PN 1188

Tutbury Castle, Staffordshire

A Programme of Archaeological Work, 2004

Project No. 1188
October 2004

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Contents

Illustrations

11. Composite pointcloud DEM of interior ward
12. Aerial photograph mosaic
13. Areas of ridge and furrow
14. All elements extracted from aerial photographs
15. Vestigial remains in school lawns
16. Westerly portion of linear earthworks looking southeast
17. Westerly portion of linear earthworks looking northwest
18. Aerial photograph draped over DEM showing position of Park Pale linears
19. Position of Park Pale shown on TIN
20. Curving bank and outer ditch
21. Plan of Area 1
22. Area 1, sections of sondages 1 & 2
23. Plan of Area 2
24. Area 2, Sondage 1, west facing section
25. Area 2, Sondage 2, east facing section
26. Area 2, Sondage 3, east facing section

Tutbury Castle, Staffordshire: A Programme of Archaeological Work, 2004

Summary

In June 2004 a programme of archaeological work was carried out at Tutbury Castle, Staffordshire at the behest of Mrs Lesley Smith, the lessee. The project was based around a training excavation for students of the Institute of Archaeology and Antiquity, University of Birmingham, and, in addition to excavation, included geophysical survey, topographical survey and building recording.

The castle, which was established circa 1070, comprises a motte and three baileys. It came to the crown as part of the Duchy of Lancaster estates in 1399, and was substantially rebuilt in stone during the fifteenth century, a project that included the insertion of the north and south towers into the line of the Norman rampart.

Excavation was carried out within the inner bailey adjacent to the north (Area 1) and south (Area 2) towers, both areas that formed gaps in the inner bailey rampart, and which had first been examined in the 1980s.

In Area 1 the natural subsoil was reached in two sondages at 1.54m and 1.72 beneath the existing ground surface. The layers immediately above natural produced a small number of worked flints including three Mesolithic blades. Dating evidence for the overlying layers was limited to a single sherd of 11th-century pottery, stratified immediately above one of the putative Mesolithic layers. Beneath the overburden was a compact clay and pebble layer, 1.10m thick, which appeared to cover most of the area in front of the North Tower, and which seemed to represent a yard area associated with the tower. At the southwest angle of the excavation the corner of a stone building was excavated, probably the plinth for a timber-framed structure, and in the traditional position of the building in which Mary Stuart was lodged during her incarceration at Tutbury.

In Area 2 the excavation of three sondages demonstrated that the lower levels of the Norman rampart survived below current ground level. One of these areas produced a number of 11th-12th century sherds including Stamford Ware, which seemed to confirm that the rampart dated from the foundation of the castle.

Resistivity and G(round) P(enetrating) R(adar) surveys of the inner bailey revealed a number of possible building foundations and floors of rectilinear plan. None of these could be phased, but the results of the survey do demonstrate the high archaeological potential of this part of the castle and suggest that excavation in these areas should prove rewarding.

1.0 Introduction

A programme of archaeological work was carried out at Tutbury Castle, Staffordshire over the three-week period 1-18 June. The archaeological programme was centred around a training excavation for first and second year undergraduates from the Institute of Archaeology and Antiquity, University of Birmingham, and included excavation, building recording, and geophysical and topographical survey. This programme was seen very much as a pilot study to assess the castle's archaeological potential. The work was instigated by Mrs Lesley Smith, the lessee of Tutbury Castle, as part of a wider research programme on the castle and town being co-ordinated by Dr Gareth Williams of the British Museum. The professional direction and supervision of the archaeological fieldwork was undertaken by the staff of the Institute and its commercial wing, Birmingham Archaeology.

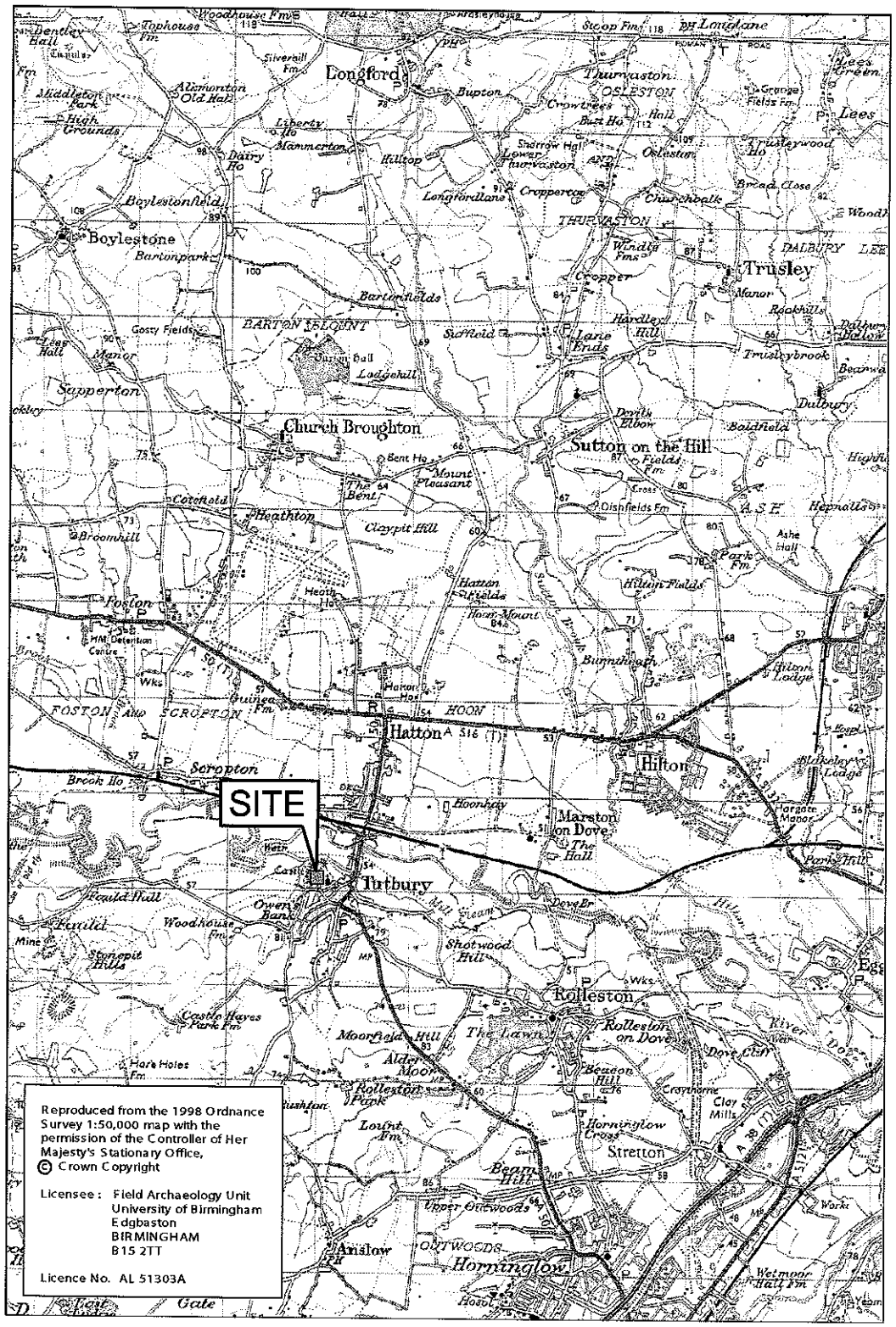

Fig.1 Location map

2.0 Location and Site Description

Tutbury Castle is situated on the northern edge of the town of Tutbury, East Staffordshire at NGR SK20952915. It lies on the south side of the River Dove, which forms the county boundary with Derbyshire (Fig. 1)

The castle is built on an elevated position above the River Dove, a steep western face providing a natural defence. It is a motte and bailey castle, but in addition to the main courtyard there were two outer baileys on the line of the approach to the gateway. Apart from the earthworks the earliest visible remains are the

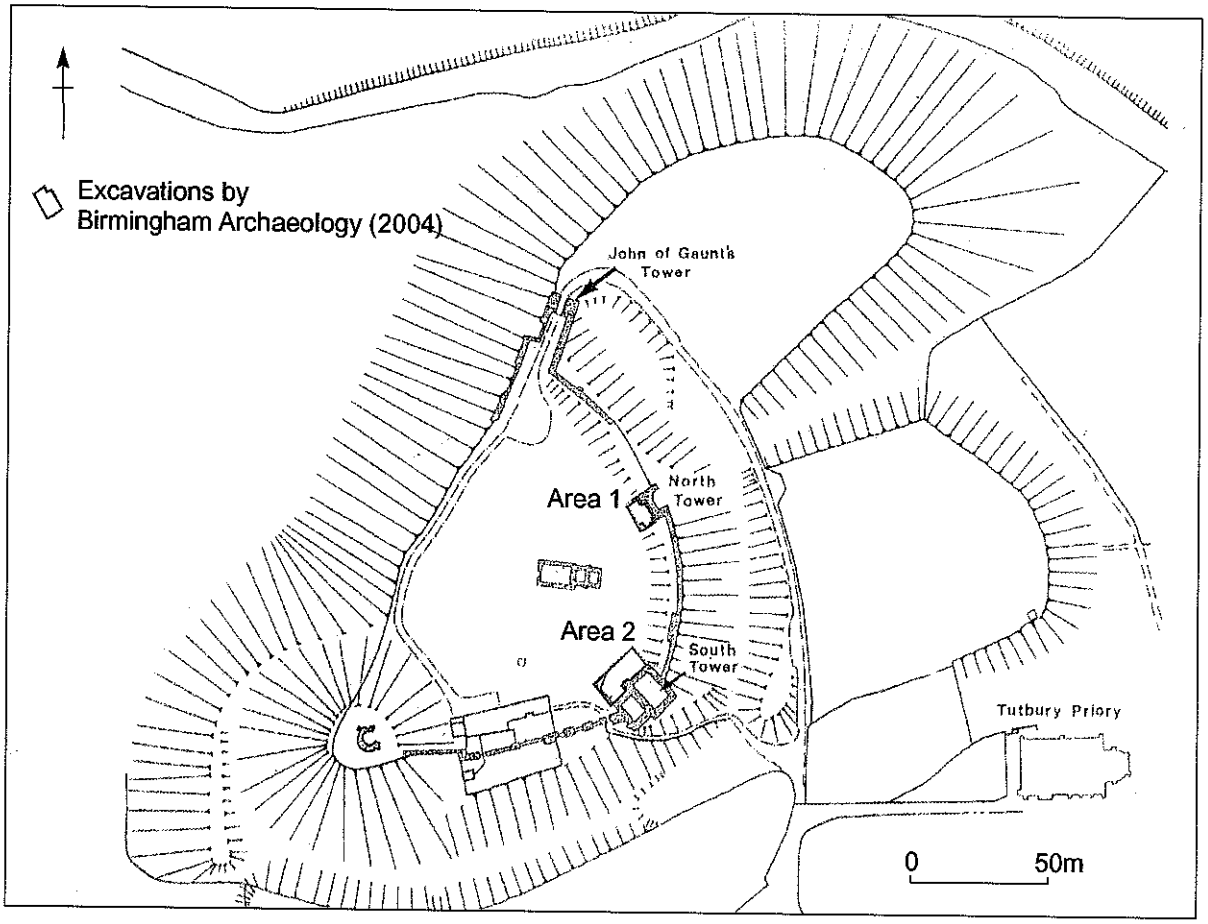

Fig.2 Plan of castle

foundations of the 12th-century chapel in the inner bailey. The gatehouse to the inner bailey is a plain rectangular tower with fourteenth-century details, and later outer turrets or barbican. The inner bailey is enclosed by a 15th-century curtain from which project two large residential towers.

Immediately to the southeast of the outermost bailey is the 12th-century priory church of St Mary. Around the town are several lengths of a linear earthwork known as the Park Pale, the significance of which has yet to be confirmed, but which may represent the boundary ditch of the medieval town.

The castle is heavily ruined, with only a small proportion of the original structure still above ground level. However, in the inner bailey it is evident that the ground level has risen significantly since the Middle Ages, and it is likely that further structural remains exist below the current ground surface. The outer baileys are currently almost entirely devoid of upstanding buildings, but it is probable that these areas too were once at least partially occupied by structures.

3.0 Previous Archaeological Work

There appear to have been four phases of earlier excavation or investigation of the castle:

- In 1913, by persons unknown, probably as part of the refurbishment of the castle by the duchy which took place in that year. A plan of the castle was produced at this time.
- In 1929 by Major T.H. Oakden, presumably on behalf of the duchy.
- In 1955-57 Robert Somerville excavated the Chapel of St Peter in the inner courtyard on behalf of the duchy.

- In 1986-88 Staffordshire County Council undertook excavation in four separate locations.

  Investigation of a mound in the ditch on the east side of the inner bailey revealed a series of post-medieval deposits and two pits cut into the ditch, also of post-medieval date.

  Two small trenches excavated in the ditch between the two outer baileys, and recovered only post-medieval material, but it was noted that the unexcavated deposits reached were 'almost certainly medieval in origin'.

  A trench excavated to the north of the South Tower located the stone foundations of a wall aligned at right angles to the tower. There was a mass of sandstone rubble, window and roof lead, glass and musket balls over the whole area.

  A trench was also excavated along the southwest side of the South Tower. This trench revealed two corner wall foundations, and a mass of pins, pottery, glass and window lead.

  In addition, a substantial amount of building recording was carried out. This has yet to be fully evaluated but appears to have included most of the curtain wall and the 18th-century tower on top of the motte.

- In 2003 a geophysical survey was carried out on a small area within the inner bailey by Derby University.

4.0 Non-Invasive Investigation

The non-invasive investigations undertaken as part of the 2004 season at Tutbury should be regarded as the initial stages of an ongoing non-destructive exploration at Tutbury, which aims to examine the castle within its local and broader landscape contexts. As such the work completed in 2004 should be regarded at least in part only as a reconnaissance upon which further work can be built. A variety of techniques were built into the 2004 season to test the validity of these potential recording and investigative methods towards a future refining of the investigative methodology. The work can be broken down into two broad areas of field research.

