



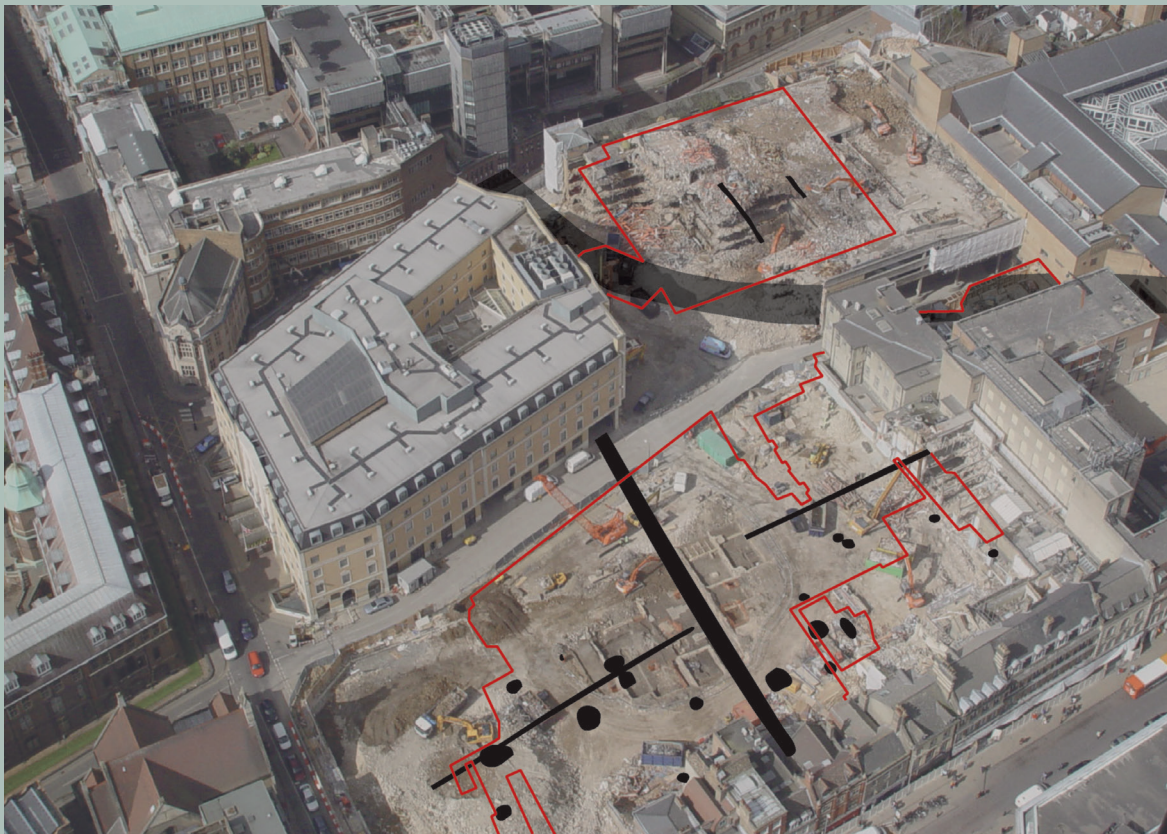
McDONALD INSTITUTE MONOGRAPHS

Medieval to modern suburban material culture and sequence at Grand Arcade, Cambridge

Archaeological investigations of an eleventh-
to twentieth-century suburb and town ditch

Supplementary material

Craig Cessford and Alison Dickens



Cambridge Archaeological Unit Urban Archaeology Series
The Archaeology of Cambridge Volume 1

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Supplementary material

By Craig Cessford and Alison Dickens

With contributions by

Martin Allen, Steve Allen, Tony Baggs†, Rachel Ballantyne, Steve Boreham,
Richard Darrah†, Charles French, Andrew Hall, David Hall, Jen Harland,
Kevin Hayward, Vicki Herring, Lorrain Higbee, Rosemary Horrox, Philip Mills,
Quita Mould, Richard Newman, Mark Samuel, David Smith, Simon Timberlake,
Ian Tyers, Anne de Vareilles and Alan Vincet†

Graphics by Vicki Herring with Andrew Hall

Principal photography by Craig Cessford and Dave Webb

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On the cover: *Aerial view of Grand Arcade, facing northwest, with outlines of areas of investigation and various features shown. Compare to fig. 1.11E (photograph courtesy of Bovis Lend Lease Ltd.).* On the back cover: *View of the excavation of the main area at Grand Arcade, facing west.*

Edited for the Institute by James Barrett (*Series Editor*).

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CONTRIBUTORS

MARTIN ALLEN

Senior Assistant Keeper, Department of Coins and Medals, Fitzwilliam Museum, Trumpington Street, Cambridge CB2 1RB (coins and jettons)
Email: mra25@cam.ac.uk

STEVE ALLEN

Wood Technologist, Conservation Department, York Archaeological Trust, 47 Aldwark, York YO1 7BX (wood species)
Email: sallan@yorkat.co.uk

TONY BAGGS†

Freelance specialist (standing buildings)

RACHEL BALLANTYNE

Research Associate, McDonald Institute for Archaeological Research, Downing Street, Cambridge CB2 3ER (environmental remains)
Email: rmb51@cam.ac.uk

STEVE BOREHAM

Senior Technical Officer, Department of Geography, University of Cambridge, Downing Place, Cambridge CB2 3EN (pollen)
Email: sb139@cam.ac.uk

CRAIG CESSFORD

CAU (principal author, plus modern pottery, clay tobacco pipes, metalwork, stone objects, worked bone and miscellaneous items)
Email: cc250@cam.ac.uk

RICHARD DARRAH†

Freelance specialist (wood and timber)

ALISON DICKENS

Director Granta Heritage, formerly CAU (principal author and standing buildings)
Email: alison@grantaheritage.co.uk

CHARLES FRENCH

Department of Archaeology, University of Cambridge, Downing Street, Cambridge CB2 3DZ (geoarchaeology)
Email: caif2@cam.ac.uk

ANDREW HALL

CAU (modern pottery, metalwork)
Email: afh21@cam.ac.uk

DAVID HALL

Freelance specialist, Pinfold, Hargrave, Northamptonshire NN9 6BW (Middle Saxon to Early Post-Medieval pottery and field systems)
Email: hargravefields@aol.com

JENNIFER HARLAND

Archaeology Institute, University of the Highland and Islands, East Road, Kirkwall, Orkney KW15 1LX (fish bone)
Email: jen.harland@uhi.ac.uk

KEVIN HAYWARD

Building Material Specialist, Pre-Construct Archaeology, Unit 54 Brockley Cross Business Centre, 96 Endwell Road, Brockley, London SE4 2PD
Email: KHayward@pre-construct.com

LORRAINE HIGBEE

Senior Zooarchaeologist, Wessex Archaeology, Portway House, Old Sarum Park, Salisbury SP4 6EB (animal and bird bone)
Email: l.higbee@wessexarch.co.uk

ROSEMARY HORROX

Fellow & Director of Studies in History, Fitzwilliam College, University of Cambridge, Storey's Way, Cambridge CB3 0DG (documentary sources)
Email: reh37@cam.ac.uk

VICKI HERRING

CAU (illustrator, modern glass)
Email: vh252@cam.ac.uk

PHILIP MILLS

Freelance specialist, Hon. Research Fellow, University of Leicester, 21, Dalby Road, Anstey, Leicester LE7 7DL (ceramic building material)
Email: tilemanandson@gmail.com

