Research and Archaeology: Resource Assessment, Research Agenda and Strategy

Cover illustration: Iron Age or Roman period enclosures at Dean and Shelton in 1986.

Rear Cover: Excavation of the Roman cemetery at Kempston.

Bedfordshire Archaeology

Research and Archaeology: Resource Assessment, Research Agenda and Strategy

by

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NOTE. All reports for sites in Bedfordshire cited below as unpublished (BCAS, Albion Archaeology) are held in the Historic Environment Record, County Hall, Bedford, and are available for public consultation.

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1 INTRODUCTION AND BACKGROUND

Martin K. Oake

The development of regional archaeological research frameworks is now well established and actively promoted by English Heritage (2003 and Olivier 1996). Throughout England the regions used for the development of such frameworks are generally the government regions which have also been adopted by English Heritage and form the basis for ALGAO regional committees. These regions are largely administrative constructs rather than geographic or historic entities. In contrast to this there have been some research frameworks based on geographically defined areas, for example the Greater Thames Estuary (Williams and Brown 1999). Against this background the apparent anomaly of publishing a research framework for a single county needs some explanation.

Bedfordshire lies on the western edge of what is now the East of England Region which comprises the counties of Essex, Suffolk, Norfolk, Cambridgeshire, Hertfordshire and Bedfordshire. Traditionally Bedfordshire has not seen itself or been seen as part of an eastern region or "East Anglia." In fact the county occupies a border position with no very strong regional affiliations. It had claims to be part of a south or south east midlands region through geographical links with Buckinghamshire and Northamptonshire and formed part of the former SERPLAN area (along with Essex and Hertfordshire in the new East of England Region) linking it with counties of south east England. In terms of loose archaeological affiliations, organisational rather than culture historical, the county tended to look west and north west rather than east; for instance Bedfordshire is part of the CBA South Midlands Group and was, until regionalisation, part of an English Heritage team that also covered Buckinghamshire and Oxfordshire. In spite of this there have always been strong links with the counties of Hertfordshire and Cambridgeshire on Bedfordshire's southern and eastern border. There has also been a common thread to the organisation of archaeology in the counties which now form the East of England Region, with integrated archaeological services providing curatorial and fieldwork capability based in County Councils; although this has been subject to ever increasing pressure, change and in some cases fragmentation since local government re-organisation in 1997.

The other five counties of the Eastern Region had a long and well established regional co-ordination committee with sub-groups covering such matters as SMR's and development control. During the mid to late 1990's Bedfordshire began to be involved in these groups at first with observer status and later, as the East of England Region became an established entity including Bedfordshire along with the other counties, as a full member. Subsequently this co-ordination group became the ALGAO East of England Committee. David Buckley (1997) has described the origin of the Eastern Counties regional research framework in 1994; before Bedfordshire was established as part of the region. By the time Bedfordshire was fully included in the regional archaeological set up the development of the regional research framework, particularly the Resource Assessment (Glazebrook 1997) was well underway and it was not possible to integrate Bedfordshire into the process. It was, therefore, agreed with English Heritage that Bedfordshire would prepare a separate county based research framework that would, in effect, be a supplement to the framework for the other five counties (Wade and Brown 2000). It is clear that research frameworks cannot be static documents and that they will require periodic review to maintain their value (Wade and Brown 2000). It is the intention that the Bedfordshire research framework will be integrated with that for the other counties at the first review creating a single research framework for the whole region.

The published Eastern Counties Research Framework follows the structure established by Olivier (1996) and consists of two volumes: a Resource Assessment (Glazebrook 1997) and a Research Agenda and Strategy (Brown and Glazebrook 2000). The Bedfordshire Research Framework follows the same structure and largely chronological approach adopted by the rest of the region although in a single volume. Because there is no consistent tradition of synthesis or strategic analysis in Bedfordshire the resource assessment for Bedfordshire is fuller and more detailed than that for the rest of the region. The research agenda will build on that published for the rest of the region highlighting those areas which Bedfordshire shares with the rest of the region and identifying any topics that are specific to the county or which it shares

with its western neighbours. The research strategy will closely match that of the rest of the region (Wade and Brown 2000).

Bedfordshire is the smallest county in the Eastern Region and indeed is one of the smallest shire counties in England. The area covered by this volume is the historic and ceremonial county that under the present administrative arrangements comprises Bedfordshire and the unitary authority of Luton.

Although Bedfordshire is a small county and not noted for dramatic or outstanding landscapes it does have varied geology and topography which results in a diverse landscape. It has been described as ". . . a county of contrasts, borrowing a little bit of Northamptonshire, a bit of Hertfordshire there, a fen landscape from Cambridgeshire, a beech wood from Buckinghamshire but remaining resolutely itself" (Houfe 1995, 4). This quotation neatly describes the county both in terms of its landscape and also its archaeological and cultural associations. Rather than having areas that are easily recognised as characteristic of the county, it is diversity that characterises Bedfordshire and is reflected in the county's historic environment.

The geology and topography of the county follows a south west to north east trend. Moving from south to north the main topographical features in Bedfordshire are: the chalk downs of the Chilterns with, in the upper chalk to the south of Luton and Dunstable, extensive clay with flints deposits. North of the Chilterns is a band of Gault Clay which forms a low vale. The Greensand Ridge runs right across the county extending in to Buckinghamshire and Cambridgeshire. North of the Ridge is another clay vale formed in the Oxford Clay, the dominant solid geology of the northern part of the county. The vale is most extensive and well defined to the west where it is known as the Marston Vale, an area now dominated by the remains of the 20th century brick making industry. North of this is the valley of the River Great Ouse and in the north of the county a clay upland which is varies between flat plateau areas and more dissected topography particularly where small tributary streams of the Great Ouse cut through the Oxford Clay. The Great Ouse and its tributaries, particularly the Ivel and Flit are the other dominating features in the Bedfordshire landscape. This is most clearly visible to the north of the Marston Vale and in the east of the county. To the east of Bedford and in the Ivel Valley there is a typically broad valley with gravel terraces and alluvial landscapes. West of Bedford the river valley has a more meandering course with outcrops of Cornbrash and Oolitic Limestone in the valley sides. The valley of the River Flit runs though the Greensand Ridge creating a distinctive landscape and environment with extensive deposits of peat. Much of the county north of the Chilterns has superficial deposit of glacial boulder clay which has had a considerable influence on the development of soils.

Traditionally Bedfordshire is thought of as a rural county dominated by farming with little significant urban development. Historically there is some validity in this perception (see Resource Assessment) and it still, to an extent, holds true today. Much of the county is now under an arable regime, areas that had been substantially pasture, heath or meadow up to the mid–20th century having been taken into cultivation during and after the Second World War. The former extent of ridge and furrow in the county and its disappearance since the 1940's show how the balance between arable and pasture has fluctuated in the last 1000 years. There are some variations in land use regimes in the countryside with extensive market gardening in the Ivel Valley and woodland plantation on the Greensand Ridge.

Bedfordshire is not a heavily urbanised county. Aside from the small towns of the Roman period at Dunstable and Sandy until the 19th century Bedford has been the only major urban centre in the county; although the royal foundation of Dunstable was of some importance in the medieval period. Today the south of the county, Luton and Dunstable, is the most heavily built up and industrialised. Elsewhere there are a number of small towns of varying size but Bedford is still the only other substantial urban area in the county. However, recently increased housing development with the associated infra-structure and business provision have expanded the urban areas of the county both around the traditional urban centres and the small towns. With government promoted growth area proposals for the county this expansion will accelerate in the next two decades.

The main modern transport corridors, both road and rail, run north-south, across the south west – north east grain of the landscape. This reflects the historical situation with the A1 and A5 following, at least in part, Roman roads which have retained their importance as routes. Only the Great Ouse, now and in the past a significant transport corridor, does not follow this trend.

Archaeological finds, recognised as such, were first recorded in Bedfordshire in the 17th century when John Aubrey noted Roman material from Sandy; the site more recently recognised as a small town (Dawson 1995). However, it was not until the 19th century that any consistent tradition of archaeological enquiry or investigation developed in the county.

The beginnings of this tradition can be seen in the excavations at Shefford by Thomas Inskip in the 1820's-1840's when he discovered a Roman cemetery and contemporary building (Simco 1984, 117). This work was initiated when finds were made during gravel digging. Inskip also undertook other investigations in the east of the county. Elsewhere other antiquarians were undertaking investigations of varying scale and skill including Roman wells at Sewell (Monkhouse 1860) and Biddenham (Monkhouse 1858) and a Roman pottery kiln on land now occupied by the Toddington Service Station on the M1 (Simco 1984, 120). But there were also investigations on a more substantial scale producing finds of more than local interest. At Kempston Rev S E Fitch excavated an extensive early Saxon cemetery uncovered during gravel quarrying in the 1860's. Other finds of national significance were of Palaeolithic material, including flint tools associated with faunal remains, recovered from mineral working or during railway building at Deep Spinney, Biddenham and Summerhouse Hill to the east of Bedford (Wyatt 1861 and 1864).

The late 19th century saw the development of a more scientific and recognisably modern approach to archaeology in Bedfordshire. This trend is most notable in the work of Worthington G Smith in an around Luton and Dunstable. Best known for his investigations of Palaeolithic sites from brick earth deposits on the chalk downs of the area, published in his classic work *Man, the Primeval Savage* (1894) he also excavated Bronze Age barrows in Kensworth (an early example of recording monuments being damaged by ploughing), at Maiden Bower and other sites.

From the beginning of the 20th century archaeological activity spread more widely across the county, although often still carried by individuals rather than groups or institutions. An example of this is Fredrick Gurney who worked in the Leighton Buzzard and Luton areas. An early landscape archaeologist he did a lot of field walking and earthwork recording as well as studying field systems but also had time for rescue archaeology, notably his single handed excavation of two Saxon cemeteries at Chamberlains Barns sand pit near Leighton Buzzard (Hyslop 1963). This period also saw the publication of a survey of earthworks in Bedfordshire by Beauchamp Wadmore (1920) and an increase in archaeological work in the north of the county by the Bedford Modern School Field Club led by F W Kuhlike (Kennett 1974).

After the Second World War archaeological activity in the county expanded slowly, often in response to development threats. In the 1950's and 1960's the south of the county saw a particular increase in excavations and other fieldwork stimulated by James Dyer in Luton and Les Matthews in Dunstable (Schneider 1992). The work Matthews led, notably at Puddlehill (Matthews 1976), brought about the foundation of the Manshead Archaeological Society who have continued the tradition of fieldwork and research by local groups in the Dunstable area ever since. Work also took place elsewhere in the county although not with the intensity of those active in the south, for example the excavations at Harrold by J H Edwards (Eagles and Evison 1970) and the work of D E Johnstone and C F Tebbutt.

As the pace of development increased so did the level of archaeological work and from the early 1970's it became increasingly a professional activity especially with the creation of the post of Archaeological Liaison Officer in the County Council (forerunner of the post of County Archaeological Officer) in 1972. This period was characterised by a number of major, large scale excavations including Elstow Abbey (Baker 1971), Grove Priory, Warden Abbey, Roxton Barrow Cemetery (Taylor and Woodward 1985), Odell (Dix 1980) and Bedford Castle (Baker et. al. 1979). While many of these projects resulted from development threats they were conceived in terms of research projects rather than rescue recording, although the research objectives tended to be site specific rather than fitting into a broader county or regional research framework.

More recently the path of archaeology in Bedfordshire has followed a course similar to that in the rest of the country with increasing emphasis on professional responses to development threats through local authority based curatorial staff backed by PPG 16 *Archaeology and Planning*. This has created an ever increasing level of archaeological investigation, reflecting both the increasing pace of development and effectiveness of the now established planning based system for procuring archaeological investigations. In parts of the county, notably the south and central areas, this is complimented by continuing work by local groups.

It is worth noting some of the characteristics of the archaeology of Bedfordshire that result from its historical development as they have implications for our present understanding of the resource base and the research agenda that is developed from it. Firstly most archaeological investigations in the county have been as a result of what we would now call the development process. This dates back to the first substantial investigations in the 19th century which often took place in gravel quarries or as a result of railway building. This continued in the early 20th century when Worthington Smith's most

significant discoveries were made in brick pits in and around Luton. Much of the work of the Manshead Archaeological Society, particularly at Puddlehill and numerous sites in Dunstable town centre, resulted from a variety of development threats. There has been no strong tradition of substantial non-development lead archaeology in Bedfordshire of the sort found in areas such as Wessex. This may be because large parts of the county do not appear, on the face of it, to be clearly ancient landscapes or contain extensive, visible and well preserved monuments. The results of extensive aerial photography during the 20th century, however, has shown that the lack of visible monument does not reflect the extent and density of the actual archaeological resource. A consequence of this is that archaeological investigations and research has been concentrated in areas where development has been greatest. This has resulted in archaeological investigations being concentrated in and around major towns, mainly Bedford and Dunstable, and in the major river valleys (Great Ouse and Ivel). Other areas, notably the extensive clay areas and the Greensand Ridge have not received much attention reinforcing the view that such areas, particularly the clays, were not favourable to human settlement in the past and certainly not before the medieval period and thus devoid of prehistoric and Roman remains. There has been a danger that this "understanding" of the nature of the resource could become self fulfilling prophecy, but fortunately until recently there was little development in the clay areas so little is likely to have been lost unwittingly except perhaps in the brick making areas around Stewartby and Marston Moretaine. A combination of aerial photography and the use of evaluation in advance of development in the clay areas and Greensand Ridge has begun to show that they do contain remains of prehistoric and Roman settlement and may have been as densely settled as the better known river valleys, however, our understanding of these parts of the county is only in its infancy.

Another consequence of the nature of archaeological work in Bedfordshire has been a concentration on excavation rather than field survey and field walking. Some parts of the county, notably the south and north west (e.g. Hall and Hutchings 1972) have been subject to systematic field survey largely the result of individual effort. Where it has taken place it has demonstrated extensive distributions of sites, frequently of prehistoric date, although the evidence can often be difficult to interpret. However, the results are geographically specific and do not coincide with the main concentrations of excavated sites or those known from aerial photography. The potential of bringing together the data from various different types of investigative technique has been demonstrated at Roxton (Taylor and Woodward 1985) and Biddenham Loop (Luke forthcoming).

It is important to understand these biases in the archaeological record for Bedfordshire. They do not reflect on the efforts of past and indeed current practitioners in the county because they are a product of the specific time and context in which the work was done. However, our understanding of the archaeological resource of the county is the present sum of archaeological investigation and research to date and this is reflected in the Resource Assessments. It will also influence the Research Agenda part of which is a statement of gaps in our knowledge and what information is required to fill them. More broadly the Research Agenda is shaped by our present understanding of the resource and the perceptions we can develop of its potential.

The formal publication of this volume has, unfortunately, been a long drawn out process. The first drafts of the resource assessment papers were completed by the end of 2002 and sent out for consultation at the beginning of 2003. The results of the consultation were available by the middle of 2003 and the resource assessments were revised in the light of comments by the end of 2003. The research agenda was drafted in 2004, developed out of the resource assessment, incorporating suggestions from the authors of the assessment and consultees. The bulk of the text was complete by the end of 2002 and subject to only minor revisions in the light of the consultation, since then there have been no substantial revisions or additions to the text. No new work undertaken since the beginning of 2003 has been included in the resource assessment reflecting the latest publication of Bedfordshire Archaeology, volume 25, and the most recent monograph in the Bedfordshire Archaeology Monograph series on Salford (Dawson 2005). The assessment represents the state of knowledge of Bedfordshire's archaeology as it stood in early 2003 and should be read and used on that basis. This time limit also explains why it has not been possible to identify common research themes or links to the East Midlands Resource Assessment and Research Agenda published in 2006 (Cooper 2006).

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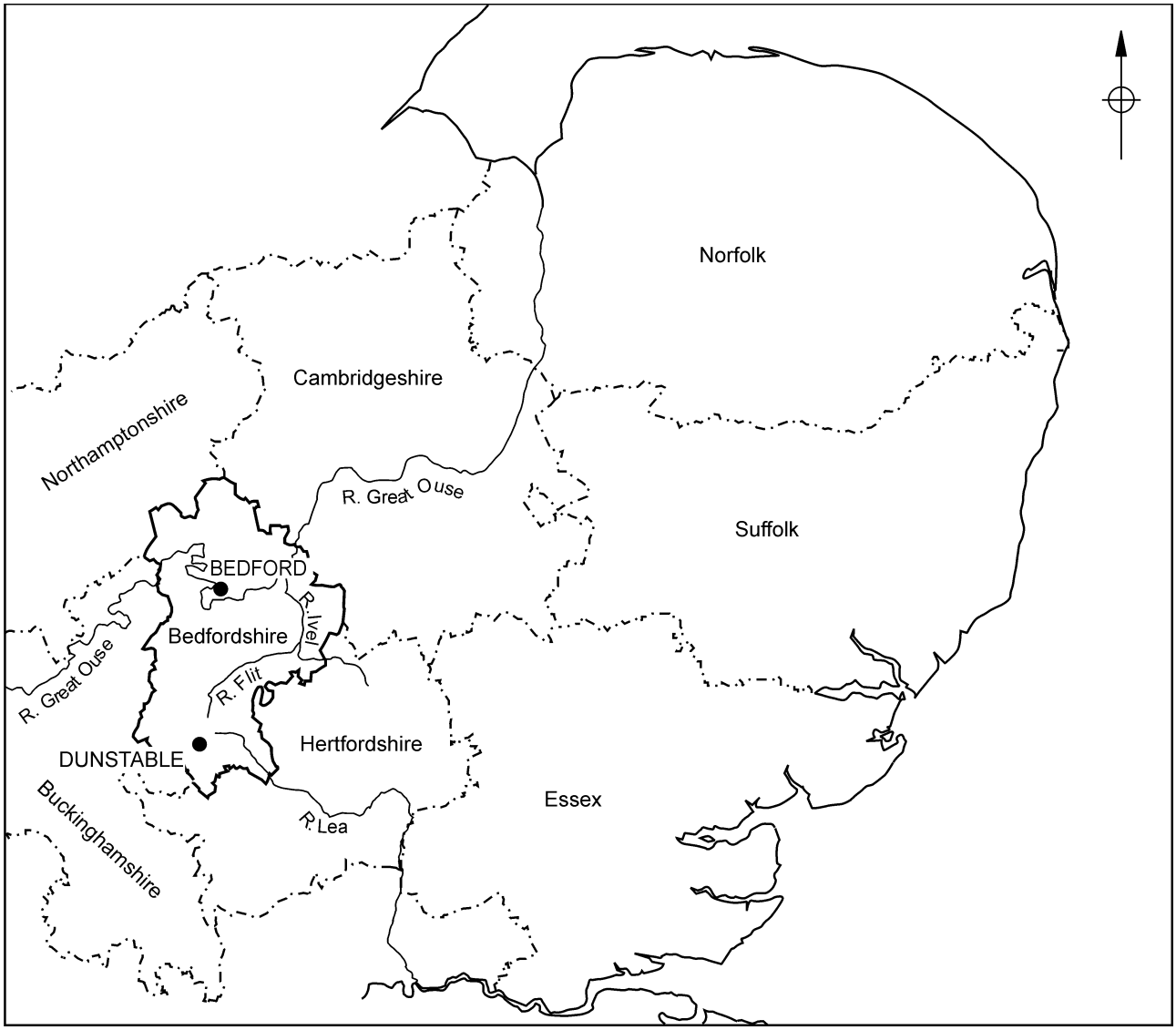

Fig. 1.1 Plan showing the location of Bedforshire based on the 1974 historic county boundary.

2 RESEARCH AGENDA AND STRATEGY

Martin K. Oake

Introduction

The *Research Agenda* for Bedfordshire, as with *Resource Assessment*, will follow the structure and rationale of the *Agenda* for the rest of the Eastern Counties (Brown and Glazebrook 2000). Many of the topics highlighted in that agenda are also relevant to Bedfordshire and the two volumes should be used in conjunction. There are of course some areas of difference, in particular geographically specific items, for example the coast, fens or river valleys, are not relevant to Bedfordshire. In other cases there are specific areas of research for which the county has particularly good data sets or high potential. There are also topics or geographical zones requiring research that are specific to Bedfordshire.

Several general points made in the *Introduction* to the *Research Agenda* for the rest of the region (Brown and Wade 2000) are equally relevant to Bedfordshire and bear repetition here. The *Resource Assessment* has highlighted were there are gaps in our knowledge and understanding of Bedfordshire's archaeology. This is often a result of the types of site that were investigated in the past, itself a function of individual or collective research interests. Or it reflects parts of the county where archaeological remains are readily detectable or opportunities for investigation and research have occurred as a result of the development process. Some of the gaps have come about because there has been a perception that human occupation of parts of the county has been restricted in the past and, therefore, it is not worth looking for sites in those areas (e.g. clay lands). Whatever the causes of these biases in the existing data sets the development of an understanding of the full range of the archaeological resource is an important short term goal because it is under constant threat from a variety of pressures (Darvill and Fulton 1998 and English Heritage 2003). Without understanding the resource it is impossible to conserve and manage it and without management it will not survive into the future and its research potential will be compromised.

Brown and Wade (2000, 2) emphasise that research should not be solely equated with collecting new data in the field. The analysis and synthesis of existing information is of equal or greater value than just digging new sites. This sort of work ranges from the publication of major or type sites, some of which have been highlighted in the *Resource Assessment*, through the synthesis of work in geographical areas (e.g. the Great Ouse Valley) or classes of artefacts, to analysis and research on the wealth of information held in the County's Historic Environment Record. The value of synthesising existing information from a variety of sources has recently been highlighted by the *Bedfordshire and Luton Extensive Urban Survey*. This project brought together the archaeological and historical information on the historic towns of the County for the first time. It highlighted how much was actually known about some towns (Bedford, Dunstable and Harrold for example) but also showed how little is know about most of Bedfordshire's small towns. In all cases the Survey has provided an effective basis for meeting the demands of managing the urban archaeological resource at a time of increasing pressure and of targeting and justifying investigations so that they contribute to our understanding of individual towns and urban development in the county as a whole. Synthesis of existing data will help to refine the nature and extent of the gaps in our present knowledge. It can also help to point out where the greatest potential for answering questions or filling gaps lies either in terms of geographical areas or data sets.

"The agenda set out below is wide-ranging, yet it cannot be all-embracing, neither is it intended to be an exclusive and static list." This quotation from the *Eastern Counties' Research Agenda* (Brown and Wade 2000, 2) is equally appropriate for Bedfordshire. Concentrating on a much smaller area (one as opposed to five counties) than the *Research Framework* for the rest of the region it has been possible to go into greater detail, particularly in the *Resource Assessment*. New areas of research will become apparent during the life of the Framework as new and unforeseen opportunities arise and the fruits of research indicate new areas of interest and potential. Emerging new political and development environments are also likely to influence the direction of research and management of the resource. These changes of emphasis or direction can partly be accommodated through the review process which is an explicit part of the Research Frameworks initiative (Wade and Brown 2000, 54). However, the Framework in general and Agenda in particular must be treated with sufficient flexibility to accommodate new topics or ones not explicitly mentioned in it.

Lower and Middle Palaeolithic

As the Resource Assessment for this period identified (Luke this volume) Bedfordshire has important deposits of Palaeolithic material notably in the Great Ouse valley and brickearth deposits in the Chilterns. However, most of these finds were made in the 19th or early 20th century as a result of gravel or brickearth digging. There have been very few new finds in more recent times and none match the quality or quantity of the early discoveries. Therefore, our understanding of this period is almost entirely based on these old if important finds whose provenance and context were not well recorded and are thus difficult to interpret. In modern terms it has to be acknowledged that this period in Bedfordshire is not well understood.

The fundamental need is to improve and develop our understanding of this period. This can be achieved by building on the work of the English Rivers Palaeolithic Survey (Wymer 1999) and conducting in Bedfordshire the sort of survey work that Austen (2000, 5) proposed for the rest of the region. By identifying the potential of the resource and the areas where it is most likely to be realised, whether it is *in situ* remains, environmental deposits or important groups of artefacts in secondary contexts, a strategy for managing the resource and realising its research potential can be developed. However, even with enhanced information and the ability to start to predict which locations have the highest potential, dealing with them in either a research or development context will require cost effective evaluation methodologies. Dealing with important deposits that are discovered during quarrying, the current common experience (e.g. Lynford Quarry, Norfolk (Boismier 2003)), is not ideal. Initially it relies on the identification of the relevant deposits, often in poor conditions, and then on there being sufficient resources available for the investigation and analysis; resources that may not always be available in the context of a watching brief. So it is essential to be able to identify sites with significant potential well in advance so that schemes of investigation (project designs) include adequate programmes of work and sufficient resources are available to carry out the investigation. This can only be achieved through early identification of sites with high potential, hence the importance of survey work and improved evaluation methodology.

This however only really deals with Palaeolithic remains that appear in context of the development process. There is considerable value in re-examining sites that have been productive in the past; especially where archaeologically important deposits have survived mineral extraction. Such work has already been undertaken at Deep Spinney in the Ouse Valley (Harding et al 1992) and Caddington (Sampson 1978). In both cases the more recent work helped to illuminate earlier finds. Further such studies, perhaps on a larger scale, could only increase our understanding of the resource and might lead to the discovery of the all important *in situ* sites.

The quality of the known Bedfordshire Palaeolithic material means that the county has the potential to provide information and material pertinent to the main broad research themes identified by Austen (2000, 5-6) for this period: chronology, landscape, hominid behaviour and economy. The two geographical areas identified as having high potential within the region: Chiltern brickearths and the Ouse Valley (linked to the Cam) (Austen 2000, 6) are certainly the areas known to have produced the most significant remains of this period, both qualitatively and quantitatively. They have also produced *in situ* sites and are most likely still to contain such sites and are therefore worthy foci of future research. However, the potential of other river valleys in the county should not be ignored, in particular the Ivel and its tributaries. The lack of Palaeolithic material from the valley of the Ivel, a major tributary of the Ouse, needs to be examined. Is it a result of the absence of the relevant gravel terraces in the valley or do past gravel winning regimes and an absence of interested antiquarians active in the area mean that finds were unlikely have been made in the way they were in the area immediately around Bedford? Further research into this is a matter of some priority.

Upper Palaeolithic

Bedfordshire in both these periods is characterised by the paucity of information. For the Upper Palaeolithic this is absolute with no material from this period having been identified in the county. Although sites of this period are rare throughout the region they are known, particularly from the Later Upper Palaeolithic (Austen 1997). Basic identification of material and sites is the main requirement for the Upper Palaeolithic in Bedfordshire. This may be partly achieved by developing an awareness of the potential for such material to be found in the county and spreading an understanding of the nature of artefacts of the period among fieldworkers and researchers. Also awareness of locations which have a high potential for containing

sites of the period e.g. sealed valley deposits (Austen 2000, 7) needs to be raised, based on research elsewhere in the Eastern or adjacent regions. Once sites have been identified and investigated the other topics identified as being regionally important can be considered (Austen 2000, 7).

Substantially more is known about the Mesolithic period in Bedfordshire than the Upper Palaeolithic but even so this period cannot be described as well known. The majority of sites have been identified from surface collection, although there are a small number of excavated sites. There appears to be two favoured locations in this period: river valleys and good vantage points notably the Greensand Ridge and Chilterns. The basic requirements for understanding the resource base for this period described by Austen (2000, 6-7) for the rest of the Eastern Counties applies equally to Bedfordshire. Surveying the known resource and the development of models for identifying areas of high potential are key priorities. Until more sites are identified in Bedfordshire the development such models may have to rely on work carried out elsewhere in similar environments. But to confirm the applicability of such models to Bedfordshire more sites need to be identified. This can be achieved through systematic field survey, although the re-examination of existing collections may help to identify Mesolithic elements in these assemblages. A greater awareness of the potential for the discovery of Mesolithic sites needs to be built into field evaluations, particularly in those locations which appear to have higher potential.

A number of issues concerning the identification of sites and interpretation of finds highlighted by Austen (2000, 7) are relevant to Bedfordshire if the resource for this period is to be understood better. This would be aided by the full publication of some of the few excavated sites, for example Grove Priory and Priestley Farm; this is a clear priority. The potential of systematic surface collection is demonstrated at Biddenham Loop (Luke forthcoming) which should provide a model for survey work elsewhere in the county. If such sites now only exist in the plough zone, any sub-surface features having been removed by subsequent cultivation, consideration must be given to intensive investigation of the zone as part of a mitigation strategy in both development lead investigations and research projects.

Once the basic work of characterising the Mesolithic of Bedfordshire has been achieved and the period is better understood the county has the potential to contribute to the broader regional research agenda for this period (Austen 2000).

Neolithic And Bronze Age

Bedfordshire in the Neolithic and Early Bronze Age is characterised by disparities in the nature and distribution of the archaeological evidence. Settlement remains are rare and the evidence is often ephemeral, difficult to identify and interpret. In contrast ceremonial and burial monuments are relatively common, perhaps because they are more readily identifiable through aerial photography. The distribution of sites from these periods is heavily biased towards the main river valleys, mainly the Great Ouse and Ivel, and the Chilterns chalk ridge in the south of the county. This distribution of sites largely reflects the focus of fieldwork activity and in the case of the river valleys the susceptibility of sites to identification from aerial photography.

The investigation of sites of these periods has been fairly limited. Although ceremonial and burial monuments are most easily identified few have been subject to even partial excavation and where larger scale work has been done, e.g. the Neolithic enclosure at Plantation Quarry, Willington (Dawson 1996), the circumstances of the project have not been ideal. The same is true of the most common and most commonly investigated class of monument from this period: ring ditches/round barrows. While some have been extensively excavated and fully published such as Roxton (Taylor and Woodward 1985) and Barton (Clark 1991) many others were only partially excavated under poor conditions or await full publication. In general the ceremonial/funerary monuments in the county are not well understood either individually or as groups or complexes. In some cases, as Luke (this volume) has shown, basic work on characterising and classifying the monuments is required.

As has already been noted the evidence for Neolithic and Early Bronze Age settlement in Bedfordshire is much weaker. On excavated sites it is usually confined to small clusters of pits and other features and occasionally possible structures. They rarely form coherent or structured patterns. They are usually encountered as adjuncts to the investigation of sites of other periods and rarely, if ever, excavated as the prime reason for a project. As yet no sealed surface sites that are likely to contain better preserved remains have been found and investigated. The other manifestation of settlements or at least activity areas are flint scatters.

These provide much of the evidence for occupation in the south of the county where fieldwalking has been actively pursued by local groups for many years; however, there are problems in deciphering what such artefact scatters represent. The potential for addressing this sort of issue has been demonstrated at Biddenham Loop (Luke forthcoming) where detailed analysis of surface material enabled the characterisation of sites. Excavation has so far failed to identify any sub-surface features associated with flint scatters and it remains a possibility that domestic sites of this period may only survive within the plough zone.

The Research Agenda for the Neolithic and Early Bronze Age in Bedfordshire is dominated by basic questions about the location and character of the resource. Although the monuments dominate the archaeological record further work is required to understand their character, the variations in form and some of the more unusual forms that appear to exist in the county. This area of research would be assisted by the publication of the Cardington-Cople complex, synthesising the results of the various investigations undertaken as a result of a number of separate developments. While many of the monuments are detectable through aerial photography it is becoming apparent that there are sites which can only be found through the use of intrusive techniques either because the sites are small in size or otherwise difficult to detect e.g. hidden by alluvium. The formulation of evaluation strategies, in particular and generally programmes of investigation and research must take problems of visibility into account.

The dearth of settlement evidence means that the identification and investigation of settlement and activity sites of this period is a high priority. The identification of settlements is difficult so the development of strategies for recognising them from the often sparse and ambiguous evidence coming from evaluations is important. Understanding flint scatters is also an important issue. Although this is a complex problem (Boismier 1997) it needs addressing in the interests of identifying and investigating sites and landscapes of these periods. Without this understanding we are likely to have a false picture of settlement for these periods which will appear either over or under-populated.

The apparent concentration of settlement and ritual activity in two areas within the county: the main river valleys and the chalk downland need to be investigated to see if it is a real distribution or a function of archaeological activity and preconception.

The relationship between monuments, settlement and other activities has been identified as a possible regional research topic (Brown and Murphy 2000). In spite of a present relative lack of settlement evidence individual monuments and monument complexes are widely known. Previous work, notably at Roxton and Biddenham, has shown that although evidence of settlement, mainly in the form of flint scatters, is closely associated with monuments the two types of activity (ritual and domestic) are mutually exclusive. This is clearly an area of research which the Bedfordshire resource is well placed to address, the Great Ouse and Ivel valleys and their immediate hinterland would a suitable geographical area for this sort of project (Malim 2000).

These characteristics of the Neolithic and Early Bronze Age in Bedfordshire, the nature of the resource, gaps in knowledge and its potential are similar those found in the rest of the East of England Region (Brown and Murphy 1997 and 2000). Most of the topics addressed in that Research Agenda, for example our poor understanding of ceramics and lithics from this period are equally applicable to Bedfordshire, as are topics around the introduction and practice of agriculture and impact of man on the environment. One subject where Bedfordshire does not appear to have much to contribute is in the study of metalwork as the county is not prolific in finds of metal artefacts. However, this lacuna in itself is a subject that would repay further investigation.

Late Bronze Age to Roman Period

In recent years the archaeology of the Iron Age and Roman periods has seen significant developments and there is a range of theoretical standpoints from which to approach the evidence (Hodder 2001, Haselgrove *et al* 2001, James and Millet 2001). Today models developed through post-colonialist perspectives as a result of processualism and post modernism have provided a wide range of insights into the complexity of human activity at the dawn of history. At the turn of the 21st century our interest in the 1st millennium BC and first half of the 1st millennium AD has moved beyond such once orthodox concerns with military dispositions, typological progression, the appearance of towns and Romanisation towards the discourse between groups within society, the role of agency and individual action in the creation of wider patterns of evidence. Today for example we are as concerned with the underlying ritual pattern of everyday life as with the formal identification of temple and shrine.

Dating is a problem area throughout these periods. A key issue is the establishment of a firm chronological

framework, especially for the 1st millennium BC. There are no contexts where ceramics, decorated metalwork and/or scientific dates are available on which to build a diachronic framework for the region. In Bedfordshire reliance is still placed on a chronological framework for Iron Age ceramics based on work in the River Nene valley (Slowikowski 2005). Recent advances suggest there is significant potential to develop a dating framework based on TL dates for the Iron Age whilst further work should be undertaken on the use of multiple C14 dates. This needs to be integrated with research into ceramics, including refinement of the County Ceramic Type Series for the period and work on Iron Age coin sequences. In the Roman period past reliance on coin and ceramic dates will need to be reappraised in view of recent theories based on dispersal patterns before models dependent on settlement synchronicity can be developed.

Another area of interest is the time lag in adopting trends from other areas, core to periphery and conversely from periphery to core. The latter is possibly exemplified at Salford where very early cremations may be the result of a community's need to express identity on the edge of a wider distribution of the Gallo Belgic ceramic tradition. It may be that here that peripheral settlement has taken the lead at the start of a more widespread burial tradition.

A series of short papers (Clark and Dawson 1995, Dawson 2000a, Simco 1973) have summarized the evidence for settlement in the late Bronze Age and Iron Age from which it is clear we have insufficient understanding to provide more than a superficial insight into the development of what appears to be an increasingly sedentary settlement pattern throughout the 1st millennium BC. In common with the rest of the Eastern Region (Going and Plouviez 2000, 19) little detailed work has been carried out on the characterization of rural settlements in either the Iron Age or Roman period. And for both periods patterns of settlement nucleation or dispersal are areas of considerable significance but little understood.

Landscape development and settlement patterns are also an area where a number of research themes can be identified. All the examples of early field systems are imprecisely dated and none of the examples have been correlated with a contemporary settlement pattern. Furthermore whilst evidence of Iron Age farming practice nationally has increased exponentially, it is too early in the analysis of these sites to have played a part in their interpretation (Haselgrove *et al.* 2000, c). Priority should be given to those projects which offer the chance to determine the relationship between settlement and enclosure in both the Roman and Iron Age. It is becoming apparent that pit alignments are significant features in the landscape but their function and relationship to the rest of the settlement pattern needs further investigation.

There is also a need to understand more about regional variation in the county during the Iron Age and Roman periods. For instance how do the settlement patterns known from the main river valleys differ from the emerging pattern recently identified from air photographs in the clay plateau in the north of the county; and where elements are contemporary how do they interact. As yet little is known about the sites on the clay and understanding these sites is a priority. At the same time the range of variation settlements in the river valleys is not yet fully understood.

There are few hillforts in the county and though a traditional area of identifiable concern, there has been only limited, partial investigation so little is understood of their layout or relationship with other enclosed settlement types. Dating of the principal phases of the hillforts should be a priority and attempts to establish the pattern of contemporary settlement, and the relationship of hillforts to it, must be a potentially productive area of research from which learn more about the evolution of communities in the 1st millennium BC.

The urban landscape also has significant potential which has to some extent been addressed by the *Bedfordshire and Luton Extensive Urban Survey* project. Nevertheless whilst some areas, such as the southern fringe of Sandy and areas of Dunstable are relatively well known, information has necessarily been collected piecemeal and opportunities raised by the current pressure for housing in existing areas may provide opportunities to address urban and hinterland issues. However, it is not yet possible to identify activity areas sufficiently characterise them (is Sandy a *mansio* as proposed in Dawson (1995)?). Nor is it possible to begin to discuss their function and role in the development of the Roman period landscape and their relationship with their hinterland. Another important question is what happens in their latest stratigraphic levels as in neither case do the Roman towns directly form the foundation of later settlement.

There is no more than a broad awareness of the processes underlying the transition from late Bronze Age burial to late Iron Age disposal patterns, and we have yet to develop adequate techniques, applicable in the development process, to generate greater understanding of the relationship between possibly dispersed later prehistoric burial patterns and contemporary settlement. Neither has our understanding of burial practices in the Roman period really progressed. In publishing the cemeteries

the focus has been on human bone analysis and layout but considerable potential exists to compare cemetery traditions across the region. Little work has focussed on the ritual codes underlying the Roman period even in the context of burial. Many of the burials clearly have specific ritual elements such as decapitation, orientation or grave goods and further work will be required into these aspects. Votive deposits such as the Iron Age coins from Sandy may indicate the locations of ritual practice in the Iron Age. In recent years Bedfordshire has produced several interesting votive deposits and artefacts of Roman date in eastern England – the Sandy sculpture (Appleton and Dawson 1995), the Sandy hoard (Manning 1964) and the Shillington and Haynes hoards (DCMS 1998-9). Finds of late Iron Age bronze mirrors have been made sporadically in Bedfordshire and recently metal detector finds have increased there number significantly, research into this apparent concentration and the relationship to coin hoards etc requires further investigation. Further analysis of these deposits and HER data may throw further light on the locations of ritual practice in the county.

In regional terms the River Great Ouse Valley has seen perhaps the most archaeological activity, the result of development pressure, whilst the area around Luton and Dunstable has been the focus of work by the Manshead Archaeological Society. Clearly it would be desirable to attempt to redress these imbalances when the opportunities arise, in particular in the clay geologies and Greensand Ridge.

The potential of the archaeological evidence from the Bedfordshire region, particularly from the artefact rich period of the last millennium BC and the first half of the 1st millennium AD must be considered in two parts: existing collections of data from past fieldwork and potential evidence from new investigations. In the case of the former no quantitative analysis has been undertaken to assess the potential of collections although in two cases excavations at Sandy from 1988 to 1991 and at Warren villas 1989 to 1992 Post–Excavation Assessments and Updated Project Designs have been prepared. Subsequent analytical projects including that by Mark Curteis (Curteis 1996) indicate the potential that archived data in the region has to yield new insights. In some areas, though, collections, such as the artefacts once held by Longmoor School derived largely from Sandy have now been dispersed and the impact of metal detector activity is largely unquantified (Wingfield 1991). In general the potential for further retrospective analysis must be high, but until a more coherent picture of archives held by the two museums, Bedford and Luton, are supplemented by quantification of material held by local societies, contracting organisations and individuals, the potential must remain considerable but uncertain.

The agricultural landscape of Bedfordshire is varied. Past survey and field artefact collection has shown that many new sites remain to be discovered but that ephemeral agricultural practices such as manuring can also be discerned in a wide variety of locations. Geophysical survey has a long track record of success in the county and has good potential for both site discovery and analysis (Dawson and Gaffney 1995). Aerial photography has significant potential not only in site recognition but in providing evidence for the extent of plough damage, such as that which is beginning to affect the ridges of north Bedfordshire. Metal detector activity at Shillington has shown the unexpected potential of apparently plough damaged areas to produce evidence of national importance. Much of this information is held in the county's HER, analysis of this information may contribute much to our understanding of the landscape and settlement patterns for these periods.

Anglo Saxon and Medieval

It is during the Saxon and medieval periods that Bedfordshire's individuality in the region resulting from its position on the western edge of the East of England Region becomes more easily identifiable and the county's links and similarities with other regions to the west and north more apparent. This means that while many of the themes identified in the Research Agenda for the rest of the region (Wade 2000 and Ayers 2000) are relevant to Bedfordshire there are others which are specific to the county and its geographical position or for which there is a different, local perspective. Although archaeological evidence for the post-Roman period is not as rich or extensive in Bedfordshire as it is in other parts of the region (c.f. Wade, 1997, 47), particularly the wealth of metal objects derived from metal detecting, the county's resource for this period does have the potential to address a number of important areas of research once gaps in knowledge and understanding have been filled.

A key question identified for the rest of the region is what happened in the 5th century AD (Wade 2000, 23). One area of research which would help to illuminate this topic is the study of late Roman sites. Increasingly evidence of early post-Roman activity is being found on late Roman sites for example the cemetery at Church End, Kempston (Dawson 2004) and more commonly the occurrence of sunken floored buildings in areas of late Roman settlement (Oakley Road, Clapham). Such finds are often difficult to

detect in evaluations or field survey and are usually encountered on sites which are being investigated for their Roman content. But greater awareness of the potential for the existence of a Saxon element on late Roman sites is likely to lead to an increase in retrieval of such remains. A reconsideration of the chronology for this period, perhaps creating a phase of "Late Antiquity," as proposed by Edgeworth (this volume) could make it easier to recognise and understand the early Saxon period.

Bedfordshire has produced a number of early cemeteries which should provide information to address this problem. Unfortunately none have been excavated in the last 50 years and many of the investigations are much older than that. They were often done under what might now be described as salvage conditions (e.g. Kempston and Leighton Buzzard) with the retrieval of artefacts as the main objective. This means that information on the context of the finds and structure of the cemeteries is usually lacking and reduces their potential, so while reassessment of these sites would be a valuable step towards understanding the 5th century the investigation of early cemeteries under modern conditions would also be very valuable.

Evidence of early Saxon settlement is known from Bedfordshire, both as a presence on ostensibly late Roman sites and without this association; the majority are from river valley locations. However, there is not sufficient information on the location of settlements to be able to understand the settlement pattern and how it relates to the late Roman pattern. Nor is there adequate excavated information to be able to understand the structure of settlements in this period. Extensive field survey to identify the early Saxon settlement pattern at a broad scale is required as is the extensive excavation of settlements thus identified to understand how they were structured and functioned. For the survey work to be successful effective means of identifying settlements of the period will need to be devised.

In spite of the problems of assigning ethic identity on the basis of often enigmatic material remains the survival of British populations, traditions and institutions during the 5th and 6th centuries in Bedfordshire needs to be addressed. This is linked to the progress of Saxon colonisation of England and the impact it had on the indigenous population. With its location on the western edge of the region Bedfordshire is sufficiently far away from the earliest areas of colonisation on the east coast to make it a good area to try and identify and date the progress of Saxon colonisation across the country. This will require high precision in scientific dating as well as DNA and other analyses of human bones from cemeteries as identified by Wade (2000).

For the middle Saxon period most of non-geographically specific research topics described for the rest of the region are relevant to Bedfordshire: the arrival of Christianity and its impact, changes in the settlement pattern ("Middle Saxon settlement shuffle"), the development of craft and agricultural specialisation and the adoption of a monetary economy. It is in this period that Bedfordshire's geographical position between East Anglia and the Midlands gives it a specific area of research. Bedfordshire was part of Mercia and that kingdom's rise to a dominant position, in part at the expense of the East Anglian kingdom, is of considerable importance and could provide an interesting contrast with the rest of the eastern region. This will require the identification of specifically Mercian elements in the settlement and material culture.

As Wade (2000, 23) has noted the research questions for the Late Saxon period are similar to and an extension of the questions for the Middle Saxon period in respect of rural settlement and the development of the economy and society. A particular aspect of this period is the impact of the Vikings. Much of the eastern region is firmly within the Danelaw; however, the boundary runs through Bedfordshire so it provides an excellent opportunity to investigate the impact of Scandinavian settlement in England. To date though, little clearly Scandinavian material has been identified in the county. It may of course be that the Scandinavian influence in the region is minimal or at least not visible archaeologically, but it is an area that requires further research.

For the Saxon period the only place that can be described as a town is Bedford. It is clear from the *Bedfordshire and Luton Extensive Urban Survey* that while most of the towns in Bedfordshire have origins in the late Saxon period none, except Bedford, have urban characteristics till after the Conquest. Excavations within Bedford have produced substantial remains of dating from the early to middle Saxon period and it has clear potential for studying the origins and development of urbanism in the post-Roman period. Bedford's position on the Danelaw boundary, indeed as a frontier town, also gives it considerable potential in the study of Scandinavian settlement. The non-geographically specific research themes identified for the rest of the eastern region apply to Bedfordshire (Ayers 2000).

Greater precision in dating is needed to address many of the research objectives identified for Bedfordshire. This can be partly achieved through improvements

in scientific dating for the period, but perhaps more crucially greater understanding of the ceramic traditions of the period is required. Elsewhere in the region Ipswich Ware provides a good chronological marker but in Bedfordshire pottery does not provide such good evidence for dating. Therefore, the acquisition of well dated ceramic assemblages is of considerable importance and would allow the re-evaluation of the dating of existing assemblages and the County Ceramic Type Series.

It is in the medieval period that the differences between Bedfordshire and the rest of the eastern region become more marked. This is partly a reflection of Bedfordshire's location on the edge of the region where it is inevitable that there will be greater affinities with the adjacent parts of other regions rather than the more distant parts of the East of England. But it is also a function of higher levels of information, bolstered by historical sources and the benefits of inter-disciplinary research. The greater detail this provides serves to highlight differences which may not be so visible in earlier periods where the level of information only allows a broader understanding of variations within the region.

Many of the gaps in knowledge for this period identified by Wade (2000) and Ayers (2000) for the eastern region are equally relevant to Bedfordshire. Within the county there is a varied settlement pattern in the Middle Ages, a detailed understanding of each element of that pattern, the chronology of the elements and how the various parts articulate into the whole settlement pattern has yet to be established. Generally few medieval rural settlements have been investigated in Bedfordshire. The potential of deserted settlements has been amply demonstrated by the almost complete excavation of the settlement at Stratton. While this sort of opportunity is likely to remain a rare occurrence it does provide a framework within in which to study present day settlements with Saxon or medieval origins. Recent work at Marston Moretaine and Yielden show the potential for acquiring information about the origins and development of villages from within or around the edges of existing settlements. Such investigations as there have been have tended to concentrate on villages, nucleated settlements at the upper end of the rural settlement hierarchy. There are other elements of the medieval settlement patterns, isolated moated sites, "Ends," church/manor complexes and magnate enclosures and the unenclosed equivalent of moated sites all require more detailed study. Research into rural settlement needs to be undertaken at the micro-scale of investigating the chronology, structure and function of individual settlements or classes of settlement and at the macro-scale of broad patterns of settlement.

Field systems have been identified as an important area of study for the eastern region and the recently completed East Anglian Field Systems project sponsored by English Heritage has demonstrated the value of such research especially when linked with the results of Historic Landscape Characterisation. However, field systems are an area which demonstrates Bedfordshire's distinctiveness from the rest of the region most clearly. With its preponderance of ridge and furrow, little of which now survives, marking the county out as part of the classic midland system with connections to Buckinghamshire and Northamptonshire to the west and north rather than towards the east. The origins and development of field systems require research as does the position of the county between the midland system and the different systems in the rest of the eastern region.

As a class of monument monastic houses have received more detailed attention in Bedfordshire than any other type of site of this period in spite of the relatively low density. However, so far none of the excavations have been fully published and until this has been achieved the potential of the sites both locally and regionally cannot be realised.

Throughout the medieval period Bedfordshire was not heavily urbanised. There were no cathedral towns comparable to Norwich or St Albans or trading centres like Kings Lynn or Ipswich. The county town of Bedford was the only major town; the other settlements with urban characteristics were few in number and cannot be described as anything other than small towns. An exception is Dunstable, a royal foundation created on the site of a Roman small town but what was in effect a "green field" site as there is no evidence for any significant Saxon occupation at the site between the demise of the Roman town and the medieval foundation. As has been highlighted by the *Bedfordshire and Luton Extensive Urban Survey* programme very little is known about the small towns of Bedfordshire certainly archaeologically and to an extent historically. Basic work on the origins and development of the small towns is required before individual towns can be understood and a broader understanding of the place of towns in the economy and society of the county and region.

As the county town and the oldest and most established town in the county Bedford is of considerable importance. But even though there have been more archaeological investigations in the town than anywhere else in the county it is still not well understood. For example the boundary of the late Saxon and medieval town has not been established. The part of the town occupied by the Castle is best known but it is atypical and outside this quarter our

knowledge of its chronology and character is at best fragmentary. Once the town itself is better understood many of the research themes noted by Ayers (2000) are relevant to Bedford.

Dunstable is equally poorly known. Although the remains of the Priory, the surviving part of which is the parish church, are still prominent in the townscape details of its layout and development are not well understood. The location of the royal palace, well known from documentary sources and thought to be in the vicinity of the Priory, has never been confirmed. Elsewhere, despite the sporadic identification and investigation of medieval deposits little is really known about the character of the medieval town.

The wider national and international context of towns is rightly noted for the rest of the region (Ayers 2000). In landlocked Bedfordshire while the international context cannot be ignored such networks and influences are likely to have been filtered through other major centres notably London, regional centres such as St Albans or via trading centres such as Kings Lynn. Bedford's place in this network needs to be examined as does its effect on the town's hinterland, both the network of small towns and the rural areas.

Post Medieval and Modern

All the problems and weaknesses associated with these periods noted for the rest of the East of England Region (Gilman, Gould and Green 2000) are just as relevant to Bedfordshire. Despite the potential wealth and relative accessibility of information about these periods, both historical and in the form of material culture, they are not well known or understood in the county. Where aspects of the resource have been subject to study it rarely goes beyond an inventory of the remains e.g. brick making (Cox 1979) or unpublished surveys of mills and parks and gardens held in the Historic Environment Record. These surveys only cover a very small part of the resource for these periods. Whilst the lack of information in many fields makes the collection of basic inventory type information a necessary starting point to allow the resource to be quantified and characterised as a prelude to understanding and management, our ambitions must be set higher from the outset. The objective must be to investigate the social, economic and intellectual meaning and context of these periods rather than be content with individualistic studies of particular aspects of technology or structures in the landscape. Edgeworth (this volume) makes a powerful argument for seeing these periods holistically with many of the elements so often studied separately being so intimately linked that they only make sense when taken together rather than individually.

The published Research Agenda for the rest of the eastern region concentrates on the three main areas: fortifications, parks and gardens and industrialisation and manufacture (Gilman, Gould and Green 2000). The reasons for this selective approach are explained in the *Introduction* to that paper. Broadly the same reasons apply to Bedfordshire and the lack of much basic information means that it is difficult to create a Research Agenda for this period. Without adequate information there is no sound basis for constructing research questions beyond characterising the resource and filling the evident gaps in knowledge. However, against this background, and an understanding that basic data for all areas of research is needed it is possible to indicate some areas that are particularly important for Bedfordshire or where Bedfordshire can make a substantial contribution to broader research themes.

Of the areas discussed for the rest of the region fortification is of least significance for Bedfordshire. Its inland situation meant that it would not be in the front line against invasion from continental Europe and therefore the county was not heavily fortified in the post-medieval and modern periods. It was not until the World Wars of the 20th century and the subsequent Cold War that military activity left its mark on the Bedfordshire landscape. Areas of military or military related research where Bedfordshire has a particular contribution to make include the early development of aviation, notably of airships at Cardington, the production of weapons and equipment (e.g. Elstow Depot and Luton), research and development post-1945 (Thurleigh Airfield) and intelligence related activities in World War 2 and during the Cold War, for example at Tempsford Airfield, Milton Bryan and RAF Chicksands.

There is a wide disparity in the distribution historic parks, gardens and designed landscapes in the county. The large, well known parks tend to be concentrated in the middle of the county along the Greensand Ridge (Woburn, Wrest Park, Ampthill Park), the result of land use patterns dating back to the medieval period. In the rest of the county there are a many parks and gardens, but they tend to be on a much smaller and less imposing scale. There is also a contrast in knowledge between the two types of site. The large sites have been subject to much more research and are better understood mainly through work done to enhance their management and improve their value as economic and recreational resources. By contrast most of the small parks and gardens are largely unknown. Basic work on researching their origins and history

is required along with identifying their surviving features. The research agenda for parks and gardens described for the rest of the region (Gilman, Gould and Green 2000, 36-39) is relevant to Bedfordshire with particular emphasis on the social and economic aspects of designed landscapes (Williamson 1995).

". . . there is an urgent need to establish what exists and where, and its comparative importance, so that priorities can be properly formulated." (Gilman, Gould and Green 2000, 40). This statement, referring to the industrial archaeology of the rest of the East of England Region is also true of Bedfordshire. The county, as with most of the Region is predominantly an agricultural area, largely lacking the resources of power or mineral raw materials to provide the conditions for the development of an industrialised landscape in the accepted sense. However, the nature of agricultural development in the county and its intimate links with development of industries related to agriculture are ripe for research. Bedfordshire has a long and complex history of enclosure and the relationship between this and developments in agriculture needs to be explored. The impact of these changes on the landscape also need to be explored in relation to changes and development in rural settlements. The Dukes of Bedford were at the forefront of these developments during the agricultural revolution and as major landowners their impact is visible across the county particularly in the development of model farms and estate cottages and villages. These are worthy of study in themselves, but also in their impact on the wider agricultural community as a study in the diffusion of evolving trends in agriculture. Elsewhere in the county, particularly in the east, market gardening and horticulture developed in importance during the 19th and early 20th centuries bringing with it its own characteristic landscapes and suites of buildings (e.g. onion drying sheds). These are a diminishing but little studied or understood resource.

Many of the characteristic industries of Bedfordshire are agriculturally based for example straw plaiting, leather working or basket making. In their early stages these were cottage industries undertaken in the homes of workers. It is a challenge to identify remains of these and how their organisation and practice is reflected in buildings, structures and landscapes. The development of these industries through time is also of interest as some never left the cottage/homeworking environment (basket making or lace making) while others became fully industrialised and transmuted into other forms of manufacture. An example of this is straw plaiting in the south of the county which became fully industrialised in the making of straw hats and ultimately became the hatting industry of Luton with a much wider product range. This line of development with intermediate stages of small scale workshop production is little understood and could illuminate the processes and impacts of industrialisation at a wider level.

Engineering is another area of industrial activity well represented in Bedfordshire. Again it has its roots in agriculture and really began to develop in the 19th century as agriculture became increasingly mechanised. Bedford was a centre for such industries with the Howard Engineering works being the most prominent. However, the small towns also played a prominent role in agricultural engineering in such places as Biggleswade. The interaction of towns and countryside leading to the growth of towns in the county during the post-medieval period is also an area of research that has been little addressed, as is the development of towns generally. Little archaeological work investigating post-medieval and later remains has been done in towns in Bedfordshire and it is now time to start addressing this issue.

The other major industry in the county is brick making and although central Bedfordshire still bears the mark of the 20th century developments in this industry in many facets of the environment and landscape little is known about the earlier phases of its development from the late medieval and early post medieval periods and the impact it had on the landscape and buildings.

Archaeological Science

Most of the priorities for archaeological science identified for the other counties in the eastern region (Brown and Glazebrook 2000) apply equally to Bedfordshire. Specific gaps in knowledge and research potential for the county are described in the period chapters or in the Research Themes below and do not need repetition here.

The Research Agenda for the rest of the eastern region identifies a number of broad research themes applicable over the whole of the area covered by the Framework (Brown et. al. 2000). Although these themes do not specifically cover Bedfordshire and its archaeological resource many of them do also apply to the county, with the exception of those themes which are geographically specific to other parts of the region and there is no need to repeat them in detail here. However, it is useful to highlight themes where the county can make a particular contribution or occasionally where the nature of Bedfordshire's archaeology means that at present it has little to offer. They are presented in the order they appear in the original publication.

The Mesolithic/Neolithic transition – The paucity of Mesolithic material and consequent poor understanding of this period at present make it difficult to address this theme in Bedfordshire. When the gaps in our understanding of the Mesolithic have been filled Bedfordshire will be able to contribute to this theme because there is substantial evidence of Neolithic occupation in the county. If there is a genuine lack of substantive Mesolithic activity in the county it will provide an important contrast for Neolithic colonisation in what would have been, in effect, an empty landscape.

Development and impact of the "agricultural revolution" and Victorian High Farming – The important place of the Dukes of Bedford in the 19th century improvements in agriculture and the obvious impact they had on the landscape in terms of model farms, estate villages and reorganisation of field systems make Bedfordshire a key area for the study of this topic. The intimate relationship in the county between agriculture and the development of industries both using agriculturally produced raw materials and in supplying the needs of farming is also a fruitful area of enquiry.

