct access from the Gatehouse to the Keep, which represented the heart of the castle's defences.

Angled gun loops at basement level within each section, or facet, of the Curtain Wall were designed to provide defensive cover for the Keep. In the angles between the Curtain Wall and the Gatehouse, flights of steps led down from parapet level through the thickness of the outer Curtain Wall to landings at basement level, which gave access into the basement galleries but not into the Gatehouse itself. From the basement landings, further flights of steps led down to a system of subterranean passages constructed beneath the Gatehouse walls. Beyond the Gatehouse, the subterranean passages ran straight out into the open, and must have been designed either as sally ports to launch an attack from within the castle, or to enable the garrison to escape from the castle in the event of its capture.

Plate 3.2: Gatehouse Inner Entrance Passage showing the brick floor and rendered walls of phase IIa; the blocking and stairs are of phase III. (English Heritage/Biddle)

Description (Figs 3.6, 3.7, 3.8; Plates 3.2, 3.3, 3.4)

The first Gatehouse

The first Gatehouse (Fig. 3.6) partially survives within the later and much expanded Entrance Bastion (see Phase IIb, below). It is a rectangular structure comprising an Entrance Passage, flanked by single rooms. The building measures 15 m by 10.5 m (49 ft 2in by 34 ft 5 in). Prior to construction a thick layer of clay was dumped upon the natural beach shingle and the Gatehouse foundation trenches were dug from this level.

The exterior north and south elevations of the Gatehouse are brick-faced with a stone rubble core to a height of *c* 1 m above the present external ground level, possibly indicating that the lower parts of the wall were intended to be concealed within the glacis which enveloped the bastions and early curtain wall in phase IIb. Above this level the walls were probably stone-faced with a core of brick and stone exposed internally. The internal elevations, and the north-west wall housing the main doorway, are also constructed in brick. It is likely that the brick-faced walling represents phase IIa work which did not extend above a single storey.

The Entrance Passage (Plate 3.2) was furnished with a brick floor set at 3.4 m OD; survey evidence indicates that the floors of the rooms either side were at a comparable level. The Entrance Passage floor was constructed on a layer of compacted beach material and was seen in excavation to butt the brick wall of the north room. The wall above the floor was offset *c* 25 mm (1 in) and rendered in white plaster.

The Entrance Passage led directly to the Vaulted Chamber, subsequently blocked and possibly used as a cellar or separate chamber. Its floor was slightly lower than that of the Entrance Passage, at 3.27 m OD. The chamber joins the back wall of the Gatehouse with a straight joint, which might imply that it was added at a later date. However, the brick archway leading to the chamber through the rear wall of the Gatehouse is clearly an original feature, and not inserted. At the time of construction, this archway must have been at the working level of the courtyard, the level from which the Radial Passages and Vaulted Ring Passage (Phase IIb, below) were being constructed. It could thus have functioned as a simple doorway into the working area. However, the fact that the Radial Passages and Vaulted Ring Passage were being constructed to lie concealed beneath a raised courtyard implies that it can never have been the intention that the archway should serve for long as an access into the courtyard, and the construction of a passage from the Gatehouse to the Keep may have been simply another, if misguided, element in the strategy of subterranean access ways represented by the Vaulted Ring Passage and Radial Passages. Figure 3.8 is a 3-dimensional image of the extant Entrance Bastion in its expanded form, but the original Gatehouse can be seen inside the later D-shaped addition; the view is from the north, with the Keep on the left of the page.

Structural evidence for the primary Gatehouse: Within the rooms flanking the Entrance Passage, the phase IIa work

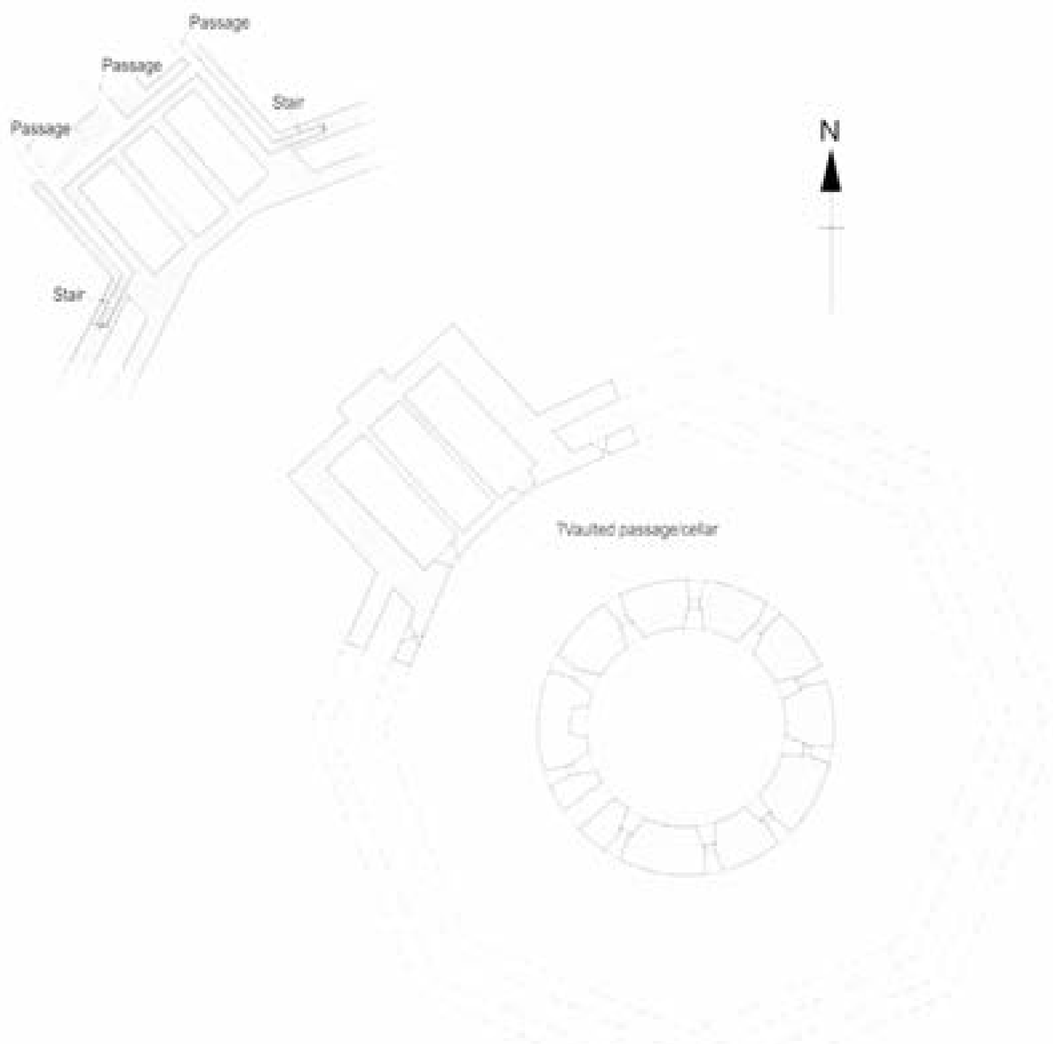


Figure 3.6: The phase IIa Gatehouse and Gallery: plan

includes pairs of brick arched recesses built at ground level in the NE and SW walls. In the SW wall (Fig. 3.7), arch 2464 is 3.7 m (12 ft 1 in) wide and arch 2472 is at least 1.8 m (5 ft 9 in) wide. The lower part of the arches is obscured by the later floor. These arches and the surrounding walls contain a higher proportion of red bricks than in later building phases in other parts of the Gatehouse and castle, where yellow bricks and stone were used, although the wider arch in the NE wall was constructed predominantly of red brick.

Above and between arches 2464 and 2472 on the SW internal elevation there are three joist holes (Fig. 3.7) which are interpreted as the roof or ceiling joists of phase IIa. These joist holes are positioned at 6 m OD. If the joists are correctly interpreted, they provide a clue to the phase IIa floor levels in the N and S rooms, in relation to the level of the floor of the Entrance Passage between the rooms. The excavation in the N and S rooms did not extend below the phase III brick floor.

There is no extant evidence for a primary roof, and this may never have been begun before the design was radically altered. Overall, the structural evidence suggests that the primary Gatehouse may have been a single storey building, rising perhaps to a height of no more than *c* 7 m OD, although there is no obvious break in the masonry at this level.

The Curtain Wall and the subterranean passages

Construction of the Curtain Wall incorporating a basement gallery began with wing walls of brick (Fig. 3.6) that extend for a distance of 5 m (16 ft 4 in) either side of the Gatehouse,

Plate 3.3: Gatehouse subterranean passages; viewed from beneath the front wall, looking west. The photograph shows the high water table that caused problems at the time of construction. 1983 (English Heritage)

Plate 3.4 Gatehouse subterranean passages: flight of steps leading down from the gallery basement landing into the west subterranean passage underneath the Gatehouse, looking north-east. 1983 (English Heritage)

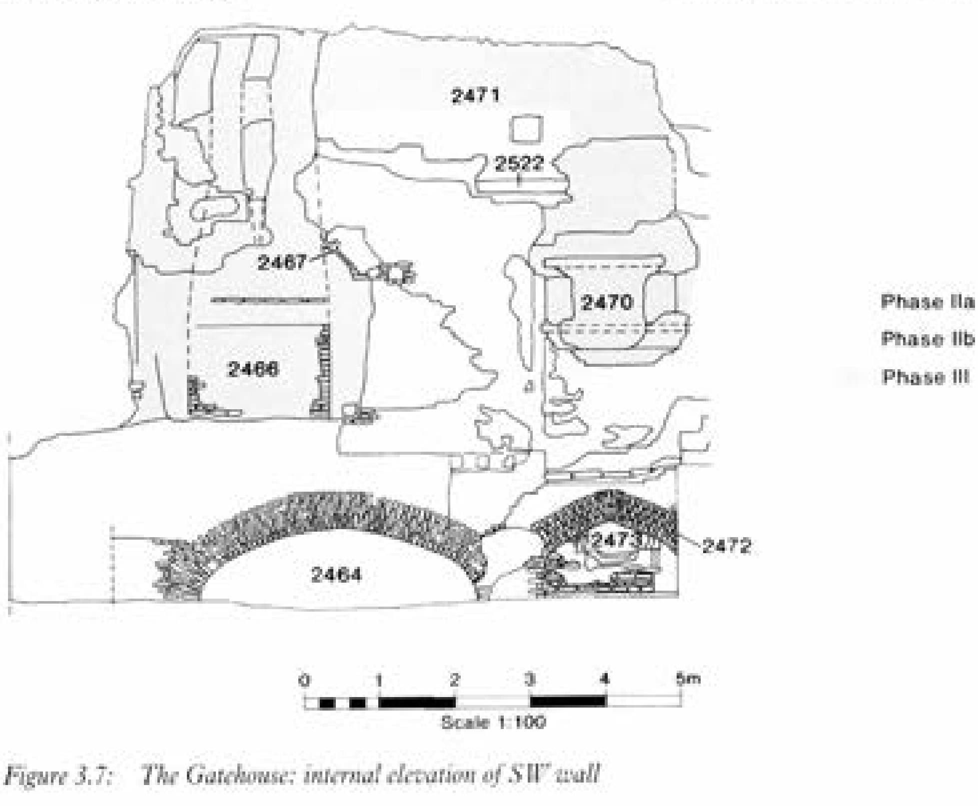


Figure 3.7: The Gatehouse: internal elevation of SW wall

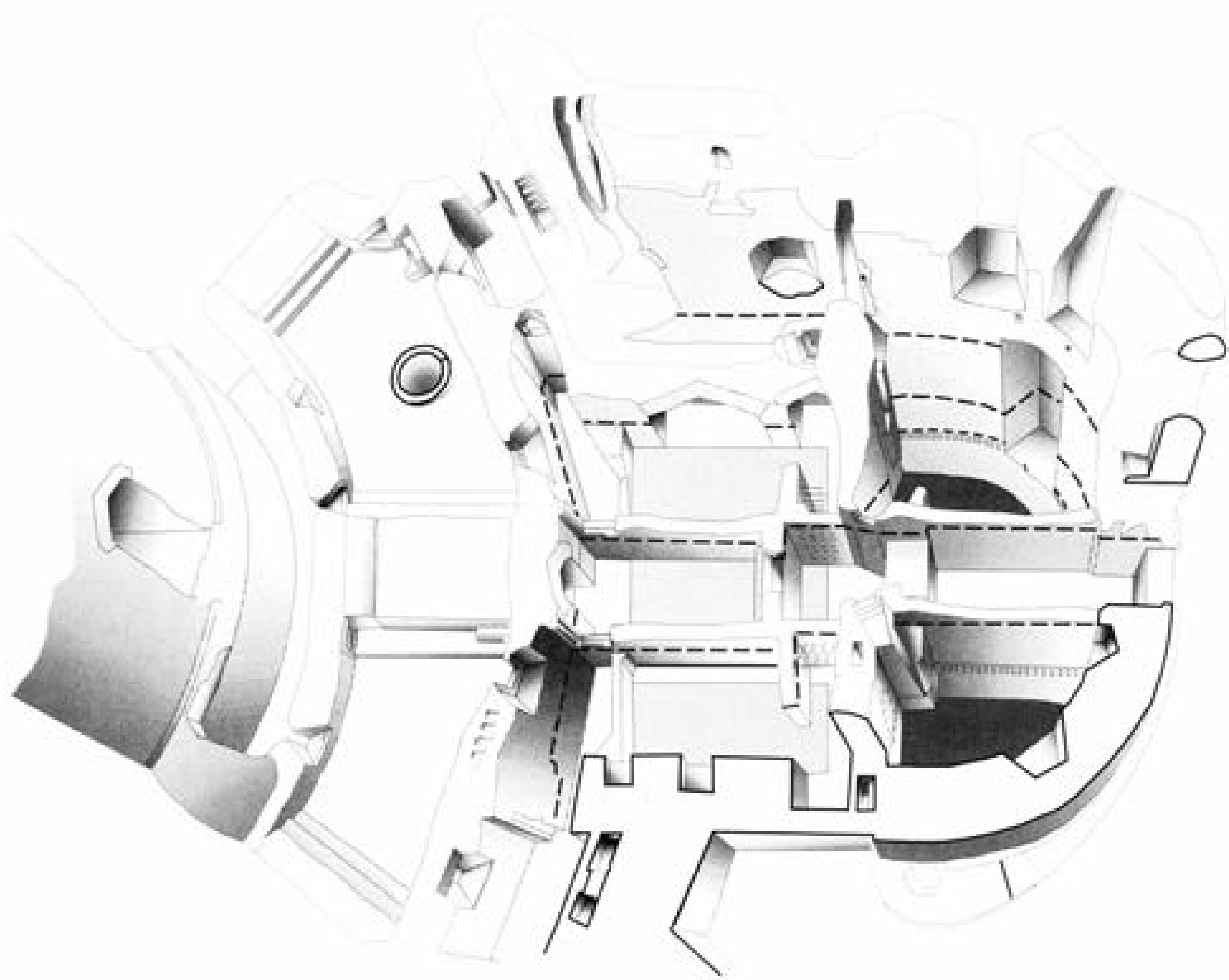


Figure 3.8: The Entrance Bastion: 3-D image of extant structure

but no further. Given that the Gatehouse was probably only a single storey structure during phase IIa, it is likely that the level above the basement gallery was designed as a gun platform with a parapet rather than another enclosed floor. Therefore the subterranean passages beneath the Gatehouse were intended to be immediately accessible from the main defensive platform. In each wing of the Curtain Wall there is a gun loop or embrasure within the thickness of the wall, the bases of which are level with the later courtyard surface, presumably to provide defensive cover for the Keep. The reveals of these gun loops are finished in brick with stone dressings; the brickwork is similar to the walls themselves suggesting that the gunloops were part of the original build of phase IIa, but it is conceivable that they were altered in phase IIb.

As built, there was no access from the Gatehouse to the basement galleries, as the walling originally ended at a blank wall on each side. Access between the galleries was via a system of hidden passages at a lower level, extending around the Gatehouse in the thickness of its walls, and opening into the galleries. The basement galleries were completed in stone in phase IIb (Plate 3.3, see below).

At the north and west angles of the Gatehouse the subterranean passages originally ran straight out into the open, but they are linked by a cross passage under the front wall of the Gatehouse. A third opening from this passage extended in front of the Gatehouse beneath a rectangular projection. This may have been the footing for a porch, or even a more elaborate structure such as a bridge. However, no evidence for this has been recovered. All three passages were extended underneath later building additions.

Structural evidence for the basement galleries: The basement level doors onto the staircase landings were subsequently blocked. This provides a clue to the planned floor levels of the basement gallery. Blocking masonry stands proud of the wall face within the stair-well of the WNW arm of the basement level gallery. Here the approximate position of the threshold of the door into the subterranean passages can be seen 0.2 m (8 in) below the final level of the basement gallery floor, and the door lintel may be seen in the patching of wall plaster above. The doorway would have had an internal height of no more than 1.4 m. The form of the opening at the top of the stairs, onto the parapet level of the Curtain Wall, is obscured by later alterations, but the chamfered end to the passage vault suggests that the opening was a simple rectangle in the floor of the timber shooting platform, probably closed by a trap-door.

Structural evidence for the hidden passages: The WNW passage under the external wall of the Gatehouse has been investigated, by Biddle in 1965 and subsequently by Atkins. They recorded a flight of eleven steps descending from parapet level to a landing at basement gallery level, which originally gave access into the basement gallery through a second opening. From the landing, a further five steps were seen to descend to the subterranean passage beneath the Gatehouse wall (Plate 3.4). The last two steps are angled to pass under the side of the Gatehouse. The passage is 0.75 m (2 ft 6 in) wide, and 1.2 m (4 ft) high at subterranean level. Limited investigation of the NNW passage by Atkins suggests that its openings appear to mirror those of the WNW passage; the passage remains largely blocked by rubble infill.

PHASE IIB (1539–40)

Summary (Fig. 3.9)

The building works ascribed to phase IIb represent the completion, during 1539–40, of Stephen von Haschenperg's concentric fortification, and include the reworking of the incomplete Gatehouse and Curtain Wall described under Phase IIa, above. In its final form, von Haschenperg's castle was a slightly irregular octagon, with a central Keep, and a Curtain Wall incorporating four stirrup-shaped towers positioned at the cardinal points of the compass. The Keep and the stirrup towers were of two storeys, a basement and a ground floor, with a parapet at roof level. The Curtain Wall was initially constructed in the same way as it had been begun (phase IIa), with a basement gallery and a planked gun platform at parapet level above. During 1540, the Curtain Wall was raised by one storey to match the Keep and the stirrup towers, thereafter comprising the original basement gallery, a gallery at ground floor level, and a parapet above. The stirrup towers were fronted by foreworks (see Fig. 3.9) comprising narrow vaulted chambers and semi-circular bastions. At the north-west angle of the curtain there was an enlarged entrance fronted by a D-shaped bastion which appears from excavated evidence to have been built with orillons to either side, to conceal flanking fire. The whole complex appears then to have been enclosed by a glacis, sloping up from an outer retaining wall, leaving only the Entrance Bastion projecting outside. The courtyard was raised and cobbled at approximately the level of the inward facing gunports of phase IIa.

A complicated system of hidden passages was incorporated into this design. The basement-level Vaulted Ring Passage surrounded the foot of the Keep, and four underground radial passages linked the ring passage to the stirrup towers. The stirrup towers were linked to one another by the galleries in the Curtain Wall. The subterranean passages under the Gatehouse (phase IIa) were retained and extended to the front of the new D-shaped bastion. The crown of the Vaulted Chamber intended to be concealed beneath the courtyard, the level of the inward facing gunports of phase IIa, and the possibility of a glacis planned from the outset of phase IIa, all point to an evolving design, elements of which were modified as work progressed in Phases IIa and IIb.

The extension of the Gatehouse and the building of the Entrance Bastion (Figs 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14; Plates 3.3, 3.5–3.8)

Work on the new fortification had begun in 1539 with the construction of a Gatehouse and Curtain Wall (Phase IIa, above). Flaws in the original design must soon have become apparent, however, because the entrance was modified and extended, to a new plan, before it had ever been completed. A D-shaped bastion was constructed projecting *c* 9 m (29 ft 5 in) forward of the original Gatehouse, and forward of the glacis and outer retaining wall, and the subterranean passage beneath the centre of the Gatehouse was extended to the new bastion's outer face. The new entrance thus consisted of the original Gatehouse with its entrance passage (now the Inner Entrance Passage) and North and South Rooms, and a new Entrance Passage and two new rooms (the N and S Quadrant Rooms) in the bastion itself. As work progressed, however, the builders soon began to encounter problems with the high ground-water level (see Chapter 2 above, and Plate 3.3), which apparently forced them to make changes as they worked. Basement level floors that had been installed in the D-shaped bastion had to be raised from 2.3 m OD to a new level at *c.* 3.6 m OD. The basement level was abandoned. This led to a corresponding series of modifications of the original Gatehouse structure. The change in build evident between the extant phase IIa walls of the Gatehouse and the phase IIb walls suggests that the D-shaped bastion was added to the original Gatehouse at basement level, and that the subsequent raising of the bastion and the Gatehouse to ground floor level may have been a change of plan prompted by the need to raise the floors. The floor level of the Inner Entrance Passage seems not to have been raised, but the floors in the N and S Rooms were relaid slightly higher than the newly raised floors in the D-shaped bastion. A new lobby was created in the space at the north-west end of the old Gatehouse, and two flights of stairs were built to lead up to the newly raised N and S Rooms. Both stairs extended upward to stairs constructed in the thickness of the outer walls giving access to the parapet of the D-shaped Bastion. The phase IIa Vaulted Chamber possibly originally leading from the Gatehouse to the Keep may have been blocked at this stage and used as a cellar.

Figure 3.8 is a 3-dimensional image of the extant Entrance Bastion in its final form; the relationship between the abandoned basement levels and the raised floor can be seen in the D-shaped extension. Plate 3.5 shows the internal elevation of the south-west wall of the Entrance Bastion. Features of phase IIb are evident in the lower part of the wall; compare Figure 3.7.

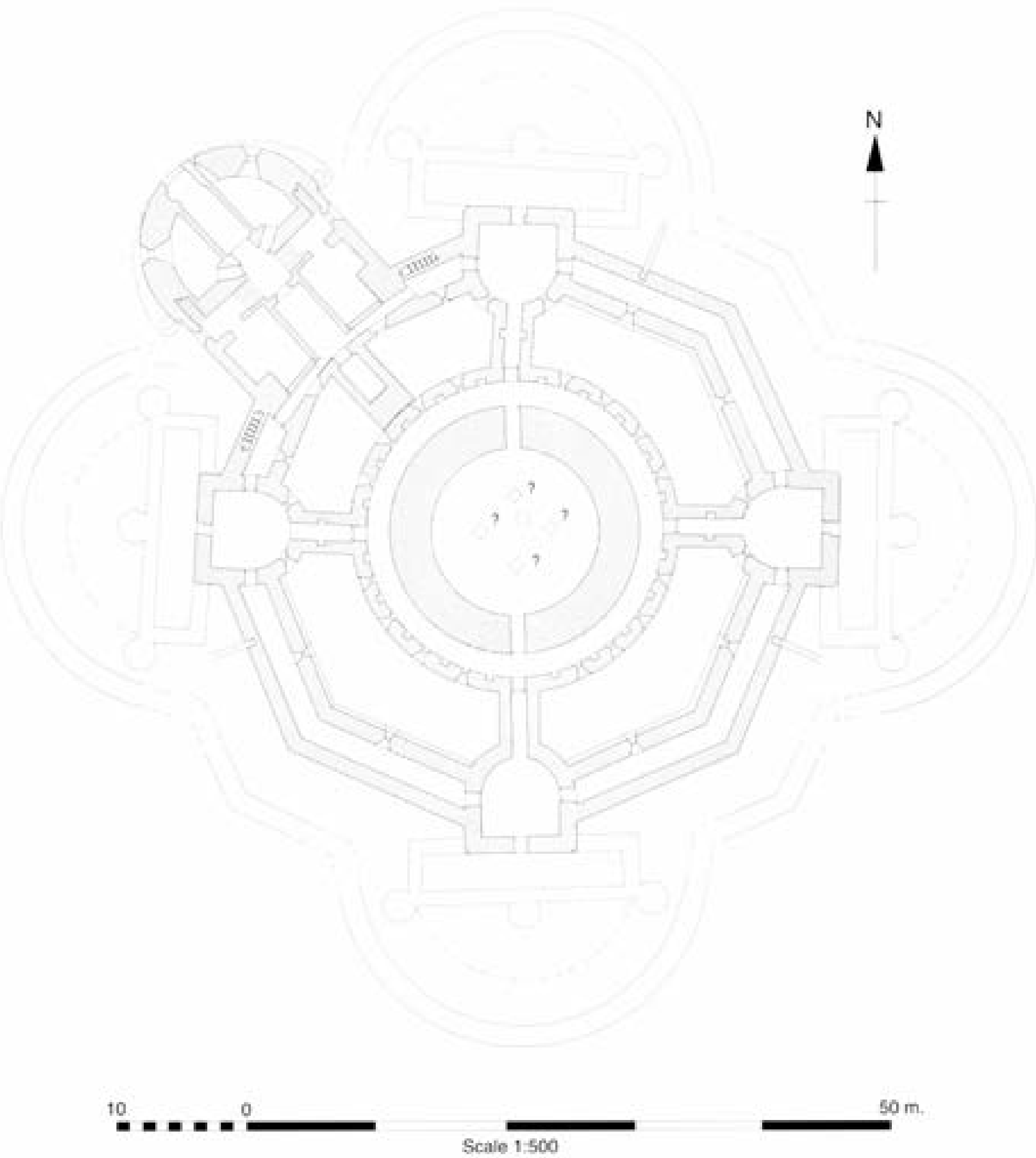


Figure 3.9: The phase IIb castle: basement level plan

Structural evidence

The D-shaped bastion and the raising of the Gatehouse: The phase IIb changes show clearly in the external elevations, and all the phase IIb work, including the bastion and the ground floor above the brick-faced elements of the phase IIa Gatehouse, appears to be of one build. It comprises brick corework faced with mixed stone. A possible change in the construction technique of the D-shaped bastion approximately level with the top of the phase IIa brickwork of the original Gatehouse suggests that the basement level of the D-shaped bastion was added to the Gatehouse prior to the planning and construction of the upper levels. However, this hypothesis cannot be confirmed on present evidence, as much of the structure is not currently visible. The internal elevation (Fig. 3.13) of the D-shaped bastion was brick-built, with stone dressings. The appearance of the original openings here has been much changed by later alterations, and the existing floor levels, which are of a later phase, conceal further evidence for the original form and extent of the openings. The original outer entrance door was blocked in phase III (below), but has been revealed in the course of excavations in the Entrance Passage and immediately outside. The original door had jambs supporting transverse arches, which were reused at a higher level in

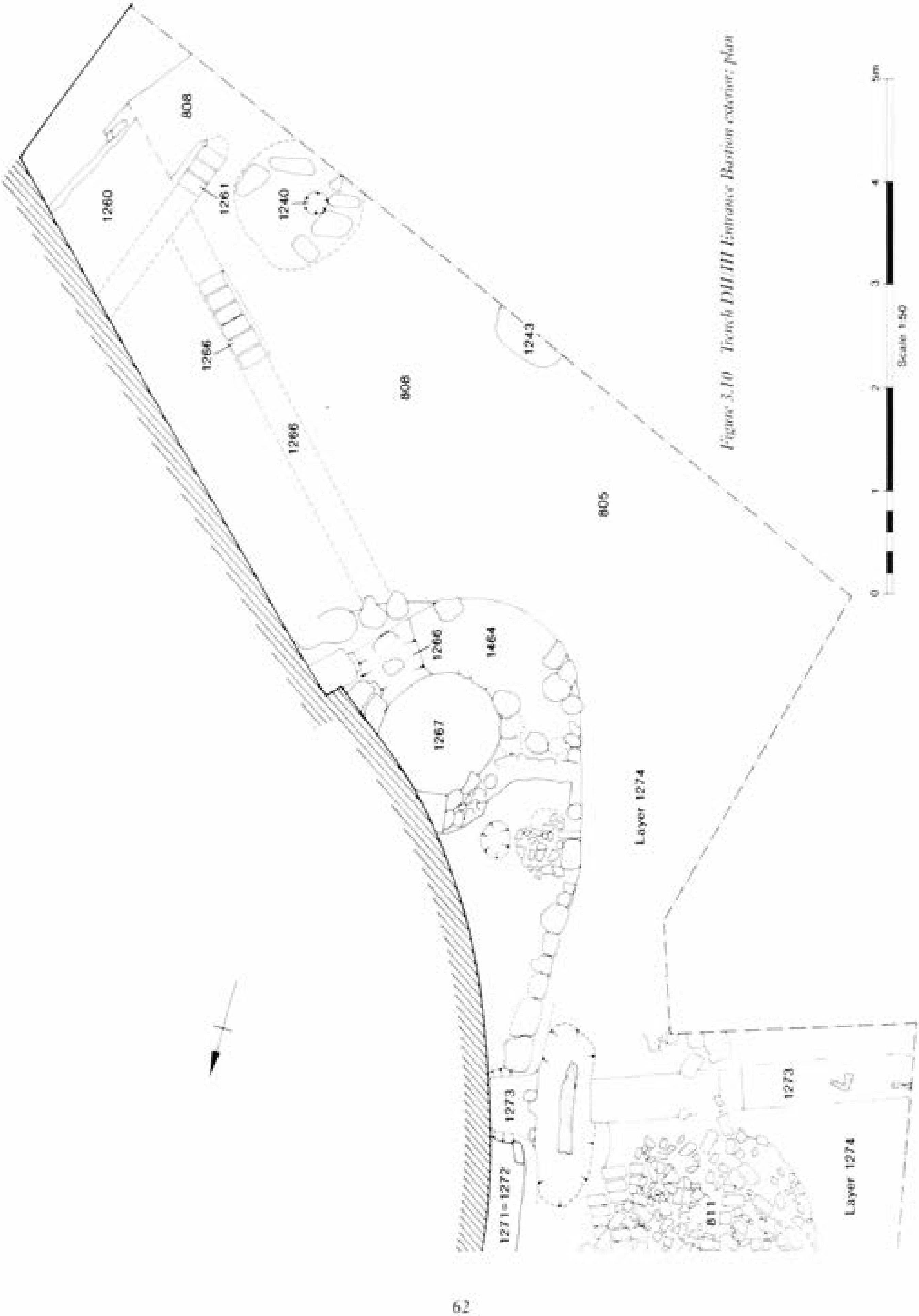


Figure 3.10 Trench DII/III Entrance Bastion exterior: plan

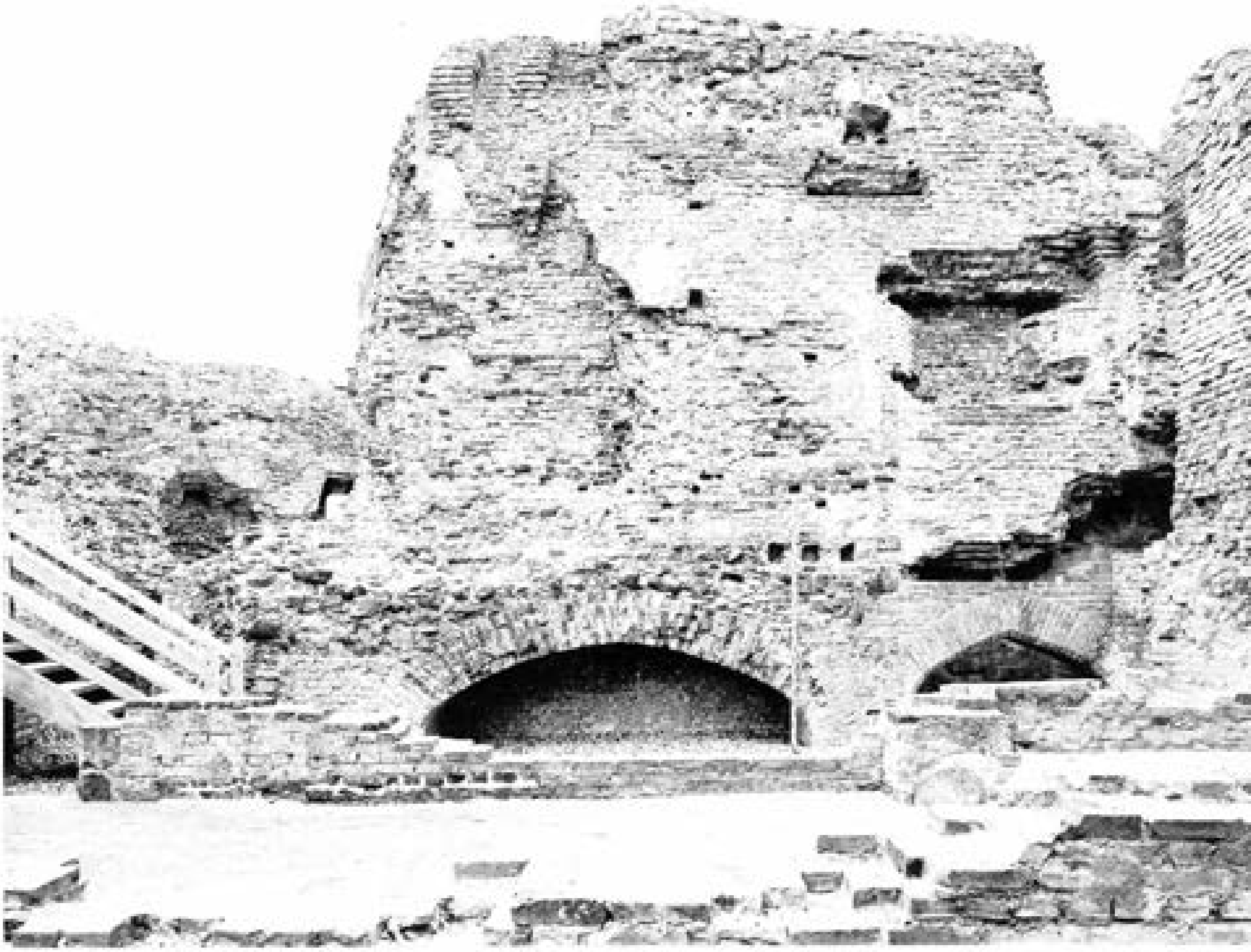


Plate 3.5: The Entrance Bastion, south-west internal elevation, looking south-west. 1998 (English Heritage)

the phase III remodelling. The door threshold must have rested on the top of the subterranean passage, and was seen to consist of a course of red bricks bonded with white mortar. The blocking above is clearly visible and comprises three courses of large sandstone blocks. The two gunports of the original bastion are not now visible in the interior elevation (Fig. 3.13), although their position is indicated by the extant heightened gunports of phase III (2481, 2487), which replaced them. The phase IIb gunports were revealed by excavation (Plate 3.6), and were begun at basement level, and heightened following the raising of the floor; they flanked the main entrance. The only primary feature to survive substantially intact is an angled opening (2525) immediately NE of the door (Plate 3.7). This shows in both the exterior and interior elevations. Externally it has a brick arch, while internally stone jambs clearly delineate an opening smaller than the gunports. No comparable opening exists on the SW side of the door, and the size of feature 2525 suggests that it may have been a gun loop, or more likely a porter's window. The base of the window was approximately 1.13 m (3 ft 5 in) above the raised floor. The doorway between the lobby and the Inner Entrance Passage is represented by a single chamfered stone forming part of the threshold which stands *c* 0.15 m (6 in) above the brick floor.

The modifications to the phase IIa Gatehouse walls are much less clear from the surviving visible fabric, where extensive reworking has clearly taken place on several occasions. The phase IIb work in the SW elevation (Fig. 3.7) has proved particularly difficult to identify, and this part of the structure remains incompletely understood. Above the level of the arched recesses of phase IIa, there is a brick-arched opening (2467) that is likely to be of phase IIb and may have been a fireplace. Different interpretations of this feature have been advanced, and it remains unclear whether it formed part of the fireplace immediately adjacent (2466), or whether it was originally part of a window, possibly for the defence of the angle between the entrance and the Curtain Wall. Atkins has detected possible traces of a similar arch in the corresponding position on the NE side of the entrance, although this is much less clear. A short distance to the NE of opening 2467 are stairs built within the thickness of the SW wall, lit by window 2473 (Fig. 3.14). The stairs led from the original Gatehouse up to the ground floor of the D-shaped bastion, although the point at which they emerged in the bastion is no longer apparent.

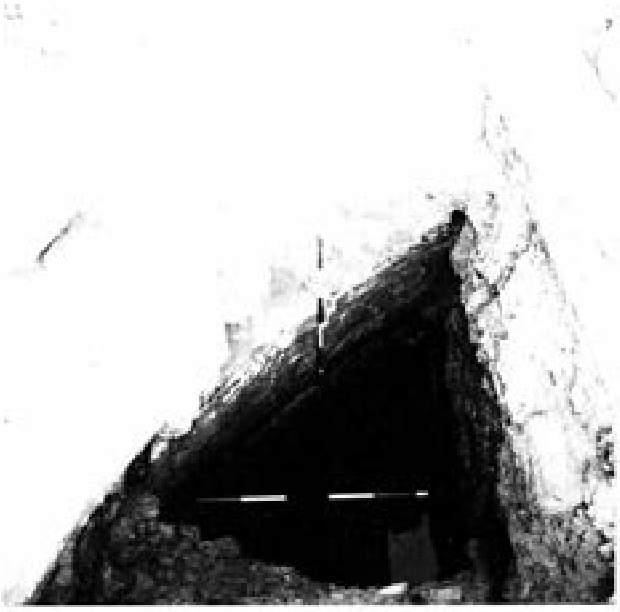


Plate 3.6: The Entrance Bastion N Quadrant Room under excavation in 1965, showing the original sill of gunport 2487 at the abandoned basement level. (English Heritage/ Biddle)

The position of the ceilings of the Entrance Bastion and Gatehouse rooms in phase IIb may be represented by occasional timber positions in the N and S walls above the timber positions associated with the earlier Gatehouse structure.

Evidence from excavations

Excavation has taken place within and immediately outside the Entrance Bastion and Gatehouse, with the aim of elucidating the structural sequence and clearing the buildings of fill for display (see Chapter 1). As a result, the buildings have generally been excavated down to the latest (phase III) floor levels but not beyond, and evidence for phase II is available only in limited areas where trenches were opened to investigate the lower levels.

The South and North Quadrant Rooms: Excavation in the S Quadrant Room revealed the sequence associated with the construction of the earliest basement floor of the Entrance Bastion, and the subsequent raising of the floor level and abandonment of the basement because of problems with the high ground-water level. The first timber floor was identified at 2.3 m OD. There was evidence in the form of surviving tar or pitch, for the caulking of this floor. The timbers abutted the side of the subterranean passage under the bastion, at a level approximately 0.3 m (1 ft) above its base. The top of the subterranean passage was recorded at 3 m OD. The earliest floor had then been sealed by a dumped layer of black beach material containing building debris including wood chippings, bricks and iron nails and probable contemporary refuse in the form of pottery and animal bone. A thick layer of clean beach material had been laid over the top, prior to the installation of new joists for the raised floor the top of which lay at 3.58 m OD. The joists rested on the internal wall footings and were inserted into sockets in the external wall. Some of the joists were seen to be laid on the floors of the new gunports, which had clearly already been started. Footings for the wall of the Entrance Passage were built on the roof of the subterranean passage. An identical sequence of construction was found in the North Quadrant Room, with the second timber floor laid at 3.62 m OD (Plate 3.8).

The construction of the Entrance Bastion: The evidence from excavation outside the bastion (Trenches DI–III and external 1960s trench; Figs 3.10-3.12) suggests that a

Plate 3.7: The Entrance Bastion N Quadrant Room under excavation in 1965, showing opening 2525, the possible porter's window. (English Heritage/Biddle)

Plate 3.8: The Entrance Bastion N Quadrant Room under excavation in 1965, showing the sequence of floors. (English Heritage/Biddle)

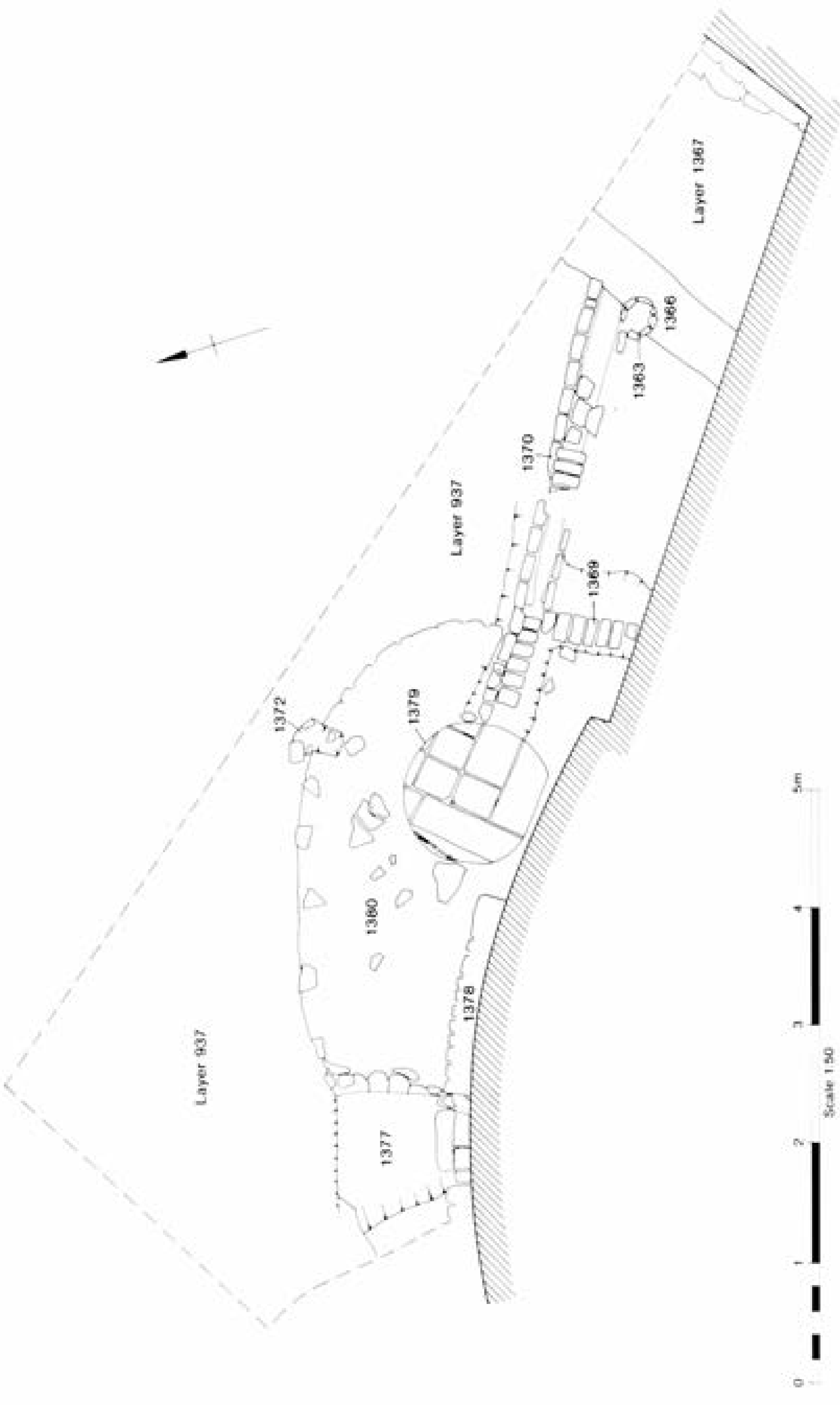


Figure 3.11: Trench DI Entrance Bastion exterior: plan

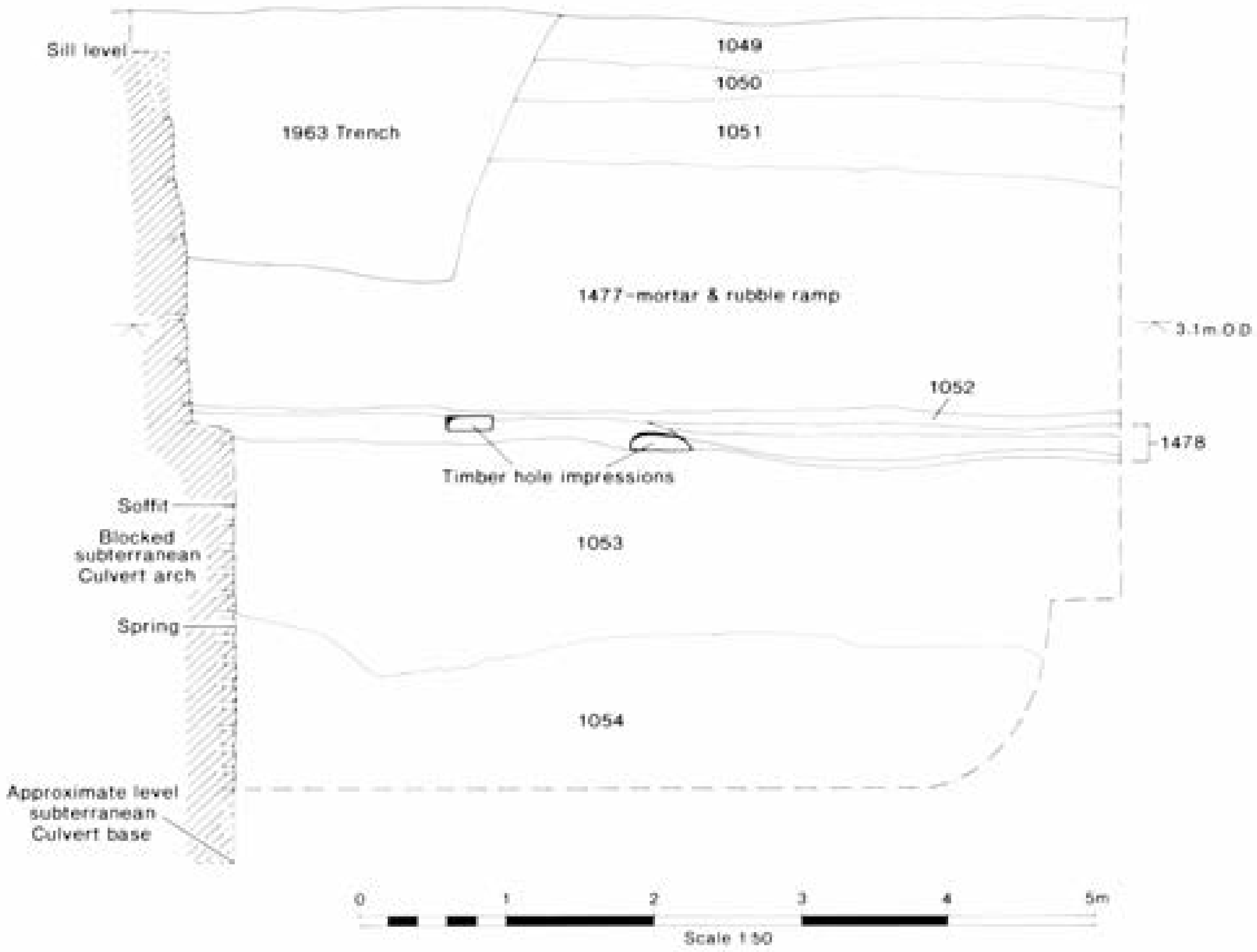


Figure 3.12: Section of 1965 trench outside N wall of Entrance Bastion

massive trench was dug where the new walls were to be built. The extent of this trench was not established within the excavations, but it was dug from ground level (presumed *c* 3 m OD, as today) to a working level at a depth of about 1.8 m (6 ft). The bastion was built upon an offset footing (1271=1272=1378) over a mortared stone raft (1380=1464) which extended out either side of the new building. The foundations of the bastion extend for at least *c* 1 m (3 ft 3 in) below this level, but the high water level prevented excavation to their base. The opening of the subterranean passage was recorded at the face of the footings, and it was shown to be entirely contained within the building foundations, the base of the footings lying below the floor of the passage. After construction of the bastion, the massive trench was infilled with beach material. The fact that this open passageway existed below the front door must imply that the construction trench was left partially open at this point, probably bridged at ground level. This would have allowed escape from the subterranean passage beneath the bridge. Two timbers were seen during the excavation of the working level for the bastion foundations. These may derive from a timber bridge, or alternatively they may have formed part of the scaffold or frame used to construct the bastion.

Entrance Bastion external drainage network

External excavations showed that the stone raft underlying the footings of the Entrance Bastion terminated in expanded curves at the point where the bastion had been joined to the front of the Gatehouse (Figs 3.10–3.11). It is clear that they incorporated integral sumps that appear to predate the construction of the D-shaped Bastion. However, they were never raised beyond foundation level, and Biddle's analysis has shown that they may derive from an abandoned design for the Entrance Bastion incorporating orillons covering the angle between the bastion and the Curtain Wall. Whatever their original purpose, they were soon integrated into a complex arrangement of drains and sumps to either side of the Entrance Bastion.

Drainage: On the NE side of the Entrance Bastion, at the point where the new D-shaped bastion had been added to the NE corner of the phase IIa Gatehouse (Fig. 3.11), the stone raft (1380) underlying the bastion footings was observed to terminate in an expanded curve. Integral to the structure of the expanded curve was a sump (1379) equipped with a flagstone base and an iron grille

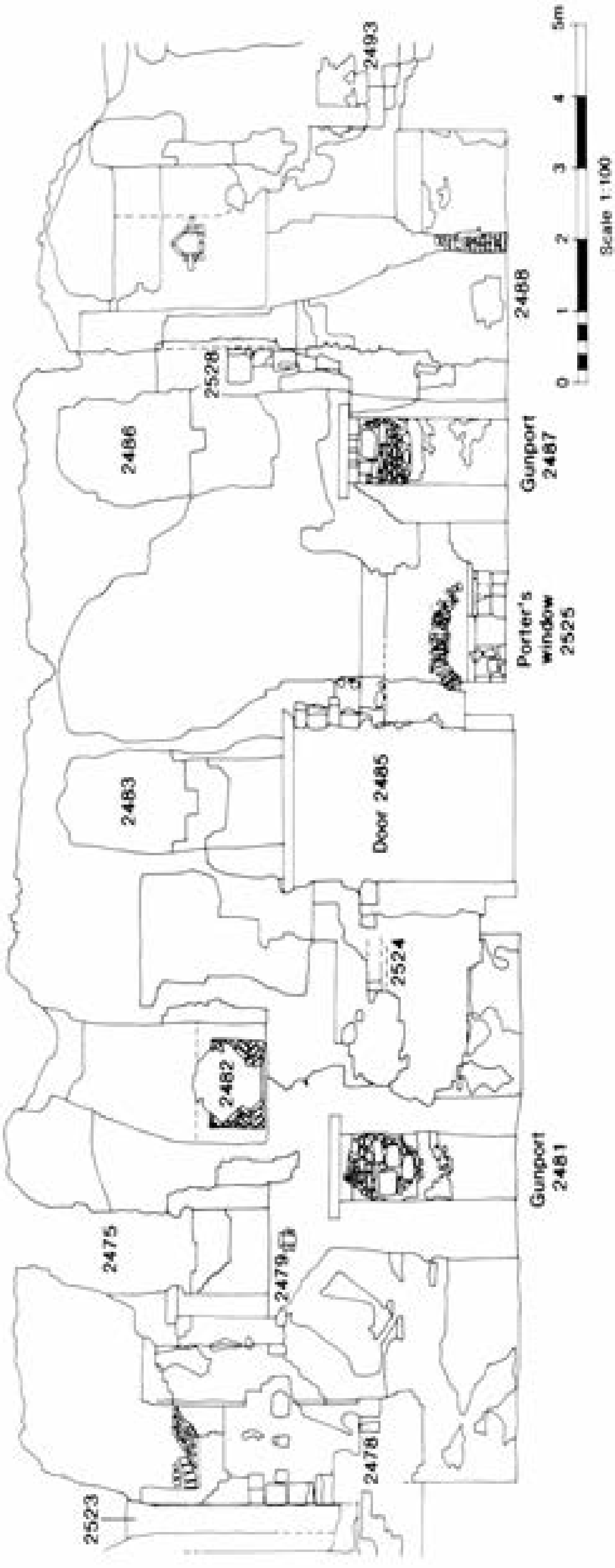


Figure 3.13: Entrance Bastion: internal elevation

separating it from the outfall of the northern subterranean passage beneath the original Gatehouse. The sump was also fed by an external brick-built drain containing a lead pipe (1370), which ran alongside the NE wall of the Gatehouse. A line of bricks (1369) at right angles to the drain extended beneath the phase IIa Gatehouse, and may represent a further drain. The SE end of drain 1370 was blocked by a linear mortar concretion (1366) which extended under the phase IIa Gatehouse, and may have been robbed brickwork of another drain. It is possible that these brick drains were never finished before the D-shaped Bastion was built.

These arrangements were mirrored on the SW side of the Entrance Bastion (Fig. 3.10), where stone sump 1267 was observed within a similar curved terminus of the stone raft (here 1464), adjacent to the junction between the original Gatehouse and the D-shaped extension; the sump appeared to extend beneath the D-shaped Bastion foundations. The subterranean passage below the SW wall of the Gatehouse emptied into the sump, as on the N side. At this single point, the outflow from the southern subterranean passage was roofed in timber, undersealed with lead, in contrast to the brick vaulting used in the rest of the passage system; the reason for this is not apparent, but may suggest an attempt at waterproofing. A brick drain (1266) extended alongside the phase IIa Gatehouse SW wall, and fed into the top of the sump. Another brick drain (1261) aligned N-S parallel to the WNW Curtain Wall was bonded to 1266 and extended beneath the phase IIa Gatehouse wall. Drain 1261 terminated soon after the junction with drain 1266. The layout of these drains almost exactly mirrors the arrangement of drain 1370 and the mortar feature 1366 to the N of the original Gatehouse.

The fact that these drainage installations extended beneath the Gatehouse, and beneath the foundations of the D-shaped bastion, must imply either that the drains predate the Gatehouse (which is unlikely) or that they were built as an integral part of the first Gatehouse design and incorporated into the changed design for the Entrance Bastion. The possible orillon bases could represent an intermediate stage of design, at which point it was intended to provide the Gatehouse with concealed flankers. There is no evidence that these orillons

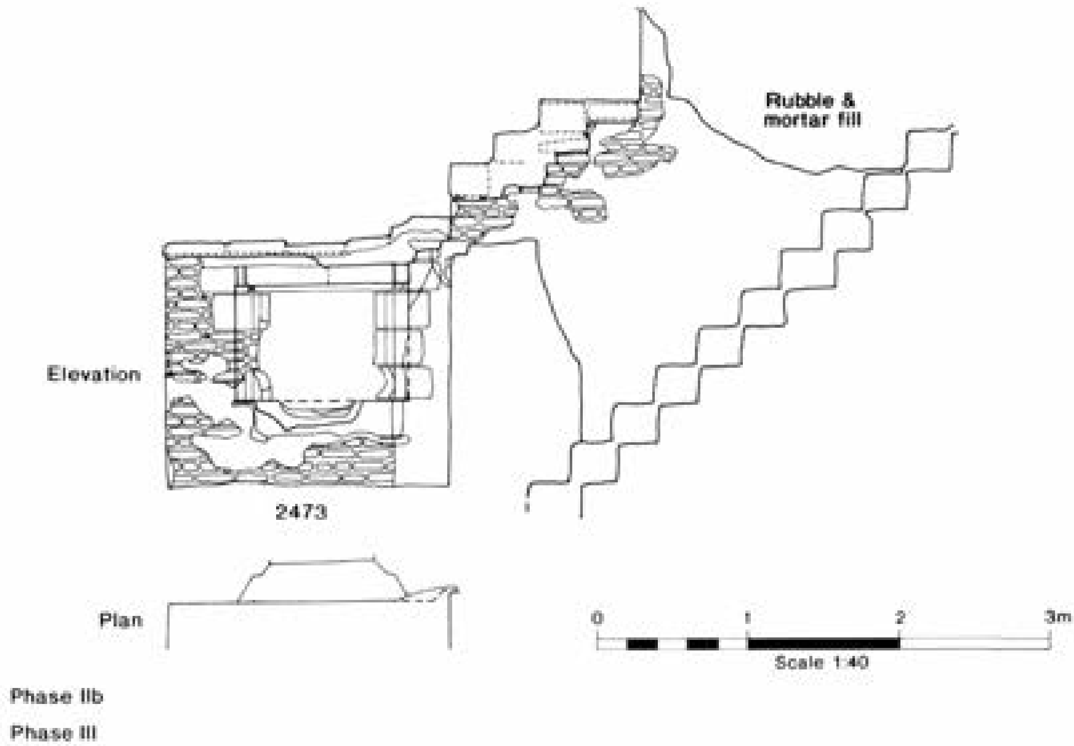


Figure 3.14: Entrance Bastion internal elevation: detail of stair

were ever raised above foundation level, and once a curved bastion had been constructed, they would have served no purpose.

The Keep (Figs 3.4, 3.5, 3.9, 3.15, 3.16, 3.17; Plates 3.9–3.14)

Sir Edward Guldeford's original circular gun tower was remodelled as a Keep with a basement, a ground floor and a roof-level cannon deck. The existing ground floor was removed, all the openings were blocked, and the interior was lowered by just over 1 m (3 ft 3 in) in order to create a basement (see Fig. 3.17 for a reconstruction of the section of the phase IIb Keep, showing the new floor levels). The new ground floor was installed at 5.96 m OD, some 1.5 m (4ft 9 in) above the presumed level of the original ground floor; the basement room thus created was at least 2.5 m (8 ft) high allowing for flooring material. The timbers of the cannon deck were installed at 11.55 m OD, 5.5 m (17 ft 8 in) above the new ground floor, 2 m (6 ft 6 in) above the original roof level represented by the corbel table, at the level of the original string-course. At basement level (Fig. 3.9), openings were created to the north and south, giving access into the Vaulted Ring Passage (Plate 3.9; see below). The openings at ground floor level are less certain in this phase, and it seems likely that further major alterations were carried out during the final heightening of the Keep in 1542–3 (Phase III, see below).

At least three openings, large gunports or windows, were definitely inserted in the phase IIb heightened wall, at the east, west and south (Fig. 3.15; Plate 3.10). These have splayed reveals containing arched recesses or seats. To the north is a door with ashlar reveals and a four-centred arch of brick, which is substantially larger than the gunports or windows and remains a striking feature (Plate 3.11). It has been generally assumed that this door was the principal entrance to the Keep during phase IIb. However, further research into the structure of the phase IIb cannon deck (see below) suggests that a second, smaller door (Plate 3.1) between the principal door and the west window/gunport (Fig. 3.15) may actually represent the phase IIb entrance, replaced within a couple of years. The smaller door is directly aligned with the Entrance Bastion, and moreover allows access for loading of ordnance to the north-west side of the central timber frame of the cannon deck, rather than giving awkwardly onto its northern corner post. In phase III the cannon deck was modified when an upper storey was added to the Keep.

A steep and narrow flight of stairs in the thickness of the wall opened off the south window (Plate 3.12), and gave access to the new cannon deck above. This reused and extended part of the original phase I stairs from the new ground floor level; below ground floor level, the stairs were blocked. Access to the basement must have been by ladder. A new fireplace was built at ground floor level (Plate 3.13). Evidence was recovered for the form of the floors and the cannon deck. At basement level

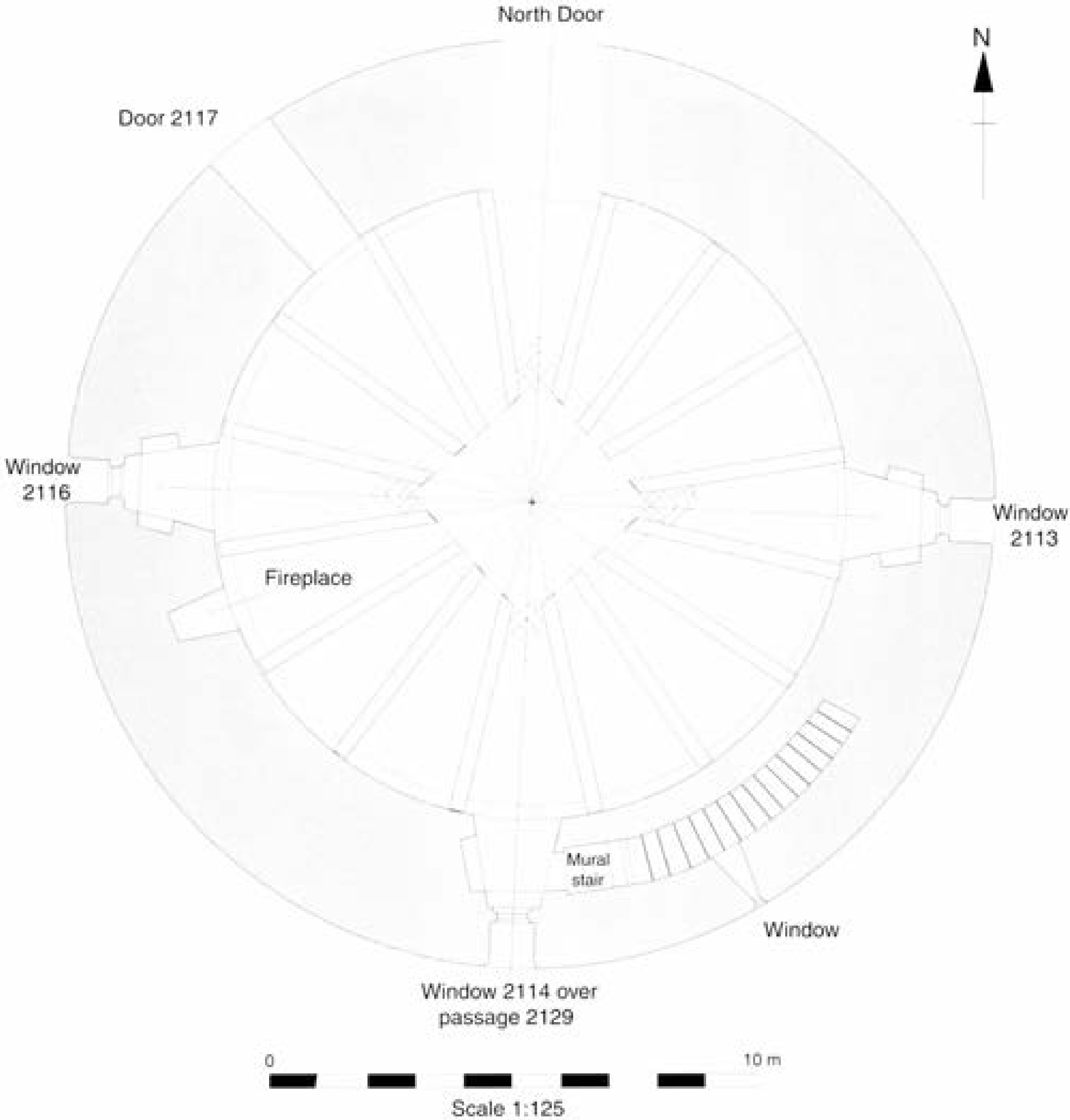


Figure 3.15: The Keep: ground floor plan with reconstruction of timber floor

there may have been a floor of stone slabs set on a mortar surface. At ground floor level, the floor was supported on 16 radial joists supported by sixteen posts rising from the basement. At roof level, the cannon deck (Fig. 3.16; Plate 3.14) was a very substantial structure consisting of 62 large timbers housed within the wall, supported by struts resting on the original corbel table. The housings are still clearly visible today as a ring of regular rectangular openings set into the yellow brickwork. The cannon deck was supported by a square frame set on four great posts.

Four large pier bases of chamfered stone were found at the level of the later phase III Keep floor (see below), and it is possible that they were inserted to replace rotted timber. It seems probable that this frame would have incorporated a hatch at cannon deck level, so that it could be used for hoisting cannon onto the roof; no direct evidence of this hatch survives. The square frame is likely to be the specially made timber structure 'for the greatt towre' referred to in the documentary sources (Chapter 2, above).

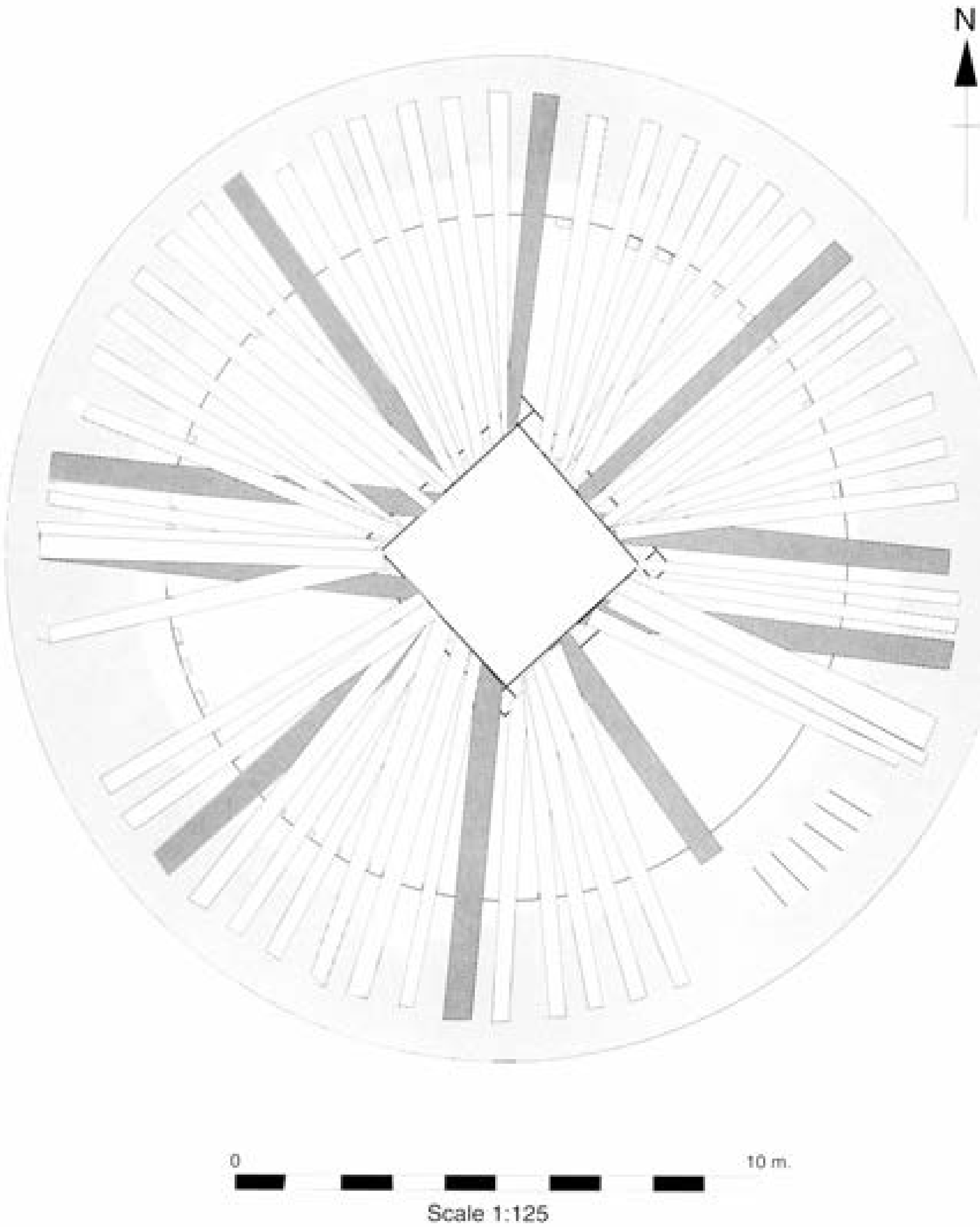


Figure 3.16: The Keep: reconstruction of cannon deck timbers

Structural evidence for the phase IIb Keep and floors

The Keep: On the exterior elevation (Fig. 3.5), two courses of yellow bricks mark the location of the original string-course. Above this are two courses of large yellow sandstone ashlars, with the resited string-course above them. Above the string-course are the outlines of crenellations consisting of up to three courses of large yellow sandstone, which contrasts with the small grey and yellow sandstone coursing of a subsequent building phase. On the corresponding part of the internal elevation (Fig. 3.4) the wall has a yellow brick face incorporating the bed of the cannon deck timbers, which lies at the same level as the double course of bricks (former string-course level) on the exterior face. Where the wall core is visible, the external evidence for phase IIb crenellations is confirmed by a stepped profile in the wall above the cannon deck timber positions.

Plate 3.9: The Keep: view from the N Stirrup Tower showing the basement level entrances (north, foreground; south, background) from the Keep into the Vaulted Ring Passage and Radial Passages. Also visible in the surviving wall face are a blocked recess for a decorative plaque, the resited string course, and the two courses of yellow (here shown as light) brick representing the original string course level of the phase I Tower. 1998 (OAU)

The ground floor was furnished with windows facing E, S and W (2113, 2114, 2116). Internally these were splayed with recesses or seats set in the reveals. On the exterior face, the jambs are chamfered, and the windows have arched heads with hood mouldings and recessed rectangular panels, later blocked. Biddle suggests (Chapter 2) that these would have been designed to take the royal arms. To the N is the impressive doorway (2118) with ashlar reveals and a four-pointed arch of brick. This door has generally been interpreted as the principal entrance of phase IIb, but it may have been a later, phase III addition, since it would have been set at a very awkward angle to give access into the Keep for ordnance prior to lifting onto the gun deck. The possibility remains that the original entrance to von Haschenperg's Keep was a second door (2117) set into the NW sector of the Keep wall, between door 2118 and the W window 2116. The door has a brick soffit but the jambs are missing; externally there is a depression visible in the wall above the door, which suggests that here too there was originally a panel with the royal coat of arms.

The W window 2116 was inserted through the blocked recess, or fireplace, 2186 of phase I, and can be seen in both the external and internal elevations (Figs 3.4, 3.5). The new fireplace, 2115, can also be seen on the internal elevation (Fig. 3.4), built into the blocked phase I door. The blocked phase I mural stair opening (2201) was cut by the construction of the S window, and the S radial passage doorway in the basement, and it is therefore clear that the staircase must have originated in phase I. All the new openings are constructed of similar materials and in similar style, and may be presumed to have been inserted at the same time. There are some variations, however, in the shape and construction materials of the internal arches over the openings, with brick used for the W window and the doors, and stone for windows 2113 and 2114. This could reflect the work of different building gangs, or alternatively suggest a sequence of construction, perhaps mirroring the sequence of construction of the protecting stirrup towers.

Plate 3.10: The Keep, view from the north showing the south window of phase IIb, above the entrance to the Vaulted Ring Passage. Also visible, above the window, are housings for the phase IIb gundeck joists. 1998 (OAU)

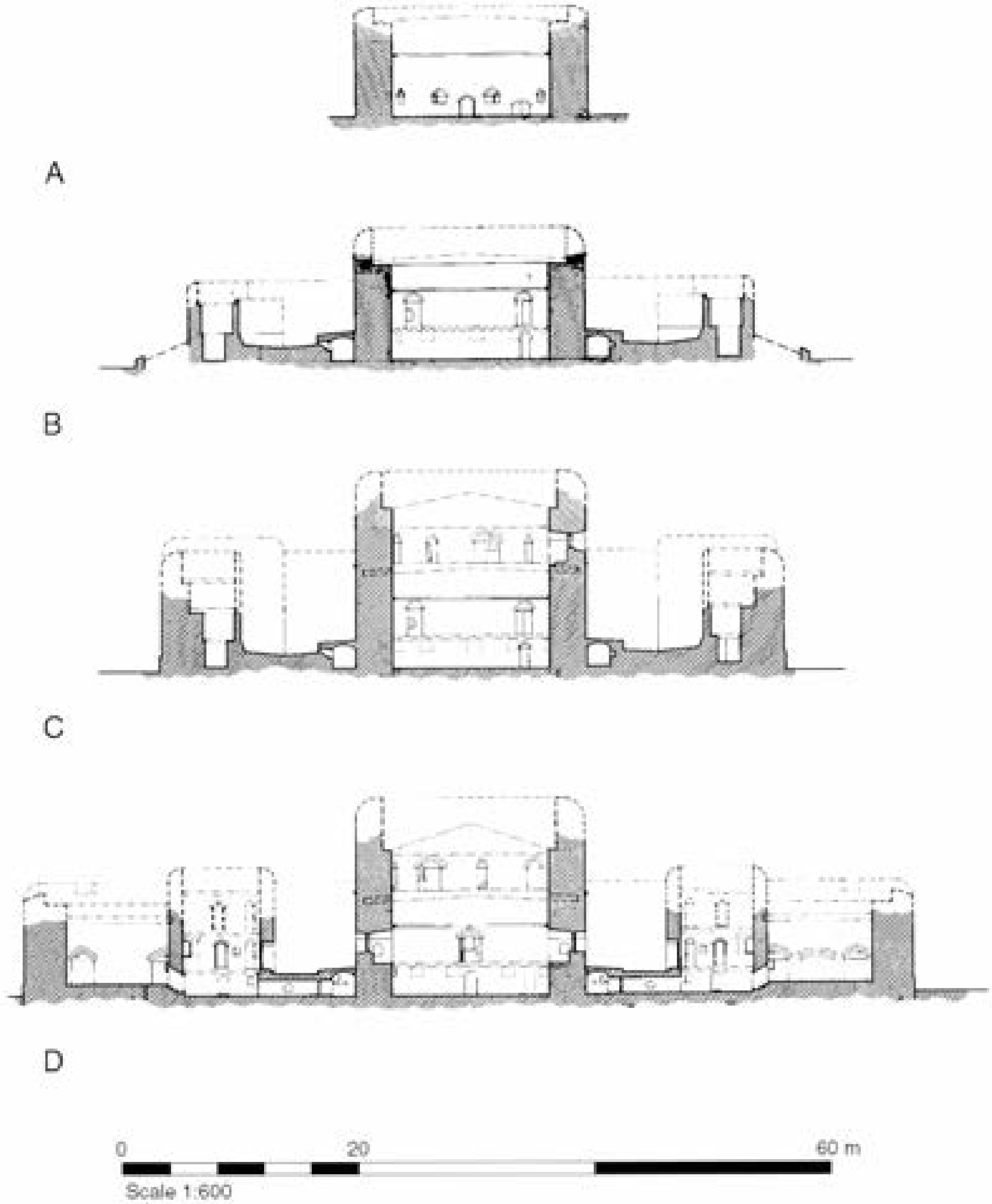


Figure 3.17: The Keep: reconstructed cross-section view showing changing floor levels; A Phase I; B Phase IIb; C and D Phase III (see Fig. 3.2) (from History of the King's Works, Volume IV 1485–1660 (Part II) Fig 31: © Crown copyright material 1982. Reproduced with the permission of the Controller of Her Majesty's Stationery Office)

Floors: Evidence for the basement floor was recovered in the form of a layer of mortar (surface 1412) revealed at 3.06 m OD, 2.9 m (9 ft 6 in) below the new ground floor. It is likely that this layer represents the bedding for the basement floor; in the SE quadrant, a number of stone slabs were found upon this mortar surface set against the outer wall, and these may represent the remains of the floor surface itself.

Above the basement, the new ground floor was constructed approximately level with the soffits of the primary gun ports, at 5.96 m OD. The floor joists were supported on 16 timber posts standing on stone slabs or post-pads around the inner circumference of the wall. The voids of the postpads were respected by the phase III brick floor of the basement (Fig. 3.42). The vertical impressions of some of these posts could be seen in the internal wall face. A clear impression of at least one timber remained as a vertical gap in the white-washed Keep wall, whilst another was clearly raised over a blocked phase I gunport.

It is likely that the joists radiated from a centrally-positioned square frame supported on posts in the centre of the building (Fig. 3.15). Whilst there is no direct evidence for such an arrangement in this building phase, subsequent alterations to the basement floor incorporated a square arrangement of four stone pier bases, and it is likely that these were a modification of a pre-existing arrangement. Assuming that these posts

Plate 3.11: The Keep; view from the south-west showing the principal door. 1998 (OAU)

Plate 3.12: The Keep; the opening for the stairs, looking south-east. 1998 (OAU)

Plate 3.13: The Keep; detail of south-west wall elevation. The replacement fireplace of phase IIb (2115) is visible in the centre of the shot, with the phase IIb west window (2116) immediately adjacent. Below fireplace 2115 is a blocked phase I gunport (2123), and the blocked phase I fireplace (2186) can be seen immediately below the window. The blocked phase Ib door (2185) can be seen on the left of the shot. 1998 (OAU)

extended upwards to the full height of the building, then they probably supported the frame of a hatch within the new roof (the cannon deck), through which cannon and their carriages, and powder and shot were raised and lowered.

The new cannon deck (reconstructed in Fig. 3.16) consisted of 62 large timbers housed within the wall, in massive beam sockets. The timbers were positioned 2 m (6 ft 6 in) above the original corbel table. Most were between 0.23 m (9 in) and 0.3–0.37 m (12–14 ½in) in width, though some were as wide as 0.53 m (21 in). The width of each timber reflected its function: from the angles of the timber settings it is clear that only 10 of the positions could have housed timbers capable of intersection at, or near, the centre of the building. Although it would have been possible for timbers to span the building completely, it is likely that there was a hatch in the centre of the cannon deck supported on a four-post frame, and therefore that all the major timbers would have been jointed onto the frame of the hatch. The following reconstruction is based on the surviving joist holes in the Keep wall. On an E-W orientation there are two pairs of parallel timbers of substantial scantling spaced approximately 1.7 m (5 ft 6 in) apart centre to centre. On the N–S orientation, single timbers (N and S) rested on the corners of the hatch frame and directly over the supporting posts. Between these timbers on the principal axes there were pairs of timbers aligned NE–SW and NW–SE. These would have been jointed to the sides of the hatch frame, with the whole arrangement supporting the weight of the deck and cannon. The remaining floor timbers numbered 6 in each sector between the main timbers. In addition, between the E–W pairs there were 2 parallel timbers. The holes show that the joists were all angled upward at approximately 3 or 4 degrees from the horizontal towards the central hatch (Fig. 3.16). Although only some impressions survive within the wall core, it is clear that all of the roof joists were secured with slighter, and apparently reused timber boards, including reused door frames. These were laid at right-angles to the joists, within the thickness of the wall. Further support for the roof joists was provided by short upright timbers which rested on the primary corbel table. The 'ghost' impressions of some of these uprights remain in the rendered wall face.

The Vaulted Ring Passage (Fig. 3.9; Plates 3.15, 3.16)

A vaulted annular passage surrounds the base of the Keep. This survives substantially complete on its northern and eastern sides, but the south-western section has collapsed or has been dismantled (Plate 3.15). The inner wall of the passage is formed by the wall of the Keep, and a new outer wall was constructed of reused irregular local yellow and grey sandstones, and ironstone blocks of local origin. The brick-vaulted passage is 1.82 m (6 ft) wide and *c* 2.25 m (7 ft 6 in) high; in its original form it housed 16 gun loops in the outer wall, four in each quadrant. Of these, nine survive intact; some have been deliberately blocked and some have a rubble fill, the date of which is unknown. The loops angle upwards to provide covering fire across the courtyard. The roof of the vault is punctuated by smoke vents, probably originally one for each loop (Plate 3.16). Rectangular niches between the loops were probably lockers to store ammunition or tinder, although the jambs do not have rebates for doors. Of particular note is a caricature figure scratched on the wall plaster (Plate 2.3) which may be of Henry VIII himself, perhaps even produced surreptitiously on the occasion of a royal visit (see Chapter 2, above).

The structural and excavation evidence: Prior to the construction of the passage, the base of the primary tower door was crudely blocked with bricks, and the upper part was blocked with faced ashlars (Fig. 3.5). The primary gunports were closed with the skilful use of large yellow sandstone ashlar blocks. The foundation of the outer wall of the passage was constructed about 0.6 m (2 ft) above the level of the Keep footings, above a layer of shingle and sand which had probably been dumped during the construction of the phase I Tower. The wall was constructed upon a wide footing, offset by *c* 0.4 m

Plate 3.14: The Keep; housing for the phase IIb cannon deck joists. 1963 (English Heritage/Biddle)

(1 ft 4 in) internally and externally. The joints of the wall and roof were galleted prior to being covered with plaster. Internally the footing and shingle and sand layer were sealed by a white mortar layer, which also abutted the wall plaster, and served as the bedding for the yellow brick floor. This floor incorporated two lines of upright red tiles between the bricks, and lay at *c* 3.28 m OD. The soffit of the vault was *c* 2.25 m (7 ft 6 in) above the level of the floor.

The Radial Passages (Fig. 3.9)

Access between the Vaulted Ring Passage and the basement level of the stirrup towers is provided by four vaulted radial passages. The radial passages are constructed of brick and of reused irregular local yellow and grey sandstone, and ironstone blocks of local origin; they are vaulted in brick, with brick floors at a level similar to that of the Vaulted Ring Passage. The walls are plastered throughout internally and have opposing recesses with four-centred heads in the middle of each side; these were possibly for lights. Like the rectangular lockers in the Vaulted Ring Passage, they do not have rebates for doors.

Excavations within the East Radial Passage showed that the height of the passage from the primary brick floor to the soffit was *c* 1.65 m (5ft 6in); the other radial passages had similar dimensions and floor levels, which lay at comparable levels to the Vaulted Ring Passage (c. 3.28 m OD).

There can be no doubt that the ring and radial passage system was the result of a single period of design and construction. Doorways in the north and south walls of the Keep open into the Vaulted Ring Passage, and four primary doorways give access from the ring passage into the radial passages. All the doors opened inwards towards the Keep, although there is little evidence for locking bars. The radial passages open without doors into the basements of the stirrup towers. The whole system thus provides direct access at basement level between the exterior and interior defences.

The Stirrup Towers (Figs 3.9, 3.18, 3.19, 3.20; Plates 3.17, 3.18)

The four stirrup-shaped towers were constructed at the cardinal points of the compass, and were originally of two storeys like the remodelled Keep: a basement and a ground floor, with a platform at roof level. Each consists of a curved wall and a straight front wall (hereafter called the chord wall). The stirrup towers were subsequently modified in the last building campaign of 1542–3, when they were incorporated into the large North, South, East and West Bastions (see Phase III, below). Three of the four stirrup towers have been excavated, and the evidence suggests that they were all originally built to a consistent plan (Fig. 3.18). The S Stirrup Tower was not excavated, and remains partially buried, although some evidence is visible for its upper level; it is likely to mirror the basement and ground floor arrangements in the other towers.

The walls are constructed of reused, irregularly shaped yellow and grey sandstones, and ironstone blocks

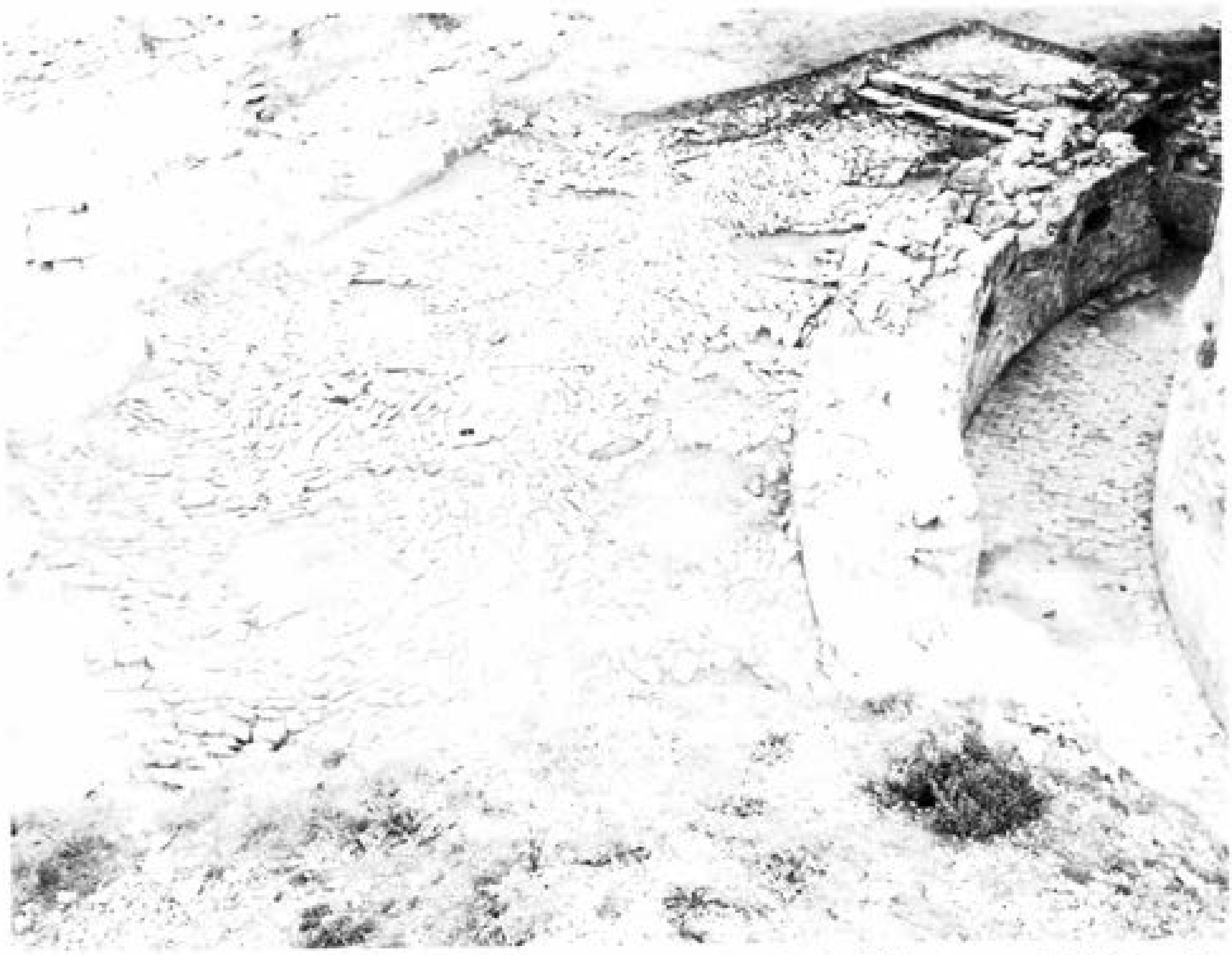


Plate 3.15: The Courtyard and Vaulted Ring Passage; south-western section showing cobbling of courtyard with drain, and the interior of the passage at the point where the original roof structure has gone, looking north. 1983 (English Heritage/Sheppard)

of local origin. There is a consistent difference between the basement and ground floor levels; larger stones are used at ground floor level in the external elevations, and internally at ground floor level the walls are faced with yellow brick. Owing to the lack of arrisses and the inconsistent size of the materials, galleting of the wide mortar joints was necessary, and this is visible on the interior elevations. The exterior elevations of the basement walls are largely masked by later structures and make-up for the courtyard, although the outer faces of the chord walls retain original features. In their final form the curved walls facing the courtyard were rendered using a mix with coarse aggregate, but this was probably a later alteration.

Details of the internal and external elevations of the chord wall of the N Stirrup Tower are illustrated in Figures 3.19 and 3.20, but here, too, original openings have been masked by later insertions. Plate 3.17 shows the typical arrangement represented by the N Stirrup Tower. Here, the roof of the N Radial Passage can be seen at the bottom right of the picture, leading to the N Stirrup Tower. The curved rear wall of the Stirrup Tower can be seen immediately beyond the Radial Passage vault. In the foreground is a gunloop within the Stirrup Tower wall.

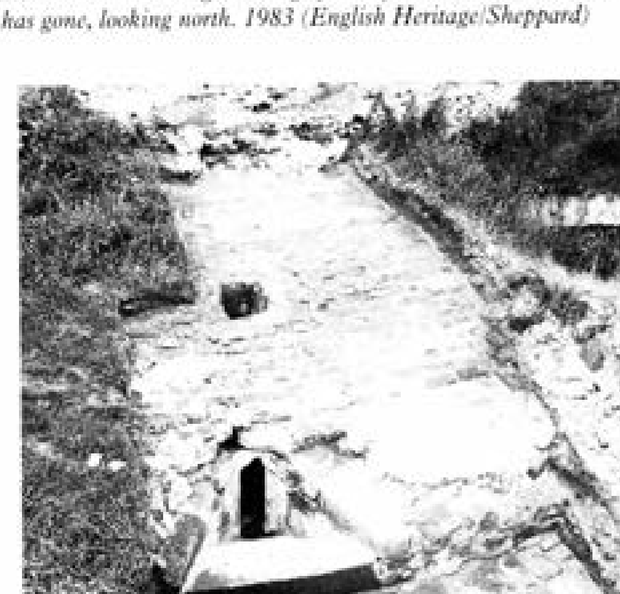


Plate 3.16: The Vaulted Ring Passage; north-west section showing surviving vault from outside, with a gun loop and a smoke vent. 1963 (English Heritage)

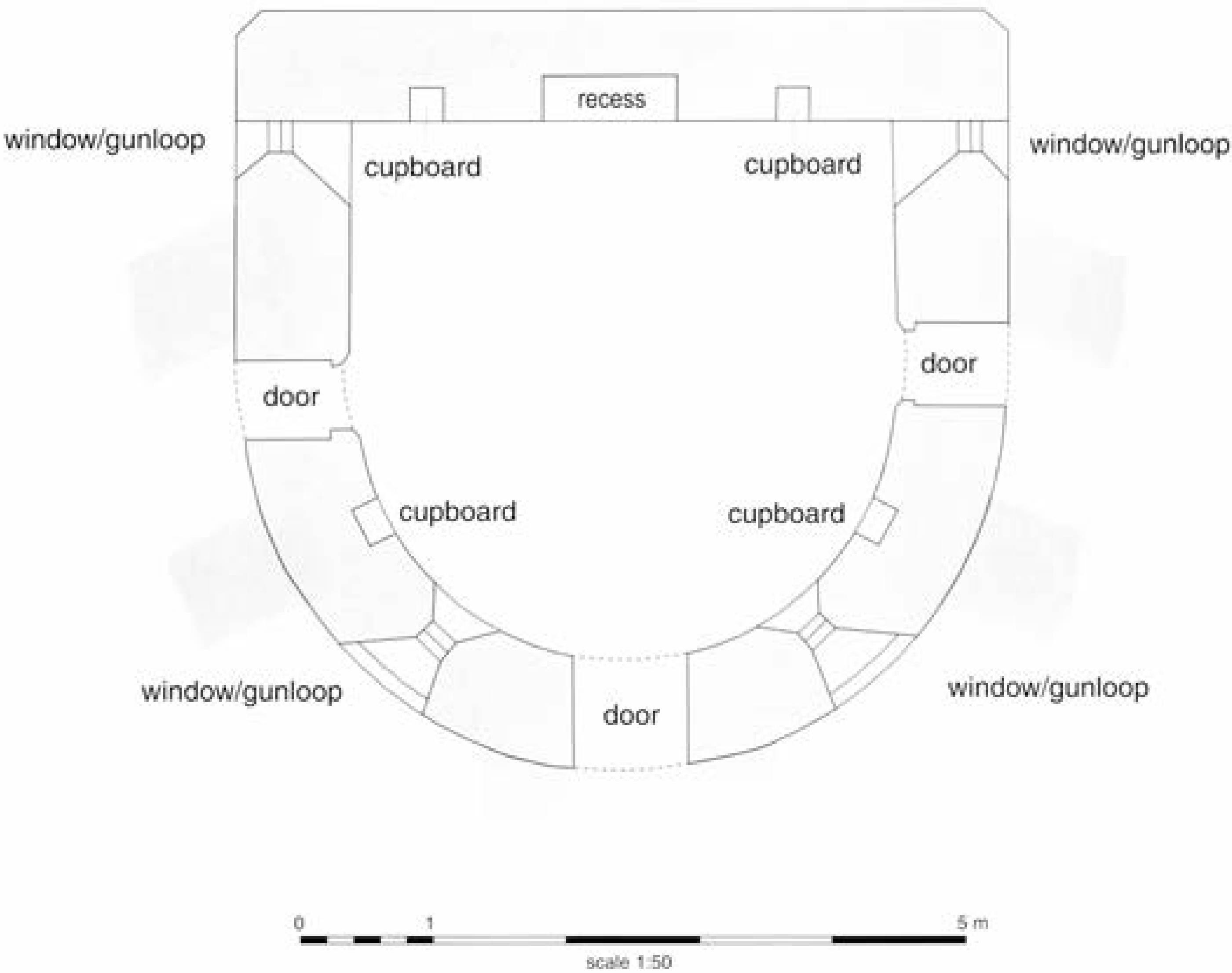


Figure 3.18: Composite ground floor plan of a stirrup tower

The arched door in the east wall of the Stirrup Tower led into the adjacent Curtain Wall gallery at basement level. The chord wall retains the phase III doorway into the gunroom of the N Bastion, which represents a heightening of the phase IIb doorway. Above it can be seen the brick-arched recess that may have been an original ground floor door into the Foreworks, or a blind recess; for detail of the chord wall, see Plate 3.18.

Basement level

At basement level (Fig. 3.9, Fig. 3.19) the towers measure 6 m (19 ft 8 in) by 6.2 m (20 ft 4 in) internally. The basement floor levels are presumed to have matched those of the radial passages and gallery basements in this phase, at *c* 3.28 m OD. There are four doors in each tower at this level: one in the curving rear wall giving access to the radial passage, one through the chord wall giving access to the foreworks, while flanking doors in the side walls provide access to the Curtain Wall basement galleries. Two gunloops in the curving rear wall of each tower command the courtyard. There is no evidence for a means of access from the basement to the ground floor of the towers.

Structural evidence for the form of the original basement openings: Later building work has altered the form of the doorways in the chord walls. The original door (1178) in the chord wall of the W Stirrup Tower measured *c* 0.91 m (3 ft) wide externally and 1.06 m (3 ft 9 in) wide on the interior, with plain ashlar jambs. This indicates that there was a rebate within the chord wall to take a door. In each tower, there are two gun loops in the curved rear wall; these are widely splayed and upward raking to command the courtyard. The SW-facing gun loop in the E Stirrup Tower retains two iron hinges embedded in its W splay.

Plate 3.17 The N Stirrup Tower with the North Radial Passage in the foreground, bottom right, and the phase III N Bastion behind; looking north-east. 1983 (English Heritage/Streeten)

A bolt hole in the E splay indicates that it was closed by a single shutter. Such features have not been found in the exposed gun loops of the other stirrup towers, though all may have been similarly equipped. The relationship between the stirrup tower basements and the basement galleries in the adjacent Curtain Wall is complicated by plaster and later structures which mask most of the junctions. The ESE Curtain and E Stirrup Tower walls were bonded below the level of the ground floor timbers, suggesting that both structures were contemporary. Elsewhere at least the top two courses of the Curtain Wall, which carried the ground floor timbers, abutted the stirrup tower walls. It is inconceivable that the doors between the basements and the flanking galleries were not original phase IIb features, otherwise the gallery basement would have little use for circulation; however, the original form of these doors is no longer apparent, since they were clearly remodelled and probably raised following the heightening of the basement gallery floor in phase III (see below).

Ground floor level

Above basement level the ground floors of the Stirrup Towers were supported on timber joists. The typical ground floor plan is shown in Figure 3.18. A door in the curved rear wall gives access into the courtyard above the radial passage. The courtyard doors of the N and E Stirrup Towers have brick jambs with stone dressings while the W and S Stirrup Towers had stone jambs. The surviving doorhead in the S Stirrup Tower was a round arch of brick, but its external treatment is not known. Doors in the side walls give access to the Curtain Wall. Evidence that there may have been a fourth doorway, leading through the chord wall to the foreworks, comes principally from the N Stirrup Tower (Plate 3.18). The evidence is not conclusive. The outer door jambs in the N Stirrup Bastion extend above the inner head of the basement door, but the broken upper part of the chord wall has the appearance of a blind recess. There are windows at ground level in each tower, two sighting along the exterior face of the flanking Curtain, and two looking diagonally along the courtyard. The windows are domestic rather than defensive in design.

The fenestration of the ground floor can be inferred from extant details in the N and E Stirrup Tower. Rebated jambs indicate the form of the windows sighting along the Curtain Wall either side of the N Stirrup Tower, while surviving features of the E Stirrup Tower indicate that there would have been windows overlooking the courtyard either side of the door in the curved wall.

Assuming a regular pattern similar to the extant remains of the E Stirrup Tower, there would have been

Plate 3.18: The N Stirrup Tower; detail of the chord wall seen from the Stirrup Tower interior, showing openings of phase IIb and phase III, looking north. 1983 (English Heritage/Sheppard)

four lockers, or cupboards, in each tower, two in the chord wall and one beside each of the doors leading to the gallery; these may have been lined with wooden boards and appear to have been closed with doors. The two cupboards in the N Stirrup Tower chord wall can be seen in the internal elevation, Figure 3.19 and Plate 3.18 (features 2507 and 2508), to either side of the opening interpreted as an original blind recess of unknown function.

Structural evidence for ground floor features: The evidence of the south wall of the E Stirrup Tower, internal elevation, suggests that the doors in the side walls of the towers may originally have led to the parapet of the Curtain Wall, before the Curtain Wall was heightened with the insertion of a ground level gallery in phase IIb. The extant brickwork of the door opening and arch appears to be of one build with the internal face of the south wall, and the course beds are consistent throughout. The fact that these doors are angled towards the outer wall of the curtain suggests that they were built to give access to the parapet, rather than, via the awkward access they now present, to the added ground floor gallery. The Courtyard doors of the E and N Stirrup Towers have brick jambs with stone dressings, while the W and S Stirrup Towers have stone jambs. The surviving door head of the S Stirrup Tower has a round arch of brick, but there is no evidence for its external treatment. From the N Stirrup Tower, there is evidence for a possible doorway through the chord wall.

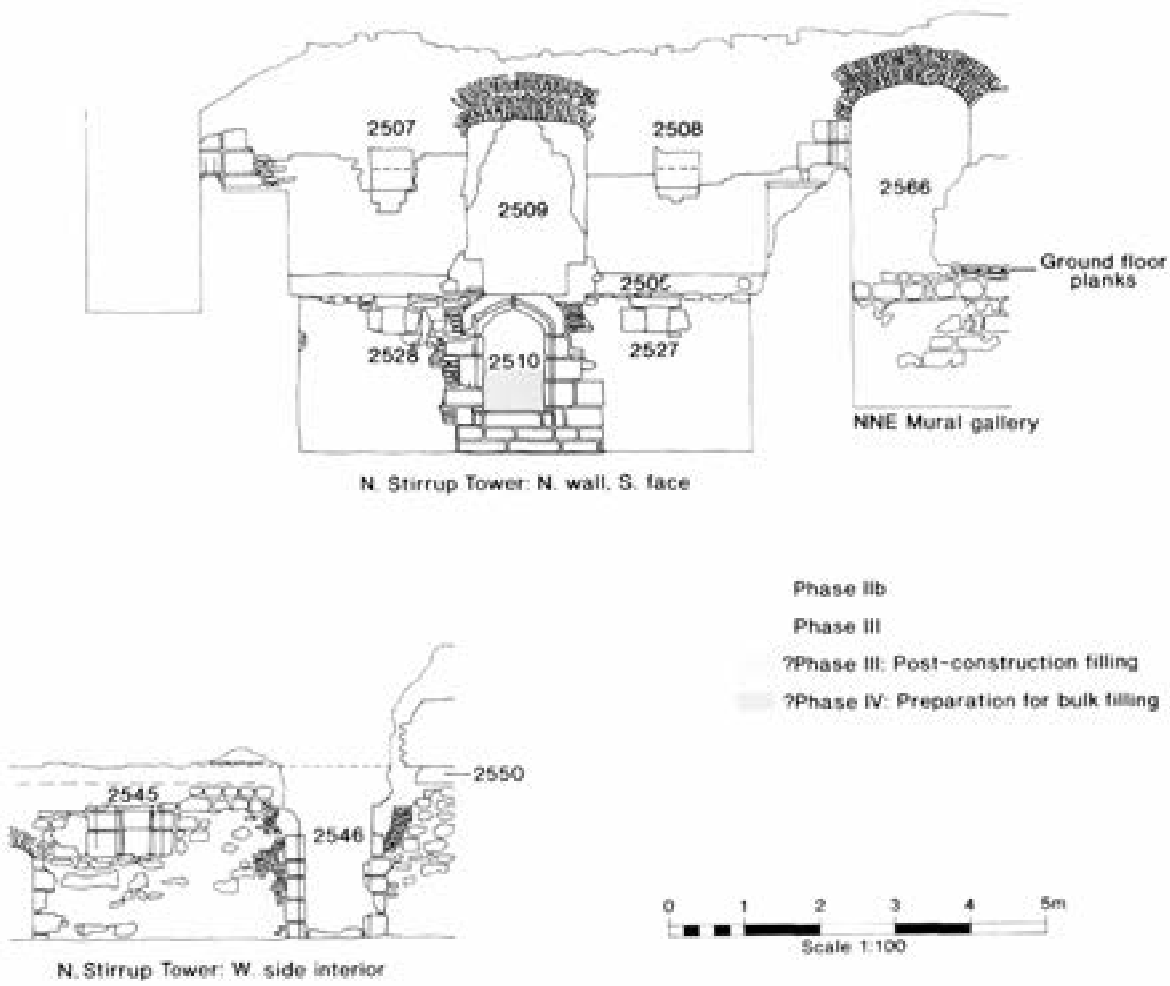


Figure 3.19: N Stirrup Tower elevations: chord wall south face; west side interior

The outer jambs of the basement door extend above the level of the inner head. However, the broken chord wall at ground floor level has the appearance of a blind recess rather than a doorway.

Internally there is evidence for the disposition of cupboards. In N and E Stirrup Towers there are two cupboards in the chord wall (Fig. 3.19, 2507 and 2508) and in the E Stirrup Tower a cupboard survives beside the S side door leading to the wall walk. The latter was possibly recessed from the inner face of the wall. A horizontal scar in one of the N Stirrup Tower cupboards may represent a shelf.

The Foreworks and Outer Defences (Figs 3.9, 3.19, 3.20, 3.21, 3.22, 3.23, 3.24; Plate 3.19–3.21)

Excavation within and outside the bastions added to the castle in the works of 1542–3 (Phase III below) has revealed the existence of further structures outside the line of the phase II Curtain Wall and and stirrup towers. This implies that the phase II castle was surrounded by outer defences that were substantially removed by the final remodelling in 1542–3. The conjectured form of the outer defences of phase II has been discussed in detail by Biddle (Chapter 2), and is shown in Figure 3.9, where the extant walls of the phase II building are shaded and the conjectured outer defences are shown in outline. Projecting forward of each of the four stirrup towers were narrow rectangular brick-vaulted compartments (the Foreworks), with circular projections at each front corner and at the centre.

Plate 3.19 shows the Foreworks excavated beneath the E Bastion; the front wall and central circular projection are clearly visible. The semicircle marked on Figure 3.9 with a broken line in front of each Forework defines a semicircular platform or bastion in front of the vaulted compartment, which Biddle argues could have carried a parapet, with a *terreplein* (a level base for mounting artillery) behind, on which the heaviest guns were probably mounted. This semicircular wall does not survive, and has not been seen in excavation. An outer wall lying beyond the Foreworks and inferred platform or bastion, and replicating their line (Plate 3.20), may have retained a shingle glacis piled up against the

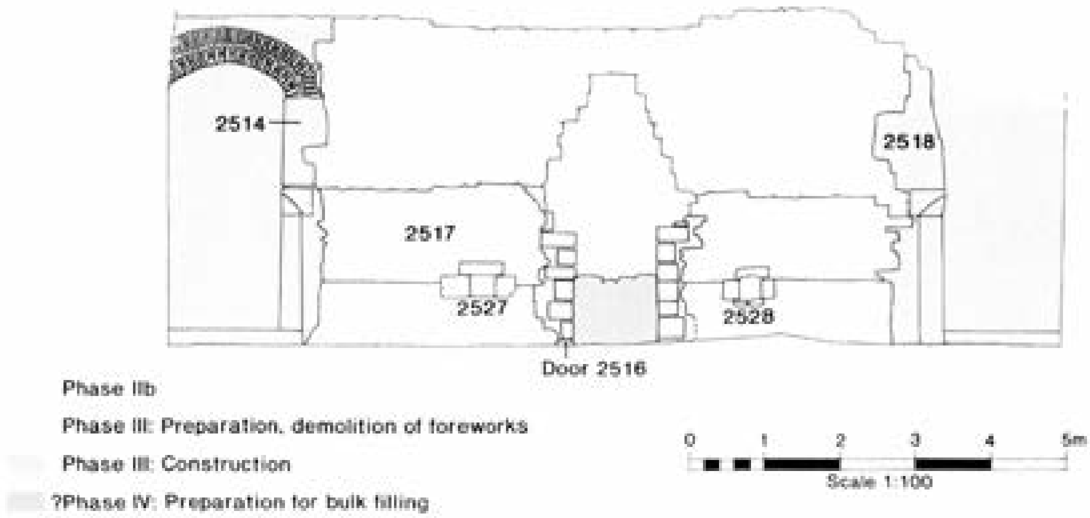


Figure 3.20: N Stirrup Tower chord wall north face

semicircular platforms or bastions, and elsewhere against the outer face of the original octagonal Curtain Wall. The defences would thus have appeared externally to be on three levels: the parapet of the stirrup tower rose above and behind the whole complex; in front of the tower was a long, narrow platform above the vaulted compartment; in front of this, at a still lower level, was the solid mass of the semi-circular bastion.

The Foreworks (vaulted compartments)

The Foreworks were destroyed to foundation level by the construction of the bastions of 1542–3 (Phase III, below), except where their inner sides were partly preserved by the retained chord walls of the stirrup towers. Evidence for their form has thus been derived largely from excavation within the later bastions. Little is known for certain about the way in which the Foreworks could have functioned, and the possibilities have been reviewed in detail by Biddle (Chapter 2), who has suggested that the central circular projection perhaps contained a newel stair, and the projections at the corners may have served as orillons (projecting towers at the corners of bastions, designed to conceal flanking fire from the side walls). Biddle argues that the presence of orillons at the forward corners implies the presence of gun emplacements in the side walls of the Foreworks. These concealed flankers would have provided covering fire towards the angles of the Curtain Wall.

Internally the vaulted chambers measured 2.8 m (9 ft) wide, and extended approximately 4 m (13 ft) to 4.2 m (13 ft 9 in) forward of the stirrup towers. The length of the vaulted chambers was probably around 21 m (69 ft), although the destruction of the end walls during construction of the phase III bastions in 1542–3 means that their exact length is not known. The circular projections probably measured around 2.4 m (8 ft) in diameter. From the little surviving evidence, it seems likely that most of the standing structure of the Foreworks was of brick, with stone facing where exposed. Layers of clay and mortar accumulated outside the Foreworks, or were dumped there to consolidate the ground level.

Structural evidence for the Foreworks: Two holes or 'slots' (2527, 2528) of uncertain function extend through the chord wall of the North Stirrup Tower to either side of the chord wall door. Immediately above these slots on the external elevation (Fig. 3.20) is a 1.1 m (3ft 7 in) high horizontal band of inserted brick facework (2517). The area of re-facing marks the position of the brick vault and overlying brick surface of the Forework and covers the scar left when the vault was subsequently demolished (see Phase III). The keyed projections in the N and S ends of the E Stirrup represent continuation of the chord wall to form the rear wall of the Forework upon which the vault was set. The top of the brick facing is here 0.6 m (2 ft) higher than the ground floor of the tower, which implies that there were probably three steps here between the two levels.

Evidence from excavations: The best evidence for the ground plan of the brick foreworks was recovered from the E and W Bastions (Figs 3.21, 3.22, 3.23), with supplementary information from the N Bastion. Excavation in the E Bastion (Fig. 3.21) revealed the top of the Forework remains at *c* 3.2 m OD. The forward wall of the Forework comprised a compacted mortar strip above a line of mortared stones (1117). It extended N–S and was associated with a semi-circular area of stones set in mortar (1118), the remains of the central circular projection.

A patch of thin compact mortar (1149) formed a construction raft for the SE circular projection, whilst the NE projection was in the form of a raft of stone and

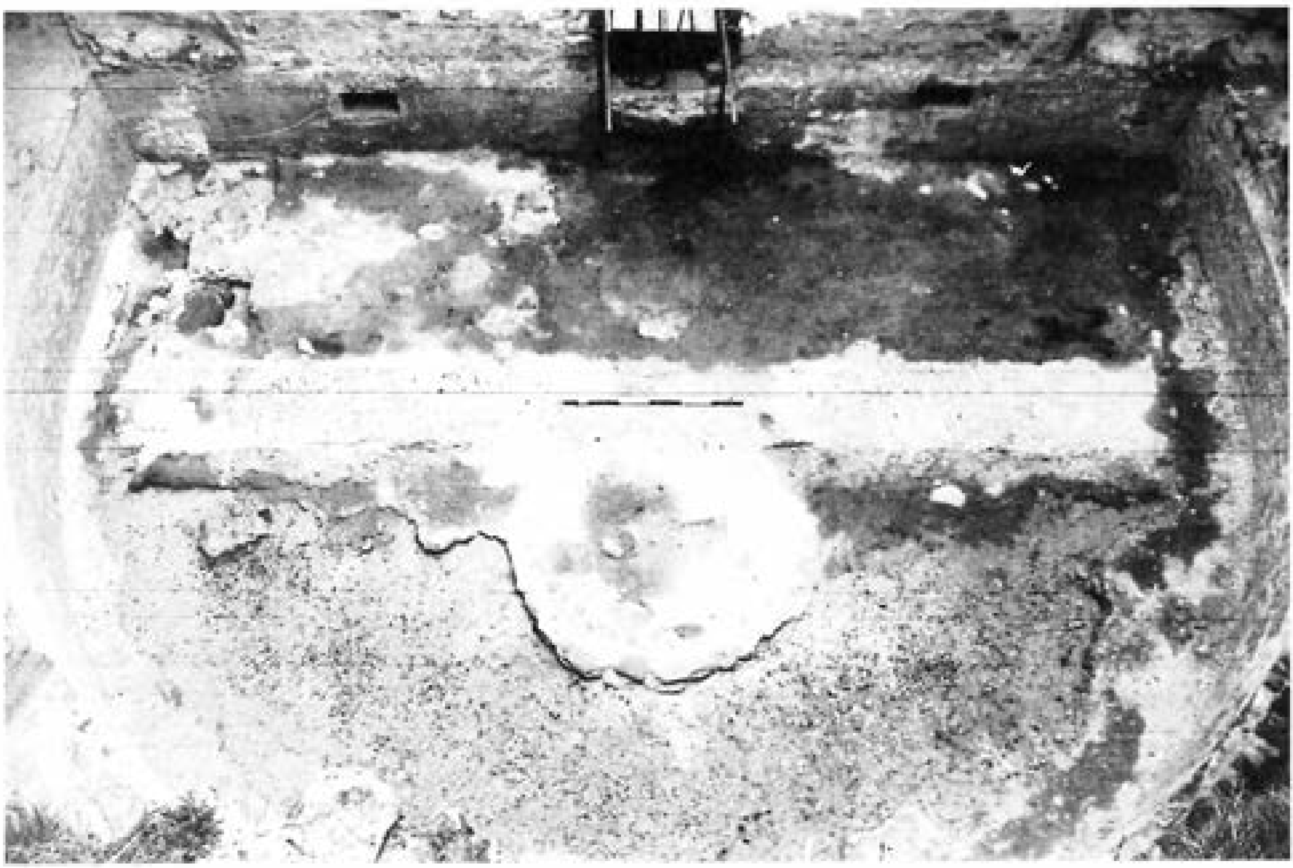


Plate 3.19: The E Bastion; the Foreworks beneath the phase III bastion, under excavation in 1974. (English Heritage/Ames)

mortar (1132), upon which survived three courses of brickwork (Plate 3.21). Within the Forework was a layer of sand mixed with beach pebbles (1116), above which lay two mortar layers (1113–1114), perhaps the remains of a floor surface. A band of sand mixed with wood fragments (624, 710) was interleaved between the mortars, in turn overlain by a thin layer of wood (623). This may have represented further remains of a floor.

Excavations in the W Bastion (Fig. 3.22) revealed the foundations of the W Stirrup Tower chord wall (1180) and the outer wall of the Forework (1181); these were cut into the natural beach (1182, 1183). The foundation trench for the chord wall was 0.3 m (1 ft) deep and filled with mortar, beach pebbles and large stones. The Forework footing was 0.61 m (2 ft) deep, and comprised large edging stones with a mortared rubble core. The fills of both foundation trenches were overlain by a thin deposit of rubble (1177), which abutted both wall foundations and probably represented construction debris or ground consolidation material. The rubble was overlain by a mortar floor (1176) laid between the two walls, and the floor showed signs of wear to the N. The original threshold of the door from the Stirrup Tower opened directly onto floor 1176. Excavations immediately S of the extant extension of the W Bastion (Fig. 3.23), located a circular footing (1300) representing the S circular projection or orillon of the W Forework. A length of stone wall footing (1287) probably represents the former S wall of the Forework, overlain by and incorporated within the S wall of the later W Bastion. Wall footing 1287 was sealed with a layer of mortar (1286), and projected 0.38 m (1 ft 3 in) beyond the Bastion wall. It was abutted by the foundation wall of the phase III Bastion (1456). The forework wall 1287 extended for a length of 2.2 m (about 7 ft 2 in) and was 0.68 m (2 ft 3 in) wide at its fullest exposure, narrowing where it underlay the offset footing of the phase III Curtain Wall (1291).

A layer of bricks (1276) abutted by a mortar layer (1288) may represent the remains of an external surface associated with the Forework. Layers of clay and mortar had accumulated outside the limit of the Forework, or alternatively may have been dumped there deliberately, in order to consolidate the ground level.

Within the later N Bastion, excavations (not illustrated) revealed the remains of the Forework in the form of a probable foundation (1383) for the circular projection at the NW corner. Scribing lines in mortar on top of these foundations suggest that there had originally been a turret of comparable size to those found beneath the E and W Bastions. No excavation took place to locate the NE end of the Forework.

The Outer Wall and glacis

Evidence from excavations within and outside the phase III bastions suggests that the phase II Outer Wall was constructed on foundations of brick and stone, 0.9–1.2 m (3–4 ft) in width, with a radius of 12.5 m (41 ft). The outer face of the Outer Wall foundations lay 4.8 m (15 ft 6 in) in advance of the phase II Curtain Wall. The archaeological evidence suggests that the base of the glacis was formed of clay,

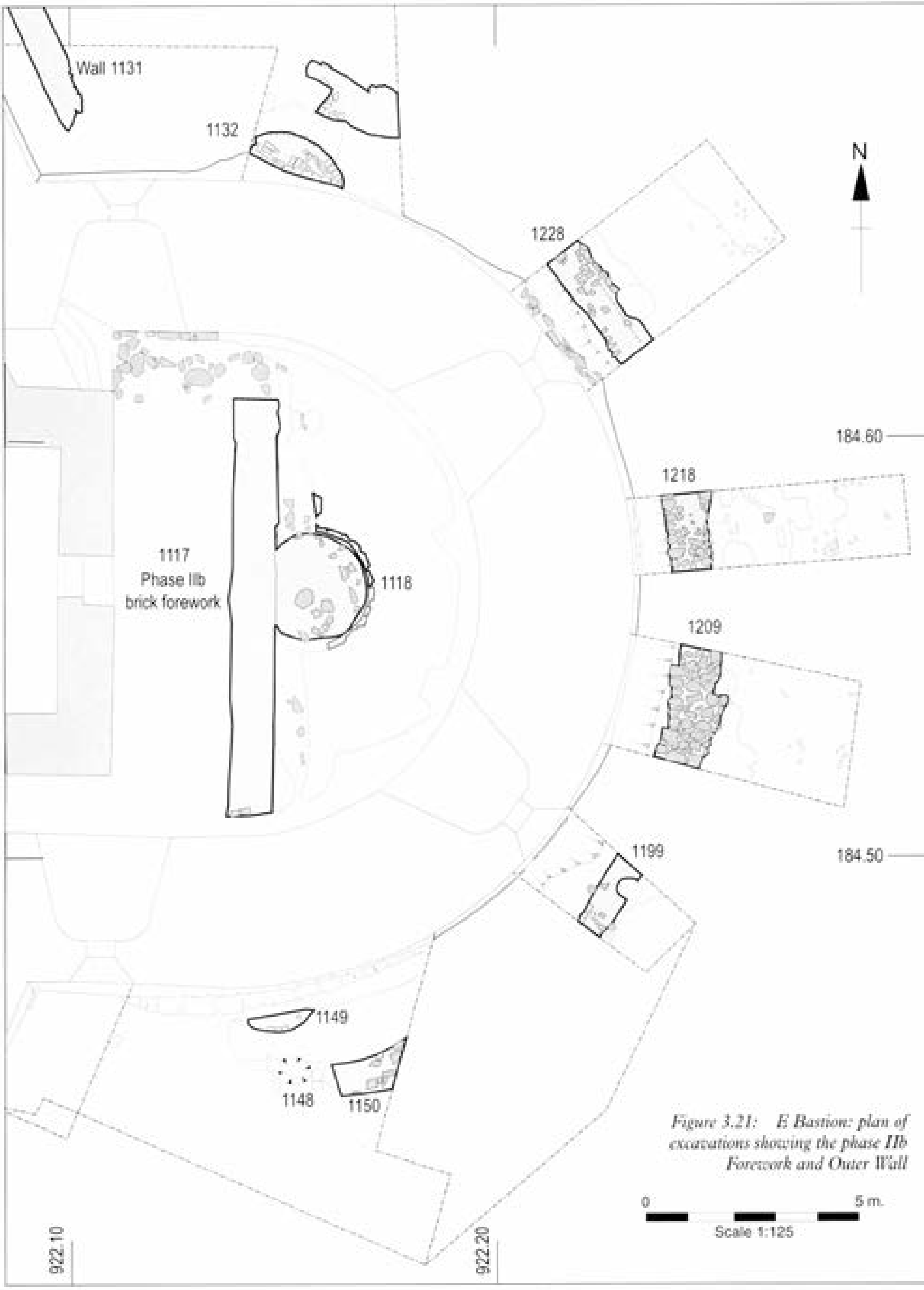


Figure 3.21: E Bastion: plan of excavations showing the phase IIb Forework and Outer Wall

Plate 3.20: The phase IIb Outer Wall as excavated outside the north-east Curtain Wall in 1975. (English Heritage/Ames)

which abutted the base of the wall footings. Clay may have been incorporated with the shingle to strengthen the bank. At the level of construction of the E Forework and associated walls, and probably contemporary with them, was a layer of dark brown soil (723) containing charcoal, brick and tile, and notable finds including a gold pendant and two bronze chains, laces, points and pins. Pottery from the layer was dated to the first half of the 16th century, contemporary with the date of construction. The most striking evidence for the form and appearance of the Outer Wall was recovered from a series of trenches excavated in front of the phase III E Bastion, where the arc described by the wall was observed (Fig. 3.21).

Evidence from excavations: Outside the E Bastion, the remains of the original outer wall were recorded in five separate trenches (features 1150 = 1199 = 1209 = 1218 = 1228); the wall was seen to consist of mortar, bricks and stones, and was 1.2 m (4 ft) wide (Plate 3.20). To the N of the N circular projection of the Forework, foundation 1132, the base of the outer wall continued as a raft of stone and mortar (1143 = 1131), and was seen to extend beyond the reentrant angle of the Bastion, running parallel to the Curtain Wall. In section (Fig. 3.24) the W face of structure 1131 was seen to be constructed against two earlier layers of crushed sandstone (1130) and a grey clay layer (1129), neither of which contained pottery; these probably represent construction debris. No evidence of the southward extension of the Outer Wall was found S of the Forework, perhaps due to later construction work here.

Plate 3.21: The E Bastion; detail of the phase IIb north-east Forework turret (1132). 1975 (English Heritage/Ames)

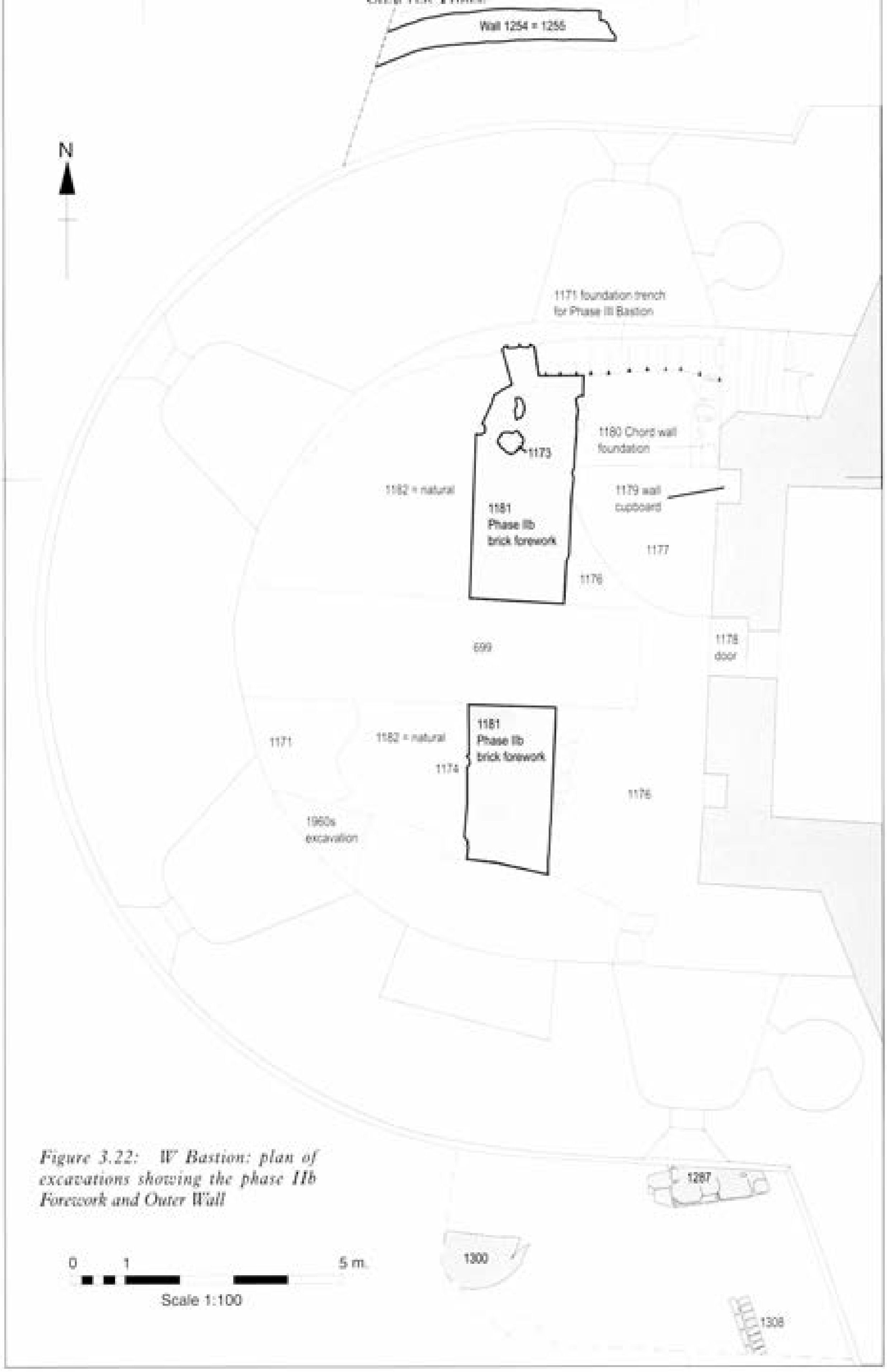


Figure 3.22: W Bastion: plan of excavations showing the phase IIb Forework and Outer Wall

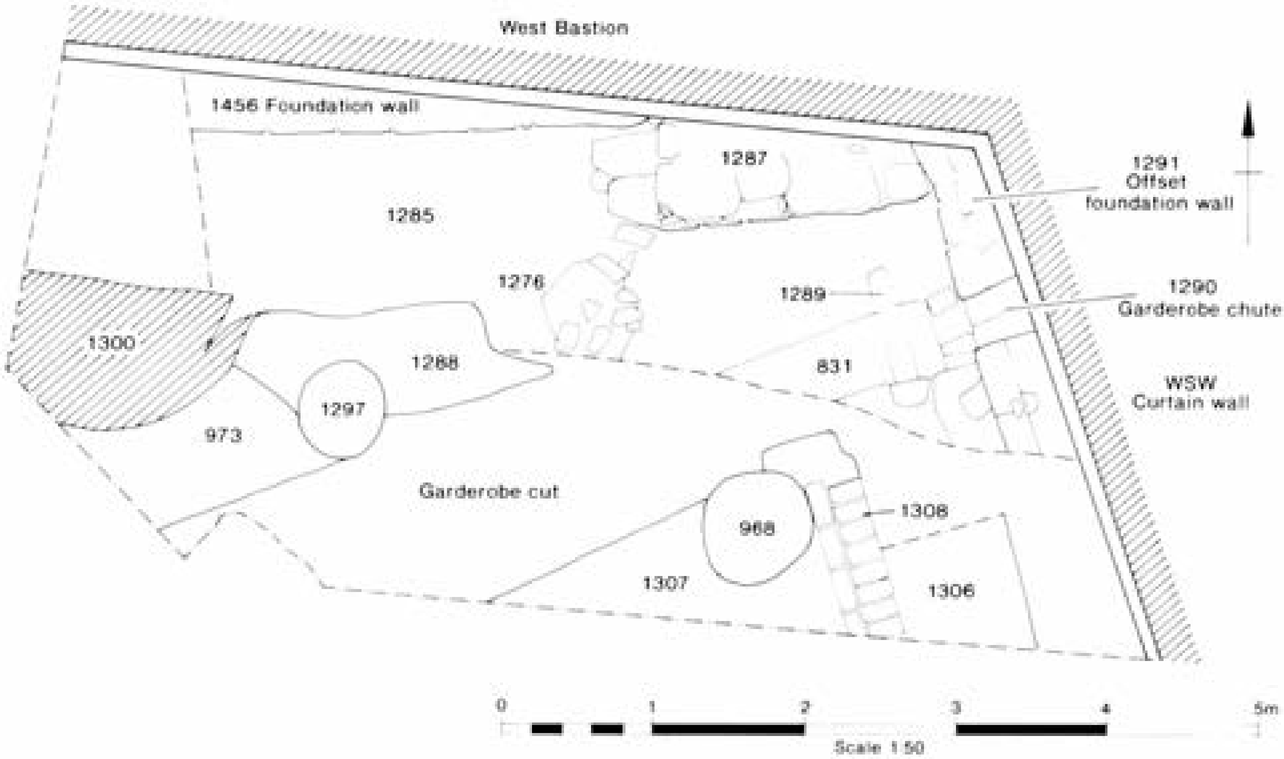


Figure 3.23: W Bastion external trench WBY: plan showing phase IIb Forework and Outer Wall

Excavations outside the W Bastion (Fig. 3.22) revealed part of the semi-circular wall (1254=1255) extending around the N side of the W Forework. The remains consisted of a rubble fill between two strips of creamy, gritty mortar. It is likely that this wall extended round in front of the Forework as a semi-circular wall, although no obvious continuation of the structure was found S of the Forework. In excavations immediately outside the bastion to the S (Fig. 3.23), the retaining wall (1308) was located extending SE parallel to the Curtain Wall away from the S end of the Forework. The brickwork was abutted by clay layers 1307 and 1306.

Outside the N bastion (not illustrated), excavations located a wall footing of large boulders bonded with compact mortar (1382), located in front of the N Forework. Although only a limited stretch of footing was recorded, it is presumed by analogy that it represents the Outer Wall curving around the brick forework. Further excavations at the salient angle of the N Curtain Wall revealed the continuation of the Outer Wall (1341), abutted by a layer of clay (1340).

Excavations outside the salient angle of the SE Curtain Wall (not illustrated) did not reveal any evidence for the Outer Wall, but a layer of clay observed here above the natural beach may have been the remains of the base of the glacis.

The Curtain Wall (Figs 3.9, 3.39)

The octagonal Curtain Wall completed the inner defensive circuit between the stirrup towers. As first built, it appears to have been of one storey only, with a gallery at basement level between the inner and outer walls. The original basement floor of the gallery has been revealed at only one point in the circuit, in the WNW sector between the Entrance Bastion and the W Bastion. Elsewhere, excavation stopped at the raised floor level. Initially, planking over the basement gallery formed a walk at parapet level, possibly with the added protection of stone flags. Doors in the side walls of the stirrup towers (see above) gave access between the basement levels of the stirrup towers and the basement gallery within the Curtain Wall, although the gallery stopped short originally at a blank end to either side of the earliest Gatehouse (Fig. 3.6). The Curtain Wall parapet was probably reached from doors set in the side walls of the stirrup towers at ground floor level (see above), and would also have been accessible directly up a few steps from the raised courtyard (see below). Biddle suggests (Chapter 2) that it was soon apparent to the builders that the parapet was so low to the field that it would almost have been possible to run up the glacis and jump over and that, consequently, probably in 1540, the Curtain Wall was raised by the

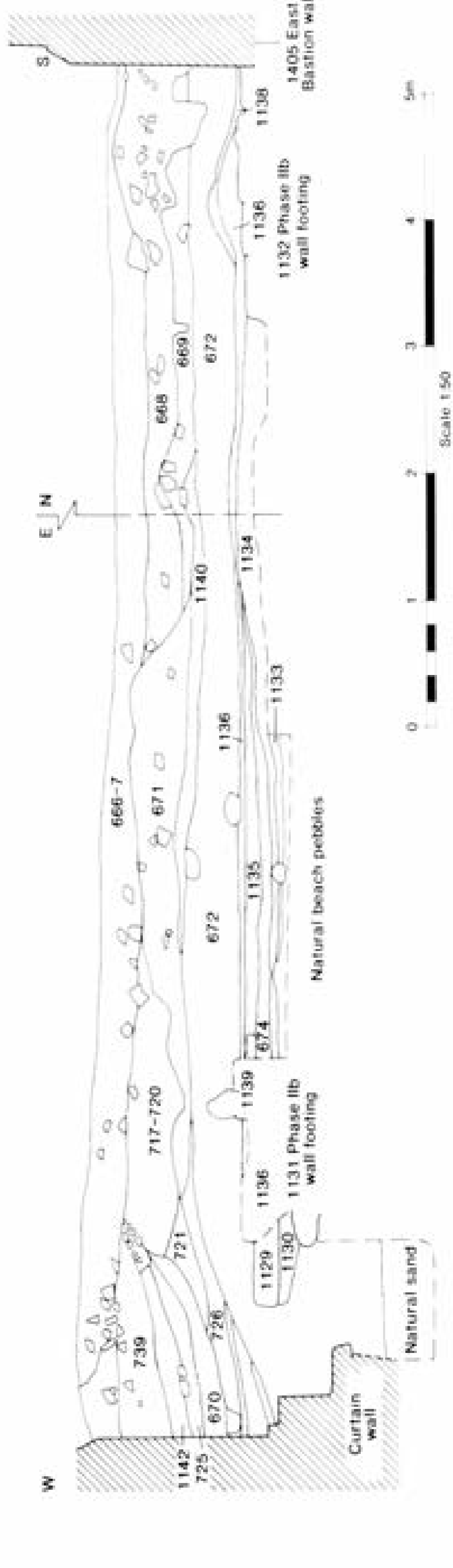


Figure 3.24: E Bastion external trench EBX: section showing phase IIb Outer Wall

addition of an entire storey. This created a new gallery, at ground floor level, and would have greatly increased the amount of barrack accommodation available. Single-seat garderobes were inserted at ground floor level in the thickness of the outer Curtain Wall, in the SW, SE and NE sectors (the position of the garderobes is marked on Fig. 3.1). The garderobe in the SE Curtain Wall, immediately south of the E Stirrup Tower, survives largely intact and is shown in Figure 3.39. Fireplaces were probably also added at this time, against the courtyard face of the inner Curtain Wall in all sectors except to the rear of the Gatehouse. Access to the heightened parapet level was by means of newel stairs in the re-entrant angle of each stretch of the outer Curtain Wall.

The outer Curtain Wall was not particularly massive, and no evidence has been found for any gun emplacements along its length. This adds to the likelihood that the Curtain Wall was not the outermost defence of the castle, and that it lay within a further protective circuit formed by the glacis and Outer Wall (Fig. 3.9, see above). The outer Curtain Wall was strengthened by the addition of masonry during the works of 1542–3 (Phase III, below), at which time the glacis and Outer Wall appear to have been removed. By contrast, the inner wall of the Curtain Wall was of massive construction from the outset, and heavily battered on the courtyard side. It contained two gun loops in each sector set at the level of the courtyard, unlike those within the basements of the Stirrup Towers which are raked upwards. The Curtain Wall is of the same build as other structures of phase IIb, being constructed of reused irregularly shaped yellow and grey sandstones, and ironstone blocks of local origin. The internal elevations of the gallery above basement level were constructed of brick and the surviving stub of the inner wall adjacent to the E Bastion, is also faced with brick externally and was presumably rendered.

Excavation evidence for the garderobes: There is no firm evidence to suggest how these garderobes were maintained. Each garderobe chute was extended through the widened Curtain Wall in the works of 1542–3 (phase III), and drained thence into latrine pits in the open air. In phase IIb, the presence of the glacis piled against the outer wall of the gallery may suggest that garderobes were cleaned from within the castle: there is evidence from the NNE gallery that a stone-lined and stone-capped drain ran from the inner courtyard wall diagonally across the gallery beneath the brick floor. Two steps surmounted the drain, which was joined to a mural downspout or drain in the NNE outer courtyard wall. The drain merged with the outflow chute of the latrine built into the Curtain Wall. An access hole to the latrine shaft at basement level had been crudely blocked with yellow bricks set in mortar, perhaps undertaken when the garderobe facilities were updated.

The Courtyard (Fig. 3.25; Plate 3.22)

The courtyard was raised and cobbled. Bulk infill, comprising sand, shingle and pebbles, was dumped against the base of the walls forming the outer side of the Ring Passage and the inner wall of the galleries. This was

Plate 3.22: W Courtyard looking south-east; cobbled courtyard with central drain. 1982 (English Heritage/Streeten)

overlain by a thin deposit of construction debris (mortar and pebbles) and another thick layer of beach material. Cobbles were then laid over the top (Plate 3.22). There are no putlog holes to take horizontal scaffold timbers associated with the phase IIb work, except in the exterior elevations of the Entrance Bastion and Keep. This suggests that all basement level structures had been completed, and the courtyard raised to the required level, before work on ground floor buildings began. The boards of the ground floor in the stirrup towers formed the building platform for the construction of the ground floor chambers. Similarly, the boards above the Curtain Wall basement gallery provided the base for the construction of the parapet.

Evidence from excavation: A section through the NNW courtyard (Fig. 3.25; Trench CT III) shows the sequence of infilling prior to the laying of the cobbles. A build-up of bulk infill (368) 1.1 m (3 ft 6 in) deep was overlain by a thin deposit of mortar and pebbles (367). Finally a 0.4 m (1ft 3 in) thick layer of beach material (366) completed the sequence prior to the laying of the cobbles, which had subsequently been removed from this area. All the layers contained distinct lenses of sand representing individual tip lines extending downwards from the Keep to the Curtain Wall. This suggests that the roof of the Vaulted Ring Passage was structurally complete, and provided a solid barrow-run to infill the intended courtyard. The cobbled surface was seen elsewhere in the courtyard (layers 100 in CTII; 303 in CTIV; 109 in CTV; and 88=56 in CTVI) and was observed to be laid over the beach fills, and abutting the wall of the Vaulted Ring Passage and the inner wall of the Curtain; the cobbling was also set against the walls of the radial passages. The cobbling consisted of water-worn ironstone, sandstone, flints and other stones varying in size to a maximum of 0.5 x 0.15 m (1 ft 8 in by 6 in). The cobbles were arranged randomly, although in places they had been more closely and purposefully set, and were either pitched or laid flat on top of the sand. There were numerous patches where the cobbles were absent, and later robbing or re-use of the stones meant that the entire surface was missing over much of the NNW courtyard (area CTIII). The surface of the cobbling sloped down slightly from the perimeter walls to approximately the mid-point of the courtyard. The outer extent of the courtyard cobbles lay at *c* 5 m OD, sloping to down *c* 4.7 m OD in the centre of the courtyard where surface run-off led to a stone built drain (329=78=1414=1415) extending around the courtyard. Where the drain survived intact it consisted of stones set longitudinally in pairs. There is a hollow (Fig. 3.25, context 1416) that may be a remnant of the drain, which was later removed together with the cobbled surface in the NNW Courtyard (CT III). In the NNE Courtyard (CTII), a single roughly square stone (129) measuring 0.5 m (1 ft 8 in) x 0.5 m (1 ft 8 in) with a 0.1 m (4 in) square central hole rebated for a metal grating was part of the drain.

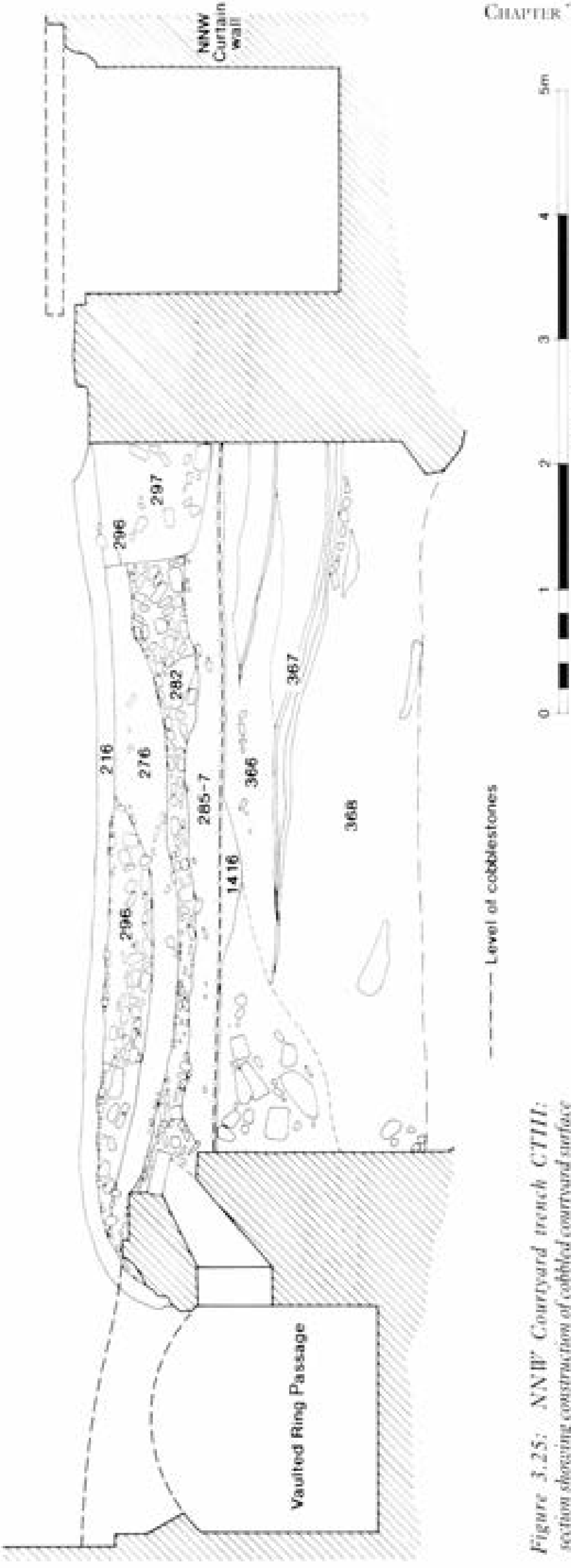


Figure 3.25: NNW Courtyard trench CTIII: section showing construction of cobbled courtyard surface

PHASE III: THE CASTLE ENLARGED (1542–3)

Summary

Stephen von Haschenperg's concentric fortification was completed in the autumn of 1540, and by the end of that year it was fully garrisoned and armed (see Chapter *2*). By January 1542, there seems to have been a total complement of 29 men, but within months a second massive and vastly more expensive building campaign was to begin, lasting until the summer of 1543, which involved the complete remodelling of the outer defences, and the heightening of internal structures. Why this new work was undertaken, at the immense cost of some £10,000, is unknown, but Biddle argues that there may have been doubts about the effectiveness of von Haschenperg's design, and the king himself may have been the instigator of the reconstruction. The Foreworks and the Outer Wall retaining the glacis were demolished to construction level. The octagonal Curtain Wall became the castle's outermost defensive line; it was heightened and strengthened and four massive semicircular bastions were added at the cardinal points of the compass, fronting the earlier stirrup towers. The stirrup towers themselves were heightened by the addition of first floor chambers. A new storey was added to the Keep, and the Entrance Bastion was remodelled for the last time. Throughout the castle, all basement levels (in the Curtain Wall galleries, stirrup towers, radial passages and the Vaulted Ring Passage) were raised by *c* 0.3 m (1 ft). The reason for this may be the high water table that so affected arrangements in the Entrance Bastion. Broadly, all basement floors through the castle were brought up to the level of the Keep floor, at *c* 3.55 m OD.

The New Bastions (Figs 3.21–3.22, 3.26–3.34, 3.40, 3.41, 3.46, 3.49, 3.50; Plates 3.23–3.26)

Following the demolition to foundation level of the phase IIb Foreworks and Outer Wall, and the removal of the glacis, four new bastions were constructed at the north, south, east and west points of the Curtain. Plate 3.23 shows the W Bastion from outside the castle. The four bastions survive essentially intact, although erosion and consequent replacement of the masonry have destroyed original details above roof level. The N, S and E Bastions are of identical form, but the W Bastion, which may have been the first to be constructed, was provided with ovens and a range in order to serve as a kitchen. Figure 3.41 is a 3-dimensional image of the E Bastion based on the extant fabric and evidence from excavation, showing the typical relationship of the new structure to the demolished phase IIb Foreworks.

The bastions measure 19 m (62 ft 3 in) across externally, and extend forward from the stirrup

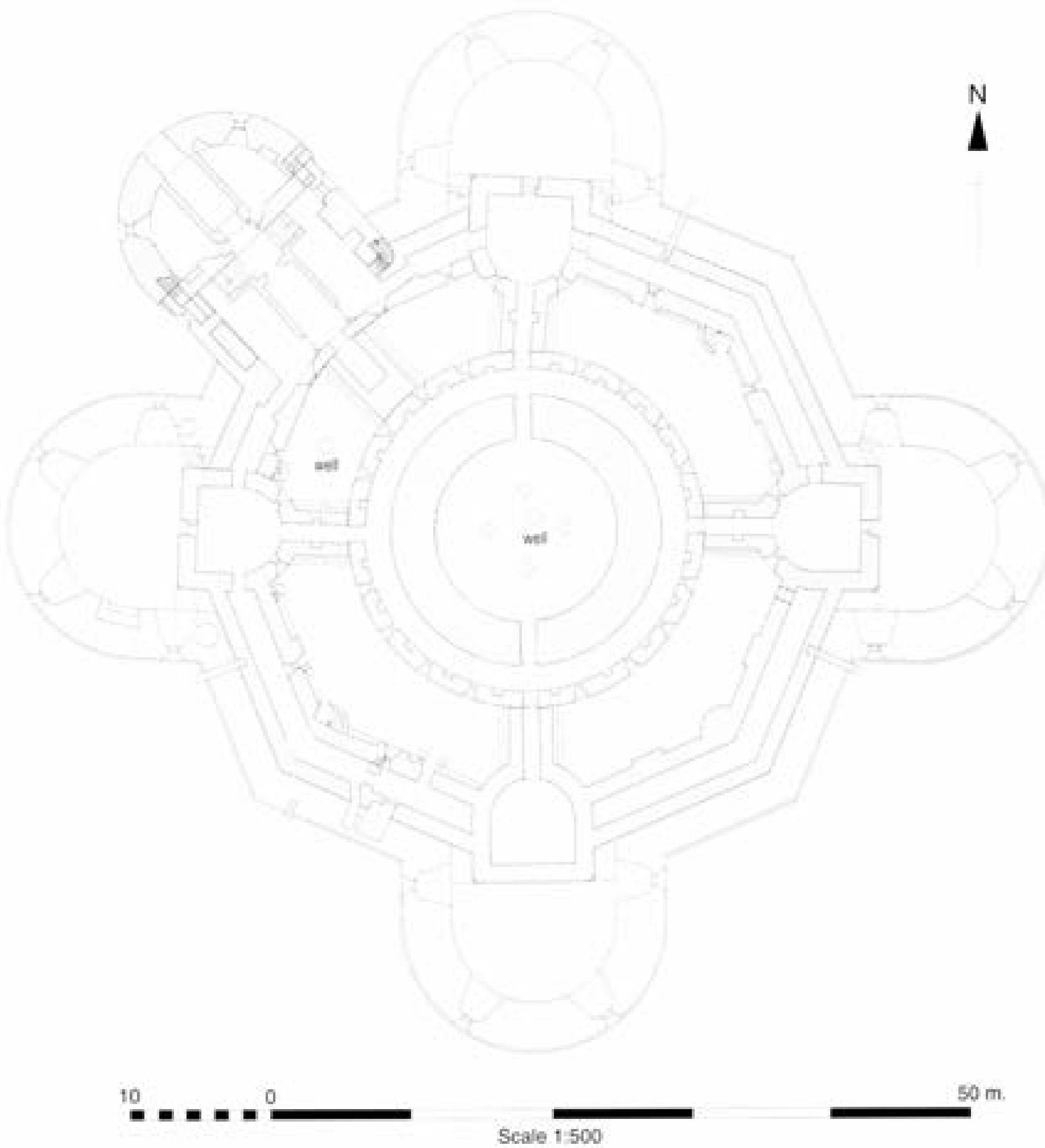


Figure 3.26: The phase III Castle

tower chord walls for a distance of 12 m (39 ft 4 in). The walls, which are constructed with a rubble core, have grey sandstone ashlars externally, and interior brick facing. They are 3.6 m (11 ft 8 in) thick, and rise from an extended semi-circular footing integral with the thickened Curtain Wall. There is a chamfered stone plinth on the exterior rising in the case of the E Bastion and adjoining curtain wall from a brick face at low level adjacent to the Entrance Bastion. There are no intermediate floors within the bastions which are set slightly lower than the ground floor level of the rest of the castle, but well above the original basement level. The interior of each bastion functioned as a single large gun room, and doubled as a kitchen in the case of the W Bastion. Massive timber roofs formed gun decks for armaments mounted at high level. There is evidence for wall-walks which were presumably originally protected by parapets, but all evidence for the parapets has been lost.

Within the gun rooms, each bastion has four casemates built within the thickness of the wall, of consistent build. Plate 3.24 shows the north-west-facing casemate of the N Bastion, with the gun embrasure filled by subsequent blocking. The casemates are 6 m (11 ft 8 in) wide at the internal wall face, narrowing to 1 m (3 ft 3 in) within the thickness of the wall, before splaying externally to a width of 1.5 m (4 ft 9 in). The casemates are 2.6 m (8 ft 5 in) high, and the soffit arches are constructed of two courses of bricks springing from stone quoins; the floors were originally of brick. The vault of each casemate has a smoke vent extending up through the wall to the parapet (see Fig. 3.34, gun embrasure *2306*). The casemates of the E and S Bastions are symmetrically positioned with two casemates flanking the curtain and two facing forward. In the N and

Plate 3.23: W Bastion from outside the castle, looking north. 1998 (English Heritage)

W Bastions, the casemates facing onto the Entrance Bastion are positioned slightly further from the Curtain Wall. Although the slight adjustment in the position of these two casemates appears to make little difference (they are still aligned onto the Entrance Bastion), it is likely that the alteration was made because of the proximity of the Entrance Bastion. There is no structural or archaeological evidence for any internal division of the bastions.

Three doors gave access to the gun rooms. Access from the ground floor level galleries of the Curtain Wall was via doors leading to steps located to either side of each stirrup tower, and inserted through the original Curtain Wall (Fig. 3.19, door 2566). At the south of the W Bastion the opening is blocked by courses of grey sandstone blocks to a height of 0.7 m. This blocking may have formed a hatch for serving food from the kitchen. Access from the stirrup towers was via a door in the chord wall. These doors were originally set at basement level (see Phase IIb, above), but they were now raised, relined, and fitted with stone steps leading up to the ground floor level of the gun rooms (Fig. 3.19, door 2510; Plate 3.18). The bastions were thus integrated into the elaborate system of internal circulation that gave covered access between the Keep, the Curtain and the stirrup towers. The 3-dimensional image of the E Bastion (Fig. 3.41) shows the access from the gallery and the E Stirrup Tower into the gun room of the Bastion, the gun room floor level being indicated by the line around the Bastion wall. Access to the gun deck was via the new first floor and parapet levels of the Curtain Wall (see below).

The W Bastion was equipped with two circular ovens built into the east sides of the north and south casemates, and a range was built between the south and south-west casemates (see Figs 3.29 and 3.35 and Plate 3.25). Unlike the other casemates, which were floored with brick, the north and south casemates of the W Bastion had flagstone floors bedded on mortar. The ovens are vaulted in tile and appear to have been built at the same time as the bastion, since their flues are integral with the smoke vents of the casemates. The range (2303) is set into the south wall of the bastion, and its chimney rises up through the outer wall of the bastion. Two large stones (now damaged and eroded) built into the brick fire back probably supported cooking apparatus. Two holes in the sides of the range were almost certainly designed to carry either a spit or bar from which cooking pots could be suspended. The floor of the range consists of large bricks measuring 0.3 x 0.15 m x 0.1 m (1ft x 6 in x 4 in).

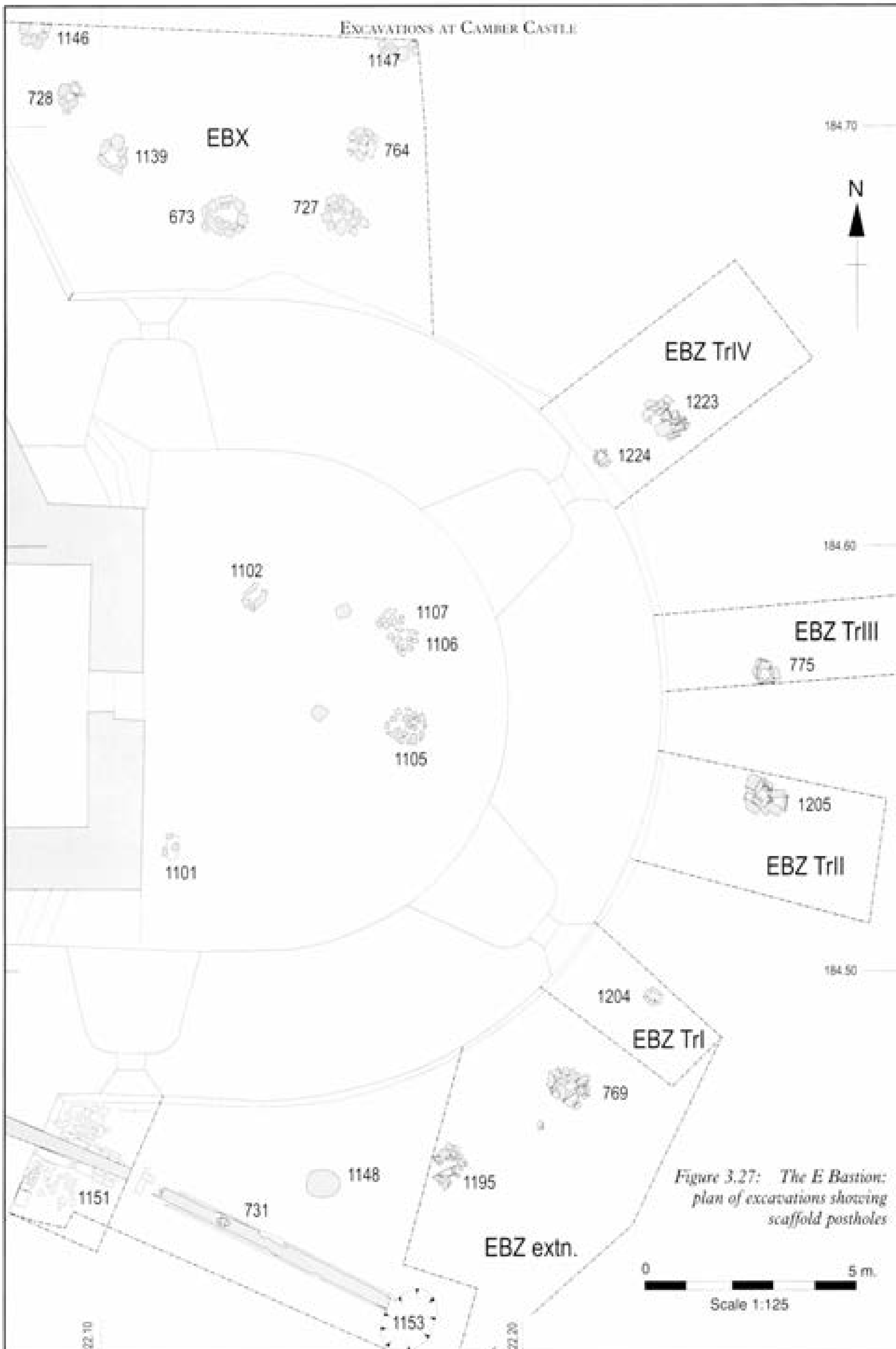


Figure 3.27: The E Bastion: plan of excavations showing scaffold postholes

Plate 3.24: N Bastion; north-west casemate, 1979 (English Heritage)

Excavated evidence for the construction sequence

During or after demolition of the phase IIb outer defences, mortar spreads were laid down over and around the levelled Foreworks. Between the N Bastion and the Entrance Bastion, a clay layer sealed the reduced remains of the drainage features on the north side of the Entrance Bastion. The foundation trenches for the new bastions and for the thickening of the Curtain Wall, with their internal and external offsets, were cut through these mortar and clay deposits and through the remains of the Foreworks. Brick and mortar fragments, pebbles and construction debris covered and sealed the foundation trenches, and were themselves sealed by thick consolidation layers of beach material and construction debris. Scaffolding postholes with stone packing, arranged in arcs around the bastions, were cut from this upper level. Within the bastions, the ground floor level was also raised by importing beach material prior to the erection of scaffolding. Putlog positions in the internal and external elevations (see Fig. 3.33) confirm the use of scaffolding during the construction of the bastions. The best preserved putlog positions can be seen in the S Bastion wall. The approximate dimensions are the same for all bastions: the upright timbers were variably spaced but averaged approximately 2.40 m (7 ft 10 in) apart, and the horizontal timbers had a more constant spacing at 1.38 m (4 ft 6 in). The sequence of construction can be inferred most clearly in the E Bastion where the floor levels were evidently consolidated and floor timbers laid after the scaffolding had been dismantled. The ground level outside the bastion was also consolidated with mixed rubble, soil and beach deposits, which sealed the scaffold postholes.

Structural evidence for the form of the roofs: Each bastion had a high level gun deck supported by four beams, each approximately 0.4 m (1 ft 2 in) square. The outer ends of the beams were set in slots in the curved outer wall of the bastion and rested on a wall plate (Fig. 3.33, slots 2457 and 2458 and wall plate 2463; Fig. 3.34, slot 2313 and wall plate 2316). The inner ends rested on a wall plate 0.1m thick and 0.34 m wide (4 in by 1 ft 2 in), placed on top of the stirrup tower chord wall. It is likely that a series of joists spanned the gaps between the main beams. Each bastion has two rainwater-spouts at this level (Fig. 3.33, spout 2461; Fig 3.34, spout 2314) angled down from the level of the main beams towards the exterior of the bastion wall. The roofs probably had a slight pitch, to assist with drainage, with the wall-walk set some 0.6m (2ft) above the level of the outfalls.

The E Bastion: excavated evidence: The archaeological sequence of the E Bastion is the best understood (Figs 3.24, 3.27, 3.49), and is notable for the quantity of well stratified finds from the construction levels of this period. To the east of the Bastion (trench EBZ II, Fig. 3.49), the construction trench (1212) cut the demolished phase IIb Outer Wall, and to the south of the Bastion (not illustrated) the remains of the S circular projection of the demolished

Plate 3.25: W Bastion interior, under excavation in 1973; north and north-west casemates; the displacement of the north casemate to the west bringing it closer to the north-west casemate is clear. (English Heritage/Ames)

Forework were cut by the construction trench (1401 = 1404) of the Bastion wall footing (1405). The construction trench also cut a mortar layer (1196 = 1206 = 1215 = 1225) formed during the demolition of the Forework structure. The wall footing was abutted by mixed 'beach' material (1403), in turn sealed by a layer of yellow sandstone debris (1193 = 772). To the N of the Bastion (Fig. 3.24) the construction trench cut the clay layer (1136) that sealed a series of deposits built up against the former NE corner turret (1132), and against the remains of the Outer Wall (1131). The clay and wall footing were partially covered by a thin spread of sandstone debris (1138) and a thin skim of mortar (1137). Following the infilling of the construction trench and initial work on the lower part of the Bastion wall, the area was covered with a thick layer of redeposited beach material and building debris (768 = 1203 = 1213 = 1222 = 672/722) which sealed all underlying deposits. To the S was an equivalent thick layer of beach pebbles (686).

The evidence for timber scaffolding set into the consolidated ground level survives as an arc of stone-lined postholes around the outside of the bastion (1194, 1195, 769, 1204, 1205, 775, 1223, 1224). The postholes (Fig. 3.27) were typically 0.6 m (2 ft) deep and 0.75 m (2 ft 6 in) wide, with a clearly defined post-pipe at the centre. A further seven postholes were recorded N of the Bastion. Of these, postholes 1146, 728 and 1139 were positioned to the N of the ENE Curtain Wall, and cut the demolished Outer Wall (1131). Postholes 673 and 727, were positioned N of the N wall of the E Bastion. Two further postholes (764 and 1147) extended in line away from posthole 727. Postholes 1147, 764 and 727 forming a line to the NE of the E Bastion may have formed part of a temporary stair leading to a temporary door in the N wall represented by two vertical straight joints in the brick core-work (Plate 3.26). The joint to the W appears to correspond with the position of E wall of the earlier Forework but there is no obvious explanation for the vertical joint situated 2 m (6ft 6 in) to its E. These vertical joints rise 1.85 m (6 ft 6 in) above the floor level of the casemates and it is suggested that they represent the jambs of a substantial doorway, which was blocked with bricks and stone on completion of the Bastion. The door may have been used for the delivery of building materials during construction.

E of the E Bastion, and stratigraphically later than the scaffold postholes was a deposit of mortar and stone chippings (767, 1201, 1210, 1219), between 0.07 and 0.1 m thick (3 in and 4 in), which extended from the E Bastion wall for a maximum distance of 1.35 m (4 ft 6 in). A similar deposit (726) accumulated N of the Bastion and extended up to the N face of the Bastion wall, sealing clay layer 672/722. The surface around the Bastion was further raised by a layer of beach material (671), which was in turn sealed by another dump of shingle (721). Layers 671 and 1140 appeared to form a distinct mound N of the Bastion and may represent the remains of the levelling of the phase

Plate 3.26: E Bastion interior, under excavation in 1973; the impressions of floor beams (602–3) are clear, in the background are the north and north-east casemates, with the area of blocking between, possibly the site of a temporary works access. (English Heritage/ Ames)

IIb glacis. Towards the top of the sequence N of the E Bastion were deposits of brick and tile with crushed mortar (669 and 670); they sealed a small posthole (1141) of uncertain function. Above there was a thin layer of loose sand (1142) cut by a stone-lined scaffold posthole (1411). Another series of deposits at this level, adjacent to the Curtain Wall and N of the Bastion, included a very dark brown soil with a high percentage of charcoal inclusions (725), which was overlain by a loose mortar and brick layer (739), also sealing layer 1142. Further deposits (739, 668, 717-20 and 671) and the mound capped by layer 721 were sealed by layers (666-67 and 716), which contained a large assemblage of early to mid 16th-century pottery (see Table 6.2) and a quantity of butchered animal bone.

South of the E Bastion there was a layer of crushed sandstone (1154) adjacent to and abutting the E Bastion wall and sealed by two separate mortar layers (1156 and 1155); all these layers probably derived from the construction of the Bastion. Above layer 1155 was a sequence of dumped and/or construction deposits comprising alternate layers of clay (730) mortar (1158) and clay (1157). A consistent spread of mortar (680) extended to the E for a distance of *c* 6 m (20 ft). This was overlain by 'rubble' layers (737 and 738) containing pottery dated from the late 15th to the 16th century, which may have been discarded after construction. Layer 736=740 above 737 contained the same pottery vessels as 737 but with additional mid 16th-century pottery.

Within the E Bastion a series of stone-lined scaffolding postholes (1101–1107 incl.) arranged in a rough semi-circle were cut into a layer of imported beach material (618–21 and 709, Fig. 3.49) which covered the demolished Forework and raised the working level by *c* 0.9 m (3 ft). The central posthole (1105) had been recut on two occasions (numbered 1104, 1103, not illustrated), which suggests that it was the setting-out point for the Bastion wall. Following the setting up of the scaffold, shallow construction deposits accumulated above the beach material: a patch of burning (617) to the W side of the Bastion may represent a small fire, and this was sealed by a layer of compact mortar and pebbles (1100). Above this level, deposits of loose mortar, brick and rubble (1098, 1099) accumulated, to the W and E sides of the Bastion.

