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(incorporating the Cambs and Hunts Archaeological Society)

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for 2004

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Editor Alison Taylor

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Editorial

The first thing you will notice about these Proceedings is our leap (as a belated welcome to the 21st century) into colour, for our cover and a number of plates. This is not really an innovation: CAS had beautiful colour plates in 1883 and a few other 19th century volumes. At last this is affordable again, and the water colour drawings and photographs we wanted to show seemed to fully merit some extra expense. In future, we will look carefully at illustrations that would benefit from such reproduction and would be particularly keen to include fine examples of artefacts.

This volume contains some very substantial reports on archaeological work, for we are one of the few outlets available for full publication of excavations. It is refreshing to see that these all relate to recent work, not the backlogs that once were a feature of British archaeology. A quick look at the 'Fieldwork in Cambridgeshire 2003' section however reminds us what a small proportion of current work can be made available in this way. Of course, reports on all sites are produced and can be purchased from the relevant units or consulted in the county archaeological office. In future, these will also be added to a national data base known as OASIS, run by the Archaeology Data Service, so accessing this huge amount of data will eventually be much simpler. We aim to keep you abreast with such advances through our own website, *www.camantsoc.org*.

It was a great pleasure to be asked by the Cambridgeshire Local History Society to publish a short note on their superb photographic project, a worthy successor to CAS' similar project in the early party of the 20th century, now a much valued part of the Cambridgeshire Collection. This voluntary effort will likewise be used by those involved with the historic environment in years to come. The same Society asked us to include the list of recent additions to the Cambridgeshire Collection, compiled by Chris Jakes. This list used to be included in *Conduit* and has been much missed. It reminds us that our local historians are not far behind local archaeologists in their labours, a tribute to the floods of new data from an ever-active antiquarian community.

'Fieldwork', 'Reviews', 'Spring Conference report' and 'Conduit' are regular items we have managed to maintain – and which add to another substantial volume. This year, 'Conduit' was compiled at short notice by our redoubtable President, Tony Kirby, to whom we owe many thanks. In the nature of things this has to be done at the last moment, and even so many societies do not have a complete programme for the following year at the time we need it. We would therefore like to have a Supplement later in the year, as with original *Conduit*, but currently this is beyond our means. Perhaps we will have better news next year.

It remains to offer further thanks to our retiring President. Tony has taken the Society safely through two quite difficult years, and this October hands over to Nicholas James. Our Secretaries carry an even larger burden of work for the Society, of which organising nine lectures, often by speakers of national repute, is only one part. We are therefore extremely grateful to our retiring Secretary, Liz Allan, and to Janet Morris, who has now taken on the challenge. We must say a sorry farewell too to Don Fage, who has had the tough job of Registrar. It may also be noticed that we still have vacancies for Excursions Officer and for Editor of Conduit, so do contact us if you are interested in volunteering.

Alison Taylor
Editor

Cover illustration: Wandlebury, 'Lord Godolphin's house', drawn by Richard Relhan 1801

Evaluation survey and excavation at Wandlebury Ringwork, Cambridgeshire, 1994–7

Charles French
with contributions by Rachel Ballantyne, Andre Corrado, Claudia Cyganowski, Natasha Dodwell, Christopher Evans, Kasia Gdaniec, GSB Prospection, Bryan Hanks, JD Hill, Helen Lewis, Preston Miracle, Alistair Oswald, Paul Pattison and Colin Shell

Evaluation investigations conducted both within and outside the Wandlebury ringwork in 1994–7 as a student training exercise by the Department of Archaeology and Cambridge Archaeological Unit (CAU), University of Cambridge, revealed an extensive area of later prehistoric and Romano-British settlement, both inside and outside the surviving earthworks. There is every likelihood that an earlier Iron Age settlement was located on the hill-top prior to the construction of the first rampart and ditch at sometime in the 5th century BC, and this appears to have been located outside and to the southeast of a precursor (undated but possibly of the Late Bronze Age/very Early Iron Age?) post-built wooden enclosure. Settlement activity predominated in the 5th and 4th centuries BC, but continued to a much lesser extent into later Iron Age times associated with the construction of the second rampart and ditch on the interior side of the first rampart in the 1st century BC and lasted on a less extensive scale into the earlier Romano-British period (1st–2nd centuries AD). Throughout, the circular and concentric nature of the enclosures persists, and a focus to the southeast with a main entranceway continues. Indeed fresh evidence substantiating the existence of an original entrance on the southeastern side and possible elaboration of the ramparts at this point is described.

A number of new discoveries were made that give us a better idea of this hill-top in the Iron Age. Features excavated within and outside the ring consisted principally of pits, but with good hints of structures which would be revealed if open area excavations were undertaken. The pits were primarily used for the storage of grain, and some also had evidence for 'closure deposits', including articulated animals (eg a dog), a male skeleton (face down with his hands possibly bound), small pots, and decorative spindle whorls and bone plaques. Uniquely, evidence for repeated episodes of grain storage and handling was documented using detailed micro-stratigraphic and bioarchaeological analyses. This stored grain had probably been brought to the site from the surrounding area. Other environmental analyses suggest that the economy around Wandlebury relied on sheep husbandry in an already open chalk downland landscape throughout the Iron Age and that cattle were predominant in the Roman period. Finally, consideration of recent rescue investigations in the vicinity of Wandlebury suggest that this was but one substantial settlement in a highly developed and extensively occupied landscape in later prehistoric and Roman times.

Introduction

The site in its setting

Wandlebury ringwork is situated about 6.5 km to the southeast of Cambridge and 2km north of Stapleford village, in the northeast corner of Stapleford parish in south Cambridgeshire (TL 4940 5343) (Fig. 1). It is positioned towards the northern end of the undulating chalk ridge of the Gog Magog Hills overlooking the Cam valley and the fens beyond (TL 4940 5343). The *c.* 330m in diameter outer rampart and ditch encloses an area of about 6.25 hectares on a natural hillock that rises to *c.* 77m OD above the surrounding chalk plain at *c.* 20–30m OD. The ringwork itself occupies roughly one-half of the northern end of the hill-top, the remainder of which has never been systematically investigated for its archaeological potential. The later internal rampart and ditch reduced the diameter to *c.* 218m and enclosed *c.* 3.73 hectares.

Wandlebury (Figs. 1–3) is a local nature conservation area, beauty spot and home to the Godolphin Arabian – one of three 18th century ancestral stallions from whom all modern thoroughbreds have descended. It was first investigated archaeologically by Clark and Hartley in 1955–6 (Hartley 1957), with the infamous and so-called chalk figures found and excavated by Lethbridge and Tebbutt (Lethbridge 1957; Lethbridge and Tebbutt 1959) in the same years. Forty years on, four seasons (eight weeks) of training excavations for the second year students from the Department of Archaeology, University of Cambridge, were undertaken at Wandlebury in June of the years 1994–7, with additional geophysical survey in 1998 (GSB 1998).

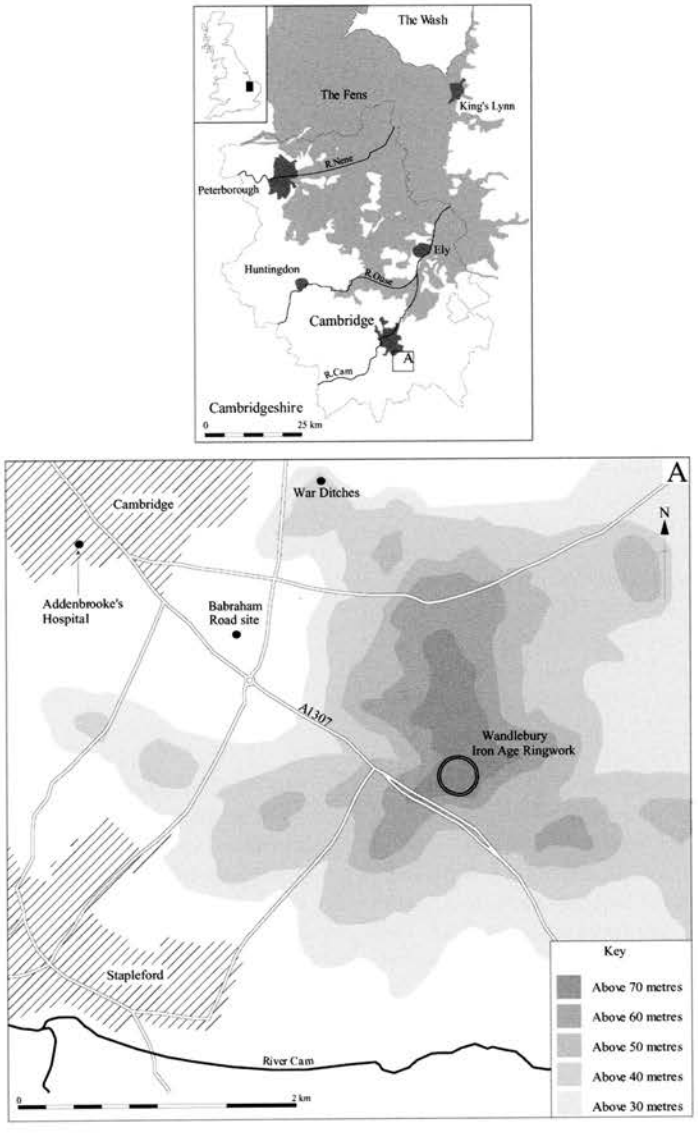

Figure 1. *Location map of Wandlebury and sites in the surrounding area. (C Begg, Archaeological Field Unit, Cambridgeshire County Council)*

Over the past two decades, prehistoric landscape archaeological projects have repeatedly demonstrated that monuments rarely exist in isolation but were integrally associated with extensively modified and utilised landscapes. These landscapes contained field systems, shifting and long term settlements (often elusive), industrial and/or processing areas, ceremonial routeways, burial monuments and cemeteries and ancillary/satellite structures (eg Stonehenge Environs Project (Richards 1991), Danebury (Cunliffe 1983; Palmer 1984), the Maxey/Etton areas of the lower Welland valley (Pryor and French 1985) and the lower Ouse valley (Evans and Knight 2000)). Consequently a similar approach to investigating the landscape outside the scheduled ringwork at Wandlebury using non-destructive survey and sample excavation techniques was proposed, albeit on a much smaller scale, and has provided exceptional new data on the occupation of the hill-top and its immediate surroundings.

Evaluation work described here comprised two seasons of work in 1994 and 1995 which took place outside the ringwork in Varley's Field before obtaining scheduled monument consent to undertake an evaluation exercise within available parts of the interior of the monument in 1996 and 1997 (Fig. 4). In the interior, the evaluation was situated between the tree belt on the surviving line of the outer rampart and the brick wall bordering the current estate's garden in an arc from the southeastern to northern sectors of the ringwork interior (Fig. 4). In addition, there was evaluation work to the south of the rampart in the

area of the putative chalk-cut figures and in Picnic Field to the southeast. In total, 99 test pits and 19 trenches were excavated, and over five hectares of land subjected to geophysical survey (Figs. 4–10).

The methodological approach

Charles French and Kasia Gdaniec

Permission was granted by the Cambridge Preservation Trust and English Heritage for a unified programme of survey, geophysical prospection and evaluation excavation as a student training exercise, co-ordinated by the Department of Archaeology and CAU, both of the University of Cambridge. This study had five main aims:

- to assess the state of extent and preservation of archaeological features within the interior of the scheduled monument
- to investigate the possibility, extent and date of archaeological remains surviving on the remainder of the hill-top outside and to the east and southeast of the scheduled area
- to investigate how these remains related to the two sets of earthworks
- to procure new material for dating and palaeoenvironmental data with which to better understand the place of this monument in its landscape
- to reassess the surviving record from Clark and Hartley's 1955–6 excavations (Hartley 1957).

Working within the confines of a scheduled ancient monument meant that investigative methods were limited to prevent unnecessary destruction of the earthworks and unknown remains. Thus the investigations involved a combination of three main techniques designed to locate and test for possible archaeological remains, as follows:

1) a new topographical survey of the earthworks of the monument by the Royal Commission on the Historical Monuments of England as part of their survey programme of the Iron Age defensive earthwork sites of Cambridgeshire (Pattison and Oswald 1996)

2) geophysical survey (magnetometer and resistivity) of selected areas of the exterior and interior of the scheduled monument under the direction of Dr C Shell, Department of Archaeology, Cambridge

3) a test pit programme of trial excavation designed to systematically sample and evaluate the available area under the direction of CAU. This involved:

- excavation by JCB of 1m^2 test pits, from which the topsoil and buried soil (if it survived) were stored separately and completely dry sieved through a 5mm mesh for artefact and bone retrieval
- second, mechanical expansion of each test pit to a 2 m^2 test station in which all features revealed were excavated and recorded conventionally; in addition a further six 1.5m wide trial trenches, three *c.* 5x5m and one 10x8m areas were cut to examine particular linear and non-linear anomalies revealed by the magnetometer survey
- every context/layer of every feature was bulk sampled (30 litres) for both wet sieving for artefact retrieval and plant macro-fossil remains.

The recording of features and soil sampling for palaeoenvironmental data and bulk sampling for wet sieving for artefact and charred plant macro-fossil remains retrieval followed standard CAU practice (after Spence 1990).

Previous discoveries

Paul Pattison and Alistair Oswald

The previous work and history of the site at Wandlebury has been thoroughly reviewed by Pattison and Oswald (1996). Accordingly, only a few salient features will be described here. Wandlebury constitutes the only 'hillfort' in Cambridgeshire. Nonetheless, there are many other Iron Age ringwork enclosure sites in fen-edge situations: Wardy Hill, Coveney, near Ely (Evans 1992 and 2003), Arbury Camp, on the northwestern side of Cambridge (Evans 1992; Evans and Knight 2002), Stonea Camp, near March (Malim 1992), Belsar's Hill, Willingham and Borough Fen site 7 near Peakirk (French and Pryor 1993; Malim and McKenna 1993).

The 'defensive nature' of Wandlebury was suggested by Clark and Hartley's 1955–6 excavations (Hartley 1957). They excavated a trench across the inner and outer ramparts and ditches in the southeastern sector of the hillfort, adjacent to the current investigations (Hartley 1957: fig. 1), as well as a series of Wheeler-box trenches on the interior of the inner ditch (*ibid* fig. 2) Fig. 2. The first phase of defences were believed to consist of the outer rampart with wooden revetment, outer ditch and counterscarp bank, with the ditch recut at least once and the outer rampart repaired at the same time (*ibid* figs. 4 & 5). The inner ditch and timber revetted inner rampart were added much later; these are now substantially flattened and infilled by gardening works associated with the estate and certainly by 1808 (Lysons 1808: 73). The inner rampart sealed a variety of pits and post-holes indicative of settlement features associated with the outer defences, which also extended within the interior of the remodelled fort (Hartley 1957: fig. 2). These features produced ceramics and metalwork then dated to the 'Iron Age B' period, which would now be approximately equated to the 3rd–1st centuries BC (Hill 1996 & below). Well preserved faunal remains were also recovered, but remain unanalysed, and a buried soil beneath the counterscarp bank and outer rampart was recognised but not investigated further.

Cunliffe (1974: 229–32) reassessed this construction sequence and suggested that Clark and Hartley's interpretation (Hartley 1957) was incorrect. He suggested that the first phase box rampart was replaced by a similar but more massive timber structure, but the associated ditch probably retained its original form at that stage. This was followed by a third phase, seen as an inner timber-revetted dump rampart and the recutting of the outer ditch, but without any super-structure on the outer bank. The variations between Hartley and Cunliffe's interpretations both

Figure 2. *Oblique aerial view of Wandlebury from the southwest (with permission of the Cambridge University Committee for Aerial Photography).*

make reasonable sense but are hard to prove one way or another without considerable new excavation. Nonetheless, as revealed in this report, there may be both modifications and additions to this story, and in particular, the possible existence of an earlier structure beneath the line of the inner rampart. But whatever the actual sequence, there is no doubt that in the 17th century the site was observed to be bounded by three ramparts (ie counterscarp bank, outer and inner ramparts) (Gough 1806: ii, 226) with two ditches or 'great trenches one within another' (Morris 1982), but by the early 18th century only one ditch and rampart remained (Defoe 1724).

Legends abound concerning the ringwork and the Gog Magog Hills in general, which describe ghostly giants of Celtic origin. These are enhanced by the supposed discovery, excavation and publication by Lethbridge (1957) and Lethbridge and Tebbutt (1959) of a set of figures of female goddesses and male warriors equipped with weaponry and chariots that were believed to have been cut into the chalk on the southern slopes outside the ringwork. Despite the dubious methods of prospection (dowsing) and subsequent excavation (cutting the shape of the figures from the turf surface downwards rather than in plan and section from the base of the topsoil), examination of the published section drawings would suggest that the figures consist of a combination of real but plough damaged, archaeological features plus natural solution hollows in the upper surface of the chalk subsoil. Apparently Lethbridge (1957) marked the outline of these 'figures' with willow canes which took root, thereby removing the possibility of their authentication through re-excavation.

Wandlebury appears in the 10th century 'Chronicle of Ramsey Abbey' in the form of *Wendlesbiri*. Between then and the 12th century, it was a hundred meeting place where land pleas were occasionally held. In the 'Historia Eliensis' it appears as *Wyndilbury*, an important meeting place of nine hundreds in the reign of Stephen (1134–54) (VCH Cambs 8 1982: 227; VCH Cambs 2 1948: 40). Between 1135 and the Dissolution in 1541, it was a holding of the prior and monks of Ely known as Stapleford Bury. So it remained until transfer to the Ecclesiastical Commissioners in 1870. But, before 1135, a small fraction of this Stapleford Bury estate was detached to form a second, smaller manor held as one-half of a knight's fee of the Bishopric until after 1600 and after the mid 14th century AD it became known as Sternes. This manor, which included

Wandlebury ringwork, was acquired by Francis, 2nd Earl Godolphin, in 1734 (VCH Cambs 8 1982: 229–30), by which time the whole area had become associated with equestrian pursuits. It is probably just after this in the 1740s that a manor house with stables was built within Wandlebury ringwork. Gogmagog House, also known as Gogmagog Hills, remained with this same family until the death of George, Duke of Leeds, in 1894, thereafter changing hands several times before it was acquired by the Cambridge Preservation Trust in 1954.

The 2nd Earl Godolphin's house (now demolished) was situated to exploit the ornamental opportunities presented by the framework of the ringwork's earthworks. Although the exact period of creation of the gardens is unsure, much effort went into creating space for them by the removal of the inner rampart and the backfilling of the ditch such that it had become a wooded perimeter walk by 1812.

Several minor pieces of archaeological work have been conducted on the hill-top prior to this evaluation. These include the examination of an electricity service trenches by Taylor (1976) and Alexander (1993) which revealed a few Iron Age artefacts and undatable linear features, just inside and outside the ringwork near the present bridge on the southern side of the site. Two human burials were discovered outside the rampart to the south during the extension of a cricket pitch and a further five burials revealed as a result of tree uprooting, all suspected of being Iron Age in date (Bevis *et al* 1967: 107–9; Taylor and Denston 1977). In the early 1970s, a large bell-shaped pit containing sheep and human bones was discovered as a result of tree-uprooting 25m to the south of the outer rampart in Varley's Field (Cambs SMR 09264). Inside the ringwork, Roman coins were discovered in 1685 during the construction of a cellar (Gough 1806: ii, 226). Archaeological evaluation for the extension of the Gog Magog golf course just off the northeastern edge of the hill-top discovered nothing of associated significance (K Welsh, pers comm).

Since the University of Cambridge evaluation took place in 1994–7, there has been a substantial amount of archaeological work done in the near vicinity in response to new developments. These include the extensive open area excavations done in advance of the construction of the Babraham Road Park and Ride facility by Hinman (1998; Hinman and Malim 1999) which revealed evidence of rather enigmatic earlier prehistoric settlement of the Neolithic and Bronze Age, while extensive investigations at the Robinson Way site at Addenbrookes Hospital has revealed a substantial area of farmsteads, roadways, field systems and burial features from the later Iron Age and early Romano-British periods, contemporary with the later phase of Wandlebury (D Mackay and C Evans, pers comm). Discussion of Wandlebury with respect to this 'developed' landscape is returned to at the end of this paper.

Topographical survey
Paul Pattison and Alistair Oswald

The RCHME officers and second year undergraduates completed a new topographical survey of the whole ringwork in 1994 and 1995 using an EDM and conventional measured tape topographical survey techniques (Pattison and Oswald 1996). This detailed survey provided important new information regarding the form and survival of the earthworks and contributed additional detail indicative of an eastern entrance way to the ringwork (Pattison and Oswald 1996) (Fig. 3). About 55m to the south of Clark and Hartley's excavations (Hartley 1957: fig. 1), two very straight lengths of outer rampart and ditch converge at a point where the inner rampart would appear to be broken (Fig. 3). Here the gently curving line of the defences straightens to form an obtuse but distinct angle, in fact the only variation in Wandlebury's striking circular plan. Indeed, the counterscarp bank increases steadily in size towards the apex of this angle, and then straightens out for about 25m. The change in angle is even apparent in the backfilled inner ditch, where there is a hint of a break with a rounded terminal to the south, possibly indicating the existence of a former causeway. Consequently it is hard to avoid the whole impression of a blocked off entrance way. Moreover, given that the pre- and contemporary settlements seem to be concentrated on the southeastern side of the monument, this would make considerable sense in terms of monument access and focus.

None of the existing entrance ways are believed to be more than recent access ways into the interior – an aspect strengthened by the presence of masonry retaining features in these areas. The exception to this is the gravelled entrance way into the north stable yard on the southwestern side of the ringwork which may represent an earlier entrance way through the surviving inner rampart (Fig. 3). This has previously been assumed to be the position of the Iron Age entrance (Hartley 1957: 2).

Like Arbury Camp, Milton, on the north side of Cambridge city (Evans 1992; Evans and Knight 2002; Knight 1995), and unlike most other hillforts/ringworks, Wandlebury is almost perfectly circular in plan. But, Wandlebury ringwork bears no relationship to the natural topography of the hillock at the northern end of the chalk ridge (Fig. 1).

The surviving earthworks comprise the deep outer ditch which maintains a quite constant width of 11.5m but ranges in depth from *c.* 1.8 to 2.7m and the outer rampart. The outer bank was substantially levelled during the construction of the gardens in the early 19th century, so now only survives to a height of 0.5m with a width of 7.5m at its base. The counterscarp bank ranges in height from 0.4 to 1.8m in height and 5–12m in width. In the southeastern sector of the monument, the counterscarp bank has been cut back and reformed into a level platform of about 5m by 20m. The inner rampart was levelled and spiked back into the inner ditch, except for an 80m stretch on the northern side of the ringwork which survives as a

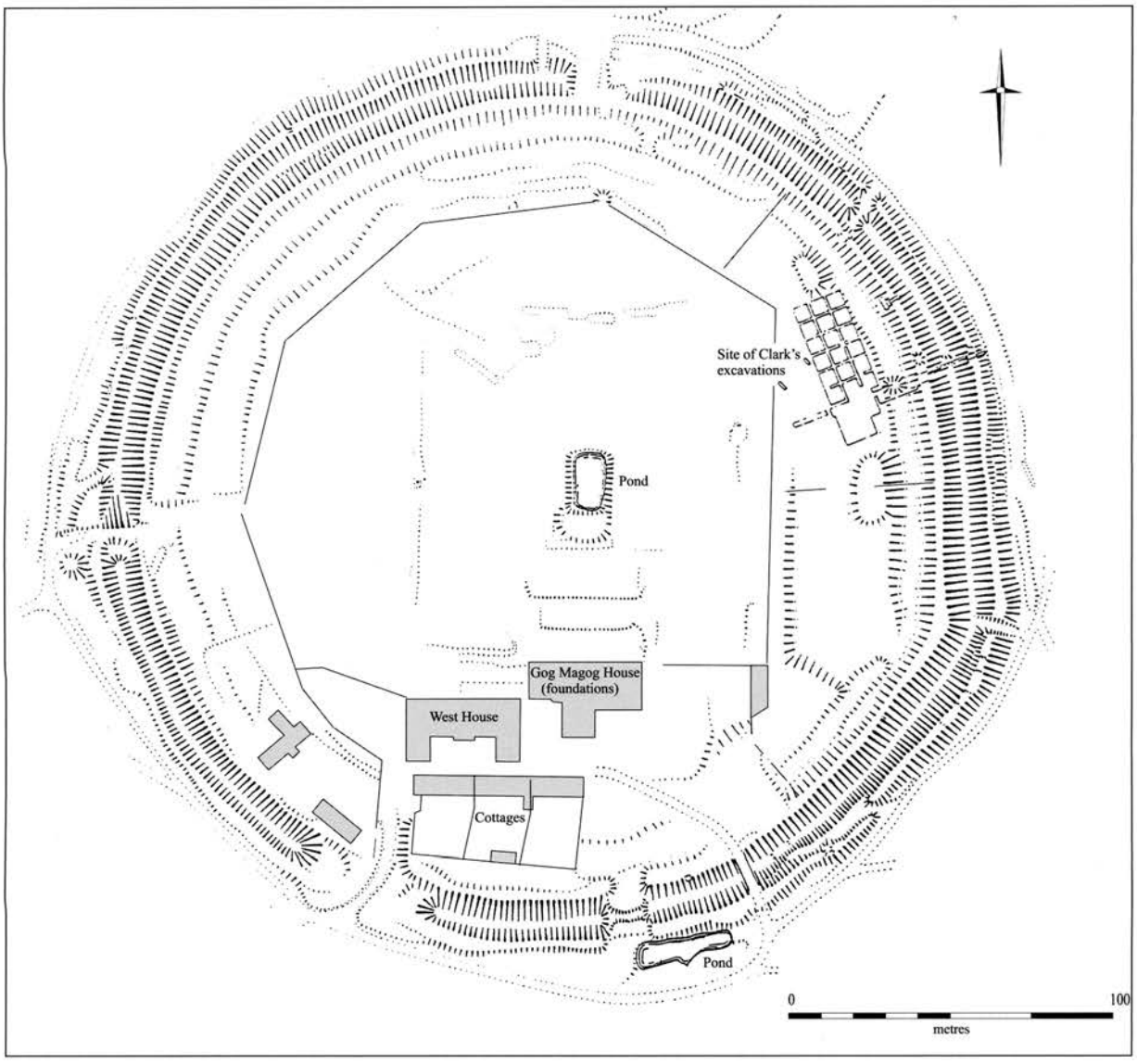

Figure 3. *The 1996 earthwork plan of Wandlebury (RCHME).*

very slight earthwork. The inner ditch now just about survives as a slight but regular depression, *c.* 0.2 to 0.5m deep and some 11m across. Clark and Hartley's excavations (Hartley 1957) suggested that this ditch had been 5.4m deep, which had been reduced to about 3m in depth through subsequent silting up.