RICHARD NEWMAN

CAU (Christ's Lane excavations, East Fields)
Email: rn276@cam.ac.uk

QUITA MOULD

Barbican Research Associates, 51 Whin Common Road, Denver, Downham Market, Norfolk PE38 0DX (leather)
Email: quita@onetel.com

MARK SAMUEL

Architectural Historian, Architectural Archaeology,
15 Grove Road, Ramsgate CT11 9SH (stone
mouldings)
Email: twoarches@aol.com

DAVID SMITH

Senior Lecturer in Environmental Archaeology,
Department of Classics, Ancient History &
Archaeology, Institute of Archaeology and
Antiquity, University of Birmingham, Edgbaston,
Birmingham B15 2TT (insects)
Email: d.n.smith@bham.ac.uk

SIMON TIMBERLAKE

Freelance specialist and Affiliate Scholar McDonald
Institute, formerly CAU, 19 High Street, Fen Ditton,
Cambridge CB5 8ST (worked stone objects and slag
and metalworking remains)
Email: simon.timberlake@gmail.com

IAN TYERS

Freelance specialist, Dendrochronological
Consultancy Ltd, Lowfield House, Smeath
Lane, Clarborough, Retford DN22 9JN
(dendrochronology)
Email: ian@dendro.co.uk

ANNE DE VAREILLES

Freelance specialist, formerly CAU (environmental
remains)
Email: ak.vareilles@gmail.com

ALAN VINCE†

Freelance specialist (thin section and ICPAES
analysis).

DAVE WEBB

CAU (photographer)
Email: dww25@cam.ac.uk

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Chapter 2 – Supplementary material

Preludes: prehistoric to early twelfth century

Craig Cessford

Geology and topography

The Second Terrace Cam Gravels overlie a sequence of Gault Clay, Lower Greensand and Kimmeridge Clay. The Kimmeridge Clay was deposited in a shallow marine environment 160–150 million years ago; after this the Lower Greensand sandstone formed in an oxygen-depleted marine environment rich in organic detritus and low in sedimentary input 125–112 million years ago. The Gault Clay is a formation of stiff blue clay deposited in a calm, fairly deep water marine environment 112–99 million years ago. The area has a complex Pleistocene geological history (Boreham 2002) and the Cam river system(s) initially developed along lines of Anglian sub-glacial drainage 478,000–424,000 years ago; in cold stages these occupied high-energy braidplains characterized by episodic erosion and the aggradation of gravels and sands. In temperate stages they occupied relatively stable low-energy channels, resulting in the accretion of fines and organics.

At a practical level this means that once overlying deposits were removed any hole would encounter river terrace gravels, a highly variable banded deposit of sands and gravel that provided a valuable source of raw materials and would drain extremely well. Any hole that penetrated through the 1–3m thick gravels would encounter clay, which also provided potentially useful raw material; in addition, its impermeable nature meant that any holes dug into it would rapidly fill with water, creating relatively shallow but reliable sources of water. The geology beneath this was of no practical significance to the site's occupants until the nineteenth century, when the artesian water supply began to be exploited.

The intensity of later occupation makes the original topography difficult to reconstruct with confidence. It seems likely that there was some form of slightly raised ridge roughly along the line of St Andrew's Street and that the area then gradually fell away to the west.

Soils of Cambridge and its immediate environs: insights from CAU excavations Charles French

Introduction, geology and modern soils

A series of excavations in advance of development within Cambridge city and its environs has afforded the chance for keyhole investigations of buried soil profiles found beneath the medieval to modern overburden. Where possible, buried soils were selectively sampled and examined using micromorphological techniques (after Bullock *et al.* 1985; Courty *et al.* 1989; Murphy 1986; Stoops 2003). The sites examined fall into three groups:

- 1) Grand Arcade environs: McDonald Institute, St Andrews Church and Emmanuel College
- 2) Cambridge south and east of the river: Jesus College, Bene't Court, St John's College Chapel Court and Master's Garden
- 3) Broader Cambridge environs: Castle Street, New Hall, Vicar's Farm, Arbury ringwork, Borough Hill Sawston and Wandlebury ringwork

The geology of Cambridge is dominated by river terrace gravels, with some chalk and Gault clay outcrops (Worssam & Taylor 1969). Essentially, on the left or west bank of the Cam there are First Terrace gravels with an outlier of Lower Chalk with Gault clay beyond. This clay, particularly in west Cambridge around the Castle Hill to New Hall and University Observatory to Girton areas is mainly characterized by gravelly loam surficial deposits, essentially a periglacial head deposit. On the right or east bank, there are the gravels of the First Terrace with Chalk beyond. The area now occupied by the Colleges along the Backs equates with the First Terrace gravels, in most cases with overlying alluvial overburden (Hughes 1907b). The core of the old town, from Trinity Street and Magdalene Bridge in the northeast to Regent Street/St Andrews Street/Jesus

College/the Downing University Site, sits on Second Terrace gravels. These latter gravels extend northwards to include the Arbury, Milton and Histon areas.

In terms of the modern soil cover, the area occupied by the city has not been mapped by the Soil Survey of England and Wales, but it is possible to extrapolate the nature of the major soil types present from the immediate environs (from Hodge & Seale 1966). The floodplain area of the River Cam is occupied by humic clay, gleyed alluvial soils (Midelney series). The terrace gravel zones are characterized by brown earths or sandy clay loam to gravelly loam soils (Milton series). To the west of the city on Gault clay the soils are gravelly clay loams to clay loams to clay (Wicken series), and are often gleyed. To the east and southeast of the city, there are brown calcareous soils or sandy clay loams (Swaffham Prior series), and rendzina soils or fine clay loams (Burwell series) and silty clay loams (Wantage series), all on Chalk geology.

The palaeosols investigated through CAU excavations in and around the city of Cambridge have given brief glimpses of the Holocene soil cover in a variety of different landscape zones, namely from the river's edge/floodplain, First and Second Cam Terrace gravels, and the wider surrounding environs of the city. These are discussed below.

Holocene palaeosols

Floodplain edge/Cam First Terrace Gravels

The best evidence of the nature of the Holocene soil complex in the floodplain edge/First Cam Terrace Gravels location is provided by excavations in the Master's Garden and Chapel Court of St John's College. Underlying about 1.5m of overburden and post-Roman alluvium there was a well preserved buried soil. This comprised an organic horizon overlying an apparently homogeneous, but irregularly preserved, B horizon of a palaeosol, developed on mixed sands and gravels of the Cam First Terrace gravels.

Although complete, this buried soil profile has suffered a variety of disturbance processes in the past. It comprises an alluviated organic (Ah) horizon as indicated by the impure clay intercalations throughout. This contains abundant Roman pottery and some stone rubble fragments, iron-phosphatic concretions and a 'dirty' organic fabric (Fig. 2.7A), all suggestive of middening additions to this soil and the mixing of fabrics suggests severe physical mixing such as would occur if it was dug over and over, perhaps using a hoe or spade (Fig. 2.7B). Beneath this horizon is a slightly depleted (Eb) horizon and the remnants of a clay-enriched B (or Bt) horizon (Fig. 2.7C) at the base of the soil profile.

The presence of illuvial limpid (or pure) clays in the B horizon (Fig. 2.7C) indicates that this was once a relatively well developed argillic (or Bt) horizon of an argillic brown earth soil (Bullock & Murphy 1979; Limbrey 1975, 134–7). These soil horizons are generally considered to form underneath stable woodland (Fisher 1982), as opposed to initial models which saw them as a result of disturbance of the soil due to forest clearance beginning in Mesolithic times (Limbrey 1975). This association with woodland environments was also suggested by Weir *et al.* (1971) working in Kent as well as by Slager & van de Wetering (1977) working in Germany. Furthermore, Fisher (1982) attested to the possibility of argillic brown earth soils forming on calcareous parent material under woodland and Bridges (1978) pointed out that these argillic horizons do in fact appear under stable woodland today. The presence of Bt horizon material, characterized by illuvial limpid clays, in the soil profile from St John's therefore suggests a former stable woodland environment.