The origins and development of field system; their change and continuity – As has been noted Bedfordshire is distinct from much of the rest of the eastern region in that it is really part of the Midlands with its common open fields typically symbolised by the remains of ridge and furrow. Nor does Bedfordshire appear to have the early co-axial field systems found elsewhere in the region. But the contrast between the origin and development of field systems in the county is worthy of study in its own right and will provide an interesting comparison with what happens further to the east.

Trade and industry in the medieval and post-medieval period – Bedfordshire's position on the edge of the region give it an important position in examining the trade within and particularly beyond the region. The study of, for instance, medieval pottery traditions should help to develop an understanding of this theme, as would the sources of medieval decorated tiles. The county's urban and rural industries and the mechanism by which an industry with rural origins can transform into an urban based one (e.g. straw plaiting and hat making in the south of the county) will provide interesting case studies; as will the relationship between agriculture and industrial development.

Survey of claylands – Surveying claylands is a very clear priority in Bedfordshire. Traditionally these have been areas presumed to have seen little human activity before the late Saxon and medieval periods on the basis that the heavy soils were too difficult to cultivate in earlier periods and were not attractive for settlement especially compared to the lighter soils of the river valleys. However, recently aerial photography in the clay plateau in the north of the county and evaluation and investigation in advance of development in the Oxford and Gault clay vales have demonstrated that the clay areas contain or have the potential to contain extensive prehistoric and Roman settlement patterns. In the northern clay plateau crop marks show a landscape of enclosed settlement in places comparable to that found in the river valleys. Where surface finds are associated with cropmarks they appear to be of Iron Age and Roman date. Characterisation of the cropmarks and analysis of their distribution is important to allow us to begin to understand this recently emerged landscape. Field survey is also important to provide further dating evidence for the cropmarks sites and to try and identify unenclosed elements of the settlement pattern that cannot be identified through aerial photography. In the clay vales it appears that sites are harder to detect and so far have tended to be identified either through geophysical survey or more intrusive techniques. The same pattern of survey and analysis is required to develop the understanding of early settlement in these areas too.

Palynology of sediment sequences – This has not been much studied in Bedfordshire but the county has considerable potential for this sort of work. That potential has been demonstrated in limited areas such as the Ivel valley (Robinson 1992 and English Heritage 2002).

Buried land surfaces – Similarly not an area much studied in the county but with significant potential where such surfaces can be identified.

River Valleys – Although the Great Ouse is only partly in Bedfordshire, its catchment covers the bulk of the county and would provide a good opportunity for an extensive study of the sort proposed in the Agenda for the rest of the region.

Wet site survey and evaluation – The River Flit in central Bedfordshire is known to contain significant peat deposits and waterlogged archaeological deposits. The extent of the peat deposits and the impact of past peat digging and drainage need to be defined.

Political and social development within territories – This is another instance where Bedfordshire's geographically marginal position within the East of England provides it with significant potential for research particularly as a contrast to the east of the region. Generally there is an opportunity for examining the transition

between what is happening to the east and to the north and west (East Anglia versus the Midlands). In the later Iron Age the relationship between the Iceni and Trinovantes can be examined in relation to the Catuvellauni (along with Hertfordshire). In Saxon period the relationship between Mercia and the kingdoms further to the east can be looked at and from the 9th century the nature and impact of Viking occupation can be investigated by comparing opposite sides of the Danelaw boundary as it runs through the county.

Archaeological Science For many sites, especially those on the terrace gravels of the Ouse and its tributaries, which are multi-period, the sub-division of the resource assessment by period tends to obscure some basic patterns of continuity and change at the same location. For the Palaeolithic and Mesolithic, the most pressing question at present is one of chronology. For some later periods there are deficiencies in the dating evidence, but at least the dates of sites can be established within broad limits. Not so before that. Consequently, the sections about hunter-gatherer peoples begin with dating, then move on to address palaeoecology, and then consider entire categories of sites that might exist in the county, but have not, so far, been detected. Scientific dating for Neolithic and later sites Radiocarbon dates have been obtained from sediment sequences (e.g. Scaife 2000), and also from archaeological contexts. It would be prohibitively time-consuming to compile a list of ^{14}C dates from the county, but it is plain there are at present few sites with targeted series of dates: the Bronze Age barrow cemetery at Roxton (Taylor and Woodward 1985) and the multi-period alluviated site at Warren Villas (Robinson 2001) are very much the exceptions. Moreover, nowhere in the county has the opportunity yet been taken to obtain multiple dates in stratigraphic series, and then to use Bayesian mathematical modelling to achieve enhanced precision of calibration (Bayliss 1998). This approach will be essential in future if histories of prehistory and of undocumented post-Roman periods are to be written (Alex Bayliss, pers. comm.).

Archaeomagnetic dating on kilns from Stagsden did not resolve date differences between construction phases, for results were statistically inseparable. However, a date range for last firing was obtained : cal AD 40-110 [Mean direction of thermoremnant magnetisation: Declination 0.13° W; Inclination 67.38°; alpha-95=2.25°] (Clark 2000).

Research Strategy

As with much else in the Research Framework for Bedfordshire the published Research Strategy for the rest of the eastern region (Wade and Brown 2000) also applies to the county. In fact that Strategy can be applied in its entirety to Bedfordshire and does not need to be repeated here. The only rider that needs to be added for the county relates to its position on the region's western edge. Although this Research Framework has been prepared within the context of the eastern region, and will continue to develop within those parameters archaeological work in Bedfordshire cannot be done solely with regard to the eastern region. The need to look beyond regional boundaries is recognised by Wade and Brown in their section on *Partnerships* (2000, 50). With the somewhat artificial geographical basis for the preparation of regional research frameworks there is a danger that research archaeological work could become compartmentalised on these boundaries. Fieldwork and research in Bedfordshire will always need to take into account what is happening to the north and west. A challenge for the future is to ensure that the links are established to the research frameworks, and indeed research effort, for the South East and East Midland regions which cover the county's nearest western and northern neighbours. When research frameworks have been published for all regions it will be possible to identify more easily where there are links across regional borders and where pan-regional research themes and projects might be expected to yield results.

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3 THE PALAEOLITHIC TO EARLY BRONZE AGE

Mike Luke

Introduction

The evidence for Lower Palaeolithic occupation in Britain has recently been summarised by Wymer (1999). His publication was based on the results of the English Heritage sponsored English Rivers Palaeolithic Project (ERPP) (Wessex Archaeology 1996a and b). For the purpose of this survey Bedfordshire was divided into two parts: the River Lea drainage in the south (Region 7), and the River Great Ouse drainage to the north (Region 9). The evidence within the Great Ouse valley between Bedford and Ely has also recently been discussed by Reynolds, who stressed "the need for urgent inclusion of Palaeolithic archaeology within the mineral plans of local authorities and their planning teams" (2000, 43).

The gravel pits at Biddenham, west of Bedford, have "the distinction of being the first prolific Palaeolithic sites to have been discovered in England" (Wymer 1999, 123). Historically, Bedfordshire was important for Palaeolithic research because the landmark book, *Man the Primeval Savage* (1894), was largely based on Worthington G Smith's discoveries in the Luton and Dunstable areas.

The number of sites recorded in the Bedfordshire Historic Environment Record (HER) remains at 60 (pers. comm. Stephen Coleman), a figure that has not changed since 1995 (Reynolds 2000, 42). In fact, the majority were known when Roe (1968) was compiling his gazetteer of Lower and Middle Palaeolithic sites. Finds of hand-axes form the majority of the records in the HER, usually less than ten for each site. They mainly derive from the river gravels of the Great Ouse, the brickearths or the Clay-with-flints.

Where identified the majority of the palaeoliths appear to be Acheulian (considered generally to be Lower Palaeolithic), e.g. the hand-axes found in the Jarvis's Pit, Kempston (Pinder 1988, 109). Levallois artefacts mainly derive from the 1st and 2nd terraces, although there are poorly provenanced examples from the 3rd terraces at Biddenham and Kempston (Wymer 1999, 124). Mousterian (generally Middle Palaeolithic) hand-axes are rare, although they have been found at Ruxox Farm, Maulden (Fadden 1972, 81). The only *Bout Coupé* hand-axes known from the county were discovered near Bedford (Tyldesley 1987) and the Biddenham Loop (Albion in prep). Debitage recovered, often in association with hand-axes, include cores, rough-outs and flakes.

Nature of the evidence

The majority of the Palaeolithic findspots within the county represent material collected from late 19th / early 20th century gravel quarrying along the Great Ouse and the brickearth around Dunstable and Luton to the south of the county. Quarrying at this time was largely a manual exercise and hand-axes in particular were easy to spot. They were often reported to antiquarians because the finder would be paid for their discoveries. It is likely that the frequency of hand-axes over other artefacts of this period has been exaggerated by the selective actions of collectors.

As a consequence of the "uncoordinated" nature of discoveries, often from spoil heaps, the precise location of finds is often unknown. Several hundred hand-axes were recovered from the gravel pits at Biddenham and Kempston, many of which survive in a variety of museums. Roe was unable to relate many of these to particular quarry pits (Roe 1968, 2), although it is likely that the majority of those from Biddenham derived from the pits adjacent to the Bromham Road, e.g. the Deep Spinney Pit (Wymer 1999, 123).

Although quarrying, especially of gravel, has continued in the county, little new material or sites have been found. This is largely a result of the shift from hand to mechanical extraction. Inevitably this has increased the speed and scale of operations, making it difficult for quarry workers to identify artefacts (should they wish to) and for archaeologists to operate successfully in the quarries.

More recently material has been recovered from fieldwalking surveys, e.g. hand-axes from the Biddenham Loop (Albion in prep). However, it should be stressed that the numbers discovered in this way are small. In some cases fieldwalking undertaken in areas considered to have high potential for locating Palaeolithic material has not produced any worked flint of this date, as was the case on the Clay-with-flints at Kensworth Quarry, near Dunstable (McSloy and Shotliff 1996, 55). Despite extensive excavations undertaken during the 1990s in advance of housing

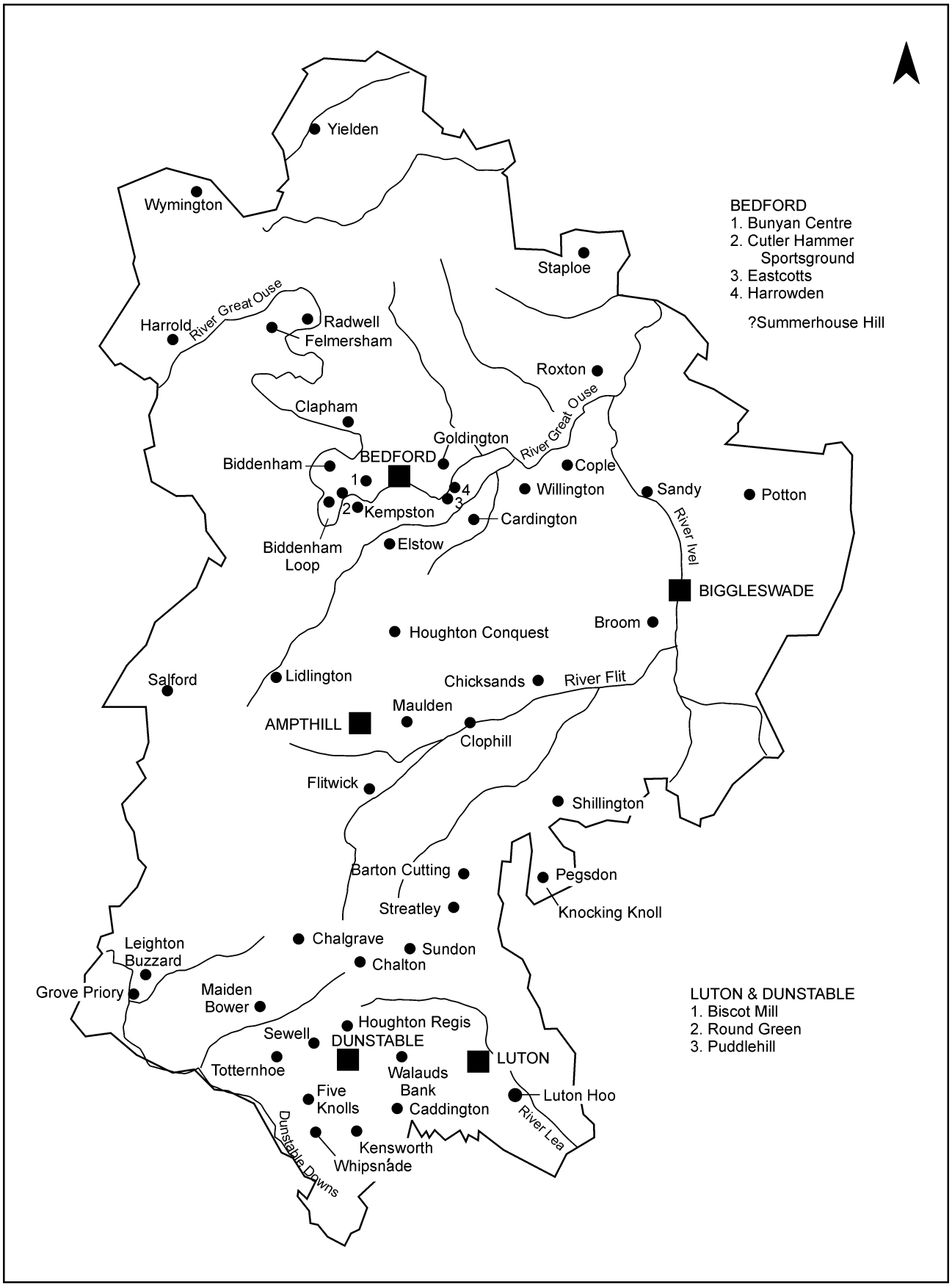

Fig. 3.1 Location plan of places mentioned in the text: Palaeolithic to Bronze Age.

Fig. 3.2 Middle Palaeolithic Bout coupé type *hand axe from the Biddenham Loop (Luke forthcoming).*

development on the river gravels at the Biddenham Loop, no further hand-axes were recovered. Perhaps unsurprisingly those discovered during fieldwalking in the same area were both within 100m of a 19th century quarry and presumably derived from deep within the gravels.

Additional material has been recovered during trial trench evaluation, e.g. from the brickearth at Luton Hoo (BCAS 1999a, 6), and as isolated finds reported by members of the public, e.g. a core tool from Roxton (Wingfield and Holgate 1994, 138). However, again the numbers are very small.

In discussing the nature of the evidence for this period the ERPP, like Roe (1968, 6), has drawn a distinction between *primary context sites* and sites where artefacts are found in *secondary contexts*, which have been disturbed and redeposited by natural processes. All of the known *primary context sites* within the county were discovered during quarrying in the late 19th / early 20th century, e.g. by Worthington G Smith around Caddington (near Dunstable) (Wymer 1999, 174).

Re-investigation using modern archaeological techniques of *primary context sites* has only been undertaken at the Cottage site, Caddington (Sampson 1978) and Deep Spinney, Biddenham (Harding et al. 1992). These have been limited in scale and purpose. For example at Deep Spinney investigation was restricted to cleaning two sections which successfully located the palaeolith-rich deposits and shell beds.

In terms of fauna and flora the 3rd river terrace of the Great Ouse at Biddenham has produced remains of elephant, rhinoceros, horse, ox and deer (Prestwich 1861). During railway construction and associated quarrying at Summerhouse Hill, east of Bedford, the 2nd river terrace produced bones including hippos and reindeer (Wyatt 1864). Similar assemblages were found within the railway cutting to the north-west of Bedford (Prestwich 1861 and Evans 1872), but in 1982 trenching and the inspection of this railway cutting was unsuccessful in locating any fossiliferous material (Green 2000, 12-13). Very little evidence has been examined for the flora from any of the investigations. It is unfortunate that, at present, palaeoenvironmental evidence such as animal or faunal remains is only recorded in the HER if it is associated with artefacts.

Lower and Middle Palaeolithic

In theory Palaeolithic artefacts might be found in any geological deposit of Cromerian or later date. However, the advance of the Anglian, Wolstonian and Devensian ice sheets, with resultant glacial and periglacial conditions, have resulted in material being reworked and redeposited in *secondary contexts*. Therefore, *primary context sites* are most likely to survive in fine-grained sediments deposited during warmer climatic stages and in relatively low energy environments, especially in locations associated with watercourses.

Worthington G Smith's work led to the discovery of lower Palaeolithic flint-working areas within the brickearth at Caddington, Whipsnade and Round Green, Luton (Roe 1981, 184-200; Smith 1916; Smith 1919). The richest area was Caddington where six sites, some only *c.* 100m apart, produced 150 hand-axes and over 3500 flints between them (Roe 1981, 191-8). Worthington G Smith records that he could refit flakes and flint nodules indicating that they were derived from knapping (Wymer 1999, 174-5). Round Green was similar in nature to Caddington producing nearly 300 flints, including 21 hand-axes (Roe 1981, 184-8). In addition to debitage, Whipsnade produced at least six hand-axes (Smith 1919).

Various archaeologists have tried to relocate undisturbed *primary context deposits* identified by Worthington G Smith, but with no success (Wymer 1999, 175). For example, the Cottage site was reinvestigated in 1971, but no *primary context sites* were located, perhaps indicating their small extent (Sampson 1978). Although no faunal or floral remains survived from Worthington G Smith's investigation, faunal remains and pollen were recovered from the reinvestigation which suggested an Ipswichian Interglacial date (*c.* 125,000 bp) for occupation of the site (Campbell and Hubbard 1978, 48-9). A reassessment of the flint assemblage suggested that two or possibly three individuals spent a few hours making at least 13 bifacial implements using flint obtained from the Chalk escarpment *c.* 450m away (Sampson 1978, 146-8). It is, therefore, possible that Caddington was a manufacturing site, rather than a living or butchery site. Contemporary living sites may have existed close by. Why else would people bring flint to this site for making tools, unless they were to be used in the vicinity? (pers. comm. Robin Holgate).

Worthington G Smith interpreted his sites as evidence for occupation around temporary lakes and ponds. He believed these formed in depressions where rainwater was trapped by the underlying impervious clay, with the sites later sealed by slope deposits (Wymer 1999, 174). A recent reassessment of the Chiltern brickearth sites by White (1997) suggests that sedimentation of these deposits occurred within solution hollows in the Chalk during cool and open conditions.

Significant quantities of lower Palaeolithic flintwork, mainly hand-axes, have also been recovered from gravel deposits associated with the River Lea (Roe 1981, 209) and the River Great Ouse (Wyatt 1861, 1862, 1864; Prestwich 1861, 1864; Lyell 1863 and Evans 1872). In particular, the Biddenham area has produced 304 hand-axes (Roe 1968, 2) and the Kempston area 445, with 65 from Foulke's Pit alone (Pinder 1988). There is currently very little material from the valley of the River Ivel, a tributary of the Great Ouse, and when present it usually comprises single hand-axes (Wessex Archaeology 1996a 50-54).

Re-investigation in 1986 of a former gravel pit at Deep Spinney, Biddenham, re-located the palaeolith-bearing gravel deposits, directly overlying the upper surface of the Oxford Clay (Harding et al. 1992). The Biddenham deposits represent the highest terrace of the Great Ouse (Rogerson 1987) and as such are likely to be Middle Pleistocene rather than Late Pleistocene. The artefacts were presumably redeposited within gravels during interglacial periods, possibly the Hoxnian. However, it is possible that both Levallois and Clactonian material is present.

Wymer was puzzled as to why the only prolific sites in the Great Ouse valley were located in the vicinity of Bedford, although accepted that other sites may still await discovery (1999, 123). Both Biddenham and Kempston are located on the 3rd terrace and there are no higher terraces in the valley. However, the dating of the terraces and palaeolith-bearing deposits is still uncertain (ibid., 122).

Upper Palaeolithic

Very little material of this date has been found in Bedfordshire. It has been suggested that the size and form of a recently discovered blade from Willington is suggestive of Upper Palaeolithic industries (Rylatt 2003, 106). Settlement in Britain at this time appears to have been episodic and often only survives within fissures and caves, often in the more highland zones of Britain. Following the time of the maximum development of the Devensian ice sheets, when glaciers covered half of England, resettlement occurred in the tenth millennium BC, at a time when birch woodland was becoming established (Jacobi 1980, 28).

Conclusions

On present evidence lower Palaeolithic sites in Bedfordshire, in common with those located elsewhere in southern Britain, appear to have been located near rivers or other water bodies such as small ponds (Roe 1981, 279). Occupation could date back to at least the Hoxnian Interglacial period (*c.* 250,000 bp). There is scant evidence for occupation during the ensuing Middle and Upper Palaeolithic, possibly because Britain offered too hostile an environment for settlement throughout the first stages of the Devensian Glaciation.

Given the paucity of *primary context sites* in Britain, those identified by Worthington G Smith in south Bedfordshire and that at Deep Spinney, Biddenham are of national significance. However, they were discovered over 100 years ago and it is regrettable that they have been subject to only limited re-examination. Any such work would inevitably have to be preceded by an extensive program of evaluation using a variety of techniques such as map regression, historical documents, borehole data, aerial photographs, geophysical survey, geological survey and possibly fieldwalking. These, in the first instance, would be designed to identify not just the location of old quarries which have produced *in situ* palaeoliths, but also to define their limits and extents. Whilst such an approach would probably be inappropriate for more recent large-scale quarries, those of late 19th / early 20th century date are likely to comprise much smaller,

hand-dug pits where it is highly likely that some palaeolith-bearing deposits survive *in situ*. A separate exercise, which would be extremely informative, would be to catalogue all available faunal and floral evidence for this period recovered during quarrying. Both these exercises would contribute to the development of predictive model for locating new *primary context sites*, away from the known, rich areas.

Reynolds believes that "until regular monitoring of developments affecting Pleistocene deposits is undertaken, the internationally important potential of the Cam-Ouse system will not be met" (2000, 43). An innovative scheme of archaeological investigations combining a "watching brief" and palaeo-environmental study has recently commenced within Willington Quarry (Octagon Farm North), although it is too early to assess the results (Phoenix 2001). This type of work should probably be extended to include developments on the brickearth in the south of the county.

Mesolithic

In 1977 the CBA Gazetteer of Mesolithic Sites in England and Wales recorded only 25 sites in Bedfordshire (Wymer 1977, 2-3). The evidence for Mesolithic activity in Bedfordshire south of the Great Ouse was assessed in 1987 and found to comprise 29 sites (Ward 1987). Of these, nineteen were located on the Chilterns or associated upland, with the remaining ten situated between the Chilterns and the Great Ouse valley, including sites located on the Greensand Ridge. As an appendix to his main work Ward extended his search into north Bedfordshire where he identified fourteen sites, all but one in the Great Ouse valley. More recently Dawson has published a summary of the Mesolithic in the Great Ouse valley, concentrating on sites in Bedfordshire (Dawson 2000). The number of Mesolithic sites recorded in the Bedfordshire HER has not increased from 53 published in 2000 (pers. comm. Stephen Coleman).

The majority of the 53 records in the HER represent lithic scatters, either in ploughsoil or within features of later date. Many of the sites have been identified by casual discoveries, the locations of which have not been recorded accurately. However, over the last 30 years there have been a number of systematic fieldwalking projects. These include those undertaken by amateur archaeological groups, for example around Ruxox Farm, Maulden (Fadden 1970, 1972), around Dunstable (Hudspith 1991a-d, 1995), along with development-led surveys, for example Biddenham Loop (Albion in prep.), the M1 survey (BCAS 1993a). Some sites have been subject to several episodes of investigation. For example, a flint scatter of this period was identified in 1977 during pipeline installation (it had not been located during fieldwalking) near Priestley Farm, Flitwick, by the Ampthill and District Archaeological and Local History Society (Fadden 1991). Systematic fieldwalking (during 1996) and subsequent excavation during 1996/7 undertaken by Engineering Archaeological Services Ltd located a substantial quantity of flintwork in the same area (EAS 1997).

At the Biddenham Loop eight flint scatters contained a "significant" Mesolithic component (BCAS 1991). Of these four were subject to more intensive field artefact collection, one was subject to trial excavation, one was subject to watching brief and two were subject to open area excavation (Albion in prep.). In common with other excavations below, no contemporary sub-surface features were identified. However, a small number of microliths, along with a truncated blade and a small bladelet, clearly representing a Mesolithic assemblage, were recovered from Iron Age and Roman features. The fragile nature of Mesolithic occupation sites has also been indicated by the investigations at Priestley Farm, Flitwick, where again no sub-surface features were identified (pers. comm. Dave Bonner). While sites may only survive in the ploughzone, it is clear this can only be demonstrated by the implementation of more subtle evaluation strategies.

Dawson highlights two sites in Bedfordshire that have produced "some evidence of structures" on the basis of small groups of Mesolithic flints found in pits (2000, 47-49). In addition to these, the evidence from a third site at Grove Priory, Leighton Buzzard, will be briefly reviewed below.

Earlier Mesolithic (post-glacial) (8,300-6,500 bc)

The earlier Mesolithic period is associated with the post-glacial establishment of birch and pine woodland across the north European Plain, of which Britain was a part. At present, no material of earlier Mesolithic date (typified by broad-blade microliths mainly obliquely-blunted points (Jacobi 1973, 237-8)) is known from Bedfordshire (pers. comm. Robin Holgate). Ward did identify earlier Mesolithic flint, on the basis of Clark's (1934) typology: "the axe, burin and non-geometric microlith" but this definition is no longer widely accepted.

Later Mesolithic (6,500-3,500 bc)

Flint assemblages of this period are typified by narrow-blades or geometric microliths (Jacobi 1973,

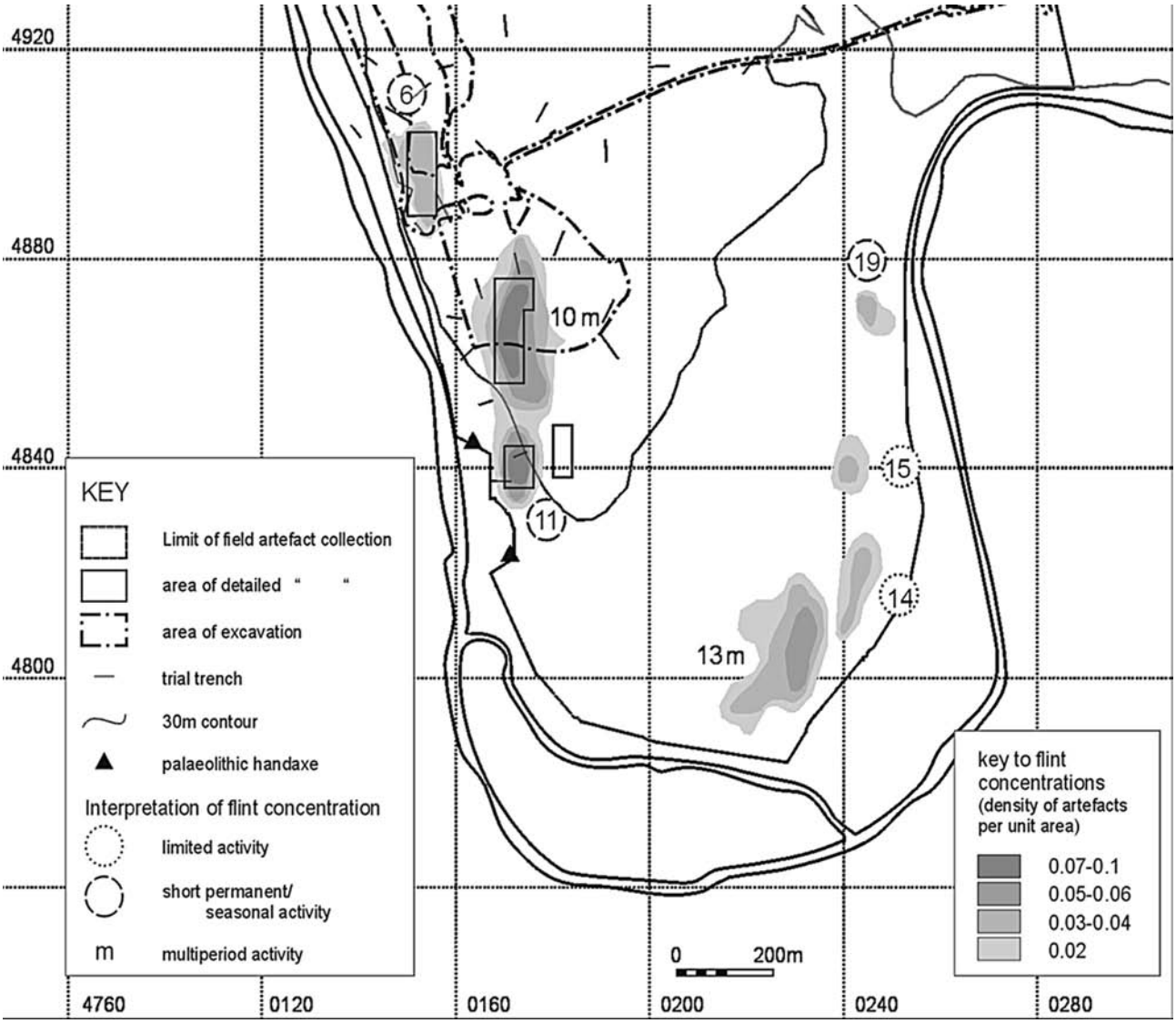

Fig. 3.3 Mesolithic/early Neolithic flint concentrations on the Biddenham Loop (Luke forthcoming).

237-8). Sizeable assemblages have been recovered from Priestley Farm, Flitwick, totalling over 85 flints (Ward 1987, 45 and Fadden 1991, table 1) and Grove Priory, Leighton Buzzard, totalling over 500 flints (Ward 1987, 69-70 and BCCAS 1988, 33-34). These assemblages are exceptional and it is unfortunate that neither has been subject to detailed analysis. Far more common are assemblages of between 10 and 20 flints.

Investigations at Priestley Farm during the late 1990s by EAS and Network Archaeology associated with the Aylesbury to Steppingley gas pipeline recovered over 19,000 flints from the plateau overlooking the River Flit. Although the majority of these were originally believed to be late Mesolithic in date (EAS 1997), further analysis has indicated that only a small, but still significant, proportion is of this date (pers. comm. Dave Bonner).

Generally, the sites appear to indicate a preference for either riverine locations (above the floodplain) and/or good vantage points (Dawson 2000, figure 6.1). With the possible exception of the Ivel, all river valleys have produced Mesolithic sites. For example, along the Great Ouse sites are known at the Biddenham Loop (BCAS 1991; Albion in prep) and Roxton (Taylor and Woodward 1985, 108 and 139), along the River Lea at Waulud's Bank (Holgate 1988, 215), along the Ouzel at Grove Priory (BCAS 1988, 33-34), and along the River Flit at Priestley Farm, Flitwick (Fadden 1991), Ruxox Farm, Maulden and Beadlow Manor Farm, Clophill (Fadden 1974, 131). They also occur at good vantage points, e.g. the Greensand Ridge at Sandy Lodge, Sandy (Dyer 1971, 14), the Dunstable Downs (Holgate 1988, 215), and on ridges at Chalton (Hudspith 1995, 131) and Zouches Farm, Caddington (Wingfield and Holgate 1991, 83-4).

The assemblages of flints from Grove Priory and Biddenham Loop have been divided into five and eight discrete scatters, respectively. Ward identified eleven tranchet axes from Bedfordshire (1987) and several sites, such as Shillington (BCAS 1993b), have produced implements and waste flakes from restricted areas. The flint assemblages from Biddenham were interpreted as representing temporary, short-term occupation, both residential and specialised (BCAS 1991). If the Biddenham Loop sites were situated at the forest margin as well as close to the river (as other sites were), they would be in an excellent position to exploit a broad spectrum of natural resources for both subsistence and the procurement of raw materials. River habitats would have provided plants, fish, waterfowl and aquatic mammals. Forest clearings would have provided wood, fruit and a variety of game (Albion in prep.). The discovery of arrowheads at the Biddenham Loop, as at a similar riverine site at Roxton, is suggestive of losses made during hunting (Woodward 1978, 50).

Dawson refers to two sites where pits of possible Mesolithic date have been reported (2000, 47-49). Both are considered to represent "working areas indicative of short stay, task-specific activities" (Crick and Dawson 1996, 69). At Ursula Taylor Lower School, Clapham, is situated on a gravel terrace approximately 150m from the present course of the River Great Ouse (Dawson 1988), a not dissimilar position to the Biddenham Loop sites. At Ursula Taylor, in addition to an unstratified Mesolithic assemblage, three ill-defined and irregular pits filled with clean sand and gravel with occasional flecks of charcoal and Mesolithic flint debitage were excavated (Dawson 1988, 6-8). It was argued that the coherence of the flint assemblage (the excavated material is unfortunately not quantified in the publication), absence of later contamination and dissimilarity of the fills to other, later features argues for a Mesolithic date (Dawson 1988, 6-8). The second site referred to by Dawson is at Kempston Manor, situated in a similar location and also 150m from the Great Ouse (Crick and Dawson 1996). Mesolithic flints were recovered from the interface of the brickearth and as residual material in later features. In addition, six pieces of flint debitage and tools characteristic of this period were recovered from a single, irregular pit (ibid. 69 and 89-90).

The evidence for *in situ* activity at the Clapham and Kempston sites is not totally convincing. However, it is perhaps significant that the possible Mesolithic pits at both sites are described as irregular with "natural"-type fills, just the sort of features which can be too easily "missed" during excavation. For example, although the excavations at Grove Priory, Leighton Buzzard, produced a large Mesolithic flint assemblage, the majority of the flints were found interleaved with wind blown soils (BCCAS 1988, 33). However, the flints were concentrated in discrete areas, one of which was apparently associated with pits (ibid. 34). It is unfortunate that the Mesolithic component of the excavations have not been included in the post-excavation analysis (pers. comm. Anna Slowikowski).

The only other evidence from the county for possible *in situ* features is extremely tentative, but potentially significant. A tree-throw hole excavated at the Biddenham Loop produced a diagnostic Mesolithic flint pick (Albion in prep.). Although a single artefact cannot be used to date a feature with any degree of certainty, it is interesting to note that May suggested that Mesolithic picks were utilised for forest clearance (1976).

Conclusions

Occupation sites for this period are difficult to locate and classify because they usually comprise flint scatters, rather than sub-surface features. The location of flint scatters suggests the Mesolithic exploitation of the county was mainly confined to the river valleys and good vantage points, locations that are suited to a hunter-gatherer lifestyle. It is in these topographical locations, along with gravel islands, that Mesolithic sites should be expected and evaluation methodologies designed accordingly. With the exception of Grove Priory and possibly Priestley Farm, the sites known in Bedfordshire comprise small assemblages of material, which may suggest a transitory population moving around to exploit seasonal resources. The mobility of these groups means that inter-site analysis of the kind attempted at the Biddenham Loop is essential to try to establish differences between the scatters. It seems reasonable to assume that the larger Grove Priory and Priestley Farm assemblages derive from repeated re-occupation of the same site. However, it is regrettable that the flint assemblage from both sites has not been analysed and published. It is also to be regretted that, although many excavations contain tree-throws holes, these are rarely the subject of hand excavation and therefore their significance, if any, is unknown.

It is quite clear that systematic fieldwalking, often undertaken as part of the evaluation of a proposed development area, can locate flint scatters of this period. However, it needs to be undertaken under certain conditions. For example, only a few pieces of Mesolithic flint were recovered from the Biddenham Loop when fieldwalked by Woodward (1978, 44), although when walked during the 1990s eight flint scatters of this period were located (BCAS 1991). Woodward made the point that the Biddenham

survey was "severely affected by differential field condition" (1978, 40). Although sub-surface features should be anticipated, it is quite possible that the only evidence for occupation at a site during this period will occur within the ploughzone. If this is the case, the surviving evidence can only be maximised through intensive artefact collection, fieldwalking with 100% collection "and/or the gridded removal and sieving of ploughsoil" although these methods do not always "fit comfortably within the normal development timetable" (Simco 1995, 165).

Environment and Economy

Peter Murphy

Chronology is important at all periods, but nowhere more so than in these. Consequently, dating must come first. Chronological data for the Palaeolithic of Bedfordshire are at present sparse (Wymer 1999; Reynolds 2000). There are depositional remnants of a pre-Anglian drainage pattern in the Nene Valley, near Northampton (the Milton Sands, characterised by absence of exotic ice-transported rock types (Green 2000, 9)), but none, so far, have been recorded in the basin of the River Great Ouse. The Bedfordshire Great Ouse cuts through Boulder Clay of presumed Anglian date, so existing terrace deposits must be post-Anglian (OIS 12). However, along most of the valley, discrete well-defined terraces are hard to define. The Biddenham gravels (Wyatt 1861, 1862, 1864) seem to represent the highest terrace in Bedfordshire (Terrace 3). Re-excavation at the Deep Spinney Pit SSSI by Harding *et al* (1992) exposed the organic shell bed under these gravels, overlying Oxford Clay: Wymer (1999, 123) suggests that they are either of OIS 11 or 9. At Stoke Goldington interglacial channel fills almost at floodplain level have been dated by U/Th and amino-acid dating to OIS 7 (Green *et al* 1996).

Dating the Palaeolithic sites in the brickearth of the Chiltern Plateau between Luton and Dunstable is even more problematic, for biological remains have not been reported (Wymer 1999, 175-6 and Map 52). Many of these sites, which occur within loessic sediments infilling topographic hollows, are surface intact, with artefacts in primary context (Smith 1894, 150; Catt and Hagen 1978; White 1997). On artefactual grounds, Wymer suggests that these sites could be of OIS 7 or 8.

There are no radiocarbon or other dates from Mesolithic sites in the county.

Palaeoecology

The fauna of the Biddenham Gravels, associated with Lower Palaeolithic artefacts was first reported by Wyatt (ibid.). It includes a temperate mollusc and mammalian fauna.

Scaife (2000) has discussed the Devensian environment, though the only palynological results relating to the very latest part of this stage in the county come from Kempston in the Ouse valley, where inorganic sediments attributed to just before 10,000 BP yielded a pollen assemblage dominated by Poaceae (grasses), Cyperaceae (sedges) and herbs, in an almost treeless environment, apart from a rare *Betula* (birch) and *Juniperus* (juniper). Late Upper Palaeolithic peoples would have inhabited this harsh environment.

Evidence for Flandrian (Holocene) vegetation change is also provided by sites at Biddenham Loop, Kempston and the Bedford Southern Orbital Sewer (Scaife, ibid.). Early Mesolithic (Flandrian I) vegetational change follows the pattern usual in lowland Britain: from approximately 10,000 BP there was an expansion of pioneer colonisers – juniper, then birch – followed by *Pinus* (pine) with *Corylus* (hazel). Subsequently, other trees colonised, and by around 5,000 BP deciduous woodland, including *Quercus* (oak), *Ulmus* (elm), *Tilia* (lime), hazel and *Alnus* (alder), was widely established. Woodland composition would have varied in relation to soil-types and drainage conditions, but more work would be required to define spatial heterogeneity. There is, as yet, no direct evidence for any human impact on vegetation.

Earlier Neolithic

The start of the Neolithic period is traditionally associated with the introduction of a sedentary lifestyle based on agriculture and is sometimes associated with forest clearance (see Smith 1974, 103-104; Whittle 1978; Megaw and Simpson 1979, 78-79). However, this view has increasingly been challenged over the last twenty years. For example, Barrett has argued that some agricultural practices were merely added to the range of activities undertaken during the Mesolithic (1994) and Whittle has suggested that the relative importance and impact of new farming resources (animal and plant species) still remains to be established (1999, 59). No division of the period is satisfactory (Whittle 1999, 59-60) and this is especially true for Bedfordshire where sites investigated to date

have generally produced very limited dating evidence. However, a crude split into earlier and later Neolithic on the basis of differences in flint industries, pottery styles and classes of monument will be used here. With regard to the monuments assigned to this period it seems likely that some, perhaps many, will have continued to develop and be used well into the later Neolithic and even the early Bronze Age.

Unlike the previous periods, the Neolithic in Bedfordshire has not been the subject of any recent coherent examination. Thomas (1964) produced a gazetteer of sites and antiquities in the county, sub-dividing the period into Early, Middle and Late. More recently Holgate (1995) presented the evidence for early prehistoric settlement of the Chilterns, covering some sites in south Bedfordshire, and Clark and Dawson (1995) summarised recent fieldwork, including that at the Cardington/Cople/Willington monument complex.

The records contained within the HER relate to findspots and cropmarks. Most of the findspots comprise small numbers of artefacts, often ones and twos, rather than more widespread scatters. This is often because they were recovered as chance finds during quarrying. Approximately 91 records comprise stone axes, but only a handful refer to pottery including Windmill Hill, Abingdon and Whiteleaf-Mildenhall types (pers. comm. Stephen Coleman).

Fieldwalking can locate struck flint typical of the early Neolithic and approximately 10 flint scatters of this period are recorded in the HER (pers. comm. Stephen Coleman). Although it is increasingly being undertaken as part of a developer-funded pre-application investigation, e.g. Kensworth Quarry, Dunstable (McSloy and Shotliff 1996), amateur/independent archaeologists have continued to undertake surveys, e.g. around Dunstable (Hudspith 1995). The latter are usually undertaken over a far more extensive area than could be expected of those associated with individual planning applications. Although identified flint scatters are often referred to as "sites", the assemblages are not always subject to detailed analysis and when excavated rarely overlie contemporary sub-surface features.

Two monuments surviving as earthworks at Houghton Conquest and Pegsdon have been identified as long barrows. The majority of the monuments, though, are known from cropmarks, usually occurring on gravel associated with the Great Ouse. It is uncertain if this distribution represents a genuine bias towards the river valley or reflects the fact that cropmarks are most easily produced on gravel. Over the last five years there has been a major increase in cropmark sites showing up on the clays of north Bedfordshire, however, these appear to have the characteristics of later periods rather than the early Neolithic (pers. comm. Stephen Coleman).

Much of the evidence for the earlier Neolithic has been located "accidentally" during the investigation of post-Neolithic sites. For example, Worthington G Smith investigated Neolithic ditches at Maiden Bower because they were below the Iron Age hillfort (1915). More recently a possible shaft of this period was investigated at the Biddenham Loop during the excavation of a Bronze Age ring ditch (Albion in prep).

Given the extent of development within the Great Ouse valley over the last one hundred years, and especially the last twenty, it is perhaps surprising that evidence for activity during this period is still relatively rare. However, some important discoveries have been made since the introduction of PPG16 in 1991. These include the identification of flint scatters during fieldwalking at the Biddenham Loop (BCAS 1991), geophysical survey at Cardington confirming the basic nature and layout of the monument complex (GSB 1991; 1992a and 1992b) and the discovery pits at Broom (Mortimer 1999).

Settlement

Evidence for settlement during the early Neolithic is elusive throughout Britain, and Bedfordshire is no exception. Despite extensive investigations at the Biddenham Loop, Broom and Cardington/Cople/Willington, little firm evidence for settlement activity has been identified. At Broom a small group of pits containing pottery and flint was identified, but these may have served a funerary/ritual/ceremonial purpose rather than been associated with settlement (Mortimer 1999, 21). Similarly, material recovered from the ditch believed to be of this period at Maiden Bower (Smith 1894, 1915), could also be the product of short-term ritual/feasting.

Flint artefact scatters that contain early Neolithic material are rare and often also contain flintwork dated to the later Neolithic. They are often interpreted as evidence for settlement that may only survive within the ploughzone. However, without detailed analysis their precise meaning in terms of the extent, nature and duration of any human occupation is uncertain (Schofield 1990). Bosimer has attempted to classify the flint scatters within the Biddenham Loop as: limited activity locations, e.g. flint working sites; short permanent and/or seasonal residential locations, e.g. hunting camps; and long term permanent residential and/or multiple locations, e.g. farming settlements (BCAS 1991, 5-6). The overall distribution of "sites"

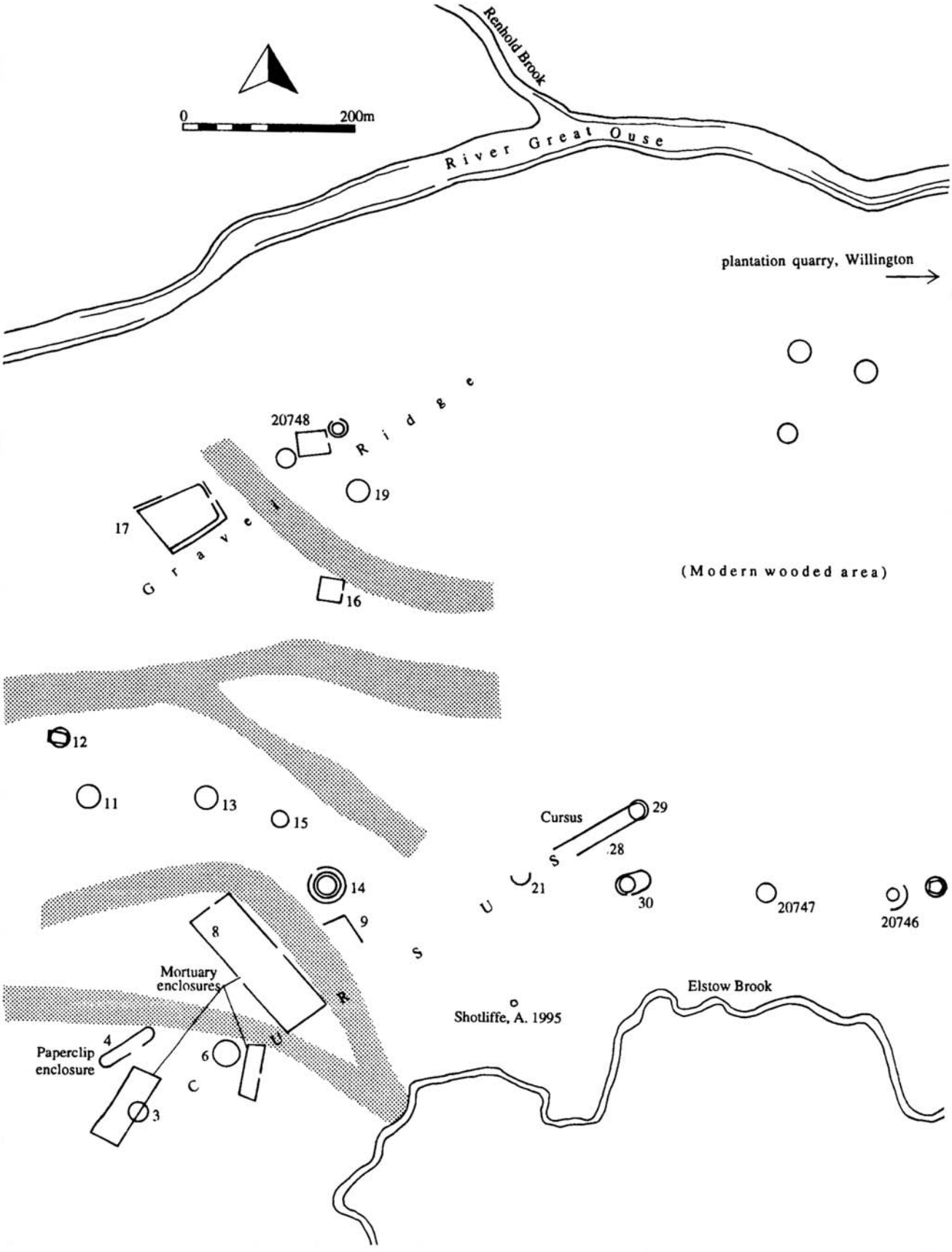

Fig. 3.4 Cardington-Cople-Willington monument complex (after Pinder 1986a, Dawson 1996, Malim 2000, Albion in prep.) (Cambridge University Collection of Air Photographs: Copyright reserved).

Location	Monument types
Biddenham	Long (2) and oval (3) enclosures
Cardington/Cople/Willington	Long, oval, square and paperclip enclosures, cursus (1), causewayed enclosure (1)
Roxton	None known
New Road, Sandy	Oval (1)
Biggleswade Sewage Works	Curus (1)
Broom	None known

Table 3.1 Neolithic components to monument complexes (all contain later ring ditches)

within the county suggests that domestic sites are few in number (Holgate 1988, 238 and 377). They appear to be concentrated near the chalk uplands to the south of the county and within the Great Ouse valley. However, these are the areas that have been the subject of the majority of the archaeological investigation in the county. Isolated finds made away from these areas, for example at Wymington (Dring 1961), indicate that activity was not restricted to these areas.

The presence of a buried soil of this period has been suggested on the basis of stratigraphy (they underlie barrows), for example beneath the Five Knolls barrow 5, Dunstable (Dyer 1991) and the presence of artefacts, for example at High Street, Yelden (BCAS 1992).

Analogies with other more intensively studied regions could present a picture of small-scale and perhaps relatively mobile settlement within the earlier Neolithic (Pollard and Hamilton 1994, 17).

Ceremonial and burial monuments

Bedfordshire contains examples, often in the singular, of all the major monuments believed to have been constructed during this period: causewayed enclosures, cursuses, long barrows, long enclosures and square/oval enclosures. It also contains a single example of a more unusual type often referred to as the paperclip enclosure. However, these monuments have only been the subject of limited archaeological investigation. This means that for the vast majority of the monuments, our understanding of their form, development sequence and dating is largely speculative, based as it is on non-intrusive survey.

Monument complexes It has long been recognised that monuments in southern Britain often occur together, in 'complexes' (Loveday 1989). The addition of new monuments in the late Neolithic/early Bronze Age suggests that many, if not the majority, of these complexes had an enduring significance. Malim has suggested that ceremonial complexes existed 5-6 km apart along the middle part of the Great Ouse. Those at Biddenham, Cardington/Cople/Willington and Roxton are situated in Bedfordshire (2000, 57). The Biddenham and Cardington/Cople/Willington complexes contain a number of different types of monuments (Table 3.1), although when compared to the number of later ring ditches, the Neolithic component is often small. There is currently no evidence for the existence of Neolithic monuments in the vicinity of the Bronze Age ring ditches at Roxton. A similar pattern of monument complexes along the Ivel valley is suggested by the occurrence of single monuments of this period, although multiple monuments of later periods are known, for example New Road Sandy and Biggleswade Sewage Works (Table 3.1).

The group of monuments at Cardington/Cople/Willington has long been recognised as representing a monument complex (Dawson 1996, 43-44, Malim 2000, 75-78), and it is the largest on the Great Ouse (Last 1999, 91). It may be significant that Bedfordshire's only definite causewayed enclosure is located 1km from the main concentration of monuments. It is interesting to note that no definite Neolithic monuments are known within the Great Ouse valley upstream of Biddenham, which could suggest that this area was not extensively settled during this period. However, at Radwell and Harrold, both upstream of Biddenham, only limited archaeological investigation was possible in advance quarrying during both the 19th and 20th century. It is therefore possible that although Bronze Age ring ditches were identified (see late Neolithic/early Bronze Age), less obvious Neolithic monuments may not have been recognised.

It is noticeable how few Neolithic monuments have been identified away from the river valleys, especially on the Chalk uplands. This may explain why so few monument complexes for this period

have been suggested in the south of the county. The only candidates comprise Totternhoe/Dunstable (Horne 2001, 21-22), to which perhaps Galley Hill, Houghton Conquest and Pegsdon could be tentatively added because later round barrows were located in the vicinity of long barrows. Therefore, although not as extensive as those in the Great Ouse valley, it is likely that monument complexes may have existed in the south of the county.

Causewayed enclosures The precise function of causewayed enclosures remains unclear, but they do appear to represent the earliest type of non-funerary monuments and instances of the enclosure of open space (Oswald et al. 2001, x). The recent national survey of all possible sites identified 69 of certain or probable status of which two are located in Bedfordshire: at Cardington and Maiden Bower. They do not survive as earthworks and have only been subject to limited investigations.

Cardington was discovered during aerial reconnaissance by Cambridge University Committee for Aerial Photography in 1951 (Oswald et al. 2001, fig 4.10). When recorded by Palmer (1976, 10), the cropmarks appeared not to form a circuit, which led Hedges and Buckley (1978, 248) to suggest that it had never been completed. However, more recent work has identified three closely spaced complete ditched circuits. The occurrence of three circuits is a common feature of enclosures in riverine locations (Oswald et al. 2001, 69). It is unfortunate that the only excavations carried out within the enclosure, a Scheduled Ancient Monument (SAM), concentrated on Roman features (Johnston 1955-6, 94).

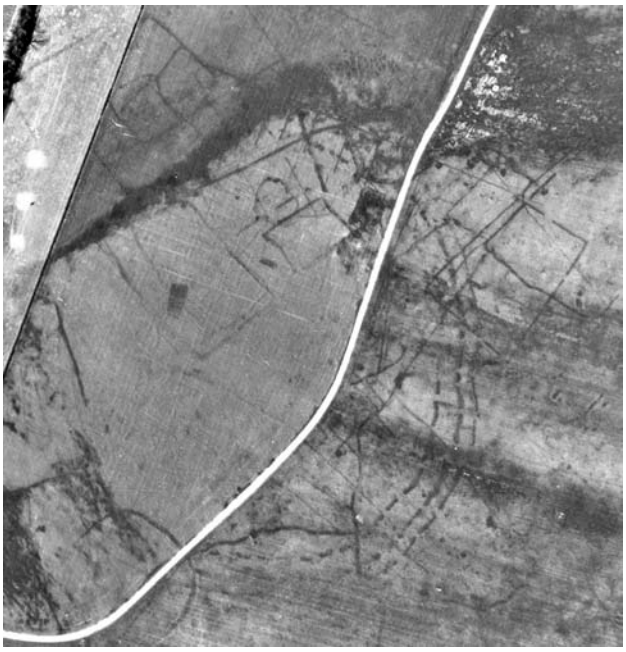

Fig. 3.5 Cardington causewayed camp looking North.

The suggestion that Maiden Bower may be the location of a Neolithic causewayed enclosure has a very long history (Curwen 1930; Piggot 1931, 90-2; Matthews 1976, 1-3; Pollard and Hamilton 1994, 11; RCHM 1994, 14; Horne1996, 28-29; Oswald et al. 2001, 12). However, in 1994 the RCHM highlighted the "problems arising from earlier interim statements" (RCHM 1994, 9). Much of the evidence is based on descriptions of investigations undertaken at the turn of the century (Smith 1894, 1915). Ambiguous statements by Smith concerning a series of "five ancient excavations" were interpreted by Dyer as five segments of a Neolithic causewayed ditch (1964, 8). Investigations of ditches revealed on the edge of the adjacent quarry have been undertaken sporadically between the 1930s and late 1960s (Matthews 1962, 1963, 1976; and Dyer 1955; 1981, 52). These appear to have located several ditch sections, some apparently sealed beneath the Iron Age hillfort rampart, some apparently containing Windmill Hill and Abingdon-type pottery and some containing human and animal bone.

Recent work, comprising geophysical survey (Pollard and Hamilton 1994) and earthwork survey (RCHM 1994) raises more questions than it answers. Within the interior of the Iron Age rampart, the geophysical survey located a ditch-type anomaly (Pollard and Hamilton 1994, 12) which appeared to flank a low bank identified within the earthwork survey (RCHM, 11). Pollard and Hamilton noted that the area enclosed, at 2.7ha, would be comparable with the causewayed enclosure at Etton, Cambs. (1994, 16). However, the geophysical survey did not identify any definite breaks in the ditch to suggest it was causewayed, although narrow gaps may not be detectable by geophysical survey (ibid.). The RCHM, while accepting that the bank could be early, suggested that it "is more probably a headland formed by the ploughing regime in the interior" (1994, 11). The Neolithic ditch investigated by Matthews and others is still visible in the quarry edge, but was not visible as a geophysical anomaly. Its alignment is, therefore, unclear and it is interesting to note that Horne has suggested that the ditch may be part of a long barrow (1996, 30).

Given the ambiguous and limited nature of the evidence at Maiden Bower, it is perhaps a little surprising that it was included in the recent survey, although the authors did state that "its identification as a causewayed enclosure remains probable rather than definite" (Oswald et al. 2001, 25).

Cursus monuments Malim has highlighted the confusion that exists in the terminology distinguishing long enclosures from cursus monuments (2000, 57). However, Harding and Barclay have argued that although probably part of the same tradition, the two different classes of monument are distinguishable (1999, 1). They defined cursuses as "enormously elongated rectilinear enclosures, which typically extend in length from 170m to 4km" (ibid.). At least five cursus monuments have been proposed in the county: Biggleswade, Cardington, Kempston, Felmersham and the Biddenham Loop. Of these only the Biggleswade example is reliable, with the others, at best, extremely speculative.

The cursus near Biggleswade was originally identified from cropmarks on aerial photographs which indicate that it was at least 700m long and 80m wide. Its square, eastern end was visible but its western end has not been identified. A short length of the southern cursus ditch was investigated recently in advance of construction work associated with the Biggleswade Sewage Treatment Works (Albion 2004; Abrams forthcoming). The ditch was found to have been redug on at least one occasion over part of its length. This raises the interesting question of the longevity and continued development of the monument.

