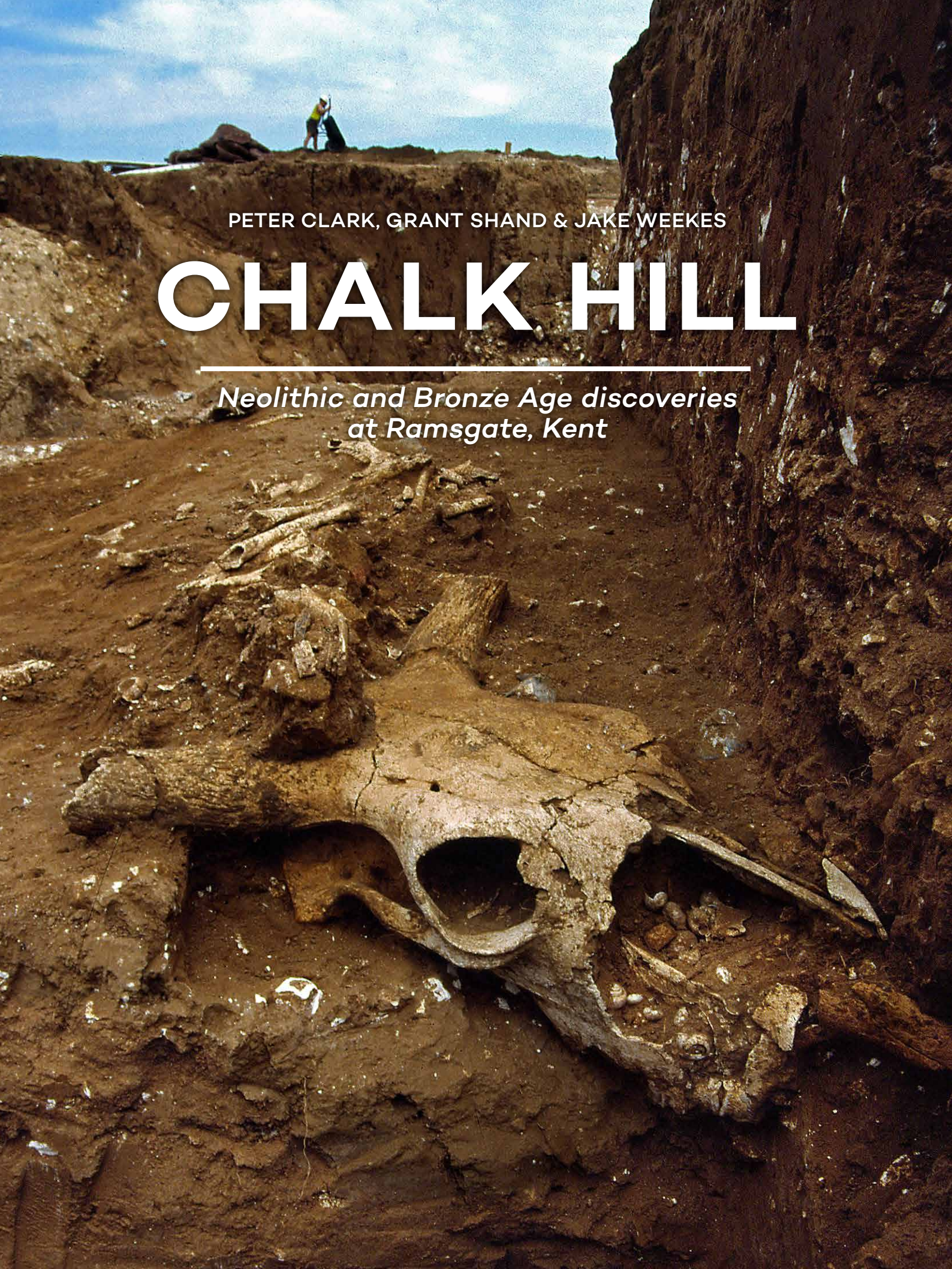
Animal bone



PETER CLARK, GRANT SHAND & JAKE WEEKES

CHALK HILL

Neolithic and Bronze Age discoveries at Ramsgate, Kent

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Sidestone Press

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Published by Sidestone Press, Leiden
www.sidestone.com

Lay-out & cover design: Sidestone Press
Photograph cover: The skull of an adult domesticated cow buried in Segment 3 of the Outer Arc of the Neolithic 'Causewayed Enclosure'. Photograph by Andrew Savage, Canterbury Archaeological Trust.

ISBN 978-90-8890-607-7 (softcover)
ISBN 978-90-8890-608-4 (hardcover)
ISBN 978-90-8890-609-1 (PDF e-book)

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Summary

Chalk Hill lies on the southern coast of what is now the Isle of Thanet in eastern Kent at the south-eastern tip of Britain, about 2km west of the port of Ramsgate. A programme of survey, evaluation and excavation was commissioned by KCC Heritage Conversation Group in advance of the construction of a new road linking the Canterbury Road (A 253) to Ramsgate Harbour by Kent County Council's Highways Department revealed a rich palimpsest of features spanning several millennia.

The earliest significant features recorded on the site dated to the early Neolithic (roughly 3700-3600 cal BC). The took the form of three concentric arcs of intercutting pit clusters forming discrete 'segments', the fills of which produced rich assemblages of pottery, flintwork, animal bone and other material. Much of this material appeared to have been deliberately placed in the pits rather than representing casual disposal of refuse. There are indications that material placed in different pits at different times may have derived from the same source, a 'midden' or some such which was not located during the excavations. The pit clusters appeared to have resulted from repeated pit-digging in the same location over an extended period. Although the overall morphology of the site is reminiscent of a 'causewayed enclosure' the pit cluster segments do not appear to represent ditches and the gaps between segments seem to be fortuitous, rather than planned 'causeways' between ditch segments. The site therefore contributes a more nuanced understanding of the heterogeneity of monumental architecture in the early Neolithic of the British Isles.

The site probably went out of use in around 3600 cal BC, and little evidence for middle or later Neolithic activity was recovered. Beaker and early Bronze Age features included four inhumations, two of which associated within a small ring-ditch probably representing a ploughed-out burial mound. A set of two parallel ditches dating to the middle/late Bronze Age running for 90m across the site and between 1.6m and 2.4 apart might represent a track- or drove-way, or alternatively a boundary division flanking a small bank and hedge. The eastern part of a late Bronze Age subrectangular enclosure was also recorded, within which was a cluster of post-holes and small pits that presumably relate to a structure or structures, reminiscent of the cluster of structural features within the Central Enclosure at East Kent Access, just to the west of Chalk Hill. Apart from a few residual sherds of late Iron Age and Roman pottery, there was no further evidence of activity at Chalk Hill until the Anglo-Saxon period when a solitary sunken-featured building was recorded along with a small number of isolated pits and post-holes. Chalk Hill was then given over to agricultural use during the medieval period with the establishment of an extensive field system and hollow way running across the site, with perhaps some extractive industry suggested by a large quarry pit immediately to the south-east of the hollow way. The hillside remained in agricultural use until the construction of the new road.

Résumé

Chalk Hill se trouve sur la côte sud de l'île de Thanet, dans l'est du Kent, à l'extrémité sud-est de la Grande-Bretagne, à environ 2km à l'ouest du port de Ramsgate. Un programme d'étude, de diagnostic et de fouilles a été commandé par KCC Heritage Conversation Group avant la construction d'une nouvelle route reliant la Canterbury Road (A 253) au port de Ramsgate par le 'Highways Department' du Kent County Council. Il a révélé un riche palimpseste de structures sur plusieurs millénaires.

Les premières structures significatives enregistrées sur le site remontent au début du Néolithique (environ 3700-3600 cal BC). Elles se présentent sous forme de trois arcs concentriques de groupes de fosse interconnectées formant des «segments» discrets, dont les remplissages ont livré de riches assemblages de poteries, de silex, d'os d'animaux et d'autres matériaux. Une grande partie de ce matériel semble avoir été délibérément placée dans les fosses plutôt que de présenter une disposition aléatoire des rejets. Il y a des indications que le matériel placé dans différentes fosses à différents moments peut provenir de la même source, un «amas» ou un tell qui n'a pas été localisé pendant les fouilles. Les groupes de fosses semblent avoir été le résultat de creusements répétés de puits au même endroit sur une longue période de temps. Bien que la morphologie générale du site rappelle une «enceinte à fossés interrompus», les segments fossoyés ne semblent pas représenter des fossés et les écarts entre ces segments semblent être fortuits, plutôt que constituer des interruptions planifiées entre les segments de fossé. Le site contribue ainsi à une compréhension plus nuancée de l'hétérogénéité de l'architecture monumentale au début du Néolithique des îles britanniques.

Le site est probablement abandonné vers 3600 avant notre ère, et peu de preuves d'activité du néolithique moyen ou final ont été retrouvées. Les structures évidentes du Campaniforme et de l'âge du Bronze ancien comprenaient quatre inhumations, dont deux associées dans un petit fossé circulaire témoignant probablement d'un tertre funéraire détruit par la charrue. Un ensemble de deux fossés parallèles datant de l'âge du Bronze moyen/final qui traverse le site sur 90m, avec un espace entre 1,6m et 2,4m d'intervalle, peut représenter un chemin ou une voie, voire une division frontalière bordée d'un petit talus et d'une haie. La partie orientale d'une enceinte sub-rectangulaire de l'âge du Bronze tardif a également été enregistrée, à l'intérieur de laquelle se trouvait un ensemble de trous de poteaux et de petites fosses qui appartiennent vraisemblablement à une structure ou à des structures, similaires à celles qui ont été trouvées à East Kent Access, juste à l'ouest de Chalk Hill.

Mis à part quelques tessons résiduels de la fin de l'âge du Fer et de la poterie romaine, il n'y avait aucune autre preuve d'activité à Chalk Hill jusqu'à la période anglo-saxonne où un bâtiment creusé solitaire a été enregistré avec un petit nombre de fosses et de trous de poteaux isolés. Chalk Hill a ensuite été consacrée à l'agriculture pendant la période médiévale avec la mise en place d'un système de champs et d'un chemin creux sur le site, avec peut-être une industrie extractive suggérée par une grande carrière située immédiatement au sud-est du chemin creux. La colline est restée en usage agricole jusqu'à la construction de la nouvelle route.

Zusammenfassung

Chalk Hill liegt an der südlichen Küste von der jetzigen Thanetinsel in Ost-Kent, an der südöstlichen Spitze Großbritanniens, 2k westlich vom Hafen der Stadt Ramsgate. Ein von der KCC Heritage Conversation Group beauftragtes Vermessungs-, Bewertungs- und Ausgrabungsprogramm (vor der von dem Kent County Council Highways Department beauftragten Konstruktion einer neuer Verbindungs-straße zwischen der Canterburystraße (A 253)) und dem Ramsgate-Hafen) zeigte einen reichen, mehrere Jahrtausende umfassenden Palimpsest von Merkmalen auf.

Die frühesten am Standort befindlichen bedeutenden Merkmale stammten aus dem früh-neolithischen Zeitalter (ungefähr 3700-3600 v. Chr.) und zwar in Form von drei konzentrischen sich durchschneidender Bogen von Gruben-gruppen, die selbständige Segmente bildeten, deren Füllungen reiche Ansammlungen von Keramik, Feuerstein-artefakten, Tierknochen und anderen Materialen vorzeigten. Dieses Material schien überwiegend mit Absicht in die Gruben deponiert, eher als spontan als Müll beseitigt gewesen zu sein. Es gibt Anzeichnen, dass das in verschiedenen deponierten Gruben Material aus derselben etwaigen Müllgrube stammten, die im Laufe der Ausgrabungen nicht aufgefunden wurde. Die Gruben-gruppen schienen aus wiederholtem langfristigem Grube-graben an derselben Stelle zu stammen. Obgleich die allgemeine Morphologie an Damm-Gehäuse erinnert, scheinen die Gruben-Gruppen Segmente keine Wassergräben darzustellen und die Lücken zwischen den Segmenten scheinen keine geplanten Dammwege darzustellen, sondern eher zufällig zu sein. Der Standort trägt also zu einem eher nuancierten Verständnis der Verschiedenartigkeit der monumental-Architektur des früheren neolithischen Zeitalter Großbritanniens.

Der Standort wurde wahrscheinlich ab ungefähr 3600 v. Chr. nicht mehr benutzt und wenige Belege für Beschäftigung in dem mittleren oder späteren neolithischen Zeitalter wurden vorgefunden. Glockenbecher- und frühere Bronzezeitalter-Merkmale bezogen vier Beerdigungen ein, von denen zwei mit einer kleinen Ringgrube in Verbindung standen: wahrscheinlich ein durch Pflügen nivellierter Grabhügel. Eine Gruppe von zwei parallel-Gruben aus dem mittel/späteren Bronzezeitalter die 90m lang den Standort durchquerte und zwischen 1.6 und 2.4 voneinander entfernt waren könnte einen Fahrweg darstellen, oder wohl eine Grenze die von einer Bank oder Hecke flankiert wurde. Das östliche Teil eines späteren Bronzealter nahezu rechteckigem Einhegung wurde auch aufgezeichnet, worin sich eine Gruppe von Pfostenlöchern und kleine Gruben befanden, die vermutlich mit einer Struktur bzw. Strukturen verbunden sind, die an eine Gruppe strukturaler Merkmale innerhalb der zentralen Einhegung im East Kent Access direkt westlich von Chalk Hill erinnern. Außer ein paar Scherben eisenzeitlicher und römischer Keramik, waren in Chalk Hill keine anderen Beweise von Beschäftigung vorzufinden, bis dem angelsächsische Zeitalter, worin ein isoliertes, versunkenes Gebäude gefunden wurde, mit einer geringen Anzahl von einzelnen Gruben und Pfostenlöcher. Chalk Hill wurde danach während des mittelalterlichen Zeitalters der Agrikultur gewidmet: ein umfangreiches Ackersystem war vorzufinden mit dazwischen laufendem Hohlweg mitsammen, unmittelbar südöstlich des Hohlwegs, eine vermutliche, durch Steinbruchgrube angedeutete Grundstoffgewinnungsort. Der Hügelhang wurde bis Bau der neuen Straße der landwirtschaftlich benutzt.

Acknowledgements

The excavations were funded as part of the road construction costs through Kent County Council Highways and we are grateful for all the help given by the road engineers in facilitating the project, both in advance of and during the project. We would also like to thank Dr John Williams and Ms Lis Dyson of the Heritage Conservation Group at KCC for their assistance during the excavation and throughout the post-excavation process. Thanks are also due to the Kent Archaeological Society for grant aid towards final publication.

The present report was prepared for publication principally by Peter Clark and Jake Weekes, working from the original site records and archive reports compiled by the fieldwork director, Grant Shand. The many specialist contributors are thanked for their assistance and patience throughout the long gestation of this report. Site drawings were prepared for publication by Peter Atkinson and finds drawings by Mark Duncan and Barbara McNee.

Linda Hurcombe would like to thank Mike Rouillard and Sean Goddard for their help with the flint microwear illustration. Experimental work which informed this analysis was performed with the kind assistance of the University of Exeter; Linda Lemieux; Ide Demant and Anne Batser, Sagnlandet Lejre, Denmark. She would also like to thank Professor David Peacock (University of Southampton) for his comments.

Alex Bayliss, Frances Healy and Alasdair Whittle would like to thank Robin Bendrey, Alex Gibson and Grant Shand, who both advised on and facilitated sample selection. The radiocarbon dating programme would have been impossible without their help.

Robin Bendrey would like to thank Kate Clark for commenting on the dog remains and kindly providing other useful advice, Richard Sabin for examining the cetacean vertebra, along with Nick Thorpe and Rebecca Oakes for commenting on the animal bone report.

Many academic specialists gave freely of their time to discuss and comment on aspects of the report, and we would especially like to thank Timothy Champion, Cyril Marcigny, Alison Sheridan and Marc Talon for their invaluable advice and support. The manuscript was copy edited and prepared for print by Jane Elder.

We would like to take this opportunity to thank all those who took part in the excavations and more particularly to all those who have worked so hard to bring this long-awaited report to publication.

1

Introduction

Peter Clark

Chalk Hill lies on the southern coast of what is now the Isle of Thanet in eastern Kent at the south-eastern tip of Britain. The Isle of Thanet is well-known for its remarkably rich archaeological heritage (Moody 2008), and so when Kent County Council's Highways Department proposed the construction of a new road linking the Canter-

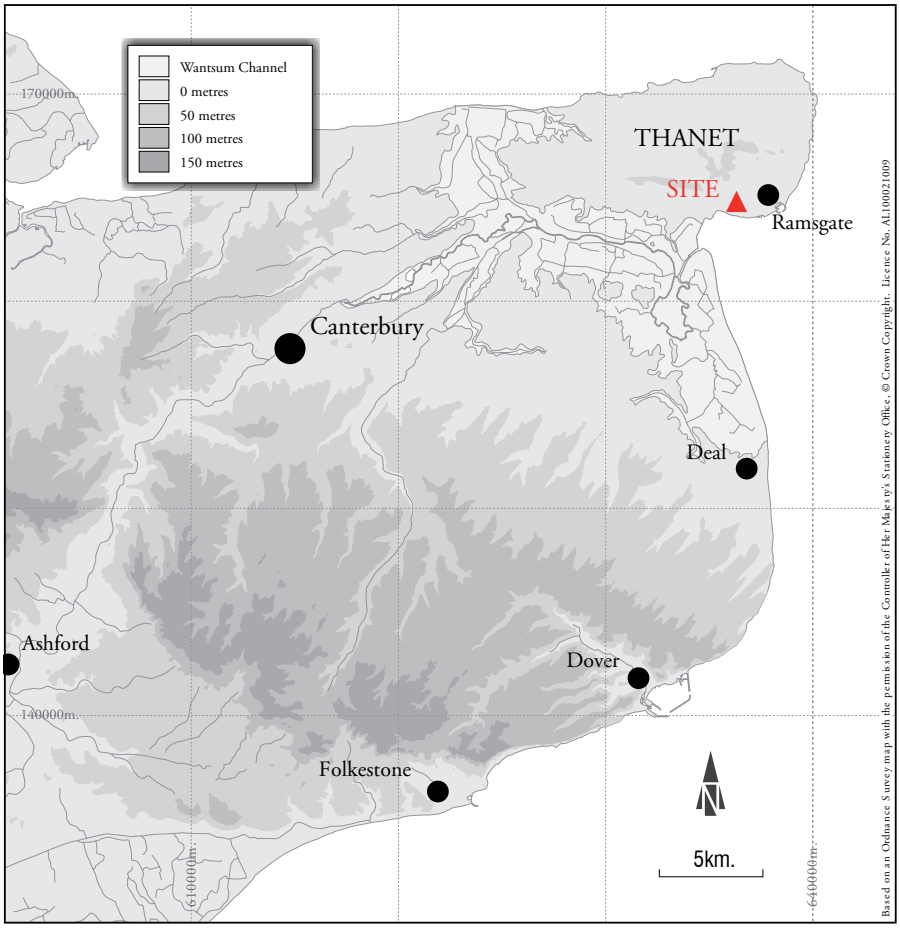


Fig 1. Site location.

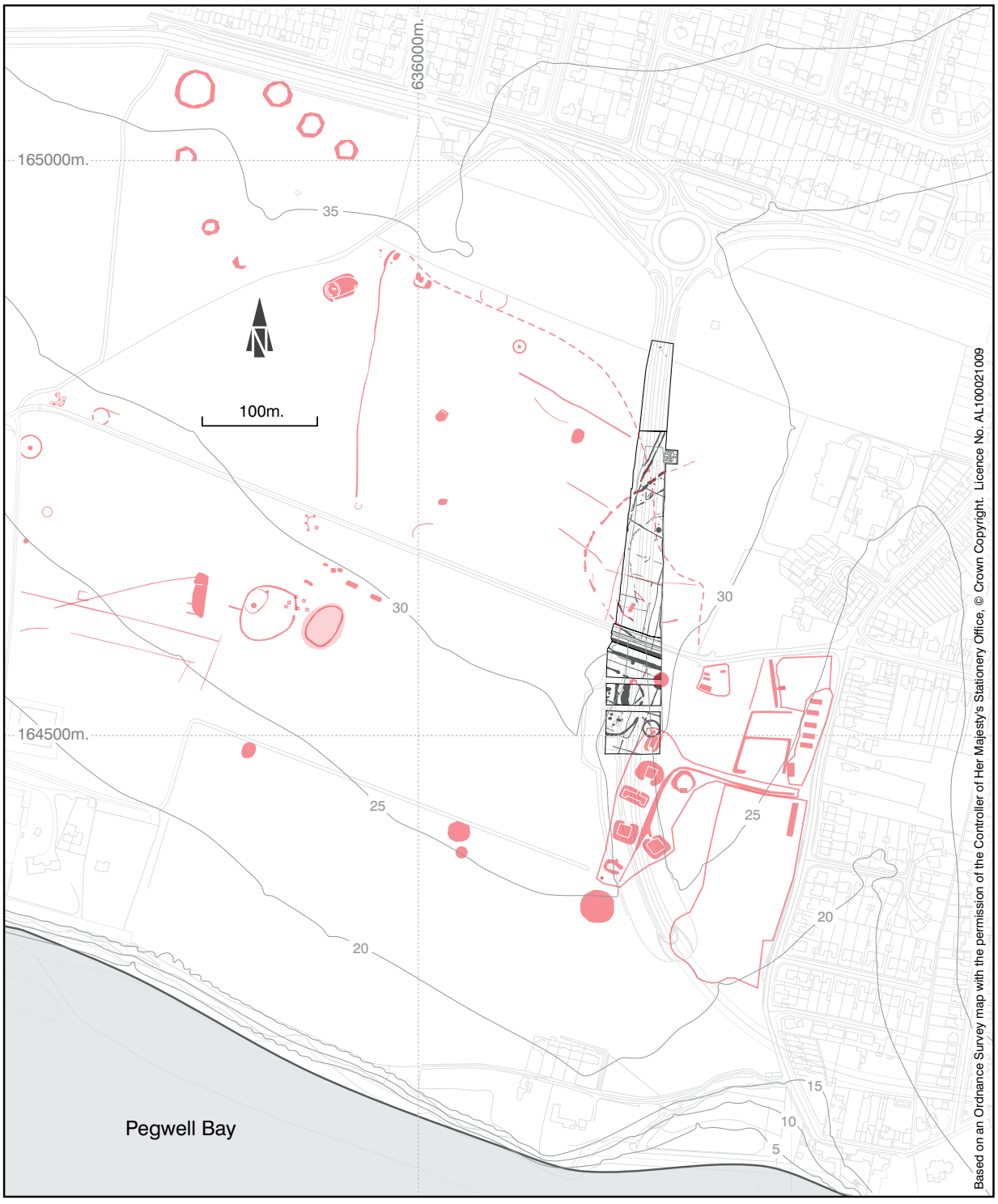


Fig 2. Site topography with cropmarks.

bury Road (A253) to Ramsgate Harbour a programme of survey, evaluation and excavation was commissioned by KCC Heritage Conversation Group to identify and record any archaeological features that would be impacted by the road construction. In the event a rich palimpsest of features spanning several millennia was revealed, whose description and interpretation is the subject of this report.

Fig 3. Evaluation trenches.

Site location

The site lies on the western outskirts of the port of Ramsgate on the Isle of Thanet at the easternmost tip of the county of Kent in south-eastern England (Fig 1). The site was excavated in advance of a new road which now runs south across Chalk Hill from a junction with the A255 through allotments and agricultural land before turning east about 200m north of the modern-day coastline, entering a tunnel as it approaches Ramsgate Harbour. Chalk Hill is a broad spur of land extending to the south-east from higher ground to the north (NGR 636200 164600, centred), flanked to the east and west by dry valleys trending north-south (Fig 2).

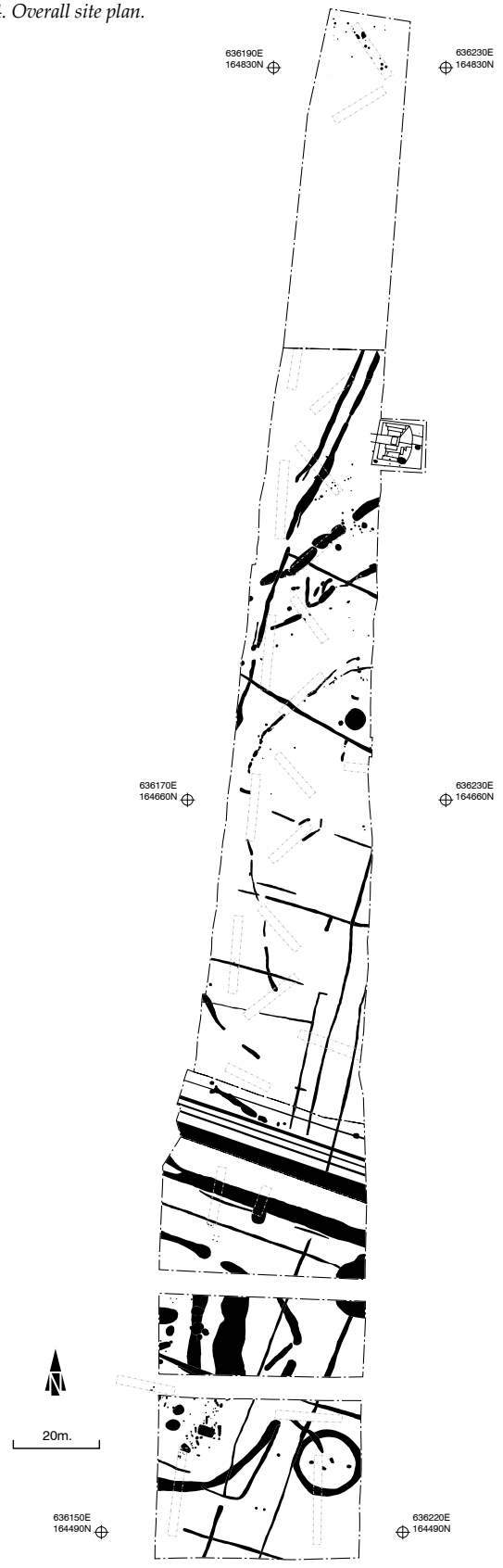
Topography and geology

Chalk Hill itself is formed by a flat plateau around 32m OD, sloping down to the south where steep cliffs form the coastline some 380m from the excavation area. The site affords fine views across the National Nature Reserve of Pegwell Bay.

Geologically, the Isle of Thanet, formed by both solid bedrock and drift deposits, is relatively uncomplicated. The solid bedrock is represented by Upper Chalk, a marine deposit laid down in the Cretaceous period between 136 million years and 64 million years ago. Folding and faulting of the earth's crust uplifted the chalk in Thanet, separating it from the mainland and creating a small syncline. Deposits of Thanet Beds and London Clay partially filled the syncline in the subsequent Palaeocene and Eocene epochs during the Tertiary period, roughly between 64 million and 30 million years ago. More recently, in post-glacial times, rising sea levels inundated the partially filled syncline and cut Thanet off from the mainland.

Overlying the chalk locally are discontinuous blankets of silt of varying thickness described in the British Geological Survey map (sheet 274) as two deposits of Brickearth (younger and older). Both these deposits of Brickearth are described as being deposited in the Pleistocene and Holocene (*ie* over the last two and a half million years). To the south, exposed in the cliffs of Pegwell Bay a deposit of loess (windblown silts) deposited during the last glacial maximum (20,000 to 14,000 years ago) is one of the best exposures in Southern Britain. A buried soil developed on the surface of the

Fig 4. Overall site plan.



loess; radiocarbon dating of organic material in this soil suggested a date of 5,600-4,400 cal BC for the deposit (I-3538; 6,120 ± 250 BP; Buckley and Willis 1970, 103). Thus the development of the soil may have occurred in the later Mesolithic. It was buried beneath 1-2m of hillwash (colluvium) described by Weir *et al* (1971) who suggested that burial occurred around 5000 years BP as a result of soil erosion after Neolithic forest clearance (Murton 1998, 26). The colluvium, containing Neolithic artefacts, was thought to have been deposited around 2,500 cal BC (Bateman 1998, 30, table 2.1). Another influx of eroded soil occurred about 1,100 cal BC, roughly corresponding to the middle Bronze Age. Evidence of buried soil/silt horizons of this date is an important indicator of environmental changes, perhaps initiated through anthropogenic agencies. The absence of buried soils observed during the excavation may be explained by the loss of material from site migrating downslope, accumulating as this deposit of colluvium exposed in the cliff face at Pegwell Bay.

The soils in the immediate area comprise a mixture of calcareous and non-calcareous humic topsoils.

Archaeological investigations

In April and August 1997, the site underwent a metal detecting survey and evaluation by machine to determine the archaeological potential. The trenches were positioned in accordance with a specification set by KCC (Fig 3; Dyson 1997, 5, 9).

A total of fifty-six trenches, each roughly 20m long and 1.6m wide were positioned to maximise the amount of ground covered along the development corridor, following the KCC specification (Shand 1997a; 1997b; 1997c). A human prehistoric crouched burial, numerous linear and curvilinear ditches and a small number of post-holes discovered during the evaluation dating to the Neolithic and Bronze Age periods prompted further investigations. A palaeoenvironmental record of the soils and the bedrock in each trench was compiled and selected samples taken for further analysis by Archaeoscape Consulting of Royal Holloway University of London (Green *et al* 1997; 1998; Palmer and Green 1997). Thirteen pollen sub-samples were extracted from column samples to assess pollen content and condition in the deep gully infill sequence and in a range of archaeological features primarily from the Neolithic features. No pollen was present in any of the samples assessed (Nick Branch, pers comm). Numerous column samples for land snail analysis were similarly disappointing and inconclusive, owing to a lack of material therein (Mark Robinson, pers comm).

During December 1997 and January 1998 large scale topsoil strip and excavation was undertaken prior to earthmoving connected with the construction of the proposed road. The resulting soil strip laid bare an area

Pl 1. Excavations at Chalk Hill, Ramsgate: view from the site overlooking Pegwell Bay to the now-demolished Richborough power station.

approximately 340m long by between 25m and 45m wide, revealing a complex multi-period archaeological landscape (Fig 4; Pl 1).

Structure of the report

A description of the archaeological features recorded during the excavation is presented in a broad chronological sequence based on a series of landscapes suggested by the archaeological evidence, the early prehistoric landscape (including the late Palaeolithic and Mesolithic evidence, Neolithic and early Bronze Age features), the later prehistoric Bronze Age and Iron Age remains, and a historic landscape (Anglo-Saxon features and evidence for medieval activity). Within these broad chronological divisions, features are described according to their interpretive associations or their spatial disposition. The majority of stratigraphic evidence took the form of cut features and associated fills; in general fills are not individually numbered in the descriptive narrative. Where deposits are individually numbered they are marked with the prefix 'D'. Negative features are marked with the prefix 'F'.

In some instances, features were sample excavated by cutting two or more slots through the feature, using different context numbers in each slot. Where these different numbers have been interpreted as representing the same stratigraphic feature, the numbers have been collated (*eg* F98/408/433).

Frequent reference is made in this report to 'placed deposits'. Although in common parlance in contemporary archaeological literature, this term was first coined in 1985 by Francis Pryor in relation to his excavations at Etton in Cambridgeshire (Pryor 1985, 292-3). Broadly synonymous with the term 'structured deposit' (Crease 2015; Garrow 2012; Pollard 20012; Richards and Thomas 1984), the expression 'placed deposit' seeks to differentiate material that found its way into the archaeological record through casual loss or unstructured deposition from 'material that seems to have been placed in position deliberately, as a symbolic act of some sort' (Pryor 1985, 293). Notwithstanding the contemporary recognition of the false dichotomy between 'ritual' and 'secular' activity in prehistoric societies (*eg* Bradley 2005), this interpretative classification is valuable in facilitating a more nuanced appreciation of the deposit formation processes at Chalk Hill.

The approach adopted in this volume is to consider the archaeological discoveries at Chalk Hill in terms of 'landscapes', that is, to look beyond the edges of the excavation area and try to understand the site in terms of its surroundings, from the perspective of topography and

environment as well as the perception of the people who experienced and modified this chalky hillside over the millennia.

This is of course not such an easy task given the enormous changes in both the topography and the environment that have occurred since the last Ice Age. As the glaciers retreated, Chalk Hill formed part of an extensive landmass that stretched from the Atlantic Ocean unbroken to the eastern shores of Asia (Clark 1932; Coles 1998; Gaffney *et al* 2009). The north-western corner of this great land, of course, was inundated as the ice sheets melted and the water locked in them was released, forming what is now the North Sea. This inundation (sea level has risen around 120m since the last glacial maximum, some 20,000 years ago; Jelgersma 1979) took place slowly throughout the earlier Holocene, but occasionally catastrophically, like the immense tsunami that swept across the region in around 6,250 cal BC (Haflidason *et al* 2005, 135; Weninger *et al* 2008). By around 6,300 cal BC the rising sea levels caused Britain to become an island (Preece and Bridgland 1998, fig 2.4), and with the sea came powerful erosive forces that further diminished the areas of dry land, forces that continue to act on the coast line of south-eastern Britain and western Europe up to the present day (Bates *et al* 2011; Meurisse-Fort 2008).

What we understand as the Isle of Thanet today has undergone extensive transformation over the last few thousand years, and much has been lost to the sea. In contrast, at least in the last few hundred years, land has also been reclaimed from the sea as the Wantsum Channel became filled with silt (Moody 2008, 35-52). Understanding the landscape context of the discoveries at Chalk Hill is thus complicated by the complex topological changes in the region. Likewise, the poor survival of organic remains on the chalk soils of the area means that the changing environmental landscape can only be articulated in the most general sense, at least at present. These same factors also inhibit our understanding of the past landscape from a phenomenological perspective; we should be sensitive to the changes in the topology and environmental context of Chalk Hill further back in time in order to attain a more nuanced understanding of the archaeology of the site. At the time of excavation, the predominant impressions were of the changing sky and the broad expanse of the sea formed by Pegwell Bay stretching away to the south, with the coastline of mainland Europe clearly visible on the horizon. These qualities of light and space have long been recognised, with many artists being drawn to the landscapes of Thanet in the recent past such as Turner, Rossetti, Tissot and Van Gogh (Lewis 2002; 2013). Today, the hillside is crossed by the Royal Harbour Approach Road, leading into a cutting and ultimately a tunnel, with no pedestrian access, effectively isolating one from the vistas of sky and sea that the excavation team were so familiar with.

The site description for each landscape is followed by a series of pertinent specialist reports focussing on a range of artefacts and ecofacts of different classes; flint, stone, pottery, registered finds, human bone, animal bone, palaeoenvironmental samples, charred plant remains, shellfish and coprolites. Radiocarbon dates printed in italics are posterior density estimates derived from statistical modelling as described in Chapter 2. Details of the dates are to be found in Table 2.

Following the description of each landscape a general discussion of the data is presented.

2

Early prehistoric landscapes

Site description

Peter Clark and Jake Weekes

Palaeolithic and Mesolithic evidence

A large natural palaeochannel on an approximately north-west/south-east alignment was identified in the northern area of the site, continuing south and to the east of the excavated area (Fig 5; Green *et al* 1997, 11; Palmer and Green 1997, 10-13). With an estimated width of around 20m and a proven depth of 4m, the feature was a former watercourse of some antiquity that had gradually been filled by erosion deposits. A struck flint flake (now lost) of possible Upper Palaeolithic date was reportedly recovered from the basal deposits (Green *et al* 1998). The hollow may well have still been a notable landscape feature even in the Mesolithic and early Neolithic, when its uppermost deposit (a brown clayey silt) was apparently being laid down and could therefore have been significant in the siting of potential Mesolithic and early Neolithic features.

A group of small post- and stake-holes excavated at the northern extremity of the site was found to cut into deposits similar to those filling the palaeochannel (Fig 5). No finds were recovered from any of these features and their date is unknown. They are not described in detail here.

Whilst there were no features datable to the Mesolithic, the presence of people in the area during this period is demonstrated by numbers of Mesolithic-style flint objects recovered during the excavation, considered to be residual in later features.

The early Neolithic 'causewayed enclosure'

Located in the central part of the excavated area was a series of three, possibly four or five, concentric arcs of discontinuous groups of cut features (Fig 6). Assuming that these arcs should be conceived as convex rather than concave, they appeared to be focussed on a point to the east of the excavation area, downslope on the western side of a shallow dry valley running southwards towards Pegwell Bay. On this basis they are described below, with the three main elements presented as the 'Inner', 'Middle' and 'Outer' arcs, with a putative fourth arc of discrete pits lying between the 'Inner' and 'Middle' arcs and possibly another short alignment of pits to the north of the 'Outer' arc.

The arcs were irregular both in their general morphology and in the alignment of individual clusters of features (here described as 'segments'). There was no sign of the arcs extending to the east of the excavation area on aerial photographs apart from a short stretch of the northern part of the Outer Arc. It is not known, therefore, if the arcs were elements of a complete circuit or enclosure.

The Inner Arc consisted of ten segments of relatively shallow cut features (in general less than 0.3m deep) extending for around 93m from the eastern section and terminating

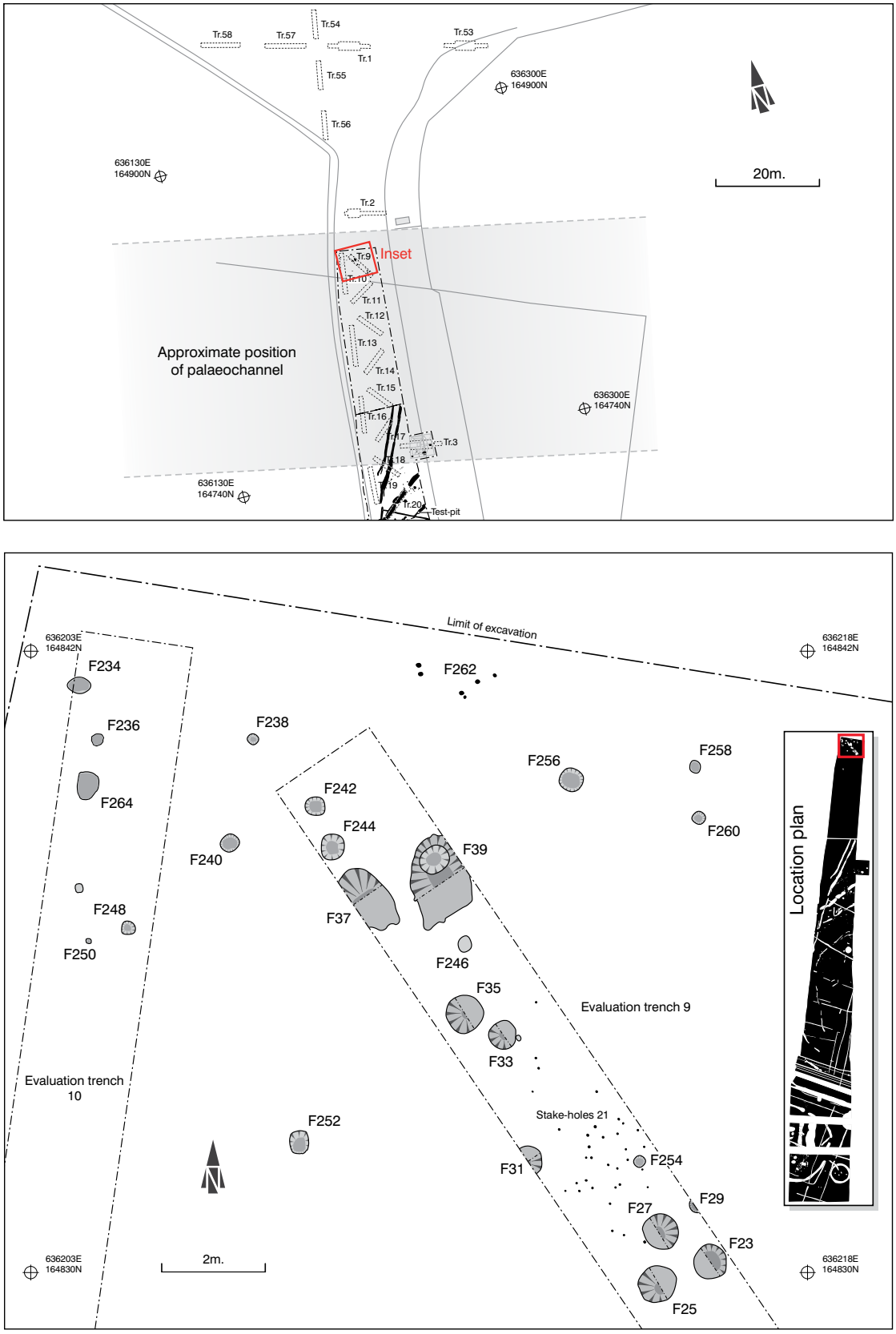


Fig 5. Post-hole and stake-hole features at north end of site.

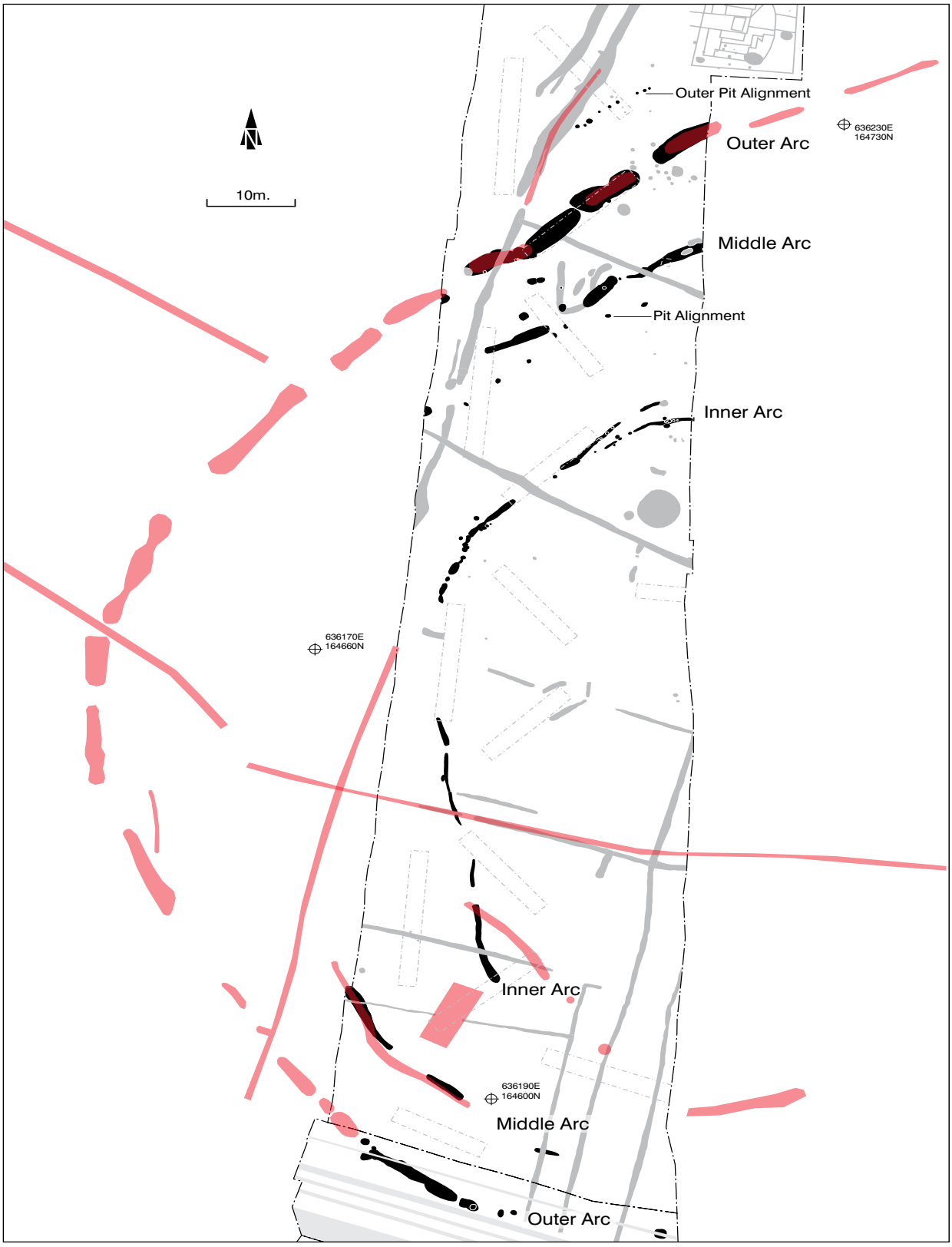


Fig 6. The concentric arcs (with cropmarks plotted) and pit alignments. Cropmarks in red, excavated features in black.

to the south; there was no sign of a return of the arc into the eastern edge of excavation here, though it is unclear if this reflects the original arrangement or that features were lost through truncation.

Only the southern and northern parts of the Middle Arc were visible in the excavation area, the presumed connecting section lying to the west; there was no sign of this on aerial photographs. The overall length of this reconstructed arc would have been in excess of 180m. Seven segments were recorded relating to this arc, two to the south and five to the north; like the Inner Arc, these were quite shallow, rarely exceeding 0.3m in depth.

The segments constituting the Outer Arc were considerably more substantial and complex. As with the Middle Arc, only the southern and northern parts of the arc were seen in the excavation area, the connecting section lying to the west, though in this case the unexcavated segments were clearly visible as cropmarks on aerial photographs (Deegan 2009). The cropmark evidence suggests the Outer Arc extended for over 200m, consisting of 16 or 17 segments. Six segments were recorded within the excavation area, one to the south and five to the north (though only two of these were unequivocally identified during excavation). The main segments of the Outer Arc were formed by multiple episodes of pit digging, resulting in composite features in excess of 1m in depth.

Lying close to the southern side of the northern section of the Middle Arc was another potential arc, formed by a number of discrete pits between 0.5 and 0.9m in diameter and 0.2-0.5m deep. Similar features were not located adjacent to the southern part of the Middle Arc. A short alignment of small pits or postholes north of the Outer Arc may also relate to this arrangement of concentric arcs.

The combination of all the above features was understood to represent part of a 'causewayed enclosure' at the time of excavation and was described as such in a number of interim publications (*eg* Dyson *et al* 2000; Shand 1998). As discussed in Chapter 6, this term is perhaps of limited utility, but has been employed here for convenience.

The Inner Arc

Ten 'segments', or rather foci for repeated episodes of pit-cutting and associated deposition, could be identified forming the Inner Arc of the putative enclosure (Fig 7). Various small pits or post-settings appeared to be associated with the segments.

Unless otherwise stated, the deposits filling all the features were homogenous silts, often with small to medium sized chalk fragments and natural flint inclusions. Details of feature morphology, dimensions, deposits and finds can be found in the segment catalogue (Appendix I).

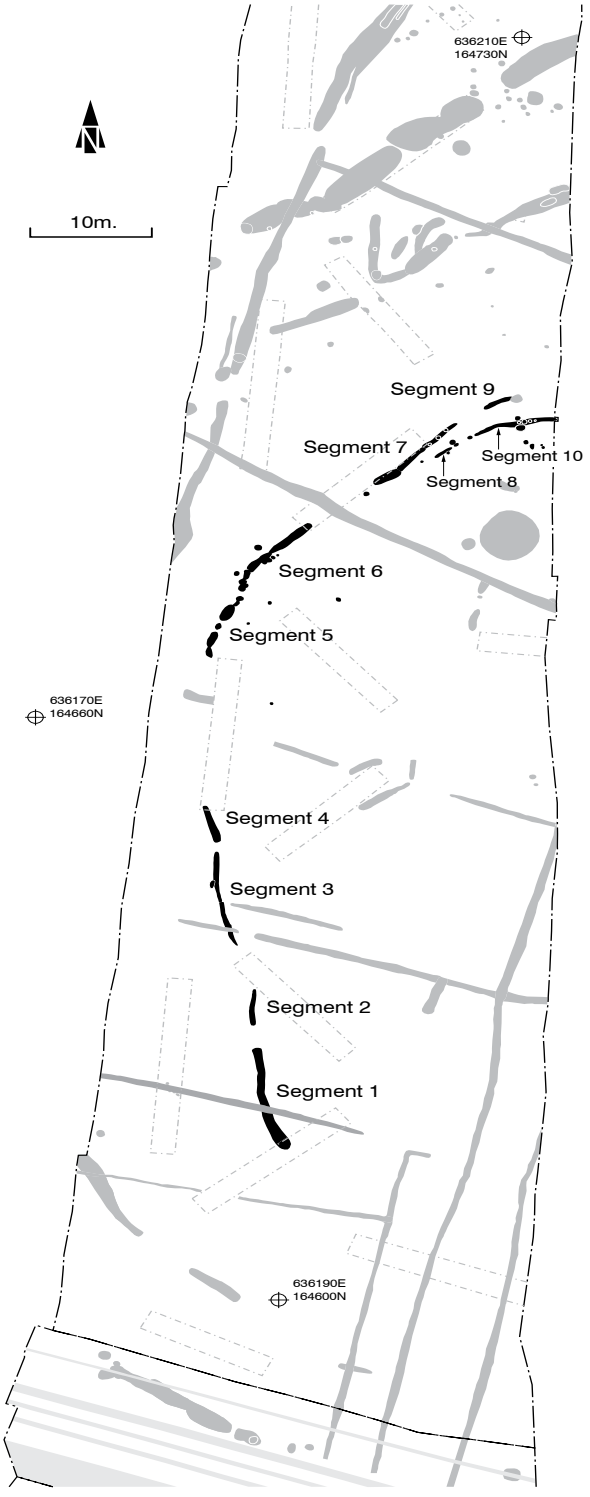


Fig 7. Inner Arc, Segments 1-10.

Inner Arc, Segment 1

This segment (Fig 8 and 12) was formed by a curving linear feature (F1046) approximately 10m long and 1.15m wide at its southern end, tapering to 0.82m at its northern terminal;

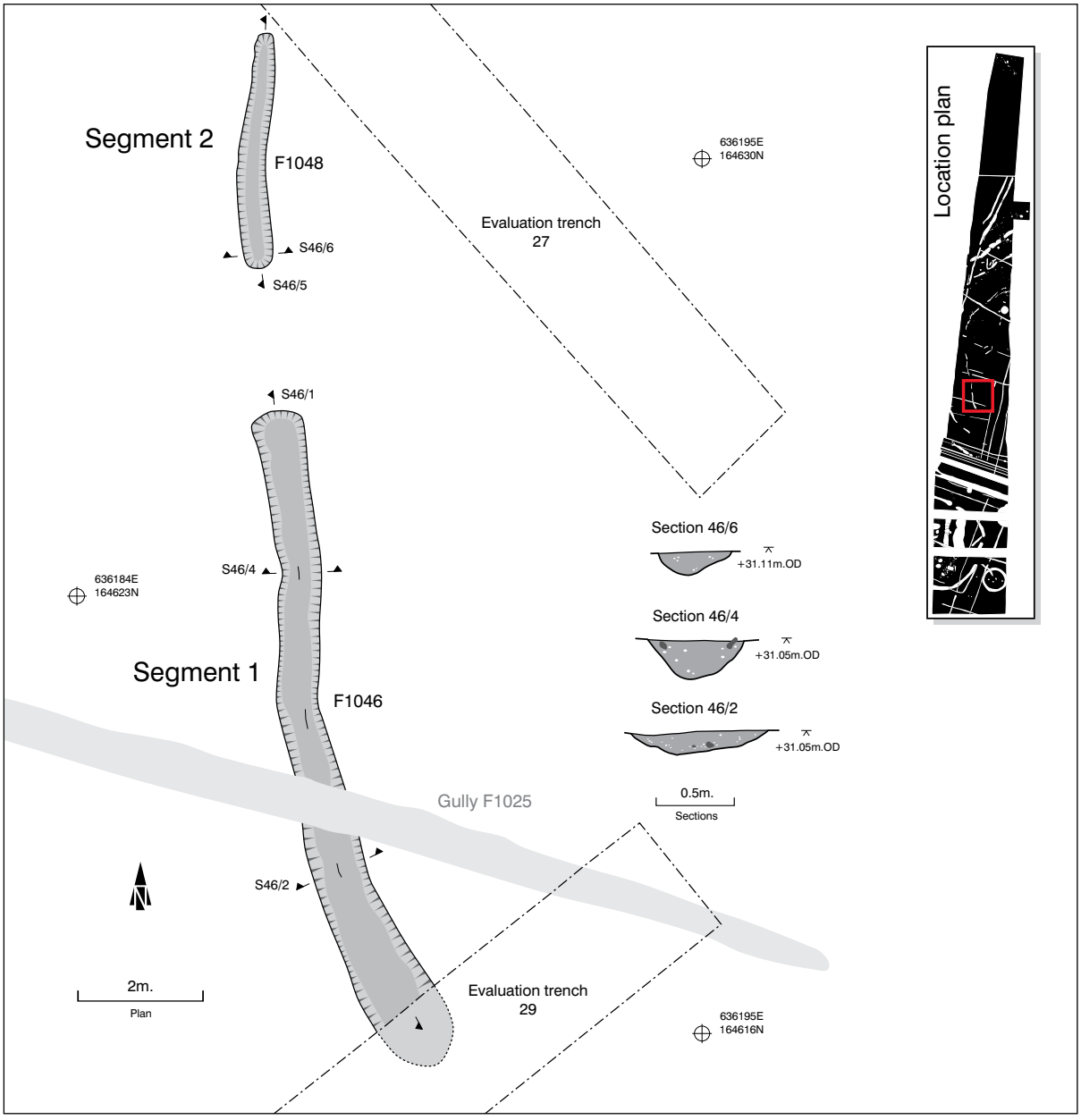


Fig 8. Segments 1-2.

the feature was 0.22m deep. Its fill contained occasional inclusions of mussel shells, burnt flint and small fragments of heat-affected clay, carbon and chalk. Finds, including worked flints (one burnt), early Neolithic pottery and some burnt and unburnt animal bone (including cattle) as well as several varieties of shellfish and a fragment of hazelnut shell were scattered throughout the fill.

A gap of 2.3m separated segments 1 and 2.

Inner Arc, Segment 2

Segment 2 (Fig 8 and 12) also consisted of a single shallow linear feature (F1048) 3.75m long, 0.45m wide and 0.3m deep. Finds were scattered throughout its fill, including worked flints, burnt flint, early Neolithic pottery and a single unidentified bone fragment. Charcoal, seeds and traces of winkle shell were also recovered.

A gap of 4.7m divided Segments 2 and 3.

Inner Arc, Segment 3

Segment 3 (Fig 9 and 12) was principally formed by two short linear gullies (F1050 to the south and F1056 to the north) which partially intercut near the centre of the segment. The features had a combined length of approximately 10m and varied in width between 0.13m and

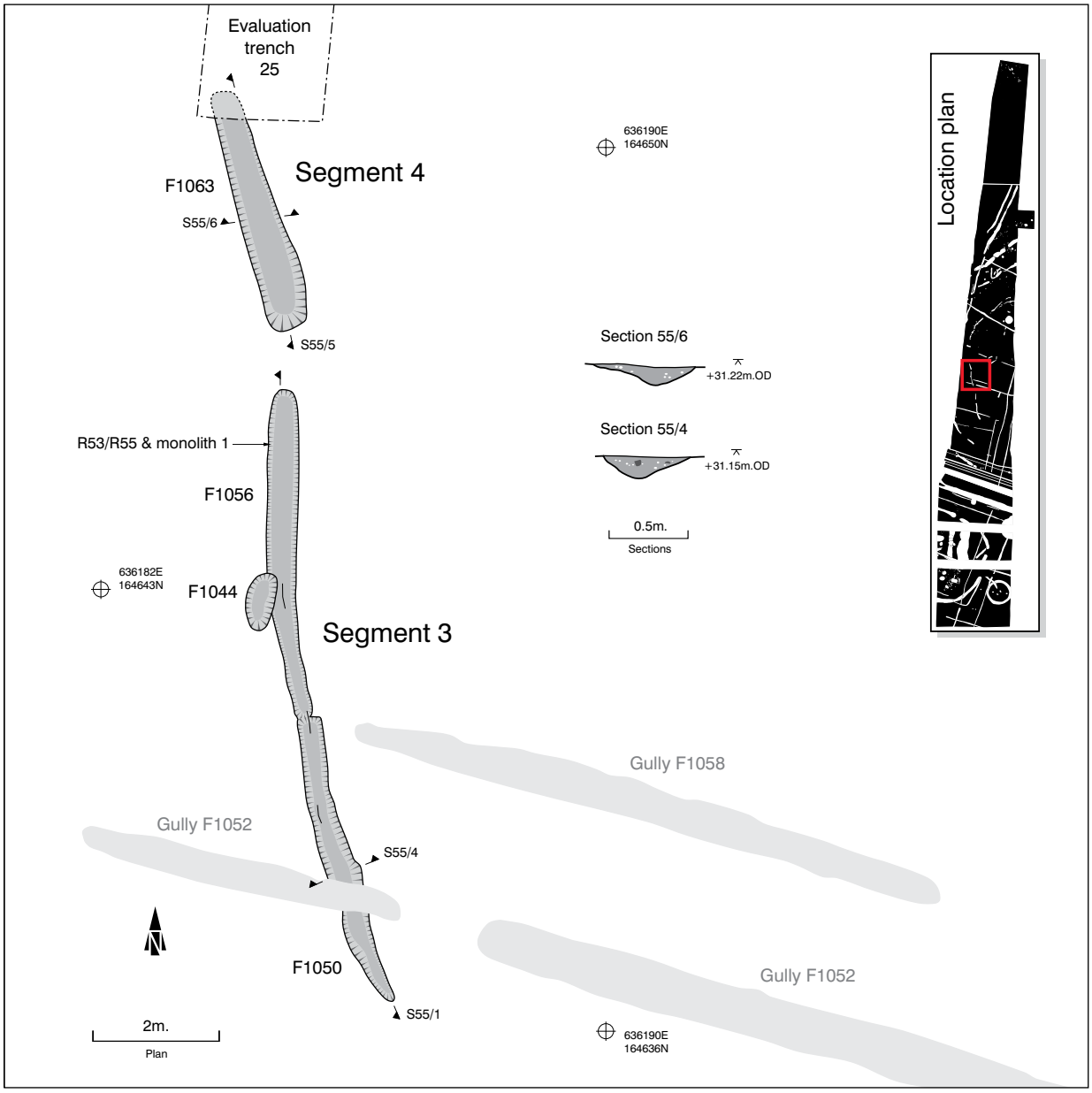


Fig 9. Inner Arc, Segments 3-4.

0.5m, having a maximum depth of 0.26m. While these apparently separate cuts could be discerned in plan it was impossible to tell which was cut first.

The more southerly feature (F1050), 4.7m long, was filled by a single deposit which produced sparse finds of worked flint (one slightly burnt), a burnt unworked piece and small quantities of unidentified pottery, mammal bone, shellfish, charcoal, grain and seeds. The more northerly feature (F1056) was approximately 5.2m long and contained sherds of early Neolithic pottery as well as a significant deposit of worked flint (burnt and unburnt) in its fill. Some of the unworked flint recovered had also been burnt. Shellfish, charcoal and seeds were also present, along with burnt and unburnt animal bone.

Near the southern terminal of this feature a discrete concentration of finds was noted (D1055), including an abraded sherd of early Neolithic Plain Bowl in association with a flint flake and a retouched scraper, along with 35 fragments of burnt animal bone. These items seemed to represent a deliberately 'placed deposit', which did not appear to lie directly on the base of the cut. An internal carbonised residue on the potsherd (Sherd Group 6) yielded a radiocarbon date of *3745-3650 cal BC (95% probability; OxA-15391*; Table 2).

A small oval pit (F1044) had been cut into the fill of feature F1056, measuring 0.9m by 0.45m in plan with a dished profile just 0.07m deep; fragments of pottery (possibly Neolithic), worked flint and particles of heat-affected clay were recovered from its fill.

A gap of 0.95m separated Segments 3 and 4.

Inner Arc, Segment 4

Segment 4 (Fig 9 and 12) was formed by a short gully (F1063), about 3.75m from south to north, 0.8m wide and 0.15m deep filled by a single deposit (its northern terminal was evidently truncated but not seen during evaluation of the site). Only a few small fragments of early Neolithic pottery were retrieved from this feature, along with 16 worked flint objects. Soil samples produced small quantities of burnt unworked flint, mammal bone, charcoal, charred grain and traces of shellfish.

A gap of approximately 15m separated Segments 4 and 5, but it is possible features interrupting this gap were missed in evaluation trench 25, which was located almost exactly along the projected line of the arc between the segments.

Inner Arc, Segment 5

Segment 5 (Fig 10 and 12) was made up of three discrete concentrations of pit/gully features forming an arc approximately 6.75m long from south-west to north-east. The most southerly group consisted of two intercutting pits (F1065 to the south and F1067 to the north) with an overall length of 2.75m and around 0.08m deep; which of these features was cut first could not be ascertained. Feature F1065 was approximately 1.15m long and 0.55m wide and filled by a single deposit which produced only small quantities of very fragmentary pottery (unidentified), burnt mammal bone and traces of oyster shell and grain. Feature F1067 was slightly larger (approximately 1.65m long and 0.70m wide); its fill contained further sparse evidence of flint working as well as traces of burnt mammal bone, charcoal and charred seeds.

Just 0.22m to the north-east of this group was an oval pit (F1075), 0.8m by 0.5m and 0.16m deep. The fill of this feature produced a hazelnut shell fragment, occasional burnt unworked flints and traces of burnt mammal bone and shellfish, as well as small quantities of charcoal.

A little further (0.29m) to the north was an irregular linear feature (F1086), approximately 3m in length with a varying width of 0.5-0.8m and 0.25m deep, which probably represents several concurrent or consecutive pit cuts which could not be clearly distinguished during excavation. Only a single fill could be discerned (D1085), although a marked concentration of charcoal was noted near the southern terminal of the feature. Soil samples derived from this charcoal deposit contained a number of unidentified pottery fragments and small amounts of charcoal, grain, burnt mammal bone and hazelnut shell fragments. This concentration of material is possibly indicative of a deliberately 'placed deposit'. Sparse worked flint was found scattered through the fill more generally, along with a burnt unworked flint fragment and some burnt animal bone.

A relatively short distance (0.45m) separated Segments 5 and 6 of the Inner Arc.

Inner Arc, Segment 6

Segment 6 (Fig 10, 12) represents a more complex arrangement of features than those described so far. The segment was primarily formed by five intercutting pits and gullies arcing from south to north-east, with a combined length of approximately 9m. While stretches of gully formed the north-eastern end of the segment, a series of oval pits marked the southern end.

Of the intercutting oval pits at the southern end of the segment, feature F1110 was possibly the earliest; an elongated pit 1m long, 0.6m wide at its northern end and 0.2m deep. Charcoal flecking and traces of shellfish were noted within the fill, which yielded finds of early Neolithic pottery and worked flint. The most southerly pit of this group (F1112), 0.65m in diameter and 0.2m deep, again included traces of charcoal and shellfish, along with a few abraded and undiagnostic potsherds.

Pits F1110 and F1112 were superseded by a small subcircular pit (F1108), 0.7m in diameter and 0.32m deep. Its fill yielded quantities of worked flint and early Neolithic pottery, a concentration of artefacts suggestive of a 'placed deposit'; two fragments of heat-affected clay, a burnt unworked flint fragment and an unidentifiable bone fragment were also recovered by hand, while soil sampling of the deposit also revealed traces of shellfish, charcoal and grain.

To the north a shallow linear gully (F1114) continued the segment. This was approximately 2.4m long and widest (0.75m) towards its southern end, filled by a single deposit. A large quantity of early Neolithic pottery sherds, including Carinated Bowl, was found concentrated at the north-eastern end of the feature, suggesting a discrete and potentially 'placed deposit'. The potsherds were found in association with a dense concentration of charcoal along with small amounts of burnt mammal bone, burnt grain and seeds, traces of shellfish and a single piece of heat-affected clay. The feature generally yielded a particularly large flint assemblage (much of it burnt), along with fragments of burnt unworked flint.

The most northerly feature of the segment was a shallow gully (F1122) estimated at 4.3m long (the terminal having been truncated by evaluation trench 23), up to 0.2m deep and 0.8m wide. The single uniform fill of the feature contained another apparently deliberately 'placed deposit', which did not rest on the base of the cut

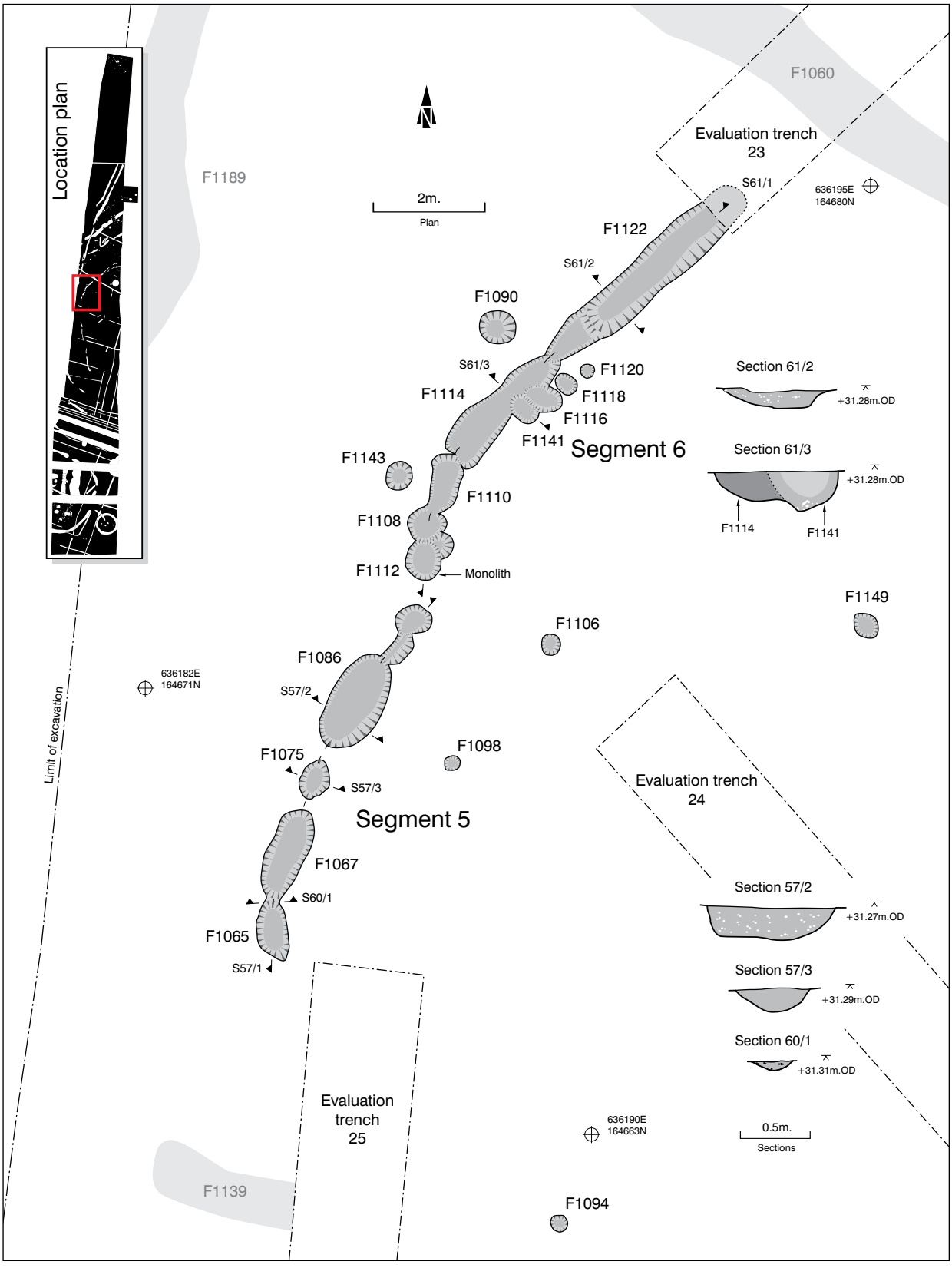


Fig 10. Inner Arc, Segments 5-6.

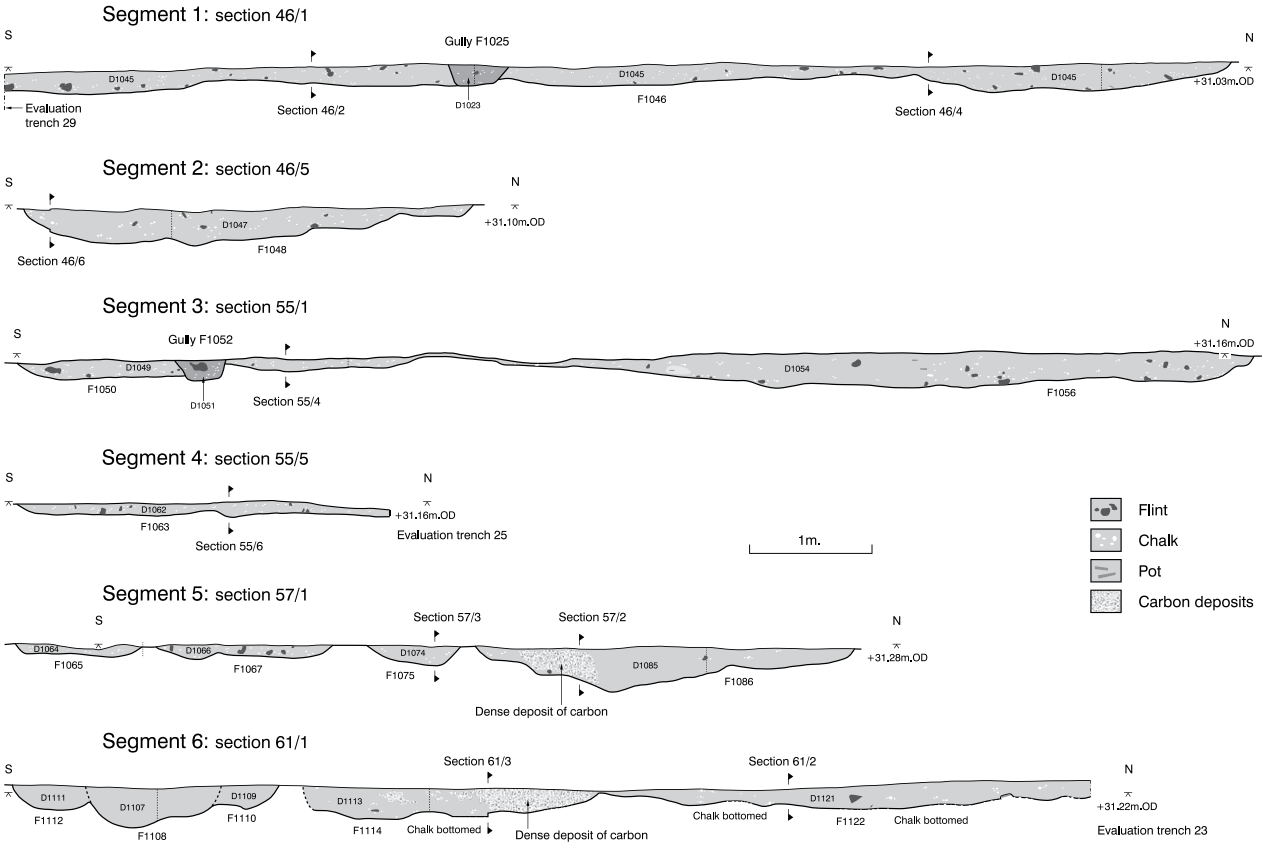


Fig 11. Inner Arc, Segments 1-6, longitudinal sections.

or form a clearly separate fill but appeared as a discrete collection of finds within the more general silt. This mainly consisted of early Neolithic pottery, probably representing three vessels, possibly associated with a leaf-shaped flint arrowhead. A large worked flint assemblage of over 100 artefacts was found within the feature more generally. Forty-one pieces of burnt unworked flint were also found in this feature, as well as two fragments of heat-affected clay and small amounts of charcoal, grain and seeds.

A linear group of four adjacent post-holes or small pits (F1116, F1118, F1120 and F1141) lay on the south-eastern side of this segment, with features F1141 and F1116 cutting the fill of feature F1114. The most southerly pit of the group (F1141) was oval (approximately 0.5m by 0.4m) and cut to a depth of 0.30m. Pit F1116 was also oval (0.72m by 0.48m) and had a dished profile approximately 0.21m deep. Immediately to the north-east of this group were two further subcircular pits; pit F1118, 0.42m by 0.32m in plan and 0.23m deep, and pit F1120, 0.25m in diameter and 0.13m deep. Worked flint (burnt and unburnt) and early Neolithic pottery was recovered from each of these small features in sufficient quantity to suggest that they were pits dug specifically for deposition, though the possibility they represent post-settings cannot be discounted.

Two further small and shallow pits/truncated post-holes (F1143 and F1090) were located less than a metre from the north-western side of Segment 6. Pit F1143 (0.5m in diameter and 0.2m deep) contained a single flint blade, whilst pit F1090 (0.65m in diameter and 0.15m deep) produced a flint blade and a single flake.

Four small pits or post-holes (F1094, F1098, F1106 and F1149) were located to the south-east of Segments 5 and 6 (Fig 10). The two nearest to Segment 5 (F1098 and F1106) were subcircular, shared similar dimensions and depths (0.3-0.4m in diameter and 0.18m deep) and had sharp profiles, as had pit F1094, 8.2m to the south-east of pit 1098. Pit F1149, 5.3m to the east of pit F1106, had more in common with slightly larger and shallower pits found elsewhere in association with the Inner Arc, being 0.53m in diameter with a broader base only 0.1m deep. A single flint flake was found in the fill of pit F1106.

To the north-east the gap separating Segments 6 and 7 measured about 7m (an estimation; evaluation trench 23 had truncated the terminals of both segments).

Inner Arc, Segment 7

Four intercutting shallow linear features with a combined length of approximately 9m, representing at least two

phases of activity formed the focus of this segment (Fig 12 and 13). Initial cuts at the western and eastern ends of the segment (F1124 and F1126) had been truncated by features F1135 and F1133 respectively. Overall, the sides of the features, even those that were extremely shallow, were steep and evenly cut, but the bases were uneven; uniform silt deposits again filled all.

The earliest feature at the western end of the segment was a shallow gully (F1124) 2.55m long, 0.84m wide and just 0.09m deep. A discrete concentration of burnt animal bone was discovered 0.9m from the western end of the feature along with three fresh sherds of early Neolithic pottery, again suggestive of a deliberately 'placed deposit'. A relatively small flint assemblage was also recovered from the western end of the feature more generally, along with traces of burnt flint, charcoal, seeds, burnt bone and unidentified shellfish.

The earliest feature at the eastern end of the segment (F1126), 3.65m long and 0.45m wide with a maximum depth of 0.20m, produced a substantial flint assemblage, as well as several burnt unworked pieces of flint, in addition to unidentified mammal bone fragments, charcoal and hazelnut shell. Evidence of a possible 'placed deposit' including 12 early Neolithic potsherds was found at the eastern end of the feature.

A short linear feature/elongated pit (F1135), 1.6m long, approximately 0.55m wide and with a maximum depth of 0.2m, cut the eastern end of F1124. Its fill contained traces of charcoal. A further short linear feature/elongated pit (F1133), 1.58m long, approximately 0.35m wide and up to 0.27m deep seemed to cut the eastern end of F1135 and the western end of F1126. It contained only a few pieces of worked flint and traces of mussel shell and charcoal.

As well as these linear features, a number of smaller discrete features appeared to be associated with this segment, either representing post-holes or small pits for the placement of deposits. An evenly spaced linear group of three small discrete features (F1102, F1104 and F1137) cut the fill of feature F1126 at the eastern end of the segment, all circular with a maximum diameter of 0.32m and depths of around 0.25m. All were filled by silts characterised by charcoal flecking, and the fill of F1102 contained a single sherd of Neolithic pottery (form unknown) as well as four flint flakes and a utilised piece of flint.

A further small pit or post-hole (F1523), situated 0.5m from the south-western terminal of feature F1124 may also relate to this segment. The feature was 0.5m in diameter with near vertical sides and a curved base 0.18m deep. The silty fill produced a single early Neolithic body sherd and very small quantities of charcoal, seeds and oyster shell.

The distance between Segments 7 and 8 was 2.65m.

Inner Arc, Segment 8

The single linear cut (F1241) forming Segment 8 (Fig 12 and 13) was 2.6m long, 0.5m wide and 0.23m deep, filled by a silt deposit containing fragments of burnt mammal bone and traces of mussel shell, charcoal and hazelnut shell. Thirteen fresh sherds (as well as smaller fragments) of early Neolithic pottery were also recovered, including rim and body sherds in the same fabric; the lack of worked flint from this segment is perhaps noteworthy, though one burnt unworked piece was present.

No further segments were encountered to the east of Segment 8.

Inner Arc, Segment 9

On a more southerly alignment than Segments 7 and 8, Segment 9 (Fig 12, 13) might have formed the original continuation of an alignment from feature F1124 (Segment 7), with the more easterly features of Segment 7 and Segment 8 marking a different phase of activity. The distance between Segment 7 and Segment 9 was just over 3m.

The main element of Segment 9 was a short and shallow linear feature (F1161) 1.5m long, 0.5m wide and 0.26m deep, filled by a charcoal-flecked silt deposit which yielded early Neolithic potsherds along with a few worked flints.

Extending the line of F1161 to the north-east were two possible post-holes or small pits (F1163 and F1165), both oval in plan. Feature F1163, near the eastern terminal of F1161, contained a single Neolithic potsherd and a flint flake; feature F1165, around 1m to the north-east, was heavily truncated.

Three other small oval/subcircular discrete features appeared to be associated with Segment 9: F1155, 0.26m in diameter and 0.06m deep; F1157, 0.51m in diameter and 0.16m deep; and F1159, 0.39m in diameter and 0.14m deep. The silt filling feature F1157 produced twenty-four unidentified fragments of burnt animal bone as well as a few worked flints and a single burnt piece of unworked flint.

The distance between the linear elements of Segments 9 and 10 was 2.21m.

Inner Arc, Segment 10

Continuing the alternative Inner Arc alignment from Segment 9, this segment was formed by an irregular linear gully (F1147/1179), 7m long with a maximum width and depth of 0.5m and 0.26m respectively; the eastern half (F1179) was potentially a separate feature (Fig 12 and 13). Largely uniform silt deposits filled the segment.

The fill of the western half of the feature yielded sporadic finds of early Neolithic potsherds and worked flint. Soil samples included burnt flint as well as small amounts of charcoal, grain and seeds, burnt and unburnt mammal bone and traces of mussel shell. It is probable that these samples were sourced from a distinct concentration of

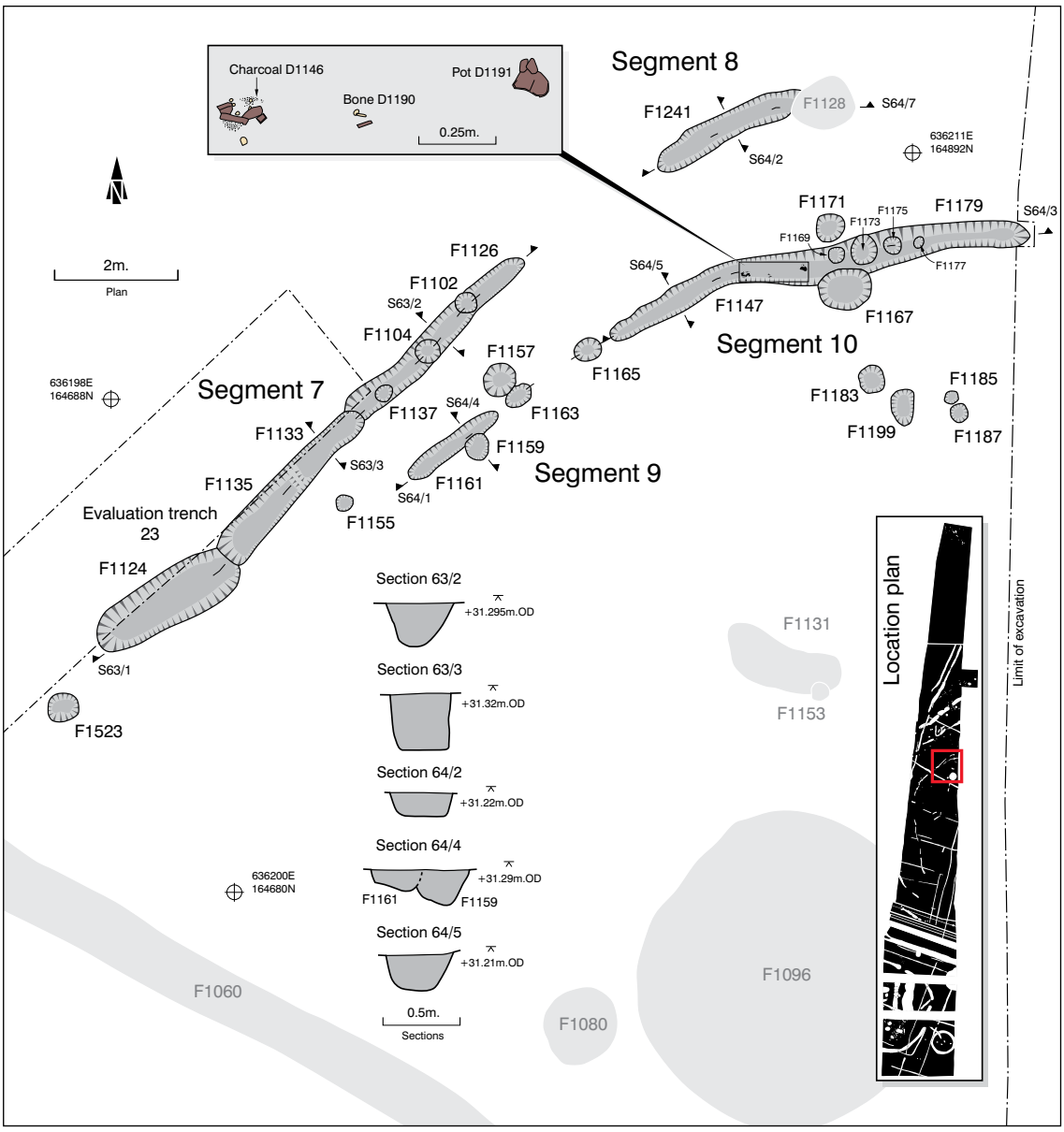


Fig 12. Inner Arc, Segments 7–10.

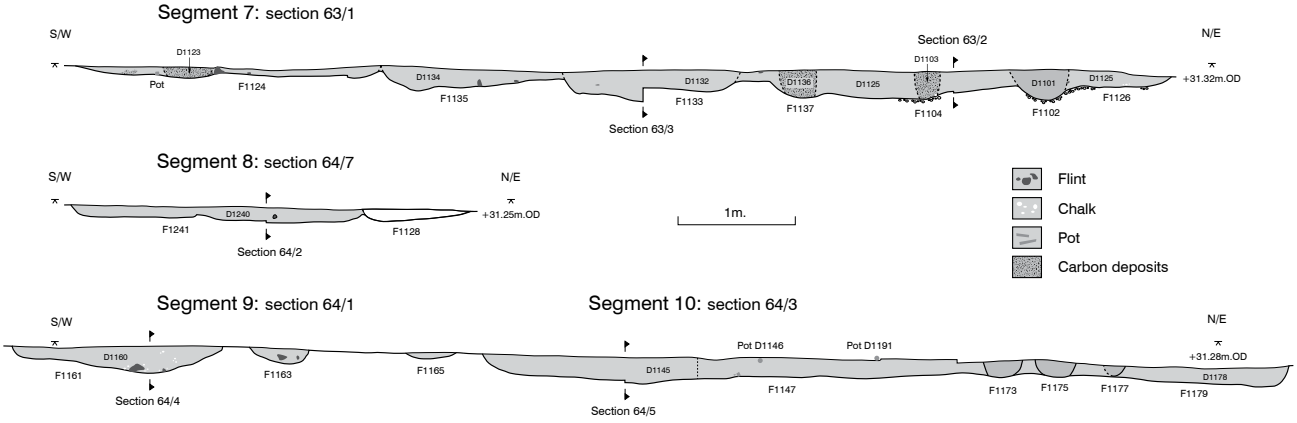


Fig 13. Inner Arc, Segments 7-10, longitudinal sections.

pottery sherds and small fragments of burnt bone thought to mark a potential 'placed deposit' (D1146), approximately 2.3m from the western terminal, apparently situated in the upper levels of the gully fill.

A further two sherds of early Neolithic pottery, located just 0.4m to the east of the latter group, were considered as possibly marking a separate discrete deposit (D1190) chiefly because they were associated with another fragment of burnt bone, and yet another discrete group of sherds lay further (0.5m) to the east. This group (D1191) comprised a larger number of fresh sherds in a single fabric and may represent either a different 'placed deposit' or disturbed material from deposit D1146.

Fewer finds were recovered from the eastern half of the segment, just two sherds of early Neolithic pottery and a relatively small worked flint assemblage; soil samples revealed traces of charcoal and grain.

The Middle Arc

Seemingly concentric to the Inner Arc on its western side was another arc of cut segments; only the northern and southern parts of this arc were visible in the excavation area (Fig 14), the presumed connecting section of the arc lying to the west, though there was no sign of this visible on aerial photographs. The Inner and Middle Arcs were separated by a gap of about 16-17m, and the overall length of the reconstructed Middle Arc would have been in excess of 180m. Seven segments were recorded relating to this arc, three to the south and four to the north; like the Inner Arc, these were quite shallow, short linear features rarely exceeding 0.3m in depth filled with generally homogenous silts with occasional small to medium sized chalk and natural flint inclusions.

The space between the eastern limit of excavation and the eastern terminal of Segment 1 of the Middle Arc was over 13m, perhaps suggesting the termination of the arc at this point, the existence of a large 'entrance' to the south of a closed circuit, or the loss of previously existing features to truncation. Details of feature morphology, dimensions, deposits and finds can be found in the segment catalogue (Appendix II).

Middle Arc: southern section

Middle Arc, Segment 1

This segment was formed by a very shallow linear feature (F1042; Fig 15 and 19) 2.9m long, 0.56m wide and just 0.12m deep, aligned approximately west/east, the fill of which yielded early Neolithic pottery and worked flint as well as sparse evidence of cattle and unidentified mammal bone, along with traces of charcoal, grain and seeds.

A gap of 10.5m separated Segments 1 and 2.

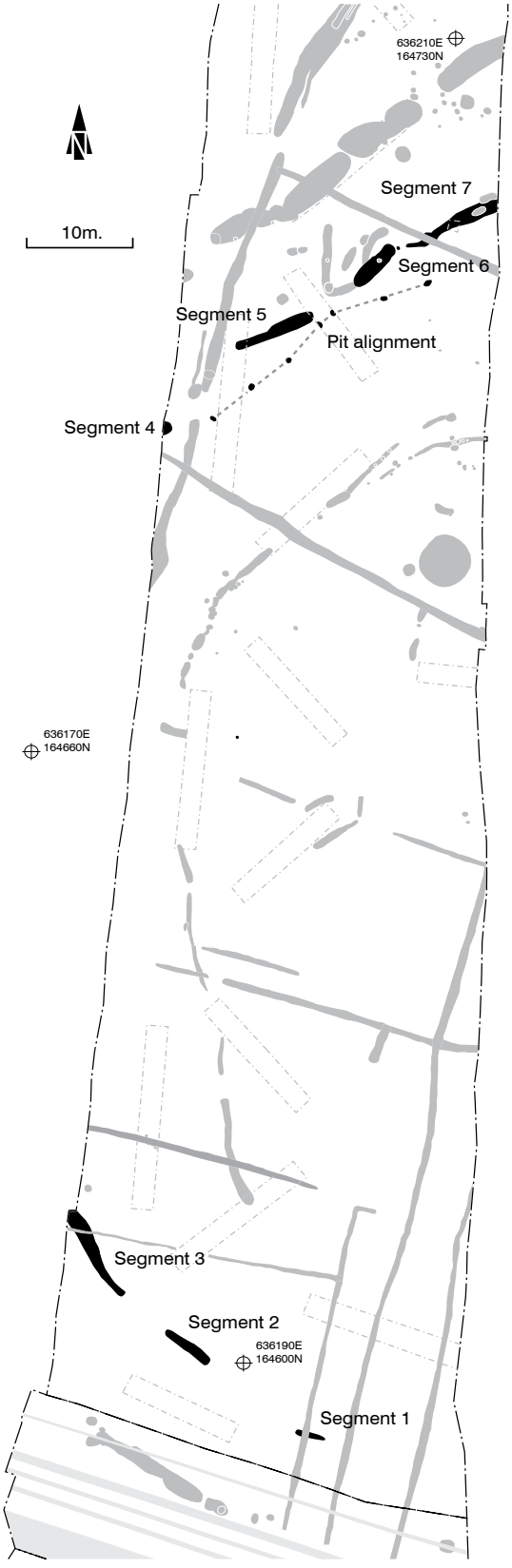


Fig 14. Middle Arc, Segments 1-7.

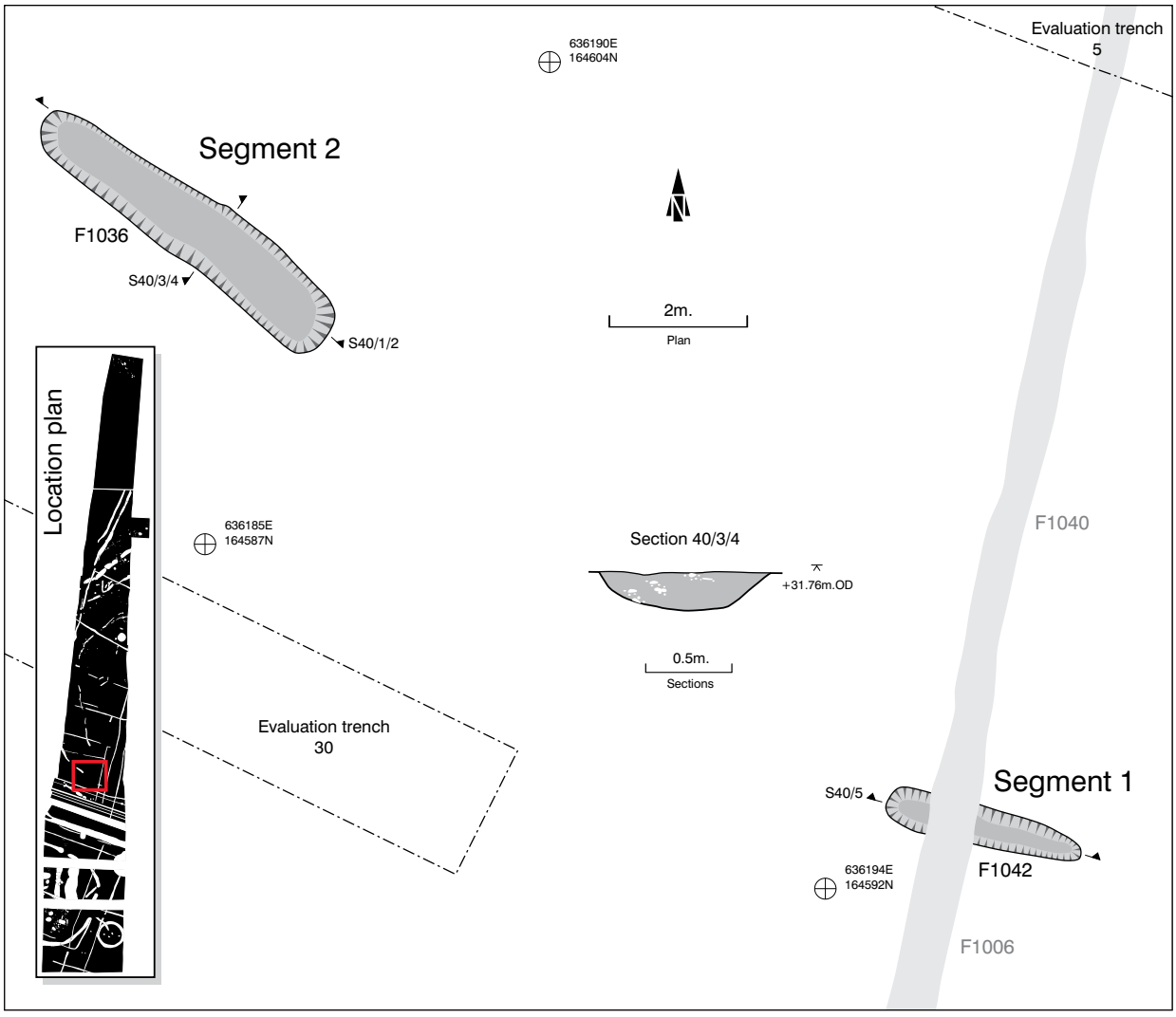


Fig 15. Middle Arc, Segments 1-2.

Middle Arc, Segment 2

This segment was again formed by a shallow linear feature (F1036; Fig 15 and 19) 5.15m long and 1m wide with a maximum depth of 0.3m, the fill of which produced a quantity of early Neolithic pottery and a relatively large worked flint assemblage (including some burnt pieces), a burnt unworked flint fragment, and traces of various shellfish, charcoal, grain and seeds.

A gap of 5.5m separated Segments 2 and 3.

Middle Arc, Segment 3

The primary cut for this segment (F1031; Fig 16 and 19) had been substantially truncated by a later feature which had removed much of the western side of the cut and its southern terminus. The surviving evidence suggests a linear cut approximately 1.5m wide at its northern end (where it ran into the section) and around 0.35m deep. The eastern edge of the feature could be traced for about 6m to the south. Two flint flakes (one serrated and slightly burnt) were retrieved from its fill.

Cutting through F1031 was a flat-bottomed linear feature (F1014) around 9.5m long. At its southern, roughly squared terminus the feature was around 0.6m deep and 0.6m wide, broadening to a maximum width of 1m with a depth of 0.22m to the north, where it ran into the edge of excavation.

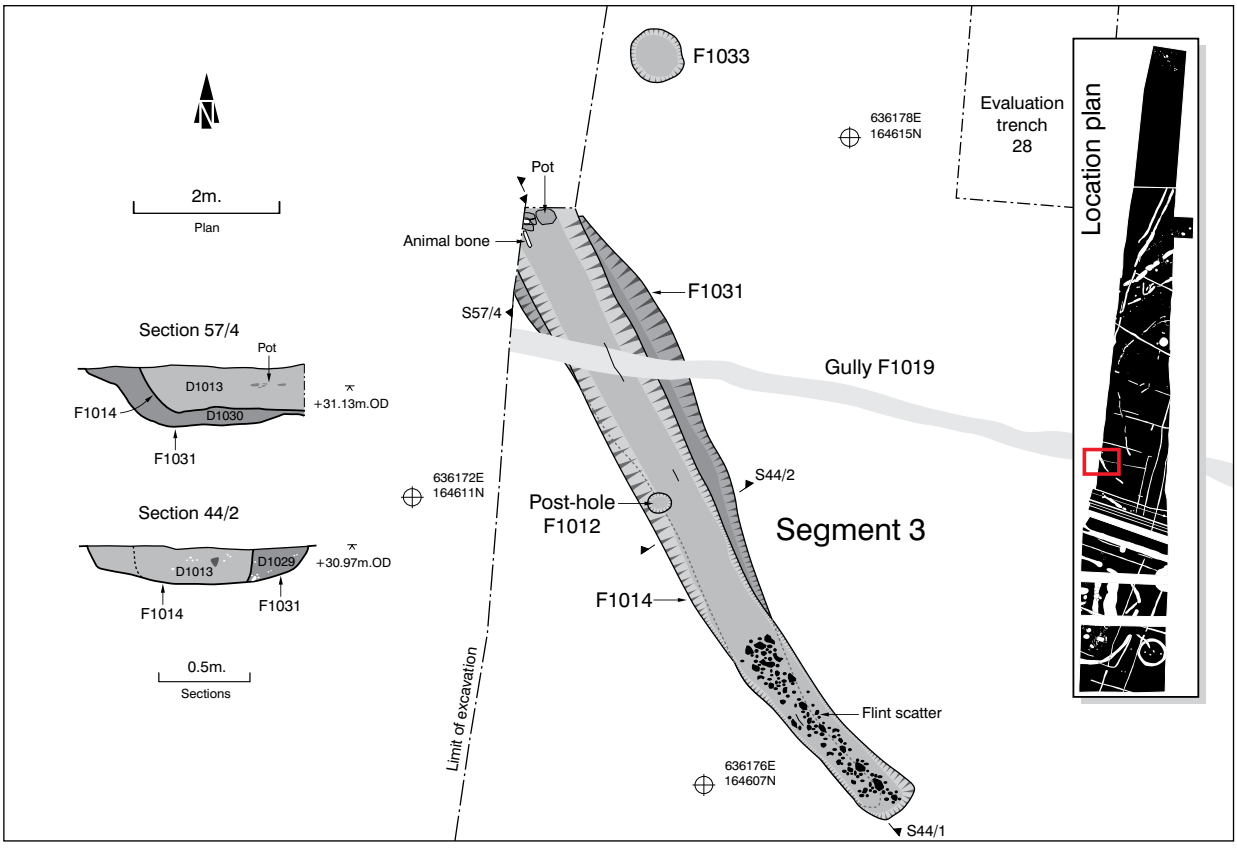


Fig 16. Middle Arc, Segment 3.

Large pottery and flint assemblages were retrieved from its silt fill (D1013), the latter including an incomplete transverse arrowhead (Fig 49/5). A number of fragments of animal bone were also collected (including 19 cattle teeth), along with small fragments of burnt unworked flint, charcoal, grain and seeds, and traces of various shellfish.

At least some of the pottery and bone from this fill was noted as being concentrated in what may have been a 'placed deposit' at its northern end next to the western limit of excavation. Several large potsherds were recorded on the cleaned surface of the deposit, in association with at least two substantial pieces of animal bone. Much of the worked flint was concentrated towards the south-eastern terminal.

Approximately half way along the segment a small post-hole/pit (F1012) with a diameter of 0.32m and 0.12m deep cut the fill of feature 1014; its fill contained two flint core fragments as well as three natural pieces and a crumb of unidentified prehistoric pottery, as well as small fragments of coal and a sherd of nineteenth-century pottery. While the latter are probably intrusive a much later date for the feature cannot be ruled out.

Middle Arc: northern section

Middle Arc, Segment 4

Only the eastern extremity of this putative segment was seen running beyond the western limit of excavation more than 75m to the north of Middle Arc Segment 3 (Fig 17 and 19).

The primary cut (F1500) had been heavily truncated by a later feature and only its southern edge survived, running eastwards for about 1m from the western section. The remainder of the feature had been removed by a secondary cut (F1503) 0.95 long, about 1m broad and 0.3m deep; its fill produced two fragmentary flint cores and a blade; some charcoal flecking was also noted.

If these features did indeed represent the north-eastern terminal of a segment, it was on a different alignment to the remaining segments forming the northern section of the Middle Arc. A gap of between 8.6m and 10.5m separated them from the south-west terminal of Segment 5; it may be that they were not associated with the Middle Arc and instead were part of a separate, unrelated feature. Without evidence for its unexcavated extent from aerial photographs or geophysics it is hard to be unequivocal.

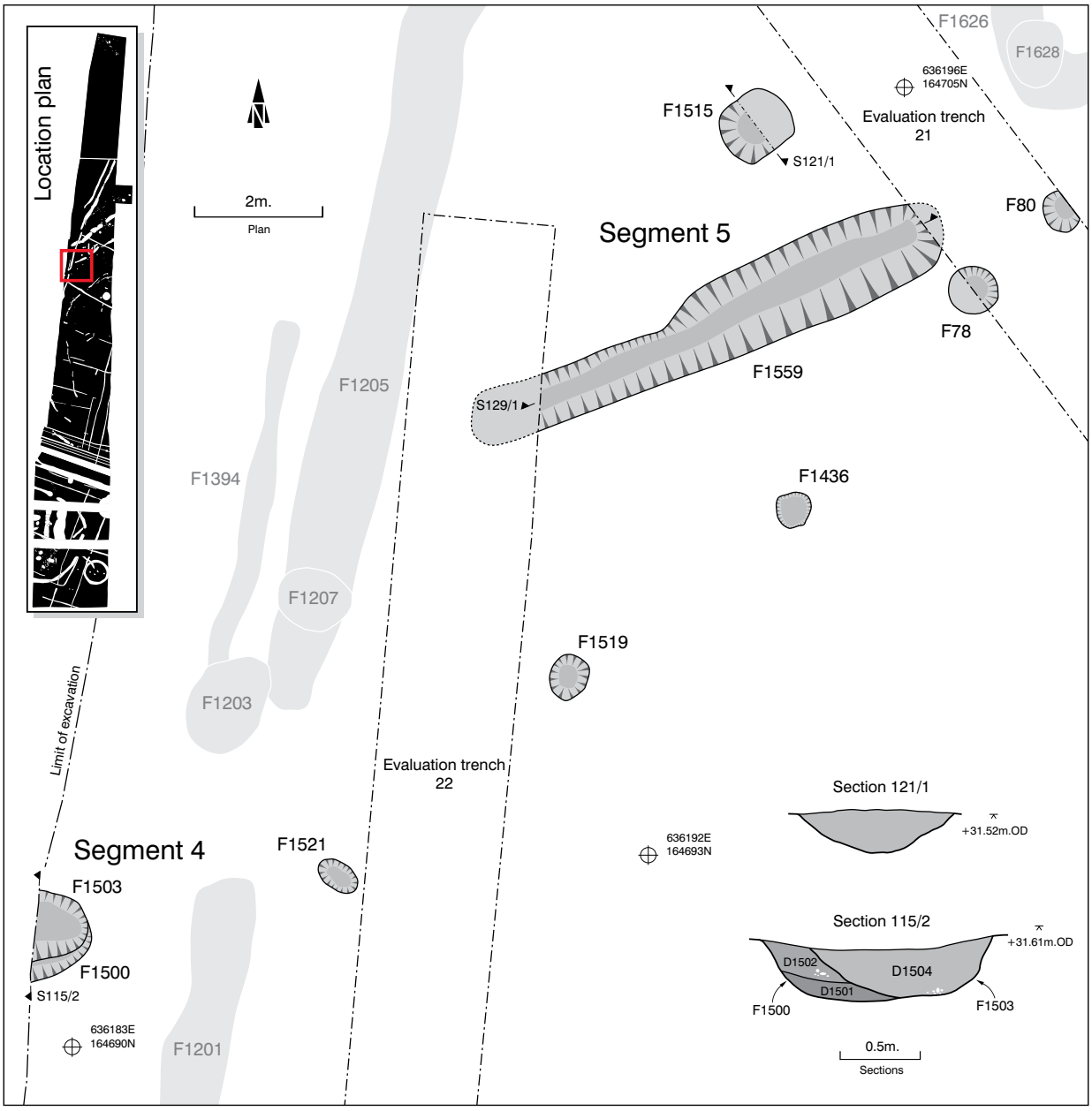


Fig 17. Middle Arc, Segments 4 and 5.

Middle Arc, Segment 5

Segment 5 was formed by a single linear feature (1559; Fig 17 and 19), running roughly east-west for around 6.5m, truncated at its western end by evaluation trench 22 (where it was not identified). It was 0.8m wide at its western end, broadening to 1.2m in the eastern 4.5m of the cut, with a maximum depth of 0.28m. It may be that this feature represents two separate cuts, but no difference in the fills of the broader and narrower parts of the cut could be identified. The homogenous silt fills produced early Neolithic pottery and several worked flints, as well as traces of mammal bone and fragments of charcoal.

A gap of 4.8m separated Segments 5 and 6.

Middle Arc, Segment 6

Segment 6 was formed by a linear feature (F1306; Fig 18 and 19), 5.3m long, 1.5m wide and 0.23m deep. Its silt fill yielded a large assemblage of 115 flint artefacts in addition to

Pl 2. Middle Arc, Segment 7. Scale 1m.

over 50 sherds of early Neolithic pottery. Twenty cattle teeth and two sheep teeth (among other unidentified bone fragments), four burnt unworked flint fragments and a piece of heat-affected clay and traces of charcoal, seeds and oyster shell were also recovered. Eleven flint scrapers from this context were clustered in a discrete and apparently 'placed deposit' at the north-west terminal.

A small pit (F1640) cut the fill of feature F1306 just to the north-east of its central point, and another (F1397) was cut 0.15m from the north-eastern terminal of the segment. Both features had similar dimensions (0.35-0.40m in diameter and 0.17-0.20m deep). The fill of pit F1397 yielded pottery (possibly Neolithic) and a flint flake.

Discounting the latter feature, the gap separating Segments 6 and 7 was 1.05m.

Middle Arc, Segment 7

Segment 7 was primarily formed by a linear gully (F1224; Fig 18 and 19; Pl 2), running approximately 9.7m from the eastern edge of excavation. Just 0.4m wide at its western end, the feature broadened to a maximum width of 1.5m towards the north-east; its maximum depth was 0.28m.

No 'placed deposits' were evident within the general silty fill of this feature, which produced scattered sherds of early Neolithic pottery but also a substantial flint assemblage. Fragments of burnt natural flint and small amounts of heat-affected clay, charcoal, grain and seeds were also present, along with traces of oyster and mussel shell. A fragment of metagreywacke sandstone from this deposit (<1545>) originated either in western Cornwall, Wales, the Lake District or the north-central Pennines. It bore no signs of having been worked, though this stone was commonly used for polished axes during the Neolithic.

A subcircular pit (F1222), 1.1m in diameter and 0.33m deep, cut the fill of feature F1224 near its western terminal, truncated on its southern side by a later field ditch. It contained a large and dense cluster of artefacts indicating either a spatial focus for deposition or a single 'placed deposit'. The assemblage included 135 sherds of early Neolithic pottery and 43 worked flint artefacts (burnt and unburnt), along with eight burnt unworked pieces of flint, small quantities of mammal bone, charcoal, grain and seeds as well as traces of oyster shell.

Another oval pit, (F1350, 1.39m long, 0.62m wide and 0.23m deep) had been cut about 4m to the north-east into the fill of F1224. Early Neolithic potsherds were retrieved from the deposit filling this pit, along with a large assemblage of flint tools, 35 small fragments of bone and two of heat-affected clay. Soil sampling indicated the presence of small quantities of charcoal, seeds and further mammal bone within the deposit.

Pit alignment between Inner and Middle Arcs

A series of five roughly circular pits (F1436, F1519, F1521, F1525 and F1527) seemed to be set in a concentric arc set back 2-3m from the southern side of the northern part of the Middle Arc (Fig 20). The pits, between 0.5 and 0.9m broad and 0.2-0.5m deep did not display any evidence of post-pipes. Two similar pits (F78 and F80), which lay slightly to the north of the putative arc alignment, closer to the segments of the Middle Arc, may also be associated.

Pits F1519 and F1521 contained one and two flint flakes respectively, whilst the fill of F1525 produced two blades and three hammerstones (along with small amounts of charcoal, grain and seeds). The flint tool assemblage from the fill of pit F1436 suggests that this small feature was the focus for a 'placed deposit'; 46 worked flints recovered from the pit included seven blades (five burnt), 28 flakes (eleven burnt), a utilised and a serrated flake/blade and nine fragments of knapping debris (three burnt), as well as six heat-affected unworked pieces. Unidentifiable crumbs of pottery were also recovered from this fill, along with some 40 fragments of heat-affected clay, small quantities of charcoal and grain and traces of mammal bone and oyster shell.

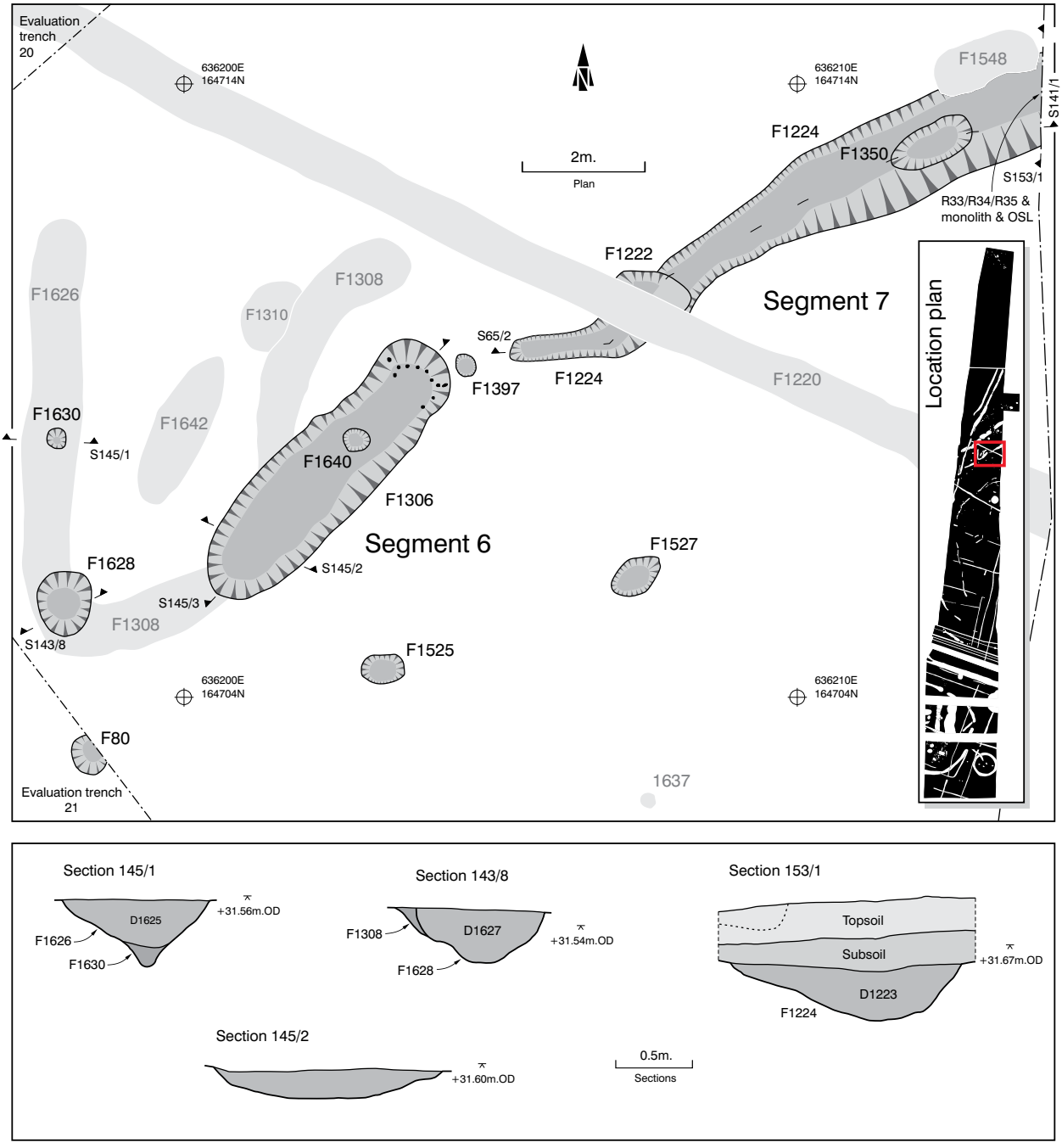


Fig 18. Middle Arc, Segments 6 and 7.

The possibility of a fourth arc is intriguing, either as part of the association of features constituting the Middle Arc or as a separate feature echoing the geometry of the main arcs in a different form. Certainly, the putative alignment varied much in terms of its distance from what was, after all, a quite varied alignment of Middle Arc features. The variation in distance between the pits is less marked, and it is this that might lead us suspect some sort of design in their layout (albeit from a qualitative perspective). Features F78 and F80, offset from the alignment of the arc and set closer together, may suggest a different function (perhaps an 'entrance').

There was little sign of a similar arrangement associated with the southern part of the Middle Arc (Segments 1-3), though a single isolated pit just north of Segment 3 (F1033; Fig 16) may represent a return of the putative arc, the rest lost to truncation.

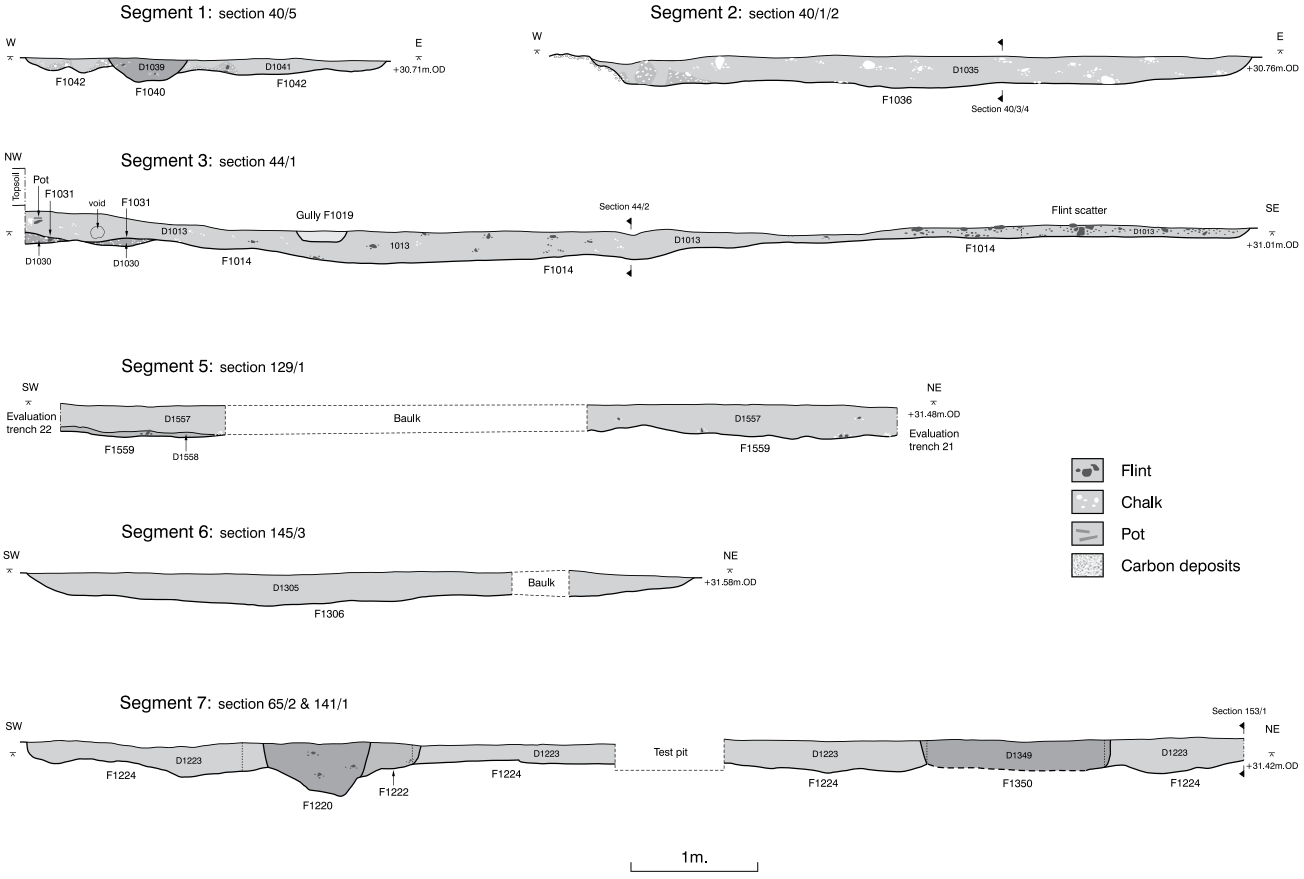


Fig 19. Middle Arc, Segments 1–7, longitudinal sections.

Pits between the Middle and Outer Arcs

Six miscellaneous pits of various sizes lay between the Middle and Outer Arcs (Fig 21), with no obvious spatial patterning. Approximately 1.4m north of the north-western edge of Segment 5 of the Middle Arc was a shallow subcircular pit (F1515), 0.95m in diameter with an irregular dished profile 0.28m deep. Approximately 2m to the west of Segment 6 was a subcircular pit (F1628), 1.05m in diameter with steep sides and a concave base 0.38m deep. This pit was the focus for 'placed' and potentially structured deposition; its fill contained 95 flint tools, including a scraper, 11 blades, 63 flakes, four utilised flakes/blades, five cores (one burnt) and 11 fragments of knapping debris. In addition, 30 early Neolithic potsherds in four different fabrics representing Plain and possible Shouldered Bowl, Open and neutral forms were recovered, as well as single pieces of burnt flint and heat-affected clay. Charcoal and seeds were also present in small quantities, along with traces of oyster shell.

Two further oval pits were situated less than 4m to the north-west of pit F1628. The earliest of these (F1542) was approximately 1.2m by 0.9m in plan, with steep dished sides to an uneven base 0.23m deep. Sixteen worked flints were recovered from its fill, including a core, ten flakes, three knives, a notched piece and a utilised flake along with three fragments of knapping debris and a single abraded prehistoric potsherd of unknown date; this again suggests focussed deposition of some sort. The western end of F1542 was cut by pit F1544, approximately 1m by 0.7m in plan (on the same alignment as F1542) with a dished profile 0.16m deep. Its fill contained a further 12 worked flints, including a blade, eight flakes and three fragments of knapping debris along with three abraded sherds of unidentifiable prehistoric pottery. Less than 2m to the south-east of pit F1545, a small pit or post-hole (F1630) was subcircular, 0.35m wide and 0.2m deep.

The Outer Arc

Seemingly concentric to the Middle Arc on its western side was another arc of cut segments; only the northern and southern parts of this arc were visible in the excavation area, the central connecting section of the arc lying to the west, clearly visible on aerial photographs (Fig 22). The Middle and Outer Arcs were separated by a gap of about 11-13m, and the overall reconstructed length of the Outer Arc would have been in excess of 200m.

Combining excavation and aerial photographic evidence (remaining mindful of the imprecision of the

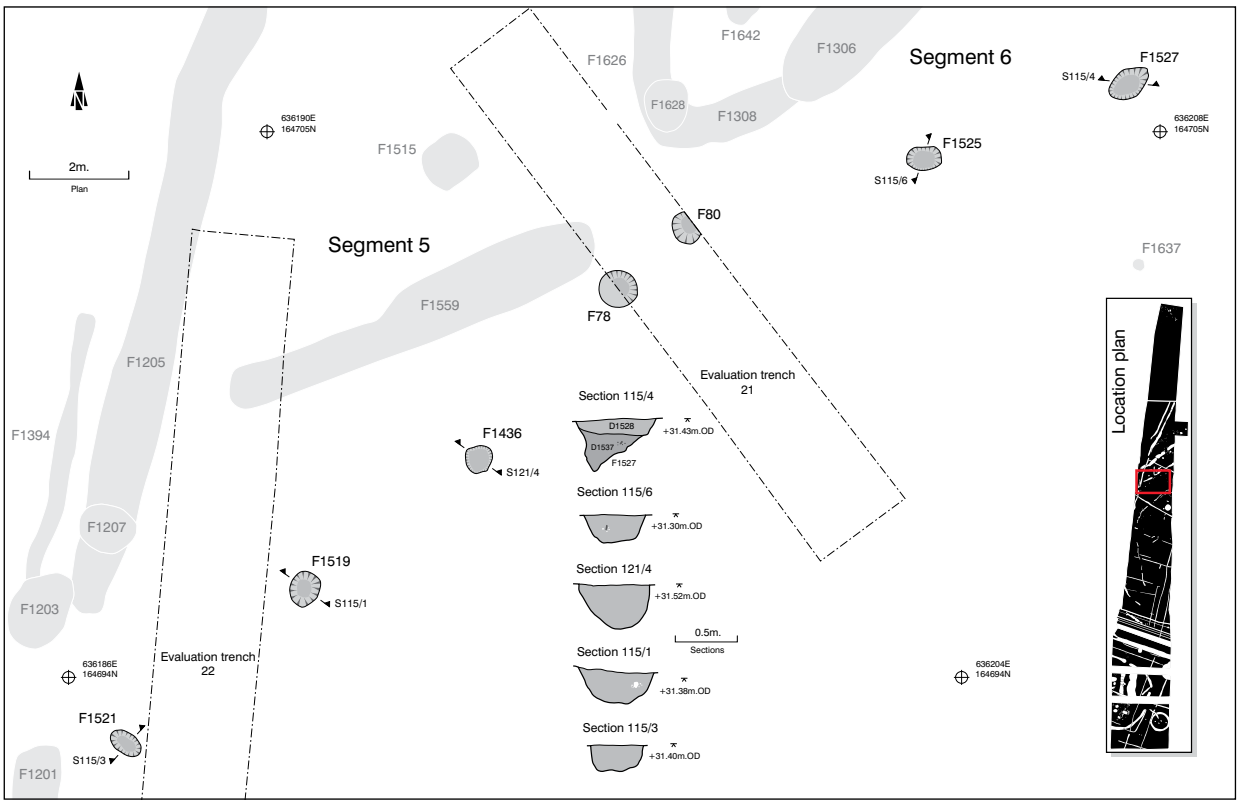


Fig 20. Pit alignment between Inner and Middle Arcs.

latter), the arc consisted of 19 segments, of which six were exposed in the excavation area. One was excavated in the southern part of the site, 11 formed the central (unexcavated) part of the arc, and five were recorded in the northern part of the excavation area. This northern section was extended to the north-east by two further unexcavated segments plotted from cropmarks.

Of the five segments forming the northern part of the Outer Arc, only two could be identified unequivocally (Segments 3 and 5). Only the eastern extremity of a potential segment (Segment 2) was identified at the western edge of excavation, on a markedly different alignment to Segments 3 and 5, but likely to form part of Segment J identified on aerial photographs (Fig 22). Segment 4 was excavated during the evaluation of the site and not recognised as a segment at the time; it has been provisionally identified as such during the course of post-excavation study of the primary site records. Segment 6 was hastily excavated towards the end of the excavation. Its shape and position suggests that it was another segment, the Bronze Age pottery recovered from its fills perhaps deriving from later (unrecognised) disturbance and truncation.

The nature of the main segments of the Outer Arc was markedly different to those of the Inner and Middle Arcs. These segments were characterised by large, linear

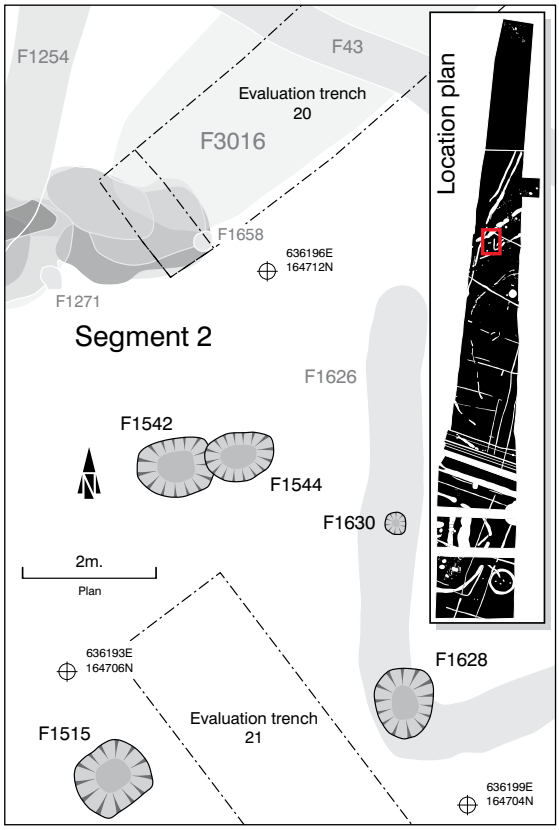


Fig 21. Pits between Middle and Outer Arcs.