- Work onsite, within the curtilage of the castle itself. This included elements of control, topographic and building survey together with some geophysical survey of the interior ward and examination of available aerial photography.

- Work offsite, within a 2km. Sq. block surrounding the castle. This included a detailed examination of four aerial photo tiles surrounding the castle, a consideration of the local topography and the survey of several offsite earthworks.

4.1 On-Site

Establishing the survey control point network and geophysical survey grid

An initial reconnaissance was carried out to select the most suitable locations for a series of permanent survey stations, where possible existing permanent features were selected for marking. However, this did not prove possible in the majority of control station positions and permanent pin-mark type markers were drilled into suitable hard surfaces. Care was taken to ensure that these were only placed in recent fabrics. One short-stem ground anchor was used to mark a permanent GPS base station on the castle motte. Here again the location was chosen to avoid any disturbance of sensitive archaeological remains. Sufficient control stations were fixed to allow a full cover of the site with intervisibility between stations, to facilitate later occupation by optical survey instruments. Each survey station is fully documented in

hard and digital formats. The nodes of the geophysical grid laid out within the inner ward of the castle were also fixed at this time, though these were only marked with temporary plastic pegs which were subsequently removed.

The control survey was accomplished using Differential GPS. This technique enables a positional fix to sub-centimetre accuracy. A Leica System 500 GPS being used to create this control framework. A base station was positioned on the castle motte with this position subsequently corrected to Ordnance Survey grid using RINEX data for post processing. The end product from this part of the survey being a series of permanently marked survey control stations designed to function as the basis for all subsequent survey work in 2004 and any subsequent seasons. Attention to this level of survey will ensure that all subsequent work, including distant remote sensing and ground-based geophysical prospection, is carried out within a common co-ordinate system, so making all data sets available to spatial analysis. This will also help facilitate the detailed 3-D topographic modelling of the Focus Area and the positioning of all subsequent ground truthing interventions.

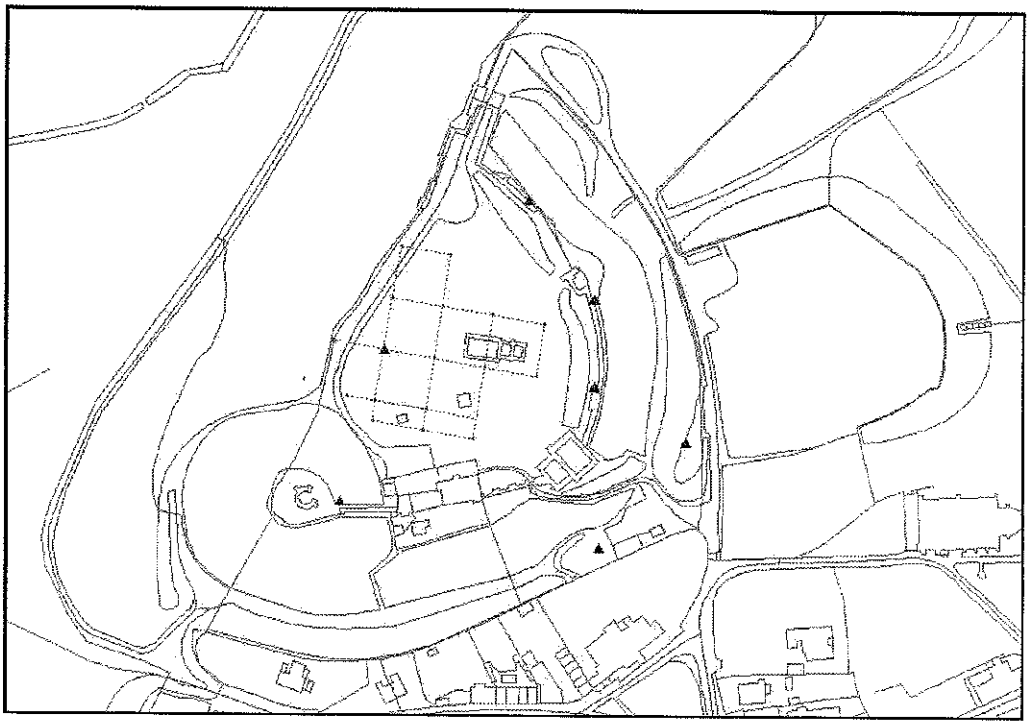

Fig. 3 Positions of main control stations and geophysics grid

The castle earthworks are complex and extensive occupying an area of some 74,623 sq. m. in total, comprising the inner ward of the castle together with two outer baileys, which lie to the east and north-east. Each of the three enclosures are roughly equal in size, the inner ward being the larger, having an internal area of some 9,304 sq.m., the north-eastern bailey 8,385 sq.m., and the smaller eastern bailey 7,343 sq.m.. It is also worth noting here that the motte itself, which lies at the south-western corner of the whole complex, occupies an area of some 5,135 sq.m. making it a very substantial castle mound. The existing Ordnance Survey plan of the castle earthworks and the 1983 topographic survey record the main features of the castle earthworks. Therefore in this initial season no attempt was made to undertake a more detailed conventional survey of the castle earthworks, though this will be undertaken as a part of subsequent seasons' work. Instead two other survey techniques were employed as part of this first season's work. The first of these was to geo-register the available aerial photography to the area of the castle to facilitate a detailed examination of this photography. This to be in advance of a future programme of aerial photographic work designed to identify and examine any existing earlier archived photography. The reasoning behind this part of the investigation was that any substantial buried structures may show as conventional AP vegetation marks if photography exists taken under suitable conditions.

Preliminary aerial photographic investigation of castle interior

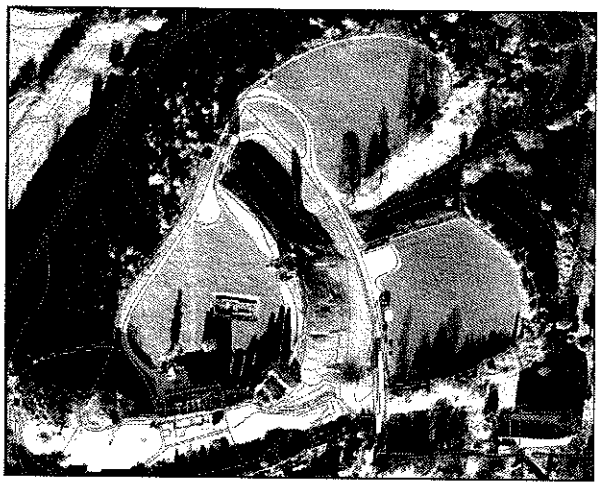

Fig. 4 Aerial Photo sub-set of castle interior, georectified to OS

A visual inspection of the surfaces of the inner baileys on this particular set of aerial photography showed no real conclusive evidence of any buried structures. There are however several elements worthy of comment.

♦ In the inner bailey, under grass, two linears are clearly visible. One light coloured straight linear runs roughly north to south between OSNGR 420911,329215 and 420913,329140. This appears to be modern in origin, possibly a vehicle track. A second linear, which runs east west between 420951,329196 and 420906,329195, appears to be a shallow depression. A roughly rectangular platform-like feature with sides of 9m is centred at 420892,329179.

♦ In the northeast bailey, also under grass, little is visible. There is however a very slight indication of a rectangular mark centred at 421014,329287. This appears to cross the general mow lines to give a rectangle some 22m northeast to southwest by 8m transversely. This is a very tentative identification.

♦ Nothing was identified in the southeastern bailey interior.

♦ On the eastern outer flank of the inner bailey, centred at 420987,329184, a series of linear features are visible on the face of the rampart. These appear to be erosion marks, possibly the result of animal poaching.

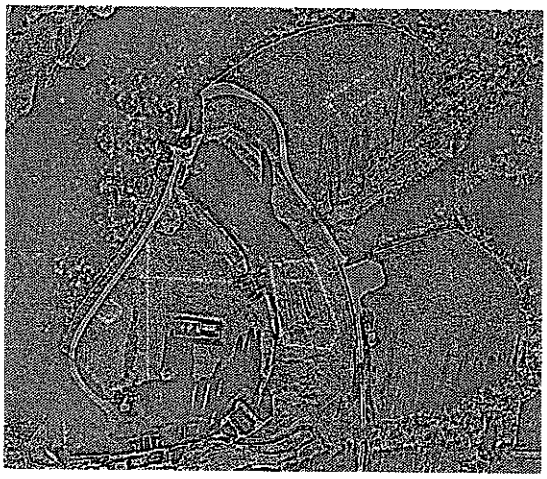

Fig. 5 AP sub-set edge enhanced showing elements described in text

In an attempt to possibly amplify some of these marks the image was subjected to an edge enhancement processing (Fig. 3). Though this appears to confirm the findings noted above, it did not add to the interpretation.

Geophysical survey of the inner castle ward

In this initial season only two geophysical techniques were employed, Resitivity and Ground Penetrating Radar (GPR), the former (Resistivity) being used as the primary investigative method. This initial investigation was applied only to the inner of the three enclosures. Resistivity involves passing current through the earth and measuring the changes in resistance, which relate to buried archaeological structures in the first metre beneath the surface. Stone structures are generally poor electrical conductors, compared to the surrounding soil and therefore show an increase in resistance, whereas filled features, such as ditches and pits, tend to retain water and are therefore enhanced conductors when compared to the surrounding ground, and thus show a lowering of resistance. GPR sends a powerful radar beam into the earth, recording features, in this case, up to a depth of 3 metres and in 3-D. The data collected using these two complimentary techniques is collected in the same spatial framework using grids positioned by either GPS or Total Station to facilitate later integration.

Resistivity

The resistivity survey was carried out using a Geoscan RM15 resistivity metre with a twin probe configuration. The survey grid was laid out in the interior ward in an orientation designed to maximise the potential coverage and grid spacing was at twenty metres. Each grid node being marked by a temporary plastic peg, and each peg being positioned as a part of the DGPS control survey. Resistivity data was collected using a series of Zig-Zag traverses in a roughly east to west orientation. The traverse intervals were 1m with sample intervals at 0.5m. The northern segment of the castle ward was occupied by a substantial marquee at the time of the survey, so this area was excluded from the survey. The excavated area of the chapel, in the east of the survey area, was also excluded, as were compacted areas of gravel in the southeast and the immediate surroundings of three specimen trees. In all, therefore, eleven 20m grids were surveyed, though only two of these were complete grids. Figure 4 below shows the grid in its planimetric position with the raw data following the initial processing of despiking, and edge matching.

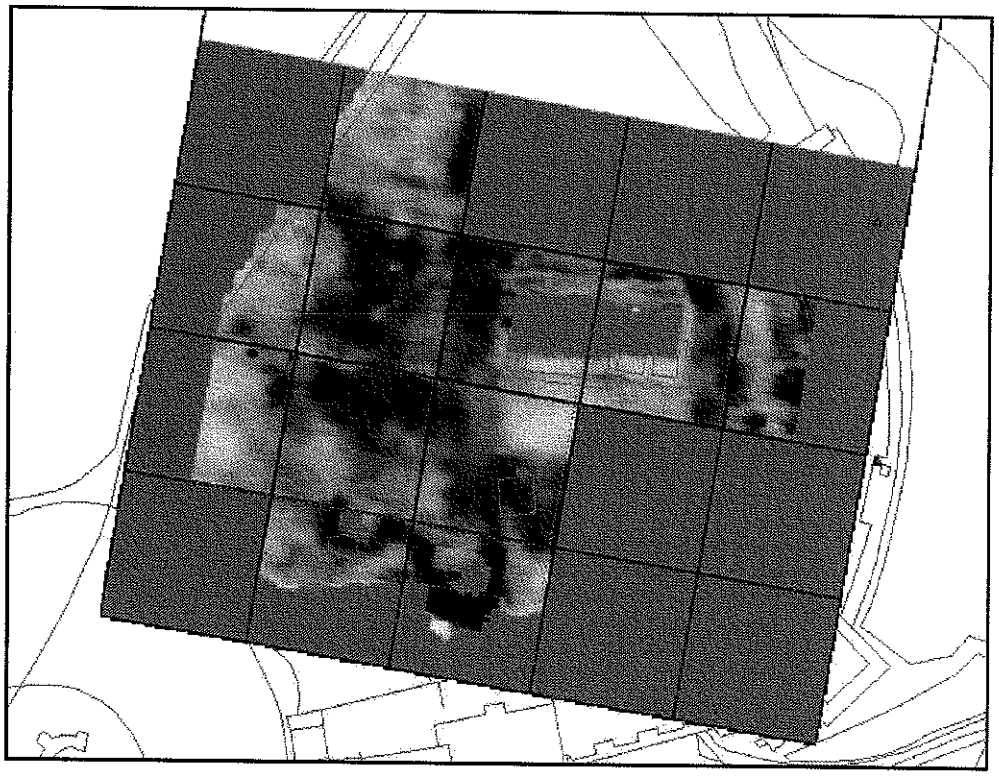

Fig. 6 Results of resistivity survey

The blank, un-surveyed area of the excavated chapel can be seen in the northeast quadrant of the survey as can the position of the trees in the south of the grid. The gravel approach road flanks the grid in the northwest, the motte in the southwest and the standing castle buildings in the south. The results clearly show that there are considerable changes of resistance within the study area, the darker areas relating to high resistance readings and the lighter to lower readings. The high readings around the trees in the south, (420898,329144. 420917,329138 and 420923,329150) almost certainly relate to the dry soil conditions in the immediate vicinity of the trees. However the substantial, roughly rectangular, areas of high resistance west of the chapel, centred at 420902,329178 and 420903,329162 and east of the chapel at 420953,329165 appear to relate to substantial compacted areas of stone-like material. The most likely explanation for these anomalies being that they represent the positions of compacted building collapse, possibly the rubble and floors of a range of demolished buildings. Areas of lower resistance, showing as lighter coloured rectangles, centred at 420926,329157. 420910,329148 and 420895,329154 may relate to rectangular pits or depressions.