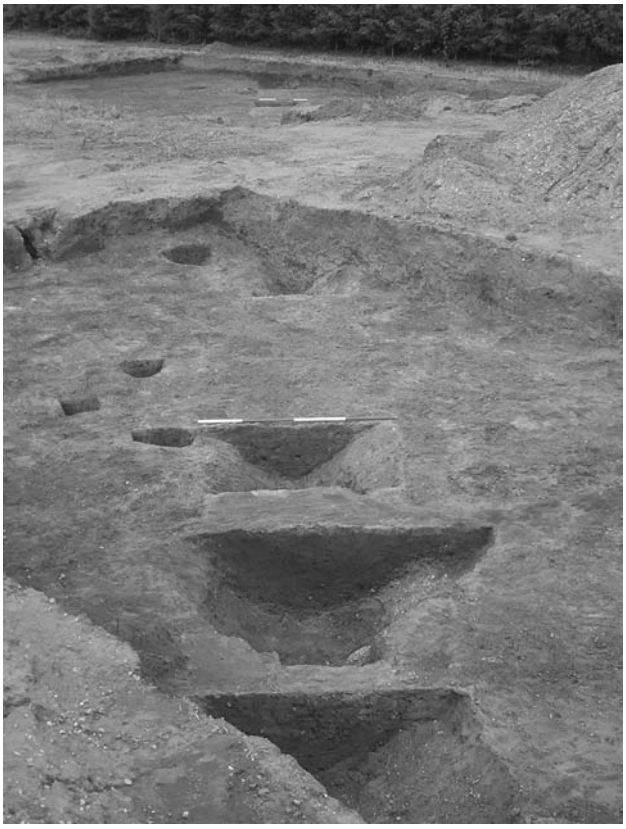

Fig. 3.6 Part of the Biggleswade cursus ditch excavated in 2004 (Albion forthcoming).

Although this can only be conclusively demonstrated by open area excavation, it is also hinted at by the close association between four ring ditches, presumed to be late Neolithic/Bronze Age in date, and the cursus.

Although the Cardington cursus is better known, this is only because it is situated within an extensive ceremonial complex (Dawson 1996). Last believes that the cursus, which is parallel to the course of the River Great Ouse and Elstow Brook, provides an organising axis to the complex (1999, 91). A 100m length is visible on aerial photographs at its north-east end where it is only 20m wide. Malim has suggested "its extent can perhaps be deduced from an alignment of four ring-ditches" (2000, 78), which if accepted would suggest an overall length of *c.* 700m. The cropmark evidence suggests that a ring ditch may have been constructed over its north-eastern end. It is somewhat surprising that the monument is not visible for a greater distance given that ring ditches are visible on aerial photographs and have been detected by geophysical survey along its projected course. Partly because of this and partly because of its narrow width some caution should be placed on its status as a cursus. Based on the definition given by Harding and Barclay (1999, 1), it would appear to be more accurately classified as a long mortuary enclosure, comparable in overall dimensions to the one at West Cotton, Northamptonshire (Windell 1989).

The original source of the speculation concerning a cursus at Kempston relates to the discovery of a "long straight ditch about a hundred yards in length" in a gravel pit in 1936 (Dunning 1938, 284). In the middle of the ditch length a probable causeway was identified. An earlier prehistoric date was suggested by the presence of a crouched inhumation and a Beaker within the ditch. The latter would suggest a later Neolithic date incompatible with a cursus. Such slender evidence is therefore insufficient to confirm that the ditch was part of a cursus and its existence has been too readily accepted (Thomas 1964, 18; Last 1999, 92). Alternative interpretations are possible, for example, if it is genuinely earlier Neolithic in date it could perhaps be associated with a long enclosure (see below).

On the basis of cropmark evidence alone, cursuses have been identified at Felmersham and the Biddenham Loop. The former at 80m by 40m is rather small and more akin to a long enclosure. Malim proposed that two parallel ditches, extending for 1km in length within the Biddenham Loop represent a cursus (2000, Fig 8.16 on 80). However, rectification of aerial photographs has demonstrated that the ditches are not straight and are only 12m apart making their interpretation as a cursus very unlikely (Luke in prep).

Long "mortuary" enclosures Long "mortuary" enclosures are defined by Harding and Barclay as "generally less than 150m long and not more than 25m in width" (1999, 1). Not all the enclosures identified on aerial photographs at Cardington and within the Biddenham Loop fit this definition, although their breadth/length ratio would suggest they are part of the same class of monument. They can also be distinguished from cursus monuments by the presence of entrances. Those in Bedfordshire, as in the Great Ouse valley in general, have acute (Malim 2000), rather than the rounded corners observed elsewhere, e.g. Dorchester-On-Thames Site VIII (Whittle et al. 1992).

At least three long enclosures have been identified within the Cardington complex, all situated within 200m of each other. During 1990-92 they were subject to geophysical survey, fieldwalking and trial excavation, during evaluation work for the Bedford Southern Bypass. This confirmed their plan and overall dimensions (Clark 1991a; Dawson 1996). The two smaller ones share the same alignment, which is distinct from the larger one. The latter is 170m long and 57m wide and as such does not fit Harding and Barclay's definition of either a long enclosure or a cursus. Entrances existed centrally in at least two of the enclosures. Intrusive evaluation demonstrated that one of the enclosures was earlier than a ring ditch. One of the enclosures produced a single sherd of pottery which had affinities with carinated bowls of earlier Neolithic date and the fabric was similar to Mildenhall pottery recovered from Goldington (Clark and Dawson 1995, 60). Given the nature of trial trenching it is perhaps not to surprising that no internal features were identified and that little information on the nature and development of the enclosures was recovered.

Although Malim suggested that ditches visible as cropmarks within the Biddenham Loop could represent long mortuary enclosures (2000, fig 8.16), recent work on rectified aerial photographs suggests they are better interpreted as part of a later field system (Luke in prep). However, two other candidates within the Biddenham Loop have been tentatively suggested on the basis of combined geophysical and cropmark evidence (Luke in prep). They are 180m apart and share a common alignment. At 75m by 23m, one of the enclosures is comparable in size to that immediately south of HER 1480.8 at Cardington (Malim 2000, Fig 8.13 on 77). The smaller Biddenham Loop enclosure, only 33m by 20m, is more comparable in size to the square enclosures at Cardington (ibid.).

Long barrows In his survey of 1964, Thomas identified five long barrows in the county: Knocking Knoll, Pegsdon; Galley Hill, Streatley; Waulud's Bank, Leagrave; Union Street, Dunstable and Biscot Mill, Luton. These are described in more detail by Dyer (1964, 9-10). Since then a sixth has been identified at Houghton Conquest. None have been the subject of intrusive investigation.

The two which survive as earthworks, Knocking Knoll and Houghton Conquest, are both protected as Scheduled Ancient Monuments, but their status is by no means certain. Dyer records that the example at Houghton Conquest is 50m long, 10m wide, 1.5m high, with traces of side ditches and is remarkably well preserved (1981, 52). Partly because of the latter it has been suggested that it may actually be a pillow mound (pers. comm. Stephen Coleman). However, the proximity of a round barrow, which also survives as an earthwork, might give its status as a long barrow increased credibility. The earthwork of the Pegsdon barrow is far less substantial and could actually be a round barrow (pers. comm. Stephen Coleman). The existence of long barrows at Galley Hill and Union Street has been suggested on the basis of aerial photographs and historical records (respectively). The Union Street example was identified by both Stukeley and Smith who would have been familiar with such monuments (Dyer 1964, 8-9). However, Matthews considered it to be a natural mound (1963, 13) and a recent watching brief by the Oxford Archaeological Unit failed to locate any sub-surface evidence (pers. comm. Martin Oake).

With the exception of the possible long barrow at Houghton Conquest, which is situated on Greensand, all the others are located on the chalk downs to the south of the county. To explain this phenomenon one must conclude that some of the long and/or oval enclosures identified by aerial photography in the Great Ouse valley (discussed above and below) either served the same functions, or actually represent ploughed out long barrows. However, the acute corners of most long enclosures would suggest that these represent a distinct class of monument.

Oval barrows/enclosures Oval ditched enclosures have been identified on aerial photographs at the Biddenham Loop (Luke in prep); New Road, Sandy (pers. comm. Stephen Coleman); and Willington (Pinder 1986a). A fourth, Ring-Ditch 9 at Harrold, is tentatively suggested on the basis of its description as "oval", but there is insufficient published information (Eagles and Evison 1970, 20). None of the three excavated examples, one at Biddenham Loop, Willington and Harrold, have produced adequate dating evidence, although in Sussex they are believed to be a later form of long barrow (Drewett 1986, 49). If they do represent ploughed out barrows, they are distinguishable from long barrows by being smaller and more rounded in plan. The danger of assuming

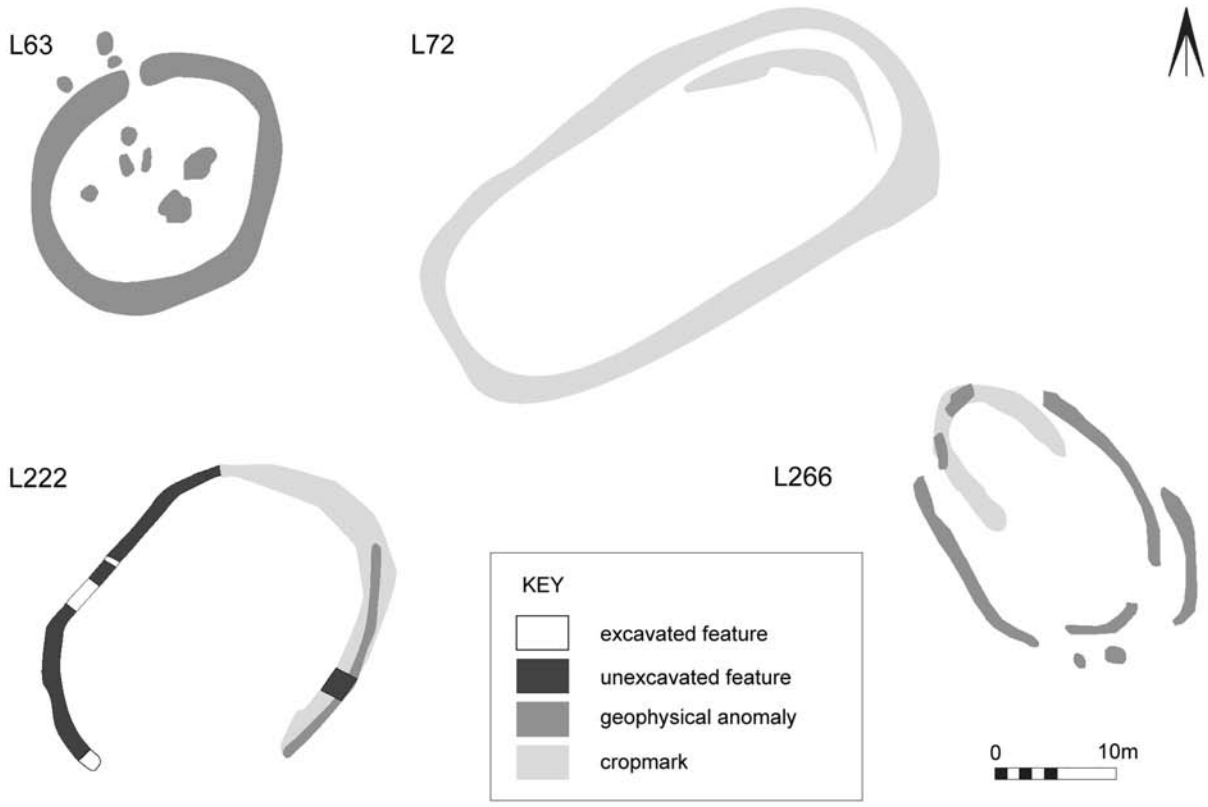

Fig. 3.7 Possible long and oval barrows/enclosures on the Biddenham Loop (Luke forthcoming).

all such cropmarks are Neolithic is indicated by excavations at Caldecotte, Milton Keynes, which demonstrated that a comparable enclosure was Iron Age (Loveday and Petchey 1982, 23).

Two of the three oval enclosures at the Biddenham Loop are comparable in size to that fully exposed at Willington, 28m by 16m (Pinder 1986a, fig 4b on 18). Only one of the Biddenham examples has been subject to partial excavation and, like Willington, there was an absence of artefacts within the ditch fills, possibly suggesting these monuments were taboo areas or deliberately kept clean. The enclosure ditch excavated at the Biddenham Loop was redug on at least one occasion, and was incomplete on its south-western side. This is comparable to the development of the monument at Radley, Abingdon, Oxfordshire, where its south-western end was twice left open within its complex sequence of development (Bradley 1992, fig 4 on 131). A similar complexity/longevity in development of ditches is indicated by cropmarks associated with a second oval enclosure at the Biddenham Loop, again, presumably indicating a multi-phased development. The third site, at New Road Sandy, is again only known from aerial photographs, but appears to have two open ends, more in keeping with the long barrow tradition.

Square barrows/enclosures At the time of the MPP survey in 1990 six square barrows were known, the majority visible as cropmarks on aerial photographs (pers. comm. Stephen Coleman). These were located at Barton, Cardington/Cople/Willington (three examples), Harrold and Staploe. Only those within the Cardington/Cople/Willington monument complex have been subject to any excavation. Trial excavation in advance of the Bedford Southern Bypass confirmed that the latter had a central east facing entrance and an opposing posthole within the interior directly opposite it (Malim 2000, 75). A comparable enclosure at Site 1 Plantation Quarry, Willington has been subject to open area excavation and was 25m by 27m (Dawson 1996, 6). This contained a central inhumation over which a single antler appeared to have been deliberately placed as a grave good. The skeleton was subject to radiocarbon dating the result of which was 3583-2908 cal BC at 95.4% probability (4530 ± 130 BP; OxA-4553) (ibid., 9 and 43). It has been suggested that the other square enclosures within the Willington complex could be Romano-Celtic temples/funerary enclosures (Malim 2000, 75 and fig 8.13). However, its similarity to the excavated Willington enclosure and the absence of Roman material from both the overlying ploughsoil when fieldwalked and their ditches when excavated during trial trenching, suggest otherwise.

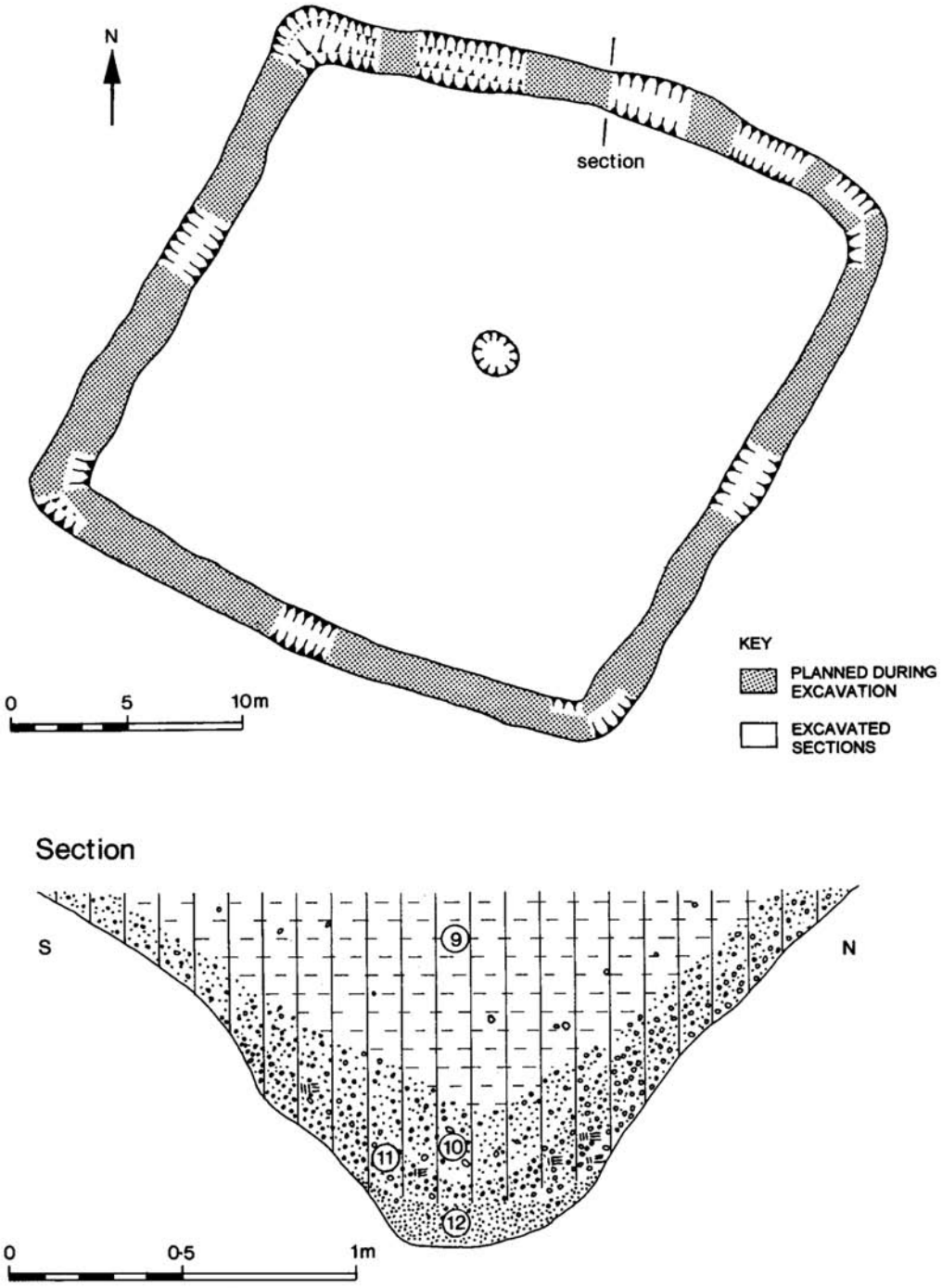

Fig. 3.8 Square barrow/enclosure at Plantation Quarry,Willington (Dawson 1996).

The status of the square enclosure located during evaluation at Octagon Farm, Cople, is uncertain but it clearly had a complex development history (BCAS 1995d, 18). Originally taking the form of a small (7m) square ditched enclosure with internal bank or mound, it was subsequently refurbished by a timber palisade. Although no direct dating evidence was recovered, the original ditch fill is truncated by pits containing Beaker pottery suggesting an earlier Neolithic date.

"Unusual" monument Bedfordshire contains an unusual monument known as the paperclip enclosure within the Cardington/Cople/Willington complex (Malim 2000, 78). If the form and date are correct (BCAS 1995b, 10-11, 178), it would appear to be a unique monument type in Britain. However, it has only been subject to geophysical survey and trial excavation so its status and development history is, at best, uncertain. Geophysical survey suggests that the gap

in the south-eastern side which gives this monument its paperclip appearance may actually be the result of a later land boundary (GSB 1991). However, the ditches on the south-eastern side of the enclosure do appear to be genuinely curving. The presence of small quantities of Iron Age pottery in one of the upper fills (BCAS 1995c, 63) might suggest that it does not belong to this period, although it is not uncommon for Neolithic monuments to survive in the landscape for a considerable period of time.

Ring ditches A small number of ring ditches in the county have produced evidence to suggest that they may have been constructed in the earlier Neolithic. For example, Site I at Barton Hill Farm, Streatley, produced earlier Neolithic decorated bowl ceramics and flintwork from its primary silts (Dyer 1962). Although it is certainly possible, and perhaps likely, too few ring ditches have been subject to open area excavation to establish how widespread this phenomenon might be.

Flat Burials Few burials conclusively of this period have been identified within the county. An exception is an inhumation at Harrold which was truncated by a later ring ditch and has a radiocarbon determination of 3325-2915 cal BC at 95% probability (Beta-139476) (Albion in prep.). Although undated the crouched inhumation sealed by forty large flints at Barton Hill Site II is another candidate (Dyer 1962, 8).

Other ritual Thomas lists four sites with evidence for what he terms "ritual structures" (1964, 25). Of these only the pits at Galley Hill (Thomas1964, 25) and Barton Hill Site II (Dyer 1962, 8) are reasonably convincing. However, neither is firmly dated, although Thomas suggests the pits at Galley Hill are associated with Windmill Hill pottery. Adjacent to the Barton Hill pits was the crouched inhumation mentioned above (ibid.).

At the Biddenham Loop a deep vertical sided pit is believed to belong to this period because it was truncated by a ring ditch and was situated 40m from an oval monument (Luke in prep). It was unusually deep (over 1.8m from present ground surface) when compared to the excavated ring ditches in the vicinity and, unlike other pits on the site, it had been dug through the gravel and into the underlying limestone. In addition, the vertical sides and presence of possible packing material, suggest the pit could have held a large 'totem' post. Its lower fill contained a small, but unusual animal bone assemblage, all from the left side of the body and included an aurochs horn. The substantial size and nature of the bones suggest they may have been deliberately selected for disposal in the shaft rather than casually dumped or naturally accumulated. The selective deposition of bones has also been noted elsewhere in Britain at causewayed enclosures and some occupation sites (e.g. Armour-Chelu 1991; Jones 1998; Maltby 1993, 315). A similar deep Neolithic pit at Barrow Hills, Radley, Oxon. was truncated by a later mortuary structure suggesting it too had a ritual function (Barclay and Halpin 1999, 28).

The status of the small group of pits at Broom is uncertain. They are clustered in an area approximately 30m by 30m in the vicinity of the later C-ditch monument (Mortimer 1999, 21-23). The pits are all small and relatively shallow. They contained early Neolithic pottery and worked flint, with charred seeds from one pit fill providing a calibrated date of 3682-3785 BC at 68.2% confidence (3640-3820 BC at 95.4%) (ibid. 19). The nature of the assemblages suggested to Mortimer that some represent the "intentional burial of chosen artefacts gathered from other contexts" (ibid. 21).

Conclusions

Given the extent of gravel quarrying, building programmes and road construction within the Great Ouse valley over the last forty years, it is perhaps surprising that the evidence for activity in this period is relatively rare and the information available generally poor. As is the case in most of Britain the evidence we do have is dominated by monuments rather than settlement evidence. In Malim's opinion (2000, 57) the archaeological response to development pressures has, until relatively recently, been generally piecemeal and poorly funded, leading to, at best, sporadic publication of results.

Despite several limited investigations of monuments with the county, for example within the Cardington/Cople/Willington complex, the nature and development history of actual monuments is poorly understood, with any discussion largely dependent on cropmark evidence. This is, in part, because many investigations have been undertaken as part of evaluations associated with proposed development, the design of which has been adjusted to preserve the monuments *in situ*. Investigation methods like fieldwalking, geophysical survey and trial excavation, all appropriate methods for evaluation purposes, do little to advance an understanding of the actual monuments. In addition, because evaluations are not intended to result in a detailed understanding of the monument, there is no requirement for radiocarbon dating or even publication of the results of the investigations. Even where Neolithic features are found within open area

excavation they are often unexpected and therefore do not form part of the original project design. This may inevitably mean that only partial investigation is possible, for example as was the case with one oval enclosures at the Biddenham Loop.

It is therefore not surprising that the evidence available for the Bedfordshire monuments is only of limited use when trying to understand the intricacies of their origins, function and development history. However, where open area excavation has taken place, for example at Broom, Biggleswade, Biddenham Loop and Willington, it is clear that the monuments were not constructed in a single episode, as is often assumed on the basis of non-intrusive survey. All four of the excavated monuments appear to have been modified and/or rebuilt on a number of occasions during their life. More accurate dating of the origins of monuments and their development history could be achieved through multiple single-entity radiocarbon dating. However, this is entirely dependent on the availability of appropriate material from reliable contexts. For example, no such material was available from the partially investigated oval enclosure at Biddenham Loop (Luke in prep) or the cursus ditch at Biggleswade Sewage Treatment Works (Abrams forthcoming).

Evaluation in advance of the Bedford Southern Bypass resulted in the scheduling of many of the monuments within the Cardington/Cople/Willington complex. Subsequent quarrying within the complex has left the scheduled monuments on "islands", while additional, smaller monuments and features have been discovered in their vicinity. Standard developer-funded investigations result in development-specific analysis and publication. However, what is needed is the holistic analysis and publication of the monument complex. As part of this, the re-examination of scheduled monuments would be highly desirable because these are poorly understood. This may then allow spatial, temporal and functional relationships between both individual monuments and the complex and its wider landscape setting to be elucidated (Simco 1995, 165).

It is interesting to note that there are no definitely identified Neolithic monuments upstream of Biddenham (Malim 2000, 57). If correct, this would have implications for the extent of human settlement and land exploitation within the Great Ouse valley. However, the majority of the gravel quarrying in this area was undertaken prior to 1980 with only minimal archaeological observation/investigation and therefore monuments may have been destroyed unrecorded. The report on salvage excavations undertaken in the 1950s at Harrold, upstream of Biddenham, alludes to this possibility with a reference to an undated "oval" ring ditch (Eagles and Evison 1970, 20). It is, therefore, possible that Neolithic monuments did exist. A re-examination of the records of all salvage investigations undertaken during quarrying operations upstream of Biddenham might shed more light on the extent of human occupation during this period.

The absence of settlement sites of this period may, in part, be because they are difficult to locate by trial trenching, the most frequently used evaluation technique. While fieldwalking can be extremely productive in locating lithic scatters of this period, the status/significance of such "sites" is the subject of much debate, partly because excavation invariably fails to locate contemporary, sub-surface features. If the evidence for occupation does in fact only survive within the ploughzone, then the type of intensive artefact collection proposed for Mesolithic sites would also be appropriate for this period (see above).

Later Neolithic/Early Bronze Age

The later Neolithic/early Bronze Age is used here as a convenient shorthand to bring together changes in pottery types, a greater range of artefacts including the use of metal, the demise of major communal monuments and increased emphasis on the individual in burial. The adoption of bronze metallurgy is no longer seen as driving social change because of the similarities in, for example subsistence practices before and after its adoption (Parker Pearson 1999, 77). As with many other parts of the country, the evidence for this period has been dominated by the study of barrows/ring ditches, although this bias is slowly being redressed.

As with the earlier Neolithic, evidence for this period in Bedfordshire has not been the subject of any recent coherent examination. Thomas (1964) produced a gazetteer of sites and antiquities in the county within which he discussed the late Neolithic and Bronze Age separately. More recently only Holgate (1995), Clark and Dawson (1995) and Malim (2000) have synthesised the evidence for more than a single site in Bedfordshire.

The records contained within the HER relate to findspots (including artefact scatters), cropmarks and earthworks. The occurrences of isolated finds (i.e. not *in situ*) are dominated by finds of Beaker pottery, along with axes (Kennett 1971a) and some metalwork.

Although many investigations of the round barrows on the chalk uplands are known to have been undertaken during the 19th and early 20th centuries, few have been

reported (see Dyer 1991, 25-26). At best, the results of these investigations were the subject of a brief note, e.g. Forde (1927). These early investigations, as elsewhere in the country, were often undertaken more with the intention of recovering artefacts than determining the nature of the monuments.

Quarrying, for chalk in the south and gravel in the north of the county, prior to the introduction of PPG16 in 1991, has produced considerable evidence for this period. Chalk quarrying in 1968 at Sewell, Houghton Regis resulted in the discovery by the Manshead Society of a "classic" Beaker burial (Matthews 1976, 19-24; Kinnes 1985, 11-14). It was the vigilance of the same society during both quarrying and digging of a pipe trench at Puddlehill, Dunstable that also lead to the discovery of at least 11 pits (Matthews 1976, 3-18). In the north of the county ring ditches were investigated during gravel quarrying in the Great Ouse valley at Harrold, Radwell, Cardington/Cople/Willington and Roxton. The quality of the excavations and subsequent publication has been extremely variable, largely dependent on available time and resources.

Since the introduction of PPG16, investigations have become more systematic with a variety of techniques employed during evaluation in advance of development. However, with the exception of Biddenham Loop (Luke in prep) and Broom (Mortimer 1997), few large-scale open area excavations have been undertaken on sites of this period. Evaluations still tend to be focused on the "obvious" elements of the landscape, i.e. ring ditches. It should be noted that even the most "obvious" ring ditch, visible as a cropmark and/or geophysical anomaly, may not be located by single, narrow trial trenches.

Occasionally "random" trial trenches have been fortunate enough to locate non-monument evidence for this period, e.g. a burial at Eastcotts, Bedford (BCAS 1993c, 13), Beaker pits at Octagon Farm (BCAS 1995d, 18-19) and Broom (pers. comm. Martin Oake). However, these discoveries are in the minority. Within the Biddenham Loop no pits of this period were identified during the trial excavation (Wessex Archaeology 1995, 19) despite their presence being confirmed by subsequent open area excavation (Luke in prep). Although it is certainly true that some pits were situated within 20m of ring ditches, the majority were found away from monuments in apparent isolation, making their location difficult to predict even if they could be found in trial trenches.

Watching briefs undertaken concurrently with development, usually quarrying, have successfully located evidence for this period that was not detected during evaluation. Most recently Beaker burials have been located and investigated within the Cardington/Cople/Willington monument complex (pers. comm. Jeremy Oetgen).

Fieldwalking often locates scatters of struck flint that are interpreted as "sites", e.g. Hudspith's work in the south of the county (1995). Using tool types and proportions of tools to waste, Bosimer has attempted to classify the flint assemblages within the Biddenham Loop in terms of the duration and type of activity that they represent (BCAS 1991, 26). Although such flint scatters are frequently trenched, it is rare for sub-surface features to be located. It is also very unusual, although not impossible, for pottery of this period to be found during fieldwalking, e.g. Beaker sherds from Barton Hill Farm (Hudspith 1994, fig 4).

Settlement

Settlement evidence for this period is not common, but is better represented in the archaeological record than for the earlier Neolithic. The majority of the evidence comprises small pits and flint scatters. In addition, the presence of a small number of buildings/structures has been suggested at Dunstable (Matthews 1976, 29), Waulud's Bank (Dyer 1964) and Totternhoe (Matthews 1976, 36-38). Despite extensive excavations within the Biddenham Loop, in advance of the Bedford Southern Bypass and at Broom, the present evidence for settlement density within the Great Ouse valley and its tributaries suggests it is considerably lower than for the Thames valley.

Pits Individual and clusters of pits have been found on the chalk uplands in the south of the county and on the gravels of the Great Ouse and Ivel to the north. Investigations at Puddlehill located eight pits: two clusters of three and four, *c.* 350m apart, along with an isolated pit *c.* 184m from the nearest cluster (Field et al. 1964; Kennett 1971, 84; Matthews 1976, 3-18; Horne 1996, 31). All the Puddlehill pits contained Grooved Ware pottery; many also produced struck flint and animal bone. The animal bone assemblage included wild species, e.g. wild cattle and red deer, along with domesticated species, e.g. cattle, pig and sheep/goat. A number of pits contained carbonized hazel nut shells also suggesting the continued importance of the exploitation of wild resources (Matthews 1976, 3-18).

The large scale open area excavations undertaken at the Biddenham Loop (Luke in prep) and Broom (Mortimer 1997, 1999 and Mortimer and McFadyen 1999), have only located slight evidence for settlement. At the former, despite the excavation of *c.* 19ha only 22 pits were located, all but four occurred in clusters.

The pits were small (average diameter 0.9m), shallow (average depth 0.3m), and bowl-shaped with steep sides and their function is uncertain. Thomas has ruled out a storage, hearth or quarry function for similar small pits (1991, 60). The majority of the pits contained pottery, struck flints, burnt stones and charred plant remains (predominantly hazel nut shells). Pottery types included Peterborough Ware (Ebbsfleet and Mortlake styles, but never both in the same pit cluster), collared urns and Beakers. The presence of contemporary potsherds in small numbers within nearby tree-throw holes could suggest the pits were related to "camps" established in recently cleared areas. It is noteworthy that where excavation took place adjacent to monuments, no such pits were present. This may suggest different types of activities took place with certain restricted areas within the landscape.

Possible buildings/structures The presence of possible buildings/structures has been suggested at three sites in Bedfordshire. Although these are briefly discussed the evidence is extremely tenuous.

The so-called "floor" at Dunstable had been truncated by ring ditch 7 (Matthews 1976). It comprised a rectangular area, approximately 1.8m by 2.7m, of apparently hard baked clay surrounded by an irregular double row of stakeholes. A second possible "hut" was located just north of Waulud's Bank and comprised a central pit with a kidney-shaped trench surrounded by an irregular circle of stakeholes (Dyer 1964, 6 and fig 3). The published figure suggests that the pit and trench elements of the "hut" could be re-interpreted as a tree throw bowl.

At Totternhoe, Matthews suggested that he had located an "occupation site" comprising a hut circle, scatter of postholes (some apparently forming two-post structures) and small pits (Matthews 1976, 36-38). The so-called hut comprised a circle of eight postholes enclosing a circular area 7m in diameter with a small pit in the northern half. Nearby was a so-called "fire pit" which had burnt sides. The hut, two-posters and pits appear to be located in discrete areas suggesting some degree of planning. However, the settlement has the appearance of an early Iron Age unenclosed settlement and it is only the presence of a small number of collared urn sherds which suggested a Bronze Age date to the excavator.

Flint scatters The majority of flint scatter 'sites' of this period occur on ridges capped with Clay-with-flints in the south of the county and on the river terrace above the Great Ouse to the north. Fieldwalking over the Cardington/Cople/Willington monument complex (see below) produced a relatively large assemblage of Neolithic and Bronze Age flint, including leaf-shaped arrowheads and thumbnail scrapers (Clark and Dawson 1995, 60). However, the density of the lithic material decreased in the areas of the monuments suggesting that whatever activity the scatters represented, it was not funerary/ritual in nature (ibid.).

The number of flint scatters of this period identified within the Biddenham Loop during fieldwalking in 1991 is double that of the late Mesolithic/early Neolithic. Area configuration estimates suggest these represent longer occupation by larger social groups (Luke in prep). It also demonstrated that the flint scatters were spatially mutually exclusive from the monuments, as had been previously observed by earlier fieldwalking at Biddenham and Roxton (Woodward 1978, 48-50). In apparent contrast to this, it is interesting to note that fieldwalking around Barton Hill Farm located an increase in flint quantities in the vicinity of the ring ditches (Hudspith 1994, fig 4). The extensive distribution of the flint scatters within the Biddenham Loop would appear to suggest that extensive woodland clearance had been undertaken by this time, and it is interesting to note that the five scatters interpreted as long/permanent are all situated within the interior of the Loop.

At Broom, in addition to large-scale fieldwalking, systematic bucket sampling from ploughsoil and subsoil has produced relatively small quantities of struck flint. Based on the results it has been suggested that settlement was located above a slight valley (Mortimer and McFadyen 1999, 5).

In the south of the county, extensive fieldwalking reported by Hudspith has identified numerous late Neolithic/early Bronze Age flint scatters in the parishes of Caddington (1991a), Houghton Regis (1991b), Luton (1991c), Chalgrave, Sundon (1992) and Edlesborough (1994). Several of these correspond with Mesolithic scatters, e.g. Chalgrave Manor Farm (Hudspith 1992, 11). Based on the quantities of flint, the scatters appear to show a preference for upland, Clay-with-flints covered locations. It is rare for contemporary pottery to be recovered during fieldwalking, exceptions being near Chalton, Houghton Regis (Hudspith 1991b, 45) and Barton Hill Farm (Hudspith 1994, fig 4).

A number of later Neolithic flint scatters also contain flint implements commonly found in Beaker contexts, e.g. barbed and tanged arrowheads, invasively-retouched scrapers and pressure-flaked knives, suggesting continuing occupation into the earlier

Bronze Age.
The lack of evidence for any activity during this period on the heavy clay uplands either side of the Great Ouse valley, might suggest that these areas were little used during the Neolithic and Bronze Ages (Malim 2000, 82). This may in part be because, once cleared of trees, the heavy clays would have been difficult to cultivate, and that the limited number of water sources was a problem. However, the lack of evidence may simply be a reflection of the limited extent of archaeological fieldwork undertaken in these areas.

Ceremonial and funerary monuments

Within Bedfordshire, as in the rest of the country, round barrows and ring ditches are the most common late Neolithic/early Bronze Age monuments. In addition, a small number of henges or hengiform monuments have been proposed. The majority of monuments occur, not individually, but in groups, often referred to as monument complexes.

Monument complexes The evidence for monument complexes within the Great Ouse valley has recently been published by Malim (2000). Each complex comprised a concentration of ring ditches which were usually situated in the vicinity of earlier Neolithic monuments, for example oval enclosures at Biddenham Loop and Sandy, cursus monuments at Cardington/Cople/Willington and Biggleswade etc. In the case of the latter two examples, ring ditches are situated adjacent to the earlier monument. However, not all the monuments are contemporary. For example, it is clear from trial excavation within the Cardington/Cople/Willington complex that at least one of the ring ditches truncated a rectangular mortuary enclosures (Clark and Dawson 1995, 60). A similar sequence can be suggested for the ring ditch visible on aerial photographs at the eastern end of the cursus in the same complex. Malim only described complexes downstream of Biddenham probably because there were no obvious early Neolithic monuments upstream (2000, 75). However, Harrold/Odell and Felmersham/Radwell, both upstream of Biddenham, contain large number of ring ditches and should perhaps be classed as monument complexes (see Table 3.2).
Within the complexes, clustering or alignments of monuments have been observed. At Cardington/Cople/Willington, Malim has suggested that some ring ditches were aligned on the entrances to earlier Neolithic monuments (2000, 75 and fig 8.13). Each of the three discrete clusters of ring ditches, *c.* 400m apart, at the Biddenham Loop appear to be focussed around an earlier Neolithic oval monument. At the least, this suggests that the earlier monuments were still visible, and may have continued to have significance within the ceremonial/ritual life of the complexes.

A similar pattern along the Ivel valley is suggested by the identification of at least eight ring ditches at New Road, Sandy (BCAS 1993d), four ring ditches near Biggleswade Sewage Treatment Works (Albion 2004; Abrams forthcoming) and at least two at Broom (Mortimer and McFadyen 1999, 1-2). Based on present evidence such complexes appear to occur every 5-6km along the Great Ouse (Malim 2000, 57) and probably at a similar distance along the Ivel.

Directly comparable monument complexes to those in the Great Ouse valley are not found in the south of the county. However, barrows/ring ditches occur in clusters/concentrations of four around Totternhoe (Matthews 1976, 25-36); seven at Five Knolls, Dunstable (Dyer 1991); four on Galley Hill, Streatley (Dyer 1974); two at Barton Cutting (Clark 1991b) and two near Barton Hill Farm (Dyer 1962). Horne, based on the distribution of round barrows, springs and tentative presence of a cursus, has suggested that the Totternhoe/Dunstable area was a "sacred landscape" (2001).

Various authors have suggested that there is a link between the distribution of ring ditches (Green 1973, 129-136) or monument complexes (Malim 2000) and 'tribal' territories or settlement patterns. The distribution, at least along the river valleys, would suggest human groups may have operated within an area between 5-10 km in diameter. With regard to the Oxford region, Case has argued that groups of ring ditches were located on the gravels adjacent to

Harrold/Odell	13 single, 1 double	Eagles and Evison 1970; Dix 1980; Albion in prep.
Felmersham/Radwell	6 single, 1 double	Hall 1973; Hall and Woodward 1977; Pinder 1986b
Biddenham Loop	16 single, 4 double	Luke in prep
Cardington/Cople/Willington	19 single, 3 double, 1 triple	Field 1973; Pinder 1986a; Dawson 1996
Roxton	5 single	Taylor and Woodward 1985

Table 3.2 Types of ring ditches within the "monument complexes" of the Great Ouse valley

Fig. 3.9 Ring ditch under excavation in 1996 on the Biddenham Loop (Luke in prep.).

tracts of seasonal grazing (1963, 51), a situation that would be comparable with the Great Ouse and Ivel in Bedfordshire. The density of ring ditches appears to be reduced upstream of Biddenham (Field 1973, 60) and assuming the number of ring ditches does reflect the population size, this could suggest Biddenham was at the limit of the more densely settled part of the Great Ouse valley. However, a degree of caution needs to be attached to our knowledge of the distribution of ring ditches along the river valleys because the majority were identified as cropmarks and visibility is very much dependent on suitable conditions. For example ring ditches sealed below alluvial deposits, such as those located by geophysical survey and trial excavation at the Cutler Hammer Sportsfield, Kempston immediately south of the Biddenham Loop (BCAS 1999b) would not, and did not, show up as cropmarks.

Round barrows and ring ditches For the purpose of this article it is presumed that ring ditches are ploughed out barrows and that, even in the exceptional cases where this is not the case, they are part of the same funerary/ritual activity. The precise number of round barrows/ ring ditches in Bedfordshire is not known. In 1973 Field estimated that there were 95 ring ditches in the Bedfordshire part of the upper and middle Great Ouse valley (Field 1973, 66-69). However, it is now estimated that 130 are known on the gravel of the Ouse or Ivel and 25 on the chalk uplands in the south of the county, but only a handful occur away from these areas (pers. comm. Stephen Coleman). The latter include one near Houghton Conquest (which survives as an earthwork) and one near Lidlington (visible as a cropmark) both on the Greensand Ridge, along with three at Salford on glacial gravels (Albion in prep). It is interesting to note that none to date have been found on the clays to the north and south of Bedford.

Number of ditches The majority of the 190 ring ditches identified within the entire Great Ouse valley by Field were single ring ditches (1973, gazetteer A). Less than ten were double and nearly all of these occurred within monument complexes, e.g. at Harrold, Radwell, Biddenham Loop and Cardington/Cople/Willington (Table 3.2). The double ring ditches at Willington (Pinder 1986a) and Radwell (Hall and Woodward 1977; Pinder 1986b), were considered to be a result of enlargement and modifications (Woodward 1986, 7), rather than representing single phase monuments. It is interesting to note that the double ring ditches at Harrold, Biddenham Loop and Cardington/ Cople/Willington are all situated on the periphery of the monument complex. Of the 10 triple ring

ditches recorded by Field in the Great Ouse valley, only those at Goldington Site 2 (Mustoe 1988) and Cardington (BCAS 1995a, 13) have been the subject of any excavation. In both cases the ditches were not contemporary and represent part of the monuments' development history.

The ditch Field observed that ring ditches within the Great Ouse valley were usually between 18m and 26m in diameter (1973, 60). The average diameter of the twenty ring ditches at Biddenham Loop was c. 20m with the ditches often 1.5m deep and 1m wide. Small ring ditches with a diameter of only c. 10m have been identified, e.g. Harrold pit, Odell (Dix 1980, 15); Barton Cutting 2 (Clark 1991b) and Bunyan Centre, Bedford (Steadman 1999). It is interesting to note that all of these were incorporated into later larger ring ditches and it has been argued that the small ring ditch at the Bunyan Centre, Bedford, might represent an oval barrow of middle Neolithic date (ibid. 15).

The presence of causeways across the ditches are rare, but can only really be determined by open area excavation. Ring ditches with causeways have been identified at Willington (Pinder 1986a), Harrold (Eagles and Evison 1970), Barton cutting ring ditch 1 (Clark 1991b) and Goldington Site 2 (Mustoe 1988). The presence of causeways has been used by some to class some ring ditches as henges (see below).

Mound/banks Due to intensive ploughing, evidence for the original form of any mound/banks associated with ring ditches is usually ambiguous. The possible variations in the form of central mounds is illustrated by the seven barrows at Five Knolls, Dunstable which comprised three bell-barrows, two bowl-barrows and two possible pond-barrows (Dyer 1991, 26).

It is rare, but not impossible, for the base of mounds to survive below the ploughsoil, as was the case with Monument I at Broom (Mortimer 1997, 15) and ring ditch 1480.14 at Cardington (BCAS 1995a, 13). At Broom the mound survived up to 0.3m high over the eastern half of the monument probably because it was protected by a headland. The former presence of a mound/banks is often proposed on the basis of the nature and position of a ditch's fills, e.g. Roxton ring ditches D and E (Taylor and Woodward 1985, 90) and Bunyan Centre, Bedford (Steadman 1999, 15). However, this is not the only form of evidence, for example at Roxton on the basis of manganese staining of the natural within the interior of the ring ditches the actual position of the mound was proposed and conventional barrow type assigned (ibid. table 1). In addition, the presence of an internal bank and small central mound within one of the ring ditches at the Biddenham Loop was indicated by the effect they had on later features and also by stone densities within the ploughsoil (Luke in prep).

Burials Inhumation and cremation burials have been found in various locations associated with ring ditches. The occurrence of central burials of both burial types appears to be in the minority. For example, at Roxton only two of the five excavated ring ditches produced central burials, all of cremated bone (Taylor and Woodward 1985, 102-106 and Table 2). Of the three ring ditches excavated on the Barton Hills only one contained a central pit with a cremation burial (Clark 1991b). Central inhumation burials are known within the small ring ditch at the Bunyan Centre, Bedford, comprising a loosely crouched skeleton (Steadman 1999, 5); at Broom Monument 1 comprising a supine skeleton (Mortimer 1997, 21) and at Harrold comprising another crouched skeleton (Albion in prep.).

Off-centre burials within the interior of the ring ditch are quite common. Two adjacent inhumations, one crouched and one partially flexed, were found *c.* 1m from the ditch at Barton Hill Farm Site 1 (Dyer 1962, 5-6). Cremation burials were found in a similar location at Goldington Site 2 (Mustoe 1988, 5). It is quite common for shallow pits within the interior of ring ditches to contain small quantities of cremated bone. These are often presumed to represent the truncated remains of a grave dug into a central mound. Such features have been identified at ring ditches 3 and 4 near Dunstable (Matthews 1976, 26-29), Broom Monument I (Mortimer 1997, 21), Biddenham Loop (Luke in prep.).

Less common are burials placed within the ditches, e.g. a crouched inhumation dug into the primary fills of ring ditch 13 at Harrold (Eagles and Evison 1970, 20) and three crouched inhumations inserted into the top fill of the inner ditch at Goldington Site 2 (Mustoe 1988, 5). Two of the latter were placed in cists constructed from saddle querns and rubbing stones. A cremation burial placed in a small pit dug into the upper fill of one of the ring ditches at Site 2 Plantation Quarry, Willington was dated to 1884-1601 cal BC at 95% confidence (Beta-87190) (Dawson 1996, 1244). Far more rare are burials located outside the ditch for example the flexed inhumation to the west of ring ditch C at Roxton (Taylor and Woodward 1985, 102).

Cremated bone is sometimes, but not always, placed in an urn, for example a biconical urn at the Barton Hills (Clark 1991b) and a collared urn at Roxton ring ditch B (Taylor and Woodward 1985, table 2).

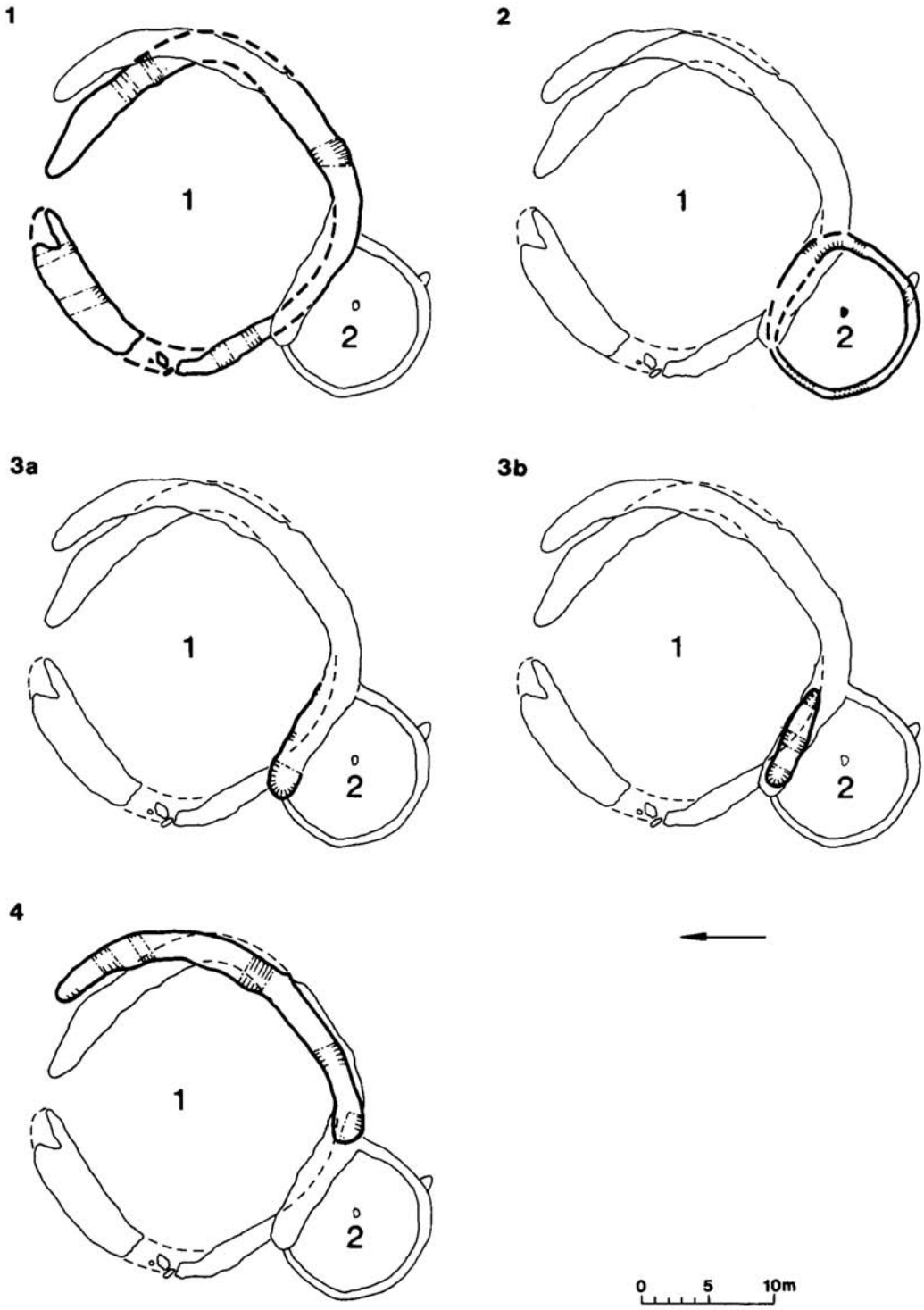

Fig. 3.10 Sequence of ring ditches at Barton Cutting (Clark 1991).

Grave goods are relatively rare, although pottery vessels and objects of bone, bronze and flint are all known. The graves within Roxton ring ditches B and C contained an accessory vessel, bone cylinder bead, bone toggles and a bronze awl (Taylor and Woodward 1985, table 2). Grave goods at Radwell ring ditch I comprised a jet and amber necklace and bronze awl (Hall and Woodward 1977, 3-4). Animal bone is often suggested as representing grave goods e.g. a rib bone of ox at Barton Hill Farm Site 1 (Dyer 1962, 6), but this is always difficult to confirm.

Ring ditches with no evidence for burials are also quite common, e.g. at Site 3 Plantation Quarry, Willington

(Dawson 1996, fig 5 and 7), but it is uncertain if this is purely the result of truncation.

The interior In addition to "obvious" central burials, the interiors of some ring ditches also contain a variety of small pits and postholes. For example, seventeen pits were located within Monument I at Broom (Mortimer 1997, 21-22) and four pits within ring ditch L200 at the Biddenham Loop (Luke in prep). Although some of these contained small quantities of cremated human bone, more common was burnt material including hazel nut shells and animal bone, along with sherds of Peterborough Ware and Beaker pottery. These cannot be interpreted with any degree of certainty as cremation burials and assuming that they are contemporary with the ring ditches a feasting/ritual origin may be suspected. No interpretation was given for the four postholes at Site 2 Plantation Quarry, Willington, but it is clear from their nature and absence of similar debris that they served an entirely different function (Dawson 1996, 12). The majority of ring ditches appear to contain no internal features (Hall 1972, 69), although this may be a question of survival.

Radiocarbon determination In comparison to the number of investigations, very few radiocarbon determinations have been undertaken associated with ring ditches/barrows in Bedfordshire. Roxton is an exception with nine radiocarbon determinations derived from charcoal recovered from graves and ring ditches. However these range from 5750 bc ± 170 (HAR- 998) to 1180 bc ± 60 (HAR- 1001) and therefore some caution was assigned to their reliability by the excavators (Taylor and Woodward 1985, 140-2). ApSimon considered that the dates determined on charcoal associated with burials (HAR-997, 999, 1000 and 1002) are statistically indistinguishable with a mean value of 2270-1850 BC at 68% probability (1985, 120). However, he considered them too early, given the presence of collared urns, and argued that they should be viewed as a terminus post quem (ibid.). He also considered that the two other dates (HAR- 1001 and 1003) for the collared urn burials with a mean value of 1590-1430 BC at 68% probability represent a terminus post quem (ibid.). It is interesting that a radiocarbon determination on human bone from the central burial of a ring ditch at Harrold of 1935-1735 BC at 95% probability (Beta-139477) falls within this range (Albion in prep.). It is clear that careful consideration should be given to whether ring ditches have produced suitable material from appropriate and secure deposits before radiocarbon dating should be considered. Where these criteria are not met, as was the case with the excavated ring ditches at the Biddenham Loop (BCAS 1998), any radiocarbon determinations obtained will provide unreliable and potentially misleading dates.

Henges and hengiform monuments Henges have been defined as circular or near-circular ditched enclosures with at least one causeway, an external bank and evidence for internal activity (Atkinson 1951; Clare 1986, 1987). They are often considered to be the focus of ceremonial activities and therefore distinct from ring ditches which are considered to be primarily concerned with burial. However, there is an inevitable blurring, or overlap, between the two functions because ceremonial activities are also likely to have taken place at ring ditches on the anniversaries of death and/or at the time of new interments. In addition, the features that distinguish the two types of monuments, as defined above, are often difficult to detect on sites that only survive as plough damaged, sub-surface features: the vast majority in Bedfordshire. Clare who undertook a major reappraisal of henge monuments (1986; 1987) stated that "we are not dealing with a clear-cut monument type but a permutation of practices and features" (1986, 282). He stressed that definitions based purely on, for example, the presence or absence of a causeway across the ditch, internal features etc. are ill conceived. For example in Bedfordshire the presence of a single causeway is not unknown in monuments which (because they are associated with burials) are often classified as ring ditches, e.g. Willington Area 1 (Pinder 1986a). In fact, in some areas, e.g. the Chilterns, the presence of causeways appears to be fairly common within ring ditches/barrows, (Dyer 1962, 7). Clare concluded that "there is no clear distinction between some sites previously called henges and some sites belonging to other types of monument such as ring ditches" (1987, 457).

In 1987 only five sites in the county were included in Harding's catalogue of henge monuments (1987, 70-74). At the time of the MPP survey in 1995 the number had grown to 21 with the increase attributable to a greater number being identified on the basis of cropmark evidence, for example near Chicksands and Potton (pers. comm. Stephen Coleman). However, many of these identifications should be treated with caution because their interpretation is largely based on cropmark evidence and therefore dependant on the presence or absence of causeways and/or internal features. For example, the assumption that a causeway and internal features are contemporary with the monument based on cropmark evidence alone is unreliable. Therefore, the following discussion is restricted to excavated sites, which have been interpreted as henge or hengiform monuments.

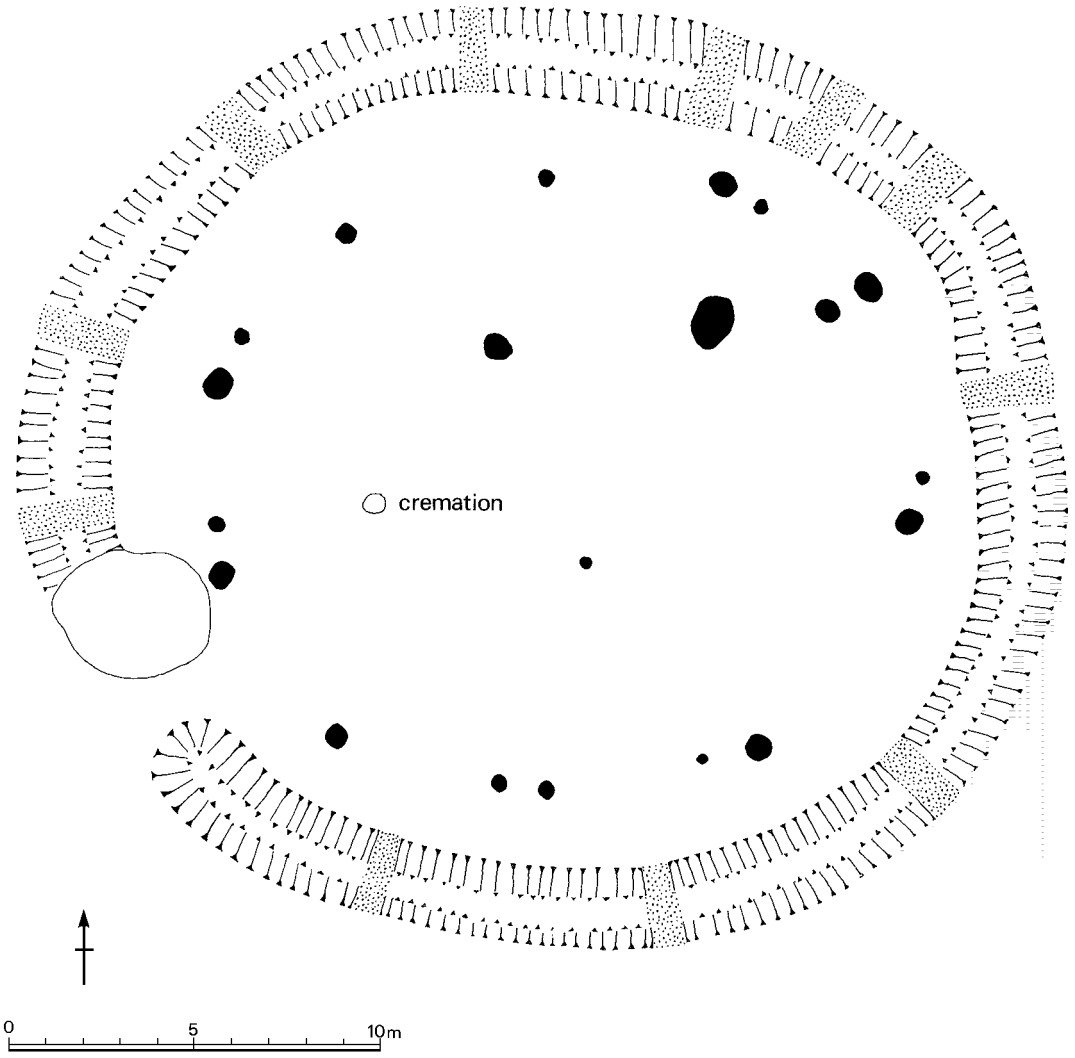

Fig. 3.11 Henge monument at Goldington, Bedford (Mustoe 1988).