All of these layers were overlain by grey-brown sand (622), sealed in turn by a hard mortar layer mixed with building debris (606-7). The sunken impressions of 19 beam slots (collectively 602–3) filled with dark earth occurred at this level. Context 602 contained early to mid 16th-century Beauvais Earthenware, but also an intrusive 19th-century Ginger Beer bottle. The beam slots were aligned E-W, and represented the decayed remains of wooden timbers 0.25 m (10 in) wide and at least 0.1 m (4 in) deep which supported a wooden plank floor. The Bastion was equipped with a drain set at the same level as the timbers. It was located between the east-facing casemates, and shows externally as a gap in the wall

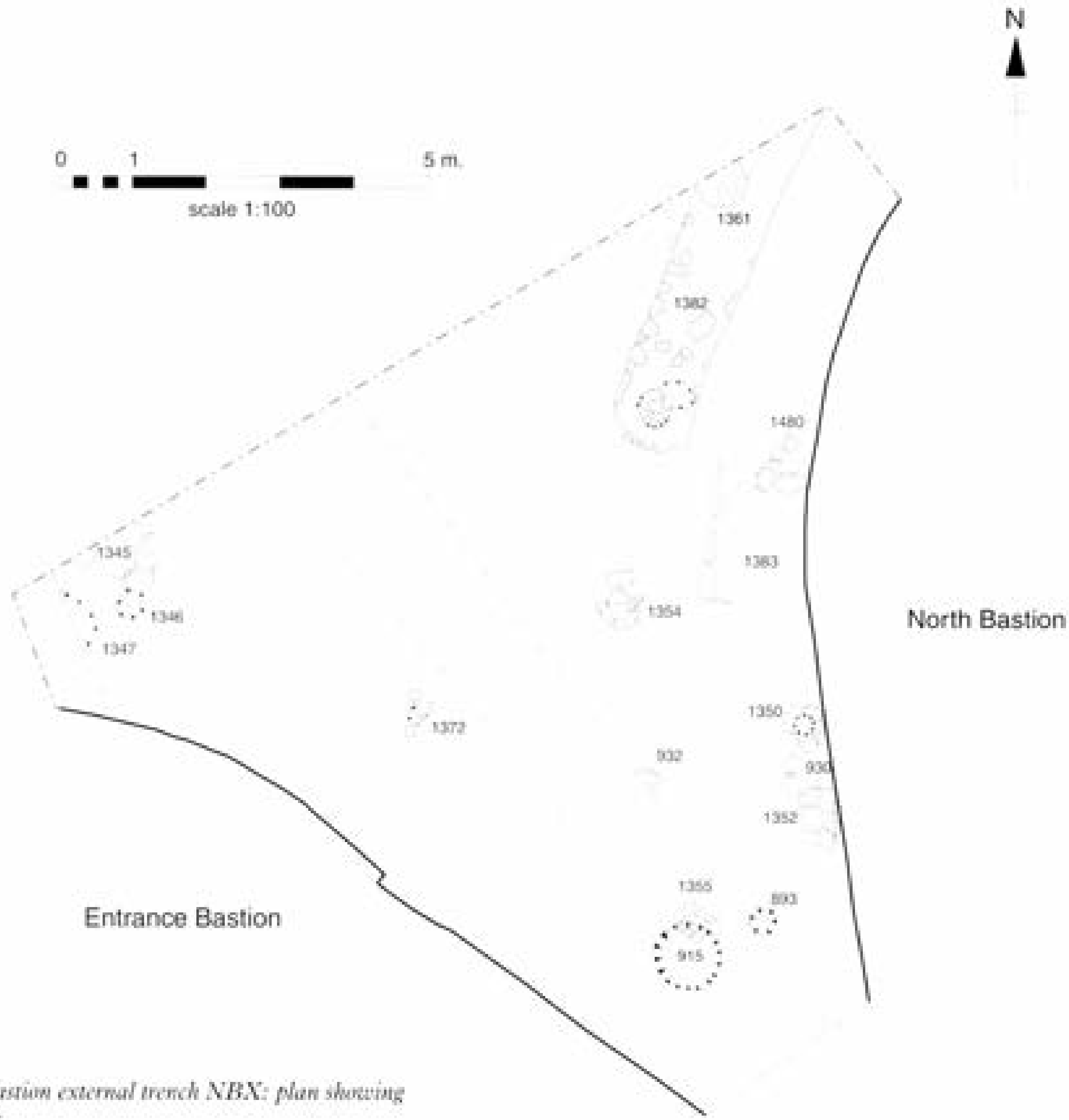


Figure 3.28: N Bastion external trench NBX: plan showing construction features

0.22 m (8½ in) wide and 0.15 m (6 in) high. It is positioned below the chamfered plinth. To the N of the E Bastion the scaffold bases were covered with a sequence of levelling deposits and beach material (921).

The N Bastion: excavated evidence: In the area of the demolished NW circular projection of the Forework, the ground surface was covered with a mortar spread (939) which also sealed the drainage features associated with the phase IIb Entrance Bastion. The mortar was sealed by a layer of dark grey clay (937) which was cut by the construction trench (1364) for the widened Curtain and N Bastion walls (1362). The fill of the construction trench for the Curtain Wall and the N Bastion was sealed by a layer of compacted pebbles, stones and mortar (1356 =1357), which also partly overlay the clay layer (937). Four stone-lined depressions (1352, 930, 1350 and 1353), possibly post bases for a scaffold arc, were cut into layer 1356=1357 (Fig. 3.28). A second ring of similar features (1355, 932, 1354, 1359 1360 and 1361), which followed the alignment of the curving N Bastion wall and probably formed part of the outer edge of the scaffold, were mostly cut into the grey clay layer (937). These postholes were generally 0.4 m (1 ft 6 in) in diameter and 0.6 m (2 ft) deep.

Inside the N Bastion, the timber floor (29) (Figs 3.40 and 3.46) was represented by the impressions of 13 timber joists, some of which were defined by lines of bricks deliberately set to either side of the timbers. Between the timber impressions was a compact sandy soil with mortar (1395). The slots were aligned N–S and were on average 0.2 m (8 in) wide and filled with a thick dark brown wood residue and occasional wood fragments.

To the W of the N Bastion, a layer of soil and beach material (927–8=1358=934–6) sealed the scaffold bases. Pottery was recovered from layer 936 and from the overlying dump deposits (layers 918–22 and 916). Of note are 37 sherds in context 918 and 31 sherds in context 919 from the same Martincamp Type I flask dating from 1475–1550. Context 921 contains further Martincamp

Figure 3.29: W Bastion: plan of excavations showing construction features and floor

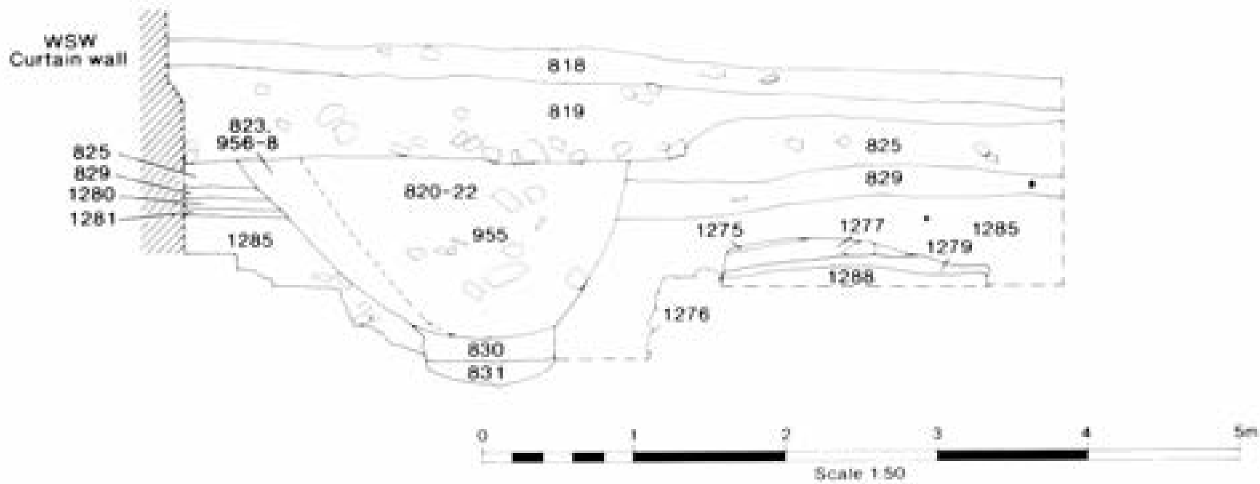


Figure 3.30: W Bastion external trench WBY: section

Type 1 flask sherds and mid 16th-century Cologne imports.

The W Bastion: excavated evidence: Excavations within the W Bastion (Figs 3.29, 3.50) showed that the construction trench for the Bastion wall (1171=1252=808=1299) was cut through the floor and walls of the earlier Forework, and that the trench had been filled with large blocks of stone. An offset was recorded at the level of the Forework floor and the foundations extended for a depth of *c* 0.76 m (2 ft 6 in) below the offset. The N wall foundation (1249) was offset by 0.6 m (2 ft) from the Curtain Wall, and widened slightly to 0.75m (2 ft 6 in) to the S. At the base of the external N face, a similar curving offset course of stone (1250) was constructed, and was seen to project just less than 0.28 m (1 ft) out from the Bastion wall. A layer of mortar and brick rubble (33=1248) sealed the construction trench of the Curtain Wall and overlay the offset footing of the W Bastion wall.

Excavations immediately outside the Bastion (trench WBY; Fig. 3.23) showed that the brickwork of the demolished Forework was incorporated in the footings (1456) of the S wall of the W Bastion. The masonry (1287), which was sealed with a layer of mortar (1286), projected 0.38 m (1 ft 3 in) from beneath the Bastion wall. Forework wall 1287 extended for a length of about 2.2 m (7 ft 2 in) and was 0.68 m (2 ft 3 in) wide at its fullest exposure, narrowing where it underlay the offset footing of the widened Curtain Wall (1291). A layer of bricks (1276) possibly associated with the Forework, was abutted by a mortar layer (1288), perhaps the remains of a floor.

In section (Figs 3.30, 3.31), the fills of the construction cut (808) of the Curtain Wall were seen to be overlain by thin layers of concreted mortar (1303) abutting the footing, and by a deposit of soft yellow mortar (1304). Above were construction deposits (1279 over 1288 and 1276, then 1277 and 1275), sealed by a thick layer of beach material (1285). Adjacent to the WSW Curtain, thin mortar spreads containing German lead-glazed Grapen and Martincamp Type I flasks (1281, 829, 960, 961) overlay the beach material (1285, 1280). A comparable mortar surface was found N of the Bastion (805=1246). Mortar layer 829 was overlain by another layer of beach material (825).

The mortar layer/surface was cut by a series of well defined postholes for a scaffold (1297 and 968 see Fig. 3.23; 1240 see Fig. 3.31; 1240, 806–07, 1244, 1243, 1284, 1283 not illustrated), mostly containing packing stones defining an obvious post-pipe. The postholes were generally 0.76 m (2 ft 6 in) to 0.91 m (3 ft) in diameter with 114 mm (4.5 in) post-pipes; the two best-preserved examples (20=1241 and 35=806) were 0.72 m (2 ft 4 in) and 0.84 m (2 ft 9 in) deep respectively from the top of the packing stones to the bottom of the post-pipes.

Construction debris (layer 1237=813) accumulated after the scaffold post bases had been inserted, and this was sealed by a mortar and limestone 'surface' (814). Sherds from the same mid to late 16th-century Cologne vessel were recovered from layers 813 and 814. A similar layer of mortar (809) sealed 814, and the later layer contained mid to late 16th-century pottery. A separate soil horizon (801–3) overlay the earlier rubble (1237) containing late 16th- to 17th-century pottery.

The internal scaffold postholes formed an arc within the W Bastion (Fig. 3.29). Two postholes (1172, 1173) cut into the remains of the Forework (1181) and two others (1174, 1175) cut the natural beach material (1182). The postholes were circular (1174) or sub-rectangular (1175) in plan, and some packing stones survived (1172, 1175 and 1173). The largest posthole (1174) was 0.3 m (12 in) in diameter, while others (1175, 1173) were 0.2 m (8 in) and 0.36 m (14 in) deep respectively. Construction debris (1169) accumulated above the earlier structures and overlay the fill of the Bastion wall construction trench (1171).

The base of the doorway (1178) in the chord wall of the Stirrup Tower was blocked (Fig. 3.29) and a 0.76 m (2 ft 6 in) thick layer of beach material (704–5) was dumped over the construction debris (1169), in preparation for a new raised floor (Figs 3.32, 3.50). Layer 704–5 was sealed

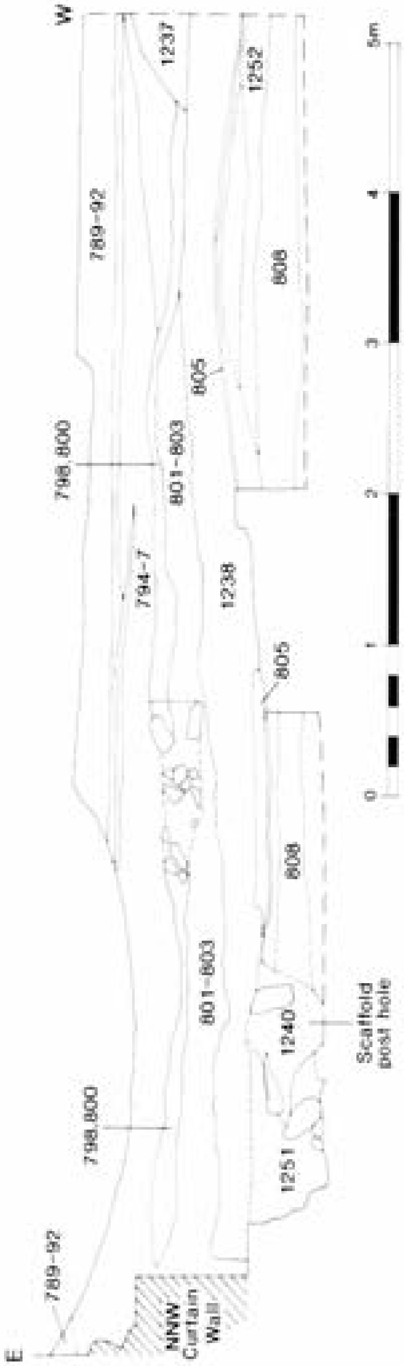


Figure 3.31: W Bastion external trench WBX: section

by a layer of compact mortar (1168) containing occasional brick fragments and small pebbles. This layer was 0.23 m (9 in) thick over most of the Bastion, thickening to 0.3 m (1 ft) to fill a depression in front of the door where the blocking gave way to the mortar bedding (1458 see Fig. 3.50) for steps forming a new threshold. The mortar floor (1168) showed signs of wear below the locker (1179) in the N half of the chord wall, and on either side of the

Plate 3.27: E Curtain Wall Gallery looking north; to the right of the picture can be seen the straight joint between the phase IIb and phase III Curtain Walls.

NW facing casemate and gunport, and appears to have been used as a 'temporary' working level whilst the kitchen installations were constructed. A spread apparently of charcoal (1167) overlay the mortar floor (1168) extending SE from the NW facing casemate. Both charcoal and mortar floor were sealed by a further layer of mortar (699–702), the level from which a stone and brick drain (1164) was constructed. This was situated between the SW and NW facing casemates and extended through the Bastion wall. The drain had a floor of stone slabs, and walls of brick three courses high, and was capped with stone. Following construction of the drain, layers of sand (694–8, 1165 below 703) were laid, prior to the installation of the timber beams for the floor. Preservation of the beam slots was poor, with the best examples found in the N quadrant of the Bastion, where the profiles suggested that the beams were 0.15 m (6 in) square. The kitchen range was contemporary with the construction of the wooden floor. Traces of fibrous material (perhaps thin wooden slats) against the S wall formed the bedding for the flagstones (1459) in front of the range built between the S and SW casemates. Five further flagstones (1460) were found E of the NW casemate at the level of the timber floor. It is unclear whether the whole of the floor of the bastion was similarly covered.

South of the W Bastion a layer of beach material (6 = 825/959) was deposited above the scaffold bases and associated construction debris. This layer contained late 16th-century French (Fig. 6.2.3) and Low Countries pottery. A single clay pipe bowl dated to 1660–1710 was also found in this layer, and is probably intrusive.

The Curtain Wall (Figs 3.23, 3.26, 3.27, 3.30, 3.37, 3.38; Plates 3.27–3.30)

The redesign of 1542–3 abandoned the earlier outer defences (glacis and Outer Wall) in favour of the octagonal

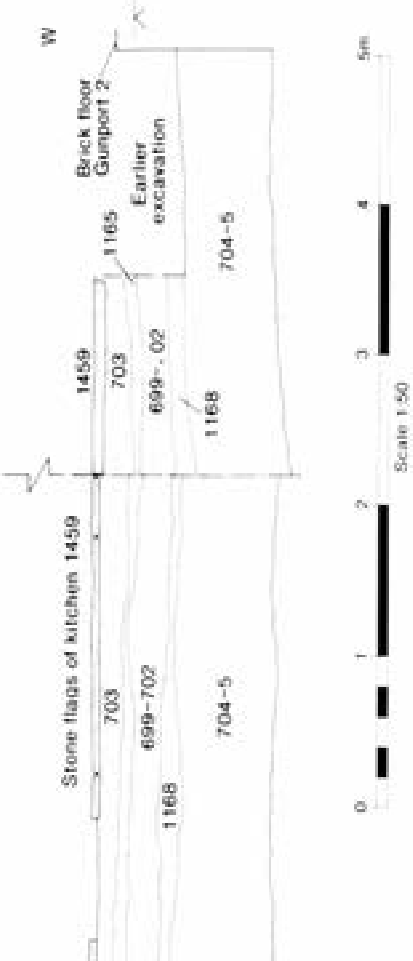


Figure 3.32: W Bastion: section across kitchen

Plate 3.28: E Curtain Wall Gallery GII, basement level leading to the door into the N Stirrup Tower. 1982 (English Heritage/Sheppard)

Curtain Wall, strengthened by the addition of the four new bastions. The outer element of the original Curtain Wall, as built in 1539–40, had not been particularly massive, and it had to be widened considerably. This was achieved by the addition of a new external wall, 2.4 m (7 ft 9 in) thick, abutting the external face of the phase IIb Curtain with a straight joint (Plate 3.27). The new wall was constructed of reclaimed sandstone at its lower levels, with freshly quarried grey sandstone used for the upper levels; as in the previous phase, Caen stone was used for mouldings (Hall, Chapter 4, below). There are large gun embrasures at parapet level in each stretch of the Curtain. The strengthening of this wall allowed the creation of a further storey of accommodation with a new first floor gallery reached via newel staircases built in the angles of the Curtain Wall. The surviving stair in the north-east angle has a diameter of 2.1 m (c 7 ft) and is entered from the courtyard over a raised threshold; the steps, formed of wood slats set on brick risers, rose to the north-east in a spiral. In the galleries adjacent to the Entrance Bastion, newel stairs were constructed above the original doorways leading to the subterranean passages, thereby providing access to the roof and parapet of the Entrance Bastion.

The floor levels in the basement galleries were raised by about 0.3 m (1 ft); the phase III basement gallery floor was constructed of brick resting on a sand bed. This has been laid over the compacted mortar remains of the basement floor of the phase IIb gallery. The SW gallery was divided by a cross wall into two separate compartments at basement level, but no evidence survives for the arrangement on the upper levels (Fig. 3.37). This formed separate WSW and SSW basement galleries, and the latter was used for new garderobe facilities (see below). The garderobes were accessed from the SSW Courtyard via a door in the inner Curtain Wall leading to a short flight of steps (Fig. 3.37). The period in which this work was carried out remains uncertain, and it is conceivable that it post-dated the phase III construction works, although, it clearly predated the infilling of the S Bastion (Phase IVb, below).

By 1543, therefore, the octagonal Curtain Wall had a basement-level gallery communicating with the radial passages and Vaulted Ring Passage via the basements of the stirrup towers. There was a ground floor gallery

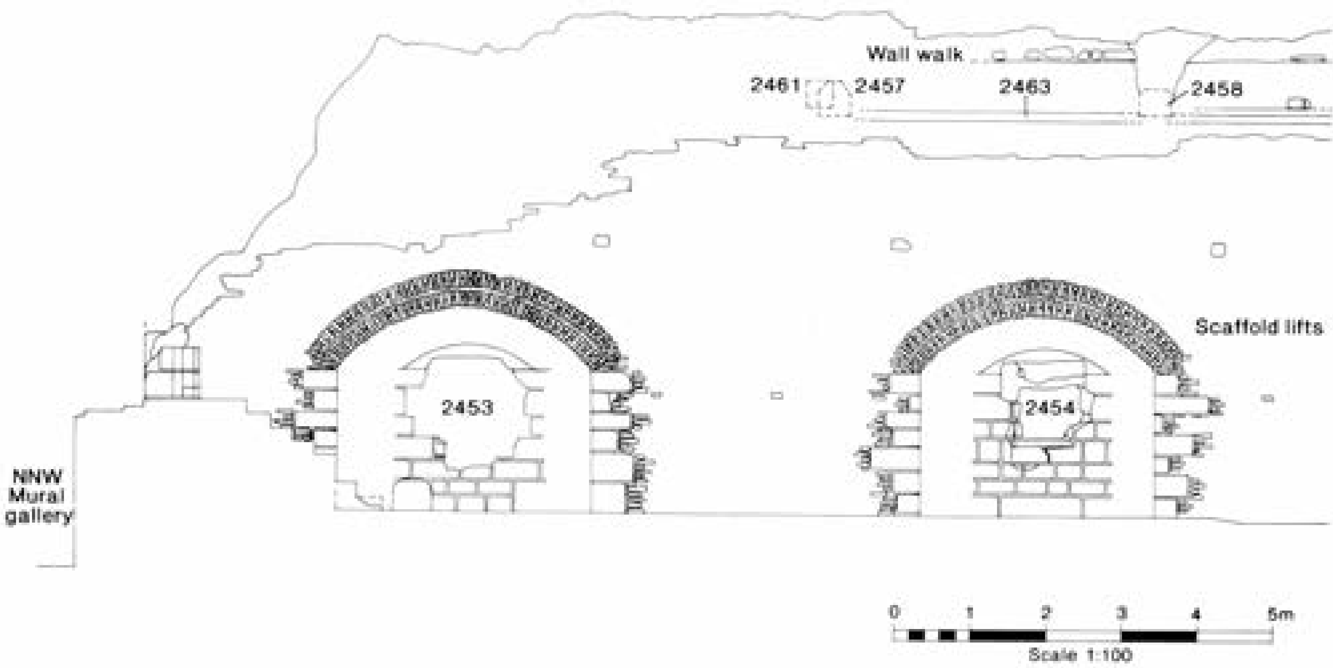


Figure 3.33: N Bastion: elevation of interior face of north-west wall showing roof timber positions and scaffold lifts

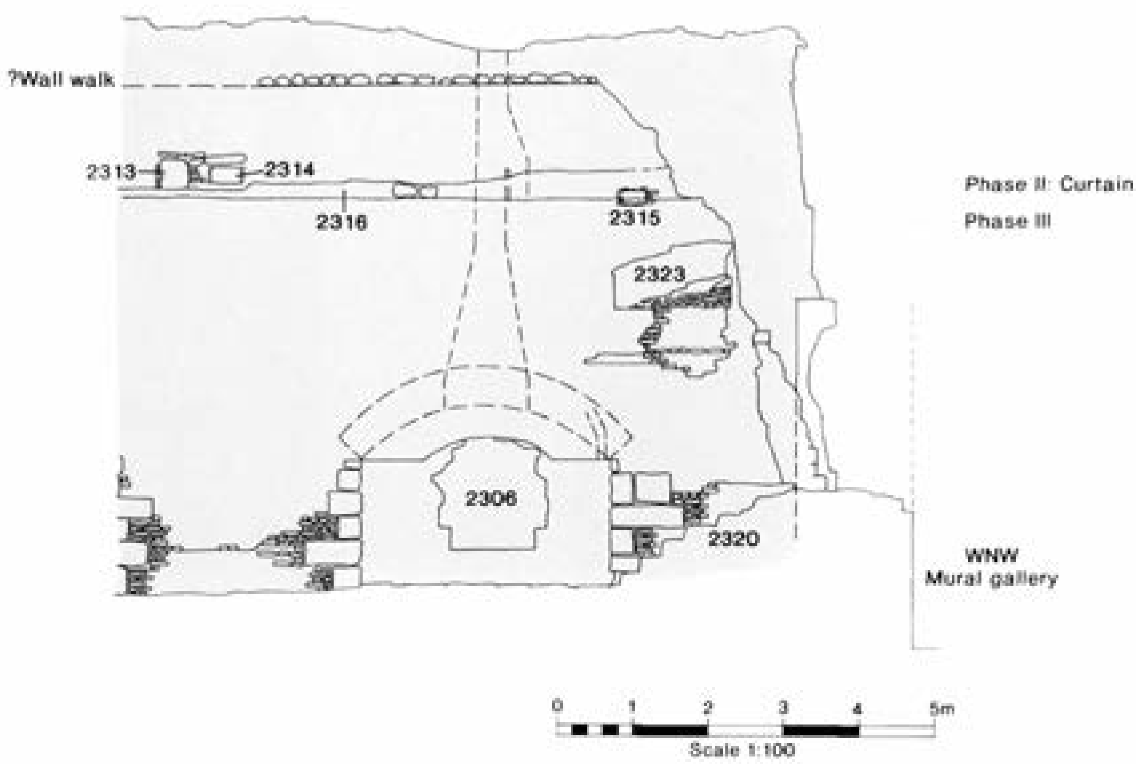


Figure 3.34: W Bastion: elevation of interior face of north wall

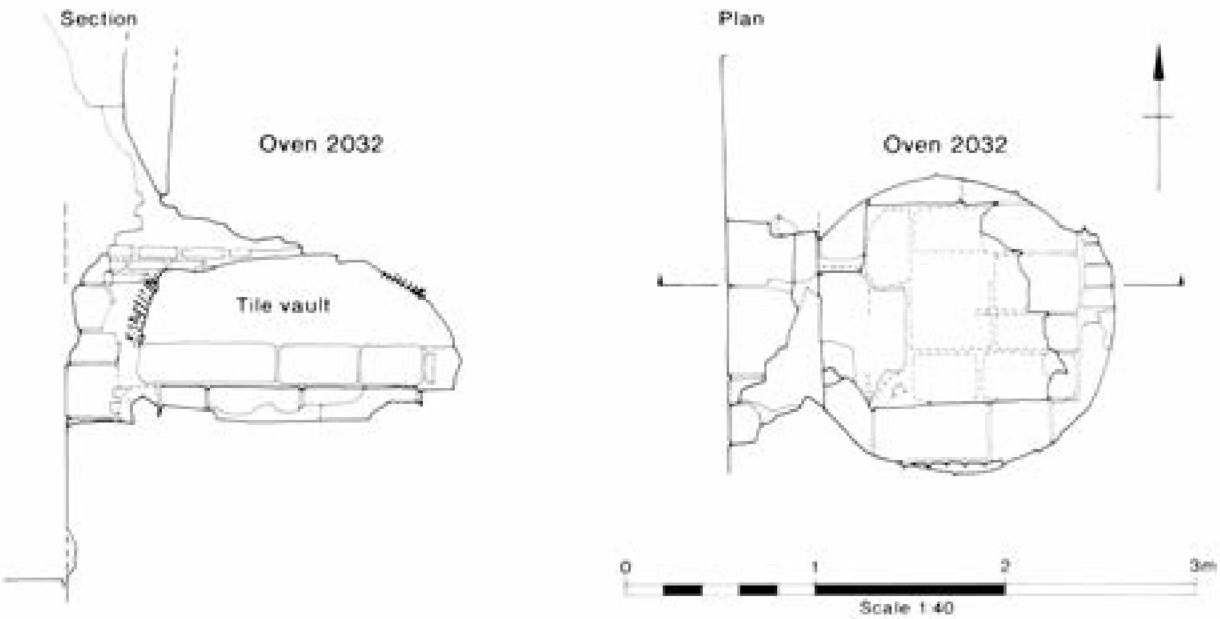


Figure 3.35: W Bastion: detail plan and elevation of oven 2302

probably already in use for barrack accommodation, with direct access into the gun rooms of the new bastions; a first floor gallery, which the evidence suggests was designed to provide a fair level of domestic comfort (see below); and above it a wide gun platform with a parapet. This was supported by a corbel table, probably continuous, as evidenced by the corbel stones found in the galleries (see architectural stone report, Chapter 4, below).

Only the basement galleries of the Curtain Wall now survive (Plate 3.28), since the galleries were demolished to ground level when the castle went out of use (see Phase V, below). A large group of individual architectural stones was recovered during the excavation and clearance of demolition deposits in the courtyard and the basement galleries, and these, together with quantities of window glass and lead calme, indicate that the galleries were furnished with glazed windows (see Hall, Chapter 4, below; Cropper, Chapter 4, below). The evidence suggests that the first floor gallery had windows overlooking the courtyard, framed by hoodmoulds and an integral string-course that probably continued around the stirrup towers. There were probably also windows overlooking the courtyard at ground floor level, although it remains unclear whether these were original features of the phase IIb gallery, or insertions of phase III. Jackie Hall's reconstruction of a first floor window is shown in Figure 3.38. Although no evidence survives *in situ*, it seems likely that there were three windows at first floor level in each stretch of the Curtain Wall, and possibly two beneath at ground floor level, one to either side of the fireplaces. The evidence for architectural details and windows is considered in more detail below.

The existing garderobe facilities at ground floor level within the south-west, south-east and north-east sectors of the phase IIb Curtain Wall were modified by the addition of culverts extending through the thickened masonry. New garderobe were built at basement level in the SSW Curtain Wall, comprising a single-seat cubicle and a three-seat multiple garderobe (Plate 3.29). A new single-seat garderobe (possibly for officers) was built at first floor level within the angle of the SW Curtain Wall, to serve both the WSW and the SSW galleries. This garderobe was spacious and well-appointed, and had a window pierced through the Curtain Wall and a recess for a lamp or candle. The style of the cubicle suggests that it might have been intended for use by officers only, and the garrison presumably continued to use the garderobes at ground floor and basement levels.

The appearance of the Curtain Wall galleries

The following interpretation of the completed Curtain Wall galleries of phases IIb and III has been suggested by Hall from her detailed analysis of the loose stones and architectural fragments recovered during excavations (see Chapter 4, below).

Of the numerous loose architectural stones, several groups could be securely identified as belonging to the galleries. These include string-course, with a moulding identical to that of the central Keep, but without any curvature (Group 2). There are hoodmoulds with stops and backplates (Group 3); corner hoodmoulds with similar profiles (Group 6); sections of string-course with a vertical moulding identical to the projecting hoodmould (Group 5); springers for windows with four-centred arches 0.6 m (2 ft) wide (Group 7); and numerous window jambs (Groups 8, 9 and 10). The sections of string-course with vertical mouldings would have connected to the hoodmoulds to form the completed string-course. The pieces of corner hoodmould hint that there were other similar windows, which were fitted independently of a string-course. Other less significant

Plate 3.29: SW Curtain Wall Gallery GVI; entrances to multiple garderobe (on the left of the photograph) and single garderrobes, 1982 (English Heritage/Streeten)

variations were found in the moulding details of both the window springers and the jambs.

It is suggested that the string-course was positioned at the top of the first floor gallery of the remodelled castle in the final period of construction. Beneath the string-course were arched windows with square surrounds, framed by hoodmoulds with stops on either side. The stops sprang from inside the string-course itself. A reconstruction of a window is shown in Figure 3.38.

The number of windows in each section of the gallery is uncertain; it is also unclear whether they also appeared on the ground floor and whether the two different designs (one beneath a string-course and one beneath a hoodmould) represent a change of design during the building of the galleries. Assuming that stones recovered during excavation lay next to the wall from which they were removed (or fell), then the recovery of three left-hand label stops in the WNW Courtyard suggests a minimum of three windows in the adjacent stretch of gallery wall.

Different types of freshly quarried stone were used during construction of the phase IIb and phase III galleries. Analysis of stone type has proved only partially helpful in determining whether the ground floor gallery was equipped with windows. Caen stone and yellow sandstone were used for the phase IIb galleries, whilst in phase III Caen stone and grey sandstone were used. All the string-course and hoodmould fragments are in Caen stone and are thus of little use in establishing the phasing and the precise location of the string-course. Five pieces of grey sandstone window-head were recovered, all of which belong to the phase III gallery. Out of 26 jamb stones, 19 are grey sandstone but only 7 are yellow sandstone. This indicates that the majority of the window stone surrounds belong to phase III, and were therefore at first floor level. The 7 yellow sandstone jambs may belong to the phase IIb gallery; equally they could have been cut from reused stones and inserted at either level of gallery in phase III. The windows built without a string-course could be original phase IIb features or phase III insertions at ground floor level. The clue to the form of the ground floor walls in phase IIb may lie with the construction of the centrally placed fireplaces along each stretch of wall. There would be room for 2 windows in each stretch of the ground floor gallery walls flanking the stacks. The more elaborate arrangement of string-course and windows would fit better at first floor level.

Despite incomplete evidence, it can be suggested therefore that the gallery walls overlooking the courtyard had windows in phase III at first floor level linked by a string-course that very probably continued around the stirrup towers, and (probably) windows at ground floor level. The latter had no linking string-course and may have been original phase IIb features as light would have been needed. The design of the windows, though interesting in the context of Camber, is not exceptional. Examples of integral string-courses are too numerous to list, but include, for instance, Layer Marney gatehouse, Essex (1520s; Pevsner 1954, 239), Cadhay House, Devon

Plate 3.30: SE Curtain Wall (Trench EBY); garderobe chute 1151, looking west. 1973 (English Heritage/Ames)

(1540s; Howard 1987, 85), and Lulworth Castle, Dorset (begun 1608; Platt 1990, 291). Less common is a label stop springing from the string-course, although this feature exists at St Osyth's Priory gatehouse, Essex (late 15th century; Pevsner 1954, 310, pl. 48b). Another example in the Henrician fortification at St Mawes Castle, above the main doorway of the Keep is exactly contemporary with the third phase of Camber Castle, although the string-courses do not have the same profile (pers. comm. Donald Tosh, Head Custodian). Since the design of the string-course at Camber was chosen with regard to the first phase Tower, this treatment suggests a degree of aesthetic quality greater than that necessary merely to meet the needs of efficient fortification.

Excavated evidence for the garderobes

ESE Curtain Wall ground floor: A sloping garderobe chute (1151) was built immediately S of the E Bastion, within the phase III Curtain Wall foundation (1152), to provide a drain for this phase IIb latrine (Fig. 3.27; Plate 3.30). The chute was constructed of stone and brick and extended for a length of 1.95 m (6 ft 6 in) before discharging into a wood-lined channel (731) which led to a soakaway pit (1153) cut into the natural beach (686). The timber channel extended for a length of 4.2 m (14 ft) and was 0.2 m (8 in) wide. The soakaway pit was 1.65 m (5 ft 6 in) in diameter and 0.9 m (3 ft) deep. The timber-lined section of the drain was sealed by a layer of clay mixed with sand and pebbles (11=683–84). Above this chute, the phase IIb garderobe vent was extended upwards, within the phase III Curtain. Although there is no evidence to suggest that a first floor latrine was constructed at this time, it is possible that the angled vent served as a drain for the first floor gallery, and for the wall-walk.

WSW Curtain Wall ground floor: A stone-lined chute (1290) from this garderobe ran out from the Curtain Wall immediately south of the W Bastion (Figs 3.23, 3.30) through an outlet constructed of brick. Outside the Curtain the chute was lined with wood beams (831), and a cross-beam (1289) was positioned immediately beyond the outlet. Large fragments of pottery from the same local earthenware (Fabric 14) vessel were found on top of the cross-beam. The chute was 0.46 m (1 ft 6 in) wide where it passed through the Curtain, narrowing to 0.3 m (1 ft) further out, and covered by 0.3 m (1 ft) of beach shingle. The chute was traced for a distance of 5 m from the Curtain Wall. A deposit of cess (830) was found on the bottom of the chute over the remains of the timberwork (831) containing late 16th- and early 17th-century Cologne Bellarmine and Tin Glazed Earthenware.

NNE Curtain Wall ground floor: The latrine shaft (112) built into the phase IIb Curtain Wall was joined by a secondary latrine shaft (111) built into the thickened masonry, just below the ground floor level of the gallery. A single shaft (144) acted as the outlet for the two and descended to a point just below the basement floor of the gallery. This chute (144) then joined a sloping drain (150) which extended through the Curtain Wall.

SSW Curtain Wall basement level: A doorway led from the courtyard into the SSW basement gallery, giving access to the garderobes (Figs 3.36, 3.37). The doorway has yellow and red brick jambs, beyond which stone and brick steps lead down to the basement. The doorway was probably contemporary with the construction of a cross-wall (Fig. 3.37, wall 49) which divided the WSW and SSW Curtain Wall gallery into two chambers. The blocking was done with care and was taken to the full height of the basement. The gallery walls in the newly created SSW basement gallery (GVI) were rendered after the blocking, the render being carried round onto the cross-wall. This new room appears to have served as an antechamber to the two new latrines. The entrance to the small latrine was angled, probably to make room for a wall (1420) housing a doorway separating the two cubicles.

The Stirrup Towers (*Figs 3.26, 3.40*)

The phase IIb stirrup towers were retained in the works of 1542–3, although the Foreworks fronting them were demolished, and the four surviving bastions were constructed in their place (see above). The height of the bastions made it necessary for the stirrup towers themselves to be raised by the addition of a further storey, and new first-floor chambers were built, surmounted by

Figure 3.36: SSW Courtyard and Gallery: plan of trench SBC/G

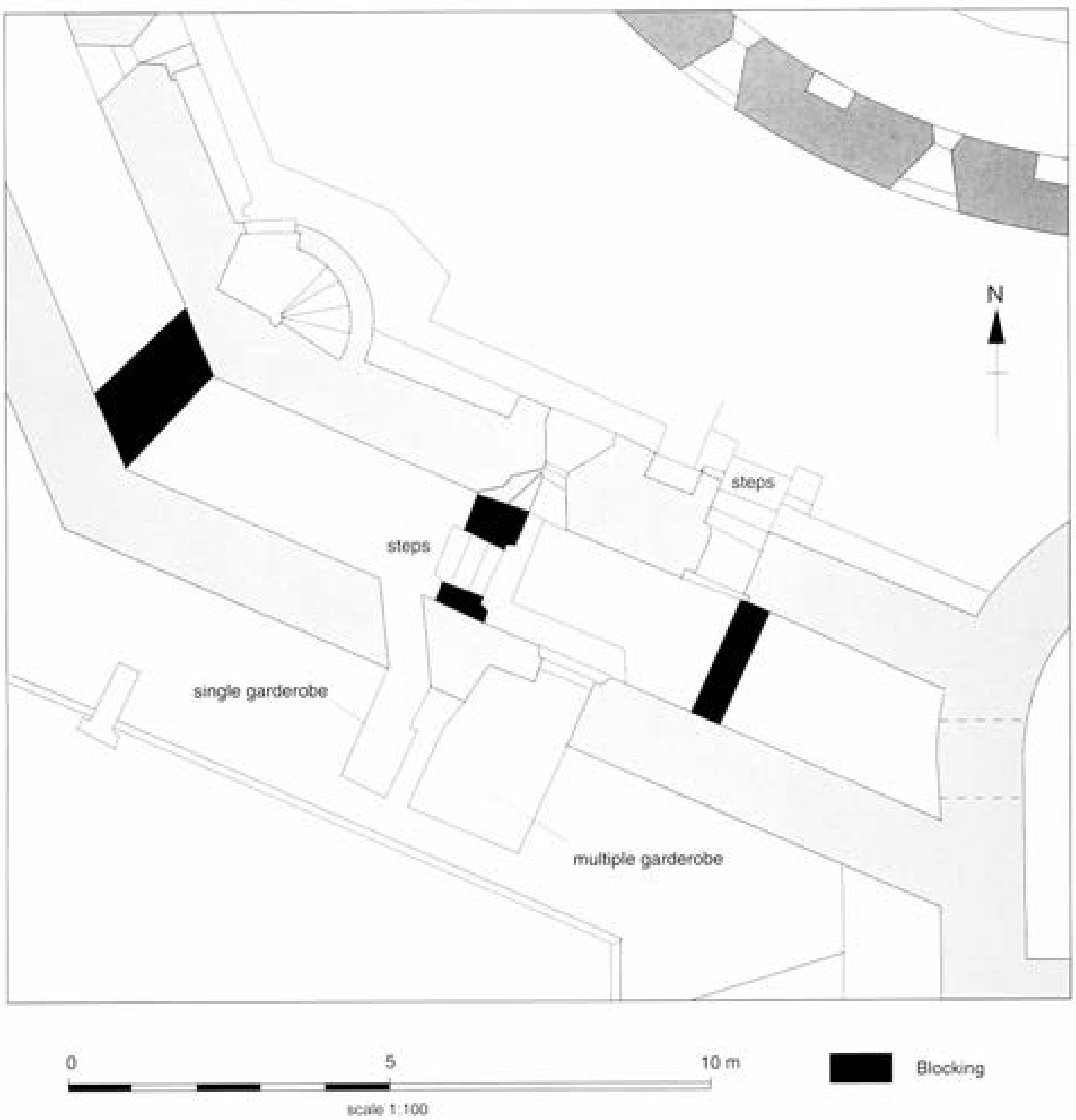


Figure 3.37: SW Curtain Wall; detail showing blockings and garderobes

walled platforms for ordnance to fire over the new bastions. On the evidence of the S Stirrup Tower, which is the best preserved, it is clear that the first-floor chambers differed slightly in shape from those on the ground floor, with the walls built straight rather than following the curve below. Where evidence is available there is also a distinct change of build, and this is best seen in the E Stirrup Tower where the wall core at ground floor level is of rubble faced with ashlar, and at first floor level both core and facing are of brick. A surviving door at first-floor level on the east side of the S Stirrup Tower gave access both to the first-floor gallery and to a landing onto the bastion gun deck, and is probably typical of the arrangements in the other stirrup towers. The basement floors in the stirrup towers were raised slightly to levels between 3.6 and 3.7 m OD: new timber floors were constructed in the E and N Stirrup Towers and a brick floor was laid in the W Stirrup Tower. The floor levels match those of the radial passages, which were also raised in this phase. Flights of steps were constructed through the chord wall doors leading up from the stirrup tower basements to the level of the gun rooms in the new bastions (see Bastions, above).

The ground floor of the stirrup towers had a door opening onto the courtyard flanked by a window on each side. Windows in the first floor may have matched the positions of the ground floor windows and perhaps the door.

Evidence from excavations: In the N Stirrup Tower, the phase III floor (Fig. 3.40; Plates 3.17, 3.18) comprised a series of parallel slots orientated NNE–SSW, filled with grey-brown loam containing brick and sandstone fragments. The slots were surrounded by compacted sandstone (325). Each slot was 0.15–0.2 m (6–8 in) wide and 0.12–0.15 m (5–6 in) deep. In the E Stirrup Tower the remains of the basement floor joists comprised seven beam slots, surrounded by hard white mortar and brick fragments (638). The floor joists were set at *c* 3.62 m OD, *c* 0.3 m (1 ft) above the phase IIb floor level, matching the final level in the E Radial Passage. Raeren/Aachen pottery of late 15th-century to mid 16th-century date was recovered from the fills of the beam slots. By contrast, in the W Stirrup Tower the floor was constructed of courses of brick stretchers aligned N–S, which lay at 3.72 m OD.

The Entrance Bastion (Figs 3.7–3.13, 3.26; Plates 3.31–3.33)

The phase IIb entrance, which comprised a D-shaped bastion added to the front of the original rectangular Gatehouse, was retained and modified in the works of 1542–3. A first floor level was added at this stage, but erosion of the upper parts of the walls has removed most of the evidence for the wall tops and roof of phase III. Problems with the ground-water level had already obliged the builders to abandon the basement level in the D-shaped building while work was in progress in 1539–40, and to raise the floors of the lower rooms to ground level. These floors were raised again in 1542–3, to approximately the same level throughout the building. It seems likely that this was undertaken piecemeal, rather than as a single operation, because a variety of flooring materials were used and slight differences in level persisted. The floors of the four ground floor rooms were relaid at their new level in brick, as was the floor of the Inner Entrance Passage. The floor of the Outer Entrance Passage was of timber, while the Lobby was floored with stone slabs. A series of regular slots clearly visible in the extant fabric of the NW half of the Entrance Bastion wall must represent the housings for the floor joists of the new first floor accommodation (Fig. 3.13). Very little evidence survives for the layout of the first floor accommodation, but the cross-wall dividing the Gatehouse from the D-shaped Bastion was clearly raised above ground floor level, suggesting that there was a division at first floor level between a room or rooms in the D-shaped Bastion and a room or rooms above the Lobby and Inner N and S Rooms.

Raising of the floors and walls was accompanied by modifications to the phase IIb openings. At ground floor level, a new main door was inserted, and the bottom of the phase IIb door was blocked. An external ramp was constructed, leading up to the new entrance (Plate 3.31). The gunports were extended upwards, with their original lower levels blocked up, but the opening interpreted (phase IIb above) as a porter's window was partially blocked to create a cupboard in the wall. The original stairs in the rounded front of the D-shaped bastion were blocked, and new stairs were added in the Curtain Wall to either side of the Gatehouse, giving access to parapet level from the Curtain Wall galleries. A staircase rose from the Inner N Room through the core of the NE wall, to provide access from ground floor to first floor level. The provision of this private stairway to the upper level of the Gatehouse adds to the impression that the first floor of the Entrance Bastion may have been occupied by particularly prestigious accommodation (see below). The two flights of stairs in the Lobby that gave access to the Inner N and S rooms were blocked, and new doors were created at the east (inner) end of the Inner Entrance Passage giving access into the N and S rooms at ground level. New stairs were built above the original stairs in the lobby, to provide access to the rooms above the Inner N and S rooms.

Plate 3.31: Entrance Bastion exterior, looking south; on the right of the picture the phase III ramp to the new Entrance can be seen sloping up above the former outlet of the subterranean passage at the face of the former Gatehouse wall. 1965 (English Heritage/Biddle)

The emphasis on comfort apparent elsewhere in work of this period (see above) is strongly evident in the Entrance Bastion (Plates 3.32, 3.33). Large windows were installed to light the first floor accommodation (Fig. 3.13), and two further windows may have been inserted at this time on the ground floor in the NW and SW angles of the original Gatehouse (2470, shown in Fig. 3.7, and 2494). New fireplaces were also constructed. Two fireplaces were built at first floor level, the first (Fig. 3.13, 2482) in the Bastion wall and the second (Fig. 3.7, 2466) in the SW wall above the Inner S Room. A third fireplace (Fig. 3.13, 2488) was built at ground floor level in the N Quadrant Room. A garderobe was constructed on the first floor above the N Quadrant Room.

Upon completion of these alterations, there is evidence that the Entrance Bastion was rendered externally with a mix including coarse aggregate, traces of which survive on walls built in phases IIa, IIb and III.

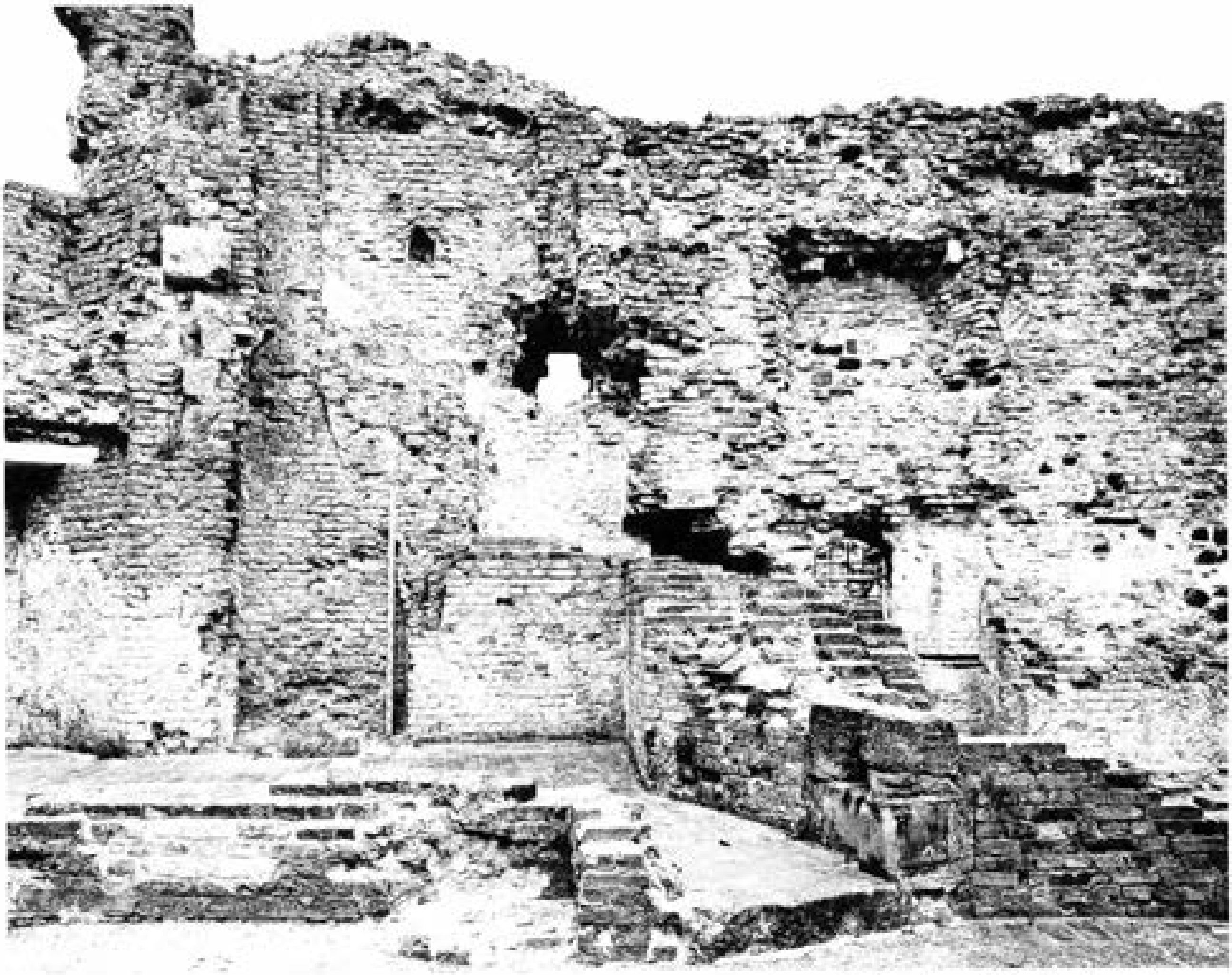


Plate 3.32: Entrance Bastion north-east interior elevation; in the centre of the photograph is the phase III garderobe with external window. To the right of the garderobe is a blocked window; to the left is a chimney with the ground floor fireplace of the N Quadrant Room. On the extreme left is gunport 2487, with window 2486 above. 1998 (English Heritage)

Structural and excavated evidence

Structural evidence for the heightening of the Entrance Bastion: The best evidence for phase III alterations survives in the wall faces surrounding remodelled and inserted openings, where it can be seen that the upper parts of the walls were constructed using the grey sandstone which is characteristic of this phase of work, with yellow brick internally. As a result of the loss of the wall tops to erosion there is no evidence for the form of the roof or parapet. There is also a change in the composition of the wall core above the external stone face of the phase IIb walling. Sockets for timber joists survive in the internal elevation of the S Quadrant Room, set slightly above the top of the new main door (at *c* 7.6 m OD), and the walls of the Entrance Bastion clearly extend above this level.

Excavated evidence for the raising of the floors: The Outer Entrance Passage floor was raised by dumping layers of beach material and rubble (1087 below 1086 and finally 1085), before a timber joist floor was constructed at 4.6 m OD. In the N Quadrant Room, a thick layer (576) of mortar, brick, wood and sand was dumped on the earlier timber floor, and the new brick floor laid at 4.5 m OD, just below the raised floor of the Inner Entrance Passage. In the S Quadrant Room, two layers of mixed rubble (1068 below 1067) were laid above the earlier timber floor and a brick floor was laid at 4.7 m OD. Single step risers form the thresholds between the new lobby level and the N and S Quadrant rooms. The base of the doorway between the Lobby and the Inner Entrance Passage was blocked with a mixed stone wall (1446) which formed a straight joint with the adjoining wall (1443). The blocking, 0.55 m (1 ft 10 in) high, was extended across the threshold stone of the earlier door. The earlier brick floor of the Inner Entrance Passage was overlain by rubble (1082 followed by 578 and lastly 1081), and a new brick floor was laid at 4.63 m OD. Two steps lead down from the Lobby to the Inner Entrance Passage, a drop of *c* 0.3 m (12 in), and the final floor surface lay at 4.3 m OD. Both the N and S Inner Rooms were furnished with brick floors. Access to both rooms at ground level was via new doorways at the E end of the Inner Entrance Passage. The phase IIb stairs to the N and S Inner Rooms were no longer required,

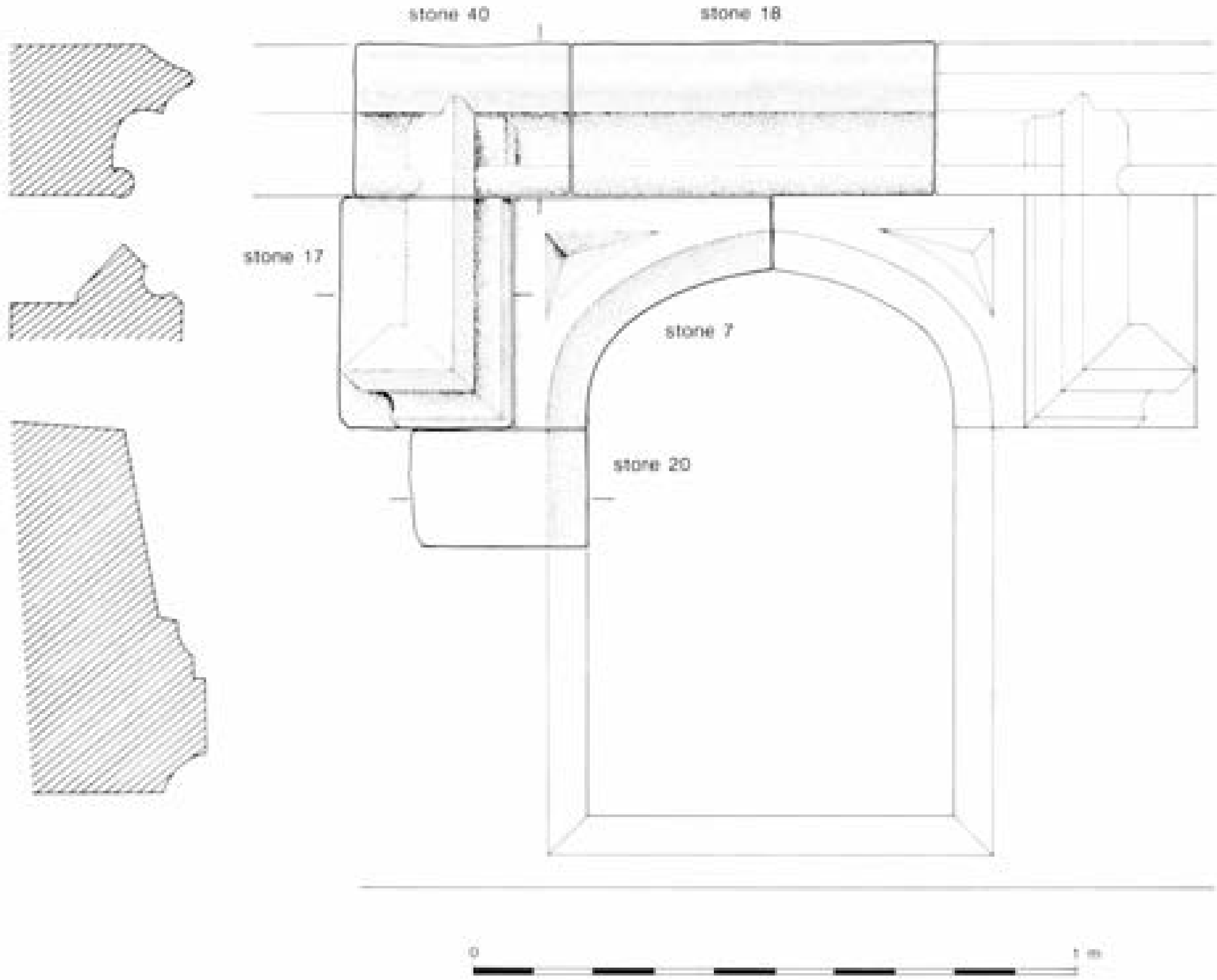


Figure 3.38: Reconstruction of a first floor gallery window

and the stairs were dismantled. The stair-wells were filled with bulk rubble and the entrances were blocked by the construction of cross-walls. Stairs were constructed above to give access to the rooms at first floor level. The Vaulted Chamber/Cellar that ran beneath the courtyard beyond the Inner Entrance Passage was partially filled, although the level of the new brick floor left *c* 1 m of the vault open (Plate 3.1). The function of the room thereafter is unclear.

Structural evidence for phase III openings: The original bases of gunports 2481 and 2487 in the N and S Quadrant Rooms (Fig. 3.13) were concealed by the raised floor. The gunports were then extended upwards through the ground floor walls, and new stone lintels inserted. Both rebuilt gunports had sockets for closely spaced iron bars, suggesting that they were not intended for firing cannon. Three windows (2475, 2483 and 2486) were built in the first floor wall; one is positioned directly above the new main door, with the others to either side. A large fireplace (2482) was constructed at first floor level, to the W of the central window (Fig. 3.13). A further fireplace and chimney (2488) were constructed in the N Quadrant room at ground floor level (Fig. 3.13). The fireplace measured 1.35 m (4 ft 4 in) across and was set back *c* 1.05 m (1 ft 6 in) into the wall. A new garderobe was constructed at first floor level above the N Quadrant room (not illustrated); the outfall drained into the existing sump (1379). A third fireplace (2466) was constructed at first floor level above the Inner S Room (Fig. 3.7).

Excavated evidence for construction: Directly outside the entrance (Fig. 3.12), the scaffold was constructed from a surface of hard smooth mortar (1052), laid over thin layers of mortar and yellow stone chippings (1478) derived from phase IIb construction activity. Four stone-packed postholes (1390, 1391, 1392, 1393; not illustrated) were cut into the mortar. Two timbers used for the construction of the scaffold had been left at the level of the mortar and stone chippings (1478). Following construction, several layers of building rubble and beach material (1477) with a combined thickness of *c* 1.2 m (4 ft) were dumped to create a ramp rising to the sill of the main entrance (at *c* 4.4 m OD). There was a mixed layer of rubble and beach material (1051) above the mortar ramp. To the S of the Entrance Bastion four postholes (807, 1240, 1243 and 1244; Fig. 3.10 not all shown) were set into a mortar surface (805, 1245, 1246) which was similar to the mortar found in front of the D-shaped bastion. N of the Entrance Bastion (Fig. 3.11) one scaffold posthole (1363) was cut

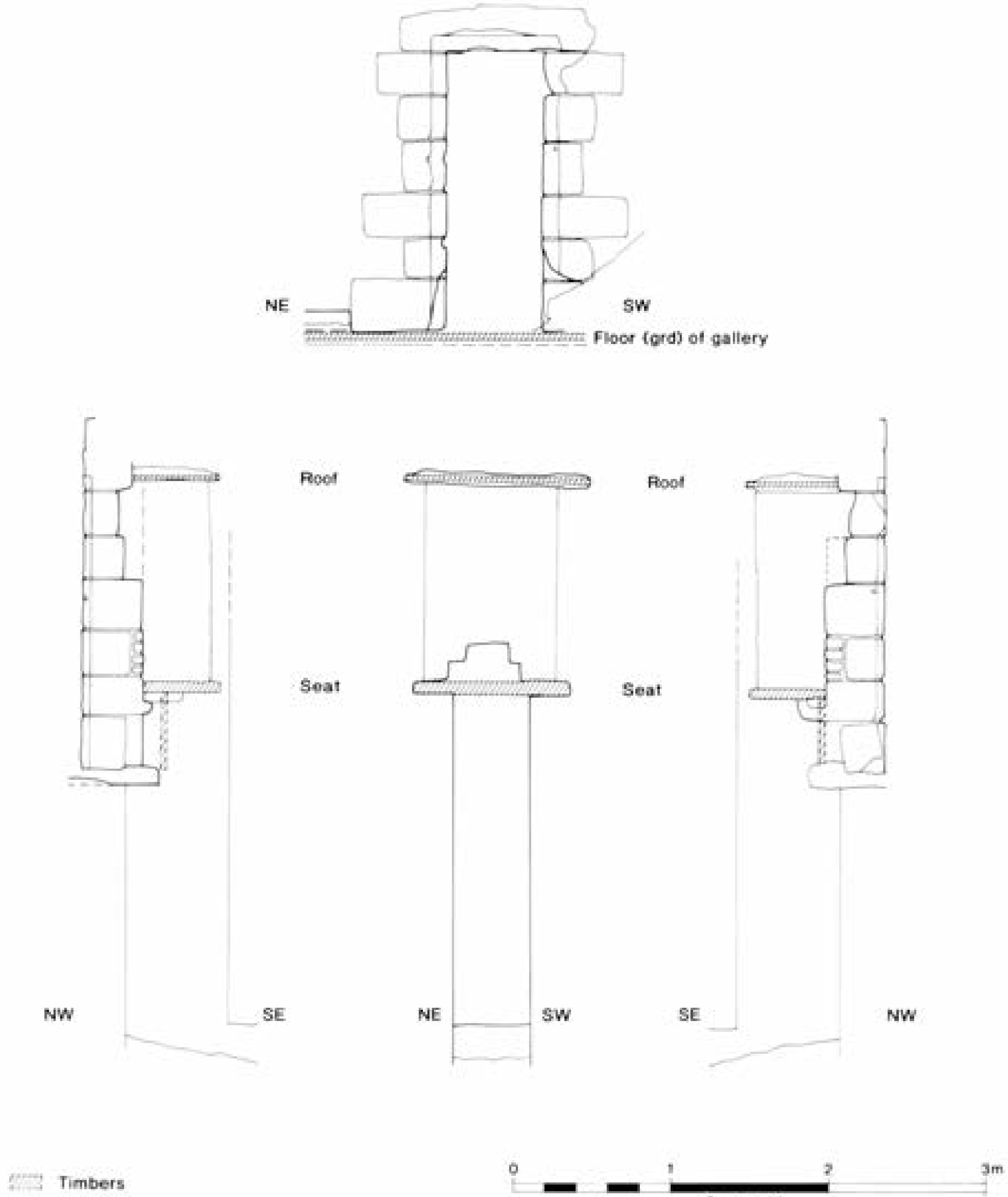


Figure 3.39: The garderobe in the SE Curtain Wall

down to the top of the level of the earlier phase IIb drain (1370). A second scaffold base (1372) to the NW was cut through a layer of sandstone and mortar (1373) overlying the stone raft. This sandstone was stratigraphically equivalent to mortar layers seen elsewhere. The remainder of the scaffold consisted of six further postholes (893, 1347, 1346, 915, 923 and 1345), which were cut into the stone and mortar spreads. One posthole (893) contained Spanish Olive Jar dating from the late 16th or early 17th century. Mid to late 16th-century Cologne/Frechen pottery was recovered from the fill of another posthole (923). The fills of three postholes (893, 915 and 923) were sealed with a general deposit of brown sandy soil and pebbles (887–892), perhaps representing a former topsoil.

Excavated evidence for drainage: New drainage facilities

Plate 3.33: Entrance Bastion north-west interior elevation; towards the right of the photograph, at ground floor level, is gunport 2481. Above the gunport are the remains of the brick-arched fireplace 2482, with window 2475 immediately adjacent. The cross-wall dividing the D-shaped bastion from the Gatehouse can be seen towards the left of the photograph; immediately to the right of this wall on the photograph are the remains of joistholes for the floor timbers. 1998 (English Heritage)

were installed at the front of the Entrance Bastion. To the NE (Fig. 3.11), a drain (1377) was inserted into the offset footing (1378) of the Bastion. The drain was also cut through the layer of clay that sealed the drains associated with the phase IIb entrance. A timber cross-piece lay across the top of the drain. It is unclear if the drain had a vertical wall shaft, but if it did, as seems likely, then it may have served as an outlet for a garderobe in the North Quadrant Room at first floor level. A similar structure was positioned on the SW of the Bastion (Fig. 3.10) where the offset foundation (1271=1272) of the Entrance Bastion was cut by a chute (1273); this chute was 0.69m (2 ft 3 in) wide against the bastion wall, narrowing to 0.38 m (1 ft 3 in) further away, where it cut a layer of mortar (1274). In 1963 a lead grille was found *in situ* at the wall face. A wooden cross-piece 0.91 m (3 ft) long was found in a pit measuring 1.83 x 0.53 m (6 ft x 1 ft 8 in), immediately in front of the offset foundation. The SW end of the chute was not exposed, but it extended for at least 4.08 m (13 ft 4 in). The chute was at least 0.5 m (1 ft 7 in) deep, and possibly as much as 0.61 m (2 ft) deep in total. It was capped with a layer of brick rubble (811), which contained pottery of 16th-century date. The function of these two drains remains unknown; they could have served garderobes, but are perhaps more likely to have carried rainwater from the roof.

The Keep (Figs 3.4, 3.5, 3.17, 3.42–3.44; Plates 3.1, 3.14, 3.34)

During the works of 1539–40, Sir Edward Guldeford's circular tower had been adapted to form the central Keep of the castle, with rooms at basement and ground floor level, and a very substantial roof that functioned as a cannon deck. The Keep was retained in the works of 1542–3, but was subject to further remodelling to raise it above the defensive perimeter (see above). A further storey was added, thus enclosing the phase IIb cannon deck which became a new first floor chamber (see Fig. 3.17 for a cross-section-reconstruction of the new floor levels). The new roof (*c* 14.94 m OD) appears to have been of ridged form, probably surrounded by a parapet of which no evidence now survives. Immediately below the roof was a floored attic space, lit by two small windows. The new roof would no longer have

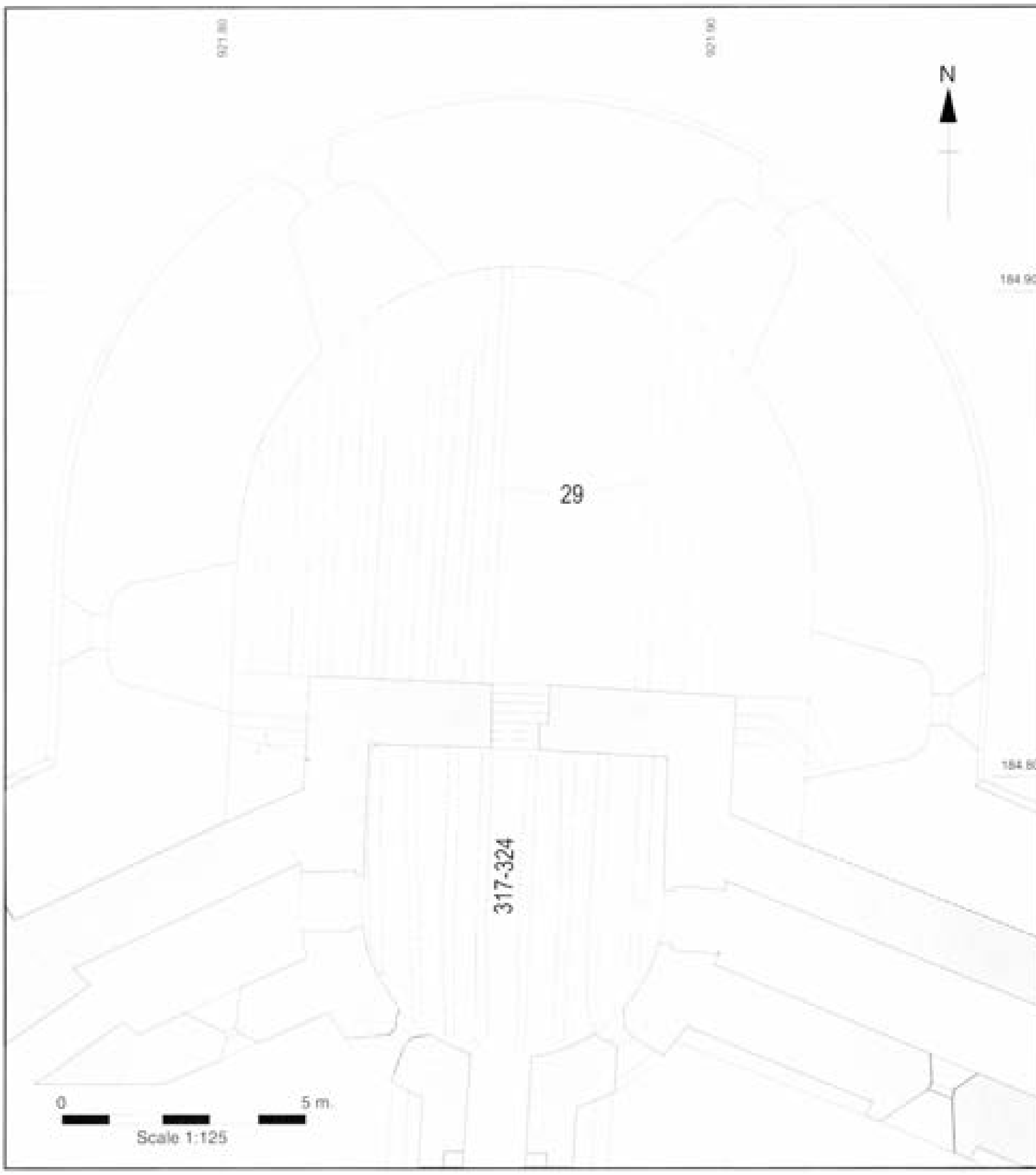


Figure 3.40: N Bastion and N Stirrup Tower: plan of floors

been suitable for mounting cannon, and there was probably only a wall-walk with handgun embrasures. The level of the basement floor, which had been lowered in phase IIb, was raised again by *c* 0.4 m (1 ft 4 in) to *c* 3.57 m OD. The new basement floor was constructed of brick, and there is a brick- and stone-lined well located slightly off centre (Plate 3.34). In its final form, therefore, the Keep consisted of a basement giving access into the Vaulted Ring Passage at a slightly heightened level; the ground floor was open to the level of the old cannon deck timbers with a new first floor above, constructed over the old cannon deck, possibly partitioned into two or more rooms (see below). There was an attic space above (see below) and a new, probably ridged, roof with a wall-walk sighting over the whole of the defensive perimeter. The floor levels of the Keep are shown in relation to the heights of the stirrup towers and bastions, and to the height of the Curtain Wall, in the cross-section reconstruction shown in Figure 3.17.

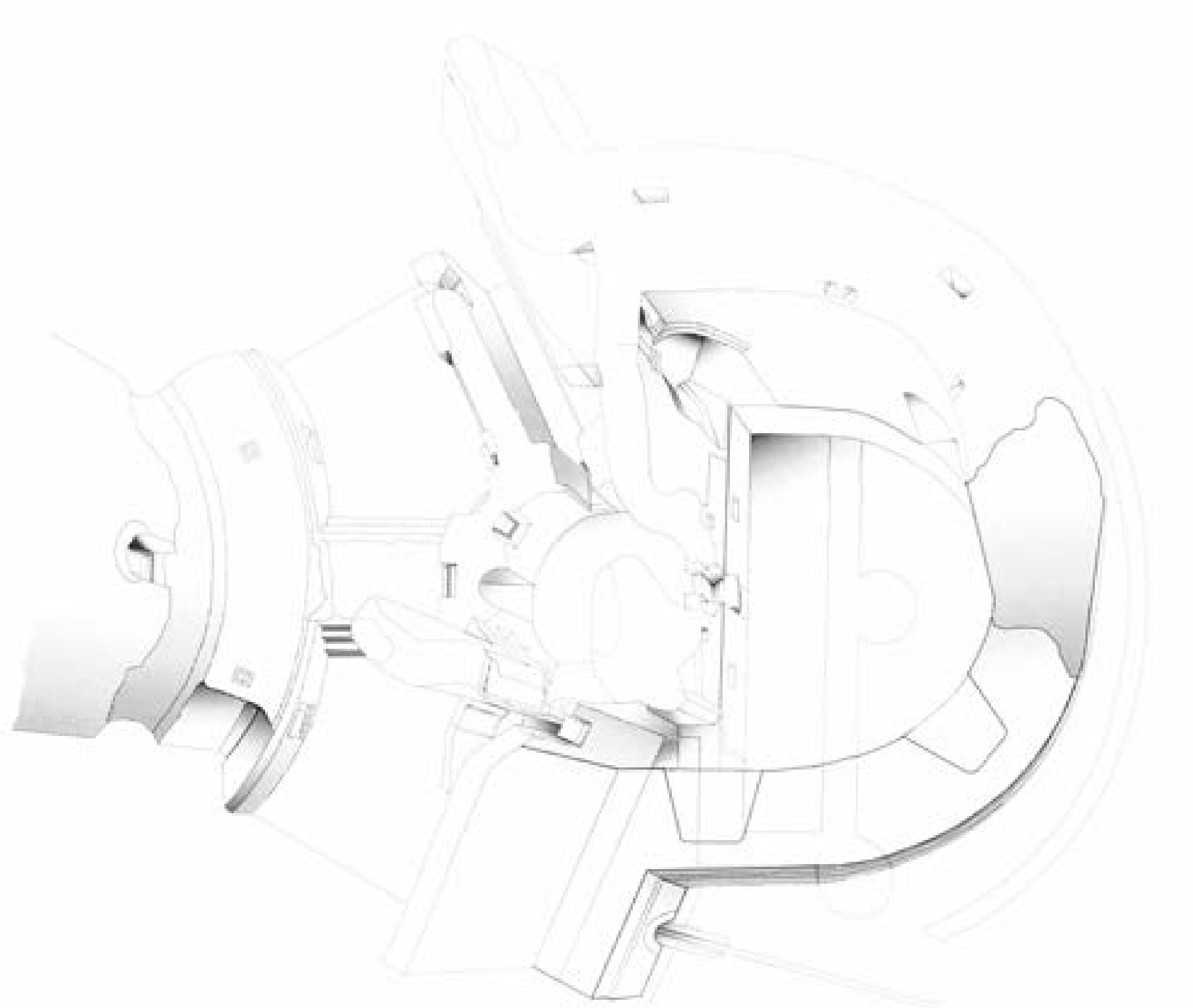


Figure 3.41: E Bastion: 3-D image of extant structure

Four new windows were constructed at first floor level, sited to look over the Curtain Wall rather than the bastions (Plates 3.1 and 3.14); two of these are visible in the W internal elevation (Fig. 3.4, window 2032 and 2033), and one in the W external elevation (Fig. 3.5, window 2033). These windows are splayed and were apparently unglazed since they were fitted with shutter rebates and horizontal iron bars; this impression is supported by the fact that very little window glass was recovered from the Keep (Chapter 4, below). The use of shutters and bars implies that the windows were not designed as gunports, but the splay and the presence of the bars suggests that they were intended to be defensible rather than purely domestic in function. Access between the ground floor and the new first floor was via the pre-existing mural stair which terminates at first floor level (at the level of the phase IIb parapet). Access to the roof thereafter was via a newel stair built in the SW wall, which was entered through a door set at first floor level (Fig. 3.4, door 2100). There are two small fireplaces in the N wall (not illustrated); they are set so close together that it seems possible that they were within two separate rooms, though there is no other evidence for partitions. The fireplaces were probably for heating rather than cooking.

Structural and excavated evidence

Structural evidence for the remodelling of the Keep: On the external elevation, the work of phase III is distinguished by the use of smaller grey sandstones above the ragged outline of the phase IIb crenellations (see Fig. 3.5). Internally (Fig. 3.4) the work of phase III shows as yellow brick above the phase IIb cannon deck timbers. Evidence for the phase III roof survives in the form of four timber sockets angled to take two massive parallel beams, and evidence has been observed for at least eight smaller timbers at right-angles to the main beams. These provide evidence for a low pitched roof and a further two timber sockets surviving at a higher level may mark the position of the ridge. Two of the main beam sockets (2158 and 2151) are visible in the W internal elevation (Fig. 3.4),

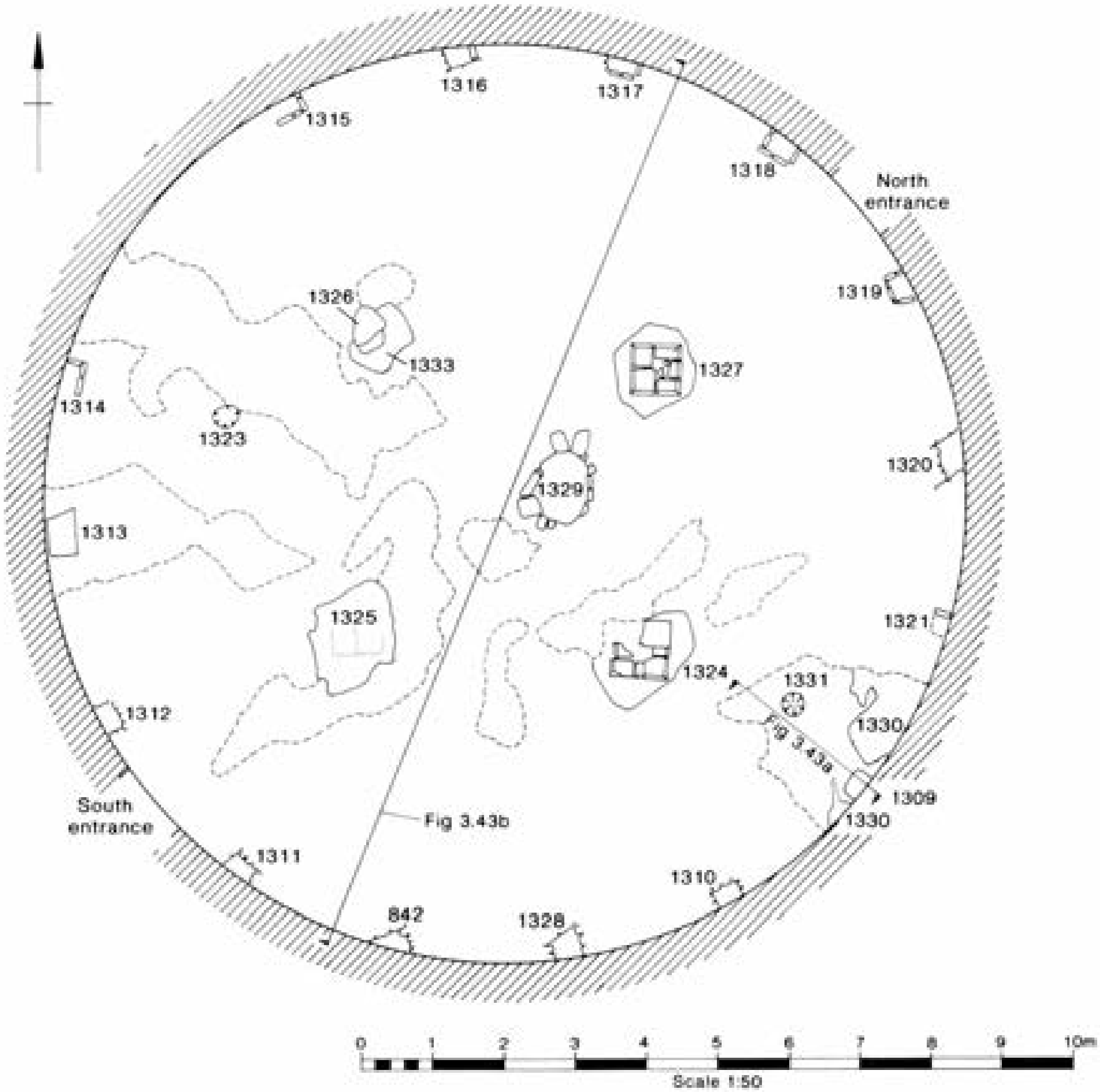


Figure 3.42: The Keep: phase III basement floor showing timber positions, four-post structure and well

and the form of the roof has been reconstructed in Figure 3.44. Two small windows set at a high level within the phase III walls (and clearly higher than the main first floor openings) are interpreted as lighting an attic space below the roof. One of the small windows (2102) is visible in the W external elevation (Fig. 3.5). Further evidence for a floored attic is provided by the survival of timber positions adjacent to these small windows (not illustrated). At first floor level, a 0.3 m (1 ft) space between the bases of the window embrasures and the level of the phase IIb cannon deck implies that a level floor had been laid above the old roof for the new first floor chamber; the level of this conjectured floor is shown as a dotted line on Figure 3.4.

Excavated evidence for the raising of the basement floor: The level of the basement floor was raised by *c* 0.4 m (1 ft 4 in) to *c* 3.57 m OD (see Figs 3.42–3.43). A layer of crushed masonry (843) was dumped over the earlier mortar floor bedding (1412). The debris was sealed by a 0.04 m thick deposit of sand (1332) and a spread of mortar (1330) 0.1 m thick was laid on the sand and served as a bedding for a yellow brick floor (847). The bricks were laid lengthways in courses aligned N–S. The timber posts supporting the phase IIb ground floor were retained and the new brick floor was laid against them. The post-voids (Fig. 3.42; 842, 1309–1322, 1328) were recorded during excavation and were seen to be evenly spaced around the wall, averaging 2.44 m (8 ft) centre-to-centre, and were typically filled with dark brown soil incorporating masonry chippings and mortar. On average they were 0.34 m (1 ft 7 ½ in) x 0.27 m (10 ½ in) wide and *c* 0.38 m (1 ft 3 in) deep. A square setting of four large pier bases of chamfered stone (Fig. 3.42, Nos 1324–7) appears to have been inserted into this floor. Although the date at which these pier bases were inserted cannot be proved from the excavation evidence, it is possible that they relate to phase III, or represent a later modification. The evidence of the

Plate 3.34: The Keep, phase III basement brick floor with the well, looking west. 1983 (English Heritage/Sheppard)

more complete bases shows that they were laid on patches of mortar and brick inserted into the phase III floor. One base (1324) is incomplete and consists of six stones and two bricks set in mortar. Another base (1325) was indicated by scribing lines in the mortar bedding below the brick floor, and a third base (1326) showed as a void in the brick floor. The fourth base (1327) was intact and consisted of five stones with a continuous chamfer and was set within an irregular patch in the brick floor. Overall, this base measured 0.73 m (28.5 in) square, while the brickwork patch was 1.22 m long and 1.07 m wide. It seems likely that all four bases would have been of similar design. Slightly off-centre within the floor is a brick and stone-lined well (1329), with a diameter of at least 0.9 m (3 ft). The water-level in the well was reached at a depth of *c* 2.32 m OD, that is 1.25 m (4 ft) below final basement floor level. The brick floor had partially subsided into the well and is therefore strictly speaking stratigraphically later; however, the two may have been closely contemporary. It is possible, however, to suggest that the well was a pre-existing feature dating from the first construction of Sir Edward Guldeford's tower, since it might be expected that the tower would have needed access to a water supply. There were no finds from the well to help with establishing its dating and the subsequent changes in floor levels have made it impossible to determine for certain when it was constructed.

The Vaulted Ring Passage and Radial Passages
(Fig. 3.26)

The floors in the Vaulted Ring Passage and radial passages were raised by about 0.3 m (1 ft), which left restricted headroom, as the vaulted roofs were not altered. The E Radial Passage is now only 1.3 m (4 ft 2 in) high from floor to soffit. The Vaulted Ring Passage is 1.9 m (6ft 4 in) high. The floor levels in the basement Curtain Wall galleries were raised to a corresponding level.

Excavated evidence for the raising of the floors: Within the Vaulted Ring Passage, an undated thin lens of black soil accumulated over the first brick floor and was overlain by patchy fine yellow mortar (989), in turn sealed by a layer of grey stone chippings (988). A layer of yellow sand (987) was laid to support a mortar bedding (986) for a second brick floor (1454 = 1455). The top of the brick floor lay at *c* 3.62 m OD. All the layers abutted the original white plaster on the walls, but no plaster survived above the level of the later brick floor. Within the E Radial Passage, the original brick floor was covered with a layer of sand to a depth of *c* 0.25 m (10 in), upon which was laid a final brick floor. The floor was set approximately level with the floor levels of the radial passages (at *c* 3.6 m OD), and this level correlates with the floor levels in the Stirrup Tower (see above).

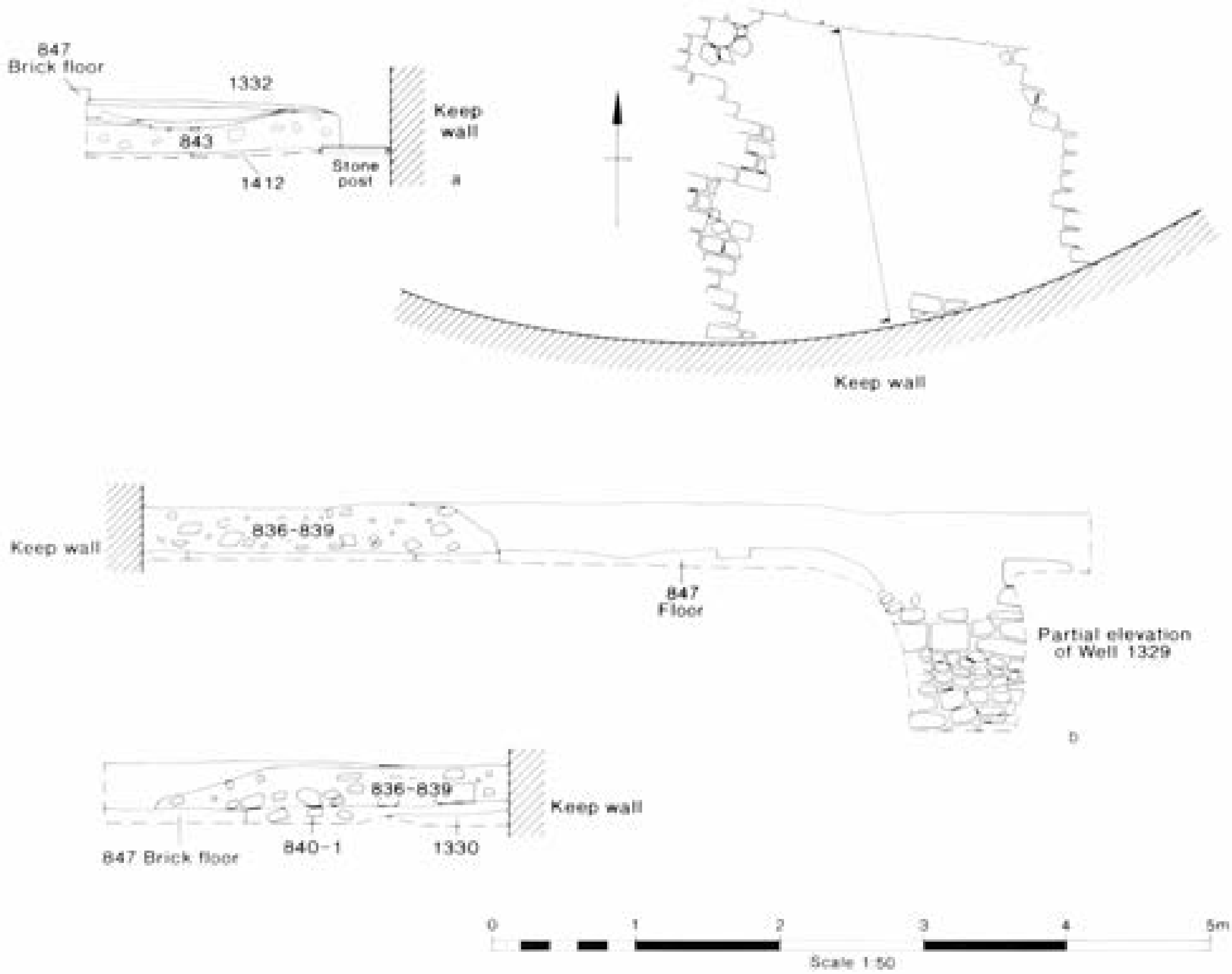


Figure 3.43: The Keep: sections showing floor makeup and the well

The Courtyard (Fig. 3.26; Plate 3.35)

Two small but significant changes in the courtyard are probably to be assigned to phase III. A well was inserted adjacent to the W Bastion (Fig. 3.26; Plate 3.35), and stone steps were built over the tops of the radial passages and the Vaulted Chamber or Cellar to the rear of the Entrance Bastion.

Excavated evidence for the well and steps: The well (327) was built in the WNW Courtyard (area CTIV). The structure is 2.7 m (8 ft 9 in) deep from the top of the courtyard. It has a base of one or more flat stone slabs, which lie below modern water-level, and the shaft is constructed of brick and stone including some reused moulded stones. Surrounding the top of the well are flat slabs of ironstone laid between the edge of the cobbled surface and the well lining, except on the W side, where the cobbles apparently come right up to the lining. The top of the lining of the well protrudes above the level of the cobbles, so it seems unlikely that the gullies either side could have drained into it. This suggests that the well was inserted into the courtyard cobbles. The earliest fill was a waterlogged layer that contained a few fragments of tile, animal bone and metal. This was overlain by the main fill which comprised large fragments of masonry, including string-courses and brick fragments presumably deriving from demolition activity (Phase V, below). The cobbles abutting the sides of the radial passages and the Vaulted Chamber behind the Entrance Bastion were overlain by the first riser of the ironstone steps. The steps to the E of the Vaulted Chamber were built after the accumulation of a layer of fine loam on the cobbles, which demonstrates that these steps were an addition, probably in this phase, though a later date is possible.

Evidence from the finds assemblages

Supplementary information about the appearance and furnishings of the castle when completed in 1542–3 comes from the various assemblages of finds recovered during the course of clearance and excavation operations. Attempts were made by all contributing specialists to identify spatial patterns in the distribution of finds that might indicate their original location. However, this has invariably proved to be impossible given the extensive movement and redeposition of material around the site during the earthmoving operations in phase IVb (see

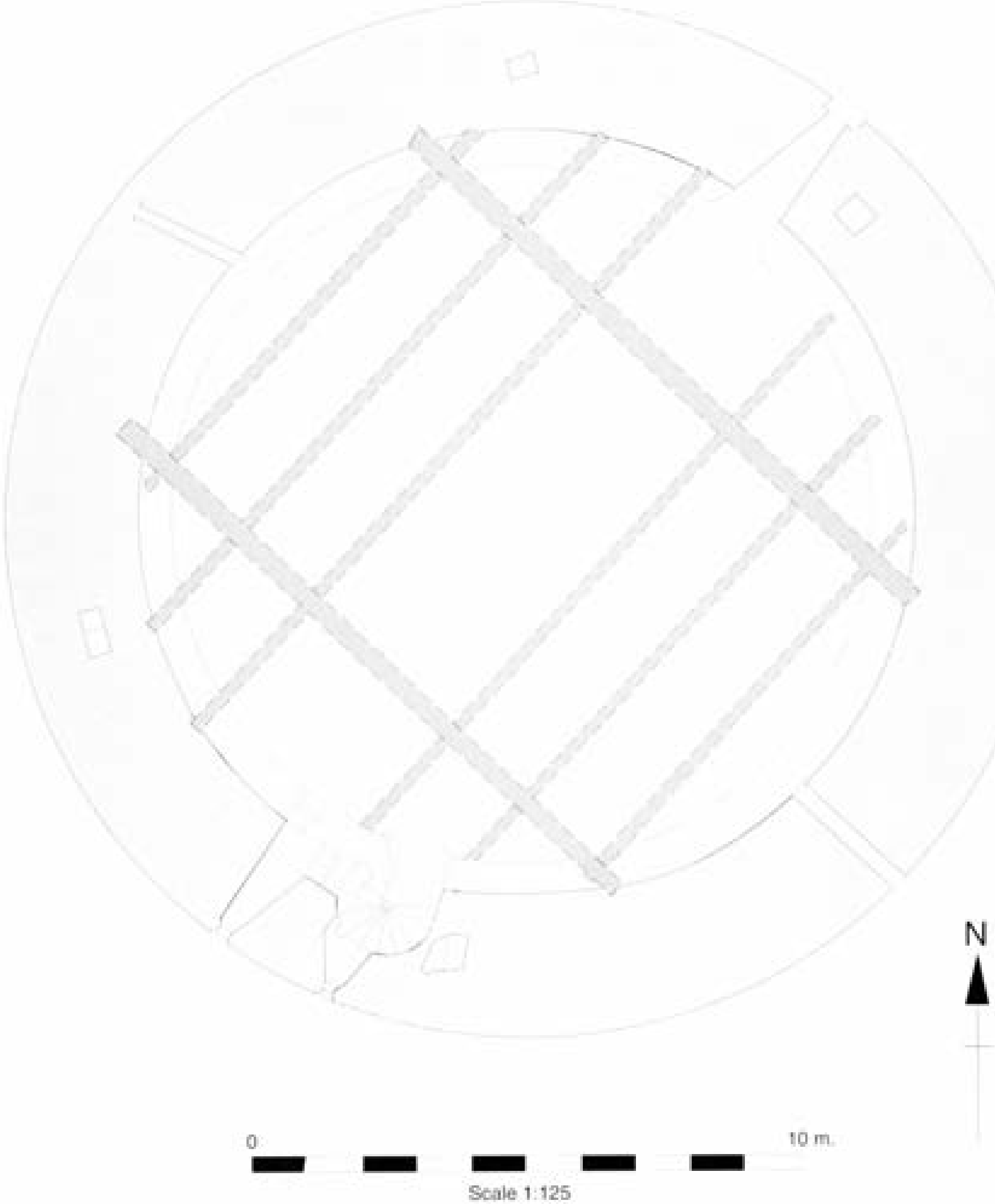


Figure 3.44: The Keep: reconstruction of phase III roof

below) and during demolition and reclamation after its decommissioning (Phase V, below). Few objects, or classes of object, can therefore be reliably provenanced. Nevertheless, a number of useful conclusions can be drawn from the known architectural forms, and with the support of documentary records or from the limited evidence of the collections themselves.

Apart from the form of windows and other features deduced from the architectural stone collection, the assemblage of window glass includes curved fragments that would have been compatible with the shape of the elaborate first floor gallery windows reconstructed by Hall (see Hall, Chapter 4; Cropper, Chapter 4). Mitchell (Chapter 4) notes the presence of green and white tiles and suggests that they may derive from chequered floors, although there is no evidence to suggest where these might have been installed. One of the most significant objects was the Continental tile-stove, which Gaimster (Chapter 4) comments would almost certainly have been bought by special commission, and was probably imported from northern or central Germany. It is very likely that the stove was purchased by, or for, the first captain of the castle, who may well have been Philip Chute of Appledore, who was one of the commissioners appointed to oversee the works (see above Chapter 2). The stove tiles were highly decorated, and the designs

Plate 3.35: W Courtyard CTIV; courtyard cobbling and the well, looking west. 1983 (English Heritage/Sheppard)

found at Camber include portraits of the leading Protestant reformer Landgrave Philip I of Hesse (r 1509–1567) and (probably) his consort Christine, daughter of the Duke of Saxony. Other tiles from the stove reproduce popular images such as Landsknecht soldiers from contemporary German woodcut art and engravings. As Gaimster notes, some of this is explicitly political iconography, and perhaps offers an unusual insight into the religious and political context in which the castle was constructed. Traces of sooting confirm that the stove was used, but it remains unclear where it was actually sited. The presence of numerous tile fragments in contexts of phase III (there is only a single, possibly intrusive, fragment from phase IIb) suggests that these may have been breakages that occurred when the stove was installed at this time; numerous tile fragments were also found in the bulk fill of the N Bastion, from which it can be deduced that the stove had been broken up by the time the Bastion was infilled (phase IVb). Its ultimate fate remains unknown. A contemporary source, and evidence from excavation elsewhere, suggests that tile-stoves were used for steam-baths in England, rather than for heating or cooking (Gaimster, Chapter 4). Camber Castle offers few locations obviously suitable for such a purpose. Moreover, the fact that the stove had to be stoked from outside the room in which it was sited, perhaps through an external wall, suggests that a ground floor location, within the Castle's defended perimeter, would have been preferable. The ground floor of the Keep is a possible location, but it is unlikely that the stove was sited there. The Keep lacks any evidence of garderobe facilities, which precludes its use for accommodation, especially that allocated to the captain. It is more likely that the stove was installed in the phase III Entrance Bastion, where there is evidence for a separated suite of rooms complete with garderobe on the first floor. The stove could have been stoked from an adjacent room to that within which it was installed.

The remains of tile manufacturing debris confirm that tile was being made on site, and it is known from documentary sources that tile was fetched from Winchelsea. Mitchell also notes the presence of decorated fragments similar to tile found at Battle Abbey, which might conceivably have been another source for reclaimed material. Roof tile, if manufactured on site, must have been used in roofs within the castle, but no certain architectural evidence for tiled roofs has been identified. Since ordnance was mounted on the bastions, on the Curtain Wall, and possibly on the roofs of the stirrup towers, tiled roofs could only have been installed in the Keep and the Entrance Bastion. The Keep roof was certainly rebuilt in 1542–3, and the surviving evidence suggests that its roof was indeed slightly ridged. No evidence for the form of the Entrance Bastion roof has been identified. The mortar analysis (Morgan, Chapter 4) has identified numerous fragments of hair-tempered plaster with lath impressions, which Morgan identifies as plaster from ceilings or from wall partitions. This adds to the evidence already noted for a degree of comfort in the residential areas of the castle.

The pottery assemblage from the construction deposits, particularly outside the E Bastion (EBX) (Whittingham, Chapter 6), included a large proportion of imported German and French vessels. The large number of Raeren drinking jugs and smaller quantities of Cologne drinking jugs and Martincamp Type II flasks are typical of the first half of the 16th century. The Rhenish drinking vessels are present in such large numbers that they probably represent debris left behind by the construction workers, of whom over a thousand were employed at peak periods of the building campaign (Chapter 2).

The bank surrounding the castle and associated earthworks

The 1.8 m (5 ft 11 in) high earthwork surrounding the south and east sides of the castle (Fig. 1.6) was sectioned with a machine-cut trench. The water level was reached just under 1.5 m below the turf line. The excavation revealed that the bank was composed of a 0.75 m (2 ft 6 in) layer of compact clay and pebbles overlying the natural sand and beach pebbles. Overlying the clay was a 0.4 m (1 ft 4 in) thick layer of sandy clay with pebbles, including broken bricks and patches of mortar. Above this were several large stones or boulders associated with mortar and broken bricks, sealed by the turf. The function of the large stones is uncertain, but it is possible that they represented the remains of a platform on top of the bank. There were no datable finds from the bank, though the presence of brick pieces within the layers forming the bank suggests that it was contemporary with the construction of the phase IIb or phase III castle. The earthworks to the north-west and west of the castle have not been investigated.

PHASE IV: THE CASTLE IN USE (1543–1637)

Summary (Fig. 3.48)

By the autumn of 1543, the castle was a massively built, completely self-contained unit of warfare equipped with a

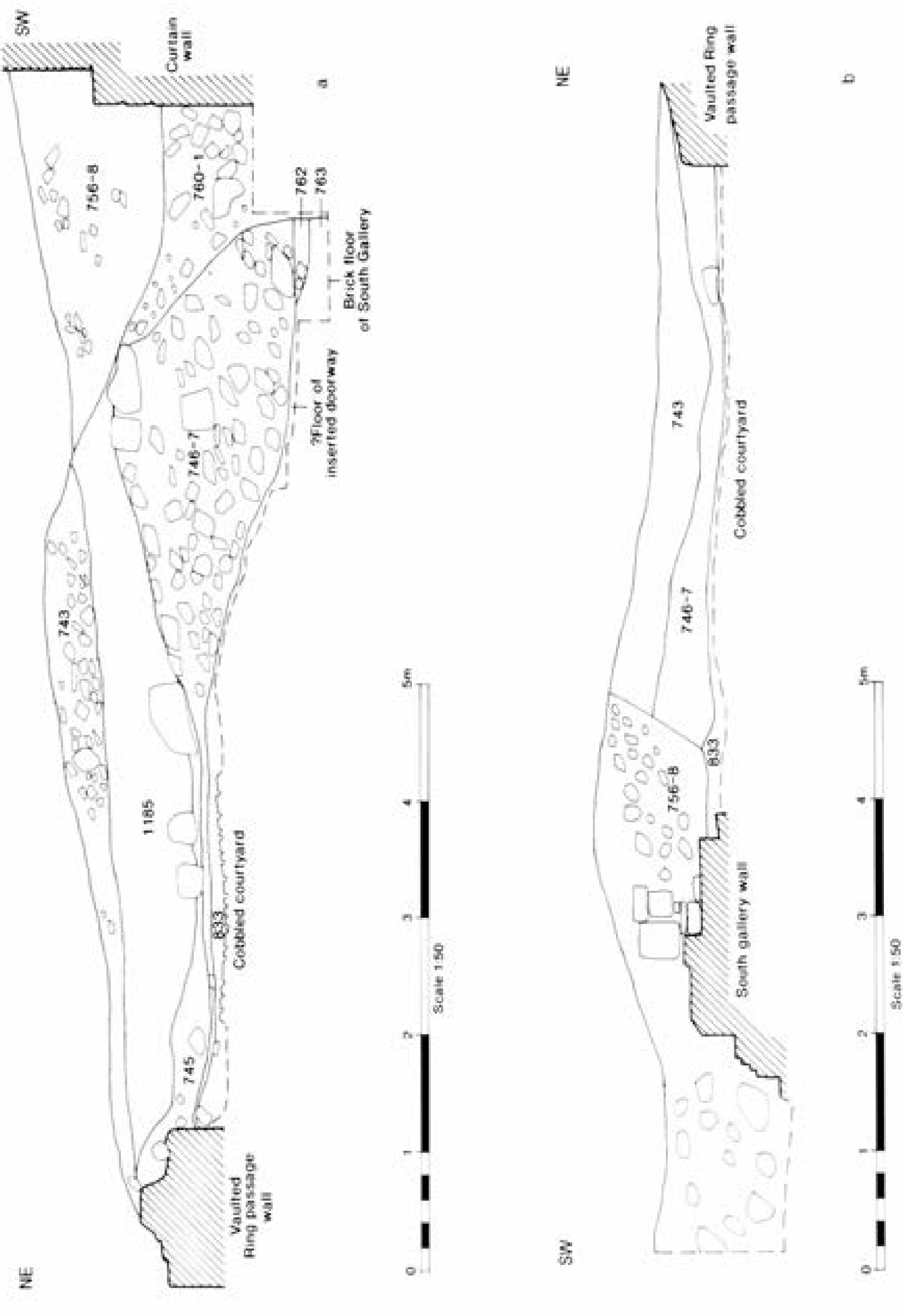


Figure 3.45a and b: SW Courtyard trench SBC/G: section, SW Courtyard trench SBC/G: reverse section

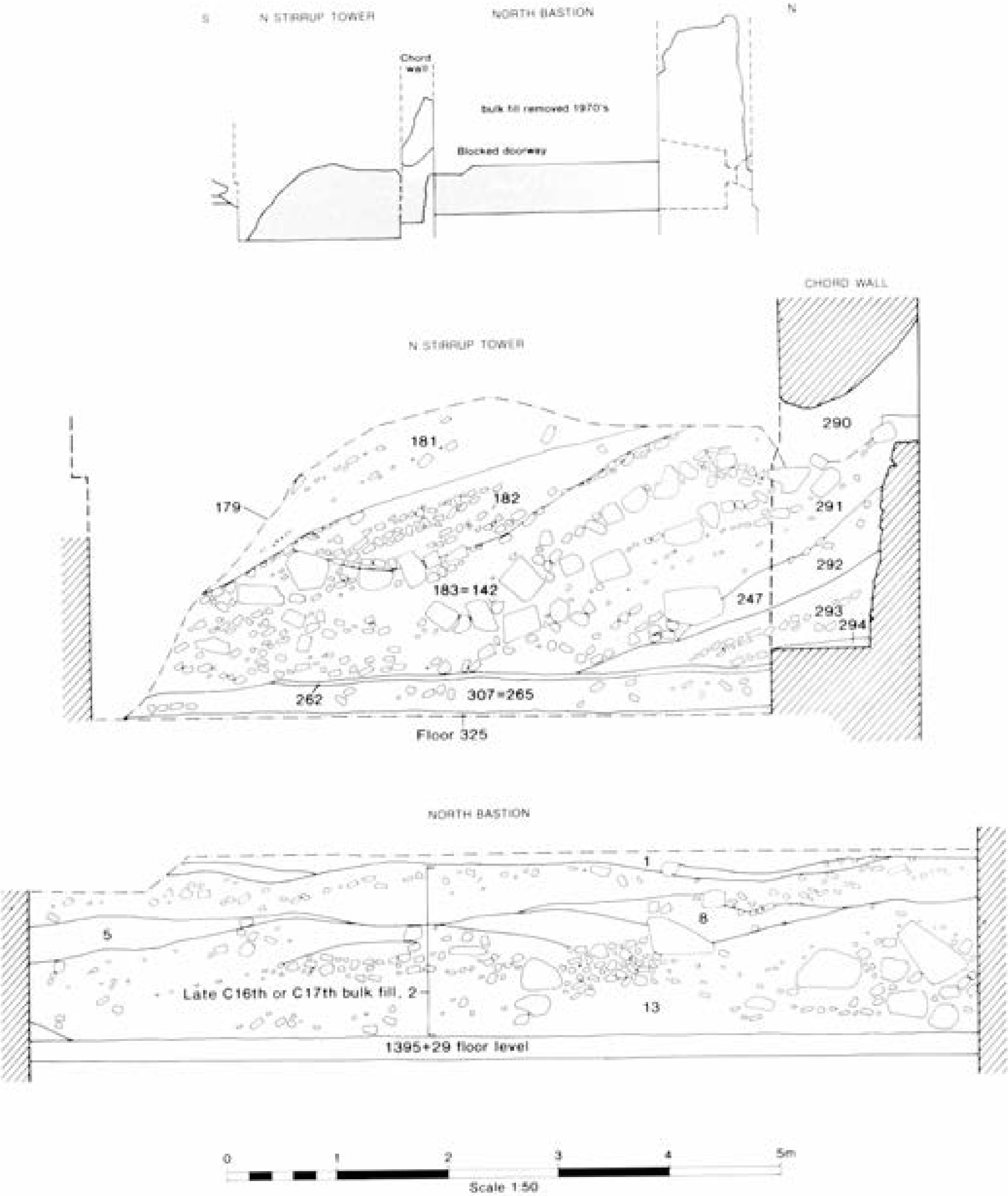


Figure 3.46: N Bastion and N Stirrup Tower: section through lower layers of infill

bewildering array of access arrangements. Biddle notes (Chapter 2, above) that in its final state it was able to mount heavy ordnance at three or perhaps four levels, in the gun rooms of the bastions, on the Curtain Wall, on the bastion parapets, and possibly on the stirrup tower roofs. The works attributed above to phase III, 1542–3, had clearly been intended to provide adequate domestic accommodation for an enlarged garrison, and probably comfortable facilities for visiting or resident officers; by January 1544 Philip Chute had been appointed Captain at a salary of 1s 4d. a day, and was to hold the position for more than 20 years. In January 1544 he had a garrison of 14 men earning 6d. a day, but this had doubled to a total of 28 by the autumn of 1546, and Chute's salary was increased to 2s a day. The garrison of 1546 was made up of 16 gunners and 8 soldiers, a porter and deputy porter, and a deputy Captain and soldier, and remained more or less at the same strength until 1610. From 1610, the garrison was reduced to 14 men and a Captain, and there were 11 men and a Captain present in 1637, the year of the castle's disestablishment.

The castle was most heavily armed during the period 1547–1593. Between 1547 and 1568, it contained a total some 26–28 pieces of ordnance, made up of six larger calibre guns (2 demi-cannon; 3 culverins; 1 demi-culverin), one or two sakers and a falcon, six breech loading portpieces and 12 or 13 slings, bases or double bases. Between 1568 and *c* 1593, there seem to have been only 10 pieces of ordnance, but these included two or three cannon or curtall cannon, and a demi-cannon, a culverin, two demi-culverins and two sakers. From *c* 1593 until 1636 the ordnance of the castle comprised ten pieces, including three demi-culverins, sakers and a minion and sometimes a falcon (Table 2.8; Scott and Biddle, Chapter 2, above).

In the later 16th century there were clearly problems with the castle's upkeep, and in 1568 it was reported that the four bastion gun platforms were in 'utter Ruing and decay only in timber and yoiestes and not able to beare the shoting of the ordinance'; expensive repairs were proposed, but possibly never carried out (see Biddle, Chapter 2, above). Eventually the N and S Bastions and the S Stirrup Tower were to be filled with shingle to create dead mounts for cannon (see Fig. 3.48), thus presumably avoiding the expense of maintaining the floors and roofs; this process is described below, but its exact date remains unclear. The infilling of the bastions was certainly accompanied by the selective infilling of the adjacent Curtain Wall gallery. Although much of the SE Gallery remains concealed beneath the Rampire, such evidence as is visible suggests that the first floor was dismantled, and the basement and ground floor levels were infilled, with openings in the E Bastion being blocked to prevent the spread of the backfill. The SSW Gallery was also partially filled, and a blocking wall inserted to prevent spillage, but it is unclear whether this was a deliberate act, or a response to slippage from the infilled S Stirrup Tower. Further shingle and debris was probably imported to create the Rampire, in the SE sector of the castle. It seems that this was created by blocking and filling the SE Gallery, S Bastion and S Stirrup Tower. The earth mound that extends over part of the SW Courtyard and all of the SE Courtyard is interpreted as the Rampire and collapse or spillage from the Rampire. Access to the top of the N Bastion must have remained available via the N Stirrup Tower and Curtain Wall galleries.

In the following account, the occupation period of around 100 years (phase IV) has been divided into three sub-phases, representing the period before the infilling of the N and S Bastions (phase IVa), the infilling of the N and S Bastions and the creation of the Rampire (phase IVb), and, where possible, events following these earthmoving operations (phase IVc). Precise dating of these phases of activity within the mid 16th to early 17th century remains uncertain. The bastions had clearly not been infilled in 1568, when the ruinous condition of the roofs was reported; equally, they certainly had been infilled by 1616 when a survey describes them as such. There is evidence to suggest that the infilling took place in 1584 but this is not conclusive, and pottery from the N Bastion fills and the collapsed Rampire suggests the possibility of an early 17th-century date. This evidence has considered in some detail in Chapter 2.

PHASE IVA: INITIAL OCCUPATION

Summary

There do not appear to have been any major changes to the layout of the castle for the first 50 years or so of occupation after 1543, although later demolition and infilling have destroyed a great deal of potential evidence. The galleries, provided with fireplaces and apparently glazed at first floor level, were probably used for barrack accommodation. The subsequent demolition of the galleries above basement level (see Phase IVb and Phase V) means that there is no surviving evidence for the arrangement of the barrack accommodation, and whether the ground and first floor galleries were subdivided. It is clear that the four bastions remained as open gun rooms, with the stirrup towers acting as antechambers. The stirrup towers probably served several functions. The basement in the W Stirrup Tower, which exceptionally had a brick floor, may have been used as a kitchen store room. Latterly it was probably used as a charcoal store. The ground floor rooms retained two windows overlooking the courtyard, but the building of the bastions had made the two other windows redundant. These rooms were fitted with cupboards and may have served as antechambers to the gun rooms, although access at ground floor level was rather indirect via the flanking Curtain Wall galleries. Very little evidence survives for the first floors of the stirrup towers, but it is possible that they were glazed, and they may have served as additional garrison accommodation, perhaps for more senior personnel. The upper floor of the Entrance Bastion seems to have been exceptionally well appointed, and this may have been the location of the Captain's rooms.

There is some evidence for minor repairs during the castle's occupation. In the Entrance Bastion, the varied style of floors may point to occasional repairs, and repairs are also evident in the W Bastion. The brick floors of the W Bastion casemates were replaced with cobbles, and a new brick lining was inserted at the back of the range. Variations in the cobbled surface of the courtyard probably derive from periodic repairs; in places the cobbles are closely set and embedded in the underlying make-up, whereas

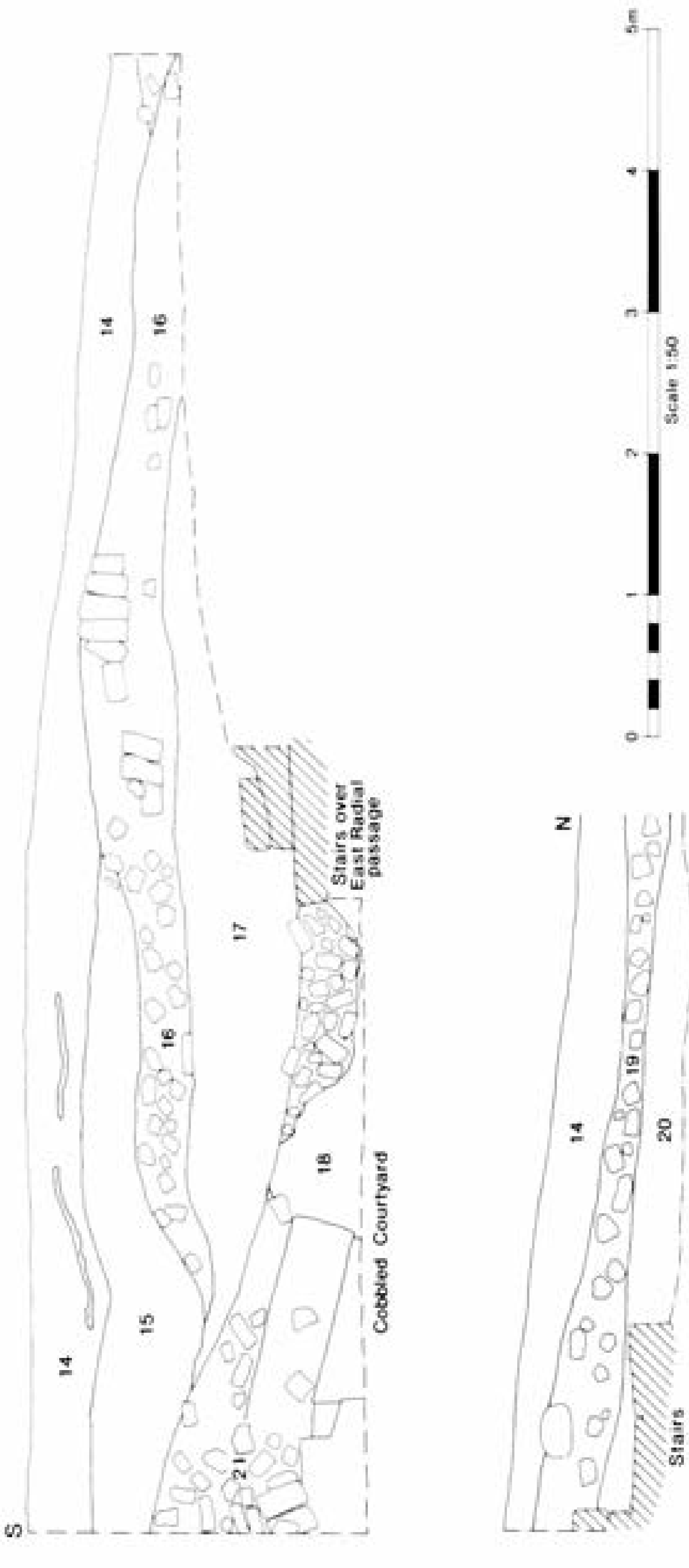


Figure 3.47: SE Courtyard trench CT1: section

elsewhere they are pitched and stand proud of adjacent closely set cobbling. It is possible that the ironstone steps over the radial passages were added after completion of the castle in 1543.

Excavated evidence (Fig. 3.45)

Very little archaeological evidence survives f or this period. Most deposits above the phase III floor levels could have accumulated at any time during the use of the castle and, given the likelihood that floors would have been kept clean, most are probably late accumulations from the last years, or even months, before the castle was decommissioned. Material associated with initial occupation was seen in only three places. Within the N Bastion the shingle infill was removed in a series of excavations (see Chapter 1), revealing soil layers above the floor timbers that had formed before the Bastion was filled. In the SE and SW Courtyards, excavations revealed further soil layers that had formed over the cobbles before the Rampire collapsed. If the Rampire originally extended over these areas, then these deposits will predate the construction of the Rampire.

Excavated evidence for phase IVa: Within the N Bastion (not illustrated) the casemate floors were covered with thin layers of charcoal, but there is no evidence for the dating of these deposits, or for their formation. Two small circular depressions were found beneath the charcoal in the floors of the NW and NE casemates. The depressions in the NW casemate were filled with shingle and sand, and those in the NE casemate were filled with stone and brick fragments. The function of these holes is unclear given that the casemates were intended for guns on field carriages. Three separate but contiguous dark brown soils mixed with charcoal and building rubble overlay the floor. The layer to the W of the Bastion (26) partially overlay the floor of the W casemate and the lower steps of the W entrance, and contained early to mid 16th-century Rhenish Stonewares together with 17th-century Martincamp flask sherds. A similar layer (27) against the S wall of the Bastion contained early to mid 16th-century Rhenish Stonewares. A third layer (10) which extended to the centre of the bastion from the NE casemate contained early to mid 16th-century Rhenish Stonewares and Martincamp Type II flasks, late 16th- or 17th-century Spanish Olive Jars and large fragments of a Saintonge green and brown costrel. All three layers were overlain by the massive bulk fills of phase IVb (see below).

In the NE courtyard (not illustrated) soil layers (30=86=115) above the cobbling were directly sealed beneath the collapsed Rampire material. In the SW courtyard (Fig. 3.45a and b) the layer of soil that had formed above the cobbles (833=763=835) also extended through the door leading to the multiple garderobe. This deposit was overlain by a shallow layer of soil (762) within the doorway.

PHASE IVB: THE INFILLING OF THE N AND S BASTIONS AND THE BUILDING OF THE RAMPIRE

Summary (Fig 3.48)

By the third quarter of the 16th century it is clear from documentary sources that the castle was falling into disrepair through lack of maintenance. Despite a number of references to proposed repair work, the eventual solution, as elsewhere, was the creation of filled mounts at the north and south sides of the castle, upon which cannon could be mounted without the expense of maintaining gun-platforms of timber and lead. The date at which this was carried out is not known, but seems likely to lie somewhere in the range 1584–1613+. The W Bastion seems to have been retained as a kitchen. The status of the E Bastion is unknown; there is no evidence for its condition, but it was not filled in. No evidence has been recovered for any external scaffold associated with the infilling, and it is probable that a crane or hoist was set up at parapet level. The lower fills may have been brought into the bastions through the gunports, but this would have been a slow and awkward operation.

Structural evidence for the infilling of the bastions and the construction of the Rampire (Figs 3.36, 3.48)

The creation of massive earth mounts meant that a number of structural alterations had to be made to the existing buildings. The SE Curtain Wall Gallery was probably dismantled at first floor level, although the ground floor level may have been retained and infilled, with the creation of the Rampire. Other alterations relate principally to the blocking of gunports and doors in order to retain the dumped shingle fills. A blocking wall in the SSW Gallery may have been an attempt to limit shingle overspill from the adjacent S Stirrup Tower. Figure 3.48 shows the extent of the infilling and the Rampire and the positions of blocked openings.

Blockings: The gunports in the N Bastion were blocked with a mixture of stone and brick, in a crude but effective manner and the door in the chord wall of the N Stirrup Tower was blocked to its full height to retain the fill so that the Stirrup Tower itself could remain in use. Similarly, all four gunports in the S Bastion were blocked; here the W gunport was blocked with ashlar, while the SW gunport was carefully blocked with bricks. In the E Stirrup Tower the gun embrasures facing the courtyard were blocked, as was the doorway to the SE Curtain Wall gallery; this must have been intended to prevent shingle from the Rampire slipping down into the basement gallery. Large boulders were found in the area of the S door to the E Stirrup, and these may have been used to block the doorway here. The gun embrasures at parapet level in the SE Curtain were partially blocked, probably also as a measure to prevent slippage of the fill. In the SSW Gallery, a cross-wall (1189, see Fig. 3.36) was built to retain shingle fill within the gallery to the south. It comprises two courses of large worked stones, with some brick fillers.

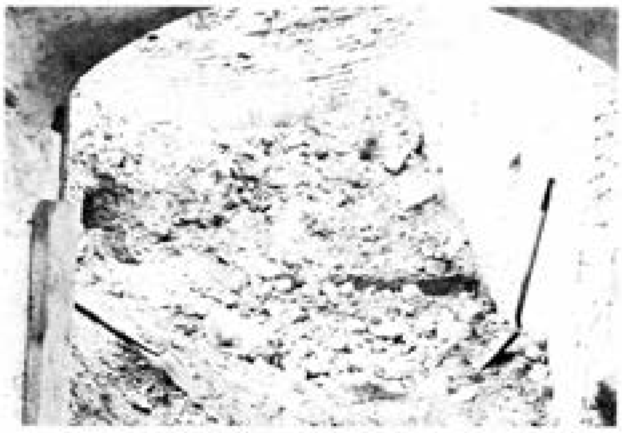


Plate 3.36: The N Bastion during clearance of bulk fill, looking north through the doorway from the North Curtain Wall Gallery GII. 1972 (English Heritage)

Excavated evidence for the infilling of the bastions and the construction of the Rampire (Figs 3.45–3.48; Plates 3.36–3.39)

The bulk fill of the N Bastion has been completely excavated (Plate 3.36), while the S Bastion and slumped Rampire have largely been left undisturbed, except for small-scale investigations to determine their composition and form (Plate 3.37). The excavations have shown that the bulk fill in the N Bastion consisted of rubble layers, beach pebbles, tiles and some large blocks of stone, in a matrix of light brown soil, to the full height of the building. Lenses of dark brown soil represented individual tip lines. Figure 3.46 shows the base layers of the Bastion fill in section, as they remained in the late 1970s prior to the final clearance work. The upper fill had been removed in previous clearance operations. In the 1960s, before any clearance had taken place, Biddle recorded the presence of a set of stone steps and a dry stone wall built into the top of the N Bastion fill (Plate 3.38). The steps extended alongside the wall, and provided access to a possible gun emplacement. It is assumed that the construction of these steps was contemporary with the filling of the Bastion, but a later date cannot be ruled out. In the 1960s at least one timber survived in good condition at the top of the stairs, and was therefore likely to have been more recent. The upper fills of the S Bastion were subject to small-scale investigation, and consisted of undated layers of dark grey-brown soil mixed with pebbles. These layers abutted the extant stonework of the chord wall. No evidence of a gun platform has been found on top of the S Bastion.

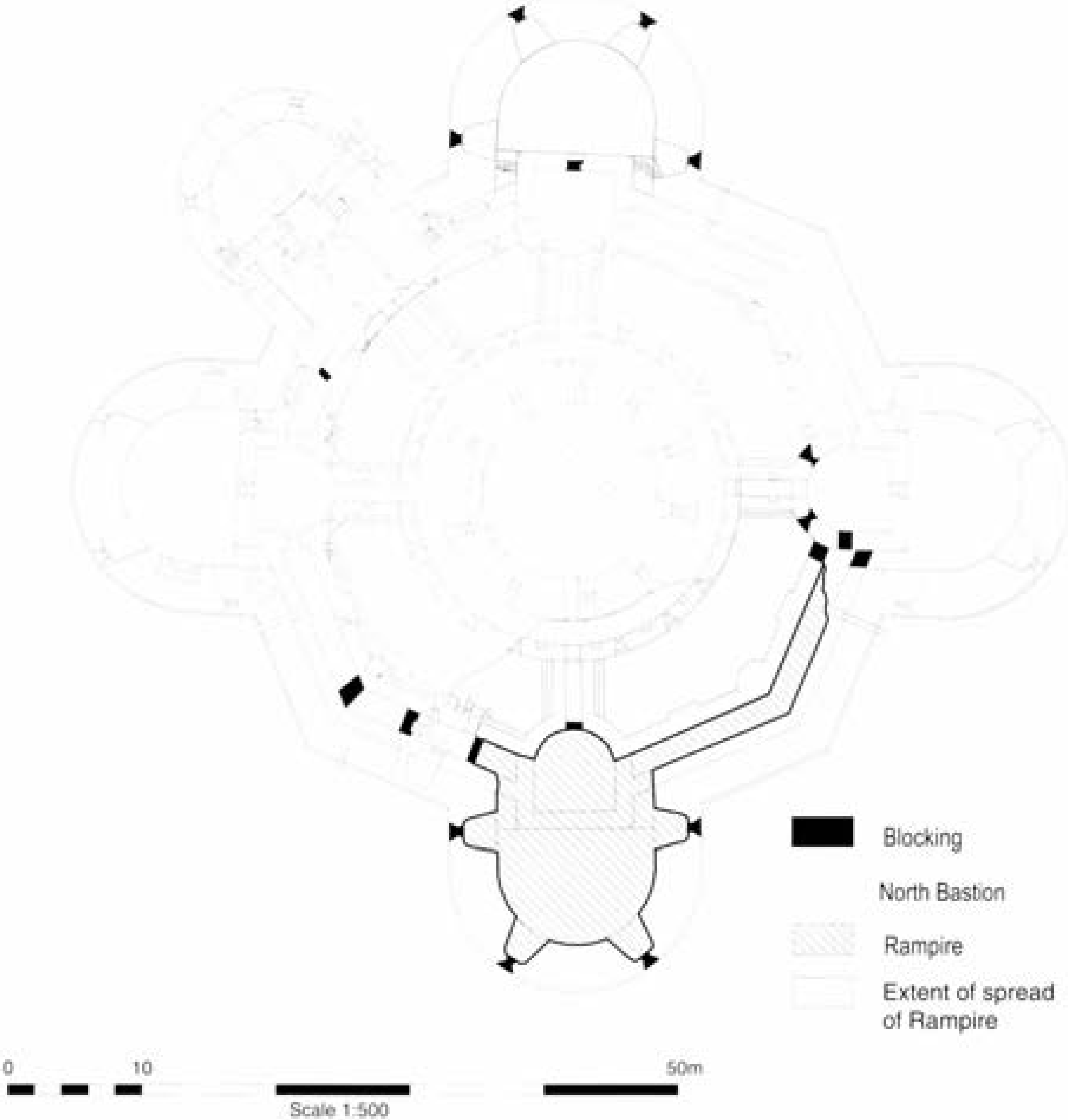


Figure 3.48: The phase IVb castle: plan showing the extent of the Rampire, and blockings

The base of the Rampire was investigated in two locations. A trench was excavated across the top of the radial passage leading to the E Stirrup Tower (Fig. 3.47), partially investigating the toe end of the slumped Rampire, and further evidence was revealed in the trench across the SSW Courtyard (see Fig. 3.45a and b). The material making up the Rampire and subsequent spread slopes from *c* 10 m OD to the level of the SE and SW Courtyards, which lie at *c* 5 m OD. The two excavations revealed a base deposit of soil and shingle incorporating masonry rubble, brick fragments, mortar and pottery. The body of the Rampire above this level consisted of shingle. The excavations also showed the extent to which the Rampire had spread into the SE and SW courtyards. In the SE courtyard it extended across the whole courtyard, northwards as far as the Keep, where it covered the Vaulted Ring Passage, and as far eastwards as the E Radial Passage leading from the Keep to the East Stirrup Tower. In the SW courtyard it extended northwards as far as the Keep, and sloped down from the S Bastion towards the W for a distance in excess of 2 m (6 ft 6 in).

Detailed evidence from excavation for the bastion fills and the Rampire: The bulk fill of the N Bastion (2=3, 5, 8, 9, 12 and 13) consisted of layers of bricks, mortar, beach pebbles, roof and floor tiles and large blocks of masonry, in a matrix of light brown soil. Lenses of dark brown soil represented tip lines (Fig. 3.46). The S part of the main fill of the

Plate 3.37: The Rampire in the South Courtyard, 1963 (English Heritage/Biddle)

Bastion was overlain by a patch of burnt soil and charcoal (7). This was sealed by further rubble layers (6 and then 4). The upper layer of rubble was the last deposit in the sequence certainly attributable to the infilling, as the layer above (1) represented the topsoil formed after the 1972 excavations. Within the SE Courtyard (Fig. 3.47), the soil above the cobbles (layer 30=86=115) was overlain by a strikingly mixed layer (18=21) of dark brown soil and shingle including large blocks of masonry, 16th-century pottery and brick fragments. At the S end of the trench the layer was 0.5 m (1 ft 8 in) thick, becoming 0.25 m (10 in) thick where it abutted the base step of the stairs rising over the E Radial Passage. This layer formed the lowest deposit of the Rampire. A layer of shingle (17) up to 0.5 m (1 ft 8 in) thick overlay the soil and shingle (18) at the S end of the trench, and extended halfway across the top of the Radial Passage before terminating. Early 17th-century pottery and 2 Nuremberg jettons (dated 1530–1650?) were recovered from this layer, together with a piece of clay pipe of 17th- or early 18th-century date. To the N of the Radial Passage was a 0.15 m thick deposit (20) of dark-brown silt with a few pebbles, including some late 16th-century and early 17th-century pottery. This natural soil accumulation extended to the N Curtain Wall, indicating that the toe end of the slump from the Rampire (represented by layer 17) reached at least as far as the mid-point of the E Radial Passage. Shingle deposits were observed inside the E Stirrup Tower overlying a layer of rubble, suggesting that

Plate 3.38: The N Bastion, looking north-east; pre-clearance photograph of stone steps set into the top of the bulk fill. 1972 (English Heritage)

the Rampire had slipped into the tower once the blocking of the gunloops had failed and the structure had begun to fall into disrepair.

In the SSW Gallery 'occupation' layers (762, 763, 835; Fig. 3.45) were cut by a construction trench for a cross-wall (1189), positioned immediately to the E of the entrance to the multiple garderobe. In the SSW Courtyard a layer (833) above the courtyard, and equivalent soil (763=835) in the multiple garderobe doorway, was overlain by material which consists of a 1.2 m (4 ft) thick deposit of masonry rubble including beach shingle and mortar (744, 746–7) and is interpreted as the phase IVb Rampire. This layer also abutted the remains of the cross-wall (1189). These levels were sealed by layers of shingle (745, 1185 and 743) to a combined depth of *c* 1.8 m (5 ft 11 in), perhaps representing slump from the Rampire. The depth of the Rampire deposits decreased to the W, where 2 m (6 ft 6 in) distant it was *c* 0.6 m (2 ft) thick, and even further W was 0.2 m (8 in) deep. The tail end of the shingle spread from the Rampire covered the top of the Vaulted Ring Passage against the S and SE sides of the Keep, thereby preserving it intact.

PHASE IVC: THE FINAL YEARS

Summary

After the infilling of the N and S Bastions and the creation of the Rampire, the castle garrison remained until the castle was finally decommissioned in 1637. Documentary evidence (see Chapter 2) shows that the garrison was halved from 28 to 14 between 1610 and 1614, and the number of gunners was dramatically reduced from 17 to 4. Abandonment of the castle was proposed as early as 1623 (Chapter 2), but payments continued to be made to the garrison until 1637, and the last known Captain, Thomas Porter, served from at least October 1633 until the eventual disestablishment. A limited amount of structural evidence can be attributed to this phase, post-dating the construction of the Rampire, and in places occupation layers are likely to derive from the latest years or months of the castle's active life.

Structural evidence (Figs 3.36, 3.37; Plate 3.29)

It was suggested above (phase IVb) that a cross-wall was constructed within the SSW Curtain Wall Gallery to prevent the slumping of the gallery fill (itself possibly overflow from the S Stirrup Tower) into the doorway leading to the multiple garderobe. This appears to have been only partially successful, however, as the Rampire material slumped into the doorway from the courtyard as well. In order to maintain access to the garderobe facilities, a new entrance was created. Stone steps were constructed within door between the single and multiple garderobes. These steps were constructed over layers of bulk fill in the west part of the chamber containing the garderobes,

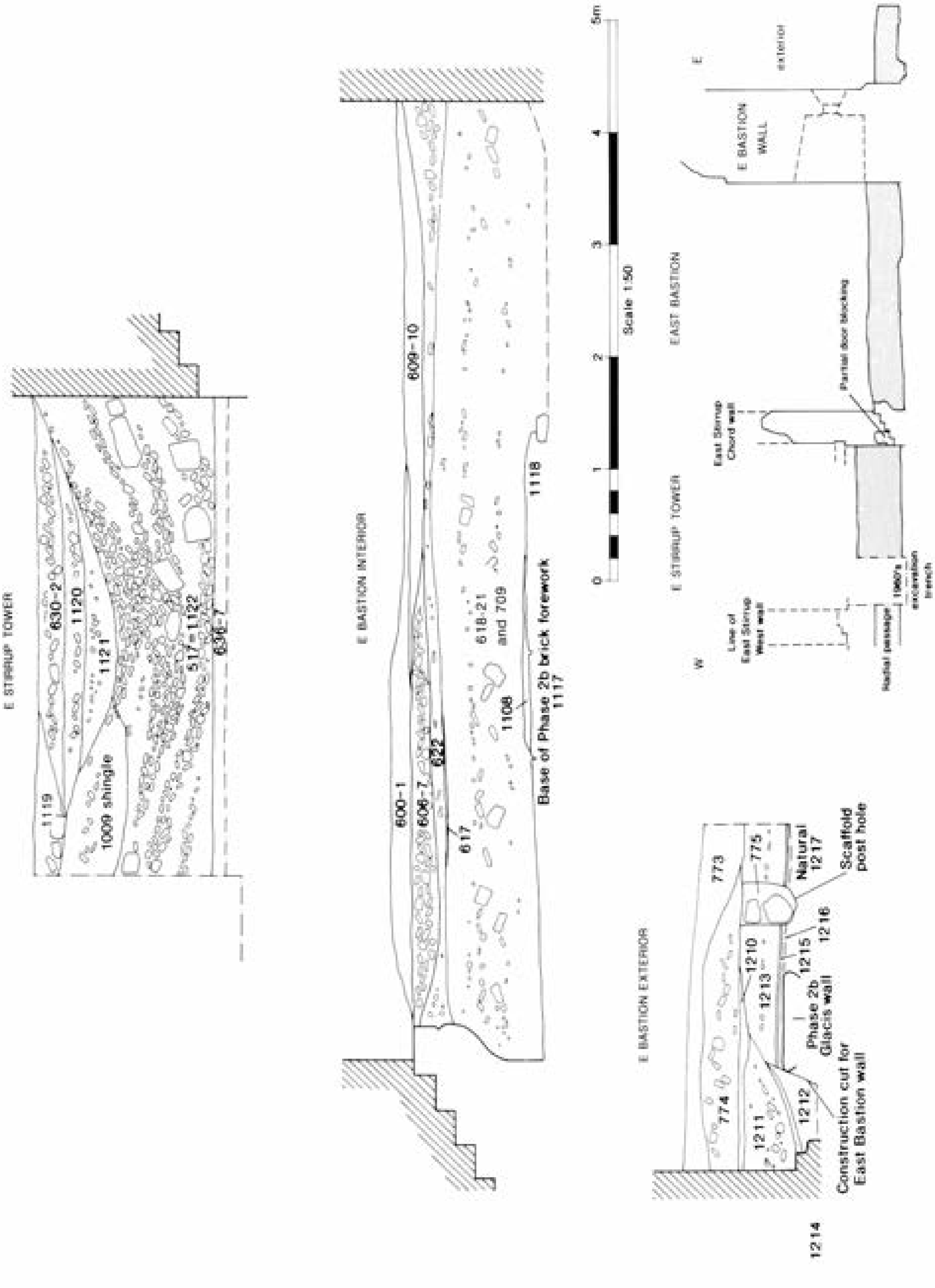


Figure 3.49: E Bastion and E Stirrup Tower composite section

indicating that the basement of the gallery was no longer used. The steps passed in front of the entrance to the single garderobe, which had also clearly gone out of use (Plate 3.29). The precise date of the steps is unclear, but they were demonstrably installed after the creation of the Rampire.

Late occupation: evidence from excavations (Figs 3.46, 3.49, 3.50)

Late occupation deposits were identified within the unfilled bastions and stirrup towers, with the finds suggesting activity up to the final departure of the garrison. The brick basement floors of the Curtain Wall galleries were usually covered by one or more lenses of dark grey-brown sandy soil. These thin deposits probably represent the final use of the galleries, rather than a gradual accumulation of material and rubbish. An early 17th-century coin was recovered from the floor of the ENE Gallery (see Chapter 7, below). The courtyard cobbling was surrounded and partially covered by thin layers of brown and grey windblown sandy soil containing pieces of pottery, brick and tile. The precise date that these soils formed is unclear, and over the whole courtyard they were eventually sealed by demolition deposits. The cobblestones were missing from the NW courtyard and were probably removed after abandonment. A soil layer (295) that abutted the well outside the W Bastion contained a Nuremberg jetton datable to the period ?1530–1650 and a stamped clay pipe securely dated to 1620–60, together with another six pipe fragments dated between 1580 and 1660.

Excavated evidence from the bastions and stirrup towers: Within the E Bastion the drain against the S wall was filled with dark soil (616). Similar layers (Fig. 3.49, 609–10; 613–14 not illustrated) accumulated on the floor; pottery from layers 609–10 was of early 17th-century date, and vessels dated from the mid 16th to the 17th century were found above this floor (layers 613–14), together with a bowl of a clay pipe dated *c* 1680–1710. Patches of burnt mortar were observed at the base of the NE and SE casemates; the latter containing a few sherds of late 16th- to 17th-century pottery. At the base of the N casemate was a patch of sand (645), from which was recovered parts of the same early 17th-century Cologne bottle as occurred on the floor of the gun room (in context 609). Within the NE casemate a shallow depression (1126) had been cut into the floor through a layer of mortar (1127), similar to those in the N Bastion casemate floors. Above the timber floor of the E Stirrup Tower (equivalent to 636-7 in Fig. 3.49) was a very thin layer of dark soil (519 = 1124, not visible in section), possibly occupation debris, above which had accumulated a layer of mortar and brick rubble (517 = 1122) presumably deriving from the demolition of the castle in phase V (see below). Seventeenth-century Southwark Tin Glazed Earthenware, indicative of this later period was found in the rubble (517). In the W Bastion, the drain against the W wall gradually became clogged with silt, presumably derived from continued use of the kitchen, but direct evidence of occupation is limited. Within the W Stirrup Tower (Fig. 3.50) finds indicate that the basement remained in use until the abandonment of the castle. A series of sandy spreads on the floor of the basement (layers 273–278 incl., 280 and 283) contained charcoal and ash, together with mid to late 16th-century pottery and clay pipe fragments dated to the period of occupation of the castle. A similar thin layer (263) contained 17th-century clay pipe. By contrast, another layer (276) contained a high proportion of 18th- and 19th-century pottery and part of a clay pipe that had been filled with metal (possibly lead), dated to the 18th century, while a Nuremberg jetton (1530–1650) was also recovered from above the floor (280) of the W Stirrup Tower. All these layers were limited in extent, and were less than 0.05 m (2 in) thick, and sealed beneath a 0.05 m (2 in) thick layer of loose mortar (257 = 279), which contained Tin Glazed pottery of mid and late 16th-century date together with pieces of clay pipe dated to 1640-80. Analysis of black viscous material covering the brick floor indicates that the basement was used to store charcoal, probably for use in the nearby kitchen, or that deposits from fires had accumulated here. A Charles I farthing (1625–34) was recovered from the surface of the staircase that leads up from the basement floor to the kitchen. Above the floor of the N Stirrup Tower (Fig. 3.46) was a layer of grey silty sand containing plaster debris and occasional pieces of charcoal (265 = 307), doubtless attributable to the final use of the Tower basement, and a Nuremberg jetton (dated 1530–1650). All these 'occupation' layers were overlain by demolition fills (phase V).

Curtain Wall Galleries (basement level): At the base of the ENE Curtain Wall Gallery (G I) the shallow soil layer (74) contained pottery sherds ranging in date from the early to late 16th century, and included a Charles I farthing (dated 1625+). In the NNE Curtain Wall gallery (G II) two comparable layers (120 and 123) above the floor produced a few sherds of early 16th-century pottery, with the majority dating to the mid to late 16th and early 17th centuries. Soil (255) above the floor in the NNW Curtain Wall gallery (G III) contained pottery of mid to late 16th-century date and included some 17th-century material; pottery of similar date was recovered from the WNW, WSW and SSW Curtain Wall galleries (respectively G IV, G V, G VI).

Excavated evidence for external activity (Figs 3.27, 3.30)

Evidence of workmen's activity was revealed by excavation outside the bastions, though the exact context for the deposits is uncertain. The pottery dates suggest later 16th-century activity, rather than association with the construction phases of the castle. The garderobe chutes were periodically cleaned out, with pits being excavated by the garrison along the length of the underlying drains. Late occupation evidence was recovered between the N and Entrance Bastions.

Excavated evidence: To the E of the N Bastion (Trench NBY, not illustrated) was a layer of soil and mortar (343) containing pottery of a local type dated to the mid to late 16th century. Above lay an 0.2 m (8 in) thick deposit of building debris (337 = 370) including brick and dressed

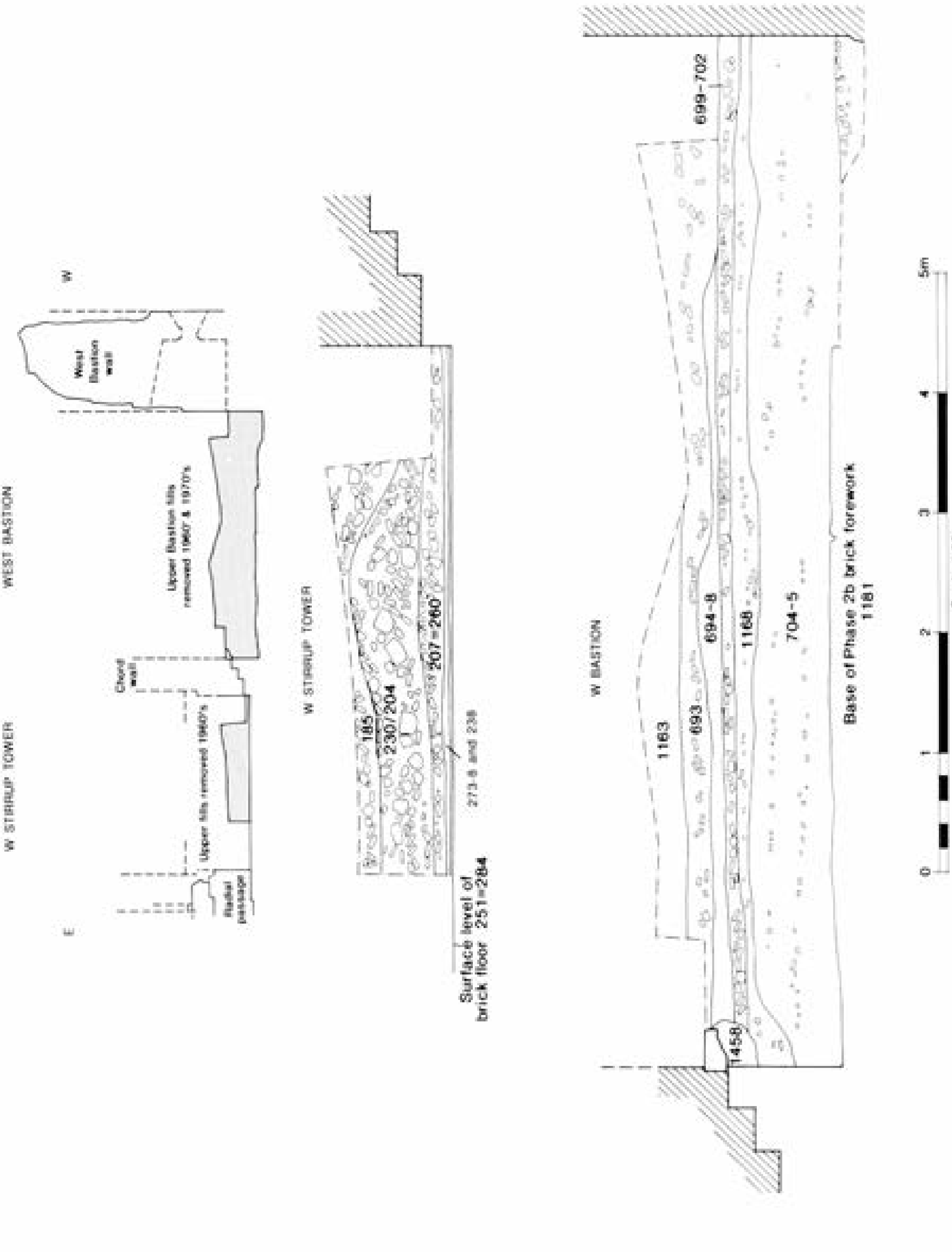


Figure 3.50: W Bastion and W Stirrup composite section

stone fragments, pottery of mid 16th- to early 17th-century date, and a clay pipe stem dated 1770-1850. A shallow oval shaped pit (335) was cut into the building debris, with fills consisting of ash, charcoal, early to late 16th-century pottery, bone and scallop shells, suggesting the remains of a bonfire. Above the pit fill and mixed with the topsoil were a number of stove tile fragments and animal bone. S of the E Bastion (Trench EBY, not illustrated) a narrow trench (1409) leading off from garderobe chute 1151 (Fig. 3.27) had been cut along the line of the fill of the underlying wooden drain (731). The trench was 0.65 m (2 ft 3 in) wide and 0.15 m (6 in) deep, and was filled with compacted dark brown earth (681–82), pebbles, brick fragments, and local pottery dated to the second half of the 16th century. Several late pits, or possibly postholes, were cut through the fill of this recut garderobe drain. These features (675–6, 677, and 679) may even post-date the occupation of the castle, but they contain a high proportion of early to mid 16th-century imported pottery. A whole Raeren drinking jug was recovered from the fill of one pit (675-6). S of the W Bastion (Trench WBY; Fig. 3.30), a large elongated pit (823, 956-58 = 1296), measuring 2.4 m (8 ft) wide, 1.2 m (4 ft) deep, and 4.8 m (16 ft) long, was cut along and virtually to the bottom of the garderobe chute (1290). Local pottery from the fill was of mid 16th- to early 17th-century date, but occurs as a mixed deposit with early 16th- and early 17th-century imports. These fills were recut by a similar but smaller pit (820-22, 955), suggesting a second cleaning operation. Pottery ranging in date from the mid- to late 16th century was recovered from this feature. The final fills in the garderobe chute within the thickness of the wall consisted of layers of clay and earth (826, 827, 828) containing the same local mid 16th- to early 17th-century pottery vessels as the fill of the elongated pit 823, as well as late 16th- and early 17th-century imports. Part of the fill (827) contained an early 17th-century example of a Low Countries Slipware bowl and fragments of a late 16th-/early 17th-century North Netherlands Maiolica dish, which joins with sherds in contexts in the WSW Mural Gallery (GVI). This pottery suggests that the garderobe must have remained in use until the latest phase of occupation in the castle. E of the N Bastion, two 17th-century clay pipe stems were recovered from a latrine shaft (111) in the NNE Curtain Wall, and three clay pipe bowls dated to 1660–1680 were recovered from the connecting chute (112), suggesting some activity in the castle long after the garrison had gone.

Excavation between the N and Entrance Bastions revealed a 0.25 m (10 in) thick layer of grey-brown sandy soil (878–881) containing large stones, perhaps tumble from the Curtain Wall, which overlay an earlier soil layer (887–892). Pottery from layer 878–881 included material ranging in date from the early 16th to early 17th centuries. This layer was overlain by mortar and stone (875–77) containing mid to late 16th-century and 17th-century pottery. A late pit (1396) was cut from this level and was filled by three deposits. The lowest (894–97) consisted of a mixture of charcoal, mortar, brick fragments and dark brown soil, together with 16th- to early 17th-century pottery. This was overlain by a band of dark brown organic soil (882–86), rich in shells of various types and containing metal finds, including a spur, a musket ball and a door fitting, and pottery, including late 16th- to 17th-century material. This was sealed by a red-brown soil (902–7) with frequent inclusions of yellow brick, and an assemblage of redeposited early to mid 16th-century pottery. A layer of former topsoil (898–900/868–9) contained a large proportion of early to mid 16th-century pottery, together with material of mid to late 16th-century date.

The evidence of the finds assemblages

Large quantities of artefacts recovered during the excavations, including metalwork, military equipment, pottery and glass, clearly derive from the occupation of the castle, but the infilling of the two bastions, and the creation of the Rampire, has introduced a large measure of uncertainty regarding their provenance and phasing. Many of these objects evidently derive from rubbish discarded outside the castle which was then re-imported with the shingle used for the Rampire and the fill of the N and S Bastions. The finds therefore have little value for identifying the ways in which different parts of the castle were used. The presence of 17th-century pottery in the assemblage from the N Bastion is discussed in detail in Chapter 9, where its implications for the dating of this event are assessed, together with the evidence from the clay pipe assemblage. Otherwise, the finds offer little to refine the dating of phase IV.

The finds from phase IV cast some light on the day to day life at the castle. Individual assemblages of military artefacts and horsegear, pottery, personal and decorative metalwork, tools, vessel glass and clay pipe are presented in Chapters 5 to 7. Chapter 8 contains a detailed analysis of the animal bone assemblage. All this material is reviewed in Chapter 9, where the living conditions in the castle are considered in more depth. The use of weapons and their deployment, based on the evidence of both finds and documentary sources, is also discussed in Chapter 9.

PHASE V: THE ABANDONMENT OF THE CASTLE (1637+)

Summary (Plates 3.39, 3.40)

Scaffolds were erected in the courtyard, presumably to dismantle the remaining Curtain Wall galleries and remove reusable stone, timber and lead from other buildings. The basements of the NE and SW Curtain Wall galleries were completely infilled with bulk rubble, including substantial quantities of worked stone (Plate 3.39). The substantial quantity of stone recovered from the gallery basements, and the fact that the fills were generally very clean, suggests that the basements had been systematically infilled during the dismantling of the ground and first floor galleries.

Elsewhere, rubble accumulated at basement level within all the castle buildings, and the courtyard eventually became buried completely beneath layers of brick, stone and tile. Architectural fragments were recovered from the stirrup towers and from the courtyard. There is some evidence that decorated and moulded stones had been selected and gathered together prior to removal from the site; three small fragments of string-course were found in the W Stirrup Tower, together with other stones that had not formed part of the tower itself. These include a decorated fireplace lintel, pieces of a window jamb from the Curtain Wall, a smoke-hole top, three reused medieval stones and six doorheads. Some 25% of the total provenanced worked stone was recovered from the courtyards, where it would have represented an impediment to movement, and 55% came from the basement galleries, and represents systematic infilling.

On the whole, however, it seems that salvage work was designed to recover the lead and timber, with stone taken as and when it was required, possibly over many years after the castle had been decommissioned. It is notable that proportionally less lead calme than window glass was recovered. Excavations found evidence for pits in which lead and metal objects had been melted down prior to removal, and lead dross occurred within rubble layers across the site. The NW-facing gunport of the W Bastion has been enlarged (Plate 3.40) and although there is no evidence to confirm when this was carried out, it is possible that an opening was created large enough for the easy removal of material from the castle during dismantling.

The documentary evidence records the names of captains of Camber Castle, and payments to the garrison, until 1637. After this date, records of the garrison cease and the castle was abandoned, although it remained in use as a military store until at least 1642, when it was dismantled by Parliamentary forces. In August of that year, Herbert Morley, Deputy Lieutenant (pro-Parliament) obtained a Commons Order for the removal of ordnance, muskets and powder at the castle to Rye for the use of the county. In the context of the Civil War, it is likely that the dismantling and infilling of the castle was a deliberate policy to ensure that it could be of no further military use.

Plate 3.39: The E Gallery GII partially cleared, with the bulk rubble fill still in situ at the far end. 1982 (English Heritage/ Sheppard)

Excavated evidence for the demolition of the galleries (Fig. 3.51)

A number of postholes were located around the courtyard, coinciding with patches where cobbling had been removed, probably for the insertion of the posts. While it remains possible that the postholes could represent temporary structures within the courtyard, the most likely explanation is that they supported scaffolding used for the systematic demolition of the galleries and other buildings. Two lines of postholes were found in the SW Courtyard, one running just outside the Vaulted Ring Passage, and the other just inside the inner Curtain Wall. A single line of postholes was found in the NE Courtyard, and two further lines were found in the NW Courtyard. Nearly half of the stones from the windows in the galleries (48% excluding fragments from excavation) were found inside the galleries themselves. Since most of these stones would originally have been located on the exterior face of the walls, they must have been deliberately pushed or moved inside thus reinforcing the impression that the galleries were filled deliberately.

The courtyard scaffolding: The courtyard postholes (Fig. 3.51) were generally sub-rectangular or sub-circular, and were typically *c* 0.75 m across varying in depth between 0.1 and 0.6 m. The postholes had vertical sides and flat bases, with clearly defined post-pipes between stone and cobble packing. The post-pipes were generally 0.2 m–0.3 m across. Pottery from the fills of some of the postholes was of late 16th-century date, with a few 17th-century sherds present.

Excavated evidence for the rubble fills (Figs 3.46, 3.49, 3.50)

Basement galleries: The WSW Curtain Wall basement gallery was infilled with rubble, and the upper fills contained pottery of late 16th- to early 17th-century date. Pottery from the gallery between the Entrance Bastion and the N Bastion was of late 16th- to early 17th-century date, with intrusive 19th-century material, and the fills of the NNE Curtain Wall basement gallery contained mid to late 16th- to early 17th-century local pottery. Pottery from the fills of the Curtain Wall basement gallery S of the Entrance Bastion dated from the mid to late 16th century, with intrusive 19th-century material in the lower fills. An intermediate fill contained a Nuremberg jetton (dated 1530–1650). All bulk fills were clean, and contained substantial quantities of worked stone. The pottery and numismatic evidence suggests that the galleries remained in use until very near the end of the occupation of the castle, whilst their demolition came shortly afterwards.

Entrance Bastion: In the N Quadrant Room, the floor was covered with rubble containing large amounts of molten lead residue (1039), and lead dross was excavated from a small pit (385) sunk into the base of the fireplace built in the N wall. The fill of the pit (374) contained ash, lead dross and other combustion by-products. A layer of rubble (538) in the Inner N Room produced a Louis XIV liard

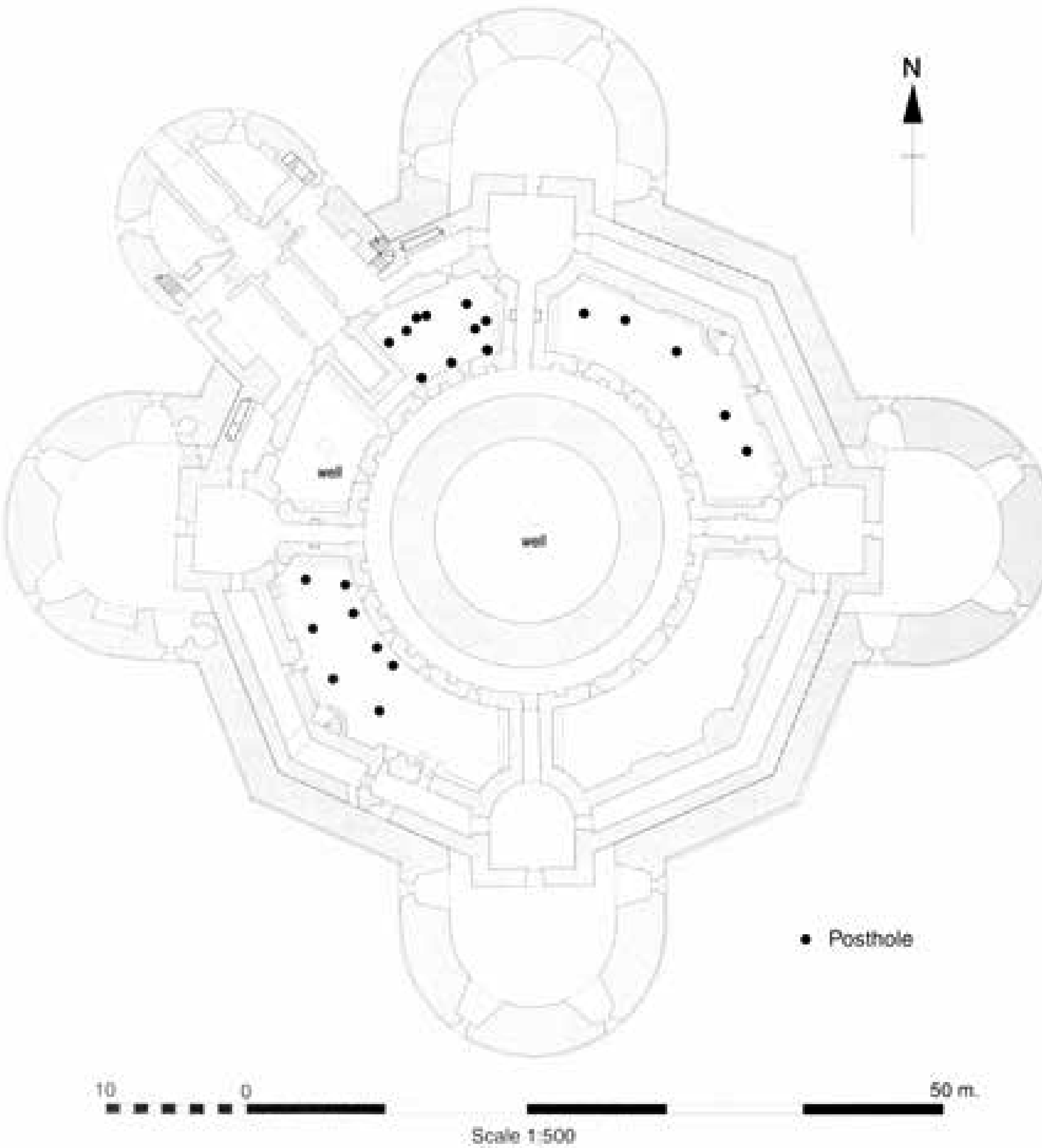


Figure 3.51: The Castle: plan of scaffold postholes from demolition activity

(Bordeaux 1656), and a Nuremberg jetton (1530–1650), both presumably lost by visitors or demolition workers. In the Inner S Room, demolition rubble (387) on the floor incorporated timbers. Two small pits (371, 386) had been cut into the rubble, the former also cutting the brickwork of the NE wall, indicating that the wall had been demolished by this time.

N Stirrup Tower: A series of rubble layers (Fig. 3.46) formed above the occupation debris (265=307). These layers all contained brick fragments, and plaster and mortar debris in a sandy loam matrix. A layer of loose brick and masonry (247) showed traces of blackening. Large blocks of masonry were present in the subsequent accumulation (183). A similar sequence was found within the blocked doorway. Pottery within the demolition layers was predominantly of mid to late 16th-century date and therefore residual.

E Bastion and Stirrup Tower: Comparatively little demolition material was excavated within the E Bastion (Fig. 3.49), suggesting either that it had been removed previously, or that the E Bastion had been left in a better state of preservation. Within the E Stirrup Tower, demolition layers accumulated to a depth of 1.7 m (5 ft 7 in) above the floor, and included a layer of shingle (1009) towards the upper part of the sequence, probably slippage of the Rampire into the basement.