A closer examination of the patterning visible within the data plot also shows a series of lighter coloured, quite regular linear features which appear to run roughly around the peripheries of the high resistance areas in the west of the study area. These appear to be arranged in an organised rectilinear patterning and have an average width of 0.5m. It is possible that these are a manifestation created in the processing.

However, it is also tantalisingly possible that they could represent the robbed out foundation trenches of the buildings, whose compacted interior platforms are represented by the higher resistance areas. Figure 5 below shows a plot of the data with an interpretation of these linears over- traced.

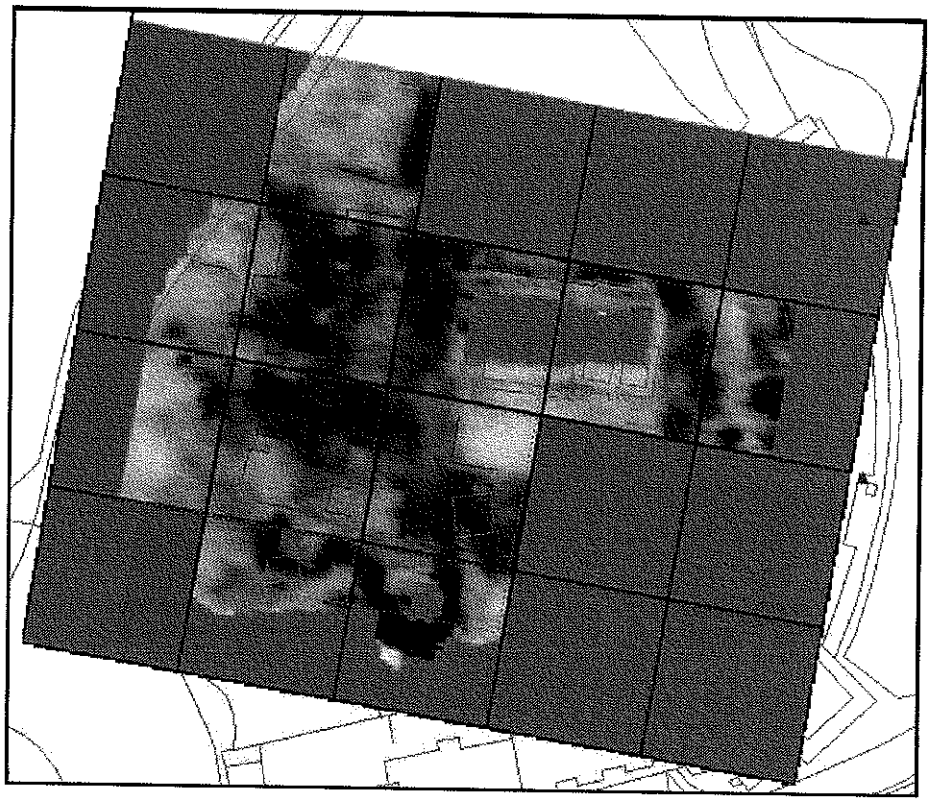

Fig. 7 Initial interpretation of resistivity

Ground Penetrating Radar

A GPR survey covering the same area as the resistivity survey in the inner ward was also undertaken. Initial inspection of this data set, which awaits further processing, suggests that it confirms the broad outlines described in relation to the resistivity survey. A sample area on top of the motte was also investigated but did not show any evidence of any significant anomalies. The full GPR data set awaits further processing and assimilation into the project GIS.

Laser scan survey of inner castle inner ward

In the spirit of experimentation of methodologies outlined above (pg.1 para.1) a ground-based laser scan survey of the castle was initiated in the inner ward of the castle. Two aims were intended for this survey, one to examine the potential for recording the standing elevations of the castle buildings, a conventional use for point cloud survey. Two to explore the potential for ground based LiDAR for recording the topographic surfaces of the castle earthworks.

Laser scanning has become increasingly accepted over the last few years as a reliable and cost effective technique for land surveying and GIS data capture. Such point cloud reflectorless laser measurements are sufficiently accurate to meet the requirements of most surveys. The speed of such laser scanning offering a considerable advantage over alternative methods such as GPS and robotic total stations. It is the *high density* of co-ordinate data that fundamentally distinguishes this technology from as-built, detail and engineering surveying based on the more discrete point methods. When high-density data (i.e. laser scan "point cloud") is viewed on a computer screen, as a 3-D visualisation, it provides powerful "high-definition" information, which may be processed and analysed in a variety of ways.

Such new technology commands high initial costs and the potential higher quality, more complete deliverables are products designed primarily with the commercial sector in mind. However the non-destructive recording of standing archaeological monuments is an area which traditionally demands high definition recording. Archaeological survey is also a discipline, which has readily assimilated the developments of Total Station and GPS survey techniques into its overall methodology. Neither have its practitioners been slow in recognising that the dense digital data sets offered by laser scanning offer a very rapid and detailed record of cultural structures which may be at risk from a variety of destructive elements.

To carry out the scanning a Cyrax 2500 3D laser scanner was used. The Cyrax 2500 scanner, now re-branded as the Leica HDS2500 is an instrument that has proved itself a practical means of data capture since its introduction some 2 years ago. The specification of the 2500 offers a maximum 40° x 40° field-of-view, a single-point range accuracy of +/- 4mm, angular accuracy's of +/- 60 micro-radians, and a beam spot size of only 6mm from 0-50m range and is capable of delivering survey-grade accuracy. Its 360° x 195° pan & tilt mount and dual internal rotating mirrors enable it to be deployed in virtually any orientation. The scanning head itself, though a substantial instrument weighing nearly 30 kilos, is capable of being utilised in a variety of field situations either tripod mounted or free standing. Scanning is controlled via a laptop computer running a dedicated software suite with the name of 'Cyclone'.

Scanning work was commenced in the interior of the inner ward. The methodology employed being to initially position control marks to facilitate the assembly of the separate scans into a composite. These were positioned by Total Station to the already established GPS control framework and were designed not as positions for the scanner itself but as control points necessary within each so-called scan world. Such control points are similar to the photo control points necessary to accomplish a photogrammetric survey. For scanning purposes a minimum of three fixed points, common to adjacent scanned scenes, is necessary to accomplish the joining of the separate scene into composites. If the final product is to be within co-ordinate space, then it is necessary also that a well spread out selection of these points, are fixed within a common co-ordinate framework. In the Tutbury survey each such point was fixed into an already existing local co-ordinate framework, using a combination of GPS and Reflectorless Total Station. The GPS used being a Leica 500 series and the Total Station a Leica TCR307. Conventional survey methods were used to establish the accurate horizontal and vertical control that is critical to this type of project. If the control is not exact, the scans cannot be accurately registered. Both onboard logging and field computer logging was used with the Total Station. The latter accomplished using PenMap software; this combination was employed as it facilitates a graphic representation of the data as collected in the field.

The physical form of the control points themselves was varied according to the application. While it is possible to select identifiable points within the target scan area it is easier in later processing to have formal targets. With this in mind where possible targets were set on, or in, the vicinity of the monument to be recorded. For all external scan areas ball targets were used. For internal and smaller areas more conventional proprietary scan targets, as supplied with the Cyrax, were used. The Cyrax scanner collects some 1000 points per second at a resolution which can be set by the operator, depending on the level of detail required to be recorded. An average resolution scan at point intervals of 5mm taking some 10 minutes, an example of a single scan is reproduced as figure 6.

Building Recording

A detailed record of the surviving fabric of the castle buildings was commenced with the scanning of the post-medieval house currently occupied by the castle offices. Scans were recorded at resolutions varying from 15mm to 1mm, as appropriate for the complexity of the architecture. The latter resolution being used only to record diagnostic details of fabric. The scans quite clearly show the complexity of fabric to the level of individual brick and record areas where there has been structural movement in the walling and or later patchwork of the fabric.

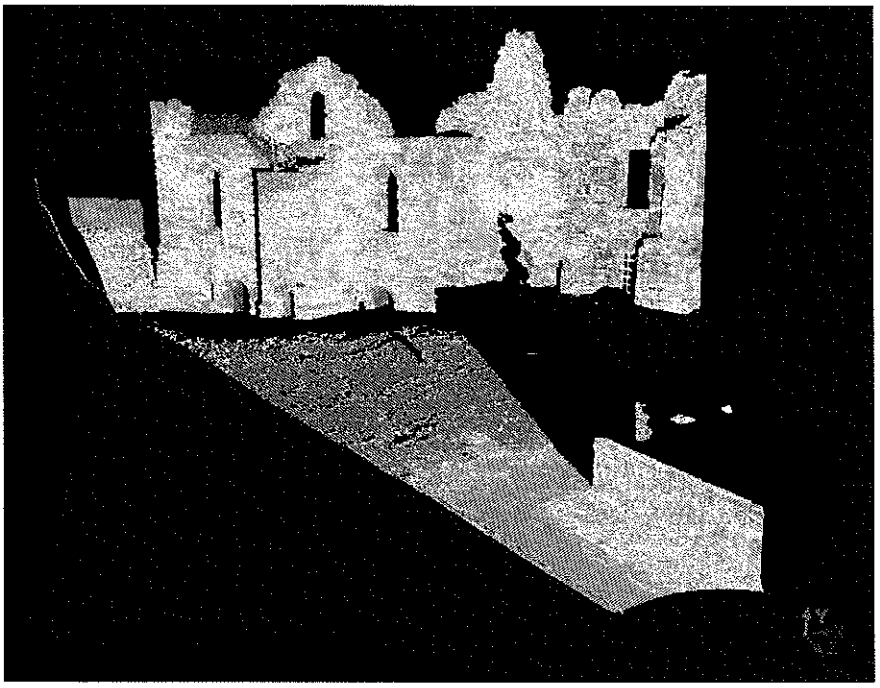

Fig. 8 Example of a single 40 degree scan

Using this laser technology, the as-built record was completed safer, faster and in greater detail than if the structure had been recorded conventionally. And, instead of hundreds of points captured conventionally, the Cyrax technology captured literally millions of points that can be transformed into two- dimensional plan drawings and/or three-dimensional models to provide virtually any view of the structure required. One further advantage to using this technology on historic or fragile structures is the ability to obtain very detailed mapping of an area to be surveyed without physically touching the surface.

A secondary property of the false colour images produced by the scanner, whereby the intensity of the laser return from varying surfaces is reflected in the image is worthy of note. This property appears to have the potential to establish a range of diagnostic spectoral signatures for different material. At its crudest level separating wood, stone, brick, plaster, metal etc. However with refinement it is possible that this characteristic of the scan could be refined to provide a finer grained material identification.

Fig. 9 Scan of building façade at 100mm resolution

It should be noted that the element shown here is a tiny portion of what is a substantial data set relating to the castle interior. This data set provides a detailed primary record of the castle fabric as it stood in the spring and summer of 2004. Considerable processing work remains still to be completed to fully extract the full information available embedded within this data set. However it is fair to say that the data collection part of the recording process shows considerable promise for the validity of this type of building survey.

Topographic Surfaces

A secondary aim of the laser scanning was to explore the application of this type of survey to record archaeological earthworks. Airborne LiDAR has demonstrated that extant earthworks

Fig 10 Detail of Fig 9 showing different fabrics recorded in elevation

can be recorded using a point cloud type of data capture. In the case of the castle earthworks, where much of the archaeological land surface is exposed and under a short lawned grass cover this would appear to be a possibility. Where possible scanning was carried out from a high vantage point. Clearly this would not be the case where vegetation cover obscures the land surface. In effect the laser is used to create a DEM of the surface similar to that created by a Total Station spot height network or by a DGPS kinematic survey. It should however be noted that none of these methods provide the level of earthwork interpretation that is available by the detailed interaction of the surveyor with the earthworks when using more traditional methods. The long term aim in the recording of the Tutbury castle earthworks will be to integrate the DEM techniques and the traditional.

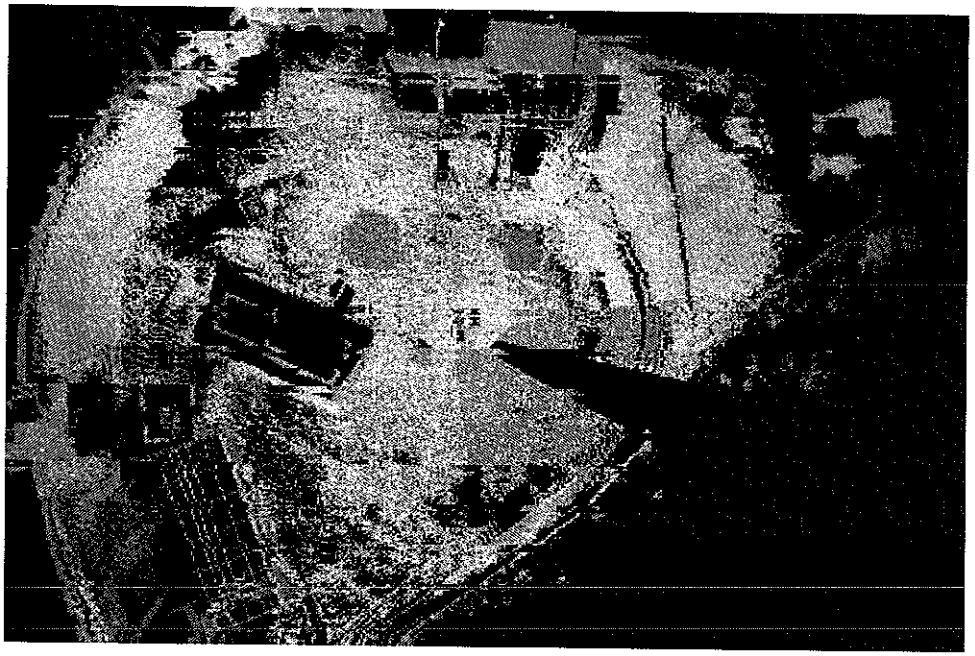

Fig. 11 Composite pointcloud DEM of interior ward

Figure 11 shows a composite of 11 individual scans, fused using common control points to create a single pointcloud record of the inner ward of the castle. Considerable editing and processing is still required to extract the topographic surface alone from the cloud. However subtle topographic changes are clearly visible within the data set. Further work is to be undertaken to edit out all standing structures and to model the topographic surface in suitable software in collaboration with Leica UK.