Geophysical survey

Interior and exterior areas

Colin Shell and Charles French

Seven areas were surveyed using a fluxgate gradiometer or magnetometer, and two areas with both the magnetometer and resistivity meters. The first area to be surveyed using magnetometry was a 0.8 hectare area of the interior of the ringwork, immediately adjacent to the modern pond. Unfortunately, this indicated little in the way of archaeology other than recent garden features such as brick/gravel paths.

A second area, a *c.* 60–100 x 120m (maximum) area (or *c.* 80,000 sq m) was surveyed in the southern part of Varley's Field to the outside of the ringwork and three areas (*c.* 50 x 100, 40 x 40 and 30 x 100m) within the eastern and northern arcs of the interior of the ringwork (*c.* 120,000 m^2) and the area of the so-called Wandlebury figures to the south of the ringwork (Fig. 4, area A). Throughout the survey, the magnetometer presented better resolution than the resistivity meter.

The survey of Varley's Field revealed a variety of archaeological anomalies such as a 'double' hollow way, two ditched enclosures – one curvilinear and one rectilinear, and numerous large and small pits (Fig. 5). As is evident in Figure 5, the density of the archaeological features does begin to fall away northwards, an observation corroborated by the test station excavation programme.

Two other areas of the hill-top were also explored using geophysical techniques by S Fidler (1995) and C Shell with student assistance (Figs. 6 & 7). The first area (Fig. 4) was the area of Clark and Hartley's 1955–6 excavations on the interior of the hillfort (Hartley 1957). This revealed the Wheeler box trench plan of those excavations as well as an area of dense archaeological features being preserved beyond the limit of the previous excavations.

The area surveyed around the so-called hill figures (Lethbridge and Tebbutt 1959) situated on the slope just to the south of the ringwork gave no indication of the figures (if they ever existed) (Fig. 4, between test pits 89 & 90). Nonetheless, some anomalies strongly suggest the presence of pits, whilst others may represent natural (geological) features in the top of the chalk substrate.

In the interior, as in Varley's Field, the most common feature was the individual pit, and occasionally linear ditch features were visible (Figs. 6 & 7). However, the resolution of the archaeology was not as clear-cut as that seen for Varley's Field (Fig. 5). With the advantage of subsequent test pitting, it was evident that large areas of this part of the interior were disturbed by brick and chalk rubble deposits left after the demolition of estate buildings around the perimeter of the walled garden, as well as levelling of the inner rampart using soil and chalk rubble material derived from the inner rampart during the formation of the 19th century park around Gog Magog House

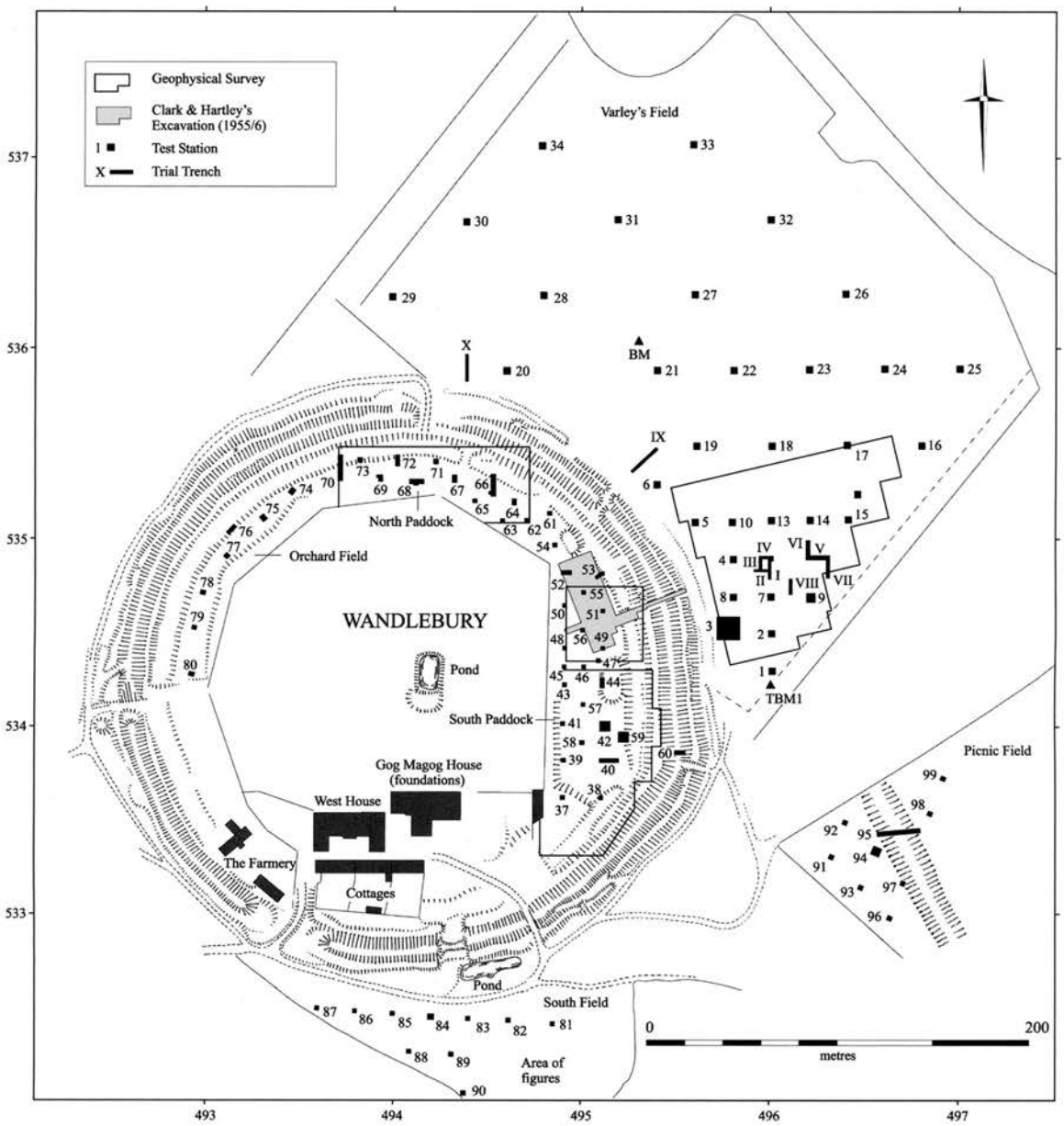

Figure 4. Location plan of the survey and excavation work carried out in 1994-7 set against the 1996 RCHME earthwork plan of Wandlebury (C French).

(Pattison and Oswald 1996). Nonetheless, this survey indicated that there is extensive archaeological survival with hints of post-built structures evident. Moreover, the magnetometer method has proved extremely reliable despite much post-depositional disturbance of the survey area and often relatively thick (*c.* 50–70 cm) topsoil/overburden deposits.

Woodland Trust survey
GSB Prospection

Subsequent to the1994–7 evaluation, the Woodland Trust purchased and wished to plant an area of land between Furze Clump, Round Clump and Long Plantation, about 500m to the southeast of the ringwork (Fig. 8). Prior to planting, the two hectare field was geophysically surveyed by GSB Prospection (1998). The magnetometer survey recorded a complex of linear responses throughout the area that indicate fragments of rectilinear field systems (Figs. 9 & 10). The linear zones in the northwest corner of the survey area certainly look like a pit alignment as it is regularly interrupted (Figs. 9 & 10). A number of its anomalies and areas of increased magnetic response were also identified, but there were no clear indications that remains of core settlement features are present (Figs. 9 & 10). Nonetheless, these results demonstrate that this is an extensive area of potentially later prehistoric land-use that is probably integrally related to Wandlebury.

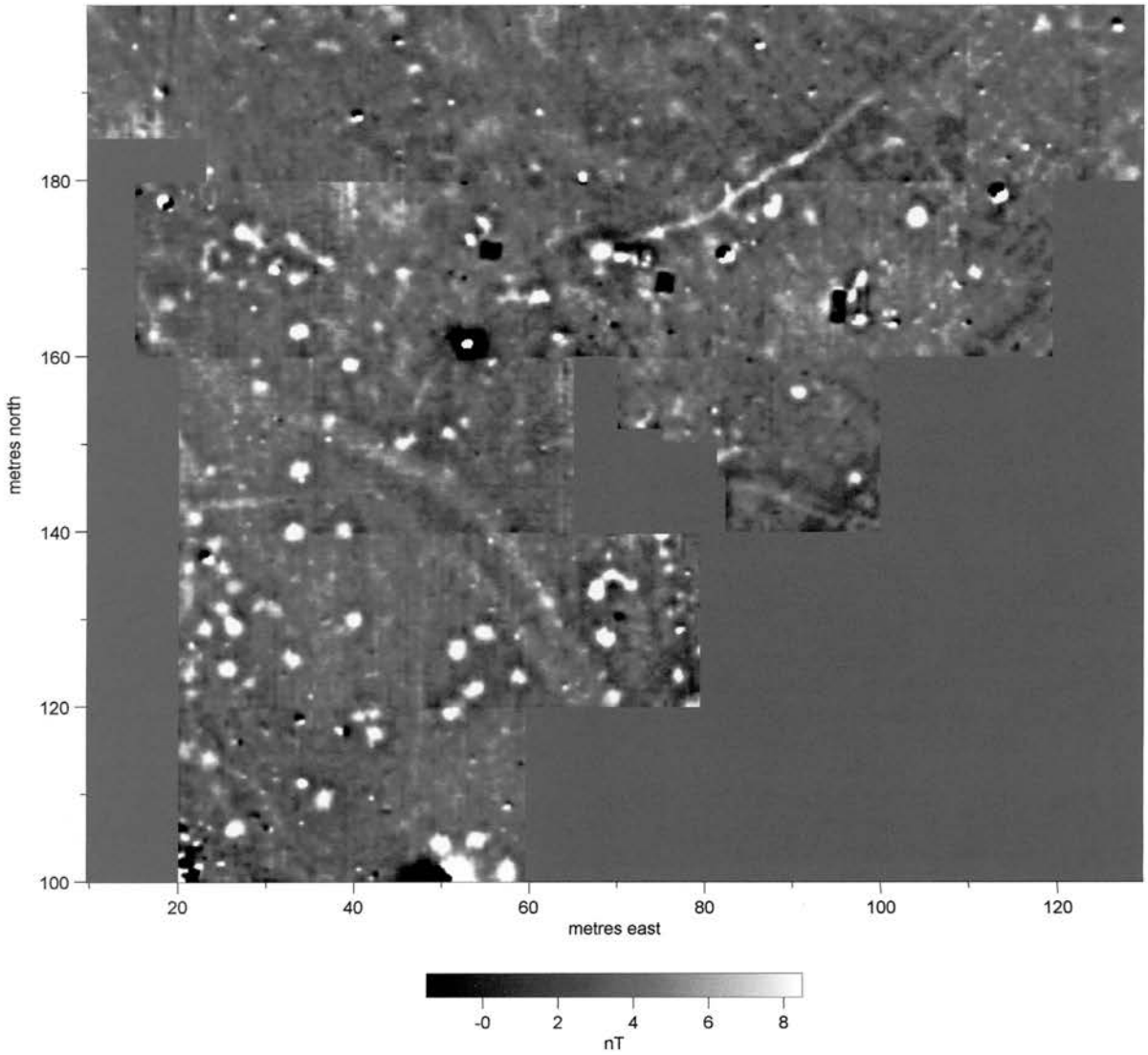

Figure 5. *Magnetometer plot of the southern third of Varley's Field (C Shell).*

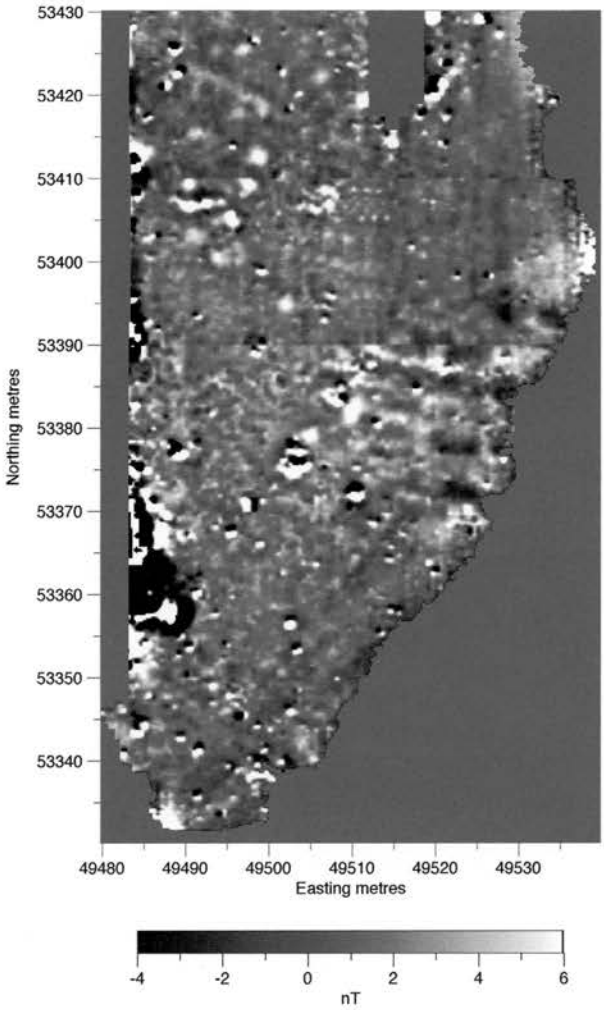

Figure 6. *Magnetometer survey plot of the interior southern paddock (C Shell).*

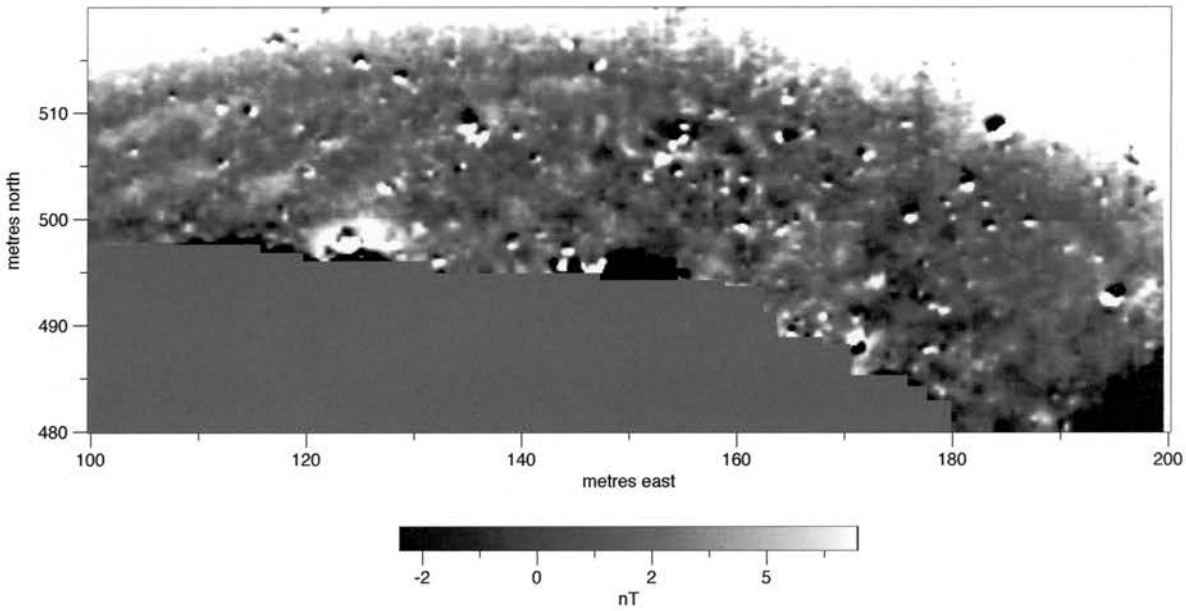

Figure 7. *Magnetometer survey plot of the northern interior paddock (C Shell).*

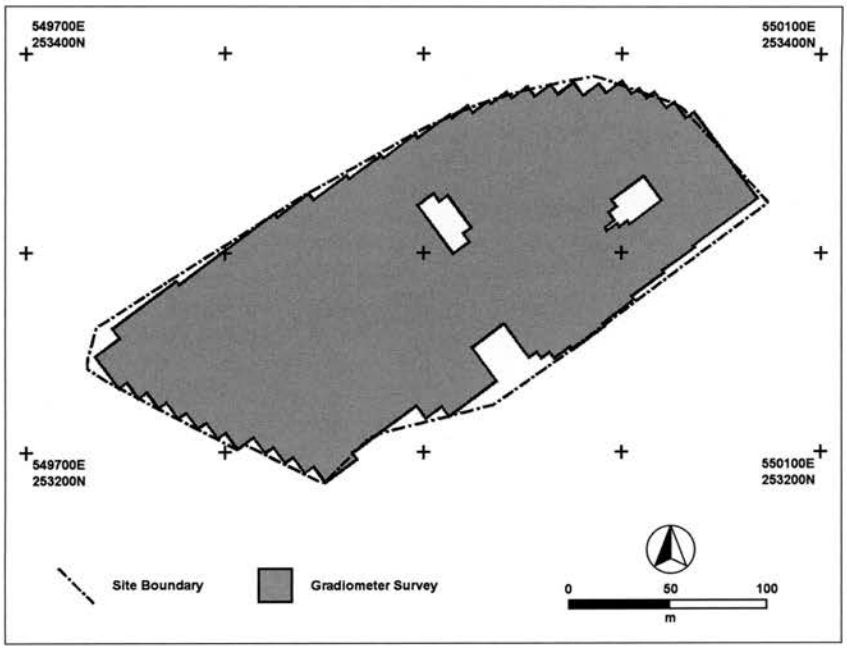

Figure 8. Location plan of the magnetometer survey of the Woodland Trust field to the south of the ringwork (GSB Geoprospection, with the permission of The Woodland Trust).

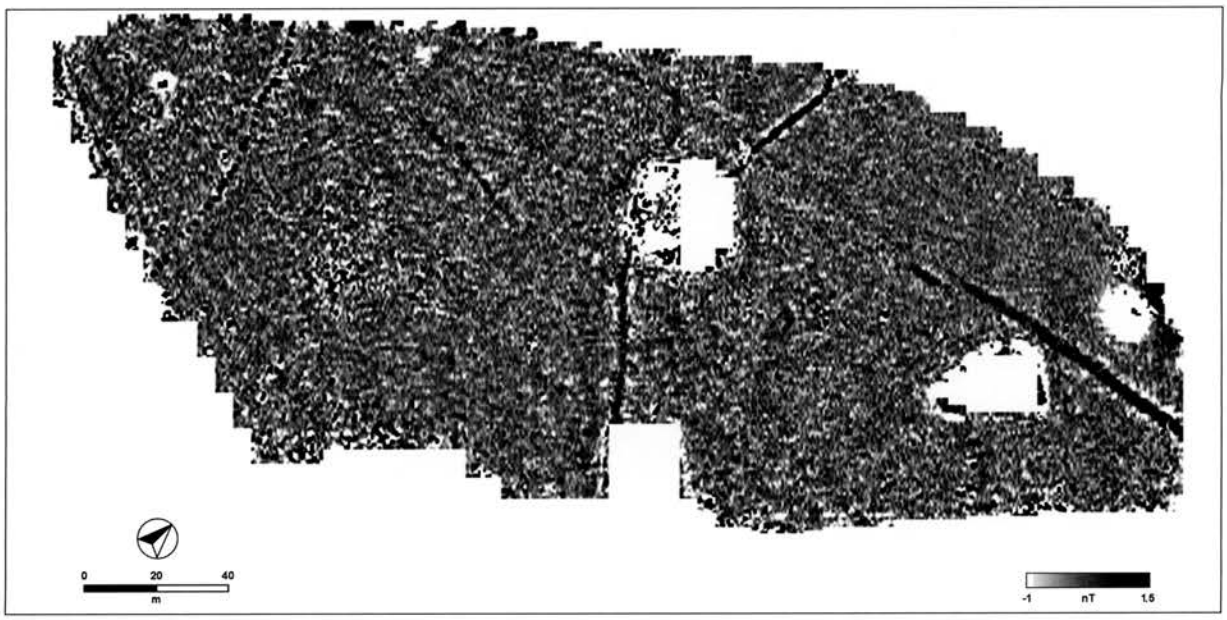

Figure 9. Magnetometer survey of the Woodland Trust field to the south of the ringwork (GSB Geoprospection, with the permission of The Woodland Trust)..

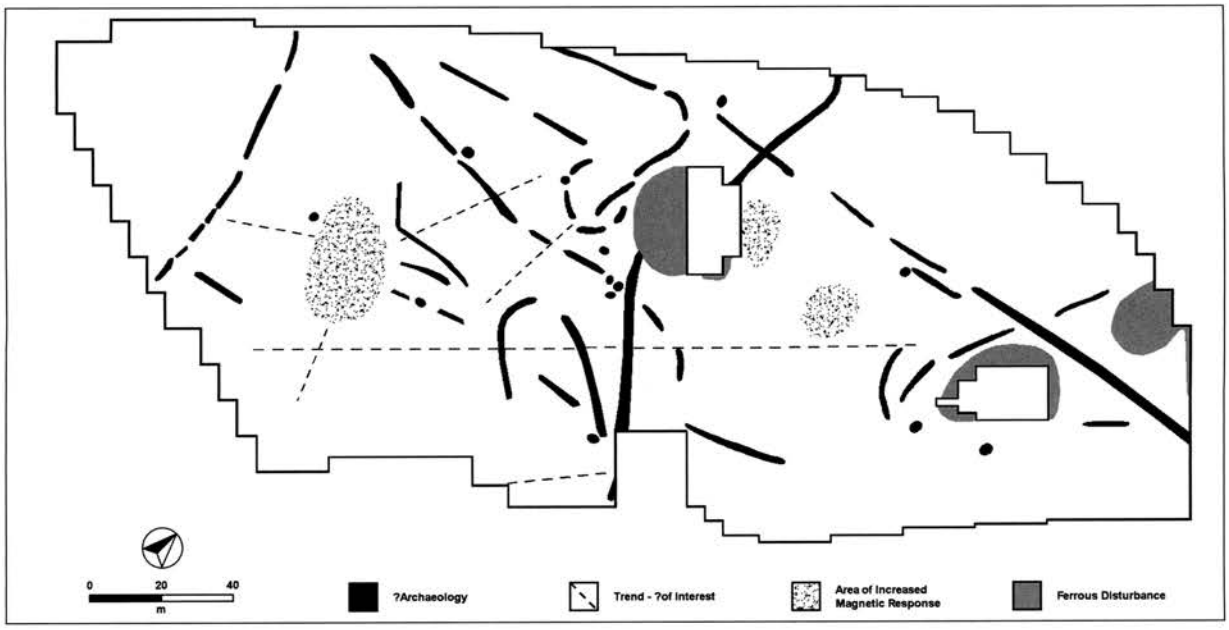

Figure 10. *Interpolated magnetometer survey of the Woodland Trust field to the south of the ringwork (GSB Geoprospection, with the permission of The Woodland Trust).*

The evaluation excavations

Charles French and Kasia Gdaniec

Introduction

A series of fields were investigated outside the ringwork to the east in Varley's Field, southeast in Picnic Field and the Woodland Trust area, and to the south around the area of the purported hill figures (Fig. 4). In all 55 test pits and 11 trenches were excavated. In the interior, another 42 test pits and five trenches were cut (Fig. 4). In total, this amounted to evaluation of about one-quarter of the available interior of the ringwork.

Investigations outside the ringwork

The topsoil artefact survey

Although artefacts were found in every test station, the recovery of Iron Age artefacts diminished markedly beyond the line of test stations 16–19 (Fig. 4; Table 1). These included Beaker to Iron Age to post-medieval pottery including handmade pottery of mainly earlier and some middle Iron Age types, Mesolithic to Bronze Age worked flint, one Neolithic polished flint axe fragment and animal bone. This evidence complements the results of the magnetometer survey and contrasts with the earlier prehistoric finds distributions which continued across the whole of Varley's Field. Indeed, archaeological features were absent in all but one of the enlarged test stations (16–34) in the northern part of Varley's Field.

In order to make sense of the artefact distributions in the former ploughsoil, the artefact distributions recovered in the test pits were compared with those contained in the tertiary fills of the excavated features in each test pit (Mititelu 1996). This study revealed several major trends in terms of finds frequency and distribution in Varley's Field. First, although very little animal bone was recovered across the whole field (*c.* 2% of the artefact assemblage), it is mainly found in the vicinity of the main settlement area marked by the pits in the southern part of the assessment area, with occurrences dropping off markedly northwards (Table 1). Second, pottery sherds (*c.* 20% of the artefact assemblage) exhibited a similar and complementary distribution to the bone material. These two distributions effectively mirror the density of the archaeological features defining in the southern part of Varley's Field. On the other hand, flint artefacts (*c.* 78% of artefact assemblage) occurred in every test pit across the whole field and are essentially unrelated to the Iron Age period of use of this field. This testifies to the long-lived use of the hill-top prior to the Iron Age.

Artefacts were present in half of the tertiary fills of the features examined and were present in much larger numbers than in the sieved topsoil of most of the test pits. These feature fills were dominated by animal bone (*c.* 60% of artefact assemblage), with pottery representing about 30% of the assemblage and flint 10%. Although there were only five instances of features found directly beneath the sieved soil of a test station, there appeared to be no direct correlation in terms of type and frequency of artefacts recovered.