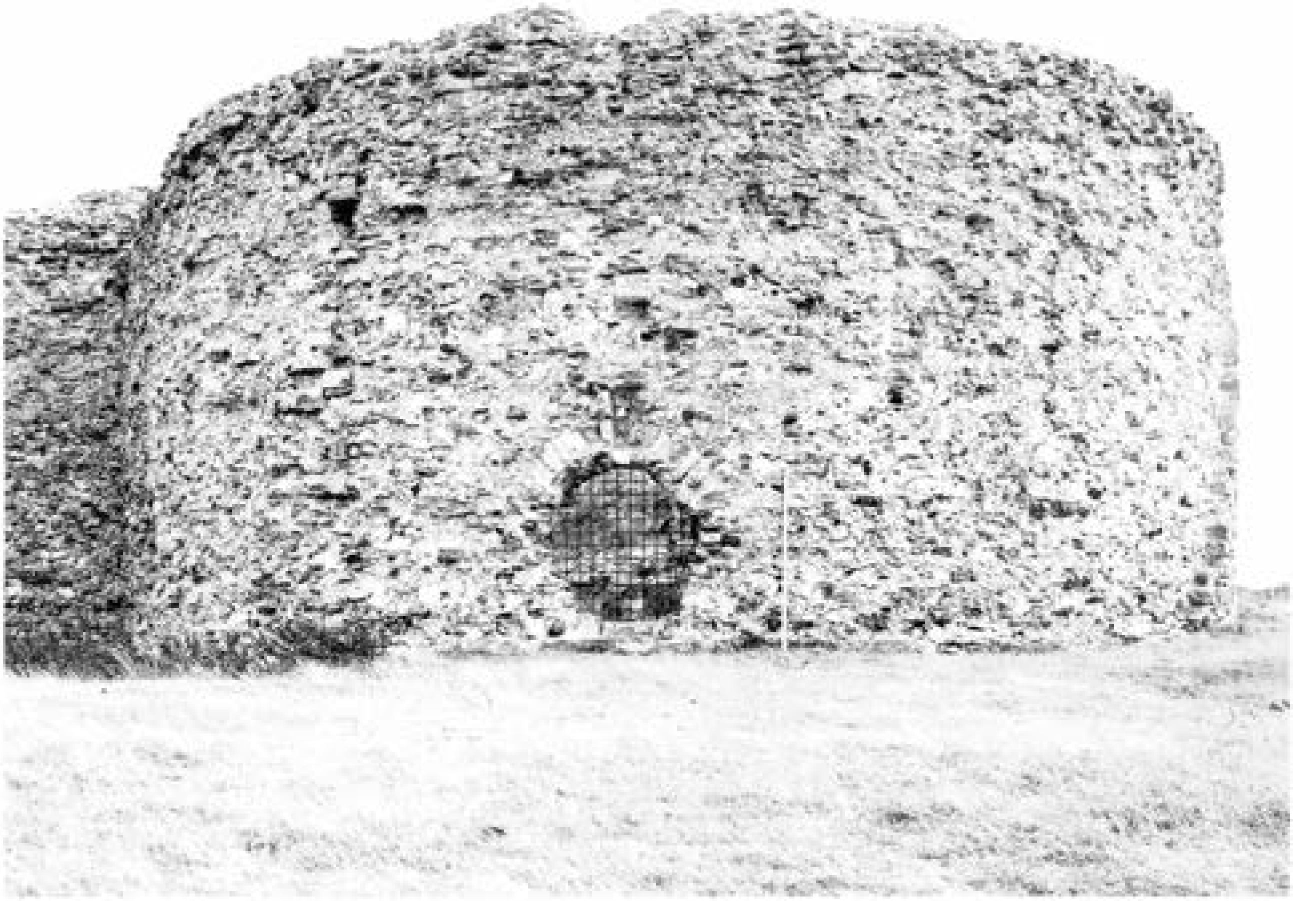


Plate 3.40: W Bastion exterior, looking south-east; showing the enlargement of the NW-facing gunport, perhaps used as a doorway for the removal of salvage material. 1998 (English Heritage)

W Bastion and Stirrup Tower: Within the W Bastion (Fig. 3.50) demolition layers (693 and then 1163) accumulated above the level of the flagstones. In the W Stirrup Tower, a shallow pit (269) cut a mortar layer (257) that overlay the occupation layers. The pit contained ironwork (270) at its edge, and there was a deposit of sandy mortar (245) containing ironwork and lead, and burnt stems of 17th-century clay pipes. Above lay further layers of demolition material.

PHASE VI: LATER ACTIVITY AT THE CASTLE (18TH–20TH CENTURIES)

Summary

The castle became popular among visitors during the 18th and 19th centuries, and is known to have been a favoured picnic spot. A compact trampled surface probably corresponding with the picnic area was found within the rubble build-up in the NE Courtyard, and the layers immediately above contained Victorian finds including pottery and glass. Other finds from this period include clay pipe fragments recovered from the rubble in the courtyard, and a trading token dated to 1790 recovered from the joints of the floor bricks in the W Radial Passage. Pottery of 18th- to 20th-century date was found consistently in the upper deposits, both inside and outside the castle, and pottery of 20th-century date within the filled bastion gunports had been dropped down the smoke vents. A number of 19th- and 20th-century coins have been recovered.

In more recent times the site was reused during World War II, possibly as an early warning lookout, and foxholes of World War II date were present in the upper fill of the N Bastion. A number of related finds have been recovered. Amongst the most interesting are 13 striker levers from hand grenades, at least 2 of which had been used, a number of arc light elements from searchlights, and a police, or air raid warden's, whistle. Anti-aircraft searchlights may have been sited nearby, although they are not listed in official records.

Recently demolished structural features outside the castle included a lean-to shed and a possible guard-hut that may date to the war years, or to work carried out after the war by the Ministry of Public Building and Works.

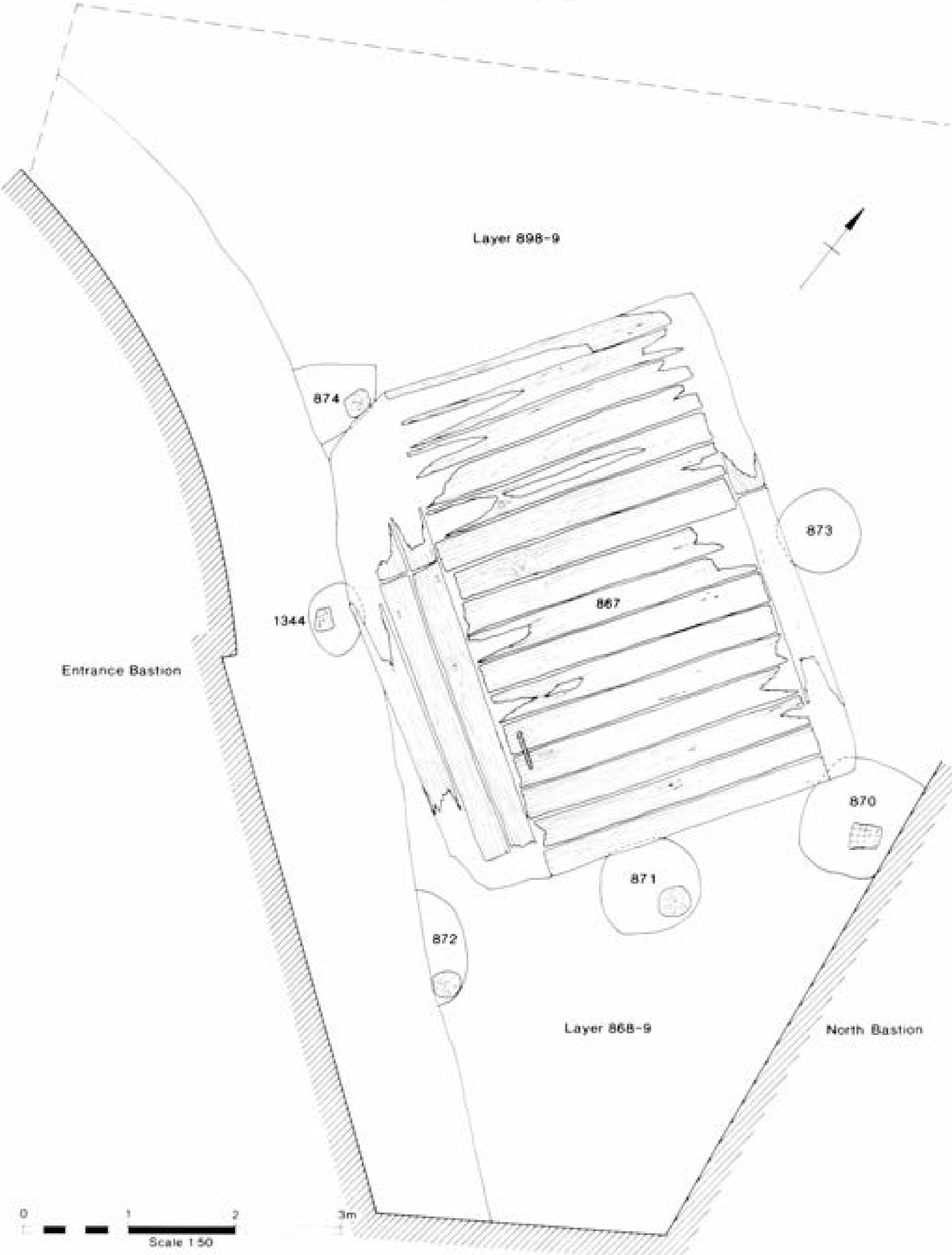


Figure 3.52: Modern wooden structure adjacent to Entrance Bastion: plan

Excavated features of recent date (Fig. 3.52)

Surface features recorded during excavation and clearance: The footings of a stone wall orientated NW-SE were found at the salient angle of the Curtain Wall between the E and S Bastions. The wall extended for a length of 4.26 m and was 0.6 m wide. On the exterior elevations of the ESE and SSE Curtain Wall are a series of timber positions, some of which retain timber impressions. This suggests that the wall was part of a large lean-to shed, perhaps of 20th-century date. The wall can be seen on earlier 20th-century photographs. The base of a wooden structure (867) was found immediately beneath topsoil next to the Entrance Bastion (Fig. 3.52). It was made of railway sleepers held together with iron nails and staples and was built within a broad shallow cut (1397) within layer 868–69. The platform measured 4.8 m by 3.9 m (16 ft by 13ft). Surrounding the structure were six postholes (870, 871, 872, 1344, 873 & 874), which probably supported a wooden superstructure. This may have been a guardhouse during World War Two, or a Ministry of Works site hut. Ministry of Works activities dating to the 1960s included the insertion of railway sleepers between the infill of the N Stirrup Tower and Radial Passage to prevent slumping of the fill into the passage. Likewise in the W Stirrup Tower, wooden sleepers and /or shutters blocked the Radial Passage, to retain the basement fill.

Consolidation and restoration

Successive campaigns of excavation have been accompanied by a rolling programme of consolidation and restoration, notably during the last quarter of the 20th century. The internal brick facings and exposed wall-cores are particularly vulnerable to erosion. Surfaces and some other features have been restored for reasons of safe public access.

Consolidation of the upper levels of the Entrance Bastion and N Bastion has included some refacing with new brick. Elsewhere, walls have been capped to prevent water penetration and accelerated frost damage. Other repairs such as to the chord wall of the E Stirrup Tower and the joist sockets in the Keep have been dated to indicate the extent of restoration.

The broken ends of the Vaulted Ring Passage where the roof has gone, and the adjoining gun embrasure have been rebuilt to ensure their continued stability. Brickwork has been replaced for the same reason on the broken wall tops of the gallery behind the Curtain Wall, and the wall of the spiral stair in the N Courtyard has been rendered for its protection. The wall marking the front of the original gatehouse has also been reconstructed.

The work carried out for the safety of visitors includes extensive re-paving in the Entrance Bastion and adjoining galleries and in the Keep, where the positions of the padstones have been reinstated. Timber treads have been installed on the spiral staircase in the Entrance Bastion.

Cobbles have been re-set and missing areas replaced in the Courtyards, while perforated timber caps have been fitted to the smoke vents in the Vaulted Ring Passage, and the well has been enclosed with a low wall, all for reasons of public safety. Flights of timber steps allow access for visitors to the various levels within the castle, but they do not seek to simulate the original patterns of circulation for the former garrison.

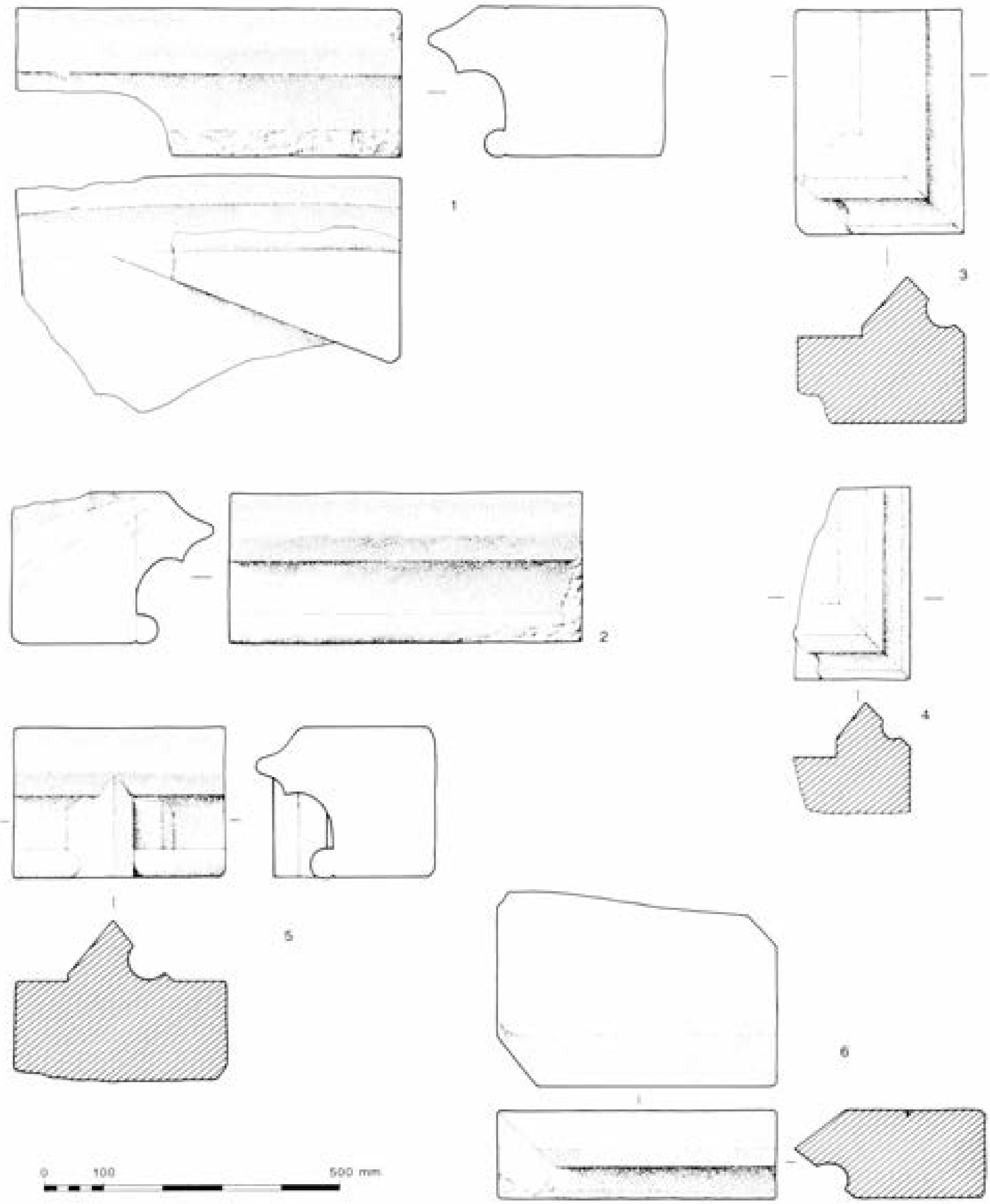


Figure 4.1: Architectural stone, Nos 1–6 (scale 1:10)

Chapter 4: The Architecture of Camber Castle

by Cecily Cropper, David Gaimster, Jackie Hall, Nicholas Mitchell, Graham Morgan and Ian Scott

THE ARCHITECTURAL STONES

by Jackie Hall

Introduction

Nature of the assemblage, and methodology

Six hundred and thirty-three loose architectural stones and fragments were retrieved from the Camber Castle excavations. The bulk of the stones (514) were removed as part of the clearance operations in the 1980s, by area, with a few (36) recovered from excavation contexts of the 1970s and 80s. The remaining stones were not provenanced. Much of the stonework has been reburied on the site.

The basis of the present analysis is the collection of 138 extant pieces, which have been recorded in detail. This analysis has been supplemented from the records of architectural stones that were reburied. These records are from the register of all known architectural stonework that was compiled by Martyn Carey in 1983 prior to reburial. Numbers from the 1983 Register are also listed in the catalogue.

Nearly a third of the stones (205) were undiagnostic ashlar blocks, chamfered blocks, splays and rebates, and no analysis has been carried out on this material. The large number of jamb stones recovered (*c* 175) were also subject to only a basic level of analysis since they too could only provide limited information. Nevertheless, there was a large assemblage of material appropriate for detailed study.

The different phases in the building of Camber Castle are closely dated and the architectural stones are typical of the 16th century. The purpose of the analysis was not to establish the date of the stones, but to extrapolate from them (and from the extant remains) a fuller picture of the appearance and functions of the buildings at Camber at different phases. The results of the analysis of the architectural stones have been presented in Chapter 3 (above). What follows here is a discussion of the analysis, and a detailed catalogue.

Provenance

One of the first priorities of the analysis was to establish the provenance of the excavated architectural stone in relation to the standing structures. Most of the recorded stone came from areas excavated in the 1980s, namely the courtyards, galleries and N and W Stirrup Towers.

The analysis was undertaken assuming that very few of the stones had moved far from their original location. On this basis, the stones found in the courtyards are most likely to have come from either the Keep or from the walls of the galleries in the Curtain Wall, with perhaps a few from the stirrup towers. Stones found in the basement galleries are most likely to have originated from the galleries themselves. The distribution patterns, and in particular the concentration of material in the galleries, suggests that the galleries were deliberately destroyed.

Geology *(compiled with the assistance of Roy Shephard Thorn)*

Several types of stone were used in the construction of Camber, and were employed both for walls and for architectural detail. Since different stone types were used in different phases, identification of the different geologies was central to establishing the phasing of the architectural fragments. To summarise the results of the architectural analysis briefly (see Chapter 3), yellow sandstone ashlar was used for the construction of the original circular tower (phase I) and in the alterations to the tower/Keep in phase II. For the rest of the phase II building work a variety of reclaimed stone was used (including both yellow and grey sandstone), which can be seen, for example, in the stirrup towers and the Curtain Wall/galleries. Much of the reclaimed stone certainly came from the religious houses of Winchelsea, as is well documented (*HKW*, 423). In phase III a mixture of reclaimed stone was again used both in the stirrup tower first floors, and in the lower levels of the curtains and bastions. This may have come from parts of the phase II structure that were being scrapped or altered (eg the foreworks), and possibly still from the religious houses of Winchelsea, although this is not documented. It is documented that 129 tons of Caen Stone were supplied in 1540 (*HKW*, 424). Freestone was also brought from Mersham, near Ashford (*HKW*, 424). The sources of the stone used in the final building phase are not so well documented. Freshly quarried grey sandstone was used in the upper levels of the Keep, the bastions and the Curtain Wall (with bricks internally in all of these), and also in the gunports of the Entrance Bastion. Caen Stone appears to have been used for mouldings throughout the building work. Although the mixture of reclaimed stone in both phases II and III confuses the issue, it is probably fair to assume that the majority of architectural pieces were cut from stone specially quarried for Camber, ie from yellow sandstone in phases I and II and grey sandstone in phase III, and from Caen Stone in all phases.

The bulk of the stone used (the yellow and grey sandstone) was of local origin and derived from the Ashdown Beds of the Hastings formation (part of the Wealden group of the Lower Cretaceous). Most of this is very fine-grained silty sandstone, massive in character. The two colours, pale buff to yellow (iron-stained), and pale grey, can occur in close proximity in the same quarry.

In both varieties, spherules of sphaerosiderite (a hydrate of iron carbonate) were frequently found, although not in all pieces. Occasionally black specks of fossil plant carbon were also found. The most likely sources for the stone are East Cliff (near Hastings), Fairlight and Cliff End, while the stone of the early Keep strongly resembles that found at Haddock's Steps (these last three are all located close to Winchelsea). In 1540, quarries were opened at both Hastings and Fairlight to supply stone to the works at Camber (*HKW*, 423).

The wall-core incorporates a number of other local stones including ironstone boulders, Tilgate Stone, a hard calcareous siltstone, and a brown pebbled sandstone. These are from the Wadhurst Clay formation which lies over the Ashdown beds and is found in the cliffs overlooking the Camber. Fine-grained glauconitic sandstone from the Lower Greensand was found in the outer bastion walls. The closest source for this is Hythe. This was probably brought to the castle as reused, rather than freshly quarried, stone.

The extant pieces of limestone are typically creamy fine-grained oolitic limestone, which probably came from Caen. One or two of the catalogued stones show variations from this description, but these may represent inferior types of Caen Stone. One of the reused medieval fragments (Archive No. 137) was a mostly pale pink silty limestone with traces of shelly fossils, and was quite different from the other limestones.

When the architectural stones were first catalogued in 1983 they were identified simply as yellow sandstone, grey sandstone and Caen Stone. The subsequent geological identification of those examples that have been retained in the archive confirm that the original identifications were largely correct. A few pale silty sandstones, which were finely cut and, unusually, not eroded, were erroneously identified as Caen Stone, while the colour of one or two silty sandstone pieces (without any freshly broken surface) was not correctly attributed. While this is important because of the observed use of stone types within the extant buildings, the overall interpretation of the stones is not likely to be radically altered by a few possible errors.

The catalogue

The 16th-century architectural stone has been divided into groups on the basis of function (string-course mouldings, window- and doorheads and so forth). Where more than one group has been identified with a particular structure or structure(s) (eg the gallery windows), these have been described together. In most instances one example from each group is illustrated. Each group has a separate entry, which comprises a description of the illustrated example, followed by a more general description of the group. Where appropriate this is followed by a table listing the relevant stones with archive number and/or register number, geological identification and provenance. The provenance is either context number where applicable or an area of the castle where there is no context. The following abbreviations are used for the geological identifications: LS - limestone (usually, but not exclusively Caen Stone); S(G) - light grey sandstone; S(Y) - buff-yellow sandstone. Numbers in brackets are Small Find numbers attributed by the excavators. Following the main body of the catalogue there is a short section listing the fragments of medieval stonework found in the excavations. This material has not been illustrated.

The Keep string-course

Group 1: Keep string-course (Fig. 4.1, No. 1)

String-course with a lower roll, a broad hollow and an elongated keeled upper roll. This piece has a degree of horizontal convex curvature and it appears recut to create a splay in its bottom face. Caen Stone. (Archive No. 33)

Six other pieces of string-course were identified (Table 4.1), including one piece reused as a splay. This curvature strongly suggests that they derive from the Keep. Since the Keep and its string-course are still extant (although parts of the string-course are missing) the apparent reuse seems odd. The raising of the string-course in phase II when the Keep was heightened may provide an explanation, since it would inevitably have damaged some stones and they would not have gone to waste. The discovery of the provenanced stones in the courtyard would be consistent with an origin in the Keep, but there is a slight possibility that they may have come from the round ends of the stirrup towers.

Table 4.1: Group 1 - Keep String Course

Archive No.	Old No.	Stone type	Site location
33	507	LS	WNW courtyard well
57	-	LS	-
78	-	LS	-
-	95	LS	SW courtyard
-	103	LS	SW courtyard
-	105	LS	SW courtyard
-	112	LS	SW courtyard

The gallery string-course and windows

Several groups of stone, which were found mainly in the courtyards and in the galleries, must have originated in the galleries. These included string-course and window elements, including label stops, hoodmould, windowheads, and jambs. These would have been positioned immediately beneath the strings, with hoodmould springing from inside the string-course. The details of the design and its place in Camber Castle have already been discussed in Chapter 3.

Group 2: Gallery string-course (Fig. 4.1, No. 2)

String-course with exactly the same profile as the Group 1 stones above, but straight rather than curved. Caen Stone (Archive No. 18)

Forty-five stones of this type were found (Table 4.2). These include 12 small fragments from the excavations: 6 in the bulk fill of the N Bastion, and the rest from

Table 4.2: Group 2 - Gallery string course

Archive No.	Old No.	Stone type	Site location	Context
18	?326	LS	WNW courtyard	-
32	482	LS	W bastion	-
48	-	LS	-	-
56	-	LS	-	-
59	?321	LS	WNW courtyard	-
73	-	LS	-	-
84	-	LS	-	-
86	-	LS	-	-
92	-	LS	-	-
95	-	LS	-	-
98	-	LS	-	-
113	(34)	LS	?	1963 I (3)
122	(24)	LS	W bastion	1983 WB i (207)
123	(20)	LS	Courtyard	1983 CT III (287)
124	(23)	LS	N bastion	1983 NB iv (183)
125	(22)	LS	Courtyard	1983 CT IV (295)
129	-	LS	N bastion	1979 NB ii (2)
130	(9)	LS	N bastion	1979 NB ii (2)
131	(15)	LS	N bastion	1979 NB i (29)
132	(16)	LS	N bastion	1979 NB ii (2)
133	(12)	LS	N bastion	1979 NB i (6)
134	(14)	LS	N bastion	1979 NB ii (2)
-	(33)	LS	N bastion exterior	1976 NBX (34)
-	106	LS	SW courtyard	-
-	110	LS	SW courtyard	-
-	146	LS	SSW gallery	-
-	222	LS	ENE gallery	-
-	258	LS	NNE gallery	-
-	312	LS	WNW courtyard	-
-	313	LS	WNW courtyard	-
-	314	LS	WNW courtyard	-
-	320	LS	WNW courtyard	-
-	322	LS	WNW courtyard	-
-	328	LS	WNW courtyard	-
-	329	LS	WNW courtyard	-
-	425	LS	W bastion	-
-	484	LS	WNW courtyard	-
-	491	LS	WNW courtyard	-
-	495	LS	NNW courtyard	-
-	498	LS	NNW courtyard	-
-	499	LS	NNW courtyard	-
-	503	LS	NNW courtyard	-
-	505	LS	NNW courtyard	-
-	508	LS	WNW courtyard	-
-	512	LS	WNW courtyard	-

abandonment or demolition contexts - 2 external, 2 in courtyards and 1 in each of the W and N Stirrup Towers. With the exception of two fragments found in the W Stirrup Tower, all the other provenanced stones (23 pieces) were whole or almost whole. Three of the whole stones were found in mural galleries and 20 in courtyard locations (predominantly from the courtyards next to the Entrance Bastion).

These string-course elements have the same profile as the Keep string-course, but cannot have been part of the Keep because they are straight not curved. They must have relieved the inner walls of the Curtain Wall galleries (looking over the courtyards). In theory, the profile of the Keep string-course could have been copied at any time, but given that it was raised in phase II, it seems likely that it was copied at this time, although other evidence (see below) rather suggests that the string-course and windows belong with the phase III first floor gallery.

Group 3: Gallery hoodmoulds (Fig. 4.1, No. 3)

Hoodmould with stop and backplate. This is a straight hoodmould with a horizontal stop, clearly for a square-headed window (see Group 7 below). The moulding is simple, with a 45 degree weathering undercut by a hollow. This piece is for the left-hand side of a window. Caen Stone. (Archive No. 17)

Twelve stones of this type were found - 6 left-hand pieces, 4 right-hand pieces and 2 fragments, 1 reused as a splay and 1 reused as a jamb (Table 4.3). The distribution of the 8 provenanced pieces is very similar to that of the straight string-courses above, with 6 found in courtyards, and just 2 in galleries, and once more a small degree of reuse was found. With only one exception, the stones have a height between 380 and 400 mm (15–16 in).

Table 4.3: Group 3 - Gallery, hoodmoulds with stop and back plate

Archive No.	Old No.	Stone type	Site location	LH / RH
17	283	LS	NNE gallery	LH
44	-	LS	-	LH
54	-	LS	-	fragt
75	-	LS	-	fragt
77	-	LS	-	RH
88	488	LS	WNW courtyard	RH
-	109	LS	SW courtyard	LH
-	257	LS	NNE gallery	RH
-	323	LS	WNW courtyard	LH
-	483	LS	WNW courtyard	LH
-	490	LS	WNW courtyard	RH
-	492	LS	WNW courtyard	LH

Group 4: Gallery, hoodmould (Fig. 4.1, No. 4)

Hoodmould with stop and backplate. This is the same basic design as Group 3 above, but the moulding is considerably smaller. Caen Stone. (Archive No. 65, unprovenanced)

No other stones of this type were found, and this stone probably just represents a variation, possibly not intended, on the same theme.

Group 5: Gallery string-course with vertical moulding (Fig. 4.1, No. 5)

This is a straight section of string-course with the same profile as Group 1 above, but in addition it has a projecting vertical moulding with the same profile as Group 3 above. Using Group 3 as a comparison, this is also a left-hand piece. Caen Stone. (Archive No. 40)

Thirteen stones of this type were found, 8 left-hand and 5 right-hand (Table 4.4). All were fairly complete, although a number were badly worn or damaged. Of the provenanced stones, 4 came from gallery locations and 8 from courtyards. These stones are crucial to determining the design of the gallery windows, since they link the string-course with the hoodmould and demonstrate that the windows were immediately beneath the string-course.

Table 4.4: Group 5 - Gallery string-course with vertical moulding

Archive No.	Old No.	Stone type	Site location	LH / RH
19	160	LS	ENE gallery	RH
40	155	LS	ENE gallery	LH
53	-	LS	-	LH
79	97	LS	SW courtyard	RH
-	91	LS	SW courtyard	LH
-	99	LS	SW courtyard	LH
-	101	LS	SW courtyard	RH
-	217	LS	ENE gallery	LH
-	304	LS	NNW gallery	LH
-	318	LS	WNW courtyard	LH
-	493	LS	WNW courtyard	LH
	502	LS	NNW courtyard	RH
-	513	LS	WNW courtyard well	RH

Group 6: Gallery, hoodmould with square moulding (Fig. 4.1, No. 6)

Hoodmould with square corner. Although this has slightly different dimensions, the moulding is very similar to that of the Group 3 label stops above. Caen Stone. (Archive No. 31)

Six stones of this type were found, including two fragments without corners (Table 4.5). Two stones were provenanced: one was found in a courtyard and the other in a gallery. The most likely origin for these stones is the gallery wall. They may have framed windows similar to those framed by the string-course/label stop combination and may represent a change of design to continuous hoodmoulds that did not intersect with the string-course, or the insertion of further windows into the gallery walls. Alternatively, they could have surrounded doors from the courtyards to the galleries.

Table 4.5: Group 6 - Gallery, hoodmould with stop

Archive No.	Old No.	Stone type	Site location
31	-	LS	-
71	-	LS	-
85	-	LS	-
127	-	LS	-
-	102	LS	SW courtyard
-	129	LS	SSW gallery

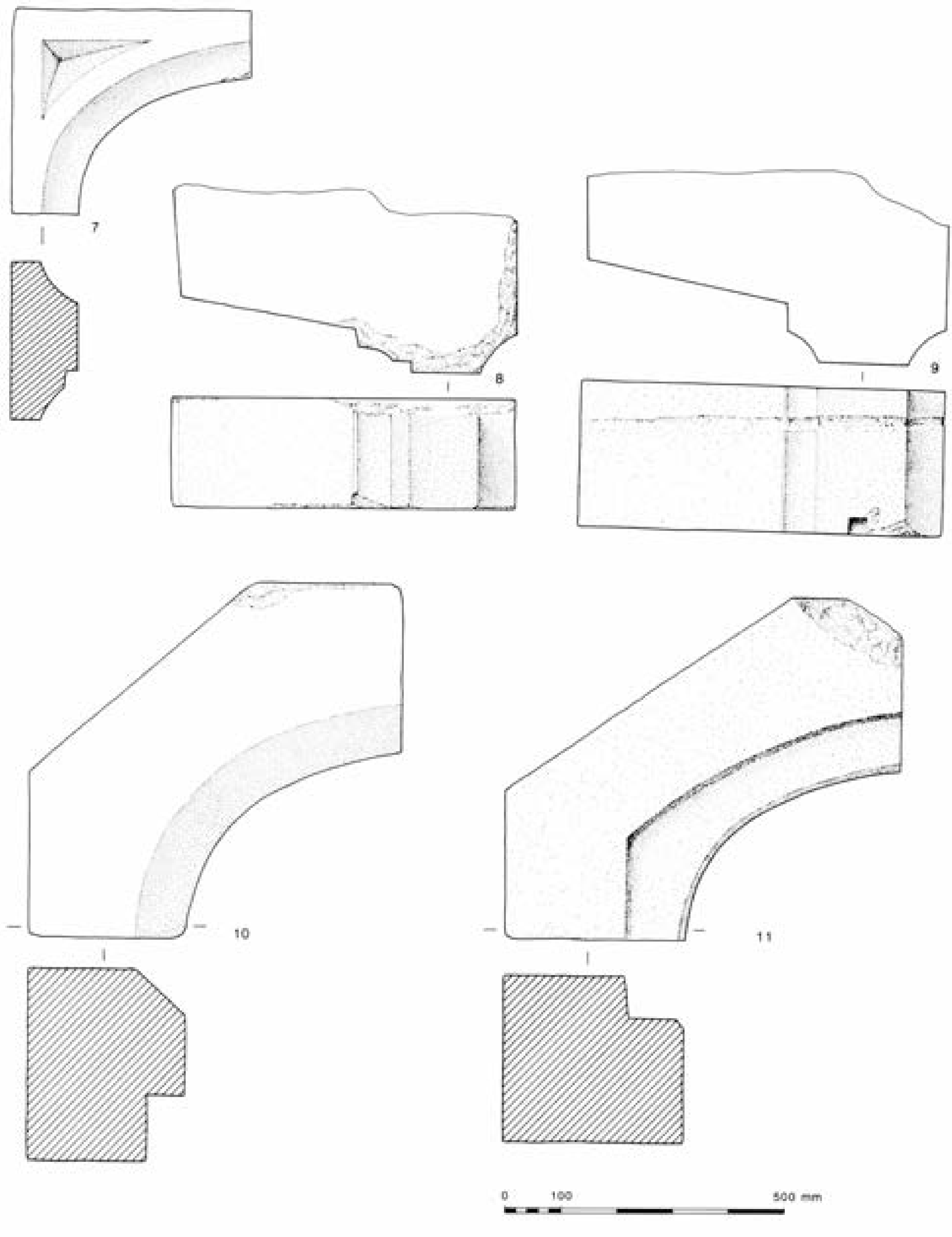


Figure 4.2: Architectural stone, Nos 7–11 (scale 1:10)

Group 7: Gallery, springers (Fig. 4.2, No. 7)

Springer forming half of a four-centred arch 0.61 m wide (24 in) and 0.24 m high (9.5 in). It has a hollow chamfer and spandrel moulding back and front. In addition, on one side a small rebate has been cut, possibly to take a window frame. Caen Stone. (Archive No. 7)

Ten other stones of this type were retrieved, 5 of Caen Stone and 5 of grey sandstone (Table 4.6). Though some are fragmentary, they seem on the whole to have similar dimensions and at least 3 clearly have no rebate. Two had a blank spandrel rather than a moulded spandrel.

The narrowness of the openings suggests that these stones originated in windows while the complete absence of yellow sandstone strongly suggests that they belong to the last major building phase. Once again, their discovery equally in gallery and courtyard locations indicates that these springers framed windows that looked into the courtyard from the first floor of the galleries, just below parapet level. Their square outline makes them obvious contenders to sit beneath the string-course and hoodmould described above.

Table 4.6: Group 7 - Gallery, springers

Archive No.	Old No.	Stone type	Site location
7	174	LS	ENE gallery
64	?273	S(G)	NNE gallery
91	-	S(G)	-
-	75	LS	WSW gallery
	213	LS	ENE gallery
	485	S(G)	WNW courtyard
	486	LS	WNW courtyard
-	509	LS	WNW courtyard wall
-	510	LS	WNW courtyard wall
-	294	S(G)	NNW gallery
-	360	S(G)	WNW gallery

Group 8: Gallery, jamb with two hollow chamfers, splay and rebate (Fig. 4.2, No. 8)

This is a jamb with two hollow chamfers and a splay, with a rebate cut into the rear chamfer. Yellow sandstone. (Archive No. 20)

Seven stones were found, including one with a glazing groove, which may have been reused (Table 4.7). All are in yellow sandstone.

The six provenanced stones were all found in gallery locations, suggesting that they formed part of the gallery windows, discussed above. This view is confirmed by the depth of most of the stones, which corresponds with the thickness of the Curtain Wall on the courtyard side, and none has a greater depth. In addition, the dimensions and mouldings of Group 8 stones are very similar, though not identical, to that of the Group 7 windowheads. The Group 7 stones, however, are all limestone or grey sandstone, while these stones are all yellow sandstone. This could suggest that different stone types were used for different architectural types, or that there were windows in both above-ground levels of the galleries, the lower dating to phase II and the upper to phase III, or that the Group 8 stones belonged to doorways rather than windows.

Table 4.7: Group 8 - Gallery, jamb with two hollow chamfers, splay and rebate

Archive No.	Old No.	Stone type	Site location
20	167	S(Y)	ENE gallery
42	-	S(Y)	-
67	137	S(Y)	SSW gallery
-	190	S(Y)	ENE gallery
-	204	S(Y)	ENE gallery
-	207	S(Y)	ENE gallery
-	275	S(Y)	NNE gallery

Group 9: Gallery, jamb with two hollow chamfers, splay and rebate (Fig. 4.2, No. 9)

This is a jamb with two hollow chamfers and a splay. It has a rebate for a glazing bar. Grey sandstone. (Archive No. 11)

Seventeen stones of this type were recorded and all but one were provenanced: three were found in stirrup towers and the rest in the galleries (Table 4.8). Like group 8 above, these stones have depths that match the thickness of the courtyard walls and mouldings, which are nearly identical to the Group 7 stones. In this case, however, with the exception of just one limestone piece, they are all grey sandstone, and they are therefore more likely to belong to the first floor (phase III) windows of the galleries.

Table 4.8: Group 9 - Gallery, jamb with two hollow chamfers, splay and rebate

Archive No.	Old No.	Stone type	Site location
11	239	S(G)	NNE gallery
55	-	S(G)	-
-	181	S(G)	ENE gallery
-	182	S(G)	ENE gallery
-	187	S(G)	ENE gallery
-	191	S(G)	ENE gallery
-	203	S(G)	ENE gallery
-	206	S(G)	ENE gallery
-	219	S(G)	ENE gallery
-	274	LS	NNE gallery
-	279	S(G)	NNE gallery
-	293	S(G)	NNW gallery
-	298	S(G)	NNW gallery
-	362	S(G)	WNW gallery
-	382	S(G)	W Bastion
-	421	S(G)	W Bastion
-	457	S(G)	N Bastion

Group 10: Gallery, jamb with hollow chamfer and splay (Not illustrated)

A jamb with a single hollow chamfer and a splay. It appears exactly the same as Group 9 above, but without the front chamfer cut into the stone. Three stones were retrieved and all were grey sandstone and found in the galleries (Table 4.9). This suggests that their use was similar to that of Group 9 above, that is framing the windows in the first floor of the galleries.

Table 4.9: Group 10 - Gallery, jamb with single hollow chamfer and splay

Archive No.	Old No.	Stone type	Site location
-	87	S(G)	WSW gallery
-	88	S(G)	WSW gallery
-	223	S(G)	ENE gallery

Other windowheads and doorheads

Six further main groups of doorheads and windowheads were identified in the collection, despite a variety of minor differences within each group. These groups do not belong to the windows of the galleries. The first four (Groups 11–14) are from openings 30 in wide with four-centred arches 12 in high and are probably for doorways. On the basis of the geology, Groups 12 and 13 may represent specific types used in phase III, while Group 11 may be a design used in both phase II and phase III. With one exception, the provenanced stones of these three groups all come from galleries or stirrup towers, and indeed a few extant doorheads with these dimensions still exist between the stirrup towers and the basement galleries. There were also doorways between the galleries and the bastions, and between the galleries and the courtyards, into the garderobes and for stairs between the different levels. Doorways may also have existed along the length of the galleries, with the possibility of restricting access to different parts of the buildings, although no extant evidence now survives.

Group 14 has only one stone and, unlike the others, it has a square spandrel moulding. This may indicate an external location, perhaps from a courtyard door into a gallery.

Groups 15 and 16 have only five stones between them and are in both yellow and grey sandstone. The Group 15 stones come from wide low arches 34 in wide and 9 in high, and the Group 16 stones from narrow arches (24 in wide and 8 in high), probably windows.

Group 11: Other door- or windowheads, springer (Fig. 4.2, No. 10)

Springer forming half of a four-centred arch, 0.76 m (30 in) wide and 0.33 m (13 in) high. It has a chamfer on one side and a rebate on the other, both of which follow the line of the arch. Yellow sandstone. (Archive No. 4)

Twenty-three stones fit this description, with minor variations (Table 4.10). A number of the stones are fragmentary, making accurate identification to this group difficult. One stone (Archive No. 76) was deliberately recut as a facing stone. That only one stone was clearly recut probably suggests accidental damage and reuse, rather than a systematic pulling down and reuse of any sections of the building.

Of the 17 provenanced stones only 1 was found in the courtyard, 5 in the W Stirrup Tower, and 11 in gallery locations. This strongly suggests that the doorheads originated in the galleries and also in the doors between the stirrup-towers and the galleries. The surprising number found in the W Stirrup Tower may be indicative of a movement of stone into this tower at a late period (see Chapter 3). The range of stone types (15 yellow sandstone, 5 grey sandstone and 3 limestone), might imply a continuous use of the same forms through phases II and III.

Table 4.10: Group 11 - Other door- or windowheads, springer

Archive No.	Old No.	Stone type	Site location
3	?142	LS	SSW gallery
4	-	S(Y)	-
35	424	LS	W Bastion
38	-	LS	-
68	-	S(Y)	-
70	-	S(Y)	-
76	-	S(Y)	-
106	?235	S(Y)	NNE gallery
-	54	LS	WSW gallery
-	80	S(Y)	WSW gallery
-	111	S(Y)	SW courtyard
-	211	S(Y)	ENE gallery
-	229	S(Y)	ENE gallery
-	231	S(Y)	ENE gallery
-	287	S(Y)	NNE gallery
-	292	S(Y)	NNW gallery
-	302	S(Y)	NNW gallery
-	303	S(Y)	NNW gallery
-	346	S(Y)	WNW gallery
-	416	S(G)	W Bastion
-	417	S(G)	W Bastion
-	422	S(G)	W Bastion
-	427	LS	W Bastion

Group 12: Other door- or windowheads, springer (Fig. 4.2, No. 11)

Springer forming half of a four-centred arch, 0.78 m (31 in) wide and 0.30 m (12 in) high. It has a small chamfer, a splayed rebate, and no rear mouldings. The chamfer follows the line of the arch, while the rebate describes a stilted arch. Grey sandstone. (Archive No. 2)

Five stones (one fragmentary) were retrieved fitting this description, again with some minor variations (Table 4.11). One example has rebates along its top to take adjoining ashlar stones. All the pieces were grey sandstone and the four provenanced examples came from gallery locations. The geology and location together suggest that this style of doorhead was used in the final phase of building, in the first floor of the galleries.

Table 4.11: Group 12 - Other door- or windowheads, springer

Archive No.	Old No.	Stone type	Site location
1	82	S(G)	WSW gallery
2	84	S(G)	WSW gallery
46	-	S(G)	-
	209	S(G)	ENE gallery
	212	S(G)	ENE gallery

Group 13: Other door- or windowheads, springer (Fig. 4.3, No. 12)

Springer forming half of a four-centred arch 0.76 m wide (30 in) and 0.30 m high (12 in). It has a chamfer on one side and a small chamfer and rebate on the other. The chamfers follow the line of the arch, but the rebate describes a stilted arch. Grey sandstone. (Archive No. 5)

Nine stones of this type were found (Table 4.12). They were all complete or nearly complete, and all but two were grey sandstone. Once more they were found in gallery (5 items) and stirrup tower locations (4 items). The predominance of grey sandstone may again suggest that this particular type was used mainly in phase III.

Table 4.12: Group 13 - Other door- or windowheads, springer

Archive No.	Old No.	Stone type	Site location
5	?115	S(G)	SSW gallery
-	85	S(G)	WSW gallery
-	311	S(G)	NNW gallery
-	342	S(Y)	WNW gallery
-	347	S(Y)	WNW gallery
-	413	S(G)	W Bastion
-	430	S(G)	W Bastion
-	471	S(G)	N Bastion
-	481	S(G)	N Bastion

Group 14: Other doorheads, springer (Fig. 4.3, No. 13)

Springer forming half of a four-centred arch 0.28 m (11 in) high and at least 0.67 m (26.5 in) wide, but probably originally 0.76 m (30 in) wide. The stone has a chamfer and spandrel moulding to the front and a square rebate to the rear. Yellow sandstone. (Archive No. 24, 1983 register no. 118)

The square spandrel moulding makes an internal location less likely, so this may belong to one of the doors leading from a courtyard to a gallery. The stone was recovered from the SSW gallery

Group 15: Other window- and doorheads, springer (Fig. 4.3, No. 14)

Springer forming half of a four-centred arch 0.23 m (9 in) high and at least 0.79 m (31 in) wide. It has a chamfer on one side continuous with the arch, and no rear mouldings. Yellow sandstone. (Archive No. 29)

No other stones exactly like this were found, but there was one example that was very similar (1983 Register no. 359) (Table 4.13). This had an overall arch width of 0.88 m (34.5 in) and a height of 0.25 m (10 in), but its chamfer described a stilted arch. It was of grey sandstone and found in the WNW gallery.

Table 4.13: Group 15 - Other window- and doorheads, springer

Archive No.	Old No.	Stone type	Site location
29	-	S(Y)	-
	359	S(G)	WNW gallery

Group 16: Other window- and doorheads, springer (Fig. 4.4, No. 15)

Springer forming half of a four-centred arch 0.62 m wide (24 in) and 0.21 m high (8 in). It has a chamfer on one side and a rebate on the other, both following the line of the arch. Yellow sandstone. (Archive No. 108; WSW gallery; 1983 register no. ?58)

Although the size of this stone suggests it is more likely to belong to a window, unlike all the other window examples it does not have a square spandrel moulding and would not fit beneath the hoodmoulds and string-courses already described. Like many of them, however, it was found in a gallery.

Corbels

Only one type of corbel was found, but it adds significantly to our knowledge of the galleries.

Group 17: Corbels (Fig. 4.4, No.16)

A very plain corbel, similar to those in the Keep, with a height of 0.20 m and a width of 0.20 m. Grey sandstone. (Archive No.16)

Ten corbels were found and all were in the galleries (Table 4.14). All but one were identified as grey sandstone. This suggests that they were intended to support the roof and parapet level of the galleries. They show a degree of variation in height and width. Since it is almost certain that they formed a continuous corbel table, as still seen in the Keep, their width would have been irrelevant. The height variation (0.18 to 0.25 m; 7 to 10 in) may be due to variations along the wall tops themselves.

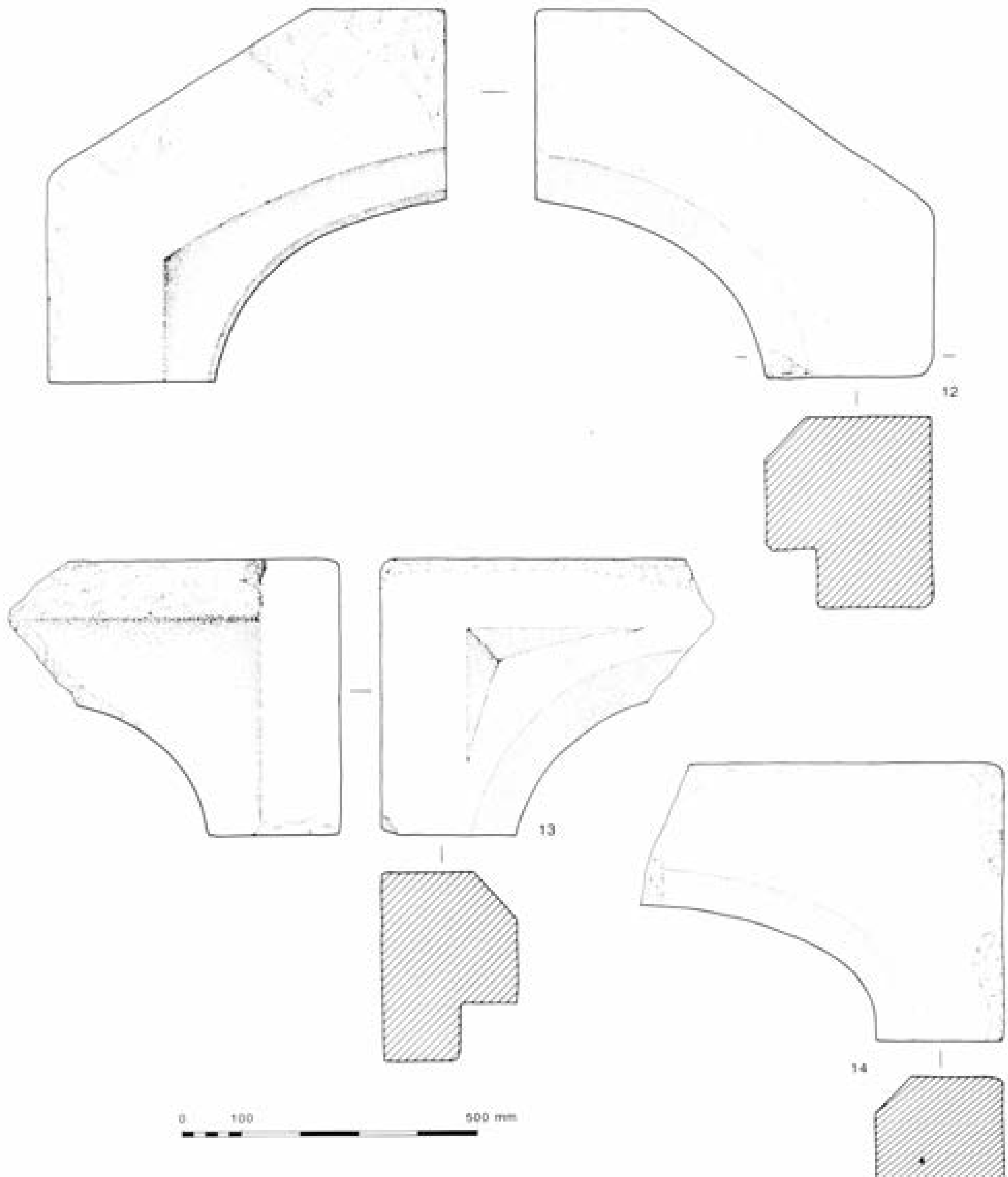


Figure 4.3: Architectural stone, Nos 12–14 (scale 1:10)

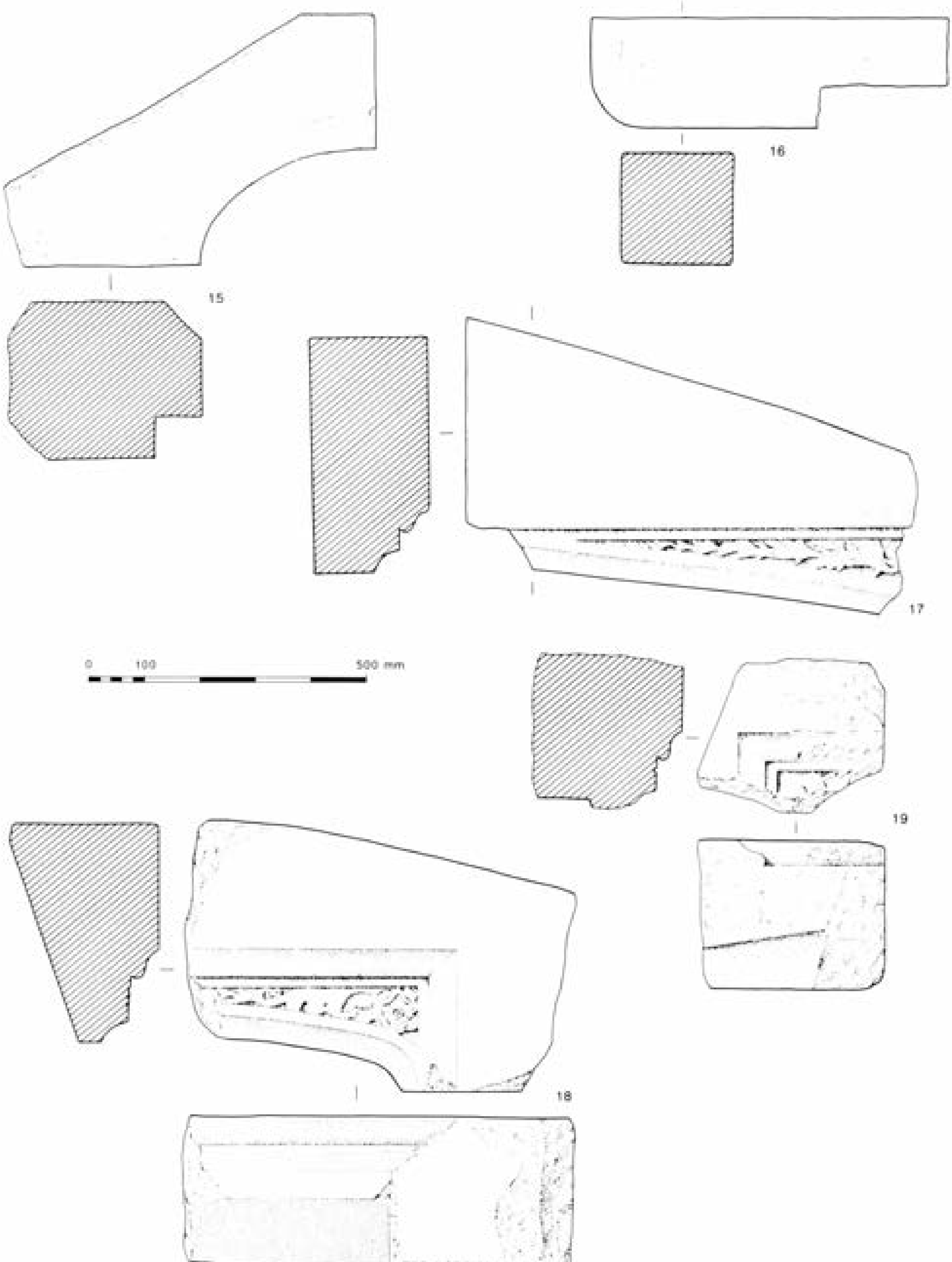


Figure 4.4: Architectural stone, Nos 15–19 (scale 1:10)

Table 4.14: Group 17 - Corbels

Archive No.	Old No.	Stone type	Site location
16	364	S(G)	WNW gallery
27	265	S(Y)	NNW gallery
-	153	S(G)	SSW gallery
-	177	S(G)	ENE gallery
-	183	S(G)	ENE gallery
-	185	S(G)	ENE gallery
-	194	S(G)	ENE gallery
-	256	S(G)	NNW gallery
-	341	S(G)	WNW gallery
-	363	S(G)	WNW gallery

Fireplace stones

Four groups of fireplace lintels were identified. Group 18 contains only one highly decorated stone, which may have originated in the Keep or Entrance Bastion - a prestigious stone for what was presumably a prestigious location. Groups 19 and 20 also contain decorated pieces but the provenances are not recorded, and Group 21 contains a number of plain arches. Although the plain examples appear to have come from the galleries, their similarity with those on the first floor of the Keep shows the use of the same types in different locations at Camber.

Group 18: Fireplace (Fig. 4.4, No. 17)

This is an almost complete half of a four-centred fireplace arch, with a sloping top and a moulded bottom with some delicate foliage carving in the spandrel. The piece is slightly concave and it was for a fireplace at least 1.60 m (5 ft 3 in) wide. Caen Stone. (Archive No. 23; N Bastion; 1983 register no. 472))

This piece was found in the N Stirrup Tower, but it almost certainly was not originally sited there. The number of possible locations for concave fireplaces is limited: 4 in the Keep, 1 in the W (kitchen) Bastion, and 2 in the Entrance Bastion. The hearth in the kitchen Bastion is too wide to accommodate this stone, and the stone is too ornate for the kitchen. The two first floor fireplaces in the Keep, and the curved ground floor fireplace in the Entrance Bastion are all too narrow. The fireplaces in the Entrance Bastion have plain arches which are still largely in place. The curved fireplace on the first floor of the Entrance Bastion is possibly the right width. It measures 1.69 m (5 ft 7 in) across at the back (curved fireplaces widen towards the back). The blocked fireplace which has been tentatively identified in the phase I Keep was *c* 1.97 m (6 ft 6 in) wide and the inserted (phase IIb) fireplace on the ground floor of the Keep was *c* 2.10 m (6 ft 11 in) wide. Both seem very likely locations. It is possible that the stone was used first in one location, and then reused in the other; the carving is not sufficiently distinctive to indicate whether 1514 or 1539 is a more likely date. It is most likely that such an ornate fireplace would be positioned in a room used by the captain of the tower or castle, and such a room is perhaps most likely to be found in the Entrance Bastion, although it may have been in the Keep.

Group 19: Fireplace stone (Fig. 4.4, No. 18)

This piece is superficially similar to Group 18 above, but the moulding detail is slightly different, and the main motif of the carved spandrel is not foliage, but a Tudor rose. Caen Stone. (Archive No. 45; unprovenanced)

It does not have any curvature, and therefore may have been sited in the Gallery. A location in the Keep or Entrance Bastion is also possible; the extant fireplace arches in the Keep also show no curvature. It is not possible to determine the width of the fireplace.

Group 20: Fireplace stone (Fig. 4.4, No.19)

This is even more fragmentary, with just a corner of the spandrel remaining. The moulding is identical to Group 19 above, but the carving shows an animal (possibly a dragon) holding up a paw to the corner motif, which is not clear. Caen Stone. (Archive No. 94, unprovenanced)

It is not possible to determine either the location or the phase to which this stone belongs.

Group 21: Fireplace stone (Fig. 4.5, No. 20)

Half a four-centred arch of a fireplace, width *c* 1.23 m (4 ft). The front is simply chamfered, with no carved detail. Grey sandstone. (Archive No. 8)

Four stones were found, one comprising two joining fragments (Table 4.15). None of the stones was curved, and the three provenanced stones were found in galleries. This suggests that they were housed in the fireplaces known to have existed there, although they are in fact similar to the extant arches in the Keep. It is possible that fireplaces existed on both the ground and first floors of the galleries.

Table 4.15: Group 21 - Fireplace stones, arch

Archive No.	Old No.	Stone type	Site location
8	117	S(G)	SSW gallery
104	-	S(Y)	-
-	188 & 189	S(G)	ENE gallery
-	208	S(G)	ENE gallery

Group 22: Smoke hole tops (Fig. 4.5, No. 21)

Smoke hole rim fragment. This is a small block with an internal square angle with a rebate cut into it. Caen Stone. (Archive No. 101)

Four smoke hole tops were found (Table 4.16). Originally they were positioned over the smoke vents that pierce the Vaulted Ring Passage around the Keep. However, none of the originals survives *in situ*.

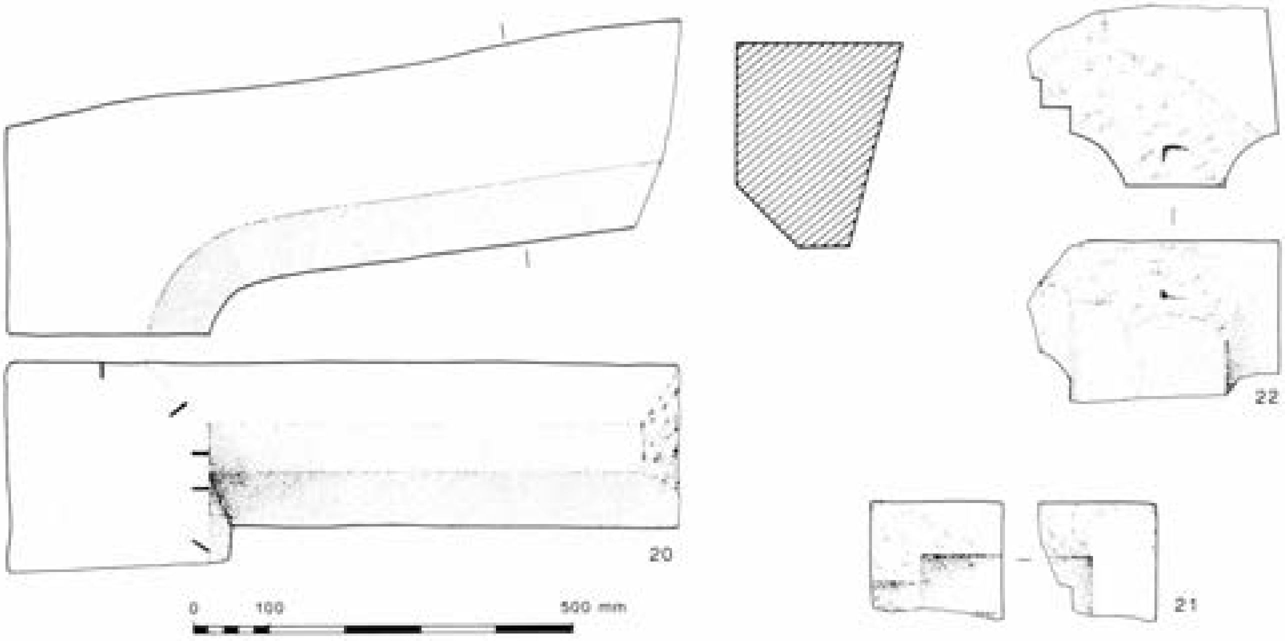


Figure 4.5: Architectural stone, Nos 20–22 (scale 1:10)

Table 4.16: Group 22 - Smoke hole tops

Archive No.	Old No.	Stone type	Site location
41		LS	-
82	501	LS	NNW courtyard
101		LS	-
-	456	LS	N Bastion

Jambs

Some 175 jamb stones were found at Camber, not including simple splays, rebates and chamfers which may have had their origin in jambs. Most of the jambs comprised chamfers, rebates and splays in a variety of combinations, dimensions, geological types and locations, which on the whole defied useful analysis. Even had they been susceptible to analysis, the information gained would have added very little to our knowledge of the buildings of Camber, since jambs are both ubiquitous and of fairly standard design. Four varieties of jamb stone, however, appeared to form more coherent groups. All have hollow chamfers, and probably all were originally sited in the galleries and stirrup towers. The first three of the more coherent groups have already been listed with the stones from the gallery windows (Groups 8-10).

Group 23: Jamb stone (Fig. 4.5, No. 22)

Jamb stone with two hollow chamfers, a rebate and a splay. Yellow sandstone. (Archive No. 61)

Three stones of this type were identified and all were found in the galleries (Table 4.17). Two are of grey sandstone. A very similar example survives at ground floor level in the W wall of the N Stirrup Tower. The window now looks into the stairwell of the bastion but predates the bastion. It therefore belongs to phase II. A very similar window was uncovered on the north-east side of the S Stirrup Tower in 1963, when it was photographed. This window is also on the ground floor and belongs to phase II. The fact that two of the stones were of grey sandstone suggests the continued use of this moulding type in phase III, the possible early use of grey sandstone in some parts of the castle, or incorrect geological identification.

Table 4.17: Group 23 - Jambs

Archive No.	Old No.	Stone type	Site location
61	162	S(Y)	ENE gallery
-	232	S(G)	ENE gallery
-	343	S(G)	WNW gallery

Stones reused from religious houses

The following stones are a miscellaneous collection brought to the castle for possible reuse. Many of these stones will have come from the dissolved religious houses of Winchelsea (*HKW*, 423), but not all (see No. 115). Although of some interest in that connection, as this study primarily concerns the buildings of Camber, the stones are treated summarily here.

Stone no. 115 12th-century voussoir, with chevron decoration. Limestone. This was found in an abandonment context in the N Stirrup Tower. It is unlikely that a stone of this date came from a religious house in New Winchelsea which was not founded until the 13th century.

Stone no. 63 Nook shaft. Grey sandstone.

Stone no. 119 Shaft fragment. Limestone.

Stone no. 120 Attached shaft fragment recut to form keel. Oolitic limestone. Found in a modern context outside the E Bastion.

Stone no. 121 Two joining fragments of capital, with necking and part of hollow. Limestone. Found in an abandonment context outside the E Bastion.

Stone no. 10 Double springer probably from an arcade, with opening 14 in wide. Plain chamfered, with rear rebate cut in later. Yellow sandstone. From the WSW Mural Gallery.

Stone nos. 83 and 111 Two fragments of probable curvilinear tracery. Limestone.

Stone no. 118 Fragment of scroll moulding. Sandstone. Found unstratified in the W Bastion.

Stone nos. 136 and 137 Two jigsaw pieces of a gowned and cloaked figure carved in high relief (0.23 m high), standing on coat of arms. Probably a saint *c* 1400, although the emblems he is holding are not clear enough to identify (Dr Lawrence Butler pers. comm.). Silty limestone. Found in the N Bastion.

Stone no. 52 Mullion, with front hollow chamfers (one with added rebate) and flat back. Limestone.

Stone nos. 14 and 15 Very large mullions, with front and rear chamfers, and substantial rear rebates. These pieces probably stood in the centre of a gated entranceway. Limestone.

Stone no. 117 Fragment of moulded jamb, with casement moulding (late 15th or 16th century). Limestone. This fragment was unstratified and a second, less complete version was retrieved from the N Stirrup Tower.

THE CONTINENTAL TILE-STOVE

by David R M Gaimster, with a contribution by Mike R Cowell

Introduction

Fragments of lead-glazed earthenware stove-tile have been found during every season of archaeological excavation at Camber since the early 1960s. The 155 fragments, all probably deriving from the same structure, are distributed across the site and are represented in successive phases of occupation following the major building programmes in 1539–43. Few of the tiles appear to come from primary contexts and most were redeposited, probably during the infilling of the N and S Bastions and the creation of the Rampire, between the late 16th and early 17th centuries. However, a group of 5 sherds representative of the principal components of an elaborate ceramic tile-stove were found in contexts (NB iii (128), EBX (666), EBX (716), EBX (723) and WBX (811)) dating to the crucial 1539–43 construction phases (phases IIb–III) (see Table 4.18). These sealed deposits provide a secure date for the construction of a ceramic stove as part of the interior scheme of the castle being completed at this time and the fragments were presumably discarded during installation of the stove. Redeposition of the remaining tile fragments has divorced them from their original location. There is no certain evidence for the siting of the stove; however, there are some clues as to its likely location within the castle. No likely site for the location of the tile-stove has been identified in the Keep. The absence of any trace of a garderobe within the Keep would tend to confirm that it was not used for accommodation. On the other hand there is evidence that the first floor in the Entrance Bastion was laid out for residential use complete with a separated garderobe. The accommodation appears to have been comparatively well-appointed and the space and facilities it could offer suggest that it is the likely location for the Captain's quarters, in which case it is probable that the tile-stove, represented by the fragments, was located there (see Chapter 3, Phase III above and Chapter 9 below). Besides the stylistic and technological conformity of the fragments, the consistency in fabric, surface treatment and chemical composition adds weight to the argument that the stove-tiles represent a single consignment from one or possibly two workshops and that the various tiles were designed for the construction of a stove in the Continental Renaissance fashion.

The assemblage of earthenware tile fragments was divided into seven groups on the basis of form and decoration (Table 4.18). Most (Types 1–6) are moulded in relief with a range of designs consistent with a northern European Renaissance-style stove of the mid 16th century. A small number (Type 7) belong to open vessel tiles typical of the stove-tiles that formed the undecorated lower stage of Continental stoves of this type. All the required structural and architectural components of a ceramic tile-stove of this kind are represented amongst the tiles: the cresting (Types 1 and 2), frieze-cornices (Type 3), upper-stage figurative panels (Types 4–6) and the lower-stage open vessel-tiles (Type 7). The type-series is described in detail below and Table 4.18 contains a concordance of fragments and form-types.

To date the precise origin of the Camber stove-tiles remains unknown. Although they were almost certainly made in northern Europe, no precise mould matches have been made with stove-tiles from the areas of western or northern Germany where the majority of imported stove-tiles of 16th-century date are known to have originated. In addition, no exact chemical matches could be made between the Camber stove-tiles and samples of imports and German production-site material already tested by the British Museum Research Laboratory (see Neutron Activation report, below). Stylistic and iconographical analysis, however, indicates a close link between the Camber stove-tiles and contemporary products made in northern and central Germany. Irrespective of the exact source, the Camber stove represents crucial physical evidence for the commissioning of a highly sophisticated interior decorative scheme and the latest in Continental heating systems for the 1539–43 works. The architect of the scheme must have been familiar with Continental smokeless heating arrangements and could have personally commissioned a stove for Camber. It is unlikely that such a complex item of domestic heating equipment would have arrived on the English south coast through the normal commercial channels. No other imported stoves are known to have existed in the region during the 16th century. Although unusual, the use of smokeless heating technology in a military context, as

Table 4.18: Stove-tile concordance

Type	Area code	Finds/context code	No. of fragments	Phase
1	CT IV	295	1	IV
1	CT IV	14	1	VI
1	NB	588	1	VI
1	NB i	3	1	IVb
1	NB i	2	2	IVb
1	NB ii	10	1	IVa
1	WBY	820	1	IV
1	WBY	823	1	IV
1	WBY	976	1	U/S
1	WBY	953	1	VI
1	WBY	957	1	IV
1	WBY	958	1	IV
1	WBY	963	1	IV
2	NB	589	2	U/S
2	NB i	5	1	IVb
2	NB ii	2	1	IVb
2	WBX	811	1	III
3a	BXI	531	2	U/S
3a	CTII	81/86	2	IV/V
3a	CTIV	295	1	IV
3a	CTVI	73	1	IV
3a	GIII	252	1	VI
3a	GIII	255	2	IV
3a	NB	588	2	U/S
3a	NB	589	3	U/S
3a	NB I & ii	2	19	IVb
3a	NB iii	127	1	VI
3a	NB iii	128	1	III
3a	NB iv	183	1	V
3a	NB iv	264	1	V
3a	NBX	DV	1	IVb
3a	NBY	337	10	IV
3a	NBY	352	2	VI
3a	WBX	802	1	IV
3a	WBY	977	1	U/S
3a	WBY	957	1	IV
3a	WBY	958	2	IV
3b	NB i	5	1	IVb
4a	WBY	820	1	IV
4a	WBY	977	1	U/S
4a	WBY	957	1	IV
4a	WBY	958	1	IV
4b	WBY	953	1	V
4c	CTIV	295	1	IV
4c	NB	589	1	U/S
4d	NB	589	1	U/S
4d	NB i	2	1	IVb
4d	NB iv	183	1	V
4e	WBY	957	1	IV
4f	CI	535	1	V
4f	CTIV	295	3	IV
4f	CTIV	281	1	VI
4f	CT	302	2	IV
4f	CTVI	372	1	IV/V
4f	EBX	666	1	III
4f	GIV	237	1	VI
4f	NB	588/9	11	U/S
4f	NB i	2	1	IVb

Table 4.18: Stove-tile concordance (continued)

Type	Area code	Finds/context code	No. of fragments	Phase
4f	NB ii	23	1	IVb
4f	NB iii/iv	2	11	IVb
4f	NBY	337	4	IV
4f	NBY	352	2	VI
4f	NBWS		2	
4f	NB I & ii	291	1	V
4f	WBX	801	1	IV
4f	WBY	820	1	IV
4f	WBY	957	1	IV
4f	1982		1	U/S
5a	NB i	2	2	IVb
5b	NBWS		1	
6	WBY	820	1	IV
7	EBX	723	1	IIb
7	WBY	830	2	IV
7	EBX	716	1	III
7	NBY	335	10	IV
7	NBY	337	2	IV
7	WBY	820	2	IV

opposed to purely residential one, is not unknown on the Continent.

Ceramic stoves in 16th-century England

The smokeless ceramic tile-stove represents a dramatic introduction into the 16th-century English interior. Besides a radical innovation in domestic heating technology, ceramic stoves also injected a new visual dimension into the private living space. The lead-glazed, plastic relief and architectural form of the tiles echo the increasing emphasis on colour and ornament among the domestic furnishings and fittings of the period. The archaeological distribution of imported stoves in southern Britain provides both an index of cultural contact with Continental Europe and also a quantitative and qualitative measure of the arrival of the Continental Renaissance in the domestic sphere. Following the Dissolution, the distribution of imported stove-tile finds is largely restricted to the residences of the aristocracy and gentry, many of them former religious houses, and to wealthy urban merchants' houses in which there was a greater emphasis on material comfort and visual display (Gaimster and Nenk 1997, 179–181). To date, Camber Castle represents the only exclusively military site in England to have produced a ceramic stove of the period.

German woodcuts of the late 15th and 16th centuries illustrate the development of the now-familiar tiered tripartite stove with substantial stone or brick plinth, capacious lower stage attached to an outside wall and smaller free-standing upper stage (Strauss 1968). The lower stage was connected via an aperture through an outside wall to a stoking area. Thus the heat level was controlled from the outside and no fumes escaped into the room. Smoke and gases were channelled out through a flue sited just above the stoke-hole. The contemporary pictorial record gives a strong impression of technological sophistication and of a dramatic improvement in material comfort provided by this innovative system of domestic heating.

Archaeological investigation has demonstrated that the fashion for Continental-style ceramic stoves spread across the Channel during the late 15th to early 16th centuries (Gaimster 1994, 292; Gaimster *et al.* 1990). According to chemical analysis of the finds, most stove-tiles of this period were imported from the Rhineland, followed by northern Germany and the Low Countries (Cowell 1990). Finds of late Gothic style and early Renaissance stove-tiles from Fountains Abbey, North Yorkshire, and the Abbey of St Mary Graces near the Tower of London and Cardinal Wolsey's residence of York Place in Westminster, are representative of the social context of the majority of stove-tiles imported into the country prior to the Dissolution (Gaimster and Nenk 1997, 179), although the finds from the 1507 fire horizon at Pottergate, Norwich, indicate that urban communities with substantial immigrant groups were also introducing Continental heating practices into England during the early 16th century (Gaimster 1993). The archaeological distribution of ornamental tile-stoves on southern British sites increases dramatically during the post-Reformation period, particularly on sites owned by the rural gentry and urban mercantile and professional classes (Gaimster 1989; Gaimster and Nenk 1997, 181). Confirmed by chemical analysis of the ceramic body, Cologne and the Middle Rhineland appears to have been the principal source of imported stoves found in the City of London and environs between the first and third quarters of the 16th century (Gaimster 1988a; Cowell 1990). Contemporary documentary references also refer to the increasing popularity of Continental-style ceramic stoves in England. In the winter of 1550 Pierre Alexandre, Thomas Cranmer's private secretary, wrote to Martin Bucer at Cambridge, reassuring him that a German stove would soon be arriving in the town (Gaimster and Nenk 1997, n 89). William Harrison, writing in his Description of England published in 1587, describes a specialised use for the stoves in England:

> As for stoves we have not hitherto used them greatly, yet they now begin to be made in diverse houses of the gentry and wealthy citizens, who build them not to work and feed in, as in Germany and elsewhere, but now and then to sweat in, as occasion and need shall require it (Edelen ed. 1994, 197).

The success of the ceramic stove trade stimulated potters of the earthenware industry sited on the Surrey-Hampshire border to enter into competition and produce stove-tiles for the English market. These products are mainly of rectangular panel form moulded with the arms and monograms of Tudor and Stuart monarchs ranging from Henry VII and Henry VIII to Edward VI, Elizabeth I and James I (Gaimster 1988b). This distinctive group, the archaeological distribution of which is concentrated in London and its immediate hinterland, has been linked chemically to production waste found at Cove, Hampshire (Gaimster 1988b; Cowell 1988; Cowell and Gaimster 1995). The largest single group of native armorial stove-tiles was excavated in 1939 just outside the private bathroom on the ground floor of Henry VIII's lodgings on the east side of Whitehall Palace, London (Gaimster and Nenk 1997, 181–2; Gaimster 1999). The ornamental repertoire and heraldic detail of the moulded reliefs suggest a manufacturing date in the late 1530s to early 1540s. The close archaeological association of tile-stove and sunken bath at Whitehall provides a physical corroboration of William Harrison's contemporary description of stoves being used to create steam-bath conditions. Whatever the specific function of the tiled stove in 16th-century England, it is clear from the archaeological record that the fashion was in sharp decline by the beginning of the next century. High prices and official restrictions on the use of wood for domestic heating purposes contributed directly to making the practice increasingly uneconomic (Gaimster 1988b, 322).

The ceramic body and surface treatment

All the tiles share the same very refined buff to light ochre quartz-tempered fabric, the edges with a deeper ochre finish. The colour spectrum and refined body qualifies it as a whiteware. Only occasional red iron oxide inclusions can be seen in the matrix. The Camber stove-tile fabric was listed as one alien to Sussex and the region by Streeten in his study of medieval and later pottery production and distribution in south-east England (1985a, fabric Qx, sample no.1046). The upper surfaces of the ornamental tiles (Types 1–6) and the inner surface of the open vessel tiles (Type 7) are covered with either a copper-rich (green) or a transparent (yellow) lead glaze. The edges of the pierced crest tiles are also covered in glaze.

The type-series

The following type-series of lead-glazed stove-tiles found at Camber Castle is based on a combination of form, constructional features and individual stylistic attributes. Each of the type-tiles can be reconstructed to form a single tripartite stove of Continental Renaissance type, with cuboid upper and lower stages separated by a decorative cornice and surmounted by a frieze around the crest of the stove. This sequence runs from the top of the stove to the base and corresponds to the latest conventions in the typological classification of European medieval and post-medieval stoves (Kaufmann *et al.* 1994, 42–47) which have also been used recently for recording the Whitehall Palace stove (Gaimster 1999). The following types represent composite reconstructions of the surviving fragments.

Crest (Figs 4.6 and 4.8)

1 Rectangular openwork tiles designed to run along as a frieze on the crest of the stove. The transparent (yellow) glazed tiles are moulded with pairs of facing birds on either side of a central baluster. The birds hold sticks (?) or olive branches (?) in their beaks as doves of the ark. Facing doves also symbolise Concord or Peace in Renaissance iconography. An alternative interpretation is suggested by the crest of feathers at the back of the head which is characteristic of the phoenix, a bird symbolic of resurrection and immortality. These openwork tiles were made from the same moulds used to make the cornice frieze tiles (Type 3a). The openings were cut by hand. Glaze covers the edges of the openings. The frieze of facing birds would have been interrupted by pierced figurative tiles such as the *Landsknecht* fifer (Type 2). Max. height: 84 mm; max. width: 144 mm; max. thickness: 16 mm.

2 Green-glazed openwork tiles moulded with a *Landsknecht* fifer standing under an arch supported by opposing male and female herms. The arch is moulded with a foliate band. The tile is made from the same mould as the panel tile (Type 4c) and is pierced by hand. Glaze covers the edges of the openings. These figurative tiles would probably have interrupted the frieze of facing birds around the crest of the stove. Reconstructed height: 187 mm; width: 150 mm; max. thickness: 16 mm.

Cornice (Fig. 4.6)

3a Rectangular frieze tiles with long flanges forming a deep heat-retaining reverse cavity. The green-glazed surfaces are moulded as Type 1 with facing birds separated by a central baluster. The birds hold (olive ?) branches in their beaks and possibly represent doves of the ark (see Type 1). The tile is moulded with crude negative dentils along the lower edge. The tiles would have been set on edge to form a cornice separating the upper and lower stages of the stove and possibly also to form a further cornice below the cresting. Height: 142 mm; max. width: 150 mm; depth of flange: 79 mm

3b Before firing one green-glazed fragment of the same

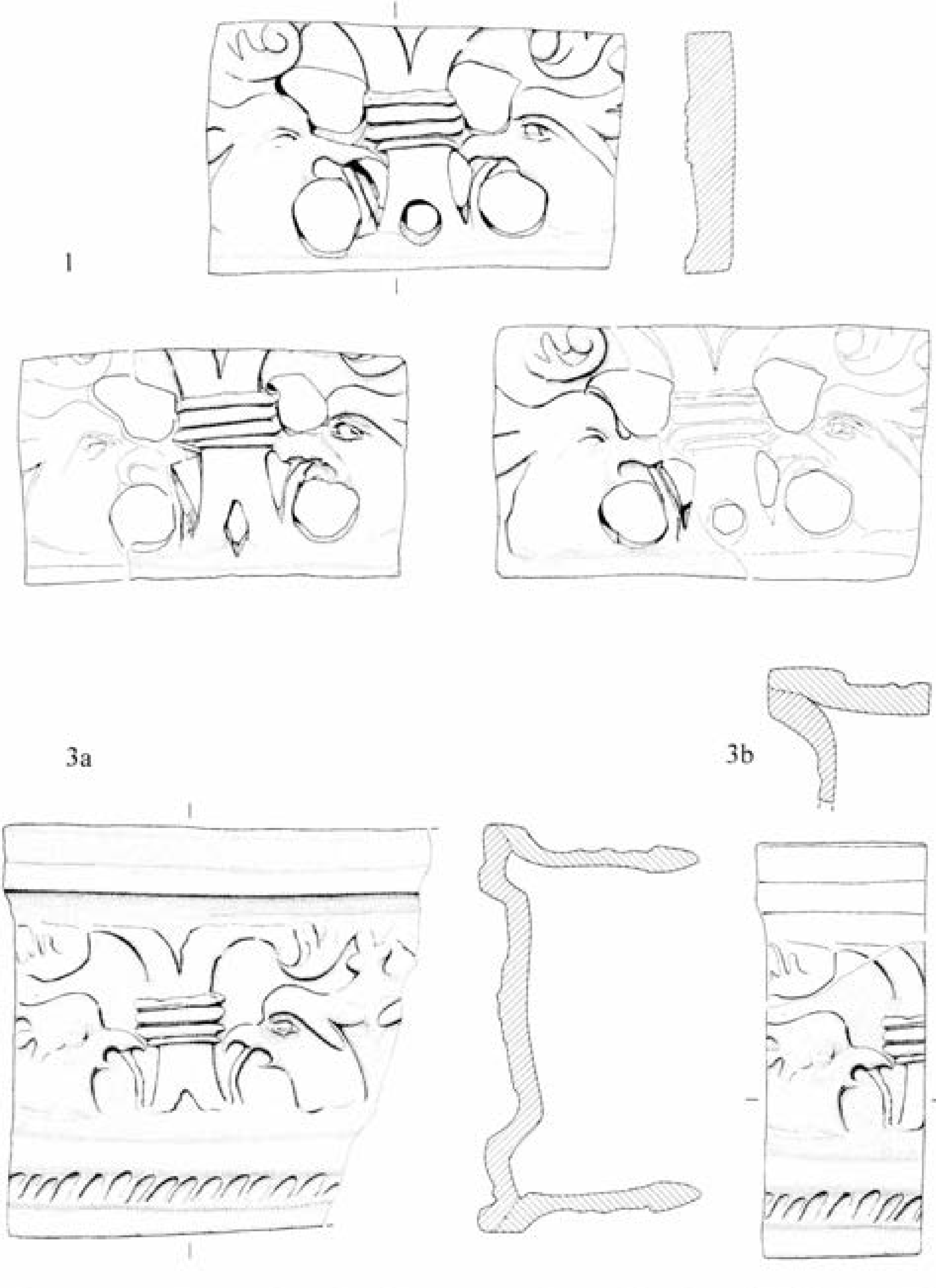


Figure 4.6: Stove-tiles; crest-tiles pierced with birds (Type 1) and cornice-frieze tiles moulded with the same design (Type 3a and 3b) (scale 1:2)

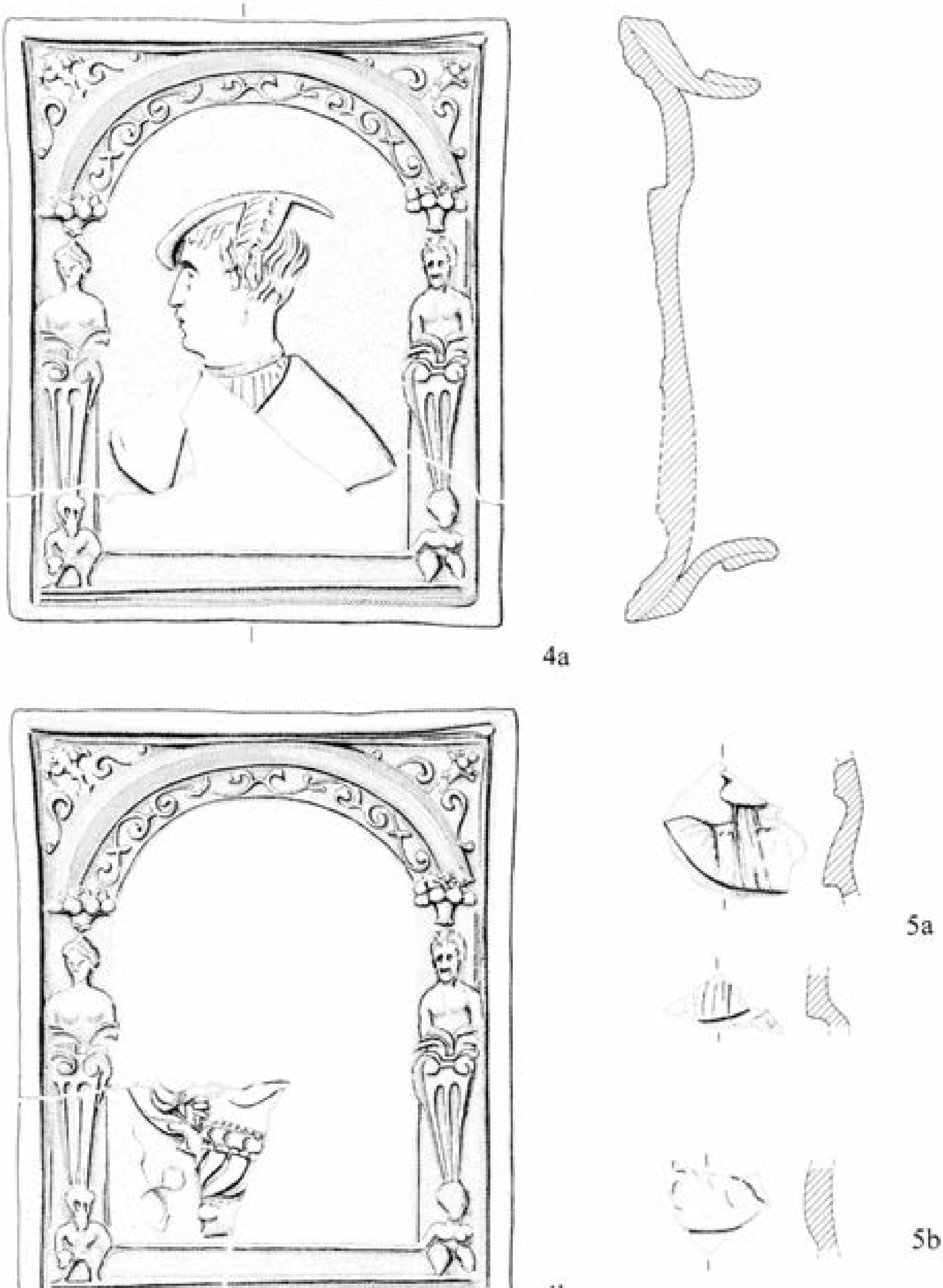


Figure 4.7: Stove-tiles; panel tiles moulded with portraits of Landgrave Philip I of Hesse (r 1509–67) (Type 4a) and his consort, Christine of Saxony (Type 4b), and with small portrait busts (Type 5a and 5b) (scale 1:2)

2

4c

Figure 4.8: Stove-tiles; crest-tile pierced with the figure of a Landsknecht fifer (Type 2) and a panel-tile moulded with the same design (Type 4c) (scale 1:2)

tile was truncated along the centre of the central baluster to form a narrower cornice-piece. The tile was probably set into the cornice at the corner of two sides of the stove. Alternatively such truncated tiles could have been used to fill gaps in the frieze. The reverse only has a half-cavity. Max. height: 122 mm; width: 59 mm; depth of single flange: 79 mm.

Upper stage (Figs 4.7–4.10)

4a Green-glazed rectangular panel-tile with short flanges creating a reverse heat-retaining cavity. The upper surface is moulded in the centre with a male portrait bust, probably of the reformist Landgrave Philip I the Magnanimous of Hesse (r 1509–1567). The portrait is flanked by male and female herms supporting an arch. The arch and spandrels are moulded with foliate ornament. The tile portrait may be based on contemporary book plates or single-leaf woodcuts such as those issued by Hans Brosamer 1534 and *c* 1535 (eg Hollstein 1957, 602 reproduced in this volume as Plate 4.3; and Geisberg 1974, vol.I, G.416 respectively). Contemporary or commemorative portraits of the Hesse Landgrave are common on stove-tiles of the 1530s to 1540s. Philip I of Hesse was one of the leading political figures of the Lutheran Reformation and after 1530 one of the joint leaders of the Schmalkaldic League aimed primarily at overthrowing the House of Habsburg. His exploits as a defender of the Protestant cause in Germany and the Netherlands were well known within the Empire and abroad. Portraits of Philip and his Protestant allies, such as John Frederick, Elector of Saxony, along with their respective consorts, Christine of Saxony and Sybil of Cleves, made popular relief designs for stove-tiles made in the Lutheran centre and north of Germany and around the Baltic Sea for the duration of the Schmalkaldic League's political influence (*c* 1530–1554). Such tiles, many of them excavated, are preserved in museum collections across the region (eg Katalynas 1991 for Lithuania; Ose 1992 for Latvia; Kilarska and Kilarski 1993 for the famous Artushof stove in Danzig). Reconstructed height: 206 mm; width: 168 mm; depth of flange: 54 mm.

4b Green-glazed panel-tile fragment. Frame and flange as 4a. The centre of the tile is moulded with a female portrait bust. Only the shoulder survives here. The bust has the same dimensions as that of Philip of Hesse and may represent his consort, the Landgravine Christine, daughter of George, Duke of Saxony. The style of the open-necked dress with its slashed sleeves may be based on the Hans Brosamer single-leaf woodcut of Christine printed by Wolfgang Resch of Nuremberg in *c* 1535 (Geisberg 1974, vol.I, G.417).

4c Green-glazed panel-tile fragments. Frame and flange as Type 4a. The centre of the tile is moulded with a *Landsknecht* fifer. The crest-tile (Type 2) is made from the same mould.

Mercenary *Landsknecht* soldiers with eye-catching slashed costumes were a popular image in German woodcut art and engravings of the period *c* 1510–1545. The heroic device appears frequently among the single-leaf woodcuts of the South German Kleinmeister artists such as Sebald Beham (eg Bartrum 1995, cat.91) and forms one of the most common designs transferred to the ceramic medium, including Rhenish stoneware (eg Gaimster 1997, cat.41) and stove-tiles (eg Strauss 1983, cat.59). *Landsknechte* also appear on other contemporary domestic media in German-speaking Europe. Comparable figures to the Camber examples can be seen, for instance, on fragments of painted window glass recovered recently from the 1559 destruction levels of a wealthy merchant's house in Heide, north Germany (Arnold *et al.* 1992/3, fig. 8). In the case of the Camber tiles, the pose and garment detail appear closest to Sebald Beham's single-leaf woodcut of a fifer printed by Hans Guldenmund of Nuremberg in *c* 1540 (Geisberg 1974, vol. I, G281) and the figure illustrated by Daniel Hopfer of Augsburg (1470–1536) in a group of 'Five German Soldiers' (Ill. Bartsch 17. 66) (Pl. 4.1).

4d Green-glazed panel-tile fragments. Frame and flange as Type 4a. The centre of the tile is moulded with a representation of the Temptation with Eve offering the forbidden fruit to Adam. Scenes from the Fall of Man are some of the most popular images of Reformation iconography and were reproduced by many of the German engravers of the 16th century (see various artists in Bartrum 1995 including Dürer, Hans Baldung and Sebald Beham). The image is a common decorative device on north German stove-tiles of the early to mid 16th century (eg Stephan 1991, figs 62–3 for examples from the Werra region).

4e Green-glazed panel-tile fragments. Frame and flange as Type 4a. A small fragment from the centre of the panel joining the frame is moulded with a hand holding a spear or halberd. The hand may belong to a halberdier taken from contemporary printed depictions of *Landsknecht* soldiers by Sebald Beham (eg for figure dated 1520 : see Ill. Bartsch 15. 203 and Bartrum 1995, cat.91, or a single-leaf woodcut of *c* 1540: see Geisberg 1974, vol I, G.282); Jakob Binck of 1525–30 (see Ill. Bartsch 16. 77 & 78) or by Peter Flötner of *c* 1535 (see Geisberg 1974, vol.III, G.832 for a single-leaf woodcut). The figure of the halberdier may also have been taken from the group published by Daniel Hopfer (1470–1536) in his group 'Five German Soldiers' (Ill. Bartsch 17, 66) (Pl. 4.1). Other possibilities include antique heroes such as the Nine Worthies who are depicted on Cologne panel-tiles of the late 16th century holding spears (Unger 1988, cat.125–130).

4f Green-glazed frame and flange fragments for panel-tiles Types 4a–4e.

5a Green-glazed panel-tile fragments. The fragments are moulded with a small male portrait bust. Only the upper body, neck and chin areas of the bust survive. Max. height : 52 mm; width: 50 mm.

5b Green-glazed panel-tile fragment. The fragment is moulded with the neck and chin of a small portrait bust. Dimensions: 38 x 32 mm.

6 Green-glazed panel-tile fragment. The fragment is moulded with a draped caryatid on a plinth. The

Plate 4.1: 'Five German Soldiers' including a fifer and a halberdier by Daniel Hopfer (1470–1536). (British Museum P&D 1845–8–9–1351 (H.74))

figure would have formed part of the frame of the tile and would have supported an arch framing a portrait or figurative scene (as Types 4a–c).

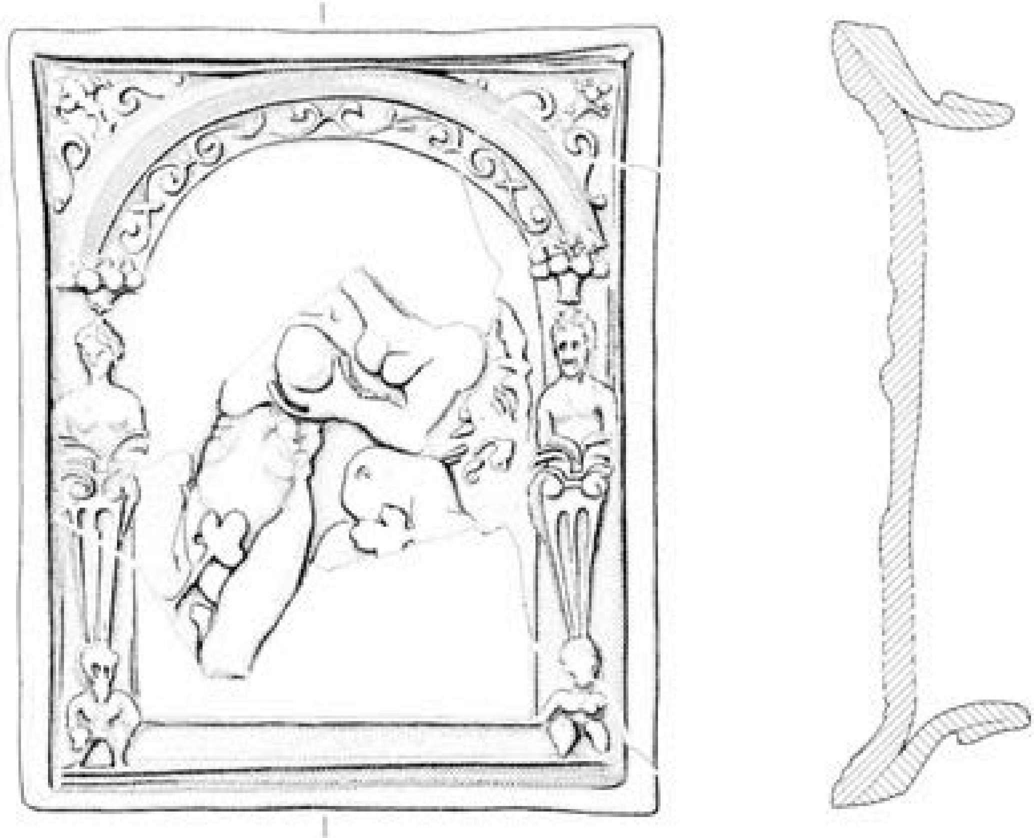
Lower stage (Fig. 4.10)

7 Transparent (yellow) glazed deep vessel tile with square opening and internal reinforced collar around the rim. Round base with wire marks on underside. Deep vessel tiles of this type and size are relatively common finds in central and northern Germany and the Baltic region and date in general to the first half of the 16th century (eg Ring 1996, fig.1 for an example of this type from Lüneburg). They would have been set on edge in several tiers to form the lower stage of the stove. The open cavities would have retained and directed heat around the room. Height: 110 mm; rim diameter: 170 mm; base diameter: 110 mm.

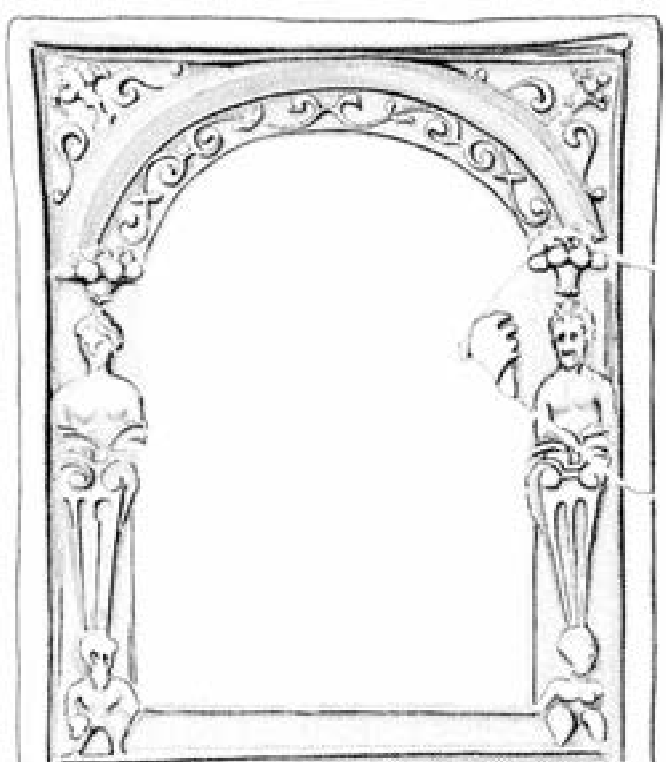
Dating and design repertoire

The Camber Castle stove-tiles are characterised by a consistency of fabric and a unity of ornament which strongly suggest that they represent the contents of one consignment and were designed to form a single tripartite tiered stove. The vertical and horizontal distribution pattern confirms that the majority of the 155 tile fragments were redeposited in their recorded locations. Indeed, several of the reconstructed fragments comprise cross-fits recovered from different locations (eg see Types 4c, 4d and 7 in Table 4.18). However, enough of the material derives from the original construction phases of *c* 1539–43 to suggest that the manufacture of the entire assemblage can be linked to this period. The groups from the N Bastion (NBii (10), NBiii (128)), from outside the E Bastion (EBX (666), EBX (716), EBX (723)) and the W Bastion (WBX (811), which contain 6 tiles of Types 1, 2, 3a, 4f and 7, belong to the construction and remodelling phases (IIb–III) of the Keep, stirrup towers and bastions. The secure archaeological context provides the principal chronological guide to the tiles, which are difficult to date closely on stylistic grounds alone. The wide iconographical range visible in the Camber group is typical of Continental Renaissance stoves of the period, which often combine a mix of figurative political-propagandist and popular imagery in addition to formalised ornament. Apparently unconnected designs - in this case ruler portraits, possible armorial or allegorical devices, biblical scenes and popular subjects (eg *Landsknechte*) - appear frequently in the same tile series and share identical ornamental frames (eg Stephan 1991, 68–9 for North Hesse).

The 1539–43 construction phases of the castle coincide with the period of circulation for images of the leaders of the Lutheran movement in northern Europe. As stated above, tiles with portraits and arms of the leading German Protestants were distributed widely in regions sympathetic to the new religion, particularly between 1530 and 1547, the period in which the Protestant League of Schmalkalden was in existence (Stephan 1991, 68). Archaeological finds made at the end of the 19th century illustrate the impact of these propagandist images of the German Reformation on this side of the English Channel. Polychrome-glazed redware panel-tiles moulded in the same series with the portraits and shields-of-arms of Landgrave Philip I of Hesse and his consort Christine



4d



4e

Figure 4.9: Stove-tiles; panel-tile fragments moulded with a representation of the Temptation (Type 4d) and the hand of a Landsknecht halberdier (Type 4e) (scale 1:2)

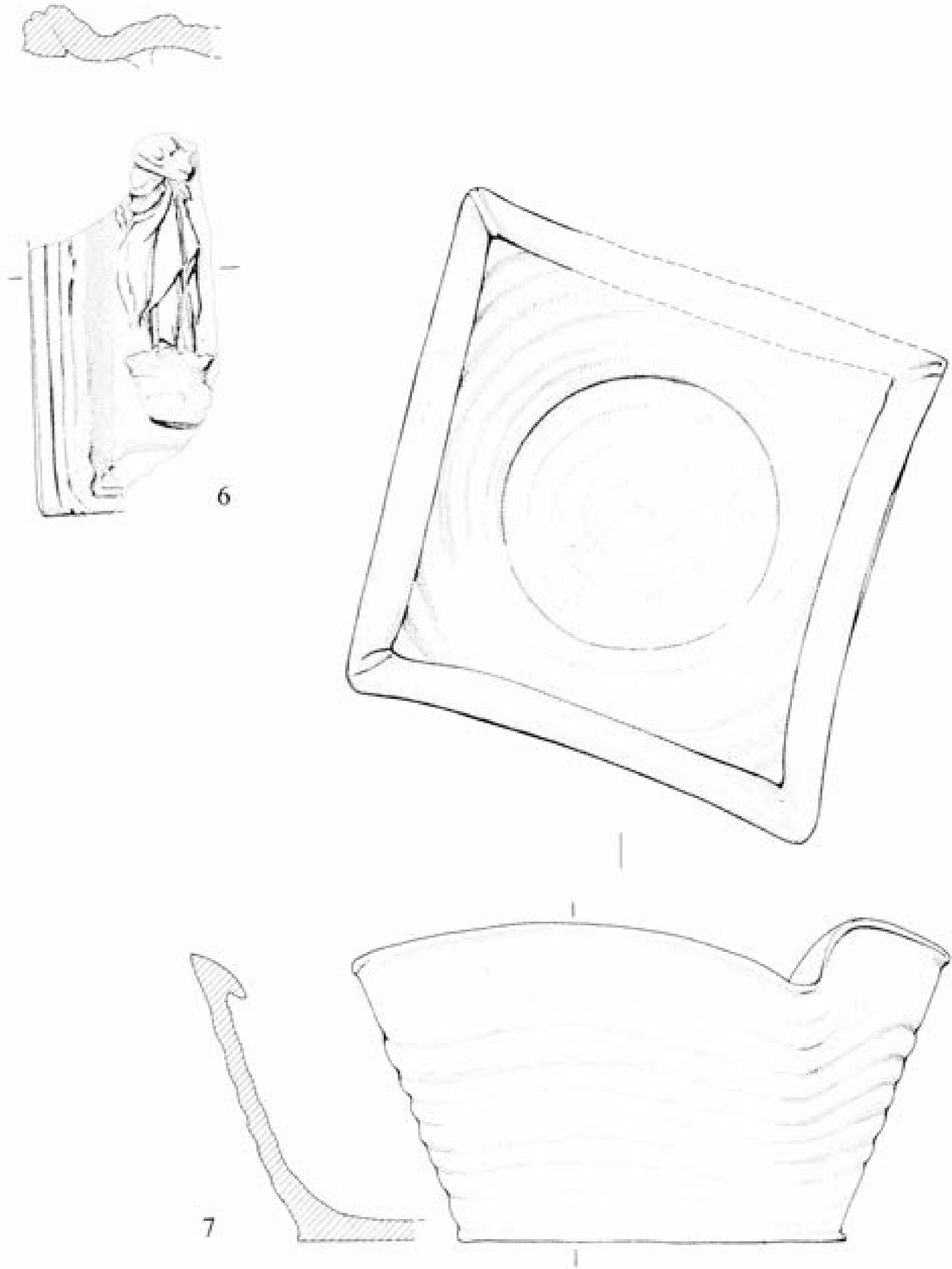


Figure 4.10: Stove-tiles; fragment of a panel-tile with caryatid column (Type 6) and an open vessel from the lower stage of the stove (Type 7) (scale 1:2)

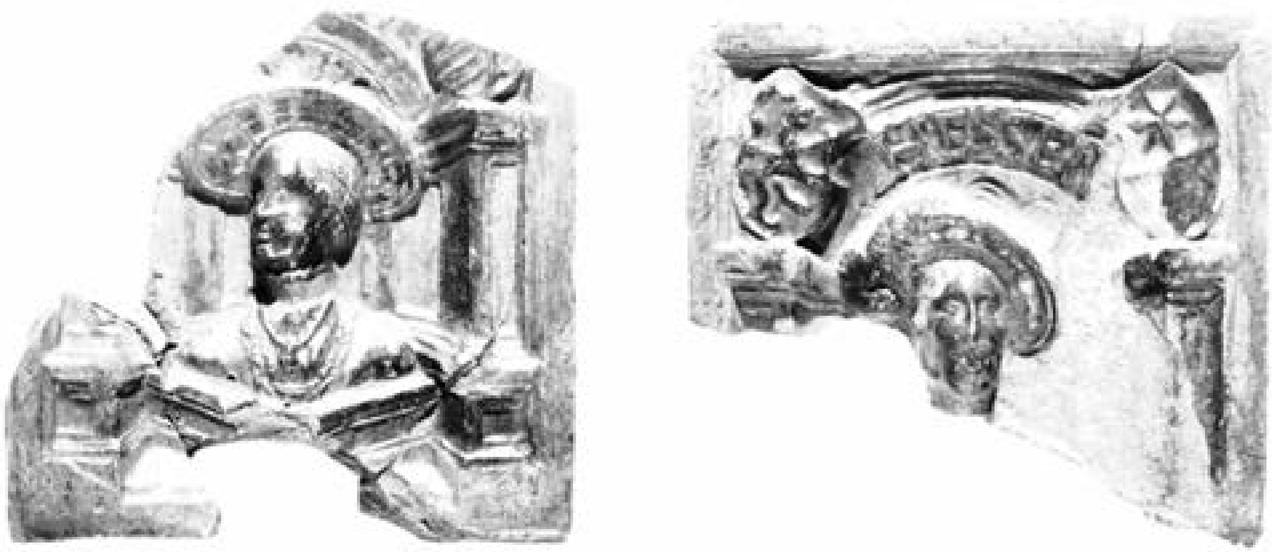


Plate 4.2: Two polychrome-glazed redware panel-tiles excavated in the City of London moulded with portraits and shields-of-arms of Landgrave Philip I of Hesse (r 1509–67) and his consort, Christine of Saxony, after single leaf woodcuts by Hans Brosamer published in 1534 and c 1535. (British Museum MLA 1891, 2–1 80–82)

of Saxony, were excavated in the City of London and acquired by the British Museum in 1891 (BM MLA 1891, 2–1, 80–82 unpublished; see Pl. 4.2). Perhaps even more so than the Camber tiles, the style and configuration of portraits and shields-of-arms appear very close to the Hans Brosamer book illustrations and single-leaf woodcuts of 1534–5 (Hollstein 1957, 602 (Pl. 4.3); and Geisberg 1974, vol.I, G.416 and G.417). As moulded objects both tile portraits are reversed versions of the original printed designs. The shared iconography of the Camber and London stove-tiles suggests something more than pure coincidence. The finds illustrate the extent to which such explicitly political iconography from the Continent had penetrated English domestic culture.

The specific combination of iconographic and ornamental mouldings that characterises the Camber stove-tile assemblage generally suggests an origin in northern or central Germany. The forms, constructional features and figurative repertoire correspond best with Renaissance-style stoves of mid 16th-century date known to have been made in these regions (eg for general comparisons in North Hesse see Kulick 1985 and Stephan 1991; for Danzig on the southern Baltic coast see Kilarska and Kilarski 1993). However, no mould-identical matches could be made despite an exhaustive trawl of the available literature on Renaissance German stove-tiles (Stelzle-Hüglin and Rosmanitz 1995/96). Stylistically the Camber group does not match the 16th-century Rhenish imports that are more generally known on southern British sites of the period. Although there is a general correspondence with samples in the BM database of Rhenish production and consumer sites, no direct matches could be made in chemical composition (see below).

Plate 4.3: Portrait of Landgrave Philip I of Hesse (r 1509–67) by Hans Brosamer. Book plate published in Erfurt, 1534. (British Museum P&D 1871–12–9–440 (H.602))

***Geographical source: the results of neutron activation analysis** by Mike R Cowell*

Samples were taken by drilling, from the edge of the tiles, avoiding surface contamination. Representative fragments of the following form-types were selected for analysis : Types 1, 3a and 4f. The samples were subjected to neutron activation analysis (NAA). The analytical procedure followed was identical to that employed in previous provenance studies of medieval and later earthenware stove-tiles and pottery (Cowell and Gaimster 1995). The full analyses, together with comparative items, were tabulated in Gaimster *et al.* (1990). A summary of the results is presented here in Table 4.19 and Figure 4.11.

To attempt to determine the manufacturing source of the tiles, the analysis drew on the existing compositional profiles of contemporary stove-tiles made in the Rhineland, the most prolific known source of imports into southern Britain. The multivariate analytical data for the Camber tiles, together with material from kilns at Cologne, Frechen and Langerwehe and from regional town excavations (Duisburg, Mayen and Cologne) were subjected to statistical analysis. The technique used, principal components analysis, transforms the elemental data onto new axes that maximise the variance, or spread, of the data (Cooley and Lohnes 1971) and enable the distribution to be displayed in a reduced number of dimensions. The following element concentrations were used: Ce, Th, Cs, Fe, Eu, La, Sm, Yb, Lu, Ba and Rb. These data were scaled to the scandium concentration prior to the statistical analysis. Results for the first two principal component axes are shown in Figure 4.11. These account for about 70% of the total variance in the data; other principal component axes would need to be examined for the detailed distribution of the data.

Figure 4.11 indicates that most of the Camber Castle items cluster together and are generally well separated from the other groups of tiles and pottery. One outlier, a sample taken from one of the crest-tiles (Type 1), indicates a separate clay source. Further testing would be required, however, in order to test the possibility that more than one workshop was responsible for the Camber stove. The exceptions are a stove-tile excavated in the city of Duisburg on the confluence of the Rhine and the Ruhr and another from a production source in Cologne which plot close to the Camber items. However, when the other principal component axes were examined it was found that the Camber group was slightly further separated from these two. It seems, therefore, that the Camber Castle tiles do not correspond exactly with any of the relevant Rhenish control material currently analysed. There is nevertheless a general similarity of composition which suggests an origin within the hinterland of the Rhine which also includes areas of central Germany, but it is not possible to determine this without more analysis.

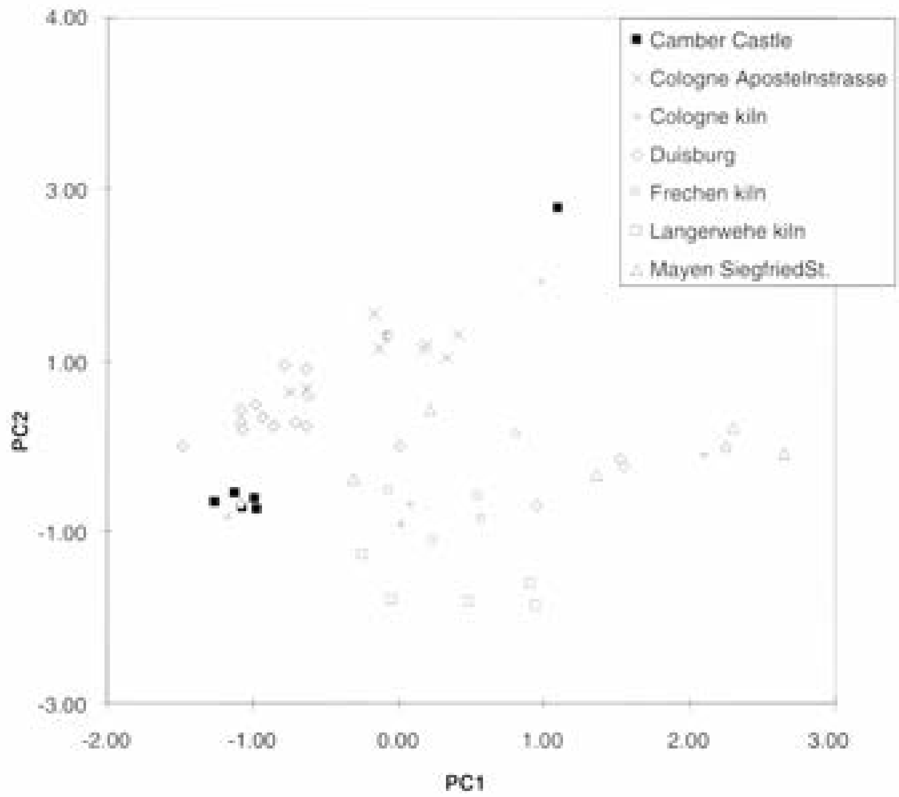


Figure 4.11: Statistical analysis of Camber Castle tiles and other relevant tiles and pottery

Smokeless central heating at Camber Castle?

Traces of sooting found within the heat-retaining reverse cavities of all the principal panel tiles and on the underside of the open vessel tiles confirm the fact that the tiles once formed part of a functioning tile-stove at Camber. In the context of known Continental and English ceramic stoves erected in southern Britain during the 16th century (see Gaimster and Nenk 1997 for a summary), Camber represents a unique location, being the only exclusively corporate and military site as opposed to a private residence. However, the use of sophisticated heating equipment is not unknown among post-medieval military communities on the Continent. Account books in the Cologne city archives dating from the late 14th to the early 16th century record the commissioning of ceramic stoves for heating bastions and gatehouses on the town defences (Unger ed. 1988, 11).

Ceramic stove-tiles represent a luxury domestic import into southern Britain during the 16th century. The fragility of individual tiles meant they were costly to transport over long distances. Once at their destination they demanded a certain level of technical know-how

Table 4.19: Summary of results of Neutron Activation Analysis (NAA)

No.	Site	Reg./Context	Ce	Tb	Th	Hf
	Camber Castle: Tile fragments					
1	Camber Castle	NB i (2) type 4f	90	1.08	13.3	6.4
2	Camber Castle	NB i (2) type 4f	91	1.09	13.3	7.3
3	Camber Castle	NB i (2) type 3a	93	1.03	13.0	7.1
4	Camber Castle	NB i (2) type 4f	85	0.96	12.9	6.4
5	Camber Castle	CT I (14) type 1	178	1.48	13.4	7.8
6	Camber Castle	G IV (237) type 4f	89	1.12	13.5	7.3
	Cologne Apostelnstrasse: Possible 16th-century tile wasters					
7	Cologne Apostelnstrasse	1980,78/29	112	1.13	14.5	9.0
8	Cologne Apostelnstrasse	1980,78/29	122	1.38	14.9	11.5
9	Cologne Apostelnstrasse	1980,78/29	116	0.99	15.3	6.5
10	Cologne Apostelnstrasse	1980,78/29	107	0.93	14.8	6.8
11	Cologne Apostelnstrasse	1980,78/29	89	0.85	12.8	6.5
12	Cologne Apostelnstrasse	1980,78/29	120	1.08	18.0	9.7
13	Cologne Apostelnstrasse	1980,78/29	110	1.08	15.7	10.0
14	Cologne Apostelnstrasse	1980,78/29	119	1.10	16.0	8.6
	Cologne: 16th-century tile wasters					
15	Cologne kiln	KS 200 (1)	112	1.13	16.1	6.5
16	Cologne kiln	KS 200 (2)	111	1.01	13.1	17.8
17	Cologne kiln	KS 200 (3)	82	0.66	14.7	8.7
18	Cologne kiln	KS 200 (4)	164	1.43	18.9	8.0
19	Cologne kiln	KS 200 (5)	86	0.72	14.9	8.5
	Duisburg: 15th-/16th-century tiles from town excavations					
25	Duisburg Innenhafen	Inv Nr 84:7/34	198	1.87	29.0	22.6
26	Duisburg Innenhafen	Inv Nr 84:7/34	98	0.92	13.8	14.4
27	Duisburg Kuhstrasse	Lfd Nr43 87:2/28	74	0.74	12.4	7.2
28	Duisburg Kuhstrasse	Lfd Nr43 87:2/28	97	0.92	15.0	6.9
29	Duisburg Kuhstrasse	Lfd Nr43 87:2/28	98	0.94	15.0	7.0
30	Duisburg Kuhstrasse	Lfd Nr12 87:2/28	97	0.92	14.6	6.6
31	Duisburg Kuhstrasse	Lfd Nr12 87:2/28	97	0.86	13.9	6.9
32	Duisburg Kuhstrasse	Lfd Nr12 87:2/28	85	0.73	12.6	6.6
33	Duisburg Kuhstrasse	Lfd Nr12 87:2/28	99	0.96	15.7	7.0
34	Duisburg Minoriten	84:52	112	0.99	14.6	15.1
35	Duisburg Minoriten	84:52	114	1.12	15.0	19.6
36	Duisburg Minoriten	84:52/29	108	1.03	16.6	11.4
37	Duisburg Niederstr	88/Fl.19	105	1.10	14.1	9.8
38	Duisburg Niederstr	88/Fl.19	99	0.88	14.3	6.5
39	Duisburg Niederstr	88/Fl.19	90	0.92	13.7	8.1
40	Duisburg Ruhrort	77:26	99	0.82	14.6	6.7
41	Duisburg Ruhrort	77:26	98	0.86	15.3	8.3
42	Duisburg Schwanenstr	85:135	69	0.69	11.8	6.6
43	Duisburg Schwanenstr	86:6/29-31	85	0.87	14.2	6.8
	Frechen kiln					
44	Frechen waster	1	80	0.72	14.0	9.4
45	Frechen waster	2	131	1.07	18.5	10.6
46	Frechen waster	3	73	0.74	14.0	10.6
47	Frechen waster	4	90	0.79	16.6	10.5
48	Frechen waster	5	115	1.06	16.2	15.7
49	Frechen waster	6	79	0.80	14.0	11.1
	Langerwehe: 15th-century pottery wasters					
50	Langerwehe kiln		73	0.83	13.6	11.5
51	Langerwehe kiln		77	0.83	15.5	11.2
52	Langerwehe kiln		66	0.78	14.0	13.9
53	Langerwehe kiln		75	0.82	15.8	10.5
54	Langerwehe kiln		90	0.90	18.0	9.4

Cs	Rb	Sc	Fe	Eu	La	Na	K	Sm	Ba	Yb	Lu
12.5	120	16.8	1.43	1.70	43.2	0.16	1.63	7.74	362	3.02	0.47
12.4	135	17.5	1.54	1.77	43.5	0.19	1.86	8.06	390	3.03	0.48
12.2	115	16.3	1.41	1.58	41.6	0.18	1.60	6.73	394	3.11	0.47
11.7	122	16.2	1.40	1.53	40.4	0.17	1.81	7.23	374	2.94	0.47
6.5	121	14.9	1.67	2.88	78.7	0.22	2.93	13.60	356	3.06	0.46
13.8	142	17.3	1.48	1.69	41.9	0.15	1.32	7.55	376	2.91	0.42
8.2	130	13.4	2.03	2.00	54.9	0.21	1.60	8.69	373	3.16	0.48
7.6	126	14.4	2.20	2.47	53.0	0.19	1.30	9.82	403	3.41	0.55
10.2	166	13.3	2.53	2.01	50.2	0.31	1.92	8.91	493	2.26	0.37
8.4	136	13.7	2.53	1.71	56.0	0.27	1.78	9.21	533	2.53	0.42
7.6	117	12.5	2.36	1.54	55.9	0.27	1.90	9.37	491	2.79	0.47
9.9	171	17.0	3.07	2.01	56.5	0.21	1.73	9.09	645	2.70	0.45
7.4	128	15.7	3.59	2.01	51.9	0.16	1.43	8.31	386	2.93	0.46
9.2	141	14.4	2.20	2.17	58.3	0.28	1.82	9.53	453	2.96	0.47
17.5	159	20.6	1.25	1.95	50.1	0.30	2.46	8.87	359	3.21	0.52
14.0	37	11.0	0.85	1.61	56.0	0.15		6.42	321	3.57	0.58
12.3	101	11.8	0.80	1.09	42.5	0.10		5.23	261	2.43	0.41
11.1	166	15.5	1.32	2.83	73.3	0.32	2.31	11.79	614	3.27	0.50
11.6	105	11.7	0.98	1.10	42.4	0.18	1.75	5.48	309	2.55	0.40
27.8	219	26.8	4.41	3.31	52.3	0.23	1.05	6.48	390	3.72	0.62
22.8	64	12.5	1.26	1.52	53.3	0.15	0.86	6.35	482	3.06	0.51
9.3	156	13.1	2.94	1.28	35.5	0.28	2.00	5.46	353	2.08	0.33
12.1	171	15.7	3.20	1.74	46.5	0.31	2.46	8.02	404	2.54	0.42
12.0	186	15.5	3.29	1.80	45.5	0.35	2.36	7.92	401	2.65	0.41
11.9	157	15.4	3.23	1.79	44.8	0.33	2.36	7.90	447	2.76	0.42
8.8	157	13.4	1.50	1.68	46.3	0.31	2.26	7.46	463	2.26	0.35
8.5	142	12.1	3.36	1.47	43.0	0.36	1.90	6.88	367	2.31	0.40
11.9	184	15.5	3.27	1.81	47.0	0.34	2.49	8.02	523	2.57	0.43
18.0	53	12.5	1.16	1.68	61.6	0.17	0.52	7.07	426	3.43	0.59
15.4	36	12.1	1.08	1.80	65.3	0.12	0.62	7.66	386	4.03	0.66
17.8	85	11.8	0.81	1.61	48.4	0.12	1.46	8.10	314	3.29	0.51
6.3	140	13.3	2.99	1.99	50.0	0.24	1.53	8.23	481	2.99	0.48
9.4	156	13.8	3.21	1.79	46.7	0.25	2.06	7.86	426	2.21	0.37
8.0	129	14.4	2.22	1.67	44.1	0.41	2.73	7.22	413	2.42	0.41
11.0	150	14.4	1.73	1.65	49.4	0.34	1.82	7.51	440	2.24	0.37
10.8	144	14.5	1.58	1.72	48.6	0.36	2.18	7.69	387	2.22	0.37
11.4	155	14.7	3.72	1.20	32.3		2.30		341	4.22	0.58
9.8	162	14.4	3.19	1.51	44.3	0.31	2.41	6.73	443	2.66	0.41
11.1	91	10.3	0.90	1.09	38.7	0.13	1.16	5.27	302	2.63	0.41
15.0	119	14.3	0.84	1.77	61.2	0.10	1.34	8.83	364	3.18	0.51
9.5	84	11.0	0.78	1.02	37.1	0.10	1.13	4.86	227	2.80	0.46
12.7	100	12.2	0.64	1.22	46.1	0.10	1.21	6.26	257	3.05	0.49
7.6	145	14.3	1.86	1.90	56.7	0.25	1.65	8.23	1176	2.76	0.43
10.9	105	11.5	1.66	1.17	37.0	0.34	1.48	5.49	315	2.72	0.44
18.7	98	11.1	0.75	1.07	40.1	0.11	1.19	5.24	288	3.64	0.58
19.2	117	12.8	1.02	1.04	41.7	0.12	1.29	5.44	274	3.92	0.65
17.1	92	10.7	0.79	0.96	37.2	0.11	1.16	4.87	220	3.64	0.58
23.1	131	13.8	1.07	1.11	43.1	0.13	1.52	5.42	315	3.44	0.56
22.6	166	15.6	1.12	1.31	51.6	0.13	1.81	6.57	501	3.48	0.55

to construct and install, often requiring the services of a specialist stove builder (Unger ed. 1988, 14–15). Moreover, once installed, heating a ceramic stove in England was almost certainly a luxury expense as it consumed large quantities of precious wood fuel. It is more than likely that many of the stoves installed on this side of the Channel were used sparingly as in William Harrison's contemporary phrase, 'as occasion and need require it' (see above). It is difficult to speculate on the precise circumstances of the installation of the ornamental Renaissance stove at Camber Castle, but the archaeological evidence points to an individual who was familiar with the latest developments in northern European heating practices and Continental Renaissance interiors. The specific iconography of the stove may reflect something of the political and religious sympathies of the individual concerned. On a more practical level, the ornate smokeless tile-stove simultaneously transformed the living arrangements and material comfort invested in the residential core of the building.

THE WINDOW GLASS

by Cecily Cropper

A glossary of technical terms is given at the end of this volume.

Introduction

The assemblage comprised 3020 fragments. Interestingly, despite the nature of the weathering and the thickness of the glass, ten fragments could be identified as medieval. Two of these (one of red glass) were painted, although both were too small for the design to be decipherable. The opaque fragment exhibited pitted weathering on the external surface indicating that it had spent a substantial amount of time *in situ* prior to dismantling. It is likely that these medieval fragments were brought from the religious houses of Winchelsea, probably as a result of the reuse of lead window calme rather than the reuse of the glass (*HKW*, 428). The remaining fragments, all from plain diamond quarry windows, can be associated with the 16th-century glazing of the castle.

The glazing

All the glass was of a green-tinted metal indicating production within established forest glass houses (see Discussion below) where wood ash was used within the glass-making process. Cullett (waste) and some individual utilised fragments show that crown, or spun glass, was used. The cullett included fragments of curved crown edges and bullseyes (Fig. 4.12, No. 1), with some pieces retaining the original score line produced during cutting. The shapes were predominantly diamonds (Fig. 4.12, No. 2) and associated triangles, though other shapes were present including irregular and curved shapes (Fig. 4.12, Nos 3–5). These would have fitted within an arched head of a window opening, such as the reconstructed window within the gallery (Fig. 3.38).

A diameter estimated from unstratified crown edge fragments gave a measurement of *c* 0.46 m (*c*18 in), and this would give an area of approximately 0.166 sq. m (*c* 256 sq in). Whilst this cannot be taken as an average, it can be used to give an indication of the number of quarries that could be cut from an individual crown. Taking a complete diamond quarry (Fig. 4.12, No. 2) measuring 143 mm x 115 mm (5 ½ in x 4 ½ in) it is clear that a maximum of 12 usable diamonds could be obtained from one crown. Using the known window opening from the gallery (Fig. 3. 38), which measures *c* 0.9 m x 0.6 m (2ft 11 ½ in. x 1 ft 11 ½ in) and gives a maximum sight size area of 0.54 sq. m, it can be calculated that at least three crowns would have been needed to glaze a window to fit that opening. It is suggested that there were 3 window openings per stretch of gallery wall at first floor level, giving a minimum number of 18 windows in the main galleries and one each in the NNW and WNW gallery on the first floor. The ground floor may have had only two windows per stretch, giving a total of 12 windows. Therefore at least 50 crowns were required to glaze the windows on both floors of the gallery. 30 crowns; giving a total area of *c* 11 sq. m of glass was the minimum required to glaze the 18 windows on the first floor of the gallery.

Distribution

Table 4.20 shows the spatial distribution of the window glass within the castle, and the percentage of fragments per phase. Comparatively little window glass (3.27%) came from phases II and III, and most (74 fragments, or 2.45% of the total assemblage) came from phase II/III contexts outside the E Bastion (EBX), with much smaller quantities from phase II and III contexts in the NNW courtyard (CT III), the Keep, N Bastion (NB), outside the N Bastion (NBY), and outside the W Bastion (WBX and WBY). It seems likely that the castle was glazed immediately prior to the main period of occupation during the construction of the first floor of the gallery and stirrup towers within phase III.

The largest amount (40%) came from the courtyard area, particularly from the WNW courtyard (CTIV), although all other courtyard trenches apart from the NE courtyard (CTI) produced large quantities. The second largest proportion (26%) came from the gallery with all trenches producing roughly similar amounts. The SSW gallery (GVI) however produced a relatively low amount when compared with the rest, possibly due to the incomplete excavation of this area. The N and W Bastions produced similar quantities (*c* 7%), and the E Bastion a relatively small amount (3%). Overall, more fragments were recovered from within the bastions than from the external trench contexts, apart from the E Bastion where a substantial amount came from outside (EBX).

With regard to phase, by far the largest amount (43%) came from phase IV contexts, then phase V (28%). It seems likely that the dismantling of the windows occurred at the beginning of the abandonment period, when the galleries were demolished, and that some windows may have been demolished when the partial blocking of galleries took place to contain the Rampire. Casual breakages probably occurred throughout the castle's occupation. The complete nature of some of the pieces (a couple still associated with their leads) and the relatively small amount of window calme recovered overall (see report below), suggests that the final dismantling of the windows took place in a relatively orderly fashion in order to retrieve the lead.

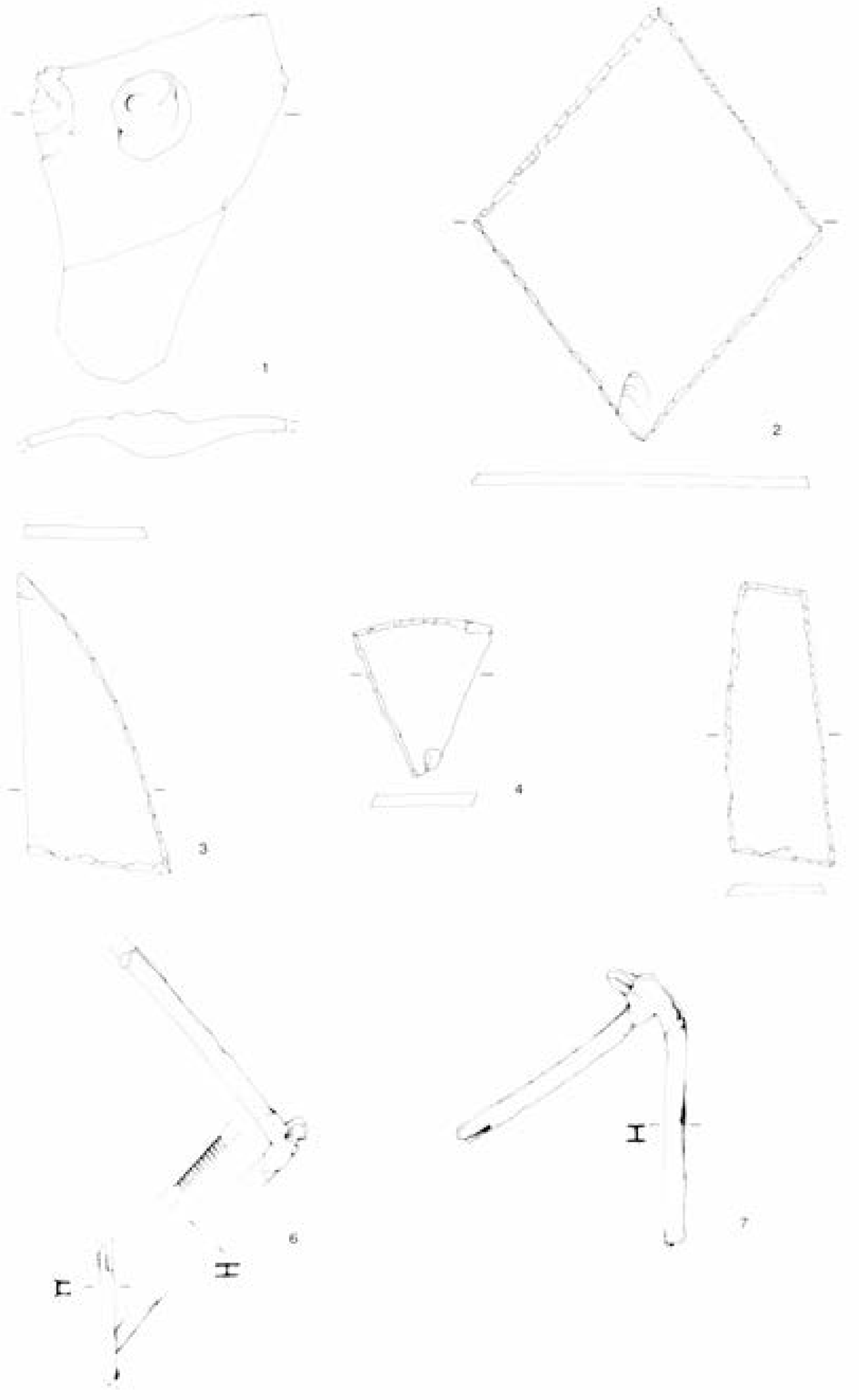


Figure 4.12: Window glass, Nos 1–5, and lead calme, 6–7

Table 4.20: Distribution of Window glass by Phase and Area

AREA (or YEAR)	CODE	Phase/ Number of fragments unph	II	II/III	III	IV	V	VI	Totals
1963 and 1965 trenches	Tr AV					0		2	2
	Tr AVI							1	1
	Tr AVII					1			1
	Tr BII						10		10
	Tr BXI	7							7
	Tr BXII	3							3
	Tr CI/II						3		3
	Tr CII						2		2
	Tr CVI		3						3
	Tr I	12							12
Courtyard	CT I	25				12			37
	CT II	6				42	161		209
	CT III				3		162	38	203
	CT IV					356	8	8	372
	CT V					169	81	35	285
	CT V/VI					3			3
	CT VI					80	20	4	104
	SBC					2			2
Gallery	G I					182	8	1	191
	G II					116	2		118
	G III	49				69	24	5	147
	G IV					107	34	8	149
	G V					2	123	1	126
	G VI					8	19	28	55
Keep	KEEP		3				5		8
E Bastion	EBGP IV							1	1
	EBSG						2		2
E Stirrup tower	EBB						7		7
External	EBX			74					74
Trenches	EBY					1			1
	EBZ						1	1	2
N Bastion	NB	8			5				13
	NBi	1					32		33
	NBii						9		9
N Stirrup tower	NBiii					14			14
	NBiii/iv					2			2
	NBiv						59		59
	NBWGC						6		6
External trenches	NBX	46				3	30		79
	NBY	1	1				2		4
W Stirrup tower	WBi					48	25	28	101
	WBii					66		9	75
External trenches	WBX				2	3		6	11
	WBY				8	6			14
	U/S	460							460
	TOTAL	**622**	**7**	**74**	**18**	**1293**	**885**	**176**	**3020**

Table 4.21: Distribution of Lead Calme by Phase and Area

AREA (or YEAR)	**CODE**	**Phase/Number of fragments**				
		III	**IV**	**V**	**VI**	**Total**
1963 trenches	Tr BII			69		69
	Tr CI			20		20
	Tr CII				91	91
	Tr DI				142	142
Courtyard	CT I				15	15
	CT II		178	349		527
	CT V		67	351/**10**	**16**	418/**26**
	CT VI		32/**12**	20	25	77/**12**
	SBC		3			3
Gallery	G I		307	19	60/**6**	386/**6**
	G II		445/**144**	91		536/**144**
	G V			46	**9**	46/**9**
	G VI				25/**29**	25/**29**
Keep	KEEP				60	60
N Bastion	NBi			90	13	103
	NBii			46/**8**		46/**8**
External trenches	NBX	**4**		102		102/**4**
	WBX		26		41	67
	WBY	99				99
	TOTAL	99/**4**	1058/**156**	1203/**18**	472/**60**	1832/**238**

Figures in bold indicate Type D calmes

Discussion

The extent of glazing at Camber Castle mirrors the increase in demand for window glass for a more secular market during this period (Charleston 1984a, 78). The immigration of French craftsmen (particularly from Normandy) influenced British production by reintroducing the spun or crown technique, and various glass houses are known to have been producing crown glass during the 16th century in Britain. The forest sites of the Surrey-Sussex Weald, for example Knightons, near Alfold, would have dominated the markets of London and the south (Charleston 1984a, 78). However, given that rates were competitive within the European import market, imported glass was also used. It is impossible to say at this point whether the glass used at Camber Castle was British or European.

The crowns were probably brought to the castle to be cut and glazed. In-house glazing, or at least in-house repair, is indicated by the waste fragments, especially those retaining the original cutting lines. Unfortunately the largest amount of waste came from unstratified contexts and it is impossible to say whether a workshop would have been located inside or outside the castle walls.

It has been suggested (see Architectural Stones report, above, and Chapter 3) that the wall of the galleries and stirrup towers facing the courtyard would have been built to a consistent design, incorporating a string-course and hoodmouldings to the windows. The windows at first floor level were probably the only ones to be glazed. The presence of an unusual quantity of glass in the W Bastion (Wb i and WB ii) recalls Hall's comment that the presence here of unusual quantities of stone suggests that stone was at some late stage moved into the W Bastion. This may have been for storage or re-working, and the presence of the glass may be incidental to this process. The lack of glass from the Keep is striking, and reinforces the view that the high status accommodation for the captain was not in the Keep, but in the Entrance Bastion. Three fragments from the infilled Vaulted Passage (or Cellar) may imply that parts of the Entrance Bastion were glazed, although on the whole this part of the castle produced very little window glass.

THE LEAD WINDOW CALME

by Cecily Cropper

Introduction

A total of 3308 g of lead calme and lead associated with glazing recovered from the excavations was examined. Two types of calme were present: lead probably milled in a toothless mill, and lead milled in a toothed mill, Knight's Types D and E respectively (1985, 155–6). Lead extruded from a toothless mill produced calmes with a smooth heart (Fig. 4.12, No. 7), whilst calme from a toothed mill had a heart characterised by parallel ridges (Fig. 4.12, No. 6). Other glazing lead included calme used as bar-ties for fixing the leaded windows to metal horizontal supporting bars, and some lead shavings pared from the border calmes surrounding the window. This paring process allowed for a good fit of the window panel into the window opening.

Type E calmes made up almost 80% (2617 g) of the total assemblage. Type D calmes made up 11.5% (379 g) of the total. The remainder (8.5%) consisted of strips of lead such as parings or ties that for reasons of concretion, poor condition or lack of manufacturing evidence merit no further study.

The majority (97%) of the milled lead was within the width range 6.5 mm to 7.5 mm, a range still consistent with present day quarry glazing. These widths were used within the internal structure of the leaded window as well as being used for the enclosing leads. Other widths were represented by small amounts of calme measuring 5 mm, 5.5 mm and 9 mm wide. It is difficult to identify the specific function of different widths though the narrower lead may represent repair to individual quarries. The wider calmes may have been used as border leads into which calme ends could be fitted to give a neater finish. The narrowest calmes, 4.5 mm in width, were all of Type D. Most of these were 6 mm wide.

Distribution

For distribution of calme by area as well as by phase see Table 4.21.

The majority of calme was recovered from contexts attributed to phases IV to VI. Almost equal amounts of both Type D and milled calme came from phases IV and V but considerably less from phase VI. By far the largest amounts, including the majority of phase IV contexts, came from the courtyard (CTII, CTV and CTVI) and galleries (GI and GII). The presence of a small quantity of milled calme from a phase III context outside the W Bastion (WBY (827)) suggests that glazing was undertaken immediately prior to occupation. Also from this context was a small amount of parings, presumably taken from border leads. This may indicate the placement of a window panel in an opening possibly within the gallery (GV), and the disposal of the waste down the nearby garderobe shaft to end up outside the W Bastion (WBY).

Discussion

It is not clear why both Type D and milled lead were used at Camber Castle. Knight (1985, 156) proposes that the toothless mill was the earlier precursor to the toothed mill, the earliest documentary evidence for the latter being mid 16th century (Knowles 1930, 133–9). This suggests the explanation that there were two glazing programmes, with the earlier being represented by Type D calmes. However, the evidence from this assemblage is unable to support this completely. Substantially more milled lead in relation to Type D lead was recovered from phase III contexts (WBY (827)) and by far the majority of Type D lead came from phase IV contexts. Both calme types therefore appear to have been in use at the same time. A piece of Type D lead was found with a tie of milled lead attached within the WSW courtyard (CTV). It is therefore more likely that at some point during the glazing process the new innovative toothed mill superseded the toothless mill originally used for glazing.

The fact that this lead assemblage is small and fragmentary, certainly when compared with the amount of window glass recovered, supports the likelihood that the lead was thoroughly stripped for smelting and reuse. The amount of lead calme and window glass, particularly within phase IV and V contexts, suggests this was undertaken shortly after decommissioning, and possibly selectively following the infilling of the N and S Bastions and the associated abandonment of adjacent stretches of the galleries.

THE CERAMIC BUILDING MATERIALS, STONE TILES AND SLATE

by Nicholas Mitchell

Introduction

Collection strategy and assemblage composition

The materials considered include ceramic roof and floor tile, slate, limestone roofing material, and bricks. The collection strategies adopted varied from season to season. The policies adopted in the earlier years of excavation from 1963 to 1979 are not explicitly stated in the surviving site documentation, but the small quantities of material from these excavations suggests that limited retrieval was undertaken. By contrast in 1982–83 all floor tile fragments and all brick and roof tile pieces with any complete dimensions were retained. Because of these differing policies the archive does not contain a sample of building materials collected consistently from all excavations. For this reason, the building materials have not been fully quantified. It was felt that the most useful information was to be gained by consideration of the occurrence of material by phase and spatial distribution.

Methodology

The ceramic building materials were studied in hand samples, and separate fabric series were created for each type of ceramic material. Where possible these have been cross-referenced. Type-series were also created for bricks and floor tiles; roof tiles were grouped by fabric alone.

The floor tiles

Types and fabrics

Ten types of floor tile were found, 3 of which are decorated, in 9 fabrics; type and fabric are set out together below.

Type 1: small, 100 mm square, 15 mm thick, green glazed, unkeyed, medium bevel. Fabric: fine with abundant very small quartz, < 0.1 mm, 30%; frequent black ?iron, 0.1 mm, 5%.

Types 2A and B: medium-sized, 117 mm square, 25 mm

Table 4.22: Distribution of floor tiles retained from excavation.

	Number of Contexts Represented Per Area 1963 & 1965 trenches										
Type	**A**	**B**	**C**	**CT**	**EB**	**G**	**NB**	**NBX**	**NBY**	**WB**	**WBX**
1						1					
2A				1			4			1	
2B				1		1	1				
3A		1	3	5		2	5			1	
3B	1		1	4		1	5				
4						1		1			
5				1							
6						2					
7							1				
8							1				
9		1									
10							1				

thick, unkeyed, with dark green glaze, type 2A, or flaky white slip and clear glaze, type 2B. Both types sometimes exhibit up to four small nail-holes in corners of the upper surface; medium bevel. Fabric: medium-hard, dark red with abundant large sub-angular quartz; moderate iron-stone < 2 mm.

Types 3A and B: fabric and form as 2A and B above except dimensions: 130 mm square, 30 mm thick.

Type 4: probably a large tile, > 130 mm across, 32 mm thick, with thick dull green glaze. Fabric: sparse, small sub-angular quartz; frequent lime-blowing 0.2 mm; frequent grog < 1 mm. (Similar to roof tile fabric 9)

Type 5: very large tile, 225 mm across, 41 mm thick, appears never to have been decorated or even glazed; unkeyed; moderately bevelled sides show this is not brick; there is one square nail-hole in the one remaining corner of the upper surface. Fabric: moderate ill-sorted sub-rounded quartz; lime, 0.5 mm, 5%; occasional iron-stone, 1 mm.

Type 6: medium-size tile, 114 mm square, 17 mm thick, worn and without trace of decoration or glaze, unkeyed, slight bevel. Fabric: hard, dull red, with sparse medium-sized angular quartz.

Type 7: mid-green glaze, unkeyed, slight bevel, four nail-holes in each corner of upper surface. Fabric: moderate to abundant, medium-sized rose and white quartz; grog, < 1 mm, 5%.

Type 8: 16 mm thick, slip-design tile, unkeyed, slight bevel. Fabric: abundant very small quartz; abundant very small black ?iron.

Type 9: 114 mm square, 27 mm thick, slip-design tile, decoration is well executed. Fabric: moderate numbers of large sub-rounded quartz; voids.

Type 10: 13 mm thick, transfer-printed tile, probably 20th-century, shallow square depressions on back for keying, and Stok[e-on-] Tren[t] in moulded letters. Fabric: white with moderate numbers of angular, small yellow quartz.

Discussion *(Table 4.22)*

Only 6 of the 41 contexts that produced floor tile were occupation deposits, of phases III and IV, represented by tile types 3 and 5. One fabric dominates the floor tile assemblage, that of tile types 2 and 3, found in 32 separate contexts, most of which are from the courtyard (CTI–CTIV), and the N Bastion. These tiles could have formed green and white chequered floors within the castle. Some have up to 4 small nail-holes in the corners of the upper surfaces, normally considered a Flemish practice for securing the tile while bevelling the edges with a knife (Keen and Thackray 1974, 147–8). These examples may be imported although it seems that decorated floor tiles with similar nail-holes were probably made at Rye in the 14th century (Streeten 1985b, 89).

Many tiles of different types show a thick layer of mortar on several surfaces including the top and broken edges. This may be due to the overlay of later floors or alternatively they may have been brought in from elsewhere for use as construction rubble. Further suggestion that some of this material was reused from earlier buildings some distance away comes from the presence of two tiles decorated with slip-designs, most likely to be of 14th-century date and too early for Camber Castle. One of the designs (type 8) is very similar to a tile from Battle Abbey (Streeten 1985c, design no. 5), and the other (type 9) has a very close parallel at Winchelsea (Eames 1980, design no. 2354). Tile type 10 is a transfer-printed tile, probably of 20th-century date, which must have been brought in from elsewhere.

Roofing material

Roofing materials recovered from the site included both ceramic and stone tile and slate. The quantities of each recovered from the excavations seem to have been comparable, assuming that similar collection strategies were adopted for the different materials.

Ceramic roof tiles

The ceramic roof tiles were grouped according to fabric alone; there are eleven fabrics as set out below with any notable features of form.

Fabric

Fabric 1: hard, dull orange with abundant, medium-large sub-rounded quartz; frequent iron-stones < 1 mm, < 5%. Seen only in ridge-tile fragments, simple ridge with no spurs, with flaky dark green glaze. (Similar to floor tile fabric type 2 and to pottery fabric 20)

Fabric 2: hard, mid-red with abundant clear and grey sub-angular quartz; occasional iron-stone, < 2 mm. Flat tiles with two round peg-holes.

Fabric 3: sandy, mid-orange with abundant clear angular quartz, both large and small, 0.1 and 0.4 mm. Unglazed ridge-tiles with regular knife-cut spurs.

Fabric 4: hard, bright orange, marled with orange swirling; sparse sub-rounded quartz; iron-stones < 1 mm. Nib-tiles with one nib only; tiles: 240 x 162 x 17 mm.

Fabric 5: marled pink and white; moderate numbers of sub-angular quartz. Flat tile with two round peg-holes.

Fabric 6: high-fired, very marled, abundant lime-blowing < 2 mm, 15%. Flat tiles with at least one round peg-hole.

Fabric 7: almost vitrified, light green-yellow with moderate numbers of medium-sized quartz, marked by frequent small red grog, < 0.5 mm, 5%; lime < 0.5 mm, 5%. (Same as brick fabric 3). 13 mm thick, only 120 mm wide. No peg-holes or nibs were noted.

Fabric 8: medium-hard , orange, with moderate small rose quartz; lime 0.2 mm, 5%. Tiles are 245 x 165 x 17 mm and have heavily sanded exterior and knife-cut nibs. Several curved plain pieces also recorded.

Fabric 9: hard, mid-orange, with sparse small sub-angular quartz; frequent small blown lime, 0.2 mm, 20%; voids; frequent grog < 1 mm. (Similar to floor tile fabric type 4, neither very distinctive.) Tiles are 242 x 165 x 12 mm and have two square peg-holes.

Fabric 10: deep red, with moderate-sparse sub-angular quartz; moderate lime, 10%; occasional grog and iron-stone inclusions. Only one tile found with small square nibs and small nail-hole, with letters 'DREADNOUG[HT]'.

Fabric 11: hard, mid-pink with very abundant very large sub-rounded quartz, 0.7 mm, 80%. One tile only, small rounded nib, formed in mould, and small nail-hole.

Stone tiles and slate

The stone roof tiles are all of sandstone, probably from a local source in the Ashdown Beds (Table 4.23). The slate is from south-west Britain and derives from a recognised trade in slate during the medieval period (Holden 1989).

Discussion *(Tables 4.23 & 4.24)*

Fabric 8, nib-tiles, and fabric 9, peg-tiles, form the major part of the roof tile assemblage and are found in 28 and 87 contexts respectively.

Many of these are from the courtyard and galleries, and possibly reflect the retention policy of the 1982–3 excavation campaigns, which concentrated in these areas. Stone roof tiles and slate were also found in significant numbers in the courtyard and galleries, and in the North Bastion, and it occurred in similar proportions to ceramic tiles. Timber with lead caulking was undoubtedly the most widely-used roofing material, however, since it was used to form the gun platforms surmounting the bastions and the Curtain Wall, and possibly also the stirrup towers. The function of the castle, designed for the mounting of guns at roof-top level, makes it very difficult to identify buildings where tiled roofs would have been appropriate. However, several tiles of fabric 7 were found in two lumps of fused kiln-waste, which suggests that these and the identical brick fabric 3 (see below) were made at or near the castle. If tile was being manufactured at the castle, it seems very likely that it was being used there. It is perhaps significant that the roof of the Keep was completely redesigned between phase IIb (1539–40) and phase III (1542–3), with the later design probably incorporating an attic space beneath a slightly ridged roof. This raises the possibility that the Keep had a tiled roof in its final form, although a leaded roof is probably more likely.

The Bricks

The bricks were present in three fabrics and have been grouped into six basic types according to form and fabric.

Brick types

Type 1: (fabric 1), small brick, hand-made, rough and irregular, varying in size, average: 180 x 90 x 38 mm. Two examples (type 1a) had been formed, before firing, to a wedge-shape at one end, starting 40 mm from the end.

Type 2: (fabric 1), as type 1 but with the two longest sides of one face chamfered after firing by chipping the soft brick, possibly with a trowel. One brick also had chamfered ends (type 2a).

Type 3: (fabric 2), heavy, medium-sized brick, 190 x 105 x 47 mm, with a thick dark green glaze over the red fabric, or a pale grey glaze over the red body (type 3a). The glaze is normally seen only on one end and one

Table 4.23: Distribution of slate and stone 'tile' retained from excavation.

	Number of Contexts Represented Per Area												
	1963 & 1965 trenches												
	A	B	C	CT	EB	G	NB	NBX	NBY	WB	WBX	WBY	Keep
Slate				22		12	7	3		3			
Stone tile	1		1	18		12	7		3	1			

Table 4.24: Distribution of roof tile retained from excavation.

	Number of Contexts Represented Per Area												
	1963 & 1965 trenches												
Fabric	**A**	**B**	**C**	**CT**	**EB**	**G**	**NB**	**NBX**	**NBY**	**WB**	**WBX**	**WBY**	**Keep**
1										1	1	2	
2										2			
3	1										2		
4				2		1	3			2	1		
5				1									
6				2	1		1			1	2		
7					1	1	1						
8				10	1	9	3	2		3			1
9			1	23	8	24	19		2	11		1	1
10													1
11				1									

of the large faces while mortar adheres to the rough unglazed surfaces.

Type 4: (fabric 3), heavy, large, > 160 x 125 x 52 mm, hand-made and rough. One of these bricks has two footprints of a small dog impressed into the upper surface, 42 x 35 mm.

Type 5: (fabric 2), large, 240 x 180 x 63 mm, heavy hand-made brick but neater than the above types, unglazed.

Type 6: (fabric 2), exceptionally large brick, > 130 145 x 104 mm, one large face and one end glazed in thin, patchy light grey glaze.

Brick fabrics

Fabric 1: soft fabric, light pink, often marled with white swirling. Abundant blown lime, < 0.2 mm, 20%; sparse medium-sized sub-angular quartz; frequent mica. Produces very light-weight and crumbly brick.

Fabric 2: hard, dark red high-fired and very heavy. Sparse-moderate medium-sized sub-angular quartz; abundant large grog, < 5 mm, 10%.

Fabric 3: very hard, high-fired to virtually vitrified, light yellow, heavy. Sparse, large quartz, 0.3 mm; frequent small red grog, 5%; lime, < 0.5 mm, 5%. (Same as roof tile fabric 7)

Discussion (*Table 4.25*)

The largest concentration of bricks retrieved from excavation comes from courtyard areas I–V, with 16 contexts, 12 of which produced only brick of fabric 1. Some of these bricks were shaped with chamfered edges and may relate to the chamfered bricks seen in the 1963 excavations used as jambs of an arch, and others apparently reused in the outer face of the North Stirrup Tower. The soft, pink brick of fabric 1, found in occupation phase IV as well as demolition phase V, would have been easy to sculpt with a trowel as it was being laid in position. Type 3 glazed brick is found regularly in virtually all the brick-producing areas of excavation but is not known from

Table 4.25: Distribution of bricks retrieved from excavation.

		Number of Contexts Represented Per Area										
		1963 & 1965 trenches										
Type	**Fabric**	**A**	**B**	**C**	**CT**	**EB**	**G**	**NB**	**NBX**	**NBY**	**WB**	**WBX**
1	1			1	3		1					
1a	1				2							
2	1	1			4							1
2a	1		1		3							
3	2			5	1	3	4	3	1	1	2	1
3a	2			1	1							
4	3							2		1	1	1
5	2										2	
6	2				2							

the extant buildings of the castle. This is noteworthy, and it is possible that the material was brought in from elsewhere as salvaged materials.

The yellow bricks of fabric 3 are unlikely to be the yellow Flemish bricks seen at several east Sussex sites (Streeten 1985c, 81), as they are of the same distinctive fabric as fabric 7 of the Camber roof tile series, several examples of which were fused together as kiln waste. This is in keeping with documentary evidence of brick-making on site throughout the building of the castle (*HKW*, 425). Yellow brick is seen today in the standing structures assigned to phase II (Chapter 3, above).

Conclusion

The excavated building material comes mostly from demolition phases V and VI. Nonetheless, stone roofing material and slate, floor tile types 3 and 5, all fabrics of brick except fabric 5, and all roof tile fabrics except the very poorly represented fabrics 1, 2, 10 and 11, are all seen in either phase III or IV contexts. For this reason it is clear that they were certainly present during the construction and use of the castle, a fact confirmed for brick types 1, 2 and 4 by their presence in the standing structure.

However, some building material is known to have been brought from elsewhere, and labourers were paid 'to tere tyle' from Winchelsea (*HKW*, 423–5). How this was to be used, whether as construction rubble or for flooring and roofing is not known, and precludes inferences from the excavated material of the number of floors and roofs laid at Camber. Nib tiles (roof tile fabric 8), which are a common site find, are known to have been manufactured from as early as the 13th century (Streeten 1985c, 96–7) and could well have been brought to the site for reuse. Further complicating the issue is the fact that some of the tiles, floor tile type 10 and roof tile type 11, are certainly too late to have been built into the castle, for they are of 19th- and 20th-century date, and presumably have been dumped after being brought from elsewhere.

This has a bearing on our understanding of the integrity and composition of the assemblage. The most common bricks from the excavations are type 3 glazed bricks. These are found widely spread throughout the excavated area and occur in two phase III and two phase IV contexts. Yet these bricks are not found in any extant castle structure, and are most likely to post-date the castle construction and occupation. This evidence suggests that material of 18th- and 19th-century date was dumped inside the castle.

MORTAR AND PLASTER ANALYSIS

by Graham Morgan

Introduction

The number of mortar samples available for analysis was limited. None of the samples came from *in situ* structures, but were from deposits within the castle. These comprise bulk fills in the N Bastion (NB I (2): sample 1) (phase IVb), deposits within the N Stirrup Tower (NB iii (127): sample 2) (phase V), the fill of a drain (CTII (153): sample 3) (phase V) and deposits on the courtyard surface (CT V (99), (108) and (114): samples 4–6) (phases IV and V). The fills within the N Bastion date were dumped in the late 16th or early 17th century to create a dead mount (phase IVb). These fills contained much re-deposited material. The material from the N Stirrup Tower had slumped from within the N Bastion. The deposit was therefore laid down in phase V but was probably material of phase IVb. The deposits on the courtyard surface comprise material between the cobbles (114) and material immediately over the cobbles (108) (both phase IV) and a layer (99) sealing these deposits (phase V).

Methodology

The samples were examined microscopically and chemically. They were all lime-based with quartz sand as the major aggregate component. Samples of sand from the current Camber Sands beach were analysed for comparison, although the beach is some way from the Castle. After examination samples were dissolved in dilute hydrochloric acid and the residues identified geologically and graded. Particle size distribution curves were constructed from these results.

Descriptions

Many of the samples showed lath impressions on the rear suggesting that they were ceiling or wall partition plasters. Also of note was the presence of fine holes and hair bundle impressions in many samples, showing that they were originally hair tempered.

1. Lath impressed white sandy plaster with hair impressions, 8 - 14 mm thick with lath infill to 25 mm. 1978 NB i (2)
2. Lath impressed white sandy plaster with hair impressions, 10 mm thick with lath to 22 mm. 1982 NB iii (127)
3. Lath impressed white sandy plaster with hair impressions, 14 mm thick with lath infill to 35 mm. 1982 CT II (153)
4. Two layer plaster: fine buff plaster, 0.4 mm on buff plaster with hair impressions, 10-13 mm, on white sandy plaster traces to 8 mm thick. Compare to sample 6 from (114). 1982 CT V (99)
5. Lath impressed white sandy plaster with hair impressions, lath infill to 35 mm. 1982 CT V (108)
6. Fine buff plaster with little sand with hair impressions. Sample too small for full analysis. 1982 CT V (114)

To compare the acid soluble residues with the natural sands, samples of the sands were graded before and after treatment with acid. The results are summarised in Table 4.26.

Discussion

It can be seen that there is quite a range of acid soluble material which approximates to the lime content. The aggregate in sample 4 from the SW courtyard (CT V (99)) is obviously very different from the other samples. The

Table 4.26: Summary of results of analysis of acid insoluble residues

Context	>2 mm Gravel	0.15 –2 mm sand	<0.15 mm silt	'lime' %	
1 1978 NB i (2)	0	93	7	58	hard
2 1982 NB iii (127)	0	92	8	86	hard
3 CT II (153)	0	96	4	56	
4 CT V (99)	0	3	87	93	
5 CT V (108)	1	95	4	72	

aggregates were mainly sub-angular quartz sand with small amounts of flint, quartzite, clinker and other lime kiln residues, and glauconite grains in various stages of oxidation, from bright green to brown or black. The natural sands were very similar, although without the kiln residues, but with the addition of sea shell fragments. In treating the natural sands with acid these shell fragments were dissolved, which was why they were graded both before and after acid treatment. The particle size distribution curves (available in archive) show that there are three main sand grades present:

[1] CT II (153) and CT V (108)
[2] NB i (2) and NB iii (127)
[3] CT V (99)

The natural sands from the present beach are similar to group [2]. Group [3] is of very fine sand, almost silt. It can be seen that the shell component had little effect on the grading of the natural sands. The three different aggregate types suggest three constructional phases. Group [3] and perhaps sample 4 from the SW Courtyard (CT V (99) and (114)), seem to be of a lime-rich plaster with very small amounts of sand, similar in grading to group [1], and may be from a different phase and or constructional technique. However there is no obvious correlation between the location and date of deposits and the results of the analysis. This is perhaps unsurprising given the nature of the deposits.

THE STRUCTURAL METALWORK

by Ian Scott

Introduction

The majority of the structural metalwork comprises fixtures and fittings and nails, staples and other fastenings of iron. The ironwork ranged from nails, dogs, clamps, holdfasts and the like for the fixing and fastening of structures and fittings, to door and window furniture, locks and other fixtures. Copper alloy was employed for smaller, lighter fixtures and fittings and was used in particular where its decorative qualities were required. Copper alloy fittings are catalogued in Chapter 7 below. Lead, which was used for certain specialised functions such as pipework and roof coverings, is also considered here; lead calmes for glazing are discussed by Cropper above.

The amount of iron and lead required for the building of the castle was large, as is shown by the quantities of materials purchased during construction (see below). The building accounts for the first campaign of construction in 1539–40 (phase II) survive in large part, but there are few extant details of expenditure for the building campaign of 1542–43.[1] Overall, expenditure on the phase III castle was substantial (Chapter 2 above and Table 2.1) and it can be assumed that structural metalwork was acquired, but it is not possible to establish the scale of purchases. Indeed some of the metalwork previously used in the phase II castle may well have been reused.

With the exception of nails, only comparatively small quantities of structural ironwork and leadwork, and iron fixtures and fittings, were recovered from the excavations. This indicates that much metalwork was subsequently salvaged from the castle. Nails may have been considered less worthy of salvage and were therefore discarded in large numbers. Furthermore, it is probable that a large number of nails were dumped as a by-product of salvage operations, having been removed from structural timberwork.

Purchases of iron and steel and iron fixtures and fittings

Many of the iron fittings used in Camber Castle were manufactured on site from iron supplied from Rye, while others appear to have been bought in ready-made. Purchases of both iron and steel are recorded in 1539–40, and iron and cast iron in 1542-3 (see Chapter 2 above). In 1539–40, over 4679 lbs (2.09 tons) of iron (2124 kg) and 5 burdens and 1 sheaf of steel were purchased. Some of the steel was purchased from a London merchant, Richard Rede, and some from a local Wealden supplier, Henry Upton of Robertsbridge,[2] whereas most of the iron was acquired locally. William Gybbon supplied three bars of iron for smiths working at the forge at the tower.[3] Other iron was purchased from Sir William Finch of Netherfield, John Stonstret of Robertsbridge and Michael Martyn of Dallington.[4] In the 1542–3 campaign 7907 lbs (3.53 tons) of iron and 5935 lbs (2.65 tons) of cast iron were purchased; Henry Westall of Robertsbridge supplied some of this iron (Crossley 1975, 51; see Chapter 2). These figures are comparable to the 4.5 tons of iron and 11 sheaves and 9 burdens of steel purchased during the construction of contemporary Sandgate Castle (Rutton 1893, 241).