The excavator of two monuments at Barton Hill Farm considered that for Site I "the symmetrical ditch with single entrance is reminiscent of Class 1 henge monuments" (Dyer 1962, 3) and that for Site III "we are dealing with a religious monument and not a barrow" (ibid., 13). Site I is perhaps slightly more convincing as a henge monument. It comprised a ditch *c.* 23m in diameter with a single narrow causeway to the north-west, two inhumations and evidence for "sleeper trenches". However, Harding has suggested that the shallow depth of the ditch and its narrow causeway are more characteristic of a causewayed ring ditch (1987, 70). Clare (1986) discusses various aspects of henge monuments, some of which occur at Barton Hill Farm monuments, including the occurrence of a "flint pavement" within the ditch (op. cit. 299), keeping the interior white (op. cit. 300), burial structures (op. cit. 300) and the origination of some monuments as a funerary enclosure/ring ditch (op. cit. 310).

A recently excavated enclosure which has been classified by the excavator as a hengiform monument was that at the Bunyan Centre, Bedford (Steadman 1999). It originally comprised a ditch *c.* 25m in diameter, with a single causeway *c.* 8m wide to the west, possibly associated with an alignment of posts leading to the entrance (ibid. fig. 6). The ditch may have been "associated with an external bank based on the limited evidence from the eastern side of the circuit" (ibid., 15). Within the interior of the enclosure was a polygonal gulley which may have supported a wooden revetment for an internal mound, and which enclosed a central inhumation burial. The ditch was redug on at least two occasions, distinguished by Steadman as phases two and three (ibid. fig. 8 and 9).

A far more convincing henge-type monument, which unfortunately has only been subject to a preliminary report, was situated in the vicinity of a triple ring ditch at Goldington, Bedford (Mustoe 1988). The

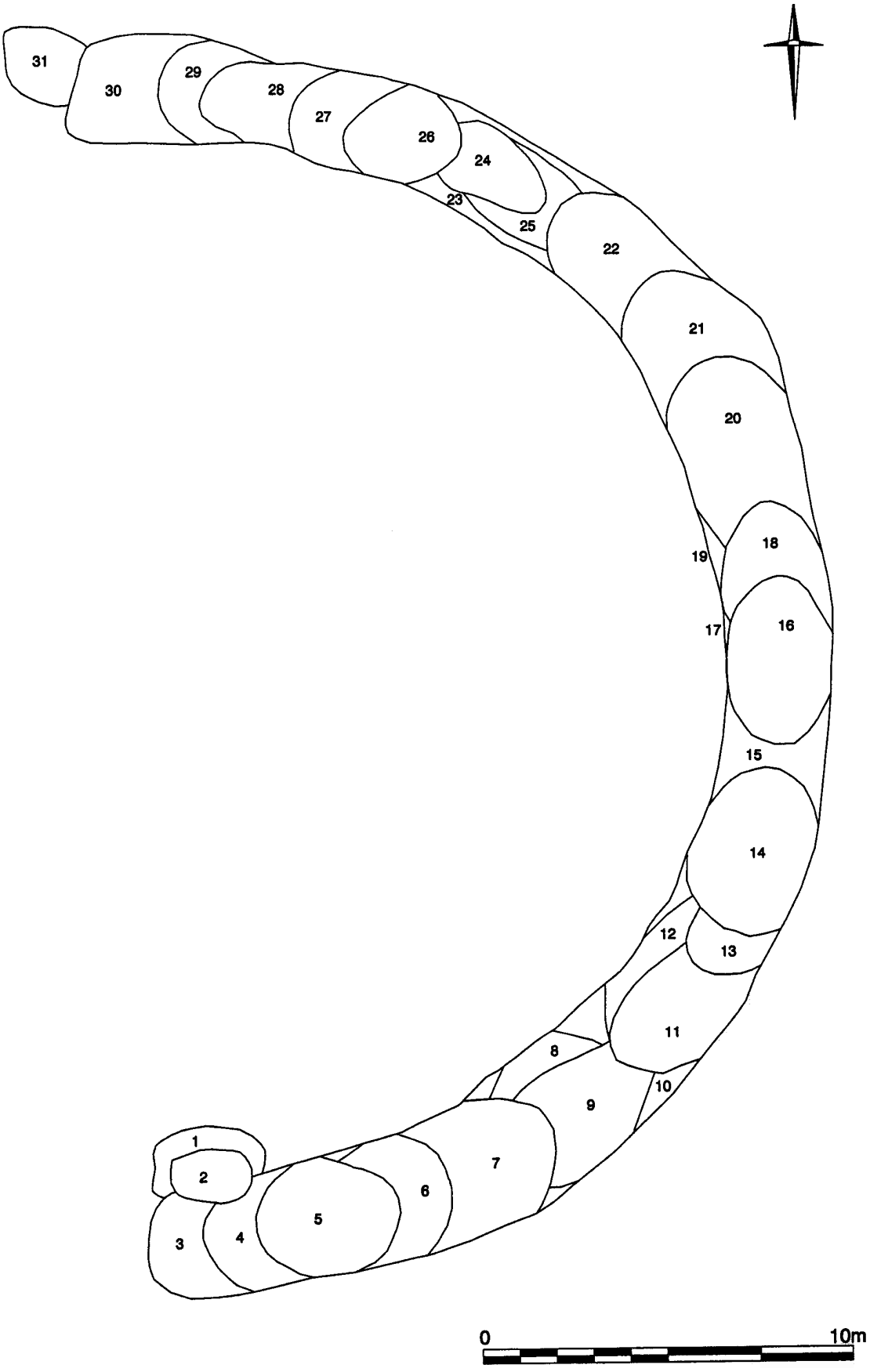

Fig. 3.12 C-ditch monument at Broom (Mortimer 1999).

enclosure comprised a ditch *c*. 25m in diameter with a single causeway, at least 4m wide, to the south-west. The excavator clearly considered the possibility of an external bank, but could not find any evidence for one and suggested an internal one was more likely (Mustoe 1988, 1). It appears that the bank was repeatedly pushed into the ditch and then dug out again (ibid.). The interior of the enclosure contained a ring of ten postholes, seven of which were associated with another posthole (ibid.; Clark and Dawson 1995, 58). Given that the postholes are between *c*. 1m and 2.5m from the inner edge of the ditch it seems unlikely that they would be contemporary with an inner bank, if one had been present. The arrangement of the postholes gives the impression that they are contemporary with the ditch, however those to the east are much closer to the ditch than those to the west. This could suggest that the post ring was actually earlier than the ditch. With regard to the pairs of posts, it is only possible to speculate whether they are contemporary with each other or if one represents a replacement post. However, in terms of the published plan it is interesting to note that one of the postholes in the pair is usually larger than the other, and that with the exception of the pair directly opposite the entrance, both postholes continue the circular pattern (Mustoe 1988, Fig. 2). It is clear that the monument continued to develop over time. Unfortunately, the currently available dating evidence is extremely limited; the primary silts of the ditch, for example, produced small quantities of Mildenhall pottery.

Waulud's Bank, Luton, is often cited as a henge monument (see Megaw and Simpson 1979, 152; Dyer 1981, 52-3), but Burl in his book on henges refers to it as one of the "great earthwork enclosures" like Durrington Walls and Avebury, both in Wiltshire (1991, 42). It is a monument on a completely different scale to the henges described above. Today it comprises a D-shaped enclosure *c*. 170m in diameter, which still survives in places as an earthwork comprising a 6m wide ditch and 2.5m high bank (Dyer 1981, 52). Excavation of the earthwork on the north side indicated that the ditch was 12m wide and 2m deep (Dyer 1964, Fig 2). Its western side has never been located and is often presumed to be represented or coincide with the present course of the River Lea. Although the present course of the river does appear to be an integral part of the monument, the validity and significance of this is uncertain. Its interpretation as a henge is problematic because of its size, the absence of entrances and the presence of an internal bank. Harding has argued that this makes a domestic or defensive function more likely (1987, 74), and Horne has even suggested it may be a causewayed enclosure (1996, 31-32). It is undoubtedly unusual in having the bank inside the ditch with only Stonehenge sharing a comparable arrangement. The limited excavations carried out within the ditch in 1953 produced Neolithic pottery, but also small quantities of Roman material (Dyer 1964, 4).

Unusual monument The C-ditch monument at Broom comprised an arrangement of 31 individual pits that had been recut on several occasions and finally replaced by a more continuous ditch (Mortimer 1999, 41-43). The absence of postpipes or obvious packing material within the pits tends to suggest that they were associated with a mound or bank rather than an arc of timber uprights. Human bone was found. Although pottery and worked flint were recovered, the dating of the monument has proved problematic; radiocarbon dating was inconclusive. Early Neolithic, late Neolithic and early Bronze Age material was recovered. At face value, this might suggest that the monument was extremely long lived. However, some of the late Neolithic pottery was found in the primary fills and the stratigraphic evidence suggests that recutting was very precise and quite rapid. Therefore, while accepting that some monuments can be quite long-lived, it is now believed that the C-ditch monument at Broom had its origins in the later Neolithic (Edmonds pers comm.).

No exact parallels are known in Bedfordshire or nationally. However, there are similarities to the complex sequences of development observed at some ring ditches. For example one of the early phases of the ring ditch at Butcher's Hill, Cambs. comprised a semi-circular ditch associated with an inhumation (Evans and Knight 2000, 99 and fig. 9.7).

Flat graves Burials not associated with barrows or ring ditches are relatively rare in the county. Perhaps the best known was found during chalk quarrying in 1968 at Sewell, Houghton Regis (Matthews 1976, 19-24). Here an area of 15m square was investigated around a grave but no traces of a mound or ring ditch were located (ibid.; Kinnes 1985, 11). The primary burial comprised a crouched adult male inhumation with a Beaker, bone toggle, stone bracer and copper pin. The grave was truncated by a second crouched adult male inhumation which contained no grave goods, but did apparently contain some cremated bone fragments. Another isolated crouched inhumation was found at Eastcotts, Bedford, on this occasion associated with a deposit of worked flint (BCAS 1993c, 13) which included a leaf shaped arrowhead, all believed to of late Neolithic date (pers. comm. Robin Holgate).

Non-monumental cremation burials are also known. For example four graves were located at the Biddenham Loop all away from the ring ditch clusters. They were associated with collared urns (sometimes

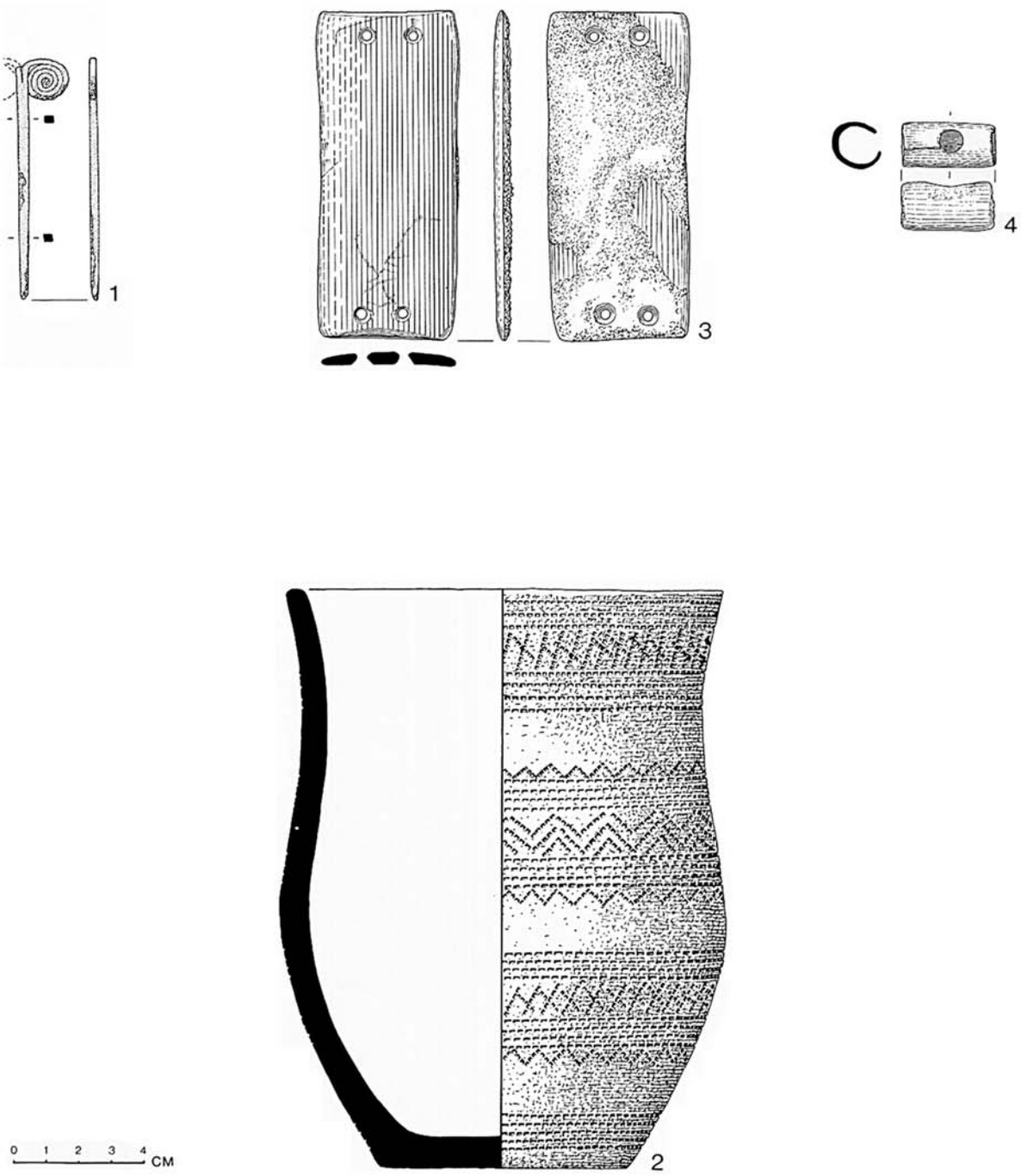

Fig. 3.13 Beaker, bone toggle, stone bracer and copper pin from a flat grave at Sewell, Houghton Regis (Kinnes 1985).

fragmentary) and one of the graves contained a copper alloy awl and plano-convex flint knife (Luke in prep).

Grave markers? The only known cupmarked stone from the county derived from an early Iron Age pit at the Biddenham Loop (Luke in prep). However, the location of the pit in the vicinity of a Bronze Age ring ditch and flat grave suggests the stone is more likely to be associated with the earlier funerary activity. Such stones are often found associated with burial monuments (Hughes 2000, 76) and numerous examples were recovered from capping levels of the monument at Loftus, Cleveland (Vyner 1988, 193). The nearest geographical examples are from Leicestershire, e.g. Lockington (Hughes 2000, 76).

Other ritual A small number of excavated sites have demonstrated the existence of pits, located away from monuments, with unusual and structured deposits.

It has been suggested that the deliberate disposal of rubbish, including pottery and flint, demonstrates the close links between daily life, ritual and ceremony during this period (Cleal 1984; Healy 1988, 108).

At the Biddenham Loop two shallow pits, both located within 40m of ring ditches, were exceptional in terms of their artefact and ecofact assemblages (Luke in prep). They both contained fine Beakers more often associated with high status sites or burials. One of the pits contained two Beakers, one of which appeared to have been deliberately smashed and the other intact. Woodward, in relation to the discovery of incomplete Beakers associated with the Lockington metalwork hoard, has suggested they may have been family heirlooms or ancestral property, and that any missing pieces may have been shared amongst relatives, possibly for reuse as tempering within new vessels (2000, 58-60). In addition to two Beakers, one pit at the Biddenham Loop contained an exceptionally large number of wild animal species including red and roe deer, three species of fish, along with birds and amphibians. The other inclusions comprised 258 struck flints (dominated by product waste), domestic animal bones (dominated by pig but including cattle) and charred plant remains (including hazel nut shell and occasional cereal grains). It is possible that the material placed in these pits derived from some important ceremonial activity, perhaps feasting associated with an anniversary or some other commemoration/festival.

At Octagon Farm, Cople a small group of shallow pits was located adjacent to a square enclosure. They appeared to have been dug and backfilled rapidly. They contained worked flint and Beaker pottery in very good condition (BCAS 1995d, 18-19).

Conclusions

As with the earlier Neolithic, the evidence for this period is still dominated by monuments, but since the introduction of PPG16 there is an increasing body of non-monumental evidence. Excluding the three tenuous buildings/structures from the south of the county, this principally comprises small pits and flint scatters. The original function of the pits is unclear, as is the "significance" of the "rubbish" deposits within them (see Thomas 1991, 60). Taken at face value, the ecofacts within some of the pits at Biddenham Loop and Puddlehill suggest that mixed cultivation was taking place alongside the continued exploitation of wild resources. The absence of obvious "domestic" settlements, storage facilities and field/enclosure systems has suggested to some that the earlier transient lifestyle continued and was not necessary replaced by one based around settled agriculture (Bradley 1986, 39; Entwistle and Grant 1989, 208). However, caution should be attached to the data-sets currently available from Bedfordshire, because of their small size.

It is commonplace for non-monumental evidence to be located "by accident" during large-scale excavation, which is targeting other periods e.g. the Biddenham Loop and Broom. As with the early Neolithic, this evidence is fragile and dispersed making detection during evaluations associated with developments very difficult. Intensive and systematic trial trenching in areas of high potential, rather than "blanket" aerial photograph analysis and geophysical survey, may be the only way to detect such evidence prior to development. However, the most productive means of locating dispersed archaeological features characteristic of non-monument activity of this period would be to undertake extensive earthmoving under the observation of an archaeologist. This would need to be done well in advance of construction work to allow sufficient time for hand excavation and recording.

The distribution of monument complexes and ring ditches has been used to postulate territories (Malim 2000) and the extent of land exploitation (Field 1973). Although the distribution looks impressive, it should be remembered that we are looking at a very incomplete and biased picture for a variety of reasons. For example it is noticeable that the monument complexes of Biddenham Loop and Cardington/Cople/Willington are separated from each other by the county town of Bedford, the presence of which has restricted archaeological investigations. Where investigations have been undertaken in and around Bedford, for example at Goldington to the east (Mustoe 1988), Bunyan Centre to the south-east (Steadman 1999); Elstow-Harrowden to the south (BCAS 1997) and Elstow to the south-west (BCAS 1995c, 13), additional ring ditches have been detected. These demonstrate that ring ditches do occur away from monument complexes where they appear to exhibit a more dispersed distribution. In addition, the potential for additional monuments to be situated undetected beneath alluvial deposits has been demonstrated at the Cutler Hammer Sportsfield, Kempston (BCAS 1999b).

Ring ditches and barrows appear to be largely restricted to the gravels of the Great Ouse valley and chalk uplands of south Bedfordshire. When the distribution of monuments and flint scatters within the Biddenham Loop is compared to the early Neolithic, it appears that activity was more extensive and no longer restricted to the edge of the floodplain. In addition, within the Biddenham Loop the monuments (ring ditches) and 'settlements' (identified by flint scatters) were mutually exclusive (Woodward 1978, 48-50;

Albion in prep). A similar situation is suggested on the basis of the small quantities of flint recovered by fieldwalking within the Cardington/Cople/Willington monument complex (Clark and Dawson 1995, 60). Based on the current evidence, it would appear that the heavy clays away from the river valleys and chalk uplands were not settled. However, a comparable situation was considered to be the case only ten years ago for the Iron Age and Roman period, which is now known to be incorrect.

Monuments are often considered to be of a single phase and function. However, it is clear from those which have been subject to open area excavation that they have complex constructional histories and functions. A number were redefined as suggested by the redigging of all or part of their ditches, or were even "rebuilt" by having completely new ditches dug. It is possible that the original purpose of ring ditches was indeed burial, but that this may have changed over time, becoming more complex and resulting in their increasing use for ritual/ceremonial activities. This continuous or intermittent use of monuments goes some way to explain the current confusion and overlap in the classification of ring ditches and henge monuments. It is perhaps into this context that the Broom C-ditch monument can be placed.

As with the early Neolithic, there is a need for more accurate dating of the origins and development of monuments. This could be achieved through multiple single-entity radiocarbon dating, although this is entirely dependent on the availability of appropriate material from reliable contexts.

Environment and Economy

Peter Murphy

Alluviation in the Ouse and its tributaries post-dated the Bronze Age, so geo-archaeological data are confined to palaeosols, archaeological feature fills, and peats in some palaeochannels.

Buried soils under the Bronze Age barrow at Roxton were sands and sandy loams, and showed extensive manganese panning (Keeley and Allen 1985). Micromorphological and chemical characteristics of fills from the Bronze Age pit alignment at Biddenham Loop, Bedford were recorded (Macphail 1999). The pre-Bronze Age soil was an argillic brown earth, and tree-throw hollows (one burnt) were noted. A primary fill had a heightened phosphate concentration, and included ash; secondary fills indicated a manured arable/animal stocking landscape.

Vegetation, foraging and crops

Scaife (2000, 20-1) notes that at present there are no palynological data from the county for the later Mesolithic, Neolithic and Early Bronze Age (Flandrian II-III). At Flitwick Moor, Ruxox, however, a *Tilia* decline, dated to 3120 ± 80 BP (Beta-117412, cal BC 1525-1145), has been recorded. This was associated with progressive increases in pollen of Poaceae (grasses), weeds and ruderals, and cereals. This represents renewed woodland clearance in the Late Bronze Age, thought to be associated with a wider reorganisation of the landscape. The palaeoenvironmental results from the first stage of work at Warren Villas in the Ivel Valley are summarised in Dawson and Maull (1996) and Greig (1993). Subsequently, a series of radiocarbon dates has been obtained, and further analysis has been undertaken (Robinson 2001). A palaeochannel fill, dating from the Late Bronze Age onwards (2902 ± 35 BP; OxA-9910: 1220-970 cal BC (2 sigma)) was examined. At the base of the sequence pollen analysis indicated a predominantly wooded landscape, with alder woodland on the floodplain, and woodland of oak and lime on higher ground. Above this, (2635 ± 60 BP; OxA-9918; 930-540 cal BC (2 sigma)) there was palynological evidence for extensive clearance, and macrofossils suggested proximity of fen pasture. Iron Age and Early Roman ditches cut across the top of the channel, showing it was no longer active by then.

Mollusc assemblages from three Bronze Age ring ditches near Barton-le-Clay in the Chilterns are reported by Allen (1991). The assemblages from all phases of ring-ditch 1 included up to 38% of shade-requiring taxa (especially Carychium tridentatum), but with 42% open country species. Tall ungrazed grassland, perhaps with some scrub, is the habitat inferred: most probably a stage in a hawthorn sere. Ring-ditch 3 produced evidence for an undated but possibly Iron Age phase of more intense grazing, and cultivation.

Charred Neolithic plant material from the Bunyan Centre, Bedford included remains of *Triticum dicoccum* (emmer wheat) and an early record of *Pisum sativum* (pea) (Scaife, in Steadman 1998). Late Neolithic pits at Puddlehill, Dunstable included hazel nutshell (*Corylus avellana*) with charcoal of hazel, ash (*Fraxinus* sp.) and Rosaceae (Taylor 1964).

Arthur (1985) has reported charred macrofossils of emmer, *Hordeum* sp. (barley) and weeds from Bronze Age cremations at Roxton. Charred plant macrofossils associated with a Middle Bronze Age cremation at Plantation Quarry, Willington included emmer spikelets, probably barley, weeds and *Carex* sp.

(sedge) (Biddle and Hutchins 1996). Samples from a barrow ring ditch at Broom Quarry, Biggleswade produced only low densities of charred plant material, but cremations included grass roots with tubers of *Arrhenatherum elatius* and fruits/seeds of weeds and grassland herbs (Stevens, undated a). Assemblages of this type have been widely reported (see, for example Murphy 2000), and are generally interpreted as indicating either *in situ* charring of grassland vegetation under a pyre, or the use of turves in pyre construction. Nutshells of hazel were also present. A second ring ditch and 'C-ditch' produced sparse charred remains including hazel nutshell, remains of *Prunus avium* (wild cherry) and *Sambucus nigra* (elder). Bronze Age pits included hazel and remains of emmer (Stevens undated b).

Later work at the site (Bower undated) again indicated rather low densities of charred material, although some Late Bronze Age features included abundant grain and chaff of emmer and *Triticum spelta* (spelt), some remains of free-threshing wheat and an associated weed flora. Plant macrofossils from waterlogged pit fills indicated standing water with damp weedy grassland and some elder in the vicinity.

Faunal remains

Late Neolithic assemblages have come from pits at two sites near Puddlehill, Dunstable (Ewbank 1964; Grigson 1976). At both sites pigs predominated, and Grigson identifies these as mainly wild pig. Other domesticates and wild species included aurochs, domestic cattle, domestic pig, sheep/goat, red deer, roe deer, fox and badger. Although these assemblages are small, they are consistent with results from elsewhere in the country, suggesting Late Neolithic exploitation of woodland 'pannage' as well as grassland.

Grant (1983) has reported a small Bronze Age assemblage from Roxton, in which cattle predominated, with some sheep/goat, pig, red deer, bird and badger. Preservation conditions in prehistoric features at Broom Quarry, Biggleswade were extremely poor for unburnt bone: only occasional teeth, mainly of cattle, were recovered (Mortimer, undated). Faunal remains from the Barton ring-ditches were very sparse, but included cattle and sheep/goat (Clark 1991). Barrow 3 at Galley Hill, Streatley is unfortunately not well-dated, but it produced a concentration of cattle bones in a pit (Dyer 1974).

Human remains

In the centre of the Neolithic enclosure at Plantation Quarry, Willington a crouched inhumation with associated partial antler of red deer (*Cervus elaphus*) was buried in a large pit. The burial was of a young woman, 17-25 years, with a stature of 1.53m. and a very gracile skeleton. A date of 4530 $\pm$ 130 BP (OxA-4553: 3526-2917 cal BC) was obtained (Jackman 1996; Roberts 1996).

Two flexed inhumations were associated with a circular ditch at Barton Hill Farm (Trevor 1962). One, of an adult female, about 25-30 years old, was not dated. There was some evidence for exposure prior to burial. The second, of an adolescent boy, was buried with a cattle rib and Bronze Age-type shale bead. The cremation within a biconical urn from Barton Ring-ditch 1 was of a single adult (Jackman 1991), as were those in collared and bucket urns from Harrold (Cornwall 1970) and unurned in a pit cut into a ring-ditch at Plantation Quarry, Willington (Jackman 1996a).

Brothwell and Jones (1976) report two Beaker inhumations, both adult males, from Sewell Quarry, Maidenbower; one showed evidence of osteomyelitis. The Early-Middle Bronze Age barrow cemetery at Roxton comprised a primary cremation of an adult female and child, with some later cremations (much disturbed and redeposited), as well as a flexed Early Bronze Age inhumation outside the ring-ditch (Denston 1985). The primary inhumation at Five Knolls, Barrow 5, Dunstable was a middle-aged female, with an ulnar fracture (Dingwall 1931).

Petrology

Fragments of Neolithic and Bronze Age saddle querns and rubbers from Goldington, Bedford were of Old Red Sandstone. The stones might represent erratics collected from local drift, or could have been imported from South Wales or Somerset (Williams 1992).

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4 FROM THE BRONZE AGE TO THE ROMAN PERIOD

Michael Dawson

Introduction

Nearly 300 sites are known from the county, dating from the late Bronze Age to the late Iron Age and if undated cropmarks that are probably Iron Age and Roman were included, this figure would be substantially higher. Many of these sites are known from chance finds; antiquarian discoveries or cropmarks, with only a small proportion that can be characterised according to their function or dated with any precision through excavation. In the past thirty years regional surveys of the Iron Age, the Bedford region (Simco 1973), between the Ouse and Nene valleys (Hall and Hutchins 1972), the River Great Ouse valley (Knight 1984), the western Chilterns (Saunders 1972) as well as wider surveys (Dyer 1971, Cunliffe 1974, 1978) have formed the framework for current analysis.

One of the most enduring problems for the county has been dating evidence. There are few metalwork finds from the area, fewer C14 dates from Iron Age sites and almost no closely datable imported artefacts until the late Iron Age. In 1984 Knight was able to divide the period from the late Bronze Age to the Late Iron Age into three broad periods: *Iron Age 1*, (the Late Bronze Age/Iron Age transition spanning the Ewart Park, late 9th century BC to La Tene 1, based on metalwork associations); *Iron Age 2*, (later 5th century BC to earliest Belgic, later 1st century BC) and *Iron Age 3*, (Belgic to earliest Romano-British (AD 43)). This periodisation relies heavily on Nene valley excavations, and was based on a ceramic chronology founded on decorated metalwork, import associations and on C14 dates. Consequently a relative pottery chronology based on broad periodisation in Northamptonshire remained the principal form of dating in Bedfordshire through much of the 1990s (BCAS 1995/14, pt 4, 14).

With publication, some localised patterns such as those at Salford (Slowikowski 2005), and Stagsden (Slowikowski 2000) are beginning to emerge and the situation has begun to improve as large scale excavations, in particular during the 1990s in the Ouse Valley, provide the basis of analysis for ceramic and artefactual data. Several recent sites have provided the raw material for C14 and archaeomagnetic dating. An improvement in the recording and identification of metal detector finds (Wingfield 1996) and increased use of field artefact collection, both as part of PPG 16 related projects and by local societies, in particular the Manshead Society (Hudspith 1991), has also begun to swell the number of identified sites, as have several good seasons of aerial photography.

The cumulative result of past survey, excavation and publication has allowed the creation of a simple model of development in the Iron Age (Dawson 2000) but this remains highly anecdotal rather than based on the results of extensive survey. Particularly important in this respect is the absence of published analysis of the circumstances of investigations and therefore the value of data that has been published. Some evidence may be found in archives held by the County Council, Luton and Bedford Museums as well as local societies (*cf.* Haselgrove 2000, G1, *quellencritik*) but this has not been quantified.

Late Bronze Age/early Iron Age Transition and Early Iron Age

The late Bronze Age in Bedfordshire is still a period characterised by the distribution of barrows along its river valleys and by the continued existence of extensive, monument complexes, probably the focus of ritual activity, on the lower river terraces (Woodward 1978, 1986, Clark 1991, Dawson and Maull 1996, Malim 2000). There is only one possible example of a middle Bronze Age field system surviving into the late Bronze Age at Broom, affecting the subsequent pattern of development. In general the structural evidence of settlement in Bedfordshire has proved elusive, although recent evidence for open dry grassland (Clark and Allen 1991) has been used to argue for intensification of both land use and occupation at the end of the 1st millennium BC. Settlements have been identified in several locations including Sandy (Dyer 1971), Harrold (Eagles and Evison 1970), Felmersham (Radwell) (Hall 1973), Mowsbury (Dring 1971), Salford (Dawson 2000), Leighton Buzzard (Jones 1992), Totternhoe (Hawkes 1940), Sewell (Shirral Springs), Totternhoe (Well Head) (Matthews 1989, 29), and Biddenham (Gold Lane) (Dawson 2004). However the attribution of

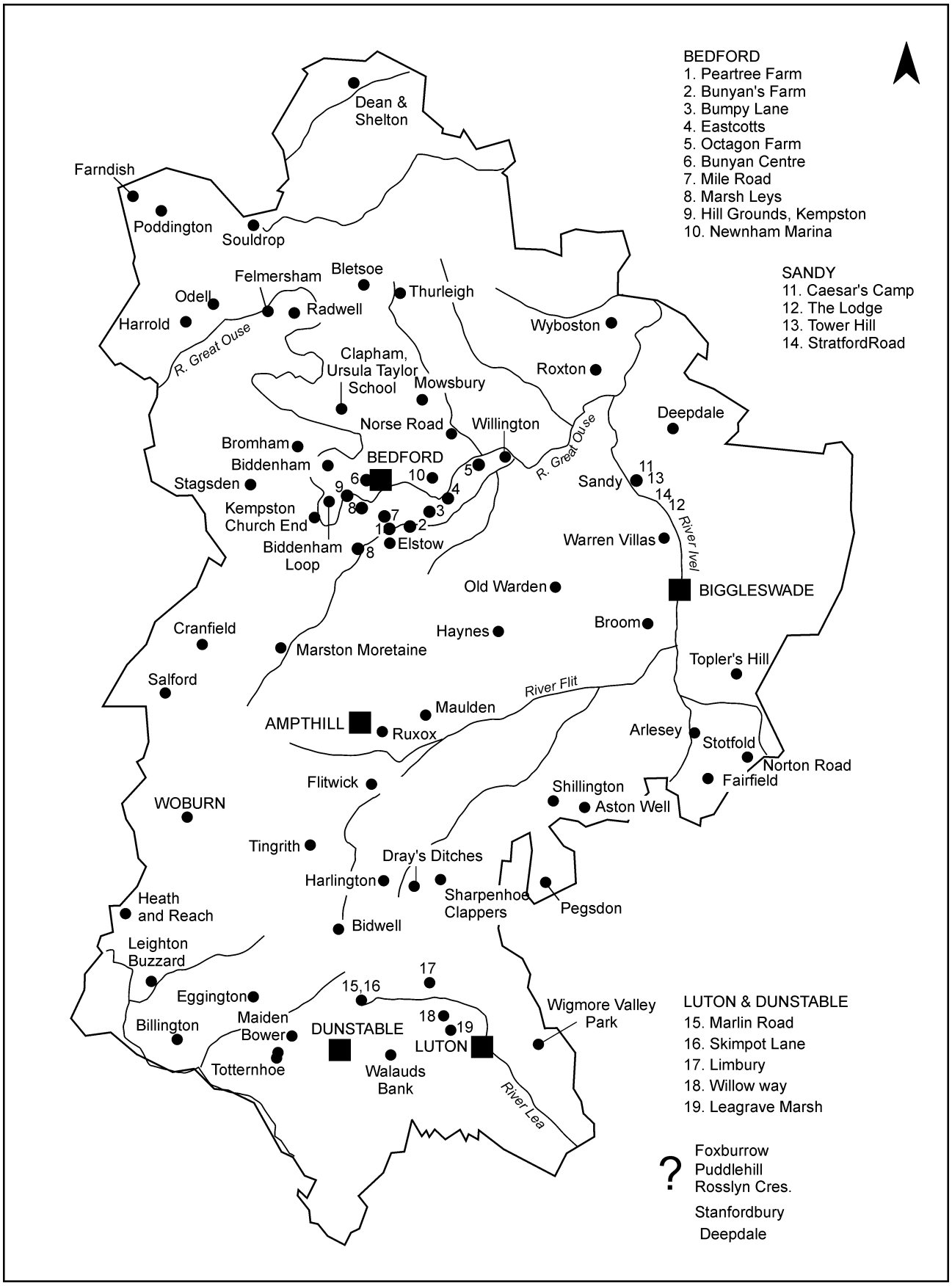


Fig. 4.1 Location of places mentioned in the text: Late Bronze Age to Roman Period.

settlement to many of these sites is far from secure. Sandy and Mowsbury have been identified on the basis of pottery scatters or single artefact finds such as the delphini lamp from Sandy (Knight 1984, 268); Felmersham is a single cremation, at Harrold settlement is assumed from Late Bronze Age ceramics in an area dominated by round barrows, but has no structural evidence. In addition to these examples from which settlement is inferred, there are several possible occupation sites which have been suggested from the presence of early ceramics at Stotfold (HER 2021), Odell (HER 2671), Souldrop (HER 2718 and 2719) and Thurleigh (HER 2752). Only at Puddlehill (Matthews 1976, 1989) and the more recent sites of Biddenham, (Gold Lane), (Dawson 2004), Salford (Dawson 2005), Biddenham Loop (Luke, forthcoming), Bunyan's Farm and Bumpy Lane (BCAS 95/14, pt 4, 13), Broom (Mortimer 1997, 1999, 2000) and Groveland Way, Stotfold (Steadman, forthcoming) has structural evidence of settlement been identified during excavation.

The distribution pattern of the settlements outlined above is predominantly riverine, located either on the first terrace or, like Mowsbury, high on the clay ridge overlooking the river valley. Although this is a similar pattern to Northamptonshire, where sites are generally known from the Nene valley (Chapman 2000, Kidd 2000), in Bedfordshire it still probably reflects the pattern of modern development during the past 30 years, with the majority of sites discovered as a result of quarrying in the Great Ouse Valley.

As the Late Bronze Age shades into the early Iron Age, settlement evidence increases slightly, and in addition to sites noted above, excavations at Puddlehill, Willington (Pinder 1986, 27) and possibly Bedford (Norse Road) (Edgeworth 2001) have produced evidence of early settlement.

Possibly contemporary with the increasing evidence of settlement was the creation of early hillforts. Maiden Bower is a univallate Iron Age hillfort on the Chiltern slopes close to Dunstable where evidence of activity stretches back to the Neolithic. Recent survey (Hamilton and Pollard 1994) has revealed the presence of an inner palisade, which Pollard suggests may be late Bronze Age-early Iron Age in date. A similar univallate enclosure at Craddocks, Heath and Reach (Dyer 1976, 10) was destroyed without record and Dyer has suggested that Walauds Bank, Leagrave, as well as Danesborough at Bow Brickhill in Bucks, should also be seen as part of an early series of univallate forts.

Possibly linked to increasing territoriality in the late Bronze Age and early Iron Age is the appearance of land boundaries. Three major forms of boundary: dykes, ditched boundaries and post hole alignments have been identified. The dykes are distinguished from ditched field boundaries by their large scale and are found predominantly on the periphery of the region. Traditionally regarded as tribal boundaries (Dyer 1961), two groups have been identified in print. One, along the Chilterns forms a series extending into Cambridgeshire as far as the Devils Ditch at Newmarket (Bryant 1995, fig 13), and another lies within the Ouse valley (Knight 1984, map 20, 161), although the distribution may be much wider (Coleman *ex litt*). In several Chiltern examples, including Drays Ditches (Dyer 1961), a sequence in which pit alignments were replaced by bank and ditch boundaries before becoming increasingly complex as double and triple ditches in their final phase, has been noted on the higher ground (Bryant and Burleigh 1995). At Biddenham (Luke, forthcoming, Malim 2000, 80, fig 8.15, 8.16) two pit alignments may separate territory within a meander of the River Great Ouse. One, identified for some 40m by geophysics runs close to the river whilst the second stretching over 1000m, is some 800m to the north. The latter has been extensively sampled and clearly cuts off a portion of the Biddenham Loop. Closely dated by post Deveril Rimbury pottery from several pit fills, marker pits have been identified suggesting the alignment was probably constructed by groups of workers. Whilst the territory it defines is too small to be equated with a tribal territory, it may still have been principally a boundary marker but with a more ritualised function (Luke, forthcoming).

Field systems originated in the late Bronze Age or early Iron Age have only been proposed at Octagon Farm where a rectangular system of enclosure ditches cuts an earlier Neolithic enclosure and at Eastcotts. At the latter lengths of ditch which pre-dated the Romano-British enclosures had similar fills to earlier prehistoric features (BCAS 94/14 pt4, 13) suggesting an early field system. At a third example the proposed field system at Broom (Mortimer 1997, 52) originated in the middle Bronze Age with the excavation of a double ditched alignment some 340m long. Perpendicular sections of ditch and other features including a group of cremations suggest the field system continued to influence the location of later features well into the late Bronze Age.

All the examples of early field systems are imprecisely dated, and none of the examples have been correlated with a contemporary settlement pattern. Furthermore, whilst evidence of Iron Age farming practice nationally has increased exponentially, it is too early in the analysis of these sites to have played a part in their interpretation (Haselgrove *et al.* 2000, c).

Settlement Form

Settlement form in the Late Bronze Age and early Iron Age can be characterised by reference to several recent excavations, although the familiar problems of a distribution determined by modern development still remain. The two principal settlement forms, enclosed and unenclosed, both probably contained houses, four and two posts structures and pits. At Biddenham (Gold Lane), a salvage excavation of limited scope exposed a settlement, which comprised a double ditched enclosure on a bluff above the River Great Ouse in which post built structures were identified together with several pits outside the enclosure ditches. Further south, the Biddenham Loop has been more extensively investigated, and the site of a late Bronze Age/early Iron Age settlement identified. Located close to the longer of the two pit alignments, discussed above, it may have been contemporary with the construction of the alignment. Little animal bone has been found on the site but the evidence of storage pits suggests more than temporary or seasonal occupation. The settlement was unenclosed and comprised 2 and 4 post structures as well as water hollows and individual post holes. A grain deposit in a pit yielded a C14 date of 905-795 cal BC (Luke, forthcoming).

A second area of late Bronze Age settlement has been investigated at Broom, quarry phases 1 & 2, where the remains of three roundhouse structures are associated with possibly an extended rectilinear field system (Mortimer 1997, 53) dating to the period *c*.900-700BC. This settlement is not only characterised by roundhouses but by distinct zones of pits as well as scattered isolated pits, working pits, a well and a midden or dung heap. A second settlement area at Broom was found in quarry phase 4, to the south, and may have been aligned on the earlier, middle Bronze Age field system (Mortimer 2000, 40-42). It comprised a single round house together with two pits containing substantial quantities of ceramics.

At Salford, phase 2, three ring ditches of Bronze Age date *c*.2000-700 BC, located on a gently sloping hillside, were superceded by a partially enclosed settlement behind a palisade dated *c*.800-400/300BC. Round houses and four post structures characterised the settlement, which was probably occupied well into the middle Iron Age. The round houses at Salford were defined by circular or sub-circular drip gullys or post rings, whilst the predominance of east facing entrances gives some hint of the underlying ritual associated with their construction and use. The discovery of a single roundhouse some distance away from the main settlement also, perhaps, suggests a ritual function for some buildings. At Salford too, the clustering of material such as burnt stone and artefact types hints at specific activity areas although how long such areas were retained or whether they where subject to changes over relatively short periods of time is unknown. At Willington, Pinder (1986) has suggested an enclosure may have been constructed specifically for animals, and this might also be the case at Norse Road, Bedford (Edgeworth 2001). In contrast at Biddenham (Gold Lane) the settlement contained a series of angular post settings suggesting a settlement form possibly comparable with Lofts Farm, Essex (Brown 1988).

At Salford, Willington and Biddenham, pits have been investigated and seem to be arranged in groups during this early period. However, in this region there is insufficient data to reach any consensus regarding their initial function or role in the disposal of artefacts (*cf.* Hill 1995).

Burial and cremation

Burial is either represented by primary interment in barrows, or by secondary inhumation or cremation. For instance at Broom, (Mortimer 1997, 54) a central inhumation beneath a barrow was succeeded by a secondary urned cremation in the mound and several un-urned cremations of Iron Age date in the ring ditch. Burial in close proximity to a barrow has been proposed at Bedford (Bunyan Centre) (Steadman 1999, 29) and un-urned cremations of probably late Bronze Age date have been recovered from locations close to contemporary settlement at Broom (Mortimer 1999, 42) and Stotfold (Steadman, forthcoming).

However no consistent model has been identified for early burial practice. At Salford, despite the presence of three ring ditches, there was no evidence of early burial, nor of excarnation (*cf.* Dyer 1976, 13), and like Harrold (Eagles and Evison 1970, 21) there are only fragments of Iron Age ceramics in the ring ditches. At several sites, Toplers Hill (BCAS 2000/74), Stotfold (Steadman, forthcoming) and Biddenham (Luke, forthcoming) fragments of human bone, some cremated, have been found in small quantities in features like pits or ditches.

There are few examples of human burial on or close to late Bronze Age and early Iron Age settlements in the county. No doubt the limited use of C14 or other scientific methods to date isolated burials and the predominance of site based investigation has distorted the figures, but the local situation nevertheless reflects a national phenomenon (Haselgrove *et al.* 2000, C2.3). Biddenham Loop remains the only site with evidence to date of contemporary burial within a settlement from the late Bronze Age/early Iron Age in the county. Two unurned cremations were recovered

Fig. 4.2 General view of the Iron Age settlement at Salford.

some 20m from the settlement and cremated bone fragments were found in 11 pits peripheral to the main settlement area suggesting disposal may have been within the topsoil or formalised in a way which did not involve burial.

Material culture

In common with the eastern region the transition from the late Bronze Age to early Iron Age is characterised by a cessation in bronze hoarding (Pollard 1991a) although some deposition of artefacts, such as a palstave from Salford, within or close to settlements, lingered into the early Iron Age. However, the processes by which the transition from copper alloy use to iron took place are unknown in the county.

Pottery assemblages are dominated by hand made forms, carinated vessels and furrowed bowls, with flint fabrics dominant until the middle Iron Age when more mixed 'grog' and calcareous types come into use. However alongside these generalised trends significant local supply was a factor at many sites (Slowikowski 1995 and 2005). The publication of further sites such as Willington, Harrold and the Bedford Southern Bypass sites may provide a useful corpus of fabrics, forms and significant groups, although scientific dating still remains an outstanding problem.

Middle Iron Age c.400-150bc

Settlement Character

In the middle Iron Age significant changes appear in the pattern of settlement. Not only do settlements begin to lose their association with early barrow sites, but they are now commonly found in locations with no explicit evidence of earlier activity. However, the same bias in the evidence towards areas of recent development remains with the distribution of investigations still largely restricted to valley sites or gravel deposits. Amongst the sites, Bedford (Newnham Marina), Bromham and Thurleigh (Simco 1973, Knight 1984 ii, 8) have been identified as settlement locations from ceramics alone, whilst Salford (phase 4), Biddenham (Gold Lane) (phase 2); Shillington (phase 4) and east Stagsden (phase 1) have all produced settlement evidence during excavation. The location of these sites still indicates a preference for higher ground, the sides of river valleys, above the flood plain, or higher still, probably within clearings in a largely wooded

landscape (Cartwright 2004). The appearance of new sites, both open and enclosed, also suggests settlement was continuing to increase in density commensurate with an increase in population.

A second important development is that settlements are becoming more substantial with sites like Salford probably growing beyond the level of farm or farmstead. Meanwhile at several sites some mobility of settlement is implied by the re-foundation of settlement close to, or in the same location as, earlier settlement. Sites such as the 'washing line' enclosure at Shillington, the second ditched enclosure at Biddenham phase 2, and phase 4 at Salford all seem to reflect re-occupation of 'preferred' locations. At Puddle Hill there may have been as much as a century between occupation in the early Iron Age and re-occupation in *c.*300 BC.

In the River Great Ouse valley several post hole alignments are known from aerial photographs and excavation, suggesting that this form of land sub-division continued to develop. Only one such alignment, at Willington (Plantation Quarry) (Dawson 1996) has been published. It dates to the middle Iron Age, and extends over several hundred metres and connecting penannular enclosures, near the river flood plain, with a single Bronze Age ring ditch. Its location and proximity to earlier burial monuments suggests that in some areas the alignments may be related to ceremony or are territorial markers, the alignments intended to focus attention on some aspect of the topography. This type of short unconnected pit alignment seems unlikely to relate to tribal territory or function as territorial boundaries. Yet the structural similarities between these alignments and others say, in the upper Thames the River Nene catchement, indicates they need further investigation.

Hillforts

The absence of hillforts in eastern England is a recognised regional characteristic and is used to support the contention that eastern England was peripheral to developments in central southern Britain for much of the Iron Age (Cunliffe 1978). Despite this assertion there are several hillforts in the region first occupied in the middle Iron Age.

Billington Hill, a small univallate hillfort south of Leighton Buzzard on the watershead between the Rivers Thames and Great Ouse, is currently under excavation by the Manshead Society (Warren 1998). Sharpenhoe Clappers (Dix 1983), on the chalk ridge of the Icknield belt, and Sandy Lodge (Dyer 1971) on the Greensand Ridge above the River Ivel, are promontory forts defined only by ramparts across the neck of a plateau. Both were investigated by small scale trenches. At Mowsbury a hillfort, with timber revetments, has been identified but not fully characterised because of later damage by a medieval moated site (Dring 1971a). No formal excavation has taken place here and finds were the result of plough erosion over the line of a large ditch. All three sites may have been chosen for their exceptional positions which offer extensive views across the Ouse, Ivel and Flit valleys. A fourth hillfort at Caesar's Camp, Sandy, which occupies a contoured hilltop on the Greensand above the Ivel, may have been occupied late in the Iron Age, although this site has not been surveyed or investigated.

Settlement Form

The evidence of settlement greatly increases in the middle Iron Age in common with much of southern Britain. The form of settlements seems however to continue the pattern of the early Iron Age with, for instance, both phase 4 at Salford, and phase 3 at Stagsden largely replicating their earlier settlement forms. At Hinksley Road, however, an unenclosed settlement in the middle Iron Age is enclosed before the appearance of 'Belgic' ceramics, whilst at Puddle Hill a series of enclosures were founded and re-founded in the same location (Matthews 1989, fig 15). Perhaps the most significant development is the potential for settlement within the hillfort at Maiden Bower (Hamilton and Pollard 1994); the result of geophysical survey, this remains to be tested by excavation.

Material Culture

A tendency has developed within the county to refer to the middle Iron Age period as the 'pre-Belgic Iron Age', at some sites including east Stagsden (phase 2), Flitwick (Hinksley Road), Marston Moretaine (Beancroft Road), and to correlate this period with Knights second ceramic phase 5th –1st century BC. The ceramics of this tradition are dominated by ovoid forms and restricted decoration, generally in grog and sand tempered, or sand tempered fabrics (McSloy 1999, 70, 81). At some sites, such as Stagsden and Flitwick (Hinksley Road), several periods of activity have been identified within the Middle Iron Age, and at Salford this has been formalised in a series of Ceramic Phases which comprise different combinations of pottery forms and fabrics (Slowikowski 2005).

Apart from ceramic finds artefacts from settlements are few. Where they occur, individual artefacts like loom weights, spindle whorls, antler picks and bone working surfaces, indicate a wide range of activities, but no analysis of wider trends which might indicate,

for instance, seasonal specialisation have been undertaken. There is also some evidence for the deliberate and possibly ritual curation of artefacts. For instance, at Salford, Duncan (2005) has argued that in phase 3 an antler tine was deliberately deposited close to the settlement boundary to signify the limit to settlement. Another antler was deposited in a pit at east Stagsden, phase 1, (in the middle Iron Age) and may be equally significant, but here excavation was limited by the extent of road construction with little data generated by geophysical survey on the margins of the settlement.

Burial and Ritual

Burial evidence is sparse from the middle Iron Age period. A crouched inhumation, accompanied by a horse skull, was recovered from a 5th century pit at Puddle Hill (Matthews 1989, plate 4). Crouched burials are also known from Eggington (Gurney and Hawkes 1940, 230) and Harrold (Eagles and Evison 1970, 51).

At Salford a ritual function for an isolated roundhouse has been suggested in both the early and middle Iron phases (phases 3 and 4), and there is an antler deposited beneath a four post structure G18 in phase 3 (Dawson 2005). The structure is isolated on the eastern side of the settlement and may be the remains of a small shrine.

Less easy to characterise is the 'massacre' at Maiden Bower (Dyer 1976, n26, Mathews 1976, 161) in *c*. 400BC. Clearly a secondary deposit, Pollard (Hamilton and Pollard 1994) has drawn attention to similar late Iron Age deposits in the hillforts of Wessex (Sharples 1991, 82).

The Late Iron Age c.150bc – ad 43

Material Culture

The appearance of Gallo-Belgic 'A' coins (Allen 1961, 62, Van Arsdell 1989), during the period from 150-100 BC has provided a chronological horizon with which the start of the late Iron Age in the south east, and in Bedfordshire, is associated. Historically attributed to an immigrant population, described by Caesar, the coin distribution was once thought to represent the expansion of Belgic hegemony into the county (Dyer 1971, Simco 1984). It is now generally accepted that Gallo-Belgic styles, particularly ceramics, probably represents the emergence of Belgic style rule or economy rather than an immigrant population. The earliest 'Belgic' style ceramics appear in the county in the late 1st century BC (Slowikowski 1988, 2005) and last well into the 2nd century AD (Marney 1989, LaNeice 1999, 40).

The Gallo-Belgic styles are copied in local fabrics, alongside more traditional forms in domestic assemblages such as that from Clapham (Ursula Taylor School) (Slowikowski 1988, 17). There is also evidence for a change in fabric types at sites such as Marston Moretaine (Beancroft Road) (LaNeice 1999, 36) and Stagsden (Slowikowski 2000, 41, Tables 34 & 36), a change which is characterised by the rise of 'shelly' wares by the 1st AD and, at Marston Moretaine, by the demise of grog and calcareous tempered wares. By the 1st century AD grog and shell or sand and grog mixtures are the principal types at Ursula Taylor and Odell (Slowikowski 1988), yet it is clear from these and other sites that fabric use remains distinctly localised until the post Conquest period.

Changes in ceramics forms, however, are easier to identify in this period. In the late 2nd century BC early domestic ceramic assemblages are dominated by tableware, storage vessels and cooking pots, and forms include jars, bowls and flagons. By the 1st century AD the range has increased to include 'Belgic' styles pedestal urns, butt beakers, platters, S-sided vessels and sharply carinated jars (Simco 1973, 14, Figs 6 & 7, Thompson 1982, 245, Slowikowski 2000, 73).

Concurrent with the changes in late Iron Age ceramics are changes in the range and scale of artefact finds. Coins, which characterise the period as proto historic, are now found as metal detector finds across the county, and with increasing excavation more coins are now being found in context rather than as isolated finds. The total number, however, is still small. The appearance of metalwork finds, such as the mirror associated with a burial at Old Warden (Spratling 1970), and Felmersham (Watson 1949, 48) have been discussed by Simco (1973, 10), and more recent finds such as those from east Stagsden (Duncan 2000, 100-1) and Sandy (Dawson 1995) are beginning to appear in non-burial contexts. Whilst these are helping to refine dating in the late Iron Age, the region's chronological framework is still predicated on ceramic dating.

Evidence of industrial and craft processes such as iron working has been recovered from several sites recently, including east Stagsden, whilst ceramic production in kilns is attested from the early to mid 1st century onwards at east Stagsden, with possible early production at Elstow (Simco 1973, 10).

In general the artefact finds and evidence of craft process in the county suggest these were carried out on a local scale with scope for regional trade in

Fig. 4.3 Iron Age or possibly early Roman enclosures visible from the air during the 1990s in the area of Roxton in the River Great Ouse valley (© Beds CC).

perhaps higher status limited to items associated with burial.

Settlement Pattern

In the late Iron Age Knight has identified a general increase in settlement density across the region (Knight 1984, figs 13, & 14), and recent excavation has tended to confirm this. Settlements have been located at Leagrave March (HER 167) and excavated at several locations in the county including Bromham (Tilson 1973), Odell (Dix 1980, 1982), Peartree Farm (Woodward 1977), Bunyan Centre (Dring 1972), Radwell (Hall and Hutchins 1983), Stotfold (Norton Road) (Steadman, forthcoming), Limbury, Pegsden, Kempston (Hill Grounds) (Dyer 1976), Puddlehill (Matthews 1976) and Wyboston (Tebutt 1957). Recently investigated sites include, Stagsden, Willington, Clapham (Ursula Taylor School), Flitwick (Hinksley Road), Marston Moretaine, (Beancroft Road) (Shotliff, Crick 2000).

Beyond the valleys less is known of the Iron Age landscape. Cropmarks on the clay ridges of north

Bedfordshire, where linear patterns of enclosures are visible (Clark and Dawson 1995 fig 23), suggests an expansion to new areas. Recent work in the clay vale west of Bedford (Pollard 1999, Shotliff and Crick 2000) and, further south, investigation on the Greensand Ridge (Shotliff and Luke, forthcoming) has identified late settlement. In the mixed topography of the land between the Greensand Ridge and Chiltern foreland, limited excavation at sites such as Harlington (Dawson 2000) and Fairfield (BCAS), as well as more extensive investigation at Stotfold (Norton Road) (Steadman, forthcoming) has begun to fill the gaps in the distribution maps. Extensive fieldwalking in the Luton and Dunstable area has also identified a number of potential sites (Hudspith 1991, 1992), whilst limited excavation has suggested the presence of late settlement sites in the Bedfordshire Chilterns at Eggington, Billington and Pitstone Hill, Bucks, (Matthews 1976) and in Luton (Wigmore Valley Park) (Hudspith 1999), Dunstable (Skimpot Lane) (Warren 1989), Heath and Reach (Jones 1990) and Leighton Buzzard (Jones 1992).

In general, the picture is one of continuity of settlement from the middle Iron Age, but unlike Bancroft, Bucks. (Williams and Zeepvat 1994), few sites in Bedfordshire were occupied throughout the 1st millennium BC. Much more typical is Salford, occupied in the late Bronze Age but deserted by the end of the late Iron Age, or east Stagsden occupied from the middle Iron Age into the Roman period (Dawson 2000). At other sites continuing settlement is reflected in the return to preferred locations. At Shillington, three enclosures aligned along a multiple ditched boundary were occupied sequentially from the middle to late Iron Age, and more *washing line enclosures* (MPP 1989), such as those in Dean and Shelton, are known from aerial photographs. Few have been excavated.