Excavations on the exterior of the ringwork

Excavations in Varley's Field

A series of 35 test pits and 10 trenches were cut by machine to evaluate the whole field (Fig. 4). Test pits 1–15 and 35 were systematically placed at 20m intervals over the dense area of Iron Age activity in

Table 1. Artefact retrieval (in %) from the topsoil test pits 1-34 in Varley's Field.

Test Pit	IA pot	R-B pot	Post- medieval pot	Modern pot	Bone	Flint
1	16.6		33.3		16.6	50
2	20				20	60
3	72.7				4.5	22.7
4						100
5	25					75
6	17.6				82.4	
7						100
8	42.85				9.5	47.6
9	35.7				50	14.3
10	41.2				11.8	47
11	22.3					77.7
12	8.57	12.5	3.125		6.25	68.75
13					8.3	91.7
14					50	50
15	11.1				3.7	85.2
16					10.5	89.5
17	3.2				0.8	96
18	25		37.5		12.5	25
19					16.2	83.8
20						100
21				22.2		77.8
22	12.5	12.5	18.75			56.3
23			19.05			80.95
24	7.7		7.7		84.6	
25				60		40
26	30				6.6	63.4
27	18.2					81.8
28						100
29			17.4	65.2		17.4
30						100
31						100
32	2.5					97.5
33						100
34				5.9	5.9	88.2

the southern (chalk subsoil) part of the field, with the remaining test pits placed at 80m intervals over the remainder of the glacial 'head'-dominated northern part of the field.

The features ranged from occasional shallow and enigmatic ring-gullies (Fig. 11, F1–3 in test pit 3 and trenches 5 & 7) to arrangements of post-holes (Fig. 11, F4–10) to many shallow pits (Fig. 3, F16) and more substantial and deep storage pits cut into the chalk (Fig. 11, F15), the ploughed out remains of the counterscarp bank (F 31) in test station 6 (Fig. 4), post-trenches in test pit 12/trench V (F88) and in Trench VII (F89), both probably of Roman date, and an historic period hollow way (F21) (Fig. 5).

Some evidence for structures was discovered, but it was not as prolific as expected nor able to be fully exposed given the nature of the evaluation. The best evidence was a clear arc of seven post-holes (F4–10) and two slightly curved, butt-ends of two possibly concentric ring gully-like features (F1 and F2), and a third, apparently unrelated, curvilinear gully (F3) test pit/trench 3 (Fig. 11). Each set of features appears to be unrelated to one another, hinting at development within the construction sequence or subsequent to it.

From the magnetometer survey at least 120 pits are evident (Fig. 5), but only 25 were excavated. Of these, a 25% sample (six pits) were singled out for further bioarchaeological analyses (Fig. 12) (see below). There is a range of pit sizes and shapes, but they fall into three main categories: small (<1m deep and in diameter) and flat-bottomed; small (<1m deep and in diameter), concave-bottomed; and large (1–2m deep and in diameter), flat-bottomed and undercut. The first two categories are very similar to those recorded by Clark and Hartley (1957), as they noted that of the 33 pits investigated only three pits had a depth greater than 3 ft (*c.* 1 m), and only two exhibited undercut lower sides.

Of the pits excavated on the exterior of the ring-work in Varley's Field, the main features of the pits are as follows:

- in most cases, the outer/upper lip of the pit has been

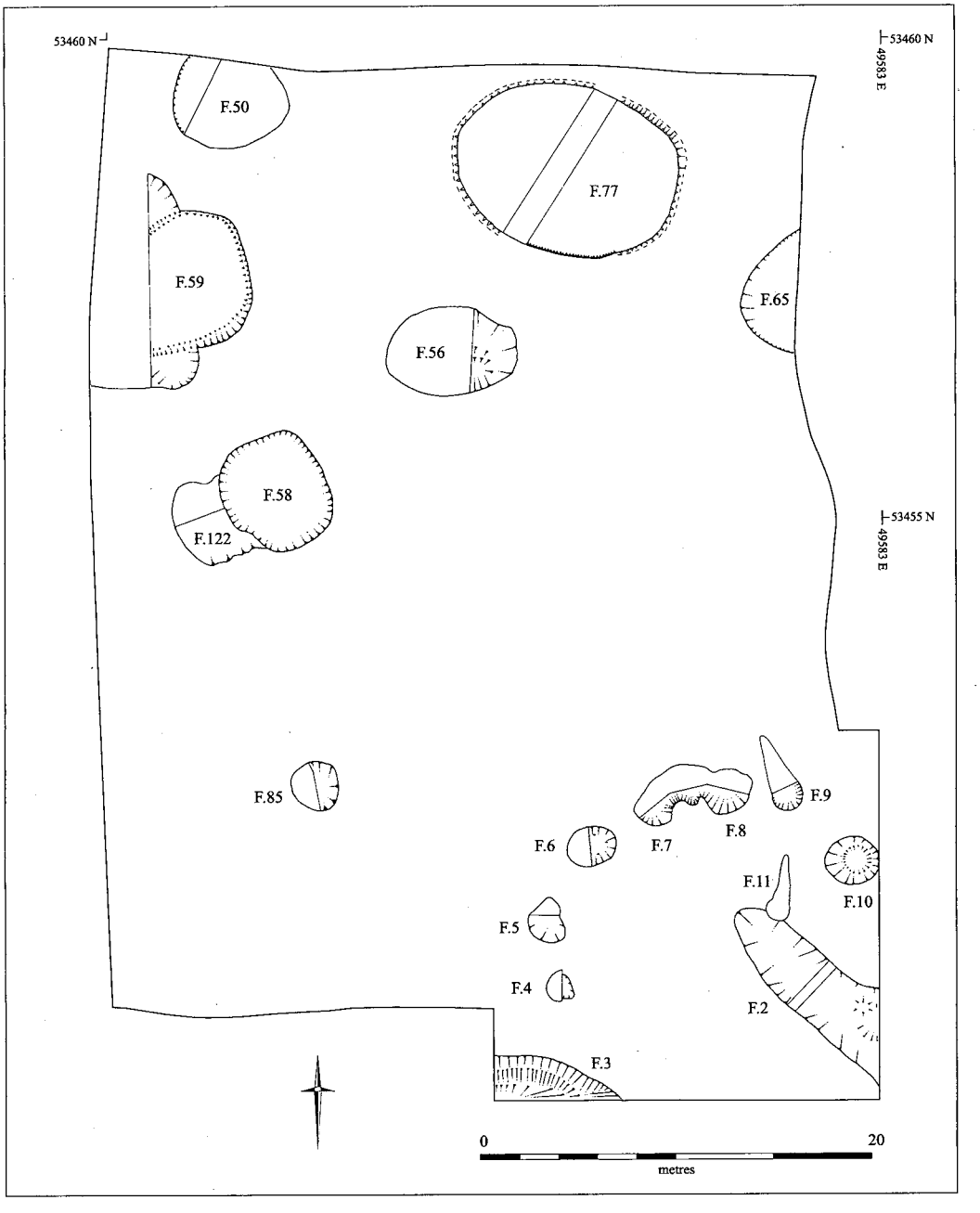

Figure 11. Extended test pit 3 showing the pit group and the possible post-hole and gully structures in Varley's Field (C French).

subject to much physical/chemical weathering, which suggests that many partly-infilled pits remained partially open for sometime
- three pits were undercut
- one contained a thick basal fill of charred grain
- one contained a thin basal fill of charred grain
- one contained the articulated torso of a sheep placed on the base of the pit with the head beside it
- two pits contained large quantities of phytolith-rich ash
- most of the pits contained relatively large amounts of animal bone and to a lesser extent, pottery, especially in their upper secondary and tertiary fills
- primary and lower secondary fills of the pits were generally devoid of artefacts.

The function of the pits is discussed further below, but encompasses several possibilities as set out in Table 2.

The southern slope and Picnic Field

Artefact densities were relatively lower than in Varley's Field and the interior areas, and dominated by more recent artefacts such as glazed pottery, iron nails, clay pipe fragments and coal/cinder.

The whole southern slope area was littered with tree stumps, root systems and new saplings, and had been ploughed earlier in the 20th century (Bill Clark, pers comm). The slope appeared to be very much

Table 2. The main features of selected pits excavated on the exterior in Varley's Field.

Pit number	Diameter (m)	Depth (m)	Dominant artefacts	Primary function
15	2.30–2.55	1.07	ash; primary charred grain processing waste	grain storage
50	1.15	0.55	near complete dog skeleton on base	'placed' deposit
58	1.0–1.10	0.25–0.30	1 sheep/goat bone	unknown
59	1.8	0.87	horse bone	unknown
77	1.70–2.10	1.15–1.25	primary charred emmer/barley grains; organic linings; spade marks and barley	two episodes of bulk grain storage of cleaned emmer
126	3.0–3.20	1.84	main pig bone assemblage on site, with cattle bone; primary charred grain at base	bulk grain storage; hay meadow in vicinity

Table 3. Artefact retrieval (in %) from the topsoil test pits (37-80) in the interior paddocks.

Test Pit	IA pot	R-B pot	Post-medieval pot	Modern pot	Bone	Flint	Glass	Other
37					9.55	3.18	0.63	86.62
38	8.57		11.42		11.42	17.14		51.42
39	0.62	0.62		3.72	13.04	0.62	1.55	71.8
40	0.8	0.8	4.76		25.39	4.76	1.58	59.5
41	0.35		0.35		5.37	6.09	0.7	86.7
42	0.9	0.9	2.75		6.42	3.67	3.67	81.65
43	6.1	4.1			24.5	12.25		53.05
44	16.72				42.46	1.8	0.8	38.2
45	34.8	4.3	4.3		21.75	13.04	8.7	13.04
46	10.16	44	3.4		22	6.8	1.7	11.86
47	13.3	15	13.3		21.66	10	6.66	20
48	22.4				53.64	6.24	0.5	17.2
49	14.3	35.7	7.1		21.42			21.42
50	26.2	3.4		4.76	50	11.9		4.76
51	19.04			4.76	66.6	9.52		
52	11.76		2.94	2.94	58.82	11.76		11.76
53	8.7		30.4	4.34	39.13	8.69	4.3	4.3
55	26.66			6.66	33.3	26.6	6.6	
56	12.5	3.12	3.12		34.37	9.37		37.5
57	8.3	16.6		16.6	25	12.5	4.12	16.6
58	2.7				3.04	1	1.35	91.55
61	37.5				37.5		1.25	12.5
62	10.7			7.14	32.14		21.4	28.57
63	1.84			5.52	6.13	1.84	6.74	77.9
64	2.77		9.72		5.55	2.08	1.38	78.47
65			5.6	16.8	11.2	4	4.8	57.6
66	0.8			4.86	2.97	0.54	0.54	90.27
67	0.6			59	14.45		4.21	21.68
68	0.96			18.26	3.84	1.92	4.8	70.2
69			32.87		23.28		1.37	42.46
70					41.66		8.33	50
71	24		2.66		2.66	1.33	2.66	66.6
72				14.28	7.79		2.59	75.32
73	3.92			25.49	21.56		11.76	37.25
74				7.4	3.7	3.7	2.47	82.7
75			1.33	21.33	8	9.33	5.33	54.66
76				28.57			14.28	57.14
77			1.69	10.16	3.38	8.47	13.55	62.7
78				31.8	6.06		13.6	48.48
79	4.54			11.36	2.27	2.27	2.27	77.27
80				36.4		1.63	3.8	55.97

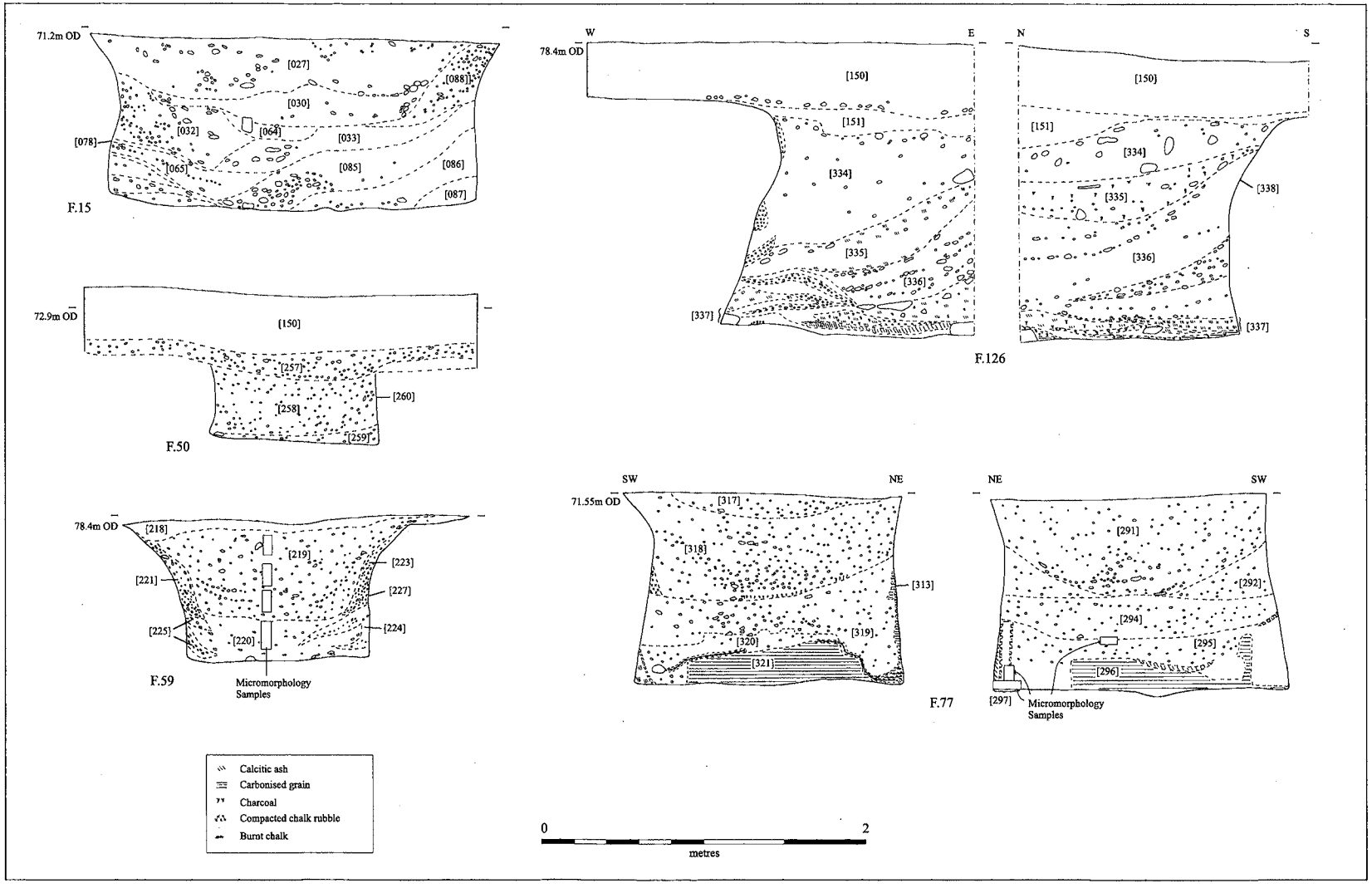

Figure 12. Sections of pits F15, 50, 59, 77 and 126 in Varley's Field (C French).

denuded with a thin (<15 cm) topsoil, no buried soil survival and no hillwash deposits present. Test pitting (81–90) (Fig. 4) also indicated that there was little in the way of archaeological survival there, with no cut features present. But, re-examination of Lethbridge and Tebbutt's published section drawings (1959: figs. 2 & 3) does suggest the presence of at least a few cut archaeological features in this area.

In Picnic Field, a thin ploughsoil (<20 cm; pasture since 1995) overlay the clean chalk substrate, dominated by numerous recent ploughmarks. The artefact assemblage is dominated by recent brick/tile, coal/cinder and glazed pottery. Another eight test pits (91–94 and 96–99) and one trial trench (95) were machine excavated (Fig. 4), but as only two features (a tree-throw hole in test pit 94 and a hollow way in trench 95, continuing on from Varley's Field) were observed, no further work was undertaken in this area.

Investigations in the interior of the ringwork

Artefact survey

In the southern interior paddock, there was a good variety of recent brick/tile, coal/cinder, iron nails and glazed pottery, but also animal bone, Iron Age pottery sherds and the occasional flint flake in the topsoil (Table 3). The animal bone was most commonly occurring with pottery to a lesser extent, and both were undoubtedly related to the density of Iron Age and Romano-British archaeological features within this area of the interior.

In the northern paddock and Orchard Field, the artefacts recovered from the topsoil were dominated by more recent artefacts such as glazed pottery, iron nails, clay pipe fragments and coal/cinder (Table 3: modern pottery & other categories).

Evaluation excavations

Most test pits and trenches within the interior paddocks revealed archaeological features (ie pits, postholes, gullies) (Figs. 13–20) surviving beneath variable depths of topsoil/former ploughsoil (*c.* 25–70 cm thick). There were also two narrow ditches which may represent part of a later field system superimposed on the Iron Age monument.

Essentially the major discoveries of this phase of interior assessment consisted of:

- a sector of the inner rampart and its associated postholes and the underlying old land surface surviving beneath the extant base of the chalk rubble rampart
- a probable original entrance way through both ramparts and ditches in the southeastern sector of the site
- a series of large and deep Iron Age pits on the interior side and line of this entrance way
- a dense area of Romano-British pottery and animal bone or 'midden' material within the entrance way area
- a series of roadways probably dating from the Roman period to the 19th century utilising this original entrance way.

As in Varley's Field, pits were the most common feature, but these tended to be small (<1m in diameter) and shallow (<0.5m deep) (Table 4), except in trial pits/trenches 42 and 59. Of the 21 pits occurring in the test pits and subsequently excavated (Figs. 13 & 14), a subset of three (12%) were subjected to further bioarchaeological analyses (see below). But there was no evidence of 'placed' or charred grain deposits as occurred in Varley's Field, nor evidence of partial human burials as Clark and Hartley (1957) observed. However, burials did occur: one undated cremation in a small pit in test pit 48, and one complete skeleton in the base of F229 (Fig. 24) (see Dodwell below). In addition, there does not appear to be the density of pits present that were observed in Varley's Field, except in trenches 42 and 59 which contained substantial pit complexes (Figs. 15, 19 & 20).

Despite many hints in the magnetometer survey plots (Figs. 6 & 7), good evidence of structures inside the ringwork was uncommon in the test pit excavations, as in Varley's Field. Of course, there are pairs and foursomes of posts that represent structural remains, but evidence of house enclosures, eaves-drip

Table 4. *The main features of selected pits excavated on the interior of the ringwork.*

Pit number	Diameter (m)	Depth (m)	Dominant artefacts	Primary function
115	1.65	0.3		on inner edge of inner rampart
117	1.0	0.35		on inner edge of inner rampart
177	1.02	0.56–0.62	conjoined sheep bone remains (same animal different layers); hare (intrusive)	unknown
182	0.8	0.75	chalk rubble	backfilled pit beneath eastern entrance
201/2	1.60–2.20	1.0	chalk rubble	backfilled pit beneath eastern entrance
213	0.82	0.40	1 sheep	unknown
220	1.40	0.80	human bone fragments; conjoined sheep bone remains (same animal from different layers)	rubbish pit
229	1.40–1.55	0.60	complete human skeleton; cow lower jaw and roe deer pelvis	rubbish pit

gullies or post-hole arrangements was rare. However, test pit 57 exposed a 1.2m length of shallow gully with a post-hole within its butt end (Fig. 13), which may be part of a contemporary structure within the ringwork.

The inner rampart

Given the large scale of 19th century landscaping of the interior of the ringwork, it was an unexpected find to discover that some of the inner rampart profile and the old land surface had survived. For example, in trench 40, the rampart exhibited the following sequence (Fig. 18):

- a core of chalk rubble, *c.* 2.4m in width and 30–35cm thick, placed directly on an *in situ* turf horizon of a buried soil
- a soil and chalk rubble dump, *c.* 3–3.5m wide; its original height is impossible to ascertain given the later truncation/destruction of the rampart by park landscaping
- more soil and chalk rubble material presumably slumping over the inner part of the rampart, giving a complete width of *c.* 6–8m for the rampart.

Defining the inner edge of the rampart was a continuous line of closely spaced, shallow post-holes. These were not observed by Hartley (1957: 8, fig. 2); rather they observed posts at regular, 14 feet (c.4.6m) intervals defining the outer edge of the inner rampart. Although the lateral extent of these post-holes is unknown, the construction of this part of the rampart may well have been less formalised than the vertical, timber fronted rampart that Hartley (1957: fig. 4c) had envisaged. Rather it appears to be of chalk rubble and soil dump construction, defined on its inner edge by an insubstantial fence line. Moreover, the more formal and better constructed parts of the rampart could conceivably have only been to either side of the entrance way, and less grandly built elsewhere around its circumference.

In addition, there were two deep (40 and 50cm) post-holes, set 2m apart, defining just within the interior edge of the inner rampart (Figs. 13 & 18). Incidentally, these post-holes exhibited vertical grooves or tooling marks in their chalk sides suggesting that they had been cut using some kind of metal or wooden driving tool. Although no dating material was found in these post-holes, they were only visible when the pre-rampart palaeosol was removed and therefore appear to be unrelated and probably predate the first rampart's construction itself.

The *in situ* old land surface and palaeosol (comprised of turf and rendzina soil) found beneath the core of the inner rampart was sampled for pollen, plant macro-fossils, molluscan and micromorphological analyses. Unfortunately the poor preservation of bioarchaeological remains in this context did not add much to the palaeoenvironmental knowledge for this site (see below). In addition, 1m^2 of the buried soil

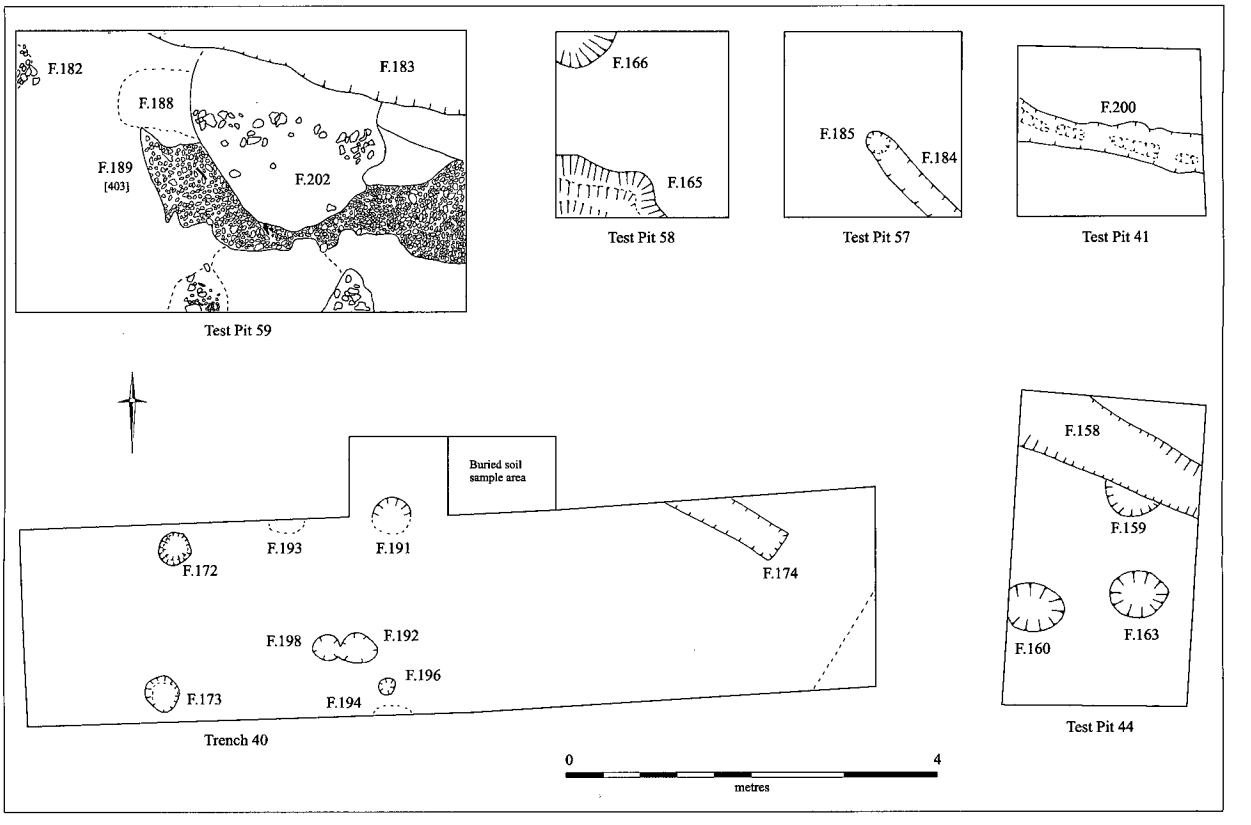

Figure 13. *Test pits 41, 44, 57, 58 and 59 and trench 40 on the interior (note that F172 and 173 are probably pre-inner rampart posts) (C French).*

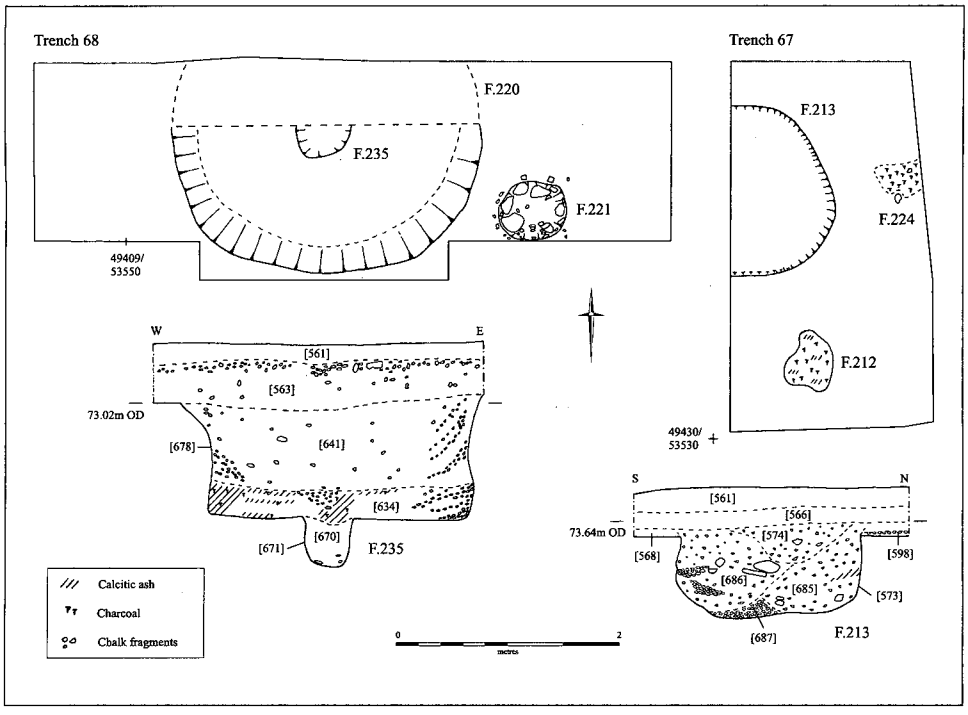

Figure 14. Trenches 67 and 68, and sections of F213 and 220/235 (C French).