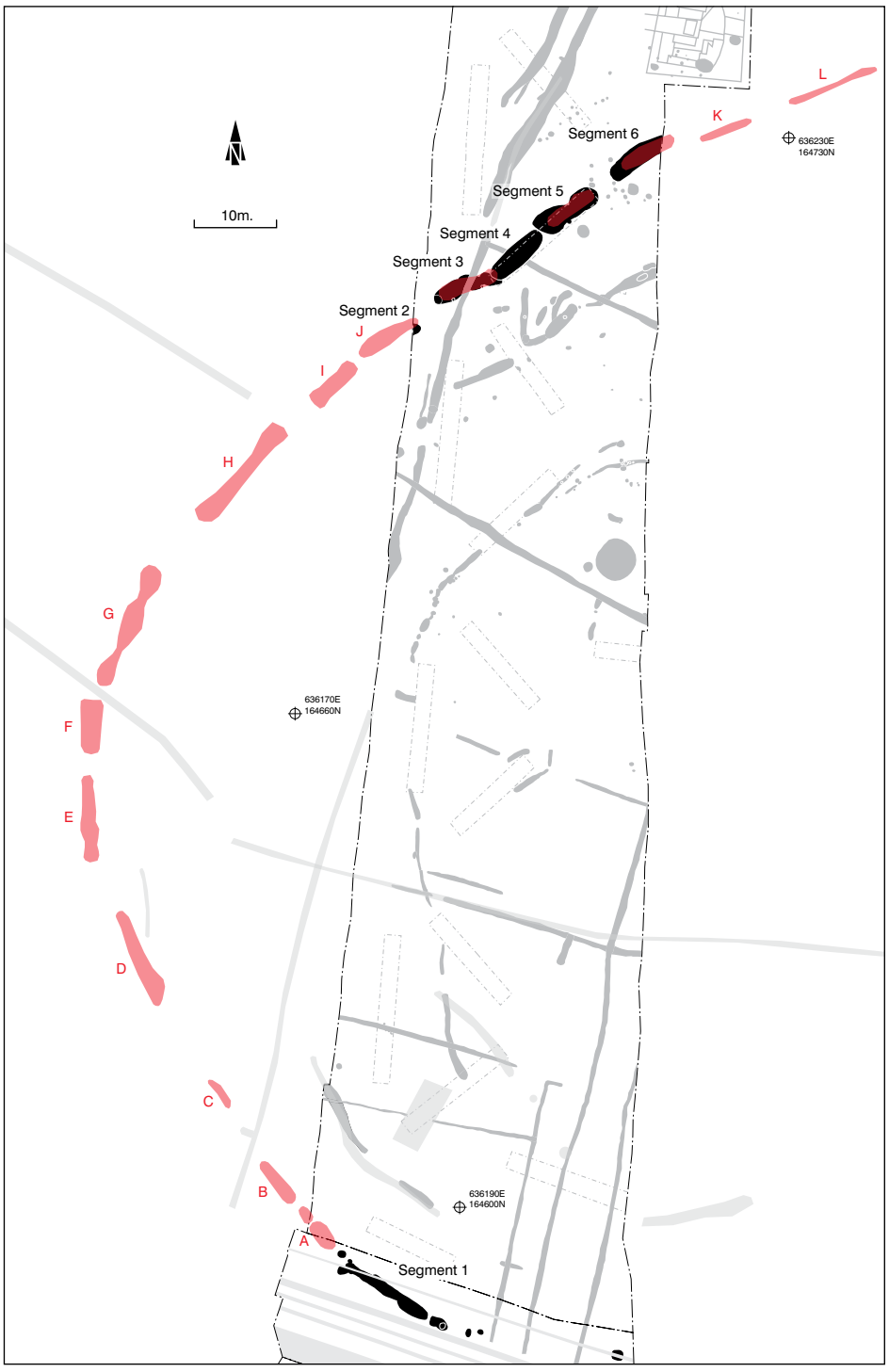


Fig 22. Outer Arc with cropmarks (plotted in red).

clusters of repeated pit digging resulting in composite features in excess of 1m in depth. Details of feature morphology, dimensions, deposits and finds can be found in the segment catalogue (Appendix III).

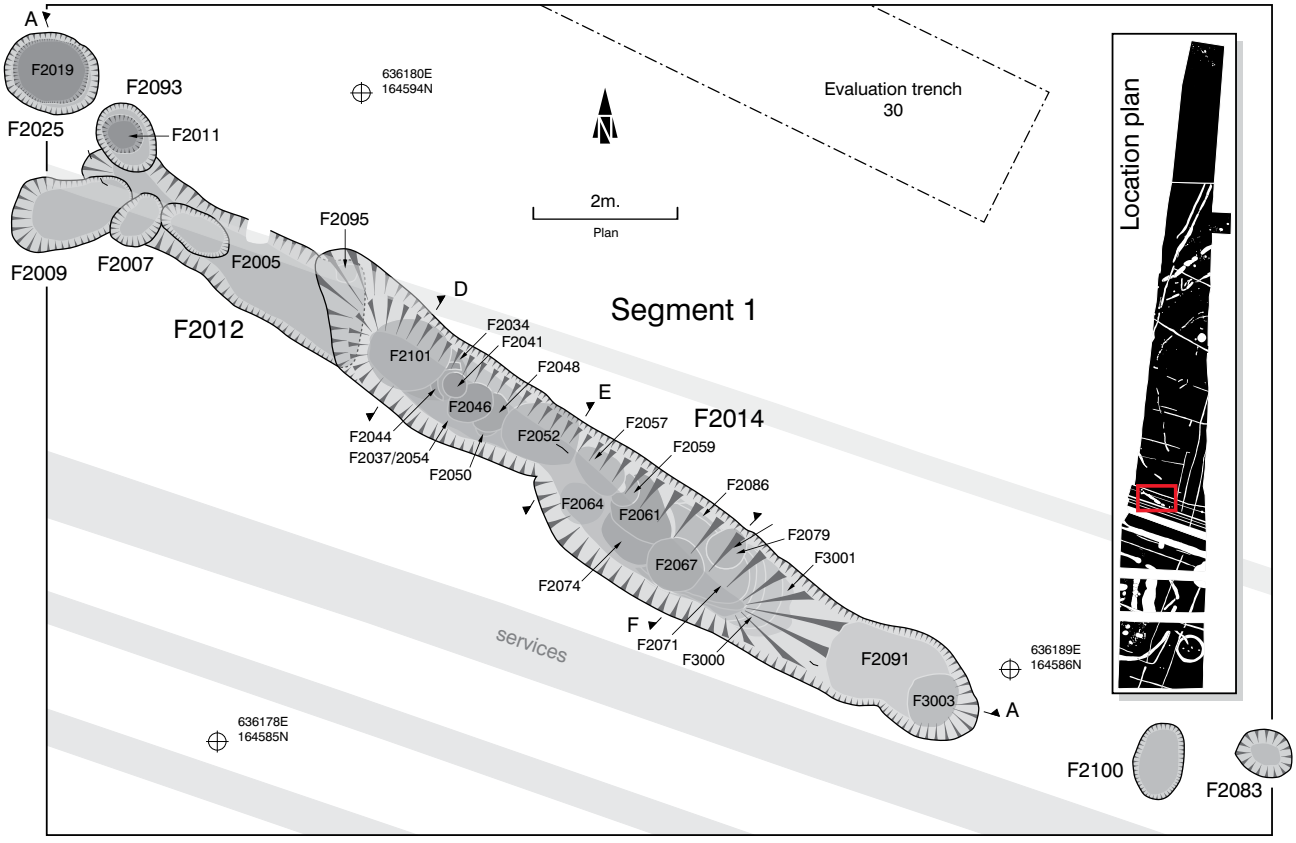


Fig 23. Outer Arc, Segment 1.

Outer Arc: southern section

Outer Arc, Segment 1

Segment 1 was a composite feature resulting from repeated pit-cutting and infilling (at least 34 pits were recorded) in a linear zone 14m long, up to 2m wide and over 1m deep. It did not appear on aerial photographs of the area.

This large linear focus of pit-cutting and depositional activity was initially characterised by a series of elongated pits. A complex sequence of smaller pits followed (Fig 23, 26 and 27), before the area was redesigned by the cutting of a relatively shallow but extensive linear feature. It should be emphasised, however, (and this is true for the other segments constituting the Outer Arc) that there is no indication that the spatial extent of the segment was marked out in any way at the commencement of pit digging; its eventual shape and size appears fortuitous rather than planned. Though for convenience we have spatially located individual pits by reference to the overall extent of the segment, this should not be construed as implying pre-knowledge of the segment's eventual boundaries on the part of the pit-digger(s).

The earliest feature at the south-eastern end of the segment was the base of a subcircular pit (F3003), measuring 0.6m x 0.8m in plan and up to 0.2m deep (Fig 24A and 27). This was overlain by a large oval pit (F2091) 1.6m long, 1m wide and 0.7m deep, filled by chalk rubble and clayey silt deposits. These fills produced only sporadic finds of worked flint, animal bone (cattle), small amounts of carbon and heat-affected clay, and traces of shellfish.

Approximately 0.6m to the north-west was the remnant of another large elongated pit (F2071/2086; Fig 24B) that had been severely truncated. Its flattish base inclined slightly towards the north-west and was approximately 1.3m by 1.25m in extent and just 0.15m deep. The silt fill of this feature was truncated by another extensive cut (F3000; Fig 24C) in a similar position to the earlier pit. While also heavily truncated, parts of this feature and its fills survived to a depth of approximately 0.45m, and remnants of the base seem to have covered as much as 2m of the segment. Occasional worked flints and traces of mussel shell were present in its silty clay and chalk rubble backfills. Cutting the fills of this feature, also in roughly the same position, was another cut (F3001; Fig 24D) with a fairly steep south-eastern edge truncated to a depth of 0.2m and an extensive base (approximately 1.7m by 1.2m remained).

Further to the north-west another large elongated pit (F2037/2054; Fig 24H) marked the earliest known

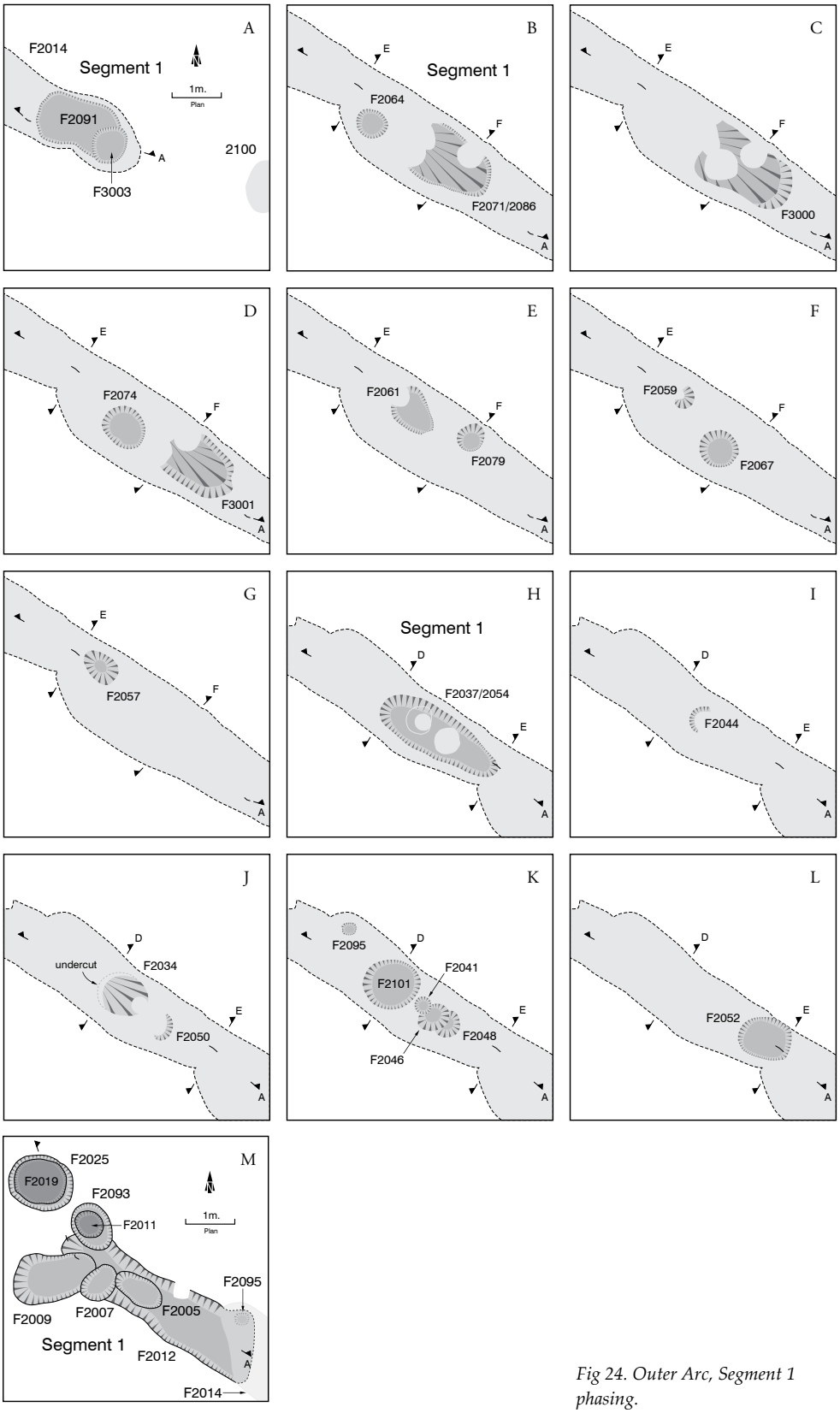


Fig 24. Outer Arc, Segment 1 phasing.

activity towards the centre of the segment. Once more this had largely been removed by later pitting, but was nonetheless some 2.6m by 1m in extent, surviving at its south-east terminal to a depth of 0.55m. The feature was variously filled by dumps of silty clay and chalk rubble as well as silty deposits, soil samples producing traces of shellfish and occasional charcoal and grain. The north-eastern area of the feature yielded a small worked flint assemblage from its basal fill.

Following backfill and/or silting of these large early pits was a complex sequence of intercutting subcircular and oval pits, with only a few finds, focussed within the central and south-eastern areas of the segment.

The fill of elongated pit F3001was cut to the north by pit F2079 (Fig 24E), 0.6m in diameter and 0.85m deep. Fills of this feature contained cattle and cattle-sized bones as well as indeterminate bone fragments, a few worked flints, two sherds of early Neolithic pottery and small pieces of heat-affected clay. Also cutting the fill of feature F3001, almost immediately to the south-west of pit F2079, was pit F2067 (Fig 24F), 0.85m in diameter and 0.6m deep; no finds were recovered from its fills but a number of fragments of fired clay were noted lying at the base of the cut. The upper fill of cut F3000 was cut by pit F2074 (Fig 24D), approximately 1m in diameter and surviving to a depth of 0.6m; unidentifiable fragments of nutshell were the only finds from the fills of this feature, which were in turn cut by an oval pit (F2061; Fig 24E), approximately 1.1m long, 0.75m wide and 0.35m deep. Its fill included traces of oyster shell. The remnant of another small subcircular pit (F2059; Fig 24F) cut the latter deposit, with a reconstructed diameter of approximately 0.5m and steep sides to a concave base, 0.25m deep.

Further to the north-west was pit F2064 (Fig 24B), approximately 0.7m in diameter and 0.6m deep. The stratigraphic relationship between this and adjacent pit F2074 could not be determined. The fills of pits F2064 and F2059 were cut by an oval pit (F2057; Fig 24G), 0.75m by 0.5m in extent and 0.28m deep. Its single fill, with a high charcoal and heat-affected clay content, also produced an assemblage of worked flint, burnt unworked flint pieces, cattle bone and cattle-sized fragments. This deposit was cut by another oval pit (F2052 (Fig 24L), which also cut the fill of early pit F2037/2054). Pit F2052 was 1m by 0.8m in plan, with near vertical sides 0.55m deep. Its fill yielded an assemblage of worked flint, burnt unworked flint, early Neolithic pottery, a fragment of heat-affected clay and traces of mammal bone and oyster shell.

Only a small fraction of a feature cutting the fill of pit F2037/2054 (F2050) remained (Fig 24J); a steep and curving cut, 0.3m deep, suggesting a feature with a diameter of perhaps 0.5m. Its fill was in turn cut by a subcircular pit (F2048; Fig 24K), 0.5m in diameter and 0.75m deep, and the fill of this was cut by a shallower oval pit (F2046; Fig 24K), 0.75m by 0.5m broad and 0.45m deep. The latter feature produced a few pieces of worked flint along with 20 fragments of heat-affected clay and a concentration of 18 pieces of unworked burnt flint. To the north-west, another truncated early feature (F2044; Fig 24I) cut the vestiges of a deposit filling pit F2037/2054. Only the curving north-west side of the feature remained, suggesting an original diameter (if this was indeed a pit) of perhaps 0.5m, and depth of 0.3m. Two silt deposits filled this cut, the uppermost containing small amounts of heat-affected clay, charcoal and seeds.

The upper fill of feature F2044 was cut by a larger feature of indeterminate shape (F2034; Fig 24J), which sloped gradually towards the north-west, where its surviving edge was vertical and partially undercut to a maximum depth of 0.15m. The whole surviving base of the feature formed an approximate oval suggesting an original extent of at least 1.1m by 0.9m. A number of slumping silts within this cut produced more cultural material than was seen elsewhere in Segment 1, although no discrete concentrations of finds were observed. The assemblage included worked flints, a sherd of early Neolithic pottery and cattle and other mammal bone as well as traces of oyster shell. Unidentified animal bone from this feature provided a radiocarbon date of *3800-3660 cal BC* (*at 95% probability; UBA-14304*; Table 2).

Another indeterminate cut (F3004, only seen in section) truncated the upper deposits of feature F2034, suggesting a shallow dish-shaped pit, approximately 0.5m in extent and 0.1m deep. This was superseded by feature F2101 (Fig 24K), a subcircular pit 1m in diameter with steep sides and a flat base 0.2m deep, filled by a single deposit which produced occasional worked flint and early Neolithic pottery as well as eight identifiable fragments of cattle bone along with six cattle-sized fragments. A single whelk shell was also present, and small amounts of heat-affected clay and charcoal, further traces of pottery, mammal and small mammal bone, oyster and mussel shell were recovered from soil samples.

At the approximate centre of the segment the upper deposit of feature F2034 was cut by a probable post-hole (F2041; Fig 24K), 0.3m in diameter and 0.58m deep. A concentration (D2040) of 'carbon', 0.1m thick, was noted by excavators at the base of this feature and partially adhering to the sides (suggesting a post burnt *in situ* or perhaps mineralized wood). Charcoal and heat-affected clay were present in moderate quantities in both chalk rubble fills in the feature, along with a few undiagnostic crumbs of prehistoric pottery and charred seeds.

Approximately 0.5m to the north-west of pit F2101 (the most north-westerly of the main pit cluster) was a shallow hollow (F2012; Fig 23 and 24M) traced on a north-west/south-east alignment, 4.1m long and 2.2m wide. Never more than 0.1m deep and truncated to the

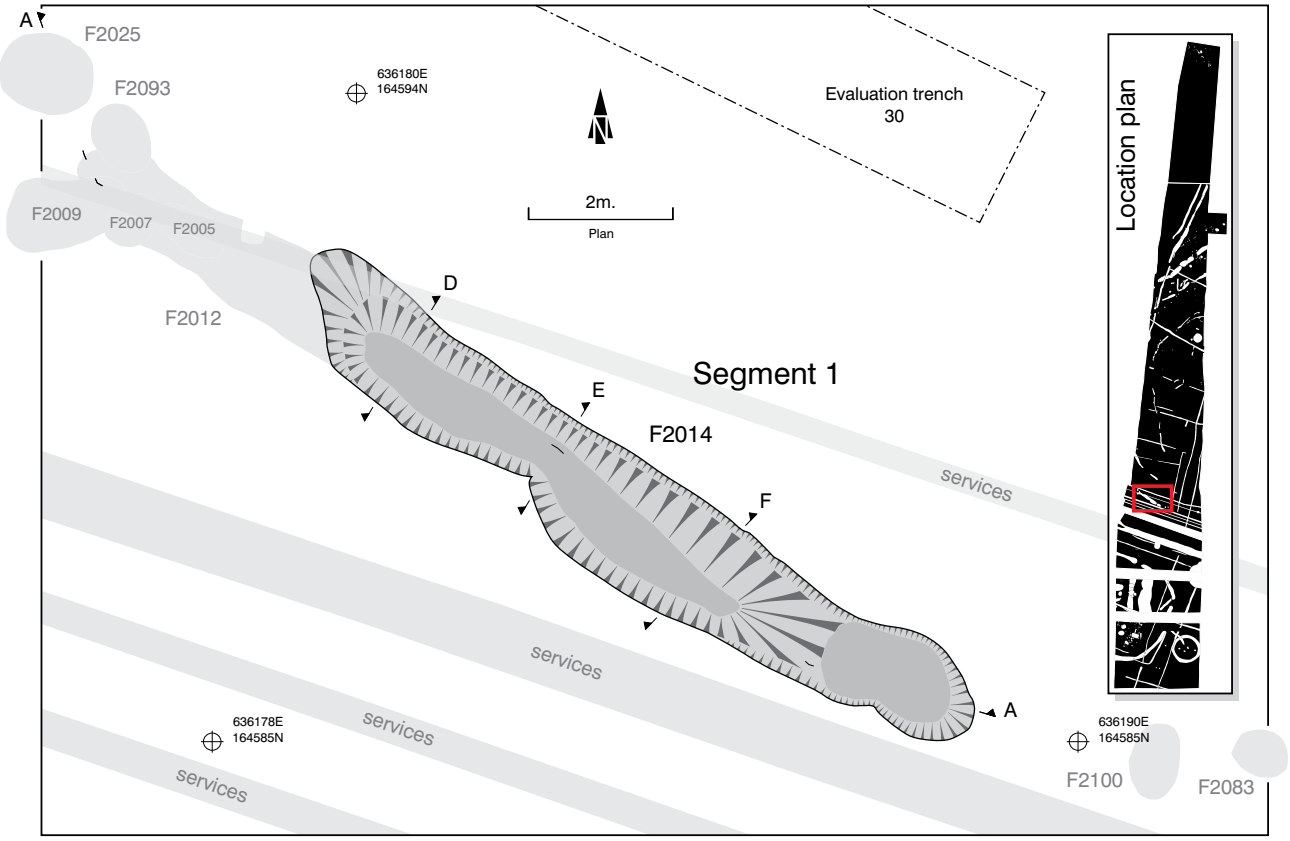


Fig 25. Outer Arc, Segment 1, feature F2014.

south-east, the feature may originally have been far more extensive, perhaps a focus for the pitting already described in the south-eastern area of the segment. It would certainly appear that the hollow formed the focus for further features at the north-western end of the segment; it was initially truncated by a probable post-hole (F2095; Fig 24M), 0.28m in diameter with near vertical sides to a depth of 0.39m, its fill containing traces of oyster and mussel shell as well as flecks of heat-affected clay and charcoal.

Towards the north-western terminal of F2012, consecutive oval pits F2009, F2007 and F2005 had been cut on a west/east alignment (Fig 24M). Pit F2009 was approximately 1.55m long, 1m wide and 0.23m deep, and was cut on its eastern side by pit F2007, 0.75m long, 0.6m wide and 0.38m deep, which was in turn cut by pit F2005, 1.1m long, 0.55m wide and 0.15m deep. Occasional worked flints, burnt unworked flint, potsherds (probably Neolithic) and animal bone (especially from pit F2005) were recovered from the fills of these features and bulk samples from pit F2009 contained traces of oyster and mussel shell, charcoal, grain and seeds.

To the north-west of this group, cutting the terminal of F2012, pit F2093 was oval, 1m long, 0.75m wide and 0.85m deep (Fig 24M). Its fill, notable for a high natural flint and chalk content, contained traces of charcoal. A smaller and shallower subcircular feature (F2011) cut the fill of pit F2093 exactly within the confines of the earlier cut, 0.6m in diameter with a concave base 0.23m deep, its fill containing flint flakes and knapping debris along with fragments of cattle bone.

The most north-westerly feature of the segment, just 0.2m from pits F2093 and F2011 was a large subcircular pit (F2025; Fig 24M), 1.25m in diameter and 1m deep. Its fill produced a small assemblage of worked flint artefacts, along with traces of heat-affected clay, mammal bone, oyster shell and fish bone. Much more cultural material was recovered from the fill of a slightly smaller subcircular pit (F2019; 1m in diameter and 0.9m deep) cut entirely within the fill of pit F2025, including a more sizeable assemblage of worked flint, early Neolithic pottery, cattle bones and traces of oyster and eggshell.

Finally, an extensive linear feature (F2014; Fig 25) was cut along approximately two-thirds of the established focus area, truncating the upper fills of all the features in the south-eastern portion of the segment. This irregular hollow, aligned north-west/south-east and seemingly deliberately focussed on the earlier activity, was some 5.4m long, 1.75m wide, and not more than 0.5m deep. Any depositional activity within this hollow seems to have taken place during its general silting. Sporadic finds from

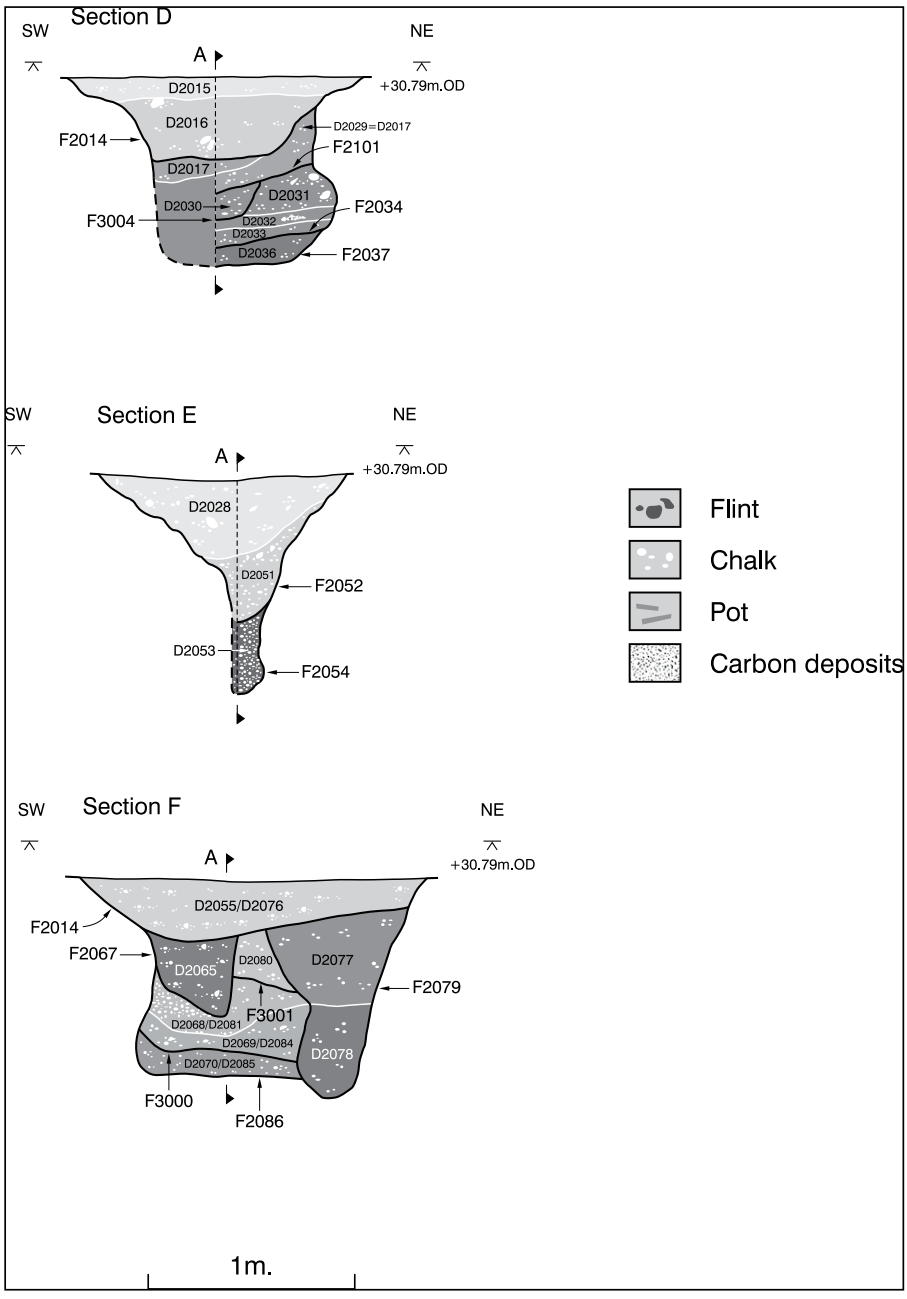


Fig 26. Outer Arc, Segment 1, sections D – F.

the silts filling the hollow included worked and burnt flint and early Neolithic pottery as well as traces of heat-affected clay, mammal bone, eggshell and oyster.

A fresh beaker sherd and at least 26 sherds dated to the early Bronze Age were also recovered from these deposits, possibly representative of the time taken for the feature to infill or perhaps intrusive as a result of later ploughing and/or other activity in the vicinity.

Features to the east of Outer Arc, Segment 1

Two shallow pits a short distance to the south-east of Segment 1 (F2083 and F2100) might have been related to it in some way (Fig 23), but no finds were recovered from these features to support this association.

Pit F2083, approximately 3.6m from the south-east terminal of Segment 1, was subcircular, 0.7m in diameter and 0.3m deep. Approximately 0.7m to the west,

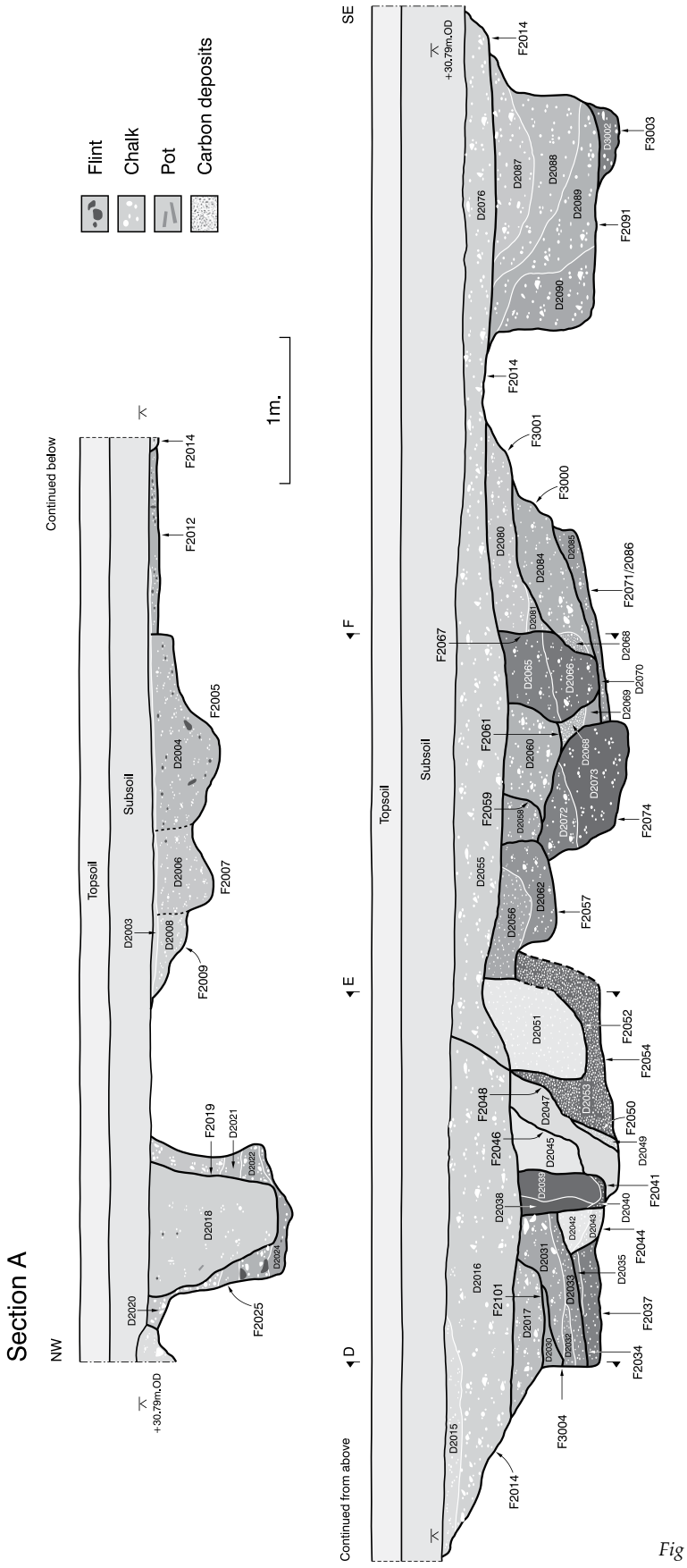


Fig 27. Outer Arc, Segment 1, section A.

Segment	Length (m)	Width (m)	Distance between segments (m)
A	6.4	2.4	
			0.8
B	6.4	1.6	
			7.2
C	4.0	0.8	
			10.4
D	11.2	1.6-2.4	
			6.4
E	10.4	1.6-2	
			2.4
F	6.4	2.4	
			1.6
G	15.2	2.4	
			7.2
H	14.4	1.6-2.4	
			4.8
I	6.4	1.6	
			0.8
J	8.0	2.4	

Table 1. Dimensions of Outer Arc centre section segments (plotted from cropmarks).

shallow pit F2100 was oval in plan (1.04m by 0.68m) and 0.26m deep; both pits were filled by silty clay with small chalk and flint inclusions. To the east of Segment 1 of the Outer Arc (discounting the above pits) was a gap of nearly 23m to the eastern limit of excavation (if the projected line of the arc is continued south-east).

Outer Arc: Central Section

The central section of the Outer Arc, lying to the west of the excavated area, was only visible on aerial photographs and was apparently comprised of eleven segments labelled A – J during post-excavation studies (Fig 22). The cropmark evidence was plotted in relation to the excavated evidence at a fairly late stage during these studies, and we should remain circumspect about the precision of these plots as regards below ground features; it is noteworthy that Segment 1 of the Outer Arc did not appear on the aerial photographs and that Segment A, plotted as lying within the excavation area, was not identified by the excavator. The cropmarks suggest an arc about 135m long extending some 34m west from the western limit of excavation. Rough dimensions of the plotted segments and the distances between them are presented in Table 1.

Outer Arc: northern section

Outer Arc, Segment 2

The Outer Arc was next encountered at the western limit of excavation, 111.5m to the north of the western terminal of Segment 1, in the form of the eastern terminal of another segment (Segment 2; Fig 28). Only a part of the feature (F1181, 1.5m north – south by 1m west – east) was seen in plan, the cut being 0.85m deep. Though the correlation is not precise, this appears to be the eastern end of Segment J of the central section of the Outer Arc identified in aerial photographs (Fig 22). Some initial silting of the feature had occurred, succeeded by a small localised dump of chalk rubble, from which a single utilised flint flake was recovered along with fragments of cattle- and sheep-sized bones (as well as unidentified bone) and three pieces of limpet shell.

These fills were overlain by a mass of cultural and faunal material in a carbon-stained silty matrix, most probably a 'placed deposit' (D1193). This contained more than 1000 seafood shells including limpet (226 shells) and cockle (778 shells), as well as a single mussel shell and fragments of winkle. Associated with this was significant pottery assemblage, including 12 large fresh adjoining sherds of an early Neolithic Plain Bowl (28 per cent complete) which appeared to have been crushed *in situ*. At least some of pottery had possible conjoins with sherds recovered from feature F3016 to the north-east (see below). Substantial amounts of worked flint (some burnt) and animal bone (mainly of cattle but some of pig and possibly sheep) were also present. An animal bone fragment from a soil sample from this deposit produced a radiocarbon date of *3700-3635 cal BC* (*at 95% probability; UBA-14305*; Table 2). The same sample also produced a dog coprolite (mineralised faeces).

Overlying this 'placed deposit' was a series of silty clay fills which produced substantial quantities of worked flint (including a flake from a ground and polished axe; Fig 50/13), pottery and animal bone as well as traces of shellfish, heat-affected clay, charcoal, grain and seeds.

Outer Arc, Segment 3

The western terminal of Segment 3 of the Outer Arc lay 3.3m to the north-east of Segment 2 (Fig 29). Segment 3 was the sum of multiple episodes of consecutive pit-cutting, many only glimpsed in section (see Fig 30-32).

The earliest feature at the western end of the segment was a large pit (F1574; Fig 30A), 2.3m long, 1.3m wide and 0.5m deep. The feature was initially filled at its western end by laminations of loose silts and chalk, never more than 0.1m thick, which produced occasional traces of mammal bone, oyster and charcoal. Sealing this material and the rest of the base of the pit was a dump of loose silt and chalk (D1586) which contained a very large

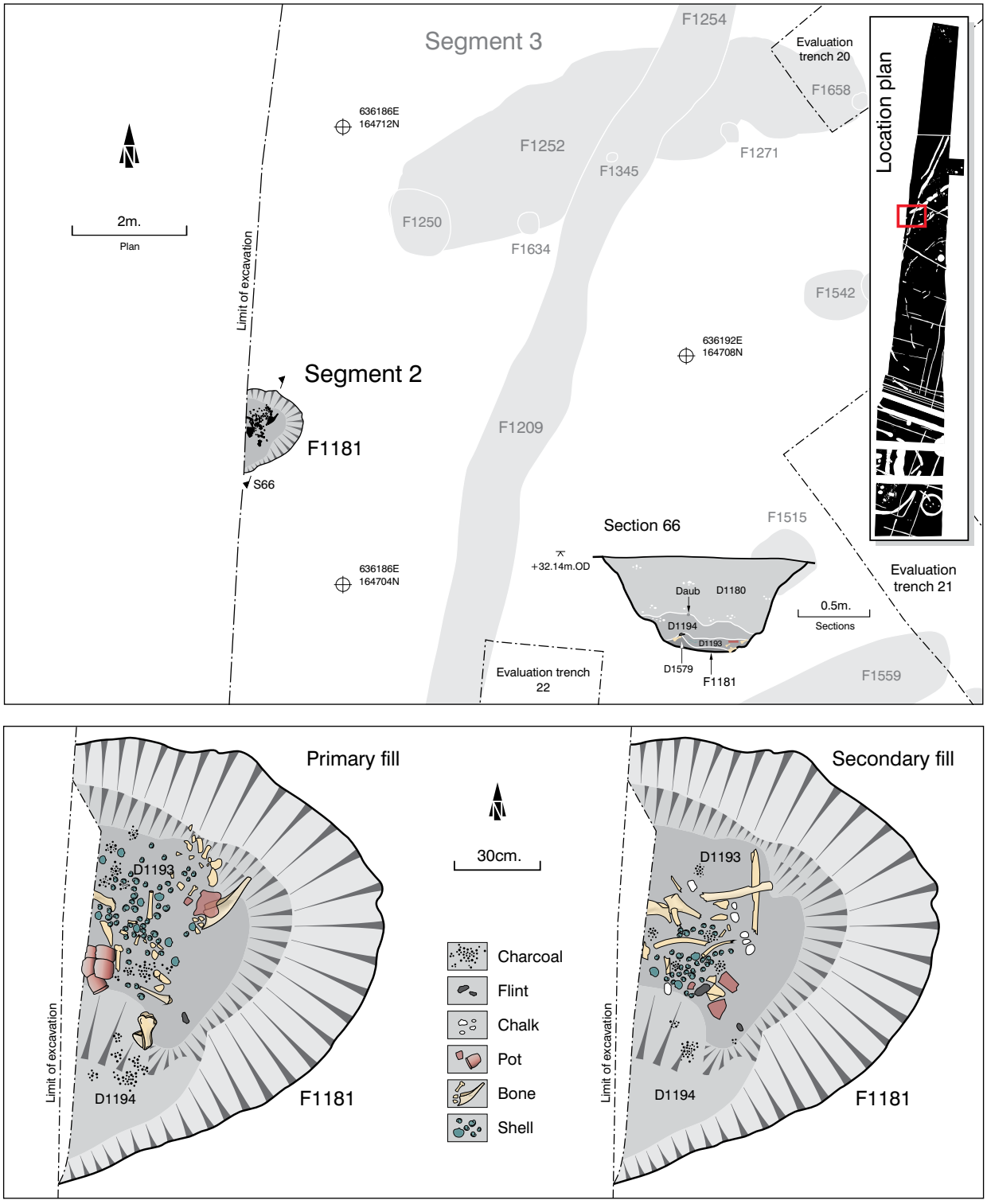


Fig 28. Outer Arc, Segment 2.

assemblage of worked flints, including 19 cores and core fragments, three struck nodules, a struck lump, 16 blades, 145 flakes and 102 pieces of knapping debris, apparently accumulated mainly within the north-west quadrant of the pit, and suggesting preservation of evidence of a single flint knapping event, perhaps *in situ*. Many of the flatter pieces of flint lay on a horizontal plane and were dispersed across the surface rather than concentrated as a tip. A few

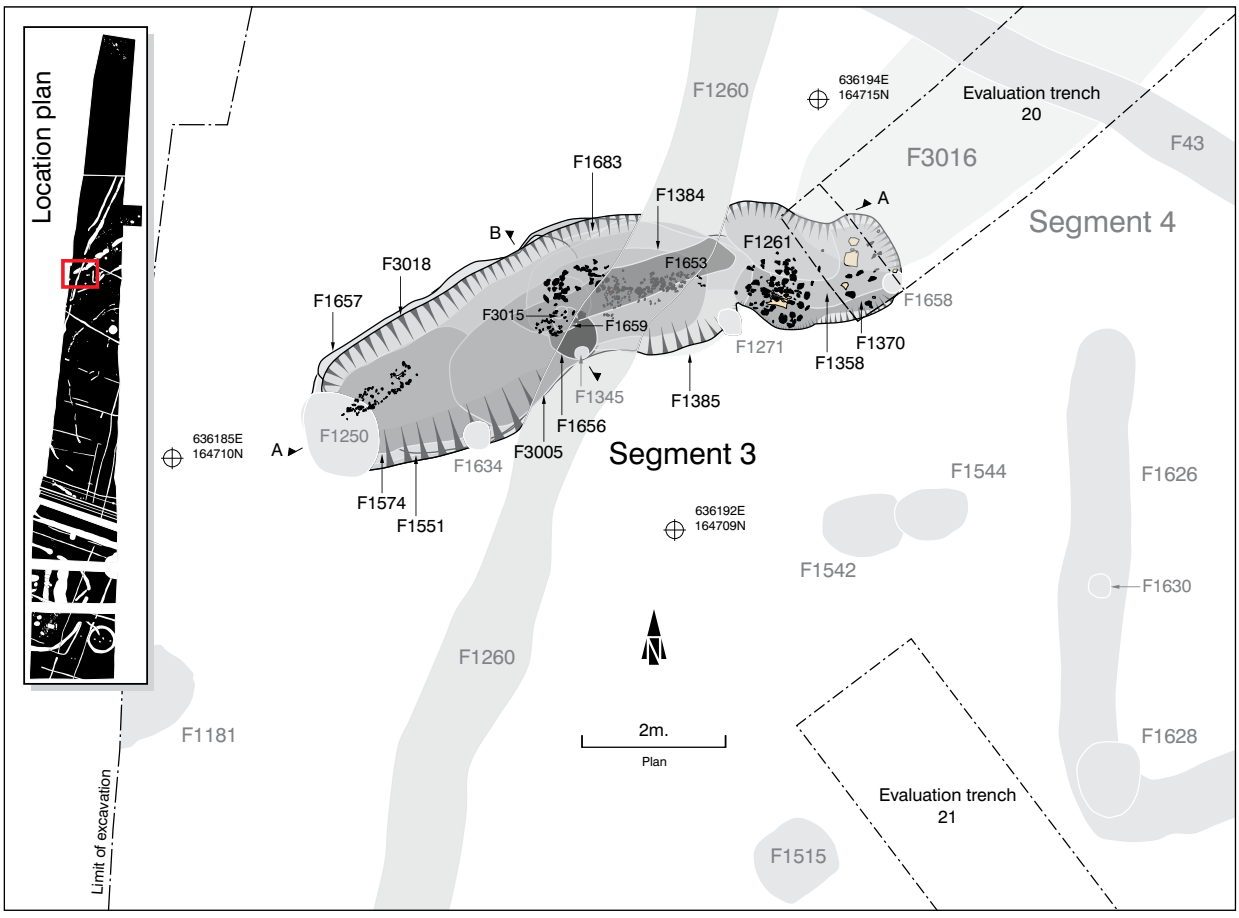


Fig 29. Outer Arc, Segment 3.

sherds of early Neolithic pottery were also recovered from this deposit, along with animal bone including a burnt/heated fragment of cattle humerus and articulating pig bones; a sample derived from one of the latter produced a radiocarbon date of *3710-3635 cal BC* (*at 95% probability; GrA-30882*; Table 2). A single mussel shell fragment was also present. Deposit D1586 was overlain by an extensive dump of loose chalk rubble which yielded further worked flint as well as cattle bone, some of which was articulating and showed signs of heating and cut marks; a tibia shaft from this context had clearly been gnawed by a carnivore.

Just over 0.75m to the north-east of pit F1574, another early pit (F1384; Fig 30A) lay approximately at the centre of the segment. Pit F1384 was aligned roughly south-west/north-east; it was oval and approximately 2.5m long, 1.23m wide and 0.4m deep. At the south-western end of the feature, the earliest deposit (D1632) was a localised concentration of worked flints, possibly representing knapping debris, though apparently not *in situ*. The assemblage included a core fragment, 17 blades, 112 flakes and 109 waste fragments. A single cattle mandible and vertebra fragments as well as two further cattle-sized bones were found in association with this material; a near complete vertebra yielded a radiocarbon date of *3760-3630 cal BC* (*at 95% probability; UBA-14306*; Table 2). A lens of silt covered deposit D1632 and the rest of the base of the pit, this in turn being sealed by a thicker deposit of chalk rubble in a silty matrix. Dispersed among these chalk fragments were numerous worked flints, a single early Neolithic potsherd, cattle bone fragments (one vertebral) and traces of oyster shell, heat-affected clay and charcoal.

Another concentration of worked flint lay on the upper surface of the chalk rubble, (D1312), noted for its generally 'chalky' condition perhaps suggesting deposition after minimal handling. In addition, fresh sherds of early Neolithic pot were recovered from this context, a number being concentrated towards the centre of the feature, and traces of mammal bone and charcoal were identified in bulk samples. This deposit was sealed by further layers of loose chalk rubble with occasional finds of flint artefacts, cattle and sheep bones (some with signs of burning).

On a similar alignment, an indeterminate feature (F3005, mainly inferred from section drawings; Fig 30B)

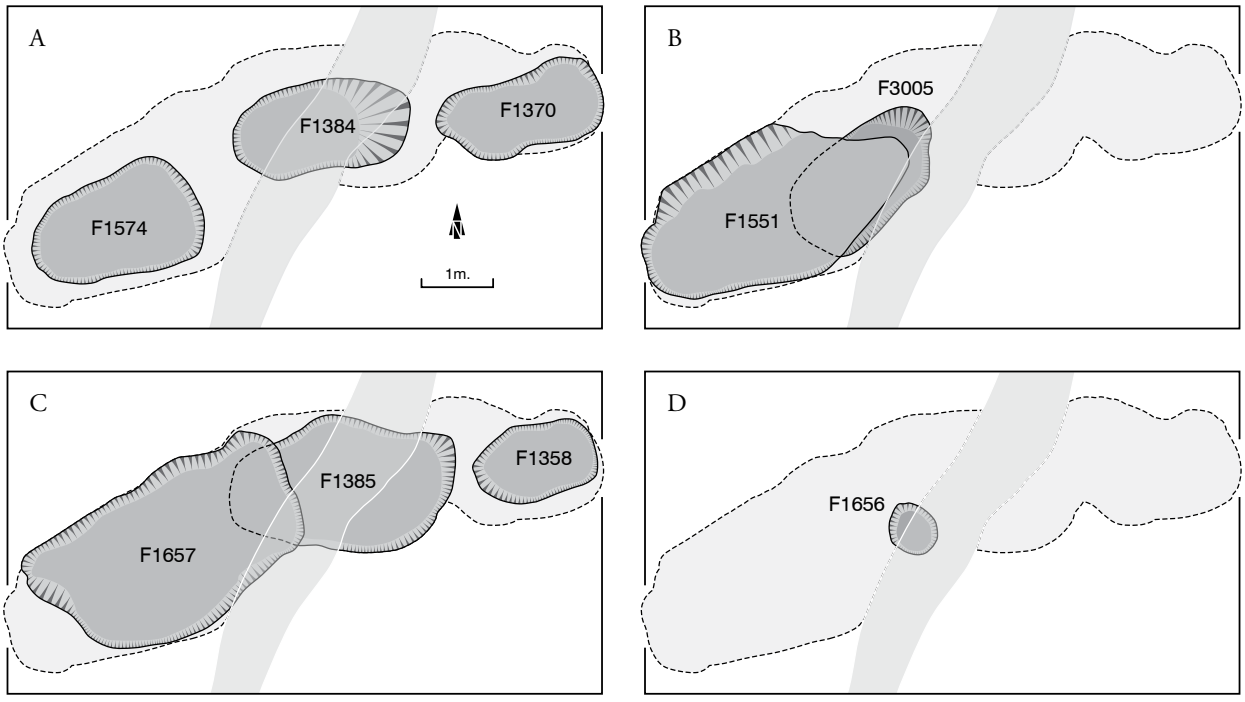


Fig 30. Outer Arc, Segment 3, phasing.

cut the upper fills of pits F1574 and F1384. This truncated and apparently oval pit was approximately 2.4m long and 1.25m wide, with a concave base surviving to a depth of approximately 0.25m, filled by fairly compact chalk rubble which contained occasional worked flints and cattle-sized bones.

The fills in feature F3005 were truncated by an extensive and irregular feature at the south-western end of the segment (F1551; Fig 30B), covering an area approximately 4m by 2.15m and 0.4m deep. A number of possible smaller cuts were noted within the feature that could only be discerned in section (Fig 32). The feature was filled by a series of extensive mixed chalk rubble and silt deposits; most lacked finds, with only occasional animal bone and small fragments of knapping debris being recovered.

The earliest feature at the north-east end of the segment (F1370; Fig 30A) was also an irregular oval pit, 2.3m by 1.15m broad and 0.8m deep. Initial mottled silty fills containing frequent finds of worked flint were capped by another distinct concentration of flint artefacts (D1291), including a struck nodule core, 32 blades, 114 flakes (one reflaked), 60 waste fragments and a bifacial piece. In addition, five sherds of pottery were recovered; one at least of these conjoined with pottery from Segment 4 (F3016; see below). A thin spread of small chalk fragments sealed the worked flints of deposit D1291, overlain by yet another distinct concentration of worked flint (D1288), consisting of a core, 11 blades, 57 flakes and 48 waste fragments. Large fragments of cattle mandible and scapula as well as 12 further cattle-sized fragments and four pieces of sheep cranium also formed part of this deposit, which was generally clustered towards the western end of the pit. Chalk rubble filled the rest of the feature, from which occasional worked flint and animal bone was recovered, along with traces of oyster shell, charcoal and seeds.

An elongated pit (F1385; Fig 30C) cut the upper deposits of features F3005 and F1370. Pit F1385 was extensive, being 3.15m long, 1.9m wide and 1.1m deep. The infilling of this feature (Fig 32) was characterised by a sequence of thin silt and chalk rubble layers, the silts tending to be earlier and localised at the western end while the chalk deposits, at first alternating with the silts, generally formed later tips at the eastern end. Only sporadic finds were derived from these contexts, but within certain deposits, suggesting localised deposition of worked flints, very occasional potsherds and cattle and sheep bone; traces of oyster, heat-affected clay and charcoal were also present throughout the sequence as well as occasional charred seeds.

The upper deposits of pit F1370 were also severely truncated to the east of pit F1385 by another oval pit (F1358; Fig 30C), 1.70m by 1.05m broad and about 0.7m deep. The basal deposit (D1272) mainly consisted of carbon and heat-affected clay fragments as well as much cultural material which would seem to constitute a 'placed deposit'. This produced a small worked flint assemblage and a group of potsherds, mainly consisting of three rim and 26 body sherds of a Plain Bowl. Internal residue from

Pl 3. Cranium of adult domesticated cow, Feature F1683/3013, Outer Arc, Segment 3. Scale 0.05m.

one large sherd (Sherd group 98) produced a radiocarbon date of *3705-3635 cal BC* (*at 95% probability; OxA-15390*; Table 2). Some of the pottery in this group was found to conjoin with sherds from Segment 4 (feature F3016; see below). A single cattle femur from deposit D1272 had been burnt at one end; traces of heat-affected clay, further pottery, oyster shell and charcoal were present in soil samples. Dumps of chalk rubble, silt and silty clay subsequently filled the pit, producing only traces of oyster shell and charcoal and occasional charred seeds.

Cutting the western end of 1385 was a large oval pit (F1657; Fig 30C), 3.85m long, 2.15m wide and 0.8m deep. It was filled by chalk rubble and silts which produced occasional finds of worked flint and cattle bone, along with traces of oyster and mussel shell, charcoal and very occasionally charred grain.

An indeterminate feature (F3009), seen only in section (Fig 32) and just short of 2m in extent and 0.2m deep, cut the upper deposits of pit F1657 approximately at the centre of the segment. This was succeeded by a series of features seemingly focussed at the centre of the segment, the first of which was a subcircular pit (F1656; Fig 30D) 0.75m in diameter, 0.58m deep and filled with chalk rubble containing traces of oyster shell and charcoal. A smaller subcircular cut (F1659; not planned), 0.34m in diameter and 0.3m deep, was perhaps the setting for a small marker post. The silt filling the feature contained further traces of oyster shell, charcoal and seeds.

Pl 4. Cranium of adult domesticated cow, Feature F1683/3013, Outer Arc, Segment 3. Scale 0.1m.

A remnant of a larger feature (F1653; Fig 31E) overlay these small pits. Only the southern side and concave base (0.41m deep) survived later truncation, running a little more than 3.1m along the segment. Largely homogenous silty deposits with frequent chalk inclusions filled the cut, containing occasional finds of worked flint and animal bones as well as traces of oyster shell and charcoal. These deposits had in turn been cut by another small feature (F3015; not planned), 0.2m by 0.15m in plan and 0.2m deep.

At the eastern end of the segment an oval pit (F1261; Fig 31E) had been cut to approximately the same level as feature F1653, cutting pits F1385 and F1358. The feature was 1.7m long, 0.9m wide and 0.9m deep, and apart from an initial localised lens of silt was filled by dumps of chalk rubble containing occasional worked flint, unidentified mammal bone and traces of oyster shell and charcoal.

An extensive reworking along the length of the segment followed in the form of pit F1683/3013 (Fig 31F), an arcing linear feature cutting the upper deposits of features F3015 (not planned) and F1261, 6m long, 1.5m wide and 0.45m deep. The primary fill of this feature appears to represent a 'placed deposit', containing a flint core, six blades, 11 flakes, two fragments of knapping debris and a side scraper along with a substantial assemblage of animal bone. The latter included five cattle humeri and the near complete cranium of an adult domesticated cow aged 7-10 years (Pl 3), 29 cattle-sized pieces, 62 sheep or goat bones and a further 245 sheep-sized pieces (one unidentified fragment being burnt). Two sheep humeri from the deposit yielded two calibrated radiocarbon dates of *3645-3570 cal BC* (*at 95% probability; OxA-15447*; Table 2) and *3645-3570 cal BC* (*at 95% probability; GrA-30880*; Table 2). A number of articulations have been suggested for the sheep/goat bone within this material, which appears to represent the remains of two animals.

A series of dumps of chalk rubble alternating with small pockets of silt at the western end filled the feature, producing more sporadic finds of animal bone, worked flint and pottery, along with traces of cockle shell and charcoal. One of these fills (D1530) contained another sizeable assemblage of animal bone, including 26 cattle-sized pieces, a cow mandible and pelvis in addition to an almost complete cranium from an adult domestic cow aged about 4-5 years (Pl 4). The cattle mandible and pelvis fragments from this deposit were radiocarbon dated to *3655-3565 cal BC* (*at 95% probability; UBA-14307*; Table 2).

Overlying pit F1683/3013 was a shallow linear feature (F3018; Fig 31G), apparently deliberately focussed on the outline formed by earlier pits at the south-western end. This emphasised the upper form of the segment, approximately 5m long and at the most 2.2m wide and 0.3m deep. Filled by homogenous silts, the feature was only partially identified and understood by excavators as it was truncated to both south-west and east by later features.

Cutting the south-west terminal of the feature was an oval pit (F1250; Fig 31H), 1.3m by 1m broad and 0.7m deep. The pit was filled with silt and yielded a number of worked flints, burnt unworked pieces and occasional sherds

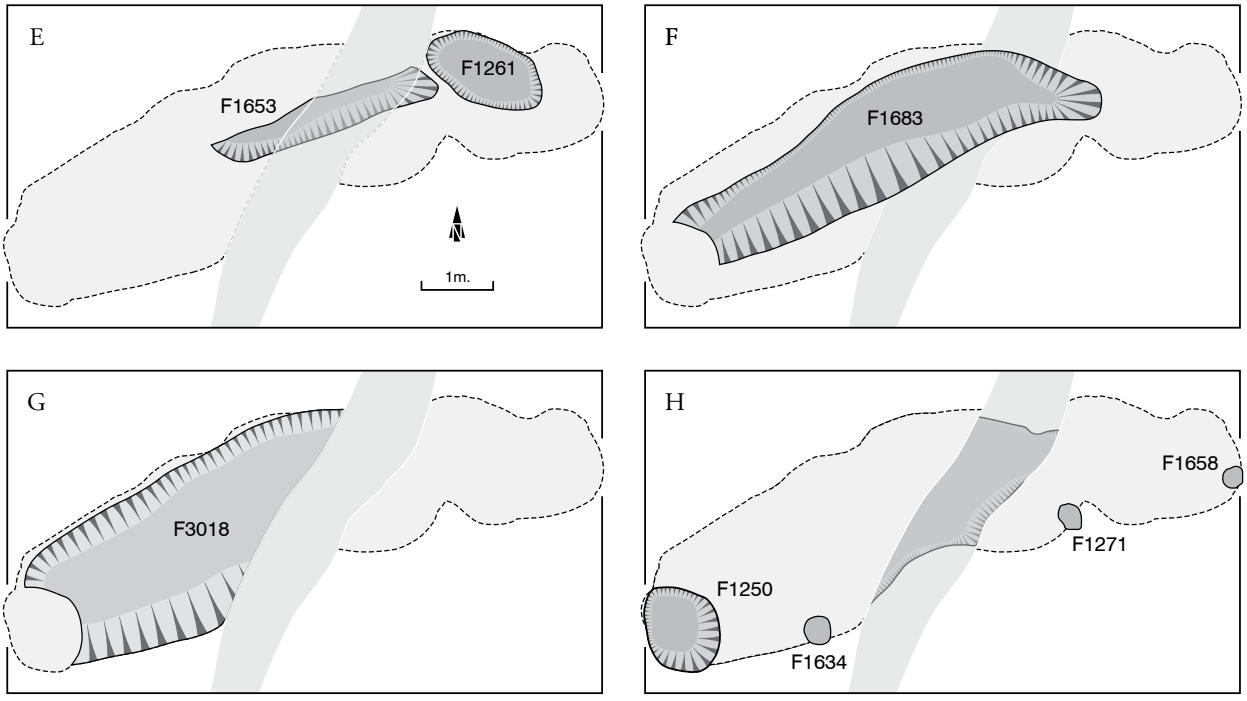


Fig 31. Outer Arc, Segment 3, phasing.

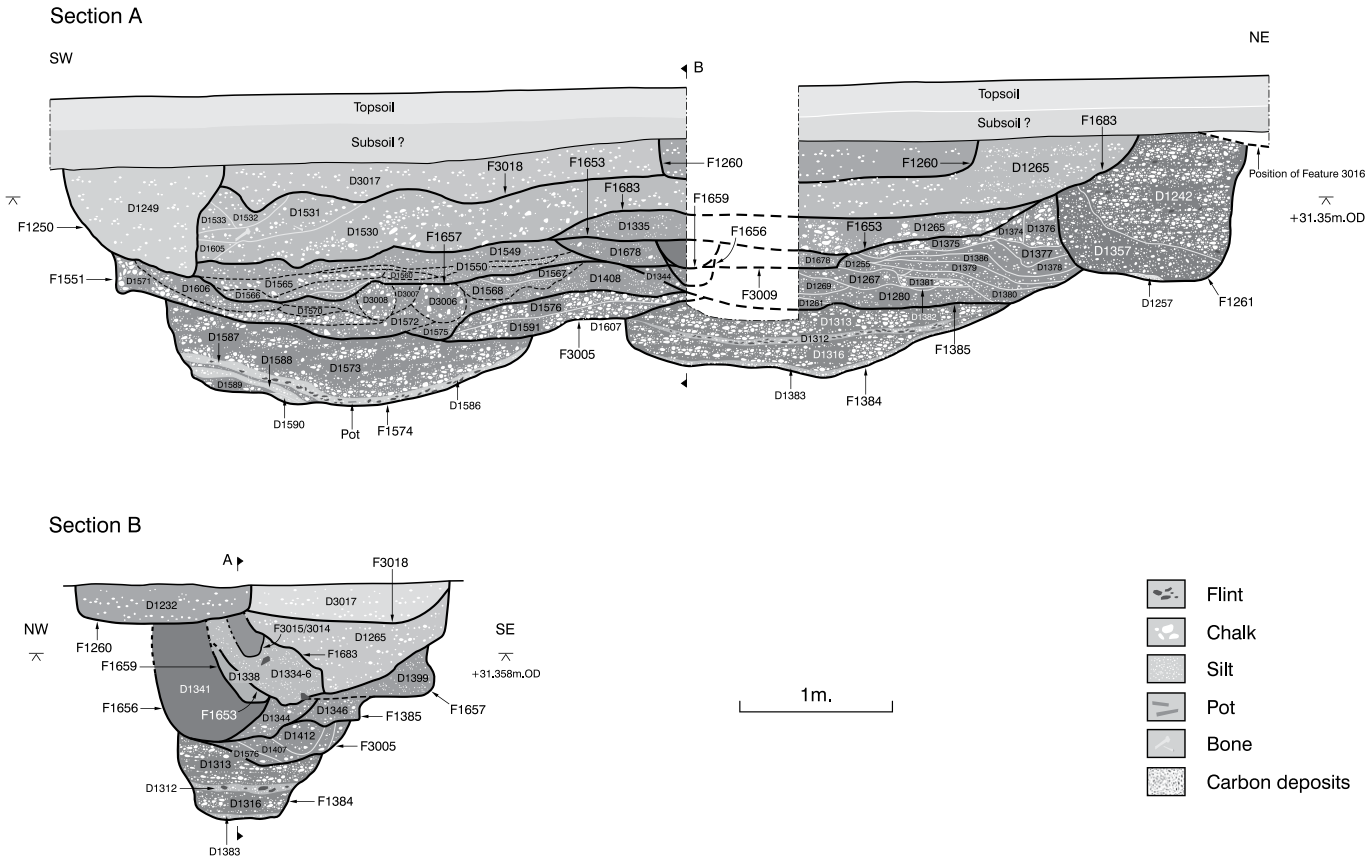


Fig 32. Outer Arc, Segment 3, sections.

of probably Neolithic pottery, along with fragmentary animal bone and traces of oyster shell and charcoal.

Three potential post-settings (F1271, F1634 and F1658; Fig 31H) were set along the south-eastern edge of the segment. Feature F1634, the most westerly, cut the upper deposit of pit F1657 and was 0.3m in diameter and 1m deep, filled with silt that contained three pieces of burnt unworked flint as well as traces of small mammal bone, heat-affected clay and charcoal. A little over 3.5m to the north-east, feature F1271 was markedly similar. Cutting the edge of pit F1385, this was 0.4m wide and 0.75m deep, filled with loose chalk rubble with small fragments of unidentified bone and some heat-affected clay. At the north-eastern terminal of the segment, the upper deposit of early pit F1370 was cut by feature F1658, 0.3m in diameter and 0.3m deep, its silty fill containing traces of oyster shell and charcoal.

Outer Arc, Segment 4

Only seen during evaluation of the site, this segment (feature F3016) was located in the space between areas later recognised as Outer Arc Segments 3 and 5 (thought at the evaluation stage to form a single linear feature). The shallow profile of feature F3016 was captured both in cross section and longitudinally during open area excavation across the perceived 'causeway' between Segments 3 and 5; its deposits were recorded in the sections of evaluation trench 20 (deposits D40 and D57). Site photographs confirm the location of the hollow but not its dimensions (tentatively reconstructed in plan and section; Fig 33-34). The feature may well have constituted a further segment in its own right, a little over 8m long with a maximum width of about 2.75m. The profiles of the hollow suggest it was at least 0.2m deep (the thickness of deposit D40), but might have been as much as 0.55m deep if deposit D57 was contained within the feature.

Certainly, deposit D40, the earliest fill of the hollow recorded in the evaluation trench, contained one of the richest concentrations of cultural material encountered on the site. This dark brown clayey silt, which was noted for its high carbon content and contained much heat-affected clay and charcoal, also produced large quantities of worked flint and pottery as well as (reportedly) a few fragments of sandstone, possibly parts of a quern stone (now lost). The worked flint assemblage of 146 pieces was particularly noteworthy in that a relatively high proportion of the artefacts had been burnt; a large number of early Neolithic potsherds (206) was recovered from the feature

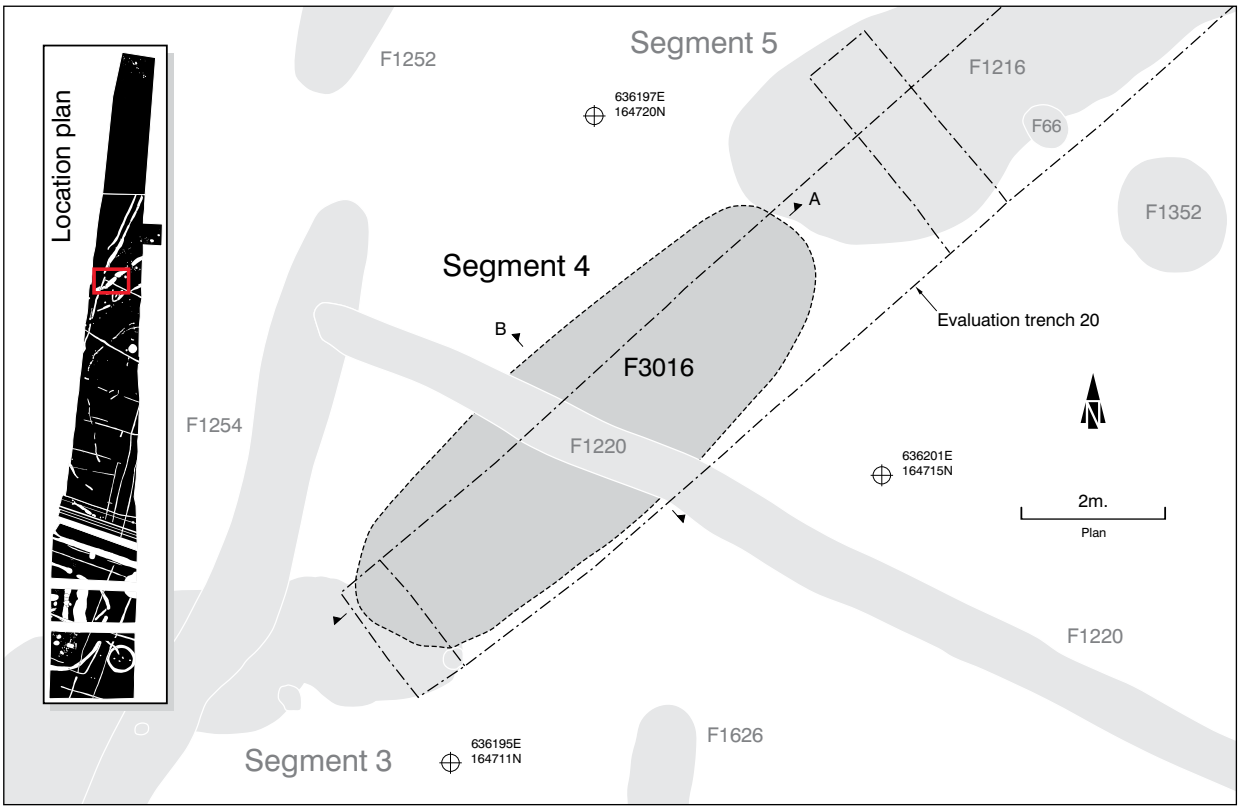


Fig 33. Outer Arc, Segment 4.

including sherds of Plain Bowl that conjoined with sherds from the earliest fill in adjacent pit F1358 (at the north-east terminal of Segment 3). Further possible joins were noted between sherds from deposit D40 and from 'placed deposit' D1193 in feature F1181 (Segment 2), at least 10.5m to the south-west. Three cattle mandibles were also present. This material was overlain by a lighter clayey silt, recorded in evaluation to a thickness of up to 0.35m; the same context number (D57) was assigned to silt within feature F1216, the uppermost cut of Segment 5 to the north-east, and it is possible that the interface between deposits D40 and D57 marks the continuation of cut F1216, *ie* that Segment 5 post-dated Segment 4. Section drawings (Fig 34) also suggest that Segment 4 post-dated Segment 3 (feature F1261) to the west.

Outer Arc Segment 5

Immediately adjacent to the putative Segment 4 and 7.4m from north-eastern terminal of Segment 3, Segment 5 was again characterised by initial development via a sequence of discrete pits, in this case focussed on two areas that were eventually joined to form a single segment (Fig 35-37).

The earliest feature towards the south-west end of the segment was pit F1667 (Fig 36A), which had been mostly removed by later pits and was little understood during excavation; nevertheless, an oval shape can be suggested from the available data, and this was evidently a large pit, with a maximum extent of perhaps 2.6m by 1.8m and at least 0.84m deep. A very large number of struck flints (2041 pieces) were recovered from what remained of its basal deposits, probably resulting from either a single major depositional event or successive dumps of worked flint; the material had been successively cut away on three sides by later features, leaving a truncated remnant. This was nonetheless the largest concentrated worked flint assemblage from the site, comprising 45 cores, struck lumps and nodules, 113 blades (one utilised), 829 flakes (one utilised, one retouched), 1053 fragments of knapping debris (one burnt) and an end scraper. Seven burnt unworked pieces and two small abraded unidentified potsherds were also present, and the deposit also produced cattle tibia, astragalus, tarsal and metatarsal fragments, 20 cattle-sized pieces (two with signs of burning), a sheep humerus fragment, a sheep-sized bone fragment and a fragment of pig cranium. An articulating cattle tibia and tarsal securely attributed to this context yielded a radiocarbon date range of *3740-3650 cal BC* (*at 95% probability; OxA-15448*; Table 2).

Cutting through the flint deposits in pit F1667 to the north-west was a subrectangular pit (F3020; Fig 36B), about 2m by 1.5m broad (depth unrecorded).

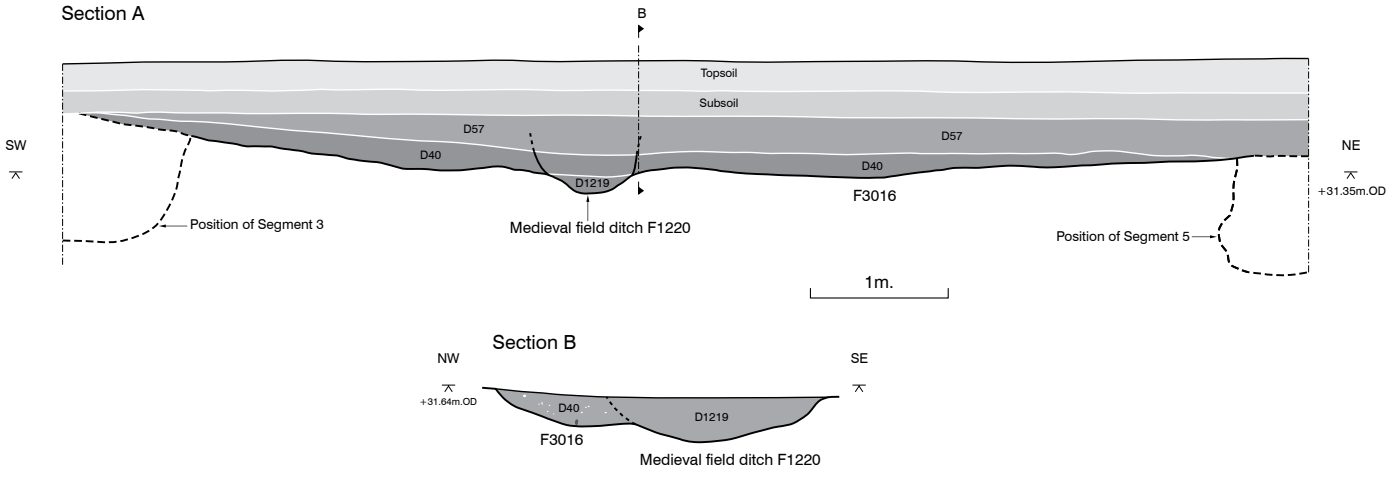


Fig 34. Outer Arc, Segment 4, sections.

Another subrectangular pit (F1440; Fig 36B) lay to the south-east of pit F3020 but the relationship between these features could not be determined. Forming the south-west terminal of the segment, this pit was around 2m by 1.8m broad and up to 0.6m deep, its vertical sides considerably undercut on the south-western edge (Pl 5). A complex series of silty clay deposits with frequent small chalk inclusions and chalk rubble filled the pit, with a relatively small number of finds recovered from the later deposits in this sequence, comprising occasional worked flint, oyster shell, a fish tooth, heat-affected clay, burnt flint, charcoal, seeds and animal bone. From the latter an articulation of cattle radius and ulna was radiocarbon dated to *3715-3640 cal BC* (*at 95% probability; OxA-15543*; Table 2).

To the north-west, pit F1429 (Fig 36B) had also cut away deposits in pit F1667, but the relationship of pit F1429 to pits F3020 and F1440 (on the other side of an evaluation slot) is again unknown. Pit F1429 was oval, at least 2.3m long and 0.95m wide and 0.36m deep and was filled by lenses of silt and layers of chalk rubble which only yielded occasional traces of mammal bone, oyster shell and charcoal.

A small discrete feature (F1481; Fig 36B) cut the upper deposits of pit F1429 at its centre. This potential post-hole was 0.45m by 0.31m in extent and 0.2m deep and produced traces of mammal bone, oyster shell, charcoal and seeds. The upper fill of pit F1429 was also cut to the north-east by a shallow or heavily truncated pit (1668; Fig 35). Difficult to establish in plan, the latter feature has been reconstructed as probably oval and approximately 1.25m by 0.75m wide and 0.15m deep. It was filled by clayey silt lenses divided by a thin spread of chalk rubble containing a fragment of cattle scapula.

The earliest feature at the north-east end of the segment was an oval/irregular pit (F1676; Fig 36A), 2.1m by 1.45m in plan and 0.8m deep. This pit was initially filled by a localised dump of loose chalk rubble and a silt deposit which produced a fresh body sherd of early Neolithic pottery along with fragments of cattle bone. Further traces of mammal bone, oyster shell, charcoal and seeds were also present in these deposits.

To the south-west, the upper fill of pit F1676 was cut by an irregular/subcircular pit (F1304; Fig 36B) 1.5m wide and 0.4m deep. The initial chalk rubble and subsequent silt fills of this feature yielded occasional worked flint and early Neolithic pottery, but more significant quantities of animal bone, mainly from cattle but also some from sheep, and one roe deer bone, the only wild animal bone noted in the early Neolithic phase of the site. An articulating cattle radius and ulna from the largest animal bone assemblage in the uppermost fill of the pit (D1259; 63 fragments in all) was radiocarbon dated to *3740-3650 cal BC* (*at 95% probability*; *OxA-15449*; Table 2). Soil samples revealed the presence of more unidentified mammal bone as well as traces of oyster shell and fragments of heat-affected clay and charcoal variously within the fills.

The north-eastern portion of pit F1676 was initially cut by a small irregular feature (F1674; 0.25m wide and 0.05m deep; Fig 36B). This had been truncated by a larger oval pit (F1672), 2m by 1.35m in extent, aligned north-west/south-east and 0.2m deep; it was filled by silt deposits and a localised dump of chalk. Despite itself being much reduced by later pitting, this feature produced a comparative wealth of cultural material. The basal silt contained three flint flakes and 36 early Neolithic potsherds in a relatively localised area, as well as two sheep-sized bones, suggesting a 'placed deposit' (D62). Overlying this on the northern side of the pit, a different silty fill yielded another localised and probable 'placed deposit' (D61) consisting of worked flint artefacts and some potsherds of

Pl 5. Detail of south-west end of longitudinal section through Outer Arc, Segment 5. Scale 0.5m.

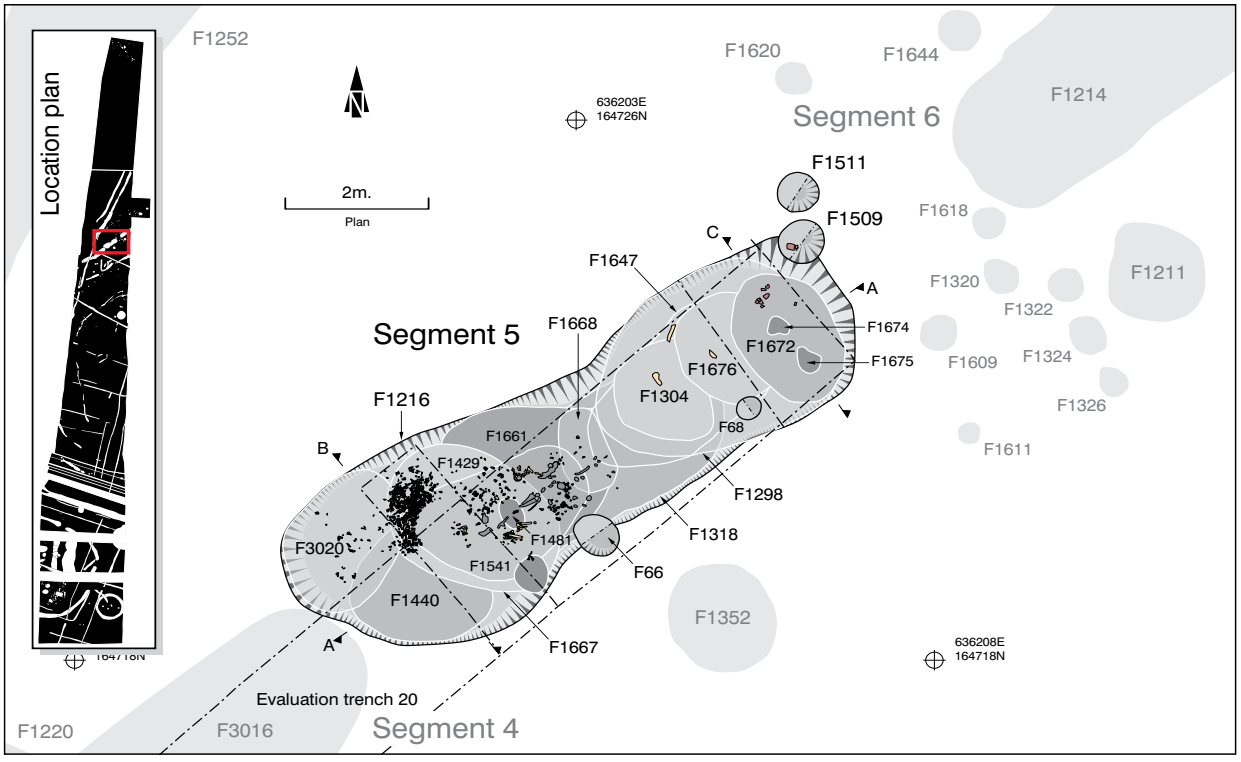


Fig 35. Outer Arc, Segment 5.

early Neolithic date, as well as a significant concentration of animal bones, and this material was succeeded in the same area by another noticeable concentration of flint, pottery, and bone in a silt matrix (D73). While the flint assemblage in this deposit included what might be considered more 'typical' items and compared with many of the causewayed enclosure flint deposits, it is perhaps notable that more 'complete' pieces were present, including five serrated blades, three serrated flakes, an end and side scraper and a borer. Ninety-two early Neolithic potsherds derived from this context along with a few fragments of burnt animal bone. It would appear therefore that pit F1672 was the focus for successive 'placed deposits'. Internal carbonised residue from pottery in deposit D73 produced a radiocarbon date of *3710-3670 cal BC* from three replicate samples (*at 95% probability*; *GrA-30888*; *OxA-15509*; *OxA-17122*; *sherd group 265*; Table 2). This material was partly covered by further silt which was cut by another small discrete feature (F1675; Fig 36C), just 0.4m wide and 0.09m deep and again filled by silt.

A large linear pit (F1318; Fig 36C) at least 4m long, 2.56m wide and up to 0.55m deep overlay pits F1481, F1668 and F1304 (possibly also F3020 and F1440 though this was not seen in excavation). It was filled with a sequence of silty clays with some chalk rubble high in the sequence at the south-western end (D45-51; D1461-1464). The earliest fill (D51) at the south-west end of pit F1318 contained two distinct concentrations of worked flint and animal bone, possibly representing 'placed deposits'. To allow the separation of this material from other finds from the remaining fill, the two concentrations were given individual context numbers (D52 and D1447); full descriptions can be found in the segment catalogue (Appendix III).

Overlying D51 was a deposit of mixed silty clay and chalk (D50) which extended across much of the base of the pit. This material had a mottled appearance with extensive patches of charcoal (40 per cent in places) with medium to large fragments of heat-affected clay, a cattle femur fragment, four cattle-sized pieces and a sheep-sized piece, as well as a number of flint artefacts (a tested nodule, two blades, eight flakes and 12 waste fragments). This fill contained six concentrations of material thought to represent 'placed deposits', which were also given individual context numbers (D1387, D1414, D1416, D1430, D1538 and D1604).

In the south-east quadrant of the pit was 'placed deposit' D1416, consisting of fragments of sheep bones (two metacarpal, two metapodial and one first phalanx). This in turn was directly overlain by the crushed skull of a 4-6 year old child with a number of teeth and a few fragments of long bone shaft (D1387). Some of the skull fragments together with tooth crowns exhibited signs of burning, though this material proved unsuitable for radiocarbon dating. A worked flint core and a flake were also found close by.

Lying just 0.1m to the north-east was a small concentration of cattle lower leg bone fragments, including a calcaneum and two tarsal fragments (D1414) together with a tibia and an articulating left tibia, astragalus, calcaneum and lateral malleolus (D1430). This articulation produced a radiocarbon date of *3695-3630 cal BC* (*at 95% probability; UBA-14309*; Table 2).

About 0.75m to the north-east lay a more concentrated cluster of animal and human bone (D1538), including articulating cattle bone (three thoracic and three lumbar vertebrae and parts of two pelvises and a metatarsal) along with 23 cattle-sized pieces, sheep teeth and seven sheep-sized pieces with a fragment of pig humerus and 18 indeterminate bone fragments; a total of 60 animal bone fragments in all. The cattle metatarsal from this deposit was radiocarbon dated to *3715-3630 cal BC* (*at 95% probability*; *UBA-14311*; Table 2). The human remains mixed with this material consisted again of skull fragments, these from a sub-adult/adult (16-35 years), possibly female, as well as several small unidentified pieces, one of which (possibly a vertebra) appears to have a clean, sharp cut in it. This material produced a radiocarbon date of *3640-3580 cal BC* (*at 95% probability*; *UBA-14310*; Table 2).

Immediately to the south-east of deposit D1538 was a cluster of worked flint artefacts (D1390) including four core fragments (all four of which were burnt or slightly burnt), five blades, 18 flakes, six larger pieces of knapping debris (four of which were burnt or slightly burnt) and 167 smaller fragments, 163 of which were burnt. Two burnt unworked pieces were also found in this context. A further concentration of worked flint (D1604) lay immediately to the north-west of deposit D1538, including a blade, 11 flakes, 18 fragments of knapping debris and a burnt serrated flake.

Overlying deposit D50 was a series of silty and chalky fills (D45 – D49) containing sporadic finds of worked flint and animal bone, traces of oyster shell, charcoal and seeds, as well as further animal bone concentrations. Deposit D47 for example, produced another significant animal bone assemblage, which included eight identified cattle bones (three crania, three teeth, humerus, radius) and 80 cattle-sized fragments, as well as a sheep-sized fragment and 40 indeterminate pieces in addition to four flint flakes (one possibly retouched) and traces of oyster shell. The uppermost fill at the south-west end of pit F1318 (deposit D45) was mainly composed of another marked concentration of animal bone, including cattle radius and sheep tibia fragments, four cattle and 12 sheep-sized bones and 120 indeterminate fragments. The deposit also yielded a flint bladelet, a blade and four flakes, as well as seven sherds of early Neolithic pottery and small quanti-

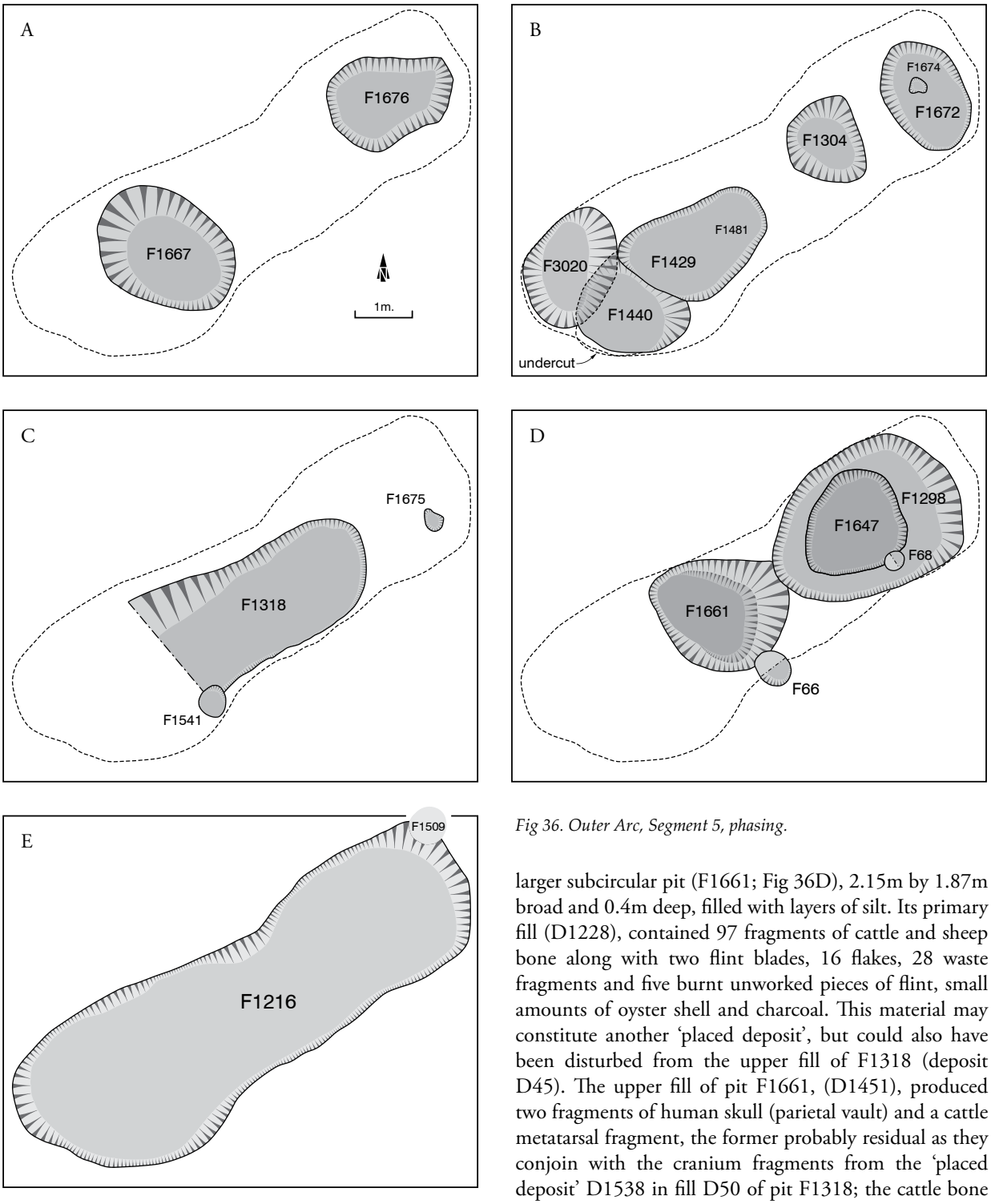


Fig 36. Outer Arc, Segment 5, phasing.

ties of mammal bone, oyster and winkle shell, burnt flint, heat-affected clay and charcoal.

The upper fills of pit F1318 at the south-western end were cut by a small feature (F1541; Fig 36C), 0.55m in diameter and 0.45m deep, filled with compact silty clay and chalk lumps. Immediately to the north-east was a larger subcircular pit (F1661; Fig 36D), 2.15m by 1.87m broad and 0.4m deep, filled with layers of silt. Its primary fill (D1228), contained 97 fragments of cattle and sheep bone along with two flint blades, 16 flakes, 28 waste fragments and five burnt unworked pieces of flint, small amounts of oyster shell and charcoal. This material may constitute another 'placed deposit', but could also have been disturbed from the upper fill of F1318 (deposit D45). The upper fill of pit F1661, (D1451), produced two fragments of human skull (parietal vault) and a cattle metatarsal fragment, the former probably residual as they conjoin with the cranium fragments from the 'placed deposit' D1538 in fill D50 of pit F1318; the cattle bone may also have been disturbed from the same context.

The north-eastern end of feature F1318 was cut by a large oval pit (F1298; Fig 36D; Pl 6), 3.85m by 2.65m broad and 0.6m deep. It was filled with a series of nine deposits of clay silt and chalk, three of which (D59, D1256 and D1301) were extremely rich in finds and may be regarded as 'placed deposits'; none were primary fills.

Pl 6. Carbon-rich deposits in Pit F1298, Outer Arc, Segment 5. Scale 0.5m.

A layer of carbon and ash at the south-west end of the pit (D1301) contained two sherds of early Neolithic Carinated Bowl associated with a flint assemblage comprising 7 flakes (two burnt), a serrated flake, 32 fragments of knapping debris and 14 burnt unworked flints. This was accompanied by a large number of animal bones, some of which were burnt, comprising 18 cattle bones (including two articulating groups from lower limbs), 90 cattle-sized fragments and two sheep-sized bones, together with traces of oyster and heat-affected clay.

Towards the centre of pit F1298 was another concentration of animal bone (D1256), comprising seven identified cattle bones (including an articulation of right cattle humerus, radius and ulna which provided a calibrated radiocarbon date of *3695-3635 cal BC* (*at 95% probability*; *GrA-30884*; Table 2), along with 24 other cattle-sized fragments.

At the north-eastern end of the pit was a very rich deposit of animal bone, flint and pottery (D59). Five fresh sherds of early Neolithic Plain Bowl were accompanied by a flint assemblage of 18 flakes (1 burnt), two fragments of knapping debris and a single retouched piece. Along with this was a large number of animal bones, including 130 identified cattle bones and 129 cattle-sized fragments. The identified bone came from nearly every part of the skeleton including many cattle femora exhibiting marks of burning or cut marks associated with preparation and cooking. A number of articulations were present, which provided three radiocarbon dates; *3695-3640 cal BC* (*at 95% probability*; *GrA-30885*; Table 2); *3695-3645 cal BC* (*at 95% probability*; *GrA-30886*; Table 2) and *3695-3645 cal BC* (*at 95% probability*; *OxA-15544*; Table 2). Other animal bone included four sheep-sized fragments and 64 unidentified pieces. The deposit also produced a single human lumbar vertebra fragment from an adult (over 25 years of age), radiocarbon dated to *3715-3630 cal BC* (*at 95% probability*; *UBA-14312*; Table 2)

Cutting pit F1298 was an oval pit (F1647; Fig 36D), 2.8m by 1.7m broad and 0.35m deep, whose fill produced a few worked flints, traces of oyster shell and small amounts of charcoal.

Two probable post-holes (F66 and F68; Fig 36D) cut the upper deposits of pits F1661 and F1647 on the south-east edge of the segment. The true stratigraphic relationship of these to other features is unclear, however, and it may be that they belong to the latest phase in the development of the segment (see below). Feature F66 (not fully excavated) had a diameter of 0.65m and was at least 0.5m deep, while feature F68 was 0.35m in diameter and

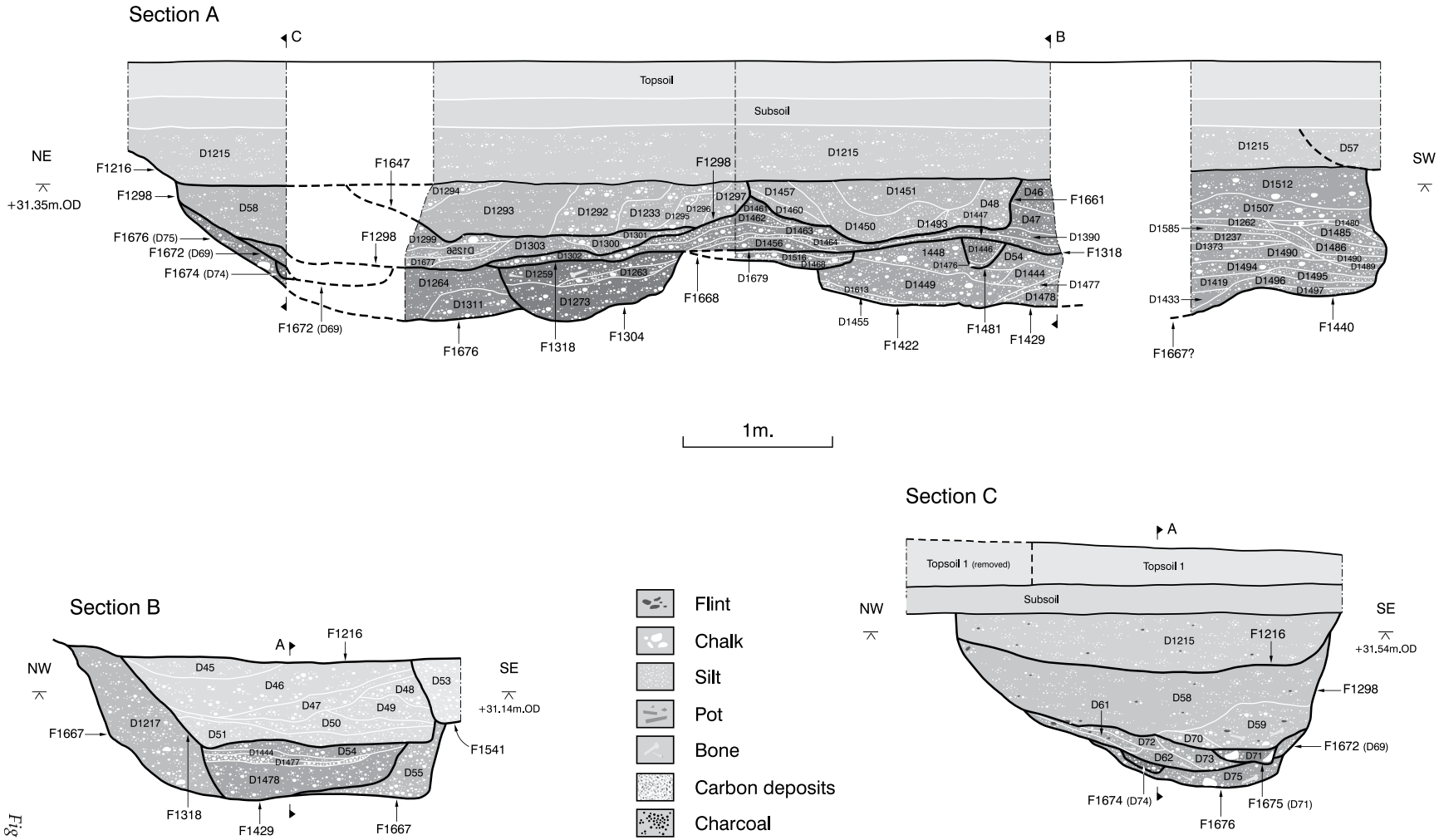


Fig 37. Outer Arc, Segment 5, sections.

0.58m deep. Both were filled by compact silt deposits with frequent chalk and flint inclusions and charcoal flecking.

Overlying these post-holes and truncating the fills of the earlier pit was a long shallow linear feature (F1216; Fig 36E), at least 8.75m long, 3.1m wide and 0.4m deep, emphasising the upper form of Segment 5 in much the same fashion as other segments of the Outer Arc. The south-eastern edge of this feature was confused by the cutting of evaluation trench 20 along the same alignment, but the curving north-west edge was clearly seen during the excavation phase of the project. The relationship of F1216 with Segment 4 (feature F3016) could not be demonstrated unequivocally but cut F1216 might have extended further to the south-west, where layer D57 (possibly equivalent to the fill of F1216) overlay the deposit (D40) filling feature F3016 (described above). Finds from feature F1216 included a large assemblage of worked flint (as well as a possible sandstone maul), early Neolithic (and much later) pottery and animal bone, suggesting the mixing and obliteration of finds-rich early Neolithic contexts by later agricultural activity.

Outer Arc, Segment 6

Almost 2.5m from the eastern terminal of Segment 5 of the Outer Arc was a linear feature interpreted as another segment (Segment 6). This feature (F1214; Fig 38) was excavated as a single arcing linear with a rounded south-west terminal, 2.4m wide and with a length of at least 7.9m.

The feature was only partially and hastily excavated, but it was found to be filled with a series of silt deposits, one of which (D1243) near the base of the sequence contained a rich finds assemblage, including 49 (mostly fresh) sherds of early Neolithic Plain Bowl, a flake from a ground and polished flint axe, eight flint cores and a small amount of knapping debris and five cattle teeth. Immediately overlying this deposit was another fill (D1213) relatively rich in finds, including 14 fresh early Neolithic Plain Bowl sherds, a retouched flint flake, a serrated flake, five utilised blades, three utilised flakes and a broken scraper. Associated with this material, however, were ten fresh potsherds of Bronze Age date and two abraded Beaker sherds. It seems difficult to dismiss this material as being intrusive from later agricultural processes and it seems more likely that the segment had been cut into and disturbed during the Bronze Age, this later intrusion being unrecognised at the time of excavation.

The eastern extension of this segment could be seen extending a very short distance (*c* 1m) beyond the limit of excavation on aerial photographs (Fig 22).

Outer Arc, Segment K

Approximately 2.4m east of the eastern terminal of Segment 6 another segment (Segment K) was visible on aerial photographs (Fig 22). Mindful of the caveats discussed for the plotting of the central section of the Outer Arc, it appeared to be around 6.4m long and 1m broad.

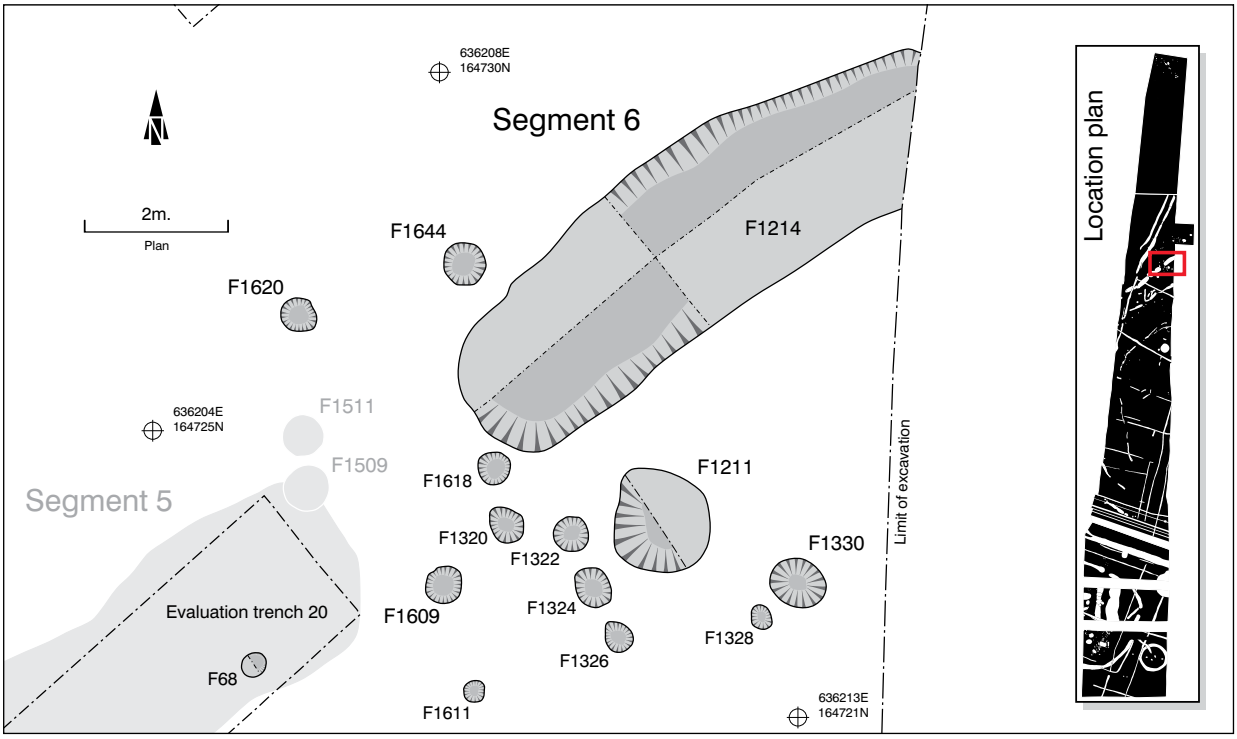


Fig 38. Outer Arc, Segiment 6.

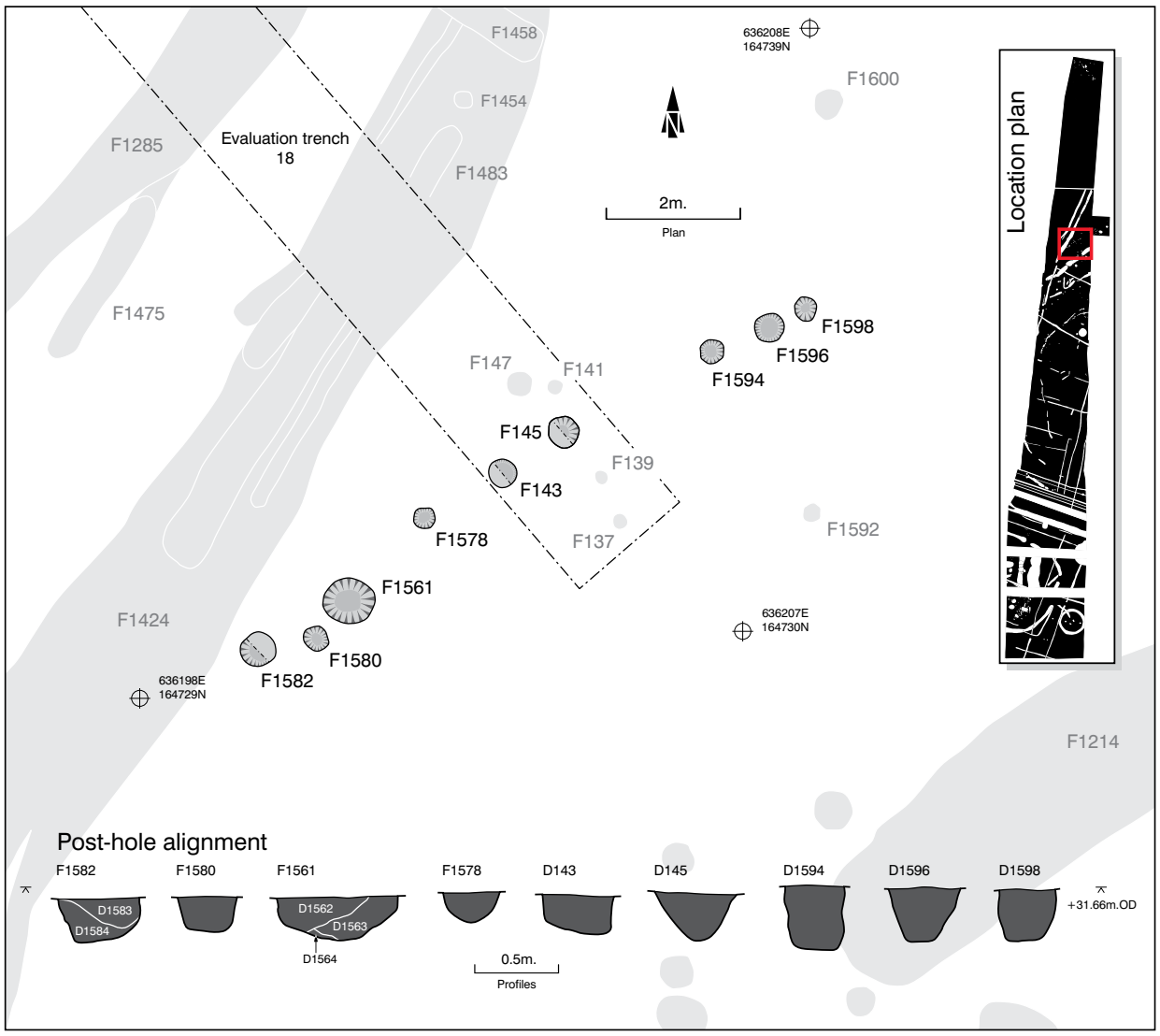


Fig 39. Outer post-hole alignment and associated features.

Outer Arc, Segment L

Continuing the line of the Outer Arc to the north-east, another segment (Segment L) could be seen on aerial photographs about 4.8m from the eastern terminal of Segment L (Fig 22). It appeared to be 11.2m long and 0.8m broad.

Outer pit alignment

Approximately 7m to the north-west of Segment 5 of the Outer Arc was an alignment of small pits or post-holes (143, 145, 1561, 1578, 1580, 1582, 1594, 1596 and 1598; Fig 6 and 39), arcing south-west/north-east and spanning just over 10m. The subcircular (and occasionally subrectangular) features in the alignment were generally of similar dimensions (mostly in the region of 0.4-0.6m wide), with minor variations in depth (0.2-0.4m). No chronologically diagnostic finds were recovered from these features, and no continuation of the alignment could be seen to the north-east or south-west. Notwithstanding this, it is feasible that this short alignment, apparently concentric to the other arcs of the enclosure, may represent an alignment perhaps similar to that lying between the Inner and Middle Arcs.

Potential 'coves'

Two groups of features each appeared to delineate a three-sided or 'horseshoe'-shaped area (Fig 40). These shallow cut features, presumably settings for some kind of timber superstructure, may represent analogues of the much-later three-sided megalithic 'coves' found at Avebury

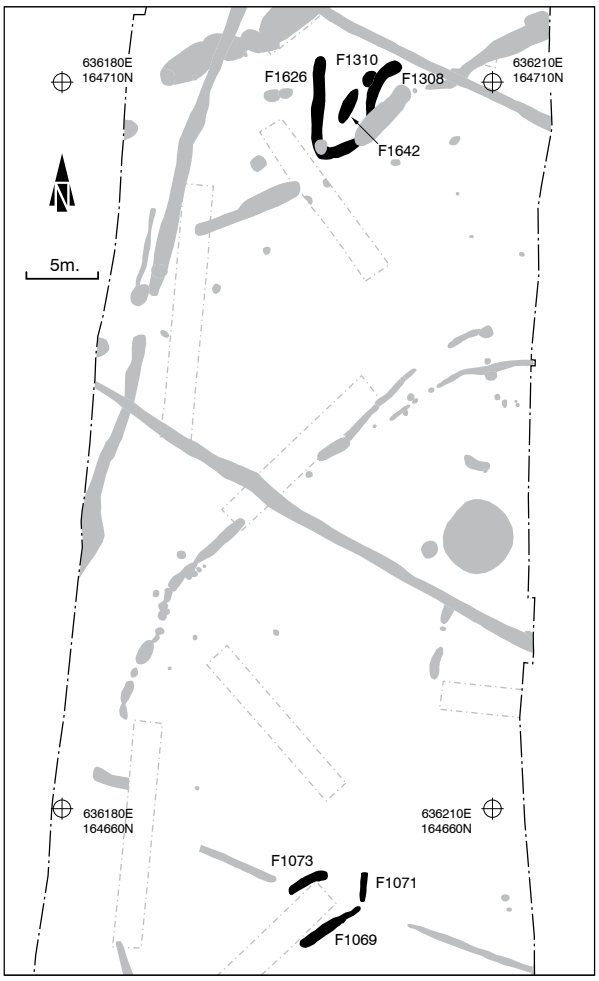


Fig 40. Potential 'coves'.

(Wiltshire), Stanton Drew (Somerset) and elsewhere (Stukeley 1743, 23; Dymond 1896; Oswin *et al* 2011; Burl 1979, 218-20)

To the north was a subcircular pit (F1310), with steep sides and a flat base 0.28m deep. The silt fill of this feature was cut by an irregular 'horseshoe'- shaped gully (F1308/1626), 16m long with steep sides and a slightly concave base 0.3m deep, which enclosed a small area and opened to the north. The silt fill of this feature contained occasional worked flints and early Neolithic potsherds.

Feature F1308/1626 appeared to enclose a shallow elongated pit (F1642) aligned south-west/north-east, 2.63m long and 0.88m wide with a dished profile 0.15m deep. The single deposit filling this feature contained traces of mammal bone, heat-affected clay, charcoal, oyster and mussel shell. Of course the apparent spatial relationship between feature F1308/1626 and the pit may be coincidental.

A rectilinear formation broadly similar to feature F1308/1626 was recorded some 50m to the south, formed by three shallow linear cuts (F1069, F1071 and F1073; Fig 40), arranged in another rough 'horseshoe' shape, the widest opening being to the south-west. All the features in this group had moderately steep sides and uneven bases and were filled by uniform silt deposits. The most southerly of the group (F1069) was 5m long and 0.75m wide and just 0.14m deep, aligned south-west/north-east. Crumbs of unidentifiable pottery and two worked flints were recovered from its fill, along with two fragments of burnt flint. On the same alignment but 2.85m to the north-west, feature F1073 was 3m long, 0.65m wide and 0.11m deep. Its fill again yielded very occasional worked flints. To the east of features F1069 and F1073 and aligned approximately north/south, feature F1071 was 2.06m long, 0.5m wide and 0.15m deep. The fill of this feature contained two abraded sherds of early Neolithic pottery.

Pits containing Peterborough Ware

At the southern end of the site was an isolated oval pit (F442; Fig 41), 1.1m by 0.8m broad and 0.22m deep. It contained two silt fills, the uppermost of which produced 20 fresh sherds of middle Neolithic Peterborough Ware (from *c* 3600 BC) in a single fabric as well as two flint blades (one burnt) and nine flakes.

Just under 7m to the west of pit F442 was a subcircular shallow feature (F596), 0.85m in diameter with a dished profile 0.1m deep. Its fill contained five sherds of Peterborough Ware and a single flint flake.

Beaker period and early Bronze Age features (Fig 42-45)

Ring-ditch

In the south-east corner of the site was a roughly circular ring-ditch (F511) about 12m in diameter (Pl 7). The base of the ditch did not form a complete circuit, however, with a sunken gap just 0.25m wide to the west-south-west (Fig 42-43). The ditch varied between 1.38m and 2.1m in width with an irregular U-shaped profile 0.55-0.65m deep. It was filled with silt containing relatively infrequent small to medium chalk fragments.

An assemblage of over 100 struck flints was retrieved from the fills of the ditch, along with four fresh sherds of Fengate pottery and two abraded sherds of Grooved Ware (from *c* 2700 BC). These presumably residual middle and late Neolithic potsherds may suggest a focus of Neolithic activity post-dating the use of the cause-wayed enclosure; one of the two pits containing Peterborough Ware (F442) lay within the ring-ditch on its western side, the other (F596) around 3m to the west of the ring-ditch.

Apart from this, very little else was recovered from the fills; a single abraded Beaker sherd and a few intrusive

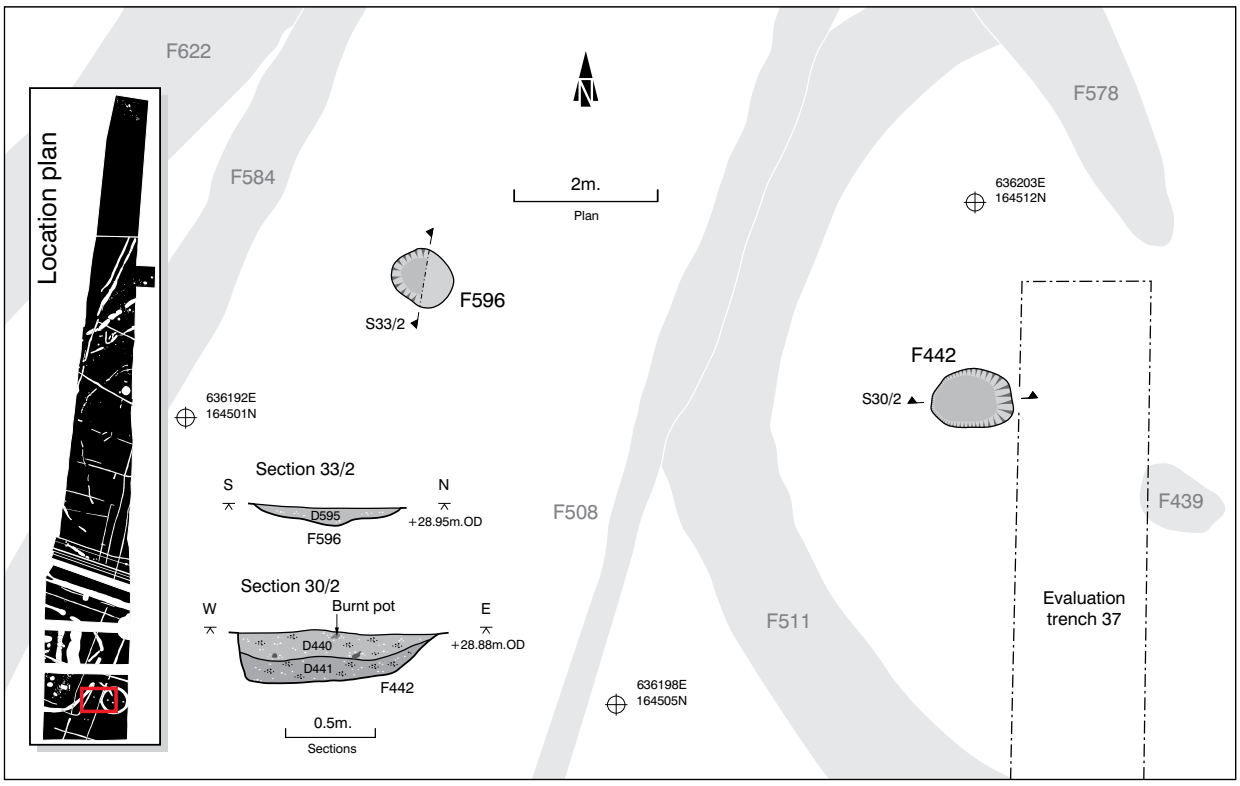


Fig 41. Burials F442 and F596.

Pl 7. Ring-ditch F511, looking south-west. Scale 1m.

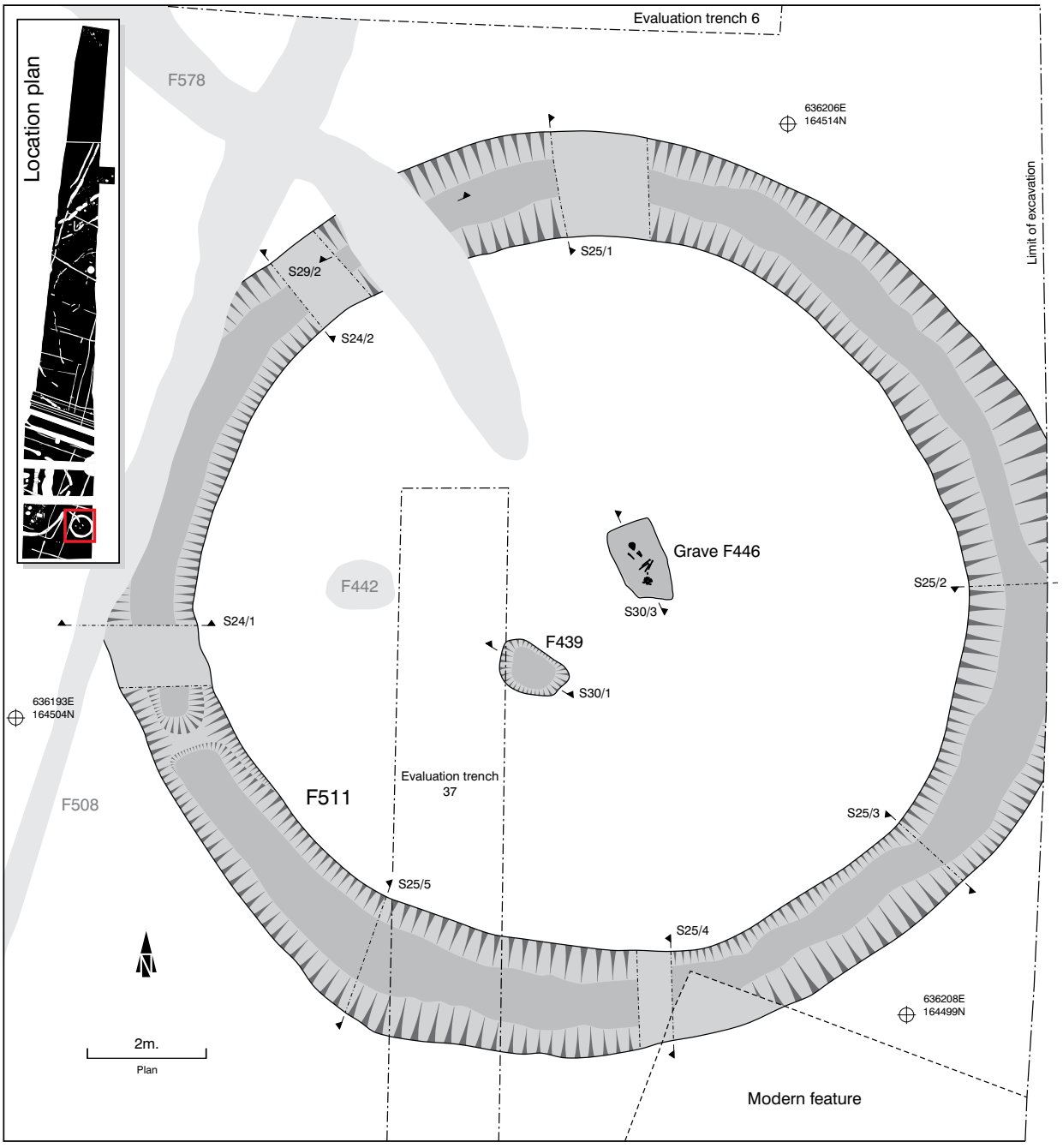


Fig 42. Ring-ditch F511.

sherds of late Bronze Age, Iron Age and early Roman date from upper ditch fills were probably introduced by plough action. Moderately frequent cattle bone, cattle-sized, sheep-sized and indeterminate bone fragments were also retrieved, along with an eroded human tibia of a sub-adult (more than 13 years old) from an upper fill of the ditch on its eastern side; this has been radiocarbon dated to 1740-1530 cal BC (at 95 per cent confidence; UBA-14317; Table 2; Fig 48).

Burials associated with the ring-ditch

Lying either side of the centre of the ring-ditch were two pits (F439 and F446) containing human burials (Fig 42 and 44).

Burial pit F446 was positioned just to the north-east of the centre of the area encompassed by the ring-ditch. The subrectangular pit was aligned north-west to south-east, 1.44m long, 0.8m wide and up to 0.2m deep. Despite significant later truncation, the heavily

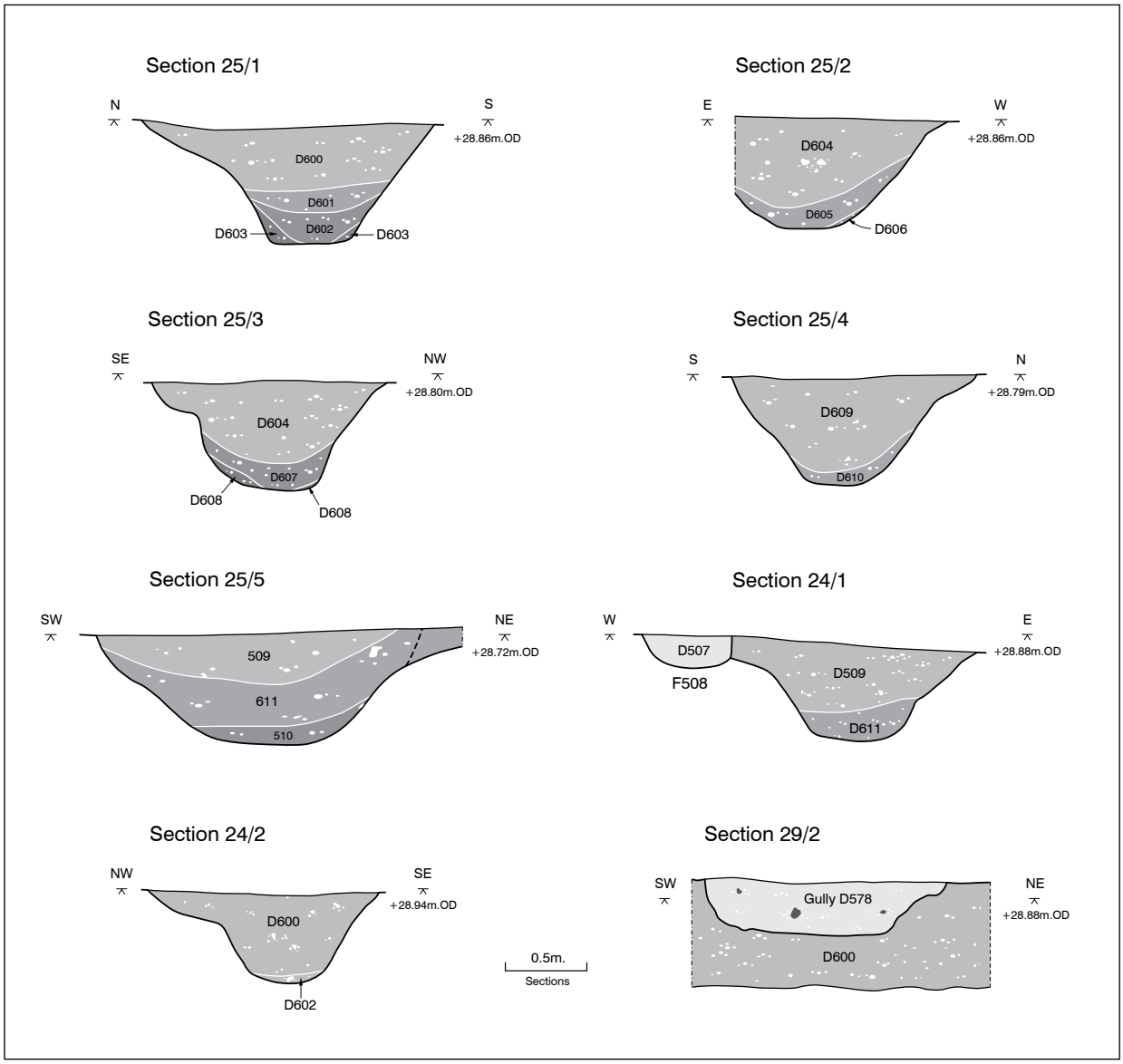


Fig 43. Ring-ditch F511, sections.

eroded skeleton of the lone occupant of the grave survived (D445), an adult of perhaps 25 to 35 years, possibly female, lying flexed on the left side, the arms bent up towards the head and the thighs at 90 degrees to the hips. The skeleton has been radiocarbon dated to 1980-1770 cal BC (at 95 per cent confidence; UBA-14315; Table 2; Fig 48). A single decorated Beaker vessel (D444) lay crushed *in situ* to the south of the feet along with a small decorated and perforated jet belt- or pulley-ring (Fig 84; <424>). Four fragments of flint knapping debris and a burnt unworked fragment of flint were recovered from the backfill of the grave.