This woodland soil then appears to have been disturbed as indicated by the illuviation of laminated dusty (or impure) clay. This may have been caused by the removal of woodland cover through clearance, as well as by subsequent human activity (*cf.* Slager & van de Wetering 1977). The presence of successive laminations of dusty (or impure) clay (Fig. 2.7C) within the illuvial horizon indicates that the soil surface was exposed to rain-splash erosion and slaking for a considerable length of time. Furthermore, amorphous sesquioxide impregnation of some of the earlier dusty clay laminations was perhaps a result of wetting/drying of the bare soil. This could have been associated with an exposed soil present after clearance and ploughing/human activities.

Cam First/Second Terrace Gravels

Palaeosol data for the First/Second Terrace Cam Gravels area comes from a variety of sites such as Jesus College, St Andrew's Church, Emmanuel College, the McDonald Institute and King's Garden Hostel, but is best expressed by the evidence from Bene't Court. The excavations at Bene't Court revealed a thin surviving remnant of buried soil at the base of the medieval stratigraphic sequence. The single c. 15cm thick horizon present beneath man-made deposits and developed on the river terrace gravel terrace deposits is an apedal, homogeneous and bioturbated sandy loam (Fig. 2.7D). This thin buried soil with its minor oriented illuvial clay fraction is indicative of the B horizon of a former brown earth soil. The absence of any kind of organic A horizon material suggests that the upper half of the palaeosol has been truncated by

the subsequent human activity on site, but the 'dirty' fine organic aspect indicates much disturbance and the introduction of organic matter from above. This palaeosol is a less well developed version of the brown earth soil observed about half a kilometre away in a similar topographical position in the grounds of St John's College (see above; French *et al.* 1995). The buried soils at both loci are typical of prehistoric soils found in lowland river valley locations (French 1990; French 2003). In addition, it has suffered alternating conditions of wetting and drying through proximity to the groundwater table, thus creating fluctuating oxidizing/reducing soil conditions.

In contrast, immediately outside the King's Ditch a medieval ridge and furrow cultivation system was observed at the McDonald Institute site. Here soil build-up within the quadrangle after the fifteenth century had buried a medieval ridge and furrow system which had deeply truncated and disturbed the brown earth soil that had developed on the former terrace river gravels substrate.

Cambridge environs

Palaeosol data from the excavations beyond the floodplain and terrace landscape zones of the city centre hint at the wider potential variety of soil types in the Cambridge environs. At Castle Street on chalky marl deposits there was a thick and well preserved silty clay loam buried soil profile. Slightly uphill at New Hall (now Murray Edwards College), there was no buried soil survival, but ditch fills of gravelly sandy loams containing abundant wood ash, pottery fragments and food remains (Fig. 2.7E) were indicative of the incorporation of midden-type settlement derived debris in the ditch systems. This had much similarity to 'dark earth' deposits observed in many late Roman and early medieval towns in England (Macphail 1983; Macphail *et al.* 2003). Downslope to the south at Vicar's Farm there was a calcareous clay loam of the Wicken series developed on Gault clay (Hodge & Seale 1966) with buried soil survival only occurring in the north-western sector of the site. Here a sandy clay loam soil was preserved but there were few diagnostic features other than an organic-rich lower A horizon (Fig. 2.7F) and an illuvial B horizon (Fig. 2.7G) indicative of a once stable, then disturbed and midden-aggraded brown earth. At Arbury Camp to the north beneath the surviving earthen rampart there was a thin brown earth soil with turf development. This buried soil became severely oxidized and mixed by the soil fauna, with some evidence for soil disturbance given by the relative abundance of impure clay within the fine groundmass. Former turf development on this soil points to an open, grassland landscape

prior to rampart and ditch construction in the earlier Iron Age. To the southeast on chalk at Borough Hill, Sawston, there was a disturbed former woodland or argillic brown earth soil (Fig. 2.7H) beneath the Iron Age rampart (French & Sulas 2005), whereas on the adjacent chalk upland at Wandlebury ringwork, thin, single horizon rendzina soils (Fig. 2.7I) indicative of long-term established grassland were observed beneath the Iron Age ramparts and also characterize the immediate surroundings and along the Icknield Way southwards (French 2004).

Conclusions

Despite the very few data points for the Holocene soil record within Cambridge city, the soil story does show remarkable consistency. Brown earth soils developed in the earlier-mid-Holocene on the floodplain and First/Second gravel terraces, with silty clay alluvium aggrading in the floodplain area during post-Roman and medieval times, an area now largely occupied by the Backs of the Cambridge Colleges. In several instances, these brown soils are very well developed as argillic brown earths which are indicative of former stable and well drained wooded conditions that have subsequently become heavily disturbed most probably through human activities. In particular, it is clear that there was arable agriculture taking place in the later Roman period in a river edge position in the area now occupied by the Master's Garden and Chapel Court of St John's College. In addition, immediately outside the southern sector of the medieval town ditch beneath the McDonald Institute there was a medieval ridge and furrow cultivation system that had severely disturbed the Holocene brown earth soil.

The soil record in the immediate environs beyond the city core becomes much more variable. This is controlled by two main factors: first, the more complex geology of head deposits, Gault clay and chalk outcrops, and second, the different trajectories of human land-use and settlement over time. Impermeable substrates such as the Gault clay often help create fine textured and gleyed soils, whereas Chalk geology can lead to brown earth and rendzina soil formation with the development trajectory as much controlled by human activities as the underlying geology.

Prehistoric material incorporating specialist information from Rachel Ballantyne and Anne de Vareilles

Gully 1 (F.3763 and F.5015) was traced for a length of c. 100m and was c. 1.1m wide and over 0.3m deep with concave sides and traces of possible postholes in its base. It was filled with largely sterile material

consisting of mid to light orangey brown sandy silt that clearly derives from the natural brown earth soil. Seven sherds of prehistoric pottery were recovered and identified by Matt Brudenell; six sherds (20g) come from *Gully 1* and are Middle Iron Age (c. 350–50 BC) and the other sherd (8g) is residual and may be Bronze or Iron Age (Cessford 2007, 297). Charred plant remains were recovered from *Gully 1* in association with the pottery and are dominated by hulled barley grains (*Hordeum vulgare sensu lato*), one of which is twisted (Table 2.1). The lack of chaff renders the barley variety ambiguous, but it was probably six-rowed. There are also a few seeds of fescue or rye-grass (*Festuca/Lolium* sp.), which are grain-sized and difficult to remove from the crop. These results are of limited interpretive value as barley has been cultivated from the Neolithic onwards in Britain (Greig 1991).

The flint, which all derives from residual features, was studied by Emma Beadsmoore (Beadsmoore in Cessford 2007, 357) included a Neolithic scraper and two Neolithic core rejuvenation flakes. Comparatively systematically manufactured, potentially Neolithic or Early Bronze Age, flakes were also recovered and a small, thoroughly worked down core that is likely to be Early Bronze Age. Two flakes are expediently manufactured and potentially later prehistoric. The remaining material comprises chronologically non-diagnostic waste flakes and unworked burnt chunks.