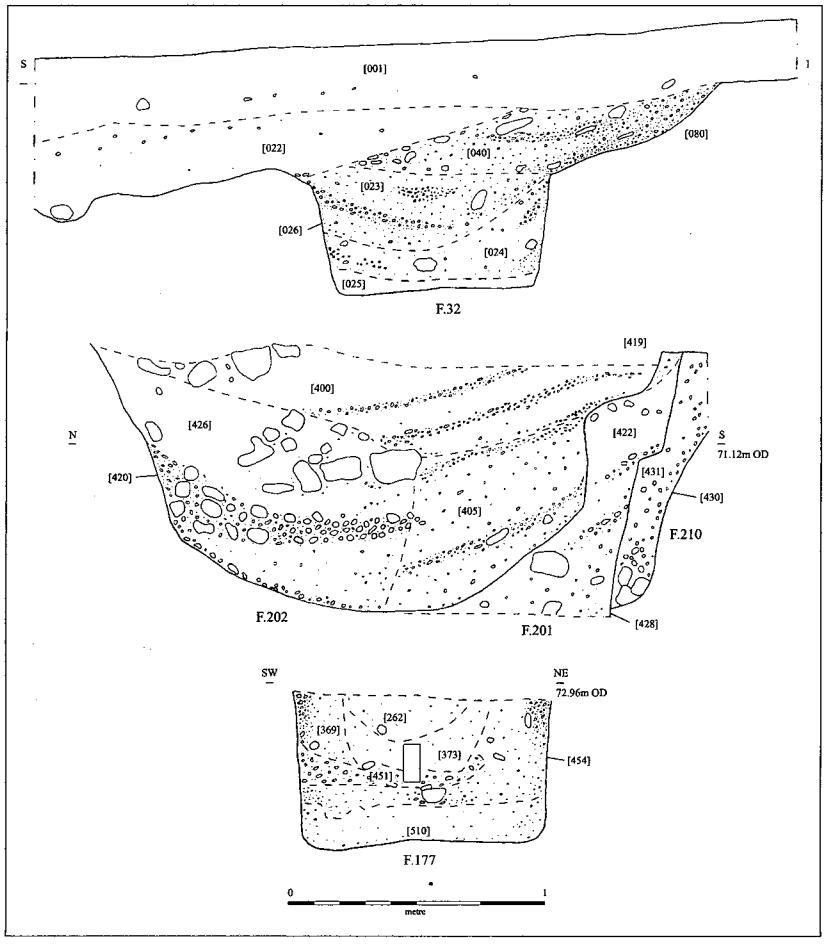

Figure 15. Sections of pits F32, 177 and 201/2 within the eastern entrance way (C French).

was dry sieved for artefact retrieval, with only one flint waste flake (of indeterminate Bronze Age date) being recovered.

Trenches 42 and 59

These two trenches were located and excavated on the basis of a large anomaly on the magnetometry plot (Figs. 6, 19 & 20). There appeared to be two large (*c.* 8 x 12m) rectilinear features on the southern side of a *c.* 4–5m wide, *c.* 20m long, linear zone devoid of archaeological features. This was immediately to the inside of where the RCHME's new survey of the ringwork had observed a distinct 'kink' in the line of the outer rampart, indicating a possible entrance way zone through the inner rampart and associated features (Pattison and Oswald 1996) (Fig. 3).

Trenches 42 (Figs. 19 & 20) and 59 revealed a series of roadways with large pit complexes sealed beneath them, as follows:

- a series of large (c.4 x 5m in diameter), deep (*c.*1.4 m), intercutting, earlier Iron Age pits; which contained large amounts of chalk rubble back-fill composing their upper secondary and tertiary fills
- a zone of large quantities of earlier Roman artefactual debris, mainly animal bone (see below) and Nene Valley Grey Ware and a few sherds of samian (Figs. 19 & 20), much of it exhibiting 'accordion-like' fracturing which is suggestive of being broken *in situ* by trampling, acting as the final tertiary infill of the pit F169 in trench 42
- medieval/post-medieval sunken way infilled with homogeneous brown silt loam material, on a similar alignment but situated slightly to the north
- 18th/19th century brick and chalk rubble roadway aligned east-northeast to east-southeast, with two wheel ruts evident.

This sequence of features strongly suggests that this was an entrance way into the ringwork from the east. As none of the entrances in use today are believed to be of any great antiquity (Pattison and Oswald 1996), this constitutes an important discovery. Indeed, an

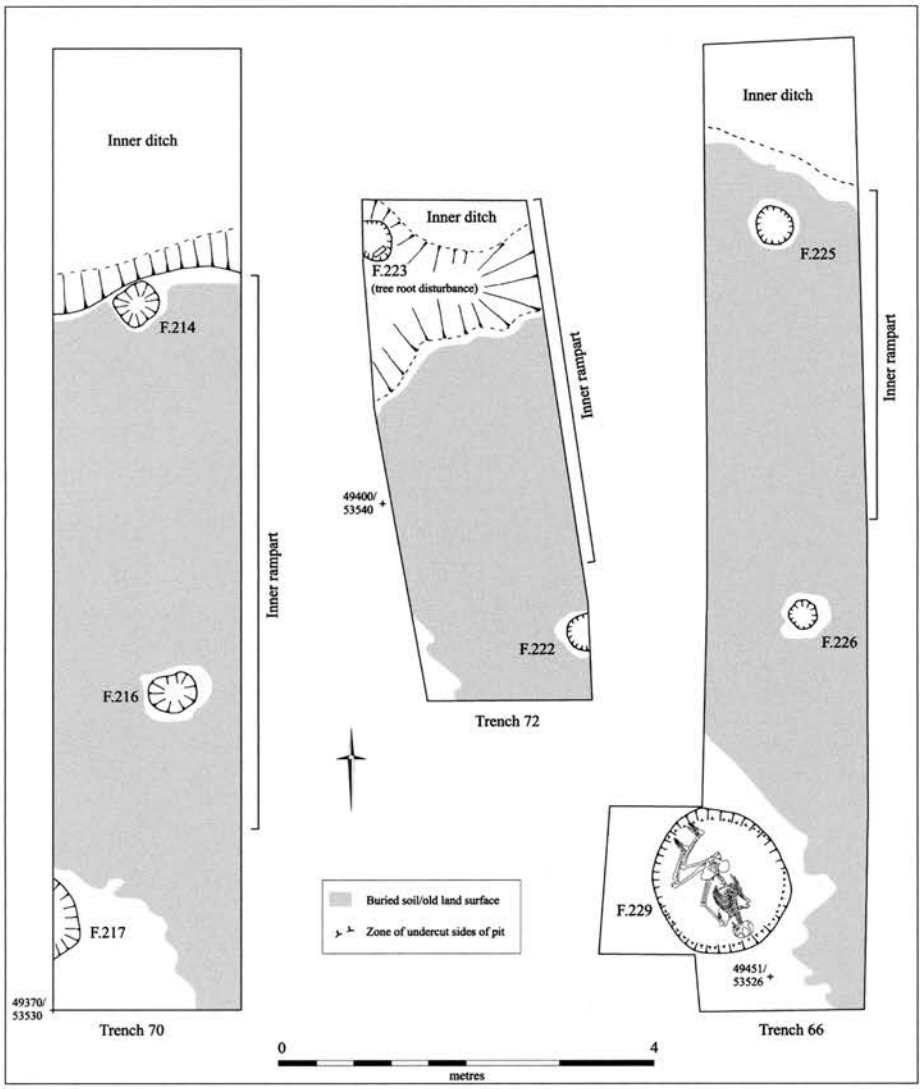

Figure 16. *Trenches 66 (right), 70 (left) and 72 (middle) through the inner rampart showing the position of post-holes beneath the inner rampart (left) and the buried soil area (hatched) on the interior (C French).*

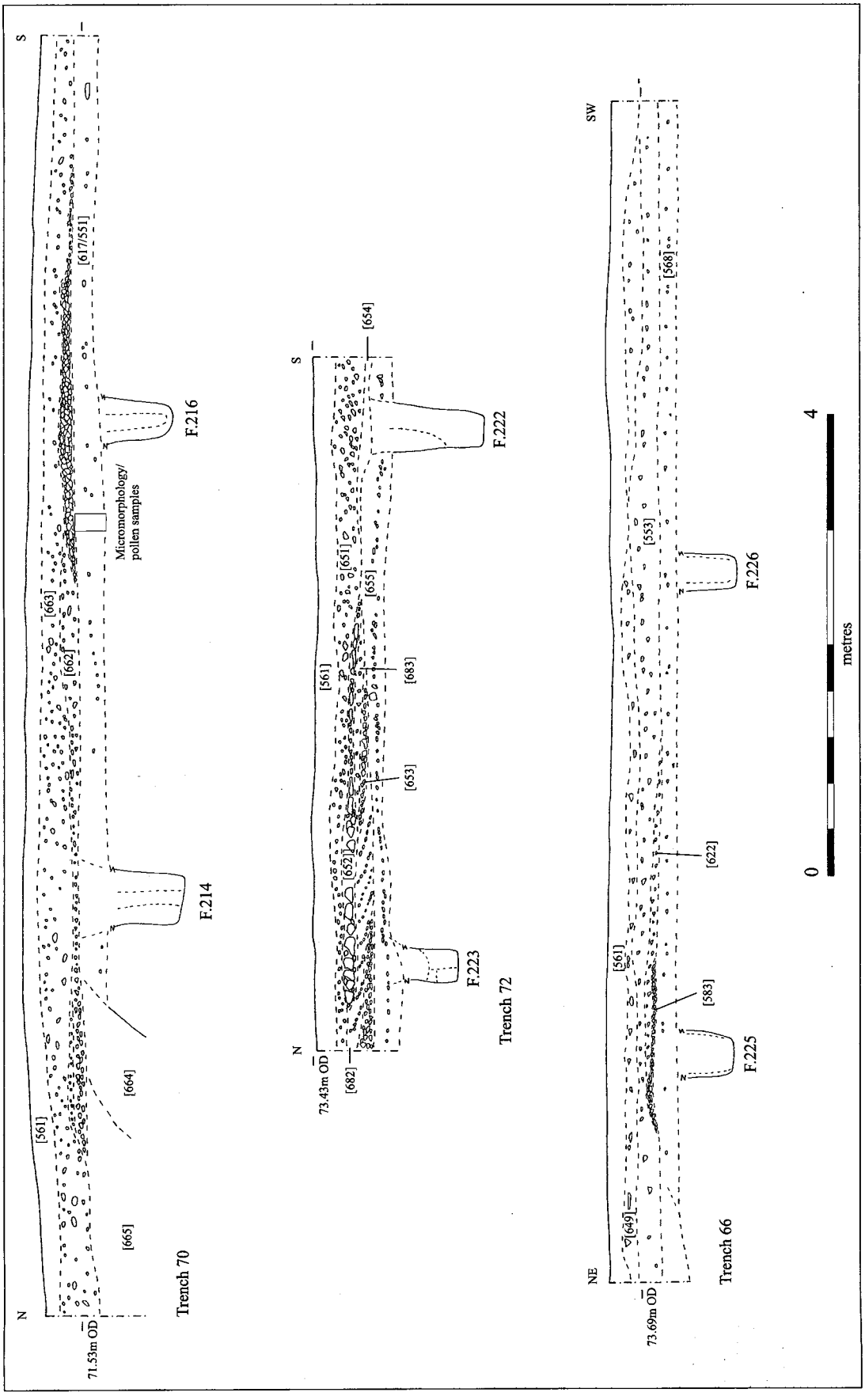

Figure 17. Section of trenches 66 (bottom), 70 (middle) and 72 (top) through the inner rampart showing the position of post-holes beneath the inner rampart (C French).

Figure 18. *The inner rampart in trench 40 with the surviving chalk rubble rampart sealing a buried turf and rendzina soil profile, the retaining post-hole on its inner edge, and the two post-holes of the possible precursor palisaded enclosure in the foreground (C French).*

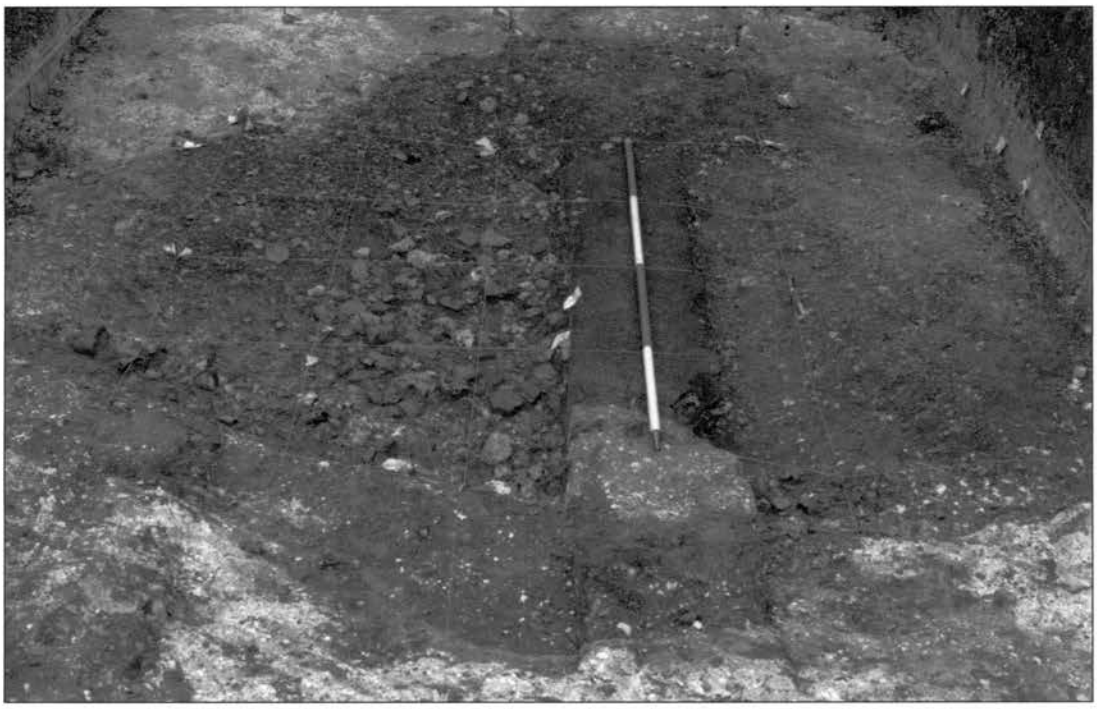

Figure 19. *The* in situ *animal bone and pottery of Romano-British date in trench 42 (C French).*

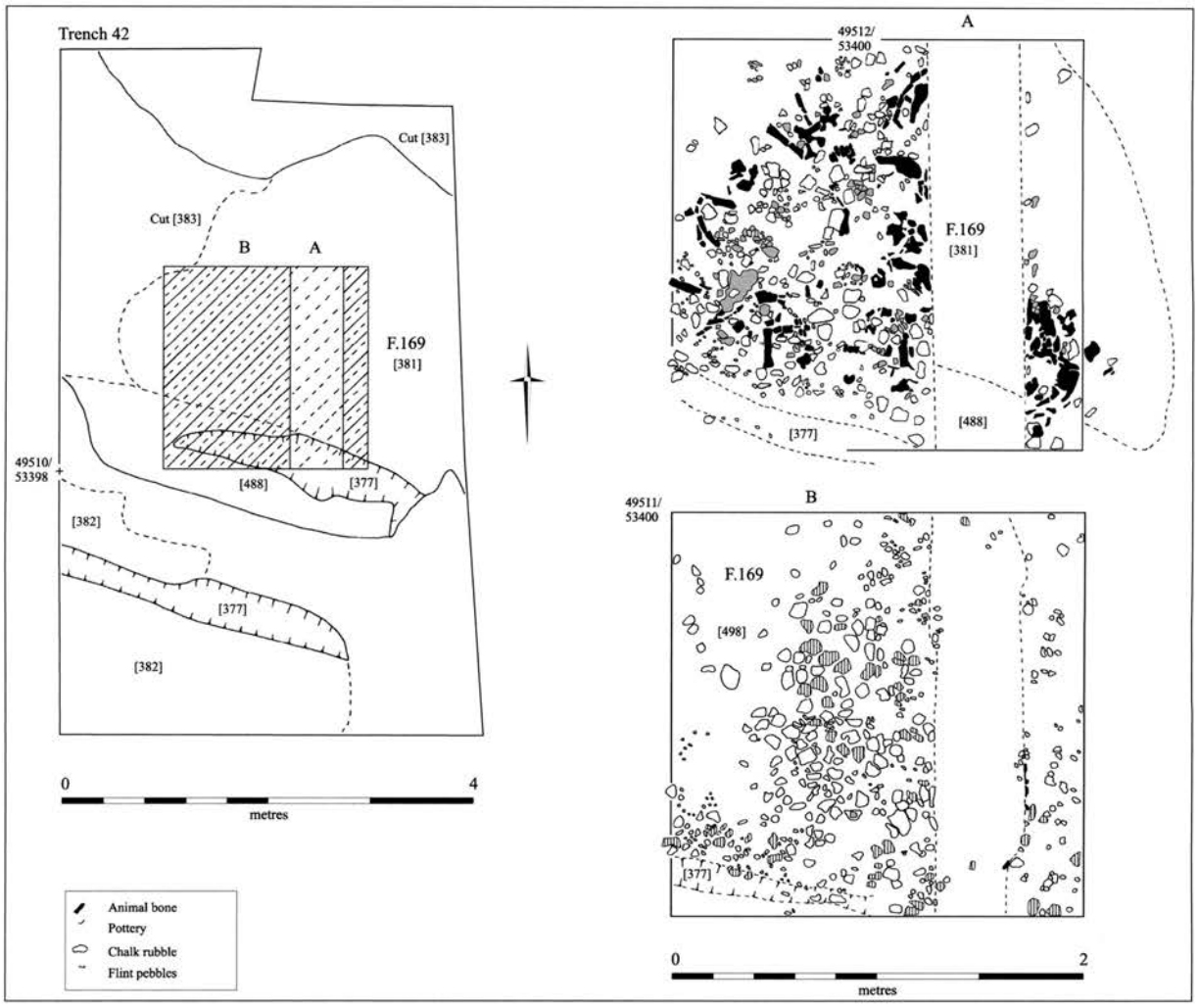

Figure 20. *Plan of trench 42 showing the metalled areas and the Romano-British material within the interior of the new eastern entrance way (C French).*

1811 drawing by Relhan of this eastern aspect of the site and Gog Magog House clearly shows a distinct step, cutting and infilling of a section of the outer rampart (Clark 1985: 47). In addition, the slight staggering of the position of the gap in the inner rampart to the south at this point (Fig. 3) may suggest that this entrance is in fact associated with the earlier, outer circuit of the ringwork. Moreover, the presence of apparent rampart in trench 40, slightly inset from the surviving line of the inner rampart (Fig. 3), may suggest that the earthworks were much more complex around this entrance than is evident from the present state of the monument. This may perhaps have involved short, blocking lengths of rampart set back from the line of the inner rampart, and/or some form of staggered entrance created at the time of the construction of the inner rampart and ditch.

The northern paddock and Orchard Field

In the interior of the monument in the northern paddock, magnetometer survey (Fig. 7) was followed by the machine excavation of a series of 13 2m^2 test pits (61 to 73) (Fig. 4), sited on a staggered 20m grid, situated on the Ordnance Survey grid. First, the topsoil from 1m^2 of each test pit was kept separately and dry sieved for artefact recovery and analysis (see above). Then the remainder of the topsoil was mechanically excavated, and test pits 68 and 72 were extended to 5m long trenches, and test pits 66 and 70 were extended to 10m in length (Fig. 4).

In the Orchard Field further to the northwest, despite the presence of many old and young trees as well as many stumps and root systems making any geophysical survey work unfeasible, it was possible to cut seven *c.* 2 x 3m test pits (74 to 80) at *c.* 20m intervals (Fig. 4). Again, the topsoil from 1m^2 was dry sieved for artefact recovery (see above). Test pit 76 was enlarged to a 5m trench to test for the presence or absence of a possible entrance way.

There were four main discoveries within the northern part of the interior of the ringwork. First, there was a well-preserved buried soil extant beneath the line of the inner rampart and between the inner edge of this rampart and the outer side of the estate wall.

Second, substantial, chalk-rubble packed post-holes were found consistently beneath the leading edge of the inner rampart at approximately 1.6m intervals (Figs. 16 & 17: trenches 66, 70 & 72, and test pits 71 & 73). Post-holes in a similar consistent position were observed in Clark and Hartley's excavations (Hartley 1957: fig. 2). As previously suggested, these posts would appear to have been part of a substantial wooden retaining structure to the outer face of the inner rampart.

Third, a consistent series of pre-rampart post-holes defined at the base of the buried soil in the upper surface of the chalk subsoil on the interior edge of the inner rampart, with an interval of about 1.5–2m between the posts (eg in trenches 66 and 70). Substantial post-holes in a similar position were also observed in trench 40 (Fig. 13). These post-holes may represent a pre-ringwork, circular, wooden enclosure. At present, there is no absolute dating for these post-holes and their lateral extent and arrangement would need to be proven by further large scale excavation and/or targeted geophysical survey.

Fourth, there continued to be pits and post-holes containing earlier and later Iron Age material present within the interior of the ringwork, although they had rapidly diminished in density northwards. One unexpected find in the north paddock was a complete skeleton of an adult male in the base of a later Iron Age pit (F229) in trench 66 (Figs. 16 & 24). The body was partially lying on its side in a semi-flexed position with the head face down. Beneath the face was the lower jaw of a cow. Analysis suggested that this adult male suffered from severe osteoporosis and *spina bifida* (Dodwell 2003 & below).

Specialist Studies

Although by no means exhaustive, several categories of evidence retrieved from the evaluation and previous excavations provided new data on the use in life of the ringwork, namely pottery (Hill 2003), soil micromorpology (French and Lewis 2003), plant macro-fossils (Ballantyne 2003; Cyganowski 2003) and faunal remains (Miracle *et al* 2003). These reports are presented here in summary form.

Pottery

JD Hill

Introduction

Hartley and Clark's excavations in 1955 and 1956 made Wandlebury a type site for the Early Iron Age in the region (Hartley 1957). The large pottery assemblage was later used by Cunliffe (1974) to define one of the key Early Iron Age type groups for the region: the 'Chinnor-Wandlebury' style. It can be argued that understanding of the chronology and affinities of Late Bronze Age and Early Iron Age pottery in the Cambridge region has advanced little since Cunliffe's (1968 & 1974) and Saunders' (1972) studies of the late 1960s and early 1970s. Until recently, this has largely been due to the lack of excavation and publication of Early Iron Age sites in Cambridgeshire and neighbouring areas (such as south Essex and the Nene Valley), but likely regional variations and a lack of a secure absolute chronology pose problems in extending these local chronologies to southern Cambridgeshire. The recent work at Wandlebury can begin to address these issues afresh.

Pottery from the 1955–56 excavations: a reassessment

The pottery assemblage from Hartley and Clark's excavations at Wandlebury survives in the Museum of Archaeology and Anthropology, University of Cambridge. It consists of a sample of 525 sherds weighing 13,018g and three reconstructed vessels, with virtually no non-diagnostic body sherds surviving. Despite this bias, it can be assumed that the large majority of the rim and base sherds recovered during the excavations have been kept. This allows a fairly accurate guide to the shapes, rim forms and rim or base diameters recovered in the original excavations. There are almost no surviving archives from the 1955–56 excavations, just one long section drawing across the outer bank and ditch. Because of these problems, this re-evaluation of the older material has concentrated on recording pot form, decoration and dimensions to provide a basis from which to compare the pottery from the recent excavations.

All the surviving material has been re-examined and recorded using the approach recommended by the *Prehistoric Ceramics Research Group*. Each diagnostic sherd was examined, weighed, measured and assigned a form type as appropriate, with further detailed variables recorded as detailed in *The Study of Later Prehistoric Pottery: Guidelines for analysis and publication of later prehistoric pottery* (PCRG 1992). Particular attention has been paid to recording and analysing vessel rim diameters. In addition the older material has been used, as far as it has been possible, to reconstruct the nature of the deposits originally excavated.

Vessel forms and types

Despite the limitations of the surviving material, it allows a study of vessel forms and sizes. In general the pottery from the 1955–56 excavations represents a typical variety of Earlier Pre-Roman Iron Age open bowls and jar forms with rounded bipartite, tripartite and stack shouldered forms. The jars, defined here by rim diameter smaller than the vessel height (L Brown 1984: 232), have open or little restricted mouths. Profiles are rounded, even although vessels may have marked shoulders. The exceptions are a few angular profiled bipartite vessels which may be earlier than the bulk of the material (see below). The majority of the assemblage appears to be contemporary although there is some stratigraphic evidence for earlier material in the excavated area (see below).

Where it is possible to assign a sherd to a particular form of vessel, nine categories of vessel shape have been defined (Fig. 21; Table 5). Two categories include a variety of shapes; cups and shallow bowls. There are

Table 5. Wandlebury 1955-6: The basic body forms discernible in the collection.