Burial pit F439 lay just to the south-west of the centre of the area encompassed by the ring-ditch, 1.7m to the south-west of burial 446. The oval cut was aligned north-west to south-east, 1.2m by 1.8m broad and 0.25m deep. Although heavily truncated, the disturbed and heavily eroded remains of two individuals survived (D438), comprising scraps of long bone from an adult (over 18 years old) and those of a child. The original disposition of the bodies could not be ascertained, but the upper jaw (maxilla) of the child's skeleton also survived. The child was probably about 8-10 years old at death, and the maxilla has been radiocarbon dated to 1750-1610 cal BC (at 95 per cent confidence; UBA-14316; Table 2; Fig 48).

The backfill of the grave produced six red fox teeth from a very young animal (1-2½ months), probably residual (though it is not inconceivable they may

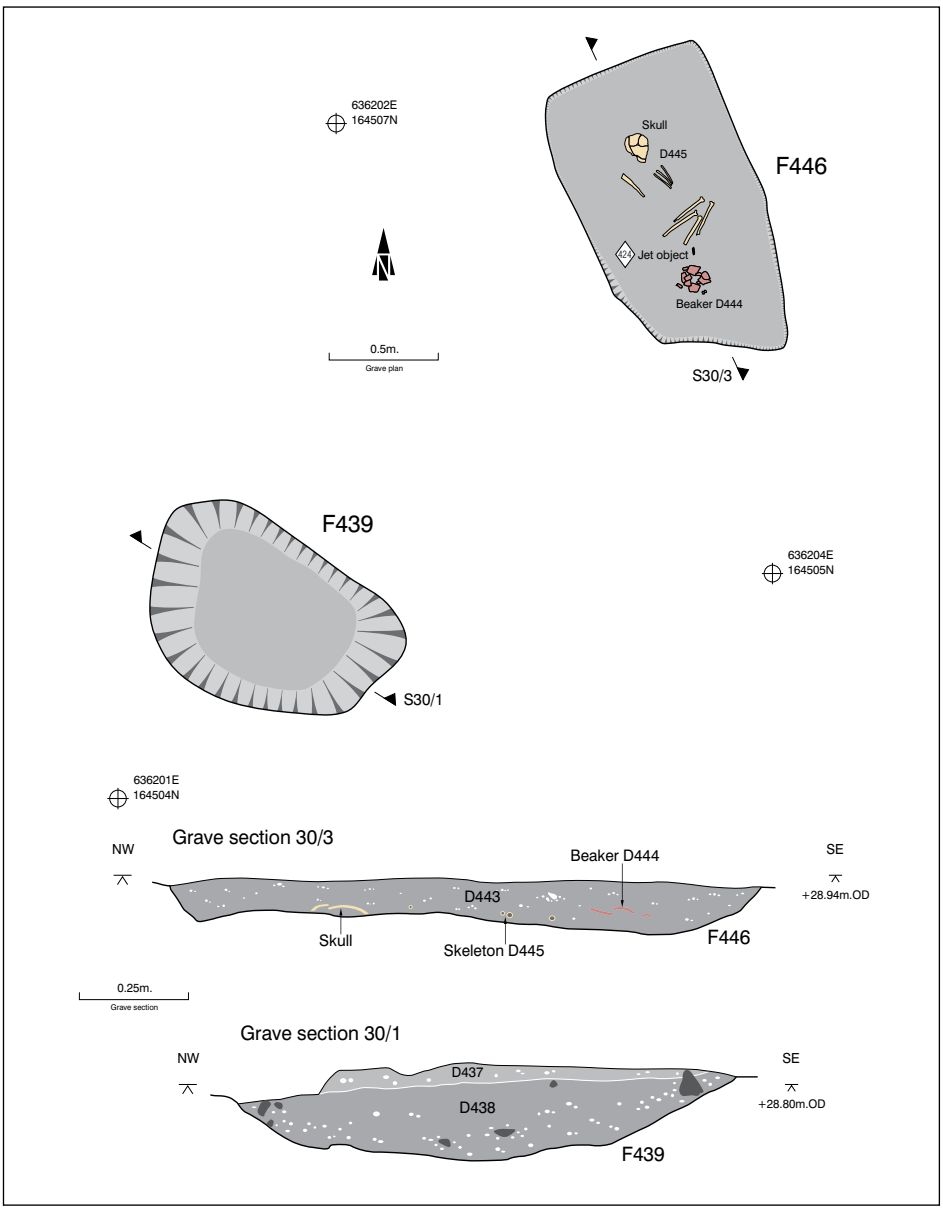


Fig 44. Burials F446 and F439.

represent a grave good), along with fragments of small mammal bone, eggshell, oyster, mussel and whelk shell, charcoal, grain and seeds.

Burials in the northern part of the site

Two crouched burials (F7 and F206) were located in the far north-eastern part of the site (Fig 45).

Pit F206 was aligned north-west to south-east, 2.25m long, 1.6m wide and about 0.25m deep (Pl 8). Although clearly heavily truncated, it contained the skeleton of an adult (D231), possibly male, aged 40 to 60 years, lightly crouched and lying on his/her right side with the head to the north-west. It produced a radiocarbon date of 1750-1610 cal BC (at 95 per cent confidence; 3379±27 BP; UBA-15139). There were no accompanying grave goods.

The backfill of the grave produced five flint flakes (one retouched) and three fragments of knapping debris, along with eight abraded and chronologically undiagnostic potsherds, traces of mammal bone, oyster and mussel shell and charcoal.

Pit F7 lay just 3.4m to the north-east, a small oval cut around 1.45m by 1.15m broad and 0.3m deep. It contained the remains of a skeleton (D6), probably of a male aged between 40 and 55 years, lying on its right side, with its legs tightly flexed, the back straight and the head towards the south-east. There were no accompanying grave goods.

Pl 8. Crouched burial F206. Scale 0.5m.

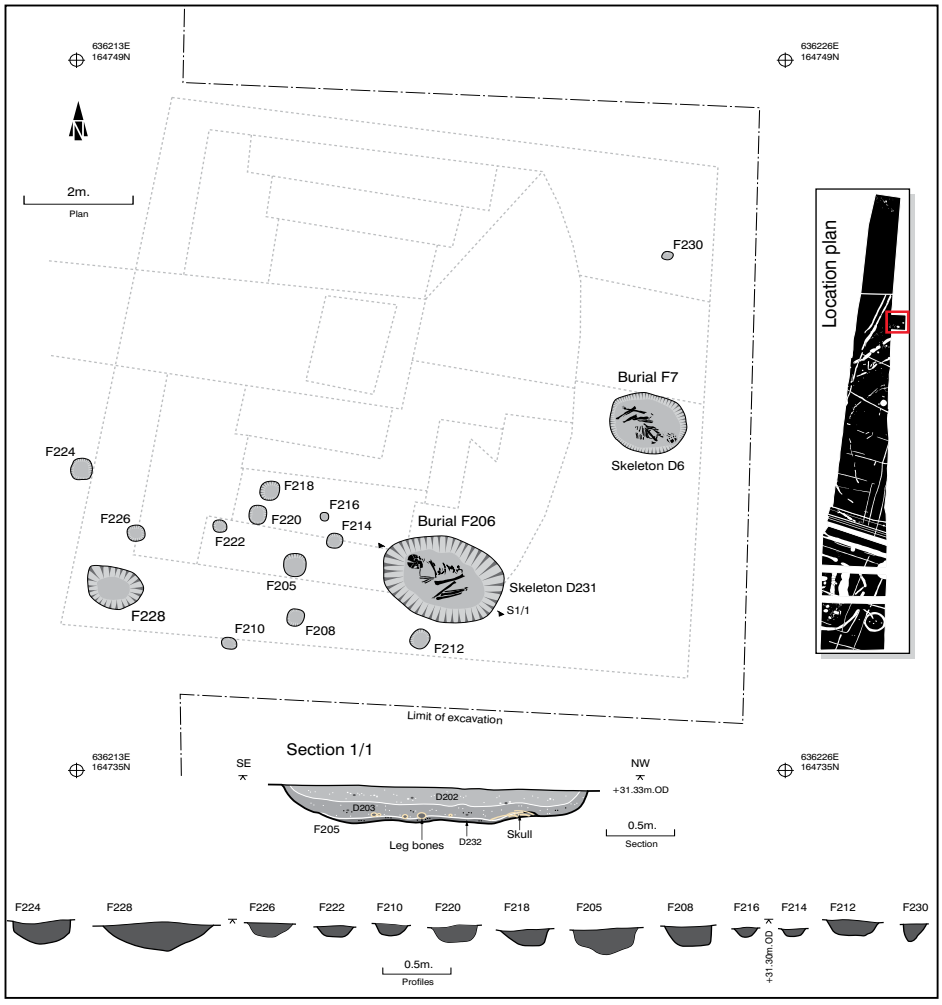


Fig 45. Burials F7 and F206 with pit/post-hole cluster.

The backfill of the grave produced two abraded Beaker sherds, a small quantity of badly preserved animal bone (which included a cattle metacarpal and molar fragment), traces of heat-affected clay, some unidentified pottery, oyster and mussel shell and charcoal.

The palaeoenvironment

Chris Green

Introduction

During the evaluation phase of the site, in tandem with the archaeological investigations, a lithostratigraphic record of natural deposits was logged in each evaluation trench. At the excavation stage numerous column samples, soil monoliths and samples collected for palaeoenvironmental analysis were taken from selected archaeological features (primarily Neolithic features) and from natural deposits. Using a suite of field techniques, the environmental conditions both prior to and during the occupation of the site, specifically the Neolithic, could be examined.

The material suggests it is possible to recognise several phases of landscape change before and during the Neolithic occupation of the site. The analysis of the material presents a number of erosion and depositional phases of natural origin. The archaeological aspects of the site, more importantly the Neolithic, are inter-woven in the framework of these natural events. It has not been possible to give definite dates to the various erosive and depositional events. Although the quartz-rich sediments were suitable for OSL dating, the episodic reworking/moving around of the sediments by erosion and deposition have made them unsuitable and unreliable for dating purposes.

Before describing these events, it is worthwhile briefly touching on the geology and the topographical nature of the site to give an image of the setting. The natural underlying chalk takes a fragmented appearance brecciated or broken, approximately 3-4m thick overlying clean bedded chalk. The fragmented chalk is the result of cycles of freeze-thaw during the Ice Age and gives a depth to which the ground was subject to local permafrost conditions. Capping the chalk are intermittent pockets of Head Brickearths. The site lies on a plateau of flat and gently sloping ground bounded by two fairly broad and shallow-sided dry valleys and is a short distance from the present-day coastline.

The earliest erosive and depositional events

The unexpected discovery of a 4m deep steep-sided wide gully (Fig 5) just to the north of the Neolithic enclosure was a surprise given the flat nature of the physical relief of the land here. In fact, the modern landscape gave no indication of the presence of this natural feature at all. The formation of the gully is wholly due to the action of water channelling and incising its way through the chalk landscape. The lower 2.5m of infill of the gully comprised of a succession of chalk and flint gravel, calcareous sands and silts. The gravelly deposits are undoubtedly water-laid but it is difficult to decide to what extent it represents flow along the gully or in-wash from the sides. Though no definite timing can be put forward for the formation of the gully the heavy gravel material at its base suggests periglacial activity and is indicative of a pre-Devensian age. This argument is supported by a struck flint flake (now lost) in sharp condition in the lowest level of the gravel. The burial of this artefact beneath deposits of periglacial affinity indicates an origin no later than the Upper Palaeolithic. At this stage the gully was only part infilled.

Archaeological features possibly pre-dating the Neolithic enclosure

Located to the north of the Neolithic enclosure and on the upper reaches of the shallow south slope of the dry valley bounding the site to the north were a group of isolated post- and stake-holes (Fig 5). These features provided no datable material and have not been securely phased. They were the only group of features located north of the enclosure and were sealed by 1-1.5m of silt. This silt material was the same material that occupied the upper 1.5m of the gully. It is possible that these features signify the earliest occupation of the site, but this view remains tentative.

The second phase of deposition

The silt sealing the localised features to the north and the upper parts of the gully was largely confined to the northern area of the site extending no further south than the northernmost parts of the enclosure.

The thickness and the spatial extent of this silt, increasing in thickness from south to north and in particular north of the enclosure and into the dry valley, is indicative of prevailing westerly winds picking fine material from the exposed loess at low-tide at Pegwell Bay and depositing it up-slope. Discontinuous lenses of small flint gravel within the body of the silt are indicative of surface run-off operating at times across the exposed surface. There is also a higher sand content within this broadly silty deposit. The general structureless appearance of the silt tends to suggest that the deposit had been reworked, probably moved around by both the wind and surface water. It is likely that this was a frequent episodic event as opposed to a continual event.

The second phase of erosion

It is suggested that prior to the Neolithic occupation of the site, a soil horizon was established. The lack of banks associated with the Neolithic enclosure or a mound as-

sociated with the Bronze Age barrow, precluded any searches for *in situ* soil beneath such features, and signs of a soil profile could not be positively determined. However it is postulated that erosion of this soil has taken place and transported the material downslope towards the sea or, by wind, into the sea. Just south of the site is the Pegwell Bay cliff exposure where a thick (by British standards) accumulation of loess overlying the chalk can be seen, the upper part of which developed into a mature soil. A radiocarbon date of 5,600-4,400 cal BC for the deposit (I-3538; 6,120 ± 250 BP; Buckley and Willis 1970, 103) suggests a later Mesolithic date. The soil is buried by 1-2m of hillwash.

Early Neolithic

The segments and associated features that form the Neolithic 'causewayed enclosure' are the first major phases of archaeological activity on the site. The northernmost fringes of the features cut through some of the existing earlier silts belonging to the second phase of deposition. To the south, the silt peters out to a very thin (hardly noticeable) layer where modern topsoil has been seen to directly overly chalk. This thinning out of the silt really only occurred on the flat plateau; further south on the sloping ground deposits of silt increased in thickness, generally 0.2m thick.

Crouched burials

Two crouched burials were located a little way to the north-east of the causewayed enclosure and in the area of the natural gully (F7 and F206; Fig 45). The graves cut through deposition phase 2. The lower fill of one of the graves, a silt-rich deposit of a wind-blown origin, supports a soil fabric representing a soil more mature than the modern soil. Two arguments can be put forward; it is possible that this grave backfill is representative of a mature soil that formed at some time following depositional phase 2, and this is just a small remnant of an already eroded soil. Alternatively, this suggests that at the time of inhumation there was a mature surface soil which has since undergone erosion and no longer survives. This would imply that at the time of burial this area had been occupied by a cover of uncontaminated material for long enough for the development of a mature soil. This would have to develop during the Neolithic. However, there is some doubt if there is sufficient time in the interval for the development of an argillic soil of the type indicated in the grave.

Radiocarbon dating

Alex Bayliss, Frances Healy, Johannes van der Plicht, Christopher Bronk Ramsey, Paula Reimer, Grant Shand, Jake Weekes and Alasdair Whittle

Introduction

Fifteen radiocarbon measurements, including a set of three replicates, were obtained for the Chalk Hill enclosure as part of the *Gathering Time* project, funded by English Heritage and the Arts and Humanities Research Council, and based in Cardiff University (Whittle *et al* 2011b). Nine samples were processed at the Oxford Radiocarbon Accelerator Unit, University of Oxford, and six at the Centre for Isotope Research of the University of Groningen, the Netherlands. Five were superficial carbonised residues from sherds; ten were articulating animal bones. Eight further human and animal bone samples from the Outer Arc of the causewayed enclosure and six human bone samples from later contexts were subsequently submitted by the Canterbury Archaeological Trust to the ^{14}Chrono Centre, Queen's University, Belfast.

Objectives of the dating programme

The three arcs of cut features held out potential for exploring both sequence and duration. The main aims were thus to establish the sequence of construction and the absolute chronology of the three arcs, and to establish the duration of use of the enclosure, especially of the repeated reworkings of the outer segments. Further samples were submitted to refine the dating of the initial construction and later reuse of the early Bronze Age barrow.

Sampling

The first of these aims was frustrated by a dearth of suitable samples from the Inner and Middle Arcs. The Outer Arc, however, provided an exceptional sequence of stratified samples, most of them of articulating animal bone, from Segments 3 and 5. In both cases the sequences started in the original pits which were later joined to form the longer segments, although there were no samples from their very lowest layers. Following the publication of a preliminary model for the chronology of the causewayed enclosure (Bayliss *et al* 2008a, fig 3.10), a series of eight further samples was dated from the Outer Arc in an attempt to refine further the chronology of the monument. One of these samples was from an articulating bone group, although the other seven were disarticulated animal and human bones.

Three samples were dated from the early Bronze Age barrow. One was from the articulated skeleton in the central burial, which was accompanied by a Beaker and belt slider. A second sample derived from the disturbed remnants of a secondary burial in the mound. A third sample of disarticulated human bone from the ditch dated other funerary activity related to the monument.

Laboratory procedures

The samples dated in Groningen were processed and measured by Accelerator Mass Spectrometry, according to the procedures set out in Aerts-Bijma *et al* (1997; 2001) and van der Plicht *et al* (2000). Samples processed in Oxford were dated according to the procedures described by Hedges *et al* (1989) and Bronk Ramsey *et al* (2004a – b). Collagen from the bone samples dated at Belfast was extracted as described by Longin (1971), graphitised as described by Slota *et al* (1987), and dated by AMS (http://www.chrono.qub.ac.uk).

All three laboratories maintain continual programmes of quality assurance procedures, in addition to participation in international inter-comparisons (Scott 2003). These tests indicate no laboratory offsets and demonstrate the validity of the precision quoted.

Results and calibration

Full details of all the radiocarbon measurements from the site are listed in Table 2.

The results reported there are conventional radiocarbon ages (Stuiver and Polach 1977), quoted according to the standards established by the Trondheim convention (Stuiver and Kra 1986). The calibrated date ranges (95% confidence intervals) were calculated by the maximum intercept method (Stuiver and Reimer 1986). The probability distributions of the calibrated dates (Fig 46) were calculated by the probability method (Stuiver and Reimer 1993). All calibrations were undertaken using the program OxCal v4.1 (Bronk Ramsey 1995; 1998; 2009) and the INTCAL09 dataset (Reimer *et al* 2009).

Description of Bayesian approach

The Bayesian approach to the interpretation of archaeological chronologies has been described by Buck *et al* (1996). It is based on the principle that, although the calibrated age ranges of radiocarbon measurements accurately estimate the calendar ages of the samples themselves, it is the dates of archaeological events associated with those samples that are important. Bayesian techniques can provide realistic estimates of the dates of such events by combining absolute dating evidence, such as radiocarbon dates, with relative dating evidence, such as stratigraphic relationships between radiocarbon samples. The resulting 'posterior density estimates', (which, by convention, are always expressed *in italics*) are not absolute. They are interpretative and will change as additional data become available or as the existing data are modelled from different perspectives.

The technique used here is a form of Markov Chain Monte Carlo sampling, which has been applied using the program OxCal v4.1 (Bronk Ramsey 1995; 1998; 2001; 2009). An OxCal model is constructed which explicitly specifies the known or assumed relative ages of the radiocarbon samples. Its structure is typically defined by the site's Harris matrix. The program calculates the probability distributions of the individual calibrated radiocarbon results (Stuiver and Reimer 1993), and then attempts to reconcile these distributions with the relative ages of the samples, by repeatedly sampling each distribution (using the Metropolis-Hastings algorithm) to build up the set of solutions consistent with the structure of the model.

This process produces a posterior density estimate of each sample's calendar age, which occupies only part of the calibrated probability distribution (the prior distribution of the sample's calendar age). The posterior distribution is then compared to the prior distribution and an index of agreement is calculated that reflects the consistency of the two distributions. If the posterior distribution is situated in a high-probability region of the prior distribution, the index of agreement is high (sometimes 100 per cent or more). If the index of agreement falls below 60 per cent (a threshold value analogous to the 0.05 significance level in a χ^2 test), however, the radiocarbon result is regarded as inconsistent with the sample's calendar age, if the latter is consistent with the sample's age relative to the other dated samples. Sometimes this merely indicates that the radiocarbon result is a statistical outlier (more than 2 standard deviations from the sample's true radiocarbon age), but a very low index of agreement may mean that the sample is residual or intrusive (*ie* that its calendar age is different to that implied by its stratigraphic position).

An overall index of agreement is calculated from the individual agreement indices, providing a measure of the consistency between the archaeological phasing and the radiocarbon results. Again, this has a threshold value of 60 per cent. The program is also able to calculate distributions for the dates of events that have not been dated directly, such as the beginning and end of a continuous phase of activity (which is represented by several radiocarbon results), and for the durations of phases of activity or hiatuses between such phases.

Analysis and interpretation

The causewayed enclosure

The radiocarbon dates from the enclosure fall into two categories: those from articulated or articulating bone samples or from internal carbonised residues on groups of refitting ceramic sherds, where there is strong circumstantial evidence that the samples were freshly deposited in the contexts from which they were recovered; and those from disarticulated bone, where we have no evidence about whether the dated material was residual. Strictly, therefore, all dates in the second category provide only *termini post quos* for the deposits from which they were recovered. A Bayesian model for the chronology of the Chalk Hill enclosure constructed on this basis is shown in Fig re 46. It has good overall agreement (A_{model}: 63).

Table 2. Radiocarbon dates.

Laboratory number	Sample reference	Material	Context	Radiocarbon age (BP)	δ13C (‰)	δ15N (‰)	C:N	Weighted mean (BP)	Calibrated date range (cal BC) (95% confidence)	Posterior density estimate (cal BC) (95% probability)
				Inner Arc						
OxA-15391	Sherd group 6	Internal carbonised residue from Neolithic Bowl sherd approx 2 cm across	Inner Arc Segment 3, F1056, context D1054. The homogeneous fill of a shallow segment (total depth 0.50 to 0.26 m). From a small group of sherds clustered with two flint flakes close to N butt (D1055)	4968±33	–25.1				3900–3650	3745–3650
				Outer Arc						
UBA-14304	RHAR98 (2032) F1	Cattle. Unspecified bone	Outer Arc Segment 1, F2034, context D2032. Fill of a pit	4968±29	–21.3	5,8	3,3		3900–3660	3800–3660
UBA-14305		Unspecified bone fragment	Outer Arc Segment 2, F1181, context D1193. Extracted from soil sample from mass of animal bone, pottery and marine shell above initial silt	4864±27	–21.7	5,5	3,3		3700–3630	3700–3635
GrA-30882	Articulation 10/A	Pig. Proximal phalanx, of identical size and development stage to another from the same context, probably from the same foot, retaining unfused epiphysis	Outer Arc Segment 3, F1574, context D1586. Fill of one of the early pits which were later joined into a single segment. Partly overlying pit base, partly overlying initial silts. It would have been deposited soon after the pit was dug	4885±40	–20.6				3750–3630	3710–3635
UBA-14306	RHAR98 (1632) F1	Cattle. Vertebra	Outer Arc Segment 3, F1384, context D1632. Lowest fill of an early pit	4886±37	–21.7	5,1	3,4		3720–3630	3760–3740 (3%)
										3715–3630 (92%)
OxA-15390	Sherd group 98	Internal carbonised residue from 1 large body sherd among >10 from a single Neolithic Bowl.	Outer Arc Segment 3, F1358, context D1272. Lowest fill of a pit truncating an undated early pit	4874±33	–27.1				3710–3630	3705–3635
OxA-15447	Articulation 37	Sheep. L humerus from among numerous bones from two animals	Outer Arc Segment 3, F1683/3013 context D1473. Lowest fill of an extensive later pit, stratified above OxA-15390	4750±32	–20.9				3640–3380	3645–3570
GrA-30880	Articulation 36	Sheep. L humerus from among numerous bones from two animals	Outer Arc segment 3, from the same context as OxA-15447 (F1683/3013, context D1473)	4730±40	–22.4				3640–3370	3645–3570
UBA-14307	RHAR97 (1530)	Cattle. Skull fragments	Outer Arc Segment 3, F1683/3013, context D1530. From general fill, stratified above OxA-15447 and GrA-30880	4788±33	–20.8	5,8	3,3		3650–3520	3655–3565

Laboratory number	Sample reference	Material	Context	Radiocarbon age (BP)	δ13C (‰)	δ15N (‰)	C:N	Weighted mean (BP)	Calibrated date range (cal BC) (95% confidence)	Posterior density estimate (cal BC) (95% probability)
OxA-15448	Articulation 23	Cattle. L astragalus, articulating with tarsal	Outer Arc Segment 5. F1667, context D55. Fill of one of the primary pits eventually joined to form segment. This layer was separated by c. 0.40 m of chalk rubble fill from later pits. The stratigraphic and probably temporal interval between it and a large amount of fresh, well-preserved cattle bone in context D59 (Segment 5, F1298), much of it articulating, at the other end of the segment makes it most unlikely that articulation 23 came from any of the same animals as the samples from that context, since the context D59 bone seems to have been deposited soon after butchery and/or consumption, without passing through intermediate contexts	4952±33	−21.6				3800–3650	3740–3650
OxA-15449	Articulation 9	Cattle. R radius articulating with ulna	Outer Arc Segment 5, F1304, context D1259. Upper fill of an early pit	4949±33	−21.8				3800–3650	3740–3650
UBA-14310	RHAR98 (1538) 1/	Human. Skull fragment	Outer Arc Segment 5, F1318, context D1538. Mixed with animal bone in a placed deposit in later pit	4687±36	−21.7	9,2	3,4		3630–3360	3640–3580
UBA-14311	RHAR98 (1538) F1	Cattle. Metatarsal	Outer Arc Segment 5, from the same context as UBA-14310 (D1538, F1318)	4880±35	−21.6	5,3	3,2		3710–3630	3715–3630
UBA-14309	RHAR98 (1430) F1	Cattle. From articulating L tibia, astragalus, calcaneum and lateral malleolus	Outer Arc Segment 5, F1318, context D1430. From the same feature as UBA-14310 and UBA-14311	4874±34	−22.2	5,2	3,2		3710–3630	3695–3630
GrA-30888	Sherd group 265/A	Fresh, well-preserved internal carbonised residue from 1 sherd out of >15 from same Plain Bowl, Replicate of OxA-15509, -17122	Outer Arc Segment 5, F1672, context D73. One of the lower fills of an early pit	4825±50	−30.9			4846±22	3660–3540	3710–3670
OxA-15509	Sherd group 265/B	Replicate of GrA-30888, OxA-17122	Outer Arc Segment 5, from the same context as GrA-30888 (D73, F1672)	4867±36	−27.3					
OxA-17122	Sherd group 265/C	Replicate of GrA-30888, OxA-15509	Outer Arc Segment 5, from the same context as GrA-30888 (D73, F1672)	4839±31	-27,5			T' =0.6; T' (5%)=6.0; v=2		
GrA-30885	Articulation 22	Cattle. R ulna articulating with radius. Radius Possibly heated	Outer Arc Segment 5, F1298, context D59. Fill of a later pit, possibly equivalent to F1256, stratified above sherd group 265	4910±40	−22.4				3780–3630	3695–3640
GrA-30886	Articulation 20	Cattle. R radius, articulating with ulna. Small patch of burning on ulna	Outer Arc Segment 5, from the same context as GrA-30885 (D59, F1298)	4935±40	−22.3				3800–3640	3695–3645

Table 2. Radiocarbon dates.

Laboratory number	Sample reference	Material	Context	Radiocarbon age (BP)	δ13C (‰)	δ15N (‰)	C:N	Weighted mean (BP)	Calibrated date range (cal BC) (95% confidence)	Posterior density estimate (cal BC) (95% probability)
OxA-15544	Articulation 19	Cattle. R radius articulating with ulna	Outer Arc Segment 5, from the same context as GrA-30885 (D59, F1298)	4911±31	−20.5				3770–3640	3695–3645
UBA-14312	RHAR97 (59) F65	Human. Vertebra fragment	Outer Arc Segment 5, from the same context as GrA-30885 (D59, F1298)	4881±34	−20.7	10,3	3,4		3710–3630	3715–3630
GrA-30884	Articulation 6	Cattle. R humerus, articulating with radius and ulna	Outer Arc Segment 5, F1298, context D1256. Fill of a later pit, possibly equivalent to D59, stratified above sherd group 265.	4885±40	−22.0				3750–3630	3695–3635
OxA-15543	Articulation 39	Cattle. 1 of 3 fragments of R radius, articulating with ulna	Outer Arc Segment 5, F1440, context D1489. Later fill of a probable feature forming SW butt of segment	4912±31	−21.5				3770–3640	3715–3640
			Early Bronze Age/Round barrow							
UBA-14315	RHAR98 (445)	Human. From articulated skeleton of adult D445	Round barrow, F446, context D445. Central burial with long-necked Beaker and belt slider	3555±28	−21.1	10,5	3,4		1980–1770	
UBA-14316	RHAR98 (438) <9>	Human. Maxilla from disturbed burial, probably articulated when interred	Round barrow, F439, context D438. 'secondary' or 'central' burial	3371±26	−21.9	5,48	3,5		1750–1610	
UBA-14317	RHAR98 (604) F10	Human. Disarticulated tibia.	Round barrow, F511, context D604. In ditch with middle and later Neolithic, Beaker and 'Bronze Age' sherds	3356±26	−20.78	8,14	3,34		1740–1530	
UBA-15139	RHAR97 (231)	Human, from articulated skeleton D231	From burial pit F206 in northern part of site	3379±27					1743–1615	
			Late Bronze Age/Early Iron Age enclosure							
UBA-14319	RHAR97 (367) F29	Human. Disarticulated adult skull fragments	F364, context D367. Pit within LBA/IA enclosure with other human remains and much pottery	2667±24	−20.96	9,66	3,5		890–790	
UBA-14320	RHAR97 (371) F28	Human. Disarticulated Maxilla	F370, context D371. Layer associated with western hollow in metalled surface within LBA/IA enclosure	2381±29	−20.26	9,71	3,43		530–390	
UBA-14321	RHAR97 (407)	Human. Disarticulated adult femur	F406, context D407. Layer associated with eastern hollow within LBA/IA enclosure, with other human remains and much pottery	2677±25	−20.37	8,28	3,41		900–800	

The Inner Arc

The only available sample was carbonised residue from one sherd of a small group clustered with two flint flakes close the southern butt of F1056 in Segment 3 (Table 2; *OxA-15391*).

The Outer Arc

This Arc provided 20 samples, those from Segments 3 and 5 forming stratigraphic sequences.

Segment 1

In Segment 1, a disarticulated cattle bone fragment provides a *terminus post quem* for one of the fills of cut F2034 (Table 2; *UBA-14304*).

Segment 2

In Segment 2 (F1181), a disarticulated bone fragment provides a *terminus post quem* for a deposit of marine shell, animal bone and pottery (Table 2; *UBA-14305*).

Segment 3

In Segment 3, context D1568, a lens near the base of F1574, one of the initial pits, yielded a pig phalanx with a fitting unfused epiphysis, of identical size and development to another phalanx from the same context. The proximity of all three bones suggests that they were still, or had until recently been, held together with soft tissue when buried and should hence be close in age to their context. These bones should date from very soon after the pit began to infill (Table 2; *GrA-30882*). A disarticulated cattle vertebra provides a *terminus post quem* for the lowest fill of another of the initial pits, F1384 (Table 2; *UBA-14306*). F1358, a feature truncating a further initial pit but in no direct stratigraphic relation to F1547 and F1384, contained a group of sherds from a single pot, carbonised residue from which provides a further date for an early stage of infilling (Table 2; *OxA-15390*). Towards the top of the sequence, the lowest fill of extensive cut F1683/3013 is dated by measurements on articulations from the bones of two sheep (Table 2; *GrA-30880, OxA-15447*), and a *terminus post quem* for an overlying layer is provided by a measurement on disarticulated cattle skull fragments (Table 2; *UBA-14307*). All six dates are in good agreement with their stratigraphic positions.

Segment 5

In Segment 5, there were several sets of articulating cattle lower limb bones, as if the discard from butchery had been placed in the segment through a substantial part of its infilling. An articulating cattle limb bone sample came from context D1489 in F1440, a possibly early cut in the south-west of the segment without stratigraphic relation to any other dated samples (Table 2; *OxA-15543*). Another such sample came from context 55=60 in initial pit F1667 at the south-west end of the segment (Table 2; *OxA-15448*). There are also samples from two localised early pits, which had no certain stratigraphic relation to each other or to F1667, although both cut another primary pit, F1676. These were context D1259 in F1304, where there were articulating cattle limb bones (Table 2; *OxA-15449*), and context D73 in F1672, where there was a group of sherds of the same pot with carbonised residue (Table 2; *sherd group 265*). The three carbonised residue measurements are statistically consistent (T′ =0.6; T′ (5%) =6.0; ′ =2; Ward and Wilson 1978) and have been combined before calibration and inclusion in the model. F1304 and F1667 were both stratigraphically earlier than extensive linear feature F1318. Here, articulating cattle bones provide a date for context D1430 (Table 2; *UBA-14309*) and disarticulated bone fragments provide *termini post quos* for context D1538 (Table 2; *UBA-14310*, *UBA-14311*). The more recent of these, UBA-14310, measured on a human skull fragment, is probably closest in age to the deposit, with the sample for UBA-14311 redeposited from earlier activity. To the north-east, F1672 was post-dated by F1298, in which two possibly equivalent fills (context D59 recorded during evaluation and context D1256 during the main excavation) contained respectively articulating cattle bones from three different animals (Table 2; *GrA-30885, GrA-30886, OxA-15544*) and articulating cattle bones from a fourth animal (Table 2; *GrA-30884*). A date for a disarticulated human vertebra fragment from context D59 is statistically consistent with the three articulating samples from the same context (T'=1.1; T'(5%)=7.8; ′ =3) and may therefore be contemporary with them (Table 2; *UBA-14312*).

A number of alternative chronological models have been constructed for Chalk Hill, combining these radiocarbon dates with the stratigraphic sequence described above. All models in which some or all of the disarticulated samples are interpreted as freshly deposited within their contexts have poor overall agreement (A_{model} < 60%). The model which treats all the radiocarbon dates on samples of disarticulated bone as *termini post quos* for their contexts is, therefore, preferred (Fig 46).

On the basis of this model, the first dated Arc of the enclosure was built in *3775-3675 cal BC (95% probability*; Fig 46; *Boundary start Chalk Hill causewayed enclosure),* probably in *3730-3685 cal BC (68% probability).* The Outer Arc was built in *3755-3675 cal BC (95% probability*; Fig 46; *First build outer Chalk Hill*), probably in *3715-3685 cal BC (68% probability).* Any date estimate for the Inner Arc is tentative because it is based on a single measurement, although the model suggests that this Arc was built in *3745-3650 cal BC (95% probability*; Fig 46; *First build inner Chalk Hill*), probably in *3715-3660 cal BC (68% probability).*

The estimate for the end of use of the enclosure is based on the dates from F1683/3013 and F1318, both of which were close to the tops of the sequences in which they occurred, so that only a short time need have elapsed between their

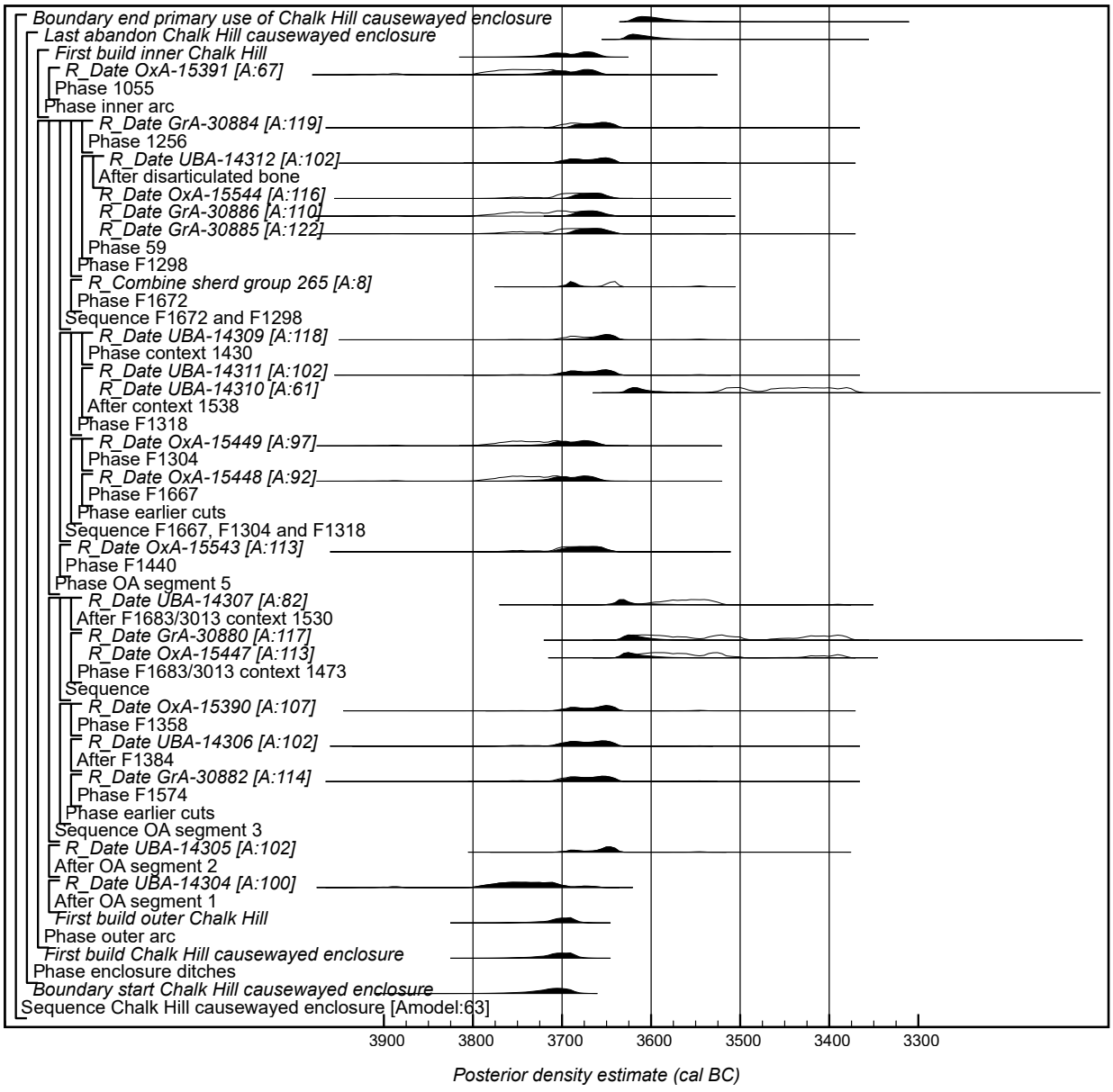


Fig 46. Probability distributions of dates from the Inner and Outer Arcs. Each distribution represents the relative probability that an event occurred at a particular time. For each of the dates two distributions have been plotted, one in outline which is the result produced by the scientific evidence alone, and a solid one which is based on the chronological model used. The other distributions correspond to aspects of the model. For example, the distribution 'first build outer Chalk Hill' is the estimated date for the construction of the Outer Arc. The structure of the model is defined by the brackets down the left-hand side of the diagram. 'After' denotes that a date has been modelled as a terminus post quem.

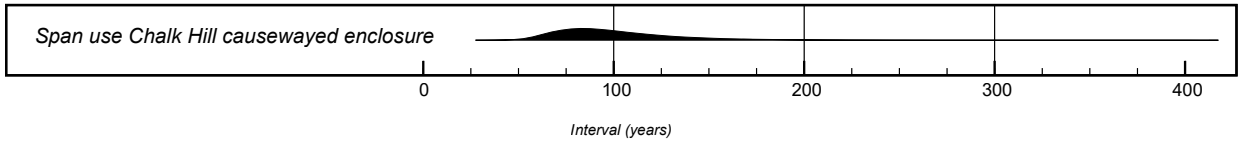


Fig 47. Probability distribution of the number of years during which the causewayed enclosure was in use, derived from the model shown in Fig 46.

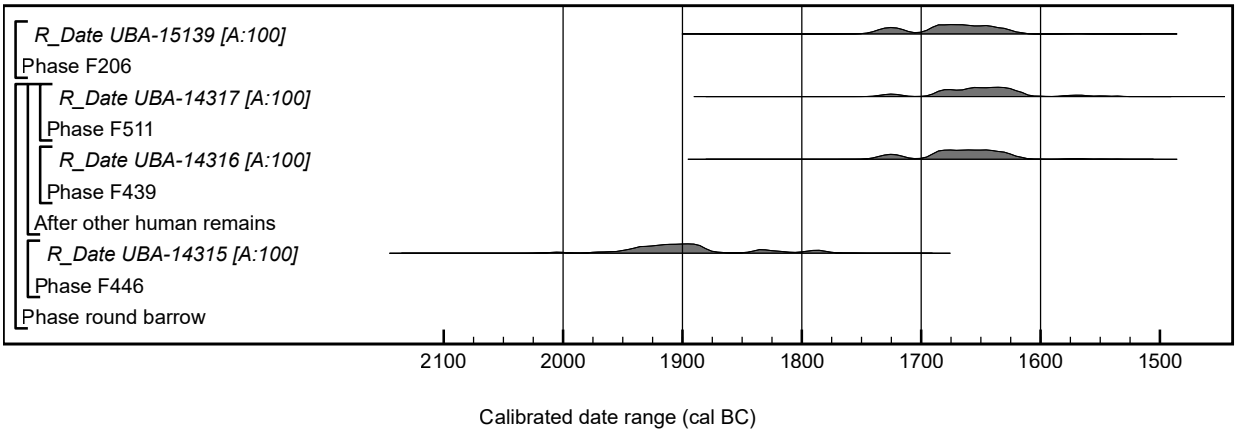


Fig 48. Calibrated dates from radiocarbon determinations from the round barrow (Stuiver and Reimer 1993).

deposition and the final infilling of Segments 3 and 5. The model suggests that the Chalk Hill enclosure was abandoned in *3630-3530 cal BC (95% probability*; Fig 46; *Boundary end primary use of Chalk Hill causewayed enclosure)*, probably in *3620-3585 cal BC (68% probability).*

The Chalk Hill enclosure seems to have been in use for *45 to 175 years (95% probability*; Fig 47; *Span use Chalk Hill causewayed enclosure*), probably for *60 to 120 years (68% probability).*

Implications for the site

The small quantities of Peterborough Ware and Grooved Ware from the site suggest that the original use of the complex was indeed over by the time these traditions became current, having ended at the latest in the 36th century cal BC as indicated by the model. If this short use-life indeed extends to the entire monument, it contrasts with an estimated period of use of *310-370 years (95% probability*; Bayliss *et al* 2008b, fig 4.23; *use_neo)* for Hambledon Hill in Dorset, pointing to very different histories for two complex enclosures. The Hambledon complex also had a later origin, estimated at *3690-3640 cal BC (95% probability*; Bayliss *et al* 2008b, fig 4.4; *start_neo*; Healy 2004). It would be tempting to see Chalk Hill's estimated start date of *3775-3675 cal BC (95% probability;* Fig 46; *Boundary start Chalk Hill causewayed enclosure)* as reflecting an earlier inception of enclosure building in an area closer to the Continent.

The round barrow

The articulated burial accompanied by a long-necked Beaker and a belt-slider in F446 is dated to *2010-2000 cal BC* (*1% probability*), *1980-1860 cal BC* (*74% probability*), or *1850-1770 cal BC* (*19% probability*; *UBA-14315*; Fig 48), probably to *1950-1870 cal BC* (*66% probability*) or *1840-1830 cal BC* (*2% probability*). This falls within the date range of other long-necked Beakers (Needham 2005, 195-8, fig 13; Healy 2012). The disturbed burial from F439 within the ring-ditch and a disarticulated femur from the ditch itself have yielded statistically consistent dates (Fig 48; *UBA-14316-17*; T'= 0.2; T'(5%)=3.8; ν=1) and could both thus derive from the same episode of activity. The individual in F439 died in *1750-1600 cal BC* (*95% probability*); probably in *1690-1620 cal BC* (*68% probability*; *UBA-14316*; Fig 48) and may have been buried soon after that. The individual whose femur was found in the ditch died in *1740-1710 cal BC* (*7% probability*), *1700-1600 cal BC* (*79% probability*), or *1590-1530 cal BC* (*9% probability*); probably in *1690-1620 cal BC* (*68% probability*; *UBA-14317*; Fig 48), although it is impossible to tell how long after that the femur reached its final resting place.

The early prehistoric flint

Tania Wilson

Introduction

An assemblage of 12,518 lithic artefacts was recovered from secure and reasonably secure contexts during the main excavation (Table 3) In addition, 5,770 small pieces of debitage were recovered from environmental samples. A further 663 were recovered from the preceding evaluation (Table 4). All assemblage figures given below exclude small debris; all percentages are rounded to the nearest whole per cent.

Fifty-six per cent (7,033 pieces) of the overall flint assemblage from Chalk Hill was recovered from stratified deposits associated with the 'causewayed enclosure'.

Previous work in the locality was conducted within the grounds of Chilton Farmhouse (Table 5). This investigation was undertaken by the land owner and produced an assemblage of some 655 struck flints. The farmhouse is situated to the east, adjacent to the causewayed enclosure. The artefacts have been re-examined and are almost certainly derived from

deposits associated with the enclosure (though not included in this report).

Raw material

The site is situated on Upper Chalk which has been sealed by a deposit of colluvium. A black-coloured flint with cherty inclusions and a white thin cortex occurs as large nodules within the Upper Chalk in the area. During the excavation a thin 'seam' of these nodules, situated close to the interface between the chalk and the colluvium, was observed. This flint was the principal source for raw material but is, however, heavily flawed with thermal fractures being a common feature.

The remainder of the raw material types are less well represented. Bullhead flint, a distinctive type with a green cortex that overlies a thin band of orange, and grey, grey-brown and honey-coloured flint, all with a buff weathered cortex are present (Table 6). Bullhead flint is originally derived from the Bullhead Beds (Shepherd 1972); a primary local source for this is in the cliff exposures of Pegwell Bay to the south of the site. Solifluction gravels also occur in the area (Murton *et al* 1998, 38) and these may present another source for these raw materials.

In addition to the struck flint, two artefacts made of non-local stone were recovered (one of which is now lost). Both are fragments of a ground and polished stone axe, probably belonging to Implement Petrology Group VI (Don Henson, pers comm). It is likely therefore that the axe, or axes, originated in the Lake District.

Early Neolithic

The Inner Arc

Four hundred and seventy-four struck flints (7 per cent of the enclosure assemblage) were recovered from the Inner Arc of the causewayed enclosure. The flint was distributed in varying quantities within each of the segments excavated (Table 7). The majority of the assemblage (61 per cent) is in a fresh, unabraded and unpatinated condition. A further 20 per cent has been heat-affected, and the remainder is patinated. Just under half (47 per cent) of the unretouched flakes and blades are incomplete. However, the retouched and utilised pieces demonstrate a lesser degree of breakage (25 per cent).

Retouched and utilised pieces form 6 per cent of the group. A large perforated nodule was also recovered. Blades are relatively well represented within the Inner Arc assemblage. Unretouched blades form 17 per cent of the assemblage, and an additional 3 per cent is serrated or utilised. However, the core assemblage recovered from this arc provides no evidence for blade production (Table 8). All the cores recovered from the Inner Arc are of black flint and the poor quality of this material is reflected in the quantity of the fragmentary cores represented. The single complete example and one core fragment represent multi-platform flake cores, neither of which has been extensively worked.

Attribute analysis of the unretouched flakes indicates limited preparation of the cores, with plain and cortical platforms forming the majority (Table 9), and the reduction strategies observed in the cores may indicate a relatively unsystematic approach to flaking. Evidence for the rejuvenation of cores is sparse with just one core tablet and a core trimming flake. This may indicate efforts to capitalise on the better quality raw material. Hinge terminations were noted on a number of unretouched blades and flakes, but feather terminations predominate. A small number of linear butts are represented which may indicate the use of a soft hammer, though no clear evidence of soft hammer percussion was noted.

Distribution

With the exception of Segments 3 and 6, the assemblage from this phase is sparsely distributed across the majority of the Inner Arc. In most cases the artefacts were found to be generally dispersed throughout the deposits filling the individual segments.

In contrast the flint artefacts recovered from Segment 3 were recovered from three discrete areas. One group, towards the northern end, comprised 54 artefacts (excluding small debris), including one complete multi-platform core (Fig 49/1), one fragmentary core and a serrated blade. Heat-affected artefacts form 41 per cent of this group.

The small assemblage recovered from Segment 5 included a naturally perforated nodule. The nodule weighs 1256g and appears to be trimmed at one end by the removal of small flakes (Fig 49/2).

Segment 6 produced 63 per cent of the Inner Arc assemblage. These artefacts were distributed between five individual deposits. At the western end a small group of flints was recovered from a sequence of pits. This assemblage included three serrated pieces and four refitting flakes of Bullhead flint. Notably three of the refitting flakes were recovered from a primary deposit with the fourth being recovered from the fill of a later feature. At the eastern end of the segment, one pit (F1114) produced a significant assemblage of 157 artefacts including 12 serrated pieces and a core fragment. A significant proportion (32 per cent) of this assemblage has been heat-affected. Another assemblage comprising 106 artefacts was recovered from the fill of pit F1122. This group includes six serrated or utilised pieces, three core fragments and a leaf-shaped arrowhead (Fig 49/3). One surface of the arrowhead is patinated and the tip is absent.

Segment 7 produced small assemblages from three discrete deposits. One situated at the western end produced just two pieces and a fragmentary core. The remainder was recovered from the eastern end and included two possibly utilised flakes.

	Inner arc	Middle arc	Outer arc	Non-phased features associated with the Neolithic enclosure	Crouched burials	Round barrow	Colluvium	Late Bronze Age enclosure	Parallel ditches	Middle to late Bronze Age features to east of site	Post-Iron Age features, non-phased features & u/s	Total
Anvil	0	0	0	0	0	0	0	0	1	1	0	**2**
Arrowhead	1	5	1	0	0	0	0	0	3	0	3	**13**
Axe	0	1	3	0	0	0	0	0	0	0	0	**4**
Biface	0	0	1	0	0	0	0	0	0	0	0	**1**
Blade	80	89	566	43	0	16	5	8	168	47	78	**1100**
Borer/piercer	0	0	2	0	0	1	0	0	4	0	3	**10**
Core	13	45	180	30	0	8	0	47	298	32	109	**762**
Core tool	0	1	1	0	0	1	0	0	0	0	0	**3**
Denticulate	0	1	0	0	0	0	0	0	2	0	0	**3**
Flake	303	370	3550	282	4	118	25	332	1990	298	853	**8125**
Hammerstone	0	0	1	1	0	0	0	4	6	6	3	**21**
Irregular waste (chips/ chunks of >10mm)	49	87	1011	98	3	9	4	40	487	75	184	**2047**
Irregular waste (chips/ chunks of <10mm)	257	233	3143	796		200	190	62	762	28	84	**5755**
Knife	0	1	1	0	0	1	0	0	0	0	3	**6**
Laurel leaf	0	0	0	0	0	0	0	0	1	0	0	**1**
Miscellaneous retouched	0	7	11	0	1	0	0	3	21	1	4	**48**
Natural, perforated nodule	1	0	0	0	0	0	0	0	0	0	0	**1**
Notched blade & flake	0	1	3	1	0	0	0	1	5	0	9	**20**
Pick	0	0	0	0	0	0	0	0	4	0	0	**4**
Scraper	1	18	15	2	0	6	0	0	41	1	20	**104**
Serrated blade & flake	13	19	22	1	0	0	0	0	8	1	3	**67**
Utilised blade & flake	13	27	51	10	0	5	0	3	49	4	14	**176**
Total, excluding small debris	**474**	**672**	**5419**	**468**	**8**	**165**	**34**	**438**	**3088**	**466**	**1286**	**12518**

Table 3. Lithics. Excavation assemblage composition.

	Middle Arc	Outer Arc	Early Bronze Age ring-ditch	Late Bronze Age/early Iron Age enclosure	Other	u/s	Total
Anvil	0	0	0	0	1	0	**1**
Arrowhead	0	1	0	0	0	0	**1**
Blade	0	12	0	2	10	1	**25**
Borer/ piercer	0	1	0	0	0	0	**1**
Core	0	11	1	1	17	0	**30**
Flake	3	325	4	35	152	12	**531**
Hammerstone	0	0	0	0	1	0	**1**
Irregular waste. Chips/ chunks of <10mm ( )	0	40 (1)	0	2	16 (1)	2	**60 (2)**
Miscellaneous retouched	0	2	0	0	3	1	**6**
Notched blade & flake	0	1	0	0	0	0	**1**
Scraper	0	1	0	0	4	1	**6**
Total, excluding small debris	**3**	**394**	**5**	**40**	**204**	**17**	**663**

Table 4. Lithics. Evaluation assemblage compostion.

Arrowhead	2
Axe	1
Blade	47
Borer/piercer	2
Core	2
Flake	538
Irregular waste	39
Knife	1
Miscellaneous retouched	2
Notched blade & flake	7
Scraper	7
Utilised blade & flake	7
Total, excluding small debris	**655**

Table 5. Lithics. Chilton Farmhouse assemblage composition.

	Inner Arc	Middle Arc	Outer Arc	Late Bronze Age/ early Iron Age
Black flint	73	77	95	78
Bullhead flint	7	8	3	6
Grey flint	20	15	2	2
Grey/brown flint	0	0	0	13
Honey flint	0	0	0	1

Table 6. Lithics. Proportion of raw material types represented within the major phases of activity (%).

Segment number	1	2	3	4	5	6	7	8	9	10	Total
Arrowhead	0	0	0	0	0	1	0	0	0	0	**1**
Blade	1	0	16	4	1	44	9	5	0	0	**80**
Core	1	0	4	1	1	4	1	1	0	0	**13**
Flake	21	4	37	8	5	193	22	8	2	3	**303**
Irregular waste (chips/chunks of <10mm)	2 (24)	0	6 (61)	2 (20)	1 (11)	36(122)	2 (3)	-14	-1	-1	**49 (257)**
Natural, perforated nodule	0	0	0	0	1	0	0	0	0	0	**1**
Scraper	0	0	1	0	0	0	0	0	0	0	**1**
Serrated blade & flake	0	0	1	1	0	11	0	0	0	0	**13**
Utilised blade & flake	0	0	0	0	0	10	2	0	1	0	**13**
Total, excluding small debris	**25**	**4**	**65**	**16**	**9**	**299**	**36**	**14**	**3**	**3**	**474**
% of arc assemblage	**5**	**1**	**14**	**3**	**2**	**63**	**8**	**3**	**0.5**	**0.5**	**100**

Table 7. Lithics. Inner Arc, assemblage distribution.

Segment number	1	2	3	4	5	6	7	Total
Anvil	0	0	0	0	0	0	1	**1**
Arrowhead	0	0	1	0	0	1	3	**5**
Axe	0	1	0	0	0	0	0	**1**
Blade	2	11	5	1	4	5	62	**90**
Core	0	4	3	2	3	8	33	**53**
Core tool	0	0	0	0	0	0	1	**1**
Denticulate	0	0	0	0	0	0	1	**1**
Flake	7	41	23	0	22	71	252	**416**
Hammerstone	0	0	0	0	0	0	2	**2**
Irregular waste. Chips/chunks of <10mm ( )	3 (15)	2 (15)	6 (29)	0	6 (1)	15 (27)	89 (189)	**121 (276)**
Knife	0	0	0	0	0	1	0	**1**
Miscellaneous retouched	0	0	0	0	0	0	7	**7**
Notched blade & flake	0	0	0	0	0	0	1	**1**
Scraper	0	0	1	0	0	11	6	**18**
Serrated blade & flake	0	1	2	0	1	2	14	**20**
Unmodified, sea urchin	0	0	0	0	0	0	1	**1**
Utilised blade & flake	0	2	2	0	5	1	18	**28**
Total, excluding small debris	**12**	**62**	**43**	**3**	**41**	**115**	**490**	**767**
% of ditch assemblage	**1.5**	**8**	**5.5**	**0.5**	**5.5**	**15**	**64**	**100**

Table 8. Lithics. Middle Arc, assemblage distribution.

In addition to the struck flint recovered from the segments, a small group of artefacts was recovered from a series of potential post-holes thought to be associated with the segments. One feature (F1102) cutting the fill of Segment 7 produced a possibly utilised piece. The remainder of this group comprised irregular waste and flakes.

The Middle Arc

Six hundred and seventy-two struck flints (10 per cent of the enclosure assemblage) were recovered from the Middle Arc. As with the Inner Arc, the Middle Arc assemblage was distributed in varying quantities within each of the segments excavated (Table 10). Retouched and utilised pieces form 12 per cent of the assemblage.

Segment number	1	2	3	4	5	6	Total
Arrowhead	0	0	1		0	0	**1**
Axe	0	1	0		0	1	**2**
Biface	0	0	2		0	0	**2**
Blade	21	70	273	9	184	25	**582**
Borer /piercer	0	0	1		1	0	**2**
Core	7	4	119	8	58	15	**211**
Core tool	0	0	1		0	0	**1**
Denticulate	0	0	1		0	0	**1**
Flake	83	200	2007	111	1053	97	**3551**
Hammerstone	0	0	0	1	0	2	**3**
Irregular waste >10mm	10	19	646	11	312	19	**1017**
Irregular waste: Chips/Chunks <10mm	375	192	1511		1209	17	**3304**
Knife	0	0	0		1	0	**1**
Miscellaneous retouched	0	3	6	2	1	2	**14**
Notched blade & flake	0	0	2		2	0	**4**
Scraper	2	0	11	3	2	2	**20**
Serrated blade & flake	0	1	3		11	1	**16**
Utilised blade & flake	2	8	35		20	8	**73**
Total, excluding small debris	**125**	**306**	**3108**	**145**	**1645**	**172**	**5501**
% of Outer Arc assemblage	**2.3**	**5.6**	**56.5**	**2.6**	**29.9**	**3.1**	**100.0**

Table 9. Lithics. Outer Arc, assemblage distribution.

Seventy per cent of the assemblage is in a fresh, unabraded and unpatinated condition. In contrast to the Inner Arc just 6 per cent have been heat-affected. The remainder are only slightly patinated. Twenty-nine per cent of the unretouched flakes and blades, and 23 per cent of the retouched and utilised pieces are incomplete.

The proportions of raw material types represented tend to reflect the overall trend. However, as with the Inner Arc assemblage, there is an above average use of Bullhead flint for the production of blades, with 12 per cent being made of this flint type. Bullhead flint is also well represented within the core assemblage (33 per cent) and the retouched pieces (20 per cent). Grey flint is also well represented within these two categories forming 54 per cent of cores and 21 per cent of retouched pieces.

Unretouched blades form 12 per cent of the Middle Arc assemblage with again a small number that are serrated or utilised. With the exception of one fragment of a small core with blade removals, no other blade cores are represented, however. Fragmentary cores form a high proportion of the core assemblage, a range of core types being represented. Of particular note are two complete cores made of grey flint which are more extensively worked. Linear butts are present, yet plain and cortical butts dominate. Evidence for core rejuvenation is limited with the recovery of just five core trimming flakes. Termination types are consistent with those observed in the Inner Arc assemblage.

Distribution

As with the Inner Arc, the assemblage distribution is variable, with some segments producing very few artefacts. In these instances, the artefacts tend to be generally dispersed throughout the fill of the segment. However, a slight increase in quantity is evident in Segments 2, 3 and 5, with the majority being recovered from Segments 6 and 7.

Segment 2 was filled with a single, uniform fill and no discrete deposits of artefacts were identified. However, the assemblage recovered from this segment includes some four cores, one serrated and two possibly utilised blades. The cores include two struck nodules with few flake removals, and a two-platform core. Additionally, one bifacially worked piece may represent a fragment of a flaked flint axe (Fig 49/4). The primary fill of Segment 3 produced just two struck flints. However, a later feature produced a more significant group including serrated

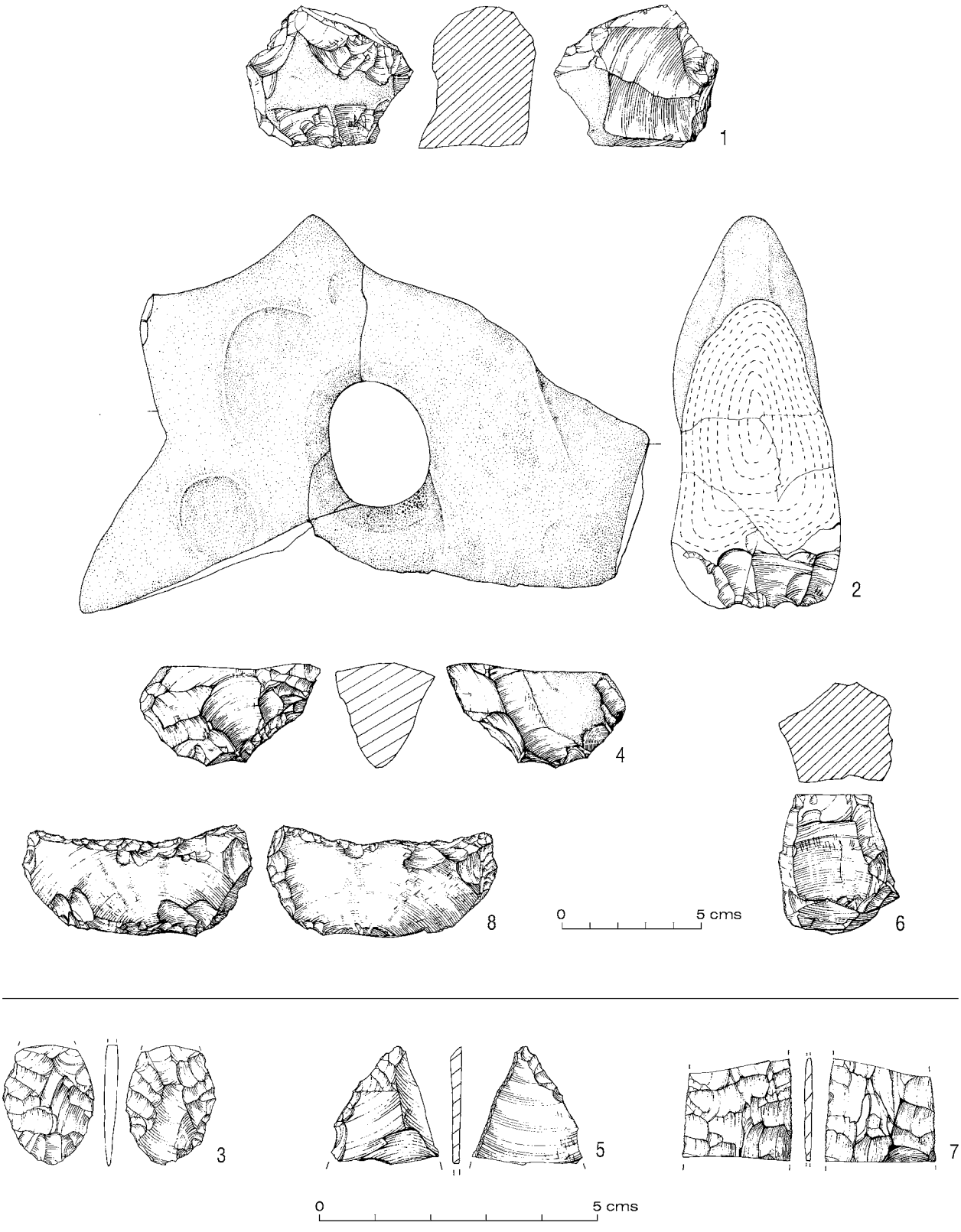


Fig 49. Lithics, nos 1-8.

Segment number	1	2	3	4	5	6	7	Total
Anvil	0	0	0	0	0	0	1	**1**
Arrowhead	0	0	1	0	0	1	3	**5**
Axe	0	1	0	0	0	0	0	**1**
Blade	2	11	5	1	4	5	62	**90**
Core	0	4	3	2	3	8	33	**53**
Core tool	0	0	0	0	0	0	1	**1**
Denticulate	0	0	0	0	0	0	1	**1**
Flake	7	41	23	0	22	71	252	**416**
Hammerstone	0	0	0	0	0	0	2	**2**
Irregular waste. Chips/chunks of <10mm ( )	3 (15)	2 (15)	6 (29)	0	6 (1)	15 (27)	89 (189)	**121 (276)**
Knife	0	0	0	0	0	1	0	**1**
Miscellaneous retouched	0	0	0	0	0	0	7	**7**
Notched blade & flake	0	0	0	0	0	0	1	**1**
Scraper	0	0	1	0	0	11	6	**18**
Serrated blade & flake	0	1	2	0	1	2	14	**20**
Unmodified, sea urchin	0	0	0	0	0	0	1	**1**
Utilised blade & flake	0	2	2	0	5	1	18	**28**
Total, excluding small debris	**12**	**62**	**43**	**3**	**41**	**115**	**490**	**767**
% of ditch assemblage	**1.5**	**8**	**5.5**	**0.5**	**5.5**	**15**	**64**	**100**

Table 10. Middle Arc, assemblage distribution.

pieces, two possibly utilised flakes, an end retouched scraper and a bipolar two-platform core. Additionally, one incomplete oblique arrowhead (Fig 49/5) was retrieved.

A range of debitage including two multi-platform cores (Fig 49/6) was recovered from Segment 5. In addition, five utilised pieces and one serrated blade were retrieved. The artefacts were generally dispersed throughout this feature.

A significant assemblage comprising 115 pieces was recovered from Segment 6. This group produced eight cores including single and multi-platform examples and the grey cores noted above. One core trimming flake was also recovered from this segment. A significant quantity and range of retouched forms is represented in this group. One leaf-shaped arrowhead, incomplete with both tips missing, has sides that appear very straight suggesting that it may represent a 'kite-shaped' type (Green 1984, 21; Fig 49/7). One knife is also present; interestingly the knife has a refitting flake. Two serrated and one possibly utilised blades were recovered; only one serrated blade is complete and this piece also has traces of gloss. The scraper assemblage recovered from Segment 6 is of particular interest. In contrast to the bulk of this assemblage, the scrapers were located in a discrete group at the north-west butt of this segment. Three examples are incomplete and, with the exception of one end and side retouched piece, they are all retouched at the distal end only.

Segment 7 yielded a substantial group of some 412 pieces, forming 61 per cent of the overall assemblage recovered from the Middle Arc. More than half of this group (52 per cent) was recovered from the primary fill of the segment. Eighteen cores were recovered representing a range of core types. One multi-platform example has a small area of crushing opposing one of the striking platforms, perhaps indicating that it was struck on an anvil. Two core trimming flakes were also recovered.

Four flakes with irregular retouch were also retrieved from the primary fill. One example is incomplete but may represent a fragmentary denticulate. One large flake with bifacial retouch around three sides could be described as a rudimentary sickle (Fig 50/9). Other retouched pieces include a core tool, seven serrated and six possibly utilised pieces. Additionally some six scrapers were recovered, all of which are retouched at the distal end.

A pit (F1222) situated at the western butt end of Segment 7 produced 43 flints including one core fragment and a notched flake. This group was associated with a number of pottery sherds and identified as a 'placed deposit'. Central to the segment another pit (F1350) produced three fragmentary single platform cores, two multi-platform cores and a blade core. One core trimming

Segment number	1	2	3	4	5	6	Total
Arrowhead	0	0	1		0	0	**1**
Axe	0	1	0		0	1	**2**
Biface	0	0	2		0	0	**2**
Blade	21	70	273	9	184	25	**582**
Borer /Piercer	0	0	1		1	0	**2**
Core	7	4	119	8	58	15	**211**
Core tool	0	0	1		0	0	**1**
Denticulate	0	0	1		0	0	**1**
Flake	83	200	2007	111	1053	97	**3551**
Hammerstone	0	0	0	1	0	2	**3**
Irregular waste >10mm	10	19	646	11	312	19	**1017**
Irregular waste: Chips/chunks <10mm	375	192	1511		1209	17	**3304**
Knife	0	0	0		1	0	**1**
Miscellaneous retouched	0	3	6	2	1	2	**14**
Notched blade & flake	0	0	2		2	0	**4**
Scraper	2	0	11	3	2	2	**20**
Serrated blade & flake	0	1	3		11	1	**16**
Utilised blade & flake	2	8	35		20	8	**73**
Total, excluding small debris	**125**	**306**	**3108**	**145**	**1645**	**172**	**5501**
% of Outer Arc assemblage	**2.3**	**5.6**	**56.5**	**2.6**	**29.9**	**3.1**	**100.0**

Table 11. Lithics. Outer Arc, assemblage distribution.

flake was also recovered. Three leaf-shaped arrowheads came from this feature. All the arrowheads are fragmentary. The medial portion and one end of two possible 'kite-shaped' arrowheads are represented. The third arrowhead fragment is very small but appears to have a more curved edge comparable to most forms of leaf-shaped arrowhead (Fig 50/9-11). This feature also produced three pieces with irregular retouch, one incomplete denticulate piece, five serrated and 11 possibly utilised pieces.

In addition to the assemblage recovered from the segments, a small group of flakes and blades was recovered from a series of post-holes possibly associated with them.

The Outer Arc

Over 80 per cent of the enclosure assemblage was recovered from the Outer Arc. The Outer Arc assemblage, as with the Inner and Middle Arc assemblages, was distributed in varying quantities within each of the segments excavated although was more heavily concentrated in the north-western segments and features (Table 11). In contrast to the Inner and Middle Arcs, retouched and utilised pieces form less than 2 per cent of the assemblage.

The majority of the Outer Arc assemblage derived from a number of concentrated deposits of knapping debris. These deposits are characterised by their condition which is slightly patinated and unabraded with a soft chalky cortex. Numerous pieces are also encrusted with calcium carbonate deposits.

This condition is in contrast to the remainder of the Outer Arc assemblage and the assemblages recovered from the Inner and Middle Arcs, all of which whether patinated or fresh, have a slightly 'glossy' appearance. This contrasting condition suggests a different approach to the treatment of artefacts. The 'chalky' condition of the artefacts could suggest that they were deposited shortly after knapping, whilst the 'glossy' condition may indicate that they have been handled or have been in circulation for a period of time.

Comparison of these two groups demonstrates a difference in their condition. More than half of the 'glossy' artefacts are in a fresh, unabraded and unpatinated condition, in accordance with the Inner and Middle Arc assemblages. In contrast, the material from deposit D1312 (Segment 3) has just 2 per cent unpatinated. Material associated with the deposits of knapping debris produced negligible quantities of heat-affected flint; 6 per cent of the remainder of the Outer Arc assemblage has been burnt. Black flint predominates, and this is partly due to it being the main raw material represented within the deposits of knapping debris. A small amount of

	Segment 3			Segment 5	
	Non-knapping	Knapping deposits	D1312	Non-knapping	Knapping deposits
Arrowhead	0	0	0	0	0
Biface	0	2	0	0	0
Blade	38	134	81	77	107
Borer	0	0	0	1	0
Core	7	43	23	22	36
Core tool	1	0	0	0	0
Denticulate	0	0	0	0	0
Flake	166	825	799	382	671
Irregular waste	90	261	256	74	238
Knife	0	0	0	1	0
Miscellaneous retouched	0	1	0	0	1
Notched blade & flake	0	0	0	2	0
Scraper	3	1	0	1	1
Serrated blade & flake	1	0	0	10	1
Utilised blades & flakes	1	6	3	19	1
Total	**307**	**1273**	**1162**	**589**	**1056**

Table 12. Outer Arc Segments 2 and 5, assemblage composition.

Bullhead is also present within both 'chalky' and 'glossy' groups. However grey flint is, without exception, only found within the 'glossy' assemblages.

In terms of technology, the 'glossy' assemblage has many similarities with the Inner and Middle Arc assemblages. The largest individual and stratigraphically secure deposit of the 'chalky' material, recovered from deposit D1312 and comprising 1162 pieces, is notably different in this regard (Table 12). A small proportion (7 per cent) of the assemblage is blades, yet no blade cores were recovered. Black flint is solely represented within this group and the poor quality of the material is reflected in the significant proportion of irregular waste (22 per cent) and fragmentary cores (84 per cent of the core assemblage). One hundred and two fragments of flint were also collected which, despite showing no apparent evidence of being struck, could potentially be the result of shattering during flaking. Furthermore, a number of the complete cores indicate that previously shattered flint was selected for flaking. Just four complete cores were recovered; examination of these and the fragments show that none have been extensively flaked. Evidence for core rejuvenation is limited with just five core trimming flakes being represented.

Distribution

The main focus for deposition of flint artefacts was in the northern segments and features (Segments 2, 3, 4, 5 and 6). A small assemblage was recovered from Segment 1, with no discrete deposits of artefacts being identified. This group includes one bipolar core fragment and a utilised flake with traces of gloss, along with a fragmentary core and an incomplete utilised blade and two small nodules, both with a single flake detached. A larger naturally shattered lump also with one flake detached was recovered, and two scrapers.

Segment 2 produced an assemblage of 306 pieces distributed between four individual deposits. One of its fills (D1180) produced 69 per cent of this group. A high degree of breakage within unretouched blades (45 per cent) and flakes (31 per cent) contrasts with those that are serrated or utilised, all of which are complete. Four per cent of this group has been heat-affected. Three core fragments were collected, one of which is a small blade core with a single platform (Fig 50/12). Of particular note is a single flake which has been detached from a ground and polished flint axe (Fig 50/13). Interestingly the axe fragment and the blade core are both made on the grey flint. Twenty-seven per cent of the Segment 2 assemblage was recovered from another fill, D1193. The proportions of incomplete blades and flakes are 30 per cent and 29 per cent respectively and, of the three utilised blades recovered one is incomplete. Seventeen per cent of this group has been heat-affected. One core fragment and two pieces with irregular retouch were also retrieved from this deposit.

The largest group of artefacts from the Outer Arc, forming 57 per cent of the entire Outer Arc assemblage, is that recovered from Segment 3. The earliest sequence

of deposits within this segment produced all but one deposit (D1624; F1657) of the 'chalky' knapping debris, including D1312 (F1384). The deposits are exclusively of black flint. As with deposit D1312, many of the cores recovered from the 'chalky' assemblages are fragmentary and none have been extensively flaked. A detailed search for refits was not undertaken. However, a number of refits within the individual deposits were observed but no long sequences were established.

This group also produced some retouched pieces. A possible axe roughout was recovered from deposit D1291 (F1370; Fig 50/14). A bifacially flaked piece, which appears incomplete and unfinished, was recovered from deposit D1586 (F1574; Fig 50/15). One end retouched scraper and some pieces with possible utilisation damage were also recovered from individual deposits.

The sequence also produced a series of assemblages of 'glossy' material. The majority of these assemblages are relatively small and largely comprise knapping debris. Pit F1384 produced a sequence of deposits of purely 'chalky' material, with D1312 being the primary deposit.

Further pit-cutting associated with this segment produced four small groups of struck flints including the remaining 'chalky' deposit (D1624, F1657). The groups of 'glossy' material produced small quantities of knapping debris, a single platform core, one serrated blade and a possibly utilised flake.

Segment 4 produced a relatively small assemblage of 145 pieces (excluding small debris), including a hammerstone, eight cores or core fragments (2 burnt), three end scrapers and side scrapers (1 burnt), seven blades (3 burnt), two bladelets, two retouched pieces (1 burnt), 111 flakes (32 burnt) and nine fragments of knapping debris (2 burnt).

Segment 5 also produced just under 30 per cent of the Outer Arc assemblage and this group is also mixed, with 'chalky' and 'glossy' deposits. A significant assemblage was recovered from one of the earliest pits in the segment (F1667). Much of the 'chalky' flint was recovered from this feature, which was only partially understood through excavation. Black flint forms the majority here, but Bullhead flint is also represented. Some 40 cores were recovered from these deposits including an extensively flaked core of grey flint (Fig 50/18). A flake with a few flakes removed at the butt end, a rudimentary end retouched scraper, a serrated flake, a utilised blade and two possibly utilised flakes were also present. A detailed search for refits was not undertaken but a number of refits were observed including three flakes which refit with a core (Fig 50/16).

Small groups of 'glossy' material were also present within other deposits in the segment. Of significance is the group recovered from deposit D1263 comprising 60 pieces and including three cores. One knife (Fig 50/17), one notched flake and three possibly utilised pieces were also recovered. A second group (deposit D1505, F1672) of 54 pieces included one multi-platform core, one borer, one end and side retouched scraper, eight serrated and two utilised pieces. Just four flint flakes were found in association with the human skull fragments within deposit D1538 (F1318).

Further pit-cutting produced 13 individual deposits of small quantities of struck flint. The remaining deposit of 'chalky' knapping debris (D1390) was recovered from this phase and was found in association with carbon/ashy material. This group comprised 33 pieces, including three fragmentary and one single platform core.

Segment 6, (F1214) produced three deposits of struck flints. The first (D1212) produced just two flakes. Deposit D1213 produced a more significant assemblage including seven cores. Two complete hammerstones weighing 159g and 192g were also recovered. Retouched pieces comprise one retouched flake, two scrapers, one serrated flake and some eight utilised pieces. Some 41 per cent of unretouched flakes and blades are incomplete and 13 per cent of the utilised pieces. Additionally, 5 per cent of the flakes have been burnt. The final deposit (D1243) produced a small amount of knapping debris including eight cores. A small flake which has been detached from a ground and polished flint axe was recovered. The axe was made of grey flint.

Other features associated with the enclosure

A small assemblage was also recovered from the southern 'horseshoe-shaped' feature situated within the enclosure. The south-east and the north-west limbs of this feature produced negligible quantities of waste flakes. However, the western limb (F1701) produced an assemblage of 42 struck flints including fives cores, two of which are blade cores. Two possibly utilised pieces were also present.

The crouched burials

Eight struck flints were recovered from burial F206, including one retouched flake. The struck flints were distributed throughout the fill of the grave and none of the pieces represent placed grave goods.

The round barrow

A small assemblage of 165 struck flints was recovered from the early Bronze Age round barrow. One hundred and thirty were recovered from the deposits filling the barrow ditch. Detailed attributes of this assemblage have not been recorded, but overall the group appears to be generally in an unpatinated condition. One blade and a flake have been burnt and evidence of edge damage was observed. This group largely comprises debitage and includes eight cores. Retouched pieces include one borer, one knife (Fig 76/26), one plane and two scrapers. The fill of the central burial (F446) produced just four pieces

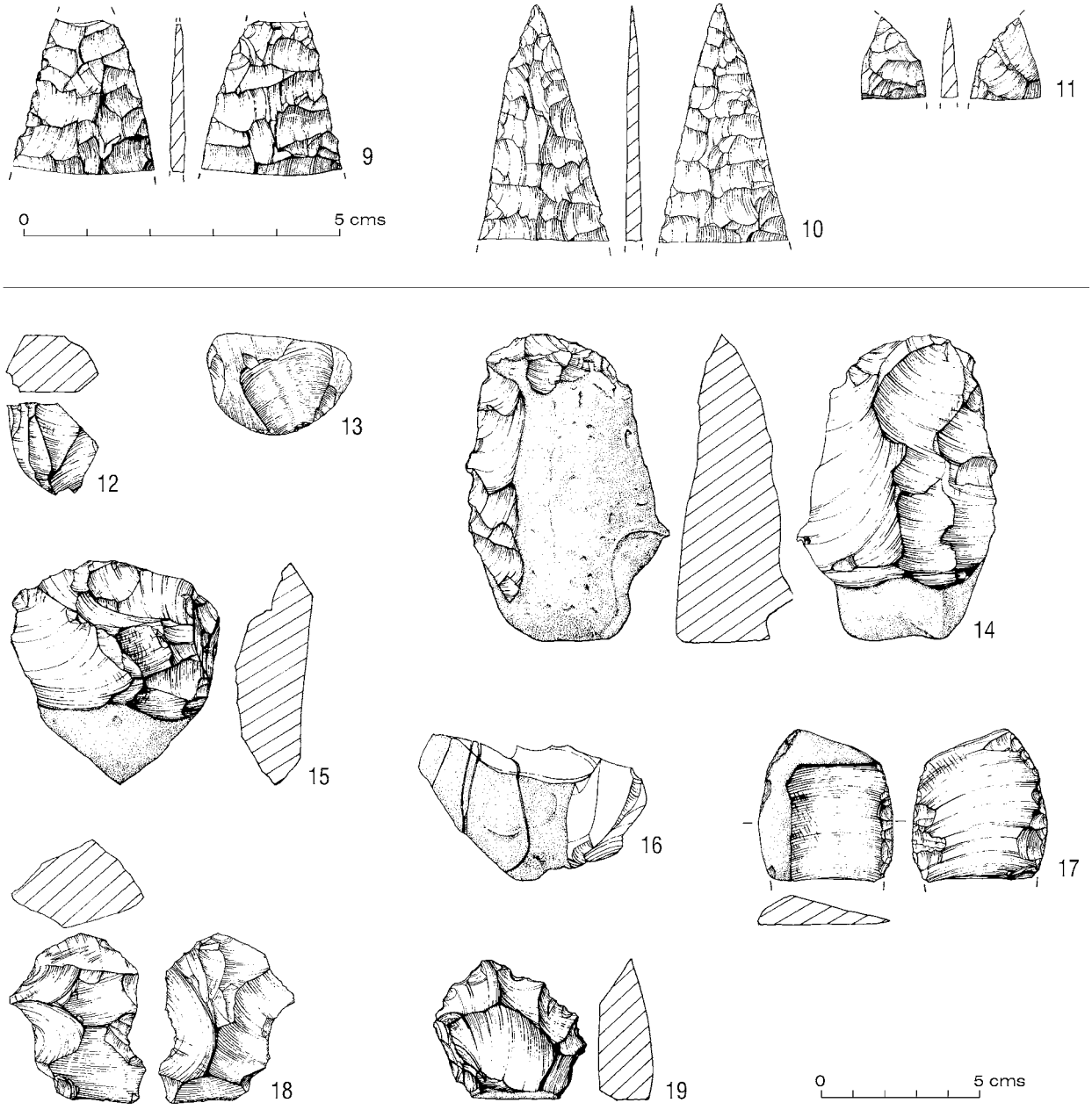


Fig 50. Lithics, nos 9-19.

of irregular knapping waste. The possible second burial (F439) produced ten waste flakes. The potentially middle or later Neolithic pit also situated within the interior of the ditch (F442) produced nine flakes and two blades. In each instance the flints were generally distributed throughout the fills of the features and are not directly associated with the burials.

Microwear analysis of selected flint tools

Linda Hurcombe

Wear analysis is a time-consuming study of macroscopic and microscopic alterations on the surface of stone artefacts. The traces can be caused by alterations made throughout an artefact's life-history including those from manufacturing techniques, holding or hafting, use, and post-depositional processes. Microwear studies use experimental reference collections to interpret the archaeological data. For more detailed explana-

tions of flint microwear methods and experiments see Van Gijn 1989; Hurcombe 2007; 2008a; Juel Jensen 1994; Keeley 1980; Vaughan 1985. It is not feasible to examine every artefact for wear traces. Instead the wear analysis is usually conducted on a subset of material selected to address specific questions.

In this study, the focus of the wear analysis was the serrated edge tools since this important Neolithic tool category is prevalent but poorly understood (Saville 2002). The tool category of serrated edge tools, associated with strong macroscopic gloss, is found across a range of Neolithic sites in Britain, including causewayed enclosures, and such objects occur in large numbers (see Hurcombe 2007, 46). Similar tools and wear traces are also found on serrated edge tools in Denmark, Belgium and northern France where they are known as 'microdenticulates'. The tools are seen as a longstanding functional puzzle (*eg* Beugnier 2007; Bocquet 1980; Hurcombe 2007; Juel Jensen 1994; Vaughan and Bocquet 1987). The present assemblage provided a good opportunity to investigate this kind of tool type with a well-excavated modern assemblage. The microwear study thus focussed on a tool category which is prevalent in the Neolithic, where the results could contribute to hidden aspects of the activities on this site and to wider questions of Neolithic life. The aim was to study all of the serrated edges to look at the variation within the tool category and to examine closely related tool categories such as utilised blades. In this way the functional integrity of tool types could be explored: are the tool types recognised by classification schemes functional types? If so, are these broad functional categories or more specific ones?

A subset of material was selected to consider for usewear analysis focussing on the serrated blades and flakes and those tools which were labelled 'utilised' because they had damage or gloss indicating wear traces, or those which were retouched. White patination is a particular problem because the glare caused by the patina can obscure wear traces under the microscope. Nonetheless, though some pieces proved problematic, others with a light patina were still able to be observed and, in some cases, showed clear wear traces.

The subset for wear analysis included all artefacts in the following categories: the serrated blades (34), serrated/utilised blades (1), serrated flakes (18) and serrated/utilised flakes (2). These pieces were examined for microscopic wear traces. In addition, all the utilised blades were closely inspected for traces of macroscopic gloss. Six tools showed gloss and two large knife-like tools showed wear traces; these were added to the full microwear study together with the utilised blade which refits with one of the macroscopic glossed blades. In total 65 artefacts were scanned under the microscope. Sets of wear traces such as striations (microscopic scratches) and textural alterations were observed all over the tools at combinations of magnifications ranging from 50-500x.

The only cleaning necessary was the occasional use of acetone to remove finger grease. A standardised wear recording form was used which recorded the macroscopic features of edge angle, edge shape and macroscopic wear characteristics and the microscopic features (50x, 100x, 200x) of the orientation and character of striations, the polish distribution and its roundedness in relation to the edge. At higher magnifications (200x, 500x) the polish brightness, polish topography, the polish distribution over the flint microtopography, and the clarity of the boundaries between altered and unaltered surfaces, were all recorded along with any distinctive characteristics such as pitted, domed, rippled, grainy, flat, fluted, or 'cauliflower' surface features. Digital photographs of the dorsal surface at twice life size were taken and reproduced for all the study pieces. As the tool was examined these were annotated to show the positions of the usewear traces, hafting and holding traces, and the location of any microscopic photographs. For the serrated blades and flakes, key types of wear were documented by photographs taken at 50, 100, 200 and 500x original magnification. Once patterns had been established, photographs were taken at 200x. For the utilised blades with macroscopic gloss, photos were taken at 50x and 200x.

Results

The results of the wear analysis are summarised by use action and worked material identifications in Table 13 with the tool numbers listed. The traces have been broadly grouped by actions which are mostly perpendicular to the used edge (scraping, chopping, planing, smoothing) and those which are parallel to it (cutting, slicing, sawing, reaping). The raw material categories are more varied and the interpretation of the worked material is as specific as possible. To some degree, the more specific definitions indicate the more extensively used tools since wear traces take some time to develop into distinctive patterns. Materials which contain silica give some of the brightest and most intense wear traces. Thus the most specific category in the table is of an intense siliceous plants polish. Siliceous plants include cereals and grasses, but also others such as reeds, rushes and nettles. The category spans plants which could be used for food and those which are useful for fibres, cordage and basketry (Hurcombe 2000). In much the same way as hideworking traces are known to vary greatly according to the state of the hide, stage of processing, and by the use of tanning agents and additives (fresh, soaked, dry, dirty; dehairing, defleshing,

Interpretation of use-material	Serrated blade	Serrated blade	Serrated flake	Serrated flake	Utilised blade	Utilised blade	No
	Transverse motion	Parallel motion	Transverse motion	Parallel motion	Transverse motion	Parallel motion	
Sickle gloss		1251l					1
Siliceous plants, intense	1188d(vr); 1188d(dr); 1223j;		1107(vr);		1113f; 1193a; 1349j	1215b; 1305o	9
Siliceous plants soft or Siliceous plants	1121e; 1223k; 1223l(vl); 1223m; 1349e; 1349f;		1029;				7
Siliceous plants soft-medium	1054; 1062vr;		1223o(d);				9
	1062v; 1121a; 1121b; 1121d; 1305n;		1121f				
Plants soft,	1035a;		1290b				4
or plants	1349d;						
	1505c						
Plants soft-medium	1113b;						2
	1505d						
Plants sub-total	***21***	***1***	***5***	***0***	***3***	***2***	***32***
Soft		1547a;	1113i;				2
Soft-medium	1113a; 1121c; 1349c;	1305m	1200b(va); 1213c;	1223o(v);		1312c	9
			1223q;				
Other		1223l(vr)	1113d	1223n (s-m, ?hide meat)			3
		?gritty hide	(gritty);				
Multiple materials				1200b(vb); 1349g		1193b *knife;	3
Used: material?, but motion interpreted	1013b; 1113h; 1255;	1505b;	1113c;			1213d	10
	1505f 1557a;	1505e	1505h			*knife	
Total	**29**	**6**	**12**	**4**	**3**	**5**	**59**

Table 13. Lithics microwear. Summary of usewear interpretations of the used edges of selected artefacts by motion and worked material. Letters in brackets refer to the particular edge where more than one edge is used on the same tool eg (vl) = ventral left edge; (dr) = dorsal right edge (va) = ventral area a; (vb) = ventral area b. The totals thus refer to the number of used edges not the number of tools. The symbol '' denotes large blades with retouch/utilisation damage which were interpreted as 'knives'.*

softening; brains, fats, ochre, bark and many more), so too, plant-working traces also vary according to the kind of plant, season of harvest, processing phase and intended purpose. Plants also grade into young woody growth. This variation gives a breadth of different wear traces but, for clarity, the subtotals for 'plants' are given. Plants can be a 'soft' material but grade into tougher materials and wood. 'Soft' materials include soft plants and bast fibres (bast fibres occur as the inner bark of plants and trees), fresh meat and possibly fresh hide, whereas 'soft-medium' materials could include tougher plants and hides, some woody plants and young woody shoots of trees and bark, and butchery with some bone and tendon contact.

Serrated blades: 34 serrated blades and 1 serrated/utilised blade tool were examined. Three have two used edges. In two cases both edges of the same tool were used on siliceous plants; in the third case one edge was used on siliceous plants, the second was used on a much grittier substance and was interpreted as possible hide working traces. On these 35 tools, 18 showed a macroscopic gloss and several had traces of hafting and holding areas. The wear interpretations of the serrated blades suggest that these tools are strongly associated with plant processing of some kind since 22 of 35 used edges have this kind of wear. Furthermore, the 12 edges interpreted as the 'soft-medium soft', and 'used' categories might also be from working plants. Only one tool edge is interpreted as possibly not being used on plants. Twenty-nine edges show transverse actions and only six parallel motions. Of the 22 edges with distinctive plant wear traces, 21 are used in a transverse motion. Even though these are all serrated 'blades' they vary in dimensions and whilst some are regular shapes which would be easy to haft others are less regular. Some have cortex which could form a natural lateral backing for

handheld tools while others have lightly blunted edges which might serve the same purpose. Experiments have shown that the tools perform well in the hand for light transverse actions.

Serrated flakes: 18 serrated flakes and two serrated/utilised flakes were examined. Of these, two have two used edges (soft-medium and multipurpose; soft to medium and siliceous plants) so 22 used edges were identified but one piece could only be identified as used with no clear direction of use so is not entered on Table 13. Six edges have a macroscopic gloss and there are traces of hafting and holding wear. Of 16 used edges, 12 are used in transverse actions. Five show traces of plant working and all these indicate transverse actions. As expected, the flakes have a greater variety of shapes in plan view than the blades. The serrated flakes have strong wear traces evident on small thin pieces as well as much less regular artefacts. As with the blades, some opposing edges show light blunting and cortex may have been used as natural backing.

Utilised blades: After close macroscopic inspection of all 41 pieces six blades were examined for microwear because they showed traces of gloss. Two other large knife-like blades were examined because of their distinctive shape and because although they did not show a gloss there were clear other signs of wear on close inspection. These two pieces both showed wear traces but these were not distinctive of plantworking and both were used in parallel actions. Of the six blades examined because of the macroscopic gloss five showed traces of working siliceous plants and one of use on a medium hard material. For the six edges with gloss three were used in transverse motions and three in parallel motions.

Overall 105 tools were examined closely with 65 investigated under the microscope using magnifications of at least 200x. Sixty used edges were identified, plus some traces of hafting and holding wear.

The serrated blade category is strongly but not exclusively associated with transverse plantworking in an activity where the tools are used for long periods but with a light action. The association also holds true for some of the serrated flakes but these show proportionately less wear specifically attributable to plant working (though this may be partly due to shorter periods of use) and proportionately more variety in the use action though transverse motions still dominate. Utilised blades as a category undoubtedly include some tools which show well-developed wear traces exactly similar to those associated with the 'serrated blades'. As explained above, distinguishing intentional serration after further damage during use and possibly also re-serration can account for this. There is a strong broad theme for serrated edges, especially for those exhibiting macroscopic gloss. However, there is variation and the specific wear traces offer further information on the purposes served by these tools.

Contexts

Some contexts contained more artefacts than others. Where there were contexts with several artefacts included in the microwear study, the diversity and similarity of the wear traces were considered in conjunction with the context's interpretation as structured or not (Table 14). The microwear sample targeted serrated blades and flakes and thus is not representative of the range of wear traces from the artefacts in any one context. Nonetheless, the character of the wear traces varies in different contexts, hinting at some differences. Context D1121 (the fill of pit F1122, Inner Arc Segment 6) contains serrated edges with very coherent wear traces compared to others. For example, context D1223 (the fill of pit F1224, Inner Arc Segment 7) contains edges with a greater variety of actions and use materials. The wear analysis thus augments the different character of contexts based on typological identifications: D1121 comprises 4 serrated flakes, 1 serrated/utilised blade and 1 serrated/utilised flake but D1223 contains 6 scrapers, 1 plane, 2 retouched flakes, 4 serrated blades, 4 serrated flakes, 2 utilised blades and 3 utilised flakes.

The character of a serrated edge and the purpose of the serrated edge tools

Plate 9 shows a photograph of a serrated blade tool. The scale clearly shows both the fineness of the serrations and that these are not always regular in appearance. This is why in lithic classification schemes some tools can be labelled 'serrated' whilst others which can have similar traces (Hurcombe 2007) are placed into 'utilised' or 'retouched' categories. It is sometimes possible to see under the microscope that such tools have been re-serrated after being used for a while: the new scars show fresher surfaces. Experiments working with plants have also shown that edge damage during use can add new scars to those created for the initial serration. An expert flintknapper believes that the only way such fine serrations can be achieved is by using another flint edge to press off the small flakes (Bruce Bradley, pers comm) Clearly, the serrations subtly alter the nature of the tool edge and could be expected to affect the performance of the edge in use. Previous research experiments have established two facts about the nature of a serrated edge: in parallel use actions, a serrated edge can be an effective cutting tool creating a 'grip and rip' effect and can be used as plant harvesting tools, and, in transverse motions, the serrations serve to stop the tool digging into the surface (Hurcombe 2007; 2008a). In both cases

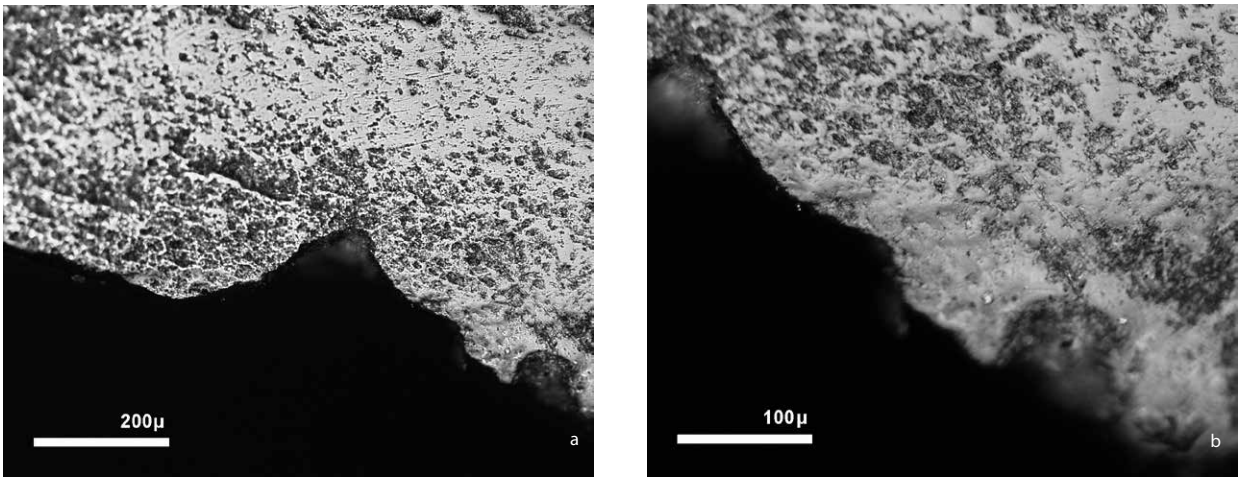
Context	Structured	Siliceous plants	Plants	Soft or soft-medium	Other	Multiple materials	Used
1113	Possibly	T:1	T:1	T:2	T:1 (gritty)		T:2; M:1
1121	No	T:5		T:1			
1188	Yes	T:2 (same tool)					
1213	Possibly			T:1			P:1
1223	No	T:5	T:1; P:1		T:1 (gritty); P:1 (?hide meat)		
1305	Yes	T:1; P:1		P:1			
1349	No	T:3	T:1			P:1	
1505	Possibly	P:1	T:2				T:2; P:2

Table 14. Lithics microwear. Sets of microwear interpretations for selected contexts with multiple tools/used edges.

the serrations stabilise the working edge by making it slightly more robust. In addition, the wear traces are characteristically strongest on the tips of the serrations even though these are small as Plate 11a shows. The tool edge does not penetrate the worked material but appears to skim it resulting in a polish which characteristically has one side showing more extensive wear traces. This is usually the flat surface not the scarred surface and in most cases the serration scars come off the dorsal surface so the more intense wear traces are located on the ventral face. The macroscopic gloss is usually focussed on a very limited portion of the tool, in most cases less than 10mm in lateral extent. Again this suggests the contact area is limited as would be the case over a round plant stem or tree shoot.

Pl 9. Serrated blade tool.

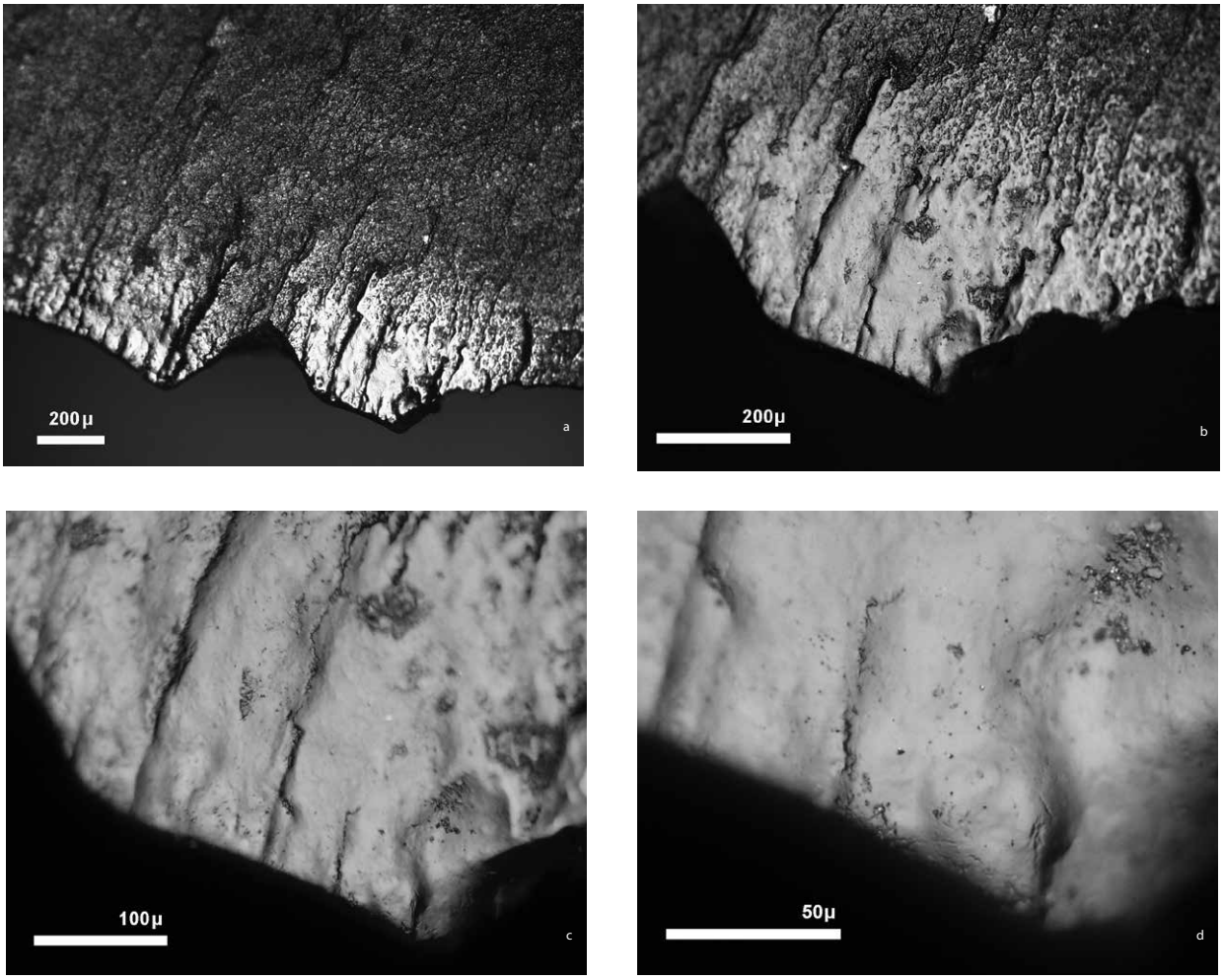
The intense siliceous plant polish can differ. There is a 'flat' polish where the areas of intense polish appear to have a very flat profile on the surface. Plate 10 shows the wear traces on tool 1251l (from the easternmost parallel ditch, F1252) which was interpreted as cutting siliceous plants such as cereals. Plate 11 (a – d) shows the intense polish on tool 1121f (from the linear gully F1122, Inner Arc Segment 6) which is more characteristic of the serrated edge tools where the intense polish has a more rounded flowing profile over the surface. The latter can appear like broad blooms over the surface near the edge, taking on a cauliflower-like appearance at higher magnifications. Several authors report experiments which assist in the interpretation of the purpose of these tools. Both Juel Jensen (1994) and Anderson (2010) have investigated wear traces from harvesting cereals and discussed the use of small tools designed to dehead ears of grain in a transverse action, perhaps before the crop has fully ripened since early cereals still have ears which fall off easily when ripe, resulting in a significant loss of grain during transport. Some aspects of the wear traces match the archaeological ones but there are still some points of variation. Other traces from experiments in the processing of flax fibres with stone tools to aid parts of the process have used straight edges and resulted in polishes which are described as matt and striated and more like those traditionally described as hideworking traces (Martial and Médard 2007). These do not match the intense polishes found on the serrated tools. Wear analysis on a broad range of bone artefacts, chipped and ground



Pl 10. Intense plant polish wear traces with a flat aspect and parallel motion interpreted as sickle gloss from cutting siliceous plants (tool 1251l). Original magnifications: (a) 100x and (b) 200x.

stone tools from a Dutch Neolithic site demonstrate sets of tools interpreted as used in basketry production and other tasks (Van Gijn 2006; Louwe Kooijmans and Jonste 2006). Beugnier (2007), Van Gijn (2008) and Hurcombe (2007; 2008a; 2010) have between them investigated working a variety of fibre, cordage and basketry plants (*Iris pseudacorus*, *Typha* sp, *Phragmites*, *Scirpus lacutris*, *Juncus effusus*, *Urtica dioica*, *Molinia caerulea*) and tree bast fibres from *Tilia*, *Fraxinus*, *Ulmus*, *Corylus* and *Salix* amongst others. The intense polish obtained from working reeds such as *Phragmites* (Beugnier 2007, 36) can leave a very flat polish surface which is a feature of some of the archaeological traces. More rounded but still intense polishes can be obtained from removing the outer bark only from bast fibres from nettle and trees while these are still on the wood (Hurcombe 2010). Again the wear traces from tools used extensively in such activities leave wear traces which offer a close match to the more rounded kinds of archaeological intense polish traces. Experiments from 1-12 hours duration per tool involving stripping the outer surface of bark away from the ring of bast fibres demonstrate that strong plant polishes build up and that the tools are still effective after 12 hours of use. Using a tool to manually strip away the outer bark from plants such as nettle and willow may confer advantages of keeping the fibres aligned and save time further down the operational chain that leads to cordage or textile production and may also reduce the risks or overall time to produce the end product (Hurcombe 2008a; 2008b; 2010). The closest matches to the archaeological wear traces come from processing a variety of plants. Most importantly, though some use of the tools for parallel harvesting activities cannot be ruled out, the transverse actions dominate. The parallel traces of wear from harvesting experiments showed that although a lot of plants can be harvested in one hour, the wear traces after this duration of use are not yet strongly developed and could be masked by the wear traces from more extensive use for transverse actions. From the performance of the tool type, there is no reason why serrated edges could not be used to harvest and then process plants. The raw materials for basketry, bags, mats and cordage, as well as fine fibre plants like nettle would all need to be harvested. Flax is the only plant traditionally harvested by being pulled up by its roots rather than cut. The cereal harvesting could also be carried out with a tool category not specifically examined in the wear study, for example the strong plant polish exhibited by a robust 'utilised blade' hints that such tool edges could serve this purpose or that harvesting is a transverse action. In any event, straw may have been an important material for craft products and many other plants would have been needed to produce cordage, nets, bags, baskets, bowstrings and fabrics (Hurcombe 2008b). The transverse scraping actions and serrated edges particularly suit the processing of plants to soften them and to prepare bast fibres. Plants such as nettles are common weed species but this can blind us to their potential as fibre plants and some of the wear traces achieved by working nettles offer some of the strongest matches to the archaeological traces (Hurcombe 2010). In a Neolithic society serrated edge tools as a category and as an individual item may have been used across a range of species rather than working only one. There is a small hint of this in one of the archaeological pieces where a flat intense polish appears to have been broken up by a similar action but slightly different material which has resulted in a more rounded and textured surface. In general the experimental evidence has shown that tools are long-lived and yet have light actions where the task requires large amount of materials processed quite finely.

In conclusion, the serrated edge tools are likely to be associated with a broad functional category of trans-



Pl 11. Photographs of typical intense siliceous plant polish on a serrated edge (ventral surface of tool 1121f) showing the location of the gloss concentrated on the tips of the serrations and the slightly rounded aspect of the polish. Original magnifications: (a) 50x, (b) 100x, (c) 200x and (d) 500x.

verse plant working. The intense gloss is likely to be related to craft activities as much as if not more than food-related activities and in particular in the production of fibres and cordage for matting, basketry and plant-based textiles.

Other stone artefacts

Grant Shand

Introduction

The provenance of locally sourced flint is dealt with in the preceding section. The rest of the stone assemblage represents a number of relatively local sources such as the argillaceous sandstone of the Thanet Beds and the Folkestone Beds, as well as material from further afield. There was a small quantity of fragments of basaltic lava probably from Germany (Garrard and Stow 1995, 1206). A few further sandstone and exotic fragments suspected as being either tools or tool remnants (nine in total) were sent for further study and their provenance is not discussed here (see Ixer, below).

The fragments of sandstone were originally provisionally checked and identified in the field and then again once they were cleaned and sorted. These fragments were highly irregular in shape offering no recognisable tool marks, worked or used surfaces. Many were small and in poor condition; some quickly disintegrated. None formed any identifiable parts of stone implements or objects. While it is possible that some fragments may have been core fragments from larger objects like quernstones, it is impossible to conclude this from the material. A limited number of stone fragments were kept as a sample and the majority discarded based on these results.

Glauconitic sandstone

Glauconitic sandstone represents 85 per cent of the stone assemblage. Visually, they were all irregularly shaped and had a fragmental texture. They were grain supported, that is to say that the individual grains forming the rock are not held in a finer matrix but support each other. The grain size of the minerals was fine to medium and the grains were sub-rounded and were generally well-sorted. The grains were generally loosely but, in some cases, well cemented. The colour of the rock fragments was grey-green. The mineral content was predominantly quartz with lesser quantities of glauconite giving a green hue. Glauconite only occurs in shallow marine environments.

Basaltic lava

Small fragments of this type of rock represented 2.9 per cent of the total assemblage by context. The texture of the surfaces of these fragments was rough due to the vesicular nature of the rock. The texture is formed by the escape of gasses contained in the rock leaving behind oval voids. No apparent crystal or mineral form could be identified by the naked eye therefore a fine groundmass of interlocking crystals must exist which can only be viewed under a polarising microscope. The overall colour of the fragments was a uniform dark grey.

Conclusions

A broad overview reveals that most of the stone assemblage (by number of fragments) derived from local sources, mainly siliciclastic sandstones. Only a small number of fragments grouped under the latter category show aspects which suggest sources further afield but located in this country. The volcanic component was sparsely represented but is well understood as a stone type and its use as quernstone material. The metamorphic and plutonic stones are probably derived from this country but are not a local resource.

It should be stressed that generally the south-east of Britain is composed of chalk, clays and unconsolidated sands and has a deficiency of large resources of hard rock. There are however small exposures of hard rock, the 'Kentish Rag' in and around the Maidstone area and sandstones from the Tonbridge area. To what extent these would have been available in prehistoric periods is not known. The Thanet Beds near Reculver and the Lower Greensand of the Folkstone Beds can be added to known exposures of hard rock in Kent.

Several categories of stone were present on the site. By far the most common type represented here is glauconitic sandstone. The presence of the mineral glauconite gives the sand beds a distinctive colour. The exposure of Thanet Beds on the North Kent coast at Reculver is a close source for this stone. The presence of glauconite in the Thanet sands (Wells and Kirkaldy 1966, 417) makes this a possible source match. However, there exists one problem with this location as a source. The present exposure does not show any areas where lithification (the process of soft deposits turning to hard rocks) of the sands has taken place to produce hard sandstone of this type. This is not to say that it was not there, coastal erosion might over long periods have removed deposits bearing lithified glauconitic sandstone.

There is a deposit of highly glauconitic sands bearing sandstone in the Folkstone area of Kent. Here, an abundance of greensand querns has been found eroding out of land slippage and a major quernmaking industry was present at Folkestone from the Iron Age through to the Roman period (Keller 1989, 199; Richardson 2014, 42). A saddle-quern and rubber, both of greensand from the Folkstone Beds was found in a Neolithic pit at Wingham (Greenfield 1960, 66-7).

Worked stone tools

Rob Ixer

Introduction

Three potential stone tools were selected from early prehistoric features for more detailed analysis. The emphasis of the study was on providing detailed petrographical characterisation of the rocks with an emphasis on their possible geographical provenance. Only limited archaeological interpretation is attempted.

Lithology and provenance

The three rocks comprise one meta-sedimentary, one plutonic igneous and one sedimentary fragments.

Ramsgate is far too south to have any glacial drift/till, since the glacial drift terminal line is approximately along the line of the present Thames. However, exotic dropstones are known as a very minor component of Pleistocene deposits in southern England and have been selectively collected and utilised since earliest prehistoric times.

None of the rocks have local, and most do not have regional, outcrops so unless the rocks were taken from the unconsolidated drift or shore-line (this is a possibility for some of the samples) then the rocks are exotic with regard to their findspot and in the case of a meta-greywacke (from the fill of F1224, Middle Arc Segment 7) and a fragment of granite from context 1420 (F1667, Outer Arc Segment 5), the nearest outcrops of such rock are in Cornubia (Devon and Cornwall) or the East Midlands of England.

The fine-grained, micaceous sandstone from cut F1216 (Outer Arc Segment 5) is probably from southern or south-eastern England and is therefore regional in origin.

The lithics as artefacts

Evidence for the shaping of these rocks is limited, in many cases because they are fragmentary. There is not much evidence for crushing/bruising of the artefact through impacts.

The fine-grained micaceous sandstone (from cut F1216, Outer Arc Segment 5) shows signs of impact damage on its corners and may have been a light, hand-hammer/maul. No stone shows convincing signs of fire-damage (there is a lack of crazing or spalling) or fire-staining. All surface discolouration is natural and due to iron or manganese-staining.

Neolithic and early Bronze Age pottery

Alex Gibson

Introduction

The Neolithic and early Bronze Age pottery from Chalk Hill comprised mainly small abraded sherds with few formal traits which made identification and vessel matching difficult in the extreme. The sherd material was so fragmentary that only six vessels were reconstructable to a degree sufficient to be certain as to vessel form. The material was laid out by context in trays in a well-lit room and weighed. Fabrics were matched to identify sherd groups and a catalogue compiled (Appendix IV; Fig 51 and 52). A search was made for cross-context joins but concrete examples of this were few. A fabric series was constructed based on a macroscopic analysis of the material using a 10x hand lens.

Fabrics

Thirteen fabric groups were identified base on the fineness of the sherds and size, frequency and type of the inclusions. These are listed in Table 15.

Various generalisations can be made regarding these fabric groups. Fabrics 2 and 11 are most likely to be Beaker in affinity. Fabrics 6 and 7 appear to be associated with open or neutral plain bowls while fabric 3 may be from shouldered bowls. Fabric 1 seems to occur most commonly on coarse, thick-walled plain bowls. Fabrics 5, 8, and 12 may be from Bronze Age vessels. Fabric 13 is likely to be later Iron Age in date. These observations cannot, however, be regarded as unequivocal.

Fabrics 1, 3, 5 and 7 constitute the majority of the sherd groups which suggests that Neolithic bowl pottery is the most frequent type of ceramic on site. Fabrics 1, 3, 6 and 7 come mainly from the causewayed enclosure ditches while fabric 5, tentatively suggested as Bronze Age, tends to come from other contexts.

Fabric 13 includes a flat-based vessel (sherd group 91; context D1290, the fill of the western parallel ditch F1285). This does not appear to have been decorated nor does it appear to have been a fabric of Grooved Ware affinity. If the Iron Age date for this fabric is correct, then it suggests considerable mixing of the deposits.

Vessel technology and surface treatments

As might be expected, all the vessels have been open fired and hand built. The material tends to have been generally well-made, however, and join voids or coil breaks were only noticeable in seven of the sherd groups (12, 75, 260, 265, 126, 134, and 207). Nine sherd groups have burnished surfaces (5, 15, 41, 51, 83, 84, 104, 107, 109, 124, 133, and 261) which usually takes the form of vertical fluting. These may well be from shouldered bowls. Slips appear to be unusual though the flaked surface of some of the sherds of sherd group 98 may be evidence of just such a surface treatment (Table 16).

The burnishing on sherd group 107 (context D61, from feature F1318, Outer Arc Segment 5) is particularly fine. Both surfaces of the sherds are burnished vertically giving the surfaces a glossy appearance with the vertical facets giving a rippled appearance. This vessel is also represented by a shoulder sherd suggesting a carinated bowl. The burnishing on sherd group 161 (context D1627, fill of pit F1628 between the Middle and Outer Arcs) is less well polished but, in typical Neolithic fashion, the burnishing extends over the top of the everted rolled rim giving this a slightly rippled effect. Though no shoulder survives, this too would appear to have been from an open carinated bowl. Internal vertical burnishing gives a glossy black polished appearance to sherd group 104 (context D45, from feature F1318, Outer Arc Segment 5) and indeed the folded over rim and similarity of fabric suggests that this might be from the same vessel as sherd group 161 though no conjoining sherds were identified. The fingernail impressions on sherd groups 231, 233 and 253, when combined with the fabrics and forms, suggest an element of Peterborough Ware. Sherd group 233 in particular comprises the remnants of a collar decorated externally with vertical fingernail incisions below which is a hollow neck with traces of a large round depression suggesting that this vessel at least represents a small Fengate element at the site. The horizontal grooves on sherd group 243 are very abraded and may in fact represent worn twisted cord impressions. These sherds probably also belong to a Peterborough Ware vessel.

Comb impressed sherds are all unequivocally from Beaker vessels. With the exception of sherd group 280, all sherds are abraded and suggest residual material. No vessels are reconstructable and in no case (other than sherd group 280) can the Beaker type be determined.

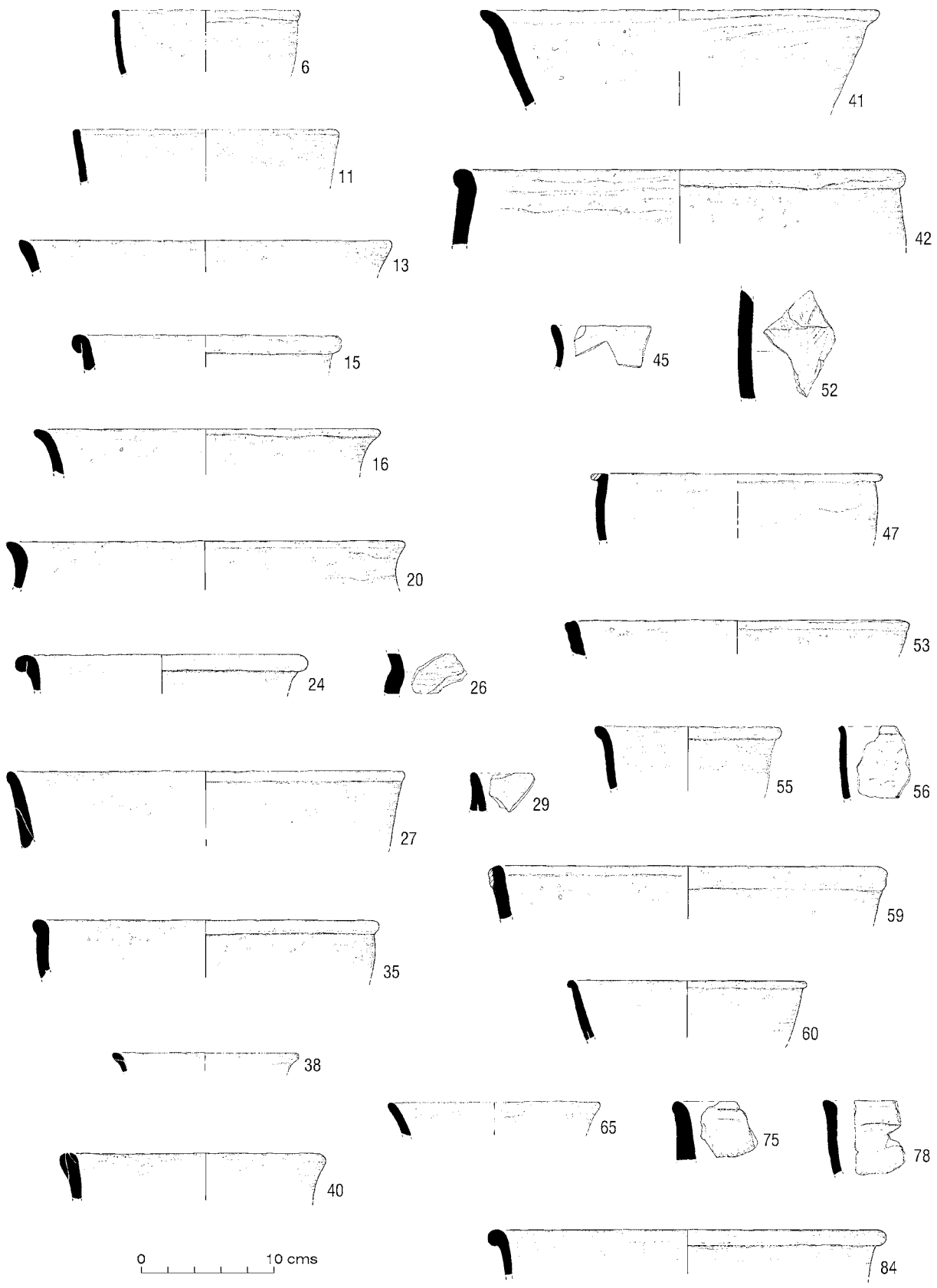


Fig 51. Early prehistoric pottery. Numbers refer to sherd group.