A second form of continuing settlement is sites where the habitation area is surrounded by several, possibly focused, enclosures. Familiar from the Upper Thames valley (Allen, Miles, Palmer, 1984), there are examples of such sites at Bedford, Norse Road (BCAS 2000/30), Odell and on the eastern border of Bedfordshire at Pennylands and Bradwell, and possibly Wavendon Gate, Bucks. These sites could share a common agricultural tradition where the core area is characterised by zones of pitting, habitation, iron working and cereal processing. At Norse Road geophysical survey identified an 'habitation effect' central to the enclosures (Dawson & Gaffney 1995), but at least two of the outer enclosures contained structural evidence suggesting that settlement may have spread outwards from a central core in progressive accretion. Here Edgeworth (Edgeworth 2001, 18) has suggested some seasonality in occupation as flocks and or herds were moved from higher ground onto the flood plain of the River Great Ouse. However, Norse Road is within 500m of the river and the situation may have been similar to that at Odell (Dix 1982) where the settlement was located to take advantage of both the upper terrace pastures and flood plain without any shift in settlement.

A new settlement form in the county also follows this pattern but from the late Iron Age into the Roman period. These sites comprise a linear row of small enclosures, all inter-cutting. They are the remains of small dwellings together with attached enclosures, within a linear band of settlement. The site type is familiar in the eastern region from examples like Mildenhall (Newman 1996). One excavated at Eastcotts, near Bedford illustrates how the enclosures were re-established several times (Dawson 2000). Eastcotts and two further examples from the county at Biddenham and Warren Villas (Dawson and Maull 1996) suggest they originate in the 1st century BC. It is possible that these sites indicate either a move to more marginal locations, or are the result of deliberate resettlement.

Boundaries

Ditches remain the most extensive evidence for land division. They most commonly form localised field systems associated with settlement, but occasionally form part of more extensive boundary systems. Inevitably dating is a problem with the latter and, for example at Biggleswade, cropmarks in the Ivel valley originating in the Iron Age may be the remains of a limited co-axial system, despite suggestions that they may be evidence of centuriation (Bigmore 1979). Several recent linear projects have provided transects across the county area[1]. Two projects in particular, the Hemel to Humber pipeline and the M1 widening scheme (BCAS 1995/22) confirm the absence of extensive enclosure systems in the county and that field boundary ditches were limited in focus with no hidden evidence for extensive field systems in areas which are not susceptible to aerial photography.

In the valley bottoms, linear arrangements of enclosures often aligned along the edge of the first gravel terrace have already been identified as a new site type, whilst the character of focussed sites has also been questioned. However in the upper Ouse valley a bi-axial system of field enclosures which stretches

[1]Barton Bypass 1991, Bedford Southern Bypass 1994, Clapham Bypass 2000, Arlesey-Stotfold bypass 1995, Stagsden Bypass 1991, Hemel-Humber pipeline 1991.

across Buckinghamshire into Bedfordshire has been found oriented on the Icknield Way, and although undated by excavation (Bull 1993) this may be a late development.

A ditched boundary form which does appear to sub-divide larger areas of landscape is the triple ditch. One stretching north from the Elstow Brook in the south across a neck of land to the River Ouse, closed a large island of land which included several settlement sites and earlier ritual monuments. Similar examples are known from the lower Ouse valley (Malim 2000).

The final component of landscape division is the tribal boundary. Caesar's reference to the Belgae has been especially influential in proposals for a Belgic tribal area in south eastern England dating to the late 2nd century. From the later part of the 2nd century BC the distribution of Gallo-Belgic ceramics, coinage of Allen's type A and B and, during the first half of the first century BC, the appearance of the Welwyn burial form have been used as the basis for assessing the extent of Belgic influence or territorial expansion. Current interpretations lay emphasis on the transmission of Gallo-Belgic styles rather than an extensive invading population. Recent excavation at Biddenham, Marston Moretaine, Salford and Stotfold have increased the number of Welwyn style cremations but these burials have not extended the distribution and, with recent finds of coins, have only contributed to the density of current patterns.

In the proto-historic period of the late Iron Age the regional sub-division of the landscape is given a political dimension with the evidence of tribal names. Three major tribal groups have been identified in the Ouse basin: the Trinovantes, the Iceni and the Catuvellauni, and much of the territory of Bedfordshire in the later Iron Age probably fell under the hegemony of the Catuvellauni (Branigan 1985). Originally derived from Caesar (Cunliffe 1978, 68) tribal territories have been projected backwards into the late 2nd century BC on the basis of coin distributions (Allen 1961, Van Arsden 1989) and modified by detailed dynastic argument (Rodwell 1976). The latter was based on specific coin issues and indicated that the frontier between tribal groups was ill defined (Kimes 1982), although the idea of a linear boundary such as the Nene or Ouse is still common. Despite the tenacity of the formal boundary the evidence of dynastic coin distributions suggests tribal territories remained unstable right up to the Roman invasion (Van Arsdell 1989; Curteis 1996).

Settlement Form

Settlement forms in the late Iron Age increase in variety, with both open and enclosed sites known throughout the region probably representative of early villages. With the recent spate of large scale excavations, smaller farms or farmsteads comprising single roundhouses together with small enclosures have been found unexpectedly suggesting a greater density of settlement than that represented by the larger settlements alone. Unlike the eastern region there is no evidence to suggest either an increase in the number of enclosed sites or the agglomeration of settlements beyond the scale of villages. Toplers Hill at Langford, proposed as the location of an 'oppidum', has recently been surveyed and found to comprise a series of interlinked enclosures.

There is, however, some indication that structural changes were taking place within settlements. Sub-circular or sub-rectangular gullies, often stone filled, rather than circular drip gullies appear to enclose comparable areas to the roundhouses. Possibly indicating changes to the structure of dwellings, they originate in the 1st century BC at Eastcotts, Biddenham, and Warren Villas where the new form may be part of a move to more marginal locations. Hingley has suggested that late examples of these structures might indicate increased investment by indigenous populations (Hingley 1997, 95). A second innovation at these sites, absent from the earlier open settlements, is the proliferation of small enclosures. Probably gardens, their linear layout and repeated overlapping form suggests sequential occupation in a tradition similar to that proposed in other regions for paired round houses (Williams and Zeepvat 1994, Evans and Serjeantson 1988).

Burial and ritual

One of the most striking changes to occur in the late Iron Age is the re-appearance of human burial. Almost all the evidence is of burial taking place in the 1st century AD possibly with the development of a distinct hierarchy, but also with an indication of the underlying ritual. The burials of perhaps highest status are the 'Welwyn' style burials from Old Warden, Stanfordbury and Felmersham from the early 1st century AD (Simco 1973, 10-11 and refs) and Dyer (1976, 16) has drawn attention to the possibly similar burials at Woburn and Maulden Moor (Lysons and Lysons 1806, 24, Simco 1984, G175).

Cremation began to appear in the 1st century BC with burials known from Arlesey, Limbury, and Pegsden in

Fig. 4.5 Late Iron Age ritual. Reconstruction of a late Iron Age burial at Stagsden where a neonate child was buried on a neonate foal in a wide shallow pit accompanied by a single pot neatly broken in half (Dawson 2000, fig. 36, 45).

the south of the county, Kempston (Hill Grounds), Biddenham (Biddenham Loop), and possibly Sandy (Simco 1984, 115). At Shillington a mirror decorated in late La Tene style and two silver brooches, *knotenfibula,* together with sherds from a pedestal urn, flat jars and other vessels indicates the location of a high status burial of mid 1st century BC date (DCMS 2000, 15-16. fig 7). There are four late 1st century BC 'Aylesford' style cremations forming a small cemetery at Salford (Duncan 2005). 'Belgic' period cremations are also known from Rosslyn Crescent and Marlin Road, Luton, Marston Moretaine (LaNeice 1999, 40), from Puddlehill (Matthews 1976, 167-9) and from Stotfold (Norton Road). Further south at Ruxox cremations in Belgic urns were recovered during the construction of the Ampthill Bypass (Fadden pers comm.). At Harlington one cremation from an otherwise post-Conquest cemetery dates to the immediately pre-conquest period (Dawson 2001) in a cemetery which includes burial with imported Roman ceramics.

Less common are inhumations on settlement sites, but a neonate child burial from Stagsden accompanied by a foal and broken pottery has recently been published (Dawson 2000, 45) and several late Iron Age inhumations have been recovered from Kempston (Jackman 2005). These latest examples suggest that although general trends throughout the county follow developments further south, excavation is beginning to reveal local interpretations and the extent to which there is time lag in their adoption is a significant objective for the future.

In the eastern counties Bryant (1997, 27) has drawn attention to the appearance of sites specifically intended for ritual or religious functions. Further north, in contrast, Kidd has found only tentative evidence for such structures in Northamptonshire. In Bedfordshire there are several candidates for Iron Age shrines including Willow Way, Luton associated with several coin finds, Biddenham Loop (Luke, forthcoming), Marsh Leys Farm (Albion Archaeology, forthcoming) and Sandy where Iron Age coins were found deposited in a stream bed (Dawson 1995). In Northamptonshire work by Curteis in the early 1990s on Iron Age coin deposition has led to the identification of several areas of probable ritual coin deposition along the Ouse. Sandy may be comparable to Evenley, near Brackley, a late pre-Roman Iron Age site which seems to have retained a ritual significance into the Roman period (Curteis 1996, 32). It is also possible that deposition in watery locations continued throughout the Iron Age at Roxton (HER 2025), where Iron Age artefacts have been recovered during dredging of the River Great Ouse. This type of deposit

is rare in the county. The potential for the discovery of further ritual sites though is high, and in this respect the recent survey of the Stagsden area has revealed at least one area which could be a ritual enclosure or *'viereckschanze'* (WYAS 1998, Site B).

Regional variation

The topography of the Bedfordshire countryside, undulating clay ridges to the north, the Ouse Valley and Greensand Ridge across the centre of the county and the mixed landscape of the Chiltern foreland to the south has created a landscape of few extremes, yet until recently areas of heavy clay soils, such as the clay vale west of Bedford were considered to have been empty of settlement . Aerial photography meanwhile has begun to show cropmarks on the clay ridges in the north of the county (Clark and Dawson 1995). Large scale projects throughout the 1990s, such as Stagsden (Dawson 2000, WYAS 1998), Broom (Mortimer 1997, 1999, 2000), Warren Villas and Biddenham are yielding data which extends beyond the site specific. However, the absence of coherent research projects in the county since the early surveys of Simco (1973), Hall and Hutchins (1972) and Knight 1984, means that even the most recent national overview (Cunliffe 1991) contained no new data between this edition and the previous 1978 edition.

Environment and Economy

Peter Murphy

Soils and geoarchaeology

At Warren Villas in the River Ivel Valley there was Iron Age-Early Roman cross-ploughing on the floodplain, indicating low groundwater levels at that time (Dawson and Maull 1996; Robinson 2001). Waterlogging and alluviation came later. Geoarchaeological data are now commonly taken into account during the preparation of Project Designs for PPG 16 interventions (*e.g.* Howlett 1998), so there is good potential for obtaining new data on the alluvial history of the county.

Soil micromorphological and chemical studies at Salford Quarry were focused principally on buried natural soils and Iron Age features (Macphail 1999). The buried soil was a stagnogleyic brown earth formed on terrace deposits. Iron Age deposits ('occupation spread' and drip-gully fill) included phosphate-rich fused ash from cereal processing, and coprolites. These, enhanced phosphate levels and dirty clay coatings were thought to indicate the concentrated presence of stock. At Biddenham Loop, Bedford fills of Early/Middle Iron Age features were phosphate-rich and showed micromorphological evidence of animal trampling (Macphail 1999).

Although well-dated deposit sequences are not available from Bedfordshire, results from adjacent counties indicate that the main phases of colluviation in the Chilterns occurred between the early Iron Age and Romano-British periods (Allen and Clark 1991).

Vegetation, foraging and crops

Following the Late Bronze Age *Tilia* decline at Flitwick Moor, Ruxox, there was continued woodland clearance, and expansion of herbaceous vegetation. Just before 2470 $\pm$ 70 BP (Lab no. not given), palynological analysis indicates a reduction in alder carr woodland, and expansion of sedge fen, willows and marginal/aquatic plants (Scaife 2000, 23). This change towards wetter conditions at valley mires, also registered at Warren Villas (Greig 1993), could represent a regional change in hydrology. More widespread woodland clearance could have resulted in reduction in evapotranspiration, and increased surface run-off; alternatively base-level changes at the coast could have affected the River Ouse (Scaife, *ibid.)*

At Salford Quarry, fills of a Late Iron Age pond were analysed palynologically (Wiltshire 2005). The pond was initially dug in an area of open ground characterised by nutrient-poor acidic pasture. A single cereal-type grain was recorded. Subsequently, reduction in Poaceae (grass) pollen and increases in pasture weeds and ruderals was thought to indicate increased grazing pressure. Trees were sparsely represented, though *Quercus* (oak) may have been conserved. Later, there appears to have been a relaxation of grazing pressure and a recovery of *Alnus* (alder), though nearby human activity was registered by abundant microcharcoal. Cereal-type pollen increased in abundance.

Analysis of mollusca from East Stagsden indicated proximity of short, open, dry grassland in the 'Pre-Belgic Iron Age', but a remarkable increase in the abundance of *Vallonia costata* in a Belgic Iron Age ditch. This seems to indicate growth of long, ungrazed grassland – perhaps incipient scrub regeneration perhaps related to abandonment of the settlement (Allen 2000).

Charred remains of spelt and emmer came from Middle and Late Iron Age features at West and East Stagsden: mainly grains with little chaff, which might imply that there was no on-site threshing and winnowing. Other crops included free-threshing wheat, barley, pea and flax/linseed. Hazel nutshell and

Prunus fruitstones occurred sporadically, and there was an associated flora of weeds and wetland plants (Scaife 2000a). Very similar results came from 1st-2nd century AD contexts at East Stagsden. Charred plant material identified from Tottenhoe Castle in the 1930s is still extant in Reading University's Herbarium (Carruthers 1990). The stated identifications now seem questionable, and re-examination might be appropriate. Charred material from Iron Age features at Broom Quarry, Biggleswade included rather low densities of glume wheats (including spelt), with some barley and free-threshing wheat (Stevens undated a). Associated charred seeds of wild plants were mainly of weeds but included some wetland species (*e.g. Lycopus europaeus*, *Carex* sp.). Cremations produced root fragments and *Arrhenatherum* tubers.

Faunal remains

An animal bone assemblage comprising 2348 fragments was collected from the sites at Stagsden (Roberts 2000). The economy was based on cattle and sheep in similar numbers, though bones of horse, pig, dog, chicken, wild birds, red and roe deer, fish, amphibians, and small rodents, insectivores and carnivores were also present. On the evidence of tooth wear, the sheep were mainly slaughtered at the immature and adult stages, implying that meat production was not the priority. 'Placed' burials of dogs and horses were recorded, including an elaborate Late Iron Age burial of a foal and a human neonate.

The possible Iron Age shrine enclosure at Plantation Quarry, Willington produced a bone assemblage mainly of cattle, with sheep/goat, pig, horse, red deer and dog (Clark and Hutchins 1996). A placed burial of a fragmented pig's head was also recorded. A poorly-curated (and consequently incomplete) Early Iron Age bone assemblage from Puddlehill, Dunstable is reported in outline by Plummer (1976). Sheep/goat appears to have been the predominant taxon, with cattle, pig, horse, dog, red deer and bird.

The Roman Period Landscape

Introduction

The earliest records of the county's Roman archaeology are those of John Aubrey in 1666, in *Monumenta Britannica*. Antiquarian discoveries continued until in the late 19th century the work of Worthington G Smith and others began to adopt a more systematic approach to the collection of archaeological evidence. Biased at first towards the south of the county, the balance was somewhat redressed in the 1930s by the work of F W Kuhliche in Bedford. Despite, however, the long interest in the Roman period there are few synoptic works from the region. The fullest account is that by Simco 1984, with Roman sections in regional surveys of Dunstable (Matthews 1963, revised by JP Schneider in 1989) and Luton (Dyer, Stygall, Dony 1964). Unpublished, limited circulation reports or notes on excavations are numerous but few sites have been published in full. Notable examples include the Dunstable (Matthews 1981) and Bletsoe cemeteries (Dawson 1994). A short paper for the Society of Antiquaries Summer School by Baker and Simco summarised the archaeology of the county from the Palaeolithic (1982) onwards whilst recently the Roman landscape was the subject of a paper based largely on unpublished work by Bedfordshire County Archaeology Service during the 1980s and '90s (Dawson 2000). Thematic essays on the Catuvellauni (Branigan 1985) and work in progress reports (Clark and Dawson 1995) provide further data with much information held in either Bedford Museum archives or available at the County's Historic Environment Record.

Over the past two decades the number of Roman sites and artefact finds has increased significantly as a result of PPG 16 led investigation, increasing liaison with metal detector users (Wingfield 1991) and the work of local societies. Many of the problems of dating encountered in the Iron Age are beginning to be resolved for the Roman period (Dawson 2004) largely because of the number of coin finds and detailed ceramic analysis. Yet dating remains a problem within the county with broad date ranges still common in site phasing (*cf.* Allen and Robinson 1993, figs 40, 41).

The infrastructure: small towns, roads and bridges

With the Roman conquest came significant discontinuities in landscape development. The construction of major roads to the east and west of the Bedford region was carried out within forty years of the conquest (Green H J M, 1975, 185) and with these came the infrastructure of imperial posting stations, which provided the focus for the growth of small towns at Dunstable (Matthews 1989) and Sandy (Dawson 1995a, Black 1995). It is generally accepted (Frere 1967) that the two main roads follow the campaign routes taken by the advancing legions during the Conquest.

Early survey work by the Viatores in 1964 suggested the development of an extensive network of minor roads, but critical appraisal showed many alignments followed later boundaries, in particular enclosure boundaries, and many proposed routes have been discounted (Simco 1984, fig 68, and Appendix).

Investigation of the roads themselves has been limited. South of Sandy 19th century market gardening saw the removal of gravel from the line of the Roman road whilst aerial photographs between Biggleswade and Sandy clearly shows the double ditches of the roads *agger* running from the Roman town, skirting the Greensand Ridge then running west of the River Ivel to follow an alignment just east of London Road, Biggleswade before disappearing beneath the current A1. The Watling Street on the western side of the county is beneath the modern A5.

Evidence of minor roads in the county has been found at Willington where a linear alignment of double ditches has been proposed as a local imitation of the larger roads. Several further short double ditched alignments have been found close to settlements which may be droveways (Peartree Farm, BCAS 1995/14). Simco has suggested that many Iron Age routes remained in use in rural areas (Simco 1984, fig 66).

Despite the topography of the county only two river crossings have been proposed. At Sandy a gravel metalled trackway was noted running westwards from the town to wards a probable ford over the Ivel, whilst at Kempston Church End, timbers in the river recorded by the Viatores (route 173c) as Roman were in fact the remains of a bridge built by Sir Edward Cater to provide access to his meadows on the Biddenham Loop.

Two small towns were established on the periphery of the county and each developed a hinterland of villas and smaller settlements. The small town at Sandy is located in an embayment of the Greensand Ridge south of the modern town, east of the River Ivel. It is located on a branch of the Ermine Street which ran between Braughing and Godmanchester. The small town is probably founded on an earlier Iron Age settlement close to the location of three Iron Age hillforts. Two of these were occupied in the earlier Iron Age and the third and largest, called Caesar's Camp, has not been investigated.

Sandy has been partially investigated and seems to have grown continuously throughout the 2nd and 3rd centuries until it extended to over 10ha (Dawson 1995, BCAS 1995/ 32). It was probably established as a posting station or *mansio* (Black 1995) at a ford or bridge over the River Ivel. In the centre of the town was a shallow stream in which several Iron Age

Fig. 4.6 The Roman small town at Sandy as it may have appeared in the late 3rd century (reconstruction by Peter Froste).

coins had been deposited. The stream bank may have been the focus for early development and the stream course was soon filled in. Structures in this area were rectangular, timber framed or post built, fronting a gravel roadway. Later in the development of the town, metalworking zones were identified and waste from these processes was deposited in the stream bed.

On the periphery of the town were at least two cemeteries. One located on Tower Hill to the west, was destroyed when the Great Northern Railway was built and the second was recorded recently to the south on Stratford Road (BCAS 99/45). Within the town several burials were found, one group in a boundary ditch, and a second alongside the gravel road also in the ditches.

In contrast Dunstable, *Durocobrivis,* was established on the Chilterns at the intersection of the Icknield Way and Watling Street not far from an area of late Iron Age settlement at Puddle Hill. The name is derived from the Antonine Itinerary. The ancient line of Watling Street lies beneath the modern Dunstable High Street, which is today flanked by largely historic buildings; consequently no excavation has taken place in this area (Matthews with Schneider 1989). However part of a cobbled road, wells and pits together with chance finds indicate the location of the Roman small town is beneath the modern town centre (Matthews with Schneider 1989, 67).

Like Sandy, Dunstable had at least one cemetery beyond the core of the settlement. This was located 200m south west of the High Street at Friary Field, (Matthews *et al.* 1981) whilst one cremation has been found in the centre of the town. Dunstable may have been founded initially as a mansio midway between St Albans, *Verulamium*, and *Magiovinium*, the Roman fort at Drop Short Farm.

The rural landscape

In the countryside several settlement forms have been identified including linear row settlements, focussed, possibly nucleated farmsteads, and substantial farms or villa sites, the latter generally characterised by stone built houses. A fourth settlement type, the planned village, identified by a gridded layout of gravelled tracks creating rectangular enclosures in which houses, pits and ancillary buildings were located has been proposed at Kempston (Dawson 2004).

The most prominent of the new rural site types in the region, however, are the substantial farms or 'villa' sites. These comprise stone-built houses and are distributed in two areas, one along the Great Ouse valley upstream from Tempsford, and the other in a band approximately north-east to south-west from Eyeworth to Totternhoe. Few of the villas have been investigated. At Newnham Marina the first range was built in the 2nd century, followed by the bath house in the 3rd/4th century, probably at the same time as the east wing (Simco 1987). Further north at Bletsoe, a late Roman cemetery and part of a field system were excavated adjacent to the possible site of a villa, the latter identified with high status finds including a carved stone pillar (Dawson 1994). The site may have been occupied from as early as the late 1st century AD, but the majority of the ceramic assemblage and artefacts dated to the 3rd and 4th centuries. Away from the Great Ouse Valley the villas seem to show a preference for the lighter soils, especially the band of villas in the hinterland of the Chilterns. In this series Totternhoe, a courtyarded villa, has been most extensively investigated and may have been occupied from the late 1st century AD until its 'heyday perhaps around AD300', but by the mid or late 4th century the east wing had been dismantled with some speculation that partial occupation continued into the 5th century (Matthews *et al.* 1992, 64). A second example at Aston Well may have been occupied from the early 2nd century.

The two groups of villa sites, although exhibiting considerable variety in their individual designs (Simco 1984 25-29), all fall within the range of site types familiar from southern Britain (Rivet 1966, Black 1987).

The second major rural site type of the period may be that represented by Kempston. The form of the settlement with its metalled trackways, gridded layout and Roman-style structures was probably founded shortly after the conquest. No other site like this has been investigated in the county and it may have been a planned settlement.

The third form of settlement has been more extensively investigated. It is characterised by sites like Ruxox (Dawson 2004) and Eastcotts (BCAS 1995/14 and forthcoming) and comprises a series of enclosures in a linear alignment. These are most commonly found in first terrace locations parallel to a river or stream course, although Ruxox is perpendicular to the river suggesting some variation. Some of these sites seem to have been occupied from the before the conquest and to have been established during the currency of Belgic-style ceramics. They remained in occupation at least until the end of the Roman period (Dawson 2000, fig 10.10).

The final type of site is the farmstead, for which excavated evidence is sparse. At Norse Road, Bedford a promontory above the River Great Ouse was

occupied, possibly episodically, from the early Iron Age until as late as the 4th century AD. Comprising enclosures formed around a farmstead, the site was similar to the valley-bottom site at Peartree Farm (BCAS 1994/11), which was occupied from at least the 1st century BC until the 4th century AD. A third example is Odell where site B, a farmstead of two round houses with a separate enclosure, was occupied from the end of the 1st century AD (Dix 1982). As well as these excavated examples, there are several potentially similar sites known from aerial photography (Simco 1984, fig 64).

Settlement Density Estimates of settlement density are still increasing as sites continue to be discovered through PPG16-led fieldwork and as more cropmark sites are revealed on the claylands (Clark and Dawson 1995, Coleman *pers comm*). Perhaps the most significant observation is that during the Roman period the number of occupation sites may fall in comparison to the late Iron Age. Further research is clearly necessary, but one factor may be that late Iron Age settlement was more dispersed and that in the Roman period settlement was subject to enclosure or emparkment. For instance, where large scale excavation has taken place on the Biddenham Loop and at Willington, there are no direct Roman successors to several smaller sites occupied in the Iron Age. At Biddenham only a single Roman site (HER 3226) developed within the whole Loop area, whilst at Willington there is no Roman successor to the Iron Age sites, only a new settlement at Mill Farm. In both areas, however, villas were established nearby, probably by the 2nd century AD.

The dispersal of villa sites suggests the potential to identify estate boundaries. Two methodologies are popular, the use of Thyssen polygons and the reconstruction of parish boundaries (Hunn 1996). Both approaches assign to the villa the role of central place within a dependent hinterland, and both acknowledge the importance of site catchment (Higgs and Vita-Finzi 1972). The mean figure 4659ha, generated for estate size is much larger than the estimates for Gorhambury and the villas in the area around Verulamium (Neal, Wardle and Hunn 1990, 99-100), but closer to Gatcombe (Branigan 1977).

Significantly, many of the smaller Roman period settlements seem to cluster either close to the villas or are on the periphery of potential estate boundaries and may represent tied or 'model' estate villages a suggestion raised with respect to two sites, Ruxox and Kempston, both close to known villas. The dispersal of peripheral sites could suggest the location of subsidiary settlements at a distance from the estate centres providing easier access to outlying areas, but might equally result from settlement in marginal areas away from an estate centre.

Despite the possible development of estates based on villa centres, the pattern of Roman period settlement does not seem to have been accompanied by extensive sub-division of the landscape. Only restricted areas of field enclosures have been identified from the period (Simco 1984 Ills 64). Suggestions that areas around Biggleswade were subject to centuriation (Bigmore 1979, fig 3) can be dismissed, as excavation at Warren Villas (Dawson and Maull 1996) demonstrated the field boundaries used in this example field were of Roman *and* Iron Age date.

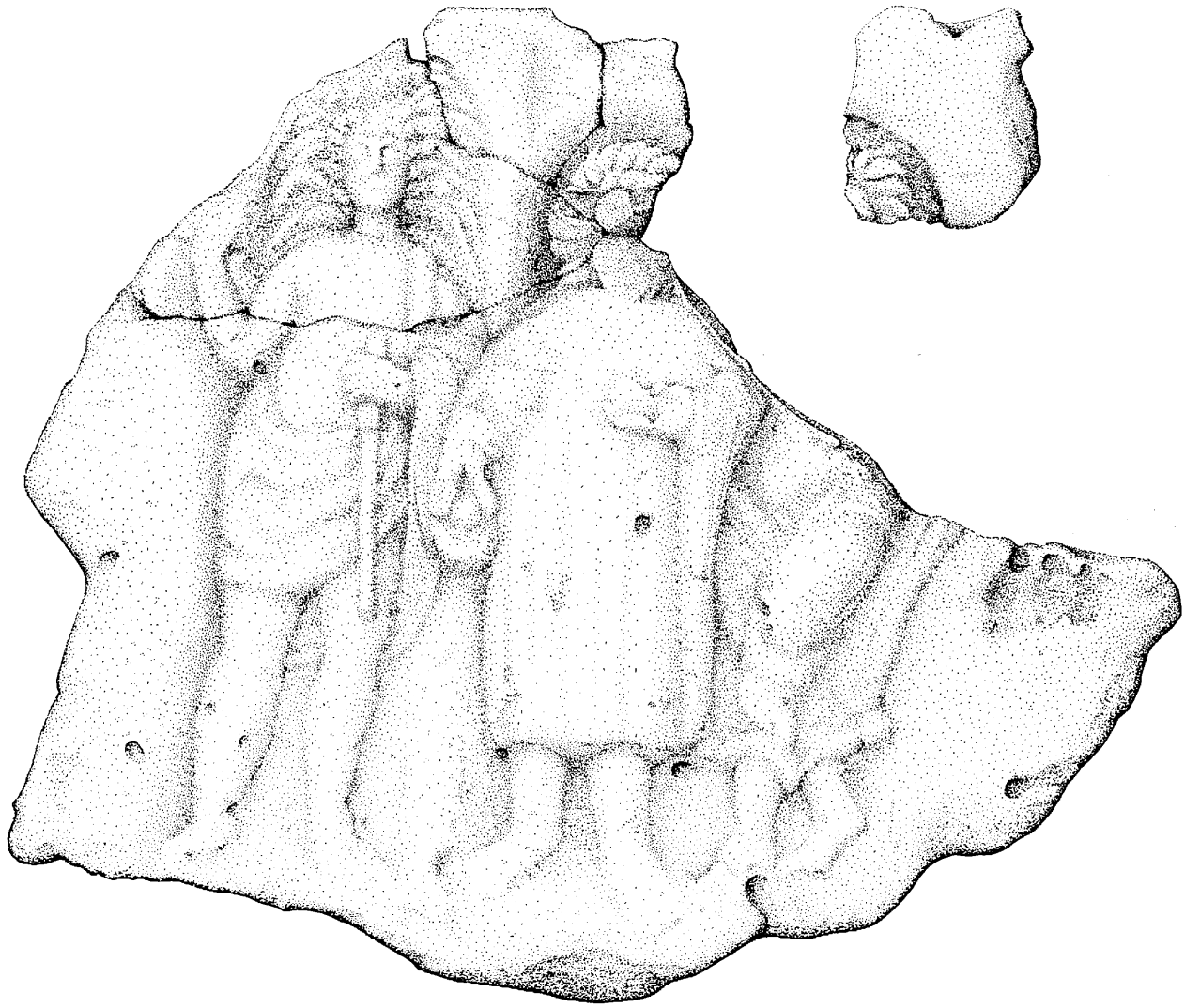
Fieldwalking in the south of the county around the Roman town of Dunstable has identified a further pattern of settlement in the Romano-British period. In this area individual farmsteads, identified by scatters of tile, pottery and stone, are found approximately 1km apart (Hudspith 1995, fig 56), suggesting some nucleation in the settlement pattern focussed on the town. Of considerable potential is the presence on most sites of late Iron Age ceramics hinting at the possibility in some areas of an underlying pattern of rural settlement (Hudspith 1995, fig 55).

Ritual, religion and burial.

Simco's 1984 survey drew attention to the variety of sacred sites in the county. The most important was considered to be Ruxox from where fragments of pipeclay figurines of Venus had been recovered. More recent excavations (Dawson 2004) recovered further evidence of this cult close to the river Flit. In addition to the figurines, a large quantity of intaglios strengthens the case for the location of a temple or sacred site. At Sandy, a watery hollow venerated in the late Iron Age, noted above, probably continued to be venerated for a short time in the Roman period. However the stream bed was soon filled with waste from the growing Roman small town, whilst the discovery of a large figured sculpture in local stone (Appleton Dawson 1995), suggests a temple, established in a different location, may have become a focus for the Roman town by the 2nd century.

Watery locations venerated in the Roman period have also been noted between Chalgrave and Toddington; at Shirrell Spring near Totternhoe; at Roxton at the confluence of the Ouse and Ivel rivers; at Bidwell, where there may be a late Roman temple and at Odell (see below).

Ritual shafts have also been noted in the county at Maiden Bower in 1859, and possibly at Biddenham, whilst a shallow stone lined pit at Stagsden may be



A large stone relief from the Roman town of Sandy. It is a votive piece containing Classical and Celtic elements possibly representing a goddess and two flanking offerants. Sculpted in local ironstone 1.10m x 1.20m (from Atherstone and Dawson 1995, ills. M. Trevarthen).

a very early Roman period example (Dawson 2000, Webster 1997).

A less certain part of ritual process is the deposition of hoards. Several are known from the county including bronze bowls (Kennet 1971, 74) and ironwork (Manning 1964) from Sandy. Simco noted coins hoards from Flitwick and Poddington, with later hoards from Tingrith, Cranfield, Kempston and Totternhoe (Simco 1984, 72). Recently two large hoards have been discovered at Haynes (DCMS 2000, no 137) and Shillington (DCMS 2001, no 283), with a dispersed hoard found at Sandy during excavations in the 1980s (BCAS 1995/32).

The Shillington hoard (DCMS 1999, 283), which was found by metal detectorists, contained 127 gold *aurei* coins ending with Vespasian, and is the largest hoard containing gold coins from 1st century Britain. It is contemporary with hoards that also contained gold coins in Kent and Norfolk (Williams and Burleigh 1999). The hoard was located amongst a series of enclosures and buildings of Roman date, but the reason for deposition remains uncertain. Nearby, possibly in the same location, a second smaller hoard was also discovered at Shillington in 1998 (DCMS 2001, no 284) comprising 18 silver denarii, but its relationship to the larger hoard is unknown. In contrast the hoard recently found at Haynes, comprising some 449 silver coins, 3 silver spoons, 2 gold rings and several silver rings is most probably a founders hoard dating to the early 5th century. Although no analysis of the three recent hoards, (including Sandy), has been undertaken, there is considerable potential to use the

patterns of coin deposition to characterise site types and to determine relationships between sites (Guest 2004).

Significant advances have been made in recent years with the discovery and publication of cemeteries at several locations. From the towns, burials have been found in groups within the settlements; in formal cemeteries; or as isolated cremations or inhumations within the settlement area and immediate hinterland. At Dunstable there is a large late Roman cemetery at Friary Field, where some of the burials were in ditches around the cemetery. Twelve out of 112 burials in the cemetery had been decapitated. A similar phenomenon was noted at Kempston, where 12 out of 92 individual burials within an enclosed cemetery were decapitated (Boylston *et al.* 2000). At Dunstable there may be a second cemetery on the eastern side of the town in the area of Kingsway (BCAS 1994/18), but within the settlement area only a single cremation (Schneider 1989, 73) has been discovered. The latter probably reflects the lack of access to the core of the town. In Sandy the presence of burials within the town has been noted above but it is significant that Sandy also perhaps supported two external cemeteries, one to the south (BCAS 1999/45) and another to the north west, at Tower Hill (Johnston 1974).

The number of rural cemeteries investigated has also risen over the past decade. Early cremation cemeteries have been published from Deepdale (Dawson and Slowikowski 1988) and Harlington (Dawson 2001), whilst a 1st century cremation accompanied by Samian and a glass jar was recovered from Fairfield, at Arlesey (BCAS 1997/12). Isolated cremations placed in urns, buried amongst fields, have been recovered from sites including Warren Villas (Dawson and Maull 1996), Kempston (2004) and Biggleswade (HER 177). Amongst the isolated burials are those of ritual significance like that from Odell, where the head and neck of a woman had been deliberately placed behind the wicker lining of a well. Rural cemeteries are represented by Bletsoe (Dawson 1994), which contained some 56 inhumations from the late Roman period, and Kempston where 92 inhumations date from the 2nd century onwards (Dawson 2004).

In publishing the cemeteries the focus has been on human bone analysis and layout but considerable potential exists to compare cemetery traditions across the region. Many of the burials clearly have specific ritual elements such as decapitation, orientation or grave goods and further work will be required into these aspects.

Little work has focussed on the ritual codes underlying the Roman period even in the context of burial. The disposal of children beneath the eaves at Kempston and the rite of decapitation in burials at Dunstable and Kempston (Bolyston *et al.* 2000) are perhaps the clearest examples of ritualised behaviour, whilst cremations at Fairfield accompanied by partially broken pots indicates the ritual 'killing' of objects (Wait 1984). No work has been carried on building orientation or the dispersal of buildings comparable with the Iron Age settlement at Salford (Dawson 2005).

Trade and economy

The economy of Bedfordshire in the conquest period was firmly agricultural. Unfortunately few of the excavated farmsteads in the county have been published. In particular the site at Odell, which could provide a valuable insight remains in manuscript, as does that for Warren Villas near Sandy. Several sites from the Bedford Southern Bypass project are nearing publication.

Early pottery kilns are known from Stagsden, (Dawson 2000), and Warren Villas (Slowikowski and Dawson 1993). These were small production sites and were located on farms, a production type which Vivien Swan has suggested may have been aimed at the early Roman military market. Later production centres are known from Lodge Farm, Harrold, which produced predominantly shelly wares (Brown 1994); Mile Road, Bedford (Dring 1971); Bromham (Tilson 1973); Foxburrow and possibly Walauds Bank, but little analytical work has been carried into the extent of their distribution. Fine wares, such as Samian, had been imported before the conquest and this trade increased in the late 1st century. Other imported finewares such as Rhenish wares were imported from the conquest period onwards. Specialist vessels such as mortaria were also imported initially, until more local sources developed. Amongst the most significant indigenous imports in the county are Nene Valley Colour Coat and Oxford wares. Tile production may have occurred on site at Newham (Simco 1984) and possibly at Kempston, but by the 2nd century and again in the 3rd to 4th centuries the kilns at Harrold seem to supply a large area of northern and central Bedfordshire (Brown 1994, 105-6). At Totternhoe in the south yellow *tegula* may have been made locally, whilst patterning on fragments of *imbrex* indicate them may be part of a distribution including Bidwell, Beds., Park Street, Herts., and Piddington, Northants (Matthews *et al* 1992, 90).

Iron working sites (Hall and Nickerson 1966, Hall and Hutchins 1972) have been surveyed and smelting sites noted at Bletsoe and Radwell, whilst there is evidence for smithing at most Roman period settlement sites.

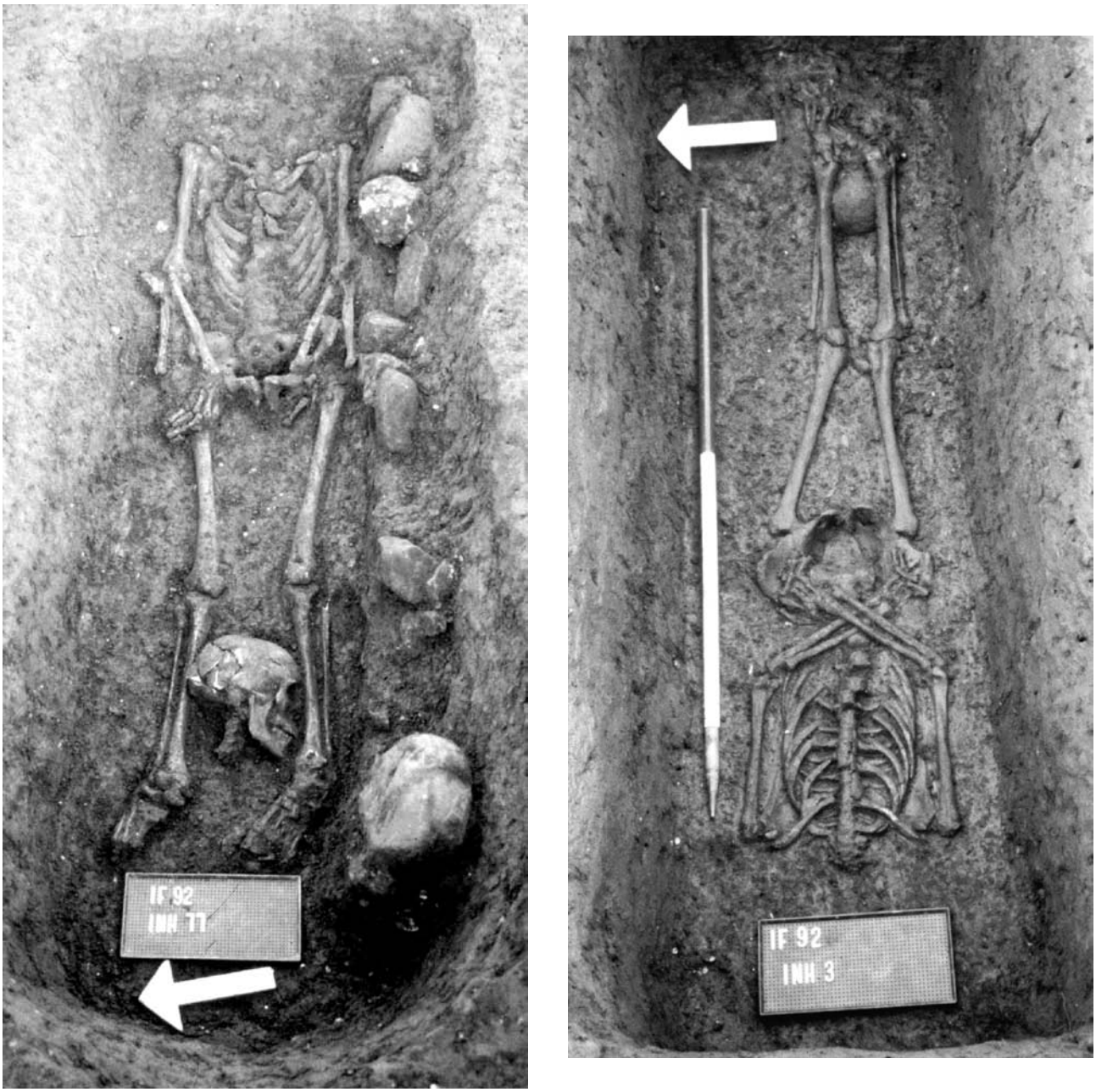


Fig. 4.7 Decapitated burials from the Roman cemetery at Kempston (Dawson 2004, Figs 5.123 and 5.140, inhumations renumbered in post-fieldwork analysis as 3903 and 3977, photographs by permission of Albion Archaeology),

Copper alloy objects are found at most Roman period settlement sites, however production sites are few. At Sandy bronze working was evident from failed castings, part of a brooch, still in the clay mould was found on site. Both lead and silver working may have been practiced at Sandy (BCAS 1995/32).

Quarrying in Bedfordshire, which has limited stone resources, has not been studied. Site finds, however, attest the extraction of sandstone for building and, in one spectacular case, for sculpture at Sandy (Appleton and Dawson 1995), whilst gravel for road metalling in the Sandy area must have been extracted from the River Ivel nearby. Limestone used for building at Newnham and Kempston clearly came from a local source, probably from the limestone ridge running southwards from Stagsden just to the west of Kempston. Stone for Newnham may well have been loaded onto barges at Kempston for the short journey eastwards.

Articulating the landscape

The dispersal of the villa sites, the location of the known secondary settlements and the framework of roads and small towns, suggests the development of a landscape in which there is a hierarchy of settlement. Within this landscape the disposition of sites hints at the ties of obligation. Such ties may be based on patronage, landownership or embedded social obligations which originated in the pre-Roman period. At Kempston the possibility of a military component to the settlement (Boylston 2004) may indicate formal veteran settlement or the return of an indigenous group after military service. At the linear row settlement at Ruxox the artefact profile suggests functions incompatible with a purely rural site and therefore may imply a dependent relationship between this site and a nearby villa.

The evidence of published site reports suggests that the early articulation of the Roman period landscape was the result of tension between conservative and radical attitudes amongst the indigenous population of the conquest period. Such trends have been noted in the ceramics assemblages, and dynamic factors are evident in the adoption of Roman building practice especially in the growth of villa estates within three generations of the conquest. The pace of change doubtless lay with the willingness of indigenous populations to adapt to the new conditions of the conquest and there is some indication that local elites were prepared to adopt Roman practice from the beginning. At Stanfordbury (Simco 1984, 117), and probably Old Warden (Fox 1923, 96, 98-99), two inhumations rich in Roman artefacts, in the Aylesford-Swarling tradition, were deposited just after the conquest. Yet the everyday tensions in the process and progress of acculturation can perhaps best be seen in the changing character of the ceramics assemblage, where Iron Age tradition and Roman practice were soon in competition.

The first recognisably Romano-British pottery appeared at both Ruxox and Kempston in the first phases of occupation, and has already been used to suggest that these sites were occupied during the conquest period. At both sites new local industries were soon clearly represented, and by the 2nd century grogged wares, characteristic of the Belgic styles ceramics, were gradually superseded by sandier fabrics which, although retaining some grog, were generally much finer. By the 3rd century, however, differences between the sites had developed. Initially appearing in small quantities at Ruxox, reduced wares reached a high in phase 3 (2nd century AD), whilst at Kempston they peaked in phase 4 (early to mid 4th century AD). If the differences between the proportions of reduced wares seem to reflect the willingness of the communities to adopt new forms, a second trend evident from the conquest period is the increasing competition between producers.

Whether coinage provided the medium of exchange from the earliest period of occupation throughout the region is unclear. At Kempston, one of the few sites where the coin-loss profile has been analysed (Guest 2004), the assemblage is similar to those at Shakenoak, Ashton and Canterbury, and it shares some similarities with patterns from Frocester Court, Silchester and Wanborough (Reece, 1995, fig 24), all of which used coin from the post-conquest period onwards. Moreover, the late 4th century use of coin at Kempston not only distinguishes this site from many in eastern Britain, but suggests it is part of a wider pattern of coin use which saw a gradual shift to western Britain during the last half of the 4th century. In contrast at Ruxox, a second site where the coin profile has been analysed, 31 coins produced an entirely different pattern of coin use (Guest 2004). It was characterised by fewer coins than expected until the Hadrianic period, after which the trend is slightly upward until the mid-3rd century, with a series of high peaks of coin loss extending from the late 3rd century through to the 340s AD, followed by a sharply downward trend immediately afterwards. Similar coin-loss patterns have been recovered from Caistor by Norwich, Catsgore, Malton, Dorchester and Henley Wood (Reece 1995, fig 18), once again representing a wide diversity of settlement forms including towns, rural, military and religious sites. The size of the coin assemblage precludes any firm conclusions, although the comparison with two civitas capitals and a fort, both important regional foci of coin use, suggests that Ruxox may have been a particularly Romanised centre in the otherwise rural landscape of mid Bedfordshire.

The comparisons noted for both Kempston and Ruxox suggest a complex pattern of coin distribution and usage in the county. Clearly this may be the result of bias in the coin assemblages, and whilst coin lists from only partially excavated sites cannot be used to determine whether a site falls into a recognisable category (Reece 1995), it may be possible to determine whether they are part of a wider regional trend.

The End of Roman Bedfordshire

By the late 4th century three hundred years of Roman rule had transformed the landscape of the Bedford region from one in which settlement had been small scale, with no discernible hierarchy, into a structured landscape dominated by extensive villa estates. From the inception of the Roman province, the development

of the Bedford region was similar to that of the wider region of the middle Great Ouse. The development of an infrastructure of roads, provincial capitals and *mansiones* may have fossilised the final tribal situation of the Late Iron Age, possibly leaving an isolated frontier area, distant from Verulamium and Leicester, open to exploitation. The impetus towards development may have come from a variety of sources and the military character of the 3rd century community at Kempston may even suggest veteran settlement, although indigenous elite activity or planned expropriation of the type historically attested at the Boudican revolt doubtless had a role to play (Tacitus Agricola 15). Nevertheless, there is no evidence for the development of imperial estates or centuriation and only the pattern of the villa estates suggests an underlying trend. Whether the development of large estates, the possible pairing of linear settlements with 'villa' centres and the disposition of minor sites (either clustering around the centres or on the periphery of notional estates) indicates dependent ties between the communities remains to be demonstrated on a wide scale. Nevertheless the articulation of this landscape, despite the geographical uniformity of the area, was, in detail, influenced by the location of individual sites and is explicit in the variance between the coin-loss profiles and the ceramics supply.

Historically the final decades of Roman Britain were harsh episodes of revolt, invasion and restoration (Jones 1997). In the area around Verulamium the decline of villa sites seems to have begun in the last quarter of the 4th century, precipitated by the revolt of Magnentius but due to more 'complex economic problems' (Neale *et al.* 1990, 95). There is, however, no clear evidence of this occurring in the Bedfordshire region. Conversely there is little evidence for the later Roman period in the Chilterns, but this is probably a reflection of modern archaeological activity rather than the late/post-Roman period. In the wider region the evidence of potentially late Roman/early-5th century activity includes late Roman zoomorphic belt sets recovered from Farndish, Sandy and Podington, whilst burials which form the latest horizons at Sandy, Dunstable, Toddington and Bancroft are comparable with those from the Kempston cemetery (Wingfield 1995, 32-35). Development continued in the final Roman phase at Kempston and Ruxox and the late incidence of coin loss distinguishes the area from trends in eastern Britain. At the end of the Roman period, therefore, the structured landscape of the Bedford region seems to have remained intact.

Environment And Economy

Peter Murphy

Soils and geoarchaeology

A buried ploughsoil was recorded at Warren Villas in the Ivel Valley, showing unidirectional ploughmarks (Dawson and Maull 1996; Robinson 2001). Preservation of macrofossils by waterlogging indicated high groundwater levels. This, together with the presence of *Spergula arvensis*, a common weed of flax suggested cultivation of that crop. Subsequently, in the later Roman period a continued rise in the water table resulted in abandonment of cultivation, and widespread peat formation under open fen meadow vegetation. A very similar sequence of events was registered at Biggleswade West (Robinson 1994). Robinson (1992) has presented a wider consideration of hydrological change in the Ouse catchment, and the South Midlands generally. The substantial rise in the water table during the Roman period is attributed to extensive woodland clearance, with consequent increased run-off and reduced evapo-transpiration.

At Eastcotts on the Bedford Southern By-Pass, micromorphology and chemistry were interpreted as indicating initial erosion and colluviation of the argillic brown earths of the river terrace (probably relating to Early-Mid Roman agriculture), then occupation, and finally burial of the site under flood silts and colluvium. There was manured cultivation during this latter phase (Macphail and Cruise 1997). Similarly, at Haynes Park argillic brown earth slope soils had become unstable by the 2nd century AD, under a manured arable regime, and this was followed by colluviation and lynchet formation (Macphail and Cruise 1997a). Fills of Roman ditches at Biddenham Loop, Bedford had moderate amounts of organic matter and were phosphate-rich, reflecting manuring or the presence of livestock. Ratios between inorganic phosphate and total phosphate in ploughsoils at Warren Villas were also thought to indicate manuring, though full analysis has yet to be completed (Macphail e*t al.* 2000).

Vegetation, foraging and crops

Palynological analysis of a Romano-British ditch at Ruxox indicated proximity of alder carr woodland, and also persistence of lime woodland in the area. High frequencies of cereal-type pollen, with weeds and grassland species reflect local agriculture (Scaife 2000, 23-4). The topmost sediments of the pond at Salford Quarry might be of Romano-British date

(Wiltshire 2005). At this site there was evidence for both grazing and cereal production/processing). Tree and shrub pollen types were virtually absent in 2nd century AD palaeosols and colluvium at Haynes Park (Macphail and Cruise 1997a, Cruise and Macphail 2000). There was palynological evidence both for grassland (high percentages of Poaceae (grasses) and Lactuceae (dandelion family), and some cereal production/processing.

A 1st century well, 1st-2nd century quarry pit and sump at Odell were analysed for insects (Girling 1983). The well and quarry pit produced rich insect assemblages. Most are likely to have been resident in the well, but dung beetles and phytophages were recorded. Overall an open agricultural landscape was indicated. The fill of the quarry pit produced more direct evidence of beetles associated with buildings, including pests of stored food (e.g. *Stegobium paniceum*), and *Anodium punctatum* (woodworm beetle).

Scaife (2000, 24) has reported charred plant remains from Stagsden, Bedford Southern Orbital Sewer and Ruxox: crops included spelt, emmer, barley and oats. At Sandy, a large collection of archaeobotanical samples has been assessed by Robinson (in BCAS 1996). Charred wheat grains predominated, with sparse chaff of spelt, and some six-row hulled barley. Other crops included pea, probably *Lens culinaris* (lentil), *Vitis vinifera* (grape) and *Prunus avium* (cherry). Charred macrofossils of weeds and damp ground plants were associated, and some of the material could represent thatch or litter.

Faunal remains

Faunal remains from the pottery and tile-producing site at Harrold comprised 945 identifiable fragments, mostly of cattle with some sheep/goat. A few bones of pig, horse, deer, dog, hare and chicken were present. The material was very fragmentary, and some bones were chopped, gnawn or burnt (Orr 1994).

2nd century faunal remains from a 9m deep 'cesspit' at Dunstable included cattle, sheep and horse or mule, dog and chicken bones, but also a remarkable placed deposit. This included neonatal bones of sheep, cattle and dog skeletons with remains of neonatal puppies, bones of the white-tailed sea-eagle (*Haliaeetus albicilla*) and raven (*Corvus corax*), and a human infant less than six months old, besides remains of small rodents, amphibians and water vole (*Arvicola amphibius*) (Jones and Horne 1981).

Late Roman material from the Bletsoe cemetery (518 fragments) was principally of cattle, with sheep/goat, pig, dog and horse (Clark 1994), apparently nothing more than typical domestic refuse.

Excavations at the Roman town of Sandy in 1988-91produced a substantial faunal assemblage, overwhelmingly dominated by cattle, with horse, pig, sheep/goat, dog, deer, chicken and goose; sieved samples included remains of rodents, birds, fish and amphibians. Most of the material was thought to represent butchery waste, though full analysis has not yet been completed (Roberts, in BCAS 1996).

Human remains

During rescue excavations at Radwell gravel pits, two adult (probably female) Belgic skeletons and cremations of Early Iron Age and Roman date were recorded. Unburnt bone survived very poorly in the acid sandy soil (Hall 1973). A cremation from Willington was of an adult, but no further information could be obtained (Stirland 1986). Burials of infants under six months were recorded from the Roman villa at Totternhoe (Jones 1992), and a fragmentary adult extended inhumation and cremations from Roxton (Denston 1983).

Shallow burials of twelve men, four women and two children at Galley Hill, Streatley are dated on coin evidence to the 4th century AD (Dyer 1974). Several of the skeletons were incomplete, and some appeared to have been dismembered or mutilated – though not necessarily ante-mortem (Powers and Brothwell 1974). Some animal bones were associated, but may have been re-worked from earlier deposits. The group is plausibly interpreted as representing a massacre. Another example of irregular burials came from a deep well at Dunstable, dug in the 2nd century AD, and remaining in use for more than one hundred years. A cremation and parts of skeletons were found at depths between 4.88m and 21.95m, representing an elderly female, two adult females, two adult males and a male of about 14 years. Skulls predominated; two of them had mediofrontal sutures, perhaps suggesting genetic relationship. (Jones 1972). It appears that the surface depression left after collapse and infilling was used for interring the cremation, and later for mass inhumation. Collapse whilst these bodies were only partially decomposed led to disarticulation. Somewhat similar unorthodox burials were recorded from another site in Dunstable, close to the junction of Watling Street and the Icknield Way (Jones and Horne 1981), where a adult female and male were buried in the top fill of a partly-infilled cesspit. Later subsidence resulted, again, in disarticulation.

A more conventional Late Roman cemetery was excavated nearby at Flory's and Friary Fields, Dunstable (Jones and Horne 1981a). 112 complete or partial skeletons were examined, comprising 46 adult males and 40 adult females, with infants and juveniles. 25% of the skeletal population had died before 20 years, whilst 50% of females died between 20 and 30 years, presumably representing deaths in child-birth. Adult mean heights for males were 167.8cm, for females 159.6cm. Dental caries and tooth-loss were recorded. Healed fractures, twelve beheadings and one facial 'sword-slash' injury were noted.

Twenty nine inhumations were recovered during the excavations at Sandy, including a high proportion of infants (Jackman, in BCAS 1995).

The very Late Roman (late 4th-early 5th century) inhumation cemetery from Bletsoe comprised 54 graves, with 25 male and 21 female adult inhumations and four infants identified. Estimates of mean stature were: males 5ft 7in; females 5ft 2in. Incidence of dental caries was similar to that from other Iron Age and Romano-British populations, and periodontal disease was widespread. Dental enamel hypoplasia, indicative of childhood stress, was noted on 22 individuals. Arthritic conditions and traumas were recorded. Some continuous (non-metric) traits implied genetic relationship (Denston and Duhig 1994).

Technology

At the small town of Sandy, there was evidence for both ferrous smithing (dense slags, hearth bottoms, iron-rich cinder and hammerscale) and copper alloy melting and casting (BCAS 1996; Starley 1993). Roman copper alloy brooches from the town were analysed quantitatively by X-ray fluorescence: Nauheim derivative brooches were bronzes, whereas Langton Down, rosette, Hod Hill and one-piece Colchester brooches were predominantly brass. Trumpet-headed brooches were of brass or gunmetal, with silver inlay and tin solder. The leaded brass composition of enamelled bow and geometric plate brooches implies a continental origin (Bayley 1995).

Petrology

A rotary quern from the villa at Totternhoe was characterised as lava from the Niedermendig area, by means of petrology and XRF analysis (Williams-Thorpe 1992). At the pottery and tile-producing site at Harrold, studies of lithology and fossils from a yellow sandy marl with limestone clasts demonstrated that this Jurassic deposit at the site was indeed a raw material used for ceramic production (Clements 1994). Petrological analysis (Woods 1994) enabled sub-division of fabrics in relation to clastic inclusions.

