Conflict in the pre-industrial landscape of England: a resource assessment

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June 2008

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Summary and acknowledgements

This project set out to ascertain how material evidence for military action[1] and the landscape in which it took place can be better integrated into the investigation and management of the UK's historic environment.

Whilst the project is concerned with England, it fits into an evolving context of existing work in Scotland and prospective work in Wales, the three elements together being planned towards an integrated whole. The project's objectives were to:

- define the resource
- identify research potential
- develop a research framework for investigation
- develop a methodology for assessment
- define a framework for conservation

The project was planned in two stages. Phase One, upon which this volume reports, was designed as a resource assessment focussing primarily upon battles, involving the preparation of a gazetteer, an assessment of condition and potential with more detailed field examination of a number of representative examples, leading to a report that would include a design for Phase Two. The design of Phase One built on substantial experience already gained in Scotland; its outputs are offered to inform policy and assist management of land use change, the work of HERs, planners, and the Portable Antiquities Scheme.

Phase Two will include more advanced pilot projects to advance investigation aspects, further publication and training outputs and will extend the scope of the

[1] Military action is taken to embrace battles, sieges, skirmishes and events of civil unrest. Because of the very different character of warfare in the industrial period, the project's younger boundary was set at the end of the 18th century. Naval action is excluded, although the value of wrecks in providing closed assemblages of weapons and munitions is recognised.

assessment more fully into the area of sieges, which are an essential complement to battles in the understanding of historic warfare on land.

The report has been researched and written by Glenn Foard, with extensive editorial help from Richard Morris. Comments and guidance have been provided by an advisory panel consisting of Professor John Childs (Chair), Dr Paul Stamper, Rob Janaway, Dr Karen Watts and Michael Rayner. Aleksandra Maclain carried out the local bibliographic searches for Cumbria and the West Riding of Yorkshire. Funding was provided by English Heritage and the University of Leeds with in-kind contributions from the Battlefields Trust.

Alongside original work undertaken specifically for this project, the report has had the good fortune to draw upon Battlefields Trust surveys in progress at several battlefields, notably Edgehill and Bosworth. Other contributions have been made by David Hall on open field systems, by Rob Janaway on taphonomy, and Rodney Burton on soils. Simon Richardson and Tim Sutherland have also given valuable advice on Towton. J Baker, S Brookes, D Parsons and A Reynolds have assisted on approaches to the location of early medieval battlefields and very helpfully contributed a note on the implications of their work for this project. Charles Haecker arranged visits to and fieldwork on battlefield sites in the USA. Douglas Scott has advised on the investigation and management of battlefields in the USA. Susanne Wilbers-Rost for advice on and tour of Kalkriese. Iain Sanderson for information on Adwalton Moor, Tony Pollard on Sedgemoor and Alex Hildred for access to the Mary Rose material. All HER officers and a number of Finds Liaison Officers have provided information.

Additional editorial and other help was given by Jane Morris, Axel Müller, Tracey Partida, Steven Moorhouse, and members of staff of the Institute for Medieval Studies, University of Leeds.

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Creaton and Leeds, July 2008

1. INTRODUCTION

Warfare is a significant aspect of human behaviour. Physical evidence of warfare forms a correspondingly important part of the historic environment. Many aspects of warfare have been the subject of much archaeological research. Weapons have been researched from the Neolithic onwards. Fortifications have been even more extensively studied, and the evidence they present is relatively well understood. In contrast, the archaeology of combat, whether from open battle or assaults upon fortified positions, is little studied and poorly understood. This is not least because the material traces of battle are far more ephemeral

While a siege site will normally have defensive remains that enable investigations to be clearly focused, a battlefield is 'just a field'. Even finding the field – the exact piece of ground, as distinct from the neighbourhood – is often difficult, particularly for earlier periods. Moreover, if the battlefield is to have more than commemorative value then the character of its landscape at the time must be understood. Using the written and archaeological record, the battle's events must then be placed accurately in that context. Only when the action has been so located can the terrain, the tactically relevant components of the historic landscape, be used better to understand the event itself. Where combat in the past has left material traces, and where those traces survive sufficiently well on a given site, then they will uniquely complement primary written sources in developing our understanding of the event.

For present purposes 'fields of conflict' must therefore be classified according to the nature of the evidence as it exists for both terrain and action. While the two broad types of combat – battles (including lesser open actions), and sieges – are complementary in the history and study of warfare, they differ in their potential and hence to a degree must be separately assessed. The identification and study of a siege site may be somewhat easier because it is located by the fortifications. The material record of a battle or skirmish is usually much more scanty. Research on battles is thus normally dependent upon written records to identify the existence and whereabouts of an action. On this basis four main phases of warfare can be defined:

1 Pre- Roman: no written records; at present, only siege sites appear to be identifiable and amenable to study.

2 Roman and early medieval (1st to 11th centuries AD): quantity and character of documentary evidence seldom sufficient to enable secure location of sites in a period where the existence of battle archaeology has yet to be demonstrated in Britain. Battles of this period are thus not normally amenable to study. It remains to be seen the degree to which siege sites are identifiable.

In due course it is possible that investigation of siege sites will lead to an understanding as to whether, and if so how, early battles may be located and investigated. The current bias in conventional research, that for the most part does not embrace either the kinds of question or methodologies considered here, means that fields of conflict in this period cannot yet be adequately assessed.

3 Later medieval (1100-1500): locations are normally known and effective terrain analysis is often possible, but ability to place action remains variable. So far only one site, Towton, has produced substantial battle archaeology. Even here, however, the lack of detailed archaeological analysis makes it impossible to transfer Towton's lessons to other

sites, because it is not yet clear what the lessons actually are. Until this situation improves, it will be impossible to disprove a location even when that location is subject to field survey.

4 Early modern (1500-1750): a wide range of documentary and physical evidence normally exists both for terrain and action, the latter being particularly prominent in the distribution of lead bullets. An effective methodology has been demonstrated for the investigation of bullets which can be implemented on a battlefield-wide scale. The methodology requires further refinement to facilitate general use.

The transition between phases 3 and 4, when firearms and effective artillery were being introduced emerges as a stage that calls for a major programme of research. While its material traces may be limited, focused research is needed to establish the full character of that resource and what questions could be posed of it. Investigation of this transitional period may have the additional benefit of helping to resolve some uncertainties about the potential of later medieval fields of conflict.

Scope of the assessment

This assessment was prepared as the first stage of work to assist English Heritage in determining the most appropriate management strategies for historic fields of conflict in England, particularly battlefields, and to determine what guidance should be provided to Local Authority Archaeologists and others who are involved in the management of archaeological assets. Sites have accordingly been assessed as archaeological monuments where physical evidence offers the potential to advance understanding of both individual actions and warfare in general.

Public interpretation and memorialization lay outside the brief, except where memorialization can assist understanding of the event itself. Nonetheless, where data relevant to these aspects have been identified, they have been recorded so that a summary of the character and distribution of both is now available.

The report provides an overview of the resource by *type of action*, and by the *spatial and chronological distribution of events*. It then proceeds to review the *character* of the physical evidence and its *research potential* and *management needs*. Where appropriate, these issues have then been further developed through a number of more detailed *case studies* based both on existing work and new research undertaken within the project. Finally, a series of recommendations is given for further action.

This was primarily a desk-based assessment working mainly from secondary sources, data in the National Monuments Record (NMR) and Historic Environment Records (HER). The primary task was to enhance the Battlefield Trust's *UK Fields of Conflict database,* which was initially developed for assessment of Scottish battlefields. Where not specifically referenced in the present text, information on specific actions and features or evidence related to them will be found in the database. While this database does not claim to be comprehensive, it does aim to include all located battles and iconic lesser actions. To facilitate comparison, the classification follows the one already applied in Scotland. Ideally, assessment should be on a European scale.

Type of action distinguishes between battles (including any rout) and skirmishes, raids, sieges and civil unrest. Siege sites were to be excluded, but practical considerations, including the degree to which their archaeology is an essential complement to that of fields of conflict, have demanded that they be included to a limited degree though they need more intensive treatment equivalent to that given to battles.

Naval actions are excluded because they represent a distinctly different resource which requires separate assessment.

As work progressed it became clear that different periods of warfare are reflected in sites of different *archaeological* (as distinct from other kinds) potential. This accordingly required a shift away from a policy of equal emphasis towards an approach wherein more attention is paid to sites and issues of the later medieval and especially the early modern periods, and correspondingly less to earlier periods. It also became clear that essential aspects of battle archaeology had never been adequately characterized or defined, and so these too became prerequisites for the assessment of research potential and management needs.

2. THE VALUE OF THE RESOURCE

Classifications

Battle

A battle is here taken to be an action involving wholly or largely military forces, present on each side in numbers comprising battalion strength (i.e. totaling c.1000 or more), and normally deployed and engaged on the field in formal battle array.

Defining the lower limit can be difficult, particularly with regard to the many actions of the Civil War in which less than 5000 troops were engaged. There are, therefore, a number of lesser actions that have not been assessed here but should be once the methodology of investigation is fully developed and the chief actions have been adequately addressed.

The *battlefield* is that area where the troops deployed and fought while in battle formation. Once the formations were lost, as in a rout and pursuit, then it can be argued that the action becomes a subsidiary skirmish, because such action was typically piecemeal and could be scattered widely. For management purposes a rout is thus to be distinguished from the typically more consolidated area of the battle proper. The area covered by such subsequent action, together with preliminary deployment and manoeuvres which influenced the location of the main action, is described here as the *immediate context* of the battlefield.

Subsidiary action often had a dramatic influence on the outcome and significance of a battle, for it was typically in the pursuit and 'execution', after battle formations had collapsed, that the greatest numbers of troops were killed or captured. It is here, too, that attacks on baggage trains will normally be found. It is in this wider area, and probably especially where major obstacles were encountered, as much as in the concentrated area where the two armies first engaged, that the potential exists for mass graves. The definition of this wider area may be problematic, although for post-medieval actions unstratified artefact distributions will often help in the placing of key elements of subsidiary action, as now demonstrated by the Edgehill survey. In defining the battlefield for management purposes the extent of immediate context needs to be properly delineated to take in the main elements of subsidiary action alongside the main action.

Skirmish

A skirmish was an engagement between military forces not in battle array. Typically, though not always, this occurred when small numbers of troops were involved, because the rigid order of a battle array was not essential for the control of numbers substantially less than battalion strength. Skirmishes could be subsidiary to a battle but most often they formed part of a wider military campaign. Generally, skirmish sites tend to be much less extensive than battlefields, though as a category skirmishes are in the nature of a continuum of scale with no rigid divisions. Skirmishing involving large numbers, which need to be dealt with together with battles as defined above, may also have occurred when action took place in an enclosed landscape, as for example with elements of the complex action at Lostwithiel in 1644 or the urban action at Alton in 1643.

Border conflict (raid)

Smaller cross-border actions, often by irregular or civilian forces, are here distinguished from actions which were part of a large military campaign by regular

forces (sometimes termed a 'chevauchee')[2], such as the major punitive action that ended in the battle of Solway Moss (Cumbria, 1542). Up to the early 17th century security in the Scottish Marches was poor, reliance on direct action correspondingly large. The more intensive pilot work for Cumbria has revealed such border raids to be heavily underrepresented on the UK Fields of Conflict (FoC) database – a factor which will be particularly significant in Northumberland. In the later medieval period similar actions may be identifiable in the Welsh Marches.

Unverified sites

Various sites are identified on the database as 'unverified' because of the limited or dubious nature of the evidence upon which they rest. Most are based on local tradition, including associations with finds of human remains, cairns and standing stones, and apparently lacking any contemporary written record. These sites are likely to be spurious, although continuing research may establish some as genuine.

Other actions

Also on the FoC database is a small number of sites that were the scene of non-typical events, as where large armies faced each other but no significant action took place, as at Turnham Green in 1642.

Sieges

Sieges are actions against fixed positions, where substantial defences were constructed to modify the strategic landscape and give tactical advantage to the defenders.

Potential

Potential can be assessed in relation to research, interpretive and commemorative value. Research value and investigative methodology are summarised here but dealt with more fully in Chapter 5. Interpretive potential will extend across different kinds of audience – for instance, from children through to battlefield specialists. Although interpretation and memorialization were not a central part of the project brief, they are nevertheless considered amongst other more core elements.

Research Potential

A battlefield's research values lie in their potential to contribute to understanding of the event itself and warfare in general. Work over the last twenty years in Europe and the USA has revealed the degree to which the physical evidence of battlefields can contribute to this, in some cases transforming our understanding of the location and character of major and lesser actions. Most battlefields pose a challenge of how to locate events within their contemporary landscape. Interdisciplinary research has proven increasingly effective at doing this, so enabling assessment of the effects of terrain upon the course and outcome of the action, and revealing – for example – the success or failures of a commander in exploiting the opportunities provided by the terrain.

Physical evidence may also contribute to the understanding of the nature of warfare of a particular period. Thus the distribution of bullets, arrowheads or other

[2] Prestwich, 1996, 10

artefacts across a battlefield, investigated through systematic archaeological metal detecting survey, may assist in estimating the size of the armies involved, determining the way in which they were deployed, their composition and how they were equipped. As an example, the calibre of bullets will indicate the bore of the firearms used and hence their type, which may in turn show where on the battlefield different types of forces were engaged and with what intensity.

The graves in which battle dead were buried may be spread across a number of square miles. Being so, in the absence of secure tradition, place-name or antiquarian reference, no reliable method yet exists to locate them. While geophysics may be effective when a target area has been identified such survey is not practicable on a battlefield-wide scale. However, if a mass grave is located then it can inform on a number of issues: in addition to its location and the numbers buried, palaeo-pathological data can illuminate the use and effectiveness of different weapon types, the distribution of troops on the battlefield and may even provide evidence of battlefield surgery.[3]

Investigation of battlefields with well preserved documentary and physical evidence may advance more than the understanding of those particular actions. Comparison of written and archaeological records, complemented by experimental work, may bring advances in the methodology of recording and analysis. It may enable assessment of the effectiveness of particular survey techniques, or reveal archaeological signatures of different types of action, as at Edgehill where recognition of the distributions of bullets fired as case shot from artillery indicates the potential to reconstruct the exact placement of battalions in a battle array. In exceptional conditions, for instance where colluvium or alluvium preserves a battlefield surface, light may be cast on the nature of the original resource, enabling a better understanding of what has been lost elsewhere.[4]

Many battlefield investigations, particularly into early medieval actions, will fall at the first hurdle of identifying the general location of the site. In contrast, for later medieval battles, with the exception of Towton, there are obstacles to our ability to validate hypotheses about specific site locations and the exact placement of deployments and action. This problem has been encountered in the Bosworth survey, in part because of a misunderstanding amongst battlefield archaeologists as to the likely potential of late medieval battle archaeology.

[3] Fiorato *et al*, 2000

[4] Foard, 2008a

Interpretation

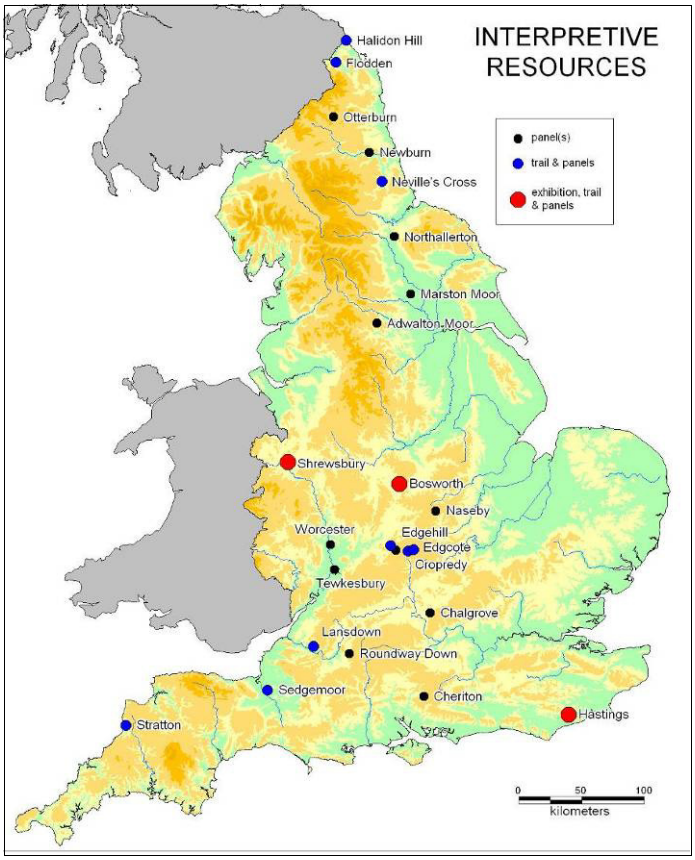

Figure 1: Interpretive resources on battlefields in England

There is substantial public and educational interest in battlefields and other fields of conflict.[5] Bosworth and Hastings, both turning points in English national history, have interpretive facilities. Another, on a smaller scale, has been established by private enterprise at Shrewsbury, and the potential for development of a large scale interpretive facility is being explored at Naseby. Although these facilities are more modest than those found on major battlefields in the USA, with a few exceptions such as Kalkriese and Culloden[6] they are more substantial than those met with elsewhere in Europe.

The extent of interest on the part of particular audiences is reflected in the number of published books and guides. Individual battles tend to be valued by local communities, some of which have established battlefield trails and interpretive panels, as at Flodden and Lansdown.

Effective interpretation requires secure understanding of the battle and battlefield, for which the research focus of this report has direct relevance. It is important to ensure that the battlefield resources, particularly as they relate to terrain, are effectively managed to sustain the interpretation. Without this, conservation may focus on the wrong area of landscape, and so overlook significant survivals from the time of the battle such as fine

[5] Pollard, 2003

[6] Sked, 1987. For a survey of preservation and interpretation in the USA see http://www.cr.nps.gov/hps/abpp/

detail of landform, hedgerow patterns, walls or other features. Such knowledge is the best defence against uninformed land use change. It was, in part, for these reasons that the Heritage Lottery Fund called for the renewed interpretation in the Bosworth Battlefield Visitor Centre to be underpinned by a new study of the battle and battlefield.

In addition to the existing and planned interpretive facilities, a further 20 battlefields were found to have one or more interpretive panels on site. Of these, 12 have battlefield trails, the most elaborate being at Hastings (which includes an audio tour), Lansdown and Shrewsbury. At Towton interpretive material is provided in the grounds of the nearby Crooked Billet Pub.

At least two further interpretive schemes have fallen into decay: at Stoke the trail and panels set up in the anniversary year of 1985 have long since disappeared, with the remaining panels now on display in the church. At Tewkesbury at least one decayed and illegible panel can be seen. While the need for continuing maintenance of interpretation schemes is obvious, such cases remind us that the need is not always observed as it has been at Worcester, where vandalized panels were recently replaced.

Commemoration

Monuments, chapels and crosses have been constructed on battlefields at least from the early Middle Ages through to the present – a phenomenon that incidentally demonstrates a continuing interest in England's fields of conflict. Memorialization is important for the management of the historic environment, and is reflected by the number of monuments that are scheduled or listed. Since this theme was not a priority for the present study, such features have only been recorded on an incidental basis. The bibliographic search discussed below provides a crude guide to the perceived cultural importance of fields of conflict; in due course the database would merit systematic enhancement to embrace battlefield memorialization, with an assessment of the presence, number and scale of battlefield monuments and other commemorative associations. The brief listing that follows is restricted to battles, and is not definitive.

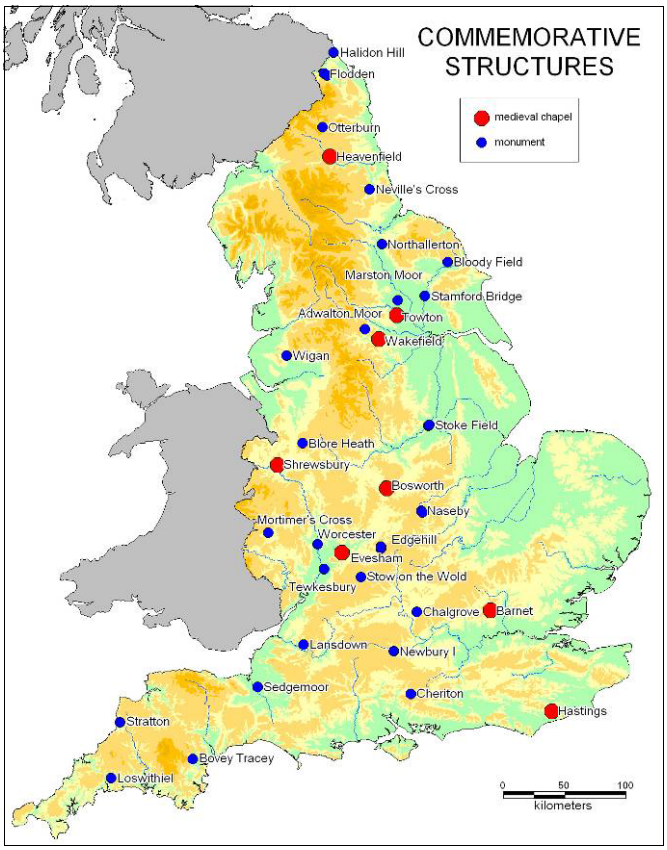

Figure 2: Commemorative structures on English fields of conflict

Most monuments were erected in the 19th and 20th centuries, and in their location thus reflect the prevailing interpretations of the day. The small number of earlier monuments, such as those at Blore Heath and Lansdown, may represent the surviving physical embodiment of a genuine oral tradition that derived from the battle itself. For medieval and especially pre-Conquest battles such monuments may thus be of considerable significance.

Where crosses or chapels are known to have been locationally stable, and (with springs) the association with the battlefield is certain, then they represent one of the strongest indicators as to the vicinity in which an action took place. However, as can be seen at Towton where the chapel lies in the village, more than 1 km (0.62 mile) from the centre of the action, the site need not be on the battlefield itself and must accordingly be treated with care. Indeed, in some cases the association may spurious, as with the so-called battle of Heavenfield, an action dated by Bede (writing almost a century later) in the mid 630s. The chapel there is certainly of medieval origin, but stands not on the site of the battle but where Oswald set up a cross in his camp beforehand. The battlefield itself lies somewhere beside Denisesburn, several miles to the south.

Figure 3: Modern art recollecting 17th-century themes adds interest to the battlefield trail at Lansdown

Fifty-one commemorative features have been identified here, ranging from chapels and monuments to features such as prehistoric standing stones and isolated trees which have become linked with battles in local tradition.

At least nine medieval chapels or religious houses stand upon or were associated with battles. The earliest is to the battle of Ashingdon, but this site is now disputed. The greatest is Battle Abbey, constructed by William I on the site of and in memory of those killed in the battle of Hastings. A collegiate church was constructed on the battlefield at Shrewsbury; known as Battlefield church, it had its own parish; the church survives today though heavily restored. Lesser chapels are documented at Towton, Barnet, Wakefield and probably Evesham. Those at Wakefield and Shrewsbury survive; the others are located with varying degrees of accuracy.

The last battlefield chapel to be projected was meant for Bosworth, but apparently this was never built, and a chantry was established instead in the parish church at Dadlington.[7]

There are also a number of chapels for which links have been claimed with battles or to kings killed in battle, where the chapel does not stand on the battlefield itself. Examples are the chapel to Edwin near Edwinstowe and that at Heavenfield, discussed above. To them can be added religious houses that were founded in expiation for acts of violence, like the monastery established in the 650s by Oswiu at Gilling, where he had ordered the murder of his rival Oswine.

Also falling into this context is a number of wells associated with medieval battles. There is a well at Evesham, said to be close to where Simon de Montfort fell, which afterwards became a place of pilgrimage and a scene of miracles, where a chapel was subsequently constructed. The earliest of this kind is Oswald's Well, said to lie on or close to the site of the battle of Maserfield (641) where King Oswald of Northumbria was killed.

[7] Parry,1993

Others are Malcolm's Well at Alnwick and King Richard's well at Bosworth, though the latter seems to lack the religious associations seen elsewhere.

Figure 4: Medieval cross which supposedly marks the location where Lord Audley was killed on the battlefield at Blore Heath

At least seven crosses stand or stood in supposedly significant relationship to English battlefields. Several others have come to be associated with a battle where the battle name derives from the cross, as with Neville's Cross, where presumably the structure was already there at the time of the action.

Most battlefield-related crosses are believed to have been erected as memorials. On Stainmore the stump of a medieval cross, traditionally associated with the violent death of Eric Bloodaxe in 950 or 954, survived into the 20th century but is said to have since been lost in road works. Perhaps more secure is Malcolm's Cross on the battlefield at Alnwick which commemorates King Malcolm's death there in1093. On that site there was also a Malcolm's Well, where a medieval leper hospital was later set up. While it is unclear if the hospital was actually associated with the battlefield, the positioning of leper hospitals on or close to major thoroughfares, to attract alms and prayers, is a phenomenon to which attention has been drawn,[8] and which in turn would fit with a tendency for battle sites to have a close relationship with the geography of communications.

Most crosses appear to be linked to the deaths of important individuals, as with the Percy Cross on Hedgeley Moor (1464). Probably the most useful is that at Blore Heath (1459) which is said to mark the place where Lord Audley fell. Equally, the cross on the battlefield of Otterburn (1388) provides an important lesson. Before it was moved in the 19th century from alongside the old road, it supposedly marked the place where Douglas died. However, the cross of 1777 may not have had a precursor and thus may not reflect any secure link in local tradition to the event itself. At North Walsham, indeed, there are remains of three medieval crosses associated with the battle of 1381, separated in all by

[8] Gilchrist,1995

more than 1 km (0.6 mile). The most substantial cross, said to have been erected in the 14th century as a memorial to the battle of Boroughbridge, is an 18ft (5.48m) column comprising four shafts banded together which in 1852 was moved a mile or so to the centre of nearby Aldborough.

In all, 43 battlefield monuments and 11 memorial plaques have been here identified. Of the early monuments three are to individuals: one, already mentioned, is the cross to Audley at Blore Heath; a second is the 17th-century monument on Wigan battlefield that marks the place where the royalist commander Sir Thomas Tyldesley died; and the 18th-century monument which recollects the place where Sir Bevil Grenville fell on Lansdown battlefield in 1643. These early constructions, which have a good chance of representing direct knowledge from the events themselves, appear to be useful indicators of key moments in battle action. In contrast, later monuments, such as that to Colonel John Hampden at Chalgrove or to Falkland at Newbury, lack such a link and often add confusion to the understanding of the events. The best example of this is the obelisk at Naseby which was erected in 1826 on the windmill mound in Naseby, more than a mile from the battlefield. Of these general monuments that commemorate the battle rather than an individual, the earliest may be that erected in the 18th century at Mortimer's Cross. Most belong to the 19th or 20th century.

Alongside them are a number of genuine funerary monuments to individuals who fell in a particular battle and which were erected within living memory. Six have been identified here. Some lie in churches and churchyards close to the battlefield; others are more distant. Hence at Edgehill the monument and effigy to Captain Kingsmill lies in Radway church, for Kingsmill fell in that parish. In contrast the gravestone to Captain Gourdon, who also died at Edgehill, is in Warmington churchyard 3.7 miles (6 km) from the centre of the action, presumably because he was taken back to the village and died there of his wounds. Others are at Stow on the Wold, in Saxton churchyard beside Towton battlefield, the church at Willoughby on the Wolds, and Middlezoy church near Sedgemoor.

Other features that have come to be treated as memorials to battles include prehistoric standing stones, natural erratics, and some trees. Standing stones (already recorded on Armstrong's map of Northumberland in the 18th century) include those at Homildon Hill (1415), at nearby Yeavering (Geteryne, 1415), and the so called (King) James's 'chair' and 'stone' at Flodden. The trees seem most often to be oaks, such as the Battle Oak at Mortimer's Cross, Wardington Oak at Cropredy and Charles's Oak at Naseby. While most are now lost they have occasionally been replaced by memorial stones, as with the Burrand Bush Stone on Stoke Field.[9] In most cases the association is probably spurious, as with the tradition of Charles's Oak in Sibbertoft, though it may be more than coincidence that this tree stood on an ancient enclosure boundary in an area that was otherwise extensive open field in 1645 and is close to a bullet scatter indicating an intense fire-fight.

[9] Barrett, 1896, 149

3. DEFINING THE RESOURCE

While this project has taken a cross-disciplinary approach to sources for fields of conflict, its primary brief has been for physical evidence for terrain and battle, because this is where management action is called for. The report aims to

- define the character of the resource, its condition and research potential
- review and where practicable refine the methodology for investigation
- identify threats faced and suggest management responses

A rapid assessment has been undertaken to grade the relative potential of individual sites. This requires a record of the location, scale and character of all battlefields. The project therefore began by enhancing the Battlefield Trust's *UK Fields of Conflict* database (UKFoC). This data set consists of two GIS tables in *MapInfo* and one bibliographic file in *Endnote*: UK Fields of Conflict; UKFoC Feature; UK Battlefields bibliography (http://www.battlefieldstrust.com/resource-centre/battlefieldsuk/index.asp). The detail for each is provided in a user manual. The UKFoC database is the primary dataset and includes key facts about each site. The features data set includes burials and memorials associated with a particular battle and linked to the main database by the action name and the UKFoC number. The association can be direct, as in the case of mass graves; or secondary, as in the case of monuments and memorials; or by assimilation, as where pre-battle or natural features (e.g. standing stones or trees) have become associated with the battle over time. Bibliographic references are not normally given in the database but all references to a named battle that have been located in the assessment are listed in the bibliographic database, with the relevant battle name recorded in the Notes field for the relevant secondary work.

The enhanced database does not claim to be comprehensive, but it does seek to include all located battles as well as iconic lesser actions. A large number of lesser actions will not have been identified. In defining fields of conflict the younger boundary has been set at the end of the 18th century. All English land battles are thus included, the last being Sedgemoor in 1685; all land skirmishes of later date could also be incorporated, the last genuinely military land action being in 1778 during the American War of Independence

when American troops landed in Whitehaven. The database excludes actions of the Industrial era, and all naval or aerial action since, because of its different character.

Enhancement was undertaken from a wide range of secondary published sources. Information so gained was then supplemented with data recorded on the NMR online (Pastscape), from all but one of England's HERs (only York did not supply data) and on ADS. Each site was then classified according to type of action, as far as practicable distinguishing between battles, skirmishes, sieges and episodes of civil unrest.

An online search was undertaken on the finds database of the Portable Antiquities Scheme for potential battle-related artefacts such as lead bullets and roundshot, which might point to sites not already entered on the database. No such sites were identified.

For a rough-and-ready perspective on perceived cultural importance, citations from a selection of 'all period' secondary sources were analysed to establish how many such sources listed each battle (Appendix I).[10] Each battle was scored on the database (under bibliographic quantity) according to the number of these books in which it appeared. The bibliographic score broadly reflects the combination of perceived importance of the action together with the degree of certainty of location, and the quality of documentation and current understanding. With this said, some battles earn a high rating simply because of their historical reputation or legendary status. Mount Badon (c. AD 500) is an example. Likewise, some other battles, like Sedgemoor, have a high score despite being of smaller scale or arguably of lower military importance.

England's fields of conflict belong within a wider tradition of European warfare and should ideally be assessed within that context. There are also regional variations across Europe, as with the English dependence on the longbow as a battle-winning weapon in 14th- and 15th-century campaigns in Ireland, Scotland and France. The relative importance of some English battlefields – in terms of their survival and archaeological potential coupled with the written record – may well be viewed differently when they are placed in a European context. However, until a comparable European database is established such a revaluation will not be practicable. Only in Scotland are there comparable data to those developed here for England.

A small number of individual battlefields outside England was examined in the present project for comparative purposes, including Kalkriese (AD9) in Germany,

[10] The sources available differed from those used for Scotland; hence, this assessment does not make for direct comparison between battles in the two countries.

Oudenaarde (1708) in Belgium and several US sites from the mid 16th and mid 19th centuries.

A second stage of enhancement was undertaken on 88 actions that were either Registered, or classified as battles or possible battles, and which dated between 1066 and 1685 and are thus potentially locatable (see below). Each of the 88 battles was searched by name in three online bibliographic databases: COPAC (the academic and national library index), RHist (Royal Historical Society bibliography) and BIAB (British and Irish Bibliography). The relevant entries were then added to the UKFoC bibliography indicating the battle(s) covered. This data set is broadly comparable between English and Scottish battles enabling comparison between the two.

What could not be done as part of this enhancement was systematically to search local historical and archaeological journals, volumes of county philosophical and record societies, society monographs and cognate sources that have proliferated since the 1840s. However, to gain a sense of what such a search might reveal, and also as a control on the effectiveness of enhancement at a national level, two sample areas were examined in such detail. The areas searched were historical administrative units, because most local history literature was and is organised by historic county. One was Cumberland and Westmorland (essentially modern Cumbria), selected as an example of a border region where numerous raids and other lesser actions were to be expected over a long period. The other was the historical West Riding of Yorkshire, which lying as it does well away from a land border during the last millennium was likely to be more representative of England's experience of warfare.

The assessment demonstrated that while more intensive enhancement is unlikely to recover additional battles, it is likely to throw up a significant number of additional sieges and skirmishes. In border regions it may also be expected to add a large number of raids.

While the border region had many more raids, Yorkshire WR had a greater number of lesser actions from the Civil War and Wars of the Roses. However, these differences were tempered by the realisation that inter-county variations in the quantity and range of secondary works will themselves influence the number of new actions revealed. Given the current focus on battles, the decision to concentrate bibliographic searching at the national level thus appears not to have missed significant quantities of information, although should work expand to deal with sieges and lesser actions then local sources should be included. The results of the sampling are discussed in Appendix X.

Using the second stage of bibliographic enhancement, a second assessment was made of the number of bibliographic entries for the 88 battles, to provide a revised indication of perceived cultural importance. It would be possible, following systematic enhancement of the database for battlefield memorialisation, to provide a parallel assessment of perceived cultural importance through the presence, number and scale of battlefield monuments and commemorative associations. Initial assessment of the latter showed a high degree of correlation with the ordering based on bibliographic score, but the incompleteness of memorialisation data render the analysis of limited value.

The sites' importance and potential were also graded by professional judgement based on quality of sources, locational accuracy, number and survival of associated features, the scale of event and its likely military and political importance.

All 88 battlefields were then assessed (where the sites were sufficiently well understood) with reference to modern Ordnance Survey Explorer mapping and, in January 2008, the vertical aerial photography available on Microsoft Virtual Earth and Google Maps, to assess

- current land use
- state of development
- survival of ridge and furrow and other earthwork features

Each battlefield has also been assessed for land use in the 1930s from Land Utilisation Survey and its underlying geological formations from the BGS 1:10000 scale mapping. For those later medieval battlefields where accuracy of location and extent of action were in doubt, a rudimentary assessment has been made based on a search around the centre point grid reference. In practice a number of the intended data sets, such as Listed Buildings and SAMs, were not used in the assessment, because in initial review they produced little in the way of significant associations. Other attributes required a degree of investigation too detailed to be consistently applicable for battles from 1066 onwards, or would have been too demanding in terms of investigation into primary sources. This included whether the troops were deployed in battle array, and the documentary potential for both military history and terrain.

The scoring yielded a list in which only a handful of surviving sites other than Registered battlefields lay within the upper levels. Given the existence of detailed reports produced to inform the Battlefields Register in 1995, it was therefore unproductive to

prepare detailed reports on each action. However, once the database enhancement and initial assessment were completed it became clear that England lacks any reasoned statement as to the character of its battle archaeology in any period. Without such a statement, the assessment of condition and potential of sites would be impossible.

It also became clear that no battlefield before 1066 is securely located. This is why the second stage enhancement and subsequent attention has concentrated on the later medieval and early modern periods to a greater extent than was intended at the start.

Some themes and sites have been singled out for closer attention than others because they exemplify potentials and problems that are relevant to the furtherance of methodology and thus better management. Thus the transitional period from 1450 to 1600 has been taken to explore the full range of site types from battles of international significance down to border raids and events of civil unrest. For lesser actions, the example of Dussindale has been taken. For sieges the Civil War data set is explored, both generally and through several specific examples.

Specific assessment

Of the 100 actions for which it was possible to enter onto the database the approximate numbers engaged, all those with 2000 or less engaged were listed as skirmishes, except for Lincoln II. These included two Registered battlefields which the Register reports themselves show were little more than skirmishes (Chalgrove and Powick).

Classificatory problems at the lower end of the scale are at their clearest when dealing with early modern battlefields. For example, the action at Middlewich has small numbers and is listed here as a skirmish, but is exceptional in that it has left a surviving contemporary battle plan, which indicates that the troops were organised in battle array not in loose order.[11] Since there were already 88 actions classed as battles after 1066 it was impractical to address such problems or opportunities within this project. It is suggested that the issue of battle-skirmish boundary be re-visited when a representative sample of lesser actions has been selected for investigation and conservation. The first priority here has been to ensure that the major actions are adequately understood and management requirements identified.

[11] Liddiard and McGuicken, 2007

The second stage of assessment was thus restricted to open actions from the later Middle Ages onwards which are generally considered to be battles or for which the numbers engaged were above 2000. Of the 88 battles there were 25, all later medieval, where data for the numbers for the troops engaged were insufficient.

The list has also been ordered by numbers engaged (Appendix I.iii). They include 22 actions in which the numbers engaged lay between 2,500 and 5,000, for which archaeological problems are substantial; four of these were Registered.

The graded lists presented in Appendix I indicate whether an action is Registered or not, because this is an important factor in determining whether a field of conflict is currently taken to be of national importance and whether effective management is attempted. It is therefore important that the consistency of inclusion of consideration and informed exclusion, on grounds of condition and adequacy of locational information, is considered. Where not included then the potential of the site should be recorded on HER so that appropriate management measures are taken when necessary. The criteria used for the definition of the Register in 1995 still remain valid, but subsequent research, particularly with regard terrain and to battle archaeology now demands that both the criteria for inclusion and for the extent of the Register boundaries are reviewed. The following discussion provides a partial focus for this.

Both scoring methods demonstrate that few battlefields in the higher levels were excluded from the Register; of those that were, most were left out either because information on their location was inadequate or because the sites were largely destroyed.

If we review the sites with numbers from the largest downward, a small number of exclusions are not accounted for by the published Register documentation. In assessing their importance and potential account has been taken of the rarity of sites for the period of the encounter, and special issues such as the introduction of new weapons and degree of archaeological potential, thus building upon the criteria defined in the Register. A wide range of issues has arisen from this assessment; to illustrate them, a number of unregistered cases is briefly discussed here.

Lostwithiel (Cornwall, 1644) is the clearest example, and requires urgent consideration. At 25,000 and involving the destruction of the main parliamentarian field army, with massive political repercussions that were partly responsible for the creation of the New Model Army and the rise of Cromwell to political power, this was a considerable event. For an English battle it was also unusual, being a complex action spread over

several days in a largely enclosed landscape and involving a number of distinct and substantial actions. A number of the locations are well preserved and are likely to have good surviving archaeology and terrain. Definition of a register area would be difficult, but that is not a reason to exclude it. The need is for a comprehensive definition of the whole landscape with its various component actions so that parts can be addressed by inclusion in the Register and other parts dealt with as appropriate.

Blackheath (Kent, 1497) involved perhaps as many as 20,000 combatants, but the Cornish rebels were easily defeated. The action is adequately understood but the main clash appears to have taken place at the crossing at Deptford bridge. Despite extensive open ground on Blackheath itself, the greater part of the battlefield is thus wholly built over and so, on present evidence, the site can be dismissed as not significant for management purposes.

Turnham Green (Middlesex, 1642) and **Ludford (Shropshire, 1459)** are both excluded as they involved no significant action, while **Penrith (Cumbria, 1715)**, despite the large numbers said to be present, was but a minor engagement of Scottish forces by local militias. The location of the battlefield at **Hilton (Durham, 1644)** is disputed – a problem which might well be resolved by a review of the primary sources in the context of a new terrain reconstruction, but this does not seem justified as, on present evidence, almost all of both alternative areas appear to be built up. Similarly almost the whole area of **Preston I (Lancashire, 1648)**, another complex action with several widely spread component actions, appears to be largely built over.

Winwick Pass (Lancashire, 1648), although only a subsidiary action to the major battle in and around Preston the day before, is of a scale greater than many Registered battlefields. The site is almost completely undeveloped, and apart from small scale mineral extraction most of it seems to be intact. Thus the site should be understandable and have a high research potential as the battle archaeology is likely to be reasonably intact. In addition the church, upon which the royalist forces were driven back, also shows some bullet impact scars.[12] The site has a high priority for assessment for inclusion in the Register.

Dussindale (Norfolk, 1549), discussed in chapter 5, is from the critical period of transition in technology of war. A significant part of the potential site is undeveloped. Exact

[12] Information from Michael Rayner

numbers are uncertain but lay somewhere between 5,000 and 10,000. The remaining area is under development threat and requires urgent investigation.

Maidstone (Kent, 1648) was a largely urban fight, with the site wholly built up today and so unlikely to be relevant for management.

Piper Dene (Northumberland, 1435) was one of the larger engagements to develop out of a border raid. The numbers engaged were high, but it is little discussed in secondary works. The landscape is intact and this might be one of a series of actions that should be taken into account in investigation of warfare in the borders, lying as it does in close proximity to a whole series of battlefield, siege, skirmish and probably also raid sites from the 11th to the 16th centuries. This site has a high priority for detailed assessment.

Selby (Yorkshire, 1644) was partly fought in an urban area; the whole site now appears to have been built over so there is no need to pursue it.

Alton (Hampshire, 1644) was almost purely a street fight. As such little seems likely to remain with the exception of bullet impact scars on the church, and scatters of bullets that presumably accompany them in the churchyard. Similar evidence may exist elsewhere nearby if other buildings of the period survive.

Case studies and supporting analysis

In a final phase of enhancement, to isolate the best examples for case study, each of the English Heritage battlefield files, including those for the Battle Sites and other sites assessed for the Register but not finally registered, was consulted. Each of the battlefields on the primary list was visited and its condition and potential considered on the ground in the light of the information presented in the relevant Battlefields Register report.

Battlefields on the primary list (Appendix I) have undergone a basic documentary search for historic maps relevant to the reconstruction of the historic terrain of the battlefield. The online catalogues of the British Library, The National Archives and, for all other archives, the A2A catalogue have been consulted. In addition, for selected battlefields a search has been made of the indexes of the relevant County Record Offices. Where significant evidence was forthcoming then new mapping was undertaken to reconstruct relevant historic landscape detail.

All RAF verticals of the 1940s and oblique photography in National Monuments Record have been searched for each battlefield on the primary list. This has enabled an assessment of the survival of earthwork evidence for the historic terrain. The latter focused

upon ridge and furrow but also included abandoned drainage systems and other features such as roads and enclosed field systems. The assessment of these data, together with the results of case studies on Bosworth, Edgehill, Sedgemoor and Towton, led to a decision not to conduct new aerial survey, as this was not considered likely to be sufficiently productive of useful new data. However, in several cases such as Lansdown a special potential that may justify future work was identified.

To assist in the quantification of threats, a circular was sent to all Finds Liaison Officers requesting advice on any relevant metal detecting rallies held on battlefields.

Detailed case studies included Sedgemoor, Naseby, Marston Moor, Braddock Down, Edgehill, Bosworth, Towton, Fulford, Heavenfield and the Boudicca battle. Hastings was also considered, but the large quantity of unpublished archaeological reports and data rendered anything beyond a basic assessment of the topography impractical within the current project.

A small number of other types of action has been examined. These included Civil War sieges at Beeston Castle, Sandal Castle, Wareham, Morton Corbet, and Grafton Regis. Prehistoric sites that are briefly reviewed include Crickley Hill, and Danebury.

The big case studies have been subject to the most intensive investigation to explore particular aspects of the resource. Where historic terrain was important then primary written sources, including surveys, terriers and enclosure awards, have been sought. The relevant Record Offices were visited and copies obtained of all significant historic maps and other terrain-related documents. Where battle archaeology was a central theme then the HER was consulted, as was the Portable Antiquities database.

4. INVESTIGATING FIELDS OF CONFLICT

For the last century or more the study of offensive military action was undertaken largely by military historians, who worked from primary written records of events and of the armies that fought. Such work brought advances in understanding, but it was unable to exploit the potential of battle archaeology or much of the physical and documentary evidence for historic terrain. The re-integration of archaeology with military history as an interdisciplinary study, supported by other specialist disciplines such as ballistics, and offers potential to resolve many problems of battlefield investigation and new directions for research. When physical and written evidence are put into conversation and analysed together, they contribute to understanding of past actions and the nature of warfare.

Methodology

A methodology for such integrated study of battlefields in England has been demonstrated, though it requires further development and more extensive trial in the field to test and refine its effectiveness. The method is iterative and runs in a series of stages which may then be repeated several times at increasing levels of detail. The main stages are:

1. identify battlefield location
2. isolate the topographical evidence in primary accounts of the action
3. reconstruct the historic terrain
4. place events in the reconstructed terrain using topographical information in the primary accounts
5. validate and enhance these hypotheses by sampling the battle archaeology

An ***initial assessment*** will normally be undertaken, based solely upon currently available information, drawing upon secondary works and modern mapping to estimate the likely research potential and problems, and where appropriate to enable the design of a reconnaissance project. If there is insufficient information to locate the battlefield in general terms an investigation may fall at this hurdle, though if this appears to be the case then the first stage of the reconnaissance project should be undertaken to confirm the assessment.

The ***reconnaissance project*** will collect and consider all known primary sources for the battle and all available data on physical evidence for terrain and battle archaeology.

This begins with the HER and NMR. It reconstructs terrain and places events in that context. Pilot work will be undertaken on the battle archaeology to test survival and the viability of more developed survey.

Next, a ***base survey*** of the battle archaeology may be undertaken, at low intensity, to give full coverage of the battlefield, the transect spacing being dependent upon the warfare period and the type of action. Specific new fieldwork may also be undertaken to answer particular questions about the reconstruction of historic terrain.

Intensive resurvey may then follow in certain areas, further to explore specific issues raised by the base survey.

The viability of this methodology will vary by period, region and the given case; the limitations are outlined here, and examined in more detail in the relevant period sections.[13]

Location

This begins with two steps:

a) review all primary accounts of the battle, to collect topographical detail and name or names, to locate the site's neighbourhood
b) complement location with existing physical evidence, including place name, traditions and relevant antiquarian information, especially relating to mass graves

All major battles in England before the Norman Conquest currently fall at this hurdle. Pre-Conquest actions against fortified positions such as *burhs* may have potential for investigation, though this could not be adequately assessed within the current project.

Advances may also be forthcoming through promising current research into the nature of visual and physical networks of military communications and fortifications in Anglo-Saxon Wessex (p.84).[14]

Some individual later medieval battles may also fall at this stage due to inadequate detail in the primary accounts – a problem that increases as the size of action shrinks. For the early modern period this problem normally only arises with skirmishes.

[13] See also Foard, 2008a, chapter 2

[14] Research into civil defence in Wessex during the Viking Age is led by Dr Andrew Reynolds, University College London, with John Baker and Stuart Brookes, supported by the Leverhulme Trust, and is due to complete in September 2008. Proceedings of a related conference held in 2007 will be published by Brepols. Cf. Reynolds, 1999

Reconstruct historic terrain

Steps here are:

a) Review topographical detail from primary accounts, to identify what types of historic landscape detail will be relevant. Reconstruction will be guided by an assessment of the battlefield location(s) following principles of inherent historic military probability – that is, essentially, what a soldier of the period is likely to have done in a given military and landscape context.[15]
b) Assess the survival of documentary and physical evidence by which the terrain reconstruction can be undertaken. This is to define what is likely to be achievable.
c) Frame, then undertake, a programme of historic terrain reconstruction. During a reconnaissance stage the primary focus will be upon the assessment of survival of evidence.

Even with the advances achieved by the English landscape school over the last fifty years, the reconstruction of a day in the life of a landscape remains a challenge. The potential for doing so varies by period, region, historic landscape character and specific location. For initial assessment, a crude guide to landscape character may be obtained from the English Heritage Landscape Characterisation mapping. However, even at this level there are severe limitations to the applicability of this material.

Some battlefields may have a very low potential or fall at this hurdle. The earlier the battle the more difficult will be the reconstruction, because understanding of regionality in landscape change will be less well developed, and because data quality and chronological control will be lower than later on. Survival of written and physical evidence will also be variable, with skewing towards particular types of evidence in some areas.

Thus, for example, in an open field landscape the maximum extent of furlong development is likely to be in the early 14th century. In earlier and later periods the expansion and contraction of the system, particularly the conversion to pasture, will pose important limitations on reconstruction. Some of these problems may be eased as both

[15] An enhancement of the principle detailed by Burne, but taking account of the practical limitations and potentials of the technology and tactics of the period: Foard 2008a

methodology and understanding develops. Hence, some battlefields will be worth revisiting at a later date.

Finally there are problems posed by specific locations. The survival of documentary and physical evidence can fluctuate even between adjacent townships, with the result that terrain reconstruction in one part of one battlefield may be more completely and securely reconstructed than in another. This can clearly be seen by comparing the terrain reconstructions and their chronological uncertainties at Naseby, Edgehill and Bosworth. All three lie in the Midland open field zone, but there is spectacular variation between them in what evidence survives. Such considerations will have big implications for the viability of a battlefield investigation in the given case.

Place events within reconstructed terrain

Using the information discussed in the primary accounts, place the events and where possible the specific principal deployments and action into the reconstructed historic terrain. This will require the reconstruction of the likely frontage of the battle arrays, using available information on troop numbers and likely tactical formations to determine upper and lower plausible limits for the scale of the frontage.

The degree of confidence that can be attached to such an exercise will depend in part upon the limitations of the terrain reconstruction. An important determinant here will often be the extent to which the terrain would have imposed constraints upon the deployments and action, and the character of such restrictions. However, the greatest limitation will normally be the quality and quantity of topographical detail in the primary accounts. In general, the earlier the period and the less important the action, the poorer will be the detail. But this does not always follow. Hastings in 1066, for instance, is better documented than Bosworth in 1485.

At this stage, the candidacy of many later medieval battles will begin to weaken. This is well illustrated by comparison of the primary accounts for two of the great battles in English history, Bosworth in 1485 and Edgehill in 1642, for both of which a digital concordance of the primary accounts has been prepared.[16]

[16] Foard, 2004b; Foard, 2008a. The Bosworth concordance currently remains in draft, but the one or two additional accounts that may be added will not change the order of magnitude of the variation between the two

Battle	Primary accounts in concordance	First hand accounts	Words in concordance	Topographical references
Bosworth	5	1	2000	13
Edgehill	24	21	25000	143

Validate and enhance hypotheses using battle archaeology

There will, of course, be cases at stage 4 where the interpretation placed on the documentary evidence will be wrong, while for most of the rest some details will be inaccurate. The hypothesis generated must thus be tested through a sampling of the battle archaeology.

As discussed in Chapter 5, the intensity and extent of archaeological survey will vary according to the period and type of action. For early modern actions, if survey takes place over a sufficiently large area and is methodologically adequate, then the archaeological returns are normally so extensive that negative results can be taken to indicate that the action took place elsewhere. (With this said, care needs to be taken with regard to cavalry action which normally produces only low densities of bullets.)

For earlier battles the method poses problems. Recent work at Bosworth, Shrewsbury, Flodden and Pinkie suggests that aside from archaeologically-visible bullets and roundshot, most late-medieval battlefields do not yield extensive scatters of relevant material. Among these sites, only Towton has produced extensive horizontal scatters of battle archaeology. Until these have been properly characterized their significance for other battlefields is uncertain. This is a critical issue for the future of battlefield studies and if effective management is to be achieved it needs to be addressed with urgency (see Chapters 5.3 and 7). In doing so, three types of site will be critical:

1. where topographical constraints are such as to leave no doubt about the location of deployment and action
2. battles of the transitional period where lead roundshot and bullets corroborate the location and thus provide a context within which to consider the distribution of other material
3. battlefields in Europe or beyond where arid conditions prevail and where scatters of ferrous artifacts survive in result

Reassessment

Reassessment of written evidence in the light of the battle archaeology will lead to a revised interpretation and may call for further research into the terrain or the archaeology.

Historic terrain

Understanding of the strategic landscape in which a battle took place will help to determine such aspects as the direction of approach to the field, or even the identification of the battlefield itself. However, it is the tactical terrain, the militarily significant elements of the historic landscape contemporary with the battle, which are of chief concern here.

Tactical terrain comprises the underlying landform, the pattern of fields, woodland, marsh, roads, buildings and other land-use types. Slight changes of landform across a field may have provided major tactical opportunities. It is thus essential that they are understood.

The terrain of a battlefield will reflect a combination of elements. While aspects such as relief and geology are normally stable within the historic period, specific elements may have been altered by man, while anthropogenic components may have undergone striking changes.

In some periods the strategic landscape will have been modified by the establishment of garrisons and by the construction of specific roads for military purposes; and in some cases these will influence the tactical situation. However, what largely determined the strategic and tactical potential of an area was the pattern of relief and drainage, the particular balance of different constituents such as open or enclosed field, of moor, heath and wood, of lesser aspects such as meadow, and the communication network, that largely determined.

Ordnance Survey contour data are adequate at the strategic level. For the fine relief detail needed to address tactical considerations, the 5m digital terrain model (dtm) from NEXTMap Britain is recommended, though this should be complemented by field examination.

Some other elements, such as the former extent of fen, may be indicated by geological or soils data. In the present study the 1:50,000 mapping of both drift and solid geology (where available) has been examined. For aspects of the anthropogenic landscape, including land use at the time of a battle, written and graphical records

supplemented where possible by archaeological and palaeo-environmental evidence must be brought into play.

As yet there is no overview of England's landscape history at a regional level such as would be enable the production of a detailed chronology of landscape change over the last millennium or potential for reconstruction of its phases. Without this it is difficult to provide an effective overview of the strategic landscape in any particular war period or, more importantly, to assess the potential for understanding of tactical terrain.[17]

Broad regional variations in the historic landscape and its history can be identified. During the medieval period a large part of England was under open field cultivation of one form or other.[18] In the central province, from Northumberland to Dorset, enclosure of these open landscape tended to be late with the systems running in many places well in to the 18th or even 19th century.

In open field areas on either side of the central zone, in regions like East Anglia or Cheshire, enclosure of open fields typically occurred much earlier, often beginning in the later Middle Ages. Within these regions there could also be large tracts of heathland, fen and woodland. Beyond the open field landscapes were other zones, such as the far south west, where largely enclosed landscapes existed throughout the last millennium, whilst many upland areas were dominated by moorland. Of course, these are generalisations, and at the local level almost any of the landscape types might be found anywhere, at any time.

For the main landscape zones there are broad possibilities for reconstruction. In the open field landscapes one may expect the furlongs to have reached their maximum extent in the early 14th century. Thus, where there is good survival of headlands and ridge and furrow, and where furlong patterns are well documented, then it may be often be possible to define the maximum extent of the open field system. Where such a system did not exist, or around its edges, informed analysis may often allow the extent of meadow, heath, wood or moor to be defined. However, the earlier we look back the less certain this picture becomes because of the uncertainties over the chronology of incorporation of land into open field systems. At Northallerton, for instance, though it may be possible to

[17] English Heritage has funded landscape characterisation projects in many counties, but the assessment undertaken for this project indicates that the HLC data sets – which were generated for different purposes – are inadequate for initial battlefield terrain reconstruction. This is demonstrated here by the Braddock Down case study.
[18] Roberts & Wrathmell, 2000; Hall, 2001; Hall, forthcoming

reconstruct the open field system and define areas which were unincorporated by c.1300, one cannot be certain of the extent of arable in 1138 when the Battle of the Standard was fought (below, p.00).

Problems also increase later on, as potential exists for reversion of land to pasture or heath with the economic changes in the later 14th and 15th centuries. Even more problematic, because of the high tactical importance of walled or hedged field boundaries, is the chronology of enclosure. Where the landscape remained largely in open field through to the age of parliamentary enclosure, then reconstruction may still be practicable, often with back projection, for if land remained open at parliamentary enclosure then it is unlikely that it had ever been enclosed beforehand. However where early enclosure took place then in the absence of written records it may not be possible to determine what was open and what enclosed at the time of a battle of the 15th-17th centuries. The broad enclosure history of a region may enable informed conjecture, but for reasons given specificity is all important. Similar issues arise over the enclosure of moor, fen and heath. Where the landscape was largely enclosed across the millennium then reconstructing the chronology of change can be complex.

As already noted, constraints physical geography, especially relief, enable the anatomy of a battlefield to be defined. This is clearly demonstrated at Towton, once one knows from the battle name and the battle accounts that the action was fought near Towton and between it and the village of Saxton. Since there is a precipitous slope to the west and former wet moor to the east, the terrain allows only one area in which the battle could have been fought.[19]

Where constraints were man-made, as with the hedgerows and ditches at Edgehill or Marston Moor, their recovery may be harder (see also Chapter 6). If an area has undergone successive changes then the definition and characterisation of features contemporary with the battle may be a long and intricate process. In many cases, the fine chronology of landscape change will be pivotal.

The example of Towton shows that locating a battlefield in surroundings of large contrast can be straightforward, and that even where primary records give little topographical detail, a high degree of confidence will attach to the result. Such cases allow robust hypotheses about principal deployments and the spread of the action, where

[19] Fiorato et al., 2000, 1-14; Foard, in preparation-c

principles of inherent historic military probability may safely be applied. The possibility of other constraints, no longer present today, must always be allowed.

Naseby and Sedgemoor show how terrain reconstruction can be used accurately to place the deployments and action (p.00, 00). Where terrain did not dictate so strongly, there will probably be outstanding questions. The earlier a battle, the more taxing the questions are likely to be. For example, there is no significant topographical detail in the battle accounts to assist in locating the action at Northallerton, known as the Battle of the Standard (1138). The location and extent of this battlefield are hypothesised from the battle name 'The Standard', the location of Standard Hill and Standard Leys from field names, and the traditional site of the Scottish mass graves known as the Scot Pits,[20] which were first reported by Leland. In the later 17th century Dugdale reported of the Battle of the Standard: 'the Ground whereon it was fought, lying about two miles distant from North Alverton [Northallerton] (on the right hand the Road, leading thence towards Durham) is to this day called Standard Hill, having in it divers hollow places still known by the name of the Scots Pits.' [21] In the mid 18th century Gale reported a few trenches still to be seen in his day called 'The Scots Pits', said by tradition to be the burial pits of the slain.[22] By the early19th century ploughing had apparently destroyed all the earthwork evidence, although Leadman, writing in 1891, reports that within living memory at Scotpits Lane 'bones of men and horses have been found'.[23]

Reconstruction of historic terrain here is difficult because of the early date. It is limited to the relief, the recovery of man-altered elements of physical geography, particularly the mires and carrs which have subsequently been drained. Running through the area is also the Great North Road the route of which passed through Northallerton and on to Durham on Matthew Paris's map of c.1250 (although the route shown here is taken from Ogilby's Itinerary of 1675). Traces of ridge and furrow have been noted on the ground and from aerial survey, and furlongs are indicated by the 'leys' field names indicating that much if not all of the area was within furlongs of a medieval open field system. However, no attempt has yet been made to reconstruct the furlong pattern, not least because the battle took place well before the early 14th century when open field systems are

[20] 'Pit' is a medieval term for 'grave' that commonly appears in churchwardens' accounts
[21] Dugdale, 1675, 1, 62
[22] Gale, 1739
[23] Leadman, 1891, 24

traditionally held to have reached their maximum extent. Thus without exceptional written sources it would be impossible to distinguish between what was open field and what was moor at the time of the battle.[24] This crude reconstruction suggests a good tactical context within which accurate placing of the deployments and action may be possible, though this can only be a hypothesis to be tested by investigation should any battle archaeology survive.

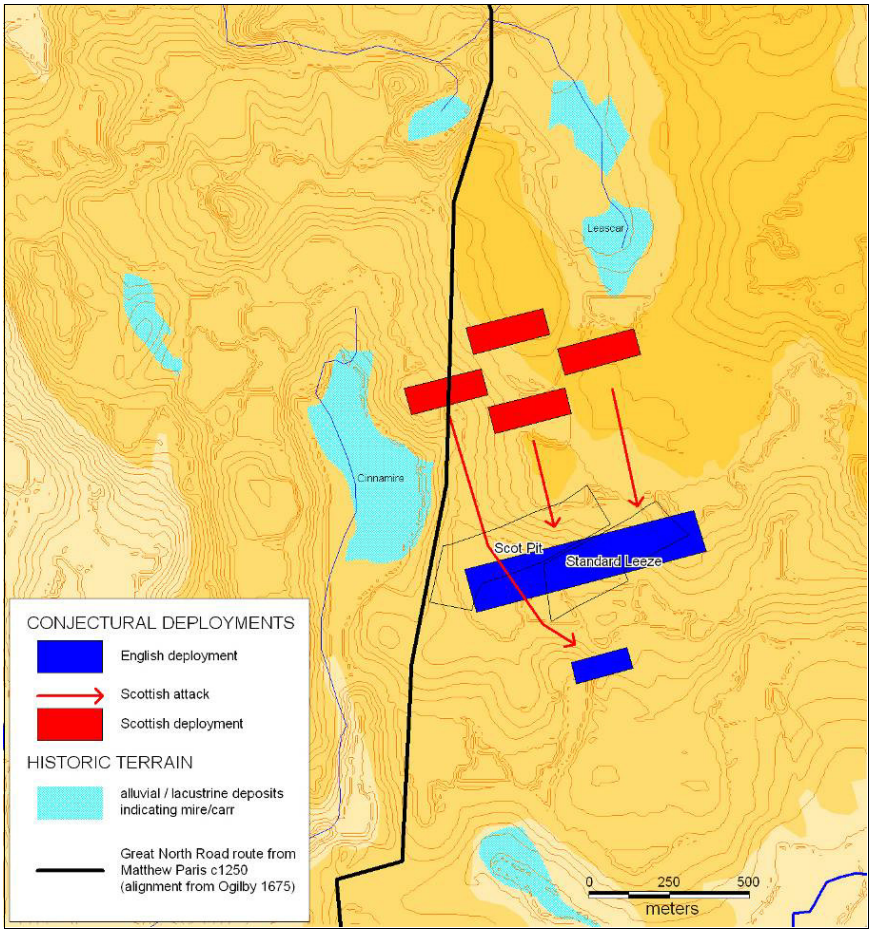

Figure 5: Northallerton: Reconstructed historic terrain and suggested deployments including relevant field names (10m contours from Ordnance Survey dtm)

[24] With this said, the large-scale (30k^2) gradiometry carried out in recent years in the Vale of Pickering by the Landscape Research Centre has successfully revealed entire open field systems across a number of contiguous parishes, where the fields are completely invisible at the surface: Powlesland, 2006; Powlesland & Lyall, 2006. Such an approach could be applied to the likely 'envelope' of a battlefield.

Similar, though not usually so acute, problems can arise in the 17th century, as for instance in relation to mid-18th-century records of earlier enclosure at Marston Moor. The problems are compounded where it is necessary to apply inherent historic military probability in placing deployments, as at Northallerton where the presence of carr and mire as flank protection suggests a width for the frontage. Similarly, the traditional placement of the burials and the Standard Leys name is used to identify the location of the English front, for it was they who stood to take the Scottish attack. The result appears to be a reasonably secure location for the battlefield but the placement of the deployments and action offers only a low level of confidence.[25]

Before 1066, even in cases of battles which are apparently well-documented, with firm names and even topographical detail, the topographical detail proves to be fugitive. Subsequent landscape changes have been so great, and knowledge of the general history of landscape evolution is usually so incomplete, that reconstruction lies beyond the reach of current methodology.

Deployments within historic terrain

Except where fought in an enclosed landscape, the tactical deployments of early modern battles are so well understood that a reasonably detailed reconstruction of frontages and placing of battalions can often be attempted. In most cases, too, written records provide sufficient topographical detail. Hence, the combined data will normally enable detailed hypotheses about location and the extent of deployments to be advanced.[26] For earlier periods we know less about the tactical formations that were employed. This renders reconstruction more difficult, and it may only be through archaeological investigation that the character of medieval frontages will ultimately be understood.

Battle archaeology

Re-interpretation of the primary accounts within the context of the reconstructed historic terrain can enable the dismissal of many improbable interpretations, but usually it will lead only to one or more refined hypotheses. Battle archaeology now provides independent evidence against which to test these hypotheses.

[25] Foard, in preparation-b
[26] Foard, 2008a, chapter 2

While horizontal artefact scatters are the main type of evidence for combat on fields of conflict, there can be stratified and even standing remains which provide related evidence. Most obvious are the burials of those killed in an action, which may be in mass or single graves. Hitherto such graves have been found but rarely, but their existence can nonetheless be posited. Early modern actions may have siegeworks associated with assaults upon fortified sites, together with impact scars and other evidence of destruction on local structures, discussed more fully in Chapter 5.

Artefact distribution patterns

Research on 17th-19th century battlefields in Europe and the USA shows unstratified artefact scatters to be the main category of physical evidence for battles. Such scatters convey information on the location, extent and character of action.[27] Investigations at Towton have shown that it is possible to recover data from late medieval battlefields that is in some ways comparable, though the nature of the artefact distributions is different and the problems of recovery and analysis are far greater.[28] Comparable evidence has also been recovered from several Iron Age and Neolithic fortified sites.

Projectiles are normally the most important artifact types, because, when present in quantity, they can be related to and provide information about the military action. In terms of quantities recovered, the main types of projectile are: flint arrowheads from the Neolithic and Bronze Age, slingshots from the Iron Age, ballista balls from Roman,[29] ferrous arrowheads from the medieval, and lead bullets from the early modern period.

The rate of metallic corrosion depends on a number of different factors, including the composition and structure of the metal artefact, the chemical nature of the burial environment, and the interval since burial. For shallow buried artefact assemblages such as are often associated with battlefields additional factors need to be considered. These included mechanical turnover by ploughing, plus alteration of the soil chemistry by the addition of agro-chemicals.

Metals can be divided into three groups according to their susceptibility to corrosion:

[27] E.g.: various papers in Freeman and Pollard, 2001
[28] Sutherland and Schmidt, 2003; Sutherland, 2000c
[29] These are common finds on some Roman military sites, but only seldom have they been found in connection with putative actions in the field

1. corrosion-resistant metals (e.g. gold)
2. metals that after initial rapid corrosion form a layer of stable corrosion products and thus become resistant to further attack. In most burial environments these will have an extensive metallic core even after burial for hundreds of years (e.g. copper)
3. metals that corrode rapidly but do not form a layer of protective corrosion products. In aggressive environments over long timescales these may be either totally lost from the burial environment or characterized by a mass of corrosion that may cover a much reduced metallic core (e.g. iron)

Artefacts most vulnerable to corrosion, due to metal composition in conjunction with artefact size and manufacture, may also be susceptible to differential preservation across the battlefield due to varying soil conditions. This may be the result of topography, geology and land use history. This is particularly affects late medieval arrowheads. Recent metallurgical analysis of the Holm Hill, Tewkesbury assemblage emphasizes the structural vulnerability of this artefact type to corrosion.[30] More such baseline studies are needed on key battlefield artefact types to generate a more sophisticated predictive model for potential survival under a range of burial conditions.

The stability of specific buried metals largely depends on a combination of pH and redox.[31] Under high redox values (oxidizing conditions) most metals will easily corrode, whereas under low redox values (reducing conditions) they will tend to remain as un-corroded metal. In addition, acidic conditions (low pH) will assist corrosion, whereas alkaline conditions (high pH) will tend result in the formation of a stable corrosion matrix in most metals, but significantly not lead (p.00).

Metals buried in the ground or in ploughsoil are subject to aqueous corrosion This is an electrochemical process in the presence of water: metal atoms lose electrons to become positively charged metal ions that go into solution. These then react with other chemical species in the soil groundwater to form solid corrosion products (e.g. metal oxides, hydroxides, sulfates). It is these solid corrosion products that often form a coloured matrix with soil particles around the corroding object.[32] The initial formation of the metal ions takes place at a site on the metal known as the anode, whereas the electrons produced consumed by another reaction with an electron acceptor (the cathode). Due to the electrical conductivity of metals the location of the anode and cathode can be at

[30] Cubitt, 2006, in work undertaken under the supervision of David Starley of the Royal Armouries
[31] Edwards, 1996
[32] Cronyn, 1990

different locations on the metal surface. In the presence of water and oxygen the cathodic reaction is
$O_2 + 2H_2O + 4e^- \rightarrow 4(OH)$. Where there are depleted oxygen levels, hydrogen ions act as the electron acceptors: $2H^+ + 2e^- \rightarrow H_2$ In the absence of oxygen, unless there is an abundance of hydrogen ions, for example in an acidic environment of pH 4 or below, corrosion rates are generally slow. This is because the reaction at the cathode determines corrosion rate. However, most shallow depositional environments, which encompass the bulk of battlefield materials, except for episodes of seasonal waterlogging, will be sufficiently aerated for oxygen to act as the electron acceptor.

In addition to the metal itself, metallic corrosion is largely influenced by two key environmental parameters: redox potential and pH. These will determine whether the metal ions form and, if they do form, whether they remain in solution and are dissipated away from the metal surface or form stable corrosion films over the surface. Where the ions do not form is termed *immunity*. Where ions dissipate and the metal continues to corrode is termed *corrosion*. Where stable films are formed, preventing further corrosion, is termed *passivation*. Pourbaix developed a series of equilibrium potential pH diagrams that predict the likelihood of corrosion based on thermodynamic stability.[33] Figure XX is a simplified version of an iron/water Pourbaix diagram. This predicts that at low redox potentials metallic iron (Fe) will be the stable form (i.e., immunity). At higher redox potentials that are acidic, ferrous and ferric ions will be the stable forms ($Fe2^+$ and $Fe3^+$: corrosion), whereas at higher redox, but more alkaline conditions, this will result in the formation of haematite Fe_2O_3 or magnetite Fe_3O_4: passivation).

[33] Pourbaix *et al*, 1966

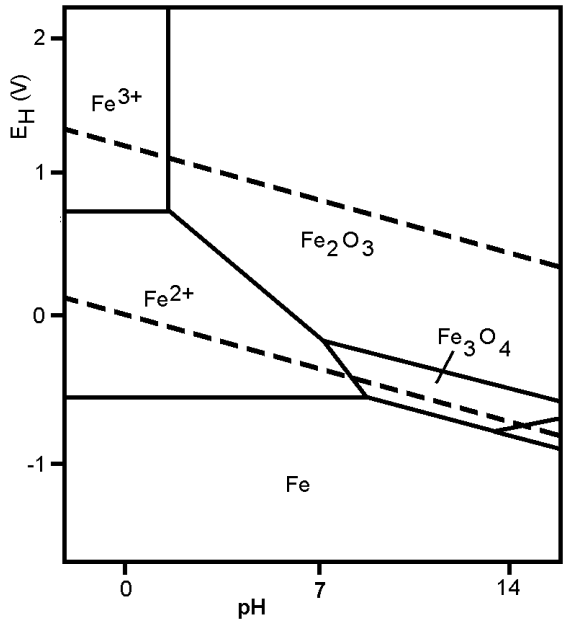

Figure 6: Simplified Pourbaix diagram (Potential –pH) for iron-water at 25°C. Fe, Fe_2O_3 and Fe_3O_4 are solids, while Fe^{2+} and Fe^{3+} are in solution[34]

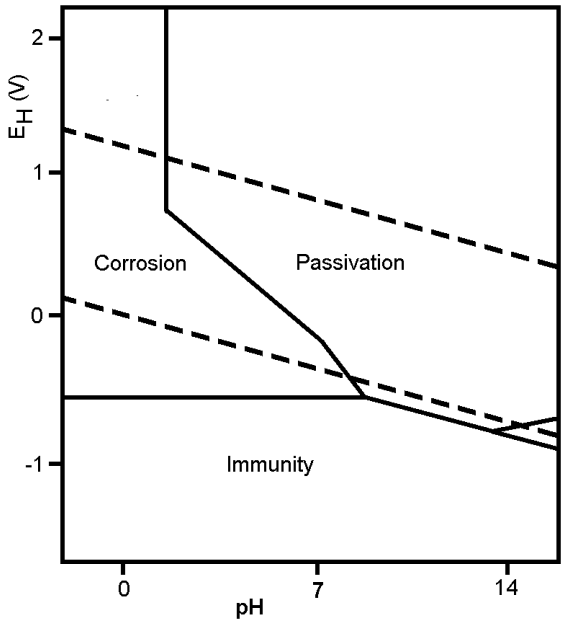

Figure 7: Theoretical conditions of corrosion, immunity and passivation by the formation of oxides. This diagram is valid only in the absence of substances with which iron can form soluble complexes and insoluble compounds

[34] Edwards, 1966

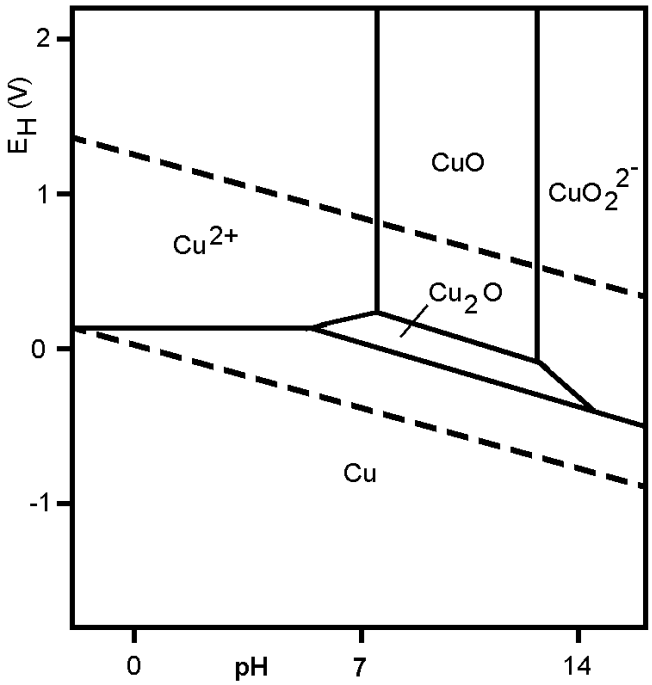

Figure 8: Simplified Pourbaix diagram (Potential –pH) for copper-water at 25^{0}C. (to left) Cu, Cu_2O and CuO are in solid phase, while Cu^{2+} and CuO^{2-} are in solution

Figure 7 shows theoretical conditions of corrosion, immunity and passivation by the formation of oxides. This diagram is of course valid only in the absence of substances with which copper can form soluble complexes and insoluble compounds.