In addition to iron and steel, tools, machinery parts, window and door fittings, hooks, locks and nails and other fixtures and fittings were supplied by William Gybbon and others (see Chapter 2 and below). Nails were purchased in large quantities and it is probable that most of the nails required were acquired ready-made, although others undoubtedly could have been made on site from some of large quantity of iron purchased. Certainly at Sandgate most nails were purchased although some larger and more specialised nails were made by the smiths on site: for example, eightpenny nails were made for the plumber by the smith at Sandgate (Rutton 1893, 243–4).

Some idea of the range of nail types required can be gleaned from the building accounts for Camber Castle and from the more complete records of purchases for the castle at Sandgate. Many purchases of nails are recorded for the construction works of 1539–40 at Camber. They included priggs, 'brodes', twopenny nails, fourpenny and fivepenny nails, 'threshelyng naylys', tenpenny tinned nails 'for dorys' and 'dentyd naylys' also for doors.[5] Nails were purchased from William Gybbon of Rye, Henry Upton of Robertsbridge and Richard Dane of Guestling as well as from St Bartholomew Fair and Playden Fair. Richard Dane supplied one hundred 'threshelyng naylys' at a cost of 3s (15 pence); their identification or function are uncertain, but their cost when compared to other nails suggests that they were large. For example, 'brodes' cost only 4d (1.6 pence) for 100, 18 lbs of 'dentyd naylys' cost 3s (15 pence) at 2d (0.8 pence) per pound and 1000 fivepenny nails cost 4s 2d (20.8 pence), at a rate of 5d (2.1 pence) per hundred. Similarly fourpenny nails were 4d (1.6 pence) per hundred and twopenny nails 2d (0.8 pence) per hundred.

The nails used at Sandgate were purchased at Wye Fair in London and elsewhere, and included small tack nails, sprigs, threepenny, fourpenny, fivepenny and sixpenny nails; the fourpenny nails were used for wheelbarrows and mortar tubs. The prices varied: threepenny nails cost between 1s 8d (8.33 pence) and 2s 6d (12.5 pence) a thousand, fourpenny nails between 2s 6d (12.5 pence) and 2s 10½d (14.38 pence) a thousand. Single and double tenpenny nails were also purchased. 'Latesse nayles' were purchased at 2s 6d the hundred and rivet nails at 3s 4d the hundred. Fifty 'great broddes' cost 6d (2.5 pence), and a hundred 'small broddes' cost 4d (1.6 pence). A thousand 'tyn nayles', that is tin-coated nails, were purchased at 6s 8d (33.3 pence) a hundred. Five hundred 'great tyn naylys' weighing 285 lbs were purchased at 4d (1.6 pence) a pound. Tinned nails called 'fyve stroke nayles' were purchased for 8d (3.2 pence) a pound. The nails for the castle gate at Sandgate included 427 tinned nails weighing 213 lbs (96.6 kg) and 730 great nails weighing 3 ½ cwt (177.8 kg) (Rutton 1893, 244).

An idea of the overall number of nails which might have been required can be gained from the records of both medieval and post-medieval building projects. In 1273 large numbers of nails, including 30,000 'prigs' (small nails) and 10,000 other types, were purchased at Wye Fair for Canterbury Cathedral (Salzman 1967, 304). At Hadleigh Castle in 1363 in excess of 124,000 nails were purchased. These included 10,000 'planchnails' (planknails), 42,000 'refnail' and 21,000 'traues' (possibly the same as transom nails used for constructing partitioning). The purchases also included 2500 'great spykeing' nails. Spikes or spikings were very large nails; for example at Calais in 1440 328 'spykynges' weighed over 275 lb (116.6 kg) and 150 spikes weighed 91 lb (41.3 kg). Spikes for fixing rafters were purchased for St Paul's in 1454 at a cost of a halfpenny each (Salzman 1967, 305). The nails purchased for Hadleigh Castle included 4000 black door nails, 7600 black window nails, 1500 door nails with tinned heads and 2000 window nails with tinned heads. Shingle nails, lead nails and sprigs were also bought (Salzman 1967, 304).

At Camber, various iron fixtures and fittings were supplied by William Gybbon of Rye. Some of those supplied in the early pays were used in temporary structures erected during the building works such as the the devisor's chamber, counting house, the 'plomery' and possibly the store. Two casements for the counting house, a lock and staple for the chamber over the counting house, a lock for the 'plomery', and four 'greatt hokys' weighing 14 lbs (6.35 kg) for the store doors were supplied by William Gybbon in the 3rd – 6th pays.[6] In later pays there are records of iron bars for windows, bars and clasps for a casement of a glass window in one of the 'lytyll Towrys' and of rides and hooks for the little towers (7th – 12th pays).[7] A stock lock 'for one of the vautys (vaults)' was purchased at Bartholomew Fair by William Oxenbridge in the 8th pay.[8] Eight iron bolts weighing a total of 112 lbs (50.8 kg) were purchased for use in the great tower, that is the Keep, in the 11th pay (November 1539).[9]

Iron fixtures and fittings

The range of structural metalwork from the excavations includes iron clamps to reinforce structural stonework (Nos 2 & 3) and associated lead yotting (Nos 4–6), staples and dogs (Nos 7–8 and Table 4.30) and clench nails and roves (Nos 9–10). Staples, clench nails and roves and bolts would have been used in quantities along with nails in the construction of structural timberwork. Various holdfasts (Nos 12–16) and other fastenings (Table 4.31) were employed for securing fixtures and fittings. Strapping was probably used for binding timberwork and holding baulks together, although none of the bindings identified in the excavated assemblage (Table 4.32) is particularly large or substantial and these examples are more likely to be strapping for shutters or chests.

In addition to structural woodwork there may well have been more decorative work. It is likely, for example, that the Captain's chamber was panelled with wood,[10] and fastenings would have been required to secure the panelling to the walls. Furthermore the presence of a ceramic stove (see Gaimster above) constructed from imported stove-tiles would seem to suggest that the Captain's lodgings were well appointed.

The various iron fixtures and fittings ranged from simple swivel rings (No. 1), to complex cast iron fittings (No. 55). The latter was possibly part of a fireplace or range. A substantial quantity of cast iron was purchased for use during the construction of the castle. Many of the fittings such as locks were purchased as ready-made items.

Locks, keys and other door fittings are the largest group of iron fitting from the site. They include a drop hinge staple (No. 37) and gudgeons or rides (Nos. 36, 38), a latch rest (No. 39), a decorated bolt (No. 40) and a number of locks (Nos 41–46). These include a plate lock (No. 41) and two small stock or case locks (Nos 43–44). These are rotary locks operated by keys similar to but smaller than those catalogued (Nos 47–51) and tabulated (Table 4.33). Both the plate and case locks are likely to have been used to secure chests or small doors by means of hasps and were not for use on the doors of the building. The contrast between the bolt of the small plate lock (No. 41) and the loose bolt (No. 42) from a large lock is marked. The latter is almost certainly from one of the main doorways. A large padlock hasp (No. 45) and a smaller triangular padlock (No. 46) could have been used to secure hasps or bolts on doors or gunports, or to secure chests and other items of furniture. Finally there is a probable door nail with a square slightly domed head (No. 52), and a small number of possible structural fittings.

Given the castle's coastal location, it is highly likely that the iron fittings were treated to prevent rusting. They could have been tinned, dipped in pitch, painted or varnished. All these processes served to protect the ironwork and prevent or slow rusting and are attested in the late medieval and early post-medieval periods (Salzman 1967, 294–5).

Purchases of lead

Large quantities of lead were purchased from Richard Rede of London: a total of 44 fothers and 267 lbs is recorded in the 6th pay, and in the 8th pay 7 fothers of lead sheet were transported from Rye to the tower.[11] The 'fother' varied between 19 and 20 cwt (966 – 1017 kg), which means that between 108,795 lbs and 114,507 lbs (49,393–51,986 kg) of lead were acquired. A word of caution is required here, because the accounts for Sandgate suggest that 'fodders' of lead were considerably less than 20 cwt and could vary in weight (Rutton 1893, 244). Certainly large quantities would be required for waterproofing roofs and for plumbing. The roofed areas of the castle were quite extensive. The phase IIb structure would have had in the region of 10,000 square feet (929 square metres) of roof requiring covering. This figure is based on the assumption that the Keep, stirrup towers, galleries and entrance would all have required covering, but that the Vaulted Ring Passage, radial passages and the brick vaults of the foreworks in front of the stirrup towers would not have done. Salzman (1967, 263) suggests that a fother of lead would cover 160 square feet (*c* 15 square metres). Based on this figure the lead requirement just for roofing would have been in excess of 65 fothers. It is likely that it was never intended to cover the roofs of the phase II castle in lead since von Haschenperg appears to have employed canvas, pitch and tar to cover the roof of the Keep. This work had apparently been completed in pay 12 (see Chapter 2 above).

Phase III would have required a significantly larger quantity of lead, mainly on account of the need to roof the bastions and the enlarged gatehouse. The roofed areas in phase III totalled more than 15,000 square feet (*c* 1400 square metres) and would have required almost 100 fothers of lead. Although much of the lead from phase II would have been salvaged and reused in the phase III castle, significant additional purchases of lead would have been required. The presence of roof tiles and slates, albeit in limited quantities, suggests that some roof areas were tiled, which would reduce the area to be leaded.

The quantities of lead required for plumbing and other works is difficult to assess in the absence of surviving pipework. There are references to a pan for the plumbers for casting lead, to planks for moulds and to carpenters making moulds for the plumbers, to billets of wood for the plumbers and to hooks for drawing lead.[12] There is also a reference to a ladle for the masons 'to mylt leade' presumably to yote iron fittings and to secure clamps.[13] The Sandgate accounts list large quantities of solder purchased and make reference to pipes and cisterns; there are also references to lead used to 'yote' iron fittings (Rutton 1893, 244). It is clear that most of the lead in the castle was later salvaged. At the beginning of the Civil War lead from Camber Castle was sent for making bullets for the Parliamentary forces (*VCHS*, 2, 157).

Structural leadwork

Lead was mainly used as a roofing material, for flashings around chimneys, for plumbing and for securing the glazing of windows. It was also used as yotting to secure structural iron in stonework (Nos 4–6, and 25–26). Much of the lead recovered from the excavations comprised fragments of window calme, which is discussed elsewhere (see above) and offcuts from sheet. Strips and offcuts of sheet (Nos 23–24, 27) including a piece with a neatly rolled edge (No. 24) probably represent offcuts of lead coverings. A diamond-shaped piece of lead sheet pierced by four nails (No. 22) appears to have served as a washer. Other leadwork was recovered, although its precise function is unclear. This includes some lead castings of uncertain function with cast edges (Nos 29–31), some flat rough semicircular castings (Nos 34–35) and pieces of lead waste (Nos 32–33). As an extension to its other more mundane purposes, lead was also used for decoration. For the most part this will have consisted of decorative work on plumbing, particularly on external pipework, and on lead roofwork. The lead portcullis plaque (No. 21) is a decorative feature probably used for such a purpose.

Doorways, windows and gunports

The castle has, or had, a large number of openings, most of which required iron fittings of one sort or another. The three main types of openings are doorways, gunports and windows.

Doorways, both internal and external, would have required hinges and fastenings. Many of the doors will have been reinforced by iron bands or straps. In general the doorways in the castle, many of which are still visible, had stone jambs and the doors were probably hung on simple drop hinges and fitted into stone-built openings without timber frames. The pintles or hooks for the drop hinges were fixed into the stone work with lead yotting. An example with a V-shaped arm particularly suited to fixing into stonework was recovered in the excavations (No. 37). The gudgeons, or rides (Nos 36, 38), of the drop hinges were attached to the door and, in most instances, will have been integral with iron door straps and formed by rolling the ends of the straps into eyes. The number of hinges and their size would have been dependent on the size and weight of the doors and their positions.

The surviving evidence at other Device forts suggests that the main entrance would have been protected by a portcullis and possibly a drawbridge. Behind the portcullis would have been heavy double doors studded with nails and with very substantial iron fittings designed to keep attackers out. The oak doors at Deal Castle, which are probably original, provide a good example (Coad 1998, 6). At Deal, there is a small wicket gate to provide pedestrian access. The main doors may well have been hung by means of pivots set into the floor and ceiling, rather than wrought iron hinges, because of their weight. It is likely that they were fastened by a drawbar sliding into the adjacent wall, and the drawbar may have been secured by a lock, or hasp and padlock. At Camber Castle, there is evidence for a slight external ditch and a cobbled causeway which may have been associated with a drawbridge. The main entrance has been badly damaged and the dressings for the doorway removed. There is no evidence for a portcullis.

Internal doors would have been somewhat lighter, although in most instances still intended to provide a barrier to potential attackers. They were closed by draw bars, simple bolts (No. 40), latches (No. 39), cased locks (Nos 43–44) or plate locks (Nos 41–42). Holes for securing bolts or draw bars are visible in some door surrounds, for example in the radial passages and Vaulted Ring Passage. Both draw bars and bolts could be locked with padlocks (Nos 45–46). The type of fastening used, and its weight, would have been governed by the function and position of the door.

The gunports of the phase I tower had been fitted with pairs of shutters opening inward and hung on simple drop hinges. They are more likely to have been closed by small sweeps or flails to give greater rigidity, than by draw bars or simple bolts. A sweep comprises an iron bar attached to one of the leaves by a pivot at its centre. To secure the opening, the pivoting sweep bar was swung to the horizontal and engaged into iron hooks or plates, and usually further secured by a hasp and padlock. When closed the sweep served both to secure the leaves of the shutters and to make them more rigid. The gunports are now blocked, but one is partially exposed and the iron pintle for a simple drop hinge is visible. The gunports on the phase III bastions have all been blocked, and the evidence for shutter fittings lost as a result, but it is most probable that they had similar shutters to the phase I gunports.

The cupboards or lockers in the Vaulted Ring Passage and the stirrup towers were probably fitted with doors, but these may have been attached to wooden frames by means of plate or strap hinges. It is possible that copper alloy hinges and door furniture could have been employed for some cupboards, particularly if they were used to hold shot and powder.

The other main openings found in the castle are windows. These were mainly located overlooking the courtyard, in the galleries, on the internal faces of the stirrup towers and in the upper floors of the Keep. The glass and lead calmes have been discussed elsewhere (Cropper, this chapter, above). The glazing panels formed of glass and lead would have been set directly into the stone window surrounds and secured by wiring to horizontal and possibly vertical iron bars (*ferramenta*) set into the stonework and held by lead yotting. Where the windows were intended to open, they would have had iron frames or cases to hold the glazing panels. The cases would have been fixed into the window openings and secured by iron stay-bars.

The assemblage

Because of the size of the sample and the limited range of types, the structural metalwork has been treated as a series of groups rather than as individual items. The quantities of material have been tabulated by area and compared with the general distribution of metal finds by area. The nails have proved particularly useful and informative. A small number of the objects identified as structural fixtures and fittings have been catalogued and illustrated, as have the comparatively small number of the locks, keys and door fittings. These objects are briefly described and the principal dimensions are given. This is followed by abbreviated details of the year of excavation, area or trench designation, context number and small find number.

Nails

Nails were found in large quantities and in terms of numbers form by far the largest part of the metalwork assemblage. The nails were counted and recorded by

Table 4.27: Distribution of nails in the Courtyard

Area	Minimum	Maximum	Percentage of total	
			minimum	maximum
CT I	279	396	27.5	28.5
CT II	128	169	12.6	12.2
CT III	158	215	15.6	15.5
CT IV	204	250	20.1	18.0
CT V	129	192	12.7	13.8
CT VI	34	40	3.3	2.9
SBC	82	128	8.0	9.2
Total	**1014**	**1390**	**99.8**	**100.1**

Table 4.28: Distribution of nails in the galleries

Area	Minimum	Maximum	Percentage of total	
			minimum	maximum
G I	178	286	36.2	35.8
G II	79	128	16.0	16.0
G III & C III	50	88	10.2	11.0
G IV	50	76	10.2	9.5
G V	106	168	21.6	21.0
G VI	26	48	5.3	6.0
SBC/SBG	3	4	0.6	0.5
Total	**492**	**798**	**100.1**	**99.8**

context. Complete (and almost complete) nails, nail heads, and stem fragments were counted and recorded separately. In Tables 4.27–4.29 the maximum figure is the sum of complete nails and fragments; the minimum figure is a count of all complete nails and nail heads, but omitting stem fragments. The maximum figure will almost certainly overestimate the actual number of nails represented, while the minimum figure will underestimate the number. However, the trends are evident for the purposes of comparison between different areas of the castle. In fact, the percentages derived from the maximum and minimum figures are not dissimilar. If there was a noticeable discrepancy in any one case, this would itself be of interest, indicating the presence either of more complete nails (perhaps unused) or more fragmentary nails (suggesting the possibility of redeposition). The distribution of nails within the courtyard (Table 4.27) and galleries (Table 4.28) is considered first and then the distribution across the major divisions of the castle (Table 4.29) is presented.

The courtyard produced the largest assemblage of nails from the castle (Table 4.29). This in part reflects the extent of the courtyard, and in part the fact that rubbish and debris seem to have accumulated, or been dumped, in the courtyard in phases V and VI. The distribution of nails around the courtyard appears to be fairly uniform (Table 4.27). The apparent bias towards the NE Courtyard (CTI) can be offset by the fact that the excavation of this area extended into the adjacent portion of the courtyard to the south. Similarly the low figure for the SW Courtyard (CTVI) reflects the limited excavation in this area in 1982–3, but is compensated for by taking into

Table 4.29: Distribution of nails by main areas

Area	Minimum	Maximum	Percentage of total	
			minimum	maximum
KEEP	131	207	3.0	3.1
COURTYARD	1014	1390	23.3	20.8
GALLERY	492	798	11.3	11.9
EAST BASTION	163	264	3.7	3.9
EAST STIRRUP	34	56	0.8	0.8
NORTH BASTION	490	699	11.3	10.4
NORTH STIRRUP	256	413	5.9	6.2
ENTRANCE BASTION	68	89	1.6	1.3
WEST BASTION	104	164	2.4	2.5
WEST STIRRUP	617	1024	14.2	15.3
Exterior trenches				
EBX	534	872	12.3	13.0
EBZ	103	133	2.4	2.0
EBY	4	7	n/a	n/a
NBX	248	436	5.7	6.5
NBY	31	44	0.7	0.6
NEX	1	1	n/a	n/a
WBX	8	10	n/a	n/a
WBY	55	89	1.2	1.3
Total	**4353**	**6696**	**99.8**	**99.6**

account nails found in 1970s excavations (SBC) in the SW Courtyard. The figure for Courtyard IV between the Entrance and West Bastions is slightly higher and cannot be readily explained, but it is perhaps worth noting that this area also produced the largest quantity of window glass (see Window Glass report above). The overall picture is of a good number of nails found throughout the courtyard excavations.

It is interesting to note that a good number of nails were recovered from the galleries. Again there is a fairly uniform spread, but with a particularly large number of nails from the gallery (G I) adjacent to the East Bastion, and from the WSW Gallery (G V). A substantial proportion (11.3–11.9 %) of the nails from the castle come from the galleries, which were deliberately filled with clean rubble, in most cases after the castle was finally decommissioned in 1637. There are only small numbers of other metal finds from the galleries.

Comparison between the excavated bastions and stirrup towers is instructive (Table 4.29). The West and East Bastions both produced small quantities of nails (3.7–3.9% and 2.4-2.5% respectively). The North Bastion produced a more substantial quantity (11.3–10.4% of totals). Since this bastion was filled in with shingle and rubbish during the lifetime of the castle and produced a substantial proportion of all the finds, the quantity of nails recovered is perhaps not surprising. The stirrup towers provide an interesting contrast. The North Stirrup Tower produced a reasonably large number of nails (5.8–6.0% of the complete castle assemblage), many more than the very small quantity of finds from the East Stirrup Tower (0.8%). The real surprise is the number of nails from the West Stirrup Tower, which produced more nails than the North Bastion (14.25–15.3% against 11.3–10.4% of totals). Only the courtyard produced more. The significance of this fact is not immediately clear, although surprisingly large quantities of window glass and architectural stone were found in the same location.

A large quantity of nails was also recovered from external trench (EBX) on the north side of the East Bastion. This area has produced a good group of pottery of early to mid 16th-century date. It is possible that the nails from this area were deposited during the various constructional changes made to the castle in phases II and III, rather than being evidence for deposition of demolition deposits.

Other iron structural fixtures and fittings *(Figs 4.13–4.14)*

Swivel ring:

1 Swivel ring of iron attached to stone by looped iron pin decorated with a small knob. L of stone 127 mm; D of ring 40 mm. 1979 NB ii (25) Ph.4b

Clamps and staples (Table 4.30):

2 (not illustrated) Stone clamp, complete. Plain square section bar, with angled ends, all coated in lead, except for upper face. There is a flange of lead at the middle where it has run between ashlar blocks. L 573 mm; 1979 CT (21) sf 22, Ph.4b

3 (not illustrated) Stone clamp, fragmentary, set in lead. L 58 mm; 1975 WBY (828) Ph.4

4 Lead yotting for securing a stone clamp. L 78 mm; 1982 CT II (86) sf 754, Ph.4

5 (not illustrated) Lead yotting for securing a stone clamp, forming square collar. L 70 mm; 1983 WB ii (260) sf 1235, Ph.5

6 (not illustrated) Lead yotting for securing a stone clamp. L 93 mm; 1974SBC (743) Ph.5

7 Timber clamp or dog, for securing timber baulks together. Well formed, ridged back, incomplete. L 156 mm; 1972 NB u/s

8 Small timber staple or clamp. L 49 mm; 1983 WB i (257) sf 1163, Ph.5

Clench nails (Table 4.31):

9 Clench nail, with diamond shaped rove, square-sectioned stem, and head in the form of a truncated faceted cone. L 73 mm; 1963 AVII (516) sf 25, Ph.4 or 5

10 Strip of 4 diamond shaped, domed roves, uncut. For use with clench nails L 99 mm; 1983 CT III (282) Ph.5

Washer:

11 Washer, large circular, triangular section thinning to outer edge. D 55 mm; 1963 BII (518) Ph.4 or 5

Holdfasts:

12 Holdfast consisting of a spike of circular section, with flattened, hooked plate at one end. There are crudely angled cuts on the edges of the plate. L 168 mm; 1963 CII (538) sf 104, Ph.5
Possibly for securing timber framing for doors or windows to stonework. The notches cut into the flange would serve as a key for mortar or plaster. A very similar object with angled cuts was found in a post-medieval context at the monastic grange site of Dean Court, Cumnor, near Oxford (Allen 1994, 378 & fig. 93, 232)

13 Flanged spike. The triangular flange is pierced by three nail holes. L 80 mm; 1982 CT VI (47) sf 337, Ph.5

14 Angled bar of stout rectangular section, with three nail holes through longer wider arm. L 142 mm, 1976 WBY u/s.
Function uncertain, a possible structural reinforcement or a bracket

15 Holdfast, comprising strip bent into a half loop and twisted and pierced with nail holes at the end. For securing a pipe or pole. L 73 mm; 1982 CT V (99) sf 782 Ph.5

16 Holdfast, formed from strip, and comprising a loop or eye attached to a flat plate or strip. Possibly for some form of pivot. There are no clear nail holes. L 103 mm; 1979 NB ii (10) sf 13, Ph.4a

17 (not illustrated) Bracket formed from strip bent into a simple arched form, with a nail hole at each end. L 82 mm; 1974 SBC (748) Ph.4a

Studs:

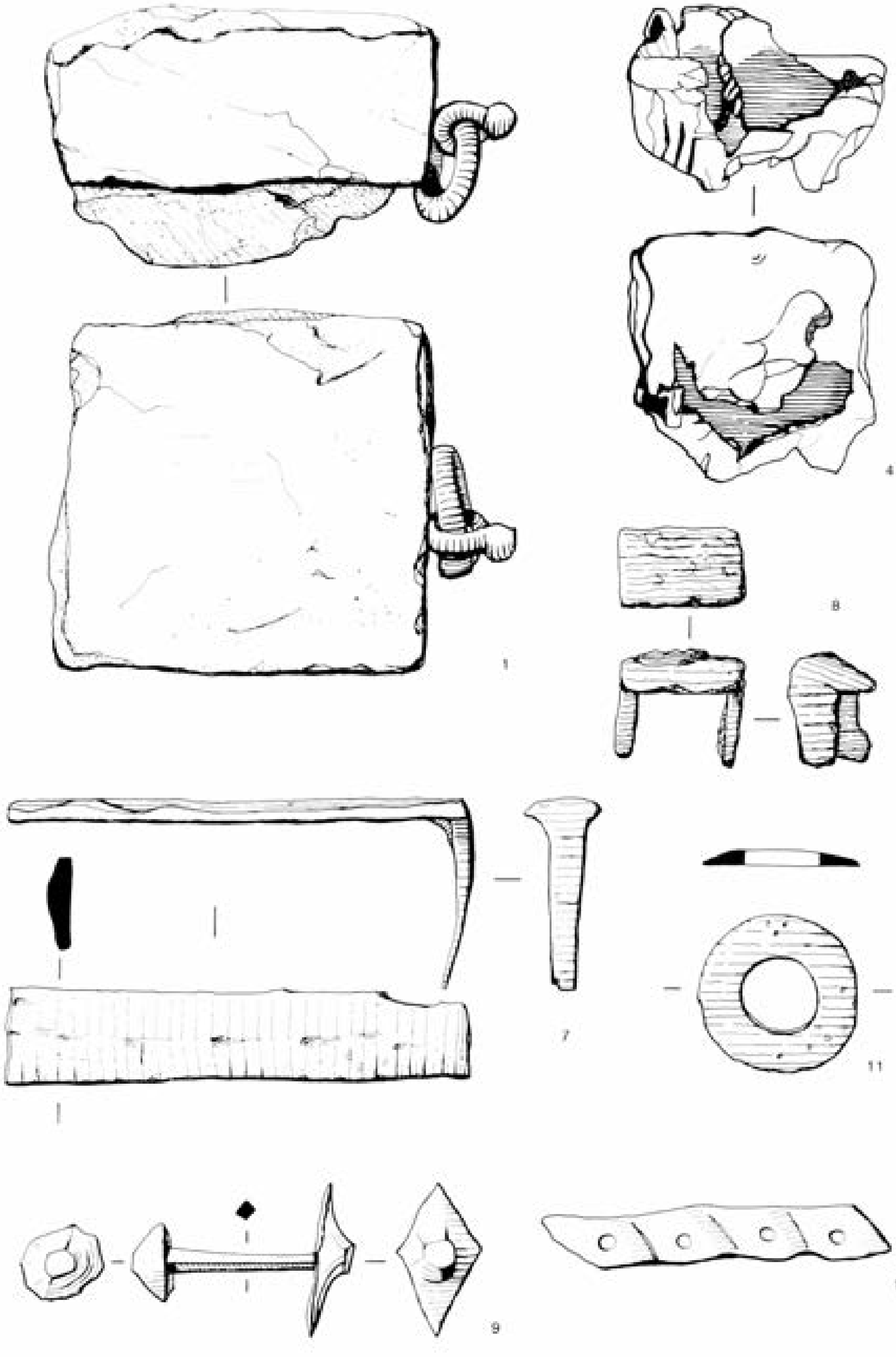


Figure 4.13: Structural metalwork, Nos 1–11 (scale 1:2)

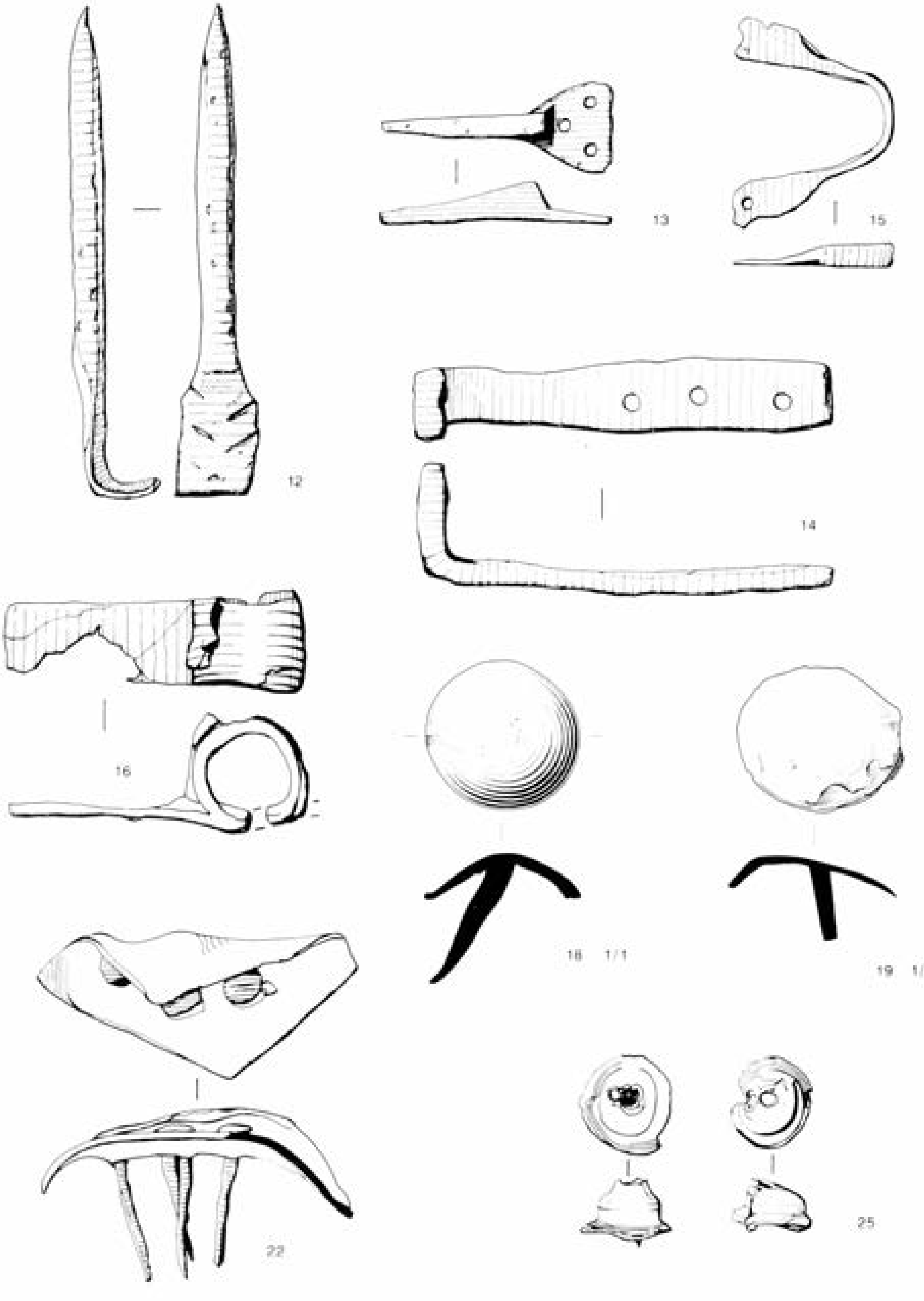


Figure 4.14: Structural metalwork and leadwork, Nos 12–25 (scale 1:2)

Table 4.30: Clamps, dogs and staples

Year	Area	Context	Phase	No.	Identification
1975	KEEP Q I	836	5	1	Staple
1979	CT I	17	4b	1	staple, L-shaped
1982	CT II	86	4	1	Staple
1983	CT III	286	5	1	Staple
1983	CT III	287	5	3	Staples
1983	CT III	297	6	1	Clamp
1983	CT IV	302	4	1	Staple
1975	SBC	835	4a	1	staple, L-shaped
1982	G II	120	4	2	Staples
1983	G III	255	4	1	Dog
1982	G V	96	5	1	staple
1982	G	u/s	-	1	clamp
1973	EBGP 2	649	6	1	dog
1973	EBGP 4	656	5	1	staple
1979	NB I	17	4b	1	clamp
1982	NB iii	127	5	1	staple
1983	NB iv	183	5	1	staple
1983	NB iv	254	5	1	staple
1972	NB	u/s	-	1	staple
1972	NB	u/s	-	1	clamp (4.6)
1973	WB	706	4	1	staple
1983	WB I	205	6	1	dog
1983	WB I	230	6	1	staple
1983	WB I	257	5	1	staple (4.7)
1983	WB ii	260	5	1	clamp
1983	WB ii	260	5	1	clamp
1983	NBY	352	6	1	clamp
1975	WBX	798	4	1	dog
1975	WBY	828	4	1	clamp, (4.3)
1975	WBY	828	4	1	staple, L-shaped

18 Large domed head copper alloy stud L 27 mm; D 26 mm; 1983 CT IV (295) sf 1514, Ph.4

19 Large domed head copper alloy stud. L 24 mm; D 30 mm; 1982 WB i (245) sf 1156, Ph.5

20 (not illustrated) Large domed head copper alloy stud. L 25 mm; D 26 mm; 1983 WB ii (280) sf 1413, Ph.4

Bindings (Table 4.32):

Bindings comprise for the most part strips of pierced iron generally with evidence for nailing. They cannot be identified to a specific purpose, but could have been used for structural bindings, for binding boxes and chests or furniture.

Leadwork *(Figs 4.14–4.16)*

A good quantity of lead was recovered from the site, much of it window calme treated along with the window glass in a separate section of this chapter. The remainder comprises mainly offcuts and melted scrap lead, probably either from construction or salvage phases. Only a selection of the lead has been described or illustrated.

Amongst the most interesting items from the site was a piece of a lead plaque or badge in the form of a portcullis (No. 21). The portcullis was a motif particularly connected with Henry VIII. Leadwork, probably from the buildings rather than portable objects, includes pieces such as edging strip (No.23), an offcut of lead sheet with rolled edge (No. 24), lead sheet with nails (No. 22) and bell-shaped castings holding iron rod (Nos 25–26). Another interesting item is the lead strip with initials and a date scratched on its surface (No. 27). The date, 1633, suggests that the lead might have been removed during salvage or looting.

There are a number of castings of uncertain function, including flat castings with raised edges and ridges. There is no sign that these were worked or in any way finished. Their function is far from clear but they appear to have been deliberately formed. The spacing and positioning of the raised edges or ridges on Nos 29 and 30 suggest that they may have been parts of the same or similar objects. Both have probably been cut.

Decorative leadwork:

21 Decorative casting in lead, in the form of a chained portcullis. It has been cut diagonally and has cuts on

Table 4.31: Other fittings

Year	Area	Context	Phase	No.	Identification
1963	A I	505	4	1	clench nail
1963	A VII	516	4 o 5	1	clench nail (4.8)
1963	B II	518	?	1	washer (4.10)
1963	C II	538	4b	1	collar
1979	CT I	17	4	1	collar, tubular
1982	CT I	115	4	1	hook
1982	CT II	62	5 or 6	1	washer
1982	CT II	82	5	1	collar
1982	CT II	86	4	1	collar
1982	CT II	86	4	1	staple
1983	CT III	282	5	1	collar
1983	CT III	282	5	1	washers, strip of 4 uncut, for clench nails (4.9)
1982	CT VI	47	5	1	bracket
1983	G III	222	5	1	junction
1983	G IV	268	4	1	washer
1982	G V	105	4	1	collar
1979	NB I	2	4b	1	collar
1978	NB I	3	4b	1	clench nail
1979	NB I	14	4a	1	spike
1978	NB ii	1	6	1	washer
1978	NB ii	1	6	1	collar
1979	NB ii	2	4b	1	clench nail
1978	NB ii	11	4b	1	spike/wedge
1972	NB	u/s	-	1	clench nail
1972	NB	u/s	-	1	washers, strip of 3 uncut, for clench nails
1972	NB	u/s	-	2	collars
1983	WB I	204	6	1	angle bracket
1973	EBX	667	3	1	collar
1974	EBX	723	2b	1	washer, for clench nail
1982	NBX	848	6	1	washer
1976	NBX	883	4	1	clench nail
1976	NBX	883	4	1	washer
1975	WBX	787	6	1	washer
1976	WBY	u/s	-	1	bracket
1972		u/s	-	1	collar
1978		u/s	-	1	clench nail

the decorated face; cast face down in a one piece open mould. L 124 mm; 1963 B VIII (1033)/(1034) sf 124, Ph.5 or 6

Structural leadwork:

22 Lead sheet, diamond shaped, with four nails. L 107 mm; 1975 Keep Q II (841) Ph.3

23 (not illustrated) Edging strip of lead of L-shaped section, narrowing slightly to one end, which may have been distorted by stretching and bending to break. L 107 mm; 1973 EBY (675) Ph.4

24 (not illustrated) Strip of lead, with neatly rolled-over edge at one end. An offcut from a lead covering. L 46 mm; 1973 EBY (675) Ph.4

25 Bell-shaped lead castings to secure iron rods, two. D 32 mm and 30 mm; 1975 Keep Q IV (850) Ph.6

26 (not illustrated) Bell-shaped lead casting to secure iron rod. D 27 mm; 1982 CT II (52) sf 356, Ph.6

27 (not illustrated) Tapering cut strip of lead with the initials 'DM' and the date '1633' scratched onto the surface. There is a nail hole at one corner of the wider end. L 254 mm; 1963 B II (517) sf 125, Ph.5

Lead objects of uncertain function:

28 Dished lead object with a central nail hole. D 145 mm; 1963 C VI cellar, Ph.3

Table 4.32: Bindings

Year	Area	Context	Phase	No.	Identification
1963	C II	538	5	2	bindings
1975	KEEP Q II	840	3	1	binding
1975	KEEP Q IV	846	6	1	binding
1979	CT I	17	4b	1	binding
1983	CT III	266	6	1	binding
1983	CT III	282	5	1	binding
1983	CT III	286	5	1	binding
1983	CT III	366	2b	1	binding
1983	CT IV	295	4	2	bindings
1983	CT IV	302	4	1	binding
1982	CT V	99	5	1	binding
1974	SBC	748	4a	1	binding
1963	ex 'multiple garde robe'		?	3	bindings
1973	EBA	613	4	1	binding
1979	NB i	2	4b	2	bindings
1978	NB i	5	4b	1	binding
1979	NB i	17	4b	2	bindings
1979	NB	21	4b	1	binding
1978	NB ii	2	4b	1	binding
1972	NB	u/s	-	2	bindings
1973	EBX	666	3	3	bindings
1976	NBX	882	4	1	binding
1976	NBX	883	4	3	bindings
1976	NBX	912	3	3	binding
1983	NBY	335	4	1	binding or hinge strap
1975	WBY	820	4	1	binding or hinge strap

29 Lead casting, flat with upstanding edges. Uncertain function. L. 51 mm; 1972 NB u/s

30 Lead casting, flat with upstanding edges. Uncertain function. L. 44 mm; 1973 EBY (673) Ph.3

31 (not illustrated) Lead casting, rectangular with two upstanding ridges. Uncertain function. L. 31 mm; 1973 EBY (675) Ph.4

32 Strip of cast lead waste, from salvage operations or construction. L. 105 mm; 1973 EBY (673) Ph.3

33 (not illustrated) Melted lead waste, in concave form. L. 80 mm; 1973 EBX (666) Ph.3

34 (not illustrated) Two semi-circular flat castings, not finished. Both have an uneven but flat back with a slight ridge off-centre. They are quite rough with a dimpled surface on the other face. The curved edges on this face are a slightly lipped . The lipping is more pronounced on the smaller example. L. 48 & 50 mm; 1973 EBY (675) Ph.4

35 (not illustrated) Damaged semi-circular flat casting, similar to above, but larger. The ridge on the back is more marked. Found with an offcut or piece of scrap lead L. 53mm; 1973 EBY (675) Ph.4

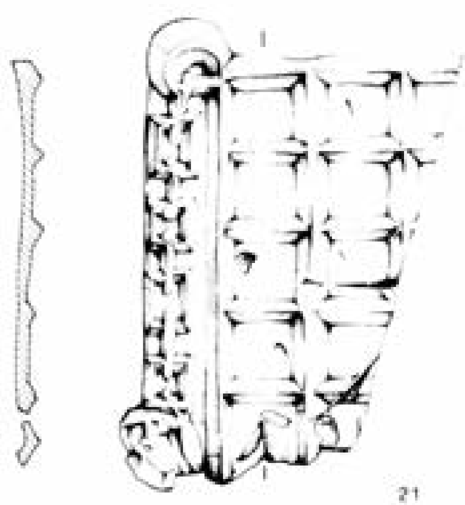


Figure 4.15: Lead portcullis plaque, structural metalwork, No 21 (scale 1:2)

***Door furniture** (Figs 4.16–4.18 and Plate 4.4)*

All door fittings, locks and keys are iron unless otherwise stated.

Door fittings:

36 (not illustrated) Possible hinge gudgeon or ride, comprising heavy eye with incomplete staple, very badly corroded. L. *c* 170 mm, 1979 NB ii (23), Ph 4b

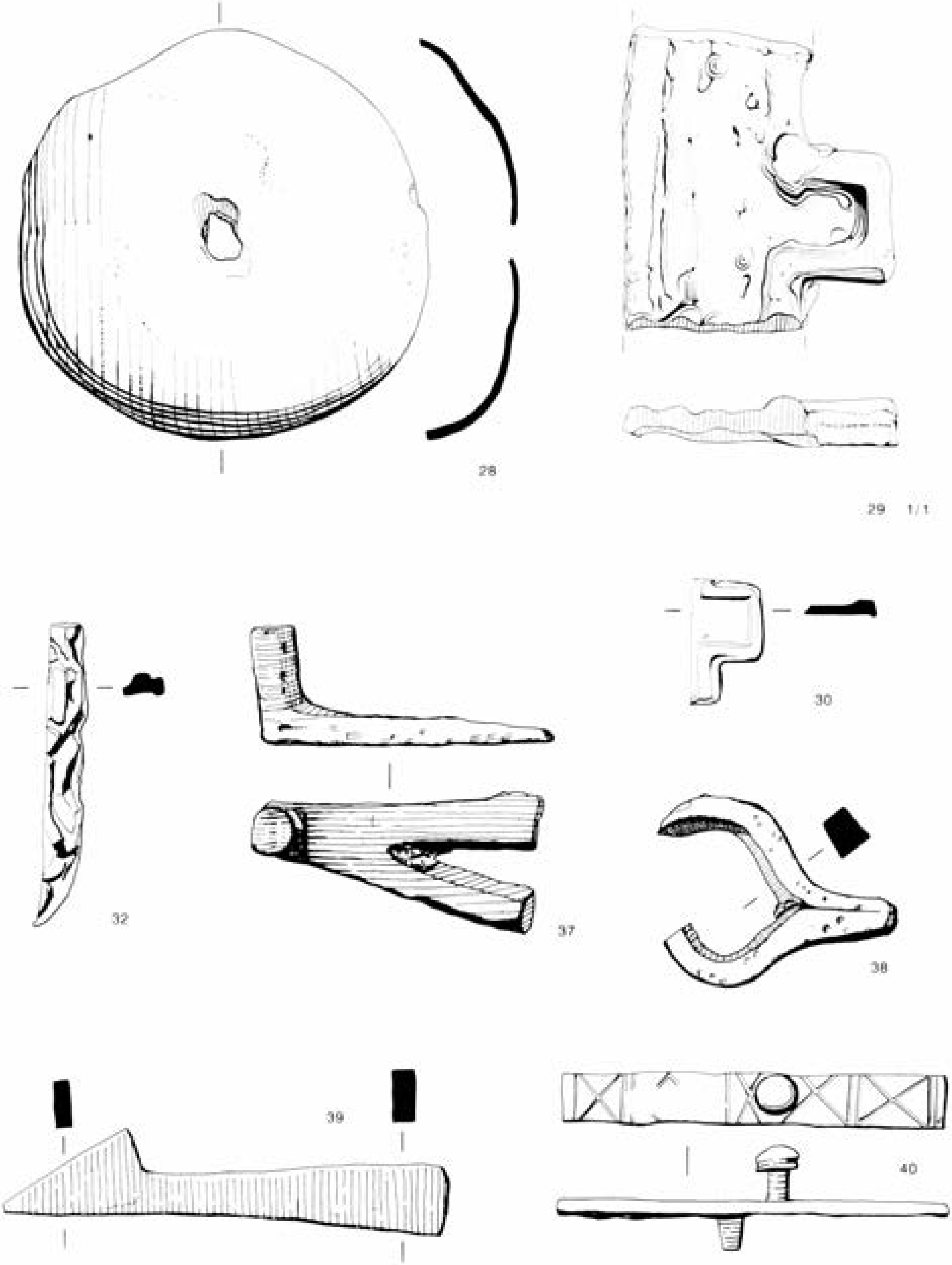


Figure 4.16: Miscellaneous leadwork and door furniture, Nos 28–40 (scale 1:2, except 29, scale 1:1)

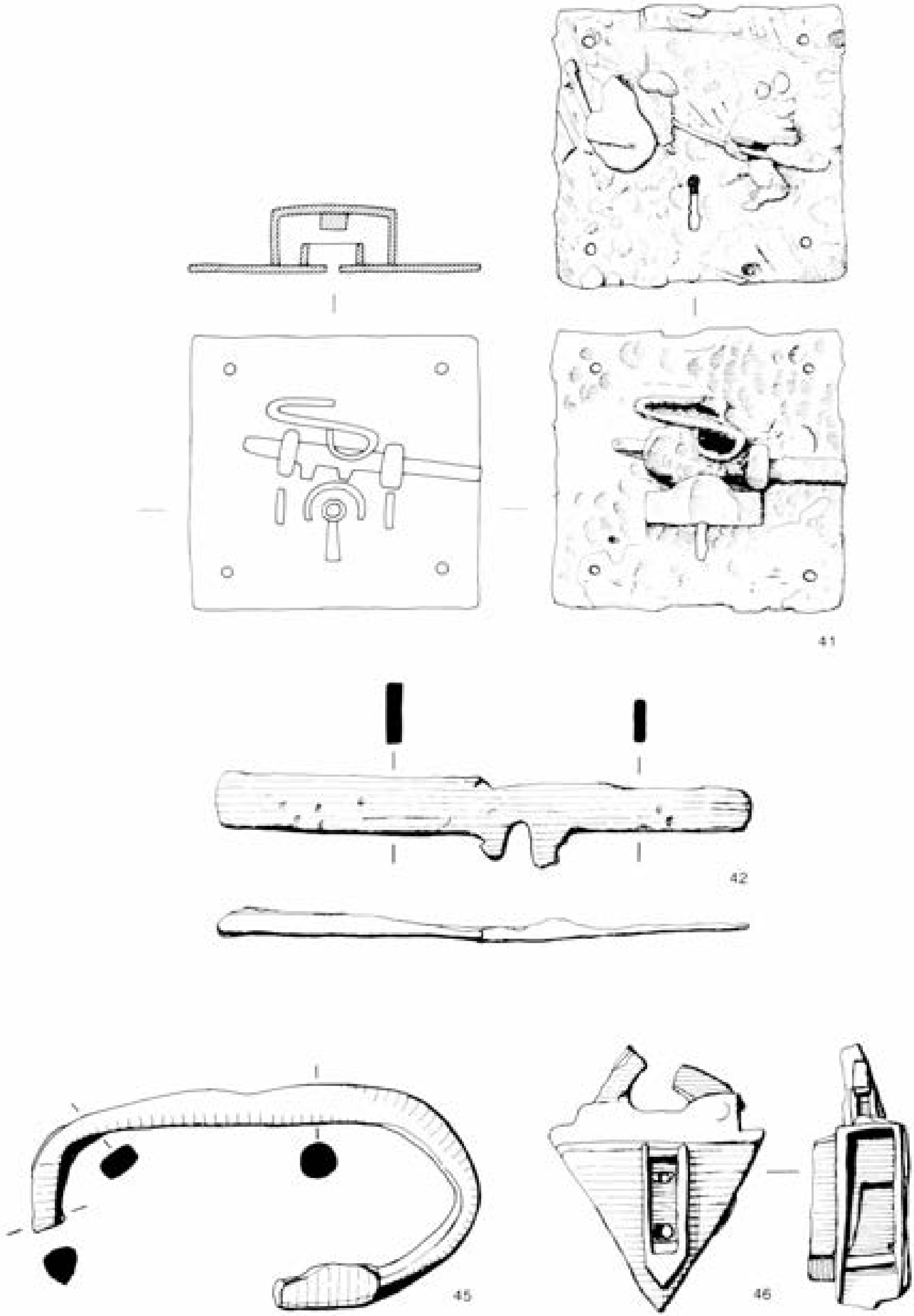


Figure 4.17: Door furniture, Nos 41–46 (scale 1:2)

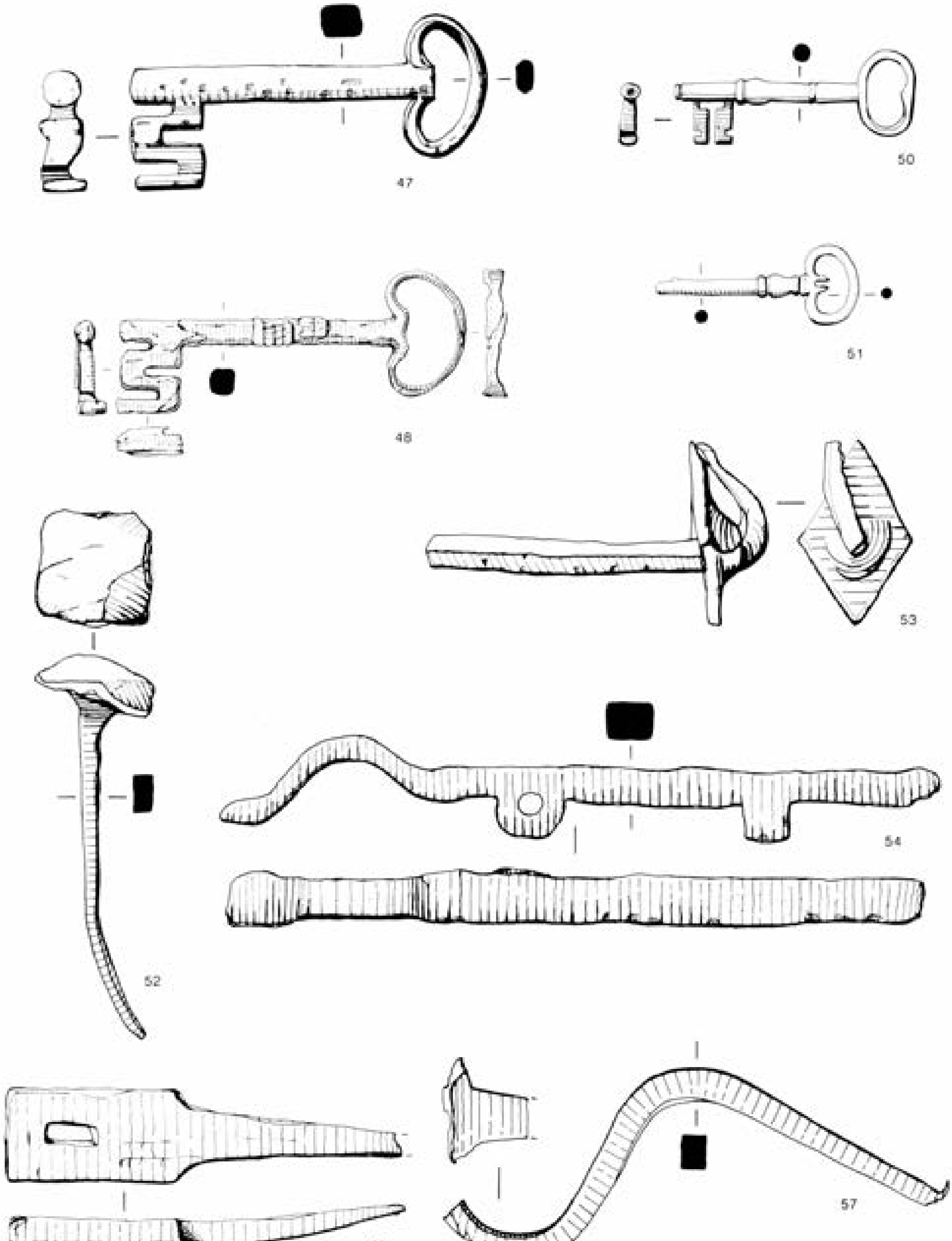


Figure 4.18: Keys and miscellaneous metalwork, Nos 47–57 (scale 1:2)

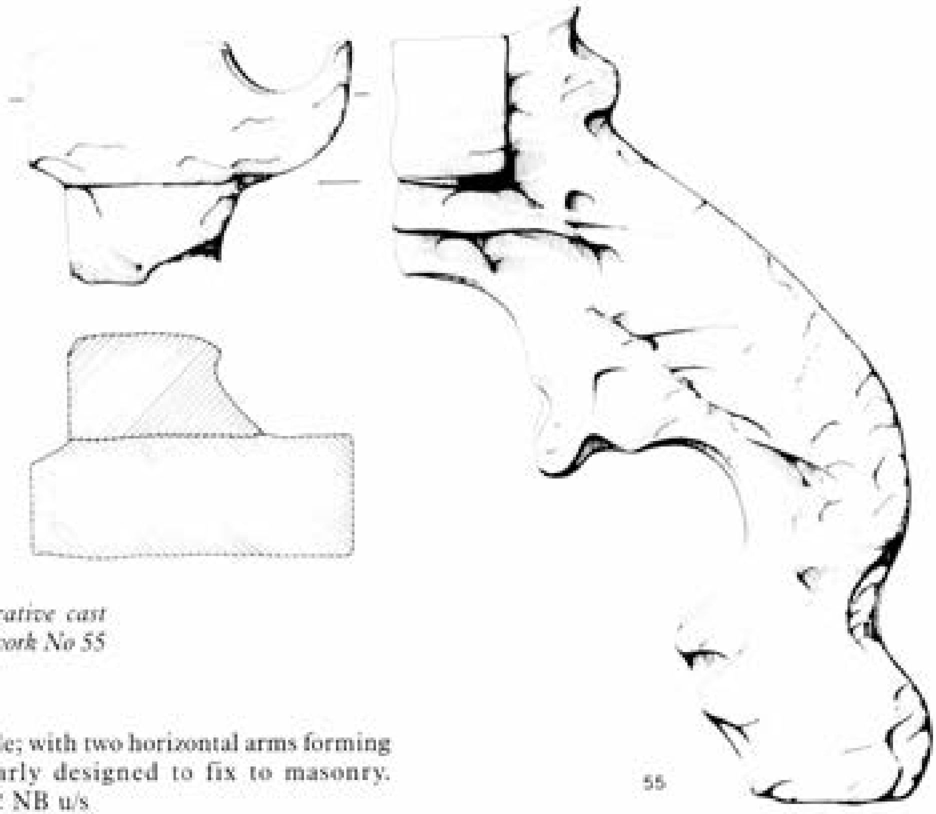


Figure 4.19: Decorative cast iron, structural metalwork No 55 (scale 1:2)

37 Drop hinge staple; with two horizontal arms forming a V-shape, clearly designed to fix to masonry. L 107 mm; 1972 NB u/s

38 ? Hinge gudgeon or ride. L 85 mm; 1972 NB u/s

Bolts and latches:

39 Latch rest. L 154 mm; 1982 G II (120) sf 646, Ph.4

40 Bolt, decorated with incised lines; the knob is decorated; there is a rectangular lug on the back of the bolt. L 135 mm; 1983 NB V (183) sf 993, Ph.5

Locks:

The small plate lock and cased locks (41, 43–44) are probably intended for use on chests or items of furniture rather than on doors (Egan 1998, 103–10). The small cased locks might be padlocks (cf. Egan, 1998, fig. 83), but it is unlikely given that they have clear nail holes for attachment at the corners.

41 Lock plate with complete mechanism. The almost square plate has nail holes in each corner. The lock bolt has two lugs on its lower edge and is retained by two staples. The key hole is clear and partially surrounded by the penannular ward. The key guard over the key hole has a small collar on its underside. The end of the key is held in this to allow it to pivot cleanly and operate the lock. There is no visible evidence for a slot into which a hasp would have fitted. The lock was intended for mounting on a cut-out on a door or more probably a chest, with the metal plate protecting the mechanism. L 98 mm; 1973 EB GP4 (657) Ph.5

42 Lock bolt with distinctive pair of lugs to engage with key. From a large lock. L 176 mm; 1983 CT IV (316) sf 1649, Ph.6

Cased locks:

43 (Plate 4.4) Cased lock. The square case has sloping sides but no flange around the edge. However, the X-ray shows at least 5 nail holes for securing the lock at or near the corners of the case. No keyhole is visible on the exterior but the lock mechanism is visible on X-ray plates and shows the bolt with a looped end, and the spring. L 76 mm x W 73 mm. 1979 NB ii (27) Ph.4a

44 (not illustrated) Cased lock, fragmentary. Four pieces forming a square lock case similar to the above. The square case has sloping sides and flange around the edge which is pierced with nail holes. There are large nail holes at the corners and smaller holes along the edges. No keyhole can be identified on the exterior but pieces of the lock mechanism including the bolt are visible on X-ray plates. L 95 mm x W 90 mm; 1979 NB ii (23) Ph.4b

Padlocks:

45 Padlock hasp, formed from rod of circular section, with a slight thickening at one end. L 145 mm; 1974 SBC (748) Ph.4a

46 Padlock with triangular case and broken hasp. L 85 mm; 1982 CT V (108) Ph.4

Table 4.33: Keys

Year	Area	Context	Phase	No	Identification
1963	C IV	545	5	1	Possible key fragment
1982	CT II	86	4	1	leverlock key
1982	CT V	98	5	1	key fragment
1982	CT V	98	5	1	key fragment
1982	CT V	114	4	1	leverlock key
1974	EBX	723	2b	1	key bit, fragmentary
1975	EBZ	u/s	u/s	1	leverlock key
1972	NB	u/s	u/s	1	leverlock key
1978	NB II	1	6	1	leverlock key
1982	NB II	250	5	1	handle, from key?
1976	NBX	868	5	1	leverlock key
1983	WB II	260	5	1	leverlock key

A number of keys were found during the excavations. Only a selection have been catalogued and illustrated. The majority come from late contexts of phases 4, 5 and even 6 (Table 4.33).

47 Lever lock key, large; horizontally cut bit. L 127 mm; 1963 A I (502) sf 107 Ph.5

48 Lever lock key with decorated stem; horizontally cut bit. L 123 mm; 1972 NB u/s

49 (not illustrated) Lever lock key bit fragment; vertically cut bit. L 50 mm; 1974 EBX (723) Ph 2b

50 Lever lock key, well made; vertically cut bit. Probably modern. L 85 mm; 1975 EBZ I u/s

51 Lever lock key, with bit missing. L 73 mm; 1983 CT IV (295) sf 1541, Ph.4

Other possible door fittings:

52 Door stud, with square, slightly domed head and long rectangular section shank. L 141 mm; 1973 EBX (668) Ph.3

53 Bolt or latch, comprising a square section bar thinned to a rounded cross-section at one end which passes through a diamond-shaped plate and is bent. L 121 mm; 1972 NB u/s

54 Catch or latch, comprising rectangular bar with an arched handle at one end and square lug near the other; there is an eye near the centre. L 255 mm; 1983 WB i (273) sf 1190, Ph.4

Plate 4.4: Cased lock, structural metalwork No 43, X-ray photograph (Ancient Monuments Laboratory)

Objects of uncertain function *(Figs 4.18–4.19)*

55 Cast iron object, with moulded arched decoration; there is a hook or pivot cast into the top of the object, which is broken at this point. There are no signs of fixings, which suggests that the original object was much larger. L 240 mm; 1973 WB (696) Ph.3

56 ?Securing pin of iron, consisting of stout rectangular plate pierced by a slot, and a tapering rod or tang extending from one end. L 143 mm; 1972 NB u/s

57 Cranked tanged iron object of uncertain function. Could be a fitting or part of a tool. L 153 mm; 1973 EBX (666) Ph.3

Chapter 4 Endnotes

1. National Library of Scotland, MS. 2830, hereafter *Accounts*; also PRO, E101/481/30. See above Chapter 2, endnote 21.
2. *Accounts*, ff. 63, 157.
3. *Accounts*, f. 25.
4. *Accounts*, ff. 89, 137.
5. *Accounts*, ff. 62v, 117v, 148, 156v; PRO, E101/481/30, f. 1.
6. *Accounts*, ff. 12, 25, 44v, 62v.
7. *Accounts*, ff. 90v, 147v; PRO, E101/481/30, f. 1.
8. *Accounts*, f. 118.
9. *Accounts*, f. 156v.
10. In the 9th pay, 200 'bordes of waynscott' were purchased: *Accounts*, f. 138.
11. *Accounts*, ff. 63, 115v.
12. *Accounts*, ff. 34, 39v, 44-44v, 45v.
13. *Accounts*, f. 12.

Chapter 5: The Military Artefacts and Horse Gear

by Ian Scott

INTRODUCTION

This chapter catalogues and discusses the excellent selection of military equipment recovered from the Camber Castle excavations. Comparisons are made with the good series of surviving surveys of the ordnance stores (see Tables 2.5, 2.6 and 2.7) researched by Martin Biddle. The majority of the finds are datable typologically to the 16th and 17th centuries, but there were also pieces of medieval sword handle and a number of 20th-century objects, which are briefly considered at the end of the chapter. The horse gear is also included in this chapter. Excluding nails, the military artefacts represent almost 15% by number of the metalwork assemblage from the site, and the horse gear represents slightly over 3%.

The courtyards and the North Bastion produced the largest number of metal objects. The latter was filled in the late 16th or early 17th century to create a gun platform (phase IVb) and most of the material from its fills can therefore be dated with confidence to the 16th century. However, it must be noted that there are objects of 20th-century date from the North Bastion. They are few in number and is probable that they represent either disturbance by rabbit burrowing, which was clearly evident on site, or objects dropped into the casemates through the smoke vent openings on the top of the walls. The South Bastion was also filled at this date, but has not been excavated. Material from the courtyards, with the exception of that associated with the filling of the North and South Bastions and the creation of the Rampire, dates from the period after the castle had ceased to be maintained as an active fortification (phases V and VI). It is probable that much of the material deposited within the castle was actually redeposited from outside the castle and includes rubbish of an earlier date. The evidence of the pottery (see Chapter 6 for a fuller discussion) gives the clearest indication that there has been considerable movement of bulk material with redeposition within the castle. In some cases early 16th-century pottery was found in quantity in late deposits. The bulk fills within the N Bastion, which contain pottery of the first half of the 16th century, are particularly good examples. The pottery presumably discarded earlier was brought into the bastion with the bulk fills used to turn the N Bastion into a dead mount in the late 16th or early 17th century.

Although the bulk of the military finds come from the fills of the North Bastion and the courtyards, it is notable that the cannon balls were recovered mainly from the North Bastion and the Keep, while the largest group of arrowheads was found in deposits associated with the creation of the Rampire in the SE Courtyard (phase IVb). Arrowheads were also found in the Keep. The presence of cannon balls in the Keep is perhaps due to the fact that a store was maintained there (see Table 2.5) and this could also explain the presence of the arrowheads. The concentration of arrowheads in layers associated with the creation of the Rampire suggests that they were being discarded, or had already been disposed of and were redeposited. The date of the deposit fits with what is known of the chronology of bows and arrows at Camber Castle from documentary sources (see Chapter 2, above, and Chapter 9, below). There are two military finds from the deposits outside the E Bastion (EBX), a halberd head (145) and a pikehead (151). Finally, mention should be made of the spur (No.187) and two stirrup irons (Nos 174, 175) found in a pit (383) in the Entrance Bastion. The spur was wedged inside one of the stirrup irons. The pit is late in date and appears to have been used for melting lead, presumably during salvage work.

The recovery strategies for the metalwork have not been explicitly stated in all cases. Nonetheless, it seems clear from the quantities of material in the archive that all metal objects found on site in hand excavation were retained. As part of the analytical process, all the metal finds were recorded. Groups of functionally related finds were identified and individual items selected for illustration. In the following report, functionally related items are described together and the individual objects are briefly catalogued and the majority illustrated. Cannon ball dimensions are catalogued in inches (Diameter) as well as millimetres (D) to allow easier cross-referencing to gun bore sizes and to 16th- and 17th-century usage; weights of cannon balls are given in pounds and ounces for the same reason. All catalogue entries are followed by a note of the year of excavation, trench or area code, context number, small finds number and phase. All objects are of iron unless otherwise specified.

16TH- AND 17TH-CENTURY MILITARY ARTEFACTS

The Artillery (Figs 5.1–5.2)

The artillery establishment of the castle is discussed in Chapter 2 above. Table 2.5 summarises what is known of stores at Camber Castle, from surveys carried out in 1568, 1613, 1615 and 1623. Reference will be made to this list, and to the surveys of ordnance (Tables 2.6, 2.7 and 2.8) both in this catalogue and discussion that follows in Chapter 9 below. The archaeological evidence for the ordnance comprises cannon balls and the breech chamber from a breechloading swivel gun, and indicates the range of guns that were in use (see Fig. 5.1).

The breech chamber (No. 1) is wrought iron and has a bore of 33 mm (1.29 inches). It belonged to a small bore breechloading swivel gun, probably a 'single base' or possibly a 'double base'. The chamber has a tapering neck (Smith 1988, 12 and fig. 12). The precise form of the breechloader cannot be determined from the surviving chamber, but it is likely to be from a base, rather than a

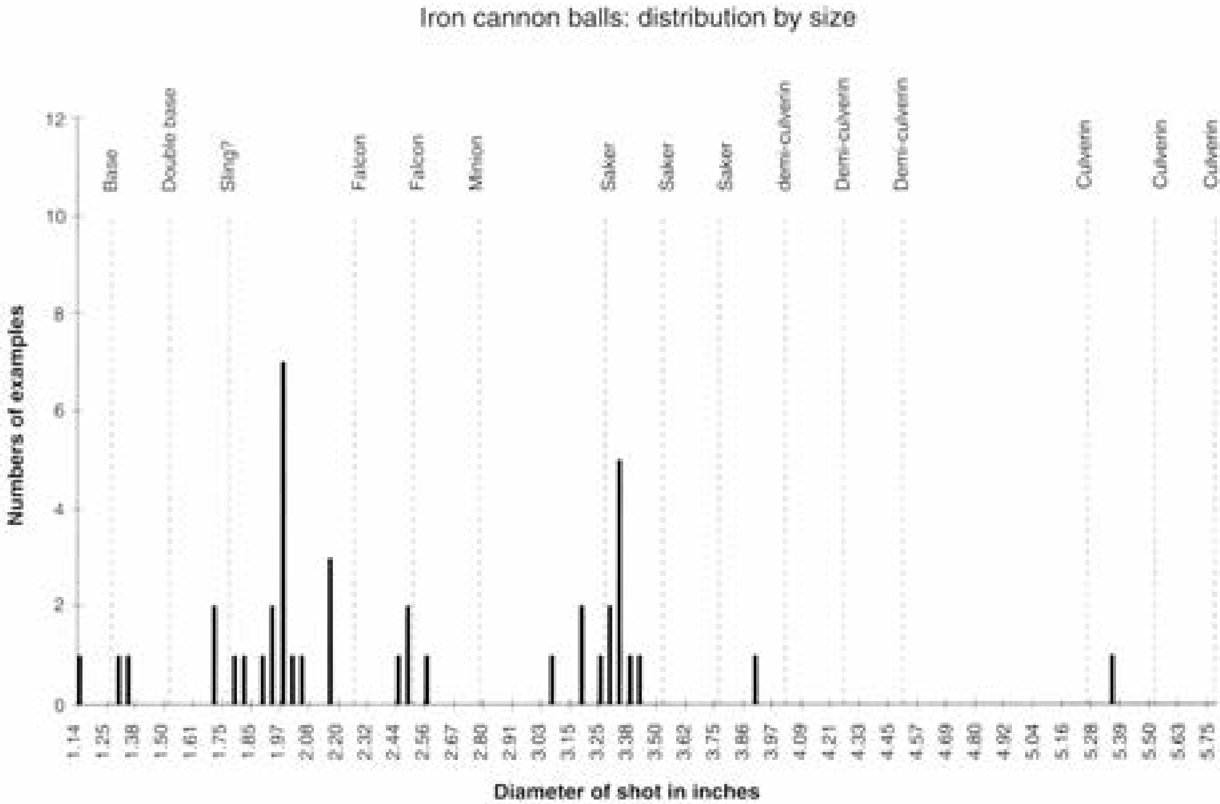


Figure 5.1: Iron cannon balls: distribution by size

sling, as defined by Smith (1995, 106–7 and figs 4–6). The bore of the barrel is likely to have been slightly greater than the bore of the chamber. Cannon balls of a suitable bore (Nos. 39–41) were recovered from the site. Norton, describing a swivel gun, wrote that it 'stands upon a forked Prop or Pintle upon the ends of which the Trunnions resteth ...' (1628, 58) and the arrangement is well illustrated by a diagram in Pietro Sardi's *L'Artiglieria* of 1621 (see Smith 1995, fig. 8). The swivel, or pintle, comprised the yoke which held the trunnions, with the swivel peg beneath. The latter was dropped into a suitable socket perhaps on the parapet or in small gunports. Breechloaders with their small bore would have been appropriate for the task of covering the dead ground at the foot of the curtain wall and forward of the bastions. Each breechloader was supplied generally with two chambers; the 1547 survey of the King's artillery fortifications lists six 'Slings of yrone wt ij chambers a pece' and six 'Doble bassis wt xj chambers' at Camber Castle (Kenyon 1982, 175). It is unlikely that the use of two chambers was intended to speed up the rate of fire, since rates of fire were necessarily slow, because all guns required time to cool between shots to prevent bursting. While it was physically possible to load and fire a gun at a rate of about two shots a minute, a rate of fire of 8 shots per hour was quite usual for larger cast bronze guns, the pieces of battery, when firing for extended periods (W.T. 1672, 84-5) and much slower rates were required for wrought iron guns which were particularly prone to heat stress. It is more probable that two chambers were provided for safety reasons.

The serpentine powder used was a dry milled powder, which required careful loading. If it was too tightly packed it would not burn properly (Hall 1997, 81). For this reason the chamber was only partially filled with powder and the powder was not rammed, but instead a wooden plug was inserted to seal the chamber. The shot was inserted into the breech end of the barrel, and the loaded and plugged chamber was dropped into place and secured by a wedge of iron prior to firing. The second chamber in the meantime could be loaded with powder. Serpentine powder was not only less efficient than corned powder for larger guns, it was also more dangerous to use because it was fine and liable to create clouds of dust when handled. These clouds would readily ignite. It is likely, therefore, that the chambers were loaded at a safe distance from the guns with their lighted match and linstocks, and that more than one chamber was provided to allow time for cooling between shots (Guilmartin 1988, 46).

Although corned powder had been available for some time, according to Hall (1997, 102) the English persisted with serpentine powder until the time of the Armada. The 1547 survey of the King's fortifications (Kenyon 1982) bears this out, for although corned powder is listed, it is generally present in very small quantities compared with serpentine powder. The 1547 survey lists two lasts (4800 lbs) of serpentine powder at Camber (Kenyon 1982, 175), and the 1568 ordnance stores list includes several barrels of serpentine powder (Table 2.5). No corned powder is listed at Camber Castle in 1547 or 1568, but in the 1613 and later lists only corned powder is shown.

The iron cannon balls range in diameter from 136 mm (5.35 in) to 29 mm (1.14 in). The majority are 87 mm (3.43 in) in diameter or smaller. There is a distinct clustering by diameter and it is possible to establish the bores of the guns for which the groups of shot were intended (Fig. 5.1). Cannon balls were of necessity of smaller diameter than the bore of the guns from which they were fired. The difference, the 'windage', was the result of the inadequacies of the manufacturing techniques employed. James Turner in his *Pallas Armata*, written in 1670–1 (1683, 192), states that 'it was long a general rule to make all Bullets for Ordnance one fourth part of an inch lower in its Diameter, than the bore of the Piece'. This is confirmed by the ordnance listed by William Harrison and William Bourne, both dated 1587, by John Sheriffe dated *c* 1590, and Robert Norton 1628 (Blackmore 1976, 392–4). Turner says that this has been condemned by gunners as being too great an allowance for smaller pieces, and too little for cannons and culverins, and suggests that 'the twentieth part of the Diameter of the bore of all Pieces is a reasonable abatement'. *The Compleat Gunner* (W.T. 1672, 3–4 and 40) allows between ¼ in and ½ in for windage for all but the smallest pieces. For the larger pieces of ordnance a measurement of between ¼ in and ½ in offers a good working figure for windage and has been used when relating the size of shot to guns in the catalogue which follows. By the mid 16th century good quality cast iron cannon that could bear comparison with cast bronze cannon, and were cheaper to manufacture, were in regular production and use. Casting brought a greater degree of uniformity in size and bore.

Some degree of standardisation of the calibres and names of guns took root in the second half of the 16th century. Before the middle of the century various names were applied to guns. However, although there was an accepted terminology for the different calibre guns, there was still a degree of variation within the framework. In part this was due to the continued use of older guns. For example William Bourne in 1587 listed 'old demi-culverins', 'ordinary demi-culverins' and 'small demi-culverins' and Robert Ward in 1639 'old demi-cannon' and 'ordinary demi-cannon' (Blackmore 1976, 393, 395). However, when the various lists are compared a pattern emerges that shows that the key variable in defining the various pieces of ordnance was the weight of shot rather than the bore of the gun (Table 5.1).

The two largest iron cannon balls (Nos 2 and 3) are 136 mm (5.35 in) and 99 mm (3.89 in) in diameter and weigh 19 lb and 7 lb respectively. They can be ascribed to guns of 5¼ inch ('culverin') and 4¼ or 4½ inch ('demi-culverin') bore respectively. There are eight cannon balls (Nos. 4–11) that range in size from 83 mm (3.26 in) to 87 mm (3.4 in) diameter and in weight between 5 lb 5 oz and 5 lb 15 oz. These are suitable for 'sakers' of 3½ inch to 3¾ inch bore. Two balls measuring 81 mm (3.2 in) in diameter (Nos. 12–13) and another measuring 79 mm (3.1 in) (No. 14) were possibly for minions of 3 inch to 3¼ inch bore. Although they could be have been used in the smallest sakers, at between 4 lb 1 oz and 4 lb 7 oz they are a little light and more suitable for 'minions'. The five balls (Nos 15–19) that range in size from 64.5 mm (2.54 in) to 62 mm (2.44 in), and in weight between 1 lb 12½ oz and 2 lb 1 oz, were for 'faucons' (falcons) of 2¾ inch bore. Culverins, demi-culverins, sakers, minions and falcons are all attested at Camber in the 16th and 17th centuries (Tables 2.6 and 2.7).

The remaining small shot can be divided into four groups: three balls (Nos 20–22) of 55 mm (2.16 in) diameter and 1 lb 2 oz to 1 lb 6 oz in weight; twelve balls (Nos 23–34) ranging from 52 mm (2.04 in) to 48 mm (1.9 in) in diameter and 14 oz to 1 lb ¼ oz in weight; four balls (Nos 35–38) of 46 mm (1.8 in) to 43 mm (1.7 in) diameter and 7 oz to 10 oz weight; and finally, three balls (Nos 39–41) of 34 mm (1.34 in) to 29 mm (1.14 in) diameter and 1¾ oz to 2½ oz weight. Three types of small breechloader -'single bases', 'double bases' and 'slings' - are attested at Camber. The smallest shot (1.14 in to 1.34 in) were probably for the 'basys' or 'single base', which Norton (1628) and *The Compleat Gunner* (W.T. 1672, 4) record as having a bore of *c* 1¼ inches (32 mm).

Table 5.1: 16th- and 17th-century gun calibres and shot weights - a composite list

Name	Bore	Shot diameter	Shot weight	Sources
Cannon royal or Cannon of 8	8 ¼ - 8 inch	8 – 7 ¾ inch	60 - 64 lb	1, 2, 3, 4, 5, 6, 7
Cannon of 7	7 inch	6 ¾ inch	39 - 42 lb	2, 6
Demi-cannon	6 ½ - 6 ¼ inch	6 ¼ - 6 inch	30 - 33 lb	1, 2, 3, 4, 5, 6, 7
Culverin	6 – 5 ¼ inch	5 ¾ - 5 inch	17- 19 lb	1, 2, 3, 4, 5, 6, 7
Demi-culverin	4 ½ - 4 inch	4 ¼ - 3 ¾ inch	9 lb	1, 2, 3, 4, 5, 6, 7
Saker	4 – 3 ½ inch	3 ¾ - 3 ¼ inch	5 - 6 lb	1, 2, 3, 4, 5, 6, 7
Minion	3 ¼ inch	3 inch	3.25 – 4.5 lb	1, 2, 3, 4, 5, 6, 7
Falcon	2 ¾ - 2 ½ inch	2 ½ - 2 ¼ inch	1.75 – 2.5 lb	1, 2, 3, 4, 5, 6, 7
Falconet	2 ¼ - 2 inch	2 – 1 ¾ inch	1.14 - 2 lb	1, 2, 3, 4, 5, 6, 7
Robinet	1 ½ - 1 inch	1 ¼ - ¾ inch	0.5 - 1 lb	2, 4, 6, 7
Base	1 ¼ – 2 inch	1 inch	0.33 – 0.5 lb	6, 7, 8

Sources: 1) English MS commonplace book c 1580 (BL Sloane MS 2497, 38; 42); 2) William Harrison 1587; 3) William Bourne 1587; 4) John Sheriffe c 1580 5) John Smith 1626; 6) Robert Norton 1628; 7) Robert Ward 1639 (see Blackmore 1976, 392–5); 8) see Smith 1995, 107.

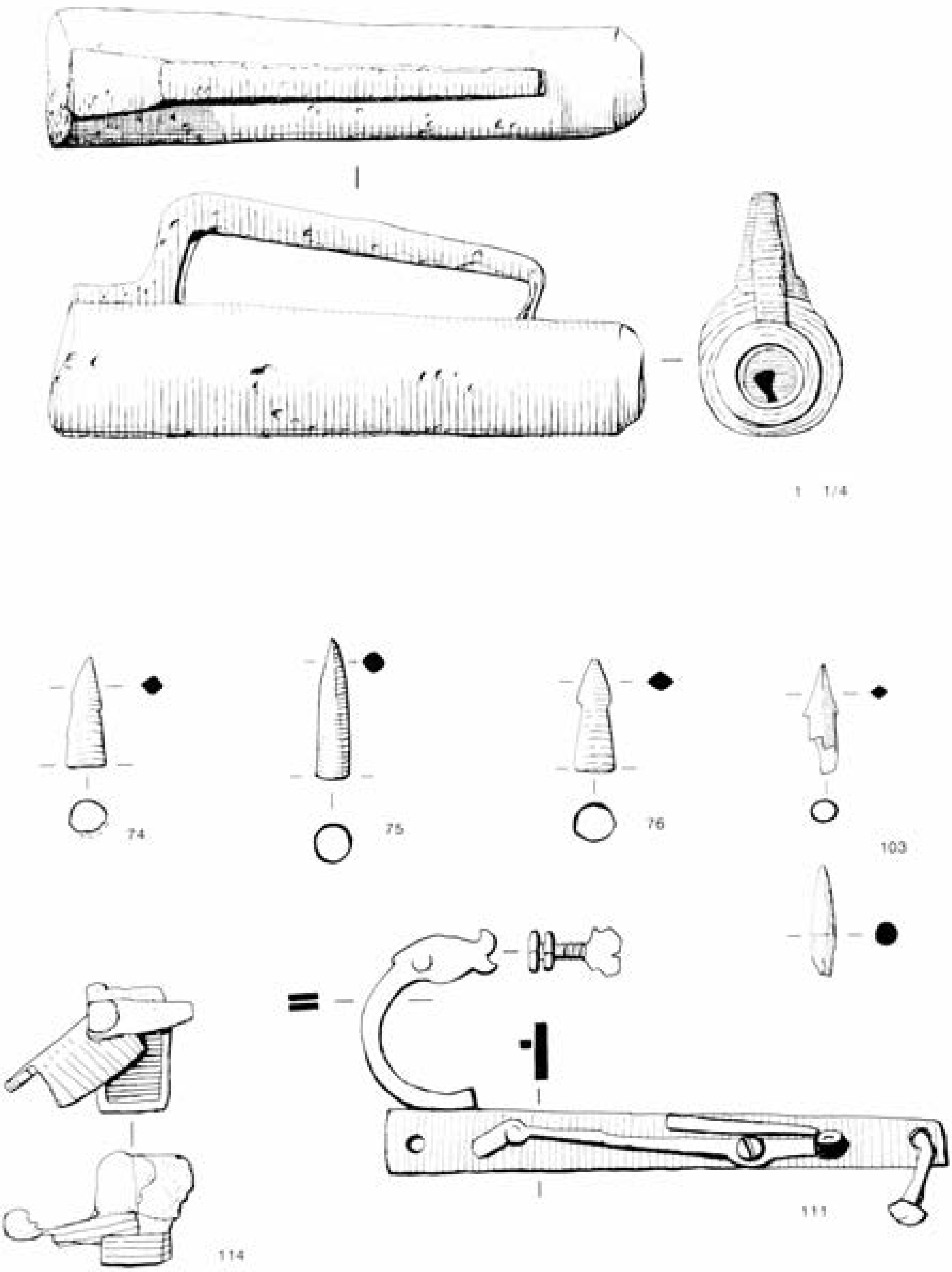


Figure 5.2: Military artefacts Nos 1–114 (scale 1:2, except 1, scale 1:4)

However, there seems to have been some variation in the bores of bases (Blackmore 1976, 218–9), and the Camber bases may have had bores of 1½ in. The next size shot (1.7 in to 1.8 in) are probably for 'double bases', which probably had bore of 1¾ (44 mm) to 2 inches (51 mm). Smith has shown that bases could range in bore from ½ in to 2 in. Bases were generally long pieces of between 21 and 30 calibres in length (Smith 1995, 107). The third form of breechloader at Camber was the sling. Slings were generally of larger bore than bases, but only 12 to 15 calibres long (*loc. cit.*) The evidence of the shot from Camber suggests that the slings were perhaps of 2¼ in (57 mm) bore. The three largest small shot, which measure 55 mm diameter, may have been for firing from slings, but their greater weight suggests that they would have been suitable for firing from 'fauconets' (falconets), which also had 2¼ in (57 mm) bores and fired 1 lb 5 oz shot. However, no falconets are attested at Camber.

As a footnote to the discussion of iron cannon balls, two stamped balls should be noted: a saker ball (No. 9) stamped 'IC', and a falcon ball (No. 15) stamped with 'H'. The latter may be stamped for Henry VIII, although HR might be expected as on the Mary Rose cannon balls. Similarly 'IC' may be for 'Iacobvs', that is James I and VI. However, it is perhaps more probable that the stamps record makers. There are three other objects of interest. The first is a dense square wrought iron block with rounded corners (No. 42), which may have been a square shot or an iron cube from a composite iron and lead shot. It was much heavier for its size than the equivalent round shot. Composite shot were cast by pouring lead into a mould around an iron cube (Simmons 1988, 33). The second object is a small cannon ball (No. 43) of lead crudely formed over a pebble. A similar musket ball (128) was found. Composite shot, both lead over iron and lead over stone, were used in the 16th century (Guilmartin 1988, 41 and note 14). The third object is what appears to be a shell or granado fragment (No. 44) of cast iron. This may be later in date.

There are far fewer stone cannon balls, but it is clear that they are generally of a larger size than the iron balls and fall into two groups. The largest stone balls are 195 mm and 192 mm (7.7 in and 7.6 in) in diameter and weigh *c* 23 lb (10.4 kg) (Nos 45–49) The smaller balls (Nos 52–56) range from 127 mm (5 in) to 115 mm (4.5 in) in diameter. They weigh between 4 lb 2 oz and 4 lb 10 oz. The stone shot are all made from a similar green stone, but the smaller balls (120 mm diameter and less) have been shaped simply by hammering, and although well formed are not so well finished as the bigger balls which have been finished by pecking. It is worth noting that in 1615 the 'olde store in the keep' included 42 stone cannon balls of 7½ inch diameter and that in the latter part of the 16th century a brass 'cannon perrier', that is a large calibre stone-throwing gun, is recorded as part of the establishment (Table 2.6). Stone-throwing guns ('perriers') differed from other guns in using a lighter charge of powder. Six 'portpieces' (breechloading guns firing stone balls) are recorded as part of the ordnance establishment in 1547 and 1568. The smaller stone cannon balls confirm that the portpieces were of 5 in bore or perhaps slightly larger. They were almost certainly wrought iron pieces fixed to a wooden bed (Smith 1993). Both sizes of stone ball could have been fired from ordinary guns, the larger shot from an 8 in 'cannon royal', or 'cannon of eight', and the smaller from culverins, provided that a smaller charge was used to prevent the break-up of the shot.

The two birch buckets or barrels (No. 57) are unprovenanced. The presence of a handle on bucket 1 suggests that they are buckets rather than barrels. However, it should be noted that the surviving handle is fitted inside the body of the bucket and could therefore have been folded away to allow the bucket to be covered by a wooden lid, which would have been necessary for a powder barrel. However, iron nails were used to construct the buckets, and it therefore seems unlikely that they were used to carry powder. Brass or similar alloys were preferred to iron for powder-handling equipment, to minimise the potential for accidents since, unlike iron, they do not strike sparks. Ready powder for guns was held in budge barrels, which were closed at the top with a leather sleeve with a drawstring. 'Boudge' barrels are listed in the ordnance stores at Camber in 1613 and 1623 (Table 2.5). The buckets or barrels are rather small, and certainly would not have held sufficient powder for charging the larger cannon, although they could have provided sufficient powder for musketeers and other hand gunners to replenish their charges.

An alternative use for the buckets would be for water for the guns, but the method of construction suggests that they were not built to be watertight, and there is no evidence for pitch or other sealants. They also seem rather too small. Every gun would have required water for wet mopping during firing, and for cleaning after firing. Wet mopping served two purposes: firstly, it dowsed down any burning wadding remaining in the barrel to prevent premature ignition of subsequent charges, and secondly it helped to dissolve burnt powder and thus inhibit fouling of the gun through the build up of powder residues. The gun was then dry mopped to remove excess water before the next charge was loaded. Cleaning involved using water in conjunction with a scourer and worm to remove powder residues.

Breech chamber (Fig. 5.2)

1 Breech chamber from a breechloading swivel gun, possibly a base or double base. This comprises a heavy tapering wrought iron tube blocked at the wider end and with a tapered mouth or neck at the other; attached to the top is a handle. The quite large sub-rectangular touch hole is to the left of the handle looking forward and is positioned up against the base of the handle. L 380 mm; D 98 mm; bore 33 mm; 1979 NB ii (23) Ph.4b

Iron cannon balls (not illustrated)

2 Culverin ball, well preserved, with clear casting line around circumference. Diameter 5.35 inches, weight 19 lb (8.6 kg). D 136 mm; 1975 Keep Q II (840) Ph.3

3 Demi-culverin ball, with laminating surface. Diameter 3.9 inches, weight 7 lb (3.2 kg). D 99 mm; 1978 NB i (2) sf 5, Ph.4b

4 Saker ball, badly encrusted with corrosion products. Diameter 3.43 inches, weight 6 lb 4 oz (2.83 kg). D 87 mm; 1982 NBX (145) sf 849, Ph.4

5 Saker ball, well preserved. Diameter 3.38 inches, weight 5 lb 15 oz (2.7 kg). D 86 mm; 1972 NB u/s

6 Saker ball, well preserved. Diameter 3.35 inches, weight 5 lb 12 oz (2.6 kg). D 85 mm; 1978 NB i (2) sf 9, Ph.4b

7 Saker ball, well preserved, with slight casting flaws and clear traces of casting line around circumference. Diameter 3.35 inches, weight 5 lb 14 oz (2.66 kg). D 85 mm; 1973 EBA (600) sf 21, Ph.5

8 Saker ball, well preserved, with clear traces of casting line around circumference. Diameter 3.35 inches, weight 5 lb 13 oz (2.64 kg). D 85 mm; 1973 EBY u/s sf 26

9 Saker ball, well preserved, with clear casting scar and line around circumference; possible stamp ?'IC'. Diameter 3.31 inches, weight 5 lb 13¼ oz (2.67 kg). D 84 mm; 1975 Keep Q II (840), Ph.3

10 Saker ball, well preserved, with clear trace of casting line around circumference. Diameter 3.31 inches, weight 5 lb 5 oz (2.41 kg). D 84 mm; 1978 NB i (2) sf 8, Ph.4b

11 Saker ball, with surface concretion. Diameter 3.26 inches, weight 5 lb 8 oz (2.49 kg). D 83 mm; 1978 NB i (2) sf 7, Ph.4b

12 Minion ball, with one flattened face, probably a casting flaw; clear traces of casting line around circumference. Diameter 3.19 inches, weight 4 lb 1 oz (1.85 kg). D 81 mm; 1963 C VIB cellar (553), Ph.6

13 Minion ball, quite well preserved. Diameter 3.19 inches, weight 4 lb 7 oz (2.01 kg). D 81 mm; 1979 CT I (20) sf 17, Ph.4b

14 Minion ball, well preserved, with clear casting line around circumference; some surface concretion. Diameter 3.07 inches, weight 4 lb 3 oz (1.9 kg). D 78 mm; 1979 CT I (17) sf 30, Ph.4b

15 Falcon ball, well preserved, with clear casting scar, and stamped 'H'. Diameter 2.54 inches, weight 2 lb 1 oz (936 g). D 64.5 mm; 1972 NB u/s

16 Falcon ball, well preserved. Diameter 2.52 inches, weight 1 lb 15¾ oz (900 g). D 64 mm; 1979 CT II (36), Ph.4a

17 Falcon ball, clear casting line. Diameter 2.48 inches, weight 1 lb 15½ oz (890 g). D 63 mm; 1979 CT I (17) sf 29, Ph.4b

18 Falcon ball, well preserved; slight trace of casting line. Diameter 2.48 inches, weight 1 lb 12½ oz (808 g). D 63 mm; 1978 NB i (2) sf 6, Ph.4b

19 Falcon ball, well preserved with slight mould line around circumference and marked casting scar. Diameter 2.44 inches, weight 1 lb 14 oz (850 g). D 62 mm; 1963 A I (502) sf 6, Ph.5

20 Sling ball, well preserved, some surface concretion. Diameter 2.16 inches, weight 1 lb 6 oz (625 g). D 55 mm; 1975 Keep Q IV (846) sf 48e, Ph.6

21 Sling ball, well preserved, with casting scar and casting line around circumference. Diameter 2.16 inches, weight 1 lb 2 oz (510 g). D 55 mm; 1975 Keep Q IV (846) sf 48, Ph.6

22 Sling ball, well preserved, with clear casting line around circumference; some surface concretion. Diameter 2.16 inches, weight 1 lb 4 oz (567 g). D 55 mm; 1975 Keep Q IV (846) sf 48a, Ph.6

23 Sling ball, encrusted with corrosion products. Diameter 2.04 inches, weight 1 lb (454 g). D 52 mm; 1983 WB ii (280) sf 1404, Ph.4

24 Sling ball, slight casting scar. Diameter 2.01 inches, weight 1 lb (454 g). D 51 mm; 1983 GIV (228) sf 988, Ph.4

25 Sling ball, well preserved with one flat face, probably a casting flaw; has mould line around circumference. Diameter 1.97 inches, weight 14 oz (397 g). D 50 mm; 1963 CVI cellar (553), Ph.6

26 Sling ball, well preserved with slight mould line around circumference. Diameter 1.97 inches, weight 14¾ oz (420 g). D 50 mm; 1963 u/s

27 Sling ball, well preserved with slight trace of moulding line around circumference and clear casting scar. Diameter 1.97 inches, weight 15 oz (425 g). D 50 mm; 1975 Keep Q I (838) sf 87, Ph.5

28 Sling ball, well preserved, with some surface concretion. Diameter 1.97 inches, weight 1 lb (454 g). D 50 mm; 1975 Keep Q IV (846) sf 48c, Ph.6

29 Sling ball, well preserved, with some surface concretion. Diameter 1.97 inches, weight 1 lb ¾ oz (475 g). D 50 mm; 1975 Keep Q IV (844) sf 45, Ph.6

30 Sling ball, well preserved, with clear casting line around circumference; some surface concretion. Diameter 1.97 inches, weight 15½ oz (440 g). D 50 mm; 1975 Keep (848) sf 39, Ph.6

31 Sling ball, well preserved. Diameter 1.97 inches, weight 14½ oz (410 g). D 50 mm; 1972 NB u/s

32 Sling ball, slight lamination, but trace of moulding line is visible as is casting scar. Diameter 1.93 inches, weight 14 oz (397 g). D 49 mm; 1975 Keep Q IV (846) sf 48, Ph.6

33 Sling ball, well preserved. Diameter 1.93 inches, weight 15 oz (425 g). D 49 mm; 1979 CT I (17) sf 26, Ph.4b

34 Sling ball, well preserved. Diameter 1.9 inches, weight 14½ oz (410 g). D 48 mm; 1972 NB u/s

35 Double base ball, reduced by corrosion, slightly irregular. Diameter 1.81 inches, weight 9½ oz (270 g). D 46 mm; 1975 Keep Q IV (846) sf 48f, Ph.6

36 Double base ball, much surface degradation, reduced in size? Diameter 1.77 inches, weight 10 oz (283 g). D 45 mm; 1972 NB u/s

37 Double base ball, badly corroded and reduced in size. Diameter 1.7 inches, weight n/a. D 43 mm; 1983 GIV (268) sf 1331, Ph.4

38 Double base ball, badly corroded with laminated surface, only part of surface extant, reduced in size. Diameter 1.7 inches, weight 7 oz (200 g). D 43 mm; NB iii (127) sf 826, Ph.5

39 Single base ball, well preserved with casting line around circumference and slight casting flaw; Diameter 1.34 inches, weight 2½ oz (71 g). D 34 mm; 1973 WB u/s

40 Single base ball, well preserved, with casting scar and casting line around circumference. Diameter 1.3 inches, weight 2½ oz (71 g). D 33 mm; 1975 Keep Q IV (846) Ph.6

41 Single base or musket ball, surface corroded. Diameter 1.14 inches, weight 1¾ oz (50 g). D 29 mm; 1975 Keep Q IV (846) Ph.6

Possible cannon projectiles (not illustrated)

42 Possible cannon ball, irregular iron square with flattened corners; D 35 mm; 1975 Keep QIV (846) Ph.6
43 Single or double base ball, formed from lead and a pebble. The lead has been crudely worked over the pebble leaving portions of the stone uncovered; Diameter 1.46 inches, weight 6 oz (172 g). D 37 mm; 1976 NBX (882) sf 75, Ph.4
44 Possible shell fragment, of thick cast iron. L 50 mm; 1975 NEX (861) Ph.6

Stone cannon balls (not illustrated)

45 Cannon ball, complete. Diameter 7.68 inches, weight 23 lb (10.43 kg). D 195 mm; 1975 Keep clearance
46 Cannon ball, 2 fragments. Diameter 7.6 inches, weight n/a. D 193 mm; 1975 Keep Q IV (846) Ph.6
47 Cannon ball, half only. Diameter 7.6 inches, weight n/a. D 193 mm; 1983 G II (268) Ph.4
48 Cannon ball, ¾ only. Diameter 7.6 inches, weight 18+ lb (8.16+ kg). D 193 mm; 1983 CT IV (332) sf 1560, Ph.5
49 Cannon ball, half only. Diameter 7.6 inches, weight n/a. D 192 mm; 1982 G I (41) sf 899, Ph.5
50 Cannon ball, complete. Diameter 7.24 inches, weight 18 lb (8.16 kg). D 184 mm; 1975 Keep clearance
51 Cannon ball, less than half, incomplete diameter. Diameter 7.16+ inches, weight n/a. D 182+ mm; 1973 EB GP 4 (654) Ph.5
52 Cannon ball, whole ball, in fragments. Diameter 5 inches, weight 4 lb 2+ oz (1.87+ kg). D 127 mm; 1979 CT I (21) Ph.4b
53 Cannon ball, well shaped, roughly finished, half only. Diameter 4.72 inches, weight n/a. D 120 mm; Keep clearance
54 Cannon ball, well shaped, roughly finished, half only. Diameter 4.68 inches, weight n/a. D 119 mm; Keep clearance
55 Cannon ball, well shaped, roughly finished. Diameter 4.53 inches, weight 4 lb 10 oz (2.1 kg). D 115 mm; Keep Q II (1309) sf 4, Ph.4 or 5
56 Cannon ball, less than half, incomplete diameter. Diameter 4.5+ inches, weight n/a. D 115+ mm; 1982 CT II (79) sf 887, Ph.5

Birch bark buckets (Plate 5.1)

57 Buckets, or barrels. Two small buckets, or barrels, made from wooden sheet complete with bark. The wood is birch. Both buckets are encrusted with salts. One example (Bucket 1) is almost complete, but its body is distorted. Most of its handle, which is made from a thin strip of wood, survives and is attached by means of clenched nails. The handle is attached to the inside of the body of the vessel, not outside. The body of the bucket was formed by rolling the sheet,

Plate 5.1: Birch bark buckets (M Dudley)

overlapping the ends, and fastening with clenched nails. The base is also formed from a thin wooden sheet cut to shape and size. This is held in place by means of nails hammered through the body into the edge of the base. The second example (Bucket *2*) is less complete and lacks its handle. The base survives but is detached. Again it appears that the bottom was held in place by means of nails hammered through the sides into the edge of the base. The body of the bucket is formed in same way as Bucket 1 but has kept its shape better. However, it may be truncated since it is not as tall as Bucket 1. Bucket *2* appears to be built of thicker wood than Bucket 1. Bucket 1 - H *c* 260 mm, D *c* 230 mm; Bucket *2* - H 188 mm, D *c* 250 mm; Provenance unknown

Distribution

Cannon balls were found in a number of locations but two structures produced the most examples, the Keep and the N Bastion. Thirteen iron and six stone cannon balls were found in the Keep in phase V and later contexts. The iron balls ranged in size from 29 mm (1.14 in) to 136 mm (5.35 in) in diameter, the stone balls from 115 mm (4.5 in) to 195 mm (7.7 in). Ten iron cannon balls, ranging in size from 99 mm (3.89 in) to 45 mm (1.77 in), were recovered from the N Bastion. Of these, five were well stratified and five were recovered from the 1972 clearance of the upper fills of the bastion. It can be argued that all the cannon balls from the N Bastion were deposited when it was filled to create a dead mount in the late 16th or early 17th century (phase IVb). The absence of smaller cannon balls for small bore breechloaders (bases, double base and slings) from the phase IVb assemblage in the N Bastion should be noted but is probably not significant, since the wrought iron breech chamber (No. 1) from a wrought iron breechloader came from these deposits.

The absence of any iron shot for larger calibres is perhaps noteworthy, although a note of caution should be added. A comparatively small number of shot were recovered in the excavations and it is not possible to be completely certain that they are representative of the shot used. In 1568 the store at Camber Castle comprised 429 shot for falcons and above, in 1623 420 shot and in 1623 526 shot. The 55 shot or possible shot, from the excavations include only 29 suitable for falcons and above. However, since no large iron shot have been found, it is possible to suggest that only stone shot were used for the larger calibre guns, which had been removed from the castle by the end of the 16th century at the latest. The two sizes of stone shot that were found must have been used for the cannon, specifically for the cannon perrier, and for the portpieces. The iron shot were used by the slings and probably by the bases, as well as the demi-culverins and sakers.

Archery and arrowheads *(Figure 5.2)*

The most numerous class of military find from the excavations at Camber is arrowheads. With the exception of one birding arrowhead with a crescentic blade (catalogued and discussed in Chapter 7), all the arrowheads are the short bodkin type. This is a late medieval-early post-medieval form with a small compact point designed to pierce armour (Jessop 1996, 197-9). The majority of the heads are well preserved although some are encrusted with corrosion products. Three of the 52 arrowheads catalogued are of uncertain identification and may be ferrules rather than arrowheads. Of the remaining 49, 42 were sufficiently complete to give both length and diameter measurements. They range in length from 26 mm to 49 mm, with the majority falling within the range 35 mm to 42 mm. The average length is 38.5 mm, the mean 37.5 mm. The sockets range in diameter from 11 to 14 mm. The majority (25) measure between 12 and 13 mm. The average diameter is 12.6 mm, the mean 12.5 mm.

Some sockets contain traces of mineralised wood. Thirty-one arrowheads were investigated and the wood identified by Jacqui Watson of the Ancient Monuments Laboratory. One arrowhead (103) has a small part of its shaft surviving. There is also a piece of a shaft with no attached head (107). In the majority of cases where identification was possible the wood is *Salix* sp. (willow) or *Populus* sp. (poplar); the only exception is No. 58 which is *Sorbus* sp. (whitebeam or mountain ash) or *Acer* sp. (maple). The shafts recovered from the *Mary Rose* are in a variety of woods: ash, beech, hazel and poplar, but the latter is most common.

One arrowhead had clear signs of brazing (No. 103), but most do not. The copper alloy is very probably a product of the manufacturing process rather than a deliberate coating. There are three tapering points (Nos 108-110) which may be ferrules rather than arrowheads; they are of similar dimensions to the arrowheads proper and have sockets of similar diameter.

The largest group of arrowheads (19 examples) comes from the courtyard adjacent to the South Bastion (1975 SBC: 74–91), and there are 10 from elsewhere in the courtyard (1983 CT II, CT III, CT IV, CT V and CT VI: Nos 64–73) and a number from the Keep (1975 Keep: Nos 58–63). The remaining arrowheads come variously from the galleries (Nos 92–95), the bastions and stirrup towers (Nos 96–103), and from external trenches (Nos 104–106)

Arrowheads (Fig. 5.2: Nos 74, 75, 76 and 103 are illustrated)

58 Arrowhead, socketed, short bodkin point; wood in socket probably *Sorbus* sp. (whitebeam or mountain ash) or *Acer* sp. (maple); pith present, maybe from young stem. L 38 mm; D 13 mm; 1975 Keep Q I (837) Ph.5

59 Arrowhead, socketed, small, short bodkin point; thin layer of wood on outside of socket not from hafting, not identifiable. L 37 mm; D 11 mm; 1975 Keep Q IV (845) Ph.6

60 Arrowhead, socketed, short bodkin point, socket incomplete; thin layer of wood on outside of socket not from hafting, not identifiable. L 40 mm; D - mm; 1975 Keep Q IV (845) Ph.6

61 Arrowhead, socketed, short bodkin point, socket incomplete; no mineralised wood inside socket, fragment outside, not from hafting, not identifiable. L 37 mm; 1975 Keep Q IV (846) Ph.6

62 Arrowhead, socketed, small short bodkin point; mineralised wood in socket from hafting identified as *Salix* sp. (willow) or *Populus* sp. (poplar) from mature timber and represents just over one year's growth. L 26 mm; D 12 mm; 1975 Keep Q IV (846) Ph.6

63 Arrowhead, socketed, short bodkin point, with mineralised section of shaft in socket from hafting identified as *Salix* sp. (willow) or *Populus* sp. (poplar) from mature timber. L 38 mm; D 11 mm; 1975 Keep Q IV (846) Ph.6

64 Arrowhead, socketed, short bodkin point. L 39 mm; D 14 mm; 1983 CT II (86) Ph.4

65 Arrowhead, socketed, short bodkin point, incomplete socket, mineralised wood too poorly preserved to identify. L 40 mm; 1983 CT III (282) sf 1463, Ph.5

66 Arrowhead, socketed, short bodkin point; mineralised wood in socket from hafting identified as *Salix* sp. (willow) or *Populus* sp. (poplar) from mature timber. L 33 mm; D 13 mm; 1983 CT III (282) sf 1463, Ph.5

67 Arrowhead, socketed, short bodkin point. L 49 mm; D 13 mm; 1983 CT III (286) Ph.5

68 Arrowhead, socketed, short bodkin point. L 45 mm; D 14 mm; 1983 CT IV (295) Ph.4

69 Arrowhead, socketed, short bodkin point. L 44 mm; D 14 mm; 1983 CT IV (295) Ph.4

70 Arrowhead, socketed, short bodkin point. L 35 mm; D 12 mm; 1983 CT IV (295) Ph.4

71 Arrowhead, socketed, short bodkin point. L 34 mm; D 13 mm; 1983 CT IV (295) Ph.4

72 Arrowhead, socketed, short bodkin point; mineralised wood in socket from hafting identified as *Salix* sp. (willow) or *Populus* sp. (poplar) from mature timber. L 35 mm; D 12 mm; CT V (108) sf 581, Ph.4

73 Arrowhead, socketed, short bodkin point. L 38 mm; D 14 mm; 1983 CT VI (187) Ph.5

74 Arrowhead, socketed, short bodkin point. L 36 mm; D 13 mm; 1975 SBC (835) Ph.4a

75 Arrowhead, socketed, short bodkin point. L 46 mm; D 12 mm; 1975 SBC (835) Ph.4a

76 Arrowhead, socketed, short bodkin point. L 38 mm; D 12 mm; 1975 SBC (835) Ph.4a

77 Arrowhead, socketed, short bodkin point. L 39 mm; D 11 mm; 1975 SBC (835) Ph.4a

78 Arrowhead, socketed, short bodkin point fragment. L 17 mm; 1975 SBC (835) Ph.4a

79 Arrowhead, socketed, short bodkin point. L 35 mm; D 12.5 mm; 1975 SBC (835) Ph.4a

80 Arrowhead, socketed, short bodkin point, no mineralised wood in socket. L 43 mm; D 12 mm; 1975 SBC (835) Ph.4a

81 Arrowhead, socketed, short bodkin point, no mineralised wood in socket. L 37 mm; D 12 mm; 1975 SBC (835) Ph.4a

82 Arrowhead, socketed, short bodkin point, no mineralised wood in socket. L 37 mm; D 12.5 mm; 1975 SBC (835) Ph.4a

83 Arrowhead, socketed, short bodkin point, no obvious mineralised wood in socket. L 38 mm; D 13 mm; 1975 SBC (835) Ph.4a

84 Arrowhead, socketed, short bodkin point, fragment of *Quercus* sp.(oak) charcoal in socket probably not from hafting? L 42 mm; D 12.5 mm; 1975 SBC (835) Ph.4a

85 Arrowhead, socketed, short bodkin point, slight traces of mineralised wood not from hafting, not identifiable. L 37 mm; D 12 mm; 1975 SBC (835) Ph.4a

86 Arrowhead, socketed, short bodkin point; mineralised wood in socket from hafting identified as *Salix* sp. (willow) or *Populus* sp. (poplar) from mature timber. L 40 mm; D 12.5 mm; 1975 SBC (835) Ph.4a

87 Arrowhead, socketed, short bodkin point, incomplete socket, no mineralised wood in socket. L 37 mm; 1975 SBC (835) Ph.4a

88 Arrowhead, socketed, short bodkin point, some traces of copper alloy corrosion, no mineralised wood in socket. L 38 mm; D 12 mm; 1975 SBC (835) Ph.4a

89 Arrowhead, socketed, short bodkin point, no mineralised wood in socket. L 40 mm; D 12 mm; 1975 SBC (835) Ph.4a

90 Arrowhead, socketed, short bodkin point, the apparent barbs may be the result of corrosion; no mineralised wood in socket. L 39 mm; D 13 mm; 1975 SBC (835) Ph.4a

91 Arrowhead, socketed, short bodkin point, no mineralised wood in socket. L 41 mm; D 12.5 mm; 1975 SBC (835) Ph.4a

92 Arrowhead, socketed, short bodkin point. L 40 mm; D 12 mm; 1983 G IV (226) Ph.5

93 Arrowhead, socketed, short bodkin point, squashed; no mineralised wood in socket. L 35 mm; 1982 G V (96) sf 573, Ph.5

94 Arrowhead, socketed, short bodkin point; no mineralised wood in socket. L 35 mm; D 11 mm; 1982 G V (96) Ph.5

95 Arrowhead, socketed, short bodkin point, fragment; no mineralised wood in socket. L 20 mm; 1982 G V (96) Ph.5

96 Arrowhead, socketed, short bodkin point, with mineralised wood in socket, not identified. L 36 mm; D 12 mm; 1983 WB i (283) Ph.4

97 Arrowhead, socketed, short bodkin point; mineralised wood in socket from hafting identified as *Salix* sp. (willow) or *Populus* sp. (poplar) from mature timber. L 39 mm; D 14 mm; 1978 NB ii (2) sf 76, Ph.4b

98 Arrowhead, socketed, or ferrule. L 40 mm; D 14 mm; 1978 NB i (3) Ph.4b

99 Arrowhead, socketed, short bodkin point; mineralised wood not from hafting, not identifiable. L 36 mm; D 13 mm; 1978 NB i (20) Ph.4b

100 Arrowhead, socketed, short bodkin point, no mineralised wood in socket. L 39 mm; D 13 mm; 1978 NB ii (1) Ph.6

101 Arrowhead, socketed, short bodkin point. L 41 mm; D 14 mm; 1978 NB iv (264) Ph.5

102 Arrowhead, socketed, short bodkin point; incomplete socket. L 41 mm; 1978 NB iv (264) Ph.5

103 Arrowhead, socketed, short bodkin point with copper alloy coating, and incomplete socket. Part of shaft surviving. L 36 mm; 1972 NB u/s

104 Arrowhead, socketed, short bodkin point. L 43 mm; D 13.5 mm; 1978 NBX (145) Ph.4

105 Arrowhead, socketed, short bodkin point. L 36 mm;

D 12 mm; 1978 NBX (145) Ph.4

106 Arrowhead, socketed, short bodkin point, incomplete and identified from X-ray only. L 34 mm; 1978 NBX (145) Ph.4

Arrow shaft fragment (not illustrated)

107 Arrowshaft, possible fragment identified as *Salix* sp. (willow) or *Populus* sp. (poplar); the chisel-shaped end appears to be covered by a resin-like material, which was possibly used to fix the arrowhead. L 70 mm; 1975 EBZ u/s sf 46

Possible arrowheads (not illustrated)

108 Ferrule or arrowhead, socketed, short bodkin point, no mineralised wood in socket. L 38 mm; D 13 mm; 1975 Keep Q IV (845) Ph.6

109 Ferrule or arrowhead, socketed, short bodkin point; mineralised wood in socket from hafting identified as *Salix* sp. (willow) or *Populus* sp. (poplar) from mature timber. L 40 mm; D 12 mm; 1975 Keep Q IV (846) Ph.6

110 Ferrule or arrowhead, socketed, short bodkin point, no mineralised wood in socket. L 38 mm; D 14 mm; 1975 SBC, (835) Ph.4a

Muskets and musketry *(Figs 5.2–5.4; Plate 5.2)*

The evidence for musketry comprises both musket parts and pieces of musket equipment. In addition to three locks and a pan from matchlock muskets, there are fragments of at least five powder flasks (although the latter could have been used for priming cannon) and the fittings from a musket rest, scourers and a wormer. A number of musket balls were also found.

The nomenclature of early handguns is confusing. 'Hagbuss' or 'hagbusshe' is a corruption of 'arquebus' and derives ultimately from the German 'Hakenbüchse' (Coltman Clephan 1909, 162; 1910, 135–7). The arquebus was the early matchlock long arm which was replaced by the caliver and then eventually by the musket. The 'caliver', or 'calibre', was a long arm which tradition has it was developed by the French in the late 1560s and which was popular in the late 16th century. The term first appears in English in 1568 (Blair 1983, 55). The caliver as it developed was of a slightly larger bore than the arquebus, but smaller than the later musket, which was a much heavier weapon firing a larger ball. In the 17th century the name 'arquebus' or 'harquebus' was given to short weapons used by cavalry and 'harquebusier' was the term for horse (cavalry) armed with harquebuses (Cruso 1632, 30–1, 43–4; see also Blackmore 1961, 24 and Blair 1983, 55 and 92–3).

In 1630 'Orders for the general uniformitie of all sortes of armes both for horse and foote' laid down among other things the bore of firearms expressed in terms of the number of shot per pound of lead. Muskets were rated at 12 shot to the pound (ie 12 gauge) and calivers at 17 to the pound (17 gauge) (Blackmore 1961, 24). The standard musket in the English Civil War was of 12 gauge and had a bore of between 0.75 and 0.8 in (19 - 20 mm). Cyprian Lucar in his translation of Tartaglia's *Three Bookes of Colloquies Concerning the Art of Shooting*, published in 1588, gives the bore of the arquebus as $^{2}/_{3}$ in (0.67 inch or 17 mm) and the bore of the musket as precisely $^{23}/_{30}$ in (0.77 inch or 19.5 mm) (Blair 1983, 54–5).

De Gheyn details and illustrates separate exercises for the caliver and the musket (1607, 'Caliver', pls 1–42, 'Musket', pls 1–43). The larger heavier musket required a rest for support and the musketeers were equipped with bandoliers, or collars, with separate containers for charges and small priming flask attached. By contrast, the 'shot' or 'caliver-men' required no rest for their firearm and were equipped with two powder flasks, one large for the main charge and one small for priming.

Although the matchlock plates (Nos. 111–113) are the earlier sear-lock type, they are almost certainly from calivers or muskets rather than earlier arquebuses. The problem is that the terminology in the 16th century is so fluid that too much weight cannot be laid on a single instance of the use of a name. The matchlock plates found at Camber are probably late 16th- or more likely early 17th-century in date. The locks are all of the sear-lock form. The mechanisms are well preserved, and on two examples (Nos 111 and 113) the sear that operates the serpent is intact. The serpent holding the match is attached to a spindle which passes through the lock plate, and on the back of the plate the spindle ends in a tumbler which engages with the hooked front end of the sear. The back end of the sear is bent at a right-angle and would have been attached to a lever that projected below the musket butt. The sear pivoted and was maintained under pressure by a sear spring, which served both to hold the jaws of the serpent away from the touch hole when not firing and to return it to the same position after firing. The musket was fired by squeezing the lever projecting under the butt. The sear-lock was replaced by a matchlock operated by a trigger or 'tricker' which was protected by a trigger guard (Blackmore 1961, 18 and fig. 1; J. B. Kist, 'A Commentary', in de Gheyn 1607, pls 60-63). There are no trigger lock plates from Camber Castle. Although trigger locks were in use by the early 17th century, sear-locks were certainly still being made and used (Blackmore 1961, 17–8 and fig. 1).

The flash pan (No. 114) is quite small, but unmistakably from a matchlock weapon. It would have been positioned on the right side of the musket breech above the lock and adjacent to the touch hole which was drilled through the side of the barrel. The pan was covered by a hinged lid, which was kept closed except when firing, to prevent the priming powder from falling out. The back of the pan was extended up to form a flash guard to protect the eyes and face of the musketeer during discharge.

The U-shaped musket rest head (No. 115) screwed into the top of the wooden shaft of the rest and served to support the weight of the musket when it was fired. Its form is quite utilitarian compared to some examples (cf. J. B. Kist, 'A Commentary', in de Gheyn 1607, pls 67–8). The scourers and wormer (Nos 116-118) were used to clean the musket barrel, and screwed into a female screw thread at the end of the ramrod or scouring stick. The scouring stick had a flat metal cap at the other end for ramming the charge (Blair 1983, 524). Black powder very rapidly

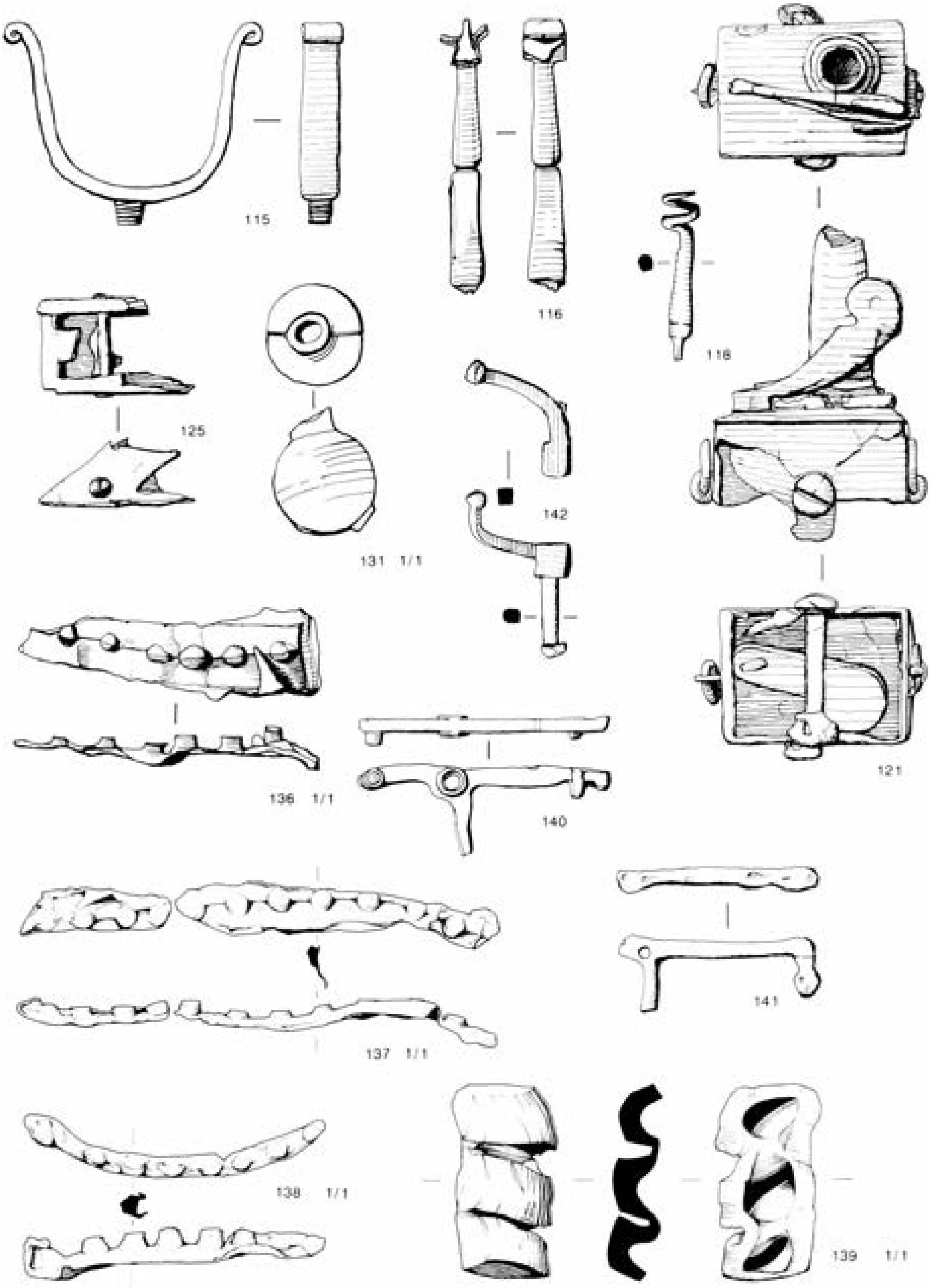


Figure 5.3: Military artefacts, musket equipment, Nos 115–142 (scale 1:2, except 136–39, scale 1:1)

fouled a musket barrel and the scourer was necessary to scrape out burnt powder residues. The wormer was used like a corkscrew to extract misfires and unfired charges. The equipment of an early 17th-century musketeer, including bandolier, rest, scourer and wormer, is illustrated by von Wallhausen in his *Kriegskunst zu Fuss* of 1615 (reprinted in J. B. Kist, 'A Commentary', in de Gheyn 1607, pl. 56; and in Courtney 1988, fig. 2).

There is evidence for two forms of powder flask from Camber. One form is represented by two pieces (Nos. 119 and 120), and has a hinged copper alloy top and a shutter closed by a coil spring. The copper alloy flask top was probably attached to a wooden or horn flask. A comparable example from the *Mary Rose* (unpublished, MR81, A2022) is almost circular and was certainly attached to a horn. The precise form of the Camber flask is not clear, but there are some clues. The top is sub-rectangular rather than rectangular, and narrower at one end, with a single suspension ring, which suggests that the flask was probably curved and suspended by rings at the top and bottom as with many of the examples illustrated by de Gheyn (1607, 'Caliver' pls 1–42; 'Musket', pls 1–43).

The second form of flask is represented by 6 pieces from a minimum of four flasks. They have iron tops and shutters closed by external V-springs (Nos. 121–126). The most complete example (No. 121) comprises a top with a tapering nozzle, which is closed off at the bottom by a copper alloy shutter inside the flask. Catalogue Nos 122 to 124 are also flask tops, but less complete. Catalogue Nos 125 and 126 are pieces of the reinforcings from the bottom corners of flasks. Traces of external V-shaped shutter springs can be seen on Nos 121, 123 and 124 but the copper alloy shutter survives only on No. 121. The shutter was made of copper alloy to prevent sparking when operated. These powder flask fragments are all from the same form of large almost triangular powder flask with concave sides; they are narrow at the top and flare out to a wide base and generally have an iron frame holding wooden panels (Blair 1983, 522 and fig. 366; National Maritime Museum 1988, 141–2, 7.54–7.56). They had two suspension rings attached to the top and were carried on a cord over the musketeer's shoulder.

In both forms of flask, the shutter was held closed by the spring as a safety feature to prevent spillage of powder, and was opened by pressure on the shutter lever. Powder could be measured out by putting the thumb over the end of the nozzle, upending the flask and opening the shutter; when the shutter was released it closed leaving a measured amount of powder suitable for charging the musket in the nozzle of the flask.

At least two sizes of powder flask were used. The smaller flask was also known as a touchbox and held priming powder to charge the flashpan. The larger kind was used for charging the gun (de Gheyn 1607, 'Caliver' pls 1–42). The fragments from Camber are probably from large powder flasks. In the late 16th century and during much of the 17th century, as an alternative to a powder flask and loose musket shot, musketeers often carried ready made-up charges in separate wooden or metal bottles hanging from a bandolier (Markham 1622, 34; see also J. B. Kist, 'A Commentary', in de Gheyn 1607, pl. 69). The priming powder would be kept separate in a small priming flask or touch box, which was often attached to the bandolier. Bandoliers with attached priming flasks are illustrated in a number of 17th-century military manuals including those of de Gheyn (1607, 'Musket', pls 1–43), Hexham (1639: see Fassnidge 1984, 7) and Jenner (1642: see Hughes 1974, 86–93). Twenty bandoliers are listed in the stores at Camber in 1613 (Table 2.5). Also listed in 1613, 1615 and 1623, are flasks and touchboxes.

The small number of musket balls recovered include a single iron ball (No. 127), a composite ball of lead wrapped around a pebble (No. 128) and 5 lead shot (Nos 129–133). The lead balls are all of a similar diameter (*c* 0.7 in or 17 or 18 mm). The average weight of the 5 lead shot is 1.03 oz, which equates to 15½ shot to the pound. Two of the lead balls (Nos 132 and 133) are damaged and may be incomplete as a result. The remaining three balls average 1.07 oz in weight which equates to 15 shot to the pound. Comparison with the larger samples from Sandal and Beeston Castles is informative (Credland 1983, 261–3; Courtney 1993, 159). The predominant size of ball at Sandal weighs 0.8 oz (22.6 gm) and measures 0.625 in (16 mm) in diameter, which equates to 20 gauge shot. The Beeston shot range in size from 0.43 in (11 mm) to 0.79 in (20 mm). The majority of the shot is in the range 0.625 in (16 mm) to 0.75 in (19 mm) in diameter. The Camber shot fall within the size and weight range of the Beeston Castle shot, and would have been suitable for firing from a musket of 0.75–0.8 inch bore. It is probable that the shot found at Camber were for muskets although they are apparently undersize. It is possible that they were deliberately made so, firstly to ensure that they would be usable given the variability of 16th- and 17th-century firearms, and secondly to conserve lead.

The lead casting headers (Nos 134–138) are evidence that lead shot was made on site as would be expected. The surviving casting headers have narrowly spaced runners which suggests that they are waste from casting smaller diameter pistol balls rather than musket balls. The lists of stores held in Camber mention moulds, very probably for making both musket and pistol balls (1613), and lead for shot making (1613 and 1623) (Table 2.5).

Musket components (Fig. 5.2; Plate 5.2)

111 Matchlock plate, for sear lock, complete with serpent arm and clamping screw to retain the match; the sear on the inside of the plate is intact and secured by a screw; a part of the sear spring above the sear survives. Iron. L. 182 mm; 1982 CT V (98) sf 773, Ph.5

112 (Plate 5.2) Matchlock plate, probably for a sear lock, comprising tapering plate complete with serpent arm with clamping screw; the eye or tumbler which engages the sear is clear, but the sear on the inside of the plate is missing; part of the sear spring survives. Iron. L. 193 mm; 1979 CT I (17) sf 25, Ph.4b

113 (not illustrated) Matchlock plate, for sear lock, with incomplete serpent, but intact sear and remains of the sear spring above the sear on the back of the plate; the plate appears to have been wrenched from its mounting. Iron. L. 160 mm; 1983 CT IV (302) sf 1587, Ph.4

114 Flash pan and cover, with distinctive upright flange and screw. Iron. L. 64 mm; 1983 CT III (286) sf 1479, Ph.5

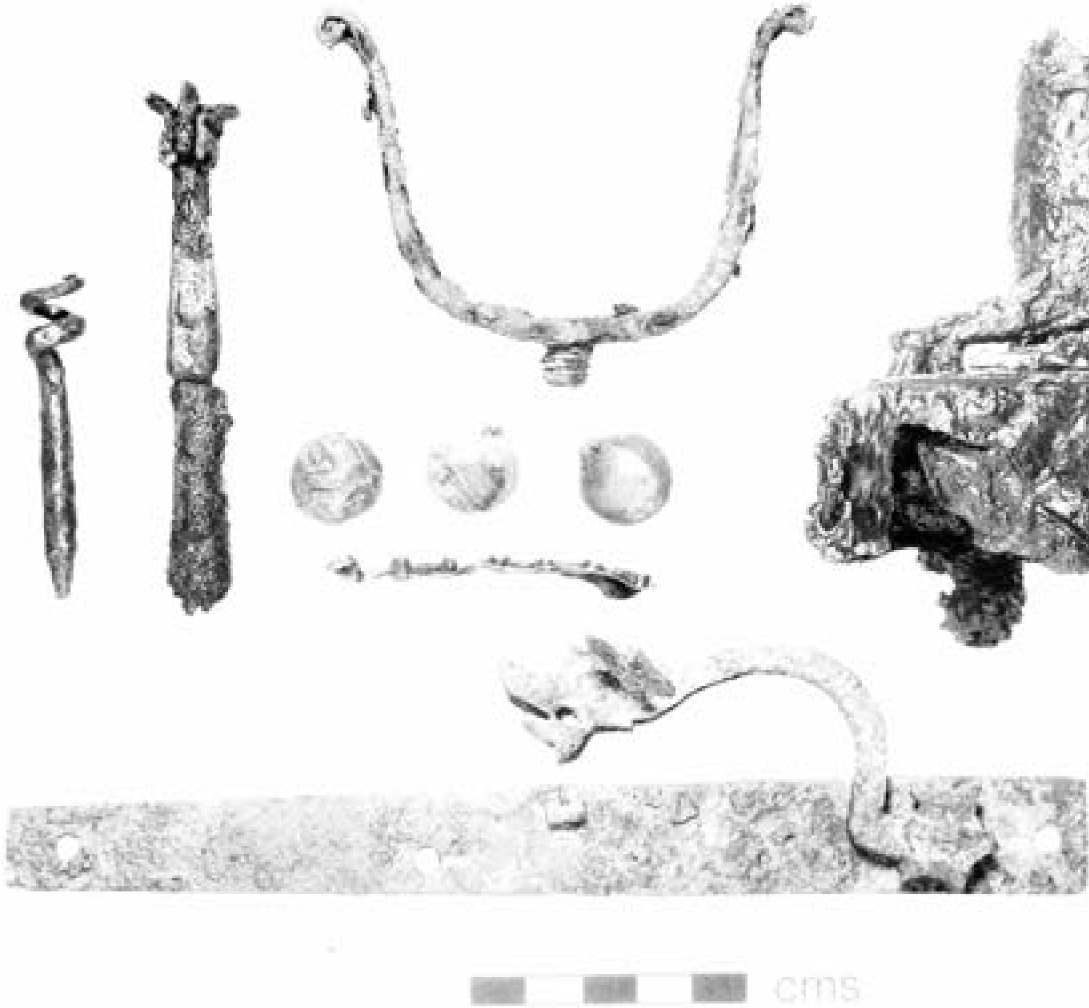


Plate 5.2: Musket locks and equipment. (M Dudley)

Musket equipment (Figs 5.3, 5.4; Plate 5.2)

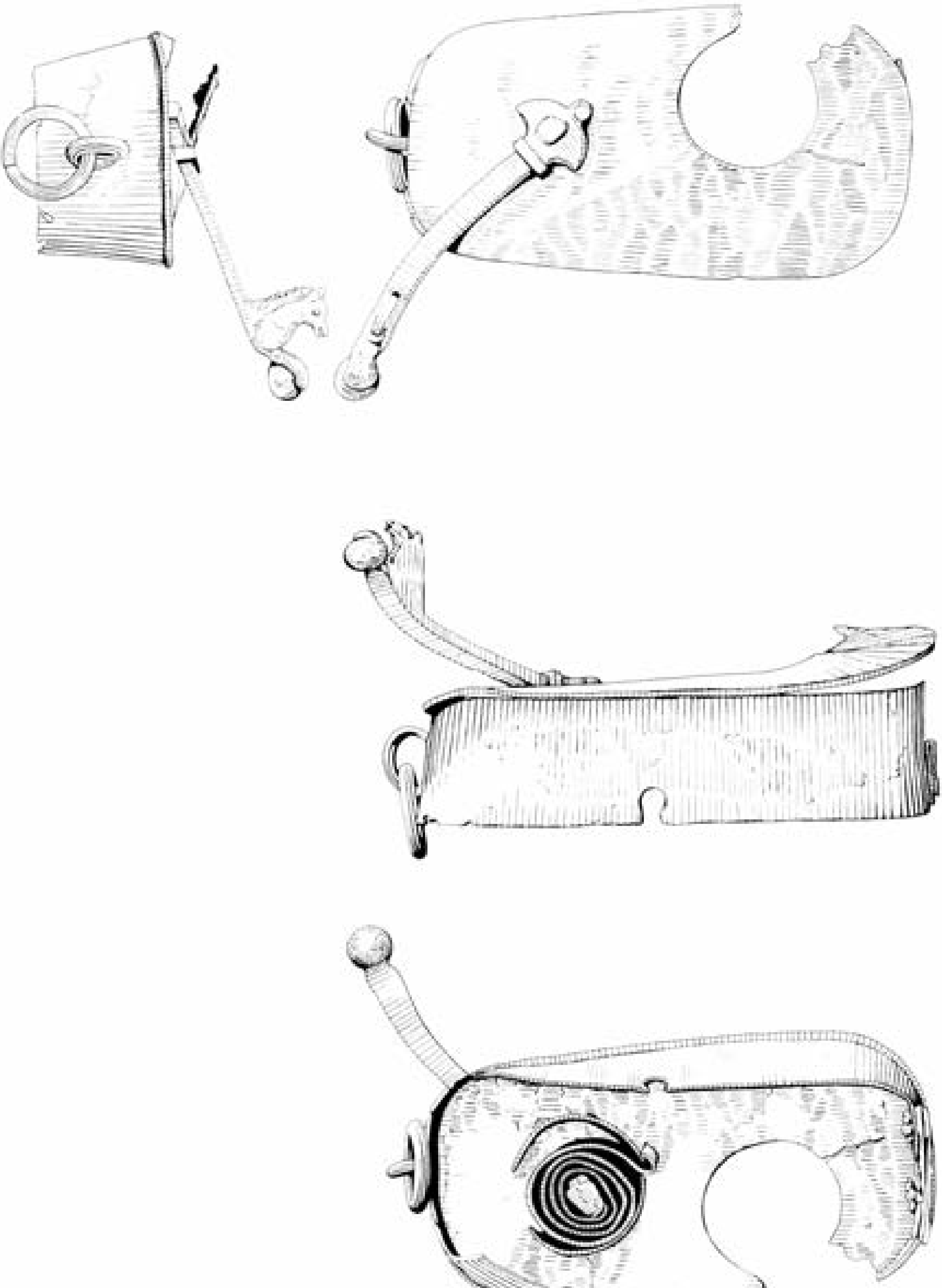
115 (Plate 5.2) Musket rest, with screw thread to secure it to its pole. Iron. L 88 mm; H 68 mm; 1982 CT V (114) sf 607, Ph.4

116 (Plate 5.2) Scourer, with tapering bevelled stem and distinctive sprung leaves for cleaning musket barrel; it may have been attached to a wooden rod by means of a socket or to the ramrod shaft by means of a screw thread; the top of the ramrod, with copper alloy binding, is attached. Iron. L 95 mm; 1975 Keep Q II (840) Ph.3

117 (not illustrated) Scourer, similar to No. 116 with distinctive sprung leaves for cleaning musket barrel; it appears to be socketed rather than attached to the ramrod shaft by a screw thread. Iron. L 88 mm; 1982 WB ii (279) Ph.5

118 (Plate 5.2) Wormer, for extracting misfires. Originally with screw thread attached to ramrod. Iron. L 59 mm; 1974 SBC (745) Ph.4b

119 Powder flask top of copper alloy, comprising a box sub-rectangular in outline, with rounded corners and slightly narrower at one end. It has no extant base, but at the wider end are the remains of a hinge; two rivets survive with decorated washers on the inside. The washers are decorated to look like flowers with eight petals. At the lower edge of the surviving long side, there is a notch or hole which may have secured a catch. At the narrower end there is a loose ring attached by a loop to the side of the box. The top of the box has a large hole offset to one side at the wider end and a lever towards the narrower end. The hole was for the nozzle which is missing. The lever now curves away from the top of the box, but probably originally lay flat. It has a decorated terminal in the form of a horse's head and forelegs. The latter are resting on a ball. The lower end of the lever is decorated and attached to a short rectangular section spindle which passes through the top of the box. The lower end of the spindle terminates in a burred-over lug and was clearly attached or secured to the shutter of the flask. The spindle is pierced by a slot into which the inner end of a coil spring has been inserted. The outer end of the spring is rolled over and engages part of a ward concentric with the spring and spindle. It is clear that the spring was intended to act against



119

Figure 5.4: Military artefacts, powder flask top, No. 119 (scale 1:1)

the lever in order to return it after operation. The whole top was hinged to allow for filling the flask. L 93 mm; 1975 Keep (848) sf 41, Ph.6

120 (not illustrated) Coil spring from a powder flask comparable to 119. Copper alloy. 1972 NB u/s L 29 mm

121 (Plate 5.2) Powder flask top of iron, complete with nozzle and shutter, shutter lever and leaf spring, and suspension rings. The shutter is copper alloy. L 110 mm; 1975 WBX (801) Ph.4

122 (not illustrated) Powder flask top, missing nozzle, shutter and shutter lever; the suspension rings survive. Iron. L 77 mm; 1983 NB iii (267) sf 1177, Ph.5

123 (not illustrated) Powder flask top, incomplete (i), the shutter lever is missing but part of its leaf spring survives, part of the nozzle (ii) is detached and the copper alloy shutter missing. Iron. L (i) 60 mm, (ii) 69 mm; 1973 NB WGC (690) unphased.

124 (not illustrated) Powder flask top, incomplete; the shutter lever survives with part of its leaf spring, but the nozzle and copper alloy shutter are missing. Iron. L 70 mm; H 70 mm; 1965 Tr I (575) Ph.5

125 Powder flask frame, part of lower corner. Iron. L 52 mm; 1963 D I (554) sf 68, Ph.6

126 (not illustrated) Powder flask frame, possibly part of binding of lower frame. Iron. L 50 mm; 1982 G II (116) sf 680 Ph.5

Musket balls and casting headers (Fig. 5.3)

127 (not illustrated) Musket ball, iron, well preserved with moulding line around its circumference. Weight 1.48 oz (42 g); D 22 mm; 1963 CII (538) Ph.5 [1012]

128 (not illustrated) Musket ball, lead over a pebble, crudely formed, not cast? Weight 2.22 oz (63 g). D 26 mm; 1963 C III (540) sf 116, Ph.5

129 (Plate 5.2) Musket ball, lead, clear moulding line and casting scar from a two-piece mould. Weight 1.05 oz (30 g). D 17 mm; 1963 C IV (546) sf 79, Ph.5

130 (Plate 5.2) Musket ball, lead, clear moulding line and casting scar from a two-piece mould. Weight 1.05 oz (30 g); D 17 mm; 1963 C IV (546) sf 79, Ph.5

131 Plate 5.2) Musket ball, lead, clear moulding line and casting scar from a two-piece mould. Weight 1.11 oz (31.5 g); D 17 mm; 1983 WB i (275) sf 1352, Ph.4

132 (not illustrated) Musket ball, lead, damaged and perhaps reduced in mass, battered and scuffed. Weight 1 oz (28 g); D 18 mm; 1963 B V (523) sf 3, Ph.6

133 (not illustrated) Musket ball, lead, with a flattened face which is heavily scored. Weight 0.95 oz (27 g); D 18 mm; 1963 A VII (516) sf 20, Ph.4 or 5

134 (not illustrated) Casting header produced by a two-piece mould for shot; the run-off channel is sharply defined and the 6, possibly 7, runners are spaced at 9 mm intervals; the spacing of the runners suggests small pistol balls rather than musket balls. L 61 mm; 1975 WBY (820) Ph.4

135 (Plate 5.2) Casting header produced by a two-piece mould; the narrow run-off channel is sharply defined and the 6 runners are spaced at 8 mm intervals. L 44 mm; 1983 CT IV (295) Ph.4

136 Casting header produced by a two-piece mould for shot; the run-off channel is broad and almost flat with little definition, and the 6 runners are spaced at 8 mm intervals. L 51 mm; 1983 WB i (274) Ph.4

137 Casting header produced by a two-piece mould for shot; the run-off channel is sharply defined and the 11 runners are spaced at 7 mm intervals. L 84 mm; 1982 CT V (108) sf 595, Ph.4

138 Casting header produced by a two-piece mould for shot; the run-off channel is sharply defined and the 7 runners are spaced at 7 mm intervals. L 52 mm; 1982 CT V (108) sf 595, Ph.4

139 Cut lead casting, possibly for use in casting lead shot, or perhaps intended for use as crude lead shot. 1973 EBY (675) Ph.4

Possible items of musket equipment (Fig. 5.3)

140 Pivoting bar of iron, well-made perhaps from a musket or pistol lock. L 87 mm; 1963 A I (503) Ph.5

141 Pivoting bar of iron, fragment. Perhaps from a musket or pistol lock. L 72 mm; 1983 CT III (282) sf 1454, Ph.5

142 Possible flash pan handle of iron; the identification is not certain; usually the handles and pan covers are integral (cf No. 114 above). L 58 mm; 1983 CT IV (295) sf 1555, Ph.4

Hand Weapons *(Fig. 5.5)*

There are a small number of pole arm heads in the Camber assemblage, including 4 halberds or bills, and 6 pikeheads. Three of the bills or halberds (Nos 144-146) are of late 15th- or early 16th-century form. The fourth halberd (No. 143) is of a more developed form with a more axe-like blade and is of mid 16th- to early 17th-century date (Oakeshott 1980, 47-8 and figs 5 and 6). The distinction between bills and halberds is by no means clear. In 1568 there are no halberds but 380 black bills were listed at Camber; in 1613 there were 20 halberds and 20 black bills. By 1615, in the old store in the Keep there were 20 brown bills only. The presence of halberds is recorded in 1623, but no quantity given (Table 2.5).

The 16th- and 17th-century pike comprised a tapering shaft approximately 18 ft long surmounted by a small head attached by a socket and secured by long side strips. The latter were to prevent attacking cavalry from cutting off the heads of the pikes. The shafts of pikes were reportedly very often shortened by pikemen in the field to about 16 ft. Pikes were intended for use on the open battlefield both as shock weapons in attack and as defensive weapons against cavalry and were not appropriate for use in confined spaces. The pikeheads (147-152) from the excavation are all of different forms; the only common feature is the evidence for strips to protect the upper portion of the wooden pike shaft seen on some examples. Pikeheads could vary, but the narrower more compact heads such as No. 147 and No. 150 were generally considered to be superior to the broader bladed heads such as No. 149. There were 68 pikes stored at Camber in 1568 and 72 in 1613. By 1623 there were only 22 pikes listed (Table 2.5).

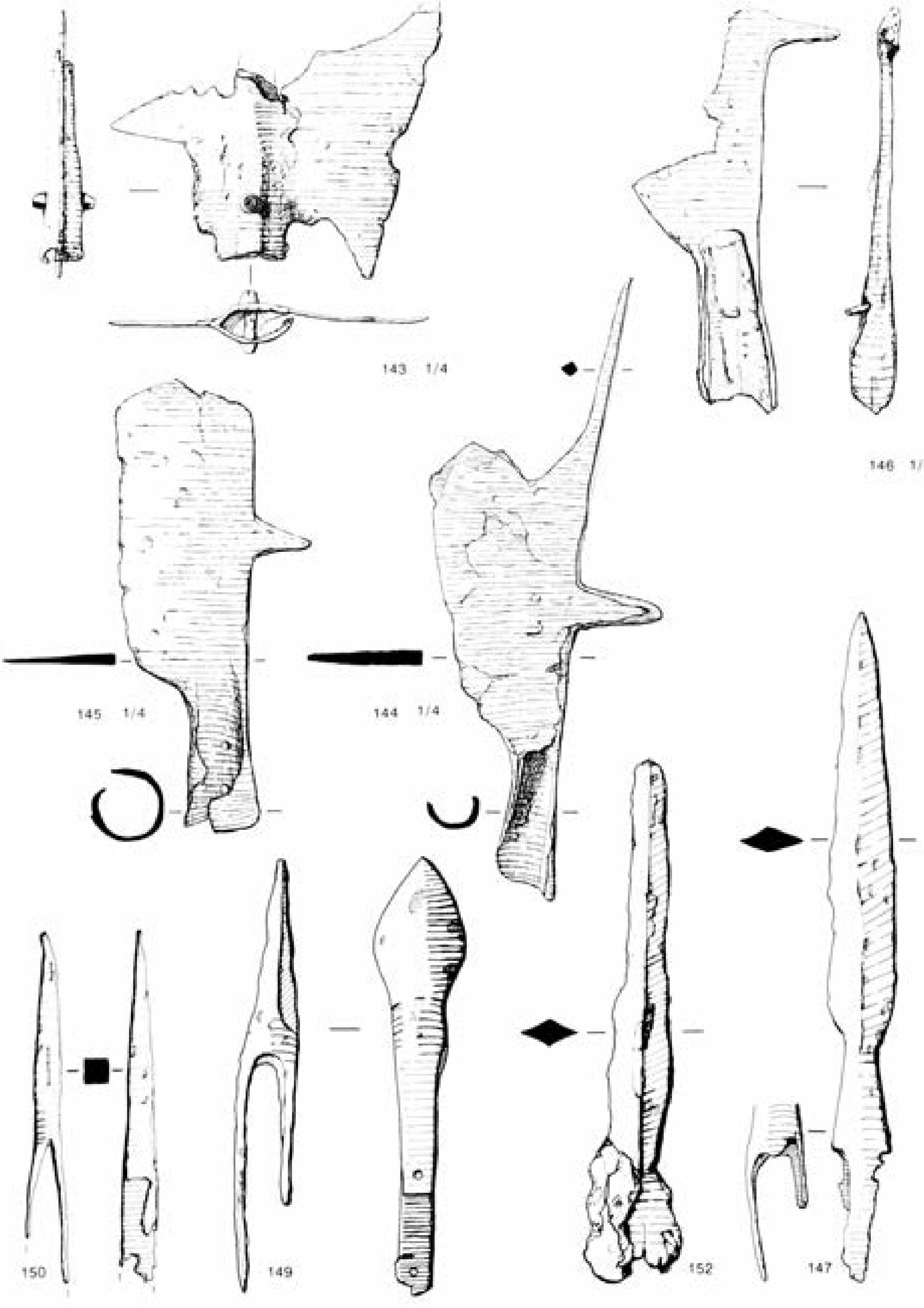


Figure 5.5: Military artefacts, pole arms, Nos 143–152 (143–6, scale 1:4; 147, 149–50, 152, scale 1:2)

Halberds or Bills (Fig. 5.5)

143 Halberd head, with straight edged blade opposed by a saw-edge spike, the point is missing; the head was fastened to the shaft by a bar or rivet secured by copper alloy washers. H 187 mm, W 232 mm; 1972 NB u/s

144 Halberd or bill head, with straight-edged blade widening at the top and small opposed hook and elongated point. L 438 mm; 1963 B V (1014) sf 11, Ph.5

145 Halberd or bill head, with straight-edged blade and small hook, the point is missing; the socket is open and has two nail holes. L 310 mm; 1973 EBX (666) Ph.3

146 Halberd or bill head, with much of blade missing but with distinctive hook; the socket is open and was secured by two nails. L 283 mm; 1983 CT IV (295), Ph.4

Pikes (Fig. 5.5)

147 Pikehead, with long leaf-shaped blade of diamond cross-section and with protective strips. L 233 mm; 1963, C V (548) sf 129, Ph.5

148 (not illustrated) Pikehead, with small leaf-shaped blade and protective strips. L 190 mm; 1979 NB ii (2) sf 195, Ph.4b

149 Pikehead, with small almost round leaf-shaped blade and protective strips. L 153 mm; 1983 CT III (276) sf 1362, Ph.5

150 Pikehead, with tapering point of square cross-section. L 123 mm; 1972 NB u/s

151 (not illustrated) Pikehead, or spearhead, with leaf-shaped blade of lenticular cross-section; it may have the strips to protect the shaft that distinguish pikeheads. L 220 mm; 1975 EBX (723) Ph.2b

152 Pikehead, or spearhead, with leaf-shaped blade of diamond cross-section; it lacks evidence for strips to protect the shaft that distinguish pikeheads. L 220 mm; 1972 NB u/s

153 (not illustrated) Weapons head, with tapering square-section point; part of the shaft is *in situ*. The mineralised wood has been identified as *Fraxinus* sp (ash) by Jacqui Watson of the Ancient Monuments Laboratory. L (of head) 135 mm; 1979 NB i (2) sf 55, Ph.4b

154 (not illustrated) Socketed tapering point, probably from a weapon. L 104 mm; 1978 NB i (5) sf 51, Ph.4b

Possible weapon heads

155 (not illustrated) Socketed tapering point, possibly from a weapon. L 154 mm; 1978 NBX (902) sf 72, Ph.4

156 (not illustrated) Socketed tapering point, possibly from a weapon. L 113 mm; 1978 NB i (5) sf 53, Ph.4b

Swords and sword fittings (Fig. 5.6)

The quantity of sword fittings and fragments of sword is meagre. This reflects the limited number that would have been present in the castle. No swords are listed amongst the stores and it is most unlikely that the soldiers or artillery men forming the garrison would have had swords. The Captain and probably the Lieutenant would have supplied their own weapons. The fragment of blade (No. 157) is very probably from a rapier rather than a sword since it seems to include part of a ricasso between the blade and tang. The piece of guard (No. 158) is probably from a 17th-century rapier, and possibly from an English hilt (Oakeshott 1980, 165, fig. 72 D and pl. 13 e).

157 Rapier blade, fragment from near the hilt, part of the ricasso survives. The blade is of diamond cross-section. Probably from a rapier rather than a sword. L 72 mm; 1975 WBX (801) Ph.4

158 Sword hilt guard, fragment, a dished guard formed from three curving strips of iron. Probably the shell guard from a rapier of 17th-century date. L 111 mm; 1963 C II (539) sf 97, Ph.5

159 Sword suspension mount, comprising cast copper alloy plate, with inturned hook. There are slight traces of tinning. The plate was secured by means of two iron pins or rivets. Early 17th-century type. L 37 mm; 1983 CT III (282) sf 1468, Ph.5

160 Sword suspension mount, with missing hook. The copper alloy mount was attached by means of two integral spikes on the back. These have been bent over to secure the mount. Early 17th-century type. L 25 mm; 1983 CT III (287) sf 1496, Ph.5

Armour *(Fig. 5.6; Plates 5.3, 5.4)*

The armour fragments (Nos 161–170) were for the most part pieces from a jack of plate, and the identification has been confirmed by the Ancient Monuments Laboratory of English Heritage. A summary of the results of their analysis is given below. In addition to jack of plate, there are also pieces from a brigandine (Nos 167–170). The armour was recovered almost exclusively from the fill of the North Bastion. The only exception is a single plate (No. 166) from the adjacent gallery (G II). The armour was clearly deposited in the North Bastion when it was filled in the 16th or early 17th century, and it is possible that the plate from the gallery basement was deposited at the same time, but more likely that it was dumped at a later date.

Possibly the best contemporary description of a jack of plate is given by William Harrison in his *Description of England* of 1587 (p 279): 'Jackes quilted ouer wyth leather, fustian or canvas over thicke plates of yron that are sowed in the same...'. The remains found at Camber comprise fragments representing some 250 plates, probably about a quarter of a jack, which might usually be expected to contain in excess of 1000 plates (Eaves 1989, 90). The fragments range from individual iron plates (Nos 163, 165 and 166) to large pieces consisting of corroded masses of overlapping iron plates and mineral-preserved organic material (Nos 161–162). In addition to the jack plates there were a small number of loose plates (Nos 167–170) which show the distinctive features of a brigandine. They are elongated rectangular plates with rows of rivet holes. Brigandines were composite armours comprising strips of iron riveted to a canvas backing and overlaid with finer

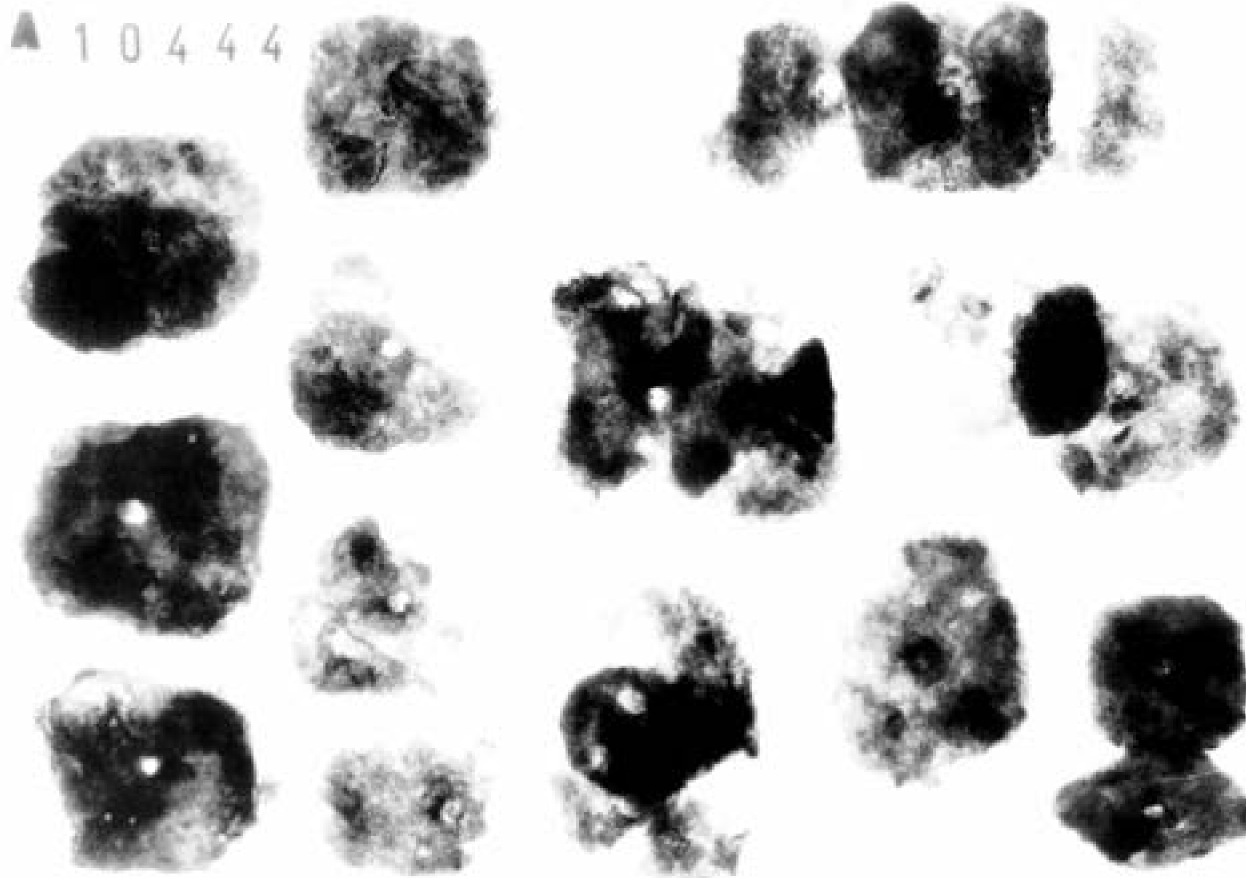


Plate 5.3: Jack of plate No. 161, selected pieces, X-ray photograph (Ancient Monuments Laboratory)

material; velvet, leather and silk were amongst the materials used as coverings. The rivets were often tinned or gilded and laid out in decorative patterns. The distinctive pattern of triangular clusters of rivets found on some of the Camber examples (see especially No. 167) can be paralleled on a number of surviving brigandines and those shown in contemporary pictures (cf Eaves 1989, pls XLVI B, XLVII A, XLIX B and LI A). It is a feature found on brigandines that date from the 1430s to the end of the 15th century. In addition to the surviving loose pieces of brigandine plate, a number of pieces of brigandine plate had been reused in the jack of plate (for example No. 163). The jack of plate from Beeston Castle had similarly reused brigandine plates (Eaves 1993).

The dating of the two types of armour is instructive. Brigandines, first recorded in the 14th century, were common during the middle years of the 15th century. By the end of the 15th century they were going out of common use and Eaves (1989, 84) argues that it is most unlikely that they were made after the mid 16th century in Western Europe. The quilted jack, which was the archetypal dress for the English foot soldier, was in use in the 15th and 16th centuries. It continued in use throughout the 16th century in England although it went out of fashion in Europe in the later 16th century. Its variant the jack of plate appears to have been in use during the second half of the 16th century in England. It was worn by common soldiers.

It is possible but unlikely that the brigandine plates were brought to the castle as part of a working armour, and more likely that they were brought in as materials for reuse. The jack of plate on the other hand would be exactly contemporary with the earlier years of the castle. It should be noted that the lists of stores held at Camber Castle (Table 2.5) make no mention of any armour.

The scientific analysis of the jack of plate: summary of results

Scientific examination of the two main groups of armour from within the North Bastion was undertaken in the Ancient Monuments Laboratory (Slack 1997). The plates were recorded, examined and assessed by Colin Slack. SEM examination and identification of the fibres was undertaken by Anna Cselik. The textiles and threads were identified by Glynis Edwards and wood by Jacqui Watson. The jack of plate pieces studied include the two main groups of finds No. 161 (Lab No 791098) and No. 162 (Lab No 791876). The scientific examinations had three main purposes: to define the plates, distinguish characteristic features and establish their sizes; to identify, if possible, the mineral preserved organic materials adhering to the plates; to establish the structure of the

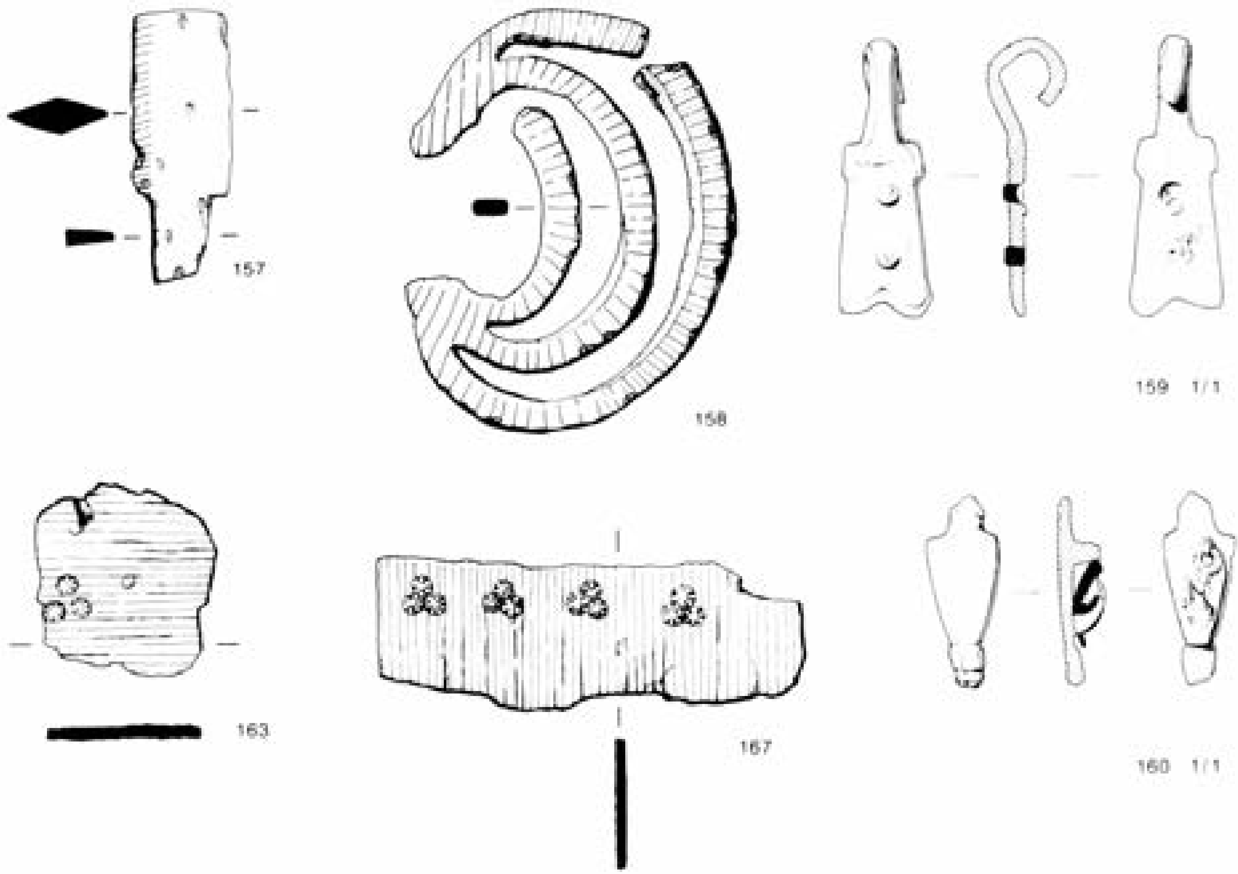


Figure 5.6: Military artefacts, sword fittings and armour, Nos 157–167 (scale 1:2, except 159–60, scale 1:1)

jack of plate. The amount of cleaning undertaken was restricted in order to retain the maximum possible mineralised organic material, and this in turn limited the exposure of individual plates. Nonetheless with the help of radiography it was possible to define a good number of plates in both main groups.

Plate sizes and characteristics: The iron plates identified are all square or rectangular with clipped corners and pierced with a central hole. Assemblage 161 comprises an estimated 52 jack plates. Many of these are 37 mm x 37 mm square, although one large mass includes plates measuring 32 mm x 37 mm. The largest plate identified is 50 mm x 37 mm. There are at least two pieces with multiple perforations suggesting reused materials, possibly from a brigandine. Assemblage 162 is larger, and comprises an estimated 200 iron jack plates. The majority of plates are 37 mm square while a good number are 32 mm square. Other examples, including a group of four overlapping plates, are 45 mm x 37 mm. There is at least one plate measuring 40 mm x 32 mm. A number of reused pieces of brigandine plates and possible brigandine plates have been identified.

Mineral preserved organic materials: On investigation the preserved organic materials proved to comprise traces of thread, fibrous material (probably traces of the padding), small fragments of textile, and wood chips and twigs. The latter relate to the deposition of the armour, not to its construction. It should be noted that there were fragments of iron plate, which were not armour, found in both assemblages. That found in No. 161 had been nailed to a piece of wood identified as ash and may have been part of the binding of a box or chest. In assemblage 161, five or possibly six fragments have traces of textile. Where identifiable this is Z,Z tabby. Seven fragments have traces of thread, and where identifiable this is Z-spun. Four fragments simply have traces of fibrous material. In assemblage 162 the organic material is less well preserved. Only three of the 23 pieces have traces of textile, while 11 have traces of thread. Fourteen pieces have traces of fibrous material, in some instances on both sides of the plates. At least eight of the 23 pieces have no traces of thread, textile or fibrous material, only unidentified organic traces or nothing at all. The material used to make the thread and textile found in both assemblages could not be identified and could be vegetable- or animal-derived.

Structure of the jack of plate: The evidence from the X-rays and from scientific investigation shows clearly that the armour comprised small rectangular plates, clipped at the corners and with a hole throught the centre. These are sewn together with thread in an overlapping scale pattern. In some instances, as many as eight threads could be identified passing through the single central hole in

Plate 5.4: Jack of plate No. 162, selected piece, X-ray photograph (Ancient Monuments Laboratory)

a plate. The stitching pattern is well illustrated in the report on the jack of plate from Beeston Castle (Eaves 1993, fig. 111). The traces of textile together with the evidence for fibrous material on both sides of the iron plates show clearly that the plates were padded and covered on both sides.