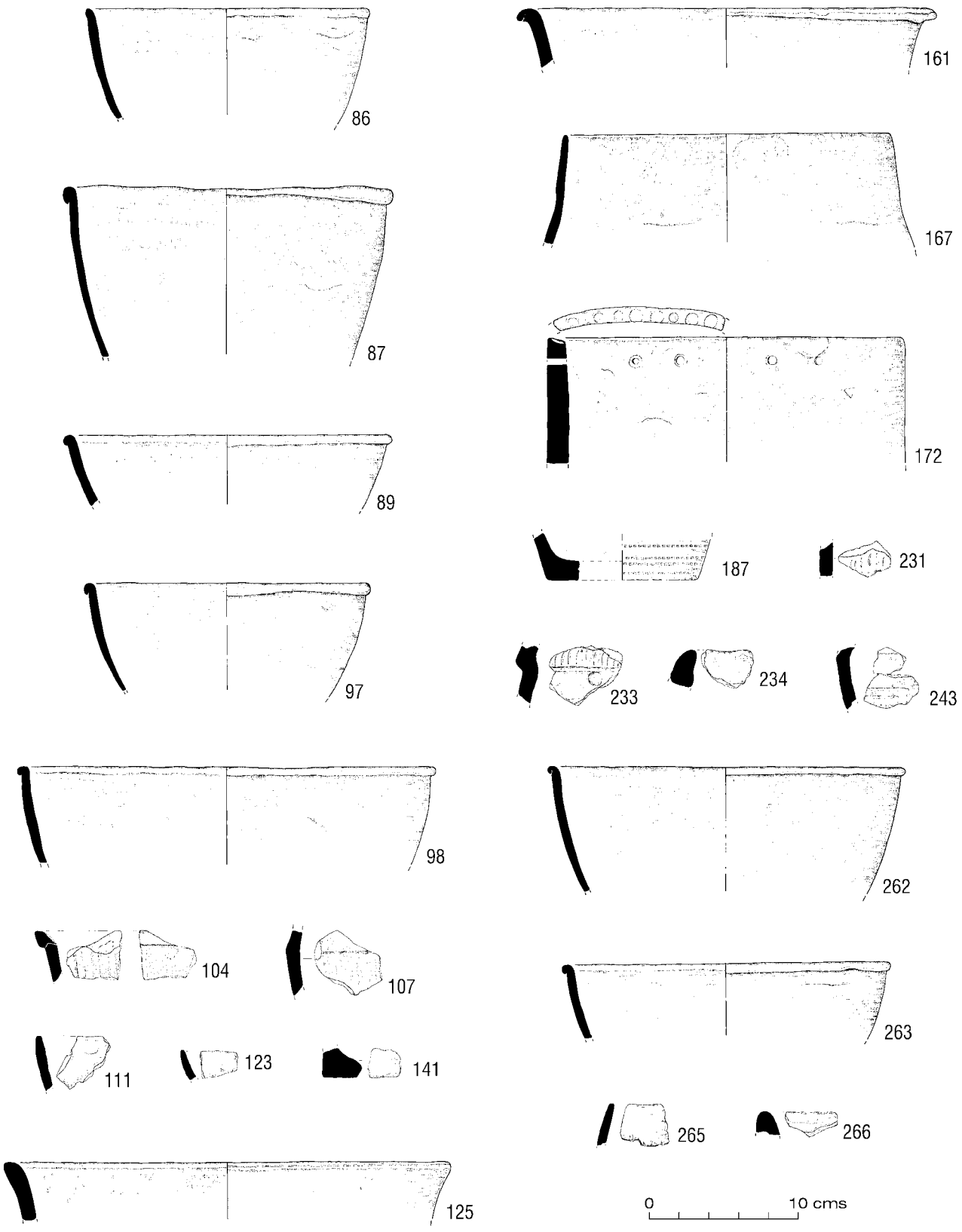


Fig 52. Early prehistoric pottery. Numbers refer to sherd group.

Fabric number	Inclusions	Inclusion size and density	Surface colours	Surface finish
1	Angular, poorly sorted, white flint, rare rounded sand grains and spherical (<2mm) voids	Flint <7mm, moderate density	Orange/brown exterior and brown/grey interior. Core varies from grey/black to orange/ brown	Smooth and silty matrix, with occasional organic or sandy voids, flints occasionally projecting the surface, crumb like fractures
2	wGrog filled fabric, soft	Grog very finely crushed. Occasional rounded flint fragments	Orange/grey with a distinct grey core, mottled interior surface	Smooth and silty matrix
3	Finely crushed, well sorted flint	Flint <3mm, sparse/moderate density	Brown exterior surfaces dark grey to black core.	Surface treatment varies from smooth to burnished. Some rough surfaces probably due to abrasion
4	Organic voids and very sparse flint, sand and grog inclusions	Ovate, elongated voids <8mm, size and shape irregular suggesting a temper of plant material	Irregular mottled orange/ brown and grey throughout	The texture is "corky" and the surface is uneven
5	Sub-rounded sand grains, oval voids, poorly sorted spalled grey flint & some grog	Flint <3mm, sparse/moderate density	Black/brown interior surface otherwise orange/brown throughout	The texture is rough, often gritty throughout.
6	Sparse rounded sand grains	Sand grains >1mm	Uniform black or light brown throughout	The surface treatment is smooth and slightly pitted on the exterior
7	Sparse finely crushed white flint and organic inclusions	1mm flint and irregular organic inclusions	Grey/black throughout	Sandy texture
8	Sandy clay matrix with sparse possible grog & crushed, flint	Sand grains <1mm & flint <4mm	Orange/brown to black surfaces. Black core.	External scoring, traces of coil construction, interior smooth
9	Fine clay matrix with sparse, spalled, crushed flint and sparse rounded grog/clay pellets	Flint <6mm & grog <4mm.	Pink-brown exterior. Black interior surface and core.	Sandy texture throughout with prominent flint protrusions (possibly due to abrasion)
10	Fine clay matrix with rare crushed flint	Flint <8mm.	Pink/orange surfaces. Grey/ black core.	Smooth & uneven with occasional prominent flint protrusions.
11	Fine clay matrix, rare, white/ grey flint inclusions. Sparse grog.	Flint <1mm & grog <4mm.	Red/brown surface, black core	Smooth throughout
12	Poorly mixed crushed flint	Flint <7mm with organic voids	Red exterior surface, brown interior surface	Gritty
13	Rounded quartz sand	<1mm	Black throuhout	Smooth fabric

Table 15. Early pottery. Chalk Hill fabric series.

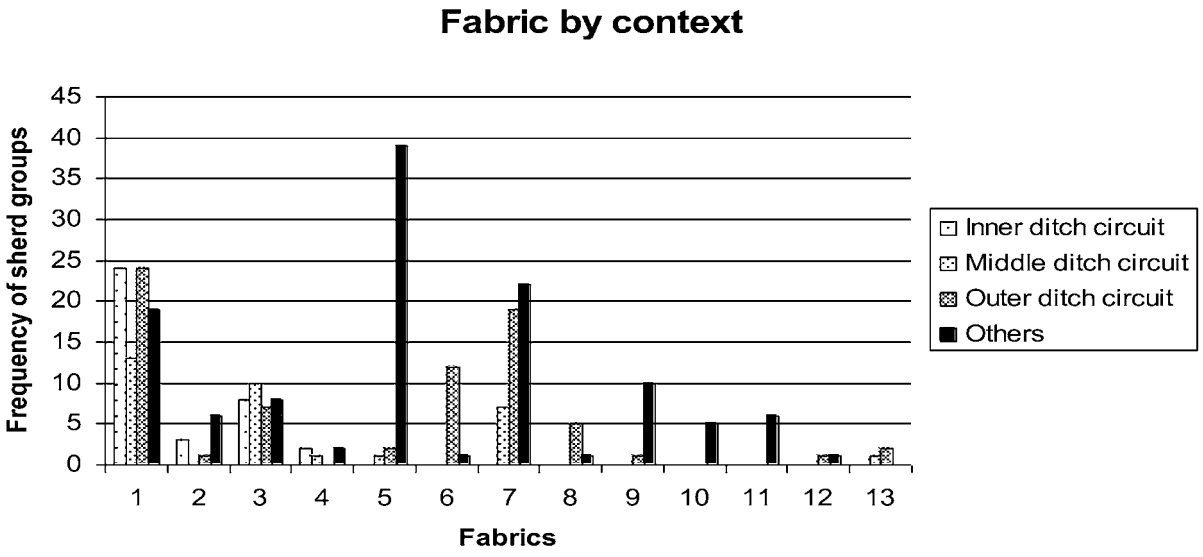


Fig 53. Fabric occurrence by broad contexts.

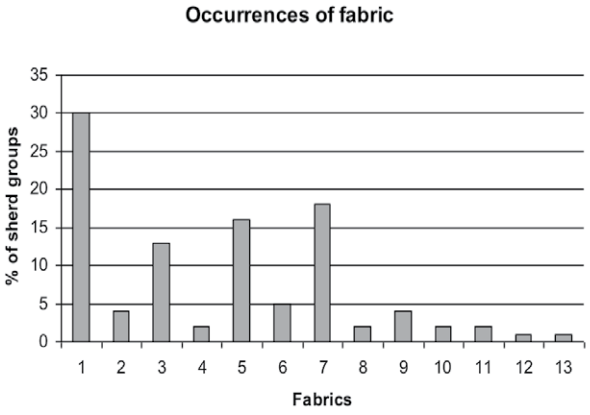


Fig 54. Early pottery. Frequency of fabrics.

Vessel size and form

Few vessels are reconstructable and therefore the only criteria for assessing size are rim diameters and vessel thickness. Even these two criteria can only provide rough estimates especially as most of the rims are represented by small sherds. Even within the larger sherd groups (*eg* 86, 87, 97, 98, 262) the unevenness of some rims highlights the difficulty of dealing with small sherd material. These uncertainties accepted, Table 17 indicates the estimated rim diameters present within the assemblage. There seems to be a broad range of vessel sizes, particularly from the enclosure ditches, of between 140 and 240mm suggesting that the majority of the assemblage comprises medium-sized vessels. With a rim diameter of possibly 340mm, sherd group 42 may represent a large Plain Bowl and this is confirmed by the thickness of the fabric however only 14 per cent of the rim is measurable and the diameter may, indeed, be slightly less.

Sherd thickness is more easily measurable and may be used as a crude guide to vessel size though obviously criteria such as fabric coarseness rather than vessel size can influence thickness. Once again, these inaccuracies and subjectivities accepted, the fabric thickness seems to mirror the pattern suggested by the rims in that medium (6-10mm) thick vessels predominate (Table 18) and especially from the enclosure ditches.

Of the rim types identified, simple rounded rims are by far the most common (Table 19). Once again analysis is hampered by the small size of much of the material and it is often difficult to determine the orientation of the rim (*ie*, upright, everted or inverted). Nevertheless, the majority of the rims appear to be simple or slightly thickened as is typical of contemporary assemblages elsewhere (see discussion). The few instances of rolled rims (*eg* sherd groups 60, 84, 87, etc), formed by the rolling over of the clay at the top of the vessel, possibly by adding another strip of clay where necessary, are also typical of Neolithic Carinated and Plain Bowl. These rims are often irregular in themselves, however, often changing slightly in profile round the circumference of the pot. The rim of sherd group 84 has been particularly finely moulded so that it forms a regularly rounded profile. The burnishing of the rim inside and out suggests that it comes from a particularly well-made Carinated Bowl. With an estimated diameter of 300mm, this vessel also appears to be one of the largest from the assemblage.

Perforations have only been noted on two sherd groups. There is a drilled hour-glass shaped hole on a body sherd from sherd group 20. This appears to have been drilled after firing. The perforations on sherd group 172 are different, however and seem to be regularly spaced *c* 12mm below the rim. These have been created while the clay was still wet and rims of dislodged clay encircle the holes on the interior surface. These holes may well have been intended to have facilitated the covering of the vessel.

Neolithic

The Chalk Hill causewayed enclosure has been extensively sampled for material suitable for radiocarbon dating as part of the English Heritage/University of Cardiff 'Gathering Time' Project. Bayesian analysis suggests that the use of the enclosure was restricted to *c* 40-160 years. If this is the case, then the period is so short that ceramic changes are unlikely to be recognisable particularly given the mixing of material in the features and the small sherd size of the assemblage. Therefore, it seems pertinent to provide only a relative ceramic chronology here.

Twenty-three sherd groups have been positively identified as Carinated Bowl, the earliest type of Neolithic pottery which arrived in Britain at the start of the Neolithic, *c* 4000 BC. These vessels are all represented by small sherd groups however and it is possible that some other examples remain unidentified within the sherd groups but in the absence of features such as everted rims and sharp carinations, it would be rash to over-estimate numbers. Equally, the identification of some sherd groups as Carinated Bowl may not always be accurate. The majority of these vessels are represented by fragmentary or residual material. Equal numbers of sherd groups (nine) come from the lower silts of the Inner and Outer Arcs while only two sherd groups were identified from the Middle Arc, however, these sherds cannot be regarded as dating the site.

The majority of the ceramics (a minimum of 82 sherd groups) belong to Plain Bowls. According to conventional chronologies, these secondary Neolithic ceramics start to appear around 3800 BC and therefore are probably primary to the causewayed enclosure. Plain Bowl occurs in all segments including primary deposits but also in later pits and higher levels. This mixing is presumably due to the working of the pit fills themselves, but also might suggest the currency of the type during the use of the monument.

Sherd group	Context	Feature	Description
Burnishing			
5	D1045	Inner Arc Segment 1 (F1046)	Burnished interior
41	D1013	Middle Arc Segment 3 (F1014)	Burnished rim top
51	D1305	Middle Arc Segment 6 (F1306)	Burnished interior
83	D1180	Outer Arc Segment 2 (F1181)	Burnished interior
84	D1193	Outer Arc Segment 2 (F1181)	Radial burnishing rim, vertical burnishing on interior
97	D1247	Outer Arc Segment 3	Burnished interior
98	D1272	Outer Arc Segment 3 (F1358)	Burnished interior
102	D1249	Outer Arc Segment 3 (F3018)	Burnished exterior
103	D1264	Outer Arc Segment 5 (F1676)	Burnished interior, scored exterior
258	D40	Outer Arc Segment 4 (F3016)	Burnished throughout
259	D40	Outer Arc Segment 4 (F3016)	Burnished throughout
261	D40	Outer Arc Segment 4 (F3016)	Radial burnishing on rim, vertically burnished interior
257	D40	Outer Arc Segment 4 (F3016)	Burnished interior
104	D45	Outer Arc Segment 5 (F1318)	Vertical burnishing on interior
107	D61	Outer Arc Segment 5 (F1672)	Burnished ripples throughout
109	D62	Outer Arc Segment 5 (F1672)	Rippled burnishing on exterior, vertically burnished interior
112	D62	Outer Arc Segment 5 (F1672)	Burnished throughout
267	D1505	Outer Arc Segment 5 (F1672)	Burnished exterior, vertically burnished interior
124	D1301	Outer Arc Segment 5 (F1298)	Radial burnishing rim, vertical burnishing on exterior
146	D1130	Pit on eastern edge of excavation (F1131)	Burnished interior
151	D1202	Small pit post-dating parallel ditches (F1203)	Burnished interior
161	D1627	Pit between the Middle and Outer Arcs (F1628)	Vertical burnishing on interior
163	D1070	Southern potential 'cove'	Burnished exterior
226	D1218	Medieval field ditch	Burnished throughout
Wipe/score marks			
52	D1305	Middle Arc Segment 6 (F1306)	Wipe marks creating striations throughout
94	D1312	Outer Arc Segment 3 (F1384)	Scored exterior
96	D1586	Outer ditch Segment 3 (F1574)	Scored exterior
Fingernail impressions			
211	D1355	Easternmost parallel ditch (F1283)	Finger tip impressions on exterior
231	D440	Pit at southern end of site (F442)	Close-set vertical fingertip impressions on the exterior
233	D509	Ring-ditch (F511)	Finger tip impressions and fingernail incisions on exterior
253	D476	Grave within LBA/EIA enclosure (F478)	Fingernail impressions
Comb impressions (Beaker)			
182	D1204	Easternmost parallel ditch (F1260)	Horizontal comb impressions on exterior
187	D1208	Easternmost parallel ditch (F1260)	Horizontal comb impressions on exterior
280	D443	Central burial of barrow ring-ditch (F446)	Zoned tooth comb impressions
Grooves			
243	D595	Pit at southern end of site (F596)	Horizontal grooves on exterior

Table 16. Early pottery. Visible surface treatments.

Diameter (in mm)	Inner Arc	Middle Arc	Outer Arc	Others	Total
100				1	1
120			1	2	3
140	1	4	3	1	9
160				1	1
180		1	3	1	5
200	3	1	1		5
220	1	1	5	3	10
240		2	1	1	4
260	1	2	3		6
280	1		1	2	4
300	2	2	2		6
320					
340		1			1
Unknown					26

Table 17. Early pottery. Rim diameters by major contexts.

Thickness (mm)	Inner Arc	Middle Arc	Outer Arc	Others	Total
4	2	5	7	17	31
6	14	8	32	37	91
8	15	14	14	33	76
10	4	3	15	19	41
12	1	2	5	12	20
14	1			1	2
16					
18				1	1
20				1	1

Table 18. Early pottery. Sherd thickness by general context.

Rim type	Inner Arc	Middle Arc	Outer Arc	Other features and non-phased
Simple	10	7	13	15
Thickened	2	7	3	2
Moulded	2			
Bevelled				3
Rolled		1	9	2
External lip			1	1
Flat topped			1	
Flat topped & external lip		1		

Table 19. Early pottery. Rim types.

Related to the Plain Bowl are the shouldered bowls (a minimum of 11 sherd groups) which appear to come primarily from the lower fills of the Middle Arc. This might suggest better survival than a true distribution, however, and other shouldered bowl sherds probably remain unidentified in the small unidentifiable sherd material. Once again it would appear to be contemporary with the use of the site.

The four sherd groups identified as belonging to the Peterborough tradition (from *c* 3600 BC) all derive from the area of the round barrow and none come from the arcs of the enclosure. This suggests that the site had gone out of use by at least the mid-4th millennium BC certainly from the point of view of deposition. This would also appear to be the case with the single Grooved Ware vessel identified

(sherd group 234). This vessel (from *c* 2700 BC) was recognised by its moulded rim and also comes from the round barrow ditch. Again the absence of Grooved Ware from the causewayed enclosure is noteworthy.

Beaker

The Beaker (context D444, from grave F446 within ring-ditch F511; Fig 55) has a rim diameter of *c* 120mm, a base diameter of 70mm and a height of *c* 180mm. The rim is rounded and the neck is slightly flaring, inturning a little to the vertical towards the rim. The waist is restricted and the belly bulbous and rounded. The outer surface is generally pink though there is some dark staining towards the base, the inner surface pink to light brown and the core black. The fabric averages some 5mm thick and contains finely crushed grog. The whole vessel is fairly soft, appears abraded and does not seem to be complete.

The decoration is all with a toothed comb and comprises four encircling lines below the rim, followed by a zone of elongated filled pendant triangles 44mm deep (Clarke 1970, Southern British Motif Group 4, No 29). This is bordered below by another three encircling lines. There is an undecorated band, some 6mm deep, then a zone of oblique to near vertical close-set comb impressions, sloping from top right to bottom left, 7mm deep, and bordered above and below by three encircling lines (Clarke's Basic European Motif Group 1, No 2). This bordered motif is repeated twice more on the body, each time separated by undecorated bands some 6-7mm deep. The lowermost zone of decoration comprises three encircling comb lines, oblique close-set comb impressions sloping from top left to bottom right, three encircling lines and then a zone of pendant-filled triangles to the base (Clarke's Motif Group 4, No 29).

The decoration is somewhat haphazardly executed and the triangles in particular are not well-formed. There is a roughly circular perforation in the neck, approximately 8mm in diameter, which seems to have been a deliberate post-firing creation.

The broad neck zone and narrower belly zones, marked distinction between neck and belly, and the inturned to vertical rim place this vessel stylistically late in Clarke's Primary Southern group (Clarke 1970). It would also fall into the late Step 5 of Lanting and van der Waals's (1972) scheme though the chronological validity of these typologies has been questioned (Kinnes *et al* 1991). The Beaker would belong in Case's Group D (Case 1993) though this group is also long-lived according to the radiocarbon dates (Case 1993, fig 1). With a neck measuring 38.8 per cent of the vessel's total height, this would place it in Needham's long necked group (Needham 2005) once more a long lived (but not primary) group dating from some time before 2200 cal BC to sometime after 1800 cal BC (Needham 2005, table 5 and fig 13). The associated burial has been radiocarbon dated to 1980-1770 cal BC (at 95 per cent confidence; UBA-14315; Table 2; Fig 48).

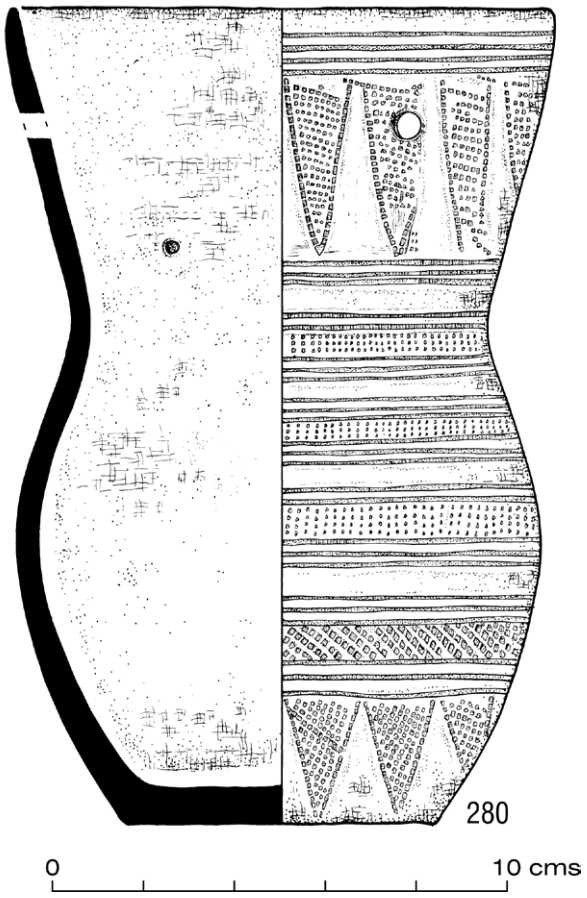


Fig 55. Beaker D444 from burial F446. Number (280) refers to sherd group.

Discussion

The pottery from Chalk Hill is a rather fragmentary and abraded assemblage, primarily of the earlier Neolithic and belongs to the Plain Bowl style common over most of Britain at this time. Its closest parallels regionally and culturally are to be found at the Kingsborough Farm causewayed enclosure on the neighbouring Isle of Sheppey (Gibson 2003; Allen *et al* 2008) though there is generally a larger decorated component at this site. Earlier Neolithic pottery has also been recovered from the recently excavated Channel Tunnel Rail Link site at White Horse Stone (Edwards 2006).

Other than these comparatively recently excavated assemblages, the largest find of earlier Neolithic pottery in Kent comprises sixteen vessels from the St Richard's Road pit site, Deal (Gibson 1995). These vessels, like much of the present assemblage, contain large angular calcined flint inclusions but, despite the coarseness of the fabric, are also from well-made vessels, occasionally with internal

burnishing. The carinated vessels from Deal may well be placed earlier in the Neolithic sequence than the Chalk Hill assemblage as they conform to the classic Carinated Bowl as defined by Herne (1988), and thus are likely to date to *c* 4000-3750 cal BC. This might be slightly earlier than the present assemblage where the carinated material appears to be more rare (perhaps residual or derived from other contexts) and more developed with slack-profiled bowls in addition to sharply carinated forms. In its fineness and rolled rim profile, the St Richard's Road vessels may be compared to the assemblage from Wingham (Greenfield 1960) though at this site carinations are only inferred. Shoulders are present at Creteway Down, Folkestone (Dunning 1966) where vertically scored necks are also present and parallel the small decorated element of the present assemblage. The presence of a lug on vessel 15 from St Richard's Road may suggest an element of baggy-profiled hemispherical bowls similar to the majority of the Chalk Hill assemblage.

The baggy-profiled neutral bowls identified in the Chalk Hill assemblage such as sherd groups 89, 97 and 98 are similar to the undecorated closed vessels from Laundry Road, Minster (Gibson 1996). These latter sherds are in a similar flint-filled fabric and, despite their fragmentary state, are likely to form a single assemblage. Similar pots have also been found at Mill Hill, Deal (Clarke 1982), Birchington, Minnis Bay, also in Thanet (Macpherson-Grant 1968) and from Creteway Down, Folkestone (Dunning 1966).

The Chalk Hill pottery, not surprisingly, draws closer analogy with the classic undecorated elements of the Mildenhall assemblages from the causewayed enclosure across the Thames estuary at Orsett in Essex (Hedges and Buckley 1978), in the Midlands at Etton in Cambridgeshire (Pryor 1998) and Briar Hill in Northamptonshire (Bamford 1985), the Thames Valley at Staines, Surrey (Robertson-Mackay 1987) and on the south-east coast at Offham in East Sussex (Drewett 1977). At Offham, flint-filled fabrics predominate as do simple rounded open and closed forms. Multi-perforated vessels are also present (Drewett 1977, fig 11.19). Like the Chalk Hill assemblage, at Orsett 'open bowls predominate over closed and carinated forms which are comparatively rare' (Kinnes 1978, 263) and shoulders are often slack though necks may be everted. Some 12 per cent of the Orsett assemblage is decorated while decoration of any sort is extremely rare at Chalk Hill (Table 16).

At Broome Heath in Norfolk, the assemblage is also largely undecorated though there are fluted rims (Wainwright 1972, P140, P275, P408) and some rare incised sherds (*ibid*, P3). The carinated element of this assemblage is larger than at Chalk Hill but there are also slack, S-profiled bowls (*ibid*, P384) and deep baggy pots (*ibid*, P207, P210). The elaborate burnished rim forms encountered in the present assemblage are also seen at Broome Heath.

Baggy closed vessels as well as pots with high and/or slack carinations are also present in the assemblage at Hurst Fen in Suffolk (Clark *et al* 1960) as are perforated vessels which appear to be absent at Orsett and rare (one vessel) at Broome Heath (Wainwright 1972, P278). The Briar Hill assemblage (Bamford 1985) was poorly preserved, but enough survives to identify this as a Mildenhall assemblage rather than the Grimston Ware affinities attributed in the report (Gibson 1986; Kinnes and Thorpe 1986) though clearly there is a large element of undecorated, carinated and baggy forms and some scored decoration. The large assemblage from Etton was better preserved than the Briar Hill material and provides a very close analogy for the Chalk Hill pottery. In terms of form, the thickened rims, the carinated and S-profiled forms as well as the simple baggy pots encountered in the present assemblage are also common in the undecorated elements at Etton. Further west, in the Thames Valley, the causewayed enclosure at Staines has also produced a similar assemblage in terms of vessel form and decoration.

The Chalk Hill assemblage therefore fits the more general distribution of undecorated baggy or shouldered bowls from early, but not primary, Neolithic contexts from the Thames estuary and south-east coast (Whittle 1977). It is unfortunate that the absorbed lipids in the pottery were too badly degraded to produce much evidence for original use, but the carbon encrustations on many sherds suggest use for cooking and therefore their generally domestic nature. This is again common to other assemblages from causewayed enclosures in southern England.

Impressed Ware

Of the five sherd groups identified as belonging to the Peterborough tradition (from *c* 3600 BC) only sherd group 233 (from context D509, a fill of ring-ditch F511) is sufficiently large enough to allow identification. It appears to have had a fingernail incised collar above a concave neck which has been filled with deep circular stabs. This is sufficient to place the vessel in the Fengate substyle of the tradition.

There are few Peterborough findspots in Kent with which to draw parallels with the Chalk Hill assemblage and these other sites have predominantly produced Ebbsfleet and Mortlake styles. Ebbsfleet, Mortlake and Fengate styles are represented at Baston Manor, Hayes (Philp 1973), while Mortlake sherds have been documented from Caesar's Camp, Folkestone (Pitt-Rivers 1882), Castle Hill, Folkestone (Gibson 1994), Eastling Down barrow, Whitfield (Gibson 1997) and St Richard's Road,

Deal (Gibson 1995). In these vessels, birdbone decoration is present (Baston Manor, Eastling Down barrow) and twisted cord (St Richards Road), fingertip (Castle Hill) and fingernail (Chalk Hill) impressions have been identified. The incised decoration found in the assemblage from Baston Manor is not paralleled in the present material and is generally rare in the rest of Kent.

Grooved Ware

A single Grooved Ware vessel was identified (sherd group 234). This vessel (from *c* 2700 BC) was recognised by its moulded rim and also comes from the round barrow ditch F511. Again the absence of Grooved Ware from the causewayed enclosure is noteworthy.

Despite the fame of neighbouring Essex for this ceramic type, Grooved Ware is comparatively rare in Kent (though note the recovery of a large assemblage of Grooved Ware from the excavations at Ringlemere (Parfitt 2006a, 9)). The moulded rim of sherd group 234 is paralleled in the material from St Richard's Road, Deal where both incised and fingernail-impressed sherds in the Clacton substyle were found in a pit group.

Longworth's corpus identifies Grooved Ware only from East Malling (Wainwright and Longworth 1971) but to this may be added the assemblages from Deal, material from Holywell Coombe (Gibson 1998), Lord of the Manor (Gibson 1993), the Lyonesse surface of the Lydden Valley (Halliwell and Parfitt 1985) and possibly Ringwould (Woodruff 1880). The Snodland entry in Greenfield's (1960) corpus appears to be a duplication of East Malling.

Though fragmentary and residual, the Lord of the Manor assemblage may also be identified as in the Clacton substyle by its tub-shaped profiles, opposed filled triangle decoration and internal rim mouldings. Similar criteria may be used to so-define the limited material from Holywell Coombe (Gibson 1998).

The Beaker from the ring-ditch

A close parallel for the Chalk Hill Beaker is an S2 (or 'Developed Southern British'; Clarke 1970, 41) vessel from Broadstairs (Gibson 2005). This vessel has a similar neck profile to the present vessel and shares a single decorative zone on the neck with a series of narrower zones on the belly. Metopic decoration on the neck is filled with opposed filled chevrons while the narrow zone decoration comprises narrow herring-bone and ladder motifs, the latter similar to the present vessel. Another southern series vessel, though more poorly made, was recovered from a burial at Manston. Associated with a flint knife and a V-perforated jet button, this vessel was dated to *c* 2130-1920 cal BC (3630±50 BP; BM 2642) and the present vessel must be assumed to be broadly contemporary (Perkins and Gibson 1990). Indeed, based on the available radiocarbon dates nationally, Case would place his Southern Group B Beakers in the period 2250-1500 cal BC. Such Beakers are rare in Kent. There are S1 (or 'Primary Southern (British)'; Clarke 1970, 41) Beakers from Folkestone (Clarke 1970, Corpus No 391) and Brenley, near Faversham (Clarke 1970, Corpus No 387, where its provenance is misspelt as 'Brendly') with similar profiles to the Broadstairs vessel and to zone decorated Beakers from Folkestone and Dover (Clarke 1970, Corpus Nos 392 and 397) are rather more squat than the present vessel.

First impressions of the Beaker suggest that this is a fine quality well-decorated pot, however closer examination shows that this is not the case. The chevron decoration on both the neck and towards the base is crudely executed. This has been noted on Beakers elsewhere in Kent and beyond (Gibson 2005) and supports Boast's observation that it is not always the high quality vessels that are selected for burial and, indeed, it may be the poorer ones that are selected more often (Boast 1995).

The fact that the vessel is incomplete may also be important from the point of view of interpretation. It is becoming increasingly recognised that the mortuary ritual of Beaker and early Bronze Age burials is more complex than had previously been considered (Gibson 2004; Woodward 2000a). Not only is there the post-mortem treatment of bones to consider such as excarnation, removal, sorting, cremation (Gibson 2004) but also perhaps the 'killing' of the grave goods by deliberately damaging the pots, or by the burial of incomplete vessels. This has also been noted on the Broadstairs vessel mentioned above (Gibson 2005). These vessels, presumably of no use in the world of the living, would further represent the changed status of the individual. The burial of sherds only, for example, may suggest 'token' burial as might the burials of incomplete bodies. Equally they may represent the burial of special pots, or the burials of heirlooms, perhaps even vessels with token yet tangible ancestral connectors (Woodward 2000a; 2000b; 2002; McLaren 2004, Lillios 1999).

Early Bronze Age

Like the Beaker fabrics, the Bronze Age material is largely fragmentary and identified mainly by flat bases and fabric (the latter alone is hardly ever a totally reliable indicator). Sherd Group 172 (probably residual in context D1508, the fill of a small pit (F1509) at the eastern edge of the excavation (Fig 72)) comprises abraded sherds with an average thickness of 14mm. The rim is bevelled with some fingertip impressions detectable on the top and below the rim is a row of perforations. This rim form and the perforations have been recognised as an important element and component of the bucket and barrel urns of the Deverel-Rimbury tradition (*eg* Calkin 1964, fig 12).

Pl 12. Jet belt- or pulley-ring.

Undecorated other than by the fingertip impressions on top of the rim, the vessel finds a parallel at the well-documented Ardleigh cemetery in neighbouring Essex (Couchman 1975) but the vessel would be at home in either a domestic or sepulchral context.

Jet belt- or pulley-ring

Nicola Powell

Catalogue no <424> Belt- or pulley-ring.

(D443); fill of grave F446 within ring-ditch F511 (Fig 84; Pl 12).

Diameter 37mm, diameter of hole 19mm; disc of jet, with central hole. Black polished surface. Two complete and two incomplete perforations clustered in one quarter of the ring. Decorated around with 3 concentric grooves.

This object, found beneath the feet of the crouched inhumation in grave F446 within ring-ditch F511, is a jet belt- or pulley-ring <424>. A disc with a central hole, it is decorated with concentric lines and has two complete and two incomplete perforations. The pulley- or belt-ring is of great interest and it is notable that it was found *in situ* within the grave cut. It is not clear what purpose these objects served, however the discovery of a rich burial in Wessex that included a plain, unperforated shale belt-ring amongst other fine ornaments and archery equipment (Fitzpatrick 2011), does suggest it may have formed part of an item of costume.

However, belt- or pulley-rings made from jet have been found in early Bronze Age burial contexts in northern Britain and Wales, often with an accompanying V-perforated button (Savory 1980, 70); an example from Wales appears to have been used with a button to fasten a bag containing a flint.

Human bone

Jacqueline I McKinley

Introduction

Human remains from eighteen contexts were received for analysis (Table 20). Four early Neolithic contexts (D59, D1387, D1451 and D1538), representing various fills from features F1318, F1661 and F1298 of Segment 5 of the Outer Arc of the causewayed enclosure (Fig 35-37), contained redeposited or possibly 'placed deposits' of human bone. Four contexts represented *in situ* and re-

deposited remains from two late Neolithic inhumation graves (F7 and F206; Fig 45) situated in the north-eastern area of the site. Three early Bronze Age deposits produced human bone, including the remains of an *in situ* burial, from within and in association with the ring-ditch in the south-east of the site (F511, grave F446 and possible grave F439; Fig 44).

Disturbance and condition

The surviving depths of the features (not all were available) from which human bone was recovered varied from 0.2m to 0.6m. The depths of the four graves were recorded at between 0.2m and 0.3m. Much of the bone both from the *in situ* burials and the redeposited material has old, worn dry-bone breaks demonstrating ancient disturbance, probably including – particularly in the case of the *in situ* remains – fracture as a result of pressure exerted on the grave fills from above.

The bone was in very poor condition, generally being heavily eroded and fragmented, with root marking evident on some bone. No complete skeletal elements were recovered from any part of the assemblage.

Some of the skull fragments from the possibly 'placed' early Neolithic deposit D1387 from pit F1318 (Outer Arc Segment 5), are slightly charred, the burning having been sustained when the bone was dry and probably already disarticulated. The bone may originally have been associated with an earlier underlying charcoal-rich deposit.

Demographic data

A minimum of three individuals was identified from the *in situ* remains recovered from inhumation graves; two late Neolithic adult males and one early Bronze Age adult (probably female).

The rest of the assemblage comprised fragments of redeposited bone. The nature of these deposits renders it possible that the date of the bone itself could be earlier than that of the features in which it was found. The general lack of abrasion to the bone, however, suggests there was little if any exposure and reworking of material. This, together with the discrete spatial distribution of material from the different periods implies that the attributed dating of the bone may be a reliable reflection of its temporal origin. This part of the assemblage is likely to represent a minimum of what originally existed since, as outlined above, the condition of the bone is very poor and elements of trabecular bone in particular are likely to have been lost due to soil acidity.

The only joins between bone fragments from different contexts within the assemblage was between skull vault fragments from contexts D1451 (pit F1661, Outer Arc Segment 5) and D1538 (pit F1318, Outer Arc Segment 5), both early Neolithic deposits.

The early Neolithic group includes the remains of a minimum of two individuals; an infant/juvenile and a subadult/adult, most likely female. The late Neolithic redeposited material probably all derives from the *in situ* remains. The early Bronze Age group includes a minimum of two individuals; a juvenile and one unsexed adult.

Pathology

Unsurprisingly, given the poor condition of the remains, few pathological lesions were observed. Some lesions were recorded in individuals from *in situ* deposits and potentially from some amongst the redeposited remains. Morphological variations/non-metric traits were also noted in the remains of three individuals (*in situ* deposits from graves F7, F206 and F446).

Parts of three erupted permanent dentitions were recovered; two late Neolithic dentitions (60 teeth, 32 socket positions), and one early Bronze Age (19 teeth). One case of *ante mortem* tooth loss was recorded (1/46 overall; 1/32 late Neolithic). No dental caries was observed. One case of dental abscesses (slight/small) was recorded (2/46; 2/32 late Neolithic).

Slight osteophytes (irregular growths of new bone along joint margins, commonly reflective of age-related wear-and-tear; Rogers and Waldron 1995, 20-31) were observed in one spinal joint from bone within a redeposited context (D59).

There is some evidence for *peri-* or *ante mortem* cut marks on bone (D1538) from pit F1318 in Outer Arc Segment 5; one of several fragments of largely unidentifiable human bone appears to represent the remains of a vertebra and to have a clean, sharp, almost polished cut in it. The bone is heavily eroded and fragmentary, however, and both the bone identification and the cut-mark are inconclusive.

Little comment can be made regarding the implied health of the individuals or populations from which they derived on the strength of the surviving evidence, which is incomplete and probably unrepresentative of the true status. The possible cut mark is intriguing. That to the vertebra, if genuine, could be indicative of decapitation, but there is insufficient evidence to be conclusive about the lesion let alone its *peri-* or *post-mortem* status.

Concluding remarks

The human bone assemblage from the site is small, spatially dispersed but temporally discrete in its distribution. Although there are some similarities between the few early Neolithic deposits within the causewayed enclosure and those from similar monuments elsewhere – fragmentary, incomplete skeletal elements (predominantly skull), charring and possible cut marks as, for example, at Hambledon Hill (McKinley 2008) –

Context	Cut	Deposit type	Phase	Quantification	Age/sex	Pathology	Comment
1 ON 325		redeposited	?	1) 8 frags a u l 2) 1 frag l	subadult/adult >16 yrs adult >18 yrs		4-5; old dry-bone breaks
2/6	7	*in situ* burial	late Neolithic	*c* 37%	adult *c* 40-55 yrs ??male	*ante mortem* tooth loss; dental abscess?; calculus; morphological variation – 8 wormians	3-4; old worn dry breaks
4 <3>	7	redeposited	?late Neolithic	4 frags s a u	subadult/adult >16 yrs		4-5
5 <4>	7	?= 2/6	?late Neolithic	scraps	?human		5+
59 ON 65	44	redeposited	?early Neolithic	1 a	adult >25 yrs	osteophytes – L articular process	2-3; old worn breaks
231	206	*in situ* burial	late Neolithic	*c* 15% s l	adult *c* 40-60 yrs ??male	calculus; morphological variation – pegged maxillary left P1	3-4; old dry breaks
357 ON 369	364	redeposited	?late Bronze/early Iron Age	*c* 5% l	adult *c* 18-45 yrs male		2-3; old dry breaks
367	364	redeposited	late Bronze/early Iron Age	*c* 2% s	adult *c* 20-45 yrs male	?cut marks – skull	2; old dry breaks
371	?406	redeposited	late Bronze/early Iron Age	*c* 1% s	adult *c* 30-45 yrs		2
407 ON 314	?406	redeposited	late Bronze/early Iron Age	*c* 6% s l	min. 1: subadult/adult *c* 16-25 yrs male		3-5; dark staining
428: ON 594	?406	redposited	late Bronze/early Iron Age	*c* 2% s	adult >30 yrs		4
438 <9>	439	redeposited	?early Bronze Age	1) *c* 1% s l 2) <1% l	juvenile *c* 8-10 yrs adult >18 yrs	?grave cut with no *in situ* remains?	4-5+; 4 tooth germs from foetal canid-type
445	446	*in situ* burial	early Bronze Age	*c* 30% s u l	adult *c* 25-35 yrs ?female	morphological variation – lambdoid ossicles	5-5+
477	478	*in situ* burial	late Bronze Age/early Iron Age	*c* 2% s u l	subadult c 14-17 yrs ?male	calculus	3-4; many recent breaks; darker colour than most
604 ON 1007	511	redeposited	?early Bronze Age	*c* 2% l	subadult/adult >13 yrs		5
1387	1388	redeposited/ ?placed	early Neolithic	*c* 8% s l	infant/juvenile *c* 4-6 yrs		Old dry breaks; dry-bone charring
1451/1538	1539	redeposited	early Neolithic	*c* 12% s a	subadult/adult *c* 16-30 yrs ??female	cut mark? – vertebra	3-5+; some bone destroyed for C14 prior to analysis

Table 20. Human skeletal remains. Key: s, skull; a, axial skeleton; u, upper limb; l, lower limb; ON, object number.

the assemblage is too small to allow any conclusive parallels to be drawn.

Previous osteological evidence for the Neolithic in Kent is sparse and mostly early in date (Mays and Anderson 1995). The majority of the less than 20 individuals identified derived from sites in the northern half of the county and generally appear to represent unsexed or insecurely sexed adults (*eg* Wells 1966). The additional numbers from Chalk Hill, although small, represent a significant addition to these previously low numbers.

The small early Bronze Age group appears similar to previous finds from Kent for this period, which have generally comprised singletons, chiefly from graves located in the east of the county, though finds made during the Channel Tunnel Rail Link (CTRL) project have extended the geographic range of finds of this date (Perkins and Gibson 1990; Anderson 1994; Parfitt 2004; McKinley 2006).

Animal bone

Robin Bendrey

Preservation and taphonomy

The animal bone assemblage from Chalk Hill shows variable states of preservation. Some contexts have yielded very well preserved bone, but most bone suffered from poor preservation with eroded surfaces. The latter condition severely restricts the information on modifica-

tions made to the bone surfaces, such as butchery marks and carnivore gnawing. The high proportion of unidentified fragments (Table 21) is due to the poor conditions of preservation. In some contexts a comparatively small number of bones have been reduced to many fragments. This can be seen, particularly, in the material from the Inner and Middle Arcs of the causewayed enclosure.

Bone weight was recorded for the Chalk Hill assemblage. The problems of using bone weight to quantify assemblages are recognised (for example see O'Connor 1982, 6), in particular where variable states of preservation exist, and this method is not applied here as a matter of course. However, bone weight is employed on occasion to present an alternative perspective to other forms of quantification, such as fragment count (NISP) and context frequency (O'Connor 1985), with the above limitations accepted.

Almost all contexts produced evidence of root etching. The presence of root etching on animal bones from archaeological sites is thought to be caused by acid excretion from plant roots or fungi associated with decomposing plants, but is not yet fully understood (Lyman 1994, 375-7). Lyman (*ibid*, 376) states that the 'presence of root etching indicates that the bone existed in a plant-supporting sedimentary environment for at least part of its taphonomic history'.

As previously stated, the surface erosion of the assemblage has limited the scope for analysis of gnawing and will also severely hamper attempts to quantify it. The low levels recorded probably reflect, to a large degree, the poor surface preservation of the bone rather than the actual number of bones that were gnawed. In the better-preserved contexts, such as the assemblages from Segments 7 and 8 of the causewayed enclosure Outer Arc, the identification of carnivore gnawing at low levels suggests relatively quick burial.

The early Neolithic 'causewayed enclosure'

Animal bones were recovered from all three arcs of the early Neolithic causewayed enclosure. The quantities of bone, however, vary considerably; the Inner Arc yielded 116 bone fragments, weighing 128g; the Middle Arc produced 89 fragments, weighing 105g; and 2,240 fragments, weighing 24,396.5g, derived from the Outer Arc.

Taxonomic representation and quantification

The Inner Arc

Very little animal bone was recovered from the Inner Arc of the causewayed enclosure, and only two fragments of cattle were identified. This assemblage is poorly preserved.

The Middle Arc

The Middle Arc also yielded a relatively small bone assemblage. Cattle was the most common taxon identified, with sheep/goat also represented. This material is very poorly preserved, and much of it consists of loose teeth and fragments of tooth enamel.

The Outer Arc

Cattle, sheep, pig and roe deer were identified in the larger assemblage from the Outer Arc. In this assemblage, cattle provide some three-quarters (77 per cent) of the identified bones and 98 per cent of the identified assemblage by bone weight (Fig 56). Over one-third of the Outer Arc cattle assemblage, by fragment count (NISP), is from a single context (D59, from pit F1298, Outer Arc Segment 5). Sheep/goat is the second most common taxon, represented by 102 bone fragments. Only sheep skeletal elements, and no goat, were positively identified, and so all sheep/goat fragments were attributed to sheep in the following discussion of the early Neolithic material. Much of the sheep assemblage (62 fragments) derives from two probable skeletons from deposit D1473 (from pit F1683, Outer Arc Segment 3). Pigs are relatively rare in the hand-recovered assemblage, and a single bone was identified to roe deer. The state of preservation of the animal bone from the Outer Arc ranges from very good to very poor, although most was in the middle of this range. Very good preservation was recorded amongst the material from earlier pits in Segments 3 and 5.

Seventy-one sieved samples from the Outer Arc produced bone. Cattle bones were recorded from nine samples, sheep from four, and pig from seven. This suggests that both sheep and pig are more common, relative to cattle, than shown by the hand-recovered bones. It also suggests that pig may have been more common than sheep. The under-representation of pig and sheep is probably due to both preservation and recovery bias.

The size of assemblages from deposits D59 and D1473 obfuscate patterns in the rest of the assemblages, but exclusion of these two contexts from the fragment counts indicates that cattle contributed around 70-90 per cent to the identified bone fragment count, and sheep contribute 10-20 per cent, in the Outer Arc deposits (Fig 57).

Pig is best represented in the earliest deposits of the Outer Arc, present in very small proportions in latter phases and absent from the assemblages in the latest pits, even though these assemblages from Outer Arc Segments 3 and 5 are rather large. Pig is also absent from sieved samples in the later features. Pig, therefore, appears to be more common in the earlier period of use of the Outer Arc. However, this evidence derives from Segments 3 and 5 alone, and the absence of one species from these two segments cannot be taken as evidence for its absence from the site at this time.

	Inner Arc	Middle Arc	Outer Arc	Parallel ditches	Burials F7 & F206	Early Bronze Age ring-ditch & burials	Colluvium	Late Bronze Age/ early Iron Age enclosure	Anglo-Saxon features	Medieval ditches	Unphased features	Modern/natural features
cattle	2	78	370	59	2	8	19	373	3	65	9	12
sheep/goat†	-	4	102	2	-	-	2	108	5	6	-	12
(sheep)	-	-	*46*	-	-	-	-	*28*	*2*	*0*	-	*-)*
(goat)	-	-	-	-	-	-	-	*5*	-	*0*	-	*-)*
pig	-	-	9	-	-	-	-	28	1	5	-	6
horse	-	-	-	1	-	-	-	28	-	21	-	-
Cf horse	-	-	-	-	-	-	-	0	-	19	-	-
dog	-	-	-	-	-	-	-	3	-	0	-	-
cat	-	-	-	-	-	-	-	0	-	3	-	-
roe deer	-	-	1	-	-	-	-	0	-	0	-	-
red deer	-	-	-	-	-	-	-	2	-	0	-	-
cetacean	-	-	-	-	-	-	-	1	-	0	-	-
cattle-sized	68	-	970	235	1	101	104	608	17	513	9	15
sheep-sized	4	-	289	2	-	6	6	81	10	8	-	1
indeterminate	42	7	499	15	-	14	4	68	17	14	32	2
Total	**116**	**89**	**2286**	**314**	**3**	**129**	**135**	**1333**	**55**	**654**	**50**	**48**

Table 21. Distribution of hand-recovered animal bone, by number of identified fragments (NISP).

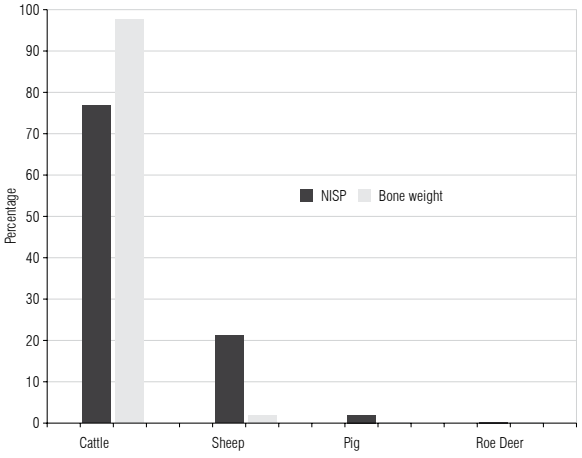


Fig 56. Distribution of Outer Arc identified hand-recovered animal bone, by NISP and bone weight.

The distribution of the identified taxa by segment indicates that only cattle bones are identified from Segment 1 and material from post-holes cutting the upper deposits of segments (Table 22). These assemblages however tended to be more poorly preserved than those from Outer Arc Segments 2, 3 and 5, and the sole presence of cattle is likely to be, in part, a product of preferential destruction of the smaller taxa. Also, in archaeological mammal bone assemblages, the number of taxa is generally closely correlated with the number of identified specimens (Bendrey 2007, 13-60), and it would therefore be expected that the smaller assemblages would produce fewer taxa.

Contextual analysis

The Inner and Middle Arcs

Identified fragments in assemblages from the Inner and Middle Arcs are too few to explore patterns of deposition and the high presence of loose and fragmented teeth suggest that conditions of preservation have strongly influenced the composition of these assemblages. Evidence for burning on bone and burnt bone fragments (*eg*

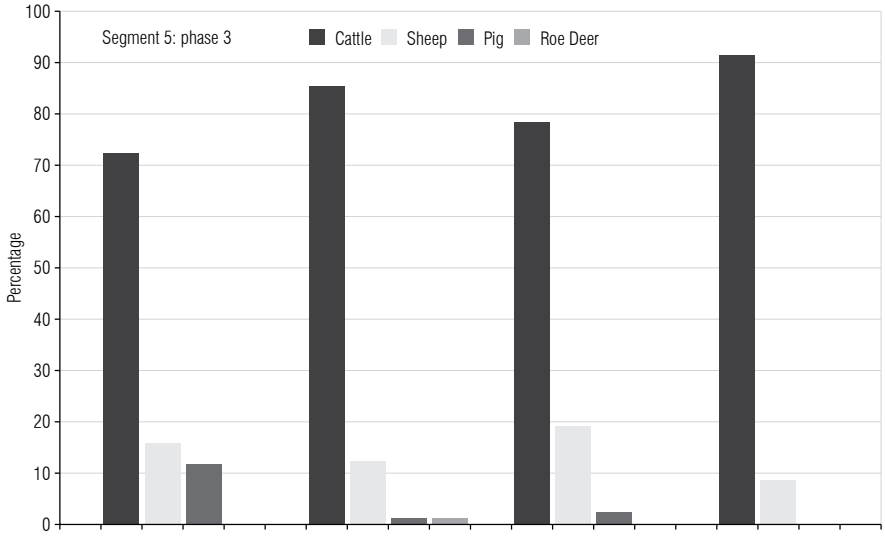


Fig 57. Distribution of identified hand-recovered animal bone, by NISP, from the Outer Arc. Bones from contexts (D59) and (D1473) have been excluded from the fragment counts.

Table 22. Distribution of identified hand-recovered animal bone from the Outer Arc by feature and segment (NISP). † includes 130 cattle bones from context (59). ‡ includes 62 sheep bones from context (1473).

	Segment 1	Segment 2	Segment 3	Segment 4	Total
cattle	46	22	248†	44	360
sheep	-	1	28	73‡	102
pig	-	2	2	5	9
roe deer	-	-	1	-	1
Total	**46**	**25**	**279**	**122**	**477**

Pl 13) are relatively common in the Inner Arc assemblage compared to that from the Middle Arc (Fig 58).

Burnt bone is also well represented in the sieved samples from the Inner Arc, with 88 per cent of samples producing burnt bone and 91 per cent of the bone, by weight, exhibiting burning. Although burning also appears to be common in the Middle Arc sieved samples the quantity of bone is too small to make any firm conclusions (there are only five bulk sieved samples, which yielded just 14 grams of bone).

Inner Arc bulk sieved samples produced small quantities of burnt bone from Segments 1, 3-5, 6-8 and 10, and evidence for burning from the hand-recovered material derived from Segments 1, 3 and 6-8. Most of the burnt bone was white in colour (calcined bone), and quantities also exhibited grey and black colouration (carbonised bone); the black carbonised bones are suggestive of burning at lower temperatures, such as those from campfires, and the calcined bone from hotter temperatures, such as cremation pyres, although temperature and time exposed to the heat will both affect the evidence for burning (Lyman 1994, 384-92). This evidence could be used to suggest that one of the activities that occurred near or in the Inner Arc involved a process that produced burnt bone. Indeed, it is notable that at Etton, Cambridgeshire, Armour-Chelu (1998, 288) records that the majority of the bones from the interior of the monument were cremated.

Armour-Chelu also suggests that burnt and unburnt bones both found in one context probably derived from introduced material, whereas solely burnt bone could suggest burning *in situ* (1998, 282). Although some contexts/samples produced solely burnt bone, these quantities are all small and do not appear sufficient to suggest *in situ* burning. The situation at Chalk Hill bears a certain likeness to, and in practice may perhaps have been similar to, that seen in the interior features at Etton, where:

> "Transport of the burnt bone is also implicated by the composition of the assemblage. The numbers of burnt bones from these pits were occasionally quite high, but the fragments were very small and seem to represent little more than a scoop of burnt material. This suggests that the bones were burnt elsewhere and then transported for burial within the pits" (Armour-Chelu 1998, 282).

There is, however, an alternative explanation for the relatively high presence of bone exhibiting burning in the Inner Arc fills – especially when compared to the data from the Outer Arc – and that is that it could be a product of the differential preservation. McKinley and Bond (2001, 288) suggest that at sites with hostile preservation calcined fragments may be the only evidence of animal bone that survives, and the high proportion of burnt bone

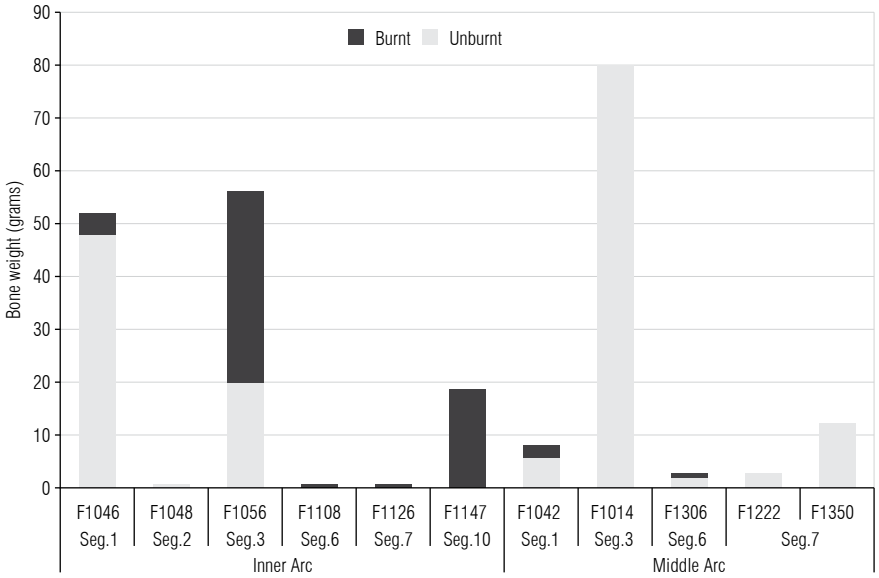


Fig 58. Hand-recovered animal bone from the Inner and Middle arcs: comparison of unburnt bone to bone exhibiting buring (by bone weight).

in the Inner Arc at Chalk Hill could also be a product of the poor preservation of this material. It must also be remembered that the quantities of Inner Arc bone under consideration are small; 128g of hand-recovered bone and 131g of bulk sieved bone.

The Outer Arc

All of the Outer Arc features and segments exposed in the excavated area produced animal bone, although the quantities from individual segments vary considerably (Table 22). What Hill (1995) terms articulated or associated bone groups (ABGs), were present in a number of features in the Outer Arc. A summary of these bone groups is provided in Table 23.

A number of sets of articulated bones were identified. The archaeological significance of these bones lies in the fact that they were probably deposited when still connected by soft tissue, and therefore butchery/consumption/manipulation of carcass parts probably occurred shortly before deposition. The most commonly identified articulations, by far, are the proximal radius and ulna, and parts of the hock joint. Other articulated groups are represented by single examples.

There appears to be a bias in the side attribution of the radius/ulna and hock articulations to the side of the body (Table 24). Unfortunately, the numbers of cases are too few to show that there is a significant association between the side of the body and the articulated joint represented (using the chi-square test ($\chi 2$), expected frequencies should be greater than five). However, the bias indicated in Table 24 suggests that the representation of these articulated bone groups is not random, that some degree of selection occurred and that there was a structure to the deposits.

Selection is also evident in the bones from context D59 (pit F1298, Outer Arc Segment 5). Only cattle bones recovered from this context, derived from a minimum of six animals (Fig 59). Also femora appear to be preferentially deposited within this context, and a high representation of radii and ulnae is also evident here.

The animal bone from later pits in Outer Arc Segment 3 also suggests a degree of repetition/duplication; pit F1683 produced two female domestic cattle skulls and the bones of (at least) two sheep. The absence of pelves and femora from the collection of sheep bones suggests that the skeletons were not deposited as complete articulations; rather they may have been deposited as butchered 'bits'. One of the cattle skulls was directly associated with the sheep bones.

It is evident that the articulated/associated bone groups derive from the segments that produced the best preserved and largest animal bone assemblages. The assemblages from the Inner and Middle Arcs were generally very poorly preserved, and preservation in the Outer Arc from Segment 1 was mostly poor, with some fair. Bone surface preservation was often too poor in these contexts to allow identification of carnivore gnawing, and it is not possible to tell the degree of scavenger access to this material. The general absence of carnivore gnawing from other segments from the Outer Arc that exhibit very good preservation (Segments 3 and 5) can be used to argue that the bone deposits were covered relatively quickly after deposition (as seen at other causewayed enclosures; Oswald *et al* 2001, 41 and 123). This does not mean that dogs did not have any access to the material in the Outer Arc; carnivore gnawing is recorded on one fragment from Outer Arc Segment 3 and two from Outer Arc Segment 5, and coprolites are recorded from Outer Arc Segments 2 and 5.

Outer Arc segment	Brief description of articulated/associated bone groups
Segment 2	collection of cattle and cattle-sized ribs
	right cattle hock joint
	pig proximal phalanges
	left cattle hock joint
Segment 3	domestic cow cranium
	domestic cow cranium
	concentration of sheep bones, representing at least two animals
	left cattle radius and ulna
Segment 5	left cattle hock joint
	left cattle metacarpal and three carpals
	left cattle hock joint
	right cattle hock joint
	left cattle and right mandibles
	left cattle radius and ulna
	right cattle radius and ulna
	right cattle radius and ulna
	right cattle radius and ulna
	sequence of cattle thoracic and lumbar vertebrae
	left cattle hock joint
	right cattle radius and ulna
	left sheep carpals
	right sheep humerus, radius, ulna and metacarpal
	left cattle hock joint
	left cattle hock joint
	right cattle radius and ulna
	right cattle hock joint
	left cattle hock joint
	right cattle radius and ulna

Table 23. Summary of articulated or associated bone groups from the Outer Arc by feature or segment in approximate stratigraphic sequence.

The relatively high proportions of burnt, and in particular calcined, bone from the Inner Arc (Fig 58) could suggest practices of deliberate deposition (as discussed above). However, the very small sizes of these assemblages and the possible biasing effect of the conditions of preservation on the proportion of burnt bone recovered mean that such a conclusion cannot be made with any certainty. Evidence for burning will be considered further in the section on cattle bones below.

Cattle bones

Size, shape, sex and age

Size is the main criterion used to differentiate between domestic and wild cattle in archaeozoological analyses. Domestic cows and wild bulls can be clearly separated on the basis of size, but there is overlap in the range of some measurements between domestic bulls and wild cows (Grigson 1999, 213-14). Where samples of measurements from sites are too small to allow such patterning to be discerned, scaling techniques can be used in which the measurements are plotted relative to a standard measurement (Albarella 2002; Payne and Bull 1988). Grigson (1999, 215) used measurements from a complete skeleton of an adult wild cow (*Bos primigenius*) from Ullerslev, Denmark as the standard for her analysis of the Windmill Hill cattle bones.

Measurements of the early Neolithic cattle bones from Chalk Hill were plotted relative to the measurements from the Ullerslev wild cow, along with early Neolithic cattle measurements from the 1988 excavations at Windmill Hill (Grigson 1999) and the ABMAP database of animal bone measurements (Serjeantson 2005) for comparison (Fig 60). Taken together, the three sets of early Neolithic cattle measurements suggested the trimodality in measurements referred to above; while a single large value from an auroch bone could be seen in the ABMAP data,

	left	right
radius/ulna	2	6
hock joint	7	3

Table 24. Side attribution of articulated proximal radii and ulnae and articulated hock joints from the Outer Arc.

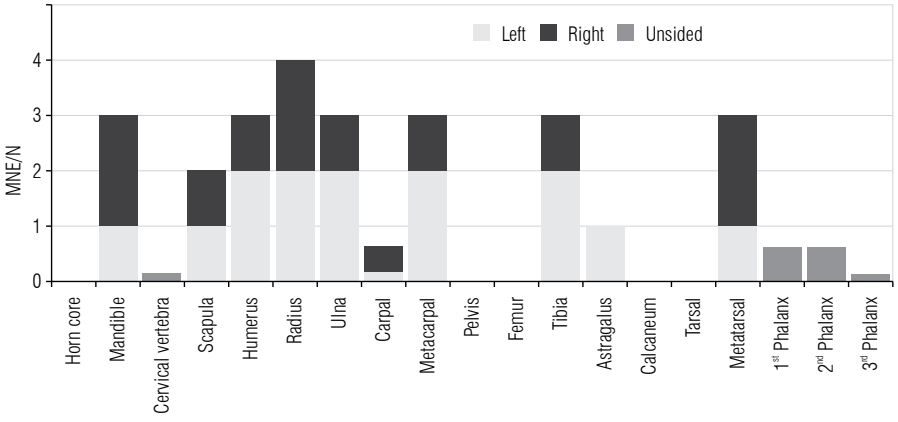


Fig 59. Representation of cattle skeletal elements from context (D59), F44, in the Outer arc, Segment 5 [minimum number of elements (MNE) dividied by the number of times (N) that element occurs in a single skeleton].

the bulk of each distribution can be safely assigned as domestic cattle and an intermediate group of domestic bulls/wild cows can be inferred from the Windmill Hill data (Grigson 1999, fig 168).

The majority of the Chalk Hill cattle bones, then, can be safely assigned as domestic cattle, although there are a few large specimens in the right tail of the distribution that are close in size to the intermediate group in the Windmill Hill data (Fig 60). The distribution of the Chalk Hill cattle log ratio values was positively skewed (skew = 0.363, *ie* a greater number of scores are clustered at the lower end of the distribution). This may be explained as either many domestic cows and few domestic bulls, or many domestic cattle and few wild cows.

It is the case that measurements from different areas of the skeleton will exhibit greater or lesser degrees of variation according to the ages and sexes of the animals contributing to a sample (*eg* Payne and Bull 1988) and plotting all the measurements together against a standard will obscure these details. Differences in conformation between the Ullerslev wild cow and the Windmill Hill cattle will also obscure patterns, such as sexual dimorphism, in the data.

Long bone width measurements can be used to explore sex ratios within samples (*eg* Legge 1981, figs 4 and 5). Original analysis of the assemblage also plotted some of the more common individual bone width measurements from the Chalk Hill Outer Arc cattle relative to the Ullerslev wild cow standard (Fig 61). This revealed bimodality in the radius Bp data that can best be interpreted as sexual dimorphism, rather than the presence of domestic and wild cattle, and the spreads of results for the other measurements suggested that just cows were represented. The proportions of two complete metatarsals

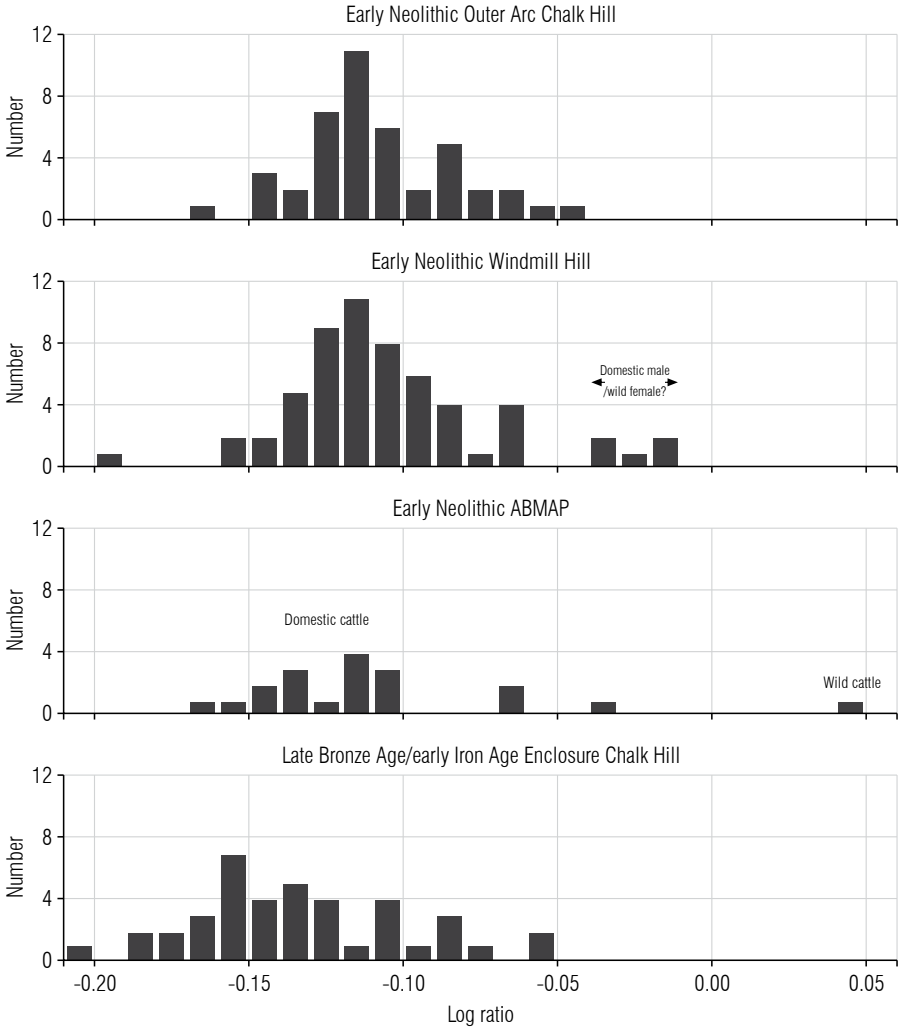


Fig 60. Logarithmic differences of archaeological cattle bone measurements from the standard wild animal (the Ullerslev wild cow: Grigson 1999, 214-15). Data compared include early Neolithic measurements from Chalk Hill (Outer Arc), Windmill Hill (Grigson 1999, appendix 1.5) and the ABMAP database (see Serjeantson 2005) and also the late Bronze Age/ early Iron Age enclosure at Chalk Hill. Measurements used consist of: lower third molar length; humerus BT; radius Bp; metacarpal Bp and Bd; astragalus GL; calcaneum GL; metatarsal Bp and Bd (measurements defined in von den Driesch 1975).

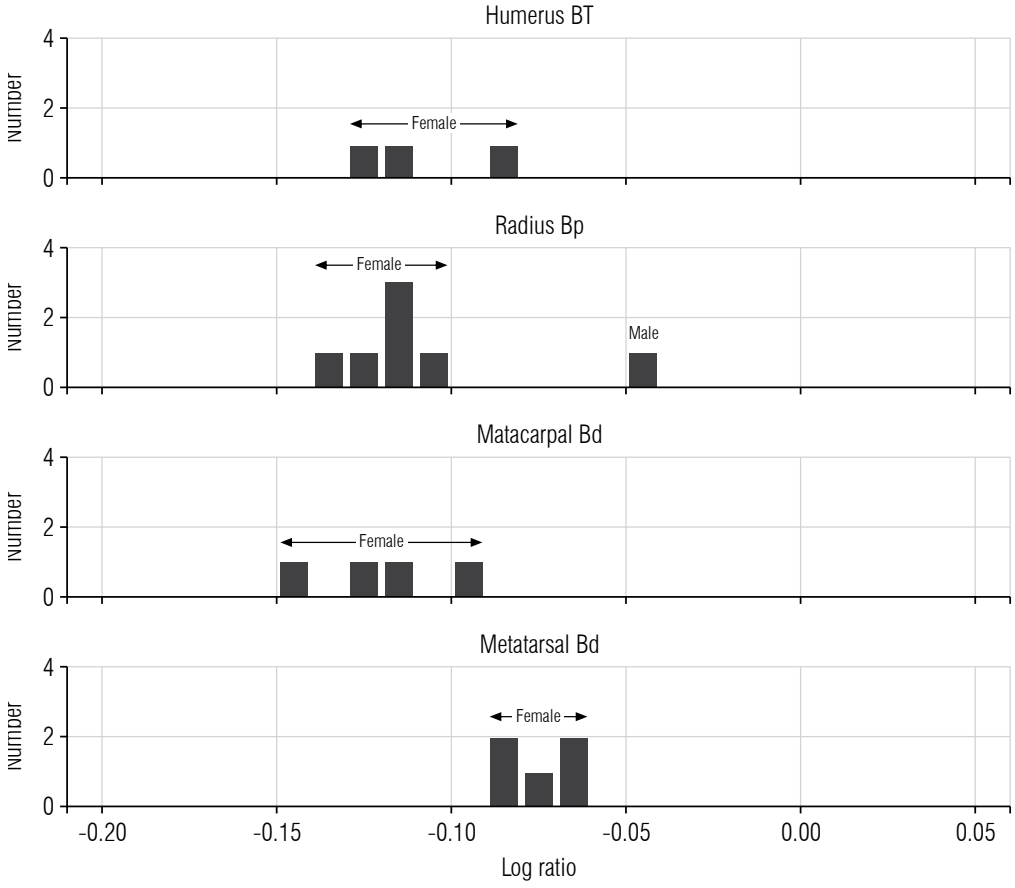


Fig 61. Logarithmic differences of individual Outer Arc cattle bone width measurements from the standard wild animal [the Ullerslev wild cow (Grigson 1999, 214-15)] with suggested sexes annotated.

also indicate that they are from cows. These suggested sex divisions were also supported by the late Bronze Age/early Iron Age enclosure analysis (discussed below).

The early Neolithic cattle metrical data from Chalk Hill therefore points towards only domestic cattle being present, and no wild cattle. This data can be taken further to argue that the bones recovered represent predominantly domestic cows, with a smaller number of domestic bulls/castrates.

There is little other evidence for the sex of the Chalk Hill cattle sample. Two complete crania, both deposited in pit F1683 (Outer Arc Segment 3), can be identified as female. Three early Neolithic horncores also provided measurements. The size and shape of these specimens suggest that all are female (Grigson 1982b). There were no sexable pelves.

The recorded data on cattle tooth eruption and wear were placed into Halstead's (1985) age stages (Fig 62), but only the Outer Arc provided specimens that could be placed into these.

The total number of left and right mandibles and the maximum number of mandibles per age stage for either left or right side (*ie* whichever is the larger) were analysed. The latter method is used to avoid possible duplication of the same individual (Legge 1992, 22-5). Plotting the data in this way excluded only a single mandible from the relatively small early Neolithic sample, from a probable pair from context D59 (pit F1298, Outer Arc Segment 5). Although a limited sample, the dental data indicates slightly higher representation of cattle in the adult and 1-8 month age stages. This could suggest a similar interpretation to that proposed by Legge (1992, 25-31) for Middle Bronze Age Grimes Graves, in which the culling of calves was seen as part of a milk producing strategy (although alternative models have been presented to challenge Legge's interpretation; see McCormick 1992; 1998).

The cattle epiphyseal fusion data disagrees somewhat with the dental data. All surviving fusion points on scapulae and pelvis acetabuli are fused, suggesting that all cattle lived beyond the age of *c* 10 months (Table 25). There are, however, four neonatal and very immature post-cranial bone fragments present to indicate that post-cranial skeletal parts of less than 10 months were being deposited on site. These few very young bones hint at the possibility that cattle may have been present on site during calving, in that they may represent natural birth mortalities. It is likely that immature, unfused, bones may be under-represented due to taphonomic attrition (see below). It is also possible that different parts of cattle of differing ages were deposited in the arcs of the causewayed enclosure.

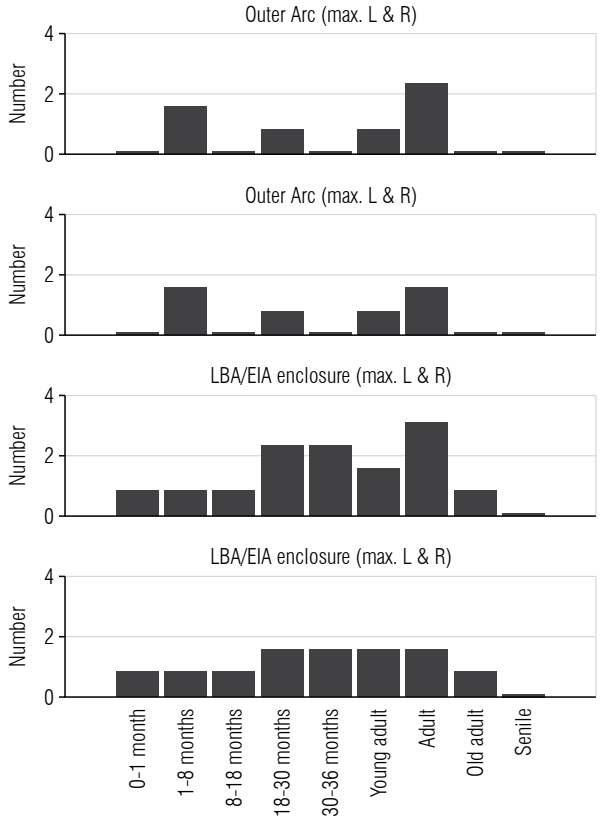


Fig 62. Cattle dental age data for Outer Arc and late Bronze Age/ early Iron Age enclosure, plotted for both the total number of left and right mandibles (the gross sample) and the total number of left or right mandibles per age stage (recorded following Grant 1982, age stages after Halstead 1985).

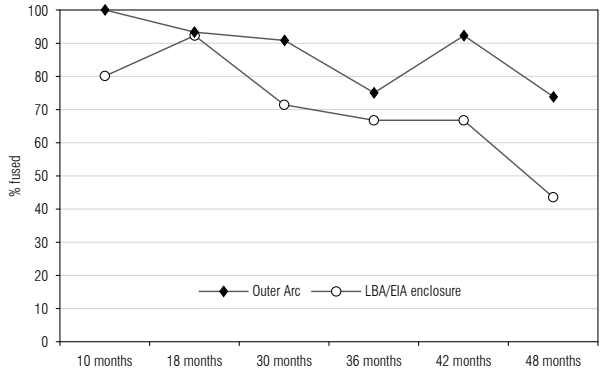


Fig 63. Cattle epiphyseal fusion summary: the proportion of epiphyses fused in each category.

The epiphyseal fusion data also indicates a higher proportion of adult animals being used at the site, with around 74 per cent of animals living beyond the age of 48 months old (Fig 63). Again, this pattern could be affected by the conditions of preservation or the differential deposition of skeletal parts from different age cattle.

Small sample size restricts the conclusions available from the analysis of the age data. The larger post-cranial epiphyseal fusion dataset would seem to suggest that around three-quarters of the cattle lived beyond the age of four, and therefore supplied some secondary product (as well as meat), such as milk, traction or calves. The identification of the majority of adult cattle as female and the presence of a number of 1-8-month-old calves in the dental sample may support the idea of milk production. Taphonomic attrition may have seriously influenced the surviving bone sample, biasing it towards older animals.

Skeletal element representation and taphonomy

Minimum number of element calculations for the Outer Arc cattle skeletal elements highlight the high abundance of femora in the assemblage (Fig 64). This phenomenon is in part due to the abundance of this element in the large assemblage from context D59. Exclusion of the context D59 assemblage, (pit F1298, Outer Arc Segment 5) reveals a situation in which the femur is still common, but is not the most abundant element (Fig 65). The low representation of the smaller and less dense elements, such as phalanges and vertebrae indicate that the assemblage has been mediated to a certain degree by taphonomic attrition. In the same way, the high representation of certain elements is probably in part due to the robusticity of these bones aiding their survival. An analysis of the parts of cattle humeri present indicates that it is the more dense and earlier fusing distal epiphysis, and distal part of the diaphysis (zones 7 and 8; Dobney and Rielly 1988), that are best represented compared to the less dense proximal epiphysis and diaphysis (Fig 66). In the same way, the more robust and earlier fusing proximal radius is more abundant than its distal end (Fig 67).

Studies of density-mediated attrition have compared the representation of skeletal elements with the average bone mineral densities of those elements to explore patterns in their survival (Lyman 1994). The frequency of the Outer Arc humerus and radius morphological zones was plotted against average bone mineral densities (calculated for bison by Kreutzer 1992; data listed in Lyman 1994, table 7.6), indicating that the assemblage has undergone density-mediated attrition (Fig 68). The relative proportion of immature cattle remains originally deposited in the enclosure is therefore likely to be significantly under-represented by the excavated assemblage.

Cut marks were located near the articulations of the cattle leg bones and represent the process of disarticulation of the limbs (including one distal humerus; three proximal radii; one proximal ulna; one carpal; one naviculo-cuboid; one proximal metatarsal, the latter two bones in articulation).

Burning/heating was recorded on 25 cattle fragments in the Outer Arc assemblage. It was most common on

		Outer Arc			Late Bronze Age/early Iron Age enclosure		
	Maximum age of fusion (Silver 1969)	fused	unfused	fusing	fused	unfused	fusing
scapula	10 months	8	-	-	3	-	-
acetabulum	10 months	3	-	-	5	2	-
distal humerus	18 months	9	-	2	8	-	-
proximal radius	18 months	15	-	-	9	-	-
proximal phalanx	18 months	4	-	-	6	1	-
medial phalanx	18 months	-	-	-	1	1	-
distal tibia	30 months	6	1	-	3	2	-
distal metacarpal	30 months	4	-	-	2	-	-
distal metatarsal	36 months	6	2	-	6	3	-
proximal femur	42 months	6	1	-	3	2	-
calcaneum	42 months	6	-	-	1	-	-
proximal humerus	48 months	5	-	2	-	3	-
distal radius	48 months	3	1	-	5	3	-
proximal ulna	48 months	3	2	-	-	1	-
distal femur	48 months	9	3	2	3	4	1
proximal tibia	48 months	8	-	-	2	1	-

Table 25. Cattle epiphyseal fusion data. Early Neolithic causewayed enclosure Outer Arc and late Bronze Age/early Iron Age enclosure.

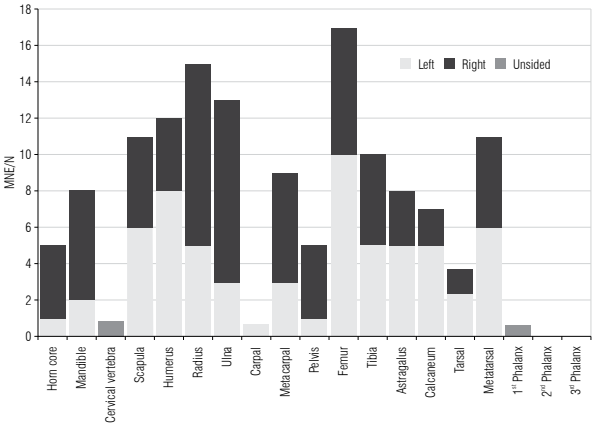


Fig 64. Representation of cattle skeletal elements from the Outer Arc [minimum number of elements (MNE) divided by the number of times (N) that element occurs in a single skeleton].

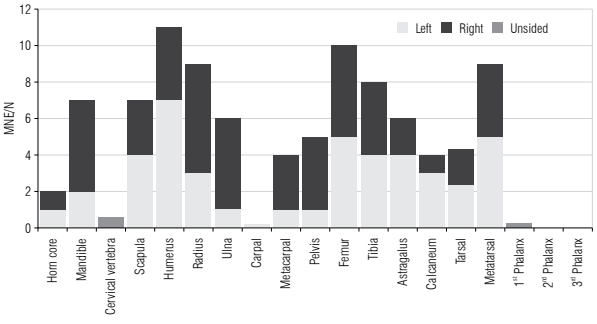


Fig 65. Representation of cattle skeletal elements from the Outer Arc excluding the bones from context (D59) [minimum number of elements (MNE) divided by the number of times (N) that element occurs in a single skeleton].

long bone mid-shaft fragments but was also recorded on the articulations of some long bones (for example Pl 13). The former may have been undertaken to facilitate marrow extraction; heating would weaken the bone, to make it easier to break open, and also melt the marrow (Dobney *et al* n.d., 25-26; Albarella and Serjeantson 2002, 41). The latter may represent the roasting of joints of meat. In such a scenario only the articular ends would show evidence for burning (*eg* Pl 14) as the other portions of the bones would have been covered with flesh when the burning took place (Lyman 1994, 389). As discussed above, the abundance of femora in context D59 might also be used as evidence that at least part of the assemblage represents post-consumption waste (Fig 59).

Taken together, the skeletal element representation data and taphonomic evidence present a picture of part of the process that contributed to the formation of the animal bone assemblage in the causewayed enclosure; whole animals were being slaughtered and used on site (although the recovered assemblage is heavily biased towards the most robust elements), the cattle were dismembered – evidenced by cut marks at the articulations of some limb bone – and then these limb bones, bearing flesh, were roasted as joints for consumption, and marrow was also exploited.

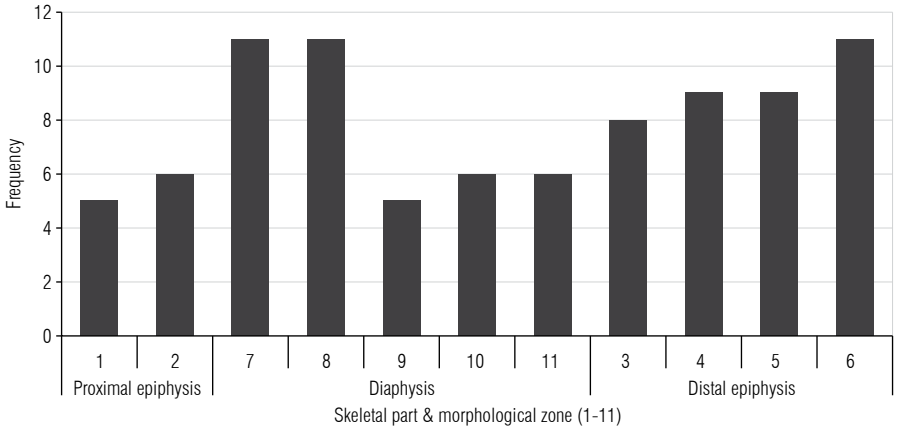


Fig 66. Frequency of morphological zones in Outer Arc cattle humeri [zones as defined by Dobney and Reilly (1988); frequency is a count of the total number of zones recorded, where >50% of that zone is present].

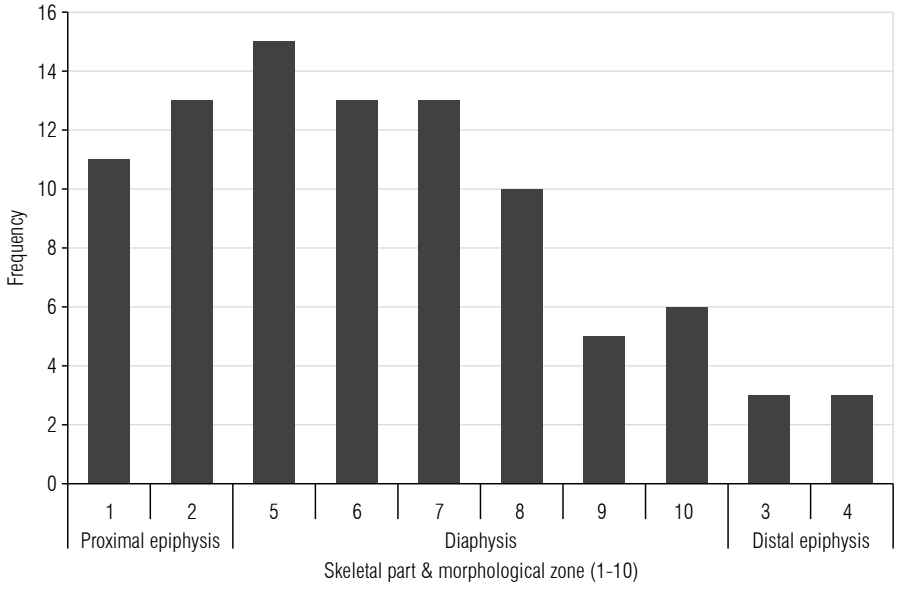


Fig 67. Frequency of morphological zones in Outer Arc cattle radii [zones as defined by Dobney and Reilly (1988); frequency is a count of the total number of zones recorded, where >50% of that zone is present].

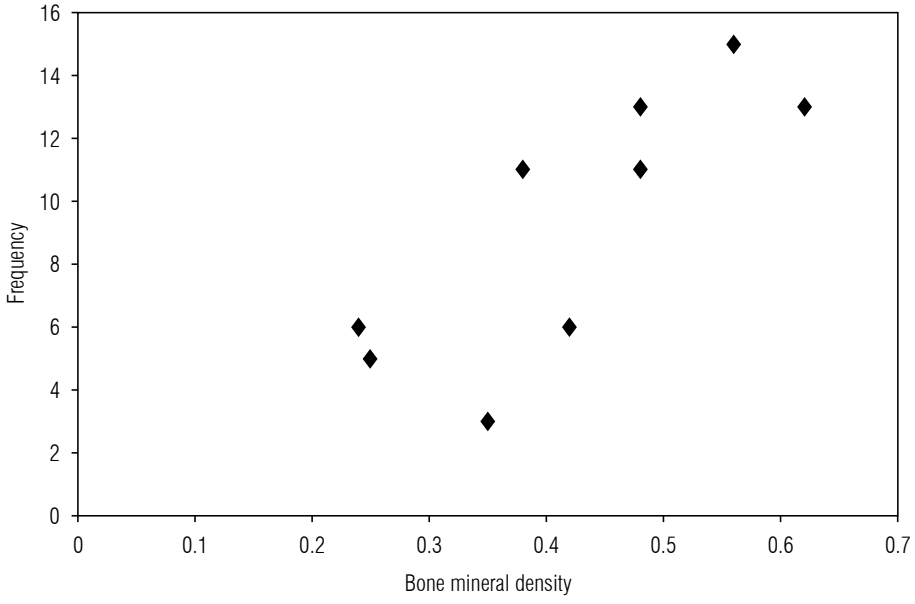


Fig 68. Scatterplot of frequency of Outer Arc cattle humerus and radius morphological zones (from Fig 66 and 67), against average bone mineral densities (calculated for bison by Kreutzer 1992; data listed in Lyman 1994, table 7.6).

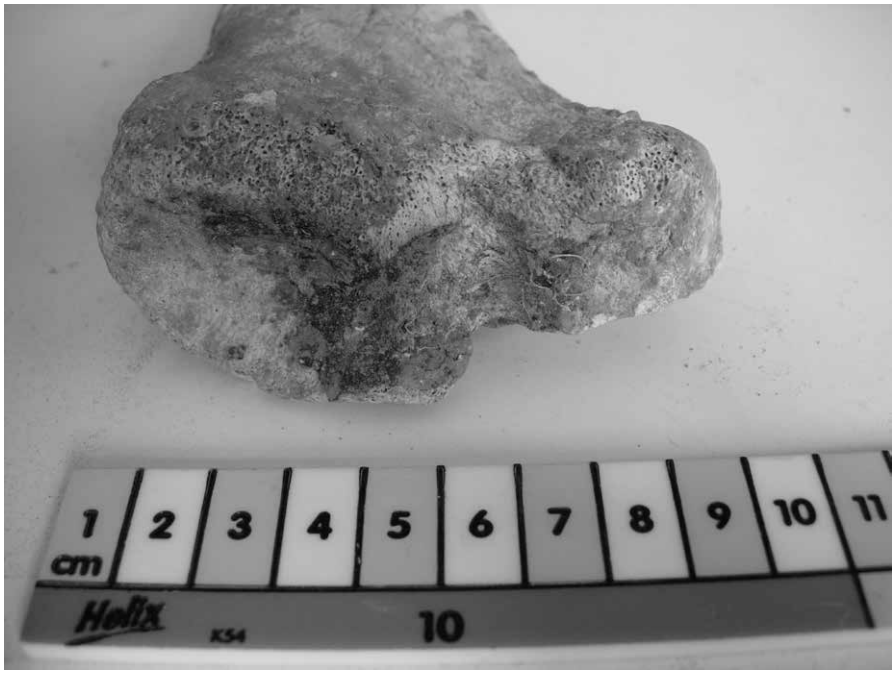
Sheep bones

Over half of the sheep bone assemblage derive from a single context (D1473, from pit F1683 in Segment 3 of the Outer Arc, and represent the bones of at least two animals (Fig 69). The remaining assemblage is relatively small and can provide little information, although it is probable that the sheep bone assemblage has been significantly affected by the conditions of preservation.

The presence of mature and immature sheep (Table 26; Fig 92) indicates that secondary products, as well as meat, were probably of importance.

A reconstructed withers height of 0.61 metres was calculated from a complete metacarpal from context D1473, following Teichert (1975). This value is at the top end of the range of contemporary data, with withers height of 0.60-0.62 metres at Maiden Castle, 0.45-0.58 metres at Etton, and 0.42-0.57 metres at Windmill Hill

Pl 13. Burnt bone from context D1146, feature F1147, Inner Arc, Segment 10.



Pl 14. Right cattle radius from context D1262, feature F1318, Outer Arc, Segment 5, exhibiting burning on the proximal epiphysis.

		Outer Arc			Late Bronze Age/early Iron Age enclosure		
		excluding context 1473		context 1473			
	fusion (Silver, 1969)	fused	unfused	fused	fused	unfused	fusing
scapula	8 months	-	-	1	3	-	-
acetabulum	10 months	1	-	-	1	-	-
distal humerus	10 months	2	-	3	4	1	1
proximal radius	10 months	1	-	4	2	-	-
phalanx proximal	16 months	-	1	3	-	-	-
phalanx medial	16 months	-	-	5	-	-	-
distal tibia	24 months	-	-	-	-	4	-
distal metacarpal	24 months	-	-	1	-	1	-
distal metatarsal	28 months	-	-	-	-	1	-
proximal ulna	30 months	-	-	-	1	-	-
distal radius	36 months	-	-	2	-	-	-
proximal femur	36 months	-	-	-	1	-	-
calcaneum	36 months	1	-	-	-	-	-
proximal humerus	42 months	1	-	-	-	-	-
distal femur	42 months	-	-	-	1	-	-
proximal tibia	42 months	-	-	-	-	1	-

Table 26. Sheep/goat epiphyseal fusion data: early Neolithic causewayed enclosure Outer Arc and late Bronze Age/early Iron Age enclosure.

(Armour-Chelu 1991; 1998; Grigson 1965; data summarised in Armour-Chelu 1998, 284).

Pig bones

Considering the degree to which the large bones of the cattle assemblage have undergone density-mediated attrition (Fig 68), it can be safely assumed that the small, and probably mostly immature, bones of pig will be significantly under-represented in the excavated sample.

No measurements and very little age data were obtainable from the very small hand-recovered pig bone sample. Age data is limited to two unfused proximal phalanges from the same context, and probably from the same animal, and an unfused cervical vertebra epiphysis.

Roe deer bones

A left roe deer tibia was recorded. This animal was likely hunted.

Discussion

The animal bone assemblage from the Neolithic site at Chalk Hill can inform us on a number of facets of past human activity.

The economy, as represented by the excavated bone remains, was clearly based upon cattle. However, it is the case that the other domestic animals present – sheep and pig – are significantly under-represented in the excavated assemblage due to taphonomic attrition.

It is problematic comparing the relative numerical proportions of taxa between sites in different areas, as local preservation conditions and the extent of individual excavations can have enormous effects on the abundance of these taxa in recovered assemblages. However some broad comments can be made from a comparison of the Chalk Hill data with some other contemporary assemblages (Table 27). The dominance of cattle in the early Neolithic assemblage at Chalk Hill is typical of causewayed enclosures in southern England. Even if cattle are assumed to be over-represented compared to the bones of the smaller animals, the much greater meat-weight of cattle means that this animal would have supplied, by far, the greatest proportion of meat to the diet. It is also apparent that the relative proportion of pig present at Chalk Hill is particularly small. To some extent this will be due to preservation and recovery bias. It may also be associated with the fact that the site is only partly excavated, as the compositions of individual segments may have varied considerably (Whittle 2003, 96-7). The sieved material would suggest that pigs were more common than is indicated by the hand-excavated bones, but to what degree is uncertain.

Wild taxa are represented by a single roe deer bone. Whittle *et al* (1999, 355) suggest that wild taxa are uncommon on sites of this date, either through a lack of exploitation of them or because, for whatever reason, they were not deposited at sites.

	cattle	sheep/goat	pig	NISP
	%	%	%	
Chalk Hill, Outer Arc	77	21	2	481
Offham, East Sussex (O'Connor 1977) †	51	33	16	61
Bury Hill, West Sussex (Bedwin 1981)	61	14	26	242
Windmill Hill, Wiltshire 1998 excavations (Grigson 1999)	66	15	19	789
Etton, Cambridgeshire, Phases 1-2 (Armour-Chelu 1998)	66	15	18	2309
Maiden Castle, Dorset, Phase 2 (Armour-Chelu 1991)	54	27	19	748

Table 27. Relative proportions of the main domestic animals in some early Neolithic causewayed enclosures from southern England (%NISP). † data cited in Serjeantson (unpublished ms 1998).

The abundance of adult female domestic cattle, and the presence of some very young cattle (again, probably significantly under-represented) indicate that dairy production was part of the animal husbandry regime. The older animals are beyond the age of slaughter expected for meat production and would probably have been kept for secondary products such as milk, breeding or traction. The younger have been culled before sufficient growth would have made it economically viable to slaughter them for meat, and so may represent calves taken from a dairy herd. Indeed, evidence for widespread dairying during the British Neolithic is now known from absorbed lipid residue analysis (Copley *et al* 2005). This work suggests that dairying was an integral component of agricultural practices from the onset of farming in Neolithic Britain.

Evidence for activities at the site are represented by material selected for deposition (although the assemblage may not represent the full range of activities employing animals and their parts on site). The relatively high proportion of burnt bone in the Inner Arc may reflect an activity that involved the production of burnt bone (although the relative abundance of this burnt material may also be associated with the conditions of preservation). The evidence from Chalk Hill bears some comparison to the situation at Etton, where small quantities of cremated animal bone were recovered from the interior features of the causewayed enclosure (Armour-Chelu 1998).

Another notable feature of the assemblage is the presence of articulated bone groups in the Outer Arc. Within this material, articulated cattle radii and ulnae and cattle hock joints are relatively common. These articulations suggest that at least some of the bone deposited retained some soft tissue, and that the material was recently butchered/consumed/manipulated. Such bone groups are recorded from throughout the duration of use of the Outer Arc. The presence of articulating bones, including hock joints, was also noted at Hambledon Hill (Legge 2008, 538-48) and Windmill Hill (Grigson 1999, 189). A key feature of the articulated bones at Chalk Hill is that there appears to be selection of the side of the body from which the joint comes. This evidence for selective deposition is key for the interpretation for the formation processes of the animal bone assemblage. As Whittle *et al* (1999, 355) state:

> "Artefacts and faunal remains could have worked their way into the ditches through a variety of processes: by accident, through casual disposal, patterned disposal routines, or intentionally 'structured' deposition."

The apparent selection of bones for deposition according to the side of the body from which they derive is suggestive of intentionality in the composition of the deposits. This side selection could also have conferred meaning (as well as the elements chosen for deposition), as left and right represent different things in different cultures (Davies 2000, 167; Edwards and Horne 1997, 125-7).

The good quality of preservation of this material and the presence of a number of articulated bone groups indicate that this material was deposited soon after butchery (often with soft tissue still attached), and the material covered quickly preventing access by scavengers. The slaughter of (at least) six cattle in a single episode (context D59, pit F1298, Outer Arc Segment 5; Fig 63) represents a very large quantity of meat, which indicates a large number of people to be fed. This, along with the evidence for consumption (high abundance of femora; evidence for roasting joints), suggests that feasting occurred on site. Such feasting – associated with the cutting of pits and deposition of bones – may be viewed within the context of a society that may not have been sedentary and which only intermittently 'visited' the causewayed enclosure (Oswald *et al* 2001, 118-19). In such a scenario feeding large groups of people who had come together at the enclosure would have involved the slaughter of a number of animals, butchery of the carcasses, cooking and finally consumption of the meat. Parts of these meals appear to have been selected and deposited, either before or after consumption. The regular selection of the same joint, such as the right forelimb (radius/ulna) or femur (Fig 69) may have held particular meaning for the Neolithic peoples. Szynkiewicz (1989), for example, presents an ethnographic case

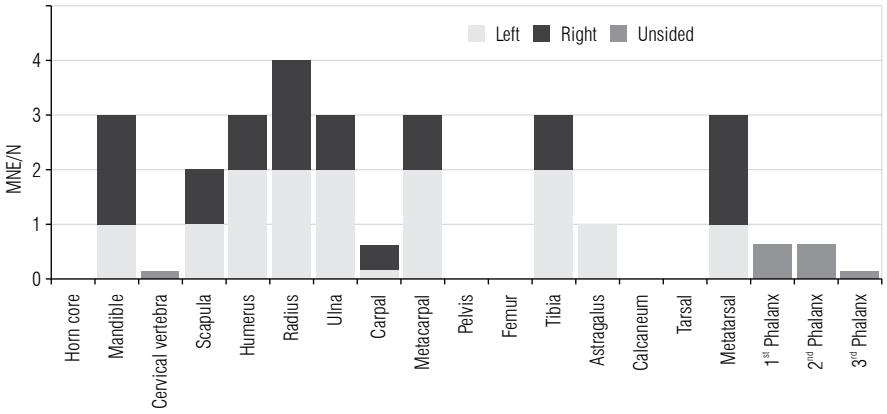


Fig 69. Representation of sheep skeletal elements from context (D1473), F1683, in the Outer Arc, Segment 3 [minimum number of elements (MNE) divided by the number of times (N) that element occurs in a single skeleton].

study (of tibial symbolism amongst the Mongols) that demonstrates that a single, particular skeletal element may possess meaning. Perhaps at Chalk Hill the selections made for deposition were token amounts of a larger whole (Whittle 2003, 96).

Communal labour is often recognised in the scale of construction of the causewayed enclosures (Oswald *et al* 2001, 2), and they are often invoked as gathering places. However, although the large quantity of cattle bones in context D59 (pit F1298, Outer Arc Segment 5) represents a large quantity of beef, suggestive of feeding a large number of people, it must be noted that most contexts produced considerably smaller quantities of bones that may be viewed as more small-scale, intimate and personal (Whittle 2003, 95-7).

On the basis of the animal bone evidence, therefore, cattle were a central part of both the economy and the activities at the site. This fits in with a broader picture of the fundamental importance of cattle to earlier Neolithic society (Ray and Thomas 2003).

The crouched burials

A small and poorly preserved quantity of material from one of the crouched burials (F7) includes a cattle metacarpal and molar fragment.

The early Bronze Age

The early Bronze Age barrow ditch (F511) produced a very poorly preserved collection of bone. Cattle was the only animal identified from the hand-recovered material (Table 21). Elements present include one upper molar, one axis vertebra, one scapula, one humerus, one radius and three metatarsals.

Six red fox teeth were identified from a sieved sample taken from F439, a possible secondary burial within the barrow. This feature produced remains from a minimum of two humans, including a child of *c* 8 years and an adult of more than 18 years. All the fox teeth are probably from the same individual, which would have been about 1-2½ months old at death, based on data in Hillson (1986, 216). Both upper and lower, and left and right, teeth are represented suggesting that, at least, the whole skull (cranium and mandible) may have originally been present. The assemblage, as stated, is very poorly preserved and it was not possible to tell whether the post-cranial skeleton was also present. There are two probable interpretations of the red fox teeth; they represent the natural death of a cub within a den (and are therefore intrusive to this stratigraphic phase); or they represent a grave good, placed in association with the human remains. If the latter is the case, the original deposit could have consisted of the skull, or more of the skeleton than just the skull, or indeed the skull with skin attached.

Foxes do not appear to have been a regular grave good in Bronze Age barrows. In a survey of mortuary ritual across southern Britain, Bristow (2001) identifies one barrow that possibly contained fox (the identification is uncertain). At this site, a bowl-barrow in Dorset (Bincombe, number 60a), an early/middle Bronze Age collared urn produced the cremated remains of what is reported as a possible fox or badger (Grinsell 1959, 93).

Conclusion

During the Neolithic it is thought that there was a high level of residential mobility, with groups moving around the landscape (Serjeantson 1998; Whittle 1997). It can also be suggested, from the unequivocal importance of cattle at Chalk Hill and other early Neolithic causewayed enclosures, that these groups 'moved to the tempo of their cattle' (Ray and Thomas 2003, 42). The regular excavation of, and deposition of cattle bones within the features at Chalk Hill may be seen within a picture of a society that moved, with its cattle, and came together intermittently for gatherings at the causewayed enclosure (Oswald *et al* 2001, 118-19; Ray and Thomas 2003). In the Outer Arc such depositions are occasionally (as in context D59, pit F1298, Outer Arc Segment 5) of a communal scale –

with the bones of many cattle suggesting considerable feasts – but are more frequently on a smaller, more 'intimate' scale of only a few bones in each context. Some of these bones appear to have been deliberately selected for deposition; perhaps the bones chosen, or the side of the animal from which they came, held meaning for the Neolithic community. As Whittle (2003, 96) has suggested, perhaps the selections made for deposition were token amounts of a larger whole.

Coprolites

Enid Allison

Poorly preserved coprolites (mineralised faeces) were recovered from bulk soil samples from two Neolithic contexts: context D1193 (sample <74>), the fill of pit F1181 (Outer Arc Segment 2) that contained a large collection of shellfish and context D1433 (sample <198>), the fill of pit F1429 (Outer Arc Segment 5; Fig 35-37).

Both coprolites contained small bone fragments (2-5mm) from unidentifiable large mammals. The presence of these fragments, together with the size and general characteristics of the coprolites, strongly indicated that they were from dogs.

Shellfish

Enid Allison

Methods

Bulk samples

The majority of the samples were from the fills of prehistoric pits constituting the segments of the 'causewayed enclosure' which, where possible, were routinely sampled at approximately 10 metre intervals. Most of the samples had volumes of 10 litres or less depending on the nature of the fills. Other (usually larger) samples were taken from the fills of discrete pits and graves. For the samples where shell was common, the weights of shell of each species was recorded and where possible a minimum number of individuals was estimated from numbers of apices for gastropods, and left and right umbones for bivalves (see Table 28).

Hand-collected shell

The hand-collected shell was identified during bulk finds processing and all fragments of each species were counted but not weighed (Table 29). Most of the shell was discarded after examination, but material from context D1193 (a fill of pit F1181, Outer Arc Segment 2; Fig 28) was retained in an unwashed state, and shell from D1180 (another fill of pit F1181) was also kept. The retained shell was subsequently re-examined by the author.

Nomenclature and ecological information

Scientific names of shellfish with common English names are given only on the first mention of individual species. Authorities for the species recorded are given in Table 30 together with ecological information following Hayward and Ryland (1995).

Results

Early Neolithic features

Several mussel shells were recovered by hand from the single fill (D1045) of feature F1046 (Inner Arc Segment 1; Fig 23-27). Four bulk samples from different locations within the same deposit produced traces of oyster (*Ostrea edulis*), cockle (*Cerastoderma edule*) and mussel (*Mytilus edulis*), and a shell of a sting winkle (*Ocenebra erinacea*) a predator of various marine molluscs and barnacles.

A single mussel shell was recovered by hand from a fill (D1586) of pit F1574 (Outer Arc Segment 3; Fig 29-32).

A whelk shell (*Buccinum*/*Neptunea*) was recovered by hand from the single fill (D2017/2029) of pit F2102 (Outer Arc Segment 1; Fig 23-27), and a small quantity of mussel and oyster shell fragments was recovered from two samples from the same fill.

Much larger amounts of shell were recovered from some of the fills of feature F1181 (Outer Arc Segment 2). The lowermost fill representing an initial phase of silting was not sampled. Several cockles were recovered by hand from a small localised dump of chalk rubble (D1331) overlying the silting deposit. Above this was a probable 'placed deposit' (D1193) that contained much cultural material in a carbon-stained matrix. It included a striking amount of marine shell among which edible winkles and cockles were by far the most abundant. The hand-collected shell from this deposit had been retained and the minimum number of individuals represented was estimated at 667 winkles, 112 cockles and a single mussel. A 24 litre sample from the same deposit produced a minimum of 155 winkles (including five very small individuals), 20 cockles and eight mussels, together with two peppery furrow shells (*Scrobicularia plana*), and 16 individuals of at least two species of top shells (Trochidae). Twelve laver spire snails (*Hydrobia ulvae*), a small coastal species found in brackish to fully marine waters (Hayward *et al* 1996) were recovered from the same deposit. The probable 'placed deposit' was overlain and sealed by another layer (D1194) in which shellfish remains were common. None were collected by hand but a 15 litre sample produced mainly winkles (34 individuals), a few cockles and mussels, and single specimens of juvenile oyster, peppery furrow and top shell. The uppermost fill (D1180) was thought likely

Phase	Context	Sample no and volume	Context description	Species	Weight (g)	MNI	Remarks
Early Neolithic	1193	<74> 24 litres	Fill of feature [1181]	winkle	342	150	
				winkle (juv)	1	5	
				mussel	9	8	
				cockle	46	20	
				peppery furrow	2	2	
				top spp.	7	16	
				Hydrobia ulvae	n/a	12	
Early Neolithic	1194	<27> 15 litres	Fill of feature [1181] overlying 1193	winkle	66	34	
				cockle	6	4	
				oyster (juv)	1	1	
				mussel	2	2	
				peppery furrow	1	1	
				top	<1	1	
Early Neolithic	1180	<21> 15 litres	Fill of feature [1181]	winkle	5	several	
				mussel	<1g	1	
				cockle	<1g	1	
				variegated scallop	<1g	1	
Late BA/EIA enclosure	392	<8> 18 litres	Upper fill of shallow oval pit [391]	mussel	1705	est 100+	very badly fragmented
				winkle	4	3	
				winkle (juv)	3	7	height <15mm
				gastropod sp.	<1	1	
				cockle	<1	2	
				oyster (juv)	2	3	
				indet bivalve	<1	1	
Early – mid Saxon	575	<10> 150 litres	Fill of SFB [576]	limpet	4	3	
				winkle	314	113	
				flat winkle	<1	1	
				common whelk	7	2	both small individuals
				red whelk	3	1	
				gastropod sp.	<1	1	
				mussel	1	1	
				peppery furrow	<1	1	
				oyster (juv)	<1	1	
				cockle	<1	1	
				cockle (juv)	<1	1	

Phase	Context	Sample no and volume	Context description	Species	Weight (g)	MNI	Remarks
Medieval	1007	<28> 12 litres	Fill of shallow linear feature [1008]	oyster	199	10	mostly upper valves
				oyster (juv)	10	7	mostly upper valves, GL under 20-40mm
				mussel	<1	1	
				common whelk	13	1	
				limpet	19	5	

Table 28. Marine shell recovered from bulk samples. MNI = minimum number of individuals.

Phase	Context	Description	Species	No of fragments	MNI*
Early Neolithic	D1045	Fill of [1046], Inner Arc Segment 1	mussel	3	
Early Neolithic	D1180	Fill of [1181], Outer Arc Segment 2	cockle	5	
Early Neolithic	D1180	Fill of [1181], Outer Arc Segment 2	winkle	4	3
Early Neolithic	D1193	Fill of [1181], Outer Arc Segment 2	cockle	226	112
Early Neolithic	D1193	Fill of [1181], Outer Arc Segment 2	winkle	778	667
Early Neolithic	D1193	Fill of [1181], Outer Arc Segment 2	mussel	1	1
Early Neolithic	D1331	Fill of [1181], Outer Arc Segment 2	cockle	3	
Early Neolithic	D1586	Fill of [1181], Outer Arc Segment 2	mussel	1	
Early Neolithic	2017	Fill of [2101], Outer Arc Segment 1	whelk	1	
Middle BA/IA	D1251	Fill of ditch [1252], eastern parallel ditch	oyster	6	
Middle BA/IA	D1284	Fill of ditch [1285], western parallel ditch	winkle	1	
Late BA/EIA	F335	LBA/EIA enclosure ditch	oyster	1	
Late BA/EIA	D355	LBA/EIA enclosure; eastern linear hollow F406	whelk	1	
Late BA/EIA	D355	LBA/EIA enclosure; eastern linear hollow F406	oyster	1	
Late BA/EIA	D360	LBA/EIA enclosure; eastern linear hollow F406	whelk	2	
Late BA/EIA	D366	LBA/EIA enclosure; pit F364	whelk	1	
Late BA/EIA	D371	LBA/EIA enclosure; western linear hollow F370	oyster	1	
Late BA/EIA	D407	LBA/EIA enclosure; eastern linear hollow F406	oyster	1	
Early – mid Saxon	D413	Fill of pit F411	oyster	1	
Early – mid Saxon	D413	Fill of pit F411	winkle	1	
Early – mid Saxon	D575	Fill of Anglo-Saxon SFB F576	winkle	169	
Early – mid Saxon	D575	Fill of Anglo-Saxon SFB F576	red whelk	3	3
Medieval	D1007	Field system; F1008	whelk	33	
Medieval	D1059	Field system; F1060	oyster	8	
Probably medieval	D1010	Field system; F1004	oyster	2	
Probably medieval	D1020	Field system; F1022	whelk	1	
Probably medieval	D1053	Field system	oyster	1	

Table 29. Hand-collected marine mollusc shell.

Species	Habitat
Limpet *Patella vulgata* Linnaeus	Between the tidemarks on rocky shores.
Top shells Trochidae spp	On rocky shores.
Edible winkle *Littorina littorea* (Linnaeus)	From upper shore to shallow sublittoral zone, predominantly on rock, overwhelmingly abundant on moderately sheltered weedy shores.
Flat winkle *Littorina obtusata* (Linnaeus)	On seaweeds especially *Fucus vesiculosus* and *Ascophyllum nodosum* on which it feeds. Common wherever these brown seaweeds occur.
European sting winkle *Ocenebra erinacea* (Linnaeus)	A predator of cockles, venus shells, other molluscs, and barnacles found on hard substrates on the lower shore and sublittoral zone.
Common whelk *Buccinum undatum* Linnaeus	On sand and mud from shallow water down to about 100m.
Red whelk *Neptunea antiqua* (Linnaeus)	Sublittoral, never intertidal, mainly feeding on carrion.
Mussel *Mytilus edulis* Linnaeus	From mean tide level into the shallow sublittoral zone on rocky coasts, typically in dense beds.
Variegated scallop *Chlamys varia* (Linnaeus)	On the lower shore and shallow sublittoral zone on rocky coasts.
Oyster *Ostrea edulis* Linnaeus	At extreme low water mark and sublittoral to 50m, on coarse bottoms.
Cockle *Cerastoderma edule* (Linnaeus)	Intertidal from mean tide level down, in all grades of sand, tolerant of low salinity. Often large communities in broad sheltered bays.
Peppery furrow shell *Scrobicularia plana* (da Costa)	In estuarine muds, intertidal, usually only in brackish water.

Table 30. Habitats of shellfish species. Authorities and information follows Hayward and Ryland (1995).

to have accumulated by gradual silting. A 15 litre sample from it produced several winkles and fragments of mussel, cockle and variegated scallop (*Chlamys varia*) shell. A few winkle and cockle shells were recovered by hand from the same deposit.

Discussion and conclusions

Deposits associated with the Neolithic 'causewayed enclosure'

The presence of a large shell assemblage in early Neolithic feature F1181 (Outer Arc Segment 2) is of particular interest. The bulk of the remains were recovered from context D1193 which was thought to have been a 'placed deposit'. Shell was common but present in smaller quantities in context D1194 which overlay and sealed D1193. Shellfish assemblages of this date are unusual in southern Britain but deposits containing abundant shell have recently been found during excavation of part of another causewayed enclosure nearby at Court Stairs Lodge. The fill of a recut within a ditch segment with a large component of fine soot or ash contained marine mollusc shells, predominantly mussels, and another recut contained 'many marine shells' (Moody 2007; Moody and Hart 2008).

It is presumed that the shells in feature F1181 were the remains of food, but it is possible that they were deposited in a complete state with the flesh uneaten. The species represented indicate a collection of molluscs from at least two habitats in the intertidal zone, by hand-picking from rocks and among seaweed for some species and by raking through exposed sand or digging on mud flats at low tide for others. Winkles were by far the most numerous species. They are extremely common on rocky shores and weedy mud flats and their flesh is sweet and richly flavoured (Wright 2009, 133). Eating them is rather laborious since they have to be individually extracted from their shells with a suitable small pointed implement after cooking. Top shells were quite common and may have been collected with winkles as they occur in similar habitats. They are edible but their collection here may have been incidental since the individuals represented were small. Cockles were the second most numerous mollusc in context D1193 and would have been collected by raking sandy substrates in the intertidal zone where they lie buried to depths of up to about 5cm.

Mussel and peppery furrow (a clam-type bivalve) were represented by much smaller numbers of shells. Mussels are common from mean tide level into the shallow sublittoral zone, often in dense beds, and can be easily harvested from intertidal rocks at low tide. Peppery furrow shells are usually restricted to areas of brackish water and are found in estuarine muds in the intertidal zone. They live at depths of up to 20cm, their presence betrayed by distinctive star-shaped marks left on the surface of the mud as the tide recedes. Peppery furrow shells are commonly represented in marine mollusc assemblages from archaeological sites of various periods in East Kent, usually by small amounts of shell. They were relatively common in shell-rich assemblages from Bronze Age deposits at Westwood Cross a few miles inland from Ramsgate (Allison 2004). They are still regularly harvested in Portugal, Norway and Senegal (manandmollusc website). Mussels and peppery furrow may be under-represented in the assemblage since

their shells are considerably more fragile than those of winkles and cockles. This would particularly be a factor if shell discarded after consumption was left exposed to the elements for a time before burial. Laver spire snails in context D1193 are likely to have arrived incidentally with shellfish, in sea water or perhaps with seaweed. Live shellfish would probably have been transported from their collection site in sea water, and sea water may have been used for purifying shellfish (ridding their digestive system and bodies of grit and sand) prior to cooking and eating.

The occurrence of the different species is likely to reflect local availability and all of the species represented are available locally at the present day. It is possible however that the overwhelming abundance of winkles and cockles in the 'placed deposit' may be due to seasonality of collection, perhaps hinting at deposition during the summer months. Winkles can be collected throughout the year although their collection is regulated in some areas nowadays by a closed season from mid-May to September, mainly to avoid depletion of stocks (Wright 2009, 132). Cockles are at their best for eating in the summer months and in poor condition from January to April. In East Kent at the present day the cockle picking season lasts from June to December (Bruce 2003). The very low incidence of mussels may be of significance. They made up the bulk of at least one shellfish deposit at Court Stairs Lodge indicating their availability during the Neolithic period (Moody 2007) and were common in later prehistoric deposits at Chalk Hill. Mussels are at their best for eating in late autumn and winter and if harvested in summer when the water is warm, a build-up of toxic algae (dinoflagellates) within them can cause serious shellfish poisoning. It is probable that ancient consumers would have been as aware of the dangers of eating them out of season as we are today. This suggestion of seasonality for the 'placed deposit' is purely speculative however, since it relies on negative evidence.

It is possible to get a basic idea of the amount of meat represented by winkles and cockles in the 'placed deposit' using data from Winder (1980) who quoted an average cooked meat weight of 1.73g for individual cockles based on information obtained from a sample of 130 cockles by the Fisheries Laboratory at Burnham-on-Crouch, and also found that the average individual meat weight for modern winkles from Kimmeridge Bay in Dorset was 1.01g. Cockle meat has a calorific value of 86 kilocalories per 100g wet weight (Waterman 1964), and winkle meat a value of 134 kcal per 100g. Using these figures and a combined minimum number of individuals from the sample and the hand-collected shell (and assuming that hand-collection had been comprehensive for the unsampled part of the deposit), the calorific value of the winkles represented would have been 1106 kcal with the cockles providing a further 1022 kcal, making a total of 2128 kcal. In itself shellfish meat has a low calorific value since it contains relatively little carbohydrate or fat but the food value could be increased considerably depending on how and with what it was cooked.

Marine mollusc shells (especially winkles) were common in deposit D1194 immediately overlying D1193, and a few remains were recovered from other deposits within feature F1181, but otherwise shells were recorded from few other deposits associated with the causewayed enclosure. Small numbers of mussel, cockle, winkle, whelk and sting winkle were identified and there were traces of variegated scallop and oyster in two samples. Whelks are a sublittoral species and are usually found in deeper and colder water than the other species represented. At the present day they are caught mainly in baited pots sunk offshore. A single specimen was recovered by hand from pit F2102 (Outer Arc Segment 1). Whelks are said to be at their best for eating between September and February (BBC Food website). They also have a relatively large attractive shell and it is possible that they and shells of some other species were collected or kept for their decorative appearance or used symbolically in some way.

Charred plant remains

Ruth Pelling

Samples were taken from a full range of phases and feature type for the recovery of charred plant remains. A total of 289 samples were processed by bulk flotation and resulting flots were collected on a 500µm mesh sieve. Sample sizes ranged from 1-36 litres.

A total of 196 samples were assessed from features associated with the earlier Neolithic causewayed enclosure. Seeds and chaff were noted in 45 samples including grain from 40 samples. Three samples were taken from deposits within the early Bronze Age crouched burials (F7 and F206; Fig 45); low numbers of cereal grain were recorded in two samples. A single sample was assessed from the central burial in the round barrow (F446; Fig 44) and produced moderate quantities of cereal grain.

The 'causewayed enclosure'

A large number of samples were examined from the earliest Neolithic phases, although the assemblage generated includes material more usually associated with later periods raising the possibility of substantial contamination by later deposits. Small quantities of *Corylus avellana* (hazel) nutshell fragments, which frequently characterise Neolithic sites, were recorded from 6 samples. In addition cereals were present in 40 samples, including occasional chaff. Finally poorly preserved pulses were present in four samples, the preservation of which limited identification to the level of *Vicia/Pisum* (wild vetch or cultivated bean or pea). Cereal species identified included *Triticum spelta*

(spelt wheat; probably intrusive, as this is likely to be a middle Bronze Age introduction to southern Britain; Pelling 2003), *Triticum dicoccum* (emmer wheat), free-threshing *Triticum sp* and *Hordeum vulgare* (barley). Generally the cereal remains consist of one or two grains, many of which were indeterminate.

Bronze Age ring-ditch

Grain of free-threshing *Triticum* and *Hordeum vulgare* were found in moderate amounts in one sample (context D438) from the early Bronze Age burial (F439; Fig 44) associated with the round barrow (F115). Free-threshing wheat is not generally associated with the prehistoric period, being more characteristic of the post-Roman period. While occasional grain is identified from the Neolithic onwards there are no securely dated examples and the grain is notoriously difficult to positively identify.

Bronze Age crouched burials F7 and F206

Two deposits from Grave F206 (contexts D202 and D203; Fig 45) produced occasional grain of free-threshing *Triticum* sp. and *Hordeum vulgare* (barley), with fragments of *Corylus avellana* (hazel) nutshell in one.

3

Later prehistoric landscapes

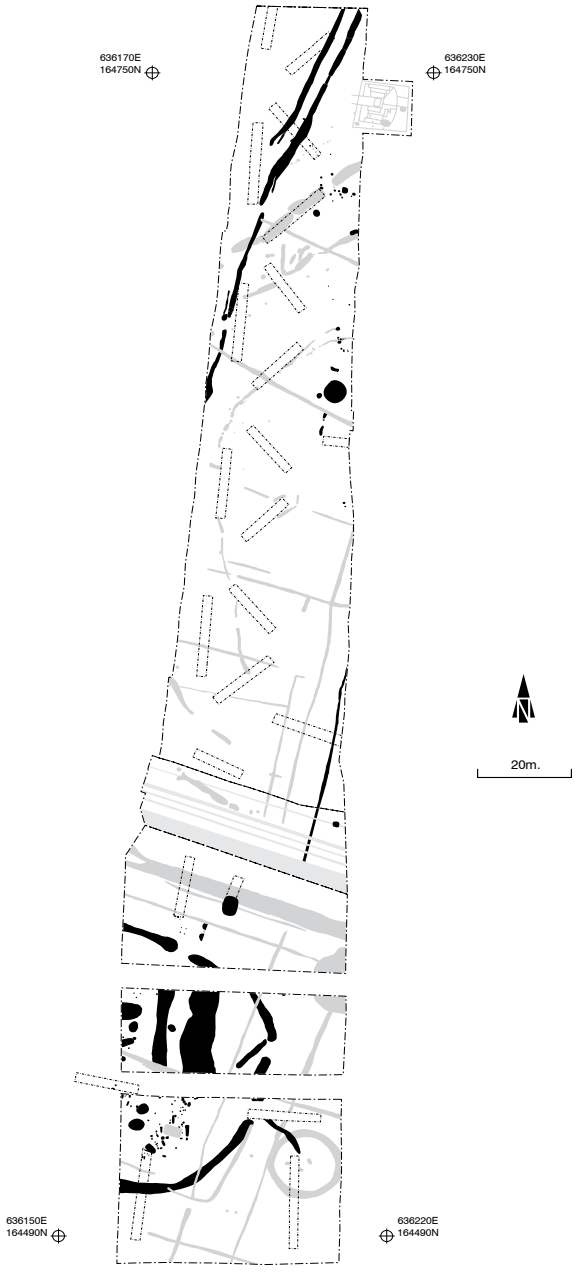


Fig 70. Mid to late Bronze Age features.

Site description

Peter Clark and Jake Weekes

Colluvium

A general process of colluviation was identified in several areas of the site (Palmer and Green 1997; Green *et al* 1997; 1998), and interpreted as affecting most of the site, although exactly how this articulated with the archaeological sequence is unclear. Certainly towards the southern end of the excavated area components of the late Bronze Age/early Iron Age enclosure (see below) appeared to cut though localised colluvial deposits up to 0.2m thick.

Parallel ditches

Two parallel ditches, running approximately north-east/south-west, crossed the excavation area obliquely from the northern limit of excavation to the western (Fig 71; Pl 15). These features may represent boundaries for controlling animal movement to or from an enclosure excavated to the south-west (see below).

The eastern ditch ran for more than 90m across the northern area of excavation and was made up of three main sections (F1201, F1260 and F1252/1283).