Quernstones and honestones from Roman Sandy were derived from a wide variety of sources, including Mayen/Niedermendig lava, Hertfordshire Puddingstone, Millstone Grit, Quartz Conglomerate probably from the Forest of Dean, Pennant Sandstone, and Greensand (Williams 1991). Amphora sherds from the town, identified largely on morphological characteristics, with reference to petrology, originated in southern Spain and the Lyon area. The main amphora-borne commodities reaching the town are thought to have been olive oil and wine, and perhaps olives or defructum (Williams 1989).

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5 'ANGLO-SAXON' AND MEDIEVAL BEDFORDSHIRE – AD400-1550

Matt Edgeworth

Introduction

The period from the end of Roman rule to the dissolution of the monasteries spans over eleven hundred years, and it is clearly necessary to divide the period in order to deal with the considerable amount of archaeological evidence. Here 1066 is taken as a convenient half-way point, reflecting the conventional division into Anglo-Saxon (pre-conquest) and medieval (post-conquest) periods. Some reservations are raised, however, over ways in which this established framework distorts archaeological evidence, and suggestions will be made as to how such problems could be overcome. In particular, there are growing concerns that the use of the blanket term 'Anglo-Saxon' may have led to a whole period of post-Roman interaction between British and Saxon populations being effectively 'squeezed out', and there is an increasing realisation that the impact of Danish settlement in the region may have been underestimated. Issues associated with the transition from the Anglo-Saxon to the medieval periods arise almost entirely from our system of categorisation rather than from the archaeological evidence itself. Recently excavated sites like Stratton and Tempsford have shown that sites we normally think of as medieval (such as deserted medieval villages or moated manors) may have developmental histories going right back to the middle Saxon period and beyond.

The 'Anglo-Saxon' Period

Previous Work: An Overview

Previous attempts at synthesis of Anglo-Saxon material were made by Morris (1962), Bilikowska (1980) and Wingfield (1995). There is an inevitable emphasis on 5th –7th century cemeteries and the evidence of grave goods, together with issues regarding early settlement of the region. Bilikowska provides a useful account of the geological and topographical background to settlement and a discussion of place-name evidence. Wingfield's review is by far the most comprehensive and up-to-date, focusing mainly on evidence from the south of the county. The apparent bias towards cemetery sites reflects in part the difficulty in identifying actual settlements on the ground, and the poor survival of the structures and artefacts of everyday life in the archaeological record. None of the synthetic work deals with evidence from the later Saxon period.

No systematic county-wide survey of either part or all of the period exists. This urgently needs to be undertaken to take account of the number of excavations, both rural and urban, which have taken place in the last fifteen years. Much of the more recently recovered evidence comes from post-PPG16 developer-funded fieldwork, though many have yet to be published. These have helped counter former imbalances to some extent and much more evidence of settlement is now emerging. Modern development-led archaeology has introduced its own bias and the gravel terraces of the river valleys tend to be targeted while the potential of the clay upland has barely been tested. We are still a long way from achieving anything like a balanced overall view.

In the past, the greater number of pagan cemeteries in the south of the county tended to draw attention away from the north, to the detriment of a holistic view. This is a pity, because Bedfordshire in its entirety is in many ways the ideal regional unit of study. Although it did not exist as an entity at the beginning of the period, the shire (with its external boundary and its administrative/ecclesiastical organisation of hundreds/parishes, centred on the burh of Bedford) is a product of the so-called Anglo-Saxon period – crystallising into something like its present form in the 10th century.

Late Antiquity: A New Period for Bedfordshire Archaeology?

On the surface there is little survival of the Romano-British way of life. Sandy and Dunstable both seem to have fallen completely out of use during the 5th century, with burials in the upper fills of ditches taken as evidence of collapse of old systems. Few excavated Romano- British sites show continuity of occupation into the Saxon period. Discontinuity seems to be the norm. Villas at Newnham (unpublished) and elsewhere appear to have gone out of use by the end of the 4th century (Simco 1984), with Saxon sherds

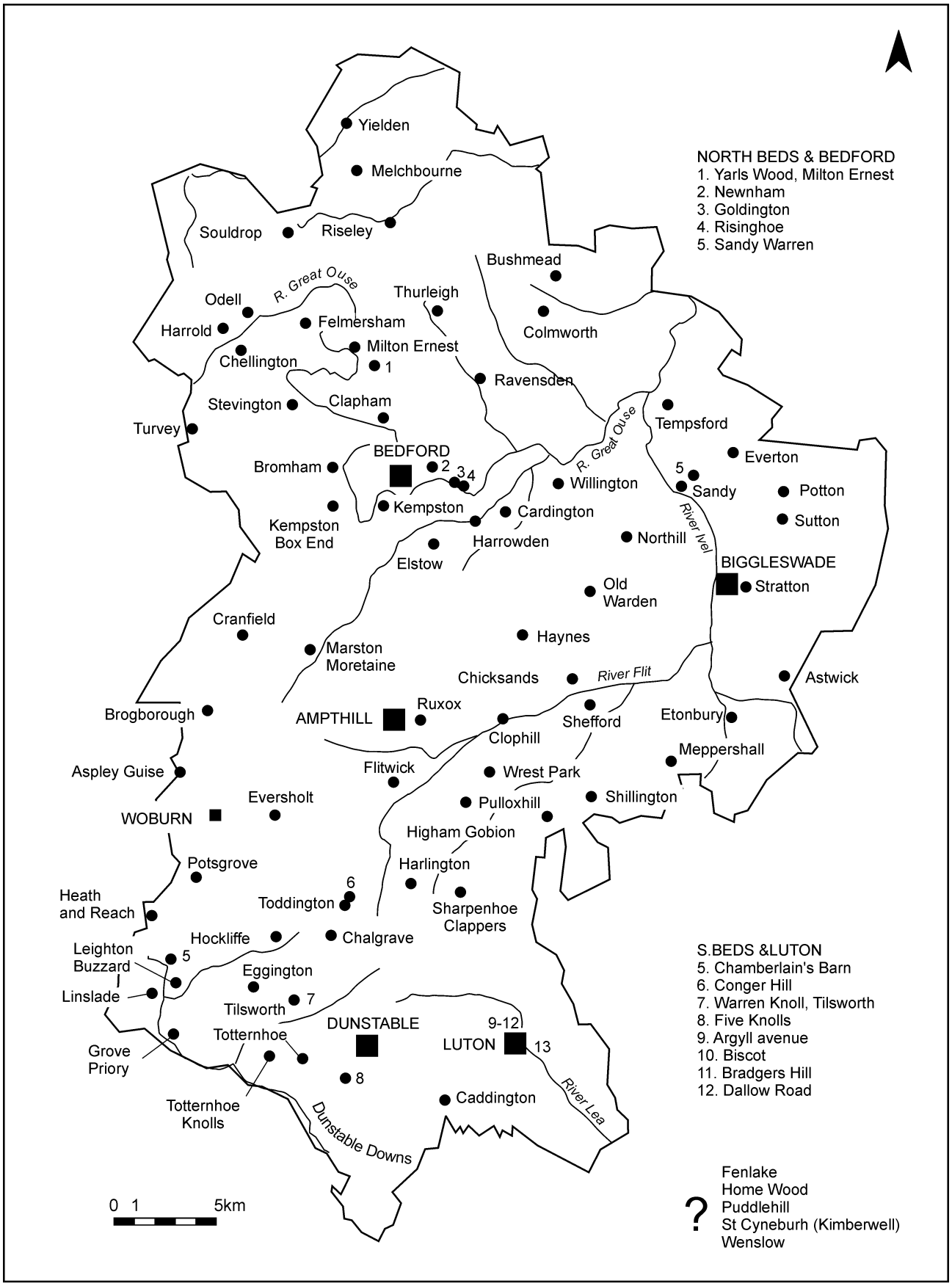

Fig. 5.1 Location of places mentioned in the text: Anglo-Saxon and Medieval AD 400-1550.

found in demolition deposits (though see Matthews *et al*, 1992, for evidence of some late re-building and re-use at Totternhoe).

On the other hand, three Saxon cemeteries with 5th century burials – at Kempston (Kennett 1986), Luton (Morris 1962) and Sandy (Kennett 1970)- are all in the vicinity of known small Roman towns (or, in the case of Kempston, a large rural settlement – see Dawson 2004). This may suggest the commissioning of *foederati* to protect British settlements (Kennett 1986) – although there are numerous alternative explanations for their presence (as invaders, settlers, traders, servants, refugees, etc). The place-name of Kempston is thought to combine British and Saxon terms (Wood 1984); its survival may imply a degree of continuity. Place-name and archaeological evidence for the transitional period after the end of Roman rule is reviewed by Simco (1984, 70-75).

The impression of an abrupt change may be partly the result of the cessation of coin and pottery production in the late 4th century, leaving little for the archaeologist to use as dating material. Discontinuities are also suggested by the way in which some Romano-British farm sites on floodplains seem to have gone out of use. This may have been partly due to climate change and a rise in water levels, as well as the general collapse in the Roman economy and a corresponding fall in agricultural production. But at the same time it is generally accepted that many field systems and other features of the landscape must have continued in use. Recent excavations by Albion Archaeology at Clapham (in progress) have revealed early sunken-featured buildings (SFBs) apparently situated inside a Romano-British enclosure (though after some of the ditches had silted up). Iron Age and Romano-British boundaries seem to have had some influence on the shape of the Saxon settlement at Stratton. At Odell, wells dug in the middle Saxon period apparently respected late Romano-British boundaries (Dix 1985).

The model of the wholesale replacement of the Romano-British way of life by that of the Anglo-Saxons in about AD 450 has been dominant for the last 50 years, but some of the assumptions that support it are increasingly being challenged. As Simco (1984) has put it, "Occupation of a site may appear to come to an end at the end of the 4th century, but it may be that the signs of continuing occupation are just not being recognised." Possible ways in which interaction between Saxon and sub-Roman British cultures might have occurred are explored by Wingfield (1995). She points out that many aspects of material culture generally labelled as 'Anglo-Saxon' – such as sunken feature buildings – may have been used by the British population too. An important factor may be that our present system for dating and categorising evidence – which has the Roman period immediately followed by the Anglo-Saxon period – tends to squeeze out even the possibility of significant British survival in the area, let alone recognition of it.

Such survival is hinted at by documentary sources. For little known Welsh references to a possible midland Dark Age state and/or British enclave in the Chilterns, see Morris (1962) and Rutherford Davis (1982). There is also the better known entry for AD 571 in the Anglo-Saxon Chronicle (Savage 1983), describing a victory over the British by the West Saxons in a battle at *Biedcanford* (Bedford?) and the capture of *Lygeanbrig* (Limbury). Formerly objected to on philological grounds and almost completely dismissed out of hand (for a summary of the arguments involved, see Kuhlicke 1953, Blair 1971), the 6th century date for the battle and the association of *Bedcanford* with Bedford is much more acceptable today. Taken at face value, the reference might be taken to imply that much of what later became Bedfordshire was part of a British controlled territory for about four generations after AD 450 – the date normally taken as the start of the Anglo-Saxon period.

Whatever interpretation is made of documentary evidence, the whole question of the survival of British traditions/political institutions in Bedfordshire in the 5th and 6th centuries – and the many complex issues of interaction, conflict, co-operation, and cultural assimilation between indigenous groups and settlers – needs to be addressed. Equally important is the question of how we would recognise it in the archaeological record, bearing in mind that present dating systems may reproduce old assumptions. Following Esmonde Cleary (2001), the insertion of a period running from about AD 400-600 and called something like 'Late Antiquity' would at least give some space within our overall framework for evidence to appear. Given the large number of Romano-British farmstead sites excavated, some of which have both late Roman and early Saxon material, perhaps part of the research focus could be shifted onto this transitional period.

Political and Social Organisation

Cemeteries provide the foundation for most inferences about the political and social organisation of the early Anglo-Saxon period. Reports of individual cemeteries, often rich in artefactual evidence, are listed in the bibliography. Gazetteers of cemetery evidence from the 5th to the 7th centuries are provided by Morris (1962), Meaney (1964) and Kennett (1973). Wingfield (1995) provides distribution maps

of sites in the south of the county, where the greatest concentration of cemeteries is found in the area just to the north of the Chiltern Hills. A distribution map of cemeteries from the whole of Bedfordshire is provided by Bilikowska (1980), who also gives a useful table of date ranges.

Early work on cemeteries often came through antiquarian discoveries made on a piecemeal basis during 19th century gravel quarrying, and suffered from an absence of proper excavation and recording methodology. Some of the finds from the early cemetery at Warmark near Toddington are reputed to have been melted down by village smiths soon after discovery. The spectacular finds from the most famous cemetery at Kempston, however, have received some re-working and re-analysis from Kennett (1983, 1986), who has also gives useful accounts of material from Sandy (Kennett 1970) and Astwick (Kennett 1972). More recent cemetery excavations in the county are published by Hyslop (1963), Hagen (1974), Matthews (1962), Morris (1962) and Eagles and Evison (1970). Nearly all give emphasis to finds at the expense of context, and in the absence of detailed spatial recording it is almost impossible to say much about the social organisation of communities represented by cemeteries. Evidence of grave architecture that might be associated with burials and which shows up on recently excavated sites like Melbourn in Cambridgeshire is completely missing. Where both cemeteries and settlements were found, as at Harrold (Eagles and Evison 1970) and Puddlehill (Matthews 1962), the two components are dealt with almost as separate sites, unconnected to each other.

The *foederati* explanation for the occurrence of early cemeteries close to Romano-British towns is well rehearsed (eg. Kennett 1986) and may be an oversimplification of what really happened. We simply do not know the processes through which communities of mercenaries, if that is what they were, later became settlements in their own right. Our lack of knowledge is not helped by the fact that many cemeteries were excavated by antiquarians who kept only the most basic records.

Amongst all this is the problem of visibility of cemeteries for the indigenous British population. To what extent the British were represented in the earlier Anglo-Saxon cemeteries (as argued for the cemetery at Wasperton, Warwickshire) is just not known. In the absence of spectacular grave goods, British burials may not have attracted the attention of antiquaries who recorded many of the sites. It is even possible that some of the 'Anglo-Saxons' were British people who had accepted Anglo-Saxon dress and culture as a matter of fashion. We must be wary of ascribing ethnic identity on the basis of material culture (Esmonde Cleary 1989). It seems likely, however, that by at least the 7th century the British and Anglo-Saxon elements had merged into a fully integrated English-speaking population, with shared burial traditions.

The shift to new burial grounds in the 7th century is usually explained in terms of the Christian conversion (eg. Hyslop 1963, Kennett 1973, Bilikowska 1980). However, it has also been argued, on the basis of the three successive cemeteries at Chamberlain's Barn, near Leighton Buzzard, that there is nothing unusual about the 7th century in this respect. Cemeteries were periodically relocated to new sites as part of a general development from dispersed to nucleated settlement and other changes in landscape use (Boddington 1990). It should perhaps be noted here that some cemeteries, such as Kempston, continued in use into the 7th century without changing site. A much more detailed account of cemeteries and exploration of relevant issues is to be found in Wingfield (1995, 39).

Christian cemeteries probably associated with churches have been excavated at Elstow (Baker 1969) and Bedford (BCAS, unpublished). The small mid 7th century cemetery at Stratton was aligned with a post built building that may have been an early church or chapel.

Evidence for early–middle Saxon political organisation survives in the form of the *Tribal Hidage*, which was probably originally compiled by Mercian administrators in the 8th century (Hart 1977). Land now call Bedfordshire was at that time held by a number of loosely affiliated tribes. Of particular interest are references to the Gifle, the Hwicce, the Herstingas and the Cilternsaetan. The Gifle people are thought to have lived in the general region of the River Ivel, the Cilternsaetan in the Chiltern Hills. Hart (*ibid*) shows a map of possible tribal territories based on all available information. At least in Bedfordshire, such attempts at allotting precise territories to the various tribes are inevitably based on much guesswork, given that there must have been a shifting of boundaries and a gradual coalescence of smaller groups into larger political units.

All these tribal territories were probably part of the Kingdom of Mercia from the 7th to 8th centuries. The burh of Bedford may have been sited on the eastern frontier, though the boundary is likely to have shifted through time. The street grid and the defences of the northern burh could have originated in this period (Haslam 1983). The possibility that Bedford may have been a royal town, or at least a major ecclesiastical centre, is suggested by later traditions (written down

by Matthew Paris in the 12th century) that King Offa of Mercia was buried in a chapel just outside Bedford. Recent excavations in Bedford have picked up a stretch of probable defences of 9th century date, though the settlement thus enclosed was smaller than that envisaged by earlier commentators (Edgeworth, *in prep*). The town of Bedford has great potential for archaeological investigation of urban origins.

There is reasonable documentary evidence for the impact of the Danish invasions in the late 9th to early 11th centuries. The importance of this part of Mercia as a key territory in the wars between the Saxons and Danes is highlighted by the fact that the Danelaw boundary came right through the middle of it from north to south, splitting it in two. Agreed by King Alfred and Guthrum in 878, the Treaty of Wedmore is the first undisputed historical reference to the town of *Bedanford* (Bedford). The social and political implications of the creation of the Danelaw boundary are, however, hard to pick up in archaeological terms. The material culture of the Danes appears to be almost identical with that of the Saxons. Nevertheless, there are several references in the Anglo-Saxon Chronicle to the Danish occupation of Bedford, the recapture and refortification of Bedford by Edward the Elder in 915, and subsequent Danish raids (Savage 1980). Tempsford is mentioned several times in the Chronicle as a fortified Danish encampment, though this has yet to be located on the ground.

Perhaps the most tangible outcome of the Danish period of occupancy of Bedford was the formation of the Shire itself. It seems likely that Bedfordshire originated as an administrative unit in the first half of the 10th century, when the effectiveness of the Danelaw boundary had broken down (although the Shire is first mentioned in the Anglo-Saxon Chronicle entry for 1011). The Shire was organised into hundreds (Meaney 1994) and parishes (Haslam 1986), and centred on the burh of Bedford itself. To what extent the hundredal/parochial organisation reflects earlier social groupings is not known, and needs further research. Interconnections of church and secular power are reflected in the system of parishes, though topography also plays an important role. Simco (1986) has shown how many parish boundaries follow topographical features such as ridges, rivers and streams.

At about the same time as the formation of the shire there would perhaps have been a corresponding re-organisation of estates into smaller units and a general re-planning of the countryside. Many of these changes probably came about partly as the result of population increase associated with the absorption of large numbers of Danish settlers into the region. The impact of Danish settlement in Bedfordshire, and the impetus it gave to economic and political change, is an issue that has yet to be fully addressed.

There is very limited charter evidence from the late Anglo-Saxon period (compared to that of other areas). Of the three charters that survive – Aspley Guise, Chalgrave and Linslade (Fowler 1920, Gurney 1920) – some of the boundaries mentioned can still be traced on the ground. The Chalgrave charter of 926 mentions land bought back from the Danes, indicating that much of the Toddington area was temporarily subsumed into the Danelaw. The charter may reflect a deliberate Saxon policy of purchasing land along the frontier for strategic reasons (Humble 1980). Of particular interest are references to the Thiodweg, a major route running west from the Icknield Way. This still forms part of parish boundaries and is partly preserved as footpaths. The ford over the River Ousel known as Yttingaford is the point where the parishes of Leighton Buzzard, Linslade and Grove (Bucks) all met on the boundary of the Shire. It is mentioned in the Anglo-Saxon Chronicle as the place where Edward the Elder made peace with the Danes in 906 (Coleman 1981). A holy well dedicated to St Cyneburh (now the Kimberwell) is also referred to. Such references hint at the richness of meaning that may be hidden in the landscape and its placenames. The Chalgrave estate boundaries are preserved in the parish boundaries today (Coleman *ibid*). For useful discussion of the likely extent of the early Kempston estate, see Wood (1984).

Much evidence for late Saxon estates can be gleaned from the *Domesday Book* of 1086 (Sankaran and Sherlock 1977). The artificial nature of parts of the county boundary is clear from the fact that it divides several manors and parishes, which must have pre-existed its formation. There is little change from the 1200 hides (12 hundreds) listed for Bedfordshire in the 10th century *County Hideage*. There is only very limited information in Domesday for the county town of Bedford itself.

Rural Settlement

Evidence for rural settlement in the Anglo-Saxon period is generally sparse but is now becoming more extensive as a result of developer-funded fieldwork. Much of the pre-PPG16 evidence seems to have come from multi-period sites, where the Anglo-Saxon component was seen as incidental to excavations focused on earlier or later periods.

Exceptional evidence of a small farmhouse from Puddlehill (Matthews 1962, 1985) may indicate what has been lost through ploughing on other sites. At the

Fig. 5.2 Sunken featured building next to a late Roman corn-drying oven at Oakley Road, Clapham (© Albion Archaeology).

Grove Priory excavations near Leighton Buzzard, several SFBs dated to the 5th and 6th centuries were found, as well as post-built buildings that may be later in date (Baker *in prep*). At Odell the remains of only one standing structure (a SFB) survived but a series of early – middle Saxon wells contained a wealth of wooden and leather artefacts (to be discussed later). Heavy concentrations of Anglo-Saxon pottery found during field-walking may indicate the former sites of buildings that have been ploughed out (Dix 1980, 1981, 1985). Close to the Odell site, excavations at Harrold uncovered SFBs and a nearby pagan cemetery (Eagles and Evison 1970). More recent excavations at Harrold located SFBs, post-built structures, a well, a possible boundary ditch, and quarries re-used as rubbish dumps, together with a large assemblage of pottery (Shepherd and Walsh 1999). Recent excavations at Oakley Road, Clapham

(AA *in progress*) have found several early SFBs on the site of a former Romano-British farmstead. Ongoing excavations at Stratton continue to find groups of middle Saxon SFBs, indicating shifting settlement over an extensive area, developing into a more 'village' like settlement in late Saxon times. The presence of larger post-built buildings may suggest that the SFBs mainly served as ancillary sheds or workshops. Excavations at Tempsford have revealed middle Saxon activity in the form of linear and curvilinear ditches containing Maxey and Ipswich ware pottery, as well as late Saxon ditches, underneath a medieval moated site (Maull *et al*, 2000).

Occupation evidence has also been found at Felmersham (Jope 1951), Eggington (Matthews 1961), Kempston Manor (Crick and Dawson 1996), Marston Moretaine (Steadman and Edmondson 1999), Flitwick (Luke 1999), and on the line of the Bedford Southern Bypass (Shepherd, forthcoming).

The all-important association of settlement and cemetery evidence occurring together was found at Puddlehill and Harrold. Middle Saxon cemeteries have been found at Stratton and Bedford. For many of the excavated cemeteries, however, associated settlement sites have not been located. Each of the 3 cemeteries around Toddington, for example, is likely to have had its own settlement. It may be that these gradually coalesced to form the later village/town, and that remains of settlements are beneath Toddington itself. A similar number of separate settlements in the Luton area is indicated by the cemeteries of Argyll Avenue, Biscot and Dallow Road.

One of the great problems for archaeologists studying the Anglo-Saxon settlement of Bedfordshire is the lack of visibility of occupation sites. In contrast to the large number of Iron Age and Romano-British farmsteads/ field systems showing up on aerial photographs, for example, there are practically no such Anglo-Saxon sites. In much the same way, fieldwalking tends to pick up large quantities of pottery from earlier and later periods, but little from the Anglo-Saxon period (Hall and Hutchings 1972).

There are probably several reasons for this. In the first place, the size of the rural population and the scale of farming were greatly reduced in early Anglo-Saxon times. Secondly, Anglo-Saxon pottery is very coarse and difficult to distinguish from Iron Age and Roman pottery. The use of mainly wooden artifacts and building types adds to the problem of site identification. Thirdly, Anglo-Saxon settlers would have made use of the existing field systems and landscape features, rather than construct their own. Continuity of British farming practices (and indeed of the British population themselves, living alongside and possibly together with the settlers) is hard to detect. Fourthly, and perhaps most importantly, many sites may be hidden beneath present day settlements. Saxon rural settlements were mainly dispersed hamlets which either remain preserved as the numerous 'Ends' or came together in the late Saxon period to form villages, which still survive today.

A related point is that a large proportion of settlements excavated by archaeologists may be untypical. The very fact they were deserted at some stage suggests that they could have been peripheral and unrepresentative of settlements that later went on to develop into modern villages. This latter type of settlement is almost by definition generally unavailable for excavation.

The pattern of nucleated villages together with dispersed settlement that we see today was probably largely established by the 9th–11th centuries, with a corresponding re-planning of field systems taking place at about this time. The general trend from dispersed to nucleated settlement and an increase in population brought about the development of an open field system of agriculture centred on villages (see parish surveys for mapping of ridge and furrow).

The geological background to settlement is considered by Bilikowska (1980), and taken into account by most subsequent writers. The consensus seems to be that early Saxon settlement was concentrated in the river valleys rather than the clay uplands (although archaeological investigation has tended to focus on the former areas rather than the latter). However, a general contraction of settlements from the preceding Romano-British period may simply be the result of a decrease in population. As the population expands in the middle and late Saxon period, there is greater exploitation of the poorer quality soils.

Place name and topographical evidence is discussed by Simco (1986). Considerable discussion has taken place regarding the early origin of the '-inga' placenames, but this is no longer generally accepted. For detailed though now rather dated placename analysis, see Mawer and Staunton (1926). Gelling's more recent (1984) work on placenames is also of great relevance to Bedfordshire. The *Domesday Book* contains important information for the study of settlement patterns in the late Saxon period.

Urban Settlement

Anglo-Saxon urbanisation was effectively confined to Bedford, largely on account of its key strategic position on the middle Ouse. Bedford's status as

an early minster site (inferred) probably stimulated growth. As already mentioned, the origins of the street grid and locations of defences are the topic of much discussion, though theories tend to be based on topographical rather than archaeological evidence (Hill 1970, Haslam 1983). References in the Anglo-Saxon Chronicle to the occupation of the town by the Danes, and its refortification by Edward the Elder, confirm that it played a vital role in the Danish wars. The King's Ditch survives in places as a ditch and internal bank marking the boundary of the southern burh. In late Saxon times, Bedford became an important administrative centre with its own mint (see Hagen 1974). It seems likely that there was a whole series of expansions as the town prospered up to the time of the Norman Conquest.

Between 50 and 100 excavations have been carried out in the town, depending on whether small watching briefs are included. A summary of excavations up to 1977 is provided by Baker *et al* (1979) – see also Baker (1970), Baker (1986), Baker and Baker (1985), and Hassall (1983). Many of these early excavations are extremely well recorded and archived but the overall import of the evidence uncovered is fairly understated. An example is the pre-Norman evidence from the Bedford Castle site. Remains of substantial timber buildings dated to the early middle Saxon period (which could easily be sub-Roman British on the evidence in the report) are little known. Overlying these early structures is an extensive dark earth deposit up to 0.5m thick. It will be essential for any future excavations in the area to determine whether these are occupation or cultivation layers. Considerable 10th-11th century occupation evidence to the south of the river, including evidence of possible stables near the south gate, also deserves more interpretation. Deep urban stratigraphy has been encountered in many parts of the old town. As already mentioned, recent excavations have produced evidence of middle Saxon boundaries and a possible early cemetery. Very little of the recent material is published (eg. the St Paul's Square excavations), and this is a real problem in raising the profile of archaeology in the town. Bedford should be viewed in a similar light to Hereford or Stafford as one of the places right at the forefront of urbanisation in the middle Saxon period.

An important theme that emerges from excavations in Bedford is the way in which present day roads may follow the courses of former boundaries (with at least two roads, Midland Road East and the southern end of Allhallows, shown to have large ditches running beneath them). It is therefore worth highlighting the great potential of roads for further archaeological investigation. Excavations have also revealed that the river was much wider in Saxon times, suggesting the possibility that there may be a whole series of preserved waterfronts on the northern bank. Bedford has yet to have a major waterfront excavation.

The Bedford Extensive Urban Survey (EUS) was carried out for BCC and English Heritage by Albion Archaeology (formerly BCAS). It contains listings, summaries and maps of all excavations in the town, together with an account of the Saxon and medieval periods. What is long overdue is a far more detailed synthetic account of the archaeology of Bedford.

Ecclesiastical evidence

There is no apparent overlap between Roman centres and the earliest Saxon ecclesiastical centres as there was, for example, at St Albans. Christianity disappeared (at least from the archaeological record) until conversion of much of England in the 7th century. Heathen practices no doubt continued in tandem with Christianity for some time. Place-names indicating pagan worship include Harrowden (OE: *hearga-dun* or place of the heathen temple) and Wenslow (OE: *Wodneslawe* or hill sacred to Woden) – for further examples see Bilikowska (1980). Many churches must have been built on existing sites with pagan associations. It seems probable, however, that Christianity, like urbanisation, was an undercurrent that re-surfaced in the middle Saxon period, rather than a totally new development.

There is limited evidence for the establishment of a network of minsters in the 7th century. Both Bedford and Elstow have been suggested as likely sites for minster churches, from which priests would have travelled round the surrounding countryside to preach Haslam 1986, Owen 1978). Haslam in particular provides a very detailed discussion of early ecclesiastical organisation and the parochial system in relation to the Bedford and Kempston estates.

A Christian cemetery thought to date from the 8th -11th century was excavated at Elstow (Baker 1969). No church was found, though it probably lies within the footprint of the present church. Part of a similar graveyard, with rows of east-west burials, was found on the north side of St Paul's Square in Bedford in 1997 (BCAS unpublished). Again, no church was found and it is thought likely it was on roughly the same site as the present St Paul's Church. However, the only dating evidence for the cemetery was one sherd of early 'Saxon' pottery and a fragment of a Roman quern in grave-fills, which were cut by 10th-11th century pits. Depending on how such slender evidence is interpreted the cemetery could actually be anything from 5th–10th century in date. The fact that it is automatically assumed to post-date the Augustinian

Fig. 5.3 A probable 8th to 9th century cross-shaft fragment which can be seen in the jamb of a Saxon doorway St Peters Church, Bedford.

conversion, to be middle Saxon or later (with the finds described as 'residual') illustrates the way in which evidence tends to be pigeon-holed by our present dating frameworks. The possibility that the cemetery could date from the Late Antiquity period is 'squeezed out' and simply not entertained as a viable option. See the earlier discussion on this important point.

The earliest (indirect) reference to a church in Bedford is in a *List of Saints' Resting Places* (Rollason 1978). Although an 11th century document, it is probably a copy of a list first compiled in the 9th century. It names Bedford as the resting place of a St Aethelbert – Bedfordshire's only known saint. Other documentary sources include the assertion by Matthew Paris, a 12th century monk of St Albans, that King Offa was buried in Bedford. For the year AD 970 the Anglo Saxon Chronicle records that an Archbishop of York was buried in Bedford. Taken together these references imply that Bedford was an important ecclesiastical centre and a place of pilgrimage in Saxon times. It is assumed the church in question was St Paul's, though another possibility is St Peter's. By the time of the *Domesday Book*, St Paul's was a house of secular canons.

A few surviving fragments of Saxon carved stone are known from the county. A probable cross shaft fragment can be seen in the jamb of a Saxon doorway in St Peter's Church, Bedford. A similar design of two winged bipeds facing each other is on a cross shaft base found in the church wall at Elstow (Baker 1969). Both are of typical Mercian design and can be dated to the late 8th – 9th century. A small carved stone with an interlaced knot design (unpublished) was found on the St Paul's Square excavations. There is part of a carved coffin lid of late Saxon date in the wall of Cardington Church (Hare 1972).

A timber building that may have been an early chapel (pre-parochial?) was excavated at Stratton. It was possibly associated spatially with two rows of burials of middle Saxon date. Most of the earliest churches would have been small wooden buildings like this though, unlike this example, many were later rebuilt in stone.

An important part of the archaeological resource of Bedfordshire consists of the standing Anglo-Saxon churches. In Bedford, St Mary's and St Peter's both have Saxon work, while St Paul's and St Cuthbert's may have had Saxon origins. The church tower at Clapham may be the tallest Saxon building in England. Churches at Stevington, Turvey and Kempston Box End are the other certain examples. Note that all are on or near the River Ouse, which could be used for the transportation of building stone (churches further away from the river were probably built of timber). These are described by Smith (1966), Taylor and Taylor (1965) and the *VCH*. Other possibilities Saxon churches are those at Riseley and Thurleigh. Numerous churches were founded in the 9th-11th centuries but have subsequently been rebuilt. Early work may be hidden within supposedly later structures, as was shown by the discovery of Saxon windows in the south transept of St Mary's Church, Bedford, during renovations in the 1950s.

Trade and Communication

The pre-existing network of trackways, including some Roman roads, continued to channel communication and trade, and this had significant effects on the shape of Saxon settlement and economy. Bedford, for example, was situated on a track and ford that was very probably in use during Roman times. Other important roads/tracks include the Icknield Way and Watling Street. The Thiodweg, already mentioned, was later used for the transport of salt (Gurney 1920). There was almost certainly a bridge at Bedford, probably of wooden trestle type, linking the two sides of the burh. The burh would have raised taxes for the maintenance of roads and bridge-works. Mills were

Fig. 5.4 Excavation of a pre-10th century cemetery under the Bull Nosed Bat, St Paul's Square, Bedford (© Albion Archaeology).

often used as crossing places of rivers, and locating these may be useful in reconstructing route networks. Many of the hollow ways, and indeed much of the basic road system for the county may originate in the Saxon period, although this is a supposition that needs further study to support it. The Rivers Ouse and Ivel were probably navigable during the Saxon period for boats of shallow draught, and can perhaps be regarded as major arteries of trade (bones of herring and other sea-fish have been found in Middle Saxon features in Bedford). Rivers may also have played an important part in the Danish wars. The Danish encampment at or near Tempsford (recorded in the Anglo-Saxon Chronicle but exact location unknown), was situated close to the confluence of the two rivers – undoubtedly an important strategic location with regard to both river and land movements of people.

The position of Bedford on the river makes it likely that it served, to some extent at least, as an inland *emporia* or *port of trade* for the surrounding area. It may have had a market at an early date, especially if St Paul's was an early minster site. Any long distance trade is likely to have come from the general direction of East Anglia, simply by virtue of the course of the river. The nature of the trading system, however, may have been very different from that of the preceding Roman or later medieval periods. Money and goods are likely to have changed hands through gift exchange, tribute, theft, payment of mercenaries, dowries, ransoms, etc (Polyani's notion of an economy 'embedded' in other aspects of life – see Hodges 1982), with a true market economy only developing in the 10th and 11th centuries.

Material Culture and Technology

Anglo-Saxon pottery, weapons and jewellery from 5th –7th century cemeteries are well represented (eg. Eagles and Evison 1970, Hyslop 1963, Kennett 1970, 1972, 1973, 1986, Matthews 1962). Exceptional finds from the largest and oldest cemetery in Kempston are illustrated in VCH. The use of such artefacts to identify Anglo-Saxon (as opposed to British) populations, however, needs to be challenged. A major question, for example, is whether the paramilitary dress of the Saxons became fashionable among British populations too. The same question could be asked of many other types of material culture normally labelled as Anglo-Saxon. When Romano- British pottery production centres broke down, for instance, could the Saxon hand-made pottery have filled the gap? Was such pottery traded and used by the British, who perhaps even made it themselves? In this respect the issue of the so-called 'Roman-Saxon' pottery may be a red herring – see the discussion by Kennett (1983).

The archaeological invisibility of the British in the early Anglo-Saxon period is paralleled by the invisibility of the Danes in the 9th and 10th centuries. Known from documentary sources to have occupied Bedford and the whole of the territory to the east, the Danes seem to have had a material culture broadly the same as that of the Anglo-Saxons. Everything from their sites (such as their fortified camps) to everyday domestic artefacts (pottery, bone tools, etc) are hard to recognise. In any case, the successive waves of Danish settlers were incorporated into the English population and the two material cultures, if there ever was any difference, became one and the same. Could this be used in the broadest sense as a model to help us understand the earlier invisibility of British populations?

A ceramic type series has been developed for the Anglo-Saxon period by Albion Archaeology. very early version of this is published and illustrated in Baker et al (1979). Early Saxon period ceramics are hand-made and difficult to distinguish from Iron Age

types. Maxey-type pottery of the 7th – 9th century is also hand-made. It has been found on sites in Bedford, along with some Ipswich ware, and is increasingly being found on rural sites such as Stratton and Tempsford. The use of Maxey ware overlaps with that of coarse St Neots ware in the 9th century, suggesting there may be some development from one to the other. St Neots ware (Kennet 1996, 1999) is the principal pottery type found on sites of the 9th-13th centuries. Large amounts of St Neots ware were recovered from possible boundary ditches on pre-war development sites in Bedford, and are now held in Bedford Museum (see Kennett 1992 and Bedford EUS for details). Re-investigation of these assemblages may shed considerable light on the development of the burh of Bedford, especially now that distinctions can be made between earlier and later forms. Even so, difficulties in dating precision necessitate the use of the term 'Saxo-Norman' for all the occupation sites dated by such material.

There is some imported Thetford and Stamford ware for the later part of this period. More work needs to be done on the relationship between locally made and imported wares, their distribution networks and the possibility of specialised markets.

It has been suggested that the great upsurge in the use of shelly wares like St Neots ware in Oxfordshire, may be generally associated with Danish presence and influence there from the late 9th century (Blair 1994). A similar association could perhaps be put forward for the Bedfordshire material. This is not to say that St Neots ware indicates the ethnic identity of the people who used it – rather that the arrival of the Danes opened up trade networks and stimulated economic growth, bringing new commercial goods and practices to the region, especially to Bedford itself. It is likely that there were local kiln sites for this ware. These sites, however, have yet to be located, and may have consisted of simple bonfire kilns that leave little trace in the archaeological record.

Slowikowski (1991) describes a sherd of Tating –type ware found on excavations in Bedford but initially mistaken for post medieval pottery. Such pottery actually dates from the late 8th –9th centuries and can sometimes be taken as an indicator of high status royal or ecclesiastical sites. This find shows the potential of re-examining existing pottery assemblages in the light of refined identification techniques. Now that pottery identification techniques are more advanced, there is a real potential for going back to material excavated from Bedford from the 1960s up to the present day and reworking it. Such a step is a pre-requisite for an adequate 'archaeology of Bedford' to be written. Any further excavations in Bedford, where deep urban stratigraphy is likely to encountered, could be used to establish a stratified ceramic sequence (that could be tied in with that already achieved for Northampton).

Shelly wares in the north of the county contrast with sandy wares found in the south, which are poorly understood and barely assimilated into the ceramic type series for the county.

Non-ceramic artefacts found in domestic contexts include weaving implements, other bone tools, combs, knives, metal tools, spurs (from the backfill of a SFB at Stratton), etc. The waterlogged conditions of middle Saxon wells excavated at Odell yielded an exceptional range of wooden and leather artifacts. These included planks, stakes, piles, shoes, a core from a lathe turned bowl, wickerwork basketry, a prefabricated framework to support the well sides, a ladder, a bucket, and even the remains of a possible stringed instrument. Several of these were radio-carbon dated to the 6th-7th centuries AD (Dix 1980, 1981, 1985).

The importance of smiths in Anglo-Saxon culture is well known and there are many examples of pits containing iron working waste (slag, hearth bottoms, hammer-scale) being found, especially in Bedford in the late Saxon period. It has been suggested that an increase in smelting and smithing activity was stimulated by the Danish occupation (Steadman 1999).

Economy

The character of the agricultural economy is addressed by more recent area excavations of both rural and urban settlement sites. Analysis is underway on important assemblages of both animal bone and charred plant macrofossils from Stratton. Here it can be shown that the landscape was extensively cleared in late Saxon times. Environmental evidence from waterlogged wells at Odell suggested an open grazed landscape. Other useful assemblages have come from Harrold, Marston Moretaine, Clapham, and several excavations in Bedford. A general increase in the ratio of sheep bones to those of cattle from middle Saxon to Saxo-Norman times in Bedford may suggest a growth in the wool industry. Of particular interest is the fruit of a hemp plant from the vicinity of the Saffron Ditch (Liberal Club excavations) – possibly the first evidence of hemp retting for the making of ropes, a traditional Bedfordshire industry in later periods (see the chapter on the post-medieval period). Other common finds in Bedford are horn cores, indicating horn working or possibly tanning activity. Detailed discussion of plant and animal bone assemblages on these and other excavations is provided by Murphy (this volume). Charcoal pits (indicative of thriving

woodland management and industry) are mentioned in the Saxon charter for Aspley Guise (Fowler 1920). A large number of ploughed over heaps of slag, indicative of ironworking activity and thought to be probably Saxon in date, have been found North Bedfordshire. There is a marked concentration on the clay uplands in the vicinity of Milton Ernest and Thurleigh, where most of the fieldwalking studies took place (Hall and Hutchings 1972).

The presence of a mint in Bedford from the middle of the 10th century indicates that the burh and its Shire was a functioning part of a highly efficient national economic system. The mint itself has not been located but coins were minted here from the reign of Eadwig (955-959) right through the reigns of Aethelred II, Cnut, Edward the Confessor and William the Conqueror. Names of moneyers are known from the coins, many of which are in Luton Museum (Hagen 1974).

Transition to Norman and Medieval England: the 'Saxo-Norman' Period

How great a change was the transition from late Saxon to Norman England? There were obvious changes in political and tenurial structure. Historical evidence suggests a decline in value of villages in the centre of the county (such as Clophill and Elstow), probably as a result of the conquest itself. The greatest change to the physical (and symbolic) landscape was the imposition of castles – mostly timber, though later transposed into stone at Yielden and Bedford. Much of the organisation of the county in terms of its administrative, legal, ecclesiastical and economic framework was already there. The boundaries of parishes, hundreds and shire stayed more or less constant. The county town of Bedford kept its central role in the administration of Bedfordshire on both secular and sacred levels, retaining its mint and its arch-deaconry. On the level of everyday life too there must have been much continuity. As already discussed, it is often impossible to tell the difference between early and late St Neots ware pottery, which spans the period from the 10th –13th centuries. As the principal pottery type, this leads to a corresponding difficulty in dating occupation deposits and building structures, particularly small dwellings – hence the use of the term 'Saxo-Norman' as a catchall. This is not altogether a drawback, however. While dating precision may be lost, it is useful to have a period of overlap between the late Saxon and medieval periods to counterbalance the impression of discontinuity which is almost entirely the result of our system of categorisation. In reality there was a smooth transition into the medieval period, with survival of many of the essential features of Anglo-Saxon life.

The Medieval Period

Overview

The archaeology of the medieval period is characterised by much greater visibility and physical presence of sites, such as mottes, moats, monasteries and fishponds. These emerged, however, as developments within an existing landscape, many of the essential features of which (estate boundaries, villages, churches, open field systems, parish boundaries, etc) were already in place in the late Saxon period. While Bedford was the county town, there was no major focus such as a cathedral city. Indeed, the county is probably best considered as a number of regional 'pays', some of which have more in common with surrounding counties than Bedfordshire itself. This inevitably leads to difficulties in marshalling the evidence.

Medieval archaeology in Bedfordshire benefited greatly from the programme of parish surveys carried out in the 1970s and 1980s (Coleman 1983a, 1983b, 1986, Wood 1984 – see also unpublished surveys held by Bedfordshire County Council). The landscape analysis approach employed in the surveys contrasts with the more site-specific method represented by excavation, but the two are complementary and a holistic view depends on the application of both (though there can be problems in reconciling the very different perspectives that they afford). In this respect the recent excavations at Stratton, to be reviewed at the end of this chapter, represent a major advance. Open area excavations over such a large area give us the best of both worlds, allowing us to view the spatial patterning of sites and features in the landscape with a time-depth that was hitherto unprecedented.

Medieval archaeology in Bedfordshire is relatively young. Development of the subject occurred from the 1960s onwards and continues apace today. However, no synthesis has yet been undertaken.

Mottes and Ringworks

The imposition of Norman rule has a material reflection in the fifteen or so mottes found throughout the county (Dyer 1961-3, Baker 1982). Of these, four are mottes without baileys (eg. Risinghoe, Toddington) and probably represent early Norman mounds capped with wooden towers. Most are beside rivers. Eleven are early sites which were later enlarged with baileys added (eg. Totternhoe, Yielden, Cainhoe) and tend to be in a much better state of preservation. Some were literally superimposed upon existing village or town settlement, as at Yielden and Bedford, where extensive clearance of houses must have taken place. Bedford is an example of a castle enlarged and fortified further in

the 12th century. Excavations took place at Yielden in the 19th century, revealing the footings of a stone tower on an island in the moat. More recently, excavations have been conducted at Cainhoe (Taylor and Woodward 1975) and Chalgrave (Pinder and Davison 1988). Numerous trial trenches have been excavated at the Bedford Castle site – uncovering evidence of stone-lined ditches, an inner bailey ditch, a range of Norman buildings within the inner bailey, a south curtain wall with a possible watergate, etc (Baker e*t al* 1979).

Related sites are ringworks such as those at Biggleswade and Howbury. Limited survey and excavation work was carried out at the Biggleswade ringwork – shown to have timber structures and an outer bailey with entrance. Importantly, this earthwork does not defend the town of Biggleswade, which is on the other side of the river. Its site within the Ivel valley is a good strategic position for controlling water traffic or movement generally through the valley, and has led some to equate it with the Danish fortress of Tempsford already discussed, the location of which is unknown. However, pottery found suggests it dates from the century following the Norman Conquest (Addyman 1966). Much more work needs to be done on understanding this class of monument.

Rural Settlement and Sites

In the EH Medieval Settlement Project (Roberts and Wrathmell 1994, 1995), most of Bedfordshire is included within the central (inner midlands) province of mainly nucleated with some dispersed settlement. Several areas within the county and comprising over half its total area, however, are classed as mainly dispersed with some nucleated, indicating the very mixed pattern of settlement here compared with much of the rest of the central province. Based on mapping of terrain and 19th century settlement patterns, this work gives us a useful framework within which to compare Bedfordshire with other regions. It also gives a broad correspondence between terrain/ soil type and the relative density of nucleated and dispersed settlement, though it has to be said that in this county settlement patterns can vary widely from one parish to another even though the terrain may be similar. This suggests that individual styles of lordship may be an important additional factor.

A more localised study of medieval settlement in Bedfordshire and Northamptonshire (Lewis, Fox and Dyer 1992) divided the county into 3 broad topographical zones, each with its own settlement pattern:-

1) the North, where settlement is densest in the valleys of the Ouse and its tributaries. Here Domesday manors were typically sited close to the river, mostly in nucleated villages (rows along streets being more common than clustered settlements). Few of these have shrunk, shifted or been deserted. Smaller settlements occupying the more peripheral zones away from the rivers and manorial centres, however, are more likely to have been deserted or to have shrunk. In parishes on the clay and far from the rivers, a dispersed settlement pattern with many moated sites is common.
2) the centre, with its much more wooded landscape and Greensand valleys. Here there are several small market towns and many dispersed settlements, loosely clustered, with frequent occurrence of small hamlets and 'ends' as well as single farmsteads. Moated sites are also common.
3) the Southern chalk zone, characterised by large Domesday manors and fairly thinly scattered and dispersed patterns of settlement, with few moated sites.

From this broad characterisation of zones, 6 areas were identified for more detailed study: Chalgrave, Cranfield/Shillington, Eversholt, Ivel, Thurleigh and Turvey. For more detailed analysis of each of these areas, and an assessment of archaeological potential, see Lewis, Fox and Dyer (1993).

A focus on 'nucleated/dispersed' is not the only way to look at settlement patterns, and other perspectives may yield different insights. The forthcoming Historic Landscape Characterisation project, due to start in 2002, will shift the focus onto the landscape as a whole (rather than just settlement) and look at it in terms of 'planned/ unplanned'.

Moated Sites Bedfordshire is especially rich in moated sites, with one of the densest concentrations in Britain. They are to be found throughout the county in a wide range of situations. Most are low-lying but some are on hilltops or cut into slopes. BCC carried out an evaluation of moated sites as the first stage of scoring for the Monuments Protection Programme (MPP) – see Coleman (1989). It was noted that the main concentrations are on the clay soils , with many in the north east (eg. around Thurleigh) and the mid west (eg. around Cranfield and Marston Moretaine) but fewer in the south. Of 297 moats evaluated, 174 are mostly destroyed. Of the surviving examples, most have rectangular single islands, but circular and double islands as well as more unusual configurations are also known.

There is a general association of moated sites with patterns of dispersed settlement and irregular multi-field systems. Some moats have manorial associations,

though by no means all. The origin of many is probably associated with assarting – the creation of new farming land from woodland in the 12th and 13th centuries. But these peripheal sites contrast with the three moated sites in the centre of Marston Moretaine. Some moats had a defensive function, but there was a fashion element too. It seems likely that moats became a status symbol among well to do farmers at that time (Coleman *ibid*). Moats were often used as or associated with fishponds, and in some cases the island was used for horticulture rather than occupation. Still other moated sites are associated with ecclesiastical centres. Examples of granges and hermitages on moated sites are discussed below.

Not all moated sites have surviving buildings – many were abandoned by about 1500 – but those that do often represent a continuity of settlement on the same site from the 12th-13th century to the present day. Individual moated sites and their buildings have been surveyed and studied by Bailey (1975), Kennett *et al* (1986), etc. Sometimes the moated site can be seen to be part of a sequence of occupation which involved shifts from one monument type to another – eg. from the motte-and-bailey site to moated farm to the present Manor Farm site at Chalgrave (Dyer 1961-3). The motte itself was probably constructed over the site of an earlier, Saxon, manor (Lewis *et al* 1997). A moated enclosure and its 13th-15th century manor house has recently been excavated at Tempsford Hall. This was found to overlie ditches and other occupation evidence from middle to late Saxon times (Maull *et al* 2000).

Many moated sites have ideal conditions for preservation of organic materials, as well as the features of water management systems such as sluices. Former access to the sites is an important consideration for the archaeologist to take into account, both in terms of bridges or causeways and also in relation to the road system as a whole. Such sites are often outside of and therefore not integrated into village layout, but their overall place within the local agricultural and road system is important to establish. Moats tend to 'frame' our perception and to focus our attention on what is on the interior or island, though associated structures and features on the outside may be equally significant.

It is also important not to lose sight of those manors, homesteads, ecclesiastical buildings and other sites, especially in the south of the county, which are similar to the ones described in this section except that for one reason or another they were never enclosed by earthworks. Such 'moat-less sites' leave far less trace in the archaeological record and are far more difficult to find. Locating them is a major challenge for archaeologists.

Magnate Enclosures A little known type of monument which has great potential for further study is the magnate enclosure – an extensive ditch and bank earthwork enclosing both church and manor. An example was found during survey of other earthworks at Meppershall, and it seems likely that other examples (not known because not looked for) remain to be discovered. The many church/manor complexes would be worth re-examining for traces of this type of earthwork. The possibility that magnate enclosures could be late Saxon in date should not be discounted.

Deserted and Shrunken Villages Deserted medieval villages (DMVs) and shrunken medieval villages (SMVs) are notoriously difficult to classify. The HER lists 38 of the former and 67 of the latter, but many of the smaller abandoned farmsteads (shrunken hamlets?) have not been included. Particularly well surveyed is the DMV at Chellington (Brown and Taylor 1999). Bedfordshire has few of the classic type of DMV with neat rectangular patterned plots, such as might be found in Leicestershire or Warwickshire. DMVs here are much 'scrappier' and perhaps represent different processes of settlement formation. Few of the sites have been touched by excavation. Recent excavations at Stratton, however, will go some way towards redressing the situation and provide some much-needed time-depth to our understanding of the development of this type of site. Evidence from Stratton, due to be published by 2003, illustrates that DMVs may have their origin right back in middle Saxon times and beyond. Pottery finds from fieldwalking at Chellington could be taken to indicate similar early origins. The general picture from both sites is of gradual change and shifting settlement with ancient trackways providing fixed points of reference. More will be said of the Stratton evidence towards the end of the chapter.

Excavations at by Albion at Potton (Phillips and Wilson, *forthcoming*) have revealed early medieval land use indicative of settlement to the north of the present town. This area went out of use by the early 13th century, and may have coincided with a general shift of settlement to the south and the creation of a planned market square (the centre of the present town) by a local lord. Like Stratton, it may be an example of a part of the village or hamlet that is perhaps best understood in terms of a model of shifting settlement rather than simply occupation/desertion.

Excavations by Albion at Goswell End, Harlington did not produce the expected evidence of medieval

settlement. What was revealed were the main and subsidiary branches of a hollow way known as Long Lane – once an important route linking the church with outlying mills. This ancient road goes on to form the parish boundary, but the interesting point to emerge from the excavations is that it probably formed a boundary between different estates within the parish too. Alongside the hollow way a buried soil of a former allotment was found, packed with pottery dated to the 13th-14th centuries (forthcoming Albion report). A nearby moated enclosure, excavated in the 1950s, was of similar date. All this evidence seems to fit within an overall pattern of shifting manors/ estates.

Many villages are thought to have shrunk, shifted or been deserted during the period of economic decline and agricultural recession in the 14th century, with outbreaks of plague and depopulation of the countryside being important aspects. The location of most DMVs and SMVs indicates that it was generally peripheral areas such as the clay uplands and to a lesser extent the greensand which fell out of use at such times. For a discussion of the historical evidence for contracting arable land in the 1340s, see Baker (1970).

The untypical nature of DMVs and SMVs is important to bear in mind. Information about settlements which continued to be inhabited by thriving communities can only be obtained from study of present day villages and towns. The excavation in Marston Moretaine (Crick 1999) is a rare example of a full archaeological investigation taking place within a village. Even so, most towns and villages in the county have at least one shrunken settlement within them – see the survey of the north of the county by Hall and Hutchings (1969).

Buildings Medieval buildings in the countryside (apart from ecclesiastical structures) are rare. Manor Farm, Eggington, has a fine late medieval roof, but many manors were simply deserted or rebuilt. 'Bury' placenames often signify the existence of a former manor. Barns at Fenlake and Felmersham are partly 15th century in date. For excavated remains of extensive agricultural structures and outbuildings at Grove Priory, see Baker (in prep).

Dovecotes Most surviving dovecotes date from the 17th century, but the Tudor dovecote at Willington is one of the finest in the country. Earlier dovecotes, like the two recently excavated at Stratton, tend to be round and fairly crude in design, with walls made of cob. Another circular dovecote was excavated at Grove Priory, which may be the one mentioned in a Bailiff's account of 1341 (Baker in prep). Dovecotes might be expected to be found on manorial and ecclesiastical sites, since only the lord of the manor and the Church had the right to construct them (Whitworth 1995).

Fishponds and Wildfowl Lakes As the discussion on moated sites has already indicated, water management was a very important aspect of life in medieval Bedfordshire. An efficient system of running water was needed to keep moats clean, and thus created ideal conditions for the stocking of the moat with fish, ducks, swans, etc. There is a considerable overlap between the site-types of moated farmstead, fishpond, and even wildfowl lake. Fishponds were often associated with either manorial or ecclesiastical sites.

We tend to associate fishponds with the medieval period largely because of the large number of documentary references that begin to appear in the 12th and 13th centuries. However, the extent to which fishponds were in use in the Anglo-Saxon period, perhaps on a much smaller scale and largely unrecorded, is not known. It is also the case that many fishponds continued in use into the post-medieval period, often taking on additional aspects as ornamental and landscape features.

The sites of sixty eight fishponds are known, about half of which survive in reasonable condition. Sites vary enormously in plan. Typical sites consist of just one or two linear ponds adjacent to a stream, but a few examples exist of much larger and more complex systems. The extensive Home Wood fishponds near Northill (Simco 1989) should perhaps be described as a 'fish farm'. Here an outer moat forms the large rectangular enclosure, which is divided in half by a ditch running down the centre. Within the western half are three islands, each with several breeding stews, connected by a complex series of channels. Within the eastern half is a bank up to 3m high, which probably represents a rabbit warren. Such combined fishpond/warren sites (another good example is at Hill, Old Warden) show a high degree of design, and illustrate the expertise which must have been available in medieval times.

Dams constructed across valley floors to create fishponds or wildfowl lakes may survive as earthen banks. Examples are to be found at Old Warden Abbey, Higham Gobion and Colmworth. At Higham Gobion a huge triangular area with central island (now a low circular mound) is enclosed by what looks like a low rampart. This has been mistaken in the past for a motte-and-bailey type enclosure – and indeed is called 'The Camp' – but is in fact a manorial fishery, the central area of which could be flooded. A

complex system of sluices must have existed and may be preserved.

In Colmworth a dam over 100m long was built to form a similar lake and island. Placename evidence (the field is called the 'Swannery') suggests the lake was used primarily for water birds and that the island was for nesting (details in the HER). Again, it is not known if any buildings were specifically associated with wildfowl lakes in Bedfordshire. At present there is no published account of such sites, and none have been explored through excavation.

Dams, mills, fishponds, moats, lakes and other water features often occur together and illustrate the extent to which the landscape as a whole was managed in medieval times. We know very little about how fishponds and wildfowl lakes were run, or how production of food on these sites was integrated into the rest of the agricultural economy. At Grove Priory, barns and other agricultural buildings were constructed right up to the edge of fishponds, suggesting that the breeding of fish for food was just one of a mixed and variegated set of farming practices. There has been little or no excavation of fishponds and associated buildings, despite their potential for preservation of sluices, other water management systems, and artefacts made of organic material.

Mills No medieval windmill buildings survive although several windmill mounds, dating from the 13th century onwards, have been located through documentary sources and parish survey.