Roman material incorporating specialist information from Martin Allen, Philip Mills and Simon Timberlake

No Roman features were identified, but small quantities of first–third/fourth-century material were recovered from residual contexts. This material consisted of small highly abraded pieces and the density of material (174 sherds per ha) is broadly comparable to other sites with no settlement, such as Cherry Hinton (215 sherds per ha; unpubl.), but is markedly lower than areas immediately adjacent to settlements, such as Vicar’s Farm (2068 per ha; Evans & Lucas in prep). There were no particular spatial concentrations, although the material occurs more frequently in earlier features, suggesting that it was deposited at the site during the Roman period and not imported at a later date through the movement of soil or other activities. In the Roman period there was a settlement on Castle Hill 1km to the northeast (Alexander & Pullinger 1999), plus activity just to the southeast of the river crossing, including domestic settlement plus associated field systems (for a recent summary see Cessford 2017), second/third-century pottery manufacturing (Hartley 1960; Hughes 1903)

and third/fourth-century cemeteries (Alexander *et al.* 2004). Of considerable importance to the later development of the area was the Roman road from Colchester to Godmanchester, usually referred to as the *Via Devana*, which was established by the mid-first century; based upon late nineteenth and early twentieth-century observations it is assumed to have run along the line of St Andrew’s Street (RCHM(E) 1959, 6; Walker 1910, 166–7).

Further south along the line of the road there have been numerous discoveries of pottery, coins and brooches. More recently investigations have revealed gravel quarry pits, perhaps dug for the construction or maintenance of the metalled surface of the road, and various ditches that appear to represent field boundaries at the Unilever site, Brooklands Avenue, Clarendon Road and Homerton College. The evidence suggests elements of the paddock networks and other outlying features of a series of scattered rural farmsteads, dating primarily to the late first and early second centuries. No evidence of a Late Roman presence was encountered, a pattern which also appears to occur within the Addenbrooke’s environs further south (Evans *et al.* 2008).

A total of 121 sherds of Roman pottery weighing 1237g (MSW 10.2g) were recovered, these were identified by Gwladys Monteil (Cessford 2007, 297). The material included grey coarseware, Nene Valley Colour Coat, Oxfordshire ware, Samian ware and Verulamium White Ware and spanned the first to third/fourth centuries. There was also a small quantity of Roman *tegulae* (four pieces, 586g), *imbrex* (five pieces, 563g) and flue tile (one piece, 127g) in three different fabrics including one produced at Horningsea. There was a roller stamp flue tile diamond and lattice design (Betts *et al.* 1994, fig. 27g nos. 69, 80, 49 or 17), that is perhaps late first-century, and a possibly second-century wide comb-decorated stamp flue tile. There was a copper alloy radiate of Tetricus I, the ruler of the Gallic Empire, which included Britain, minted 270/1–3 with the reverse LA[...], Laetitia standing r. (Besly & Bland 1983, no. 2641, mint II). A second brass of Antoninus Pius (138–61) was found during the construction of the Post Office in the 1930s (CUMAA 1935.650). A piece of pozzuolanic mortared floor was found in a mid-sixteenth-century feature. It is almost certainly of Roman origin and made from heavily compressed crushed flint with the addition of some crushed glassy slag and set in mortar (weight 338g). The thickness of this piece (40mm) reflects the depth of original flooring, or possibly walling although this is unlikely. One face of this had originally been covered with lime wash, possibly a painted plaster. The presence of a quite different and presumably later mortar addition around

the edges of the broken fragment suggests that this may have been reused as a 'stone' within a medieval wall or other feature.

Early and Middle Anglo-Saxon material

incorporating specialist information from David Hall

No Early Anglo-Saxon features or material were recovered. There were a series of Early Anglo-Saxon cemeteries and settlements along the western side of the river Cam (Dodwell *et al.* 2004). More limited evidence from south and east of the river indicates that there were also cemeteries and settlements in this area (Fox 1923, 245). Discoveries include a pair of 'small long' fibulae found at Jesus Lane, decorated and plain pottery from Sidney Street and decorated pottery found at Trinity Hall. The most convincing evidence is of spearheads, knives, three shield bosses, a buckle and pottery found in 1901 at Rose Crescent. Given the degree of later truncation and the limited opportunities for investigation this suggests that the eastern side of the river was just as intensively occupied as the western side. Further south the Addenbrooke's environs investigations have revealed relatively isolated sunken featured buildings and other features indicative of small scale dispersed occupation (Collins 2009; Evans *et al.* 2008, 194–5).

No Middle Anglo-Saxon features were identified but there was a small quantity of Middle Anglo-Saxon pottery from residual contexts, consisting of Ipswich ware (six sherds, 179g; Fig. 2.8) of *c.* 720–850 and Maxey-type ware (five sherds, 82g) of *c.* 650–850. This is a low density (16 sherds per ha) compared to known areas of settlement such as West Fen Road (74 sherds per ha; Mortimer *et al.* 2005), Cherry Hinton (78 sherds per ha; Cessford with Dickens 2005b), Cottenham (349 sherds per ha; Mortimer 2000) and Castle Hill (121 to 14,286 sherds per ha; Cessford with Dickens 2005a). There is evidence for Middle Anglo-Saxon occupation of the Castle Hill area, including a predominantly eighth-century execution cemetery (Cessford with Dickens 2005a; Cessford *et al.* 2007) suggesting a 'central place' of some sort that eventually formed the nucleus of the emergent 'town'. Other Middle Anglo-Saxon evidence is sparse locally, although there was a small settlement with five wells and one or two timber buildings in the Addenbrooke's environs, plus another site identified as a pottery scatter (Evans *et al.* 2008, 92–100, 149). Further afield there is a small possibly eighth-century cemetery at Barnwell Road (Newton *et al.* 2007), suggestions that Chesterton has Middle Anglo-Saxon origins (Cessford with Dickens 2004) and strong evidence of Middle Anglo-Saxon occupation at Cherry Hinton (Cessford with Dickens 2005b).

Late Saxon activity

Although no features or diagnostic finds were recovered it is likely that in the period *c.* 850–1150 the area fell within the East Fields of the nascent town, which appears to have expanded gradually. These open field strips, which presumably ran perpendicular to the Roman road, may have had an influence on the later settlement pattern, although this is difficult to discern.

By the eighth century Cambridge exercised a few central-place functions including judicial executions in the form of untidy, often excessively violent beheadings with swords (Cessford *et al.* 2007). Cambridge eventually fell within the area of the Danelaw (866–917) and a 'vast' Viking army 'sat there one year' in 875. Archaeologically the Danelaw settlement remains an enigma, with the only convincing archaeological evidence being two silver St Edmund (895–918) memorial issue coins minted in the Eastern Danelaw *c.* 905–15 found in a pit on Castle Hill (Blackburn & Haigh 1986). The most likely scenario, given the negative results at various sites to the southeast of the river, is that there was a 'longphort' or 'ship camp' to the north of the river plus some occupation of the area within the Roman walls on Castle Hill, similar perhaps to various sites in Ireland (Simpson 2005), Repton (Biddle & Kjølbye-Biddle 1992) and more locally possibly at Stonea Camp (Kelly & O'Donovan 1998). A small group of Viking-/Scandinavian-style worked bone and possibly some hack-silver and a whetstone at Earith Camp Ground indicate that this site's Roman period earthworks may have been utilized as a defensive camp (Evans *et al.* 2013).