The northern section of ditch (F1252/1283) was around 45m long, varying in width between 1m and 1.25m, up to 0.6m deep with a U-shaped profile. A complex sequence of cuts and recuts is suggested along the alignment, particularly at the northern end where variation in plan and profile suggests a continual process of recutting. This part of the alignment was filled by homogenous compact clayey silts from which 49 sherds of Bronze Age pottery were recovered, along with crumbs of heat-affected clay, oyster shell, charcoal, grain and seeds.

At the southern end of the northern section the ditch became increasingly shallow and discontinuous. After a gap of *c* 1.5m, the middle section of ditch (F1260) extended a further 25m, 1.2m wide and 0.1m deep, cutting through Segment 3 of the Outer

Pl 15. View of the Bronze Age parallel ditches, facing south-west. Scale 0.5m.

Arc of the causewayed enclosure. It was filled by clay silts containing residual Neolithic sherds, six Beaker sherds and middle – late Bronze Age material. Approximately 0.5m to the west of the south-western end of this section of the ditch a 5.5m stretch of gully (F1394), at most 0.45m wide with a U-shaped profile just 0.14m deep ran parallel to the main ditch. No finds were recovered from its fill.

After a gap of about 2.5m the southern section of ditch F2101 ran for 15m into the western section. Its width varied between 0.5 to 0.7m, with gently sloping sides around 0.16m deep. No finds were recovered from its fill.

The western ditch was situated between 1.6m and 2.4m from the north-west edge of the eastern ditch. This single feature (F1285) covered just 35m in an unbroken line, although it seems likely that modern ploughing had truncated it completely towards the south-west (*cf* the much shallower southern end of the eastern ditch), and that the parallel arrangement with the eastern ditch originally continued beyond the limit of excavation. The western ditch, about 1.5m wide, generally had a shallow 'v' shaped profile throughout, with a maximum depth of 0.4m, and was filled by homogenous clayey silts. These produced 16 sherds of Bronze Age pottery, along with three late Iron Age sherds (perhaps intrusive), as well as evidently residual early Neolithic material (two sherds).

About 25m south of the northern edge of excavation a series of recuts into the northern section of the eastern ditch was recorded (F1424, F1475, F1483 and F1646). All were filled by clay silts that produced eight middle – late Bronze Age sherds in various fabrics, along with traces of heat-affected clay, burnt flint, mammal bone, eggshell, shellfish, fish teeth/bone, charcoal, grain, seeds, hazelnut/nutshells, two small fossils, fragments of (exotic) stone and iron.

Distinct concentrations of worked flint were found at several specific points along the lines of the ditches. In the eastern ditch, one deposit produced almost 350 pieces including many cores and flakes as well as knapping debris, and a significant number of reworked or utilised flakes and blades, scrapers and a borer, along with occasional burnt unworked pieces. The fill of the southern extremity of eastern ditch F1201 yielded 135 worked flints and occasional burnt unworked pieces, with a similar profile of artefact types. The western ditch (F1285), near the northern limit of excavation, produced a further 166 artefacts, with significant numbers of cores, flakes and finished pieces, including a leaf-shaped arrowhead. These flint concentrations probably represent residual material derived from earlier Neolithic features.

Features post-dating the parallel ditches

A number of smaller discrete features cut the fills of the parallel ditches (Fig 47). Several clustered near the recuts described above, including pit F1458, which lay at right-angles to the main alignment of the eastern ditch. This was an elongated feature, 2.15m long, 0.55m wide and 0.34m deep, containing occasional worked flints (some burnt), fragmentary unidentified pottery and traces of oyster shell. Two small post-holes (F1428 and F1454), 0.15 and 0.3m in diameter and 0.08m and 0.2m deep respectively also cut the ditch fills in this area. To the south-west, deposits in the central section of the eastern ditch (F1260) and parallel gully (F1394) were cut by two small pits (F1203 and F1207, both filled with compact clayey silts. Pit F1203 was oval and 1.65m by 1.18m in plan (depth not recorded) and contained a single sherd of Iron Age pottery; pit F1207 was 1.15m by 0.95m broad and 0.2m deep and produced a Neolithic sherd.

Features at the eastern edge of excavation

A scatter of cut features was recorded along the eastern boundary of the site (Fig 72). Dating of these features has proved problematic; some contained pottery of Neolithic or Bronze Age date, and many did not produce any

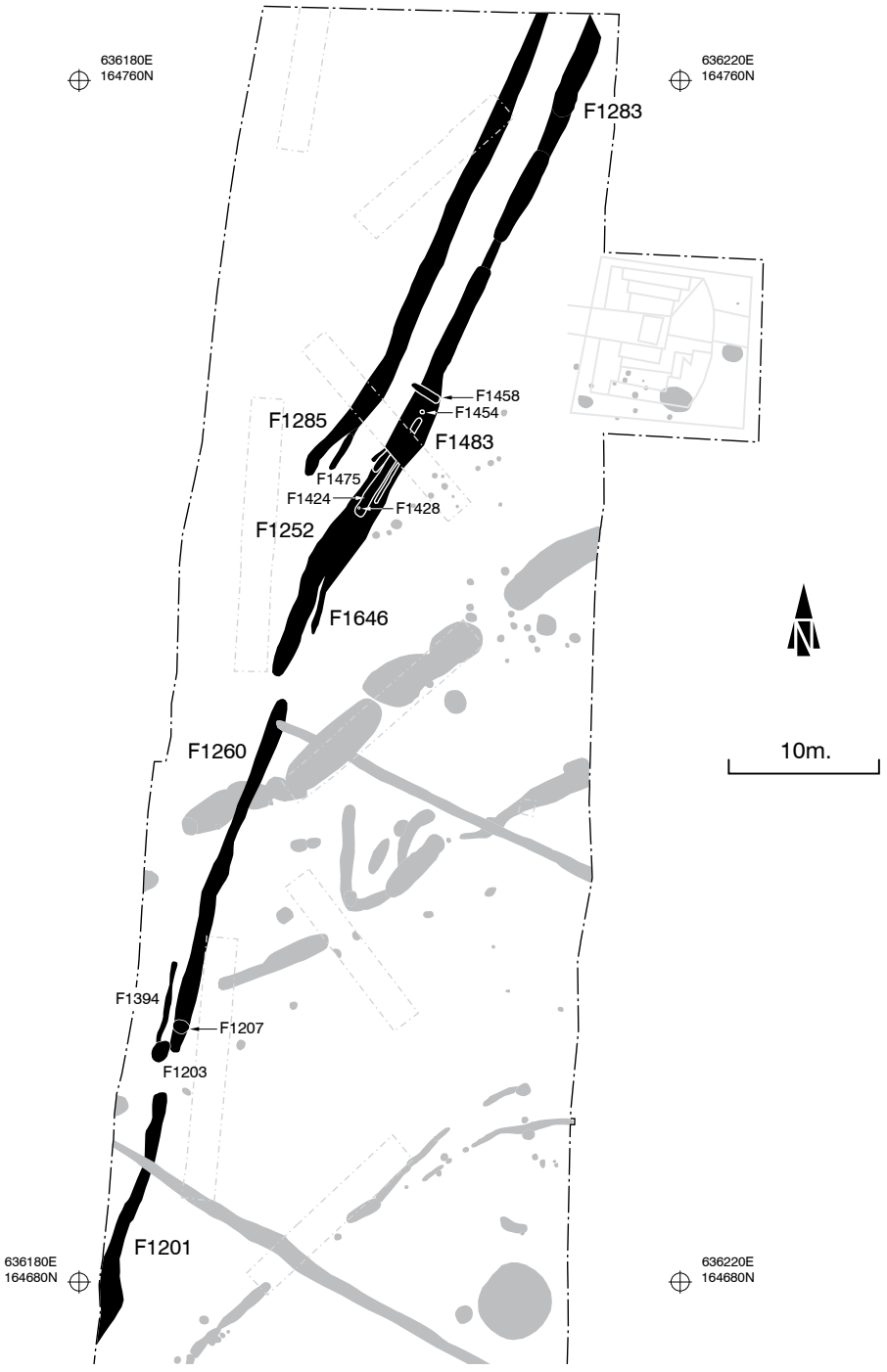


Fig 71. Parallel ditches.

chronologically diagnostic finds at all. On balance, it is considered most likely that the majority of these features represent the periphery of a middle – late Bronze Age focus of activity that lay mostly beyond the eastern boundary of the excavation, the Neolithic material found in some features generally thought to be residual.

No clear spatial patterning or function for the features could be discerned. The most southerly was a shallow subcircular pit (F2097; 1.43m by 1.3m; depth not recorded). While the fill of this feature contained five fresh sherds of possible Neolithic pottery (as well as some flint flakes (two burnt) and fragments of knapping debris), two abraded sherds of possible Bronze Age date were also present.

Approximately 70m to the north of pit F2097 were two further pits (F1088 and F1092). Feature F1092 was subcircular with a diameter of 0.6m, steep sides and an uneven base 0.13m deep. Feature F1088, located 0.45m to the south-east, was more oval (0.39m by 0.28m), with steep sides and a curved base 0.2m deep. No finds were found in the fills of either feature.

A group of three features lay 14m to the north-north-east of feature F1092; an elongated pit (F1151), 2.3m in length, 0.65m wide and 0.21m deep; a small oval pit (F1082), 0.43m by 0.30m broad and 0.10m deep; and another elongated pit (F1084), 1.23m long, 0.76m wide and 0.15m deep, truncated at its northern end by a later feature. No finds were recovered from any of these features, though small quantities of charcoal, seeds and fragments of oyster and mussel shell were recorded from the fill of F1151.

Just 2.7m to the north was a large shallow pit (F1096), 5m in diameter and 0.28m deep. Its silt fill contained 22 middle – late Bronze Age potsherds (five separate fabrics represented). Several shallow pits seemed to be spatially associated with pit F1096, including an elongated pit (F1131; 1.97m by 0.7m and 0.25m deep), aligned approximately north-west to south-east. The sides of this feature were steep and the base uneven, and its silt fill contained small fragments of mammal bone, charcoal and traces of oyster shell, as well as four potsherds of possible Neolithic date. This fill had been cut by a small subcircular pit (F1153; possibly a truncated post-hole), with a diameter of 0.3m and just 0.08m deep which produced a single Beaker sherd. Approximately 5.6m to the south-west of pit F1153 was a roughly circular pit or hollow (F1080), 1.25m in diameter and just 0.07m deep, which yielded only crumbs of unidentifiable pottery.

Further features, the nearest approximately 4m to the north-east, included an adjacent pair of small post-holes (F1185 and F1187), around 0.2-0.3m in diameter and 0.8m deep. About 0.5m to the west was another pair of somewhat larger pits or post-holes (F1183 and F1199), 0.4m and 0.55m in diameter and 0.1m deep. Only one feature in the group (F1183) produced finds; four abraded potsherds (possibly Neolithic) and a single (burnt) flint flake.

Two more pits straddled Segment 10 of the Inner Arc of the causewayed enclosure. The most southerly (F1167), whilst 0.43m in diameter, was just 0.05m deep, its fill containing 16 potsherds; most are thought to be possibly Neolithic but at least two abraded sherds are of Bronze Age date. The pit also contained a single flint flake. A wider and deeper pit (feature F1171; 0.65m by 0.85m broad and 0.28m deep) cut the fill of the segment on its northern edge. Two fragments of flint knapping debris were recovered from its fill.

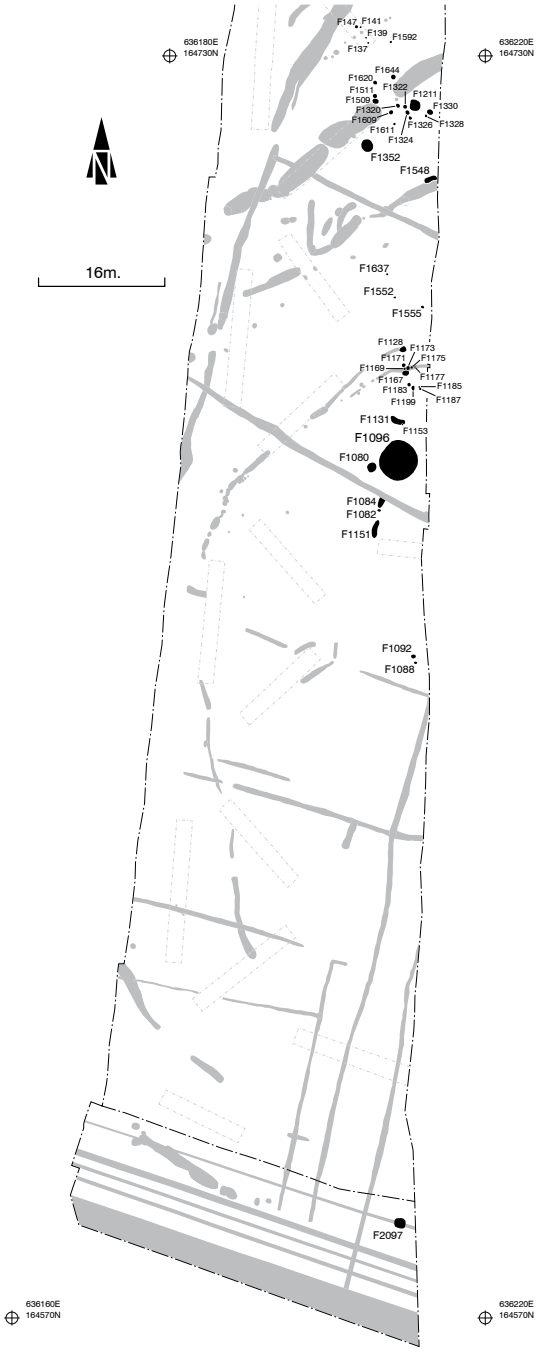


Fig 72. Features at the eastern edge of excavation.

A group of four circular small pits/post-holes (F1169, F1173, F1175 and F1177) had been cut into the fill of the central area of Segment 10 of the Inner Arc of the Neolithic enclosure. This group was in a linear arrangement (forming a T shape with pits F1167 and F1171) with diameters ranging between 0.14 and 0.28m, with steep sides and curved bases. They were all relatively shallow, being no more than 0.15m

deep. Feature F1173 yielded a single flint flake and F1175 a single slightly abraded early Neolithic potsherd.

Approximately 1.4m to the north of pit F1171 was another small pit (F1128), 1m by 0.8m with a dished profile 0.11m deep, cutting the terminal of Segment 8 of the Inner Arc of the causewayed enclosure. It produced no finds but contained a concentration of preserved grain including spelt (*Triticum spelta*).

Three small pits/post-holes (F1552, F1555 and F1637, 0.25-0.40m in diameter), quite evenly spaced, were located some 5m to the north. There was some diversity in their depth (0.05-0.18m) and profiles, but the configuration of the features suggests some association between them, potentially structural.

Approximately 12.5m to the north-east of feature F1637 was a more elongated pit (F1548), 1.75m long and 0.70m wide, with quite a shallow profile 0.2m deep. The earliest deposit filling the feature contained quantities of medium-large sized natural angular flints. Seven flint cores, a struck lump and an anvil were also present, along with a hammerstone and 40 flakes (two refitting, one derived from a hammerstone), two blades (one serrated, one utilised) and 64 fragments of knapping debris. A fossil sea urchin was recovered, along with 31 fragments of heat-affected clay. Five abraded sherds of middle Bronze Age pottery were also recovered from this deposit. Many of the lithic finds from the feature probably derive from a disturbed Neolithic context. The upper fill produced no finds apart from six pieces of heat-affected clay.

A little over 7m to the north-west of pit F1548 were further pits of more certain middle – late Bronze Age date. Pit F1352 was subcircular, at most 1.6m wide with near vertical sides 0.2m deep; its fill yielded 12 sherds of middle – late Bronze Age pottery as well as some worked and burnt flint. A smaller circular pit (F1509), 0.65m in diameter with vertical sides 0.4m deep produced 57 sherds of middle – late Bronze Age pottery (three different fabrics), some of which has been dated to *c* 1500 BC, and 19 fragments of worked flint, possibly residual, derived from the fills of Segment 5. A nearby feature, (F1511), was 0.63m in diameter and 0.2m deep; it produced 11 sherds of possibly early Bronze Age date and fragments of worked flint.

Further to the north was a group of 11 potential post-holes (F1320, F1322, F1324, F1326, F1328, F1330, F1609, F1611, F1620 and F1644) as well as a larger pit (F1211). The smaller features in this group ranged between 0.45m and 0.65m in diameter, were 0.2m – 0.3m deep and tended to have steep edges and sharply concave profiles; they contained occasional pieces of worked flint and unidentified potsherds. Set amongst these post-holes was a subcircular pit (F1211), about 1.45m in diameter with steep sides and a concave base 0.42m deep. It produced six flint cores, a flake and a fragment of knapping debris, along with small quantities of unidentifiable pottery, mammal bone, mussel shell, charcoal and grain.

A little to the north of this group was a scatter of five post-holes (F137, F139, F141, F147 and F1592) approximately 0.2-0.4m wide and 0.15-0.4m deep, whilst to the north-east was a small oval pit (F228), 1.05m by 0.8m broad with a dished profile 0.16m deep, associated with a cluster of smaller subcircular post-holes (F205, F208, F210, F212, F214, F216, F218, F220, F222, F224, F226 and F230), generally 0.3-0.4m wide and 0.1-0.2m deep (Fig 45).

Late Bronze Age/early Iron Age enclosure and associated features

Extending from the western edge of excavation at the southern end of the site was the eastern part of an enclosure measuring about 57m north-south and 32m east-west, formed by six curving sections of shallow ditch (Fig 73), with at least three causeways or entrances on its eastern side. Within the excavated area, these ditches enclosed an area of approximately 1650m², encompassing further linear features, pits and numerous post-holes suggesting a structure or group of structures. A number of post-holes and pits just outside the enclosure may also have been associated with it.

The enclosure and its attendant features can be dated to the late Bronze Age (*c* 1100-800 BC) on the basis of pottery evidence. Many of the features in the area were shallow and sealed directly by topsoil, suggesting that considerable truncation of the archaeological horizon had taken place, mainly through ploughing.

Enclosure ditches

The enclosure ditches were quite varied in width (1.25-3.25m) and depth (0.09m – 0.75m), in places barely surviving later truncation (Fig 73). Where a profile could be confidently drawn, it tended to be a broad 'U' shape, with fairly steep sides and a dished base.

Just over 12.6m of the most northerly section (F363) was visible within the excavation area, this being one of the shallowest sections and barely discernible at the edge of excavation. Fourteen sherds of late Bronze Age plain ware were recovered from its fill, along with two pieces of burnt unworked flint. A gap of 2.85m separated the rounded terminal of this section of the enclosure ditch from that of the next (F362), 5m of which was visible to the north of a baulk crossing the excavation area. The ditch was deeper here (0.45m) and contained a sequence of silt deposits, the latest of which produced six sherds of late Bronze Age plain ware and some worked flint.

A further section of ditch (F335; 11.7m long) emerged from the southern side of the baulk, but with a noticeably narrower profile and even on a slightly different alignment, suggesting that further variation in the enclosure at this point was masked by the baulk. The ditch was shallow (0.15m deep) and about 1.75m wide. Its fill produced nine

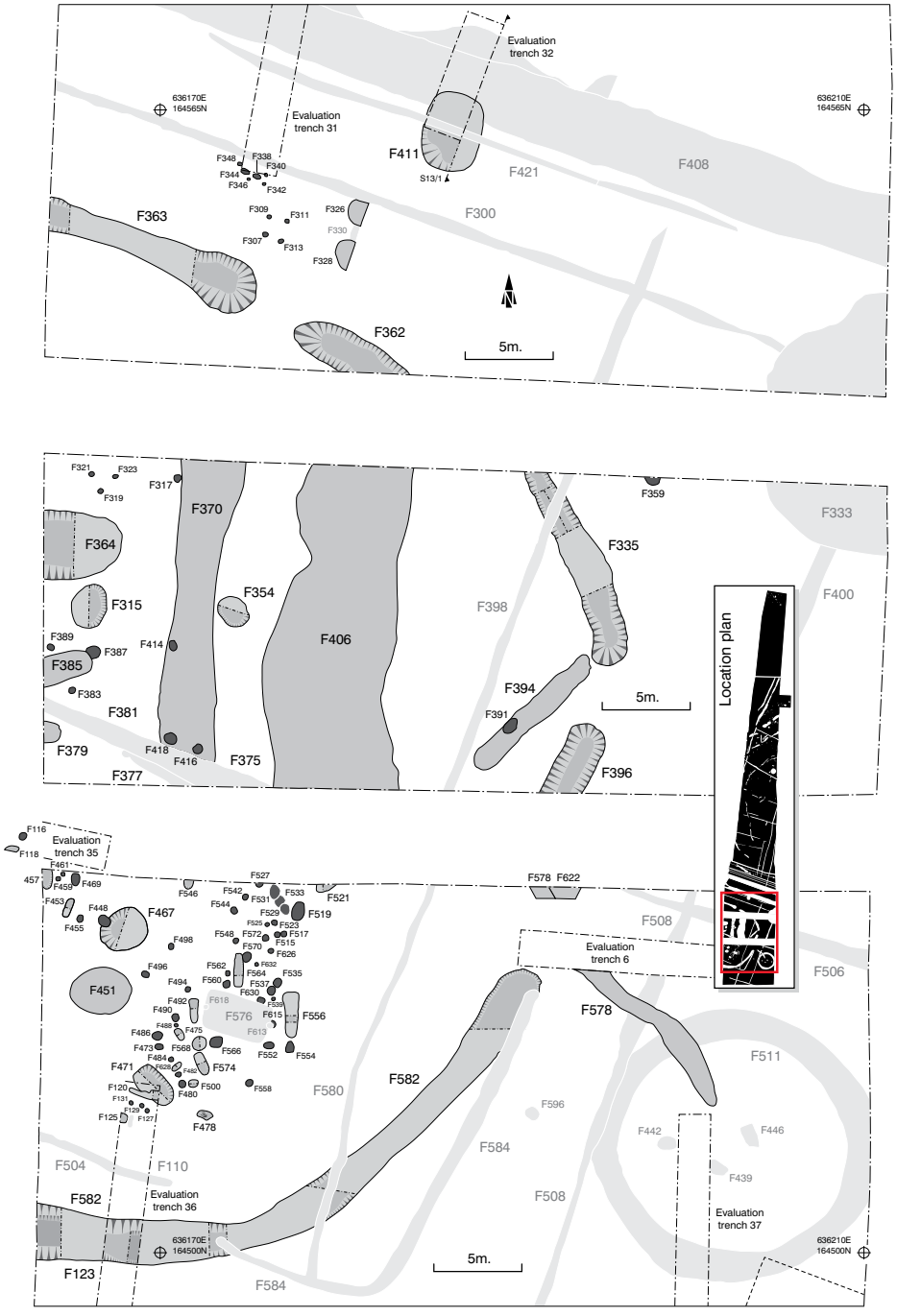


Fig 73. Late Bronze Age/early Iron Age enclosure and associated features.

sherds of pottery, mainly late Bronze Age (two decorated) but also a scrap of late Iron Age date, as well as sporadic finds of worked flint.

A gap of 3.5m separated the rounded terminal of this ditch section from the next (F396), around 2m wide and 0.4m deep, of which only 4.27m was visible, its southern end running into another baulk to the south. The single fill of this ditch section yielded a further eight sherds of late Bronze Age plain ware.

A small section of the enclosure ditch (F622) was identified on the southern side of the baulk, its alignment again not exactly mirroring that of the section entering the baulk to the north. Truncated by a later feature, the enclosure ditch here was 0.45m deep and approximately 1.7m wide. There was no sign of it continuing beyond the later feature that cut across it, however, and another gap/entrance in the enclosure is therefore suggested at this point, at least 3m across.

The final section of enclosure ditch (F582) formed a continuous curve from north-east to west, over 34m long and continuing beyond the western limit of excavation. At the north-eastern end of this section (just 0.19m deep near the terminal), a slot excavated through its silt fill produced 31 sherds of late Bronze Age pottery (one decorated) and a small amount of worked flint. Further south, another slot yielded no finds, whilst at the western edge of excavation, 118 sherds of late Bronze Age plain ware, along with a flint blade and occasional cores, flakes and knapping debris were recovered from a third slot.

Perhaps modifying the entrance formed by the terminals of western ditch sections F335 and F396, a further small section of ditch (F394) had been cut just within the enclosure on a south-west to north-east alignment. This feature, 8.85m long and 1.35m wide at its widest point, had rounded terminals, gently sloping sides and a shallow stepped base 0.2m deep. Its fill produced a single middle to late Bronze Age sherd and seven sherds of late Bronze Age plain ware, in addition to a single flint flake. The feature may represent the foundation trench of an additional means of controlling access through the gap in the enclosure perimeter.

To the south, the entrance formed by the terminals of ditch sections F622 and F582 also seems to have been modified. Cutting through the terminal of ditch F622 on the northern side of the entrance, a sinuous linear feature (F578) ran for about 16.5m to the south-east. Approximately 0.9m wide with a rough U-shaped profile 0.2m deep, this produced no chronologically diagnostic finds (just two flint flakes and a scraper), but its spatial positioning suggests it was a deliberate modification to the enclosure entrance.

Hollows/vestigial surfaces

Two linear hollows lay within the enclosure running north-south between two unexcavated baulks (their northern and southern limits were unseen).

The western hollow (F370), ran for 16.65m from the northern baulk southwards, where it was truncated by a later feature (Fig 73). It was 3.7m wide and 0.20m deep, and contained a metalled surface along most of its length consisting of a compact matrix, up to 0.15m thick in places, of small to medium sized rounded and sub-angular flints. A number of significant finds were recovered from the surface of this metalling, including 46 sherds of pottery, some notably large and fresh, including late Bronze Age plain ware and decorated phase material, along with a single flint flake. Above the metalling the hollow was filled by dark brown silty clay, containing a further six late Bronze Age plain ware sherds, 47 decorated phase sherds, an early Iron Age sherd (600-550 BC) and two sherds dating to the late Iron Age, along with a human skull fragment from an adult about 30-45 years old and a fragmentary human maxilla which has been radiocarbon dated to the third quarter of the 1st millennium cal BC (UBA-14320; Table 2; Fig 74).

Three small discrete features (F414, F416 and F418), potentially post-holes, were directly associated with the hollow towards its southern end, although it is unknown whether these preceded or were contemporary with the metalled surface. All were approximately 0.2m in diameter and 0.2m deep with vertical sides; 12 sherds of late Bronze Age plain ware were recovered from the fill of feature F414. An additional discrete feature (F317), adjacent to the hollow on its western side near its northern end, may also have been associated with it. This subcircular feature, another possible post-hole, was 0.42m wide with steep, uneven sides 0.2m deep; it produced nine potsherds, including both middle to late Bronze Age pottery and late Bronze Age plain ware.

It is conceivable that linear hollow F370 acted as a means of access between the northern entrance to the enclosure and a structure or structures evidenced by a mass of post-holes a few metres to the south (see below).

A wider linear hollow (F406; Fig 73) lay broadly parallel to hollow F370 on its eastern side, separated by a gap of 3-5m. This hollow, again only seen between two unexcavated baulks crossing the excavation, was 18.4m long, and up to 7.3m wide, with irregular sides and an uneven base between 0.25m and 0.4m deep. The base was pitted with numerous small holes, not seen in any other feature, suggesting trampling by animals. Excavation of three slots through the deposits in the hollow produced 105 potsherds including middle to late Bronze Age, late Bronze Age (plain and decorated), very early Iron Age and some late Iron Age material, along with occasional flint flakes. Disarticulated fragments of human maxilla and femur were also recovered, possibly from the same person (a male aged 18 to 45 years). The femur has been radiocarbon dated the first quarter of the 1st millennium cal BC (UBA-14321; Table 2; Fig 74).

Structure(s) represented by post-hole and linear pit cluster

To the south of hollow F406 and the baulk masking its southern termination, a cluster of 47 post-holes signified the location of a structure or structures within the enclosure (F127, F129, F131, F473, F475, F480, F482, F484, F486, F488, F490, F494, F496, F498, F500, F515, F517, F519, F521, F523, F525, F527, F529, F531, F533, F535, F537, F539, F542, F544, F546, F548, F552, F554, F558, F560, F562, F566, F568, F570, F572, F615, F626, F628, F630 and F632).

Of the 40 potential post-holes in the main cluster a large proportion (24 = 60 per cent) had a maximum width of between 0.3m and 0.45m. Six (15 per cent) were smaller, between 0.2m and 0.25m in extent, and 14 (35 per cent)

were larger, with a few closer to 1m across (*eg* F519). Some at least of the latter might represent more than one feature, or the scar left by post removal or collapse. An assortment of profiles was represented, with some features perhaps more convincing as post-holes than others (feature F482, complete with a post-ghost, was a good example). Many, particularly in the southern third of the cluster, were less than 0.2m deep, while those in the northern areas of the cluster were more often between 0.25m and 0.3m deep, these variations again the result of wholesale truncation of the enclosure and its internal features, probably as a result of ploughing. All of the features were filled by silt; dating evidence comprising between one and two sherds of late Bronze Age (plain or decorated) pottery was recovered from 11 features (F529 contained three sherds). Occasional worked flint, generally single flakes, notched pieces and waste fragments, were also present in a similar number of features. Feature F482 contained what appeared to be the *in situ* remains of a burnt post.

While the putative post-holes and associated features in this group did not clearly delineate the ground plan of a building or buildings, a qualitative assessment of the cluster suggests an overall rectilinear arrangement (with possible internal partitions) covering an area of approximately 9m north-west/south-east by 14m south-west/north-east (126m²; Fig 73).

Linear pits

Among and potentially associated with the post-hole cluster were five linear pits/scoops (F125, F492, F556, F564 and F574).

The most northerly of this group of linear pits (F564) was 1.9m long and 0.54m wide, with near vertical sides forming a U-shaped profile 0.3m deep. Less than 2.5m to the south-east, pit F556 was 2.6m long and 0.9m wide; shallow sloping sides formed a slight concave base 0.15m deep. Its fill produced 34 late Bronze Age plain ware sherds and a flint core. Similar features (F574 and F492) lay approximately 5m to the south-west and west of pit F556, both 1.35m long, 0.5-0.6m wide and 0.15-0.2m deep. Further to the south, the eastern 0.37m of a shallow linear feature (F125), 0.5m wide and 0.2m deep was revealed in evaluation trench 36. The fills of these features contained a further 22 middle – late Bronze Age potsherds and some worked and burnt unworked flint.

Burial

Just to the south of the post-hole cluster was a small truncated subcircular pit (F478), 0.5m by 0.9m broad and 0.10 deep, containing the partial remains of a human skeleton, apparently a crouched or flexed burial of a sub-adult male (14-17 years) on its right side, the head to the west. Only parts of the leg bones, one arm, some ribs and a few teeth survived. A small copper alloy object (<756>; now lost) found roughly where the lower jaw bone would have been suggests a Bronze Age date, unless the object was intrusive in what was a heavily truncated feature; a sherd of Peterborough Ware (Sherd group 253) from what remained of the grave backfill might suggest that this interment was made much earlier. Sadly, the bone from this skeleton was too poorly preserved for radiocarbon dating.

Other post-holes and pits within the enclosure

Approximately 4m west of the northern end of hollow F370 were three small features (F319, F321 and F323; Fig 49), all just over 0.3m wide with curving sides and flat bases 0.1-0.15m deep. Quite closely and evenly spaced in a loose triangular formation, the features might have formed the basis for a small structure of leaning and tied posts. Feature F319 contained seven late Bronze Age plain ware sherds and six of indeterminate date, while a further plain ware sherd and an indeterminate sherd were derived from features F321 and F323 respectively.

Almost immediately to the south was the eastern end of a large elongated pit or possibly the rounded terminal of a substantial ditch (F364), 4.4m long and 3.8m wide with steep sides and an uneven base 1.2m deep. Its primary fill contained only frequent small – medium chalk fragments and two potsherds of indeterminate date, but 110 middle to late Bronze Age sherds were recovered from its upper fills along with occasional worked flints. Disarticulated human bone was also recovered from these upper fills; an adult male femur and some skull fragments from an adult male with possible cut marks. The latter was radiocarbon dated to the first quarter of the 1st millennium cal BC (UBA-14319; Table 2; Fig 74).

Another large pit (F315) was excavated immediately to the south of feature F364, this being oval (2.5m by 2m) with a dished profile only 0.15m deep. It produced over 50 plain (and some decorated) late Bronze Age pottery sherds along with a flint hammerstone, a core, flakes and knapping debris. A little over 6m to the east was a similar sized but deeper oval pit (F354; 1.85m by 1.5m) with near vertical sides 0.8m deep. Only its upper fill produced finds, including middle to late Bronze Age and late Bronze Age potsherds and over 80 worked flints including mainly flakes but also some cores, blades and knapping debris.

Just to the south of pit F315 was an elongated feature (F385) running from the western section for about 4.5m and 2.3m wide (not excavated), probably a natural feature. To the north and south of this were two post-holes (F383 and F389) about 0.4m wide and 0.1-0.2m deep, whilst cutting its eastern terminus was a slightly larger post pit (F387), 0.8m wide and 0.2m deep.

To the south was a subcircular pit or possibly the terminus of a linear feature (F379), 1m wide with steep sides and a concave base 0.4m deep which yielded a single

flint flake. Pit F467, around 10m to the south-east of feature F379, was 2.65m wide and 1m deep, filled by chalk rubble overlain by slumping silt deposits. Only the uppermost deposit produced finds, 14 late Bronze Age potsherds and a flint flake. It was cut on the north-east side of the feature by a small oval pit (F448), 0.7m by 0.5m in extent and just under 0.3m deep, containing eight sherds of late Bronze Age pottery (decorated phase; 800-600 BC) and fragments of heat-affected clay.

This feature formed part of an irregular cluster of small pits/post-holes of various dimensions and morphology (F455, F453, F469, F459, F461, F116 and F118). All were filled by silty clay, some containing small combined assemblages of late Bronze Age plain ware (1100-800 BC), decorated phase pottery (800-600 BC) and worked flint; feature F118 yielded 41 mostly decorated phase potsherds, along with the tip of a bronze spearhead perhaps of early – middle Bronze Age type (<747>; Fig 84).

Just over 1m to the south-west of pit F467 was another subcircular pit (F451), 2.7m by 3.35m broad and 0.35m deep, whose primary fill produced 85 late Bronze Age potsherds (mainly decorated phase; 800-600 BC) and a small assemblage of worked flints including nine cores and 33 flakes. Its upper fill contained slightly more worked flint and a rich pottery assemblage including 99 sherds of late Bronze Age plain ware and 227 decorated phase sherds.

A large subrectangular pit (F471), 2.6m by 1.45m with a dished profile 0.15m deep, lay on the southern margins of the pit/post-hole structure, 3.5m to the south-east of pit F451. It contained eleven sherds of late Bronze Age plain ware and nearly 300 sherds of late Bronze Age decorated phase pottery along with some evidence of flint working.

Further north, cutting the fill of the fill of the putative entrance modification 394 was a shallow oval pit (F391; Fig 73), 1m by 0.6m broad and 0.25m deep; its primary fill produced twenty-nine sherds of late Bronze Age plain ware and animal bone.

Pits and post-holes outside the enclosure

Running in to the southern section of the northernmost baulk was the southern part of a small pit (F359; Fig 73), about 0.15m deep and containing nearly 30 sherds of late Bronze Age pottery (the latest dated 800-600 BC) and animal bone, along with traces of brick/tile, pottery, oyster and mussel shell.

A number of features also clustered just to the north of the possible north-eastern entrance to the enclosure (Fig 73). These included two adjacent oval pits (F326 and F328), not fully excavated but both approximately 1.5m wide, 2m long and 0.35m deep which produced occasional late Bronze Age plain and decorated pot sherds. Just over 3m to the west was a group of four post-holes (F307, F309, F311 and F313) forming a square 1m across; these were between 0.3m and 0.5m in diameter, with steep sides around 0.1- 0.2m deep. A single late Bronze Age plain ware sherd was recovered from the fill of F307.

Less than 2m to the north of this possible 'four poster' was a linear cluster of six small pits or post-holes (F338, F340, F342, F344, F346 and F348), between 0.25m and 0.5m in diameter, and 0.2m to 0.3m deep. The fill of feature F338 yielded some late Bronze Age plain and decorated sherds.

Further to the north was a large oval pit (F411), 4.5m by 3.3m in extent and 0.65m deep; the northern area of the feature had been eroded by a later hollow way and cut by an associated drainage gully (see below). Its primary fill contained ten middle to late Bronze Age (1300-1100 BC) and late Bronze Age (1100-800 BC) pot sherds along with an early Iron Age bowl sherd (600-550 BC) in good condition, as well as sparse finds of worked flint. The secondary fill of F411 produced over 200 sherds, with the late Bronze Age decorated phase (800-600 BC) being particularly well represented, and the uppermost fill yielded yet more late Bronze Age sherds. A few worked flints were again present in these contexts, but this feature was especially noteworthy for its cattle bone content, a large quantity (over 500 cattle and cattle-sized pieces) being recovered with femora and pelves predominating; whole bones in this assemblage indicate some meat wastage, however, perhaps suggesting a more specialised and even ceremonial use of the animals. The pottery evidence suggests an early Iron Age date for the infilling of the feature, perhaps at the very end of the use of the enclosure.

The late Iron Age period

Whilst no features could be dated to the late Iron Age, a number of abraded sherds from across the site, either intrusive in late Bronze Age/early Iron Age features or residual in later features suggests an agricultural landscape during this time, with material being introduced by manuring the soil with domestic waste. A large collection of sherds from a later pre-Roman Iron Age pot recovered from the stripped surface in the vicinity of the late Bronze Age/ early Iron Age enclosure may have come from a ploughed out burial, however.

Radiocarbon dating: The late Bronze Age/ early Iron Age enclosure

Alex Bayliss, Frances Healy, Johannes van der Plicht, Christopher Bronk Ramsey, Paula Reimer, Grant Shand, Jake Weekes and Alasdair Whittle

Samples were submitted to confirm, and if possible refine, the artefact-based dating of the late Bronze Age/early Iron Age enclosure (Fig 74). Adult human skull fragments from F364 and a human femur from F406 yielded statistically consistent dates (UBA-14319, UBA-14321; T'= 0.0;

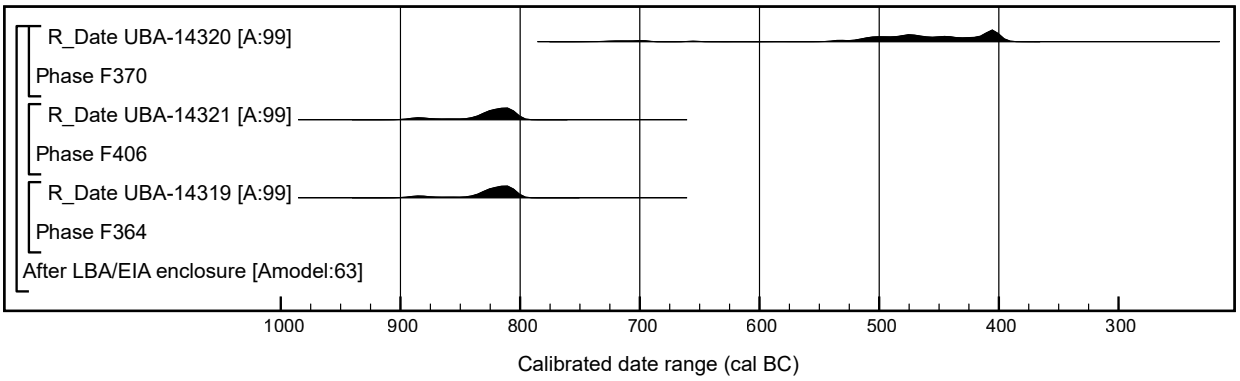


Fig 74. Calibrated dates from radiocarbon determinations from the late Bronze Age/early Iron Age enclosure (Stuiver and Reimer 1993).

	Western ditch	Eastern ditch	Total
Anvil	0	1	1
Arrowhead	3	0	3
Blade	67	101	168
Borer	2	2	4
Core	126	172	298
Denticulate	1	1	2
Flake	816	1174	1990
Hammerstone	0	6	6
Irregular waste	192	295	487
Laurel leaf	0	1	1
Miscellaneous retouched	8	13	21
Notched blade and flake	3	2	5
Pick	3	1	4
Scraper	15	26	41
Serrated blade and flake	3	5	8
Utilised blade and flake	35	14	49
Total	**1274**	**1814**	**3088**

Table 31. Lithics. Parallel ditches, assemblage composition.

T'(5%)=3.8; ν=1; Table 2; Fig 74), so that the individuals could have died at the same time in 900-790 cal BC (95% probability); probably in 840-800 cal BC (68% probability). A human maxilla from F370 was substantially later (UBA-14320; Table 2; Fig 74), the individual having died in 720-690 cal BC (2% probability) or 540-390 cal BC (93% probability); probably in 510-430 cal BC (43% probability) or 420-390 cal BC (23% probability). The dates provide *termini post quos* for the incorporation of the disarticulated remains in their final contexts.

Flint from mid to late Bronze Age and early Iron Age features

Tania Wilson

The parallel ditches

A substantial assemblage totalling 3,088 struck flints was recovered from the middle to late Bronze Age parallel ditches (Tables 3 and 31; 25 per cent of the excavated assemblage), with a significant number of cores represented (nearly 10 per cent).

The western ditch (F1285) produced 1214 struck flints. The feature produced quantities of debitage and a leaf-shaped arrowhead which is made of Bullhead flint with the tip missing, from deposit D1266 (Fig 75/20). A flake detached from a hammerstone was also recovered and two refitting flakes were noted within this group. A second leaf-shaped arrowhead (Fig 75/21) was recovered from deposit D1286. This deposit also produced two retouched flakes, two scrapers and a utilised piece. One further example of refitting was noted in deposit D1315. In this instance a nodule with just one flake detached has the refitting flake.

In contrast to the principal deposits within the Outer Arc of the causewayed enclosure, pit F1475 produced just eight pieces of debitage.

The eastern ditch (F1201, F1260 and F1252/1283) produced the remainder of the assemblage including the majority of the cores. One hammerstone was recovered which has a faceted surface (Fig 75/22). Scrapers and serrated, notched and utilised pieces are also represented. A small assemblage was also recovered from the recuts of the eastern ditch, the most notable, from F1424, included an anvil and a laurel leaf (Fig 75/23). The anvil has been burnt; a flat thermal fracture has been used as a surface which has a concentrated area of crushing (Fig 75/24).

Features at the eastern edge of excavation

A series of shallow pits (some Bronze Age, others of uncertain date) located within the enclosure also produced

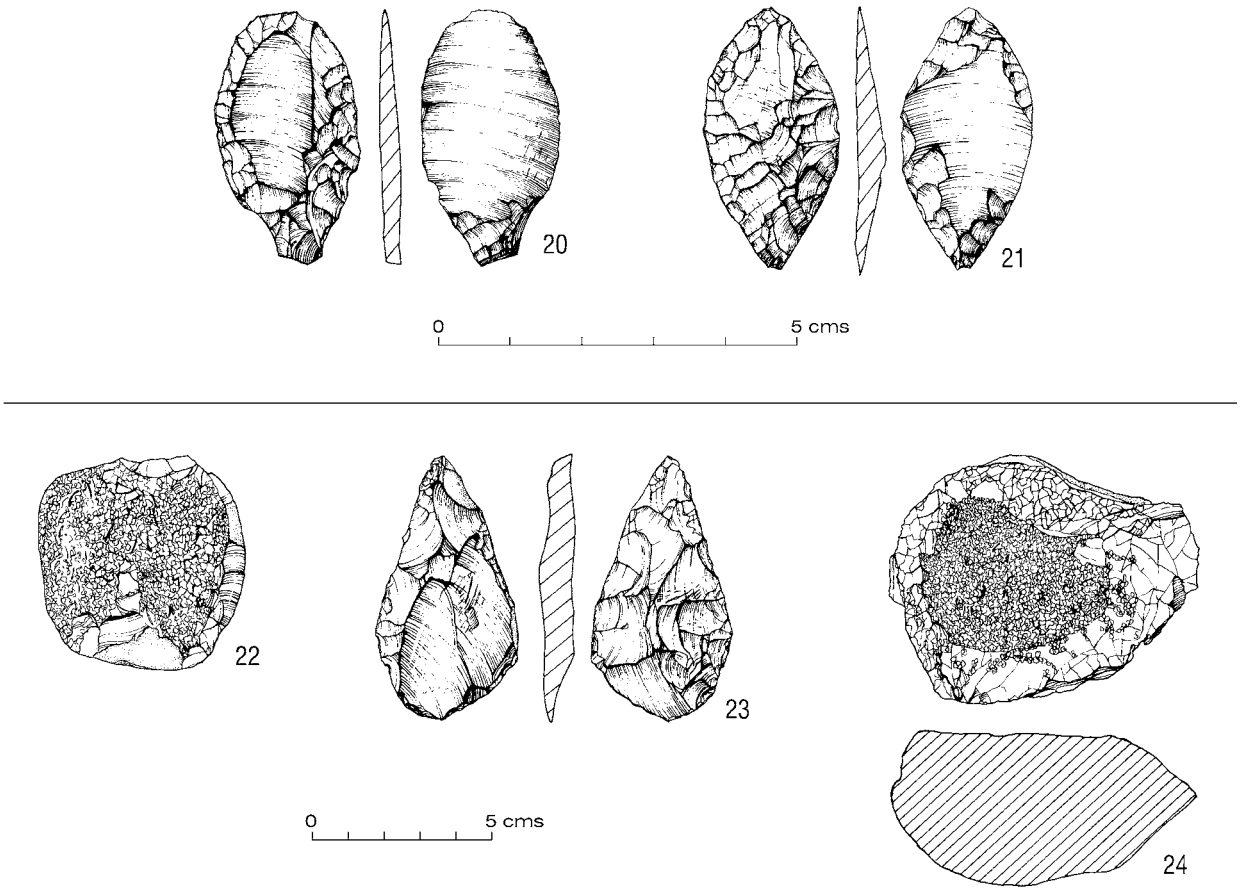


Fig 75. Lithics, nos 20-24.

a range of struck flints. Eleven of these features produced small quantities of knapping debris. One notable example, pit F1096, produced 210 struck flints including 12 cores, two hammerstones and three utilised pieces. In addition to the hammerstones, three natural spherical nodules were also recovered perhaps indicating an intention to use these pieces as hammerstones.

A series of post-holes at the northern end of the site also produced a small assemblage (Fig 72). Four of these post-holes produced small quantities of knapping debris. In the same area a small middle to late Bronze Age pit (F1509) produced a more significant group including four cores, one of which is a Levallois-type (Fig 50/19).

The late Bronze Age/early Iron Age enclosure

A total of 438 struck flints was recovered from the features associated with the late Bronze Age/early Iron Age enclosure. A sample of 64 per cent of the assemblage was examined in detail. This sample was selected from the enclosure ditch, the trackways, and some of the pits and post-holes. Based on the sample the condition appears to be variable, but the majority are unpatinated or have slight patination. Burnt pieces are sparsely represented but include one of the hammerstones. Twenty-one per cent of the unretouched blades and flakes are incomplete and 6 per cent of the assemblage has edge damage probably resulting from post-depositional influences.

A range of raw material types are represented within the assemblage, with the black flint dominating. All of the flint types represented have hard weathered cortex.

Technology

In contrast to the earlier assemblages, blades are very poorly represented. Of the blades examined in detail 38 per cent are incomplete. Only a sample of the cores recovered from the enclosure has been characterised. However, of those examined none have blade scars.

A range of core types are represented including B3 types. However, the cores are not extensively flaked, and, in a number of examples, the reduction strategies appear rather ad hoc. One of the better worked examples is a keeled core. Of the cores examined in detail 38 per cent have evidence of mis-hits and 10 per cent have areas of stepping. Two core trimming flakes were also recovered, both of which removed areas of stepping.

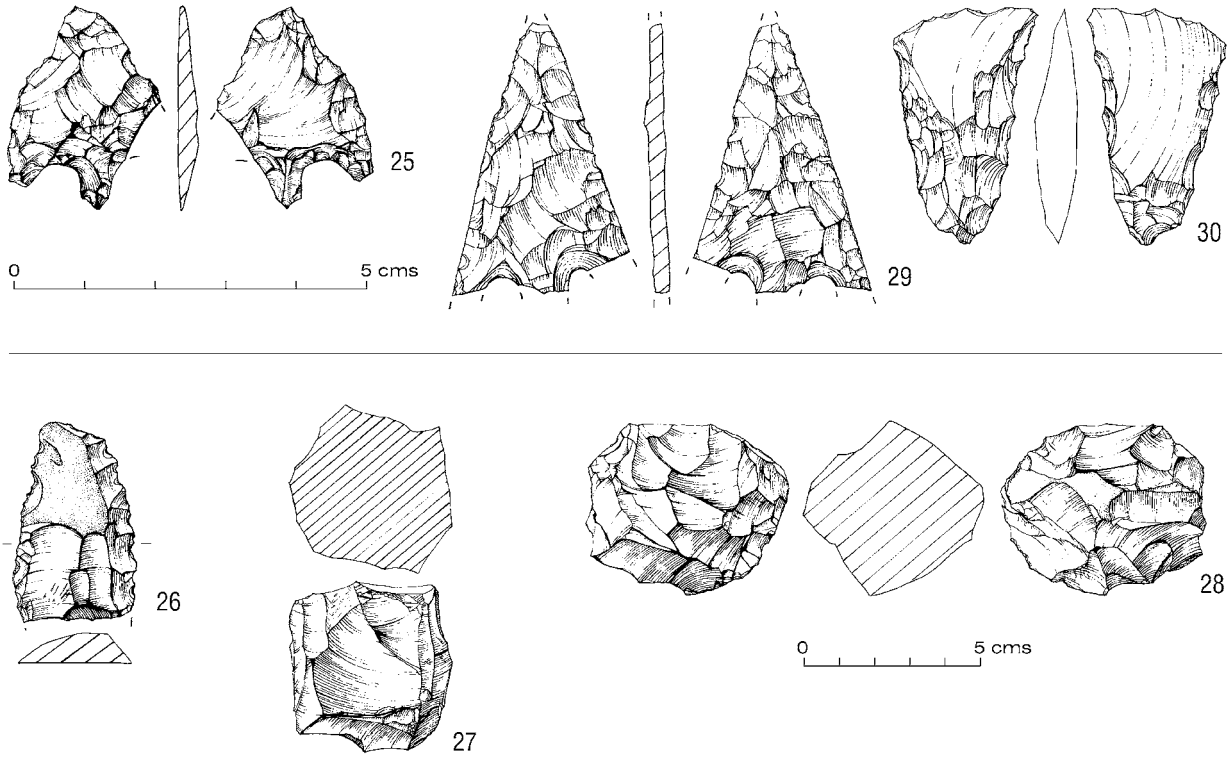


Fig 76. Lithics, nos 25-30.

The butt attributes show little evidence of platform preparation with plain and cortical butts dominating, and a relatively low frequency of platform abrasion. Of the complete flakes and blades examined in detail 19 per cent have hinge terminations.

Four flint hammerstones are represented including a heat-affected example which is complete and roughly spherical with a localised area of crushing. One example has also been used as a core, and a flake detached from a hammerstone has been subsequently used as a core.

Retouched pieces are poorly represented within this assemblage. Three flakes with irregular retouch, one notched piece and three possibly utilised pieces were recovered.

Distribution

In total 43 struck flints were recovered from the enclosure ditch. A deposit of 26 pieces formed the single largest cluster within the ditch and this included five cores, a retouched flake and a utilised piece.

The largest component of the assemblage was recovered from a series of pits located within the enclosure. One pit (F315) produced a small group including a multi-platform core and the hammerstone fragment. Another group of some 80 pieces was recovered from pit F354, which included a single platform and three fragmentary cores, along with a range of debitage. Pit F364, which produced fragments of human skull, yielded 48 struck flints. This group included 11 cores, four of which are fragmentary. The remainder of the cores have multiple striking platforms (*eg* Fig 76/27), and include the keeled core (Fig 76/28) and one core that was also used as a hammerstone. The heat-affected hammerstone was also recovered from this deposit in addition to a retouched flake. Pit F451 also produced a significant assemblage of 116 pieces including 15 cores and two utilised pieces.

The group of post-holes located within the enclosure also produced struck flint. In general, small quantities of debitage were found within the fills of the post-holes. However, 39 artefacts were recovered from post-hole F426, including one two-platform core.

The metalled surface, the dark soil and the linear feature (F394) all produced negligible quantities of struck flint. Small quantities were also recovered from features external to the enclosure. The most noteworthy is a group of five struck flints recovered from post-hole F592. This assemblage included two hammerstones and a retouched blade.

Technological aspects of this assemblage have not been considered in detail. A detailed search for refits was not undertaken. However, two sets of two refitting flakes were located, and other flakes almost certainly detached from the same nodule were identified from deposit D1005. A number of retouched and utilised pieces were recovered

from the ditch fills including scrapers and one serrated piece. In addition, one incomplete barbed and tanged arrowhead of Green's Sutton type is represented (1984, 24; Fig 76/29).

Worked stone tools

Rob Ixer

Five potential stone tools were selected from later prehistoric features for more detailed analysis. The emphasis of the study was on providing detailed petrographical characterisation of the rocks with an emphasis on their possible geographical provenance. Only limited archaeological interpretation is attempted.

Lithology and provenance

The five rocks comprise one plutonic igneous and four sedimentary fragments.

A fragment of epidotised granite from the fill of the eastern parallel ditch F1283 is very exotic as the nearest outcrops of these rocks are in Cornubia (Devon and Cornwall) or the East Midlands of England.

There were two reddened arkoses (one from the fill of the easternmost parallel ditch (F1252) and the other from the western ditch (F1285)) that may be from south-western/western England rather than from the Pennines area.

Two silicified, glauconitic limestone/sandstone fragments (one from the hollow way (F370) in the late Bronze Age/early Iron Age enclosure and the other from the easternmost parallel ditch (F1283)) are probably from southern or south-eastern England and are therefore regional in origin.

The lithics as artefacts

Evidence for the shaping of these rocks is limited, in many cases because they are fragmentary. However, the epidotised granite from the fill of the eastern parallel ditch (F1283) appears to have been faceted with some faces pecked and then polished.

There is more evidence for the deliberate utilisation of the two silicified glauconite-bearing sediments from the hollow way (F370) in the late Bronze Age/early Iron Age enclosure and the easternmost parallel ditch (F1283). They have polished, basal surfaces suggesting their use as rubbing stones/millstones. They comprise a very suitable lithology for grinding as they are hard and, although taking a good polish, the continuous eruption of rounded glauconite/chert clasts from the silica cement means that there is an underlying constant roughness to the grinding surfaces.

Later prehistoric pottery

Barbara McNee

Introduction

A total of 2,900 sherds weighing 25,734 grams and with a mean sherd weight of 8.9 grams was subjected to detailed analysis. Pottery from the late Bronze Age forms the largest component of this assemblage, but there are very small quantities of middle to late Bronze Age and early Iron Age pottery. The condition of the pottery is fair to poor; many sherds are small and abraded, but the assemblage also includes a great many featured sherds which will enable a more detailed decoration, form and fabric type analysis to be undertaken. The material is derived from 97 contexts, including ditches, postholes, stake-holes, pits, linear features and a trackway.

Methodology

The pottery was recorded using the methodology set out by the Prehistoric Ceramics Research Group (PCRG 1997). All sherds were assigned a fabric type after macroscopic examination and by using a binocular microscope (10x power). The assemblage was divided into different fabric groups on the basis of the dominant inclusion types, and to a fabric type based on the variation within the group. Density charts (PCRG 1997, appendix 3) were used to standardise assessment of the quantity of inclusion present within the pottery fabric. All sherds were counted and weighed to the nearest whole gram, and given a unique pottery record number for ease of reference. Diagnostic sherds were additionally assigned to a form and decorative scheme; other characteristics noted include individual sherd thickness, surface treatment and evidence of usewear. Featured sherds were recorded onto individual featured sherd record sheets, and key sherds were selected and illustrated. Parallel form types were sought from within, and also outside the Kent area, using published and unpublished material. Microsoft Excel was used to analyse and summarise the data.

Chronology

Five ceramic phases have been identified (Table 32): Ceramic phase 1: middle to early late Bronze Age, accounting for 5.7 per cent of the overall assemblage; Ceramic phase 2: late Bronze Age Plain Phase, accounting for 39.7 per cent of the overall assemblage; Ceramic phase 3: late Bronze Age decorated phase (47 per cent); Ceramic phase 4: very early Iron Age (0.4 per cent); Ceramic phase 5: late Iron Age (0.4 per cent). 6.4 per cent of the assemblage could not be identified with any degree of certainty and is described as indeterminate. This material is likely to be prehistoric but assigning it to a specific ceramic phase is difficult.

Ceramic phase	Sherd count	Sherd weight (grams)
1 Middle to early late Bronze Age (1300-1100 BC)	164 (5.7%)	2364 (9.2%)
2 Late Bronze Age plain phase (1100-800 BC)	1150 (39.7%)	9674 (37.6%)
3 Late Bronze Age decorated phase (or earliest Iron Age, 800-600 BC)	1375 (47.4%)	12315 (47.9%)
4 Very early Iron Age (600-550 BC)	12 (0.4%)	366 (1.4%)
5 Late Iron Age (100 BC – 50AD)	13 (0.4%)	385 (1.5%)
Indeterminate	186 (6.4%)	630 (2.4%)
Total	**2900**	**25734**

Table 32 (above). Later prehistoric pottery, ceramic phases.

Table 34 (below). Late pottery. Summary of sherd condition (W1 – W6) by ceramic phase (by sherd count and weight).

	Sherd count and percentage	Sherd weight and percentage
W1	211 (7.3%)	822 (3.2%)
W2	400 (13.8%)	3152 (12.2%)
W3	1720 (59.3%)	15076 (58.6%)
W4	18 (0.6%)	248 (0.9%)
W5	550 (19%)	6334 (24.6%)
W6	1 (0.03%)	102 (0.4%)

Table 33. Late pottery. Summary of sherd condition by count and weight. W1: surface treatments are completely worn, and all sherd edges are worn; W2: surface treatments are worn but still identifiable, and all sherd edges are worn; W3: surface treatments are worn but still identifiable; most of the sherd edges are worn but at least one edge may be less worn; W4: surface treatments are in reasonable condition; all sherd edges are worn; W5: surface treatments are in reasonable condition, most of the sherd edges are worn but at least one sherd edge is less worn; W6: surface treatments are in good condition; sherd edges are generally fresh.

	W1	W2	W3	W4	W5	W6
Ceramic Phase 1	6 sherds (40g)	33 sherds (345g)	123 sherds (2007g)		2 sherds (72g)	
Ceramic Phase 2	32 sherds (164g)	233 sherds (1914g)	808 sherds (6398g)	12 sherds (113g)	65 sherds (1085g)	
Ceramic Phase 3	4 sherds (13g)	133 sherds (972g)	763 sherds (6573g)	5 sherds (81g)	470 sherds (4676g)	
Ceramic Phase 4			7 sherds (60g)		4 sherd (204g)	1 sherd (102g)
Ceramic Phase 5	1 sherd (28g)		3 sherds (8g)	1 sherd (54g)	8 sherds (295g)	

Terminology

There are in current use several dating schemes and associated terminologies that cover the early 1st millennium BC. Barrett's (1980) division of post middle Bronze Age pottery into a plain ware tradition (1100-800 BC) and then a later decorated phase (800-600 BC) is considered to be more user friendly (Hamilton 2001, 90) and is essentially followed in this report. It should be mentioned that the phrase 'decorated phase of the later Bronze Age' is also known as the earliest Iron Age. The manufacture and use of iron metalwork are part of the changes which took place at that time, and the term 'earliest Iron Age' recognises this development (Morris 2006a).

The decorated phase extends into the period of overlap between the Bronze and Iron Ages (Barrett 1980, 303); however some of the pottery from Chalk Hill may also be slightly later and belong to an early Iron Age tradition. It is described in this report as belonging to the very early Iron Age, rather than using the term late Bronze Age/early Iron Age. Pottery assigned to this category is considered to be slightly later on the basis of finer fabrics, and more complex surface treatments, and offers good parallels with early Iron Age pottery from other sites such as Highstead in eastern Kent (Couldrey 2007) and North Shoebury in south-east Essex (Brown 1995b).

Taphonomy

Many of the contexts from Chalk Hill produced small quantities of pottery. Ten contexts produced large assemblages of pottery (over 100 sherds) (D121, D355, D357, D360, D413, D449, D470, D575, D616, and D623). In addition there are 26 medium-sized assemblages (25-100 sherds).

The condition of the pottery was assessed on a scale of one to six (see Table 33).

Table 34 demonstrates the variety of abrasion noted for the Chalk Hill assemblage. The majority of the sherds exhibit worn edges and surface treatments, and there are no complete vessels within the assemblage. The assemblage would appear to have derived from a diverse range of post-breakage histories. Some of the ceramics may have been subjected to quite a lot of trampling and wear and tear prior to final deposition. Sherds which are in good condition may have been carefully curated, or broken and deposited soon after breakage.

Generally speaking, the average sherd weight for the late Bronze Age ceramics is quite low (8.4g for phase 2,

and 9.1g for phase 3). The mean sherd weight for the small percentage of early Iron Age ceramics is high (33g). This suggests that the pottery was deposited soon after it fell out of use. A summary of pottery by context is presented as Table 35.

Chalk Hill fabric descriptions

Twenty-six different fabric types were identified which can be placed in nine groups on the basis of principal inclusion types (Table 36). The fabric groups established include a range of flint-tempered fabrics, two quartz fabrics, five quartz and flint fabrics, one grog- and flint-tempered fabric, two grog fabrics, one shell fabric, one iron fabric, one iron and flint fabric and one flint and iron oxide fabric. Seventeen flint-tempered fabric types account for 91 per cent of the assemblage, and the remainder consists of 15 sherds belonging to two quartz types, twenty sherds containing grog, four sherds containing grog and flint, four sherds containing shell, three sherds containing black iron oxides, 15 sherds containing iron and flint and nine sherds containing flint and iron. A small number of sherds were considered too fragmentary to be assigned to a fabric group. All flint fabric types contain calcined flints (burnt and crushed). The fabric typology for Chalk Hill is a site specific one and has not been referenced to previously published ones, as ceramic fabric and form typologies for Kent are currently being reviewed by the author.

Flint group (clay matrix is silty)

F/1. A coarse fabric containing common (25 per cent) poorly sorted subangular flint 1-2m in size with occasional pieces, which are 3mm in size. The clay matrix is silty; fracture is irregular; surface feels rough.

F/2. A fairly fine fabric containing common (25 per cent) well sorted subangular flint 0.25mm in size and sparse (5 per cent) flint detritus 2mm in size. The clay matrix is silty; fracture is fine; surface feels quite smooth.

F/3. A very coarse fabric containing abundant (40 per cent) poorly sorted subangular flint up to 7mm in size. The clay matrix is silty with sparse (7 per cent) round black and red iron oxides 0.5mm in size; fracture is irregular; surface feels harsh.

F/4. A coarse fabric containing abundant (40 per cent) moderate to poorly sorted subangular flint 2-3mm in size. The clay matrix is silty; fracture is irregular; surface feels rough.

F/5. A fine fabric containing common (20-25 per cent) well sorted subangular flint 0.25-0.5mm in size and flint 'dust'. The clay matrix is silty; fracture is fine;

Context and feature	Interpretation	Sherd count	Sherd weight (g)	Ceramic phase
D113, F398	Medieval field system	1	17	3
D115, F116	Late Bronze Age/early Iron Age enclosure	2	4	2
D117, F118	Late Bronze Age/early Iron Age enclosure	42	219	2, 3
D119, F120	Unphased linear feature	38	168	3
D121	Unphased deposit in interior of late Bronze Age/early Iron Age enclosure	144	1565	3
D122, F1239 (=F582)	Southern ditch of late Bronze Age/early Iron Age enclosure	3	3	ind
D128, F129	Post-hole within late Bronze Age/early Iron Age enclosure	1	8	2
D203, F206	Crouched burial	1	1	ind
D303, F362	Northern ditch of late Bronze Age/early Iron Age enclosure	6	66	2
D304, F363	Northern ditch of late Bronze Age/early Iron Age enclosure	14	120	2
D305, F307	Post-hole within late Bronze Age/early Iron Age enclosure	1	23	2
D306, F365 (=F406)	Eastern linear hollow within late Bronze Age/early Iron Age enclosure	1	10	3
D314, F315	Pit within late Bronze Age/early Iron Age enclosure	52	543	2, 3 (mostly late Bronze Age plain phase)
D316, F317	Small pit/post-hole within late Bronze Age/early Iron Age enclosure	9	37	1, 3
D318, F319	Small pit/post-hole within late Bronze Age/early Iron Age enclosure	13	77	2
D320, F321	Small pit/post-hole within late Bronze Age/early Iron Age enclosure	1	2	ind
D322, F323	Small pit/post-hole within late Bronze Age/early Iron Age enclosure	1	10	2
D324	Cleaning layer within late Bronze Age/early Iron Age enclosure	35	174	2
D325, F326	Small pit just outside late Bronze Age/early Iron Age enclosure	7	59	2, 3

Table 35. Late pottery. Summary by context. Continues on following pages.

Context and feature	Interpretation	Sherd count	Sherd weight (g)	Ceramic phase
D327, F328	Small pit just outside late Bronze Age/early Iron Age enclosure	2	29	2
D331, F333	Large quarry pit	2	9	2
F333	Large quarry pit	3	39	2
D334, F335	Late Bronze Age/early Iron Age enclosure ditch	9	151	2, 3, 5
D336, F335	Late Bronze Age/early Iron Age enclosure ditch	24	235	1, 2
D337	Small pit outside late Bronze Age/early Iron Age enclosure	7	126	2, 3
D349, F302	Medieval field ditch	58	345	1, 2, 3
D350, F354	Pit within late Bronze Age/early Iron Age enclosure	14	134	1, 2
D353, F354	Pit within late Bronze Age/early Iron Age enclosure	1	12	2
D355, F356 (=F406)	Eastern linear hollow within late Bronze Age/early Iron Age enclosure	116	1309	2, 3, 4
D357, F364	Pit within late Bronze Age/early Iron Age enclosure	169	1989	1, 2, 3, 4, 5
D358, F359	Small pit just outside late Bronze Age/early Iron Age enclosure	29	198	2, 3
D360, F361 (=F406)	Eastern linear hollow within late Bronze Age/early Iron Age enclosure	108	1008	2, 3, 4
D366, F364	Pit within late Bronze Age/early Iron Age enclosure	81	895	2, 3
D367, F364	Pit within late Bronze Age/early Iron Age enclosure	25	253	2, 3
D368, F364	Pit within late Bronze Age/early Iron Age enclosure	9	74	2, 3
D369, F364	Pit within late Bronze Age/early Iron Age enclosure	2	4	ind
D371, F370	Western linear hollow within late Bronze Age/early Iron Age enclosure	56	566	2, 3, 4, 5
D372, F370	Western linear hollow within late Bronze Age/early Iron Age enclosure	46	217	2, 3
F375	Medieval field ditch	2	7	1
D378, F377	Medieval field ditch	2	20	2
D382, F381	Medieval field ditch	1	10	2
D392, F391	Pit within late Bronze Age/early Iron Age enclosure	10	25	ind
D393, F391	Pit within late Bronze Age/early Iron Age enclosure	29	98	2
D395 F394	Late Bronze Age/early Iron Age enclosure ditch	8	48	1, 2
D397, F396	Late Bronze Age/early Iron Age enclosure ditch	8	86	2
D403, F402 (=F406)	Eastern linear hollow within late Bronze Age/early Iron Age enclosure	61	684	1, 2, 3, 4
D407, F406	Eastern linear hollow within late Bronze Age/early Iron Age enclosure	44	457	2, 3, 5
D409, F408 (=F406)	Eastern linear hollow within late Bronze Age/early Iron Age enclosure	55	525	3, 5
D410, F408 (=F406)	Eastern linear hollow within late Bronze Age/early Iron Age enclosure	19	138	1, 2
D412, F411	Large pit north of late Bronze Age/early Iron Age enclosure	37	131	2, 3
D413, F411	Large pit north of late Bronze Age/early Iron Age enclosure	220	1384	2, 3, 4
D415, F414	Post-hole within late Bronze Age/early Iron Age enclosure	12	92	2
D420, F421	Medieval field ditch	8	19	2
D428, F433 (=F406)	Eastern linear hollow within late Bronze Age/early Iron Age enclosure	1	3	2
D432, F411	Large pit north of late Bronze Age/early Iron Age enclosure	12	106	1, 2, 3, 4
D443, F446	Burial associated with ring ditch	5	11	ind
D447, F448	Small pit within late Bronze Age/early Iron Age enclosure	8	64	3
D449, F451	Pit within late Bronze Age/early Iron Age enclosure	346	3499	2, 3
D450, F451	Pit within late Bronze Age/early Iron Age enclosure	85	895	2, 3

Table 35 continued.

Context and feature	Interpretation	Sherd count	Sherd weight (g)	Ceramic phase
D452, F453	Small pit within late Bronze Age/early Iron Age enclosure	7	31	2, 3
D456, F457	Linear feature within late Bronze Age/early Iron Age enclosure	36	332	1, 2, 3
D462, F467	Pit within late Bronze Age/early Iron Age enclosure	14	111	2, 3
D470, F471	Pit within late Bronze Age/early Iron Age enclosure	127	1105	2, 3
D472, F473	Post-hole within late Bronze Age/early Iron Age enclosure	1	7	2
D481, F482	Post-hole within late Bronze Age/early Iron Age enclosure	2	53	3
F486	Post-hole within late Bronze Age/early Iron Age enclosure	1	4	ind
D491, F492	Linear feature within late Bronze Age/early Iron Age enclosure	1	13	3
D495, F496	Post-hole within late Bronze Age/early Iron Age enclosure	2	1	ind
D509, F511	Early Bronze Age barrow ditch	3	3	ind
D512, F508	Medieval field ditch	4	15	2
D514, F515	Post-hole within late Bronze Age/early Iron Age enclosure	1	43	3
D516, F517	Post-hole within late Bronze Age/early Iron Age enclosure	2	24	2
D520, F521	Post-hole within late Bronze Age/early Iron Age enclosure	7	42	2
D528, F529	Post-hole within late Bronze Age/early Iron Age enclosure	3	9	2
D530, F531	Post-hole within late Bronze Age/early Iron Age enclosure	2	2	ind
D534, F535	Post-hole within late Bronze Age/early Iron Age enclosure	1	1	ind
D536, F537	Post-hole within late Bronze Age/early Iron Age enclosure	3	13	3
D540, F482	Post-hole within late Bronze Age/early Iron Age enclosure	5	125	3
D545, F546	Post-hole within late Bronze Age/early Iron Age enclosure	1	3	3
D555, F556	Linear feature within late Bronze Age/early Iron Age enclosure	34	151	2
D565, F566	Post-hole within late Bronze Age/early Iron Age enclosure	6	22	2
D567, F568	Post-hole within late Bronze Age/early Iron Age enclosure	1	1	ind
D569, F570	Post-hole within late Bronze Age/early Iron Age enclosure	1	1	ind
D573, F574	Linear feature within late Bronze Age/early Iron Age enclosure	21	206	2, 3
D575, F576	Anglo-Saxon sunken-featured building	125	762	1, 2, 3
D581, F582	Late Bronze Age/early Iron Age enclosure ditch	2	5	ind
D583, F584	Medieval field ditch	12	71	2, 3
D585, F586	Medieval field ditch	2	4	ind
D597, F584	Medieval field ditch	6	29	2
D612, F613	Post-hole of Anglo-Saxon sunken-featured building	3	54	2
D616, F582	Late Bronze Age/early Iron Age enclosure ditch	118	435	2
D623, F584	Medieval field ditch	120	2035	1, 2
D624, F584	Medieval field ditch	31	407	2, 3
D627, F628	Post-hole within late Bronze Age/early Iron Age enclosure	1	3	ind
D1059, F1060	Medieval field ditch	6	16	2
D1095, F1096	Pit at eastern edge of excavation	4	38	1
D1314, F1283	Eastern parallel ditch	12	33	1, 2
U/S		66	523	1, 2, 3
Total		**2900**	**25734**	

Table 35 continued.

Fabric	Sherd count	Percentage of assemblage by sherd count	Sherd weight (g)	Percentage of assemblage by sherd weight
F/1	775	26.7%	6209	24.1%
F/2	166	5.7%	1641	6.4%
F/3	241	8.3%	3335	13.1%
F/4	30	1.0%	350	1.4%
F/5	238	8.2%	1872	7.3%
F/6	180	6.2%	1624	6.3%
F/7	7	0.2%	35	0.1%
F/8	13	0.4%	134	0.5%
F/9	58	2.0%	808	3.1%
F/10	8	0.3%	112	0.4%
F/11	26	0.9%	425	1.7%
F/12	26	0.9%	230	0.9%
QF/1	91	3.1%	819	3.2%
QF/2	33	1.1%	316	1.2%
QF/3	3	0.1%	21	0.1%
QF/4	553	19.1%	4388	17.1%
QF/5	207	7.1%	1602	6.2%
Q/1	12	0.4%	108	0.4%
Q/2	3	0.1%	8	0.0%
GF/1	4	0.1%	47	0.2%
G/1	10	0.3%	254	1%.
G/2	10	0.3%	377	1.5%
S/1	4	0.1%	44	0.2%
I/1	3	0.1%	120	0.5%
IF/1	15	0.5%	39	0.2%
FI/1	9	0.3%	261	1.0%
Indeterminate	175	6.0%	555	2.2%

Table 36. Late pottery. Sherd count and weights according to fabric types.

surface feels smooth. This fabric is very similar to F2 but even finer.

F/6. Quite a fine fabric containing moderate (15 per cent) well sorted subangular flint 0.25mm in size and sparse (5 per cent) flint detritus 3mm in size. The clay matrix is silty and micaceous and may derive from a different clay source. Fracture is fine; surface feels quite smooth.

F/7. A fine fabric containing abundant (40 per cent) well sorted subangular flint 0.5-1.0mm in size. The clay matrix is silty; fracture is smooth; surface feels smooth.

F/8. A coarse fabric containing abundant (40 per cent) fairly well sorted subangular flint 1mm in size. The clay matrix is silty; fracture is quite fine; surface feels quite smooth.

F/9. A fairly coarse fabric containing moderate (10-15 per cent) poorly sorted subangular flint 2mm in size. The clay matrix is silty with sparse (7 per cent) round black iron oxides 0.5mm in size; fracture is irregular; surface feels quite smooth.

F/10. A coarse fabric containing abundant (40-50 per cent) well sorted subangular flint 0.5-1mm in size. The clay matrix is silty; fracture is fine; surface feels smooth.

F/11. A coarse fabric containing very common (30 per cent) moderately sorted subangular flint 1-2mm in size. The clay matrix is silty; fracture is hackly; surface feels rough.

F/12. A medium coarse fabric containing moderate (10 per cent) poorly sorted subangular flint up to 2-3mm in size. The clay matrix is silty; fracture is irregular; surface feels rough.

Quartz and flint group (clay matrix is sandy rather than silty)

QF/1. Quite a fine fabric containing fine to medium sand sized rounded quartz grains and sparse (5-7 per cent) poorly sorted subangular flint. Fracture is quite fine; surface feels quite smooth.

QF/2. A fine fabric containing fine sand sized rounded quartz grains and moderate (15 per cent) well sorted subangular flint. Fracture is fine; surface feels smooth.

QF/3. Quite a fine fabric containing very common (30 per cent) well sorted tiny glauconite grains, and moderate (15 per cent) reasonably sorted subangular flint up to 1mm in size. The clay matrix is sandy; fracture is fine; surface feels rough.

QF/4. A medium coarse fabric containing common (20 per cent) moderately sorted subangular flint 1mm in size, and occasional larger pieces 2-3mm in size. The clay matrix contains fine sand; fracture is smooth; surface feels quite smooth.

QF/5. A fine fabric containing moderate (10 per cent) moderately sorted subangular flint 0.5mm in size. The clay matrix contains very fine sand; fracture is smooth; surface feels smooth.

Quartz group

Q/1. A fine fabric containing very fine sand and rare (1 per cent) red iron ore and rare (1 per cent) subangular flint. Fracture is fine; surface feels smooth.

Q/2. Medium coarse fabric; containing abundant (40-50 per cent) well sorted medium sand sized rounded quartz. Fracture is quite fine; surface feels rough.

Grog group

G/1. A coarse fabric containing common (25 per cent) poorly sorted sub-rounded grog up to 3mm in size and rare (2 per cent) poorly sorted subangular flint up to 2mm in size. The clay matrix is micaceous and silty, fracture is hackly; surface feels soapy.

G/2. A fairly fine fabric containing very common (30 per cent) well sorted subangular grog mostly 0.5mm in size, with sparse (3 per cent) grog up to 1mm in size. The clay matrix contains coarse silt to very fine sand; fracture is fine; surface feels soapy.

Grog and flint group

GF/1. A coarse fabric containing common (25 per cent) poorly sorted subangular grog up to 3mm in size, and common (25 per cent) poorly sorted subangular flint up to 5mm in size. The clay matrix is silty; fracture is hackly; surface feels rough.

Shell group

S/1. Quite a fine fabric containing very common (30 per cent) moderately sorted subangular shell up to 1mm in size. The clay matrix is silty; fracture is fine; surface feels smooth.

Iron oxide group

I/1. Quite a fine fabric containing common (25 per cent) fairly well sorted rounded black iron oxide and rare (2 per cent) poorly sorted subangular flint. The clay matrix is silty; fracture is fine; surface feels smooth.

Iron and flint group

IF/1. A coarse fabric containing common (20 per cent) rounded fairly well sorted black iron oxide up to 2mm in size, and moderate ((15 per cent) subangular flint mostly 2mm in size. The clay matrix is silty; fracture is irregular; surface feels fine.

Flint and iron oxide group

FI/1. A coarse fabric containing common (20 per cent) poorly sorted subangular flint up to 3mm in size, and moderate (15 per cent) poorly sorted rounded red iron up to 2mm in size. The clay matrix is silty; fracture is irregular, surface feels rough.

Clay and temper sources

The site is located in the south-east corner on the Isle of Thanet (Geological Survey Sheet of Great Britain no 274), which is formed by both solid bedrock and drift deposits. The solid bedrock is represented by Upper Chalk, and overlying the chalk are deposits of brickearth (Shand 2001b, 3-4). Brickearth is used for making bricks (Dines and Robbie 1954, 148) and could have provided a source of good potting material. Geologically the Chalk Hill pottery fabrics suggest reliance on locally available resources for ceramic production during the Bronze Age. This conclusion is based on the Dean Arnold model of resource procurement, whereby the preferred territory of exploitation for both clay and temper is 1 kilometre or less, and the common range of exploitation ranges within 7 kilometres for clay, and 6-9 kilometres for temper (Arnold 1985, 54-5, Morris 1994a; 1994b).

Flint, the main fabric tempering, could have been obtained locally from the Chalk. The sandy and silty clays used could have derived from a variety of local sources including the deposits of Thanet Beds. These consist mainly of fine sand, passing downwards into silt (Dewey *et al* 1924, 50). Iron oxides and ironstone are also recorded in these deposits (*ibid*, 52), and a small number of the Chalk Hill vessels have been made with clays containing iron oxides.

Pottery containing shell is used infrequently at Ramsgate and shell occurs naturally in the Woolwich Beds (Dines and Robbie 1954, 86-7). These deposits are

found some six to seven kilometres to the south-west of the site. Shelly fabrics are an unusual addition to the Chalk Hill repertoire and may suggest that the potters did not want to travel very far to obtain this type of clay. Shell also occurs in the Gault of Folkestone, which is extremely fossiliferous (Davies 1939, 101). This lies some distance from the Chalk Hill site and may suggest evidence for imported pots or clays. It is however difficult to be certain of this.

Summary

There is little correlation between fabric groups and form types, although bowl types tend to be made with finer fabrics. This is often the case, as fine fabrics would have helped facilitate the production of vessels with thinner walls and burnished surfaces. Flint tempered wares are very popular, accounting for 91 per cent of the entire assemblage, and this is very typical of middle and late Bronze Age assemblages in Kent. The inclusion of grog is quite rare, and this is also quite typical of middle to late Bronze Age pottery from settlement sites. The overall picture of grog as an unpopular choice of inclusion may be indicative of social constraints on its use (Cleal 1995, 192).

The fabric recipes of the late Bronze Age can be generally described as being finer than that of the middle to late Bronze Age. Fabric type F/3 is a very coarse fabric and is predominantly employed on middle to late Bronze Age, and early late Bronze Age pottery. A greater variety of flint-tempered fabrics have been utilized in the production of the late Bronze Age pottery, and the flint inclusions are generally smaller and less dense. Sorting of the flint can be moderate or well sorted, and it is possible that more effort was being put into the preparation of the clays, and that some of the flint was sieved in order to extract the very fine pieces. However, some of the flint types, for example flint fabric type F/1 cannot be placed within a chronological parameter, and it may be argued that there is a continuation of fabric recipes used by middle and late Bronze Age potters. Fabric recipes may have passed down from generation to generation, and family traditions may have been important to the Chalk Hill potters and their families.

The addition of sandy fabrics appears in the late Bronze Age and would have facilitated the production of more thin-walled vessels, thus continuing and developing the possibilities of form variety in the domestic sphere of food preparation, serving and consumption (Woodward 2002b, 117). The use of shelly fabrics is generally quite rare in Bronze Age Kent and tends to gain in popularity in the early Iron Age. Shelly fabrics are particularly common during the early Iron Age in south-east Essex (Brown 1995a, 30), and can be found in Kentish early/middle Iron Age assemblages, for example at Tollgate, Cobham, Kent (Jones 2006b). The Chalk Hill assemblage included just four shell-tempered sherds, which belong to three early Iron Age vessels, and include a fine burnished bowl. The paucity of shell tempered pottery at Chalk Hill may suggest lack of settlement activity in the early Iron Age. Fabric types Q/2 and G/2 are specific to late Iron Age pottery at Chalk Hill.

Petrology

Seventeen sherds were selected for thin sectioning. The results suggest that quite a variety of clay sources was used for pottery production. Ethnographic observations suggest that complex behaviours relate to suitable clay selection, including competition over land use and between artisans, individual conceptions regarding the quality of raw materials, habits and traditions and social interactions at a local or regional level (Gosselain and Livingstone Smith 2005, 34). The importance of tradition resulting in long-lived popular fabric recipes has already been mentioned. It is also interesting that so many different clay sources appear to have been used. This might suggest that potters and their families wanted to express their creativity and individuality by using particular clays. It may also suggest that potters had the freedom to exploit and experiment with a variety of clays and were not bounded by specific territories.

The clays used by the Chalk Hill pottery could have been obtained locally, although these results are not conclusive. Similar geological deposits occur across the region of Kent, and it would be difficult to identify vessels which might have been transported to the site. However, a similar pattern can be seen on several other sites in Kent. A number of sherds have been selected for thin sectioning from ten sites across Kent by the author, and the results indicate that pottery production from the middle Bronze Age through to the early Iron Age (*c.* 1500 BC – 600 BC) is very localised (McNee 2012). Ceramic production within Bronze Age Kent suggests that small-scale household level production took place, and that each household made the pottery it required for its own consumption (Sinopoli 1991, 99; Peacock 1982, 8). The characteristics of the pots would suggest that most of the pots were utilitarian, and made for household consumption, rather than trade and exchange. Quite large, coarse vessels, which would not have travelled very well, dominate the Chalk Hill assemblage and this may be further evidence of local ceramic production.

One sample is from fabric type GF/1. Poorly sorted different coloured grog inclusions are present. It is possible that the grog derives from more than one vessel. The grog inclusions contain subangular flint; however, the clay matrices of the grog may differ. One example of grog has a coarse silty clay matrix, and another example appears to contain iron ore and mica. The grog is surrounded by voids, created when the wet and plastic clay shrinks

away from the inert grog during the drying of the vessel (Gibson and Woods 1997, 178).

A combination of flint and grog temper suggests a mixture of old and new fabric recipes. The incorporation of old pots into new pots may be a reflection of a changing society, but at the same time there might be a need to remember the past and maintain some long-standing traditions. Bronze Age technology often involved the mixing and recombination of elements, as for example in the recycling of bronzes and the use of grog tempering in pottery manufacture. Artefacts contained fragments of older objects, which in turn incorporated traces from the more distant past. These traces provided artefacts with genealogies, imparting meanings carried out of the past into the present (Brück 2006, 309-10).

Vessel forms

A total of twenty-three rim types, three base types, and three angled shoulder types have been defined within the Ramsgate assemblage. No surviving vessel profiles remain and therefore it has not been possible to calculate and compare vessel capacity. A number of sites were examined for parallels of the various vessel types and parallels have also been sought outside of the Kent area. Studying Bronze Age pottery from sites outside the region can help with the identification of the pottery and can aid in building up a picture of social contact with other areas.

Rim forms

R1. Slightly flaring rounded rim, long neck joining a gently rounded shoulder (Fig 80/35). Form type: jar.
Parallels: Monkton Court Farm (Macpherson-Grant 1994, figs 5/1); Shoebury (Brown 1995b, fig 65/78); Willow Farm (McNee 2004, figs 2/12 and 3/27); Aldermaston Wharf (Bradley *et al* 1980, 12/14D); Coldharbour Road (Barclay 1995, fig 10/10).

R2. Very slightly flaring flattened rim, long upright neck joining a gentle rounded shoulder (Fig 80/36). Form type: jar.
Parallels: Chanctonbury Ring (Hamilton 2001, fig 11/4); Highstead (Couldrey 2007, fig 67/147).

R3. Flaring flat-topped rim with internal bevel, long curving neck joining a shoulder (Fig 79/23). Form type: jar.
Parallels: Monkton Court Farm (Macpherson-Grant 1994, fig 14/79); Runnymede (Longley 1980); North Shoebury (Brown 1995b, fig 65/74).

R4. Fairly upright flat-topped rim, long neck (Fig 80/41). Form type: jar.
Parallels: Chanctonbury Ring (Hamilton 2001, fig 1/16); Willow Farm (McNee 2004, fig 2/17).

R5. Very slightly inturned rounded rim, upright neck joining a shoulder (Fig 79/29). Form type: jar.
Parallels: Monkton Court Farm (Macpherson-Grant 1994, fig 14/80); Chanctonbury Ring (Hamilton 2001, fig 10/19).

R6. Flat-topped rim sloping inwards, short neck joining a gentle rounded shoulder (Figs 79/28 and 79/30). Form type: jar.
Parallels: Chanctonbury Ring (Hamilton 2001, fig 11/29), Darenth, Kent (Couldrey 1984, fig 45/335); Monkton Court Farm (Macpherson-Grant 1994, fig 14), Holborough Quarry (McNee 2007a, fig 3/27).

R7. Short everted rim (Figs 77/3 and 79/31). Form type: jar.
Parallels: Chanctonbury Ring (Hamilton 200,1 fig 1/15); Reading Business Park (Hall 1992, fig 45); Knights Farm (Bradley *et al* 1980, fig 34); Monkton Court Farm (Macpherson-Grant 1994, fig 16/96); Ellington School (McNee 2007b, figs 3/28 and 4/38).

R8. Short everted round topped rim joining a rounded shoulder (Fig 80/40).
Form type: bowl.
Parallels: Monkton Court Farm (Macpherson-Grant 1994, fig 9); Willow Farm (McNee 2004, fig 2/13), Saltwood Tunnel (Jones 2006a), Iwade (Hamilton and Seager Thomas 2005, fig 35/4).

R9. Short everted round topped rim, long straight neck sloping inwards (Fig 79/25). Form type: jar.
Parallels: Chanctonbury Ring (Hamilton 2001, fig 9/10); Willow Farm (McNee 2004, fig 1/9).

R10. Ovoid jar (Fig 79/26).
Parallels: Kemsley (McNee 2006a, fig 22/48); Downsview (Hamilton 2002, fig 7/28: 14), North Shoebury (Brown 1995b, fig 62); Aldermaston Wharf (Bradley *et al* 1980, fig 12).

R11. Flaring round topped rim with internal bevel (Fig 81/48). Form type: jar.
Parallels: Chanctonbury Ring (Hamilton 2001, fig 11/29).

R12. Flaring flat topped rim (Fig 81/42). Form: bowl.
Parallels: Monkton Court Farm (Macpherson-Grant 1994, fig 10).

R13. Slightly flaring rounded rim, long neck joining a slightly carinated shoulder (Fig 82/58). Form type: jar.
Parallels: Darenth, Kent (Couldrey 1984, fig 45/334); Monkton Court Farm (Macpherson-Grant 1994, fig 14/76); Runnymede (Needham 1996, fig 80, P772).

R14. Upright round topped rim (Fig 78/12). Form type: bowl.
Parallels: Kemsley (McNee 2006a, fig 19/30).

R15. Flat topped upright rim joining a rounded shoulder. Form: bowl.
Parallels: Welling (Couldrey 1988, fig 3/4).

R16. Flat topped rim with small external bead (Fig 83/60). Form type: jar.

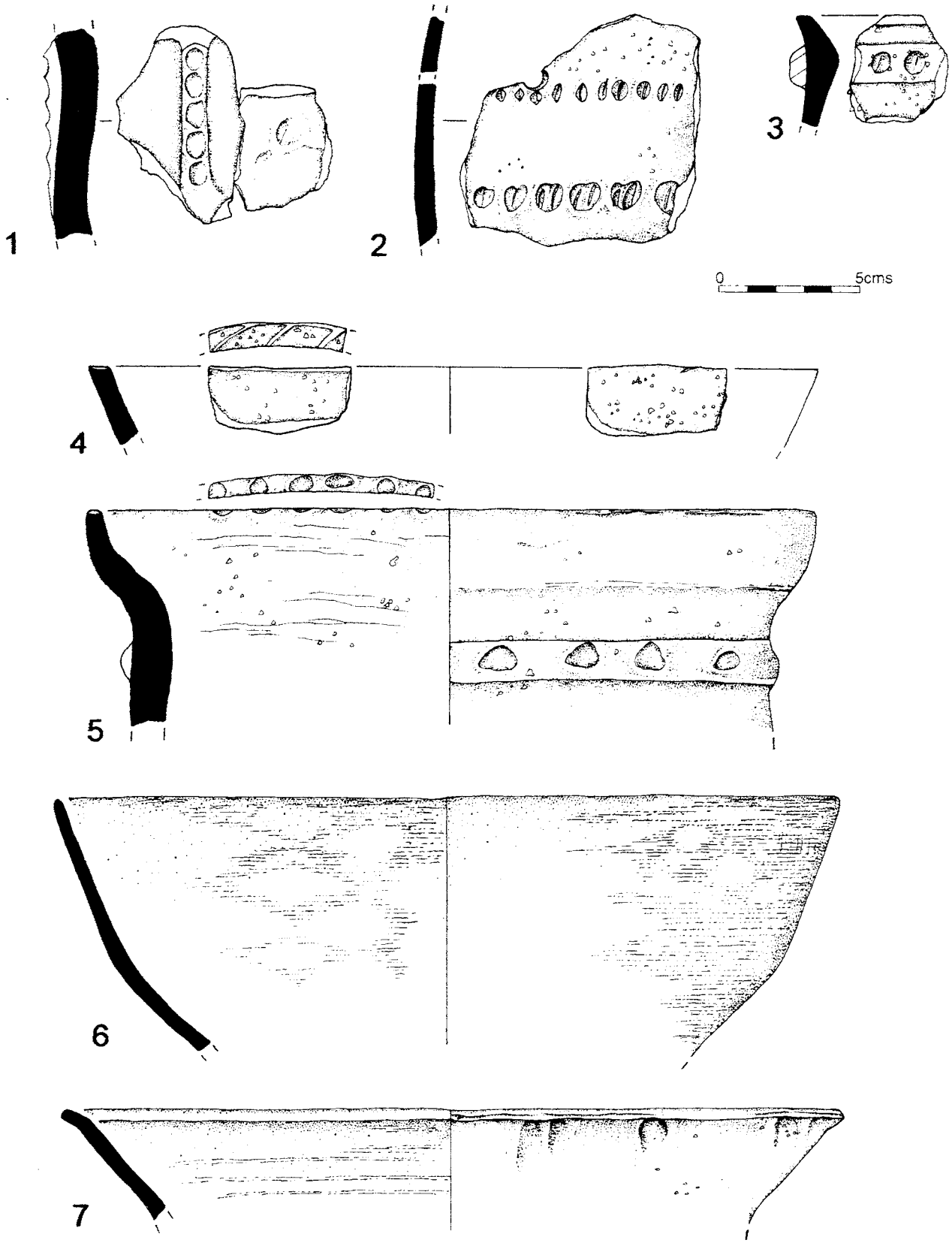


Fig 77. Middle to late Bronze Age and late Bronze Age pottery.

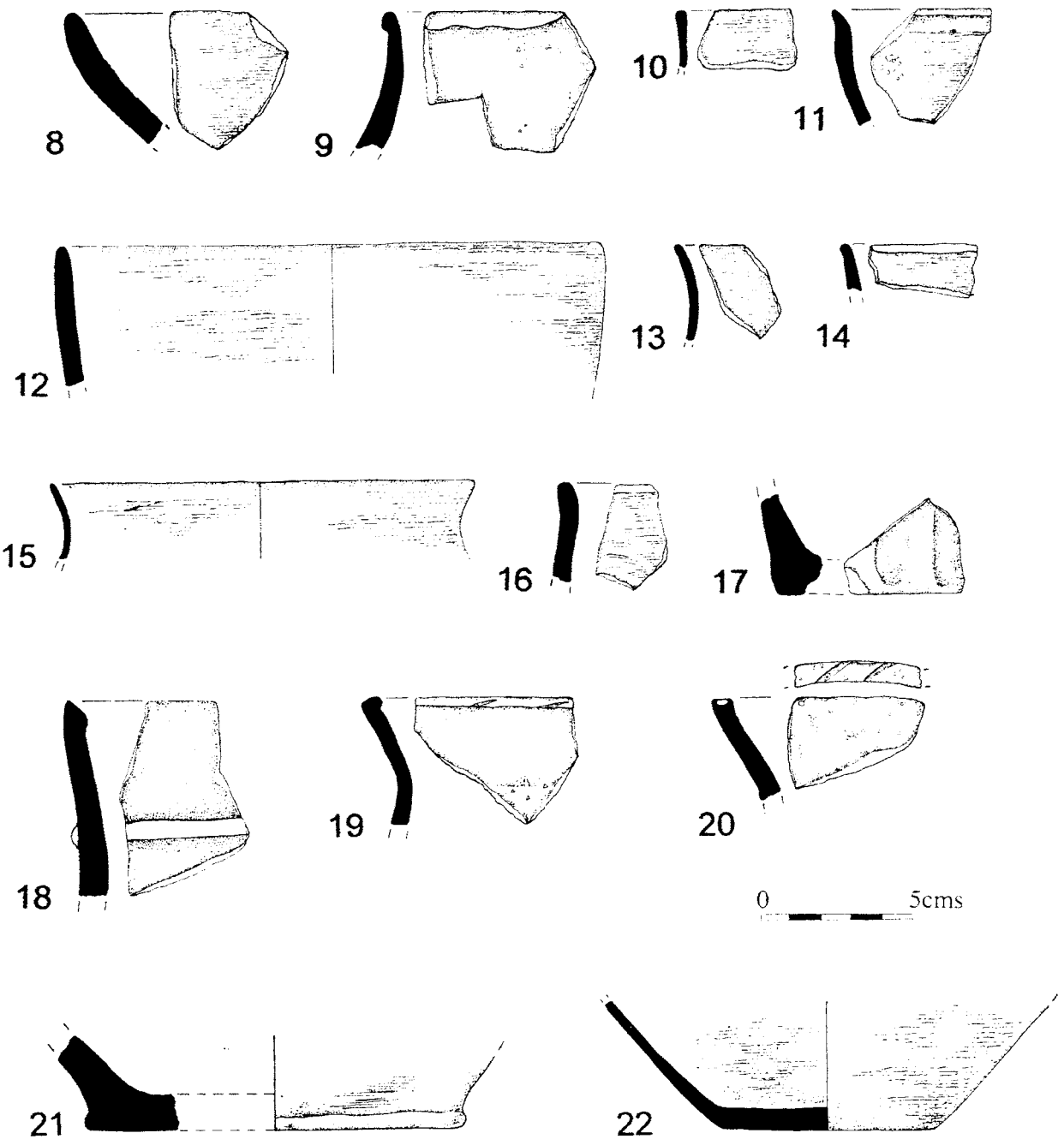


Fig 78. Late Bronze Age pottery.

Parallels: Monkton Court Farm (Macpherson-Grant 1994, fig 16/97).

R17. Flat topped rim, bucket/barrel shaped (Fig 83/61). Form type: jar.
Parallels: North Shoebury (Brown 1995b, figs 65/93 and 94); Lofts Farm (Brown 1988, fig 14/9); Downlands Walmer (McNee 2010, fig 33/27).

R18. Hemispherical open bowl (Fig 77/6).
Parallels: Kemsley (McNee 2006a, fig 19/28); Willow Farm (McNee 2004, fig 1/3); Mill Hill, Deal (Champion 1980, fig 6/12); Welling (Couldrey 1988, fig 3/5); Ellington School (McNee 2007b, fig 5/51).

R19. Very slightly flaring flattened rim, long upright neck, similar to R2 but is a bowl form (Fig 78/13).
Parallels: Monkton Court Farm (Macpherson-Grant 1995, fig 9); Willow Farm (McNee 2004, fig 3/26).

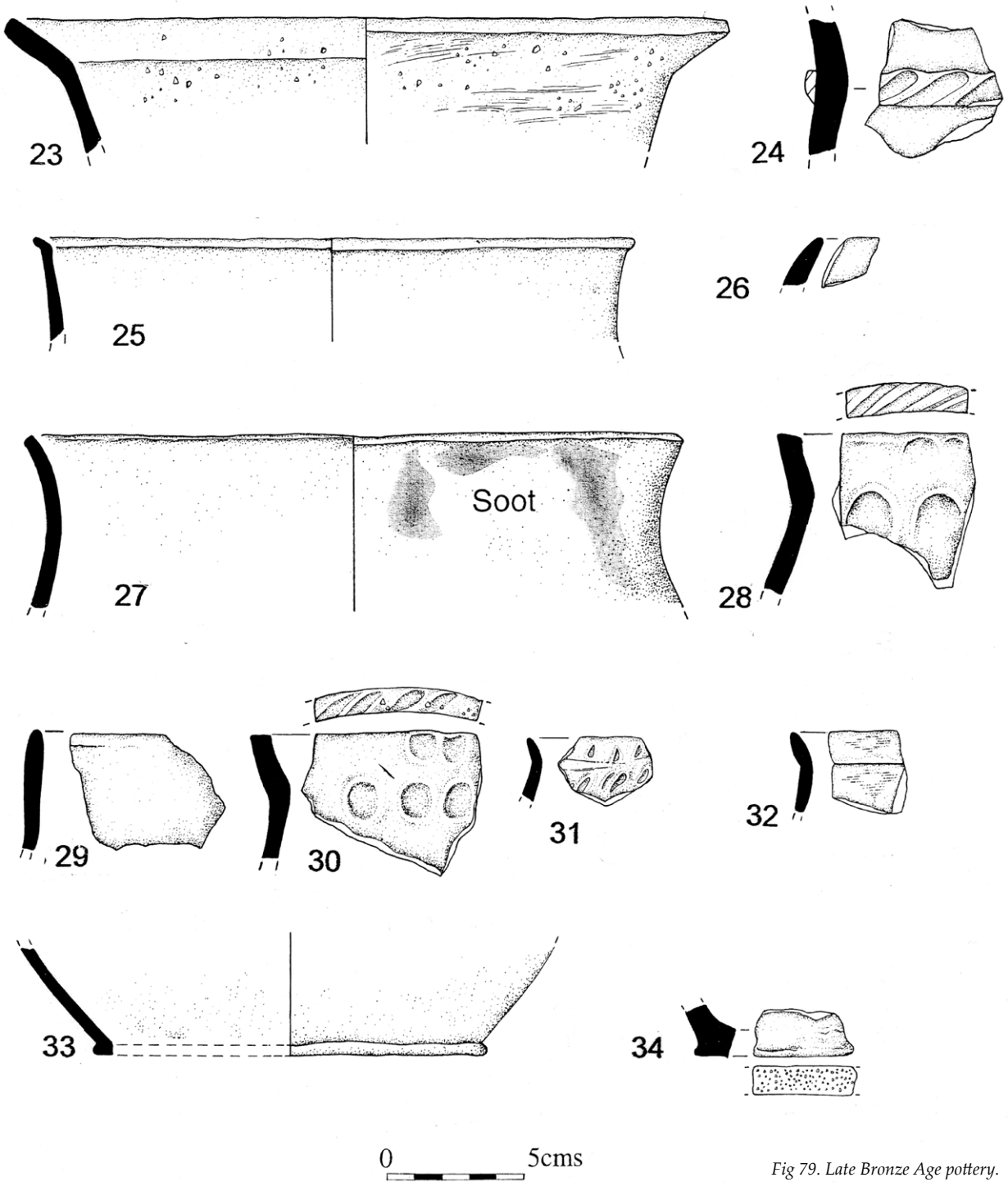


Fig 79. Late Bronze Age pottery.

R20. Open bowl or jar, rounded slightly flaring rim with tiny bead on exterior (Fig 78/11).
Parallels: Kemsley (McNee 2006a, fig 19/33); Mucking (Barrett and Bond 1988, fig 22/61).

R21. Fairly upright or slightly inturned rim, rounded top and internal bevel, long neck joining a shoulder (Fig 78/18). Form type: jar.
Parallels: Monkton Court Farm (Macpherson-Grant 1994, fig 17/95); Mucking South Rings (Jones and Bond 1980, 476, fig 14); Holborough Quarry (McNee 2007a, fig 8/75).

R22. Rounded inverted rim, short neck, sharp carinated shoulder joining an inward sloping body (Fig 83/68). Form: bipartite bowl.

Parallels: Highstead (Couldrey 2007), White Horse Stone (Morris 2006b, fig 25); Shelford Quarry (McNee 2008, fig 34).

R23. Closed ovoid bowl.

Parallels: Kemsley (McNee 2006a, fig 18/23); Willow Farm (McNee 2004, fig 3/24); Monkton Court Farm (Macpherson-Grant 1994, fig 11/48).

Angled forms

A1. Slight carinated shoulder (Fig 82/58).
A2. Gentle rounded shoulder (Fig 80/36).
A3. Sharp carinated shoulder (Fig 83/68).

Base forms

B.1 Flat-bottomed base, expanded wall (Fig 78/22).
B2. Flat-bottomed base, fairly upright wall (Fig 78/17).
B3. Splayed base.
B99 Unclassified base/central disc only.

Discussion

Middle to late Bronze Age forms

The earliest later prehistoric pottery appears fairly typical of a later Deverel-Rimbury tradition and is mainly characterised by very coarse thick-walled body sherds, a small number of base sherds (form type B2 and B99), and a small flat-topped rim. Decorative techniques include finger impressions and applied cordons. There appears to be a transitionary stage from the middle to late Bronze Age, and it is tentatively suggested that the transitional middle to late Bronze Age period referred to in this report is characterised by the continued use of coarse fabrics but on vessels with thinner walls, and also the introduction of finer fabrics used on middle Bronze Age forms. One rim sherd (form type R7) may be representative of a middle to late Bronze Age transition. The form is not typically middle Bronze Age, but the fabric is very coarse and has an applied cordon with finger impressions (Fig 77/3). As a whole these pottery forms find general parallels with Deverel-Rimbury pottery from a wide range of sites, including Kemsley near Sittingbourne (McNee 2006a), Highstead Farm Quarry, Chislet (Seager Thomas 2002), and Westwood Cross, Thanet (Couldrey 2004).

Late Bronze Age forms

This is characterised by jars and bowls belonging to the plain and decorated phase as characterised by Barrett (1980). Some pottery forms may have been popular over a long period of time, and consequently there are difficulties in placing some of the Chalk Hill pottery in a particular phase. Form type R18 is an open bowl form (Fig 77/6) and represents a marked departure from the Deverel-Rimbury tradition (Barrett 1980, 302). There are numerous parallels for this type of bowl (see above for parallels relating to form types), and this can be placed in a late Bronze Age plain ware phase. Six or seven of these bowls were identified, and the majority of them are quite fine (Barrett's class IV bowl). Two of the bowls have been made with a fairly coarse fabric, and surface burnishing is poor (Barrett's class III bowl).

Ovoid jars (form type R10, Fig 83/62) have an ancestry that goes back to the middle Bronze Age. They first appear during the earliest 1st millennium BC and are found in largely undecorated post Deverel-Rimbury assemblages (Hamilton 2001, 96). Chalk Hill has five examples of this type of pot; the fabrics are coarse, and the pots are plain. Form type (R23) also occurs in the plain ware phase, and Chalk Hill has just one of these. There are five examples of form type (R9); none of these jars are decorated and may fit into a plain ware tradition.

The late Bronze Age assemblage is characterised by both coarse and fine shouldered jars, with long necks and slightly flaring or upright rims. Shoulders can be gently rounded or carinated, and vessels occur in a variety of sizes. Although these jar forms are present in the post Deverel-Rimbury plain phase some of the Chalk Hill examples are decorated on both the rim and shoulder, so have been classified as belonging to the late Bronze Age decorated phase. The Ramsgate assemblage also has clear parallels with the nearby Monkton Court Farm assemblage, where the ceramics have been dated to 850-600BC (Macpherson-Grant 1994, 280). Form types R2 (Fig 82/51); R4 (Fig 80/41); R6 (Figs 79/28 and 79/30); R13 (Fig 82/58), and R17 (Fig 69/61) include examples which have 'pie-crusted' rims, and/or finger impressions on the shoulder.

A few vessels may be slightly later in date, for example form type R22 (Fig 83/68). Chalk Hill has two, or possibly three of these vessel types, which are similar in form to a fine painted bowl from Highstead period 3B (Couldrey 2007). One of the Chalk Hill bowls has a very sharp carinated shoulder, a finely burnished surface, and quite fine fabric. It compares very well to the Highstead bowl, but there are two clear differences. The Chalk Hill bowl has a shorter neck and no painted surface; however, another rim example from Chalk Hill has traces of white paint on the exterior (Fig 83/63). Form type R/17 (Fig 83/61) is also more typical of an early Iron Age tradition. The presence of these vessels may be indicative of continuous occupation into the early Iron Age.

Base forms

Forty-eight bases are present within the Chalk Hill assemblage. They are all flat bottomed with either upright or flaring walls and are fairly typical of middle to late Bronze Age, and late Bronze Age assemblages. Eight splayed bases have been identified, and these are present in late 2nd mil-

Surface treatment	Sherd count and %	Sherd weight	Additional information
Basal flints	12 (0.4%)	46	
Burnishing	438 (15.1%)	3597	Mostly all over burnishing.
Basal flints and burnishing	3 (0.1%)	5	All over burnishing.
Smoothing and burnishing	39 (1.3%)	249	
Wiping and burnishing	3 (0.1%)	120	Burnished exterior, wiping interior.
Applied clay slurry	6 (0.2%)	223	
Applied clay slurry/smoothed	6 (0.2%)	61	
Simple wiping	491 (17%)	6058	Some evidence of grass wiping.
Applied clay slurry/wiped	196 (6.8%)	2175	Wiping quite rough, almost rusticated.
Finger wiping	5 (0.2%)	44	Mostly vertical finger wiping on the exterior of the vessel.
White paint	1 (0.03%)	2	Traces of white paint on exterior of rim.
Finger 'kneading'	22 (0.8%)	162	Exterior of pot has been 'kneaded'.
Smoothing	415 (14.2%)	4124	
Surface 'combing'	1 (0.03%)	10	Shallow combing marks on exterior of pot.

Table 37. Late pottery. Summary of surface treatments by sherd count and weight.

lennium BC and early 1st millennium assemblages from Lowland Britain (Hamilton 2002, 48). Six bases have profusely flint gritted under-bases (Fig 79/34) and have been discussed under surface treatment.

Summary of form types

It is interesting to note that although the Chalk Hill assemblage displays a good range of forms it is very much dominated by both fine and coarse jar forms. Many of these jars are quite large in size, and rim diameters suggest a range of sizes up to at least 40 centimetres. It was not possible to obtain a rim measurement on 59 rim sherds, but it is apparent that many of these rims belong to large vessels. Jars with finer fabrics and very smooth surface finishes tend to be undecorated, and this may have satisfied an aesthetic requirement. The lack of usewear evidence may suggest that these jars were used for storage, and this might be a specialised feature of the site.

Surface treatment

Fourteen types of surface treatment were identified within the assemblage (Table 37). 1638 sherds (56.5 per cent) have some form of surface treatment; the remaining pottery sherds displayed no obvious surface treatments.

The use of burnishing is one of the most popular surface treatments in the Chalk Hill assemblage. Most of the pots have been burnished on the exterior and interior of the pot. Some of the pots have a highly polished surface, but the burnishing on most of the pots appears to be quite poor and superficial, or roughly applied (Fig 83/68). This may of course be due to post-depositional wear and tear. Burnishing occurs mainly on fairly thin walled plain bowls and is both a functional and decorative treatment. It gives the vessel a smooth polished surface, and also reduces the permeability of the pot (Gibson 2002, 65). Generally speaking, finer fabrics have been employed to make burnished pottery at Chalk Hill, but some of the coarser flinty fabrics have also been used, for example flint fabric type F/1. Some of the pots have been coated in fine clay slurry; this would have made the task of burnishing a pot with a coarse flint temper somewhat easier.

Wiping is an equally popular surface treatment and occurs mainly on coarse jars but also on finer jars. Surface finishing involving the smoothing and simple wiping of the vessels may have been carried out with the fingers, or a pad of grass or straw. Impressions of some sort of vegetable matter are evident on the exterior and interior of a few pots (Fig 80/35), and also on some surviving base sherds within the assemblage. One base sherd has been wiped on the interior using a circular motion. Several pots have horizontal wiping on the interior of the pot, and vertical or diagonal wiping on the exterior of the vessel. A few other examples have been wiped with the fingers in a vertical fashion of the exterior of the pot, and this has resulted in 'fluted' finger pull impressions above the base (Fig 78/17). Similar surface treatments have also been noted at Monkton Court Farm (Macpherson-Grant 1994, 258).

Some of the pottery appears to have been coated in a form of clay slip or slurry. Patches of this slip have worn away to reveal the coarse flint fabric underneath. The application of this extra coating of clay may have helped reduce permeability in vessels intended for storage or may have been used to make the pot more attractive by

disguising unsightly coil joins. This technique has been observed from many sites including Monkton Court Farm (Macpherson-Grant 1994, 248), and Willow Farm, Herne Bay (McNee 2004, 17). It is interesting to note the occurrence of rough wiping on pots that have an extra application of clay slurry and is a feature which can also occur on pots without clay slurry. The wiping is similar to pots which have been 'rusticated', a surface treatment peculiar to east Kent and of continental origin in the early-middle Iron Age (Macpherson-Grant 1991, 41-3). Comparisons with rusticated sherds from sites such as Ebbsfleet (Macpherson-Grant 1992, 298), and Downlands, Walmer (McNee 2010) demonstrate that the Chalk Hill examples are slightly finer, and do not have the 'encrusted' effect that some rusticated sherds can have. It is tentatively suggested that the Chalk Hill examples may represent some form of transitional period from the end of the late Bronze Age into the Iron Age.

One small body sherd from a fine jar has very light combing/wiping on the surface. It is however very similar to an example from Monkton Court Farm (Macpherson-Grant 1994, 256) and may well be an example of decoration rather than surface treatment. One small sherd from a possible form type R22 appears to have traces of white paint on and just below the exterior of the rim (Fig 83/63). Painted surfaces are known from Kent sites such as Highstead and occur during the early-mid Iron Age (Macpherson-Grant 1991, 42). Research by Middleton suggests that white bands were apparently produced by inlaying quartz rich material into troughs incised into the surface of the sherds (Middleton 1995, 210).

The use of finger 'kneading' is evident on 30 sherds and could be a result of the use of finger squeezing to form and finish vessel shapes that have been slab built (Hamilton 1987, 58). It is evident that some of the Chalk Hill pots have been constructed by slab building as well as coil building.

Six base sherds have profusely flint gritted under-bases (Fig 79/34), and this may indicate that manufacture of the pot was carried out on a bed of burnt and crushed flint to stop the pots from sticking. This form of surface treatment has been noted for late Bronze Age/early Iron Age assemblages from Kent (Macpherson-Grant 1991, 39). One example from Chalk Hill is identified as belonging to the middle to late Bronze Age phase. Pottery with basal flints is found on many sites in Sussex, including Knapp Farm, which has been dated to the earliest post-Deverel-Rimbury phase (Hamilton 1997, 83). Two examples from Willow Farm, Herne Bay may belong to middle to late Bronze Age transitional period (McNee 2004, 14), and it may be that the occurrence of basal flints starts as early as 1100 BC, or even earlier, and continues up to and possibly beyond 600 BC.

Visible usewear evidence

There is little evidence of vessel use surviving on the pottery, possibly as a result of the poor condition of many of the sherds. A total of 97 sherds (3.3 per cent) displayed evidence of sooting, mostly to the exterior of the vessel, and indicates the use of these pots in some form of cooking activity. One sherd has soot adhering to the exterior of the rim (context D355, from the linear hollow F406 in the late Bronze Age/early Iron Age enclosure), and this would suggest that the vessel was placed directly on an open fire (Hally 1983, 10). Pots used for cooking or heating activities tend to be roughly wiped shouldered jars, especially form type R2 (Fig 79/27). The fabrics are quite coarse, and some of these jars have 'pie crust' decoration on top of the rim (Fig 80/41). Surface roughening can enhance the properties of cooking vessels (Rice 1987, 232). Certain features on the site may have been cooking areas; there are however not enough examples of usewear evidence to offer any correlation between vessel types and activity areas.

Repair holes

The assemblage contains two sherds bearing one perforation each (Fig 77/2). Holes drilled after firing are generally regarded as repair holes, enabling cracks or breaks to be repaired by binding (Cleal 1988, 139). One example from Chalk Hill has soot deposits on the exterior, implying a domestic function, possibly cooking.

Decoration

Nineteen decorative techniques occur within the assemblage representing just 4 per cent of the overall assemblage. This is not a particularly high percentage and may be partly due to the fragmentary condition of the pottery. Despite this low incidence of decorated pots there is a considerable variety of decoration (see below). The single incidence of some of these decorative techniques do not allow for any conclusions to be drawn.

Decorated forms

D1. Horizontal incising (Fig 80/38).
D2. 'Piecrust' rim (Figs 77/4; 77/5; 78/20; 79/30).
D3. Diagonal stab marks below the exterior of the rim (Fig 79/31).
D4. Horizontal 'rilling' marks (Figs 82/55; 82/56).
D5. Applied cordon with fingertip impressions (Figs 77/3; 77/5).
D6. Stab and drag on shoulder (Fig 81/49).
D7. Horizontal shallow tooling (Fig 82/57).
D8. Small impressions made with a stick or bone?
D9. Applied cordon with cable decoration (Fig 79/24).
D10. Applied cordon with horizontal incised lines above? the cordon (Fig 83/69).

D11. Fingertip impressions (Fig 81/50).
D12. Horizontal rilling with diagonal stab/incised marks possibly above the rilling (Fig 82/54).
D13. Vertical stab marks on shoulder carination.
D14. Tooled impressions on the shoulder either in the shape of an upside down 'V' or a triangle (Fig 83/61).
D15. Applied cordon (plain) (Fig 78/18).
D16. Incised geometric decoration.
D17. Vertical scored decoration.
D18. Diagonal incising.
D19. Applied cordon with double fingertip impressions (Fig 77/2).

One of the most popular types of decoration is 'pie-crusting' on top or on the edge of the rim. Fifteen vessels have been decorated in this fashion, mostly occurring on vessel form type R6. One vessel (form type R3) has also been decorated on the shoulder with the application of a finger-impressed cordon, and one vessel (form type R17) has large 'stab' marks on the shoulder (Fig 83/61). Applied cordons occur on 13 vessels, often around the shoulders of coarse jars. This may have given the pot more stability, as well as providing a pot which is aesthetically pleasing. One pot (Fig 77/1) has a finger-impressed cordon, which is possibly in the shape of a 'horse-shoe'. This type of decoration is a fairly common

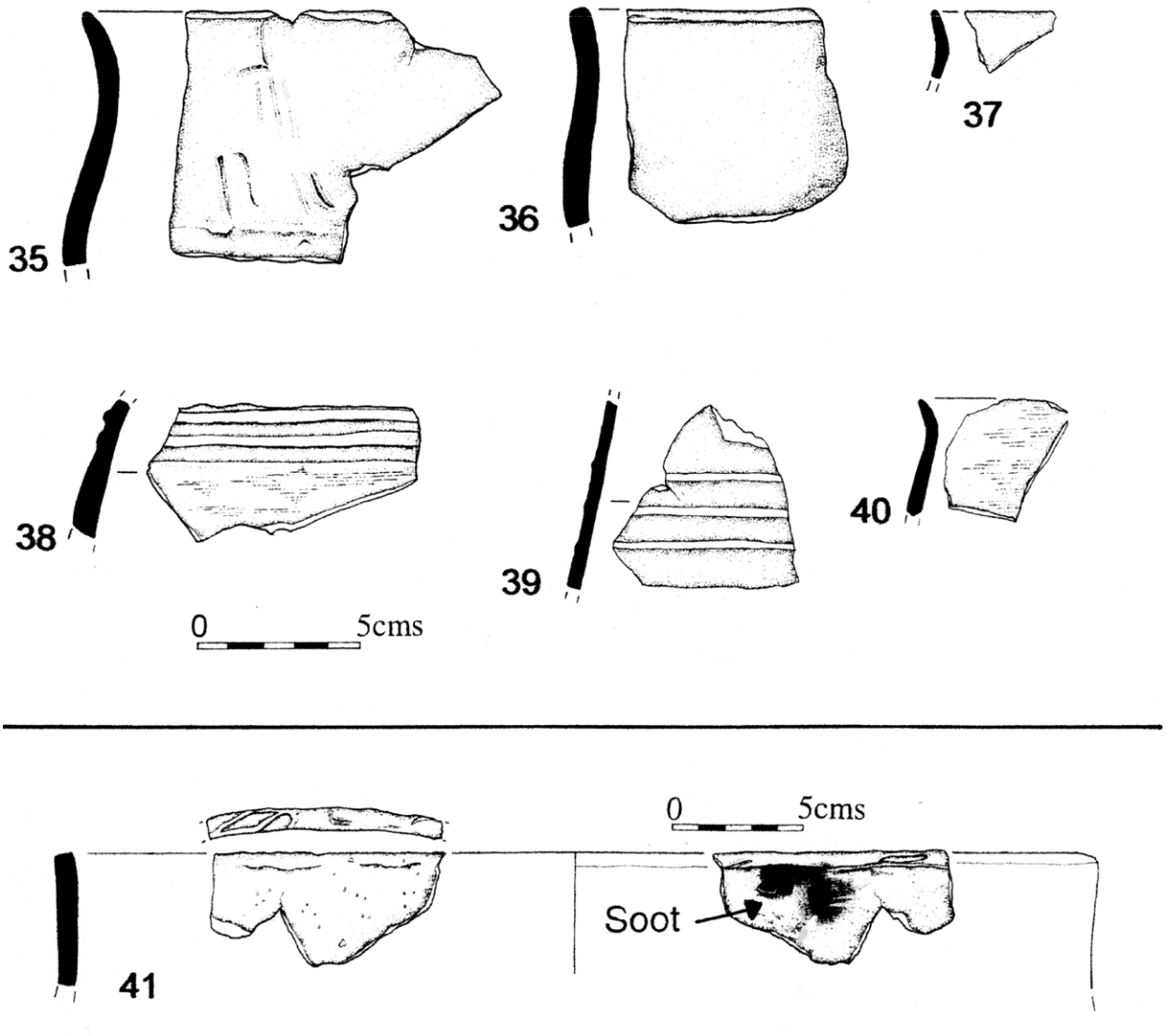


Fig 80. Late Bronze Age pottery.