Jars	8	Tripartite jars with distinct rounded shoulder	Unburnished & rarely burnished	Medium sized rims
	3	Bipartite jars with distinct rounded or sharp shoulders	Unburnished	Medium sized rims
	2 & 4	Straight or slightly 'S' shaped tall flared 'flower pot' shaped jars	Unburnished	Medium sized rims
	7	High shouldered jar	Unburnished	Large sized rim
	5	Barrel shaped jar with flared lower wall and small base	Unburnished	Medium & Large sized rims
	6	Slightly 'S' shaped walled jar with flared lower wall and small base	Unburnished	Large sized rim
Open Bowls	Variety of forms		Burnished	Medium sized rims
Cups		Variety of forms	Unburnished	Small sized rims

only three vessels for which complete profiles can be reconstructed (a burnished bowl, a burnished jar and a cup) (Hartley 1957: fig. 7, nos. 16, 24 & 34). Because of this low number of reconstructable profiles, the calculation of the probable volumes of different vessel types is difficult to establish. However rim diameter data is available for a minimum of 99 different vessels, and as Woodward (1997; Woodward and Blinkhorn 1997) has shown, the volume of a vessel is usually directly related to diameter of its rim for most British prehistoric pottery. Because of this large sample of measurable rims, and Woodward's (*ibid*) recent studies, attention has been paid to using rim diameters in this collection to examine questions of vessel sizes, classification and possible use.

It is possible to discern four groups of different sized vessels in the Wandlebury assemblage Fig. 36):

1) a small number of cups/small vessels with rim diameters between 4 and 10cm
2) the majority are jars with diameters of 8–20cm, with an apparent bi-modal distribution with vessels peaking at 8–10 cm and again between 18 and 20cm, especially for the unburnished rims in the collection
3) burnished vessels with rim diameters of between 12 and 22 cm, with a small peak of 14–18cm
4) a number of much larger vessels with rims up to 32 cm in diameter, which are also distinguished by their body shape, rim form and decoration.

The pottery broadly fits into the long lasting ceramic traditions of the Late Bronze Age/Early Iron Age (*c.* 1000BC to 400/300 BC) in southern Britain (Barrett 1980; Elsdon 1989; Cunliffe 1991). Although probably late in the history of these ceramic traditions, the assemblage can broadly be analysed in the terms Barrett (1980) outlined for later Bronze Age pottery.

There are two main types of vessel represented in the collection (Table 6):

I. *Burnished* (132 sherds; 12.47% by weight or 12.3g): fine tempered bowls and some jars with tapered or rounded undecorated rims and occasional body decoration of incised lines or rows of fine dots.

II. *Unburnished* (343 sherds; 87.53% by weight or 28.9g): more coarsely tempered, jars of different sizes often with flat or rounded rims which may be decorated, as may the body, with finger nail, finger tip or large dot impressions.

The distinction between surface treatment and type of decoration was long lasting in southern English pottery traditions, beginning in the Late Bronze Age and not finally disappearing until the emergence of Middle/Later Iron Age pottery traditions in *c.* 400–300 BC.

Burnished pottery

All the burnished pottery appears to have been made from fine burnt flint or chalk tempered fabrics with very small visible inclusions. The sherds are often very thin (less than 4–6 mm) and of a small size, with very little decorated.

Due to the fragmentary nature of the burnished pottery, it is only possible to measure the rim diameter of 22 vessels and establish the body shape of 14 with any certainty (Hartley 1957, fig. 7, nos 8, 16 & 73). Rim diameters range between 12 and 24cm. There are only four vessels with complete, or substantially complete, vessel profiles. One of these vessels is a rounded, tripartite jar (*ibid* fig. 7, no 8). The other three are all open bowls. The pedestalled very open bowl (*ibid* fig. 7, no 16) was used by Cunliffe (1968, 1974 & 1991) to define his Chinnor-Wandlebury style of elaborate vessels usually with a large flared rim, but it may not be typical of the collection. Rather, it is possible that a major component of the burnished vessels were either small 'S' shaped tripartite jars, or larger deep tripartite bowls with pronounced rounded shoulders. The closest regional parallels to such possible vessels come from Stansted, Essex (N Brown, pers comm), but the form has parallels in Kent and East Sussex (Elsdon 1989; Macpherson-Grant 1991). However, an alternative reconstruction of these fragments of sharp shoulders and short rims is that they came from shallow open bowls similar to that from Long Wittenham, Oxfordshire (Elsdon 1989).

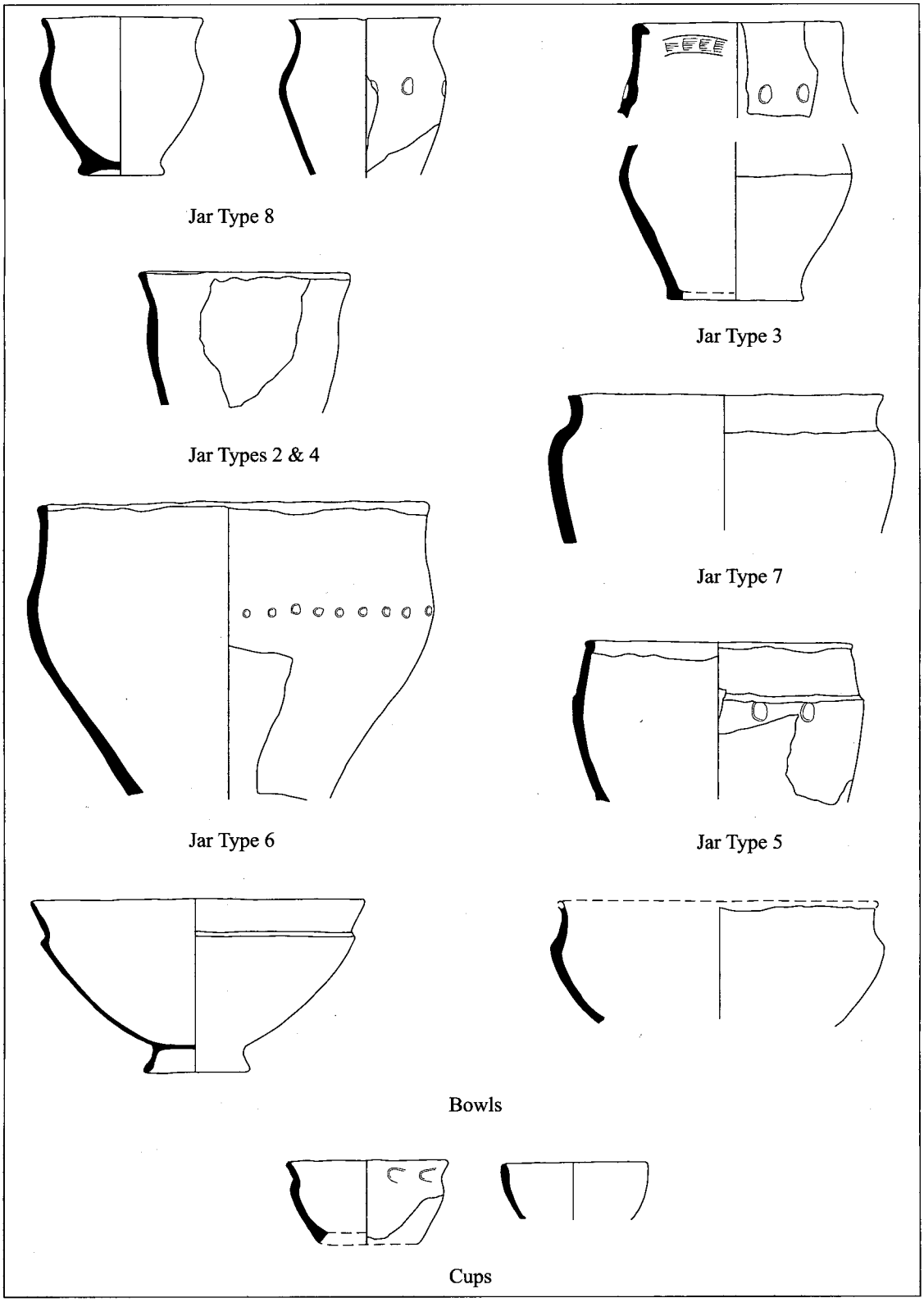

Figure 21. Different body forms used in the re-analysis of the Wandlebury 1955-6 pottery assemblage (JD Hill).

Unburnished pottery

The unburnished pottery represent a wide range of shaped and sized vessels ranging from a group of very small jars/cups to very large open jars, with rim diameters ranging from 4 to 32mm. They were made in burnt flint, chalk or occasionally fossil shell tempered fabrics which often contain significant proportions of larger sized inclusions than the burnished fabrics. Some of the pottery appears to contain unburnt flint inclusions, small fragments of rounded gravel which visually seem to have only been slightly transformed by heat, possibly during the firing of the vessel. There are a variety of unburnished, coarse ware rim forms (Hartley 1957: figs. 7 & 8). As well as tapered and rounded rims, mainly on the smaller vessels with diameters generally falling between 10 and 24cm, many are simple flat, flat and thicken, 'T' shaped, or flat topped and square lipped/hooked forms, with hooked and 'T' shaped rims mostly associated with the largest vessels with rim diameters between 16 and 32cm.

Unburnished vessels came in three different shapes of bases, although most had simple flat bases with the wall of the vessel raising directly up from the base which occurs on all types and sizes of vessel (Table 6). The two other forms are associated with medium to small sized bases: stepped and pinched down bases, neither stepped or pinched down base forms occur in burnished fabrics.

The unburnished pottery is more frequently decorated than the burnished pottery and decorated in a different manner. Decoration most commonly consists of impressed dots and is largely restricted to the rim. Other rim decoration consisted of small dots just below the rim (one example inside, one example outside), overlapping rough finger impressions around the outside of the rim, or short vertical scores, possible finger nail marks, around the inside of upright or inward leaning tapered rims (six examples). The latter might possibly be a late trait in the assemblage.

Deposition and distribution

Given the problems with the partial nature of the pottery assemblage and lack of any detailed site archive, what can be said about the deposition of the pottery, and how it related to the possible ritual activities that took place on the site is limited. There would appear to be a distinction between (Table 7) those pits with large quantities of surviving pottery and those with little or no surviving pottery. For example, the two largest pits, 3 and 12, contained the largest quantities of surviving pottery, but the next largest pit, 23, contained very little. The large pit assemblages also have high mean sherd weights, which suggests that much of the pottery deposited in these features was either freshly broken or carefully curated. As on other Iron Age sites, it seems likely that few complete pots, broken or whole, were deposited.

Also, there is no clear relationship between the quantity of pottery in a feature and the presence of other finds, such as deposits of articulated human bone or metal and worked bone/antler objects (Table 7). In a number of pits, sherds from the same vessel were found in different layers (Hartley 1957), thus suggesting a rapid backfilling with deliberate dumps of material. It is also clear that three pits (27–9) were probably backfilled simultaneously as all contained sherds of the same vessel, the shallow 'Chinnor-Wandlebury' burnished bowl.

Pottery from the section across the ringwork's banks and ditches

The section across the 'defences' of the ringwork excavated in 1955 (Hartley 1957: fig. 4) yielded a small quantity of pottery.

There are 43 sherds of pottery (278g) from the inner ditch (Table 8). It contained Roman period pottery in its lower fills, with the upper half of the fills consisting of the remains of the original inner bank which was levelled into the ditch in the 18th century. The majority of the pottery is in a dense sandy fabric that is typical of the Later Iron Age (*c.* 300 BC–AD 40/60) pottery in the region (Table 8). The absence of abraded Earlier Iron Age flint tempered pottery is noticeable. Given the abraded nature of the assemblage and the naturally derived deposits in the lower ditch from

Table 6. *Wandlebury 1955-6: sizes and types of burnished and unburnished bases.*

Base diameter (cm)	Flat/Simple	Stepped	Pinched down	Footring	Pedestal	Burnished	Unburnished
2							
4		1					1
6	2	2	4				8
8	8	4	1	2		2	13
10	5	2	2		1	3	7
12	3	1				2	2
14	3	1					4
16	2		1				3
18	1						1
20	1						1
?	3	1	1				5
Total	**28**	**12**	**9**	**2**	**1**	**7**	**45**

Table 7. Wandlebury 1955-6: the pottery and associated finds recovered from the pits.

Pit	Feature descriptions	Human remains	Small finds	Pottery (g)
1				543
2		partial corpse	bronze needle	
3	very large pit			1452
4				
5			iron knife	934
6				
7	very shallow pit			
8				637
9				72
10	very shallow pit			199
11	very shallow pit			162
12	very large pit	human corpse	2 iron penannular brooches, bone comb, worked antler	1612
13			bone needle	357
14				
15	very shallow pit			105
16	very shallow pit			
17	very shallow pit			
18	very shallow pit			
19	very shallow pit	partial corpse		
20			decorated bone comb	2119
21	very shallow pit			6
22	very shallow pit			
23	unusual hole in base of pit		iron object	80
24	unusual hole in base of pit			96
25				73
26				47
27				1293
28			bronze penannular brooch, iron 'hook'	211
29				513
30				
31				183
32				299
33				

Table 8. Wandlebury 1955-6: pottery recovered from the excavation of the inner ditch (note: datum is 15.3ft above the base of main ditch).

Depth below datum	Number of sherds	Pottery weight (g)	Mean sherd weight	Context/period
1 to 2 ft				Bank Material
2 to 3 ft				Bank Material
3 to 4 ft				Bank Material
4 to 5 ft				Bank Material
5 to 6 ft				Bank Material
6 to 7 ft				
7 to 8 ft	4	22	5.5	RB pottery
8 to 9 ft	4	43	10.8	RB pottery
9 to 10 ft	1	6	6.0	
10 to 11 ft				
11 to 12 ft	11	50	4.5	RB pottery
12 to 13 ft	8	39	4.9	RB pottery
13 to 14 ft	12	101	8.4	LIA pottery
14 to 15.3 ft	3	17	5.7	MLIA pottery

Table 9. Wandlebury 1955-6: pottery recovered from excavation across the outer earthworks.

Site zone	Number of sherds	Weight of pottery (g)	Mean sherd weight (g)
Rampart	1	8	8
Buried Soil	16	48	3
Main Ditch	6	81	13.5
Ditch Re-cut	1	5.5	5.5

Table 10. Wandlebury 1955-6: pottery recovered from excavation of the main outer ditch (note: datum approximately 8ft above base of main ditch).

Depth below datum	Number of sherds	Pottery weight (g)	Mean sherd weight	Other artefacts
1 to 2 ft				
2 to 3 ft				
3 to 4 ft	1	22	22	Modern Glass
4 to 5 ft	4	50	12.5	
5 to 6 ft				
6 to 7 ft	1	9	9	
7 to 8 ft				

which they come, the pottery cannot give a close date for the construction of this ditch. However, the pottery probably points to a Late Iron Age/Early Roman period date for the accumulations of these fills – and by implication the construction of the inner earthwork.

There are 24 sherds of pottery (112.5g) from the outer earthworks (Table 9). Most sherds are very small and moderately to severely abraded. The pottery also differs from that in the inner ditch as there are no clearly Roman or Late Iron Age sherds. The outer earthwork produced a higher proportion of flint/chalk tempered sherds (Earlier Iron Age) compared to sandy fabric (Later Iron Age) pottery.

A small quantity of moderately to considerably abraded pottery was recovered from the buried soil horizon under the outer bank/rampart and the counterscarp bank beyond the ditch. This material is almost exclusively either burnt flint or chalk and sand tempered, and is probably residue material from the Earlier Iron Age. The small sherd size would suggest that either there was little settlement activity in the immediate area before the outer bank/rampart was constructed, or that a considerable time had passed since the activities which originally deposited the pottery in the buried soil.

The material from the outer ditch is equally imprecise as that from the inner ditch for closely establishing a date for the construction of this bank and ditch. The outer ditch contained both medium sized sherds of Earlier Iron Age shouldered pottery and probably later sandy tempered pottery. All came from deposits relatively high up in the sequence of ditch fills. The re-cutting of the outer ditch produced only a single small sherd of pottery.

Discussion and conclusions

Pottery from the 1955–6 excavations represents a typical variety of earlier pre-Roman Iron Age open bowls and jar forms with rounded bipartite, tripartite and slack shouldered forms, either in burnished or unburnished finish. Cunliffe (1974) used this assemblage to define a key Early Iron Age type group for the region called the 'Chinnor-Wandlebury' style. The majority of the assemblage appears to be contemporary, and broadly fits into the long-standing ceramic traditions of the Late Bronze Age/Early Iron Age (*c.* 1000 BC to 400/300 BC). Close parallels are hard to find for the assemblage, but the majority probably dates to *c.* 500–300 BC, with some stratigraphically earlier material. Unfortunately, only a sample of the original assemblage survives in the Museum of Archaeology and Anthropology in Cambridge, the bulk of the body sherds having been discarded.

The surviving pottery from the banks and ditches does not provide any firm evidence for the date of either the inner or outer earthworks' construction and their relationship to the Early Iron Age settlement. The assemblage represents redeposited medium to very small sized sherds which may have entered the buried soil or ditch fills some time after they were originally broken and discarded. However, the pottery suggests that the outer bank and counterscarp bank were not constructed over a soil containing some large quantities of large well preserved pottery. The outer bank/rampart seals a buried soil containing small sherds of probably Earlier Iron Age pottery. The absence of Roman pottery from the outer ditches fills might be significant given the occurrence of 11 sherds (65g) of Roman and probable Roman period pottery and an oyster shell in the inner ditch, only 20m away, and Roman pottery in field ditches outside the earthworks (in the 1995 excavations). If this absence is not fortuitous, it supports the original interpretation of the ringwork sequence of the outer bank and ditch preceding the inner bank and ditch (Hartley 1957). The presence of Roman and Late Iron Age sherds in the middle and lower fills of the inner ditch probably

suggests a Late(r) Iron Age date for the construction of the inner ringwork. However, well preserved and stratified artefacts and/or radiocarbon dates are needed to securely date the earthworks and establish their relationship with the Earlier Iron Age activities excavated both inside and outside the ringwork.

The recently excavated material supports suggestions made on the basis of the re-examination of the old collection for a long span of activity on the hilltop. It ranges from small quantities of Late Bronze Age (900–700 BC) pottery from test pits north of the excavated area in Varley's Field to a substantial assemblage of earlier Iron Age pottery (*c.* 500–300BC) (Webley, in press) and lesser quantities of Middle/Later Iron Age pottery (300–1BC), from one pit in particular. The majority of the pottery from Varley's Field is broadly contemporary with that excavated by Clark and Hartley (1955–6) in the interior, but there are important differences. Most notable is the relative paucity of finds from the pits excavated outside the earthworks. A number of pits in the interior contained large quantities of quite large sherds of pottery unlike any deposit so far excavated in Varley's Field. It is also probable that the range of fine ware burnished vessels differs from those found in the interior. Although requiring further attention, the lack of large assemblages from Varley's Field might suggest that this area is peripheral to the main concentration of settlement, or lay outside an existing enclosure.

The faunal remains

Preston Miracle, Andre Corrado and Bryan Hanks

Introduction

The Wandlebury assemblage contains 3591 mammal remains (Table 11). Of these remains, 664 (18.5%) were identifiable to genus, 610 (17.0%) identifiable to element and body-size category (eg small animal, small ungulate, medium ungulate, large ungulate), and the remaining 2317 (64.5%) were non-identifiable or unidentifiable (Table 11). A total of nine taxa were identified, including the major domestic animals (sheep, goat, cattle, pig, horse, dog), a few wild animals (badger, hare, both potentially intrusive) and human (Fig. 22). This summary is based on studies of the Iron Age contexts by Meece (1997) and Corrado (1999) and the Romano-British contexts by Hanks (2001).

Methodology

The Wandlebury assemblage was described using a system developed from 'bonecode' (Meadow 1978) and quantified using the number of identified specimens (NISP) and the minimum number of individuals (MNI). The minimum number of elements (MNE) has not been used owing to inter-observer differences. The MNI has been calculated separately for each pit; by summing MNIs from these different contexts it is assumed that pits are independent of one another, ie a single animal was not divided among different pits.

Assemblage composition and taxonomic description

Cattle were predominant in terms of meat weight in the Iron Age at Wandlebury with 230 remains from a

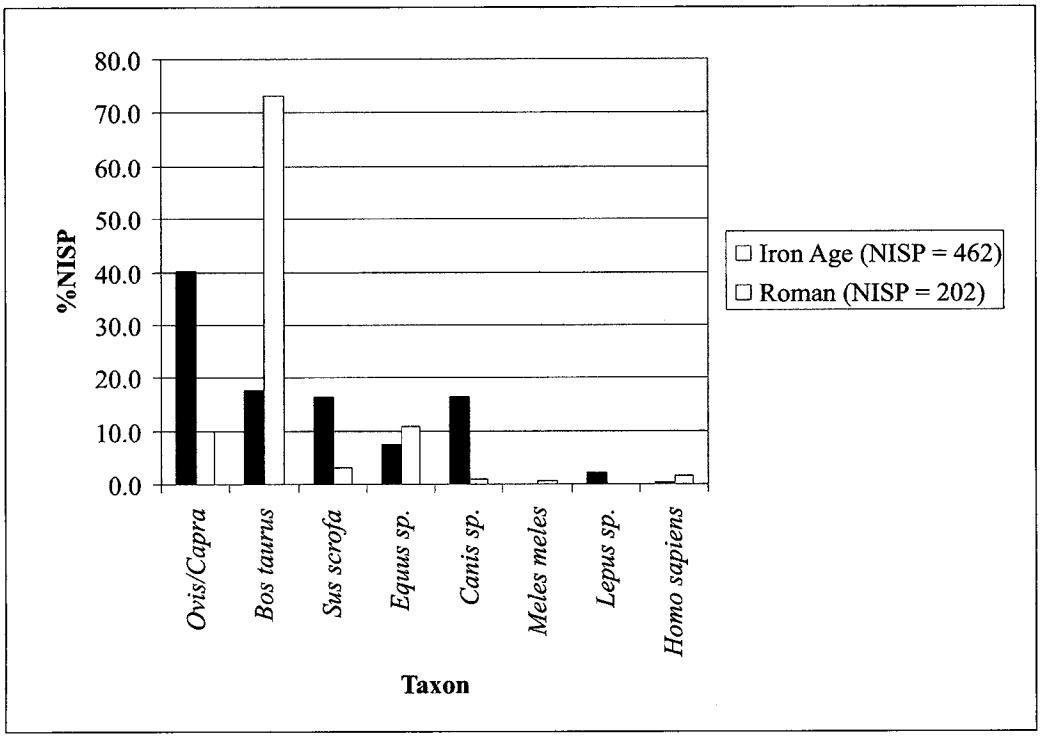

Figure 22. The faunal remains species representation at Wandlebury (P Miracle).

Species	Iron Age																Roman		Total Wandlebury			
	Outside ditches/ramparts										Inside ditches/ramparts											
	Pit 50		Pit 58		Pit 59		Pit 77		Pit 126		Pit 177		Pit 213		Pit 220							
	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI	NISP	%NISP	MNI	%MNI
Ovis/Capra sheep/goat	11	2	1	1	26	2	32	3	28	2	31	2	1	1	55	5	20	2	205	30.9	20	31.3
Bos taurus cow	5	2			7	2	12	1	39	5	6	1			13	4	148	3	230	34.6	18	28.1
Sus scrofa pig	1	1			1	1	8	1	58	2	2	1			5	1	6	2	81	12.2	9	14.1
Equus species horse	0				11	1	1	1	1	1	19	1			2	1	22	2	56	8.4	7	10.9
Canis species dog	71	1			1	1	3	2									2	1	77	11.6	5	7.8
Meles meles badger																	1	1	1	0.2	1	1.6
Lepus species hare											9	1	1	1					10	1.5	2	3.1
Homo sapiens human															1	1	3	1	4	0.6	2	3.1
Total ID Species	88	6	1	1	46	7	56	8	126	10	67	6	2	2	76	12	202	12	664	100	64	100
Small animal	1								1		1				1				4		0	
Small ungulate	4				16		106		161		36				36		18		377		0	
Medium ungulate	0								1		1						27		29		0	
Large ungulate	1				15		13		59		35				12		65		200		0	
Non-identifiable																	23		23		0	
Unidentified fragments	33		3		67		117		438		116		8		66		1446		2294		0	
Totals	127	6	4	1	144	7	292	8	786	10	256	6	10	2	191	12	1781	12	3591		64	

Table 11. *Faunal composition at Wandlebury.*

Species	Iron Age																Roman		Total Wandlebury			
	Outside ditches/ramparts										Inside ditches/ramparts											
	Pit 50		Pit 58		Pit 59		Pit 77		Pit 126		Pit 177		Pit 213		Pit 220				Cut Marks		Burned	
	CM	Burn	CM	Burn	CM	Burn	CM	Burn	CM	Burn	CM	Burn	CM	Burn	CM	Burn	CM	Burn	NISP	%NISP	NISP	%NISP
Ovis/Capra sheep/goat	1				1	1	2	1	1		4	1			3	1			12	5.9	4	2.0
Bos taurus cow							1		1	3	2				4				8	3.5	3	1.3
Sus scrofa pig							2		1	3									3	3.7	3	3.7
Equus species horse											2								2	3.6	0	0.0
Small ungulate							1	2	7	11	2	1			3				13	3.4	14	3.7
Medium ungulate																	1	1	0	0.0	0	0.0
Large ungulate							1	1	8	9	4	2			4				17	8.5	12	6.0
Unidentified fragments		1					1	4	6	76		9			1	1		2	8	0.3	93	4.1
Total Modified	1	1			1	1	6	8	24	102	14	13	0	0	15	2	0	2	63		129	
% Modified	0.79	0.79	0	0	0.69	0.69	2.74	2.74	3.05	13	5.47	5.08	0	0	7.85	1.05	0	0.11	1.75		3.59	

Table 12. *Number of remains with cut marks and burning at Wandlebury.*

minimum of 18 individuals (%NISP = 34.6). The cattle remains appear to be smaller and more gracile than bones of modern cattle (Corrado 1999), confirming a general pattern noted by Maltby (1996). It is not known if this pattern holds into the Roman period.