Jack of plate: catalogue of excavated fragments (Fig. 5.6, Plates 5.3–5.4)

161 (Plate 5.3) Jack of plate. Thirteen fragments, including large sections with overlapping plates, smaller groups of plates and single sub-rectangular plates pierced with a central hole. Some of the pieces could rejoined to make seven pieces. The largest of the pieces contained an estimated 36 jack plates. Most of the fragments were covered in mineralised organic materials, and some clear evidence for stitching can be seen. Comprises a total of *c* 52 jack plates. 1979 NB ii (23) sf 205, Ph.4b. See also no. 170

162 (Plate 5.4) Jack of plate. Twenty six pieces, including large sections with overlapping plates, smaller groups of plates and single sub-rectangular plates pierced with a central hole. A small number of the pieces could be rejoined, to produce 23 pieces. The largest of these contains an estimated 59 plates. Comprises a total of *c* 200 jack plates. 1979 NB ii (25) sf 215, Ph.4b

163 Plate, rectangular with rounded corners and pierced at its centre; from a jack of plate. There is a group of three small decorative washers indicating that the plate was cut from a brigandine plate. L 34 mm; 1979 NB i (2) sf 253, Ph.4b. Found with Nos 164, 168 and 169.

164 (not illustrated) Plates from a jack of plate, overlapping group of possibly three plates, with organic materials attached. L 71 mm; 1979 NB i (2) sf 253, Ph.4b. Found with Nos 163 and 168 and 169.

165 (not illustrated) Plate, originally sub-rectangular pierced with central hole for stitching; from a jack of plate. L 49 mm; 1979 NB ii (23) sf 199, Ph.4b

166 (not illustrated) Plate, sub-rectangular pierced with central hole for stitching, with mineralised remains of stitching; plate from jack of plate. L 43 mm; 1982 G II, (155) sf 877, Ph.V

Brigandine: catalogue of excavated fragments (Fig. 5.6)

167 Plate, rectangular and slightly curved with a series of small rivet holes along one edge; the holes are grouped in four sets of three and are all decorated with washers in the form of flowers. L 114 mm; 1978 NB i (2) sf 9, Ph.4b

168 (not illustrated) Plate, rectangular and incomplete, with two groups of three small rivet holes. There are a further three more widely spaced holes, two of which are decorated with decorative washers similar to those on No. 167. From a brigandine. L 58 mm; 1979 NB i (2) sf 253, Ph.4b.Found with Nos 163, 164 and 169.

169 (not illustrated) Plate, sub-rectangular and incomplete, with two small holes. Possibly from a brigandine. L 56 mm; 1979 NB i (2) sf 253, Ph.4b. Found with Nos163, 164 and 168.

170 (not illustrated) Plate, sub-rectangular with numerous small holes. Possible a piece of a brigandine. L 90 mm; 1979 NB ii (23) sf 205, Ph.4b. Found with No. 161.

HORSE HARNESS, FARRIERS' EQUIPMENT AND RIDING GEAR

Harness and riding gear *(Figs 5.7, 5.8)*

The fragments of harness fitting found are clearly of post-medieval date. The side bars of bits (Nos 171–173) are simple functional pieces and are of a type current through much of the 16th to 18th centuries (Ellis 1985, 171). The stirrups are of forms current in the early 16th century. Both have slots to attach them to the stirrup leathers. Stirrups change more than other pieces of harness equipment because they are affected by changes in the fashions of footwear. The long pointed sabaton worn by late medieval knights was replaced towards the end of the 15th century by the broad, round-toed, or so-called 'bear paw', sabaton, and stirrup irons were made broader to accommodate the new footwear. At the same time other elements in their design were changed. The broad stirrup with the fanned sides and separate footplate (No. 174) is typical of mid 16th-century stirrups. The small guard protecting the stirrup leather is undecorated, but on some 16th-century examples the guard is quite elaborately finished. The form is similar to a pair of stirrups in the Tradescant Collection in the Ashmolean Museum. These too are broad, have fan-shaped sides, and foot rests formed from rods, but they are more highly decorated (Wilson 1983). The guard for the stirrup leather is pierced and has a castellated appearance. There is an unpublished stirrup of similar but simpler form in the Ashmolean Museum from Stanton Harcourt. This too has fan-shaped sides, but is higher in relation to its width. A similar stirrup of copper alloy, but more rounded in outline, was found at Basing House (Moorhouse 1971, 47 and fig. 20.80). The second stirrup (No. 175) is a typologically earlier form, but the simple stepped strap attachment and the broad shape show that it is transitional between late medieval and early modern forms.

Horses would not have been of particular importance to the garrison except as draught animals. The Captain would certainly have had his own horses for riding, but it is unlikely that many other members of the garrison would have had their own mounts. Draught horses would only be required for the guns on those occasions when new guns were brought to the castle or old guns removed, but the garrison might well have used horse drawn transport to bring in some supplies. Although it is likely that much of the traffic, particularly bulky cargoes, came by boat, horses would still have been more practical than boats for carrying small items and light loads.

There no evidence from the lists of stores for any farriery equipment. Little can be said about the horseshoes, only a small number of which were found, except that all are post-medieval. The fullering on Nos. 177, 179 and 181 is diagnostic. Among the other interesting finds are curry combs (Nos. 182-184). Two (Nos 182 and 183) have tanged handles with a single arm and T-bar attachment to the blade. This is a post-medieval form. There is a handle of similar form from Sandal Castle (Goodall 1983, 251, fig. 4.10, no. 254). They differ markedly from medieval curry combs, which have either two- (Goodall 1975, 282 and fig. 254.2049) or three-arm handles (Clark 1995, figs 117–18 and 120–21). The surviving blades at Camber (Nos 183–184) are semi-cylindrical and their ends have been reinforced by doubling (No. 183) or rolling (No. 184). Medieval curry combs from archaeological contexts are found with blades of both semi-cylindrical and angular cross-sections, but the semi-cylindrical blade appears to be a later development. (Clark 1995, 163). The rings on the back of the most complete Camber curry comb (No. 183) were to help in holding the comb in use. A number of medieval examples have loose rings on the arms of the tang, as in an example from Westminster (Clark 1995, fig 121), but there are post-medieval examples with lugs with loose rings riveted to the back of the blade (Clark 1995, 162).

The spurs all had rowels but are difficult to date on typological grounds; most are broadly datable to the period of the late 16th to 18th centuries. Fortunately a number of examples are datable by their provenance. Two spurs (Nos 185 and 186) have quite narrow sides which suggests a later 17th- or 18th-century date, but No. 185 is from a possible late 16th- or early 17th-century deposit containing earlier material; spur No. 192 is from the same deposit. Two spurs (Nos 187 and 188) have deeper sides and are probably to be dated to the late 16th or early 17th century (Ellis, B 1983, 256–7, fig. 11, nos. 9–26; Ellis, B 1993, 165 and figs 113-4); spur No. 188 is from the bulk fills of the N Bastion and dates to the late 16th or early 17th century, while spur No. 191 is from a phase IV context and therefore dates to the second half of the 16th century or first half of the 17th century.

Harness (Fig. 5.7)

171 Side bar from a snaffle bit, with integral ring for attachment of reins; part of the jointed mouth bar survives. L 111 mm; 1983 CT IV (316) sf 1646, Ph.6

172 (not illustrated) Snaffle bit side piece, similar to above. L 110 mm; 1983 CT IV (295) sf 1547, Ph.4

173 (not illustrated) Snaffle bit side piece, similar to No 171. L 97 mm; 1982 CT V (99) sf 785, Ph.5

174 Stirrup iron. The arch is broader than it is high, the top is almost straight and the sides splay out slightly, and were forged separately from the foot rest. The sides are fan-shaped and have a concave outer face with a slight medial ridge. The bottom edge has the remains of possible decorative cut-outs. The foot rest is formed from 4 rods which are hammer-welded to the arch. The front and back pairs bow out to front and back respectively. The stirrup was hung by means of a rectangular slot cut through the thickened top of the loop. The slot has a raised guard along one edge. L 147 mm; H 130 mm; 1983 C V (383) sf 1718, Ph.5. Found with Nos 175 and 187

175 Stirrup iron. D-shaped. The loop is semicircular and in front view its arms curve into the footrest. The sides of the loop are split to form two rods which support the footrest, which consists of sheet welded to the rods. Suspension was by means of a slot offset to one side of the top of the stirrup loop. L 143 mm; H 103 mm; 1983 C V (383) sf 1719, Ph.5. Found with spur No. 187 wedged inside and with stirrup iron No. 174. The stirrup is a transitional form, broad and low.

176 (not illustrated) Possible harness strap junction comprising trapezoid plate pierced by large central hole, and with flattened rolled-over loop. Identification uncertain. L 40 mm; 1975 WBY (821), Ph.4

Horseshoes (Fig. 5.7)

177 Horseshoe, complete. The branches are broad particularly towards the heels, and each has 4 nail holes joined by fullering. The front of the shoe is very worn. L 126 mm; W 133 mm; 1972 NB u/s

178 (not illustrated) Horseshoe, fragment. A single branch with 3 nail holes survives. L 120 mm; 1973 WB (704), Ph.3

179 (not illustrated) Horseshoe, complete. The branches are of uniform width and each has 4 nail holes joined by fullering. There are 3 extent nails. The front of the shoe is worn. L 130 mm; width 132 mm; 1979 CT I (14) sf 141, Ph.6

180 (not illustrated) Horseshoe, small, with one complete branch. The extant branch tapers to the heel. There are 4 surviving nail holes all towards the front of the shoe. L 100? mm; W 113 mm 1979 CT I (30) sf 249, Ph.4a

181 (not illustrated) Horseshoe, fragment. Single branch with 3 nail holes joined by slight fullering. 2 nails *in situ*. L 111 mm; 1983 CT III (266) sf 1444, Ph.6

Curry combs (Fig. 5.7)

182 (not illustrated) T-shaped tanged curry comb handle. The cross arm is incomplete. No traces of the sheet metal comb survive. L 125 mm; 1982 CT I (17), Ph.4b

183 T-shaped tanged curry comb handle. The cross arm has 3 evenly spaced lugs with rings. Slight fragments

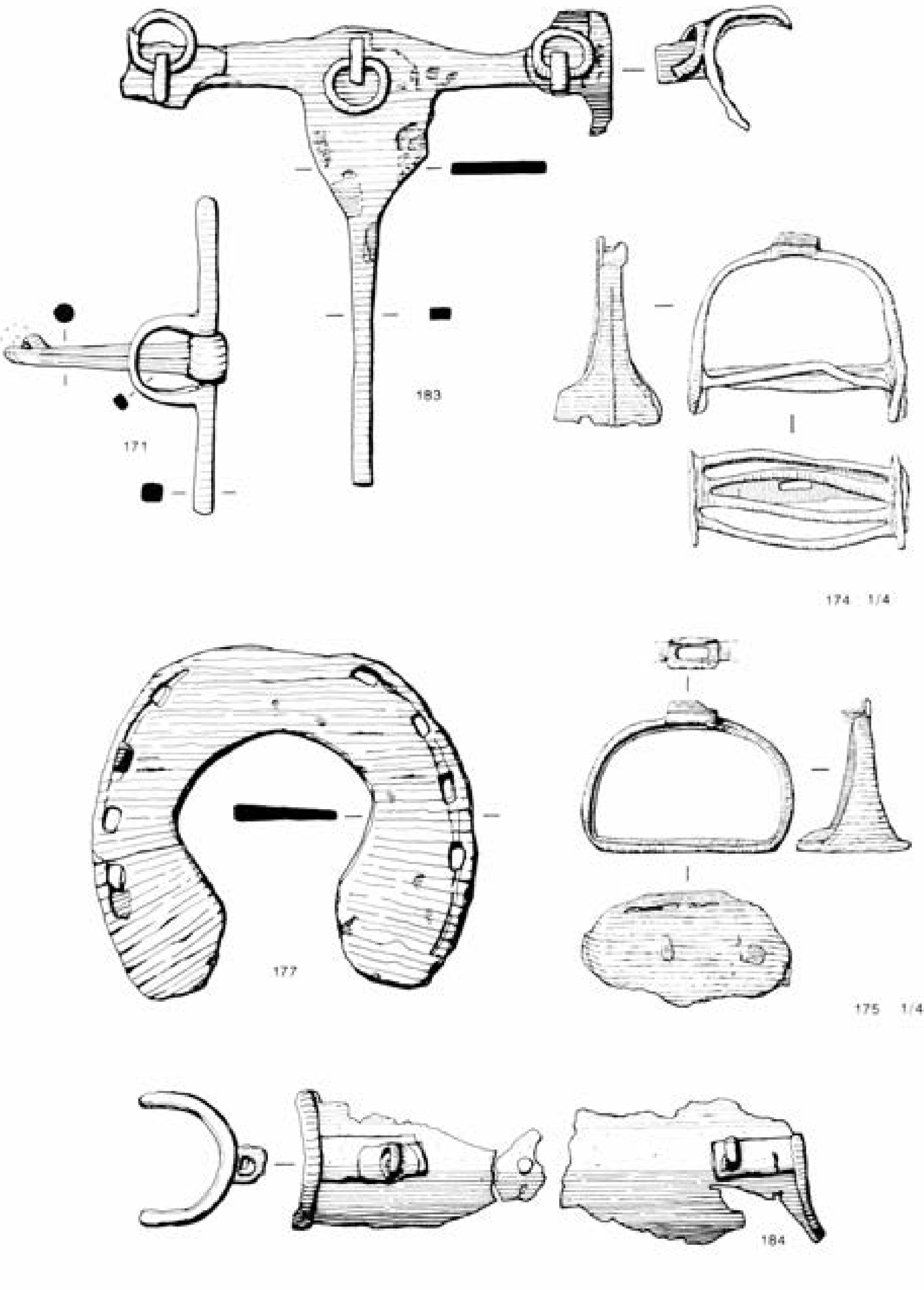


Figure 5.7: Horse gear, Nos 171–184 (scale 1:2, except 174–5, scale 1:4)

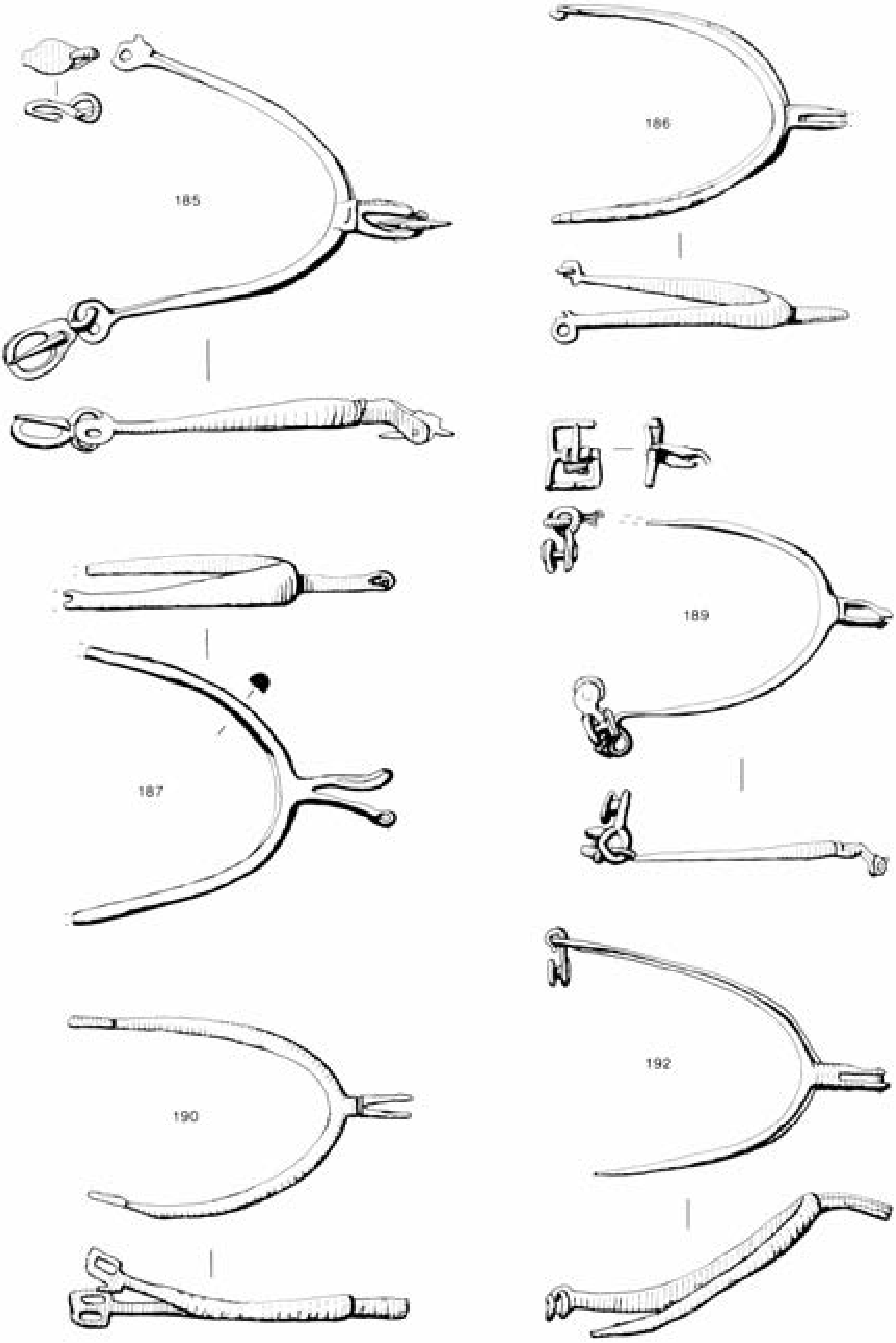


Figure 5.8: Horse gear, 185–192 (scale 1:2)

of the semi-cylindrical sheet metal comb survive. The surviving edge has been doubled to reinforce the end of the blade. L 167 mm; W 169 mm; 1982 CT V (98) , Ph.5

184 Curry comb, fragments. Two pieces formed from sheet metal; each has a lug which originally will have held a ring, and one end neatly rolled over to form a reinforced edge. L 71 mm and 93 mm; 1973 EBA (602) sf 23, Ph.4

Spurs (Fig. 5.8)

185 Rowel spur, with slightly curved sides of half-round section, ending in 'figure of eight' terminals. One riveted and looped leather attachment is attached to one arm, and a circular buckle to the other. The neck is cranked and slotted with the remains of an eight point rowel in place. L 140 mm; 1979 CT I (17) sf 15, Ph.4b

186 Rowel spur, with sides of uncertain cross-section, with broken 'figure of eight' terminals and a now detached rectangular buckle. The neck is of sub-rectangular section and slotted for a rowel. L 96 mm; 1963 B II (517) sf 16, Ph.5

187 Rowel spur, with sides of plano-convex cross-section, wider at the junction with the rowel neck, which is long and straight but slightly dropped at the end. The rowel neck is slotted. No attachment loops or buckles survive. L *c* 115 mm; 1983 C V (383) sf 1719, Ph.5. Found wedged inside stirrup iron No. 175

188 (not illustrated) ?Rowel spur, with sides of thin plano-convex section, with no extant terminals; the neck is long and slotted for a rowel. L 118 mm; 1978 NB i (4) sf 1, Ph.4b

189 Rowel spur, with fine round-sectioned sides, one of which is complete with 'figure of eight' terminal, with the looped and riveted attachments for leathers still in place. The buckle now detached from the other arm is present. The neck is cranked and slotted for a rowel now missing. L 104 mm; 1963 B XII (532), u/s.

190 Rowel spur, with thin sides of circular section ending in rectangular terminals with double slots. The neck is heavily encrusted but appears to be cranked and is slotted for a rowel. L 117 mm; 1983 CT III (286) sf 1474, Ph.5

191 (not illustrated) Rowel spur, with sides of half round section and no extant terminals. The neck is slotted for a rowel; poorly preserved. L 95 mm; 1976 NBX (885) sf 64, Ph.4

192 Rowel spur, with gently curving sides of half round cross-section; one arm has a 'figure of eight' terminal with a looped and riveted leather attachment; the other side is incomplete. The neck is curved and slotted for a rowel; the rowel is missing but its pivot survives. L 120 mm; 1979 CT I (17) sf 20, Ph.4b

Spur attachments

193 (not illustrated) Figure of eight terminal (i), with buckle attached by a loop (ii), and a riveted and looped attachment (iii), originally joined, now separate. The buckle has a central bar with tongue; one end of the buckle frame is circular the other square. L (i) 23 mm; (ii) 25 mm; (iii) 25 mm; 1982 G I (74) sf 558, Ph.4

194 (not illustrated) Buckle for spur, with traces of tinning. L 28 mm; 1982 G II (120), Ph.4

195 (not illustrated) Buckle for spur. L 26 mm; 1982 G II (120), Ph.4

196 (not illustrated) Chain, fine, comprising two interlocking series of 'figure of eight' links, with a hook at one end. Possibly from a spur. L 35 mm; 1982 NBX (145), Ph.4

A number of buckles were also recovered. Most are very plain and undiagnostic as to use. The buckles have been catalogued in Chapter 7 (below) and the larger examples may well have been harness buckles.

OTHER MILITARY ARTEFACTS

Medieval

Two pieces from the hilts of 13th-century swords were found. These comprise a flat circular pommel and a simple curved hilt guard. There is no evidence of occupation of the site of Camber Castle prior to the construction of the first tower in the early 16th century. These early sword fragments might possibly have been from old weapons kept as heirlooms or keepsakes; alternatively, they may have been imported accidentally to the site with the vast quantities of reused building material known to have been obtained from suppressed religious houses in the vicinity. A number of other medieval items present in the Camber assemblage may derive from the same processes.

20th-century

The predominant 20th-century artefact is the hand grenade striker lever of which two types were found. One type was cut in one piece from flat sheet, and the other was cut and pressed from thin sheet with a pin inserted at one end. Only one example of the latter was found, but at least twelve examples of the former. In addition two strikers and springs from the centre of grenades were recovered. Both were distorted suggesting that they came from grenades that had been detonated. The other pieces of 20th-century equipment comprised shell cases from small arms of various calibres, and perhaps most interestingly, carbon rods, probably from World War Two searchlights.

Chapter 6: The Ceramic Assemblage

by Lucy Whittingham

METHODOLOGY

Classification of the Fabric Type Series

This assemblage of 9468 sherds (200 kg) had been assessed initially by Dr A D F Streeten and partially sorted into 33 fabric types, to which a further 19 have been added in the course of further analysis. The original type sherds were given a Type Fabric number (TF Number) which is quoted in the catalogue. Also noted are the Sample Numbers of fabrics selected for thin section and textural analysis by Streeten as part of his doctoral research (1985a). The thin sections can be consulted in the reference collection at the Dept. of Archaeology, University of Southampton. Detailed fabric descriptions are not given in the present report since 'common' or 'established' names exist for the majority of the pottery found at Camber. The Quartz Tempered Red Earthenware fabrics are grouped as one category as most were defined by textural analysis in Streeten's thesis (1985a). The Established wares and Continental imports are well published elsewhere: reference to the Continental imports uses the conventional terms as set out by J G Hurst *et al.* (1986).

Quantification

To ensure that the whole of this assemblage had a final standard identification, full quantification of the assemblage was undertaken, including sherd count, weight, EVE and minimum vessel number estimated on sherd families (Orton and Tyers 1993). Other attributes such as glaze colour, vessel form, rim form, base form, joining sherds and decorative motifs were also recorded.

The pottery has been recorded by sherd families identifying 3035 vessels, of which 168 are represented by sherds that join or are groups of sherds that are almost certainly from the same vessel (ie a sherd family). The distribution of sherds from these 168 vessels shows that there has been a massive movement of pottery and redeposition within the castle and its immediate environs. In some areas it is clear that pottery of the first half of the 16th century had been removed from its primary context and had been redeposited at a later date elsewhere in the castle. This is particularly evident in the assemblages from the infilling of the N Bastion, where pottery of the first half of the 16th century, which had presumably been discarded outside the castle during construction and early occupation, appears to have been reintroduced with the material used to infill the bastion at some point in the late 16th or early 17th century.

The total assemblage has been quantified and studied for its intrinsic interest as a closely dated collection from a site whose nature and functions are well understood from documentary sources. It is discussed in terms of fabric, vessel form, and regional trade. Six well stratified/dated assemblages have been selected to measure chronological changes in fabric, and typological changes in vessel form.

FABRICS

The assemblage of 9468 sherds has been sorted into 52 fabric types, grouped into 4 categories: Continental Imports, Quartz Tempered Red Earthenwares, Established Wares and Late Post-Medieval English Wares. Where possible the fabric types and vessel forms have been identified with reference to previous work and standard nomenclature. Figure 6.12 is a summary of these wares by sherd count as a percentage of the total assemblage. The illustrated vessels provide a type series of major forms, although classic forms such as Martincamp flasks, which are fully published elsewhere, have not been illustrated here. Full details of decorative motifs are given in the appropriate catalogue entry. References to illustrated vessels are given in the form (Fig. 6.2.1) where the illustrated vessel is of the fabric type under discussion; references to forms illustrated in a different fabric are given as (cf. Fig. 6.2.1).

Summary Catalogue of Fabric Types

Continental Imports

French

Fabric 10 Beauvais Earthenware - plain green glaze
Fabric 15 Beauvais Sgraffito
Fabric 40 Beauvais Stoneware
Fabric 11 Saintonge Green and Brown ware
Fabric 11 Saintonge Plain Glazed wares
Fabric 28 Saintonge Chafing Dishes
Fabric 34 Martincamp Type I White Earthenware
Fabric 1 Martincamp Type II Stoneware
Fabric 2 Martincamp Type III Red Earthenware

Portuguese

Fabric 13 Portuguese Merida Type Ware
Fabric 12 Red Earthenware

Spanish

Fabric 4 Seville Olive Jar

German

Fabric 45 Siegburg White Stoneware
Fabric 23 Raeren/Aachen Stoneware
Fabric 24 Cologne/Frechen Stoneware
Fabric 35 Westerwald Stoneware

Fabric 5 Lead Glazed Earthenware
Fabric 32 Werra Slipware
Fabric 33 Weser Slipware
Fabric 54 Seltzer bottles

Low Countries

Fabric 31 Low Countries Slipware
Fabric 30 Tin Glazed Earthenware
- Spanish
- Netherlands
- English

Quartz Tempered Red Earthenwares

Fabric 16 Low Countries type Redware
Fabric 17 Red Earthenware
Fabric 6 Red Earthenware
Fabric 3 Red Earthenware
Fabric 14 Red Earthenware
Fabric 29 Red Earthenware
Fabric 18 Red Earthenware
Fabric 20 Red Earthenware
Fabric 52 White-Slipped Red Earthenware
Fabric 7 Bichrome Red Earthenware
Fabric 43 Cistercian Ware
Fabric 41 Post Medieval Blackware
Fabric 51 Metropolitan type Slipware

Established Wares *(English Wares from Established Sources)*

Fabric 53 Tudor Green
Fabric 8 Surrey Hampshire Border Ware - Brown glazed
Fabric 9 Surrey Hampshire Border Ware - Green or Yellow glazed
Fabric 48 Surrey Hampshire Red Border Ware

Late Post-Medieval English Wares

Fabric 55 Late Surrey Ware
Fabric 56 Staffordshire Press-moulded Slipware
Fabric 26/36 English Stoneware bottles
Fabric 27 Creamware
Fabric 37 Transfer Printed Ware
Fabric 38 China
Fabric 46 English Porcelain
Fabric 47 Staffordshire White Salt Glazed Stoneware
Fabric 49 Red Earthenware
Fabric 50 Red Earthenware - Flowerpot

Continental Imports - French

Beauvais Earthenware *(Fig. 6.2 nos 1–3)*

Type Fabric 10, thin section sample 1035

Forms: 28 vessels of plain copper green glazed Beauvais Earthenware are classic examples of this late 15th- to 16th-century type. Vessels include a possible costrel, 7 small jugs, of which the complete vessel (Fig. 6.2.3) is a late example (J G Hurst pers. comm.), 1 lid (Fig. 6.2.2), 8 bowls (Fig. 6.2.1 and cf. Fig. 6.2.4) and 4 flanged dishes. The bowls either have a copper green glaze on the interior or alternate yellow lead glaze on the interior and copper green on the exterior. Small loop handles are present on some bowls with a small collared rim. One bowl has a hole drilled through the body wall just below the rim.

Dating: The majority of these vessels are typical forms dating from the first half of the 16th century (Hurst *et al.* 1986). The early 16th-century vessels in phases IIb (EBX) and III (NBii) mark the earliest occurrence of these wares at Camber in *c* 1539 and 1540. The majority of the sherds are found in phases IV (WBY, BI, NBX, CTV, EBA), IVa (SBC; Fig. 6.2.2) and IVb (NBi/ii, SBC) dating from between *c* 1543 and 1637. Also of note is the presence of the later 16th-century jug (Fig. 6.2.3) in phase IV, in a late cleaning pit associated with the garderobe chute outside the W Bastion (WBX). These sherds are a small part (1%) of the total assemblage.

Illustrations:

1. Small bowl with flat base and collared rim (12 cm). This example has no glaze but others have an internal copper green glaze. Entrance Bastion Vaulted Chamber fill (CVI), phase III+.
2. Complete lid with small hollowed knob handle (13 cm). Unglazed. SW Courtyard (SBC) occupation and shingle within Rampire; phases IVa and IVb.
3. Complete jug with short, thickened and flattened rim (12 cm), short rounded body and flat base. Decorated simply on the shoulder with two incised lines. The vessel is glazed in a copper green glaze on the exterior and a yellow/green glaze internally. Garderobe chute outside the W Bastion (WBY), phases III, IV and V.

Beauvais Sgraffito Ware *(Fig. 6.2 nos 4–9)*

Type Fabric 15, thin section sample 1040

Forms: 23 vessels in Beauvais Sgraffito Ware are classic examples of this fabric type. There are 11 bowls with small 'lug' handles (Fig. 6.2.4 and Fig. 6.2.9), 2 chafing dishes (Fig. 6.2.6), 1 cup, and 4 flanged dishes (Fig. 6.2.8), all elaborately decorated with double sgraffito patterns, Gothic lettering and polychrome green and blue glazes. The decorative details are discussed further in the illustration catalogue. A further 3 vessels, 1 cup (Fig. 6.2.5) and 2 flanged dishes (Fig. 6.2.7), are decorated with single sgraffito patterns incised through an orange glaze over a red slip.

Dating: All of these forms date from the first half of the 16th century (Hurst *et al.* 1986) and represent only 1% of the total assemblage. They are primarily associated with phase IIb and phase III build up outside the E Bastion (EBX) and in the phase IVb bulk fills of the N Bastion (NBi/ii).

Illustrations:

4. Double sgraffito small bowl with collared rim (18 cm)

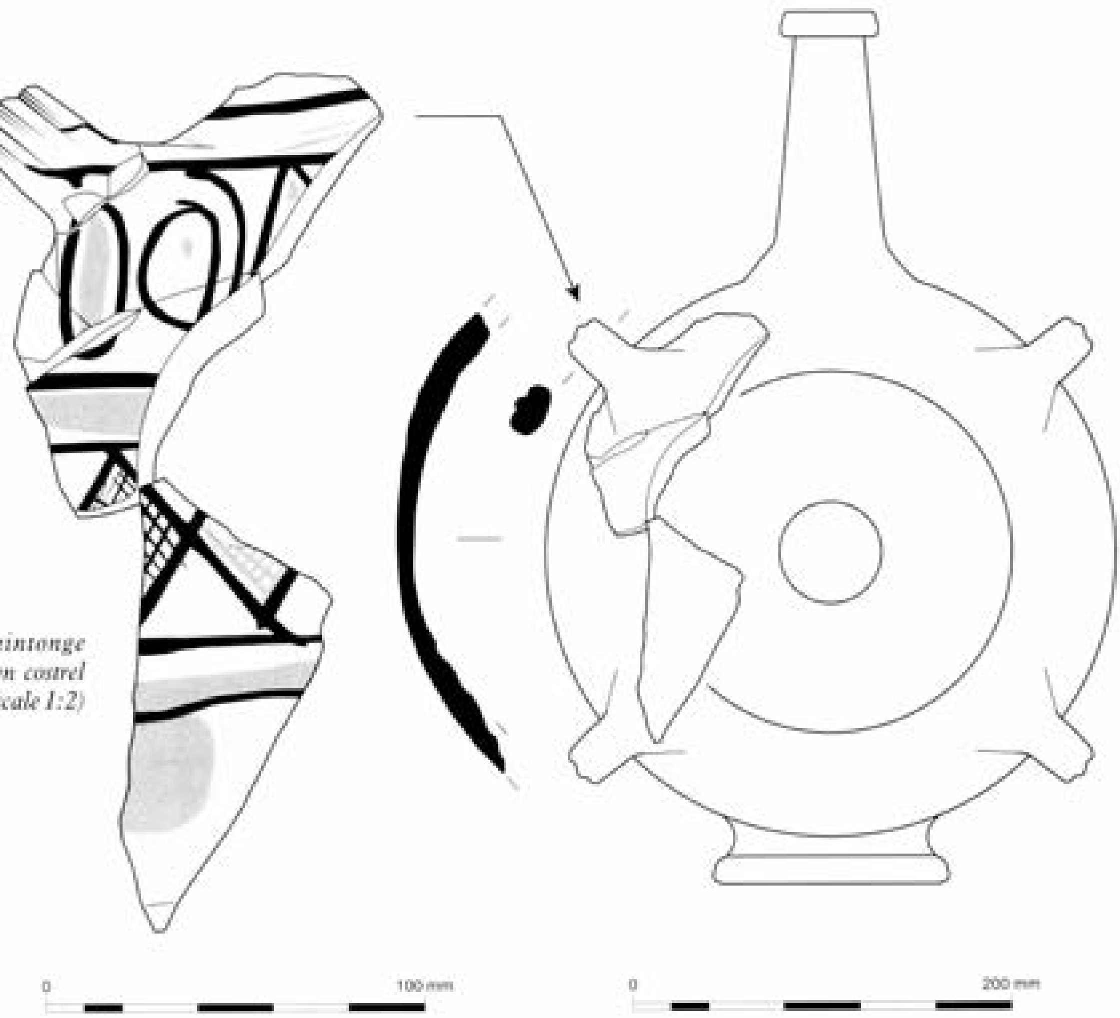


Figure 6.1: Saintonge Green and Brown costrel (scale 1:4; detail scale 1:2)

and at least two solid lug handles. Sgraffito lines around the interior of the rim and central motif of a 'bird' with areas of sgraffito lattice patterning. Polychrome clear glaze with zones of green and blue and brown motif of a ?bird?. E Bastion Exterior (EBX), phases IIb, III and VI.

5. Single sgraffito thin-walled cup with thickened rim (9 cm). Decoration in two yellow horizontal lines around the body, and single vertical curvilinear lines down the body exterior. NW Courtyard (CTIV), phase IV.
6. Double sgraffito chafing dish with hollow pedestal base, thickened/flattened rim (20 cm) and at least three handles. Squared holes occur all around the upper part of the bowl placed regularly between the 'flower/leaf' motifs. Sgraffito pattern of 'lotus leaf' on the exterior under polychrome glaze with green and blue zones on both exterior and interior. Curvilinear lines on spine of handles. E Bastion Exterior (EBX), phases III and VI.
7. Single sgraffito dish with flanged rim (26 cm) and glossy bright red/orange glaze internally. Curvilinear and concentric circles in single sgraffito (yellow) lines. N Bastion (NB i/ii), phase IVb and NB U/S.
8. Double sgraffito large dish with flanged rim (40 cm). Hole drilled through flange on rim. The sgraffito pattern is on the interior of the dish, with a central motif bordered by three concentric circles. These are surrounded by a design of trailing foliage, bordered again with concentric circles. The flange is decorated with 'tulips' between the Gothic lettering of an inscribed band reading '... MOU...'. Polychrome glaze on the interior has a continuous clear glaze with coloured zones of green and blue. N Bastion Interior (NBi/ii), phase IVb.
9. Double sgraffito bowl with collared rim (20 cm). Internal repeated sgraffito pattern of 'lotus leaves' and concentric circles around the rim. Scar on rim for handle. Polychrome glaze on the interior has a continuous clear glaze with coloured zones of green and blue. N Bastion (NB i/ii), phase IVb and Entrance Bastion (CI), redeposited in phase V.

Beauvais Stoneware

Fabric 40

Forms: 7 possible 16th-century Beauvais Stoneware costrels with flat sides and short necks occur in a grey stoneware.

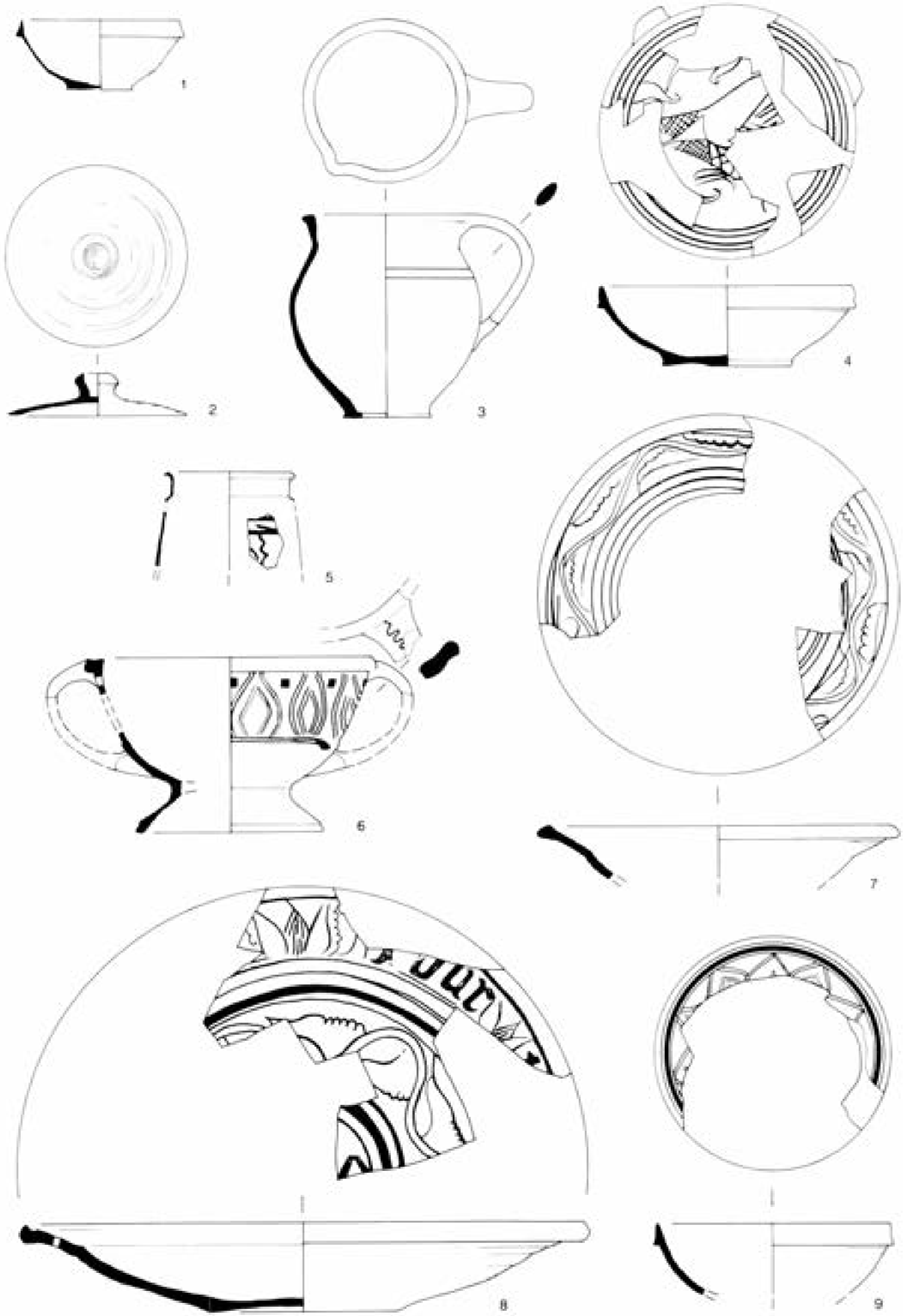


Figure 6.2: Pottery nos 1–9, Beauvais wares (scale 1:4)

Dating: With the exception of one vessel found with material from the first half of the 16th century outside the E Bastion (EBX) and attributed to phase IIb, all these vessels are redeposited in 19th- or 20th-century contexts. They do not register as an identifiable percentage of the total assemblage.

Saintonge Green and Brown *(Fig. 6.1)*

Type Fabric 11, thin section sample 1036

Forms: Eleven sherds from a single costrel with flattened sides. The form is similar in shape to a 17th-century Palissy flagon in the Louvre, Paris (Chapelot 1975, no. 269). The body sherds have clear throwing rings and flattened sides with a central point showing that the vessel has been thrown as a globular form, turned on its side and flattened on both sides to be made into a costrel. Although there are no surviving fragments of the neck there is a scar showing where the neck has been fluted to the body. A number of sherds join together to show the position of the handles on the body. Two fragments of handle survive; one attached to the shoulder of the vessel clearly looping from one side of the costrel to the other and a second springing from a body sherd decorated with the lower part of a latticed-diamond and, therefore, nearer the base of the vessel. Further handles are indicated by scars, one of which occurs immediately below the shoulder handle indicating that there might have been two handles adjacent to each other at this point and therefore four handles on either side of the vessel.

The fabric is a typical Saintonge off-white earthenware, decorated on the exterior in a geometric scheme of painted brown lines, lattice patterns and oval motifs filled with a pale green glaze. The decorative pattern is assumed to be symmetrical and the same on both sides of the vessel.

The only other green and brown costrel known in the British Isles is from Carrickfergus Castle, Ireland, and was found in 1962 (McNeil 1981 fig. 26 no. 18).

Dating: Four large fragments of this vessel occur beneath the bulk fill of the N Bastion (NBii) phase IVa (context 10), confirming that this vessel is of 16th- or early 17th-century date. The other sherds must be redeposited in the N Bastion (NBi/ii) phase IVb and in the N Stirrup Tower (NBiii/iv) phase V.

Illustrations:

Fig. 6.1. This figure illustrates the fragments of the costrel which join together to show key elements of its decoration and manufacture; these include the shoulder, handle and flattened sides of the vessel. Also illustrated is a suggested reconstruction of the complete vessel form. The outer surface is partially glazed with a clear lead glaze giving a cream-coloured finish and is decorated with a painted geometric scheme of ovals and diamond-lozenges. On the upper body of the vessel are two parallel brown lines which encircle the shoulder of the vessel. The lower of these lines becomes the top border to a row of ovals or 'eyes' outlined in brown and filled with a pale green glaze. Around the centre of the vessel is a band of diamond-shaped lozenges filled alternately with a brown or green lattice pattern. The lozenges are bordered above and below by two parallel brown lines filled between with a pale green glaze. These decorative schemes do not extend around the circumference of the vessel but stop towards the edge of the flattened sides, leaving a perimeter band of clear lead glaze running under the handles and around the outer edge of the vessel. The handles are ribbed and have a plain clear lead glaze. N Bastion (NBii) phase IVa, N Bastion (NBi/ii) phase IVb and N Stirrup Tower (NBiii/iv) phase V.

Saintonge Plain Glazed Wares

Type Fabric 11

Forms: 7 sherds are from 4 possible small jugs with mottled copper green glaze. One has a folded strap handle.

Dating: These vessels were imported into north-west Europe between 1230 and 1350 and again in 1475–1650 (Hurst *et al.* 1986). All the sherds at Camber are redeposited either in phase III deposits (EBX) or phase IVb bulk fills of the N Bastion (NB i/ii) and are therefore insecurely dated. They are associated with other imports of the first half of the 16th century, deposited after *c* 1542 outside the E Bastion, but occur with a late 16th- to early 17th-century Weser wavy line dish in the Keep, also in phase III.

Saintonge Chafing Dishes *(Fig. 6.3 nos 10–11)*

Type Fabric 28

Forms: 8 classic 16th-century and one 17th-century Type I Chafing dishes (Hurst *et al.* 1986, fig. 35.104) have alternate green and orange glaze over 8 knobs decorated with applied faces (Fig. 6.3.10). Figure 6.3.11 shows a variation in the style of applied face. The one example with applied facemask and brown glaze on the exterior is more likely to be 17th-century (J G Hurst pers comm).

Dating: One of these chafing dishes occurs in phase III (EBX), but the majority occur in phases IV (DI, NBX, EBY) and IVb (NBi/ii) dating from *c* 1542–3 to 1637. The one 17th-century example occurs in the phase IV/V deposit outside the NE Curtain Wall (AVII).

Illustrations:

10. Type I chafing dish with hollow pedestal base, 8 raised knobs with applied facemasks and 4 handles. Plain bowl, 18 cm diameter rim. Bowl glazed in alternating bands of yellow and copper green on the exterior and over rim. Interior unglazed. N Bastion Interior (NBi/ii), phase IVb and N Bastion Exterior (NBX) phase IV.
11. Type I chafing dish identical in form to above, but with a different style of applied facemask. N Bastion Interior (NBi/ii), phase IVb.

A total of 47 sherds in various types of Saintonge Wares form 0.5 % of the total assemblage.

Martincamp Type I White Earthenware

Type Fabric 34, thin section sample 1044

Forms and Dating: 33 examples of white earthenware flasks were scattered throughout the castle. All are typical examples of Type I flasks dated *c* 1475–1550 (Hurst *et al.* 1986). These vessels account for 2% of the total pottery assemblage. The majority of these sherds are from 7 vessels in phase III (NBX, EBZ/TR1) *c* 1542–3. An eighth vessel, represented by 20 sherds, occurs in phase IVb (CTIV) *c* 1600–1637. Single sherds occur in phase I (EBY) *c* 1512–14 and phase IVa (CTI). Five vessels are redeposited in the phase IVb infills (NBi/ii, CTI) and 4 vessels are residual in phase V *c* 1637+.

Martincamp Type II Stoneware

Type Fabric 1

Forms: 38 vessels are classic examples of 16th-century Type II stoneware flasks, occasionally with an orange bloom/ash glaze on the exterior surface.
Dating: These vessels account for 2% of the total assemblage. A small number of sherds occur in earlier phases IIb (EBX) and III (EBX) dating from 1539–43, but are primarily associated with phases IV (NBX, CTI–II, CTIV–V), IVa (NBii, CTI), IVb (NBi/ii), V and VI dating from *c* 1543–1637+ and 19th–20th century. Large collections of sherds from two vessels occur in phases IV (CTIV) and IVb (NBi/ii).

Martincamp Type III Red Earthenware

Type Fabric 2, thin section sample 1027

Forms: 13 classic examples of 17th-century Martincamp Type III flasks occur as 1% of this assemblage.

Dating: The majority of these sherds occur in phase IVb where 83 sherds from one vessel were found in the Courtyard (CTI). The majority of sherds in phases IV, V and VI are from a second vessel found in the NNW and WNW Courtyard (CTIII and CTIV). The presence of this ware in phase IVa occupation layers (CTI and SBG) is significant since these contexts predate the infilling of the bastions and construction of the Rampire.

Continental Imports – Portuguese

Portuguese Merida Type Ware

Type Fabric 13, thin section sample 1038

Fabric: A fine, red micaceous earthenware, typical of this 16th- and 17th-century fabric ((Hurst *et al.* 1986).

Forms: One standing costrel is represented by a complete base and upper part of the vessel with one of two small rod handles. This type of vessel can be dated by parallel examples in Amsterdam to the period 1575–1625 (Hurst *et al.* 1986, fig. 31.90) and at Southampton to the 17th century (Platt and Coleman-Smith 1975 fig 208.1343). Six other vessels are represented by undiagnostic sherds.

Dating: The majority of these sherds, from 3 vessels and the standing costrel, were found in the bulk fill of the N Bastion (NB i/ii), phase IVb. The remaining 2 sherds were found in phase IVb (NB i/ii) and phase V (CI). These 11 sherds do not register as an identifiable percentage of the total assemblage.

Red Earthenware - Import

Type Fabric 12, thin section sample 1037

Fabric: This is a fine earthenware, abundantly tempered with fine subangular quartz of less than 0.1 mm and moderate subangular quartz of less than 0.2 mm. The fabric is characterised by the occasional inclusion of a white clay pellet and streaks of white clay mixed throughout the oxidised red fabric.

Form and Dating: These 7 undiagnostic sherds are unglazed. The small number of these sherds in the assemblage, their streaky fabric and their occurrence in phase IVb (NBi/ii) suggests that they are a continental import similar to the Portuguese Merida Wares. These sherds do not register as an identifiable percentage of the total assemblage.

Continental Imports – Spanish

Seville Olive Jar *(Fig. 6.3 No. 12)*

Type Fabric 4, thin section sample 1029

Fabric: This is a coarse pink fabric with buff external surfaces.

Forms: 19 examples of globular Spanish olive jars (Fig. 6.3.12) are dated at the earliest as *c* 1580 and more generally as 17th-century (Hurst *et al.* 1986, fig. 29.79). Some sherds have lead glaze on the exterior. These vessels account for 1% of the total assemblage.

Dating: The majority of sherds (47%) occur in phase IV (CTII–VI, WBX) with a further 42% redeposited in phases V and VI (CTII–IV, CV, AI). Of note is the single sherd in phase III (NBX) and the sherds in phase IVa occupation layers which predate the infilling of the N Bastion (NBii) and the S Bastion and Rampire (SBC). Large fragments from 8 vessels are found in phase V (CTII–IV, CTVI, AI, CV). The majority of these sherds thus occur at Camber between *c* 1543 and 1637+.

Illustrations:

12. Rim and base of olive jar reconstructed to show vessel profile. Thickened rim of 9 cm diameter. Some examples have zones of pale green glaze on the exterior. Courtyard IV, phases V and VI.

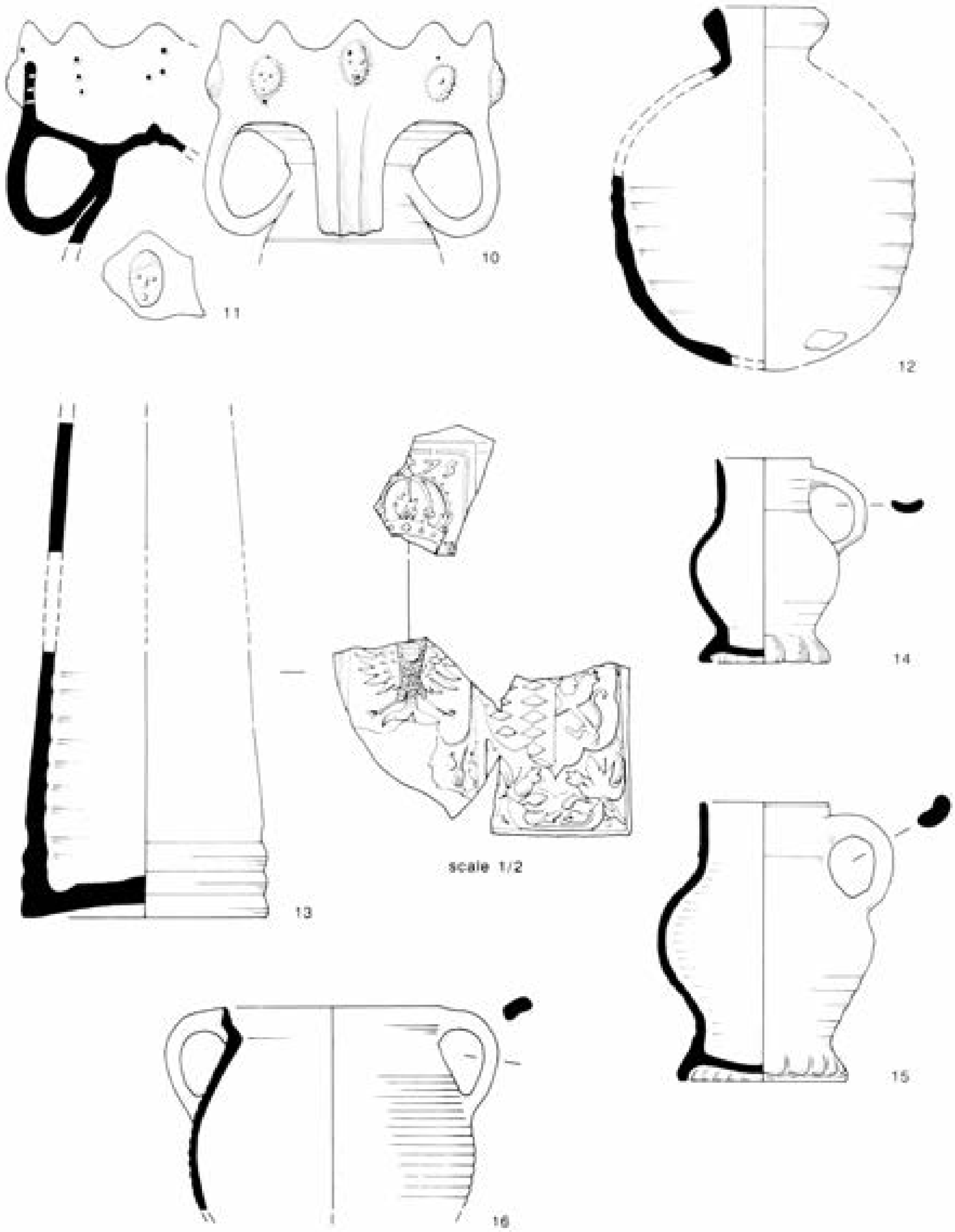


Figure 6.3: Pottery nos 10–16, Continental imports (scale 1:4; detail scale 1:2)

Continental Imports - German

Siegburg Stoneware *(Fig. 6.3 No. 13)*

Fabric 45

Forms: 2 Schnellen are represented by base and body sherds. 5 sherds from one vessel reconstruct into a base with 3 cordons and 3 decorative panels, dated [15]75 (Fig. 6.3.13).

Dating: Sherds from the dated vessel are scattered between phases IVa (CTI), IVb (NBii), V and VI (CTIV, CTV). The sherd in phase IVa occupation in the NNE Courtyard (CT I) is the most likely to be *in situ* as the others are redeposited in the bulk fill of the N Bastion and are residual in phases V and VI. The second vessel occurs in the bulk fill of the N Bastion, phase IVb. These sherds do not register as an identifiable percentage of the total assemblage.

Illustrations:

13. The cordoned base and lower part of an unglazed Siegburg Schnelle. Two of the panels can be identified as containing the coat of arms of the Dukes of Bavaria (2a) (Goodall 1997, 362) and an armorial panel containing the imperial eagle beneath a crown. Above the crown is the date '..75'. At the base of the crown is part of the monogram 'LW' representing the initials of a mould-cutter likely to have been working in the various Knutgen workshops, but whose identity remains uncertain (Gaimster 1997). Courtyard I phase IVa, N Bastion Interior phase IVb, Courtyard V phase V, Courtyard IV phases IV and VI.

Raeren/Aachen Stoneware *(Fig. 6.3 Nos 14–15)*

Type Fabric 23

Forms: 140 classic drinking jugs with a splayed frilled foot-ring base occur in 2 sizes. The majority of these vessels are small (Fig. 6.3.14) with rim diameters ranging from 6 to 8 cm. 8 vessels are larger (Fig. 6.3.15) with rims of between 8 and 11 cm.

Dating: Raeren/Aachen stoneware is most frequently found in Britain in contexts of the late 15th and early 16th centuries *c* 1475–1550. 39% of the 338 sherds at Camber are found in phases IIb and III (EBX) dating from *c* 1539 to 1543. A further 12% occur in phase IV and IVa, (CTII, CTV–VI, EBB, GI, GII, NBX, NBY, WBX, WBY) dated between *c* 1543 and 1637. The 6% of sherds in the phase IVb bulk fill (NBi/ii) are redeposited and the high percentage of sherds (22%) in phases V and VI are residual.

Illustrations:

14. Small drinking jug with frilled foot-ring base, plain rim (6 cm) on tall neck with cordon at the base and handle. Unstratified.
15. Large drinking jug with frilled foot-ring, plain rim (8 cm) with cordon at the base of a tall neck and handle. E Bastion Exterior (EBY), phase IV.

Cologne/Frechen Stoneware *(Fig. 6.4 Nos 17–25)*

Type Fabric 24

Forms: 435 stoneware vessels display a wide variety of decorative designs, which encompass every period of production of the Cologne and Frechen stoneware industries. Three hundred and ten vessels are plain jugs dating from *c* 1550–1575. One example has a pewter lid mount. Thirty eight drinking jugs have the applied trailing rose-plant design (Fig. 6.4.18) and 29 have the trailing oak and acorn design (Fig. 6.4.17). The earliest archaeological evidence for traded examples of these designs is in the period 1500–1510; they continue throughout the first half of the 16th century and represent the main output of the Maximinenstrasse workshop in Cologne over the period *c* 1500–1540 (Gaimster 1997, 192). At Camber, both oak and rose-plant designs on the body are combined with applied Tudor roses or male portraits in contemporary costume on the rim (Fig. 6.4.19). In the centre of Figure 6.4.19 the trailing rose stem springs from a small urn? on a plinth. Single examples of other decorative motifs include a jug with trailing stems and oak leaves on the body and a repeating panel around the neck containing Blattmasken or leaf-masks (see Plate 9.3). This design, which is a replica of an engraved design of Heinrich Aldegrever, was used on a wide range of vessels in the second quarter of the 16th century (c 1530s) at Cologne (Gaimster 1997, 145, 192). One tankard/Pinte is represented by a straight-sided sherd with the figure of a Landsknecht soldier playing a flute in high relief, derived from the engravings of Jacob Binck *c* 1520–30 (Gaimster 1997, 145) (Plate 9.3). A large jug with tall neck has applied panels, of the same size as a Pinte, around the neck. Two of these three panels survive in high relief showing an allegorical portrayal of Adam and Eve. Part of one panel depicts the serpent around a tree, and the second panel has the figure of Adam beside a tree (Plate 9.3). Both designs are characteristic of the early 16th-century period of production at the Maximinenstrasse workshop in Cologne *c* 1500–1540 (Gaimster 1997, 192).

Fifty Bellarmine/Bartmann jugs in various styles date from the mid 16th to early 17th centuries. One early Bellarmine/Bartmann jug has applied trailing rose stems and leaves and a large square-shaped facemask. Four vessels have botanical foliage bands around the centre containing a frieze either of twisted vine leaves or acanthus stems with either applied shells or pendant bosses (Fig 6.4.22) or acanthus palmettes with portrait medallions (Fig 6.4.20) on the body. The application of the botanical foliage frieze around the centre of vessels may have derived from designs published in Peter Quentel's Modelbuch (pattern book) of 1527 (Gaimster 1997, 144) and the style continued in production until at least the middle of the 16th century (Gaimster 1997, 162). A later form of decoration seen on Bartmann jugs is the inscribed waistband, which appears on products of the

Komodienstrasse and Streitzeuggasse workshops in Cologne at the same time as it appears in the Frechen workshops. At the Streitzeuggasse workshops these products are thought to belong to the later phase of production from 1566–1590 (Gaimster 1997, 193) and at Frechen (dated by comparison with Cologne) to *c* 1550–1570 (Gaimster 1997, 209). At Camber there are three vessels with inscribed waistbands, acanthus palmettes, portrait medallions containing a helmeted head, and the inscriptions 'VN/EST' and 'I/N?VERGE DRI' 'Drink and eat, but do not forget your God' or 'DENCK:AL:DAF:ENT….ENS' 'Hooray for a good drink, cheers to Hans'. Also of this date are 11 vessels with acanthus palmettes and portrait medallions containing a Roman Emperor/ laureate head?, a helmeted head, or female heads. These could be associated with either foliage or inscription bands and could therefore be datable anywhere in the range *c* 1527 to 1570. One Frechen Bartmann jug (Fig 6.4.21) in a pale yellow stoneware has a large facemask on which the eyes and part of the beard are painted blue. This type of vessel dates from *c* 1595–1605 (Gaimster pers comm).

Ten examples of Bartmann bottles date from the late 16th to mid 17th centuries. Identified forms include three with oval medallions containing the arms of the Duchy of Julich-Kleve-Berg (1) (Gaimster 1997, Cat. No. 68, and Goodall 1997, 368) (Fig. 6.4.25). Three further examples with armorial medallions are too debased to identify (Fig. 6.4.24). Other bottles are represented by vessels with a small rim diameter (Fig. 6.4.23), and three examples with ten-petalled double rosette medallions dated as 1629+ (Hurst *et al.* 1986, pl. 44 right).

Dating: The plain drinking jugs dating from *c* 1550–1575 are spread throughout the site, but this is the principal form found in phases IIb (EBX) and III (WBX,NBX,EBX CVI/cellar). 12% of the Cologne/ Frechen stoneware sherds at Camber are attributed to these early phases dating from *c* 1539–1542/3, and these represent an early occurrence of this ware. 46% of all the Cologne/Frechen stoneware is associated with phases IV (WBY, NBX, CTIV–VI), IVa (NBii, SBC, CTI–II) and IVb (NBi/ii, CTI) dating from *c* 1543–1637. The bulk fills of the N Bastion (NBi/ii) and deposits on the SE Courtyard (CTI), which are attributed to phase IVb, contain the majority of styles of drinking jugs, Bellarmine/Bartmann jugs and bottles, ranging from the early 16th to late 16th/early 17th centuries. These include a mid to late 16th-century plain drinking jug with pewter mount and the majority of the rose and oak plant decorated drinking jugs of *c* 1500–1550. Various types of Bellarmine/ Bartmann jug include an early to mid 16th-century jug with rose tendrils and large square facemask; a *c* 1527–1550 jug with foliage band; a *c* 1550–1590 jug with inscription band; a *c* 1527–1570 jug with portrait medallions and a *c* 1595–1605 painted Frechen form. Of note is a bottle with rosette medallion dated as "current by 1629" (Hurst *et al.*1986) also in the bulk fill of the N Bastion. Phase V contains a further 12% of the Cologne/Frechen sherds which again include a range of early 16th century forms such as the rose and oak leaf design drinking jugs, Bellarmine/Bartmann jugs with portrait medallions of *c* 1527–1570 and bottles with rosette medallion dated as 1629+ (Hurst *et al.*1986). This latest style of Bartmann bottle occurs in phases V and VI in the SW Gallery (GVI), the Multiple Garderobe and the Keep.

Illustrations:

17. Cologne drinking jug with plain rim (6 cm) and cordon at base of neck. Decorated with applied trailing stems, oak leaves and acorns. The neck is decorated with applied roses. Entrance Bastion (CV), phase V.
18. Cologne drinking jug with plain rim (8 cm) and cordon at base of neck. Decorated with applied trailing stem and rose leaves and rose flowers. The neck is decorated with applied roses. Entrance Bastion (CVI) cellar, phase III+.
19. Cologne jug with slightly tapered tall neck and plain rim (6 cm). Body decorated with trailing stems springing from an urn on a plinth and neck with applied portrait heads of a man in contemporary dress. Entrance Bastion (CVI) cellar, phase III+.
20. Bartmann jug with central foliage bands, acanthus palmettes and portrait medallions containing a man's head. N Bastion Interior (NBi/ii), phase IVb.
21. Frechen Bartmann jug with broad naturalistic mask. The glaze is a pale yellow colour and the eyes and beard are highlighted in cobalt blue. Phase IV deposits in Courtyard VI (CTVI), N Bastion Interior (NBi/ii) phase IVb and Courtyard II (CTII) phase V.
22. Cologne/Frechen drinking jug with central band containing scrolling foliage interspersed with portrait medallions. The ends of the scrolls have small portrait facemasks. The body is decorated in randomly applied shells/pinecones. Phase IVb deposits in N Bastion Interior (NBi/ii), phase VI in N Bastion Exterior (NBX) and 1976 N Bastion, unstratified.
23. Frechen Bottle with small neck (4 cm) and debased Bartmann facemask. Courtyard VI, phase V.
24. Frechen Bottle with narrow cordoned neck (4 cm). Narrow Bartmann facemask with oval medallion below. The heraldic medallion is purely decorative. Courtyard IV, phase IV.
25. Frechen Bottle with Bartmann facemask and four heraldic medallions around the centre of the vessel. Each coat of arms is of the Duchy of Julich-Kleve-Berg (1) (Goodall 1997, 368). Gallery VI (GVI), phases IV and V.

Westerwald Stoneware *(Fig. 6.4 No. 26)*

Fabric 35.

Forms: 8 of the 9 sherds in this fabric type are from the same Biconic jug decorated with panels of blue cobalt glaze (Fig. 6.4.26). The ninth sherd is undiagnostic.

Dating: These sherds are from a typical early 17th-century vessel (Hurst *et al.* 1986, fig.107.338 and pl. 45) and occurred at Camber in phase IV (CTIV–V, WBI, GII) dated from between *c* 1543 and 1637. The sherds are too few to register as an identifiable percentage of the total assemblage.

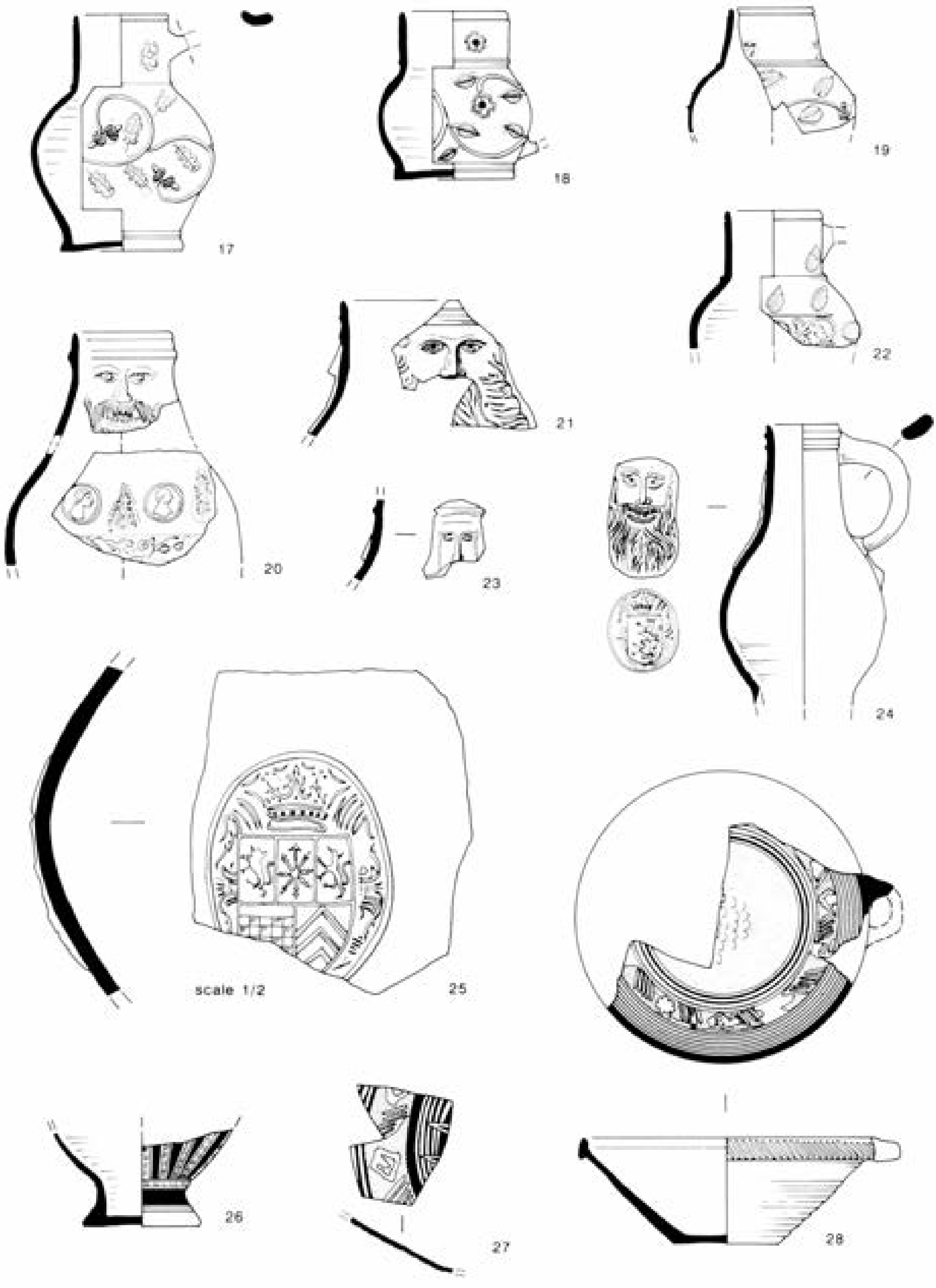


Figure 6.4: Pottery nos. 17–28, Continental imports (scale 1:4)

Illustrations:

26. Base of Biconic jug decorated on the lower part with incised gadroons painted blue, separated by rouletted vertical ribs highlighted in alternating grey glaze and blue. The design ends at a rouletted cordon around the base, below which is a painted band of blue. Courtyards IV–V and W Bastion Interior, phase IV.

Lead Glazed Earthenware *(Fig. 6.3 No. 16)*

Fabric 5, thin section sample 1030

Fabric: This fine quartz tempered pink/white fabric is indistinguishable from the fabric of the stove tiles also found at Camber and is therefore believed to be an imported North German product. Streeten noted that in textural analysis sample 1030 may have been a continental import but that similarities between locally-produced earthenwares and imports from the Low Countries presented significant problems of identification (Streeten1985a). Sample 1030 is, however, a fragment of stove tile and therefore not particularly reliable for the identification of this vessel fabric.

Forms: 37 vessels include 26 Grapen, 1 small jug with a rilled body like a drinking jug, and 2 lids. The 26 typical Grapen have tall or short tripod feet, a rounded body with rilled upper section and a short everted rim with two handles (Fig. 6.3.16). All these vessels have a distinctive continuous dark yellow glaze with frequent dark brown flecks caused by the iron content of the fabric. One vessel is exceptional in having a dark brown glaze on the interior and a splash of copper green glaze on the exterior of the rim.

Dating: These earthenwares are most likely to be 16th-century products of North German provenance, where kiln sites are known in the Coppengrave (Stephan 1981). At Camber this ware is found in phase IIb and III deposits (EBX, WBY) from *c* 1539, but is also present in occupation layers and redeposited material in phases IV, IVa and IVb (NBY, WBX, NBi–ii, SBC, CTI) dating from between *c* 1543 and 1637. A small number of sherds are present in phases V and VI but by comparison with the previous phases these are likely to be residual. These 136 sherds constitute less than 1% of the total assemblage.

Illustrations:

16. Grapen with everted thickened rim (14 cm) and two small strap handles. Good quality yellow lead glaze flecked with brown, continuous on the interior, but usually partial and on the upper part of the exterior surface. Upper part of the vessel rilled. Lower exterior surface often darkened/sooted. N Bastion 1976 collection, unstratified.

Werra Slipware *(Fig. 6.4 Nos 27–28)*

Type Fabric 32

Forms: 5 flanged dishes (Fig. 6.4.27) and a handled bowl (Fig. 6.4.28) are typical examples of this German Red Earthenware. The vessels are decorated with slip and sgraffito patterns.

Dating: The main period of export for Werra Slipware to the Low Countries was between 1580 and 1630 and though frequently found in Britain in contexts of the second quarter of the 17th century century it is likely to be residual after *c* 1625 (J G Hurst pers. comm.) The handled bowl (Fig 6.4.28) occurs in phase IVa occupation layers in the SW Courtyard (SBC), predating the collapsed Rampire. Two of the flanged dishes occur in phase IV (GV, CTV) and a further three in phases V and VI (AI, AV, CTIII, CTV). All of these vessels, therefore, occur at Camber between *c* 1543 and 1637+. These 15 sherds do not register as an identifiable percentage of the total assemblage.

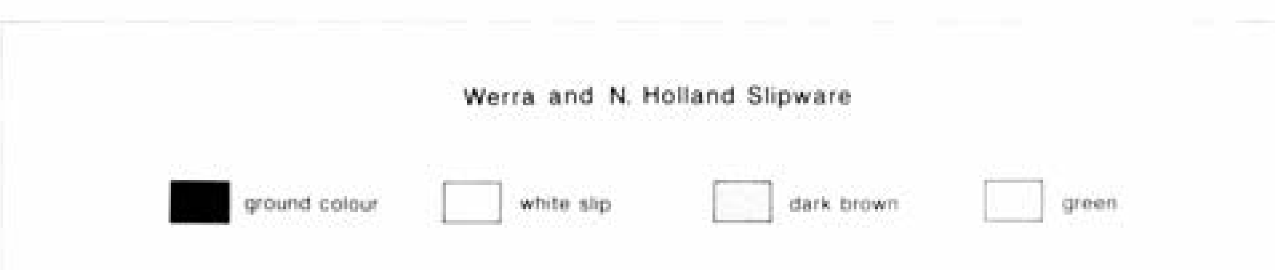
Illustrations:

27. Part of a shallow dish with central motif containing radiating rays from a central sun (Bruijn 1992, 225). The central motif is surrounded by concentric lines of white slip and the sides of the dish are decorated with a border of dark brown/green with dashes of white slip alternating with 'rhomboid' shapes in white slip. Courtyard III, phases V and VI.
28. Handled bowl with hammer-head rim (20 cm) decorated with white dashes of slip. Interior of bowl covered in white slip and copper green glaze. Sgraffito bunch of grapes in centre surrounded by incised concentric circles and a band of dark green with applied white slip dashes alternating with indistinguishable shapes (Bruijn 1992, 261). SW Courtyard, phase IVa.

Weser Slipware

Type Fabric 33

Form: 5 flanged dishes with wavy line decoration in orange and green slip trail are classic examples of this German



Redware. These 16 sherds do not register as a percentage of the total assemblage.

Dating: The main period of trade of Weser Slipwares to the Low Countries was between 1580 and 1630 but most was exported between 1590 and 1620 (Hurst *et al.* 1986). Flatwares are the most common import and well known in Britain. At Camber three of the dishes are contemporary in phases IVa (SBC) and IV (CTII, CTIV) dating from between *c* 1543 and 1637. Sherds from two of these dishes are redeposited in phases IVb (CTI) and V (SBG, CTIV). The other two dishes are intrusive in phase III (Keep) and residual in phase VI.

Seltzer bottles

Fabric 54

One fragment from a 19th-century imported seltzer bottle is intrusive in a phase V context outside the W Bastion.

Continental Imports - Low Countries

Low Countries Slipware *(Fig. 6.5 Nos 29–30)*

Type Fabric 31

Forms: 13 vessels include 11 small bowls, 1 flanged dish and a cauldron with slip decoration. The small bowls have collared rims, two loop handles and a foot-ring base and are decorated internally with white slip and zones of copper green glazing (Fig. 6.5.29). One bowl has sgraffito decoration through white slip and a copper green glaze on the interior. One complete example of a small tripod pipkin (Fig. 6.5.30) is decorated with white slip concentric circles and dots, highlighted in copper green, on the exterior. One fragment of a flanged dish is also slip decorated on the interior.

Dating: Products from the Low Countries date from *c* 1400 but those from North Holland date from *c* 1575 onwards (J G Hurst pers. comm). The small bowls at Camber are therefore more likely to be the North Holland products of *c* 1575 +. These are primarily associated with phases IV (CTIV–VI, WBY) and IVb (CTI) dated between *c* 1543 and 1637. The complete pipkin (Fig 6.5.30) also occurred in phase IV (CTV). A small number of vessels occur in phase V (GVI, BIV, CTV) dated 1637+ but are residual in phase VI. These vessels account for 1% of the total assemblage.

Illustrations:

29. Small bowl with foot-ring base and plain rim (14 cm) above a collar and cordon. Only one handle surviving. Interior decorated with white slip painted with copper green glaze in segments alternating with the brown body of the vessel. Courtyard II phase IVb and redeposited in AV phase VI.
30. Tripod pipkin with three pinched feet, central carination on the body and lid seated, collared rim (13 cm). Decorated with white slip trail in concentric circles and alternating dots. The dots are highlighted in copper green glaze. Courtyard V, phase IV.

Tin Glazed Earthenware- Spanish, Netherlands and English. *(Fig. 6.5 Nos 31–35)*

Type Fabric 30

Forms: 33 vessels can be identified, amongst which 18 diagnostic forms can be recognised. The majority of these vessels are from the Netherlands, but also from Spain and England. One tall plain rim from a vase? similar to a vessel illustrated by Hurst, Neal and van Beuningen (1986 fig. 20.53), could be a mid to late 15th-century or 16th-century Spanish/Mediterranean Lustreware (J G Hurst pers comm). The glaze is a cream/white colour on both interior and exterior surfaces, with a decayed patch of gold/yellow, which could be deterioration of the glaze, or the traces of lustre on the exterior.

North Netherlands Maiolica vessels include 14 dishes in 5 polychrome decorative styles. Two vessels have a chequer board design (Fig. 6.5.31), 3 vessels a geometric design (Fig. 6.5.32), 3 vessels a floral design (Fig. 6.5.33), 1 vessel a second type of geometric central design (Fig. 6.5.34) and 1 a central rosette (Fig. 6.5.35). The designs of these vessels can be paralleled by examples in North Netherlands Maiolica produced in the later 16th century at many centres including Haarlem and Amsterdam (Hurst *et al* 1986). The rosette motif is a typical 16th-century motif of both South and North Netherlands Maiolica. Eight small fragments (average 4 g) are from a maximum of five possible flower vases. These are sherds from hollow vessels decorated with vertical pale blue and yellow lines and a pale green motif and are one of the most commonly traded South Netherlands Maiolica forms dating from *c* 1500–1575 (Hurst *et al* 1986). Recent neutron activation analysis has shown that some of these are Italian, not South Netherlands Maiolica (Gaimster 1999). Four Anglo/Dutch straight-sided drug jars or

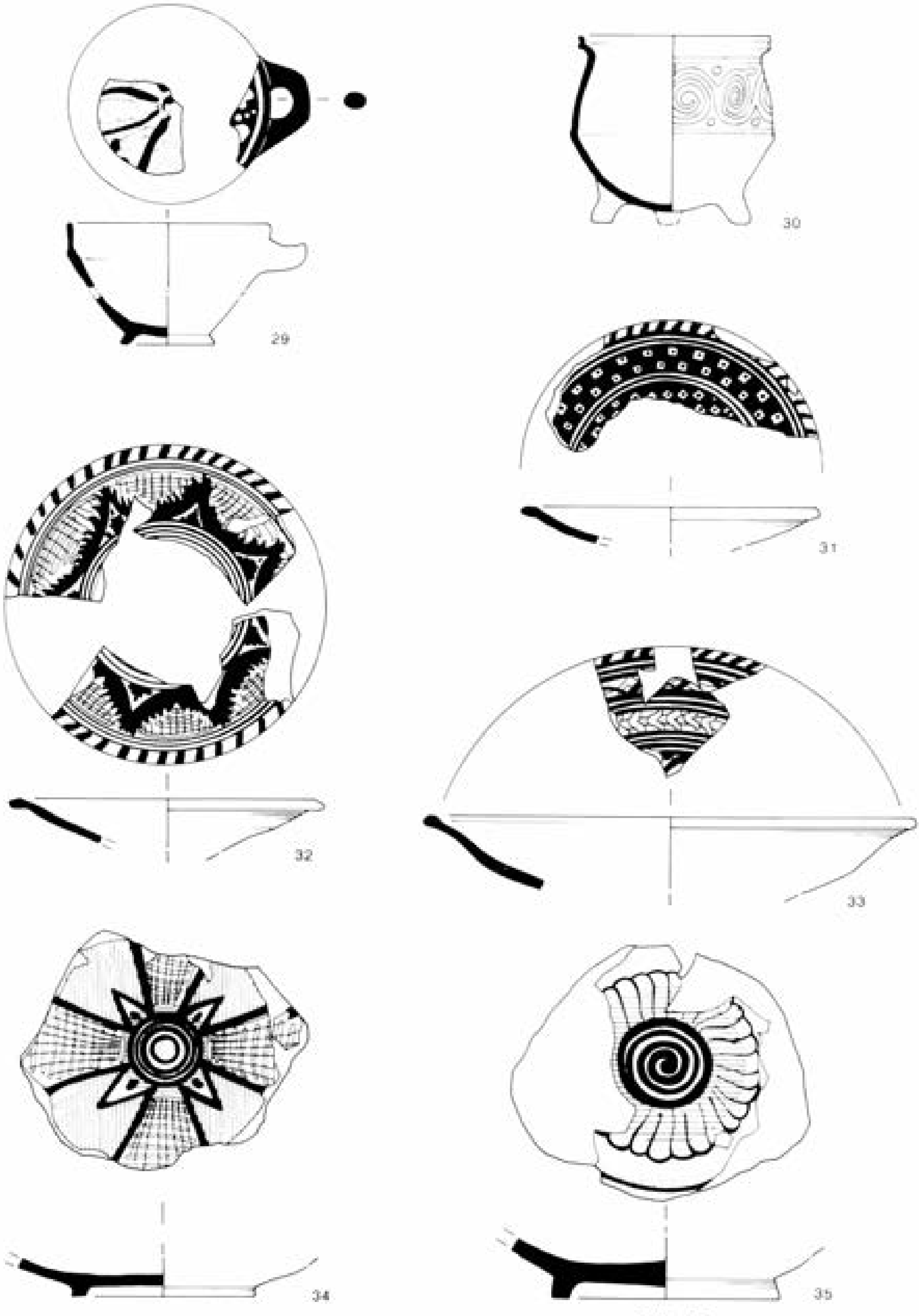


Figure 6.5: Pottery nos 29–35, Continental imports (scale 1:4)

albarelli are discernible from base and lower body sherds. One of these is decorated with bands and dashes of cobalt blue. Two tankards, represented by a plain rim and tankard handle with scroll at the base are Southwark products of *c* 1620s (J G Hurst pers. comm.). Both examples have a speckled manganese/purple glaze.

Dating:

Spanish: Mediterranean? The one example at Camber occurred in part of the E Bastion (EBB) in phase V (1637+).

North Netherlands: N Netherlands Maiolica is conventionally dated as late 16th century though recent discoveries of early 16th-century wasters in the north of the Netherlands have brought this date into question (Hurst *et al* 1986). Eight of the 14 dishes at Camber occur in phases IV, IVa and IVb-VI dating from between *c* 1543 and 1637. Of particular interest are three dishes (Fig.6.5.33–34) associated with the SW Courtyard (SBC) and Gallery as they represent vessels contemporary with the phase IVa use of the courtyard, gallery and blocking of a doorway in the second half of the 16th century before the area was filled by the Rampire and are the earliest occurrences of North Netherlands Maiolica at Camber. The sherds from these dishes are found in phase IVa (SBC, SBG) and IV(GVI) and are residual in phase V (1637+). They are associated in occupation levels of phase IVa with 17th-century Martincamp Type III flasks and a Werra bowl (Fig. 6.4.28) imported between *c* 1580 and 1625 and are therefore most likely to be late 16th-century North Netherlands products. Four other dishes (Fig. 6.5.31–32) occur in phase IV (WBY, GVI, CTIV, CTVI) with residual sherds in phases V (GVI) and VI (AVI). One dish, with a central rosette design (Fig.6.5.35), occurs in the phase IVb bulk fill of the S Bastion dating from late 16th or early 17th century. The remaining 6 dishes are residual in phases V (CIV, CTIII) or VI (CTIV, AV) or unstratified.

South Netherlands: The earliest occurrence of the flower vases are two sherds in phases IV (CTVI) and phase IVb (NBi/ii) dating from *c* 1543–1637. The remaining sherds are residual in phase V (CTV-VI, WBI).

Anglo/Dutch: The drug jars are found in phases IVb (CTI), V (CTIII) and VI (AV) dating from between *c* 1600 and 1637 and afterwards.

English: Two tankards dating from *c* 1620s occur in phases IV (CTIV) and V (BII). The rim in phase IV is probably contemporary dating from occupation up to 1637, but the handle sherd is redeposited in phase V after 1637+.

All the Tin Glazed Earthenwares constitute 1% of the total assemblage

Illustrations:

31. Dish with thickened rim (20 cm). Glazed internally in dark blue chequer board pattern with white squares containing a blue dot. Centre and interior of rim highlighted with two white concentric lines. Rim decorated with blue dashes. Underside grey/white mix of lead and tin glaze. W Bastion Exterior (WBY) and Gallery VI, phase IV and redeposited in Gallery VI, phase V.
32. Dish with thickened rim (22cm). Central motif (missing), surrounded by three blue concentric lines surrounded by large triangular motifs joining into arcs of dark blue. Semi-circular areas are filled with horizontal lines in yellow/orange crossed with vertical blue lines. Three concentric circles run around the interior of the rim which is decorated with blue dashes. The underside of the dish is glazed in a lead/tin mixed glaze. Gallery VI, phase IV and redeposited in Gallery VI, phase V and AVI, phase VI.
33. Dish with thickened rim (34 cm) decorated with blue dashes. Interior of plate decorated in bands of blue and yellow flowers and lozenges bordered by three concentric lines. Central motif missing. The underside of the dish is glazed in a mix of lead and tin. SW Courtyard (SBC), phase IVa under the Rampire, Gallery VI, phase IV and redeposited in SW Gallery (SBG), phase V.
34. Central part of a large dish with foot-ring. The central motif is a circle of orange glaze surrounded by concentric blue lines from which radiate four petal-shaped triangles containing blue dots, and eight longer lines dividing the interior of the dish into eight segments. The segments are filled with yellow/orange horizontal lines crossed by blue vertical lines alternating with segments of plain green glaze. The underside of the dish is glazed in a mix of lead and tin. SW Gallery (SBG), phase IVa, under the collapse from the Rampire.
35. Central part of a dish with foot-ring. Central rosette design outlined in dark blue and shaded in light blue edged with yellow. Underside glazed in mix of lead and tin. SW Courtyard (SBC) phase IVb, collapsed Rampire material.

Quartz-Tempered Red Earthenwares

Low Countries type Redware *(Fig. 6.6 Nos 36–45)*

Type Fabric 16, thin section sample 1041

Fabric: This fabric is oxidised throughout to a bright red colour, and is heavily tempered with abundant fine sub-angular quartz which are well-sorted and all less than 0.2 mm. Fabric 16 is entirely different from any of the four early post-medieval local kilns, both in textural analysis and in the style of vessel form produced. It is most likely an import from the Low Countries. Similar coarse red earthenware fabrics have been described at Bayham Abbey, Fabric DXIII (sample 412), but described as 'miscellaneous' (Streeten 1983a).

Forms: 226 vessels occur in this fabric in a wide variety of forms. Cauldrons are the most common, and there are 100 examples with thickened (Fig. 6.6.39; cf. Fig. 6.9.65), everted (Fig. 6.6.40; cf. Fig. 6.7.52), lid-seated

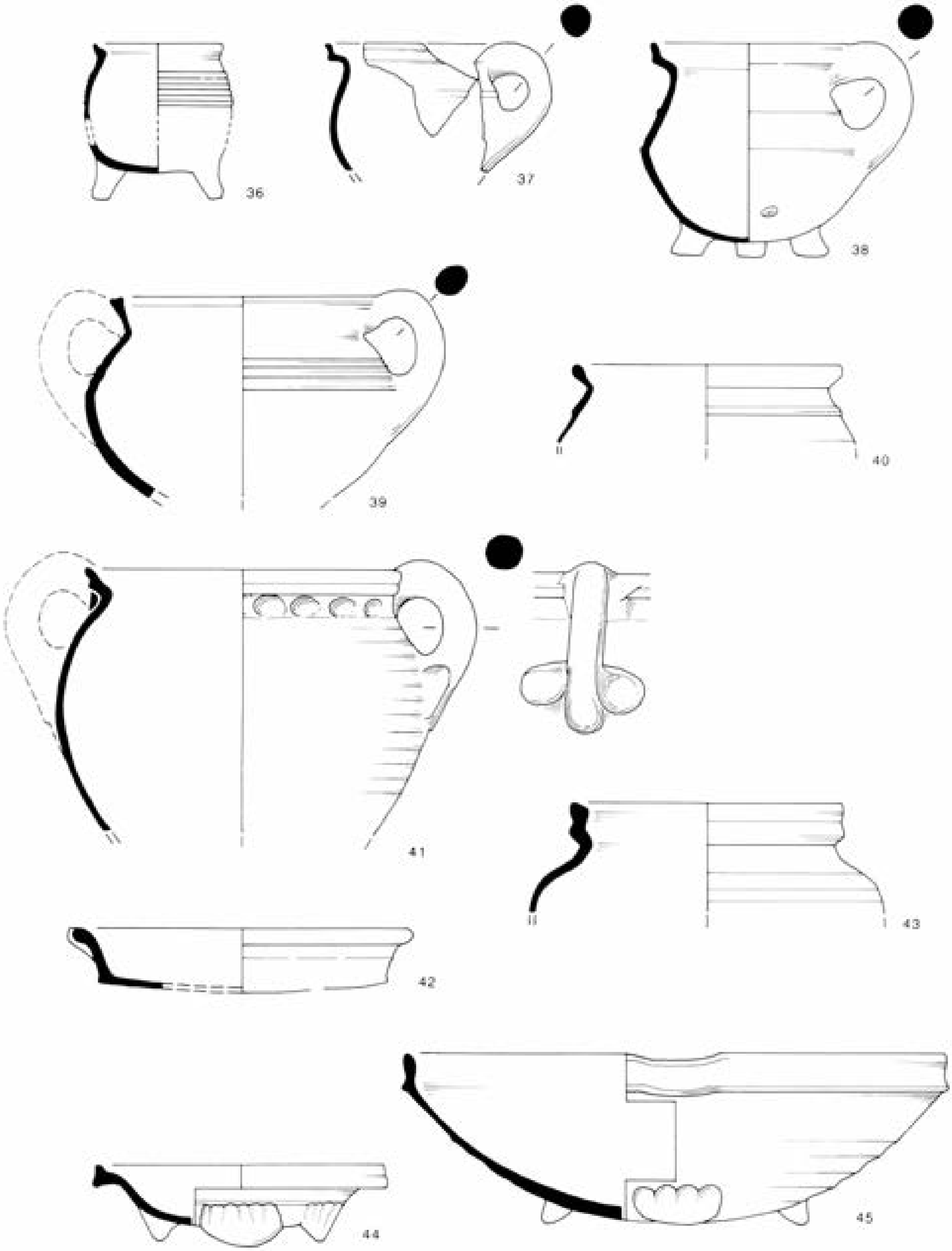


Figure 6.6: Pottery nos 36–45, Low Countries type Redware (scale 1:4)

(cf. Fig. 6.8.59) or collared (Fig. 6.6.41) rims. There are also 15 tripod pipkins (Fig. 6.6.36–38), 8 collar-rimmed dishes, 1 shallow dish (Fig. 6.6.42), 1 handled bowl (cf. Fig. 6.10.83), 1 small bowl with footring similar to the slipware vessels (cf. Fig. 6.5.29), 1 small bowl/porringer with collared rim (cf. Fig. 6.10.75), 1 chafing dish (cf. Fig. 6.11.85), 1 flanged dish (Fig. 6.6.44), 1 jar (Fig. 6.6.43) and 1 lid (cf. Fig. 6.11.90). Most of these vessel forms have a continuous orange lead glaze on the interior and splashed glaze on the exterior surface.

Dating: Low Countries type Redwares were imported into Britain from the late 14th to the 17th centuries (Ellison 1981). The 687 sherds in this fabric are a small part of the total assemblage (7%) and are distributed throughout the site. The majority of sherds (27%) occur in the phase IVb redeposited material in bulk fills of the bastions and Rampire (NBi/ii, SBC, CTI), but the small percentages of this ware in phases IIb (5%), III (13%) and occupation layers in phases IVa (3% in SBC, CTII) and IV (16%) date the occurrence of this ware at Camber Castle between *c* 1539 and 1637. A smaller quantity in phase V (8%) is possibly contemporary (*c* 1637+) but the 9% in phase VI is residual.

Illustration:

36. Tripod pipkin with rilled upper body and everted rim (9 cm). E Bastion Exterior (EBX), phases IIb and VI, AVII, phase IV/V.
37. Tripod pipkin with single rod handle and lid seated collared rim. E Bastion Exterior (EBZ), unstratified.
38. Tripod pipkin with lid seated, collared rim (14 cm), pinched feet, carinated body with two cordons, and single rod handle. W Bastion Exterior (WBY), phase IV.
39. Tripod cauldron with thickened, everted rim (20 cm). Upper part of the body is rilled with one of two handles surviving. Entrance Bastion (DI), phase IV.
40. Cauldron with thickened, everted rim (20 cm) and cordons on the body. Courtyard V, phase VI.
41. Tripod cauldron with everted collared rim (22 cm) with lid-seating and thumbed cordon around the neck. One of two rod handles survive with thumbed attachments. Entrance Bastion (DI), phase IV.
42. Shallow dish with thickened everted rim (24 cm) and pinched spout. E Bastion Exterior (EBX), phases III and VI.
43. Jar with thick collared rim (20 cm). Courtyard I, phase IVb bulk fill.
44. Small flanged dish with claw feet and thickened flanged rim (21 cm). E Bastion Exterior (EBX), phase III.
45. Bowl with collared rim (38 cm) and pouring spout. The rounded base of the vessel rests on three claw feet. Unstratified.

Red Earthenware *(Fig. 6.7 Nos 46–47)*

Type Fabric 17, thin section sample 1042

Fabric: A second coarse earthenware fabric is less well sorted with abundant fine subangular quartz of less than 0.1 mm and moderate quartz of 0.2 mm. This is a bright red fabric with moderate red iron oxides of 0.2 mm and occasional large oxides of 1.0 mm. This fabric is frequently reduced pale grey on the exterior surfaces and therefore frequently has a reduced olive green lead glaze. Fabric 17 (sample 1042) was grouped as a 'miscellaneous post-medieval lead glazed red ware' by Streeten (1985a).

Forms: 233 vessels include 47 cauldrons with thickened, everted and collared rims (cf. Fig. 6.6.39–41), 3 collar-rimmed dishes (cf. Fig. 6.6.45), 10 deep bowls (cf. Fig. 6.10.82), 2 chafing dishes (cf. Fig. 6.10.85), 1 chamber pot (cf. Fig. 6.9.68), 3 handled jars (cf. Figs 6.7.48, 6.9.67, 6.9.69), 1 pedestal candlestick, 1 handled bowl (cf. Fig. 6.10.71), 10 jars (cf. Figs 6.8.57, 6.8.61, 6.7.53, 6.8.59), 1 large oval dripping pan (Fig. 6.7.46), 1 small jug (cf. Fig. 6.9.64), 13 tripod pipkins occasionally with a pinched spout (cf. Figs 6.8.55, 6.7.49, 6.6.40), 3 wide bowls (Fig. 6.7.47), 2 flanged dishes (cf. Fig. 6.11.86), 2 shallow dishes (cf. Fig. 6.6.42) and a urinal? The glaze is always continuous and usually thickly applied to both surfaces on all of these vessels, which on firing produces a high gloss.

Dating: The 746 sherds in this fabric type are a small part (7%) of the total assemblage. The majority of these sherds (39%) are associated either with redeposition in phase IVb (NBi/ii, CTI, SBG, SBC) or demolition in phase V (1637+). The smaller percentage of sherds in phase IIb (1% in EBX), phase IV (16% in NBY,WBX,WBY, CTI–II, CTIV) and phase IVa (8% in NBi, SBG, SBC, CTI–II) are contemporary with the use of the castle up to 1637.

Illustrations:

46. Oval dripping pan with pinched spout at one end and pulled handle attached to one side. Thick, crudely potted sides, heavily knife-trimmed around the flat base. Glazed continuously on the interior. S Bastion Courtyard (SBC), phase IVa.
47. Wide bowl with flanged rim (36 cm). Keep, phase III.

Red Earthenware *(Fig. 6.7 Nos 48–49)*

Type Fabric 6, thin section sample 1031

Fabric: A moderately tempered fabric with fine subangular quartz of between 0.1 and 0.2 mm. There is also occasional polycrystalline quartz of 0.4 mm. Moderate red iron oxides range from 0.2 mm up to 0.5 mm. The sherds are all oxidised red throughout with a dark brown/black surface. Fabric 6 (sample 1031) has been grouped in textural analysis with the late 16th- to early 17th- century kiln products of High Lankhurst, Westfield (samples 126 and 356; Streeten 1985a), as defined at Battle Abbey (Fabric Fiii ,sample 972). It is also grouped by textural analysis with Fabric Fviii at Battle Abbey and Fabric Di (sample 402) at Bayham Abbey (Streeten 1985a).

Forms: 69 thin-walled vessels include 21 tripod cauldrons with thickened (cf. Fig. 6.6.39), collared (cf. Figs 6.6.41 and 6.8.59) and flanged (cf. Fig. 6.11.96) rims. There are also 13 tripod

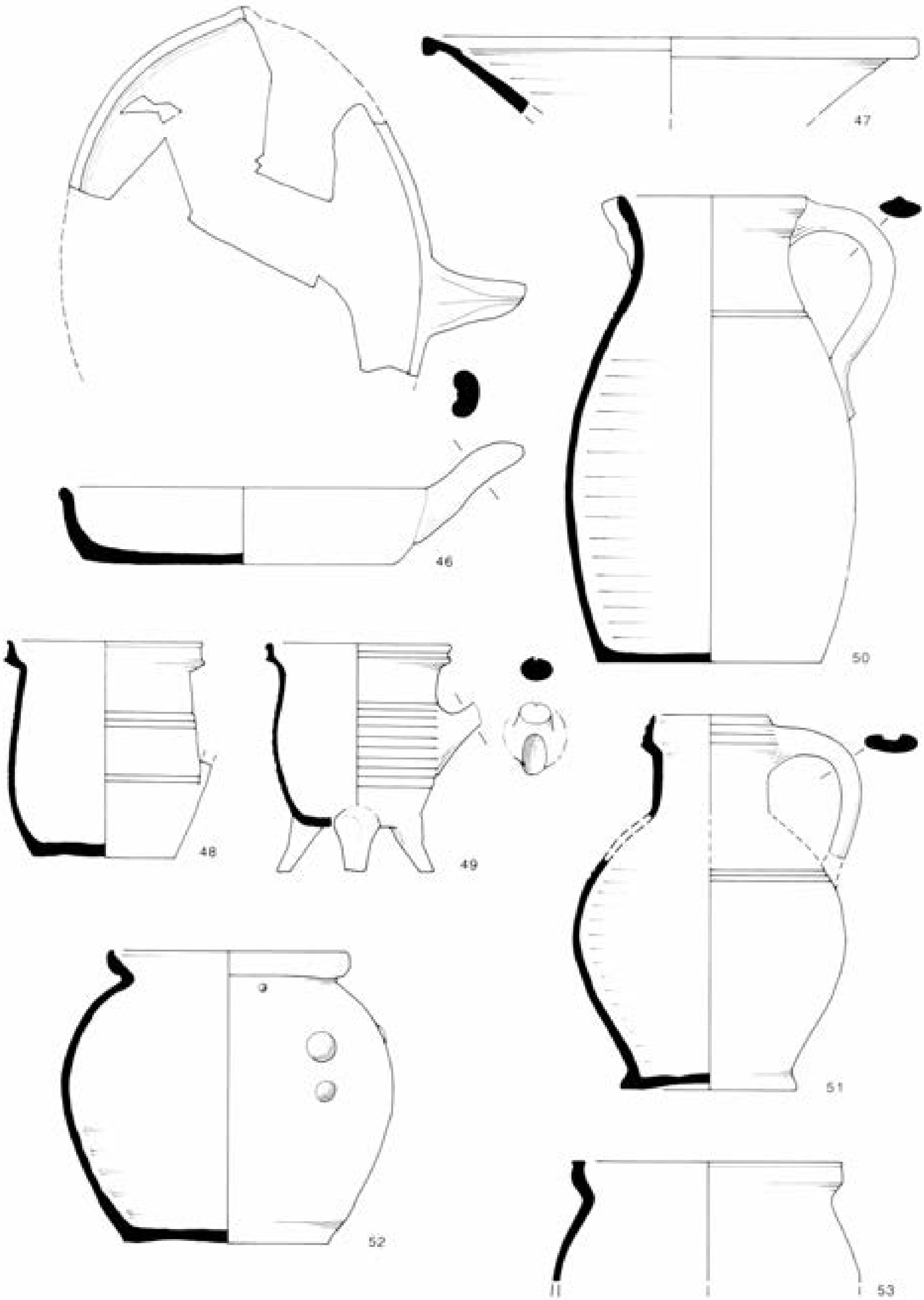


Figure 6.7: Pottery nos 46–53, Red Earthenwares (scale 1:4)

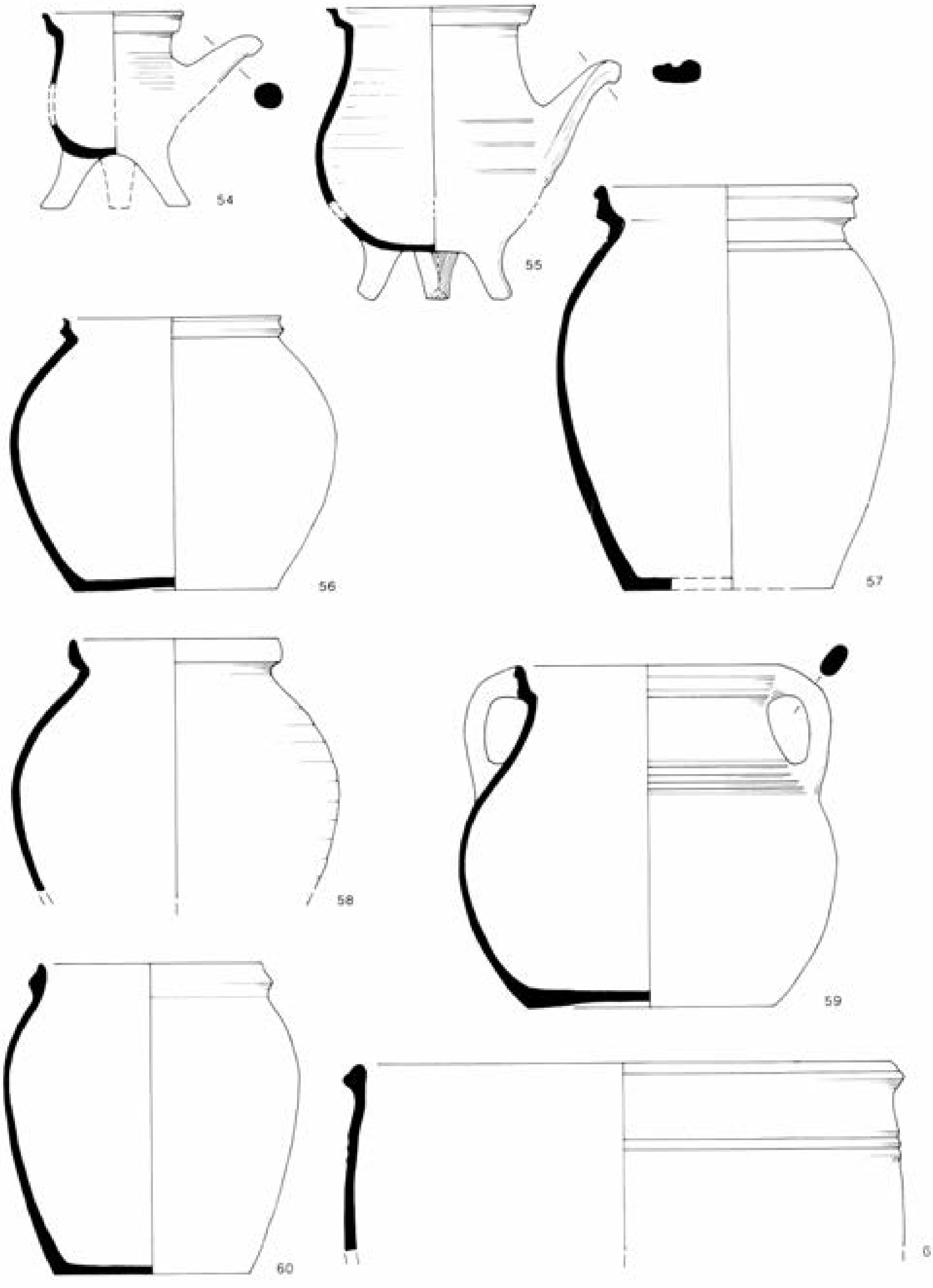


Figure 6.8: Pottery nos 54–61 Red Earthenwares (scale 1:4)

pipkins (Fig. 6.7.49 and cf. Fig. 6.11.95), 1 chafing dish (cf. Fig. 6.11.85), 3 cups (cf. Fig. 6.11.89), 4 handled jars/chamber pots (Fig. 6.7.48), 2 lids (cf. Fig. 6.11.90) and 1 small bowl/porringer.

Dating: The 253 sherds in this fabric constitute 3% of the total assemblage at Camber. The presence of sherds in phase IIb (at the level of construction of the E Bastion) suggests that this fabric could have been in use from *c* 1539. The majority (55%) of this fabric is, however, primarily associated with phases IV (20% in WBY), IVa (2% in SBC, NBii, CTI) and IVb (33% in CTI and NBi/ii) dating from between *c* 1543 and 1637. The handled jar/chamber pot (Fig 6.7.48) is one of a number of complete vessels attributed to phase IV from outside the West Bastion (WBY). 15% of the sherds are still present in the abandonment levels of phase V. Fabric 6 therefore occurs from 1539/40 to the late 16th or early 17th century and might still be contemporary after 1637+.

Illustrations:

48. Handled jar/chamber pot with collared rim (14 cm) and strap handle. Simple decoration of incised lines in bands around the body. Glazed internally. W Bastion Exterior (WBY), phase IV and SW Courtyard (SBC), phase IVb.
49. Tripod pipkin with collared rim (13 cm), pinched feet, rilled body and single pulled rod handle. Glazed internally and externally. Courtyard I (CTI), phase IVb.

Red Earthenware

Type Fabric 3, thin section sample 1028

Fabric: This is a sparsely tempered fabric with fine subangular quartz of between 0.1 and 0.3 mm. There are also red iron oxides of 0.2 to 0.4 mm. The fabric is oxidised pale pink throughout with reduced orange/brown surfaces. Fabric 3 (sample 1028) is linked with Fabric Dxi (sample 410) at Bayham Abbey and with Fabrics Fvi and Fxii (samples 1005 and 987) at Battle Abbey by textural analysis (Streeten 1985a). At Battle Abbey, it is ascribed as almost certainly a product of the High Lankhurst kiln (Streeten 1985b), though Streeten (1985a) had previously noted in textural analysis that sample 1028 may have been a continental import, difficult to distinguish from the locally-produced earthenwares.

Forms: 5 unglazed vessels occur in this fabric. All the vessels are thin walled cauldrons/ jars, one of which has red painted linear decoration. The majority of the sherds are from one vessel (cf. Fig. 6.6.40) with incised line decoration on the body.

Dating: These 47 sherds account for less than 1% of the total assemblage. The majority are from one vessel and are primarily derived from the redeposited fill in the N Bastion (NB i/ii); phase IVb . Two sherds in a phase IVa occupation layer below the N Bastion fill are the only dating evidence for the presence of this ware at Camber between *c* 1543 and 1637.

Red Earthenware *(Fig. 6.7 Nos 50–53)*

Type Fabric 14, thin section sample 1039

Fabric: This is a fine fabric with well-sorted moderate subangular quartz of less than 0.1 mm. There are also occasional limestone inclusions and fine mica. The fabric has an oxidised pink/red core and reduced surfaces. This fabric, sample 1039, is categorised as one of the hard-fired earthenwares (Oxidised buff wares: E Sussex) in textural analysis and linked with sample 476 at Michelham Priory, approximately 35 km west of Camber (Streeten 1985a; 1991).

Form: 258 vessels include 45 jars (Fig. 6.7.52–53; cf. Figs 6.6.40, 6.8.56, 6.8.58-59, 6.8.61, 6.9.65–66), 2 tripod pipkins (cf. Fig. 6.7.49), 1 deep bowl (cf. Fig. 6.10.79), 1 small bowl/porringer (cf. Fig. 6.10.77), 9 handled jars/chamber pots (cf. Figs 6.9.67, 6.9.69), 7 jugs (Fig. 6.7.50–51; cf. Fig. 6.9.64), 1 cup (cf. Fig. 6.11.89), 1 flanged dish (cf. Fig. 6.11.86) and 1 costrel (cf. Pearce 1992 fig. 37.297/298). These vessels are usually unglazed and have a distinctive reduced light brown/purple surface.

Dating: The 692 sherds in this fabric are a small percentage (7%) of the total assemblage. 13 sherds in phases IIb (CTIII) and III (EBX, WBX, NBX, SBC) suggest that this ware could date from *c* 1539. A small group of 20 sherds occur in phase IVa occupation layers in the SW Gallery, SW Courtyard and NNE Courtyard (SBG, SBC, CTII). The majority of sherds (43%) are associated with phase IV, where there are large fragments from outside the W Bastion (WBY), in the N and W Courtyards (CTII, CTIV–VI), WSW and SSW Galleries (GV–VI) , outside the E Bastion (EBY) and a complete jar (Fig. 6.7.52) outside the Entrance Bastion (DI). A smaller amount (27%) of this fabric occurs widely in phase V (1637+). Fabric 14 therefore occurred at Camber between *c* 1539 and 1637+.

Illustrations:

50. Large jug with flat base and slightly flaring/everted rim (14 cm). Pulled spout opposite strap handle with raised central spine and central thumbed attachment at the base. Simple incised line decoration on shoulder. Entrance Bastion (CIV), phase V.
51. Globular jug with turned, flat base, narrow tall neck and cordoned inturned rim (10 cm). Grooved strap handle attached to shoulder and rim. Simple incised lines on shoulder exterior and splashed lead glaze on exterior of rim. Courtyard IV, phase IV.
52. Rounded jar with flat base and everted, thickened rim (18 cm). Surface blistered in firing. Entrance Bastion (DI), phase IV.
53. Jar with thickened rim (20cm). AI and AIV, phase V.

Red Earthenware *(Fig. 6.9 Nos 62–63)*

Type Fabric 29

Fabric: The fabric is moderately tempered with subangular quartz of 0.1 mm and occasional subangular quartz of 0.2–0.3 mm. The 'metallic' brown or green glaze described at Battle Abbey for Fabric Fviii (Streeten 1985b) appears to be very similar to the surface treatment and fabric of Camber Type 29, but the association cannot be proved by textural analysis as Type Fabric 29 was not included in Streeten's research (1985a).
Form: 57 vessels include 7 jars (cf. Figs 6.7.52, 6.8.57, 6.8.61, 6.9.66), 6 tripod pipkins (cf. Fig. 6.7.49), 9 handled jars/chamber pots (Fig. 6.9.62; cf. Fig. 6.9.69), 2 chafing dishes (Fig. 6.9.63), 5 cups (cf. Fig. 6.11.89), 1 jug (cf. Fig. 6.9.64) and 3 tankards. These vessels are characterised by a continuous thick manganese purple/brown glaze on both surfaces.

Dating: 68% of these 157 sherds are found equally in phases IV and V, primarily in the W Courtyards (CTIV–CTVI). An additional 12% of the sherds are associated with the phase IVb infilling (CTI and NBi/ii). Fabric 29 is, therefore, present at Camber between *c* 1543 and 1637+. They constitute 2% of the total assemblage.

Illustrations:

62. Jar/chamber pot with flat base, collared-rim (19 cm) and incised line decoration on the body. Glazed internally. May have a handle as in Fig. 6.7.48. Courtyard I, phase IVb.

63. Chafing dish with hooked rim (18 cm) and four applied lugs. Lower part of the vessel missing. Glazed on both surfaces. Courtyard V, phase IV.

Red Earthenware *(Fig. 6.8.54–61, Fig. 6.9.64)*

Type Fabric 18, thin section sample 1043

Fabric: The fabric is moderately tempered with subangular quartz of 0.1 mm and occasional subangular quartz of 0.2–0.3 mm. Also sparse red iron oxides of 0.2–0.4 mm. The fabric is oxidised pink/red throughout. Fabric 18 (sample 1043) has been grouped in textural analysis with the late 16th- to early 17th-century products of kilns at High Lankhurst, Westfield (samples 126 and 356) and identified as such at Battle Abbey (Fabrics Fiv and Fv, samples 978 and 982 and associated Fabric Fiii, sample 972; Streeten 1985b). This kiln product is also identified at Bayham Abbey as Fabric Diii (Streeten 1983a, sample 403).

Form: 304 vessels include a broad repertoire of vessels including 73 jars (Fig. 6.8.56–59, and Fig. 6.8.61; cf. Figs 6.6.41, 6.6.43, 6.7.52–53, 6.9.65–66), 16 tripod pipkins (Fig. 6.8.54–55; cf. Figs 6.6.38 and 6.7.49), 7 handled jars/chamber pots (cf. Figs 6.9.62, 6.9.67, 6.9.69), 2 chafing dishes (cf. Fig. 6. 11.85), 2 cups (cf. Fig. 6.11.89), 2 dripping pans (cf. Fig. 6.7.46), 1 jug (Fig. 6.9.64), 6 lids (cf. Fig. 6.11.90), 1 small bowl (cf. Fig. 6.10.73), 2 tankards and flanged dishes. These vessels are frequently glazed on the interior in a dark green or brown lead glaze and only occasionally splashed with lead glaze on the exterior.

Dating: The 1202 sherds in this fabric constitute 12% of the total assemblage. 4% of the sherds could be contemporary in phase III (1% in NBii and the Keep) and in phase IVa occupation layers (3% in NBii, SBC, CTI–II) some of which were sealed beneath the bulk fills. The majority of the sherds occur in phase IV (26% in GV–VI, DI, WBX, WBY, CTII, CTIV–VI) and phase V (35% in CTII–V) suggesting that Fabric 18 was in contemporary use at Camber between *c* 1542 and 1637+.

Illustrations:

54. Tripod pipkin with collared rim (10 cm), pinched feet, rilled body and single pulled rod handle. Glazed internally and externally. SSW Gallery (GVI) , phases IV and V.
55. Tripod pipkin with lid seated, collared rim (16 cm), pinched feet, rilled body and single pulled rod handle. Glazed internally and externally. Vaulted Ring Passage, unstratified.
56. Rounded jar with collared rim and possible lid-seating (16 cm) and flat base. Entrance Bastion (DI), phase IV.
57. Large rounded jar with thickened collared-rim and lid seating (19 cm). Flat base. AVI, phase VI.
58. Rounded jar with everted, thickened rim, very similar in form to Fig. 6.7.52. W Bastion Exterior (WBY), phase IV.
59. Handled jar with thickened, collared-rim and lid-seating, similar to Fig. 6.8.57, but with two short rod handles attached to shoulder and rim (20 cm). Slightly concave base. Simple incised line decoration around shoulder. SSW Gallery (AVI), phase VI.
60. Jar with inturned thickened rim (18 cm) and flat base. Entrance Bastion (CV), phase V. 61. Large open storage jar with thickened/clubbed rim (40 cm). Incised line decoration around the upper part of the body. Courtyard 1, phase IVb.
64. Jug with rounded body , short neck and inturned collared-rim (12 cm). Large grooved strap handle joined to rim? and body. Incised line decoration on shoulder. Flat base. W Bastion Exterior (WBY), phase IV.

Red Earthenware
(Figs 6.9.65–70, 6.10.71–83, 6.11.84–88, 6.11.90)

Type Fabric 20, thin section sample 1045

Fabric: This fabric is moderately tempered with quartz ranging from 0.1 to 0.3 mm and occasional red iron oxides up to 0.5 mm. The fabric is usually pink/red with reduced pale grey/buff surfaces. Fabric 20 (sample 1045) is identified as a 'miscellaneous post-medieval lead glazed earthenware' by textural analysis (Streeten 1985a) and cannot be linked with any of the products of Battle or Bayham Abbey (Streeten 1983a and 1985b).

Forms: Although on sherd number this fabric only accounts for 14% of the total assemblage, the 539 vessels are the largest group of vessels found at Camber. These include 11 tripod cauldrons (cf. Figs 6.6.36, 6.7.49, 6.8.54 and 6.11.95), 20 small tripod pipkins (cf. Fig. 6.7.49), 38

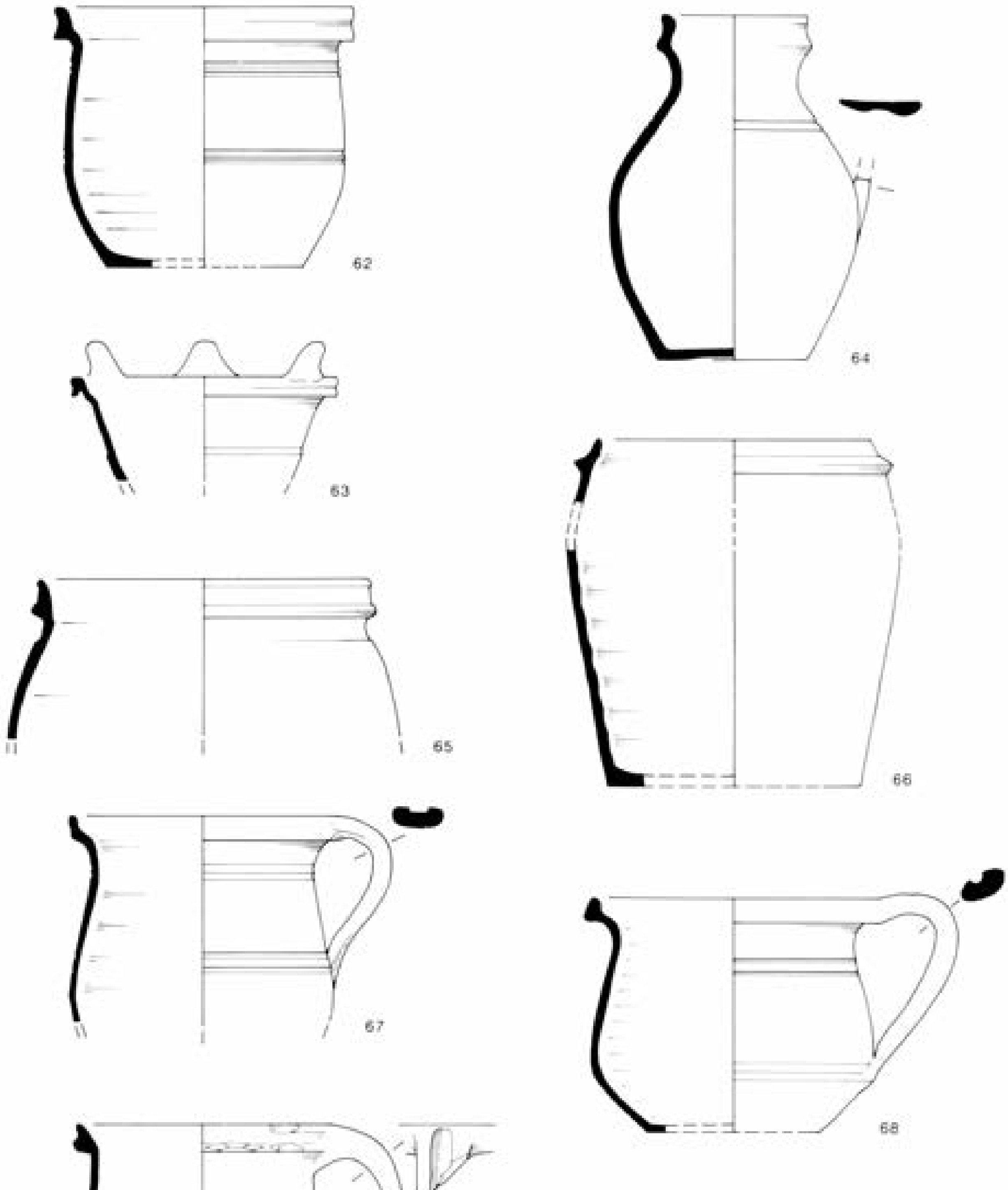


Figure 6.9: Pottery nos 62–70 Red Earthenwares (scale 1:4)

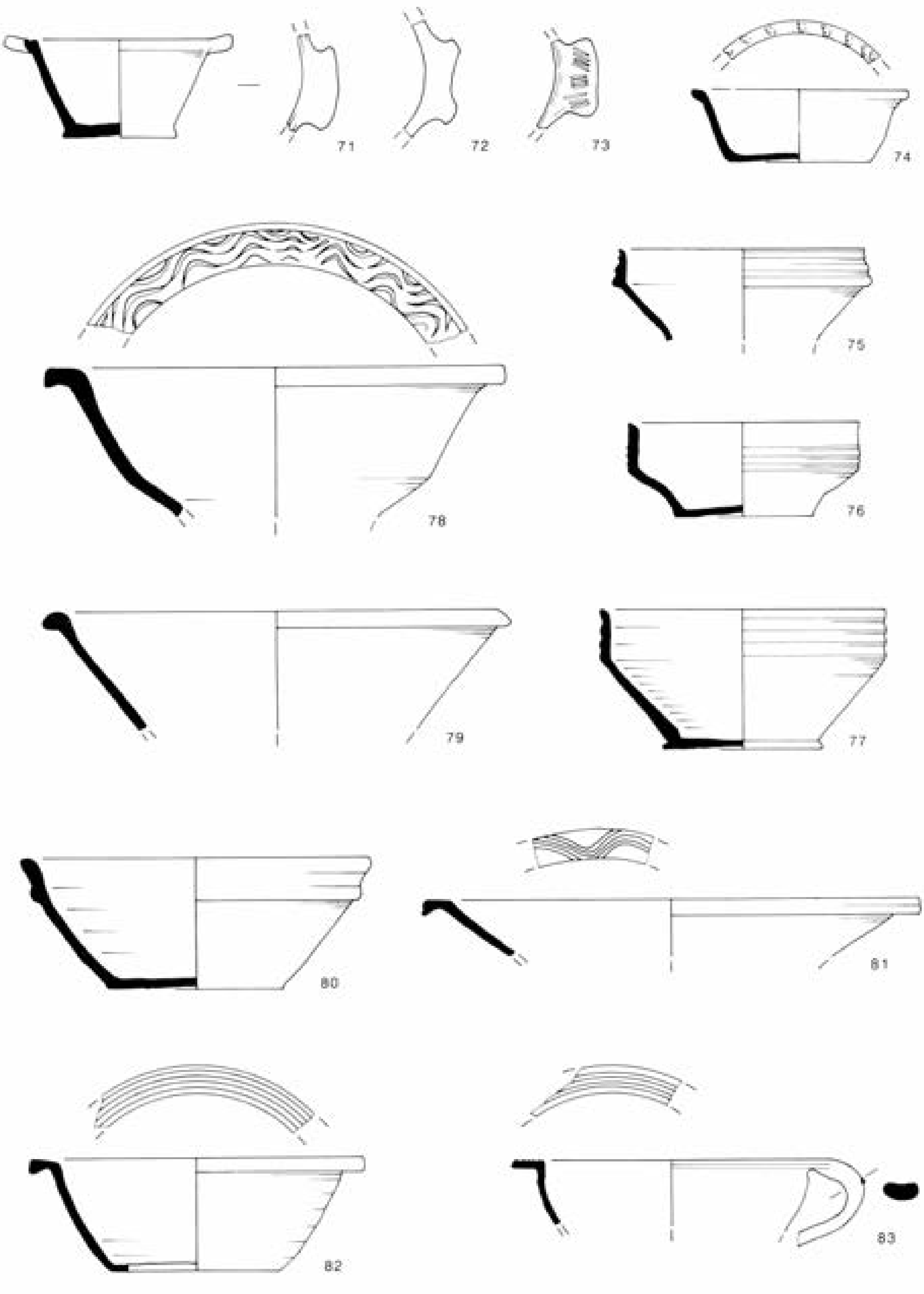


Figure 6.10: Pottery nos 71–83 Red Earthenwares (scale 1:4)

jars (Fig. 6.9.65–66; cf. Figs 6.6.40, 6.6.43, 6.8.60–61), 9 lids (Fig. 6.11.90), 17 handled jar/chamber pots (Fig. 6.9.67, 6.9.69), 2 chamber pots (Fig. 6.9.68), 1 flask?/costrel (Fig. 6.9.70), 27 small-handled bowls (Fig. 6.10.71–74), 17 bowls/porringers (Fig. 6.10.75–77), 20 deep bowls (Fig. 6.10.78–80, 6.10.82), 5 handled bowls (Fig. 6.10.83), 5 wide bowls (Fig. 6.10.81), a wide bowl/pancheon with spout in the same form as Fig. 6.10.80, 1 colander (Fig. 6.11.84), 5 flanged dishes (Fig. 6.11.86), 7 chafing dishes (Fig. 6.11.85), a condiment? (Fig. 6.11.88), 4 cups (Fig. 6.11.87; cf. Fig. 6.11.89) and 4 dripping pans (cf. Fig. 6.7.46). Most vessels have a continuous olive green and patchy orange glaze on both interior and exterior surfaces. One vessel has white slip-trailed decoration on the exterior surface.

Dating: The 1356 sherds in Fabric 20 constitute 14% of the total assemblage and represent one of the largest fabric types present. 3 of the 7 sherds in phase III associated with the floor of the N Stirrup Tower and the Keep can be considered as contemporary and are, therefore, dating evidence for the presence of this ware from *c* 1542. The majority (56%) of these sherds are found in phases IV (GV–VI, CTIV–V, WBX), IVa (CT I–II, SBC, SBG) and IVb (CTI, SBC). This fabric is virtually absent from the bulk fill of the N Bastion. 23% of these sherds are present in phase V (primarily in CTIII–VI). Fabric 20 is therefore thought to have been in contemporary use at Camber from *c* 1542, but had not been discarded outside the castle in sufficient quantities to be reintroduced with the bulk fills.

Illustrations:

65. Large jar with thickened, collared rim (22 cm). Courtyard IV, phase IV.
66. Large storage jar with inturned rim and external flange for lid (18 cm). Flat base. Entrance Bastion (CIV), phases V and VI.
67. Handled jar/chamber pot with lid seated, collared rim (18 cm). Grooved strap handle with single thumbed attachment at base. Bands of incised line decoration on the exterior of the body. AI, phase V.
68. Chamber pot with everted thickened rim (18 cm) and grooved strap handle attached to rim and body. Glazed internally. Bands of incised line decoration on the exterior. Courtyard V, phases IV and V.
69. Handled jar/chamber pot with collared rim (17 cm). The collared rim is thumbed on the exterior and the body decorated with bands of incised lines. Near straight-sided vessel, slightly widening towards the concave base. Large grooved strap handle attached to rim and body. Glazed internally. Courtyard II, phases IV and V.
70. Costrel? with flat base and lug handles, drilled with a suspension hole. Courtyard V, phase V.
71. Small bowl with two lug handles and small flattened rim (14 cm). Rim decorated on top with single incised line. Flat base. AI and AIV, phase V.
72. As ill 70 but with variation in style of handle. Courtyard I, phase IVb.
73. As ill 70 but with slashed decoration on the top surface of the handle. Courtyard VI, phase V.
74. Small bowl with small thickened/flattened rim, decorated at regular intervals with stabbed notches. No traces of handles. Courtyard I, phase IVb.
75. Small bowl/porringer with rilled, collared rim (16 cm). Courtyard V, phase IV
76. Small bowl/porringer with plain rim (16 cm). Rilled around central carination in body. Concave base. Vaulted Ring Passage, unstratified.
77. Small bowl/porringer with collared rim (20 cm). Turned flat base. Courtyard IV, phases IV and V.
78. Deep/wide bowl with flanged rim (32 cm), decorated with incised curvilinear pattern. Courtyard V, phase IV, V and VI, W Bastion Exterior (WBY) phase IV and BXI unstratified.
79. Deep/wide bowl with thickened everted rim. Courtyard I, phase IVb, Courtyard II phases IVa and VI and Courtyard IV, phase VI.
80. Deep bowl with thickened cordoned rim (24 cm) and flat base. AVI, phase VI.
81. Wide bowl/flanged dish with flanged rim (34 cm). Decorated on rim with band of curvilinear incised lines. Courtyard II, phase V.
82. Deep bowl with flanged rim (24 cm) and flat base. Rim decorated with four parallel incised lines. Courtyard II, phase IVa and S Bastion Courtyard (SBC), phase IVb.
83. Handled bowl with flanged rim (22 cm), decorated with four parallel incised lines. Small strap handle attached to rim and body. Courtyard IV, phases V and VI.
84. Colander with flanged rim (32 cm) and flat base. Holes pierced though base of vessel and occasionally through rim. Rim decorated with parallel incised lines. Courtyard IV, phase IV and W Stirrup Tower Interior (WBii), phase V.
85. Chafing dish with flanged rim (22 cm), two rod handles and a minimum of three, probably four applied lugs. Gallery VI, phase V and AVI, phase VI.
86. Flanged dish with thickened flanged rim (38 cm) and flat base. Gallery V, phase IV.
87. Cup with rounded body and plain slightly flaring rim (10 cm). Decorated with a band of curvilinear incised lines around the centre of the body bordered by cordons above and below. Gallery VI phase IV and AVI, phase VI.
88. Unknown form?/condiment? Thick walled, flattened rim/base? Courtyard I, phase IVb, Gallery I, phase VI and Gallery VI, phase IV.
90. Lid with solid knob cut from a wheel-thrown column of clay. Courtyard I, phase IVb.

Discussion of the quartz-tempered Red Earthenwares

Detailed quantification of these earthenwares has shown that a minor variation in firing colour could be the only distinguishing factor between Fabrics 6, 14 and 20, between Fabrics 18 and 20, and between Fabrics 14 and 18. Fabric 29 is also very similar to Fabric 14 but with a distinguishing metallic/manganese glaze. The reproduction of particular forms, such as jars, tripod pipkins and handled jars/chamber pots in Fabrics 6, 14, 18, 20 and 29 adds to the likelihood that all these fabrics are part of the same local tradition, if not from the same production centre or workshop. Some of these wares are comparable with the 'hard-fired earthenwares' identified by Streeten, and their provenance is suggested by textural analysis (Streeten 1985a). These comparisons have been discussed in the fabric descriptions, above. To summarise, Fabrics 18, 6 and 3 have been linked with the kiln products of High Lankhurst, Westfield, E Sussex (Streeten 1985a and b). Fabric 14, whilst somewhat finer than Fabrics 18, 6 and 3, is classified in the same group of 'hard-fired earthenwares' by Streeten (Streeten 1985b) and appears visually to be similar to Fabric 18 at Camber. Fabric 20 remains a 'miscellaneous post-medieval lead glazed earthenware' (Streeten 1985a) but visually very similar to the products of High Lankhurst, Westfield (samples 126 and 356) and Boreham Street, E Sussex, in Streeten's thin section sketches (Streeten 1985a).

Four known early and late 16th-century kiln sites could arguably have been the sources for pottery found at Camber. These are 1) High Lankhurst, Westfield, 2) Boreham Street, Wartlington, 3) Lower Parrock, Hartfeld and 4) Hareplain, nr Biddenden in Kent, which lie within 10, 20 and 48 km respectively of Camber Castle (Streeten 1985b). There were undoubtedly other local workshops in the area and a cautionary note in ascribing the Camber earthenware fabrics to kilns/production centres is that the thin section sketches of products from High Lankhurst, Westfield (samples 126 and 356) appear as very similar to the products of Boreham Street, Wartlington (sample 005) and Lower Parrock, Hartfield: Fabric One (sample 010), though the textural analysis graphs of Boreham Street and Lower Parrock show quite distinctly different patterns of grain size/frequency. These distinctions are evidently not so clearly discernible by eye (Streeten 1980). Without doing further textural analysis on Fabrics 14 and 20, their likeness to Fabrics 18, 6 and 3 cannot be corroborated. Another cautionary observation in attributing fabrics to kiln sources is that at Rye, the medieval kilns operating to *c* 1500 sometimes produced vessels in different fabrics and were therefore exploiting various clay sources (Streeten 1985b).

As so little of the assemblage at Camber is associated with either phase I or II it is impossible to determine the earliest date at which these fabrics were manufactured.

Fabrics 6 and 14 are the earliest Red Earthenwares in the stratigraphic record. They occur in phase IIb in the NNW Courtyard (CTIII) and at the level of construction outside the E Bastion (EBX) and could therefore date from *c* 1539. Fabrics 18 and 20 both occur for the first time in phase III in floors within the N Bastion (NBii), N Stirrup Tower (NBiii–iv) and in the Keep and were therefore in use by *c* 1542. Fabric 29 does not occur until phase IV and was therefore in use from *c* 1543. 96% of the sherds in Fabric 3 are associated with the phase IVb fill of the N Bastion (NBi/ii) and though there are two sherds which predate the infilling it appears more likely to be of a late 16th- or early 17th-century fabric type.

White-slipped Red Earthenware *(Fig. 6.11.91)*

Fabric 52

Fabric: A coarse red earthenware with abundant fine subangular quartz of less than 0.2 mm.
Form: Nearly all the 23 sherds found in this fabric are from 2 cauldrons and 1 flanged dish, distinguished from the other red earthenware fabrics by the use of an internal white slip. The vessels are typical mid 16th- to mid 17th-century forms: the cauldrons have thumbed, collared-rims (cf. Fig. 6. 41) and the flanged dish a thickened rim and claw feet (Fig. 6.11.91).

Dating: These vessels were first recognised in London at Guy's Hospital where they were dated as *c* 1550–1650 (Dawson 1979), and are now referred to as Post-Medieval Slip-coated Redware (PMSR) (B Nenk pers. comm.). Coarse red earthenwares and white-slipped earthenwares found in west Kent and east Surrey might be from the same source as the London and Camber examples. Some medieval white-slipped jugs found at Canterbury have been attributed to the London area and are similar in textural analysis to sherds found in west Kent. A source for these wares is unknown but outcrops of London Clay occur on both sides of the Thames Estuary and were exploited by the Tyler Hill industry near Canterbury (Streeten 1982a and 1982b).

At Camber, the cauldrons both occurred in the SW Courtyard (CTV), with the earliest sherds in phase IV and redeposited sherds in phases V and VI. The flanged dish is from phase V in the Entrance Bastion. The 23 sherds in this ware do not register as an identifiable percentage of the total assemblage.

Illustrations:

91. Small flanged dish (21 cm) with claw feet. Partially white-slipped in centre of the interior. Entrance Bastion (CI), phase V.

Bichrome Red Earthenware *(Fig. 6.11.92)*

Type Fabric 7, thin section sample 1032

Fabric: This is a coarse earthenware with abundant fine subangular quartz of between 0.1 mm and 0.2 mm. Occasional black iron oxides of 0.2 mm also occur.

Form: 13 vessels include 5 cauldrons (Fig. 6.11.92; cf. Fig. 6.6.40), 1 bowl (cf. Fig. 6.10.80), 1 jar (cf. Fig. 6.7.53) and 2 tripod pipkins (cf. Fig. 6.7.49). These vessels are distinguished by the white slip and copper glaze used on the interior of the vessel, contrasting with a clear lead glaze on the exterior.

Dating: Fabric 7 (sample 104) has unique vessel forms and decorative treatment and is grouped in textural analysis with samples from Upper Parrock, Hartfield, samples 215 and 413 (Streeten 1985a). This attribution links with the distribution of white-slipped wares found in west Kent and east Surrey (Streeten 1982b). At Camber these vessels occur first in phase III (EBX) where they can be dated at the earliest as *c* 1542–3. The majority of sherds (44%) are found in phase IV (CTII, WBII, WBY, EBY) dating from *c* 1543 to 1637. 23% of the sherds in phase IVa occupation

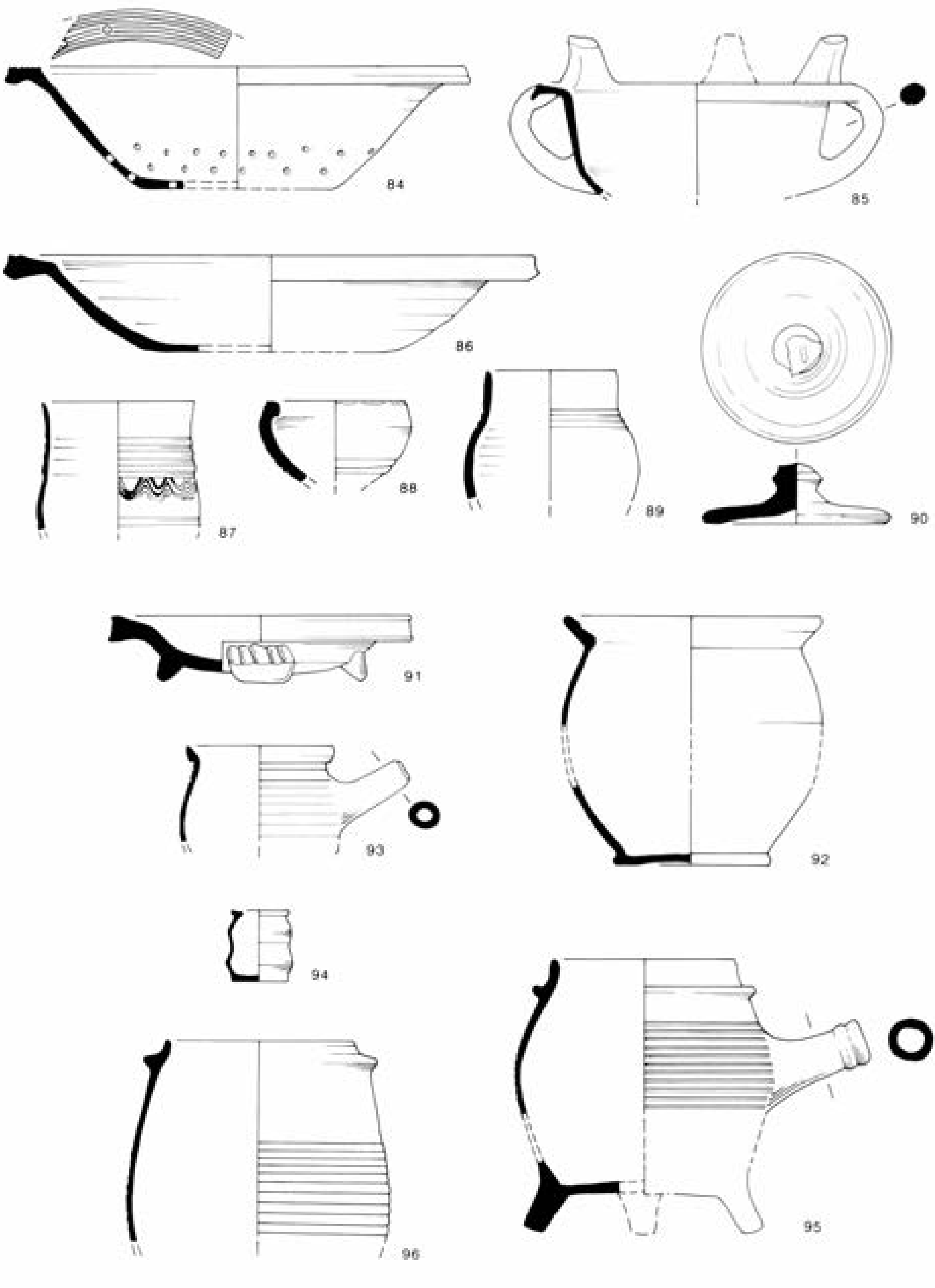


Figure 6.11: Pottery nos 84–96 (scale 1:4)

deposits (NBii, CTII, SBC) are from three vessels (Fig. 6.11.92), two of which have numerous sherds which are redeposited in the phase IVb infills (NBi/ii) or are residual in phases V and VI (CTI–II). This ware is, therefore, present from between *c* 1543 and 1637. These 114 sherds account for less than 1% of the total assemblage.

Illustrations:

92. Cauldron with rounded body, flat turned base and everted rim (18 cm). White-slipped on interior with copper green glaze and lead glazed on the exterior. Courtyard II phases IVa, V and VI, AIA, phase V and Courtyard I, phase VI.

Cistercian Ware

Fabric 43

Form: Two sherds from two cups in a hard red earthenware with brown glaze have slip trail decoration on the exterior.

Dating: Cistercian Ware is traditionally recognised as a 16th-century type, though produced in many local kilns. At Camber one vessel occurs in phase V (CTIII) and the other in phase VI (CTIV). These sherds are too few to be represented as an identifiable percentage of the total assemblage.

Post Medieval Blackware *(Fig. 6.11.89)*

Fabric 41

Form: 37 sherds from 17 vessels include globular cups (Fig. 6.11.89), tankards and a jug.

Dating: These occur primarily (57%) in phase IV and join with sherds in phase IVa, dating, therefore, from between *c* 1543 and 1637. 14% of the sherds are also present in phase V, where as a mid 16th- to mid 17th-century type they could be contemporary. This group constitutes less than 1% of the total assemblage.

Illustration:

89. Globular cup with tall straight rim (11 cm) and cordons around the base of the neck. Vaulted Ring Passage phase IVa and Courtyard V, phase IV.

Metropolitan type Slipware

Fabric 51

Form: Two flanged dishes and a tankard decorated with trailed slip decoration could be imports from Harlow, Essex.

Dating: This ware is usually dated as *c* 1640–1750 and occurs at Camber in phase V (CTV, NBiii and NB 1976 U/S) dating from *c* 1637+. The 3 sherds account for less than 1% of the total assemblage.

Established Wares

Tudor Green

Fabric 53

Form: 19 sherds with continuous copper green glaze are from 8 vessels including 2 costrels and 2 small jugs. These wares are part of the Surrey/Hampshire industry operating between *c* 1380 and 1550 (Pearce and Vince 1988).

Dating: Two sherds occur in phase III (EBX), but most are associated with phase IV (WBI, NBY, WBY) where they date from between *c* 1543 and 1637. Sherds from one vessel in phase IV (NBY) are redeposited in phase VI (NBY).

Surrey/Hampshire Border Ware - Brown glazed

Type Fabric 8, thin section sample 1033

Forms: 9 vessels in brown glazed Border Ware include a flanged dish, globular cup, tripod pipkin (cf. Fig. 6.11.93), 4 cups, 2 with encrusted decoration (see Pearce 1992, fig. 36.275) and an encrusted lid (Pearce 1992, fig. 36.276). Most vessels have a continuous manganese brown glaze on both surfaces.

Dating: The products of Surrey/Hampshire Border Ware are dated 1620–1700 (Pearce 1992), though forms such as the globular cups with encrusted decoration do not occur until *c* 1640. At Camber these wares are less than 1% of the total assemblage, and are found in phases IV (CTIV–V, GV), IVb (CTI, NBi/ii) and V (CTV, CIV, NBiii). Of note are the encrusted wares in phases IV and IVb, which may be contemporary with the bulk fills of the bastion and the Rampire, since this ware is not represented in the earlier phases.

Surrey Hampshire Border Ware - Green and Yellow Glaze *(Fig. 6.11.93–95)*

Type Fabric 9, thin section sample 1034

Forms: 107 vessels include 2 bowls, 11 porringers (Pearce 1992, fig. 26.110/113), 23 tripod pipkins (Fig. 6.11.93 and 6.11.95; Pearce 1992, fig. 29.116), 4 chafing dishes (Pearce 1992, fig. 31.189), 2 strainers (Pearce 1992, fig. 46.450), 2 bottle-shaped costrels (Pearce 1992, fig. 37.297/298), 1 cup?, 9 flanged dishes, 1 skillet (Pearce 1992, fig. 30.176), 1 lid and 1 ointment pot (Fig. 6.11.94).

Dating: The products of Surrey/Hampshire Border Ware are dated 1550–1750 (Pearce 1992). The majority of the forms are 17th-century, and occur primarily in phases IV and V (CTI–VI) dating from between *c* 1543 and 1637+. Of note are sherds from a 17th-century bottle-shaped costrel in phase IVa occupation deposits in the NE Courtyard (CTII) indicating late activity in this

area. These sherds account for 3% of the total assemblage.
Illustration:

93. Tripod pipkin with simple everted rim and socket handle. Gallery VI, phases IV and V.
94. Ointment pot/small straight-sided jar. W Bastion Exterior (WBY), phase IV.
95. Tripod pipkin with external flange on rim and socket handle. Rilled around the centre of the vessel. Yellow lead glaze on the interior only. Courtyard V, phases IV and V, Courtyard VI, phases V and VI, AVI, phase VI and BXI, unstratified.

Surrey Hampshire Red Border Ware *(Fig. 6.11.96)*

Fabric 48

Forms: One tripod pipkin (Fig. 6.11.96) in a fine red earthenware with glossy orange glaze occurs in phase V (CTII). These wares are a part of the same industry as the whitewares and of a similar date. The 29 sherds in this fabric are less than 1% of the total assemblage.

Illustration:

96. Tripod pipkin with external flange on rim. Glossy orange/red glaze. Rilled lower section of body. Courtyard II, phase V.

Late Post-Medieval English Wares

Late Surrey Ware

Fabric 55

Forms: A minimum of four money boxes are small globular forms with a dark brown glossy lead glaze on interior and exterior. These were identified originally as late 16th- to early 17th-century Late Surrey Ware. 2 sherds occur in phases IIb dating from *c* 1539–1540, but the remaining 13 sherds are redeposited in phases IVb, V and VI (CTI, CTIII, GI, CIV).

Staffordshire press-moulded Slipware

Fabric 56

One fragment of a late 17th- to 18th-century flatware dish occurs with other 19th- and 20th-century wares in an unstratified location in the E Bastion.

English Stoneware bottles

Type Fabric 36

226 ginger beer bottles made by Doulton at Lambeth and Baile of Fulham are printed with "Dolebrooke, Rye. Brewed ... Beer". These occur primarily in phase VI but are occasionally intrusive in phases III, IV, IVa, IVb and V.

Creamware

Type Fabric 27

14 sherds from a Creamware plate occur in phase VI (CTIV).

Transfer Printed Ware

Type Fabric 37

45 sherds from 35 plates and cups are from late 19th- or 20th-century, phase VI, activity on the site. 8 of these sherds are intrusive in phases III, IV and V (NBiii, GIII, GV and SBC).

China

Type Fabric 38

167 sherds from 67 china vessels are from 19th- or 20th-century activity in phase VI. 24 sherds are intrusive in phases IV and V (NBX, GIII–IV, GVI, CTI, CTIII–IV, CTVI, NBiii–iv, CI, CIV)

English Porcelain

Fabric 46

24 sherds from plates, teapots and cups are from 19th- or 20th-century, phase VI activity on the site. 3 sherds are intrusive in phases III and V (CTI, GV–VI).

Staffordshire White Salt Glazed Stoneware

Fabric 47

8 sherds from an 18th-century fluted bowl and jar occur in phases V and VI (CTII–III).

Red Earthenware

Fabric 49

29 sherds of a modern 19th- to 20th-century red earthenware occur intrusively in phases III, IV and V (EBZ, GV–VI, CTIII, CTVI, CV, SBC, SBG) but are *in situ* in phase VI (GI, WBI, WBX, CTIII–IV, CTVI)

TRENDS WITHIN THE CERAMIC SEQUENCE AND SITE FORMATION PROCESSES AS SHOWN BY SPECIFIC CERAMIC ASSEMBLAGES.

A summary of the total number of sherds in each phase (Table 6.1) shows that the majority of the pottery occurs in phases IV, IVb, V and VI (*c* 1543–1637+ and 19th to 20th centuries). There are few deposits associated with occupation, demolition or accumulated rubbish in phases II and III. These two phases span a period of only four years between 1539 and 1543, and are characterised by

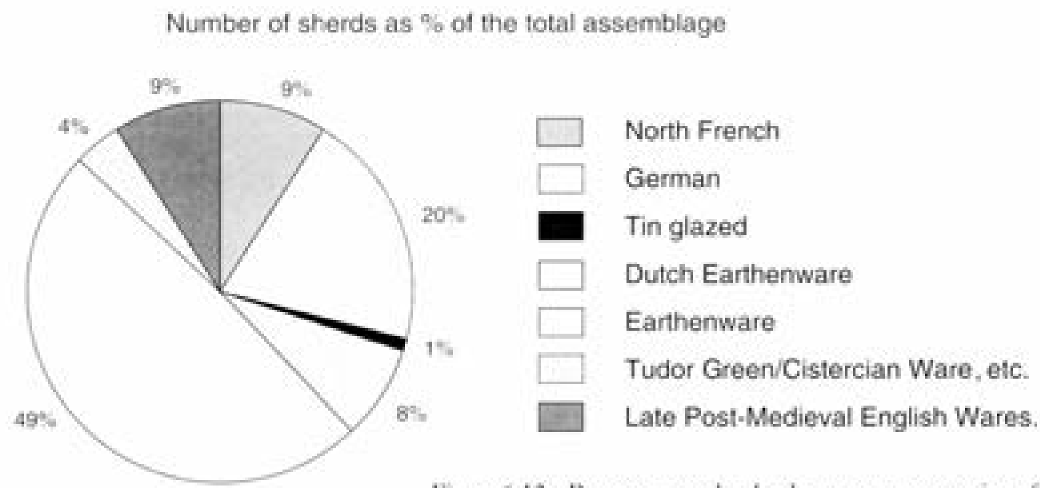


Figure 6.12: Pottery; wares by sherd count as a proportion of the total assemblage

structural changes rather than stratigraphic evidence. Rubbish from these phases has evidently been redeposited with the bulk infilling material taken back into the castle to fill the N and (probably) S Bastions, thereby obscuring the clarity of the archaeological record. Although a chronological and historical framework of phasing can be applied to different stages of the castle's building works, the frequent structural changes have resulted in a disjointed sequence of deposits. Consequently the pottery cannot be interpreted or assessed in chronological stages spanning the period 1512–1637+ as there are no continuous sequences. Trends within the ceramic sequence have, therefore, been assessed by selecting groups of contexts from six areas of the site, assigned to specific phases according to historical documentation and structural interpretation. These are the deposits outside the E Bastion (EBX), bulk fills and related levels within the N Bastion (NBi and ii), occupation levels in the Courtyards (CTI and CTIV), a collection of vessels from outside the W Bastion (WBY) and groups from the SW Courtyard/Gallery and multiple garderobe (SBC/SBG/GVI), which contain large, well stratified assemblages of an early 16th-century, mid to late 16th-century or late 16th- to early 17th-century date (Fig. 6.13).

Assemblages from other areas (EBY, EBZ, EBB, GI–VI, KEEP, CTIII–VI, EBA, NBiii/iv, WBX, CTII, CI–VI, A, B) and the Vaulted Ring Passage have been excluded from further study as the assemblages were either too small or disturbed throughout by 19th-century material.

Table 6.1. A summary of the total assemblage by phase as sherd number and weight

Phase	Sherd no	Weight (kg)
I	1	0.006
IIb	85	0.910
III	589	7.395
III/IV	1	0.010
IV	2218	44.321
IVa	408	8.568
IVb	1605	35.582
IV/V	97	1.310
V	1765	39.032
V/VI	36	0.562
VI	1568	28.382
u/s or unphased	1095	34.843
TOTAL	**9468**	**200.921**

Exterior of the E Bastion (EBX) *(Table 6.2)*

(Contexts 723 phase IIb, contexts 666, 667, 668, 713, 716, 718, 719, 721, 725, 728, 739; phase III, contexts 714, 715, 724; phase VI)

This assemblage, from material dumped against the outer wall of the E Bastion, is a single deposit that can be dated from the ceramics themselves to the first half of the 16th century. Given the known history of construction and use of the castle, however, this group can be attributed specifically to the decade(s) immediately after 1542–3. Sherds from 25 vessels occur in various layers, and in some cases sherds from the same vessel occur in the lowest and highest levels of stratification. In terms of chronology, there appears, therefore, to be little distinction between the individual layers comprising this deposit. Unlike the majority of vessels at Camber there are no cross-joins with other features on the site, suggesting that this material has been little disturbed since it was discarded. The majority of the pottery is closely dated to the first half of the 16th century and there is little later material so the date of deposition probably coincides with the date of the pottery. The high percentage of large, well preserved fragments with little abrasion also suggests that this material was discarded and dumped in relatively quick succession. The large number of highly decorated tablewares implies that the vessels were coming from an area where good quality tablewares were in use in the first half of the 16th century.

A high proportion (78%) of the 535 sherds (7 kg) in this assemblage are early 16th-century imported wares. This group includes Beauvais Whiteware, Beauvais

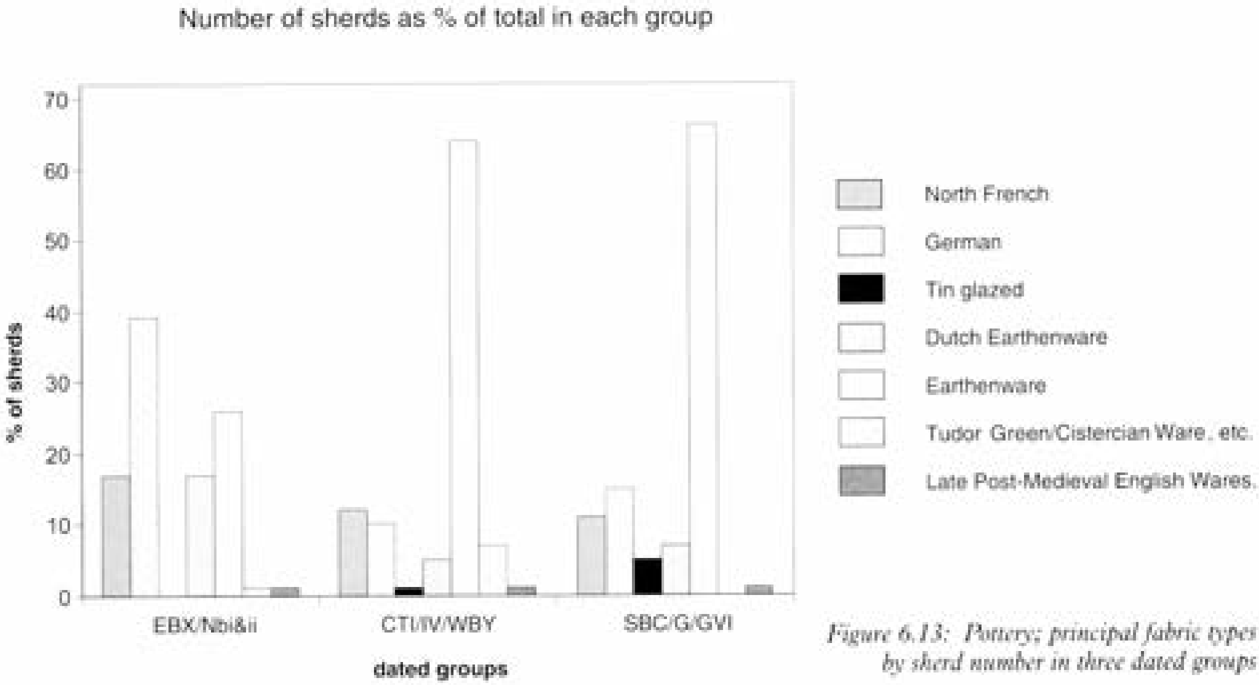


Figure 6.13: Pottery; principal fabric types by sherd number in three dated groups

Sgrafitto Ware, Late Saintonge mottled green glazed Ware, Martincamp flasks (Types I and II), Rhenish Stoneware and Low Countries type Redware. The Rhenish Stonewares, and the Beauvais Whiteware and Sgrafitto bowls, chafing dishes and flanged dishes date to the first half of the 16th century. It is notable in this assemblage that the Raeren drinking jugs of *c* 1475–1550 are much more popular than the rose and oak decorated Cologne drinking jugs dating from 1500–1550. The high number of Low Countries type Redware vessels, in particular the broad open tripod cauldron forms, cordoned tripod pipkins and collar-rimmed bowls, are also indicators of an early to mid 16th-century date.

A small number of Red Earthenware cauldrons, jars and lids in Fabrics 6, 17, 14, 18 and 20 are present, but account for only 13% of this assemblage. The composition of this group suggests that these wares were in production by the mid 16th century but that they were a relatively insignificant commodity. A small number of Whiteware porringers and tripod pipkins also occur in these contexts and could be contemporary products of a local industry and the Surrey/Hampshire Border Ware industry.

North Bastion (NBi and NBii) *(Tables 6.3, 6.4)*

(Contexts 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 23, 24, 25, 26, 27, 29. Contexts 2–25 are the bulk infill of the Bastion, phase IVb, and are stratified above contexts 10, 26, 27, occupation layers, phase IVa, which are above context 29, decayed floorbeams in phase III.)

This group comprises pottery found within the redeposited bulk fills of the N Bastion, and a smaller quantity from occupation layers beneath. The contexts in this group belong to phases IVa and IVb and should be earlier than, or contemporary with, the filling of this bastion.

Mixing of these contexts is indicated by cross-joins between this group and pottery from many different areas of the Courtyards (CTII–IV and VI and SBC). The presence of early 16th-century material stratified above mid to late 16th-century pottery, and sherds from the same vessels in both the lowest (phases III and IVa) and high (phase IVb) levels of stratification, confirms the extent to which the material has been disturbed by the earth moving operation in the late 16th or early 17th century.

A third (36%) of the pottery within these deposits belongs to the first half of the 16th century. It is very similar to the assemblage found outside the E Bastion and includes Beauvais Sgraffito bowls (Fig. 6.2.9), double and single sgraffito flanged dishes (Fig. 6.2.7–8), Beauvais Whiteware and Martincamp Type I flasks. Also present are Saintonge Type I chafing dishes (Fig. 6.3.10–11), Saintonge mottled copper green jug, the Saintonge Green and Brown costrel, Martincamp Type II flasks and Rhenish Stoneware drinking jugs. Raeren/Aachen plain drinking jugs are less common than the Cologne jugs with rose and oak leaf decoration dated 1500–1550 and Bellarmines with foliage band, acanthus leaf and portrait medallion decoration (Fig. 6.4.20) dated as 1527–1550. In the same contexts as the early to mid 16th-century material are a smaller number of vessels of a mid to late 16th-century date and a few early 17th-century wares. Mid to late 16th-century wares include part of a Siegburg Schnelle dated '..75', Cologne Bellarmines with inscription band and portrait medallions containing helmeted heads dated 1550-1570/90 and a late face mask with painted blue eyes and beard (Fig. 6.4.21) dated 1595–1605 (D Gaimster pers comm.). The 17th-century wares include the complete neck of a red earthenware Martincamp Type III flask, Spanish olive jars and Portuguese Merida standing costrels. Red Earthenware Fabrics 6, 14, 17 and 18 form a large part of this assemblage.

Table 6.2: Exterior of the E Bastion (EBX), phases IIb and III
A summary of fabrics and vessel forms in an early to mid 16th-century assemblage.

Fabric	sherd no	weight (g)	no of vessels	ill no*	date
10 Beauvais White	9	154	2 bowls	1	1500–1550
			2 id?		
15 Beauvais Sg	79	688	3 bowls	9 (4)	1500–1550
			1 chafing dish	6	
			2 flanged dishes	(8)	
40 Beauv Stn	1	20	1 costrel/flask		16C
11 Saintonge	5	14	1 jug		M13C–M16C
28 Sain Chaf	4	46	1 chafing dish	(10)	1500–1600
34 Mart I	1	2	1 flask		1475–1550
1 Mart II	19	246	3 flasks		1500–1600
23 Raeren	140	1866	42 drinking jugs	(15)	1475–1550
24 Cologne	35	450	14 drinking jugs-plain and rose/oak	(17, 18)	1500–1550
5 German Lead Glazed	31	274	6 Grapen	(16)	16thC
16 Low Countries Redware	134	1814	26 tripod cauldrons		1500–
			1 collar-rimmed bowl	(39)	
			1 flanged dish	45	
			1 shallow dish	44	
			3 tripod pipkins	42	
			7 ?id	36	
6 Redware	18	214	9 cauldrons/jars		?1500–1600
			2 lids	(90)	
			4 ?id		
17 Redware	31	594	3 tripod cauldrons		1500–
			1 ?id		
14 Redware	6	92	3 jars	(52)	?1540–
18 Redware	4	62	2 jars	(56)	1500–
			1 tripod cauldron		
20 Redware	2	62	1 cauldron?		L16C–E17C
			1 bowl base?		
7 Redware	11	66	1 deep bowl	(80)	1500–1600
			2 cauldrons		
			1 ?id		
41 Blackware	1	8	1 tankard		19thC
53 TUDG	2	2			
9 BORDG/Y	2	32			1550–1750
TOTAL	**535**	**6706**	**150**		

* *Illustration numbers in parentheses refer to examples of the same form in a different fabric*

The interpretation of this largely redeposited assemblage is far from straightforward. The majority of the pottery dates from the first half of the 16th century, but the presence of mid to late 16th- and 17th-century material could indicate longevity of use for earlier vessels. A more likely explanation is that the early material has been redeposited. It is clear also that the stratigraphy has been thoroughly disturbed by rabbit warrens, thus explaining the presence of 19th-century ginger beer bottles in the lowest of the stratified layers in phase III. The absence of wares such as Werra and Weser Slipwares, dated 1580/1590–1620, indicates that the fill of the N Bastion comprises mainly earlier material, dating from the first half of the 16th century through to the dated piece of 1575. The small quantity of 17th-century pottery may be intrusive, although the date of infilling of the N Bastion remains unclear and could be as late as this. Evidence for the date of this earthmoving is considered further in Chapter 2, above.

NE Courtyard (CTI) *(Table 6.5)*

(Context 115 phase IV, context 30 phase IVa , contexts 17 and 20 phase IVb)

Contexts 17, 20, 30 and 115 are all within the NE Courtyard (CTI). These can be distinguished as occupation layers (contexts 30 and 115) below a layer of shingle (context 17) which had slumped from the Rampire, and soil which had subsequently accumulated (context 20) over the slumped shingle. However, as all the contexts contain a similar suite of fabrics and sherds

Table 6.3: N Bastion (NBi and ii), phases IVa and IVb
A summary of fabrics and vessel forms in an early to mid 16th-century assemblage.