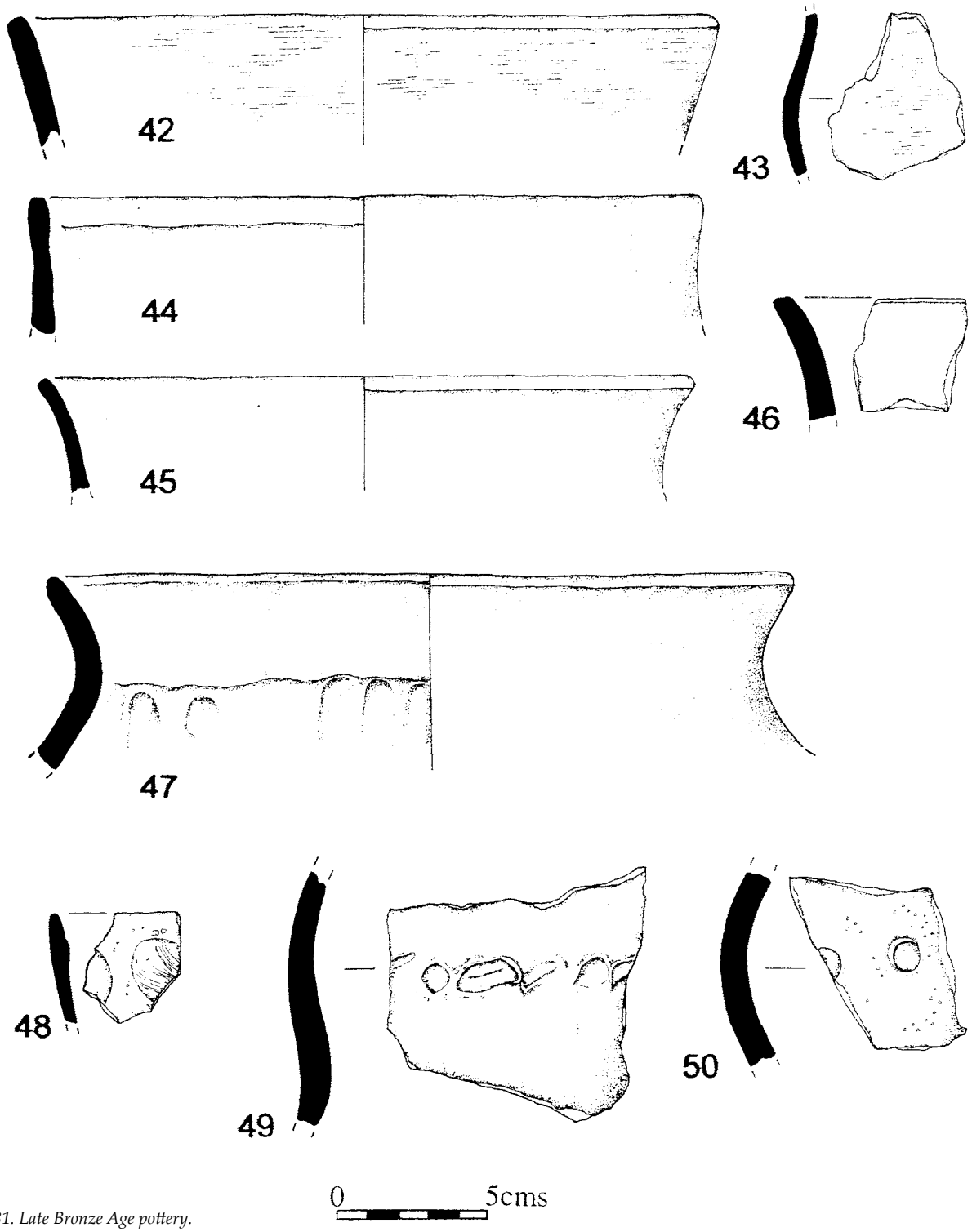


Fig 81. Late Bronze Age pottery.

component of the Deverel-Rimbury tradition and occurs at Kemsley (McNee 2006a). Another pot (form type R13) has a thin finger impressed cordon applied around the exterior of the rim, and finger impressions on the shoulder (Fig 82/58). The finger impressions are very small and may have been done by a child. This vessel is quite typical of pots made during the late Bronze Age decorated phase. Fingertip decoration occurs on 15 other pots, mostly on the shoulder or on the exterior of the rim area. Most of these pots have coarse fabrics and quite thick walls and may be earlier on in the late Bronze Age sequence, or representative of middle to late Bronze Age transition. One

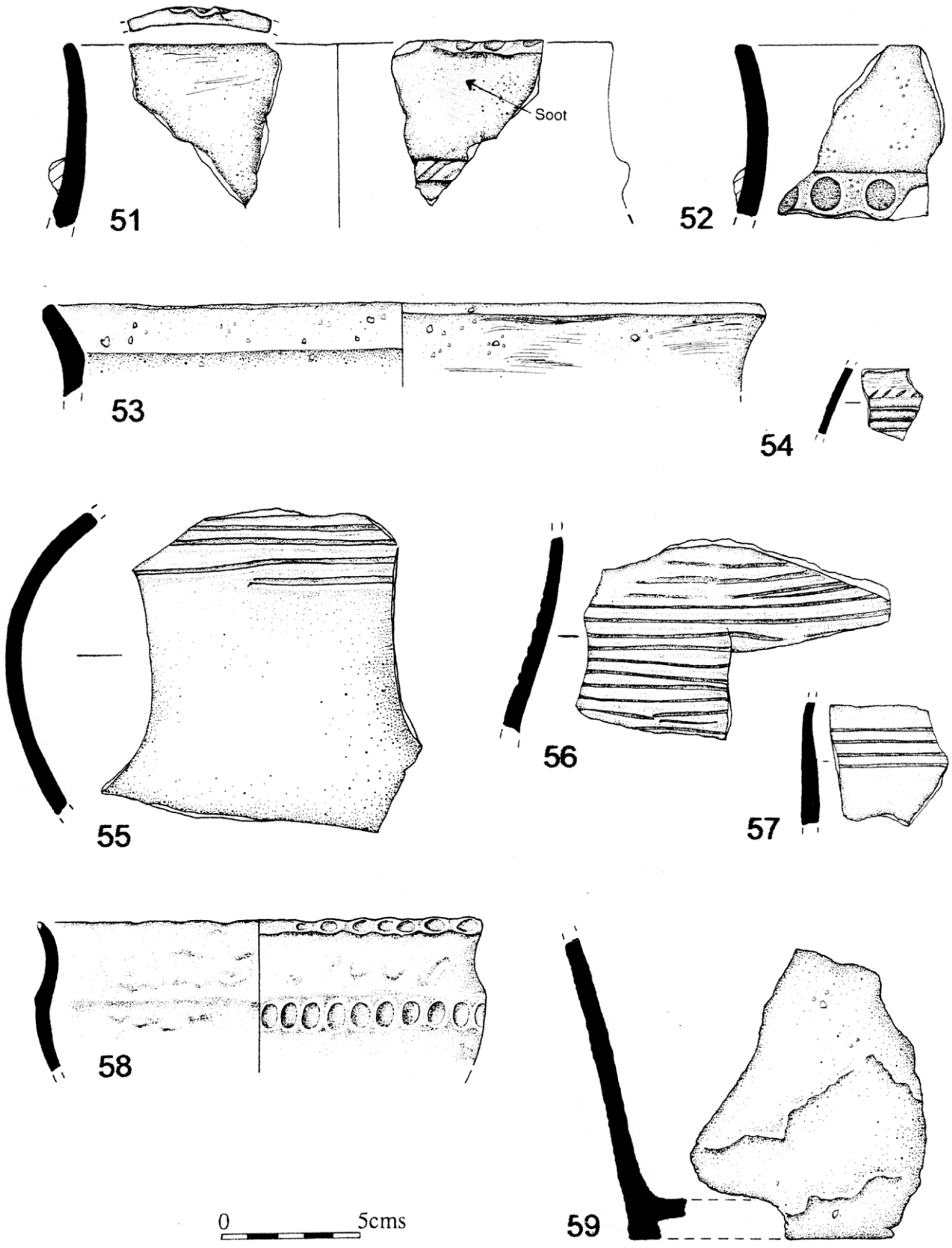


Fig 82. Late Bronze Age pottery.

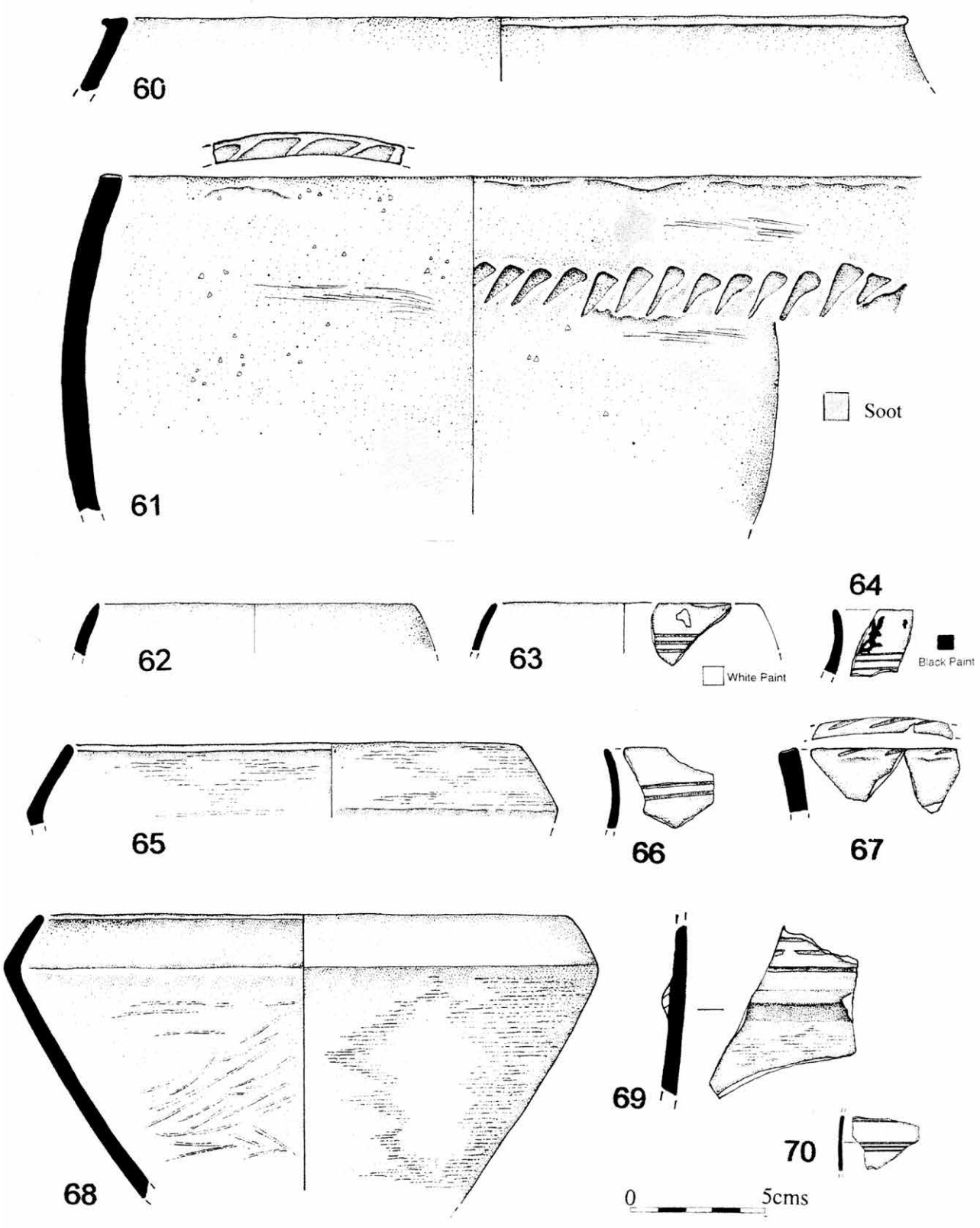


Fig 83. Late Bronze Age and very early Iron Age pottery.

body sherd (Fig 77/2) is decorated with finger impressions possibly using two fingers in some of the impressions. The fingers would have been small, and the finger nails quite long in order to achieve this decorative technique.

Shallow horizontal tool impressions occur on seven pots and tend to be applied to a finer range of bowls and jars including a bowl type (R19). One example of tooling appears on the shoulder sherd from a fine jar/bowl (uncertain form type) and is possibly in the shape of a triangle. Horizontal incising decoration also appears to occur on vessels with finer fabrics. This may be because the Chalk Hill pots, which have been decorated with tooling/incising, occur in the later part of the Bronze Age. Generally speaking fabrics appear to become finer and more varied as you move through the Bronze Age. One rim sherd has traces of white paint on the exterior, and at least three lines of horizontal tooling below the exterior of the rim (Fig 83/63). The fabric is quite fine, and vessel walls very thin, and this example has been placed within an early Iron Age phase. One decorated body sherd (Fig 82/54) is very similar to a decorated globular bowl from Kemsley (McNee 2006a, fig 20/41).

One of the most intriguing types of decoration within the Chalk Hill assemblage is 'rilling', or 'corrugated' (Fig 82/55). Three, possibly four vessels have been decorated with multiple horizontal lines of 'rilling', which occur above the shoulders of fine jars. One jar may be associated with form type R16 (Fig 83/60), and another could be a broken base with rilling above the exterior wall. Another of the jars still retains its very smooth (although not obviously burnished) surface and other examples are quite abraded revealing the flint temper underneath. Very fine flint dust is evident on the surface of some of the sherds and gives the impression that the fabric is much finer than it actually is. A lot of effort seems to have gone into creating an aesthetically pleasing pot. Some of the 'rills' are closely spaced together (Fig 82/56) and have been made with a tool. Other examples are more widely spaced (Fig 80/39), and have been made with fingertips. These jars are considered quite unusual, though decoration reminiscent of rilling is known from late Bronze Age sites such as Lofts Farm, Essex (Brown 1988, 269), Kingston Buci, West Sussex (Curwen 1931), Bridge By-pass Site 8, Kent (Macpherson-Grant 1980a, fig 19/131), and Highstead period 2, also in Kent (Couldrey 2007, 114).

Discussion

Ten contexts produced large assemblages of pottery (over 100 sherds): (D121), (D355), (D357), (D360), (D413), (D449), (D470), (D575), (D616), and (D623).

Context D121 was a deposit of silty clay recorded in evaluation trench 36, which lay in the southern part of the late Bronze Age/early Iron Age enclosure. Context D575 was the fill of the Anglo-Saxon building F576. Context D623 was the fill of the ditches of the medieval field system (F584). The remaining contexts all appeared to be related to the late Bronze Age enclosure; D616 was the fill of the southern enclosure ditch F582, D355 and D360 the fills of the linear hollow F406, and the others were fills of pits either within or close by the enclosure (D357 = pit F364, D413 = pit F411, D449 = pit F451, D470 = pit F471).

The majority of contexts produced only small quantities of pottery. It has been suggested that a minimum of 25 sherds should be present in a context in order for a reliable estimation of phase to be carried out (PCRG 1997, 21). The more significant quantities of pottery are discussed below.

Late Bronze Age/early Iron Age enclosure

Late Bronze Age pottery was recovered from the ditch segments, including a handle made from a coarse flinty fabric, a coarse bowl (form type R18) and three coarse jars (form types R1; R4; R20). The pottery is generally quite worn, coarse and undecorated apart from a sherd with finger impressions on the shoulder. Some sherds have very thick walls, and are comparable with later middle Bronze Age pottery.

Pits associated with the enclosure

Large quantities of pottery were retrieved from nearly all of the pits. A good range of bowls and jars was recovered from pit F315 in a range of fabrics, including two plain jars which might date to the plain phase of the late Bronze Age. Jars decorated on the rims and shoulder also occur, and pottery from both these pits is very comparable in form and fabric. Pit F451 also produced a wide range of forms, and includes conjoining sherds from contexts (D449) and (D450). Context (D449) also produced sherds from form type (R9), which joins a jar from the linear hollow F406, and a sherd from a coarse shouldered jar joins a vessel from context D623, the fill of medieval field ditch F584. Pit F471 produced a quantity of medium coarse jars, and four sherds belonging to 'rilled' jars. One of these sherds joins a pot in context D121.

Pit F364 contained 286 sherds of late Bronze Age pottery, including a variety of jars and two bowls, and includes pottery from all ceramic phases. The pit also contained small fragments of human skull indicating special use of the pit. One hundred and nineteen sherds are in good condition, and have a higher than average mean sherd weight of 13g. Some of this pottery belongs to the middle to late Bronze Age, and late Bronze Age Plain Phase, and suggests careful curation of the pottery over a long period of time. The assemblage also includes rim sherds from a small number of large jars, and these could have been used for storage or feasting.

The presence of human remains deposited with a large assemblage of both worn and fresh pottery which spans several hundred years occurs on other Kentish sites, for example at Shelford Quarry near Canterbury (McNee 2008, 23-4). Unusual or special pit deposits may be associated with monumental events such as site abandonment, and research indicates that on some sites special closing deposits appear to have been made on the abandonment of the house (Brück 2001, 151). The presence of two shell-tempered vessels represents the latest phase of ceramic activity at Chalk Hill (prior to possible re-use during the late Iron Age). The absence of any later early Iron Age and middle Iron Age pottery may suggest that the Chalk Hill settlement was abandoned, and pit F364 may be a permanent marker to represent this event.

Five narrow features located within the south-eastern area of the enclosure produced small quantities of late Bronze Age pottery. Context D360, a fill of the linear hollow F406, produced 108 sherds of late Bronze Age pottery, including a coarse jar with 'pie crust' decoration on the rim (R6), and two plain bowls (R15 and R18).

Post-holes within the enclosure

These were mainly concentrated in the southern area of the enclosure, and produced very small quantities of abraded late Bronze Age pottery. Seven sherds belonging to 'rilled' jars were retrieved from post-holes F482 and F515, and although no joins were achieved these jars almost certainly belong to jars recovered from pit F471. This would suggest that the pits and post-holes within the enclosure ditches are contemporary.

Western linear hollow within enclosure (F370)

This was located within the enclosure and produced 102 sherds of pottery. This included coarse jars, a fine jar with tooled decoration, a single sherd from a 'rilled' jar, and a rim sherd with traces of white paint on the exterior. The presence of the 'rilled' jar suggests that this feature is contemporary with the post-holes and pit features.

Eastern linear hollow within enclosure (F406)

This was a linear tract parallel to the linear metalled surface F370, which produced over 100 sherds belonging to roughly wiped coarse jars, a form type (R19) bowl, and a form type (R21) jar. Located in the eastern area of the enclosure was a small linear feature (F394). Eight sherds of pottery recovered from this feature are very coarse and belong to a form type (R7) jar, which has a finger impressed applied cordon, This form is typical of the late Bronze Age, but the wall thickness and coarseness of the fabric suggests a slightly earlier date – possibly the middle to late Bronze Age transition. A rim sherd from an early Iron Age burnished bowl (Fig 89/65; 89/68) was also recovered from this feature.

Residual prehistoric pottery in later features

Medieval hollow way (F98/408/433)

This feature produced 74 sherds, which are mostly body sherds belonging to jars and bowls.

Medieval field system

This complex produced a small quantity of abraded sherds fairly consistent with those of a late Bronze Age tradition. One hundred and twenty sherds were recovered from context D623, the fill of ditch F508, and included coarse jars consistent with a late Bronze Age plain ware phase. Several small sherds were also recovered from D623 as well as from the fill of ditch F302, (D349), which appears earlier in date, possibly later Deverel-Rimbury.

Anglo-Saxon sunken-featured structure

A sunken-featured building was discovered within the earlier Bronze Age enclosure. One hundred and twenty-five sherds were recovered from this feature (F576), and include one form type (R18) bowl (Fig 78/8), and two large coarse jars with 'pie-crust' rims. One jar (Fig 77/5) is extremely coarse and the correct orientation of the pot is difficult, consequently the rim of the pot may be more flaring than the illustration suggests. This is an unusual vessel with no obvious parallels. Many of the sherds are small and abraded and are residual.

Medieval pit F411

This feature produced a good assemblage (269 sherds) of late Bronze Age pottery, including four shouldered jars, one of which has decoration on the rim and shoulder, and a burnished bowl (form type R22). There is also a thick walled very coarse body sherd with an applied cordon which may be earlier in date, possibly middle Bronze Age.

Conclusion

A small residual assemblage of middle to early late Bronze Age pottery represents the earlier part of later prehistoric activity on the site, and mostly occurs in the linear features of the medieval field system and late Bronze Age/early Iron Age enclosure ditch. The pottery is generally quite abraded with few diagnostic features apart from body sherds with applied cordons and finger impressions. It is much thicker and coarser than the pottery assigned to the late Bronze Age, and the firing is very irregular.

The main focus of later prehistoric activity revealed at Chalk Hill occurred during the decorated phase of the late Bronze Age (800-600 BC), and a slightly more limited proportion of the pottery is consistent with those of a late Bronze Age plain ware tradition. The problems of placing certain forms within a chronological parameter has already been mentioned and it is possible that the percentage of plain wares is actually higher. It cannot be assumed that

if a pot is undecorated that it is likely to belong to a late Bronze Age plain phase tradition and the percentage of decorated pots recovered from the majority of Kentish late Bronze Age sites is rarely more than 4 per cent, and may be even lower (McNee 2012, 224-5). Some forms do have a long history of use, and it is doubtful whether particular styles of potting tradition ended abruptly. It is feasible that there is a co-existence of pottery styles between the plain and decorated phases of the late Bronze Age. Mixed assemblages of pottery are quite common in Kent, and it is also possible that deposits accumulated over a long period of time. A regional chronology aided by high quality radiocarbon dates would be most useful.

The pottery from inside the late Bronze Age enclosure includes conjoining sherds from different features, and many sherds which are comparable in form and fabric. Some conjoining sherds have evidence of surface erosion, which may indicate that the pottery was exposed to weathering or trampling prior to ending up in their excavated context. Sherds from the same vessel that have ended up in different pits may have derived from the same source, possibly a rubbish dump, which was then cleared into open pits. Pottery from the pit features is quite similar, and suggests a group of related material. The 'rilled' vessels are almost certainly contemporary, and occur in pits, post-holes and a linear tract within the enclosure. A large percentage of the Chalk Hill assemblage derived from pit features, and it is interesting to note that pit F471 and the fill of linear hollow F406 produced much larger sherds in comparison to the rest of the assemblage, some with fresh breaks. This indicates that this material was deposited soon after breakage. There is no obvious correlation between form types and features, and 'mixed' assemblages of large and small bowls and jars, in a variety of fabrics occur across the site. However, the assemblage is dominated by jar forms, and to a lesser extent bowl forms. The character of the pottery suggests a society producing utilitarian pottery for local consumption, and reliant on exploiting local clay resources. Some of the large coarse jars may have been used for storage.

Activity may have continued into the early Iron Age, and this is characterised by a shift in fabric recipes dominated by flint, to the introduction of sandy and shelly fabrics. New form types also appear such as the sharply carinated bowl (Fig 83/68). Surface finishes can be much finer, or heavily wiped (Fig 82/59), and it has been tentatively suggested that these may herald the start of the Kentish early Iron Age 'rusticated' tradition. There is not a great deal of early Iron Age pottery on the site, and it is feasible that the settlement was abandoned at some point during the early Iron Age or had shifted into areas that have yet to be identified archaeologically. There are areas of Kent which show very little evidence of occupation during the Iron Age, and this is a striking feature of the emerging pattern of prehistoric occupation in Kent (Champion 2007, 299). The ceramic assemblage from Chalk Hill shares clear similarities with Monkton Court Farm. The main phase of occupation at Monkton appears to be between 800 and 600 BC, and the site also appears to have been abandoned around 600 BC, or a little earlier (Macpherson-Grant 1994, 287). It is suggested that Chalk Hill may have been abandoned a little later. A small number of late Iron Age/early Roman sherds suggest activity within the vicinity of the Chalk Hill site.

Additional note

A small assemblage of pottery from a number of features on the Chalk Hill site was presented to the author for spot dating after the completion of this report. The presence of Deverel-Rimbury pottery including a coarse bucket jar suggests that the site may have been occupied throughout the middle Bronze Age (contexts D1284, D1315, D1347 and D1355 from the parallel ditches and D1508, the fill of a small pit (F1509; Fig 72) on the eastern edge of the site). This would therefore suggest continuous later prehistoric settlement activity from approximately 1500-550 BC.

Daub

Louise Harrison

Approximately 6.6kg of daub (including material extracted from soil samples) was retrieved from both the evaluation and the excavation. The majority of the daub (approximately 91 per cent by weight) was abraded and had no diagnostic impressions such as flat surfaces or wattle impressions. This material was discarded after rudimentary recording which involved quantifying and weighing the daub by context. The remaining material, weighing 610g (9 per cent of the assemblage by weight), bore flat surfaces and wattle impressions and underwent more detailed analysis. This is discussed below. The majority of the retained daub (76 per cent by weight) came from within pits located within the late Bronze Age/early Iron Age enclosure ditches.

The fabric

The retained daub was studied with a microscope to identify the different fabric types present. These consisted of two distinct fabric types.

Fabric 1 varied from a very pale cream colour to a reddish orange colour. It has a fine sandy texture with varying quantities of chalk inclusions. These varied in size from 0.5mm to up to 10mm. The greater the quantity of chalk flecks the lighter the colour of the fabric.

Fabric 2 is a basic orange colour. It has a fine, sandy texture with occasional inclusion of small (under 0.5mm) quartz grains; no other inclusions were present.

The majority of the retained daub consisted of fabric 1 (10 fragments) while the remainder (4 fragments) consisted of fabric 2.

The surfaces and wattle impressions

Most of the retained daub had flat surfaces, except for one piece which had a rounded surface. The majority of the daub had wattle impressions which varied greatly in width. Two fragments had impressions measuring as little as 5mm while one piece in the assemblage had an impression measuring 22mm in width.

Two fragments had vertical and horizontal wattle impressions. Although comparisons were made looking at the differences in diameter between the vertical impressions (stakes) and the horizontal wattle impressions, only differences of approximately 2-3mm were apparent.

Conclusion

It is difficult to make a conclusive statement about this material as only a small quantity was intact enough to bear diagnostic features. However, the daub from within the late Bronze Age to early Iron Age enclosure ditches suggests that this material may have been used to form wattle-lined fencing along the enclosure ditches or in the construction of structures.

Registered finds

Nicola Powell

Catalogue

Copper alloy

<747> Implement tip.
(D117); fill of small pit (F118) within late Bronze Age/early Iron Age enclosure (Fig 84).
Snapped point/tip. Small and fine, very worn with a lozenge-shaped section and central rib on each side. Possibly the tip of a spearhead.w Probably residual from early/middle Bronze Age.

<401> Vessel.
(D371); fill of western linear hollow in the late Bronze Age/early Iron Age enclosure (F370).
Cast vessel fragment, probably a vessel leg. Intrusive.

Iron

<748> ?Tool.
(D123); fill of late Bronze Age/early Iron Age enclosure ditch F582.
Rectangular section with a tapering chisel-like end.

Ceramic

<400> Perforated clay slab.
(D360); fill of eastern linear hollow F406 within late Bronze Age/early Iron Age enclosure (Fig 84).
Thickness 23mm, with one complete and two incomplete perforations. Buff to light grey fabric with coarse flint inclusions.

Discussion

The late Bronze Age/early Iron Age enclosure

Pit F118 produced the tip or point of a possible weapon such as a spearhead <747>. It is an early Bronze Age to middle Bronze Age type and is probably residual in this context. As it is a fragment, it could well be part of an assemblage collected by a smith for recycling. From the enclosure ditch F582 came a heavily corroded piece of iron <748> with a rectangular section, tapering to a flat chisel-like end that could be part of a tool.

The sole ceramic registered find from the site (<400>) is a fragment of rectangular perforated clay slab from an unstratified context within the enclosure. It has one complete perforation and the remains of two others.

Fragments of perforated clay slab are a common feature on late Bronze Age sites, particularly in the South-east, and notably in Essex and the Thames valley. The purpose of these ceramic objects remains unknown (but see Champion 2014). That they may have served as oven or kiln furniture, acted as ventilation or used during cooking have all been posited. Circular perforated clay slabs found in Iron Age contexts during excavations at Danebury and Maiden Castle have been interpreted as oven plates and associated with cooking (Sharples 1991, 243-4). However, they did not appear in phases that contained houses with hearths, suggesting a transformation had occurred in the way food was prepared, possibly using oven plates as part of a more temporary or portable hearth (*ibid*). The fragment <400> found within the fill of linear hollow F406 is part of a robust object, and may similarly have served in a cooking process that leaves little trace apart from the objects themselves in the archaeological record.

Human bone

Jacqueline I McKinley

Introduction

Excluding the undated redeposited material from the topsoil, six contexts from which human bone was recovered are all believed to be of late Bronze Age/early Iron Age date (Table 20), five being from features/deposits situated within the area described by the

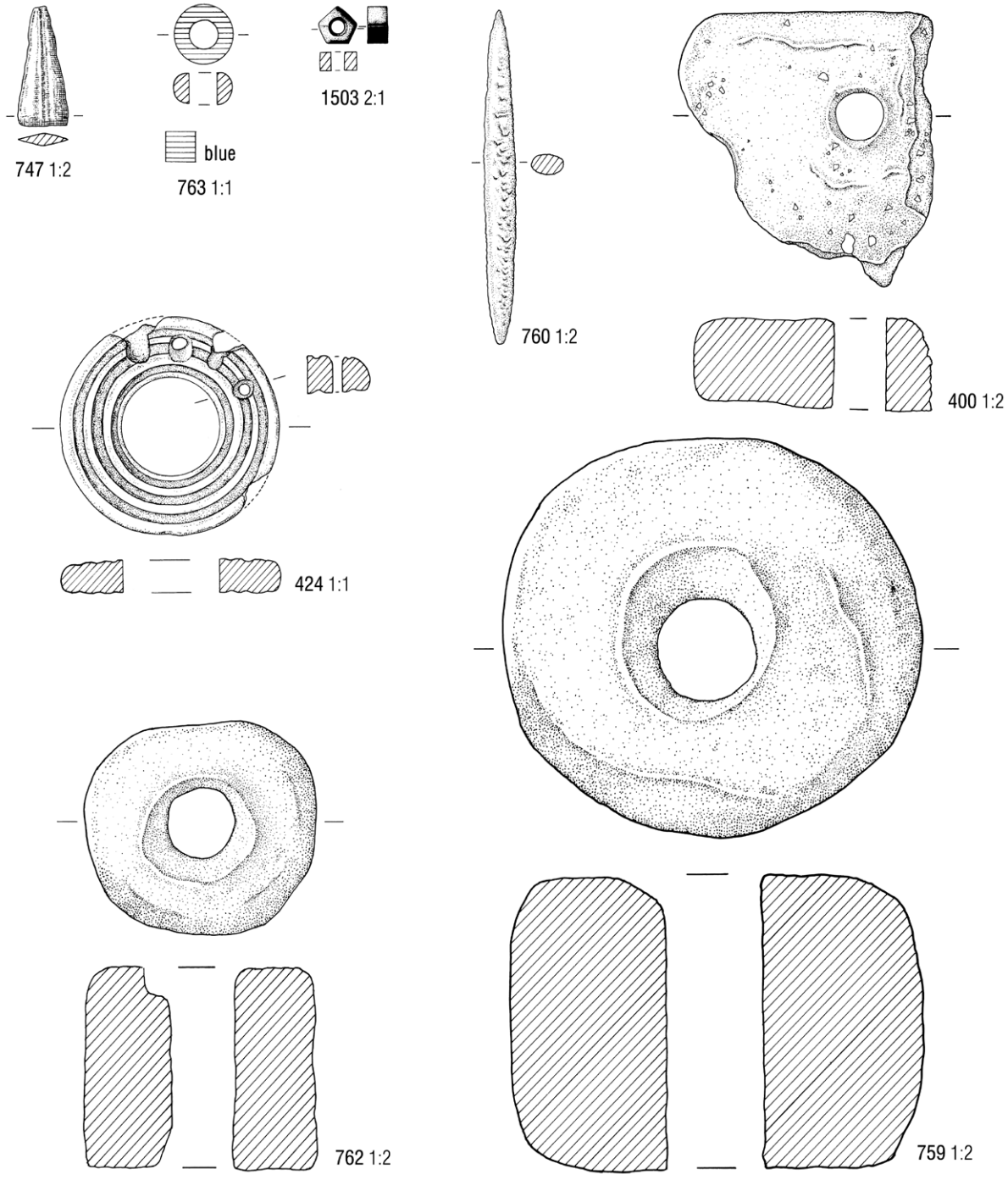


Fig 84. Registed finds.

south-western enclosure and one being from a deposit (D428) in the medieval hollow way (F98/408/433; Fig 94), but probably eroded from late Bronze Age/early Iron Age pit F411. Most of the material represents redeposited bone but the remains of one inhumation burial (grave F478; Fig 73) were also recovered.

Disturbance and condition

There is limited evidence for abrasion (slight-moderate to bone from late Bronze Age/early Iron Age deposits D357 and D367, both from pit F364 in the late Bronze Age/early Iron Age enclosure; Fig 73), suggesting the disarticulated remains were subject to limited, if any, surface exposure and/or repeated episodes of redeposition. There

is no evidence, direct or indirect, suggestive of animal gnawing to any of the bone. The bone from context D407 (from the eastern linear hollow F406 within the late Bronze Age/early Iron Age enclosure) shows slight dark staining, suggesting it had at some stage been deposited in a different burial environment to that in which it was found or experienced by the bone from other deposits.

Demographic data

The possibly late Bronze Age/early Iron Age burial from F478 was of a subadult, possibly 14-17 years old and probably male.

The rest of the assemblage comprised fragments of redeposited bone, representing a minimum of two individuals, both adult males, one *c* 18-25 years of age and the other *c* 30-45 years.

Pathology

Unsurprisingly, given the poor condition of the remains, few pathological lesions were observed.

Parts of three late Bronze Age/early Iron Age erupted permanent dentitions were recovered, totalling 25 teeth and 14 socket positions. No dental caries was observed. Mild dental calculus (calcified plaque/tartar; Brothwell 1972, fig 58b) was observed in one late Bronze Age/early Iron Age dentition; this material may have been more frequent but lost *post-mortem* from other teeth.

There is some evidence for peri- or ante mortem cut marks on bone (D367) from pit F364 within the late Bronze Age/early Iron Age enclosure. A frontal vault (D367) from pit F364 has two pairs of fine linear cut marks with a worn V-shaped profile on the right side, set more or less parallel at a *c* 80-85 degree angle to the supra-orbit. One pair, *c* 30mm from the coronal suture, are *c* 30-45mm long and set *c* 3mm apart but converge; the second pair lie central to the right half of the frontal, *c* 30mm superior to supra-orbit, and are 14-24mm long set *c* 1mm apart.

The cut marks to the skull are not of a form suggestive of sharp-weapon trauma associated with a violent attack nor are they consistent with those seen in scalping. They are similar in form and location to some of those seen on skull fragments from Hambledon Hill, Dorset, which it was suggested represented 'skinning' marks (McKinley 2008).

Concluding remarks

The numbers of late Bronze Age and early Iron Age mortuary deposits from Kent are relatively small (<80; Mays and Anderson 1995; McKinley 2006). The earlier period is dominated by singletons or small groups of cremation burials, mostly from sites close to the east coast (*eg* O'Connor 1975; Cruse 1985). The potential number (dating of all deposits not yet fully confirmed) of unburnt remains has recently been boosted by finds from a large mortuary feature at Cliffs End Farm, Ramsgate, which includes the remains of a potential 25 individuals, a substantial proportion of which, as at Chalk Hill, are represented by disarticulated redeposited remains (McKinley 2014). The early Iron Age is particularly poorly represented in the county, with disposal by inhumation of the unburnt corpse appearing to dominate (possibly with subsequent human manipulation of remains), although cremation was also practiced (Parfitt 2004, 16; Mays and Anderson 1995, 380-81; McKinley 2006).

Animal bone

Robin Bendrey

Over 1500 fragments of animal bone were recovered by hand excavation from middle – late Bronze Age/early Iron Age features. Most of these derived from the domestic enclosure (Table 21) and associated features, with a smaller quantity deriving from the parallel ditches to the north.

The enclosure

Taxonomic representation and distribution and associated features

Cattle bones dominate the animal bone assemblage associated with the late Bronze Age/early Iron Age enclosure (Table 21). Sheep/goat bones are the second most common taxon (with both sheep and goat represented), followed by pig and horse. There are, however, a number of significant biases affecting the representation of the taxa by fragment count. Conditions of preservation will probably have favoured the survival of the larger bones of cattle and horse relative to those of the smaller taxa (sheep, goats and pigs). Also, cattle bones predominate in the relatively large assemblage from a single feature (pit F411), with cattle providing 226 fragments, or 94 per cent of the identified assemblage from this feature. The pit produced 572 bones overall (Table 39); although 107 fragments from the medieval hollow way (F98/408/433) were unfortunately mixed with this assemblage; this marked concentration was very likely eroded from pit F411 with which it coincided. If the bone counts from this feature are excluded from the enclosure and associated feature assemblage then cattle is still the most common taxon, but not to such a large degree (nearly 40 per cent).

Quantification of the total assemblage by number of fragments appears to over-represent the presence of cattle in particular (Table 39). One quantification technique that reduces the effect of the biases described above is that of context frequency. Context frequency measures the

	Enclosure ditches	Enclosure pits	Enclosure post-holes	Western hollow F370	Eastern hollow F406	Ditch F394	External four poster	External post-holes	External pits	Pit F411	Total
cattle	5	83	3	16	33	6	1	0	0	226	373
sheep/goat†	2	68	2	17	4	1	5	2	0	7	108
(sheep)	*0*	*21*	*0*	*2*	*0*	*0*	*1*	*1*	*0*	*3*	*28*
(goat)	*0*	*4*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*5*
pig	1	19	1	4	2	0	0	0	0	1	28
horse	3	11	0	6	6	0	0	0	0	2	28
cf. horse	0	0	0	0	0	0	0	0	0	0	0
dog	0	2	0	0	0	0	0	0	0	1	3
cat	0	0	0	0	0	0	0	0	0	0	0
red deer	1	0	0	0	0	0	0	1	0	0	2
cetacean	0	1	0	0	0	0	0	0	0	0	1
cattle-sized	4	123	5	75	70	9	0	9	0	313	608
sheep-sized	3	43	4	14	2	0	9	2	0	4	81
indeterminate	7	7	1	14	20	0	0	0	1	18	68
Total	**26**	**357**	**16**	**146**	**137**	**16**	**15**	**14**	**1**	**572**	**1300**

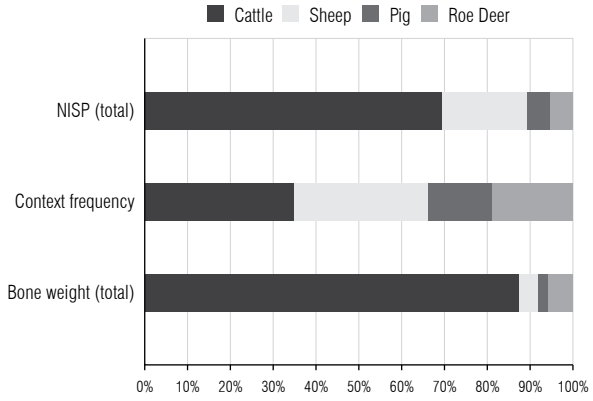


Table 38 (above). Distribution of mammal bone associated with the late Bronze Age/Iron Age enclosure, by number of identified fragments (NISP). (†sheep/goat includes the specimens identified to sheep and goat).

Fig 85 (left). Comparison of the relative proportions of the common taxa from the late Bronze Age/early Iron Age enclosure when quantified by the number of bone fragments (NISP), the number of bone fragments excluding those from pit F411 (NISP excluding pit F411), context frequency (c.f.), weight of the bones (bone weight) and weight of the bones excluding those from pit F411 (bone weight excluding pit F411).

number of contexts in which a taxon occurs, and allows a different measure of assessment of the occurrence of taxa throughout a site (O'Connor 1985). Consideration of the common taxa by context frequency indicates that cattle are still the most common in the assemblage (occurring in 28 contexts), followed more closely by sheep/goat (25 contexts), then horse and pig (15 and 12 contexts, respectively). Quantification of the common taxa by context frequency reduces the numerical dominance of cattle, and may give a better representation of relative importance than the fragment count data (although it may over-represent the less common taxa; Fig 85).

Quantification by bone weight may give a better idea of the relative meat contribution of the different taxa (Armour-Chelu 1991), and it does appear likely that cattle would have provided the bulk of the meat consumed on site. This method, however, as with the fragment count, may be biased against those smaller taxa that survive less well in poor preservation conditions.

Any single quantification method will be subject to its own particular biases, and the benefit of employing more than one is that multiple perspectives may be used to build a more accurate picture of the past diet and economy. Cattle are clearly the most common animal used and deposited on the site, and would have contributed most to the diet. The bones represented in pit F411 are greatly dominated by cattle, however, and do not appear to represent 'normal' disposal.

Sheep/goat are the second most common taxon, and whilst less abundant overall than cattle in terms of bone count, were probably more numerous in terms of animals slaughtered on site. Pig and horse are of lesser importance than cattle and sheep. Although horse is the third most common taxon in terms of a number of the quantification methods, it is likely that pig is seriously under-represent-

	Enclosure ditch		Internal features		External features	
	c.f.	r.f.	c.f.	r.f.	c.f.	r.f.
cattle	2	0.33	19	0.59	7	0.7
sheep/goat	2	0.33	18	0.56	5	0.5
pig	1	0.17	9	0.28	2	0.2
horse	3	0.5	7	0.22	5	0.5
Total	6	1	32	1	10	1

Table 39. Animal bone. Distribution of the commont taxa from features associated with the late Bronze Age/ Iron Age enclosure by context frequency.

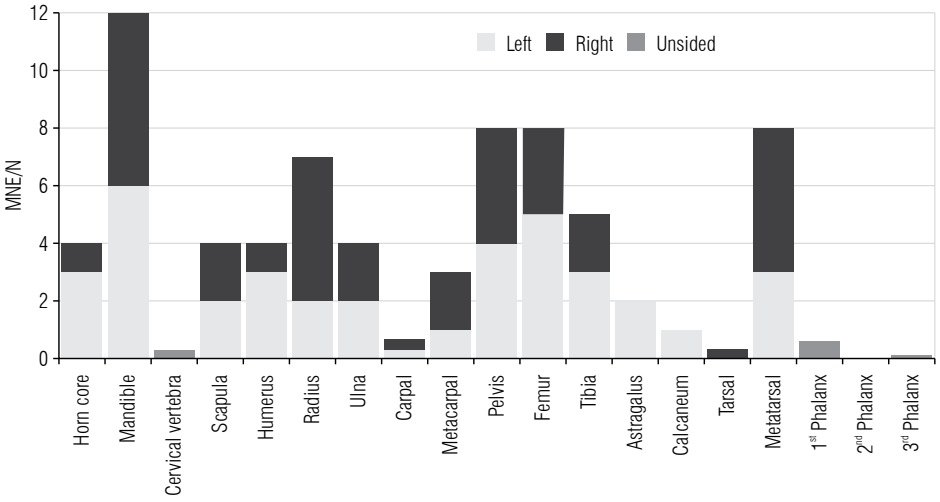


Fig 86. Representation of cattle skeletal elements in Pit F411 [minimum number of elements (MNE) divided by the number of times (N) that element occurs in a single skeleton].

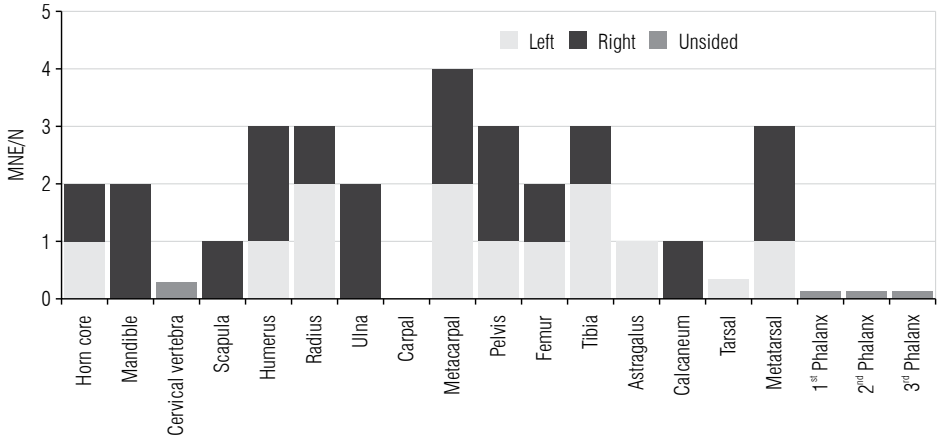


Fig 87. Representation of cattle skeletal elements in the pits within the late Bronze Age/early Iron Age enclosure [mimum number of elements (MNE) divided by the number of times (N) that element occurs in a single skeleton].

ed due to taphonomic attrition and was originally more common than indicated by any of the methods.

Division of the assemblage into material excavated from the enclosure ditch, features within the enclosure and features outside the enclosure allows some assessment of the distribution of the taxa. Variation in the assemblages between the internal and external features may represent differential practices of deposition (Table 35). The internal features have relatively higher representation of the smaller taxa (sheep/goat and pig) than the external features, and relatively lower representation of larger taxa (cattle and horse). Wilson (1996) has suggested that the varying proportions of species across a site can represent different activities, with the smaller taxa associated with domestic activity and the larger taxa found at the edge of settlements and are more suggestive of peripheral rubbish dumping; a similar pattern can be seen in the Chalk Hill material, although it should be remembered that pit F411, for example, may date to early Iron Age, apparently the latest phase of use of the enclosure, and also perhaps represents a more specialised type of deposit.

Cattle bones

Skeletal element representation and taphonomy

Within the relatively large assemblages from features both inside and outside the enclosure ditch it is evident that almost all elements of the skeletons of cattle are represented, indicating that animals were being slaughtered and utilised on-site.

Quantifying the larger stratigraphic group assemblages (see 33) by minimum number of elements (MNE) gives a measure of skeletal element representation independent of fragmentation (Figs 86 and 87). The relatively low numbers of the small bones – phalanges, carpals and tarsals – evident in the NISP and MNE data could be both a feature of differential preservation and recovery bias. The relatively low representation of vertebrae, relatively less structurally dense elements, may also be a feature of differential preservation. A difference in the relative numbers of cattle mandibles in pits within the enclosure and those in pit F411 can be noted, although the low level of this element from the pits within the enclosure may be associated with primary butchery being undertaken in a more peripheral location. Relatively high representations of femora and pelves in pit F411, both high-quality meat-bearing bones, may possibly be associated with food consumption.

Direct butchery marks on cattle bones are few (with most evidence from pits within the enclosure and pit F411) and generally derive from the dismemberment of the carcasses. A notable feature of the cattle bones from pit F411 is a number of complete limb bones, particularly metapodia and radii. This indicates some wastage of food, as the bones were not butchered to extract all possible nutrients. This fact, along with the overwhelming presence of a single species, suggests a different activity contributed to the formation of this deposit compared to the rest of the Bronze Age/Iron Age assemblage – perhaps feasting. There is, however, some possible evidence for marrow extraction from the pit F411 cattle bone assemblage, suggested by burning on a number of bones.

Burning in the cattle assemblage was recorded on nine fragments, all from pit F411. Three mandibles exhibited burning; a left mandible exhibited a large burnt patch on the medial side of the horizontal ramus; a right mandible exhibits burning on the M1 and M2; and a left P3 is burnt. A right maxilla has a burnt M2. A femur and a radius exhibit burning on the diaphysis. Three carpals also exhibit burning; a left magnum and unciform were burnt black, and a right magnum was burnt grey/white.

Burning on animal bones may derive from a number of intentional human processes including cooking, disposal of food waste, fuel for anthropogenic fires and cremation (generally of human remains; Lyman 1994, 388). As only a small proportion of the cattle bones were burnt (4.0 per cent of cattle fragments), burning bones for fuel and waste disposal can be ruled out (and there is no evidence for cremation of the bones). Various processes may also contribute to naturally (accidental or unintentional) burned bone (Lyman 1994, 388).

Heating limb bones and mandibles, as discussed above, can be undertaken to melt the marrow and weaken the bone, so that marrow can easily be extracted (Dobney *et al* nd, 25-6; Albarella and Serjeantson 2002, 41), perhaps explaining the burning present on the mandibles and long bones. The burnt carpals could have derived from a number of practices, perhaps including roasting limbs (Albarella and Serjeantson 2002, 42). It is also possible that accidental burning is present on some of these bones.

Size, shape, sex and age

A size decrease in cattle at Chalk Hill can be seen to have occurred between the early Neolithic and the late Bronze Age/early Iron Age (Figs 60 and 88). As for the data from the Outer Arc, the distribution of the Bronze Age/Iron Age cattle log ratio values were found to be positively skewed (skew = 0.323), indicating a greater number of scores clustered at the lower end of the distribution which, again, is best interpreted as a sample of domestic cattle dominated by females.

Cattle metapodia can be sexed by plotting length and width measurements to give an indication of relative size and shape (*eg* Grigson 1982a; Grigson 1999, fig 169). Measurements from three metatarsals and four metacarpals were plotted (Fig 89) against measurements from middle Bronze Age Grimes Graves (Legge 1992, appendix I). Legge (1992, 37-8) interpreted the clustering of the Grimes Graves cattle measurements for each element into two groups as the presence of smaller (more numerous) females and larger (less numerous) males. Comparison with the Chalk Hill data indicates the presence of three female metatarsals, and one male and three female metacarpals.

Logarithmic differences of individual cattle bone width measurements from the standard wild animal (as was undertaken for the early Neolithic cattle data) were also plotted (Fig 90). Suggested sex divisions for the metapodial plots were supported by the attribution of sex to the metapodia. Similarities in spread and bimodality between the radius and metacarpal distributions may be suggested to indicate more numerous females, with a smaller number of male cattle and the humerus BT distribution would seem to indicate the presence only of females.

The metrical data, therefore, presents a picture of a Chalk Hill adult cattle population dominated by females,

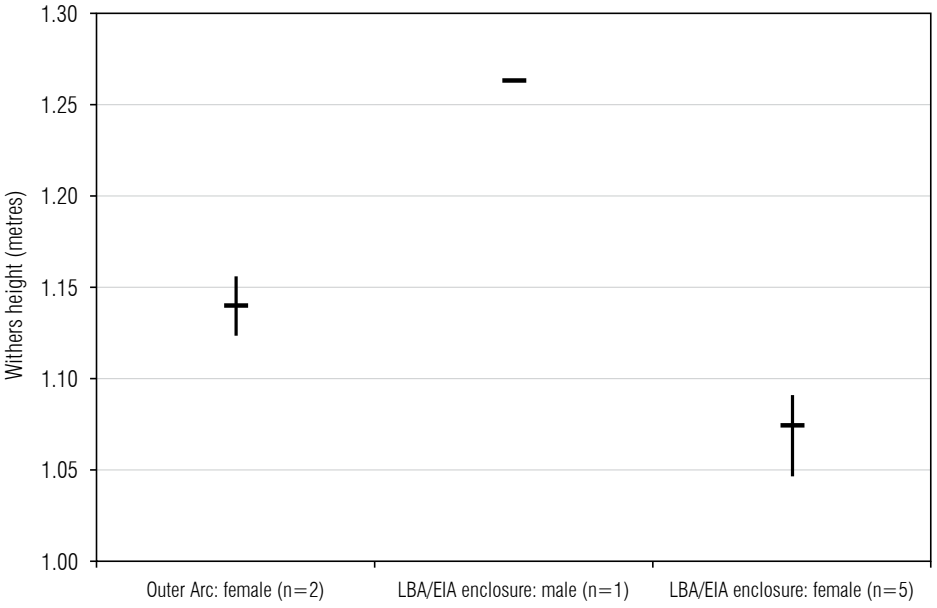


Fig 88. Withers heights from complete metacarpals and metatarsals, calculated using the factors of Matolcsi (1970).

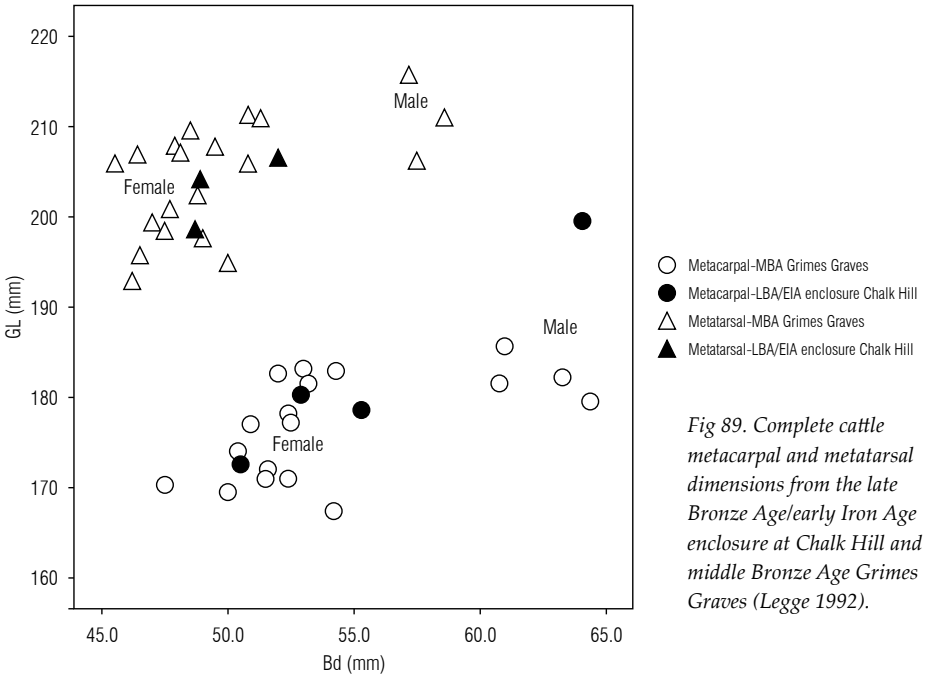


Fig 89. Complete cattle metacarpal and metatarsal dimensions from the late Bronze Age/early Iron Age enclosure at Chalk Hill and middle Bronze Age Grimes Graves (Legge 1992).

with a smaller number of males. This is a pattern seen on many prehistoric British sites (Legge 1992, 38). It is notable that the majority of the Bronze Age/Iron Age metrical data (including all the complete metapodia) derive from feature F411.

In addition to data on sex from the metrical analyses, three cattle pelves were sexed, following Grigson (1982a, fig 1), all again from feature F411. These consist of a left and a right female pelvis, and a right male pelvis.

A broad range of ages was recorded in the cattle from this phase. Compared to the early Neolithic animals, higher levels of cattle between the ages of 18 to 36 months suggest a greater emphasis on meat production (Fig 62). This is also supported by the epiphyseal fusion data, which suggest that over half of the cattle were slaughtered by 48 months (Fig 63). The presence of adult and old adult animals indicates that secondary products, such as traction and milk, were also of importance.

The presence of neonates within the dental data, and also represented by a small number of post-cranial bones, probably derive from natural birth mortalities from a breeding population.

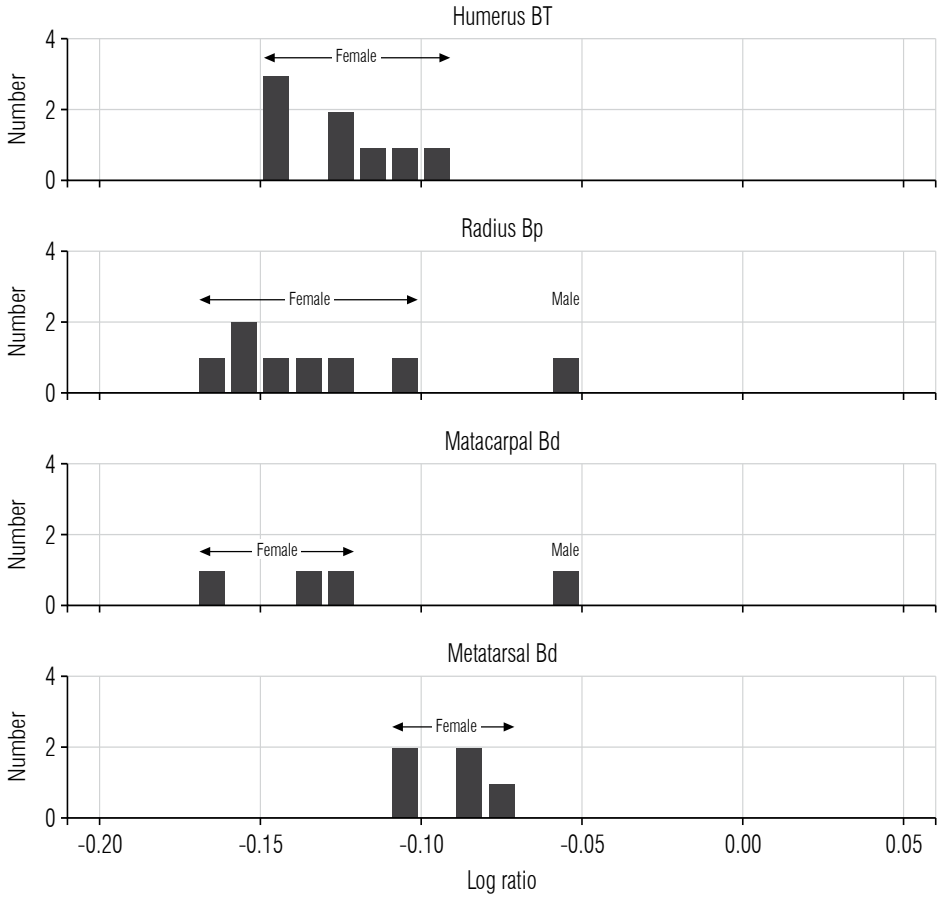


Fig 90. Logarithmic differences of individual late Bronze Age/early Iron Age enclosure cattle bone width measurements from the standard wild animal [the Ullerslev wild cow (Grigson 1999, 214-15)] with suggested sexes annotated.

Sheep and goat bones

Identification

Of the 108 caprine fragments recorded from this phase, 26 per cent are identified to sheep (*Ovis* sp domestic) and 5 per cent are identified to goat (*Capra* sp domestic). Goat is represented by five horncores, whereas a range of cranial and post-cranial bones are identified to sheep. It is assumed here that the bulk of the material identified as sheep/goat is sheep.

Skeletal element representation and taphonomy

The distribution of sheep/goat skeletal elements suggests an assemblage strongly influenced by conditions of preservation and recovery, with the more robust limb bones being abundant. As in the cattle assemblage, the relative absence of the smaller and less dense bones is probably a product of both preservation and recovery bias. Examination of the sheep/goat assemblage from pits within the enclosure by minimum number of elements confirms this pattern; the tibia and radius, in particular, are well represented; although the mandible, a particularly robust bone that generally survives well (Stallibrass 1984), contributes a lower proportion than might be expected (Fig 91). This may perhaps be explained by differential discard practices, with elements removed at an early stage in butchery (such as the skull) being discarded elsewhere and not into the pits within the enclosure.

Dismemberment of the skeleton is indicated by cut marks on a distal humerus, proximal radius and the necks of two scapulae. A metatarsal had been split in an axial plane. A goat horncore and a sheep horncore had been chopped from the cranium, at the base; and a further goat specimen had a number of small transverse cut marks below the base of the horncore.

It is perhaps notable that all the sheep (MNE=1) and goat (MNE=4) horncores from the enclosure pits are left side specimens only (Fig 91). Unfortunately, the sample size is too small to suggest that the bias towards left horncores has statistical significance. One of these left goat horncores (from pit F364 in the late Bronze Age/early Iron Age enclosure) presents an unusual morphology in that it ends in three 'peaks' at its tip (Pl 16, lower). A right goat horncore, from the eastern linear hollow within the enclosure (F406), presents a similar morphology, although the tip is partially damaged (Pl 16, upper). The size and morphology of these two specimens

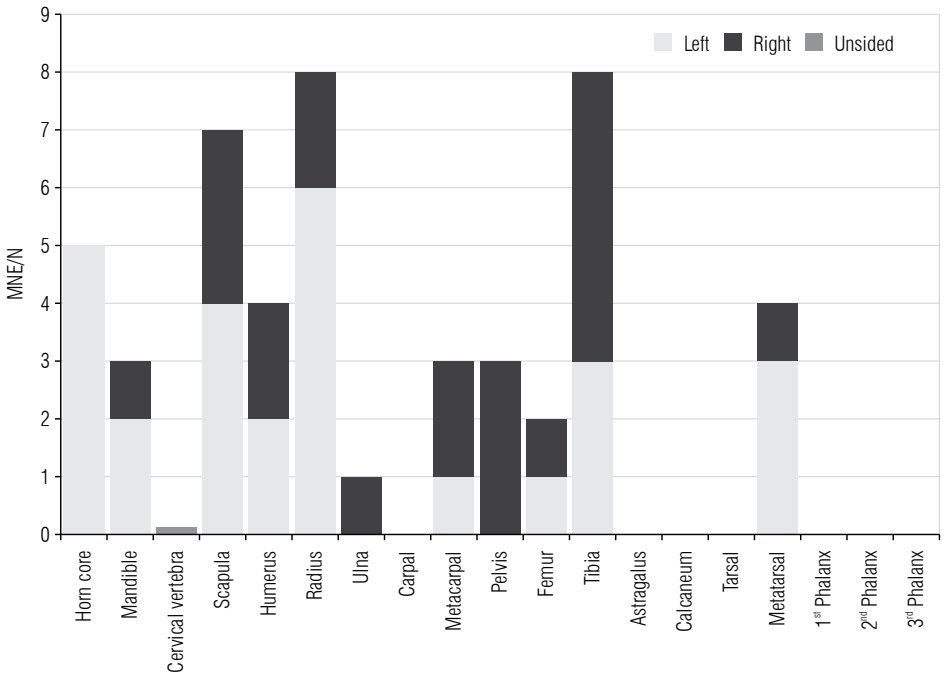


Fig 91. Representation of sheep/goat skeletal elements in the pits within the late Bronze Age/early Iron Age enclosure [minimum number of elements (MNE) divided by the number of times (N) that element occurs in a single skeleton].

Pl 16. Goat horncores exhibiting a number of 'peaks' at the tip. Left specimen from pit F364 (lower) and right specimen from the linear hollow F406 (upper) from within the late Bronze Age/early Iron Age enclosure.

are very similar, but they are not from the same animal. Nonetheless it is potentially interesting, in the context of deliberate deposition and the identification of only left horncores within the enclosure, that left and right horncores may have been deposited in different areas of the site.

Selection of animal bones for deliberate deposition on the basis of side was suggested for some elements within the early Neolithic assemblage at Chalk Hill and has also been suggested for prehistoric sites elsewhere (*eg* Davies 2000; Edwards and Horne 1997; Legge 1991). The pattern evident in the Bronze Age/Iron age goat horncores could indicate that left-sided specimens were selected for deposition within the enclosure at Chalk Hill, or that right-sided specimens were being selectively removed, for example perhaps for tool manufacture.

Age, sex and size

Limited age, sex and metrical data are derived from the sheep/goat assemblage, and interpretations must be made

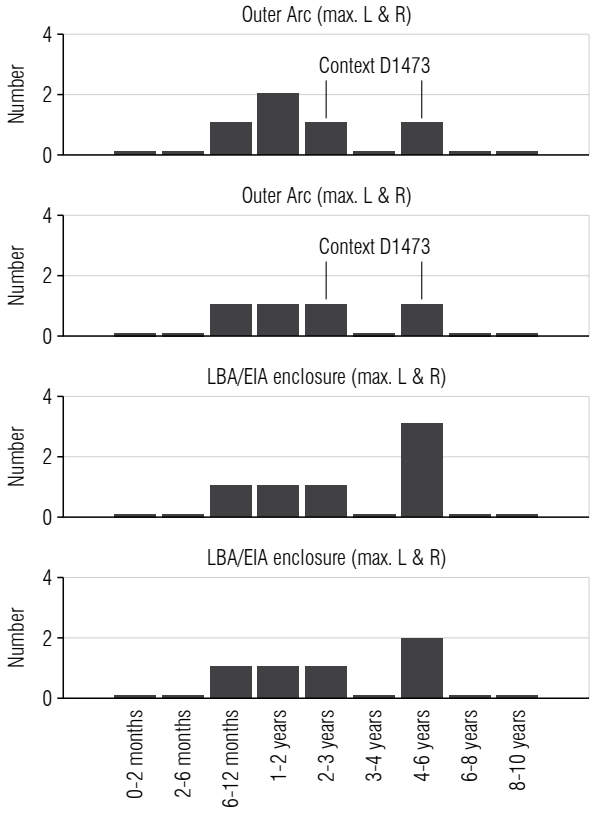


Fig 92. Sheep/goat dental age date, maximum values for left or rigtht mandibles per age stage (recorded following Grant 1982; age stages after Payne 1973).

with caution. The slaughter pattern of the sheep indicates both animals kept into adulthood, probably for wool and lamb production, and animals culled at younger ages for meat (Fig 92). The small quantity of epiphyseal fusion data present is too limited to add further detail to the picture of the slaughter pattern. A sheep pelvis and a sheep/goat pelvis are female, and both derive from pits within the enclosure.

It is notable that the younger mandibles all came from pits within the enclosure, whereas the older animals derived from other features (the western hollow (F370) and post-holes outside the enclosure). This may be linked to differential use of animals across the site, with the younger animals being culled and used for food within the domestic arena of the enclosure. Alternatively, it may be a case of differential preservation, with the pits affording greater protection to the more fragile juvenile bones than other features on the site. Or, indeed, this pattern could be a product of small sample size.

A number of neonatal sheep post-cranial remains recovered from this phase (six fragments from pits within the enclosure, one from the eastern linear hollow (F406)) are probably neonatal mortalities from a breeding population. This may reflect the practice of bringing the ewes within the enclosure during lambing, as has been suggested for other later prehistoric sites (for example Maiden Castle, Dorset; Armour-Chelu 1991, 144).

Pathology

A proximal sheep radius from a pit F364 within the late Bronze Age/early Iron Age enclosure exhibits minor exostoses on the lateral, medial and posterior sides of the proximal epiphysis. The cause of this new bone formation is uncertain, but may be an enthesopathy.

Pig bones

The absence of phalanges and other small skeletal elements in the pig bone assemblage is probably, as suggested for the sheep and goats, a product of differential preservation and recovery.

Age estimates from dental data are restricted to two lower third molars, one in a mandible and one loose, which indicate ages at death of 21-27 and 27-36 months (following Hambleton 1999). The presence of an unfused distal humerus and an unfused proximal radius indicates that some specimens were also culled at a younger age, in these cases less than 10 months old (Table 40). The late Bronze Age/early Iron Age enclosure produced a single sexed pig canine (sexed following Mayer and Brisbin 1988). This is a male upper canine, from enclosure ditch F362.

For pigs, the distinction between wild and domestic animals, as it is for cattle, is based predominantly on differences in size (Grigson 1999, 221; Payne and Bull 1988). As with the cattle analysis the pig measurements are compared to a standard animal (from Payne and Bull 1988) to allow some exploration of patterning within a very small dataset. None of the Chalk Hill pig measurements are large enough to positively identify the presence of wild pigs (Fig 93); indeed, the range of sizes is comparable to those recorded from early Neolithic Windmill Hill (Grigson 1999, fig 174) which have been interpreted as domestic animals. The data would therefore suggest that only domestic pigs are present at Chalk Hill.

Horse bones

The small size of the horse bone assemblage from the enclosure restricts the information available from an analysis of the skeletal element representation. All major areas of the horse skeleton are represented. The subdivision and utilization of horse carcasses is witnessed by a number of the long bones having been fractured while fresh, presumably for marrow. A superficial chop mark on a left ischium may have been made during filleting. In addition, axial splitting is indicated by butchery evidence on a fragment of scapula.

	Maximum age of fusion (Silver 1969)	fused	unfused
distal humerus	10 months	1	1
proximal radius	10 months	1	1
distal tibia	24 months	-	1

Table 40. Pig bone epiphyseal fusion data: late Bronze Age/early Iron Age.

	Maximum age of fusion (Silver 1969)	fused	unfused
proximal phalanx	15 months	1	0
scapula	20 months	1	0
distal tibia	24 months	2	0
distal femur	42 months	2	0

Table 41. Horse epiphyseal fusion data: late Bronze Age/early Iron Age.

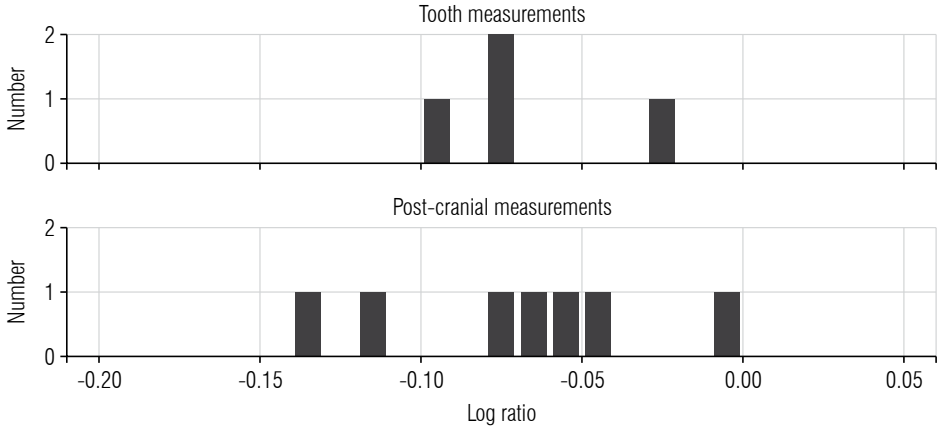


Fig 93. Logarithmic differences of the late Bronze Age/early Iron Age enclosure pig measurements from the standard animal (from Payne and Bull 1988).

The few cheek teeth present exhibit typical caballine characteristics of the enamel folds on the occlusal surfaces (Baxter 1998; Davis 1987). A loose lower first/second molar was aged to 8-11 years and an unworn upper second premolar was aged to 15-36 months old (following Levine 1982). The small quantity of epiphyseal fusion data would support a situation in which most horses were skeletally mature at death (Table 41), which would be a logical situation for an animal used mainly for secondary products such as riding or traction.

Dog bones

Kate M Clark

The enclosure produced three isolated dog bones. Two came from pits within the enclosure and one from pit F411 outside the enclosure.

Pit F364 produced a right mandible. The mandibular length measurements indicate an animal with a long muzzle, corresponding closely to measurements of modern greyhounds. The paucity of metrical data for Bronze Age animals precludes useful comparison, but these dimensions do fall within the range for Iron Age dogs (Clark 2000).

Of particular note is the length of the carnassial which, at 26.0mm, brings this specimen into the range for smaller wolves. However, confident identification of wolf carnassials lies in the relative proportion of the length of the upper carnassial to the sum of the two molar lengths (Clutton-Brock 1963).

While there is no reliable metrical test for the lower carnassial, it is possible to calculate the degree of tooth crowding in the premolar row and it has been shown (Wijngaarden-Bakker 1974; Clutton-Brock 1963; Degerbøl 1963) that non-domesticated canids will have a smaller degree of tooth crowding than domestic dogs. Using Wijngaarden-Bakker's formula for deriving the relative percentage of premolar lengths to the premolar tooth row, this mandible produces an index of 100.7 which is within the range for domestic dog and confirmed by the visible displacement of the P2 alveolus relative to that of P3.

Therefore, although the length of this carnassial is notable it is concluded that this mandible should be classified as domestic dog. Although lower carnassials of this size are rare, they have been observed in dog mandibles from the middle Iron Age (Powell and Clark 1996), the eleventh century (Clark 1998) and the nineteenth century (Clark *in prep.*).

The degree of wear on the 1st and 2nd molars is slight and suggests a young animal. A cut mark on the buccal side below P4 indicates that this dog was skinned.

Pit F463 contained a complete right fifth metatarsal. The metatarsal is fully fused and therefore from an animal

older than 5 months. The height at the shoulder can be estimated from the metapodia (Clark 1995) and this metatarsal is from an animal with a shoulder height of approximately 51 cm. This is within the range for both Bronze Age and Iron Age dogs (Clark 2000; Harcourt 1974).

A left scapula was recovered from pit F411. Comparison with dimensions of scapulae of modern dog types suggests that this bone derives from a dog of similar joint conformation to that of a modern greyhound.

Wild mammal bones

Red deer

Two fragments from this phase consist of an upper deciduous third premolar from the enclosure ditch (F335) and a metatarsal fragment from an external post-hole (F338).

Cetacean

An unfused fragment of whale vertebral epiphysis came from the eastern linear hollow within the area of the enclosure (F406). It was not possible to identify the specimen to species level, rather, it can be described as 'large cetacean'. There are a number of chop marks on the vertebral epiphysis (Pl 17). These could result from the butchery/defleshing of the carcass, the exploitation of the vertebra for oil, or the use of the vertebra as a 'chopping block'. Such use of whale vertebrae as 'chopping blocks' is suggested for specimens bearing cut marks on the epiphyseal surfaces from a number of sites in southern England from the Iron Age to the medieval period (*eg* Albarella and Davis 1996, 24 and fig 2b; Curwen 1931, fig 53; Gardiner 1997, 188, 190, 206-7 and pl I). It is not possible to tell which of the three interpretations suggested above is the true cause of the butchery marks on the Chalk Hill specimen. Even though the piece of vertebral epiphysis is unfused, fusion begins from the centre of the epiphyseal plate (Richard Sabin, pers comm) and this specimen may well have been attached to the centrum; as such it is possible that it was used as a 'chopping block'. The site of Chalk Hill, situated on an island, was within easy reach of a relatively long coastline and this find was probably salvaged from a locally beached whale (although it could have been transported to the site from a greater distance). On the Isle of Thanet, whale bone has also been recorded from Roman deposits at the settlement at Monkton (Bendrey 2008, 254) and the Roman villa complex at Minster-in-Thanet (Parfitt 2006b, 122).

Discussion

Cattle, although probably outnumbered by sheep, appear to have been the mainstay of the late Bronze Age/early Iron Age economy. The presence of neonatal bones of cattle and sheep suggest that both these species were being bred at the enclosure. The absence of neonatal bones of other animals is most likely due to the small sample sizes but could also occur if these animals were not brought within the enclosure during parturition. Pigs were probably more common than horses. Most pigs were culled before adulthood for meat. It is highly likely that their remains are seriously under-represented due to taphonomic destruction of their (mostly immature) bones. Horses, as well as being used for work, also contributed in part to the diet.

The high proportion of a single species in the large animal bone sample from pit F411 appears to represent a selected bone group, which differs from the rest of the later prehistoric assemblage. The high percentage of cattle and the presence of a number of complete limb bones, indicating some wastage of food, may be interpreted as evidence for feasting (although bones from more than one source may have contributed to this deposit). A similar feature, containing large numbers of cattle and horse bones, is pit 1046 from middle Iron Age Old Down Farm, Hampshire, which may represent the simultaneously dumped butchered bones of several carcasses of horse and cattle (Maltby 1981, 130).

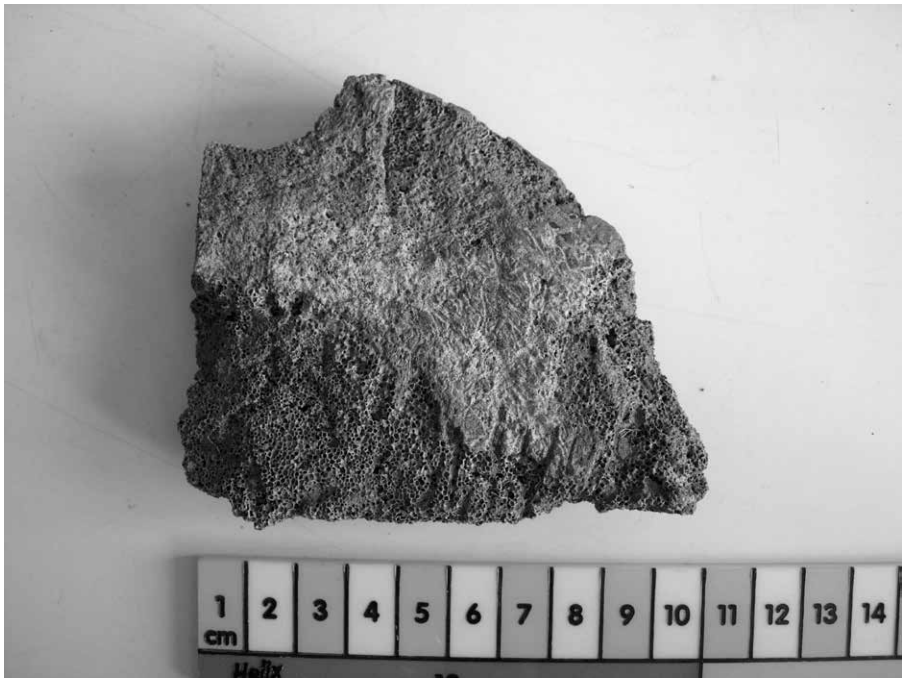
Wild taxa are rare. A few red deer bones indicate that this animal was on occasion hunted. Finds of whale from later prehistoric sites in southern England are uncommon, restricted to coastal locations, and probably derive from the opportunistic exploitation of stranded carcasses. In addition to the whale vertebra from Chalk Hill, Curwen (1931, 215) reports a whale vertebra of probable early Iron Age date from Kingston Buci, West Sussex that appeared to have been used as a 'chopping block'. Another large cetacean vertebral fragment, dated to the early Iron Age, was recovered from Rookery Hill, Bishopstone, East Sussex, where it had been used as packing in a post-hole (Gebbels 1977, 279).

Animal bone from the parallel ditches

The parallel ditches produced a small and poorly preserved assemblage of animal bones (Table 21). In total 59 cattle fragments, two sheep bones, and one horse tooth were identified amongst this material. Loose and fragmented teeth are well represented amongst the cattle bone, reflecting the poor conditions of preservation, although some post-cranial limb bones are also represented. The horse tooth is a lower first or second molar (M1/2) and came from a recut of the eastern of the two parallel ditches (D1423; F1424). The only material identified from the sieved samples from this phase is a fragment of sheep tooth enamel.

Discussion

The establishment of a settlement enclosure and field system in the late Bronze Age at Chalk Hill reflects a



Pl 17. Fragment of whale vertebra (from linear hollow F406 within the late Bronze Age/early Iron Age enclosure) exhibiting chopping on the surface of the epiphysis.

general reorganisation of the landscape at this time in which the landscape was divided and controlled by the layout of permanent settlements, field systems and boundaries (Champion 1999; Yates 2001). In the late Bronze Age/early Iron Age at Chalk Hill, sheep were probably most prevalent, although cattle would still have contributed most meat to the diet. These animals were kept for a range of purposes including secondary products, such as wool, milk, breeding and traction, and primary products, such as meat and fat. The high percentage of cattle in the large assemblage from one feature (pit F411) and the presence of complete limb bones in this feature, suggest a degree of selection and wastage that sets this assemblage apart from others associated with the enclosure, and may represent feasting in the early Iron Age. The possible role of cattle in feasting has parallels with that seen in the early Neolithic deposits on the site, and although the role of cattle in society would have changed by this time it can still be seen as representing a form of wealth (Ray and Thomas 2003; Rowlands 1980). Horses are a regular feature of the animal bone assemblage at Chalk Hill by the late Bronze Age/early Iron Age (and at other contemporary sites) and may have been an important factor in the control of territory and livestock (Bendrey 2007).

Shellfish[1]

Enid Allison

Bronze Age parallel ditches

Six oyster valves were recovered by hand from context D1251, the fill of eastern parallel ditch F1252 (Fig 71). Three samples from the same deposit (total volume 53 litres) produced only traces of oyster and mussel. A single winkle was recovered by hand from the fill of western parallel ditch F1285, and there were traces of common whelk in a sample from the same deposit.

Late Bronze Age/early Iron Age enclosure

Small numbers of oyster and whelk (*Buccinum*/*Neptunea*) shells were recovered by hand from six deposits associated with the late Bronze Age/early Iron Age enclosure. Samples taken from some of the same deposits contained only traces of shell. By contrast, a sample from a thin, shell-rich layer (D392) overlying earlier deposits in pit F391 (Fig 73) produced a large amount of highly fragmented mussel shell. It was not possible to produce an accurate estimate of the number of shells represented because of the poor condition of the remains but it was likely that several hundred individuals were represented in the 18 litre sample together with ten edible winkles, two cockles, and three juvenile oysters.

1 For methods see Chapter 2.

Discussion and conclusions

Small quantities of oyster, winkle, mussel, and common whelk shell (the last two species only represented by traces of shell in samples) were recovered from the Bronze Age parallel ditches (Fig 71). Shell was similarly poorly represented in most deposits associated with the late Bronze Age/early Iron Age enclosure (Fig 73) although a few oyster and whelk shells were recovered by hand. Mussel shell was abundant in a fill of pit F391 together with much smaller numbers of winkles, cockles, and juvenile oysters. The oysters were small and would not have provided a great deal of food.

Charred plant remains

Ruth Pelling

A total of 18 samples taken from the Bronze Age parallel ditches (Fig 71) contained limited charred seeds, while charcoal was noted in 10 samples. Three samples were taken from deposits within the crouched burials (F7 and F206; Fig 45); low numbers of cereal grain were recorded in two samples. Four samples from the colluvial deposit revealed low numbers of indeterminate cereal grain. Four samples were assessed from the late Bronze Age/early Iron Age enclosure (Fig 73). Small quantities of charred remains were noted in three of the samples, including cereal grains in two of them.

Bronze Age parallel ditches

Single grains of cereals were noted in three samples from the parallel ditches (contexts D1208, D1251 and D1315), two of which were of probable free-threshing *Triticum* grain (bread or rivet type wheat), while the third was indeterminate. In addition a poorly preserved pulse (*Vicia/Pisum* sp, bean/pea) was noted in a fourth sample (context D1284).

Late Bronze Age/early Iron Age enclosure

Three samples assessed from features (mainly pits/post-holes) in the late Bronze Age/early Iron Age enclosure (Fig 73) produced few charred remains. Cereal grain of *Triticum spelta* (spelt), less well preserved *Triticum spelta/dicoccum* (spelt/emmer wheat) and *Hordeum vulgare* were present in two samples while hulled wheat chaff was recorded in a third consisting of glume bases (parts of the chaff) of *Triticum spelta/dicoccum* (spelt/emmer wheat). Moderate amounts of *Vicia/Pisum* were noted in one sample with occasional *Arrhenatherum elatius* (false oat-grass) tubers. The presence of hulled wheats in this period is entirely consistent with the pattern seen elsewhere in the country in the period (Greig 1991). The presence of spelt wheat would suggest it had been adopted locally well before the end of the Bronze Age as it had been elsewhere in southern Britain (Champion 2014, 291; Martin *et al* 2012; Pelling 2003; Hinton 1982; Straker 1990).

4

Early historic landscapes

Site description

Peter Clark and Jake Weekes

Anglo-Saxon features

A sunken-featured building

The clearest evidence of later occupation of the site was an Anglo-Saxon sunken-featured building set amongst the main post-hole/pit cluster within the late Bronze Age/early Iron Age enclosure (Fig 94; Pl 18). As mentioned above, at least some of those features may have been associated with this Anglo-Saxon structure, but the evidence remains equivocal.

The building itself consisted of a rectangular pit (F576), aligned north-west/south-east and approximately 3.9m by 2.3m in plan, with steep sides and a flat base just under 0.3m deep. At the centre of each end was a single post-hole (F613 and F618), 0.3m – 0.35m in diameter and 0.55m – 0.65m deep. The fill within the pit and post-holes contained a single sherd of organic-tempered pottery dating to *c* AD 550-700 (along with over 100 residual prehistoric sherds) as well as a number of interesting registered finds (Fig 84), including a bone pin-beater (< 760>), two large cylindrical perforated shale objects (< 759> and <762>, perhaps fishing net weights), a complete annular glass bead of Anglo-Saxon date (< 763>) and a fragment of a jet bead

Pl 18. View of excavated sunken-featured building. Scale 1m.

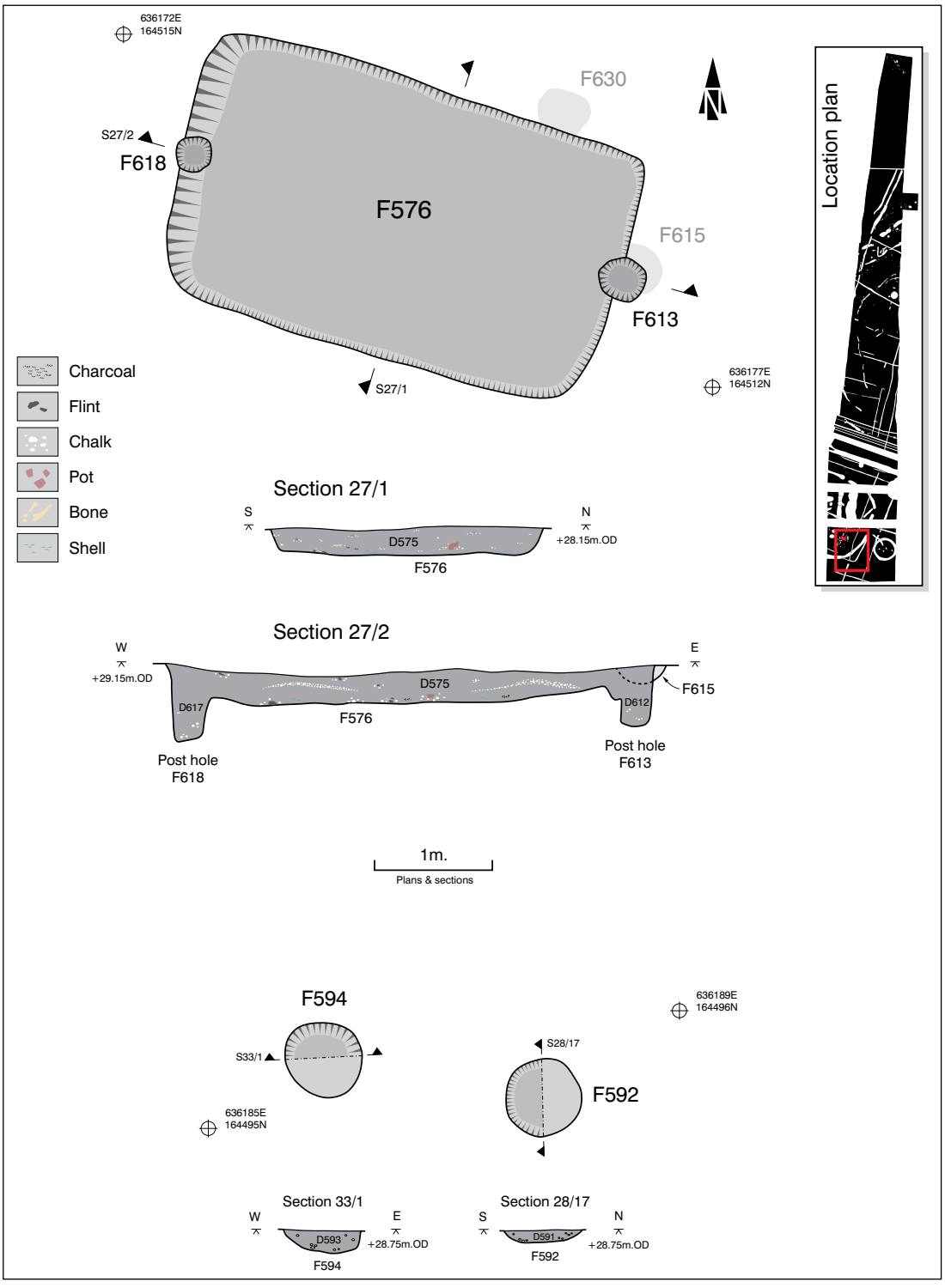


Fig 94. Anglo-Saxon sunken-featured structure and associated features.

likely to be of Roman date (<1503>). Environmental sampling produced fragments of heat-affected clay, unidentified pottery, glass, hammerscale, mammal, bird and fish bone, eggshell, shell fragments of whelk, mussel, limpet, cockle, winkle and scrobicularia, as well as charcoal, grain and seeds.

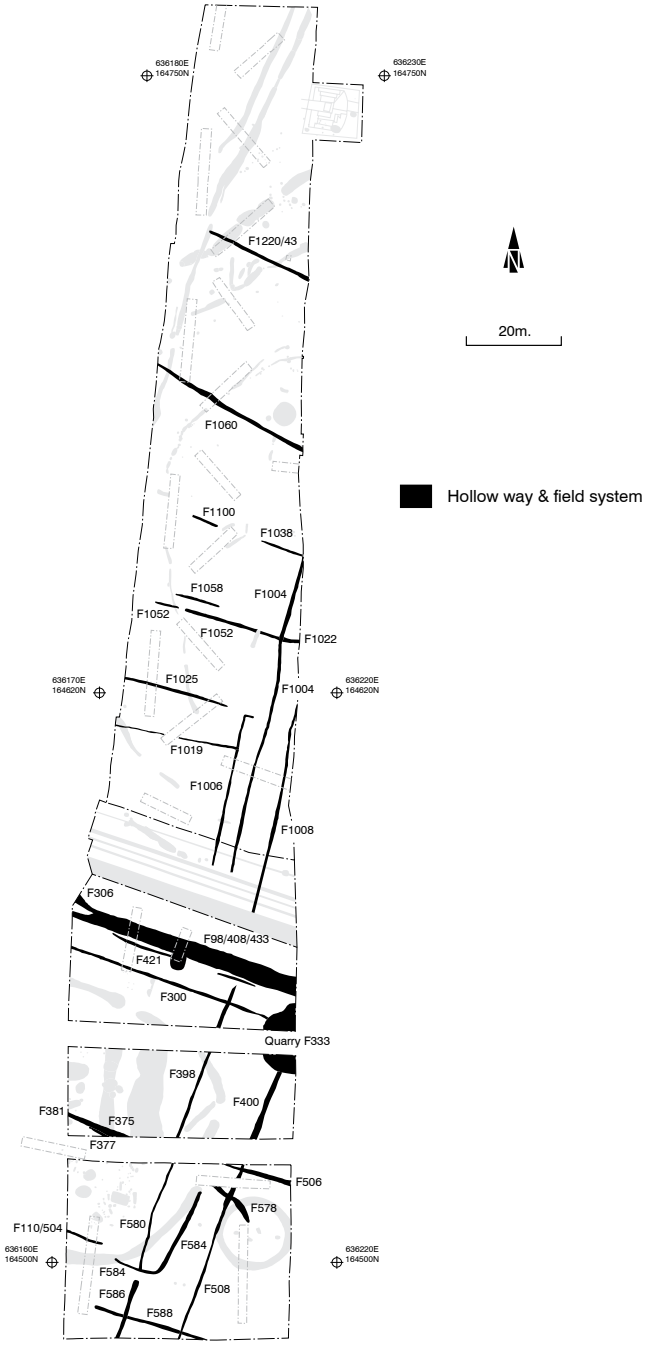


Fig 95. Medieval field system and hollow way.

The structure seems to align with and potentially lie within an enclosure formed by a co-axial medieval field system which spread across most of the site and which was itself clearly associated with a medieval hollow way on the same alignment as the Chalk Hill road some 50m to the north (see below). It is thus possible that the medieval landscape had its origins in the Anglo-Saxon period.

Pits and post-holes

Two subcircular post-holes (F592 and F594; Fig 94), 0.5m in diameter, 0.3m deep and 1.3m apart, were located approximately 20m to the south-east of the sunken-featured building. The fill of feature F592 contained nine sherds of pottery dated to AD 550-700. The only other feature of probable Anglo-Saxon date lay some 180m to the north of this group, at the extreme eastern limit of excavation. This was an apparently subcircular pit (F1077) which had been truncated by a later feature. The remnant of pit F1077 was 0.71m by 0.37m broad and just 0.08m deep. Three sherds of Anglo-Saxon pottery (dated AD 600-725) were recovered from the fill of the pit.

Medieval features

Medieval field system

A network of numerous small linear gullies (F1220/43, F302, F398, F400, F421, F504, F578, F586, F1004, F1006, F1008, F1019, F1022/1052, F1025, F1038, F1060, F1061, F1058, F1052, F1004 and F1100) was spread over a large area of the site, approximately 230m in extent (north – south), forming the rectilinear pattern of a co-axial field system (Fig 95). The gullies, undoubtedly truncated by later ploughing, tended to be less than 0.5m wide (but could be up to 1.3m wide in places) with generally shallow profiles up to 0.3m deep. Homogeneous brown silts filled all and finds were scarce. The latter mostly comprised abraded residual or intrusive pottery (variously dating to the later pre-Roman Iron Age, Roman, Anglo-Saxon and medieval periods), worked flint and animal bones, although more concentrated finds of worked flint were retrieved from features in the vicinity of and cutting Neolithic features (gullies F1220/43 and F1060).

It seems most likely that this field system is medieval in date, possibly with its origins in the Anglo-Saxon period. Early-middle Anglo-Saxon potsherds were recovered from gullies F1008 and F1060, the latter producing eight sherds dated *c* AD 600-725. This feature, which cut the Anglo-Saxon pit F1077, also produced a single sherd dated to the tenth or eleventh century, and later medieval pottery was variously found in field system gullies F1006 (three sherds: two *c* AD 1075-1200 and one *c* AD 1250-1325), F1025 (nine sherds: *c* AD 1150-1350), F1022; (one sherd: *c* AD 1275-1325) and F586 (one sherd: *c* AD 1475-1525). The features also produced a number of iron objects of indeterminate date.

The southern end of the system as revealed within the area of excavation appeared to be roughly aligned axially with the Anglo-Saxon building, and gullies F375,

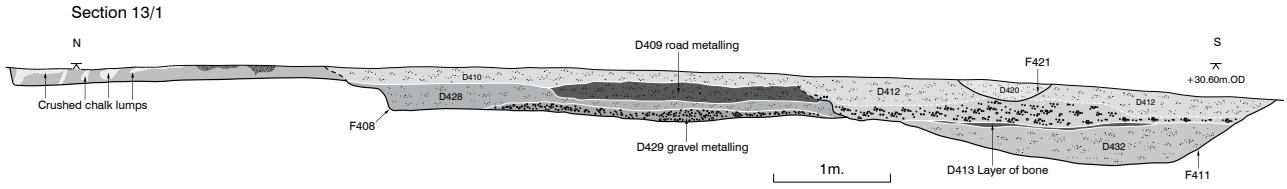


Fig 96. Section through medieval hollow way.

F377, F504, F584, F381, F110/504, F584, F588, F508, F506 and F578, in the vicinity of that structure (and on a slightly different alignment to the rest of the system; Fig 95) could be earlier (*ie* Anglo-Saxon in date) and have originated as an enclosure associated with the structure.

Medieval hollow way

A hollow trackway (F98/408/433; Fig 95), aligned roughly south-east to north-west, ran across the site and was clearly axially aligned with both the field system described above as well as the line of Chalk Hill road, almost immediately to the north. It seems likely that this hollow way, varying between 3.8m and over 6m wide, was the forerunner of the modern road.

Three sections were cut across the hollow way, those at the western and eastern limits of excavation showing a simple hollow up to 0.4m deep (eroded by ploughing), with some light gravel metalling. At approximately the centre of the excavated area, however, the hollow cut through the soft silt fills of an earlier pit (F411; Fig 73), which had clearly caused difficulties in terms of drainage and progress along the trackway. Here was the widest part of the feature, with a clear upslope diversion, probably avoiding a depression caused by slumping of deposits into the pit to the south.

Fig 96 demonstrates that the earliest gravel metalling (D429; also noticeably thicker at this point at 0.13m) and the silt sealing it (D428) had indeed slumped into the silty clay filling pit 411, occasioning the laying of another even thicker metalling (D409, 0.17m thick). Deposit D428 also produced human skull fragments from an adult (more than 30 years old at death), probably eroded from pit F411. A layer of silt (D410) sealing this layer produced three conjoining sherds of early-middle Anglo-Saxon pottery (organic tempered, *c* AD 550-700). Over 50 apparently residual prehistoric potsherds were also recovered from the feature at the point where it truncated pit F411, with a single late Bronze Age plain ware sherd from silt layer D428, 49 sherds of late Bronze Age decorated sherds, five of indeterminate date and one late Iron Age sherd from metalling D409 (suggesting that at least some of the gravel from this later metalling was retrieved from earlier material slumping into pit F411) and a further 19 plain ware sherds from layer 410. The latter also contained a flint flake, and 12 flint artefacts (mainly flakes but one core) were found to be mixed within the gravel in metalling D409.

A linear drainage gully about 0.18m deep ran along the southern side of the hollow for at least 30m (F421; Fig 95); it may have needed to be especially deep in this area, and therefore survived truncation by later ploughing.

Quarry pit

Lying partially within the site, immediately to the south-east of the hollow way was a large quarry pit (F333; Fig 95), at least 14m wide and over 1.5m in depth (it could not be fully excavated). Its upper fill, flecked with oyster shell, bone fragments, heat-affected clay and chalk, contained a small assemblage of worked flint, at least two late Bronze Age plain ware sherds and three medieval Tyler Hill sandy ware sherds (*c* AD 1200-1250). Whilst it seems likely that this feature probably resulted from medieval activity associated with the hollow way, it is also possible that the medieval sherds are intrusive, and that the pit was much earlier.

Flint from post Iron Age features

Tania Wilson

The features dated to the Anglo-Saxon period produced some 31 struck flints. With the exception of a backed knife fragment the remainder of this assemblage comprises waste flakes.

An assemblage of some 425 struck flints (3 per cent of the excavated assemblage) was recovered from the fills of medieval field system ditches F1060 and F1220 in the vicinity of the causewayed enclosure. The northern ditch produced some 177 pieces comprising largely debitage but including 27 cores, two retouched flakes, one notched piece, three scrapers and two serrated pieces. The remainder of the assemblage was recovered from the southern ditch and included one arrowhead (Fig 76/25) and a burnt scraper.

Another 235 struck flints were recovered from the fills of the ditches forming the rest of the medieval field system. The flints were generally dispersed throughout the ditches and no notable clusters were observed. A 10 per

cent sample of this assemblage was examined in detail. Based on the sample, the condition is largely unpatinated with a negligible group displaying slight patination. Fifty-four per cent of the sample is incomplete and 46 per cent has edge damage. The range of raw material types represented is consistent with that of the late Bronze Age enclosure.

A large quarry pit (F333), attributed to the field system phase, produced the remainder of this assemblage. This group largely comprises debitage but includes a number of notable pieces; one fragmentary end-on-blade scraper with extensive use wear along both sides, one incomplete backed knife, one borer and a complete Chisel-type arrowhead (Green 1984, 25; Fig 76/30).

Post-late Bronze Age/early Iron Age pottery

Louise Rayner

Around 170 sherds of post-late Bronze Age/early Iron Age pottery were retrieved from the excavations, representing around 3.32 per cent of the entire ceramic assemblage.

Pre-conquest late Iron Age

Eleven sherds of principally grog-tempered material of pre-conquest late Iron Age date were recovered from the excavations.

These small and variably worn sherds, are probably derived from agricultural manuring spreads or by deep ploughing introducing pottery into the upper surfaces of these features.

Late pre-Roman Iron Age to early Roman

Seven small worn sherds of late pre-Roman Iron Age to early Roman date, with typical Thanet-type fabrics with silty matrices, were recorded from a small number of features.

None of this material is significant (mostly 1-2 sherds per context), other than confirming a degree of activity in the general area, the condition of the sherds again suggesting continued use of this area for probable agricultural purposes throughout the conquest period.

Roman

A similarly moderate quantity of small, worn Roman sherds (mostly 1-2 sherds per context), was recovered from a small number of features. Again, none of this material is significant other than indicating continued, probable agricultural use of the land. There is no material later than *c* AD 150/175, suggesting a change in land use, perhaps from arable to livestock farming, or even abandonment of the area.

Anglo-Saxon

Both sandy and organic-tempered potsherds were recovered from 10 contexts, tentatively dated to the earlier Anglo-Saxon period.

It would seem though, that a degree of this material is intrusive, being recovered from earlier features. Apart from a single small fresh sherd from the fill of the sunken-floored building, a possible post-hole F592 produced eight sherds, fairly worn and probably from the same vessel, dated to AD 550-700. In addition, a silt deposit (D409), sealing the eastern hollow F406 within the late Bronze Age/early Iron Age enclosure provided three conjoining body sherds. Eight small to large sherds dated *c* AD 600-725 were also found in the fill of one of the medieval field system ditches further to the north (F1060). This ditch truncated the fill of pit F1077 which itself contained part of a perforated lugged handle from a large two-handled bucket or water lifter dated to around AD 600-725.

The overall combination of fabrics present suggests a date emphasis between *c* AD 575-650.

Medieval and post-medieval

Up to 120 sherds of mostly small and fairly worn sherds representing these periods were recovered from a number of features. Most sherds are likely to have been introduced to the site via agricultural practices.

Registered finds

Nicola Powell

Catalogue

Copper alloy

<402> Waste/slag. (D376): fill of medieval field ditch F375.
Lump.

<401> Vessel. (D371): fill of western linear hollow in the late Bronze Age/early Iron Age enclosure (F370).
Cast vessel fragment, probably a vessel leg. Intrusive.

<1024> Strap loop. (D1232): fill of eastern parallel ditch F1260.
Trapezoidal strap loop with opposed internal projections. Intrusive. Medieval, *c* 1200-1350 (Egan and Pritchard 2002, 231).

Iron

<745> Sheet. (D111): fill of medieval hollow way F98/408/433.
Tapered sheet fragment.

<746> Sheet/plate. (D113): fill of medieval field ditch F398.
Small narrow sheet/plate fragment with rivet hole.

<748> ?Tool. (D123): fill of late Bronze Age/early Iron Age enclosure ditch F582.
Rectangular section with a tapering chisel-like end.
<838> Hook. (D1020): fill of medieval field ditch F1004.
Small fragment, bent and flattened at one end. Possibly part of a fishing hook.
<836> Sheet. (D1023): fill of medieval field ditch F1025.
Sheet fragment, possibly part of strapping or binding.
<839> Nail. (D1039): fill of medieval field ditch F1006.
Nail fragment. Heavily corroded but appears to have a rectangular section and remains of a round flat head.

Glass

The glass from the site was very small and fragmentary and in most cases intrusive. Only one glass find can be dated.
<763> Bead. (D575): fill of Anglo-Saxon sunken-featured building F576 (Fig 84).
Diameter 10mm; annular bead with a D-shaped section, monochrome, blue. Good condition with little sign of wear or degradation. Anglo-Saxon

Stone

<759> Weight. (D501): from fill of Anglo-Saxon sunken-featured building F576 (Fig 84).
Weight 1430g, Diameter 125mm, Height 84mm; cylindrical weight with central perforation. Made of coarse bitumous shale. Appears too large for a loomweight or net sinker, and shale is not a good material for immersion in water. Possibly a thatch weight.
<762> Weight. (D575); from fill of Anglo-Saxon sunken-featured building F576 (Fig 84).
Weight 285g, Diameter 75mm, Height 62mm; cylindrical weight of coarse bitumous shale. Found with the pin-beater so possibly a loomweight as it falls within the weight range found for loomweights from this period.
<1503> Bead.
(D575); from fill of Anglo-Saxon sunken-featured building F576 (Fig 84).
Diameter 2mm; fragment of a jet bead with a pentagonal section. Probably residual. Possibly Roman in date.

Bone

<760> Pin-beater. (D575): from fill of Anglo-Saxon sunken-featured building F576 (Fig 84).
Length 109mm; complete pin-beater, with only the very tip of one end lost. Surface badly worn and eroded. Anglo-Saxon.

Discussion

Anglo-Saxon

The fill of the Anglo-Saxon sunken-floored building F576 produced some very interesting finds, including a bone pin-beater <760> and a cylindrical shale object <762>. The pin-beater appears complete, with perhaps just the very tip of one end missing. Its surface is very poor, being pitted and marked, unlike the smooth polished surface usually seen on these objects. The shale object has a central perforation. A second cylindrical perforated shale object was also recovered from the structure (<759>).

The interpretation of the shale objects has proved difficult as these interesting objects appear to be unparalleled. Firstly, their discovery in association with the pin-beater and in a domestic context suggests they may be loomweights. However, they are not the familiar annular or bun-shape of Anglo-Saxon loomweights; indeed, they have some similarities to middle and late Bronze Age loomweights (Tim Champion, pers comm). The shale object <759> weighs 1430g, which is outside the weight range noted for loomweights and so another purpose must be sought. A net sinker seems a strong possibility as this object appears to have been immersed in salt water for some time and retained an attached barnacle. However, the shape is not consistent with stone weights interpreted as net sinkers from the period like two chalk weights found in the Thames (Thomas 1981, 130); shale does not seem durable enough for prolonged immersion in seawater. At 1430g the largest of the shale objects would also seem to be unwieldy for such a function, unless it served a more pivotal or anchoring role. It may be a structural context should be sought.

The complete annular glass bead <763> can be assigned an Anglo-Saxon date. It is in good condition and was found with the pin-beater and the smaller of the shale objects. It is a solid bright blue colour throughout. A second bead <1503> also came from (D575). It is a tiny fragment of a long jet bead with a pentagonal section. It is likely to be Roman in date and thus residual.

Medieval and post-medieval

A trapezoidal strap loop <1024> recovered from context D1208 in the middle to late Bronze Age parallel ditches dates from the thirteenth to mid-fourteenth century and is intrusive. Also intrusive from the metalled hollow within the late Bronze Age enclosure is a cast vessel fragment <401>. It is small and is probably part of the foot of a pot leg, from a vessel such as a skillet or posnet. It is medieval to post-medieval in date.

The copper-alloy waste or slag <402> from medieval field ditch F376 is possibly residual, and suggests metalworking was carried out in the area. A piece of iron plate

with a rivet hole <746> from ditch F398 may form part of some iron stripping or binding.

To the north, a bent iron stem or shaft <838> from F1004, a ditch forming part of the field system, may be part of a fishing hook. It has a flattened rectangular section and tapers to a point. Other iron finds attributed to this phase include a fragment of sheeting <836> from D1023 and what may be a nail stem fragment <839> from D1039, both also from ditches forming part of the medieval field system. Iron objects also included a piece of tapering sheet iron <745> from D111, a fill of the medieval hollow way (F98/408/433). It may possibly have been part of a tool or knife, but as with all the iron, is in very poor condition.

Animal bone

Robin Bendrey

Anglo-Saxon

All the animal bones dated to this period derived from the Anglo-Saxon sunken-featured building. Identified specimens include five fragments of sheep/goat, three of cattle and one of pig (Table 21). This assemblage can tell us little beyond the fact that these taxa are present. A single environmental sample from the sunken-featured building produced a number of sheep/goat teeth fragments.

The medieval field system

Both cattle and horse are over-represented in the fragment counts from the co-axial field system ditches due to the presence of two (probable) partial articulations. The distribution of the common taxa as represented in the context frequency calculations for this material, however, probably gives a better representation than NISP of the relative importance of the taxa (Table 42). Counts of context frequency indicate a rank order of importance of cattle, sheep/goat, pig then horse. The relatively high representation of cattle in the field system by context frequency may represent a combination of both differential deposition and differential preservation.

	c.f.	r.f.
cattle	9	0.41
sheep/goat	5	0.23
pig	5	0.23
horse	1	0.05
Total	22	1

Table 42. Distribution of the common taxa from the medieval field system by context frequency.

In addition to the four common taxa (cattle, sheep/goat, pig and horse) cat is also recorded. Three bones of cat (a left femur, tibia and calcaneum) are identified from field ditch F1006. The bones are poorly preserved and no metrics were available; in appearance they are consistent with those of a single animal.

The horse and cattle associated bone groups (ABGs), both from field ditch F1025, context D1023, were identified during the analysis phase of the animal bones. The probable horse articulation consists of seven cervical vertebrae, five thoracic vertebrae and some ribs. The vertebrae were fused and so the animal was over five years of age at death (Silver 1969). The probable cattle partial articulation consists of five thoracic, four lumbar vertebrae and a number of ribs. The vertebrae were fused, indicating an age of over five years for the animal (Silver 1969).

Whether these ABGs resulted from butchery, animal burial or some other purpose is unknowable given their tenuous stratigraphic context, in the upper deposit of a shallow and plough truncated field boundary ditch (which may well be later medieval in origin), at the western limit of excavation, and unrecognised by excavators as spatially defined groups.

Shellfish[1]

Enid Allison

Anglo-Saxon sunken-featured building F576 and pit F411

The fill (D575) of SFB F576 was sampled in its entirety (total volume 150 litres) but larger artefacts and biological remains, including some shellfish, had been removed from the deposit before sampling. The hand-collected shell consisted of 169 fragments of winkle and three red whelks. The samples produced a further 113 winkles together with shells of limpet, flat winkle (*Littorina obtusata*), common whelk, mussel, peppery furrow shell, oyster and cockle, all represented by four individuals or less. The oysters, common whelks and a cockle were all juveniles. They may have been too small to have been deliberately harvested for food but, with flat winkle, may represent a discarded by-catch with larger individuals being consumed elsewhere. An oyster valve and a winkle were recovered by hand from a pit fill (D413; F411) rich in animal bones.

Medieval field system

Shellfish remains were common in the fill of a shallow linear ditch (D1007; F1008; Fig 95) associated with a medieval

1 For methods, see Chapter 2.

field system. Hand-collected material consisted of 62 limpets (*Patella vulgata*), 33 whelks, 62 valves of mussel and 15 of oyster. The same four species were recovered from a 12 litre sample from the same deposit where oyster was the most common species with a minimum of 17 individuals represented mainly by right valves. Seven of the oyster valves were from small oysters (<40mm maximum length). Small numbers of oyster valves and a single whelk shell were recovered by hand from four other deposits associated with the medieval field system.

Discussion and conclusions

Anglo-Saxon sunken building F576

Winkles were by far the most numerous species in the fill of the sunken building. Limpet, flat winkle, common whelk, mussel, peppery furrow shell, oyster and cockle were all represented by four individuals or less, and there were three complete shells of red whelk. Although most of the species are edible and the winkles in particular probably represent food waste, it is possible that some of the assemblage represents discarded by-catch, and meat from some species may have been used as bait for fishing if not required for human consumption. The group that may have been rejected as food may have included small juvenile oysters, common whelks and cockles and the three full-sized red whelks. The last of these is a cold water species found sublittorally in water up to 100 fathoms deep (183 metres) and is more typical of the northern parts of Britain. A local population of red whelks is known to exist off the coast of Thanet in Pegwell and Sandwich Bays however (Light 2009). Live red whelks are not normally encountered on the shore and they are likely to have been caught with common whelks in baited pots in deep, cold water. A large red whelk can yield up to 80g of meat (Fleming 1971) but consumption can cause acute poisoning because the animal produces the toxin tetramine (tetramethylammonium hydroxide) in its salivary glands (Halstead 1965, 665). Tetramine produces a curare-like affect in experimental animals and a number of cases of poisoning of people in Scotland (where red whelks are more common) have been described in the medical literature. Symptoms can develop within an hour of consumption and include visual disturbances, tingling and twitching of the hands and feet, prostration, nausea, vomiting, diarrhoea and paralysis. Fortunately, complete recovery occurs in 24 hours (Fleming 1971; Reid *et al* 1988). For communities that were familiar with the possible effects of poisoning, it is possible that the salivary gland was removed before consumption. Fleming (1971) also remarked that red whelks were eaten in areas in Scotland where they made up a small proportion of catches of edible common whelks and he inferred that the toxin may have a quantitative affect and if the specimen eaten is small there may be little danger of serious toxic effects. He also noted that red whelks were a popular food for the poorer working classes in the later nineteenth century. Interestingly, the species was common, and more so than common whelk, in middle Saxon deposits at Foads Hill that were excavated on the route of the East Kent Access road close to Sandwich Bay, but there were very few records from other periods. Some specimens had cut marks indicating extraction of the meat (Nicholson 2015).

Features associated with the medieval field system

Marine mollusc shell was common in the fill of a shallow linear ditch (D1007; F1008) associated with a medieval field system. Subjectively, oyster and limpets were more common relative to other species in medieval features than they had been in any of the preceding periods of activity on the site, but it would be unwise to draw firm conclusions from such a limited number of deposits, only one of which produced a substantial amount of shell. By the early medieval period a series of controlled oyster grounds extending from Whitstable through the Swale channel and into the Medway had been established (Pike *et al* 1992, 49). Some of the oysters recovered were not of the size usually deliberately harvested for eating but they may have been collected with larger specimens from a coarse bottomed substrate from extreme low tide mark and the sub-littoral zone down to about 50 metres. Oysters recovered from a sample from the linear ditch were mainly right valves, the part usually removed when oysters are eaten raw so that the meat lies cupped in the deeper left valve, suggesting that the assemblage may primarily represent discard from food preparation.

Charred plant remains

Ruth Pelling

Two samples were examined from the Anglo-Saxon sunken-featured building (F576; Fig 94), producing small amounts of charred grain and pulses. In addition, a total of 61 samples was assessed from non-phased features, of which 13 contained cereal grain and 4 contained chaff. Non cereal remains were noted in a further three samples.

Anglo-Saxon sunken-featured building

Occasional grains of *Triticum spelta* and *Triticum spelta/dicoccum* were recovered from one sample from the sunken-featured building (F576; Fig 94). Another

sample provided moderate quantities of *Vicia/Pisum.* Hulled wheats are not generally recorded in the Anglo-Saxon period being more closely associated with the prehistoric and Roman periods, although they are occasionally identified (*eg* Pelling and Robinson 2000). Given the apparent degree of stratigraphic movement of much of the charred cereal remains it is highly likely that the material here is intrusive.

The general scarcity of chaff and weed seeds throughout all phases would suggest that the site was never involved in intensive cereal production and processing. There appears to be considerable stratigraphic movement of material with deposits in most phases producing grain and/or chaff out of character for the period. It is probable that soil cracking, decaying roots leaving voids in the soil and animal burrowing could all be suitable agents in the mobilisation of small material. This sort of activity is not phase specific and could be responsible for contamination inter-phase in regards to the smaller sized materials. The presence of intrusive material is further suggested by the occasional presence of coal and recent plant material as well as roots in a number of the samples.

5

Discussion: an interpretation of the 'causewayed enclosure'

Jake Weekes

Features

The subject of the complexity of development and use of causewayed enclosures is an area of continuing contribution and debate (see Edmonds 1999; Thomas 1999; Oswald *et al* 2001). Whether or not the Chalk Hill 'enclosure' began as a notable natural clearing and/or 'place' imbued with meaning for those that hunted and foraged in the area, it appears increasingly to have become a designated and managed space in the early 4th millennium BC. Carinated bowl within the pottery assemblage puts initial activity at Chalk Hill within the same general time frame as the very early structures recently discovered at White Horse Stone, near Maidstone, Kent (Hayden 2007). Moreover, early radiocarbon date ranges from the Outer Arc of the enclosure suggest that the causewayed enclosure itself is relatively early (Healy 2007; Bayliss *et al* 2011, 371-6).

Carinated bowl and early Plain bowl are mixed in heterogeneous 'placed deposits' that may have been acquired from the same 'midden' like source (*cf* Garrow *et al* 2005, 149-51). In terms of the development of the enclosure, one is compelled to allow for various scenarios, including a single construction of the entire enclosure to an overall design with only minor modification thereafter, piecemeal development of segments, arcs and alignments over time and therefore changing overall form, or diverse development of individual segments at different times.

Despite the narrow view of the enclosure provided by a limited area of excavation, its overall pattern is sensed from a qualitative assessment of the spatial relationships between segments and projection of the three arcs and associated pit/post-hole alignment (Fig 6). This idea can be reinforced with some basic quantitative data. Five measurements taken between nearest points of the Inner and Middle Arc segments, following projected arcs from south to north (Table 43) seem indeed to demonstrate some regularity of layout, and therefore apparent design, between these groups of features.

These measurements produce a median distance of 14.8m between the features of the projected Inner and Middle Arcs, with an arithmetic mean of 14.74m. Moreover, approximate measurements between nearest points and projected alignments of middle and Outer Arcs also seem to demonstrate a broad regularity, although the position of feature F1181 (Table 44) appears anomalous, suggesting that this was actually a discrete feature situated to the south of the alignment of the Outer Arc, rather than a segment terminal partially seen.

Inner Arc	Middle Arc	Distance (m)
Segment 1, south-east terminal	Segment 3, nearest point	14.7
Segment 1, approximate centre	Segment 3, limit of excavation	15
Segment 6, north-east terminal	Segment 4, limit of excavation	14.8
Segment 7, north-east terminal	Segment 5, north-east terminal	14.4
Segment 8, approximate centre	Segment 6, south-west terminal	14.8

Table 43. Distances between nearest points of Inner and Middle Arcs.

Middle Arc	Outer Arc	Distance (m)
Segments 1-2, projected	Segment 1, feature 2091	9.8
Segments 1-2, projected	Segment 1, feature 2071	10.3
Segment 2, south-east terminal	Segment 1, feature 2095	10.2
Segment 2, nearest point	Segment 1, feature 2025	10.4
Segment 5, projected	Segment 2, segment terminal?	7
Segment 5, nearest point	Segment 3, south-west terminal	9.6
Segment 5, north-east terminal	Segment 3, nearest point	9.2
Segment 7, south-west terminal	Segment 5, south-west terminal	9.7
Segment 7, nearest point	Segment 5, north-east terminal	9.7

Table 44. Approximate distances between nearest points of Middle and Outer Arcs.

Excluding feature F1181 (Outer Arc Segment 2), then, these approximate measurements produce a median distance between middle and Outer Arcs of 9.7m, with an arithmetic mean of just over 9.8m. The probable pit/post-hole alignment between the Inner and Middle Arcs also suggests a regular layout in the form of an arc, although perhaps on a slightly different alignment.

Gradual development of the 'design' of individual segments at least (and possibly of the enclosure as a whole) is attested by the piecemeal method of segment formation, involving numerous episodes of pit digging, disturbance and deposition. Rather than segmented 'ditches', complete with designed 'causeways', the evidence suggests traditional and episodic concentration of activity on a number of linear foci arranged in several arcs. This phenomenon does not accord with the general model of wholesale 'ditch recuts' reported elsewhere (*eg* at Kingsborough, Sheppey; Allen *et al* 2008), yet it has been independently witnessed in recent discovery and excavation of what is probably another Ramsgate causewayed enclosure, just over 0.6km to the south-east of Chalk Hill (Moody and Hart 2008, fig 2). It also compares interestingly with intercutting pit sequences of the period recently redefined by Garrow *et al* (2005; a similar early Neolithic pit sequence was more recently excavated on the Isle of Thanet at nearby Westwood; Poole and Webley 2008). Garrow *et al* (2005, 154) offer alternative scenarios for the production of such clusters of features, also applicable at the Chalk Hill causewayed enclosure. Scenario 1 involves a single visit by multiple groups of people who, whilst digging a cluster, kept themselves spatially (and materially) separate.

Scenario 2 involves permanent occupation by a single group of people, digging pits in different places over the course of many years. Scenario 3 involves repeated visits, by one group, or even a small number of groups, digging a cluster each visit over what may also have been a relatively long period.

Scenario 3 would perhaps be most consistent with the evidence from Chalk Hill, although in this case the repeated visits to the site seem to have been made over a relatively short period compared with other causewayed enclosures in the region (Healy 2007).

Such activity perhaps gradually produced the broadly concentric system of segments and pits that formed the 'causewayed enclosure', a design that may have been symbolic in itself, perhaps reflecting a particular cosmology and/or ceremonial sequence. However, if the basic premise of the form of the enclosure being a symbolic design *per se* is suspended, the evidence is also perfectly consistent with the segments and pits being foci based on an alternative spatial arrangement that has left little or no direct trace in the archaeological record. It would be quite understandable, for example, if a temporary and perhaps seasonal encampment of semi-sedentary people was traditionally arranged on structuring principles (*eg* hierarchies/identity/cosmology) expressed through the positioning of certain temporary dwellings and/or particular activities. In this alternative developmental scenario it could be that the formalised features of the established causewayed enclosure arose from, and perhaps even represented in idealised form, a structured disposition of ephemeral dwellings/activity areas.

Deposits

At Chalk Hill as with other causewayed enclosures, taphonomy has had a major role in selecting the types of object available for archaeological analysis, and the fact that many organic remains have undoubtedly not survived the millennia of post-depositional processes must be borne in mind when attempting to reconstruct selectivity in original deposition. Equally, any relative quantification even of surviving artefact types is curtailed by limited excavation and therefore highly contingent. In addition, the very actions of repeated digging and deposition focussed in the same places undoubtedly disturbed and thereby 're-selected' some (and possibly most) objects that may have originally been in association and mixed them with other material, meaning that putative combinations of objects clustered together must be interpreted with caution.

Flint and stone

The worked flint assemblage, containing both burnt and unburnt artefacts (see below), characteristically contains a large amount of debitage, with only a minority being retouched tools. Substantial concentrated flint deposits were recovered from early pits of Outer Arc Segments 3 and 5 (especially Segment 3). The 'chalky' quality of much of this material might also suggest deposition soon after knapping. Whether such concentrations of apparently freshly worked flint represent single large-scale depositional events, separate tips, or even knapping *in situ* was generally impossible to evaluate at Chalk Hill. Excavators of the poorly understood pit F1667 in Segment 5 of the Outer Arc, which contained one of the largest concentrations, did infer separate layers within flint deposits, but no substantive evidence for this exists in the excavation records.

Beyond the potential fresh knapping deposits in early pits of Outer Arc Segments 3 and 5, the vast majority of flint assemblages, particularly those from the Inner and Middle Arcs, contained at least some, and sometimes a significant proportion of burnt artefacts, and were often found to be mixed with pot and occasionally animal bone in carbon rich deposits. The implication here is that such mixed material was accumulated somewhere in or around the enclosure prior to deposition, much of it having already been modified through burning. Burnt unworked flint was also a noteworthy component of the mixed deposits and of the finds assemblage as a whole, adding to the general picture of activities at the site that included burning and cooking.

While this phenomenon tended to characterise flint assemblages of the Inner and Middle Arcs, worked flint concentrations in features F1672 (Segment 5) and F1181 (Segment 2) of the Outer Arc also contained some burnt material and were encountered among more mixed deposits. These deposits of the Outer Arc that seemed to contain a few more 'finished' tools in proportion to the debitage. Also of note in this regard is the concentration of eleven scrapers at the western terminal of Middle Arc Segment 6. Only in such rather limited cases does the evidence appear to allow obvious comparison with Saville's (2002) profile of 'typical' tool types (scrapers are indeed prominent among these more developed tools).

The Chalk Hill site produced little in the way of polished flint or tools made of exotic stone, but this may well be a function of selective excavation. It is noteworthy that a number of small sandstone fragments were recovered from deposit D40, the carbon and cultural material rich deposit filling, the shallow late feature F3016 in Outer Arc Segment 4.

Pottery: Plain Bowl

Plain bowl, the main pottery constituent at Chalk Hill, was associated with early radiocarbon dates from *in situ* animal bone articulations in the Outer Arc (see Table 2) that would seem to make the Chalk Hill Plain bowl especially early, like the enclosure itself.

None of the sherds amounted to a complete vessel; fresh and abraded sherds were also often mixed, and the pot frequently derived from the carbon rich deposits of the Inner and Middle Arcs, along with burnt and unburnt flint artefacts and occasional animal bone. Together with token amounts of mixed material being taken from a 'midden' or storage area, then, the ceremonial breakage of pot at some stage cannot be ruled out. In this respect, conjoining potsherds from Outer Arc feature F3016 (Segment 4; Sherd group 262) with pits F1370 and F1358 (Sherd groups 93 and 98) in Segment 5 are especially noteworthy, even suggesting possible curation of these objects for later deposition. This sort of activity has been inferred from pottery and other material deriving from clusters of intercutting pits examined by Garrow *et al* (2005). Alternatively, the possibly conjoining of sherds in feature F3016 (Sherd group 264) with some from feature F1181 (Sherd group 84) might simply point to derivation of the mixed deposits therein from the same primary source. Regrettably, it has proved impossible because of the condition of the pottery at Chalk Hill to test for its use via lipid analysis, so further questions such as whether or not pots were used and discarded, or made especially for 'votive' deposition, for example must remain open.

Animal bone

Certainly, meat was being processed and presumably consumed at or very near the enclosure. The fact that the animal bone was rarer among Inner and Middle Arc deposits, and tended to be burnt, is possibly significant, but may have been caused by variant post-depositional processes. In the Outer Arc, domestic cattle, pig and sheep/goat are all represented, but it is the cattle element

that dominated. A dairy herd is implied, with evidence of consumption (cut marks and localised burning are diagnostic in a number of cases) and deposition of single joints as well as large numbers of animal parts, the most striking example being the large quantity of cattle femora in deposit D59 (feature F1298) in Segment 5 of the Outer Arc. Whether individual bones and articulations signify individual meals or token amounts of larger feasts and sacrifices must again remain an open question, although the masses of animal bones, including several mixed with human remains, in Segment 5 of the Outer Arc, are suggestive of quite large scale ceremonial events. On the other hand, the single wild animal bone, a roe deer tibia in feature F1304 in Segment 5 of the Outer Arc, is an interesting anomaly for the site, pointing to hunting rather than animal husbandry. Indicating broadly contemporary exploitation of another natural resource, the shellfish deposit in Segment 2 would appear to be particularly noteworthy, being a very rare inclusion for such sites (see comparison, below).

Human bone

Human remains from the enclosure were restricted to three separate deposits at approximately the same level in Segment 5, not counting a conjoining skull fragment in an upper deposit (D1451; pit F1661) that was probably residual (or could it have been curated, and deposited at a later date, *cf* conjoining pot sherds considered above). A small fragment of human bone deposit D1538 from pit F1318 (Outer Arc Segment 5), possibly part of a vertebra, was reported as having a 'clean, sharp cut' potentially representing some form of ceremonial modification (perhaps de-fleshing, partial cremation or cannibalism).