It has been suggested that the area south and east of the river began to be occupied in the early tenth century, after it was conquered by Wessex in 917 (Haslam 1984). This hypothesis is not supported by much evidence and Cambridge as a whole developed slowly as an urban centre from the second half of the ninth century until the mid-tenth century, remaining an 'economically viable backwater' (Hines 1999, 136). It was only in the late tenth century, with the establishment of a mint in the 970s under Edgar (Hill 1981, 126–32) and a reference in the *Liber Eliensis* stating that in the 980s the citizens of Cambridge, Thetford, Ipswich and Norwich did not require witnesses for transactions (Fairweather 2005), that Cambridge can be recognized as a significant urban centre. Archaeologically, the early development of the town is difficult to trace accurately; in large part because the pottery in use changed relatively little during the tenth–twelfth centuries. Nonetheless most stratigraphic sequences in central Cambridge indicate that there was no occupation prior to the eleventh century; the principal

exception is the Corfield Court site where occupation appears to commence around the mid-tenth century (Cessford 2015). There is also some other occasional evidence indicating tenth-century activity, notably a penny of Ethelred II crux-type minted *c.* 991–7 and probably lost before *c.* 1000 from Free School Lane (Blackburn & Haigh 1986). In 1010 the Anglo-Saxon Chronicle records that the men of Cambridgeshire gained great reput[e] by their valour in opposing the incursions of the Danes, but the Danes amongst other ravages burnt the town of Cambridge; it is unclear how much of an impact this really had.

Classic medieval open-field systems under arable cultivation as a series of arge, hedge-less ‘open fields’ farmed in strips were laid out *c.* 850–1150 (Oosthuizen 2006), although locally there is evidence for eighth–ninth-century intensively cultivated proto-open field systems (Oosthuizen 2005; Oosthuizen 2006). Typically each ridge measured a quarter of an acre in area, 11 yards (*c.* 8m) wide, and 220 yards (*c.* 200m) long. The strips were not straight, but have curved ends making the overall shape an elongated reverse-S, which arose because of the tendency of the plough team to pull to the left in preparation for making the turn. The field systems of Cambridge are complicated; Maitland (1898) described it as a three field arrangement involving the West Fields, East Fields and the Fields of Chesterton, but since these were enclosed at different dates in the early nineteenth century (Tate & Turner 1978, 73, 75) it is clear that they were three independent field systems. A fourteenth-century field-book covering the West Fields demonstrates that there were four fields, grouped into a three-year cultivation regime (Hall & Ravensdale 1976). The East Fields have been less intensively studied, although there is considerable evidence relating to them (Hesse 2007; Stokes 1915): a fourteenth-century field-book covering the East Fields (similar to that for the West Fields) survives in the Corpus Christi archives and further research could elucidate the detailed structure and management of the East Fields. The overall field system probably developed from the tenth century onwards, if not earlier (Hesse 2007).

The Hadstock Way

Although first recorded in 1288, the name Hadstock Way (Reaney 1943, 48) is of eleventh-century or earlier origin. Hadstock, 17km southeast of Cambridge, was a relatively insignificant medieval village, but was the site of a major Anglo-Saxon church. The church has three Anglo-Saxon phases; the original excavator believed that these represented a long sequence of activity (Rodwell 1976), although it has been argued that they are all post-Conquest (Ferne 1983). The

earliest church was a large five-cell cruciform structure; although originally identified with St Botolph’s monastery of Icanho established in 654, this has been challenged (Martin 1978). The church was rebuilt on a monumental scale in the early eleventh century; this has been identified as a minster associated with Cnut although the case is not compelling.

Medieval streets are rarely excavated, principally because they usually lie under modern streets making it logistically difficult to investigate them (Schofield & Vince 2003, 66). A sewer trench west of Bradwell’s Court revealed ‘an earlier road surface of cobbles and smaller stones, with a ditch, perhaps a road ditch on its east side. Earlier than the road and ditch was a larger but undated cutting, perhaps also a ditch running along the side of an earlier street’ (Addyman & Biddle 1965, 82). Although undated it is likely that the ditches and road are medieval. The most extensive investigations of a medieval street in Cambridge revealed a series of coarse yellow sand and gravel deposits interspersed with dark clayey layers interpreted as a sequence of road metallings with accumulations of material between them (Cessford 1999), which although messy were not ‘at least ankle deep in refuse’ like those at Winchester (Keene 1985, I.53). In Oxford, where a considerable number of observations have been made, there was evidence of frequent successive surfaces with up to 18 metallings and major thoroughfares had drains in the middle of the street (Dodd 2003, 258–70). Grant of tolls for paving Cambridge were regularly passed between the late thirteenth and early fifteenth century and there were frequent complaints that the streets were not being cleaned and that the paving tolls were being used for other purposes (Cooper 1842, 62, 69, 77, 80, 85, 112). By the 1470s the streets were paved with stone rather than gravel and in 1543–4 an act for paving the town was passed: it was stated that the streets were covered with ‘great heaps’ of ‘filth and mire’ and that they should be ‘well and sufficiently’ paved with paving stone’ (Cooper 1842, 409). This extended along both sides of the Hadstock way, by then known as Preachers Street, as far as Emmanuel Street opposite Plots XI and XIII.

Features associated with the mid to late eleventh-century dispersed occupation incorporating specialist information from Rachel Ballantyne, Richard Darrah, David Hall, Lorraine Higbee, Ian Tyers and Anne de Vareilles

Area 1 features

Building 1 (F.3917, F.3931, F.3935) consists of a row of three relatively substantial postholes 0.25–0.4m in

diameter with surviving depths of up to 0.5m which relate to a structure at least 2.2m long (Fig. 2.3E).

The probable circular *Cesspit 1* (F.3957; Fig. 2.3F) was 1.65m in diameter and over 1.0m deep; its wattle lining had decayed leaving just a single piece of hazel roundwood. In its base were six pieces of oak board with pottery lying over them. The timber comes from one or more wide slow grown radial oak boards, with one 22mm-diameter hole present. Such high quality wood would have been used for coffins, wells or buildings, and in this case probably derives from a building. It produced a 238-year tree-ring sequence that matched English tree-ring data of 802–1039, felled in 1049 or later. The timber is heavily decayed, suggesting that it was used for around 50 years prior to deposition, dating the pit to c. 1100. Lying over the boards was a scatter of relatively large unabraded sherds of St Neots-type ware (74 sherds, 3403g) and Thetford-type ware (51 sherds, 1400g) from four vessels: two Thetford-type ware jars and a St Neots-type ware jar and bowl (Fig. 2.3A–D).

Cesspit 1 contains a number of mineral-replaced plant remains consistent with the accumulation of concentrated organic matter. The seeds are all of nutrient-loving wild taxa and probably represent plants growing nearby: stinging nettle (*Urtica dioica*), chickweed (*Stellaria media*), bittersweet (*Solanum dulcamara*) and a small-seeded grass. The only indicator of arable land or human faeces is corncockle (*Agrostemma githago*), which has grain-sized seeds that require hand-removal at a late stage of crop processing. Numerous fly puparia further indicate rotting plant or animal matter; the presence of so many seeds of inedible wild plants suggests (possibly with the exception of corncockle) organic refuse such as fodder, bedding, strewn plants or herbivore dung. Waterlogged plants also show the presence of human faeces, as there are numerous probable ingested seed-coat (testa) fragments of both cabbage/mustard (*Brassica/Sinapis* sp) and the arable weed corncockle (see Clapham 2005, 175). Seeds of brambles (*Rubus* subgen. *Rubus*), strawberries (*Fragaria vesca*) and elder may also have been ingested. The high numbers of edible plant seeds compared to those of local flora, which are expected within a pit-fall trap, suggests that this pit may have been backfilled rapidly with refuse and faeces.