Fig.12 AP mosaic

In summary the laser-scanning programme at Tutbury is, as the technology itself, still in its comparative infancy but it does appear to offer some real advantages to the rapid recording of large area heritage sites. It is intended to full explore this potential and to fully document the methodology as it develops. It seems certain that while laser scanning is not likely to be a universal answer in all cases it does seem that it will have a distinctive role to play in the future of archaeological survey.

4.2 Off-Site

A fundamental aim of the Tutbury Castle Project is to consider the castle not only in its own right but also in its relationship to the landscape of which it is, and has been throughout its long life, a component part. Ultimately it is intended to consider the broader landscape context, but within the confines of the 2004 field season the landscape under consideration was limited to the 4 square km surrounding the castle. The work undertaken in this respect included a detailed examination of four aerial photo tiles surrounding the castle, a consideration of the local topography and the survey of several offsite earthworks.

Aerial Photo Interpretation

Four 1km sq. tiles of aerial photography were obtained in advance of the 2004 fieldwork season. The APs were colour, flown in 2000 and had a resolution of 25cm. They were supplied to the project in digital form and archived in tif format. The four tiles were combined as a single mosaic and geo-registered to Ordnance Survey Landline digital mapping.

The aerial photography was subjected to visual inspection within the image processing module of ArcView, Image Analyst. Features noted as of potential archaeological significance were then on screen digitised as a series of separate themes, each relating to the morphology of the identified feature. The known archaeological features within the scene, i.e. the castle and the so-called 'park pale' earthworks, although examined, were not extracted in this fashion.

Three broad themes of feature were identified, areas of ridge and furrow, man-made drainage features and miscellaneous linear works. These are described briefly below:

It is perhaps worth first defining what is being referred to by the term ridge and furrow. Ridge and furrow, sometimes shortened to the term Rig is comprised of a series of long narrow ridges of raised soil, lying parallel to each other and usually arranged in blocks. These distinctive earthworks are comparatively a common survival on the heavy soils of the Midlands. They are produced by the action of a heavy plough capable of turning over a sod and by the repeated ploughing of a narrow strip of land over a long period of time. The occurrence of R/F means therefore that either ridges have been deliberately built up, possibly to improve drainage, or that there is a constraint on the land, possibly through ownership. Ridge and furrow may be and has been created over a long period of the agricultural history of the landscape and may therefore be quite modern in origin. Where it occurs as a series of interlocking blocks of strips these are known as furlongs. When the individual strips are broad and show a characteristic reversed curve shape in plan, caused by the need to turn a large plough team, it is usual to attribute the features to the medieval period (C. Taylor 1975).

Several such blocks of ridge and furrow can be identified surviving in the farm land surrounding Tutbury. Although perhaps not the most exciting of our archaeological field monuments, ridge and furrow is an important component of both our past and contemporary landscape. This is particularly true of the vestiges which survive within the vicinity of the castle and town as they provide definite evidence for the past agricultural use of the landscape. Three distinct blocks of ridge and furrow can be identified in the photography.

To the southeast of the town centred at 421846,328121 on comparatively high ground, at a height of some 62m on the old river terrace, is a well preserved block of five interlocking furlongs of ridge and furrow (A on Fig 12). They are extremely well defined in the photography and appear to be well preserved under pasture. The block exhibits the characteristics of broad reverse S-shaped ridges ending on distinct headlands which separate the individual furlongs. Their condition makes them an important survival and in their association with the medieval town and castle worthy of more detailed recording and possible preservation. In close association to this block, lying to the west between 421623,328204 and 421228,328230 is a second long strip of ridge and furrow. Less characteristically medieval it is likely by association to be contemporary to the eastern block. A series of three short linear ditches to the north of this furlong may in some way be associated, but their age and purpose is not apparent from the photography alone.

In the opposite corner of the study area, (B on Fig 12) centred at 420439,329763 in pasture, is a second equally well-preserved area of ridge and furrow. In contrast to that described above, this block lies on the floor of the current flood plain on the north bank of the river. Here again the characteristics of reverse S-shaped ridges, though less pronounced, and interlocking furlongs are present, possibly suggesting that the earthworks belong to a similar early period of open field land management. However it is possible here that the ridge and furrow may have its origins in the need to provide drainage in an area likely to be subject to periodic flooding. A series of possibly linear drainage ditches may also form a part of this

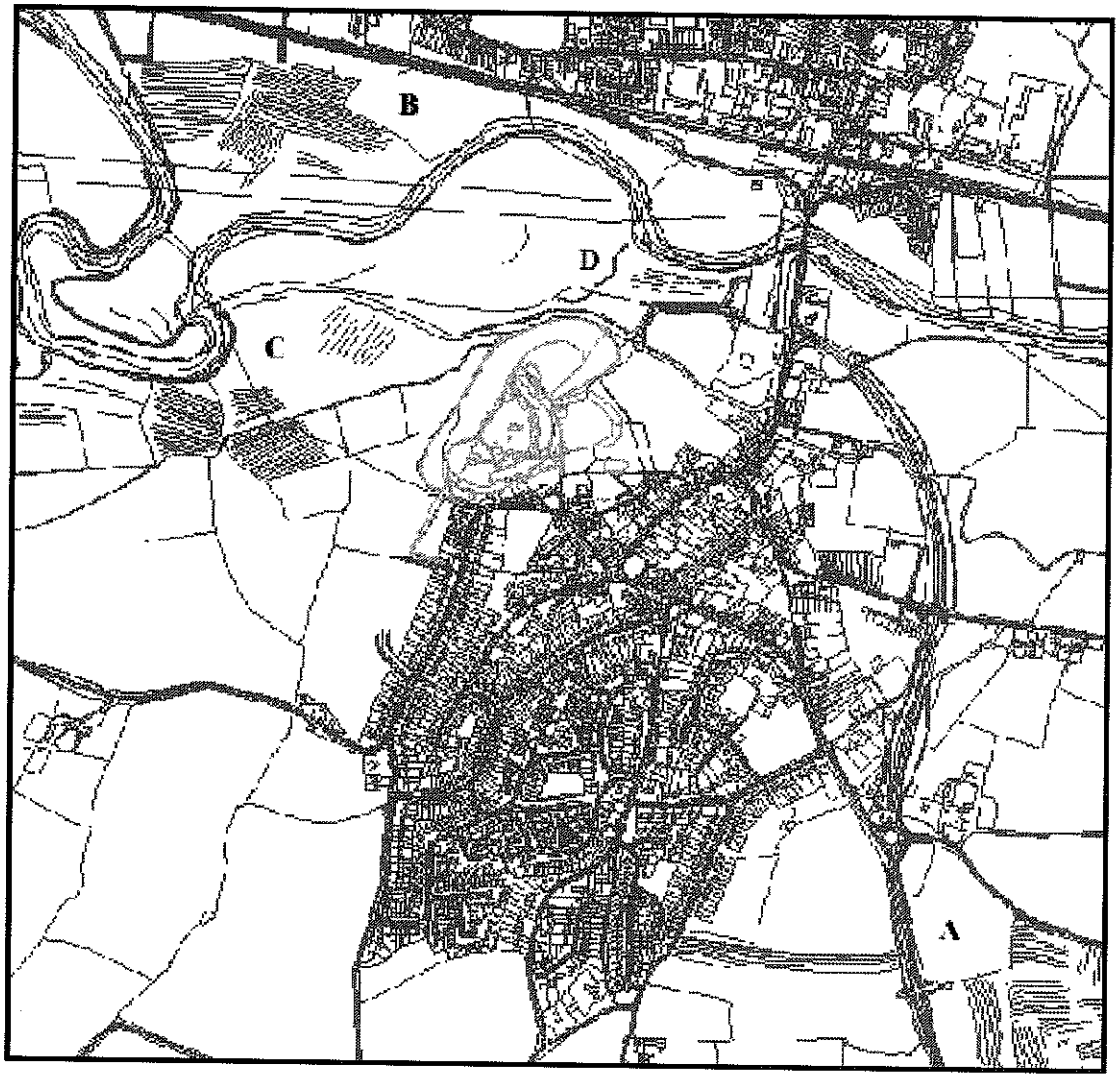

Fig. 13 Areas of ridge and furrow

water management system.

Further areas of ridge and furrow can also be recognized in areas 'C' and 'D' on Fig 12, centred at 420447,329262 and 421159,329445 respectively, again lying under pasture on the river flood plane. Each of these is less distinct than those areas already described and appear less well preserved. They occur in the proximity of a series of linear ditches, again possibly suggesting an origin for the creation of the ridge and furrow in the requirement to enhance drainage. Figure 13 below shows a composite plot of those elements potentially belonging to the medieval landscape extracted from the AP together with the position of the river, castle and park pale earthworks.

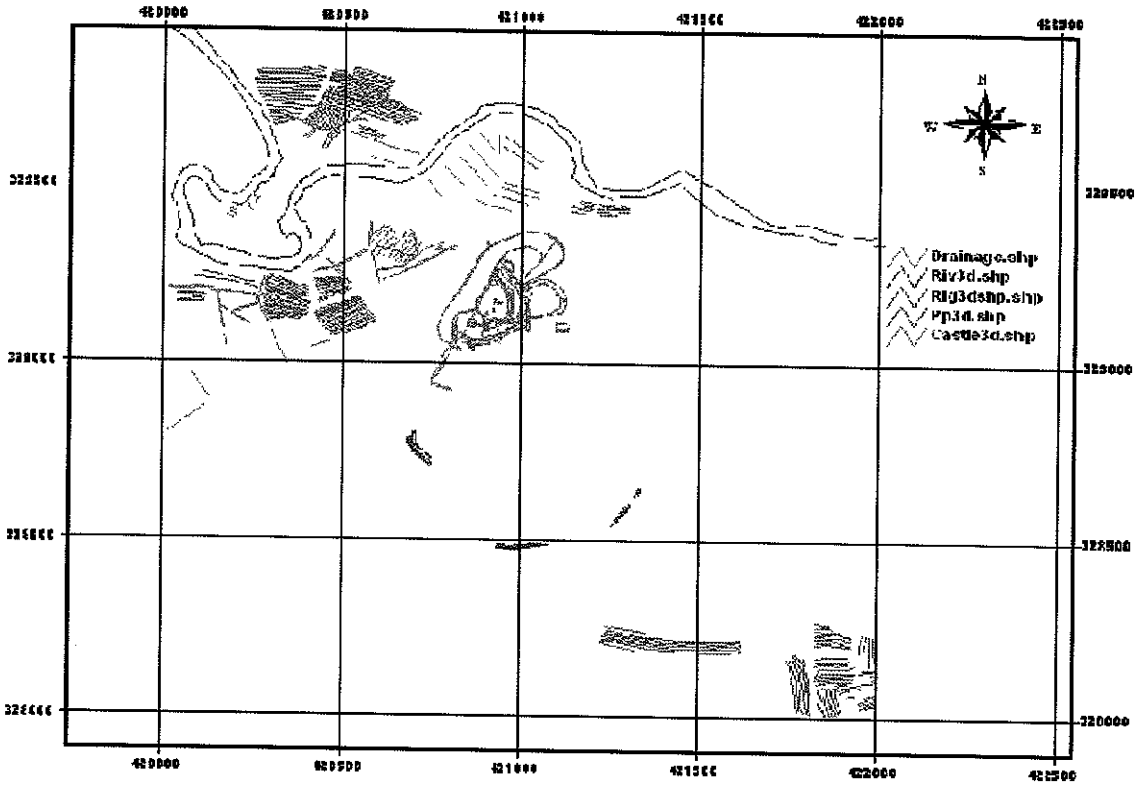

Fig. 14 All elements extracted from APs

The 'Park Pale' Survey

One important element of the offsite work undertaken in 2004 was the initial investigation of the so-called park pale earthworks. These comprise three separate linear earthworks, each occupying elevated positions on the 61m old river terrace south of the castle outlier. The most easterly of these monuments, which is designated as a Scheduled Ancient Monument (SAM), is shown on the OS Landline as two sections of linear bank, the most easterly, shorter section, being some 25m long running between 421336,328642 and 421322,328621. Heavily overgrown it has an average width of 7.5m and an average height of 0.8m and lies contained within the grounds of the school. Undulations in the surface of the school lawns at 421346,328662 probably represent the vestigial remains of the bank continuing to the northeast for a short way.