Fabric	sherd no	weight (g)	no of vessels	ill no*	date
10 Beauvais White	28	336	1 bowl		1500–1550
			1 flanged dish		
			1 jug	(3)	
15 Beauvais Sg.	17	450	1 single sg. Dish	7	1500–1550C
			2 flanged dishes	8	
			2 bowls	9	
			1 chafing dish	(6)	
11 Saintonge	9	376	1 costrel		M13–M16thC
28 Saintonge	15	878	2 chafing dishes	11	1500–1600
Chafing Dish			1 chafing dish	10	
34 Mart I	7	72	3 flasks		1475–1550
1 Mart II	66	1040	12 flasks		16thC
2 Mart III	4	54	3 flasks		17C
13 Portuguese	8	58	1 sm jug		1550–1650
Merida Ware			3 id?		
12 Redware	5	151	4 ?id		1542/3+
4 Sp Olive	2	76	2 olive jars		17C
45 Siegburg	4	52	1 schnelle	13	1575–1600
23 Raeren	25	1528	16 drinking jug		1475–1550
24 Cologne/ Frechen	353	6640	54 drinking jugs-	(17, 18)	1500–1550
			plain and rose/oak		
			23 bellarmines-		
			shells & foliage band	22	1527–1550
			foliage band	20	1527–1550
			blue painted beard	21	1595–1605
5 German Lead Glazed	25	524	8 Grapen	(16)	16thC
30 TGW S Netherlands	1	2	1 ?vase		17thC
16 Redware	127	3136	20 tripod cauldrons	(39, 40)	14th–17thC-
			5 tripod pipkins	(37, 49)	
			1 sm bowl	(29)	
			1 chafing dish	(85)	
			5 collar-rim bowls	(45)	
17 Low Countries	135	3994	17 tripod cauldrons	(39, 40)	1542/3+
Redware			4 collar-rim bowls	(45)	
			3 tripod pipkins	(55)	
			2 chafing dishes		
			1 jug		
			1 shallow dish		
			1 sm bowl	(46)	
			2 flanged dishes	(29)	
			9 ?id	(44)	
6 Redware	18	214	1 jar	(57)	1542/3+
			6 ?id		
3 Redware	45	428	3 cauldrons	(58)	1542/3+
			1 jar		
14 Redware	9	112	3 jars		1542/3+
29 Redware	2	8	1 jar		1542/3+
18 Redware	97	1710	1 tripod cauldron		1542/3+
			1 tripod pipkin	(55)	
			6 jars		
			1 chafing dish	(85)	
			2 lids	(90)	
			9 id?		
20 Redware	7	286	1 Deep Bowl		L16C–E17C
			1 Drip		
			5 ?id		
7 Bichrome	19	230	1 tripod cauldrons		1500–1600
			2 ?id		
8 BORDB	2	4	1 ?id		1550–1750
9 BORDG	4	74	3 flanged dishes		1550–1750
			1 tripod pipkin	(93)	
36 Stoneware	9	152	7 Ginger Beer bottles		19th–20thC
38 China	2	20	2 ?id		20thC
TOTAL	**1045**	**22605**	**275**		

* Illustration numbers in parentheses refer to examples of the same form in a different fabric

Table 6.4 N Bastion: 1976 collection (Finds codes DB, DC, DD, DF, DH, DI)

Fabric	sherd no	weight (g)	no of vessels	ill no*	date
10 Beauvais White	3	94	2 flanged dishes		1500–1550
15 Beauvias sg.	10	224	2 single sg. dishes	7	1500–1550
			1 double sg. dish		
11 Saintonge Green and Brown	2	82	1 costrel		16thC
34 Mart I	16	620	3 flasks		1475–1550
1 Mart II	29	952	3 flasks		16thC
4 Sp Olive Jar	1	54	1 olive jar		17thC
13 Merida Ware	1	22	1 costrel base		1575–1625
23 Raeren	24	1116	1 lg drinking jug	(14)	1475–1550
			13 drinking jugs		
24 Cologne/Frechen	200	5070	60 drinking jugs - rose & oak	(17, 18)	1500–c 1575
			1 lg drinking jug		
			1 lg jug		
			3 bellarmines		
5 German Lead Glaze	2	70	2 Grapen	16	
30 TGW. S and N Netherlands	2	140	1 DUTR vase?		L16th–17thC
			1 flanged dish		
16 Low Countries Redware	23	1636	2 cauldrons	(41, 38)	14th–17thC
			1 CR bowl	(45)	
17 Redware	135	5700	12 deep bowls	(82)	1542/3+
			6 tripod pipkins		
			14 cauldrons	(36, 40)	
			1 CR bowl	(45)	
			3 jars		
14 Redware	4	264	1 jar		1542/3+
29 Redware	2	32			
18 Redware	88	4074	3 deep bowls		1542/3+
			2 wide bowls		
			2 jars		
			3 cauldrons		
			1 lid		
20 Redware	25	1006	1 deep bowl	(46)	16th–E17thC
			1 tripod pipkin		
			1 jar		
			1 dripping pan		
			1 tankard		
51 Redware Slip.	1	4	1 flanged dish		1640+
9 BORDY	3	92	2 tripod pipkin		
36 Stoneware	60	1508	10 Ginger Beer bottles		19th–20thC
TOTAL	631	22760	166		

* Illustration numbers in parentheses refer to examples of the same form in a different fabric

from the same eleven vessels, this deposit is considered here as one group of 670 sherds (14 kg).

Occasional early to mid 16th-century wares are present in both the upper and lower deposits in the form of Beauvais Sgraffito Ware, Martincamp Type I and II flasks and Low Countries type Redware. The majority of the pottery is, however, mid/late 16th- or early 17th-century in date. A small number of Cologne/Frechen drinking jugs and two Bellarmines, one with rose leaf and tendrils and the other with an inscribed band, acanthus leaf and portrait medallions, are typical mid to late 16th-century forms. Part of the '[15]75' Siegburg Schnelle (Fig. 6.3.13) occurs in the lower phase IVa occupation deposits. Mid/late 16th- to early 17th-century local Red Earthenware Fabrics 6, 14, 17, 18, 20 and 29 are predominant in this assemblage (66%), among which Fabrics 6, 17 and 20 are the most common. This is the largest single group of Fabric 20 vessels in the entire ceramic assemblage. Also present are a small number of mid 16th- to 17th-century Surrey/Hampshire Border Ware vessels.

Table 6.5: NE Courtyard (CTI), phases IV, IVa and IVb A summary of fabrics and vessel forms in a mid to late 16th and early 17th-century assemblage

Fabric	sherd no	weight (g)	no of vessels	ill no *	date
15 Beauvais Sg	2	16	1 bowl	(9)	1500–1550
			1 ?id		
34 Mart I	4	30	3 flasks		1475–1550
1 Mart II	4	10	2 flasks		16thC
2 Mart III	83	300	1 flask		17C
45 Siegburg	1	14	Schnelle	13	1575–1600
24Cologne/ Frechen	20	354	3 bellarmines -		1550–1570/90
			inscription band		1500–1550
			rose leaves & beard		
			6 drinking jugs		
33 Weser	3	136	1 flanged dish		1590–1620
31 N Holland Slip.	12	84	1 bowl		1600–1625
30 TGW	1	34	1 drug jar		1590's
16 Low Countries Redware	61	1120	10 tripod cauldrons	(90)	14th–17thC
			1 lid	(43)	
			2 jars		
17 Redware	88	2172	3 tripod cauldrons	(39, 41)	1542/3+
			3 tripod pipkins	(49)	
			2 jars	(57)	
			2 flanged dishes	(86)	
			1 jar/chamber pot	(69)	
			1 sm bowl	(71)	
			11 ?id		
6 Redware	67	1126	7 tripod pipkins	49	1542/3+
			2 tripod cauldrons	(96)	
			1 chafing dish	(85)	
			1 sm bowl/porringer		
			4 ?id		
14 Redware	40	1292	12 jars	53 (59, 61)	?1542/3+
29 Redware	17	588	4 tripod pipkins	(49)	1542/3+
			2 jars	(52, 57)	
			1 jars/chamber pots	62	
			2 cups	(87, 89)	
			1 tankard		
18 Redware	47	1666	4 jars	(57, 58)	1542/3+
			1 tripod pipkins	(38)	
			1 jar/chamber pot	(69)	
			2 lids	(90)	
			2 ?id		
20 Redware	183	4700	8 tripod pipkins	(49)	L16C–E17thC
			2 tripod cauldrons	(49)	
			4 jars	(65, 66)	
			4 lids	90	
			2 shallow dishes	(46)	
			1 flanged dish	(86)	
			4 sm bowls/porringers	(75, 76)	
			12 sm bowls	72,74 (71)	
			3 jars/chamber pots	(69)	
			1 deep bowl	79	
			1 condiment?	66	
			51 ?id		
8 BORDB	3	18	1 encrusted cup	= Pearce 1992 fig 36.275	1550–1750
9 BORDG/Y	31	326	11 cooking pots	(93)	1550–1750
			5 tripod pipkins	(81)	
			1 wide bowl		
			1 sm jug		
36 Stoneware	1	26	1 Ginger beer bottle		19th–20thC
55 Late Surrey Ware	1	70	1 money box		L16th–E17thC
46 Eng. Porcelain	1	4	1 plate		L18th–20thC
TOTAL	670	14086	218		

* Illustration numbers in parentheses refer to examples of the same form in a different fabric

The upper phase IVb shingle deposits in this part of the Courtyard contain the same range of ceramics as the lower fills but with the addition of a small number of late 16th- and early 17th-century wares. These include 17th-century Martincamp Type III flasks, an early 17th-century Tin Glazed Earthenware drug jar, a Weser Slipware dish and a Low Countries Slipware bowl. Also in the upper fill is a mid 17th- or early 18th-century Border Ware encrusted cup (see Pearce 1992, fig. 275) which joins with sherds from the SSW Gallery (GVI).

This assemblage contains a high percentage of mid/late 16th- to early 17th-century local earthenware vessels, confirming the supposition that these deposits derive from occupation of the castle in the mid to late 16th century. The small number of early 17th-century imported wares occur only in the upper levels of phase IVb infill and the one late 17th- or early 18th-century vessel that joins with sherds from the SSW Gallery (GVI) must derive from activity after the castle had been abandoned. The imported wares from the first half of the 16th century could have remained in use into the mid 16th century but must be residual in the upper layers of this area.

SW Courtyard (CTIV) *(Table 6.6)*

(Contexts 295 and 302 in phase IV, context 288 phase V, contexts 281, 316 and 304 phase VI)

The SW Courtyard contains a large assemblage of 810 sherds (12 kg). The phase IV material comprises large groups of late 16th- to early 17th-century pottery accounting for 86% of this assemblage. The small collection attributed to phase V (13%), includes numerous redeposited sherds from vessels that occurred in phase IV. The phase IV assemblage is of considerable interest, as it derives from activity within the castle in the later 16th and early 17th centuries.

The majority of the 704 sherds (9 kg) in phase IV are in local Red Earthenware Fabrics 14, 17, 18 and 20 of which Fabric 20 includes the greatest range of vessel forms. Mid 16th- to 17th-century Surrey/Hampshire Border Wares in green and brown glazes are also common. Imported Rhenish wares include part of the '[15]75' Siegburg Schnelle, Cologne Bellarmines of a mid to late 16th-century type with portrait medallions and an early 17th-century bottle with armorial medallion (Fig. 6.4.24). Late 16th- to early 17th-century imports include a Weser dish, and a North Netherlands Maiolica dish (cf. Fig. 6.5.33). Imports of 17th-century date include a Martincamp Type III flask, three Low Countries Slipware bowls, a Westerwald Stoneware biconic jug (Fig. 6.4.26) and a Spanish Olive Jar. A Beauvais single sgraffito cup (Fig. 6.2.5) and Martincamp Type I flask, broadly dated as 16th century, would probably be considered residual by the late 16th century.

The phase V assemblage contains a further 108 sherds (3 kg) of late 16th- to early 17th-century date, many of which are from the same vessels as occurred in phase IV.

Exterior of W Bastion (WBY) *(Table 6.7)*

(Contexts 820, 821, 823, 826, 827, 828 , 830, 957 phase IV. Context 957 contains the same vessels as context 820, context 820 the same vessels as 823 and 830. Context 823 also shares vessels with the garderobe chute, contexts 827 and 828.)

Pottery was not present in the lowest level of excavation outside the W Bastion but the upper levels produced a closely dated mid to late 16th-century group of near complete vessels. These intact vessels may have been discarded from the kitchen in the W Bastion. Several vessels have sherds spread throughout the stratification and join with pottery from a garderobe in the same area. The high incidence of large sherds from the same vessels shows that these various layers are from a common source and that they have been relatively undisturbed. The presence of Cologne/Frechen Stoneware drinking jugs and Bellarmines with portrait medallions indicates a date in the mid or late 16th century. The complete Beauvais Whiteware jug (Fig. 6.2.3) is also of this date. The majority of the sherds are from cooking vessels in Low Countries type Redware (Fig. 6.6.38), Red Earthenware Fabrics 6, 14, 17, 18 and 20 (Figs 6.6.38, 6.7.48, and 6.8.57–58) and German Lead Glazed Earthenware (Fig. 6.3.16). A complete Border Ware ointment pot (Fig. 6.11.94) is the only example from the whole site.

The garderobe contains the same vessels and suite of fabrics. The only exceptions are the additional late 16th-/early 17th-century North Netherlands Maiolica dish (Fig. 6.5.31) which joins with sherds from contexts in the SSW Gallery (GVI), and an early 17th-century example of a Low Countries Slipware bowl. The garderobe must have remained in use until the latest phase of occupation in the castle.

SW Courtyard (SBC) and SSW Gallery (SBG and GVI) *(Table 6.8)*

(Contexts SBC 744, 745, 746, 748, 750, 752, 755, 832, 834, 835, SBG contexts 759, 760, 761, 762, 763 and GVI contexts 87, 48, 75 and 65)

This is a small assemblage of 352 sherds (9 kg) from phases IV, IVa, V and VI, which represents mid to late 16th-century occupation, the abandonment of the S Bastion, probable early 17th-century occupation within the SSW Gallery, and late activity after the castle had been abandoned.

The Phase IVa deposits (SBG 762, 763 and SBC 748, 750 and 835) accumulated over the brick floor of the SSW Gallery and over the adjoining Courtyard surface, and represent the lowest levels in the stratigraphic sequence in this area. The pottery from these deposits dates from the late 16th and early 17th centuries and includes a 16th-century Beauvais Whiteware lid (Fig. 6.2.2), two late 16th-/early 17th-century North Netherlands Maiolica dishes (Fig. 6.5.33–34), a Werra bowl (Fig. 6.4.28), a Weser wavy line dish, 17th-century Martincamp Type III flasks and Spanish Olive Jars. A small number of undiagnostic Cologne/Frechen drinking jugs and bottles and German lead glazed Grapen are also present. Red Earthenware Fabrics 6, 7, 14, 16, 17, 18 and 20 comprise 72% of the material from this phase. Minor amounts of Surrey/Hampshire Border Ware also occur in these layers.

Table 6.6 : SW Courtyard (CTIV), phases IV, V and VI. A summary of fabrics and vessel forms in a mid/late 16th to 17th-century assemblage

Fabric	sherd no	weight (g)	no of vessels	ill no *	date
15 Beauvais Sg.	2	14	1 single sg. cup	5	1500–1550
34 Mart I	20	250	1 flask		1475–1550
1 Mart II	46	302	1 flask		16th C
2 Mart III	22	78	1 flask		17thC
45 Siegburg	1	26	Schnelle	13	1575–1600
4 Sp Olive Jar	10	422	2 olive jars	12	17thC
24 Cologne/ Frechen	102	1624	1 bellarmine - portrait medallion		M16th -17thC
			1 bottle - armorial medallion	24	c.1600
			34 drinking jugs		
35 Westerwald	6	16	1 biconic jug	26	1600–1625
33 Weser	5	302	1 flanged dish		1590–1620
31 N Holland slip.	7	24	3 sm bowls		17thC
30 TGW	16	38	1 dish	(33)	1590?
N Netherlands			1 Maling jug		1550–1600
English			1 ?id		
17 Redware	55	1098	1 ped candlestick		1542/3+
			3 tripod cauldrons		
			2 jars/chamber pots	(69)	
			1 jug	(64)	
			17 ?id		
14 Redware	153	2108	1 cup		1542/3+
			2 jars/chamber pots	(69)	
			1 jar		
			1 jug	51	
			1 bowl/porringer	(77)	
			88 ?id		
29 Redware	17	254	2 cups		1542/3+
			4 jars/chamber pots	(69)	
			1 tankard		
			5 ?id		
18 Redware	99	1156	7 jars	(57, 65, 53, 56, 66) (69)	1542/3+
			1 tripod cauldron		
			1 jar/chamber pot		
			1 tankard		
			45 ?id		
20 Redware	159	2826	5 deep bowls	(82)	L16th-E17thC
			1 tripod pipkin	(36)	
			3 bowls/porringers	77	
			1 colander	84	
			2 sm bowls	(73)	
			1 shallow dish	(46)	
			7 jars	65, (43, 61)	
			1 flanged dish	(86)	
			3 handled bowls	83	
			4 lids	(90)	
41 Blackware	4	40	1 tankard		17thC
8 BORDB	10	36	1 encrusted lid		1550–1750
			1 globular cup		
9 BORDG/Y	69	1032	2 chafing dishes with knob roundels	(Pearce 1992 fig 30.187)	1550–1750
			1 flanged dishes	(86)	
			1 jar	(Pearce 1992 fig 26.113)	
			2 porringer		
			5 tripod pipkins	(93)	
			1 colander		
			3?id		
36 Stoneware	3	120	3 ginger beer bottles		19th–20thC
38 China	4	14	2 cups		20thC
TOTAL	809	11754	286		

* Illustration numbers in parentheses refer to examples of the same form in a different fabric

Table 6.7: Exterior of W Bastion (WBY), phase IV. A summary of fabrics and vessel forms in a mid/late 16th to early 17th-century assemblage.

Fabric	sherd no	weight (g)	no of vessels	ill no *	date
10 Beauvais White	16	306	1 jug	3	1500–1550
34 Mart I	1	20	1 flask		1475–1550
23 Raeren	2	10	2 drinking jugs		1475–1550
24 Cologne/Frechen	18	274	1 drinking jug 2 bellarmines		1550+
5 German Lead Glazed	8	166	4 Grapen	(16)	16thC
31 Low Countries Slip.	2	2	1 bowl	(29)	1600–1700
30 N Netherlands TGW	2	22	1 dish	31	1590-???
16 Low Countries Redware	5	94	1 tripod cauldron	(39)	14th -17th C
17 Redware	6	328	1 cauldron 1 wide bowl 1 jar	 (47) (59)	1542/3+
6 Redware	46	1434	2 jar/chamber pot	48	1542/3+
14 Redware	10	954	1 jar/chamber pot 2 jars 1 ?id	(69) (65)	1542/3+
18 Redware	20	586	4 jars 1 jug	58 64	1542/3+
20 Redware	70	2492	2 chafing dishes 1 tripod cauldron 1 jar 1 deep bowl 1 ?id	(85) 78	L16th–E17thC
7 Bichrome	2	72	1 jar/chamber pot	(48)	1500–1600
9 BORDG/Y	3	82	1 ointment pot 1 ?id	94	1550–1750
36 Stoneware	1	10	1 ginger beer bottle		19th–20th C
TOTAL	**212**	**6852**	**38**		

* Illustration numbers in parentheses refer to examples of the same form in a different fabric

Overlying all of these layers is a deposit of beach/shingle, which constituted slumped material (SBC 744, 745, 746, 832, 834 and SBG 759) from the phase IVb Rampire and which produced a mid to late 16th-century assemblage of Red Earthenware Fabrics 6,14, 17, 18 and 20, and mid to late 16th-century German Lead Glazed Grapen and Cologne drinking jugs. Some of the sherds are from vessels that also occur in the underlying occupation/accumulation deposits.

The highest levels of stratification (SBG 756, 757, 758, 760 and 761) over the slumped Rampire material, though interpreted as phases V and VI, contain the same vessels (eg Fig. 6.5.33) as the phase IVa occupation under the Rampire. The occasional 19th-/20th-century ginger beer bottle in these layers is intrusive.

The phase IVa occupation deposits above the brick floor of the SW Gallery and surface of the Courtyard confirm that these areas were in use in the late 16th/early 17th century. This is attested by the presence of various imported wares. The overlying slumped phase IVb Rampire material contains some of the same mid to late 16th-century vessels as these occupation levels but does not contain the late 16th/early 17th-century material. This is explained by the presumed composition of the Rampire as redeposited material removed from earlier mid to late 16th-century features within the vicinity of the castle. Some of the cross-joins between the phase IVb Rampire material and the phase IVa occupation layers could be the result of disturbance during the movement and deposition of large volumes of earth in creating the Rampire, if they are not the result of the modern rabbit warrens. The highest levels of stratification (phases V and VI), above the Rampire material, which contain a similar late 16th/early 17th-century assemblage and the same vessels as the phase IVa occupation layers below the Rampire, must be redeposited in contexts post-dating the abandonment of the castle.

The SSW Gallery (GVI) contains a small assemblage of 77 sherds (2 kg) and is one of the few associated with the latest phase of occupation in the late 16th/early 17th century. It is similar to the assemblage from the occupation layers in the SW Courtyard and adjoining parts of the SW Gallery with which it shares the same vessels. Within the SSW Gallery (GVI) there were only two contexts that produced significant amounts of pottery. Although one of these contexts has been attributed to the period after

Table 6.8: SW Courtyard (SBC) and SSW Gallery (SBG and GVI), phases IV, IVa, V and VI. A summary of fabrics and vessel forms in a late 16th to early 17th-century assemblage.

Fabric	sherd no	weight (g)	no of vessels	ill no *	date
10 Beauvais white.	5	140	1 lid	2	1500–1550
2 Mart III	1	2	1 flask		17thC
4 Sp olive jar	1	24	1 olive jar		17thC
23 Raeren	1	40	1 drinking jug		1475–1550
24 Cologne/ Frechen	36	560	9 drinking jugs		1550–1650
			4 bottles- armorial medallion	25	c.1600
5 German Lead Glazed	5	42	1 Grapen	(16)	
32 Werra	4	240	1 bowl	28	1580–1630
33 Weser	4	62	1 sm flanged dish		1590–1620
31 N Holland Slip	1	8	1 sm bowl	(29)	17thC
30 TGW N Netherlands	17	662	5 dishes	31,32, 33, 34	1590's??
16 Low Countries Redware	24	294	2 tripod cauldrons	(83)	14th–17th C
			1 handled bowl		
			1?id		
17 Redware	22	1494	1 jars	(67)	1542/3+
			1 jar/chamber pot	46	
			1 dripping pan		
			2 ?id		
6 Redware	8	14	1 jar/chamber pot	48	1542/3+
			1 cup	(89)	
14 Redware	25	1016	2 jars	(56, 59)	1542/3+
			1 jar/chamber pot	(69)	
			1 jug	(50)	
			3 tripod pipkin	(49)	
			7 ?id		
18 Redware	47	1410	7 jars	(57)	1542/3+
			2 cups	(87, 89)	
			1 tripod pipkin	54	
			1 dripping pan		
			2 ?id		
20 Redware	127	2322	1 chafing dish	85	L16th–E17thC
			1 handled bowls	(83)	
			7 deep bowls	(82)	
			1 small bowls	(62)	
			1 condiment	88	
			1 flanged dishes	(86)	
			1 cup	87	
			1 dripping pan	(46)	
			3 jars		
			1 jar/chamber pot	(69)	
			1 lid		
			27?id		
7 Bichrome	1	36	1 tripod pipkin	(49)	1500–1600
9 BORDY	18	298	1 bowl		1550–1750
			1 tripod pipkins	93	
36 Stoneware	1	10	1 ginger beer bottle		19th–20thC
38 China	1	2	1 ?id		20thC
46 Eng. Porcealin	1	2	1 plate		L18th–20thC
49 Redware	2	48	1 hollow vessel		19th–20thC
TOTAL	**352**	**8726**	**117**		

* Illustration numbers in parentheses refer to examples of the same form in a different fabric

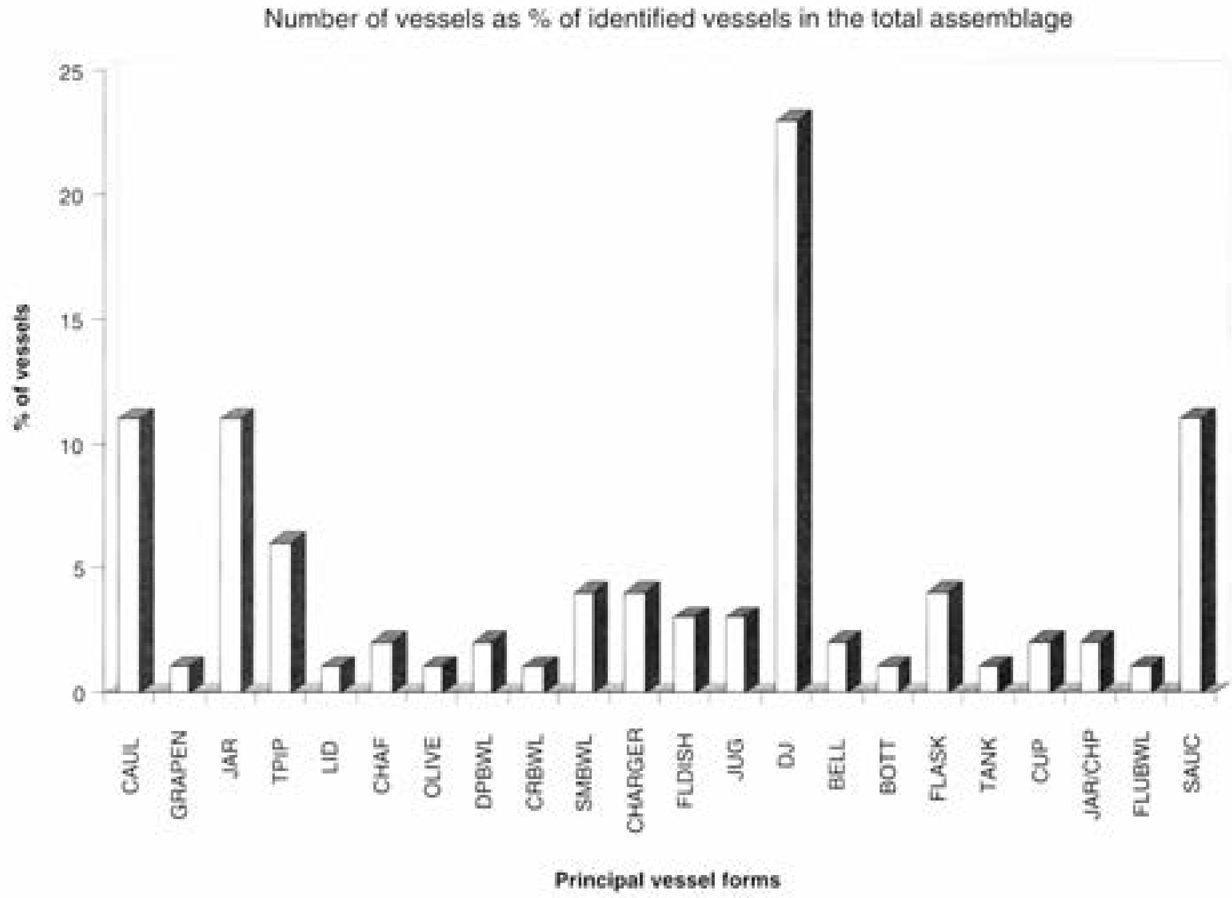


Figure 6.14: Pottery; principal vessel forms

the castle had been abandoned (phase VI), both contexts share the same vessels which are likely to have come from the same place. The majority of the pottery is in Red Earthenware Fabrics 14, 18 and 20 (Figs 6.8.59, 6.10.81 and 6.11.87). Imported wares include a German Lead Glazed Grapen (Fig. 6.3.16), an early 17th-century Cologne/Frechen bottle (Fig. 6.4.25) displaying the coat of arms of the Duchy of Julich-Kleve-Berg (1) *c* 1600 (Gaimster 1997), two late 16th- /early 17th-century North Netherlands Maiolica dishes (Fig. 6.5.31–32) and an early 17th-century Low Countries Slipware bowl.

Multiple Garderobe

Twenty-seven sherds labelled 'CAM 63 Multiple Garderobe "Upper level" and "Sed" level' come from this feature within SSW Gallery (GVI). The upper level contains 23 sherds from a vessel in a glossy glazed red earthenware similar to Fabric 17 (*c* 1542/3 –1637+). The vessel form is unusual with a flat base, globular body, a scar for a strap handle and a narrow opening with cordon around the neck. It is reminiscent of a medieval urinal. Four sherds from the 'Sed' level comprise a 16th-century Martincamp type II flask, a Low Countries type Redware cauldron with footring base, and a plain Cologne drinking jug of *c* 1550–1575.

Key to Figure 6.14

Key
CAUL = Cauldron,
TPIP = Tripod Pipkin,
CHAF = Chafing Dish,
OLIVE = Olive jar,
DPBWL = Deep Bowl,
CRBWL = Collar-rimmed Bowl,
SMBWL = Small bowl,
FLDISH = Flanged Dish,
DJ = Drinking Jug,
BELL = Bellarmine,
BOTT = Bottle,
TANK = Tankard,
JAR?CHP = Jar/Chamber Pot,
FLUBWL = Fluted Bowl,
SAUC = Saucer.

'A Doorway on the west side of the South Horseshoe [Stirrup Tower] into Bastion'

A small group of 23 sherds from the 'blocking of the doorway' must derive from the filling of the S Bastion. They include a Cologne/Frechen bottle with armorial medallion of early 17th-century date, sherds of late 16th-century North Netherlands Maiolica and Red Earthenware Fabrics 14, 18 (cf. Fig. 6.8.61) and 20.

VESSEL FORM AND FUNCTION *(Fig. 6.14)*

A summary of the entire assemblage at Camber identifies 3035 sherd families/vessels of which 1947 can be positively categorised by form (see Fig. 6.14). If the 18th- to 20th-century ginger beer bottles, teapots, cups and saucers are subtracted from this figure it leaves a total of 1715 identified vessels contemporary with the castle. This assemblage contains a wide range of forms, often represented by a single vessel, ranging from cooking vessels and storage vessels to basic tablewares and fine tablewares. The illustrations provide a comprehensive type series of forms for the century of occupation from *c* 1539, and represent the possessions of the builders, garrison and officers.

Cooking vessels and associated food storage or preparation vessels account for 40% of all vessels in the assemblage. They include 242 cauldrons, 135 tripod pipkins, 225 jars, 71 bowls, 4 colanders, 8 dripping pans, 1 pancheon and 15 olive jars.

Cauldrons account for 14% of all the vessels. The most distinctive are the Low Countries type Redware tripod cauldrons (Fig. 6.6.39 and 6.6.41) with an everted or collar-rimmed/lid-seated rim ranging in size from 16–28 cm diameter. These are found in coarse Red Earthenware fabrics 16 and 17. Some vessels have a thumbed cordon and others a rilled body.

Tripod pipkins (Figs 6.6.36–38, 6.7.49 and 6.8.54–55) are also easily identified as kitchen vessels. These occur in all the Red Earthenware fabrics (Fabrics 6, 14, 16, 17, 18 and 20) at Camber and constitute 8% of all the vessels. They are typical small vessels with a tripod base, rilled body, pulled handle and collar-rimmed or lid-seated rim of 10–18 cm diameter.

Jars comprise 13% of all the vessels (Figs. 6.6.43, 6.7.52–53, 6.8.56–61 and 6.9.65–66). These 225 examples are one of the most common vessel forms at Camber and occur in all of the Red Earthenware fabrics. These are large storage vessels, frequently glazed only on the interior surface, with everted, thickened, collar-rimmed and inturned/flanged rims of 16–30 cm diameter. Only one of the jar forms (Fig. 6.8.59) has handles and could have had an alternative use as a cooking vessel. Twenty-three examples of lids (Fig. 6.11.90) that might fit these jars are most common in Fabric 20.

There are 71 bowls, in a variety of shapes, probably for several uses in food preparation. They account for 4% of the vessels at Camber. Other bowls used in food preparation include Deep Bowls with flanged, thickened or collared rims of 14–30 cm diameter (Fig. 6.10.78–80 and 6.10.82), Collar-rimmed bowls of 30 cm diameter with a pouring spout (Fig. 6.6.45), Handled Bowls with flanged rims of 20–26 cm diameter (Fig. 6.10.83) and Wide Bowls with flanged rims of 22–30 cm diameter (Fig. 6.10.81). Occasional examples are decorated with wavy or multiple incised lines around the top of the rim (Fig. 6.10.78 and 6.10.82–83).

Other vessels used in the preparation of food, colanders (Fig. 6.11.84) and dripping pans (Fig. 6.7.46), occur as occasional vessels in Red Earthenware Fabrics 17 and 20. Colanders are a mid to late 17th-century form in London (B. Nenk pers.comm.) which may explain the small number at Camber.

Tablewares are a relatively small part of the Camber assemblage accounting for 15% of the total number of identified vessels. These vessels include small bowls, drinking jugs, flanged dishes, jugs and chafing dishes. The unique nature of the Camber assemblage invites speculation that the highly decorated continental imports might be considered high status and the equivalent form produced in a local earthenware low status. High status vessels might therefore be the small bowls (Fig. 6.2.4 and 6.2.9), cups (Fig. 6.2.5), flanged dishes (Fig. 6.2.7–8) and chafing dishes in Beauvais Sgrafitto Ware, small bowls (Fig. 6.2.1) and small jugs (Fig. 6.2.3) in Beauvais Whiteware, Saintonge chafing dishes (Fig. 6.3.10–11), Spanish Maiolica and North Netherlands Maiolica dishes (Fig. 6.5.31–35), Westerwald Biconic jugs (Fig. 6.4. 26), Werra Slipware bowls (Fig. 6.4.28) and flanged dishes (Fig. 6.4.27) and Weser wavy lined dishes. The equivalent low status vessels are Low Countries Slipware small bowls (Fig. 6.5.29) and Red Earthenware flanged dishes (Figs 6.6.44, 6.11.86 and 6.11.91), chafing dishes (Figs 6.9.63 and 6.11.85), cups (Fig. 6.11.87 and 6.11.89) and small bowls/porringers (Fig. 6.10.75–77) together with small handled 'drinking' bowls (Fig. 6.10.71–74), and jugs (Figs 6.7.50–51 and 6.9.64). There is also a possible condiment (Fig. 6.11.88). The small handled bowls may have had a dual function as eating or drinking bowls.

The most common vessels in this assemblage are associated with drinking or the transport of liquids. Drinking jugs, Bellarmines, bottles, flasks, costrels, cups and tankards account for 39% of all the identified vessels. Among the 484 examples of these Rhenish vessels are basic undecorated Raeren jugs with a frilled base (Fig. 6.3.14–15) and an abundance of Cologne vessels with a wide range of decorative motifs (Figs 6.4.17–19 and 6.4.22). These vessels were apparently the common drinking vessel of the garrison or the builders in the first half of the 16th century. In the second half of the 16th century the Rhenish drinking jugs are replaced by Bellarmines of which there are 50 examples at Camber. By the 17th century bottles are introduced into the assemblage. Later drinking vessels are also present in the form of 29 examples of globular earthenware cups (Fig. 6.11.87 and 6.11.89) and 15 tankards. These later types of drinking vessel are of minimal significance. The Bellarmines and the earthenware cups and tankards each account for 3% of the assemblage, and were perhaps eclipsed by vessels in other materials such as glass or metal, or removed when the castle was abandoned.

Another large group of drinking vessels comprises 9 costrels and 75 flasks and accounts for 5% of all the vessels at Camber. Nine bottle-shaped costrels with pierced lug handles on the shoulder occur in Tudor Green Ware and green glazed Border Ware (see Pearce 1992, fig. 37.297), Red Earthenware Fabrics 12, 14 and 20 and Beauvais Stoneware. Sixty-four of the flasks are Martincamp types. It has been concluded that the Martincamp flask was made for export and transported empty and not as the necessary by-product of an exported commodity. They were sold as a specific vessel form (Allan 1983; Ickowicz 1993). There is a possibility that these vessels were popular at Camber with a migratory population.

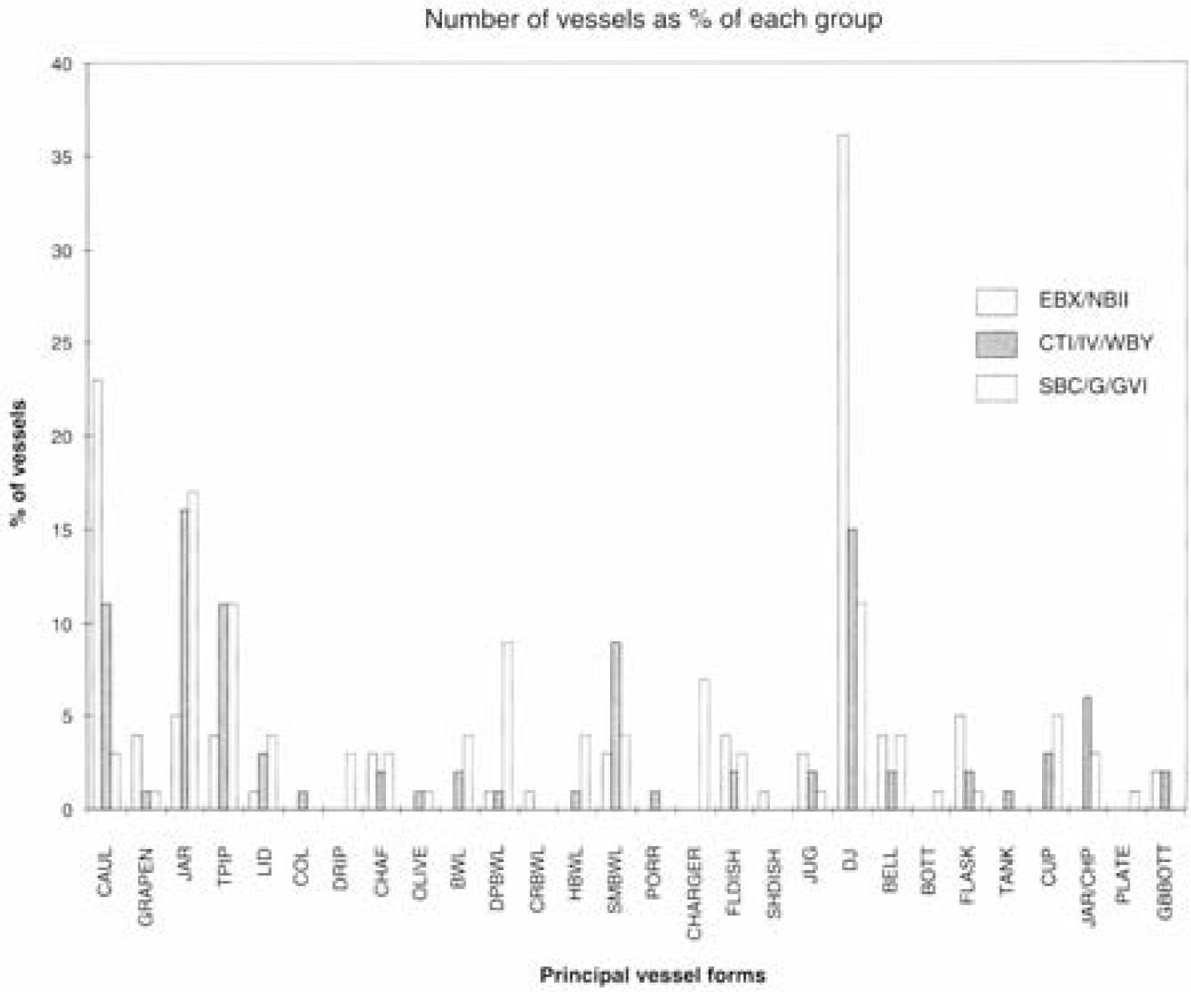


Figure 6.15: Pottery; proportions of main vessel forms in three dated groups

Fifty-six possible chamber pots are identified as 3% of all the vessels. These occur in Red Earthenware fabrics 7, 14, 17, 18 and 20 (Figs 6.7.48, 6.9.62, 6.9.67–69). Other sanitary vessels include an ointment pot (Fig. 6.11.94) in Surrey/Hampshire Border Ware and Tin Glazed Ware drug jars .

Because of the redistribution and disturbance of the majority of the pottery at Camber, there is no discernible pattern in the distribution of different vessel types around the castle. However, it is noticeable that a well preserved group of complete cooking vessels/jars occur outside the W Bastion Exterior which contained the kitchen.

FABRIC CHRONOLOGY AND VESSEL FORM TYPOLOGY

The conservative nature of ceramics is such that significant typological changes in vessel form would not be expected in the short lifetime of the castle (*c* 1512–1637), and particularly not in the case of fabrics such as red earthenwares, which account for 48% of the assemblage. This is further compounded by the fact that most of the pottery is found in phases IV, IVb, V and VI, narrowing the date-range of the ceramic sequence to

Key to Figure 6.15

Key: CAUL = Cauldron,
TPIP = Tripod Pipkin,
COL = Colander,
DRIP = Dripping Pan,
CHAF = Chafing Dish,
OLIVE = Olive Jar,
BWL = Bowl,
DPBWL = Deep Bowl,
CRBWL = Collar-rimmed Bowl,
HBWL = Handled Bowl,
SMBWL = Small bowl,
PORR = Porringer,
FLDISH = Flanged Dish,
SHDISH = Shallow Dish,
DJ = Drinking Jug,
BELL = Bellarmine,
BOTT = Bottle,
TANK = Tankard,
JAR?CHP = Jar/Chamber Pot,
SAUC = Saucer,
GBBOTT = Ginger Beer Bottles.

c 1542/3–1637+. Continental imports, and the interpretation of the stratigraphic sequence, have therefore been the determining factors in dating this assemblage. However, the assemblage shows certain associations of fabric types and vessel forms that lend themselves to classification as three broadly differentiated groups: early to mid 16th-century, late 16th- to early 17th-century and early 17th-century.

Group 1: Early to mid 16th century

This group is primarily represented by the assemblage from outside the E Bastion (EBX). Continental imports constitute 78% (by sherd count) of the pottery, and Red Earthenwares, 13% (see Fig. 6.13). Group 1 is characterised by the association of Beauvais Whiteware, Beauvais Sgrafitto Ware, Saintonge Mottled green glazed ware, Saintonge Chafing Dishes, Martincamp Type I and II flasks, Raeren drinking jugs, Cologne rose and oak decorated drinking jugs, and Low Countries type Redware. The French wares from Beauvais, Saintonge and Martincamp account for 20% of the pottery at this date and provide bowls (Fig. 6.2.1, 6.2.4, and 6.2.9), flanged dishes (Fig. 6.2.7–8), chafing dishes (Figs 6.2.6, 6.3.10–11), small jugs (Fig. 6.2.3), costrels and flasks. Rhenish Stonewares account for 33% of the group. Raeren drinking jugs (Fig. 6.3.14–15) are more common than the Cologne 'rose and oak' jugs (Fig. 6.4.17–18). The absence of Bellarmine/Bartmann jugs is a significant factor in dating this group. Low Countries type Redware (Fabric 16) accounts for 25% of the assemblage from outside the E Bastion and is more common at this date than in the late 16th-century assemblages. It includes tripod pipkins (Fig. 6.6.36–38), tripod cauldrons (Fig. 6.6.39–41), shallow dishes (Fig. 6.6.42), small flanged dishes (Fig. 6.6.44) and collar-rimmed bowls (Fig. 6.6.45). The thumbed cordon on cauldrons is considered to be a mid 16th-century feature (Hurst *et al.* 1986).

The Red Earthenware Fabrics 6, 14, 17, 18 and 20 provide jars (Figs 6.7.52 and 6.8.56–58) and lids (Fig. 6.11.90). Their presence is limited and they were evidently eclipsed by Low Countries type Redware at this date. Surrey/Hampshire Border Ware tripod pipkins (Fig. 6.11.93), porringers and flanged dishes occur in this group in small numbers, but are more typical products of the second half of the 16th century.

Group 2: Mid to late 16th century

The mid to late 16th-century assemblages (CTI, CTIV and WBY) at Camber contain a high percentage of Red Earthenwares (66%) and a smaller number of imported wares (28%). The majority of the pottery is in Red Earthenware Fabrics 6, 17, 14, 29, 18 and 20, with a large proportion of vessels in Fabric 20. The range of vessel forms has increased far beyond the jars found in the first half of the 16th century and now includes tripod pipkins (Figs 6.7.49, 6.8.54–55), tripod cauldrons (Fig. 6.6.40), chafing dishes (Figs 6.9.63 and 6.11.85), small bowls/porringers (Fig. 6.10.75–77; cf. also 6.5.29), small handled bowls (Fig. 6.10.71–74), jars (Figs 6.7.52–53, 6.8.56–61, 6.9.65–66), lids (Fig. 6.11.90), handled bowls (Fig. 6.10.83), deep bowls (Figs 6.10.78–80, 6.10.82), wide bowls (Fig 6.7.47 and 6.10.81), flanged dishes (Fig. 6.11.86), cups (Fig. 6.11.87 and 6.11.89), tankards, handled jars/chamber pots (Figs 6.7.48, 6.9.62, 6.9.67–69), shallow dishes (Fig. 6.7.46), a possible condiment (Fig. 6.11.88), jugs (Figs 6.7. 50–51, 6.9.64), colanders (Fig. 6.11.84), a pedestal candlestick and a possible costrel (Fig. 6.9.70). Although it is not always possible to distinguish between mid and late 16th-century deposits at Camber, there are certain vessel forms, such as the colanders, cups, tankards and lids, which only occur in Fabric 20. This diverse range of new vessel forms associated with Fabric 20 may be the result of a typological change in the High Lankhurst, Westfield industry in the late 16th century. Such changes occur in the London-area Redware industry during the course of the 16th century (Gaimster and Nenk 1997) and in the Surrey/Hampshire Border Wares in the early 17th century (*c* 1640). An assemblage in Surrey/Hampshire Border Ware and dating to AD1640+ contains, for example, chafing dishes, flanged dishes, porringers, colanders, jugs, wide bowls, cups and tripod pipkins (Pearce 1992). At Battle Abbey it was noted that tripod pipkins, associated by textural analysis with Camber Fabric 6, occurred in the later 16th or early 17th centuries (Streeten 1985b). At Camber they occur in phase IV dating from 1543 to 1637. A distinctive type of 16th-century Bichrome Redware cauldron (Fig. 6.11.92) occurs only in this mid to late 16th-century group.

The continental imports are a minor part (28%) of assemblages of this date. They include French Martincamp Type I and II flasks, a Beauvais single sgraffito cup (Fig. 6.2.5) and Saintonge chafing dishes. Rhenish imports include the dated Siegburg Schnelle of '[15]75' and Cologne Bellarmines/Bartmann jugs with motifs dated to the second half of the 16th century (Fig. 6.4.20). Tripod cauldrons in Low Countries type Redware are still present in two of the assemblages (CTI and WBY) of this date, but are now minor products. A near complete Low Countries Slipware pipkin (Fig. 6.5.30), usually found in Britain in the 17th century, occurs here in phase IV.

Group 3: Late 16th /early 17th century

This period is distinguished by the introduction of well dated continental imports, which constitute 25% of the assemblages from the SW Courtyard and SSW Gallery (SBC, SBG and GVI). Red Earthenware Fabrics 6, 17, 14, 18 and 20 remain predominant at 64%. The continental imports of this date include French, Dutch, German, Spanish and Portuguese wares. The French wares are all Martincamp Type III flasks. The Low Countries products are North Netherlands Maiolica dishes (Fig. 6.5.31–35) and Slipware bowls (Fig. 6.5.29). The German wares include Weser and Werra bowls and dishes (Fig. 6.4. 27–28), Frechen bottles with rosette medallion of *c* 1629+ and armorial medallions of *c* 1600 (Gaimster 1997), a Westerwald Biconic jug and lead glazed Grapen (Fig. 6.3.16). The Spanish vessels are all olive jars and the Portuguese, standing costrels.

A diverse range of Red Earthenware Fabrics 6, 17, 14, 18 and 20 continue into the early 17th century. The range of vessels is much the same as for the previous period but with the addition of a possible condiment (Fig. 6.11.88) and a dripping pan (Fig. 6.7.46). Another distinctive mid 16th- to mid 17th-century ware, white-slipped 'Guy's-type Ware', is represented at Camber in phase V, 1637+.

REGIONAL CONTEXT AND TRADE

The ceramic collection from Camber Castle is important for two reasons. Firstly, as an assemblage from a military establishment of national significance, and secondly, as a sample of marketed vessels in a part of Sussex where few kilns have been identified. Because of the lack of identified kilns, marketed vessels are a significant indicator of fabric chronology and trade within the region. A summary of the fabrics at Camber (Fig. 6.12) shows an assemblage primarily of local earthenwares, secondly of Continental imports, and lastly of Established Wares.

Local Earthenwares

In a regional context, the 'local' hard-fired Red Earthenwares can be compared with published assemblages from Period D at Battle Abbey and Dissolution debris at Bayham Abbey both representing the range of ceramics used in these two religious houses in the years preceding 1538 and 1525 respectively. The early 16th-century assemblage at Bayham Abbey demonstrates that the finer hard-fired Red Earthenwares (Fabrics Dii and Div) attributed to nearby kilns at Lower Parrock, Hartfield, E Sussex and Hareplain, Biddenden, Kent were readily available in parts of the Weald (Streeten 1983a). In the Camber assemblage comprising the ceramics used by the builders and garrison of the castle in the decades after 1539, there are 13 Bichrome vessels in Fabric 7 that could be from these or other kilns producing similar wares. These bichrome vessels occurred in assemblages of the first half of the 16th century at Camber. The general absence of Lower Parrock and Hareplain products at Camber Castle and at Battle Abbey corroborates Streeten's observation that in the early part of the 16th century there is a recognisable difference in purchasing/marketing of pottery between the north-east and south-east of the county, as shown by comparing assemblages from Battle Abbey and Bayham Abbey which are 22 km apart. The early 16th-century market in East Sussex was evidently supplied from a number of small workshops, probably sold through a variety of outlets; from the workshop, by itinerant salesmen or despatched as a specific order (Streeten 1980). This pattern of marketing may be present at Camber. The large quantities of imported pottery such as Beauvais Sgrafitto Ware and Low Countries type Redware, the latter accounting for 25% of the assemblage from outside the E Bastion (EBX), may show a preference in the first half of the 16th century for purchasing pottery either from merchants travelling along the south coast or through local ports.

By the late 16th century the differences in the composition of the ceramic assemblages of Battle Abbey and Camber Castle have diminished. Both assemblages are dominated by the products of a kiln/workshop located approximately 10 km to the south-west of Camber at High Lankhurst, Westfield, E Sussex. Local hard-fired earthenwares now became an important source of cooking vessels at Camber, where Fabrics 18, 6 and 3 (products of the High Lankhurst kilns), are a predominant type constituting 20–22% of the phase IV and V assemblages. Their popularity might be a reflection of the more settled garrison stationed at Camber in the second half of the 16th century which needed a good, cheap local supply of utilitarian vessels such as cooking and storage vessels. The distribution of these wares would appear to be well established in the hinterland of this workshop since these products are the principal group of Red Earthenwares at Battle Abbey (Fabrics FIII, FIV, FV, FVI and FVIII) and vessels identified as coming from High Lankhurst (Group LV, Streeten 1985a) are also found at Hastings. By comparison with Camber Type Fabric 18, they may also occur at Withyham and Herstmonceux in East Sussex and at Bayham Abbey (Fabrics DI, DIII and DXI) (Streeten 1985b). The proximity of High Lankhurst to the River Brede was probably a significant factor in the successful supply of its pottery to Camber.

Fabric 6 is typical of the red earthenwares occurring over a wide area of South-East England and examples have been identified at Withyham, Newchurch, Forest Row, Isfield, Buxted, Eastbourne and Bodiam in East Sussex, and at Tonbridge, Aldington, Pluckley and Otterden in Kent and as far afield as Kingston-upon-Thames (Streeten 1985a). It can be inferred from such extensive distributions that similar wares were probably being produced by several different workshops.

Another common local hard-fired Red Earthenware at Camber is Fabric 14 which also occurs at Michelham Priory, East Sussex (sample 476) and Herstmonceux (Streeten 1985a), approximately 35 km and 30 km respectively to the west of Camber.

The three white-slipped vessels that occur at Camber after *c* 1542/3 are possibly Guy's-type Ware as found in London, but of unknown source, or alternatively they may have been products of a tradition/industry that produced white-slipped vessels in west Kent and east Surrey (Streeten 1982a and1982b). The vessels at Camber are a regional import, either brought from west Kent by an itinerant merchant or possibly re-exported from London.

Continental imports

Table 6.9 summarises the range of Continental imports, which account for 38% of the assemblage at Camber. The large number of Continental imports is a reflection of the trade in ceramics around the coastal ports of Britain and the re-export of imported wares from London around the south coast (Allan 1983). The Coastal Port Books for General Wares between 1565 and 1660 show that London played a central role in the redistribution of imported ceramics and that all the south coast ports, including Rye and Hastings, received regular shipments. The port books of Lyme Regis in the late 17th century also record regular coastal trade with most of the ports of the south coast. Here, trade with Hampshire and Hastings in Sussex was as important as trade with Devon and Cornwall (Allan 1983), and is reflected at Camber by the presence of a Plymouth clay pipe (Higgins, Chapter 7). The proportion

Table 6.9: Summary of Continental Imported Wares

Fabric	Sherd No	Weight	Vessel No	% of imports (no of vessels)
Beau. Whiteware	105	1978	28	
Beau. Sgraffito Single	8	56	3	
Beau. Sgraffito Double	114	1506	20	
Beau. Stoneware	10	142	7	
Saintonge Green and Brown	11	504	1	N French - 14%
Saintonge Mottled	7	26	4	
Saintonge Chafing Dish	29	1412	9	
Martincamp I	194	2110	33	
Martincamp II	202	2810	38	
Martincamp III	135	638	13	
Portuguese Merida	11	94	7	Portuguese - 0.6%
Seville Olive Jar	62	2124	19	
Spanish?	7	199	1+	Spanish - 2%
Spanish Maiolica	1	10	1+	
Siegburg	9	178	2	
Raeren/Aachen	338	8438	148	
Cologne/Frechen	1338	23423	435	German - 59%
Westerwald	9	190	1	
Werra	15	370	5	
Weser	16	570	5	
Lead Glazed Earthenware	135	1533	36	
Seltzer Bottle	1	92	1	
Dutch Slipware	57	604	13	
Dutch Redware	687	16819	226	Dutch - 25%
Dutch TGW	68	1057	27	
Total	**3569**	**66883**	**1083**	
% of total assemblage	**38%**	**33%**	**36%**	

of Continental imports at Camber equals that at Plymouth, Southampton, Hull and Newcastle, where imports represent 30% or more of the assemblages (Allan 1984). City sites in Exeter have 13% imported pottery on average, and at Battle Abbey imports represented 10% of the 'dissolution' assemblage (Streeten 1985b, 122). A group of imported wares dating from the second quarter of the 17th century at Dover Castle has a limited range of Tin Glazed Earthenware and German Stoneware, but is published with no quantification, which prevents comparison (Mynard 1969). The large number of Continental imports at Camber is a reflection of its proximity to various coastal ports, the markets available within the region, and also perhaps of the purchasing power or purchasing policy for a prestigious building operation and military establishment.

The high quality tablewares at Camber Castle may reflect the presence of a higher ranking individual such as the captain. High quality tablewares of the first half of the 16th century are French, and those of the late 16th century are in North Netherlands Maiolica . The French Beauvais and Saintonge vessels are datable to the first half of the 16th century, and must have been in use during the construction period, or the earliest years of occupation. The late 16th-century North Netherlands Maiolica are a small collection of high quality dishes possibly in individual ownership, and datable to the latest occupation of the castle. The many Martincamp flasks, listed in the English Port Books as 'earthen bottles' (Allan 1983), could reflect the large number of men employed in building works, or equally a garrison made up of a transient population, needing vessels/containers that would transport liquid.

Spanish Olive Jars, listed in the English Port Books as containing olive oil, oil and turpentine (Allan 1984), have a wide distribution in Britain's coastal ports. Fifteen jars were recorded at Camber, and this relatively large assemblage could be interpreted as a specific purchase or simply a reflection of the ready availability of these goods through major south coast ports.

The most common of the continental imports at Camber are the Rhenish Stonewares, in particular Raeren and Cologne drinking jugs. These vessels were mass-produced and commonly available. They were 'cheap vessels' valued in the late 16th century at 2d. each (Allan 1984). It has been noted previously that the number of Rhenish Stonewares is much greater at Camber than in deposits at the monastic establishment of Battle Abbey (Streeten 1985b) perhaps reflecting both the different status and slightly later date of the Camber material. The 140 Raeren vessels and 377 Cologne jugs at Camber could have been used by the 1272 workmen employed in the construction campaigns of 1539–40 and 1542–3. The date of this intensive building activity coincides with the currency of the very numerous Cologne drinking jugs (dated 1500–1550). It is quite possible that large numbers of these cheap imported jugs were used by the workmen as well as by the much smaller garrison, and that the shingle and beach material used to infill such features as the N Bastion includes the rubbish they left behind.

Cologne/Frechen Stonewares represent 37% of the imports at Camber, a similar proportion to Exeter, where 41% of the imports in the second half of the 16th century are Frechen. David Gaimster comments that the development of the Frechen industry depended on its long-distance export trade, and this is borne out at Exeter and London where there are extensive collections of Bartmann jugs and bottles from the second half of the 16th century (Gaimster 1997, 209). It is interesting to note that the late 16th- to mid 17th-century Bartmann bottles with armorial medallions at Camber contain the same coat of arms (Duchy of Julich-Kleve-Berg (1); Fig. 6.4.25) as a significant number of vessels in London (Gaimster 1997, 210), suggesting a process of redistribution. A small number of individuals dominated the import trade in Stoneware in the late 16th and early 17th centuries. The Coastal Port Books of 1565–1603 record coastal shipments of pottery from London into Rye, where 2 maunds of stone pots arrived in 1579–80, 2 further maunds arrived in 1585–6 and 6 baskets of stone pots arrived in 1585–6. Similarly 8 maunds of stone pots are recorded for Hastings in 1585–6 (Allan 1983). A maund could be 50 or 500 pots but was usually 100–150 (Allan 1984). The high number of Stonewares at Camber is not surprising given that these imports were readily available through the local ports. The customs accounts of London show the import of 3,000 Stonewares into London in two months of 1509, and for the period 1600–1640 Allan has calculated a figure of 10 million (Allan 1983).

Regular contact between Camber Castle and the ports of Rye and Winchelsea is well attested in the documentary sources. One of the commissioners for the building work was John Fletcher, who came from a well-known Rye family and was an important merchant. The Camber Castle accounts make repeated references to carriage of men and material by water and land (*HKW* and Biddle, Chapter 2 above). Ferryboats to carry workmen from Rye were on hire throughout the 1539–1540 season and for part of the time a ferryboat from Winchelsea is also mentioned. The Camber was still an open stretch of water navigable by 'great ships' at this time. Timber was brought in by water, from Horne Wood, near Appledore, Kent and Knell Wood in Beckley parish, Sussex. Both locations are 8 miles distant by water. There is a reference to the transport of 'nine tons of tile brought in by water' in the tenth pay, to five burden of steel, some purchased from a London merchant, and to 16,000 bricks bought from Francis Dosse, a Fleming, for mending the lime kilns in the works of 1539. The North French wares (14% of the imports) might have accompanied the purchase of stone from Caen, obtained from five different suppliers in Normandy. Reference is also made to a quay somewhere near the works, which served as the main off-loading point for lighters coming from adjacent parts of Kent and Sussex, and sometimes from Dover, London and Normandy.

Established wares

The low proportion of English Established Wares is possibly a reflection of the abandonment of Camber around 1637. Surrey/Hampshire Border Wares, for example, are present in the assemblage, but the greatest range of products in this industry date from the mid to late 17th century, beginning around 1640 (Pearce 1992). Little work has been carried out to date on 'Later Surrey Whitewares' (Surrey/Hampshire Border Wares) in Sussex, although Surrey Whitewares, Tudor Green and Cheam have been more extensively studied for the county. 'Later Surrey Whitewares'/Border Wares are known at Canterbury, Rochester and Dover in Kent, where they are probably the result of a growing trade with London (Streeten 1982a). Their distribution in Sussex awaits future research in relation to recently published corpora from London (Pearce 1992).

Chapter 7: Other Finds

by Cecily Cropper, David Higgins and Ian Scott

METALWORK AND ORGANIC MATERIALS
by Ian Scott

Personal items *(Figs 7.1–7.5)*

The limited quantity and range of personal items from Camber reflects the status of the builders and garrison of the castle. Personal items include jewellery, toilet items, clothing, shoes and their fittings. The most common items are pins and lace tags. A small number of buckles have also been found. Catalogue entries give a description of each object, followed by the year of excavation, Trench or Area code, context number and small find number.

Jewellery (Pl. 7.1; Fig. 7.1)

1 Gold decorative link from a collar, cut. The link is formed from thin gold sheet with the decoration formed by applied gold wire with some inlaid. There is a rectangular panel defined by a double border of gold wire in the centre. The object has been cut on one long side of this central panel; the cut has removed part of the border. In the centre of the panel is a circular inlaid field containing a cross, which is supported by pairs of coils formed from gold wire. Pairs of semicircular fields flank the central rectangular panel. The panels on the longer sides are larger. One of the extant semicircular panels is inlaid with a cross. L 20 mm; 1974 EBX (723) sf 33 Ph 2b
This is clearly not a first rate piece of jewellery.

Although a great deal is known about the high class jewellery worn by the royal family, courtiers and the wealthy at this time, because pieces survive or are depicted in portraits, comparatively little is known about less high quality jewellery because it does not survive. Much was melted down or broken up for reuse as fashions and fortunes changed. The filigree work, which is not a feature of jewellery of mid 16th-century and later date, and the presence of crosses, suggest that this is a late medieval or early Tudor piece.

2 (Plate 7.1) Gold finger ring with engraved pattern of foliage on curved outer face, and an inscription in well cut upper case letters on the inner face. The inscription reads 'PERN[reversed]ES > EN > GRE •'. D 21 mm; 1983 NB iii (262) sf 1089 Ph. 5

The style of the lettering suggests a late medieval or post-medieval date for the ring. It may date to the period 1400–1500, or perhaps to the early 16th century. The motto is French, and in modern French would be 'Prenez en gré', meaning to 'Take pleasure from it' or 'Take pleasure in it'. It is probably a message to the recipient, and probably from a man to a woman. The size of the ring suggests that it was probably worn by a woman. (The reading was provided by Dr Pierre Chaplais, former Reader in Palaeography, University of Oxford, and additional comments were provided by Richard Sharpe, Professor of Palaeography, University of Oxford.)

3 Gilded copper alloy pendant or medallion with three-quarter view of a bearded male face, moulded in low relief. The gilding has worn from the raised elements. The beard is small and pointed, with moustaches, and there is a ruff around the man's neck. These are late Elizabethan or Jacobean fashions. This piece is now lost. L 32 mm; 1983 NB iv (300) sf 1586, Ph 4b

In addition to the pieces catalogued above, two other pieces of jewellery are recorded from the site. The information published here is based on the Ancient Monuments Laboratory Report (Hutchinson 1986):

4 (not illustrated) A faceted heart-shaped transparent mauve stone. Cast glass. 10 mm x 9 mm; 1983 CT III (266) sf 1092 Ph 6

5 (not illustrated) Small green transparent glass bead, roughly spherical. There is a circular scratch each end of the bead around the hole, which may indicate a small metal cap. 6.5 mm x 6 mm; 1983 WB i (279) sf 1393 Ph 5

Textile and leather (not illustrated)

A single small piece of silk ribbon (not illustrated) and a small fragment of a cone-shaped object formed from leather and gilded wire (not illustrated) were recovered from the SW courtyard. The latter item has been identified tentatively by Miss Elizabeth Crowfoot as part of a medieval lady's head-dress or hennin. It is difficult to

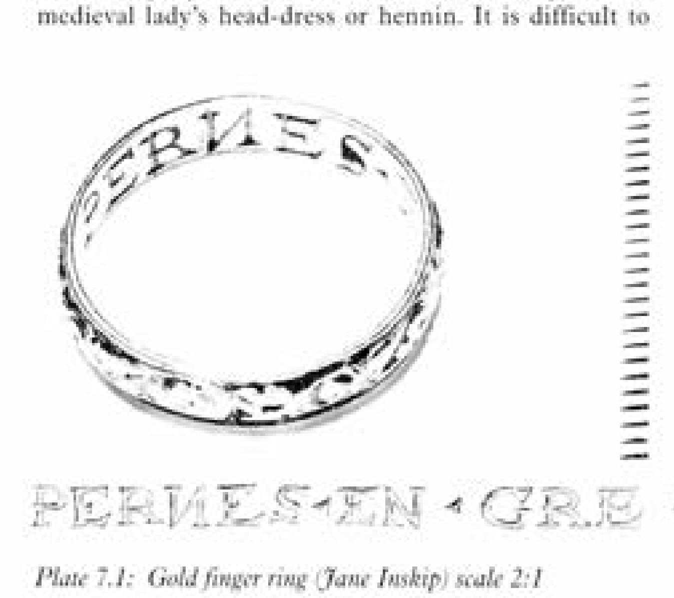


Plate 7.1: Gold finger ring (Jane Inskip) scale 2:1

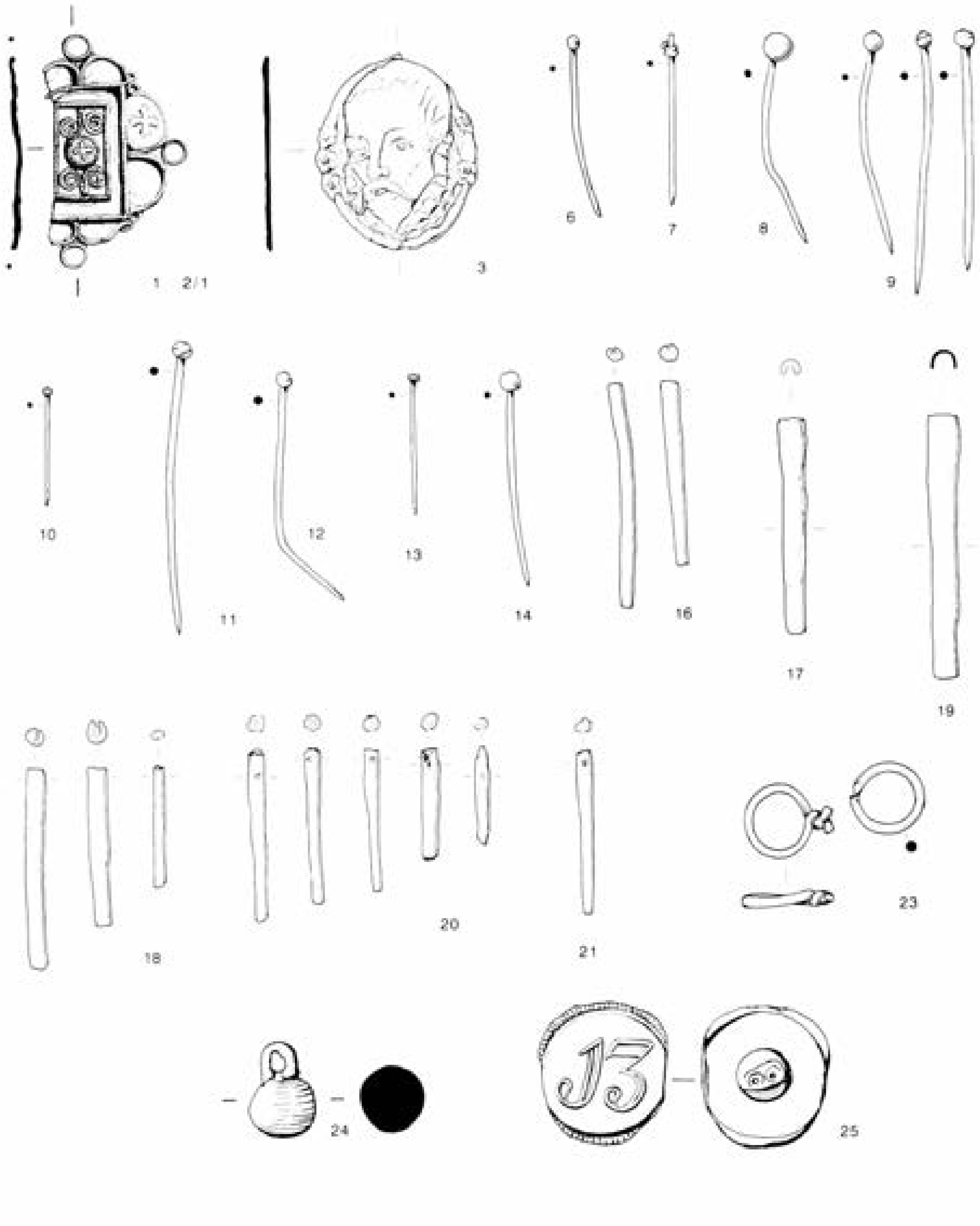


Figure 7.1: Metalwork, Nos 1–25, personal items (scale 1:1, except 1, scale 2:1)

deduce the circumstances under which this 15th-century survival came to be discarded at Camber Castle and incorporated into the occupation levels on the surface of the courtyard (phase IVa). Miss Crowfoot wrote reports on these objects for the Ancient Monuments Laboratory shortly after excavation. A conservation report on the hennin was prepared by K Lindahl in the 1990s (Lindahl nd). The following extracts are taken from the Ancient Monuments Laboratory reports:

> Fragment of wide silk ribbon with parts of both selvedges present, width 120 mm, length 16 mm. Warp fine, unspun silk, weft coarser, again unspun; the warp is stained dark brown-purple except in some small areas, but both systems were probably originally the same red colour. Weave, six-end satin, count *c* 98/52 threads per centimetre; selvedge, as far as can be seen, of five warps; the warps are damaged in all but a few areas (Crowfoot 1976). 1976 CT u/s, sf 71

> Fragments of a leather and wire cone, possibly a hennin. Parts of a delicate cone, 44 mm diameter at the widest part preserved, 27 mm at the narrowest, broken at both ends. This appears to be made of leather, now dark brown, with gilded 5-ply metal wire going round and round, both inside and outside, 15 mm of leather showing between the wires; X-ray examination would show if the wires are a continuous spiral or a series of diminishing circles. Inside the cone are remains of wood. Fibrous remains in the earth on the outside of the cone are coarse, and probably grass fibres. The only item in 15th-century costume this suggests is part of a lady's hennin, perhaps a section from near the point. However, these are generally described as covered in brocade or gold or silver tissue, and I cannot find any mention of wooden supports for the long cone. Analysis of the wire in the 1990s show that it was tin-coated brass (Lindahl nd, 2). [Lab. No. 753896] (Crowfoot 1975). 1975 SBC (835) sf 50, Ph 4a

Three pieces of leather shoe (not illustrated) were also recovered, from a phase IV context to the north of the Entrance Bastion. J H Thornton wrote a report following the excavations in 1976, from which the following extract is taken.

> Welted insole, left foot. Worn away at the outside (left) toe-end and outside (left) corner of the heel seat. Very prominent marginal edge/flesh seam, stitch length 8 mm. Length 230 mm, modern size equivalent: 13 children's (ignoring shrinkage in burial). [Lab. No. 753686] The size and separation of the stitch holes indicate that they are for a welt-sewing seam on an insole and not a sole-stitching seam on a sole and, therefore, that the specimen is post-1500.

> Welted sole, right foot. Worn away at the right side of the toe and forepart and at seat. Marginal row of grain/flesh stitching holes, stitch length *c* 4 mm, set in channel on grain side, *c* 2 mm from edge. As seat has now disappeared, any evidence of a heel will have gone with it. Present length 170 mm. [Lab. No. 753687]

> Welted sole, left foot. Worn away at toe, down left side and at seat. Marginal row of grain/flesh stitching holes remaining down inside (right) waist edge, stitch length *c* 4 mm and set channel *c* 3 mm from the edge. Some thread remains *in situ*. Present length 170 mm. [Lab. No. 753688] Presumably it belongs to the same shoe as the insole Lab. No. 753686; the other sole, Lab. No. 753687, may belong to the right shoe of the same pair although its shape is not quite the same.

> A welted insole gives [a date] post-1500. The general shape of the sole, also the pairing (left and right) and the lack of heel suggests pre-1600. The toe shape is post 1560. A possible date for the specimen is probably 1580±20. (Thornton 1982)
> 1963 DI (555), sf 80 a–c, Ph 4

Pins (Fig. 7.1)

A large number of pins were recovered from the excavations and a selection have been illustrated. Caple (1983) discusses the typology and manufacture of pins from Sandal Castle.

6 Pin, small with wound wire head. L 30 mm; 1983 CT IV (295) sf 1511 Ph 4
7 Pin, small, with wound wire head. L 29 mm; 1982 CT V (99) sf 791 Ph 5
8 Pin with large cast head. L 36 mm; 1982 CT V (119) sf 621 Ph 5
9 Pins, one with a cast head (38 mm), two with wound wire heads. L 45 mm, 41 mm, 38 mm; 1982 G I (74) sf 528 Ph 4
10 Pin, very small, with wound wire head. L 19 mm; 1983 G III (255) sf 1083 Ph 4
11 Pin, with round wound wire head. L50 mm; 1982 WB ii (279) sf 1396 Ph 5
12 Pin wire wound wire head. L 40 mm; 1978 NB i (33) sf 35 Ph 4a
13 Pin, with wound wire head. L 23 mm; 1983 NB iii (307) sf 1617 Ph 4a
14 Pin, with large cast head. L 36 mm; 1983 NB iv (246) sf 1216 Ph 4b
15 (not illustrated) Pins, 218, all with one possible exception with wound wire heads. Various sizes. Found with 25 lace points (No. 22). (not measured) 1974 EBX (723) Ph 2b

Points (Fig. 7.1)

Very large numbers of points or lace tags were recovered from the excavations. Only a small sample has been published and illustrated here. All are formed from rolled sheet copper alloy. Two types are found at Camber. The first type is simply rolled with an overlapping seam and has a hole or holes for sewing or pinning to ribbon or laces. There are variants of this type, including examples with a single hole and others with two opposed holes. A third variant has two superimposed pairs of opposed holes. Although most examples with opposed holes may have been sewn into position, there is an example of a point which was secured by a pin (No. 22). The second type of lace tag is rolled with an edge to edge seam, with the edges folded into the seam. This type has no stitching or pinning holes, and the folded edges will have served to crimp the tag onto the lace or ribbon edges. All appear to have been open ended, although some taper almost to a point. Medieval lace tags or chapes have been discussed by Egan (Egan and Pritchard 1991, 281-90). Oakley (1979a, 262–3) has defined a simple typology which has been extended by Margeson (1993, 22). The types identified at Camber are Oakley Type 1: tapering tags with overlapping seams and rivet holes, and Type 2: tags with edge to edge seams with folded in edges.

16 Two points, open ended, edges folded into seam and no stitching/pinning holes. L 37 mm, 30 mm; 1983 CT III (287) sf 1495 Ph 5
17 Point, no stitching/pinning hole, folded edges, open at ends. L 34 mm; 1983 CT IV (316) sf 1644 Ph 6
18 Three points, open ended, edges folded into seam and no stitching/pinning holes. L 33 mm, 26 mm, 19 mm; 1982 CT V (99) sf 789 Ph 5
19 Point, large, no stitching/pinning hole. Has been opened up. L 42 mm; 1982 G I (74) sf 558 Ph 4
20 Points, five, all small and with stitching/pinning holes clearly visible. L 28 mm, 25 mm, 24 mm, 18 mm, 15 mm; 1982 NBX (162) sf 914 Ph 4
21 Point, with stitching/pinning hole, tapers to near point. L 27 mm; 1974 EBY (730) Ph 3
22 (not illustrated) Points, 25, all simple rolled and including 5 with a single stitching/pinning hole, 18 with opposed stitching/pinning holes and 2 with 2 pairs of superimposed opposed holes. One of the examples with opposed holes was secured by a cut pin rather than stitching. Found with 218 pins (see No. 15). (not measured) 1974 EBX (723) Ph 2b

Wire loop fasteners (Fig. 7.1)

23 Loop fasteners, two, formed from copper alloy wire, one complete. D12 mm & 12 mm; 1983 CT III (297) sf 1677 Ph 6

Buttons (Fig. 7.1)

24 Round button formed of pewter or lead with a loop of iron wire. L 16 mm; 1983 NB IV (264) sf 1304 Ph 5
25 Button, later post-medieval. Cast from a lead alloy, it has a '13' on its curved front face, and is decorated with a cast milled edge. The button was attached by a wire loop which was attached at the back but is now lost. D 24 mm; 1963 D I (554) Ph 6

Copper alloy buckles (Fig. 7.2)

The double-looped figure of eight buckles are a late medieval and early post-medieval type (cf Goodall, in Margeson 1993, 28 & figs 30–1, 163–174; Egan, in Egan and Pritchard 1991, 82–7).

26 Figure-of-eight double loop buckle, with cast decoration. Strongly curved, with decoration on the concave face. L 34 mm; 1976 NBX (894) sf 1517 Ph 4/5
27 Figure-of-eight double loop buckle, with cast rosette on each loop. L 53 mm; 1983 CT IV (295) sf 1517 Ph 4
28 Figure-of-eight double loop buckle, plain cast. L 41 mm; 1978 NB ii (1) sf 11 Ph 6
29 (not illustrated) Figure-of eight double loop buckle, plain cast, with slight traces of leather strap. Similar to no. 28. L 37 mm; 1975 WBY (830) SF 56 Ph 4
30 Rectangular double loop buckle, plain cast. L 34 mm; 1982 CT V (98) sf 774 Ph 5
31 Figure-of eight double loop buckle. L 53 mm 1973 EBB (625) sf 3 Ph 5

Iron buckles (Fig. 7.2)

32 (not illustrated) Buckle, elongated trapezoid frame of circular cross-section, with roller at narrower end and tongue or bar attached at wider end, loop of circular section. L 56 mm; 1979 CT I (17) Ph 4b
33 (not illustrated) Buckle, trapezoidal, with bar or tongue attached to wider end, no extant roller. L 44 mm; 1979 CT I (17) Ph 4b
34 Buckle, trapezoidal frame of rectangular section, with bar attached at wider end and roller at narrow end. L 55 mm; 1983 CT III (266) sf 1305 Ph 6
35 (not illustrated) Buckle, similar to no. 34. L 60 mm; 1978 NB i (2) Ph 4b
36 (not illustrated) Buckle, elongated trapezoid frame of rectangular cross-section, with pin at wider end and roller at narrower end. L 59 mm; 1978 NB i (3) Ph 4b
37 (not illustrated) Buckle, similar to No. 34. L 57 mm; 1979 NB ii (23) Ph 4b
38 (not illustrated) Buckle, small trapezoidal frame of rectangular cross-section, with slightly curved outer edge. L 34 mm; 1979 NB ii (24) Ph 4b
39 Buckle, trapezoidal frame of rectangular cross-section, with roller at narrower end; no surviving pin or bar. L 47 mm; 1972 NB u/s
40 (not illustrated) Buckle, rectangular frame of square cross-section, of greater width than length, with slight trace of roller, but no extant tongue or bar. L 50 mm; 1982 CT I (115) sf 614 Ph 4
41 (not illustrated) Buckle, rectangular frame of circular cross-section, longer than it is wide. Has tongue but no extant roller. L 48 mm; 1983 CT V (383) sf 1710 Ph 5
42 (not illustrated) Buckle, sub-rectangular. The outer edge and sides are of rectangular cross-section. The frame is wider than it is long and its outer edge is curved and longer than the inner edge. There is no surviving tongue. L 45 mm; 1982 CT II (86) sf 750 Ph 4
43 (not illustrated) Buckle, similar to no. 42, but with sides and outer edge of square cross-section. The inner edge is of circular section and there is a slight trace of a tongue. L 39 mm; 1982 CT II (86) sf 751 Ph 4
44 (not illustrated) Buckle, sub-rectangular. The sides are of square cross-section; the outer edge, which is curved, is of half round cross-section. The inner edge which holds the tongue is of circular section. L 50 mm; 1982 CT V (108) sf 796 Ph 4

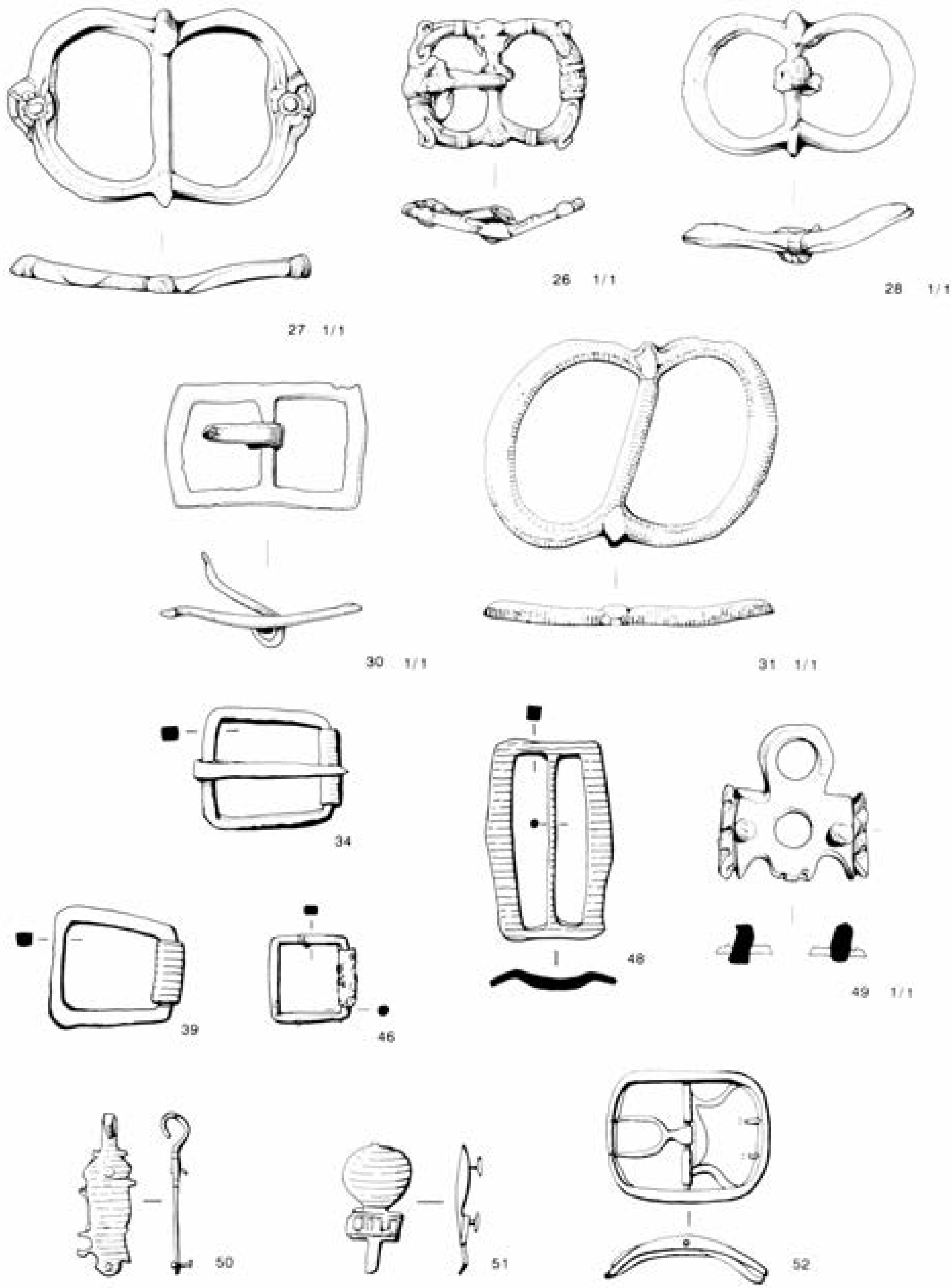


Figure 7.2: Metalwork, Nos 27–52, buckles and belt fittings (scale 1:2, except 26–28, 30–1, 49, scale 1:1)

45 (not illustrated) Buckle, square, with missing tongue. The frame is of square cross-section except for the bar which is round. L 35 mm; 1983 CT IV (288) sf 1498 Ph 5

46 Buckle, square, with missing tongue. The frame is of square cross-section except for the bar which is round and has a roller. L 33 mm; 1983 CT IV (295) sf 1550 Ph 4

47 (not illustrated) Buckle, with tongue attached to, or integral with, central bar; pinch in the middle. L 43 mm 1982 CT V (108) sf 799 Ph 4

48 Buckle, sub-rectangular, with central bar of circular cross-section. The frame has curved side bars of square section and flat rectangular outside edges. L 69 mm; 1979 CT I (17) obj 162 Ph 4b

Belt fittings and junctions (Fig. 7.2)

49 Junction or mount, consisting of a copper alloy plate secured by two iron rivets. The plate has a hole in the centre. An eye or loop extends from one long edge; the other edge is decorated. The short sides are decorated with cable patterns. Either a junction or a connector possibly allowed attachment to a belt. L 28 mm; 1982 G VI (76) sf 435 Ph 4

50 Junction of iron with decorative plate and rolled-over loop. The plate was secured by two rivets. L 55 mm; 1975 Keep Q I (837) Ph 5

51 Junction or mount of iron, consisting of a teardrop-shaped slightly curved plate above a rectangular panel from which a hook or loop sprang. The plate was secured by two rivets, which appear to be integral with the plate. L 44 mm; 1974 EBX (719) Ph 3

Shoe buckles (Fig. 7.2)

52 Shoe buckle, strongly curved oval buckle with double tongue and secondary loop, complete. L 56 mm; 1975 NEX (861) Ph 6

53 (not illustrated) Shoe buckle, strongly curved oval, fragment. L 44 mm; 1976 NBX (876) Ph 5

Bells (Fig. 7.3)

Pellet bells had a number of uses. The larger cast bells (eg. No. 54) may well have been used on horse harness, whether riding horses or draught animals. Smaller pellet bells could have been worn on clothing; small pellet bells made from thin sheet metal, being lighter, may have been attached to the legs of birds used in hawking.

54 Large pellet bell, cast in copper alloy, with attached wire loop. L 44 mm; 1983 CT IV (295) sf 1527 Ph 4

55 Pellet bell, copper alloy, formed in two pieces from thin sheet. The upper and lower halves join at the middle. L 21 mm; 1983 CT IV (295) sf 1516 Ph 4

56 Pellet bell, formed in two pieces from copper alloy sheet. The two halves join in a ridge around the middle. There are clear signs of milling above and below the join. The suspension loop is formed from strip. The low half is stamped with an 'S'. L 23 mm; 1979 NB ii (24) obj 211 Ph 4b

57 (not illustrated) Pellet bell formed in two pieces from copper alloy sheet. The lower half is damaged. The suspension loop is formed from strip. L 18 mm; 1973 EBY (677) sf 29 Ph 4

58 Pellet bell, part, possibly unfinished. D 22 mm; 1983 NB iii (127) sf 925 Ph 5

Folding knife (Fig. 7.3)

59 Folding knife, with antler handle plates. The hinged and curved tapering lever at the back of the blade was swung over when the knife was in use to prevent the blade from closing. L 112 mm; 1972 NB u/s

Toilet items (Figs 7.4–7.5)

These are very limited in number but include a typical bone grooming comb (No. 62) with two sets of teeth. The larger teeth were used for everyday combing, the finer teeth for the removal of nits and lice.

60 Spoon or scoop formed from copper alloy sheet. The hollow handle is formed from rolled sheet, and the suspension ring attached by a rolled-over tongue of sheet. The scoop end is broken. L 104 mm; 1983 CT IV (295) sf 1520 Ph 4

61 Toilet item handle with loop formed from copper alloy wire, folded back and twisted. L 84 mm; 1975 WBY (820) sf 58 Ph 4

62 Bone comb, incomplete; plain, with square ends polished smooth. The two sides of the comb have teeth of markedly different widths. The larger teeth are spaced 11 per inch, the smaller at between 20 and 22 per inch. There are clear lines on one face showing that the depth of both sets of teeth was marked out before cutting. The larger teeth have been sharpened to a chisel-like edge. L 57 mm; 1982 CT VI (47) sf 524 Ph 5

Sewing equipment (Fig. 7.3)

63 Thimble, copper alloy, hand made. L 18 mm; 1982 G I (74) sf 530 Ph 4

64 Thimble, copper alloy, fragment. L 12 mm; 1982 G V (105) sf 897 Ph 4

65 Thimble, copper alloy, small. L 16 mm; 1983 NB iii/iv (311) sf 1635 Ph 3

Miscellaneous (Fig. 7.4)

66 Iron pendant attached to a small ring. L 41 mm; 1983 CT IV (295) sf 1552 Ph 4

67 Lead seal or pendant. L 23 mm; 1983 CT IV (302) sf 1605 Ph 4

68 Ring crudely formed from wire. The wire is twisted from fine copper alloy strands. D 22 mm; 1982 CT II (153) sf 896 Ph 4

69 Pin, copper alloy with rounded point and flattened end pierced with an eye. L 60 mm; provenance unknown.

70 Chain consisting of 12 copper alloy figure-of-eight links; links between 11 and 13 mm long. L 128 mm; 1982 CT V (119) sf 620 Ph 5

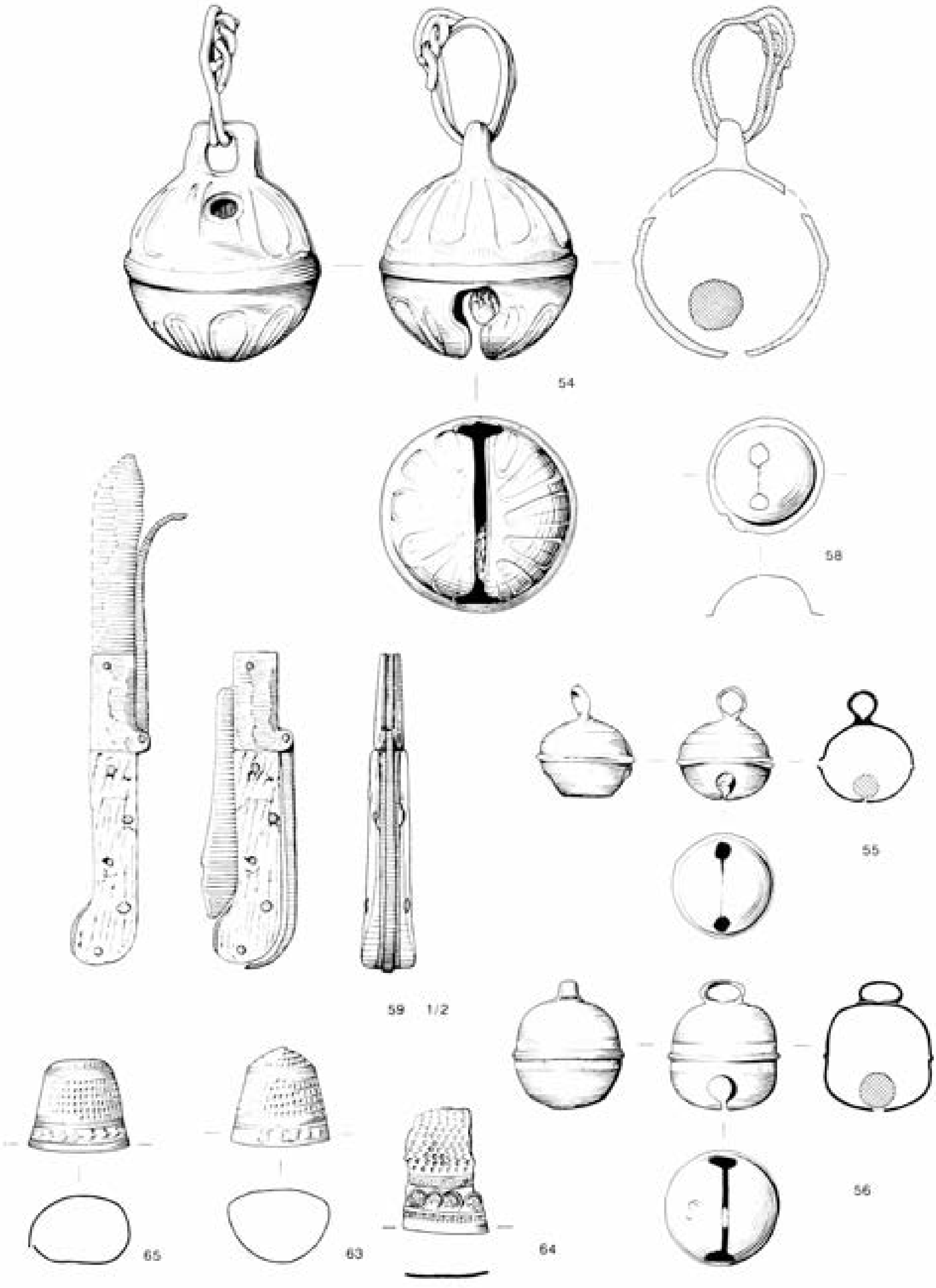


Figure 7.3: Metalwork, Nos 54–59, 63–65, personal and domestic items (scale 1:1, except 59, scale 2:1)

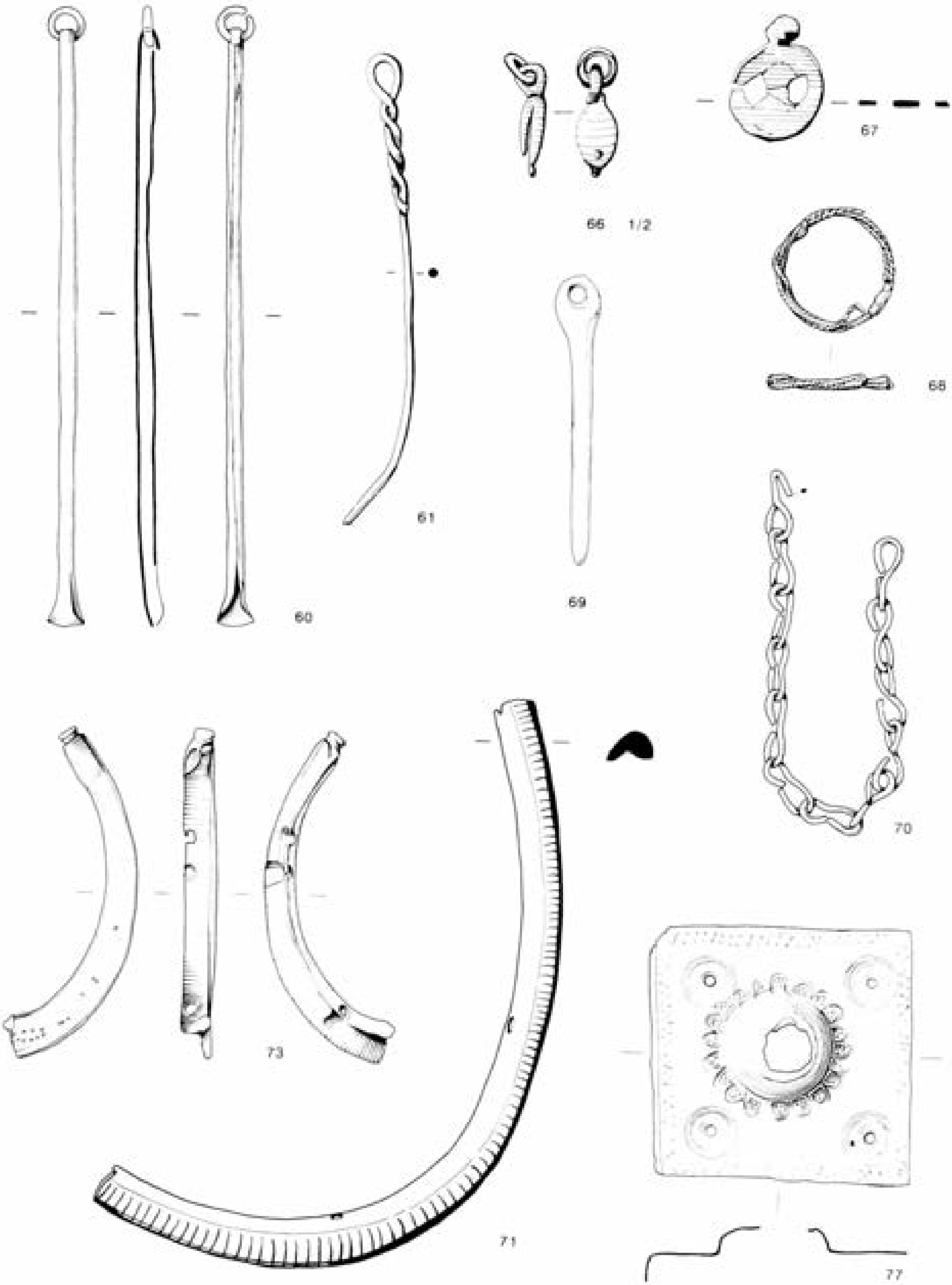


Figure 7.4: Metalwork, Nos 60–61, 66–73, 77, personal and domestic items (scale 1:1, except 66, scale 1:2)

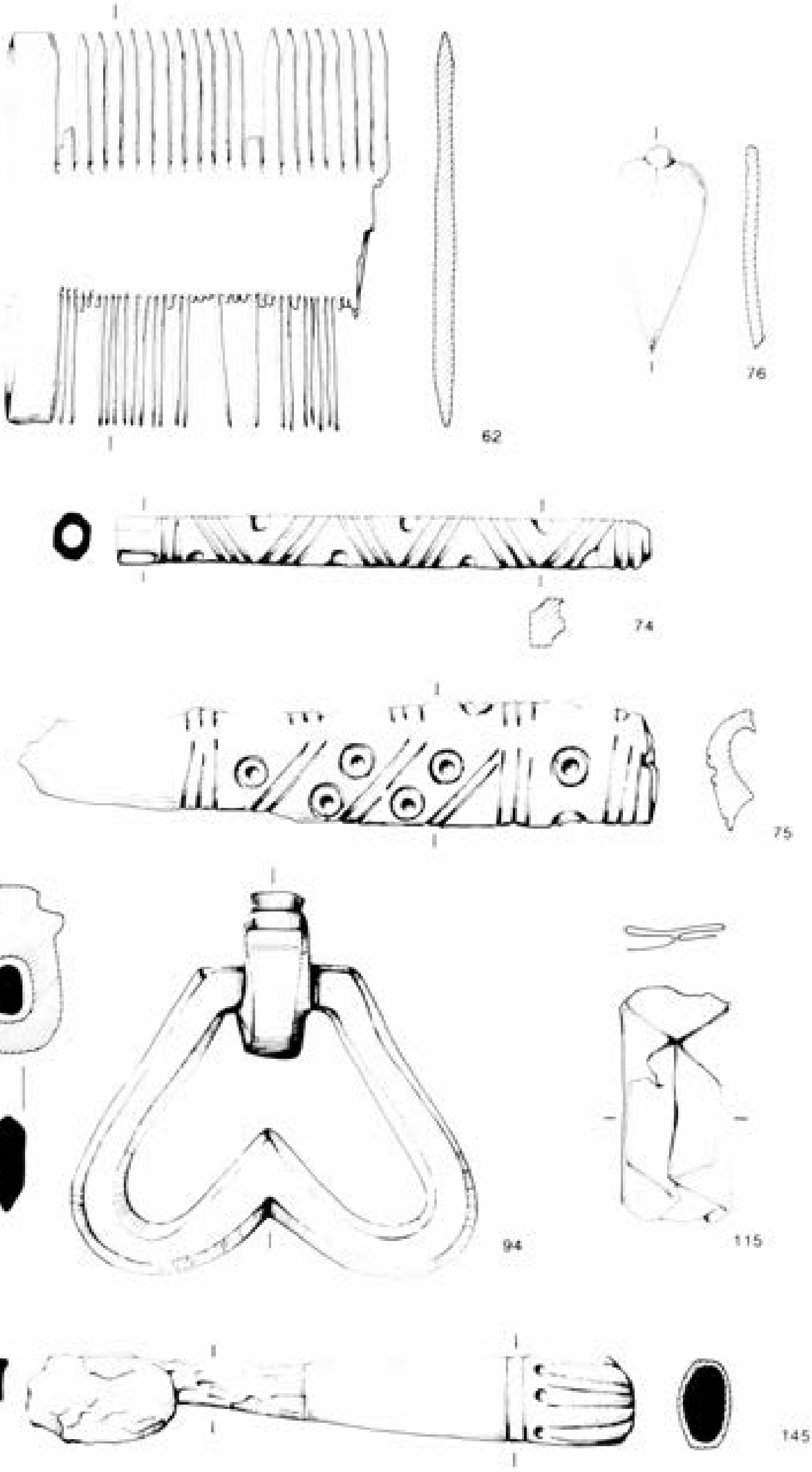


Figure 7.5: Bone objects, Nos 62, 74–76; copper alloy objects, Nos 94, 115, Knife with ivory handle, No 145 (scale 1:1)

71 Cast edging, of L-shaped cross-section, with holes drilled through it at intervals. Possibly part of a purse mount. L 115 mm; 1983 NB iii (142) sf 932 Ph 5

72 (not illustrated) Cast edging, similar to the above. L 94 mm; 1978 NB ii (3) Ph 4b

73 Cast edging, of L-shaped cross-section, tapering to one end, which is finished with a circular section lug hammered flat to secure it, possibly as a swivel. Possibly from a purse frame. L 57 mm; 1976 NBX (888) sf 67 Ph 4

74 Bone handle of rectangular cross-section which narrows slightly towards its terminal. The wider end is drilled out to form a socket to take a small tool or implement head. The opening is faceted to give an octagonal cross-section. The handle is decorated with sets of three diagonal cut lines aligned in alternate directions. Between these sets notches have been cut out of the edge of the handle on alternate sides. The handle originally terminated in some form of decorative knob or finial, which is broken off. L 79 mm; 1983 NBY (352) sf 1681 Ph 6

75 Bone handle fragment, formed from cut and polished long bone, decorated with ring and dot and cut lines. Sets of two or three parallel lines separate the ring and dot motifs. L 96 mm; 1975 SBC (835) sf 52 Ph 4a

76 Leaf-shaped bone object. There is a small lug or stem at the wider end. One face has been deliberately smoothed to a convex surface. This must be the front face. It is slightly eroded, but nonetheless there are clear marking out lines on the surface. The opposite face, which must be the back, is flat and is scored probably by filing. The edge of the object is also roughly filed. The rough unfinished filing of the edges and the apparent marking out suggest that this is an unfinished object. L 30 mm; 1983 CT V (99) sf 895 Ph 5

Household or domestic metalwork *(Figs 7.4–7.11)*

The domestic metalwork represents one of the smaller categories of identifiable metalwork from the site. The range of material is limited, which is in itself interesting, and comprises principally knives, and bucket and cauldron fragments. Locks and keys, which would usually be categorised as domestic, are in this instance published with the structural metalwork and fixtures and fittings (see Chapter 4, above).

The largest group of domestic metalwork consists of table knives (Nos 119–159). There is surprisingly little evidence for food preparation knives. The lack of domestic metalwork from the area of the kitchen in the W Bastion is notable. In addition to knives there are a number of fragments of vessels, most notably pieces of cauldrons.

There are a number of interesting pieces including two book corners (Nos 77, 78), furniture and/or box fittings (Nos 79–99) and a small tap for a cask or barrel (No. 116). One of the book corners (No. 77) is directly comparable to a published example from Norwich (Margeson 1993, 74–5 & fig. 40, 456).

Book corners (Fig. 7.4–7.6)

77 Book corner, in copper alloy, comprising a square plate with central boss. The boss is circled by a ring of repeated motifs. The motifs comprise three pellets in a stirrup-shaped border and have been punched into the surface. There are four nail or pin holes each with punched circle. The edge of the plate has a zigzag border. One of the two flanges has been cut off. L 46 mm; 1983 CT IV (295) sf 1513 Ph 4

78 Book corner in copper alloy comprising L-shaped plate with a stepped inner corner. There is a raised boss in the centre. The plate was secured with three iron pins; each pin hole is within a circle. L 37 mm; 1982 CT V (119) sf 622 Ph 5

Furniture hinges and fittings (Fig. 7.6)

79 Strap hinge in copper alloy, with iron pin. Each strap has three nail holes. L 73 mm; 1963 A VI unphased

80 Butterfly hinge, or strap hinge with iron base plate and pivot pin. One plate is complete and one broken; both have 2 nail holes. L 89 mm; 1963 A VII (516) sf 28 Ph 4 or 5

81 Strap hinge with butterfly base plate of iron. L 82 mm; 1973 EBB (636) Ph 4

82 Plate from a strap hinge of iron, with 2 nail holes and a pin pivot pin. L 114 mm; 1973 EBX (666) Ph 3

83 (not illustrated) Plate fragment in iron possibly from a strap hinge, with 1 nail hole and a pin pivot pin. L 54 mm; 1976 NBX (890) Ph 3

84 Strap hinge in iron. L 109 mm; 1982 CT II (86) sf 745 Ph 4

85 Drop hinge strap in iron with looped eye and two nail holes. L 95 mm; 1972 NB u/s

86 Stapled hasp in iron with hinge. L 107 mm; 1972 NB u/s

87 Figure-of-eight hasp in iron. L 131 mm; 1972 NB u/s

88 (not illustrated) Figure-of-eight hasp in iron. L 150 mm; 1973 EB GP 2 (647) Ph 6

Catches (Figs 7.6–7.7)

89 Catch or latch hook formed from strip of rectangular section, with a square eye at one end. Iron. L 96 mm; 1978 NB i (2) Ph 4b

90 (not illustrated) Catch or latch hook of rectangular section, with an incomplete loop forming an eye. L 76 mm; 1982 CT II (81) Ph 5

91 Catch or latch hook of rectangular section, flattened and pierced for a eye at one end. L99 mm; 1976 NBX 878 Ph 4

Handles (probably for drawers) (Figs 7.5, 7.7)

92 Drop handle with fixing spikes. Iron. L 138 mm; 1983 WB i (273) Ph 4

93 Drop handle, similar to above. L 125 mm; 1972 NB u/s

94 Heart-shaped drop handle in copper alloy, with part of attachment. L 60 mm; 1976 NBX (878) sf 66 Ph 4

Possible furniture fittings (Fig. 7.7)

95 Binding or decorative strip for furniture or box. Iron. L 72 mm; 1982 G V (96) sf 762 Ph 5

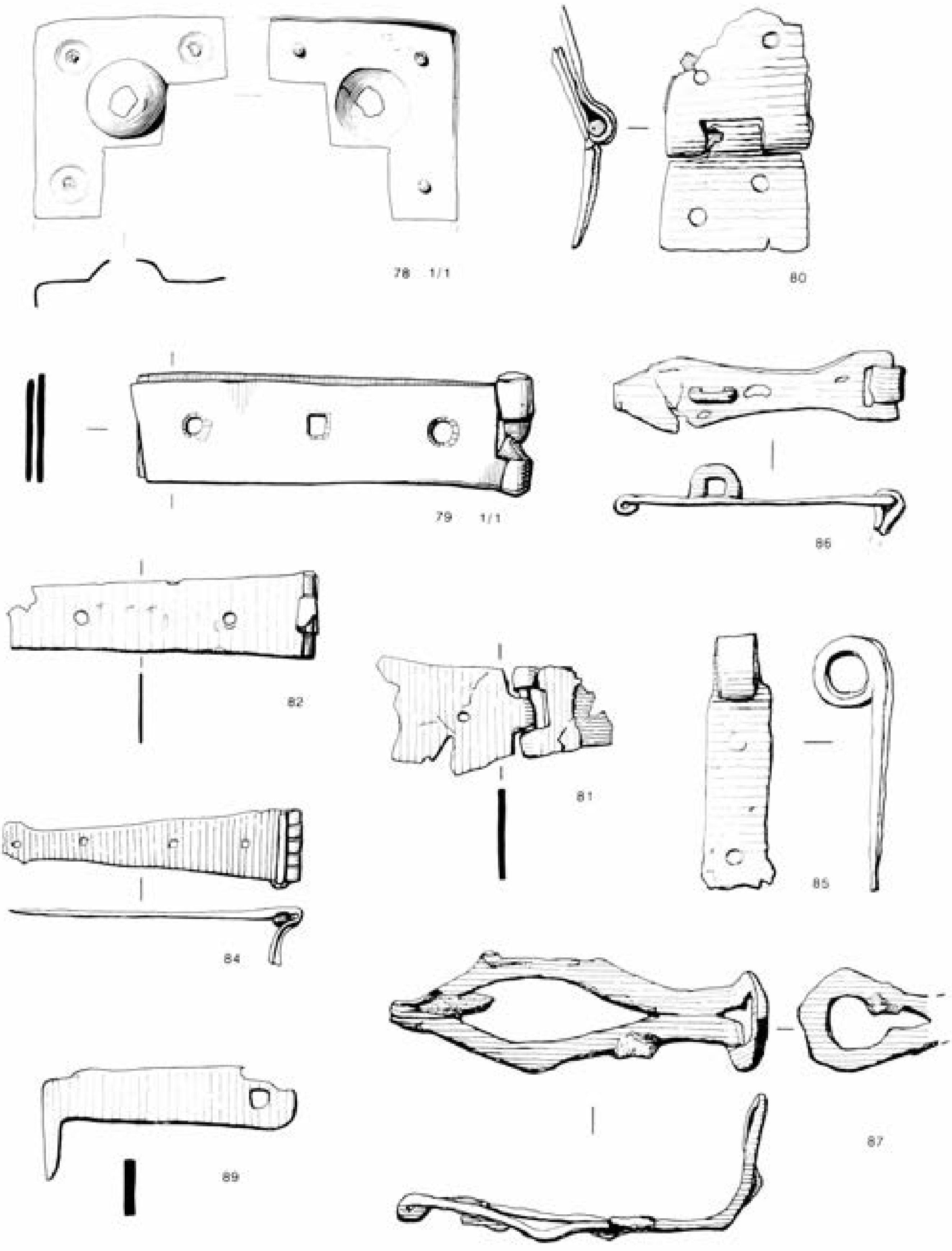


Figure 7.6: Metalwork, Nos 78–89, book corner, furniture fittings (scale 1:2, except 78–9, scale 1:1)

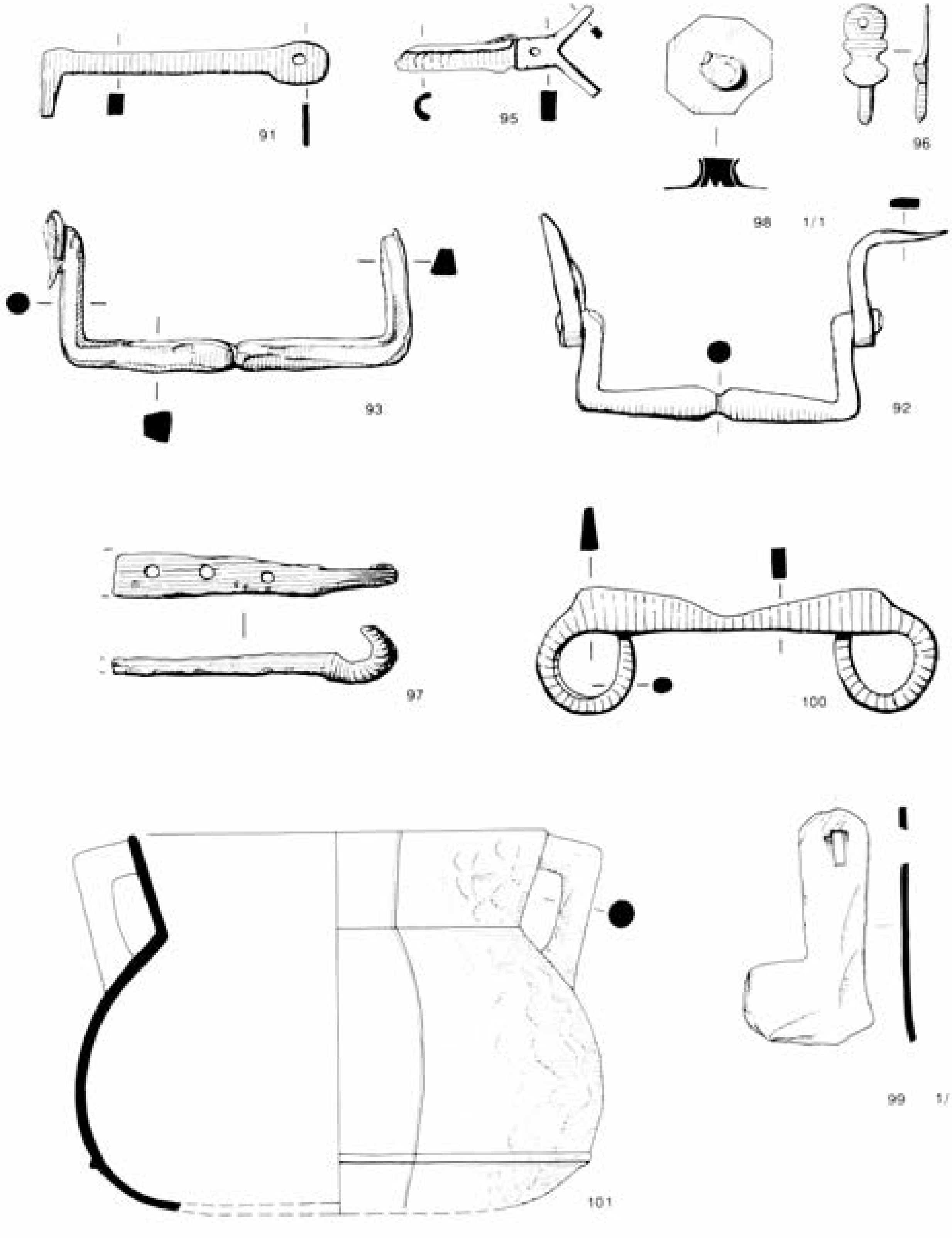


Figure 7.7: Metalwork, Nos 91–101, domestic items (scale 1:2, except 98–99, scale 1:1, and 101, scale 1:4)

96 Decorative terminal, with scallop shell decoration. Iron. Possibly for furniture. L 42 mm; 1972 NB u/s

97 Hinge strap, or junction, with three nail holes. Iron. L 97 mm; 1983 G III (222) sf 987 Ph 5

98 Hexagonal copper alloy washer or terminal. A hole has been punched through the washer and then filled with rolled up sheet and hammered flat. L 18 mm; 1983 CT IV (295) sf 1515 Ph 4

99 L-shaped strip of copper alloy with rectangular perforation. Possibly corner reinforcement for furniture? L 41 mm; 1982 CT II (79) sf 442 Ph 5

Fire (Fig. 7.7)

100 Strike-a-light of iron, with a loop at each end. L 136 mm; 1982 CT V (108) sf 805 Ph 4

Vessels (Figs 7.7–7.8)

A limited number of metal vessels and fragments of vessels were recovered, far less than would probably have been used at the castle, since these valuable items are likely to have been retained either for use elsewhere or for scrap. The most complete piece is a cast iron cauldron from the Entrance Bastion (Trench C IV) (No. 101). A small number of body sherds of cast iron, some clearly from cauldrons, were found in other locations. One piece of cast iron was from a shallow flat-bottomed skillet (No. 109). Parts of a single tripod pan in copper alloy were found in two separate locations within the courtyard (No. 108). A small number of fragments of sheet iron vessels, including a shallow spouted vessel (No. 110) and a possible skillet or frying pan (No.111). Fittings from buckets were also found.

101 Cauldron, cast iron. Three large fragments, 1 medium and many small, including parts of rim and one handle, and most of the profile of the cauldron. L 360 mm; 1963 Tr C IV (546) sf 88 Ph 5

102 (not illustrated) Cauldron, 2 large fragments, and 1 small, includes parts of the rim and one handle, giving the upper part of the profile of a cauldron similar to 7.91. Cast iron. L *c* 200 mm; 1982 CT V (98) sf 764 Ph 5

103 (not illustrated) Cauldron body sherd with even curve and small section of plain raised horizontal rib. Cast iron. L 147 mm; 1963 Tr C V (548) sf 133 Ph 5

104 (not illustrated) Cauldron body sherd with marked horizontal break in curve. Cast iron. L 98 mm; 1963 Tr A VI B unphased

105 (not illustrated) Cauldron body sherd with even curve and plain raised horizontal rib. Cast iron. L 107 mm; 1983 WB i (263) sf 1268 Ph 4

106 (not illustrated) Cast iron rim sherd, probably from a cauldron. L 63 mm; 1983 NB iv (261) sf 1242 Ph 5

107 (not illustrated) Cast iron sherd from a deep round vessel, no distinguishing features. L 105 mm; 1983 CT IV (281) sf 1424 Ph 6

108 Tripod pot, two fragments. Copper alloy. The two pieces were both found in different excavations in the courtyard, but join. Open pot with sloping sides. L 110 mm & 124 mm; 1979 CT I (17) sf 31 Ph 4b, and 1982 CT V (108) sf 592 Ph 4

109 Pan, cast iron. Fragment of shallow flat bottomed pan with a handle of rectangular cross-section. L 90 mm; 1983 WB i (257) sf 1162 Ph 5

110 Pan. Fragment of a ?shallow flat-bottomed vessel with a spout formed from sheet iron. L 84 mm; 1983 CT III (287) sf 1488 Ph 5

111 Pan. Fragment of a shallow flat-bottomed vessel with sloping sides formed from sheet iron. There is a copper alloy rivet through the side, possibly for a repair, or to attach a handle. L 187 mm; 1976 NBX (882) sf 74 Ph 4

112 (not illustrated) Pan, or vessel rim formed from sheet iron with rolled-over edge. L 67 mm; 1976 NBX (928) Ph 3

Skimmers (Figs 7.8–7.9)

113 Skimmer head, complete, comprising an oval slightly dished copper alloy disc irregularly pierced with holes. There are traces of the attachment of an iron handle, overlaid by a riveted repair. D 203 mm; 1963 D I (555) sf 81 Ph 4

114 Skimmer head fragment, formed from copper alloy sheet pierced by a pattern of regularly spaced holes in concentric circles and with copper alloy rivets for attachment to handle. L 124 mm; 1973 EB BC (639) unphased

Paper clip rivet (Fig. 7.5)

115 'Paper clip' rivet formed from thin folded copper alloy sheet and used to hold repairs on vessels. L 35 mm; 1979 CT I (30) Ph 4a

Tap (Fig. 7.9)

116 Tap for a barrel or cask, with a key in the form of a cock, or perhaps more correctly a chicken, since one face of the bird is stamped with a small chick. Copper alloy. Now missing. L 79 mm; 1974 EBX (723) Ph 2b

Taps or spigots are quite common finds from late medieval and post-medieval sites. However, the best parallel for this particular object is from Kempten in Bavaria (Garbsch 1975, fig. 1, 8). The Kempten tap is similar in most details to the Camber example. The form of the spout, the cross-section of the seating for the tap and the outline of the cock forming the handle are all similar. The Camber example lacks a notch in the cock's comb, and has lines decorating the junction between the tap seating and the spigot. The Kempten tap lacks the stamped decoration on the cock. However another south German example, from Durnberg (Garbsch 1975, fig. 1, 3a) has stamped decoration. The Kempten tap is 80 mm long and therefore precisely the same size as the Camber tap.

The Kempten tap and related examples from southern Germany and adjacent areas were dated by Garbsch to the Roman period (1975, 98), but there is reason to doubt the Roman date, and Garbsch concedes that some of these taps were originally dated to the medieval period. The 16th-century context of the Camber example is unambiguous, and the tap is undoubtedly of late medieval

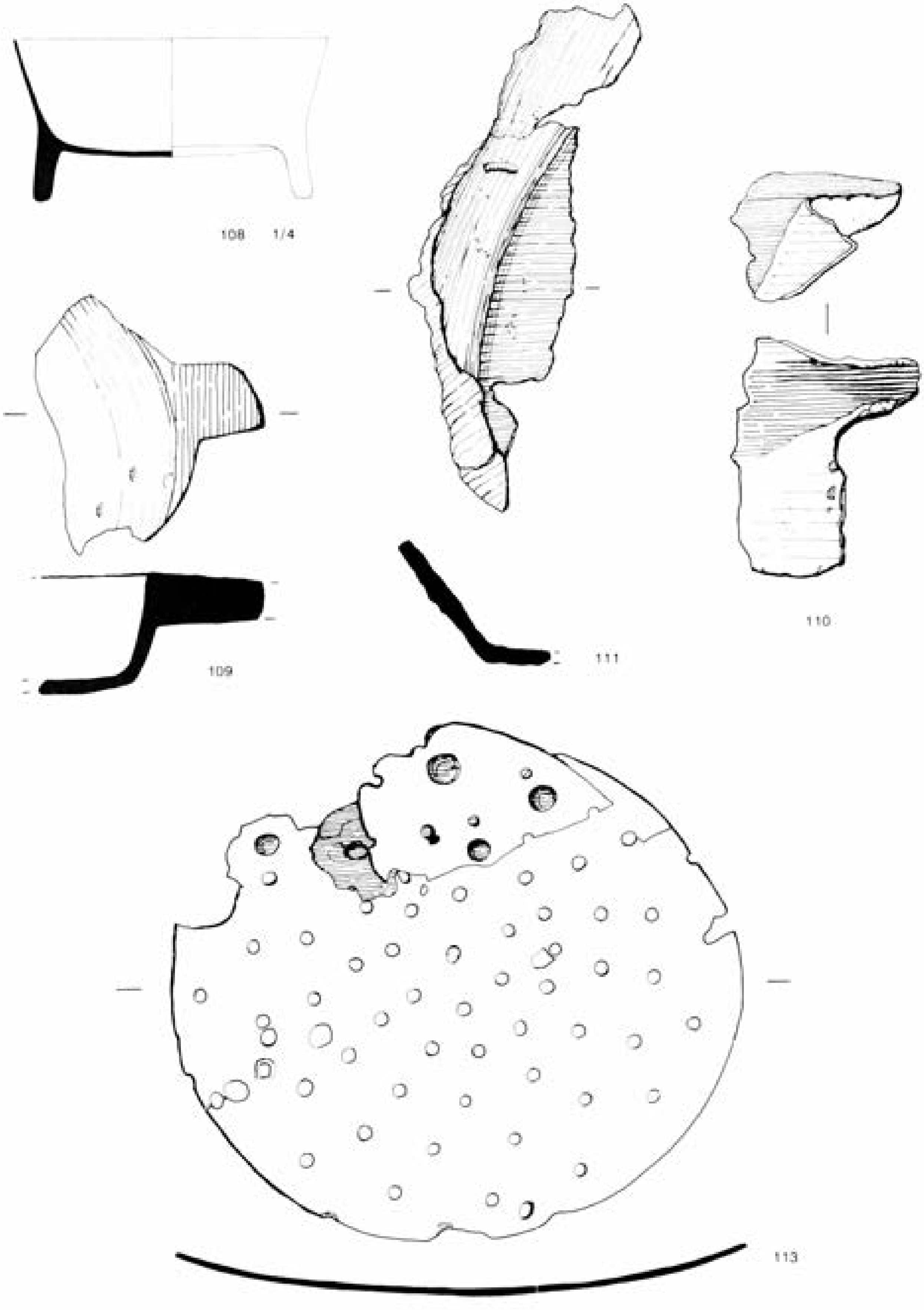


Figure 7.8: Metalwork, Nos 108–113, domestic items (scale 1:2, except 108, scale 1:4)

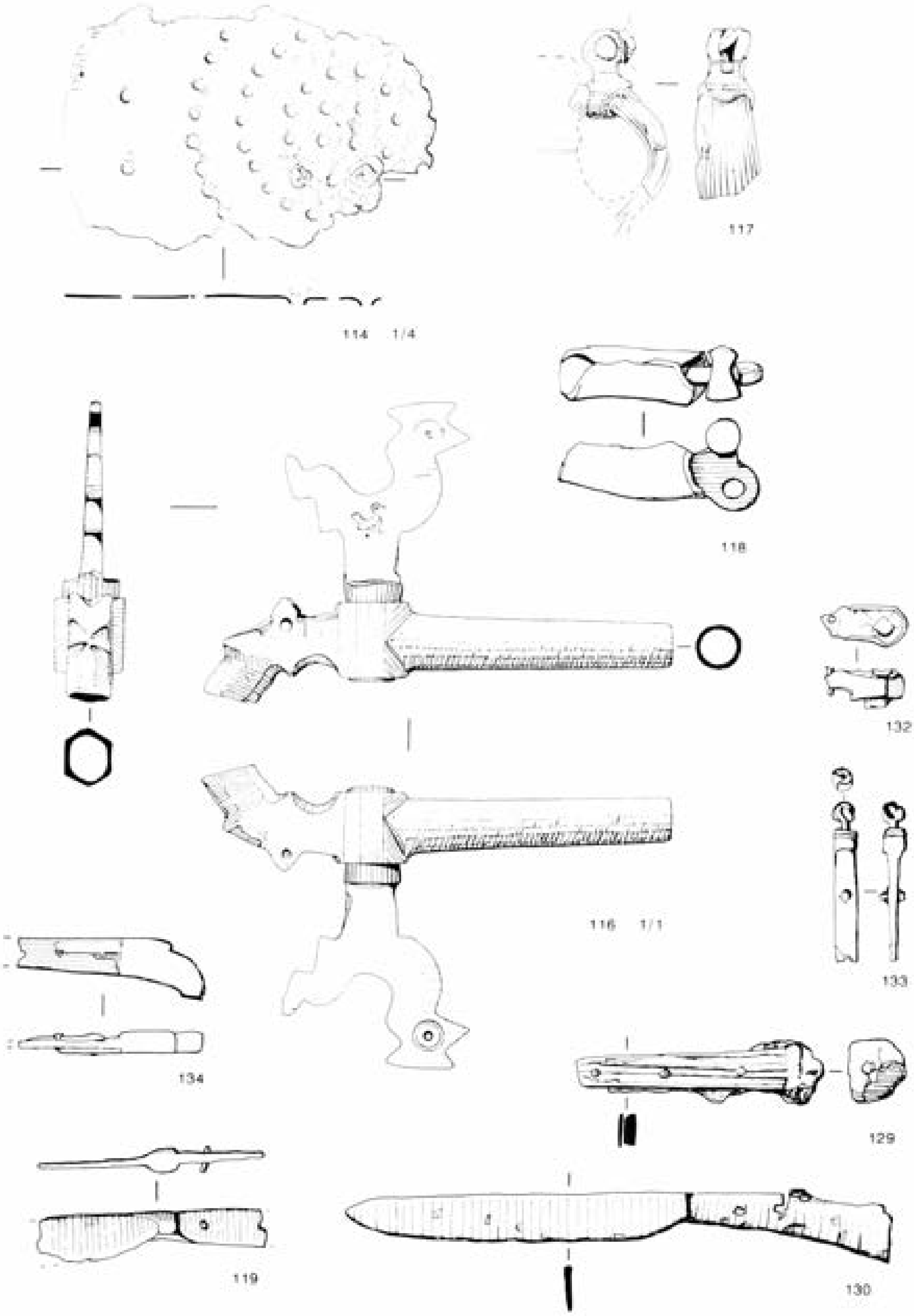


Figure 7.9: Metalwork, Nos 114–134, domestic items (scale 1:2, except 114, scale 1:4, and 116, scale 1:1)

or early post-medieval date and contemporary with the construction of the castle. Even if, as seems likely, the date adduced by Garbsch is incorrect, the distribution of the examples he cites is interesting, for it shows that the type was widely, but not exclusively, distributed in southern Germany, Switzerland and Austria.

Tankards (Fig. 7.9)

117 Stoneware tankard handle with pewter hinge. 1963 C V ext unphased

118 Pewter tankard lid. The lid has been deliberately rolled up. The eye for attaching to the tankard is clear, as is the thumb knob. L 67 mm; 1982 CT V (108) sf 596 Ph 4

Knives (Figs 7.5, 7.9–7.10)

Some 40 iron knives or fragments of knives were recovered. All appear to be knives for food consumption rather than kitchen knives for food preparation.

Knives with plate tangs:

119 Knife, fragment of blade and plate tang with bolster. L 75 mm; 1963 A I (502) sf 7 Ph 5

120 (not illustrated) Knife handle with much decayed ?bone plates attached to plate tang. 1 extant rivet and 2 rivet holes. The handle has a rounded expansion at the end. L 74 mm; 1963 C VI cellar (569) unphased

121 (not illustrated) Knife fragment, comprising plate tang with 3 nail holes and elongated bolster (i), and a small piece of blade (ii). L (i) 69 mm; (ii) 34 mm; 1982 G V (96) sf 574 Ph 5

122 (not illustrated) Knife. Fragment of blade with tapering bolster of rectangular cross section and slight trace of plate tang. L 66 mm; 1973 WB (697) Ph 3

123 (not illustrated) Knife fragment, with possible bolster and plate tang. L 79 mm; 1978 NB i (2) sf 3 Ph 4b

124 (not illustrated) Knife handle fragment, comprising section of plate tang with 4 copper alloy rivets. L 57 mm; 1978 NB i (5) sf 21 Ph 4b

125 (not illustrated) Knife with blade tapering to a point, tapering bolster and remains of plate tang. L 112 mm; 1979 CT I (17) sf 170 Ph 4b

126 (not illustrated) Knife handle comprising plate tang with 3 extant copper alloy rivets, and finished with a shaped oval washer formed from copper alloy sheet. L 44 mm; 1978 CT I (17) sf 178 Ph 4b

127 (not illustrated) Knife, fragment of blade and possible bolster and plate tang. L 75 mm; 1983 CT III (297) sf 1679 Ph 6

128 (not illustrated) Knife handle, comprising plate tang with some traces of organic materials. At least 4, possibly 5, rivets can be identified. No extant blade. L 126 mm; 1976 NBX (899) Ph 5

129 Knife handle. Tapering handle comprising antler plates attached to either side of a plate tang by means of 3 rivets. The handle terminates in a flat circular pommel. L 83 mm; 1976 NBX (883) Ph 4

130 Knife with plate tang and tapering bolster. There are 2 rivet holes in the surviving tang. L 185 mm; 1976 NBX (876) sf 62 Ph 5

131 Knife, fragment of deep blade, with small curved handle. The handle has a long tapering bolster and handle-plates of mother of pearl attached to a plate tang, with 2 rivets. Jacqui Watson of the Ancient Monuments Laboratory identified the mother of pearl. L 94 mm; 1983 WB i (274) sf 1339 Ph 4

132 Knife, fragment of handle, comprising plate tang with 2 extant rivets and traces of organic material from the handle plates. The copper alloy rivet at the end of the handle is unusual in that it is tubular. The end of the handle is protected by a copper alloy strip with bevelled edges. L 27 mm; 1978 NB i (2) sf 6 Ph 4b

133 Knife handle fragment, with plate tang and writhen terminal knob. L 54 mm; 1982 CT II (81) sf 482 Ph 5

134 Knife handle of rectangular cross-section with plate tang and hooked beak-like pommel or terminal. There are traces of organic plates and 2 rivets survive. L 64 mm; 1983 CT IV (295) sf 1539 Ph 4

Knives with rod tangs:

135 (not illustrated) Knife fragment, comprising tapering bolster of oval cross-section and rod tang. L 58 mm; 1975 Keep Q IV (846) Ph 6

136 Knife, in two pieces: (i) the blade and (ii) the handle and bolster. The handle is made of bone and attached by a rod tang, and secured with a copper alloy washer. L (i) 59 & (ii) 89 mm; 1982 WB i (275) sf 1360 Ph 4

137 (not illustrated) Knife blade, poorly preserved; comparable in form to 7.124. L 141 mm; 1978 NB i (2) sf 2 Ph 4b

138 (not illustrated) Knife with slightly tapering blade, elongated bolster and remains of rod tang. L 139 mm; 1979 CT I (17) sf 131 Ph 4b

139 Knife, comprising fragment of blade, bolster and rod tang with copper alloy retaining knob. L 96 mm; 1979 CT II (32) sf 274 Ph 6

140 Knife with elongated bolster of sub-rectangular section and stub of a rod tang. L 109 mm; 1983 CT IV (295) sf 1539 Ph 4

141 Knife, almost complete, with bolster of oval section and complete rod tang. L 135 mm; 1983 CT IV (295) sf 1542 Ph 4

142 Knife, almost complete, with bolster of oval section and bent rod tang. L 116 mm; 1983 CT IV (295) sf 1543 Ph 4

143 (not illustrated) Knife fragment, with elongated tapering bolster and remains of rod tang. L 78 mm; 1982 CT V (98) sf 767 Ph 5

144 (not illustrated) Knife, comprising fragment of blade, tapering elongated bolster and rod tang. L 87 mm; 1982 G V (148) sf 856 Ph 4

145 (Fig. 7.5) Knife, small, with fragmentary blade, but with ivory handle mounted on a rod tang, with no bolster. The handle is decorated with incised lines and dots at the pommel end. L 91 mm; 1974 EBA (603) sf 22 Ph 3

146 (not illustrated) Knife, fragment of blade with rod tang and possible bolster. L 60 mm; 1973 EBX (666) Ph 3

147 Knife, fragment with long tapering bolster decorated

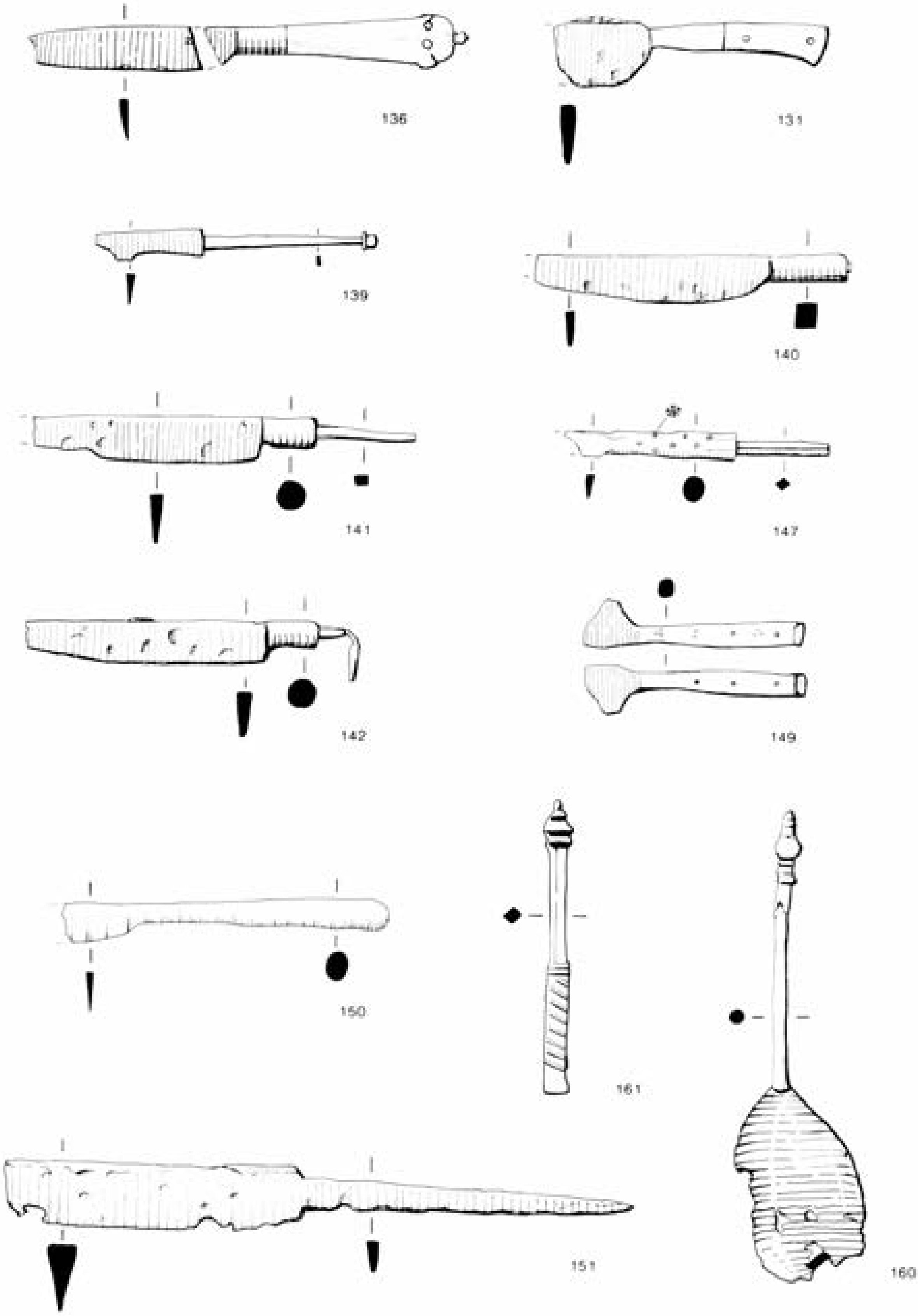


Figure 7.10: Metalwork, Nos 131, 136–160, domestic items (scale 1:2)

with inlaid copper alloy rosettes. Rod tang. L 90 mm; 1963 A VIa unphased

Other knives:

148 (not illustrated) Knife, comprising handle with plate tang and short possibly slightly hooked blade. L 118 mm; 1976 NBX (899) sf 70 Ph 5

149 Knife, with fragment of blade and slim solid handle of oval cross-section, decorated with copper alloy inserts and terminal. L 77 mm; 1973 EBX (666) Ph 3

150 Knife with slim solid tapering handle of circular cross section. L 111 mm; 1982 CT V (45) sf 654 Ph 6

151 Knife, large, but incomplete, with triangular section blade with concave faces. L 214 mm; 1972 NB u/s

Fragmentary pieces:

152 (not illustrated) Blade fragment of triangular cross-section. L 50 mm; 1983 CT IV (295) sf 1539 Ph 4

153 (not illustrated) Knife, fragment of the tip of the blade. L 70 mm; 1983 CT IV (295) sf 1537 Ph 4

154 (not illustrated) Blade fragment of triangular cross-section possibly from a large kitchen knife. No trace of handle. L 154 mm; 1983 G IV (259) sf 1224 Ph 4

155 (not illustrated) Blade fragment, possibly from a knife, with possible bolster but no traces of any tang. L 55 mm; 1979 NB ii (25) sf 217 Ph 4b

156 (not illustrated) Blade fragment, from centre of deep blade with curved edge. L 138 mm; 1978 NB i (5) sf 42 Ph 5

157 (not illustrated) Knife, fragment of deep blade and rod tang. L 103 mm; 1978 NB ii (2) sf 117 Ph 4b

158 (not illustrated) Knife blade, with no extant evidence for handle or bolster. L 93 mm; 1975 WBY (820) Ph 4

159 (not illustrated) Bone handle-plate with three rivets from a knife with a plate tang. L 40 mm; 1974 EBX (718) sf 34 Ph 3

Spoons (Figs 7.10–7.11)

160 Spoon, pewter, with a fig-shaped bowl, plain stem of circular cross-section and decorative finial consisting of a baluster moulding now somewhat eroded. L 159 mm; 1963 B VIII (1034) sf 127 Ph 5 or 6

161 Spoon handle, pewter or lead. Lower portion of stem is wider and decorated with cable or spiral motif; the narrower upper portion is plain and of circular cross-section. The stem is topped by a baluster finial. The object has marked parting lines, or flash, and may be unfinished. L 100 mm; 1978 NB ii (2) sf 197 Ph 4b

162 Spoon handle, pewter. The stem is plain and of hexagonal cross-section. The bowl does not survive. L 103 mm; 1979 CT I (17) obj 154 Ph 4b

Bucket fittings (Fig. 7.11)

163 Bucket handle, and mount. Iron. Small handle of circular cross-section, with U-sectioned central grip; each end is rolled into a loop with part of a bucket handle mount attach to one loop. L 227 mm; 1963 or 1965 u/s

164 (not illustrated) Bucket handle, incomplete, of square cross-section, hooked at one end. Iron. L 290 mm; 1973 EBA (610) Ph 4

165 (not illustrated) Bucket handle mount, fragment of vessel wall attached by rivet. Iron. L 42 mm; 1982 G II (120) sf 640 Ph 4

166 (not illustrated) Bucket handle mount, fragment. Iron. L 29 mm; 1983 CT IV (295) sf 1551 Ph 4

Miscellaneous household and domestic metalwork (Fig. 7.11)

167 Lead weight, tapering up from a flat base. At the top there is a suspension lug which has not been pierced suggesting the object was not finished. It is circular in cross-section, but slightly faceted. L 39 mm; 1973 EBY (675) Ph 4

168 Iron chain consisting of three figure-of-eight links, and a hook. L 237 mm; 1983 CT IV (295) sf 1544 Ph 4

Tools *(Figs 7.11–7.13)*

There were numerous workmen at the castle during construction work (Table 2.2), including carpenters, sawyers, joiners, scaffold-makers, bricklayers, mortar makers, plumbers, masons and smiths as well as labourers and 'earthworkers'. All will have required tools, some more specialised than others. The archaeological record includes single examples of a range of tools of construction. However, it is unlikely that many of the tools used in building the castle will have survived into the archaeological record, and it is more probable the tools recovered in excavation derived from the later occupation phases. A very limited range of tools - pickaxes, shovels and spades and crow bars - were recorded in surveys of the castle (Table 2.5), but it seems likely that other tools will have been required for day to day repairs and maintenance. The most notable features are the more than twenty spade irons (Nos 201–26) that have been recovered from the excavations and the complete saw blade found in the central tower or Keep (No. 191); saws rarely survive intact in the archaeological record because the metal from which they are made is very thin.

Hunting and fishing equipment (Fig. 7.11)

Objects of note include a fragment of an eel spear (No. 169), a birding arrow (No. 170) and a gin trap (No. 171). There are also a number of fish hooks varying from 46 to 97 mm in length. All the following are of iron.

169 Eel spear, comprising socket and three broad flat prongs in a fan shape. The prongs have angled notches cut into them. L 345 mm; 1975 WBX (802) Ph 4

170 Socketed arrowhead with crescent blade, used for hunting birds. L 70 mm; 1979 CT I (17) sf 166 Ph 4b

171 Gin trap, fragment, comprising tapering spring with square collar at the narrow end. When the trap was set the collar was held down allowing the jaws of the trap to lie open. The spring was under tension, and when the trip plate positioned between the jaws was touched, the sprung arm lifted the collar and closed the jaws of the trap. L 134 mm; 1982 NB iii (127) sf 825 Ph 5

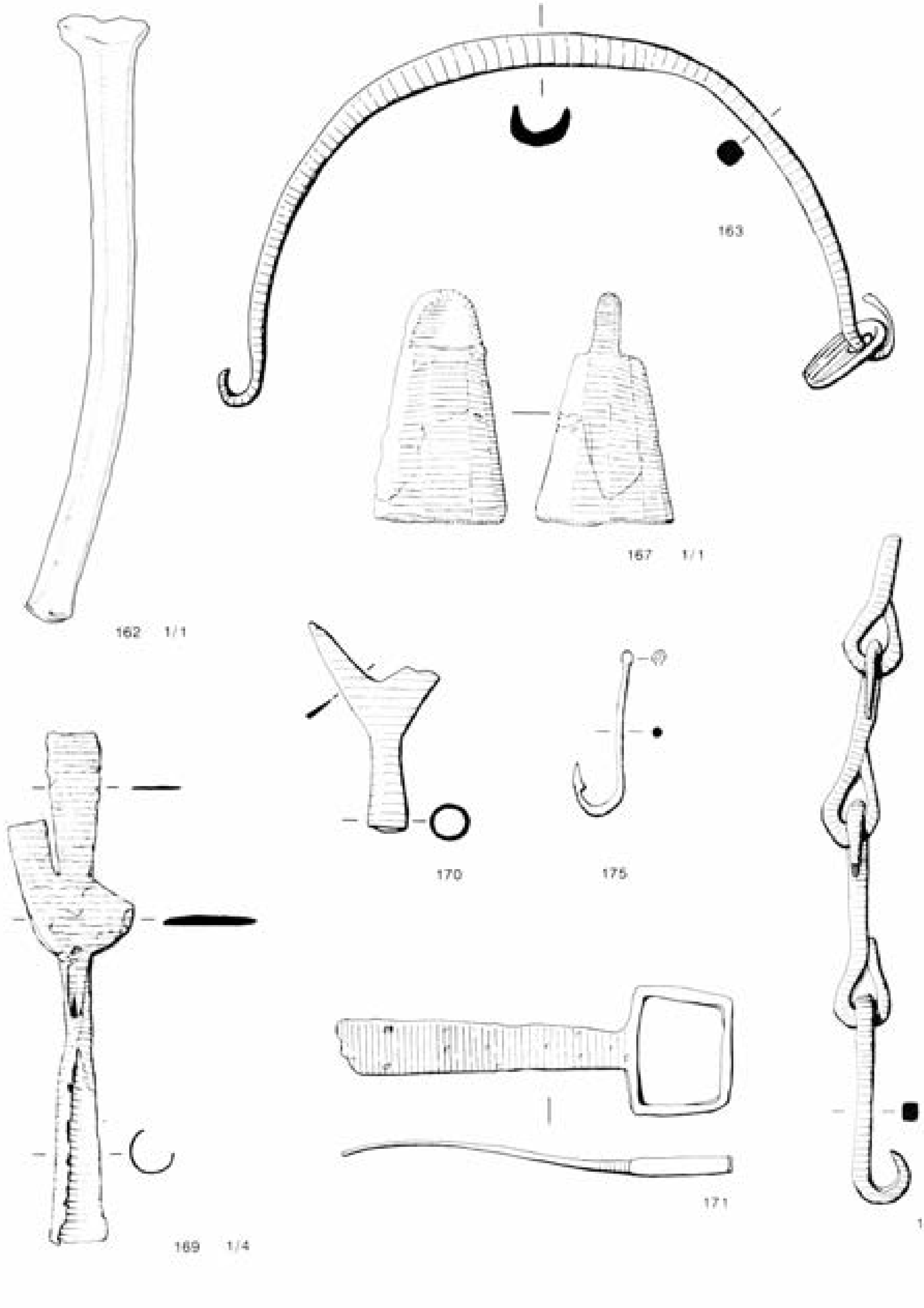


Figure 7.11: Metalwork, Nos 162–175, domestic items and tools (scale 1:2, except 162 and 167, scale 1:1, and 169, scale 1:4)

Fish hooks:

The fish hooks are all very similar and vary only in size. Only a single complete example (No. 175) has been illustrated.

172 (not illustrated) Barbed fish hook formed from wire, large. L 91 mm; 1975 Keep QI (837) Ph 5
173 (not illustrated) Barbed fish hook formed from wire. L 46 mm; 1979 CT I (17) sf 171 Ph 4b
174 (not illustrated) Barbed fish hook formed from wire, large. L 86 mm; 1982 CT II (82) sf 496 Ph 5
175 Barbed fish hook formed from wire. L 58 mm; 1983 CT IV (295) sf 1548 Ph 4
176 (not illustrated) Barbed fish hook formed from wire. L 56 mm; 1983 CT III (297) sf 1683 Ph 6
177 (not illustrated) Barbed fish hook formed from wire, incomplete. L 45 mm; 1983 CT IV (295) sf 1548 Ph 4
178 (not illustrated) Barbed fish hook formed from wire, incomplete. L 47 mm; 1983 CT IV (302) sf 1548 Ph 4
179 (not illustrated) Barbed fish hook formed from wire, with well-preserved suspension eye. L 58 mm; 1982 CT V (99) sf 779 Ph 5
180 (not illustrated) Barbed fish hook formed from wire, with preserved suspension eye. L 61 mm; 1982 CT V (99) sf 779 Ph 5
181 (not illustrated) Barbed fish hook formed from wire, large. L 95 mm; 1982 CT V (99) sf 780 Ph 5
182 (not illustrated) Barbed fish hook formed from wire, incomplete. L 54 mm; 1982 CT V (108) sf 797 Ph 4
183 (not illustrated) Barbed fish hook, large, formed from wire. L 97 mm; 1982 CT V (108) sf 798 Ph 4
184 (not illustrated) Barbed fish hook formed from wire, large. L 92 mm; 1982 CT VI u/s sf 881
185 (not illustrated) Barbed fish hook formed from wire. L 75 mm; 1973 EBX (666) Ph 3
186 (not illustrated) Barbed fish hook formed from wire, incomplete. L 53 mm; 1982 NB iii (127) sf 717 Ph 5
187 (not illustrated) Barbed fish hook formed from wire, fragment. L 42 mm; 1982 NBX (145) sf 846 Ph 4

Miscellaneous tools (Fig. 7.12)

A variety of tools were recovered, predominantly comprising tools associated with building construction and maintenance, or smithing. The latter would have included the manufacture of building fixtures and fittings and the production and repair of arms. Although it is likely that minor repairs to armour and other specialised equipment was undertaken at Camber, it is most unlikely that specialist repairs were carried out there. The only smith's tools are for general work: a poker (No. 196), sets (Nos 199, 200), tongs (No. 197) and a possible small anvil (No. 198). All the tools are of iron.

188 (not illustrated) Scythe, large fragment of blade, now badly laminated. L 350 mm; 1963 CII (538) sf 112 Ph 5
189 (not illustrated) Pickaxe, with points at both ends. Very like a modern pickaxe, but hand forged. L 530 mm; 1973 EBA (600) sf 14 Ph 5
190 (not illustrated) Trowel, with cranked tang and broad blade with curved sides and rounded point. There are mineralised remains of the wooden handle. The wood has been identified as *Salix* sp (willow) by Jacqui Watson of the Ancient Monuments Laboratory. Very badly laminated. L approx. 200 mm; 1983 CT II (153) sf 861 Ph 4
191 Saw, with tapering slightly curved blade. Teeth are large (4 per inch). Part of the tang for the handle survives. L 311 mm; 1975 Keep QIV (846) sf 49 Ph 6
192 Firmer chisel. Well-preserved wood chisel, with maker's mark stamped on upper face. L 130 mm; 1972 NB u/s
193 Possible wedge or chisel, with short stem, and blade tapering in longitudinal section. L 68 mm; 1973 EB u/s
194 (not illustrated) Mason's chisel formed from square section bar with a chisel edge and slightly battered head. L 153 mm; 1979 CT I (17) sf 172 Ph 4b
195 Claw hammer head. L 137 mm; 1978 NB i (5) sf 43 Ph 4b
196 (not illustrated) Smith's poker, comprising rod of circular section, tapering to a point at one end and rolled over to form a loop at the other. L 461 mm; 1982 CT IV (295) sf 1545 Ph 4
197 Smith's tongs, iron. These are very small and presumably intended for fine work. L 180 mm; 1972 NB u/s
198 Possible anvil fragment. L-shaped. The identification is not certain. L 86 mm; 1982 G II (116) sf 688 Ph 5
199 (not illustrated) Smith's set, comprising square section bar tapering to an edge at one end and slightly battered at the head. L 103 mm; 1978 NB i (3) sf 12 Ph 4b
200 Possible smith's set. Fragment of slightly irregular rectangular cross-section with heavily battered head. L 63 mm; 1982 CT V (99) sf 783 Ph 5

Spade shoes (Fig. 7.13)

The iron spade shoes from Camber are all remarkably similar with a limited range of features. From the complete or near complete examples it appears that they fall into two main groups: broad spade irons (196 mm to 215 mm wide) and narrow irons (130 mm to 160 mm wide). All the Camber spade sheaths have straight mouths (cutting edges) and are grooved on the inside to receive the wooden blade. In the narrow examples the inside edge describes a tight curve; in the broader examples a shallow curve. The sides usually consist of strips to reinforce the sides of the wooden blade with U-sectioned lugs at the top corner of the blade. In some cases the side strip would have extended up to the top of the wooden blade and been bent over the top corner. The uniformity of form is perhaps to be expected. In 1613, 40 shovels or spades were listed amongst the stores at Camber (Table 2.5). The archaeological assemblage contains the remains of 26 spade irons, of which 11 were found in the fills of the N Bastion. Only three of the better preserved examples have been illustrated.

Broad sheaths:

201 (not illustrated) Spade shoe, broad, with straight mouth and inner edge. Nothing of side reinforcement

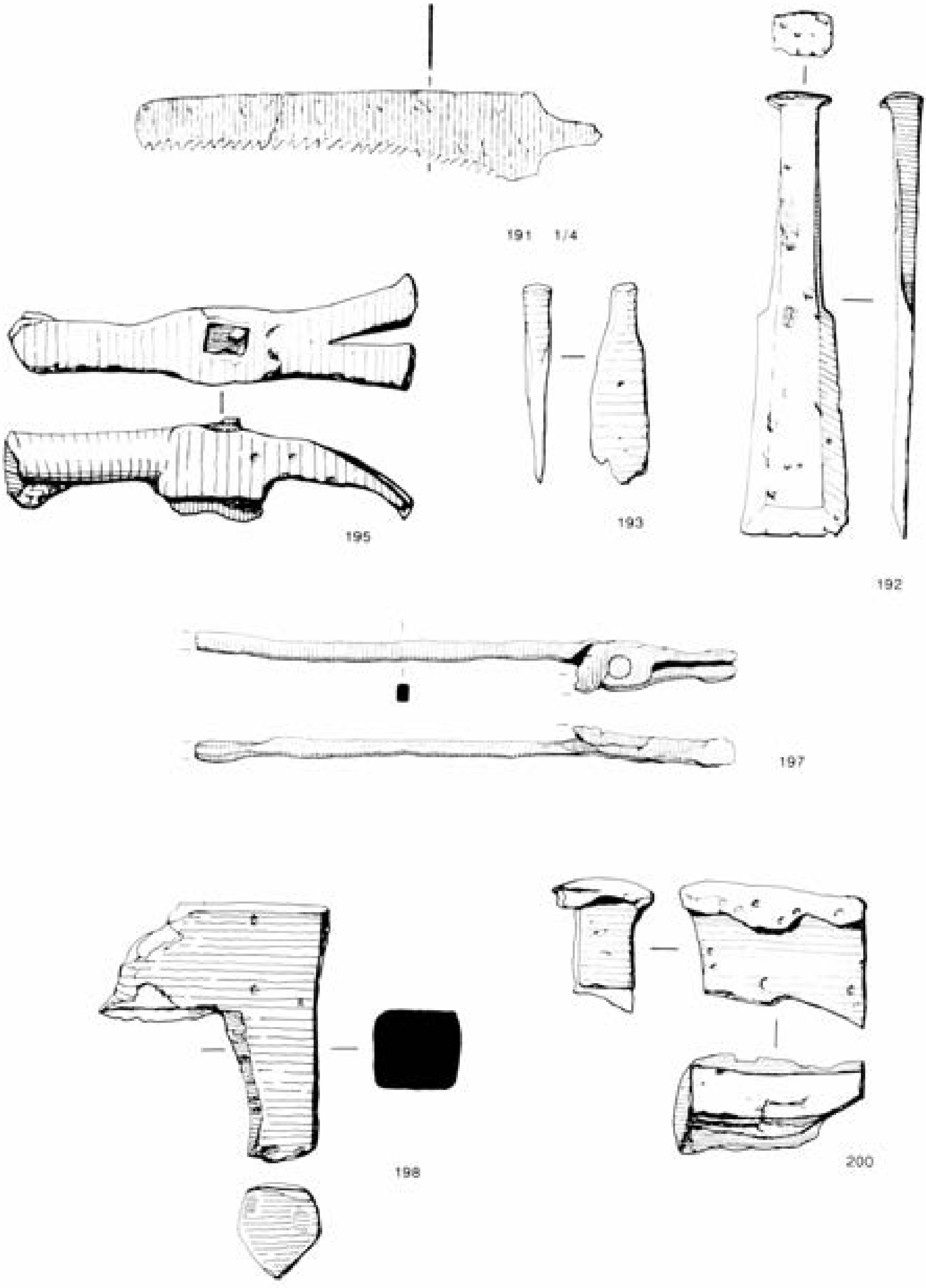


Figure 7.12: Metalwork, Nos 191–200, tools (scale 1:2, except 191, scale 1:4)

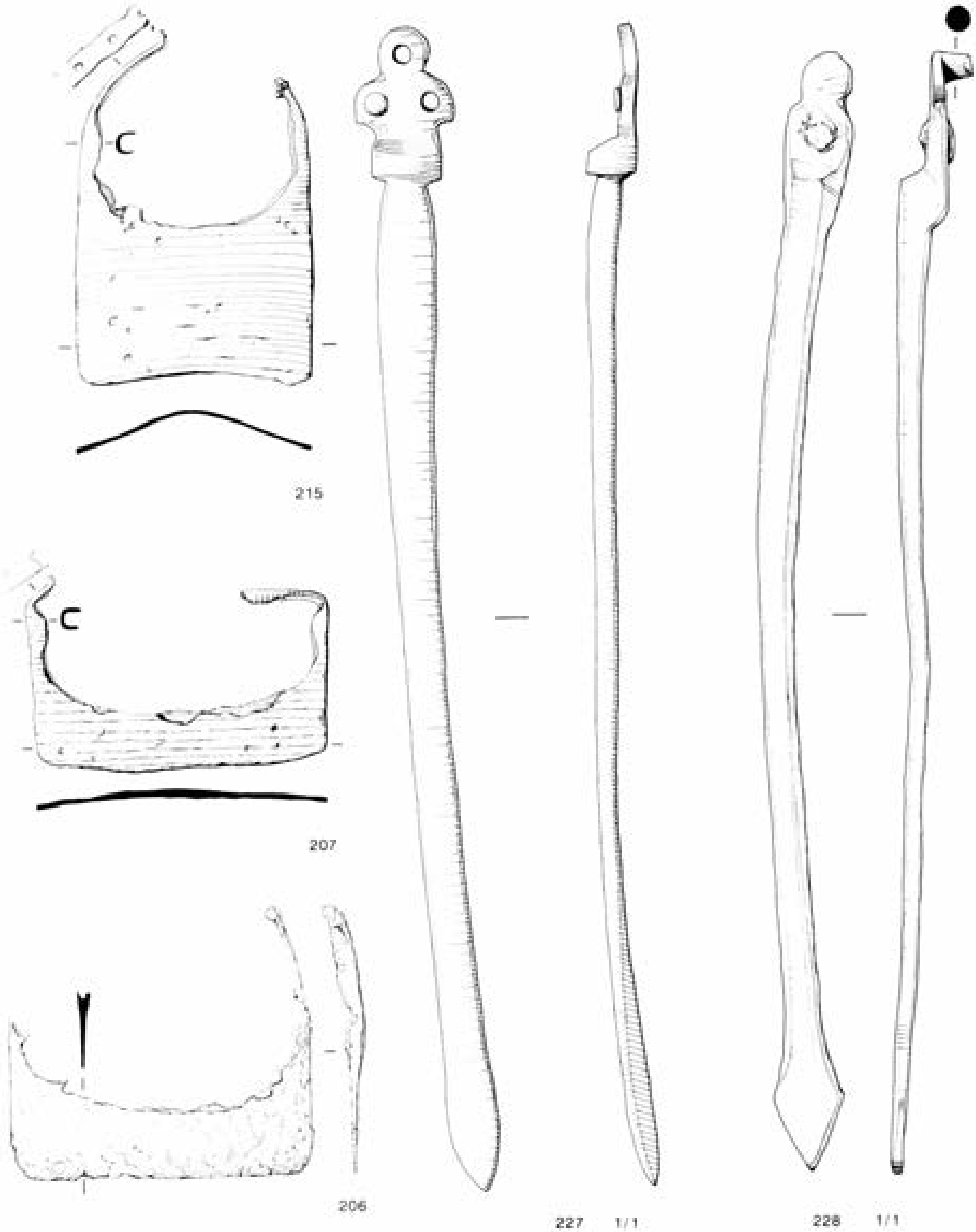


Figure 7.13: Metalwork, Nos 206–228, tools and miscellaneous items (scale 1:4, except 227–8, scale 1:1)

survives. L *c* 110 mm; W c 210 mm; 1965 Tr VIII (578) Ph 3

202 (not illustrated) Spade shoe, broad, with straight mouth and curved inner edge. Part of 1 side reinforcement survives, consisting of a U-sectioned lug above the blade. L 115 mm; W 200 mm; 1965 Tr X (1090) Ph 3

203 (not illustrated) Spade shoe, broad, with straight mouth and slightly curved inner edge. The side reinforcements appear to be very short on this example, but may be incomplete. L 105 mm; W 215 mm; 1973 EBSG u/s

204 (not illustrated) Spade shoe, broad, with straight mouth and slightly curved inner edge. The side reinforcements consist of U-sectioned lugs just above the blade, and these may have continued as plain reinforcing strips. L 138 mm; W 230 mm; 1979 NB ii (2) sf 256 Ph 4b

205 (not illustrated) Spade shoe, broad, with straight mouth and strongly curved inside edge; little of side reinforcements survives. L *c*130 mm; W 205 mm; 1978 NB ii (23) sf 201 Ph 4b

206 Spade shoe, with straight mouth and curved inside edge, which is slightly grooved. The extant side reinforcement comprises a U-sectioned channel or lug above the blade leading to a plain strip. L 181 mm; W 198 mm; 1972 NB u/s

207 Spade shoe, broad, with straight mouth and curved inner edge grooved to take the wooden blade; the side reinforcements have short U-sectioned channels leading to flat strips, topped by U-sectioned lugs. L *c* 130 mm, W 196 mm; 1983 CT VI (375) sf 1708 Ph 5

Possible broad sheaths:

208 (not illustrated) Spade shoe, fragment, with straight mouth and slightly curved inner edge. Little of side strip survives. Possibly from a wide spade. L (extant) 108 mm; W (extant) 108 mm; 1963 D I (555) sf 82 Ph 4

209 (not illustrated) Spade shoe, fragment. Only a piece of the blade survives. The shoe had a straight mouth and slightly curved inner edge. L 102 mm; 1979 NB ii (2) sf 260 Ph 4b

210 (not illustrated) Spade shoe, fragment, broad?, with straight mouth and inside edge. The side reinforcement consists of a U-sectioned lug or possibly grooved side strip. W (extant) 156 mm; 1983 CT IV (295) sf 1553 Ph 4

Variant broad sheath:

211 (not illustrated) Spade shoe, with straight mouth, and curved deeply grooved inner edge. The side reinforcements have U-sectioned lugs. The spade clearly tapered to the mouth, or cutting edge, which is narrower than the maximum width of the sheath. L *c*110 mm; W 205 mm; 1972 NB u/s

Intermediate width sheath:

212 (not illustrated) Spade shoe, with straight mouth and inner edge, possibly grooved. A fragment of U-sectioned lug survives at one side. L *c* 95 mm; W *c* 180 mm; 1973 WB (705) [3007]

Narrow sheaths:

213 (not illustrated) Spade shoe, narrow with straight mouth and curved inner edge. The side reinforcements consist of plain strips apparently pierced for at least 1 nail. L 240 mm; W 148 mm; 1983 NB iii (250) sf 1100 Ph 5

214 (not illustrated) Spade shoe, narrow, with straight mouth and strongly curved inner edge; simple side strips. L 154 mm; W 130 mm; 1979 CT II (37) sf 267 Ph 4a

215 Spade shoe, narrow with a straight mouth. It is curved on the inside edge and has side reinforcements comprising slight U-shaped sectioned lugs above the blade leading to flat strips pierced for nails. The sides are possibly incomplete but do not appear to have terminated in further U-sectioned lugs. L 233 mm; W 153 mm; 1982 CT V (119) sf 619 Ph 5

Uncertain width:

216 (not illustrated) Spade shoe, too fragmentary to measure. 1963 N Bastion unphased

217 (not illustrated) Spade shoe, fragment, with straight mouth and straight grooved inner edge. Little of side survives. W (extant) 83 mm; 1963 D I (555) sf 82 Ph 4

218 (not illustrated) Spade shoe, fragment. Probably a straight mouth and curved inner edge. It has an almost complete side strip. Above the blade is a U-sectioned lug with a plain strip above it terminating in a further U-sectioned lug with a nail hole and extant nail. L 133 mm; 1983 CT IV (295) sf 1556 Ph 4

219 (not illustrated) Spade shoe, fragment. Has a straight mouth and curved inner edge with almost complete side reinforcement. This consists of a U-sectioned lug just above the cutting edge with a plain side-strip rising from it; the latter is incomplete. L 134 mm; 1978 NB i (2) sf 29 Ph 4b

220 (not illustrated) Spade shoe, fragment, poorly preserved. L 101 mm; 1979 NB i (14) sf 147 Ph 4a

221 (not illustrated) Spade shoe, fragment, poorly preserved. Its mouth appears to be straight, with a curved grooved inner edge; little of the side reinforcing survives. L 75 mm; 1978 NB i (2) sf 36 Ph 4b

222 (not illustrated) Spade shoe, fragment, poorly preserved. No evidence for the form of its mouth survives, but the curved inner edge with groove is visible. The side reinforcement consists of a slightly curved strip. L 125 mm; 1978 NB i (3) sf 35 Ph 4b

223 (not illustrated) Spade shoe, fragment, very poorly preserved. 1978 NB ii (1) sf 86 Ph 6

224 (not illustrated) Spade shoe, side reinforcement, of U-section at one end, flat in the middle and with U-sectioned lugs and a nail hole at the other end. L 93 mm; 1983 NB iii/iv (309) sf 1608 Ph 3

225 (not illustrated) Spade shoe, fragment, from a sheath with a straight mouth and curved inner edge.