Wattle-lined *Well 1* (F.3958; Fig. 2.3G) was around 3.4m in diameter and over 1.4m deep; its lining was too heavily decayed for identification. The backfilling of the well contained single sherds of St Neots-type ware (15g) and Thetford-type ware (30g) plus some grey coarseware (3 sherds, 125g), and 50 fragments of bone, most of which are unidentifiable but include cattle (5), sheep (2), pig (1) and chicken (1). *Well 1* lacks waterlogged seeds of edible plants other than one fragment

of bullace/damson stone (*Prunus domestica*), although numerous elder seeds could be natural or from faeces. The majority of taxa are ruderal plants likely to have grown nearby: nettles, goosefoots, oraches (*Atriplex patula/prostrata*), chickweeds, docks (*Rumex* spp.), black horehound (*Ballota nigra*), dead-nettles and true sedges. Of note is a single seed of common club-rush (*Schoenoplectus lacustris*), a tall semi-aquatic riverside plant that is today still harvested for its fibres along parts of the River Great Ouse – and which medieval written records attest was highly sought after for basketry and matting (Prendergast & Sanderson 2004). Overall, the waterlogged seeds are consistent with debris from plants growing nearby and they suggest that, by this time the area had damp, disturbed soils with nutrient-enrichment probably from human and animal faeces.

Area 2 features

The northern row of intercutting gravel quarry *Pits 1* (G.108) appear to have been dug relatively rapidly, running backwards from the direction of the street. Such linear arrangements of pits are a common feature of densely occupied medieval urban sites (Schofield & Vince 2003, 80–1) and indicate that, despite the apparently dispersed pattern of occupation, the overall area was already strictly divided and controlled. This row of pits ended 26m from the frontage at the northern end of *Gully 2* (F.3583) which was 9.6m long and defined the boundary of the innerland and backland. A rectangular quarry pit over 1.05m by 0.95m in extent and over 0.55m deep was lined and reused as *Cesspit 2* (F.3634). After this cesspit was backfilled *Building 2* (F.3618, F.3632), consisting of a beamslot (F.3618) over 1.05m long, 0.65m wide and over 0.5m deep and a post (F.3632), was built over it. Possibly contemporary with the building and a replacement for the earlier cesspit was another rectangular *Cesspit 3* (F.3620), over 2.1m by 1.65m in extent and over 0.5m deep.

Wattle-lined *Well 2* (F.3894) was located near the area's rear boundary; its oval construction cut is 2.3m by 1.8m in extent and over 1.4m deep. Only a portion of the wattle lining could be investigated, this was 0.55m in diameter and used hazel and willow. Unlike later wattle-lined wells, the lower shaft was not tight to the wattle lining and three pieces from oak cask(s) were placed around the wattle as a form of 'propping' or support. The pieces come from different trees. One produced an 85-year tree-ring sequence that could not be matched, another a 116-year English sequence that ended in 905 and the final one a 142-year English sequence that ended in 925. As none had any sapwood they were felled no earlier than 915 and 935 respectively. The piece felled in 915 or later was

an incomplete tangential middle stave from a 1.0m diameter cask head of a *tun*. Only 780mm of its length survived; its bevels on the surviving edge were of 55° on its outer face and 15° on its inner face. The oak was 35mm thick, but had lost several millimetres from each face, suggesting an original thickness of 40–45mm. Three 15mm cleft oak dowels were set in the outer straight edge of the stave (spacing from edge 80mm, 260mm and 260mm) in 42mm deep dowel holes. This inner tangential middle head stave had broken near to line above the pith, suggesting that it may have been twice its present width or c. 0.5m wide. No evidence of dowel holes survived at this broken edge. A single 16mm bung or dowel hole survives on the face of the piece; this may have attached the head to a batten or held a bung. The only similar sized cask head stave from York (Morris 2000, 2245 no. 8776) had both more pegs and two battens; the hole was in the wrong place for a pair of battens making it more likely that this was a bung hole.

Although no sapwood survives, it would be reasonable to assume that this piece of timber was cut as wide as possible without sapwood, as the wider the piece the shorter the straight joint and the less likely this joint was to leak. The tree that this head was made from was probably felled 930–70, as otherwise the plank would have been wider. The two other pieces were backed and hollowed staves with missing surfaces; the undated example tapers from 0.14m to 0.125m over 0.6m, matching the narrow taper noted on Anglo-Saxon staves (Morris 2000, 2240). The piece with a felling date of 935 or later tapers from 0.15m to 0.14m; this stave was also backed and hollowed above a crude notch removing any evidence of the croze groove, but was not hollowed at the narrower end below the notch. This thickening below the groove suggests that this stave was from a c.1.0m diameter tub, unless the lower head on a cask had been fitted from inside. The loss of surface of these durable sections of oak timber, compared to the better survival of less durable hazel and willow in the wattle lining, suggests that these cask pieces were already decayed when they were reused. Both surviving staves were backed and hollowed, with the faces curved both on the outside ‘backed’ and curved on the inside ‘hollowed’, and only tapered slightly over their length. This fits with evidence from York that Anglo-Saxon casks were nearly straight-sided and backed and hollowed over the full lengths of the staves (Morris 2000, 2240). *Well 2* continued in use until the mid-fifteenth century.

Also located towards the rear of the area were a number of gravel quarry pits; one of these, *Pit 2* (F.3767) measuring 2.6m by 2.5m in extent and over 1.0m deep, was used for refuse disposal after it had largely silted

up. The refuse included Thetford-type ware from at least three vessels (56 sherds, 1805g) and St Neots-type ware from at least five vessels (79 sherds, 1534g; Fig. 2.4B). There was also some worked bone, including a pig incisor trimmed to form a point, a scoop made from a sheep/goat scapula with trimmed spina and glenoid and proximal suspension hole possibly used for handling flour or grain (MacGregor 1985, 179–80), a square-sectioned mammal long bone rod decorated with dots (Fig. 2.4C) and a possible stamp or handle rough-out made from a sheep metacarpal. Iron items included a knife (Fig. 2.4D) and a small iron hook. In total 64 of the 478 bones recovered were identified; sheep is common (48 per cent NISP), just over half are waste elements from primary butchery while the rest represent nine good quality mutton joints (c. 22kg) (Table 2.2). Cattle and pig bones are comparatively rare (12.5 per cent and 17 per cent NISP) and are represented by a mixture of butchery and domestic waste, with two beef (c. 10.8kg) and two pork (c. 9.2kg) joints. A small number of chicken bones and single finds of goose and fish bone were also present, plus a horse pelvis and several bones from a common frog. A sheep mandible from one of the lower fills in early wear stage C (6–12 months) indicates that the animal was slaughtered in September/November, suggesting that this accumulated during the autumn. A mandible from a piglet aged 0–2 months in the uppermost fill indicates that this occurred in spring.

Features associated with the early twelfth-century large-scale imposed layout incorporating specialist information from Rachel Ballantyne, David Hall, Lorraine Higbee, Ian Tyers and Anne de Vareilles

The surviving portions of *Ditch 1* (F.3165; Fig. 2.6) were 1.6–2.3m wide and 0.8–1.3m wide; it was cut through the gravel into the Gault Clay, so its base would have been constantly wet. The base sloped downwards from east to west, falling 0.6m over 60m from 8.45m OD to 7.85m OD with a 1:100 slope. The earliest fill appears to have been deposited by water borne silting; this was followed by some collapse deposits, which indicate that there was a bank to the north. The ditch then appears to have been deliberately backfilled in two stages. The pottery was predominantly Saxo Norman (92 sherds, 1006g), plus some late twelfth–early thirteenth-century material (26 sherds, 347g) including a small pink coarseware jar. The ditch was initially created c. 1100 and largely filled in by the mid-twelfth century; it then appears to have formed a slight hollow that was not entirely levelled until the early thirteenth century.