Most manors and monasteries had mills and there are undoubtedly numerous sites waiting to be discovered. Some watermill sites mentioned in the Domesday book were still in use in the post-medieval period, but many others must have gone out of use. The recent discovery of what looks very much like the wooden paddles of a horizontal mill from a 16th century pit in Stratton suggests that this may have been the predominant form of technology for small mills in medieval times, even though they are generally thought to have gone out of use by the 13th century. The under-chambers of these mills could have great potential for the preservation of waterlogged artefacts and economic information in the form of grain and seed remains. Vertical wheels were probably used on larger sites. Dams, weirs, leets, sluices and millponds may all be associated features. Mills could also have been the focus of settlement or industrial activity. Such sites could well be worth the effort of locating and excavating.

Deer Parks Nearly 40 deer parks are known, 11 of which are on the Greensand Ridge (roughly corresponding to the area covered by the parks of the great country houses in Post medieval times). In the gazetteer by Cantor (1983) only 26 are listed, but more have been discovered in the last 20 years. There is a general correlation of parks and areas of ancient woodland. Characteristically an area of woodland and pasture was enclosed with a bank and interior ditch. Some have surviving earthworks – eg. Brogborough, Ampthill, Woburn, Wrest. At Harrold Park Wood the banks are about 3m high and 6m wide (Hall and Hutchings 1972). Others are known only from documentary evidence – eg. Bushmead Priory, Keysoe Park.

Warrens Warrens for the keeping of rabbits are an important type of site, often associated with manors or monasteries. Pillow mounds for rabbits to burrow into were sometimes specially constructed, as at Dunstable Downs. These were often enclosed with perimeter banks and ditches, perhaps in conjunction with fishponds, as at the Home Wood site already discussed (Simco 1989). In other cases large existing earthworks were re-used as warrens – for example at Conger Hill in Toddington or Warren Knolls in Tilsworth (both mottes). Sharpenhoe Clappers was probably an Iron Age hillfort adapted for use as a warren (for excavation results, see Dix 1983). In all these instances the use is recorded in placenames, which may help to locate further sites. The Bronze Age barrows at 5 Knolls, Dunstable, were also re-used. Sandy Warren differs from all the above in that it was simply a large area of open heathland (the sandy soil being so suitable for rabbits that it made the construction of mounds unnecessary). Several such large warrens were situated across the Greensand Ridge.

Like fishponds, little is known of how warrens were managed. How, for example, were the rabbits caught? Dogs, hawks, ferrets or nets could all have been used. Were there any associated buildings? What was the status of the warrener in medieval society? Do any warrener's lodges survive? What sort of protection was installed against poaching? How did the breeding of rabbits fit in with the rest of the agricultural system?

Vineyards Medieval vineyards are known from fieldname and documentary evidence. In the south of the county, there are references to wine-presses at Caddington Bury. Field names suggest the location of a vineyard on the south facing slopes below Harlington church. Clearly there is some potential for traces of these in the archaeological record. Many of the religious houses probably grew grapes and processed their own alcohol. A vineyard at Old Warden Abbey has recently been revived and produces wine today. Dunstable Priory, situated as it is on favourable chalk soils, may well have had a vineyard on its estate.

Field systems, Meadows, Woods Landscape survival maps assembled from aerial photographs (in HER) show that remains of ridge-and-furrow in Bedfordshire are now fairly sparse, at least relative to adjoining counties such as Buckinghamshire and Northamptonshire. There are good areas of survival in the south-west around the Hockliffe/Chalgrave and Potsgrove areas. For field surveys showing ridge-and-furrow see Hutchings (1969), Hall (1972, 1991). Parish surveys and other HER material contains detailed information on a local level. Continuing threats from modern agriculture and development have led to the scheduling of remains at Potsgrove.

Lynchets are visible at various places on the chalk scarp in the south, including the Pegsdon area of Shillington, Totternhoe Knolls and Chaul End in Caddington. An earthwork survey of lynchets at Bradger's Hill in Luton is held in the HER.

Only about 50% of the countryside was farmed in open fields. There were also many small closes, for example around Thurleigh and Cranfield. Meadows tended to occupy the lowest ground alongside rivers or streams, providing hay for winter fodder. Woods were also important productive elements of the landscape, supplying raw materials and supporting a range of industries and crafts. Many of the ancient woods surviving today such as Kings Wood at Houghton Conquest achieved their present shape by about 1300, often enclosed by external banks. Sometimes internal banks were used to subdivide coppiced from non-coppiced areas. The *Ancient Woodland Project* – an archaeological survey recording all visible archaeological remains within woods at Chicksands, Potton, Wilstead and other 'Forest Enterprise' woods – was recently completed by Angela Simco (copy in HER). The findings give a good indication of the potential for woodland survey elsewhere. Ideally the survey should be extended to cover all historic woods in Bedfordshire

Greens Many villages like Goldington were set out around greens – communal open spaces used for grazing, fairs, etc. Luton had at least 8 greens in late medieval times. As part of the old common land, most greens disappeared at the time of Parliamentary Enclosure. Even where they no longer survive, however, former greens are likely to have had a significant impact on village and town topography, and their origin as settlement features may be very early. Moot halls (eg. at Elstow), town kitchens (Toddington) and other communal buildings were sometimes situated on the green. For a discussion of Bedfordshire greens in the early post-medieval period, see Kennett (1987).

Urban Settlement

The archaeology of all eleven historic towns in Bedfordshire is covered by the Extensive Urban Survey.

As already mentioned, the only town extensively explored through archaeological excavation is Bedford (Baker *et al* 1979), with many recent projects awaiting publication. Apart from the Norman castle and earlier material, evidence includes wells, pits, ditches, ovens, kilns and building foundations. The use of limestone as a building material is apparent, but most houses were probably just single roomed with walls of wattle and daub and roofs of thatch. With the exception of churches, only two or possibly three medieval buildings remain – a survival rate that is fairly typical for Bedfordshire as a whole. In Bedford as in all the other towns, however, there is always the possibility of medieval buildings hidden behind later frontages. Properties of the 18th and 19th century may also retain old property boundaries, many of which may represent old burgage plots. Bedford suffered a period of decline in the later medieval period and, while retaining its former shape and size, experienced some shrinkage within the framework of existing streets (Hassall and Baker 1974).

A major theme to emerge from the Bedford excavations is the re-use and re-cycling of building stone. It is known, for example, that St Paul's Church was demolished to provide building material for construction of the castle, but the destruction of the castle in turn provided stone for the re-building of the church, as well as for roads, squares, and possibly the network of little buildings and streets which in-filled the market square.

Following on from the Extensive Urban Survey, a major challenge will be synthesis of information from all the Bedfordshire towns.

Town Defences Bedford is the only town in the county known to have defensive earthworks in the medieval period. Although the Kings Ditch encircling the southern half of town is generally dated to the 10th century, the fact that it still functions today testifies to regular re-digging, maintenance and possibly even re-routing during the medieval period (EUS). A considerable stretch of bank and ditch survives on the east side of south Bedford. The flow of water from the ditch was channelled through sluices into the fishponds of St Johns Hospital; these ponds remained in use right up to the early 19th century. Part of the bank has been re-modelled in zig-zag fashion as an extensive WWII air-raid shelter!

Ecclesiastical

Monasteries Bedfordshire is particularly strong in excavated evidence of monastic sites. In all, seven sites have been the subject of archaeological investigation.

Rescue excavations were carried out at the Cistercian Old Warden Abbey in the 1960s (Rudd and West 1964) and 1970s (draft report held by Albion Archaeology). Of great interest are the 13th and 14th century mosaic tile pavements, now on display in Bedford Museum (Baker 1980, 1987).

Important excavations at Grove Priory near Leighton Buzzard – including a whole complex of agricultural buildings, industrial features, fishponds, dovecote, stables, etc – are shortly to be published (Baker, *in prep*). Excavations of the Benedictine Abbey at Elstow have also given a detailed picture of the plan and development of abbey buildings, including a multi-period sequence of outbuildings to the south (Baker 1966, 1969, 1971).

The Gilbertine Priory at Chicksands has surviving 13th century cloisters and has been the subject of archaeological investigation (Dyer 1970, Jackman 1991), including recent work by *Time Team*. Another site where much archaeological work has been carried out is the Augustinian Priory at Newnham, where the cemetery, courtyards, and several ranges of buildings have been located (Dawson 1991). A refectory or large rectangular hall, containing some medieval paintings, still survives at the Augustinian priory at Bushmead (Sherlock 1985). Here excavations were focused on a large area of rectilinear soilmarks 200m away. These were shown to represent an open courtyard with possible timber buildings – almost certainly agricultural in function (Simco and Mustoe 1980).

Excavations at the Dominican Friary in Dunstable uncovered domestic buildings, ovens and other industrial features, as well as exceptional evidence of a regular series of cross-shaped features thought to represent a garden or orchard (Matthews 1972). BCAS excavations in the late 80s and early 90s located the Friary itself and identified its main constructional phases. About 60 inhumation burials were also excavated (Clark and Maull 1989). Friaries are important indicators of urban status, often being situated on the outskirts of towns. The other example from the county is Greyfriars in Bedford.

Some of the work outlined above is still in need of full publication, and there has been little attempt at synthesis of the wide range of evidence from very different kinds of monastic sites. An important theme to emerge, particularly with regard to Elstow Abbey and Grove Priory, is the significance of outbuildings and temporary buildings. The excavated evidence and research potential of these are explored by Baker and Baker (1989).

A relatively unexplored type of site is the monastic grange, of which about 17 are known in the county – eg. at Haynes, Ravensden, etc. Some were moated, as at Ruxox. Excavations here in 1959 uncovered medieval walls thought to represent a monastic cell or chapel on the D- shaped island (HER). More than just barns, the grange may have had mills, gardens, styes, byres, hen-houses, granaries, fishponds, etc. Such independently run small estates were often some distance away from the monastery itself. There was a grange belonging to Woburn Abbey at Heath and Reach, and one belonging to Ramsey Abbey at Cranfield. A hermitage is recorded at Yarl's Wood, Milton Ernest. Like Ruxox, it is on a moated island (the site of a later manor house). Excavations in 1961 revealed the foundations of a rectangular stone building with much 12th-16th century pottery and roof-tiles. Such sites are fairly rare and would benefit from more extensive excavation.

Hospitals About fourteen medieval Hospitals are known, of which three were in Dunstable and several in Luton. Remains of one of the walls of the Hospital in Toddington probably survive as part of the present churchyard wall. In Bedford in the 1960s, the medieval structure of the Hospital of St John was discovered within what seemed to be a Victorian building– a reminder of the potential of standing buildings. The nearby parish church was originally a chapel of the Hospital, and there may have been cloisters between the two buildings. Almost certainly there were other buildings attached. The area to the east was glebe land, and here the remains of fishponds belonging to the Hospital can be seen. Such sites remain virtually unexplored by excavation, and the rather limited information we have on them needs to be expanded.

Churches/Chapels Churches are perhaps the most common category of standing medieval building, and it is not possible to do justice to them here. Nearly all existing churches were rebuilt and modified in the medieval period, often with the addition of spires and porches (for a general guide, see Pevsner 1968 or VCH). Many church watching briefs have been carried out, as well as detailed recording and analysis such as the recent project at St George's Church, Toddington (Network Archaeology Ltd, Lincoln). For excavations within churches, see Hall et al (1971) and Hall and Hutchings (1980). Medieval graveyards may be much more extensive than their present day boundaries suggest, and are sometimes encountered during excavation – for example, at St Paul's Square

Fig. 5.5 Excavations at Grove Priory showing an early long barn (top); and a dovecote (below).

in Bedford. With the exception of monastic graveyards and part of the graveyard of the demolished St Peter-de-Dunstable Church in Bedford, where about 50 burials were found (Baker et al 1979), no major medieval graveyard excavations have taken place in the county.

Communication and Economy

Many of the major bridges over the Rivers Great Ouse and Ivel were built in medieval times. Harrold, Turvey, and Bromham bridges, for example, are all mentioned in 12/13th century references. Bedford Bridge, replaced in the early 19th century, had two gatehouses – one serving as a chapel and the other as a gaol. Bedfordshire County Council carried out an intensive programme of restoration and archaeological recording on the bridges of the county, leading to the publication of *Bridges of Bedfordshire* (Simco and McKeague 1997).

Perhaps the most unusual bridge in the county, however, is the smallest. Sutton packhorse bridge was built alongside a ford in the 13th/14th centuries. Only wide enough for a single horse and with no parapets to facilitate the carrying of loads, this is sometimes thought to have been associated with the medieval wool trade. Many other such bridges must have been lost.

Many of the larger bridges had long causeways or packhorse ways leading back from the bridge across the floodplains. The only surviving example of such a causeway is at Harrold.

Maps of the location of bridges over the Ouse, Ivel and Lea gives a useful idea of the network of principal routes in medieval times (Simco and McKeague *ibid*). Most journeys undertaken were probably local rather than long distance. Many hollow-ways date from this period. Nevertheless, major roads like Watling Street continued to attract settlement, with Dunstable re-founded on it in the 12th century, and Hockliffe gradually shifting towards the road over a period of time. Ancient tracks such as the Theod Way (later the Saltway) in the south of the county were used for transport of salt and other goods – steering clear of towns to avoid paying tax. Other roads brought traffic into towns for markets, serving as the main link between town and countryside.

The hollow way known as Long Lane in Harlington has two branches leading north from the village, both heading towards mills. One leads to the site of a former windmill at Samshill. The other heads to Harlington watermill. The track must have been used not only to take grain to the mill, but also (in the other direction) to bring in tithes to the church. Like many such ancient tracks it also forms part of the parish boundary. Excavation of a segment of the hollow way was recently carried out by Albion Archaeology.

The rivers probably ceased to be navigable over long distances, with numerous weirs and mills blocking passage. This must have greatly increased the importance of roads for transport of goods.

Political and religious considerations also influenced the layout of roads and tracks. Of great interest but poorly understood are the moot sites, or assembly places of the hundreds, which may be discernible on maps as places with paths radiating out from them. Fairs also attracted road traffic and must have been held at easily accessible points (sometimes at the moot sites themselves). A few medieval crosses survive such as Thurleigh and Cardington. Gallows were also frequently situated where roads crossed parish boundaries. Other 'nodes' on the network of tracks were wayside shrines and holy wells. The holy well at Stevington is known to have attracted pilgrims, though the routes by which they travelled are unknown. Some hospitals accommodated pilgrims as well as tending the sick. Little work has been done on Bedfordshire's place on the pilgrimage 'map'. Much more work is required on understanding the medieval road system and associated roadside features.

A gazetteer of markets and fairs in England and Wales up to 1516, including a section on Bedfordshire, has recently been completed by the Centre for Metropolitan History at the University of London (available online at *www.ihrinfo.ac.uk/cmh/gaz*).

Material Culture and Technology

The pottery type series for the medieval period is largely based on assemblages from Bedford (Baker *et al* 1979), with many additions from Grove Priory and more recent sites such as Stratton. Once Stratton post excavation analysis is completed, the whole type series for Bedfordshire will urgently require complete revision and synthesis.

The main type of pottery for the 11th- 13th century in northern Bedfordshire is the developed form of St Neots shelly ware, with sandy wares being more characteristic of the south of the county. There have been suggestions of a north/south divide (similar to that in Buckinghamshire) but more work needs to be done to clarify this. Local kiln sites are suspected but not yet found. A 13th century pottery kiln was found at Harrold (Hall 1972). This produced new forms of properly fired medieval shelly wares, although the transition to St Neots ware is imperfectly understood.

The existence of a late medieval kiln was suggested when wasters were found during fieldwalking at Everton (Hassall 1976), and a kiln was later discovered at the other end of the village (Slowikowski 1992). Another late medieval kiln was found at Flitwick Church End (Mynard et al. 1983), whilst a potter's waste dump of 15th cent sandy ware found at Flitwick East End (Baker 1985), showed some affinities but with quite different vessel forms.

More kilns remain to be located. Documentary sources and placenames – for example Potter's Street in Bedford, hint at their existence. Of those kilns which have been found the lack of scientific dating is a problem, hampering the dating precision that the pottery provides for other sites. Another shortfall is the absence in the record of associated structures such as potter's workshops, windbreaks, puddling pits, etc.

Tiles are important sources of information for the medieval period. The 14th century decorated floor tiles found at Old Warden Abbey, now on display in Bedford Museum represent an outstanding assemblage. These have yielded much information about the techniques of tilers and their use of ciphers and numbers (to aid dismantling and assembly of floors). On the basis of the Old Warden tiles it has been possible to overturn a number of assumptions about the status of tilemaking, at least for high status ecclesiastical sites, and to view it as an art form in its own right (Baker 1987). Baker has shown that Bedfordshire has the potential to contribute to wider debate on this subject. Little is known, however, about the actual organisation of the craft. Were travelling craftsmen brought in from elsewhere, even abroad, to work on the Old Warden floors? Were the tiles produced in a kiln on site, or imported from elsewhere? To what extent was a local tradition of tilemaking established in Bedfordshire at this time? It seems likely that a considerable body of expertise had been developed by the late medieval period.

Floor tiles with line figures and an exceptional 15th century knight-on-horseback roof finial were found at Mill Street in Bedford (Baker 1974).

No medieval tile or brick-making sites have yet been found in Bedfordshire. Cox (1979) explores what documentary evidence there is and points out that right up to the 17th century there was an ambiguity in the use of the terms 'brick' and 'tile'. Most kilns producing tile probably produced brick also. Someries Castle near Luton was built of brick in 1448 and is a testament to the great technical expertise around at that time – see Smith (1979) for a discussion of its place in early brick building tradition. It is one of the oldest brick-built buildings in the country.

Fig. 5.6 The Stratton Helmet (© Albion Archaeology).

Perhaps the principal non-ceramic find from Bedfordshire in recent years is the Stratton helmet, which had been deliberately placed (concealed?) inside a pit. It still has vestiges of linen lining. Opinions differ as to whether it represents a 14th century basinet or 15th century sallet/skull-cap. This will be published together with the rest of the material and excavation results from Stratton.

Medieval industries which have been attested archaeologically include quarrying (eg. for stone at Totternhoe), brewing or baking (with ovens found in St Mary's Street in Bedford), lime production (with the lime kiln excavated on the Bedford Castle site being an exceptional example) and ironworking (although mostly secondary deposits rather than original forge sites have been found). A late medieval sawpit was found at Marston Moretaine (Steadman and Edmondson 1999). Numerous references to water-mills and windmills exist but few have been investigated through excavation. At Haynes a timber-lined tank or cistern, dated by dendochronology to 1086, may have been used for some industrial process (Shotliff 1995a). Other industries known to have taken place such as leather tanning and rope-making must have left traces but have yet to be encountered/ recognised in the archaeological record.

Beyond Frameworks: the example of Stratton

Large scale excavations at Grove Priory, Tempsford and Stratton have all produced evidence of

considerable continuity from the Saxon to the medieval period, cutting across the basic division commonly employed in this and other frameworks. The three sites between them cover the characteristic medieval monuments of priory, moated manor and DMV, yet all of these have been shown to have roots in the preceding Anglo-Saxon period. At Grove the priory was situated within an earlier ditched enclosure and on the site of a probable timber hall which may represent the late Saxon Royal Manor of Leighton (Baker 1982). At Tempsford the 13th century moated enclosure was constructed with respect to an existing field system defined by boundary ditches of late Saxon date, with evidence of activity on site going back to middle Saxon times and earlier (Maull *et al* 2000). A major theme to emerge from both excavations is the extent to which monuments like priories and moated manors can be taken to be developments of earlier sites rather than simply as new arrivals in the landscape.

Stratton is worth considering in some detail because it is clearly a site of national significance. With excavations covering an area of about 11 hectares, the Stratton project combines a view of the landscape as a whole with the time depth that only excavation can provide. Development of the village begins in the 5th –7th centuries, when six small farmsteads, each consisting of SFBs and post-built structures, were evenly spread from north to south. Some continuity of use of Roman field boundaries into the Saxon period was evident. In the 7th century a small cemetery and a possible church or chapel appeared, together with post-built halls. A 9th century cemetery further north indicated that the settlement itself may have been shifting in this direction. During the 10th and 11th centuries the settlement shifted to the east, with at least three large farmsteads enclosed by ditched boundaries on either side of a north-south trackway – a proper village plan. The associated field system now partially overlaid the abandoned settlement to the west. In the medieval period two dovecotes and other structures may have been associated with a moated manor site to the south east. Settlement continued to shift eastwards, with post built buildings gradually being replaced by timber-framed structures, until the village was largely abandoned as a result of emparkment in the 17th century (Shotliff 1995b).

Importantly, Stratton could easily have been identified as a classic DMV or deserted medieval village from its visible remains (though as it happens earthwork survival was poor). Excavation has shown it to be much more than that, with continuity of (shifting) settlement stretching from at least late antiquity into the post-medieval period. This not only indicates that our view of the medieval period is somewhat flat and lacking in time depth; it also raises the question of how many other such sites, if subjected to detailed excavation, would reveal similar length and age of occupation.

Conclusion

All frameworks shape our perception of material remains, highlighting some aspects at the expense of others. Issues of visibility and invisibility have figured prominently in the preceding account. Some aspects of the archaeological record, previously neglected and hidden by existing frameworks (issues surrounding the period of Late Antiquity, or the economic impact of Danish settlement, for example) have been highlighted here. The question which emerges is whether the frameworks we use should be more flexible – capable of being modified or re-framed according to the kind of research we are doing and the type of evidence we are looking for. While conventional categories are used to review most of the Bedfordshire material, then, the discussion at the end has moved outside the framework – to look at recently excavated evidence that cuts right through the artificial divisions we may place upon it.

Research frameworks also need to expand their parameters to take account of the new kinds of site that have been identified in recent years. Magnate enclosures, large water management features such as dams and wildfowl lakes, monastic granges, warrens, etc, are examples of types of site which clearly need further research. Their emergence into the archaeological consciousness is largely a result of the success of the landscape archaeology approach developed during the parish survey programme and embodied in the HER..

The relationship between landscape studies and site specific methods of investigation such as excavation is potentially a very creative one. As the example of Stratton shows, excavation can provide the time-depth that landscape archaeology lacks, while a focus on the broader landscape provides the context and the connections for individual sites. The two approaches are complementary.

Perhaps the main point to bring out in the conclusion is the generally understated and underplayed nature of Bedfordshire archaeology in the period(s) covered by this chapter, though forthcoming publications are likely to greatly improve the situation. Evidence of the early urban origins of Bedford, for example, is virtually unknown outside the county. On the other hand the paper by Evelyn Baker on decorated floor tiles from Old Warden Abbey, published in *World Archaeology* (Baker 1987), is an instance of the way in which local evidence can be used to address issues of national and even international importance. The

Fig. 5.7 Yielden Castle earthworks (© Northamptonshire County Council).

county has great potential for further study of the various processes at work in Late Antiquity, urban origins in the middle-late Saxon period, the impact of Danish invasion and settlement, etc – issues which go far beyond county boundaries. Its research record on monastic sites is strong, and the publication of Grove Priory will be an important contribution. In the study of rural settlement , too, Bedfordshire has much to offer. There is as great a density of moated sites here as anywhere in the country, and the publication of excavations at Tempsford will be especially significant for our understanding of this type of site. Forthcoming publication of Stratton, a site of national importance, should represent an important milestone in raising the profile of Bedfordshire archaeology.

Environment and Economy

Peter Murphy

Soils and geo-archaeology

On the Ivel floodplain at Warren Villas, peat had begun to form extensively by the late Roman period. A fen meadow environment, seasonally flooded and (on the evidence of Coleoptera) grazed, existed; but it was not until the Late Saxon to Early Medieval period that clay alluviation began. This is attributed to large-scale and intensive cultivation in the catchment (Robinson 1992; 2001). Analysis of plant macrofossils points to use of the floodplain as hay meadow. Alluviation appears to have largely ceased after the 14th century.

At Haynes Park, there was continued erosion and downslope colluviation in the 11th century. Manuring and marling were registered, with intense animal activity in wet hollows. Lynchet formation continued into the 12th century (Macphail and Cruise 1997a).

Micromorphological and chemical studies of the fills of Early- Middle SFBs at Harrold elucidated aspects of construction and use (Macphail 2000). Results suggested that turf was used in wall and/or roof construction, that there was probably a floor of beaten earth and internal hearth. Inclusions of weathered hammerscale and possible loom weight fragments hinted at activities associated with these buildings. Fills of an Early Saxon SFB at Stratton showed evidence for initial trampled floor formation, then installation of a clay-based floor, and finally collapse

of a turf roof, which included dung; later SFBs at the same site included ashed residues from burned dung and domestic waste (MacPhail 1998).

Soil micromorphological analysis of 'dark' occupation deposits pre-dating and contemporary with the 13th-14th century moated site at Tempsford showed that these layers represented long-term accumulations of predominantly ashy material (Macphail and Cruise 1996).

At Stratton, fills associated with a Late Medieval dovecote indicated that it had been built in an area where human waste had previously been deposited, and where there was lime production; unsurprisingly, the trampled floor became enriched with phosphates from bird droppings (MacPhail and Cruise 1998).

Vegetation, land use and crops

At Cainhoe Castle, a peat including wooden stakes of oak, alder, willow, Prunus and ash was recorded. A date of 1450 $\pm$ 70 BP (HAR-715) was obtained on one (Thomas 1975). No further palaeoenvironmental studies were undertaken. Waterlogged sites of this date are extremely rare nationally. There is certainly a case for further evaluation of this deposit by coring, to determine whether any of it survives after road construction.

Assessment of fills in Middle Saxon well at Stratton pointed to proximity of damp pasture/meadow, indicated by abundant Poaceae, Lactuceae and Cyperaceae pollen with *Ophioglossum* and *Trifolium*. Cereals were being grown or processed nearby. A second well gave rather different results, relating more to the ruderal vegetation of the settlement area (Cruise 1997). Trees and shrubs were sparsely represented. Girling (1983) analysed insects from a 7th century well at Odell. Dung beetles predominated in the assemblage. An open, grazed landscape was inferred, and there was no evidence for any significant changes at the site since the Roman period.

At Haynes Park, 11th century colluvial deposits produced assemblages indicating a very open landscape, with herb-rich pasture and arable nearby (MacPhail and Cruise 1997a).

Samples from the base of a probable Late Medieval sawpit at Marston Mortaine, have also been assessed palynologically (Cruise 1999). Wood was too poorly preserved for identification. *Pinus* (pine) and *Picea* (spruce) pollen predominated, perhaps relating to the processing of timber imported with bark from a northern source, though Rosaceae pollen was also present.

A very substantial collection of archaeobotanical samples (over 600) from early-Middle Saxon to Late Medieval contexts at Stratton has been analysed (Moffett, undated; Smith and Moffett, undated). In all phases, free-threshing wheat grains dominated the assemblages, and cereal chaff was rare. Rye (*Secale cereale*), six-row hulled barley (*Hordeum vulgare*), oats, peas and beans (*Vicia faba*) were recorded from all phases but rivet wheat (*Triticum turgidum* type) did not occur before the Late Saxon period, and two-row barley (*Hordeum distichum*) was present only in Late Medieval samples. Hazel nutshell was present in several site phases, walnut (*Juglans regia*) was recorded from Late Medieval deposits, and there was a single peach stone (*Prunus persica*) from a 12th-14th century deposit. Small-scale domestic cereal processing before hand-milling seemed generally to be represented, though there was some evidence for barley malting. Abundant small-seeded legumes occurred in some deposits (*Vicia*/*Lathyrus* spp) and these could represent animal fodder.

Plant macrofossils and molluscs from the evaluation of the Tempsford Moat site, a 13th century moated enclosure, abandoned in the 15th century, are reported by Robinson (1996). The moat fill, unsurprisingly, produced remains of aquatic plants and molluscs, with woody plant debris including *Prunus*/*Crataegus* (sloe/hawthorn) and *Rubus* (bramble). Charred cereal grains (mainly free-threshing wheat with some barley, rye and oats) were present, but no chaff. The sparse weed seeds included Anthemis cotula. Subsequent excavation has produced more material, and from earlier phases (Maull and Chapman 2005). Charred crop remains came from Early/Middle Saxon to Medieval contexts: cereal grains, including wheat, barley and oats, were noted but, so far, no chaff. Seeds of *Vicia* and *Lathyrus* spp. (vetches, tares) and hazel nutshell were present. Terrestrial and freshwater molluscs from a range of habitats were recorded. Unfortunately, the moats appeared to have been repeatedly cleaned out thereafter, so that intact medieval fills suitable for palaeoecological analysis could not be defined. However, fills of Late Saxon and early Medieval features will be analysed.

Urban investigations have been confined to the town of Bedford. Macrofossils from sediments at the Liberal Club Site, Midland Road, Bedford indicated initially open grazed marsh conditions, with intermittent flooding, in the Late Saxon period (Robinson 1986a). A fruit of hemp (*Cannabis sativa*) and remains of *teasel* (*Dipsacus fullonum*) were recorded. The former could have been derived from nearby retting; but it is unclear whether the teasel remains were of wild or cultivated sub-species.

Robinson (1984) has also described plant and invertebrate remains from Middle Saxon and Saxo-Norman pits at Bedford Castle. These included calcium phosphate-replaced plant material, fly puparia and millipedes, implying that these were latrine pits. Charred and replaced macrofossils of *Brassica*/*Sinapis* (charlock/mustard), field bean, wheat, barley, oats, hazelnut and weeds were present.

Plant and invertebrate remains from Early Medieval deposits at Duck Mill Lane, Bedford (Robinson 1986) appeared to be from a latrine pit. Samples were very rich in cereal bran, with testa fragments of corncockle (*Agrostemma githago*) and cornflower (*Centaurea cyanus*). Macrofossils of linseed, bramble, wild strawberry, plum, cherry and apple core were also present, as well as a specimen of the bean weevil (*Bruchus rufimanus*). There was also some charred cereal waste. Bracken and remains of wetland plants were thought to represent discarded flooring and/or roofing materials. Other beetles included woodworm beetle (*Anobium punctatum*) and *Ptinus fur,* a strongly synanthropic species.

At the Empire Cinema site, Bedford, samples were obtained for analysis from Saxo-Norman to Early Medieval contexts (Girling 1981; Keepax 1979; Paradine 1981). Insects included taxa characteristic of refuse and dung (e.g. *Cercyon* spp, Staphylinidae), domestic situations (e.g. woodworm beetle) and aquatic habitats (e.g. *Tanysphyrus lemnae*), with phytophages and eurytopic taxa. Samples from ditches and pits produced plant macrofossils of segetal and ruderal weeds, aquatics, scrub/woodland species and cereals (barley, rye, rivet-type wheat). Charcoals of oak, ash and hazel were noted. These twenty-year-old studies were pioneering when produced, and include some remarkably prescient identifications; but the paucity of reference to context renders them of limited value today.

Animal bone

An Anglo-Saxon SFB at Puddlehill, Dunstable produced a bone assemblage dominated by sheep, with some cattle, pig and domestic fowl (Higgs 1962).

Animal bones from sites in Bedford excavated up until 1977 are reviewed by Grant (1979), and individual site reports are given in the same volume. The faunal remains were predominantly of 9th-13th century date, with some 15th century material. In general, sheep predominated, followed by cattle and then pig. On-site butchery is suggested by the presence of both 'waste' and 'meat-bearing' bones at most sites. Only at Bedford Castle were bones of red, roe and fallow deer at all common, hinting at some social differentiation. Other taxa represented were dog, cat, horse, hare, bird (mostly domestic fowl) and fish. Since there was no sieving at these sites, retrieval of fish bone was poor. Industrial processes represented included horn- and bone-working. Further evidence for horn-working was provided by assemblages mainly of sheep and goat horn-cores, with some cattle (mixed with domestic food waste), from the Empire Cinema site (Grant 1983). Mid-Late Saxon assemblages from the Bennett's Works site were dominated by cattle, whereas Saxo-Norman contexts included more sheep (Grant 1983a).

Medieval fishbones from the Bennett's Works site included eel (*Anguilla anguilla*), herring (*Clupea harengus*), mackerel (*Scomber scombrus*) and indeterminate cyprinids (Wilkinson 1986). Although this was a small assemblage, it does at least demonstrate importation of marine fish – especially in pelagic shoaling fishes, as well as freshwater fishing. Marine molluscs (mainly oyster with some mussels and cockles) were present at other sites in the town (Baker et al. 1979, 291).

A very small collection of pig, cattle, horse and sheep/goat bones came from Saxo-Norman deposits at Kempston Manor (Hutchins 1996). Faunal remains, mainly of 13th-14th century date from evaluation of the moated site at Tempsford were likewise sparse, comprising cattle, sheep, pig, horse, bird, dog, domestic fowl, hare, frog and fish. The latter included a large sea-fish (cod?) rib (Roberts 1996). Later excavations at this site produced more material: 165kg in total (Hutchings, in Northamptonshire Archaeology (2000). Most bones were fragmentary, and many showed evidence of trampling, rolling and damage by dogs. Cattle remains predominated, with pig, horse and dog. Sheep/goat was rare. Birds, including domestic goose, fowl and blackbird/rook were present, with hare. Sieved material included amphibians and fish, but not in large amounts.

An assemblage of some 700 bones was retrieved from the moated site at Willington (Grant 1975). Cattle were most common (around 30% of total), with sheep, pig, bird, (including domestic fowl), dog, and rare remains of fallow deer, rabbit, cat, horse and red deer. Bones showing evidence of dog-gnawing and/or butchery were consistently present.

Human remains

As so often elsewhere in the country, the Anglo-Saxon inhumation cemetery at Chamberlain's Barn, Leighton Buzzard, was on an acidic soil, so only fragments of skull and teeth survived, with body stains (Hyslop 1963). The probable Early Anglo-Saxon execution

site around the Bronze Age Barrow 5, Five Knolls, Dunstable was not excavated to modern standards, and the report on the human bones is curiously antiquated, focusing on skull morphology (Dingwall 1931). Fragmentary and incomplete inhumations of "more than a hundred persons", mainly males but of both sexes, were recovered. Fractures, including unhealed skull fractures were noted. The skeletal remains from the Anglo-Saxon cemetery at Harrold were also very poorly curated, and the bones had become so mixed that only minimal information on sex, maturity and stature could be obtained. Three adult males, three adult females and an immature individual were represented, with female heights of 5ft 2in-5ft 5in and male heights of 5ft 10in and 6ft 0in (Denston 1970).

At Marina Drive, Dunstable a group of late 6th-early 7th century inhumations was focused around a Bronze Age barrow (Brothwell 1962). There were at least 49 burials, of all ages and both sexes, though with a predominance of males. The group was rather tall, with male stature estimated between 5ft 7in to 6ft 1in (mean 5ft 9.5in), female 5ft 1in to 5ft 7in (mean 5ft 3.5in). Healed fractures and evidence for osteoarthritis were noted, and oral health was good. Grave goods included a beaver tooth amulet, cowrie shells, cattle ribs and 'extra' human teeth.

A group of 52 medieval burials was excavated at St Mary's Street, Bedford (O'Connor 1979). There was high infant mortality, a second peak in mortality about 20-25 years (considered to be mainly women dying in childbirth) and a third peak at about 35-45. Male mean stature is estimated at around 168cm; female at 162cm. There was a high incidence of osteoarthritis, particularly of the spine, a probable case of Paget's Disease, one femoral fracture, dental caries, abscesses and ante-mortem tooth loss.

The partially-excavated cemetery at Priory Road, Dunstable produced remains of 20 individuals, probably of 12th-13th century date (Jones 1993). Both sexes were represented, with individuals ranging in age from infant to adult. Spinal arthritic changes were noted, and there was a high incidence of lower leg or foot injuries resulting in healed fractures and fused distal phalanges. It is suggested that these injuries were sustained during construction of the Priory.

Burials in the monastic cemetery at Chicksands Priory were disturbed during construction work in 1969 (Martin 1970). At least six adult male burials were recorded. Stature was estimated at 5ft 2in-5ft 6in; at least one individual was over 60, on the evidence of ossified cartilage at the sternal end of the ribs. Caries was not noted. In addition, part of the pelvic bone of a young child was recovered, suggesting use of the cemetery by a lay community as well as the monastic.

Three human burials of medieval date came from Tempsford Moat (Chapman, in Northamptonshire Archaeology 2000). All were small adults, two probably female.

Technology

55kg of slag, ranging from the Late Saxon to Medieval period, was recovered during the excavations at Tempsford Moat (Mack and McDonnell, in Northamptonshire Archaeology (2000). Hearth bottoms indicative of secondary smithing and fluid slags were noted, but there was no evidence for bloomery smelting.

Ferrous slag from medieval sites in Bedford comprised a mixture of both smithing and smelting slag, but very little furnace lining, implying that most material was imported from iron-working sites elsewhere. Hammer-scale was, however, recorded at Midland Road, suggesting proximity of a forge. No hearths or furnaces have been recorded (Baker et al. 1979, 285).

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6 POST-MEDIEVAL, INDUSTRIAL AND MODERN PERIODS

Matt Edgeworth

With contributions by Stephen Coleman, Drew Shotliff and Peter Murphy

Introduction

Of all fields of archaeology in Bedfordshire the post-medieval and industrial periods have the greatest potential for advancement. The potential exists not just in the sense that a vast range of structures and other material remains survive (though many are now under threat of demolition), but also in the sense that relatively little work has been undertaken by archaeologists. This is a reflection of the priorities of the wider culture as well as those of the archaeological profession. Society at large, while it clearly does value its archaeological heritage, does not always ascribe the same value to monuments of more recent times as it does to those of the earlier periods. Public perceptions are quick to change and the boundaries of what is perceived to be of cultural significance are constantly being swept forwards in time. An analogy could perhaps be drawn between post-medieval archaeology today, under threat from modern development, and the neglected state of medieval archaeology back in the early 1960s. Large numbers of sites and buildings were literally bulldozed away, while the sheer extent of what had been lost was only realised when it was too late. Unless the discipline in Bedfordshire is rapidly developed, there is a real danger that a similar scenario could be re-enacted. The post-medieval archaeology of the county must emerge more fully into the sphere of archaeological attention so that its riches and potential can be revealed.

In the opening up of new or largely untouched fields of research, some conventional assumptions may have to be overturned. It is often assumed that Bedfordshire, being primarily an agricultural county, has little industrial heritage. Our ideas of industry are bound up with the concentrated industrial development of towns in the midlands and the north. In Bedfordshire it is true that, with the exception of the engineering, car and hat factories in the larger towns, there was relatively little in the way of this kind of urban industry. Industry here took a different form, and the countryside was actually far more industrialised than the towns. Bedfordshire played a key part in the Agricultural Revolution of the 18th and 19th centuries, and innovations developed here, such as the steam plough, had an enormous impact on the rural landscape. The county may have had 'country towns', but it also had an 'industrialised countryside' where farms were built like factories and even hedgerows and fields were re-fashioned to fit the new machines. Sites and structures associated with these developments – the model farms and villages on the great estates, the buildings associated with market gardening in the east of the county, as well as the agricultural engineering foundries in the towns – are little known. In this respect Bedfordshire has a powerful contribution to make to industrial archaeology.

Also explored in this chapter is a class of monument that, until very recently, would not be considered as being within the remit of archaeology at all. Defensive installations of the 20th century, particularly airfields, have made a considerable impact on the county landscape. But the recent origin of these sites does not protect them from dereliction and demolition, and this makes the task of recording and understanding them all the more urgent.

Not every type of evidence from the post-medieval, industrial and modern periods is described, and the chapter does not set out to be a gazetteer. While an attempt has been made to put some sort of overall shape on the mass of material, and to give some idea of the range of sites, comprehensive coverage would be impossible. The field is simply too vast for that. Instead, themes have been developed that seem to emerge from the Bedfordshire material, and emphasis has been placed on those aspects of the resource that are, if not unique to the area, strongly represented here compared to elsewhere.

The below-ground archaeology of the period after about 1500 has not been widely investigated, and exceedingly few studies in archaeological science have been published although dendrochronology has been applied to date several standing buildings in the county. Six poorly-preserved adult inhumations, five male, one female, from Galley Hill, Streatley are thought to represent individuals executed on a gallows, erected

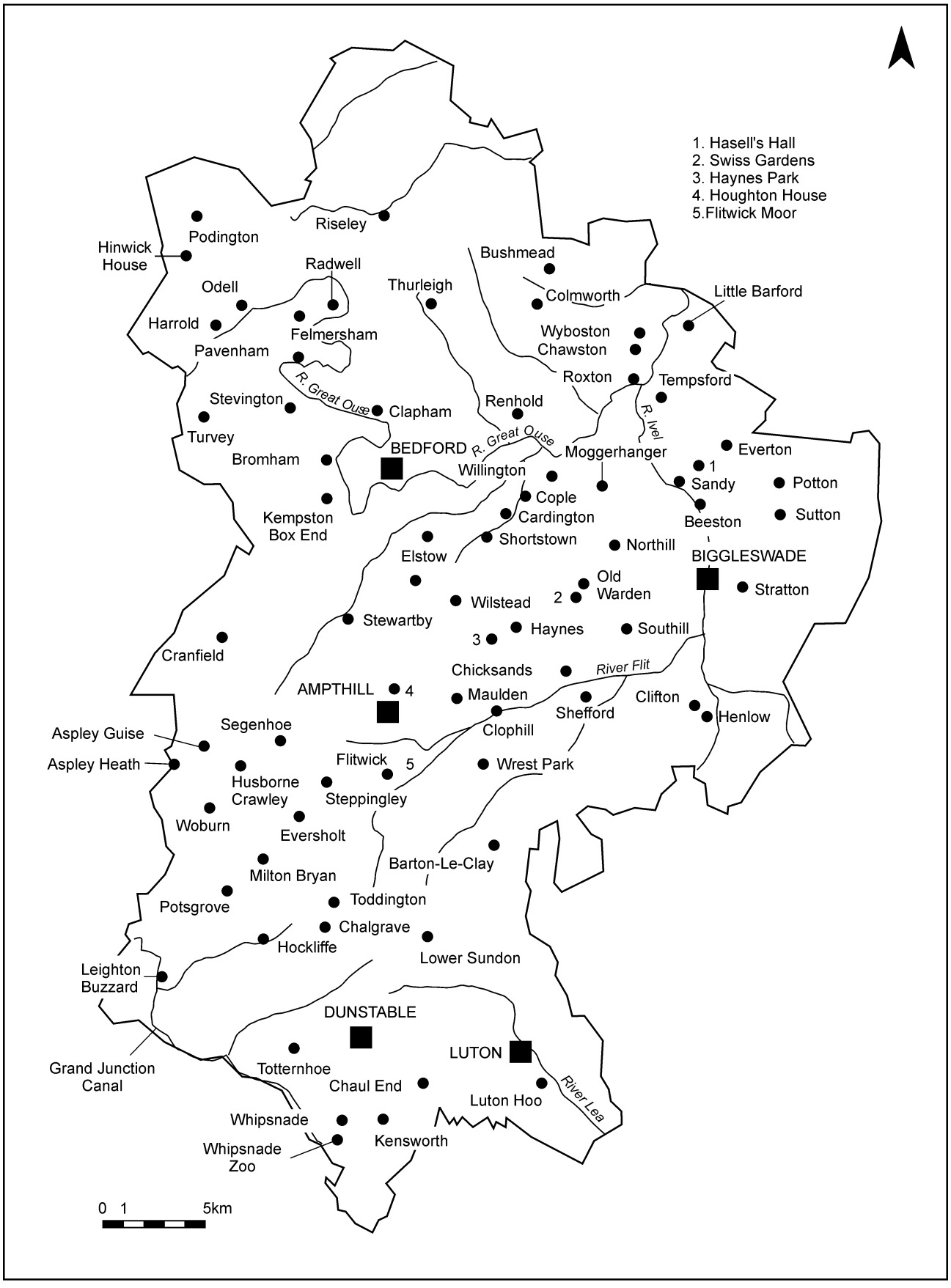

Fig. 6.1 Location of places mentioned in the text: Post-Medieval, Industrial and Modern Periods.

on a prehistoric barrow (Dyer 1974). At the same site, a large pit included a horse skull, a dice and sixteenth century ceramics, seemingly a very late example of a 'placed' non-Christian deposit (Dyer 1974). 18th century textiles from a stone-lined tank at Bedford were of fine wool, perhaps imported Merino wool from Spain, dyed with madder (Crowfoot 1979).

Sources

Bedfordshire has no established tradition of either post-medieval or industrial archaeology. The county is hardly mentioned in the national journals, such as the *Journal of Post-Medieval Archaeology* or the *Industrial Archaeology Review*. Similarly, there are only a few papers covering these periods in local archaeological journals.

With some exceptions, excavation reports tend to have only brief sections on post-medieval evidence. Few opportunities have arisen for archaeological investigations in towns (where most post-medieval development has occurred), with the exception of Bedford. Here much post-medieval material was found during excavations in the 1960s and 1970s, and this is one of the few bodies of evidence to have been extensively reported (Baker *et al* 1979).

A pamphlet entitled *Industrial Archaeology in Bedfordshire* (Laws 1967), published over 30 years ago, and sketched out a basic framework for an incipient subject. There has been no subsequent attempt to develop the subject further, apart from an unpublished paper by Cox (1981). Some Bedfordshire industries are well covered by published literature. Brickmaking is dealt with by a comprehensive survey and gazetteer (Cox 1979a). Subjects such as mills (Howes 1983), the railway network (Cockman 1994), straw-plaiting (Grof 1988), and the Cardington airship industry (Chamberlain 1984) all have excellent books, though not written by archaeologists. What they lack is the particular slant on material culture that an archaeologist would bring to their study. Numerous gaps in the literature can also be identified. There is no published account, for example, of model farms. Nor is there anything like an up-to-date synthesis of the whole range of industrial sites surviving in the county today.

Nevertheless Bedfordshire has a fairly strong base of unpublished primary data in need of analysis and synthesis. Of particular relevance is the listing and categorisation of industrial sites in the Heritage and Environment Record (HER). Over 700 transport features (roads, bridges, tollhouses, waterway, railway, air transport sites), over100 manufacturing sites (saw mills, breweries, engine works, factories, tanneries, etc), over 300 power production sites (stationary engines, mills, donkey wheels, electric power stations, etc), over 200 sites of services (fire stations, waterworks, gasworks, hospitals, prisons, etc) and over 1000 sites of extractive industries (brickworks, lime works, quarries, etc) are listed. This grouping of sites will undoubtedly provide the starting point for anyone attempting a synthesis of industrial archaeology in Bedfordshire.

The Post Medieval Period (1550-1850)

Rural Settlement and Landscape

Until the enclosures of the 18th and 19th centuries, about half of Bedfordshire was farmed under the open field system (with a considerable amount of land farmed in small closes, some dating from medieval times). Now largely destroyed, ridge and furrow and associated headlands survive in several areas, especially in the SW of the County. Of especial interest are those areas where the old furlongs have been overlaid by enclosure fields, creating a palimpsest (see Landscape Survival Maps for the Hockliffe/ Chalgrave/ Potsgrove area). Detailed studies of open field systems and the changes brought about by enclosure in particular parishes are to be found in Hutchings (1969), Hall (1991) and many of the Bedfordshire County Council (BCC) Parish Surveys. A challenge is to synthesise this information beyond the individual parish and to look at wider areas, and this will in part be taken on by the Historic Landscape Characterisation project funded by English Heritage, due to start in Bedfordshire in 2002.

Bedfordshire has a mixture of dispersed and nucleated rural settlement. In the centre of the county, in parts of the north and on the Chilterns there are numerous single farmsteads and 'end' place names. Usually these are seen to be of medieval origin, but some almost certainly originated in the post-medieval period. Enclosure encouraged scattered farmsteads to be built away from villages. Unfortunately most large-scale studies of settlement patterns tend to focus on the Saxon-medieval periods and fail to cover later developments, though parish surveys give good coverage on a local basis.

Deserted and shrunken villages from the medieval period are well known, but many settlements were partially deserted in the post-medieval period too. Some villages shrank as towns grew because agricultural workers were being drawn towards the towns to look for work, leaving the platforms of

Fig. 6.2 Wooden work bench or stool from a cobblers workshop found in waterlogged pits at Stratton, near Biggleswade (© Albion Archaeology).

houses still visible on the ground. The row of houses at Tanner's End in Toddington, mapped in 1581, had been replaced by a farm by the time of enclosure in 1797. Examples of desertion as a result of the enlargement of parks in the 18th century and early 19th century are known from Colworth, Haynes, Stratton, Little Barford, Little Sundon and elsewhere in the county. More work is needed on these sites to counterbalance the relatively large amount of research done (nationally if not locally) on deserted medieval villages.

Market gardening is recorded in Sandy from the early 17th century. It is not known quite how it fitted into the open field system. Nor is much known about early methods of cultivation. Peas, carrots, onions, parsnips, beans, potatoes, etc, were grown on the rich alluvial soils next to the Ivel. At first the scale of production was small, but grew as access to wider markets became possible. High yields were obtained by intensive methods of hand-cultivation together with heavy manuring. Sandy specialised in long-lasting crops that could be transported by wagon to London, and the turnpiking of the Great North Road in 1725 must have given trade an enormous boost. This set the scene for the great expansion of market gardening with the arrival of the railways. Much more work needs to be done on the early development of this important Bedfordshire activity.

Rural crafts included mat-making at Pavenham (Linnell 1947), with rush-cutting taking place all along the Ouse valley. The annual Pavenham Rush Ceremony on 29th June, when the floor of the church is strewn with rushes, symbolises the renewal of cottage floors with rush mats that used to take place at that time of year in this part of the county (Dyer 1987). Baskets were also made in profusion, largely to meet the demand from market gardeners and farmers, later from laundries and post offices (Bagshawe 1981). Osier beds were once common, and until recently survived at Willington, Pavenham and elsewhere. None of these activities leave much trace in the archaeological record – or do they? It might

be worth challenging the assumption and looking for ways in which these countryside activities could be archaeologically attested.

Rural Buildings

Timber-framed rural buildings have attracted a certain amount of study (Alcock and Addyman 1969). Several examples of cruck construction farmhouses are known in the west and north from the early post-medieval period (Alcock and Woodward 1976). There are good examples of clay lump or daub construction in labourer's cottages in Thurleigh (Alcock and Addyman 1969) and occasional Wealden houses (Bailey 1977). Bunyan's Mead at Elstow is probably the best surviving row of timber-framed cottages.

Moated sites are usually regarded as medieval in date yet some continued to be used throughout the post-medieval period up to the present day. The 17th century timber-framed building at Mavourn Farm in Bolnhurst (Kennett *et al* 1986) is an example of a post-medieval building constructed within the pre-existing spatial frames that moats provide, probably on foundations of a medieval building. Scores of other examples could be given, demonstrating continuity from the late medieval period.

A recurrent theme in the published literature is the importance of making full use of available documentary and cartographic evidence to supplement physical examination of the buildings themselves. In their study of Crowhurst Farmhouse at Bolnhurst, Kennett and Smith (1977) showed how cross-referencing of material observations with information from tenurial histories can result in real insights into development of buildings.

More attention could perhaps be directed to the brick cottages of Bedfordshire. Brick replaced timber as the main building material in the 18th century. Most of estate cottages are built of brick, manufactured in the estate brickyards. Brick was also used as in-filling of earlier timber-frames. One of the characteristics of brick is that the different kinds, colours, textures, etc, reflect different clays, and therefore the district from which they were originally obtained. The atmosphere of particular locations often derives from this characteristic. The red and yellow bricks of the north and middle of the county contrast markedly with the greys and blues of the south (see the brick library compiled by Alan Cox, held by Albion Archaeology).

Rural buildings and structures include dovecotes, lock-ups, animal pounds, smithies, windmills, watermills, horse engine houses, donkey wheel houses, barns and other farm buildings. Mills are covered by Howes (1983), though not much detail on actual material remains is given. There are approximately 140 windmills and about 100 watermills listed in the HER for Bedfordshire. Many of the buildings are of post-medieval date and include standing structures with surviving machinery in working order such as Stevington windmill (Cirket 1966) and Bromham watermill. Doolittle Mill in Totternhoe is one of only a few combined wind and water mills in the country.

Watermills were situated on the Ouzel, the Flit, the Ivel and the Lea as well as the Great Ouse. Associated with watermills were complex systems of water management involving the construction of weirs, sluices, leets, tailraces, millpools all of which leave considerable trace in the archaeological record. Woburn Park Mill was driven by water culverted from an artificial lake on higher ground. Little is known of earlier watermill sites, many of which have been forgotten. Probable waterwheel paddles dating from the 16th century, however, have recently been found preserved in waterlogged pits at Stratton. If, as suspected, these prove to be from a horizontal wheel, this would represent a very significant discovery. Horizontal mills are generally thought to have gone out of use in England in the 13th century.

It is often thought that water and wind provided the only sources of power for semi-industrial processes before the advent of steam. However, just as important and much less well known were the horse mills or horse engines, where teams of horses or oxen walked in a circle to provide the rotary power. Smith (1975) describes in detail a horse-engine house at Priestley Farm, Flitwick (now demolished). Such mills were often enclosed in a farm building or wheelhouse alongside the main barn which held the machinery (Griffin 1972). Unenclosed and probably earlier horse engines existed at Little Staughton and elsewhere. Remains consisting of circular track and mounting for central post are easy to miss, and have not yet been encountered by archaeologists working in the county. A horse mill is recorded in Mill Street in Bedford in late medieval and early post-medieval times. It apparently had a monopoly in the town on the production of malt.

Horse mills were common on model farms before the advent of steam in the mid 19th century, and the enclosed engine house type was closely associated with the threshing machine. The Batchelor survey of 1808 identified 11 threshing mills in Bedfordshire, of which three were at Woburn. Such mills could also be used for butter-making, brewing, brickmaking – and indeed any task that involved crushing, grinding, or mixing. Like watermills, some were probably used for grinding bone for fertiliser. Many brickfields and

breweries, such as the Park Square Brewery in Luton, had horse engines.

Horse mills also represent an important stage in the technology of water pumping. A 'pumping engine' powered by horses at Haynes Park was used to pump water from springs in the park to the mansion on higher ground. Remains of the machinery (which was originally enclosed in a pump-house) can be seen on display outside Bedford Museum. The pump-house was connected to an iron tank or cistern by a lead pipe about 400m long (Hagen 1984). Study of such water systems in their entirety always provides much more information than just a narrow focus on the pumping machinery itself.

To be distinguished from the horizontal wheels and wheelhouses are the much less powerful donkey wheels or vertical treadmills of South Bedfordshire. Donkey wheels represent a much more ancient method of raising water; they were used primarily to raise water from deep wells. About 10 are listed in the HER. All are situated on the chalk, where wells were sunk to great depths. An example from Nash Farm, Kensworth, is preserved in the grounds of Luton Museum, complete with the wheel shed in which it was enclosed. Most other examples have been demolished.

All these sites were recorded some time ago. There is an urgent need for a programme of site visits and survey to check on current state of survival.

Model Farms and Estate Cottages

Perhaps the least known and yet most remarkable buildings of 18th and 19th century Bedfordshire are the so-called model farms and estate cottages. These were built on large estates by landlords committed to agricultural improvements. Leading the field were the Russells, the Dukes of Bedford, whose estates included about a tenth of the total area of Bedfordshire. Their work has transformed much of the landscape of the county. Already in the late 18th century, Woburn Park Farm had firmly established Bedfordshire as a major centre of agricultural innovation and research – a tradition that has been carried on up to the present day.

The new Park Farm at Woburn was designed and built by Robert Salmon in 1795-8. Symmetrical ranges of brick and stone were built in Neo-Classical style. The farm had the most up-to-date machinery, including chaff-cutters, drills, threshers, reapers, mill machines, etc, many of which were invented by Salmon himself. The Estate Office, Salmon's house, and the Bailiff's house were reminiscent of rectories – symbolising the high status of the farm administrators (Robinson 1976).

By the 1860s a much more factory-like kind of model farm had been developed – one that was less ornate and almost industrial in its optimisation of function and efficiency (to be discussed later in the chapter).

A major part of the improvements in the 19th century was the re-building of tenants' cottages. This had been started in the late 18th century by John Howard and Samuel Whitbread on their Cardington estate, but in the 19th century was mainly carried out by the Duke of Bedford and other major landowners.

The appearance of these estate cottages was deeply symbolic, greatly improving living conditions but sometimes at a cost to the dignity of the tenant. At the village of Old Warden, for example, Lord Ongley of Southhill Park required the tenants of his cottages to wear a uniform of tall red hats and rustic Swiss dress, and not to be visible at all at certain times. This was in keeping with other landscape improvements such as the creation of the ornamental Swiss gardens (see the discussion of idealised landscapes below). On the Duke of Bedford's estates today there are still about 400 estate cottages in about 6 villages. Many were built of local brick in Rustic Gothic style in the mid 19th century. Standard designs of the cottages – together with the 'B' for Bedford, a coronet and the date of the building – make them easily recognisable today. This important trend in Bedfordshire building tradition deserves to be better studied and more widely known.

Country Houses, Parks and Gardens

It is often said that Bedfordshire only has about nine surviving great houses. Of 34 houses listed in the Hearth Tax of 1671 as having 15 or more hearths, at least 25 have been demolished. Those remaining include Houghton House, Wrest Park, Woburn, Southill Park, Ampthill Park, Hinwick House and Hasell's Hall (see Kennett 1990 for a summary). Woburn, with 82 hearths, was one of the largest houses in England and is especially well studied.

A different calculation can be reached by including gentry houses of smaller size. It has been pointed out (Kennett 1987) that in 1671 there were about 125 houses in the county occupied by people who could be called gentry. Many of these have been demolished or replaced. Of the 24 survivals, some (such as the Hillersden Mansion at Elstow) are in ruins. Kennett (1990) gives an account of what has been lost through the demolition of many of the great houses.