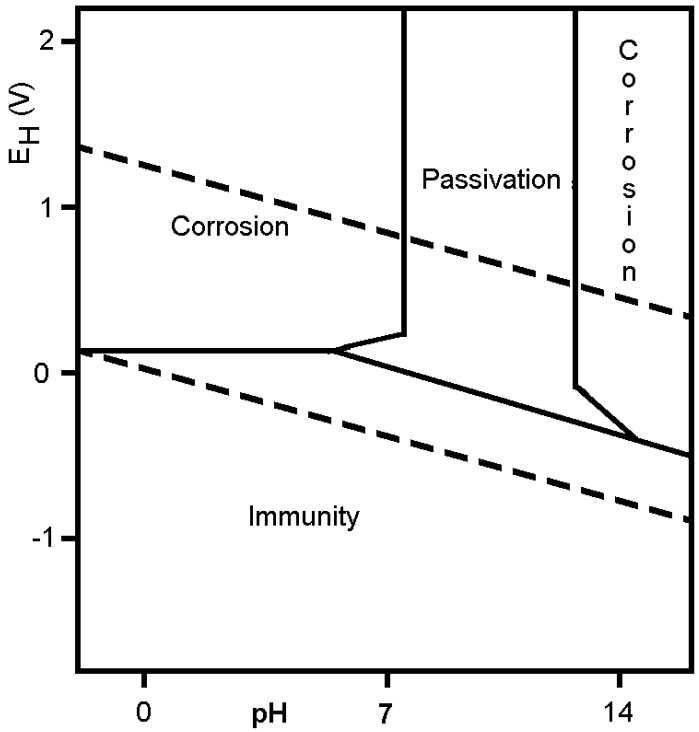

Figure 9: Comparison of the iron and copper diagrams demonstrate why copper alloy condition is often better on a wide range of burial sites. However, metal stability, especially the formation of passivation layers are severely affected by the presence of chloride

Taphonomy and battlefield finds

The quality of battle archaeology is largely determined by the survival of artefacts and their condition. Almost without exception, battle scatters consist of metal artefacts, although the balance of metals in the assemblage differs dramatically between periods. The survival, condition and vulnerability of battlefield assemblages will thus vary according to the metal types that predominated in different periods. What follows is a general discussion of key artefact types, with special emphasis on lead bullets and ferrous arrowheads.

For reasons just discussed, different environmental factors mediate the processes. Thus survival, condition and the trajectory of decay will vary from site to site or even from one part of a site to another. The time that an object has been in the ground will inevitably influence condition but the dominant factors are soil chemistry and levels of mechanical damage: natural soil chemistry, including soil type, pH and soil moisture; the nature and degree of application of agricultural inputs, including fertilizers and other agricultural chemicals; and land use history, especially the chronology of arable and pastoral use, and

hence the level of mechanical damage to the artefacts. Unfortunately while a great deal is known about the way in which metals decay and why, there are few data as to how the various influences interact in the topsoil, and how the longer-term land use history as opposed to recent agricultural regimes impact on this.

There is now considerable evidence to suggest that the policy of 'Preservation in situ' is not advisable in all instances.[35] The premise of the policy is that archaeological evidence is stable within its depositional environment and should therefore not be disturbed without good reason. However, the safeguarding of battlefield assemblages must take account of their vulnerability to corrosion or loss within the depositional environment, due to a combination of soil conditions, land use and shallow burial within the aerated vadose zone. Surveys of metal artefact survival, mostly copper alloy, in agrarian landscapes in Denmark and Sweden have focused on soil type, groundwater and pollution/acidification.[36] A particular threat to metalwork on arable and possibly pasture land, which includes the majority of English battlefields, is the fieldscale application of modern agrochemicals over the past century or so. The impact of fertiliser use on metal artefact corrosion within the vadose zone as been explored as part of English Heritage-funded research.[37] The need for this research arose because of evidence suggesting that the survival and condition of prehistoric metal artefacts varied according to their find date, with more recent finds exhibiting a greater extent of metal corrosion than earlier finds.[38] The composition and corrosion behaviour of commercial agricultural fertilisers, categorised according to their NPK value to enable farmers to calculate appropriate field application rate for different crops is not fully understood and many are proprietary blends.[39] However, it is evident that soluble chemicals used as fertilisers will alter the dissolved salt content in soil pore water, increasing conductivity and thus the corrosivity of soil. The solubility and rate of anion removal from fertilisers will vary. Those fertilisers incorporating a high mineral potash component, for instance, are dominated by highly mobile chloride ions which are frequently implicated in metal corrosion.

Clearly there are many factors implicated in metal survival/corrosion, both derived from human intervention and natural processes. As such it is hardly surprising that as well

[35] Department of the Environment, 1990
[36] Brinch Madsen *et al*, 2004; Nord *et a*l, 2000
[37] Pollard et al., 2003; Pollard *et al*, 2006; Pollard et al., 2004; Pollard *et al*, 2006
[38] Brinch Madsen *et al*, 2004
[39] MAFF, 2000

as inter-site variation there is evidence for the differential survival of metals within individual battlefield artefact assemblages. These intra-site differences, often showing as differing survival rates across individual field systems highlights the importance of detailed GIS-linked soils data and potentially geochemical modelling for better understanding the preservation of artefact assemblages.[40] While for most archaeology the decay of artefacts in the topsoil is not a major problem as they are just one, and often a relatively minor element of the whole data set, for battlefields the artefact scatters represent the vast majority of the data. This issue is therefore central to the assessment of potential on any field of conflict.

A range of factors determine how aggressive soil conditions will be. How freely draining is the soil can be important. In clay and alluvium there are small spaces between particles and so oxygen levels are low, whereas sand has large particles, and one accordingly finds high oxygen levels deep down as well as at the surface. Sandy soils also drain more easily, so that soluble materials tend to flush through and strip irons out, hence creating acid conditions. For similar reasons the deeper a find lies the less oxygen will diffuse to that level. If a find has lain in permanent pasture for a century or more then it is likely to have gravitated to the bottom of the topsoil and thus further from the air. Cultivation leads not only to mechanical damage but also to the aeration of the soil and so more oxygen and hence increased corrosion. Adding organics or top dressing will change the soil pH and thus present and historic pH may be different. Other influences will be the chloride levels which are impacted by the application of fertilisers.

Field assessment of the taphonomic effects of such environmental factors was not within the scope of the present project, but it was essential to clarify the problem. Therefore, in collaboration with the Bosworth project, specialist advice has been obtained from and analysis undertaken by Rob Janaway at the Department of Archaeological Sciences, University of Bradford and from Dr Rodney Burton, formerly of the Soils Survey, Cranfield University. Pilot work has been undertaken at Towton, Flodden, Edgehill and Wareham. This has included small scale sampling of soil chemistry (soil pH, and chloride and nitrate levels). There has also be collection of basic information on land use history as an indicator of likely level of mechanical damage, by distinguishing arable from pastoral and other land use using the modern air photo evidence combined with the field by field

[40] Wilson *et al*, 2006

land use survey of 1931-5.[41] For some areas survival of ridge and furrow will provide important information and can be assessed from the 1940s RAF vertical aerial photography, while some areas will also have tithe map land use data from the 1840s.

One objective for the present project was to establish whether it was practicable to take existing data sets on the parent geology or on soil type, and on land use history to predict current condition and the ongoing trajectory of decay. Prior to fieldwork at Flodden an assessment of likely soils conditions was made by Burton, based on the 1:10,000 geological survey, the national soils map, contour data and available vertical aerial photography. From this an assessment was made of the likely soil conditions across the site. This was then tested by soil sampling at three locations during the metal detecting survey in 2007 to assess actual soil pH.. Comparative samples were also taken on Edgehill battlefield and from the Wareham siege site. In the present project the assessment of artefact condition has been limited to subjective estimation of bullet condition on a sample of Edgehill and Wareham bullets.

Battlefield	**Average pH**
Edgehill	7.2
Towton	7.1
Flodden	6.0
Wareham	4.6

The Wareham (Bestwall Quarry) soil sample is from a site where lead bullets have been characterised as in poor condition. These values are consistent with the soils to the SE of Wareham. The very low pH as a result of the free draining soils of this region would be expected to be highly corrosive to most metals including lead and iron. The soils from Flodden are characterized also by low pH values and poor condition of metals. This is contrasted with the higher (neutral) pH values from Edgehill, where lead bullets are in much better condition than at Wareham. The average pH values for Towton are similar to those at Edgehill.[42] Initial results suggest that while extremes of soil pH can be a major factor in lead bullet condition, it may be mechanical damage rather than soil chemistry

[41] Stamp, 1931-1935

[42] The continuing work at Bosworth and Towton, other than initial data on soil pH, will be reported as part of the Bosworth project; hence, the impact on other non-ferrous as well as ferrous artefacts cannot be assessed here.

which is the dominant factor affecting the condition of most other artefacts.[43] There is no simple relationship between any of the factors, and wider research would be needed to quantify the threat posed by modern agricultural practices to unstratified metal artefacts. Such research would have large implications, extending far beyond battle archaeology.

Mechanical damage will be absent where land is under pasture or some other non-arable land use, although coniferous woodland can reduce soil pH and so increases decay. Mechanical damage will also have been avoided where there has been secondary stratification – that is, where a battlefield surface or a subsequent ploughsoil assemblage has been lagged beneath colluvium, alluvium or deposits laid down by activity such as terracing, or the burial by levelling of furrows from former ridge and furrow. Such areas will afford far better preservation than elsewhere, and incidentally may demonstrate what has been lost in other circumstances. If such deposits become abruptly incorporated into the topsoil by deep ploughing, then an exceptional assemblage of artefacts may be recoverable from the topsoil for a limited period. This may explain why ferrous arrowheads have been recovered from Towton.

Ridge and furrow survival was excellent on a number of battlefields in the 1940s but today most has been lost. A few fields survive at Edgehill and Naseby but the best survival is at Cropredy where an extensive area is under ridge and furrow. These areas are of high importance because the battle archaeology there will not have suffered mechanical damage for several centuries. Where there was extensive ridge and furrow in the 1940s then the period when mechanical damage was inflicted will be far shorter and so these sites – notably Edgehill, Cropredy and Rowton – may prove to have better preserved assemblages. Even where the ridge and furrow has been levelled for a century or more there is still the potential for the survival of furrows beneath the topsoil. An assessment of the Edgehill data set may demonstrate the degree of variation in condition, with and without mechanical damage. However, this will need to be complemented by work on other sites where the geology is less conducive to bullet preservation, to determine if soil chemistry is a more important influence than mechanical damage.

Burial by colluviation may protect small pockets of battle archaeology, but is likely to be identifiable only by site inspection. This may be another important factor in the preservation of the Towton arrowheads, given the high soil mobility seen in the pilot work

[43] Information from Rob Janaway

at Towton. Far more extensive burial is likely where there has been alluviation. This can be broadly estimated with reference to the British Geological Survey 1:10,000 scale mapping. A rapid assessment of registered battlefields has been undertaken to assess likely survival of buried deposits. This finds that five battlefields (Sedgemoor, Marston Moor, Myton, Mortimer's Cross, and Newburn) have extensive alluvial areas in the core of the battlefield, and five have large areas in the core (Cropredy, Bosworth, Worcester, Boroughbridge, Maldon). However this is not a simple relationship, for much will depend on the chronology of alluviation. This is most clearly seen at Sedgemoor where, although nearly all of the battlefield is alluviated, the battle archaeology is seen by field survey to be spread through the topsoil over large areas of the site. The same appears to be true at Marston Moor. This probably means that alluviation largely pre-dated the battle. The earlier the battlefield the greater the potential for effective sealing of deposits, with the major phase of alluviation (at least in some Midland river valleys) falling between the 10th and 14th centuries as a result of the expansion of medieval arable cultivation.

A corollary of buried soils is that they are usually invisible to normal methods of prospection. This emerges with particular force from recent work in the Vale of Pickering, where the preservation of prehistoric and early medieval land surfaces under low undulating sand dunes results in an apparent absence of evidence where evidence is in fact at its best. Steps to factor this in to battlefield survey will be needed.

On a small number of battlefields within the alluvial areas there will be waterlogged deposits, such as palaeo-channels, or associated small areas of peat. Existing data sets can be inadequate for pin-pointing these; at Bosworth neither the geological data nor the soils survey identified the two small peat deposits relevant to that battle – these were only identified as a result of field name data enabling walkover observation and then the targeting of intensive programme of augering. Other sites with peat deposits include Sedgemoor, Marston Moor (where one or more carrs were drained at enclosure),[44] and a small area in the core of Flodden. The rarity of these conditions means that high priority attaches to the identification and assessment of battlefields where they exist. It goes without saying that the presence of such survival may not in all cases be of evidential relevance to questions about the battlefield. Meanwhile, it is advised that:

[44] Marston Moor enclosure award

- sampling representative of different soils should routinely be part of battlefield survey, to enable assessment of the condition of finds in relation to the soil pH and levels of chlorides and nitrates
- areas under permanent pasture, including those uncultivated for centuries, should be compared to those under intensive arable and ley grass
- account should be taken of potential for a reservoir of artefacts below the topsoil which might gradually become incorporated iinto the surface picture by deep ploughing
- it is vital to ascertain what processes have been at work at Towton, since from their understanding will come a key to turn in locks elsewhere. The reverse is true
- arable reversion to pasture is the single most effective step for the conservation of battlefield archaeology

Recovery of artefacts

Aside from flint arrowheads and stone slingshots, almost all artefacts recovered from fields of conflict are of metal and are recovered with metal detectors. Only a few English sites have seen systematic, controlled survey and only at Edgehill, Bosworth and Towton have these surveys been battlefield-wide.

To date, by far the greatest amount of material has been recovered either by treasure hunters or by a small number of detectorists who have embarked free-lance surveys of their own.

Treasure hunting poses an extreme threat, discussed in more detail in chapter 6. Treasure hunting can, of course, produce useful data; its weakness is that it is anecdotal and unsystematic, and that it has potential to mislead. This extends from the provenances for artefacts for sale on eBay through to information passed to the Portable Antiquities Scheme.

For example, two lead roundshot, a Burgundian jetton and a belt fitting found at Barnet by a metal detectorist are potentially highly important because they may locate the action for the first time. However, while the character and calibre of the roundshot appear fully compatible with the artillery in the arsenal of the Dukes of Burgundy in the later 15th century, the Portable Antiquities database records the objects as probably of the 17th or 18th century, and places them in locations other than those described by the finder to the Battlefields Trust. While one of the former locations makes little sense in terms of the

battle, the locations given to the Trust are wholly compatible with what until now was considered the least likely of the possible locations for the battle.

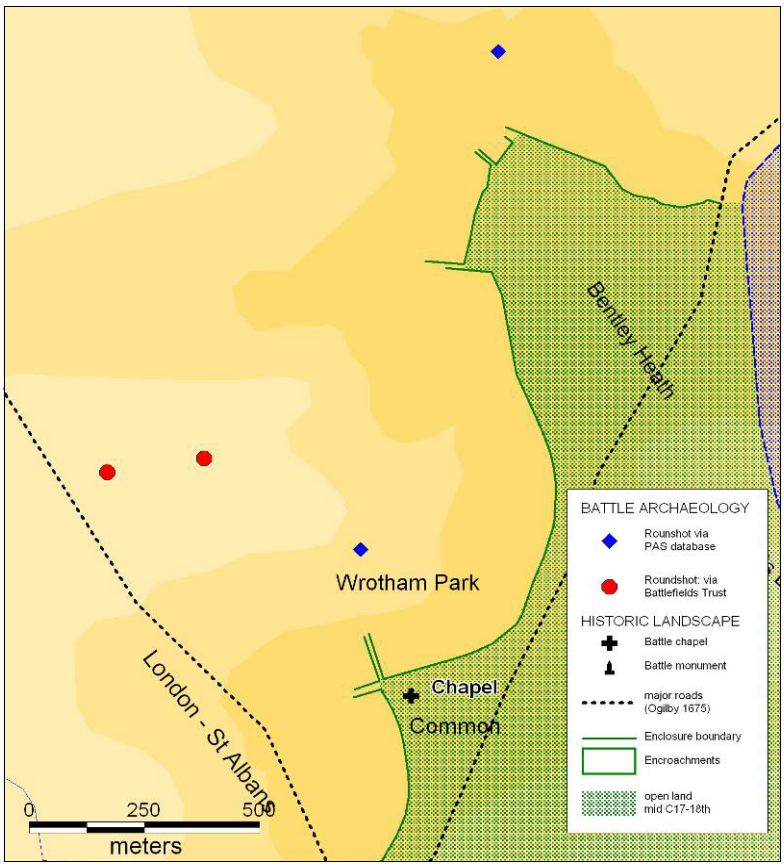

Figure 10: Barnet battle archaeology locations as reported to the Portable Antiquities Scheme and to the Battlefields Trust

Data provided by detectorists often pose concerns over accuracy and consistency. This is not, of course, to comment on detectorists as a group, but rather to say that detecting practice frequently differs from that of archaeology. This is demonstrated *inter alia* by a comparison of the character and location of detectorists' finds made in one field on one day, on the one hand by archaeologists using GPS, and on the other with the published plan of the detectorists' own survey. There is no match between the character, distribution or recovery rate of the finds. This reinforces previously-published evidence for similar discrepancies, as between the Newman and the Roberts surveys of Marston

Moor.[45] While the quality of evidence will vary between different detectorists, the need for care in using non-archaeological survey data is clear.

In relation to the agenda of battlefield archaeology, the shortcomings of 'ordinary' detecting often include:

[45] Foard, 2007

- failure to separate recording or bagging of finds
- locations are normally plotted later, from memory, or if in the field then sketched only
- identification is usually basic
- finds stored together, not by point locations
- finds can be subject to mechanical damage in storage
- in some cases finds are dispersed and/or lost

This is in contrast to surveys such as Edgehill and Towton, where accurate distribution plans are possible and the material can be reinterrogated and distributions enhanced.

Or again, comparison of systematic and non-systematic data collection on Sedgemoor reveals how the scatter of bullets fired as case (seen in Sagar's data) is matched by the 2007 survey data, where the latter extends the pattern, adds new locations for artillery pieces, and greatly extends the spread of battle archaeology to the north and west of Sagar's record.

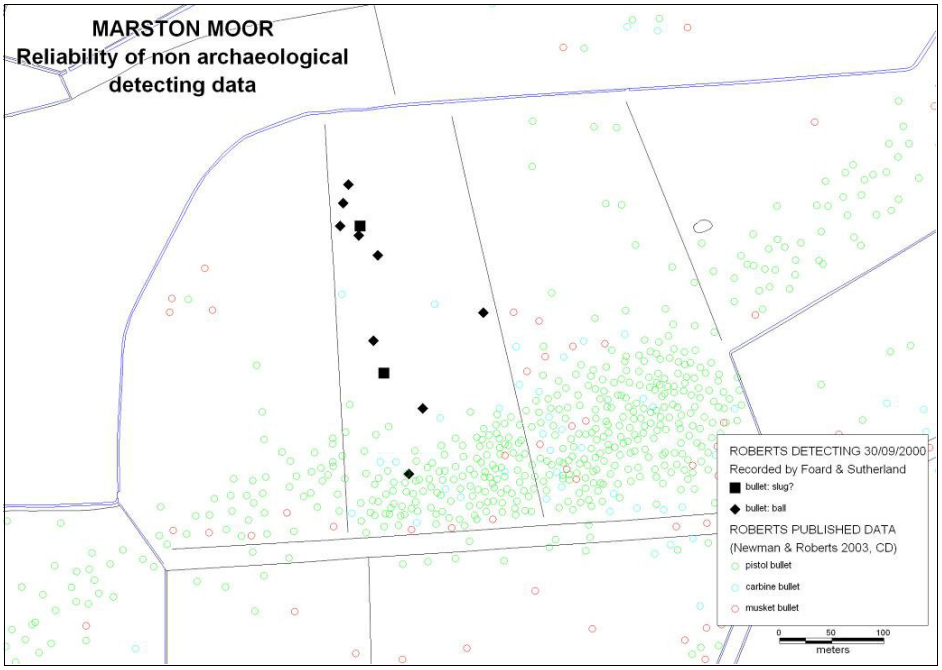

Figure 11: Unreliability of data gathering, as demonstrated by one day's recording at Marston Moor compared with an extract of the distribution plan of battle archaeology from the same detecting work published in Newman and Roberts 2003. (GPS accuracy for the 2000 data set is c.40m as this was prior to implementation of WAAS in Europe and while degradation of signal by the US government was still taking place)

Among detectorists, factors that may play a part include:

- sampling intensity and exactitude or recording
- equipment used, and experience in using it
- conditions on the day

There is enormous variability between detectorists and detectors, illustrated by the Sedgemoor data where recovery rates for lead bullets on a single day in on a single field, where detectorists' transects were evenly interspersed across the area, range from 0 to 21.

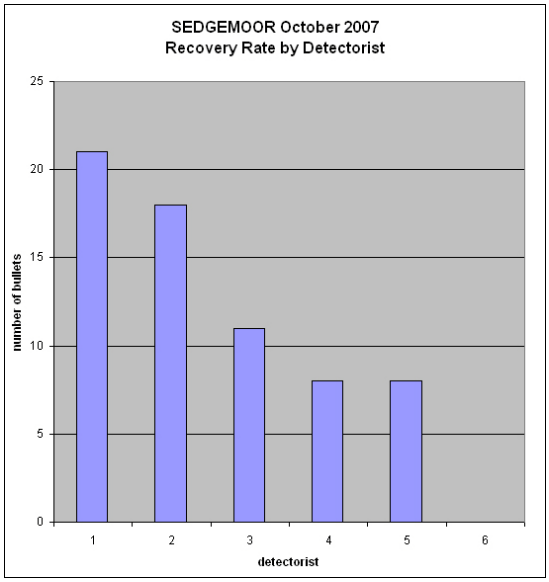

Figure 12: Sedgemoor 2008: comparison of recovery rates for lead bullets for each detectorist engaged in the survey, with one detectorist recovering none and at the other extreme one recovering 21 bullets

Archaeological survey is itself not without problems. The methodology developed for Edgehill and Bosworth aims at consistency and reproduceability, and so provides a starting point, but the lessons of these and other research surveys need to be more widely applied. Development-led surveys are beset by problems that reflect the failure fully to develop and disseminate best practices for different periods.

Research is needed into the ways in which non-systematic gathering in the past may have distorted the patterns revealed by subsequent systematic surveys. Only then

may it be possible to take account of the biases that have been introduced. This is needed not only for control on individual battlefields, but also to provide for comparability between them.

These problems were tackled at Edgehill by application of a standard survey method with a base survey made up of 10m spaced transects, implemented with a small and fairly constant team which developed a good level of detecting skills.[46] This appears adequate to provide an overview of a 17th century battle, but not for earlier battles. Land use at the time of survey as well as in the longer term has a significant influence on recovery rates.

Where pasture has been unploughed for a long period the artefacts, especially heavy spherical lead bullets, tend to gravitate to the bottom of the plough soil. Because detector effectiveness reduces with depth such bullets are far more difficult to locate than in arable, where the artefacts are regularly re-distributed throughout the soil column.[47] It is known that topsoil tends to be considerably shallower on the tops of ridges,[48] and as the latter are spaced at less than 10m intervals so for the base survey a method was instituted of detecting along the ridge tops, the 15-20% sample being maintained by each detectorist.

[46] Foard, 2008a
[47] Foard, 1995, 20
[48] Hall, 1972

Figure 13: Sedgemoor: comparison of survey data from Context One survey in 2007 and that by Sagar (data from Somerset HER) and by GUARD (information from Tony Pollard)

It appears that there is a sample bias against small calibre bullets. That is, the deeper a bullet is buried, the greater may be the bias.

These problems result from the cone-shaped form of the detecting signal, which tapers with depth, and from the lower intensity of signal produced by smaller objects. During survey depths from which artefacts were recovered were not normally measured, but experimental detecting, conducted on a test grid of bullets of four different calibers,

each buried at four standard depths, confirmed that there is an increasing bias towards the recovery of larger calibre bullets at greater depth. In arable or temporary pasture, because the bullets have been mixed through the soil column within recent years, the bias is less acute; however, in permanent pasture, where bullets are at the bottom of the topsoil, no small calibre bullets may be recovered even though they are in fact present. This may explain the lack of pistol or carbine calibre bullets in one field, though it may equally represent a genuine lack of cavalry action.

The greatest variable is the type of detector. Next to this is the technique and experience of the detectorist. Most important is the extent of ground coverage by the detector, which is determined by attributes of the coil, the width and speed with which the detectorist swings the detector and the speed at which he walks forward when scanning. For this reason tracking data are important. The rate of forward movement for each detectorist was continuously recorded in the GPS track log to enable future analysis, but the bias was minimised, as far as possible, by encouraging the detectorists to work at roughly the same speed, averaging about 12 metres per minute depending on the detecting conditions.

Variation in detecting conditions is another influential factor. Crop conditions will significantly affect ground coverage and slow forward motion, especially in newly cut stubble or other conditions of high crop density or height which restrict the ease of swing.

Extremes of soil moisture have a significant effect on recovery rates.

Where key artefacts are ferrous they are difficult to pinpoint by metal detecting because of the presence in the topsoil of large numbers of other iron artefacts. A battlefield which does not have such a substantial ferrous background will be easier to study.

At present, the most important distinction to be drawn is between early modern and later medieval scatters. On early modern battlefields the evidence of bullet scatters is so consistent and familiar that in the right conditions it is possible to say where and to some extent how particular types of action took place. For the later medieval period, work at Bosworth, Shrewsbury and Flodden, supported by similar results obtained by GUARD on the latter two and several other battlefields, appears to indicate that the negative element of this validation process will not work. This is a dramatic limitation which may mean that it will remain impossible to say where earlier actions took place.

Determining whether this is the case becomes the leading research objective for battlefield archaeology.

Mass graves

Notoriously, mass graves are difficult to locate. Equally, as seen at Towton, they provide dramatic insights.

Sutherland, after his failure to locate mass graves on the traditional site at the centre of the action at Towton, has questioned the extent to which bodies were buried after major battles.[49]

There are some battlefields where specific reference is made to non-burial of the dead, as at Ashingdon in 1016 and Stamford Bridge in 1066. In the Good Friday battle at Uppsala, Sweden, written sources state that the bodies of the Swedes were left for dogs and wolves in the marshes and swamps where some of the action was fought. A mass grave has been found on the field where the nature of the skeletal remains is consistent with the bodies being left in water for 5-6 months before burial.[50] Such delays could be because the site was a long distance from occupation or that the land was not in agricultural use. However, references to the dead on English battlefields are overwhelmingly to their burial. In England's intensively exploited landscapes, the clearance and burial of bodies will almost always have been essential.

Mass graves should therefore be expected at various locations on most battlefields, with the main concentration most often at the point where the main engagement began.[51] However, given the degree to which losses occurred during a rout, a substantial proportion may be far from the main action, as at Towton where the mass grave excavated in 1996 lay more than a mile from the centre of the battlefield.[52]

While graves from a rout may be widely dispersed they are most likely to be found where a pinch point restricted movement or where an attempt might be made to stand and stop the pursuit. Thus at Stoke Field the proven mass grave and others detailed by antiquaries all lie close to a point where ancient enclosures of East Stoke village barred the flight of the rebel forces, presumably enabling them to be caught and killed. Similar explanations may exist for the location of the mass grave on the edge of Towton village and those on the edge of the town at Lewes, where routs met enclosed settlement.[53] In

[49] Sutherland, 2002
[50] Paper to the Fields of Conflict conference in Aland, Finland, 2002
[51] Burne, 1950
[52] Fiorato *et al*, 2000
[53] English Heritage, 1995; Carpenter, 1987

such circumstances Burne's use of the mass grave as the indicator of the location of the main action may not always be as clear cut as has been assumed.

While most evidence indicates that the dead were buried close to where they fell, as seen in the preparation for burial at Edgehill, this was not always so. Where the dead were widely scattered, especially in the pursuit, it will often have been more efficient to collect them in carts and take them to the churchyard for burial in a mass grave as to move them elsewhere – a step well documented for Pinkie, Scotland. Thus the presence of mass graves in churchyards needs to be explored and compared to that of mass graves and lesser graves showing trauma found outside consecrated ground. There may also be burials of men who died later after being cared for locally, though these would usually be singletons.[54] Thus for any battlefield there is a potential for bodies to be in mass graves at the centre of the main action and in specific areas of the rout, in mass graves in local churchyards and in single graves in churchyards in parishes where wounded med later died. In a small number of cases there may be a further complication caused by the transfer of remains from one site to another years or decades after the battle.

One thing that seems universally to have occurred is the stripping of the bodies prior to burial. This is clearly depicted on the margin of the Bayeux Tapestry and seems to have been followed in every case where burials have been excavated, as at Towton, Stoke and Naseby. Only in exceptional circumstances, as noted at Wisby, were the dead buried in their armour and clothes.[55]

Thus the evidence in the graves will be limited to the bodies themselves, any projectiles that were embedded in them when they were buried, and artefacts introduced in the backfill.

[54] Foard, 2008a; Foard, 1995
[55] Thordeman, 2001

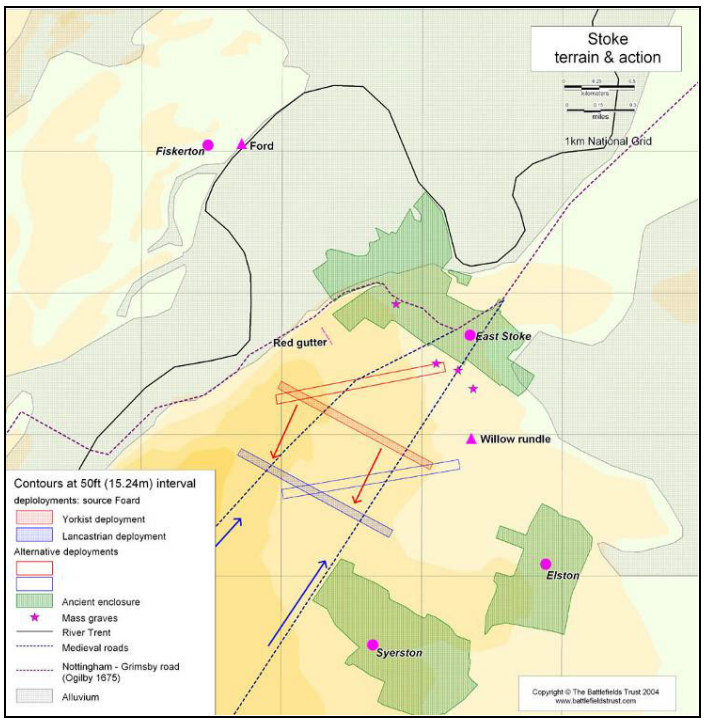

Figure 14: Stoke Field: location of mass graves

There is a total of 106 records on the database for burials reported on fields of conflict. Of these 80 are separate sites; a small number, almost all major battlefields, have multiple recorded locations. While the multiple grave records may in part be a genuine reflection of the variability between sites, the large numbers for Edgehill are influenced by detailed research, while at Newbury I & II they reflect the unusually high level of enhancement of battle related information on the HER. Mass graves have been noted on 24 of battlefields from 1066 onwards, though only a handful are securely located, and very few are confirmed as battle-related.

Fields of conflict on the database with more than one mass grave reported

Edgehill	7
Newbury I	6
Flodden	4
Newbury II	4
Stoke Field	4
Lewes	3
Marston Moor	2
Sedgemoor	2
Stokesay	2
Towton	2

A small number of records of mass graves date from times close to the battles themselves. Thus at Hastings a 12th-century entry in the chronicle of Battle Abbey reports the discovery of a mass grave, its site now unknown.[56] A 15th-century description of the site of the chantry chapel at Shrewsbury states that the mass grave lay within the ditched enclosure where the chapel stands.[57] At Naseby there are reports of mass graves being ploughed or dug up within a few years of the battle.[58]

With these aside, the majority of reported burial sites show only a tenuous link with the battle to which they are supposed to belong. Most are undated, found in the 19th century or before, a few now known to belong to ordinary cemeteries, of various dates. Occasionally, too, the site of the battle is now known to be elsewhere and so the claimed association of graves must fall, as with the burials and swords found close to Heavenfield.[59]

Even when one is dealing with proven battlefields where the action is reasonably securely located there can still be problems with reports of burial sites. At Towton a number of supposedly battle-related burial sites have been revealed to be spurious, though significantly not all.[60] Even where the burials may relate to the battle they are sometimes over-interpreted, as at Marston Moor where Leadman claimed that burials discovered on the moor during drainage works in White Syke Close in the nineteenth century actually represented the supposed last stand of the Earl of Newcastle's regiment.[61] There are just a few exceptions where antiquarian work does appear to have provided securely battle-related burials, as with Fitzgerald's report of a mass grave from his excavations on Naseby battlefield in the 1840s.[62] Other possibly genuine battlefields mass graves include Lewes where at least four were found in the 19th century development, three of them in one location and said to contain of the order of 500 bodies, and Northallerton where Leadman reports finds of burials along Scot Pits Lane.[63]

Other mass grave sites are identified by tradition. Where these traditions are recorded early, and especially where the report is reasonably close in time to the battle

[56] Searle, 1980
[57] National Army Museum, 1995c
[58] Foard, 1995
[59] Northumberland SMR
[60] Sutherland, 2000b
[61] Leadman, 1891
[62] Foard, 1995
[63] National Army Museum, 1995b; Leadman, 1891.

itself so that a secure continuity of oral history is likely, then they may be valid battlefield burial sites. Thus at Edgehill several of the grave sites are first recorded in the 1720s, within about 80 years of the battle, thought exact locations are not given until the nineteenth century.[64]

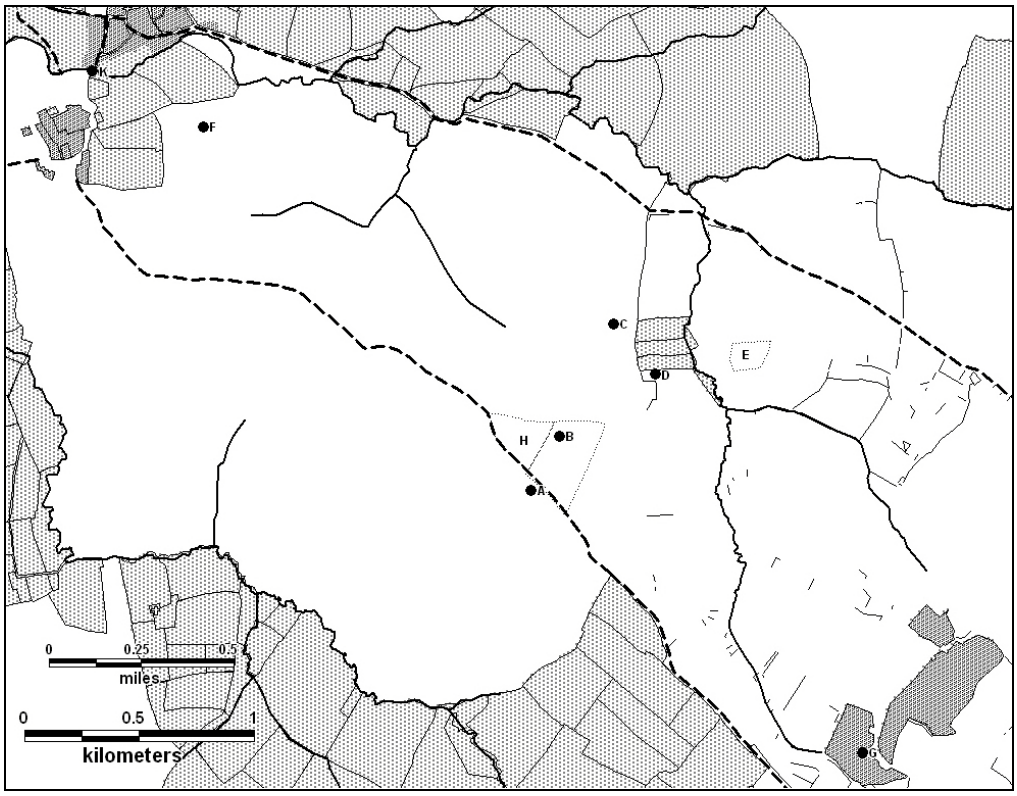

Figure 15: Edgehill: mass grave sites from antiquarian reports and historic maps are depicted with a black symbol; those identified from field names shown by a broken line polygon. K and F are close to the baggage train; the rest are associated with the main infantry action

Finding mass graves

There appear to be just three battlefields in England where there has been modern excavation of mass graves: Towton, Stoke and Chester. That at Chester is represented by a series of individual inhumations showing weapon trauma and with a C^{14} date compatible with the early 7th-century battle of Chester, but where the association with the battle is

[64] Foard, 2008a

perhaps not as secure as might at first appear.[65] The single mass grave at East Stoke examined in the late 20th century is fairly securely linked to the 1487 battle but only saw rushed salvage recording; the work was never published.[66] Only the Towton mass graves were investigated with substantial modern excavation, and even there the main grave had already been partially destroyed and the excavation was undertaken in difficult circumstances, without adequate time or resources.[67]

While mass graves may occasionally be identified by chance, an effective methodology to find them is badly needed – to advance research, to facilitate the evaluation of threatened areas and to enable effective management.

Only rarely do battle burial sites seem to have been marked by more than an earthen mound that has subsequently been levelled by ploughing. Battle graves are hard to find because they are small compared to the extent of a battlefield. The largest European mass grave yet known, at Wisby, Denmark, containing c.800 individuals, was only 72m^2.[68] Within a battlefield extending up to 10km^2 such a feature is hard to locate.

A known aid to identification is tradition, and the area to be searched may be narrowed by reference to the battle archaeology. However, Towton again throws up cautions: while there is a close association between the known mass graves and one of the concentrations of battle archaeology, similar evidence extends across a much wider area. Moreover, on some battlefields, especially those of major 17th-century actions, artefact scatters can cover dauntingly large areas, yet still take no account of the possibility of graves from the rout.

At Towton geophysics and trial trenching led by 18th and 19th century reports have been used to search for mass graves at the centre of the battlefield. Even here, where there is highly concentrated battle archaeology and the constraints of terrain frame the action, the initial geophysical survey failed. Not until small fragments of human bone were found on the surface of ploughsoil during metal detecting did targeted geophysics and trial trenching finally identify the remains of the mass graves.

What is required – urgently – is the opportunity to develop methodology through an adequately funded research investigation on at least one well-preserved medieval and one

[65] Mason, 2006
[66] Nottinghamshire HER
[67] Sutherland, 2000a
[68] Thordeman, 2001

17th-century mass grave. Suitable examples may be those at East Stoke and Naseby. Once located these graves and their environs should be explored with a range of techniques to seek significant artefactual, chemical or geophysical signatures that might assist in the identification of other mass graves. The potential of calcium phosphate, a chemical that is in theory stable in the soil and has been tested on the Washita battlefield in the USA, should be trialled, as this may locate not just extant mass graves but also indicate where such graves existed in the past.[69]

The condition and potential of mass graves will be influenced by post-depositional activities. On a few medieval battlefields, such as Bosworth and Towton the bodies were exhumed and transferred to consecrated ground years or decades after the battle. Also to consider is the impact of cultivation; some bodies were shallowly buried, as at Naseby, where human remains were being disturbed within a few years of the battle. Also to be reckoned with, occasionally, may be the effects of antiquarian excavation.

Mass graves: conclusion

Management of this aspect of battle archaeology is currently as ineffectual as it is for artefact scatters. In addition to considerations already discussed, on many battlefields the location of mass graves in relation to the rout and pursuit will mean that they lie beyond, possibly well beyond, registered areas. Under current registration criteria, it is likely that a large proportion of the burials from English battlefields are excluded. Yet even if such areas were to be extended, management needs would not necessarily be better addressed. The only two securely-located mass graves relating to registered battlefields, at Towton and Stoke Field, are still not scheduled. For the majority of sites the first step must be the formulation of an effective methodology, without which all mass graves will remain vulnerable as well as academically mute.

Towards integrated study

Many battles on the database are from periods in which warfare was of restricted scope and intensity. Thus most of the battles of the Wars of the Roses were part of short, sharp campaigns with long periods of relative peace between. Similarly, the events of the de

[69] Neff, 2002. Testing for calcium phosphate at the Washita pony kill site was possible only because tradition already placed it within a 10-acre area. The probable location of the kill site, as determined by calcium phosphate tests, awaits confirmation. The methodology for this – water screening soil samples taken from below the subsurface stratum – should be applicable in the UK.

Montfort rebellion were restricted to short campaigns in which a relatively small number of garrisons were involved. There were a few periods when warfare was more intense. The clearest are the Civil Wars of the 17th century, but there is also the civil war of Stephen and Matilda in the 12th century and the phase of the Wars of the Roses when garrisons in the north east controlled a broad territory and held out for a long period.

Of different character are the two marcher zones, where territory was to some degree always on a war footing. Along the Welsh border this largely ceased after the conquest by Edward I. For the Scottish border, conflict continued to the end of the 16th century, though of course with periods of heightened tension and action interspersed with battles of varying scale.

In these two zones, as with the short periods of Civil War, there is potential for integration of the study of battles with investigation of wider conflict that integrates sieges, skirmishes, raids, various stages in the development of fortification, and road construction to modify the strategic and tactical context to the advantage of the defending forces. This aspect is touched upon in discussions of later medieval and transitional battle, but it is the Civil War which has been taken here as providing the main opportunity to develop the full range of conflict study.

5. THE CHARACTER OF THE RESOURCE

There are 1102 English fields of conflict on the Fields of Conflict database. Thirty-nine of them have more than one record because multiple sites have been suggested, including eight for *Brunanburh*, six for *Ethandun* and four for Hexham, while six others each have three candidate sites, and 29 others have two. There is also an ancillary Features database which contains 354 records, linked to the relevant actions, including information that ranges from the modern excavation of burials and field survey of artefacts scatters through to dubious early finds, and written records of memorial chapels traditionally associated with sites.

The 1102 actions on the main database include 37 which appear to be spurious actions mainly deriving from dubious archaeological discoveries in the 19th century or before, and place-name evidence. Of the remaining 1065 there are 321 from before and 781 after 1066. Just 102 of these are classified as battles with a further 101 identified as possible battles (see Appendix I). However, of the possible battles 79 per cent date from before 1066, confirming the high level of uncertainty about all aspects of battlefields from this early period. Only one percent of the possible battles are from the 17th century, but here many actions are classified as skirmishes, a small number of which may need to be reclassified as battles. In the earlier periods it is more likely that some uncertain battles will be reclassified as skirmishes, although for the actions before 1066 the paucity of the documentary record makes secure classification impossible.

Sieges account for 383 actions of which 243 date to the 17th century, while 189 are classified as skirmishes of which 142 date from the 17th century. The dominance of the 17th century in these two classes is in part a result of database enhancement specifically undertaken for the period, but it also reflects the far greater detail for military action of the Civil War compared to earlier periods that is available in both primary and secondary sources. All skirmishes, even those of the 17th century, are likely to be grossly under-represented on the database.

In order to place the English resource in context, data from the previous database enhancement for Scotland have been used. The comparison is valid for battles as the database enhancement for the two countries was similar; however, the lack of enhancement of the Scottish element for sieges has led to a substantial bias in the total numbers of actions recorded for England. Where the battles are graphed to display the

chronological distribution, figures have been supplemented by unvalidated data for the Republic of Ireland.

Ultimately the evidence needs to be viewed on a Europe-wide scale, for only then will the particular strengths and unique characteristics of the English resource be fully understood.

COUNTRY	ENGLAND			SCOTLAND		
	All actions	Battles	Multiple sites	All actions	Battles	Multiple sites
Total Records	1182	262		368	72	
Total Actions	1102	203	28	345	56	
Roman (43-410)	14	3	1	4	1	
Early Medieval (411-1065)	201	114	18	45	8	1
Later Medieval (1066-1535)[70]	285	33	5	109	23	2
[Wars of Roses 1455-1487]	32	15	4	-	-	-
Post Medieval (1535 – 1639)	38	7	2	55	7	1
Civil War (1640-1659)	436	29	2	26	10	1
Stuart Rebellions (1660-1900)	23	1	0	26	7	1

The scale of battles varies enormously. Looking first in terms of numbers engaged, Marston Moor was probably the largest with about 45,000, while numbers fall progressively until 5,000, below which problems of classification become acute. It has been decided not to quote figures for medieval battles because of the uncertainty that arises from unrealistic numbers and wide variation that frequently occurs in the primary sources.

Secondly, there is the size of the battlefield which is determined not only by the numbers engaged but was also mediated by the tactics of deployment employed, and then the degree to which the action moved through the landscape. Tactics of deployment varied dramatically between different periods leading to substantial differences in the frontage of armies when deployed in battle array, compounding the implications that arise from numbers. Thus, for example, very deep, sometimes square formations were in use in the 16th century, compared to the very shallow arrays used in the mid-17th century where

[70] Including Wars of Roses

deployments would be just eight, more often six and even occasionally three deep.[71] Thus a 17th century battlefield may be expected to be far broader in frontage than a 16th century one. In the later medieval period there is uncertainty about the nature of deployments, and hence the size of the battlefields on which they were drawn up. This is an issue upon which archaeology may ultimately provide some answers.

[71] Prestwich, 1996, 315-323; Chandler, 1990

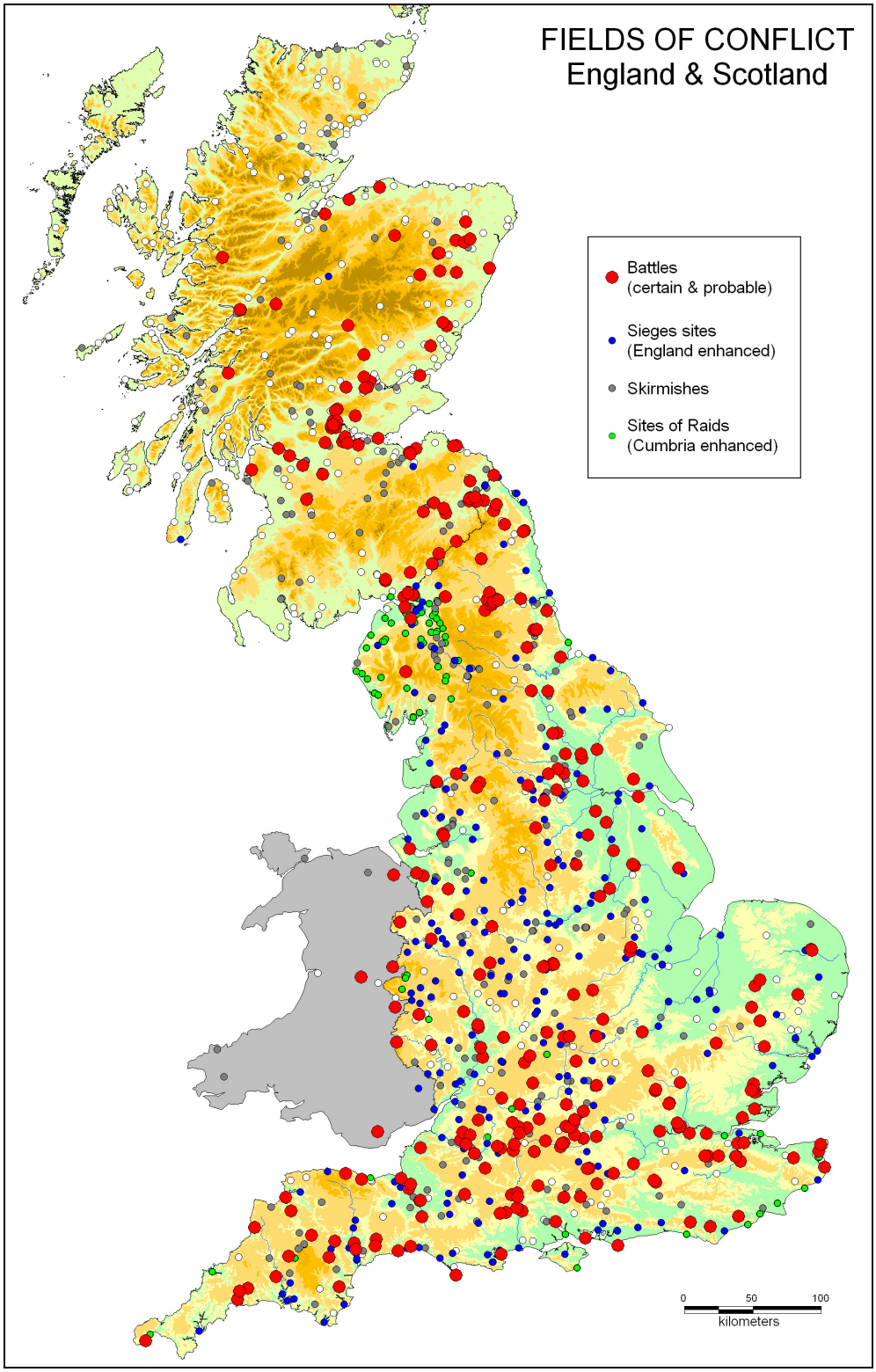

Figure 16: Map of Fields of Conflict in England and Scotland by type

When viewed on a national scale, patterning is visible. For example, a concentration of battles is noticeable along the Anglo-Scottish border but significantly where the actions extend away from the border they congregate on the east rather than the west, a direct reflection of the ease of access along the eastern as opposed to the western route. Most of the patterning visible reflects topographical factors, which explain the absence of battles from the Pennines, Fens or Weald. More consequential distributions only become visible when the data are broken down chronologically.

During the last millennium there is a general decline in the number of actions as one moves back in time, particularly if the unverified sites are excluded. To a degree this may be influenced by a decrease in quantity and quality of primary documentation for earlier centuries, which by the early medieval period becomes a large problem. But, with regard to battles at least, it also reflects in some degree the generally accepted view that, compared to sieges and lesser actions, battle in the Middle Ages was very much a matter of last resort. The most distinctive peaks are the Wars of the Roses in the second half of the 15th century and the Civil Wars in the mid 17th century.

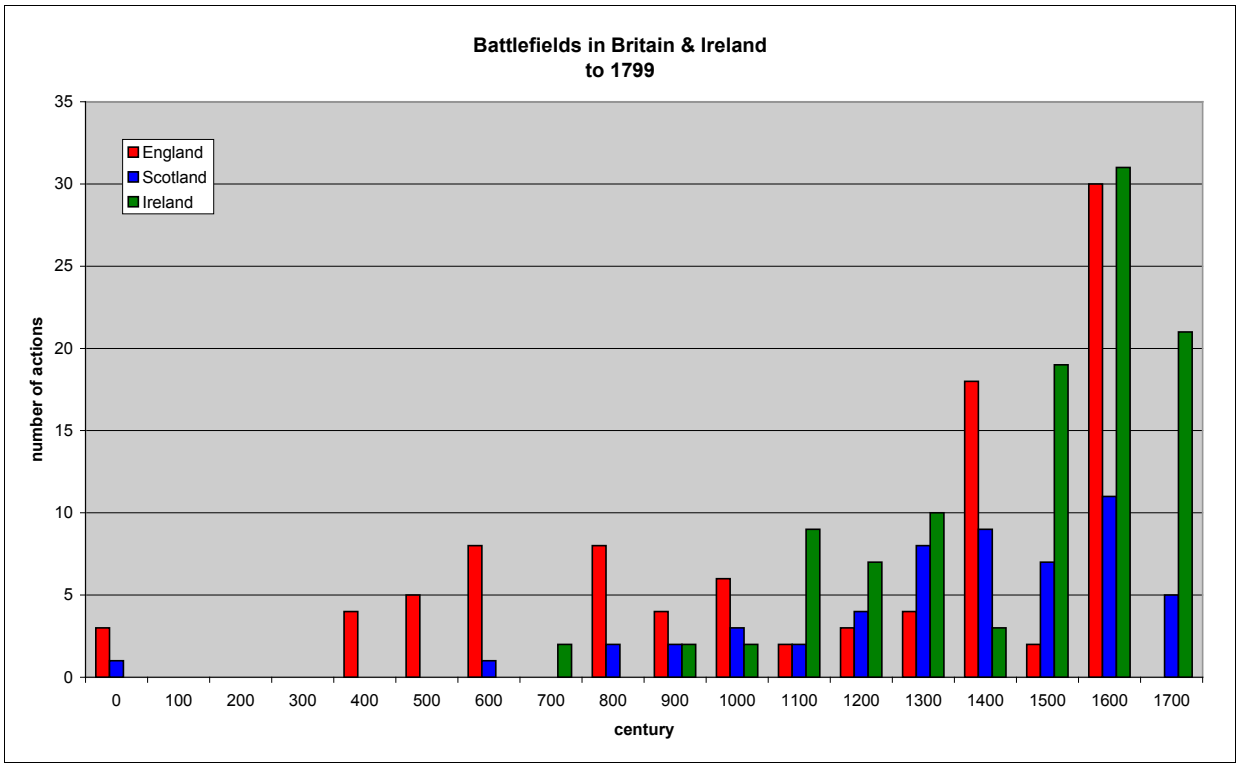

Figure 17: Battles in England, Scotland and the Republic of Ireland, by century. The Irish data are unvalidated

The fields of conflict fall into six main chronological phases of warfare based on the broad archaeological and documentary potential of the sites. Each of these is discussed individually below. For reasons explained, it is only with the later medieval and early modern phases, and the transition between the two, that detailed study of the physical evidence for battlefields is currently possible.

Between the Neolithic and late Iron Age, sites are known only through the archaeological record. Thereafter increasing numbers of battles and other actions are recorded, but rarely in sufficient detail to enable their location. The only exceptions are actions against fortified sites, of which a handful are known. Hastings is the first battle with both detailed documentation and a reasonably secure location. Many battles thereafter, though more poorly documented, are nonetheless located, even if the action is not yet securely placed in the landscape. While potential exists through analysis of primary written records within the context of historic terrain reconstruction, iIt is only from the later 15th century that the full methodology for battlefield investigation can be implemented.

Prehistoric warfare

Warfare in the prehistoric period is such a specialised research area that no systematic data collection or analysis has been attempted here – it is an area largely separate from the study of later battlefields.[72] No systematiuc data collection has been attempted here. Only five sites revealed by HERs are recorded on the database, and of these several are spurious or speculative. Fields of conflict of the prehistoric period identified with some confidence include the Neolithic evidence from Crickley Hill, and the Bronze Age burials from Todmarton.[73]

Assessment

Prehistoric warfare has been subject to detailed investigation that has largely been kept separate from the study later battlefields.[74] It deserves further investigation, but the greatest potential appears to lie with the identification of action against fixed positions

[72] Carman, 1997
[73] Keeley, 1996; Mercer, 1999, 143-56; Osgood & Monks, 2000
[74] Carman, 1997

rather than open battles. Many defensive sites have left a substantial and distinctive archaeological signature.

The greatest potential appears to be the identification of action against fixed positions rather than open battles, because many defensive sites are there to be seen. The most obvious evidence will be in the form of groups of inhumation burials showing trauma. However, the location of such remains will usually be by chance. Given the experience from later battlefields it is likely that secure evidence of military action itself will most often be recognised through the distribution of projectiles. While flint projectile points survive well, they will be difficult to recover other than via extensive excavation where the sites remain as earthworks, though it is possible that concentrations might be revealed by fieldwalking on arable land where defensive sites have been ploughed flat. Recovery of bronze artefacts after an action was presumably a high priority, although any left un-retrieved should survive, subject to the cultivation history of the land. If bronze or copper alloy items do survive, recovery through systematic metal detecting should be practicable unless they are deeply buried.

In contrast, the survival of projectile points and other artefacts of iron is likely to be low. In non aggressive soil conditions (low pH and low levels of mechanical damage) survival of stratified artefacts is likely to be good, but even in ideal conditions unstratified ferrous artefacts are unlikely to have survived for more than 2,000 years, especially if the topsoil has been subject to long periods of cultivation.

Flint arrowheads and stone slingshots have been found in significant quantities on fields of conflict of the Neolithic and Iron Age, respectively. However, these projectiles rarely if ever bear evidence as to whether or not they were actually fired. This is a problem for siege sites where it is possible, if not likely, that substantial numbers of these artefacts may have been deposited by mechanisms other than military combat. This is the reason given for the absence of an analysis of slingshot patterning across Iron Age Danebury hillfort, it being suggested that most of the slingshots retrieved may have been from the collapse and redeposition of stockpiles.[75] At Danebury there is also tentative differentiation between slingshots for hunting birds, and for battle.[76]

At Crickley Hill the discussion has normally dwelled just on the distribution of flint arrowheads, without presentation of the wider artefactual context. Yet to understand the

[75] Cunliffe 1984
[76] Poole, 371-2

projectile distribution it is necessary also to understand the background noise of flint artefact distributions and to see how the arrowhead distribution relates to them. It might yet be possible to tease combat evidence out of the Danebury assemblage but such analysis may need to be part of a wider analysis of the nature of projectile distribution patterns, seeking comparative patterning perhaps between prehistoric sites and those of the second millennium AD to determine if general principles can be identified.

Roman

With the coming of written records, information on open battles becomes available. Britain's first and only example from the prehistoric period is from accounts of Caesar's campaigns in Britain in 55 and 54 BC, which record military actions of various scales.[77] None of the actions described can be securely located, though suggestions have been made.[78] Though technically belonging to English prehistory, they are better considered alongside military action during the Roman period.

The written record for battle in Roman Britain is sparse and irregular; there is no necessary reason why even major military actions will have necessarily have attracted references in the sources that survive. We are, for example, dependent upon the survival of the eulogy written by Tacitus for his father-in-law Agricola for what detailed evidence we have of what we suppose to be two of the most important battles of the period in Britain: Boudicca's defeat and Mons Graupius.[79]

From the documentary record only three significant engagements in the period can be reasonably identified as battles: Medway (AD43), Thames (AD43) and Boudicca's defeat (AD61).[80] In addition there are two documented Roman battles elsewhere in Britain: Mons Graupius, Agricola's major victory in AD84 in Scotland, and Caratacus's defeat in AD51, for which a site at Cefn Carnedd in Wales is just one suggested site.[81] None of these actions is securely located, despite much effort on the part of many authors.

[77] Caesar, *De Bello Gallico*, 4.20-37, 5.2-24; cf. Cassius Dio
[78] Wiseman and Wiseman, 1980; Johnson, 1917
[79] Life of Agricola, 16, 29-37
[80] Webster and Dudley, 1973; Webster, 1993
[81] Webster, 1981; Fraser, 2005

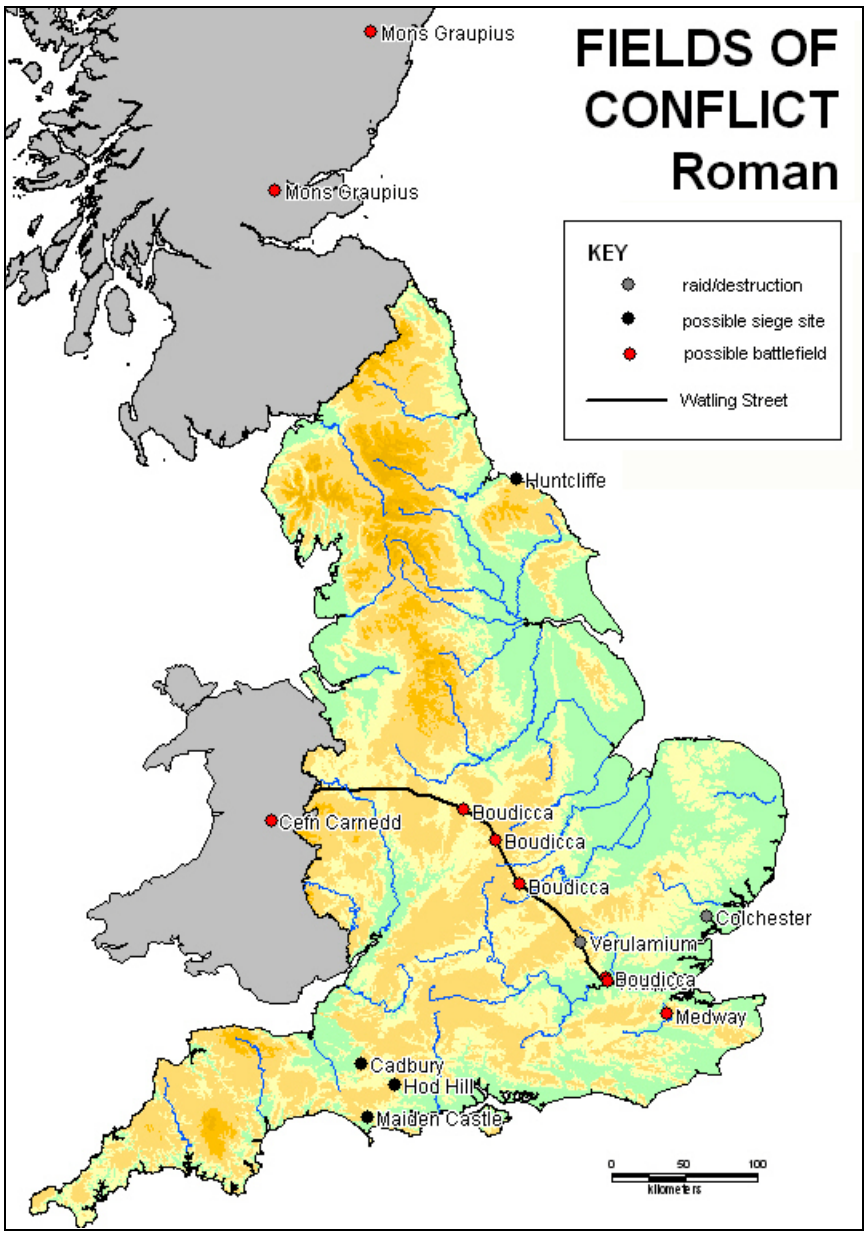

Figure 18: Fields of Conflict: Roman

Even a brief examination of the battle in which Boudicca was defeated in AD61 demonstrates the difficulties that have to be overcome in identifying Roman battlefields in Britain.[82] Only four of the many suggested sites suggested for the Boudicca battle are recorded on the database and mapped here, but there is no secure evidence to prefer these or any of the others.

[82] Webster, 1993; Marix Evans, 2007

The primary source is Tacitus, writing some 50 years later and not an eye witness. However, he may have had report of the event from Agricola, his father-in-law, who was serving in the army in Britannia at the time of Boudicca's revolt.

It would appear from Tacitus that Suetonius, the Roman commander, had to withdraw the majority of his troops from campaign in Wales to deal with the rebellion, while the rebel force was active in the south east, having sacked Camalodunum (Colchester) and Verulamium (St Albans). Because the majority of Suetonius's forces appear to have had to march back towards London it is believed by many that a site along Watling Street is most likely for the encounter. This is then further narrowed as probably lying somewhere between the West Midlands and St Albans, where Boudicca burnt Verulamium. There is, however, nothing in the original source to prove that either of these assumptions is correct.

Different authors have sought a location along Watling Street which would accord with what little Tacitus reports of the battlefield terrain:

> Suetonius had the 14th legion and a detachment from the 20th, and auxiliaries from the nearest (allies), some 10,000 troops in total. He decided to fight without further delay. He selected a place in a narrow defile enclosed at the rear by a forest. This guaranteed that the enemy could not attack except from the front; and the front was an open plain which removed any apprehension of ambush. He therefore drew up the legionaries on close ranks with the light armed auxiliaries on either side; the massed ranks of cavalry stood on the wings. On the other hand the British forces were moving this way and that in groups of various sizes, and in numbers never before seen. So confident were they, that they had brought their wives to witness their victory, and placed them on wagons positioned around the extreme edge of the battlefield.'[83]

Even if one sets aside the possibility that elements of terrain detail were topoi based on accounts of earlier battles, this is still vague. When land use change since the Roman period is added in, then together with our very limited knowledge of land-use at the time, the difficulties look insurmountable.

This can be illustrated by examining just one suggested site, to the south of Towcester near Cuttle Mill in Paulerspury (Northamptonshire), where Watling Street runs through Whittlewood Forest.[84] The site appears originally to have been suggested because of the presence of a large undated cemetery in close proximity to Watling Street.[85] The small valley here, opening out into the main valley of the Tove, might accord

[83] Translation by N Hopkinson, from Marix Evans, 2007
[84] Marix Evans, 2001, 2007
[85] Information from Charmian Woodfield, Northamptonshire HER

with the narrow defile opening onto a plain described by Tacitus, although even in the immediate environs there are several other small valleys in close proximity that also cross Watling Street.

The extent of woodland is problematic, even though this region has been subjective to fairly intensive archaeological investigation and detailed historic landscape mapping.[86] Woodland extent when this was part of the medieval royal forest of Whittlewood is well understood, the woods lying on the boulder clay-capped plateau to the west of the valley of the river Tove. Although the medieval woodland did not extend close to Watling Street, there may have been extensive woodland across much of the boulder clay in the earlier medieval period. If so, this was largely a result of post-Roman woodland regeneration.[87] In the prehistoric period the permeable geologies of the river valleys were cleared very early, with the boulder clay apparently the latest area cleared of woodland in the Iron Age and Roman period. However, there is good evidence from settlements and pottery distributions that colonisation and clearance of these clays was already well advanced by the end of the Iron Age. Several Iron Age sites are known on the boulder clay in the Cuttle Mill area, despite the lack of systematic fieldwalking survey here. Thus it is quite likely that by AD61 woodland had been cleared well away from Watling Street in the area of Cuttle Mill.

[86] Jones and Page, 2006; Cooper, 2006; Deegan & Foard, 2008; Britnell, *et al*, 2004
[87] Jones and Page, 2006

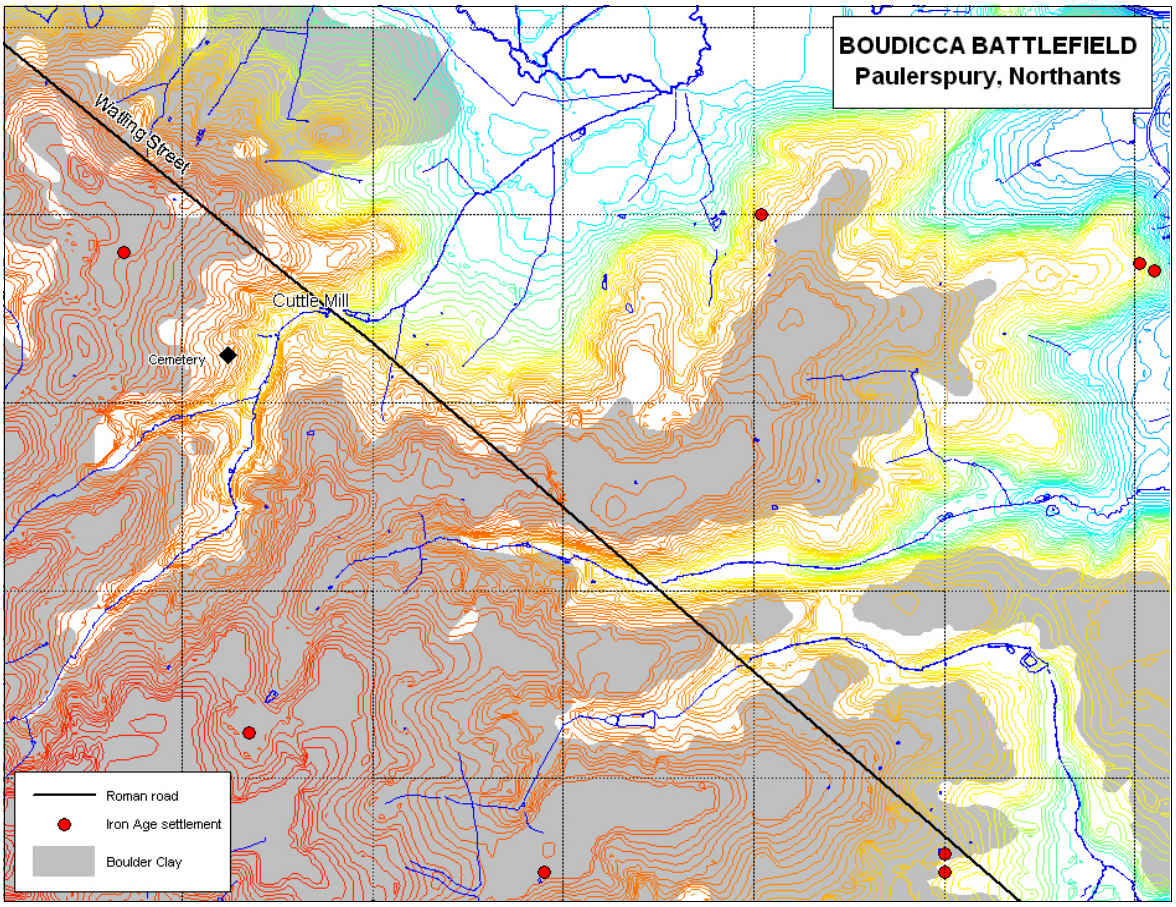

Figure 19: Boudicca battlefield (10m contour)

Not only is there doubt about the extent of woodland in AD61, but the burials in the cemetery and associated finds have now been dated to the early Middle Ages.[88] A small metal detecting survey on fields surrounding Cuttle Mill to test this as the Boudicca battlefield failed to produce supporting evidence.[89]

Such failures are not as significant as might at first appear: we need to know more about the nature of the archaeology of Roman battles before we can determine what their signatures may look like.

[88] A substantial stone building has been revealed by aerial survey, associated with Roman material: metal detecting by B Kings, information from Northamptonshire HER
[89] Information from John Kliene

Kalkriese

That there is a recognisable Roman battle archaeology is shown by several sites in continental Europe. One of them is the grave of 40 men and 30 horses reported from Krefeld-Gellep, Germany.[90]

The main site is at Kalkriese, near Osnabruck, which is probably where the Roman army under Varus was destroyed while on campaign in Germany in AD9.[91] From finds of coins and other material the site have been known here since the 19th century; modern investigation has followed significant metal detecting finds by Clunn.[92]

The action – reflected in a broad distribution of Roman coins and other distinctive artefacts, recovered as chance finds or through systematic and casual metal detecting – appears to have taken place over a number of days and across some 10 - 20 km.

The wide and impressive range of finds is displayed in a purpose-built visitor centre on the battlefield, a small part of which is accessible to and interpreted for the public. Interpretation is disputed.[93]

Kalkriese is important because it shows what the disintegration of a Roman legion in battle might look like archaeologically. The 'site' appears atypical in a number of ways. Firstly, because it is believed to represent the near-total destruction of a legion, a wide range of distinctively military artefacts (in addition to large numbers of undiagnostic artefacts) will have been deposited in large numbers.

Secondly, because the battle was fought outside the Roman Empire, most of the artefacts carried by legionaries – not just military items but also 'domestic' artefacts – were near-unique in the area, and so more easily distinguished from other contemporary material, in their quantities that exceed what might have reached the area through trade or plunder.

In contrast, the German forces are near-invisible. This is not simply because they were the victorious force and hence their losses were less, but most importantly because

[90] Coulston, 2001
[91] http://www.kalkriese-varusschlacht.de/ ; Coulston, 2001, 28-31; Harnecker, 2004; Wilbers-Rost, 2007
[92] Clunn, *et al*, 1999
[93] This account was prepared following a site visit and discussion with Susanne Wilbers-Rost, with reference to unpublished information made available by Achim Rost and Susanne Wilbers-Rost

the vast majority of artefacts that they lost during the action will not be distinguishable from other artefacts deposited in a non-military context at an earlier or later date.[94]

The best preserved area of the site, at Kalkriese itself, has been examined through large-scale excavation over a number of years. These deposits are exceptionally well preserved. They represent a deeply buried battlefield surface, protected by more than a metre of medieval and later deposits of turf brought in over a long period to improve the fertility of the soil. The material appears to be associated with – and in places is possibly buried by the decay of – a Germanic fortification, which in some interpretations represents a fortification used against the Roman forces.

With all this said, it must be noted that almost no projectiles have been recovered from the core area. It could be argued that the assemblage is more typical of what might be expected from the destruction of a baggage train than of open battle of armies deployed in battle array.

It would be instructive to see analysis of the artefacts from systematic metal detecting survey across wider areas, as this may represent a more typical assemblage. To better understand the nature of the deposits it would also help to have knowledge of the preservation factors involved, with evidence on soil pH, land-use history and other factors likely to influence artefact survival and condition.

Kalkriese provides extraordinary information on the character of deposits that may have existed on parts of other battlefields. Yet this, and the exceptional nature of the character of the material, means that Kalkriese cannot be a model for the character of battle archaeology likely to survive on Roman battlefields in Britain. While northern Scotland in AD81 might be sufficiently beyond the frontier to meet one criterion, Mons Graupius did not see the destruction of the Roman army and there will not be corresponding artefact loss. Losses on the native side, even if substantial, will not stand out from the surrounding landscape, at least in type, although they might do so in terms of density. For battlefields in England, it would appear that none of the conditions at Kalkriese will apply.