A low number of grains are identifiable to barley and free-threshing wheat (*Triticum aestivum sensu*

lato); both types are consistent with medieval southern Britain, although there is no cereal chaff to refine these identifications. Very few charred seeds are present, with nine of elder (*Sambucus nigra*) and two of sedges (*Carex* spp.). The wild seeds are of uncertain origin as elderberries could not be arable weeds and are more likely to be charred from food preparation or wood fuel. There are abundant waterlogged seeds from a few taxa characteristic of disturbed nutrient-enriched soils: goosefoots (*Chenopodium* sp.), white/red dead-nettle (*Lamium album/purpureum*) and elder. Despite their abundance, the tough woody seed-coats of all three taxa and low species diversity suggests this context has not been fully waterlogged since formation and that only robust organic items have survived (e.g. Monckton 1999).

The badly preserved wattle-lined well (*Well 3*; F.5066) was c. 2.45m in diameter and over 1.4m deep, with a single surviving *in situ* chisel-pointed 33mm diameter hazel stake.

The surviving portions of the gullies were typically c. 0.4–0.8m wide and up to c. 0.4m deep with concave profiles:

Gully 3 (F.3453 and F.6276)

Gully 4 (F.3114, F.3115, F.3166, F.3371, F.3391 and F.3427)

Gully 5 (F.1086)

Gully 6 (F.1010, F.1046, F.1093 and F.1094)

Gully AB 1 (F.18)

Other twelfth-century ditches

In addition to *Ditch 1* several other ditches are known from the immediate vicinity and further afield in Cambridge. A broad shallow ditch over 10ft (c. 3.0m) wide and 2ft6in (c. 0.75m) or more deep containing ‘a few’ sherds of St Neots-type ware ran parallel to the modern course of Christ’s Lane (Addyman & Biddle 1965, 80–1). A large west-southwest to east-northeast aligned feature, that appears to be the southern portion of a substantial ditch, runs along the southern side of Downing Street (White & Mortimer 1998). These suggest that ditches were used to demarcate street blocks and it may be that the ditch at Grand Arcade was intended to become a similar boundary, but did not retain that level of importance potentially due to the creation of the King’s Ditch. It may also be that a large area of unknown size was being divided up into a series of ditched enclosures, which were then sub-divided by gullies. Further afield the most fully investigated comparable ditch sequence is at Jesus Lane where there were three successive lane flanking ditches of twelfth–early thirteenth-century date (Evans *et al.* 1997, 131). In order, these ditches were concave (1.0–1.2m wide, 0.5–0.6m deep), V-shaped (2.0m wide, 0.55m deep) and U-shaped (1.3m wide, 0.4m deep). At Chesterton there is a sequence of roadside ditches that are rather different as they shifted position considerably over time (Cessford with Dickens 2004; Mackay 2009), indicating a less ‘constrained’ landscape.

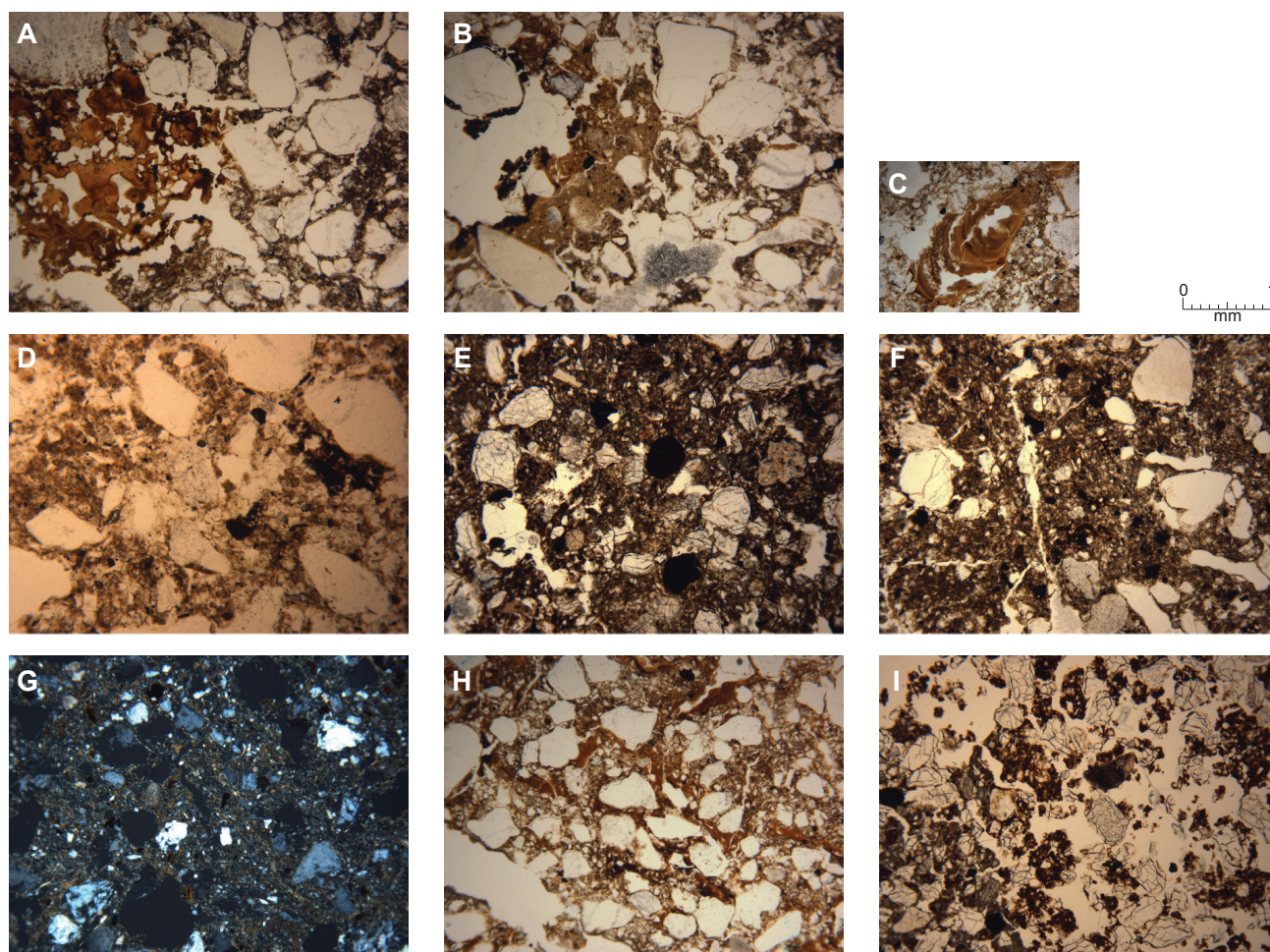


Figure 2.7. Micromorphology images of soils in and around Cambridge, all plane polarized light apart from G which is cross polarized light. Showing: (A) iron-phosphate concretion and dusty/organic sandy loam in sample from St John's College Chapel Court and Master's Garden; (B) mixed fabrics of organic or Ah sandy loam and sandy/silty B horizon material in sample from St John's College Chapel Court and Master's Garden; (C) crescentic pure to dusty clay infills in dusty fabric material in sample from St John's College Chapel Court and Master's Garden; (D) dirty sandy loam fabric of a disturbed brown earth in sample from Bene't Court; (E) 'dark earth' soil in sample from New Hall; (F) midden-rich lower A horizon with much included very fine charcoal and organic punctuations in sample from Vicar's Farm; (G) weakly reticulate to striated illuvial dusty clay in sample from Vicar's Farm; (H) micro-laminated dusty clay coatings in a Bt or argillic horizon at the base of the palaeosol in sample from Borough Hill, Sawston; (I) bioturbated organic Ah horizon of a rendzina soil in sample 10/1 Wandlebury ringwork (photographs courtesy of Charles French).