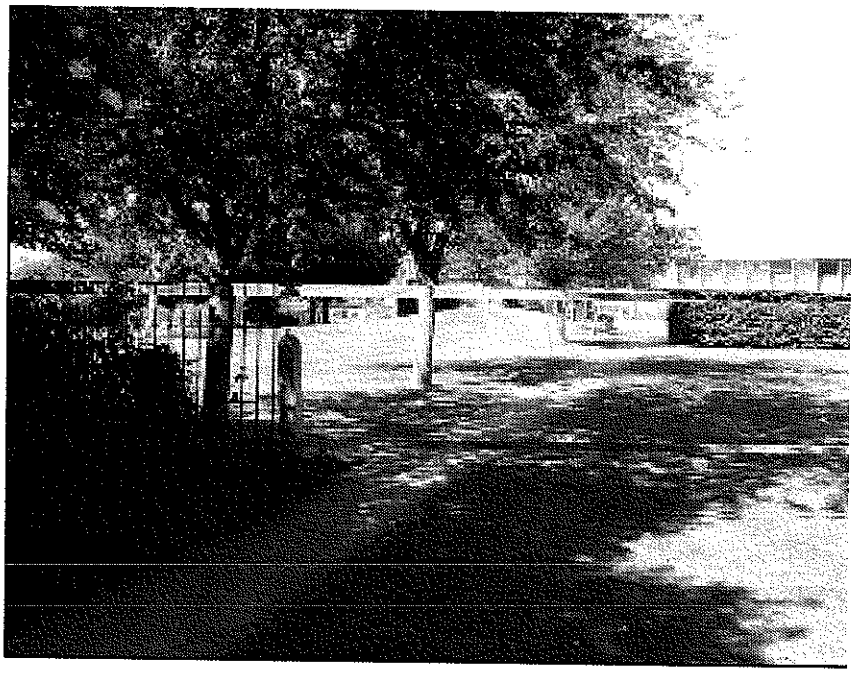

Fig. 15 Vestigial remains in school lawns

The longer, southern, section runs between 421308,328600 in the northeast to 421259,328542 in the southwest, to give an overall length of some 78.5m. Of similar proportions to the shorter section, it too is heavily overgrown. It runs along the eastern flank of a small public pathway and is surmounted by the boundary fence of properties lying to the south and east. Its adjacency to the boundary of properties has created some management problems. The monument is aligned fundamentally straight, running

roughly northeast to southwest.

The second linear bank also designated as a SAM, lies further south and west running between 421079,328488 at its east end to 420938,328481 at its west end, curving towards the west end. It has an overall length of 140m, an average width of some 10m and stands up to 1.2m high. This section of the monument runs through open public land with a small play area to the north and a footpath to the south. Here again there are some management problems in the form of erosion from cycle tracks. The western end of the monument has been recently inadvertently damaged by work to the property on the north side of the bank, EH are aware of this.

Fig. 16 Ground photographs of the westerly portion of linear earthworks looking south-east

Each of the sections of earthwork described above is similar in construction and proportions and they do appear to be contemporary with each other in origin. The third linear feature, generally regarded as a part of the same overall structure, lies some 300m to the northwest. Here, a substantial bank and outer ditch run from 420746,328716 in the southeast to 420701,328802 in the north, giving an overall length of some 113m. From this point the monument continues as a steep scarp slope for a further 133m where it merges into a deep hollow way. The proportions of this section of the earthwork are altogether more massive than the previously described sections. The bank having an overall width of some 18m and standing in excess of 2m above the outer, southwestern flanking ditch.

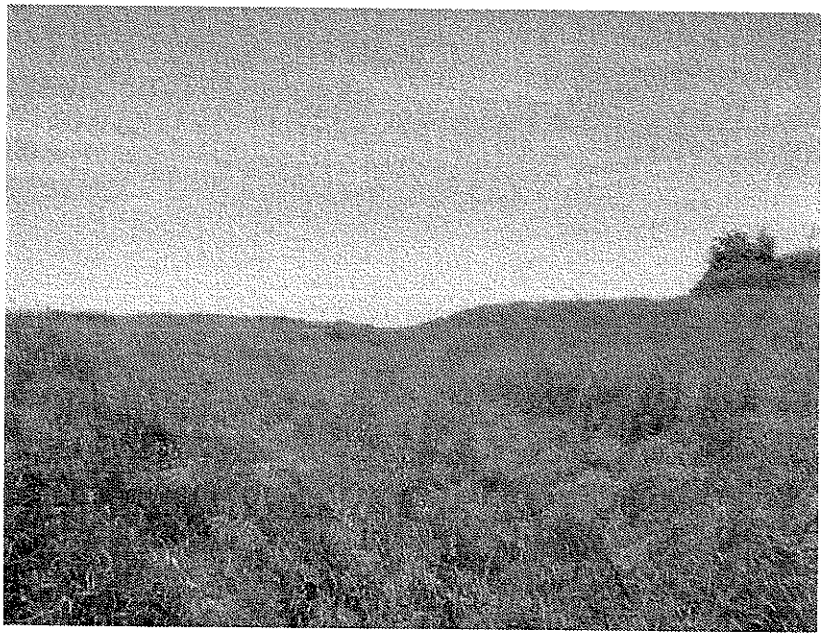

Fig.17 Ground photographs of the westerly portion of linear earthworks looking north-west

This section of the works and that to the south were subjected to a GPS based survey to record their location and extent. The survey was carried out using a GS20 differential hand held GPS on loan from Leica UK. This instrument which uses a radio link to beacons to provide the differential corrections, has the capacity for a sub-metre accuracy making it a viable medium to small scale survey tool. In particular, it gives users the capability to walk around a landscape and map features on the fly, particularly important being the capability to actually see the recorded information graphically as the survey takes place. It also has the capacity to record associated attribute detail, such as the diversity and maturity of tree species or concentrations of specific flora and fauna. This enables the gathering of not only archaeological information, but environmental data as well, towards a more complete understanding of the management requirements of a site.

A number of codelists were set up prior to the survey in the Leica GIS DataPRO software and transferred to the GS20 sensor using the bluetooth link. This ability to pre-program the sensor to create choice lists of features and attributes significantly reduced the actual survey time in the field. Although this required a considerable anticipation of what was to be encountered during the survey, which is not always possible in archaeological fieldwork, it was found to be straightforward to add new codes whilst in the field if necessary. The survey of the linear earthworks was carried out by recording a string of points along the banks and ditches, with the attribute choice list defining whether the string was at the top or bottom of the earthwork. The sensor and WoRCS belt proved to be lightweight and portable and therefore far more suitable for such large earthworks than a more cumbersome GPS with telescopic rod and backpack would have been. The map view capability also provided an invaluable tool for quick in-field analysis of the form and scale of the earthworks and their relationship with other features already recorded.

Whilst conducting this survey a number of soil exposures were located and several spot finds of pottery discovered. The GS20 was used to approximately position these spot finds, which were bagged and taken away for examination. Digital photographs of the soil sections visible in these exposures were taken and the positions in which the photographer stood were recorded with the sensor. The orientation of the photographer was recorded in the attribute information for this code, with the intention that the photographs will be able to be inserted into the GIS project to be formed from the survey information.

Interpretation

Viewed in isolation the interpretation of these linear earthworks is difficult. Each lies on a separate alignment, which in plan form do not appear to be designed to link in anyway. The southern and eastern sections do appear to be of similar construction but the more westerly is very different in size and form. This section, which is perhaps the best preserved of the three portions is also not currently designated as a Scheduled Ancient Monument and it seems clear that it should be.

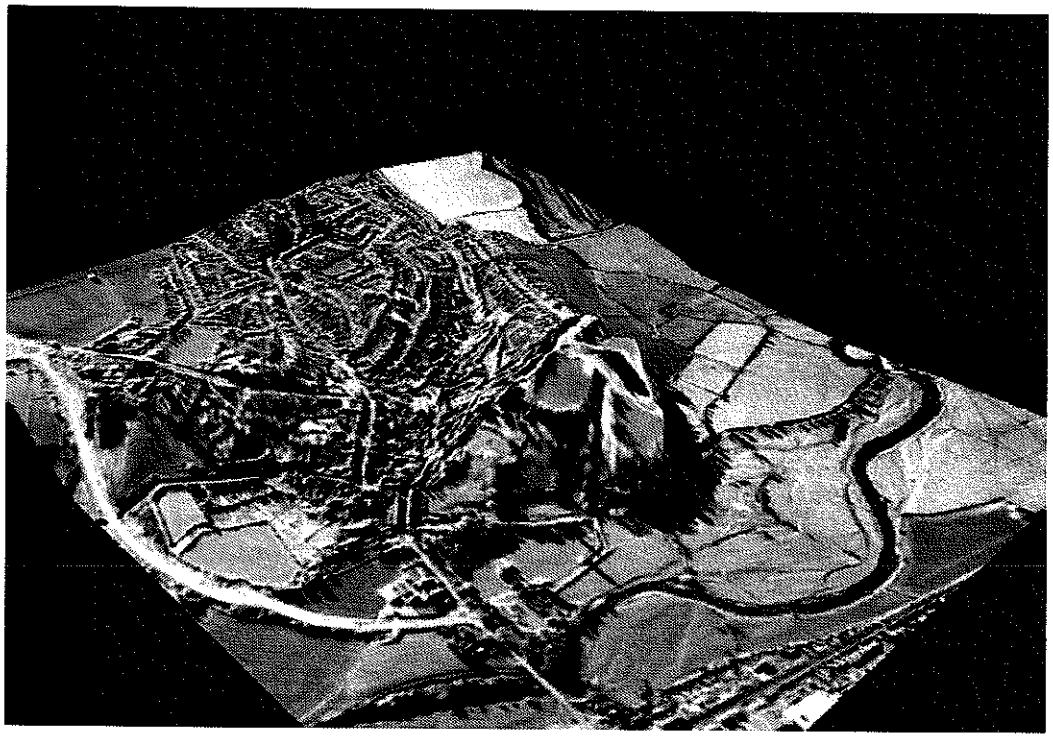

Fig. 18 AP draped over DEM showing position of 'Park Pale' linears

However when the earthworks are examined in relation to the natural topography of the land upon which the castle and settlement are constructed then the earthworks do appear to have a rational. It is perhaps axiomatic that any study of a predominantly strategically defensive settlement such as Tutbury should have regard to the physicality of the landscape. Tutbury can be broken down into two broad landscape blocks, the flat river flood plane to the north and the higher plateau land to the south. The castle itself occupies an outlier from the plateau reaching out into the river valley. The town stretching back from the castle along the high to the south. When this is visualised in 3-D space then the linear earthworks are better understood. Figures 14 and 15 below show the earthworks in relation to the topography.

What is apparent in figure 14 (the AP drape) is the way in which the town of Tutbury stretches back from the castle outlier, occupying a series of ridges interspaced with shallow valleys. Each section of earthwork is restricted to the tops of these ridges. When the locations are shown over a simplified landscape, with an exaggerated vertical interval, it becomes apparent that each segment is cutting roughly across the neck of each of these ridges and each lies roughly equidistant from the castle itself. Two interpretations are instantly suggested. One that they are, as previously suggested, some form of outwork to the castle marking perhaps the extent of an outer enclosure, possibly containing the early settlement associated with the castle, in effect the park pale or town wall. A second possible but more tentative interpretation could be that they represent the possible position of siege works designed as the protection for artillery pieces, located at an optimum range to bombard the castle. Certainly the positions of the earthworks do appear to provide crossfire positions. Though of this is of course equally appropriate for outer defensive works. It may be possible to test this hypothesis by examining the military history of the castle and considering the ranges of appropriate artillery pieces. The work proposed by the Civic Society to investigate and present the two SAMs may present an opportunity to further explore these earthworks. Possibly with some limited excavation which could be incorporated into further seasons' work.

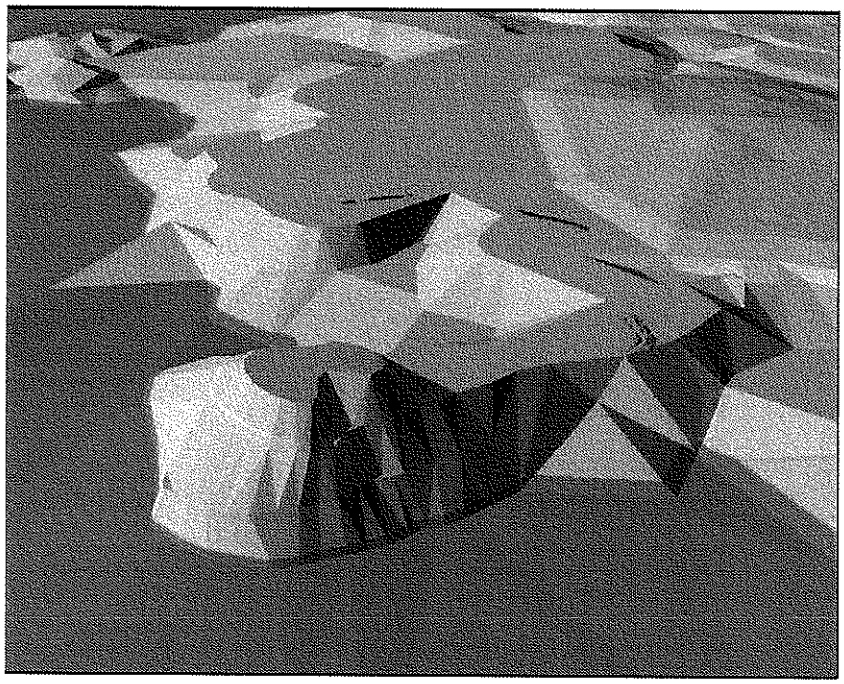

Fig. 19 Position of 'Park Pale' shown on TIN

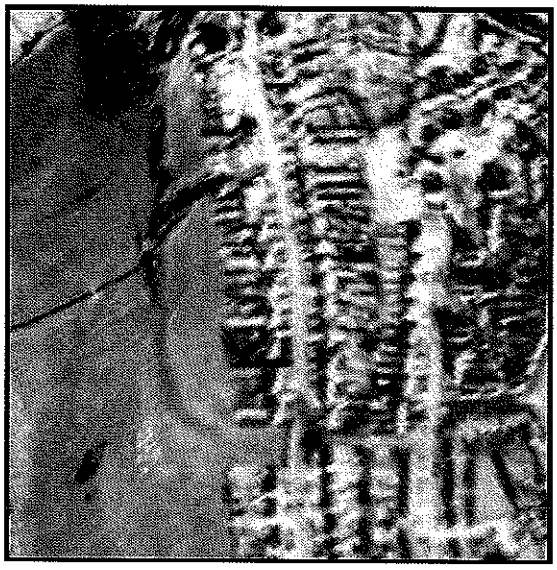

Fig. 20 Showing curving bank and outer ditch

However, the western curving linear still remains something of an enigma, being considerably more substantial and different in form to the other two sections. In its size and location it has a distinct look of a much earlier earthwork, possibly with a late prehistoric IA origin. Viewed from the southwest, looking along the spur it has the distinct appearance of the western half of a small ridge top enclosure, the eastern half of which has been lost beneath the housing estate that occupies the eastern half of the ridge top. Such an earthwork could easily have been incorporated into the later schemes of linear earthworks outlined above. Further seasons' work will incorporate an investigation of the surviving interior of this monument in an attempt to secure a more certain identification of its origins. In particular, a detailed survey of the earthworks and their topographic position will be undertaken, together with a geophysical exploration of the undisturbed portion of the possible enclosure interior, and perhaps some test pitting of the interior. It may also prove useful to examine any exposed garden surfaces that may exist in the eastern portion of the interior.