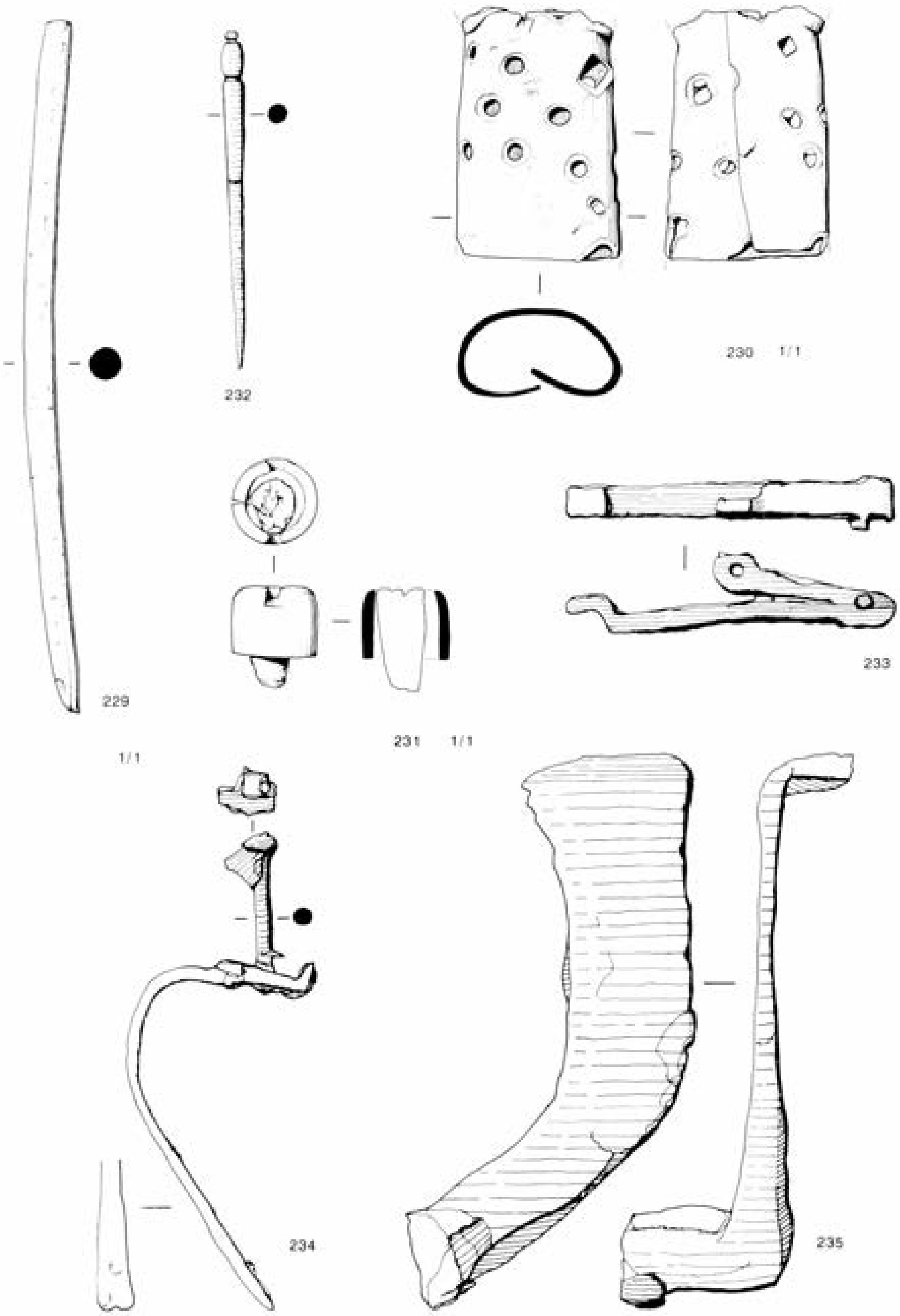


Figure 7.14: Metalwork, Nos 229–235, miscellaneous items (scale 1:2, except 229–31, scale 1:1)

A U-sectioned lug or channel survives. L 121 mm; 1975 WBX (787) Ph 6

226 (not illustrated) Spade shoe, fragments. From a shoe with slightly rounded mouth and curved inner edge. Pieces from each side of the shoe can be identified; the more complete (i) has two U-sectioned lugs forming the side reinforcement. The smaller piece (ii) has one U-sectioned lug. L (i) 100 mm & (ii) 43 mm; 1973 u/s (?) sf 13

Miscellaneous unidentified pieces (Figs 7.13–7.16)

227 Pointer, much like a clock hand, made of copper alloy. Similar to 7.228, but more rounded in profile. There are three eyes at the top in a trefoil pattern. The uppermost was probably open. One of the lower pair has the remnants of a copper alloy rivet in place. It seems probable that the rivets served to attach the pointer. Its function is uncertain. L 191 mm; 1963 AIII (996) sf 12 Ph 5/6

228 Pointer, much like a clock hand. Copper alloy. There are the remains of an iron pivot near the top end away from the pointer, and a small lug at the back of the object at the very end. The latter was clearly intended to engage with a gear sear to move the pointer. L 185 mm; 1982 G II (123) sf 699 Ph 4

229 Point, formed from copper alloy rod of circular section. The point is crudely formed at one end. Function unclear. L 120 mm; 1979 NB ii (27) sf 266 Ph 4a

230 Copper alloy sheet pierced and rolled, possibly a makeshift match cover. L 44 mm; 1976 NBX (878) sf 65 Ph 4

231 Collar, with opposed notches, with piece of wooden dowel in the middle. Copper alloy. D 14 mm; 1982 CT VI (47) sf 343 Ph 5

232 Pin or pricker, comprising tapering point decorated with a knob and mouldings. Iron. L 119 mm; 1983 CT IV (295) sf 1535 Ph 4

233 Bar bent double and pierced with an eye at one end. Iron. Part of a mechanism? L 114 mm; 1983 CT IV (281)

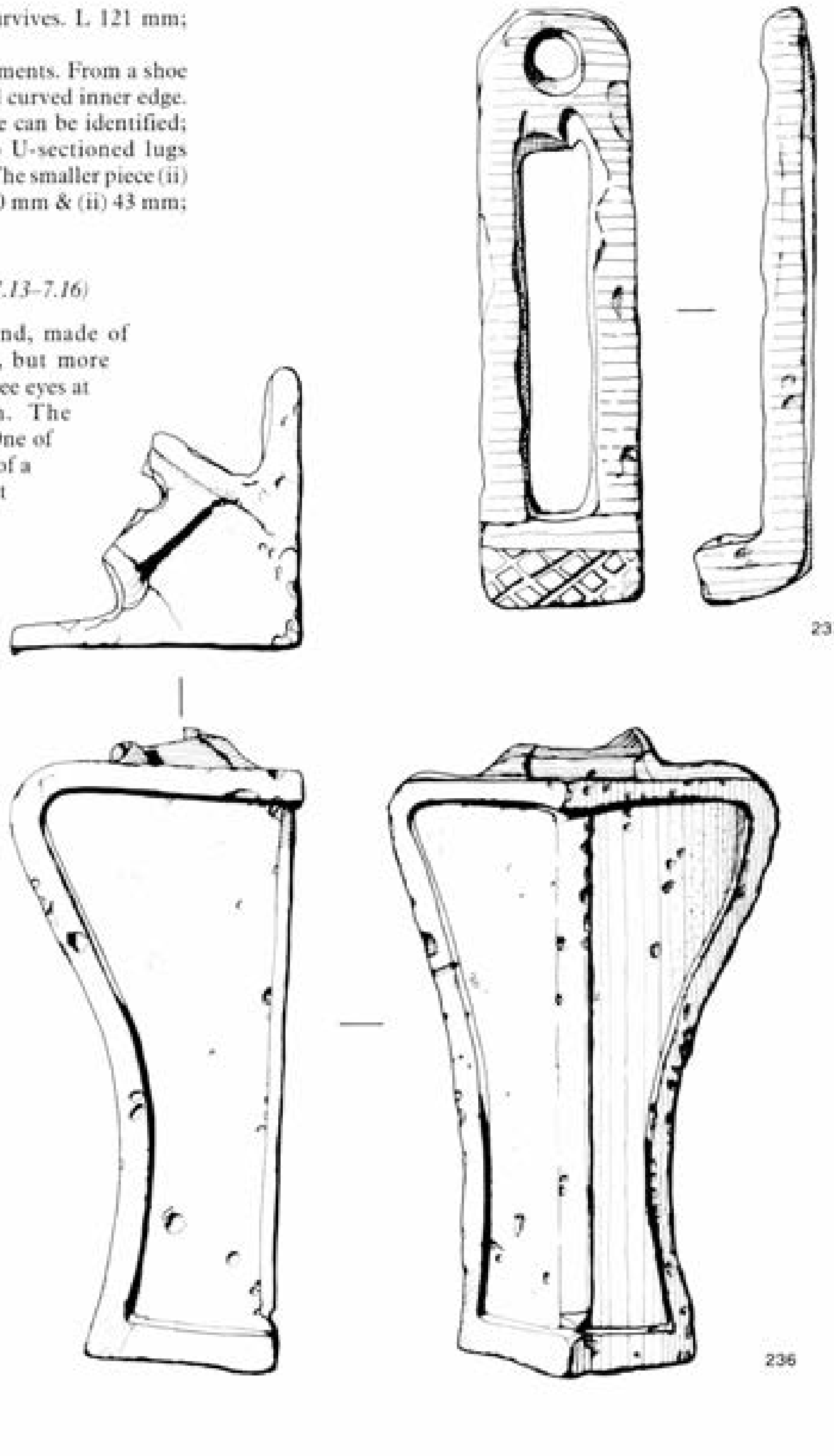
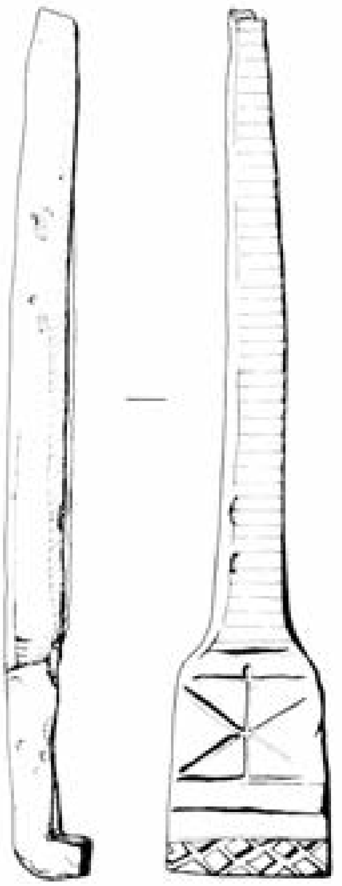


Figure 7.15: Metalwork, Nos 236–237, miscellaneous items (scale 1:2)



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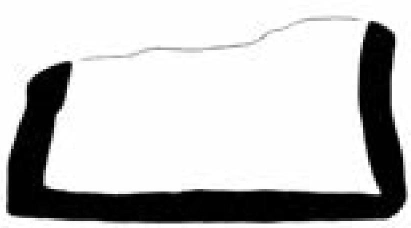

sf 1423 Ph 6

234 Swivel fitting of iron, comprising curved strip widening at its lower end with a clenched bar attached at the upper end. For suspension? L 162 mm; 1963 C V (548) sf 136 Ph 5

235 Iron object formed from tapering rectangular sectioned strip. It is curved and bent at a right angle at each end. At the narrower end there is a solid lug or foot. Function unclear. L 210 mm; 1973 WB (705) sf 18 Ph 3

236 Cast iron object, L-shaped in section. At the wider end there are signs that it is broken. Possibly a foot from a stove or oven. L 182 mm; 1973 WB u/s

237 Rectilinear iron object, pierced with an eye at one end, and a rectangular cut-out in the centre. The end opposite to the eye is bent at the right-angle and decorated with a cut criss-cross pattern. Function uncertain. L 176 mm; 1963 D I (555) sf 117 Ph 4

238 Decorated iron object, with a tapering round-sectioned stem and a broad head decorated with cut lines. The edge of the flat head is bent at right-angles and has a cut criss-cross pattern. Possibly a linch pin? L 230 mm; 1973 EBA (602) sf 24 Ph 4

239 Lead object, oval in plan, with vertical sides. Slightly irregular in form, it is pierced for attachment. Function uncertain. L 53 mm; 1982 G I (74) sf 538 Ph 4

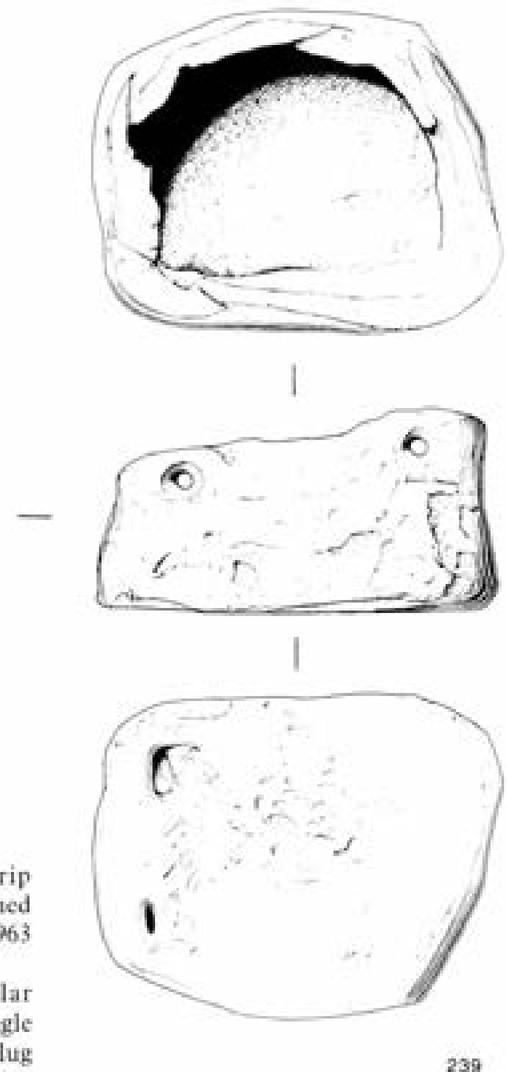

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Figure 7.16: Metalwork, Nos 238–239, miscellaneous items (238, scale 1:2; 239, scale 1:1)

VESSEL GLASS

by Cecily Cropper with additional notes by Rachel Tyson

Introduction

The excavations recovered 624 fragments of glass vessels datable to the hundred years or so of the castle's occupation, *c* 1540 to 1637. This assemblage of 16th- and early 17th-century vessels is of considerable significance for the study of glass of this period, with the potential to examine the functions and status of material used by the garrison officers. Comparative assemblages are mainly from urban sites that have been studied synthetically, as groups, such as Exeter (Charleston 1984b, 258–278), Northampton (Oakley 1979b, 296–302), Norwich (Haslam 1993, 97–109), Southampton (Charleston 1975, 204–226), and St. Ebbe's, Oxford (Haslam 1984, 232–249), as well as glass-making sites such as Haughton Green near Manchester (Hurst Vose 1994, 1–71).

Material of later date has not been studied in detail. This included 79 fragments from bottles with diagnostic pieces dating from the late 17th century onwards, and a further 8 boxes (visually examined, though not quantified), which were confirmed as bottle and vessel fragments dating from the late 18th to 20th centuries. This material was not derived from contexts contemporary with the construction or occupation of the castle. The present report aims to indicate the range of vessels present in the assemblage contemporary with the castle's occupation.

Vessel types and manufacturing and decorative techniques are only briefly described, as comprehensive published accounts can be found elsewhere (in particular Charleston 1975; 1984a). A glossary of technical terms is provided at the end of this volume. Consideration was given to spatial analysis of the assemblage in the hope that this might help to shed light upon the internal organisation of the castle (see Discussion); unfortunately, in common with other finds assemblages, the results were of limited value. Table 7.1 shows the spatial distribution of fragments by area and phase.

The period of occupation of Camber Castle was one that saw a great expansion in the range of glass vessel types and forms, brought about by the development of the glass industry (Liefkes 1997, 50). The assemblage shows in particular the introduction to Britain of the colourless *cristallo* glass (later known as crystal glass). This type of glass was perfected in Italy during the mid 15th century and evolved within Continental workshops as *façon de Venise* or glass 'in the Venetian style'. The forest glass (see Glossary) so typical of medieval metals continued to be produced by existing glass-making sites. Vessels of this type may well have been manufactured in Britain by established glass houses (such as Alfold in the Surrey-Sussex border area of the Weald), or may have been imported from houses using similar technology elsewhere in Europe. Exeter, for example, was importing both *cristallo* and forest glass from the Netherlands during the 16th century (Charleston 1984b, 260). The wrythen vessels (see below) tend to be of forest glass, and show the continuing popularity of the decorative and manufacturing technique from preceding centuries. A 16th-century glasshouse at Northiam, producing both window and vessel glass, or the nearby site at Beckley (Kenyon 1967, 210–12), may have been the local source(s) for some of the vessels used during the second half of the 16th century at Camber Castle.

For the purposes of this report, the assemblage has been grouped by vessel type; comments on typology and dating are followed by a catalogue of illustrated vessels and unillustrated glass where relevant. Drinking vessels are divided into decorative types as illustrated forms do not demonstrate the typological sequence. Dr Rachel Tyson provided additional information, notes and references on the Venetian glass, and in particular on the *vetro a retorti* and paint/enamel decorated vessels. This information has been incorporated within the report.

Drinking vessels *(Figs 7.17–7.19)*

These vessels are represented predominantly by surviving bases and rims, although some also provide evidence of the body or bowl. A general distinction of form can be made from these diagnostic remains, providing a selection of types within the broad categories of goblets and beakers. The majority of bases have hollow footrims created from a single *paraison*, or gather, of glass (see Glossary).

The earliest vessels are two-part biconical goblets, represented here by their funnel-shaped bases (Nos 20, 28–9), which tend to be more common in the first half of the 16th century than in the second. Early vessels were present in a group from a phase III context within the Vaulted Passage/Cellar (CVI), infilled early in the castle's history. This group contains a maximum of nine vessels, and includes goblets and beakers with marvered white trails (No. 5) and a slightly squat funnel base (No. 28). Also present is a vessel fragment with *a fili* and *a retorti* decoration (Lab. No. 833503, not illustrated). These forms gave way to the three-part goblet, where a stem was included to form a distinct separation between bowl and base. The inverted baluster stem (No. 31) seems to have been introduced in the 17th century. A similar, though later, example from Trichay Street, Exeter is dated to the mid 17th century (Charleston 1984b, 271–2, fig.150, no.105).

Goblet rims and bodies present in the assemblage suggest that a wide range of forms were in use, with bodies flaring from the base resulting in relatively wide-mouthed vessels with deep or shallow bowls (Nos 5–8), and other shapes such as the possible bowl of a wine flute (No. 21), the large ovoid bowl of No.16, and the smaller cup-shaped bowl of No.13. A goblet with enamelled decoration (No. 9) was recovered from a phase III context outside the N Bastion (NBX), and a fragment with horizontal segmented ribbing (Lab. No. 753881, not illustrated) was recovered from a scaffold posthole, also of phase III, outside the W Bastion (WBX).

Beakers, in general, tend to have longer bodies than goblets, with sides closer to vertical, and rims that curve slightly inwards (Nos 1–2, 11–12, 14–15). Beakers are also represented in the Camber assemblage by squatter footed bases, including domed (Nos 24, 27) and 'pork-pie hat' types (Nos 25–6), the latter possibly representing a tall, cylindrical form such as the *Stangenglas* (see Bases below). One base (No. 23) comes from a beaker where the vessel body rises from near the base rim. Two domed beaker

Table 7.1: Distribution of vessel glass by phase and area

AREA	PHASE											
	Unph	**2B**	**2B/3**	**2/3**	**3**	**4**	**4/5**	**5**	**5/6**	**64–6**		**TOTAL**
AV									2			2
AVI										1		1
AVII							21					21
BVI									3			3
BXII	1											1
CIV								3				3
CV							14			1		15
CVI		17										17
CTI						4						4
CTII						10	15	10		2		37
CTIII						63		5		2		70
CTIV						1		3		6		9
CTV						12	1			4		17
CTV/VI											1	1
CTVI						7		5		2		14
EBA										1		1
EBB								2				2
EBX				21								21
EBY						48						48
GI	12											12
GII					1	1		1				3
GIII						3				5		8
GIV						5				1		6
GV								4		17		21
GVI	17					1		2				20
Keep I	1								1			2
Keep II			1									1
Keep IV										2		2
NB	3											3
NB i						11						11
NB ii						5				4		9
NB iii/iv					1			5		5		11
NB iv	3							7				10
NBX					41	9	27	4		1		82
NBY	6		6							9		21
SBC	4					5				5		14
WB	2							3				5
WB i	2					8		3		6		19
WB ii										4		4
WB iii						1						1
WBX	5				1	1						7
WBY	25				1	2				4		32
U/S	32											32
TOTAL	**112**	**17**	**7**	**21**	**45**	**197**	**78**	**57**	**6**	**82**	**1**	**624**

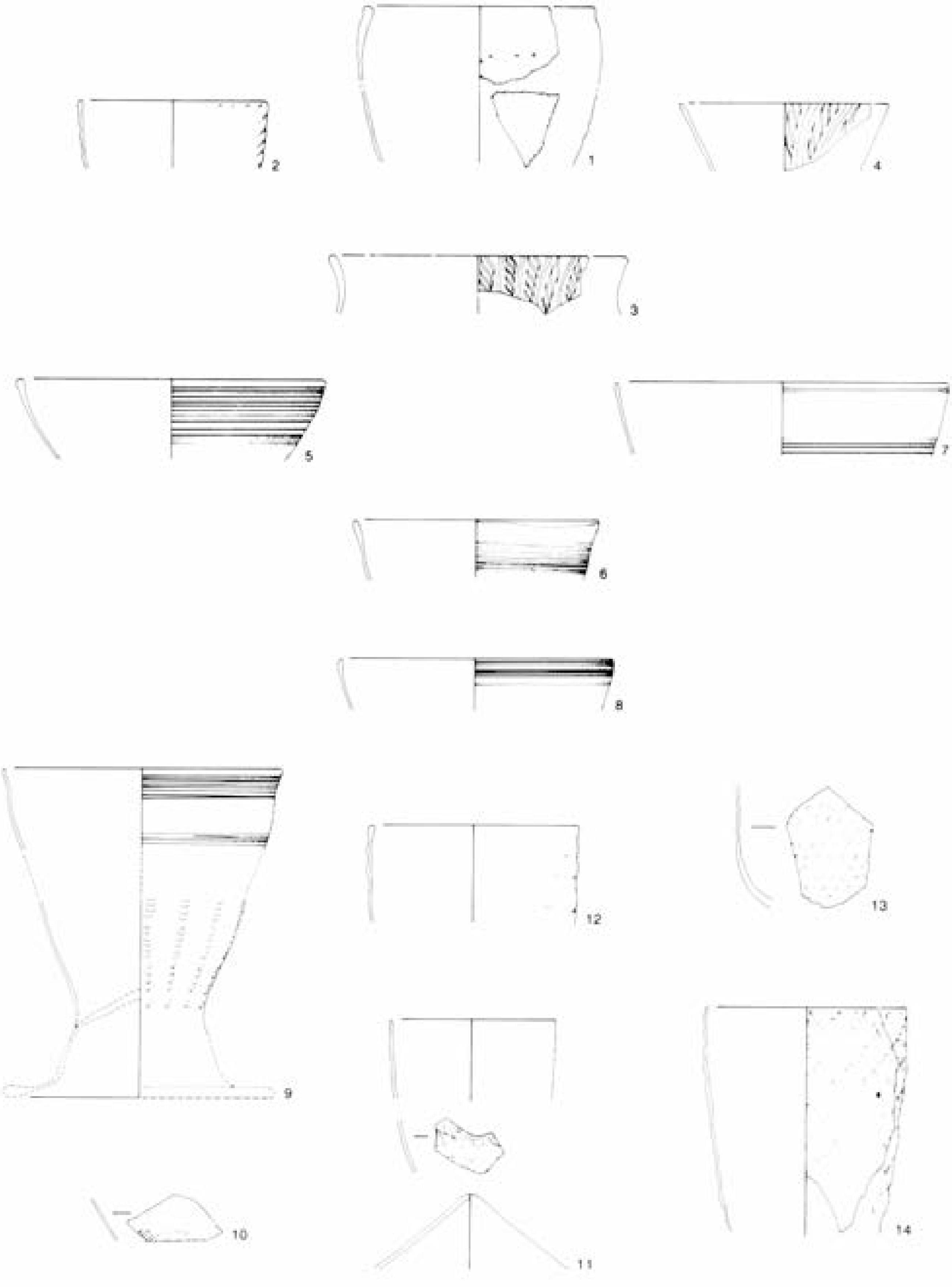


Figure 7.17: Vessel glass Nos 1–14, drinking vessels (scale 1:2)

bases, not illustrated but similar to Nos. 24–6, came from an early construction deposit outside the E Bastion (EBX), which also included a lamp base (No. 42).

These forms of goblet and beaker seem to have continued in use during the occupation of the castle (phase IV), though later types were also introduced, such as the stemmed goblet (No. 31) and the diamond-point engraved vessels (Nos 10–11), which became popular during the second half of the 16th century (see Glossary).

Catalogue entries comprise: year, trench or area code, context number, six-figure Ancient Monuments Laboratory number and phase.

Decorative Types

Optic-blown with wrythen decoration (Fig. 7.17)

The vessels are optic-blown in vertically ribbed moulds and then spun on the pontil (see Glossary) to create a wrythen or spiralling ribbed effect running diagonally around the vessel. The method of manufacture is comparable to the Optic-blown vessels catalogued as Nos 12–16. The examples from Camber Castle are all beakers, and all appear to be of forest glass. Similar beakers have been found at Northampton (Oakley 1979b, 300, nos.GL64 & 65), Exeter (Charleston 1984b, 270–1, fig.149, no.79) and Southampton (Charleston 1975, 213). It is generally assumed that these types are of British origin.

1 Beaker rim and upper body, pale green. D 94 mm, 1982 NBX (145) 833461, 833462 Ph 4; 1975 WBY (827) 753889 Ph 3
2 Beaker rim, pale green. D 68 mm, 1982 CT V (66) 833440 Ph 6; and 1982 CT VI (59) 833452 Ph 5. This example and a second very fragmented vessel (1974 SBC (746) 833519 Ph 4b) show the wrythen decoration right up to the rim.

Three other fragments with wrythen decoration, one rim and two body, cannot be attributed to either of the above: 1975 WBY (827) 753889 Ph 3; 1978 NB i (8) 833566 Ph 4b; 1983 G IV (268) 832704 Ph 4.

Façon de Venise (Fig. 7.17)

Vessels Nos 3–17 are all of colourless *cristallo*. Opaque white glass trails using *lattimo* canes (nos 3–4), were developed in the 15th century and used as decoration, in an attempt to imitate Chinese porcelain. All the following vessels that are decorated can be regarded as being *'façon de Venise'*.

Vetro a retorti:

Four vessels have vertical opaque white glass threads (*fili*) alternating with helical, opaque white threads (*retorti*) spiralling upwards from left to right (unless otherwise stated). According to Charleston (1984a, 48) this type of decoration is first documented in Venice in 1527 and it was well established by the 1540s. It has also been recorded at Southampton (Charleston, 1975, 223–4, fig.225, no.1579), where it has been attributed to the late 16th century or later. A wine glass from Trichay Street, Exeter has the same decoration and has been described as Venetian or Netherlandish, dating from the period between the late 16th and early 17th century (Charleston, 1984b, 271–2, fig.150, no. 96). The presence of a fragment in a phase III context at Camber (1963 C VI cellar (553), 833503) suggests that this form of decoration was in use at least by 1543.

3 ?Goblet rim, flaring slightly out from a narrower neck. Upper body flares slightly outwards. D 109 mm. 1978 NB i (2) 833559 Ph 4b
4 Goblet rim, flaring. D 71 mm., 1982 G I (64) 833475 Ph 6; 1982 CT II (81) 833429 Ph 5

Other examples not illustrated include:

> Goblet rim, slightly flaring, and body fragments. The body appears to flare gently outwards. The *retorti* spirals upwards from right to left, though the white opaque thread has been lost on the external surface. The two separate gathering processes can be seen clearly in cross-section. D 70–80 mm. 1983 NBY (352) 832724 Ph 6
> Body fragment, bulbous. 1963 C VI cellar (553) 833503 unphased

Marvered enamel trails:

In numerous examples, the white threads are trailed horizontally in concentric circles around various parts of the vessel and then smoothed, or marvered, on a flat surface (see Glossary). Concentric white trails date to the end of the 15th century and the first half of the 16th century. There are well-dated French examples of biconical goblets and vessels with high kicks (Foy and Sennequier 1989, 272 and 277–8). The general form appears to consist of a body flaring from a footed base, with a wide rim diameter. It is probable that the conical bases with a high kick (see Glossary) belong to some of the rims described below, forming the biconical goblets attributed to the first half of the 16th century. Both goblets and beakers have this type of decoration. Vessel No. 5, and two other unillustrated examples were recovered from a phase III context (C VI cellar 553), suggesting that these were current types in the period 1539–43. A similar example came from Goldsmith Street, Exeter (Charleston 1984b, 268–9, fig.148, no.52). Vessels of this type probably originate in the Netherlands where examples of 16th-century date are known (Henkes 1994).

5 Goblet rim, slightly inturned, body flaring and bowl shallow. Colourless, with concentric white trails below rim. D 112 mm. 1963 C VI cellar (553) 833503 Ph 3

Another example from the same context is not illustrated:

> Rim fragments of a second vessel, exhibiting a wide band of white enamel just below the rim with concentric white trails on the body. Colourless and extremely weathered. D110–120 mm. 1963 C VI cellar (553), Ph 3

6 Goblet rim, slightly flaring. Colourless with uneven white band on rim. Further concentric white bands of uneven width and spacing starting 6–7 mm down. D 89 mm. U/s 833492

7 Goblet rim, slightly flaring. Colourless with fine white enamel thread just below the rim. Further concentric white trials starting 16 mm down. D 120 mm. U/s 833492

8 Goblet or beaker rim, slightly inturned, body flaring. Weathered opaque, colourless core. White trails starting on rim and continuing down for approximately 10 mm. D 100 mm. 1978 NB i (5) 833565 Ph 4b

A further 17 vessels represented in the assemblage fit into this decorative category. For reasons of fragmentation or extreme weathering, or indeed repetition, they have not been illustrated or catalogued. None shows any significant diversion from the flaring profiles described above. Contexts represented include: 1978 NB i (5) 833565 Ph 4b; 1983 C V (373) 832727 Ph 5; 1975 WBY (823) 753888 Ph 4, (D *c* 90 mm); 1976 WBY (956) sf 61 767208 Ph 4 (D *c* 100 mm); 1983 C V (387), 832729 Ph 5 (D *c* 80 mm); 1974 EBX (723) 833517 Ph 2b, (D *c* 110 mm); 1973 EBY (675) 833513 Ph 4 (D 78 mm); 1983 C V (372) 832726 Ph 5; three other examples from 1963 C VI cellar (553) 833503 Ph 3; 1978 NB i (3) 833564 Ph 4b, (D *c* 100 mm); 1983 CT III (286) , 832711 Ph 5.

Painted/enamelled glass (Fig. 7.17)

Gilding and enamels of various colours were used in the late 13th and 14th centuries. After an apparent break, these techniques became popular again from the mid 15th century. Coloured enamels were used from the 15th century onwards, while the use of white enamel alone is found from the end of the 15th or early 16th century. No gilding is represented in this assemblage. A reconstruction is attempted for one vessel (No. 9).

9 Goblet or footed beaker, body and base fragments. Colourless, optic-blown ribs. The vessel flares right from the base. On each rib are broken trails of white enamel giving the effect of opaque white dots that become more elongated towards the base, where they terminate. The base is of a pedestal type and domed. It is likely that rim fragments from a flared vessel from the same context, exhibiting concentric white trails, are associated (Rim D 100 mm), and this is assumed for the reconstruction. It also appears that the ribs peter out towards the upper part of the painted vessel. Body base D *c* 45 mm; 1976 NBX (922) 767206 Ph 3

Similar vessels from Orleans and Avignon in France have the broken enamel trails continuing onto the foot, and horizontal white trails towards the rim, and date to the early 16th century (Foy and Sennequier 1989, *272–3*, nos. 280 & 282).

Other examples not illustrated include:

Body fragment, colourless glass with three parallel lines. Colours are unclear though possibly white and dark brown paint/enamel. 1982 NBX (145) 833463 Ph 4

Body fragment, probably from a goblet. Colourless glass, original surface and paint mostly lost through weathering and subsequent washing. The slightly raised surface left from the painted areas is also finely pocked indicating the firing of the ground material. There are two parallel horizontal lines, one with some originally white enamel remaining, with running dots above one line and below the other. 1983 NBY (352) 832724 Ph 6

Diamond engraving

This process of decorating glass was redeveloped in Italy in the mid 16th century. In Britain the practice was led by Giacomo Verzelini, a Venetian immigrant living in London, who became a significant figure within the glass industry during the last quarter of the 16th century.

10 Vessel body fragments, probably from a goblet. Colourless glass, complete loss of original surface. Detailed patterning of straight lines and one serpentine, and filled-in foliate design. The serpentine line is reminiscent of the late 16th-century Verzelini glassware (Charleston 1984a, pls.12–13). 1963 A V (513) 833494 Ph 5/6

11 Beaker rim, body and possible base fragments. Rim near vertical. One body fragment retains the marks and pattern of the design: filled in ?foliate pattern with horizontal lines and incomplete fish-like signs. The rim fragment also retains remnants of the design though this and the rest of the vessel has undergone substantial loss of the original surface. Base has a high conical kick, with the foot-rim missing. Most engraved vessels are goblets and it is possible that the base is from a different vessel. 1982 CT V (66) 833439 Ph 6; 1982 NBX (145) 833464 Ph 4; 1982 NBX (157) 833468 Ph 4

Optic-blown vessels (Figs 7.17–7.18)

The variety of mould-blown designs is well attested elsewhere in Britain. Examples comparable with the Camber vessels can be seen from Southampton (Charleston 1975, *206–226*), Norwich (Haslam 1993, 97–109), Exeter (Charleston 1984b, 258–78) and Basing House (Moorhouse 1971, 35–77).

12 Beaker rim and body, vertical rim. Weathered opaque, core colourless or very pale green. Raised-dot decoration up to rim. D 76 mm. 1975 WBX (811) 753893 Ph 2b; 1975 WBY (827) 753899 Ph 3

13 Goblet bowl, cup-shaped. Original surface lost, colourless. Impressed dot (or dimple) decoration. 1983 G IV (228) 832689 Ph 4; 1982 CT I (115) 833420 Ph 4

14 Beaker rim and body, cylindrical. Colourless, original surface lost. Raised mesh decoration, each diamond-shaped area increasing in length down the vessel. D 72 mm. 1983 CT III (287) 832713 Ph 5

15 ?Beaker rim and body, cylindrical. Colourless, severe

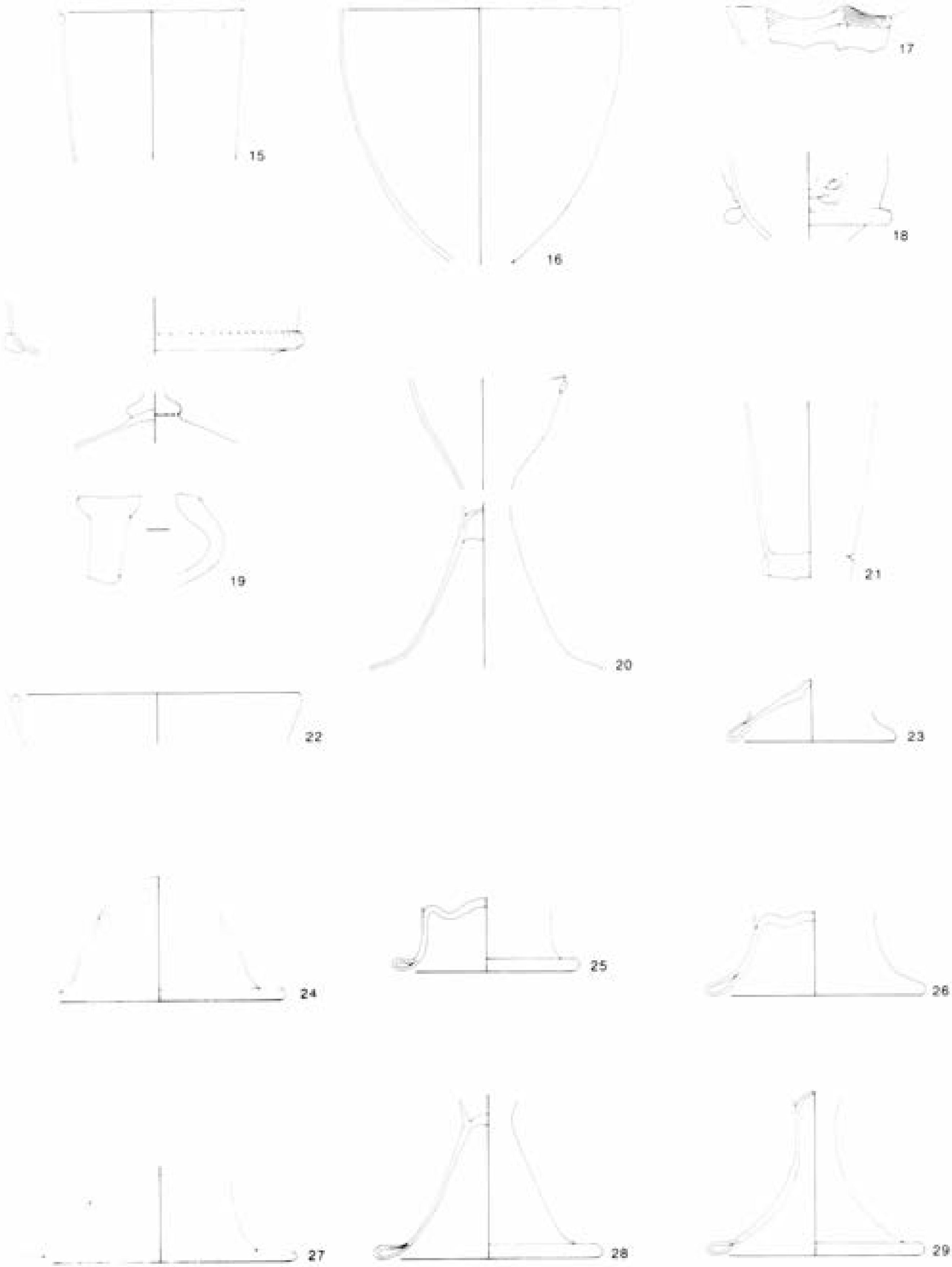


Figure 7.18: Vessel glass Nos 15–29, drinking vessels (scale 1:2)

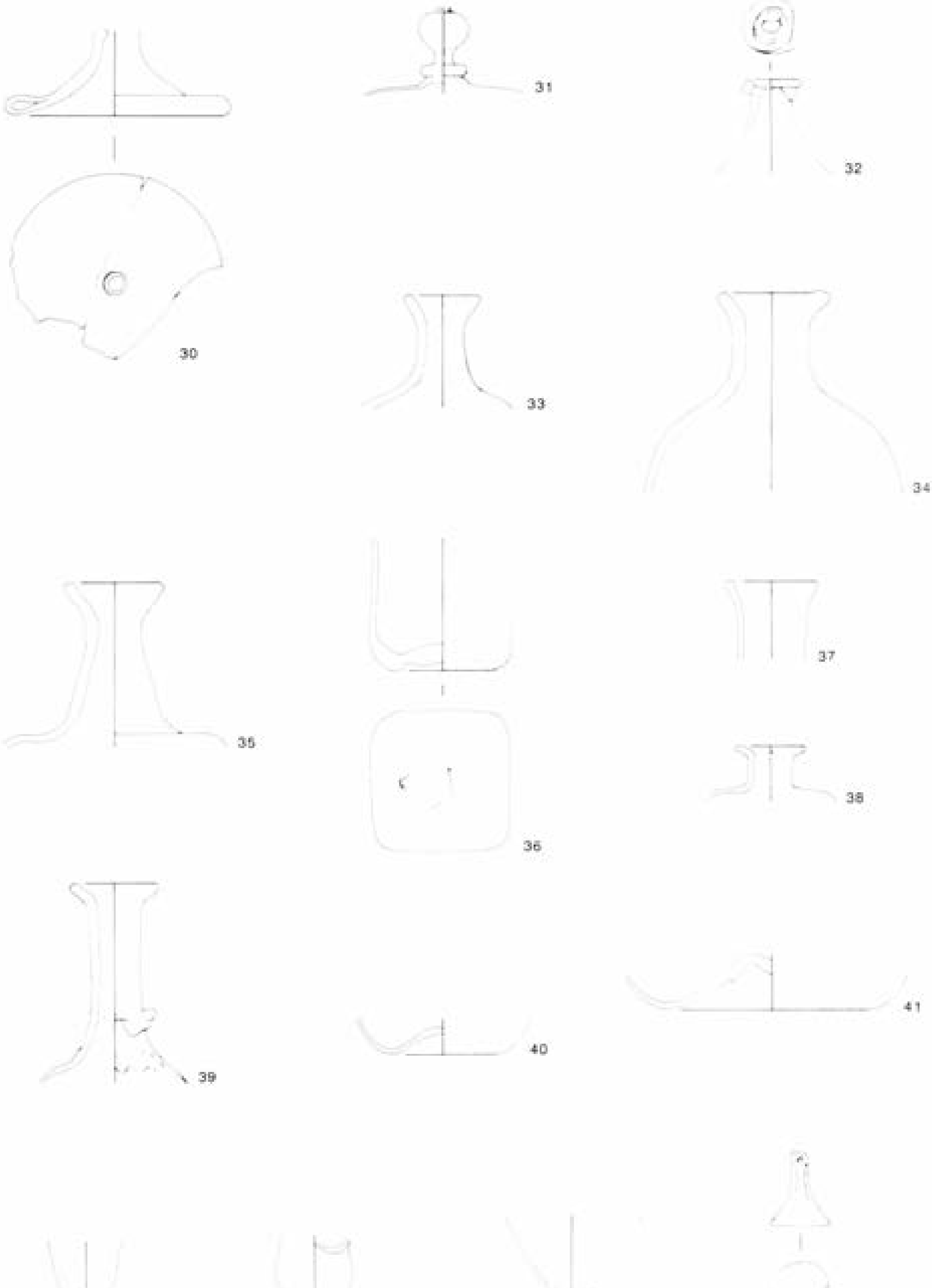


Figure 7.19: Vessel glass Nos 30–44, drinking vessels, bottles and miscellaneous items; seal fob No 45 (scale 1:2)

surface weathering. Raised vertical ribbing up to rim. D 68 mm. 1982 CT II (86) 833433 Ph 4

16 Goblet rim and large ovoid bowl. Colourless, with vertical rib-moulded decoration. D. 103 mm., 1982 G VI 833505 unphased

17 Prismatic vessel rim, slightly flared and scalloped. Colourless, with marvered, overlapping trail along rim edge. Badly weathered. Possibly Venetian. A parallel has not been found. 1973 EBY (675) 833513 Ph 4
No. 17 is a type found among Venetian glass vessels of the 16th and 17th centuries (Tait 1979).

Other examples not illustrated:

Two goblet bowl fragments from separate vessels with horizontal, segmented trails (1975 SBC (835) 753881 Ph 4a; 1965 Tr I (575) 833507 unphased), show a type of decoration strikingly similar to a surviving Verzelini goblet with a large conical bowl and stemmed base. This goblet is engraved with a name and date of 1568 (Liefkes 1997, 83, fig.101), though the early example (753881) from outside the W Bastion (WBX) suggests that this type of moulded decoration may well have been established by the early 1540s.

Applied decoration (Fig. 7.18)

Vessel No.18 is very similar to early *prunted roemers* of the late 16th to early 17th centuries (see Glossary). The very deliberate green-tinted metal and the flat, slightly pointed prunts are typical (Liefkes, 1997, 41, fig. 42).

18 Goblet bowl, green-tinted, well preserved. Applied trail in same metal around bowl, with applied prunts above. Diameter over trail *c* 61 mm. 1976 NBX (919) 767207 Ph 3

19 ?Goblet bowl, applied milled trail, or notched cordon. Remains of trailed decoration, in same metal, towards upper bowl. Colourless. D 112 mm. Possibly associated with a handle which may have been attached at the rim. Curved rods were used for elaborate decoration on some Venetian goblets, but not usually on ordinary goblets with milled trails such as this. Also possibly associated is a flat foot retaining a basal annular knop and the lower part of a drawn stem. Diameter of stem 9 mm. Cristallo. 1983 CT III (286) 832711 Ph 5
No.19 is similar to a goblet from Exeter (Charleston 1984b, 270, fig. 149, no.77).

20 Goblet base and bowl. Base is funnel-shaped. Ovoid bowl, rim missing. Colourless. Remains of applied dots (same metal) and trail (opaque white) on bowl. Severe surface loss. Kick-height: *c* 60 mm; D *c* 90 mm; Base of bowl 15 mm. 1973 EBY (675) 833513 Ph 4

Plain vessels *(Fig. 7.18)*

21 Goblet or possible bowl of a wine flute, rim missing. Colourless. Upper base remains with pontil scar. Bowl flares out slightly from base. Upper base/lower bowl D 32 mm. 1978 CT II (17) 833571 Ph 4b

22 ?Goblet rim, weathered opaque, colourless core. D 106 mm. 1974 EBX (716) 833515 Ph 3

Similar plain rims, either from beakers or goblets, include 1983 CT IV (332) 832723 Ph 5; 1983 G III (255) 832698 Ph 4; two vessels from 1975 WBY (827) 553889 Ph 3; 1974 EBX (720) 833516 Ph 3; 1982 NBX (157) 833469 Ph 4.

Bases *(Figs 7.18–7.19)*

The bases from Camber can also be paralleled with those found at Exeter, Northampton, Norwich and Southampton. Beaker bases tend to be more uniform than their heights, although kick-heights vary. Goblet bases tend to be more 'sophisticated' or stylish (a good example being No. 29), either in pedestal form or in stemmed form. The 'pork-pie hat' bases may belong to a form of tall, cylindrical beaker known as a *Stangenglas*. This type was made in Germany and the Netherlands in the 15th to 17th centuries. Venetian glass houses also produced these vessels for the German market in the 16th century. All have a hollow foot-rim unless otherwise stated.

23 Beaker base, high conical kick. Green-tinted. Kick-height 26 mm. D 62 mm. 1975 WBY (819) 753887 Ph 6

24 ?Beaker base, domed. Green-tinted. Kick-height 43 mm; D 93 mm. 1963 B VI (525) 833497 Ph 4/5

25 Beaker or ?*Stangenglas* base, pedestal. Colourless. Kick-height 24 mm; D 69 mm. U/s 833491

26 Beaker or ?*Stangenglas* base, pedestal. Colourless. Kick-height. 27 mm; D 80 mm. 1963 A VII (516) 833496 Ph 4/5

27 Beaker or ?*Stangenglas* base, pedestal. Kick rises above base of body. Colourless, near complete loss of original surface. Kick-height 28 mm; D 100 mm. 1982 G VI 833504 unphased

28 Goblet base, funnel-shaped. Colourless. Kick-height 48 mm; D 84 mm. 1963 C VI cellar (553) 833503 unphased

29 Goblet base, funnel-shaped. Colourless. Kick-height 59 mm; footrim D 80 mm. 1978 NB ii (1) 833563 Ph 6

Further examples (not illustrated) of this type of goblet base include: 1963 C VI cellar 833503 unphased; u/s 833493 (x2).

30 Footed-vessel base, terraced. Colourless, mould blown with vertical ribbing. Lower part of hollow stem remains; D 17 mm. Shallow kick. Foot-rim D 80 mm. 1978 NB i (2) 833561 Ph 4b; 1978 NB ii (2) 833572 Ph 4b

31 Goblet base, flat. Colourless with slight yellow tint. Lower part of stem remaining with squat baluster knop above an annular knop, which sits directly on base. Stem and knops hollow. Complete loss of original surface. Stem D 5 mm. Foot D *c* 56 mm. 1982 CT V (97) 833442 Ph 5

A similar, though later, example from Trichay Street, Exeter is dated to the mid 17th century (Charleston, 1984b, 271–2, fig.150, no.105).

32 Vessel? base with trailed knop? The trailed knop

may be a merese, ie. a flattened knop at the base of the stem. Funnel-type base, with cavity between top of kick and through knop. Cavity probably due to weathering. 1975 WBY (827) 753889 Ph 3

Bottles *(Fig. 7.19)*

The bottles are typical of the 16th and early 17th centuries. Thick wall wine bottles of later 17th- and 18th-century type were absent from contexts of phases I–IV. Numbers 33–6 are fragments from square-sectioned bottles or case bottles. The shape facilitated transportation and storage, hence the term 'case'. Similar examples can be seen from Basing House (Moorhouse 1971, fig. 29, nos. 42–3, 46), Haughton Green (Hurst Vose 1995, fig.9, no.19, 27) and Exeter (Charleston 1984b). Smaller case bottles, such as No. 36, seem to have preceded the larger types (Haslam 1984, 237). It is difficult to say whether these are of British origin or from the Continent. Bottle No. 39 is a type common in Britain (Charleston 1984a, 91), though probably obtained from German sources. The bottle is typically small and squat with wrythen decoration on a second gather. This is seen clearly at the join of body and neck. Three bottles of this type were recovered from the *Mary Rose*, indicating that this form was already established by 1545; there are also examples from Norwich (Haslam 1993, 100, fig. 66, nos. 617–8). The other interesting attribute is the presence of the trail around the neck. This was a support for a handle, and can be paralleled on examples from Basing House (Moorhouse 1971, fig. 27, no.16) and in a more elaborate form from Exeter (Charleston 1984a, fig. 152, no.141).

33 Rim, neck and shoulder, green-tinted. Rim flared, neck cylindrical flaring into shoulder. Rim D 26 mm; Neck D 16 mm., 1973 WB u/s 833509

Other examples are not illustrated:

Similar bottle rim and neck fragment. Rim D 27 mm. 1982 G V (96) 833486 Ph 5
A bevelled rim and neck fragment, slight green tint. Rim D 26 mm. 1982 G VI (65) 833489 Ph 4

34 Rim, neck and shoulder, light green. Rim flared and unevenly finished, neck cylindrical, shoulder sloping and rounded. Rim D 38 mm; Neck D 26 mm. 1975 SBC (835) 753877 Ph 4a

35 Rim, neck and shoulder, weathered opaque with colourless core. Rim flaring, neck flaring towards shoulder, upper shoulder horizontal. Rim D 35 mm; Neck D 19–35 mm. 1978 CT II (36) 833569 Ph 4a

36 Base and lower body of square case bottle, green-tinted. Slight kick with pontil scar. Heel rounded. Base: 47 mm². 1975 WBY (819) 753887 Ph 6

Another example is not illustrated:

Base, square with shallow domed kick. Weathered opaque with colourless core. Base: 48 mm². 1982 CT V (99) 833444 Ph 5

Nos 37–41 are from bottles typical of the period.

37 Rim and neck fragment, green-tinted. Rim very slightly flared, neck flares slightly inwards from rim. Rim D 32 mm. 1983 WB i (277) 832706 Ph 4

38 Rim, neck and shoulder, slight green tint. Rim horizontal, neck short and cylindrical, breaking sharply into a horizontal upper shoulder. ?Phial (see Haslam 1993, fig. 68, nos. 634, 637). Rim D: 24 mm; Neck D 16 mm. 1982 CT II (39) 833422 Ph 6

Other examples not illustrated:

Similar bottle rim and neck fragment, with mould blown vertical ribbing starting on lower neck. Rim D: 35 mm; Neck D 22 mm. 1978 CT I (14) 833470–4 Ph 6
Rim. D 35 mm; Neck D 25+ mm. 1983 CT IV (332) 832723 Ph 5

39 Rim, neck and body, weathered opaque. Possibly from a footed bottle. Rim horizontal, neck long, narrow and cylindrical, attached to rounded body. Single trail, in the same metal, applied on lower neck. Body mould blown with wrythen decoration. Rim D 28 mm; Neck D 17 mm. 1983 CT IV (316) 832721 Ph 6

40 Base, pale green, shallow, conical kick and rounded heel. ?Phial. Signs of wear on resting point. L 39 mm; W 35 mm. 1963 C IV (545) 833498 Ph 5

41 Base, shallow, conical kick. Possibly oval, L: 85 mm, W: 75 mm. Rounded heel. Weathered opaque, pale green core. Large, globular bottle, similar to no.138 from Exeter (Charleston 1984b). 1982 CT V (119) 833446 Ph 5

Other vessels/objects *(Fig. 7.19)*

Charleston (1984, 261) suggests that the production of the established type of glass lamp, so common during the medieval period, declines during the 16th century, and the presence of only a single base within one of the earliest contexts at Camber supports this view. Object No. 43 has not been identified, and may not necessarily come from a vessel. Object no. 44 has been identified tentatively as a sand-glass. The hollow bore seems to be decisive. A similar fragment comes from Southampton (Charleston 1975, 214, fig.226, no.1597). A dismantled sand-glass from the Science Museum in London (Newman 1977, 271) shows marked similarities.

42 Lamp base, convex. Weathered opaque. Maximum D 22 mm. 1974 EBX (723) 833517 Ph 2b

43 Unidentified near-spherical blown object. Weathered opaque, colourless core. Body appears to go in different directions at the break of curve. D 27 mm. 1978 NB ii (2) 833574 Ph 4b

44 ?Sand-glass, ovoid body with hollow bore. Glass becomes horizontal at bore. Green-tinted. Bore D 10 mm. 1963 C VI cellar (553) 833503 unphased

45 Seal, fob. Faceted shank with suspension hole at ground end. Two opposing grooves just below and to the sides of hole. No design is present. Opaque light green base with a marbled effect of different coloured

opaque glass. Possibly of agate or *calcedonia* glass. This technique of simulating semi-precious stones with glass was developed in the late 15th century in Venice (Newman 1977, *278–9*). L 25 mm. 1982 NB iii (127) Ph 5

Discussion

Vessel glass was spread widely throughout the excavated areas, and no significant information is forthcoming regarding the function of different areas within the castle. In common with the other finds assemblages, the distribution of the glass undoubtedly reflects the extensive movement of previously dumped material in phase IVb, and subsequent demolition activity (phase V–VI). It is possible that more detailed taphonomic work would reveal clues regarding the movement of fragments of a particular vessel through space and time. However, certain obvious matches of fragments from different areas and phases have been made during the work on this report and these have been sufficient to confirm the extensive movement of material within the castle.

The preponderance of drinking vessels, and wine glasses or goblets in particular, reflects their use certainly by the captain and the higher ranking officers who would have joined him at his table, as well as important guests. On the whole, glass was preferred by those who could afford it, as it was rarer than the more widely available plate (Charleston 1984, 50). For the gentry, wine was the respected tipple, as it indicated the wealth (Sim 1997, 58) required to procure these imports.

Deposition is most likely to result from accidental breakage with subsequent dumping (or throwing out) of broken glass outside the castle. However glass was not only physically fragile, and therefore easily broken by accident, but on occasion could also be seen as a symbol of the frailty of human existence and be deliberately broken. On special occasions 'drinking glasses were deliberately broken as a sign of happiness' (Liefkes 1997, 50).

CLAY TOBACCCO PIPES
by David Higgins

Introduction.

The excavations produced 457 pieces of clay tobacco pipe consisting of 100 bowl, 352 stem and 5 mouthpiece fragments. These were recovered during 10 seasons of excavation from a total of 108 different contexts (Table 7.2)

These figures show that there was a clear collecting bias in favour of bowls during the 1960s and 1970s and that it was only during the 1980s that a more complete sample was collected. The recovery rate of mouthpieces has been low at all periods. The selective retention of pipe fragments unfortunately restricts the statistical analysis that can be applied to the context groups, and limits the reliability of the pipes as dating evidence. This is because bowl types have differential survival rates in the ground. The small, thick-walled early bowls survive well under most conditions whereas the large, thin-walled later types are easily crushed and lost. As a result, early bowls may occur as residual material in later contexts that have not produced any later bowls. In these instances it is the presence of later stems that gives the true date of the deposit.

At Camber the eight seasons of excavation between 1963 and 1979 produced 61 bowls but only 59 stem fragments, representing 61% of the total number of bowls recovered but only 17% of all stems. As a result, the majority of the 108 pipe-bearing contexts have only small assemblages, with fewer than 10 fragments. Only eleven groups contain more than 10 pipe fragments; and nine of these contain between 12 and 15 fragments, and two larger groups contain 27 and 36 pieces. Most of these eleven groups are of mixed date and only five contain material that is principally of just one period. The five consistent groups all derive from the 1982 and 1983 excavations in the Courtyard and all appear to date from the late 18th or early 19th centuries: contexts *276*, *282* and *297* in the NNW Courtyard (CT III), 281 in WNW Courtyard (CT IV) and 45 in the WSW Courtyard (CT V).

Although no particularly large context groups were recovered, the pipes collectively range from the late 16th through to the late 19th or early 20th century in date. As such, they provide a reasonably good sample of the pipes circulating in this part of East Sussex. This is particularly important since Atkinson's work on Sussex pipes (1977) does not include much material from this part of the county and there do not appear to be any significant excavated assemblages from Sussex as a whole (Atkin 1989).

Methodology

The pipe fragments were sorted and catalogued by year groups and context according to the excavators' original labelling, and cross-referenced to the unified primary reference number sequence for the site. All fragments were individually examined and recorded using the system developed at the University of Liverpool (Higgins & Davey 1994), and context summary sheets were prepared. These provided totals for the various classes of information recorded from each context, together with an overall date range for the fragments present. Copies have been deposited as part of the site archive.

The principal guide used for dating the bowl forms was the London typology (Atkinson & Oswald 1969) since both Sussex and Kent lie firmly within the stylistic influence of the capital. Local styles and makers were primarily identified using Atkinson's work on Sussex pipes (1977), supplemented by the national makers lists found in Oswald (1975) where necessary. Reference has also been made, as far as possible, to reported local sites, as well as to work in neighbouring counties (for Kent, Driver 1979; for Surrey, Higgins 1981) to assist with the identification and interpretation of the finds.

None of the context groups recovered was sufficiently large or homogeneous to warrant individual study, nor were there any groups where complete pipes were likely to have been recovered. Despite this, the assemblage as a whole was felt to offer a useful overview for both the site and region. The pipe evidence is first presented by topic, irrespective of context, followed by a discussion as to its significance and interpretation in relation to the site.

Table 7.2: Clay tobacco pipe - numbers of fragments by year

Year	Bowl	Stem	Mouthpiece	Total fragments	Total contexts
1963	10	2	0	12	9
1972	9	3	1	13	1
1973	13	27	0	40	9
1974	4	2	0	6	2
1975	18	4	0	22	8
1976	5	2	2	9	5
1978	0	1	0	1	1
1979	2	18	0	20	8
1982	22	96	1	119	29
1983	17	197	1	215	3
Total	**100**	**352**	**5**	**457**	**108**

The Bowls *(Figs 7.20–7.22)*

The bowl forms found in South-East England generally follow the styles set in London (Atkinson & Oswald 1969) and the finds from Camber are no exception.

The earliest complete bowl (No.1) was recovered from context 119 in the WSW Courtyard (CT V) and dates from around 1600. Although retaining an early forward-sloping bowl form, this piece is a little larger than the first pipes and has a milled rim, a feature first introduced around the turn of the century. Two other fragments have heels cut flush with the stem and reduced grey cores to the fabric at the bowl junction, both of which are typical of the earliest pipes. These two fragments were recovered from contexts 45 and 99 in the WSW Couryard (CT V). All three of these early pipes are likely to have been produced between *c*1580 and 1610. Pipes of the late 16th or very early 17th century are extremely rare and these pieces are particularly important since they are the only known examples from Sussex (Atkinson 1977, 3).

From the early 17th century until about 1680 a mixture of heel and spur forms were used at Camber (Nos 2–11). These are typical of the styles current in London and the south-east, although slight differences in the proportions and lines of these bowls suggest local manufacture. It is worth noting that the draft typology of Canterbury pipes for this period does not include any spur forms at all (Driver 1979), although these were current in both Sussex (Atkinson 1977) and Surrey (Higgins 1981).

In contrast, from *c*1680 until the middle of the 18th century, only one spur pipe was present in the Camber assemblage (No. 12). During the late 17th century a rather cylindrical but forward-leaning bowl type seems to have been particularly in vogue (Nos 13–18), with no fewer than 13 examples being recovered (representing 13% of all bowls from the site). As with the earlier spur pipes, this style does not seem to have been used in Canterbury, although it is found in Sussex and in Surrey.

Around 1700 the upright, cylindrical bowl form was adopted, which was to remain the typical form for most of the 18th century in London and the south-east (Nos 20–23). Spur forms reappear from the middle of the 18th century (Nos 26–7). The evidence for the late 18th and 19th centuries is rather scrappy as most of the bowls of this period have been crushed and are represented only by fragments. The form of these fragments, however, shows that typical south-eastern styles continued to be employed (Nos 24–5, 28–36).

Stamped Marks *(Fig. 7.20)*

Two stamped pipes were recovered from the excavations as follows:-

Mark	Fig	Date	Context and Phase
Eglantine	7.20.1	1590–1610	1982 CT V (119), Ph 5
IB	7.20.7	1620–1650	1982 CT IV (295), Ph 4

The earlier of the two stamps is the eglantine mark of *c* 1590–1610 from the WSW Courtyard (CT V context 119). This mark is particularly interesting since there do not appear to be any examples of this type from amongst the substantial number of published early pipes from London. In contrast, the eglantine was commonly used on early pipes from the south-west, numerous examples having been recovered from Plymouth (Oswald 1969; Higgins 1992). The early forms of this mark often occur on good quality pipes which, in turn, have been found at high status sites such as Berry Pomeroy Castle in Devon (Higgins 1998). The Camber example is on a good quality pipe and is likely to have come from the Plymouth region.

The second stamped pipe was recovered from the WNW Courtyard (CT IV context 295) and, although only the heel survives, it can be dated to around 1620–60. The mark consists of the relief initials IB with a star between, and a beaded border. The decorative device below the initials would have been mirrored above. The style of this mark is typical of those produced in London and this example probably originates from there. There is only one maker with the initials IB who is known to have been working in London during this period. This is John Bower, working in 1634 (Oswald 1975, 131), to whom this pipe can probably be attributed.

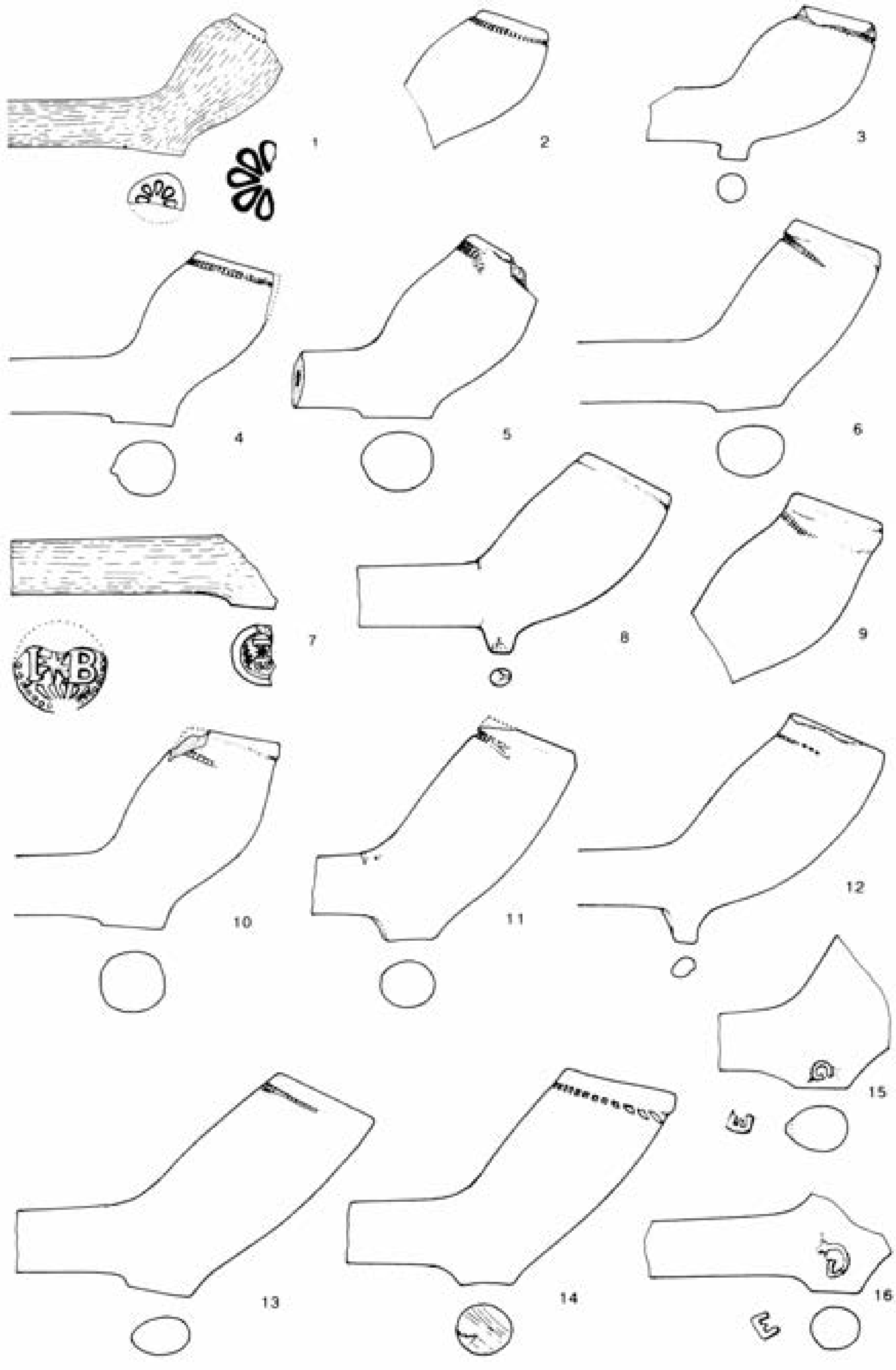


Figure 7.20: Clay tobacco pipe, Nos 1–16 (scale 1:1)

Moulded Heel Marks *(Figs 7.20–7.22)*

A total of 28 heels with moulded marks were recovered from the excavations. These are listed and discussed in alphabetical order below. Damaged, illegible and symbol marks have been placed at the end of the list. At the head of each entry information about the examples is given in the following order: mark; figure number; date; context, phase and comments.

Mark	Fig	Date	Context and Phase
WA	7.21.33	1790–1830	1976 WBY (951), Ph 6
WA	-	1790–1830	1975 Vaulted Ring Passage, clearance, unphased

Two WA marks were found, both from the same mould and both with only the heel surviving. The initials are poorly cut with clear striations on both sides of the heel suggesting that earlier initials may have been erased. The mould halves fit poorly with the seams of the heel being slightly out of line. Neither of the heels has been trimmed. These pipes can be attributed to one of the William Appses who were working in Rye. Atkinson (1977, 9) lists three makers of this name in the town; the first born in about 1765, the second in about 1794 and the third in about 1821. The date of these pieces suggests that they belong to the first William. These appear to be the first known pipes attributable to any of this family.

Mark	Fig	Date	Context and Phase
EG	7.20.15	1680–1710	1983 CT III (276), Ph 5
EG	7.20.16	1680–1710	1972 NB (587) u/s

Large, crude initials, moulded upright on either side of the heel.

Mark	Fig	Date	Context and Phase
E?G	7.21.19	1700–1750	1975 KEEP (849), Ph 6

Crowned initials

Three EG pipes were found, all from different moulds. The earlier two are very fragmentary and have crudely executed initials. In one case (No. 16) the initials have been placed upright on the sides of the heel with the G retrograde. These are early examples of moulded marks, produced at a time when this style was only just starting to be used by the London makers. The use of upright initials appears to be a Sussex characteristic, and Atkinson (1977) illustrates several examples of this style. The third pipe has crowned initials, typically a London characteristic, although makers in Surrey are known to have used this device (Higgins 1981, 211–2). There are no known makers from Sussex or Kent with the initials EG (Atkinson 1977; Oswald 1975) but, given the number of examples from Camber and the local style of the earlier marks, it seems likely that one must have been operating somewhere on the Sussex/Kent border during the late 17th and early 18th centuries.

Mark	Fig	Date	Context and Phase
MH	-	1700–1770	1982 CT VI (47), Ph 5
MH	7.21.20	1700–1750	1982 CT II (81), Ph 5
MH	7.21.21	1730–1780	1973 WB (692), Ph 6
MH	7.21.18	1680–1710	1973 WB (693), Ph 6

Bottered rim.

Mark	Fig	Date	Context and Phase
MH	-	1700–1770	1975 Vaulted Ring Passage, clearance, unphased

Five pipes marked MH were recovered. One of these is of a transitional late 17th- to early 18th-century style, the others are all standard 18th-century forms, although they exhibit a range of heel sizes. Two of the examples (from SSW Courtyard (CT VI context 47) and from clearance of the Vaulted Ring Passage; not illustrated) may have been made in the same mould, but the other three examples all come from different moulds (Nos 18, 20 and 21). The lettering is generally small and fairly neatly formed although No. 20 has rather larger, boldly cut initials. As with the EG marks, there is no known maker in the Camber area although the range and number of these examples suggests that one must have worked nearby during the late 17th and early 18th centuries.

Mark	Fig	Date	Context and Phase
TH	7.21.22	1700–1740	1972 NB (587) u/s

One example of a standard 18th-century form marked TH. This can be attributed to Thomas Holness of Hastings, who died in March 1739/40 (Atkinson 1977, 13).

Mark	Fig	Date	Context and Phase
?IS	7.21.32	1820–1850	1972 NB (587) u/s
JS	7.21.31	1840–1880	1982 CT V (45), Ph 6

Two pipes were found marked IS or JS. These are most likely to have been made by James Shoesmith, *c* 1807-67, who worked at Fairlight Down and Ore, just to the east of Hastings (Atkinson 1977, 16).

Mark	Fig	Date	Context and Phase
WT	7.21.23	1700–1770	1963 A V (512), Ph 512

One example of a standard 18th-century London and south-eastern form. No known maker with these initials is recorded from Sussex or Kent.

Mark	Fig	Date	Context and Phase
EW	7.21.25	1780–1820	1963, C I (536), Ph 5

One fragmentary example of a standard London and south-eastern form of *c* 1780–1820. No known maker with these initials is recorded from Sussex or Kent.

Mark	Fig	Date	Context and Phase
?I?W	-	1780–1830	1973 WB (692), Ph 6

Very fragmentary example, probably marked IW, with traces of fluted decoration on the bowl. This could have been made by one of three local makers listed by Atkinson (1977, 17). The nearest would have been John Walker of Rye, recorded as working in 1798. Slightly further away were John Watkinson, recorded working 1838–41, and Joseph Watkinson, recorded working 1836–45, both of Hastings. Given the date of the pipe and the proximity of Rye, John Walker would seem the most likely maker for this piece.

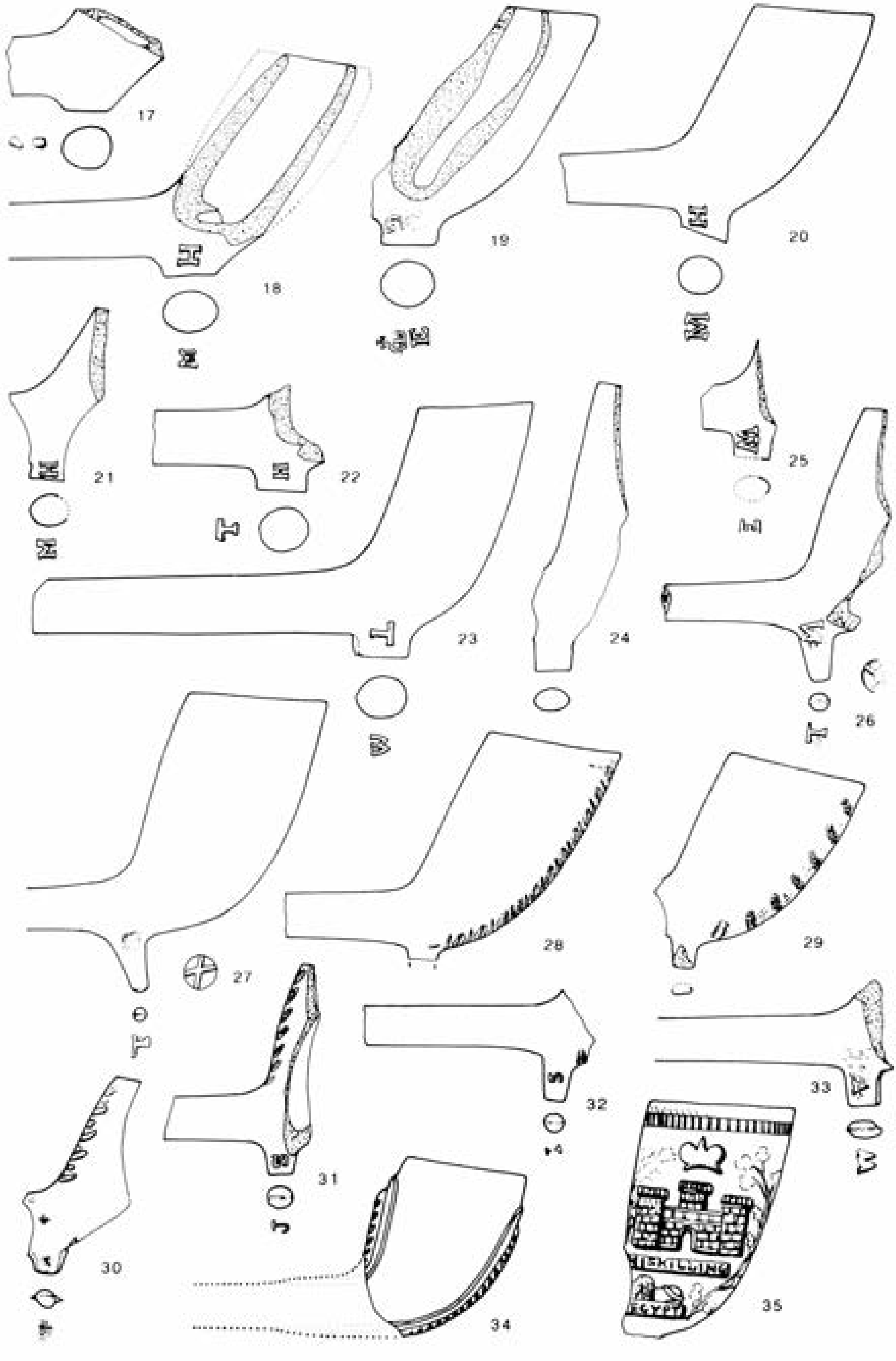


Figure 7.21: Clay tobacco pipe, Nos 17–35 (scale 1:1)

Mark	Fig	Date	Context and Phase
TW	7.21.26	1750–1800	1983, G III (222), Ph 5

One example of a later 18th-century spur pipe with an internal bowl cross; unidentified maker.

Mark	Fig	Date	Context and Phase
??W	-	1740–1800	1974, SBC (743), Ph 5

One example of a later 18th-century spur pipe. This is not from the same mould as the TW example above, although it is a similar style and could have been made by the same unidentified maker.

Mark	Fig	Date	Context and Phase
I/	7.21.27	1780–1840	1963 B V (523), Ph 6
?T/	-	1740–1800	Vaulted Ring Passage, clearance, unphased
Possibly another TW pipe; has an internal bowl cross			
??	-	1780–1820	1972 NB (587) u/s
Faint marks on heel, possibly where initials have been erased.			
??	-	1700–1770	1973 WB (693), Ph 6
Most of mark broken away.			
??	-	1800–1840	1975, WBX (790), Ph 6
Illegible marks on spur, same mould as second example from WBX (790) below.			
??	-	1800–1840	1975, WBX (790), Ph 6
Illegible marks on spur, same mould as 790 above.			
??	-	1800–1840	1975 KEEP (849), Ph 6
Illegible marks on spur.			
??	7.21.30	1800–1840	Vaulted Ring Passage, clearance, unphased
Illegible marks on spur; leaf decorated seams.			

Six examples of illegible or damaged marks which cannot be matched with any of the clearer makers' marks.

Mark	Fig	Date	Context and Phase
:	7.21.17	1680–1710	1973 EBA (614), Ph 5
Dots on left hand side of heel only.			

One example of a fragmentary late 17th-century bowl form with two dots moulded on the left hand side of the heel only.

Mark	Fig	Date	Context and Phase
Shields	7.22.40	1840–1860	1972 NB (587) u/s
Stem marked R.LANG/ /T CLIFF			

One example with a moulded shield on either side of the heel. The stem (see below) is marked for Richard Lancaster of East Cliff at Rye, who was working in 1851 (Atkinson 1977, 14).

Moulded Stem Marks *(Fig. 7.22)*

Three fragments of stem with moulded marks were recovered from the excavations as follows:-

Mark	Fig	Date	Context and Phase
R.LANG/ /T CLIFF	7.22.40	1840–1860	1972 NB (587) u/s

Moulded shield mark on either side of heel.

One example with relief moulded serif lettering reading R.LANC/ /T CLIFF along the stem. The lettering starts and terminates with a little flower motif. The seams are decorated with alternating acorns and oak leaves and have been trimmed with a serrated trimming tool which is unusual in this country, although common in the Netherlands. There is a moulded shield on either side of the heel. The pipe was made by Richard Lancaster of East Cliff at Rye, who was working in 1851 (Atkinson 1977, 14).

Mark	Fig	Date	Context and Phase
RYE / RYE	7.22.41	1850–1900	1973 WB (692), Ph 6

One example of a later 19th-century or later stem with the incuse (stamped), sans-serif lettering RYE on either side. Traces of fluted bowl decoration. There are no known makers for Rye during the second half of the 19th century although William Apps III, only 30 in 1851, could well have continued manufacturing into this period.

Mark	Fig	Date	Context and Phase
/SON / No SH/	7.22.42	1820–1860	1983 CT III (266), Ph 5

One example of a thin, slightly curved stem with relief serif lettering. Unidentified maker.

Internal Bowl Crosses *(Fig. 7.21)*

Three examples of internal bowl crosses were noted amongst this assemblage. There are two plain bowls dating from the second half of the 18th century which have an 'X' shaped mark inside the bowl (Nos 26–7). One of these, from NNW Curtain Gallery (G III context *222*), is marked TW, while only the first initial, ?T, can be made out on the other, which is from the clearance of the Vaulted Ring Passage. The two examples are from different moulds although both could have been made by the same, as yet unidentified, maker. The third example is very fragmentary and occurs inside the bowl of a plain pipe of c1820–80 from the N Stirrup Tower (NB iii context 130; not illustrated).

Decorated Pipes *(Figs 7.21–7.22)*

The decorated pipes from this assemblage are rather fragmentary but follow the typical trends of the south-east. There is one 17th-century stem fragment with a random pattern of milled decoration around it (No. 37). Moulded decoration first came into common use around the middle of the 18th century and is represented at Camber by a fragmentary armorial pipe from the Keep (1975 KEEP context 849). Unfortunately the spur appears to have been damaged during the manufacturing process and so any maker's name has been lost. The surviving section of bowl appears to have the Hanoverian Arms on it, very neatly and finely engraved although rather poorly moulded. From the early part of the 19th century there are a number of examples of bowls with leaf-decorated seams. These bowls usually had plain sides although there

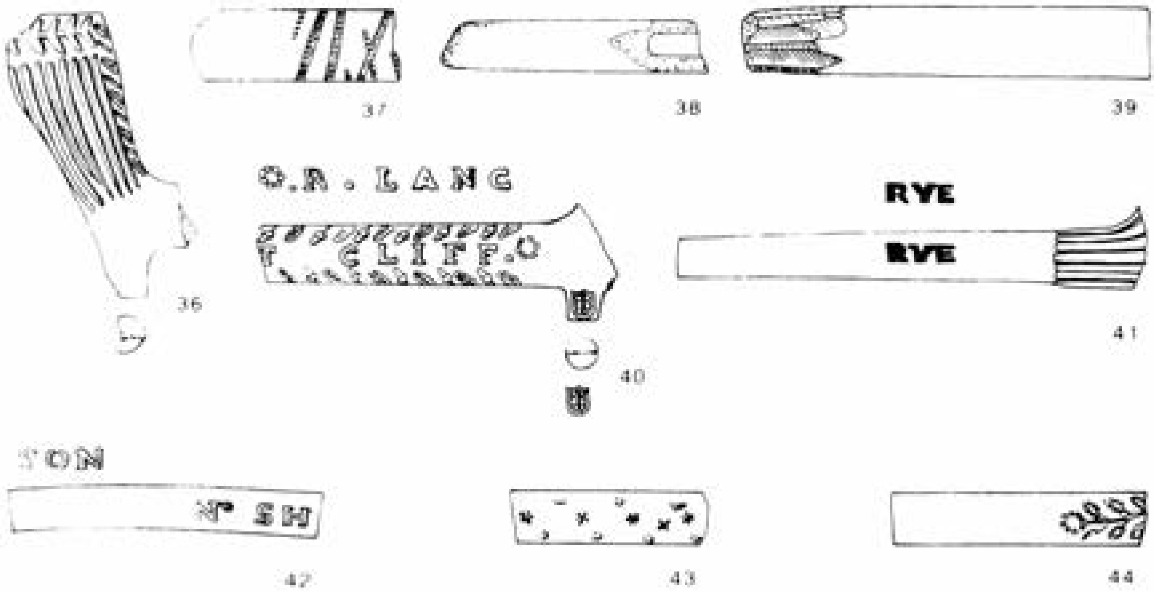


Figure 7.22: Clay tobacco pipe, Nos 36–44 (scale 1:1)

is one example with flutes and foliage (No. 36) and another with a spread eagle and grapes motif on the bowl sides. The spread eagle and grapes design is a particularly south-eastern type. Later 19th-century pipes include a number of spurless 'cutty' designs as well as an 'INNISKILLING, EGYPT' bowl with very deep but rather crudely executed decoration (No. 35). Moulded stems also occur on the 19th-century pipes. Most of the examples appear to date from the second and third quarters of the century and consist of various combinations of motifs such as dots, stars and leaves (for example, Nos 43–4).

Modified Stems *(Fig. 7.22)*

Two 17th-century stems with signs of post-firing alteration were recovered. In one instance the end of a stem very near to a mouthpiece had been ground at an angle of about 45 degrees, perhaps to smooth a chipped or damaged end for reuse (No. 38). A much thicker stem section, from towards the middle of a pipe, also shows signs of alteration. In this case the stem has been tapered by whittling all round with a sharp implement such as a knife (No. 39).

Mouthpieces

Only five mouthpiece fragments were recovered from the excavations. One of these, from the NNW Curtain Gallery (G III context 222), is probably of 18th-century date while the other four, from the WSW Courtyard (CT V context 45), from clearance of the upper fills of the N Bastion (1972 NB (587) u/s) and from outside the W Bastion (1976 WBY contexts 951 and 953), are of 18th- or 19th-century date. All are formed by simple cut ends to the stem. There is evidence for a treatment or coating of the mouthpiece in only one instance. This is on the mouthpiece from the N Bastion (context 587 u/s) which has traces of a dull, matt red coating, presumably of wax, along all of its surviving 35 mm of length.

Manufacturing Techniques *(Figs 7.21–7.22)*

Most of the fragments from Camber exhibit the normal manufacturing techniques that would be expected for their style and date. There are, however, one or two pieces which are of note. The crowned EG pipe (No. 19) has a particularly interesting rim finish. This bowl dates from around 1700 when pipe styles were rapidly evolving into upright types with cut rims. Earlier pipes had forward-leaning bowls with rims finished by bottering (smoothing by twisting a button like device on the rim). The transition to cut rims is thought to coincide with the introduction of a trimming slot at the top of the mould, a characteristically English technique that allowed faster production. The EG pipe appears to have a simple trimmed rim, which may have been lightly wiped to smooth it. Such a rim finish would normally be associated with a cylindrical bowl form terminating abruptly at a cut rim. In this example, however, the body of the bowl curves in slightly at the rim. There are clear mould marks on this curved section showing that the mould was intentionally manufactured in this way and that the curve is not a result of subsequent finishing of the pipe. This rounded rim may have been intended to produce the effect of bottering while allowing quicker production with a simple cut rim. This is a very unusual detail which reflects the fundamental changes in pipe and mould design which were taking place at this date.

Another finishing technique can be observed on the Richard Lancaster stem from Rye (No. 40). The seams of this pipe have been finished with a serrated-edged trimming tool. This leaves a series of diagonal cuts across the mould seam, a finish normally associated with pipes from the Netherlands. The use of this technique is very rare in England.

Finally, a number of the later 17th-century fragments have very glossy surfaces despite the fact that the pipes have not been burnished. This could reflect the use of a particular clay source, or suggest that the pipes were polished or buffed in some way while in a leather-hard state.

Metal Rod

One of the most unusual finds was a piece of stem from the NNW Courtyard (CT III context 276) that appears to have been excavated with a length of metal rod in its bore. The pipe fragment, which is probably of 18th-century date, comes from the bowl junction end of the stem. It was 34 mm in length and has a stem bore of 5/64 inch. When the pipes were tipped out for examination, the bowl end of this piece split into three splinters along fracture lines caused by the corrosion of a metal rod within the bore. The metal rod is 19 mm long and made of a heavy grey non-ferrous metal with slight traces of greenish corrosion products on the surface. At the end further from the bowl junction the rod has an almost separate section, just joined on one side to the main length of rod. Beyond the rod the remaining bore of the pipe seems to be filled with earth. It would seem most unlikely that a metal rod could be inserted into a complete pipe and then broken in this position. A rod could, of course, have been pushed into the bowl end of a stem that had already been broken, but the nearly separate section looks as if it formed from molten metal. This might suggest that liquid metal found its way into a pipe bowl and ran 19 mm along the bore before setting. The outside of the pipe does not show any evidence of discolouration from burning and so this is unlikely to have happened accidentally in a fire. The most likely explanation would seem that someone deliberately poured molten metal into the pipe bowl. No plausible explanation can be offered for this although it is worth noting that a parallel is provided by a pipe from Knaresborough Castle in the Mercer Art Gallery, Harrogate (KNC 89 1038). This dates from *c* 1680-1710 and has a funnel-shaped run of metal, probably lead, in the very bottom of the bowl. The metal extends about 10 mm into the stem, at which point the stem has been broken. The metal projects slightly beyond the broken stem, and has been bent, showing that the metal was cast before the pipe broke at this point.

Discussion

Perhaps the most significant pieces amongst the Camber assemblage are the three very early fragments recovered from the WSW Courtyard (CT V contexts 45, 99 and 119). These date from *c* 1580–1610 and are the earliest known pipes to have been recovered from Sussex. Although the castle itself was an important structure it would probably have been garrisoned by ordinary troops and the pipes suggest that they had adopted the habit of smoking by the end of the 16th century. The finding of such early fragments not only identifies a social context within which smoking was being introduced but also a mechanism by which it might have been disseminated within the surrounding community. The garrison troops are likely to have travelled more widely and to have been exposed to a wider range of influences than the farmers from surrounding villages. In this way they are more likely to have come into contact with the new habit. But they are equally likely to have mixed with the local farmers and traders at the nearby markets and inns. This would provide a mechanism by which the new habit of smoking could have been transmitted from one social group to another and from one place to another.

The movement of goods is a useful indicator of social interactions and the adoption of new fashions. Clay pipes are particularly useful in this respect since the makers' marks found on them often mean pipes can be attributed to a source, and can be used to identify the movement of goods and/or individuals to and from a given site. Most of the marked pipes from Camber can be attributed to an area, if not to an individual maker. Only two stamped pipes from the 16th and 17th centuries were recovered, but from the late 17th century onwards most of the pipes are mould marked.

The early marked pieces are interesting in that both are of good quality and both are imports to the Camber area. The early eglantine mark is an unusual find since this particular mark does not appear to have travelled much from the south-west and it has not been previously recorded in the south-east. Given that this type of pipe does not appear to have been widely traded, the Camber example is most likely to have been brought to the site as the personal possession of someone travelling from the Plymouth area. The presence of this pipe at Camber supports the suggestion that troops may have brought the habit of smoking to the area from elsewhere.

The London IB mark is less unusual, although pipes from the capital were still surprisingly scarce in the surrounding counties (Higgins 1981). This piece may have been brought to the site by an individual travelling from London or as a high quality product for use by the officers at the castle. Although the majority of the 17th-century pipes are unmarked and typical of south-eastern styles, the two imports are unusual and reveal a movement of people and/or goods to the castle that would not be expected on a lesser site.

In contrast, the later pipes do not include any 'exotic imports', despite the much larger number of marked examples recovered. From the late 17th century onwards the pipes appear to have been almost entirely local, coming principally from the nearby production centres at Rye and Hastings. Even when the makers cannot be identified, as with the EG and MH pipes, the provincial style of the pipes combined with their numbers argues for a local origin.

In terms of dating, the pipes recovered span four hundred years, from the late 16th century through to the late 19th century. The earliest forms are relatively scarce, with only about 6% or 7% of the bowls dating to before *c* 1640 when the castle was in use. Surprisingly, there is a fairly even chronological distribution of pipes for the later periods, presumably representing those lost by demolition gangs and casual visitors to the castle. The castle is in a comparatively isolated position, where the tipping of domestic waste or night soil would not be expected. If the pipes cannot easily be dismissed as rubbish from elsewhere then an explanation for them must be sought.

There do not appear to be any relevant studies of artefact disposal patterns and post-medieval site formation processes against which the Camber evidence can be tested. In the 18th and 19th centuries the ruins provided a focal point for outings and picnics, and the later pipes almost certainly arrived in that way. From the end of the 19th century, it was in use as a golf course. The large numbers of mid to late 17th-century pipes on the site could derive from the documented demolition campaigns at the castle, but equally they could have resulted from other undocumented activities. The earlier use of the site as a picnic venue, its temporary use as a shelter or the 17th-century equivalent of 'schoolboy smoking' are all possibilities.

COINS AND TOKENS

The majority of the coins and jettons from Camber Castle, are missing, having been stolen shortly after the post-excavation assessment in 1995. Fortunately, they had been listed and identified in preparation for conservation in the Ancient Monuments Laboratory. The published list is based on the manuscript list prepared by Dr Barry Knight. The only additional item is No. 21, which will be found in the site archive.

1 Nuremberg jetton, standard type. IOG SHVLTES NR / IOG SVHLTE FPENG. D 25mm; 1963 C II (539) sf 85b, Ph 5
2 Nuremberg jetton, standard type. HANNS KRAVWINCKEL IN NVRNB: / DAS WORT GOTES BLEIBT EWICK (1586-1635). D 25 mm; 1965 Tr II (1051) sf 200, Ph 3
3 Nuremberg jetton, standard type. As No. 1. D 25 mm; 1973 EBX (666) sf 25, Ph 3
4 Nuremberg jetton, standard type, corroded right through in places. Garbled Lombardic legends. D 24 mm; 1973 EBA (622) sf 27, Ph 5
5 Nuremberg jetton, standard type. Garbled Lombardic legend / HANS SCHVLTES [G]RXNI. D 24 mm; 1979 CT I (17) sf 23, Ph 4b
6 Nuremberg jetton, standard type. HANS SCHVLTES ZV NVRENB / GLICK KUMPT VON GOT IS WAR. D 25 mm; 1979 CT I (17) sf 24, Ph 4b
7 Nuremberg jetton, standard type. HEVT ROT MORGEN TODT / HANNS KRAVWINCKEL IN NVR. D 22 mm; 1983 CT III (282) sf 1365, Ph 5
8 Nuremberg jetton, standard type, worn. As No. 5. D 24 mm; 1983 CT IV (295) sf 1440 Ph 4
9 Nuremberg jetton, standard type. Garbled Lombardic legends. D 25 mm; 1983 G IV (237) sf 1002, Ph 6
10 Jetton, probably Nuremberg, damaged. *Obv*. Bust l [ ] D : G HISPA REX . C .Z. *Rev*. arms crowned, surrounded by chain. PACE . [ET] . IVSTITIA D 26 mm; 1983 G IV (237) sf 1090, Ph 6
11 Nuremberg jetton, standard type. IORG SCHVLTES 1553 / same. D 24 mm; 1983 NB iii (249) sf 1091, Ph 4b
12 Nuremberg jetton, standard type. As No. 1. D 25 mm; 1983 NB iii (250) sf 1088, Ph 5
13 Nuremberg jetton for the French market. *Obv*. Reichsapfel in trilobe, garbled Lombardic legend. *Rev*. Arms of France in escutcheon, crowned, garbled Lombardic legend. 1983 NB iii (307) sf 1310, Ph 4a
14 Nuremberg jetton, standard type. No legend. *Obv*. border of pellets; Rev. border of wedges. D 21 mm; 1983 NB iii/iv (309) sf 1571, Ph 3
15 Nuremberg jetton, standard type. GOTTES GABEN SOL MAN LOB / HANNS KRAVWINCKEL IN NVR. D 22 mm; 1983 WB ii (280) sf 1311, Ph 4
16 Reichsapfel in beaded circle. 13 x 13 x 2 mm; weight 3.12 g; 1982 G VI (76) sf 445 Ph 4
17 Lead token. *Obv*. Lombardic A with fleur-de-lys serifs, border of dashes; *Rev*. Cross fleury, border of dashes. D 25 mm; 1963 CVI cellar unphased
18 Charles I farthing, Richmond 'round' type Ic (1625–34) i.m.castle? 1963 BV 'from staircase between cavalier and bastion' unphased
19 Charles I farthing, Rose type 2, i.m. mullet/crescent (after 1636). 1982 GI (74) sf 531 Ph 4
20 Louis XIV liard (Bordeaux 1656), fairly worn, would have circulated as farthing. 1963 C II (539) sf 85a, Ph 5
21 Trade token of John Wilkinson Iron master, dated 1790. Legend around the edge comprises the following names: Snedshill, Bersham, W[i]sley and [B]radley. Found by workmen between bricks of floor of Vaulted Ring Passage adjacent to the radial passage leading to the W Bastion. Unphased
22 Edward VII penny, 1908, fairly worn but uncorroded. 1982 NB iii (127) sf 924, Ph 5
23 George VI penny, 1946, little wear or corrosion. 1979 CTI (14) sf 19 Ph 6

Chapter 8: The Animal Bones

by Brian Connell and Simon Davis
with a contribution on the fish bones by Alison Locker

INTRODUCTION

This report describes studies carried out on the animal bones recovered during excavations at Camber Castle between 1963 and 1983. A full account with measurements of individual bones and teeth is available as an Ancient Monuments Laboratory (AMLab) report (Connell, Davis and Locker 1997). A number of research questions have been addressed for the purpose of the present publication, including the diet and status of the castle's occupants, methods of provisioning, and the local environment. The assemblage was also studied for evidence of changes in the occupation and use of the castle. Comparisons were undertaken with other medieval and post-medieval sites to identify evidence for livestock improvement in this 16th- to 17th-century material. The Camber Castle animal bones, viewed in the context of other assemblages, both earlier and contemporary, provide interesting information about the development of English animal husbandry, and illuminate aspects of the day-to-day existence of the garrison at this fortification.

No animal bone was recovered from phase I, the early tower, and very little from the construction phases of the castle (phases II–III). Most bones came from the period of main occupation (phase IV) and from periods of alteration, abandonment and reuse (phases V and VI) although some of the material occurring in the bulk fills of phase IVb may have been derived from earlier refuse (see Tables 8.1 –5).

Other sources of evidence

In 1540 there were 16 gunners and a porter at Camber Castle in addition to the captain, and this had increased to 28 by 1546 (see Chapter 2, above). However, at a time of crisis soldiers could be supplemented by local musters (Saunders 1989, 47). Camber Castle's guns were possibly never fired in anger, and the castle became obsolete in the course of the 16th century as silting and land reclamation led to the formation of marshes that isolated the castle some one and a half miles inland from the receding sea.

While something is known of the provisioning of Henry VIII's troops on military campaigns in northern France and the Scottish border country (see for example Davies 1964; and Cruickshank 1966 and 1990), little is known about how a small fortified position such as Camber might have been victualled. The commander may have purchased supplies of major food items from local farmers. Troops overseas were expected in part to 'requisition' food from the local inhabitants and soldiers were responsible for feeding themselves. A soldier's wage of 6d a day was supposed to be enough for him to buy his own food; but this still left the government with the problem of arranging for its delivery, unless soldiers were expected to do all the procurement themselves. While on campaign, troop's rations, in theory at least, were certainly generous; each man was entitled to 1–1½ lb of biscuit, 1–1½ gallons of beer, and a pound of beef each day (Davies 1964). In Elizabethan times forces overseas were supplied with bread, biscuit, butter, cheese, beer, oatmeal, peas, beans, pork, bacon, fresh and salt beef, dried cod (stockfish), ling and herring (Cruickshank 1966). Salt beef, bacon, ling, beer, biscuit etc as well as salt fish, 300 oxen and 1,000 sheep are mentioned for victualling Henry VIII's force invading France (Cruickshank 1990). These animals feature in the Camber animal bone assemblage, and dual sourcing (that is, central supply and local 'requisitioning') of the animals seems to tally with the spectrum of species found at the castle. However, it should be noted that the above documentary sources refer to campaign situations and may not necessarily reflect the circumstances of the garrison at Camber.

The nature of the assemblage.

Animal bones, unlike coins and pottery, cannot be dated individually (apart from very expensive techniques such as radiocarbon analysis). Therefore, one of the key problems with the Camber animal bones has been to determine the origin of the considerable quantity of bone from the abandonment and reuse phases (V and VI). It is unclear, for example, whether the animal bones derive from casual occupation or visiting of the castle after its decline, or whether they are redeposited from the main occupation. The latter interpretation is supported by the marked similarities between the phase IV bones and those assigned to phases IV–VI bones (for example in terms of size, frequencies of species, and body-part frequencies). The whole collection of animal bones, in other words, appears to be a single homogeneous assemblage. This is also supported by the evidence of the other archaeological finds. Studies of the metalwork and especially the pottery from Camber Castle indicate that these finds are almost exclusively derived from the period between the mid 16th century and 1637. For most purposes therefore the Camber animal bones are here treated as a single assemblage dated to the mid 16th to mid 17th centuries. This means that the collection represents a short archaeological time-span and provides a useful benchmark for the zoo-archaeology of post-medieval England. This is particularly relevant to the process of livestock improvement in the course of the last few centuries, usually associated with the Agricultural Revolution.

METHODS OF ANALYSIS

Identification

Most, but not all, caprine (sheep and goat) bones are difficult to identify to species and are referred to as sheep/goat. However, deciduous cheek teeth (dP_3 and dP_4), metacarpals, astragali, and metatarsals are relatively easy to identify (Boessneck 1969; Payne 1969; 1985) and these parts of the caprine skeleton have been identified to species wherever possible. The distinction between the two species of hare that occur in Britain, the brown hare (*Lepus europaeus*) and the mountain hare (*Lepus timidus*), is usually made on cranial characteristics, but skulls are rarely found on archaeological sites. There is no reliable method as yet for distinguishing the two species on the basis of postcranial bones. All hare bones at Camber are described as *Lepus*. Horse (*Equus caballus*) and ass (*E. asinus*) bones are also difficult to separate, although the patterning of the enamel folds of their cheek teeth often enable them to be distinguished (Eisenmann 1981). The distinction between the three closely related and osteologically rather similar species of galliform, chicken, guinea-fowl and pheasant, is difficult, although some bones like the tarsometatarsus are more distinct (Cohen and Serjeantson 1986, 77). Further criteria are also provided by MacDonald (1992). As a result several categories of galliform are given (see Table 8.1), but often only one of the three possible species can be confidently eliminated.

Quantification

For a full description of the methods used see Davis (1992b). In brief, all mandibular teeth and a restricted suite of 'parts of the skeleton always recorded' (that is a predetermined set of articular ends/epiphyses and metaphyses of girdle, limb and foot bones) were recorded and used in counts. In order to avoid multiple counting of very fragmented bones, at least 50% of a given part had to be present for it to be counted. Broken, and therefore single, metapodial condyles of caprines, cattle and cervids were counted as halves, as were each of the two central pig metapodials. The following bird bones were recorded: scapula (glenoid articulation), distal humerus, distal femur, distal tibiotarsus, and distal tarsometatarsus.

Ageing

Caprine teeth were assigned to the eruption and wear stages of Payne (1987); pig and cattle teeth were assigned to the eruption and wear stages of Grant (1982). The state of fusion of the epiphyses or growing ends of the long bones was also recorded. (In mammals growth in length occurs within a cartilaginous plate between epiphysis and shaft, and ceases when this cartilagenous plate disappears and epiphysis fuses to shaft. Fusion of the different epiphyses occurs at various ages from birth onwards.) Three stages of epiphysial fusion were recorded: unfused, just fused (in which the suture line was still visible) and fused. The second and third categories were added together when calculating the percentages of fused versus unfused bones. Bird bones with spongy (ie incompletely ossified or growing) ends are recorded as juvenile.

Measurements

The measurements taken are among those suggested by von den Driesch (1976). In addition measurements taken on the humerus and cattle metapodials are illustrated in Davis (1992b), and on pig teeth follow Payne and Bull (1988).

Butchery

Marks, such as cuts, chops and saw marks, were recorded when present on all bones to determine whether there was any change in the pattern of butchery between the phases. For more details and tabulation of data, especially a full listing of individual measurements of teeth and bones, the reader is referred to Connell, Davis and Locker (1997).

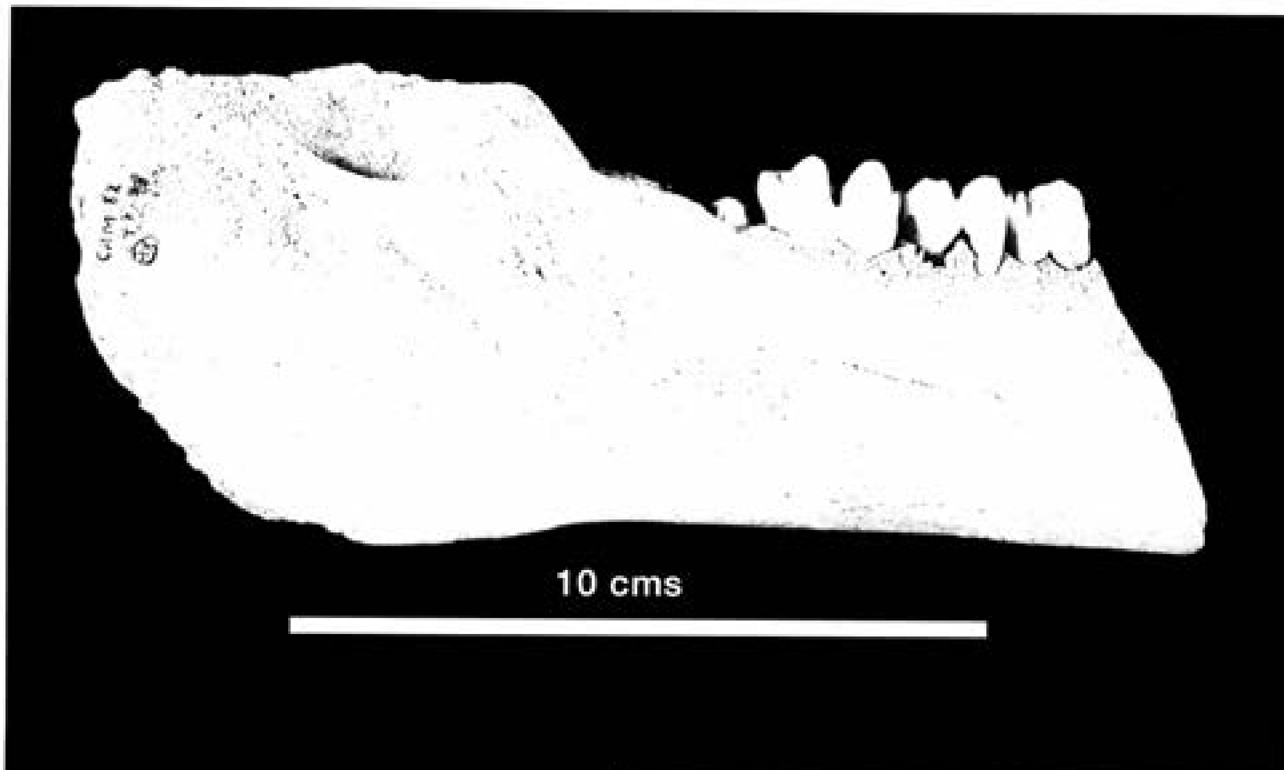
Recovery, condition and storage

The Camber Castle bones are from excavations over a period of 20 years by five different teams of excavators. Although some samples were sieved for the recovery of faunal remains and small artefacts, there was no controlled systematic sieving for small bones across the site as a whole. Reliance on hand-retrieved material is known to favour the recovery of larger bone fragments (Payne 1975). This problem may also be compounded on an excavation where large quantities of rubble have had to be removed. All these factors will affect the standard of recovery and this must be borne in mind when interpreting data from this site. Preservation of animal bone was generally good. Gnawed (presumably by dogs) bones were present in very small numbers. Similarly, some bones had been gnawed by rodents. The Camber Castle faunal remains are stored at Dover Castle.

COMPOSITION AND INTERPRETATION OF THE ASSEMBLAGE

Species present *(Tables 8.1–8.5)*

As with most hand-retrieved assemblages of archaeological animal remains from England, well over 60% of the bones from Camber belong to sheep, cattle and pig. No sheep/goat bones or teeth could be identified as goat, although 166 bones were identified with certainty as sheep; sheep and sheep/goat data have been pooled as sheep. In addition a very large number of rabbit bones were found, and excavations revealed that the archaeological deposits at Camber were riddled with rabbit burrows, many of which were active in the 1970s and 1980s. It remains unclear to what extent the bones represent the remains of rabbits actually eaten by the soldiers at Camber, or how many of them may be derived from animal predation or other activity. The interpretation of the rabbit bone assemblage has been considered in a separate section below. A substantial number of fish were also found and they too are discussed separately below.



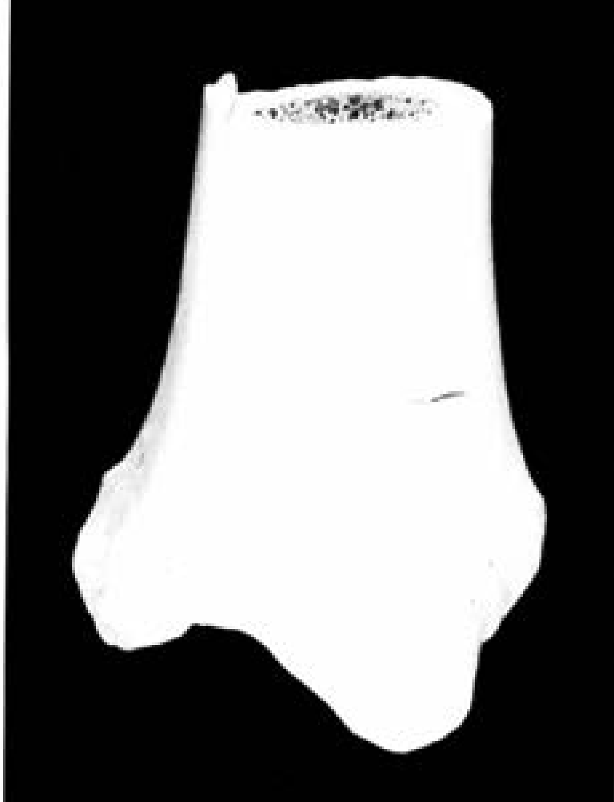


Plate 8.1: Top: Pig mandible with oblique chop across the front; bottom: Sawn horse distal tibia.

Three species of deer were present at Camber - red, fallow and roe. Roe deer (*Capreolus capreolus*) was represented by a single calcaneum. Bones of red deer and fallow deer were more common, although still not present in any great quantity. The red deer (*Cervus elaphus*) remains comprised 10 antler fragments, some sawn, and two radii (one fused, one unfused). The sawn antlers suggest antler-working, but the radii presumably indicate the consumption of these animals. There are 13 bones of fallow deer (*Dama dama*). Two have cut marks. The very small number of deer bones at Camber suggests that while venison was occasionally eaten it was probably not an important item on the menu. It may have been too expensive to provide, or as Dobney *et al* (1995, 50) note at Lincoln, the scarcity of roe deer may simply reflect the lack of dense woodland (their preferred habitat) in the Rye area at that time.

Thirty six bones of hare were found. They probably belonged to the brown hare nowadays found throughout England and most of Scotland. The mountain hare is today restricted to Scotland and the Peak District where it was introduced.

Two equid cheek teeth were present. They are horse-like, and since no definite ass-like characters were recognised, it is probable that the Camber equid remains are horse. Three equid bones (a distal tibia and two metapodials) were also identified. At Camber horses may have been used regularly for draught purposes, including moving heavy ordnance like the big guns. Guns were often moved from fort to fort in response to emergencies (Saunders 1989, 47) and horses would have been useful for this, perhaps for winching guns up and down. Unfortunately, none of the horse bones was complete enough to allow an estimate of size. The distal end of the tibia had been sawn from its shaft (Plate 8.1). Instances of

Table 8.1: Mammal and bird bones found in the different phases at Camber Castle. (The right-hand column, IV–VI, includes specimens assigned to "phase IV/V" and "phase IV–VI".)*

Mammals:	II	III	IV	V	VI	IV–VI*
Rodents						
Water vole *Arvicola terrestris*	-	2	3	5	1	9
Field vole *Microtus agrestis*	-	-	7	1	-	8
Rat/water vole *Rattus/Arvicola*	-	2	18	5	2	27
Wood/yellow-necked mouse *Apodemus* sp	-	-	1	-	-	1
House mouse *Mus musculus*	-	-	3	-	1	4
Black rat *Rattus rattus*	-	1	3	2	2	9
Rat *Rattus sp*	-	-	-	5	7	12
Small rodent	-	-	39	14	1	57
Insectivores						
Common shrew *Sorex araneus*	-	-	-	2	-	2
Shrew *Sorex sp*	-	-	4	2	-	6
Water shrew *Neomys fodiens*	-	-	-	2	-	2
Mole *Talpa europaea*	-	-	-	2	-	2
Hedgehog *Erinaceus europaeus*	-	-	1	1	11	13
Lagomorphs						
Rabbit *Oryctolagus cuniculus*	5	41	532	288	183	1143
Hare *Lepus sp*	1	-	18	3	2	35
Carnivores						
Dog *Canis familiaris*	-	3	37	43	11	92
Dog/Fox *Canis/Vulpes*	-	-	-	1	1	2
Fox *Vulpes vulpes*	-	-	1	2	3	6
Cat *Felis catus*	-	1	19	3	6	32
?Ferret *Mustela cf furo*	-	-	-	2	1	3
Cetaceans						
Whale (not identified to species)	-	-	1	3	1	5
Ungulates						
Horse *Equus caballus*	-	-	-	2	1	5
Roe deer *Capreolus capreolus*	-	-	-	-	1	1
Red deer *Cervus elaphus*	-	-	4	4	4	12
Fallow deer *Dama dama*	1	-	9	2	1	12
Cattle *Bos*	27	13	263	474	119	909
Sheep/Goat *Ovis/Capra*	21	45	573	728	191	1581
Pig *Sus*	2	6	103	43	39	230

Birds:	II	III	IV	V	VI	IV–VI*
Ducks and geese						
Duck *Anas sp*	-	3	25	9	5	40
Mallard/domestic duck *Anas platyrynchos*	-	-	20	11	4	35
Teal *Anas crecca*	-	-	11	3	1	16
Goose *Anser* (?domestic)	-	1	30	9	8	51
Goose *Branta*	-	-	-	2	2	4
Partridges, quails and pheasants						
Quail *Coturnix coturnix*	-	-	1	-	-	1
Grey partridge *Perdix perdix*	-	-	1	1	-	2
Turkey *Meleagris gallopavo*	-	-	4	3	1	8
Peacock *Pavo cristatus*	-	-	2	-	-	2
Chicken and cf chicken *Galliformes*	15	9	97	70	25	230
Crows						
Jackdaw *Corvus monedula*	2	6	143	92	56	298
Crow/rook *Corvus corone/frugilegus*	2	2	14	5	2	25

Birds (continued) :	II	III	IV	V	VI	IV–VI'
Gulls						
Blackheaded gull *Larus ridibundus*	-	-	5	-	-	5
Common gull *Larus cf canus*	-	-	-	1	2	3
Herring gull *Larus cf argentatus*	-	-	-	1	-	1
Great black-backed gull *Larus cf marinus*	-	-	-	1	-	1
Herring/lesser black-backed gull *Larus argentatus/fuscus*	-	-	-	4	-	4
Kittiwake *Rissa tridactyla*	-	-	1	-	-	1
Gull *Larus sp*			5	1	2	10
Pigeons and doves						
Pigeon/dove *Columba*	-	1	13	3	3	19
Rock dove *Columba cf livia*	-	-	2	1	4	7
Wood pigeon *Columba cf palumbus*	-	-	-	-	1	1
Sandpipers, godwits and curlews						
Dunlin/sandpiper *Calidris sp*	-	-	23	5	1	29
Bar tailed godwit *Limosa lapponica*	-	-	-	1	2	3
Redshank/sandpiper *Tringa sp*	-	2	9	7	1	19
Woodcock *Scolopax rusticola*	-	-	2	-	-	2
Curlew *Numenius arquata*	-	-	3	1	-	4
Scolopacidae	-	1	2	-	-	2
Rails, crakes and coots						
Water rail *Rallus aquaticus*	-	-	-	1	-	1
Stilts and avocets						
Avocet *Recurvirostra avosetta*	-	-	4	1	-	5
Oystercatchers						
Oystercatcher *Haematopus ostralegus*	-	-	10	2	-	12
Pipits and wagtails						
Wagtail *cf Motacilla*	-	-	3	-	-	3
Robins, chats and thrushes						
Starling *Sturnus vulgaris*	-	-	1	1	1	3
Blackbird/thrush *Turdus* sp	-	5	36	13	8	59
Blackbird/thrush/ starling *Turdus/Sturnus*	-	-	2	1	1	4
Sparrows						
Sparrow *Passer*	-	-	7	1	-	8
Passeriformes	-	6	18	6	5	30
Plovers						
Plover *Pluvialis sp*	-	1	17	1	-	18
Lapwing *Vanellus vanellus*	-	-	29	9	5	44
Herons and bitterns						
Grey heron *Ardea cinerea*	-	-	1	1	-	2
Auks						
Black guillemot *Cepphus grylle*	-	-	-	1	-	1
Harriers, hawks and buzzards						
Buzzard/hen harrier *Buteo buteo/Circus cyaneus*	-	-	1	1	-	2
Sparrowhawk *cf Accipiter nisus*	-	-	-	1	-	1
Cormorants						
Shag *Phalacrocorax aristotelis*	-	-	1	-	-	2
Owls						
Tawny owl *Strix aluco*	-	-	11	1	-	12

Table 8.2: Numbers of fish bones by Phase

Phase:	II	III	IV	V	VI	IV–VI
Elasmobranch		-	2	4	1	7
Roker *Raja clavata*	-	-	5	-	-	5
Eel *Anguilla anguilla*	-	-	4	-	-	4
Conger eel *Conger conger*	2	1	6	2	-	8
Herring *Clupea harengus*	-	-	16	2	1	19
Pilchard *Sardina pilchardus*	-	-	1	-	-	1
Carp *Cyprinus carpio*	-	-	-	1	-	1
Angler *Lophius piscatorius*	-	-	2	-	-	2
Cod *Gadus morhua*	2	1	57	11	1	69
Small gadid	-	-	6	-	-	6
Large gadid	-	1	14	8	2	24
Haddock *Melanogrammus aeglefinus*	-	-	150	14	-	164
Whiting *Merlangius merlangus*	-	2	154	18	16	188
Ling *Molva molva*	9	-	6	9	2	17
Tub gurnard *Triglia lucerna*	-	-	3	4	3	10
Gurnard	-	-	27	3	2	32
Perch *Perca fluviatilis*	-	-	2	1	-	3
Sea bream	-	-	2	-	-	2
Mackerel *Scomber scombrus*	-	-	1	1	-	2
Turbot *Scophthalmus maximus*	-	1	1	2	19	22
Turbot/Halibut *Scophthalmus/Hippoglossus*	-	1	4	2	-	6
Plaice *Pleuronectes platessa*	-	-	2	-	1	3
Plaice/Flounder	-	29	241	61	25	327
Dab *Limanda*	-	-	6	2	-	8
Sole *Solea solea*	-	-	16	-	-	16
Large Flatfish	-	-	-	1	1	2
Flatfish	-	-	28	2	-	30
Totals:	**13**	**36**	**756**	**148**	**74**	**978**

butchered horse bones, though not common, are recorded in the medieval period. Three butchered horse bones were found at Launceston Castle (Albarella and Davis 1996) and another 'trimmed' calcaneum was found at Banbury Castle (Wilson 1976). Butchered horse bones also occur in post-medieval deposits; a butchered calcaneum was found in period 7 (post-medieval) at Middleton Stoney, Oxfordshire (Levitan 1984) and butchered horse bones have also been found in 18th-century deposits at Witney Palace, also in Oxfordshire, where, according to Wilson and Edwards (1993) horse flesh was fed to dogs. Dogs were present at Camber in all phases, but it would be unwise to draw too firm a conclusion from a solitary bone about whether horse flesh was exploited. The sawn horse tibia may represent evidence for bone working or even knackering.

The bones of dogs were relatively common and probably come from animals kept in the castle. A relatively complete skeleton, whose skull was roughly the same size as a modern Jack Russell Terrier (cranial index 54.4, snout index 49.5, snout width index 38.1), was found in the N Bastion. Comparison of the limb bones with a Jack Russell showed that this dog had limbs that were longer and thinner, and a shoulder height of 30 cm (following Harcourt 1974). Six of its ribs also showed visceral surface lesions, indicating that the dog had a pulmonary infection before it died. A second partial skeleton was also found in the N Bastion, although much less complete. This skeleton was very similar in size and shape to the semi-complete skeleton mentioned above, and it too had a shoulder height of 30 cm. Also found in the same context (900) was the forelimb of a much larger dog. The shoulder height of this dog was 74 cm, indicating that the size of dogs at Camber was extremely variable, from the size of a small lap dog up to the size of wolf. Dogs may have been kept as pets, hunting dogs, or, as in the case of the large dog mentioned above, guard dogs. The ulna from the very large dog also had several fine cut marks along its posterior border, suggesting that it had been skinned. The smaller dog skeletons had no evidence of skinning, and they were perhaps too small for this to be worthwhile. In addition to these partial skeletons, 95 other dog bones were found, ten of which show small cut marks. Three cervical vertebrae had multiple cut marks on both ventral and dorsal surfaces consistent with decapitation. Two bones (a calcaneum and a metacarpal) had fine cut marks which may be associated with skinning. The remainder consisted of limb bones with cuts at mid-shaft level and in and around joints, which could be associated with dismemberment as well as skinning. It is unlikely that dogs were eaten as human food, but Wilson and Edwards (1993) suggest that

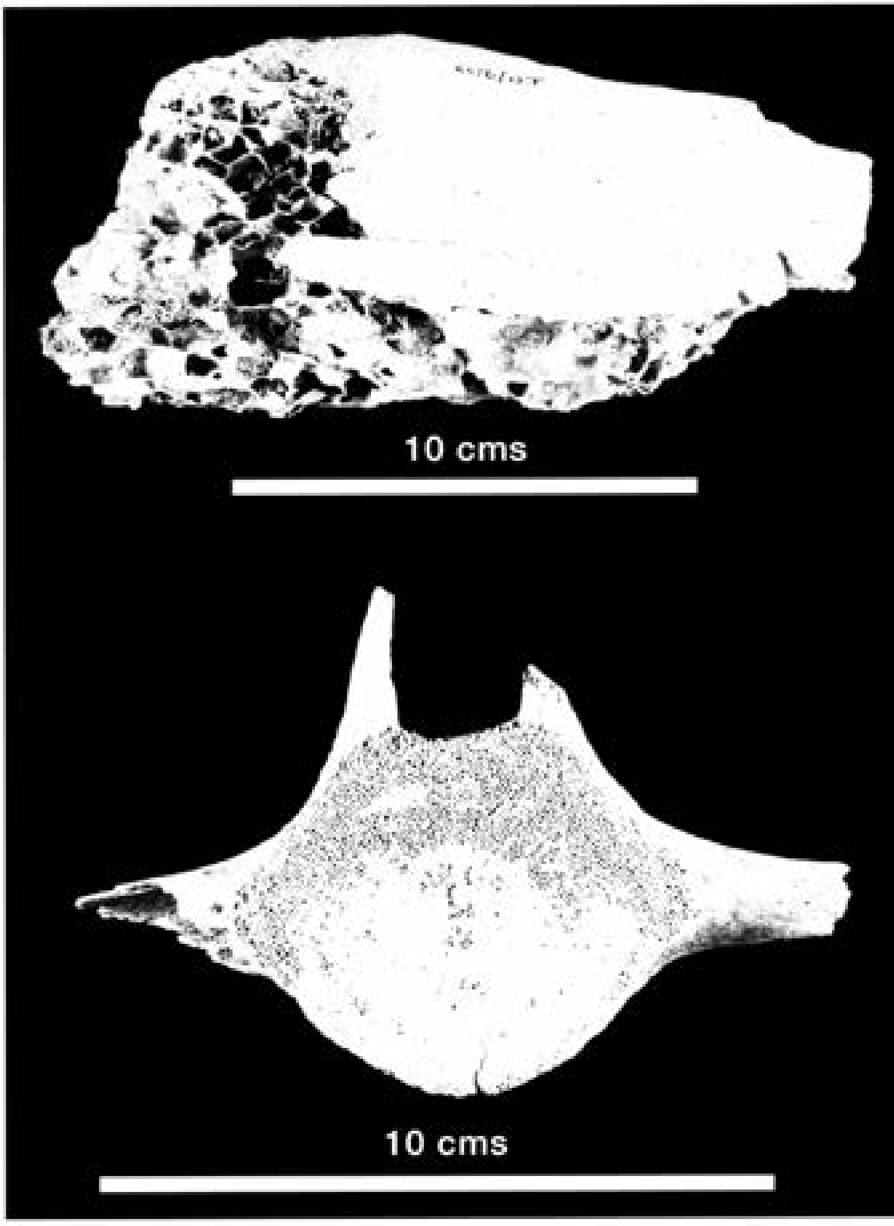


Plate 8.2: Top: Whale bone fragment; bottom: Cetacean vertebra

dogs may have been 'recycled' as food for other dogs. Dogs were found in 'significant' numbers at Portchester Castle (Grant 1985) and many had cut marks on them, although this was attributed to dogs being eaten. Dog skins were commonly used in medieval times, and the cut dog bones from Camber suggest that dogs were still valued for their pelts in the early post-medieval period. Perhaps dog pelts had particular significance to soldiers.

A small number of cat bones were present. A partial skeleton of a kitten (not included in the total count of cat bones) was found in the gallery, and the complete skull of a young adult was found in the S Bastion. In post-medieval Exeter a large proportion of the cat bones were semi-complete skeletons (Maltby 1979). The presence of these bones during the occupation phase at Camber indicates that cats were probably kept on site, perhaps to help control vermin, or simply as mascots or pets. Cat bones are commonly found on castle sites, and at Middleton Stoney they were the most common of the minor mammals (Levitan 1984) and cats were also found at Banbury Castle (Wilson 1976), Bramber Castle (Westley 1977) and Battle Abbey (Locker 1985). Of particular interest is a cat metatarsal whose distal end had been chopped off, and a radius with two mid-shaft cut marks possibly caused when the animal was skinned. Grant (1988) has drawn attention to the fact that occasionally cats may have been skinned. Cut marks on cat bones were noticed at Launceston Castle (Albarella and Davis 1996), and at West Cotton (Albarella and Davis 1994). However, there are no cut marks on the post-medieval cat bones from Exeter and Middleton Stoney. The Camber finds indicate that cat pelts were still valued in the early post-medieval period.

Three bones of polecat (*Mustela putorius*) or ferret (*M. furo*) were found and comprise a humerus, mandible and an incomplete cranium. Dobney *et al.* (1995) tentatively identified ferret (a domesticated form of the polecat) at Lincoln and associated this with rabbit hunting. Polecat was also found in post-medieval contexts at West Cotton, although Albarella and Davis (1994) note that the size of the polecats was smaller than those in the AMLab comparative collection, and were closer to the size of a ferret. Jones (1993) also identified ferret in 15th- to 16th-century deposits at Thetford, although the criteria used for the identification were not described. Ferret skulls may be distinguished from polecats by the extent to which the cranium is constricted behind the orbit. However, there is insufficient of the cranium of the Camber specimen left to enable the distinction to be made. The Camber polecats/ferrets may in part be responsible for the large accumulation of rabbit bones (see below).

Six bones of fox (*Vulpes vulpes*) were found, which may derive from animals scavenging on rubbish. Although foxes may have been valued for their fur, which is highly likely given the evidence for dog and cat pelts, none of the fox bones bore any cut marks.

Not surprisingly, given the large size of the faunal assemblage at Camber, bones from a wide spectrum of other mammal species were found. These include

Table 8.3 Relative representation of different parts of the skeleton of cattle, sheep and pig at Camber Castle. MNI = the Minimum Number of Individuals calculated for a particular bone.

Cattle:	Ph II–III MNI	Ph IV MNI	%	Ph IV–VI MNI	%
Incisor	1	1	8	3	6
$dp_4 + P_4$	1	2	15	11	23
$M_{1/2}$	1	1	8	8	17
M_3	1	3	23	15	32
Scapula	1	13	100	40	85
Humerus	2	10	77	47	100
Radius	3	6	46	22	47
Metacarpal	1	3	23	13	28
Pelvis	1	8	62	30	64
Femur	3	8	62	30	64
Tibia	2	8	62	36	77
Calcaneum	2	6	46	23	49
Astragalus	0	7	54	18	38
Metatarsal	1	9	69	25	53
Phalanx 1	3	5	38	15	31
Phalanx 3	1	4	31	7	15

Sheep:	Ph II–III MNI	Ph IV MNI	%	Ph IV–VI MNI	%
Incisor	1	2	4	3	2
$dp_4 + P_4$	5	23	46	55	44
$M_{1/2}$	5	19	38	44	35
M_3	2	20	40	45	36
Scapula	4	28	56	90	72
Humerus	4	46	92	125	100
Radius	2	20	40	64	51
Metacarpal	2	4	8	29	58
Pelvis	3	27	54	63	50
Femur	2	18	36	37	30
Tibia	4	50	100	97	78
Calcaneum	1	18	36	38	30
Astragalus	0	12	24	18	14
Metatarsal	3	9	18	38	30
Phalanx 1	0	2	4	12	10
Phalanx 3	0	0	-	0	-

Pig:	Ph II–III MNI	Ph IV MNI	Ph IV–VI MNI	%
Incisor	1	3	6	50
$dp_4 + P_4$	1	6	12	100
$M_{1/2}$		3	10	83
M_3		2	8	67
Scapula	1	2	6	50
Humerus		4	11	92
Radius		3	6	50
Metacarpal	1	3	6	50
Pelvis		2	5	42
Femur	1	3	5	42
Tibia		4	8	67
Calcaneum		2	3	25
Astragalus		2	4	33
Metatarsal		2	6	50
Phalanx 1		1	3	25
Phalanx 3	1	0	0	-

common and water shrew, hedgehog, water vole, wood-/yellow-necked mouse, house mouse, and black rat. Most of their remains were reasonably easy to identify to species. The lack of systematic sieving means that all small mammals and smaller bones of large animals are undoubtedly under-represented. Rat (identified on the basis of cranial characters) is a typical commensal species, and, as Maltby (1979) notes, their presence in deposits of rubbish and food waste is to be expected. The remains of water voles (*Arvicola terrestris*) were identified in small numbers. The proximity of the castle to a river may explain the presence of this species. It is possible that some or all of these rodents were taken by the predator that took the rabbits, or at least the juvenile rabbits. Two mole bones were found and are probably intrusive. Water shrew (*Neomys fodiens*) is also present, perhaps a reflection of the generally wet environment of Camber.

The remains of hedgehog may represent a meat source, though there is no evidence in the form of cut marks that hedgehog was eaten at Camber. Hedgehogs may simply have become trapped in the castle ruins. The remains of shrews, mole, mice, voles and rats might equally derive from the pellets of owls roosting in the castle, and the remains of tawny owls are indeed present in the assemblage.

The most unusual animal encountered at Camber was whale (Plate 8.2), of which five fragments were found. The presence of whale is not especially surprising, given Camber's proximity to the coast. One of the fragments is slightly burnt and has two small chop marks indicating that whale meat was being eaten. Three fragments are from bones that must have been very large, and the other two are small fragments of a cranium and a caudal vertebra. Unfortunately, all are too fragmentary to be identifiable to species. Whale meat was, at least occasionally, consumed in the past. For example Muffet (1655, 173) describes whale flesh as the 'hardest of all other, and unusuall to be eaten of our Countrymen ... yet the livers of Whales, and Dolphins smell like violets, taste most pleasantly being salted, and give competent nourishment'. According to Drummond and Wilbraham (1939, 66) whale, porpoise and seal meat were an interesting feature of medieval and Tudor menus but went out of fashion in the late 16th century.

There is a wide spectrum of wild and domestic bird species, not surprising given the coastal location of Camber Castle, near a river estuary with its mud-flats, which explain the abundance of gulls and waders. Human activities at the castle, such as dumping of kitchen waste may also have attracted some of the scavenging species. As the castle fell into disuse the ruins would have made an attractive nesting site for many bird species.

Over 200 *Gallus/Numida/Phasianus* (ie chicken, guinea-fowl, pheasant) bones were present at Camber. No definite guinea fowl or pheasant could be identified, and we assume that most, probably all, of the fowl-like bones belonged to chicken. Chicken bones represent less than 10% of the main food taxa. This relatively low frequency indicates that chicken played only a subsidiary role in the diet at Camber, though the possibility of poor recovery has to be considered. Chicken were particularly

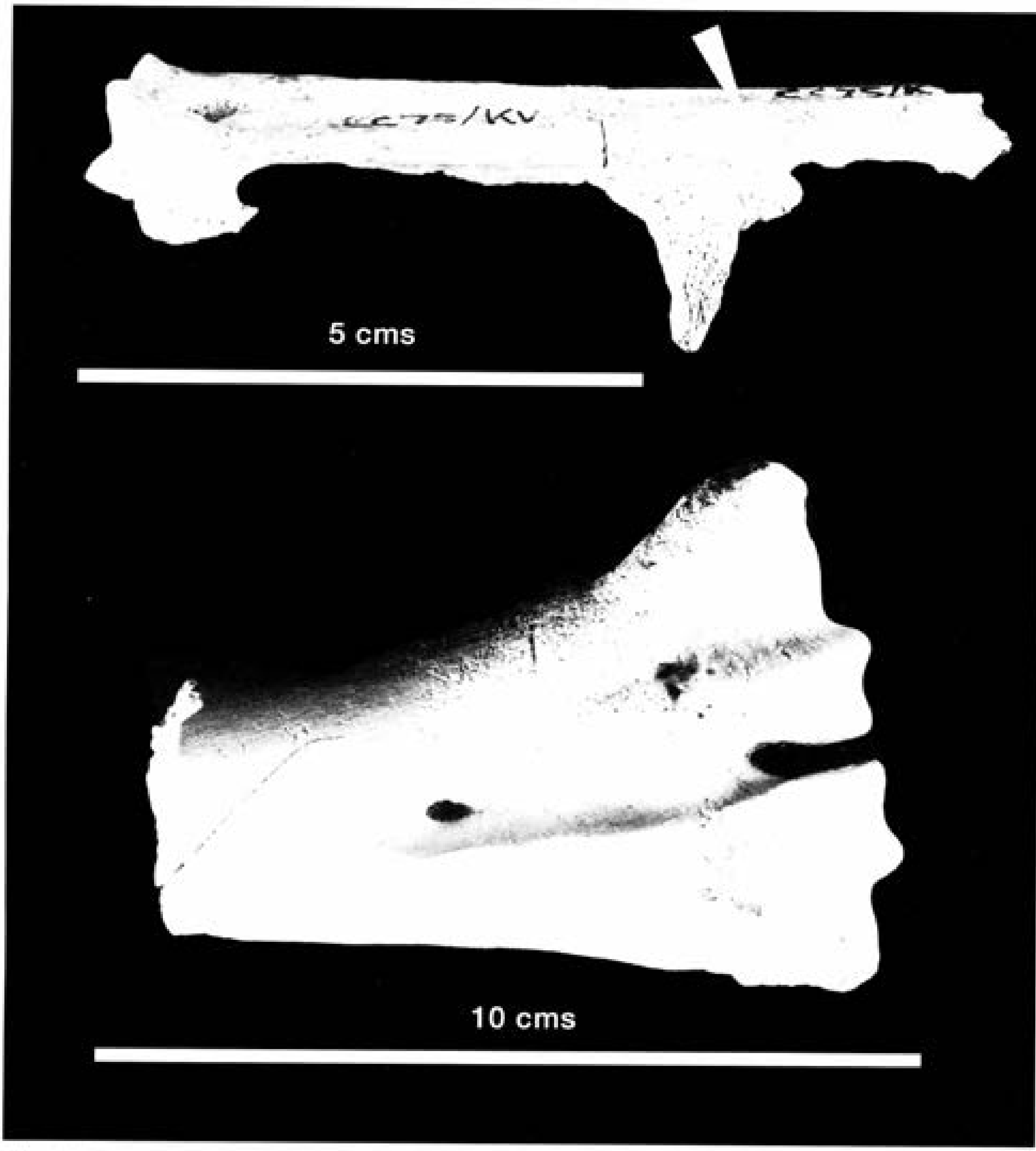


Plate 8.3: Top: Male (spurred) chicken tarsometatarsal with green (copper and zinc) stained patch on the anterior shaft surface; bottom: Cattle distal metatarsal with an extended medial trochlea

useful birds, providing (besides meat) eggs, down and feathers, and (see below) 'amusement'. Thirty tarsometatarsals were recovered. Of these 30 bones, 10 were spurred (ie from cocks) and one has a spur scar. A cock tarsometatarsus (ie with a spur) was found (Plate 8.3) which has a green stain parallel with the spur on the anterolateral surface of the shaft. X-ray fluorescence of the stain indicated mainly copper and zinc, and this cock was probably wearing a brass spurred ring for cock-fighting. Cock-fighting in England has been traced back to the 12th century and became a fashionable amusement during the reign of Edward III, becoming subsequently the most popular form of animal baiting. Henry VIII added a cock-pit to the palace at Whitehall (Strutt 1801, 224). At first cocks fought with their natural weapons of spur and beak, but by the 17th century the refinement of metal spurs had been added and all sectors of English society appear to have enjoyed this barbarous pastime (Arlott 1975, 9–11). It is easy to imagine the bored soldiers

Table 8.4: Numbers and percentages of mammal, bird and fish.

Phase	II		III		IV–VI	
	n	%	n	%	n	%
Mammals	171	**62**	1653	**56**	4220	**68**
Birds	56	**20**	554	**19**	1029	**17**
Fish	49	**18**	756	**25**	978	**16**
Totals	276		2963		6227	

at Camber whiling away their time engaged in this activity.

Some 52 goose bones were identified. The differentiation between bones of wild and domestic geese is difficult to make and all the goose bones were identified as *Anser* sp. In addition, four other non-domestic goose bones were identified from the genus *Branta* - which includes barnacle, brent and red-breasted goose. Goose flesh probably played a very subsidiary role in the diet. There were some cut marks on goose bones; two proximal humeri had cut marks across their articular surface presumably made when removing the wings. A tibiotarsus also had a small cut mark at its proximal end, indicating that goose was eaten.

Two species of duck were identified, the mallard or domestic duck (*Anas* cf. *platyrhynchos*) and the teal (*Anas crecca*). Forty three bones could not be identified to species and are merely recorded as duck (*Anas sp.*). One teal humerus has a chop mark at the distal end, and a possible mallard ulna has a cut mark on it. These indicate that ducks too were eaten. 'Teal, for pleasantnesse and wholsomenesse of meate excelleth all other water-fowle: for it is easily digested...and the nourishment which it giveth, is very commendable and good, lesse excrementall, than of any other water-fowle' (Venner 1628, 62). No doubt ducks were caught locally.

Eight bones of turkey (*Meleagris gallopavo*) were recorded. This species was introduced from Mexico around 1540 and 'was enthusiastically hailed and made welcome as soon as it appeared on the tables of the well-to-do' (Simon 1944, 75). Turkey bones have been found at a number of post-medieval sites in the south of England. Wilson (1984) identified 17th-century turkey bones in domestic tenements at St. Ebbe's, Oxford, and three turkey bones were found in contexts at Aldgate in London, dated to the third quarter of the 17th century (Armitage 1984). Turkey was also found in 16th-century Exeter, Devon (Maltby 1979), 17th- /18th-century Christchurch, Dorset (Coy 1987) and at 18th- /19th-century Launceston Castle, Cornwall (Albarella and Davis 1996). As this bird was probably quite rare in the 16th century, its presence at Camber Castle gives some suggestion of higher status.

Two fragmentary bones of heron (*Ardea cinerea*), another 'high status bird', were also found. Heron was once highly regarded at the table and heron priced at several shillings was served to the Lords of the Star Chamber in the 16th and early 17th centuries. It was recommended to drink plenty of strong old wine with it (Simon 1944, 29). Venner (1628, 62), however, commends herons 'unto such as are delighted with meates of strange and noysome taste'!

A tarsometatarsus and a carpometacarpus of the peafowl (*Pavo cristatus*) were found. The latter had its proximal end chopped off. Like the turkey, this bird may have made a rare appearance on the dinner table. Peacocks and peafowls used to have pride of place on the tables of the wealthy (Simon 1944, 143), although Venner (1628, 56) complained of their hard flesh which is 'digested with difficulty, and breedeth a thicke and drie melancholick bloud'. Evidence of peafowl was also found further north at Whitefriars, Coventry dated *c* 1545–1558 (Holmes 1981), which is roughly contemporary with the occupation of Camber Castle. Peafowl have been found at other castle sites: Levitan (1984) describes peafowl at Middleton Stoney, although these were from medieval layers.

Quail (*Coturnix*) and grey partridge (*Perdix*) were identified. The occurrence of the partridge may be incidental as they are known to inhabit sand dunes (Peterson *et al.* 1993, 86). A water rail (*Rallus aquaticus*) bone was found. According to a letter of Sir Thomas Browne written in the second half of the 17th century this bird was 'counted a dayntie dish' (Simon 1944, 58). The remains of woodcock (*Scolopax rusticola*), another highly reputed game bird, were also found. An oystercatcher (*Haematopus ostralegus*) humerus has cut marks across the distal articular surface, and an avocet (*Recurvirostra avosetta*) humerus has cut marks at the proximal end, perhaps made when removing the wing of the bird with a knife.

Over 300 bones of the jackdaw (*Corvus monedula*) were found at Camber. None had cut marks. This bird prefers to inhabit old buildings, and the castle, particularly after abandonment, would have provided an excellent

Table 8.5: Numbers and percentages of the most frequent mammals.

Phase	II		III		V		IV–VI	
	n	%	n	%	n	%	n	%
Cattle	40	**22**	263	**17**	474	**30**	909	**22**
Sheep	66	**36**	573	**37**	728	**45**	1581	**39**
Pig	8	**4**	103	**7**	43	**3**	230	**6**
Chicken	24	**13**	97	**6**	70	**4**	230	**6**
Rabbit	46	**25**	532	**34**	288	**18**	1143	**28**
Totals	184		1568		1603		4093	

Table 8.6: The numbers and percentages of the major animal taxa in the main areas of Camber Castle (all phases). (The right-hand column gives the total numbers of bones. "+" refers to values less than 0.5%)

Area		Cattle	Pig	Sheep	Dog	Cat	Red deer	Fallow deer	Fowl	Goose	Rabbit	TOTAL
Courtyard	%	17	8	40	3	1	+	+	3	1	26	
	n	308	135	717	56	9	5	8	60	24	460	**1782**
North Bastion	%	30	2	35	1	+	+	+	7	1	23	
	n	429	36	508	17	7	3	1	94	12	334	**1441**
West Bastion	%	16	6	32	1	0	1	0	7	1	37	
	n	59	21	113	2	0	4	0	26	2	131	**358**
Gallery	%	10	4	28	1	4	0	1	11	2	40	
	n	36	13	98	5	15	0	2	37	6	139	**351**
East Bastion	%	27	6	43	3	0	0	+	5	1	15	
	n	75	17	123	8	0	0	1	15	2	42	**283**
South Bastion	%	26	10	45	5	1	0	1	4	2	8	
	n	34	13	59	6	1	0	1	5	3	10	**132**
Keep	%	6	2	23	1	0	0	0	10	1	56	
	n	8	3	29	1	0	0	0	13	1	70	**125**
Close	n	0	0	0	0	1	0	0	4	2	3	**10**

environment. Peterson *et al.* (1993, 217) note that jackdaws nest in holes and occasionally in burrows in the ground, and the large number of rabbit burrows at Camber may also have encouraged this bird. It seems quite likely that the jackdaw was not directly associated with the human inhabitants of Camber Castle. Other corvids (rooks/crows) were also recovered but rook could not be separated from crow with any certainty. These birds, like the jackdaw, are to be expected in and around sites of human habitation.

Given the coastal location of the castle, it is not surprising that several species of gull were identified, although the bones were only found in small numbers. However, five bones of blackheaded gull (*Larus ridibundus*) and one of kittiwake (*Rissa tridactyla*) were found and these may have been scavengers of rubbish. During the 17th century young blackheaded gulls, termed 'puets', were netted and held in high esteem as a delicacy after being fed on bullock's liver or with corn or curds from the dairy, which may have imparted a more pleasant flavour (Simon 1944, 28). None of the gull bones had any cut marks. Venner (1628, 62) dismisses gulls as being 'not only unpleasant, but also offensive to the stomacke'. Besides gulls, sea birds such as the black guillemot (*Cepphus grylle*; uncommon in southern Britain) and shag (*Phalacrocorax aristotelis*) were also found. Twenty eight pigeon/dove (*Columba* sp.) bones were found. None shows any signs of cuts - though such small birds are easily cooked and eaten whole.

Of the smaller song-birds, starlings (*Sturnus vulgaris*), blackbirds and thrushes (*Turdus* sp.), sparrows (*Passer* sp.), and the wagtail (*Motacilla* sp.) were identified. The bones of sparrowhawk (*Accipiter nisus*) and hen harrier/buzzard (*Circus cyaneus*/*Buteo*) were also found. The latter could not be identified to species. Twelve tawny owl (*Strix aluco*) bones were found, perhaps derived from owls roosting in the castle, although there is the possibility that owls were kept as pets.

Frequencies of species

For an estimate of the relative importance of cattle, sheep, pigs and chicken, the frequencies of these animals were compared (Table 8.5). Phases IV and V were the only ones with sufficiently large quantities to allow a meaningful comparison to be made. This gives at least some indication of variation of species frequencies between phases and indicates that there is little evidence for any change in the Camber sequence. This is not surprising given the conclusions drawn from the pottery and metalwork (see above), that most of the material from phases V and VI is redeposited from the period of the castle's occupation (phase IV).

Sheep bones were the most numerous at Camber and this animal must have been an important meat source. However, since sheep are rarely more than one tenth the size of cattle, beef was without doubt a more important meat than mutton. As on most medieval and post-medieval English archaeological sites, pig remains were less common than those of cattle and sheep. Today, pork and pork-derived products are often consumed off-the-bone. If this was the case at Camber then the pig bones may under-represent the contribution of pork to the diet of the soldiers stationed there.

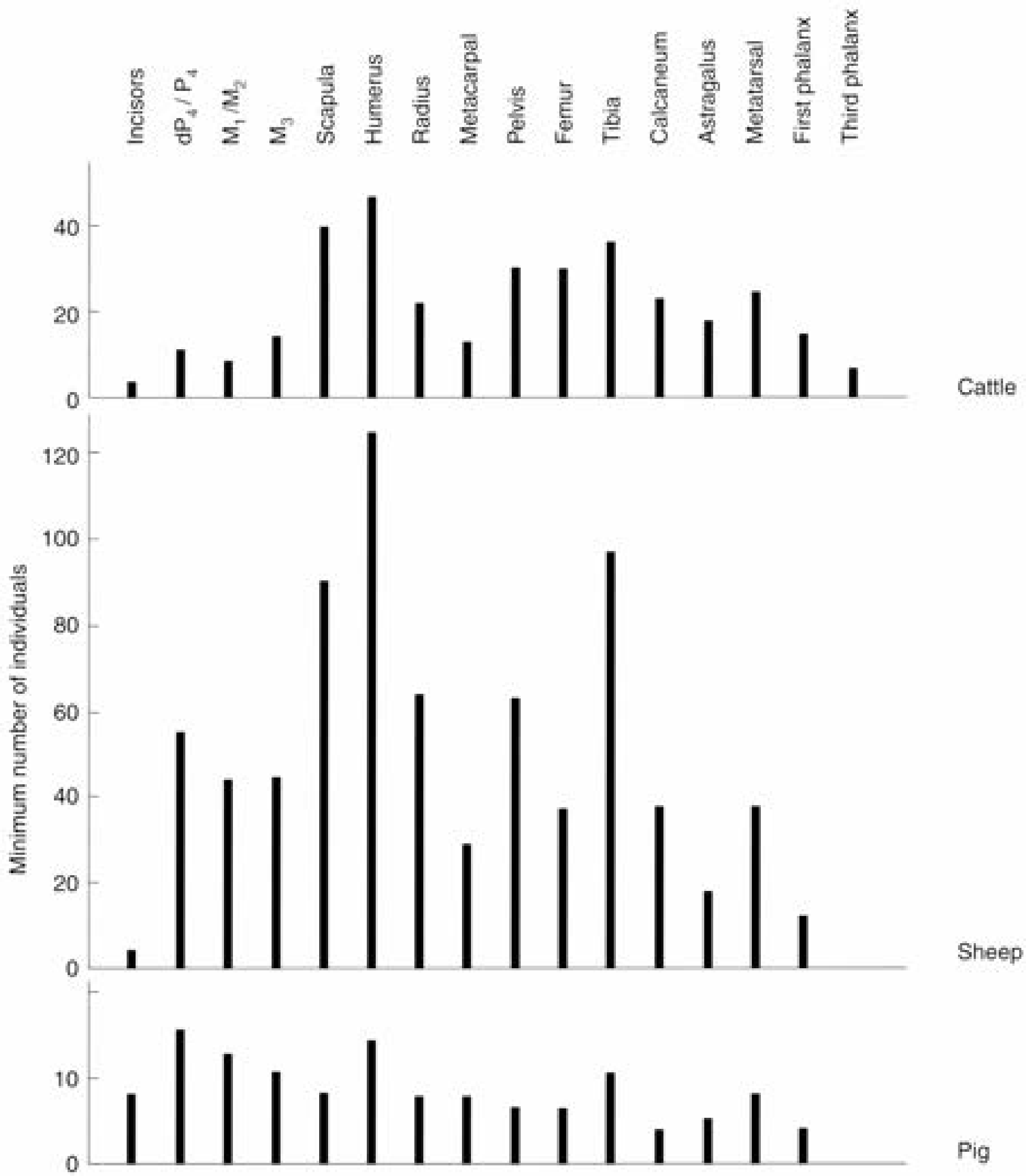


Figure 8.1: Animal bone; parts of skeleton of cattle, sheep and pig

The local environment

The common food animals such as sheep, cattle, pigs and chicken are domesticated animals and cannot tell us a great deal about the environment surrounding Camber for two reasons. First, they tolerate a wide variety of conditions and second, many of them may have been driven to Camber from afar, ie from farms around Rye or even further afield. Some of the other species may however tell us a little more. The scarcity of deer in archaeological sites is often taken to reflect a scarcity of woodland in the vicinity of the settlement. However, after the Norman conquest deer hunting was restricted to the aristocracy so their scarcity at Camber may simply reflect the lowly status of most of the the men eating there (see also below).

The animal remains are typical for a settlement situated on rather marshy land near a coastal estuary, and in close proximity to the fishing towns of Rye and Winchelsea. There is an abundance of fish remains, and several species of seabirds such as gulls, kittiwake, oystercatcher and guillemot. These are presumably locally derived, perhaps as a result of bird hunting by the soldiers at Camber. Another biotope well represented within the assemblage is fresh water/marshland with water vole and water shrew, ducks, shag, heron, water rail, and the waders. Then as now, it seems likely that the environs of the castle were rather wet.

Distribution of bones across the site

Most bones come from the courtyard and the N Bastion (Table 8.6) and doubtless represent dumped rubbish reimported into the castle with the bulk infilling material. Under these circumstances, it is very hard to interpret the evidence for differential disposal of animal remains across the whole castle, particularly as the S Bastion remains largely unexcavated. On the whole there does not appear to be any very marked variation in species frequencies across the site.

Parts of the skeleton represented *(Fig. 8.1; Table 8.3)*

Different parts of a mammal's skeleton bear varying amounts of flesh, and some of the choice cuts of mutton and beef are to be found around the shoulder and pelvic girdles, and the parts of the limb closest to the body (humerus and femur). The feet have hardly any flesh and are generally consumed by the poor or even discarded at the slaughterhouse. It is sometimes possible to determine the wealth of the inhabitants of a settlement simply by the parts of the skeleton present, although if animals were slaughtered on site, as was probably often the case before rail transport, then we should expect to find all parts of the skeleton represented. However, bones vary in their size and fragility, and as Brain (1967) and Payne (1975) have demonstrated, the frequencies of different bones represented in an assemblage of mammalian remains varies with their density and their size. At a very crude level, however, body-part frequencies can generally provide an approximate idea of whether joints or whole animals are represented.

Cattle

No differences were found between the phases. Large meat-bearing parts such as scapulae and humeri from the forelimb, and pelves, femora and tibiae from the hindlimb are well represented. Teeth, however, are poorly represented, as are the smaller bones such as phalanges. Hardly any carpal bones were found and this, relative to the higher number of radii and metacarpals (bones which are adjacent to the carpals), would suggest that small bones and teeth were less often recovered during excavation. The low numbers of teeth might indicate that many of the beeves brought to Camber had been decapitated. However, if beef was brought to Camber already extensively butchered, a low occurrence of non meat-bearing bones such as the metapodials would normally be expected. These are generally (today) detached at the abattoir.

This does not appear to have been the case, and we conclude that many of the discrepancies between the different parts of the cattle skeleton represented at Camber reflect the vagaries of preservation and recovery. In other words it seems more likely that cattle were brought to the castle live and slaughtered locally. Davies (1964) mentions that oxen travelled on the hoof from the Midlands to the Berwick slaughter-house when Henry VIII and his 20,000 men were fighting in the northern Marches, and when the king was fighting in northern France hay and straw had to be shipped to Calais for the thousands of horses and oxen accompanying the army.

Sheep

As with cattle, no differences were found between phases. Humeri and tibiae, both meat-bearing bones, are the most common parts of the skeleton represented. A similar pattern was noted in both medieval and post-medieval layers at Launceston Castle (Albarella and Davis 1996). These two bones are large and their distal ends are dense, and hence it is easy, as Brain (1967) suggested, to understand why they are common. There does not appear to be any very marked under-representation of any part of the body, and for example metatarsals, with little meat on them, are fairly well represented. We conclude, if tentatively, that like the cattle, mutton was brought to Camber in the form of whole carcasses or even perhaps live on the hoof.

Pig

From Roman times onwards, most British archaeological remains of pig comprise teeth and cranial bones (King 1978), and Camber is no exception in this respect - perhaps a reflection of the robust nature of the pig's head. Of the few post-cranial bones, humeri and tibiae were the most common. There were also several bones from the distal part of the limb such as metapodials and phalanges, which suggests that sections of pigs or whole pigs were brought to the castle. But with so few bones it is difficult to examine the question of body-part selection in the pig.

Table 8.7: Butchery. Numbers of butchered cattle, sheep and pig bones from phases IV-VI expressed as a proportion of the total counts of the different bones.

	Cattle	Sheep	Pig
Scapula	37/79	12/179	3/12
Humerus	50/93	55/247	7/22
Radius	20/56	11/132	1/13
Metacarpal	2/16	0/0	
Pelvis	24/59	14/123	1/9
Femur	27/83	10/90	4/15
Tibia	34/76	37/197	5/14
Astragalus	22/35	1/24	0/7
Calcaneum	13/47	5/76	0/7
Metatarsal	4/42	0/0	
Metapodial			0/28

Butchery and cut marks *(Table 8.7)*
Cattle

Cattle bones were heavily butchered. While most of the butchery was on or around the joints, many femora and humeri had multiple chop marks mid-shaft. There are no significant differences in the pattern of butchery marks between the main phases. The presence of chopped metapodials and phalanges (bones with very little meat) suggests that at least some butchery (perhaps slaughtering too) took place on site. More convincing is the presence of eight butchered mandibles and a zygomatic (cheek) bone with a chop mark on it. These marks could have been made when removing the mandible from the rest of the head.

Sheep

Sheep bones too were heavily butchered, 30% of limb and girdle bones having cut marks. Most butchery marks consisted of small chops on or around the joints. One interesting pattern consisted of multiple, fine circumferential cuts in the mid-shaft area of the humerus. These marks were probably made when the forelimb was cut up into a large shoulder joint (scapula and proximal humerus) and an elbow joint with less meat on (distal humerus and proximal radius/ulna). This unusual pattern has also been observed at Battle Abbey, Sussex, in 16th-century deposits at Nonsuch Palace, and at Baynards Castle *c*1520 (Locker 1985).

Pig

Some 17% of pig bones showed evidence of butchery. The most commonly occurring chop marks were on the neck of the scapula, distal articulation (trochlea) of the humerus and proximal part of the tibia shaft. These were probably made during dismemberment of the carcass. However, since other parts of the skeleton are so scarce it is difficult to determine how carcasses were processed. Two cuboid bones (a small tarsal or foot bone) have fine cut marks on their ventral surfaces and there are five examples (Plate 8.1) of mandibles chopped obliquely through the diastema (the space behind the canine and in front of the premolars), a feature also seen at Battle Abbey (Locker 1985) and Banbury Castle (Wilson 1976).

Age at slaughter

Cattle

A consideration (Table 8.8) of the numbers of milk and permanent teeth and their wear stages reveals that 13 of the 15 deciduous lower fourth premolars (dP_4) were in very early wear stages - a, b or c. These are from animals which must have been under 6 months old, that is from veal calves. The M_1 and M_2 teeth are mostly in stage g or

Table 8.8: Cattle wear stages of individual teeth (following Grant 1982). Both teeth in mandibles and isolated teeth are included.

		a	b	c	d	e	f	g	h	j	k	l	m	n	o	p	Total
dP_4	Ph II–III																**0**
	Ph IV			3													**3**
	Ph IV–VI	1	9	3							1	1					**15**
P_4	Ph II–III						1										**1**
	Ph IV																**0**
	Ph IV–VI	1		2		2	1		3							1	**10**
M_1	Ph II–III																**0**
	Ph IV										1						**1**
	Ph IV–VI							3	1	1	7		1				**13**
M_2	Ph II–III																**0**
	Ph IV							1									**1**
	Ph IV–VI						2	4			6	2					**14**
$M_{1/2}$	Ph II–III									2	2						**4**
	Ph IV			1							1	2					**4**
	Ph IV–VI		1					6	1	3	6	2					**15**
M_3	Ph II–III						1										**1**
	Ph IV			2	1		2										**5**
	Ph IV–VI		5	4	2	6	3	7	1	2	2	1					**33**

Table 8.9: Counts of unfused (U) and fused (F = "fused" + "just fused") epiphyses/metaphyses of sheep, cattle and pig bones at Camber Castle. NB: The numbers and percentages for sheep in parentheses are the counts excluding sheep bones in context PR#2 (phase V) which contains an unusually large number of neonatal sheep bones.