[94] Coulston, 2001

Sieges and other actions

No attempt has been made here systematically to collect data for sieges, or for raids that led to the destruction of settlements – they lie beyond the terms of the project.

A few such sites have nonetheless been added to the database, where evidence incidental to battlefields has been collected. Of these, two are possible conquest period sieges of hillforts: Hod Hill and Maiden Castle. Another, Cadbury hillfort, is a possible siege or massacre deposit of cAD60. In addition there are the raids of AD61 on Colchester and Verulamium. To them can be added the late Roman signal station at Huntcliffe, which has yielded burials showing trauma which might have resulted from military action.[95]

Several sites included in SMR reports have been specifically excluded: for example, the report from Whittlesey (Cambridgeshire) of mutilated bodies of Roman date was not considered to be sufficiently securely associated with military action. Returns from two other SMRs provided records of artefact collections which had been interpreted as possibly indicating battle sites, but both appear spurious and have been excluded. Cambridgeshire SMR provided by far the most detailed response to our SMR enquiry, it seems likely that comparable sites would be revealed elsewhere through a more intensive search. Such research lies beyond the scope of the present study. Also excluded are various locations that have been suggested for the Roman invasion landing of AD43: none is convincing or has any substantial associated evidence of military action.

Sieges are promising because the identification of fixed positions is easier than battlefields in the open landscape. Even then, evidence is likely to be found more by chance than by strategy. Once identified, the potential for systematic metal detecting may yield informative horizontal spreads. What can be achieved on a wide scale through investigation of siege sites, admittedly with an exceptional artefact type, the lead slingshot, is graphically demonstrated from the investigation of the attack on Olynthos, Greece, in 348 BC. [96]

[95] Hind, 2005
[96] Cf. Coulston, 2001; Lee, 2001

Conclusion

Potential may exist in

- monuments to an action, or where people were killed
- burials showing clear evidence of trauma
- horizontal spreads of artefacts (e.g. ferrous arrowheads, small items of military equipment, slingshots, material lost in the pillaging of a baggage train)

We do not know what the assemblage of a ‘normal’ Roman battlefield would look like, or what ‘normal’ might mean. Work elsewhere on continental Europe and the wider Mediterranean, where arid conditions offer better preservation, may assist.

Early Medieval warfare: 411-1065

There is a total of 232 early medieval records on the database for England. Many cannot be classified as to type of action, or have been assessed as spurious. A further 29 appeared to be sieges and at least two were assassinations. This left 154 battles or possible battles – 'possible' because they are attended by uncertainties, and the paucity of contemporary primary written sources. Of the 154 at least 20 actions have more than one possible location, including Brunanburh 7, Ethandun 6, Ashdown 5 and Ashingdon 3. This leaves a total of 114 individual actions.

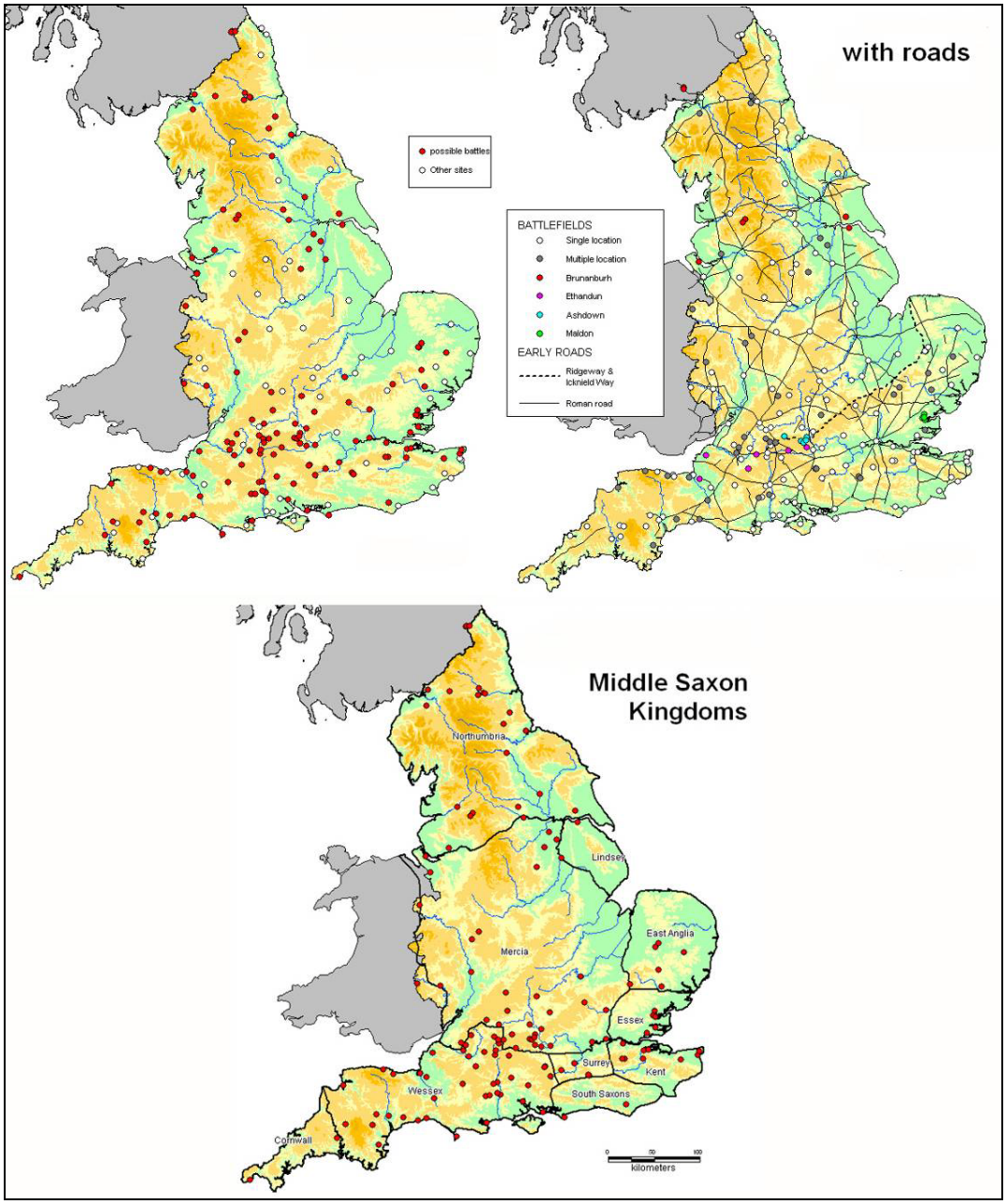

Figure 20: Distribution and some associations of early medieval battles

Thanks largely to the battle names, in most cases the information in the database has sufficient detail to enable analysis at least on a national scale. However, the bias that is introduced by the level of detail for Wessex from the Anglo-Saxon Chronicle is immediately apparent.

Of those actions with more than one possible site some, like Maldon, offer a reasonable degree of confidence about location, but a small number, including some of the most important of battles, have alternative sites which are widely separated. Thus, for example, *Brunanburh* has alternative sites right across northern England and into southern Scotland, though place-name analysis has demonstrated a high probability that site lay in the Wirral.[97]

This is not to suggest that battles recorded with a single location are accurately located, for many are traceable only to a general area. For many, the evidence comes from just one reference in one source – the Anglo-Saxon Chronicle – and though the combatants are often known even the outcome is frequently uncertain and the nature of the action even less clear. Thus for example *Bedcanford* in 571 is now unlocated because the place-name evidence can no longer support identification with Bedford. In the case of Luton the place name association is accepted but there is no evidence as to where the site may be in the surrounding territory. The lack of topographical information from almost all the documentary records of the battles of the period means that there is rarely any evidence by which to pinpoint the site.

One exceptional type of evidence which may assist in the resolution of problems for a few battles is where memorial chapels were established to commemorate them, as for example at *Assandun*. However, as is seen below with Heavenfield, the chapel does not always stand on the battlefield. There are also problems with earlier identifications of finds and burials as coming from early medieval battlefields. Cemeteries of various date have been misinterpreted as battlefield burials, such discoveries in the 19th century or before sometimes prompting assumptions about battles and giving rise to local names that have themselves become part of a spurious evidential base. In the case of Bloodmoor Hill in Gisleham, Suffolk, for instance, the name is now known to have been bestowed following the opening of an Anglo-Saxon barrow in 1758.[98] On the other hand, in a few cases the attribution of a battle name may be genuine, perhaps for example with Battle Wood in Stoke Lyne, Oxfordshire, of which Stenton points out that the presence of a 12th-

[97] Higham, 1997
[98] Newman, 1996, suggests that the description of the area in past records as a battlefield probably resulted from the discovery of early Anglo-Saxon burials with weapons.

century name of a wood there as *Fethelee* can be linked to the battle of Fethanleag in 584.[99]

Until the 9th century the distribution, and some cases historicity, of early medieval battles must be viewed with the further caution that compilation of the Anglo-Saxon Chronicle itself did not begin until the 890s, and that although the Chronicle drew from other sources and annals that in some cases have not survived, the degree of confidence in detail that attaches to its record for the 5th-7th centuries must often be small.

This notwithstanding, when the early medieval distribution is compared against a number of other data sets, some general conclusions may be drawn. One of them is with Roman roads, where there is some degree of patterning at a strategic level, though in reality it is only when examined at a very local level that significant conclusions might be drawn as regards the actual sites. Similarly, there appears to be a degree of concentration of battles along some boundaries between Anglo-Saxon kingdoms – but again these boundaries are often modern supposals, and 'kingdom' in the 7th century may been as much or more a matter of the extent of family or dynastic influence at a given moment than a geographical area with permanent borders. [100] This analysis can be extended to the patterning by chronology, where conclusions may be drawn about the spread of warfare across the country in different periods. However, none of this assists in the identification of the actual sites of the battles which is critical to the present purpose.

Table 1: Early Medieval Battles by Century

century	number
5th	7
6th	14
7th	17
8th	5
9th	36
10th	15
11th (to1065)	20

[99] Stenton, 1947, 29; Trans Royal Hist Soc, 4th Series, xxii, 19-20
[100] Wood, 2007

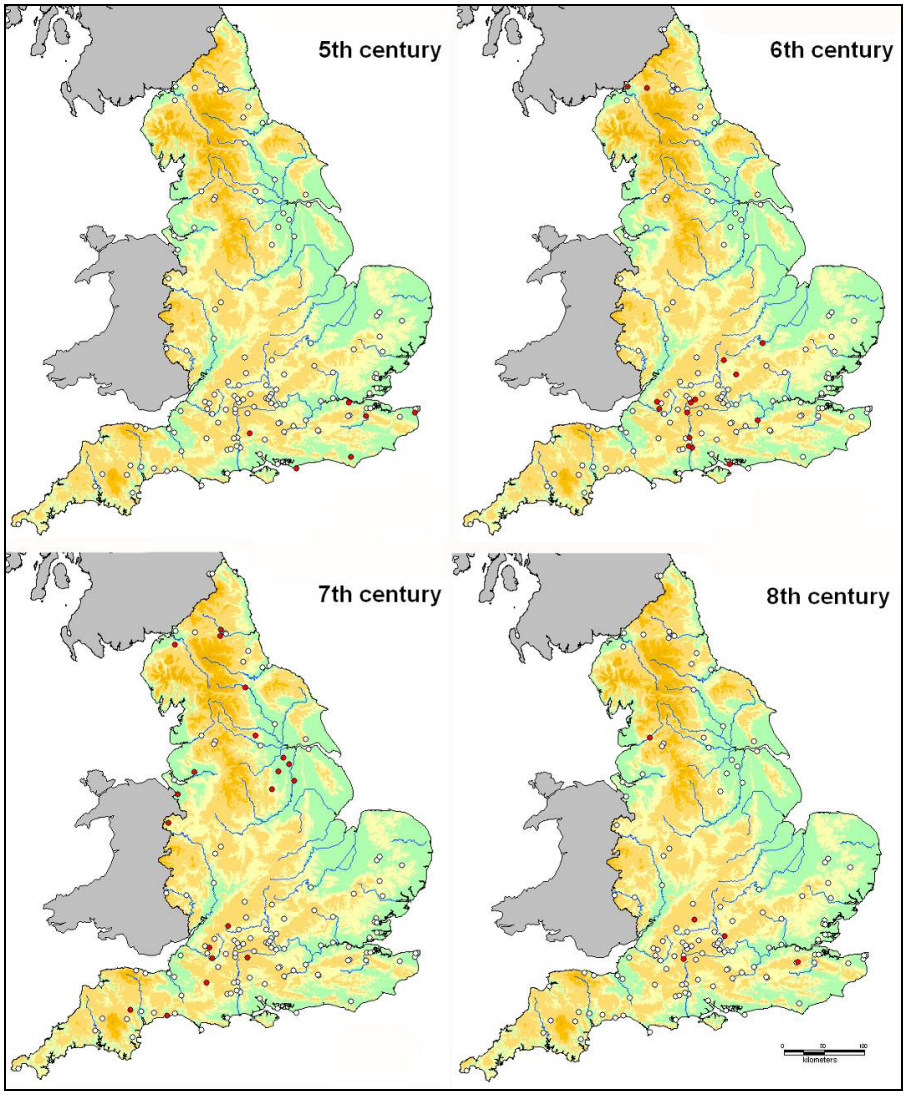

Figure 21: Distribution of early medieval battles by century (5th–8th), compared to total distribution

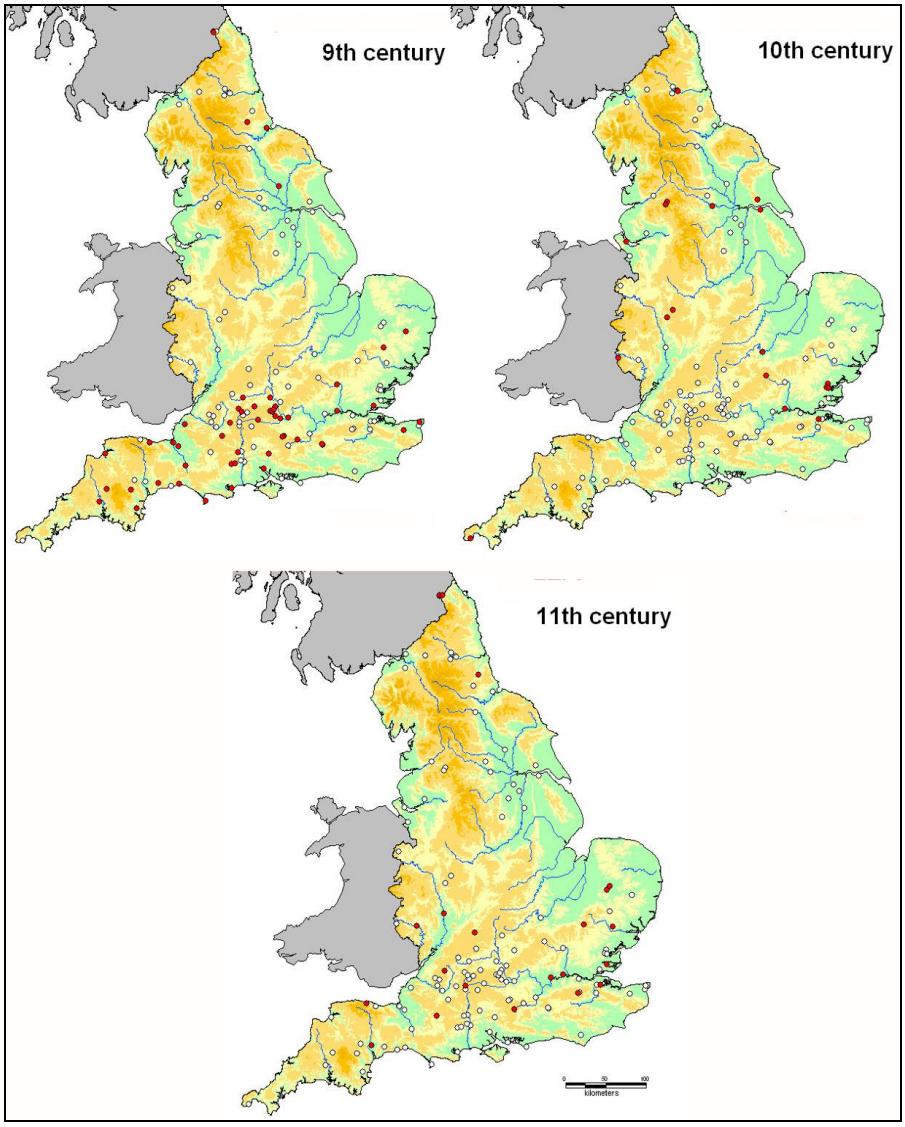

Figure 22: Distribution of early medieval battles by century (9th–11th), compared to total distribution

Secure and substantial archaeological evidence has yet to be retrieved from any English battlefield before the 15th century. Indeed across Europe, apart from mass graves, the only major study of an earlier battle to have produced extensive battle archaeology is that at Kalkriese (Germany, AD 9), where exceptional preservation conditions prevail.[101] Burials which may relate to the battle of Chester in the early 7th century have been located at Heronbridge, but the association is insecure.[102] There is also a report of archaeological

[101] Wilbers-Rost, 2007
[102] Mason, 2001; 2002; 2004

finds from the Fleet Valley in London which have been suggested as representing the battle of London in 1066; this needs to be assessed against later battlefield deposits.[103] While chance discoveries of burials may cast light on warfare, it is only when spatial patterning across a landscape is identified that the physical evidence can make a major contribution to the understanding of a battle.

The iron spear is likely to have formed a substantial proportion of the projectiles used in the early Middle Ages, although to judge from manuscript and other evidence (e.g. sculpture), iron arrows were also significant in some actions. Since spears points will have been far easier to retrieve for re-use during or immediately after a battle, they are likely to have been so. Hence, where artefacts do survive their patterns of distribution may be far less dense or representative of the action than arrowhead spreads of the Hundred Years War or Wars of the Roses.

A question not yet settled, and critical in relation to survival, is the extent to which early medieval equipment lost on the field will have been of ferrous or non-ferrous metal. In addition, account must be taken of the length of time that artefacts will have lain in topsoil. If we accept the traditional dates for, say, Badon, Heavenfield (Denisesburn), and Ethandun, then these periods would be 1500, 1375, and 1130 years, respectively. Thus the artefact distributions for early medieval battles, if they survive, will probably be sparser than for later periods. It may only be where part of a battlefield surface has been buried beneath alluvium, waterlogged, or left uncultivated, that battle artefacts may survive in sufficient numbers to permit analysis.

Until we are able to locate early medieval battlefields, a research strategy to address them archaeologically remains out of reach. Even Maldon, the only example to have been Registered, is doubtful (below, p.80). Study of the strategic landscape of the early medieval period may assist in focusing attempts to identify the general location of battles in this period, and in this context the research currently underway to map Anglo-Saxon civil defence could lead to substantial advances, and possibly offer methodological innovations that could be employed elsewhere (see pp 85-87). However, it is only through the presence and interrogation of intelligibly-patterned battle archaeology that resulting hypotheses can be tested, and unless or until such an assemblage can be identified the

[103] Mills 1996, 59-62

location of battles of the period is likely to remain conjecture. An exception may be through the discovery of mass graves, and there may also be potential to identify siege sites.

Resolution of the problem calls for a two-fold approach. One path is to approach from Hastings backwards, for Hastings is the most accurately-located of this group of battles, and although it comes at the very end of the period, tactics and equipment of preceding centuries were still in use by the English army. The other is to seek one or more of the 'battles' of the period which appear to have been an attack on a defended location and where that location can be identified with some confidence. For example on might choose an action directly associated with a Roman fort, or a located centre such as Bamburgh. However, problems would then arise regarding the conduct of a detecting survey around or on such sites. The most viable strategy, assuming favourable soil chemistry, thus seems to be to target Hastings.

Maldon

Maldon is the only battle from before 1066 where the battlefield has been identified with some confidence. The Anglo-Saxon Chronicle states that the battle took place near Maldon (clearly Maldon in Essex, because Brihtnoth, the English commander, was Ealdorman of Essex while the earlier plundering by the Viking force took place at Ipswich, 30 miles to the north east). The position of the battlefield has been interpreted from topographical evidence within the broadly contemporary poem *The Battle of Maldon*.[104] The key topographical facts are that the Viking force landed or marched to a position on one side of a channel of the Blackwater estuary or a tidal section of the river, then called 'Panta'. At high tide they were unable to cross but the channel was sufficiently narrow to enable the opposing forces to negotiate by shouting across the water. When the tide fell and they were allowed to cross they did so, across a causeway (brycg) or ford, in a westerly direction.

The interpretation currently favoured is that the battle was fought on the mainland immediately opposite Northey Island, in the Blackwater estuary just to the east of the town of Maldon. However, this has been challenged,[105] and there have been three main candidates for the site. One lies immediately north east of Maldon at the place now known

[104] Laborde, 1925, 161-73; Cooper, ed., 1993; Keynes, 1991
[105] Bessinger, 1963

as Heybridge, now completely built up as a suburb of Maldon.[106] The Viking force was suggested as having crossed north eastward from just outside the Maldon defences to attack the East Saxon army on the north east bank. The case for this site has been rejected by more recent authors, partly because it does not appear to meet the criteria relating to the tides, and partly also because the poem makes no reference to Maldon town, which would have been immediately to the back of the Viking force.[107]

The second candidate was Osea Island, which lies in the north of the estuary and is connected to the mainland by a causeway. But even when sea level rise is taken into account, the 1 km distance between the island and the mainland is too great to fit the events in the poem.[108]

The strongest candidate is Northey Island, which has been shown to fit closely the topographical features described in the poem, including the way in which the rising tide flows around both sides of the island to meet at the causeway.[109] While today the distance from mainland to the island might be considered too great for a shouted exchange, it has been shown that in this area land has been sinking since the last glaciation and that sea level has risen by about 6ft since the 10th century. As a result there are now saltings where there was dry land at the time of the battle, which would have made the channel no more than about 110m wide at that time. The adjacent land was dry pasture, dipping gently to a steep river bank. In AD 991 the causeway would have been covered by 6-8 ft of water at high tide, while silts similar to those seen today would have made crossing the channel impossible except by a causeway.[110]

According to the poem there was a wood nearby, for one Englishman let his hawk fly to the wood before he advanced to battle, while others fled to the woods after Brihtnoth's death. The parishes to the west of Northey Island have woodland-related names, Woodham and Hazeleigh and Purleigh.[111] However, no reconstruction of the distribution of woodland in this area in the medieval period has apparently been attempted so it is unclear how closely the woodland might have extended towards the battlefield, or indeed at what date(s) it may have existed. Despite the apparent strength of the case,

[106] Freeman, 1869
[107] E.g. Burne, 1996
[108] English Heritage, 1995a
[109] Laborde, 1925
[110] Petty G.R. and Petty S., 1976. Petty and Petty, 1993
[111] Dodgson John McNeal, 1991

therefore, unless or until archaeological evidence for the battle is recovered, Maldon's identification remains open.

Heavenfield

The battle of Heavenfield, a celebrated encounter between king Oswald and Cadwallon in the early 630s, is widely assumed to have taken place just to the north of Hadrian's Wall, a short distance east of Chollerford, at a place commemorated at least from the later Middle Ages by a chapel, and by an annual procession of canons from Hexham Abbey.

If this were the battle site, then Heavenfield would certainly be a candidate for the closest archaeological survey. In fact, re-examination of all the available sources for the purposes of this project shows that Heavenfield and the battle were in different places, and that almost all commentators have been wrong about the location of the initial encounter.[112]

In summary, Heavenfield was north of the wall, but was the site of Oswald's camp before the battle, not the battle itself. The battle concluded with the death of Cadwallon at

[112] The leading source is Bede, writing in the earlier 8th century: HE III 1, *Quo (Osualdo), post occisionem fratris Eanfridi, superueniente cum paruo exercitu, sed fide Christi munito, infandus Brettonum dux cum inmensis illis copiis, quibus nihil resistere posse iactabat, interemtus est in locol, qui lingua Anglorum Denisesburna, id est riuus Denisi, uocatur*; HE III 2, on erection of cross: *Fecerunt omnes, ut iusserat, et sic incipiente diluculo in hostem progressi, iuxta meritum suae fidei uictoria potiti sunt …Uocatur locus ille lingua Anglorum Hefenfelth, quod dici potest latine caelestis campus, quod certo utique praesagio futurorum antiquitus nomen accepit …Est autem locus iuxta murum illum ad aquilonem, quo Romani quondam ob arcendos barbarorum impetus totam a mari ad mare praecinxere Brittaniam …*

Other references to the battle site occur in Historia Brittonum 64, Oswald … Ipse occidit Catgablaun, regem Guenedotae regionis, in bello Catsgaul, cum magna clade exercitus sui; Annales Cambriae, s.a. 631, Bellum Cantscaul in quo Catguollaun corruit. Plummer, II, 121: 'The name of the battle both in Ann. Camb. 631 and in Nenn. § 63 is 'bellum Catscaul' (= cath-is-gwaul, 'the battle within the wall.') Clearly it is not at Heavenfield (thus destroying the argument of Raine, Hexham, I, xi, ff., cited in Plummer, II, 122-3). On the other hand it is obviously south of the Wall.

On Heavenfield: also Adomnan, Vita Columbae I 1, 14-15: Before the battle Oswald had a vision of Columba: '*Sanctus igitur Columba haec ad regem in uisu loquens addit: 'Haec sequente nocte de castris ad bellum procede. Hac enim uice mihi dominus donauit ut hostes in fugam uertantur tui, et Catlon inimicus in manus tradatur tuas, et post bellum uictor reuertaris et feliciter regnes.' … Eadem subsequta nocte Osualdus rex sicuti in uisu edoctus fuerat de castris ad bellum cum admodum pauciore exercitu contra milia numerosa progreditur. Cui a domino sicut ei promisum est felix et facilis est concessa uictoria, et rege trucidato Catlone uictor post bellum reuersus postea totius Brittanniae imperator a deo ordinatus est.*'

Denisesburn, south of the Tyne. *Denisesburn* probably equates with today's Rowley Water.[113]

It is not clear where the battle began. Leland, working from an older tradition, may provide a clue when he says: 'There is a fame that Oswald won the betelle at Halydene, a two miles est from St. Oswalde's asche.'[114] Plummer identifies Halydene with Hallington,[115] but this is north of the Wall and can be discounted.[116] This would seem to suggest that Oswald was at Heavenfield, while Cadwallon was in the vicinity of Onnum/Halton: that Cadwallon fled south through Corbridge, but was caught at the far side of the Tyne.

Oswald would seem to have attacked at night: Bede says he attacked *incipiente diluculo*, but Adomnan says clearly that the attack took place at night.

One overall reconstruction would leave Heavenfield where everyone thinks it was: but it as Oswald's camp, not the battlefield. Oswald then launched a night attack on Cadwallon's camp, which was near Dere Street. Cadwallon and his army fled back down the Roman road, but were caught just after crossing the Tyne bridge at Corbridge, and the rout took place at *Denisesburn*, which flows into the Tyne effectively at the bridge crossing.[117]

This still leaves questions. There is nothing in the Roman or later road pattern to suggest why an army in flight would be anywhere near the Rowley Burn as we know it today, whilst if Cadwallon's forces had broken, the greater bottleneck would be at the crossing of the Tyne. Is it possible that we are missing a key piece of the Roman or medieval road pattern? If the battle had been fought close to Corbridge, why was it not called the battle of Corbridge, as were a number of other battles? If it was fought at or near Halton or the fort there then why not name it again after Corbridge as the parochial area

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[113] Plummer, II, 123: *Denisesburn* is identified by a charter edited by Raine, Hexham, Appendix iv: 'Dedit … archiepiscopus … xx acras terrae … in Ruleystal … inter Denisesburn et Diuelis.'
[114] Itin. Ed. 2, vii. 58 (cited by Plummer, II, 23)
[115] Plummer, II, 123
[116] There is, however, a Halton approximately four miles east of the supposed site of Heavenfield, just off Dere Street: In fact, Halton Chesters = Onnum is the fort adjacent to where Dere Street crossed the Wall.
[117] The Rowley Burn as it is today is the stream that joins the Devil's Water to the east of Juniper, some 6km south-west of Corbridge. Close to the head of the burn there is Rowley Head, recorded in the 18th century on Armstrong's map. The OS 1st edition gives Devil's Water for the stream that runs into the Tyne next to Corbridge; this is also the case on the Armstrong map, and is supported by the place name Dilston – which has a 'devil' derivation according to the English Place Names Society, though Mills (2003) gives 'dark stream'.

(admittedly much later though presumably reflecting some early pattern) or the Onnum fort or Halton?

A part-answer to some of the questions may lie in the devotional background to the battle, to which Bede and Admonan give much prominence. Since Heavenfield was where Oswald and his army prayed for victory, in Bede's mind, was where the battle was actually won, even though the physical events occurred elsewhere?

'Heavenfield' is clearly not a battle that can yet be located for archaeological purposes; it is a question whether any other important battle in England during the early middle ages can be located more closely. However, while discussion thus far has been tinged with pessimism, recent interdisciplinary work in Wessex offers a methodological way forward. This is now summarised.

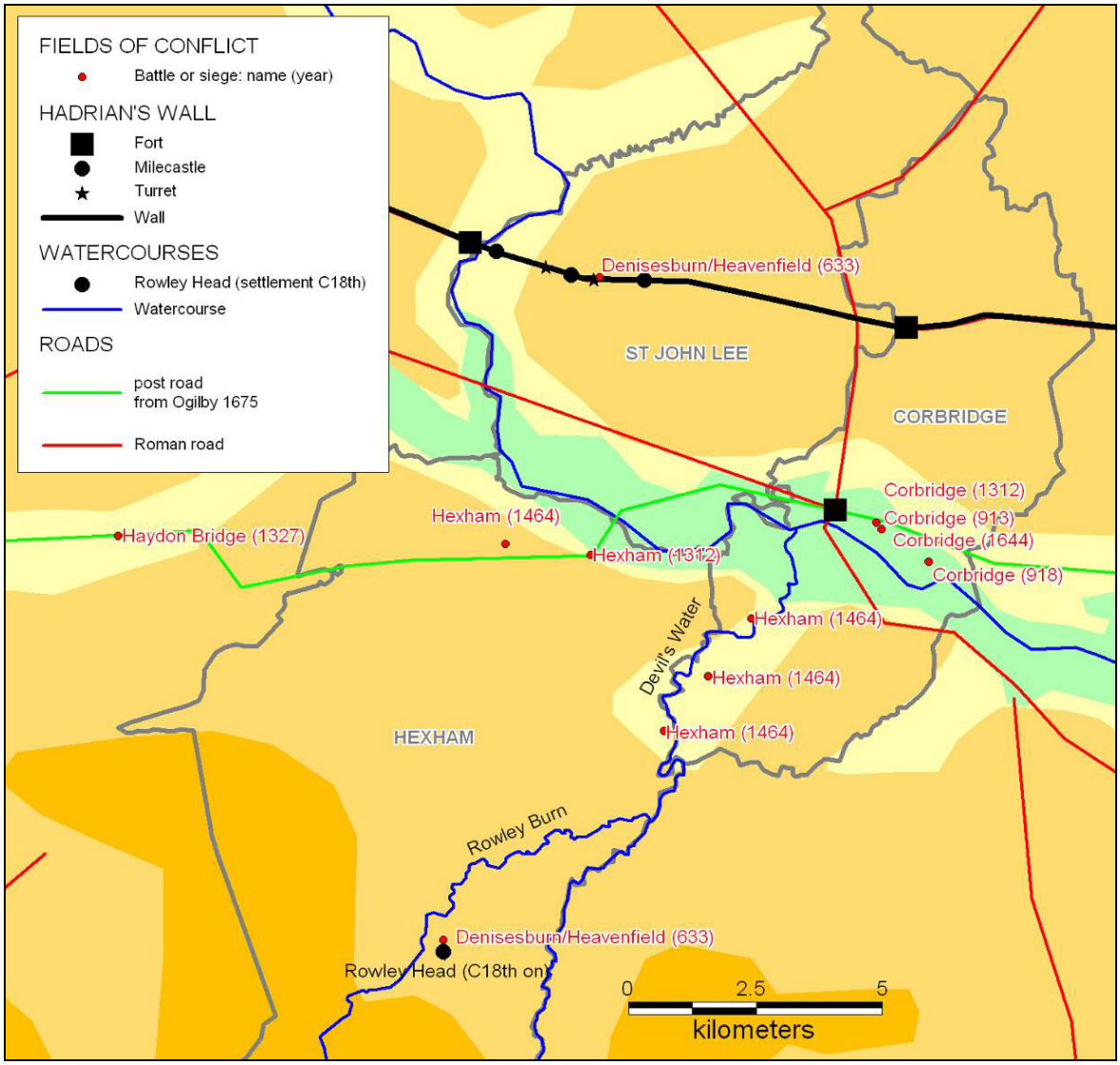

Figure 23: Battle of Heavenfield or Denisesburn: of the alternative sites for the battle, the one adjacent to Hadrian's Wall is now known to be incorrect. The other lies somewhere in the vicinity of Rowley Burn

On locating early medieval battlefields[118]

Although primary textual sources for the early medieval period give only a limited amount of information about battles, a number of strands of evidence can be used to identify early battlefield locations and aspects of the historic terrain. These include:

[118] This section paraphrases the forthcoming work of J Baker, S Brookes, D Parsons and A Reynolds, *Beyond the Burghal Hidage*. We are extremely grateful for their contribution.

- The nature of the action (e.g. set-piece battle, raid, skirmish)
- The location of communications (e.g. roads, signalling systems, mustering points)
- Topography (geology, relief, and vegetation)
- Other monuments (e.g. fortifications, meeting places)

Two main forms of battle can be discerned from primary sources. Most of the battles are characterised by swift raids into enemy territory for the purpose of inflicting damage and capturing booty. A second – less common – form of battle is large set-piece confrontations. The purpose of these was to force the opponent into submission – by force if necessary - which was indicated through the giving of hostages and tribute. Both forms of engagement rest on a number of conditions which are potentially reconstructible by archaeology.

For the second category of battle in particular the physical make-up of the landscape is highly significant. Firstly, gathering large forces together, and coordinating confrontations was very difficult. There are indications in the sources that **places of assembly** were an integral part of these battles, whether this meant the gathering together of friendly forces as part of a local or national mobilization, the meeting of hostile forces on the field of battle, or the coming together of opposing forces for the drawing up of a treaty. From first summons, through local and regional mobilization, to final arrival at the battlefield, this demanded a complex level of organisation and a pre-arranged network of assembly-places. The origins of the hundredal system are unclear, but it is a natural supposition that the mobilization of an army took advantage of existing governmental structures, with forces gathering first at local moots, then regional meeting places, before assembling with the rest of the *fyrd* at a predetermined spot. The meeting at *Swinbeorg*, mentioned in Alfred's will, is traditionally taken to refer to a mustering at the assembly-place of Swanborough hundred (W) prior to the Battle of Ashdown in 871. In 878, before the battle of Edington, Alfred stopped first at *Ecgbryhtesstane* 'Egbert's Stone' – on the borders of Somerset, Dorset and Wiltshire and perhaps an established focal point – then at Iley Oak, the meeting-place of the hundreds of Warminster and Heytesbury. The battle site itself is near the probable meeting-place of the hundred of Whorwellsdown, in the vicinity of Cresswell Down Farm.

Perhaps the most essential feature of all meeting-places, whether for mustering, diplomacy or battle, was their **accessibility**. In many instances, this meant the proximity of major roads or waterways, but it could equally mean their location on the borderland

between two hostile territories. The place-names of numerous meeting places give quite precise topographical information which can potentially be used to define the location of battlefields. The place-name, OE *ēa-gemōt* 'junction of streams', in reference to the confluence of the Lowther with the effluent of Ullswater lies beside the line of the old Roman road from Brough to Carlisle. Another place-name compound that may be relevant to a discussion of mustering is OE *here-feld* 'army field'. These are often very close to major boundaries.

Halsall suggests that the limited number of **campaigning routes** and the basic nature of medieval scouting made selection of a battlefield a question of convenience as much as tactical choice, noting that twenty-two of the twenty-six located Anglo-Saxon battlefields of the period c.600 to c.850, were at river-crossings or significant landmarks.[119] He nevertheless points to examples of armies stationing themselves at significant legal or administrative centres, perhaps as a form of challenge to the opposition. The activities of the Vikings at Cuckhamsley in 1006 might perhaps be viewed in this light. The Viking occupation of a shire meeting-place on a prehistoric monument was perhaps a confident (and ultimately successful) challenge to the West Saxon levies to meet them in battle.

The Cuckhamsely incident demonstrates that distinctive **topographical features** appear to have been highly relevant. The high number of later Anglo-Saxon military engagements with place-names in *ford* – Fulford, Stamford Bridge, Brentford, Thetford, Hereford and Castleford – suggests that river-crossings were still often the sites of battles, and by extension, that accessibility was of prime importance. This is hardly surprising, but it is notable that many battles fought between c.850 and 1066 were in close proximity to Anglo-Saxon fortified sites, Viking encampments, or prehistoric monuments – Hastings, Wilton, Maldon, Hereford, Cynuit/Congresbury, Thetford and Reading – many of which might be expected to have been focal points for the mustering of troops. They were also, of course, notable landmarks and therefore perhaps useful for armies attempting to locate each other. For the purposes of mustering and engagement in battle, accessibility would need to be combined with ease of identification, especially in cases where the *fyrd* was operating outside its own shire. In many cases, shire meeting-places were marked by distinctive landscape features, identifiable through fieldwork.

[119] Guy Halsall, *Warfare and society in the barbarian west, 450-900*, 2003, 156

If established meeting-places were convenient general locators for battle, the specific choice of battle site was subject to other considerations of **terrain**. Although contemporary sources seem relatively unconcerned with the tactical and spatial details of battle, recording only the general locations and the outcomes, terrain was obviously an important factor in the battles between Anglo-Saxons and invading armies, influencing the choice of landing places and the deployment of troops. The location of several battles involving the 'seizure of ships' are constrained by topographical factors that include terrestrial and submarine contours; harbours; navigable waterways; extent of the foreshore, marsh or sandbars; extent of the inter-tidal zone; the tidal head for each creek and river; deep water channels; the extent of artificial harbour works; and access points – all of which are potentially accessible archaeologically. In other cases such features as marsh, sharp relief, woodland or causeways might also play a determining role in the identification of battlefields.

It thus appears that at least some early medieval battlefields are potentially accessible to landscape archaeology, but that this requires a detailed knowledge of the civil administrative structure of middle and late Anglo-Saxon kingdoms, early medieval logistics, and topographical conditions. It is a conclusion of the research by Baker, Brookes *et al* that these various evidences can be confidently reconstructed and used in combination to locate battlefields on the ground. The data in their forthcoming study *Anglo-Saxon Civil Defence in the Viking Age* should be assessed to identify sites for which this potential can be explored.

Later Medieval warfare: 1066-1500

There are 31 later medieval actions on the database which have been classified as battles. A further 17 are classified as possible battles where the scale or nature of the action is to some degree unclear, with some probably sieges and others perhaps no more than skirmishes. The possible battles vary between events such as Bramham Moor and Fornham, where more detailed study may lead to reclassification as a battle, through to events such a Clitheroe where there is little more than a vague reference. The present analysis focuses on the 31 certain battles, though it can be seen that in the earlier part of the period the uncertain actions could have a significant impact on the number of sites. Even so, the reality is that the detail available is often so poor that there is little chance that the site could be located even if it survives undeveloped. Sites of lesser actions are far more common, and require a level of enhancement of the database that has not yet been possible at a national scale. This is well shown by Cumbria, a sample area that was researched to a higher intensity.

Action name	Year	Type of action	War type	War
Hastings	1066	battle	international	Norman Conquest
Fulford	1066	battle	international	Norman Conquest
Stamford Bridge	1066	battle	international	Norman Conquest
Southwark	*1066*	*battle?*	*international*	*Norman Conquest*
Hereford	*1067*	*battle?*	*international*	*Anglo-Welsh*
York	*1069*	*battle?*	*international*	*Norman Conquest*
Durham	*1069*	*battle?*	*international*	*Norman Conquest*
York	*1069*	*siege/battle ?*	*international*	*Norman Conquest*
Alnwick I	*1093*	*battle?*	*international*	*Anglo-Scottish*
Northallerton	1138	battle	international	Anglo-Scottish
Clitheroe	*1138*	*battle?*	*international*	*Anglo-Scottish*
Lincoln I	1141	battle	civil war	Civil War of Stephen & Matilda
Stockbridge	*1141*	*battle?*	*civil war*	*Civil War of Stephen & Matilda*
Salisbury	*1143*	*battle?*	*civil war*	*Civil War of Stephen & Matilda*
Wilton	*1143*	*battle?*	*civil war*	*Civil War of Stephen & Matilda*
Wichum	*1146*	*battle?*	*international*	*Anglo-Welsh*
Fornham St.Genevieve	*1173*	*battle?*	*civil war*	
Alnwick II	*1174*	*siege/battle*	*international*	*Anglo-Scottish*

		?		
Lincoln II	1217	battle	civil war	First Baron's War
Lewes	1264	battle	civil war	Barons' Revolt 1258-1267
Evesham	1265	battle	civil war	Barons' Revolt 1258-1267
Chesterfield	*1266*	*battle?*	*civil war*	*Barons' Revolt 1258-1267*
Myton	1319	battle	international	1st Scots War of Independence
Boroughbridge	1322	battle	civil war	
Halidon Hill	1333	battle	International	2nd Scots War of Independence
Neville's Cross	1346	battle	international	2nd Scots War of Independence
Otterburn	1388	battle	international	unclassified
Homildon Hill	1402	battle	international	unclassified
Shrewsbury	1403	battle	civil war	Percy rebellion
Woodbury Hill	*1405*	*battle?*	*civil war*	*Glyndwr Revolt 1400-1408*
Bramham Moor	*1408*	*battle?*	*civil war*	*Percy Rebellion*
Piper Dene	1435	battle	international	Anglo-Scottish
St Albans I	1455	battle	civil war	Wars of the Roses
Blore Heath	1459	battle	civil war	Wars of the Roses
Wakefield	1460	battle	civil war	Wars of the Roses
Northampton	1460	battle	civil war	Wars of the Roses
Mortimer's Cross	1461	battle	civil war	Wars of the Roses
St Albans II	1461	battle	civil war	Wars of the Roses
Towton	1461	battle	civil war	Wars of the Roses
Hexham	1464	battle	civil war	Wars of the Roses
Hedgeley Moor	1464	battle	civil war	Wars of the Roses
Edgcote	1469	battle	civil war	Wars of the Roses
Empingham	1470	battle	civil war	Wars of the Roses
Tewkesbury	1471	battle	civil war	Wars of the Roses
Barnet	1471	battle	civil war	Wars of the Roses
Bosworth	1485	battle	civil war	Wars of the Roses
Stoke Field	1487	battle	civil war	Wars of the Roses
Deal Beach	*1495*	*battle?*	*civil war*	*Perkin Warbeck's Rebellion*
Blackheath	*1497*	*battle?*	*civil war*	*Cornish Revolt*

The chronological spread of battles across the British Isles reflects the rarity of these sites compared to most other types of archaeological site. The addition even of a small number of further actions to the list could thus be significant. The list also shows how important it is, in this period especially, for research to be conducted on a European scale. Different countries underwent major phases of warfare at different times, one such grouping of battles being those of the Wars of the Roses, which may provide a valuable range of physical evidence for warfare at the eve of the transition to firearms. Other stages in the development of warfare may be similarly reflected at other periods and in other parts of Europe. An integrated international approach, already demonstrated a century ago for

military history by authors such as Delbruck and Oman, is the only way to gain a consistent chronological perspective of the physical evidence.[120]

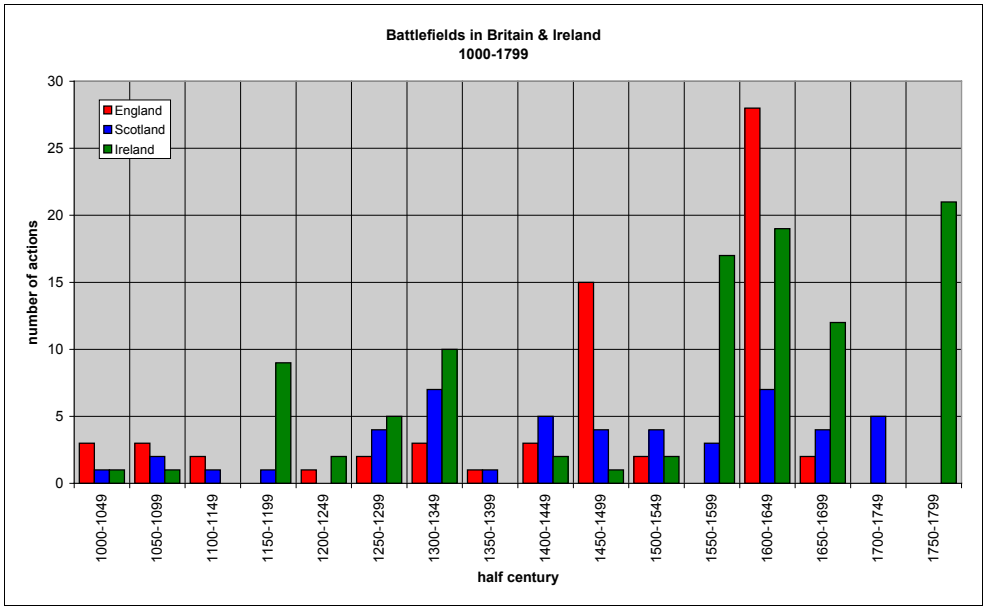

Figure 24: Battles in England, Scotland and Ireland 1066 - 1799

The period has been defined from1066, simply because the first battles to be well located by written records are those of 1066, notably Hastings. From then onwards the documentary record tends to improve, though only a handful of battles before the 17th century matches the detail available for Hastings. However, while the sites of many later medieval battles can be identified in general terms, uncertainty persists about the detailed placing of actions within the landscape.

Where information about numbers taking part exists, the figures typically vary widely; medieval chronicles often give numbers far greater than seen in well- documented later battles, or indeed in contemporary medieval battles fought by English armies on the continent.[121] For most battles, detail is provided by a few sources. Rarely are these first hand accounts; very often, the written records are distant in both time and space from the events themselves. Not surprisingly, then, topographical detail in those accounts is often sparse.

[120] Delbruck, 1923; Oman, 1898
[121] Information from Anne Curry

The end date (1500) has also been chosen for practical reasons, for although it does not correlate exactly with the first introduction of firearms to the battlefield, in a European context it is close to the critical turning point when the ferrous arrowhead or crossbow bolt begins to give way to the lead bullet, with all the implications that flow from this for archaeological investigation.

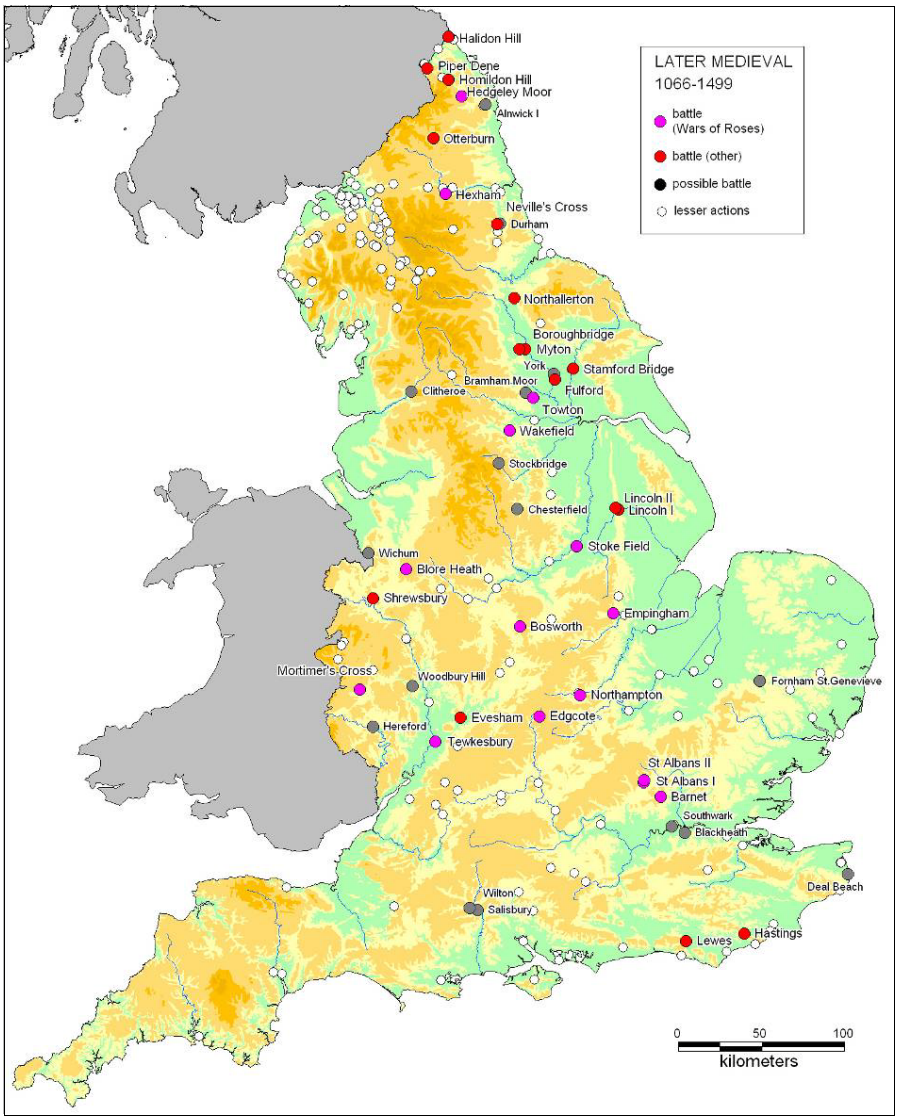

Figure 25: Later medieval battlefields and other actions

Later medieval battles can be divided into three main groups. Fifteen fall during the Wars of the Roses (1455-1487), a period of discontinuous warfare that was dominated by brief periods of intense action and by battles rather than sieges. Scottish invasions along

the eastern corridor, penetrating as far south as Myton, just 20km from York, account for a further seven battles. The third group comprises the three great actions of 1066.

Other battles relate to various civil wars, including those of Stephen and Matilda (Lincoln I) and of Simon de Montfort (Lewes and Evesham). Given the small number of battles before 1455 each one is potentially of high importance as representing important aspects of warfare of its period. Thus Stamford Bridge and Fulford are the only two reasonably securely located battlefields where Danish armies were engaged, and such actions might be expected to differ significantly from that at Hastings, and later battles, where both the technology and tactics change in many ways. If there is battle archaeology on pre-Norman battlefields then these two sites may provide an important insight into the character of the evidence which could then be applied to the investigation of the many Anglo-Danish battles of the preceding two centuries, none of which has yet been securely located.

This is an issue with other important tactical transformations. Thus dominance of the heavy cavalry charge is represented by only a handful of battles, such as Lewes and Evesham. It is true that after the devastating defeat at Bannockburn the reversion to action where almost the whole army dismounted to fight, but now supported by the devastating arrowstorm, is represented by several battles from Halidon Hill onwards, but it is really to northern France that one must look for the main evidence for its use.

A related factor that needs to be taken into account is that, the Wars of the Roses aside, siege warfare was far more common than open battle. This means that concentration purely on battles will give a biased view of warfare in the period, and very possibly miss or misinterpret important aspects of it. Comparison of the number of battles with the number of sieges so far recorded on the database, despite the very incomplete nature of the data on sieges, demonstrates this:

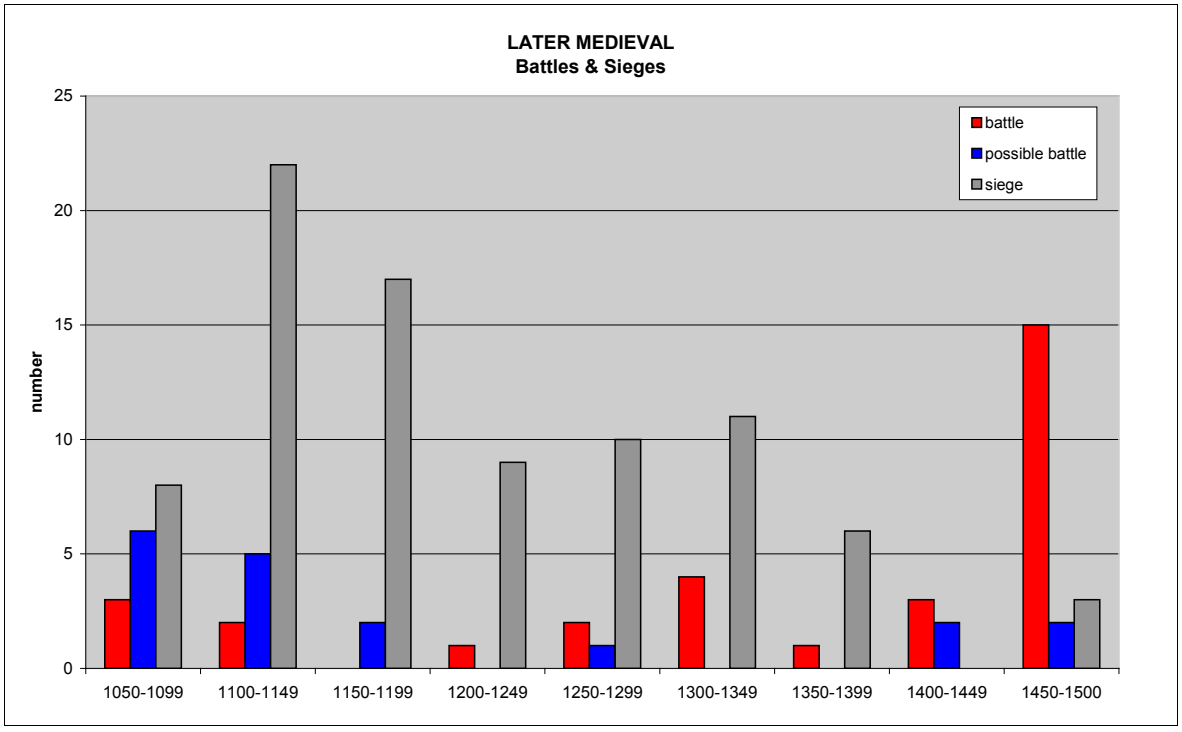

Figure 26: Later medieval battles and sieges

Physical evidence for medieval sieges, as with every other aspect of the archaeology of medieval fields of conflict, is probably in many aspects far more ephemeral than that for the early modern period. Impact scars such as those discussed below for Early Modern sites are not to be expected on a medieval battlefield but it is possible that assaults on fortified positions using siege engines such as the mangonel or trebuchet may have left impact scars. No example has been identified in the current assessment, but then, medieval siege sites have not been prioritised for examination. Large calibre stone balls from the major siege of Kenilworth castle in 1266 have been recovered from the site, and are now displayed there, but no impact scars are reported. The potential presence of impact scars on medieval masonry has large implications for strategies of conservation management and repair.

Figure 27: One of several large stone balls from Kenilworth Castle, presumed to be trebuchet missiles fired during the 1266 siege. 130mm scale

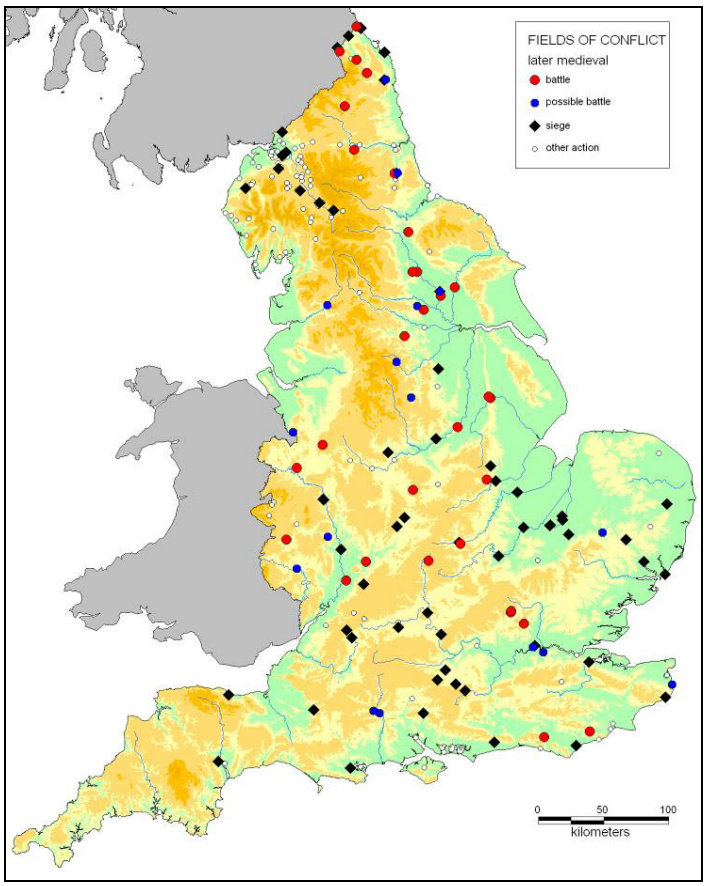

Figure 28: Later medieval battles and sieges

The Anglo-Scottish frontier is taken here to illustrate the depth of evidence below the level of the battle that can exist and of which account needs to be taken in the study of medieval warfare. It also demonstrates the need to work at an international level,

integrating evidence of actions fought by English armies in Scotland as well as those of Scottish armies in England.

This was a heavily fortified region, with large garrisons and supply bases in Carlisle, Berwick and Newcastle, other great castles like Norham, Bamburgh and Prudhoe, and then a vast number of lesser defended pele towers.[122]

Conflict was on a number of levels. At the lowest, and grossly under-represented in our data, was the raid. Raids extended from localised cattle rustling through to large military incursions. The latter could end in substantial engagement, which explains several border battles such as Piper's Dene. Greater incursions could involve substantial sieges – not practicable to identify here – and long distance sorties. Some culminated in major battles, as at Otterburn where a Scottish force was engaged during retreat along one of several major cross-border routes, or at Northallerton where an opposing English force intercepted the enemy to halt their advance.

While the risk of the Scots taking control of the border regions was a real possibility, with Carlisle and Berwick changing hands several times, it was only the English invasions of Scotland, particularly under Edward I, that had a realistic potential for conquest. While castles such as Stirling, in the heartland of Scottish power in the lowland regions, lay less than 150km from Berwick or Carlisle, such a distance would not bring a Scottish army even to the gates of York.

[122] Rowland, 1987; Ryder, 2004, with further references

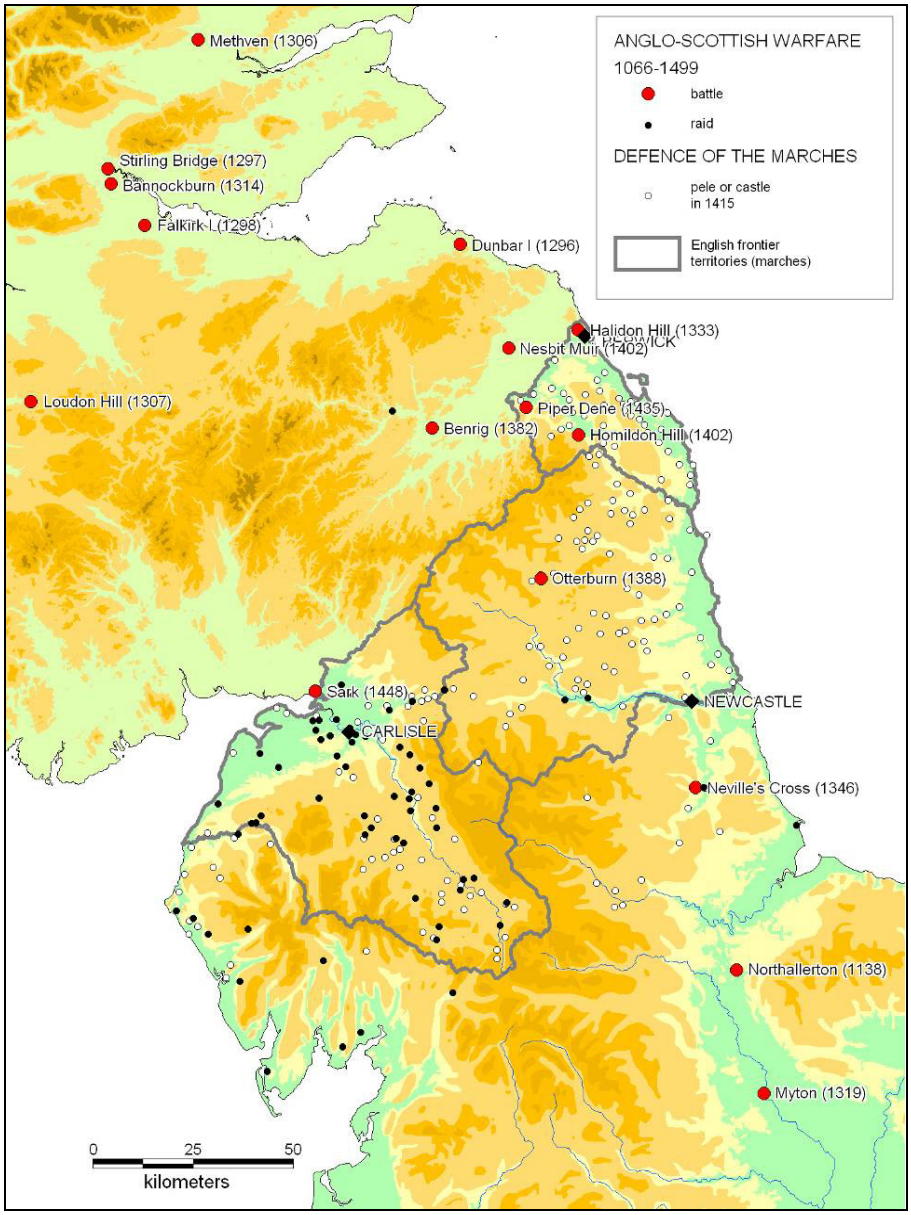

Figure 29: Warfare on the Anglo-Scottish border showing battles on both sides of the border. Fortified sites are only depicted in England. Cumbrian data are enhanced, with consequent greater representation of raids by Scottish forces

Of the 31 medieval battles just 19 are Registered. A further three (St Albans I & II, and Wakefield) were assessed but excluded from the Register because they were too heavily developed, and four were omitted because their sites were too poorly located (Mortimer's Cross, Hexham, Edgcote, Empingham). Two – Lincoln I and Hedgeley Moor – included in the initial assessment were excluded at an early stage. Lincoln I has alternative sites, one of which is fully developed but the other largely intact; Hedgeley Moor is

undeveloped. Another three appear not to have been considered: Fulford is not securely located but the probable site is heavily developed (though until recently a substantial area remained intact and with a high potential for investigation); Lincoln II is wholly developed; it is unclear why Piper Dene was excluded, given the numbers supposedly engaged and the fact that the site is undeveloped. Of the possible battles only Bramham Moor was assessed for the Register but was excluded at an early stage for unknown reasons. Of the remainder most are poorly located and some likely to be heavily developed, but a number appear to be worth re-examination, including Fornham St.Genevieve and Alnwick I.

Uncertainty about exactly where medieval battles took place is often not evident from historical studies or the Register reports, which normally consider in depth the problems of location. There are also cases where more recent information has cast doubt on locations hitherto assumed to be secure. This is most clearly demonstrated for Barnet, reviewed below, where three distinct sites are now in contention thanks to detailed documentary research on the historic terrain and the appearance of the first possible faint traces of battle archaeology.

Unless unregistered battlefields are located with sufficient accuracy to be added to the Register, and the precision of existing Registered areas is confirmed or refined, then medieval battlefields will never be effectively managed as a cultural resource. However, as has been shown over the 12 years since the Register was compiled, independent research to resolve the problems of location is unlikely. Before any attempt is made to review all but the most easily located of unregistered sites, the first need is for the refinement of methodology for medieval battlefield investigation.

Historic terrain

A great deal relating to the interpretation of later medieval battlefields depends upon two things: the numbers of troops present, and the tactical deployments that were employed. It is from these that the width of the frontages can be determined. The only military manual known to have been consulted during the period was that of Vegetius, from early 5th century Byzantium, who provided a conspectus of key aspects of Roman classical military practice.[123] This was reworked by several medieval authors and used by military commanders throughout the period. However, the various versions contain little that assist

[123] Vegetius, *Epitome of military science*, ed. Milner, 1993

understanding of the apparently very different tactical formations that were in use during the later Middle Ages. In result, there is debate about the forms that battle arrays took at different times. It may be that archaeology will settle this.

In some cases, more sophisticated analysis of historic terrain will enable the location of deployments and action. Although most information in written records is limited and rarely first hand, there are sites for which the topographical detail is highly specific, and where the terrain is otherwise distinctive then there is scope for pinpointing sites. Where the extent of woodland clearance, drainage of fen or enclosure of open field or other open land is the central issue then problems can arise over their extent and dating in relation to a battle.

Elsewhere, neither of these requirements is fulfilled and the battle may be located no closer than to a broad area. Improvements in knowledge may sometimes demand revisions of long-held assumptions. Hence at Stamford Bridge the mapping of the Roman road system, as part of the Vale of York project of the National Mapping Programme, has demonstrated that the Roman river crossing was a considerable distance to the south west of the normally accepted location. This may have important implications for the location and geographical context of the Stamford Bridge battlefield, but it is likely that the Roman crossing had long since been abandoned and replaced by a separate crossing, the Stam–ford by 1066.[124] The repercussions of the investigation of historic terrain can be seen most clearly from the continuing travels of Barnet battlefield.

Barnet

On the 13th April 1471 a Lancastrian army of some 15,000 troops under the Earl of Warwick took up position about a mile north of Barnet. Edward VI arrived at Barnet that evening with a force of 10,000-12,000, and in the dark he deployed to the south of the

[124] Bewley, 2003

Lancastrians, very close to Warwick's lines, in a marshy valley. As a result the artillery bombardment that Warwick launched passed over their heads. In deep mist the next morning the two armies advanced but with the Yorkist left having deployed short of the Lancastrian right, whilst their right extended past the Lancastrian left flank. The Lancastrians quickly took advantage on their right flank, the troops under the Earl of Oxford pushing back the Yorkist left, and driving them from the field. The Yorkists fared better on their right flank where they successfully pushed the Lancastrian left flank back towards the centre. The battle was fiercest in the centre and as the Lancastrian troops faltered Edward launched his reserve. The Lancastrians broke and fled.

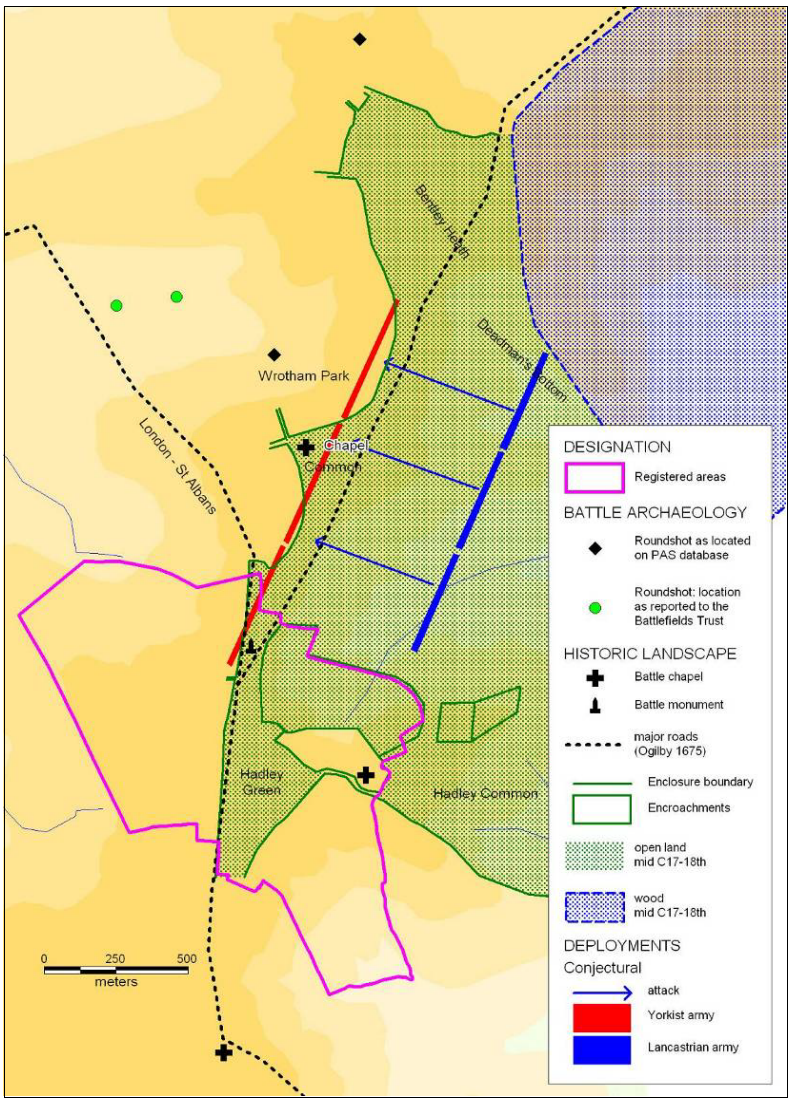

Figure 30: Barnet: conflicting evidence for location and extent

The location of the battlefield is disputed. From at least the early17th through to the 19th century it had been depicted on maps to the north of Monken Hadley. William Smith's 1602 map of Hertfordshire shows the main road system and is very specific in locating the action of the battle, with the two armies, one on either side of the road branching north east from the Great North Road towards Potters Bar. In the mid 18th century Taylor shows a similar location and appears to describe this as Gladmore Heath.[125] The monument to the battle, constructed in the late 18th century, lay at the southern edge of this area. This location was accepted by Barrett and other 19th century authors.[126] However, by 1898 when Oman discussed the battle the site had shifted to the ground between Monken Hadley and Chipping Barnet, an interpretation followed and developed by Burne, providing the site which is now Registered.[127] However, research by Warren has located the battle chapel at Barnet and shown that it stood on the very western part of Enfield Chase, known at Enclosure in 1777 as South Mimms Common. This is exactly where the 17th- and 18th-century sources placed the battle.

A simplified reconstruction of the historic landscape is presented here, derived from historic map evidence: the extent of Enfield Chase is defined on an unimplemented enclosure proposal map of 1656 with further detail before enclosure provided by Rocque's county map of 1754.[128] A far more detailed analysis, as yet unpublished, has been undertaken by Warren, though there may still be the need for an accurate reworking in map form of the evidence he has amassed.[129]

The combined evidence has led to a re-interpretation of the possible location of the deployments and action with a conjectural interpretation presented here, showing the deployments some distance to the north of the Registered area in the traditional site adjacent to the chapel site. Unfortunately the first ephemeral evidence of battle archaeology, comprising two lead roundshot (tested for but lacking iron cores seen at Flodden and Pinkie) have been found with a Burgundian jetton and a medieval purse bar.[130] This site lies in the small valley to the north of the chapel site, presenting a third possible location for the battle which also fits the few topographical details we have for the

[125] Taylor's Map of Middlesex, 1759
[126] Barrett, 1896
[127] Burne, 1950; National Army Museum, 1995b
[128] Foard, 2004, http://www.battlefieldstrust.com/media/573.pdf
[129] Information from Brian Warren; Warren, 2002
[130] Information from Andrew Coulston, Hendon & District Archaeological Society. The metal detectorist states that the incorrect locations were reported to the Portable Antiquities Scheme.

battle. In the absence of extensive systematic survey for the battle archaeology, compounded by the general problems for investigation of medieval battle archaeology, it is currently not possible to define the exact location or extent of Barnet battlefield.

Bosworth

Even when the full range of techniques of historic landscape reconstruction is applied and written accounts of military events are integrated, a medieval battlefield may yet remain unlocated.

The battle of Bosworth, originally known as the battle of Redemore, has disputed sites ranging over nearly 10 square kilometres, with a further site some 6km away.[131] A research project, funded by the HLF as part of the rejuvenation of the Bosworth battlefield interpretive centre, is investigating the battle in an attempt to locate it.[132] The survey, scheduled for completion in August 2008, has had considerable success in reconstructing the historic terrain; however, the project shows how limitations in the documentary record for the historic landscape can make it impossible to say with certainty the neighbourhood of battle might lie.

Historical research has demonstrated that Redemore lay, at least in part, in Dadlington township: *'They will that Redmore dyke should be scoured before All Saints on pain of 12d.'*[133] This record, from 45 years after the battle confirms that at the time of the battle Redmore lay within Dadlington lordship, or possibly in lands where Dadlington shared common rights, for Foss had noted a 13th century document referring to Redmore in Dadlington. The reference in 1530 to the dyke also suggests that the 'pallius' or marsh referred to by Polydore Virgil had by then been drained. The other evidence presented by Foss has also been confirmed, namely that the chantry established under Henry VIII in memory of the dead of Bosworth, to which the bones were to be moved, lay in Dadlington, so demonstrating that the main burial sites were in the chapelry of Dadlington.

Jones and Austin argue, in support of a site 6km away, that the Redmore name was given to the battle from the location of mass graves, not the battlefield, because the bodies were carried there with the victorious army as it marched towards Leicester. This can be dismissed, as the battle name is recorded in York within 24 hours of the battle, and

[131] Foard, 2004b
[132] Foard, 2004a
[133] Dadlington Court Roll: 30 May1530, LRO 2D71/I/56

when the rider who carried the news departed the bodies could not yet have been in the ground. In addition, there is the fact that no documented case is known from any battle in England of such large scale transfer of bodies over such a distance for burial.