4.3 Conclusion

The 2004 season at Tutbury by necessity concentrated its main resources on the excavations described elsewhere in this report. The non-invasive investigations were limited in their extent by the constraints

placed upon the survey by both a need to provide student training and by a limited amount of available labour. However, although much remains to do to more fully understand the complexity of the castle and its surroundings, the first season's survey work has been useful in identifying some of the questions which require further investigation and some of the methodologies which have the potential to further pursue those questions. Much still remains to be done to obtain the maximum information from the data collected in 2004. Further processing of the laser scanning will add to an understanding of the fabric of the castle itself. The GPR data still requires detailed analysis and integration with the resistivity data and further work is planned to identify and investigate earlier aerial photography, to pursue a wider temporal range of landscape change. It is hoped also that further seasons' work will be able to build upon the promise shown in this initial season towards an understanding of the castle and its relationship to Tutbury town and its more distant hinterland. These aims are encouraged by the interest shown in the project by the residents of Tutbury, in particular, the initiative shown by the Civic Society to pursue a local community heritage lottery award towards the investigation and presentation of the park pale earthworks. It is hoped that perhaps in the longer term some of the other cultural resources identified in the work so far may be able to be incorporated into some form of ongoing scheme of presentation. It seems certain from the results of 2004 that the hills upon which Tutbury Castle and town stand have been a focus of human activity for a considerable length of time. Perhaps a timeline which reaches unbroken directly from the small band of Mesolithic hunters who may have camped above a river rich in game, directly to the weekend visitors who make the castle such a vibrant place today.

5.0 The Excavation

Two areas (1 and 2) were investigated during the 2004 season, both of which were situated in the inner bailey within areas excavated in the 1980s under the auspices of Staffordshire County Council. Area 1 was located immediately in front (west) of the North Tower, whereas Area 2 was in front (north) of the South Tower (Fig. 2). All excavation was by hand. Recording of features and contexts was on pro-forma record sheets supplemented by measured plans (at 1:20 and 1:50) and sections (at 1:10), and by monochrome and colour slide photography.

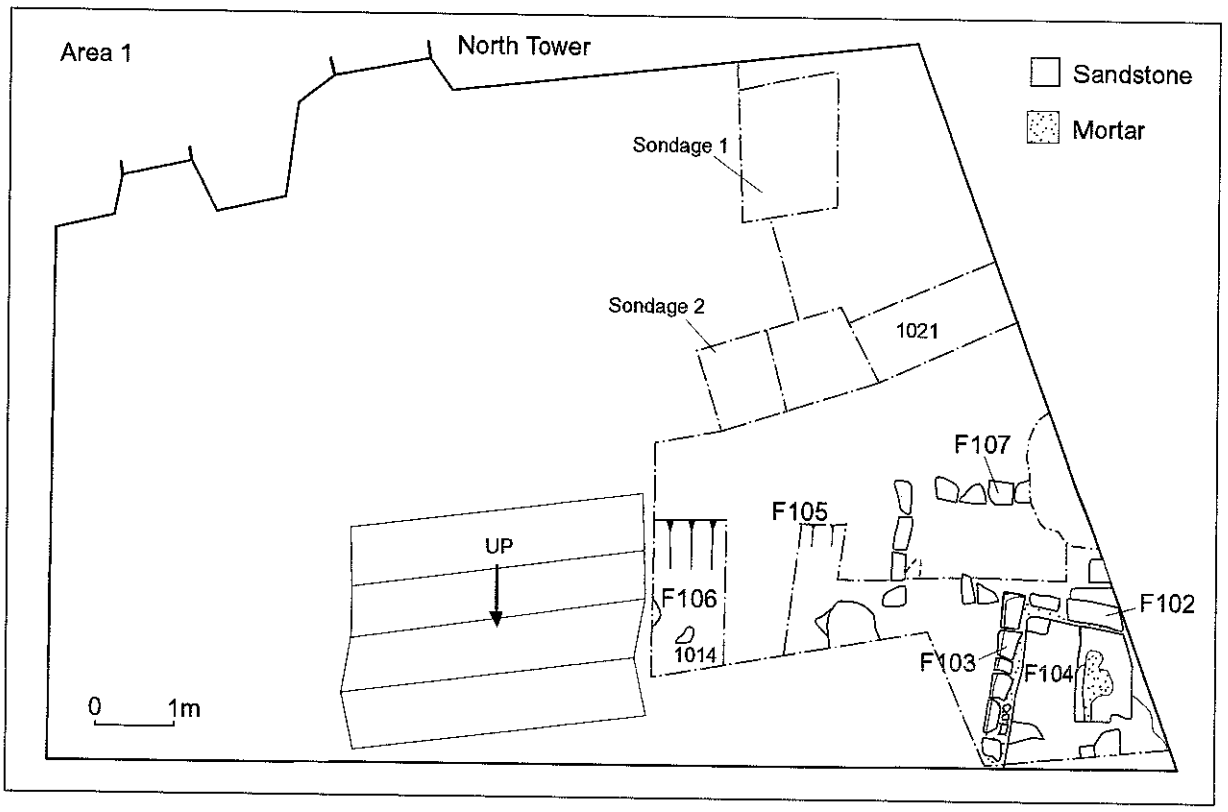

Fig.21 Plan of Area 1

5.1 Area 1 (North Tower)

Two sondages were excavated, one immediately in front of the North Tower (Sondage 1) and one approximately 3.5m to the west of the tower (Sondage 2). The natural clay subsoil was encountered at 1.54m below the existing ground level (AOD 83.577) in Sondage 1, and at 1.72m below ground level (AOD 83.537) in Sondage 2 (Fig. 19).

Directly above natural in Sondage 1 was a 0.25 to 0.32m light brown, mainly clay layer with a red sandy tinge containing some charcoal and some very small stones (1032). A Mesolithic flint blade and some animal bone were recovered from this layer. Overlying 1032 was a friable layer containing a good deal of charcoal (1024A). Both animal bone and Mesolithic flint artefacts, including a crested micro-blade and a micro-blade, were recovered from this layer. In Sondage 2 the layer immediately above the natural (1030) ranged in depth from 0.11m (south) and 0.27m (north) and comprised a dark moderately compact clay and sand mixture containing some medium-sized rounded stones and some specks of charcoal. This layer produced three flint artefacts including a blade, possibly Mesolithic in date.

Sondage 1 layer 1024A was sealed by a 0.05m layer of dark blue/green clay with a heavy charcoal content (1020) containing a sherd of 11th/12th century Stamford ware. Above this was a 0.525m dark brown/red clay layer containing some sand and stones (1028), from which animal bone was recovered. Overlying

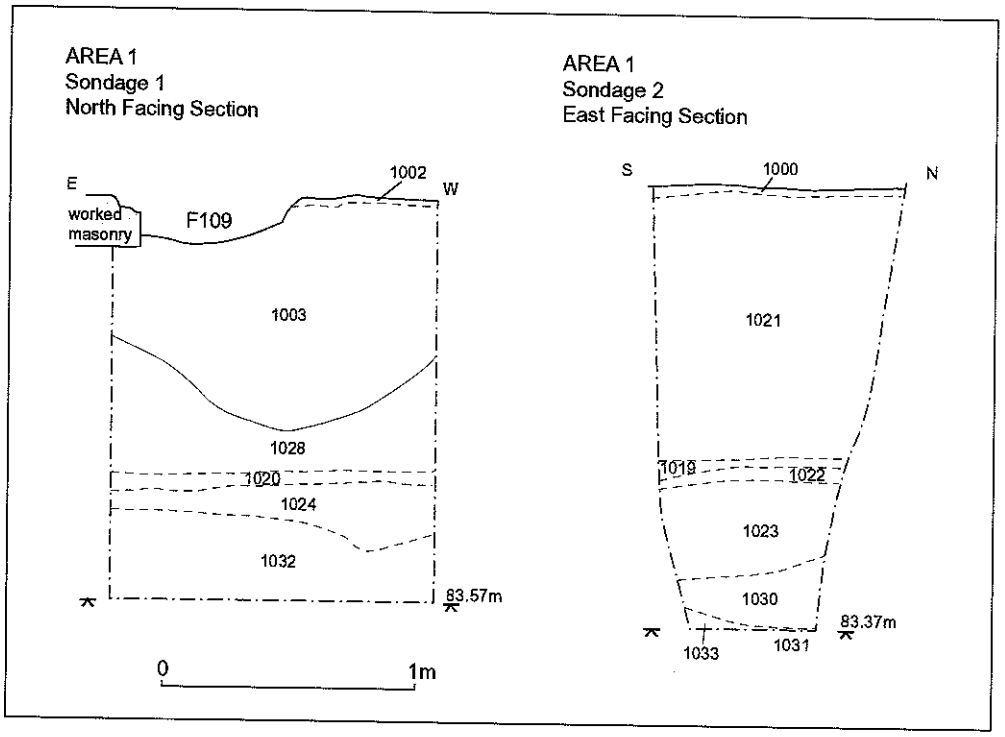

Fig.22 Area 1 sections of Sondages 1&2

1030 in Sondage 2 was a layer (1023) that ranged in depth from 0.30m (north) and 0.35m (south). It had a plastic, compact consistency and contained few stones, if any, though there were many flecks of charcoal within it and some animal bone was recovered. As this layer was uncovered the excavators were aware of an unpleasant methane-like smell of the kind sometimes associated with excavated cess pits. Overlying 1023 was a thin red/brown layer (1022) of compact clay containing medium-sized pebbles and many flecks of charcoal, but no finds. 1023 was overlain by another thin layer, dark grey and compact, containing a good deal of charcoal (1019).

Above these levels, much of the area in front of the North Tower was covered by a very compact clay and pebble layer. The top of the layer was at a height of 85.10 AOD in Sondage 1(1003), and at 84.947 AOD in Sondage 2 (1021). In Sondage 1 it formed the fill of a possible ditch (F109) which cut into 1028, bottoming at 84.217 AOD. In Sondage 2, it was found to be approximately 1.10m deep. Towards the west end of the trench this layer was cut by a ditch (F105/F106), aligned roughly north-south, the west side

of which fell outside the excavated area. The bottom of the feature was filled with a dark compact layer (1012) with numerous stones in it, including several large blocks, all of which seemed to be part of the backfill from the 1980s excavation.

The southwest corner of the Area 1 contained a series of stratified stone structures. After exposure, it was decided to leave all these structures *in situ* and the excavation in this area was carried out in a series of test slots within and between them. The earliest of these structures was an east-west aligned wall (F104) constructed of large undressed blocks of masonry, the north side lined with several courses of clay tiles laid horizontally and bound with lime mortar.

The area immediately north of F104 was excavated to a depth of 85.007 AOD (within a sondage). At this level a layer of red clay sand was encountered (1018) containing mid-13th-14th-century pottery. Overlying 1018 and butting against F104 was a 0.02m thick layer of yellow brown clay (1009), and over this, also abutting F104 a wet and soft layer of green clay containing charcoal, red clay and mortar (1007).

F104 and 1007 were overlain by the corner of a structure (F102/103) built of sandstone blocks dressed and chamfered on the external (north and east) sides only. Excavation immediately to the north of F103 revealed another series of layers. In the angle with the edge of the excavated area, the top of a patch of dark brown compacted soil containing a large number of bones was exposed at 84.867 AOD, but not excavated. Above it a layer ranging in depth from 0.30m to 0.50m (1017) was excavated and produced a sherd of 14th-15th century pottery. Overlying 1017 was a charcoal layer (1035), and above 1035 a compact red clay containing mortar, small stones and charcoal, and mid-16th to 17th-century pottery (1006). This layer was stratified beneath F103.