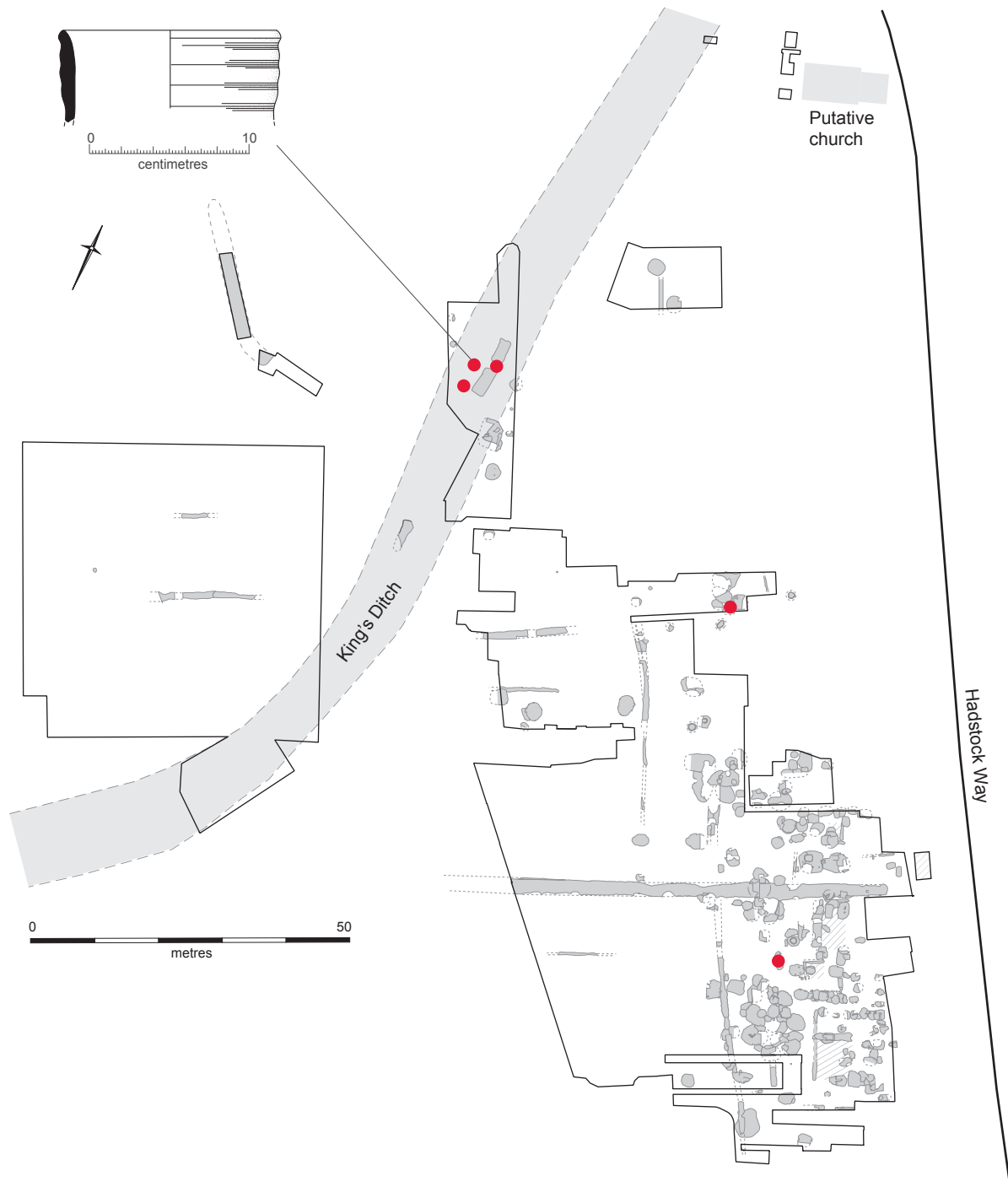


Figure 2.8. *Distribution of Middle Anglo-Saxon pottery, plotted against background of eleventh–twelfth-century features. Inset of Ipswich ware jug rim with rilled decoration, moderately coarse fabric but not ‘pimply’ ([50347] F.5192).*

Table 2.1. Raw data for plant remains from Middle Iron Age Gully 1. * 1 or 2 items, + less than 10 items, ++ 10 to 50 items, +++ more than 50 items.

Feature		3763
Context		34245
Sample		3073
Sample volume/ litres		0.1
Flotation fraction examined -%		100
Taxonomic description	English name	
CHARRED CEREAL GRAIN		
Hulled, straight <i>Hordeum vulgare sensu lato</i> caryopsis	Hulled Domesticated Barley grain	25
Hulled, twisted <i>Hordeum vulgare</i> ssp. <i>vulgare</i> caryopsis	Hulled Six-rowed Barley grain	1
Hulled <i>Hordeum vulgare sensu lato</i> caryopsis	Hulled Domesticated Barley grain	27
<i>Hordeum/Triticum</i> sp. caryopsis	Barley or Wheat grain	10
Cereal indet. heavily fragmented caryopses	Indeterminate cereal grain fragments	++
CHARRED VEGETATIVE PLANT PARTS		
Poaceae indet. culm fragments	Grass Family stem fragments	*
Wood charcoal		
Large charcoal [>4mm]		
Medium charcoal [2–4mm]		+
Small charcoal [<2mm]		++
Twiggy charcoal		
Vitrified charcoal		+
Charred concretions		
Parenchyma fragments	Starch-rich undifferentiated plant tissue	++
CHARRED OTHER WILD FRUITS AND SEEDS		
<i>Festuca / Lolium</i> sp. caryopsis	Fescues/Rye-grasses	2
Poaceae indet. large caryopsis [>4mm]	Large-seeded Grass Family	2

Table 2.2. Minimum number of butchery units (MNBUs) and meat weights from late eleventh-century Pit 2.

Species	Joint	No. bones	MNBU	Estimated meat weight (kg)	Total estimated meat weight (kg) by species
Cattle	Leg	2	1	3.6	10.8
	fillet/sirloin	2	1	7.2	
Sheep	Leg	5	3	6.6	22.0
	Shoulder	9	5	14.5	
	Loin	2	1	0.9	
Pig	Shoulder/ hand	3	2	9.2	9.2
Chicken		4	1		
Goose		1	1		
Total		28	15	42.0	



Medieval to modern suburban material culture and sequence at Grand Arcade, Cambridge

This is the first volume describing the results of the CAUs excavations in Cambridge and it is also the first monograph ever published on the archaeology of the town. At 1.5 hectares the Grand Arcade investigations represent the largest archaeological excavation ever undertaken in Cambridge, significantly enhanced by detailed standing building recording and documentary research. It includes one of the most comprehensive studies of the suburb of a British town, with fourteen investigated plots of the mid/late eleventh to twentieth centuries, and the most detailed investigation of a British town ditch ever undertaken, spanning the early/mid-twelfth to eighteenth centuries. Major artefactual assemblages of many material types were recovered, with extensive waterlogged preservation of wood and leather plus environmental sampling, including pollen and insects. The volume treats the copious eighteenth–twentieth-century material culture in a manner unparalleled in a British context, including a considerable number of college related items that attest to the town's distinctive role as a university centre.

This is an important book, and the scale of the investigations and the richness of the archaeology make it a major contribution to studies of British town suburbs and boundaries in particular and urban archaeology more generally. The ground-breaking commitment to the archaeology of the eighteenth–twentieth-centuries is particularly important, as Cambridge was one of the key intellectual hubs of the foremost global power for much of the period.

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