In the absence of a specific location for Redmore from the documents it has been necessary to ascertain where marsh could and could not have existed in Dadlington and its environs. The marsh mentioned by the historian Virgil is the only topographical detail other than Redmore that is likely to be identifiable, for in this landscape marsh or fen are not common. Virgil records that: *'There was a marsh betwixt both hosts, which Henry of purpose left on the right hand, that it might serve his men instead of a fortress, by the doing thereof also he left the sun upon his back…'*

The enclosed and open field systems at Bosworth have been reconstructed from a combination of documentary research and archaeological fieldwork to establish what land was not covered by open field furlongs, and soils survey has been undertaken to identify which soils developed in a waterlogged context. These two data sets were found to be closely complementary, with only a small overlap of furlongs over areas of alluvially derived soils. This has shown that Ambion Hill, where the battle has been placed since at least the 1770s, was covered by furlongs while the narrow floors of the adjacent streams where no furlongs existed had no evidence of peat deposits. The conclusion of the specialists is that there never has been a marsh on or in close proximity to Ambion Hill. There were, however, substantial areas to the south west, partly in Dadlington, where there was high potential for marsh. Intensive augering was undertaken to complement sampling undertaken in the soils survey. This analysis was complemented by a fieldnames search, which developed Foss's assessment, and shows that only two areas had clear place-name evidence of fen conditions within the medieval period, although several other scattered 'bog' and 'moor' names existed elsewhere in Dadlington and Stoke Golding. More intensive augering in the target areas then identified just two locations with peat deposits which correlated with the fen names. One was shown to be so small as to be very unlikely to answer to the marsh in Virgil. The other, on Fen Meadow, proved to be more extensive, being some 90m across. C^{14} dating has shown that peat accumulation proceeded from the late glacial through to the 7th or 8th century AD but it is believed that the area would have remained waterlogged until drainage took place.

Thus in the whole only one candidate site has been located that fits the description in the primary accounts, but in the absence of a location for the Redmore name it is not possible to claim certainty. Archaeology is left as the arbiter.

Battle archaeology

To resolve the remaining Bosworth problems an intensive metal detecting has been undertaken. The survey used a strategy based on the interpretation of the Towton results current in 2005 and designed with the advice of the Towton team. The first stage was a systematic survey to seek a concentration of copper alloy artefacts comparable to that at Towton. One this was identified, an intensive all-metal detecting survey to seek arrowheads would follow.

The first stage of survey has failed to recover an artefact distribution comparable to Towton. This posed a problem, as one interpretation could be that the site lay elsewhere. Such a conclusion demanded comparative data from other battlefields of the period where there is little doubt as to the general location. Thus fieldwork was undertaken at Flodden, where the accuracy of the battlefield location was confirmed by recovery of two lead roundshot of typical 16th century form, and at Shrewsbury where the battlefield church provides a clear focus. This work returned similar negative results to the more intensive but localised detecting previously undertaken on both sites.[134] Such results correlate well with the very low density of copper alloy artefacts from early modern battlefields, where the bullets demonstrate clearly the focus of different elements of the action, although the status of the troops engaged and the nature of their equipping may be so different from that of a later medieval battle as not to represent a valid comparison. Before 1500, with the possible exception of St Albans II (now lost to development and mineral extraction) and Barnet, where companies of Burgundian handgunners were deployed, there were few firearms and thus few lead munitions to be deposited on the battlefield.

Two decades of ihe intensive metal detecting by Richardson at Towton has produced just one roundshot from artillery or lead ball from small arms fire, a composite lead/iron ball which weighs 225g. The other bullets recovered at Towton appear consistent with background noise from later sporting activity, as seen elsewhere.[135] If Barnet can be securely located then it may offer a unique potential in England of a battle where one

[134] Pollard & Oliver, 2003; Pollard & Oliver, 2002
[135] Foard, 2008a

component of the battle archaeology closely linked to part of the action will survive, the lead bullets, complemented by small numbers of small calibre lead roundshot. In one sense, therefore, Barnet can be grouped with the battlefields of the transitional period discussed below, with all the potential they offer for the investigation of lead alongside ferrous and copper alloy artefacts, giving a secure location for the latter two classes to be searched for. However, this means that for all other 15th century battlefields lead munitions are unlikely to provide an indicator as to where the action took place.

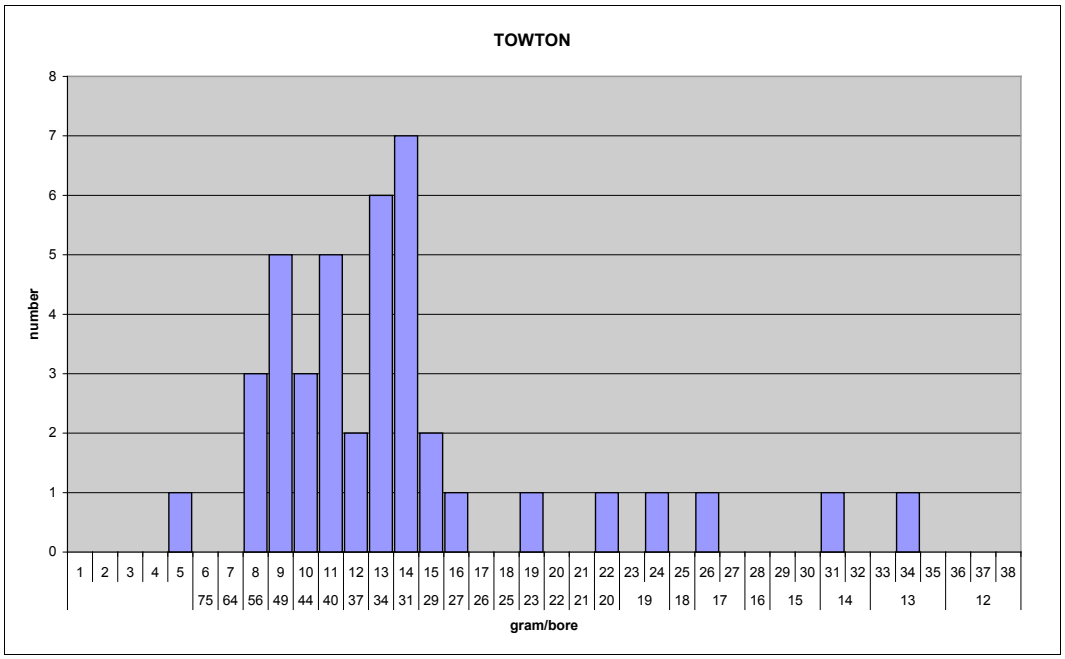

Figure 31: Towton: calibre graph for all smaller calibre lead munitions, which give a signature compatible with background noise deriving from sporting activity in later centuries

A further possible explanation for the failure to recover copper alloy artefacts comparable to those seen at Towton may be one of survey intensity. Systematic monitoring of data collection at Edgehill has demonstrated that on that site with an experienced team an intensity of survey of 10m transects with a reconnaissance speed of c.8-12 metres per minute was only just adequate to identify case shot locations, and that 2.5m transects were the minimum for tracing the orientation of the case shot scatters.[136] While absolute densities of artefacts will very between battlefields, and leaving aside the problem of depletion caused by previous retrieval of artefacts, the Edgehill data provide an

[136] Foard, 2008a

order of scale by which to compare surveys on other 17th century battlefields. In the absence of similar data from Towton, or indeed any other medieval battlefield, we cannot know whether 10m or even 2.5m transect survey is sufficient to recover a distinctive signature.

On present evidence, moreover, it would appear that Towton's high density battle-related copper alloy assemblage is exceptional. If so, it is not alone: a similar conclusion on the investigation of another medieval battlefield has been independently arrived at through field investigations in Sweden.[137] The Bosworth project has now been forced into intensive all-metal detecting to find ferrous arrowheads and other ferrous artefacts. All-metal detecting is far more time consuming because of the vast quantity of ferrous junk that lies in most fields in England, with the core area at Towton producing something of the order of 40 pieces of junk to every arrowhead. Such survey is only practicable for a tightly constrained site, not a wide landscape, and so is only practicable for the prime location now identified at Bosworth, where analysis has shown the soil chemistry is less favourable to the preservation of ferrous artefacts than at Towton.

The difficulties encountered at Bosworth raise questions about the character, significance and representativity of the evidence from Towton (discussed further below), and cast doubt on the potential for investigating medieval battlefields elsewhere in England. In particular, it is coming to appear likely that medieval battle archaeology alone may be insufficient to prove, and therefore disprove, a hypothesis about battle location.

This has additional implications, for in land-use planning there is a danger that inappropriate conclusions will be drawn from a failure to recover battle archaeology from a specific area of a medieval battlefield. It may be taken as demonstrating it to be the wrong site, or even that the absence of battle archaeology demonstrates that the site does not have conservation importance. This is seen to some degree at Fulford, where the absence of a template for what battle archaeology to expect, and hence for how to assess it, was a major stumbling block.[138]

[137] In formation from Bo Knarstrom

[138] Artefacts of the relevant period recovered from Fulford do not appear to have an obvious military character, including, for example, metalworking debris. It is not clear whether this is because this was the wrong location or that site conditions of deposition, soil chemistry and land use history meant that no significant archaeology survived. Information from Charles Jones

Towton

To date, Towton (1461) has provided the only substantial medieval battlefield assemblage to have been found in the UK. Towton is thus doubly significant – in its own right, and as the lens through which we are tempted to view everything else.

To assist here, additional work has been undertaken by David Hall on reconstruction of the historic terrain. Initially an analysis was made of the Enclosure Award and 19th century map for Saxton, defining the areas of ancient enclosure with their names, approximate extents and names of the Great Fields or the land then being enclosed. Hall then reconstructed Towton's open field system and that of the greater part of Saxton township.[139] This included the use of field survey for headlands, slades, and surviving ridge and furrow, all complemented by examination of 1940s RAF vertical air photos in the NMR, and interpretation from the 1st edition Ordnance Survey six inch mapping and the Tithe Map together with the information from the Enclosure analysis. Unfortunately, a rapid search in the Borthwick Institute and other Yorkshire archives did not produce terriers or related documents that would provide information on the medieval furlong names and land use. However, a limited number of potential sources remain unconsulted.[140] Hall's work shows that the vast majority of both townships were under open field cultivation at least by c.1300, although it is not possible to say how much of this land, if any, might have reverted to pasture by 1461.

On the eastern edge there is no evidence for open field furlongs – a lacuna that coincides with an area of silt and clay geology associated with several carr names where woods existed in the 19th century. This ground was undoubtedly boggy in the later Middle Ages, and possibly also partly under trees.[141] On the western periphery, likewise, there were no furlongs on the very steepest land falling into the dale of the Cock Beck and the deepest parts of Towton Dale. The area on the adjacent plateau, which some authors have suggested was wooded in 1461, is according to Hall's work highly unlikely to have been wooded at that time, any woodland here being limited to the steepest slopes.

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[139] This followed methodology applied in the Bosworth project and in Hall's long term research in Northamptonshire: Foard *et al*, 2005; Hall, 1995

[140] The glebe terriers for Saxton in the Borthwick are an augmentation of Saxton with land in Collingham. Further records identified but not consulted include Court Rolls for Saxton 1463-1465 and 1480, West Yorkshire Archives Service, Leeds: Gascoigne GC/M4/1

[141] Saxton-cum-Scarthingwell, 1849 Tithe map (Borthwick Institute); Enclosure Award and map (West Yorkshire Archives Service QE 2/6); Ordnance Survey 1st edition 6 inch

Towton is the UK's only later medieval battlefield where mass graves have been located using modern archaeological methods. Even when located, however, a mass grave cannot be assumed to be at the heart of the action. The first mass grave to be examined at Towton lay in the area of the rout, in Towton village, a mile to the north of the primary deployments and the initial engagement.

The difficulties of locating mass graves are further demonstrated here: for some years there were doubts about the validity of post medieval records of the mass grave locations on the field, because of the failure of geophysics to locate them. It was only as a result of chance discovery of human remains on the surface that trial excavations could be targeted to locate these graves, from which the bodies had been moved in the later 15th century to Saxton churchyard. The presence of these mass graves in Saxton parish as opposed to Towton chapelry may explain why the burials were transferred to Saxton churchyard later in the 15th century and not moved to the battle chapel at Towton. The mass grave and other burials there presumably only represent troops killed in that chapelry. Indeed given this and the apparent focus of the action in Saxton it is perhaps surprising that the battle was named after the village of Towton and that the battle chapel was located there.

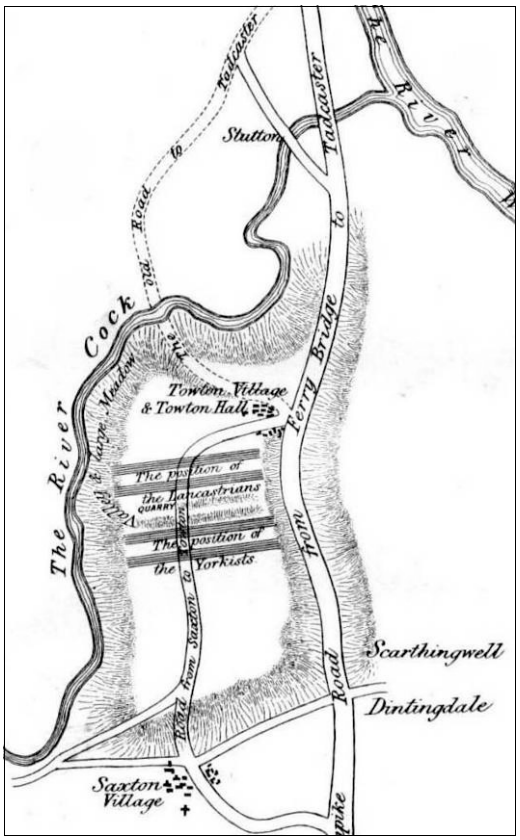


Figure 32: Towton: Brooke's plan of 1857 showing the deployments within the tightly constrained topography, demonstrating how securely located the site has always been

To summarise thus far, Towton emerges as a battlefield where quite good and topographically concise primary sources show the action to have been fought between Towton and Saxton, in a definable area that is constrained by distinctive elements of relief and topography. In memory, Towton's location has been constant. Thus, unusually for a later medieval battle, minimal terrain reconstruction is required to enable the deployments to be exactly located, either side of Towton Dale. Moreover, this is one of the few battlefields where such an identification is repeated by independent 18th-century mapping and earlier records of the main location of the mass graves, lying on the lowest part of the northern (Lancastrian) slope of Towton Dale, roughly central (east-west) to the two presumed battle arrays. The unusual precision of the identification in turn enabled intensive exploration using archaeological techniques with a high level of confidence

A dense scatter of copper alloy artefacts appears to reveal the clash between the two armies and then the Lancastrian rout running northward past Towton village. In addition, the far more restricted scatter of arrowheads has been interpreted as a trace of

the great arrowstorm loosed into the Lancastrian lines by the Yorkist archers (though no comparable scatter has been demonstrated from the Yorkist lines).

A number of problems exist with these data that make extrapolation to later medieval battle signatures inadvisable.

First, there has been extensive metal detecting by different individuals across the battlefield. Just one, Simon Richardson, has been drawn into the formal archaeological investigation of the site. While Richardson's material is without doubt the product of most intensive detecting, the available data thus form part of an unquantified assemblage that has been removed.

Second, while Richardson has worked within a formal survey framework at least since 2000, the survey method has not collected data which enable calculation of recovery rates for copper alloy artefacts or ferrous arrowheads in terms of man hours per artefact in different parts of the battlefield. Without such data it is impossible to predict how intensive a survey might need to be to recover a significant distribution on another site. A partial proxy for intensity data might be provided by the quantification of other artefact classes that form background noise – such things as cauldron feet or crotal bells which are not battle related. This can only be ascertained if all such finds or at least given classes of pre-industrial artefact have been consistently retrieved and distributionally recorded. Although this background noise may vary between battlefields, as a record of other landscape uses it provides a rough baseline against which to measure other distributions.

Most importantly, as yet there is no comprehensive catalogue or mapping of all the artefacts recovered by Richardson. Hence, published distribution plans are incomplete. Neither is it possible to seek patterning within the overall scatter by breaking distributions down into component classes of artefact (see below). Analysis may enable some conclusions to be drawn as to what the artefact assemblage actually represents in terms of type and status of troops. A partial explanation for the apparently atypical character of the Towton assemblage might rest with the numbers of high status individuals killed on the field. The subjective view of the finder is certainly that the majority of the copper alloy artefacts appear to be of higher status and thus support this idea. Equally, the finds may confirm the exceptional intensity of the action, as reported in primary sources, even if we doubt their quantities.[142] In some ways, therefore, Towton may offer similarities to our

[142] Boardman, 2000; National Army Museum, 1995

other exceptional early battlefield assemblage – Kalkriese, where the sheer immensity of destruction caused such a large and unique assemblage to be deposited.

The present analysis is based on the published data and must be considered in the light of stated limitations. The two published plans, one showing all copper alloy artefacts catalogued and mapped up to 2005, the other showing all ferrous arrowheads recovered up to 2006, have been digitised and placed in a terrain context.[143] While there is clear pattern within the artefact scatter, the absence of a survey boundary makes it impossible to say whether the blank areas represent absence of evidence or absence of survey. Similarly, lack of data on survey intensity (above, p.00) makes it impossible to determine the degree to which concentrations of artefacts relate to their actual density in the ground as opposed to the intensity of survey. For example, the absence of material on the eastern part of the site could relate to important information about the character of the deployments and the distribution of the action.

It seems inconceivable that the two armies would deploy leaving their flanks unprotected, especially with a major road present, for they would be vulnerable to an outflanking manoeuvre. If this is a genuine gap in the scatter then it is probably where cavalry were deployed. A cavalry action on one flank is documented in which with the Lancastrian army (on the north) drove off and pursued the Yorkist cavalry to the south. Such a quick clash is unlikely to have deposited a significant number of finds compared to the intense and sustained infantry engagement further west. In contrast, on the west there is no such gap until the steep scarp down to the Cock Beck, which would have provided the Lancastrians, who deployed first, with protection for their right flank. The gap in the scatter on the western spur has been suggested as the location of a wood, but Hall's reconstruction of the open field system suggests that the only woodland here will have been on the steep scarps and that the absence of finds could simply be an absence of action due to the nature of the deployments, not the terrain.

[143] Sutherland, 2005; Sutherland, 2007

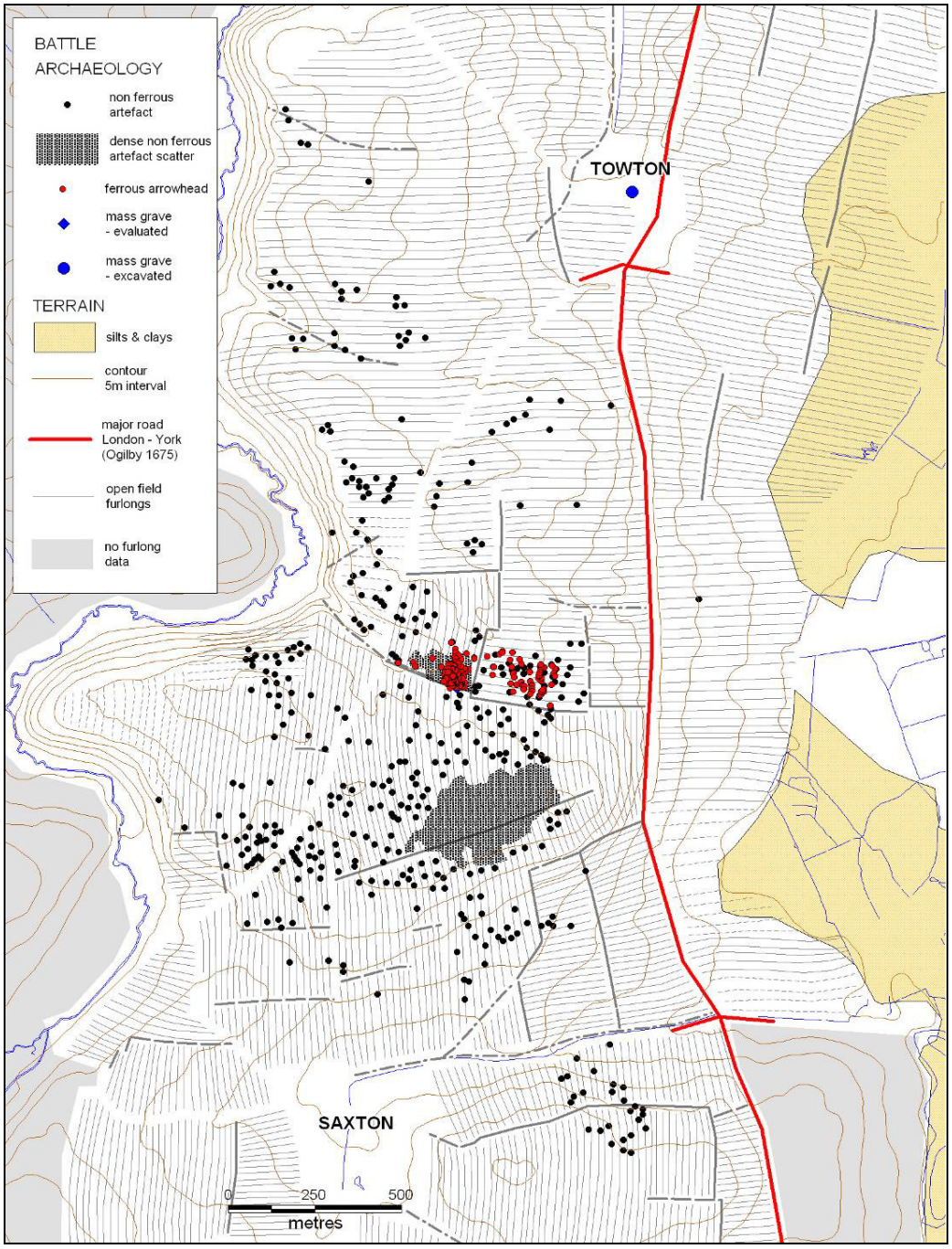


Figure 33: Towton: published artefact distribution viewed against historic terrain

Given the problems with the apparent absence of copper alloy artefacts on other battlefields, it is especially to the ferrous arrowheads that we must look. In this period when the iron arrowhead was the dominant projectile, there are questions to consider

about the nature of the evidence and its survival. Such arrows were typically used in their thousands, but it was practicable for them to be recovered for re-use, both during and immediately after the action, unless they had been broken. Thus at Towton the Yorkist archers are said to have stepped forward and retrieved many of the Lancastrian arrows which had fallen short because the Yorkists had the wind at their backs.[144] This shows that the pattern of survival on a battlefield may not fully reflect the pattern of use. Another factor to be taken into account is the ground conditions at the time. Towton was fought in intermittent snowstorms and it is likely that in the intense infantry action many artefacts were easily trodden into the ground, something that would perhaps have been less likely in drier conditions or on grassland.

Far greater is the problem of post-depositional decay. The projectile points were of iron and in many soil conditions these are very vulnerable to decay through oxidisation, which then makes them highly vulnerable to mechanical damage especially where the ground is under sustained cultivation. These post-depositional factors need to be assessed so that their potential distortion of the original patterns can be understood and to some degree be catered for.

[144] Accounts differ. The near-contemporary account by the Burgundian Jean de Waurin is controversial, but corroborated by the 15th-century 'Brief Latin Chronicle'; Edward Hall's Chronicle was completed in the later 1530s

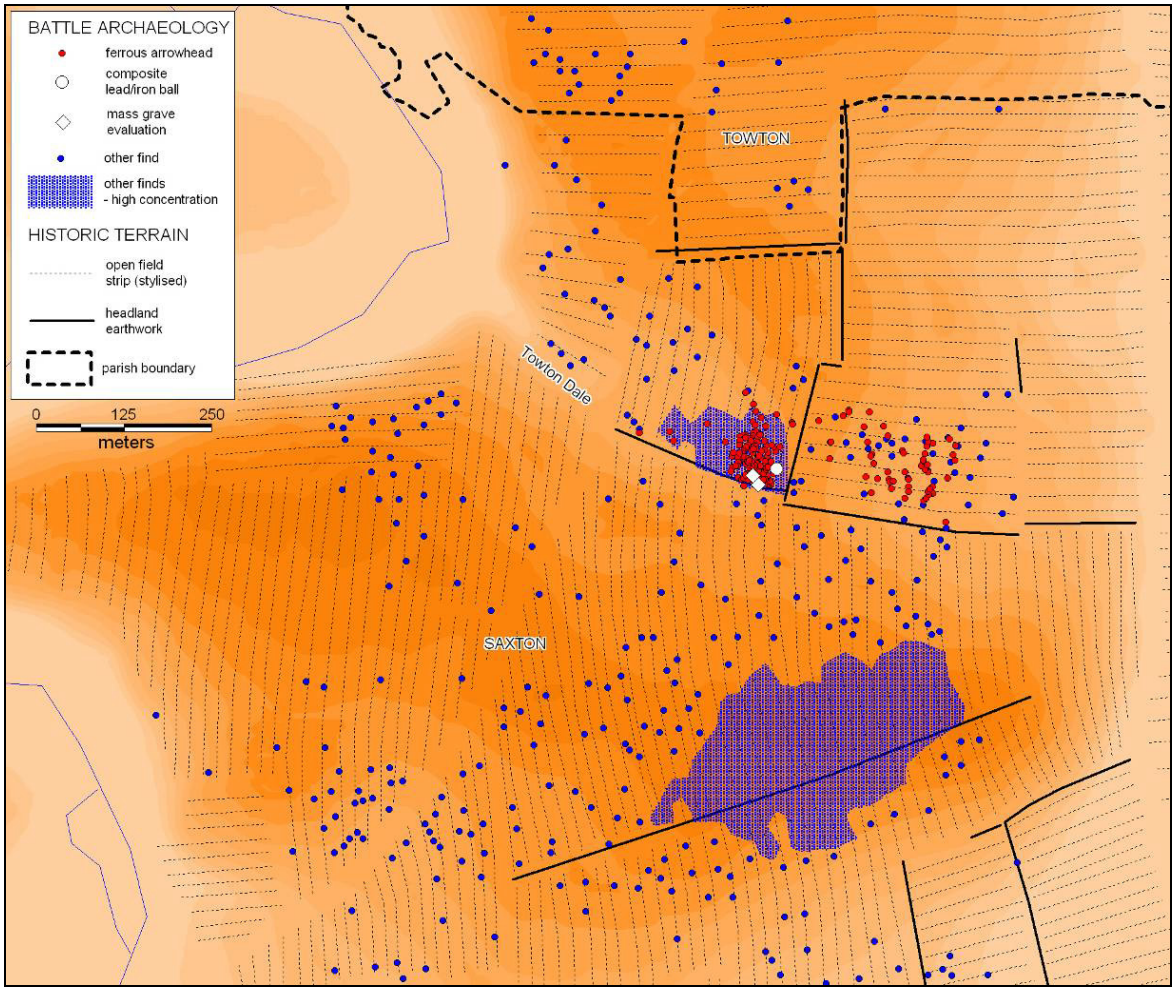


Figure34: Towton: distribution of published evidence of arrowheads and other finds distribution against a background of historic terrain and relief (10m interval contours

Towton shows that iron arrowheads can survive in topsoil, but it is not yet clear to what degree the pattern is determined by exceptional conditions of preservation. While the copper alloy artefact spread covers some 200 ha the ferrous arrowheads extend across just 5ha. Indeed the concentration is yet more focused, with 111 arrowheads from just one hectare, concentrated around the mass graves, with a second but far less intense concentration to the east.

Soil analysis undertaken by Janaway[145] to ascertain why ferrous arrowheads survive on part of the Towton battlefield shows that Towton has a highly alkaline soil wherein ferrous artefacts should survive well. Land use history, in contrast, shows that in both the1840s and 1930s, as well as today, almost the whole of Towton, including the area

[145] In conjunction with the Bosworth project

producing the arrowheads, was under arable cultivation.[146] Thus though the chemistry of the Towton soils is conducive to preservation, current and recent land use have been aggressive.

Additional factors may have been at work. The arrowhead distribution appears closely related to two particular furlongs and lies in an area of substantial colluviation. It is possible, therefore, that the scatter results from preservation in reservoirs beneath the topsoil. Such a sheltering effect may have been created by colluvium, furrows, or even by a remnant of the burial mound that was incorporated into the topsoil by a documented episode of deep ploughing in the 1990s. All but a handful of the arrowheads lie on sloping ground, with the main group at the head of Towton Dale in an area where there appear to be deep colluvial deposits. The highly mobile nature of the soils at Towton, noted during the open field survey, is clearly seen in the substantial lynchet on the north-south headland. immediately adjacent to the main arrowhead concentration, representing soil movement down-slope along the strips of the furlong to the east. The boundary between the two groups is a narrow strip of slightly higher ground along which runs a headland, the latter possibly also providing a context for burial of artefacts and, as it is followed by a modern hedge, where there has been no context for modern cultivation to remove arrowheads from this deposit.

The complete absence of arrowheads elsewhere on the battlefield reinforces the hypothesis of special conditions of preservation. So does the history of detecting, which has taken place across a wide area of the battlefield seeking arrowheads but not finding them outside the area depicted on the plan. Just one has come from the Yorkist side of Towton dale and this was very close to the others. The discontinuity in the artefact scatters along the two main headlands is distinct and certainly argues for post depositional factors affecting survival or recovery.

Excavation of the mass graves has shown arrowheads in relatively good condition stratified within the features. It is believed that it is primarily these that are being incorporated into the topsoil because the farming regime on the north side of Towton dale includes occasional deeper ploughing and it is this that brings the human remains and the fresh arrowheads to the surface. It is possible that the remnant furrows from open field ridge and furrow, which have been demonstrated in the geophysical survey, and also

[146] Saxton Tithe map; Land Use Classification 1931-5

some colluvial deposits, are acting as further reservoirs of arrowheads. It is possible that on the south side of Towton dale and elsewhere on the battlefield such deposits exist in small areas, determined by the topography, which are not being actively eroded and thus where further arrowheads may survive, but at a depth that cannot be recovered by detecting with standard detectors.

Once incorporated in the topsoil the arrowheads appear to have a very short life. Where they are found at the surface later in the year when they have been subject to months of frequent drying and wetting then they are typically in very bad condition. All the arrowheads, but especially the more heavily decayed ones, are so heavily oxidised that very little solid metal remains and thus cannot be detected at more than circa 150-180mm, with the deepest recovery being of the very largest and most intact arrowheads. The vast majority are only found at a much more shallow depth. The manufacture of the arrowheads with the braising to fix tip and socket together appears to be a major factor in their survival; without this they probably would decay even more quickly.

There are other ferrous artefacts that are thought to be battle related that have been recovered: five spurs and two spur rowels, but all these are believed to have survived in good condition because they are tinned. There have been one or two other ferrous items that might have been battle-related but where analysis or condition makes this inconclusive.

If we extrapolate from the special factors that appear to be at work at Towton, we can predict that arrowheads are only likely to survive on a small number of other later medieval battlefields, and only in areas where particular conditions obtain. Further, if such conditions are changed (e.g. by an episode of deep ploughing), the signal will quickly fade.

When these factors have been fully explored it should be possible to identify other battlefields where comparable evidence can be sought. The urgency in this is demonstrated by the rapid decay of Towton's arrowheads. Both here and on any other battlefields with similar preservation it is urgent that arable reversion is promoted if the remaining battle archaeology is not to be destroyed.

Other questions which need to be addressed include determining what percentage of the total population of arrowheads is being recovered for what intensity of detecting. This can be addressed by trench-sampling, to ascertain the carrying capacity of the soil. Within sample trenches, all artefacts are recorded in spits of 10cm or less, with intensive detecting at each stage (both of the next spit and then of the soil removed) to ensure that

nothing is missed. It is also important to determine the rate of decay of the Towton arrowheads, and to ascertain and quantify the co-varying influences of different factors that cause it.

Unless or until all these questions are answered, it will be impossible effectively to interrogate the Towton evidence, or to apply its lessons to the investigation of other battlefields. It must also be noted that highly corroded condition of the ferrous artefacts calls for specialist metal detecting techniques to recover them.[147]

There is therefore a clear case for systematic survey at Towton to identify colluvial deposits, furrows and other potential reservoirs. This should be complemented by a programme of detecting with a pulse induction detector, which enables far greater penetration than any other detector. This should initially be undertaken in collaboration with American battlefield archaeologist Chris Adams, who is highly skilled in the use of such specialist equipment, who could also provide training in the use of the equipment to enable further work, if the initial survey is able to identify arrowheads at depth, beneath the topsoil in the protected reservoir.

If such signals can be identified in the area where such deposits have been demonstrated then small-scale excavation should be undertaken to confirm the signals and test the viability of the method. Ideally this work should be undertaken in collaboration with Simon Richardson and Bo Knarrström in an attempt to pool the skills and knowledge of the only people in the world who possess the relevant experience and expertise. In this way it may be possible more fully and objectively to quantify the factors that influence survival and recovery at Towton, and thereby provide both a methodology and a nucleus of expertise that will be capable of examining and conserving other battlefields to best effect.

Wider issues

In tackling the later medieval battlefield it may be necessary to look to earlier 16th century sites, when elements of the medieval troop and equipment and aspects of the tactical deployments were still in use alongside the new firearms and large scale use of artillery. Hence, as will be demonstrated at Flodden and Pinkie (p.00), there is a limited lead bullet/roundshot archaeology that can prove the location and help to delineate certain

[147] Information from Simon Richardson, supported by experience of Bo Knarstrom in Sweden

elements of the action, and so in turn provide a context for study of copper alloy and ferrous battle related artefacts.

A second strategy lies in the investigation of later medieval battlefields in arid locations where ferrous survival should be better than in north-west Europe. In this way it may be possible to determine what would typically have been deposited right across a battlefield and then to draw conclusions as to the way in which northern Europe's discontinuous scatters and fainter signals relate to an overall artefact distribution. Potential areas for such modelling include Mediterranean countries (especially Spain) and also the Americas where Spanish conquistadors fought with crossbows alongside firearms at the very end of the period of the bow, as for example with Coronado's expedition of 1540-2 nto what is now New Mexico. In the New World the investigations are further assisted by the fact that the bolt heads used by the Spanish were typically of copper, not iron.

Third, and developing the international point, there is a case for seeking the optimal preservation conditions (colluvium, furrows, 'reservoirs': see above) in other areas where English armies fought in the later Middle Ages. The obvious place to start is France, with a survey of battles and sieges of the Hundred Years War.

Battle archaeology where English troops were engaged is likely to be somewhat different from that of other European armies of the 14th to early 16th centuries, because of English dependence on the longbow as opposed to the crossbow. However, as one moves back beyond the mid 14th century there may be a substantial reduction in the quantities of arrows deposited.[148] In the 11th century and before iron spearheads will also need to be taken into account, and because of their size they are more likely to remain retrievable.

If significant projectile survival can be demonstrated on battlefields other than Towton then there will need to be comparison of arrow distribution between well-preserved 14th/15th century and earlier battlefields. Changes in the nature of warfare may also have had significant influence: for example, the use of tactics in the 13th century which saw the dominance of the heavy cavalry charge compared to earlier and later dependence upon tactics in which most cavalry dismounted to fight. Cavalry action might be expected, as in the 17th century, to provide far less artefactual evidence than intensive hand to hand fighting on foot, especially as it is the high status troops whose equipment includes substantial use of metalwork and copper alloy fitments. Finally there is the greater the

[148] Prestwich in Chandler, 1994

length of time since deposition. Hence, irrespective of soil chemistry, Hastings fought 942 years ago may prove to have poorer preservation than Towton fought 547 years ago. What is at present unclear is the degree to which such decay, though initiated by chemical action, is determined by the levels of mechanical damage from cultivation. This is therefore *the* critical issue that needs to be investigated.

Strategy

If there is to be progress in releasing archaeology's contribution to the history of medieval battle, it is best addressed from both ends. Firstly, at Hastings as probably the most securely located of all England's battlefields before the 15th century, with arguably the most detailed documentary record. The first step should be a pilot all-metal detecting survey over several days using an experienced team, ideally in autumn 2008, supported by specialist analysis of any finds and advice on arms and equipment from the Royal Armouries. In parallel there should be analysis of soil chemistry to assess the potential for survival of ferrous artefacts. This work could incidentally test the degree of contamination by modern re-enactment before modern artefacts decay to a point where they cannot be distinguished from the originals. Thereafter should follow

- a more detailed assessment of the physical geography of the battlefield involving one or more augering sections across the valley to identify if alluviation or colluviation may have preserved a battlefield surface and whether waterlogged conditions exist in the valley in areas unaffected by later pond construction
- a review of the records of all previous investigations on the site of Battle Abbey, to ascertain whether any material recovered in the past might be battle related, to examine evidence for the major ditch reported from one excavation, which could represent the *malfosse* of the battle accounts
- work to establish where terracing in the construction of the Abbey may have preserved a battlefield surface and where destroyed it
- an assessment of potential for further work as an examplar of best practice

Working backwards, the first need is to address the large group of battles from the Wars of the Roses. The Towton data require:

- full analysis and mapping of the Richardson finds, supported by
- an approach to other detectorists to recover information that they may hold on the artefact distribution which can be compared to and possibly enhance the key data set provided by Richardson
- detailed investigation of taphonomy
- intensive systematic survey to establish recovery rates (although there are limitations because so much of the copper alloy assemblage has already been removed)[149]

Once these results are available there should be an intensive study of another battlefield which can be located with confidence. This may be Barnet, because of its exceptional potential among 15th century battlefields for the existence of lead bullets in sufficient numbers to provide a template for the exact area of the action, so enabling intensive detecting for both ferrous and copper alloy artefacts.

Aside from their significance as archaeological bellwethers, Hastings and the Wars of the Roses represent key stages in the formation of England and English identity.

[149] Information from Chris Hall

Transition, 1450 – 1599: the origins of firepower

In the second half of the 15th century a fundamental transition began in the technology of battlefield weapons that was to have a far-reaching effect on the nature of warfare. This has been the subject of much debate amongst historians, some of whom promote and others challenge the idea of a 16th-century military revolution, and argue about its chronology.[150] However, with the exception of study of the surviving ordnance of the internationally important 15th-century Burgundian army and the military equipment on the *Mary Rose* almost all the evidence has been taken from written records. [151] The impact on this subject of the longbows discovered on the Mary Rose cannot be overestimated, yet the ship also provides a snapshot of the transition in progress, with hundreds of lead bullets and composite roundshot preserved alongside the more famous longbows. Yet there is more that archaeology can contribute, particularly from fields of conflict, if the character, location and potential of the archaeological evidence is recognised. Battle archaeology can provide new evidence about the actual use of the new technology.

Battlefields of the late 15th and 16th century have a high research potential because of the contribution that they might make to the understanding of the introduction of firearms. The introduction of lead ammunition for small arms and some artillery in the early modern transition had a major impact on what kinds of evidence for battle archaeology actually survive. From the work at Flodden and Pinkie in 2005-2007, lead and composite lead/iron bullets for hand held weapons and roundshot for artillery would appear to be the main classes of finds from 16th-century battlefields. This is important not only in its own right, but also because it might contribute to the study of earlier warfare. If distribution patterns can be recovered where both lead bullet and iron arrow were used in significant numbers then the survival of the former may assist us in understanding the survival potential and significance of distribution patterns of the latter. In Britain battlefields of the 16th century are rare (see table) and thus any battle of this period will have a particular importance and may justify far more intensive study than the political or strategic importance of the action might otherwise imply.

[150] Eltis, 1998
[151] Smith and DeVries, 2005. E.g.: Strickland and Hardy, 2005; Walker and Hildred, 2000

The humble lead bullet offers a unique perspective on one of the most important cultural developments in the early modern period. Deposited in millions across the world by Europeans between the mid 15th and the mid 19th century, the

Table: rating the archaeological significance of 16th-century actions

action	year	bullet potential	arable modern	arable 1930s	State of development	professional judgement
Sampford Courtenay	1549					3
Fenny Bridges	1549					3
Flodden	1513	3	4	3	1	3
Solway Moss	1542	3	3	1	2	3
Clyst St. Mary	1549	0	0	0	3	3
Dussindale	1549	2	4	4	3	3

bullet is the archaeological signature of firepower, and firepower was arguably a, if not, the main instrument behind European domination of the world in the 19th century. Yet perhaps the most important element in this story, the development of firepower in the fifteenth and sixteenth century and particularly its implementation on the battlefield, has hardly begun to be examined through physical evidence. Aside from the limited work at Flodden and Pinkie, and other work now underway on contemporary sites in Sweden, there has been no substantial archaeological investigation of any 16th-century European battlefield.

Because of the importance of the transition, and given the small size of the resource in England (below, p.121-22), the 16th-century fields of conflict have been taken here as the pilot sample for assessment of the full range of sites, from battles down to small actions, in so far as this is practicable within the scope of the present project.

Although gunpowder weapons were in use in Europe from the first half of the 14th century, it would appear that they were not used in quantity or to any real effect in open battle until at least the mid 15th century, and that they only began to take a decisive, battle-winning role once the technology of gunpowder manufacture had been perfected by the mid 16th century. It is this interaction between the development of gunpowder manufacture and the development of small arms and ordnance to use it that presents a most important challenge for archaeology. Advances in hand-held firearms were first and foremost a response to the opportunities that arose as gunpowder technology advanced up to the mid sixteenth century, culminating around 1550 with the introduction by the Spanish of the musket, which was to become the dominant battlefield firearm for the next three hundred years.

Already, the first stages of analysis of bullets and related small arms and artillery firing experiments for the seventeenth century hint that bullet and roundshot assemblages from fields of conflict might offer a unique perspective on this iterative process in the evolution of firepower. The evidence of temperatures and pressures left on the lead projectiles as a result of firing, together with the damage on the projectiles and on the impacted surfaces resulting from impacts, provide potential evidence for changing efficiency in weapons technology. To explore this fully it is essential to identify the sites, conserve their archaeological assets, and sample the evidence. Hence, a signal finding of this project is that until secure sample assemblages of fired bullets and other data are recovered from fields of conflict, complemented by new experimental work, it will be not be possible to establish the potential or to effectively manage the resource.

While fields of conflict tend to be relatively few in any given period compared to most other archaeological site types, in England those of the 16th century are particularly rare, because this was not a period of intensive warfare on English soil. English armies were most often engaged abroad, particularly in Ireland and to a lesser degree in Scotland, the Low Countries, and France, including the Battle of the Spurs in 1513, Henry's only real continental action which was little more than a cavalry skirmish.[152] Thus in this period, more than any other, battlefields in England should be viewed not as a discrete group but as just part of a wider resource that needs to be assessed on an international scale, focusing in particular on the actions of English armies abroad as well as at home. From what were probably gunpowder weapons' first battlefield use in Britain at St Albans in 1461 to their decisive influence on the outcome of Pinkie in Scotland in 1547, and from the unique assemblage of the 1545 wreck of the Mary Rose, Britain should present an unusual archaeological perspective on their introduction to the battlefield.

Of all European countries, England traced a distinctive path in the transition from bow to bullet. It is often viewed as a backwater in which, through a high degree of inertia, the longbow was retained against the international trend. Perhaps equally important, because of the degree to which English armies continued to use the longbow side by side with gunpowder weapons long after the transition from the crossbow was completed by most other military powers, these battlefields may offer unusual potential for the archaeological investigation of the bow in battle, with the lead bullet providing the

[152] Cruickshank, 1990

battlefield patterning within which the evidence for the ferrous arrow and other artefacts distributions can be sought with confidence of location and context.

One type of evidence not yet located in England but which might exist on siege sites, having apparently been located on at least one Scottish site of the sixteenth century,[153] is bullet impact scars, which are discussed below for 17th-century sites.

Assessment

At St Albans II, in 1461 and followed at Barnet in 1471, companies of Burgundian handgunners were engaged. There is also limited documentary evidence to suggest that small arms were used in small numbers of other battles in the Wars of the Roses (above: p.00).[154] While some sites such as St Albans II have been largely dismissed as archaeological sites because the physical evidence across so much of the site has been destroyed, this is an issue which is of such importance, and where the archaeological evidence is so rare, that even a small area of surviving battle archaeology could be of great significance and is consequently worth the extra, fine-grained search.

Another transition battle, Flodden (1513), involved some 40,000 English and Scottish troops and was of international scale and significance. Firearms and artillery were used, though compared to the impact of the English archers not on a scale or with sufficient efficiency to have had a critical effect on the outcome. Flodden does, however. offer the potential to define a baseline against which to assess the introduction of firearms on later battlefields.

The other major English battle, Solway Moss (1542), was of much smaller scale and a rather unusual type of action, being dominated by English light cavalry, but it did see the arquebus play a substantial role. The terrain evidence in the primary accounts is too sparse to delineate the area of action, especially given that the English cavalry engaged in loose order to fire at the infantry. The extent of the action will only be determined by a survey of battle archaeology. Such a survey will need to take account of the fact that the archaeology of cavalry action in this period will be even more problematic to locate and interpret than that of infantry, chiefly because of the far lower density, and possibly smaller

[153] Bullet impact scars are visible on the walls of Crichton castle (East Lothian), which has a series of 16th-century gunports, and also on the church there. The site was besieged in 1559 and the scars are thought to come from this attack, though it is possible that the site also saw later action.
[154] Foard, in preparation-a

calibre, of bullets. [155] The Scottish forces as well as the English were probably using significant numbers of firearms, but it may well be possible to isolate the bullets from the mounted harquebusier on the basis of calibre. Given that the action was largely one of light cavalry skirmishing, then the distribution of bullets and other artefacts in the main action may be expected to be unusually light. Moreover, there is no indication of artillery, and thus the most distinctive 16th-century munitions, seen at Flodden and Pinkie, are unlikely to be present. All this adds up to a likelihood that the evidence to determine the extent of the action may not be recoverable from a given development evaluation, and in the absence of this it is impossible to determine the degree of threat from further encroachment of development on the south side of Longtown. Even if the Registered area does encompass the whole battlefield, it is important that a reconnaissance survey is undertaken to establish whether battle archaeology can be located and if so where and of what character.

Two more English 16th-century battles, Dussindale (Norfolk) and Sampford Courtney (Devon), are largely ignored by national battlefield studies and were apparently not considered for the Register. Both involved between 5-10,000 combatants and seemingly included substantial numbers of mercenaries firing arquebus alongside or against the longbow. They also saw significant use of artillery. Where the two weapons were used in quantity in a single battle then that battlefield may offer a unique opportunity to assess the potential of ferrous arrows as a viable resource for battlefield study. This may also enable the wider character of the archaeology of late medieval battles to be assessed with confidence as to where in the action one is looking. The only battlefield in Britain so far to produce small arms bullets is Pinkie in East Lothian, Scotland in 1547, where they appear to be present in significant numbers. [156]

[155] The archaeology of cavalry action in the 16th century awaits study. In principle, the 'caracole', the standard cavalry tactic of the period in which ranks of horsemen trotted or walked up to the enemy infantry or cavalry, discharged their pistols at very close range, before wheeling to the rear to reload (in effect, a mounted version of the infantry counter-march) could produce a significant and possibly distinct signature. This remains to be ascertained.
[156] Foard, 2008a

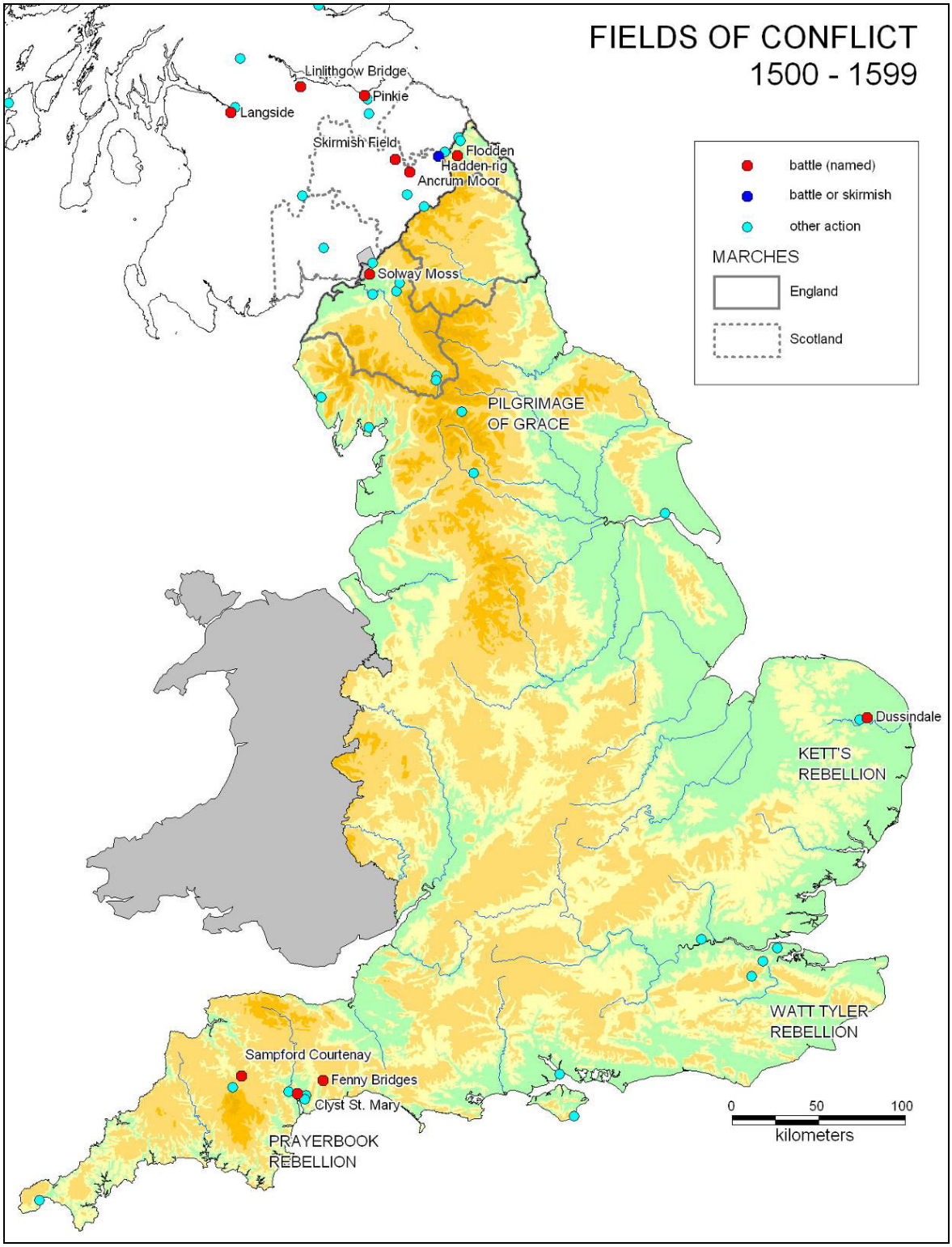


Figure 35: Sixteenth-century fields of conflict

The Scottish Border

The greatest concentration of military action in 16th-century England was on England's only land border, with Scotland. Here on both sides of the border were military administrative territories or Marches which organised border protection through garrisons, several of which were besieged and taken during the period. In addition to the battles of Flodden and Solway Moss there were lesser actions, mainly developing out of large border raids.

Border raids, sometimes on a very large scale involving substantial Scottish forces also occurred in this region during periods of tension, while lesser raiding – for example, stealing cattle – was a way of life.[157] Most, such as the 1537 raid on Muncaster, were small scale actions and have not been a priority for database enhancement. Only three were added for the 16th century (these being thrown up as a result of the intensive review of Cumbria (p.00)), so it is likely that this evidence is underrepresented in the database.

The more substantial cross-border raids could lead to significant engagements, as at Grindon in 1558, which supposedly took place on Battle Moor. The area is wholly undeveloped but under intensive arable. Another large raid through the Debatable Lands precipitated the battle of Solway Moss in 1542. A further substantial skirmish took place at Gelt Bridge / Naworth in 1570, though there is uncertainty about location. While the minor raids may yield little of relevance, the larger actions may provide a useful perspective on the character of warfare and the weapons in use. The same is true of the small number of sieges of garrisons and fortified sites along the border. Wark Castle, Northumberland, besieged in 1513 and1523, is a Scheduled Ancient Monument with earthwork survival and a substantial part of its environs undeveloped. Liddel Strength, Cumbria, besieged in 1528 and 1583, is another intact Scheduled earthwork with unbuilt environs comprising arable, wood and pasture. Both thus have potential for bullet scatters and other artefact patterns arising from any fire fight. Other sieges included those in 1513 at the important Carlisle garrison, and at the castles of Norham and Etal.

While it is clear from limited work already undertaken that there is substantial archaeological potential in the investigation of siege sites, no work has been undertaken on 16th century sieges in England to ascertain if historically useful information may lie within the structures or in surrounding ground.

[157] Fraser, 1974

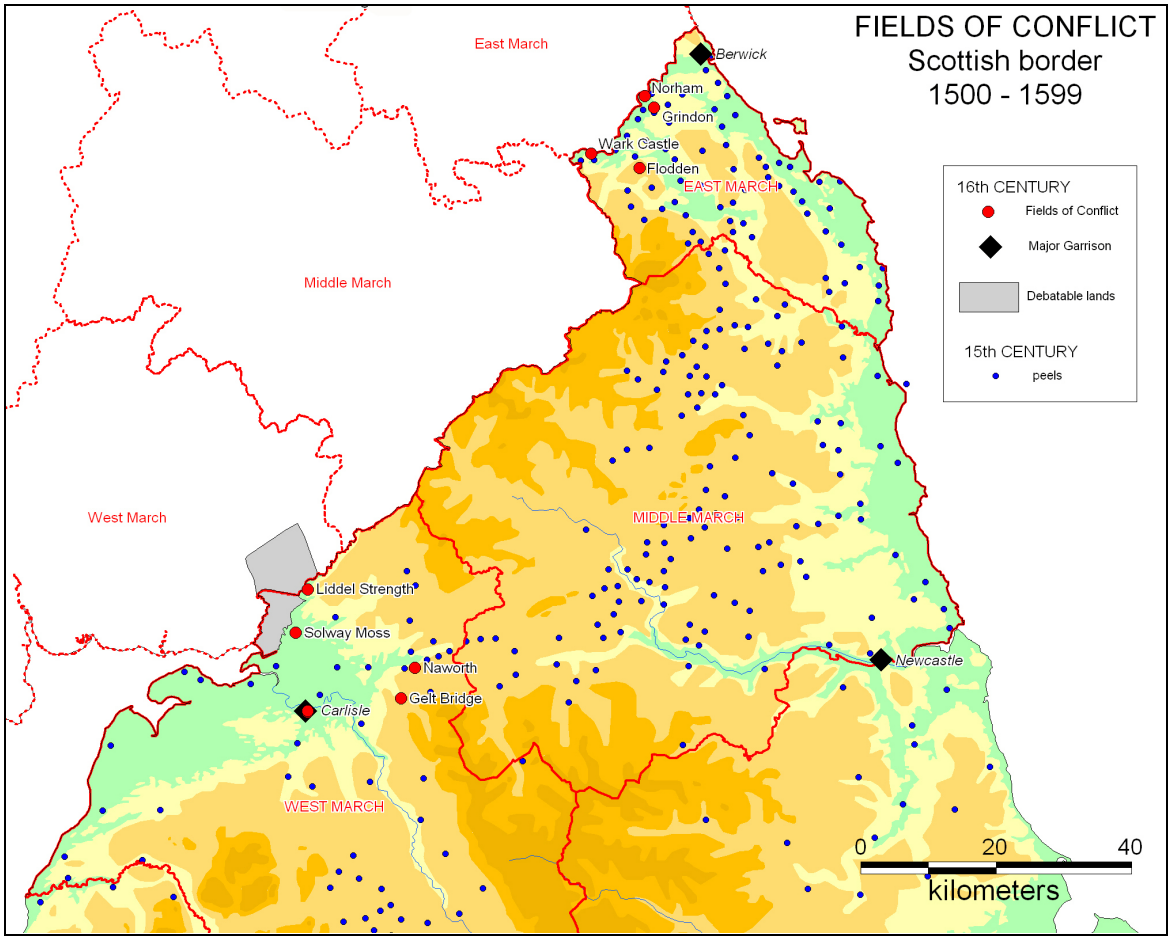


Figure 36: Fields of conflict on the Scottish border viewed against the military administrative areas, the major garrisons and supply bases, together with the distribution of lesser fortified sites of the 15th century, used in the absence of identification of an easily accessible 16th-century data set

Multiple sieges on some of these sites may complicate the study of actions of transitional character because of the superimposition of patterns of artefacts from different actions. At Carlisle, the urban location probably means that little if any evidence survives outside the defences, though excavation may reveal useful evidence of bullet scatters if the potential is realised and metal detectors are systematically used. At and around Berwick, the potential seems to exist, particularly in the town's hinterland, for a major landscape-scale study integrating the physical and documentary evidence for Flodden with that for the various sieges, skirmishes and raids. If pursued as it should be in as a cross border study, then the range of sites will also include Ancrum Moor and Haddon Rig, together with skirmishes at Sclaterford, Grindon and Gelt Bridge/Naworth. Such a project could logically

be extended to include the Pinkie campaign and thus build up a coherent regional picture of the archaeology of warfare in the 16th century.

The nature of warfare on the border was such that a somewhat different character may be expected to the training, equipping and leadership of the troops engaged, and the nature of the action, than was seen elsewhere in the country. Action can clearly be seen to focus on the main routes between the two countries: that on the east coast – the one most frequently used by major armies – controlled by the Berwick garrison of the East March, supported by lesser strategic sites including Norham castle; the other on the west coast, controlled by the Carlisle garrison of the West March; with Newcastle in the Middle March as the major fortified rearward supply base and port for logistical support.

The written record for Anglo-Scottish Tudor warfare has been studied in detail, particularly by Phillips.[158] There is, however, no satisfactory account of any of the battles and lesser actions that is married to an adequate understanding of the fields of conflict themselves. If these sites are to be effectively managed, and their research potential realised, this needs to be remedied.

Naval raids, rebellions and civil unrest

Apart from conflicts along the Scottish border the sixteenth century was a largely peaceful period in England. There was just a handful of naval raids on the south coast ports by the Spanish and French. Only a handful is identified here, such as the Spanish raid on Penzance and Newlyn in 1595. These actions appear to be mainly urban in character and unlikely to yield significant battle archaeology. Other minor events of civil unrest were noted with monks at Cartmel resisting the dissolution of the priory in 1537 and other private conflicts at Wharton in 1549 and in Ryedale; others of this kind were certainly missed in the enhancement process and will come to light in due course. At this stage, however, none appears likely to have particular archaeological potential and they are not considered further here.

However, in the mid-16th century there was a series of rebellions linked to grievances which led to substantial armed conflict. The first was the Pilgrimage of Grace in 1536-7, which included sieges of Carlisle, Hull, and Skipton castle in 1536, and a skirmish

[158] Phillips, 1999

at Kirkby Stephen in 1537. All the garrisons saw action at various times in the sixteenth and seventeenth centuries, while Hull and Carlisle in particular are probably now too heavily developed for any significant archaeology related to the 16th-century events to survive.

1549 saw two armed insurrections. In south west England the Prayerbook Rebellion led to a siege of Exeter and several skirmishes of which Clyst St Mary and Fenny Bridges might be classed as battles. The former site, if correctly located, was largely developed in the late 20th century, though negative evaluations on peripheral developments raise questions about the accuracy of location. The Fenny Bridges site also appears to have been severely affected by a railway and bypass. Apparently more substantial was the action at Sampford Courtney, a largely undeveloped site, where as many as 5-10,000 were engaged.

1549 also saw Kett's Rebellion in Norfolk. The major action was at Dussingdale, immediately east of Norwich, but there was also skirmishing within the city itself at St Andrew's Plain and Palace Gate. Twenty-five lead bullets were found by metal detecting in 16th-century garden soil in a small (4 x 4m) excavation. This was a very high density of bullets for the area examined, and association with other mid-sixteenth century artefacts could relate to the 1549 action.[159] However, the deposits were stripped without significant investigation in preparation for full excavation of Anglo-Saxon deposits below. In the absence of published data on the bullet weights it is not possible to assess how the calibre of the assemblage relates to other assemblages form the period. The lesson here is that while in many urban settings there is little or no potential for significant archaeology of urban actions, on some sites useful data do exist and could be retrieved if there are clear and justified research priorities.

Wyatt's Rebellion in 1554 resulted in skirmishes at Wrotham and Cobham, a siege at Cooling Castle and a larger engagement at Temple Bar in London. The site of the Wrotham action, which involved about 1,000 combatants and included firearms as well as archers, is suggested in Black Sole field. Part of the area is developed but the rest remains agricultural land.

[159] Emery, 2000

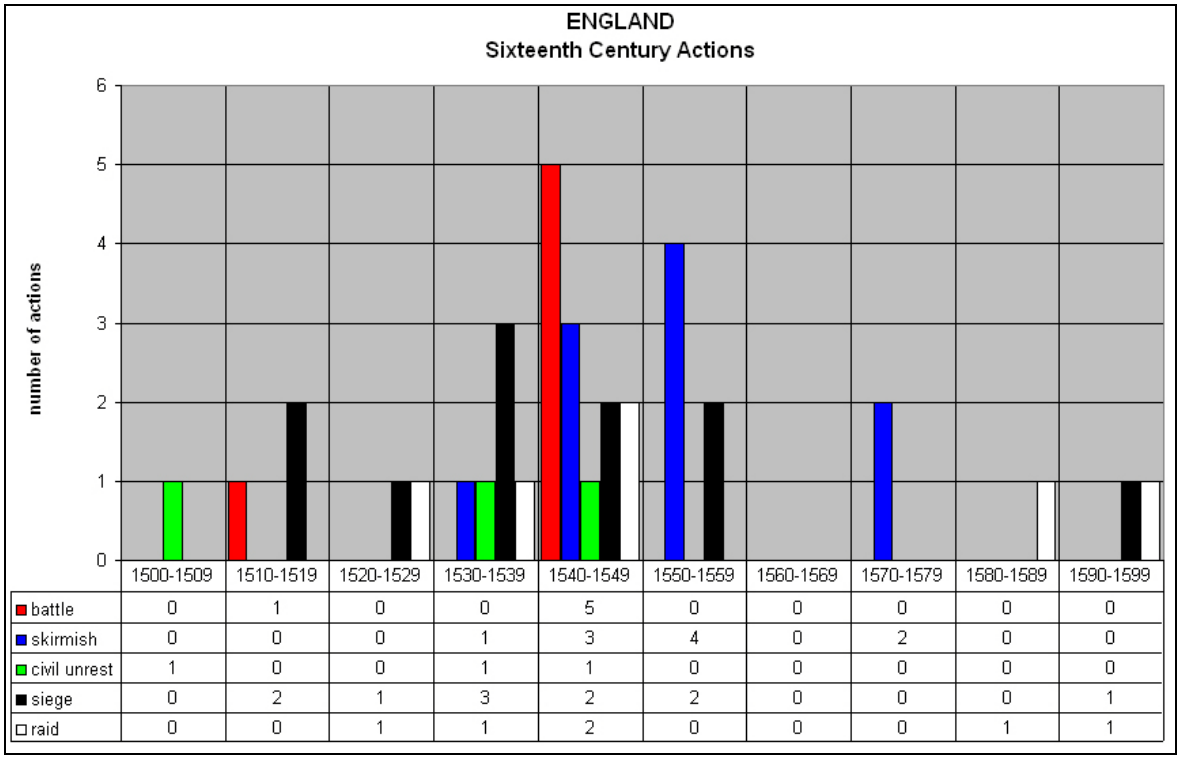
Priorities

The general argument in this report is that, at least in the short term, the investigation of skirmishes and raids should not be a priority, because much more information can be retrieved and many more priorities addressed through the investigation of battles and sieges. In the case of the sixteenth century, however, we argue that sites of these lesser actions should be a priority. This is partly to compensate for the paucity of 16th-century sites in general, but also because of the

- importance of the origins of firepower as a research theme
- potential for archaeology to add significant data, and the
- possibility of examining the penetration of firearms into the militia

Lesser sites accordingly need to be located, assessed for survival and then tested for surviving battle archaeology. As such they could also represent a pilot for the investigation of lesser sites in other periods. But given the limited extent of firearms use in this period the difficulties of investigating such sites should not be underestimated.

The lesser actions in English regions, mainly from the rebellions against Henry VIII, each with well under 5000 combatants, where mercenary harquebusier appear not to have been used, warrant classification as skirmishes rather than battles. These actions may have a potential which far outweighs their scale, or their military or political significance at the time. This is because they may provide evidence of the degree to which firearms had been adopted by the militias, and the nature of those firearms. They would thus provide a valuable comparison with the archaeological evidence to be expected from the battles where mercenary harquebusier were involved.

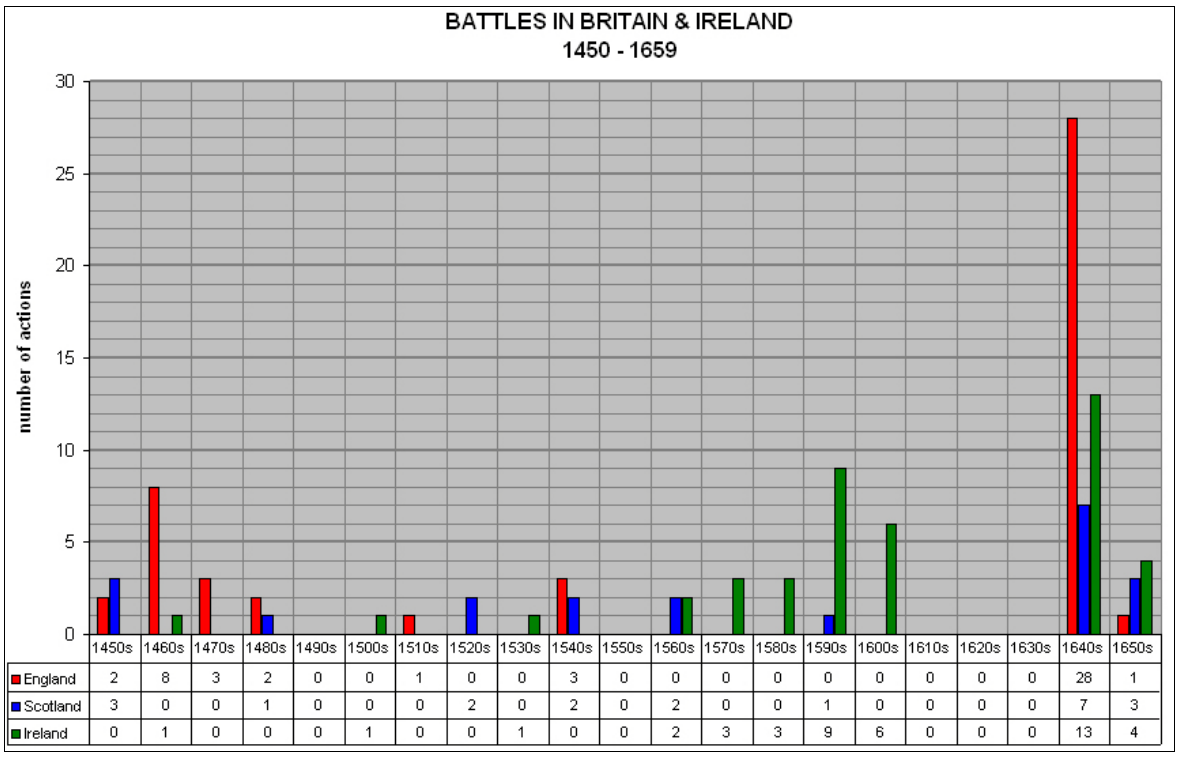


	1500-1509	1510-1519	1520-1529	1530-1539	1540-1549	1550-1559	1560-1569	1570-1579	1580-1589	1590-1599
battle	0	1	0	0	5	0	0	0	0	0
skirmish	0	0	0	1	3	4	0	2	0	0
civil unrest	1	0	0	1	1	0	0	0	0	0
siege	0	2	1	3	2	2	0	0	0	1
raid	0	0	1	1	2	0	0	0	1	1

Figure 37: All actions in 16th-century England recorded on the database. Sieges, skirmishes and especially raids are under-represented, probably by a wide margin

Figure 37 shows that not only were 16th-century English battles few in number, but also that their chronological spread is uneven. As this is a period of fast moving technological change, it is important to see as broad a chronological span as possible. Thus it is essential to assess the actions in England in the context of English military action in Scotland and Ireland throughout the century (Figure 38). Significant differences are to be expected in English armies as time passed and also between forces suppressing rebellions within England, forces defending the frontier and English armies fighting major international actions at home or on foreign soil. Finally, it will be important to make comparison with the activities of contemporary military powers elsewhere in Europe to see if, as historians argue, the Tudors really were using the arquebus far less, and bringing it much later to the battlefield, than other European powers. Here it is even more important that the chronological span is extended, to reflect leading military powers such as the

Burgundians and the Spanish who were introducing gunpowder weapons to the battlefield by the mid fifteenth century.[160]



	1450s	1460s	1470s	1480s	1490s	1500s	1510s	1520s	1530s	1540s	1550s	1560s	1570s	1580s	1590s	1600s	1610s	1620s	1630s	1640s	1650s
England	2	8	3	2	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	28	1
Scotland	3	0	0	1	0	0	0	2	0	2	0	2	0	0	1	0	0	0	0	7	3
Ireland	0	1	0	0	0	1	0	0	1	0	0	2	3	3	9	6	0	0	0	13	4

Figure 38: Battles in Britain and Ireland 1450s-1650s (interim data only for Ireland: not collected to same standard or validated)

This is an important research theme that requires a major research project. This work must be done quickly, so that the evidence can be recognised and effectively conserved for future study. The need for swift action arises because at present the eviodence is not recognised for what it is, and where it is being found it is usually misunderstood, often being mistaken for material of much later date. The problems are compounded by the fact that the transitional munitions are present in small numbers compared to the more prolific bullets and roundshot on seventeenth-century battlefields. Thus they are probably currently being lost amongst the background noise of the very low density bullet scatters left by sporting activity from the 16th to the 19th centuries.

[160] Smith and DeVries, 2005

Munitions of the fifteenth and sixteenth centuries

Lead bullets were used in guns in China by the early 14th century and in Europe before the mid fourteenth century. In 1337 the English ship the *All Hallows* carried an iron weapon firing quarrels and lead pellets using gunpowder, while in 1384 Chaucer could write: 'as swift as pellet out of gonne when fire is in the poudre ronne'.[161] Though there are records of their use in sieges it was not until the 15th century that they became significant weapons andused in battles by the leading European military powers. There were handcannon in the arsenal of the Dukes of Burgundy throughout the fifteenth century, for which the ammunition was almost solely lead ball, in addition to a bewildering array of artillery, large and small, for which the ammunition was mainly of stone or less often of iron.[162] In the late 15th century the cumbersome and inefficient handcannon with its large calibre ball was rendered obsolete by the introduction of the arquebus, which had the same basic form as later muskets but was of a smaller calibre. This was made possible by developments in the technology of the manufacture of gunpowder which dramatically altered the rate, degree and consistency of energy release as well as its stability prior to use.[163]

As we have seen, the archaeology of battle in the 16th century has hardly begun to be studied and there is no characterisation of the nature of battle archaeology of the period anywhere in Europe. Since an understanding of the nature of the munitions is central to any assessment of the archaeological potential of fields of conflict, it has been necessary here to define the current state of knowledge for Britain. Following the lessons learnt from the study of 17th-century battle archaeology (below: p.00), the present analysis began with an assessment of the munitions on the *Mary Rose*. The data from the wreck have then been used when examining the material from recent fieldwork at Flodden and Pinkie, and will also provide an initial a guide for material from other sites such as Solway Moss and Dussindale. It is less clear whether these data are relevant to weapons in use in 1513, as this was a period of rapid change in small arms technology.

The *Mary Rose* sank in 1545 while engaging the French fleet. While best known for her complement of longbows, the *Mary Rose* also exhibits the origins of firepower. Her magazine originally contained a large number of roundshot for artillery, hailshot in the form of flints in wooden boxes, as well as more than 1000 lead bullets for small arms. Of the

[161] *The Hous of Fame*; Kelly, 2004, 92
[162] Smith and DeVries, 2005
[163] Strickland and Hardy, 2005, 398-407

latter only a small number have so far been retrieved from the wreck, representing just 6 per cent of the total supply of bullets recorded in the vessel's inventory. The bullets came from various locations within the ship and it is unclear at present whether they were intended for a few specific weapons rather than providing a representative conspectus of the calibres available in the ship.[164] Indeed, the relatively small sample of munitions from the *Mary Rose* need not be wholly representative of the period as a whole or even of English armies of the mid 16th century. There is therefore the need to examine other collections of munitions from 15th- and 16th-century wrecks, and other magazines of whatever country. Ultimately, however, the reality of the use of gunpowder weapons in the 15th and 16th centuries can only be determined by study of the fields of conflict themselves.[165]

Lead bullets for arquebus

The methodology developed for the study of lead bullets from the seventeenth century appears directly applicable to the study of those of the sixteenth century, though the problems are greater because the quantities are much smaller and comparative data sets are not at present available. Examination of the lead bullets for small arms from the *Mary Rose* demonstrates that they were manufactured in a similar way to those of the 17th century but that the calibre signature of the assemblage as a whole from a site may prove distinctive to the period.

Just one potentially distinctive attribute of some of the *Mary Rose* bullets is the presence of multiple cuts caused during sprue removal, a feature which has not been recognised on other later material. However, this is not visible on all the bullets and may prove to have no relevance to the dating of the bullets.