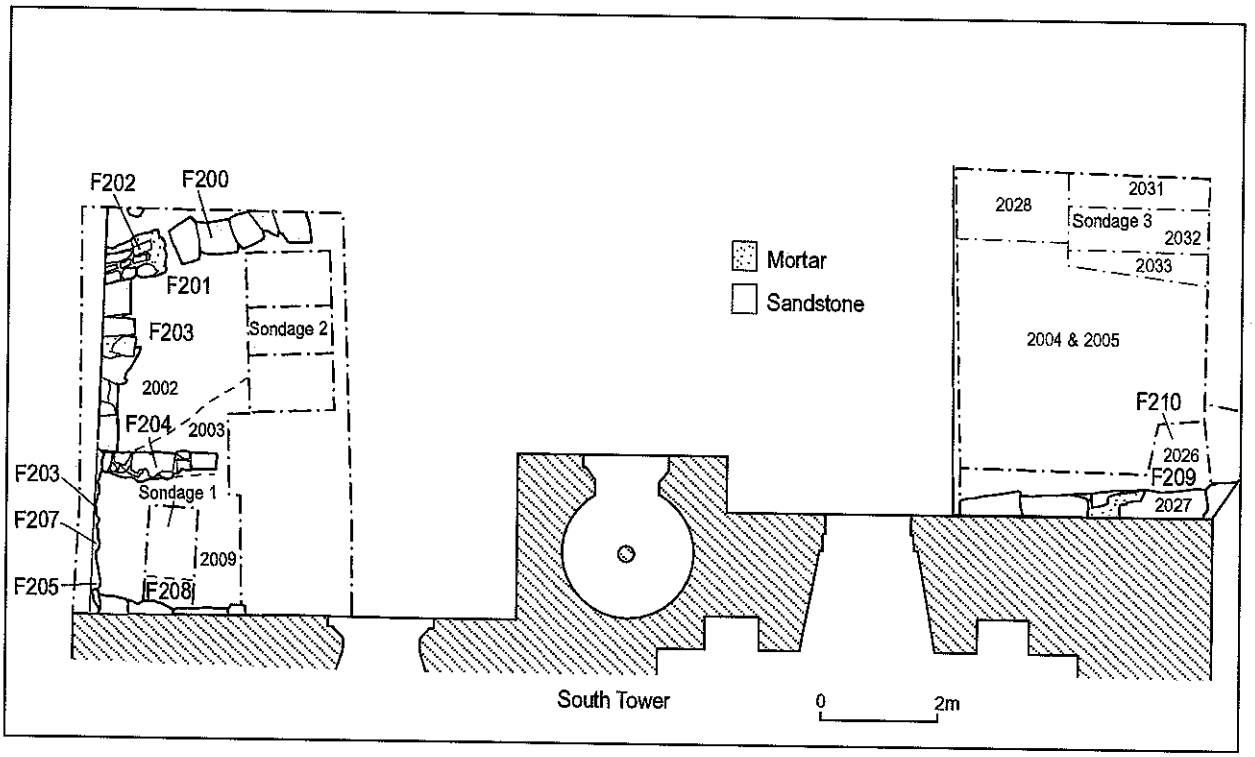

Fig.23 Plan of Area 2

To the northeast of F102/103 was an L-shaped arrangement of mainly alabaster blocks (F107), laid without any kind of bonding. A sondage excavated within this arrangement revealed at the lowest level a layer of green/khaki material with a sandy clay consistency, possibly degraded stone, containing charcoal but no finds (1024). Above this, sloping from north to south, was a dark brown clay containing cobbles (1015) and late 15th-16th-century pottery. Overlying 1015 was a deep red clay layer (1016), possibly a pit fill contained by 1016. F107 was stratified above these layers and overlain by a mixture of compact soil and rubble (1008) containing residual mid-13th – 14th-century pottery.

AREA 2
Sondage 1
West Facing Section

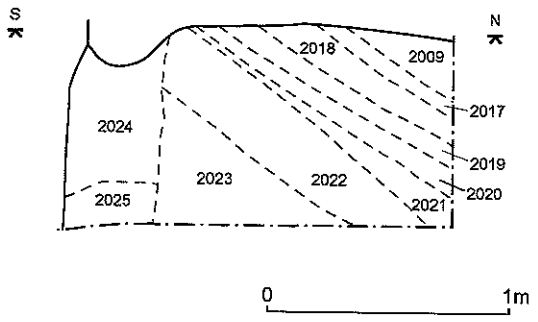

Fig.24

5.2 Area 2 (South Tower)

Three sondages were excavated, two on the west side of Area 2 (Sondages 1 and 2), and one on the east side (Sondage 3). Sondage 1, was located directly in front of the South Tower, Sondage 2 further to the north, and Sondage 3 in the northeast corner of the excavated area. Sondage 1 was excavated to a depth of 0.75m (AOD 84.57m), Sondage 2 to 1.15m (AOD 85.42m) and Sondage 3 to 1.35m (AOD 84.44m). In none of these three areas was the depth of the natural subsoil ascertained.

The earliest deposits in Sondage 1 comprised a series of compact red clay layers in the sequence 2023, 2022, 2021, 2020, 2019, 2018, 2017, 2009 from bottom to top. They appeared to form a sequence of tip lines falling away from south to north at angles ranging from 25-40°. No dating evidence was recovered from these deposits but they were cut towards the south by the construction trench for the South Tower begun in 1442. A similar stratigraphy was recorded in Sondage 2 (comprising a sequence of inclined layers indicating tip lines (2016, 2015, 2014, 2013, 2012, 2011 and 2010, from bottom to top). No finds were recovered from either of these two areas.

AREA 2
Sondage 2
East Facing Section

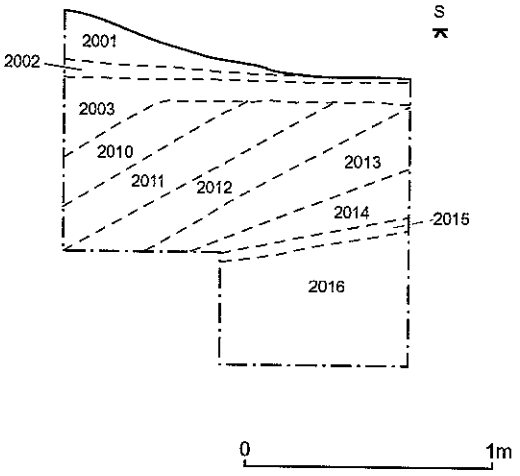

Fig.25

In Sondage 3 a different stratigraphy was encountered (Fig. 12). The excavated material was a harder more compact clay than that in Sondages 1 and 2, and the comparatively narrow tip lines that were so marked in the other two sondages were not evident. However, the general pattern of the stratigraphy was similar in that a series of layers sloped down from south to north (2033, 2031, 2030 and 2028).

AREA 2
Sondage 3
East Facing Elevation

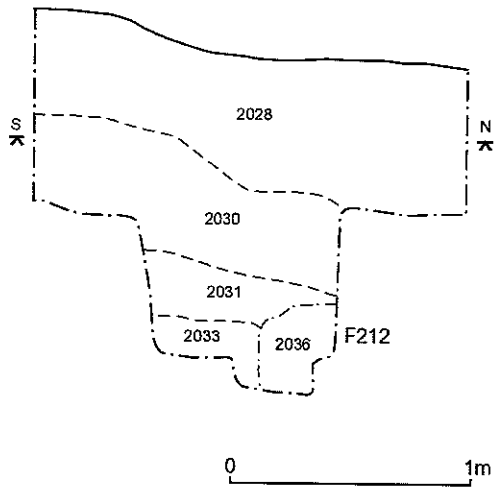

Fig.26

The two lower layers (2033 and 2031) and the upper layer (2028) all produced pottery dating from the late 11th-12th century. In the bottom of the sondage, against the west section, and only partially within the excavated area, was a cut (F212), 0.37m across at its widest point, and possibly the base of a posthole, the fill of which contained a large amount of charcoal. Seemingly associated with this feature was an area of dark material containing a large quantity of charcoal (2036), apparently cutting 2033 in a vertical line immediately above the south side of F212, but sealed by 2031. This context seemed to represent an area of *in situ* burning possibly the destruction by fire of a timber structure associated with 2033.

Immediately north of the eastern half of the South Tower a trench from the 1980s excavations was re-excavated and some of foundations exposed (F209). These were formed of massive, roughly dressed sandstone blocks protruding from the face of the tower by up 0.56m. Towards the western end of this trench the protruding foundations were stepped down, the ashlar blocks of the tower being carried down for an additional course at this point.

On the west side of the site, above the stratified layers already described, was a series of stone structures, all of which appeared to be post-medieval in date.

5.3 Interpretation

The flint implements recovered from the lowest levels of Area 1 coupled with the absence of later dating evidence suggests that there may have been human activity on the site since the Mesolithic period. Charcoal and a small quantity of calcified bone suggest that animals were being cooked and eaten here. The area excavated was too small to draw any more definite conclusions, but, as Alex Lang points out (below), Mesolithic sites are commonly found on hilltops.

From a narrow layer (1020) in Sondage 1, Area 1, immediately above the possible Mesolithic levels, came a sherd of 11th-12th-century Stamford Ware, probably representing the Norman occupation of the site. This layer also contained bone which bore cut and chop marks and signs of canid gnawing. Further to the north, immediately above a putative Mesolithic layer (1030), a possible cess pit (1023) was picked up in Sondage 2, and may also date from the Norman period.

All these layers fall within the line of the existing rampart, but the stratigraphy points to the possibility of this area having been open in the early years of the castle's existence. This is in contrast to Area 2, where the lower layers of the former rampart containing 11th-12th century pottery, could be seen quite clearly.

At a later, unknown, date the whole area now in front of the North Tower was built up with a compact clay and pebble layer up to a depth of 1.10m. The presence of a cesspit might explain the need for this deep stratum, when the area was redeveloped. The possible ditch cutting the eastern end of this layer may have marked its extent in this direction. The line of the ditch is set obliquely to that of the North Tower, perhaps suggesting that the two are not related. However, it is possible that it may bear some relation to the rampart, for it seems to mark the position of its rear extent if this were to be projected in front of the North Tower.

There are a number of different ways of interpreting this layer. A yard surface, road or a solid base for a rampart or building are all possibilities, but the lack of dating evidence and the limited area exposed preclude a definitive explanation. One possibility that ought to be considered stems from the fact that the North Tower lies at the head of the ditch or holloway that separates the two outer baileys and extends down the hill in the direction of the bridge over the River Dove between Tutbury and Hatton. Traditionally, this is the original approach to the castle, though there is no firm evidence to support the theory. Nevertheless, if it were true, then the North Tower may lie on the site of an early gatehouse, in which case one would not expect to find evidence for a rampart in this area. Clearly, a more detailed investigation is needed before we can come to any conclusions on the matter.

Finds from layers in the southwest corner of Area 1 suggest that wall F104 may be medieval in date. They are also consistent in suggesting a post-medieval, possibly 16th-century date for the corner of the building that overlies it (F102/103). The latter lies close to the supposed site of the lodging assigned to Mary Queen of Scots during her imprisonment at Tutbury, and may well be part of it. Neither of these two phases of walling is aligned in relation to the North Tower, though they may both bear a relationship to the rampart.

5.4 Proposals for 2005

The evaluation of Areas 1 and 2 has identified considerable potential for further work in these locations. The chance discovery of a possible Mesolithic site provides a rare opportunity for increasing our knowledge of that period in the West Midlands, and for making a significant contribution to the study of the evolution of castle sites.

Further investigation will also tell us more about the earliest phase of the Norman Castle. Whilst we know that we are likely to enhance our knowledge of the early defences in Area 2, not least the character of the rear of the rampart, the nature of Area 1 in this period is less well understood. Here we may be able to establish how this area functioned in the 11th century and how and why this function changed. In particular why has no evidence for a rampart been found in this area, and what is the date of the substantial clay and pebble layer?

Area 1 borders the traditional site of the building in which Mary Stuart was lodged in the later 16th century, and it is possible that this is represented by the corner of the structure exposed in Area 1. A forensic approach to the excavation of this building would prove useful in extending our understanding of the post-medieval castle and may throw light upon the effect of the Civil War siege on this part of the inner bailey.

The proposals for excavation in 2005, then, are as follows:

- Excavation of substantial trenches in Areas 1 & 2 down to the natural subsoil in order to obtain two complete sections through the castle's archaeology in these locations.

- Extension of Area 1 to expose the rest of the building uncovered there in 2004 in order to establish its extent, structural character, process of abandonment, and relationship with the adjacent rampart.

6.0 The Pottery *by Stephanie Rátkai*

The pottery from Area 1 and Area 2 was examined macroscopically and spot dated (Table A). Brief notes were made of the vessel forms present and the general range of fabric types present. A small number of the early cooking pot sherds were examined under x 20 magnification to check the types of inclusion present in the clay. The pottery was not quantified.

Area 1

The earliest pottery was found in 1020 and comprised an unglazed sooted Stamford ware sherd. Contexts 1008 and 1018 contained glazed buff/whiteware sherds likely to date to the mid-13th-14th centuries. Contexts 1002, 1004, 1010 and 1015 were dated by the presence of Midlands Purple (15th-16th c) or Cistercian ware (late 15th-mid 16th c) sherds. There was a single unglazed gritty sherd from context 1017. Visible in the break was a large piece of slag. Whether this was added as intentional temper or was an accidental inclusion into the clay body is difficult to say. A reduced, glazed sherd recently excavated at Stafford College, Stafford, also contained a piece of slag within the clay body.

Area 2

Most of the pottery recovered from this area dates to the earliest occupation of the medieval castle. Contexts 2028, 2031, 2032 and 2033 contained a mix of both glazed and unglazed Stamford ware and coarse gritty cooking pot sherds. The cooking pot sherds were tempered with large rounded grains of quartz but also contained feldspar. Feldspar is not infrequently found in ceramics from northeast Staffordshire and it may have derived from degraded Pennine Millstone Grit. Whatever its source, there is no reason to doubt that the cooking pots found in these early groups from the castle, were locally made. The Stamford ware

seemed to consist for the most part of Kilmurry's (1980) Fabric A (dominant from the early 10th century to the late 11th century) or occasionally Fabric G (c 1000-1200). The glazed sherds almost entirely had Kilmurry's Glaze 1, which was in use throughout Stamford ware production. A few sherds had Glaze 6 (11th-12th centuries). Much of the Stamford ware could not be related to form. However, there was a rim from a spouted pitcher paralleled in Kilmurry (1980 fig52; 5.75) in 2032. The likely date for this vessel is in the second half of the 11th century. About two-thirds of the pottery from 2033 was made up of Stamford ware sherds. Amongst these were one or two fragments of thumb print handles, dated by Kilmurry to c. 1050-1150. This context also contained a tiny but unabraded Samian sherd.

Context 2056 contained a single glazed Stamford ware sherd and several cooking pot sherds. The most diagnostic sherd was from a large unglazed pitcher handle in a local gritty fabric. The handle belongs stylistically to the 12th century.

Late medieval material in 2004 and 2006 consisted, as in Trench 1, of Midlands Purple and Cistercian ware.

7.0 **Worked Flint** *by Alex Lang*

11 pieces of worked flint were recovered from the lowest contexts of two sondages dug in Trench One. This collection comprises, 1 struck chunk; 2 pieces of knapping debitage; 3 flakes; 2 small blades; 1 crested micro-blade; 1 micro-blade and a piece of worked flint, possibly part of a core. The majority of this collection is not chronologically-diagnostic, although there is enough evidence to assume a Mesolithic date for all of them.