Fig. 6.3 Discovery of an interal wooden building within the early 19th century aviary at Swiss Garden, Old Warden (© Albion Archaeology).

Kennett (1991) has also written an important study about the relationship of the country houses and their parks with market towns in Bedfordshire. Post-medieval parks influenced the development of Ampthill, Luton, and Woburn. The economic development of Luton in particular was effected by the nearby house and park at Luton Hoo.

There are relatively few large landscaped parks in Bedfordshire. Most of these are located in a belt of land roughly corresponding to the infertile Lower Greensand – ideally suited for woods or parkland. Archaeological work has been carried out at Wrest Park in Silsoe (Dawson 1991) and Luton Hoo (BCAS 1999), but only on a very limited scale. An earthwork survey and archaeological evaluation of garden features was conducted at Haynes Park (BCAS 1995). This was quite important in the sense that the garden features found were not previously known about – indicating the potential of forgotten gardens, of which there must be many. More recently, an excavation was carried out on the ruined aviary at Swiss Gardens in Old Warden (Albion 2002). For the English Heritage register of parks and gardens of special historic interest, see Thacker (1986). A more detailed survey was carried out by Sarah Rutherford for English Heritage (copy at HER). This includes designed landscapes such as urban parks and private gardens as well as the larger country parks. All parks are recorded in the HER itself.

Luton Hoo and Wrest Park were both landscaped by Capability Brown in the 1760s, and Woburn by his successor, Humphrey Repton, in the early 1800s. Many of the most elegant monuments of the post-medieval period are to be found in the gardens of the great houses. These include the baroque pavilion and orangery at Wrest Park, the Chinese Dairy at Woburn.

Some of these could almost be included within the category of 'follies', of which Bedfordshire has a

good selection. Examples are a dry bridge with grotto at Flitwick, a tower with grotto at Bushmead, and a Fishing Temple by a lake at Southill (Headley and Meulenkamp 1999). Many structures with functional purposes also have folly-like attributes. An example is the ice-house with dome and turrets built in 1788 by Henry Holland at Woburn.

An important collection of ice houses survives in the gardens of other country houses, such as Southill and Wrest. About 13 are known in total, though some have been in-filled or their location forgotten. As some smaller houses such as the Higgins house in Bedford also had ice-houses, it seems likely there are more to be discovered. Information from survey and other work carried out for the HER deserves synthesis and publication. More survey work is needed to update the record. Ice-houses have considerable potential not just in themselves but also to be studied as part of the landscape. They were sometimes constructed as free-standing structures and then covered over with small mounds planted with trees for shade, and so became landscape features in their own right. At least two were built inside earlier earthworks –the medieval mottes at Flitwick and Bedford. Many were built close to lakes for drainage purposes (as well as for collection of ice).

The creation of ornamental lakes on large estates (such as Woburn) sometimes involved the modification of medieval fishponds, and certainly made use of the extensive knowledge of hydraulic engineering accumulated in medieval times. Monastic fishponds often remained in use long after the monasteries themselves had been dissolved. Listed in the HER are the sites of a few duck decoy ponds – a distinctive but relatively unexplored type of earthwork, many of which have been filled in and forgotten..

Parks and gardens are often described in aesthetic rather than socio-political terms. There is a need for archaeological interpretations to take into account the ways in which designed landscapes like Woburn Park symbolically encoded the prevailing social order (Muir 2000). The brick wall which surrounds the Woburn estate, for example, is not only an impressive monument in its own right, several miles long. It also clearly demarcated the division between rich and poor, or land-owning classes and rural peasantry, as well as physically barring entry from one domain to another. Yet an attempt was made by the landowners, through imposing their vision onto the landscape, to present themselves as benevolent towards their tenants. Gate-houses, estate cottages (described in a previous section) and even specially rebuilt churches (see below) were all important elements in the grammar of the idealized landscape. Perhaps the important questions to be asked are – how was the landscape intended to be 'read' at the time of its design, and how has our reading changed within the very different context of the 21st century?

The role of the great estates in agricultural and horticultural innovation, for which Bedfordshire was renowned, cannot be underestimated. Woburn, in particular, was a centre of skill and experimentation – in animal breeding, agricultural machinery, crop fertilizer, fruit growing, as well as brickmaking and building techniques. In the late 18th century it was visited by agriculturalists from all over the world. An example of the widespread influence of such expertise is provided by the story of Joseph Paxton and the Crystal Palace (Roberts 1951). Paxton was born in Milton Bryan to a family of poor tenant farmers in 1801. He worked as a gardener on the Woburn estate, before moving on to work on other estates in Derbyshire. He developed an interest in architecture, and was inspired by Repton's glasshouses at Woburn as well as the glass orangery built by Clephane at Wrest Park in 1836. In 1850 Paxton built the Crystal Palace to house the Great Exhibition – in effect enclosing the best of British industry within a giant and splendid Bedfordshire greenhouse. The revolutionary techniques of steel framing employed ultimately led to the steel-framed skyscrapers of America and gave rise to the technology that made the construction of airships (and airship hangars) possible.

Churches and Chapels

The strong tradition of non-conformity in Bedfordshire is well-known, and there are good documentary sources for the study of the various movements and their chapels (Bell 1984, Welch 1996). As elsewhere in the region, there are problems of building survival, with many chapels having been converted into houses. Damage to internal spaces is caused especially by the insertion of floors – often cutting across full-length windows (Baker 1991). A neglected part of the study of non-conformist structures is that of associated buildings. In the 18th century the Moravian Chapel in Bedford constructed a whole complex of buildings. These included a Single Sisters' House (where up to 40 women supported themselves by lace-making and embroidery), a Single Brothers' House, a Ministers' House, girls' school, etc, set around a burial ground and extensive gardens. Such communities and their material structures, which represent a whole way of life, are potentially of greater interest to the archaeologist than simply the chapels or places of worship themselves.

A remarkable building is the Congregational Chapel at Roxton, built from a converted barn in 1808 by

the lord of the manor, with 2 wings added for use as schools. It was thatched with reeds and made to look like a rustic cottage, with overhanging eaves supported by gnarled tree trunks. It is one of only a few thatched chapels in England. Woburn and Southill churches were both rebuilt by land-owners as part of the idealised landscapes of their estates.

Southill Church is built entirely of brick, and of special interest is the increasing use of brick as a building material for churches (Kennett 1993). This is partly a testament to the growth of the brick industry, especially estate brickyards. St Mary Magdalene Church at Whipsnade is a brick church with at least 3 different phases of construction. The tower is 16th century, the nave is 18th century, and the chancel is 19th century.

Urban Development

The major towns of Bedfordshire were all relatively small market towns until the period of expansion in the Victorian era. Luton and Dunstable were both centres of the developing straw plaiting and hat-making industries. Plait markets were also located in Ampthill, Shefford and Toddington. The making of agricultural implements and carts took place in all the major towns. For much of the post-medieval period agriculture itself was practised by many townspeople.

The archaeological study of towns is covered in part by the Historic Towns Survey conducted by Bedfordshire County Council in the 1970s (held in the HER). This has largely been superseded, however, by the more detailed Extensive Urban Survey (EUS), currently being carried out by Albion Archaeology on behalf of the County Council and English Heritage. Eleven historic towns (Ampthill, Bedford, Biggleswade, Dunstable, Harrold, Leighton Buzzard, Luton, Potton, Shefford, Toddington and Woburn) are studied. A twelfth, Roman Sandy, is not directly relevant here. The EUS Assessments cover both the archaeology and the standing buildings of the towns up to about 1914, with summaries by period, an overview of the principal archaeological components and maps of town development. Separate strategy documents will deal with issues of utilisation and management of the archaeological resources identified.

Bedford is the only town in the county to have been explored much through excavation. Considerable amounts of post-medieval evidence have been found, especially in the form of building foundations, ovens, pits, pottery, glass and clay pipes. Work carried out up to 1969 is summarised in Baker *et al* (1979), which includes detailed illustrations of assemblages of pottery and other finds. Subsequent work, such as the excavations on St Paul's Square, revealed much information about market shambles and other buildings cleared during 19th century town improvements. This site has much potential for our understanding of Bedford in the post-medieval period, and is greatly in need of full publication

Excavation in towns generally needs to focus on issues of post-medieval archaeology, rather than this being an 'add-on' to investigations that are targeted mainly at earlier periods. Archaeological remains of industrial activities such as tanning, known to have taken place, have yet to be encountered. Waterfronts in Bedford and other towns would be prime sites for investigation. Townscapes of wharves, warehouses, coal-yards, malt kilns, are not as yet represented in the archaeological record (although some of these, of course, are still standing). An important point to bear in mind is that post-medieval layers are inevitably the first to suffer damage from disturbance caused by modern development.

Prisons, workhouses, town halls, corn exchanges, inns, schools are important kinds of building not covered in this chapter. Numerous building surveys have been carried out, and it is not intended to summarise these here. The HER holds variable amounts of information on historic buildings (summarised in EUS), including all listed buildings. A key point is that most dating was done from external survey only. Internal survey may lead to radical re-assessment of date. When timber-frames became unfashionable in the 18th century, many town buildings were completely re-faced with brick and stone. Numerous earlier buildings remain to be discovered behind their 18th and 19th century facades. There is a need, then, for more detailed survey to be carried out.

A focus on individual buildings needs to be balanced out by an area approach. Many areas of towns, such as the St Paul's Square area of Bedford, can be considered to be entities in their own right, more than just the sum of their individual parts. Whatever the architectural merits of the Shire Hall, for example, its grand appearance and civic status derives mainly from its geographical and historical context, in association with other buildings within the overall space of the square. An area approach would also be suitable for industrial parts of town, such as the Bute Street area of Luton, or the study of town suburbs.

Brewing and Malting Brewing was one of the major industries of the post-medieval period in Bedford, Biggleswade and other towns. In the 16th century, inns brewed their own beer, but already specialist maltsters (who prepared malt for these small brewers) were starting to appear. Some of these developed

into larger breweries in the 17th century and 18th centuries. Usually these were situated close to rivers to ensure a water supply. It was a short step from brewers supplying beer to inns to actually acquiring and controlling them, sometimes owning 20 inns or more. In Bedford there were up to eight breweries on both sides of the river. Consolidation into larger and larger companies continued in the 19th century, as brewing started to use industrial technology. Wells and Winch of Biggleswade owned over 100 tied public houses throughout east Bedfordshire. For a history of the Biggleswade brewery industry, see Wilson (1983) and Page (1997), for Bedford, (Collett-White 1980) and Luton, (Lea 1960).

About 6 small maltings and 35 breweries are listed in the HER for the county as a whole, but some of these are 'sites of' rather than actual remains. Much more work needs to be done in the form of general survey and site visits. Breweries and inns were so embedded in other aspects of life that their study has great potential as a way in to an understanding of towns in particular, and the structure of the post-medieval economy in general.

Tanning and other Industries Tanneries are known from documentary evidence to have existed along the waterfront in Bedford in the 16th and 17th centuries, with one on the site of the present Shire Hall. A tanyard is also recorded at Potton, and this was in use up to recent times. Several tanneries were sited by wharves on the Grand Junction Canal at Leighton Buzzard; some of these are shown on early OS maps. Place names such as Tanner's End at Toddington may also give important clues. Evidence of tanning and other smelly activities like hemp or flax retting might be expected to be found on the outskirts of towns, near springs, streams, or other water supply (see the discussions on the leather-working and rope-making industry). Surprisingly, pits for such purposes are rarely encountered in the archaeological record, though recent discoveries of 16th century possible hemp-retting pits by Albion Archaeology at Stratton show the great potential of similar industrial features for the preservation of leather and wooden artefacts. Evidence for ropemaking, which also often took place on the edges of towns, is explored later in the chapter.

Trade and Communication

River Navigation and Canals The opening of the River Great Ouse Navigation to the sea in the late 17th century stimulated the growth of Bedford after a period of decline in the late medieval period. Wharves, coal yards and warehouses were built either side of the river. Coal and other raw materials were imported and distributed throughout the county. Agricultural produce was loaded onto barges for the return journey. An account of the Ouse Navigation is given in Summers (1983). There is little trace today of the original works, as most of the locks were replaced in the 19th and 20th centuries. Some of the basic cutting, such as the channel between the back and front river at Bedford (later Bedford Lock) is almost certainly late 17th century in date. Much can be gleaned about trade on the river from records of tolls held by the Bedford and Luton Archive and Record Service (BLARS).

The Ivel Navigation was completed in 1758. Wharves were built either side of the church at Biggleswade. In 1822 an extension was made to Shefford with the help of a number of canal cuts. By 1870, however, this part of the Navigation had fallen into disuse. Many sections are now filled in or retained as garden water features (Cook and McKeague 1991).

The Grand Junction Canal, built in the 18th century, competed with the Great Ouse as a means of shipping coal and other material into the Midlands. Important for the development of industry in Leighton Buzzard, it just clipped the southwest corner of what is now Bedfordshire. Structures of archaeological interest, such as locks and bridges, are described by Cook (1990).

Bridges An extensive programme of repair and restoration to the historic bridges of the county, together with archaeological recording and documentary research, was carried out by BCC (Simco and McKeague 1997). Much bridge building took place in the period from 1760-1820 together with improvements in roads. Bridges built or rebuilt at this time include those at Turvey, Radwell, Felmersham, Tempsford and Bedford. Wing's Bedford Bridge was built in 1813 to replace an older bridge as part of town improvements. The first cast iron bridge in the county was built over the River Ivel at Blunham in 1823.

Roads Turnpike Trusts were set up for the main roads of Bedfordshire between about 1706 and 1827 (Emmison 1936). Many tollhouses have been lost through subsequent road widening. Six tollhouses survive – at Biggleswade, Bromham, Cople, Northill, Roxton and Sutton. Those at Cople and Roxton are of similar design because both were on the road built by the same turnpike trust, set up in 1772 (Laws 1967). Some carriage and cart building was carried out at Bedford, Leighton Buzzard and other towns. The old transport system is reflected by the network of historic coaching inns, like the Swan Inn in Bedford, often with spaces at the front for horse and carriages to pull in, or with carriageway entrances to spaces at the rear. Dunstable had 20 inns alongside the High

Street. Many towns and villages had ponds, a primary function of which was to refresh horses on long journeys. Toddington's 'Town Water' was impressively large, with a ramp down into the water. Dunstable's many ponds and Ampthill's Oxfloode, long since filled in and built over, may have been of similar size. Such sites are likely to be preserve organic artefacts in waterlogged conditions, and thus have considerable archaeological potential.

Cottage Industries

The agricultural economy of Bedfordshire supported a number of cottage industries, which were characteristically carried out by farming families in their own cottages as a means of providing a second income. Towns tended to act as marketing centres but the manufacturing base was in the countryside. The two principal cottage industries were lace-making in north and mid Bedfordshire and straw plaiting in the south. Both can be taken as examples of what has been called 'proto-industrialisation', sometimes taken as an essential first stage of the Industrial Revolution (Clarkson 1985). But while lace-making was never mechanised in this part of the country, straw plaiting developed into the true industrial stage of factory-based hat-making in Dunstable and Luton. The two cottage industries therefore provide an interesting contrast and raise interesting questions for archaeologists.

Lace-making Lace-making was supposedly introduced by Flemish refugees in the late 16th century, and carried out mainly by women and children of farming families right up to the end of the 19th century. Artefacts include pillow horses, candle-stools, bobbin winders, bobbins, scissors, pins, etc (see collection in Luton Museum). Apparently carried out and taught in cottages rather than buildings specifically for the purpose, lace-making has left little trace in the archaeological record. The introduction of lace-making machines in and around Nottingham brought about the decline of Bedfordshire lace-making in the latter half of the 19th century (Freeman 1966, Kennett 1974).

Straw-Plaiting While lace-making predominated in the north, straw-plaiting and hat-making was the principal cottage industry in the south of the county (Grof 1988). It originated in medieval times, making use of the vast quantities of straw left over from wheat production. The industry underwent rapid organisation and expansion at the time of the Napoleonic Wars, when imports of hats from Italy were prevented from entering the country. Straw plaited in villages was sold to dealers or taken to the weekly market in Luton. In the 1860s plaiting halls were built in the town. Unfortunately a new source of cheaper plait was found in the Far East in the 1870s. This just about killed off the local plaiting industry but gave a great boost to the manufacture of hats. Thousands of former straw plaiters were attracted into the towns from the countryside to seek work, providing a ready workforce for the burgeoning hat industry. In this way the rural cottage industry provided the essential conditions for the development of the later urban hat factories and warehouses.

The challenge to archaeologists is to find ways in which 'proto-industrial' activities might find expression in the archaeological record. For example, it is known that hundreds of lace-making and straw plaiting schools were set up throughout the county, often teaching classes of over 40 children. (for information on the many lace-schools in Marston, see Bushby 1975). Were such schools always held in cottage rooms as is usually supposed? Might larger buildings sometimes have been involved, and how might their former use be attested for in archaeological terms? At what stage in the development of an industry do we start to see particular buildings specifically designed for certain industrial processes start to appear?

Rural Industries

Industries which have their roots in the agricultural economy include brickmaking and leatherworking. Brickmaking in particular was so mechanised and was carried out on such a vast scale in the 20th century that its former connections with farming and the large estates are often forgotten. It is important to recognise that the Industrial Age did not just happen out of the blue. Nor was it something that was simply introduced from elsewhere. In Bedfordshire, leather making and brickmaking, like hat-making, first went through its own 'proto-industrial' stages, when many of the conditions for the later stage of full industrialisation were established.

Early Brickmaking The clays of Bedfordshire are especially suitable for making bricks and tiles. Much of the technology may have been introduced from abroad in late medieval times. By the mid 18th century bricks had taken over from timber as the main building material and every parish situated on suitable clay probably had at least one brickyard and kiln – making everything from land-drains and pipes to bricks and pantiles for the local community. Several farms on the large estates also had their own pits and kilns. There was a kiln at Wrest Park from at least 1703. The Duke of Bedford's brickyard at Husborne Crawley ran from 1789-1867, and produced bricks for the buildings of model cottages and farms, as well as for the external market. It is often not realised the extent

to which experiments and innovations carried out here laid the foundations for the later industrialisation of brickmaking. Also not fully realised is the extent to which early brickmaking was embedded in the agricultural economy. Farm labourers were employed to work in the yards on a seasonal basis, and many of the brickyard owners were farmers.

A stimulus to the growth of the industry was the growing demand for field drains, especially in the heavy clays of Bedfordshire, which needed drainage more than most areas. This reached a peak in the 1840s. At about this time drainage-tiles were superseded by pipes made by machine. This is just one of the many ways in which industrial innovations were tied in with the agricultural improvements of the 19th century. Without effective field drainage the improvements in the efficiency of agricultural production would not have been possible. Despite their importance, however, field drains are generally ignored by archaeologists. A local type-series of this neglected kind of artefact would be useful, and would help to shed further light on the close relationship between the emerging brick and tile industry and agriculture.

No known early brick kilns survive though many old clay pits, maps and documentary evidence indicate rough locations. Earthworks next to Kiln Farm in Steppingley are likely to represent the brick and tile kilns marked on the Jeffreys map of 1765 and discussed by Davison (1997). The site of a 19th century brick kiln is known at Kempston Box End. Other sites are recorded in the HER. Locating and excavating some of the earlier sites is an important task that has yet to be tackled. Estate brickworks are of particular interest.

Leatherworking The traditional craft of leatherworking has probably been carried out at Harrold and Odell and nearby villages since late medieval times (though this is a matter of some dispute -see Manton 1983 for a possible 19th century origin). Originally sheep and goat skins would have been used, taking advantage of the fact that these villages were centres for sheep rearing. Later to become a heavily mechanised and world renowned industry, the early history of leatherworking here is little known. In the absence of written records, archaeology could be the principal means of investigation, with the likely survival of tanning pits and structures close to the river. An important question that archaeology could address is whether any surviving houses or other small scale structures were associated with earlier leatherworking. Were some leather dressing activities carried out in cottage workshops in the villages themselves? Did leather working buildings evolve from cottage rooms and sheds to specially adapted work-shops to larger factories and warehouses – rather like the hat making buildings of Luton?

Ropemaking While leatherworking (skins) and straw plaiting (wheat straw) both made use of the by-products of farming, some industries like rope- and sack-making created their own demand for agricultural produce, and the end-products (ropes and sacks) were themselves used primarily for agricultural purposes. Possible hemp-retting pits dating to the 16th century have been found during recent excavations at Stratton. It is sometimes possible to discern the former existence of rope walks from property boundaries in towns, such as near Rope Walk in Bedford. There are many references to hemp-dressing and rope-making in the Ivel Valley in late medieval and early post-medieval times. Field and place names also give clues. Some areas, like Shortsmead Street in Biggleswade, seem to have specialised in the activity. Was this what we might call a 'back-garden' industry? Did it go into decline in the later post-medieval period? What was the connection between the growing of hemp, the processing of the material and the making of rope in rope-walks?. To what extent was rope-making in Bedfordshire mechanised during the industrial period? Little about hemp-growing and rope-making is known (though see Roberts 1980), and the whole subject needs researching in more detail.

Ceramics and other Artefacts

A Ceramic Type Series for the post-medieval period is held by Albion Archaeology in Bedford. This is comprised of about 65 ceramic types, and is based largely on the Bedford assemblage described and illustrated by Baker *et al* (1979, 217-240), together with material from Grove Priory in the far south of the County. The type series is in need of major enhancement and updating to take account of assemblages from more recent excavations, for instance St Paul's Square excavations and the Town Centre Watching Brief in Bedford or at Haynes Park. Apart from the pottery of the very early post-medieval period, all the ceramics were produced commercially and have been imported from elsewhere -for a map of sources of Bedford pot see Baker et al, (*ibid*, 220). Although late medieval pottery kilns are known in Flitwick and Everton, there are no known post-medieval sites of pottery production in Bedfordshire. It is an interesting question as to why Bedfordshire with all its clay ended up specialising in brick rather than ceramics.

Particularly useful for dating purposes are clay pipes and bottles. The clay pipes of Bedfordshire date from the early 17th–late 19th centuries. Oswald (1975) attempted a list of pipe-makers in the County. Of 37

identified, 32 were working in the town of Bedford itself. Especially good assemblages have come from Bedford, including recent excavations for which information has yet to be processed. Bottles and other glass vessels are often found but rarely studied by archaeologists, despite the amount of information they can give on breweries and pharmaceutical industries. For an account of clay pipes, bottles, brick, tile and other post-medieval artefacts found in Bedford up to 1969, see Baker *et al* (1979, 241-253).

The Industrial Period (1850-1950)

Railways and the Age of Steam

The introduction of the railways is taken in this chapter to mark the end of the post-medieval period and the beginning of the industrial period. It was crucial to the development of towns, at once attracting and supporting emerging industries. Sandy and Flitwick provide examples of this. Both villages quickly developed into small towns as a result of being located on the railway network. Large towns like Bedford, Luton, Leighton Buzzard and Dunstable also thrived and expanded. On the other hand, former market towns like Toddington, bypassed by the railways, became little more than large villages.

Bedfordshire was well served by the developing railway network, with the opening of the Bedford – Bletchley line in 1846, the London – York line in 1850 and the Leicester – Hitchin line in 1857. Bedford itself was at the centre of a number of radiating lines, which quickly killed off the river trade as well as road traffic. Industrial development in the town, such as the Britannia Ironworks, invariably sited itself next to the tracks. Brickworks, well served by the Bletchley line, also flourished, with many new works located next to the line, often with sidings and internal railway. So essential was the railway to the market gardening and coprolite trades in Sandy that Captain Peel (the local landowner) paid for the construction of a 4 mile extension to Potton. The Light Railway at Leighton Buzzard was built to serve the sand quarrying industry in the early 19th century (Dingwall 1994).

The construction of the railways involved massive earthworks such as embankments, cuttings and tunnels, as well as monuments such as bridges, stations, signal boxes, etc – only some of which are listed in the HER. Exceptional remains are the battlemented portals of the tunnel at Leighton Linslade on the London to Birmingham Line (1836), the Old Warden tunnel, and the old locomotive shed at the terminus of the line from Sandy to Potton.

The age of railway transport in Bedfordshire is described by Cockman (1994). In view of the importance of the railways, however, it is perhaps surprising that they are not generally perceived to be significant in archaeological terms. Railway bridges are absent, for example, from the otherwise comprehensive work on Bedfordshire bridges by Simco and McKeague (1997), though several are recorded in the HER. A basic survey of these and other railway structures such as signal boxes, stations, engine sheds, etc should be undertaken together with an evaluation of their archaeological worth.

The steam engine not only revolutionised trade and communication, but also milling, agriculture, etc. Steam power quickly replaced horse power on many of the model farms, with many farms literally centred on and designed around engines. The mobile steam plough also revolutionised work out in the field (of which more later). Little is known about the steam mills of Bedfordshire. In the 19th and early 20th century there were large steam mills in towns like Bedford and Luton. Steam engines were also used for industrial processes in brickyards and coprolite workings. Some watermills like Kempston Mill made use of steam to supplement or replace water power. Here an auxiliary steam engine was added, together with a tall brick chimney, in about 1900. A turbine engine was installed in 1920 in place of one of the wheels. Later the mill switched over entirely to electric power. Unfortunately, much of Kempston Mill was burnt down in the 1960s.

Steam power enabled huge steps to be made in the provision of water supply. A beam engine preserved at Bedford College of Further Education was used to pump water from Clapham to Bedford right up until the 1950s. For an example of imaginative architecture, see the Newspring Pumping Station at Biggleswade (built 1906); this was also known as 'the Spanish Gaol'. Many of water towers were also built about this time. The Charles Wells Pumping Station on Cemetery Hill in Bedford stands as a testament to the close connection between the brewing and water industries in Bedfordshire. It pumped water from deep wells to the brewery in the town centre.

Other Power Production Sites

Gas Companies built works in all the towns from the 1830s to the 1870s. Coal-fired electrical power stations were important monuments of the 20th century. The first Bedford Electric Works in Prebend Street was opened in 1894. All that remains of the later Barkers Lane site is a railway gate and a conduit which took water from the river to the cooling towers. The arrival of electricity at the turn of the century was

a vital factor in the growth of industry, especially in Bedford and Luton.

Foundries and Engineering Works

The first engineering works were small foundries producing agricultural implements. In the early 19th century, foundries existed at Ampthill, Biggleswade, Potton, Shefford and Woburn, as well as the larger towns of Bedford, Dunstable, Leighton Buzzard and Luton. John Howard had a small foundry in the High Street, Bedford. It was here that Howard manufactured the famous 'Champion Plough of England' in 1838 (though it was actually invented by the Armstrong family in Wilstead). This and other Howard products can be seen in the Science Museum.

The Britannia Ironworks were founded in Bedford by Howard's sons in 1859. Fig. 6.4 shows the extensive area covered by the factory, its favourable siting next to the railway and the river as well as the road system, and its proximity at that time to the agricultural hinterland. It had its own railway sidings, internal railway and wharves. Eight steam engines provided power and iron and steel furnaces were kept going day and night (Smith 1975). Here ploughs, cultivators, harrows, land-rollers, balers and agricultural machines of all descriptions were manufactured for use all over the world. The factory was especially famous for its steam ploughs and steam threshers, made from the 1860s on. In addition to self-moving ploughs, a plough and windlass system was also made – see Fig 6.5 for a picture of this in operation in the fields. These machines were partly the result of field experiments and tests carried out on the firm's land at the Clapham Estate.

Further photos and drawings of Howard ploughs have been published (Haining and Tylor 1970) and some Howard steam ploughs may survive in the USA or further afield (Hempstead 1980). Potential to find them in this country remains though no examples are known. The Ironworks closed in the Agricultural Depression of 1932 and most of the factory was recently demolished. All that survives today is the impressive monumental gateway – a testament to the pride the Victorians had in their industrial achievements – and a few of the smaller workshops.

Another Bedford firm, the Victoria Works in Mill Street run by E. Page, originally produced agricultural machinery but later produced brick and tile making machines, and even manufactured the Suspension Bridge (still standing today). While the work of the Britannia Ironworks is quite well documented, the smaller foundries are little known and require more detailed study. Recording of factory sites (such as the Vulcan Works in Elstow Road) prior to demolition, would be an important first step.

In 19th century Luton, engineering firms such as Brown and Green's tended to concentrate on kitchen ranges, stoves, pipes, boilers and pumps. The town actively sought to advertise itself as an industrial centre in the early 1900s, and was rewarded by the arrival of Davis Gas Stove Company, the Skefco Ball Bearing Company and George Kent Ltd, who made meters. The most important company of all, as it turned out, was Vauxhalls (see below).

Smaller concerns included the Ivel Cycle Works at Biggleswade, where the famous cycling pioneer, Dan Albone invented a tandem in 1886 and a women's cycle in 1887 (Lea 1954). Together with another local man, H P Saunderson, Albone went on to invent one of the first motor tractors, continuing the fine

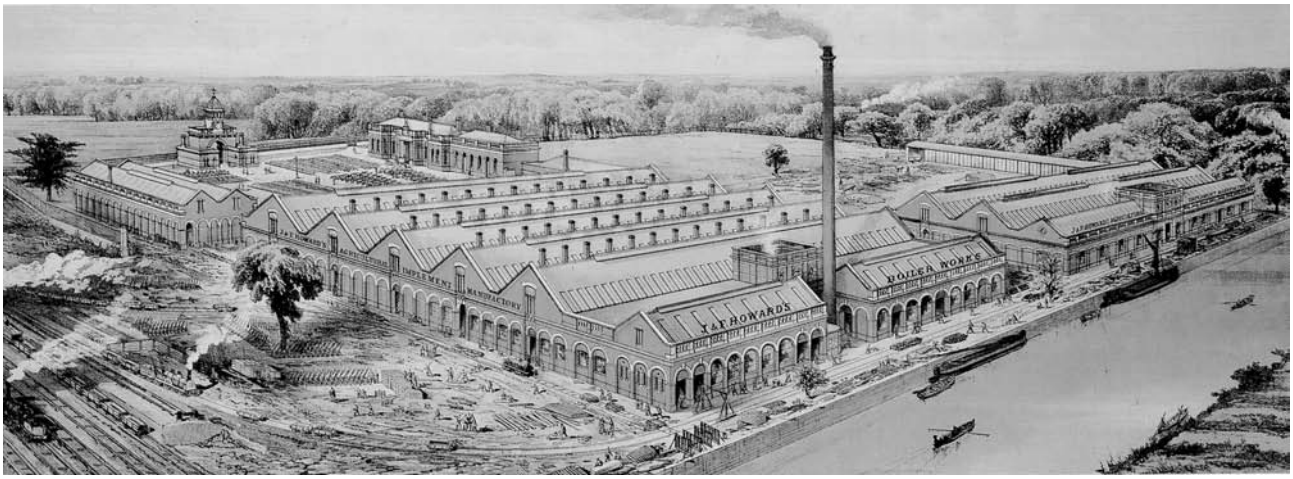

Fig. 6.4 Howard's Agricultural Implement Manufactory, Bedford in the 1860s, with wharves and railway sidings (Bedford Museum).

Bedfordshire tradition of agricultural innovation. A 'Saunderson Universal G Agricultural Tractor' of 1917, made at the Elstow Tractor Works at Kempston, is said to be preserved on a farm in Leicestershire (Tibbutt 1971).

Car Industry

The Vauxhall car industry is fully described by Hart (1996) and numerous other authors. Its enormous influence on the development of Luton is well known and need not be recounted here. The car industry in Bedfordshire is represented, of course, not only by car producing factories and ancillary works in urban areas but also by the vehicle proving ground at Millbrook, which covers about 300 acres of Bedfordshire countryside.

Not so well known is that Bedford also had a car factory. The Adams Manufacturing Company built the Igranic works in 1905 and produced cars such as the *Mail Phaeton* of 1907 that can be seen in Bedford Museum.

Brickmaking

For much of its history, brickmaking had been a relatively minor rural industry carried out by part-time farmers and employing agricultural labourers on a seasonal basis. The expansion of towns in the 19th century increased the demand for brick, and the construction of the railway network enabled them to be transported nationwide. Coal brought by the railways could now be used as fuel instead of furze. There was also an enormous programme of public building (banks, chapels, churches, railway stations, schools, town halls, workhouses, etc). Formerly hand-made, bricks were now shaped and cut by brick making machines. New types of kilns were invented and steam engines utilized. The discovery in the 1880s of the advantages of the lower part of the Oxford Clay (Fletton Clay), containing enough organic matter to assist in firing, greatly improved productivity.

It was a combination of these factors that brought about the construction of larger brickworks and the establishment of the famous Bedfordshire brick-making industry.

Clay started to be quarried on a huge scale. The London Brick Company and Forders Ltd was formed in 1923 from an amalgamation of 5 companies. By 1931 Stewartby was the largest brickworks in the world.

The model 'garden village' of Stewartby was built to house brick workers in the 1920s. It was gradually added to with the construction of a Village Hall, Schools , Homes for Retired Workers, Church and other buildings over the next forty years. This was a continuation of a Bedfordshire tradition of model villages going back to the work of Howard and Whitbread in Cardington in the late 18th century

For a detailed account of brickmaking – its history, raw materials, quarries, factories, processes of manufacture, products, etc – see Cox (1979). This includes a gazetteer of sites, which now needs to be updated. Surviving remains, including hundreds of clay pits, are also listed in the HER. Film footage of the brickworks in use during the 1930s is held by the East Anglian Film Archive. An oral history of the industry, 'Changing Landscapes, Changing Lives' is currently being carried out by Carmela Semeraro. The main gap in our knowledge, however, is the early development of the industry and its relationship to the agricultural economy.

Hat-making

While hat-making had been mainly carried out in houses and small workshops, the mechanisation of hat-blocking led to much larger manufacturing premises in Luton and Dunstable. Some of these factories and warehouses can still be seen, but many have been demolished or converted to smaller units, their interiors destroyed. Other buildings in the vicinity were used for the production and distribution of related goods such as boxes, thread and sewing machines. Remarkably, home production continued to flourish alongside mechanisation. Many mid-late 19th century houses, such as 106/108 Wellington Street, Luton, have small extensions (workshops) at the rear. Houses are divided by 'straw-gates' to give access to carts carrying straw plait. Felt hat-making was introduced in the early 20th century. Bevan (1992) has shown the great potential of the study of buildings associated with hat-making – to be understood not just as a form of production, but as a whole way of life.

Leatherworking

As already outlined, leatherworking on a relatively small scale had probably taken place for hundreds of years, though it is sometimes claimed it was introduced from Wales in about 1850 (Manton 1983). In the late 19th century and early 20th century there was a shift to greater productivity. Small workshops and later larger factories were built in both Harrold and Odell. These produced tanned, dressed and dyed leather for shoe factories in Rushden, Wellingborough and Northampton. When the supply of local skins ran out, crust leather was imported from Madras in India. Between the wars Harrold leather became renowned

across the world for its quality, and was exported as far afield as the USA and South Africa (Tustig 1996).

The factories closed down in the 1980s. Some factory buildings were demolished and replaced by housing, but more survey work is required to find out exactly what, if anything, survives. Aerial photographs may be useful in recording the location and extent of factory development.

A small shoe making factory building survives at 73 High Street, Riseley. Its general appearance, especially its use of chequered brick, is very similar to many of the little shoe workshops in Rushden and elsewhere in Northamptonshire.

Quarrying

Bedfordshire has always provided a good source of basic raw materials, and quarrying has taken place for stone, clay, gravel, chalk, fuller's earth, sand and coprolites in various parts of the county. Shaft mining was used for fuller's earth in Aspley Heath in the 18th and 19th centuries though open cast mining was later used here too. Clay was the most intensively extracted, providing raw material for the brickworks. More clay has been dug out from south Bedfordshire than anywhere in the world, with massive drag-line excavators removing up to 150,000 tons per week in the 1960s, and cable car and tram-like systems constructed to transport material (Cox 1979). Extraction of sand began in the early part of the 20th century, and gave rise to the construction of the Leighton Buzzard Light Railway (Leleax 1969). A much smaller railway was built on Flitwick Moor to transport peat excavated there. Chalk burning took place in 28 pairs of kilns at the Totternhoe Lime and Stone Company. The lime industry was particularly strong in the south of the county, with several quarries specifically for extraction and processing of this material. The sites of many lime kilns are also known, including some on the wharves of the Grand Junction Canal at Leighton Buzzard.

Perhaps the most unusual raw materials extracted were the coprolites or phosphatic nodules extracted from the gault clay in an area stretching along the Greensand Ridge from Everton in the east to Eggington in the south. Centred on Potton, this industry flourished from 1860 to 1890. Hundreds of thousands of tons of nodules were excavated, processed and transported for use as fertilizer across the country and beyond, even as far as Australia. The extension of the railway from Potton to Cambridge was built to take the fertilizer to East Anglia. At the quarries themselves, steam operated washmills, horse wheels and sorting sheds were used. Hillocks of stone mark the site of former coprolite works. The documentary evidence for the industry is covered by Bernard O'Connor (1998), but there has yet to be a full archaeological survey of sites and many questions are unanswered. Where, for example, did workers sleep and eat? Were special bunkhouses constructed? There is great potential for excavation of coprolite workings. Such an excavation would be roughly on a par with those of, say, lead workings in the NE, and could considerably raise the profile of industrial archaeology in Bedfordshire. Over 1000 quarry sites are recorded and mapped in the HER.

Agriculture and the Industrialisation of the Countryside

Model Farms The strong influence on the rural landscape of the large estates – and in particular the estates of the Dukes of Bedford, who came to own about a tenth of the county – has already been touched upon. In the mid 19th century, model farms were built in many parts of Bedfordshire. A television programme made for the Open University (OU 1987) showed Steppingley Park Farm to have been more like a factory than a farm. Built in the 1860s, it was centred round a steam engine housed in an engine shed. This pumped water from wells and powered the numerous machines and systems throughout the extensive farm buildings.

An important source of information is the unpublished and still incomplete survey of model farms carried out by Ruth Gibson, of which the record sheets and plans are available in the HER. She lists 68 model farms in the county, most of them built of brick between the 1830s and 1870s on the Duke of Bedford's land. Many are still in use, and though retaining their basic structure and external appearance have lost much of their internal fittings. The model farm at Eversholt has been converted into light residential units. Others, such as the farm at Segenhoe, have been partially converted into residences. Some farms have been demolished. It was not possible to visit all the farms and the survey is badly in need of completion, synthesis, and some form of publication.

Field Systems Many of the small closes, some of which date back to medieval times, were subject to the agricultural improvements of the late 19th century. The Dukes of Bedford pulled up great swathes of hedgerows on the Bedford estates in order to augment and enlarge the angular rectilinear pattern of enclosure fields. The main reason for this was to maximise efficiency in an industrial age. Machines like the steam plough needed larger rectangular fields in which to operate, so fields were literally shaped to fit the machines (Fig. 6.5). Many fields and hedgerows

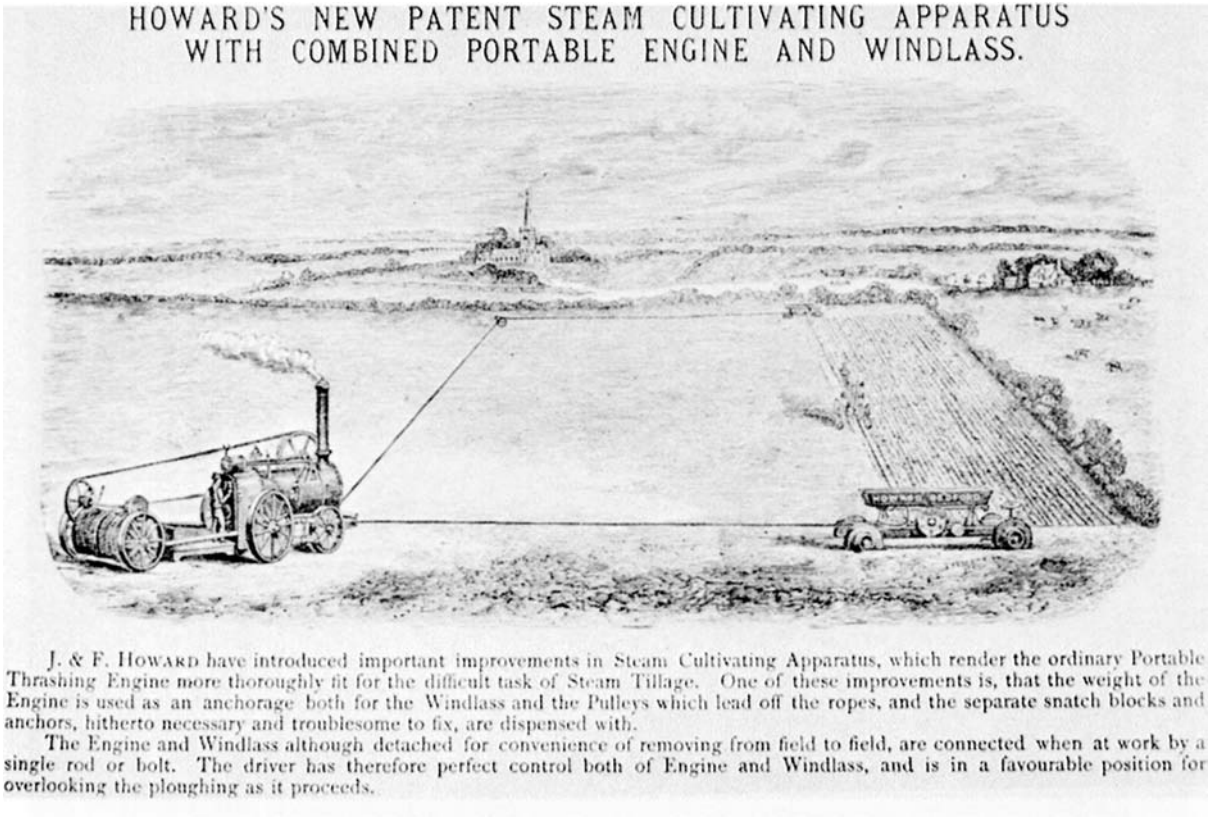

Fig. 6.5 Industrialisation of the countryside with fields enlarged to fit the machines – advertisement from the Agricultural Gazette 1878.

from this period can be regarded not only as living parts of the landscape but also, in a very real sense, as *industrial artefacts*. Survey of such fields is just as important as those of earlier periods.

Market Gardening The arrival of the railways had an enormous effect on market gardening, which now had faster and better access to markets. In the late 19th century, trains full of vegetable produce bound for London returned laden with horse manure to fertilise the fields for the huge increase in production. Market gardening spread to Biggleswade, Old Warden, Clophill and Maulden. By 1900, over 7000 acres were being cultivated (Beavington 1975, Webber 1972).

Onion drying sheds have recently been noticed as an important kind of structure of the late 19th century on. At least 6 examples of this distinctive type of building, with their characteristic wooden slatting for drying, are known to exist – though there are probably many more unrecorded examples. Some of the larger ones, such as a surviving building at Beeston, have their ground floor built of brick, with upper floor walls of wooden shuttering. Other smaller examples, such as a recently demolished onion drying shed at Willington, were built entirely of wood. For further details and photographs, see the relevant entries in the HER.

Most onion drying sheds are no longer in use and there are problems of preservation. Some discussion has taken place over how they could be adapted (as workshops? local museums? etc). There is an obvious need for site inspection and basic survey to be carried out. A gazetteer of existing sites would also be useful, though at present insufficient data exists to compile anything like a complete one.

An interesting question is what types of structures were specifically associated with market gardening in Bedfordshire. Little is known, for example, of early glasshouses. Huge glasshouses have now become a prominent feature of this part of Bedfordshire. Their distribution along the eastern side of the A1 from Wyboston to Biggleswade is a vivid illustration of the important role of transport systems in linking gardens/glasshouses to their markets.

Trends in Rural Settlement

Estate cottages constructed in the 18th and 19th centuries established a tradition that continued into the first half of the 20th century in an industrial context. On a small scale, companies like WH. Allen in Bedford built rows of terraced houses for their workers. On a much larger scale, Shortstown, a 'garden village', was

built in 1916 by the Short Brothers to house airship workers. Stewartby was built in 1926-8 to house brick workers. The main difference now was that whole settlements, rather than individual houses or rows of houses within existing villages, were being designed and built. And it was the large industrial companies, rather than aristocratic landowners, who were behind the developments.

Bedfordshire was the setting for experiments in land settlement in the 20th century. Over 500 acres of land were bought for smallholdings at Potton in 1934. The estate was divided into 30 smallholdings, each with a house (15 pairs of detached houses) centred on a farm with shared tractors, poultry breeding units, etc. Another estate for 82 settlers was created at Chawston. Both were intended to provide work for the unemployed – including redundant miners from Co Durham – growing fruit and vegetables for the London market. Although the Land Settlement Association no longer operates, smallholdings are still going strong around Potton, Wyboston and Chawston today (Clarke 1985).

Defensive Installations of the 20th century

World War I There are few documented WWI sites in the county, though many of the parks such as Ampthill and Luton Hoo were used as training camps. Some factories, such as the Davis Gas Stove Company of Chaul End, Luton, manufactured grenades. For an account of Luton in WWI, see Craddock (1999). At Elstow, cropmarks of practice trenches intermingled with cropmarks of Roman and Saxon sites are visible on aerial photographs. The principal buildings from this period, however, are the airship hangars at Cardington (below).

Airships Once the largest man-made structures in Europe (each building encloses nearly 5 acres), the Cardington hangars are without doubt the most spectacular and striking monuments in the Bedfordshire countryside. First built by the Short Brothers in 1916-17, the works were nationalised and became the Royal Airship Works in 1919. In the mid 1920s No 1 or North Shed was enlarged for the building of R101, and No 2 or South Shed was built to accommodate the R100. The doors of the sheds are mounted on motors and operated with electric motors. Associated structures of the Royal Airship Works included a hydrogen plant, mooring blocks, mooring masts, workshops, etc (for outline map see Chamberlain, 1984). All were massive structures. The mooring mast, for example, had a large elevator inside and facilities for the boarding of passengers and crew. The tragic crash of the R101 in France, however, on its maiden voyage to India in 1930 and the consequent loss of confidence in the airship industry led to redundancy of the sheds almost as soon as they were completed.

The hangars are all the more important because they represent a system of inter-continental transport which, though envisaged to dominate the world, has now been all but abandoned. The steel frame and corrugated sheet cladding is reminiscent of the airships themselves (Robinson 1982). The large internal space provides an exciting architectural experience for the visitor. It also provides a unique location for activities that require vast amounts of space. Used for training barrage balloon operators in WWII, the sheds have since been used for storage of weather balloons, meteorological research, fire research and parachute training. Some airship construction (on a greatly reduced scale) is still carried out there.

World War II The principal source for the large number of WWII sites known in Bedfordshire is the database of the Defence of Britain Survey. This has been compiled by BCC, through the work of volunteers, as part of a national survey, supported by several bodies including the CBA. At present it contains entries on over 270 sites, many of which were located from information provided by locals or survivors of the war. These include airfields, pillboxes, spigot mortar points, anti-aircraft batteries, anti-aircraft searchlights, ammunition factories, rifle ranges, tank traps, gun emplacements, trenches, airfield decoys, firing ranges, barracks, air raid shelters, etc. Many of the structures have been demolished, filled in, or fallen into a state of ruin, but a considerable number survive. Of the surviving sites, the more unusual include a rare mushroom pill-box at Twinwood Airbase in Clapham, and a wartime 'farm camp' (to give respite to Londoners) at Barton.

Most of the entries in the Survey database have been plotted on OS maps and are being incorporated into the HER. An overall map of WWII defence installations in Bedfordshire has also been produced. Structures such as pillboxes, perhaps not of much importance in themselves, take on new meaning when several are seen together. Suddenly strategic lines of defence or 'stop lines', such as the Ivel Valley Line, become visible. These often follow landscape features or are strung out along important routes. Others are in circular defensive configurations around airfields or other major sites, such as the ammunition and fuel dump at Potton.

Work on the Defence Survey is largely complete but unrecorded features are still being reported. Some site-types are better covered than others. POW camps, for

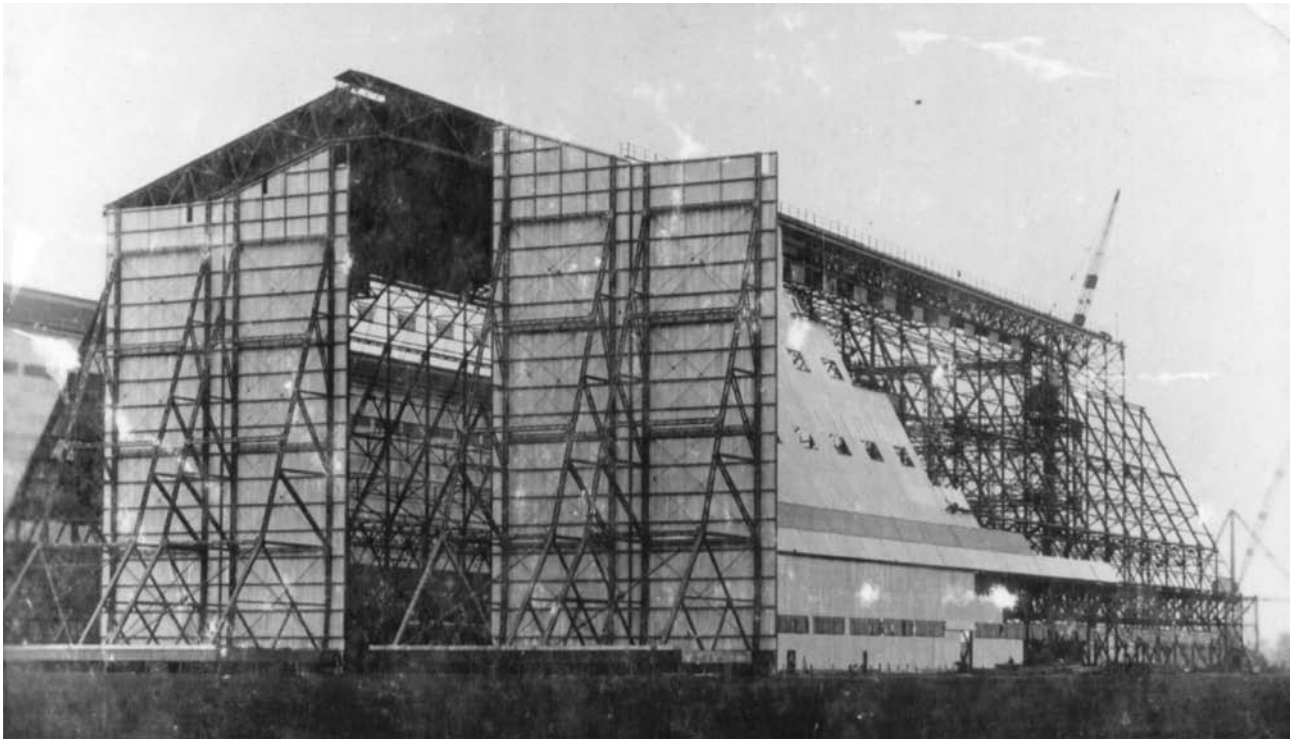

Fig. 6.6 Cardington Hanger at Shortstown.

instance, have received fairly little attention so far but are now being treated as a priority. Useful information was issued by the Red Cross in Geneva.

A study of the grounds at Luton Hoo (BCAS 1999) revealed the existence of numerous defensive features, including searchlights or anti-aircraft guns, air-raid shelters, Nissan hut footprints and concrete platforms for barrage balloons – many of these pointed out by the estate gardener. This is an example of the importance of parks, which were often taken over and used as military centres during WWI and WWII. In Bedford, both Russell Park and Bedford Park were intensively used as army training grounds. Defensive features may show up on aerial photographs.

One of the largest and most important sites in the County was the Royal Ordnance Factory 16 at Elstow Storage Depot, where ammunition was manufactured. An account of work here is given by HE Bates in his deceptively titled book, *The Tinkers of Elstow*. Covering an enormous rectangular area of roughly 2km x 0.5km, the factory employed thousands of workers in about 250 separate buildings. It had its own railway and road systems, with about 15 miles of railway track and 14 miles of road in total, as well as its own fire and ambulance services, community centres, laundries, worker's hostels, etc. It also had numerous electricity stations supplying the lighting, and powering the hundreds of machines. Principal products in the early days were high explosive 4,000lb bombs, known as 'blockbusters', but in the latter part of the war 12,000lb and even 22,000lb bombs were also made here. The factory operated continuously, day and night, for several years, and was well known for its efficiency and productivity. Described by Bates as a 'wartime township' the factory was used for storage after the war. It is shortly to be demolished to make way for a new town. Original plans are held by National Power.

The Vauxhall Works in Luton made tanks, trucks, gun carriages, etc, George Kent Ltd produced meters for aircraft and machinery for ships, while some of the hat making factories shifted production to tank landing-craft parts.

There were about a dozen airfields in Bedfordshire during WWII, depending how you count them (some are situated on the county border). Some of these were constructed in the 1930s before the beginning of the war. Bases at Little Staughton and Thurleigh had particularly long runways to accommodate the RAF / USAF bombers engaged in bombing offensives against German cities (Smith 1999). The building of Little Staughton airfield involved demolition of 3 inns, a Baptist Chapel and over half the village (Godber 1969).

However, some of the airfields made a significant contribution to Bedfordshire economy and culture after the war. Cranfield became the home of the College of Aeronautical Engineering, now the University of Cranfield. The airfield at Luton developed into Luton Airport, one of the largest in the country. The Royal Aircraft Establishment took over part of the base at Thurleigh (Pearcey 1999). Later called DERA, this was the site of development of planes like the Harrier jump jet and Concorde. Important standing structures here include the three wind tunnels, at least one of which is now used for testing of racing cars. Podington airfield became the major drag racing centre now known as Santa Pod. Chicksands was until recently a USAF base, of considerable importance for intelligence gathering during the Cold War (below). Henlow, of course, is still an RAF base. There are some issues of preservation concerning surviving buildings on airfields no longer in use. An example of re-use might be the control tower at Twinwood in Clapham, famous as the base where Glen Miller flew from on his last flight, shortly to be re-opened as a museum..

Less well known is the role of Bedfordshire in intelligence and propaganda work during the war. Tempsford Airfield was a base of the Special Operations Executive, who sent agents on numerous missions to France, Scandinavia and elsewhere – see Clarke's (1969) book *Agents by Moonlight*. Not unconnected to these activities were the propaganda and intelligence gathering centres at Milton Bryant, Potsgrove and Aspley Guise. At Milton Bryant a wireless station still survives. From here radio programmes masquerading as German pirate radio productions were transmitted to Nazi-occupied Europe, to give the impression of subversive elements within Germany itself. These in turn were connected to the famous intelligence base at Bletchley Park near Milton Keynes. This is still a 'shady' area of operations and there is a need for more research. The principal book on the subject is the autobiographical *Black Boomerang* by Sefton Delmer (1962). Investigation of surviving buildings and any related structures is required.

Cold War A new type of archaeological site that has only recently been decommissioned is the underground bunker of the Cold War period. Designed to withstand nuclear attack, such bunkers (which evolved from the bunkers of WWII) are known to have existed at Ampthill, Biddenham, Chalgrave, Clifton, Moggerhanger, Pavenham, Riseley, Renhold and Wilstead. Some, such as the command bunker at Biddenham, have been destroyed or filled in (photos of the Biddenham bunker are held in the HER). At least four are still intact – monuments to an attitude of war that, after the fall of the Berlin Wall, seems to have passed very quickly into history. A spectacular monument of this period used for American intelligence gathering, the ring antennae at Chicksands known as the 'elephant cage', and one of only 6 in the world, has already been demolished.

Conclusion

This chapter has tried to sketch out a basic outline of a field which exists *in potentia* rather than in actuality. Little archaeological work on post-medieval and industrial periods, or 20th century defence sites, has so far been published. Much knowledge exists in the form of primary data on HER sheets or 'in the heads' of individuals who have acquired it through experience but have yet to write it down. Most sources cited, despite intensive searches of the literature, are therefore either unpublished or non-archaeological. But this will surely change. Perhaps one of the most important points to emerge from the assessment is that Bedfordshire has much to contribute to the areas of research in question. Importantly, and contrary to popular belief, it clearly does have an industrial heritage that is worth investigating, recording, and preserving. This heritage is fast disappearing through modern development, so the task facing the archaeologist is an urgent one.

That the scope of archaeological study in the county should be widened to include the post-medieval and industrial periods is important for the study of earlier periods too. The Industrial Age in Bedfordshire was a continuation and development of trends that go right back into the distant past. The roots of industries which were to be heavily mechanised in the 19th and 20th centuries – such as hat-making in Luton, leather-working in Harrold and the huge brick-making industry – can be discovered in the agricultural economy of the later Middle Ages or even earlier. To stop looking at evidence from after a more or less arbitrary cut-off date of 1550 would be to fail to pick up on these incipient trends, to miss out on the 'benefit of hindsight', or the perspective afforded by looking back over long periods of time. It would also be to miss out on the connection between the past and the present.

Any study of this nature is bound to come up with more questions than answers. How can early rural or cottage industries be recognised in the archaeological record? What are the processes through which such industries are transformed into factory-based industries in towns? Were these processes reflected in changing building designs? In what ways did the relationship between town and countryside alter through time? Was the Industrial Revolution in Bedfordshire as much a product of innovations made locally as it was of developments introduced from elsewhere? To what

Fig.6.7 Ridgmont Brickworks in the 20th century (© Bedfordshire County Council).

extent can we regard the countryside itself, even fields and hedgerows, leaving aside more obvious features such as quarries and brickworks, as being subject to industrial process? These and other questions are all accessible to and can perhaps be answered by further archaeological research.

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