[164] Information from Hildred. Calibre and character detail are from the author's analysis of the assemblage
[165] Gardiner, ed., 2005

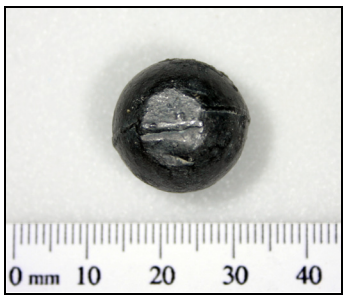


Figure 39: Lead bullet for use in a 'hackbut' otherwise known as an arquebus, showing the mould ridge and the sprue snip with central bar (*Mary Rose*)

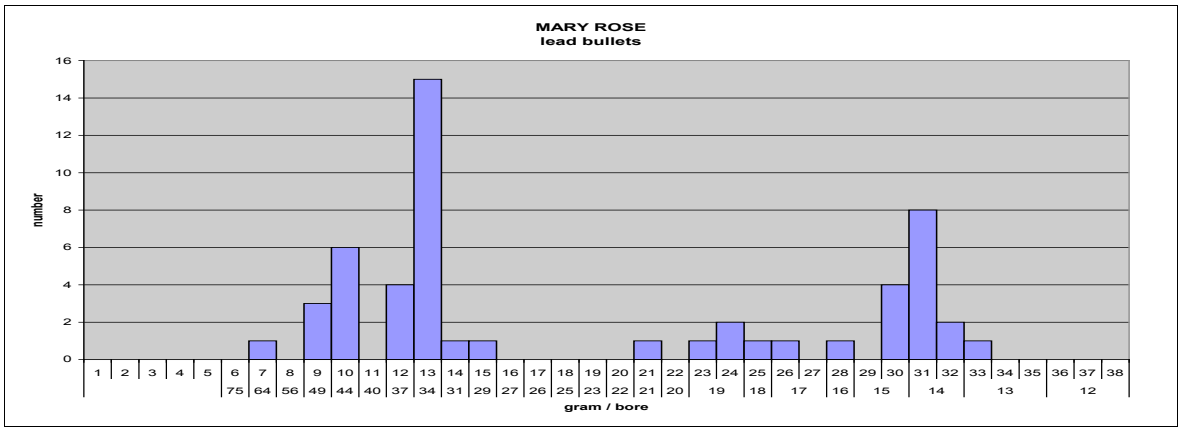


Figure 40: Calibre graph for lead ball from the *Mary Rose*, wrecked 1545

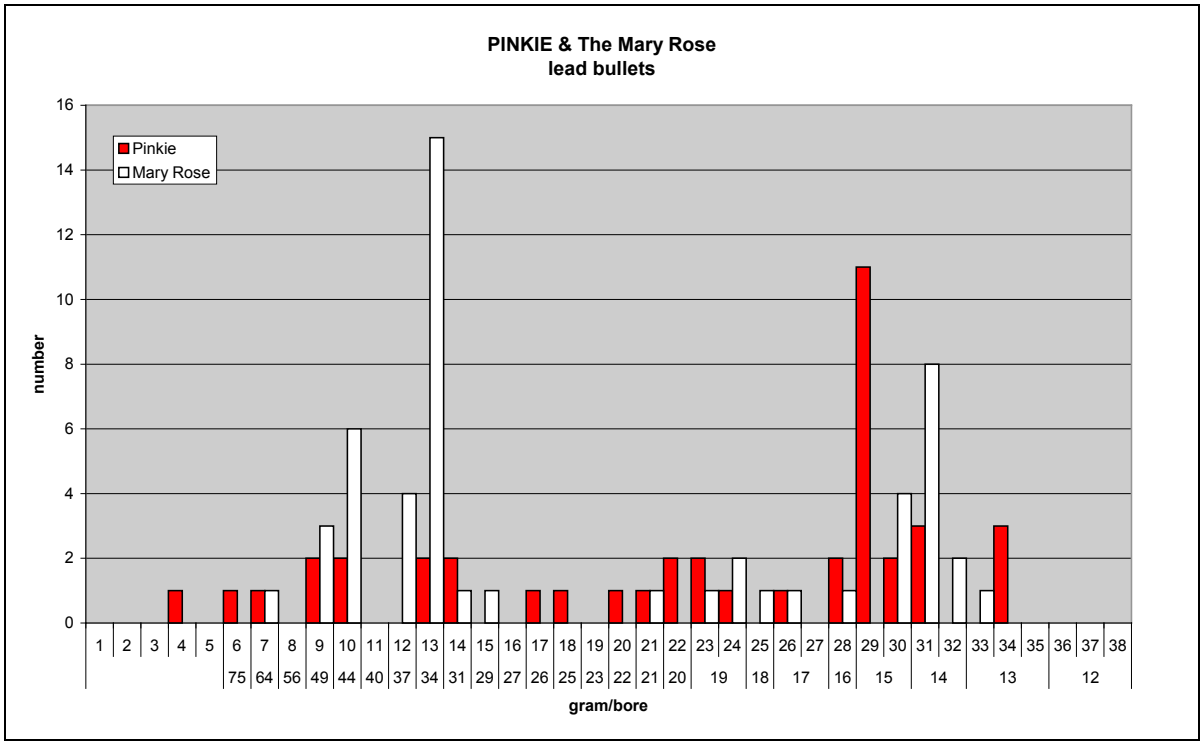


Figure 41: Comparison of calibre of assemblages of lead bullets from Pinkie and the *Mary Rose*

The calibre graph, most practically prepared in grams and cross-referenced to bore (bullets to the pound of lead), has been shown for the seventeenth century to be the most effective way in which to gain an overview of an assemblage of spherical lead bullets. Though there are many caveats regarding the nature of the sampling process involved in the collection of the assemblage, the exact position of the peaks and the gaps in the graphs may provide a reasonable, though not infallible guide to the period of a bullet assemblage.[166] For 16th-century battlefields the small number of bullets from the *Mary Rose* provides a more limited guide, and wider research on wrecks of the period is urgently needed to provide a comprehensive partial baseline from unfired magazine assemblages. If we take into account the calibre shift seen in larger calibre small arms bullets, as a result of melting during firing, then the calibre graph from recent fieldwork at Pinkie appears very different from later battlefield assemblages but is fairly compatible with the *Mary Rose* data (though with this said, the sample is currently too small to draw secure

[166] Foard, 2008a

conclusions).[167] The fact that many fewer firearms were in use on the 16th-century battlefields than in battles of later periods in turn points up the high intensity of organised detecting that will be required on 16th-century sites to recover a sufficiently large assemblage of bullets.

Bullets for handcannon

Handcannon or 'coulovrines' and the bullets for use in them are documented for the 15th-century Burgundian arsenal. For handcannon the bullets are almost exclusively of lead throughout the 15th century. There is little specific information on calibre but one description indicated lead ball of 1134gram (2.5lb) which would be 57.5mm diameter, for use in 'culverins'.[168] The bore of a surviving handcannon of c.1440 in Basel is 29mm, which would give a ball of circa 150gram. One lead ball with a diameter of 40.67mm, recovered with the other bullets from Barnet (above), does lie within the potential calibre range of hand cannon. However, from the discussion roundshot (below: 00), that there is potential for confusion with artillery roundshot.

It is possible that the bullets recovered from Towton and from close to Barnet do not derive from those battles but rather represent background noise of later date. The Barnet calibre graph shows the metal detecting finds from immediately south-east of Monken Hadley are unlike any other of 16th or 17th-century date that have so far been examined. The slight focus on seventeen bore is however the bore identified by Cruso in 1632 as that of an arquebus. On present evidence it would appear that these bullets are of the wrong calibres for handcannon of the mid 15th century. The Towton graph looks very similar to background noise as seen at Bosworth and elsewhere.[169]

[167] Foard, 2008b
[168] Smith and DeVries, 2005, 248-253
[169] Foard, 2008a

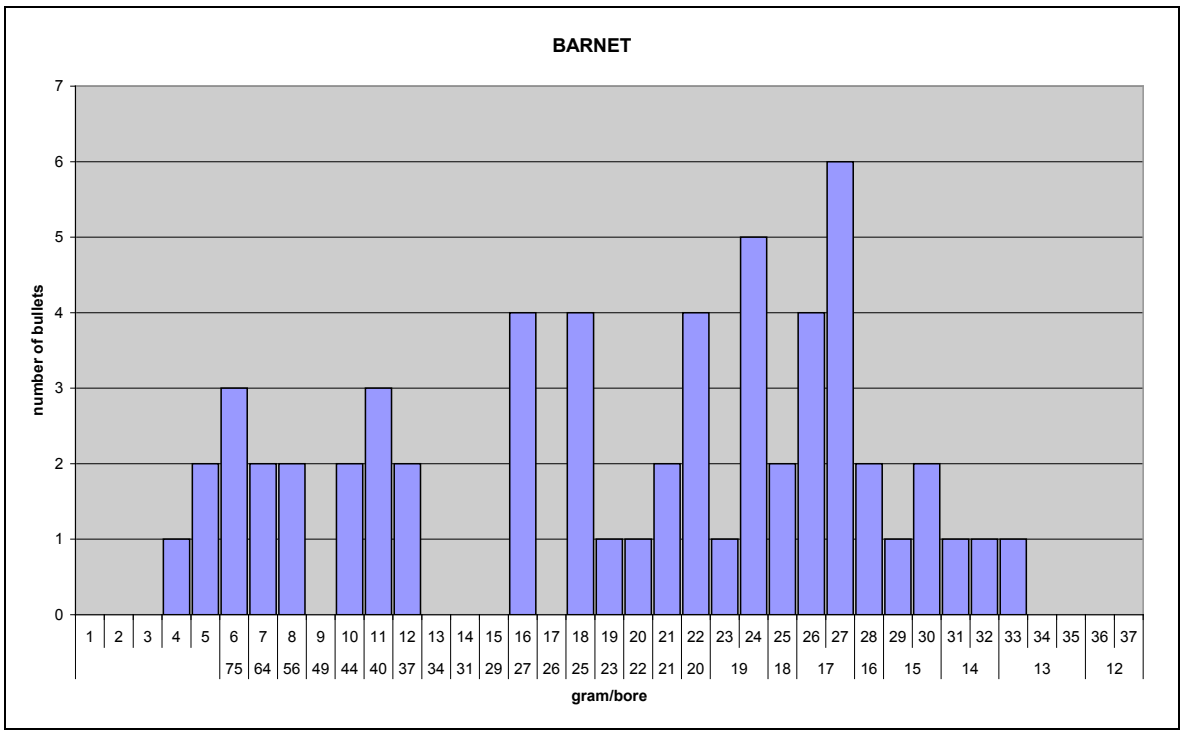


Figure 42: Calibre graph from Barnet, possibly representing background noise of later date

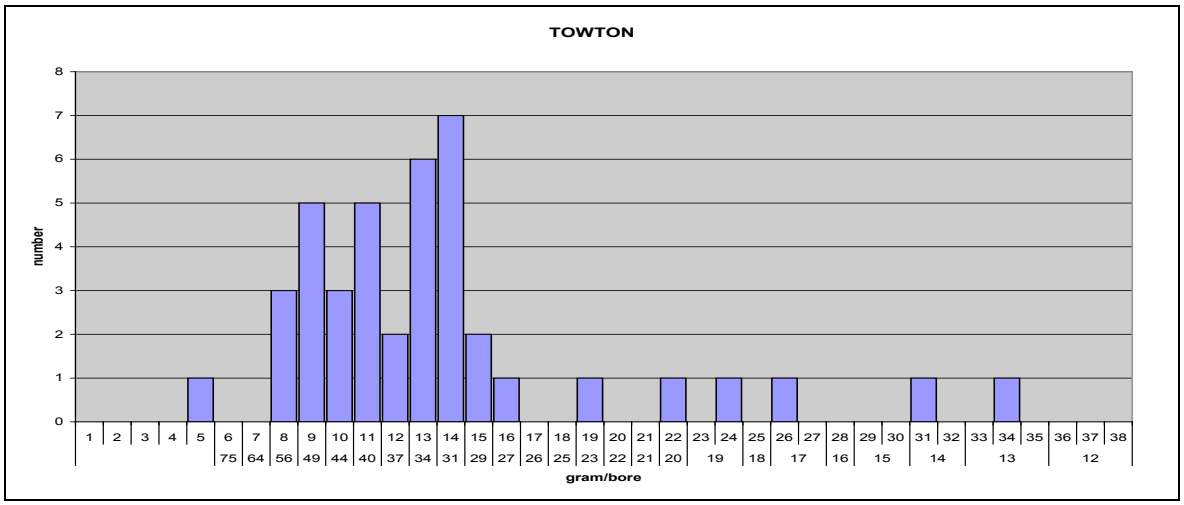


Figure 43: Calibre graph from survey of Towton battlefield, believed to represent background noise from later sporting activity

Background noise

Given the relatively limited use of hand held firearms on 15th- and 16th-century battlefields, at least until the middle of the 16th century, it will be essential to have a high intensity of metal detecting survey on these battlefields to recover sufficient quantities of bullets to be able to distinguish early munitions from the result of later sporting activities. If there is later military action on a site then separating the two assemblages will pose an even greater challenge. This is a concern, for example, at Pinkie, where there was also a Civil War cavalry action somewhere near Musselburgh, as well as the possibility of finds resulting from training at a nearby early 19th-century barracks.

If the general background noise from sporting activity is to be screened out, then it will be necessary for regional reference collections to be brought together from non battlefield sites, as is already for data from Midland England.

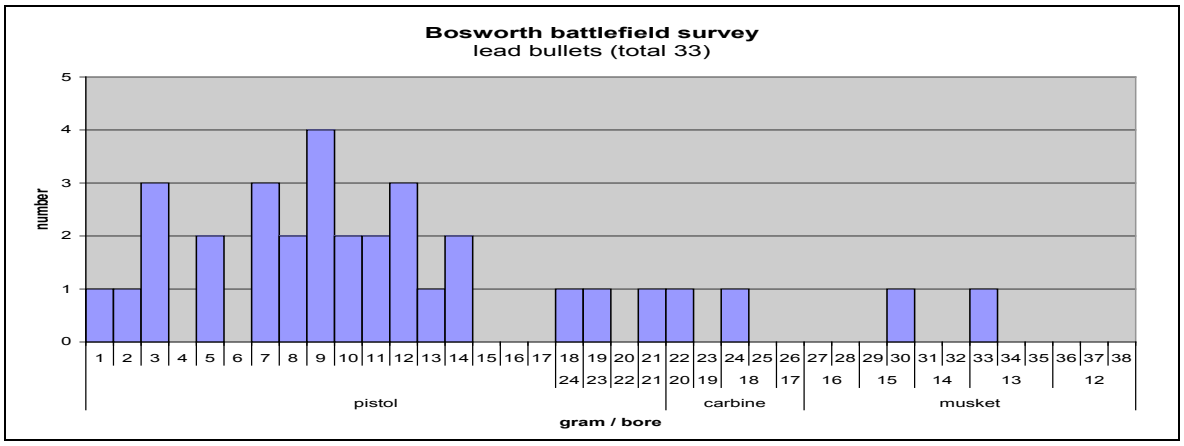


Figure 44: Calibre graph from survey of Bosworth battlefield, believed to represent background noise from later sporting activity

Roundshot

Most metal ammunition documented from the fifteenth century was of lead or composite lead/iron and was for use in smaller calibre weapons, both hand-held and artillery. These are reflected in purchases in the Burgundians records for 1476-77 for 'Making of 2,000 plommées, 6 f. and purchase of 600 livres of iron to make cubes to put in plommées', and in another from 1473-74: 'Item 200 lead plommées, some of which have iron inside, for the said serpentines, the said plommées weighing 505 livres.' Significantly, the Burgundian records suggest these were much more expensive to make than solid metal shot.[170]

[170] Information from Kelly De Vries

Whereas roundshot wholly of lead are not obviously distinctive from those of the 17th century, composite roundshot was in use from least the 1470s but seems not to have continued beyond the end of the 16th century.[171]

The *Mary Rose* contains a large number of roundshot for artillery. While the larger calibres are of iron or stone, the smaller calibres are almost all composite. There is just one intermediate sized roundshot of lead but this is a fired round and so represents incoming fire rather than being from the English ship's magazine.

Figure45: Distinctive 16th-century composite roundshot of 'iron dice cast about with lead' probably for use in an artillery piece called a Falconet, with a bore of 57mm, here showing evidence of firing (Flodden battlefield survey)

Figure46: Unfired composite roundshot of multiple small iron dice cast about with lead, where the dice are now lost through oxidisation leaving two conjoined and roughly square holes in the lead sphere (The *Mary Rose*)

[171] Lists of munitions in the Tower during the 16th century are printed in Blackmore, 1976

At Pinkie two certain and one possible composite roundshot and one apparently wholly lead roundshot have been recovered. The two calibres of composite represented are close to the two main calibres represented on the Mary Rose. The smaller is 221g and the larger 530grams. From Flodden the composite roundshot are of 576g, c.49mm, and an incomplete damaged ball of 387g but apparently or nearly identical diameter. All the composite roundshot from Pinkie and Flodden have single large dice but on the *Mary Rose* there are also a small number of examples with at least two smaller dice. The larger of the two calibres are approximately that of an artillery piece called a falconet.

In the absence of experimental data one must use the manuals, though these only relate to effective range, not final range after bounce and roll. According to Bellone in 1587 the point blank range of a falconet was 381m (250 paces or 1250ft) and the extreme range 4572m (3000 paces, 15,000ft). However, the information provided by different manuals varies both in the weight of the munition and the range.

Two lead roundshot is also reported from Barnet, where it is known that a substantial artillery exchange took place before the battle. It is of 538.4g (1.187 lb) and 46.2mm in diameter. A second is 362.6g and 40.3mm. Although both are identified in the Portable Antiquities database as being from the 17th or 18th century, they lie well within the range of calibres of lead roundshot recorded for 15th-century Burgundian artillery. Confusingly, the PAS database places them well away from their actual place of discovery, one over a kilometre to the north east the 400m to the south east of the actual location of discovery..[172] There is no recorded military action in this area from the Civil War. Since such small roundshot of lead are not common finds and so it is highly likely that both derive from the battle of Barnet.

Hailshot

The other class of munition for artillery was hailshot. These were for use at close quarters and comprised either iron dice, pebbles or ordinary lead balls as used in small arms. They could be fired loose or in cases of wood, metal or canvas. Though well known from 17th-century battlefields (below), 15th- and 16th-century hailshot munitions are known only from

[172] Information from Adrian Coulston, Hendon and District Archaeological Society, based on information provided by the finder.

documentary sources or from the *Mary Rose* and other wrecks. None have yet been identified in a battlefield context.[173]

Figure 47: Dice of iron to be used as hailshot, fired loose from a Murdered (The *Mary Rose*)

Research questions

For reasons already given, it is only now becoming possible to begin to frame research question for the study of munitions of the period. There are obvious questions, such as the reasons for the use of the more expensive and difficult to manufacture composite roundshot in preference for wholly lead roundshot. There are also wider questions that could be addressed by the study of the munitions from wrecks and battlefields, including the degree of standardisation of the calibre of bullets. This is important both for an understanding of the weaponry themselves but also has significant implications for the study of the development of industrial processes and particularly the progress in the reduction of production tolerances from the 15th to the 19th centuries, culminating in the dramatic changes seen in the industrial revolution.

Table: Bore and weight of roundshot for artillery and small arms from Eldred (1648 but relevant to the early 17th century and before)

	Bullets to the pound	*Bullet weight in pounds and ounces*	*Bullet weight in grams*
Caliver	**20**	**0.8oz**	**22.6**
Musket	**11**	**1.45oz**	**41.1**
Hargobus of Crock shot	**7.5**	**2.13oz**	**65.2**
Po(r)t Piece		**11.25, 0**	**5103**
Fowler		**6, 3**	**2806**
Base		**0, 6**	**170**
Robinet		**¾**	**340**

[173] Starkey *et al*, 1998

Falconet		**1 ¼**	**566**
Falcon		**2 ¼**	**1020**
Minion (3 prd)		**4**	**1814**
Saker (6 pdr)[174]		**5 ¼**	**2381**
Demi-Culverin ((12 pdr)		**9**	**4082**
Culverin		**15**	**6803**
Demi-Cannon		**27**	**12246**
Cannon		**47**	**21318**
Cannon Royal		**63**	**28576**

[174] Royalist ordnance papers refer to 6 pounders and 12 pounders. They have been listed here together with saker and demi-cannon, with which the bullet weights broadly coincide.

Sixteenth-century case studies

St Albans II

Date: 17th February 1461

County: Hertfordshire

Grid Reference: TL151078

Outcome: Lancastrian victory

Location: secure

Terrain: urban / heath

Armies: Yorkist; Lancastrian

Numbers: up to 40,000

St Albans II was assessed for the Register but quite reasonably considered to be too badly damaged to justify inclusion. However, in the light of the potential of the site to contribute to the understanding of the introduction of gunpowder weapons, a rapid desk based assessment of the likely survival of battle archaeology has been conducted here. [175]

While much of the action in the battle of St Albans II took place within the urban area itself, part of the action took place on Bernard's Heath on the north-eastern edge of the town, with the Yorkists then being driven back north eastwards towards Sandridge and Nomansland Common beyond.[176] The surviving nineteenth-century extent of Bernard's Heath at the eastern end of the town has been defined using the 1805-6 Ordnance Surveyor's Drawings and the extent of the urban area of St Albans has been plotted from Hare's 1634 map, all transcribed to the 1883 Ordnance Survey first edition six-inch map

[175] Burley *et al*, 2007
[176] Haigh, 1995, 46-54

base. The extent of quarrying has been taken from the latter while the extent of undeveloped modern parkland is taken from Live Search vertical air photography.

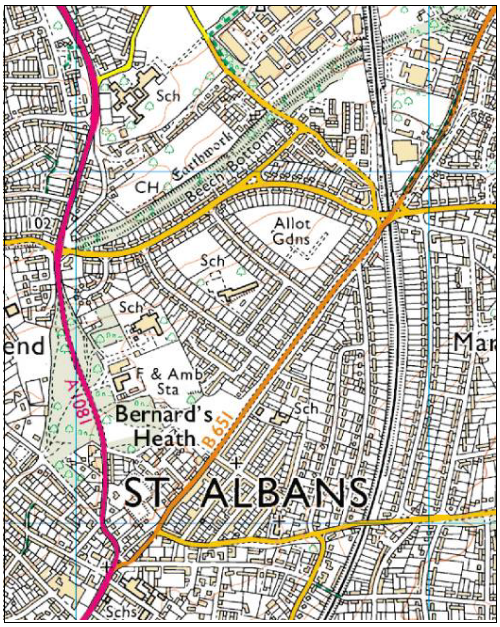


Figure 48: Current state of development of the former area of Bernard's Heath (Crown Copyright 2008)

The greater part of Bernard's Heath as it survived in the early nineteenth century is unaffected by development as parkland. If this area encompasses part of the action then there seems initially to be a possibility that it will contain significant battle archaeology including lead bullets. However, as so often when local historians are consulted or local histories and local archaeological studies are examined for a battle or its landscape context, it is discovered that the situation is far more complex. In this case detailed study has already been undertaken of the historic landscape of the St Albans area and particularly Bernard's Heath. This suggests that the heath was far more extensive prior to enclosure in the 1670s, spreading north eastward from the nineteenth-century area. Unfortunately it has also shown that quarrying activity apparently extended over most of not all of the surviving area of the former heath.[177] Hence apart from the improbable survival of bullets in the redeposited topsoil the only area of undisturbed ground where remains might be found is likely to be immediately to the north where the prehistoric

[177] Information from Peter Burley; Reynolds, n.d., Hunn, 1991

earthwork known as the Beech Bottom survives. It has been suggested that it was where this was crossed by the railway cutting that the nineteenth century discovery of a mass grave, supposedly containing artefacts of the fifteenth century, was made.[178] Thus the research potential of this battlefield appears to have been wholly lost.

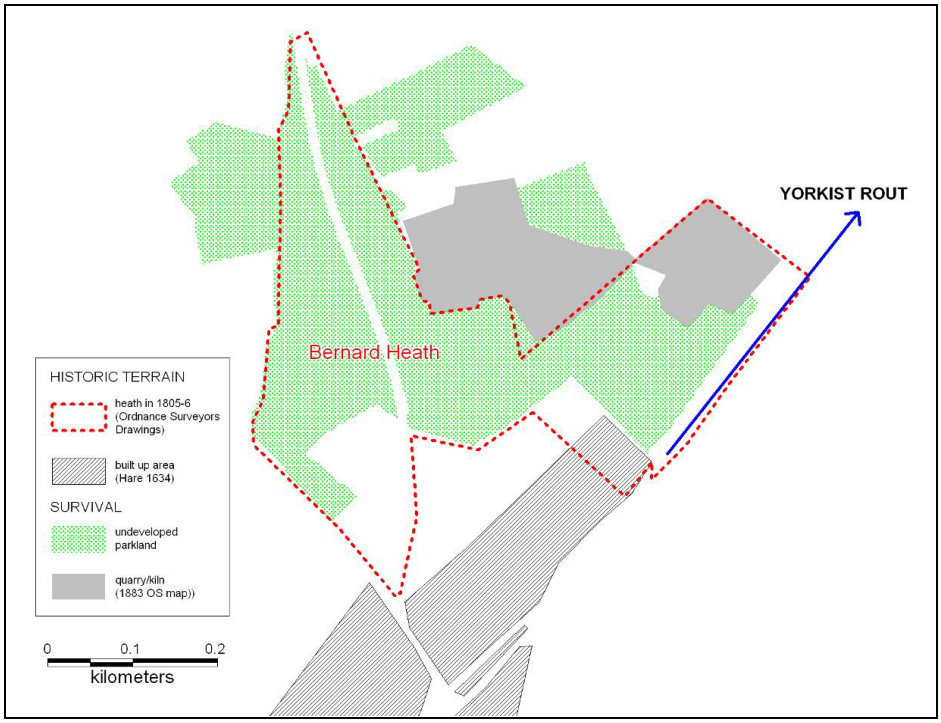


Figure 49: St Albans II: the general area of the final stage of the battle on the northern edge of the town. The modern built up area is shown as white

Dussindale

Date: 27th August 1549

County: Norfolk

Grid Reference: TG282090

Outcome: Government victory

Location: alternatives

Terrain: heath?

Armies: Government; Kett's rebels

[178] Burley et al., 2007; information from Harvey Watson; Burely 2007

Numbers: 5-10,000

Losses: several hundred?

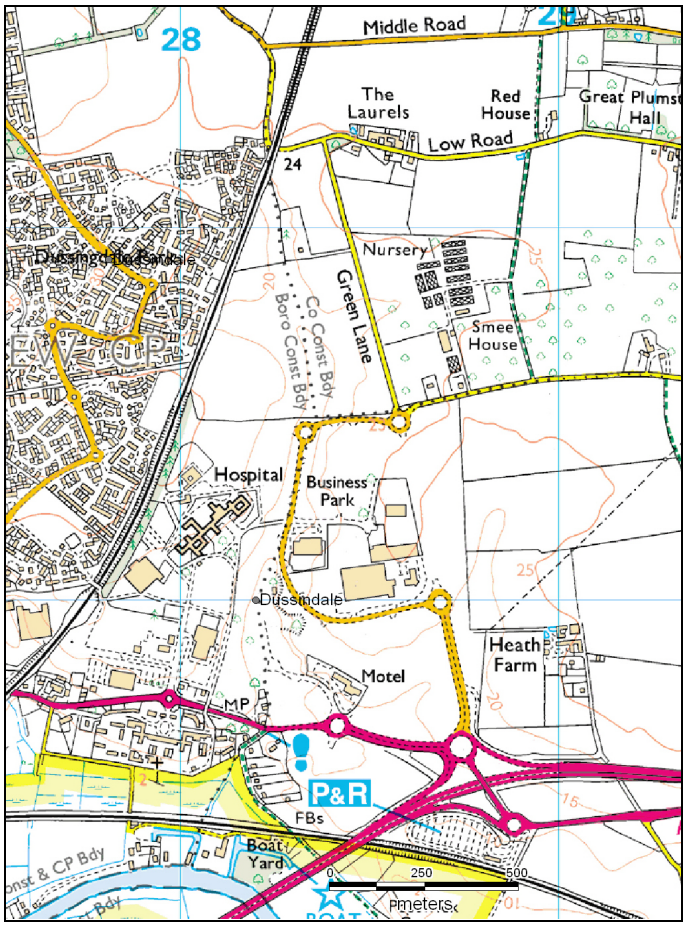


Figure 50: Putative site of the battle of Dussindale, centred on the north south valley along which runs the administrative boundary (Copyright Ordnance Survey)

Dussindale well typifies smaller scale battles and the problems that they pose. The battle is not well documented but a number of accounts do survive from the following decades, though none accurately locate the action. The generally accepted number of combatants is between 5 -10,000. The government forces under Warwick numbered about 3500-4500 men, largely professional including 1500 German 'lance knights' and Captain Drury's handgunners as well as retinues of several prominent local lords and remnants of Northampton's forces brought up from Cambridge, again containing a disproportionate number of foreign mercenaries. The rebels were armed with bills, bows and agricultural

implements though archers are consistently mentioned and played a significant part. They may also have had as many as twenty captured guns commanded by 'Miles, the Master Gunner', which they had already used effectively against the city defences. The number killed at Dussindale was as high as 3500 by Neville's account, though more likely to be in the high hundreds.[179]

The action saw the intensive use of both mercenary arquebusier as well as English archers, while there is good reason to believe that there may also have been a substantial artillery exchange though it is unclear whether this could have included use of case at close quarters. The soils of the putative site lie partly on sand and gravel and partly on glacial till, the former probably acidic and aggressive towards lead while the latter is likely to have produced more favourable conditions, depending on land use history.

The site was lost for centuries and was believed by some to have lain to the north of the city. It was within the parishes of Thorpe and Sprowston and 'a mile or above' from Mount Surrey. Terrain reconstruction by Carter resulted in the suggestion of a new location, to the east of the city along a shallow north/south valley, Dussindale, that rises up to a small ridge on the eastern side.[180] This dale is the first substantial feature travelling eastward across Mousehold heath from the city. To the north were two enclosures called Lumners. Further enclosures lay to the south, providing a narrow frontage of well under a kilometre and providing flank protection on both sides, with other enclosures to the east behind the putative rebel position on the eastern side of the dale.

This is arguably the most threatened site of its kind in England, lying on the edge of expanding Norwich, with part of the area already built over and much of the rest already evaluated in the late 1990s. The problems are compounded by the fact it is also one of the least recognised. Despite publication in the 1970s of terrain-based research that located the battlefield more accurately it has only recently been added to the SMR and the location given is not on the undeveloped but threatened location which the terrain research indicated, but under an existing housing estate. Of almost equal concern is the lack of recognition of the research potential of the site or of the methodology necessary for the evaluation and recording of such sites.

[179] Champion, 2001; information from Matthew Champion
[180] Carter, 1984

The site was evaluated in 1995 but without awareness that this may have been the battlefield.[181] Thus, despite metal detecting being included in the evaluation strategy, finds of lead were apparently discriminated out, the priority being the investigation of much earlier settlement activity. The failure of the evaluation to yield relevant evident is therefore not surprising as the main evidence from evaluation of the battlefield should be lead bullets. However, the site is said to have been subject to extensive metal detecting by a local detectorist over many years who reports no significant battle-related finds. Again however, this is not necessarily a valid conclusion as detectorists normally dismiss low densities of lead bullets as irrelevant background noise and so may not have reported or even collected such material. What is urgently required is a re-examination of the terrain evidence and the evidence for the placement of the battlefield here, together with systematic sampling of the site by metal detecting survey at 10m transects, the case then being reviewed.

[181] Norfolk Archaeological Unit, Report 121

Early Modern warfare: 1600-1745

The Civil Wars were an intense period of warfare in which England, Ireland, Wales and Scotland were all involved. While for historically incidental reasons this report is confined to England, the study and management of battle archaeology of the Early Modern age should be British Isles-wide.

There are over 400 English records on the database for the 17th century. Of these just one, the Anglo-Scottish battle of Newburn Ford (1640), precedes the Civil Wars, though in reality it should be treated as part of the same phase of warfare.

From 1660 come another nine actions. Three were part of the Anglo-Dutch wars, involving naval landings around the Thames Estuary, on the Medway and at Landguard and Sheerness forts in 1667. The main actions stem from the Monmouth rebellion, the abortive attempt to overthrow James II in 1685. This campaign saw a series of skirmishes at Bridport, Keynsham and Norton St Philip and then the final destruction of the rebel army at Sedgemoor.

In military terms the events of 1688 represent little more than a footnote to the Monmouth rebellion. They saw the successful overthrow of James II by a Dutch army under William of Orange which had strong support in England and so involved only token resistance in skirmishes at Reading and Wincanton.

Apart from the phasing out of the matchlock in favour of the flintlock amongst most of the government troops, and the apparent introduction of the hand grenade to the battlefield,[182] military practice and equipment changed little between the 1640s and 1680s. The pike was still in use and the bayonet would not be used in action until 1689 at Killiecrankie. Thus the warfare of the 1680s is treated here alongside those of the Civil Wars.

[182] The grenade may have been used in some circumstances in the 1640s

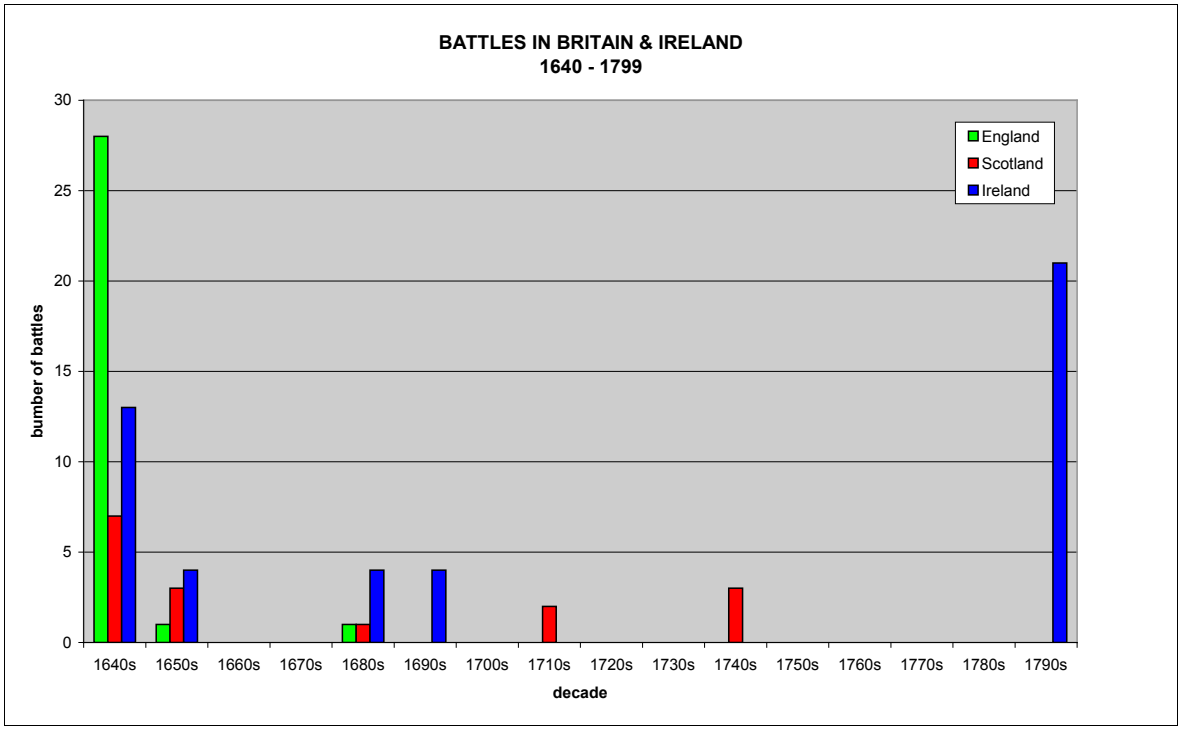


Figure 51: Battles in Britain and Ireland, 1640-1799

The database also contains 20 actions in England from the 18th and 19th centuries. Of these four are 19th century events of civil unrest, such as the Gordon Riots. One is an American naval landing at Whitehaven in 1778, during the American War of Independence. None were substantial, and all lie beyond the scope of the present study. The significant actions from this later period are all from the Stuart uprisings based in Scotland. In 1715 during the first Jacobite rebellion a substantial army entered England via the west coast route. At Penrith they were faced by local levies who fled rather than engage, with the result that this was not a significant engagement. Subsequently the rebel army was defeated in an urban action at Preston but although some 6000 troops were involved, Preston II was an urban street fight and is normally classified as a skirmish whence no significant terrain or battle archaeology is to be expected.

During the second Jacobite uprising in 1745, following their victory at Prestonpans, another rebel army some 5000 strong entered England, again via the western route. They first took the garrison of Carlisle on 15 November and then continued south as far as Derby where the massive scale of the government response forced them to retrace their steps. With a detachment of cavalry, dragoons and mounted infantry the Duke of

Cumberland pursued the rebels and on 18 December engaged them in a running skirmish around the village of Clifton and on Clifton Moor on the upland pass north of Shap in Cumbria. Only about 50 troops were killed but it was an effective rearguard action for it allowed the rebel army to escape into Scotland. Although it cannot be classed as a battle it was the last substantial action to take place on English soil. Clifton is also reasonably well documented, including the Jacobite battle plan, and may be expected to have left significant archaeological traces. As the only 18th century action of note where the field of conflict is likely to remain intact, this site should be fully assessed.

Clifton aside, for warfare of the 18th century which can yield a substantial battle archaeology it is to Scotland that one must look for the first half of the century and to the British campaigns in Ireland for the 1790s.

The focus of interest here is the period of the Civil Wars, together with the addendum of the Monmouth Rebellion.

The most important conclusion of this study is that battlefields of the early modern period can no longer be studied in isolation from other fields of conflict, including sieges and skirmishes, and other military sites, including garrisons and shipwrecks. Archaeologically, these different aspects are interdependent, with the potential to answer questions better when explored together than alone.

Seventeenth-century warfare

England saw no military action in the first forty years of the century. In the 1640s it was plunged into what was arguably the most intense period of warfare in its history. This age of civil conflict can be divided into five phases. The first opened with a clash between Charles I and his Scottish subjects that led to the First and Second Bishops Wars, which saw Scottish armies enter England and in 1640 culminated in the first battle on English soil since Solway Moss nearly a century before.

The main events belonged to the First Civil War (1642-1646), followed in 1648 by the Second Civil War. The Third Civil War developed out of a pre-emptive strike by English government forces into Scotland in 1650 to counter a campaign for the English crown that was being planned by the son of Charles I from his Scottish kingdom. Despite Cromwell's success at Dunbar, there was an invasion of England in 1651 that ended in the destruction of the largely Scottish army at Worcester, one of the largest and most complex actions of the war. The final years of the Republic saw no further battles but were troubled by several

small scale royalist rebellions, the Penruddock Rising (1655) and the Booth Rising (1659), which led only to minor skirmishes.

The Civil Wars differ from earlier periods of warfare not simply in scale and intensity, but also in the wealth of primary written sources that refer to them, and the range of physical evidence that has survived. The scale and depth of action, together with the quality and detail of scholarly analysis already undertaken, puts the Wars on a European scale of importance, as an example of warfare in the period when the full development of pike and shot tactics had been achieved. The short period within which the Wars took place also makes it likely that evidence on garrison sites will not be confused by later or earlier action and military occupation. Methodology for research into the archaeology of this period is increasingly well developed.[183]

It has not been practicable to attempt a list of all the minor actions, but a pilot study was undertaken to establish the scale of information that could be rapidly retrieved. Thus in addition to the more intensive work on battles of all periods in Cumbria and West Yorkshire, discussed above (p.00), several of the county histories on the Civil War were also examined to identify the number of sieges, skirmishes, beating up of quarters and other minor military events.

Five works were examined, from the later 19th or early 20th century, which was a period of intense interest in the history of the Civil Wars Thomas-Stanford's 'Sussex' yielded four sieges and four skirmishes not already present on the database. Bayley's 'Dorset' gave eight new sieges and three other minor actions. Broxap's 'Lancashire' added no significant sites. Such variation is explained in part by the fact that some HERs have better listings of Civil War sites than others, and some counties are better served than others by the national overviews that were used for the general database enhancement phase.

One more county, Shropshire, was enhanced from a modern study of the war followed by field visits, though here the emphasis was on siege sites (below, p.00).[184] Given that most counties or regions have one or more secondary works on the Civil War, a national review would be useful to collect the majority of lesser garrison and siege sites

[183] Harrington, 2004; Foard, 2008a
[184] Bracher and Emmett, 2000. Rapid searching of other county volumes was precluded by the absence or inadequacy of indexes

and many of the skirmishes. It might also help to decide the scale of some of those actions which sit on the boundary between battle and skirmish. But this is not a high priority.

Sieges and related sites

Sieges lay largely outside the present study, other than for scoping purposes. However, for the Civil War the evidence they offer is so closely associated with the characterisation of battle archaeology that it was essential to address them in more detail. The scale of the data retrieved incidentally from the SMR and bibliographic searches enabled this.

There are five types of evidence for military action that may be recovered from siege sites: bullet scatters, bullet impact scars scatters, siege works, destruction levels and burials. Key aspects of this resource have never previously been characterised or investigated. The present discussion is therefore offered as a scoping exercise, to illustrate what would be achievable through a full resource assessment of what emerges on the one hand as an important class of monument, and on the other as a category that has largely escaped strategies for management of the historic environment.

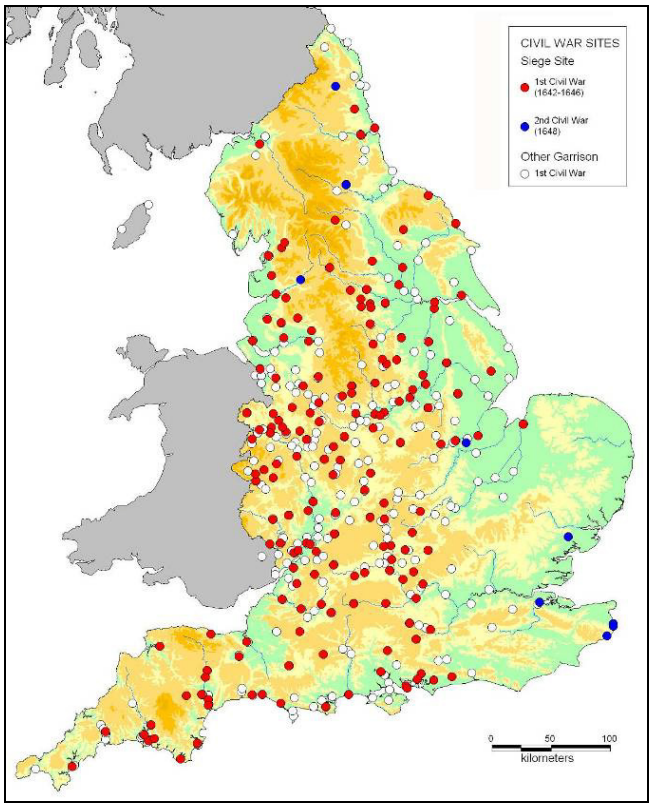


Figure 52: Siege sites and garrisons of the Civil Wars in mid 17th-century England

The database (not a definitive list) includes 242 sieges in England from the Civil Wars, of which 223 are from the first Civil War (1642-6) and 19 from the second (1648).[185] These comprise just 189 siege sites as a number of garrisons were besieged more than once (e.g. Basing House, attacked in 1643, 1644 and 1645).

Evidence from a siege will vary in nature according to the scale, duration and character of the action, the size of the garrison and the attacking forces and the scale of the defences. A siege that involved attempts at storming is more likely to have left complex and informative archaeological evidence. It was not practicable to distinguish where storming took place, but the 41 stormings identified here are almost certainly a large underestimate.

In addition to offensive works such as trenches to approach the defences or saps to undermine them, siege works are likely to have been accompanied by camps, sometimes with their own defences. Such constructions can be substantial, as seen with the siege of Newark, which appear to be the only major complex of English Civil War offensive works to have been the subject of extensive archaeological study.[186] No attempt has been made here to collect information on the detail of the siege works themselves.[187]

In addition, there are garrisons for which no record of a siege has been identified (and hence do not appear as such on the Fields of Conflict database) but yet may have seen some action. To catch these, a supplementary database of Civil War garrisons, developed independently, has been used to map their distributions as ancillary data.[188] This is probably the most complete listing so far produced, but is still not exhaustive: for instance, it is very possible that a small number of sites were defended at some point during the war, and saw action, but were not garrisons as such. For example, the church of St Mary at Canons Ashby, Northamptonshire, was used as a place of refuge by a tax-collecting force from Northampton when attacked by troops from the royalist garrison of Banbury. The latter proceeded to launch an attack on the church, blowing the door with a

[185] Hutton and Reeves, 1998
[186] RHME, 1964. Some other sites have seen more limited investigation, as at Plymouth
[187] Some information is provided in Harrington, 2003, 35-39 and Harrington, 2004 but this does not appear to be an exhaustive catalogue.
[188] Sources included: Gaunt, 1987; Foard, 1995; Atkin, 1995; Bracher and Emmett, 2000; Harrington, 1992; Harrington, 2003; Kenyon and Ohlmeyer, 1998; Baker, 1986; Newman, 1985; Marix Evans, 1998

petard and firing the tower, which remains a floorless shell today as a result.[189] Additional garrisons and such lesser sites of action would only be identified by a systematic search of secondary works that have been produced at a county and regional level. The present data for sieges must therefore be taken as interim.

Magazines and related evidence

Garrisons are identified here not only because some of them may have seen action but also because they have a research potential with wider relevance to battlefield studies. Many were occupied only briefly, and since they often have clear destruction phases they can provide exceptional sealed assemblages of Civil War date. They will normally include unfired bullets, which may provide a calibre signature for the types of firearm in use by a particular force, as seen below with the Beeston castle and Sandal castle data sets. If so, such information will assist the analysis of battlefield assemblages as well as being of interest in its own right.

In a few cases remains of the magazine may survive, as with the 1691 garrison of Ballymore in Ireland, where more than more than 2000 unfired bullets illuminate the nature of the munitions in use at the time by a particular army.[190] Garrison assemblages may also contribute to the resolution of problems of identification of non weapon-related artefacts in use by the military, and assist in their separation from other metal artefacts deposited by agricultural and other non-military activity over the centuries.

A maritime contribution

Of yet greater importance for the characterisation of munitions and other equipment are shipwrecks. There are many European wrecks scattered around the world; warships or supply vessels carrying munitions are well-dated sealed assemblages which can contain near-unique data, valuable for the interpretation of battlefield archaeology. Just two from the 17th century were assessed in association with the present project: the *Duart*, lost off Scotland c.1650, and the *Vasa*, wrecked in 1628 in Stockholm harbour. With the exception of the Akko I shipwreck from the harbour at Haifa, Israel, which seems to represent naval combat c.1800, nearly all the bullets so far seen from wrecks are unfired and mainly magazine assemblages. These collections are essential for the first stages of

[189] Page, 1893
[190] Foard, 2008a

characterisation of early modern munitions in use on the battlefield. The resulting bullet calibre graphs are presented here. Individual bullets have also provided a reference collection of unfired munitions for comparison with the mainly fired munitions recovered from battlefields and siege sites.[191] Having demonstrated the value of the data and the effectiveness of the methodology for analysis, what is now required is for the data from excavated European wrecks around the world to be brought together in a single study to more effectively define the calibres and character of munitions in use by different European armies from the 15th to the early 19th century as an essential reference point for the archaeological study of early modern warfare.

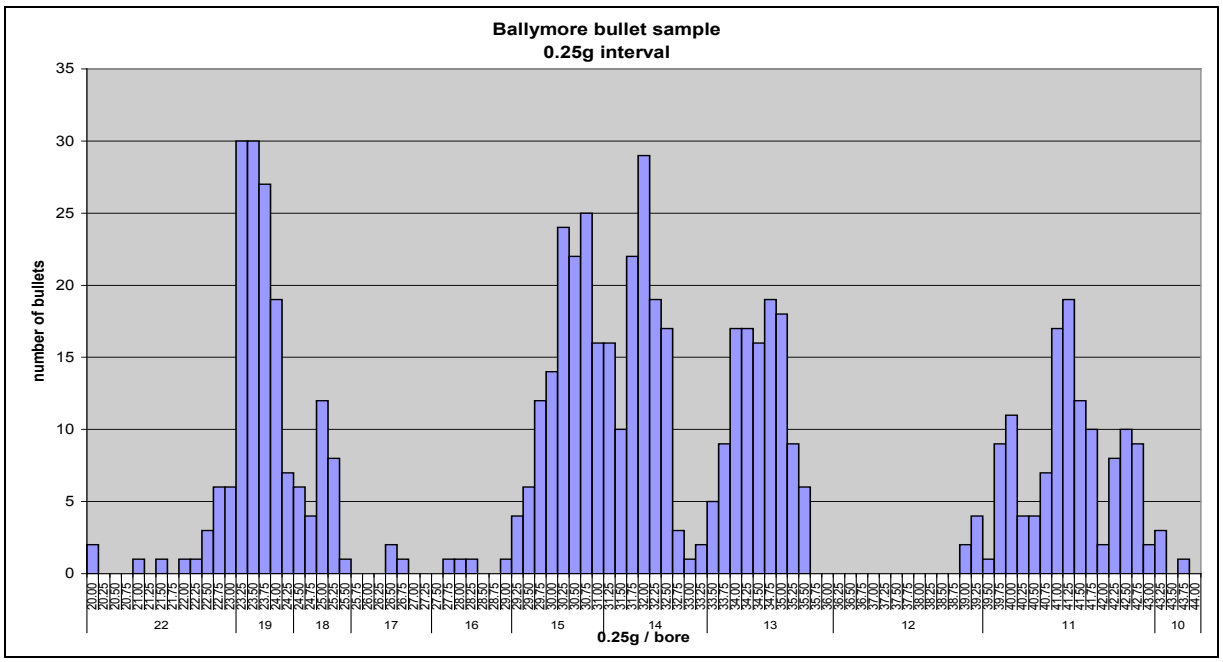


Figure 53: Calibre graph for lead ball from the 1691 siege of the Ballymore garrison, Ireland[192]

[191] Foard, 2008a
[192] Foard, 2008a

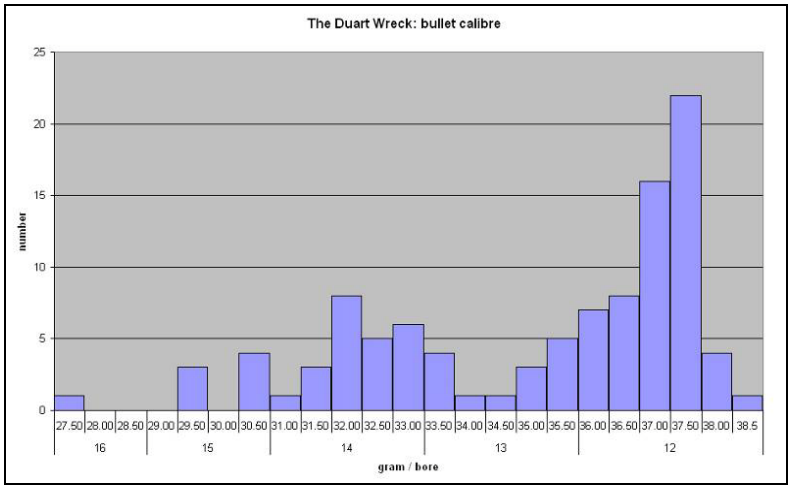


Figure 54: Calibre graph for lead ball from the *Duart*, lost off Scotland c.1650[193]

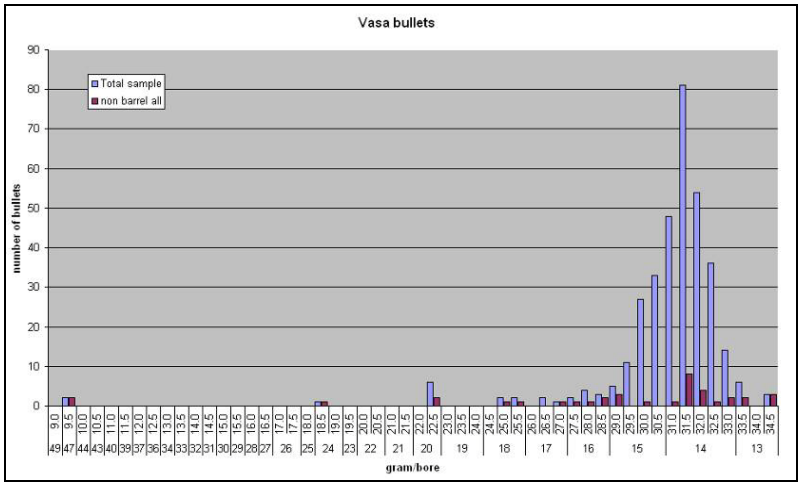


Figure 55: Calibre graph for lead ball, mainly of one calibre intended for case, from the *Vasa*, wrecked in Stockholm harbour in 1628[194]

Impact scars and impacted bullets

Buildings on fields of conflict may bear scars resulting from fire-fights or artillery bombardment. To date there has been no systematic study of such evidence. Limited recording has thus been carried out on several sites, to sample the nature of this resource and to assess where and how it is likely to present itself.

[193] Foard, forthcoming a
[194] Foard, 2008a

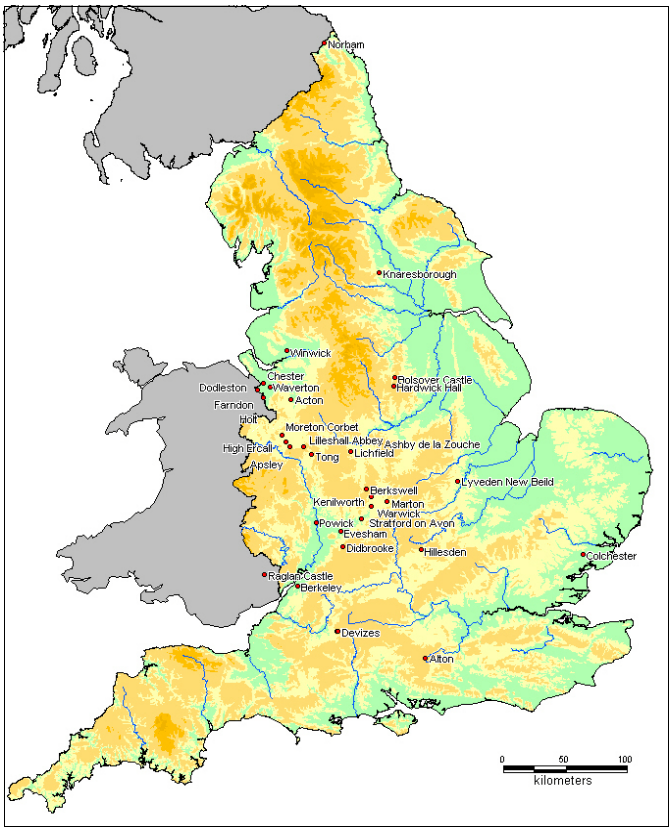


Figure 56: Sites with signs of bullet impact scars

Impact scars have long been known, but have been treated as a curiosity rather than a potential source of information.[195] Field inspection of 16th and 17th century battlefields in England for the present project produced impact scar evidence only at Nantwich (Acton church). There are reports of impact scars on Winwick church, which was a refuge for some routed troops from the 1648 battle of Winwick Pass, but the church was also part of a garrison in 1643 and the evidence may not relate to the battle.[196] The rarity of such cases is in part because few battles involved the use of buildings or walls for defensive purposes, and because not all structures that might have been so used have survived. For example, at Adwalton Moor royalist musketeers took cover behind isolated buildings and enclosures to slow down the parliamentarian approach to the moor. They were driven off in a fire fight by parliamentarian musketeers, but none of those buildings remain.[197]

[195] Barrett, 1896, 285
[196] Information from Michael Rayner
[197] Foard, 2003a; Johnson, 2003b

This type of evidence is far more common on siege sites, particularly castles and churches. The accompanying map gives results of a rapid assessment of a small sample of siege sites of the 17th century, together with examples that have come to light incidentally. Many more such sites will exist.[198]

Scars result from bullet impacts on all but the hardest stones, such as granite. They are most clearly defined on dressed stone, particularly sandstone or limestone, but may be lost or obscured by erosion on friable stone and are very difficult to recognise on rubble. Scars can be several centimetres deep and typically have a cup-shaped central depression often with surrounding shallower surface spalling. There may also be one or more radial fractures, especially where the impact is close to the edge of a block of stone when larger pieces of stone may also have been broken off. Such attributes are quite distinctive compared to pitting of stone due to the natural erosion of faults in stonework and other damage caused by human activities. Normally problems of recognition only occur where stonework is heavily eroded.

Figure 57: Bullet impact scars on sandstone at Ashby de la Zouche castle (an English Heritage property), showing the typical cup shaped core though there has been some erosion of the spalled surrounding surface. There is also one example of radial fractures and another of fragmentation due to impacting close to the edge of a stone.

While most of this evidence appears to be from musket fire, occasionally there are larger scars which have resulted from roundshot fired by artillery, as at Tong church,

[198] While the large majority should prove to be the result of Civil War action, a few may be the result of later target practice, as with the impact scars identified on Lyveden New Build, Northamptonshire which is known never to have been defended in the Civil War but which did lie within a hunting landscape. Lyveden is said to have been used for a day or more as a military camp in the 18th century.

Shropshire and on the defences of Chester. The latter appear to be the only published example of impact scars that have been subject to recording.[199] Structural damage from artillery fire is reported on several other sites, including Lichfield Cathedral which suffered two Civil War sieges.[200] Other types of munition that may have left such scars, of varying form and scale, are case fired by artillery, and carbine, pistol and hailshot fired from small arms.

Figure 58: Roundshot impact scar from artillery fire against the exterior of Tong church, Shropshire

Only one example of a roundshot impact scar has been noted on brickwork: the wall of the Grange within the outermost defences of Basing House.[201] The character of bullet impact scars on brick seems to be quite different from those on stone, with a far more jagged and fractured form, as demonstrated by an example of Minie ball impacts from the American Civil War on the Carter House in Franklin, Tennessee. However it should be noted that the Minie ball had a higher velocity than a 17th century musket bullet and the brick may have been harder, so it is possible that 17th-century examples will differ. Another variant is the bullet hole, which is seen on various siege sites including the timber framed 'Siege House' at Colchester, on the main door at Hillesden church, Buckinghamshire and on the tower doors at Berkeley church, Gloucestershire.

[199] Ward, 1987
[200] Information from Bob Meeson; Morris 1979
[201] Information from Alan Turton

Figure 59: Detail of impact scars on brick on an outbuilding of the Carter House, Franklin, Tennessee from Minie ball fired in an assault during the American Civil War

Figure 60: Hillesden church, Buckinghamshire, showing bullet hole in wooden door in north porch from the storming of the garrison in hall and church, 1643

Given the lack of previous analysis, in the present project a simple method has been developed for the recording of impact scars. Firstly they have been mapped in plan, to record the surviving distribution and thus give an indication of the intensity and direction of incoming fire around the site. Two example sites have been mapped in this way: Acton church, Cheshire (battle of Nantwich, 1644) and Morton Corbet castle, Shropshire (siege, 1644). Secondly a sample section of the elevation of Morton Corbet castle has been recorded, to present the vertical distribution of impact scars. This complements the plan, as distinctive patterning in the vertical plane has been noted on many of the sites. A simple method of recording individual scars has been trialled on Kenilworth castle, with vertical

and horizontal sections produced with a template to accompany a photograph and annotated scale drawing of the scar.

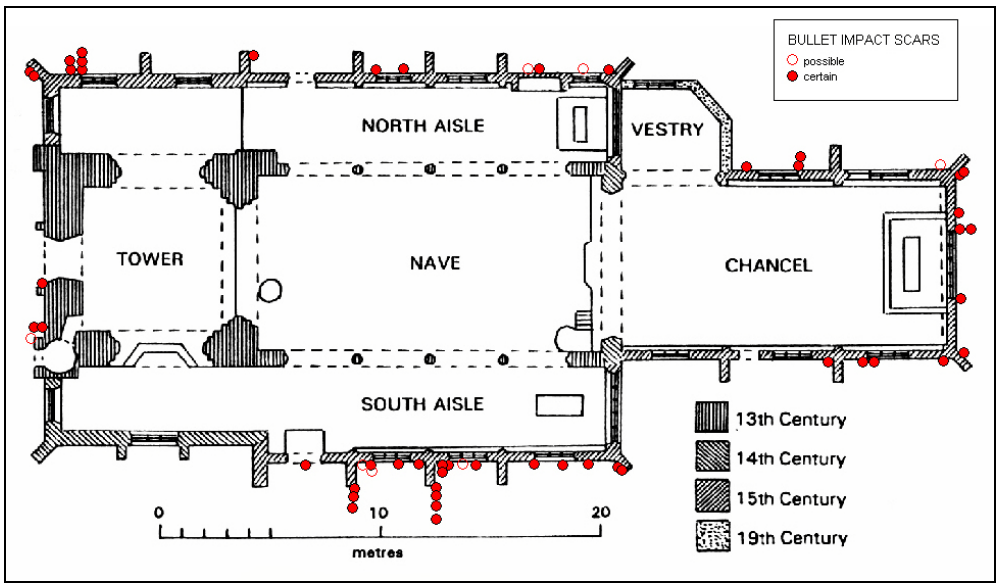


Figure 61: Bullet impact scars on Acton church, attacked during the battle of Nantwich, 1644. Scar locations were surveyed by G Foard in 2007 and are superimposed on a plan of church taken from Salter, 1995

Acton church was the site of the royalist baggage train during the battle of Nantwich in 1644; some 50 bullet impact scars witness the assault on the building.[202] A photo-based sketch plot of the distribution of impact scars gives a basic insight into the scale and distribution of incoming fire. For full recording a measured survey would be required using the data from the photo rectification used to record the elevation. However, additional information is required for interpretation. For example, the pattern may represent only part of that which existed, some having been lost though demolition or repair. It is clear from the plan of Acton that the 19th century vestry will have obscured or destroyed scars on that part of the building, whilst other evidence may have been lost when the upper stages of the church were rebuilt in the later 18th century. Even more problematic is the loss of impact scars through piecemeal re-facing and stone replacement. While occasionally a small piece of patching is seen that almost certainly represents the repair of a scar, a comprehensive identification of the potential losses would require a detailed

[202] English Heritage 1994

recording of the structure that was far beyond the scope of the present work. Another uncertainty concerns the number of bullets which passed through windows. In the case of Acton no impact scars were found within the church, but at Tong church the incoming rounds had passed through one window and impacted on internal vaulting. This was probably during the 1644 royalist assault on the adjacent parliamentarian garrison in the castle, of which the church may prove to have been an outwork.[203]

Figure 62: Impact scars, one partly repaired, on the arch of the north aisle arcade at Tong church from rounds which passed through the windows

Further piloting of the recording methodology was undertaken on the English Heritage property of Morton Corbet castle, Shropshire. Between 1643 and 1645 this was a minor royalist garrison. It fell when it was stormed on the night of 8 September 1644, but was soon back in royalist hands and was not finally abandoned until late 1645. The assault presumably involved the attackers in taking the adjacent church, for it too carries scars from bullets fired from the direction of the castle. In contrast, the impact scars suggest that the assault on the castle was aimed primarily at the south eastern corner of the site, though this could in part simply represent suppressing fire against an artillery piece firing from the gun port there. Moreover, as the plan indicates, survival of the whole circuit of the defences is incomplete, while in some areas survival is only of unfaced or very low walling. Hence, the picture provided by the impact scars may not be wholly representative.

[203] Auden and Frost, 2007

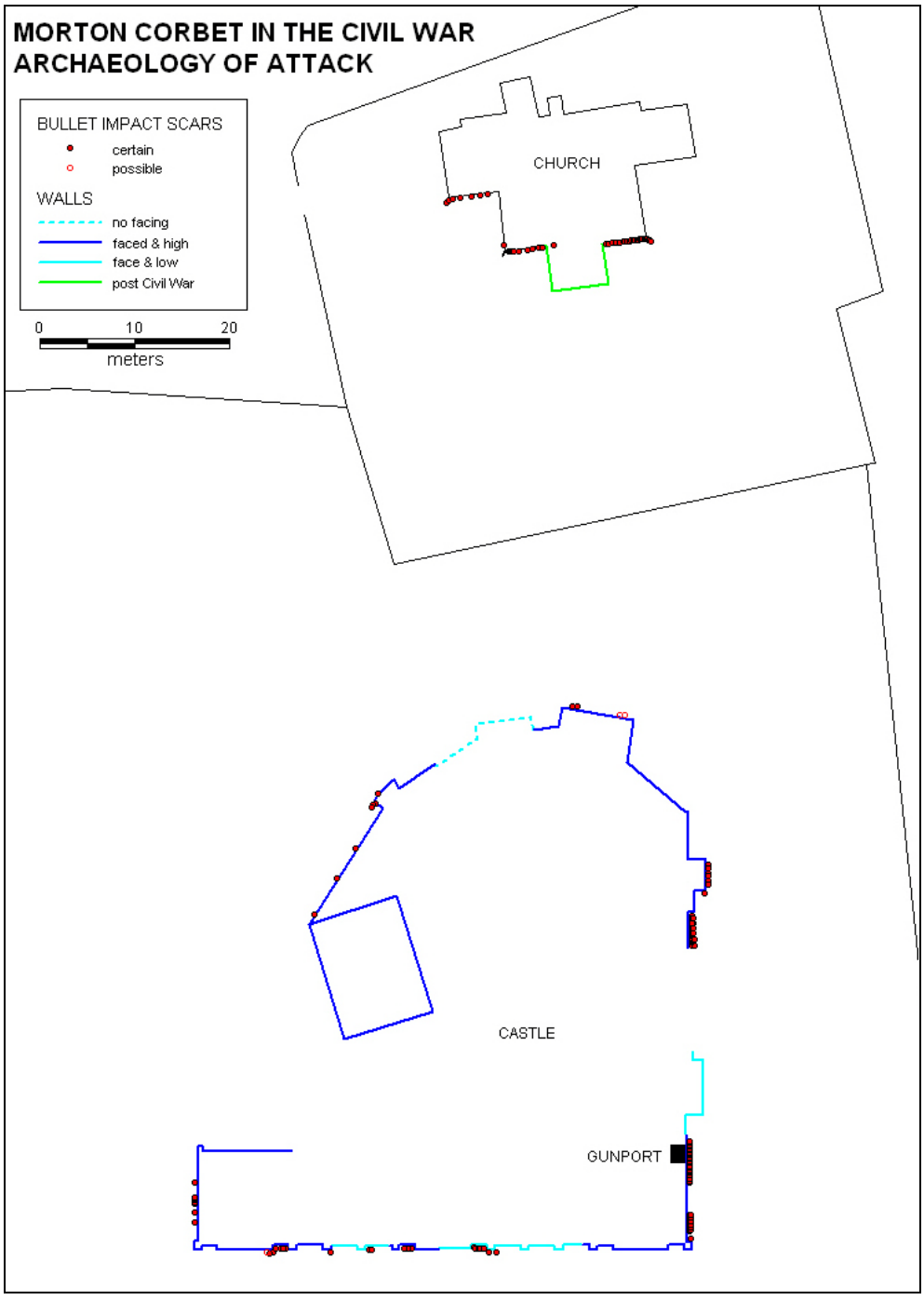


Figure 63: Plan showing distribution of bullet impact scars on Morton Corbet castle and church (Crown Copyright 2008. An Ordnance Survey / EDINA supplied service)

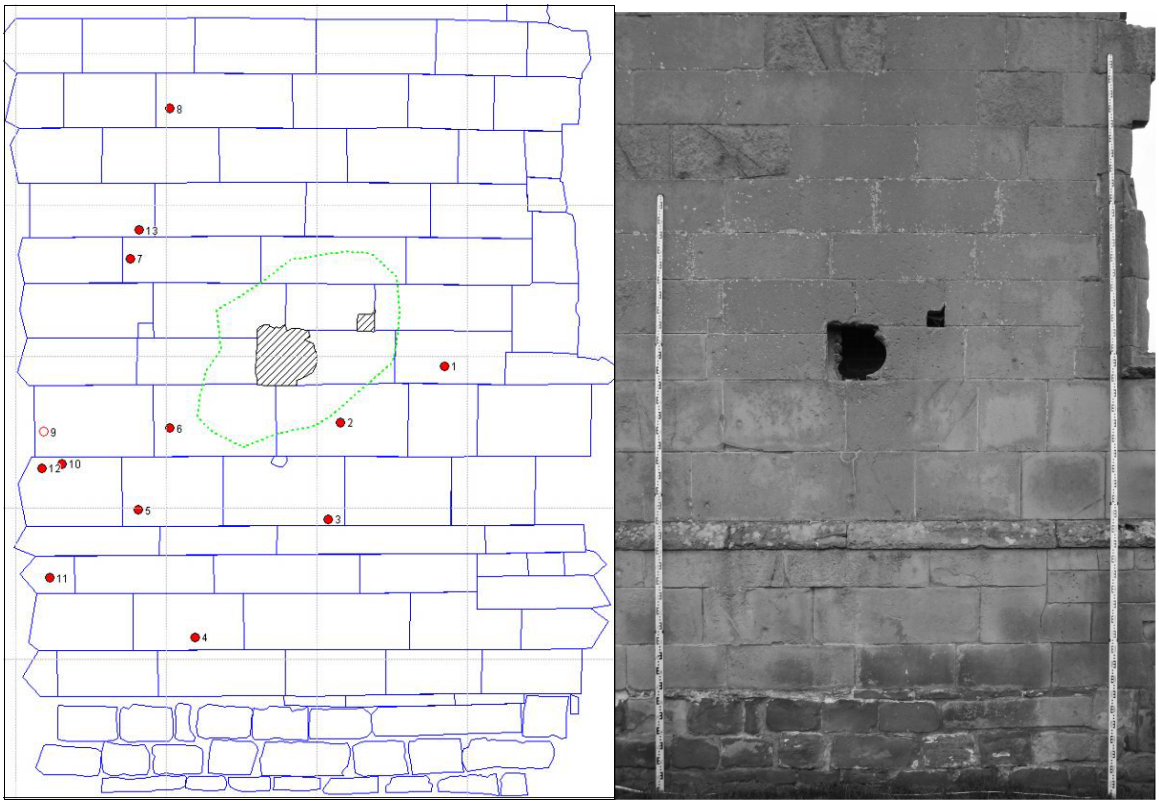


Figure 64: Digital drawing and related rectified photograph of a sample area of the elevation of Morton Corbet castle showing the distribution of bullet impact scars (red) and area of possible hailshot impact (green) around a probable gunport and associated viewing point (shaded) cut into the wall

A small number of impact scars from musket fire survive on the gatehouse and barn of Kenilworth castle. These are part of a wider spread that extends to remains of the Abbey and the church in the town. They may derive from a brief royalist assault in 1642. Examples were recorded in plan and section to trial a simple recording method for recording individual scars. However, until there are data from experimental firing it is unclear whether this method produces a record that will be adequate for future analysis – for instance to recover information on the angle of impact and kinetic energy dissipated during impact. Comprehensive analysis will also require assessment of the properties of the stone, both its geological composition and its hardness, measured with a Schmitt hammer.[204]

[204] Advice on this issue has come from Professor Peter Doyle

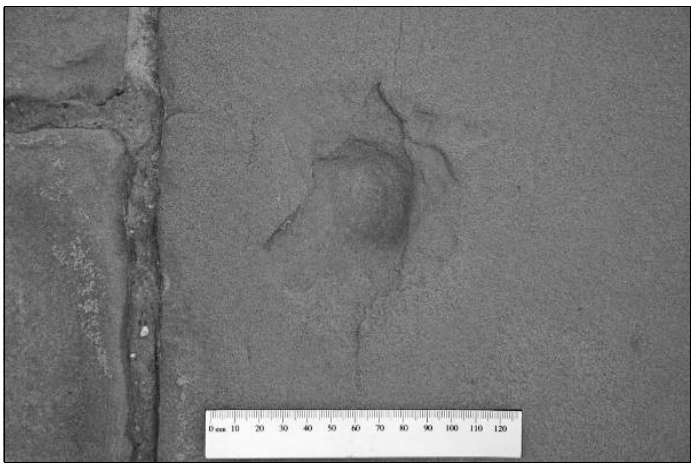


Figure 65: Bullet impact scar on the gatehouse of Kenilworth Castle showing the distinctive central cup shaped depression, shallower spalling of the surrounding surface but no radial fractures

Kenilworth provides other evidence which demonstrates the complementarity of siege sites and battlefields. On the gatehouse there is an apparent association of bullet and hailshot impact scars. Although it is possible that the two types of impact scar are coincidentally superimposed they may come from a single weapon discharge. This would be evidence of use of an unusual bullet type recent discovered in fieldwork on the Sedgemoor battlefield and subsequently matched by other bullets from Wareham. The Sedgemoor bullet is a musket calibre ball which has been fired as a multiple load with very small calibre hailshot resting immediately above.[205] This seems to be a precursor of the buck and ball multiple loads that are seen in the 18th and 19th century in the USA.[206]

[205]Foard, 2008a; Foard and Ladle, in preparation; information from John Pettet
[206] Information from Larry Babits

Figure 66: Impactpact scars on Kenilworth castle gatehouse where one of the larger scars, presumably from musket fire, is apparently accompanied by hailshot. These scars may all derive from the single firing of a multiple load though they may prove to be two separate and superimposed sets of impact scars

Figure 67: Banded ball of 12 bore musket calibre fired as part of a multiple load in the form of small hailshot set immediately above the ball. The polygonal compression marks from the hailshot and the surrounding melt grooves are identical to the larger scale evidence seen on musket calibre ball fired in groups as case from artillery, as discussed below (Sedgemoor 2007 find 180)

Impacted bullets

Even when a structure has been demolished, rebuilt or refaced, evidence of impacting rounds may still be recoverable from the bullets themselves. Some bullets will lie in the ground where they fell after ricochet from the wall, their stratigraphic significance depending on subsequent activity. Ricochet bullets should also be present around structures of the hardest stone which do not display scars.