Comparison of deposits with those from similar sites

Generally speaking, the types of material recovered from pits forming the causewayed enclosure at Chalk Hill are typical of the suite of artefacts generally found within causewayed enclosures locally (Hart 2007; Moody and Hart 2008; Moody 2008, 65-6), regionally (*eg* Allen *et al* 2008; Robertson-Mackay 1987; Drewett 1994), nationally (*eg* Pryor 1998; Whittle *et al* 1999; Mercer and Healy 2008) and internationally (Varndell and Topping 2002). Finds from these sites predominantly include worked flint, broken pottery, animal bone and human bone. There may also be some more detailed qualities of the assemblages that are not 'typical'.

While the overall proportions of debitage and reworked flint and tool types at Chalk Hill is typical of sites where large assemblages have been recovered (*cf* Kingsborough, Sheppey, where Butler and Leivers report a 'very typical' range of artefacts (2008, 260, citing Saville 2002)), the fact that this approximate proportional representation remains true at overall assemblage level, between different arcs, and even within particular assemblages (especially the apparently freshly knapped deposits in early pits in Outer Arc Segments 3 and 5) is surely of note. While this would seem simply to imply a 'general' level of debitage produced for the production of more 'finished' objects, it does not explain why a quite constant small proportion of retouched material should be included in debitage deposits, especially if they are primary. Could the more finished (and perhaps used) tools be 'token' inclusions, of some sort?

Yet it is the burnt flint debitage and tools recovered from the carbon rich mixed deposits at Chalk Hill that would seem to be a significant anomaly worthy of more in-depth discussion. No such burnt artefacts are reported from Combe Hill (Musson 1950, 115; Drewett 1994, 17), Offham (James 1977) or Whitehawk (Ross Williamson 1930, 72-9; Curwen 1934, 121-3; 1936, 80-3; Underwood 1996, 49-50) in East Sussex. Neither burnt flint debitage and or tools are mentioned in early reports of mixed deposits from nearby Court Stairs Lodge (Hart 2007; Moody and Hart 2008; Moody 2008, 65-6), a local variation on a theme, perhaps (flint from the broadly contemporary pit complex at Westwood also appears to have been entirely unburnt (Devaney and Bradley 2008, 85-9)).

Moreover, to the north and west, burnt debitage and tools do not appear in reports on the enclosures at Kingsborough, Sheppey (Butler and Leivers 2008), and burning is not noted within the substantial assemblage from the Staines enclosure (Healey and Robertson-Mackay 1987, 95-118). Less than 7 per cent of the 'flint artefacts' from Orsett, Essex, are reported as showing 'clear traces of fire damage' (Bonsall 1978, 255), but it is not clear from the text whether this describes burnt unworked flint or burnt debitage and tools. Indeed, it would appear that what is a prominent feature of the Chalk Hill assemblage is apparently either not present at causewayed enclosures further afield (*eg* Etton (Middleton 1998) and Windmill Hill (Pollard 1999a)) or are considered negligible (*eg* Hambledon Hill (Saville 2008)). A closer parallel to the Chalk Hill burnt flint tools and debitage from mixed carbon rich material can be seen in deposits derived from pit clusters at Kilverstone, Norfolk (Garrow *et al* 2005).

The inclusion of Carinated bowls in the Chalk Hill mixed deposits is also reminiscent of the very early burial (dated 4220-3980 cal BC (2σ)) recently excavated at Blackwall, on the lower Thames, which contained a Carinated bowl (and was associated with another), along with both burnt and unburnt flint artefacts as grave goods (Coles *et al* 2008).

Chalk Hill does not appear in the least bit extraordinary in terms of exotic and other specialised stone imple-

ments. Such items are often sporadic finds, or of a more or less fragmentary nature; regional comparanda include examples at Kingsborough, Sheppey (Leivers 2008), Combe Hill (Musson 1950, 116), Offham (Cartwright 1977) and Whitehawk (Ross Williamson 1930, 80; Clark 1934, 121-3; Curwen 1936, 87) in East Sussex and Staines, Surrey (Robertson-Mackay 1987, 118). Some objects in this general category can derive from more singular and probably 'placed' or structured deposits, such as three polished axes at Combe Hill (Drewett 1994, 13-15, figs 11-12) and the ground axe fragment associated with animal bone at Kingsborough (Leivers 2008; Knight 2008, 262).

Turning to the pottery, Carinated bowl also formed part of the assemblage within the segments of the causewayed enclosure at Court Stairs Lodge (Moody and Hart 2008, 2). This lies south-east of the Chalk Hill enclosure on the opposite side of the dry valley overlooked by both. Whether the Court Stairs Lodge material was similarly mixed in the sense of having been derived from a long-used 'midden'-like source is potentially of great importance in relating the two sites, which could possibly have been used for the deposition of material derived from the same primary deposit(s). Carinated bowl has also been recovered from a pit excavated during the 'Thanet Earth' excavations, some 7.7km to the north-west of the Chalk Hill enclosure, associated with a mass of charred grain, hazelnuts etc (Jon Rady, pers comm). No Carinated bowls were recovered from the enclosures at Kingsborough but the authors of the report posit pre-enclosure activity there on basis of redeposited radiocarbon dated charcoal (Allen and Bayliss 2008, 267), and cite the Chalk Hill material as 'fragmentary or residual' (Gibson and Leivers 2008, 252). 'Residuality' of Carinated bowls at Chalk Hill should be qualified, however, given that mixed deposits from an alternative primary context (apparently of considerable longevity) seem to have found their way into causewayed enclosure contexts.

The Plain and Shouldered bowls at Chalk Hill seem at least latterly to have been contemporary with different pottery profiles locally, regionally and nationally, and appear to fit within a mosaic of differences in style and distribution. Other than Carinated bowl, Court Stairs Lodge produced both Plain and some burnished Decorated bowls (Moody 2007), and recently excavated pit complexes at Westwood on Thanet (Edwards 2008) also produced 'Mildenhall' pottery. The pottery from the two causewayed enclosures at Kingsborough, Sheppey, was again generally of the 'Mildenhall' decorated style (Gibson and Leivers 2008, 251). While, therefore, the pottery contemporary with the Chalk Hill enclosure seems to fit within a broad pattern, it seems to differ from the potentially contemporary assemblage at Court Stairs Lodge and that at least some of the Plain bowl, through association with radiocarbon dates from *in situ* samples, would appear to be at the early end of the date range for this type of material. No early middle Neolithic pottery was found at Chalk Hill (or Court Stairs Lodge or the Kingsborough enclosures); this differs from Staines (Whittle 1987), Combe Hill and Whitehawk (Piggott 1950), where later enclosure features included sparse Ebbsfleet elements.

The deposition of disarticulated human remains (particularly skulls) is not untypical of causewayed enclosures, but some of the treatment undergone by the Chalk Hill specimens in Segment 5 of Outer Arc is perhaps especially interesting. All three of the main human bone deposits were mixed with or in very close proximity to animal bone. Had this material already been mixed at some earlier stage of a ritual or funerary sequence? Apparently carefully combined human and animal bone deposits are reported from Windmill Hill (Pollard 1999b; 40; Whittle, Grigson and Pollard 1999, 89), and are mentioned as having been found in proximity along with other 'occupation deposits' at Staines (Robertson Mackay 1987, 36-8) and possibly at Whitehawk (Ross Williamson 1930, 88-96). More particularly, Whitehawk produced evidence of charred human cranial fragments in association with what was considered to be a 'hearth' in the centre of a segment of the third ditch; Curwen considered these highly suggestive of cannibalism (1934, 112). Whatever practice such deposits represent, their qualities are distinctly reminiscent of the charred cranium (D1387) and the cranium with cut marks (D1538) associated with animal bone and carbon rich material at Chalk Hill. In terms of the disturbed or curated conjoining skull fragment in Segment 5 (D1451), it is worth noting that long bones apparently from the same individual were found in different circuits of the Staines enclosure (Robertson-Mackay 1987, 36), suggesting some sort of complexity in depositional process, whether anthropogenic (curatorial or moved from another primary deposit) or the work of scavengers, for example, none of which can be ruled out at Chalk Hill.

The profile of domesticated animals represented at Chalk Hill is again generally in keeping with those found at similar sites (*cf* Drewett 1994, 22-3); conditions at Kingsborough, Sheppey had not preserved a comparative sample, and the Court Stairs Lodge assemblage awaits detailed examination at the time of writing. Where conditions are right for the survival of evidence, activity at these sites very clearly bears the stamp of a largely pastoralist lifestyle, as well as attendant more specialised activities like sacrifice/feasting. The placement of complete cattle skulls at both Chalk Hill (Segment 3; upper deposits) and Court Stairs Lodge (Moody and

Types	Qualities	Notable contexts and material	Suggested activity
1: Cache?	Large assemblage of worked flint dominated by flakes, blades and cores with some re-touched material, all in clean and apparently freshly knapped condition; a small amount of (articulated?) animal bone and/or pot may also be present; deposits probably or definitely truncated, perhaps during efforts to relocate them, backfills of reworked chalk rubble with occasional 'residual' finds also suggest repeated relocation of buried resources. (NB: anything from microwear on this?)	This type of deposit is most obviously associated with the earliest deposits of early elongated pits in Outer Arc, Segments 3 and 5 (although 11 flint scrapers found at the terminal of Middle Arc, Segment 6 are also noteworthy). The best preserved example this type of deposit is the contents of pit 1667 (D55 etc) in Outer Arc Segment 5; some smaller separate concentrations possibly once formed larger deposits selectively disturbed through recovery; with only occasional 'residual' finds, Outer Arc Segment 1 could therefore represent a more complete recovery of cached objects (e.g. pit 2025 targeted by pit 2019?). Outer Arc: Segment 3/D1586; D1632; D1312; D1291; D1288; Segment 5/D55 etc; (Middle Arc: Segment 6/ D1305?).	Potential caching: concealment and recovery; complete 'life-cycles' of working of flint represented: not just completed artefacts (cf. ethnographic parallels). Association of animal bone and/or pot may represent 'closure' or other sacrificial deposit and crossover with type 3 (see below).
2: Token midden deposit?	Mixed deposits often including burnt material (especially burnt worked flint), apparently derived from a midden like primary context (?), also often includes Carinated Bowl (CB) mixed with Plain Bowl, and various mixtures of burnt worked flint, animal bone, carbon and in one case a mass of shellfish; also some evidence of scavenging (coprolites and gnawing) suggest another primary context? Mixed abraded and 'fresh' sherds might also be significant.	This type of deposit seems to be found across most of the monument and is exemplified by the contents of Outer Arc, Segment 2 (although potential Segment 4 may have been another significant Outer Arc focus). Inner Arc: Segment 1/ D1045 (CB); Segment 3/D1055; Segment 5/D1086 (carbon concentration); Segment 6/D1107; D1113 (CB); D1121 (CB); D1140 (CB); Segment 7/D1123 (CB); D1125; Segment 10/D1145 (CB); D1146 (CB); D1178 (CB); Middle Arc: Segment 1/D1041(CB?); Segment 2/D1035 (CB); Segment 3/ D1013; Segment 6/D1305; Segment 7/D1305; D1223; D1221; D1349; Outer Arc: Segment 2/D1193/D1180 (CB; shellfish, coprolites); Segment 3/D1272; Segment 4/D40; Segment 5/D62; D61; D73; D1301; Other: Pit 1436/D1435; Pit 1628/D1627.	Token deposits derived from an alternative primary context, perhaps of much greater longevity (Carinated Bowl components); cf. Court Stairs Lodge. This again may represent a distinct type of 'closure' or votive activity.
3: Contemporary	Articulated animal parts, specific animal parts or concentrations of certain bone types, often with signs of cooking/burning and/or within carbon rich layers; articulations and concentrations suggest different provenance and placement from type 2.	Outer Arc: Segment 2/D1473 (cattle cranium and other bone including articulations mixed with mass of sheep/goat bone, further cattle cranium in backfill suggests spatially focussed deposition of the same material); Segment 5/D1259; D52; D1447; D1414; D1430; D47; D45; D1258.	Specific sacrifice/votive and potential 'closure' with fresh or cooked animal parts associated with particular feasting/sacrifice events.
4: Contemporary mixed with curated human elements?	As above but mixed disarticulated (curated?) human concentrations associated with small amounts of worked flint (as above but distinguished by the human elements).	Outer Arc: Segment 5/D1387; D1538; D59 (three separate deposits).	Perhaps a particular variant of type 3, with further connotations (eg 'apotropaic').

Table 45. Proposed taxonomy of 'placed deposits'.

Hart 2008, 2; near the base and terminal of a segment) is interesting, and while the degree to which skulls were considered more or less symbolic than other parts of the animal is unknowable (*cf* Moody 2008, 65), placement in both cases is suggestive of ritualised actions.

The mineralised dog faeces recovered from mixed deposits in feature F1181 at Chalk Hill seem to provide evidence that the rest of the material lay in the open long enough for scavenging to take place, perhaps further evidence of its derivation from a separate primary source. Exactly how these animals related to society is not known; only their presence is attested at Chalk Hill and elsewhere. Dog teeth and a fragment of lower jaw were recovered from ditches at Whitehawk in the 1930s (Jackson 1934, 129; 1936, 90), and dog bones made up 2.3 per cent of the animal bone assemblage from the Staines enclosure ditches (Robertson-Mackay 1987, 123-4, tables 25 and 26); a single canid foot bone was recovered from Segment 2 of the outer ditch at Offham in the 1970s (O'Connor 1977, 230, 232).

The ratio of domestic to wild animals at Chalk Hill also compares well with other enclosures. An apparently careful burial at Whitehawk of a whole roe deer in a pit cutting the fourth ditch led Curwen to suspect an overtly symbolic 'placed deposit' (1934, 102). The single roe deer bone in an early pit (1304) in Segment 5 of the Outer Arc at Chalk Hill, however, along with at least some of the damaged arrowheads variously found across the site, more likely reflect a not entirely agricultural or pastoral lifestyle on the part of those who dug the enclosure pits, with some continuation of exploitation of natural resources, as we might expect.

On the other hand, the mass of marine mollusc shells (mixed with pottery and animal bone in a carbon

rich deposit) in feature F1181 (Outer Arc Segment 2) may have been considered until very recently a distinct rarity. In fact, in terms of causewayed enclosures regionally, only the inner ditches at Whitehawk had produced marine molluscs in quantity, notably from apparently carbon rich deposits of mixed material (Ross Williamson 1930, 61; 85; Kennard 1936, 91-2). Sporadic cockle shells were also reported from Combe Hill (Jackson 1950, 114). The excavation of the Court Stairs Lodge enclosure produced considerable deposits of shellfish, however, again largely mixed or directly associated with other cultural material (Moody 2007; Moody and Hart 2008; Moody 2008, 65-6), suggestive of kind of connection between the two Ramsgate sites.

In this respect, we might wonder if these sites could have been used for different purposes by the same people; a hypothesis put forward for the Kingsborough 1 and 2 enclosures was that they may have been used for more public 'land-oriented' and more private 'sea-oriented' ceremonies/activities respectively (Allen and Leivers 2008, 309-11). Following this scenario, we might understand the Chalk Hill enclosure to have opened in an inland direction, while the suggested arc at Court Stairs lodge appears to have opened towards the south, and the sea (see Moody 2007, fig 2).

Proposed taxonomy of 'placed deposits'

If spatially focussed combinations of different classes of object and suggested variations of provenance are taken into account, the Chalk Hill segments seem to incorporate 'placed deposits' which fall into broadly defined classifications: clean worked flint 'caches', mixed and burnt deposits derived from a midden-like primary context, articulated animal parts, specific animal parts probably associated with particular feasting/sacrifice events and animal bone mixed with disarticulated (curated?) human elements (Table 45). These provisional classes of deposit can be tentatively related to diverse activities (or a combination of ceremonial behaviours) taking place within the focus of the Chalk Hill enclosure.

Spatial emphasis?

The Chalk Hill enclosure shares many of the spatial traits seen at other causewayed enclosures. There are indeed potential spatial emphases to consider in terms of the deposits, both in the patterning of certain materials within and between particular segments and arcs, and in the deliberate grouping (spatial combination) of particular materials. A detailed quantitative analysis of such aspects is beyond the scope of this study, but a brief qualitative assessment certainly suggests patterning. This would include, for example, the considerable variation between the quantity and degree of burning of animal bones between the Inner and Middle Arcs and the Outer Arc, which, although potentially reflecting variant taphonomy, could equally mark a deliberate symbolic and/or functional spatial bias. Moreover, despite the limited sample we have of the enclosure as a whole, the concentration of animal bone in the northern features of the Outer Arc, particularly of cattle skulls in Segment 3 and mixed (or carefully combined/structured?) human and animal bone deposits in Segment 5, the mass of marine molluscs in Segment 2, and the fresh flint deposits in Segments 3 and 5, are all suggestive of spatial emphasis in deposition. This apparent focussing of deposits on given segments would accord with the idea of 'aspect' as a regular quality of causewayed enclosures, suggested by Philippa Bradley in relation to the example at Staines (2004), but could again equally reflect certain temporary loci for short-term dwellings or particular work, albeit perhaps idealised through 'structuring' of deposits.

The more mixed deposits noted in Inner and Middle Arcs should probably also be included here, especially if derived from a special 'midden' or area for burning, as while such deposits might not qualify as 'placed' or 'structured' in the same way (*cf* Garrow *et al* 2005, 144; Allen *et al* 2013, 492-5), they might still reflect specialised selection, modification and deposition. The fact that many of these deposits were located in features forming the Inner and Middle Arcs could suggest that some sort of communal area of burning/midden focussed at the 'centre' of the enclosure, or rather in the place where the enclosure later developed, if the material pre-dates its inception. Alternatively, the concentration of burnt material in deposit D40 (feature F3016; Outer Arc Segment 4) might indicate proximity to at least one focus from which such material could have been derived.

Spatial emphasis was also noted from a more localised perspective; it was noted that concentrations of finds in these Inner and Middle Arc segments, particularly of flint artefacts which may shadow the location of organic artefacts that have not survived, were often located at the termini of Inner and Middle Arc segments. Focus on segment terminals can be inferred at Court Stairs Lodge (Moody and Hart 2008, 3), and was a repeated practice noted at Staines and Etton, for example (Robertson-Mackay 1987; Pryor 1998). Indeed, it is one of the reasons for interpreting such material as deliberately 'placed'. Also at the level of individual deposits, perhaps the designation 'structured deposit' accords best at Chalk Hill with the human and animal deposits in Segment 5 of the Outer Arc, although it should be said that the same evidence could again have been produced by different scenarios; either careful placement of these materials together in the pit, derivation from a previous-

Phase of activity	Foci	Deposit characteristic	Relative/Absolute dates	Stratigraphic evidence
Earliest Neolithic use of the site?	Possible structures/early pits of Outer Arc/unknown features?	Carinated bowl	40th to 39th century BC	Residual pot? A dumping/ storage/ mixing area for material suggested?
Earliest known use of Outer Arc?	Elongated pits in segments 1–5	Segment 1 deposits too disturbed; flint 'knapping deposits' or caches and occasional animal bone and pottery in segments 3 and 5	3800–3650 cal BC (4952±33 BP; OxA-15448)	Early pit (1667) in Outer Arc segment 5
			3750–3630 cal BC (4885±40 BP; GrA-30882)	
				Early pit (1574) in Outer Arc segment 3
Continued use of Outer Arc?	Smaller pits and possible post-holes in segment 1, larger in the case of segments 3 and 5	Infrequent deposition/re-deposition of flint, pottery and bone in segment 1; largely sterile chalky fills in segment 3; increased combinations of unburnt animal bone, human bone, pottery and worked flint in segment 5	3770–3640 cal BC (4912±31 BP; OxA-15543)	Early or secondary pit (1440) in Outer Arc segment 5
			3800–3650 cal BC (4949±33 BP; OxA-15449)	Secondary pit (1304) in Outer Arc segment 5
			3780–3640 cal BC (4925±28 BP; GrA-30888; OxA-15509)	
			3800–3640 cal BC (4935±40 BP; GrA-30886)	Secondary pit (1672) in Outer Arc segment 5
			3780–3630 cal BC (4910±40 BP; GrA-30885)	
			3770–3640 cal BC (4911±31 BP; OxA-15544)	Secondary pit (1298) in Outer Arc segment 5
			3750–3530 cal BC (4885±50 BP; GrA-30884)	
			3710–3630 cal BC (4874±33 BP; OxA-15390)	Secondary pit (1358) in Outer Arc segment 3
Formalisation into concentric arcs of more shallow linears (either separately or all at once)?	Inner, Middle and Outer Arcs; features 1181 and 3016?	Mixed burnt/midden deposits in Inner and Middle Arcs and features 1181 and 3016; F1181 included a significant shellfish deposit and two dog coprolites, perhaps indicating prolonged availability of material to scavengers	3710–3540 cal BC (4867±36 BP; OxA-15391);	Linear forming Inner Arc segment 3;
			3640–3370 cal BC (4750±32 BP; OxA-15447; 4730±40 BP; GrA-30880)	
				Stratigraphically late linear cut of Outer Arc segment 3
Final features	Post-holes and/or pits cutting the upper deposits of Inner, Middle and Outer Arc, post-hole/pit alignment? Features 1181 and 3016?	Some post-hole/pits cutting upper deposits of arcs and one in the alignment contain potential placed deposits of flint		Stratigraphic and/or morphological factors

Table 46. Potential overall phasing of the Chalk Hill 'causewayed enclosure'.

ly mixed deposit, or perhaps fortuitous sorting of the material through disturbance of an earlier feature containing both elements.

The reconstruction of an overall scheme of deposit patterning (*cf* Bradley's approach to Staines (2004)) for the Chalk Hill enclosure would depend on relativity, and (therefore) on contemporaneity of deposits in a monument that had been constructed and all used at the same time. But was it?

Phased development model

A speculative framework for the gradual formal development of the Chalk Hill enclosure can be suggested on the basis of stratigraphic relationships and feature morphology (Table 46). By implying that early pits of Outer Arc of the enclosure may have preceded later formalisation into three arcs, this model contradicts the suggestion 'that inner circuits were the first element of a given layout' (Allen and Bayliss 2008, 268).

In the developmental scenario outlined here, the deepest and potentially earliest pits dug in the Outer Arc (elongated pits F2091, F2071/2086 and F2037/2054 in Segment 1, F1574, F1384 and F1370 in Segment 3, and

F1667 in Segment 5) may have formed an initial group of smaller segments forming the first arc of the enclosure to be built. The early pits in Segments 3 and 5 of the Outer Arc produced the earliest radiocarbon dates, derived from animal bone articulations (although this of course may reflect taphonomic variability). If Neolithic at all, the enigmatic 'horseshoe' shaped arrangements formed by features F1308/1626 and F1069, F1071 and F1073 respectively (possible structures) could have belonged to this phase, enclosed by the nascent Outer Arc. Early pits of the Outer Arc evidently formed the focus of repeated pit-digging, which gradually formed larger segments (the pits were noticeably smaller in Segment 1 than in Segments 3 and 5), before general and much shallower clearance of Outer Arc segments took place. This could have been contemporary with construction of the shallower Inner and Middle Arcs of linear features, perhaps formalising the space further into a system of three concentric arcs.

Much of the Inner and Middle Arc features may have been lost to erosion and that these may once have formed much more robust 'segments'. Despite heavy truncation, some of these produced evidence of intercutting features. Divergence of north-east Inner Arc segments also suggests modification of the enclosure. A latest phase, represented by smaller discrete pits/post-settings, but now focussed on the segments of all three arcs, can be postulated, perhaps incorporating the pit/post-hole alignment between Inner and Middle Arcs, which seems to have been aligned slightly differently. Segment 4, lying between Segments 3 and 5 of the Outer Arc (F3016), rich with cultural material, could also be attributed to one of the later phases. Various other internal features, including many small pits/post-settings and shallow scoops of uncertain chronology in themselves, could belong to any of the aforementioned proposed stages of development.

It is also possible to suggest a phasing of deposit types, broadly articulating with the potential phasing of causewayed enclosure features already proposed. The early pits of the Outer Arc, particularly of Segments 3 and 5 (those in Segment 1 were more heavily truncated) were perhaps the focus for large 'caches' of worked flint (predominantly knapping waste in features F1574, F1384, F1370, and F1667) more of which was no doubt redistributed into later features in the same segments through the next phase of pit-digging. The larger of these later pits in Segment 5 of the Outer Arc (F1318 and F1298) produced the human bone deposits (all mixed with animal bone) and heavy concentrations of cattle bone in particular, sealed by carbon rich fills. The two cattle skulls and a mass of sheep/goat bone from Segment 3 both derived from the remnant of an extensive pit cut to a similar depth (F1683). The Inner and Middle Arcs, whether contemporary with the Outer Arc or not, were characterised by mixed and generally heat-affected flint, pottery, occasional animal bone and carbon rich deposits. The same would apply to the material contained within features F1181 and F3016 of the Outer Arc, the former also being the focus for the large shellfish deposit, the latter for further pottery, burnt flint and animal bone in a carbon rich matrix.

Taking all of the foregoing into account, the overall development of the Chalk Hill enclosure and its deposits could therefore have been as presented in Table 46. This model must undoubtedly be over-simplified, however, and phases of activity are perhaps better considered a continuum with considerable overlap between phases, particularly in terms of deposit types. It should be reiterated then that this is only one model and that the evidence clearly affords alternative narratives. It is clear, for example, that concurrent use of the entire enclosure with only minor development over a very brief period could have produced the same set of radiocarbon dates, as could digging of adjacent segments at different times or in an overlapping sequence (*cf* radiocarbon dates for Segments 3 and 5 of the Outer Arc in particular). A set of diverse but contemporaneous activities, perhaps forming part of a scheme of symbolic deposition and recovery, is a more convincing interpretation of the Chalk Hill evidence.

Discussion

Most of the more convincing recent accounts of causewayed enclosures incline towards an understanding that ritual, ceremonial, symbolic and ideological facets of human culture are not separate from but form part of multifarious activities occurring on such sites (see for example Pryor 1998, 363ff; Whittle and Pollard 1999; Oswald *et al* 2001, 123-32; Mercer and Healy 2008, 744-80). This seems to reflect an ethnographically informed approach. The problem of past scholarly emphasis on ritual (critiqued by Russell (2004)) perhaps actually arises from what is essentially a taphonomic issue. The very nature of the archaeology of such sites means that they primarily preserve evidence of certain apparently specialised activities that took place in them; the deliberate placement of selected materials into specially dug pits within a symbolically defined space. However, just like any other specialised feature (including burials), the pits and segments of causewayed enclosures do of course also provide more indirect evidence for what some might see as separate categories of human behaviour, such as settlement, diet, trade and exchange. If culture-centric separation of 'domestic vs ritual' (*cf* Saville 2002; 2008; Russell 2004; Bradley 2004) is avoided it becomes possible to present a more holistic reconstruction of semi-sedentary people developing and using the Chalk Hill site in the early Neolithic, no doubt as part of an increasingly 'imposed' landscape (*eg* Thomas 2004, 174; Edmonds 1999, 140).

We can envisage seasonal or otherwise temporally arranged gatherings at this specified and gradually more modified place, perhaps originally within a natural clearing or less densely forested space, and perhaps the beginnings of increasingly indirect and symbolic caching behaviours, including returning to and recovering objects for symbolic re-use. The Carinated bowl component seems to put the first use of the site within what has been called the Carinated Bowl Neolithic (40th or 39th century BC; Sheridan 2007). The enclosure at Court Stairs Lodge also produced Carinated Bowl as well as morphologically similar features. Such meetings or visits might have been sporadic, initially perhaps an informal locus for loosely affiliated hunting and increasingly pastoral groups, involving only a few people at any given time. Alternatively they could have been on a larger scale, straight away bringing together dispersed groups and fuelling a shared identity, perhaps involving temporary dwellings and activity areas laid out in a traditional way. It is not at all impossible that early features, perhaps of the Outer Arc, simply reflected such spatial foci, rather than monumentalising them as a purely symbolic expression. Repeated visits and development in ideas could have increasingly formalised the space into a ceremonial place delineated with at least three arcs and a pit/post-hole alignment, as well as other features that have left little or no trace.

The view of the use of such sites put forward by Isobel Smith (1965, 19) is applicable to the Chalk Hill evidence, therefore. Such gatherings would have been perfect occasions for all sorts of integrated activities, including trade and exchange, rites of passage, sacrifice, feasting and even aspects of funerary rites, much or all of which would have generated considerable amounts of either new or used material.

And these gatherings were certainly also marked, perhaps for example at the close of particular events, by the burial of either token or quite large amounts of the material they generated, within certain pit foci or specific parts of segments. Most of those materials that have survived post-depositional processes do not intrinsically suggest ceremony (the human remains are surely the exception here); however, even apparently mundane 'domestic' material culture is known to be a highly symbolic 'text' in human societies, the more so when it has undergone transformative emphasis via specialised deposition (maybe with increasingly symbolic caching at Chalk Hill). Such materials could also have been formed in a specialised social context that has left no direct trace, such as rites of passage and associated feasting, as has been suggested for Kingsborough (Allen *et al* 2008) and other enclosures (*eg* Pryor 1998). Certainly the mixed deposits associated with the Inner and Middle Arcs and features F1181 (Segment 2) and F3016 (Segment 4) of the Outer Arc, containing burnt flint, mixed pottery sherds, animal bone (and in one case a marine mollusc concentration) suggest a specialised and potentially curated deposit, seemingly derived from an already mixed primary source. This particular type of Chalk Hill deposit can be suggested at certain sites elsewhere, most notably at nearby Court Stairs Lodge, but also at Whitehawk in east Sussex, at Staines in Surrey, and even in pit complexes as at Kilverstone in Norfolk.

6

Discussion: Chalk Hill in its prehistoric and historic context

Peter Clark

The topography and environment of Chalk Hill through time is a complex subject. Following the inundation of Doggerland in the earlier part of the Holocene, Thanet has been subject to a long process of coastal erosion and deposition that is not yet fully understood (Moody 2008, 26-34). Substantial parts of the northern side of the island appear to have been lost since the later Mesolithic period but Pegwell Bay seems to have attained its current position during the Neolithic, after which erosion of its shores was lessened through the development of the Stonar Bank and the Sandwich Bay spit. The relationship of Chalk Hill to the sea during the Neolithic and later periods may not therefore have been so different to today. As to the palaeoenvironment of the site through time, the chalky soils have not favoured the survival of relevant biological materials, in particular pollen, which would help us address this problem. We do not know, for example, if the Neolithic features were constructed in open land, cleared of trees or in a clearing in woodland ('The majority of causewayed enclosures on high ground were probably located in fairly small clearings in woodland…' (Oswald *et al* 2001, 104)). For the moment, then, this must remain speculative.

A 'causewayed enclosure'?

The arcs of pit clusters at Chalk Hill have been described as a 'causewayed enclosure' in a number of interim statements (*eg* Shand 1998; 2001a; Dyson *et al* 2000; Bayliss *et al* 2011a, 371-6). This term however encompasses a wide range of monuments of varying morphology, date and no doubt function. Although recognised in Britain from the early part of the 20th century at Knap Hill in Wiltshire (Cunnington 1909; 1911-12), the first 'causewayed enclosure' identified in north-western Europe, however was at Peu-Richard in Charente-Maritime, France in 1882 (Eschasseriaux 1884a; 1884b; Joussaume and Marsac 1977, 21). The classic type site for this monument class in Britain is Windmill Hill in Wiltshire, first excavated in the 1920s and 1930s (Kendall 1923; Keiller 1934) with smaller campaigns in the 1950s and 1980s (Smith 1958; 1959; 1965; Whittle *et al* 1999a; 1999b). Windmill Hill was to set the definition of the monument class; 'A roughly circular or oval area surrounded by one or more discontinuous circuits of bank and ditch' (Oswald *et al* 2001, 1). By 1930 Curwen could put forward sixteen possible sites that might be considered as candidates for causewayed enclosures, and by 2011

nearly 140 probable or possible sites in southern Britain could be suggested (Whittle *et al* 2011b, 5; fig 1.2).

'Causewayed enclosures' are also found right across central and north-western Neolithic Europe, in France (*eg* 'Mont d'Hubert' at Escalles and 'Rue Jacques Cartier' at Lauwin-Planque (Nord-Pas-de-Calais; Praud 2015; Bostyn *et al* 2006), 'Chez Reine' at Semussac and 'Peu-Richard' at Thénac (Charente Maritime; Mohen and Bergougnan 1984; Pautreau 1974; Joussaume and Marsac 1977) and 'Le Gros Bost' at Saint-Méard-de-Drône (Dordogne; Burnez *et al* 1991). In the Low Countries, sites include those at Darion in the Geer valley (Keely and Cahen 1989) and Thieusies in Hainault (Vermeersch and Walter 1975; 1980), and many sites are known in Germany, such as Heiningen in Niedersachsen (Braasch and Moeller 1994; Geschwinde and Raetzel-Fabian 1998), Bruchsal-'Aue', Baden-Württenberg (Seidel 2014; Behrends 1994) and Büdelsdorf, Schleswig-Holstein (Hingst 1975; 1981). About 40 potential sites are known in Scandinavia (Nielsen 2004; Andersen 2002), notably the complexes at Sarup (Andersen 1997) and the site at Lønt in Haderslev (Jørgensen 1988). Outliers to this distribution may be found in Ireland, where as yet just two potential candidates exist, that at Donegore, Antrim (Mallory and Hartwell 1984; Mallory 1993; Cooney *et al* 2011, 564-74) and at Magheraboy, Sligo (Danaher 2007; Danaher and Cagney 2005; Cooney *et al* 2011, 574-85), with other possible examples in the Iberian peninsula (Márquez-Romero and Jiménez-Jáimez 2013).

The term 'causewayed enclosure' itself focuses conceptually on the gaps between the 'ditches' (the 'causeways') and the notion of enclosure. Certainly all of this is fitting and proper for many of the monuments classified as causewayed enclosures, but a glance at Oswald *et al*'s 2001 survey of British causewayed enclosures shows that there is great variability in what might be understood by this type of monument. There is perhaps room to develop a more nuanced understanding of the phenomena that have been placed together in this catch-all classification.

Both the British and continental monuments encompass an enormous variation in size, morphology and topography. They vary in size from the small enclosure at Radley, Oxfordshire, just 50 metres across with an enclosed area of just under 0.2 hectares (Oswald *et al* 2001, 73, fig 4.22) to the huge site of Urmitz near Koblenz, Germany which encloses an area of around 120 hectares (Lehner 1910). The largest causewayed enclosure in Britain is probably that at Crofton, Wiltshire with an enclosed area of around 27 hectares (Lobb 1995), though most British causewayed enclosures fall between *c* 0.4 and *c* 10 hectares in area (Oswald *et al* 2001, 72-5). The enclosures also vary in shape enormously, assuming 'the form of a circle, an oval, a spiral, a triangle, a large D-shape, or a keyhole' (Andersen 2015, 797). Indeed, it is not always clear that the term 'enclosure' is appropriate at all in many cases; often the lengths of interrupted ditches do not describe a full circuit; perhaps just 35 per cent of known enclosures have complete or nearly complete circuits (Oswald *et al* 2001, 61). Many of the plans of causewayed enclosures, particularly those plotted from aerial photographs, show incomplete arcs of interrupted ditches, as at Dorney in Buckinghamshire (Carstairs 1986, 164), Landbeach in Cambridgeshire (Oswald *et al* 2001, 63, 150), Southmore Grove in Gloucestershire (Trow 1985) and perhaps Eastry in Kent (Oswald *et al* 2001, fig 4.2). However, the prevailing paradigm is that these sites are intended to be *enclosures*; 'Their shape was governed by an aim to enclose, or 'wrap', a particular area' (Andersen 2015, 797). Such incomplete stretches are therefore often interpreted as being part of a complete bounding circuit additionally formed by natural features such as steep slopes, rivers, thick woodland or other types of man-made boundaries such as fences or palisades. Alternatively, it is sometimes posited that part of the original circuit has been lost through truncation, or is concealed beneath masking overburden such as colluvium (Oswald *et al* 2001, 61-3). In many instances this may the case, but the desire to understand these sites in an over-arching interpretive model should not impede the assessment of the evidence on a case-by case basis; the heterogeneity of these phenomena might allow for a multiplicity of interpretation (Oswald *et al* 2001; Bradley 1998a).

Heterogeneity can also be seen in other structural elements relating to such causewayed enclosures. Many sites have banks associated with the ditches as at Beusterberg in northern Germany where banks are located on both the inner and outer sides of the ditches (Tackenberg 1951), though in general, where banks existed and have survived, they appear to be on the inner side of the ditches as at Barkhale Camp in West Sussex (Leach 1983) and Hambledon Hill in Dorset (Mercer and Healy 2008, 49-54). Another common feature of these sites is the presence of a palisade, sometimes very substantial and forming a dominant feature of the monument as at Sarup I in Denmark, where close-set oak posts were set in a trench on average 0.78m deep extending for 572m (Andersen 1997, 29-34), and at Catenoy (Oise) in France a palisade of individual posts was set in post-holes up to 2.2m deep (Blanchet *et al* 1984, 182). Palisades seem less common on British sites, but that at Orsett in Essex consisted of close-set posts in a palisade trench about 0.75m deep on the inside of the outer ditch circuits (Hedges and Buckley 1978, 238, fig 6).

Other variations and differences can be seen in the range of structural elements present, the types of objects and the way in which they were deposited on these sites and their topographical positions (Andersen 2015; Oswald *et al* 2001), to the point it may not be unreasona-

ble to ask if this monument classification is so loose and so broad that it is of little use, particularly in separating these particular sites from the already heterogeneous corpus of Neolithic enclosures in general (Darvill and Thomas 2001; Varndell and Topping 2002). '…as a monument type these multi-faceted enclosures still evade pigeon-holing and easy categorization. They were clearly not 'one thing'…' (Evans and Hodder 2006, 240).

Ditches

Causewayed enclosures may be understood in part as lines of ditches interrupted by gaps or causeways. However, the notion of what constitutes a ditch is moot; one might understand that a ditch should be an open feature that acts to impede or control movement of people and/or animals (whether or not associated with a bank). At Chalk Hill we might question whether the segments of the three arcs ever acted as 'open ditches' in this way. The earliest constituent pits of the segments (even allowing for truncation by later pits) appear to be discrete (*eg* segments 3 and 5).

In some circumstances ditches may be dug by excavating a series of conjoining pits which sometimes produce a characteristic 'lobate' shape to the final lengths of ditch. This technique of cutting continuous lengths of ditch is not unknown from the Neolithic and can be seen in the construction of the early phases of the inner ditch of Ring-ditch III at Monkton-Mount Pleasant, 7km west of Chalk Hill (Clark and Rady 2008, 26-7), and has been suggested for the causewayed enclosure at Orsett, Essex where the ditches appear to have been excavated as a series of large ovoid pits with a low gravel bridge sometimes separating them (Hedges and Buckley 1978, 228).

However, looking at the plan of the segments at Chalk Hill, they seem too irregular and too fragmented to be understood as stretches of ditch deliberately laid out and excavated purposively *ab initio*, by whatever construction technique. The eventual shapes of the segments may best be understood as the result of the amalgamation of a sequence of pit digging rather than the deliberate creation of 'ditch sections' (though these shapes may have been formalised in the later stages of the monument; see below).

In this regard Chalk Hill has many similarities with the 'causewayed enclosure' at Briar Hill, Northamptonshire, where the excavator noted that the development of the segments 'has more in common with pit alignments than with what is normally signified by the terms 'segments' or 'causewayed' ditch' (Bamford 1985, 130). The phase plans of the Briar Hill enclosure suggest the gradual development of segments through a process of recutting pits rather than a synchronous process of ditch creation through the digging of a series of contiguous pits (*ibid*, 131, figs 62-4).

The 'causeways' between these pit clusters may not have a particular significance in the spatial geometry of the final form of the monument overall; rather, they may be fortuitous, simply an area of undug ground between foci of pit digging. This may be reflected in the irregular length and size of particular segments, the variable size of the gaps between pit clusters themselves, the apparent merging together of initially separate pit clusters (*eg* Outer Arc Segment 1) and the minor gaps between individual pits in some clusters (though this could be a function of truncation). Similarly the presence of 'semi causeways', *ie* upstanding ridges of subsoil originally separating early pits but subsequently cut away and diminished in height by later cut features, as at sites like Briar Hill (*eg* Bamford 1985, fig 14.2, SA6/3) and Windmill Hill, Wiltshire (Whittle *et al* 1999, Middle Ditch X, fig 33, section X – Y-Z) may suggest that the ultimate size and shape of the pit clusters and the gaps between them were not necessarily part of the original conception of the monument.

Pit deposition

The pit clusters at Chalk Hill may be better understood in terms of the tradition of structured deposition in pits during the Neolithic that has been increasingly recognised and articulated over the last twenty years or so (*eg* Garrow 2006; Anderson-Whymark and Thomas 2012; Carver 2012). This phenomenon may be characterised by the excavation of pits specifically for the deposition of material, *ie* they were not dug for a primary purpose such as storage and subsequently re-used for refuse disposal. Furthermore, the material that was deposited in pits such as these often incorporate occupation material including pottery, flints, animal bone, charcoal-rich soil (including hearth material). Just over 3km north-east of Chalk Hill, a concentration of 48 pits were recorded at Westwood, near Broadstairs. Twenty-three of these were excavated, and proved to be mostly bowl-shaped in profile with dark, ashy fills containing early Neolithic flint work and pottery, and these were interpreted in this context by the excavators (Poole and Webley 2008). Sometimes such material appears to have derived from a separate, 'pre-pit' context where such material was gathered and stored (Garrow 2015, 733-4; Case 1973, 188), often characterised as a 'midden' (Pollard 2001, 323). Such 'pre-pit' deposits rarely survive in the archaeological record, though examples of Neolithic middens have been found at Ascott-under-Wychwood, Oxfordshire and under the long cairn at Hazleton North in Gloucestershire, where the make-up of artefactual and faunal material was similar to that often found in these specially dug pits (Benson and Whittle 2007, 34-5; Saville 1990, 14-16, fig 13). There

seem no hard and fast rules about what was put into such pits, and there is variation regionally and indeed within different pits on the same site. Pits seem to have been backfilled deliberately in a single action or as a possibly rapid sequence of individual fills (Thomas 1999, 64-74, fig 4.2). Materials in the pit can be mixed or deliberately 'placed' with strong spatial organisation of the material, which sometimes includes arrangements of presumably carefully chosen object types, sometimes of 'high status' (such as the complete bowls associated with a fox mandible and decorated antler comb in segment 7 at Etton (Pryor 1998, 33, fig 31) or the stone mace-head fragment deposited in a pit at Cam in Gloucestershire (Smith 1968, fig 4); we must however be mindful of the relativity of modern concepts of 'value' when thinking of such deposits).

Such structured deposition (*sensu* Richards and Thomas 1984, 190) is also characteristic of many Neolithic features in Britain, from pits to henges, long barrows to causewayed enclosures (Thomas 1999, 62-88). What the motivation for this practice was is difficult to understand and has been the subject of intense debate over many years (*eg* Bradley 1975, 30; Cleal 1984, 146-51; Garrow 2012). From the more obvious 'odd deposits' such as the child's femur inserted into the marrow cavity of an ox bone from the innermost ditch at Windmill Hill (Grigson 1999, 206, fig 161) or the bundle of ten antler picks placed in the ditch at Woodhenge (Wainwright 1979, 73, pl XXVb; Pollard 1995, 145) and that of 57 picks in the enclosure ditch at Durrington Walls (Wainwright and Longworth 1971, 22; pl Vb) to the less immediately visible 'material culture patterning' (*sensu* Garrow 2012, 104) such as that seen at Etton and also at Durrington Walls (Pryor 1998; Richards and Thomas 1984). Archaeologists have often understood this practice in terms of 'ritual' or 'symbolic' expression, often with the idea that introducing material culture into the earth is a statement of control or identification of a certain place or creating or reinforcing identity and legitimising a society's belonging to the land (*eg* Lewis and Brown 2006, 44). Alternatively, spatial patterning of different types of material or object types in more complex monuments has been seen as emphasising polarities or distinctions between life and death, gender, or 'public' and 'private' areas as at Etton and Windmill Hill (Pryor 1998; Whittle *et al* 1999). These and many other interpretations have been ascribed to the motivation behind 'structured deposition' and 'placed deposits', although more recently this has been complemented by an appreciation that the patterns seen in the archaeological record are not universally evidence of 'ritual' expression, whether conscious or unconscious. Patterning may come about because of essentially random depositional processes, a function of the 'mundane' as opposed to the 'ritual'. To what extent post-Enlightenment concepts of rational and non-rational behaviour as a mutually exclusive dichotomy is very questionable however (Bradley 2005; Brück 1999). Even habitual, every day 'mundane' practices may be themselves redolent of underlying (irrational) world views and 'ritual' understanding that may or may not impart a structure to the archaeological record and may also be carried out by individuals who learned such practices simply because 'that it is how it is done': 'It is because subjects do not, strictly speaking, know what they are doing that what they do has more meaning than they know' (Bordieu 1977, 79).

The nature of the many 'placed deposits' at Chalk Hill has been discussed above by Jake Weekes. In terms of the very specialised spatial geometry of the Chalk Hill pit clusters, it is difficult to imagine that the underlying meanings of the act of pit digging and infilling were not fully appreciated and consciously enacted by the participants involved. What the precise context and import of these actions – the '*gestes*' of André Leroi-Gourhan (1964-5) – must remain speculation at present, and with only a fraction of the monument at Chalk Hill having been excavated, and that part in the context of a rescue excavation means that a multiplicity of explanations remain possible.

Continental parallels?

The phenomenon of structured deposition in pits during the Neolithic appears to be a peculiarly insular phenomenon, however. It does not appear to be part of what used to be called the 'Neolithic package' in France for example (Cyril Marcigny, pers comm), and it is difficult to find suitable comparanda in western continental Europe. There are some pit groups of the Spiere culture (*eg* at Masnières and Corbehem (Nord-Pas-de-Calais; Bostyn *et al* 2011, 57) and the western Michelsberg culture (*eg* at Spiennes, Wange, Avin and Meeffe in Belgium (Bostyn *et al* 2011)) that may reflect intentional and structured infilling, but these are equivocal and seemingly rather unusual in the archaeological record of northern France and the Low Countries. Notwithstanding this, the existence of enclosures characterised by 'ditches' composed of elongated pits dug progressively over a period of time has been recognised at many sites throughout Europe (les enceintes à pseudo-fossé; Jeunesse 2011; 2018), which offer strong parallels with the construction of the Chalk Hill enclosure.

Further north, in Scandinavia, the existence of large numbers of Neolithic pits with 'special' or 'finds-rich' fills has long been recognised, usually in small groups but sometimes in great numbers; at Almhov in southern Sweden about 200 early and middle Neolithic pits were excavated, about half of which categorised as 'finds rich' (Gidlöf *et al* 2006; Gidlöf 2009), analogous to the 'struc-

tured deposition' found in the Neolithic pits of Britain and Ireland. Otherwise structured deposition in pits is very rarely encountered on archaeological sites in western Europe, despite over two decades of 'commercial' or 'preventive' archaeology which is thought to have led to the recognition of the ubiquity of such features in Britain and Ireland (Thomas 2012, 2). Furthermore, it is salient that the highly structured and extensive arrangement of pit clusters should occur so early at Chalk Hill. The site appears to have been laid out in around the end of the 38th or beginning of the 37th century BC, perhaps within two or three centuries of the beginning of neolithisation in Britain in the 41st century cal BC, and part of the 'surge of change' that took place in just two or three generations in southern Britain (Bayliss *et al* 2011b, 801). If this was not part of the 'Neolithic way of life' that was introduced by or assimilated from our continental neighbours, it seems a very short time for such a novel cultural phenomenon to develop on such a scale. Superficially the arrangement of interrupted cut features arranged in apparently 'concentric' arcs is reminiscent of the classic 'causewayed enclosures' familiar throughout northern and western Europe. We lack the chronological precision for these continental monuments that has been achieved for some southern British and Irish examples through the 'Gathering Time' project funded by English Heritage and the Arts and Humanities Research Council (Whittle *et al* 2011b). However, in general the causewayed enclosures of western France typical of the Chaséen, Matignon, Peu-Richard and Noyen cultures appear to date from the late 5th millennium BC, and those of the Michelsberg culture of Western Germany and eastern France to the late 5th and early 4th century (Andersen 2015, 795), somewhat earlier than the British and Irish examples.

As we have seen, the continental enclosures typically consist of interrupted ditches *per se* rather than the arrangement of pit clusters seen at Chalk Hill and Briar Hill. However, the general architecture of these continental sites may have informed or influenced the spatial layout of such sites in Britain in the 38th century cal BC. However, the quite specific nature of the Chalk Hill pit clusters requires some explanation. If the tradition of structured deposition in pits was not part of the 'Neolithic package' introduced from the continent, then what was its origin, particularly in such a monumental and highly structured way so early in the neolithisation of Britain?

Mesolithic origins?

Perhaps the practice of structured deposition in pits in the early stages of neolithisation in Britain developed from already existing practices during the Mesolithic. Examples of structured deposition in pits of Mesolithic date (*c* 7000-6500 cal BC) were found at Heathrow, Middlesex (Lewis 2010, 45-7; Lewis and Brown 2006, 41-4). Here a cluster of shallow pits was excavated, containing burnt flint and stone along with undiagnostic flint places and broken blades, possibly derived from a midden where the material had been stored prior to inclusion in the pits (Lewis 2010, 47). Other possible examples on the British mainland include the pits at Charlwood in Surrey (Ellaby 2004) and possibly Wawcott Site XXIII in Berkshire (Froom 1972, 15-17). 'Ritual' pits have been found on the Isle of Man at Killeaba and Billown Quarry dated to the first half of the 6th millennium BC (Darvill 2012, 30-31), whilst the infilling of some of the Mesolithic pits in Ireland may be understood in terms of 'symbolic' deposition (Lawton-Matthews 2012, 44). The practice of structured deposition in pits may be related to the 'exceptional' deposits placed in tree-throws during the Mesolithic (Lawton-Matthews and Warren 2015). In Ireland, Mesolithic tree-throws often contain dark 'occupation' soil with charcoal and burnt stones and bone, and occasional 'special' objects such as the Moynagh points recovered from tree-throws at Baldrige, Co Mayo (Warren 2009) and Mullinabro, Co Kilkenny (Wren 2006); a tree-throw at Mount Sandel, Co Londonderry had a pit deliberately cut into its fill (Woodman 1985, 30). One of the Mesolithic pits at Heathrow cut an (undated) tree-throw (Lewis 2010, 47) and recent work has suggested that Mesolithic 'pit dwellings' may be re-interpreted as tree-throws that attracted deposition of cultural material (Evans *et al* 1999, 249; but note Newell 1980). The significance of tree-throws in the Mesolithic has been discussed in a number of papers (*eg* Healy *et al* 2007, 51-53; Crombe 1993; Brown 1997; Langohr 1993; McPhail and Goldberg 1990; Bishop 2008, 153-5), but here we may note that the placement of cultural material into the earth, whether in tree-throws, shallow depressions in the earth or in deliberately dug pits was an important part of social behaviour during the Mesolithic and Neolithic in Britain and Ireland. The suggestion that Neolithic patterns of pit deposition in Britain arose from Mesolithic antecedents has been put forward by several authors, either in the use of pits (Bishop 2008, 152; Carver 2012, 131; Anderson-Whymark 2012, 187; Thomas 2012, 3) or tree-throws (Lamdin-Whymark 2008, 137).

In contrast, though there does seem to be evidence for structured deposition in some of the Mesolithic pits reported from western continental Europe (Verjux 2004; 2006; Ducrocq 2001; Dupont *et al* 2012; Ghesquière 2010; Hénon 2013; Riquier *et al* 2014), for example the 'symbolic' deposits of auroch skulls and horn cores in pits at Auneau (Eure-et-Loire) in France (Verjux 1999; 2000; Leduc and Verjux 2014), this tradition does not appear to have continued into the Neolithic apart from in Scandinavia.

However, Mesolithic pits are rarely direct analogues of those we are familiar with from the British and Irish Neolithic. Tree throws aside, many features categorised as pits are perhaps better described as natural depressions or scoops in the earth, or are relatively poorly defined, like the 'dish-shaped' pits of Ireland (Lawton-Matthews 2012, 9). Bowl-shaped pits are not unknown, however, and deeper and more elaborate pits have been found such as the group of deep (>1m) pits at Stonehenge which were thought to have held timber marker posts (Vatcher and Vatcher 1973; Allen and Gardiner 2002, 141-3, fig 10.2) and the straight-sided, flat-bottomed 'beaker-shaped' pits in Ireland, possibly associated with human cremations like those at Bay Farm, Co Antrim (Woodman and Johnson 1996), Brecart, Co Antrim (Dunlop 2010), Clowanston, Co Meath (Mossop and Mossop 2009; Mossop 2009) and Hermitage, Co Limerick (which was also though to hold a timber 'marker post'; Collins 2009; Collins and Coyne 2003; 2006)).

Mesolithic pits are therefore quite heterogeneous and a range of possible functional interpretations have been ascribed to them (*eg* Woodman 1985, 128-54), and though there appears to have been a tendency to understand them from a ritual/mundane dichotomy, the theme of introducing cultural material into the earth in negative features has resonance with practices in the Neolithic.

Although it is as yet too early to assert direct continuity in this practice from the Mesolithic into the Neolithic (Lawton-Matthews and Warren 2015; Bishop 2008, 154; Blinkhorn *et al* 2017), the possibility offers fertile ground for speculation. The nature of the neolithisation of the western European seaboard, and in particular that of Britain and Ireland, has been a subject of heated debate in recent years (Guilane and van Berg 2006; Whittle and Cummings 2007; Burov 1996; Garrow and Sturt 2011; Louwe Kooijmans 1993; Vanmontfort 2008; Whittle 1996a; Sheridan 2010).

Notwithstanding the reasons why the spread of the Neolithic way of life seemed to be delayed in Britain and Ireland and in some parts of the Atlantic European seaboard (Whittle and Cummings 2007), and whether the introduction of the Neolithic 'package of novelties' (Whittle *et al* 2011a, 853) was brought about mostly by the physical immigration of European 'farmers' or by the acculturation of indigenous peoples, it is difficult to envisage a process that did not involve some kind of interaction between insular hunter-gathers and incomers bringing new ideas and attitudes to the British archipelago; it was '…a time of intense social mobility as tranches of continental communities trickled into Britain and Ireland…interacting with the resident hunter-gatherers to evolve cultures different from those from which they originated' (Cunliffe 2012, 174).

It appears that the Neolithic 'package' was not adopted either wholesale or without modification; the character of the British Neolithic was quite distinctive to that found in western Europe, perhaps from its inception and certainly during the 3rd millennium BC, when British Neolithic cultures appeared quite isolated from continental influences, becoming more inward-looking, perhaps with a cultural focus structured around developments in the north and west (Cunliffe 2012, 181-95). The more obvious signs of this were the development of monuments specific to these islands, such as the 'cursus' ('a British invention'; *ibid*, 167), and the 'henge' (Harding 2003; Whittle 2009, 98-9; this term, like 'causewayed enclosure' has moved away from its original definition to encompass a wide range of heterogeneous monuments within the broader tradition of ditched enclosures and likewise its utility has become diminished (*cf* Gibson 2012)). Also of note is the purely insular tradition of Grooved Ware pottery in the later Neolithic (Cleal and MacSween 1999).

If we are correct in surmising that the unique nature of the British Neolithic is due, at least in part, to the mixing of cultural traditions belonging to the indigenous hunter-gatherers and the incoming Neolithic folk, then we might expect to see this process in the earlier Neolithic, creating the starting conditions for the trajectory of insular innovation during the later 4th and early 3rd millennium BC. This is in fact difficult to see; despite the presence of Mesolithic-style flintwork at Chalk Hill, this is largely understood as residual material, and several authors have commented on the fact that Mesolithic material culture seems to have 'stopped' abruptly with the advent of neolithisation; the 'sudden extinction of the British Mesolithic' (Thomas 2007, 427). Mesolithic people are very hard to see in the archaeological record post-4,000 BC, though there are of course regional differences (Waddington and Pedersen 2007; Cummings and Fowler 2004; Brophy and Barclay 2009). This is in contrast to many areas of western Europe, where Neolithic farming communities co-existed alongside Mesolithic communities for long periods: 'small islands of farmers in the immense sea of foragers' (Nowak 2001, 590; *see also* Scarre 2002, 400; 2007)

Similarly, whilst the evidence for the continuity of hunting well into the Neolithic period seems well established in western continental Europe (*eg* the Low Countries; Raemaekers 2014), the evidence is more equivocal in Britain, perhaps suggesting another dislocation in cultural practice. The find of a single roe deer bone at Chalk Hill (a left tibia in feature F1304 in Segment 5 of the Outer Arc) suggests that the hunting of wild animals did not contribute in any significant way to the diet. This comparative scarcity of wild animals in early Neolithic faunal assemblages is not unusual in Britain (Cummings and Harris 2011, 369; 2014, 825). As at Chalk Hill, such assemblages are predominantly formed of domesticat-

ed species in contrast to Mesolithic assemblages which comprise wild species such as red and roe deer, wild boar and aurochs (Schulting 2008). On the face of it, the practice of hunting seems to have disappeared along with the flint tool traditions of the Mesolithic during the process of neolithisation. However, the picture is not clear cut; most early Neolithic animal bone assemblages are derived from monumental sites such as long barrows, 'causewayed enclosures' or chambered cairns, 'special places' whose animal bone assemblages may also be 'special', and not representative of everyday dietary choices. Furthermore, the relatively common finds of leaf-shaped arrowheads in early Neolithic contexts must also be considered (Green 1980, 67-99). If they were not intended to tip arrows for hunting, then what was their purpose and why are they so commonplace? One possibility is that they were intended for inter-personal violence. Fragments of projectile points embedded into human remains have been recovered from a number of Neolithic chambered tombs such as Wayland's Smithy (Oxfordshire; Whittle *et al* 2007), Tulloch of Assery B (Caithness; Corcoran 1967), Ascott-under Wychwood (Oxfordshire; Selkirk 1971; Knüsel 2007), Penywyrlod (Powys; Wysocki and Whittle 2000, 599-600, fig 5) and Poulnabrone (Co Clare; Lynch 1988; Lynch and Ó Donnabháin 1994). More problematic, but suggestive of violence using projectile weapons, are the many instances of projectile points closely associated with skeletal remains. Examples include a leaf-shaped arrowhead found between the ribs of an adult an adult male in a Neolithic multiple grave at Cat's Water, Fengate, near Peterborough (Pryor 1976), the bodies of a two young adult males found lying in the ditch segments of a causewayed enclosure at Hambledon Hill, each with a finely worked leaf-shaped arrowhead within the thoracic cavity (Mercer and Healy 2008, 261, figs 3.102-3.106; 269, figs 3.05-3.106), along with many other examples (*see* Green 1980; Mercer 1981, 68; Schulting and Wysocki 2005, 108; Schulting 2006, 224-7).

Further afield, around 60 examples of Neolithic human bones exhibiting injuries are known from France, mostly caused by projectiles (Beyneix 2012, 209; Guilane and Zammit 2001, 339-49), such as Quatzenheim (Alsace; Steiber 1955), La Pierre-Michelot (Marne; Cartailhac 1896, 254, fig 124; Dias-Meirinho 2009, fig 2) and Villeneuve-Tolosane-Cugnaux (Haute-Garonne; Beyneix 2003, 200-201). Most examples, however, are found in the south-central and eastern parts of the country, with none yet known from north-western France (Cordier 1990; Beyneix 2012). Other examples have been found in the Low Countries (Smits 2012), in central Europe at sites such as Talheim (Baden-Württemberg; Vencl 1999, 60-61, Schletz-Asparn (Lower Austria; Golitjo and Keeley 2007, 334; Windl 1999a; 1999b) and possibly Schöneck-Kilianstädten (Hessen; Meyer *et al* 2015) and further south in Iberia such as the individuals with arrowheads lodged in their vertebrae at the Cami de Can Grau in the Roca des Vallès (Barcelona; Pou *et al* 1995; Martí *et al* 1997), Bovila Madurell in Sant Quirze del Vallès (Barcelona; Campillo *et al* 1993) and Lapa do Bugio in Sesimbra (Setúbal; Silva and Marques 2010).

These examples of interpersonal violence can be contrasted with the evidence for large-scale group conflict, if not warfare, at several sites in Britain and western Europe (Beyneix 2001; Christensen 2004; Mercer 1999; Schulting and Fibiger 2012; Schulting 2013). At Carn Brea in Cornwall, over 750 leaf-shaped arrowheads were recovered from excavations of the Neolithic fortified complex in the early 1970s (Saville 1981, 124); the excavator suggested that this was just a sample of a putative total of 3-4,000 arrowheads from the whole site (Mercer 1981, 68). The vast majority of these were recovered from the eastern summit, with a marked concentration associated with a substantial defensive wall, suggesting that these arrowheads had a role linked with warfare (*ibid*, 69). The eastern entrance passageways of the Neolithic enclosure at Crickley Hill, Gloucestershire were marked by a thick spread of over 400 flint arrowheads which was interpreted as evidence of an archery attack (Dixon 1988, 82, fig 4.5). In Europe, the Neolithic enclosure at Altheim, southern Germany, produced over 170 arrowheads and some twenty skeletons from its enclosure ditches, also interpreted as the remains of archery attack (Petrasch 1999, 505ff).

This evidence, along with other indications such as cranial and other blunt force trauma wounds on human skeletons (*eg* Fibiger *et al* 2013; Schulting and Wysocki 2005; Teschler-Nicola *et al* 1996; Wild *et al* 2004) or the rupestrian depictions of archery battles and other forms of violence in Iberia and elsewhere (Nash 2005) suggest that inter-personal and inter-group violence was widespread throughout western and central Europe (*eg* Golitko and Keeley 2007; Keeley 1996; 1997; Petrasch 1990; 1999; Blouet 2017; Beyneix 2001; 2007; Guilane and Zammit 2001; Schulting and Fibiger 2012; Mercer 2006; Christensen 2004). However, despite the extensive evidence for interpersonal and inter-group violence using projectile weaponry, the question using the use of the bow and arrow for hunting remains; 'for the British Neolithic at least, the large numbers of leaf-shaped arrowheads that have been found seem to be incommensurate with the paucity of hunted game known from contemporary faunal assemblages' (Schulting 2013, 23).

The apparently insular tradition of structured deposition in pits, exemplified *par excellence* by the pit clusters at Chalk Hill and dated to the earlier Neolithic, may, as we have seen, have some antecedent in the traditions of Mesolithic peoples in Britain and Ireland. The arcs of intercutting pits at Chalk Hill might therefore be understood as an expression of an insular tradition of structured

pit deposition expressed through a monumental spatial geometry derived from the interrupted ditch enclosures familiar to the Neolithic cultures of north-western continental Europe.

Of course, the nature of the interaction between incoming 'farmers' and local 'hunter-gatherers' is as yet difficult to articulate and the subject of fierce academic debate. Certainly there would not necessarily be any question of the 'shock of the new' regarding Neolithic cultural practices being introduced to these shores. Neolithic farming communities had been living cheek-by-jowl with hunter-gathering communities at the western edge of Europe for generations (Whittle 1996b, 144-210) and there is good evidence for cultural contact between these two worlds long before the eventual neolithisation of the west. For example, in Ireland, the remains of domesticated cattle have been found at Dalkey Island and Sutton (Co Dublin), Kilgreany Cave (Co Waterford) and Ferriter's Cove (Co Kerry) in Ireland dated to the middle of the 5th millennium BC (Woodman *et al* 1999), whilst in the south of Britain at Bouldnor Cliff off the north-west coast of the Isle of Wight, sedaDNA analysis of a submerged Mesolithic palaeosol has demonstrated the presence of Einkorn wheat (*Triticum monococcum*) dated to around 6,000 cal BC (Smith *et al* 2015a; 2015b, table S1; 2015c; Bennett 2015). Precisely what the implications of such finds are is moot; the domesticated animal bone in Ireland may represent stock rearing, importation of individual animals or joints of meat (see Case 1969 for the issues facing the importation of a Neolithic way of life across the sea), whilst the importation of einkorn wheat at such an early date (2,000 years before the neolithisation of Britain and 400 years earlier than its earliest presence at sites on the near continent) suggests that long distance social networks existed at this time between the Mesolithic peoples of north-west Europe and the Neolithic communities of the south. It seems clear that hunter-gatherer communities were well aware of the presence and nature of their farming neighbours and there was some exchange of material culture and goods between these different worlds (for example the Neolithic artefacts and ceramics found on Mesolithic sites in Belgium dating to the late 5th millenium BC, such as Dilsen-Vossenberg 2, Meeuwen-Donderslagheide 1 and Opgrimbie-De Zjip (Vermeersch 1990, 100-101)).

There are also indications of such contact and exchange in western France, for example at the site of Le Haut-Mée (Ille-et-Vilaine) in Brittany (Cassen *et al* 1998). Here some of the polished stone rings recovered from this early Neolithic site were made from serpentine (a form of schist) proved to derive from the Ile de Groix, about 200km to the south-west off the southern coast of the Morbihan; 'it seems therefore that the early Neolithic community of Le Haut-Mée was obtaining raw materials from late Mesolithic groups in adjacent regions' (Scarre 2007, 247). Also in Brittany, two complete cattle skeletons were carefully buried in a late Mesolithic pit in front of the southern façade of the long mound of Er Grah near Locmariaquer (Morbihan), presumably exotic items acquired by local Mesolithic groups in contact with Neolithic communities south of the Loire (Le Roux *et al* 2007; Tresset 2005; Tresset *et al* 2009, 84; Tresset and Vigne 2006).

However, in the UK the interaction between farmers and hunter-gatherers is more difficult to see. Partly this is due to relative scarcity of later Mesolithic sites, at least in southern Britain where coastal erosion, silting and marine inundation may have destroyed or masked many sites (Coles 2000). Julian Thomas has posited that the 'public architecture' of the early Neolithic (simple passage tombs, portal dolmens, post-defined avenues, etc) may indicate a degree of continuity with Mesolithic attitudes to the dead and the treatment of some of these monuments (such as the repeated burning of the timber cursus at Holm near Dumfries in Scotland) may reflect a theme of transformation that again suggests an attitude to place and landscape that had Mesolithic antecedents (Thomas 2007, 432; 2004).

Thus whilst the overt signifiers of Mesolithic culture in Britain (namely lithic technology) seems to have been abruptly abandoned at the end of the 5th millennium BC, there some indications that Mesolithic communities were acquainted with the Neolithic way of life (and had been for centuries), and that the cultural traditions of indigenous hunter-gatherers had a profound influence on the cultural expression of the new Neolithic communities of the late 5th and early 4th millennia BC.

In this regard we might consider the growing body of studies of prehistoric diet based on the analysis of stable isotopes (particularly carbon, nitrogen and sulphur isotopes) recovered from human bones (Richards 2002; Richards and Hedges 1999; Richards *et al* 2001; 2003a 2003b; Schulting 2005; 2010; Schulting and Richards 2002; Smits and van der Plicht 2009; Milner *et al* 2004). Many of these studies demonstrate a distinctive difference in the dietary preference of Mesolithic populations to that of Neolithic populations (at least in coastal areas); it seems that there was a significant shift from marine to terrestrial food resources during the Mesolithic-Neolithic transition in Western Europe (Schulting 2015, 362-4).

This overall trend remains convincing, though of course this is not to say marine foods were never consumed by Neolithic communities. Stable isotope analysis of five human bone samples from Chalk Hill suggested that the individuals had a high proportion of animal protein (meat or dairy) in their diet (at least 80 per cent of collagen protein, implying about 50 per cent of energy came from animal sources), with little evidence of the exploitation of marine resources (Hamilton and Hedges 2011, 680-81).

This correlates with the extensive evidence for cattle rearing and dairy production derived from the animal bone, though to what extent the faunal remains from the sites reflects everyday diet is debatable.

In a general sense, this distinctive isotopic signature presumably relates to a cultural choice, with coastal Mesolithic communities focussing on exploiting marine resources for their nourishment (shellfish, fish, etc, but note that even inland British hunter-gatherers have the same isotopic signature as coastal ones (Schulting 2015)). Neolithic people had a diet that was apparently almost exclusively derived from terrestrial sources (meat, dairy products, cereals, etc). Some authors have suggested that this deliberate choice was part of an affirmation of their cultural identity (Thomas 2007, 428). This may suggest a memory of the cultural legacy of the long migration of Linearbandkeramik farmers across the central European plain during the 6th and 5th millennia BC, far from marine sources of food, which contributed to a particular dietary preference as part of such community's cultural identity, an identity that continued down the generations even when marine food resources were easily accessible. The notion that these farming communities maintained some understanding and memory of their geographical origins and diaspora across Europe has also been suggested by Richard Bradley, who has noted that the alignment of LBK houses often seems to be orientated towards earlier settlements in the east, a physical chain of self-reference mapping the movement of the Neolithic way of life across the Continent (Bradley 2002, 19-28).

In this context of a society deliberately selecting terrestrial resources as a statement of cultural identity (and borne out to some extent by the stable isotopic analysis of the Neolithic human skeletal material at Chalk Hill), the large assemblage of shellfish recovered from Outer Arc Segment 2 requires some consideration.

Of course, no author has suggested that the isotopic signature of Neolithic human skeletons means that no marine foodstuffs were eaten by such people; up to 5-10 per cent of the diet could consist of non-terrestrial foodstuffs without being detectable in and individual isotopic signature (Schulting 2015, 362). Furthermore, though the quantities of shellfish found at Chalk Hill made a large subjective impact on the perceptions of the excavation team, in reality the assemblage has a relatively small calorific value (*c* 2128 Kcal) and thus does not imply that marine resources necessarily formed a significant part of the diet of people visiting Chalk Hill at this period. Of course, only a relatively small sample of the archaeological features were excavated, and there may be much larger quantities of such material in the unexcavated parts of the site. Just 50km (30 miles) across the channel, at the causewayed enclosure recently excavated at Mont d'Hubert at Escalles, close by Cap Blanc Nez (Pas-de-Calais), the excavators retrieved huge quantities of shellfish (3,685 litres) from the infilled ditches (Praud 2015, 14). Though the evidence is slight and equivocal from Chalk Hill, we might consider the possibility that the consumption of both marine and terrestrial foodstuffs here may reflect the admixing of different cultural traditions – those of the aborigine and those of the immigrant – amongst the people using Chalk Hill.

The relationship and interaction between the Mesolithic and incoming Neolithic communities has long been a subject of fascination and debate amongst archaeologists (*eg* Thomas 1988; 2013; Armit and Finlayson 1992; Schulting 2000). Few would now support the polarised opposition of the acculturation/immigration schools of explaining neolithisation, and most would accept that some kind of interaction took place. However the speed of neolithisation in these islands (the whole of Britain seems to have moved to a Neolithic way of life in just a few hundred years; Pailler and Sheridan 2009; Whittle *et al* 2011a, 848-66) and the concomitant sudden disappearance of Mesolithic material culture from the archaeological record poses its own questions. What happened to the Mesolithic people who had occupied these islands for millennia as this new way of life took hold? The possibility that they were annihilated in some kind of Neolithic genocide seems hard to credit (notwithstanding the evidence for interpersonal violence during the period; Smith and Brickley 2009, 104-12), as does the drastic depopulation of Britain by disease or the mass exodus of Neolithic people from continental Europe around 4000 BC to replace the indigenous hunter-gatherers: 'The only way in which we can make sense of the evidence is by assuming that indigenous Mesolithic populations had a dynamic role in the formation of the British Neolithic' (Thomas 2007, 427).

In some way, the indigenous people of Britain must have been assimilated, adopting a Neolithic lifestyle apparently very quickly (note the date ranges derived from the Down Farm Shaft, Dorset spanning the Mesolithic-Neolithic transition; Green and Allen 1997; Allen and Green 1998; Green 2000, 40-43, fig 23; Schulting 2000, 30-31). But we have seen that the Neolithic of these islands was in some ways quite different – unique – compared to that of the neighbouring European landmass. We might speculate that this uniqueness originated in this mixing of cultures through a process of 'creolisation'; 'a process whereby men and women actively blend together elements of different cultures to create a new culture' (Orser 2002). This concept has been employed widely in historical archaeology (Van Pelt 2013), but its usefulness has only begun to be harnessed in prehistoric archaeology (*eg* Jennbert 2011, 104-5; Cummings and Harris 2014, 830 or Zvelebil 1995 in terms of prehistoric linguistics). It seems a particularly helpful approach to the issue of neo-

lithisation in Britain and Ireland, together with its related concepts of 'indigenisation' and 'ethnogenesis' (Knörr 2008, 4-8), especially as we become more sensitive to the potentially elusive signatures of Mesolithic influence in early Neolithic expression.

Leaving such speculation aside, as Jake Weekes has described above, the 'causewayed enclosure' at Chalk Hill may best be understood as a meeting place of peripatetic peoples coming together at intervals for a wide range of activities, including the digging of pits for the structured deposition of cultural material, an activity that seems strange to modern eyes and difficult to explain, though clearly an important part of cultural life throughout Neolithic Britain.

As the Neolithic period progressed, new monument forms began to appear in Britain, such as the earthwork 'cursus' (from around 3640 cal BC in southern Britain; Barclay and Bayliss 1999, 25) and the 'henge' (from the late 4th millennium cal BC; Brophy and Noble 2012, 21-2). The final phase of activity recorded at the 'causewayed enclosure' at Chalk Hill, perhaps around 3600 cal BC, may be of relevance in considering the development of monumental expression during the 4th and early 3rd millennia BC. As we have emphasised above, the 'segments' of intercutting pits did not appear to be planned or marked out as clearly defined spatial entities, but rather were the result of intermittent pit digging over generations, albeit informed in a general sense by the overall spatial geometry of the site. The activities at Chalk Hill in the earlier part of the Neolithic seem to have continued for between 60-120 years. Then, for whatever reason, the episodic pit digging and structured deposition stopped, probably with all the other social activities we presume accompanied this practice. But in the final phase of use, the overall morphology of these pit agglomerations seemed to be formally recognised, their shapes perhaps marked out and transformed by excavating new features closely matching their final form (assuming that these final cuts are not an artefact of the excavation process). In all cases this seemed to be the final act of digging and it appears that this was a conscious act whereby the final form of each segment – which had grown and developed over decades by many episodes of pit digging – was 'fixed' by marking out its eventual shape, a form of 'monumentalising' the arcs of pit clusters as a closing act before activities ceased at the site.

It is difficult to know why the activities at Chalk Hill came to an end, or indeed why the range of monumental constructions continued to evolve during the later part of the Neolithic; was this a function of 'creative innovation', itself a product of a 'continuing desire for innovation and difference' (Whittle *et al* 2011a, 905-9), or a response to other factors that required the mutation of cultural practices and social adaptation, the 'changes in material reality which took place through the Neolithic would have proceeded alongside changes in human self-understanding' (Thomas 1999, 229).

However, we might understand these changes, the final phase of activity at Chalk Hill – the 'monumentalisation' of the final form of the segments of the Outer Arc – seems to imply that there was a conscious understanding that the social practices that had been enacted at this site over generations were no longer appropriate. The finality of this phase of Neolithic cultural life was well understood and recognised by people at the time, who physically marked the end of use of the monument by a final and quite different episode of pit digging and deposition, a point we shall return to below.

It is unfortunate that commercial issues have not allowed the detailed study of the pit clusters at Court Stairs Lodge, apparently another 'causewayed enclosure' just 900m to the east on the opposite side of a dry valley running down to the sea (Moody 2007; Moody and Hart 2008). The research potential of this site therefore remains unrealised, even though interim reports suggest some similarities to the Chalk Hill features, possibly even with a final phase of 'monumentalising' the final form of the pit clusters (Ges Moody, pers comm). Without the detailed study of the results of the 2007 excavation, particularly as regards establishing a robust chronology for the site, developing a satisfactory understanding of the potential relationship between the two sites must await another day. This should include a consideration of the intriguing possibility that the two sites were in use at the same time and had a complementary function, as has been suggested for the two causewayed enclosures at Kingsborough on the Isle of Sheppey in Kent (Allen *et al* 2008) and elsewhere (Oswald *et al* 2001, 112-13).

Changing perspectives

The Chalk Hill Pit Complex seems to have gone out of use by the 36th century cal BC. The presence of two pits containing Peterborough Ware (a tradition probably current for about five or six hundred years, between *3510-2890 cal BC (68% probability)*; Woodward 2009, 96) and the two abraded sherds of the later Grooved Ware tradition from the ring-ditch F511 (from *c* 2700 cal BC in the south of England; Frances Healey, pers comm) do not speak of any substantive subsequent use or occupation of the site for some 1,500 years. We have no way of knowing why the site was abandoned or what (if any) activities marked the disuse of the complex after 60-120 years of use. Perhaps the 'monumentalisation' of the site in its final phase was a deliberate 'closing event', creating a statement in the landscape that presumably was to remain visible and meaningful for generations (other forms of 'closing events' have been suggested at other causewayed enclosures, like

the deliberate slighting of the bank into the ditch at Crickley Hill, Gloucestershire (Dixon 1988, 81), the final marking of the already infilled main enclosure ditch at Hambledon Hill, Dorset with shallow, finds-rich slots capped with flint nodules (Mercer and Healy 2008, 56-7) or the erection of four posts around the ditch circuit at Briar Hill, Northamptonshire (Bamford 1985, 136). One might speculate that the meaning of the abandoned site at Chalk Hill became eroded or transformed over time, but it may be that this place retained a 'special' quality (*sensu* Bradley 2000) in the minds of nearby communities in the middle and later Neolithic.

Peterborough Ware may be sub-divided into three sub-styles, namely Ebbsfleet, Mortlake and Fengate Ware (Smith 1956; 1974, 111-13). Sherds of this kind of pottery were recovered from two pits (F442 and F596) as well as presumably residual sherds in Grave F478 within the late Bronze Age/early Iron Age enclosure and the fill of ring-ditch F511 (identifiable as a Fengate-style vessel). Apart from Chalk Hill, small quantities of Peterborough Ware have been found at other sites in Thanet. Twenty-nine sherds of Peterborough Ware were recovered from a Neolithic pit around 80m to the west of the Outer Arc at Chalk Hill (Hearne *et al* 1995). Preliminary assessment of the linear pit complexes excavated at nearby Court Stairs Grange suggests that, whilst dominated by early Neolithic Plain Ware and Decorated Bowl, there was a small component of Peterborough Ware (Moody 2007; Moody and Hart 2008, 3; Gibson 2007). Fragments of up to five Mortlake-style vessels were recovered from small pits excavated at Cottington Road, about two kilometres to the west of Chalk Hill, and fragments of a Fengate-style jar from an early Bronze Age ring-ditch at Cliffs End Farm (Egging Dinwiddy and Schuster 2009, 67). Peterborough Ware was recovered from the angle of two ditches at the Oaklands Nursery near Cliffsend (Perkins and Slade 1998, 356-7), at Laundry Road in Minster and Little Brooksend Farm (Boast and Gibson 2000) and on the route of the Monkton Gas Pipeline (Perkins 1985, 45). A few sherds of Mortlake-style pottery came from a small refuse pit at St Peter's Refuse Tip in Broadstairs (Minter and Herbert 1973, 11) and a couple of residual sherds of possible Peterborough Ware were reported from Foreness Point in north-east Thanet (Egging Dinwiddy and Schuster 2009, 67).

This pattern of Peterborough Ware being found in indeterminate or secondary contexts is typical of such material throughout the country; a recent survey of English Peterborough pottery found that 83 per cent came from such deposits, with only 17 per cent being from potentially primary contexts (Ard and Darvill 2015). Furthermore, it has been suggested that many of these depositional contexts, particularly the presence of Peterborough Ware in pits was 'backward-looking, often focused on monuments and places in the landscape that already had some significance' (*ibid*, 26). That the sparse finds of Peterborough Ware at Chalk Hill can be taken as evidence of the persistence of memory of this 'special' place is an intriguing possibility.

There is little evidence for much activity at the site during the 3rd millennium BC; a couple of abraded sherds of Grooved Ware from the fill of the later early Bronze Age ring-ditch are no doubt residual, and there is little other sign of activity during this period. We cannot say what the abandoned 'causewayed enclosure' looked like as time went on; though there are signs of continuing colluviation, this was seemingly concentrated in the southern part of the site, and little or no activity seems to have occurred in the area of the infilled pit clusters until the later Bronze Age. Presumably the area was gradually colonised by vegetation, though it is difficult to ascertain if the site persisted as a physical feature of the landscape or how the site was perceived in the long centuries following its disuse.

Probably around the beginning of the 2nd millennium BC, the area to the south of the disused Neolithic site began to be used for funerary and non-settlement purposes. Whether this was motivated by some folk memory of the site as a 'special place' is unknowable, but the topographical situation of the site in itself is not exceptional for the Isle of Thanet, and similar locations were utilised for such activities all across the island (Perkins 1999). Two relatively elderly men were buried in the far north of the site (F206 and F7) and to the south a small ring-ditch (F511) was constructed. There was no reliable dating evidence from the ring-ditch itself, but its general morphology suggests it dates to the early to middle Bronze Age and is typical of tens of thousands of such features in north-western Europe (Bourgeois 2013, xi; Bourgeois and Talon 2009, 39-43; Toron 2005; Doorenbosch 2013, 13; Johansen *et al* 2004, 34). At 12m in diameter, F511 is at the smaller end of the spectrum of ring-ditch sizes, which in Kent can range from around 10m to well over 30m (Perkins 1999, 27-32; but note a middle Bronze Age example just 6m in diameter at Manston Airport, a little over 4km to the north-west (Fitzpatrick *et al* 2015, 101-102, figs 3.17-3.18)). Examples of similar size in Thanet have been excavated at St Nicholas at Wade (9.8m; Perkins 1987), Dumpton Gap, Broadstairs (10m; Hurd 1909), Manston (11.7m; Perkins and Gibson 1990) and Lord of the Manor (12m; Macpherson-Grant 1980b, 5). Aerial photographs show three potential ring-ditches around 600m to the north-east of F511 just below the 30m contour varying between 8m and 18m in diameter and another three to the north-north-east below the 35m contour, two just 9m in diameter and the third 23m across (Fig 2; Deegan 2009). These ring-ditches appear to form part of a distinct concentration of around forty such

monuments distributed along the crest and false crest of a downland escarpment east of a broad shallow valley known as Hollins Bottom (Perkins 1999, 49, fig 3.4).

Such ring-ditches are traditionally understood to be the encircling ditches of burial mounds or barrows, the original mound of which has become severely denuded or more commonly completely destroyed by ploughing and other agricultural activities (Champion 2007a, 87-9). However, more recent research has shown that such monuments have more complex roles than simply burial markers, sometimes having complex histories of use and construction (Garwood 2007).

The ring-ditch at Chalk Hill is of simple form, with no evidence of remodelling or recutting. The upper part of the ditch is continuous around its circuit, though the base of the ditch was not completed, leaving a narrow break in its orbit of about 0.25m. There was no evidence to indicate that this break had any significance. The fills of the ditch were mainly of silt with infrequent inclusions of small fragments of chalk, and no differential infilling from the inner or outer edges of the ditch was observed. The absence of any significant deposits of chalk rubble suggests that any internal mound or bank had not eroded or was slighted into the ditch. There was no evidence of an external bank. Very few finds were recovered from the ditch fills, chiefly residual middle and late Neolithic pottery; the late Bronze Age, Iron Age and early Roman sherds recovered from the upper fills may be indicative of how long the ditch remained a feature in the landscape or alternatively could be intrusive, being introduced by ploughing activity in later periods. A ditch relating to the later medieval field system (F508) clips the western edge of the ring-ditch possibly suggesting that the barrow was still extant at that time, but equally this may be fortuitous. If there was a central mound it was presumably constructed from the chalk bedrock that the ditch cut through. It is not known how long such barrow mounds survived as upstanding features in the landscape; the alignment of later features such as field ditches and trackways at sites such as Thanet Earth (Rady *et al* forthcoming) suggest they were visible well into the post-Roman period; a list of known round barrows in Kent made in 1960 identified just 30 barrows in 21 locations, many of which were still extant as visible earthworks (Ashbee and Dunning 1960, 55-7). They seem to have formed a focus for Anglo-Saxon burial in the second half of the 1st millennium AD (*eg* at the Meads, Sittingbourne (Clark 2014a); a survey at the end of the last century identified over 200 examples of this 're-use' of prehistoric round barrows in England (Williams 1997, 6; *cf* Crewe 2008; Semple 2013). The same phenomenon can be observed across the channel in northern France as at Fréthun, Pas-de-Calais, where a large Merovingian cemetery was associated with an early Bronze Age triple ring-ditch (Bostyn *et al* 1992, figs 2 and 5). Many of the extant barrows described by William Stukeley in his *Itinerarium Curiosum* (1776) at St Margaret's-at-Cliffe, Barham, Hardres, Chilham and elsewhere may have been survivors from the earlier Bronze Age (as well as of Anglo-Saxon date). Most had been ploughed flat by the middle of the 19th century (Clark 2014b, 16).

The two burials lying within the circuit of the ring-ditch (F446 and F439) cannot be proven to relate to the ditch itself, but their roughly central position suggests that this is not an unreasonable suggestion. Radiocarbon dating suggests that the more northern burial F446 (probably a young woman of 25-35 years buried with an incomplete but fine quality beaker at her feet) was slightly earlier, perhaps in the first quarter of the 2nd millennium BC, with the young child in the southern grave (F439) dated to around 1750-1500 BC, which equate well with the expected date range of the barrow itself based on its morphology.

There was no evidence for the next phase of use of the landscape at Chalk Hill, but by extrapolation from other sites in Thanet, we might postulate that the funerary elements went out of use in around the middle Bronze Age and area given over to agriculture (as at Monkton-Mount Pleasant, for example, just 7km to the north-west, where there were indications of ploughing between the upstanding barrow mounds by the beginning of the 1st millennium BC (Clark and Rady 2008, 100)).

Certainly by the late Bronze Age, perhaps from around 800 BC, the ceremonial and funerary use of Chalk Hill became much diminished, and the area seems to have been given over to food production. The two parallel ditches cutting across the infilled arcs of the Neolithic causewayed enclosure might be part of a field system, perhaps flanking a trackway or droveway of some kind, maybe related to stock management (droveways of a similar width and date have been identified at Thanet Earth, 8km to the north-west; Rady *et al* forthcoming). There was little other trace of field systems at Chalk Hill, an attribute mirrored at Monkton-Mount Pleasant some 7km to the west (Clark and Rady 2008), but evidence for Bronze Age field systems are not uncommon at other sites in Thanet (*eg* at Westwood Cross (Poole and Webley 2008, 80, fig 2), East Kent Access (Fitzpatrick *et al* 2015), Manston Road, Ramsgate (Hutcheson and Andrews 2009, 241), Manston Airport (Moody 2008, 99, Fig 55), Minster in Thanet (Martin *et al* 2012, 4548, fig 1) and Thanet Earth (Rady *et al* forthcoming)). Such field systems seem to date to the middle Bronze Age, possibly with their origins in the early Bronze Age (Champion 2007, 298-300; Martin *et al* 2012, 45-7, table 1, fig 2; Fitzpatrick *et al* 2015, 110). The dating of the parallel ditches at Chalk Farm is equivocal, though a date in the later Bronze Age seems more likely. A pair of parallel ditches of similar date was excavated at Coldharbour Road in Gravesend (Mudd 1994), where

they were interpreted as a ditched trackway or droveway. Though these ditches were around 10m apart, they may represent a widening of an earlier trackway about 5m wide (*ibid*, fig 13; Yates 2007, fig 3.5). There seems to have been a downturn in the creation of new field systems in the late Bronze Age, though at East Kent Access, just to the west of Chalk Hill, a series of parallel double ditches, interpreted as droveways, were thought to have been a late Bronze Age development (Fitzpatrick *et al* 2015, 106). These droveways were on average 2-2.5m wide, comparable to the width of the ditched trackway at Chalk Hill, and indeed with other Bronze Age droveways elsewhere (*eg* Storey's Bar Road, Peterborough (Pryor 1978, 62-4), Thanet Earth (Rady *et al* forthcoming) and the central droveway at Mucking (Clark 1993, site atlas plans 20, 21, 23; Evans *et al* 2016, fig 37), where such features and their associated field systems are thought to be part of a pastoral landscape (Pryor 1996; 2001, 415-20).

However, the interpretation of these closely-spaced parallel ditches as droveways or trackways is open to discussion. Often such features are much wider than that at Chalk Hill; at Hornchurch (Essex) the Phase 2 droveway ditches were around 14m apart (Guttman and Last 2000, 326, fig 7); the early Iron Age double-ditched trackway at Wickham Fields in Berkshire was around 10m wide (Crockett 1996, fig 66), though the track or droveway recorded at Brisley Farm, Ashford was a little under 4m wide (Stevenson 2013, 24, fig 2.6) and the 'main droveway' at the Power Station site at Flag Fen, Peterborough was a little over 5m wide (Pryor 2001, 409, fig 4.3). This variation in width of putative trackways or droveways requires further explanation. The very narrow (*ie* <2.5m) pairs of parallel ditches have been understood by some to be for close control of livestock, perhaps a 'sheep run' like the Phase 3a parallel ditches at Hornchurch (Essex) which whilst extending for around 175m, narrowed in places to around 1m (Guttman and Last 2000, 332, fig 11), and this seems reasonable for the narrow (1.5m) 'sheep race' of the putative stock management system at Storey's Bar Road (Cambridgeshire; Pryor 1996, 317, fig 2). Others, however, have understood these very narrow pairs of parallel ditches to mark the line of 'hedgebanks', the ditches flanking low bank surmounted by hedges of blackthorn (*prunus spinosa*) or something similar (Evans *et al* 2009, 45, fig 2.13; Lambrick 2009, 73; Poole and Webley 2008, 80, fig 2). Given the heavily truncated nature of the parallel ditches at Chalk Hill, and the absence of any associated field boundary ditches, it is difficult to be prescriptive about their original function.

To the south, set just below the 30m contour on the western side of the dry valley running down to the sea, the late Bronze Age/early Iron Age enclosure is an important addition to the corpus of such sites in eastern Kent. Measuring 57m north-south within the excavation area, with perhaps a similar dimension east-west (it did not appear in aerial photographs of the area), it is comparable with other enclosures of similar date, such as that at Highstead (Enclosure B70; Bennett *et al* 2007, 16, fig 16), Eddington (Shand 2002, 19-20), Kingsborough, Sheppey (Allen *et al* 2008, 284, fig 18), Cliffs End Farm, Thanet (Leivers and McKinley 2014, 19-30, fig 2.5), East Kent Access (*eg* the probable enclosure in Zone 19; Fitzpatrick *et al* 2015, 99-101, fig 3.16) and at Hartsdown, Margate (Perkins 1996, sites 3 and 11). The end of the Bronze Age saw a much wider variety of settlement types compared to earlier periods, and though both open and enclosed settlement forms were current, there seemed to be a move to upland sites on ridges and hilltops; the establishment of the enclosure at Chalk Hill is symptomatic of a profound change in the organisation of the landscape that affected communities all across Britain and western Europe from around 800 BC (Needham 1992; 2007; Milcent 2009). The reasons for this are complex and much debated (Clark 2015, 15-17), but appear to relate to a time of great social upheaval, a diminishing food supply, the rise of interpersonal violence, and the end of the long-distance socio-economic contacts that so characterised the middle Bronze Age, perhaps exacerbated by a period of climatic deterioration from about 800-750 BC onwards (Brun and Ruby 2008, 55). The interior features of the enclosure at Chalk Hill presumably relate to a domestic settlement of some kind, though the multitude of post-holes, pits and other features do not easily resolve themselves into easily identifiable structures. The general arrangement is perhaps best paralleled by the cluster of 34 small pits and post-holes within the Central Enclosure at Cliffs End Farm (Leivers and McKinley 2014, 28-9, fig 2.8), notwithstanding the statement that 'there were no traces of any structures within [the Central Enclosure]' (Leivers 2014, 208). The deposits recorded in the two 'linear hollows' are most probably best understood as remnants of originally more widespread layers that had been partially removed by truncation; the hoof prints in the western hollow suggest that animals may also have been kept within the enclosure. Pottery evidence suggests that the enclosure was abandoned a little after 600 BC, and thereafter there is little evidence for any late Iron Age or Roman activity.

The site seems to have been briefly occupied in the late 6th or 7th century AD, when a small Anglo-Saxon Grubenhaus was constructed; some undated features and perhaps some field ditches may have been associated, though this cannot be demonstrated unequivocally. The finds recovered from this relatively unsophisticated structure suggest a range of activities; apart from the hammerscale recovered from environmental samples, the bone pin-beater is suggestive of weaving (pin-beaters are used to lift up the weft when making cloth on a vertical loom),

whilst the possible fishing net weights and the fragments of shellfish suggest that the sea was exploited as a source of food.

The medieval field system shows continual agricultural activity, with a hollow way leading down into the dry valley to the east; the alignment of this co-axial system of field ditches may relate to an Anglo-Saxon precursor, but in general this alignment reflects the natural topography. In this rural context, the distinction between 'prehistoric' and 'historic' landscapes is not very meaningful; the data we have is still largely archaeological and limits the inferences we can draw from such features.

Thus the landscape at Chalk Hill has undergone profound changes in the way it was perceived by human society over the millennia. From the public and ceremonial use of the site in the early 4th millennium BC, an episodic meeting place for Neolithic people to gather together for a wide range of social and spiritual activities, it was then seemingly little used for well over a thousand years, though we might speculate that local people retained an understanding of it as a 'special place' during that time, perhaps until the beginning of the 2nd millenium BC. The southern part of the site was then transformed into a place for the burial of dead, a funerary landscape typical of much the Isle of Thanet during the period. By the beginning of the 1st millennium BC the site was occupied and the hillside given over to agricultural activity, the previous spiritual significance of the place presumably forgotten, as the site returned to agricultural use, briefly reoccupied during the Anglo-Saxon period before returning to open fields as it remains today. The rescue excavations of 1997-1998 and subsequent analyses reflected the overarching paradigms and research agendas of the day and have provided important new evidence for the long story of communities in Thanet, whilst throwing into relief new insights and a more nuanced appreciation of current archaeological models of interpretation. This account has by no means exhausted the potential of the data recovered from this fieldwork, which may perhaps be enhanced by new excavations in the future.

Appendix I. Inner Arc: segment catalogue

(*all measurements are maxima; F=feature, D= deposit; segments/features listed in the order that they appear in the main text; deposits in stratigraphic sequence; all lithics are flint unless otherwise stated; all bulk sample residues comprise very small quantities).

Inner Arc, Segment 1 (Fig 8)

F1046. Linear, arcing feature, approximately 10m long. 1.15m wide at southern end tapering to 0.82m at north-western terminal. 0.22m deep, steep-sided, flat based; filled by silt D1045.

D1045.

Lithics: 21 flakes (1burnt), struck nodule (2 flakes removed), blade, 16 knapping debris.

Pottery: 19 fresh and abraded sherds (+ crumbs): early Neolithic Carinated Bowl and Plain Bowl: 4 fabrics (Sherd groups 1-5).

Animal bone (fragments): 18 (mainly unidentified but including cattle tooth and humerus).

Shellfish: occasional mussel shells.

Bulk sample residues: fossil(?)sea urchin, mammal bone (burnt and unburnt); fragment of hazelnut shell, traces of oyster, cockle, mussel and Ocenebra (species?); charcoal, grain, seeds.

Inner Arc, Segment 2 (Fig 8)

F1048. Linear arcing feature, 3.75m long, 0.45m wide and 0.3m deep, with irregular sides and an uneven base; filled by silt (D1047).

D1047.

Lithics: 4 flint flakes; 1 burnt unworked flint.

Pottery: 8 sherds (some fresh, some abraded): early Neolithic Plain Bowl: 3 fabrics (Sherd groups 7; 69-70) + 2 intrusive sherds (early Bronze Age; Roman).

Animal bone (fragments): 1 unidentified.

Bulk sample residues: traces of winkle; charcoal, seeds.

Inner Arc, Segment 3 (Fig 9)

Formed by intercutting linear features (F1050; F1056) and a discrete feature (F1044).

F1050. Linear arcing feature, approximately 4.7m long, 0.55m wide and 0.15m deep, with irregular sides and an uneven base; filled by silt (D1049).

D1049.

Lithics: shattered core, 2 blades (1 slightly burnt), 4 flakes; 3 knapping debris; 1 burnt unworked flint; small piece of glauconitic sandstone.

Pottery: undiagnostic crumb.

Bulk sample residues: mammal bone, shellfish; charcoal, grain, seeds.

F1056. Linear arcing feature, approximately 5.25m long, 0.50m wide and 0.26m deep, with irregular sides and an uneven base; filled by silt (D1054) and possible 'placed deposit' (D1055).

D1054.

Lithics: 2 cores, 14 blades (6 burnt), 33 flakes (11 burnt), 64 knapping debris (4 burnt, 1 slightly burnt), serrated blade.

Pottery: 14 fresh and abraded sherds: early Neolithic Plain Bowl (neutral form): (Sherd group 6).

Animal bone (fragments): 18 unidentified (burnt and unburnt).

Bulk sample residues: traces of mussel, whelk and other shell; charcoal, seeds.

Radiocarbon date: *3745-3650 cal BC* (*at 95% probability*; *OxA-15391*; *sherd group 6*; Table 2).

D1055.

Lithics: flake, retouched scraper.

Pottery: 1 abraded sherd: early Neolithic Plain Bowl: the interior surface sooted (Sherd group 8).

Animal bone (fragments): 35 burnt.

F1044. Discrete feature measuring 0.9m by 0.45m; dished profile 0.07m deep; filled by silt (D1043).

D1043.

Lithics: blade, flake.

Pottery: 2 very abraded sherds: probable Neolithic date: (Sherd group 140).

Inner Arc, Segment 4 (Fig 9)

F1063. Linear feature, approximately 3.75m long (northern terminal was truncated but not seen during evaluation), 0.8m wide and 0.15m deep with steep and even sides and an uneven base; filled by silt (D1062).

D1062.

Lithics: shattered core, 4 blades (1 burnt), 8 flakes (1 burnt), 22 knapping debris, serrated blade.

Pottery: 3 fresh crumbs: early Neolithic (Plain Bowl?): (Sherd Group 9).

Bulk sample residues: burnt unworked flint, mammal bone, traces of mussel and other shells; charcoal, grain.

Inner Arc, Segment 5 (Fig 10)

Discrete concentrations of pit/gully features (F1065; F1067; F1075; F1086; F1094; F1098; F1106; F1149) forming an arc approximately 6.75m long.

F1065. Linear pit approximately 1.15m long, 0.55m wide, with steep sides and uneven base 0.08m deep; filled by silt (D1064).

D1064.

Bulk samples: very fragmentary pottery (unidentified), burnt mammal bone, traces of oyster; grain.

F1067. Linear pit approximately 1.65m long and 0.70m wide with steep sides and uneven base 0.15m deep; filled by silt (D1066).

D1066.

Lithics: naturally perforated flint nodule with small flakes detached from one end, 2 flint flakes, 4 knapping debris.

Bulk sample residues: burnt mammal bone; charcoal, seeds.

F1075. Oval pit, 0.8m by 0.5m, with steep sides and uneven base 0.16m deep, filled by silt (D1074).

D1074.

Lithics: shattered core fragment, 1 knapping debris.

Bulk sample residues: fragment of hazelnut shell, burnt mammal bone, shellfish; charcoal.

F1086. Irregular linear feature approximately 3m long, with varying width of 0.5-0.8m and a flat base 0.25m deep (probably represents several small pits), filled by silt (D1085).

D1085.

Lithics: core, blade, 3 flakes.

Animal bone (fragments): small amounts unidentified: burnt.

Bulk sample residues: fragment of hazelnut shell, unidentified pottery, knapping debris, burnt mammal bone; charcoal, grain.

Inner Arc, Segment 6 (Fig 10)

Five intercutting pits and gullies (F1108; F1110; F1112; F1114; F1122) arcing from south to north-east, with a combined length of approximately 9m, as well as attendant small pits (F1090; F1116; F1118; F1120; F1141; F1143).

F1110. Elongated pit 1m long, 0.6m wide and 0.2m deep, the sides and base uneven; filled by silt (D1109).

D1109.

Lithics: blade, 10 flakes, 10 knapping debris, serrated blade.

Pottery: 4 fresh or abraded sherds: early Neolithic Plain Bowl (open form): (Sherd group 13).

Bulk sample residues: traces of mussel and whelk.

F1112. Oval pit 0.65m in diameter and 0.2m deep, uneven base; filled by silt (D1111).

D1111.

Pottery: 3 abraded sherds: possibly Bronze Age (therefore intrusive), but may be earlier (Sherd group 254).

Bulk sample residues: traces of cockle, marine annelid tubes; charcoal.

F1108. Subcircular pit 0.7m in diameter and 0.32m deep; filled by silt (D1107).

D1107.

Lithics: blade, 15 flakes (1 burnt; 1 in bullhead flint found to be refitting with 3 flakes from D1109 in pit D1110), 2 knapping debris, 2 serrated flakes (1 slightly burnt).

Pottery: 14 fresh and abraded sherds: early Neolithic Plain Bowl, including neutral forms: 2 fabrics (Sherd groups 11-12).

Animal bone (fragments): 1 unidentified.

Bulk sample residues: mammal bone, cockle, barnacle; charcoal, grain.

F1114. Shallow linear gully approximately 2.4m long and 0.75m wide, with steep sides and an uneven base 0.25m deep; filled by silt (D1113).

D1113.

Lithics: shattered core (slightly burnt), 25 blades (15 burnt, 1 slightly burnt), bladelet (burnt), 97 flakes (14 burnt, 11 slightly burnt), 126 knapping debris (10 burnt to varying degrees), 12 serrated pieces (three burnt); 34 burnt unworked flint.

Pottery: 50 fresh and abraded sherds: early Neolithic including Carinated Bowls (open forms: variously): 3 fabrics (Sherd groups 14-16).

Bulk sample residues: burnt mammal bone, traces of shellfish; grain, seeds.

F1122. Linear gully estimated at 4.3m in length (the terminal having been truncated during evaluation of the site), 0.8m wide and 0.2m deep, the sides and base quite uneven; filled by silt (D1121).

D1121.

Lithics: 3 cores, 14 blades (1 burnt), bladelet, 69 flakes (4 burnt, 4 slightly burnt), 16 knapping debris, 6 serrated or utilised pieces (1 burnt), leaf shaped flint arrowhead (tip missing); 41 burnt unworked flint.

Pottery: 59 fresh sherds: early Neolithic Plain Bowl and possibly Carinated Bowl (open and neutral forms), 1 sherd with a seed impression: 3 fabrics (Sherd groups 17-19).

Bulk sample residues: charcoal, grain, seeds.

F1116. Oval pit, 0.72m by 0.48m, with a dished profile 0.21m deep; filled by silt (D1115).

D1115.

Lithics: 4 flakes (1 burnt), 7 knapping debris (1 burnt); 6 burnt unworked flints.

Pottery: abraded sherd: early Neolithic Plain Bowl (Sherd group 132).

F1118. Subcircular pit, 0.42m by 0.32m with a dished profile 0.23m deep; filled by silt (D1117).

D1117.

Lithics: blade (burnt), 7 flakes (1 burnt), 4 knapping debris (1 burnt); 5 burnt unworked flints.

F1120. Subcircular pit, 0.25m in diameter with a dished profile 0.13m deep; filled by silt (D1119).

D1119.

Lithics: 2 blades, 2 flakes (1 burnt), 2 knapping debris; 2 burnt unworked flints.

F1141. Oval pit approximately 0.5m by 0.4m with steep sides and flat base 0.3m deep; filled by silt (D1140).

D1140.

Lithics: 5 blades (1 burnt), 11 flakes (1 burnt, 1 utilised), 4 knapping debris; 3 burnt unworked flints.

Pottery: 8 fresh sherds: early Neolithic Plain Bowl and possible Carinated Bowl fragments: 2 fabrics (Sherd groups 133-4).

F1143. Subcircular pit with diameters of 0.5m and dished profile 0.2m deep; filled by silt (D1142).

D1142.

Lithics: blade, 4 knapping debris.

Pottery: unidentified crumbs.

F1090. Subcircular pit with diameter of 0.65m and dished profile 0.15m deep; filled by silt (D1089).

D1089.

Lithics: blade, flake.

Inner Arc, Segment 7 (Fig 12)

Four intercutting shallow linear features (F1124; F1126; F1133; F1135), apparently representing at least two phases of activity; approximately 9m long (the extreme western terminal truncated by an evaluation trench) and 0.5m wide; discrete features (F1102; F1104; F1137; F1523) in association.

F1124. Shallow gully 2.55m long, 0.84m wide and 0.09m deep, the base uneven; filled by silt (D1123).

D1123.

Lithics: shattered core fragment, flake, 3 knapping debris.

Pottery: 3 fresh sherds: early Neolithic Carinated Bowls (open forms): (Sherd group 20).

Bulk sample residues: burnt flint, traces of calcined bone and unidentified shellfish; charcoal, seeds.

F1126. Shallow gully 3.65m long and 0.45m wide and 0.20m deep, with a dished profile, the base uneven; filled by silt (D1125).

D1125.

Lithics: 9 blades, 20 flakes (1 burnt, 2 utilised), 1 knapping debris; 5 burnt unworked flints.

Pottery: 12 fresh and abraded sherds: early Neolithic, probably Plain Bowl (Sherd group 21).

Animal bone (fragments): 3 unidentified.

F1135. Short linear feature/elongated pit 1.6m long, approximately 0.55m wide and 0.2m deep, with dished profile, the base uneven; filled by silt (D1134).

D1134.

Bulk sample residues: charcoal.

F1133. Short linear feature/elongated pit 1.58m long, approximately 0.35m wide and 0.27m deep, with a dished profile, the base uneven; filled by silt (D1132).
D1132.
Lithics: 3 flakes, 1 knapping debris.
Bulk sample residues: traces of mussel shell; charcoal.
F1102. Circular pit with diameter of 0.32m, sides near vertical with flat base 0.25m deep; filled by silt (D1101).
D1101.
Lithics: 4 flakes, 1 utilised piece.
Pottery: 1 slightly abraded sherd: Neolithic, form unknown (Sherd group 10).
F1104. Circular pit with diameter of 0.32m, sides near vertical with flat base 0.25m deep; filled by silt (D1103).
F1137. Circular pit with diameter of 0.32m, sides near vertical with flat base 0.25m deep; filled by silt (D1136).
F1523. Circular pit with diameter of 0.5m, sides near vertical with curved base 0.18m deep; filled by silt (D1524).
D1524.
Pottery: 1 fresh sherd: early Neolithic Plain Bowl (?): (Sherd group 34).
Bulk sample residues: traces of oyster; charcoal, seeds.

Inner Arc, Segment 8 (Fig 12)

F1241. Linear gully 2.6m long, 0.5m wide and 0.23m deep, with evenly cut steep sides and an uneven base (truncated at eastern terminal); filled by silt (D1240).
D1240.
Lithics: 1 burnt unworked flint.
Pottery: 13 fresh sherds (+ crumbs): early Neolithic, possible Plain Bowl (open form): (Sherd group 27).
Bulk sample residues: fragment of hazelnut shell, burnt mammal bone, traces of mussel shell; charcoal.

Inner Arc Segment 9 (Fig 12)

Formed by a linear gully (F1161) and associated discrete features (F1163; F1165; F1155; F1157; F1159).
F1161. Linear gully 1.5m long, 0.5m wide and 0.26m deep, with evenly cut steep sides and a flat base; filled by silt (D1160).
D1160.
Lithics: 3 flakes (1 the result of core trimming, 1 utilised), 1 knapping debris.
Pottery: 27 fresh and abraded sherds (+ crumbs): early Neolithic Shouldered Bowl and possible Plain Bowl: 2 fabrics (Sherd groups 29-30).
F1163. Oval pit, 0.52m by 0.29m, with steep sides and a curved base 0.14m deep; filled by silt (D1162).
D1162.
Lithics: flake.
Pottery: 1 slightly abraded sherd: Neolithic (unidentified form): (Sherd group 32).
F1165. Oval pit, 0.44m by 0.32m, heavily truncated, with only the basal 0.05m surviving; filled by silt (D1164).
F1155. Subcircular pit/post-hole 0.26m in diameter and 0.06m deep; filled by silt (D1154).
F1157. Subcircular pit 0.51m in diameter and 0.16m deep; filled by silt (D1156).
D1156.
Lithics: core, 3 flakes, 2 knapping debris; 1 burnt unworked flint.
Animal bone (fragments): 24 unidentified (burnt).
F1159. Subcircular pit, 0.39m in diameter and 0.14m deep; filled by silt (D1158).
D1158.
Lithics: 2 burnt unworked flint.
Animal bone (fragments): 1 unidentified.

Inner Arc Segment 10 (Fig 12)

F1147/1179. An irregular linear gully, 7m long, 0.5m wide and 0.26m deep (the eastern half (1179) potentially a separate feature), with steep sides and a curving profile, the base uneven; filled by silt (D1145/D1178) and possible 'placed deposits' (D1146; D1190; D1191).
D1145.
Lithics: struck lump, 3 blades (1 burnt), 6 flakes, 14 knapping debris.
Pottery: 10 fresh and abraded sherds: early Neolithic Plain and Carinated Bowl (some open forms): 3 fabrics (Sherd groups 22-3; 65).
D1146.
Pottery: 14 abraded sherds: early Neolithic Carinated Bowl (open form): (Sherd group 24).
Bulk sample residues: burnt and unburnt mammal bone, traces of mussel shell; charcoal, grain, seeds.
D1190.
Pottery: 2 fresh sherds: early Neolithic Plain Bowl? (Sherd group 25).
Animal bone (fragments): 1 unidentified (burnt?).
D1191.
Pottery: 17 fresh sherds: early Neolithic probable Plain Bowl (open form): (Sherd group 26).
D1178.
Lithics: 3 flakes, 1 knapping debris.
Pottery: 2 fresh sherds: early Neolithic possible Carinated Bowl (Sherd group 31).
Bulk sample residues: crumbs of pottery, charcoal, grain.

Appendix II. Middle Arc: segment catalogue

(*all measurements are maxima; F=feature, D= deposit; segments/features listed in the order that they appear in the main text; deposits in stratigraphic sequence; all lithics are flint unless otherwise stated).

Middle Arc Segment 1 (Fig 15)

F1042. Linear feature aligned approximately west/east, 2.9m long, 0.56m wide and 0.12m deep, with evenly cut sides and an uneven base; filled by silt (D1041).

D1041.

Lithics: 2 blades, 3 flakes, 18 knapping debris; 1 burnt unworked flint.

Pottery: 26 fresh and abraded sherds: early Neolithic Plain Bowl (open forms) and possible Carinated Bowl (Sherd groups 35-6).

Animal bone (fragments): 4 cattle (teeth).

Bulk sample residues: crumbs of early Neolithic pottery, traces of mammal bone; charcoal, grain, seeds.

Middle Arc Segment 2 (Fig 15)

F1036. Linear feature 5.15m long, 1m wide and 0.3m deep, the sides even and steep and the base generally flat; filled by silt (D1035).

D1035.

Lithics: 2 cores, struck nodule, struck lump, 41 flakes (3 slightly burnt), 13 blades (2 utilised), 17 knapping debris, serrated blade), possible axe fragment (flint?); 1 burnt unworked flint.

Pottery: 34 fresh and abraded sherds: early Neolithic Plain Bowl, Carinated Bowl, Shouldered Bowl (open forms): 4 fabrics (Sherd groups 37-40).

Bulk sample residues: limpet, oyster, mussel, whelk, cockle; charcoal, grain, seeds.

Middle Arc Segment 3 (Fig 16)

Curving linear feature (F1031, cut by F1014) running beyond the western limit of excavation; 9.5m excavated: also cut by a small discrete feature (F1012).

F1031. Linear gully at least 6m long, 1.5m wide and 0.35m deep, with steep sides and a flat but generally uneven base; filled by silt (D1031).

D1031.

Lithics: 2 flakes (1 serrated and slightly burnt).

F1014. Linear gully, rounded at its south-eastern terminal (0.6m wide and 0.6m deep), broadening to 1m wide at the western edge of excavation, 0.22m deep, the sides steep and the base flat and quite uneven; filled by silt (D1013).

D1013.

Lithics: 2 cores, struck nodule, 5 blades (1 burnt), 23 flakes (2 utilised), 35 knapping debris, incomplete transverse arrowhead, retouched scraper, serrated blade.

Pottery: 116 mostly fresh sherds (+ crumbs): early Neolithic Plain Bowl (open forms): 1 sherd with a possible seed impression: 6 fabrics (Sherd groups 41-4; 67-8); 1 sherd: Roman (*c* AD 75-125/150); 2 sherds: later medieval (*c* AD 1075-1175/1200; 1275-1325/50).

Animal bone (fragments): 19 cattle (teeth), 9 unidentified.

Bulk sample residues: burnt unworked flint, traces of mussel, whelk, limpet, cockle, winkle and other shellfish; charcoal, grain, seeds.

F1012. Small post-hole/pit with a diameter of 0.32m and 0.12m deep; filled by silt (D1011).

D1011.

Lithics: 2 core fragments.

Pottery: 1 unidentified prehistoric crumb; 1 probably intrusive post-medieval cream ware (*c* AD 1800-1825).

Other: hand collected small coal fragments: number unknown.

Middle Arc Segment 4 (Fig 17)

Formed by indeterminate features (F1500 cut by F1503) running beyond the western excavation boundary.

F1500. Indeterminate feature, 0.7m in extent, steep-sided and levelling to a flat base 0.28m deep; filled by silt (D1501; D1502).

F1503. Indeterminate feature 0.95 in extent and steep-sided (with a similar profile but suggesting a more northerly alignment), the base quite flat at a depth of 0.3m; filled by silt (D1504).

D1504.

Lithics 2 fragmentary cores, blade.

Middle Arc Segment 5 (Fig 17)

F1559. Linear gully, the surviving portion of which was 6.8m long, 1.2m wide and 0.28m deep with steep sides and a quite uneven base; filled by silts (D1558; D1557).

D1557.

Lithics: 3 cores, 26 flakes (4 utilised), 5 blades (1 utilised), 7 knapping debris, serrated blade.

Pottery: 17 generally abraded sherds: early Neolithic Plain Bowl (neutral and possible open forms) and Shouldered Bowl; a possible seed impression noted on 1 sherd: 4 fabrics (Sherd groups 45-8).

Bulk sample residues: traces of mammal bone; charcoal.

Middle Arc Segment 6 (Fig 18)

F1306. Linear gully/elongated pit, 5.3m long, 1.5m wide and 0.23m deep, with steep sides and an uneven base; filled by silt (D1305).

D1305.

Lithics: 8 shattered cores, 6 blades (1 utilised), 71 flakes (one burnt), 42 knapping fragments (one burnt), arrowhead, knife, 11 scrapers, 2 serrated blades; 4 burnt unworked flint.

Pottery: 52 mainly fresh sherds: early Neolithic including Plain Bowl and Shouldered Bowl: 4 fabrics (Sherd groups 49-52).

Animal bone (fragments): 20 cattle (teeth), 2 sheep (teeth), some unidentified.

Bulk sample residues: traces of oyster shell; charcoal, seeds.

F1640. Subcircular pit, 0.40m in diameter, steep sides to an angled base 0.17-0.20m deep; filled by silt (D1639).

F1397. Subcircular pit, 0.40m in diameter, with vertical sides to a flat base 0.20m deep; filled by silt (D1396).

D1396.

Lithics: flake.

Pottery: 9 fresh sherds (+crumbs): possible Neolithic pottery (Sherd group 137).

Middle Arc Segment 7 (Fig 18)

Formed by a linear cut (F1224) which continued beyond the eastern limit of excavation, tapered and kinked at its south-western terminal and cut by oval pits F1222 and F1350.

F1224. Linear gully (approximately 9.7m revealed within the excavated area), 1.5m wide and 0.28m deep, with curving sides to a gently undulating base; filled by silt (D1223).

D1223.

Lithics: 18 cores, 22 blades (1 burnt, 1 slightly burnt, 2 utilised), bladelet, 118 flakes (37 burnt or heat-affected; 2 refitting, 4 utilised),130 knapping debris (6 burnt), retouched flake, small plane (possibly a rudimentary sickle), 6 scrapers, 10 serrated blades and flakes, backed knife; 8 burnt unworked flint; meta-greywacke stone fragment (find no. 1545) originating from Cornubia, Wales, the English Lake district or the north-central Pennines: no signs of having been worked.

Pottery: 16 fresh and abraded sherds: early Neolithic Plain and possible Shouldered Bowls (open forms): three fabrics (Sherd groups 53-5).

Bulk sample residues: traces of oyster and mussel shell; heat-affected clay, charcoal, grain and seeds.

F1222. Subcircular pit with a diameter of 1.1m and steep sides to a slightly concave base 0.33m deep; filled by silt (D1221).

D1221.

Lithics: shattered core fragment, 11 blades, 21 flakes (7 burnt, 1 notched), 33 knapping debris (4 burnt); 8 burnt unworked flint.

Pottery: 135 fresh and abraded sherds (+ crumbs): early Neolithic Plain Bowl (open and neutral forms): 4 fabrics (Sherd groups 56-9); Sherd group 59 predominated with 120 fresh sherds.

Bulk sample residues: mammal bone, traces of oyster shell; charcoal, grain and seeds.

F1350**.** Oval pit 1.39m long and 0.62m wide, with steep sides and a flat base 0.23m deep; filled by silt (D1349).

D1349.

Lithics: 6 cores and core fragments, 32 blades (4 utilised), 74 flakes (1 burnt, 7 utilised, 3 refitting with 2 flakes recovered from D1223), 28 knapping debris, flaked flake, serrated flake, 2 retouched flakes, 4 serrated blades, possible denticulate, 3 leaf-shaped arrowheads: 1 burnt unworked flint.

Pottery: 4 generally abraded sherds: early Neolithic including Plain Bowl (open form): (Sherd group 59); 22 fresh and abraded sherds: less certainly Neolithic: 3 fabrics (Sherd groups 60-62).

Animal bone (fragments): 35 unidentified.

Bulk sample residues: mammal bone, traces of oyster shell; charcoal, grain, seeds.

Appendix III. Outer Arc: segment catalogue

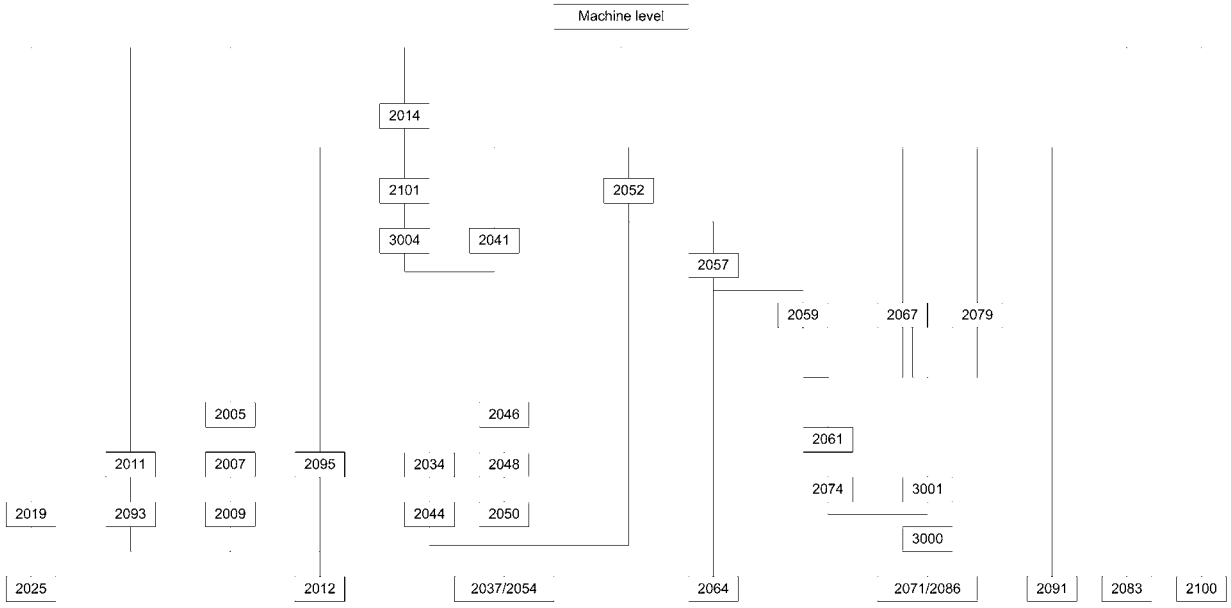
Outer Arc Segment 1 (Figs 23-27)

(*all measurements are maxima; F=feature, D=deposit; segments/features listed in the order that they appear in the main text; deposits in stratigraphic sequence; all lithics are flint unless otherwise stated).

Linear focus for pit-cutting and deposition 16m long (excluding potential outliers F2083; F2100) and aligned south-east/north-west, formed by a series of early pits (F2091; F2071/2086; F3000; F3001; F2037/2054), an intercutting south-eastern and central pit complex (F2074; F2061; F2079; F2057; F2059; F2052; F2050; F2048; F2046; F2044; F2034; F2041; F3004; F2101), a shallow linear gully with attendant pits to the north-west (F2012; F2095; F2009; F2007; F2005; F2093; F2011; F2025; F2019) and final remodelling via a large shallow linear (F2014).

F2091. Large oval pit 1.6m long, 1m wide and 0.7m deep, the sides steep and the base uneven; filled by chalk rubbles D2090; D2089 overlain by clayey silts (D2088; D2087).

Fig 97. Cut matrix for Outer Arc, Segment 1.



D2089.

Lithics: flake, 10 knapping debris.

Bulk sample residues: traces of oyster.

D2088.

Lithics: 3 flakes (1 burnt), 19 knapping debris.

Animal bone (fragments): 8 cattle (humerus; mandible; 6 teeth), 2 cattle-sized.

Bulk sample residues: traces of mussel.

Other: occasional carbon and 12 fragments of heat-affected clay.

F2071/2086. Probably the remnant a large elongated pit; truncated: approximately 1.3m by 1.25m remaining, vertical and partially undercut south-eastern edge and a flattish base inclined slightly towards the north-west at 0.15m deep; filled by silt (D2070/2085).

F3000. Elongated pit with a stepped south-eastern edge and a shallow concave base sloping towards the north-west. Heavily truncated, remnants of the base seem to have covered as much as 2m with parts surviving to a depth of approximately 0.45m; filled by clayey silt (D2069/2084) and loose chalk (D2068/2081).

D2069/2084.

Lithics: blade, 4 flakes, 6 knapping debris.

D2068/2081.

Bulk sample residues: traces of mussel.

F3001. Remains of a pit with a fairly steep south-eastern edge truncated to a depth of 0.2m and an extensive base (approximately 1.7m x 1.2m remaining); filled by silt (D2080).

F2037/2054. Elongated pit severely truncated by later pitting, 2.6m long and 1m wide with a maximum depth of 0.55m, the sides steep and occasionally slightly undercut, the base generally flat with slight undulations throughout; filled by silty clay and chalk rubble (D2053) and silts (D2036; D2035).