Sheep and goat is the second most common taxon with 205 remains (%NISP = 30.9), although it is numerically dominant at Wandlebury when quantified by MNI (20 individuals). Although a few horn core fragments of sheep and goat demonstrate the presence of both species, it is suggested that sheep were more common that goats during the Iron Age at Wandlebury (Corrado 1999). The bones appear to fit Maltby's (1996) description of Iron Age sheep, and are more gracile than those of modern animals. Two fragments of sheep horn core compare favourably to a Soay skull in the Grahame Clark Laboratory collections (Corrado 1999).

Suid or pig remains came in a distant third (NISP + 81; %NISP = 12.2; MNI = 9). These remains are mostly from domestic pig, although the presence of wild boar in the assemblage cannot be ruled out. Most of the Iron Age pig remains were concentrated in a single context, pit F126 (NISP = 58; MNI = 2).

Dog is represented by 77 remains (11.6% of NISP). Most of these remains (NISP = 71) comes from a partial skeleton placed on the very base of pit F50 lying on its right hand side. This skeleton was missing the skull and all of the main limb bones except for a left femur and right tibia. This dog skeleton does not show any signs of butchery or gnawing. The treatment of this dog clearly differed from the remains of other animals deposited in the pits. The significance of this 'placed' deposit (cf Cunliffe 1992; Hill 1995) is unclear, but there are other indicators of special treatment of dogs. Of the remaining six dog bones, four are radii that have been individually deposited in pits.

A total of 56 horse remains (%NISP = 8.4) were discovered. Most of the Iron Age horse remains come from only two pits, F59 and F177 (30 out of 56 NISP), even though most pits have a token horse bone or tooth. Most of the horse remains from pit F59 may come from a single, fragmentary skull, while the horse remains from pit F177 appear to come from a fragmentary skull and a single pelvis. Although sample sizes are small, there may be a selective interment of only particular horse bones, much as Grant (1984a) has noted at Danebury.

Both the minor presence of hare (%NISP = 1.5) and badger (%NISP = 0.2; a single auditory bulla) may be intrusive. These are probably disturbed remains of burrow deaths.

Four fragments of human remains were identified among the fauna in several pits, namely a right ilium (acetabular portion and shaft); left scapula (glenoid fossa and blade) and right scapula (acromion process). These remains do not show signs of bone modification. They could all come from a subadult to adult. In isolation their significance is unclear, but is a common occurrence in Iron Age pits elsewhere, for example at Wandlebury (Hartley 1957) and Danebury (Cunliffe and Poole 1995).

Taphonomy

Bone preservation varied dramatically by period. The Iron Age assemblage was very well preserved and only a low percentage of fragments were weathered (Corrado 1999). This was undoubtedly due to the high pH of the chalk and the rapid infilling of the pits. In contrast, the Roman assemblage was in quite a poor state of preservation (Hanks 2001). Most bone specimens were in a somewhat friable state and exhibited strong evidence of weathering, abrasion, and subsoil root action. There may be a contrast in soil chemistry between the Iron Age and Roman layers, but it is more probably due to the proximity of the Roman remains to the modern ground surface and the apparently extended length of exposure of these remains prior to burial.

Basic information on the frequency of bones that have been cut and burned is presented in Table 12. Only 63 bones preserve butchery marks (1.75% of assemblage), while 129 fragments are burned (3.59% of assemblage). The frequency of butchery and burning marks varies dramatically by period and strongly correlates with the evidence of bone weathering; burning and cut marks are much more frequent in the well-preserved Iron Age assemblage, while they are almost completely absent from the poorly-preserved Roman assemblage.

Iron Age Wandlebury

The faunal remains from eight pits (F50, 77, 126, 177, 213 & 220) were examined in detail. Many of the pits were probably infilled rapidly, a suggestion corroborated by the three sets of conjoined/articulated remains from different layers within two pits (two instances from pit F177 and one example from pit F220). These inter-layer connections indicate either post-depositional disturbance (Corrado 1999) or more probably very rapid infilling. Only one pit (F59) appears to have been infilled by slowly natural erosion. Treating each pit as a unit, there is clear variability among them in assemblage size and species composition. Pit 126 stands out for both its large size and dominance of pig and cattle remains over those of sheep/goat (Table 11). As noted above, pit F50 is unusual in terms of its dog burial.

There are important spatial contrasts in the Iron Age assemblage (Table 13). Pits from inside the ringwork are overwhelmingly dominated by sheep and goats (%NISP = 60.0) followed by horse (%NISP = 14.5) and cattle (%NISP = 13.1). Pits from outside the ringwork show a very even representation of sheep and goats (%NISP = 30.9), dog (%NISP = 23.7), pig (%NISP = 21.5) and cattle (%NISP = 19.9). The contrast in the treatment of dog and pig is most pronounced; they are limited to contexts outside of the ringwork. Most of the dog and pig remains come from individual pits (F50 and F126, respectively). In fact, if pits F50 and F126 are excluded from the exterior assemblage, faunal composition between the two areas is almost identical (sheep/goat %NISP = 57.3, cattle %NISP = 18.4, horse %NISP = 11.7, pig %NISP = 8.7, dog %NISP = 3.9). Pit F126 also stands out as having a very high

frequency of bone burning (Table 12).

Without further contextual information and relatively small sample sizes from individual pits, not to mention only eight pits analysed, it is difficult to make too much of these patterns. Nonetheless, the treatment of animal remains was more standardised inside than outside the ditch and bank of the ringwork. A higher number of fragments were identifiable to species inside as opposed to outside, which may indicate less bone fragmentation and more rapid filling of pits on the inside than the outside. Likewise, as shown in Table 12, cut marks are more frequent inside (%NISP CM = 6.3) than outside (%NISP CM = 3.3), while burning is less frequent inside (%NISP burn = 2.5) than outside (%NISP burn = 8.3). Chi-square tests show both of these differences to be statistically significant.

The two unusual deposits were both outside of the ringwork and consisted of the interment of a partial dog skeleton (torso without head) at the base of pit F50 and pig and cattle remains associated with increased burning in pit F126. The dog remains in pit F50 appear to have been buried after the removal of the head and limbs, but with the torso relatively intact. Too much of the body is missing to interpret this as 'skinning waste' or the removal of a dead dog to clean the interior. Whether or not this is ritual, dogs are clearly being singled out for special treatment, a pattern that has been commented on at Danebury and other sites (Grant 1984b &1991).

The assemblage from pit F126, on the other hand, would appear to be food debris. The concentration of cattle and pig remains might imply food preparation and consumption in which large amounts of meat was being consumed, for example 'feasting'. But the remains were highly fragmented and there was a lack of meat-bearing bones among the identifiable fragments (Corrado 1999).

In many ways the Iron Age faunal assemblage from Wandlebury is similar to those from other Iron Age hill-forts in Britain. Sheep and goat dominate the assemblage in terms of number of remains, while cattle would have provided the largest amount of meat. Remains of wild animals are extremely rare. Dogs and horses received special treatment, although the latter appears to have been cut and butchered along with the other livestock. Iron Age activities appear to have differed on either side of the ramparts, with activities more variable on the outside of the ditch and bank. There are insufficient ageable remains to reconstruct culling patterns, although the presence of neonatal cattle and sheep/goat indicate that herds were kept and managed in or near the ringwork. There is no evidence from Wandlebury itself of specialised animal production, although this picture may change with the excavation of further remains and/or more detailed comparison with other Iron Age assemblages from the region.

Romano-British Wandlebury

The composition of the assemblage changes dramatically over time, shifting from a dominance of sheep/goat (%NISP = 40.0) and cattle (%NISP = 17.7) in the Iron Age to cattle (%NISP = 73.3), horse (%NISP = 10.9) and sheep/goat (%NISP = 9.9) in the Roman period (Table 13; Fig. 22). The depositional context of these remains also changes significantly to tertiary fills of most pits and the midden-like spread of bone within the eastern entrance way in test pit 42. Also, the Romano-British remains are more highly weathered and fragmented than those from the Iron Age (Table 13), reflecting probably a longer period of exposure before burial as well as post-depositional modification (eg root damage and decalcification).

Table 13. Faunal assemblage characteristics by excavation area and period.

	Roman	Iron Age		
		Outside	Inside	Total
Species	%NISP	%NISP	%NISP	%NISP
Ovis/Capra	9.9	30.9	60.0	40.0
Bos taurus	73.3	19.9	13.1	17.7
Sus scrofa	3.0	21.5	4.8	16.2
Equus species	10.9	4.1	14.5	7.4
Canis species	1.0	23.7	0	16.3
Meles meles	0.5	0	0	0
Lepus species	0	0	6.9	2.2
Homo sapiens	1.5	0	0.7	0.2
Total ID Species	202	317	145	462
Total Remains	1781	1353	457	1810
%ID species	11.3	23.4	31.7	25.5
% Cut marks	0	2.5	6.3	3.48
% Burned	0.11	8.3	3.3	7.02

The basic ageing data show few changes between the Iron Age and Roman periods, but the assemblage size is really too small. Adult cattle outnumber juveniles by a ratio of 2:1; the absence of neonatal remains from the Roman period is explainable by the relatively poor bone preservation. The extremely poor preservation of bone surfaces makes it impossible to know whether the lack of evidence of butchery, cooking, and/or consumption reflects behaviour or site formation processes.

In conclusion, the Wandlebury assemblage is too small to make detailed inferences regarding the role of the site in the region during the Roman period. Maybe herders periodically penned stock at the site. Perhaps people occasionally came to Wandlebury to feast on a cow and celebrate a betrothal, alliance, or some other ritually or socially significant event. Unfortunately, the Romano-British animal bones are not very revealing about the nature of human visits. The increased importance of cattle in Roman compared to Iron Age sites has been noted at many other sites in Britain, and is probably related in part to the increase in consumers relative to producers and various strategies of provisioning urban and military sites with meat (Grant 1989). At the very basic level of species composition, the Wandlebury Romano-British fauna fits a known pattern. Further elucidation of this pattern must await more extensive excavations here.

Micromorphological analysis of the buried soils beneath the counterscarp bank and inner rampart
Charles French

The pre-counterscarp bank soil profile
A buried soil was observed at three locations (test pit 6 and trenches IX and X) on the northeastern side of the ringwork in Varley's Field (Fig. 4). Although these trenches were located outside the scheduled area, in each case there were the remnants of the presumed counterscarp bank (F31) preserved in section, with the best sequence preserved in test pit 6. Here about 15–20 cm of chalk rubble bank material (context 012) survived beneath 30–40 cm of topsoil (context 011), in turn overlying a *c.* 25–35 cm thick palaeosol which exhibited two horizons (contexts 014 and 015). Both the base of the present day topsoil overlying the counterscarp bank and the underlying palaeosol in this profile were sampled for micromorphological analysis in two sections in test pit 6 and trench IX (after Bullock *et al* 1985, Courty *et al* 1989; Murphy 1986).

The palaeosol profile in test pit 6 comprises a turf developed on an organic A horizon over a weathered B horizon composed primarily of illuvial silty clay (dusty or impure clay) intermixed with discrete, but irregular aggregates of calcareous fine sand. Although this soil has undoubtedly been subject to earthworm activity throughout its existence, its structural development is typical of a brown earth soil profile (Avery 1980; Limbrey 1975). In contrast, the palaeosol profile in trenches IX and X is indicative of a turf and rendzina soil fabric developed directly on the chalk substrate (Limbrey 1975).

The upper two-thirds of the palaeosol is essentially similar to the base of the modern topsoil (context 011) developed on the counterscarp bank, except for the absence of organic micro-aggregates. For this reason and the presence of amorphous organic matter throughout the groundmass, it is suggested that it is indicative of organic A horizon material immediately beneath the turf line. The sub-angular blocky structure exhibited in this upper horizon of the palaeosol is probably a relict feature formed prior to its burial in the later Iron Age.

The lower horizon of the palaeosol is characterised by a distinctly different composition. The prolific occurrence of the impure clay component is probably related to the clay-rich nature of the mixed 'head'/chalk subsoil in this part of the site, but does indicate that there has been considerable within-soil mass movement of fines down-profile. This illuviation may have been caused by slaking of fines from an exposed topsoil associated with rainsplash erosion (Jongerius 1983). By implication, this soil may have been bare and even ploughed at least on occasion prior to turf formation. Further corroboration for previous arable use may be provided by the presence of discrete aggregates of calcareous fine sand material intermixed with the dominant clay loam fabric and the relatively poor structural development of this soil.

Thus, the pre-Late Iron Age palaeosol preserved on the northern exterior of Wandlebury hill-fort is varies from a rendzina to a calcareous brown earth (Avery 1980). This palaeosol variation is primarily dependent on the underlying geology. Although it may have been disturbed occasionally, stable, grassland conditions appear to have existed by the later Iron Age. Nonetheless, this brown earth would appear to have been de-turfed either prior to and/or associated with the construction of the counterscarp bank, whereas the rendzina soil has not been de-turfed.

The pre-inner rampart buried soil profile
The pre-rampart buried soil was sampled at two locations: in trenches 40 and 70 (Figs. 21–24). The better exposure (*c.* 20–24cm) of the two profiles from trench 40, just to the south of the probable main eastern entrance way into the ringwork, was made into thin sections for micromorphological analysis (after Bullock *et al* 1985, Courty *et al* 1989; Murphy 1986).

The pre-rampart soil was composed of a turf Ah horizon over a micritic sandy loam lower A horizon over a mixed micritic sandy loam and chalk rubble B/C horizon, all developed on the chalk substrate. This is typical of a thin rendzina soil profile on chalk subsoil (Avery 1980; Limbrey 1975), and is the modal soil type for much of the chalk downland area of southern England (French 2003).

Nonetheless, throughout the whole soil profile there is evidence for mixing processes. First there are minor (10–20%) amounts of a yellowish brown calcitic sand fabric in irregular aggregates within the turf fabric, and minor (<10%) irregular micro-aggregates of turf fabric found towards the base of the soil profile. This suggests that the whole profile has been disturbed and not just through soil faunal mixing (or bioturbation), as one would expect. As the turf is *in situ* and sealed beneath the chalk rubble of the rampart, there has been no pre-ringwork stripping of the turf prior to the construction of the inner rampart (as appears to have occurred with respect to the construction of the counterscarp bank). Rather the whole soil profile appears to have suffered some mechanical mixing prior to the later Iron Age. This could conceivably be the result of periodic ploughing (cf Macphail 1998), but the absence of typical silty clay coatings and structural variations that can reasonably be expected to have been caused by ploughing (Lewis 1998) suggest that this mixing was more probably caused by human activities occurring within the ringwork earlier in the Iron Age.

Soil micromorphological study of a spade mark in pit F77
Helen Lewis

Introduction
Intact blocks of pit infill deposits were removed for thin section analysis from pit (F77) just outside the enclosure (Figs. 4, 12 & 23). The basal fills of the pit were very rich in ash and charred plant remains, and overlay a deposit of burnt grain (context 296). One soil block was taken for micro-excavation from the lower 45 cm of the pit, where lenses of carbonised

material and fine silt and ash layers were located (Cooper 1996), and this has been compared to plant macrofossil remains and to a micromorphology sample from the same location (Ballantyne 1997). Additional samples were taken from the possible spade marks cutting into the top of the uppermost basal fill (context 295) as part of research into the micromorphological characterisation of tillage and digging features (Lewis 1998). These spade marks are thought to represent the digging out or digging over of the underlying fill material. Preserved spade-marks are quite rarely reported, and the opportunity for detailed study of such features does not arise often. In this report the micromorphology of the features from Wandlebury will be described and discussed in relation to spade-marks from other sites, and to digging and tillage features in general.

The earliest spade marks known in England are Bronze Age in date (eg at Gwithian, Cornwall (Thomas 1970: 14–6)). Most spade marks are found in ditches or at the edges of fields, demonstrating the use of this implement for digging, including localised clearance, possibly of turf (Thomas 1970: 14–5 & 1978; Lerche 1977: 121; Evans 1970: 3; Macphail 1992; Crummy *et al* 1992). The earliest known example in southern England where a case can be made for spade tillage is the horizon of spade marks found at Hengistbury Head Site 6, thought to date to the early Iron Age (Chadburn and Gardiner 1985; Chadburn 1987; Lewis 1998 & 2002). Double paddle spades found in Denmark dating to the Iron Age are thought to be comparable to ethnographically known digging (*versus* tillage) spades, and to have been used for construction (Lerche 1977: 113–4 & 119).

Micromorphological characteristics of the spade mark

The spade mark sampled is characterised by several micro-features that can be related to those seen through study of experimental tillage features (see Lewis 1998) (Table 14). The cut of the spade mark is clear, defined by a line of voids (planar voids and interconnecting vughs and packing pores), which is partially infilled with fine particles and aggregates, creating both a structural and textural discontinuity between the fill and the surrounding material. The location and morphology of the lens of fine micro-aggregates, very fine sand and silt infilling the cut is similar to lenses created experimentally at the Silsoe soil bin (Cranfield University, Bedfordshire) and Lejre Historisk-Arkæologisk Forsøgscenter (Lejre, Denmark), both using an ard (Lewis 1998). This suggests that at least some of the same basic disturbance processes that are involved in ard ploughing are also evident in spade digging – namely disruption of aggregates, mechanical movement of finer components (under gravity and the action of the implement) to the base of the feature, and retention of these fines at that level due to the impediment of slightly denser material underlying the implement cut. In addition to the lens of fines, structural characteristics that could be related to digging are seen adjacent to the spade mark. Planar voids defining relatively large (for this context) blocky aggregates immediately outside of the spade mark cut may be shear planes related to implement use (cf Lewis 1998). Finally, in the spade mark cut, frequent micrite (<10μm) cappings were seen. This suggests much quicker drying occurred at some point, possibly associated with the digging cut itself. Iron staining (oxidation) was seen in all contexts.

Thus, these spade marks are definitive and suggest the clearing out of the pit to this level and digging into the underlying fill (Fig. 12: context 295).

The macro-botanical remains from a selection in exterior/interior pits

Claudia Cyganowski

Introduction

As at many other Iron Age sites such as Danebury, pits dug into the chalk subsoil were the most common archaeological feature. Over the course of the 1994–7 excavations, 46 pits both inside and outside the ringwork were excavated and bulk samples taken for macro-botanical analysis. Of these, a 15% sample (from seven pits, including F77, see below) was sub-selected from the basal fills of these pits and a buried soil context for wet sieving and macro-botanical analysis (Table 15).

Bulk samples, ranging in volume from *c.* 26 to 71 litres, were floated using standard methods and a 500μm mesh to catch the charred plant material. The flots obtained ranged in mass from *c.* 2g to >100g, with a sub-sample of *c.* 1.5–3g extracted for analysis. Table 17 provides a summary of the pit contexts investigated (Cyganowski 2003) and the grain:chaff: weed ratio generally used for inferring crop processing stage (Hillman 1981 & 1984).

Preservation

The most obvious and consistent difference between the contexts outside and inside the ringwork is in the state of preservation of the charred remains. The samples taken from pit contexts inside the ringwork are generally more poorly preserved, with 75–100% of the grain having the honeycomb texture characteristic of severe charring (ie at high temperatures and/or for long periods of time) (Bowen and Wood 1968; Boardman and Jones 1990). All the samples from pits inside the ringwork also contained moderate to high quantities of such heavily charred, and thus unidentifiable and usually fragmented, grain. In addition, in F229 only the very densest parts of the chaff, those most resistant to destruction by charring (Boardman and Jones 1990: 4–5), survived in the assemblage. In contrast, samples from the pits outside the ringwork (with the exception of F59, which was heavily contaminated and disturbed by modern roots) were generally well-preserved (<25% of grain with honeycomb texture) and had only small quantities of honeycombed grain. The implication is that, overall, the plant remains deposited in the pits inside the ringwork had either been exposed to higher temperatures, burned for longer periods of time, and/or exposed to greater subsequent oxidizing conditions than those plant

Table 14. Summary of the micromorphological descriptions for the spade-marks in pit F77 at Wandlebury (%s based on visual estimates of area).

	Context 1	Spade mark cut	Context 2	Context 3	Context 4
Field Description	[294] – greyish brown silt loam with <25% ash content and fine chalk fragments (<1 cm). Pot and bone inclusions.		[295] – greyish brown/brown silt and ash and fine chalk rubble fragments. Pot and bone inclusions. Surface had possible spade marks visible in it.		
Characteristic Microstructure	Single grain with intergrain microaggregates	Sub-rounded aggregates of context 2 material	As context 1. Blocky peds adjacent to cut	As context 1	As context 1
Porosity	15-30%: packing pores, vughs and channels	Planar void and line of interconnecting pores/vughs	25-40%: as context 1	20-30%: vughs and channels	20-30%: vughs and packing pores
Mineral Components	20:80 (mostly very fine sand and silt, including calcium carbonate)	As context 1	25-30:70-75, as context 1	30:70, as context 1	35:65, as context 1, but increase in medium and fine sand
Organic Component	20-40%: amorphous black fragments, 'charcoal, 'punctuations	10-15%: as context 1	15-20%, as context 1 but more frequent very fine components	As context 1, except more coarse charred remains	20-30%: as context 1, but more very fine charcoal and coarse charred remains
Groundmass	Crystallitic; enaulic-porphyric	As context 2	Crystallitic; mostly enaulic	Crystallitic; enaulic-porphyric	As context 3, but rather chalky
Pedofeatures	Possible daub and other clay-rich inclusions. Sparite and microsparite replaced plant remains. Some iron staining.	As context 1. Also frequent micrite cappings.	As context 1	As in context 1. Root/Worm-related fabric inclusions. Frequent iron staining.	As in context 3, but all very chalky-looking. Possible pottery fragment.

remains deposited in pits outside the ringwork.

It should be noted that the poor preservation in the sample from the buried soil beneath the inner rampart in trench 70 stems from a different combination of causes. The chaff and 'weed' seeds are much more likely to have suffered oxidation through exposure, trampling and mechanical disruption in the course of monument construction and their heavy soil/mineral encrustation probably relates to the soil/drainage conditions of burial under the monument.

Crop processing and weed ecology

Buried soil in trench 70

The sample from the buried soil under the inner rampart (Fig. 17: trench 70) is unique among the samples analysed in not containing any cereal grain. There is, however, slight evidence of cereal cultivation in the vicinity (unsurprisingly, since the ringwork had been occupied for some four centuries before the inner rampart was constructed in the 1st century BC) in the form of a single glume base (probably from spelt wheat) (French and Gdaniec 1996, 3). The glume base could, of course, have been blown in from some distance. This is, however, less likely for a glume base than for a piece of lighter chaff. The bulk of the sample was composed of unidentifiable weed seeds, in addition to one Gramineae (wild grass) seed, a probable fragment of a *Bromus* seed, and a legume. The few identifiable seeds are widespread in 'grassy' areas (Clapham *et al* 1989: 628–33).

The pits on the interior

Pit F177

The observed composition of this rather poorly preserved sample is not markedly similar to that of any other examined, and is distinguished by glume:grain and weed:glume ratios of *c.* 2:1 (see Table 17). The weed:glume ratio is particularly important as a distinguishing factor; the only other interpretable sample (ie excluding F59, see below) in which the number of weed seeds exceeds the number of glumes is F126, in which the weed:glume ratio is *c.* 12:1.

While the dominance of weed seeds in the sample might be a taphonomic artefact, the floristic composition of the weed component is still of interpretive interest, and the preservation of the weed seeds (as opposed to the grain and chaff) is quite good. All of the weed flora present can grow in grassy habitats or as weeds in arable fields (ie *Avena*

spp, from which two awn fragments were present, can be considered either a weed or a crop itself). *Bromus* spp prefers calcareous soils, which supports a local source for the weed flora, while Chenopodiacae and *Polygonum aviculare* are indicators for nitrogenous, nutrient-rich, well-drained soils (in modern agriculture, and *P aviculare* is a weed primarily associated with spring cereal crops) (Clapham *et al* 1989: 628–33; Hanf 1983: 202–5 & 397). Thus it is probable that the charred remains from the primary fill of F177 were waste associated with/derived from a locally grown cereal crop, but there is insufficient evidence with which to suggest a stage of crop processing. Given the association with burnt bone, charcoal and a loom weight, it is possible that the charred matter represents domestic debris.

Pits F229 and F220

These samples are united by the very high proportion of chaff relative to both grain and weed seeds. They produced larger, better preserved samples and very high chaff:grain ratio (*c.* 15). Samples dominated by small weed seeds and heavy bits of chaff (eg glume bases and rachis segments) are associated with fine sieving (Hillman 1984: stages 12 and 13b), a processing stage that, in wet climates, occurs after the grain has been removed from bulk storage and immediately before use (Hillman 1981: 132–3 & 1984: 10).

While the grain:chaff:weed ratios are quite similar for the two samples, the compositions of the weed flora in the two samples are slightly more divergent. The F229 sample contained only eight weed seeds (eg Chenopodiacae and *Rumex crispus*, indicative of nutrient-rich soils; *Rumex crispus*, a common weed in grassy places (Hanf 1983: 404) and *Poa* spp). Pit F220 also contained Chenopodiacae and *Rumex* spp, as well as *Bromus* spp, *Avena* spp and *Vicia* cf *tetrasperma* were present. *V tetrasperma* grows in generically 'grassy places' (Clapham 1989: 188–9) or on arable land (unusually in lime-deficient soils) (Hanf 1983: 341). *Bromus* spp, *Avena* spp and *Chenopodium* spp have all been suggested as possible supplementary food sources, the seeds of which were deliberately not excluded from cereal harvests (Hanf 1983: 202). Both assemblages could, and probably do, derive from the weeds of cultivated fields; however, it seems likely that they either came from different fields and/or different harvests (when different weed assemblages were present) or were processed slightly differently or more or less thoroughly.

Pits on the exterior of the ringwork

Pit F59

The sample from pit F59 (Fig. 12), like that from the buried soil in trench 70, proved essentially impossible to interpret because of the very low quantity of charred material recovered and disturbed by modern roots. A single, indeterminate cereal grain was present, as was one *Bromus* spp seed and one *Chenopodium* spp seed. This sample thus falls within the pattern of seed assemblages found in other pits, but does not provide any useful interpretive information.