Bullets in the ground around buildings are likely to be far more common than impact scars, yet they have scarcely been noticed in archaeological literature, and there is no known published site plan showing their distribution.

Anecdotal reports concern bullets recovered from building fabric (as at Ripley, where impacted lead can be seen in some scars), in thatch (at Old Basing, just outside the Civil War dfences), or timber structures or even walls (as on Lansdown Hill, where a wall is suggested as having been defended by Waller's troops in the 1643 battle[207]) and even trees (as on the York estate at Long Marston, where bullets found in the trunks of several trees were suggested as being from the 1644 battle). However, no examples have been identified from published archaeological investigations. Other likely collecting places for embedded bullets include 'Cornish hedges' and other forms of embanked boundary. The Stratton battlefield, where intense fire fights took place within an enclosed landscape of Cornish hedges, appears from field inspection to survive in good condition and offers potential as an ideal case study placing such evidence within a wider context.[208] However, there will undoubtedly have been change in the boundary system since 1643, such an enquiry would need first to be placed within the context of a wider interdisciplinary study of the historic terrain. This could apply or extend the existing methodology for the study of such landscapes that has been developed in the South West but which has not yet been applied to Stratton.[209]

Impacted bullets appear to witness the temperatures and pressures during impact, the direction of impact, and in some cases, apparently, embedded particles from the impacted surface. This is an aspect of bullet analysis that has not been much researched and currently there are few data either on the nature of impact evidence or on what useful information such evidence might convey.[210] Bullet assemblages from excavations on two Civil War siege sites, Beeston Castle and Sandal Castle, have accordingly been re-examined to characterise such material.[211] This shows a very high number of impacted bullets compared to battlefield assemblages and certain bullet attributes not yet encountered from battlefields. The best examples relate to information on angles of impact, and major variations in the degree and character of impact damage that may relate

[207] Information from Alan Turton, Colonel York, David Evans
[208] National Army Museum, 1995g
[209] Information from Steve Hartgroves
[210] Foard, 2008a
[211] Mayes and Butler, 1983; Ellis, 1993

to issues of range and the type of impacted surface. However, as at present there are no experimental firing data to calibrate or contextualise such evidence, this becomes part of the wider data shortfall that is discussed below (p.00).

Figure 685: Heavily impacted bullet showing impact face with the typical irregular surface to the central core, though unusually with grains of embedded stone, and radial lead flow towards the periphery, where some lead has been lost by spalling. The symmetrical splash suggests an impact at or near 90 degrees to the wall surface

Figure 69: Massively impacted bullet with asymmetrical patterning of the core (below) and radial flow suggesting an oblique impact

A small experiment was undertaken as a first step in scoping how impact effects might be reproduced. In this work, 19 bore lead balls fired from a musket at 25m range against limestone disintegrated on impact and failed to produce the cup shaped marks. They did, however, produce the fractures and fragmentation of stone at the edge of the block. They also deposited large quantities of lead on the impacted surface and this might suggest that microscopic quantities of lead residues may still survive in association with some Civil War impact scars. Whether analysis with modern forensic techniques would

yield more evidence in this context has yet to be demonstrated.[212] Although the bullets themselves all fragmented, probably because of the small calibre of the bullet, those fragments did exhibit the key attributes of irregular central core and radial lead flow to the periphery seen on the Civil War bullets from siege sites. A more extensive programme of research needs to be developed if the character and potential of this kind of evidence is to be ascertained.

Figure 70: Result of experimental firing against limestone with a 19 bore musket ball: two areas of lead have melted onto the stone, with fragmentation of stone to the left where it was close to the edge of the block. The presence of melted lead and failure to create an impact depression may be linked to the close range and resultant extreme pressures generated. (Ashdown experimental firing, 2007)

[212] Use of lead residue tests for modern forensic work in the USA: information from Douglas Scott

Figure 716: Fragment of ball recovered after firing against limestone, showing the central irregular area and traces of the surrounding radial melt and flow. (Ashdown firing experiment 2007)

Bullet scatters

While there has been extensive study of defences,[213] there has been little archaeological investigation of (and almost no management thought given to) the archaeology of attack on siege sites. Given that it is just this evidence that is likely to tell most about the purpose of the sites and how in practice they were actually defended and attacked, this is surprising.

The archaeology of attack lies primarily in the bullets and other artefacts that are scattered across the site. This evidence often extends well beyond the small arms range from the defences. Close and within the defences it will comprise mainly incoming fire, unless there was a storming which breached the defences. The wider scatters outside the defences may include fire fights from ancillary action, where troops engaged in skirmishing in open or, more often, in enclosed ground beyond the defences. This is in addition to the outgoing fire from the fortifications.

At Grafton Regis, dense bullet scatters extend well beyond 500m (547 yds) from the probable defences; some bullets have been recovered at a similar distance from the defences of Boarstall Tower (below, p.00). In some cases there may have been structures in the environs which provided cover for the attacking forces and these may yield distinctive impact scar and impacted bullet evidence, as discussed above for Morton Corbet church, and demonstrated by excavations at Hayes Barton in the suburbs of

[213] E.g. Saunders, 2004; Harrington, 2003

seventeenth century Exeter.[214] Significant pattering may also relate to siege camps and artillery positions set around a besieged site where a complementary archaeology might be expected. It follows that the archaeology of attack on siege sites will be a variation from, rather than contrast to, the archaeology of battlefields.

A handful of surveys, almost all of them small, have been identified in the present review. A survey was undertaken by Colchester Museum in High Woods, Colchester recovering a bullet scatter related to the 1648 siege.[215] Limited field survey has been undertaken on Prince Rupert's Mound at Lichfield, part of the defensive works around the cathedral, which recovered a small number of munitions including bullets and a cast iron grenade fragment (a munition that may be unique to siege sites in the mid 17th century).[216] A small but systematic metal detecting survey was undertaken in 2001-02 in Farnham Park, north of the English Heritage castle, on the site of the siege of 1643, recovering lead bullets of musket, carbine and pistol calibres and several fired as case.[217] However, the great part of the large area of undeveloped land on the north-west and north-east sides of Farnham castle has never been examined. It may contain a substantial body of archaeological evidence relating to action.

[214] Henderson, 1987
[215] Information from Philip Wise
[216] Information from Bob Meeson; Welch, 1998
[217] Information from David Graham

Grafton Regis

Grafton Regis, Northamptonshire, was besieged in 1643. It is the only siege site to have been subject to an extensive, recorded archaeological metal detecting survey to recover the wider distribution of bullets. Over 800 bullets were collected in the survey, which was carried out by the Midland Archaeological Research Society (MARS) in the late 1990s under the supervision of Bob Kings.[218] The calibre graph presented here has been prepared from an unpublished initial assessment of the assemblage by Mark Curteis.

The survey was never finished because the intensity of survey was too great, thus demanding too great a commitment of time, especially in the areas of low or negative bullet distribution. Among other things this demonstrates the need for full site surveys to be undertaken at a sustainable level of intensity and then subject to follow-up resurvey of specific areas.[219] The small calibre of most of the bullets differs sharply from the bullets detected at Basing, raising questions as to the nature of the evidence and its meaning, and demonstrating the value of calibre graphs in identifying archaeological signatures of conflict.[220]

[218] Foard, 2000; Foard, 2001
[219] As now demonstrated at Edgehill: Foard, 2008a
[220] The excavated collection from Basing was not examined. Allen *et a*l, 1999

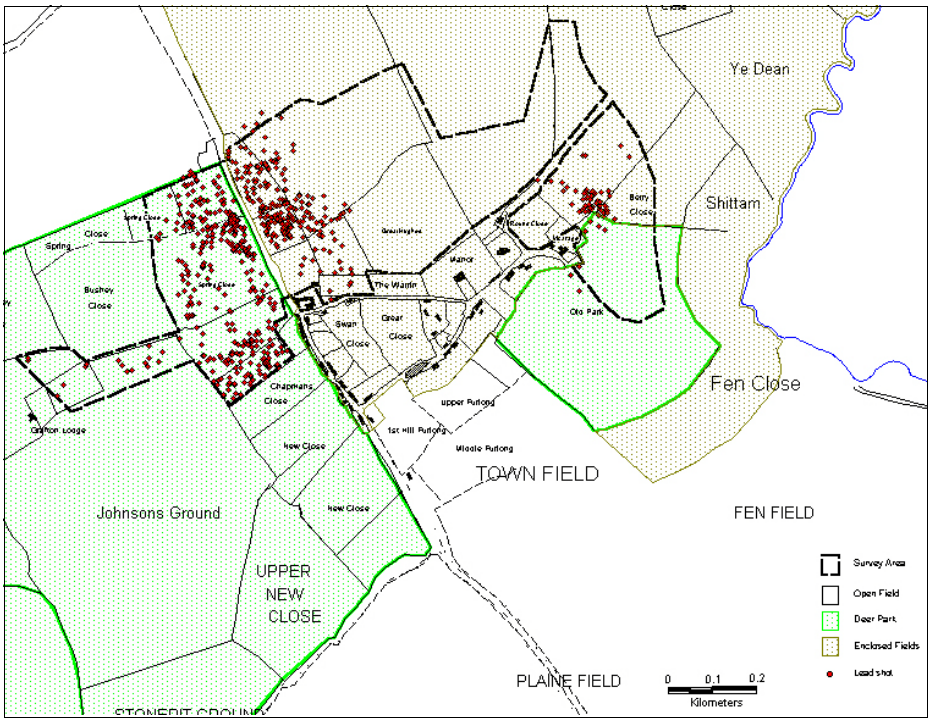


Figure 72: Bullet scatter from systematic metal detecting of part of the siege site at Grafton Regis, Northamptonshire, where a royalist garrison in the fortified manor house and church was besieged in December 1643. Data are superimposed on terrain reconstruction

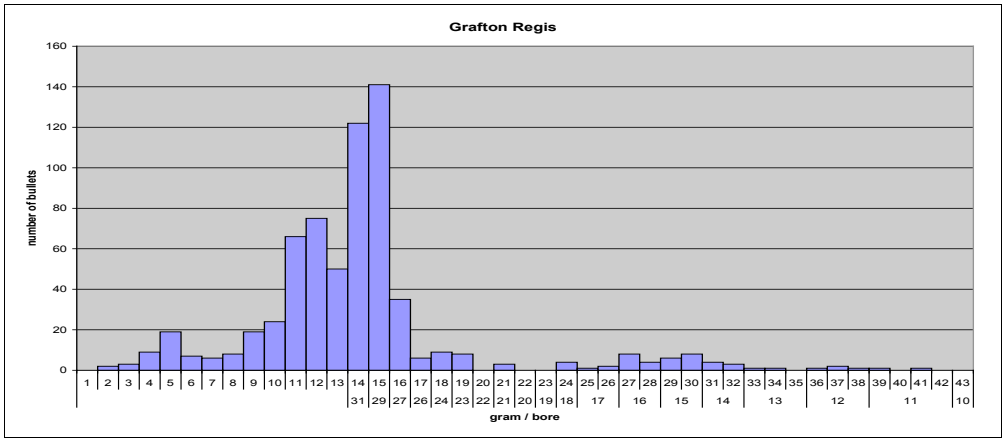


Figure 73: Calibre graph for the siege of 1643 at Grafton Regis, Northamptonshire

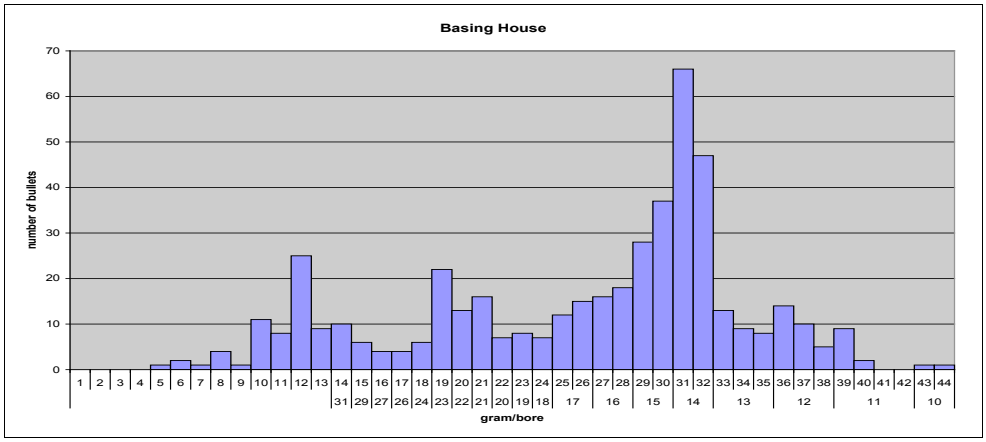


Figure 74: Calibre graph for bullets collected by D Coppin from metal detecting immediately adjacent to the site of Basing House, besieged in 1644 and besieged and stormed in 1645

Boarstall (Buckinghamshire, 1643-1646)

Another site where a partial distribution plan has been produced – in this case by non-systematic collection with sketch recording by a metal detectorist – is around Boarstall Tower. Now a National Trust property, the fortified manor house was established as a royalist garrison in 1643 as an outpost to the royalist capital at Oxford. It was abandoned soon after but was reoccupied by the parliamentarians in spring 1644, being surrendered in the face of a royalist assault a short time later. A royalist garrison was again installed, and briefly besieged by Waller later in 1644. In late May 1645 a large detachment of the New Model Army besieged the site once more and attempted a night assault. This failed and soon after the siege was raised. The royalists then demolished the church and all the surrounding buildings of the village to establish a clear field of fire as part of a refortification. The garrison finally surrendered to a siege in 1646.[221]

Metal detecting was undertaken by Les Rees over several years in the 1990s, recovering some 400 bullets plus various other artefacts. A sketch plan of the distribution of finds, including just 115 bullets, was produced in 1996=97, after the event. No subsequent finds were mapped, but are said to have come from the same general areas, particularly the field on the south east of the site. In addition, a small number of bullets were found on the north east edge of the site. Seven bullets were recovered following dredging on the inner bank on the west side of the moat in August 1997, and a further nine

[221] Page, 1925, 10-11; Porter, 86-90

bullets on 26/9/1997.[222] The bullets held by Rees were briefly examined and although no recording was undertaken it was confirmed that they embraced a range of calibres and types, as well as several powder box caps. The majority of the artefacts undoubtedly relate to the siege but the assemblage also included several belted bullets – 19th century rifle balls – and it thus looks as though some contamination by later activity has occurred. The bullets were all stored loosely in a single box, with no artefact identified to a particular location on the site. An additional small group of impacted bullets was held by the resident of the Tower in 1994, who also reported at that time the earlier discovery of one iron roundshot which had subsequently been lost. The surviving gatehouse, which is the only part of the house that survives from the time of the siege, shows no obvious evidence of bullet or roundshot impact scars.

[222] Plan in Buckinghamshire HER. Information from Les Rees

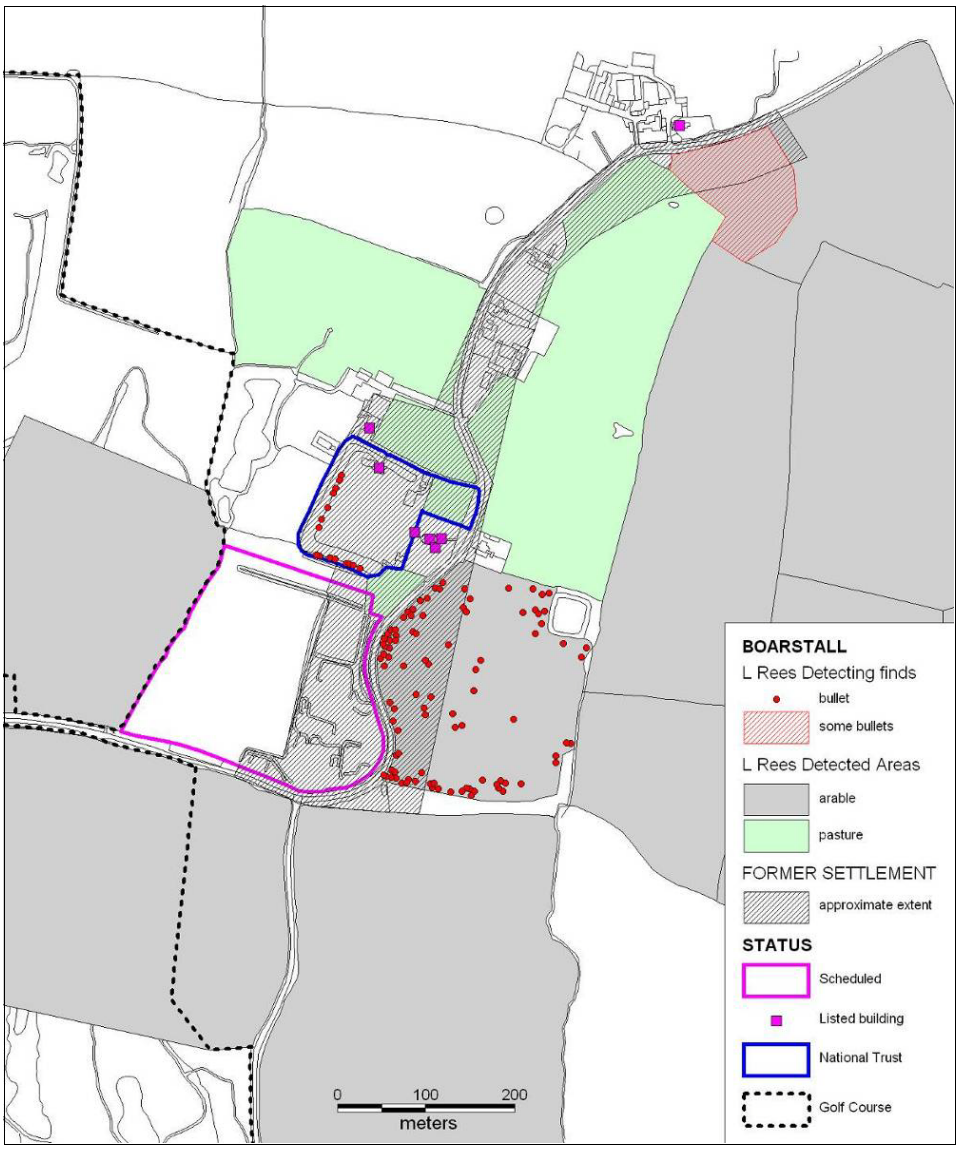


Figure 75: Siege site at Boarstall, Buckinghamshire: plan showing distribution of bullets from the sieges of 1643-1646 from detecting by L Rees (Crown Copyright 2008. An Ordnance Survey / EDINA supplied service)

The medieval and early modern settlement, as mapped from aerial survey, fieldwalking, and a map of 1697, extended well beyond the moated manor.[223] The settlement was at least in part deserted as a result of the clearance for the refortification. The apparent close association between the bullet scatter and the settlement area may indicate that approach to the house was mainly via the built up area during the 1645 siege and before. The absence of finds from the pasture areas is, however, very suspect, as the

[223] Buckinghamshire HER; Beresford and St Joseph, 1979, 111-112

scatter extends from beneath it to both north and south and may simply be a result of differential recovery where bullets have been deeply buried in the absence of recent ploughing.

Although over 400 bullets have already been removed from the site, most of them without record, there would still appear to be a high potential here for the archaeology of the sieges. The potential confusion of more than one siege would pose problems of interpretation, but it may be that the 1645 siege alone involved a substantial assault depositing large numbers of bullets. The fact that various buildings stood until late 1645 means that there may be a good stratigraphic association between bullets and other siege-related artefacts and the structures. Such potential may not exist on many siege sites. In other respects, however, this may be less than ideal as an exemplar for investigation of siege archaeology, since there are no buildings to show impact scars, and most of the impacted bullets are likely to have ended up in the moat and so are inaccessible. In addition, the surviving earthworks will mean that investigation of this part of the site would be severely restricted and only really possible through excavation.

Subsequent to the detecting by Rees, an extensive area immediately west of the site has been converted to a golf course. Earthmoving for tees, greens and bunkers may have caused substantial archaeological loss. Although Rees recovered no bullets in this area the comprehensiveness of his recovery is unknown, and would need a control survey to test. There has also been a small amount of infilling within the settlement area, in another area where Rees' detecting produced no bullets, though his notes suggest that in these small fields either side of the church the main problem was later contamination. Such problems could probably be overcome in recording action involving trenching prior to development. The presence of a scheduled area, created purely to protect the remaining village earthworks, has had the incidentally positive effect of protecting part of the siege site from the golf course, and the artefacts within it from detecting. This is in contrast to the unprotected half of the former village. The ownership of part of the site by the National Trust appears to have conferred only a limited restriction on detecting, apparently because the National Trust lacks a conservation strategy for the management of battle archaeology on their properties.[224]

Beeston Castle (Cheshire, 1642-1646)

[224] Information from Mark Newman

The published report for two excavations on this Civil War garrison claims 70 bullets were recovered.[225] Rapid re-analysis of the collection as part of the present study has revealed a total of 233 certain and 5 possible bullets. Of these 220 are lead ball, including one certain and two possible burred bullet, plus two possible lead balls. A calibre graph based on bullet weight has been produced. There are also 10 hammered slugs, three possible slugs, plus two 'rods' of uncertain significance. Neither the burr nor the slugs were identified in the finds report, though one slug was identified there as a 'rod'. Twelve headers from bullet casting were also examined, two more than reported, and including one with a bullet attached. All had far smaller spacing of sprues than the finds report states. At least 38 of the bullets had been fired, of which 32 were impacted, most of them massively so.

Besston's bullet assemblage should be re-analysed in detail as it tends to be treated as one of the standard reference assemblages for Civil War bullets and contains important information not previously reported. Moreover, it is said that accurate 3D recording was made of each bullet location and if this record survives then a distribution plan indicating each calibre and distinguishing the fired and the impacted bullets should be produced. Most of the latter appear from Courtney's report to have come mainly from the outer gateway and so presumably relate to the various attacks on the castle. If this is achievable then it would be the first plan of its kind to be produced for any site and might allow further development of a methodology for the investigation of siege sites.[226]

[225] Ellis, 1993, 159

[226] Information from Paul Courtney. The limitations of his report on the finds arise largely from the full assemblage not having been passed to him for study, and also from the degree to which the study of bullets has advanced in recent years

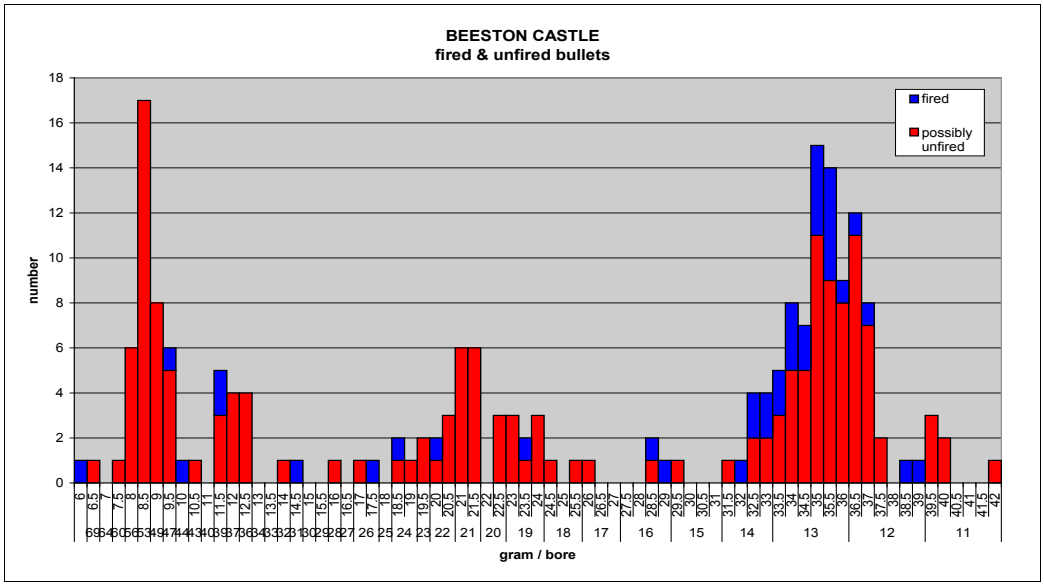


Figure 767: Calibre graph for bullets from Beeston Castle. The graph distinguishes definitely fired lead ball (impacted & banded) from all other

Table 2: Bullets from Beeston castle excavations

	certain	*possible*	*banded*	*impacted*
Total of Bullets	233	5		
Ball	223	2	10 (+ 1?)	32 (+9?)
including burred ball	1 (+2?)			
Hammered Slug	10	3		
Casting headers	12			
Rods (not bullets?)	3			

Re-analysis of the 220 lead ball from the Beeston assemblage shows that at least six discrete calibres were in use during the Civil War at the site. Pistol bullets centre on c. 50 bore but with a minor cluster on c.37 bore. Carbine bullets centre on c.20 bore. Musket bullets focus on both 13 bore and, with a subsidiary peak, at the lower end of 12 bore, together with a minor grouping on 11 bore.

If the fired bullets are taken into account separately (most are heavily impacted and have lost significant mass), then the distortion of the graph may be explained, with the impacted bullets probably being largely12 bore shifted down to13 bore or less. The significance of this pattern in the musket calibres is unclear, as Beeston is the only site so far examined which shows a concentration on 13 bore. More detailed analysis is called for, but cannot be undertaken until the collection has been washed; the dirty condition of the bullets may mean that a significant number with firing evidence await identification. If our interpretation of the calibres is correct then it may distinguish bullets fired by attacking forces from those dropped by defending forces, with the former having mainly 12 bore and the defending forces mainly 13 bore muskets. This could be tested by mapping the bullets in GIS on the plan of the castle.

Sandal Castle (West Yorkshire, 1645-1646)

The Civil War garrison was subject to a long and intensive siege in 1645. There are just 98 bullets in the assemblage from excavations made between 1964 and1973.[227] Fragments of wall survive, but careful examination failed to reveal more than one or two doubtful examples of bullet impact scars. All the bullets from the excavations were subject to rapid re-analysis in the present project, enabling the preparation of a calibre graph of the un-impacted bullets. No information exists as to the location of each bullet on the site, the

[227] Mayes *et al*, 1983

association at best being no closer than to the trenches that were open in a particular year. Moreover, the greater part of the ground outside the walls appears to have been cleared by machining to 'restore' the earthworks without collection of the bullets, roundshot and grenados. The greater part of the archaeology of the siege thus appears to have been destroyed without record.

What the small assemblage does demonstrate is the distinctive character of bullets that have impacted on stone structures, although in the absence of locations for the bullets it is impossible to take this further. Though Sandal is often cited as a type site for the archaeology of the Civil War, the study is wanting. The report on the bullets, though a significant statement at the time, can now be seen to have failed to address the range of evidence available.[228]

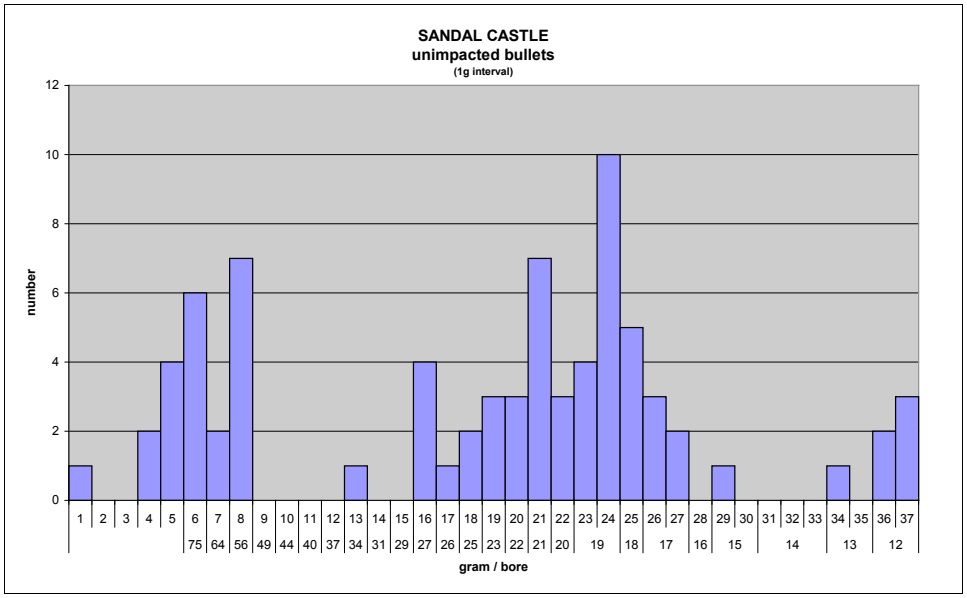


Figure 77: Calibre graph for unimpacted bullets from Sandal Castle excavations

Wareham (Dorset, 1640s)

As part of the Bestwall quarry excavation, an assemblage of 558 bullets from one or more of sieges was recovered by metal detecting survey both prior to and during excavation, with limited recording of spatial location of finds.[229] The collection was rapidly assessed and a calibre graph produced. This is a good example of a collection of bullets from a

[228] Mayes and Butler, 1983
[229] Foard and Ladle, in preparation

highly acidic sandy soil. The bullets show a high level of erosion and surface decay which has destroyed most of the detail of manufacture and use that is normally seen on bullet assemblages. Even the calibre graph appears to have been compromised by the differential loss of bullet weight due to varying degrees of erosion on different bullets. The assemblage thus clearly demonstrates the importance of soil chemistry to the selection of sites for detailed investigation of battle archaeology.

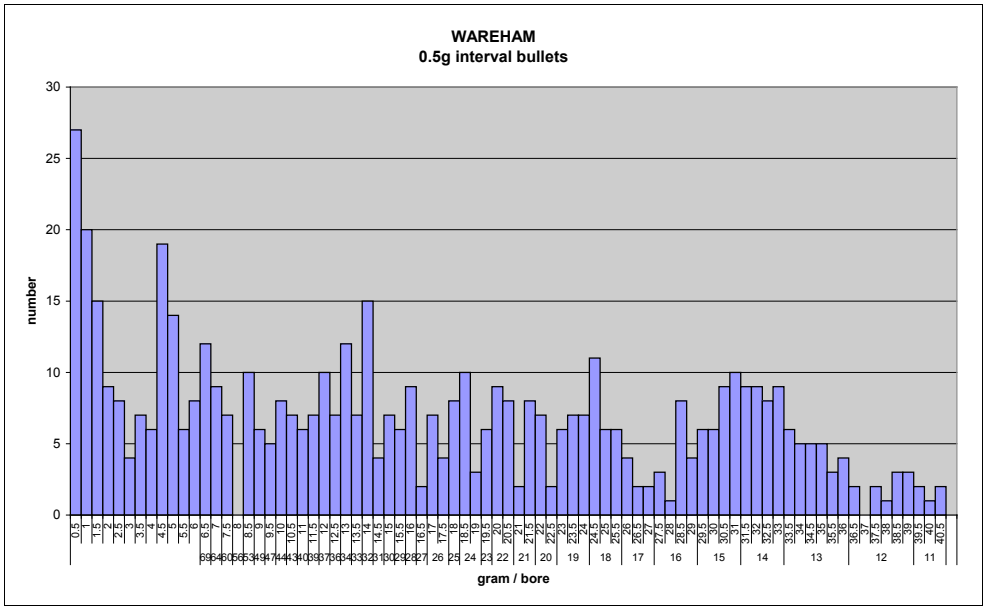


Figure 788: Calibre graph for bullets recovered on the Bestwall Quarry excavation from one or more of the Civil War sieges of Wareham

Wareham is a highly atypical assemblage. The near absence of 12 bore bullets is interesting, though the same occurs with the Basing House siege; on most sites 12 bore would expected to be the dominant musket calibre. The very flat graph below 16 bore is also unusual. One might expect a 20 bore carbine calibre to stand out, and the continuance of the spread into the pistol calibres is very odd. Nor does any distinct pistol calibre – such as 28 or 36 bore – stand out. The presence of so many very small bullets, which are very small even for hailshot (which tends to be at between 5g and 9g) may indicate a substantial amount of later birding shot. A separate distribution plan would be needed to address this. It should be noted that, as at Sedgemoor, a single bullet shows clear evidence of having been fired as a multiple load with very small hailshot; this might indicate the at least some of the fine hailshot is from the Civil War action.

Gleaning more from impact scars and their ricochets: a prelude to management

Research on the combined evidence of impact scars and their related impacted bullets, which have ricocheted back or to one side, possibly in fragments, may enable reconstruction of information such as the direction, range, accuracy and intensity of fire. Such work needs to include the testing of the stone itself to seek a calibration between its hardness, measured with a Schmit Hammer, and the depth of the scar and degree of fragmentation of the stone, in relation to the energy of the impact and the calibre of the bullet.

An initial small scale pilot survey is required to test and refine the methodology. This would attempt to recover bullets from a sample area of bullet scatter close to the walls and to record the related impact scars, to explore the extent and significance of the two data sets and the degree to which they can be correlated, and to test the recording and survey methodologies presented here. This should be complemented by firing experiments on blocks of stone and/or stone walls of identical type to determine whether the angle of impact, and hence direction of incoming fire, and the range of the gun, can be determined from fine detail, or whether such information could be recoverable from more sophisticated recording. A proposal for such a trial at Morton Corbet castle is given in Appendix 00.

Unlike battlefields, where the background noise of non-projectile artefacts will normally be relatively low, on most siege sites a garrison will have been present for months or years, while on many there will have been longer lived occupation. In such circumstances a higher proportion of non-projectile artefacts is likely to derive from occupation rather than combat. This needs further investigation.

Once the methodology has been refined then a site needs to be sought for a more extensive survey, where the methodology can be applied, combining comprehensive impact scar recording, recovery of impacted bullets from sample areas, and systematic sampling at an appropriate intensity to recover the full distribution pattern of the bullet scatter in the immediate context. Research on the vertical plane in the study of impact scars and associated impacted bullets should provide an important complement to the general study of the horizontal distributions, for it should give clear evidence on spread, angle of impact etc that is not available from horizontal distributions.

In this way, outgoing as well as incoming fire would be integrated into what a single coherent picture – something that hitherto has never been achieved.

This broad scale approach should then, for the first time, enable effective exploration of the analytical potential of such evidence. Such a full study would act as an exemplar to guide work on other sites, providing a methodology for

- bullet impact scar recording where this is demanded by repair
- the recovery of a representative sample of bullets, impacted or not, where these are threatened by ground disturbance

Such work could also

- assist in refining research questions to be addressed by further experimental firing
- provide information to allow, for the first time, the drafting of management strategies appropriate for conservation of siege assemblages across entire sites

For individual sites Conservation Statements should include such evidence, the evaluation of which should form part of the evaluation of a structure before any potentially destructive work is undertaken. The identification of sites where such work is called for requires an assessment of all garrison and siege sites, to enhance the UKFOC database.

Management needs

Next to nothing has yet been done to investigate and conserve the archaeology of attack on siege sites. Action will be thus needed to ensure the survival of a representative sample of this evidence.

It is suggested in the Battlefields Register that 'sieges are better considered separately from battles because they are usually associated with physical remains which can be conserved through existing statutory mechanisms such as scheduling and listing'.[230] The evidence presented here suggests that this is wrong: the resource is being neither protected nor managed, and it is almost certainly being rapidly eroded without record.

Morton Corbet site provides a conspectus of the issues. The scheduled area encompasses only the area enclosed by the defences of the castle together with two small

[230] English Heritage, 1995

isolated areas. The listing does cover the standing structures of church and castle, but without understanding of the importance of the evidence of impact scars this may not count for much. The same applies to deliberations of the Diocesan Advisory Committee about groundworks.

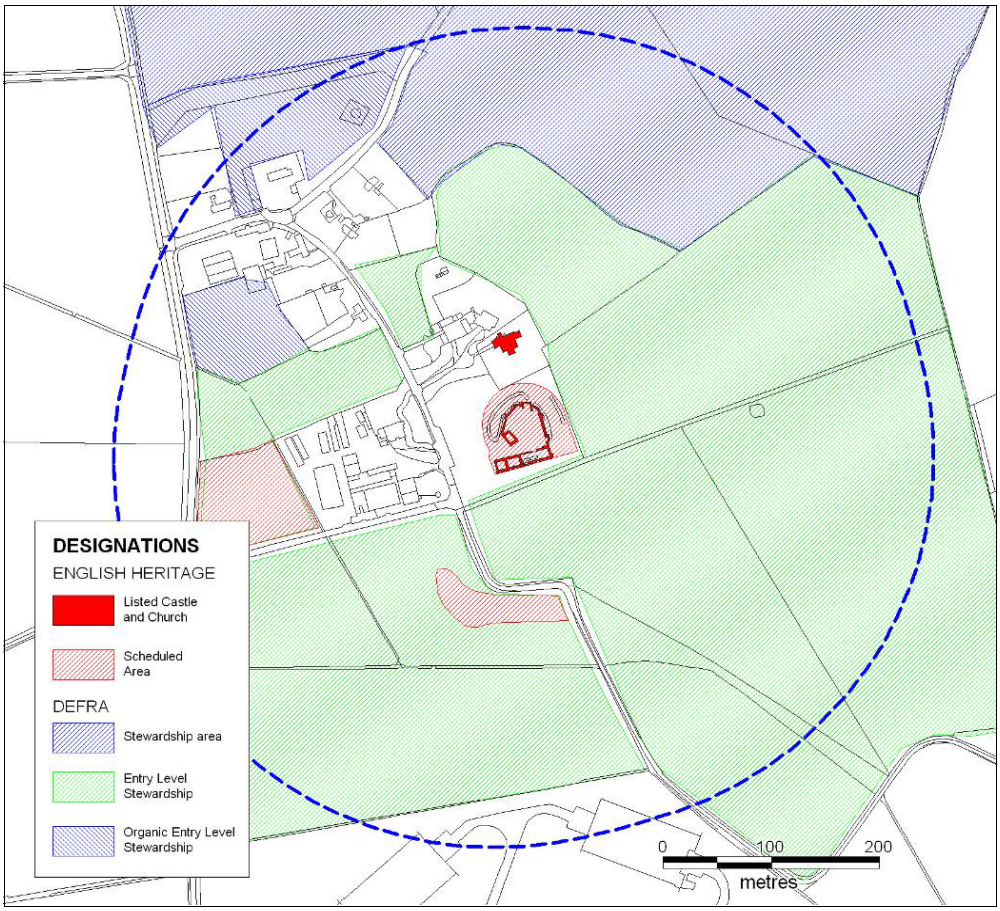


Figure 799: Scheduled and Stewardship areas at Morton Corbet relative to the probable maximum final range of a musket fired from the castle. The 350m diameter is based on the Ashdown 2007 firing experiment

Around the site, in the absence of any detecting survey but on the basis of musket range, one can suggest a minimum area of likely combat evidence. This is provided on the plan in the form of a near circular zone drawn 350m from the walls, which represent the final range, after bounce and roll, of a musket fired point blank, as recorded by the initial Ashdown firing experiment.

Unfortunately there may be a large number of apparently well preserved siege sites in guardianship where the bullet evidence was destroyed during the first half of the 20th century Office of Works clearances to display the stone structures. At Helmsley Castle, for

example, there was massive destruction of stratified and unstratified bullet scatters.[231] As we have seen, continuing official indifference to the archaeology of attack from siege sites is shown at Sandal Castle. Even where impacted and un-impacted bullets have been recovered in trench and area excavations, as at Beeston, the data do not appear to have survived and were certainly not published.[232]

Professional unawareness of the character and potential of siege assemblages, and methodology for recording them, mean that such losses continue in the present. Hence, when the former garden immediately north of the slighted wall of the keep of Kenilworth Castle was excavated in 2005-06 on behalf of English Heritage, the research design (which went to EHAC for advice) did not provide for the metal detecting survey that would have been appropriate to record unstratified and secondary stratified bullet distributions. This is despite the fact that the castle held a Civil War garrison, and the presence of numerous bullet impact scars. The presence of bullets is rumoured to have been demonstrated by metal detecting of the spoil heaps; this cannot be confirmed because Northamptonshire Archaeology has not replied to requests for information.

Within the present study it has not been possible to review the full range of excavations and reports that relate to recent fieldwork on siege sites, but these include Corfe Castle, Taunton, Montgomery, Pontefract Castle and Dudley Castle.

[231] Paper by Peter Harrington to the Fields of Conflict IV conference, Leeds, 2006
[232] Information from Paul Courtney

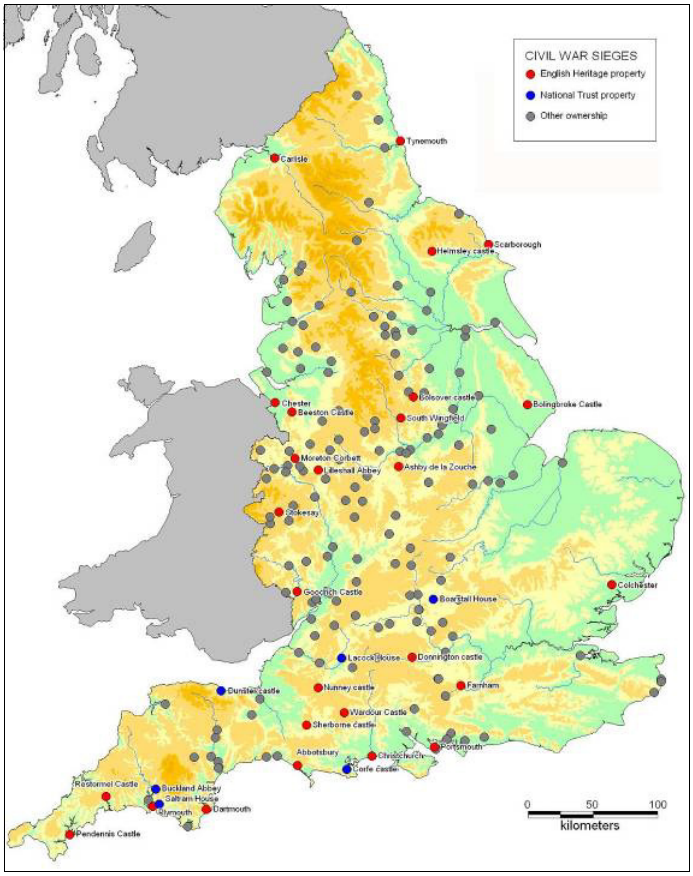


Figure 80: Civil War siege sites indicating English Heritage and National Trust ownership of all or part of site

Siege sites of the Civil War have been assessed to identify ownership. English Heritage own or manage all or part of 27 sites, the National Trust at least 6. These 33 sites represent an important sub-set of the resource from which one or more case studies could be drawn for further investigation, more fully to define the character of siege assemblages and to develop best practice for their management.

A significant number of the remainder are standing structures in private, local government or ecclesiastical ownership. Many of them are either scheduled or listed, and the provision of appropriate guidance to those who operate these controls is a clear priority. The Chester Diocesan Advisory Committee (DAC) was consulted regarding bullet impact scars because, in addition to Acton, they have a number of churches that bear such evidence. Chester DAC acknowledged awareness of the issue and in at least one case, at Dodleston, the church's inspecting architect had made a rudimentary record of the impact scar locations on the north elevation of the tower when identifying works

required.[233] However, the DAC does not have a list of churches in the diocese which display such evidence, and neither English Heritage nor the CCC have issued guidance on what effective management might involve. Since identical problems and opportunities will exist for other siege sites in country houses and castles, there is a case for the production of guidance on the management of Civil War archaeology generally, for use by individual owners, local authority archaeological advisors, conservation officers, DACs and the HHA.

Skirmishes

One hundred and thirty two skirmishes are listed on the database. A handful appears to be based purely on local traditions and may be spurious. Even so, for reasons already discussed (p.00), this figure is far below the real total.

The 132 are unlikely to be distributionally representative. Though the rarity of skirmishes in East Anglia is real, the concentration in Cheshire and Lancashire is as much a result of exceptional HER enhancement and greater representation in national works as it is a reflection of the true intensity of action.

No attempt has been made to examine any of the skirmish sites in detail. While a major enhancement of the database to include them would be practicable, it is not clear that the scale of the task would be proportional to the value gained, other than to explain many of the small bullet scatters identified by metal detectorists.

Nevertheless, that lesser actions can have a substantial battle archaeology is shown by recent work on the site of the 1642 'battle' of Aylesbury. Both the identification of this action and its location on the basis of a vaguely reported 19th-century discovery of a mass grave, beside Holman's Bridge on the edge of Aylesbury, had been questioned; however, recent development-led fieldwork produced at least 24 lead bullets and four powder box caps, in addition to other possibly battle-related artefacts.[234]

Such lesser actions are not well documented. What is needed is systematic investigation of several large and small skirmish sites, using the methodology which has been demonstrated on battlefields, to ascertain if or how they can contribute to wider understanding of warfare in the period.

While it may be important in the longer term to ensure the conservation of a representative sample of skirmishes, the main issue that would justify immediate attention

[233] Information from Richard Mortimer, Chester DAC Secretary
[234] Foard, 2008c

is the problem encountered in defining the boundary between skirmish and battle. Some substantial skirmishes, like Southam in 1642, might on detailed inspection reclassify as a battle. The coalescence of several neighbouring skirmishes likewise illustrates an inconsistency in the way in which battles at the lower end of the scale are currently being defined.

For actions involving more than 5000 troops there is no uncertainty. The exceptions can be explained. Modbury is classified as a skirmish because no substantial action occurred, despite the numbers present. Alton, with 6000 engaged, had the character of a skirmish similar to Preston II, with disbanded groups fighting through the town. In contrast, uncertainty does arise over actions involving 5000 or less. Hopton Heath, for example, with just 2500 engaged is a Registered battle whereas Norton St Philip with 4500 is not. Two other engagements of or below 5000 were Registered, though recognised as skirmishes, and a further four were assessed for the Register but dismissed. Even at 2000 and below, some actions might need to be reconsidered as battles, as with Middlewich where the surviving plan suggests a formal deployment in battalions.[235]

[235] Liddiard & McGuicken, 2007

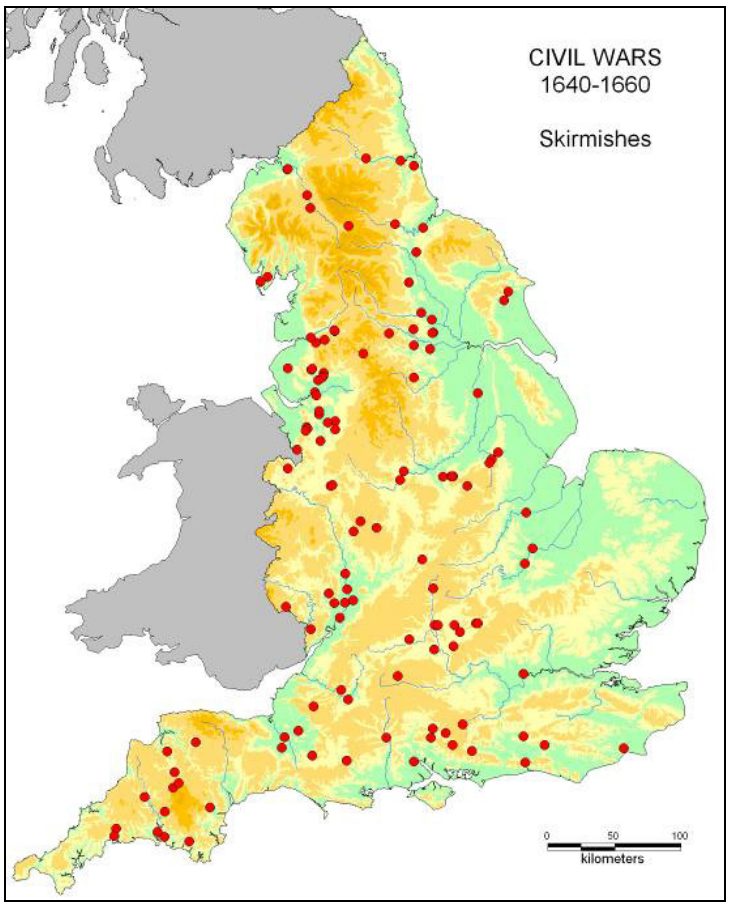


Figure 10: The 132 Civil War skirmishes recorded on the database under-represents this type of site type

Action name	Year	Type of action	Numbers engaged	State of development	Designation
South Molton	1655	skirmish	400	0	
Marshall's Elm	1642	skirmish	500	0	
South Harting	1642	skirmish	500	0	
Babylon Hill	1642	skirmish	500	0	
Longford	1644	skirmish	1000	0	
St Neots	1646	skirmish	1000	0	
Huntingdon	1645	skirmish	1000	0	
Wetherby	1642	skirmish	1140	0	
Carlisle Sands	1645	skirmish	1250	0	
Powick Bridge	1642	skirmish	2000	0	Registered
Grantham	1643	skirmish	2000	0	
Seacroft Moor	1643	skirmish	2000	0	
Middlewich	1643	skirmish	2000	0	
Willoughby on the Wolds	1648	skirmish	2000	0	
Chalgrove	1643	skirmish	2000	0	Registered
Wigan	1651	skirmish	2100	0	
Saltash	1644	skirmish	2500	0	
Hopton Heath	1643	battle	2500	3	Registered
Gainsborough	1643	skirmish	3000	0	
Highnam	1643	skirmish	3000	0	
Ripple Field	1643	battle	3000	4	assessed
Ankle Hill	1645	skirmish	3500	0	
Oldcastle Heath	1644	skirmish	3500	0	
Sherburn in Elmet	1645	skirmish	3500	0	site a
Sourton Down	1643	skirmish	4000	0	assessed
Norton St. Philip	1685	skirmish	4500	0	
Launceston	1643	skirmish	5000	0	
Brentford	1642	skirmish	5000	0	
Whalley / Sabden Brook	1643	skirmish	5000	0	
Tadcaster	1642	skirmish	5000	0	
Torrington II	1646	battle	5000	2	site b
Sedgemoor	1685	battle	6000	4	Registered
Roundway Down	1643	battle	6000	4	Registered
Alton	1643	skirmish?	6300	0	
Stow on the Wold	1646	battle	6300	4	Registered
Selby	1644	battle	7000	1	
Stratton	1643	battle	8000	3	Registered
Rowton Heath	1645	battle	8000	3	Registered
Winceby	1643	battle	8000	4	Registered
Braddock Down	1643	battle	9000	4	Registered
Modbury	1643	skirmish	10000	0	
Maidstone	1648	battle	10000	1	
Lansdown	1643	battle	10000	4	Registered
Nantwich	1644	battle	10000	4	Registered
Winwick Pass	1648	battle	12500	3	

Adwalton Moor	1643	battle	14000	3	Registered
Newark	1644	battle	15000	1	site b
Cheriton	1644	battle	15000	4	Registered
Langport	1645	battle	17000	3	Registered
Cropredy Bridge	1644	battle	18000	3	Registered
Preston I	1648	battle	20000	1	site b
Newburn Ford	1640	battle	20000	2	Registered
Lostwithiel	1644	battle	25000	3	assessed
Naseby	1645	battle	25000	4	Registered
Newbury II	1644	battle	30000	2	site b
Newbury I	1643	battle	30000	3	Registered
Edgehill	1642	battle	30000	3	Registered
Worcester	1651	battle	40000	2	Registered
Marston Moor	1644	battle	45000	4	Registered

Battles

For practical purposes the following assessment is limited to the 29 actions listed as battles because it was not practicable in the current project to begin an assessment to identify the skirmishes which might justify reclassification. Of these battles, 20 are Registered and three were assessed but dismissed as being too heavily developed. While re-examination has confirmed that little if any of Preston I or Newark remains undeveloped, there is the potential for some surviving areas of both Newbury II and possibly for Torrington II, while Ripple appears to be wholly undeveloped. Given the scale and importance of Newbury II a re-examination of that site is justified. Of those never assessed for the Register both Selby and Maidstone are wholly developed but Winwick which was not assessed would appear to justify consideration, not least because it is the one battle from 1648 which appears to survive in a good state of preservation. It may for example provide valuable information as to the character of the munitions in use in the Second Civil War. Without doubt, however, the most remarkable omission is the battle of Lostwithiel, one of the largest and most substantial battles of the war.

The Lostwithiel battle was a large complex action extending over more than 6km, involving various skirmishes over several days. This was one of the most important actions of the Civil War which saw the destruction of parliament's most important field army, which together with the abortive action at Newbury II led to major political upheaval ultimately resulting in the establishment of the New Model Army, with the most dramatic military and then political results. It was almost the only major battle of the war that was fought in an almost wholly enclosed landscape and thus the character of the action is very different

from that of the other battles, comprising a number of subsidiary action over several days and across a wide landscape. As such it would be a valuable comparator for the many battles fought in wholly or partly open landscape. The action included the capture of Restormel Castle, an English Heritage property, and the destruction of church in Lostwithiel when the powder magazine exploded but the most substantial event was the engagement around Castle Dore, a publicly accessible prehistoric earthwork. It is such a complex action that it was not practicable to undertake a detailed study as part of the present project but there is clearly a high priority for its assessment for the Register (cf. p.000).

The level of detail which exists in the primary written sources for seventeenth century battles means that almost all are located in general terms, with Braddock Down the only one of the 29 currently with two alternative sites where the uncertainty over location has not been resolved. At Cheriton it appears that battle archaeology has already demonstrated that the alternative site proposed by Adair is incorrect, although the extent of the action has yet to be clearly defined and the Registered area certainly appears inadequate.[236]

The potential of the battlefield varies enormously as a result of the state of preservation of the sites. This has been crudely assessed in table x, with 4 representing the site is nearly complete whereas 1 represents one that is wholly developed. Of those with some survival Worcester and Newburn Ford are the most damaged. The physical evidence for both is however still of great value because a whole sector of Worcester battlefield where probably the most critical actions of the battle took place, for the crossing of the Severn. At Newburn Ford it may be that the two river crossings and the at least one of the two sconces around which the critical action was focussed, are undeveloped. The sites classified as having less extensive destruction vary greatly in the significance of the loss, with some development being in critical areas, as at Edgehill or Adwalton, which has severely devalued the site while on others the destruction appears to have occurred in less important areas, although until detailed investigation has taken place it is difficult to be certain. This aspect of survival may however be more than outweighed by the destruction suffered by the battle archaeology, discussed below, as a result of the lack of control of metal detecting or from the impact of soil chemistry and land use history, which may mean

[236] Bonsall, 2008

that the overall potential of a site like Marston Moor or Braddock Down respectively may be no greater than that of Edgehill. However this may only be determined through fieldwork.

Historic terrain

Our understanding of the nature of the historic landscape of the regions of 17th century England is generally far better and the documentary record for individual landscape is often far more detailed than for earlier periods. Together with the topographical detail present in many primary accounts, this means that terrain reconstruction can be very effective. The principles are demonstrated through the case studies of Braddock Down and Sedgemoor (below, pp.00-00), with the former showing what can be achieved with relatively limited documentary research, whilst simultaneously demonstrating that existing historic landscape characterisation mapping is not adequate for the purpose. The Sedgemoor study provides an example of the integration of documentary and archaeological evidence for terrain.

The character of the terrain within which a battle was fought will often have had a key influence on the tactics employed and how the events evolved. There are examples of commanders manoeuvring to force a battle in a specific type of landscape that best suited the composition and strengths of their forces, as with Essex's approach to Newbury in 1643 to take advantage of the enclosed landscape to the south west of the town rather than face the royalist army, which was far stronger in cavalry, in the more open landscape to the north.

Of the 29 battles on the database the terrain of eight has not been classified, though four of these are now wholly built over and so not relevant. Of the remaining 21, 13 were fought in a landscape with significant areas of enclosed land which had consequences for the battle, with various examples of enclosures used by one army and open landscape by the other (e.g. at Adwalton Moor) In almost every case the enclosures were hedged, with just Stratton being wholly Cornish hedges (effectively stone-revetted banks), though several others had some stone walls, as at Lansdown. Only in four – Nantwich, Stratton, Newbury I and Lostwithiel – does the enclosed landscape appear to have been the dominant context. In contrast, 22 were fought in a landscape with substantial open land, and in 12 of these open field, heath, moor or pasture was the

predominant context for the action. Only one battle (Newburn Ford, where two sconces controlled the river crossing) was fought primarily around fortified positions.

Most of the detailed studies we have of battlefield terrain and battle archaeology come from the open landscape battles, thus potentially introducing a striking bias in our understanding of warfare of the period. There is as yet no recovered evidence as to the nature of battle archaeology where hedged or walled enclosures were defended, but the nature of the battle archaeology should be very distinctive in such a context. Investigation of a battlefield which was predominantly enclosed is a high priority.

Action name	Historic terrain	State of development
Adwalton Moor	open moor, enclosures	3
Braddock Down	open pasture, (enclosures)	4
Cheriton	open pasture, enclosures (wood)	4
Cropredy Bridge	open field	3
Edgehill	open field	3
Hopton Heath	open heath, (enclosures)	3
Langport	open field, enclosures	3
Lansdown	open pasture, enclosures, open field	4
Lostwithiel	enclosures?	3
Maidstone	unclassified	1
Marston Moor	open field, open moor, (enclosures)	4
Nantwich	enclosures, (settlement)	4
Naseby	open field, (enclosures)	4
Newark	unclassified	1
Newburn Ford	open meadow, enclosures, fortifications	2
Newbury I	enclosures, open heath, open field	3
Newbury II	unclassified	2
Preston I	enclosures, open moor?	1
Ripple Field	open field?	4
Roundway Down	open pasture	4
Rowton Heath	open heath, enclosures	3
Sedgemoor	open moor	4
Selby	unclassified	1
Stow on the Wold	open field?	4
Stratton	enclosures	3
Torrington II	unclassified	2
Winceby	open field	4
Winwick Pass	unclassified	3
Worcester	open meadow?, enclosures, settlement	2

Battle archaeology

In this period the lead bullet became the main projectile, and the rate of fire at a distance became the determinant of success.[237] Firepower provides the critical element of battle archaeology and is directly representative of the actual fighting. From the great arrow-storms launched by English warbows in the 14th and15th centuries through to the relentless fire of machine guns in the 20th, understanding of firepower is central to the historian's

[237] Foard, 2008a

task. From the 18th century this can largely be achieved through written records; before this, archaeology plays a key role.

At least from the 16th century, lead bullets are the most durable and ubiquitous of battle artefacts. However, the reverse transition from the 18th century back to the introduction of firearms in the 15th is marked by a diminishing quantity of bullets. The earlier the date, the fewer the number of troops carried firearms as primary offensive weapons. In the 18th century all troops would be expected to carry and use firearms, whereas passing back through the 17th century just two thirds decreasing to one half of the infantry carried small-arms. In the early 17th and 16th centuries the proportions decrease again, while in the earlier 16th and later 15th centuries only a very small number of troops, if any, carried such weapons, even in major actions.

Although the rate of fire possible for small-arms was not substantially increased by technological change during this period (except right at its start), the nature of tactics evolved from one of great depth of deployment and associated slow rate of fire through to shallow deployments and more intense fire. These changes affect the archaeological record. The earlier the period, the fewer are the absolute numbers of bullets likely to have been fired, while the distributions are likely to be sparser. Up to the mid 16th century arrows were still in use alongside bullets, but rapidly declined during the second half of the century.

Typically, bullets were deposited on the battlefield in thousands or tens of thousands. And because they are small it was not normally practicable to recover them.[238] Lead is stable over long periods. There is therefore a high potential for the survival of battle scatters from this period. Compared to ferrous objects, lead bullets give distinctive signatures during metal detecting and so are relatively easy to recover by systematic survey. This also makes them vulnerable to treasure hunting or maverick survey.

Research on several 17th- and 18th-century battlefields in the UK, and more in the United States, has shown that projectile distribution provides the most valuable evidence as to the extent, intensity and character of fighting. Other military equipment and non-

[238] With this said, during the American Civil War great quantities of lead were collected as soon as lead oxidation occurred (the whiteness permitting easy identification of lead on the surface). Lead collecting was an organised affair in the Confederate armies, and noted as such during the sieges of Petersburg and Atlanta. Also, large quantities of lead shot were collected for sale as souvenirs, even before the Civil War had ended. Information from Charles Haecker

military artefacts lost during action or in the stripping of bodies can assist interpretation,[239] but projectiles provide the bulk of the evidence. To interpret this, and to determine wider potential, it has been necessary to undertaken firing experiments in which ballistics and forensics have been applied alongside archaeology.[240] Results have been pivotal in the characterisation of early modern battle archaeology; uncertainties remain.[241]

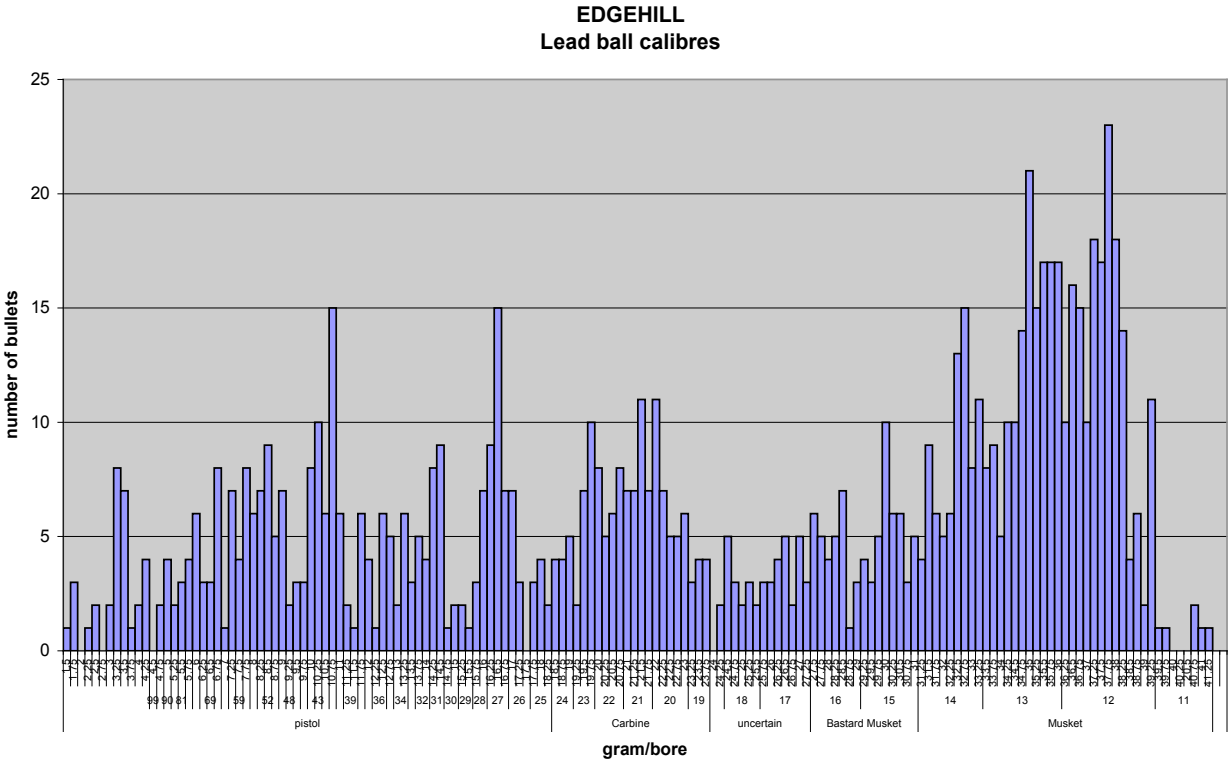


Figure 82: Calibre graph from Edgehill, showing relative numbers of bullets by weight, also indicating bore and probable weapon type[242]

Unlike flint arrowheads, stone, clay or lead slingshot, and ferrous arrowheads, a substantial proportion of fired lead bullets bear distinctive marks which show that they have been fired. Because of this, an archaeology of attack is recoverable from lead bullets that is more significant than that which can be derived from any other class of artefact.

[239] Foard, 2008a
[240] E.g.: Allsop and Foard, 2008
[241] Foard, 2008a
[242] Foard, 2008a

The weight/diameter of a lead ball can be broadly correlated with the weapon – and hence the kind of troops – that fired it. The first and most significant information about a bullet is thus its calibre or 'bore'. This is most consistently defined and effectively presented from its weight, whence evidence for a site can be graphed.

Bullets show a range of form and surface detail that relate to their manufacture and use. This has been subject to detailed study; some aspects are well understood, enabling sophisticated analysis; other aspects, such as impact damage, are subject to ongoing research which it is hoped will enable better interpretation of bullet assemblages in future.[243]

Figure 11: Unfired lead ball, the dominant type of bullet in use via early modern small arms. The image shows detail of manufacture, with sprue extending up from the centre that shows a distinctive snip with a central bar. Also to be seen is the faint trace of a ridge running around the ball from top to bottom, representing the join between the two halves of the mould

Figure 84: Bullet showing extreme evidence of firing through a smooth bore musket, where under pressure the bullet has expanded to fit the barrel. The lower hemisphere (right) shows

[243] Sivilich, 2007; Allsop and Foard, 2008; Foard, 2008a

melting from the combustion, while the upper (left) hemisphere shows the original bullet surface intact

Figure 85: Lead slug, a distinctive type of ammunition fired in small quantities on early modern battlefields, normally by cavalry from pistols or carbines

Figure 8612: Lead bullet which shows the most distinctive evidence of having been fired as part of a multiple load of 'case shot' from an artillery piece, where the lead ball has been compressed on firing against other bullets to create a polygonally facetted surface

Figure 8713: Lead bullet of musket calibre which has impacted on a hard, smooth surface distorting the lead ball and creating a distinctive impact surface

Taphonomy of bullets

Understanding of the taphonomy of most battlefield finds is incomplete. However, as a result of investigation undertaken over the last five years there is now limited evidence to suggest that a basic correlation can be made between the geology of early modern battlefields (as supplemented by information on 20th century land use), and the condition of lead bullets found upon them.

At one extreme sits the Edgehill material, in excellent condition. At the other is the Wareham siege assemblage, which shows extreme decay.[244] Subjective analysis of these bullets suggests that it is soil chemistry, primarily the soil pH, which determines the degree of lead decay. On high pH sites, such as those with parent geologies such as clays and limestones, there is stabilisation of the decay process. The build-up of a thin layer of corrosion deposit retains much of the fine surface detail of evidence for bullet manufacture and use. Beneath this the lead is largely unaltered.

By contrast, in low pH conditions decay appears to proceed to a far greater depth with no stabilisation. In some cases aspects of the detail of manufacture and use are retained at the surface of the deep corrosion deposit, but often it is very poorly preserved. The condition seems to be further affected by land use history, with arable cultivation causing mechanical damage. Where bullets have minimal corrosion then mechanical damage progressively removes the corrosion layer, although much of the detailed evidence survives. Where corrosion has been more aggressive, the bullet is made much more vulnerable to mechanical damage, rapidly losing its surface detail as the deep corrosion deposits are removed; in the worst situations, bullets begin to fracture and fragment, so that even calibre information for weight or diameter are no longer certain. Where early land use history was non-arable then damage may be less, but attenuation of evidence is likely wherever arable cultivation occurs.

Almost all bullet assemblages on land show corrosion of the surface lead, usually with conversion to lead carbonate. Unlike the oxidisation of ferrous artefacts, in most environmental conditions the build-up of lead carbonate leads to a relatively stable condition and thus significant loss of bullet mass does not normally occur. Where a corrosion deposit is thin then the fine surface details left by manufacture and use of the bullet will normally show; where there is a thick deposit the finer detail may be masked or

[244] Information from Michael Pratt and Charles Haecker

lost. Where corrosion has been more extreme then a thick deposit results and the surface evidence then appears to be preserved only in the lead carbonate; in such cases, removal of the corrosion deposit will often remove the evidence.

Figure 8814: Slight corrosion on this bullet from Sedgemoor means that remarkable detail survives, showing it to be a lead ball of carbine bore that was fired as the lower part of a multiple load together with a large number of hailshot of a few millimetres diameter

Figure 15: A slightly thicker lead carbonate corrosion deposit on this musket calibre bullet from Edgehill masks some detail. Even so, the snip which removed the casting sprue (a shallow scoop in the form of two hemispheres with a central bar) remains visible

So little investigation has yet taken place that it is as yet unclear how many sites are seeing erosion, and to what degree. It is possible that a substantial long term loss of evidence is underway which will rob most sites of the level of detail that has been seen at Edgehill, where conditions have been highly conducive to bullet preservation. Yet even at Edgehill there is evidence of decay, in some cases amounting to near complete removal of corrosion deposits.

Figure 90: The crazed surface of a lead bullet from Edgehill, apparently resulting from early stages of decay of the lead carbonate corrosion deposit

In aggressive soil conditions, corrosion penetrates deeper. Where there is no mechanical damage then deeply-corroded bullets may still retain some detail on their surface, but where cultivation occurs then the mechanical damage appears to lead to rapid erosion of the surface.

If corrosion has been even more extreme the result can be a fracturing and fragmentation of the bullet, rendering all measurements of calibre nugatory.

Figure 9116: Intense corrosion has penetrated deep into the lead of this bullet from Wareham where, on a parent geology of sand, the soil pH is very low. The bullet has begun to fracture and fragment under the impact of mechanical damage in arable conditions

The other major cause of loss of surface detail is post recovery. For bullets this is a combination of lack of control of moisture levels and, most importantly, the failure to protect bullets from mechanical damage. Standards of current best practice are detailed in Appendix 3.

In the present project just two large data sets, from Wareham and Edgehill, have been subjectively assessed and soil chemistry tested. They represent the two extremes. The majority of the Edgehill assemblage survives in excellent condition and most bullets

have yielded evidence of manufacture and use. This excellent condition seems to result from high soil pH (see Chapter 4) combined until recently with relatively low mechanical damage over several centuries, demonstrated by a well documented land use history. The site was wholly under pasture in 1931-5 while the presence of ridge and furrow over almost the whole battlefield in the late 1940s shows it to have been uncultivated since the 18th century when the open fields were enclosed. By 2004-7 the landscape was largely arable, although a small number of fields still contained ridge and furrow that had never been ploughed. Thus mechanical damage at Edgehill will have been very recent.

At the other extreme lies the Wareham siege assemblage, where the condition of most though not all bullets is very poor. Not only have the surface indicators of manufacture and use been lost on a large part the assemblage, the erosion appears to have rendered the calibre graph meaningless for this is the only assemblage so far studied where distinctive calibre groupings are not distinguishable. The primary factor is likely to be soil chemistry, for the soil has a parent geology of sand and so the soil has a low pH (see Chapter 4). Mechanical damage may also have played a part for the site was under arable in 1931-5 and immediately prior to mineral extraction in the 1990s. One problem complicating the analysis is that the Wareham assemblage, because collected in the 1990s as an unstratified collection, has not been stored to curtail decay by controlling humidity and minimise abrasion.

The present analysis needs validation. Further research is required to establish the relative importance and complementary nature of the various factors that influence decay of bullets, including the impacts of different land use history and different modern agricultural regimes. The Edgehill data provide the starting point as they reflect variable mechanical influences on a well preserved site. However, these need to be compared to new samples collected to the same standard from other battlefields where conditions vary. Until this is done it will not be possible to predict the trajectory of decay and so determine where conservation need may lie. It is recommended that such validation be undertaken in Phase II through small scale sampling of bullets and soil chemistry from a number of battlefields on contrasting geologies, with a standard method of assessment of bullet condition to ensure parity of data. The principles behind such an approach may also prove valid for ferrous and copper alloy artefacts. If the preliminary analysis offered here can be so formalised, and if some chronology can be determined for the decay processes in different conditions, then it should be possible to predict the potential of the bullet

assemblages on early modern battlefields. If so, it will then be possible to see where the greatest threats exist and hence where the priorities lie for arable reversion or, failing that, recording.