Sheep:	**Phase IV**			**Phases IV–VI**	**(context 2)**	
	U	**F**	**%U**	**U**	**F**	**%U**
Scapula	6	50	**11**	19 (10)	160 (132)	**11 (7)**
Humerus dist.	7	84	**8**	32 (21)	215 (191)	**13 (10)**
Radius dist.	15	25	**38**	49 (36)	79 (71)	**38 (34)**
Metacarpal dist.	5	2		30 (19)	16 (14)	**65 (58)**
Pelvis	3	51	**6**	14 (5)	111 (102)	**11 (5)**
Femur dist	18	18	**50**	40 (32)	34 (30)	**54 (52)**
Tibia dist.	17	83	**17**	48 (30)	144 (134)	**25 (18)**
Calcaneum	5	30	**14**	22 (16)	52 (51)	**30 (24)**
Metatarsal dist.	11	4		55 (38)	17 (13)	**76 (75)**
Phalanx	1	6	7	11 (9)	20 (19)	**35 (32)**
Metapodial	2	0		5 (3)	1 (0)	

Cattle:	Phase IV			Phases IV–VI		
	U	F	%U	U	F	%U
Scapula	3	23	**12**	8	71	**10**
Humerus dist.	6	13	**32**	14	78	**15**
Radius dist.	9	2		17	26	**40**
Metacarpal dist.	0	2		4	14	**22**
Pelvis	1	14	**7**	3	56	**5**
Femur dist.	14	1	**93**	34	23	**60**
Tibia dist.	5	10	**33**	18	51	**26**
Calcaneum	7	5		24	20	**55**
Metatarsal dist.	9	5		17	25	**40**
Phalanx	1	2	36	4	109	**4**
Metapodial	3	0		7	1	

Pig:	Phase IV		Phases IV–VI	
	U	F	U	F
Scapula	4	0	6	4
Humerus dist	3	5	6	15
Radius dist.	5	0	11	0
Metacarpal dist.	5	0	11	1
Pelvis	1	3	1	8
Femur dist.	4	2	7	2
Tibia dist.	3	4	8	6
Calcaneum	3	0	5	0
Metatarsal dist.	2	0	9	1
Phalanx 1	3	4	7	6
Metapodial	4	0	6	0

above, which indicates that older animals were also eaten. The counts of unfused versus fused long bone epiphyses (Table 8.9) indicate that there were high frequencies of fused bones. For example 85% of the distal humeri are fused. Similarly, 74% of the distal tibiae are fused. This suggests that the majority of cattle at Camber were adult, though these data have to be viewed with caution due to the fragile nature of veal bones (juvenile teeth may be somewhat more robust than juvenile bones and therefore less susceptible to destruction *post-mortem*).

The presence of veal calves, indicated by relatively unworn dP_4 teeth, and of older cattle, points to specialised cattle farming, a pattern that presumably reflects cattle husbandry with an emphasis on the production of milk as well as beef, with veal as a side product. This is in marked contrast to the pattern on medieval sites where most cattle remains derive from adult beasts that were presumably retired dairy and traction animals. Veal and dairy production seems to have become common countrywide in post-medieval times. Grant (1988) mentions an 'increase in the percentage of young animals in later deposits at some sites', a change that she attributes to the increasing importance of cattle as suppliers of meat. Maltby (1979) notes an increase of young cattle in the 16th century and onwards at Exeter;

Table 8.10: Sheep wear stages of individual teeth (following Payne 1987). Both teeth in mandibles and isolated teeth are included.

		0	1	2	3	4	5	6	7	8	9	10	11
dP_4	Ph II–III												
	Ph IV	1					3				1	1	
	Ph IV–VI	14					3			3	1	1	
	(Ph IV–VI	5					3			3	1	1	
P_4	Ph II–III					2							
	Ph IV			3		3	1		2	4	1		2
	Ph IV–VI			4		3	2	1	3	10	10		2
	(Ph IV–VI			3		3	2	1	3	8	8		2
M_1	Ph II–III					1		1	1		6		
	Ph IV	1			1		1				22	2	3
	Ph IV–VI	4		2	2	1	1	4		4	51	4	7
	(Ph IV–VI	3		2	2		1	4		3	44	3	5
M_2	Ph II–III	1			1		1				4		
	Ph IV						1	2	1	8	23	2	
	Ph IV–VI	2	1				1	7	9	13	45	3	
	(Ph IV–VI	2					1	6	6	10	39	3	
$M_{1/2}$	Ph II–III										1		
	Ph IV							3	1	2	5		
	Ph IV–VI	1					2	4	4	2	13		
	(Ph IV–VI	1					2	4	3	2	12		
M_3	Ph II-III									2			2
	Ph IV	1	1	4	1	3	2	2	1	1	1	7	15
	Ph IV-VI	5	1	9	1	5	4	6	4	5	7	11	32
	(Ph IV-VI	3	1		1	5	2	4	3	4	5	10	27

Griffith *et al.* (1983) note many more young cattle jaws in the 17th century at Sandal castle, and in his summary of animal remains from monastic sites, O'Connor (1993) notes that at St. Andrew's priory '... the 15th and 16th centuries seem to have seen an increase in ... the exploitation of newly-weaned cattle for veal'. Veal as well as adult cattle teeth were also found in late post-medieval Lincoln (Dobney *et al.* 1995) and in the post-medieval period at Launceston Castle (Albarella and Davis 1996).

It is interesting to compare the dP_4-P_4-M_3 tooth counts from Camber with those from Launceston (although this exercise is admittedly risky in view of the probable recovery biases already alluded to.) At Launceston the counts of these teeth in the medieval levels and post-medieval levels are respectively 12-61-103 and 28-19-44 (ie the proportion of milk teeth increased considerably). The Camber count of 15-11-34 is remarkably different from the Launceston medieval and similar to the Launceston post-medieval one. In other words the slaughter pattern of the Camber cattle appears to reflect a national pattern of cattle husbandry.

Recent studies by historians appear to confirm the zoo-archaeological data. Trow-Smith (1957) suggested that during the 16th and 17th centuries the role of the cow shifted from that of a beast of traction to that of a breeder of meat and supplier of milk. In his section on Sussex and Kent (ibid, 188–193) he wrote that at this time some beef was being grown from young surplus beasts, and some dairying was being undertaken, based upon the cow. He also writes that other sources 'hint at a growing interest in meat production'. In their study of manorial accounts and probate inventories Campbell and Overton (1992; 1993) discovered that the ratio of immature:adult cattle increased during the 17th century. The ratios (with dates) that they calculated are as follows: 0.72 (1250–1349), 0.47 (1350–1449), 0.78 (1584–1640) and 1.63 (1660–1739), although this date range is a little late for Camber. Campbell and Overton discovered that at

NB: The numbers in parentheses for phases IV-VI are counts excluding sheep teeth in context 2 (phase V) which contains an unusually large number of neonatal sheep bones.

12	13	14	15	16	17	8	19	20	21	22	Total
1		3			1						5
1	3	5		5						2	19
1	10	14		8	2		1			3	61
1	8	13		6	2			1		3	47)
2		1									5
8		6									30
14		10	1								60
12		10	1								53)
		2									11
2			5								37
4		3	8								95
4		3	7								81)
											7
		1									38
1		3									85
1		2									70)
											1
			1								12
		1	1								28
											25)
											4
	1										40
	1	1									92
	1										73)

some time between medieval and post-medieval times stocking densities almost doubled and that by the early modern period there was a general move away from dairying towards fattening younger cattle for meat.

Sheep

A large proportion of sheep mandibles and mandibular teeth are from animals under 2 years old, and some are even new-born judging by the presence of dP_4 teeth with no wear on them. Quite a large proportion of the limb-bone epiphyses are unfused (Table 8.9). The sheep kill-off pattern deduced from the eruption and wear stages of the teeth suggests that over half were slaughtered by 3 years, and three-quarters by 5 years (see tables 8.10 and 8.11). This points to sheep being used primarily as a meat source, though the older animals presumably had been exploited for their wool and milk, reflecting a mixed sheep economy in the Rye area.

A closer examination of the sheep ageing data, both long-bones and teeth, revealed that in one deposit within the N Bastion (context 2) there is an unusually large number of neonatal sheep. (There are no neonatal sheep bones and only a small number of dP_4s with no wear in the other phases.) For example of the 11 dP_4s in phase V with no wear (ie in wear stage '0' which must have come from neonatal lambs), 9 are from this deposit. It is possible that they come from a single 'dumping' event of, say, still-born sheep and therefore do not represent part of the assemblage of food remains. For this reason they have been subtracted from the counts of sheep dP_4s in wear stage '0' in Table 8.10. Similarly, the numbers of unfused/fused long-bone epiphyses have been recounted in Table 8.9 (they are in parentheses) to exclude the sheep bones in context 2. The fills within the N Bastion, including context 2, were deposited in phase IVb in the late 16th or early 17th century, but the pottery in this context is predominantly of early to mid 16th-century date

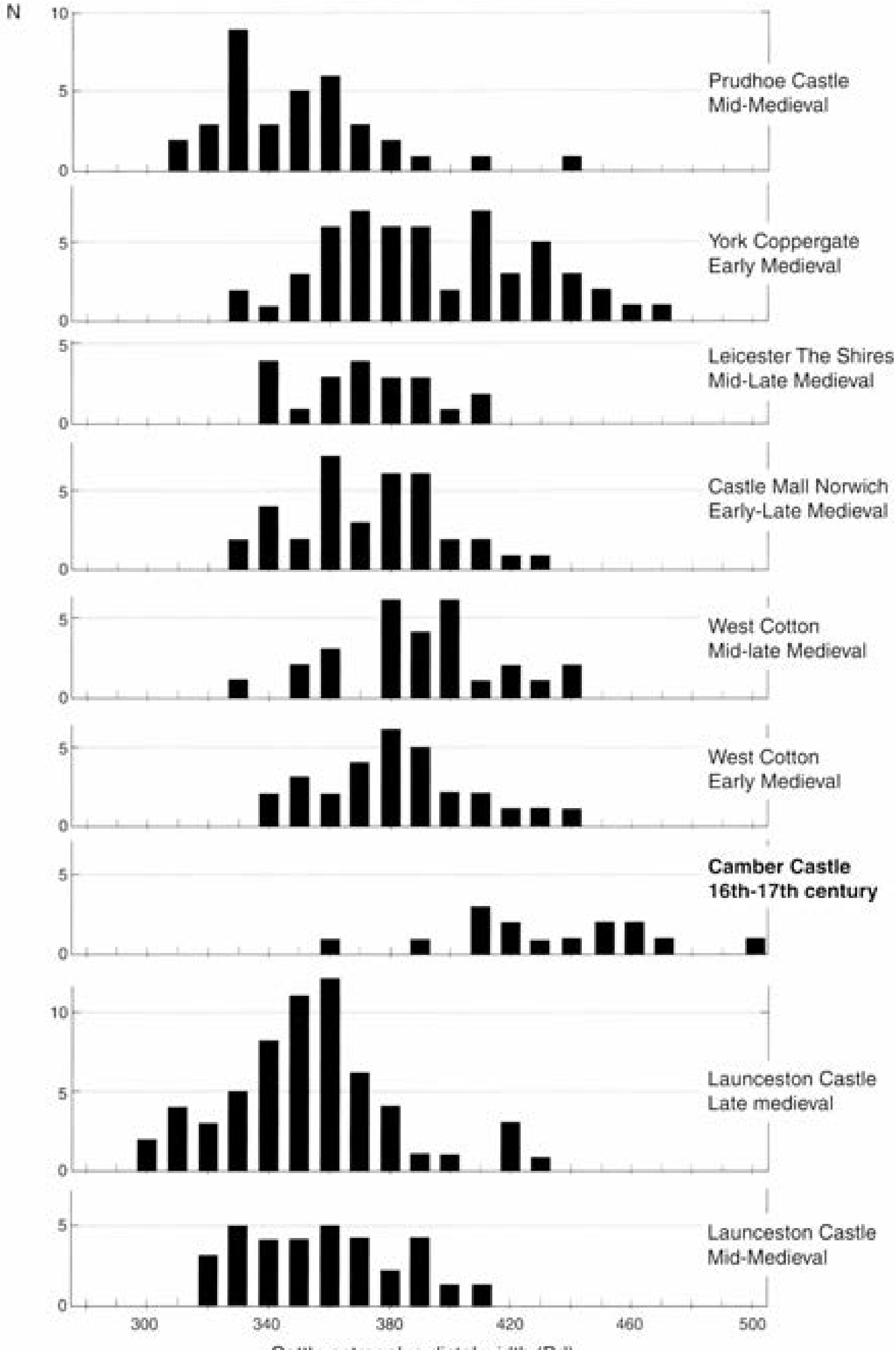


Figure 8.2: Animal bone; comparisons of cattle astragalus distal width for selected medieval sites in England

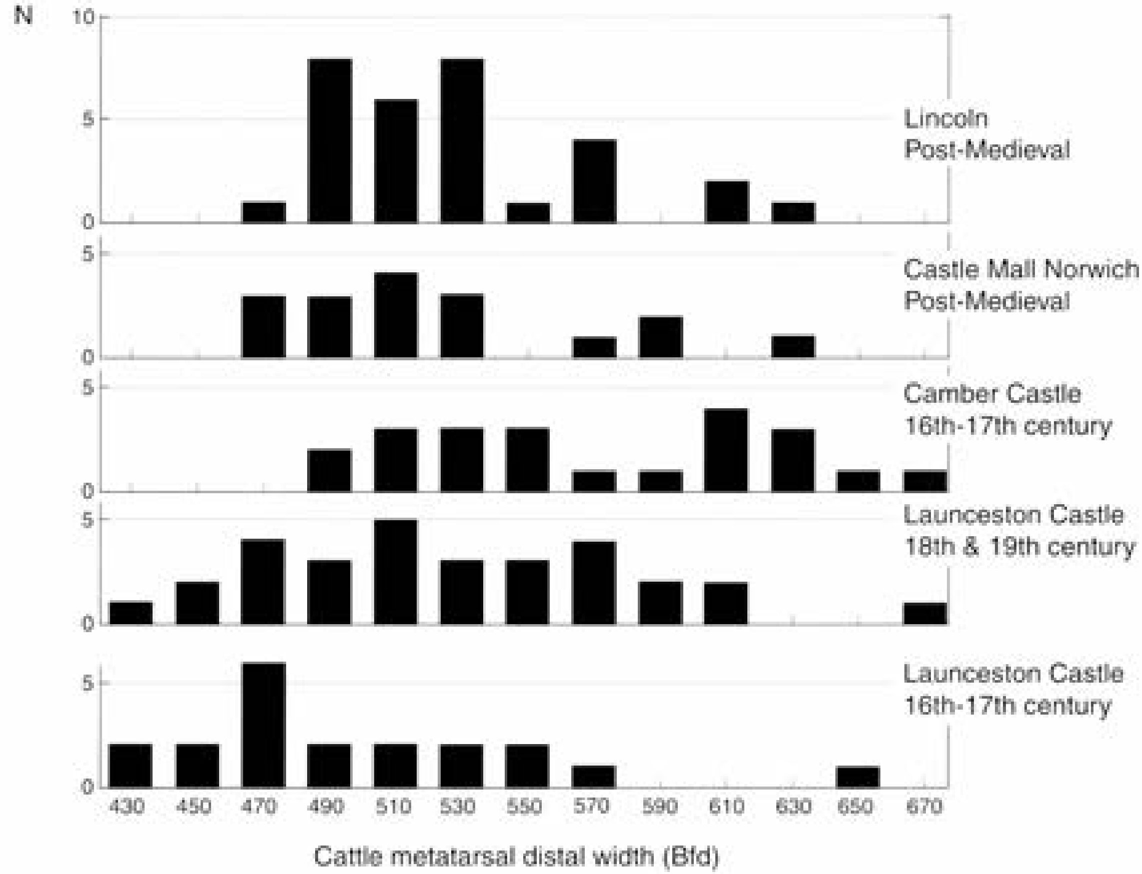


Figure 8.3: Animal bone; comparisons of cattle metatarsal distal width for selected post-medieval sites in England

(see Chapter 6). (There are a few obvious neonatal pig bones in phases IV (4) and V (4); there are no obvious neonatal cattle bones.)

Pig

There were few pig mandibles with fully erupted third molars in wear (Table 8.12). In the pig this tooth erupts at approximately 17–22 months (Silver 1969). Of the 14 M_3s present either in mandibles or isolated, 10 were at wear stage 'a' and 4 at stage 'b', the oldest stage present. The first lower molar showed a similar pattern; out of 19 teeth present, only 7 were at stage 'g' or more, with one animal at stage 'm'. Of 17 dP_4s, 14 were at stages 'a–f', and only 3 at stage 'h' or more. As on most archaeological sites, most pigs appear to have been slaughtered relatively young which is not surprising for an animal primarily exploited for its meat and fat. Epiphysial fusion data for pigs (Table 8.9) were very limited due to the small samples available.

The size of the animals at Camber Castle

This section first addresses the question of size variation between phases at Camber and then comparisons are made between the Camber animals and those from other parts of England within the medieval and post-medieval periods.

Cattle and sheep measurements from phase IV were compared with pooled measurements from phases IV–VI (Table 8.13). This comparison failed to reveal any statistically significant inter-phase differences. In view of this, as well as the homogeneity of the pottery and metalwork (see above), the data from Camber have been treated as a single assemblage of mid 16th- to mid 17th-century date in order to compare the sheep, cattle and pigs at Camber with those from other sites. Measurements of various parts of the skeleton of cattle, sheep, pig, rabbit and chicken are represented as 'stem and leaf' diagrams in an appendix at the end of the volume.

Cattle

Figures 8.2 and 8.3 provide plots of Camber cattle bones alongside those from other sites in various parts of England. These show, firstly, that the Camber cattle were considerably larger than medieval cattle. Secondly, within the group of comparable 16th- to 18th-century assemblages, it would appear that the Camber cattle were also larger than those from Launceston Castle in Cornwall and also possibly larger than cattle from Norwich and Lincoln (though the differences here are much less marked). The large size of the Camber cattle is consistent with the pattern emerging from studies of other sites, which show a size increase in some parts of England as early as the 15th and 16th centuries (see for example Maltby 1979; Davis 1987; Stallibrass 1988; Dobney *et al.* 1996; Albarella *et al.* 1997).

Table 8.11: Sheep kill-off pattern (following Payne, 1988)

	Age range	Tooth	n	Wear stage	% killed	cum. % killed	age (approx)
Phase IV:	0-2 yrs	dP_4	19		39	39	2 yrs
	>2 yrs	P_4	30		61		
	2-3 yrs	M_3	8	2-4	13	52	3 yrs
	3-5 yrs	M_3	14	5-10	22	74	5 yrs
	6-10 yrs	M_3	15	11G	24	98	10 yrs
	>10 yrs	M_3	1	>11G	2	100	
Phases IV–VI:	0-2 yrs	dP_4	61		50	50	2 yrs
	>2 yrs	P_4	60		50		
	2-3 yrs	M_3	15	2-4	9	59	3 yrs
	3-5 yrs	M_3	37	5-10	22	81	5 yrs
	6-10 yrs	M_3	32	11G	19	99	10 yrs
	>10 yrs	M_3	2	>11G	1	100	
Phases IV–VI (excluding context 2)	0-2 yrs	dP_4	47		47	47	2 yrs
	>2 yrs	P_4	53		53		
	2-3 yrs	M_3	6	2-4	5	52	3 yrs
	3-5 yrs	M_3	28	5-10	24	76	5 yrs
	6-10 yrs	M_3	27	11G	23	99	10 yrs
	>10 yrs	M_3	1	>11G	1	100	

Sheep

The Camber sheep bones are considerably larger than those from medieval sites (Fig. 8.4). For the post-medieval period (Fig. 8.5), the Camber sheep were still much larger than those in Cornwall and also larger than those from Norwich, though similar in size to the post-medieval sheep from Lincoln and the 17th-century sheep from Exeter (Maltby 1979). When compared to the 'baseline' of modern Shetland ewes (Davis 1996) in Figures 8.6 and 8.7, the Camber sheep appear to be larger; most of the Camber sheep measurements fall to the right of the zero line. This is in part probably due to the fact that the Camber sheep include bones of rams, rams being larger than ewes. It is interesting also to note that the Camber bone-length measurements (note especially metacarpal GL and calcaneum GL) fall further to the right of the zero line than do most of the width and depth measurements (such as humerus BT and HTC) suggesting that the Camber sheep were slightly longer-limbed than modern unimproved Shetland ewes. A similar discrepancy was noticed when comparing the Shetland 'baseline' measurements with those of other samples of archaeological sheep bones. The Shetland sheep may be a special case, their short limbs being an adaptation to a colder climate. Assuming that size increase reflects improvement, it is clear that by the 16th to 17th centuries there were already improved sheep present in this part of England.

The large size of sheep from Camber Castle is consistent with the pattern from other post-medieval sites which show an increase in the late 16th to 17th centuries, and the Camber data therefore indicate that the shift towards larger, more robust, stock had already occurred

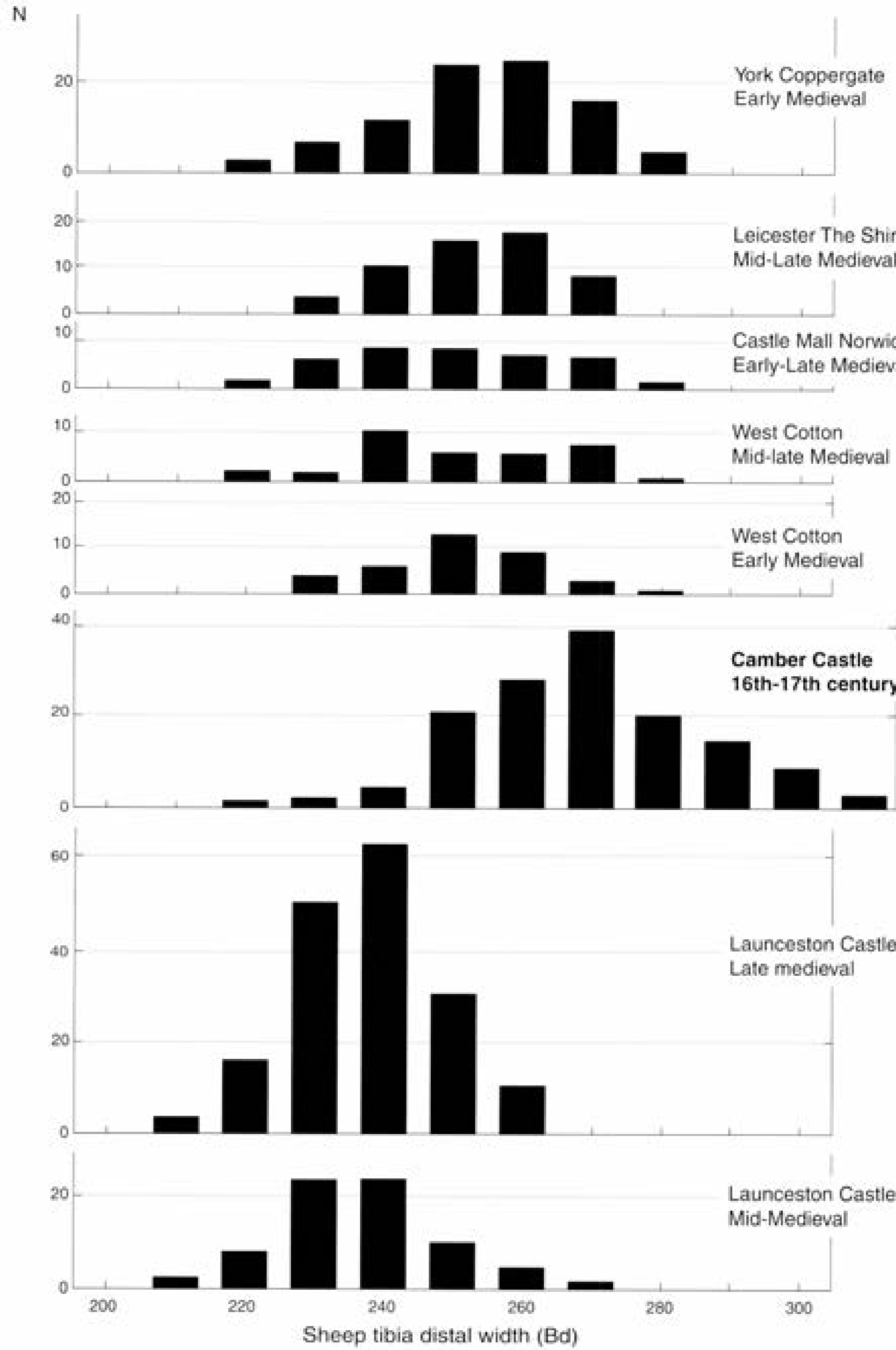


Figure 8.4: Animal bone; comparisons of sheep tibia distal width for selected medieval sites in England

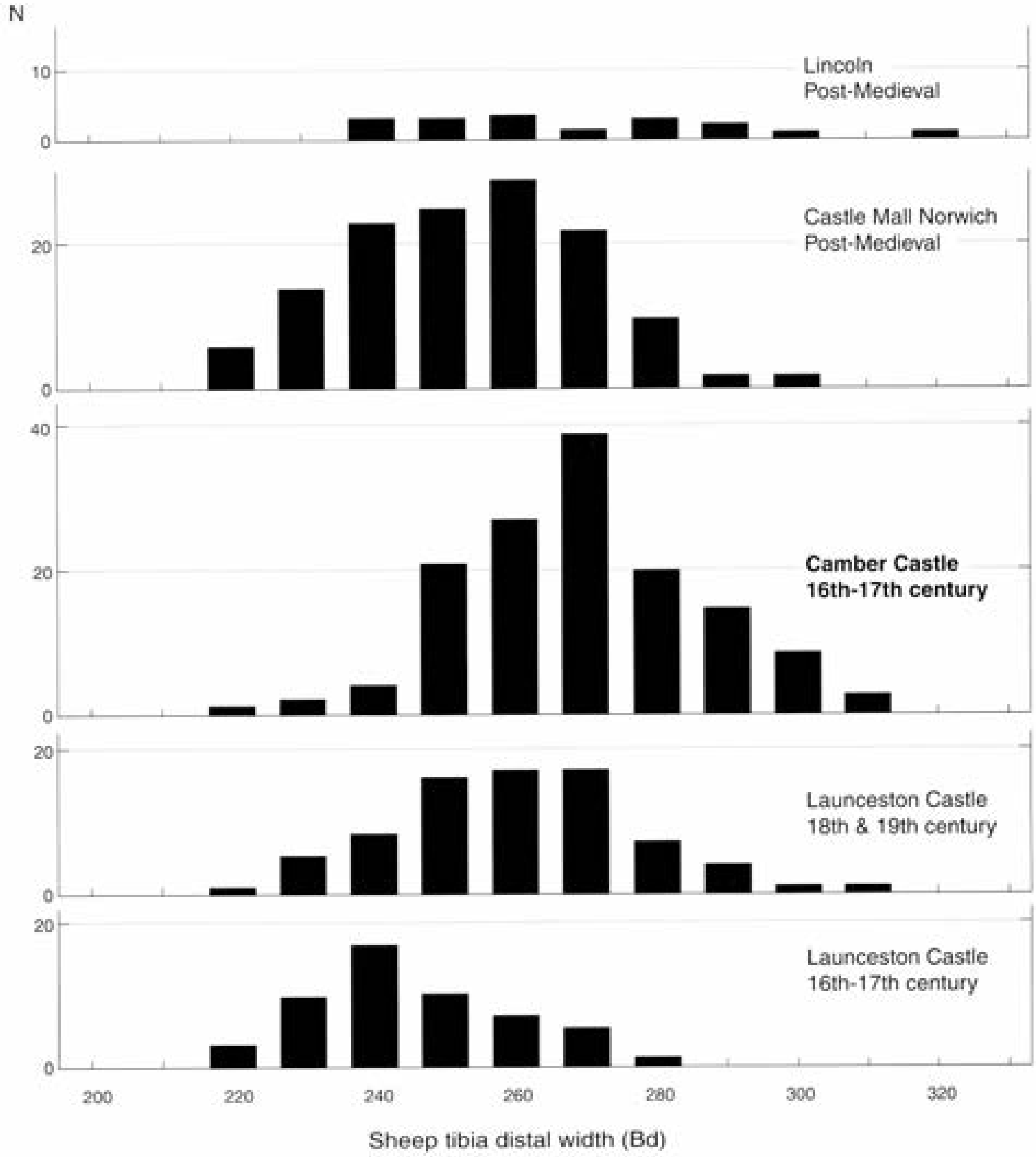


Figure 8.5: Animal bone; comparisons of sheep tibia distal width for selected post-medieval sites in England

in Sussex by the 16th to 17th century. Without measurements of archaeological sheep bones from earlier sites in Sussex it is difficult to determine when and how rapidly this improvement occurred.

Pig

There are too few pig measurements from Camber to determine whether there is any inter-site size variation. Measurements of the dP_4, M_1 and M_2 teeth show that their mean widths are slightly larger than those from the 16th and 17th century at Launceston but similar to those of 18th and 19th centuries at Launceston and post-medieval Lincoln. The humerus is the only pig bone surviving in quantities sufficient for comparison, and it indicates that the Camber pigs were significantly ($p < 0.01$) larger than those from 18th- and 19th-century Launceston.

In Figure 8.8 the tooth widths are compared with the 'standard' values calculated from the Neolithic sample of pigs from Durrington Walls (Albarella and Payne

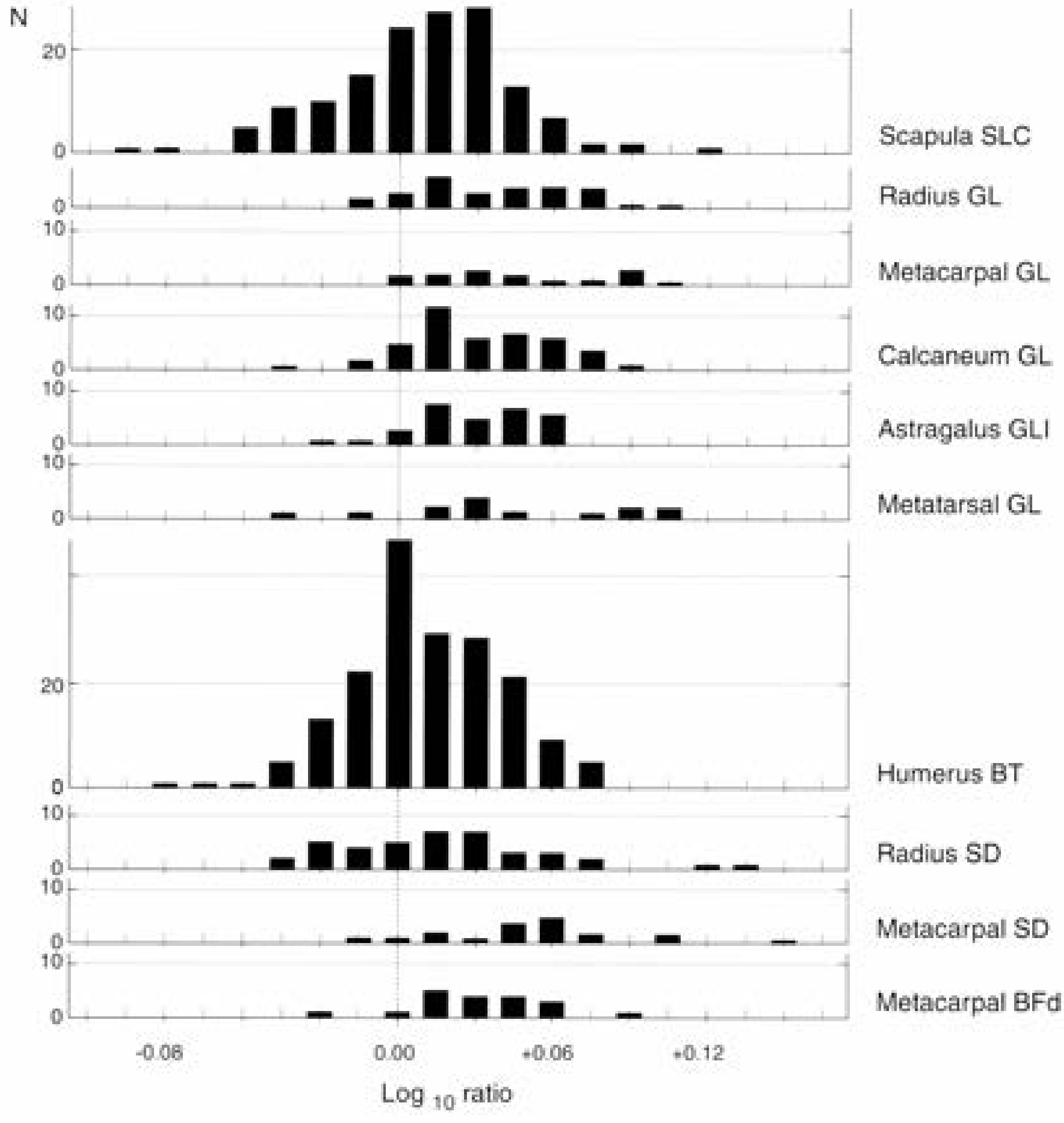


Figure 8.6: Animal bone; Camber sheep measurements compared with modern Shetland ewes

forthcoming). This method allows a comparison to be made of different measurements and (in this case) of different teeth, highlighting possible differences in proportions. An interesting difference in proportions relative to the Neolithic examples can be seen; relative tooth size decreases towards the back of the jaw. The anterior tooth widths are slightly larger than the Durrington Walls standard and the posterior tooth widths such as the width of the posterior cusp of M_3 are smaller than the Durrington standard. A similar trend was noted for the medieval pig teeth from West Cotton in Northamptonshire (Albarella and Davis 1994, fig. 18). It seems likely that the relative sizes of the front teeth and back teeth of the pig have altered since domestication, with an increase in size towards the front of the mouth. This phenomenon is worth further study.

Taken overall, the sheep and cattle in the period from the mid 16th to the mid 17th century were large and presumably 'improved' versions of their medieval ancestors. This would seem to corroborate what Trow-Smith (1957, 188–193) wrote when he suggested that this period saw the 'beginning of enlightenment' in Sussex and Kent.

Pathology

Cattle

Several of the cattle bones from Camber Castle had pathological features. Two incisor teeth had V-shaped grooves on the distal surface at the base of the crown. Miles and Grigson (1990, 494–495) attribute this to the pulling of long grass between the teeth during grazing. Similar notches were also reported by Davis (1992a) in medieval deposits at Burystead and Langham Road, Northants. A common feature in artiodactyl mandibles is the congenital absence of the P_2 tooth (Andrews and

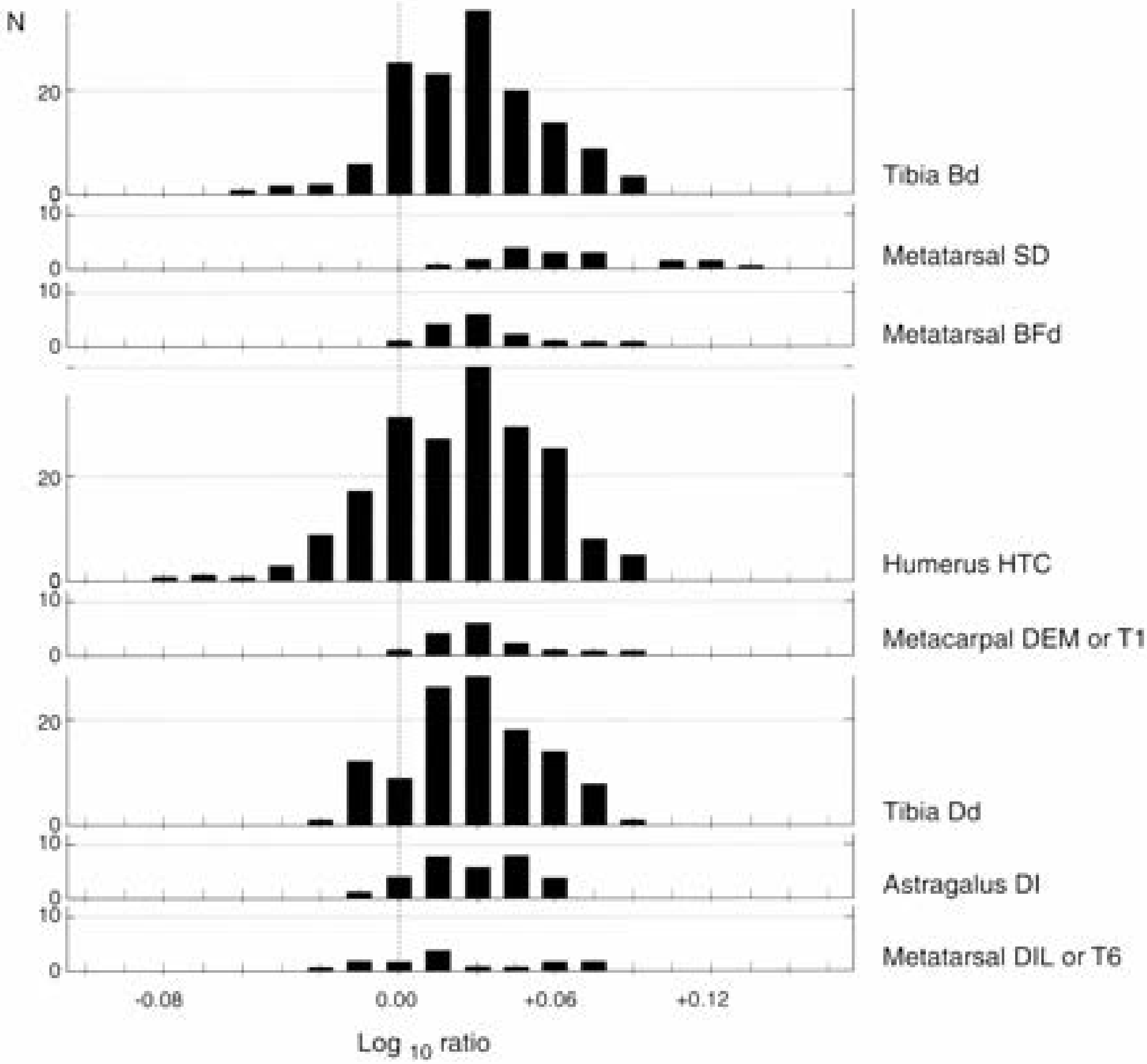


Figure 8.7: Animal bone; Camber sheep measurements compared with modern Shetland ewes (continued)

Noddle 1975). One such case appeared at Camber in a left cattle mandible. Another interesting anatomical variant in cattle is the absence of the third pillar (hypoconulid) from the back of the lower third molar tooth. This anomaly was common in England in the medieval period and it appears to have become progressively rarer subsequently. For example, relatively high frequencies of missing M_3 hypoconulids have been reported in Roman assemblages at Exeter, Devon (10/76 cases; Maltby 1979) and Dorchester, Dorset (7/114 cases; Maltby 1993) and the medieval levels at Launceston, Cornwall (14/108 cases; Albarella and Davis 1996). In the post-medieval period at Launceston this trait appears to have almost completely disappeared and Maltby (1979, 40) suggests that it may have disappeared from English cattle some time after the Roman period. There were no reduced or missing hypoconulids observed in the 28 cattle M_3s from Camber Castle.

Two proximal cattle metacarpals showed small (6 mm), well defined circular lesions on the articular surface for the magnum. The floor of these lesions is porous in appearance. Dobney *et al.* (1995) also observed these lesions in post-medieval cattle from Lincoln and attributed them to osteochondritis dessicans. These lesions were also seen in Camber sheep, and it is possible that these are an inherited (or epigenetic) trait rather than the joint disease osteochondritis dessicans

A distal metatarsal (Plate 8.3) had an extension of the medial condyle 33.6 mm wide (compared with a lateral condyle width of 27.5 mm) which makes the end of the metatarsal appear 'asymmetric' when viewed from the front. Its measurements (they are as follows, in tenths of a millimetre: BFd = 634, BatF = 506, BFdm = 336, BFdl = 275, 1 = 257, 2 = 340, 3 = 299, 4 = 225, 5 = 307, 6 = 290) have not been included in the metrical analyses or the tables/stem-and-leaf diagrams. There was no evidence for any kind of inflammation. This kind of extension of the articular surface is described by Davis (1992a) who attributes a possible stress (? traction) induced cause. Bartosiewicz *et al.* (1993) also note that the exploitation of cattle for draught purposes may be a factor. At Prudhoe Castle, this feature was more common

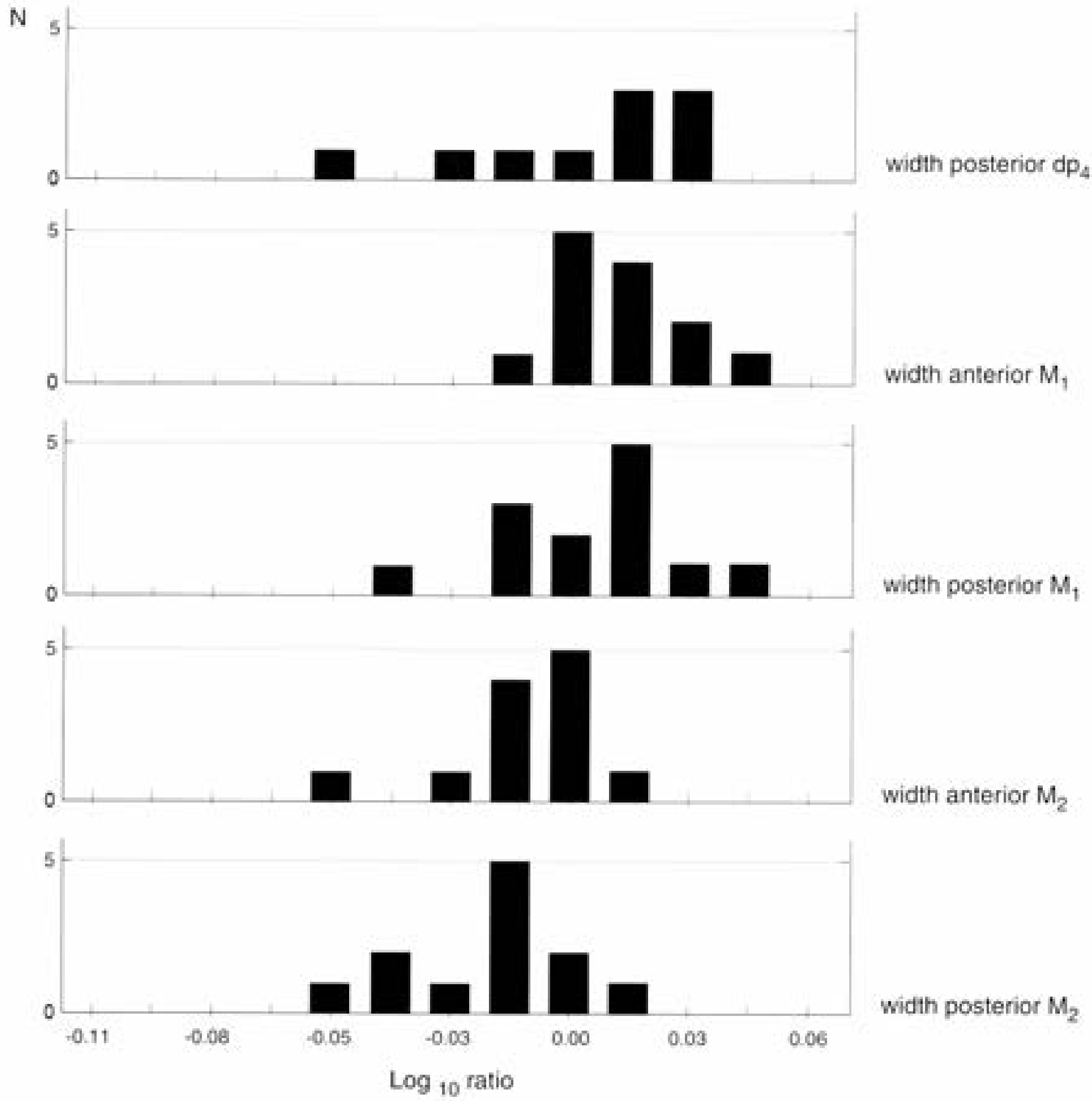


Figure 8.8: Animal bone; comparisons of pig teeth widths

in cattle metatarsals, and it was also more common in medieval than later periods (Davis 1987) and a decrease in its frequency could be correlated with the suggestion that horses rather than oxen became the primary source of traction power in the post-medieval period (Albarella and Davis 1996). The rigid horse harness, which allowed horses to pull (in fact they were now pushing) with greater effect, was introduced from the continent some time in the 12th century and gradually led to the increased use of horses (Lefebvre des Noettes 1931), though in many parts of the country (especially those with heavy clay soils) ox-drawn ploughing survived very late. Did this anomalous metatarsal derive from a retired work-ox? There is a small butchery mark across its anterior surface, so this individual was probably eaten.

Sheep

A number of dental abnormalities were found. The congenital absence of the P_2 tooth, also seen in the cattle, was noted in 2 mandibles out of a total of 97. Four mandibles had periodontal disease and ante-mortem tooth loss.

A number of sheep bones had evidence of disease. Firstly, a right rib (8–10) had a visceral surface lesion consisting of a small (15 mm) area of woven bone, possibly the result of a lung infection. Two proximal sheep metacarpals showed small circular lesions on the articular surface for the magnum. One was entirely smooth-walled whilst the other had a finely porous floor. These are very similar to lesions seen in an identical location on cattle metacarpals (see above).

Table 8.12: Pig wear stages of individual teeth (following Grant 1982). Both teeth in mandibles and isolated teeth are included.

		a	b	c	d	e	f	g	h	j	k	l	m	n	Total
dP_4	Ph II–III	1													1
	Ph IV	3				1	4		1						9
	Ph IV–VI	5				1	7		2	1					16
P_4	Ph II–III														0
	Ph IV	1			1										2
	Ph IV–VI	2	2		2										6
M_1	Ph II–III														0
	Ph IV		2	3									1		6
	Ph IV–VI	1	5	3	3			1		4	1		1		19
M_2	Ph II–III														0
	Ph IV	2	1				1								4
	Ph IV–VI	4	4	3	2	2	2								17
$M_{1/2}$	Ph II–III														0
	Ph IV	2				1		1							4
	Ph IV–VI	4		1	1	1	1	1							9
M_3	Ph II–III														0
	Ph IV	3	1												4
	Ph IV–VI	10	4												14

A complete fused metatarsal had a formation of dense lamellar bone on the anterior surface of the proximal end. It is 30 mm long, 5 mm at its widest point and protrudes 1.5 mm from the surface. This lesion is identical to lesions described by Dobney *et al.* (1995) at Lincoln, and similar ones have also been noted by O'Connor (1984) in material from post-medieval Walmgate (York).

A condition occurs in the elbow joint of sheep that is described as 'penning elbow'. This takes the form of large projections of bone in the lateral collateral ligament. Three cases were noted at Camber Castle on the humeral attachment where 8 mm ossifications are seen, and the radial attachment where projections of up to 6 mm are seen. These could be the result of sprain or partial dislocation (O'Connor 1991, 267), although the exact cause of this rather common anomaly is still unclear.

Pig

One of the pig mandibles displayed a congenitally absent right P_1 tooth. There is a distal tibia with new bone formation around the joint margins and on the joint surface itself. There are some small sub-chondral cystic cavities, but there is no eburnation and these changes are probably due to a septic arthropathy. Pathological lesions on pig bones were also rarely seen at other sites, a feature partly due to the larger proportion of juvenile culling (before pathology can become manifest in the skeleton).

The rabbit and hare assemblages

Over one thousand bones of rabbit (*Oryctolagus cuniculus*) were recovered at Camber. Rabbits are burrowing animals and their remains when found in archaeological sites are often considered to be intrusive. At the time of the excavation Camber was densely populated by rabbits and the strata were riddled with rabbit burrows. It is highly likely therefore that the majority of the rabbit bones at Camber are intrusive. However, there is much documentary evidence for the exploitation of rabbits in the medieval and post-medieval periods, and a number of origins for the Camber bones might be possible.

The rabbit was probably introduced into England from Spain or France by the 13th century. In the 13th and 14th centuries rabbit was expensive but by post-medieval times it was an important minor element in the English diet (Veale 1957). The black rabbits of Kent were particularly prized during the 16th century and a new warren was set out at Hampton Court during the reign of Henry VIII. John Caius (1576), the first writer on British dogs, mentions the use of the 'Thievish Dog' for hunting rabbits at night, and there was a considerable traffic in rabbit meat and fur which began in medieval times. In the 1690s Gregory King estimated the numbers of animals inhabiting England. His figures include 4½ million beeves, 11 million sheep, 2 million pigs, 100,000 deer, 50,000 goats, 24,000 hares and 1 million rabbits

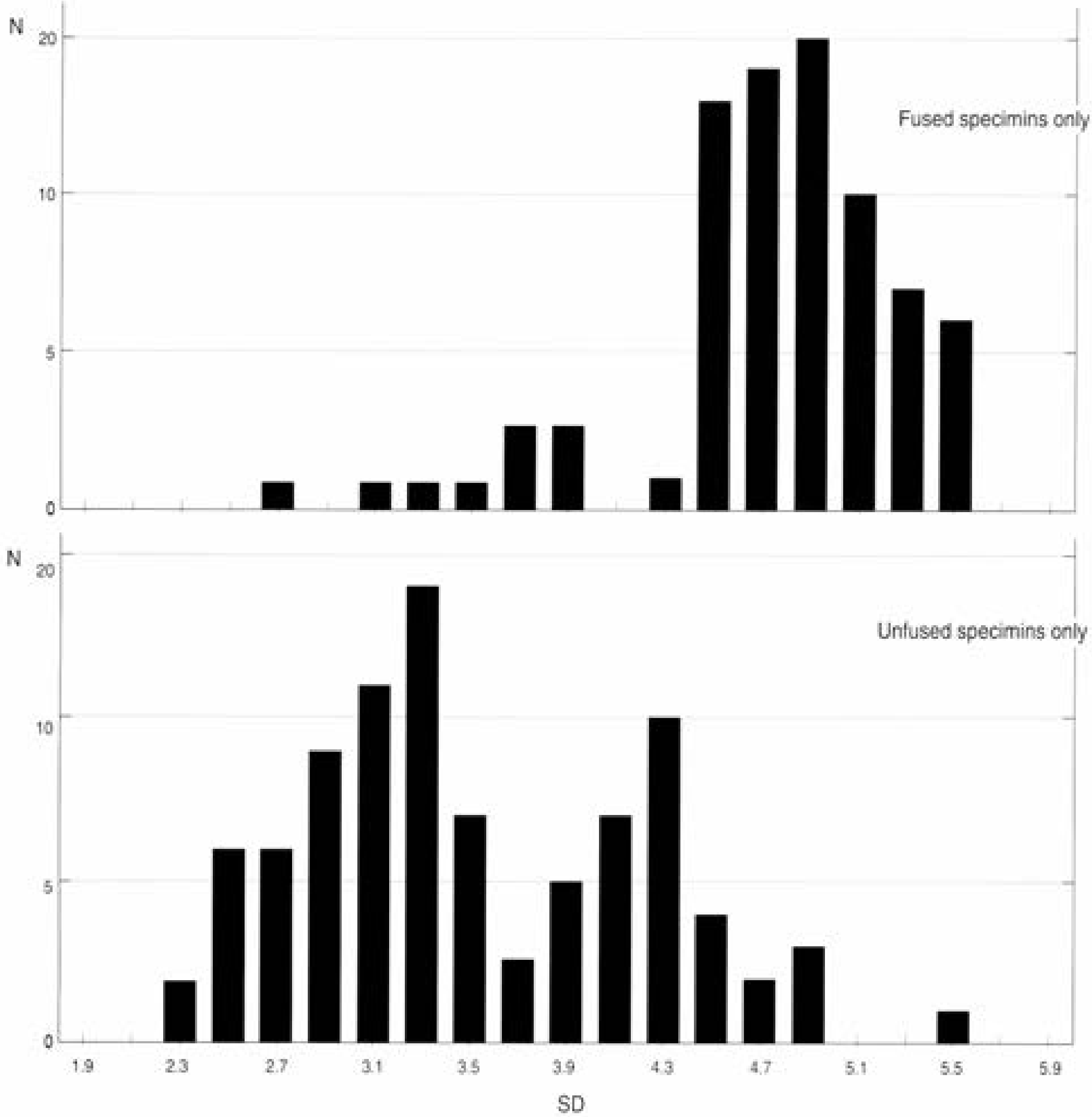


Figure 8.9: Animal bone: rabbit tibiae from all phases

(Sheail 1971). King's ratio of hare to rabbit (24:1000) is in fact strikingly similar to the ratio (36:1189) of hare to rabbit bones actually found at Camber.

One certain clue that archaeological remains of animal bones were associated (gastronomically or otherwise) with the site's human inhabitants would be the presence of cut or butchery marks, but this proves inconclusive for the Camber assemblage. Only one rabbit bone (a radius) showed a cut mark. However, while cut marks may argue for an association, their absence does not necessarily argue against. Cut marks would not necessarily be expected on bones of small mammals like rabbits, since they are easy to skin and the whole carcass can be easily accommodated in a pot. None of the hare bones had any cut marks either (although the sample is admittedly small, comprising only 36 bones); hare is not a burrowing animal and cannot be considered a burrowing contaminant. Despite the absence of cut marks, it is likely that the hare had been eaten. By contrast, the restricted sample of small birds showed far more evidence for cut marks. (For example 1 out of 15 teal bones, 2 out of 32 mallard bones, 1 out of 5 avocet bones, and 1 out of 12 oystercatcher bones have cut or chop marks on them.) However, wild birds with their tough ligaments are quite unlike small mammals, and tend to be difficult to skin and dismember without the use of knives.

The bone measurements of the rabbits were studied for clues as to the nature of the population. A plot (Fig. 8.9) of the tibia shaft widths shows a clear bimodal

Table 8.13: Pairwise comparisons of measurements (in tenths of a millimetre) of cattle and sheep bones, 'phase IV' versus 'pooled phases IV–VI'. For all bones there was no statistically significant (Student's "t" tests, at the 5% level) difference between on the one hand 'phase IV' and on the other 'pooled phases IV–VI'.

	Phase(s)	n	mean	sd
Cattle				
Humerus BT	IV	4	783	58.0
Humerus BT	IV–VI	25	756	59.2
Humerus HTC	IV	7	354	35.2
Humerus HTC	IV–VI	48	347	31.5
Tibia Bd	IV	7	645	46.8
Tibia Bd	IV–VI	34	622	44.4
Sheep				
Humerus BT	IV	68	277	17.0
Humerus BT	IV–VI	173	278	17.7
Humerus HTC	IV	74	145	9.8
Humerus HTC	IV–VI	87	144	9.9
Radius GL	IV	7	1476	131.8
Radius GL	IV–VI	27	1505	110.7
Radius Bd	IV	18	282	19.8
Radius Bd	IV–VI	57	287	17.5
Tibia Bd	IV	77	269	15.4
Tibia Bd	IV–VI	129	269	17.0
Astragalus Bd	IV	20	188	11.8
Astragalus Bd	IV–VI	28	188	10.9
Calcaneum GL	IV	23	571	33.2
Calcaneum GL	IV–VI	41	567	35.9

distribution, and similar results were obtained for rabbit scapula and humerus. This is not the result of sexual dimorphism, since modern specimens of known-sex rabbit bones show considerable overlap of the sexes on this measurement. The results suggest that two distinct age-groups of rabbits are represented. The left-hand peak consists entirely of juvenile bones with unfused distal epiphyses. Some (those that measure around 2 mm for example) must have belonged to extremely young individuals, probably foetal, or new-born individuals still in their burrows, or just beginning to emerge. The right-hand peak, which includes both unfused and fused specimens, must have belonged to older individuals, presumably those that were fully independent. According to Southern (1940) the age at which the majority of young rabbits disappear in the wild is between 3 and 4 weeks after birth (as a result of dog and cat predation). Tyndale-Biscoe and Williams (1955) who studied natural mortality in a wild population of the rabbit in New Zealand also found that the vulnerability of rabbits to predators is highest at the time of emergence from burrows and declines steadily thereafter. It is possible then that the left-hand peak of very young rabbits derive from individuals that either died in their burrows or were killed (perhaps by dogs and cats) upon emergence from their burrows in centuries following the abandonment of the castle. The older group may have been taken by a different predator. But at present the bimodal pattern for the Camber rabbits is enigmatic. Nestlings may have been taken by humans from their burrows outside the castle while it was in use, for consumption as 'fish'; in medieval England, nestling rabbits were considered to be fish and could be eaten by the devout on fast days (Zeuner 1963). Older animals could have been hunted or trapped.

It is also possible that the majority of the rabbit bones derive from animals taken by buzzards, and that the younger ones, like some of the other rodents mentioned below, represent the juvenile prey of predators capable of entering the rabbit burrows (?polecat or stoat). At Douara cave in Syria, Payne (1983) suggests that juvenile hares were taken by owls, and adults by man.

The early 16th-century site of Little Pickle in Surrey contained a large quantity of rabbit (approximately 30%; Bourdillon 1992). However, unlike at Camber where all parts of the skeleton were represented and there was only one cut mark, at Little Pickle the majority of the rabbit bones were from the head and feet. Bourdillon mentions that they were butchered, and the hind feet had been cut off at the lower part of the tibia shaft.

On balance, it seems likely that the rabbit remains at Camber Castle derive in part from young animals that died in their burrows, and in part from individuals taken by predators, most, perhaps even all, animal predators. The problem of identifying the origin of rabbit bones in an archaeological site is clearly worth further investigation.

As a first step in determining the origins of the large number of rabbit bones, two samples of bones from the castle were submitted for radiocarbon assay. A date of cal AD 1460–1650 (OxCal: 95% confidence OxA-7533; 325± 45 BP) was obtained from a sample from a phase V deposit in the W Stirrup Tower (WB ii context 279), and a date of cal AD 1680–1740 and 1810-1930 (OxCal: 95% confidence OxA–7534; 30± 45 BP)) from a sample from a phase IV soil deposit on the WNW Courtyard (CT IV context 295) (Bronk Ramsay *et al* 1999, 200). The date from the stirrup tower sample is more or less contemporary with the occupation of the castle, whereas the date from the courtyard sample is modern. The dates confirm that there were the bones of rabbits both contemporary with the occupation of the castle and others which were more recent; it does not solve the question of the date or origin of the bones.

FISH

by Alison Locker

Introduction

Since the sieving and sampling techniques were inconsistent during the years that Camber was excavated, the presence or absence of certain species cannot be reliably attributed to any selectivity by the castle's inhabitants. A total of 1027 fish bones were identified to species or family group (see Table 8.2), as well as a few fragments of crab (*Cancer* sp.) and cuttlefish (*Sepia officinalis*). The biology of the fish species present indicates exploitation of the local coastal resources for a regular supply of fresh fish, with some evidence for the purchase of dried or salted fish from the presence of ling and in some instances cod. Freshwater fish are poorly represented. Table 8.2 shows the total number of identified fragments from each phase: 71% are from phase IV, as well as a sieved sample from a phase IV deposit in the NNE Courtyard (CT II context 86), where many remains of whiting and haddock were identified.

The fish species

The presence of ling is interesting. It is found in northern waters, not usually south of the Norfolk coastline, which suggests that these bones at Camber may be the remains of dried or salted fish brought to the castle. Some caudal cod vertebrae could also be the remains of stockfish, in which the fish is split and cleaned for drying, the last few caudal vertebrae being left *in situ*. As cod could have been caught in the Channel these vertebrae could also be from a fresh local catch. A small quantity of conger eel was also present at Camber. This fish was popular and was often caught off rocky coastlines in traps or on lines (Wheeler 1978, 63).

Flatfish, especially plaice/flounder, are strongly represented in the courtyard deposits. Measurements were made on the length of the 1st anal pterygiophore, which was commonly present, and compared with modern reference specimens of known length. Today plaice are usually around 500 mm in length, with a maximum of 910 mm, and flounder reach a maximum of 500 mm (Wheeler 1978, 354, 356). Of the 17 pterygiophores measured in phase IV, 12 indicated fish between 150 and 200 mm, two indicated fish between 200 and 300 mm, three indicated fish between 300 and 400 mm and a single large specimen of around 550 mm was measured from a maxillary. These fish are not large specimens, and are likely to have been caught as part of an inshore/shoreline fishery where fish are caught on lines or trapped as they come up on the shoreline to feed. The gurnard remains, also strongly represented in context 86, may also have been part of the same inshore fishery for bottom-living fish.

The abundant whiting remains from context 86 in the NNE Courtyard were mostly skull bones and represented a minimum of 11 heads from fish between 300 and 400 mm total length (measured from premaxillae and dentaries), an average size today. Eleven other lengths were calculated from other contexts included two other smaller individuals of 250 mm and a larger one of 500 mm. Whiting have been important foodfish throughout historic times. Haddock were also present in some quantity in context 86; skull bones were predominant and at least 6 heads were represented from fish of less than 430 mm with one at around 510 mm, that is within the size range for commercial haddock exploited today (Wheeler 1978, 152) (measurements are after Beerenhout 1994). In the English Channel, in the south of its range, haddock would have been found in inshore shallow waters during the winter and would have been a valuable seasonal catch.

Other species identified from the courtyard deposit include the premaxilla and dentary of an angler fish from a phase IV deposit in the SSW Courtyard (CT VI context 73). This species of angler (*Lophius piscatorius*) is found in shallow water and is good to eat. Davidson (1980, 161) finds the flesh comparable to lobster. Although it has never been the subject of a commercial fishery (Wheeler 1978, 145), accidental catches are marketed as monkfish. The fleshy tail is eaten and the fish is usually sold without the head because of its unattractive appearance. Roker was identified by two of the characteristic dermal denticles or 'bucklers'.

Both eel and herring, often present at other sites in large numbers in sieved material, are absent from context 86 in the NNE Courtyard except for two eel dentaries. It appears, therefore, from the evidence of context 86, that eel and herring were eaten rarely. Amongst the other hand-collected material, in which they are also rare, this absence may be attributed to their small size.

In the gallery fills, Vaulted Ring Passage deposits and the bastions, plaice and flounder are present throughout, as well as sole in small numbers. A valuable foodfish, the adult sole move into shallower water in the summer where they would have been easier to catch. Turbot, identified from the N Bastion, is common in the English Channel (Wheeler 1978, 344) and is found in shallow inshore waters to 80 m. A valuable and highly esteemed food-fish, turbot may be considered indicative of higher status than the fish already discussed. The only fish bones found in the Keep were two turbot heads.

A single pilchard opercular bone was identified from a context in the gallery. This species used to be the object of a valuable local fishery off the Cornish coast, where the fish were barrelled and exported to Italy as well as supplying a local home market. The export trade was later affected by the Napoleonic wars from which it never recovered, despite efforts to find a new market in the West Indies as slave food (Culley 1971). The pilchard, like other clupeids, is subject to periodic fluctuations in numbers that make for an unstable fishery. It is present in the Channel, where small catches are still made, and is sensitive to temperature change being encouraged by warm periods (Wheeler 1978, 68).

Whiting, haddock, cod and ling (the last two species by virtue of their size rather than the number of occurrences), were probably the most commonly consumed species after the flatfishes. Occasionally mackerel, sea bream, gurnards, roker and conger eel were also eaten. Proximity to a bountiful shoreline may have obviated the need to consume throughout the year the large numbers of barrelled herrings that are so often encountered in other assemblages both inland and on the coast.

An interesting find was three skull bones of perch, a true freshwater species. Another interesting find of a freshwater species was a carp pharyngeal from the N Bastion from an individual of around 400 mm in total length. Carp are not native to Britain, and were introduced from the Danube basin in the Balkans into Western Europe in the early Middle Ages (Hoffman 1995). They were particularly suitable for fish ponds, the development and maintenance of which ensured a supply of fresh fish all year in inland areas. Carp arrived in Britain rather later than the rest of Europe, the earliest record being in the 1460s when carp were used to stock the Duke of Norfolk's ponds (Hoffman 1995). Tolerance of low oxygen conditions made the carp an ideal fish, in what became a complex fish pond culture. The flesh can have a muddy taste, but this could be improved by hanging the live fish in a net of wet moss and feeding it bread and milk for a few days (Zeuner 1963). Carp have also been identified from mid 16th- to 17th-century deposits from Nonsuch Palace, Surrey, during its use as government offices by officials such as Samuel Pepys, who wished to leave London to escape the plague (Locker nd). However, the virtual absence of freshwater species is to be expected from a site so close to the coast and fishing ports.

Discussion of the fish bones

The assemblage of fish bones from Camber shows conformity in species distribution between the phases, which is not surprising in view of the other findings (see above). There is no evidence for area-related distribution of fish species.

Situated on the Sussex coast, close to the fishing ports of Rye and Winchelsea and less than 12 miles from the larger port at Hastings, the castle could have been supplied daily with fresh fish. This is strongly reflected in the assemblage, where flatfishes as well as whiting and haddock predominated. The other marine species, with the exception of ling and possibly cod, would have been supplied from the same source. The presence of so few freshwater fish is to be expected on a site so close to the sea.

There seems to be no suggestion of high status from the fish. As previously stated turbot was well regarded as a food-fish and probably would have been a more costly purchase than the other flatfishes. By the mid 17th century carp was not held in the same regard as it had been in the medieval period.

The low number of herring and eel are difficult to assess owing to the lack of a consistent sieving programme, but as only two eel bones were found in context 86 in the NNE Courtyard (CT II), which was sieved, it does suggest that their absence may not be solely attributable to recovery loss. At Battle Abbey (Locker 1985), some 14 miles away, herring was only present in the post-Dissolution deposits, although the cellarer's accounts show herring to have been the monks' staple diet. They also purchased stockfish, possibly cod, ling and mackerel, but the last was not identified from the bone assemblage. These documentary sources highlight the difficulties in interpreting the significance of absent species, particularly when maximum retrieval has not been ensured.

Documentary evidence also shows that both the monks and the Brownes (who lived at Battle Abbey after the Dissolution) were supplied with fish from London, including dried cod and 'red' and 'white' barrelled herrings. It would seem possible that Camber Castle, being coastal and close in location to Battle Abbey, could have had access to the same markets for fish. However, it should be noted that there are differences between Battle and Camber in the patterns of supply of pottery until later in the 16th century, which may have implications for the supply patterns for other items such as fish.

THE ANIMAL BONE ASSEMBLAGE: GENERAL CONCLUSIONS

A wide spectrum of species of animals are represented in the Camber Castle assemblage, but the common ones are sheep, cattle, pig, chicken, rabbit and several species of fish. Given the relative size of these animals, beef was undoubtedly the main source of meat, although mutton, pork, poultry and fish were also consumed. As far as species frequencies, parts of the skeleton represented, and the size variation of the sheep and cattle are concerned, no differences could be observed between the phases or across the site. The homogeneity of the faunal assemblage, like the pottery and metalwork, indicates that the faunal remains are predominantly derived from the period in which the castle was in use, that is from the mid 16th century to the mid 17th century. In archaeological terms this is a relatively short time

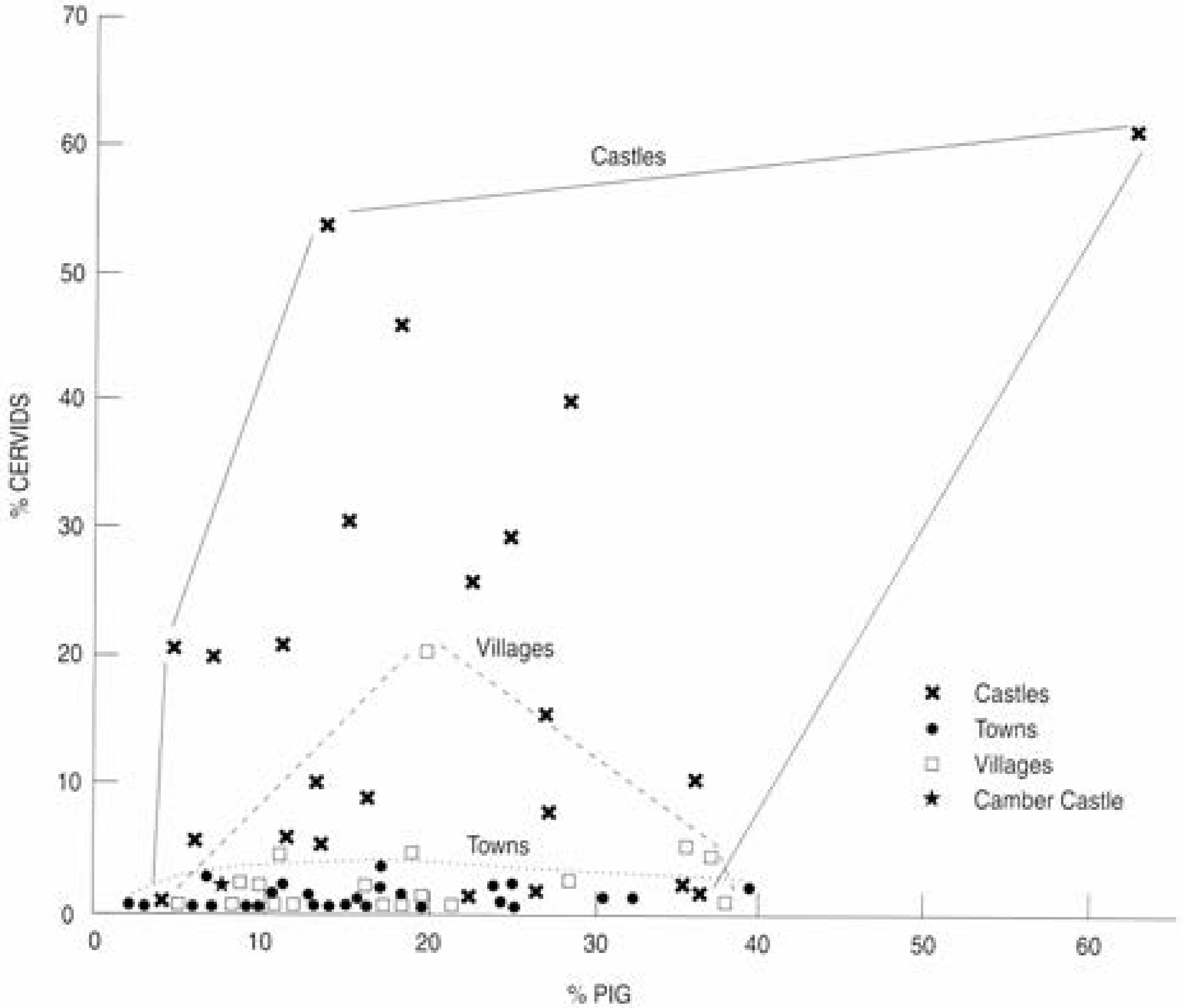


Figure 8.10: Animal bone; pig and cervid frequencies for different assemblages

span, and one which therefore provides a useful benchmark for comparison with other assemblages.

The assemblage is similar to those from low status urban sites, and this is consistent with the likelihood that the castle was usually occupied by gunners and soldiers. There are some indications of a higher status component in the diet from the presence of turkey, peafowl, deer and turbot, but these are not very prominent and were probably eaten only on rare occasions. Indeed they probably bear witness to the occasional visits of high ranking officers. Comparison with other English medieval and post-medieval towns, villages and castles (Fig. 8.10) suggests that Camber is in fact very similar to urban animal-bone assemblages, with low percentages of both pig and cervids. As in towns, food was imported to the castle from the surrounding countryside; by contrast, villages tended to be largely self-sufficient. We might assume that the large farm animals such as cattle and sheep were purchased from farmers in the Rye area, and that many of the fish were brought over by fishermen from Rye and Winchelsea. The bird and fish species present suggest that the local coastal and estuarine resources were also exploited. Flatfishes, whiting and haddock dominate the fish component, and ducks and waders the bird component. It is likely that the soldiers supplemented their rations by fishing, hunting and snaring many of the species present, such as the teal, avocets and oystercatchers, and some of the smaller animals, including the hares. Numerous fish hooks were found at the castle, as well as an eel spear, a birding arrow and a spring from a gin trap (Scott, Chapter 7). It remains unclear at present to what extent the large number of rabbit bones, some extremely young, derive from animals trapped or hunted by the soldiers of Camber, or to what extent they are simply intrusive or even derive from other predatory mammals and birds.

While most of the bones are undoubtedly the garrison's food remains, some are probably not. These include the cats and dogs, parts of whose skeletons were found in articulation. Dogs were probably used as guard animals or mascots, and cats would have helped with the control of rats and mice as well as possibly being pets. Many of the dog and cat bones have cut marks suggesting these animals were skinned. The abundant remains of jackdaws and some of the smaller animals such as sparrows, shrews, rats and mice, may have accumulated by natural means. The poor representation of horse suggests that horses were used for their power alone. A sawn horse bone could be evidence of tool production.

Much of the meat was probably brought in as whole animals or carcasses, and butchered, or perhaps even slaughtered, in the castle. At that time armies on foreign campaigns were supplied with live beef cattle that followed the troops (Davies, 1964). Some beef, however, may well have been brought in from outside the castle as butchered joints. There is little indication that other animals besides the cats and dogs were kept nearby.

The cattle age structure at Camber conforms to what was probably a countrywide pattern by the 16th century with a shift towards the culling of veal calves, indicating the development of more specialised beef farming geared towards veal and dairy production. It would also suggest that perhaps the dairy industry was important in the Rye area in the 17th century. Many of the sheep were less than 3 years old; they were probably exploited primarily for their meat, though no doubt the local farmers also exploited them for other purposes, and it is quite likely that, for example, the retired dairy animals were sent elsewhere.

Our comparison between the Camber bone measurements and those from other medieval and post-medieval sites has proved very rewarding. There is considerable interest among agricultural historians in the improvement of livestock in England over the last few centuries (see for example Beckett, 1990). Livestock improvement is generally associated with the Agricultural Revolution, but when, and at what speed, improvement actually occurred remains unclear. If increased size equates to improvement, then measurements taken on zoo-archaeological remains can provide an alternative source of information about this process. The short period of occupation at Camber Castle means that sheep and cattle measurements from this site can serve as a useful benchmark for animal size during an archaeologically brief period of 120 years. Several recent studies of animal remains from medieval and post-medieval assemblages have shown that sheep and cattle underwent a marked increase in size during the period between the 15th and 19th centuries. In several cases where material could be fairly closely dated, these size increases appear to have occurred quite early: even as early as the 15th century, some three centuries before the accepted date of the Agricultural Revolution (Maltby, 1979; Stallibrass, 1988; Davis, 1995; Dobney *et al.*, 1995; Albarella and Davis, 1996).

In view of these findings it is not surprising that the Camber cattle and sheep are considerably larger than medieval English cattle and sheep. As far as the comparisons with other post-medieval remains are concerned, it would appear that the Camber animals are larger than the post-medieval ones from Launceston in Cornwall (both those of 16th- to 17th-century date and those of 18th- to 19th-century date) and perhaps, though the samples are small, slightly larger than those from Norwich and Lincoln too. (It should be noted, however, that the small difference between Camber and the assemblages from Norwich and Lincoln may be due to a disparity in the sexual composition of these samples, as would arise, for example, if there were a larger proportion of males compared to females at Camber and a smaller number of males at Norwich and Lincoln.) However, if the Camber cattle and sheep are indeed larger than their post-medieval relatives elsewhere in England, then this might be a reflection of the state of agriculture in Sussex at that time. In his description of the Romney Marsh country in the 16th century, Kerridge (1973, 91) writes that it was mainly in the hands of well-to-do graziers above all interested 'in producing fat stock'. Cattle were brought here to be fattened, and the native Romney Marsh sheep were big animals with 'long legs, deep paunches, thick necks and heavy fleeces of very long, semi-lustrous combing wool, well suited to all but the finest worsteds'.

It will be interesting, when samples become available, to compare medieval sheep and cattle remains from the Rye area with those from Camber and with contemporary sheep and cattle elsewhere in England, to investigate when their size increased and whether, even in medieval times, East Sussex had larger livestock than other areas of the country. The measurements of the animal bones from the site are valuable and will therefore make a useful contribution to a much broader study of selection trends and animal husbandry practices during the post-medieval period in the south of England.

Chapter 9: Discussion

by Jonathan Hiller, Ian Scott and Anthony Streeten

Camber Castle was abandoned in 1637 because of the retreat of the sea and the silting of the Camber. For this reason it was not adapted for continued use through the 18th and 19th centuries, unlike many of its contemporaries such as Walmer, Deal and Hurst, and survives as an example of a largely unmodernised Henrician artillery fort.

The castles of Henry VIII's Device were built at a time when the destructive capability of mobile field artillery was beginning to determine the design of fortifications. Charles VIII had invaded Italy in 1494 with 18,000 troops and an artillery train of at least 40 guns, and the medieval fortifications in their path had proved unable to withstand the sheer firepower at Charles's disposal (Coad 1997, 158). In England, many medieval castles were in a poor state of repair by the Tudor period; they were large, expensive to maintain, and militarily obsolete. Leland recorded the condition of many of them in his *Itinerary*, and Thompson lists 137 castles out of 258 that were ruinous by the 15th century (1987, 170–8).

The history of the Device forts and the European context has been set out by J R Hale (*HKW*, 367–82) and it is only necessary to sketch the outline of the story briefly here. In late 1538 and early 1539 the threat of invasion by the combined catholic powers became a reality. France and Charles V had signed a peace treaty in June 1538, and Pope Paul III was threatening to publish the Papal Bull excommunicating Henry. The invasion scare of 1539 was very real and led to an unprecedented building campaign of new fortresses to bolster England's weak defences. Henry was able to finance this enormous building programme and bring it to completion very rapidly because the royal finances were in a very good state as a result of monastic confiscations. It also helped that Henry had a real interest in military matters and new ideas and developments.

Hale has suggested that 'we can speak confidently of a Henrician style' (*HKW*, 380), and there is no doubt that the majority of the fortifications were the product of the King's Devisors at Hampton Court. Camber is unique amongst the defensive works of the scheme firstly in being constructed around an existing tower, and secondly, in being almost completely rebuilt. The result is three clear and discrete phases of construction. The first structure on the site was a round gun tower, built between 1512 and 1514. This was retained in subsequent modifications. Stephen von Haschenperg's castle, completed in 1540, seems to have been designed with a marked emphasis on internal security and close defence. The importance and interest of this structure lies in its low-lying bastions with a shingle built glacis and orillons. It was clearly out of step with the Downs forts, which represent the apex of Henrician design, and reflect the centralised royal control of the building works (Coad 1997, 159). Von Haschenperg's castle was completely remodelled in 1542–3, bringing it more into line with contemporary fortifications (Fig. 9.1).

Aside from the intrinsic interest of this unusual construction history, it remains the case that archaeological investigations of Henry's fortifications have been few in number. With the exception of Sandgate Castle (Harris 1980), the only other comparable work has been at two of the Thames blockhouses (Smith 1979; 1982). The excavations reported in the present volume represent therefore a significant contribution to the archaeological understanding of these sites. However, the excavations were undertaken in the exceptional context of the simultaneous preparation and publication of Biddle's major study of the castle for *The History of the King's Works*. His analysis, based on the historical sources and supplemented by archaeological evidence, remains the most authoritative account of the castle's construction, and of the strategic goals that determined its design and redesign, and it has not been significantly modified by the results of subsequent research. The text has been reprinted with some minor changes as part of Chapter 2 of this volume. The present concluding discussion will therefore highlight the complementary information that has been derived for the most part from excavation. This information comes from the assemblages of finds and animal bone, and from additional work carried out by Martin Biddle on documentary sources, supplemented by research that has taken place into the castle's environs since the publication of Biddle's account.

THE CASTLE IN ITS LOCAL AND HISTORICAL CONTEXT

Camber Castle, as originally conceived and as it survives today, reflects the operation of historical and geographical influences that have their origins in the medieval period. The port towns of Rye and Winchelsea were granted by royal charter to the abbey of Fécamp in the 11th century. They prospered, and were included in the Confederation of the Cinque Ports in the second half of the 12th century. The Cinque Ports, in their most developed form, represented a confederation of the ports of Hastings, Romney, Hythe, Dover and Sandwich, augmented by corporate members such as Seaford, and the 'ancient towns' of Winchelsea and Rye. The ports were responsible for the maintenance of their trade and shipping, harbour works, fortifications and protection against storm damage. They provided up to 57 ships for service to the King for a maximum of 15 days, and soldiers for military campaigns, in return for coveted liberties and privileges including exemption from national taxation, the right to self-rule, and their own judicial system.

The Defences of Rye and Winchelsea

The marsh estuaries of the rivers Brede, Rother and Tillingham (the Rother Levels) were crucial for the inland commercial trade of the 'ancient towns', but historically

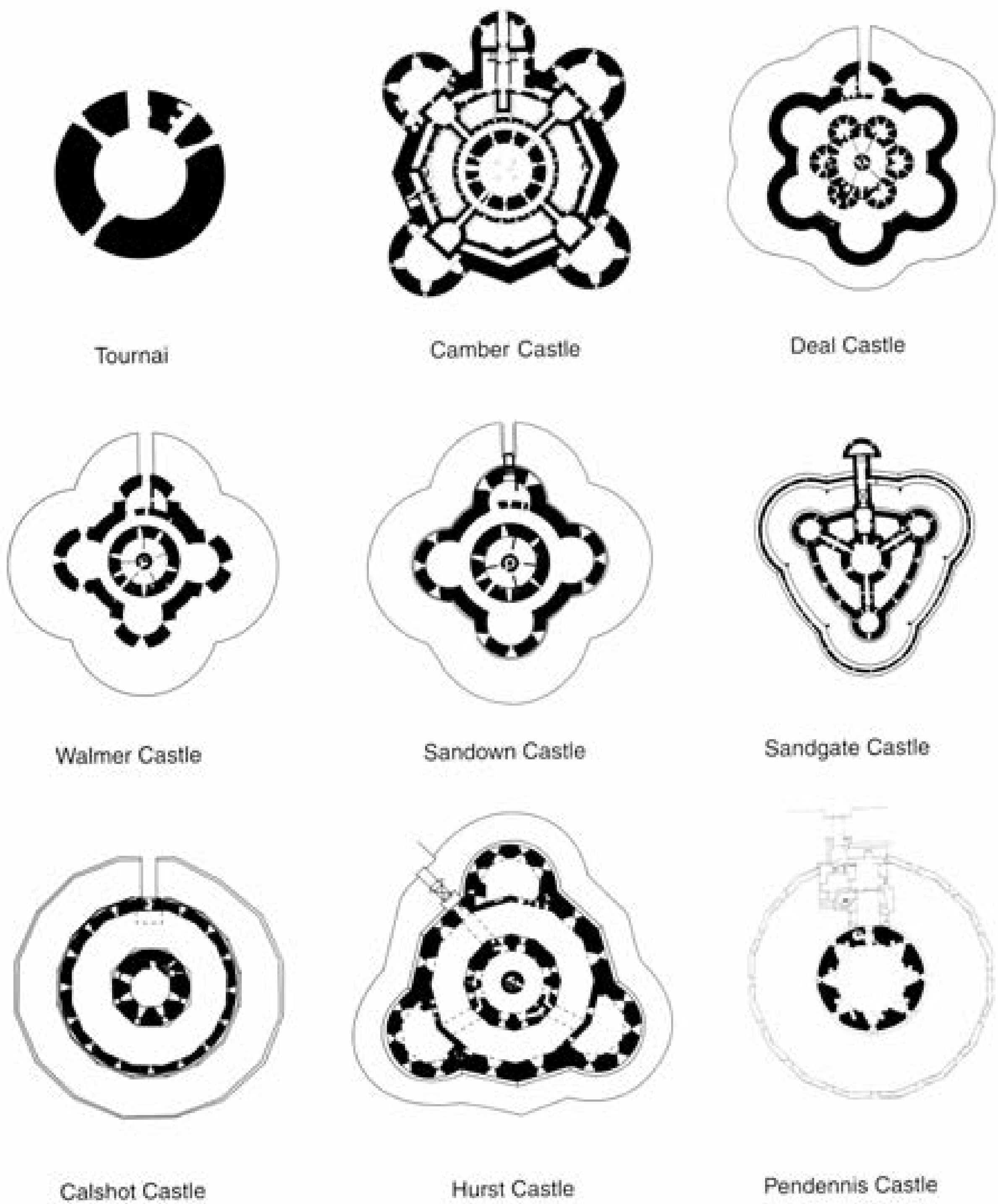


Figure 9.1: Comparative plans: Camber compared with contemporary Device fortifications (after Saunders 1989, p37)

they were poorly protected (Renn 1979, 193). The ports at Pevensey, Hastings and Dover had castles dating back to Norman times, but by contrast the protection of the Rother Levels relied on local initiative. At Brookland on Walland Marsh, a timber tower, perhaps for a warning bell, had been built at the instigation of St Augustine's Abbey (Gravett 1974, 43–48). Upstream from Rye, at Newenden, a sharp bend in the river Rother was guarded by a 13th-century earthwork (Davison 1965, 80). The 14th-century castle at Bodiam, which overlooked the river Rother, could have contributed little to the defence of the Levels. Its builder Sir Edward Dalyngrigge, a veteran of the French Wars, had obtained in 1385 a licence to crenellate to 'make a castle thereof in defence of the adjacent country against the king's enemies' (Kenyon 1981, 209), but it has been argued that Bodiam was intended more for show than to provide a real defence (Coulson 1991).

The strategic and economic importance of Rye had been acknowledged as early as 1217, when it was recaptured from the French and became the royalist naval base with attendant fortified house. In 1243 the king's galleys were transferred there (Renn 1979, 194–5). In 1247, for reasons of safety of the realm, the Crown regained both towns from the abbey of Fécamp under the Charter of Resumption, and the abbey was offered manors in Gloucestershire and Lincolnshire in return (Renn 1979, 193). 'Rye Castle', the cubic Ypres Tower, was constructed around 1250, and was equipped with three-quarter-round towers. This fortification afforded some protection to the town and had a good command of the confluence of the rivers Brede, Tillingham and Rother (Renn 1979, 198). Nonetheless Rye was seriously damaged in the French raids of 1339 and 1360 and the town was taken and burned in 1377. In 1381 a murage grant was obtained for the construction of stone defences, of which only the Land Gate survives today.

New Winchelsea was laid out in 1283, to replace the old town of Winchelsea in Rye Bay. The new town was laid out on a site already partially occupied by a settlement belonging to Fécamp, and including a defensive tower some 7.6 m square (Renn 1979, 198). Ditches and walling appear to have been erected around the town (Cooper 1850), though it was sacked by the French in 1359 and 1380 (Cooper 1850, 80, 90). When the construction of stone defences began at Rye, surveyors were appointed to recommend appropriate defences for the new town at Winchelsea. In 1415 the king granted 600 marks to construct the town wall and towers against repeated French incursions (*VCHS* 9, 67). A watchtower, 'the Roundle', stood until 1828 in the intriguingly named 'Castle Field' north of St Leonard's church; Renn suggests that this may be the only part to have been built of a planned 13th-century royal castle here (1979, 199, 200).

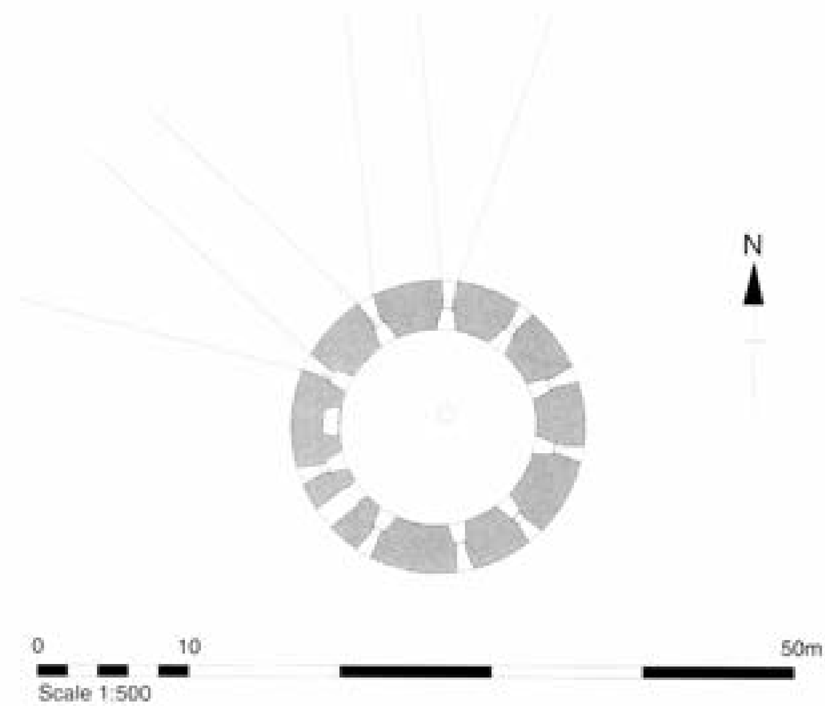


Figure 9.2: The Phase I Tower, fields of fire

Despite the French raids, Rye and Winchelsea remained vibrant trading ports into the early 16th century, served by the Camber which formed the largest natural harbour in the eastern English Channel. Up to 400 ships could shelter in the Camber, both local trading vessels and those escaping foul weather in the Channel (Mayhew 1984, 107). Both ports remained militarily sensitive, Rye particularly so, as the sea surrounded the town to a depth of 20–30 ft at high tides. In 1528 it was reported that 'ships could lie at a stone cast from the town wall and the town would not be able to resist them' (Mayhew 1984, 111).[1]

Throughout the Tudor period repeated wars against the French meant that the south coast was under regular threat of attack, and there was good reason to suspect that the Camber would be vulnerable. In June 1495 Perkin Warbeck had attempted a south coast invasion, supported by Margaret of Burgundy and Emperor Maximilian I. Warbeck and his forces eventually landed at Deal, but were easily defeated (*HKW*, 367).

THE FIRST TOWER

Sir Edward Guldeford's tower of 1512–14 was the first new fortification to be built in Sussex for over a century, and was one of a number of late medieval fortifications built intermittently along the English coast prior to the Device of 1539. Kenyon has suggested that the early Tudor period was the beginning of a less conservative period of fortification, with the medieval castle plan discarded in favour of smaller blockhouses. Dartmouth Castle in Devon was begun in 1481 by the local townspeople to help defend the haven from French raids; financial aid from the Crown came later. Important defences were constructed at Plymouth, and three blockhouses were built before 1540

Plate 9.1: The Keep, vault of phase 1 gunport cut for the insertion of the N Radial Passage, looking north, 1963 (English Heritage)

around Firestone Bay west of Plymouth (Kenyon 1981, 217–18). These fortifications are of mixed design: at Dartmouth there is a double tower arrangement, one circular, one rectangular, while the central gun tower in Firestone Bay is seven-sided. The gunports of these blockhouses were usually rectangular or circular.

Domestic arrangements and accommodation

The space available within the tower was limited to a single storey, and the accommodation would have been basic. There was probably a well to provide water, and there was a large fireplace for heating and cooking. There is no evidence that the tower ever had any garderobe facilities and it is unlikely that it was ever intended to have a permanent watch or garrison.

Design and ordnance provision

The tower at Camber contains several interesting features, notably the ten round-headed and double-splayed gunports that anticipated by some 25 years the grand double-splayed gunports of the Device fortifications. The gunports were splayed internally and externally, but lacked smoke vents and were too small for large guns (Plate 9.1). The gunports had shutters, which were hung on iron pintles and opened inwards. The double splay allowed greater traverse for guns (Kenyon 1981, 221) and superseded in design the rectangular single-splay, circular or 'inverted keyhole' gunports of the earlier period (as seen, for example, at Bodiam and Portchester). Inspite of their external splays these gunports had limited arcs of fire, which did not meet and would therefore would have left dead ground around and approaching the tower (Fig. 9.2). Although the field of fire was still restricted, the double-splayed gunports at Camber were based on a major advance in military architecture, and stylistically may be compared closely to those at Tournai.

The phase I tower appears only to have been armed from *c* 1536 (see Chapter 2 above). What the guns were is not known. The tower was armed at two levels, probably with the main ordnance mounted on a gundeck on the roof, and smaller guns in the ports around the base of the tower. The absence of suitable vents to disperse smoke from heavy guns suggests that the gunports were for handguns or more probably swivel guns for 'local defence', as Biddle has suggested (see above Chapter 2). These are likely to have been breechloading wrought iron pieces mounted on wooden beds and known as 'serpentines' (Smith 1995, 104–5, figs 1 and 2). So far as we know the tower never fired its ordnance in earnest and therefore its shortcomings were never exposed.

THE PHASE II CASTLE

Design

The castle was constructed rapidly at a time of crisis, and it is known that its designer, Stephen von Haschenperg, was engaged at other building sites (Chapter 2) and not always present during the work; these factors may account for some obvious faults in the completed building. For example, the flankers in the north and west Foreworks fired directly onto the Entrance Bastion, and the north and west radial passages to their respective stirrup towers were built slightly off-centre, giving a curious skewed appearance to the finished building. The sally port beneath the Entrance Bastion could never have functioned as intended because of the high water table, and had been abandoned within three years. Similarly the low-level basement in the D-shaped addition was apparently abandoned soon after the timber floor had been laid. The basement must have been built within a pre-existing ditch dug to provide an exit for the basement-level culverts under the original Gatehouse. The raising of all floor levels in phase III suggests that water level was always a problem. The design defects may not all be the fault of von Haschenperg; in fact design problems appear to have been typical of the period. Henry put intense pressure on his builders, and once designs were settled he wanted to see instant results. Builders worked through all weathers and round the clock to complete Whitehall Palace, and canvas tents were erected to protect them from the rain (Thurley 1993, 39). Much money was spent on overtime to ensure that buildings were ready for the king's visits, and overtime was worked at Sandgate (another of von Haschenperg's constructions), and at Camber itself. The rapid pace of construction often resulted in poor standards of workmanship (Thurley 1993, 40).

Design flaws aside, the second phase of Camber Castle contains several unique features. Of note are the angled curtain walls, retained in phase III, which are analogous to the curtain walls of Hurst Castle, Hampshire. This layout pre-empted by four years the design of Southsea Castle (Hampshire), which has north and south projecting salient walls forming embryonic angle bastions, and Sandown (Isle of Wight), where the angled bastion made its first appearance, after 1545 (Kenyon 1979, 62).

Domestic arrangements

The domestic arrangements within the phase II castle can only be tentatively suggested, since only parts of the structure survive above ground level. The phase II curtain wall survives together with the stirrup towers, much of the original Entrance Bastion and modified Great Tower or Keep. The phase II castle was intended to house a small permanent garrison and therefore sleeping quarters and mess and garderobe facilities would have been required for the garrison and the captain, as well as storage space and other facilities. The features which can be identified confidently are the garderobes.

By comparison with the phase III castle the space available for accommodation in the phase II castle appears to have been quite restricted. In the phase II design, the Keep was the main gun platform, and would doubtless have seen much day-to-day activity by the gunners and soldiers. The large fireplace in this period may have been used for cooking, and space in the Keep used by the garrison as a mess room.

There is little direct evidence to suggest where the captain's quarters were located in phase II. His quarters would be private and not generally accessible by the garrison, so it is most unlikely that they were set up in the Keep. It is probable that the captain's quarters were in the Entrance Bastion, which on completion was the most spacious of the castle structures. The only rooms with raised floors were the Inner North and South Rooms, both of which were only accessible from the lobby. Both rooms were furnished with brick-arched recesses, possibly used as cupboards or shelf spaces; the smaller arch in the Inner South Room originally gave access to the parapet of the D-shaped Bastion. These domestic arrangements represent a degree of domestic furnishing not apparent in the other castle buildings and rooms of this phase. The purchase of 200 'bordes of waynscott' is recorded in the 9th pay and it is likely these were for installation in the captain's chambers.[2] It is not clear that there was a garderobe in the Entrance Bastion at this period, so the Captain may have used the same facilities as the garrison when he was in residence. The elaborate arrangements at first floor level in phase III perhaps suggest that the captain, Philip Chute, had been less than impressed with his earlier accommodation.

The main spaces otherwise available were the stirrup towers. It seems probable that these housed stores and other facilities and perhaps provided some accommodation for the garrison. They would have afforded access into the foreworks and low level bastions at the castle perimeter. Some limited additional space might have been available in the ground floor gallery, within easy reach of the curtain wall parapet. Each stretch of gallery was equipped with a garderobe, and this level of provision presumably reflects a symmetrical disposition of living accommodation linked to defensive positions, throughout the castle.

The defences and ordnance arrangements

The layout of the defences of the phase IIb castle can be reconstructed from the surviving structural evidence, but because parts of the defences of this phase were levelled prior to the reconstruction of the castle in 1542–43 (phase III), some elements of the reconstruction are more tentative than other parts. As part of the new works in 1539, the original 1512–14 tower was heightened and a new gun deck constructed. The original gunports were blocked and a Vaulted Ring Passage with gunloops was built around the foot of the tower. The tower was surrounded by a curtain wall and gallery, which linked together the four stirrup-shaped towers with vaulted chambers and low bastions projecting forward.

The defences of the phase IIb castle show a number of distinctive features. Firstly, they were very low-lying, with a comparatively thin curtain wall protected behind a sloping glacis. In this the design seems to be adopting elements of the *trace italienne*, and seems to be looking forward. Secondly, the Vaulted Ring Passage and the gallery basements with their gunloops firing over the courtyard, and the radial passages linking the galleries and Vaulted Ring Passage, are all features which help in defence against land attack. Sandgate, which was also the work of von Haschenperg, like Camber has radial passages linking the keep with the outer defences. These features all point to an attempt to create a modern style of fortification different from the other device forts.

In one way, Camber phase IIb was like the other Device forts, in that it had gun positions at a number of levels. Indeed it is probable that these were on five levels with the main guns on two levels and handgunners and/or archers on three levels. The highest tier, which was formed by the gundeck on the tower, or Keep, probably mounted some of the heavier guns. The tops of the stirrup towers will have formed the next tier down, and were perhaps equipped with light guns, possibly breechloaders, or more likely were manned by handgunners. Just forward of the stirrup towers were vaulted chambers, which probably supported fighting platforms suitable for handgunners or archers, or possibly for smaller breechloaders, but not for large guns. These platforms formed the third tier. At the same level would have been the curtain parapet, which was possibly pierced by embrasures. It is unlikely that guns of any size were mounted on the phase IIb parapets, which were more likely to have been defended by handgunners or bowmen. Forward of the vaulted chambers were the four low bastions, which formed the next tier down, and were perhaps intended to carry the heavy guns. The lowest tier comprised the gunports which it is suggested were located at each end of the vaulted chambers behind the main bastions. These would have acted as flankers providing fire across the glacis and front of the curtain wall. These flankers probably mounted small breechloaders.

There is no evidence for the intended ordnance provision in the phase IIb castle. The building accounts record the delivery of guns and powder, but give no indication of the size or number of guns.[5] Some attempt can be made to reconstruct the likely ordnance positions and the fields of fire of the subsidiary positions of the phase IIb castle. The main guns will have been divided between the gundeck on the Keep and the low forward bastions; it is possible that larger guns, perhaps culverins or demi-culverins, will have been mounted on the *terrepleins* of the bastions, with smaller guns on the Keep. At St Mawes in 1609 culverins and demi-culverins were mounted on the bastions and a minion and two sakers on the roof. Although no embrasures or other evidence for gun positions survive for the phase IIb castle, the fields of fire for the main batteries will have been wide, giving all-round cover. The stirrup towers will have covered the parapets and glacis and provided anti-personnel fire over the main bastions. The proposed flankers in the vaulted chambers forward of the stirrup towers will have provided cover for the glacis (Fig. 9.3).

THE PHASE III CASTLE

The design

The redesigned castle of phase III is smaller in area than its precursor, covering 0.73 acre, but was comparable in size with the largest of the Downs forts, Deal, which covered 0.85 acre. The new design is considered in detail in Chapters 2 and 3, above. It is clear that, on a practical level, it was essential to raise the floors in order to avoid the high water table. At basement level there seems little doubt that damp was a major problem and probably the first stage of modification of 1542–3 after the previous defences had been dismantled was to raise floor levels throughout the castle. The rebuild was on a large scale, and very costly, perhaps due in part to the more elaborate and decorative domestic style of architecture adopted, particularly in the Entrance Bastion at first floor level, and in the first floor level of the Curtain Wall galleries.

Domestic arrangements

The phase III castle appears to have had far more space available for accommodation and storage. Floors were added to the galleries, the stirrup towers, the Entrance Bastion and the Keep. In addition the gunrooms in the new bastions provided more space. There is limited structural evidence for the domestic and related uses to which the various parts of the castle were put.

The presence of ovens and the site of a range show that the kitchen was located in the W Bastion. The W Bastion, facing in towards the sheltered anchorage of the Camber, was perhaps of less strategic importance than the seaward-facing N, S and E Bastions, and was probably for this reason selected as the site of the castle kitchen. Two ovens and a range were installed to keep the garrison fed. The water supply was probably from the well in the west courtyard, which was easily accessible from the kitchen, and the use of brick instead of timber for the floor of the W Stirrup Tower suggests that provisions and

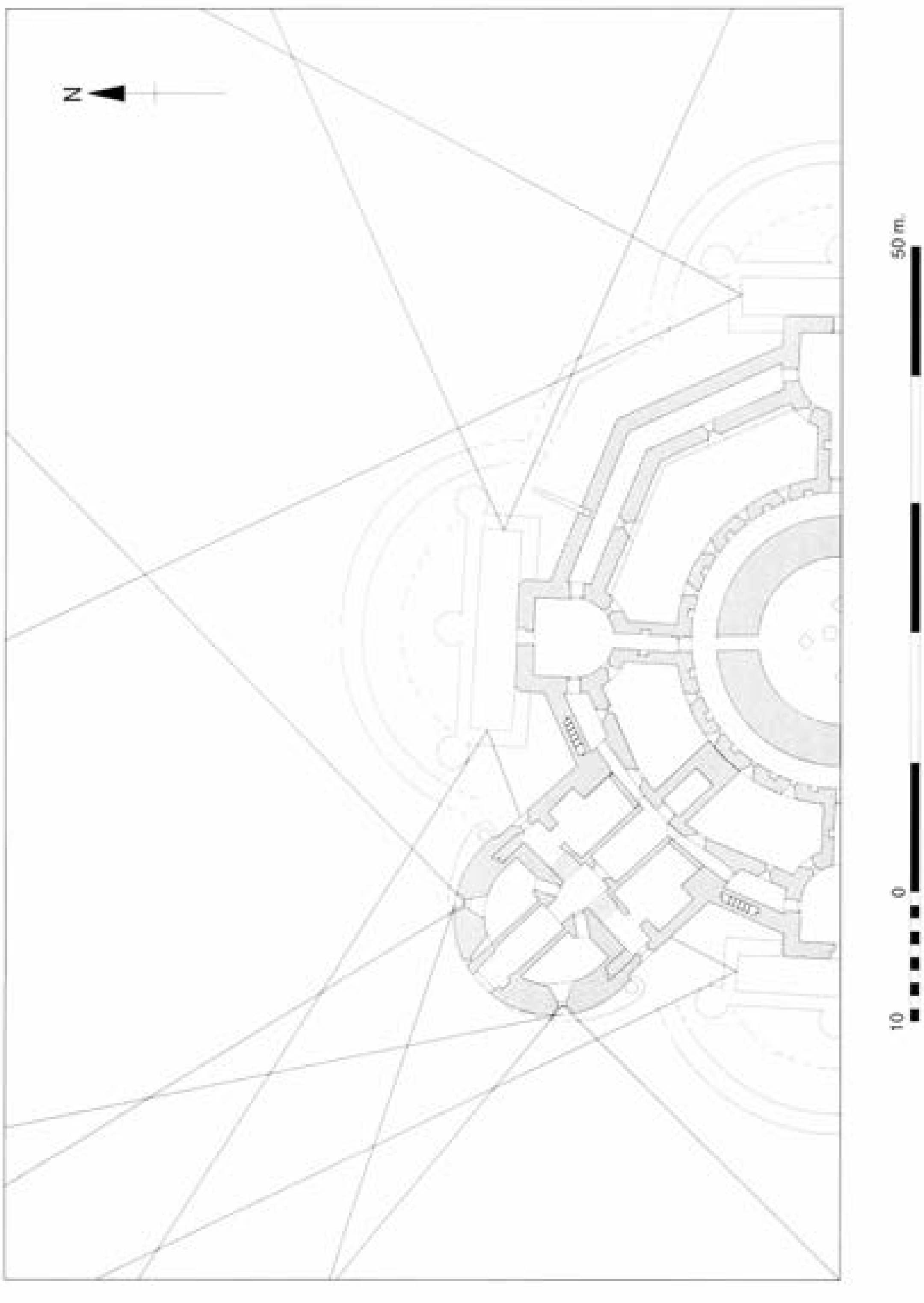


Figure 9.3: The Phase IIb castle, fields of flanking fire for guns positioned in foreworks. Hypothetical reconstruction

Plate 9.2: WNW Curtain Wall gallery basement, looking north-east to the partially blocked door into the W (Kitchen) Bastion, which may have functioned as a serving hatch. 1982 (English Heritage/Streeten)

foodstuffs were stored here where they could be kept dry. A new ground level access was built through the WNW Gallery wall as a result of changes in the access arrangements to the Entrance Bastion and the creation of the blocking which is identified as a possible serving hatch (see below).

The garderobes and fireplaces in the Entrance Bastion and Curtain Wall Galleries indicate the location of accommodation. It has been suggested that the garderobe on the first floor of the Entrance Bastion was intended as a private facility attached to a suite of accommodation used by the captain. The internal walls of the Entrance Bastion are largely demolished and because of this the layout of the first floor accommodation can only be sketched in.

Major changes took place in the design of the Entrance Bastion, with the effect of creating a private and very comfortable set of rooms at first floor level. The Inner North and South Rooms were extended to the outer wall of the Gallery, thereby cutting off the basement and ground floor circulation at this point. The door in the WNW basement gallery was blocked, leaving only a single access point from the Basement Gallery into the Inner North Room. A stair was built in the Inner South Room, providing access to the first floor of the Entrance Bastion. Above the Quadrant Rooms and Outer Entrance Passage, the fireplace and evidently large windows suggest a spacious room and here the captain may have entertained guests and received visitors. The room also contains the only private garderobe in the castle, a garderobe that was not accessible from the galleries where the soldiers were accommodated or on guard. Two drain chutes housed in the thickness of the wall were probably for disposal of washing water.

Meals could conveniently have been brought round to the Entrance Bastion from the W, or Kitchen, Bastion, via the WNW gallery. The blocking of the door into the WNW gallery basement may have been for the creation of a serving hatch for this purpose (Plate 9.2). The rooms of the ground floor of the Entrance Bastion were presumably used for administrative purposes, and possibly by the captain's deputy. The new recess in the N wall of the Inner N Room may have housed a cupboard. Facilities were improved for the porter, with large fireplaces installed in both N and S Quadrant Rooms.

The accommodation in the galleries, with both single and multiple garderobes, was probably for the soldiers and gunners of the garrison. The infilling of the N and S bastions and the SE Gallery in the early 17th century will have resulted in some loss of accommodation, but will have left sufficient space for the garrison. The garderobes set in the Curtain Wall survive, the bases of probable chimney stacks were found in the courtyard and evidence for glazed windows was recovered from bulk fills. The standing structures of the galleries are largely missing because of their demolition above ground level.

The first floor gallery living quarters must have been a considerable improvement on the earlier barrack accommodation, being supplied with glazed windows as well as heating facilities. The well-appointed garderobe at first floor level in the SW angle of the Curtain Wall may have been for the use of senior personnel, or perhaps even important visitors. The multiple garderobe in the basement gallery at this point was presumably for the use of the soldiers and gunners. Even allowing for the provision of private facilities, the total of seven garderobes is an extraordinary number for a garrison that at its highest recorded level was 29 men in 1553. The concentration of new garderobes in the SW Gallery could suggest that the remaining cubicles at ground level were de-commissioned, although this cannot be proved from the available evidence. The permanent garrison could be augmented in the event of an emergency by calling on men from the adjacent two Hundreds, so this may account for the additional facilities.[4]

There are fireplaces in the Keep, but no garderobe, which suggests that the Keep was not used for sleeping accommodation. This in outline is the sum total of the structural evidence.

1616 Survey

Fortunately we do not have to rely solely on the evidence of the standing structure. There is also evidence from surveys of the castle. While the main evidence comes from a survey in 1616, an indenture of 1613, with additions dated 1615, mentions three rooms - the hall, the porter's lodge and a chamber over the porter's lodge. The 1616 survey of Camber was undertaken as part of a larger enquiry into the estimated cost of repairs to 'his Majesties castles and fortes':

Camber Castle

Imprimis the outer walls of the saide Castle to be coped pointed and repaired in the most needfull places and the portes and loops to be amended will cost in Masons worke and all other needfull materialls

40 - 0 - 0

Item the gate and porters lodge to be repaired in tymber workes and leades will cost with Masons, carpenters, Plombers and Glasiers worke and other neidfull materialls

10 - 0 - 0

Item the halle there being decayed in the leades and tymbers of the roofe and in the tymbers and plankes vnder foote being vaulted or sellared vnderneath will cost to be repaired and amended

15 - 0 - 0

Item the dyneing roome there being decayed in the leades and tymber over head and the plankes and tymber vnder fote with the glasse and some iron worke for the windowes will cost to be repaired

10 - 0 - 0

Item there are eight lodging chambers towardes the East decayed and much ruinated in the leades, tymber worke, plaistering glasing and Iron worke of the windowes with the flouers and tymbers vnder foote being sellared or vaulted vnderneath which to be repaired will cost

30 - 0 - 0

Item the wainscote Chamber decayed in the leades and tymbers of the roofe and in the glasse and Iron worke of the windowes and in the plankes and tymbers vnderfoote with plaistering and other thinges will cost to be repaired

15 - 0 - 0

Item the leades over the storehouse to be repaired and the tymbers hereof to be amended will cost

5 - 0 - 0

Item the Chapell Chamber decayed in the leades and tymbers will cost

5 - 0 - 0

Item the platforme there called the East Mounte to be made vppon the leades of the same mounte with tymbers and plankes being in length 52 and in breadth 36 foote will cost to bee new made being vtterly decayed

31 - 4 - 0

Item the platforme vppon the Southe Mounte to be made servicable for the Ordnance either tymber or hewen paving stone being an earth or dead mounte will cost

31 - 4 - 0

> Item the platforme on the west Mounte, being over the kitchen, to be made with tymber servicable for ordnaunce and the leades and tymber vnder the said platforme to be repaired will cost
>
> 36 - 0 - 0
>
> Item the North Mounte or platforme for Ordnaunce to be made of stone or tymber being a dead mounte will cost
>
> 31 - 4 - 0
>
> Item the keepe there being a round tower standing in the middest of the Castle with a vault of stone for a close sight under ground and [three roomes] in the saide keepe on[e] above another besides the leades, etc over the topp of the same the saide leades and tymbers of the saide roomes being in great decay and the roomes in the saide keepe ready to fall the stayres leading to the roomes and topp of the keepe vtterly decayed all which to repaire in the leades and Tymbers and stayres will cost
>
> 100 - 0 - 0

Although the survey was made more than 70 years after the construction of the phase III castle, it is unlikely that major internal changes had been implemented in the interim. The only substantial documented structural works involved the creation of the Rampire in the SE quadrant and dead mounts in the N and S Bastions. The creation of the Rampire seems to have involved the abandonment and blocking of the galleries between the E and S bastions, and this will have meant a reduction in the usable space available within the castle. Apart from this change, it is assumed that the function of the various other rooms and chambers within the castle remained unchanged through most of the life of the castle.

A total of 18 rooms are mentioned in the 1616 survey. They are a porter's lodge (and gate), a hall, a dining room, a wainscot chamber, eight lodging chambers 'towardes the East', a chapel chamber, a storehouse and a kitchen, together with three rooms 'one above another' in the Keep. With the exceptions of the kitchen, the porter's lodge and the three rooms in the Keep, none of the entries gives any clear indication of the location of the rooms. However, there are some clues, as will become clear. All of the rooms mentioned individually must be outside the Keep since the repair costs for the Keep are separately estimated.

The porter's lodge is mentioned with the gate and can be presumed to have been in the Entrance Bastion, as can the chamber over the porter's lodge mentioned in the 1613 indenture. The latter chamber held 18 'long pikes', 18 arquebuses, 17 flasks and touch boxes and 18 bows; all but the pikes were recorded as unserviceable. The hall was also probably in the Entrance Bastion although its precise location is unstated. The reference to timbers and planks underfoot 'being vaulted or sellared underneath' and to 'the leades and tymbers of the roofe' suggest that it may have been on the first floor. It was perhaps in the rear portion of the Entrance Bastion. In the 1613 indenture eight arquebuses and seven 'long pikes' together with other stores were listed as being in the hall. The arquebuses are described as 'decayd', which is scarcely surprising since they must have been at least 45 years old (see below).

The dining room was also probably in the Entrance Bastion. Although not specified, it seems likely that the dining room was for the use of the captain and his guests and that it formed part of his accommodation, rather than being provided as a dining room for the garrison. The wainscot chamber was probably also within the Entrance Bastion and part of the captain's suite of rooms. It is of interest because its name confirms that there were panelled rooms in the phase III, as well as in the phase IIb, castle.

The eight lodging chambers 'towardes the East decayed and much ruinated' were probably the accommodation for the garrison. The likelihood is that these were located within the Curtain Wall galleries and perhaps also in the stirrup towers. The alternative explanation, that this is a reference to lodging chambers outside the castle to the east, can be easily dismissed. There is no evidence surviving for external structures to the east of the castle, and the description, including references to cellars or vaults beneath, indicates permanent structures of more than one storey, which would be improbable outside the fortification. The need for repairs to plastering and glazing confirms that these are permanent structures rather than temporary accommodation. The galleries had basements and were almost certainly glazed, and had garderobes and fireplaces.

The storehouse may well have been in one of the stirrup towers. The repairs listed for the storehouse seem to have been limited to lead- and timberwork, perhaps indicating a need for roof repairs; the estimated cost is quite small. There is no indication of the use to which this storeroom was put, but it may have been used for storing food, in which case it may well have been in the West Stirrup Tower to be close to the kitchen in the W Bastion. It is unlikely that it was a storeroom for arms or armour, or for other munitions, since these seem to have been stored in various rooms around the castle. Furthermore, it is likely that the main store of powder and shot, and equipment for the artillery, was kept in the Keep.

No indication is given for the use to which the rooms in the Keep were put, but the newly created first floor in the Keep appears to have had a domestic or administrative function, rather than being used for permanent gun emplacements. The evidence suggests that there were unglazed, barred windows, and the space was possibly divided into two separate rooms, with a small fireplace in each. There was no garderobe. Given the fact that glazing, garderobes and large fireplaces had been installed elsewhere in the castle, it seems unlikely that this area would have been used for permanent residential accommodation. Perhaps it is more likely that this new level was used as a lookout or guard room, with access to the roof and parapet provided by the newel stair.

One of the more intriguing references is to the chapel chamber. As in the case of the storeroom, the repairs required are limited to lead- and timberwork. It is probable that the chapel was in one of the stirrup towers, although it could have been in the Entrance Bastion.

The estimated costs for the repairs in 1616 indicate where the major work was required. The largest single

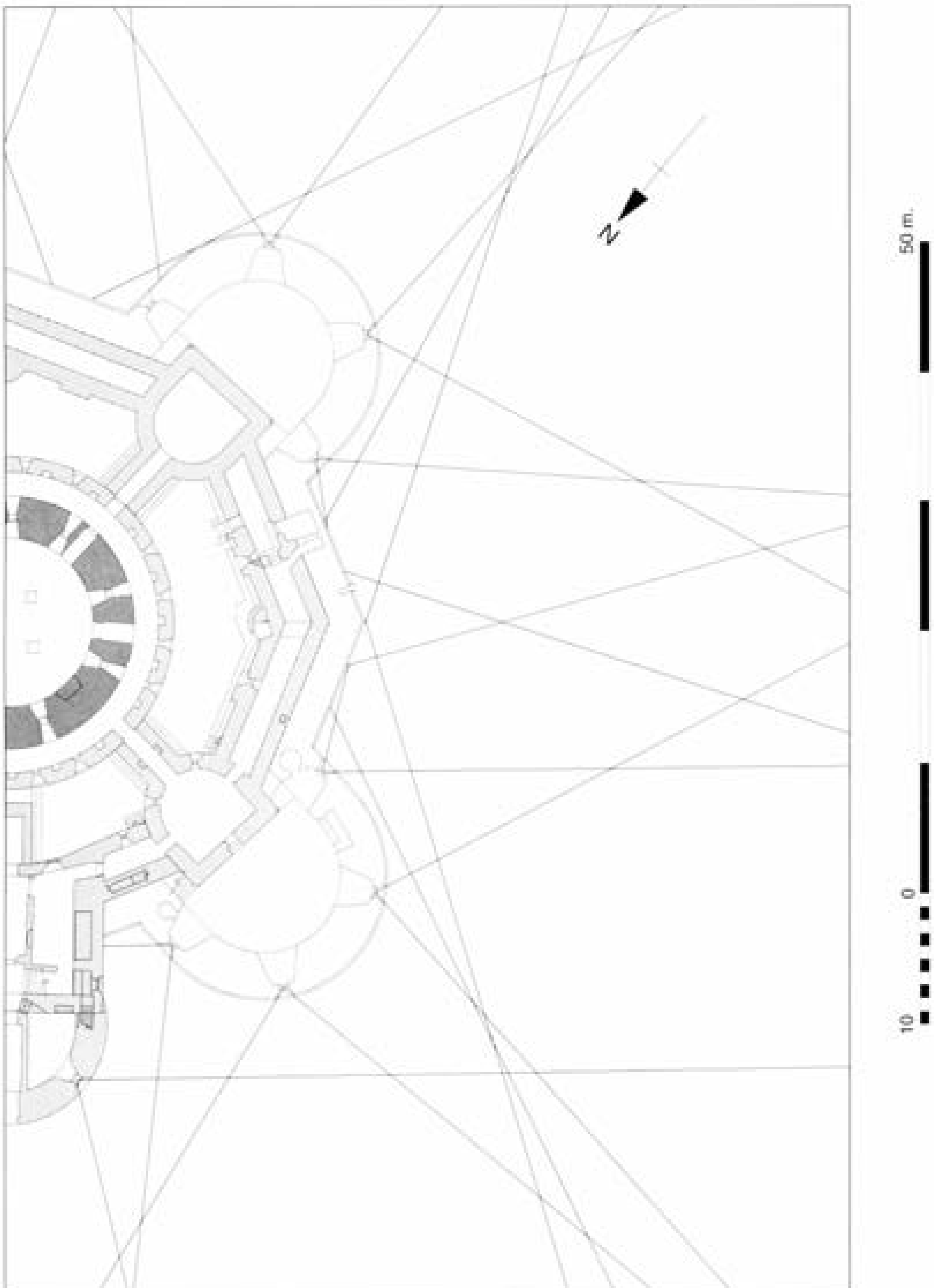


Figure 9.4: The Phase III castle, fields of flanking fire

cost was £100 estimated for repairs to the timber- and leadwork in the Keep. The repairs to the Curtain Wall, and the gunloops and embrasures, was clearly another major task which was estimated at £40 for 'masons worke' and materials alone. The repairs to the four bastions or mounts comprised the provision of platforms for ordnance. In the case of the N and S Bastions, which were dead mounts, the gun platforms were to be of either timber or stone. On the W and E Bastions the platforms were to be over the leads of the roofs and made of timber. In addition to the gun platform, the W Bastion also required some repairs to its roof. The total estimated cost of the work on the mounts was £128. 12s, or more than a third of the total estimated cost of £359. 12s. for repairs to the castle. The main repair work required seems to have been to the lead- and timberwork of roofs. Other timberwork, particularly for floors, was also in need of repair. Aside from this repairs to the stonework of the curtain, and the provision of gun platforms on the four mounts were the major tasks. Some plastering was needed in the lodging chambers, and ironwork for windows was needed in the lodging chambers, dining room and wainscot chamber.

The defences and ordnance

The raising of the curtain, and the construction of the new higher bastions, may, moreover, also reflect concern about the offensive capability of von Haschenperg's design, obsessively defensive in conception and with low-level gun platforms. Although able to mount guns at more than one level, it was probably unsuited to its primary purpose. The heavy ordnance was moved from the Keep onto the roofs, or into the gunrooms, of the new bastions, with only a local defensive capability retained in the heightened Keep itself.

There were guns on three levels. The four casemates in each of the ground floor gunrooms of new large bastions formed the lowest level and probably mounted guns on field carriages. At this level there were also two gunports, which flanked the main gate in the Entrance Bastion, and which may have been provided for hand guns or for small breechloaders. At the next level were the guns mounted on the bastion roofs, which served as gundecks. Further ordnance would have been mounted here. It is possible that the positions of the embrasures in the bastion parapet mirrored the positions of the gunports below. At the same level as the bastion gundecks were the embrasures in the Curtain Wall parapet. There was a single embrasure to each section of wall, except for the sections flanking the Entrance Bastion where there were no embrasures. This gives a total of six embrasures in the parapet, which could have been served by small breechloaders, handguns or bows. At St Mawes the embrasures of the S Bastion appear to have been 'socketed to take light guns' presumably pintle-mounted breechloaders (MPBW 1963, 25–6). Overlooking the bastion gundecks and the Curtain Wall parapet were the stirrup towers which provided a further a further firing platform. It is possible, but perhaps unlikely, that further ordnance was mounted here, and more probable that the stirrup towers provided a firing platform for handgunners.

The defences of the phase III fort were quite different from those of the phase IIb castle, and concentrated the main batteries on two levels in the four new bastions . Although the phase III castle with its large high round bastions and central Keep more closely resembles the other Henrician castles, than did the phase IIb castle, nonetheless it differs in one important respect: no guns were sited on the Keep, which was heightened again in phase III but was now topped by a roof rather than a gundeck. This contrasts not only with the phase IIb castle at Camber but also with the arrangements at Deal, Walmer and Sandgate, where a gundeck was provided on the top of the keep. At these castles the main guns were usually sited on three levels: in the bastion casemates, on the bastion gundecks and on the gundeck on the keep. At Camber in phase III the main guns could only be mounted at two levels, in the bastion casemates and on the bastion gundecks.

The larger guns were probably mounted in the casemates of the gunrooms of the bastions, with smaller guns mounted on the gun decks above. The gunports in the main bastions had substantial vaulted casemates and were each provided with a smoke vent at the crown of the vault. These passed up through the core of the walls and vented at the wall top. The gunports had external splays, which provided the guns with a reasonable arc of fire, but because of the curvature of the bastion walls these arcs did not meet until well out from the foot of the bastions (Fig. 9.4). This was a potential weakness, which could only be mitigated by fire from the embrasures on the angled Curtain Wall and from the flanking bastions. The gunports nearest the Curtain Wall could also provide covering fire to protect the curtain. As has been noted, at St Mawes there is evidence that the parapet had sockets for mounting breechloading swivel guns.

The disposition of the main guns cannot now be reconstructed in any detail, but some suggestions can be made. It is clear from the lists of ordnance that all four bastions could not have been armed with the same quota of guns, for although not consistently adhered to, the larger guns are generally in groups of three. This suggests that main weight of the batteries may have been concentrated on three bastions. It is likely that the N and S bastions were well armed. Guns mounted on the N Bastion could fire out to sea but more importantly would have covered the entrance to the Camber and would have been able to fire over the anchorage itself. Guns on the S Bastion would have been able to fire out to sea, provide defence against any land attack northwards along the shingle spit from the Winchelsea direction, and fire over the anchorage. The E Bastion looked out to sea, and guns mounted there would be able to fire at approaching ships. By contrast, guns on the W Bastion would have been unable to fire out to sea, although they would have been able to fire on enemy ships once they had entered the sheltered anchorage of the Camber. It is likely that smaller guns were mounted on the W Bastion. Two further points are worthy of note. Firstly, it was the N and S Bastions that were filled later to create dead mounts, and this may reflect the fact that they always mounted the heavier artillery. Secondly the W Bastion served as the kitchen and similarly this probably reflects its more limited importance. The dispositions can be suggested but not proven.

The two double splayed gunports in the Entrance Bastion flanking the doorway were a similar size to those in the bastions, but lacked their large casemates because of the thinner walls of the Entrance Bastion. They were almost certainly provided for breechloading swivel guns. Breechloaders formed part of the original ordnance complement of the castle, but do not seem to have been retained for very long, for at some point after 1568 they were removed. Precisely when this occurred is not certain, but it may have been quite soon after 1568 and well before the filling of the N and S bastions, which the evidence suggests took place early in the 17th century. Precisely when the breechloaders were removed is uncertain, but is likely that handguns, probably calivers or muskets, were substituted. In 1568 the castle stores included only 9 'hagbuses', but by 1613, there were 26 hagbusses and 20 muskets. It is at least probable that the additional muskets were brought in as a direct replacement for the breechloaders, although we lack information to confirm the connection.

The garrison and its arms

The 'hagbusses' or 'arquebuses' referred to in documentary sources (see Table *2.5*) are early weapons. Nine 'hagbusshes' are listed in 1568. Amongst the arquebuses listed for 1613 are eight 'of Sir Thos Gresham's provision decayd'. Sir Thomas Gresham was active as an agent in the Low Countries during Henry VIII's reign and early in Elizabeth's reign (1559–63). In Elizabeth's reign, he purchased large quantities of arms and munitions for the crown (Boynton 1967, 56-7; Cruickshank 1966, 119). He was also active as a gunfounder on his estate in Sussex towards the end of his life (Teesdale 1991, Appendix). He died in 1579. He was not above using bribery to acquire large quantities of arms and munitions at a time when the Philip II had placed an embargo on the export of such materials. Clearly these eight guns were old in 1613 and it is tempting to identify the nine arquebuses listed for 1568 with those listed in 1613 as Sir Thomas Gresham's provision. The other 18 arquebuses listed for 1613 were noted as unserviceable, and were probably almost as ancient. The 20 muskets first listed in 1613 were presumably distinguished from the arquebuses, because they were the later weapon with larger bore. In 1615 there are 38 'harquebuses with long crooked stocks unserviceable' at Camber but no muskets are listed. It seems likely that these 38 weapons include a mixture of the muskets and arquebuses previously listed.

Between 1546 and 1604/1614 the garrison had varied between 26 or 29 men and included 16 or 17 gunners. After 1604 the garrison consisted of 14 men including only 4 gunners. The number of soldiers remained fairly constant at between 8 and 10. The reduction in manpower might simply indicate that the castle was being partially stood down to cut costs, but it is possible that there was a link between the reduction of the number of gunners and the changes in the ordnance provision of the castle (see Chapter *2*).

The number of arrows in the finds assemblage, and objects associated with handguns (arquebuses, calivers and muskets), need not occasion surprise: it parallels the situation on the *Mary Rose*, which capsized and sank in July 1545 only a few years after Camber Castle was completed. The finds from the ship include over 3500 arrows and 138 complete longbows, but very few handguns. In 1568 the Camber Castle inventory (Table 2.5) lists 9 handguns (hagbusses), but no 'bandeleers', powder flasks or shot. By contrast, 130 whole and 10 broken bows are listed together with 560 sheaves of arrows and a half firkin of bowstrings. The number of bows and quantity of arrows are far more than would be needed by the small garrison, which never numbered above 29 men counting gunners and soldiers, and clearly suggests that the bows and arrows were primarily stored at the castle for the use of the local militia or trained bands, although some may have been used by the garrison.

The decline in archery in England during the course of the 16th century although protracted was real and has been well documented (eg Cruickshank 1966, 102–8). It should be noted that elsewhere in Europe handguns were adopted even more readily and rapidly than in the British Isles (Hale 1985, 50–1). To counter the decline in archery, a number of acts were passed in Henry VIII's reign to ensure that England would have trained archers to call on in times of emergency by requiring all able-bodied men under 60 to practise archery (3 Henry, c.3; 6 Henry, c.2; 33 Henry, c.9). The decline continued nonetheless, and is amply attested at Camber. The 1613 inventory shows a dramatic change: only 18 bows and 10 sheaves of arrows are listed, but there are 26 hagbusses (ie arquebuses) and 20 muskets, 20 bandoliers, 17 'flasks and touch boxes' and 1 cwt of shot. It is reasonable to assume that each musketeer was supplied with a bandolier complete with attached priming flask. The flasks and touch boxes may have been for the hagbusses. In 1615, the old store in the Keep has 38 hagbusses but no muskets and 9 'flasks and touch boxes' described as 'for calivers'. It is possible given the imprecision of some of the terminology that all the handguns have been lumped together as arquebuses.

The existence of gun loops in the basement galleries and Vaulted Ring Passage shows that it was planned from the outset to use handguns as part of the defences of the castle. The gunloops in the Vaulted Ring Passage are provided with smoke vents and there are ammunition lockers set into the walls. In both cases the gunloops overlook the courtyard. It is quite probable that archers were positioned on the gun platforms and parapets away from the confines of the towers and bastions.

The confined space of a comparatively small artillery fort was not an appropriate location for the use of pikes or halberds, and it is clear that any pole arms from the site must have been stored there for the use of the militia or trained bands. The numbers of pole arms stored at Camber were obviously far more than the small garrison would ever need. In 1568 the garrison was 26 strong and stores held included 68 pikes and 380 black bills; in 1613, the garrison was only 14 men and stores still included 72 pikes, 20 black bills and 20 halberds. By 1623 there were only 22 pikes and an unknown number of bills.

EVERYDAY LIFE AT THE CASTLE: THE EVIDENCE FROM THE FINDS AND ANIMAL BONE ASSEMBLAGES

by Anthony Streeten

The excavations, coupled with stratigraphic analysis and artefact studies, have revealed complex patterns of earthmoving during successive phases of construction and occupation at Camber Castle. The pottery and vessel glass is particularly instructive in demonstrating the extent to which fragments from the same vessel have become scattered across the site. Floor surfaces and the courtyards appear generally to have been kept clean while the castle was in use, hence the artefact assemblages from subsequent accumulations show little correlation with the presumed functions of different buildings.

Rubbish would probably have been discarded outside the castle, so the pottery analysis has paid particular attention to a deposit of near complete vessels from outside the W Bastion (kitchen) (WBX), which was found to contain mid to late 16th-century Cologne/Frechen drinking jugs, Beauvais Whiteware and a complete Borderware ointment pot. By far the greatest part of this assemblage, however, derived from earthenware cooking vessels, of local Red Earthenwares, Low Countries type Redware and German Lead Glazed Earthenware. Other material from this area outside the W Bastion (trenches WBX and WBY) includes fragments from two glass vessels (Fig. 7.17. No. 1, and another example, not illustrated), an unidentified copper alloy toilet item (Fig. 7.4, No. 61) and a copper alloy buckle (not illustrated, Scott, Chapter 7, No. 29). Late deposits from Gallery VI comprised a majority of local Red Earthenware, with some local Whiteware cooking vessels; a small quantity of imported material included a German Lead Glazed Grapen and an early 17th-century Cologne/Frechen bottle with the coat of arms of the Duchy of Julich-Kleve-Burg. The character of these assemblages implies that they are both derived from continued use of the kitchen in the nearby W Bastion.

Among the other ceramic groups studied by Whittingham (Chapter 6), the 25 vessels dumped in the area of the E Bastion (EBX) are exceptional in being derived apparently from a single source. Dating from the first half of the 16th century, they comprise mainly good quality table wares. Associated artefacts, however, represent a broader range of functions. The copper alloy tap from a barrel or cask (Fig. 7.9, No. 116), knives (Fig. 7.10, No. 149; and Scott, Chapter 7, No. 146, not illustrated) and the bone handle plate from a knife (not illustrated, Scott, Chapter 7, No. 159) may perhaps relate to the same episode of eating and drinking but the ironwork includes weapons (Fig. 5.5, No. 145; and Chapter 5, No. 151, not illustrated), a fish hook (not illustrated, Scott, Chapter 7, No. 185), a hinge probably from furniture (Fig. 7.6, No. 82) and various other fittings. Other items include a Nuremberg jetton (Chapter 7, 'Coins and Tokens', No. 3), over 200 pins and 25 points or lace tags (not illustrated, Scott, Chapter 7, Nos. 15 and 22), a possible decorative junction plate of iron (Fig. 7.2, No.51), a gold decorative link from a collar (Fig. 7.1, No. 1) and melted lead waste.

Overall, therefore, this material reflects the range of pottery (see Chapter 6) from outside the E Bastion Exterior (EBX) which is likely to be associated with the phase III construction of the castle, and includes a high proportion of early 16th-century imported wares, amongst them Beauvais Whiteware and Beauvais Sgrafitto Ware, Martincamp Type I and II flasks, Raeren Stoneware and Low Countries type Redware. A major element of the Rhenish Stoneware is represented by Raeren drinking jugs. By contrast, local wares form a less substantial proportion of the assemblage than in later phases. Most of the imported pottery is datable to the period up to 1550, and suggests that this deposit must include a preponderance of material left behind after the building campaigns, in which there were on occasion more than 1000 people working at a time.

Although lacking functional context, redeposited material in the bulk fills, and the assemblages among accumulated debris in the Courtyard, are of interest as they represent the material culture of occupation at Camber Castle during the later 16th and 17th centuries. The pottery from the fill of the N Bastion is therefore likely to represent a mixture of construction period debris and material contemporary with the occupation of the castle. Much of the assemblage is of the first half of the 16th century, but later material present includes Cologne Bellarmines datable to the period 1550–1570/90, Seville Olive Jars, Portuguese Merida standing costrels and part of a Siegburg Schnelle inscribed with the date [15]75. As might be expected from occupation debris, a much higher proportion of this assemblage comprises local Red Earthenwares, probably routinely used for everyday cooking and storage, but there are also fragments of glass goblets (Fig. 7.17, No. 8) and table knives (Fig. 7.9, No. 132, and Chapter 7, Nos. 125, 137, 154–55, not illustrated).

The diverse range of associated material from the N Bastion fills includes weapons such as the breech chamber (Fig. 5.2, No.1), iron cannon shot (not illustrated, Chapter 5, Nos. 3, 5–6, 10–11, 15, 18, 31, 34, 36) and arrowheads (not illustrated, Chapter 5, Nos. 97–100); armour, including jack plates (Chapter 5, Nos. 161–165; Fig. 5.6, No. 163 and Plates 5.3, 5.4) and brigandine plates (Chapter 5, Nos. 167–170; Fig. 5.6, No.167); tools, including spades (Scott, Chapter 7, Nos. 204–6, 209, 211, 219–223; Fig. 7.13, No. 206), a chisel (Fig. 7.12, No.192), claw hammer (Fig. 7.12, No.195), smith's tongs (Fig. 7.12, No. 197) and a smith's set (not illustrated, Scott, Chapter 7, No. 199); and ubiquitous ironwork such as nails (Table 4.29), clamps and dogs (Table 4.30), clench nails and collars (Table 4.31) and bindings (Table 4.32). Two small cased locks (Scott, Chapter 4, Nos. 43, 44; Plate 4.4) were also recovered from the N Bastion.

As in the fill of the N Bastion, the material recovered from deposits over the Courtyard ranges from household items such as knives (Scott, Chapter 7, Nos. 126–127 and 138–143; Fig. 7.10, Nos. 139–142), a spoon or scoop (Fig. 7.11, No. 162), pins (Fig. 7.1, Nos. 6–8) and points (Fig. 7.1, Nos. 16–18) and even corners of book covers (Figs 7.4, No. 77; and 7.6, No. 78) to tools such as spades (Fig. 7.13, Nos. 207, 215), and weaponry including a halberd or bill head (Fig. 5.5, No. 146), matchlock plates

(Chapter 5, Nos. 111–113; Fig. 5.2, Nos. 111, 113), a flashpan from a matchlock handgun (Fig. 5.2, No. 114) together with items of musketeers' equipment, including a part of a musket rest (Fig. 5.3, No. 115) and a wormer (Fig. 5.3, No. 118). The casting headers produced from two-piece moulds for musket balls (Nos. 135, 137, 138; Fig. 5.3, Nos. 137, 138) were also recovered. Arrowheads were also found all around the Courtyard (Chapter 5, Nos. 64–73 from CT II – CT VI), but particularly in the SSW Courtyard (Nos. 74–91 from SBC). This mixture of domestic and military items occurring in conjunction with quantities of animal bone and fish bones therefore confirms the character of the assemblage representing the possessions and diet of those who had been engaged in building and manning the castle during the century before the site was abandoned in 1637.

A few medieval items from the site may have been heirlooms including the sword hilt (Chapter 5, not illustrated) and possibly even the hennin or fragment of medieval head-dress (Chapter 7, not illustrated). Although medieval building stone was brought in for reuse during construction of the castle (Chapter 4), the quantity of medieval artefacts is so small that the bulk fills of the later 16th and 17th centuries are unlikely to have come from sources other than the immediate vicinity of the castle where rubbish had been discarded only a few decades earlier.

Significant quantities of material are associated with the storage of liquids and foodstuffs, food preparation and cooking. Overall, 40% of the pottery from the excavations comprises cooking vessels, and vessels for the storage or preparation of food, including cauldrons, tripod pipkins, jars, bowls, colanders, dripping pans, one pancheon and 15 olive jars. Many of the jars are large storage vessels, possibly lidded, made in local Red Earthenwares.

By contrast, the number of metal vessels recovered is very limited, and probably reflects the systematic removal of reusable material from the castle after its abandonment. A range of vessels is suggested by the surviving fragments (Scott, Chapter 7, Nos.101–114) and includes cast iron cauldrons (Fig. 7.7, No. 101), skillets or frying pans, a tripod pan in copper alloy, a shallow spouted vessel, skimmers (Figs 7.8, Nos. 108–111, 113; and 7.9, No.114) and a number of iron buckets.

The large number of knives found appear to be for food consumption, rather than for food preparation in the kitchen (Scott, Chapter 7). Some retain traces of decorative handles and fittings: one example had a decorated ivory handle (Fig. 7.5, No. 145), others had bone (Fig. 7.10, No. 136) or antler handles (Fig. 7.9, No. 129). One example had plates of mother of pearl (Fig. 7.10, No. 131). There was a knife with a beak-terminal to its handle (Fig. 7.9, No. 134). There were a few spoons, all of pewter or lead; one had a fig-shaped bowl, and both it and another example appear to have had decorative baluster finials (Fig. 7.10, Nos. 160, 161).

The commonest vessels in the ceramic assemblage are associated with drinking or the transport of liquids, and these account for 39% of all identified vessels. There are 484 examples of Rhenish drinking vessels, including an abundance of Cologne jugs with decorative motifs (see Plate 9.3). These seem to have been the common drinking vessels of the builders and the garrison in the castle's early years. The equivalent vessels from the second half of the 16th century comprise much more modest quantities of Bellarmines. Metal objects include the lid from a pewter tankard (Fig. 7.9, No. 118) and the handle from a stoneware tankard with a pewter hinge (Fig. 7.9, No.117). Bottles appear in the early 17th century, and later drinking vessels include globular earthenware cups and 15 tankards. There are also considerable numbers of flasks, and Whittingham suggests these might have been popular with a migratory population, perhaps such as was assembled at the site between 1539 and 1542 for the castle's construction.

Tablewares account for 15% of the ceramic assemblage, and include small bowls, drinking jugs, flanged dishes, jugs and chafing dishes. Whittingham (Chapter 6) draws attention to the presence of high quality tablewares among the assemblage, represented in the first half of the 16th century by French Beauvais and Saintonge vessels, and in the late 16th-century by a small collection of high quality dishes in North Netherlands Maiolica, possibly from a set in individual ownership. Tablewares such as these are likely to have been used by the captain and high-ranking visitors, and perhaps in the construction stages for the visits of the commissioners and the devisor himself. The builders and the soldiers are more likely to have used earthenware vessels.

The glass vessels (Cropper, Chapter 7) include a number of fine drinking goblets and beakers in *cristallo* glass, with examples of both early and late 16th-century date. Some were elaborately decorated with enamel, and others were decorated by diamond engraving, a technique introduced into Britain by the Venetian Giacomo Verzelini who was an influential figure in the English glass industry during the last quarter of the 16th century. Such vessels would undoubtedly have been found only on the tables of the well-to-do, and must reflect the presence of the gentlemen captains at Camber, and high-ranking visitors.

The animal and fish bone assemblages suggest an adequate, though not luxurious, diet. Cattle and sheep were probably purchased locally, and fish would have been bought at Rye or Winchelsea. Flatfish, whiting and haddock dominate the fish bone assemblages. More exotic species present include whale, turkey (a recent introduction in the 16th century, and therefore probably still a luxury item), peafowl, deer and turbot. These are not prominent, however, and were probably eaten on rare occasions only. Small species present, such as teal, avocet, oystercatcher and perhaps hare, may have been trapped or snared by the soldiers.

Connell and Davis (Chapter 8) have noted that the assemblage of animal bones is consistent with the possibility that meat was obtained by means of both central supply and local 'requisitioning'. Similar arrangements may account for composition of the ceramic assemblage. The number of continental imports probably reflects access to the trade in ceramics around the coast of Britain, and via London, and Whittingham suggests that this element of the Camber assemblage might be a sign of the purchasing power or purchasing policy of a major construction project and a significant military establishment. The Raeren and Cologne drinking jugs were mass-produced and commonly available, and were priced at 2d each in the late 16th century. The Red Earthenwares that dominate the later assemblages are probably the products of a local kiln at High Lankhurst, Westfield, E Sussex, some 10 km away from the castle and there was a small number of locally-traded Surrey Hampshire Border Ware vessels. A number of late 16th- and early 17th-century imported wares also occur, suggesting that good quality imported pottery was still in use at this time. The continental imports include French, Low Countries, German, Spanish and Portuguese Wares.

The Continental tile-stove (Gaimster, Chapter 4; see also Chapter 3, above for a discussion of the location and use of the stove at Camber) was used for heating, or for steam-baths. The stove was almost certainly ordered specially from Germany for installation in the castle, and it was decorated with popular images derived from German woodcut art, and with portraits of leading Protestant reformers. As such, it offers an unusual insight into the cultural and political context of the castle's construction, at a time when Henry VIII had assumed the title of Supreme Head of the Church of England in defiance of the Pope, and was preparing to defend his Reformation against the powers of Catholic Europe.

Personal items and a few other objects illuminate pastimes and everyday life among the builders and garrison at Camber Castle.

The presence of an eel spear, a birding arrow and a gin trap, together with a large collection of fish hooks (Chapter 7), suggests that the garrison were involved in small scale hunting, trapping and fishing, perhaps to supplement their diet, to rid the castle of pests, or perhaps even to relieve boredom. A cock bone with traces of a brass spurred ring is likely to come from a bird used for cock-fighting at the castle.

Cats present on the site may have been kept for mousing, and dogs perhaps as guard dogs, or as pets or mascots. The paw prints of a small dog found in a discarded tile manufactured on site suggests that perhaps the building crews brought pets with them as well. Some cats and dogs seem to have been skinned, suggesting that the soldiers had a use for these small pelts.

Three very early fragments of clay pipe were also found in the excavations (Higgins, Chapter 7; Fig. 7.20,

Plate 9.3: Cologne/Frechen Stoneware: applied decoration from a drinking jug, a Pinte and a large jug

No. 1). These date from *c* 1580–1610 and suggest that members of the garrison had adopted the habit of smoking by the end of the 16th century. One of the early pipes had been brought to the site from London; the other probably arrived as the personal possession of someone travelling from the Plymouth area. Higgins suggests that these links with the wider outside world suggest that troops may have been instrumental in bringing the habit of smoking into E Sussex from more cosmopolitan areas.

Metal objects found during the excavations include a strike-a-light (No 7.100), doubtless used more often for lighting lamps or fires than for igniting fuses. Among the personal items, an inscribed gold finger ring (Plate 7.1) was found in the N Stirrup Tower, shoes (not illustrated, Scott, Chapter 7) had been discarded outside the Entrance Bastion and buckles of both iron and copper alloy occur throughout the site (Fig. 7.2). Like the buttons (Fig. 7.1, Nos. 24–25), some of the buckles would have come from items of clothing and footwear (eg. Fig. 7.2, No. 52), while small pellet bells (Fig. 7.3, Nos. 55, 56) might also have been worn on clothing. The presence of thimbles (Fig. 7.3, Nos. 63–65) indicates that some clothing may have been mended or altered at the castle while the few pieces of toilet equipment (Figs 7.4, Nos. 60, 61; and 7.5, No. 62) presumably represent lost or discarded items from among the personal equipment normally carried by the builders and garrison.

Sanitary wares present include 56 possible chamber pots in Red Earthenware fabrics, the Borderware ointment pot, and Tin Glazed Ware drug jars.

Two book corners (Figs 7.4, No. 77; and 7.6, No. 78) were found, and raise the interesting question of what kind of book might have been kept at an artillery fortification such as Camber. It is perhaps possible that they derive from personal possessions such as bibles or prayer books.

Overall, however, both the material culture and the evidence of diet reflect the stratified status of the garrison, ranging from the fine tablewares and some exotic foodstuffs from the captain's table to the utilitarian drinking vessels and staple diet of beef and mutton. Although the character of the archaeological record does not lend itself to the comprehensive analysis of functional assemblages, the isolated location of the site and the short chronology have yielded a remarkably instructive collection of artefacts and faunal remains illuminating aspects of daily life within this Henrician and later fortification.

Endnotes

1. *L.& P.* 4 (2), no. 5031; see Chapter 2 above.
2. *Accounts*, f. 138.
3. *Accounts*, ff. 9^{v}, 10^{v}, 41^{v}, 115, 117^{v}, 148^{v}.
4. *Acts PC* vi, 258.

Glossary of Military Architecture, and of terms used in the lead calme, window glass and vessel glass reports

Bastion Projection from the side or angle of a fortification from which flanking fire can be directed.

Blockhouse Small detached fort.

Bulwark *Bastion* or *blockhouse*.

Calme (sometimes 'came') H-sectioned lead strips into which window glass is inserted. Joined by soldering.

Casemate Vaulted chamber providing emplacement for a gun or guns.

Cavalier Raised platform usually built on a *bastion* for guns to provide an additional tier of fire.

Citadel A strong, self-contained fortress, within a fortified town.

Crown Disc of glass created by spinning a gather of glass on a *pontil*. The disc remains thicker in the centre and often retains the pontil mark.

Curtain Section of wall or *rampart* between towers or bastions.

Diamond-point engraving The technique of decorating glass by scratching the surface with a handled diamond point

Echaugette A protected sentry box or lookout. Usually on the apex of a *bastion* at *parapet* level.

Embrasure Opening in a *parapet* through which a gun can be fired.

Flanker *Casemate* or *embrasure* sited to provide flanking cover along the line of the *curtain* wall.

Forest Glass Glass manufactured at forest sites using wood potash.

Glacis Long forward slope outside defensive wall or ditch and facing the enemy.

Gunport Opening or port through the thickness of a wall for a gun or guns.

Half-moon Outwork, rounded or segmented in plan.

Heart The part of a calme separating, and at right-angles to, the visible flanges. The pieces of glass sit up against the heart.

Kick Indentation, shallow or deep, in the bottom of a vessel base, providing greater stability.

Knop A component of the stem of a glass vessel, usually spherical.

Loop Opening in exterior surface of a wall for firing guns.

Marvered Glass smoothed externally and consolidated by rolling on a flat slab of metal or marble.

Milled Calme extruded through a vice in order to create the H cross-section. In the post-medieval period, the wheels through which the lead passes have teeth that create corresponding grooves in the central part of the calme. This was for ease of extrusion.

Mould- or Optic-blown Glassware made by the process of blowing the molten glass *paraison* into a mould

Murderer *Casemate* or emplacement for cannon or large guns, usually to provide flanking fire. Also a type of gun.

Orillon Projections at the rear corners of a bastion designed to mask the *embrasures* or *flankers* covering the adjoining flanks.

Paraison Gather of glass enclosing the air bubble of the first inflation and ready for further working.

Parapet Low wall or earth mound forming breastwork along the front edge of a *rampart*, giving protection to defenders behind it.

Platform Floor or surface upon which guns are mounted.

Plat (plott) Drawn plan of, or for, a fortification or building.

Pontil Metal rod on which the blown vessel is fixed by means of a drop (wad) of hot glass, ready for finishing.

Prunt A drop of glass applied to a vessel as decoration, but also for a better grip in the absence of a handle.

Quarry An individual pane of glass, normally rectangular or diamond-shaped, used in plain glazing.

Rampart or Rampire Mass of earth formed behind a curtain wall to provide a platform for guns and their crews.

Sally-port Subsidiary gateway, sometimes concealed, through which troops can make a 'sally', or an attack, on besieging forces.

Terreplein Level ground on top of a *rampart* and below the *parapet* providing a platform for guns.

Appendix: 'Stem-and-leaf' summary plots of selected measurements of cattle, sheep, pig, galliform (probably all chicken) and rabbit teeth and bones from Camber Castle.

1) Cattle

Cattle humerus BT

1	6	f	5
3	6	s	777
1	6	.	8
2	7	*	11
4	7	t	2233
3	7	f	445
3	7	s	677
5	7	.	88999
1	8	*	0
1	8	t	3
2	8	f	44
1	8	s	6

Cattle humerus HTC

2	29	.	56
5	30	.	02579
5	31	.	23479
6	32	.	034688
2	33	.	14
6	34	.	133599
7	35	.	1223689
4	36	.	3559
5	37	.	02459
3	38	.	367
2	39	.	01
3	40	.	006
1	41	.	2

Cattle metacarpal BFd

1	5	*	2
6	5	.	567789
3	6	*	124
2	6	.	89
2	7	*	00

Cattle tibia Bd

1	5	*	2
10	5	.	5888899999
17	6	*	00000111122333444
5	6	.	56799
1	7	*	0
1	Extremes		(744)

Cattle metatarsal BFd

2	4	.	99
9	5	*	011233444
2	5	.	68
7	6	*	0111233
2	6	.	56

Cattle astragalus Bd

2	3	.	69
8	4	*	01122444
3	4	.	567
1	5	*	0

Cattle astragalus GLl

1	Extremes (568)		
4	6	.	5578
2	7	*	34

2) Sheep

Sheep humerus BT

2Extremes (219), (226)

3	24	*	012
4	24	.	6889
9	25	*	002222234
12	25	.	555779999999
11	26	*	00111122334
21	26	.	556667777788888899999
2	27	*	0000000011112222222333333444444
13	27	.	5557777888888
19	28	*	0001111112222233444
12	28	.	556666899999
14	29	*	00011223333334
10	29	.	5556778888
11	30	*	00001122234
5	30	.	55568
4	31	*	0124
3	31	.	558
1	32	*	3

Sheep humerus HTC

1Extremes (112)

1	11	.	7
2	12	*	04
11	12	.	55667778999
22	13	*	0122222222223333344444
34	13	.	5555566677777788888888888899999999
39	14	*	000000000011111222223333333333444444444
31	14	.	5555555556666666667788888899999
28	15	*	0000001111111222223333333344
16	15	.	5555666667888889
7	16	*	0000123
5	16	.	55568

Sheep radius GL

2	13	*	13
3	13	.	789
7	14	*	0223334
2	14	.	59
4	15	*	0124
4	15	.	5699
4	16	*	0133
1	16	.	8
17	*		
1	17	.	5

Sheep radius Bp

4	29	.	0347
5	30	.	04568
5	31	.	11344
1	32	.	8
1	33	.	0
1	34	.	2
1	35	.	2
2	36	.	39

Sheep radius SD

2	14	*	34
2	14	.	99
7	15	*	0012223
5	15	.	77789
2	16	*	23

6	16	.	567779
6	17	*	011123
4	17	.	5589
2	18	*	12
2	18	.	59

3Extremes (211), (214), (301)

Sheep radius Bd

2Extremes (245), (249)

4	26	.	1379
11	27	.	00124556899
22	28	.	0011233345555577788889
9	29	.	124455669
5	30	.	78899
3	31	.	079

3Extremes (322), (326), (337)

Sheep metacarpal GL

2	11	*	34
2	11	.	57
4	12	*	0004
2	12	.	67
1	13	*	1
3	13	.	589
1	14	*	1

Sheep metacarpal SD

2	12	.	38
3	13	.	125
11	14	.	00123456789
15	.		
2	16	.	02

1 Extremes (175)

Sheep metacarpal BFd

1	22	.	4
23	.		
6	24	.	134458
4	25	.	1258
4	26	.	4557
3	27	.	155
1	28	.	9

Sheep tibia Bd

1	22	*	4
2	22	.	69
23	*		
1	23	.	9
3	24	*	022
7	24	.	5688999
14	25	*	11111222234444
11	25	.	55556667899
16	26	*	0111122222344444
17	26	.	55556666667777799
22	27	*	0000000111122233334444
11	27	.	55577778999
9	28	*	001112344
9	28	.	555666677
6	29	*	011134
6	29	.	666789
3	30	*	024
1	30	.	6
2	31	*	12

Sheep tibia Dd

1	18	*	2
4	18	.	7779
9	19	*	001111224
8	19	.	55556789
13	20	*	0011112233344
26	20	.	55555555556667777888899999
18	21	*	000000000001233444
15	21	.	555666678888999
8	22	*	11222234
7	22	.	5777789
6	23	*	011223
2	23	.	67

Sheep calcaneum GL

1	4	.	7
16	5	*	1133333334444444
17	5	.	55555666778888889
10	6	*	0001111124

Sheep astragalus GLl

1	25	.	3
1	26	.	3
10	27	.	0334566799
6	28	.	046788
6	29	.	356777
7	30	.	0455668

Sheep astragalus Dl

1	14	*	3
3	14	.	778
7	15	*	0112234
6	15	.	556668
8	16	*	00123334
4	16	.	6679
2	17	*	01

Sheep astragalus Bd

1Extremes (158)

2	17	*	04
3	17	.	669
6	18	*	012224
5	18	.	77799
4	19	*	2234
5	19	.	56689
3	20	*	000
1	20	.	8

Sheep metatarsal GL

2	11	.	27
3	12	.	889
4	13	.	0023
3	14	.	677
2	15	.	45

Sheep metatarsal SD

1	11	*	4
2	11	.	68
3	12	*	002
3	12	.	889
13	*		
1	13	.	8
3	14	*	122
1	14	.	9

Sheep metatarsal BFd

1	22	.	6
4	23	.	3468
6	24	.	144778
2	25	.	34
1	26	.	4
2	27	.	35

3)Pig

Pig dP_4 wIII

1	7	.	6
2	8	*	13
1	8	.	7
6	9	*	011444

Pig M_1 wI

1	10	*	0
2	10	t	33
3	10	f	444
10	s		
4	10	.	8999
2	11	*	01
11	t		
1	11	f	4

Pig M_1 wII

1 Extremes (99)

4	10	.	6789
5	11	*	12244
2	11	.	56
1	12	*	1

Pig M_2 wI

1 Extremes (121)

1	12	.	7
2	13	*	33
7	13	.	5567889
1	14	*	2

Pig M_2 wII

12	*		
2	12	.	59
2	13	*	13
4	13	.	7888
3	14	*	034
1	14	.	6

Pig M_3 wI

14	*		
2	14	.	57
15	*		
1	15	.	8
16	*		
16	.		
17	*		
1	17	.	6

Pig humerus BT

1	29	.	6
1	30	.	5
31	.		
2	32	.	66
1	33	.	0
34	.		
1	35	.	1

Pig humerus HTC

1	19	.	6
2	20	.	49
4	21	.	5778
2	22	.	11

Pig tibia Bd

2	3	*	22
3	3	.	557

4)Rabbit

Rabbit fused humerus Bd

1 Extremes (79)

3	8	*	011
2	8	t	23
15	8	f	444444455555555
21	8	s	666666666677777777777
37	8	.	8888888888888888888889999999999999999
31	9	*	0000000001111111111111111111111
18	9	t	222222223333333333
7	9	f	4444555
8	9	s	66666777
5	9	.	89999

1 Extremes (101)

Rabbit fused humerus SD

3	t		
2	3	f	45
5	3	s	66677
10	3	.	8888899999
14	4	*	00000001111111
11	4	t	22222333333
4	4	f	4445
3	4	s	667
2	4	.	88

Rabbit unfused humerus SD

1	2	*	0
1	2	t	3
1	2	f	5
6	2	s	666777
7	2	.	8899999
4	3	*	0000
4	3	t	2333
7	3	f	4445555
1	3	s	6

Rabbit unfused femur SD

2	2	*	22
4	2	.	6679
5	3	*	13334
24	3	.	555556666677777888889999
34	4	*	0000000000000111111122223333444444
27	4	.	555566666666667778889999999
21	5	*	000000011122333333334
3	5	.	667

Rabbit fused femur SD

1	4	s	7
10	4	.	8888999999
18	5	*	000000000111111111
17	5	t	22222222333333333
15	5	f	444444455555555
12	5	s	666666667777
3	5	.	899

Rabbit fused femur Bd

1 Extremes (122)

12	*		
10	12	.	5668889999
28	13	*	0011111122222223333344444444
31	13	.	5555556667777777788888899999999
8	14	*	00011333
1	14	.	5

Rabbit fused tibia Bd

8	11	*	12233344
20	11	.	55556677777779999999
32	12	*	00000001111222222333333444444444
19	12	.	5666667777777888889
7	13	*	0012334

Rabbit fused tibia SD

1	4	t	3
9	4	f	444455555
14	4	s	66666677777777
14	4	.	88889999999999
13	5	*	0000000011111
7	5	t	2223333
8	5	f	44445555

Rabbit unfused tibia SD

3	2	*	244
16	2	.	5556666688899999
31	3	*	0000000011122222222333444444444
12	3	.	555567799999
17	4	*	00111122223344444
8	4	.	55666789
1	5	*	0
1	5	.	5

Rabbit fused tibia GL

1	89	.	9
90	*		
1	90	.	9
1	91	*	1
91	.		
3	92	*	244
92	.		
93	*		
1	93	.	5

5)Galliforms

Galliform humerus GL

1	7	*	1
2	7	t	23
1	7	f	4
2	7	s	67
1	7	.	9
2	8	*	11
8	t		
4	8	f	4444
1	8	s	6
1	8	.	8

Galliform humerus Bd

1	13	.	7
14	.		
6	15	.	256789
5	16	.	08999
6	17	.	123457
3	18	.	119
2	19	.	48

Galliform ulna GL

1	6	*	4
2	6	.	79
4	7	*	1122
7	.		
2	8	*	14
1	8	.	9

Galliform ulna Bp

2	8	.	89
4	9	*	0012
2	9	.	58
4	10	*	0124
10	.		
11	*		
1	11	.	7

Galliform carpometacarpus Bp

1	8	.	6
1	9	.	7
3	10	.	347
1	11	.	5
3	12	.	178
4	13	.	2288
1	14	.	2

Galliform carpometacarpus GL

1	3	*	4
3	3	.	889
8	4	*	11123344
3	4	.	556

Galliform femur Bp

1	14	.	6
4	15	.	5899
7	16	.	0233599
17	.		
2	18	.	15
1	19	.	3

1 Extremes (216)

Galliform tibiotarsus Bd

3	11	.	456
12	.		
3	13	.	025
1	14	.	6
1	15	.	0

Galliform tarsometatarsus GL

2	7	.	59
1	8	.	7
2	9	.	44
1	10	.	8

Galliform tarsometatarsus Bd

1	12	.	1
3	13	.	678
2	14	.	01
4	15	.	5579
16	.		
1	17	.	9

Notes:

Unless otherwise stated (eg for some of the rabbit bones), all bones measured are adult, ie with epiphyses 'fused' or 'just fused'.

Explanation: The left hand column gives the frequencies. These plots show each value subdivided into two components - the leading digit or digits called the *stem*, and a trailing digit, called the *leaf*. Within each stem, the leaves are ordered from smallest to largest.

Take for example the cattle humerus BT measurements. There is one humerus which measures 65 mm, three which measure 67 mm, and one which measures 68 mm and so on up to the one which measures 86 mm. Many of the measurements however are more tightly grouped; for cattle tibia Bd, each leaf represents a 5 mm group. There is one tibia which measures 52 mm, ten which measure between 55 and 59 mm and seventeen which measure between 60 and 64 mm. Extreme values are shown separately in parentheses, note the single large tibia with Bd = 74.4 mm

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Abbreviations

Accounts National Library of Scotland, MS 2830, particular accounts for works at 'The Tower', ie Camber Castle, in 1539
Acts P C *Acts of the Privy Council*, ed. J R Dasent *et al.*, 46 volumes, 1890-1964
BL British Library
BM British Museum
Cal Pat Rolls *Calendar of Patent Rolls*
Cal S P Dom. *Calendar of State Papers Domestic*
Commons Journals *Journals of the House of Commons*
HKW *The History of the King's Works*, Volume IV 1485–1660 (Part II), gen. ed. H M Colvin, HMSO, London, 1982. References to other volumes of *The History of the King's Works* will be found listed by author in the general bibliography below

HMC Historical Manuscripts Commission

Ill. Bartsch *The Illustrated Bartsch*, New York (1978–), ed. W Smith until 1988 and J D Spike after 1988

L & P *Letters and Papers of Henry VIII*

PRO Public Record Office

S P Dom State Papers Domestic

SCM *Sussex County Magazine* (1926–1956)

Statutes *Statutes of the Realm*, ed. A Lauders *et al.*, 11 volumes and index (1810–28)

VCHS *Victoria History of the County of Sussex*, various volumes

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Notes

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Published by English Heritage, The Engine House, Fire Fly Avenue, Swindon SN2 2EH
www.english-heritage.org.uk
English Heritage is the Government's lead body for the historic environment.

E-book (PDF) published 2013

E-book (PDF) ISBN 978 1 84802 162 4
Version 1.0
Plate 1.1 Original photography is held at Cambridge University Collection of Aerial Photography
Plate 2.4 © National Maritime Museum, Greenwich, UK
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First published 2001 in paperback ISBN 0 904220 23 0

British Library Cataloguing in Publication data
A CIP catalogue record for this book is available from the British Library.

Typeset by Paul Hughes
Scanning and production of e-book (PDF) by H L Studios www.hlstudios.eu.com

Front cover
Reconstruction painting showing Camber Castle after rebuilding in c 1542–43.
(Peter Dunn)