Pit F15

This sample is the most comparable to the basal fill of F77 (see Ballantyne below) in composition as well as state of preservation, although there are a number of important differences. The F15 fill (Fig. 12) is not as grain-rich as that of F77, but barley is present in equal or greater quantities (*c.* 1:1) than wheat, whereas in both the F77 spits barley was a minor component (present at levels of 2:11 or 2:39 compared to *Triticum* spp). The wheat component, while mostly spelt, contains one distinctively emmer grain, and the barley component contains two unusual slender hulled barley grains. Unlike F77, there are more glumes than whole grains in the F15 deposit. But a large quantity of non-honeycombed broken grain fragments, mainly wheat grains, were present which might suggest that the grain:glume ratio should be revised upwards from *c.* 1:1.5 towards 1:1.

If this is the case, it suggests the possibility that F15 represents, like F77, the charring of a bulk spikelet store (Hillman 1984: stage 8). The primary fill of F15 consists of a light gray ashy layer with abundant charcoal flecks, which could represent the more complete burning of a basal grain fill similar to that present in F77. Roughly equal numbers of grains and glumes, combined with the presence of spikelet forks, suggests storage of whole spikelets (Hillman 1984: 10; Jones 1984). While the abundance of weed seeds might appear high for a storage deposit, the weed assemblage of F15 is remarkable in that it is heavily dominated by *Bromus* spp (>60% of the weed seeds present), as are the weed assemblages from F77 (see Ballantyne below). This supports the suggestion that F15 and F77 might represent similar storage deposits, and suggests that *Bromus* was either deliberately included in the stored assemblages or was not removed by a (size-dependent?) cleaning technique.

Pit F126

The macro-botanical assemblage from pit F126 (Fig. 12) is completely unlike any other examined. It is dominated by small weed seeds, particularly *Poa* spp (c.65% of the weed assemblage). Of the 24 categories of weeds recovered from the pits at Wandlebury, eight are found only in F126 (or 33%). The preponderance of *Poa* or meadow-grass is indicative of grassland, as is the presence of Gramineae, *Cerastium* spp and *Plantago lanceolata*, which occur only in the F126 sample and are indicative of dry pastures or meadows and light, neutral or calcareous sandy soils (Hanf 1983: 191–2 & 393).

This seed assemblage could represent either seed for planting a meadow or waste associated with the use of meadow grasses, possibly as fodder or animal bedding (M Jones, pers comm). In summary, the macro-botanical remains from pit F126 may represent an unusual example of charred debris not directly associated with crop processing for food production. Instead, the assemblage may derive either from other uses of cultivated crops (ie thatching with wheat straw) or from the harvesting and use of non-cultivated (but possibly managed) crops (Reynolds 1981: 119; Hillman 1984: 19; Greig 1984: 213).

Summary and comparisons to other sites

The archaeobotanical assemblages analysed from Wandlebury consist of one or two burned stores of whole spikelets, two assemblages which most likely represent the waste products of fine sieving, one assemblage that may represent the by-products of cleaning and using straw or meadow grasses, and three assemblages that are too small and/or too badly preserved to be interpreted with confidence. The first and second phenomena, including the mixed storage of wheat and barley, are well-known and documented at Danebury as well as other less intensively studied sites (Jones 1984). One significant difference between the possible storage deposit described in this report (F15) and other such deposits from Wandlebury (F77) and elsewhere is the relatively higher proportion

Table 15. Summary of contexts investigated and macro-botanical remains present.

Feature and Context Number	Location	Context Description	Preservation Index	*Triticum spelta/ dicoccum* Grain: chaff: weed ratio	*Hordeum* spp Number of grains	Abundance of highly charred grain fragments
Pit: F15 Context [095] 90-105cm	Varley's Field (TS 9)	Primary fill: light gray ash with abundant charcoal flecks and lenses of fine chalk fragments. Deliberate dumping of hearth rake-out + pit-edge slip	5 Fragmented, non-honeycombed grain is evidence for mechanical breakage	26: 40: 36 (c 1: 1.5: 1.4)	29	low
Pit: F59 Context [200]	Varley's Field (Area 1)	Lower secondary fill: dark, yellowish-brown ashy silt with chalk fragments and charcoal flecks. Lens of primary inwash. Root disturbance noted	1 Majority of flot consisted of modern roots/ twigs; most charred material is wood charcoal	0: 0: 2	0	low (all grain present is heavily charred)
Pit: F126 Context [333]	Varley's Field (TS35)	Primary fill: mottled black/red/pale gray/ rich brown ashy silt with chalk fragments, charcoal flecks, and burnt stone. Intact, upright pot on south side of pit. Microfauna-rich, including rodents	4-5	2: 12: 178 (1: 6: 86)	1	low
Pit: F77 Spit 9 Context [241]	Varley's Field (Area 1, TP 3)	Mixed layer of charred grain and soil with possible spade marks, *c.* 40cm from pit base	38% of grain retained embryos	329: 241: 83 (c 4: 3: 1)	61	
Pit: F77 Spit 12 Context [285]	Varley's Field (Area 1, TP 3)	Basal fill of charred grain	25% of grain retained embryos	274: 148: 21 (c 14: 7: 1)	14	
Pit: F177 Contexts [503/504] 30-43cm	Inside ringwork (TP 52)	Primary fill: yellow sand, including 1 piece burnt bone, charcoal, and chalk loom weight	1 Weed seeds better preserved than grain/chaff	2: 5: 13 (1: 2.5: 6.5)	3	moderate
Pit: F220 Context [632] 90-100cm	Inside ringwork (TR 68)	Basal/primary fill of western side of pit. Silt loam and ash (phytolith rich) with a black lens representative of comminuted charcoal. Domestic rubbish and hearth rake-out deliberately deposited	2-3 Weed seeds and chaff better preserved than grain	4: 54: 25 (c 1: 13.5: 6.5)	7	moderate
Pit: F229 Context [621] 20-30cm	Inside ringwork (TR 66)	Fill layer immediately above human burial. Red-yellow-brown sandy silt	1-2 Only densest parts of chaff survive	2: 32: 8 (1: 16: 4)	0	moderate-high
Buried soil: Context [617]	Buried soil beneath inner rampart, near edge of inner ditch	Fairly compact mid-reddy-brown silt, >5% chalk content, occasional flint and chalk pebbles, charcoal flecks	1-2 Heavily encrusted with soil	0: 1: 29	0	none (no grain present, highly carbonized or otherwise)

of barley. This, along with the presence of emmer and some unusual forms of barley (slender hulled barley and naked barley) may hint that the cereal economy of Wandlebury was somewhat more diversified than at other sites. There is no evidence in the weed flora, however, to suggest that the crops stored at Wandlebury were grown other than locally. Indeed, the recorded weed taxa are quite similar at Wandlebury and Danebury – undoubtedly a reflection of Wandlebury's location on chalk.

The archaeobotanical evidence from sites more directly comparable to Wandlebury such as other Iron Age ringwork enclosures near the fen-edge is relatively sparse. Arbury Camp contained no contemporary settlement remains and the archaeobotanical work done on waterlogged remains in the enclosure ditch fills demonstrated no evidence of cereal cultivation (Roberts 1995). Stonea Camp was likewise apparently uninhabited, and poor preservation of seeds and modern contamination precluded any substantial archaeobotanical investigation, nor was any evidence of cereal cultivation found (Haselgrove 1999: 121; Philpot and Potter 1996: 39).

The most closely comparable site where any archaeobotanical work has been done on charred remains is probably Wardy Hill, Coveney (Evans 2003). Within the ringwork were six structures and associated pits and ditches. One striking characteristic that the Wardy Hill pits share with the majority of the pit assemblages from Wandlebury (in contrast to the assemblages at Danebury) is the very low number of cereal grains present (Stevens 2003: 138–43). In general, chaff and weed seeds predominated in the assemblages, and they are interpreted as crop by-products rather than prime grain (*ibid*). The weed taxa do not contradict the idea that crops were grown locally. Interestingly, G Wilson (1984: 242), writing about the Cat's Water Iron Age settlement at Fengate, Peterborough, concluded based on similarly low concentrations of cereal and very small quantities of chaff that Fengate's corn supplies were brought in ready threshed, perhaps from farms on drier ground. Also, the weed flora evidence from fen-edge sites does indicate that nearby land (including wet areas) was being used in some way that resulted in the transport of local weed seeds back to the habitation sites, probably including (if not limited to) cereal cropping (DG Wilson 1984).

At Danebury, the charred archaeobotanical remains have been used to investigate which areas of the hillfort were used for which stages of crop processing and corresponding changes in societal attitudes towards the production and consumption of crops (Jones 1995). Despite problems of dating, such a study would be of particular interest at Wandlebury, a unique example of a site at which a ringwork appears to have been superimposed on an existing community, with people continuing to live both inside and outside the enclosure (French and Gdaniec 1997a & b).

Conclusions

Analysing the macro-botanical remains from the pits (*c.* 15% sample) at Wandlebury, both inside and outside the enclosure, has provided concrete evidence for a wider variety of agriculture-related activities taking place at the settlement in and surrounding the ringwork. Some of the assemblages (ie debris from fine-sieving) were anticipated, others (the meadow-weed seed dominated assemblage) less so. The latter assemblage, from pit F126, may provide increasingly direct evidence for the use and management of meadow grasses, and/or the transport of weed seeds to a settlement site as part of a straw crop. Analysis of more samples and better dating would continue to fill in the picture of agricultural activity at Wandlebury.

A cross-disciplinary investigation of Iron Age pit deposition

Rachel Ballantyne

Introduction

The aim of this project was to investigate the depositional and taphonomic processes operating within pit F77, and thus develop a better understanding of deposition of the charred plant macro-remains and events that surround them. This involved the analysis of the plant macro-fossil remains from spits 9 and 12 in the basal third of the pit (Fig. 12: contexts 295 & 296) combined with micromorphological study of its south-western basal corner fill, with particular attention to the nature of combustion within the pit and its subsequent infilling. Both these processes are little studied in Iron Age pit contexts, yet have implications for the way in which original plant deposits are reconstructed from their charred remains.

Seven separate fill contexts (291–7) were recorded in pit F77, of which 295–7 appeared to contain the most charred organic matter (Figs 12 & 23). Lenses of phytolith-rich ash were noted overlying context 295 in one place, and also between context 296 and context 295 in another. Two parallel lines of charred grain (context 297) separated by ashy material, and running down the southwestern edge of the pit, prompted the taking of block samples from this area. Spade marks were apparent as shallow cuts, sub-rectangular in plan, cut into the top of 295 (see Lewis above).

Micromorphology of the basal pit fill

Two block samples of the south-western basal corner of F77 were removed during excavation of the pit (Fig. 16). One sample was subjected to micro-excavation (Cooper 1996), the other used to produce a thin-section slide through the basal layers of pit fill. Six units were identified in a sequence from right (inside) to left (outside) across the slide (Table 16). An open calcitic matrix with organics is present to a varying extent throughout all the layers, which represent three basic matrix types, as follows:

Layers 1 (inside) and 6 (outside) both represent a roughly equal mixture of carbonised organic (45–58%) and mineral components (mainly calcium carbonate). They are poorly sorted and grade into their adjacent

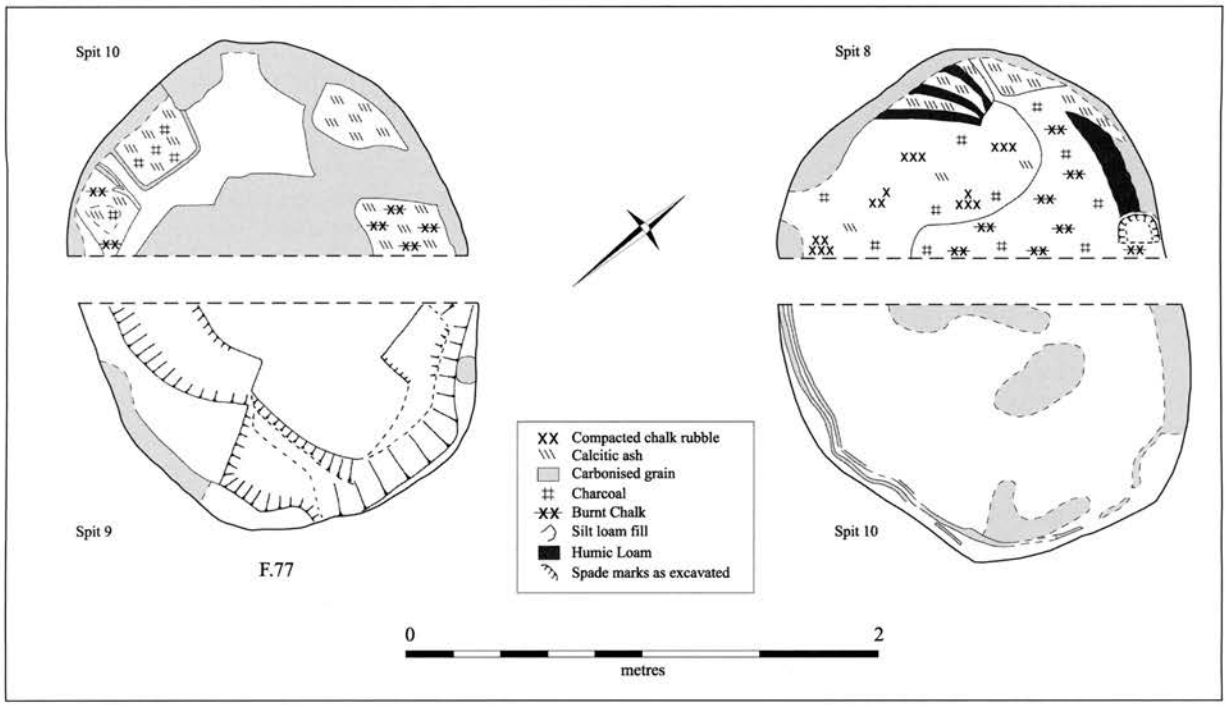

Figure 23. *Charred grain deposits and spade marks in pit F77 (C French).*

layers, 2 and 5, respectively.

Layers 2 and 3 contain a high mineral component (88%) comprising mainly aggregations of amorphous calcium carbonate, spirite and microspirite calcium carbonate. Organic matter is relatively rare (10%). 50% of layer 3 is fine chalk rubble (>2 mm), and the surrounding fine matrix is virtually identical to the composition of layer 2, which contains slightly more organic matter.

After the well-defined boundary between layers 3 and 4, layers 4 and 5 grade into one another. Both contain very high levels of organic matter (90%) and a very low mineral component. An extremely high level of phytoliths in layer 4 and found to represent numerous hair bases, intact hair cells, and prickles (trichome cells) remained attached to sheets of phytoliths 100–300 µm long. No bulliform cells or stomata – both diagnostic of leaves – were observed. The 'hairy' nature of the remains suggests that they derive from the inflorescences (especially glumes) of grasses; some particularly intact pieces are identifiable as awn fragments.

Several layers contain bone inclusions with partial mineral replacement and no evidence of exposure to charring conditions. Both layers 6 and 3 contained intrusive fragments of topsoil, and layer 1 a possible fragment of burnt soil.

The plant macro-remains

Two samples derived from different depths and contexts in the centre of pit F77 were examined, the highly carbonised basal fill (context 296) and the top of fill 295, a mixture of charred grain and soil with possible spade marks (*c.* 40 cm above the pit base) (Fig. 12), with all identifiable components recorded and quantified. As the relative proportions of grain, chaff and weed components in an assemblage are useful indicators of the stage of crop processing at which charring occurred (Hillman 1981: 84), ratios of components within the two samples were calculated (cf Van der Veen 1992: 82–4) (Table 17). The ratios are also potentially good indicators of the taphonomic effects of charring and preservation conditions on the recovered assemblage (Boardman and Jones 1990; Hubbard and al Azm 1990).

The calculations highlighted some interesting contrasts between the two samples (Table 17).

In both samples, glume wheat grain, mainly emmer, was in significantly larger amounts than hulled six-row barley (11:2 in spit 9; 39:2 in spit 12). The high grain:rachis segment ratio of 4:1 for *Hordeum vulgare* in spit 9 further suggests that the glume wheat and barley had been processed separately.

In whole barley ears the ratio of grain:rachis segments is 3:1; once the greater vulnerability of chaff to taphonomic processes (relative to grain) is taken into account, it appears whole ears must have been present in spit 9 for a 4:1 ratio to exist.

The ratio of 4:3 for *Triticum spelta/dicoccum* glume bases to grain in spit 9, is close to that for spikelets (1 glume base:1 grain for glume wheats) and (once taphonomic processes are taken into account) it appears intact spikelets must have been present. A fully intact glume wheat spikelet was found in the sample, which further supports this statement. Only two ears of glume wheat were identified, creating a grain:rachis segment ratio of 329:2 for the sample. This is much less than the expected 2:1 ratio even when taphonom-

Table 16. Synopsis of micromorphology results for the basal fills of pit F77.

			Coarse Fraction (%)	Fine Fraction (%)					
layer	% void	% stone-% soil	medium/fine quartz	phytoliths	Organic carbonized	other	Inorganic CaCO3	other	Inclusion
1	30–50	0–100	< 7	0	30	15	43	2	<3
2	20–30	0–100	< 2	0	8	4	83	<3	0
3	30–40	50–50	< 2	0	4	<2	90	0	<2
4	30	0–100	< 2	78	10	<4	<6	0	0
5	30	0–100	< 2	15	<60	15	<6	0	<2
6	30	0–100	< 3	15	32	10	37	0	<3

Table 17. Seed, glume, embryo and rachis ratios in pit F77.

	OVERALL	*Triticum spelta/dicoccum*		*H. vulgare*	*T. s/d:H. vulgare*
	grain: seeds	grain: glumes	% grain with embryos	grain: rhachis	ratio of grains
Spit 9	5:1	4:3	38	4:1	11:2
Spit 12	14:1	2:1	25	7:2	39:2

ic processes are taken into account, and this suggests the glume wheat must have been already threshed and winnowed into spikelets. This is in contrast to the unthreshed barley ears.

In the less well preserved context 296 sample, the 2:1 ratio of grain to chaff for glume wheats is very similar to that recorded by Jones (1984) for pit 1078 at Danebury. These values still support the hypothesis that a bulk charred spikelet deposit with barley ears is represented. Glume bases and rachis segments are both significantly more susceptible to fragmentation, and the clearly severe charring and subsequently poor preservation in context 296 would account for this loss of chaff components.

Weed species and morphology

The weeds found included some potential cereals, *Avena* sp and *Cereale secale*, but since only one grain of rye, and wild oat awns were found, neither appears a particularly significant (or intentional) inclusion.

The most substantial weed component was *Bromus* sp seeds, particularly in spit 9 where 58 seeds raised the total weed:grain ratio to 1:5. This species was also noted in high quantities at Danebury (Jones 1984). The seeds are a very similar size to the grain, but may have been deliberately left in the assemblage, depending on the means by which most other weeds were excluded.

Other weed species were in very small quantities, with often only one or two seeds present. They are also mostly of similar size to the spikelets (ie *Lithospermum arvense* or *Malva* sp seed head), although some are much smaller (ie *Phleum pratense*). If the weed species were removed by sieving, then it would appear to have been slightly inefficient, as also suggested by the presence of cereal tail grains. An alternative explanation for the low weed levels is that grain was collected by plucking, but the *Malva* sp suggests against this. This genus is quite distinctive, and would be unlikely to be accidentally included during the harvest. Inclusion of many of the small-seeded weeds would also be unlikely in such circumstances, although it could be argued that the *Bromus* sp seeds were deliberately included.

The weed ecology

Many of the species present, particularly *Rumex* sp and *Avena* sp are common in a wide variety of temperate environments, and so it is difficult to conclude much from their presence. Several species, particularly *Bromus* sp and *Lithospermum arvense* (both annuals), exhibit a tendency to grow on arable land. The inclusion of *Malva* sp is interesting, as it is rare in arable fields today, being more likely to occur around the edges.

The crop processing stage at charring

It appears that glume wheat bulk spikelet deposits were charred in F77 at Wandlebury, which is similar to Iron Age pit deposits at many other British sites, particularly Danebury. The harvested ears (mainly emmer, with some spelt) had been threshed into spikelets, winnowed, and sieved to remove the main weed components. At some stage after this hulled six-grain barley ears were added to the spikelets. If the barley had also been threshed, winnowed and sieved then such a high proportion of barley rachis segments would not have remained. The subsequent assemblages were placed in pit F77, presumably for storage, before being charred.

The components of the two samples, particularly the relatively high quantities of chaff and grain, and low amounts weeds, correlate well with 'Hillman Stage' 8 (Hillman 1981: 84). This stage is associated with the products of accidental charring during parching of glume-wheat spikelets, but it is also

analogous to the result of charring a bulk spikelet store. Hillman (1981) noted from ethnographic research in Turkey that storage of spikelets rather than pure grain is common in 'wet' climates, since the chaff acts as a protective outer coating, which is then removed as and when the grain is needed. The mixing of partially processed glume wheat spikelets with barley ears suggests that they were harvested separately.

Pit infilling, preservation and charring

From the micromorphological study, it is clear that infilling and slumping within the pit has been significant since charring of the original grain deposit. The presence of phytoliths emphasises this point, confirming that charring must have occurred *in situ*, and that intrusive material since then has included surface debris (topsoil and bone fragments) and erosion from the pit edges (fine chalk rubble). Conditions within the pit have been well aerated and occasionally damp, with high micro-faunal and root activity. In terms of the plant remains, any uncarbonised or non-mineralised components are likely to have rapidly degraded, as suggested by the extensive void space (average 30%) observed in the thin section.

Hubbard and al Azm (1990) suggested a series of characteristics which could be used to estimate the levels of preservation within a context, based on the surface characteristics of charred grain. According to their classifications, the remains from spit 9 correspond with preservation stage 2, and spit 12 to stage 3, but the distinction seems quite subtle. In order to provide a quantitative estimate of preservation standard the number of whole *Triticum spelta/dicoccum* grains with embryos intact was recorded for each layer (Table 17). The results support earlier observations, with 38% of the whole *T spelta/dicoccum* grains in spit 9 still with their embryos intact, compared to 25% for spit 12.

When interpreting the preservation standard of the remains in each layer the probable charring conditions should also be considered, since preservation is not independent of charring. As spit 12 was completely composed of carbonised grain with little void space, it implies that carbonisation effected all grain in this area, whereas spit 9 was less densely packed with carbonised material and therefore represents less complete carbonisation. But the grain in spit 12 was also less well preserved and the differing embryo preservation between layers represents the vulnerability of the more highly charred remains in spit 12 to mechanical destruction. Thus, even though context 296 appeared clearly more charred than context 295 during excavation, its remains are also much more degraded and less representative of the original (probably partially processed spikelet) deposit.

Implications for plant macro-remains analysis

Boardman and Jones (1990) clearly showed in a series of experiments that chaff components are much more vulnerable to the taphonomic effects of charring (and subsequent preservation conditions) than grain. In both samples, *T spelta/dicoccum* and *H vulgare* grain are over-represented compared to glume bases and rachis segments (respectively) if whole spikelets or ears had been charred. This divergence is also more marked for the more carbonised remains in spit 12 than for spit 9.

Whilst F77 has so far been treated as the charred remains of a single deposit and episode of burning, this may not be the case. Patterns remain which suggest two charring episodes (and deposits) could be present. This observation is based on the phytolith-rich ashy material recorded between fills 295 and 296. As noted in the micromorphological analysis, phytoliths are produced in extreme charring conditions where high temperatures and oxygen levels cause the complete oxidation of plant tissue such that only silica components remain. In an enclosed pit, the only area where such conditions are likely to exist appears to be where a grain deposit is directly in contact with the air. Cunliffe and Poole (1995) note that at Danebury thick layers of ash were sometimes present overlying carbonised plant remains in 'undisturbed' pits, perhaps acting as an insect deterrent (Hakbijl 2002).

In an 'undisturbed' grain deposit resulting from one episode of deposition and charring within in a pit, clear patterning of the remains should be visible. Theoretically, an ashy phytolith layer would be present at the top of the deposit where the oxygen supply had been greatest, with layers of increasingly less charred remains underneath. But, no such layers were noted in pit F77, although well preserved phytoliths did occur in the thin-section taken, and also during micro-excavation of a basal corner fill sample (Cooper 1996). It is highly unlikely that the two fills and the ashy lens are *in situ* from the same episode of charring, due to the oxygen and temperature gradients involved. Earlier firing to 'clean-out' deposits around the edge of the pit is possibly suggested by the layer of phytoliths and charred remains (in 297) clearly present in the south-west basal corner fill of the pit, following the pit wall upwards (Fig. 12). This vertical element also strongly suggests that the grain was within a container, probably made of organic material (ie cloth/textile).

The presence of charred remains from two burning episodes would explain the sequence of charring levels within the pit – with more highly charred remains and phytoliths underlying a slightly less charred and better preserved layer. The decreasing level of preservation quality with depth would be the result of more extreme charring conditions associated with context 296 as compared to 295, rather than oxygen and temperature gradients during one episode of burning. If two different episodes of burning did take place, and the different charring intensities taken into account, then each assemblage appears to have originally been quite similar in composition.

Conclusion: the biography of a pit

It is suggested that pit F77 at Wandlebury contains the remains of two separate episodes of charring of different intensities, but relatively similar assemblages. The first grain deposit and charring is represented by context 296 which was severely carbonised, and the remains of an ashy phytolith layer formed which overlay the centre of this fill context and to its outer sides. Subsequently another grain deposit (mainly represented by context 295) was charred in the pit, but under less severe circumstances. This sequence has lead to a heavily charred deposit with overlying phytolith remains which required high oxygen levels to be underlying less severely charred remains.

Both deposits were of partially processed mainly emmer spikelets, with some spelt spikelets, and ears of hulled six-row barley; in context 295 three times as much barley grain and *Bromus* sp seeds were present relative to glume wheat grains – which seems unlikely to be solely due to the differential charring and preservation of components. The few other weed species present suggest that the crop was grown on the chalky downland surrounding Wandlebury. Other differences between the two contexts (particularly grain:chaff) can be attributed to the different charring conditions they were exposed to. The more severely charred context 296 shows poorer preservation, linked to the increased fragility of the carbonized remains relative to context 295.