For the present purposes, 31 battles have been assessed for

- their surface geology
- the percentage of land under arable on the 1930s land use survey
- percentage of land under arable on vertical aerial photography of c.2000

All early modern battles have been assessed except for those which are so heavily developed as to be irrelevant or where information as to the exact location of the battlefield was unavailable. Lesser areas of potentially significant geologies are indicated in brackets, for example where there are peat and alluvial deposits which might provide exceptional preservation, through protection from mechanical damage or waterlogging, respectively. Grading is in each case from 1 (bad) to 4 (good). Zero indicates not assessed. Braddock Down appears twice because alternative sites have been separately assessed, incidentally showing how greatly the potential of a battlefield may vary depending on exactly where the core of the action is focused. If the correlation is broadly correct then it is likely that the potential of different battlefields may vary substantially, not simply according to the state of development or the quality of the documentary record but also because of the differing quality of the archaeological record.

action name	year	state of dev.	arable modern	arable 1930s	bullet potential suggest by geology	geology
Selby	1644	1	0	0	0	n/a
Maidstone	1648	1	0	0	0	n/a
Newark	1644	1	0	0	0	n/a
Hilton	1644	1	0	0	0	n/a
Preston I	1648	1	0	0	0	n/a
Torrington II	1646	2	0	0	0	n/a
Newbury II	1644	2	0	0	0	n/a
Braddock Down	1643	4	2	3	1	sandstone
Hopton Heath	1643	3	2	4	1	sandstone
Adwalton Moor	1643	3	3	3	1	sandstone
Stratton	1643	3	4	4	1	sandstone

Ripple Field	1643	4	1	1	2	sand & gravel; sandstone
Newbury I	1643	3	2	3	2	sand & gravel; clay/sand/silt; (alluvium)
Lostwithiel	1644	3	3	4	2	sandstone
Winwick Pass	1648	3	1	1	3	clay (sandstone)
Rowton Heath	1645	3	1	4	3	clay (sand & gravel / sandstone)
Winceby	1643	4	1	1	4	clay
Marston Moor	1644	4	1	2	4	clay; (peat?)
Newburn Ford	1640	2	2	2	4	alluvium
Stow on the Wold	1646	4	2	2	4	limestone
Cheriton	1644	4	2	2	4	chalk; clay with flints
Roundway Down	1643	4	1	3	4	chalk
Cropredy Bridge	1644	3	2	3	4	mudstone; alluvium
Langport	1645	3	2	3	4	mudstone; limestone (alluvium)
Worcester	1651	2	2	4	4	alluvium; siltstone (sand & gravel)
Edgehill	1642	3	2	4	4	mudstone; (alluvium)
Langport	1645	3	3	3	4	(alluvium)
Nantwich	1644	4	2	4	4	clay (sand & gravel)
Naseby	1645	4	2	4	4	clay; (alluvium)
Lansdown	1643	4	3	3	4	limestone
Sedgemoor	1685	4	2	4	4	peat (sand & gravel)
Braddock Down	1643	4	3	3	4	shale (alluvium)

Further priorities

There is need for

- a reference collection of bullets, comprising digital images and descriptive text
- database analysis of bullets, roundshot and bandolier items to facilitate wider and more consistent analysis of battlefield assemblages. This needs to be linked to a
- physical reference collection of experimentally fired bullets with related scientific data and a detailed methodology of bullet analysis
- a case study on a well-preserved battlefield fully to explore the potential of bullet scatters, including particular aspects such as case shot scatters and firing lines;

the Edgehill study suggests that such aspects may enable the recognition of individual battalions

Braddock Down: a case study in historic terrain

Summary of action

On the 9 January 1643 at Braddock in Cornwall (SX177631), about seven kilometres north east of Lostwithiel, a royalist army of c.5000 men under Sir Ralph Hopton defeated a parliamentarian army of c.4000 under General Ruthin. There were few royalist losses but the parliamentarians suffered about 200 killed and 1500 captured as well as losing their baggage train and several pieces of artillery. The battle secured Cornwall for the royalists and established Hopton's reputation as an effective commander.

The royalists camped the night before the battle at nearby Boconnoc and were surprised when, in the morning on breaking camp, their vanguard of dragoons encountered enemy cavalry to the east. They discovered the parliamentarian army already deployed in battle array on Braddock Down, though a parliamentarian report claims it was they who were caught on the march by the royalists. Hopton quickly deployed his own troops with the infantry flanked by cavalry on both wings, and in the centre placed two artillery pieces commandeered from Boconnoc House. A forlorn of musketeers, a detachment of commanded musketeers sent forward of the main body as a skirmishing unit, was placed in small enclosures closer towards the enemy.

The two armies faced each other on opposing ridges across a small valley. To begin with there was a prolonged fire fight but neither seemed willing to give up the advantage of their relative positions. Eventually Hopton, after firing the two artillery pieces, led his entire army down into the valley and charged up the other side. The Parliamentarians were overwhelmed almost immediately. Standing to fire only a single volley they fled. Ruthin left parliamentarian musketeers lining the hedges on the road towards Liskeard, to protect the retreat, but these were soon flushed out and the rout was complete, as the royalists continued the pursuit into Liskeard.

Finding the battlefield

Braddock battlefield is included on the Register, but is one of the few Civil War battles where there is a significant dispute over the exact location. Only one of the alternative sites has been included within the Register boundary but there is no definitive evidence to

prove that this is correct. Detailed discussion of the battle is omitted by most battlefield guides and histories but where it is addressed most authors, including Burne and Kinross, follow the traditional location although Brooks presents both options.[245]

The traditional site, recorded in 1881 on the 1st edition six inch Ordnance Survey, lies between Boconnoc Park and Braddock Church.[246] The suggestion of an alternative site 2km to the north east was made by a local historian after re-examination of the primary sources for the battle and historic terrain evidence.[247] This reinterpretation has been followed by the English Heritage Battlefield Register report and thus the Registered Battlefield lies adjacent to the main Liskeard to Lostwithiel road near Middle Taphouse.[248]

One thing that emerges both from the review of English battles in this report and for the inventory of Scottish battlefields is that where sites have been shifted from traditional locations the transfer is seldom satisfactory.[249] Re-examination of the primary documentary sources in the context of our terrain reconstruction does not yield sufficient topographical evidence to resolve the issue. However, the present analysis has worked from the reprinting of extracts of the primary accounts of the battle in the Register report. A prerequisite for analysis is the compilation of full transcripts of all the accounts in a concordance. However, though this may add to understanding, it is unlikely that the dispute over location will be resolved by this alone. Braddock Down thus presents a classic example of where integration of the evidence for terrain and military history provide hypotheses that need to be tested archaeologically.

Historic terrain

In a region which was largely enclosed at a very early date, extensive areas of open ground are significant. The battle name Braddock Down mirrors many from the enclosed zones of Britain, which relate to the intentional choice of open ground in which the standard 17th-century tactical formations could be applied.

The historic landscape and the main historic map sources for the Registered Battlefield area were discussed by Buck, in the CEI landscape report and in the National

[245] Burne and Young, 1959; Brooks, 2005
[246] Kinross, 1988
[247] Wilton, 1985; Wilton, 1992
[248] National Army Museum, 1995c
[249] Foard and Partida, 2005

Army Museum battlefield report which underpins the Register.[250] This is one of the Register's more substantial discussions. However, a mapped reconstruction was not prepared for the latter and it is this which enables the sometimes disparate details from different sources to be brought together in a single representation. The same is true of the 1996 desk top assessment prior to pipeline construction across the Registered battlefield.[251] The preparation of such reconstructions is a key issue that needs to be clearly defined in a guide to best practice for battlefield investigation. As demonstrated above, the landscape characterisation data set is not adequate for the purpose.[252]

The historic landscape of the Boconnoc/Braddock/St Pinnock area is unusually well documented. There is a very good sequence of historic maps from the 16th to 19th centuries which have been used here, as well as an extensive written record for the Bocconoc estate from the 16th century onwards, which could not be exploited here but which offers a high research potential. Gascoyne's county map of 1699 yields little, but that of 1748 by Martyn provides a valuable picture of enclosed versus open land at that date, a level of detail only occasionally found in such county maps. There is also more detailed local mapping. Few parliamentary enclosures took place in Cornwall, the majority of the open land being enclosed by agreement in the 15th-18th centuries; in some areas enclosure is even more ancient. It is therefore exceptional to have extensive parliamentary enclosure of the Downs at Braddock defined in a map and award of 1822.[253] More important still the enclosure was so late that prior to enclosure the downland had been mapped on the Ordnance Surveyors' Drawings at two inch scale in 1803.

Enclosure maps, because of their very specific purpose, typically do not show the pre-enclosure roads and pre-enclosure field closes (enclosures in which common rights were still maintained). However, both are shown on the Ordnance Surveyors' Drawings, which were intended to provide a representation of the militarily significant aspects of the landscape.[254] In addition there is a detailed map of the southern part of the area in the late 16th century, long before the battle, while in 1675 Ogilby shows the main post road across the Down. There are also various other estate and tithe maps from the 18th and 19th centuries and a vast documentary archive in the Cornwall Record Office for the Boconnoc

[250] CEI, 1994; Buck, 1996; National Army Museum, 1995c
[251] Buck, 1996
[252] Cornwall County Council, 1996
[253] Tate and Turner, 1978, 82
[254] Delano-Smith and Kain, 1999

estate, which will probably contain a great deal of information on the landscape of the 17th century. Of all the main data sources consulted for this assessment only the RAF 1940s vertical air photographs failed to produce any useful evidence.

The mapping presented here shows the extent of open common which was still unenclosed in 1803. Within that it distinguishes the field closes, at least one of which (to the east of Boconnoc church) is depicted on the 16th-century map. The remaining areas were anciently enclosed as defined on the enclosure map and this is broadly confirmed for the southern part of the battlefield by the 16th-century map. A small area of ancient enclosures surrounds Middle Taphouse, to north and south of the main Liskeard to Lostwithiel road. Ogilby's 1675 Itinerary does not show the enclosures at Middle Tap House but it does refer to the House itself and so there may already have been a very small area of enclosures there are that time. It would, however, be surprising if they had existed on both sides of the road and yet remained unmapped by him, given his usual attention to such detail.[255] Within the southern area of the Taphouse enclosures a large mound, interpreted as a Bronze Age burial mound, still survived in 1946; others are recorded from historic maps and archaeologically elsewhere on the former heathland of Braddock Down.[256] But, contrary to the Register report's suggestion, this proves little in relation to the battle account reference to artillery being placed on a barrow, for at least ten barrows were recorded in the 20th century as still scattered across the downs, and many more appear on the 16th century map.[257]

The road network will have been critical in determining the approach and flight of the parliamentarian army. The army's initial deployment, though not necessarily the principal deployment before the action, is said in one original account to have been where the Liskeard road opened out into Braddock Down. The Register report describes the Liskeard Road running through St Pinnock, but Ogilby in 1675 clearly identifies it on a more northerly course, joining the Launceston to Fowey road at East Tapp House. The remaining road network is provided on the 1803 map with those on the southern half of the area largely confirmed by the 16th century map. While the geological mapping provides little clear evidence of peat or even alluvial deposits across most of the area, the 1881

[255] Ogilby, 1675, plate 69
[256] Buck, 1996
[257] 'draught of the East Commons', c.1590: CRO map AD644

Ordnance Survey depicts a substantial boggy area immediately north of the Fowey to Liskeard road south of Middle Tap House.

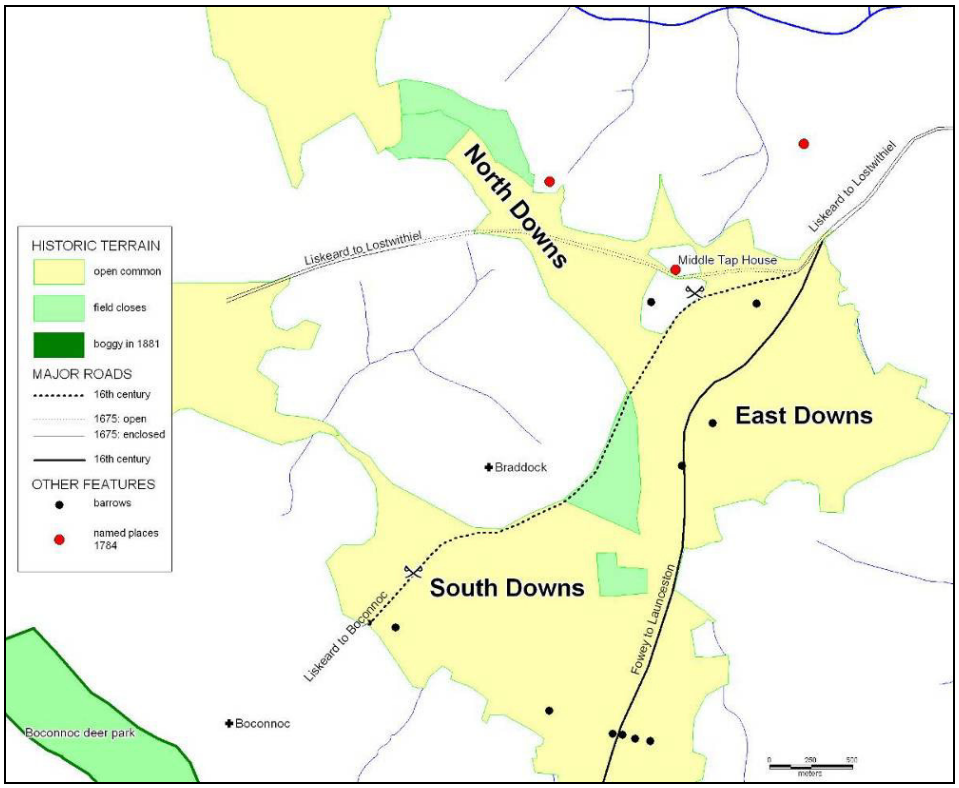


Figure 92: Braddock Down: historic terrain with traditional battlefield to the south west and the Registered battlefield to the north east

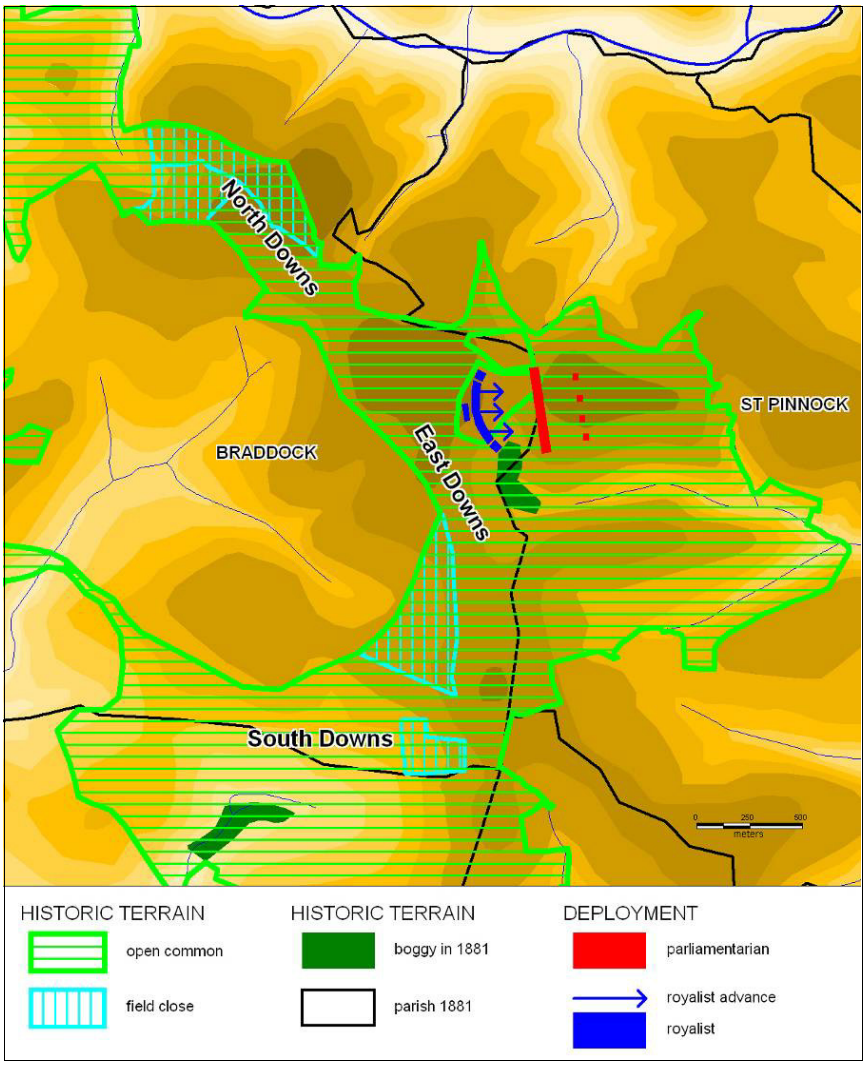


Figure 17: Braddock Down: relief with superimposed historic terrain detail

Action placed in terrain

Having recovered the broad structure of the historic terrain it is possible to reconsider the detail presented in the primary accounts of the battle, briefly reviewing each of the arguments presented in the Register report.

The parliamentarian account by Wrothe specified that they were attacked as they marched 'beside a dangerous bog and a very high hill'. This would seem to accord best with the road from Liskeard to Fowey where, to the south east of Middle Tap House, it crosses the boggy area depicted in 1881. Thus the first encounter seems most likely to be where the East Downs begins to narrow south westward towards the South Downs. A royalist approach to the Downs from Boconnoc park, where they were camped, will almost

certainly have brought the royalists across the traditional site of the battle, on the South Downs.

According to Hopton the parliamentarians deployed on Braddock Down at the end of the lane coming out from Liskeard and the royalists deployed on the west side of Braddock Down. This seems initially to fit well with the Registered site, if the East Down is meant, but there are three separate downs and when the field closes are taken into account, and particularly that recorded in the 16th century on the East Common (South Downs), then it can be seen that the Liskeard to Boconnoc road would also enter the East Common through enclosed ground. Thus the descriptions could equally be compatible with the traditional site. To reinforce the latter there is the most specific of all topographical references, written by Grenville, one of the senior royalist officers who was from the region. Grenville states that the action took place on the heathland between Boconnoc and Braddock church, which fits perfectly with the traditional site for the battle. The Register analysis, following Wilton, presents a convoluted argument to accommodate this description with the modern re-interpretation of the battle site, arguing that Grenville mixed up Braddock church, which is close and clearly visible, with St Pinnock church which is over 2.5km to the east and out of sight from both alternative sites. It is suggested that this error may have occurred because of the lack of clarity over the churches seen on Speed's map, or in various published derivatives, to which Grenville probably had access.

Grenville then says that the parliamentarians deployed on a 'pritty rising ground' which was in the way towards Liskeard and the royalists on another hill within musket shot of them, so perhaps some 250-350 meters apart.

Symond's Diary states that during the1644 Lostwithiel campaign, on 7th August 1644, Charles I's army camped on the site of the Braddock Down battle, on Pinnock or Broadoak [Braddock] Down and then the next day advanced towards Boconnoc.[258] Though at first sight this might seem to be helpful in fact there is again insufficient detail to be certain of the location meant.

Thus it can be seen that even with more detailed terrain reconstruction, it is impossible to be sure about the location of the battlefield. Unless important new documentary evidence is found it will only be through a study of the battle archaeology that this problem will be resolved.

[258] National Army Museum, 1995c

Battle archaeology

Part of the Registered Battlefield has been subject to an archaeological desk based assessment, evaluation and watching brief.[259] A metal detecting survey was conducted in advance of pipeline construction, but this was restricted to the Registered Battlefield, incidentally showing how influential the Registered boundary can be in governing the archaeological response to threats. The full 20m width of the planned pipeline was detected prior to topsoil stripping, but not all fields within the corridor were accessible. The survey, undertaken by a number of metal detectorists under archaeological supervision, produced no Civil War related artefacts at all. The follow up watching brief during construction was conducted under difficult circumstances and again produced no significant results.

The survey traced a transect through the two opposing deployments, as defined by English Heritage. While the absence of finds on the parliamentarian side is explained by the inaccessibility of the land for survey, the lack of finds from the area of the supposed royalist deployment challenges the Register's interpretation of the battlefield location and the position and extent of deployments shown there. While an absence of bullets from an area of cavalry action might be explicable, the failure to find bullets deriving from the substantial fire-fight that occurred between infantry battalions is very difficult to explain. Even if the area had been under pasture for a century or more and the bullets had all migrated to the bottom of the topsoil, the results from Edgehill demonstrate that at least some musket calibre bullets would be recovered by competent metal detecting.[260] Though the report does not specify the level of expertise of the detectorists or the intensity of the survey, to find no bullets is highly unusual.

[259] Cole, 1999; Buck, 1996
[260] Foard, 2008a, chapter 5

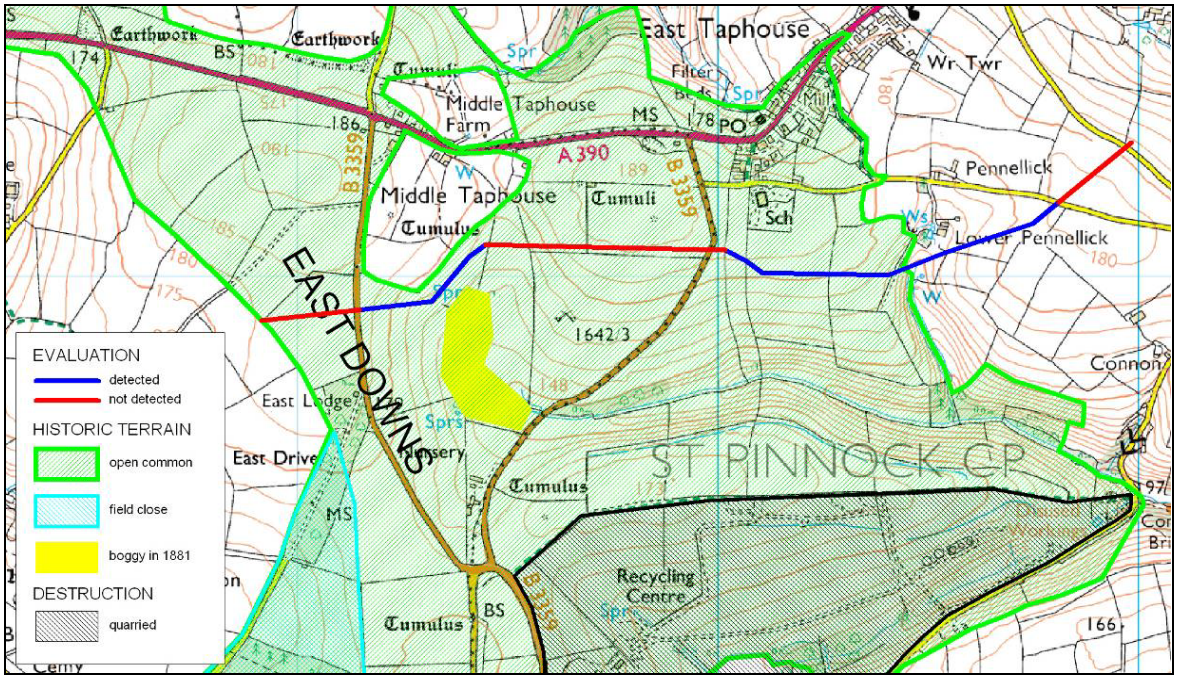


Figure 18: Braddock Down: evaluation prior to pipeline construction across the Registered battlefield

Condition

The landscape of the traditional site was wholly transformed by 19th-century and earlier imparking. It is now half under woodland and half under pasture. In the 1930s it was 30% heathland, 10% pasture and 60% woodland and it is on a sandstone and siltstone geology which may have produced an acidic soil. This combination of land use and geology may have resulted in soil chemistry which is causing some damage to the bullets, but the lack of arable cultivation would probably largely mitigate this. The Registered site appears to retain most of its early enclosure hedgerows. It is now largely arable (90%) with a further 10% under pasture, but in the 1930s it was 70% pasture and 30% arable. The geology is slate and siltstone and so may prove to have less aggressive soil chemistry but this may be compensated for by mechanical damage due to the largely arable land use.

Research potential

Work at Wareham siege site has shown that even in very aggressive of soil conditions and with intensive arable for much of the twentieth century lead bullets from a Civil War action still survive, even if their surface information is largely lost. Thus it cannot be suggested that the absence of battle archaeology in the Registered site is due to its destruction. If

there has been no depletion by treasure hunting (of which as yet there are no reports), then evidence should be well preserved. Further, it is highly improbable, in the light of the topography, that the action could have occurred solely in the large area on the south eastern quarter of the East Down which has been recently quarried.

Both in the ancient and in the parliamentary enclosed areas there are the typical Cornish hedges, stone faced banks surmounted by hedges, as well as normal hedgerows. There may thus also be potential in several locations for evidence of the fire fights preserved in these revetted banks. Though bullet impact scars are unlikely to survive on the stone revetting, embedded bullets may well exist within the banks, though this would pose some unusual problems for battlefield survey.

If well preserved the battle archaeology can be expected conclusively to locate the battlefield, both from the musket calibre bullets from small arms fire, and probably also from case fired by artillery. Indeed as at Edgehill, it is likely that such evidence, if surveyed and analysed following the methodology demonstrated for Edgehill, will enable the deployments and action to be closely mapped. Moreover, given the high quality of the historic landscape data combined with the relatively good level of detail available in the various primary accounts of the action, Braddock offers a high research potential to explore the relationship between the action and the historic terrain, by integrating the three data sets.

There were at least three main elements to the action: a fire fight; a rapid assault; and a destructive rout, including a separate fire fight for enclosures bounding the main road leaving the battlefield towards Liskeard. The archaeological signatures of the three elements are likely to be spatially separate and may exemplify the archaeological signature of a fighting retreat in an enclosed landscape.[261]

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[261] **Primary sources: terrain** In the 19th century Braddock (or Bradoc) was a parish united with Bocconnoc. It includes the manors of Braddock and Warleggan. Boconnoc includes manors of Botelet, Langunnet, Bodulgate. St Pinnock includes manors of: Botelet, Penvvrane, Fursdon, Trevillis. Lanreath, the northern extremity, extends into the East Down at Boconnoc, and includes the manors of Botolet, Langunnet, Lanreath, Treire. St Winnow: the West Down of Braddock was contiguous with that of St Winnow at enclosure, and also includes the north western part of Boconnoc Park.

Historic maps and awards*:*

Boconnoc	Tithe Map CRO TM12, Award CRO TA12
Braddock	Tithe Map FS3/924, Award TA17

The potential of Characterisation data

The first project completed was for Cornwall by the Cornwall Archaeological Unit. [262] The generalised mapping that this provided of anciently (pre 17th century) and recently (17th-19th century) enclosed lands provides a useful background against which to view the military situation in the region in the 17th century. However, because it was prepared for a very different purpose, at a battlefield scale the mapping does not provide sufficient detail for understanding of the historic landscape at the time of the Civil Wars.

Lanreath Tithe Map TM113, Award TA113
St Pinnock Tithe Map TM189, Award TA189
St Winnow Tithe Map TM253, Award TA253/1

Inclosure of Downs in Braddock, Boconnoc & St Winnow (2300 acres):
1809 Enclosure Act, CRO AD593
1822 Enclosure Award, CRO QS/PDA1

Inclosure of Pollard's Down in St Pinnock (106 acres) (not on or near the battlefield):
1867 Enclosure Act
1873 Enclosure Award, CRO QS/PDA20

- Tracing of Bodargie in Bradoc with fields numbered (ref. P 17/3/2, no date)
- Plan of Boconnoc, 'draught of the East Commons', c.1590, CRO AD644 (catalogue states: Bought by CRO from Grampound Antiques, Truro, but was from the sale of the contents of Ethy House, June 1977)
- Plan of Boconnock Barton – woods, fields named, undated, F/3/map/21
- Enclosure of roads in Boconnoc, Bradoc & St Winnow, 1811: F/325 – unfit for production
- Commissioners' draft plan Boconnoc Enclosure c.1821, F/326 – unfit for production
- Plan of part of Boconnoc estate, c.1811-20, F/327/1
- Plan of Penventon platation and adjoining land, 1817, F/321/8
- Map of deer park in parishes of Boconnoc & St Winnow, F/327/27
- Warleggan manor in Braddock – 18th century, no land in Braddock identified, CRO DDG1872

Other sources: Various deeds, leases etc from 17th-19th centuries: DDR741-5; Fortescue Collection: summary catalogue only. Important large collection, mostly uncatalogued, extending t least from 16th century onwards. The estate encompasses most of the battlefield. County maps: Gascoyne 1699, Martyn 1784 (appears to show church towns (church), other hamlets (circle) and isolated single farms or great houses etc (house)); Morden 1695, Greenwood 1826-7; Smith 1804

[262] Cole, 1999, 1996

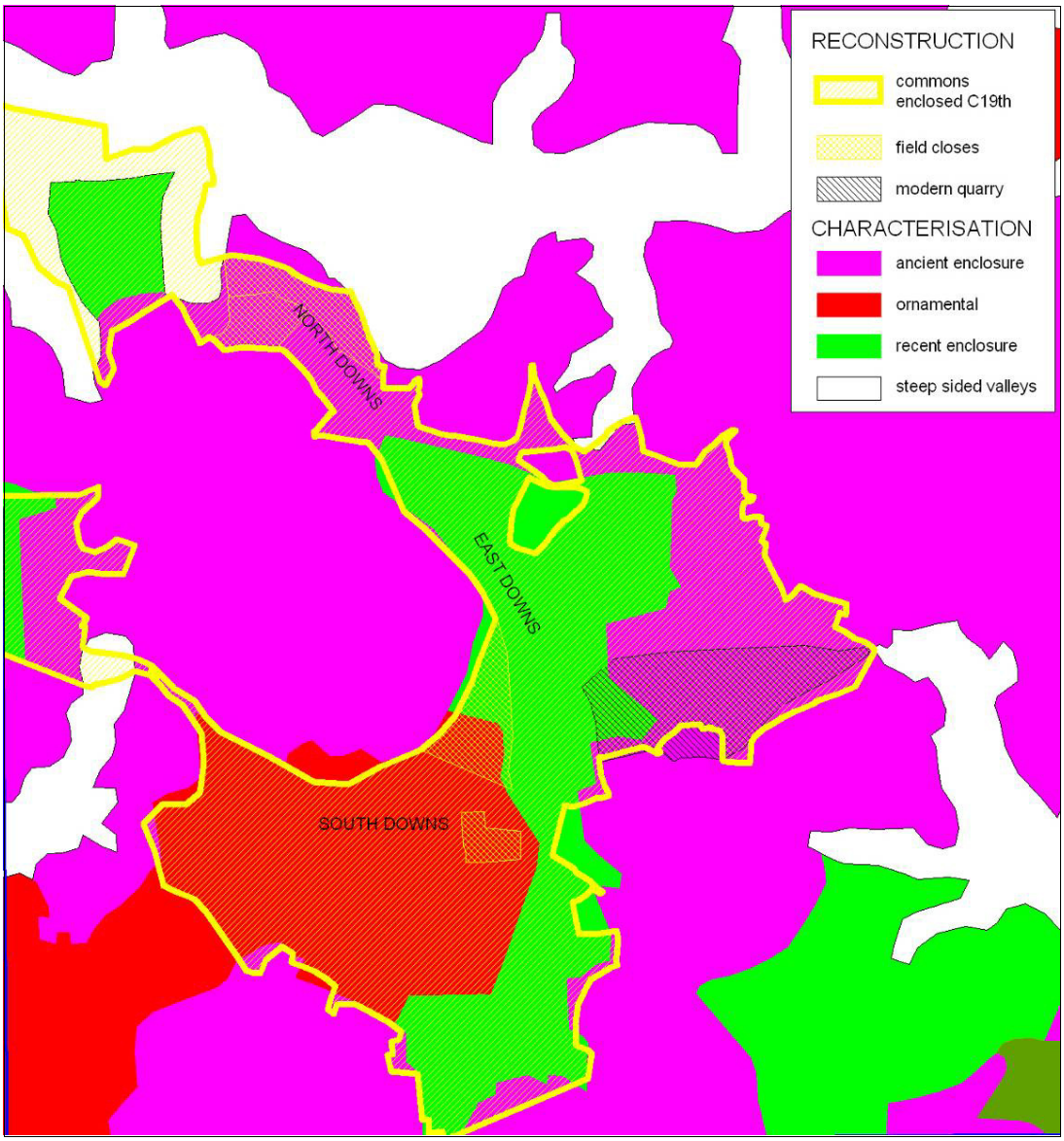

Figure 9519: Landscape characterisation and historic terrain reconstruction compared

The Cornish battlefield of 1643 on Braddock Down was taken as a case study to test this. A basic reconstruction of the historic terrain of the battlefield has been prepared from a range of maps from the 16th to 19th centuries. The key elements mapped are: ancient enclosures; common enclosed in the nineteenth century by parliamentary Act; and field closes enclosed at an early date but still retained as commonable land until parliamentary enclosure.

This accurately-mapped terrain detail has then been superimposed in onto an extract of the countywide characterisation dataset. It can be seen that the characterisation

classification represents a merging of different chronological elements, the ornamental obscuring the earlier pattern of ancient and recent enclosure. In addition, at this scale the level of accuracy in the countywide characterisation data set is low, with key areas of common being misclassified as anciently enclosed and a small but potentially very important area of ancient enclosure at Middle Taphouse misclassified as recent. Further, the field closes within the common are wholly missed, whereas the reconstruction provides an unusually accurate definition of them, with good documentary evidence that the largest lying between South and East Downs was already in existence in the 16th century. This demonstrates that landscape characterisation, at least as first applied in Cornwall, is too inaccurate and inconsistent for the reconstruction of historic terrain at the level required by battlefields.

Sedgemoor: a case study in historic terrain and battle archaeology

Summary of action

In June 1685 the Duke of Monmouth mounted a rebellion in south-west England in an attempt to topple the new Catholic king James II. It proved an abortive campaign and by 5 July the rebel army of about 3,500 lay cornered in Bridgewater. That night across the boggy wastes of Kings Sedgemoor, Monmouth launched a last desperate attack on the royal army's camp. They were discovered before they arrived and then, in the darkness, their cavalry failed to locate the ford giving access to the camp. Most of the rebel horse soon fled and, in open country without cavalry support, Monmouth's infantry proved an easy target for the royal cavalry. Finally the royal commander launched a join cavalry and infantry attack and Monmouth's army was destroyed.[263]

[263] Chandler, 1995

Historic terrain

Sedgemoor is arguably the best documented of all English battles, with a series of contemporary plans by Dummer and by Paschal. It is, however a landscape that was dramatically transformed, largely under an Act of Parliament of 1791 for drainage and enclosure.[264] Thus the military information in the primary sources can only be fully unlocked through reconstruction of the historic terrain. For this there is excellent documentary and archaeological data, which enable a clear demonstration of the methodology of historic landscape reconstruction for the purposes of battlefield study.

The analysis was made using a sequence of maps that start with the Ordnance Survey 1st edition six inch survey of 1880s, which were registered in MapInfo to the modern OS map base. Then there was a sequence of three earlier maps of King's Sedgemoor: a late-18th-century pre-enclosure map; a drainage and enclosure map of 1795; and a tithe map of Westonzoyland, 1843. Relevant data from each earlier map was successively added, as discussed above, the later map providing the base for mapping from its predecessor and thus correcting for the geodetic inaccuracy of the earlier maps.[265] Where features were depicted on earlier maps but not later ones then archaeological earthwork evidence from the RAF 1947 vertical air photographs, rectified and registered in GIS, was used, where possible, accurately to position them. This was most successful in locating the 'rhynes' or drainage dykes.[266] The reconstruction plan shows a small section of King's Sedgemoor, a lowland moor of poorly drained alluvium, with adjacent anciently enclosed arable fields on the main islands of Chedzoy and Zoy, on the north west corner of which lay Westonzoyland. Small areas on the periphery of Chedzoy and of the mainland to the north east had been drained and enclosed as meadow, something that had already happened by 1685 judging by Dummer's plan. From Westonzoyland the main road led across the moor to Bridgewater but there was also a moorland route that crossed the Bussex Rhyne via the lower plungeon and passed by Penzoy Pound westward. A second track led from that plungeon to Chedzoy, entering the enclosures via Brinsell Gate. Another track crossed by the Upper Plungeon and went via Langmoor Stone, where it

[264] Foard, 2003b; transcripts published by Chandler, 1999; Young and Adair, 1979, plate 13
[265] Late eighteenth-century pre-enclosure map of Kings Sedgemoor, Somerset Record Office: DD/AH Box 47, 11. Map of Kings Sedgemoor re Drainage and Enclosure, 1795, National Archives CP43/851, after rot.276; Tithe Map of Westonzoyland, 1843, National Archives IR30/30/453
[266] RAF CPE/UK/1924/3035-8

crossed the Langmoor Rhyne, then following a thin tongue of moorland skirting Chedzoy to the east and north, ultimately joining lanes leading from the Bridgewater to Bristol / London road.

Taking the battle accounts and battle plans produced at the time, and using the troop numbers and principles of deployment in the military manuals, a detailed reconstruction of the approach of the rebel army to the battlefield and the deployment of both armies has been developed.

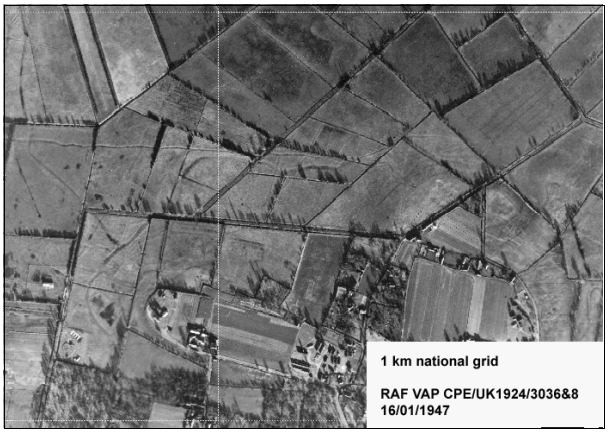

Figure 96: Sedgemoor: earthworks on RAF vertical air photograph (© English Heritage)

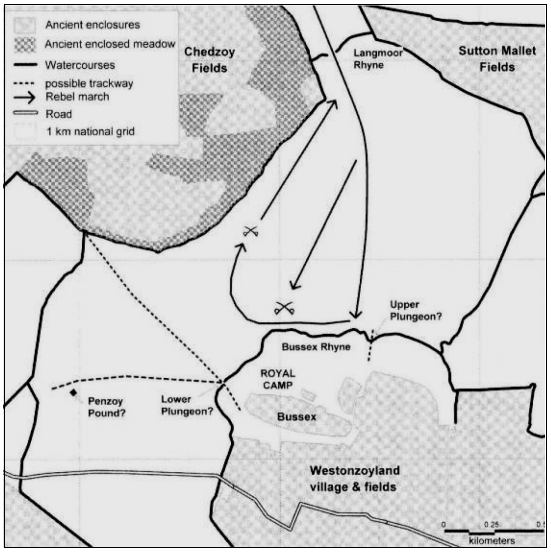

Figure 97: Sedgemoor: reconstruction of historic terrain (from Foard, 2003b)

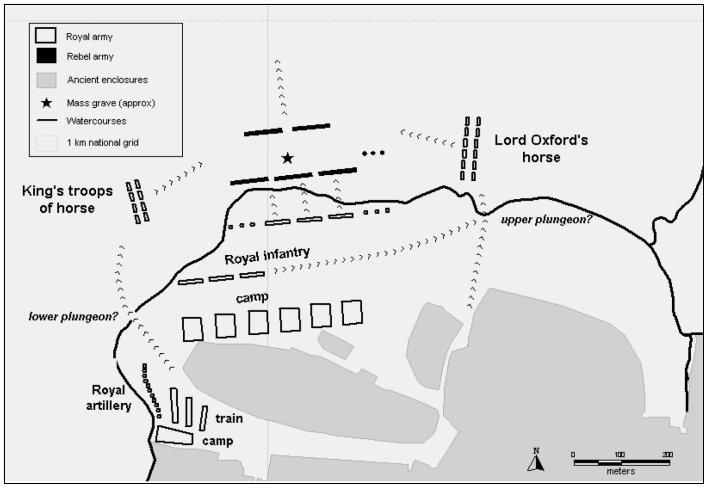

Figure 98: Sedgemoor: deployment and action within reconstructed terrain (from Foard, 2003b)

Battle archaeology

This hypothesis has since been tested by battle archaeology, as recorded by a metal detectorist, and by limited new investigation carried out in 2007 in response to a threat from pipeline construction.[267] The management issues are discussed further in chapter 6. A more extensive data set from detecting by Pettet is currently under analysis by Fergusson as part of post graduate research at the University of Glasgow. Conclusions presented here are accordingly provisional.

The 2007 investigation was conducted on 2.5m spaced transects along the proposed route of the pipeline and then on a single sample field to link the pipeline data to the wider context of the battlefield. The survey was undertaken with a team of six metal detectorists and followed the Edgehill survey methodology, but with survey grade GPS recording, complemented in the second stage by navigation grade GPS recording as used at Edgehill. Dramatic variation in bullet recovery rates between detectorists demonstrates the large biases in recovery rates that can occur when an inexperienced detecting team is employed. This bias will have caused some distortion in the recovered pattern but this was minimised by interspersing the transects undertaken by each detectorist. This also shows

[267] Undertaken in collaboration with Context One, Wessex Water and Somerset County Council. Foard, 2008b. The work was requested by Somerset County Council in fulfilment of requirements in Local Plan Policy HE10 and County Structure Plan policy10:
http://www.sedgemoor.gov.uk/localplan/text/text10.htm
http://www.somerset.gov.uk/enprop/strucplan/review4.htm

the importance of recording reconnaissance speed, coverage and finds recovered by each detectorist (see further in Chapter 6).

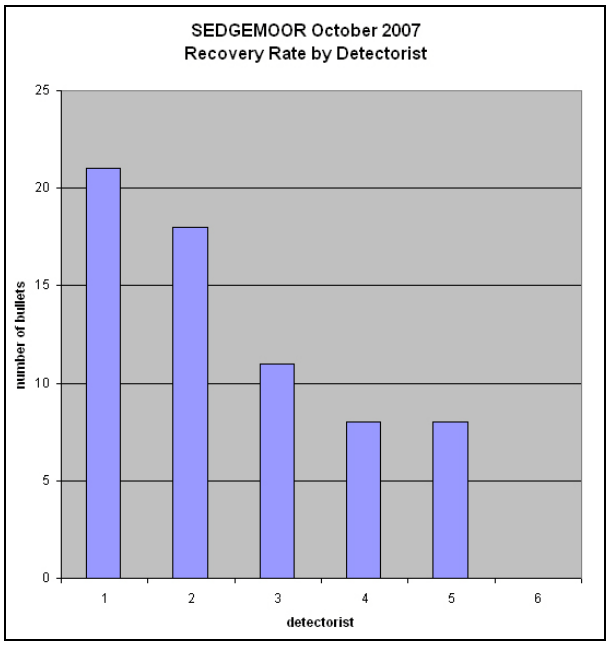

Figure 99: Sedgemoor: comparison of recovery rates between detectorists (October 2007)

There are no data on the recovery times for finds reported by Sagar, so it is not possible to control for relative intensity of survey in his data or to correlate this with results of the new survey. What is clear, however, is that the pre-2007 distribution pattern is highly unrepresentative of the pattern that was recovered in 2007 by systematic survey; the latter shows a far more extensive scatter with discrete concentrations missed in the earlier work although some elements of patterning do match. This seems to be a typical problem with unsystematic metal detecting and shows the extreme care that needs to be taken in placing reliance upon or drawing conclusions from such data sets. It can be however be seen that there is good correlation between the results of the 2007 pipeline and full field surveys. However, the battle archaeology may pose some questions. The orientation of the case scatters, particularly that at A in Fig 100, suggests that at least in one stage of the action the orientation of the deployments may have been rotated somewhat further in a clockwise direction than shown here as the case scatter might be expected to lie at right angles to the deployment. However, if enfiladed fire was involved then A could represent fire from the artillery on the left flank of the royal army's forward deployment. To say which

is correct calls for more extensive and consistent data, to enable firing lines to be distinguished which can be compared to the case scatters.

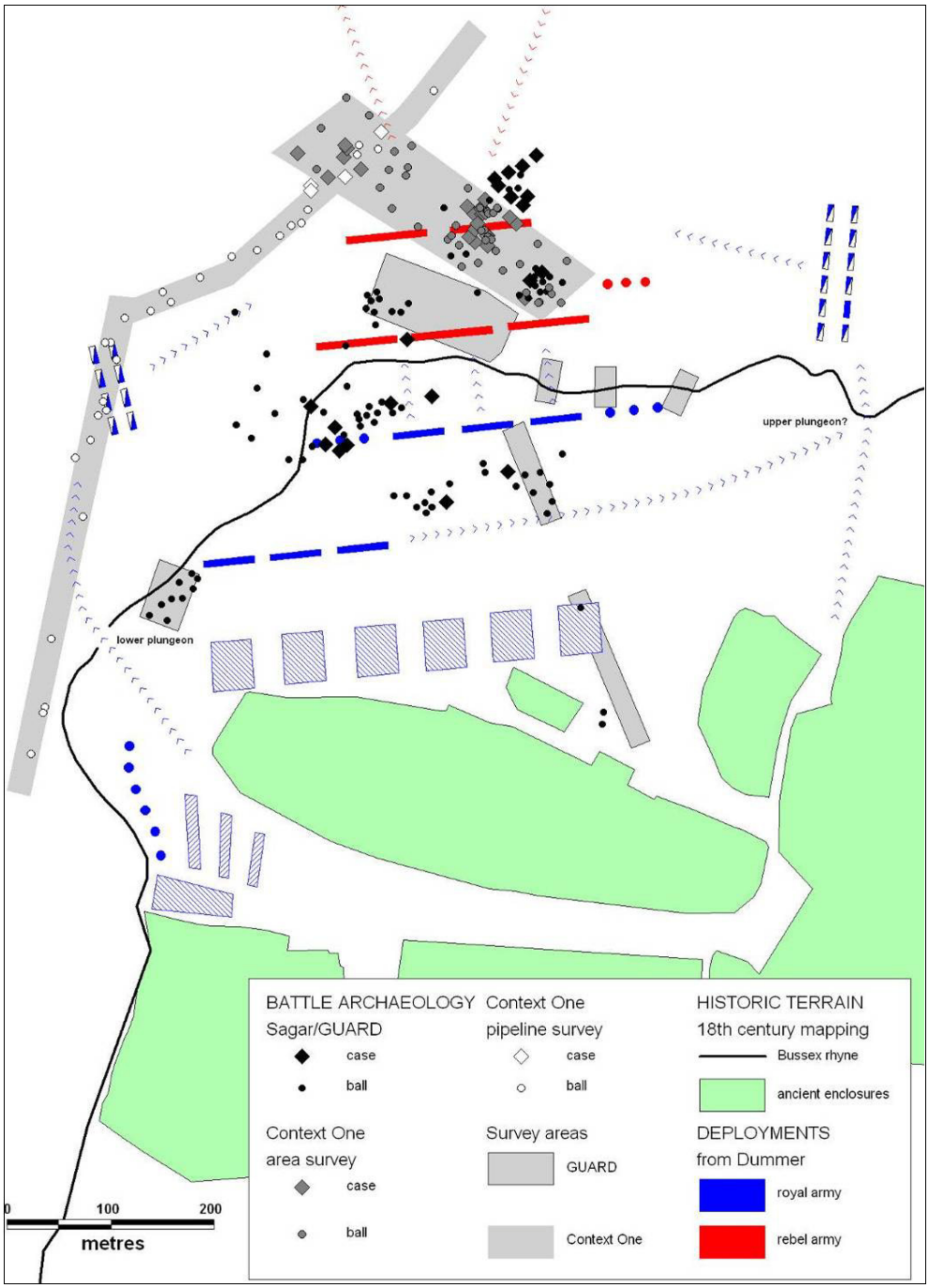

Figure 100: Sedgemoor: the battle archaeology, historic terrain and deployments combined

Though the Sagar/GUARD data did distinguish case from other bullets, and pistol from musket calibres, there is no information on the criteria used in this classification, while

no other types, calibres or evidence on use is presented. As the material was not available for re-analysis the following discussion is therefore restricted to the 2007 bullets. Using a calibre graph that data was inspected to identify any groupings by weight in order to distinguish and then map the bullet calibres. This reveals three peaks for musket which, when calibre shift due to weight loss in firing is taken into account,[268] may broadly correspond with 16, 14 and 12 bore. Also visible are five bullets of carbine calibre and three groupings of pistol calibres. However, the sample size is so small that uncertainty remains over the validity of these groupings.

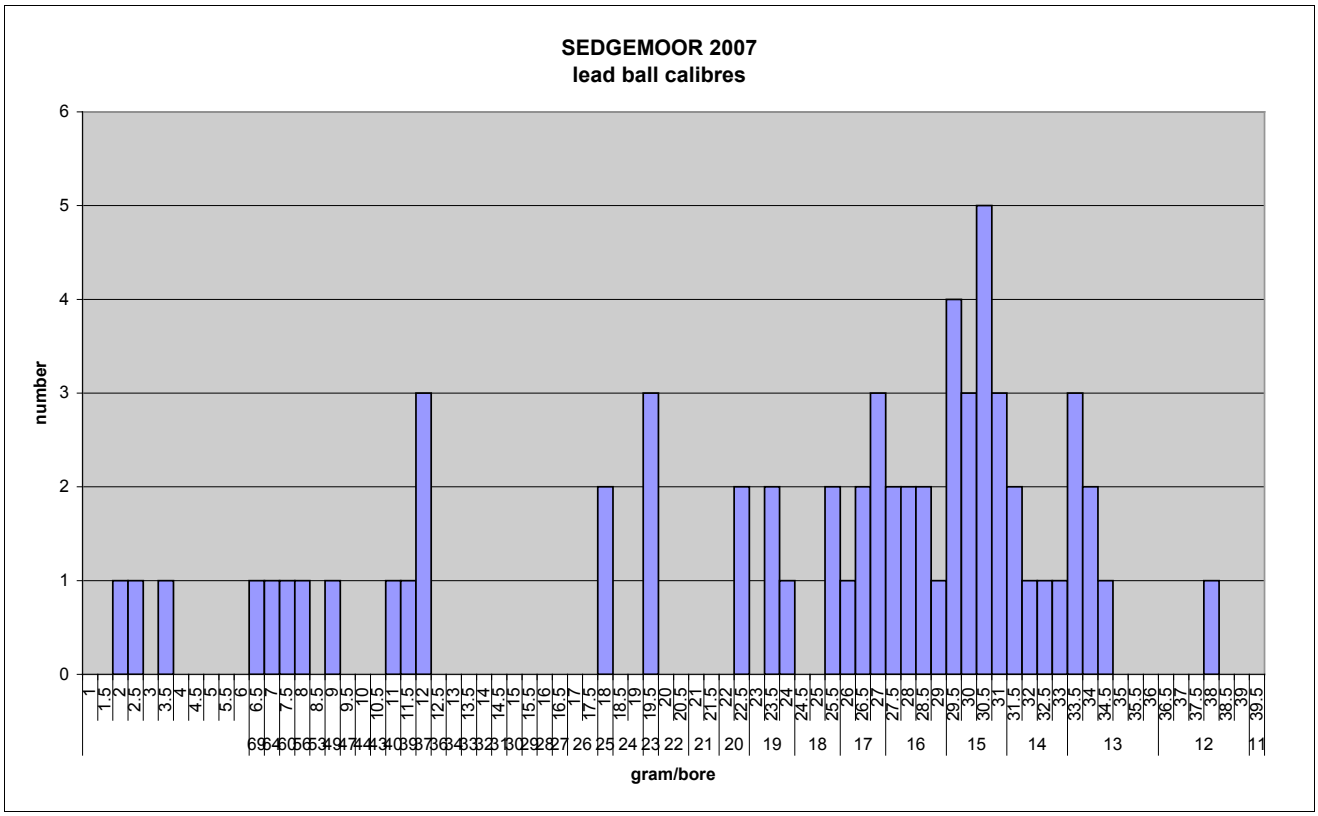

Figure 101: Sedgemoor 2007: calibre graph distinguishing three musket calibres

These calibres have then been presented in plan form, first in relation to the Sagar/GUARD data. This demonstrates the greater part of the scatter to the north west side is in the form of pistol and carbine fire, representing cavalry action. This even includes very small calibre hailshot, which may have been fired as a multiple load with a single

[268] Foard, 2008a, 118

carbine bullet (based on the evidence of Fig 102). These accord reasonably well with the reconstruction of the royal cavalry enveloping counter attack.

In the centre there is a far higher density of musket calibres associated with the reconstructed rebel infantry deployment. The presence of a low proportion of pistol calibres within the infantry core suggests cavalry sweeping through the rebel infantry position, though the potential for some of the cavalry action to relate to the early stage of action between detachments of rebel and royal cavalry must be born in mind as this might represent separate but superimposed action from a different stage of the battle.

From the point blank musket range scale it can be seen that the musket scatters could be compatible with fire from the approximate positions shown for the infantry, but the extent and consistency of the overall data are inadequate to enable bullet overshot lines to be distinguished which might be related to deployments. The other problem encountered with the Sedgemoor data in this context is the relatively low numbers of bullets showing impact damage, presumably because of the pasture in 1685 on soft peat soils, and hence the need to use firing evidence to suggest whether and where bullets have been fired or dropped. Though that evidence has been isolated in the 2007 analysis, a more extensive data set would be needed to reveal patterns that would be susceptible to detailed analysis.

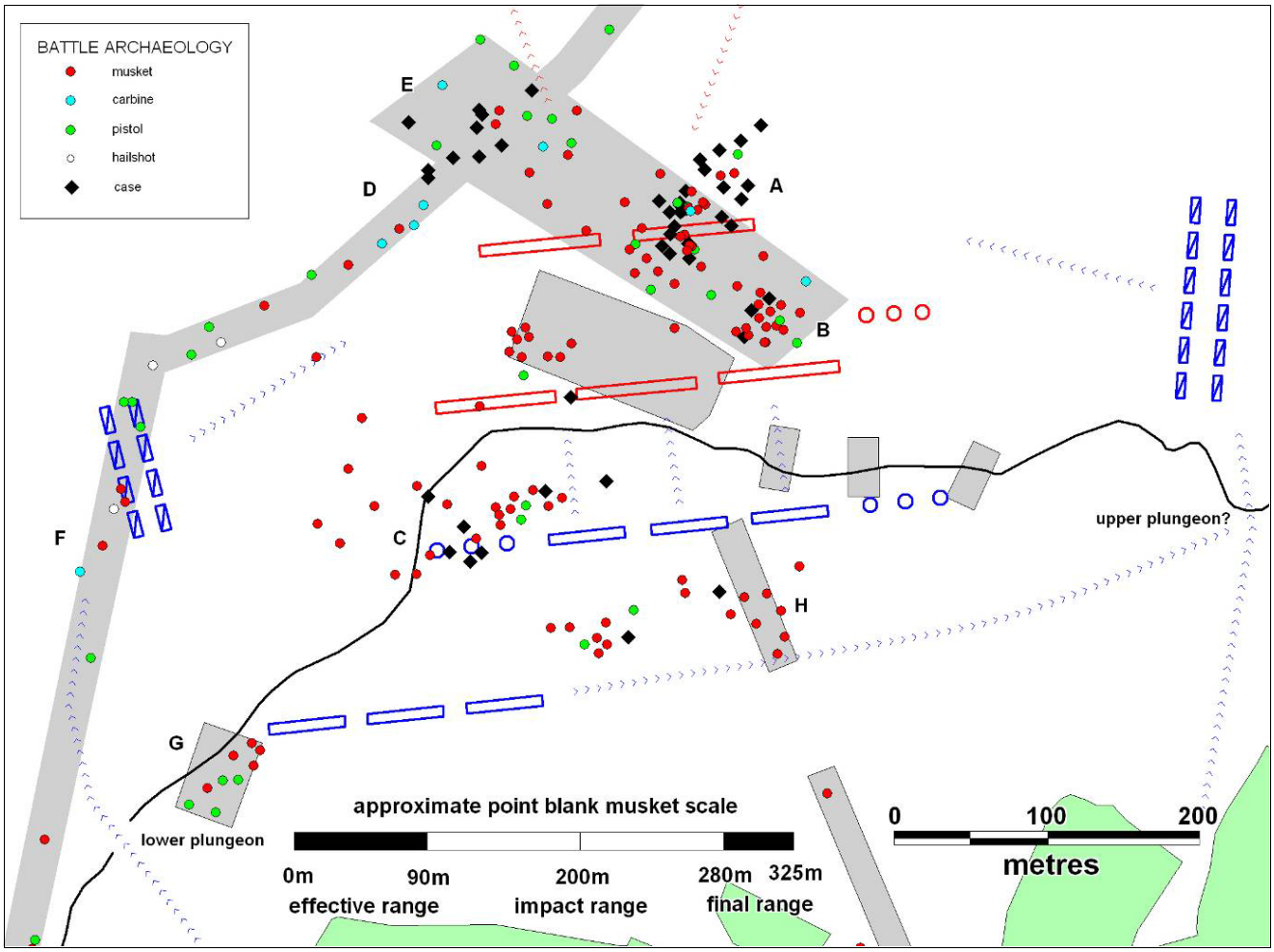

Figure 102: Sedgemoor: integrated data showing main bullet calibres and types present in relation to the reconstruction of deployments

In contrast, it has been possible to undertake an initial analysis of the distribution of the individual musket calibres distinguished in the calibre graph. The 2007 data suggest a potentially significant new pattern, with the 16 bore bullets all concentrated in the rebel position, whereas the 12 and 14 bore bullets are more widely distributed. This might indicate that the 16 bore bullets represent only royal musket fire while the 12 and 14 bore were used by both sides. The sample is, however, very small and the pattern may prove to be illusory when more data are recovered.

This analysis points to ways in archaeological data may be employed, and the ways in which such evidence may complement and validate the interpretations derived from written records and terrain.

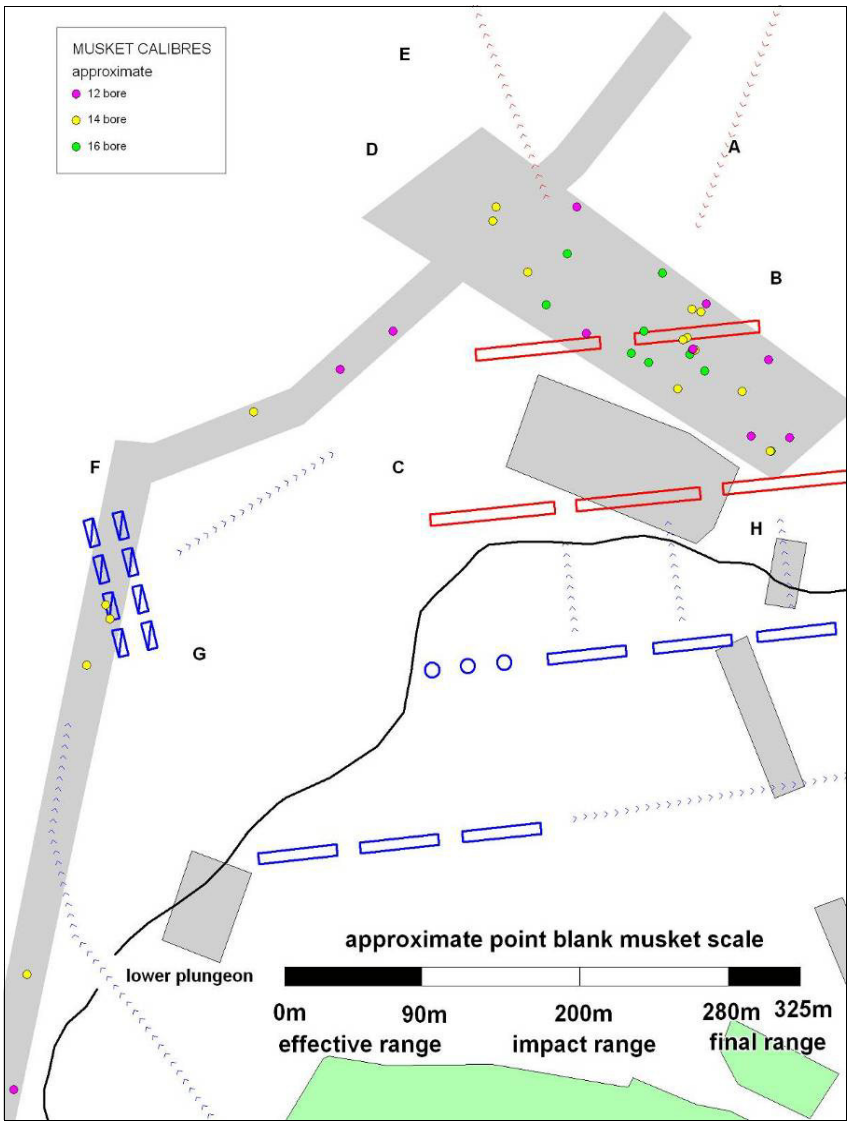

Figure 103: Sedgemoor 2007: distribution of musket calibre bullets

6. MANAGING FIELDS OF CONFLICT

Three aspects of fields of conflict require active management:

- visual character and setting
- physical evidence for the historic terrain
- archaeological evidence in and on the ground

Together with written and graphical records, these are the primary resources for future interpretation and research. Terrain and battle archaeology are not yet being managed at any level. This is largely because the archaeological entity that is a field of conflict is only just coming into focus - potential cannot be managed in the absence of a general awareness of what it is. In practical terms, the ability to manage and to mitigate threats is determined by

- the effectiveness of measures available
- accessible information about the location, extent, and character of a field of conflict, and the wider significance of the evidence it contains
- availability of appropriate guidance
- well signposted sources of specialist advice

None of these is currently in place.

The ability to manage fields of conflict will depend upon the degree to which methodologies that are needed to increase understanding are improved by paradigmatic studies.

The present state of things

The main mechanisms currently available for battlefield management are:

- ownership or guardianship, as with that part of Hastings that is managed by English Heritage

- the planning process, operated by local authorities
- agri-environment schemes managed by DEFRA

The Battlefields Register is non-statutory and so can only provide guidance for the operation of these mechanisms on sites that are registered. However, the draft Heritage Bill proposes to extend statutory controls to Registered battlefields; present discussion takes this into account as a potential fourth strand of management.[269] The mechanisms themselves have not proved fully effective, in part because they were not designed for the task, and partly because of widespread unawareness as to where the archaeological significance of fields of conflict actually lies.

As already shown, information about battlefield terrain is generally inadequate. Until components are identified – hedgerows, walls, earthworks, cut features and so on – they cannot be managed.

As also seen, battle archaeology is typically exiguous and often under threat. Most of what has survived into the early 21st century is eroded and depleted. Without urgent and appropriate measures, this reduced legacy will itself be destroyed before it has even been defined.

Only the visual character and setting of nationally important battlefields has been effectively addressed, thanks to the Battlefields Register, but only to the extent that the Register's level of understanding allows. Nonetheless, for this reason the present discussion focuses on the other key aspects – historic terrain, and archaeology.

Experience in the United States

Lessons can be learned from battlefield management in the USA, where a similar range of problems has been tackled over a much longer time. While the earliest European management initiative was the English Battlefields Register in 1995, the first US National Military Parks were established in the 1890s.[270]

The strategy of management through acquisition has been more successful than any other. Thus, for example, the greater part of the 1781 Yorktown battlefield in Virginia is part of the Colonial National Historical Park, managed by the National Parks Service. In

[269] DCMS, 2008
[270] Chickamagua, Chattanooga, Shiloh, Gettysburg and Vicksburg battlefields: Official Guide to Chickamauga and Chattanooga National Military Park, Georgia & Tennessee

1993 there were 31 Civil War battlefields where all or part was protected within a National Park of some kind, with most areas being of more than 1000 acres and the largest of more than 8000 acres.[271] Parts of other battlefields are also managed by various state and local battlefield preservation organisations. In addition, there is collaboration between the various national organisations, through the American Battlefield Projection Program, to promote the conservation of fields of conflict across the USA.[272]

US management in the face of development threats has been less effective. Where government land is involved or where the government is the developer then evaluation and recording prior to destruction is now normally taking place. On private land the mechanisms are generally far weaker than in England, though effectiveness varies between states and local authorities. Urban encroachment on major battlefields has been restricted on some sites by zoning, but there are far more cases where development has proceeded without restriction.[273] Thus, to take a site managed at a local level, in 2007 the Piedras Marcadas pueblo on the outskirts of Albuquerque, which contains exceptional battle archaeology from Coronado's campaign of 1540-1, was under threat from urban expansion. Since there is little potential for protection of the area beyond the city land, managed as part of the Open Space Visitor Centre, the main strategy under discussion is to restrict further encroachment by purchase of key areas of land.[274]

US battlefields also face an enormous and relentless threat from metal detecting. Even where detecting is banned, on the national parks and other state and locally managed sites, illicit detecting occurs.[275] Beyond park boundaries there is typically no control on relic hunting and extensive destruction takes place. Immediately outside the boundary of Shiloh National Military Park is a shop that sells artefacts collected from that part of the battlefield that lies outside the park boundary.

Threats

Threats to battlefields are both active and passive, resulting from human action and natural decay, respectively.

[271] Civil War Sites Advisory Commission, 1993, 30-31
[272] Greenburg, 1997
[273] Civil War Sites Advisory Commission, 1993
[274] Information from Dr Matt Schmader (Open Space Assistant Superintendent, City of Albuquerque)
[275] Information from Larry Ludwig (Park Ranger, Fort Bowie National Historic Site)

Land use change may affect the aspects of the terrain which survive as functioning features in landscape or are present as earthworks or buried remains. Then there are the impacts of decay, removal or mechanical damage upon artefact spreads, both in relation to their patterning and to the integrity of the individual objects that make them up. Among factors which influence the vulnerability of a site, proximity to built-up areas, with consequent exposure to tendencies for encroachment, infilling, and fragmentation of landholding – looms large.

Development

Urban development, road construction and mineral extraction will destroy or occasionally mask the archaeology in the areas upon which they impact. Large scale earthmoving can transform the detail of relief and drainage. Such activity will also threaten other surviving aspects of terrain. Stripping and redeposition of topsoil will redistribute artefacts and so destroy the detail of spatial patterning. Even modest or small development can have large impact. Artefact patterning can only be fully understood through consistent recovery across a wide area, and the potential of a site may be significantly reduced through fragmentation even if substantial areas remain undeveloped. Hence in the Edgehill survey it proved impossible accurately to position all the battalions in the principal deployments, or fully to grasp important detail of the main infantry action, because the central area of the battlefield was so heavily disturbed and fragmented.

With this said, Edgehill has shown that where fragmentation has taken place a site can still have a high archaeological potential and may yield terrain or battle evidence critical to the validation of hypotheses on the location and nature of principal deployments and the character and distribution of the action. Such analysis of fragmented patterning should become increasingly practicable as detailed research on well preserved battlefields enables us to distinguish the finer detail of particular aspects of the action. Thus even poorly preserved battlefields, or poorly preserved areas on battlefields which are otherwise in good condition, may have research potential to justify recording when the remaining evidence is under threat. This is particularly true of early modern battlefields where relatively small areas of surviving battle archaeology in key locations may enable the testing of hypotheses or illuminate particular features of terrain.

Piecemeal land use change, such as the incorporation of parcels of a battlefield into gardens, will also cause fragmentation, render future survey impracticable, and

expose the ground to small scale removal and redeposition of topsoil. If such change of use is to take place then prior recording should ideally take place beforehand to ensure that a battle archaeology data set is available.

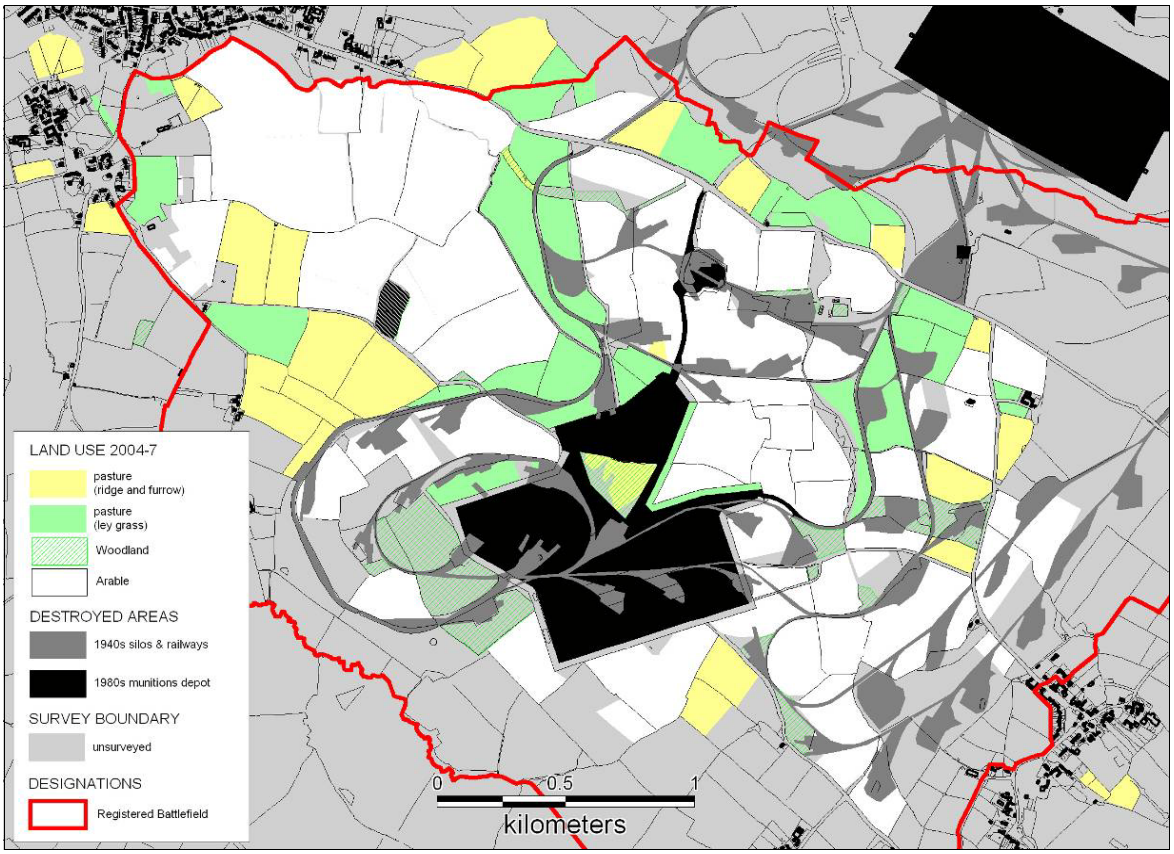

Figure 104: Edgehill battlefield in 2004-7: land use and state of development, showing the degree of fragmentation caused by the first phase of the munitions depot and the massive destruction of the core area of the infantry action by the modern depot

Fragmentation should be resisted, but if it does occur then the paramount need is for consistency between different episodes of survey. [276] To ensure compatibility of data, the intensive detecting of corridors across a battlefield should be preceded by a lower intensity 'base survey' (for 17th-century battlefields this can be at 10m transects) of all or at least a substantial part of each field traversed by the corridor, to enable future data sets to be effectively correlated to the detailed record for the corridor. This approach has been piloted in the present project on one field on Sedgemoor battlefield. Accurate recording of

[276] Foard, 2008a, 211-1

the extent of topsoil disturbance is also essential, so that the redeposited element of the artefact scatter is known for future survey.

Investigation of a battlefield poses needs that differ from those faced in most other evaluations. This is because the significance of an area can only be understood from the distribution pattern of metal artefacts over a wide area, not from a small corridor or even a single field. For example, an absence or very low density of artefacts need not mean that an area did not see significant action or that the scatter is not worth detailed recording. With a 17th century battlefield a low density scatter can often reflect a particular character of action that did not involve an intense or indeed any kind of fire-fight. Yet when the small quantity of bullets or other artefacts is viewed within a wider context, it may reveal essential information about the nature of that action as compared to adjacent sectors. Thus at Edgehill the royalist right wing cavalry attack left a very low density of bullets, but also a very distinctive assemblage of calibres and the patterning, which when viewed with the adjacent areas suggested the position and orientation of the parliamentarian cavalry deployment and the direction of the royalist attack. The resulting re-interpretation placed the deployment in a different location to any previously suggested.[277]

The 1995 guidance from the Battlefields Register suggested that 'small-scale ground disturbance such as pipeline laying is unlikely to diminish the value of battlefields'. We can now see that this is wrong. While it is true that the visual character of the site may not be compromised, for reasons already explained the archaeological effect can be significant. While the probability that a pipeline might destroy a stratified mass grave is low, it may well impact on terrain, and through large-scale topsoil disturbance will almost always distort patterning by the removal and redeposition of artefacts. As has been seen from Edgehill, distribution patterns that relate to firing lines and the firing of case from artillery can be highly specific. Thus the removal of topsoil over a 20m wide corridor could destroy the orientation of a case shot scatter. A good example of this is seen with the rail line on the Edgehill battlefield which has cut through the centre of the only such scatter so far identified on the parliamentarian left wing of cavalry. As a result, the orientation of the case scatter remains in some doubt; these data are critical to the exact alignment of the parliamentarian cavalry wing.[278]

[277] Foard, 2008a, chapter 5
[278] Foard, 2008a, 242

Sedgemoor: a case study

To explore these issues a study was undertaken as part of the present project, in collaboration with archaeological contractors Context One, Somerset County Council and Wessex Water, to examine the impact of previous pipelines and to attempt more effective mitigation of new pipeline construction on Sedgemoor battlefield.[279]

Sewer pipeline data for the Registered area were provided by Wessex Water. The routes of water mains were not released as this is sensitive data, though the opinion expressed was that although the mains do impinge upon the registered area they 'occur in areas of previous disturbance which may limit their impact upon the battlefield'. For existing sewer pipelines there is no record of the width of the disturbed areas; however, it was suggested there was probably removal of c.30cm depth of topsoil over a 15-20m wide working corridor and then a construction trench c.2-3m wide. For the present purpose a 20m corridor has been mapped spanning the recorded course of the pipeline.

The two early sewer pipelines cross the centre of the main action, on either side of the Bussex rhyne. In this central zone of the battlefield where most of the key action occurred, the pipelines have disturbed 5.1% of the surface area. Had the 2008 scheme gone ahead then this would have increased to 8.2%. Following evidence from previous terrain analysis and from an evaluation detecting survey, which demonstrated the wide extent of the battle archaeology in this central area, Wessex Water implemented a scheme comprising direct drilling. The only disturbance was the drill pits, thus limiting the impact to 0.5% of this core area.

The survey of the route was undertaken at 2.5m transects which proved adequate for an evaluation of the battle archaeology.[280] Had full recording been necessary then more intensive survey at 1m intervals with resurvey at 90 degrees would have been undertaken to ensure a sufficiently large sample of the total artefact population was recovered before destruction to enable the full character and pattern to be established. In an attempt to ensure that the data recovered from the evaluation of the corridor could be compared with any future survey data, a sample area of one field crossing the pipeline corridor was also surveyed at 2.5m transects and the two distribution patterns compared.