The finds were recovered from three contexts in the two sondages of Trench One. In total 8 of the artefacts were excavated from the first sondage (sondage 1) and from the lowest two contexts (1024 and 1032) which lay up to 0.5m above natural subsoil. The artefacts from 1024 are the most identifiable as Mesolithic in date. The two clear examples are the crested micro-blade and the micro-blade. The latter has had additional working after its removal to create a point at one end, both of these artefacts have indications of retouch, the only artefacts from the worked flint to show this. Artefacts also recovered from this context include a large flake; 2 small flakes; a piece of debitage and the worked flint. This last piece is highly irregular, with two long removals taken from a facetted platform. One artefact came from the context below this, a small blade, also of Mesolithic age with a good cutting edge, although no retouch. Only three artefacts came from the second sondage (sondage 2), again from the lowest context (1030). These artefacts are less diagnostic with a struck chunk, a piece of debitage and a blade. This second blade is larger than the example from (1032) with remnants of cortex on its dorsal surface. It can be suggested that these are also Mesolithic in age and broadly contemporary with the finds from sondage 1.

The appearance of the Mesolithic is not unknown in Staffordshire although it is by no means a major area for Mesolithic finds, a number of stray finds have been recorded (Wymer, 1977). The largest accumulation of findspots comes from the north of the County, where artefacts have been recovered from a number of sites, including caves in the Parishes of Wetton and Grindon (Gunstone, 1964) that form the southern part of a group of sites identified in the Peak District area (Munby, 1963) . The condition of the Tutbury Castle artefacts indicate they can have only moved a very short distance as the edges are fresh and there is little indication of edge damage or general rolling damage. This means that the artefacts were either *in situ* or very close to the area where they were originally deposited. This would indicate that there is a good chance that the hilltop upon which Tutbury Castle resides was used as a site in Mesolithic times. Mesolithic sites are extremely common on hills, promontories and sites that would often later become Iron Age hillforts. The site of Tutbury is such an example and would have provided an excellent view of the surrounding countryside and good views along the Dove valley. The majority of Mesolithic sites in Britain are found in such contexts: "It is certainly the case that high ground, well drained soils and access to water sources appear to have attracted some of the significant concentrations of evidence" (Myers, 2003, 13).

Artefact descriptions

Sondage 1.

(1024)

1. Large flake made from grey flint with inclusions and a small remnant of cortex. There are a number of removal scars on the dorsal surface of this artefact. 42.5 x 35 x 10.9mm

2. Small flake, with a small remnant of cortex with remnants of removals on the dorsal surface, possibly a thinning flake for an artefact. 21 x 13.7 x 3mm

3. A piece of knapping debitage, irregular in shape although a number of faces showing conchoidal scarring.

4. A piece of worked flint, black and lustrous with opaque edges. A number of removals and a facetted platform at one end. There is also an irregular burin-type removal (although this is **not** a burin) taken from one edge. Long and shallow flake removals taken.

5. A flake, of slightly irregular shape, of black flint with opaque edges. An irregular bulb of percussion. This is either a thinning flake or possibly a failed attempt at a small scraper.

6. A crested blade removed from a microlith core. Perhaps an initial removal as there is some remnant of cortex. This is made from patinated flint, as it is completely white. There are signs of some retouch along one edge. 30 x 9 x 5.2mm

7. A long micro-blade made from opaque flint. It is thick in the middle, but thinning towards both end. One end has had oblique retouch that has created a point, the tip of which has broken off.

(1032)

1. A blade made from light grey opaque flint. There are removal scars on the dorsal side and a small bulb of percussion. One edge is straight, whilst the other curves to form the point (almost knife-like in planform). There are no signs of retouch. 36.3 x 12 x 5mm

Sondage 2

(1030)

1. A blade made from grey flint with inclusions. There are no signs of retouch and a curved form, with thick ridges and remnants of cortex on the dorsal side and proximal end of the artefact. 41.3 x 19.5 x 8mm.

2. A struck chunk of drift flint. Ochre coloured and frost shattered on one side, a difficult piece to work, small removals, perhaps indicative of knapping practice or testing.

3. A small flake of grey flint. A prominent bulb of percussion and irregular edges, knapping debris or thinning flake.

8.0 The Animal Bone *by Emma Hancox*

Introduction

A small assemblage consisting of a single box of hand collected animal bone was recovered from the excavation at Tutbury Castle, Staffordshire. Twenty-six contexts produced faunal remains.

Methodology

The mammal bones were assessed following the standard protocol of Birmingham Zoological Laboratory, which is based on a modified version of the system described by Albarella & Davis (1994) and Davis (1992). This system considers certain anatomical elements as 'countable'; it does NOT include every bone fragment that is identifiable. The recordable skeletal elements considered are as follows: all the mandibular teeth, the skull (zygomaticus), scapula (glenoid articulation/cavity), distal humerus, distal radius, proximal ulna, carpals 2-3, distal metacarpal, pelvis (ischial part of the acetabulum), distal femur, distal tibia, calcaneum (sustentaculum), astragalus (lateral part), naviculo-cuboid/scafocuboid, distal metatarsal, proximal phalanges 1-3. At least 50% of the specified area has to be present to be 'countable'.

Horncores are considered as 'non-countable' elements using this system, however, they are recorded separately as noteworthy 'non-countables', along with any bones displaying evidence of butchery, pathology, burning or gnawing and any unusual species. These elements are not included in any statistical analysis.

The following skeletal elements were considered 'countable' for birds: scapula (articular end), proximal coracoid, distal humerus, proximal ulna, proximal carpometacarpus, distal femur, distal tibiotarsus, distal tarsometatarsus. All fish bone fragments were considered to be 'countable'.

Measurements are not taken at the assessment stage, it is merely noted whether it is possible to take them. Measurements follow von den Dreish (1976) and Dobney *et al.* (1996). Most bones were identified to species. The sheep/goat, horse/donkey and chicken/pheasant/guinea fowl distinction was not attempted at this stage and several small bird bones were not identified to species either. Teeth and mandibles with recordable wear stages were noted, again these are not taken at the assessment stage.

Factual Data

All of the assemblage considered here was hand collected, no environmental samples were taken during the excavation. This has repercussions on the type and ratio of taxa found in the assemblage. Without systematic and extensive sieving of samples there tends to be a bias towards larger species and anatomical elements, it is likely that this bias will occur here.

15 contexts have been dated from the pottery at this stage. 22 countable elements were recorded in contexts dated to 11th-12th centuries, 4 in those dated to 13th-14th, 11 in those dated to the 15th-16th, and 8 in those dated to the 17th. This accounts for roughly half the countable elements.

The preservation of the bones varied from context to context, but generally the state of preservation was fair/poor, with exfoliation of the outer layers of the bone surface. The majority of bones in the assemblage were fragmented, but a few contexts produced complete or almost complete bones.

The amount of residuality and contamination is difficult to assess with animal bone, it is usually determined by the amount of residual pottery in the assemblage. As there is very little residual pottery here, it would seem likely that most of the animal bone can be securely dated to the context in which it was found.

84 countable elements were noted from 16 contexts out of 26 containing bone. 18 measurable bones and teeth and 4 ageable mandibles were recorded. Species recorded were pig (21 countables), cattle (16) sheep/goat (16), dog (4), red deer (4) and horse (1). Also noted were 4 fish bones from a large species

and 18 bird bones. 9 of the bird bones were identified as sparrowhawk (*Accipiter nisus*) and appeared to come from a single individual (context 2003). The majority of the rest of the bird bones were galliform. A wide range of elements was present across the assemblage from all species with no preferences for high meat yield bones or cranial and foot bones noted. Most of the pig bones recorded were juvenile. Of the other species both adult and juvenile bones were noted.

Evidence of canid gnawing was found in 4 contexts (1019, 1020, 2031 and 2033). Evidence of both butchery and burning were recorded across the assemblage. Cut and/or chop marks were noted in 15 of the 26 contexts and burning, in the form of both blackened and calcified bone was recorded in 6 contexts. No pathology was noted.

Discussion

There is not enough material here to draw conclusions as to percentages of animals consumed on-site over time or to look at changing practices in animal husbandry as there are only 14 dateable, countable and measurable bones. However, there are certain conclusions that can be drawn.

The assemblage appears typical of castle kitchen refuse. The amount of butchery marks, the evidence of burning and the variety of skeletal elements present are indicative of this, as are the types of species present (with the exception of the sparrowhawk). Deer was found in 4 contexts; this is fairly typical of castle sites, which tend to produce high status meats such as deer, and tend to have a wider variety of species than faunal assemblages from towns and villages. Pig accounts for 25% of the total assemblage. Pig bones are generally more porous and do not survive as well as other species e.g. cattle, also most of the pig bones here are juvenile which are also more porous and less likely to survive than adult bones, suggesting that the true percentage of pig may have been higher still. The collection bias, noted earlier, may favour pig, it being a large animal, but not in relation to cattle which have larger anatomical elements. Clearly pig was very important in the diet throughout the medieval period at Tutbury. Albarella and Davies (1996:20) looked at a variety of early medieval sites in towns and found that over 85% of them contained less than 20% pig. Castle sites however, tend to contain a higher percentage of pig, therefore, this assemblage is typical in this respect. The high proportion of juveniles is normal as pig tended to be used solely to produce meat.

Recommendations

The assemblage is too small to be of significant archaeological potential by itself. However, it may be possible to incorporate this assemblage into any faunal assemblages recovered from future excavations in the castle.

9.0 The Coin *by Gareth Williams*

Although a number of modern coins were recovered from the surface layers, only one coin of interest was recovered. This is a cut halfpenny (originally struck as a penny, then literally cut in half for use as a halfpenny) of the 'Short Cross' type, class 5-6 (*c.* 1204-17), but probably class 5 (1204/5- *c.* 1209), minted in London. Unfortunately, because half of the coin is missing, it is not possible to identify the name of the moneyer who issued the coin, or to be absolutely certain of the class.

The 'Short Cross' coinage (1180-1247) was an immobilized type, meaning that the design and the ruler's name remained unchanged throughout its period of currency, with coins struck in the name of HENRICUS REX under Henry II, Richard, John and Henry III. Stylistic details permit a division of the type into classes in a known chronological sequence, although the dates of each class are approximate, rather than absolute. Thus we can be certain that the coin was struck in the early thirteenth century, in the latter part of John's reign or at the very beginning of the reign of Henry III. However, because the type as a whole survived until 1247, and coins were not withdrawn from circulation when new classes were introduced, the date at which the coin was deposited is less certain. 'Short Cross' coins only very rarely appear in hoards deposited after the recoinage of 1247, so it would appear that most 'Short Cross' coins

disappeared fairly promptly following the recoinage. It therefore seems likely that the coin was deposited between *c.* 1205 and *c.* 1250. Unfortunately this was can not be linked with a particular stratified layer, as it was recovered from the spoil heap from Area 2, when checking the spoil heap with the use of metal detectors. From the area of the spoil heap in which it was found, it seems likely, but not certain, that it comes from a layer not far above the putative rampart.

10.0 Aknowledgements

The Tutbury Castle research project was instigated and part-funded by Mrs Lesley Smith, the castle's lessee. The project has also gratefully received funding from the British Museum and Advantage West Midlands. Dr Malcolm Hislop directed the archaeological programme and Glynn Barratt co-ordinated the survey work. As principal supervisor, Helen Martin had the day to day running of the site. The other supervisors were Mark Kincey (excavation and geophysics) and Leonie Driver (excavation and building recording). Nineteen students from Birmingham University took part in the training programme, which was monitored by Dr Chris Callow of the Institute of Archaeology and Antiquity. In addition, three volunteers, Bill Griffiths, Ric Groves (who is also undertaking historic map analysis for the project) and John Arnold, took part in the excavation at various times. We are grateful to them and to the staff of Tutbury Castle for their interest and support. The project was monitored by Bill Klemperer for English Heritage and by Ian Wykes for Staffordshire County Council

11.0 References

Albarella, U. and Davis, S. 1994 *The Saxon and Medieval Animal Bones Excavated from 1985-1989 from West Cotton, Northamptonshire*, AML Report 17/94 (London).

Albarella, U. and Davis, S.J.M. 1996, Mammal and bird bones from Launceston Castle: decline in status and the rise of agriculture, *Circaea* 12 (1) 1996 for 1994, 1-56.

Davis, S., 1992 *A rapid method for recording information about mammal bones from archaeological sites*, AML report 19/92 (London).

Dobney, K.M., Jaques, S.D. and Irving, B.G. 1996, *Of Butchers and Breeds. Report on vertebrate remains from various sites in the City of Lincoln*, Lincoln Archaeological Studies 5.

Driesch, A. von den 1976, *A Guide to the Measurement of Animal Bones from Archaeological Sites*, Peabody Museum Bulletin 1, Cambridge Mass.: Harvard University.

Gunstone, A.J.H. (1964) An Archaeological Gazetteer of Staffordshire. Part 1: Chance finds and sites, excluding barrows and their contexts, *North Staffordshire Journal of Field Studies* **4**, 10-45.

Kilmurry, K. 1980, *The Pottery Industry of Stamford, Lincs* c. *850-1250,* BAR British Series 84.

Manby, T. G. (1963) Some Mesolithic Sites in the Peak District and Trent Basin, *Derbyshire Archaeological Journal* **83**, 10-23.

Myers, 2003. The Upper Palaeolithic and Mesolithic Archaeology of the West Midlands Region. Internet paper for the *West Midlands Regional Research Framework for Archaeology.*

www.arch-ant.bham.ac.uk/wmrrfa/Andy20%Myers.doc

Wymer, J.J. (ed) with C.J.Bonsall (1977) A Gazetteer of Mesolithic Sites in England and Wales, with a Gazetteer of Upper Palaeolithic Sites. CBA Research Report, No. 20.