D2053.

Bulk sample residues: traces of oyster and mussel; charcoal, grain.

D2036.

Lithics: blade, 6 flakes, 72 knapping debris.

Bulk sample residues: traces of oyster and mussel.

D2035.

Bulk sample residues: traces of oyster; charcoal.

F2079. Subcircular pit 0.6m in diameter with vertical sides, stepped and partially undercut on its southern edge to a concave base 0.85m deep; filled by silts (D2078; D2077).

D2078.

Lithics: blade, flake.

Animal bone (fragments): 4 cattle (mandible; pelvis; femur; metatarsal), 3 cattle-sized pieces; 7 unidentified.

D2077.

Lithics: 1 burnt unworked flint.

Pottery: 2 fresh sherds: early Neolithic (Sherd group 71).

Animal bone (fragments): 1 cattle (tooth).

Other: 8 fragments of heat-affected clay.

F2067. Subcircular pit 0.6m in diameter with vertical sides to a concave base 0.85m deep; filled by silt (D2066).

D2066.

Other: fragments of fired clay.

F2074. Subcircular pit approximately 1m in diameter, with near vertical sides and a flat base 0.6m deep; filled by silt deposits (D2073 (frequent chalk inclusions); D2072).

D2073.

Other: unidentified fragments of nutshell.

F2061**.** Oval pit approximately 1.1m x 0.75m with steep sides and a concave base 0.35m deep; filled by silt (with frequent chalk) D2060.

F2059. Subcircular pit with a reconstructed diameter of approximately 0.5m and steep sides to concave base, the surviving depth being 0.25m; filled by silt (D2058).

F2064. Subcircular pit approximately 0.7m in diameter and 0.6m deep; filled by silt (D2063).

F2057. Oval pit 0.75m long, 0.5m wide and 0.28m deep; filled by silt (D2056: with noticeably high charcoal and heat-affected clay content).

D2056.

Lithics: two platform core, 2 blades, 11 flakes (1 slightly burnt, 1 utilised) and 15 knapping debris; 4 burnt unworked flints.

Animal bone (fragments): 7 cattle (6 mandibles; 1 tooth, 34 cattle-sized.

Bulk sample residues: traces of oyster and mussel shell.

F 2052. Oval pit 1m by 0.8m, with near vertical sides 0.55m deep; filled by silt (D2051).

D2051.

Lithics: shattered core fragment, utilised blade, 4 flakes, 20 knapping debris; 11 burnt unworked flints.

Pottery: 6 fresh and slightly abraded sherds (+ crumbs): early Neolithic Plain Bowl (open form): (Sherd Group 75).

Bulk sample residues: traces of mammal bone and oyster.

Other: fragment of heat-affected clay.

F2050. Steep curving cut suggesting a discrete feature with a diameter of perhaps 0.5m and 0.3m deep; filled by silt (D2049).

F2048. Subcircular steep-sided pit, 0.5m in diameter with a flat base and 0.75m deep; filled by silt (D2047).

F2046. Shallow oval pit, 0.75 x 0.5m and 0.45m deep, steep-sided with an angled base; filled by silt (D2045).

D2045.

Lithics: 2 flakes, 15 knapping debris; 18 burnt unworked flints.

Other: 20 fragments of heat-affected clay.

F2044. Curving cut suggesting small pit with an original diameter of 0.5m, dropping steeply to a concave base 0.3m deep; filled by chalky silt (D2043) and silt (D2042).

D2042.
Bulk sample residues: heat-affected clay, charcoal, seeds.

F2034. Indeterminate feature 2.1m by 0.9m (cutting pit 2037/2054), the base sloping towards the north-west, its surviving edge vertical and partially undercut to a depth of 0.15m; filled by silts (D2033; D2032) and chalky silt (D2031).

D2033. Lithics: blade, 2 flakes, 83 knapping debris.
Pottery: fresh sherd: early Neolithic (Sherd group 72).
Animal bone (fragments): 2 cattle (cranium, mandible), 1 cattle-sized.
Bulk sample residues: crumbs of pottery, traces of mammal bone and oyster; charcoal.

D2032.
Lithics: blade, 3 flakes, 20 knapping debris; 1 burnt unworked flint.
Animal bone (fragments): 3 cattle (2 vertebra; 1pelvis), 1 cattle-sized, 4 unidentified.
Bulk sample residues: burnt and unburnt mammal bone, traces of oyster.
Radiocarbon date: *3800-3660 cal BC* (*at 95% probability*; *UBA-14304*; Table 2).

D2031.
Lithics: 22 knapping debris; 1 burnt unworked flint.
Animal bone (fragments): 1 cattle (vertebra); 3 cattle-sized.

F3004. Shallow dish shaped pit, approximately 0.5m in extent and 0.1m deep; filled by silt (D2030).

F2101. Subcircular pit 1m in diameter with steep sides and a flat base 0.2m deep; filled by silt (D2017/2029).
D2017/2029.
Lithics: 2 flakes; 15 knapping debris.
Pottery: 2 fresh sherds: early Neolithic (Sherd group 72).
Animal bone (fragments): 8 cattle (1 cranial; 3 vertebral; 1 pelvic; 2 metatarsal; 1 metapodial), 6 cattle-sized.
Shellfish: whelk shell.
Bulk sample residues: crumbs of pottery, traces of mammal and small mammal bone, oyster, mussel; heat-affected clay; charcoal.

F2041. Probable post-hole (2041), 0.3m in diameter with vertical sides to a flat base 0.58m deep; filled by 'carbon' (D2040) and chalk rubble (D2038; D2039).

D2038.
Other: charcoal and heat-affected clay (moderate).

D2039.
Other: charcoal and heat-affected clay (moderate).

F2012. Shallow hollow on a north-west/south east alignment, 4.1m long, 2.2m wide and 0.1m deep; filled by silt (D2013).

F2095. Probable post-hole, 0.28m in diameter with near vertical sides 0.39m deep; filled by silt (D2096).

D2096.
Bulk sample residues: traces of oyster and mussel.
Other: flecks of heat-affected clay and charcoal.

F2009. Shallow pit aligned west/east, approximately 1.55m long and 1m wide, with steep sides and an uneven base 0.23m deep; filled by silt (D2008).

D2008.
Lithics: 2 blades, 6 flakes, 21 knapping debris.
Pottery: 4 fresh sherds (+ crumbs): probably Neolithic (Sherd group 76).
Animal bone (fragments): 3 cattle-sized.
Bulk sample residues: mammal bone, traces of oyster and mussel; charcoal, grain, seeds.

F2007. Oval pit 0.75m long and 0.6m wide, with a near vertical western edge dipping to a concave base 0.38m deep; filled by silt (D2006).

D2006.
Lithics: blade, 2 flakes.

F2005. Oval pit 1.1m long and 0.55m wide, with near vertical sides and uneven base 0.15m deep; filled by silt (D2004).

D2004.
Lithics: 2 cores, 15 flakes; 10 burnt unworked flint.
Animal bone (fragments): 9 cattle (1 cranium; 4 mandible; 2 teeth; 2 femurs); 24 cattle-sized.

F2093. Oval pit, 1m long and 0.75m wide, with vertical sides and a flat base 0.85m deep; filled by frequent natural flint and chalk in silt matrix (D2092).

D2092.
Other: charcoal flecking.

F2011. Pit 0.6m in diameter with a concave base 0.23m deep; filled by silt (D2010).

D2010.
Lithics: 5 flakes, 21 knapping debris.
Animal bone (fragments): 2 cattle (metatarsal).

F2025. Subcircular pit 1.25m in diameter with an uneven base 1m deep; filled by silts (D2024; D2022; D2021) and chalk rubble (D2020).

D2022.
Bulk sample residues: traces of mammal bone and oyster; heat-affected clay.

D2021.
Lithics: 2 struck lumps, 3 blades, 9 flakes, 20 knapping debris.
Bulk sample residues: traces of fish bone and oyster.

D2020.
Bulk sample residues: traces of oyster.

F2019. Subcircular pit 1m in diameter and 0.9m deep; filled by silt (D2018).

D2018.

Lithics: struck lump, 7 blades (1 burnt), 6 flakes, 24 knapping debris; 2 scrapers; 3 burnt unworked flint.

Pottery: 13 fresh and abraded sherds (+ crumbs): early Neolithic Plain Bowl (open form); 2 sherds: probably Neolithic (Sherd groups 77-8).

Animal bone (fragments): 1 cattle (radius), 2 cattle-sized.

Bulk sample residues: further traces of mammal bone, along with oyster and eggshell; heat-affected clay, charcoal.

F2014. Irregular linear hollow, aligned north-west/south-east, 5.4m long, 1.75m wide and 0.5m deep; filled by silts D2015=D2016=D2028=D2055=D2075=D2076 =D2094.

D2015=D2016=D2028=D2055=D2075=D2076 =D2094.

Lithics: blade (burnt), 10 flakes (1 burnt), 4 knapping debris; 6 burnt unworked flint.

Pottery: 9 fresh sherds: early Neolithic Plain Bowl (Sherd group 237); fresh beaker sherd (Sherd group 242); at least 26 sherds (+ crumbs): Bronze Age (Sherd groups 238-41).

Bulk sample residues: small fragments of pottery and traces of mammal bone, oyster and mussel.

Outer Arc Segment 2 (Fig 28)

(*all measurements are maxima; D=deposit; deposits in stratigraphic sequence; all lithics are flint unless otherwise stated).

F1181.

D1331.

Lithics: utilised flake.

Animal bone (fragments): 1 cattle (metatarsal), 8 cattle-sized, 1 sheep-sized, 7 unidentified.

D1193.

Lithics: shattered core fragment, 23 blades (3 utilised, 3 burnt), 57 flakes (1 reflaked, 1 retouched, 12 burnt); 140 knapping debris.

Pottery: 12 large fresh and conjoining sherds of an early Neolithic Plain Bowl (open form; 28 per cent complete) crushed *in situ* (Sherd group 87); 21 fresh or slightly abraded sherds: early Neolithic Plain Bowl, Carinated bowl and uncertain: 4 fabrics (Sherd groups 84-6; 88).

Animal bone (fragments): 16 cattle (4 ribs (3 right and 1 left)), 113 further rib fragments among 164 cattle-sized, 2 pig (mandible; cranium), 2 sheep-sized.

Shellfish: 226 limpet shells, 778 cockle shells, 1 mussel shell.

Bulk sample residues: winkle, top shells and dog coprolite (fossil faeces).

Radiocarbon date: *3700-3635 cal BC* (*at 95% probability*; *UBA-14305*; Table 2).

D1194.

Lithics: blade, 10 flakes, 27 knapping debris, reflaked flake.

Bulk sample residues: heat-affected clay (high temperature), mammal and bird bone, oyster, mussel, cockle, winkle, scrobicularia, top shell; charcoal and charred seeds.

D1180.

Lithics: 3 cores, 51 blades (2 burnt, 2 utilised), 137 flakes (1 detached from a ground and polished axe, 6 burnt, 1 utilised), 44 knapping debris, serrated flake; 4 burnt unworked flint.

Pottery: 39 fresh and abraded sherds: early Neolithic including possible Carinated and Shouldered Bowls (open and neutral forms): 5 fabrics (Sherd groups 79-83).

Animal bone (fragments): 5 cattle (cranium; 2 teeth; calcaneum; 1st phalanx), 74 cattle-sized, 1 sheep (mandible), 2 sheep-sized.

Shellfish: 'small quantities' of limpet and cockle shell.

Bulk sample residues: burnt flint, pottery, burnt and unburnt mammal bone, mussel, cockle, winkle and a trace of *chlamys varia*; heat-affected clay, charcoal, grain, seeds.

Other: three pieces of heat-affected clay.

Outer Arc Segment 3 (Figs 29-32)

(*all measurements are maxima; F=feature, D=deposit; segments/features listed in the order that they appear in the main text; deposits in stratigraphic sequence; all lithics are flint unless otherwise stated).

Linear focus of pit-cutting and deposition 8.65m long (although potentially extended by feature 3016, see below), formed by a series of early elongated pits (F1574; F1384; F1370), cut by more extensive elongated pits (F3005; F1551; F1385; F1358), smaller pits and potential post-holes (F1261; F3009; F1656; F1659; F3015), and longer shallow linear cuts (F1653; F1683/3013; F3018), the established segment then being the focus for further small pits and potential post-holes (F1271; F1250; F1634) and Segment 4 (F3016) which appears to have filled the gap between Segments 3 and 5 (see also F1216, Segment 5 below).

F1574. A large pit, 2.3m long, 1.3m wide and 0.5m deep, the sides steep and the base concave but uneven; filled by laminations of loose silts and chalk (D1573; D1587-90), followed by more extensive chalk dumps (D1586; D1573), D1586 contained a very large worked flint deposit, possibly *in situ* knapping.

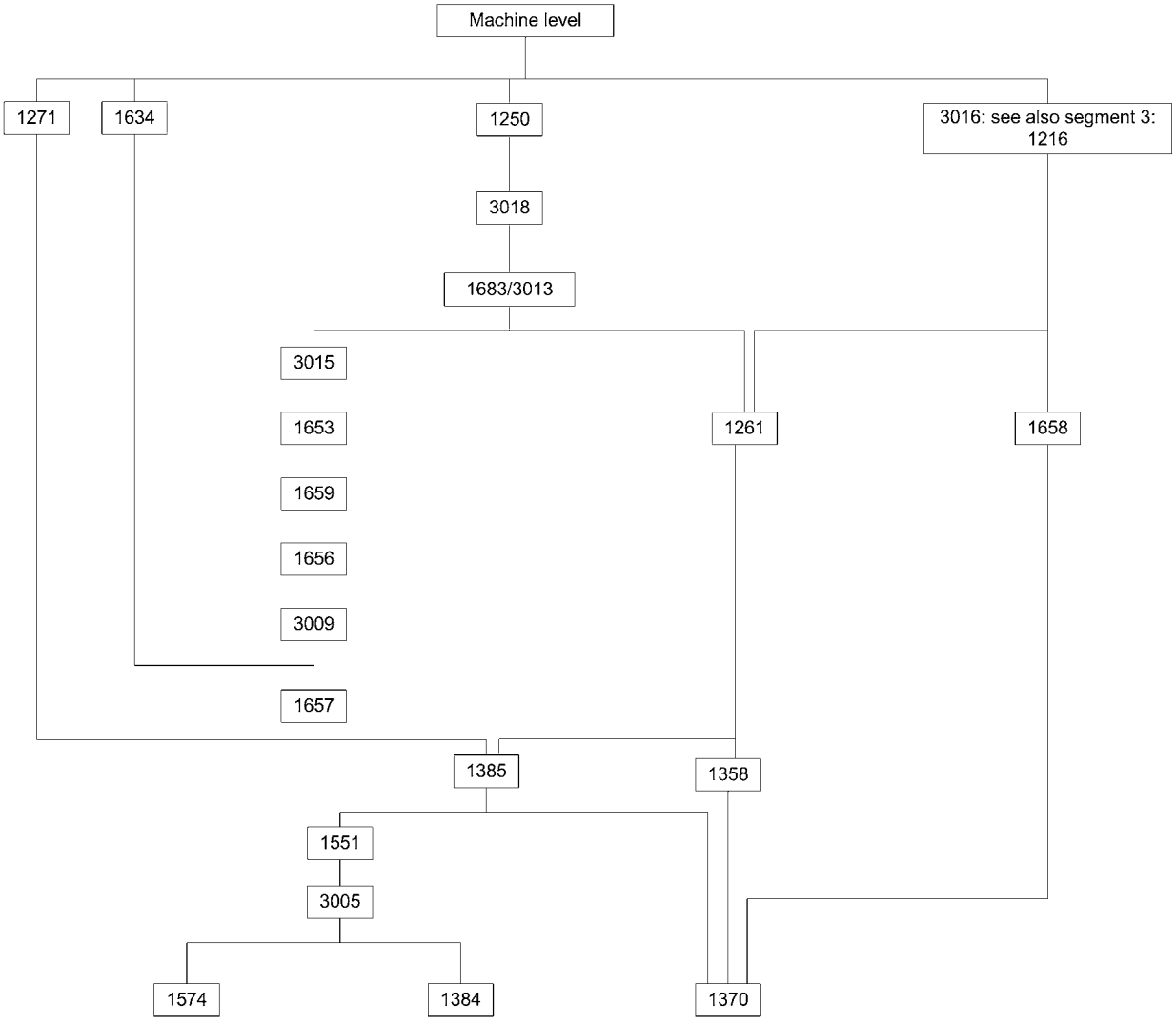


Fig 98. Cut matrix for Outer Arc, Segment 3.

D1588.

Bulk sample residues: traces of mammal bone and oyster; charcoal.

D1586.

Lithics: 19 cores and core fragments, 3 struck nodules, a struck lump, 16 blades, 145 flakes (2 utilised), 102 knapping debris (1 slightly burnt), bifacially worked piece.

Pottery: 8 fresh sherds: early Neolithic (Sherd group 96).

Animal bone (fragments): 1 cattle (humerus: burnt/heated), 5 cattle-sized, 5 pig (3 vertebra; 2 proximal phalanges: un-fused, from same animal).

Shellfish: mussel shell.

Radiocarbon date: *3710-3635 cal BC* (*at 95% probability*; *GrA-30882*; Table 2).

D1573.

Lithics: 3 blades, 13 flakes, 6 knapping debris.

Animal bone (fragments): 5 cattle (femur; tibia; 2 tarsal; metatarsal), some articulating and showing signs of heating and cut marks; tibia shaft gnawed by a carnivore.

F1384. Elongated pit aligned roughly south-west/north-east, oval and of approximately 2.5m long and 1.23m wide; near vertical sides except the more shallow eastern edge and an undulating base 0.4m deep; filled by a probable 'placed deposit' (D1632), a lens of silt (D1383) and chalk rubble in a silty matrix (D1316).

D1632.

Lithics: core fragment, 17 blades, 112 flakes, 109 knapping debris.

Animal bone (fragments): 2 cattle (mandible; vertebra), 2 cattle-sized.

Radiocarbon date: *3760-3630 cal BC* (*at 95% probability*; *UBA-14306*; Table 2).

D1316.
Lithics: 10 core fragments, 43 blades, 282 flakes (1 utilised), 584 knapping debris, end scraper.
Pottery: 1 fresh sherd: early Neolithic possibly Plain Bowl (Sherd group 95).
Animal bone (fragments): 1cattle (vertebra).
Bulk sample residues: traces of mammal bone and oyster; heat-affected clay, charcoal.

D1312.
Lithics: 23 core fragments, 82 blades (1 utilised), 801 flakes (2 utilised), 256 knapping debris.
Pottery: 10 fresh sherds (+ crumbs): early Neolithic possible Plain Bowl (Sherd group 94).
Bulk sample residues: traces of mammal bone; charcoal.

D1313.
Lithics: 5 shattered core fragments, 4 blades, 56 flakes (3 utilised), 13 knapping debris.
Animal bone (fragments): 1 cattle (femur), 3 sheep (mandible; upper molar (burnt/heated); pelvis).
Bulk sample residues: traces of mammal bone; charcoal.

F3005. An apparently oval pit approximately 2.4m long and 1.25m wide, with a concave base approximately 0.25m deep; filled by fairly compact chalk rubble fills (D1591; D1576; D1407; D1412).

D1576.
Bulk sample residues: burnt flint, traces of mammal bone and oyster; charcoal.

D1407.
Lithics: single platform core, blade, 9 flakes (1 utilised), 22 knapping debris.
Animal bone (fragments): 1 cattle-sized.

F1551. Truncated irregular pit approximately 4m by 2.15m and 0.4m deep, the edges initially steep or near vertical before breaking to shallow sides forming concave and undulating base; filled by mixed chalk rubble and silt deposits (D1572; D1571; D1408; D1606; D3007) interrupted by smaller discrete chalk and silt deposits (D1575; D1570; D3006; D3008; D1567; D1568).

D1575.
Bulk sample residues: traces of mammal bone and oyster; charcoal.

D1572.
Animal bone (fragments): 3 cattle (mandible; rib; scapula), 1 cattle-sized.
Bulk sample residues: traces of oyster.

D1568.
Lithics: 7 knapping debris.

F1370. Irregular oval pit, 2.3m by 1.15m in extent, with vertical sides and an uneven base 0.8m deep; filled by silts (D1368; D1278), possible knapping deposits (D1291; D1288) separated by chalk spread (D1289) and chalk rubbles (D1277; D1362).

D1368.
Lithics: 17 knapping debris.
Bulk sample residues: traces of oyster; charcoal, seeds.

D1278.
Lithics: 8 blades, 46 flakes, 114 knapping debris.

D1291.
Lithics: struck nodule core, 32 blades, 113 flakes, 60 knapping debris, reflaked flake, bifacial piece.
Pottery: 5 sherds recorded *in situ*, some apparently lost; 3 fresh sherds: 2 early Neolithic Plain Bowl (open form) and 1 possibly Neolithic: 2 fabrics (Sherd groups 92-3); a sherd from Sherd group 93 conjoins with pottery from feature F3016.

D1288.
Lithics: core, 11 blades, 57 flakes, 48 knapping debris.
Animal bone (fragments): 2 cattle (mandible; scapula), 12 cattle-sized, 4 sheep (cranium).

D1277.
Lithics: two platform core, blade, 12 flakes, 4 knapping debris.
Animal bone (fragments): 1 cattle (mandible).

D1362.
Bulk sample residues: mammal bone, crumbs of unidentified pottery; charcoal.

F1385. Large oval pit 3.15m long and 1.9m wide with fairly steep sides and an uneven base 1.1m deep; filled by a sequence of thin silt layers (D1281; D1255; D1269; D1346; D1344; D1382) and chalk rubble (D1267; D1280; D1374-1381; D1386), the silts tending to be earlier and localised at the western end while the chalk deposits, at first alternating with the silts, generally formed later slumping tips at the eastern end.

D1255.
Lithics: flake, 29 knapping debris, serrated blade.
Animal bone (fragments): 1 cattle (metatarsal), 1 cattle-sized.

D1346.
Lithics: core, 2 blades, 2 flakes, 17 knapping debris, end scraper.
Animal bone (fragments): 1 sheep (femur).

D1344.
Lithics: 10 flakes, 14 knapping debris.
Pottery: 2 fresh sherds: Neolithic (Sherd group 100).
Animal bone (fragments): 3 cattle (mandible; vertebra; tibia).
Bulk sample residues: traces of oyster; heat-affected clay, charcoal.

D1375; D1377-81.
Bulk sample residues: traces of oyster; charcoal.

D1386.
Bulk sample residues: heat-affected clay, seeds.

F1358. Oval pit 1.70m by 1.05m with vertical sides to a flat base approximately 0.7m deep; filled by a possible 'placed deposit' (D1272), dumps of chalk rubble (D1364; D1361), silt (D1360), silty clay (D1359) and further loose chalk (D1426).

D1272.

Lithics: core, 1 flake, 5 knapping debris.

Pottery: 29 fresh sherds: early Neolithic Plain Bowl (neutral form): (Sherd group 98); some conjoining with sherds from F3016.

Animal bone (fragments): 1 cattle (femur: burnt at the end).

Bulk sample residues: crumbs of pottery and traces of oyster; heat-affected clay, charcoal.

Radiocarbon date: *3705-3635 cal BC* (*at 95% probability*; *OxA-15390*; Table 2).

D1364; D1361; D1360; D1359.

Bulk sample residues: traces of oyster shell; charcoal, seeds.

F1657. Oval pit 3.85m long and 2.15m wide, with near vertical and occasionally slightly undercut sides to a generally flat but undulating base 0.8m deep; filled by chalk rubble (D1566), silty clay (D1399; D1399), a thin spread of chalk (D1565), a thin and loose spread of carbon, ash and small chalk fragments (D1550) and a compact silt deposit (D1549).

D1566.

Lithics: shattered core, 14 flakes, 43 knapping debris.

Animal bone (fragments): 3 cattle (vertebra; radius; astragalus), 2 cattle-sized.

Bulk sample residues: traces of oyster; charcoal.

D1565.

Lithics: 2 blades, 14 flakes, 18 knapping debris.

Animal bone (fragments): 3 cattle (2 tarsal; 1 calcaneum), 2 cattle-sized.

Bulk sample residues: traces of mammal bone and oyster; charcoal.

D1549.

Lithics: 6 flakes, 14 knapping debris.

Animal bone (fragments): 1 cattle-sized.

Bulk sample residues: traces of mussel shell; charcoal, grain.

F3009. Indeterminate feature only seen in section, 1.92m in extent and 0.2m deep; filled by silt (D1678).

F1656. Subcircular pit 0.75m in diameter and 0.58m deep; filled by chalk rubble (D1341).

D1341.

Bulk sample residues: traces of oyster; charcoal.

F1659. Subcircular pit 0.34m in diameter and 0.3m deep, steep-sided; filled by silt (D1338).

D1338.

Bulk sample residues: traces of oyster; charcoal, seeds.

F1653. Truncated southern side and concave base of an indeterminate feature, 3.1m long, 0.3m wide and 0.41m deep; filled by silty deposits with frequent chalk inclusions (D1336; D1335; D1334; D1265).

D1335.

Lithics: struck lump, 7 flakes.

Animal bone (fragments): 1 sheep-sized.

D1334.

Lithics: blade, flake.

Animal bone (fragments): 2 cattle-sized, 2 sheep-sized.

D1265.

Lithics: 2 blades, 4 flakes, 59 knapping debris.

Animal bone (fragments): 2 cattle (2 mandibles).

Bulk sample residues: traces of oyster; charcoal.

F3015. Small discrete feature, 0.2m by 0.15m and 0.2m deep; filled by chalky silt (D3014).

F1261. Oval pit 1.7m long and 0.9m wide, with a vertical northern edge and slightly shallower sides to the south, the base concave at a depth of 0.9m; filled by a localised lens of silt (D1257), and general dumps of chalk rubble (D1357 being mixed with silt and deposit; D1242 consisting almost entirely of chalk fragments).

D1357.

Bulk sample residues: unidentified mammal bone, traces of oyster; charcoal.

D1242.

Lithics: multi-platform core, 3 blades and 7 flakes.

Bulk sample residues: traces of oyster; charcoal.

F1683/3013. Arcing linear feature, 6m long, 1.5m and 0.45m deep; filled by a probable 'placed deposit' (D1473) and dumps of chalk rubble (D1530-32; D3012) alternating with small pockets of silt at the western end (D1533; D1605); D1530 also contained evidence of a 'placed deposit'.

D1473.

Lithics: core, 6 blades, 11 flakes, 2 knapping debris, side scraper.

Animal bone (fragments): 7 cattle (near complete cranium from adult domestic cow aged 7-10 years; 5 humerus), 29 cattle-sized, 62 sheep/goat (including articulations; 4 mandible; 12 tooth; 2 vertebra; 4 rib; 2 scapula; 3 humerus; 4 radius; 5 ulna; 3 metacarpal; 3 carpal; 3 tibia; 1 astragalus; 3 metatarsal; 1 metapodial; 12 phalanx), 245 sheep-sized (1 burnt).

Radiocarbon dates: *3645-3570 cal BC* (*at 95% probability*; *OxA-15447*; Table 2); *3645-3570 cal BC* (*at 95% probability*; *GrA-30880*; Table 2).

D1530.

Lithics: 5 blades, 13 flakes, 59 knapping debris.

Pottery: 2 abraded sherds: probably Neolithic: (Sherd group 101).

Animal bone (fragments): 7 cattle (near complete cranium from adult domestic cow aged about 4-5 years; 1 mandible; 1 pelvis), 26 cattle-sized.

Bulk sample residues: traces of mammal bone; charcoal.
Radiocarbon date: *3655-3565 cal BC* (*at 95% probability*; *UBA-14307*; Table 2).

D1531.
Animal bone (fragments): 2 cattle (radius; ulna).
Bulk sample residues: traces of cockle shell; charcoal.

D1532.
Bulk sample residues: charcoal.

F3018. Linear feature approximately 5m long and 2.2m wide, with shallow sides to an uneven base 0.3m deep; filled by silt (D3017).

F1250. Oval pit 1.3m by 1m in extent, with steep sides to an angled base 0.7m deep; filled by silt (D1249).

D1249.
Lithics: 4 blades (1 utilised), 11 flakes, 38 knapping debris, retouched flake, end scraper; 4 burnt unworked flints.
Pottery: 5 fresh sherds: early Neolithic possible Plain Bowl (Sherd group 102).
Animal bone (fragments): fragmentary animal bone seems not to have survived for analysis.
Bulk sample residues: traces of oyster; charcoal.

F1634. Probable post-hole, 0.3m in diameter with vertical sides to a concave base 1m deep; filled by silt (D1633).

D1633.
Lithics: 3 burnt unworked flint.
Bulk sample residues: traces of small mammal bone; heat-affected clay, charcoal.

F1271. Probable post-hole with a maximum width of 0.4m and vertical sides and a flat base 0.75m deep, filled with loose chalk rubble (D1270).

D1271.
Bulk sample residues: unidentified bone; heat-affected clay.

F1658. Probable post-hole 0.3m in diameter with vertical sides and a concave base 0.3m deep; filled by silt (D1365).

D1365.
Bulk sample residues: traces of oyster; charcoal.

Outer Arc Segment 4 (Figs 33-34)

(*all measurements are maxima; D= deposit; deposits in stratigraphic sequence; all lithics are flint unless otherwise stated).

F3016. Linear feature >8m long and up to 2.75m wide, depth varying from 0.2m – 0.55m containing dark grey brown clay silt (D40).

D40.
Lithics: hammerstone, 3 struck lumps, 8 cores and core fragments (2 burnt), 7 blades (3 burnt), 2 bladelets, 111 flakes (32 burnt or slightly burnt), 9 knapping debris (2 burnt), 2 retouched pieces (1 burnt), end scraper, 2 end and side scrapers (1 burnt).
Pottery: 206 fresh and abraded sherds: early Neolithic Plain Bowl, Carinated Bowl and Shouldered Bowl (including open forms): 9 fabrics (Sherd groups 256-264). Sherds of Plain Bowl from deposit D40 (sherd group 262) were found to conjoin with sherds from adjacent feature 1358 (1272: sherd group 98).
Animal bone (fragments): 3 cattle (mandible).

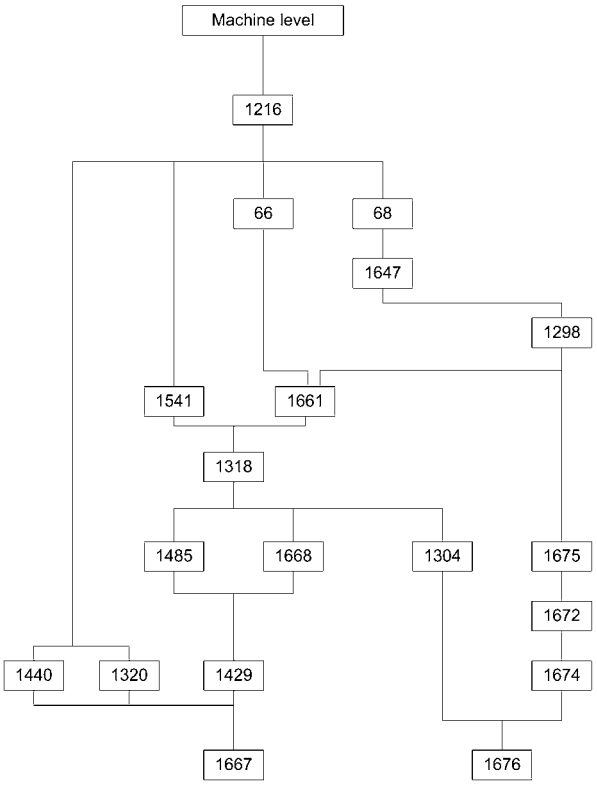


Fig 99. Cut matrix for Outer Arc, Segment 5.

Outer Arc Segment 5 (Figs 35-37)

(*all measurements are maxima; F=feature, D= deposit; segments/features listed in the order that they appear in the main text; deposits in stratigraphic sequence; all lithics are flint unless otherwise stated).

Approximately 7.4m from the north-western terminal of Segment 3, a linear concentration of pits and deposition with two initial focus areas based on early pits eventually joined form an arching segment.

F1667. Large early pit, with a maximum extent of perhaps 2.6m by approximately 1.8m, steep southern and northern edges and a roughly flat base (within those portions remaining) 0.84m deep; filled by concentrations of worked flint in a silty matrix (D55=D60;

D1217; D1279; D1317; D1323; D1372; D1392; D1417; D1420; D1431; D1622).

D55.

Lithics: 45 cores, struck lumps and nodules, 113 blades (1 utilised), 828 flakes (1 utilised), 1053 knapping debris (1 burnt), retouched flake, end scraper; 17 burnt unworked flint.

Pottery: 2 abraded sherds: unidentified: 2 fabrics (Sherd groups 115-6).

Animal bone (fragments): 4 cattle (tibia; astragalus; tarsal; metatarsal), 19 cattle-sized (2 with signs of burning), 5 sheep (humerus; articulating right humerus; radius; ulna; metacarpal), 1 sheep-sized, 1 pig (cranium).

Radiocarbon date: *3740-3650 cal BC* (*at 95% probability*; *OxA-15448*; Table 2).

F3020. Indeterminate feature, perhaps subrectangular and approximately 2m by 1.5m in extent with sloping sides and a flat base: depth unknown; filled by silt (?) and disturbed worked flint (apparently originating from flint deposits from pit F1667).

F1440. Semi-circular pit, 2m x 1.8m, with vertical sides considerably undercut on its south-western edge, the base, at a maximum depth of 0.6m, sloped towards the south-east (although this break of slope possibly a remnant of the base of early pit 1667, not fully recognised during excavation); filled by complex series of silty clay deposits with frequent small chalk inclusions (D1497; D1496; D1495; D1494; D1490; D1373; D1489; D1492; D1491; D1373; D1262; D1486; D1485; D1480; D1479; D1507; D1512) and chalk rubble (D1433; D1419; D1237; D1585).

D1497.

Bulk sample residues: mammal bone and oyster.

D1496.

Bulk sample residues: mammal bone and oyster.

D1495.

Bulk sample residues: traces of mammal bone and oyster.

D1433.

Bulk sample residues: heat-affected clay, small mammal, traces of oyster; charcoal.

D1419.

Bulk sample residues: traces of mammal; heat-affected clay.

D1495.

Bulk sample residues: traces of mammal bone and oyster.

D1490.

Bulk sample residues: mammal bone, fish tooth, traces of oyster; charcoal, seeds.

D1373.

Lithics: 4 blades, 4 flakes, 7 knapping debris.

Animal bone (fragments): 1 cattle (rib).

Bulk sample residues: mammal bone, traces of oyster; charcoal.

D1489.

Animal bone (fragments): 2 cattle (articulating radius and ulna), 1 cattle-sized.

Bulk sample residues: burnt flint, mammal bone; heat-affected clay and charcoal.

Radiocarbon date: 3770-3640 cal BC (4912±31 BP; OxA-15543).

D1492.

Lithics: flake, 8 knapping debris.

Animal bone (fragments): 1 cattle-sized.

Bulk sample residues: mammal bone, traces of oyster; charcoal.

D1491.

Bulk sample residues: mammal bone, traces of oyster; charcoal, seeds.

D1373.

Bulk sample residues: mammal bone, traces of oyster; charcoal.

D1237.

Bulk sample residues: mammal bone, traces of oyster.

D1585.

Bulk sample residues: traces of oyster; charcoal.

D1262.

Lithics: 3 blades, 15 flakes, 11 knapping debris.

Animal bone (fragments): 2 cattle (radius; ulna: apparently fused prior to death, both with signs of burning), 9 cattle-sized.

Bulk sample residues: traces of oyster; charcoal.

D1485.

Bulk sample residues: traces of oyster; heat-affected clay, charcoal.

D1480.

Bulk sample residues: traces of mammal bone, oyster; charcoal.

D1507.

Bulk sample residues: traces of oyster; charcoal.

D1512.

Lithics: 2 blades, 9 knapping debris.

Bulk sample residues: traces of mammal bone and oyster.

F1429. Oval pit at least 2.3m long and 0.95m wide, the north-east side initially steep but with a break of slope and a shallow edge leading to an uneven base 0.36m deep; filled by a thin lens of silt and chalk (D1455), silt (D1613) with a localised patch of chalk (D1614) and loose and compact chalk rubble (D1478; D1477; D1449; D1444; D1448; D54).

D1455.

Bulk sample residues: traces of mammal (or possibly human) bone and oyster.

D1449.

Bulk sample residues: traces of mammal bone and oyster; charcoal.

F1485. Small discrete feature 0.45m by 0.31m and 0.2m deep; filled by an initial lens of silt (D1476) capped by a compact chalk (D1446).

D1446.

Bulk sample residues: traces of mammal bone and oyster; charcoal, seeds.

F1668. Probably oval pit approximately 1.25m x 0.75m and 0.15m deep, with an uneven base; filled by clayey silt lenses (D1468; D1457) divided by a thin spread of chalk rubble (D1516).

D1516.

Animal bone (fragments): 1 cattle (scapula).

F1676. Oval/irregular pit, 2.1m by 1.45m with fairly steep sides and a flat base 0.8m deep; filled by a dump of loose chalk rubble (D1311), overlain by silt (D75/1264).

D1311.

Bulk sample residues: traces of oyster; charcoal.

D75/1264.

Pottery: 1 fresh sherd: early Neolithic possibly Plain Bowl (Sherd group 103).

Animal bone (fragments): 2 cattle (humerus; tibia).

Bulk sample residues: traces of mammal bone and oyster; charcoal, seeds.

F1304. Irregular/subcircular pit, 1.5m wide with steep sides and an uneven base 0.4m deep; filled by chalk rubble (D1273), a localised lens of chalky silt (D1264), silty clay (D1263) and silt (D1259).

D1273.

Lithics: utilised blade.

Animal bone (fragments): 4 cattle (metacarpal; articulating tibia, astragalus and malleolus).

Bulk sample residues: traces of oyster; heat-affected clay and charcoal.

D1263.

Pottery: 1 sherd: possibly early Neolithic Plain Bowl (Sherd group 114).

Animal bone (fragments): 4 cattle (tooth; vertebra; humerus (with cut marks); femur), 13 cattle-sized, 1 sheep-sized, 2 indeterminate, 1 roe deer (tibia).

Bulk sample residues: 1 fragment of heat-affected clay.

Other: flecks of charcoal.

D1259.

Animal bone (fragments): 17 cattle (cranium; 2 vertebra; scapula; 3 humerus; radius and ulna articulation; metacarpal; 3 femur; 2 tibia; 2 metatarsal), 44 cattle-sized, 1 sheep (humerus), 1 sheep-sized.

Bulk sample residues: mammal bone, traces of oyster; charcoal.

Radiocarbon date: *3740-3650 cal BC* (*at 95% probability*; *OxA-15449*; Table 2).

F1674. Small irregular feature, 0.25m wide and 0.05m deep; filled by silt (D74).

F1672. Oval pit, 2m x 1.35 and 0.2m deep; filled by silts (D62; D61; D73) and a localised dump of chalk (D72); D62, D61 and D73 include possible 'placed deposits'.

D62.

Lithics: 3 flakes.

Pottery: 36 fresh sherds: early Neolithic Plain Bowl (30 sherds), Carinated and Shouldered Bowls and unidentified early Neolithic pottery: 4 fabrics (Sherd groups 109-112).

Animal bone (fragments): 2 sheep-sized.

D61.

Lithics: 4 blades (1 notched, 1 possibly denticulated), bladelet, 26 flakes (3 burnt), 7 knapping debris (1 burnt), end scraper.

Pottery: 6 fresh or slightly abraded sherds: early Neolithic Carinated Bowl (open form) and unidentified: 2 fabrics (Sherd groups 107-8).

Animal bone (fragments): 3 cattle (cranium; mandible; tibia), 25 cattle-sized, 3 sheep-sized, 4 unidentified.

D73.

Lithics: core, 16 blades (1 utilised, 4 burnt), 23 flakes (1 utilised), 5 serrated blades, 3 serrated flakes, 1 end and side scraper, 1 borer, 4 knapping debris; 2 burnt unworked flint.

Pottery: 92 fresh sherds: early Neolithic Plain Bowl and possible Carinated Bowl (open forms): 4 fabrics (Sherd groups 265-7; 281).

Animal bone (fragments): a few fragments of burnt animal bone (possibly sheep and cattle).

Radiocarbon date: *3710-3670 cal BC* from three replicate samples (*at 95% probability*; *GrA-30888*; *OxA-15509*; *OxA-17122*; *sherd group 265*; Table 2).

F1675. Small discrete feature (maximum width of 0.4m and depth 0.09m); filled by silt (D71).

F1318. Linear pit 4m long, 2.56m wide and 0.55m deep, with steep sides and a slightly undulating base; filled by general layers of compact silty clay (D51; D50; D49; D48; D46; D1461), chalk rubble (D1463), and silt and chalk (D1462) interspersed with localised areas of carbon, burnt material and concentrations of finds: (probably 'placed deposits' D52; D1447; D1387/1416; D1414/1430; D1538; D1390; D1604; D47; D45).

D52.

Lithics: blade, 2 flakes, 1 knapping debris.

Animal bone (fragments): 3 cattle (metacarpal; 2 tibia), 5 cattle-sized.

D1447.

Lithics: 3 flakes, 9 knapping debris; 2 burnt unworked flints.

Animal bone (fragments): 1 cattle (humerus).

Bulk sample residues: traces of mammal bone, burnt flint; heat-affected clay, charcoal.

D50.

Lithics: tested lump, 2 blades, 8 flakes, 12 knapping debris.

Animal bone (fragments): 1 cattle (femur), four cattle-sized, 1 sheep-sized.

Other: extensive patches of charcoal (40 per cent in places) and medium to large fragments of heat-affected clay.

D1387/1416.

Lithics: core, flake.

Human bone (fragments): crushed skull of a child as well as a number of teeth a few fragments of long bone shaft (1387): estimated age of 4-6 years. Some skull fragments and tooth crowns with signs of burning.

Animal bone (fragments): (1416) 1 cattle-sized, 5 sheep (2 metacarpal; 2 metapodial; 1 1st phalanx).

D1414/1430.

Animal bone (fragments): 8 cattle (calcaneum; 2 tarsal (1414); tibia and articulating tibia, astragalus, calcaneum, tarsal (1430)).

Radiocarbon date: (articulation) *3695-3630 cal BC* (*at 95% probability*; *UBA-14309*; Table 2).

D1538.

Human bone (fragments): skull from sub-adult/adult (16-35 years), possibly female. One of several small unidentified pieces (perhaps vertebral) noted as having been cut (cut mark? Cut off?).

Animal bone (fragments): 6 articulating cattle (3 thoracic and 3 lumbar vertebrae; 2 pelvises; 1 metatarsal), 23 cattle-sized, 2 sheep (teeth), 7 sheep-sized pieces, 1 pig (humerus), 18 indeterminate.

Radiocarbon dates: (human) *3640-3580 cal BC* (*at 95% probability*; *UBA-14310*; Table 2); (cattle metatarsal) *3715-3630 cal BC* (*at 95% probability*; *UBA-14311*; Table 2); cattle vertebrae articulation?

D1390.

Lithics: 4 core fragments (burnt or slightly burnt), 5 blades, 18 flakes, 6 larger knapping debris (4 burnt or slightly burnt), 167 smaller knapping debris, (163 burnt); 2 burnt unworked flint.

D1604.

Lithics: blade, 11 flakes, 18 knapping debris, serrated flake (burnt); 1 slightly burnt unworked flint.

D49.

Lithics: blade, flake.

D47.

Lithics: 4 flakes (1 possibly retouched).

Animal bone (fragments): 8 cattle (3 cranium; 3 teeth, humerus, radius), 80 cattle-sized, 1 sheep-sized, 40 unidentified.

Bulk sample residues: traces of oyster.

D46.

Lithics: struck nodule, core fragment, blade, 3 flakes.

Animal bone (fragments): 1 cattle (scapula), 1 cattle-sized.

Bulk sample residues: traces of oyster; charcoal, seeds.

D45.

Lithics: blade, bladelet, 4 flakes.

Pottery: 7 fresh sherds: early Neolithic Plain Bowl and Carinated Bowl (open form): 2 fabrics (Sherd groups 104-5).

Animal bone (fragments): 1 cattle (radius), 1 sheep (tibia), 4 cattle-sized, 12 sheep-sized, 120 unidentified.

Bulk sample residues: mammal bone, oyster, winkle, burnt flint; heat-affected clay, charcoal.

F1541. Small discrete feature, 0.55m in diameter and 0.45m deep with near vertical sides and an angled base; filled by compact silty clay (40 per cent) and chalk lumps (60 per cent) (D53).

F1661. Subcircular pit 2.15m by 1.87m in extent and 0.4m deep, the south-west side steep, the north-east edge more shallow, the base uneven; filled by silts (D1228 (containing 'placed deposit' or material disturbed from D46); D1493; D1450; D1457; D1460; D1451).

D1228.

Lithics: 2 blades, 16 flakes, 28 knapping debris; 5 burnt unworked flints.

Animal bone (fragments): 24 cattle-sized, 5 sheep (mandible, 2 radius, metacarpal, tibia), 4 sheep-sized, 64 unidentified.

Bulk sample residues: traces of mammal bone and oyster; charcoal.

D1451.

Human bone (fragments): 2 skulls (parietal vault).

Animal bone (fragments): 1 cattle (metatarsal).

F1298. Oval pit, 3.85m by 2.65m, with an initially steep side at the north-east end leading to a generally concave if uneven base 0.6m deep; filled by a very compact chalk layer (D1303), clayey silt (D1300) and lenses of compact silt (D70) and carbon rich material (D1677), interspersed with probable 'placed deposits' (D1301; D1256; D59) and overlain by further clayey silt (D1299: probably equivalent to D58).

D1303.

Bulk sample residues: traces of oyster; charcoal.

D1301.

Lithics: core fragment, 7 flakes (2 burnt), 32 knapping debris, serrated flake; 14 burnt unworked flints.

Pottery: 2 abraded sherds: early Neolithic Carinated Bowl (open form): (Sherd group 124).

Animal bone (fragments): 18 cattle including two articulating groups from lower limbs (2 humerus; 1 radius; 2 ulna; 1 metacarpal; 3 femur; 4 tibia; 3 astragalus; 1 tarsal; 1 metatarsal), 90 cattle-sized, 2 sheep-

sized, 1 indeterminate; 17 burnt, including 3 cattle bones.

Bulk sample residues: traces of mammal bone and oyster; heat-affected clay, charcoal.

Other: mass of carbon, ash.

D1677.

Other: 50 per cent silt: 50 per cent carbon and ash.

D1256.

Animal bone (fragments): 7 cattle (mandible; scapula (neonatal); humerus; radius; ulna; carpal; pelvis (articulation of cattle right humerus, radius and ulna)), 24 cattle-sized.

Radiocarbon date: 3750-3530 cal BC (4885±50 BP; GrA-30884).

D1299.

Bulk sample residues: traces of large and small mammal bones and oyster; heat-affected clay, charcoal.

D59.

Lithics: 18 flakes (1 burnt), 2 knapping debris, retouched piece.

Pottery: 5 fresh sherds (+ crumbs): early Neolithic Plain Bowl (Sherd group 106).

Human bone (fragments): lumbar vertebra from an adult in excess of 25 years old.

Animal bone (fragments): 130 cattle (28 cranium; 5 mandible; 4 vertebra; 2 rib; 15 scapula; 3 humerus; 8 radius; 9 ulna; 3 carpal; 5 metacarpal; 2 pelvis; 31 femur; 4 tibia; 2 astragalus; 3 calcaneum; 1 tarsal; 2 metatarsal; 3 1st Phalanx), 129 cattle-sized, 4 sheep-sized, 64 unidentified.

Radiocarbon dates: (human) *3715-3630 cal BC* (*at 95% probability*; *UBA-14312*; Table 2); (animal) *3695-3640 cal BC* (*at 95% probability*; *GrA-30885*; Table 40); *3695-3645 cal BC* (*at 95% probability*; *GrA-30886*; Table 2) and *3695-3645 cal BC* (*at 95% probability*; *OxA-15544*; Table 2).

D58.

Lithics: 2 struck lumps, 6 flakes.

F1647. Oval pit, 2.8m x 1.7m with steep sides and an uneven base 0.35m deep; filled by loose silty clay deposits (D1297; D1295; D1233; D1292; D1293; D1294), with one pocket of loose silty chalk (D1296).

D1297.

Bulk sample residues: traces of oyster; charcoal.

D 1293.

Lithics: 5 flakes, 7 knapping debris.

Bulk sample residues: traces of oyster; charcoal.

F66. Probable post-hole (not fully excavated), 0.65m in diameter with vertical sides, at least 0.5m deep; filled by compact silt with frequent chalk and flint inclusions and charcoal flecking (D65 and D64).

F68. Probable post-hole, 0.35m in diameter with vertical sides and a concave base 0.58m deep; filled by compact silt deposits with frequent chalk and flint inclusions and charcoal flecking (D 67).

F1216. Shallow linear feature at least 8.75m long with a maximum width of 3.1m and depth of 0.4m; filled by silt (D1215 (=D57?)).

D1215.

Lithics: 4 cores, 6 blades (all utilised), 156 flakes (2 utilised, 1 notched, 5 burnt); water worn sandstone cobble from the deposit (Stone 4: possibly exotic if Carboniferous) appears to have been used as a maul, with at least two sides showing signs of repeated impacts.

Pottery: 85 mainly abraded sherds: early Neolithic Plain Bowl (neutral form) with one possible Carinated Bowl: 6 fabrics (Sherd groups 118-23); 7 abraded sherds: Middle- to Late Bronze Age (Sherd group 117).

Animal bone (fragments): 4 cattle-sized, 1 sheep (mandible).

Bulk sample residues: traces of oyster; heat-affected clay.

D57.

Lithics: core, 28 flakes, 4 knapping debris, leaf shaped arrowhead.

Animal bone (fragments): 13 cattle (7 cranium; tooth; humerus; radius; ulna; metacarpal; femur), 25 cattle-sized, 2 sheep (tooth; metatarsal), 17 unidentified.

Outer Arc Segment 6

F1214. A linear cut extending from the eastern section for 7.9m, roughly 2.4m wide and 0.78m deep, containing silty clay deposits (D1212; 1213; 1243).

D1212.

Lithics: 2 flakes.

D1213.

Lithics: retouched flake, serrated flake, 5 utilised blades, 3 utilised flakes, broken scraper.

Pottery: 14 fresh early Neolithic Plain Bowl (Sherd groups 125–9).

D1243.

Lithics: a flake from a ground and polished axe, 8 cores and a small amount of knapping debris.

Pottery: 49 early Neolithic Plain Bowl (Sherd groups 130–1).

Animal bone (fragments): 4 cattle-sized, 1 sheep (mandible).

Appendix IV. Early prehistoric pottery sherd groups

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
1	D1045	F1046: Inner Arc Segment 1	11 + crumbs (15g)	1	Body	Angular sherds averaging 10mm thick. Brown to dark grey surfaces with black core. Slightly gritty exterior texture & smooth interior with some organic voids.	Plain bowl. Early Neolithic.
2	D1045	F1046: Inner Arc Segment 1	2 (6g)	2	Body	Abraded sherd, 7mm thick. Brown surfaces, grey core. Smooth texture throughout.	Beaker?
3	D1045	F1046: Inner Arc Segment 1	2 (12g)	1	Body	Abraded sherd, 7mm thick, brown outer surface with a mottled brown interior surface and core. Gritty texture throughout.	Plain bowl. Early Neolithic.
4	D1045	F1046: Inner Arc Segment 1	1 (6g)	1	Body	Fresh sherd, 10mm thick, orange exterior surface, grey interior surface and core. Slightly gritty texture.	Plain bowl. Early Neolithic.
5	D1045	F1046: Inner Arc Segment 1	5 + crumbs (12g)	3	Body	Fresh sherds, thickness 5mm. Grey/black surfaces and even brown/grey core. Smooth texture with burnished interior surface.	Carinated bowl. Early Neolithic.
6	D1054	F1056: Inner Arc Segment 3	14 (39g)	1	1 rim 13 body	Fresh & abraded sherds, 6mm thick. Mottled brown/grey surface and core, internal sooty deposits. Rough texture with flint protrusions. Simple rim, 140mm diameter, 5% surviving.	Plain bowl, neutral form. Early Neolithic.
7	D1047	F1048: Inner Arc Segment 2	1 (5g)	2	Body	Abraded sherds, 7mm thick. Orange/brown surfaces with a black core. Smooth surface texture throughout.	Early Bronze Age.
8	D1055	F1056: Inner Arc Segment 3	1 (10g)	1	Bodyw	Abraded sherd, 9mm thick. Brown exterior, changing to black near the interior surface with sooty deposits on the interior surface. Smooth texture throughout.	Plain bowl. Early Neolithic.
9	D1062	F1063: Inner Arc Segment 4	3 (2g)	? crumbs	Body	Angular, fresh crumbs.	Plain bowl. Early Neolithic?
10	D1101	F1102: Small pit, associated with Inner Arc Segment 7	1 (7g)	1	Body	Slightly abraded sherd, thickness 10mm. Orange exterior surface. Mottled black/grey interior and core. Smooth texture throughout.	Neolithic.
11	D1107	F1108: Small pit, Inner Arc Segment 6	2 (16g)	3	2 rim	Fresh sherds, thickness 6mm. Orange/brown surfaces with a black core. Slightly gritty surface texture. Simple rim, 200mm diameter, 5% surviving.	Plain bowl, neutral form. Early Neolithic.

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
12	D1107	F1108: Small pit, Inner Arc Segment 6	12 (36g)	1	Body	Fresh or abraded, sherds, 9mm thick. Brown/orange exterior surface, a dark grey interior surface and mottled brown-grey/black core. Smooth surface texture. Join voids visible.	Plain bowl. Early Neolithic.
13	D1109	F1108: Pit, Inner Arc Segment 6	4 (14g)	1	1 rim3 body	Fresh or abraded sherds, thickness 8mm. Brown/black exterior surface and mottled orange/brown interior surface and core. Smooth texture with occasional flint protrusions. Rounded and slightly everted rim, 280mm diameter, 4% remaining. 2 possible horizontal incisions externally below the rim.	Plain bowl, open form. Early Neolithic.
14	D1113	F1114: Linear gully, Inner Arc Segment 6	5 (17g)	4	1 rim 4 body	Fresh or abraded sherds, thickness 7mm. Orange surfaces, with mottled irregular grey core. Corky texture. Rounded rim, <1% remaining.	Open form. Early Neolithic?
15	D1113	F1114: Linear gully, Inner Arc Segment 6	16 (50g)	3	1 rim 15 body	Fresh or abraded sherds, thickness 6mm. Grey/black throughout, burnished interior surface. Smooth texture with horizontal striations. Moulded rim, *c* 200mm diameter with 5% surviving.	Carinated bowl? Open form. Early Neolithic.
16	D1113	F1114: Linear gully, Inner Arc Segment 6	32 + crumbs (144g)	1	3 rim 28 body	Fresh or abraded sherds, thickness 9mm. Mottled orange/brown exterior surface & core. Grey/brown interior surface. Texture rough throughout. Simple rim, 260mm diameter with 9% remaining.	Carinated bowl? Open form. Early Neolithic.
17	D1121	F1122: Linear gully, Inner Arc Segment 6	12 + crumbs (25g)	3	Body	Fresh sherds, thickness 7mm. Black throughout. Smooth & pitted exterior texture & very smooth interior surface.	Carinated bowl? Open form. Early Neolithic. Seed impression.
18	D1121	F1122: Linear gully, Inner Arc Segment 6	22 (81g)	4	1 rim 20 body	Fresh sherds, thickness 8mm. Mottled orange & orange/grey though out. Corky texture. Simple rim.	Plain bowl, neutral form? Early Neolithic?
19	D1121	F1122: Linear gully, Inner Arc Segment 6	25 + crumbs (81g)	1	Body	Fresh sherds, thickness 7mm. Brown exterior surface, brown/black interior surface & core. Texture rough and gritty due to surface protrusions.	Plain bowl. Early Neolithic.
20	D1123	F1 124: Shallow gully, Inner Arc Segment 7	3 (33g)	1	1 rim 1 shoulder 1 body	Fresh sherds, thickness 7mm. Brown exterior slip, dark grey interior surface & grey core. Smooth exterior texture with flint protrusions & rougher interior surface. Simple rim, *c* 300mm in diameter, 4% remaining. Rounded shoulder with perforations.	Carinated bowl? Open form. Early Neolithic.
21	D1125	F1126: Shallow gully, Inner Arc Segment 7	12 (34g)	1	Body	Fresh or abraded sherds, thickness 7mm. Orange exterior, black core and interior surface with some internal sooting. Rough texture with many surface protrusions.	Plain bowl? Early Neolithic?
22	D1145	F1147: Inner Arc Segment 10	3 + crumbs (16g)	1	Body	Fresh sherds, thickness 8mm. Dark brown exterior surface, black interior surface and core. Rough texture with many flint protrusions.	Plain bowl? Early Neolithic?
23	D1145	F1147: Inner Arc Segment 10	2 (13g)	3	2 shoulder	Abraded sherds, average thickness 8mm. Brown/grey exterior grey and grey/black core. The texture is smooth and corky (burnt) with flint protrusions. Carination present.	Carinated bowl, open form. Early Neolithic.
24	D1146	F1147: Inner Arc Segment 10	14 (53g)	3	2 rim 12 body	Abraded sherds, average thickness 8mm. Grey or brown/grey surfaces and grey core. Smooth and corky (burnt) texture with flint protrusions. Moulded rim, 220mm in diameter, 10% remaining.	Carinated bowl, open form. Early Neolithic.
25	D1190	F1147: Inner Arc Segment 10	2 (24g)	1	Body	Fresh sherds, thickness 9mm. Brown/black surfaces and brown core. Slightly rough exterior texture & smoother interior surface. Both with flint protrusions.	Plain bowl? Early Neolithic.

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
26	D1191	F1147: Inner Arc Segment 10	17+crumbs (80g)	1	16 body 1 rim	Fresh sherds, thickness 9mm. Brown/black surface and brown core. Rough texture with flint protrusions. Simple rim, 1% remaining.	Plain bowl? Open form. Early Neolithic.
27	D1240	F1241: Inner Arc Segment 8	13 + crumbs (52g)	1	2 rim 9 body	Fresh sherds, thickness 10mm. Black surfaces & core. Smooth texture throughout. Simple rim, *c* 300m in diameter, 3% remaining.	Plain bowl, open form. Early Neolithic.
29	D1160	F1161: Inner Arc Segment 9	18+crumbs (86g)	1	18 body	Fresh sherds, thickness 8mm. Brown/dark brown surfaces with brown/black core. Surface texture rough with raised flint protrusions. Possible rounded rim or carination.	Plain bowl? Early Neolithic.
30	D1160	F1161: Inner Arc Segment 9	2 (2g)	2	1 rim 1body	Abraded sherds, thickness 7mm. Brown exterior surface, brown black/interior surface & core. Smooth surface texture. Simple rim, *c* 1% remaining.	Shouldered bowl. Early Neolithic.
31	D1178	F1179: Inner Arc Segment 10	2 (3g)	3	Body	Fresh sherds, thickness 5mm. Black surfaces and core. Smooth texture throughout.	Carinated bowl? Early Neolithic.
32	D1162	F1163: One of two oval pits, Inner Arc Segment 9	1 (6g)	1	Body	Slightly abraded sherd, thickness 12mm. Brown exterior surface, black interior surface and brown/grey core. Smooth exterior surface texture with flint protrusions, very smooth interior surface.	Neolithic.
33	D1174	F1175: One of a group of four small pits/post-holes at eastern edge of excavation	1 (14g)	1	Body	Slightly abraded sherd, thickness 9mm. Orange/ brown throughout. Smooth texture with slight flint protrusions.	Plain bowl? EarlyNeolithic.
34	D1524	F1523: Small pit, Inner Arc Segment 7	1 (2g)	1	Body	Fresh sherd, thickness 7mm. Brown exterior surface and core, black interior surface. Texture smooth throughout.	Plain bowl? Early Neolithic.
35	D1041	F1042: Middle Arc Segment 1	19+ crumbs (108g)	1	1 rim 18 body	Fresh and some abraded sherds, average thickness 8mm. Brown to black exterior surface, black interior surface & brown to dark grey core. Slightly rough texture with raised flint protrusions. Thickened rim, 260mm diameter, 7% remaining.	Plain bowl, open form. Early Neolithic.
36	D1041	F1042: Middle Arc Segment 1	7+crumbs (9g)	1	Body	Abraded sherds, average thickness 5mm. Black/ grey throughout. Smooth and corky texture (burnt).	Carinated bowl? Early Neolithic.
37	D1035	F1036: Middle Arc Segment 2	9+crumbs (16g)	1	Body	Fresh sherds, average thickness 10mm. Brown surfaces and brown to black core. The texture is slightly rough with raised flint protrusions.	Neolithic?
38	D1035	F1036: Middle Arc Segment 2	13+crumbs (27g)	3	1 rim 12 body	Fresh sherds, thickness 5mm. Brown/black surface and core. Smooth texture throughout. Thickened rim, *c* 140mm diameter, 3% remaining.	Carinated bowl? Open form. Early Neolithic.
39	D1035	F1036: Middle Arc Segment 2	14 (25g)	3	1 rim 13 body	Abraded sherds, thickness 6mm. Brown exterior surface, black interior surface and grey core. Slightly rough exterior surface texture and very smooth interior surface. Simple rim, *c* 140mm diameter, 5% remaining.	Shouldered bowl, open form. Early Neolithic.
40	D1035	F1036: Middle Arc Segment 2	1 (11g)	3	Rim	Abraded sherds, thickness 8mm. Black to dark brown surfaces and core. Slightly rough texture with flint protrusions. Thickened rim, *c* 200mm, 4% remaining. Join voids are visible in the rim.	Shouldered bowl, open form. Early Neolithic.
41	D1013	F1014: Middle Arc Segment 3	36 + crumbs (384g)	1	4 rim 32 body	Fresh or slightly abraded sherds, average thickness 9mm. Brown throughout. Surface texture slightly rough and uneven with raised flint protrusions and some organic voids. Simple rim, *c* 300mm diameter, 12% remaining. Horizontal burnishing on top of rim.	Plain bowl, open form. Early Neolithic.

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
42	D1013	F1014: Middle Arc Segment 3	60+ crumbs (366g)	1	3 rim, 57 body	Fresh or slightly abraded sherds, average thickness 9mm. Brown exterior and dark brown to black interior surface & grey core. Rough exterior texture with raised flint protrusions & slightly burnished interior with some organic voids. Thickened rim, *c* 340mm diameter, 14% remaining.	Plain bowl, open form. Early Neolithic.
43	D1013	F1014: Middle Arc Segment 3	7 (26g)	3	Body	Slightly abraded sherds, thickness 7mm. Brown exterior and brown/black interior surfaces with brown core. Generally smooth texture with occasional spherical voids.	Early Neolithic.
44	D1013	F1014: Middle Arc Segment 3	2 (3g)	3	Body	Abraded sherds, thickness 4mm. Brown surfaces and core. Smooth texture.	Early Neolithic.
45	D1557	F1559: Middle Arc Segment 5	10 (31g)	3	2 rim 8 body	Abraded with occasional fresh sherds, thickness 6mm. Brown exterior surface, brown to black interior surface with brown core. Surface texture smooth throughout & burnished where fresh. Simple rim, *c* 140mm diameter, 5% remaining.	Shouldered bowl? Open form. Early Neolithic. Possible seed impression.
46	D1557	F1559: Middle Arc Segment 5	8 (15g)	7	3 rim 5 body	Generally abraded sherds with occasional fresh breaks, thickness 6mm. Mottled brown exterior surface, brown interior surface and core. Smooth texture with flint protrusions near the rim. Simple rim, diameter 240mm, 8% remaining.	Neutral form? Early Neolithic.
47	D1557	F1559: Middle Arc Segment 5	4 (40g)	7	1 rim 4 body	Abraded with occasional fresh breaks, thickness 7mm. Brown slip on exterior surface, red/brown interior surface and brown/black core. Smooth texture with rare flint protrusions and organic voids. Flat-topped rim with external lip, diameter *c* 220mm, 3% remaining.	Plain bowl, neutral form. Early Neolithic.
48	D1557	F1559: Middle Arc Segment 5	5 (24g)	1	Body	Abraded sherds, average thickness 12mm. Brown exterior surface, brown/black interior surface and black core. Rough exterior texture & smooth interior surface.	Early Neolithic?
49	D1305	F1306: Middle Arc Segment 6	3(7g)	7	Body	Abraded sherds, thickness 5mm. Brown exterior surface, darker brown interior surface (possible slip) and core. Slightly rough exterior texture and very smooth interior surfaces.	Early Neolithic.
50	D1305	F1306: Middle Arc Segment 6	30 + crumbs (113g)	1	Body	Fresh or slightly abraded sherds, average thickness 8mm. Brown exterior surface, black interior surface and core. Rough exterior texture with raised flint protrusions & smooth interior with sooty deposits.	Early Neolithic.
51	D1305	F1306: Middle Arc Segment 6	7 (44g)	3	9 body	Fresh sherds, average thickness 8mm. Black throughout. Smooth exterior and burnished interior texture.	Shouldered bowl, Early Neolithic.
52	D1305	F1306: Middle Arc Segment 6	12 (111g)	1	Body	Fresh sherds, thickness 10mm. Brown exterior surface and core, black interior surface. Smooth texture with uneven surfaces with wipe marks creating striations throughout. Occasional organic voids. Surface flint visible.	Plain bowl. Early Neolithic.
53	D1223	F1224: Middle Arc Segment 7	10 (29g)	1	1 rim 9 body	Abraded sherds, thickness 8mm. Brown exterior surface and core, dark brown to black interior surface. Generally smooth texture with wipe marks around the rim & occasional flint protrusions. Externally thickened rim, *c* 260mm diameter, 3% remaining. Possible incised line on top of rim.	Plain bowl. Early Neolithic.
54	D1223	F1224: Middle Arc Segment 7	5+ crumbs (10)	3	Body	Fresh sherds, thickness 7mm. Dark brown exterior surface and core, black interior. Gritty exterior texture & smooth interior surface.	Early Neolithic.
55	D1223	F1224: Middle Arc Segment 7	1 (15g)	7	Rim	Abraded sherds, thickness 8mm. Orange/brown colour throughout. Gritty texture, probably due to abrasion & sparse grog inclusions. Externally thickened rim, *c* 140mm diameter, 5% remaining.	Shouldered bowl? Open form. Early Neolithic.

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
56	D1221	F1222: Middle Arc Segment 7	7 (32g)	4	1 rim 6 body	Abraded sherds, thickness 6mm. Brown exterior surface, brown black interior surface and core. Smooth but uneven texture with many organic voids. Externally thickened rim, 1% remaining.	Plain bowl, neutral form. Early Neolithic.
57	D1221	F1222: Middle Arc Segment 7	12 (46g)	1	2 rim 9 body	Fresh or slightly abraded shreds, average thickness 8mm. Dark brown surfaces, black core. Smooth surfaces except where abraded. Simple rim, <5% remaining.	Plain bowl. Early Neolithic.
58	D1221	F1222: Middle Arc Segment 7	3 (24g)	7	Body	Abraded sherds, average thickness 8mm. Brown surfaces, darker brown core. Traces of a blackened inner surface. Texture sandy, possibly due to abrasion.	Plain bowl? Open form. Early Neolithic.
59	D1221	F1222: Middle Arc Segment 7	c.120 + crumbs (538g)	1	4 rim 116 body	Mostly fresh with occasional abraded sherds, thickness 10mm. Brown exterior surface and brown to black interior surface & core. Uneven exterior surface with wipe marks. Smoother interior surface. Both with occasional flint protrusions. Thickened rim, *c* 300mm diameter, 10% remaining. Coil breaks visible.	Plain bowl, open form. Early Neolithic.
60	D1349	F1350: Middle Arc Segment 7	4 (21g)	7	1 rim, 3 body	Generally abraded with some fresh breaks, thickness 8mm. Brown exterior surface, brown or black interior surface, grey brown core. Exterior texture uneven and gritty, interior smooth. Rolled rim, diameter 180mm, 6% remaining.	Plain bowl, open form. Early Neolithic.
61	D1349	F1350: Middle Arc Segment 7	5 (18g)	7	Body	Abraded sherds with one fresh break, thickness 5mm. Brown surfaces with a thick black core. Gritty exterior surface due to flint protrusions. Smooth interior surface where not abraded.	Neolithic?
62	D1349	F1350: Middle Arc Segment 7	1 (4g)	3	Body	Abraded sherd, thickness 5mm. Black and possibly sooty exterior surface. Dark brown interior surface and core. Texture smooth and slightly sandy throughout.	Neolithic?
63	D1349	F1350: Middle Arc Segment 7	16 + crumbs (59g)	1	Body	Abraded and fresh sherds, thickness 9mm. Brown exterior surface, brown/black interior surface and brown to black core. Smooth surfaces with rare flint protrusions.	Neolithic?
64	D1547	F1548: Pit at eastern edge of excavation	5 (24g)	5	6 body	Abraded shreds, average thickness 12mm. Orange/brown exterior surface and core & black interior surface. Rough and gritty texture throughout.	Bronze Age.
65	D1145	F1147: Inner Arc Segment 10	5 + crumbs (19g)	3	1 rim 5 body	Abraded sherds, thickness 7mm. Orange exterior surface. Mottled grey-black interior surface and core. Rough gritty texture possibly due to abrasion. Simple rim, 200mm diameter, 8% remaining.	Carinated bowl? Open form. Early Neolithic.
66	D1160	F1161: Inner Arc Segment 9	7 (21g)	1	Body	Fresh sherds, thickness 8mm. Orange exterior surface, black interior surface and core. Exterior texture rough with frequent flint protrusions, interior surface smooth.	Plain bowl? Early Neolithic.
67	D1013	F1014: Middle Arc Segment 3	6 (54g)	1	2 rim 1 body	Slightly abraded sherds, average thickness 9mm. Brown exterior surface and core, brown/black interior surface. Uneven surface texture due to wipe marks and occasional irregular voids. Simple rim, *c* 240mm diameter, 5% remaining.	Plain bowl, open form. Early Neolithic.
68	D1013	F1014: Middle Arc Segment 3	5 (19g)	3	Body	Slightly abraded sherds, thickness 8mm. Brown surfaces, black core. Slightly gritty texture throughout with sub-rounded surface voids.	Early Neolithic. Possible seed impression.
69	D1047	F1048: Inner Arc Segment 2	7 (28g)	1	Body	Mostly fresh sherds, thickness 9mm. Brown exterior surface and core, brown to black interior surface. Smooth texture throughout with sparse flint protrusions.	Plain bowl. Early Neolithic.

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
70	D1047	F1048: Inner Arc Segment 2	1 (5g)	1		Fresh sherd, thickness 8mm. Orange/brown exterior surface, brown interior surface and black core. Rough exterior texture with moderate flint protrusions and smooth slightly rough interior surface.	Plain bowl. Early Neolithic.
71	D2077	F2079: Outer Arc Segment 1	2 (7g)	6	Body	Fresh sherd, thickness 5mm. Black colour throughout. Smooth texture throughout but slightly pitted on the exterior surface.	Early Neolithic.
72	D2033	F2034: Outer Arc Segment 1	1 (9g)	1	Body	Fresh sherd, thickness 8mm. Brown exterior surface. Black interior surface and core. Smooth texture with the exterior slightly gritty due to flint protrusions.	Early Neolithic.
73	D2029	F2101: Outer Arc Segment 1	2 (16g)	1	Body	Fresh sherds, thickness 7mm. Brown/black throughout. Slightly gritty exterior texture & smooth interior.	Early Neolithic.
74	D2239	F2041: Outer Arc Segment 1	9+ crumbs (70g)	1	Body	Fresh sherds, thickness 13mm. Brown exterior surface, black interior surface and core. Rough and sometimes irregular texture with raised flint protrusions. One sherd contains a 7mm fragment of fresh black flint.	Early Neolithic.
75	D2051	F2052: Outer Arc Segment 1	6+ crumbs (33g)	As 1 but with fewer inclusions	1 rim 5 body	Fresh or slightly abraded sherds, thickness 7mm. Brown surfaces, black core. Smooth exterior texture & smooth but uneven interior with rare flint protrusions. Thickened rim, 180mm diameter, 6% remaining. Join voids visible.	Plain bowl, open form. Early Neolithic.
76	D2008	F2009: Outer Arc Segment 1	4+ crumbs (10g)	1	Body	Fresh sherds, thickness 11m. Brown exterior surface, brown/black interior surface and core. Texture smooth.	Neolithic?
77	D2018	F2019: Outer Arc Segment 1	2 (36g)	1	Body	Fresh or slightly abraded sherds, thickness 12mm. Dark brown exterior surface. Black/brown interior surface and core. Texture uneven and rough due to dense flint protrusions.	Neolithic?
78	D2018	F2019: Outer Arc Segment 1	13+ crumbs (64g)	1	1 rim, 12 body	Fresh and abraded sherds, average thickness 12mm. Brown surfaces but slightly darker brown at the rim. Texture smooth and slightly uneven with rare inorganic voids. Simple rim, 1% remaining.	Plain bowl, open form. Early Neolithic.
79	D1180	F1181: Outer Arc Segment 2	6 (21g)	7	Rim	Slightly abraded sherd, thickness 6mm. Light brown throughout. Smooth texture with faint wipe marks. Simple rim, 140mm diameter, 7% remaining.	Neutral form. Neolithic?
80	D1180	F1181: Outer Arc Segment 2	4 (17g)	1	Body	Abraded sherds, average thickness 10mm. Brown exterior surface, grey/brown interior surface and core. Smooth texture.	Carinated bowl? Early Neolithic.
81	D1180	F1181: Outer Arc Segment 2	1 (2g)	3	Body	Thickness 7mm. Brown exterior surface, black interior surface and core. Gritty exterior texture and burnished interior surface.	Early Neolithic?
82	D1180	F1181: Outer Arc Segment 2	8 (21g)	1	Body	Fresh sherds, thickness 7mm. Brown exterior surface, black interior surface and core. Rough and uneven exterior texture & smooth interior.	Early Neolithic?
83	D1180	F1181: Outer Arc Segment 2	20 + crumbs (41g)	1	Body	Fresh sherds, thickness 7mm. Brown to black exterior surface and core. Brown to dark brown interior surface. All surfaces generally smooth texture with internal burnishing.	Shouldered bowl? Open form. Early Neolithic.
84	D1193	F1181: Outer Arc Segment 2	6 (45g)	3	1 rim 5 body	Fresh or slightly abraded sherds, thickness 6mm. Brown exterior surface and core, black interior surface. Radial burnishing on rim and vertical burnishing internally and on rim exterior. Rolled rim, diameter *c* 300mm, 5% remaining.	Carinated bowl? Open form. Early Neolithic.
85	D1193	F1181: Outer Arc Segment 2	5 (4g)	3	Body	Fresh sherds, thickness 7mm. Black exterior surface and core, grey/black interior surface. Texture gritty throughout.	Early Neolithic.

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
86	D1193	F1181: Outer Arc Segment 2	6 (108g)	6	3 rim, 3 body	Fresh sherds, thickness 6mm. Grey throughout. Texture generally smooth throughout. Simple rim, 190mm diameter, 20% remaining.	Plain bowl, open form. Early Neolithic.
87	D1193	F1181: Outer Arc Segment 2	12 (252g)	6	5 rim, 7 body	Fresh sherds, thickness 6mm. Grey throughout. Texture smooth throughout. Rolled rim, 220mm diameter, 28% complete.	Plain bowl, open form. Early Neolithic.
88	D1193	F1181: Outer Arc Segment 2	4 (17g)	6	Body	Fresh sherds, thickness 6mm. Grey/brown exterior surface, orange brown interior surface and core. Smooth texture throughout.	Plain bowl. Early Neolithic.
89	D1290	F1285: western parallel ditch	1 (27g)	7	Rim	Abraded sherd, thickness 6mm. Grey/brown exterior surface, brown interior surface and core. Slightly gritty texture, possibly due to abrasion. Rolled rim, 220mm diameter, 6% remaining.	Plain bowl, open form. Early Neolithic.
90	D1290	F1285: western parallel ditch	1 (5g)	1	Body	Very abraded sherd, thickness 10mm. Orange/brown exterior surface, brown interior surface and core. Exterior texture gritty, possibly due to abrasion. Interior surface smoother and uneven with pitting.	Early Neolithic.
91	D1290	F1285: western parallel ditch	3 (27g)	13	1 body, 2 base	Abraded sherd, average thickness 9mm. Dark brown interior and exterior surface & brown core. Texture uneven with possible diagonal scoring on exterior & slightly pitted interior. Flat base.	Late Iron Age.
92	D1291	F1370: Outer Arc Segment 3	1 (3g)	2	1 possible rim	Abraded sherd with fresh break, thickness 5mm. Brown surfaces & black core. Smooth texture but uneven surfaces. Simple rim.	Neolithic?
93	D1291	F1370: Outer Arc Segment 3	2 (11g)	6	Body	Fresh sherd, thickness 6mm. Black throughout. Texture smooth with rare exterior pitting.	Plain bowl, open form. Early Neolithic. Joins 262.
94	D1312	F1384: Outer Arc Segment 3	10 + crumbs (46g)	8	Body	Fresh sherd, average thickness 8mm. Brown/black surfaces, black core. Texture smooth but uneven with occasional external scoring & voids.	Plain bowl? Early Neolithic.
95	D1316	F1384: Outer Arc Segment 3	1 (32g)	8	Body	Fresh sherd, thickness 10mm. Brown/black surfaces & black core. Texture smooth but uneven with rare voids.	Plain bowl? Early Neolithic.
96	D1586	F1574: Outer Arc Segment 3	8 (130g)	8	Body	Fresh sherd, thickness 9mm. Orange/brown exterior surfaces, mottled brown/black interior surface & black core. External texture smooth with scoring & interior smooth with 'wipe' marks.	Neolithic
97	D1247	F1248: One of six pits forming Outer Arc Segment 7	17 (82g)	6	7 rim 10 body	Fresh sherd, thickness 7mm. Brown/black surfaces & cord. Exterior texture smooth with occasional pitting & interior surface smooth to burnished with 'wipe' marks around rim. Rolled rim, 190mm diameter. 19% remaining.	Plain bowl, neutral form. Early Neolithic.
98	D1272	F1358: Outer Arc Segment 3	29 (188g)	6	3 rim 26 body	Fresh sherds with some abrasion, thickness 8mm. Brown/black throughout. Texture smooth to burnished with interior wipe marks near rim. Rolled rim, 280mm diameter. 13% remaining. Joins with 262.	Plain bowl, neutral form. Early Neolithic.
100	D1344	F1657: Outer Arc Segment 3	2 (11g)	3	Body	Fresh sherd, thickness 7mm. Brown exterior surface, black interior surfaces & core. Gritty exterior texture due to flint protrusions, interior surface smooth with some large voids (<4mm).	Neolithic?
101	D1530	F1683: Outer Arc Segment 3	2 (16g)	1	Body	Abraded sherd, thickness 10mm. Orange/brown surfaces & core. Exterior texture smooth but slightly gritty due to flint protrusions & interior smooth.	Neolithic?
102	D1249	F1250: One of a series of post-holes/pits associates with Outer Arc Segment 3	5 (31g)	7	Body	Fresh sherd with slight abrasion, thickness 7mm. Brown/black throughout. Smooth to burnished exterior, slightly gritty interior due to fine flint protrusions.	Plain bowl? Early Neolithic.

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
103	D1264	F1676: Outer Arc Segment 5	1 (15g)	6	Body	Fresh sherd, thickness 7mm. Brown/black throughout. Smooth exterior texture with horizontal scoring & burnished interior.	Plain bowl? Early Neolithic.
104	D45	F44 (=F1318): Outer Arc Segment 5	2 (10g)	7	1 rim 1 body	Fresh sherd, thickness 6mm. Brown/black surfaces, brown core. Vertical fluting on surfaces. Thickened rim.	Carinated bowl, open form. Early Neolithic.
105	D45	F44 (=F1318): Outer Arc Segment 5	5 (9g)	1	1 rim 4 body	Fresh sherd, thickness 10mm. Brown/black throughout. Roughened exterior texture & smooth interior surface with rare flint projections. Rolled rim.	Plain bowl, open form. Early Neolithic.
106	D59	F44 (=F1318): Outer Arc Segment 5	5 + crumbs (8g)	8	Body	Fresh sherd, thickness 10mm. Orange/brown exterior surface. Black interior surface & core. Slightly roughened surface texture with rare flint projections.	Plain bowl. Early Neolithic.
107	D61	F44 (=F1318): Outer Arc Segment 5	3 (34g)	7	1 shoulder 1 body	Fresh sherd, thickness 7mm. Brown exterior surface. Black interior surface & core with slight sooting. Burnished rippled surfaces with large organic voids throughout. Slack carination.	Carinated bowl, open form. Early Neolithic.
108	D61	F44 (=F1318): Outer Arc Segment 5	3 (8g)	7	Body	Fresh or abraded, thickness 7mm. Brown/black exterior surface. Brown interior surface. Black core. Rough & uneven exterior texture & smooth interior with occasional flint protrusions and possible organic voids. Possible join voids visible.	Early Neolithic.
109	D62	F44 (=F1318): Outer Arc Segment 5	3 (19g)	7	Body	Fresh sherd, thickness 6mm. Brown exterior surface. Black interior surface & core. Rippled burnished exterior texture & burnished fluting on interior.	Carinated bowl. Early Neolithic.
110	D62	F44 (=F1318): Outer Arc Segment 5	1 (2g)	6	Body	Fresh sherd, thickness 5mm. Light brown throughout. Smooth texture.	Early Neolithic?
111	D62	F44 (=F1318): Outer Arc Segment 5	30 (49g)	1	3 rim 27 body	Fresh sherds, average thickness 7mm, very variable. Mottled brown/black exterior surface. Brown interior surface. Black core. Slightly gritty and uneven exterior texture & interior smoother with organic voids. Simple rim, approximately 140mm, 5% remaining.	Plain bowl, neutral form. Early Neolithic.
112	D62	F44 (=F1318): Outer Arc Segment 5	2 (33g)	7	Shoulder	Fresh sherds, thickness 7mm. Brown exterior with some sooting. Black interior & core. Smooth to burnished exterior texture & burnished interior.	Shouldered bowl, open form. Early Neolithic.
113	D63	F44 (=F1318): Outer Arc Segment 5	15 + crumbs (72g)	8	Body	Fresh sherds, thickness 10mm. Brown exterior surface. Black interior surface and core. Surfaces texture uneven with occasional flint protrusions	Plain bowl? Early Neolithic.
114	D1263	F1304: Outer Arc Segment 5	1 (11g)	1	body	Fresh sherd, thickness 7mm. Brown/black surfaces & brown core. Smooth matrix with pitted surface texture & occasional flint protrusions.	Plain bowl? Early Neolithic.
115	D1217	F1318: Outer Arc Segment 5	1 (15g)	1 (with slightly lower density of inclusions)	Body	Abraded sherd, thickness 8mm. Brown exterior surface, possibly due to abrasion, but black in places with orange/brown core. Exterior texture rough and uneven, interior surface smoother with occasional flint protrusions.	Neolithic?
116	D1217	F1318: Outer Arc Segment 5	1 (28g)	1	Body	Abraded sherd, thickness 11mm. Orange brown exterior surface, brown/black interior surface and core. Slightly roughened exterior texture, possibly due to abrasion, with rare flint protrusions & smooth interior surface with visible flints.	Neolithic?
117	D1215	F1216: Outer Arc Segment 5	7 (86g)	5	1 shoulder 6 body	Abraded sherds, average thickness 12mm. Orange/brown exterior surface. Black interior surface and core. Exterior texture rough and very uneven with some organic voids. Interior slightly smoother & pitted. Slack carination. Ridge on exterior surface.	Bronze Age.

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
118	D1215	F1216: Outer Arc Segment 5	2 (9g)	3	Body	Abraded sherd, thickness 6mm. Dark brown exterior surface. Brown/black interior surface & core. Exterior texture slightly gritty possibly due to abrasion & interior smooth & burnished.	Carinated bowl? Early Neolithic.
119	D1215	F1216: Outer Arc Segment 5	57 (74g)	1	2 rim 55 body	Generally abraded sherds with some fresh breaks. Average thickness 8mm. Brown/black exterior surface. Black interior surface & Core. Rough exterior texture & smooth interior with some scoring. Simple rim. 150mm diameter. 8% remaining.	Plain bowl? Neutral form. Early Neolithic.
120	D1215	F1216: Outer Arc Segment 5	12 (33g)	1	Body	Both abraded & fresh sherds. Average thickness 9mm. Brown/black surfaces & core. Exterior texture variable depending on abrasion but originally smooth & interior smooth.	Plain bowl? Early Neolithic.
121	D1215	F1216: Outer Arc Segment 5	6 (12g)	7	Body	Abraded sherds, average thickness 8mm. Mottled grey/black throughout. Smooth but pitted surfaces.	Plain bowl? Early Neolithic.
122	D1215	F1216: Outer Arc Segment 5	7 (70g)	5	1 base 4 body	Abraded sherds, average thickness 9mm. Brown to black exterior surface. Black interior surface & core. Surface texture rough & pitted. Flat base.	Plain bowl? Early Neolithic.
123	D1215	F1216: Outer Arc Segment 5	1 (2g)	6	Rim	Slightly abraded, thickness 6mm. Black throughout. Smooth texture. Simple rim, 130mm diameter, 6% remaining.	Plain bowl, neutral form. Early Neolithic.
124	D1301	F1670 (=F1647): Outer Arc Segment 5	2 (28g)	7	Rim	Abraded, thickness 8mm. Black surfaces, black/brown core. Smooth exterior texture, radial burnishing on rim & vertical burnishing on interior. Rolled rim, 260mm diameter, 9% remaining.	Carinated bowl, open form. Early Neolithic.
125	D1213	F1214: Outer Arc Segment 6	7 (74g)	1	2 rim 4 body	Fresh sherds, thickness 9mm. Brown exterior surface and core. Black interior surface. Smooth texture, slightly uneven. Simple rim, 300mm diameter, 9% remaining.	Plain bowl, open form. Early Neolithic.
126	D1213	F1214: Outer Arc Segment 6	10 (33g)	12	1 shoulder 9 body	Fresh sherds, average thickness 11mm. Pink/brown surfaces & black core. Uneven, gritty, pitted exterior texture & smooth interior with flint protrusions. Also contains fresh flint with possible cortical surface. Carinated shoulder. Coil breaks visible.	Bronze Age?
127	D1213	F1214: Outer Arc Segment 6	1 (5g)	7	Body	Abraded sherds, thickness 5mm. Pink-brown exterior. Black interior surface and core. Sparse, spalled, crushed flint and sparse grog. Gritty texture throughout with prominent flint protrusions (possibly due to abrasion).	Neolithic?
128	D1213	F1214: Outer Arc Segment 6	2 (3g)	7	Body	Abraded sherd, thickness 5mm. Orange/brown throughout. Generally smooth texture with rare flint protrusions, possibly due to abrasion.	Beaker?
129	D1213	F1214: Outer Arc Segment 6	7 (33g)	1	1 shoulder 6 body	Fresh sherds, thickness 9mm. Brown exterior surface. Dark brown/black interior surface and core. Gritty exterior surface. Smooth interior surface with possible organic voids. 'S' profile shoulder.	Plain bowl? Early Neolithic.
130	D1243	F1214: Outer Arc Segment 6	40 (164g)	1	Body	Fresh sherds, average thickness 10mm. Orange/brown exterior surface. Black interior surface and core. Rough exterior texture with flint protrusions & smooth slightly gritty interior.	Plain bowl? Early Neolithic.
131	D1243	F1214: Outer Arc Segment 6	9 (15g)	7	1 rim 8 body	Some fresh, some abraded, average thickness 7mm. Brown to black throughout. Smooth slightly gritty texture & uneven surfaces. Simple rim.	Plain bowl? Early Neolithic.
132	D1115	F1116: Inner Arc Segment 6	1 (2g)	7	Body	Abraded sherd, thickness 6mm. Brown/black surfaces, orange/brown core. Texture smooth but uneven with flint protrusions.	Neolithic?
133	D1140	F1141: Inner Arc Segment 6	2 (9g)	3	Body	Fresh sherd, thickness 8mm. Brown/black throughout. Burnished fluted exterior & interior texture.	Carinated bowl? Early Neolithic.

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
134	D1140	F1141: Inner Arc Segment 6	6 (9g)	1	Body	Fresh sherds, average thickness 7mm. Mottled brown exterior surface. Brown/black interior surface and core. Gritty exterior texture with flint protrusions & smooth interior with visible flints. Coil break visible.	Plain bowl. Early Neolithic.
135	D1152	F1153: Pit on eastern edge of excavation	1 (1g)	9	Body	Abraded sherd, thickness 6mm. Orange/brown exterior surface. Black brown interior surface & core. Smooth slightly gritty texture.	Beaker.
136	D1182	F1183: Pit on eastern edge of excavation	4 (11g)	5	Body	Abraded sherds, thickness 8mm. Brown surfaces, black core. Texture rough & gritty.	Neolithic?
137	D1396	F1397: Middle Arc Segment 6	9 + crumbs (9g)	5	1 rim 1 shoulder 3 body	Fresh sherds, average thickness 9mm. Mottled brown/black throughout. Generally smooth texture with rare flint protrusions. Simple rim.	Neolithic?
138	D2098	F2097: Pit on eastern edge of excavation	5 + crumbs (7g)	7	Body	Fresh sherds, average thickness 6mm. No interior surface surviving. Orange/brown exterior surface. Brown/black core. Uneven slightly gritty exterior texture.	Neolithic?
139	D2098	F2097: Pit on eastern edge of excavation	2 (3g)	7	1 rim 1 neck	Abraded sherds, thickness 4mm. Brown/black exterior surface. Brown interior surface & core. Smooth texture. Bevelled, 110mm diameter, 5% remaining.	Bronze Age?
140	D1043	F1044: Inner Arc Segment 3	2 (2g)	7	Body	Very abraded sherds, thickness 5mm. Brown exterior. Black interior & core. Smooth texture.	Neolithic?
141	D1095	F1096: Pit on eastern edge of excavation	3 (47g)	5	1 base 4 body	Abraded sherds, thickness 9mm. Orange/brown exterior. Grey/brown interior. Black core. Gritty, pitted, corky texture. Possible base	Bronze Age?
142	D1095	F1096: Pit on eastern edge of excavation	6 (30g)	10	6 body	Abraded sherds, average thickness 12mm. Orange/brown throughout. Smooth texture with rare flint protrusions.	Bronze Age?
143	D1095	F1096: Pit on eastern edge of excavation	3 (6g)	2	Body	Abraded with some fresh breaks, thickness 8mm. Thin orange/brown surfaces & thick black core. Smooth texture throughout.	Bronze Age?
144	D1095	F1096: Pit on eastern edge of excavation	3 (5g)	7	Body	Abraded sherds, average thickness 6mm. Brown, black throughout. Smooth surfaces.	Bronze Age?
145	D1095	F1096: Pit on eastern edge of excavation	7 (19g)	5	Body	Mostly fresh sherds, average thickness 10mm. Orange to black exterior surface. Black interior surface and core. Gritty surface texture.	Bronze Age?
146	D1130	F1131: Pit on eastern edge of excavation	4 (5g)	7	Body	Abraded sherds, thickness 7mm. Orange/brown exterior surface. Black interior & core. Rough & gritty exterior texture & burnished interior.	Neolithic?
147	D1166	F1167: Pit on eastern edge of excavation	2 (24g)	7	Body	Abraded sherds, thickness 13mm Orange/brown exterior. Brown/grey interior & core. Smooth texture with flint protrusions, possibly due to abrasion.	Bronze Age?
148	D1166	F1167: Pit on eastern edge of excavation	1 (1g)	2	Body	Abraded sherd, thickness 5mm. Grey/brown throughout. Smooth texture.	?
149	D1166	F1167: Pit on eastern edge of excavation	10 + crumbs (13g)	1	Body	Fresh sherds, average thickness 8mm. Mottled brown/black throughout. Uneven exterior texture & smoother interior with flint protrusions.	Neolithic?
150	D1202	F1203: Small pit post-dating parallel ditches	1 (5g)	1	Body	Abraded sherd, thickness 7mm. Orange/brown throughout. Smooth texture with moderate flint protrusions.	Bronze Age?
151	D1166	F1167: Pit on eastern edge of excavation	2 (7g)	1	Body	Abraded sherds, thickness 7mm. Brown/black surfaces & core. Smooth exterior texture with sparse flint protrusions & smooth to burnished interior.	Neolithic?
152	D1166	F1167: Pit on eastern edge of excavation	1 (2g)	7	Body	Abraded sherd, thickness 7mm. Brown surfaces & black core. Smooth texture throughout.	Neolithic?

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
153	D1206	F1207: Small pit post-dating parallel ditches	5 (5g)	1	Body	Abraded sherds, thickness 6mm. Brown exterior surface, brown/black interior surface & core. Smooth throughout with rare flint protrusions.	Neolithic?
155	D1351	F1352: Pit at eastern edge of excavation	12+crumbs (47g)	5	Body	Abraded sherds with some fresh breaks, thickness 10mm. Orange brown exterior surface, black interior surface and core. Surfaces smooth and uneven.	Bronze Age.
156	D1351	F1352: Pit at eastern edge of excavation	1 (5g)	2	Body	Abraded sherd, thickness 9mm. Brown surfaces, black core. Smooth throughout.	Bronze Age?
157	D1543	F1542: Pit between the Middle and Outer Arcs	1 (1g)	6	Body	Abraded sherd, thickness 5mm. Grey black throughout. Smooth texture throughout.	?
158	D1627	F1628: Pit between the Middle and Outer Arcs	7 (67g)	5	1 rim 6 body	Mostly abraded sherds, thickness 7mm. Brown/ orange exterior. Black interior & core. Surface texture uneven & gritty. Simple rim. <2% remaining.	Bronze Age?
159	D1627	F1628: Pit between the Middle and Outer Arcs	2 (15g)	5	Body	Fresh sherd, thickness 7mm. Brown exterior surface. Black interior surface & core. Gritty texture throughout.	Plain bowl. Early Neolithic.
160	D1627	F1628: Pit between the Middle and Outer Arcs	6 (19g)	7	1 rim 5 body	Abraded sherds, thickness 6mm. Brown/black surfaces & core. Rough, gritty & uneven texture. Simple rim, 130mm diameter, 8% remaining.	Plain bowl, neutral form. Early Neolithic.
161	D1627	F1628: Pit between the Middle and Outer Arcs	15 (73g)	7	4 rim 11 body	Abraded sherds, average thickness 8mm. Brown/ black throughout. Smooth with interior vertical burnishing & occasional flint protrusions. Rolled rim, 280mm diameter, 11% remaining.	Shouldered bowl? Open form. Early Neolithic.
162	D1068	F1069: SE limb of southern potential 'cove'	Crumbs (2g)	1	Body	Abraded sherds, average thickness 6mm. Brown exterior. Black interior surface & core. Smooth texture throughout.	?
163	D1070	F1071: NE limb of southern potential 'cove'	2 (4g)	3	1 neck 1 shoulder	Abraded sherds, thickness 6mm. Brown/black throughout. Smooth to burnished exterior texture with slightly gritty interior.	Plain bowl? Early Neolithic.
164	D1307	F1308: Single curved slot forming part of a horseshoe shaped feature north within the Inner Arc	3(3g)	? crumbs	Body	Fresh & abraded sherds, average thickness 7mm. Brown/black throughout. Smooth texture.	Neolithic?
165	D1307	F1308: Single curved slot forming part of northern potential 'cove'	1 (3g)	5	Body	Abraded sherd, thickness 10mm. Orange/brown exterior. Brown/black interior & core. Rough exterior texture & smooth interior.	Bronze Age.
166	D1625	F1626: Single curved slot forming part of northern potential 'cove'	2 (7g)	1	Rim	Slightly abraded, thickness 7mm. Black throughout. Gritty & uneven texture. Moulded rim, *c* 140mm diameter, 4% remaining.	Plain bowl? Early Neolithic.
167	D1625	F1626: Single curved slot forming part of northern potential 'cove'	15 (68g)	9	2 rim 2 shoulder 11 body	Some fresh & some abraded sherds, average thickness 7mm. Black exterior surface & core. Brown to black interior surface. Gritty texture throughout with wipe marks on the exterior. Simple rim, 220mm, 8 % remaining. Rounded shoulder.	Shouldered bowl, open form. Early Neolithic.
168	D1625	F1626: Single curved slot forming part of northern potential 'cove'	1 (4g)	5	Body	Abraded sherd, thickness 8mm. Pink/brown surfaces. Black core. Rough texture throughout.	Neolithic?
169	D1625	F1626: Single curved slot forming part of northern potential 'cove'	3 (14g)	9	Body	Fresh sherds, thickness 8mm. Brown exterior surface. Black interior surface & core. Slightly gritty texture due to flint protrusions.	Neolithic?
170	D1625	F1626: Single curved slot forming part of northern potential 'cove'	2 (7g)	7	Body	Abraded sherds, thickness 8mm. Mottled orange/brown surfaces. Black core. Rough & pitted exterior texture & smooth to burnished interior.	?

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
171	D1625	F1626: Single curved slot forming part of northern potential 'cove'	1 (4g)	3	Body	Fresh sherd, thickness 7mm. Black/brown throughout. Smooth surfaces.	Plain bowl? Early Neolithic?
172	D1508	F1509: Small pit at eastern edge of excavation	20 + crumbs (292g)	10	6 rim 14 body	Abraded sherds, average thickness 14mm. Pink/orange surfaces. Grey/black core. Smooth & uneven texture with sparse, prominent flint protrusions. Bevelled rim, 240mm diameter, 26% remaining. Row of large pre-fired perforations *c* 10mm below rim.	Bronze Age. Neutral form.
173	D1508	F1509: Small pit at eastern edge of excavation	22 (116g)	5	2 rim 20 body	Abraded sherds, average thickness 10mm. Orange to brown exterior surface. Black interior surface & core. Rough, gritty & uneven surfaces. Bevelled rim, *c* 280mm diameter. 5% remaining.	Bronze Age. Possible join with 167.
174	D1508	F1509: Small pit at eastern edge of excavation	15 (14g)	7	1 rim 14 body	Abraded sherds, average thickness 6mm. Brown exterior surface. Black interior surface & core. Gritty, uneven exterior texture, possibly due to abrasion & smoother, slightly gritty interior. Simple rim.	Bronze Age?
175	D1510	F1511: Small pit at eastern edge of excavation	11 (37g)	10	1 base 10 body	Abraded sherds, average thickness 12mm. Brown exterior surface. Black interior & core. Uneven exterior texture & smoother interior, both with flint protrusions.	Bronze Age
176	D1621	F1620: Post-hole at eastern edge of excavation	16 (10g)	7	16 body	Abraded sherds, average thickness 7mm. Brown exterior surface. Black interior surface & core. Gritty exterior texture & smooth interior.	?
177	D1188	F1189 (=1201): Easternmost parallel ditch	1 (1g)	7	Body	Abraded sherd, thickness 5mm. Brown surfaces, black core. Smooth texture throughout.	Late Bronze Age/ Early Iron Age.
178	D1188	F1189 (=1201): Easternmost parallel ditch	2 (13g)	1	Body	Abraded sherd, thickness 12mm. Brown exterior surface and black core. Gritty texture due to prominent flint protrusions.	Plain bowl? Early Neolithic?
179	D1188	F1189 (=1201): Easternmost parallel ditch	2 (4g)	5	Rim	Abraded sherd, thickness 7mm. Brown exterior surface and core, brown/black core. Gritty texture. Simple rim.	Plain bowl? Open form. Early Neolithic?
180	D1188	F1189 (=1201): Easternmost parallel ditch	3 (1g)	2	Body	Abraded sherd, thickness 4mm. Orange surfaces & black core. Smooth texture throughout.	?
181	D1195	F1196 (=1201): Easternmost parallel ditch	1+crumbs (8g)	1	Body	Abraded sherds, thickness 8mm. Generally brown surfaces & black core. Smooth texture throughout.	Neolithic?
182	D1204	F1205 (=1260): Easternmost parallel ditch	3 (20)	11	2 base 1 body	Abraded sherds, thickness 5mm. Orange brown surface, black core. Smooth texture. Flat based pot with faint traces of three horizontal rows of comb impressions.	Beaker.
183	D1204	F1205 (=1260): Easternmost parallel ditch	2 (14g)	1	Body	Abraded sherds, thickness 12mm. Brown exterior surface, brown/black interior surface and core. Exterior uneven texture with prominent flint protrusions & gritty interior.	Plain bowl. Early Neolithic.
184	D1204	F1205 (=1260): Easternmost parallel ditch	4 (9g)	7	1 rim 3 body	Abraded sherds, thickness 8mm. Brown exterior surface, brown/black interior surface and core. Slightly gritty and uneven exterior texture & smooth interior. Externally thickened rim.	Plain bowl, open form. Early Neolithic?
185	D1208	F1209 (=1260): Easternmost parallel ditch	8 (12g)	5	2 rim 6 body	Fresh sherds, thickness 8mm. Cream/brown exterior surface, grey/black interior surface and core. Gritty texture throughout (possibly due to abrasion). Simple rim.	Neolithic?
186	D1208	F1209 (=1260): Easternmost parallel ditch	5 (9g)	3	Body	Abraded with fresh breaks, thickness 6mm. Brown/black throughout. Smooth exterior texture & burnished interior.	Carinated bowl?. Neolithic.
187	D1208, 1204	F1209 (=1260): Easternmost parallel ditch	3 (23g)	11	1 base 2 body	Abraded sherds, thickness 5mm. Orange/brown surfaces. Black core. Smooth texture throughout. Flat base. 4 rows of horizontal comb impressions.	Beaker.

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
188	D1208	F1209 (=1260): Easternmost parallel ditch	1 (1g)	1	Crumb	Orange abraded sherd.	?
189	D1232	F1345 (=1260): Easternmost parallel ditch	1 (3g)	9	Body	Abraded sherd, thickness 8mm. Orange throughout. Smooth, uneven texture.	?
190	D1251	F1252: Easternmost parallel ditch	1 (1g)	? crumbs	Body	Abraded sherd, thickness 9mm. Orange surfaces. Black core. Smooth texture.	?
191	D1251	F1252: Easternmost parallel ditch	1 (2g)	7	Rim	Slightly abraded, thickness 6mm. Brown exterior surface. Black interior surface & core. Smooth texture throughout. Some soot on interior. Simple rim.	Carinated Bowl. Early Neolithic.
192	D1251	F1252: Easternmost parallel ditch	1 (37g)	5	Body	Slightly abraded, thickness 11mm. Orange/brown exterior surface. Black interior surface & core. Gritty texture throughout. Sooty interior.	?
193	D1251	F1252: Easternmost parallel ditch	2 (4g)	3	Body	Fresh sherds, thickness 6mm. Black throughout. Smooth & gritty texture throughout. External striations.	Neolithic.
194	D1251	F1252: Easternmost parallel ditch	4 (16g)	9	1 rim 3 body	Abraded sherds, average thickness 8mm. Brown exterior. Black interior & core. Gritty texture throughout. Simple rim.	Bronze Age?
195	D1251	F1252: Easternmost parallel ditch	2 (43g)	5	Body	Abraded sherds, thickness 18mm. Brown surfaces, Grey/black core. Gritty texture throughout.	Bronze Age.
196	D1251	F1252: Easternmost parallel ditch	2 (19g)	9	Shoulder	Fresh sherd, thickness 9mm. Orange/brown exterior surface. Black interior surface & core. Gritty texture throughout with interior sooty deposit. Rounded shoulder.	Bronze Age?
197	D1282	F1283: Easternmost parallel ditch	1 (4g)	7	Body	Abraded sherds, thickness 7mm. Brown exterior. Brown/black interior & core. Smooth texture throughout.	Bronze Age?
198	D1282	F1283: Easternmost parallel ditch	2 (1g)	5	Body	Abraded sherds, average thickness 9mm. Orange/brown surfaces. Black core. Smooth texture throughout.	Bronze Age?
199	D1284	F1283: Easternmost parallel ditch	1 (2g)	1	Body	Abraded sherd, thickness 8mm. Orange exterior. Black interior & core. Smooth texture throughout.	Bronze Age?
200	D1284	F1283: Easternmost parallel ditch	5 (4g)	11	Body	Abraded sherds, thickness 5mm. Orange surfaces. Black core. Smooth texture.	Bronze Age?
201	D1286	F1285: Westernmost parallel ditch	7 + crumbs (8g)	5	Body	Fresh sherds, average thickness 6mm. Mottled brown/black & gritty texture throughout.	?
202	D1314	F1283: Easternmost parallel ditch	4 (4g)	2	Body	Abraded sherds, average thickness 8mm. Brown exterior surface & interior. Black core. Smooth texture with flint protrusions.	Beaker?
203	D1315	F1285: Westernmost parallel ditch	1 (58g)	5	Body	Abraded sherd, thickness 20mm. Orange/brown exterior. Brown/black interior & core. Gritty texture throughout.	Bronze Age.
204	D1315	F1285: Westernmost parallel ditch	1 (4g)	5	Body	Fresh/abraded sherd, thickness 8mm. Brown exterior, black interior & core. Gritty texture throughout.	Bronze Age.
205	D1347	F1285: Westernmost parallel ditch	1 (8g)	10	Body	Abraded sherd, thickness 10mm. Pink/orange throughout. Smooth, uneven surface texture with sparse flint protrusions.	Bronze Age.
206	D1347	F1285: Westernmost parallel ditch	5 (11g)	5	Body	Abraded sherds, thickness 12mm. Mottled brown/black throughout. Smooth, uneven texture with rare flint protrusions.	Bronze Age.
207	D1347	F1285: Westernmost parallel ditch	9 (34g)	5	Body	Abraded with some fresh breaks, thickness 12mm. Dark brown exterior and brown/black interior & core. Uneven & sandy texture throughout. Frequent flint protrusions. Coil breaks visible.	Late Bronze Age.
208	D1347	F1285: Westernmost parallel ditch	1 (1g)	5	1 rim?	Abraded sherd, thickness 5mm. Orange surfaces, grey/brown core. Rough & pitted texture throughout. Simple rim.	?

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
209	D1353	F1283: Easternmost parallel ditch	19 (47g)	5	1 rim 12 body	Abraded sherds, average thickness 12mm. Pink/brown exterior. Brown/black interior & core. Smooth, uneven texture with sparse flint protrusions. Simple rim.	Bronze Age.
211	D1355	F1283: Easternmost parallel ditch	4 (30g)	5	Body	Abraded sherds, average thickness 12mm. Orange/brown exterior surface. Grey/black interior surface & core. Texture smooth with fingertip impressions to exterior & uneven interior with voids (<5mm).	Bronze Age.
212	D1355	F1283: Easternmost parallel ditch	14 (52g)	5	Body	Abraded & fresh sherds, average thickness 13mm. Orange/brown exterior. Dark brown interior surface & core. Gritty texture throughout.	Bronze Age.
213	D1355	F1283: Easternmost parallel ditch	3 (17g)	5	Body	Abraded sherds, thickness 9mm. Brown exterior surface & mottled black/brown core. Black interior. Gritty texture throughout.	Bronze Age.
214	D1348	F1285: Westernmost parallel ditch	1 (4g)	4	Body	Abraded sherd, thickness 8mm. Mottled black/brown throughout. Smooth, uneven texture with many voids <4mm. Organic impressions to exterior? Mud infiltrated fabric.	?
215	D1418	F1252: Easternmost parallel ditch	3 (2g)	5	Body	Abraded sherds, thickness 10mm. Brown exterior. Black interior surface & core. Gritty texture throughout.	?
216	D1423	F1424: Recut of easternmost parallel ditch	2 (4g)	5	Body	Abraded sherd, thickness 5mm. Orange/brown exterior. Brown interior & core. Smooth exterior texture & gritty interior.	?
217	D1423	F1424: Recut of easternmost parallel ditch	1 (6g)	7	Poss. rim	Abraded sherd, thickness 7mm. Brown exterior. Black interior & core. Gritty exterior texture & smooth interior. Simple rim.	Late Bronze Age?
218	D1423	F1424: Recut of easternmost parallel ditch	3 (61g)	5	Body	Abraded sherd, average thickness 10mm. Orange/brown surfaces. Black core. Uneven texture with sparse flint protrusions.	Bronze Age.
219	D1423	F1424: Recut of easternmost parallel ditch	1 (13g)	1	Body	Abraded sherd, thickness 11mm. Black/brown throughout. Uneven texture with sparse flint protrusions & wipe marks on interior.	Bronze Age.
220	D1423	F1424: Recut of easternmost parallel ditch	1 (6g)	5	Body	Abraded sherd, thickness 7mm. Brown exterior surface. Black interior surface & core. Rough texture with sooty deposit on interior.	Bronze Age.
221	D1129	F1060: Medieval field ditch	20 + crumbs (49g)	1	2 rim 18 body	Fresh sherds, average thickness 12mm. Orange/brown surfaces. Brown core. Smooth & uneven surface texture with flint protrusions. Rounded, everted rim with external lip, less than 2% remaining.	Bronze Age?
222	D1225	F1220: Medieval field ditch	9 + crumbs (13g)	3	Body	Fresh sherds, thickness 8mm. Brown/black throughout. Smooth texture throughout.	Neolithic?
223	D1225	F1220: Medieval field ditch	1 (7g)	7	Body	Abraded sherd, thickness 10mm. Brown surfaces & black core. Gritty texture throughout.	Bronze Age.
224	D1225	F1220: Medieval field ditch	8 (23g)	10	Body	Abraded sherds, thickness 12mm. Pink/brown surfaces & grey core. Smooth texture throughout.	Bronze Age.
225	D1218	F1220: Medieval field ditch	3 (16g)	1	1 rim 2 body	Abraded sherds, thickness 5mm. Grey/black throughout. Gritty texture throughout. External lipped rim, 180mm diameter, 4% remaining.	Plain bowl, neutral form. Early Neolithic.
226	D1218	F1220: Medieval field ditch	6 (14g)	7	2 rim 4 body	Abraded sherds, thickness 6mm. Brown throughout. Smooth to burnished texture. Thickened rim, 220mm diameter, 6% remaining.	Plain bowl, open form. Early Neolithic.
227	D1218	F1220: Medieval field ditch	12 (36g)	5	Body	Abraded sherds, average thickness 10mm. Pink/brown exterior. Grey/brown interior surface. Grey/black core. Pitted, uneven exterior texture with flint protrusions & smooth interior.	Bronze Age?
228	D4/5?	F7: One of two crouched burials in northern part of site	2 (3g)	11	Body	Abraded sherds, thickness 6mm. Orange/brown throughout. Smooth texture with three possible linear incisions.	Beaker.

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
229	D203	F206: One of two crouched burials in northern part of site	8 (6g)	3	Body	Abraded sherds, thickness 7mm. Grey/black throughout. Smooth texture.	?
230	D105	F106 (=F511): Barrow ring-ditch	1 (4g)	5	Body	Abraded sherd, thickness 9mm. Brown exterior surface, black interior surfaces and core. Exterior texture gritty, interior smoother with occasional flint protrusions.	Bronze Age.
231	D440	F442, Small pit within barrow ring-ditch	20 + crumbs (84g)	5	1 shoulder 19 body	Fresh sherds, average thickness 11mm. Brown exterior surface. Black interior surface & core. Uneven exterior texture with flint protrusions & smooth interior surface with wipe marks & occasional flint protrusions. Sooty deposits. Row of fingernail impressions on exterior.	Peterborough ware. Middle Neolithic.
232	D440	F442, Small pit within barrow ring-ditch	2 (8g)	1	1 rim 1 body	Abraded sherds, average thickness 8mm. Brown throughout. Smooth texture. Simple rim, 120mm diameter, 5% remaining.	Bronze Age.
233	D509	F511: EBA barrow Arc	4 (20g)	5	2 collar 2 body	Fresh sherds, average thickness 9mm. Brown exterior surface, brown black interior surface and core. Texture uneven and slightly gritty. Horizontal row of finger nail incisions or finger tip impressions on base of possible collar.	Fengate, open form. Middle Neolithic.
234	D600	F511: Barrow ring-ditch	2 (7g)	4	1 rim 1 body	Abraded sherd, rim thickness 10mm. Dark brown/black throughout. Uneven & pitted exterior texture with irregular voids & smoother interior. Simple rim, *c* 160mm diameter, 5% remaining.	Grooved Ware, closed form. Late Neolithic.
235	D600	F511: Barrow ring-ditch	1 (4g)	5	Body	Abraded sherd, thickness 10mm. Brown exterior. Black interior & core. Gritty texture throughout.	Bronze Age?
236	D600	F511: Barrow ring-ditch	1 (1g)	2	Body	Abraded sherd, thickness 9mm. Orange/brown surfaces. Black core. Smooth texture throughout.	Beaker.
237	D2016	F2014: Outer Arc Segment 1	9 (15g)	12	Body	Fresh sherds, average thickness 10mm. Orange brown exterior. Brown/black interior & core. Gritty exterior texture & smooth interior.	Plain bowl. Early Neolithic.
238	D2028	F2014: Outer Arc Segment 1	2 (6g)	7	Body	Abraded sherds, thickness 5mm. Brown exterior. Black interior & core. Gritty exterior texture & smooth interior.	Bronze Age.
239	D2028	F2014: Outer Arc Segment 1	9 (23g)	5	Body	Abraded sherds, thickness 5mm. Black throughout.	Bronze Age.
241	D2075	F2014: Outer Arc Segment 1	15 + crumbs (52g)	5	Body	Fresh sherds, average thickness 10mm. Orange/ brown exterior surface. Brown interior surface. Black core. Smooth texture throughout.	Bronze Age.
242	D2076	F2014: Outer Arc Segment 1	1 (4g)	11	Body	Fresh sherd, thickness 6mm. Orange/brown surfaces. Black core. Slightly gritty texture throughout.	Beaker.
243	D595	F596: Pit at southern end of site	5 (10g)	5	2 collar,	Fresh sherd, thickness 8mm. Cream brown surfaces, brown core. Uneven exterior texture with flint protrusions & gritty interior. Two possible external horizontal grooves.	Peterborough Ware. Middle Neolithic.
244	D91	F92: Medieval field ditch	1 (3g)	9	Body	Abraded sherd, thickness 8mm. Pink/brown surfaces black core. Smooth surface texture.	Beaker?
245	D99	F100 (=421): Medieval field ditch	6 (10g)	5	Body	Abraded sherd with fresh breaks, thickness N/A. Red brown exterior. Black core. Smooth & uneven texture with occasional flint protrusions. Unidentifiable ceramic object.	Late Bronze Age/ Early Iron Age.
246	D1016	F1019: Medieval field ditch	5 (9g)	1	Body	Fresh sherds, thickness 10mm. Orange/brown exterior surface. Black interior surface & core. Smooth texture with flint protrusions.	?
247	D1016	F1019: Medieval field ditch	1 (3g)	3	Rim	Abraded, thickness 8mm. Black throughout. Gritty texture. Simple rim.	Peterborough Ware? Open form. Middle Neolithic.

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
248	D1016	F1019: Medieval field ditch	1 (15g)	5	Body	Fresh sherd, thickness 8mm. Brown/black throughout. Smooth exterior texture & slightly gritty interior.	Late Bronze Age/ Early Iron Age.
249	D1020	F1004: Medieval field ditch	1 (1g)	9	Body	Abraded sherd, thickness 5mm. Brown throughout. Smooth texture.	Beaker?
250	D1023	F1025: Medieval field ditch	3 (17g)	9	Body	Abraded sherd, thickness 6mm. Brown black throughout. Smooth and even texture.	Bronze Age.
251	D1028	F1019: Medieval field ditch	1 (5g)	1	Body	Abraded sherd, thickness 7mm. Brown exterior. Brown/black interior & core. Smooth texture with flint protrusions.	Bronze Age?
252	D1051	F1052: Medieval field ditch	1 (6g)	9	Body	Abraded sherd, thickness 10mm. Red/brown exterior surface, grey/black interior surface and core. Slightly gritty texture possibly due to abrasion.	Bronze Age.
253	D476	F478: Grave cut within LBA/EIA enclosure	1 (1g)	1	Body	Fresh sherd, thickness 7mm. Brown surface, black core. Uneven exterior texture & smooth interior with flint protrusions throughout. Fingernail impressions.	Peterborough Ware. Middle Neolithic.
254	D1111	F1112: Inner Arc Segment 6	3 (22g)	1	Body	Abraded sherds, thickness 15mm. Red throughout. Smooth texture with prominent flint protrusions.	Bronze Age?
255	D1643	F1644: Post-hole at eastern edge of excavation	2 (1g)	7	Body	Abraded sherds, thickness 5mm. Brown/black throughout. Slightly gritty exterior texture & smooth interior. One sherd decorated with linear & diagonal incisions forming bands.	?
256	D40	F44 (=F1318): Outer Arc Segment 5	12 (122g)	7 (slightly larger inclusions)	1 rim 9 body 2 possible shoulder or base	Abraded sherds, thickness 10mm. Brown surfaces, brown/black core. Gritty texture, generally even with irregular (possibly organic) depressions on interior surface. Simple rim, *c* 260mm diameter, 3% remaining.	Plain bowl, open form? Early Neolithic.
257	D40	F44 (=F1318): Outer Arc Segment 5	25 (149g)	7	Body	Slightly abraded or fresh sherds, thickness 5mm. Brown exterior surface, black interior surface & core. Smooth exterior surface (when fresh), burnished interior surface & core.	Plain bowl. Early Neolithic.
258	D40	F44 (=F1318): Outer Arc Segment 5	55 (162g)	7	Body	Slightly abraded sherds, average thickness 7mm. Brown surfaces. Black core. Smooth to burnished throughout.	Carinated bowl. Early Neolithic.
259	D40	F44 (=F1318): Outer Arc Segment 5	1 (14g)	7	Rim	Abraded sherd, thickness 9mm. Brown throughout. Smooth to burnished texture with faint wipe marks. Flat topped rim with external lip, 220mm diameter, 4% remaining.	Shouldered bowl, open form. Early Neolithic.
260	D40	F44 (=F1318): Outer Arc Segment 5	60 + crumbs (252g)	1	Body	Generally fresh sherds, average thickness 13mm. Brown exterior surface. Brown/black interior surface & core. Uneven texture with sparse flint protrusions& irregular voids. Coil breaks visible.	Plain bowl. Early Neolithic.
261	D40	F44 (=F1318): Outer Arc Segment 5	10 (42g)	3	3 rim 1 neck 6 body	Fresh sherds, thickness 6mm. Brown/black throughout. Radial burnishing on rim and vertical burnishing internally and on rim exterior. Thickened rim, 260mm diameter, 3% remaining.	Carinated bowl, open form. Early Neolithic.
262	D40	F44 (=F1318): Outer Arc Segment 5	10 (147g)	6	5 rim 5 body	Slightly abraded sherds, thickness 6mm. Brown to black surfaces. Black core. Smooth throughout. Rolled rim. 240mm diameter. 20% remaining.	Plain bowl, open form. Early Neolithic. Joins with 98.
263	D40	F44 (=F1318): Outer Arc Segment 5	30 (219g)	7	4 rim 26 body	Abraded sherds, thickness 6mm. Brown to black surfaces. Black core. Smooth throughout. Rolled rim. 220mm diameter. 27% remaining.	Plain bowl, open form. Early Neolithic.
264	D40	F44 (=F1318): Outer Arc Segment 5	3 (10g)	9	Body	Abraded sherds, thickness 4mm. Brown exterior surface. Black interior surface & core. Surface texture uneven with possible organic voids and rare flint protrusions.	Early Neolithic. Possible join with 84.

Sherd Group	Context	Details	No and weight of sherds	Fabric	Rim/Body	Description	ID
265	D73	F1672: Outer Arc, Segment 5	36 (242g)	7	4 rim 37 body	Generally fresh sherds, average thickness 7mm. Brown exterior. Black interior & core. Gritty exterior texture & smooth interior. Simple rim. 220mm diameter. 10% remaining. Coil joins visible.	Plain bowl. Early Neolithic.
266	D73	F1672: Outer Arc, Segment 5	47(221g)	1	6 rim 41 body	Fresh sherds, average thickness 10mm. Brown exterior. Brown/black interior & core. Exterior texture slightly gritty with wipe marks. Interior pitted with occasional flint protrusions. Simple rim. *c* 200mm diameter. 15% remaining.	Plain bowl, neutral form. Early Neolithic.
267	D73	F1672: Outer Arc, Segment 5	4 (13g)	7	body	Fresh sherd, thickness 6mm. Brown/black throughout. Smooth to burnished texture decorated with burnished flutes on exterior.	Carinated bowl? Open form. Early Neolithic.
280	D443	F446: Central burial of barrow ring-ditch	87 + crumbs (543g)	11	5 rim 5 base 77 body	Abraded sherds, average thickness 6mm. Orange surfaces. Black core. Smooth texture with external decoration: Tooth combed pendant filled triangles on upper body, zoned decoration on lower.	Beaker.
281	D1505	F1672: Outer Arc, Segment 5	5 (9g)	6	1 rim	Fresh sherds, thickness 6mm. Brown surfaces, black core. Smooth surfaces. External lipped rim (<1% remaining).	Plain bowl, open form. Early Neolithic.
282	D1215	F1214: Outer Arc Segment 6	1 (21g)	5	Base	Abraded sherd, thickness 11mm. Brown/black throughout. Gritty texture throughout.	Bronze Age.

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CHALK HILL

Excavations at Chalk Hill, Ramsgate in south-eastern Britain were primarily aimed at investigating the remains of a possible early Neolithic causewayed enclosure visible on aerial photographs. However, the monument could not in fact be categorised as a causewayed enclosure, but instead represented a type of early Neolithic ritual monument unique to the British Isles.

The earliest significant features recorded on the site dated to the early Neolithic (roughly 3700–3600 cal BC). They took the form of three concentric arcs of intercutting pit clusters forming discrete 'segments', the fills of which produced rich assemblages of pottery, flintwork, animal bone and other material. Much of this material appeared to have been deliberately placed in the pits rather than representing casual disposal of refuse. There are indications that material placed in different pits at different times may have derived from the same source, a 'midden' or some such which was not located during the excavations. The pit clusters appeared to have resulted from repeated pit-digging in the same location over an extended period of time. The site therefore contributes a more nuanced understanding of the heterogeneity of monumental architecture in the early Neolithic of the British Isles.

This report is therefore critical for understanding the early Neolithisation of southern Britain, the relations between Neolithic incomers and indigenous Mesolithic hunter-gatherers, the potential creolisation of different cultural groups and cross-Channel relations in the early 4th Millennium BC.

The site probably went out of use in around 3600 cal BC, and subsequent use of the landscape in the Bronze Age and later periods is evocative of the perception of 'special places' in the landscape long after they were abandoned.

Intended Audience: Archaeologists interested in the Neolithisation of western Europe, interactions between incomers and indigenous communities, and the prehistory of the Transmanche zone.

Kent County Council

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Sidestone Press

ISBN: 978-90-8890-607-7

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