Intrusive eroded material and the high levels of void space (30%) in the southwestern basal corner fill of the pit suggest that the pit fill has been disturbed since charring. The concentration of context 296 in the centre of the pit, and erosion patterning revealed by the thin-section (see above) and micro-excavation block (Cooper 1996) suggests disturbance has been greatest around the edges of the pit. Root activity is usually greatest along the edges of cuts, and could have been a strong influence here. The mixing of contexts 295 and 296 is likely in this area.

The presence of eroded topsoil and bone slivers (perhaps from bone working?) within the base of the pit, combined with fine chalk rubble possibly eroded from the upper edge of the pit, suggests that it was partly filled for some time, probably after the charring event that formed context 295. The eroded upper edges of the pit may also be as a result of reuse. Possible spade marks in the surface of context 295 suggest that human activity may have disturbed the layers of fill in the pit, and this could explain why little ashy material was found overlying this context. If two charring episodes and deposits are present, then it is interesting that the assemblages were so similar, and that reuse of the pit occurred when it was not completely clean.

Much of the interpretation of the deposits in F77 is only suggested, particularly with reference to the charring conditions within the pit. A complex sequence of deposition, wall erosion, and fill slumping has obviously occurred here, and in trying to understand the fill patterning it is important to know how charring of grain actually proceeds within an enclosed pit environment. This has not been experimentally investigated at all, although Reynolds (1974 & 1979) did burn the germinated grain 'skin' to sterilise used pits at Butser Farm. The lack of germinated grains in spit 12 of pit F77 clearly shows that this was not the case here.

The human skeleton in pit F229

Natasha Dodwell

The well preserved skeleton discovered in pit F229 was that of a mature adult male (Fig. 24), aged approximately 40–50 years old and about 1.68m tall. The body was lying on the base of the large circular pit, head towards the southwest, in a prone position, with its legs flexed to the right and hands together, in front of the pelvis. Two animal bones which appear to be deliberately placed were recovered close to the body; a cow mandible was recovered from below the shoulder area, facing the same direction as the human head and a roe deer pelvis (haunch of venison) from close to the feet.

The age of the skeleton was determined by a combination of the degree of epiphyseal fusion, the degree of dental attrition (Brothwell 1981), the macroscopic appearance of the pubic symphysis (Brooks and Suchey 1990) and the ilium auricular surface (Lovejoy *et al* 1985). The sex of the individual was determined using diagnostic characteristics of the pelvis and skull and by metrical data (Bass 1987; Buikstra and Ubelaker 1994). An estimation of stature was made using the regression equations developed by Trotter and Gleser (1958).

Pathological changes to the skeleton

The presence of Schmorl's nodes and an increase in porosity on the superior and inferior bodies of the lower vertebrae (T6–T12 & L1) are characteristic of the degeneration of the inter-vertebral discs and incipient osteoarthritis. Marginal osteophytes at the sternal end of the right clavicle and an alteration to the joint morphology are also indicative of osteoarthritis. The congenital defect of the spine *spina bifida occulta* was recorded. Although visually severe, it should be emphasised that this bony defect was, in life, bridged by cartilage or membrane. Problems with bladder control and lower limb paralysis recorded in modern cases of *spina bifida* would not have affected this individual.

Small holes and tiny worm-like depressions recorded on the surfaces of the orbits, *cribra orbitalia*, are indicative of childhood anaemia. The aetiology of anaemia is multifactorial and, for example, can result from an iron-deficient diet, diarrheal disease or parasitic infection (Roberts and Manchester 1995: 166–7). Other indictors of childhood stress were observed as defects in the tooth enamel, known as hyperplasias, on the mandibular canines.

The skeleton is relatively lightweight and this is most noticeable in the spine (including the sacrum), the ribs, sternum and pelvis. This may well be the result of the burial environment but diminished bone mass is characteristic of osteoporosis, a condition

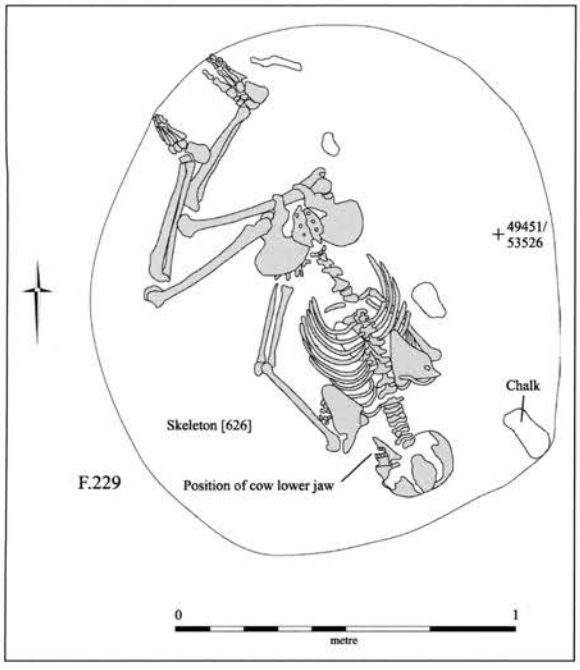

Figure 24. Pit F229 with the human skeleton (626) in its base (C French).

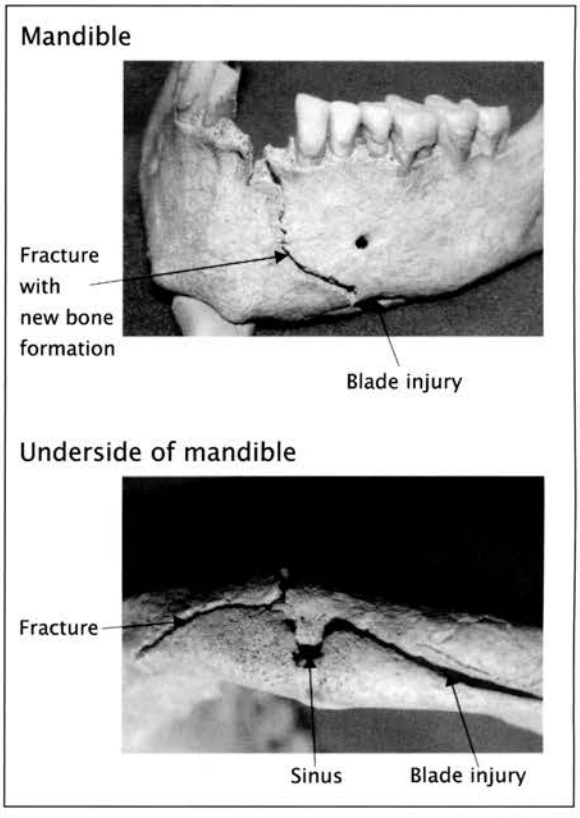

Figure 25. Blade injury at the base of the left side of the mandible in the mature adult skeleton found in the base of pit F229 (N Dodwell).

resulting from a long-standing imbalance between bone resorption and bone formation (Ortner and Putschar 1981: 289). It does not usually manifest itself until the fifth decade and is more frequent and severe in females. Where the vertebrae and sternum have broken post-mortem, the normally dense vertical and transverse trabecular system appears reduced, but X-rays would be necessary to confirm a diagnosis.

All the permanent teeth are present. Slight to medium deposits of dense grey/brown mineralised plaque, calculus, were recorded around the necks of all the teeth, particularly on the buccal and lingual aspects.

There is a probable blade injury *c.* 25 mm in length on the left side of the mandible, at its base, in the region between the mental tubercle and the inferior border of the ramus (Fig. 25). The lesion is well healed, although open and still visible. A small sinus (2 mm), which would have drained pus and is probably related to the blade injury, was located at the medial end of the lesion on the border, c 10 mm below the mental foramen. The proliferation of grey brown new bone surrounding the sinus suggests that it was still active at death. Running medially in a jagged line from the sinus up to the alveolar, in the region of the left central incisor, is a radiating fracture. This injury is probably associated with, and secondary to the blade wound. The new bone, which was recorded around the sinus extends along the margins of the break indicating that the antemortem fracture was uniting but was still in the process of healing at death. How long the injuries occurred before death is difficult to tell, but it was probably some months as the interior cancellous bone seen at the site of the fracture appears to have reorganized. The mandible is actually in two pieces; a post-mortem/dry fracture has occurred in antiquity, along the line of the original fracture presumably because the bone is weakest here.

The ribs are fragmentary with many post-mortem breaks but it was still possible to identify an antemortem fracture on a lower left rib. Unfortunately, the most sternal end of the rib is missing but raised, striated new bone was recorded towards the sternal end of the rib shaft. It is similar in appearance to the new bone which had developed along the fracture in the lower jaw and likewise, the fracture would have been in the process of uniting at death.

The body of a mature adult male had been deliberately deposited in the pit with various parts of animal and the position of the hands suggest that they may have been tied in front of him. The injuries he received to his jaw and ribs were inflicted some months prior to death and were in the process of healing; it is not possible to say that he died of these injuries. Several other human burials excavated at Wandlebury ringwork in recent years have displayed signs of

mutilation and/or trauma. Excavations in the 1950s revealed three burials in pits, two of which had been mutilated (Hartley 1957) and in the 1970s a skeleton with a sword cut, that had removed part of the chin, was recorded (Taylor and Denton 1977). These would repay a detailed re-analysis.

Discussion

The suite of archaeological and palaeo-environmental evidence presented above indicates that there is an extensive and long-lived use of the hill-top. There is a sparse scatter of Neolithic and Bronze Age flint work in the former ploughsoil of Varley's Field, but no monuments or sites are yet known. There is strong evidence for an extensive earlier to middle Iron Age settlement surviving outside to the east of the hill-fort, as well as contemporary Iron Age and later, Romano-British, occupation within the southeastern sector of the interior. The intensity of Iron Age settlement appears to drop away northwards, but as so little of the interior and hill-top have been investigated thoroughly, this may be of unproven significance. It is clear that a major objective of any future fieldwork would be to define the real extent of this settlement and to relate this earlier settlement to the construction and use of the ringwork and the newly discovered and previously know contemporary sites in the hinterland.

The ditch and rampart construction and sequence

There is the possibility that the substantial post-holes found beneath the interior edge of the line of the inner rampart represent a palisade setting, rather than posts supporting/retaining the inner rampart. Rather than defining within the buried soil and containing chalk rubble-rich fills, these features significantly only define at the very base of the buried soil/top of the chalk substrate, and are infilled with soil material only. This suggests that this placement and removal took place prior to any chalk rampart material being present. If these observations could be repeated over a length of inner rampart, a pre-ringwork palisaded enclosure, perhaps of the latest Bronze Age and earliest Iron Age date, could become a very strong possibility. Alternatively, the palisade construction could be associated, spatially discrete and concentric with the first (outer) rampart and ditch. Whichever is the case, appropriate dating and phasing relationships are still required.

Although Hartley (1957) and Cunliffe (1974) have suggested somewhat different constructional sequences for the two sets of ditches and three ditches, there is still no adequate evidence to support either of these. The dating of the sequence is still based on pottery alone, much of which could be residual. But it does suggest that the outer ditch, rampart and counterscarp bank were earlier and of the 4th–1st centuries BC, and the inner ditch and rampart of the 1st century BC. Certainly more investigation of the ditches/ramparts sequence and adequate samples for radiocarbon assay are still much needed to refine these interpretations. In order to do this, lengths of the outer and inner ramparts would require excavation to retrieve appropriate organic/carbonised material from the base of the rampart banks and upper surface of the old land surface/buried soil for radiocarbon dating as well as from the primary fills of both the inner and outer ditches.

The topographical survey conducted during this investigation discovered an original entrance through the inner rampart and ditch within the southern paddock in the southeastern sector of the monument (Fig. 3). There was also some additional elaboration of the defences here through the construction of a short length (*c.* 15 m) of chalk rubble rampart just within and to the south of this entrance. It appears to have been blocked and out of use by the earlier Roman period as 1st/2nd century AD occupation material was accumulating in the tops of back-filled Iron Age pits just within this entrance area. There may also have been a northern entrance way as observed within Orchard Field in this evaluation, but it is impossible to be sure whether it is of Iron Age, or some later date. These are both in addition to the other possible entrance way through the inner rampart which is represented by the gravelled entrance to the north stable yard on the southwestern side of the ringwork.

Although the double rampart and ditch defences of Wandlebury are substantial, they do not take any advantage of the natural contours of the hill-top. Indeed, they are placed well away from the northeastern scarp face of the hill-top and enclose only a proportion (less than half) of the highest part of the hill-top (Fig. 1). In addition, when the Wandlebury ditches are compared to the contemporary triple-ditched enclosure recently found at Borough Hill, Sawston (Mortimer 2001), they are shallow and insubstantial, and when compared to the location of the nearby War Ditches on a chalk spur to the north (McKenny-Hughes 1903), they appear to have little defensive aspect. Rather the importance, position and form of the post-built precursor monument at Wandlebury could well have dictated the position of the subsequent ramparts and ditches of the ringwork, that is set back from the northern scarp face of the hill-top.

In terms of the contemporary environmental conditions, there is now some new evidence from the buried soils themselves beneath the inner rampart and counterscarp bank, as well as the faunal and charred plant remains. The palaeosols are well preserved rendzina or brown earth soils present which are ubiquitous on chalk and limestone substrates and are associated with long established grassland vegetation (Limbrey 1975), but may have witnessed some arable use. This type of local environment would certainly fit with the faunal remains found in the pits in the recent evaluation which suggest that sheep husbandry was the norm and unchanging throughout the Iron Age at this site, with cattle becoming predominant in the Roman period. Nonetheless, grain crops were brought to and stored on the site in pits, in various stages of processing and storage handling. Further corroboration of open, mixed pastoral/arable

agricultural landscapes in the near vicinity comes from the charred plant remains which suggest open meadow and arable grain crops being grown. The generally poor preservation of molluscs, and the poorer condition of the animal bone in Roman than Iron Age contexts hints at post-Iron Age decalcification of the area. This kind of observation is regarded as a long-term trend in the Holocene especially on chalk downland landscapes (Keeley 1982), and is sometimes suggested as associated with over-grazing and a lack of suitable manuring practices.

The settlement outside and inside the ringwork

Evaluation of Varley's Field immediately to the southeast of the ringwork indicates that the first (outer) rampart probably cuts through an area of earlier Iron Age settlement eccentrically. Indeed several pits (ie in Fig. 11) appear to be situated beneath the line of the associated counterscarp bank, and therefore may slightly pre-date the first rampart and ditch construction. Again, good/tight archaeological stratigraphic relationships/sequences and dating are missing, and the question of the relationships between settlement inside and outside of the ringwork must still remain open.

What is striking is that there are dense areas of pits seen in the geophysical survey (Figs. 5–10) and tantalisingly in almost all the evaluation test pits and trenches. But without good archaeological visibility in much of the interior of the ringwork, it is impossible to suggest activity areas, as done at Danebury (Cunliffe 1995; Jones 1995). Nonetheless, pit density tails off rapidly beyond the southern third of Varley's Field on the exterior, and is more sparse in the northern paddock and more or less absent in the Orchard Field in the interior, for example. In fact, it does appear that there is a greater density of features around the newly discovered entrance way, both inside and outside the ramparts and ditches, in the southeastern sector of the site.

Structures and linear features were not common in the evaluation, but good hints of structures were uncovered. For example, several shallow and irregular gullies have been revealed in the trial trenches (ie II, V, VII, IX & X) and test stations (ie 3, 5 & 7) which may represent eavesdrip gullies around structures (Figs. 4, 15 & 17), fence lines and/or drainage gullies. In addition, test pit 3 contained a possible four-post structure, a very common structure on most English Iron Age sites and believed to be for the storage of grain (Cunliffe 1995; Reynolds 1981). The geophysical survey also contains hints of more substantial post-built structures (Fig. 6). Really only extensive open area excavations would provide sufficient detail and relationships to be sure of the density of above ground storage and domestic structures, both inside and outside the ringwork.

There are relatively few linear features so far investigated. Certainly the magnetometer survey (Fig. 6) shows a substantial, southeast to northwest oriented ditch of over 50m in length, although this was not investigated. There shallowness makes dating problematic also, but the post-trench/gully F88/9 in trenches V/VII contained abraded sherds of Roman pottery, which suggests that it may be Roman or later in date. Nonetheless, these hints plus the aerial photographic record and the geophysical survey of the Woodland Trust area to the south (Figs. 9 & 10) indicate that an extensive area of later prehistoric and later field systems exist in the immediate vicinity of the ringwork.

The pits and their possible uses

Given the small number of pits excavated (46), there are a number of different uses and depositional events evident, effectively mirroring interpretations given for sites such as Danebury where a large number of pits were excavated (Cunliffe 1991, 1992 & 1995). In only one case is there the strong possibility that the pit was used for storage of grain, pit F77 (Figs. 12 & 23), but hints of similar use in pits F15 and F126 (Fig. 12). From pit F77, emmer (*Triticum dicoccum*) and barley (*Hordeum* spp) were the main cereals observed in a frequency ratio of 3:2, but with very few weed seeds or carbonised chaff fragments observed.

The lower fills of F77 exhibited clear, regular, vertical boundaries between the weathered chalk of the pit sides and the carbonised ash material which strongly suggest the presence of former organic linings of this pit. There are at least two linings evident marked by two repeated sequences of a fine chalk 'slurry' followed by carbonised grain, fine charcoal and ash deposits over a thickness of about 1cm. This feature is further corroborated by two episodes of grain charring *in situ*, sandwiched by two episodes of partial cleaning out using a spade. If there had not been such linings, the abundant earthworm soil fauna would have completely destroyed these sharp boundaries by mixing processes. In one other instance (F220), the pit appears to have been roofed as there is a single central post-hole in the centre of the pit (Fig. 14).

Observations from much larger samples of pits at other Iron Age sites (Hillman 1981; Jones 1984 & 1995) have revealed that glume wheats (ie emmer) and barley were often stored together at the same stage of processing. The general lack of range of weed species has been observed at other contemporary Iron Age sites such as Danebury (Jones 1995), and may suggest selective harvesting of the ears separately from the straw, or methodical weeding and cleaning of the crop. On balance and following Hillman's criteria (1981), the composition of the samples in the base of pits F77 and F126 suggest that they were bulk storage deposits. The vertical ashy (phytolith-rich) lens which separates the two burnt layers may well represent a 'scorching' of the pit as a form of sterilisation (Reynolds 1981).

Secondary use of the pits is evident in the 'closure deposits' that some of them contain. Specific depositional acts incorporate a variety of artefact and bone types, including fragments of human skull (in F220), a complete adult male skeleton in F229, decorated spindle whorls and bone plaques, small pottery vessels and parts of articulated animal carcasses (eg a dog in F50). Backfill layers often seal these deposits,

indicating intentional deposition as opposed to casual discard.

The faunal remains suggest the overwhelming predominance of sheep and to a lesser extent cattle in the agricultural landscape. Although the relative abundance to grain production/consumption was not established, it could mirror Danebury (Cunliffe 1995) where meat production was less than one-third of grain production. This begins to change in the Roman period with greater abundance of cattle, which may indicate a more equal status between meat, grain production and consumption.

Comparable sites in the surrounding contemporary landscape of Cambridgeshire

Although good summaries of Iron Age enclosure sites in the region have been presented elsewhere (Evans 1992; Malim 1992; French and Pryor 1993), it is important to bring out some salient points here. In particular, it is noticeable how there is now a considerable concentration of enclosed/fortified sites in and around the modern city of Cambridge.

At Arbury Camp, on the north side of Cambridge, Wandlebury's closest comparable site in terms of size and shape, evidence for contemporary settlement is substantially lacking and it appears to have been set in open grassland (Evans and Knight 2002). Also, Arbury Camp does not appear to have been occupied past the 1st century BC, whereas at Wandlebury there is limited earlier Roman occupation in terms of pits, post trenches and midden material being present.

The entrance way architecture and the perfect circularity of the ditch and bank at Arbury Camp were undoubtedly imposing against the flat surrounding topography. Similarly at Wandlebury, as it appears too that it was situated in a substantially open landscape, the ramparts and ditches would have been imposing from the southern, southeastern and southwestern approaches, but invisible from the northern fenland side. This suggests that the position of Wandlebury was deliberate, not taking advantage of the natural topography to exploit the highest part of the land and the northern spur overlooking the fens. Rather, it was to be seen and connected to the chalk downland area immediately to its south. This was where its population and wealth were probably derived, not the fenlands and Cam valley to the north.

Elsewhere, Iron Age enclosures of the scale of Arbury Camp and Wandlebury would be considered as 'defended enclosures' or 'fortified settlements' (Taylor 1977; Chowne *et al* 1986). It may be better to view these sites as of long-term importance in the landscape where there was a need to demonstrate power of people, place and land, and control of and/or access to agricultural resources. Indeed this emphasis on their visual impact and communal definition through the very act of enclosure has been suggested by several author writers (Bowden and McOmish 1987; Sharples 1991). The monument form varies from an imposing circular monument such as Wandlebury or Arbury Camp to those placed in a commanding position on a natural spur of land, whether at War Ditches on the last chalk high ground before dipping into the fens, or on the last dry land before being submerged in the wet peat fen such as Wardy Hill, Coveney or Borough Fen site 7, with forms ranging from oval to circular to roughly D-shaped. Indeed, the 'defensiveness' of the ringwork enclosure may take many forms as several authors suggest (Pryor 1982; Evans and Serjeantson 1988; Evans and Hodder forthcoming). However it is argued, the ditches at all these sites are very substantial, and if they held water, as may well have been the case for at least part of the year, they would have been considerable imposing obstacles to pass, whether there were banks and/or palisades on the inside or not.

War Ditches, set 3km to the north of Wandlebury, may also be of some significance. Hughes (1904 & 1906) suggested that it was circular (*c.* 165m in diameter), surrounded by a steep V-shaped ditch of 3m depth and of 4–3rd centuries BC date and out of use by the 1st century BC. Nonetheless, Lethbridge's (1949) later work at the same site suggested that this site was incomplete on its eastern side and may have had a Bronze Age origin. Although most of this site is now quarried away, it would justify reappraisal to answer whether it is either a twin or precursor site to Wandlebury. Perhaps also, the long-lived prehistoric activity at the Babraham Road Park and Ride site (Hinman 1998) in the low ground immediately to the northwest of Wandlebury and southwest of War Ditches, hints at an extensively exploited and integrated Bronze Age landscape in which the Iron Age enclosures subsequently develop.

Recent investigations of the Borough Hill at Sawston (Taylor *et al* 1993; Mortimer 2001) have revealed a substantial D-shaped, multivallate enclosure, situated in the Cam river valley about 5km to the southwest of Wandlebury. The triple rampart/ditch sequence is not yet understood, but construction appears to have begun in the 5/4th centuries BC. Aside from the sheer scale of the three sets of ditches and banks, Early/Middle Iron Age settlement activity has been recorded from the centre of the enclosed area and later Iron Age material is seen to cover a much wider area but appears to be bounded by the ditched area. In addition, the well preserved buried soils beneath the ramparts produced worked and burnt flint of the Mesolithic to Bronze Age periods, and there is Roman occupation material, all of which signify very long-lived settlement activity.

There are two other possible contemporary enclosures on the western side of Cambridge which have seen limited investigations. The Ridgeon's Garden Site, Castle Hill (Alexander and Pullinger 1999: Enclosure IX), had a projected diameter of *c.* 100m with evidence of an entrance way structure, but is of later Iron Age date given that only Belgic pottery was recovered. The other nearby site of Marion Close, off Huntingdon Road, Cambridge, revealed a massive arc of Middle/Later Iron Age, V-shaped ditch that was 6m in width and 2.25m in depth with a palisade trench on its interior edge (Mortimer and Evans 1997). This site is also of comparable size to both Wandlebury and

Arbury Camp.

Recent archaeological investigations in the area around Wandlebury have also begun to indicate the apparent density of unenclosed settlement and land-use activity in the vicinity. In particular, the Robinson Way site at Addenbrookes Hospital has revealed an extensive rural later prehistoric and early Roman farmstead landscape with production areas for pottery in the 1st century AD, connected by well established routeways to all adjacent areas (D MacKay and C Evans, pers comm). In addition, immediately to the south of Wandlebury, an area of land planted by the Woodland Trust has been geophysically surveyed and has revealed (GSB Prospection 1998) farmsteads, possibly pit alignments and associated enclosures (Figs. 8–10). Whilst these landscape features have not been investigated by excavation nor dated, they appear from the aerial photographic record (CUCAP, BY-75, 1949) to be part of a widely and densely utilised, later prehistoric landscape to the south of Wandlebury. Speculating a little, this area could be a grain and meat procurement zone for a site like Wandlebury.

Conclusions and further work

It is now very clear that we are dealing with a very extensive Iron Age, apparently unenclosed, settlement which either just pre-dates or is contemporary with the first ringwork at Wandlebury, probably from the mid-5th century BC. The ringwork continues to see occupation right into the 2nd century AD, but on a much less extensive scale by the later Iron Age and earlier Roman period. This open settlement appears to be concentrated in the southern third of Varley's Field and in the eastern sector of the superimposed ringwork. Re-examination of the aerial photographic record from the 1950s and 1960s would suggest that this same dense area of pits continues southwards down the hill-side and into the arable fields beyond the cricket pitch to the south and southeast of the ringwork. In future years the extent, date, relationships and forms of these features will also have to be assessed.

Despite the Iron Age pottery suggesting that the main period of settlement represented is about 500–300 BC, there are strong indications of very long-lived use of the hill-top. The general scatter of prehistoric flints across Varley's Field indicates that it was at least frequented in the 3rd and 2nd millennia BC. In addition, the relatively small quantities of later Iron Age and Roman pottery wares indicate continued use of the hill-top outside and inside the hill-fort into the earlier 1st millennium AD.

Thus this evaluation has reinforced our impression of the hill-top as one of variable intensity, but long-term activity and importance, and one that it is fully integrated into a much wider landscape.

Further work must appraise the extent and nature of use of the hill-top and ringwork enclosures throughout the later prehistoric and Roman periods, and the constructional and settlement relationships. This must involve further larger scale, intensive survey and excavations. It needs to set out to examine the spatial aspects of the organisation of the settlement related to the earlier and later use of the hill-top, both inside and outside the ringwork, the reasons for the siting of the monument, provide comprehensive dating evidence and further elucidate the contemporary environments and land-use of the hill-top.

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