From this limited sampling exercise it is not possible to assess the degree to which the old pipelines have disturbed the battle archaeology. This may only be determined, if at

[279] Foard, 2003b
[280] McConnell, 2007; Foard 2008d

all, after comparable systematic survey of the whole of the core area to seek any breaks in the patterning which correlate with the approximate pipeline corridors.

Figure 105: Sedgemoor: extent of destruction of battle and terrain archaeology by pipeline construction with mitigation for 2007-8 construction

It should also be noted how close one pipeline runs to the apparent location of the lower plungeon, which was one of two crossing points of the Bussex rhyne used by the royal army in their counter attack and is taken to be the gap in the line on the plan. Had the

pipeline been just 15m further to the north-west then it would have passed through the plungeon. This would have destroyed most of the information about its character that in turn would be valuable in understanding its tactical significance.

Adwalton Moor: another case study

Adwalton Moor lies on the edge of the city of Bradford. Fought in 1643, it is one of the most threatened of all English battlefields. Despite intensive study, the extent of the battlefield and the exact location of key elements of the action remain uncertain.[281]

The battle began as the two armies encountered each other in the closes between Bradford and Adwalton Moor. The royalists had deployed their army and artillery on Adwalton Moor but according to Sir Thomas Fairfax had 'manned divers houses standing in the enclosed grounds betwixt Bradford and Atherton moor with musketeers, and sent out great parties of horse and foot by the lanes and enclosed grounds to give us fight . . .' Parliament's hope had been to advance up a hill to drive the royalists from the enclosures. The hill is named by another account as Wiskeard Hill, where the pub stands on Westgate Hill today. According to Slingsby the royalists at first stopped the parliamentarian advance, but then 'they come on fiercer, and beat the enemy (the royalists), from one hedge, from one house to another; at last they were driven to retreat and we (the royalists) recover the moor . . .'

Having driven back the royalists from the enclosures, the main body could at last deploy on the hilltop and then advance close to the royalist army, which was in open moorland, but staying within the protection of the enclosures. Fighting from the security of the hedgerows, the parliamentarians' advantage in firepower gave them the upper hand. When they ventured forward into the open ground where the royalists were deployed they were at a severe disadvantage, even if at least once during the action they drove the royalists right back to their own artillery, for they then had to retreat once more to the security of the enclosures. After successive royalist attempts to break into the enclosures were repulsed, and with the royalists about to retreat and leave the field to the parliamentarians, a final desperate royalist infantry attack supported with artillery fire and seconded by cavalry drove back the defenders on the parliament left. Here the sheer weight of numbers finally told. Thanks in part to the failure of the parliamentarians to

[281] Foard, 2003a; Johnson, 2003; National Army Museum, 1995

commit their reserves, the royalist infantry and cavalry broke into the enclosures and the tables were turned. Now the cavalry were also able to outflank the parliamentarians on that side of the field. On the left and in the centre, parliamentarian resistance collapsed and they fell back in disarray north westward towards Bradford. On the right Sir Thomas Fairfax's forces were cut off and had to retreat, still in good order, south westward towards Halifax.

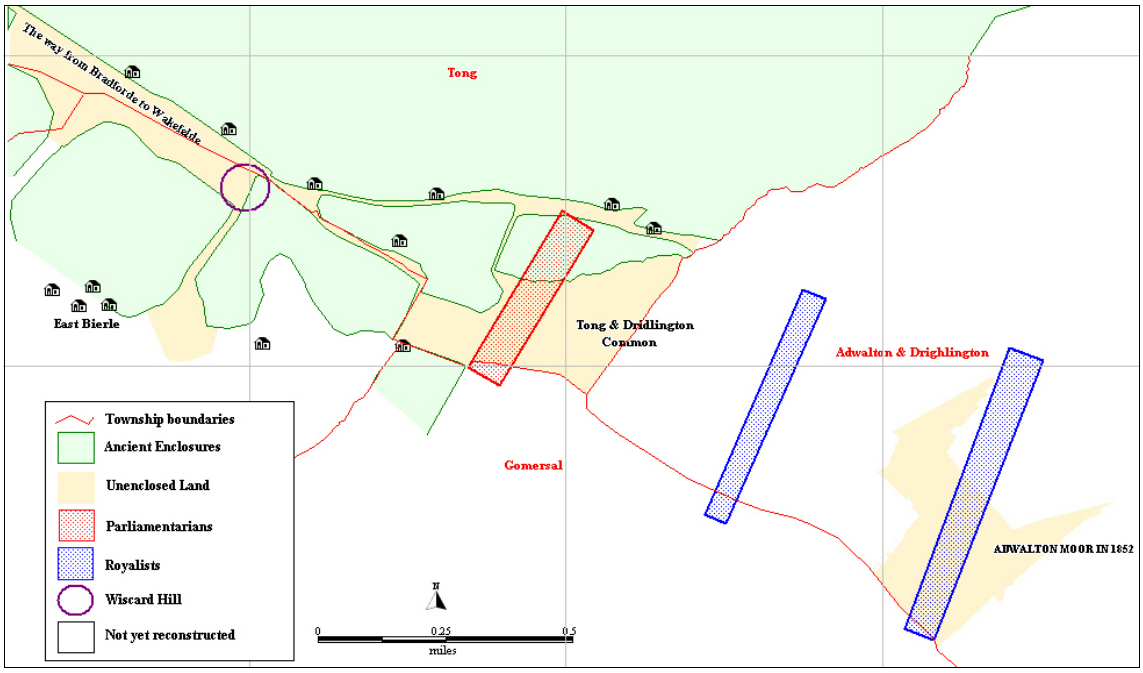

Figure 106: Adwalton Moor: terrain reconstruction of the western area of the battlefield in 1599 with the extent of Adwalton Moor on the eastern part of the battlefield from 1852 map (Foard 2003)

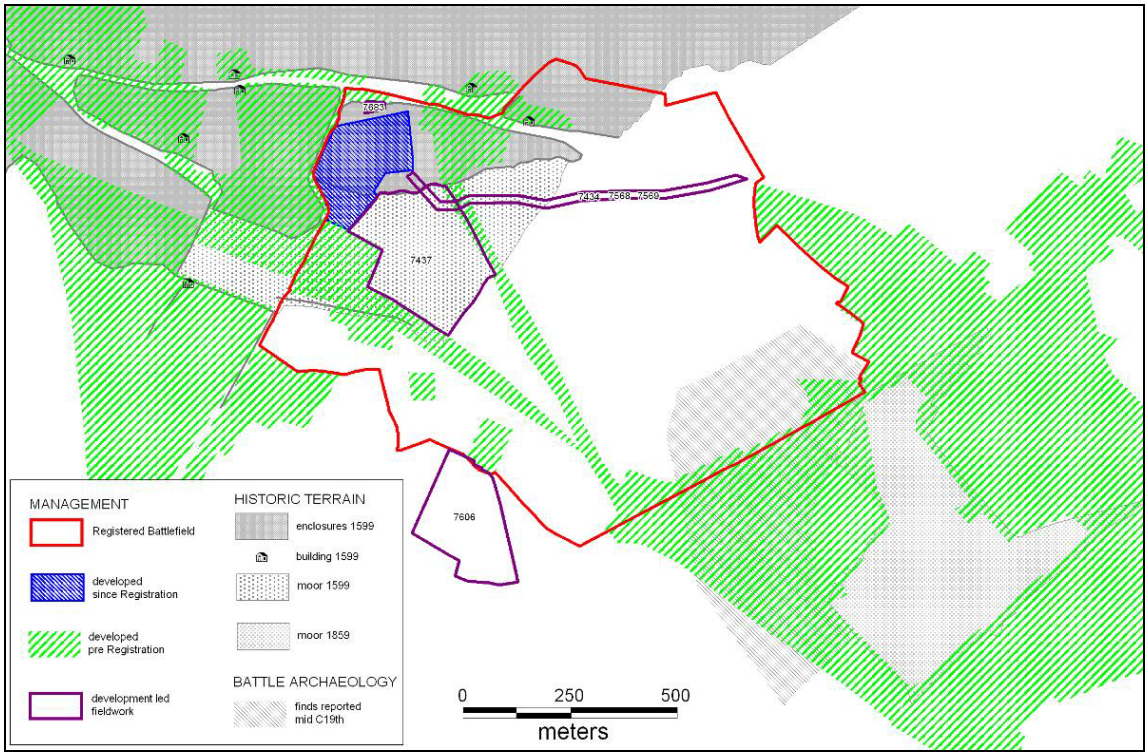

Figure 107: Adwalton Moor: state of development in 2007 (7683 & 7437: detecting survey; 7606: watching brief; 7568, 7569 & 7434: evaluation, watching brief and detecting survey)

The areas of former moorland, enclosures and buildings at the western end of the battlefield are where the initial fire-fight occurred. The main action probably took place on the western edge of Adwalton Moor as defined in 1852, though the exact extent in 1643 of the enclosures immediately to the west has not been defined and they are not shown on our reconstruction. It is at this moor edge, on the west and south of the surviving piece of the moor, that Scatcherd recorded extensive battle related finds in the 19th century.

It can be seen that small areas of enclosures and moor on the western part of the battlefield still survive undeveloped. These fragments may contain sufficient evidence to locate securely the initial fire-fight, but most lie outside the Registered boundary. Similarly, on the eastern part of the battlefield a large tract of Adwalton Moor remains undeveloped yet is also excluded by the Registered boundary. Though the Moor is partly disturbed by early coal pits some of these might predate the battle, while substantial areas appear to survive undisturbed between the pits. Again, any surviving battle archaeology in this area could be decisive in fixing the location of the main action.

Adwalton Moor clearly shows the influence of the Register report and the Registered boundary in determining what is and is not achievable in managing a battlefield

in the face of development pressure. The local planning archaeologist reports: 'The main problem with Adwalton Moor is that the area of the Registered Battlefield does not fully reflect the area of the battle. The eastern part of the battlefield, where the Royalists probably drew up on the ridge and repelled a Parliamentarian advance, is not within the Registered area.' [282] This area 'has relatively recently been landscaped into playing fields without any archaeological work carried out (as far as we are aware) although this was what we had recommended. We find it difficult to recommend refusal in these circumstances because the boundaries drawn by English Heritage are further west and English Heritage has conceded industrial development within the Registered area.'

There is also pressure for incremental development within the historic battlefield but outside the Registered battlefield, including house building in larger gardens within Drighlington. In some cases it has proved possible to achieve a watching brief and metal detecting survey, in several cases with positive results. A metal detector survey in 2003 at 163 Moorside Road, Drighlington, in advance of construction of 9 houses within the garden of a single bungalow, produced 6 musket balls, a possible spent musket ball or pewter cap, a decorative lock cover and 3 buttons. 'Within the Registered Battlefield there has been development pressure at the western end (within Bradford district) where English Heritage agreed development in the late 1990s. Archaeological work was carried out here although probably the methodology used & the degree of work is less than we would now wish to see. Unfortunately, English Heritage's agreement to development in this area has significantly weakened our case in trying to protect the Registered boundaries.' The pressure for development continued and in the early 2000s development proposals were made for the south western part of the Registered area, although this has not occurred. The additional pressures faced on an urban periphery are also seen at Adwalton where, in addition to development there have been other potentially destructive activities, such as the use for some years of one field on the battlefield for a go-kart track. Given the results from similar motor sport use on one field at Bosworth, where the vast quantity of modern artefacts made survey detecting impracticable, the battle archaeology in this field at Adwalton may also have been put beyond reasonable recovery.

Much of the work undertaken at Adwalton in advance of development has proved negative. This cannot, however, be taken as indicating that no battle archaeology existed,

[282] Information from Ian Sanderson

as the standard of the work has been variable. In some cases detecting was without retrieval of artefacts, and by modern standards the work was piecemeal and poorly documented. Adwalton demonstrates the need for guidance on good practice, and for comprehensive survey, to provide a context into which localized work may fit. Both reflect the need for an overall strategy for management and investigation.

Other land use and related changes

While the character of land use on many battlefields has changed since the time of the action, remnants of original character survive more often than one might imagine, especially where the action was fought in a largely enclosed landscape. Where features like hedgerows or walls that provided cover survive, they are vulnerable to what by ordinary standards would be considered to be minor changes, but in relation to the battlefield may be very significant.

Other activities can change the historic personality of battlefields. Among them is earthmoving, which may change the form of the land, for example by removing high points that provided important prospects or created tactically important dead ground. The insertion of new buildings or tree planting may affect the intervisibility of different parts of the battlefield. Cultivation can remove earthwork evidence of former terrain features, such as ridge and furrow, banks and ditches. Even if such features had no direct tactical significance, they are important for understanding of the character of the battlefield at the time of the action.

Tree planting can be an obstacle to survey. At Edgehill, for example, in Grave Ground Coppice, a key surviving area in an otherwise destroyed zone at the heart of the battlefield, it proved impossible to undertake consistent survey on 10m transects because of the close spacing of trees and the density of undergrowth and roots. Conversion of open ground to plantation threatens accessibility to battle archaeology, while coniferous plantations may also have an effect on soil chemistry.

Repairs or changes to buildings that were standing at the time of battle may diminish the total body of evidence if they involve stone or brick replacement on structures containing bullet and roundshot impact scars (see chapter 5).

There are two main types of landscape evidence that may be used to assist in the reconstruction of the battlefield: ridge and furrow and associated headlands from open field systems; and hedges, walls and ditches from enclosed field systems. In addition, on

battlefields that were partly or wholly outside any field system, there may be particular types of evidence, such as drainage dykes, carrs and causeways that are sometimes encountered on lowland moors. Hence on Sedgemoor there are fragmentary earthworks and extensive buried evidence of the Bussex and Langmoor rhynes, pre-enclosure drainage dykes which were of key tactical significance during the battle (see chapter 5).

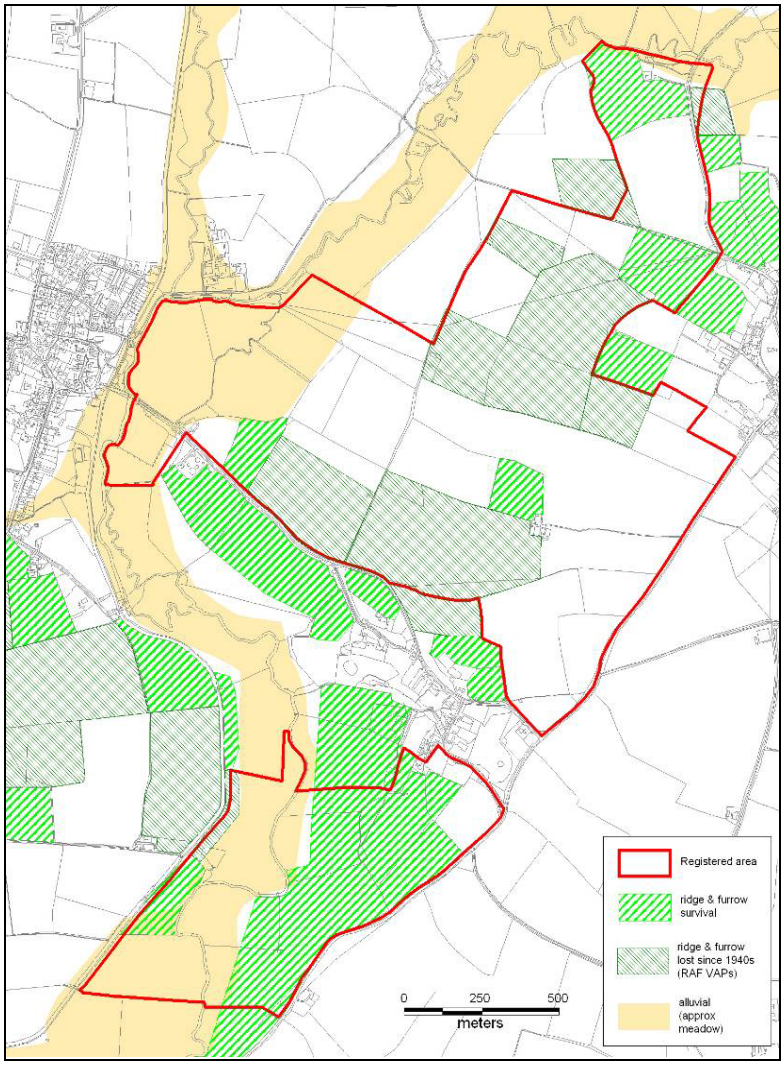

Figure 108: Cropredy: ridge and furrow survival 1940s and 2007

Lessons from Cropredy

A review of all Registered battlefields as they appeared on RAF vertical air photographs taken in the later 1940s has shown that a number of those in the Central Province[283] of open field landscapes still had extensive survival of ridge and furrow. These were Edgehill (Warwickshire), and Cropredy (Oxfordshire). Survival at Rowton and Nantwich (Cheshire) was also extensive. Bosworth (Leicestershire) and Naseby and Northampton (Northamptonshire) had significant though less complete survival, while several more had just a few fields, as at Stoke (Nottinghamshire). Today most of those earthworks have gone and there are just a few fields remaining on one or two of these battlefields. The occasional field can nevertheless still be of interpretive value because it typifies the form of the landscape at the time of the battle and so is worthy of conservation.

Only one Registered battlefield, Cropredy, retains extensive continuous areas of ridge and furrow. Cropredy also had by far the most extensive survival in the 1940s.[284] In addition, a substantial area can be seen to have been meadow within the open field system, [285] with at least one field containing surviving palaeo-channel earthworks.[286] The Registered area at Cropredy is in two parts, reflecting the standard interpretation of the location of the action in two discrete areas. Re-examination of the primary sources and the very limited metal detecting survey so far undertaken (see p.00) suggest that action extended into the intermediate zone.

The degree to which ridge and furrow persisted long enough at least to appear on mid-20th-century aerial photographs is also a guide to the potential for reconstruction of the open field systems today. Field examination conducted by Hall for this project at Towton has shown that even the least promising of the former open field landscapes may still have sufficient survival of headlands, which, when taken together with other evidence, is sufficient to enable the reconstruction of the furlong pattern. Such reconstruction is important not only because it shows what areas of land were open, but also because it identifies the areas which never had furlongs because they were too wet or too steep and were left as uncultivated pasture, meadow, heath, moor or wood.[287] With this said,

[283] As defined by Roberts & Wrathmell, 2000
[284] RAF vertical air photos 1947: CPE UK 1994/1107, 1109 & 1019; CPE UK 1926/1072. Modern survival from vertical photography is available at http://www.flashearth.com/ and complemented by field inspection in 2007
[285] Evidence from alluvial deposits defined on the geological mapping
[286] The extent of meadow will be defined through a full reconstruction of the open field system
[287] Hall, 1995; 1982

reconstruction is achievable with greater confidence and in much greater detail on better preserved landscapes, as at Bosworth or Naseby.[288]

Headland earthworks which survive in cultivated land suffer rapid destruction and require either reversion to pasture or recording. It follows that for those battles fought wholly or partly across an open field landscape, field survey should be considered to recover the evidence for the furlong pattern that is not available from air photographs or historic maps.

Ridge and furrow surviving in permanent pasture is vulnerable to arable conversion. In such cases, the only effective conservation measure in the long term is scheduling.[289] The highest priority is for the small number of cases where there is substantial survival, most notably Cropredy. Here enough survives to be of value also for the conservation of an open field system in its own right. Protecting the small number of fields surviving on some other battlefields would be primarily for interpretative reasons but would have added value in that these are also likely to be the best preserved areas for artefact survival.

A small number of battles were fought across a largely enclosed landscape, elements of which – like hedgerows or walls – may survive, as at Stratton and Newbury I. There are more battlefields where limited areas of enclosure provided a critical tactical element, as at Adwalton Moor.

Assessment of the issue has not proved possible because work at Marston Moor, discussed in chapter 5, and at Edgehill has shown that, in the absence of documentary sources of the right date, it is not possible to prove the existence of some features. However, a reasonable hypothesis may be developed based on later documents, such as enclosure awards.[290] It is possible that on early modern battlefields the presence of such features may be proven by detailed study of the battle archaeology – for instance, if distinctive impact damage is found on bullets associated with a former boundary line where a major fire-fight took place. But this needs to be proven by research on an appropriate battlefield, such as Newbury I.

It appears from assessment of air photographs and field inspection that only rarely do substantial earthworks remain from such features. The best example may be at

[288] Foard, in preparation a; Foard, 1995, 212
[289] Hall, 2001
[290] Foard, 2008a

Lansdown where an extensive area of earthworks including banks, ditches, hollow ways and quarries seem to represent a significant part of the battlefield terrain, though no study has yet been made of them. Smaller areas exist on other battlefields, as with the village closes at East Stoke which appear to be associated with the destruction of the rebel army in the rout. Like ridge and furrow, all such features are vulnerable to conversion to arable and require protection where they are not already protected for other reasons, as with the existing scheduling of the East Stoke earthworks for their settlement history value. There will be many more battlefields where such features have been levelled but where buried evidence still survives in the form of ditches or foundations, though the aerial photographic assessment yielded only a few examples, as discussed above for Sedgemoor.

Cultivation and soil chemistry

For reasons explained in Chapter 4, land use and soil chemistry have a large influence on the rates at which metal objects decay. To recapitulate:

- Objects in topsoil are usually more vulnerable than those more deeply buried[291]
- Decay in soils with a tendency to waterlogging and with high pH will tend to be slower than in soils that are well aerated or have a low pH. Decay's effects are greatest for ferrous artefacts, although in certain conditions other metal types such as lead can also be vulnerable.
- Decay is exacerbated by cultivation, which both aerates soil and inflicts mechanical damage; cultivation effects will be acute for artefacts already affected by other factors
- Fertilisers and other agri-chemicals can speed up decay, particularly through an increase in chloride levels
- Ploughing, especially subsoiling or deep ploughing, may in some contexts disturb artefacts that hitherto have been protected through secondary stratification (e.g. post-battle colluvial or alluvial build-up) or burial in other features such as remnant furrows (cf Towton, pp.105—113, esp.110-113).
- Exceptional deposits exist on a few battlefields. Peat may preserve pollen and macrofossils that will witness landscape character at the time of the battle, or

[291] Cronyn, 1990; Janaway and Wilson, 2006; and see chapter 4

occasionally may preserve artefacts of organic materials that were deposited during the action. Such deposits are vulnerable to drainage schemes.

- Where land has remained as pasture or otherwise uncultivated over a long period, or where there has been secondary stratification then artefacts may survive in exceptional condition. Research to predict such sites is a priority.

As a generalisation, arable cultivation threatens battle archaeology, and the condition of terrain and of artefacts within it will be roughly proportional to the length of time that cultivation has been taking place.

To generalise further is difficult, as many aspects of the subject are highly particularistic. For example, where the condition of artefacts is currently good this may mask a trajectory of rapid decay if the land has seen conversion to arable in recent years. Deep ploughing or subsoiling will have no greater impact than normal cultivation on most battlefields, but if there is secondary stratification then such activity will be highly destructive if it disturbs funds of hitherto well-preserved artefacts below normal plough depth. Artefacts recently removed from such protected zones may appear in relatively good condition at present but are likely to undergo rapid decay. This applies especially to ferrous objects which are likely to oxidise rapidly and so suffer total disintegration. In terms of scale of threat, our best estimate is such erosion is second only to artefact removal by metal detectorists.

Artefacts in land under permanent pasture are likely to be in far better condition. The conversion of pasture to arable is accordingly problematic. The identification of battlefield areas that are now under permanent pasture should thus be a high priority, to enable the putting in place of measures to maintain their status.

Conversion of arable to minimal cultivation may also have benefits, though in some circumstances this will be more than offset by the periodic subsoiling that accompanies it. Arable reversion is the most positive step to reduce artefact decay, especially if there is also a halt to the use of chemicals. An incidental additional benefit to reversion is the protection that permanent pasture offers in the face of metal detecting: this is because of the tendency for artefacts to gravitate to the bottom of the topsoil making them more difficult to locate.[292]

[292] Foard, 2008a, 212-214

Data are being collected to measure decay processes more accurately, [293] and so enable the ascertaining of varying degrees of vulnerability to inform management. [294]

Contamination

Battlefields can be archaeologically devalued by means other than direct damage or depletion. Contamination of a site with modern artefacts may render survey and/or interpretation difficult if not impossible. In parts of continental Europe 20th-century warfare has caused massive contamination with munitions and other debris, as for example noted in survey work on the battlefields of the Crimean war.[295] While nothing of this character is seen in England, there is a range of modern activities that can cause significant problems.

Of greatest concern is re-enactment, because the contaminants may be difficult to distinguish from historic artefacts. This problem will increase as knowledge about original manufacture advances, and skills in replicating ancient technologies improve. Further, the longer the reproductions are in the ground, the harder it will be to differentiate them from original objects. This will be especially true of ferrous artefacts, where high levels of oxidation are seen on most battlefield finds. These include the most important artefact classes on medieval battlefields.

In recognition of these and other problems, the US National Park Service prohibits all forms of 'simulated warfare' on their sites because they 'create an atmosphere that is inconsistent with the memorial qualities of the battlefields and other military sites placed in the Service's trust. The safety risks to participants and visitors, and the inevitable damage to the physical resource that occurs during such events are also unacceptably high when seen in light of the NPS mandate to preserve and protect park resources and values.'[296] The NPS does, however, recognise the importance of re-enactment for the appreciation of historic events and so in some circumstances it does support re-enactment off the battlefield. This approach is followed by most US federal and state organisations with battlefield management responsibilities.[297]

Any activity which brings together large numbers of people on a battlefield as participants or spectators, together with the wide range of logistical support that

[293] By R C Janaway, as part of the Bosworth project
[294] For example, of different metals, artefact types, contexts
[295] Wason, 2003, 167 and plate opposite 160
[296] National Park Service, 2006, section 7.5.9 Re-enactment
[297] National Park Service Living History and Re-enactments Policy; information from Douglas Scott

accompanies major events particularly where camping is promoted, will also contaminate the site with modern artefacts. While these artefacts will rarely confuse the assemblage of battle archaeology in themselves, the modern coins, ring-pulls, tent pegs and other small items can come to outnumber the battle artefacts and so make systematic detecting survey difficult if not impossible.

Another activity which causes contamination is long term use for motor sport. One pasture field on Bosworth battlefield has been used for stock car racing, depositing a vast number of small non-ferrous items that put the area beyond survey.

While concern to maintain battlefields first and foremost as memorials to the dead is not as strong in England as it is in the USA (perhaps because the English battles were fought in the more distant past), the potential archaeological threat is just as great. The issue needs urgent assessment, for English Heritage and some other organisations and individuals responsible for battlefields and siege sites promote re-enactment on the original locations. On siege sites the National Trust has sponsored re-enactment at Corfe Castle; Hampshire County Council does so at Basing House, while English Heritage holds an annual re-enactment on the Hastings battlefield. Other battlefields which have seen on site re-enactment include Cheriton, Roundway Down and Worcester. There are also new interpretive schemes being developed, for example at Shrewsbury and Naseby, where regular re-enactment is intended.

The threat should be assessed by systematic sampling of the unstratified battle archaeology on Hastings and on one early modern battlefield which has been used for re-enactment, such as Cheriton or Roundway Down. This would provide data as to the quantity, character and condition of the contaminating artefacts already present, compared to the genuine battle archaeology. It would also provide a baseline against which future survey results can be assessed, when the reproduction artefacts will have suffered more sustained decay.

Contamination: a case study

Limited assessment of contamination from other types of public event has taken place at Cropredy, where a significant proportion of the 1644 Cropredy Bridge battlefield has been used for an annual folk festival since the 1970s. The festival has been held in the same location throughout, including camping and parking fields as well as the event fields, and is thus ideal to determine the impact on battlefield archaeology.

Visual inspection gave no sign of ground disturbance. Small scale sampling was then undertaken to assess any masking effects of artefacts deposited by the Festival and its impact on the practicality of battlefield survey.[298] The site has been subject to some previous metal detecting but though the exact scale is uncertain it does appear to have been occasional rather than intensive and sustained. Three fields were detected along single transects: fields 1 and 3 on the Festival site and field 2 immediately across the river. All artefacts were recorded but none was removed in order not to further compromise the distribution of the battle archaeology prior to any larger scale survey.

Field	***Transect Metres length***	***Modern non ferrous finds***	***Metres per modern find***
1	425m	>32	13m
2	228m	11	21m
3	183m	34	5m

The Edgehill survey provides comparative data. There the number of metres per modern non ferrous find was typically greater than 100m, while even in close proximity to a modern farm the total reduced to only 40m per find. At Cropredy while the non-festival field produced double the maximum Edgehill density the festival fields produced up to 20 times the average Edgehill density. The impact of this upon systematic survey is thus likely to be massive. A more substantial survey should be undertaken of all of the fields at 10m transects to determine the full impact on the archaeological recovery pattern.

[298] Field inspection 19th May 2007. Metal detecting by L Macfarlane 29 August and 3 September 2007

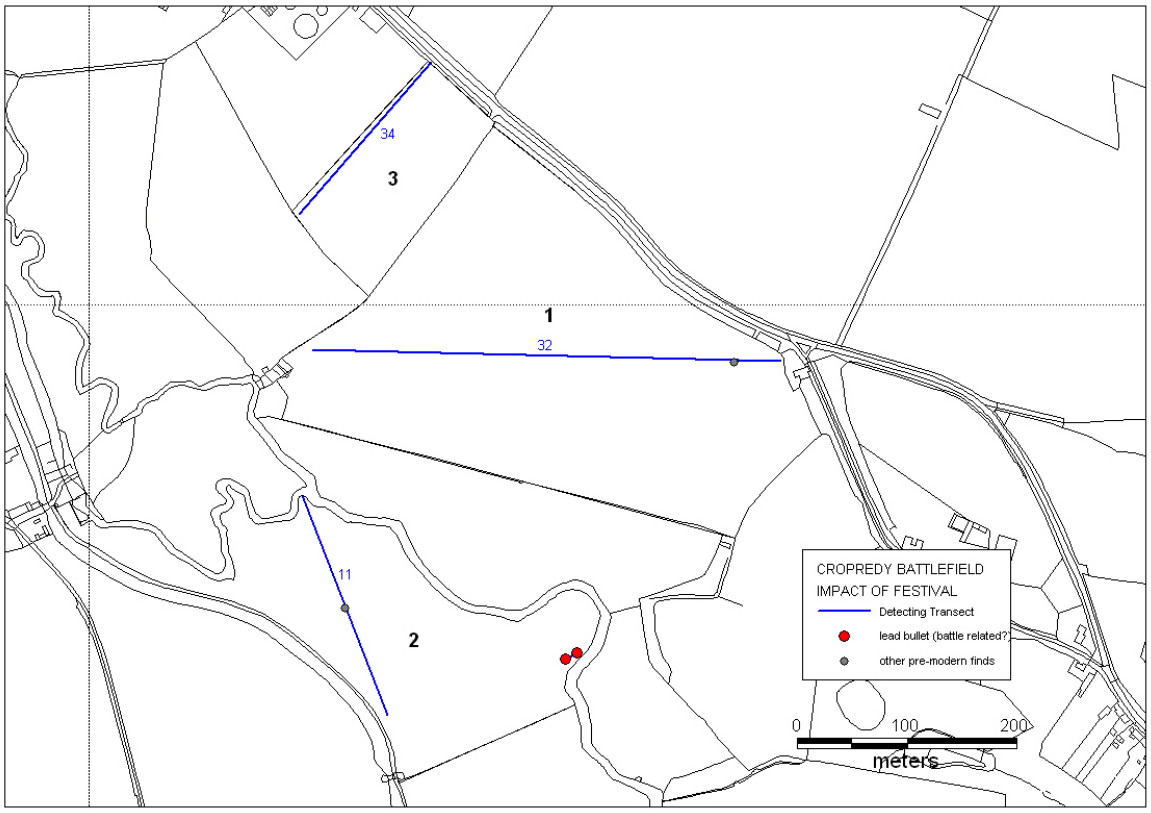

Figure 109: Cropredy: assessment of the impact of the Festival on the surveying of battle archaeology

Metal detecting

The greatest threat to battle archaeology is the removal of artefacts by metal detectorists outside the framework of an archaeological survey. Such detecting is problematic because

- The removal of artefacts leaves no record
- The interpretation of battle archaeology is heavily dependent upon the relative densities of artefacts across the landscape, so any unrecorded removal is significant
- Battlefields are exceptionally vulnerable among archaeological sites because almost all evidence is in the form of spreads of metal artefact

The threat divides into two main kinds: (a) treasure hunting, which may be for the development of private collections or for sale; and (b) survey which departs from current best practice in battlefield archaeology.

Reports from the Portable Antiquities Scheme, several museums and HERs, together with published and anecdotal evidence suggest that many if not most battlefields have seen metal detecting, although the scale is largely unmeasured.[299] Battlefields where non-archaeological detecting is known to have taken place include Marston Moor *2; Sedgemoor *2; Naseby; Stratton; Shrewsbury; Barnet; Cropredy; Towton *2 (plus many other occasional detectorists working without permission); Cheriton *3; Edgehill, though only peripheral; Blore Heath.[300]

The single most constructive action for the conservation of battlefield archaeology will be the introduction of a licensing scheme for metal detecting on the Registered areas of battlefields, with approval given only for survey that is undertaken to the current best practice.[301]

Though licensing may not stop nighthawks, this is not where the main threat lies. With the exception of one or two sites, such as Towton, most battle archaeology consists of lead bullets and other artefacts which individually have a relatively low value. As in the USA, illicit detecting will still occasionally occur on protected ground; indeed, there are already reports of illicit detecting on the Scheduled area of the Basing House siege site. However, it is normal metal detecting that causes the most destruction and here a licensing scheme should be largely effective, because most metal detectorists, rally organisers and detecting club officials are law abiding and will respect the Register restrictions.[302]

Rallies

Metal detecting rallies pose the highest profile threat to battlefields: those held at Marston Moor led to Parliamentary questions and national press coverage. Not all rallies on

[299] Smith, 2004-5; Bailey, 2001
[300] Newman and Roberts, 2003 & FLO; HER and FLO; Foard, 1995; FLO; landowner; information from Andrew Coulston; landowner; information from T Sutherland & West Yorkshire FLO; FLO; landowner; Staffordshire Museums
[301] DCMS, 2008, clause 161
[302] Information from Alan Turton, Hampshire County Council

battlefields have resulted in such a high level of reaction. Some, like Nantwich, have gone almost unnoticed.

At least four rallies are known by the Portable Antiquities Scheme to have been held on battlefields. The first, at Marston Moor, was held on 13 September 2003. Following discussion between English Heritage and the Portable Antiquities Scheme there were Finds Liaison Officers present to conduct recording, the data being entered onto the PAS database.[303] In response to a question in the Lords, Lord McIntosh of Haringey responded thus for the Government: 'My Lords, I agree with all that the noble Lord says. It is why we have a review that includes historic battlefield sites as part of the general subject of listing and scheduling. At present, it is entirely unsatisfactory that we can do nothing about battlefields, metal detectorists or anybody else, if they operate with the permission of the landowner and avoid scheduled sites.''[304]

Despite the furore over the first rally, two years later a second was held, on 27-29th August 2005, on another area of the battlefield, again promoted locally by the same landowner to raise money for charity. Despite approaches by English Heritage and others the rally went ahead, this time impinging on the Registered area. This rally involved about 300 detectorists and affected 540 acres, though it did see more substantial recording by Finds Liaison Officers. There were a number of potentially battle related artefacts reported for recording among which were 60 bullets, including at least one case shot, 1 roundshot and 1 sword hilt guard. In addition, 136 other post-medieval finds, 37 coins from a hoard and 7 other coins were recorded. Where possible GPS was used to record find locations, using volunteers assistance, and this enabled a partial distribution plan to be compiled. There is no distributional evidence for the 2003 rally and only a small proportion of the bullets recovered on that occasion are believed to have been shown to the Finds Liaison Officers present, although there are reports of more than a hundred bullets having been found.[305] The 2005 data are more informative, for they show that some action occurred well to the north of the published scatter and well beyond the Registered area. However, it is not known whether all bullets found were reported or whether the concentrations reflect the intensity of detecting rather than a genuine concentration of action. In addition, there is

[303] Keyes, 2003; recording by S Holmes and D Evans, then the North and East Yorkshire Finds Liaison Officers, respectively
[304] Hansard, 17 September 2003, 230917-02 http://www.publications.parliament.uk/pa/ld200203/ldhansrd/vo030917/text/30917-02.htm
[305] Information from Tim Sutherland

recorded detail for each find is inadequate, because the bullets were not examined and reported upon by an appropriate specialist. The bullets were taken away by the detectorists and thus dispersed, so that it is not possible to return to the material for re-analysis.

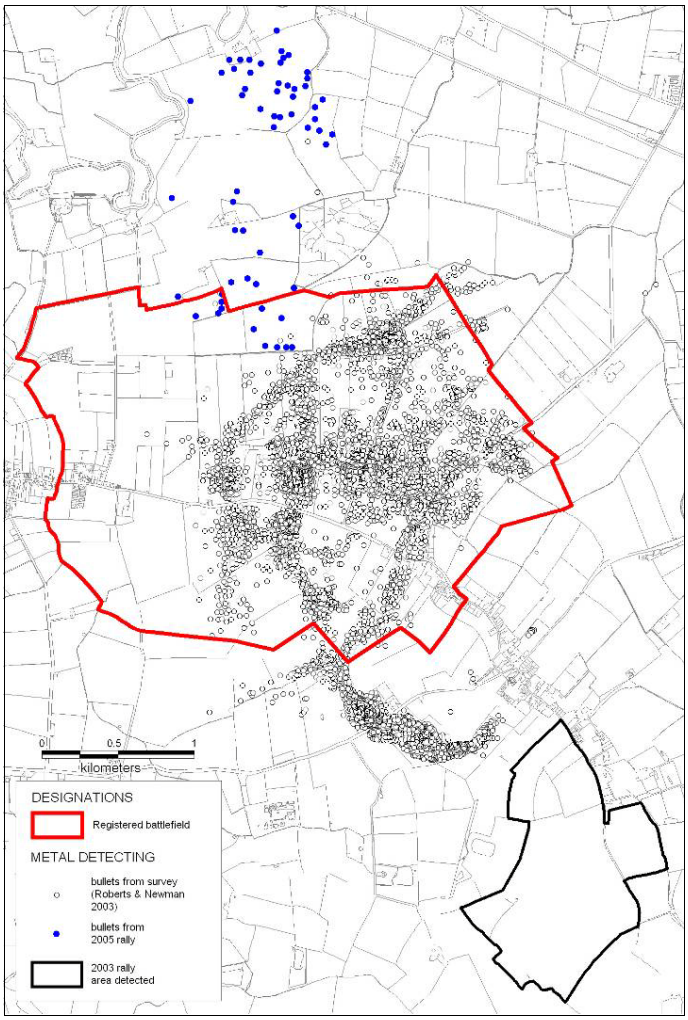

Figure 110: Marston Moor detecting rallies compared to published battlefield finds and Registered area

A rally took place at Newbury in 2004, on the north part of the battlefield, without any awareness by battlefield archaeologists and with no recording because the involvement of the Finds Liaison Officer was rejected by the organisers.[306]

[306] Information from Sally Worrell, paper to Battlefield Archaeology seminar held by the Battlefields Trust at the Royal Armouries, Leeds, 2005

On 5 August 2007 a rally was held at Nantwich in the heart of the Registered area, again without the knowledge of battlefield archaeologists and the event went ahead with no concerns expressed, although the Finds Liaison Officer was able to undertake recording.[307] Another two rallies are reported to have been held outside the Registered area but close to Acton church, where a battle-related fire-fight is demonstrated by the impact scars on the structure (see below). Unreported rallies on other battlefields may have taken place.[308] The main reason for archaeological awareness of the Marston Moor rallies was coincidence – a battlefield archaeologist lived nearby.

In the absence of any national consultation mechanism for battlefield issues, and with no general guidance available for archaeologists, variable response to this large threat it is not surprising.

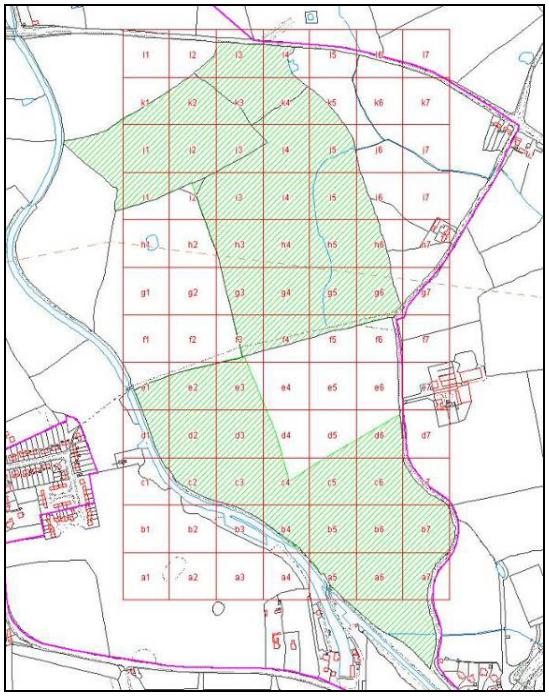

Figure 111: Nantwich: Registered Battlefield outlined in pink, extent of 2007 metal detecting rally shaded green and the recording grid in red

[307] Information from Frances McIntosh, FLO for Cheshire
[308] Evidence for the rallies reported here comes from consultation with the Portable Antiquities Scheme and with English Heritage Regional Inspectors. None was identified in the HER consultation

Other treasure hunting threats

Most detectorists have a genuine interest in finds, and some who detect on battlefields do so for the thrill of discovery and to build up personal collections. What usually is missing is an understanding of the significance and potential of spatial context. A few detectorists retrieve material to sell for profit. Whatever the motive, the archaeological impact will almost always be loss of evidence, even if the finds are reported to the Portable Antiquities Scheme.

Detectorists have been developing collections from battlefields for several decades,[309] but in recent years sale of artefacts has increased, or at least become more obvious, with the advent of eBay where English battlefield finds are now regularly on sale. For example: on 17 September 2003 a search of eBay returned four lots: five bullets and six bullets from 'near' unnamed Civil War battlefields; five from Newark and three from Naseby. On 29 January 2008 another search returned 14 lots comprising 'musket balls' in groups up to 20 bullets, and one including a half pound iron cannonball. These included finds specified as coming from Cheriton battlefield and the siege sites of Newark and Pontefract Castle.

There is online encouragement for such activities in various forms. This example reproduced information from the Battlefield Trust online Resource Centre:

> 'Posted by ricey on December 22, 2006 11:54 pm: I continue my blog on famous battlefields in England. Although as I have explained previously it is often illegal to Metal Detect on these fields, there is absolutely nothing wrong in contacting land owners in the vicinity and ask if you can detect on their land.'[310]

Battlefields form part of the portfolio of sites used by commercial business that run metal detecting holidays[311] and related events, occasionally advertised on the internet.[312] Battlefield detecting is also occasionally organised by metal detecting clubs as 'club sites', as for example with the baggage train area at Marston Moor where a Manchester metal detecting club detected with about a dozen people at a time in the late 1990s and early 2000s.[313]

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[309] E.g.: Bailey, 1992a; Bailey, 1992b
[310] http://detecting.merseyblogs.co.uk/english_battlef/
[311] E.g.: www.metaldetectingholidays.co.uk
[312] E.g.: 'Hands on History' tours where groups pay to detect on 500 acres of Lansdown battlefield: http://website.lineone.net/-handsonhistory, 14 December 1999
[313] Information from Paul Roberts

Most often, however, battlefield detecting is undertaken by an individual or several friends working together. Some detect on a battlefield without realising the significance of the land or their finds and most collect the material with little or no understanding of the archaeological evidence that they are destroying. Indeed discussion with detectorists often reveals the 'bullet bucket' where they collect their 'musket balls', for though they are treated largely as junk they are normally still collected, and while most are probably not from military contexts, some are.

Battlefield investigation

We argue that metal detecting below standards of best practice is a serious problem. A small number of detectorists have developed a special affinity for certain sites, in some cases detecting on them years or decades. The cumulative impact of such activity is far greater than a single rally. Published evidence for Marston Moor shows that the scale of removal can be very substantial.[314]

The greatest losses of information occur when little or no record other than a sketch plan is produced. Although in the 1990s such an approach could be argued to have been beneficial in raising awareness of the potential of battle archaeology, there is no longer any justification for such collecting.[315] Subsequently several detectorists have adopted GPS to record the location of each find, and where this is combined with individual bagging and submission for specialist analysis the resultant increase in information is substantial. However, this still does address the full problem, for the removal of some artefacts from the ground will affect the populations of artefacts that remain, and thereby impinge on the fine detail of patterning which is critical to interpretation.

Further loss of information occurs if the collection method is not consistent or systematic, and where the recovery process itself is not recorded. This is because a significant proportion of the evidence relates to the relative density of artefacts, which in turn is influenced by the relative intensity of survey. An impression of the way in which this can distort distribution patterns can be generated from the Edgehill 2004-07 survey by comparing the density pattern for lead ball recovered in the consistent base survey at 10m transects, with that from all survey work, which includes intensive re-survey of specific areas. The latter create false concentrations and relative densities are heavily distorted.

[314] Newman and Roberts, 2003; Foard, 2007b
[315] E.g.: Foard, 1995, esp. 275-279

Figure 112: Edgehill Survey 2004-7: lead ball from base survey at 10m transects only

Figure 113: Edgehill Survey 2004-7: lead ball from all survey work

The published data for Towton are of great value, not least because a lot of them derives from GPS-recorded find locations. Equally, they provide a further example of the difficulties which can arise from non-systematic data collection.[316]

[316] The artefact distribution presented here is compiled from plans in Sutherland, 2005 and Sutherland, 2007

There is clear patterning within the published artefact scatter, but the extent of the scatter is not related to a survey boundary. Hence, it is not possible to tell blank areas representing an absence of evidence from blank areas that represent absence of survey. There are no data on the intensity of survey in different areas of the site, so it is not possible to determine the degree to which the intensity of the scatters is related to the actual density in the ground as opposed to the intensity of survey. The problems this poses can be seen when interpretation of the distribution is attempted. For example, the absence of material on the eastern part of the site could represent important information about the character of the deployments and the distribution of the action. On the eastern periphery, where the evidence of open field furlongs is absent, the ground was undoubtedly boggy and probably partly under trees, for here the area of silts and clays is associated with several carr names where woods existed in the 19th century.[317] However, the intermediate area between the carr and the easternmost extent of the published artefact scatter is more problematic. It seems inconceivable that the two armies would deploy leaving their flanks unprotected, especially with a major road present, for they would be vulnerable to an outflanking manoeuvre. If this is a genuine gap in the scatter then it is probably where cavalry were deployed, for a cavalry action on one flank is documented in which with the Lancastrian army (on the north) drove off and pursued the Yorkist cavalry to the south. Such a quick cavalry clash is unlikely to have deposited a significant number of finds compared to the intense and sustained infantry engagement further west. In contrast, on the west there is no such gap until the steep scarp down to the Cock beck which would have provided the Lancastrians, who deployed first, with protection for their right flank. The gap in the scatter on the western spur has been suggested as the location of a wood, but Hall's reconstruction of the open field system suggests that the only woodland here will have been on the steep scarps and that the absence of finds could simply be an absence of action due to the nature of the deployments, not the terrain.

[317] Saxton cum Scarthingwell, 1849 Tithe map (Borthwick Institute) and Enclosure award and map (West Yorkshire Archives Service QE 2/6) and; Ordnance Survey 1st edition 6 inch

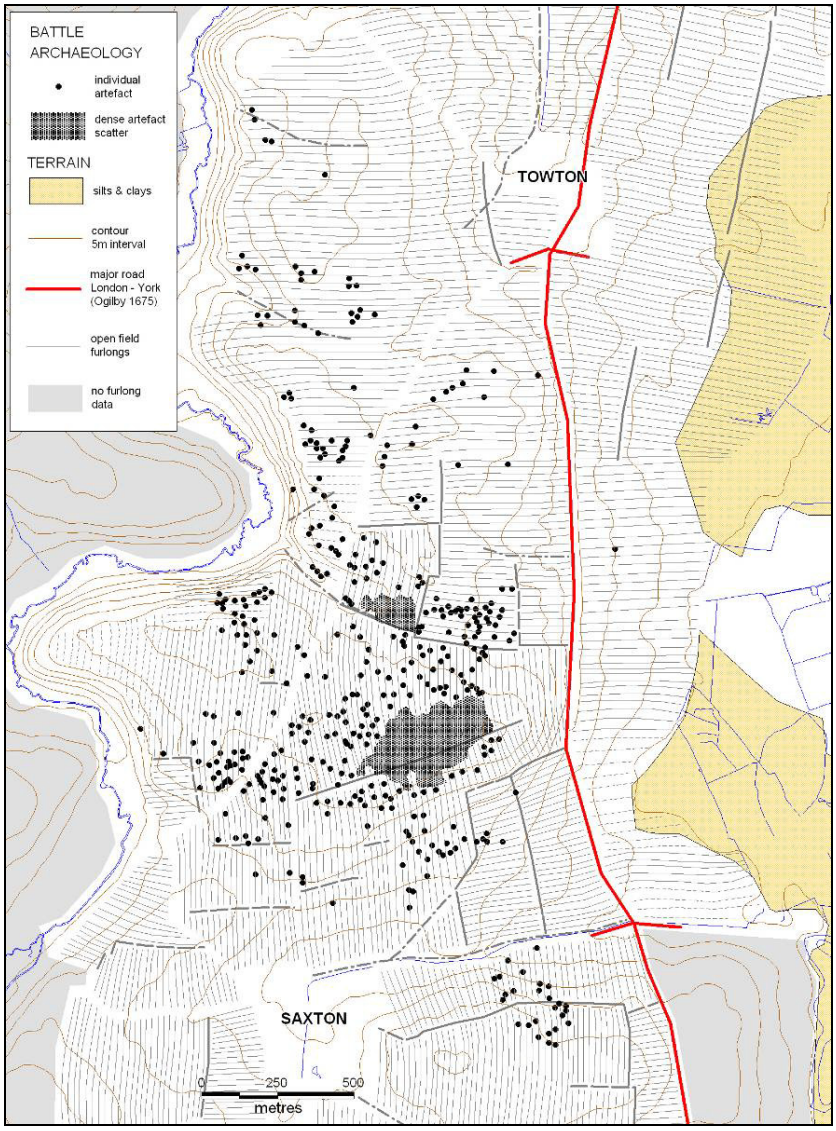

Figure 114: Towton: published artefact scatter with terrain evidence (furlong data from D Hall survey 2008)

Research is required to quantify the scale of loss from treasure hunting and non systematic survey, and to determine how to assess what information can be salvaged from sites that have been affected. This work would need to establish, on a site that has not seen unrecorded detecting such as Edgehill, the total population of artefacts in a sample area of soil relative to the numbers recovered from that area.

Such data would have far-reaching implications for the wider interpretation of battlefield survey data. There is also the need for further fieldwork on sites which have suffered large scale artefact removal, to assess likely loss rates by comparing densities

and distribution patterns between contiguous areas that have and have not suffered artefact removal.

The Portable Antiquities Scheme is doing valuable work in recording battlefield finds, undertaking recording at some rallies and working with individual detectorists as well as assisting in several battlefield surveys.[318] However, this is just a small element of the Scheme's wide remit, and it is not surprising that many battlefield collections have not been seen or recorded by them, or that, where they have, the FLOs do not always have the specialist knowledge needed to get the most from them.

Before it is too late, therefore, a record should be compiled of finds from past metal detecting on battlefields. It is now over 40 years since metal detecting became a significant hobby, and as time passes some collections will be dispersed or farmers change such that all memory or record of removal will be lost. There is, therefore, an urgent need for a programme to establish what metal detecting has already happened on and around each battlefield, its intensity, extent and, as far as possible the character of the assemblages removed. The value of this information is not simply in knowing what has been removed or from where, but also to assess the degree to which the population of what survives on the battlefield has been biased.

It is sometimes argued that metal detected assemblages from battlefields are of no value if each object is not accurately and individually located.[319] This is wrong, for it has been clearly demonstrated that assessments of such assemblages to show the relative proportions of different calibres of bullet, as recorded on a calibre graph, together with the relative proportions of different types of bullet and ancillary artefact such as powder box caps, yield important information when interpreted with care.

Information and guidance

Information on fields of conflict is at resent provided in two main ways: through the Battlefields Register and through inclusion in an Historic Environment Record. If a site is not on the record, if the location is wrong or if its extent is unknown or inaccurately delineated, then capacity for effective response to threats will be poor.

[318] Report by Sally Worrell of the Portable Antiquities Scheme to a seminar on battlefield archaeology held by the Battlefields Trust at the Royal Armouries, February 2006; and information from Sally Worrell, 2008

[319] Comments by Bo Knaarstrom, Swedish National Heritage Board, at ESTOC seminar on battlefield archaeology, Oudenaarde, November 2007

The Battlefields Register

The English Register of Historic Battlefields was published in 1995. It remains unique in Europe in identifying battlefields of national importance which should be managed to secure their research and interpretive value.[320] Building upon this pioneering initiative, a new generation of battlefield conservation measures is being developed in Scotland and Ireland. In England the Register has raised awareness, and has had notable successes in the conservation of particular battlefields, as for example at Tewkesbury.[321] But its non-statutory status has meant that some of threats, already identified in 1995, have not been effectively countered. This is particularly true of metal detecting, which as we have already seen remains the greatest threat to the archaeology of medieval and early modern battlefields. Other threats that did not seem significant in 1995, like pipeline construction, can now be seen as problematic (above, p.211ff).

The Register is about to be integrated with other historic environment designations into a single Heritage Register for England. Given the major advances that have taken place in understanding of battlefields since the Battlefields Register's publication, it is thus timely, as well as urgent, for registration criteria to be reviewed. Updated guidance about the Register should be issued which takes account of advances in understanding of archaeological and terrain evidence, and clarifies the limitations in current knowledge. While the licensing of metal detecting on battlefields is the main provision needed, there are other specific resources that would benefit from systematic identification and better stewardship through the new framework. The mass grave at East Stoke and the bullet impact scars on Action church are examples.

The need for review was predicted in the original publication.[322] Advances made since, especially in relation to the early modern period, demonstrate both the potential and need to enhance and expand the Register. For earlier periods the implications of recent work are less definite, suggesting the need (for instance) to be more cautious with regard to the sites and delineation of medieval battlefields. The absence of adequate baseline

[320] English Heritage, 1995. Registered Battlefield reports are available online at: http://www.english-heritage.org.uk/

[321] Public inquiry heard March 1998, result announced March 1999

[322] 'The Register will evolve over time as new evidence emerges or as circumstances change on Registered battlefields. Our advisory panel will review the situation periodically and, when appropriate, we will issue revisions or supplements to the Register.'

data against which to monitor both short term change and long term trends in the condition of the battlefield resources should also be noted.

Scope of Register

In 1994-5 a total of 71 actions was assessed for inclusion on the Register. Of these 43 fulfilled the criteria and were Registered; a further 13 were classified as battle sites, 8 of them being considered in too poor a condition to justify inclusion on the Register, while a further 5, although located in general terms, could not be defined with sufficient accuracy to enable inclusion. The remaining 15 were discarded as it was not considered that they could be classified as battles and the primary objective of the Register was to conserve battlefields. For inclusion on the Register the battles had to meet key criteria:

- Political significance: its impact should be traceable nationwide
- Military historical significance: it saw the use of tactics of particular note
- Biographical significance: it was the crowning glory of a military career, or where a famous leader was killed or captured

Advances in understanding and the consequent potential for more effective management argue for re-assessment of some of the battles that were excluded from the Register, of which Lostwithiel represents only the most important example. However, given the character and scale of the evidence demonstrated above for siege sites, and to be expected for skirmish sites of the early modern period there is a strong case for a review of the Register to ensure that it includes a representative sample of all significant types of field of conflict which have an archaeological dimension.

Skirmishes and other lesser engagements were to be excluded in 1995 although Powick Bridge and Chalgrove, which are generally agreed to have been skirmishes, were included. While the current work has not indicated that there is a priority for the registration of further skirmishes, it is possible that exceptional preservation of evidence may be found on some skirmish sites in the future, and that this might warrant their inclusion.

Engagements which did not include recognised military units and incidents of civil unrest were also excluded; nothing in the present study suggests that this should be reconsidered.

In 1995 sieges were recognised as potentially of national importance but were excluded from the Register because, at that time, it was believed that ‘they are usually

associated with physical remains which can be conserved through existing statutory mechanisms such as scheduling or listing'.[323] This report shows, at least with regard to early modern sites, that sieges have many characteristics in common with battlefields and require similar conservation measures, in addition to what can be achieved by scheduling and listing. Moreover, while bullet impact scars could be embraced by Listing or Scheduling, they can only be so on the basis of a clear recognition of their presence and significance. (Straightforward like-for-like stone repair, for instance does not call for Listed Building Consent.) Defensive works, siege-works and related evidence, most particularly the scatters of impacted and unimpacted bullets and other munitions within or close to the defensive works, may effectively be taken in by a Scheduled area, but only with practical effect if their presence is catered for in schemes of management (cf Kenilworth: chapter 5). Evidence in the ground beyond the defences, however, is both vulnerable and unprotected, except occasionally where there are siege works. Here there are the same issues of visibility as occur on battlefields, though in this case between batteries or siege-lines and the defences, fields of fire and so forth.

Most in need of protection, again as on battlefields, are the bullet scatters that are to be expected to extend out to 500m or more from the defences, as demonstrated at Grafton Regis. Following the discussion of Morton Corbet (chapter 5) it is recommended that the character of archaeological assets of sieges be adequately defined so that a nationally important sample can be selected for inclusion on the Register.

[323] English Heritage, 1995

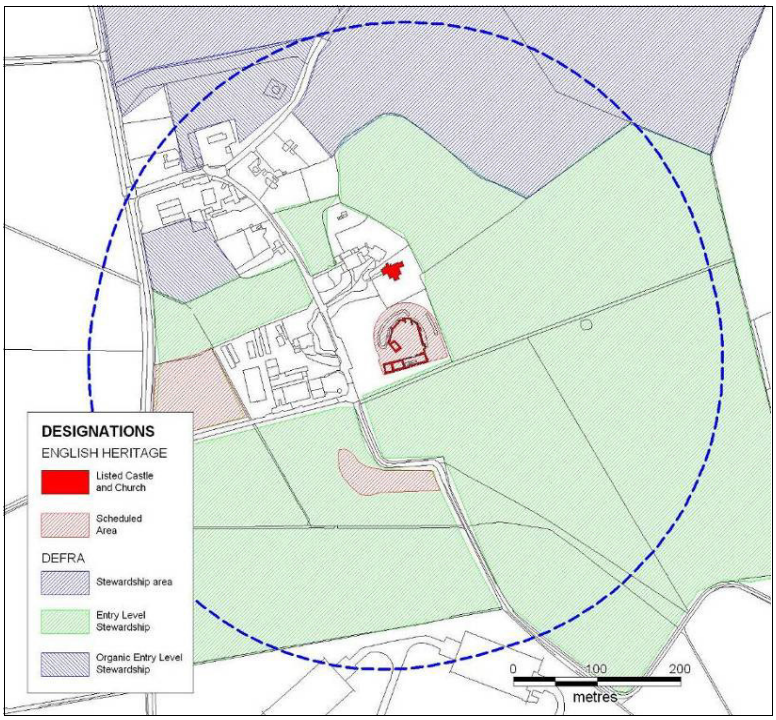

Figure 115: Scheduled and Stewardship areas at Morton Corbet relative to the probable maximum final range of a musket fired point blank from ground level from the castle (350m based on the Ashdown 2007 firing experiment: Foard, forthcoming)

Accuracy of Register boundaries

The boundaries drawn in 1995 were delineated on the basis of 'evidence of documentary, archaeological and topographical and landscape history' that was then available, to encompass 'the outer reasonable limit to the area within which the bulk of the fighting took place'.

We have visited all 43 Registered battlefields, in each case re-examining the evidence presented in the National Army Museum battle reports and the CEI landscape reports. For some, we have supplemented the terrain evidence with additional historic map data, and use has been made of archaeological data where this is now available. In a number of cases the evidence indicates a need for revision of the Register boundaries.[324]

Redefinition calls for effective methodology, which will vary according to period. For reasons already discussed, only terrain analysis has been demonstrated as effective on earlier battlefields: the validation and enhancement of boundaries of medieval battles will

[324] A subtle but important point is that after revision, the boundaries of a given battlefield, while improved, will not be definitive

thus require further methodological development. For early modern battles, on the other hand, an integrated method of analysis of historic terrain and battle archaeology works successfully.[325]

For Sedgemoor, analysis of the terrain appears to confirm the general accuracy of the Register boundary, and this is supported by the limited archaeological information that is currently available. However, it can be seen that the important crossing of the Langmore rhyne is excluded from the Registered area. This is a key feature, for it was the problems caused by the narrowness and invisibility of the crossing in the darkness that disrupted the rebels' clandestine night attack. Also, it would appear from results of as-yet unpublished metal detecting that some action from the rout of the rebel forces may lie beyond the boundary to the north west.[326]

It is unclear how many other Registered areas are similarly near-accurate, but the majority of the examples for which good evidence has been obtained appear at least to call for partial review. In some cases, while the great part of a battlefield is inside the Register boundary, limited but potentially very significant exclusions have been identified. Edgehill provides the most secure example as it has the most comprehensive data set for any English battlefield.[327] Here, based on the new analysis, it would appear that the Registered boundary includes all the core cavalry and infantry action and much of both royalist and parliamentarian rout, the latter including various subsidiary actions. However, only part of the attack on the parliamentarian baggage train in Little Kineton has been included within the boundary. Although the full extent cannot be defined today because survey here is incomplete, it is important that the whole area should be included on a precautionary basis, as village infill presents a significant threat. On the northern edge of the battlefield the probable extent of the royalist dragoon action, taking the hedgerows at the beginning of the battle to facilitate Rupert's attack, may be partly excluded, although, again, incomplete survey makes it impossible at present to determine the extent. On the south the boundary seems likely to take in all the action on that flank, while on the south east it is likely to include most of the royalist infantry rout as well as the meadow area

[325] Foard, 2008a; ascertaining battlefield extent through low level sampling still requires further pilot work

326 Information from John Pettet. A detailed study of this wider distribution of battle archaeology, based on Pettet's non-archaeological metal detecting survey, is in preparation by Natasha Ferguson as part of her PhD at the University of Glasgow

[327] Foard, 2008a

where their army initially assembled. Uncertainties over the exact definition of boundaries, even in such a well studied battle as this, are highlighted by the recent find of isolated case shot, made further to the south east on the lower slopes of Edgehill, suggesting close-quarter action involving artillery beyond the Register and survey boundaries.

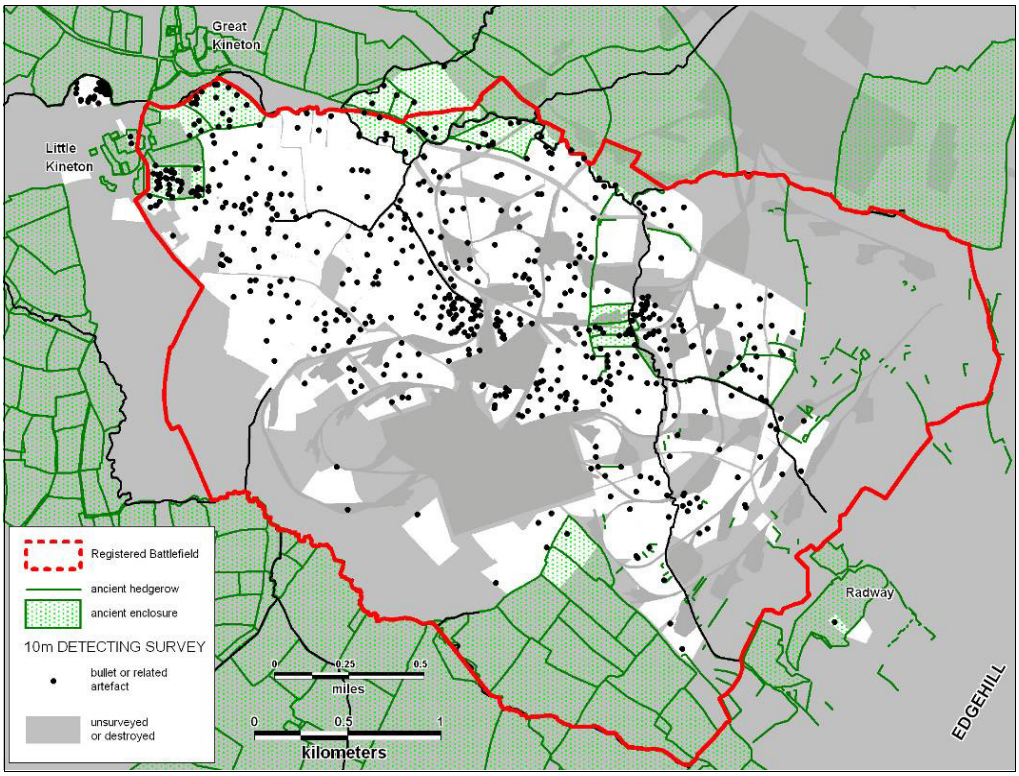

Figure 116: Edgehill: Registered Battlefield boundary compared to the historic terrain and the 10m transect base survey of the battle archaeology (Foard 2008)

Several other battlefields also have extensive battle archaeology which demonstrates that substantial action extended well beyond the Registered area. In these cases, however, the data are less reliable than those from Edgehill, and while they show that the boundaries require adjustment, they are not sufficient to show exactly where the new delineations should run. At Naseby the Registered area includes the initial action and the attack on the parliamentarian baggage train. However, the bullet scatter runs for over a mile further to the north and, supported by terrain analysis and reinterpretation of the primary written sources for the battle, suggests that the destruction of the royalist infantry, including the plundering of the royalist baggage train, took place over a much wider

area.[328] This destruction was a critical outcome of the battle. While the detail, particularly the narrow width of the spread and the lack of pistol and carbine calibre bullets, raises questions as to the precision of the definition, the length and significance of the spread are not in doubt.

[328] Foard, 1995

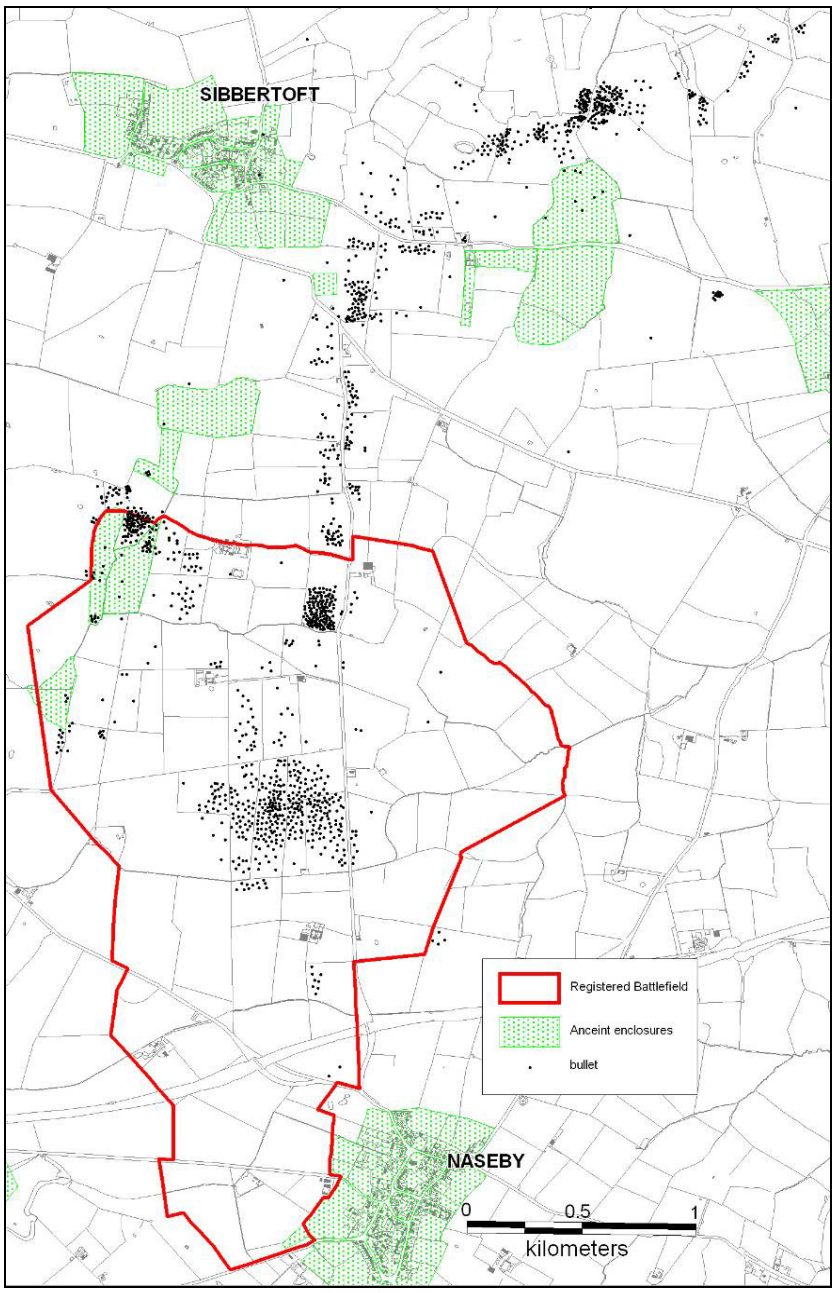

Figure 20: Naseby: Registered area compared with the terrain reconstruction and battle archaeology

At Marston Moor substantial battle archaeology again extends well beyond the Registered area, indicating that the main action was more extensive than previously

believed and seemingly incorporating the attack on the parliamentarian train.[329] However, as has been seen, the accuracy of detail in these data is in far greater doubt than at Naseby. The terrain reconstruction presented above suggests a far wider frontage than the published battle archaeology, close in extent to that defined in the Register boundary. The complications here are compounded by the evidence from the detecting rally of 2005, which extends more than a kilometre to the north, though for reasons already explained these data are in their turn unreliable as a guide to the extent and nature of the action.

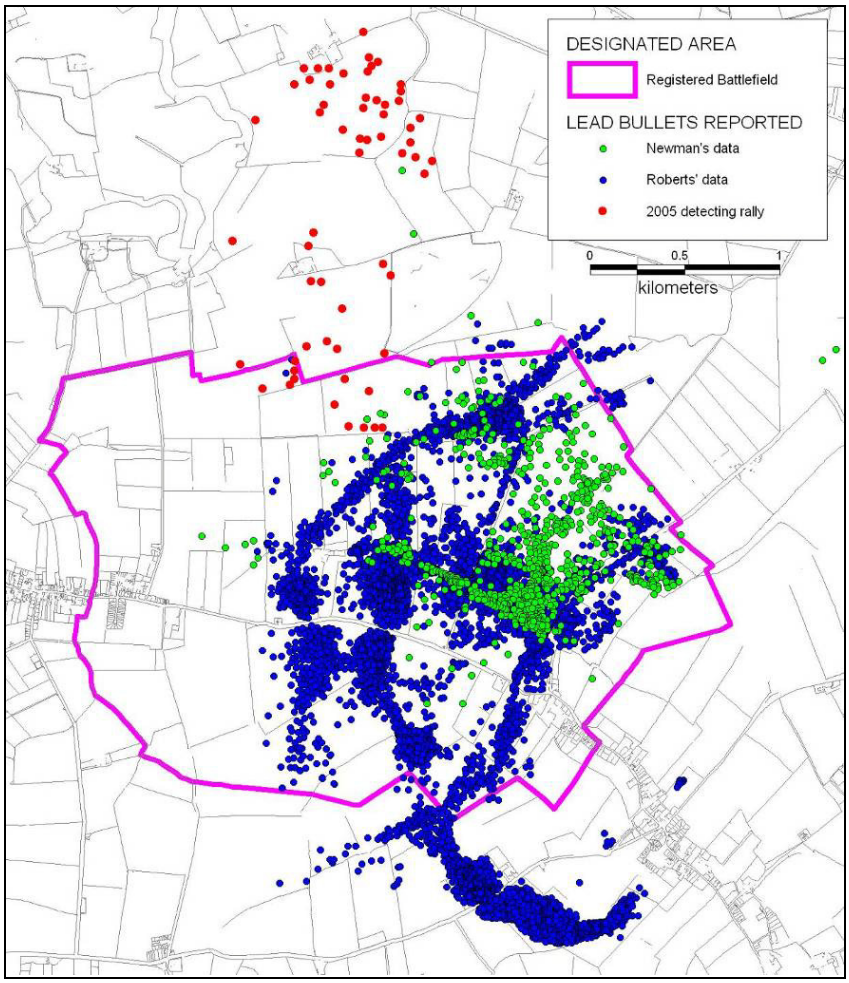

Figure 118: Marston Moor: comparison of Registered area with reported distributions of bullets (Sources: Foard, 2007b; Newman and Roberts, 2003; Portable Antiquities Database)

[329] Newman and Roberts, 2003, with additional data for the 2005 rally from the Portable Antiquities Scheme and Newman's survey data from Foard, 2007b

The evidence from Towton is far more reliable. The mass grave excavated in 1996 lay just beyond the Registered area, while the scatter of battle archaeology, though wholly in the centre and north, extends beyond the Registered area to the south, a scatter which is interpreted as the immediately preceding subsidiary action in Dintingdale.[330]

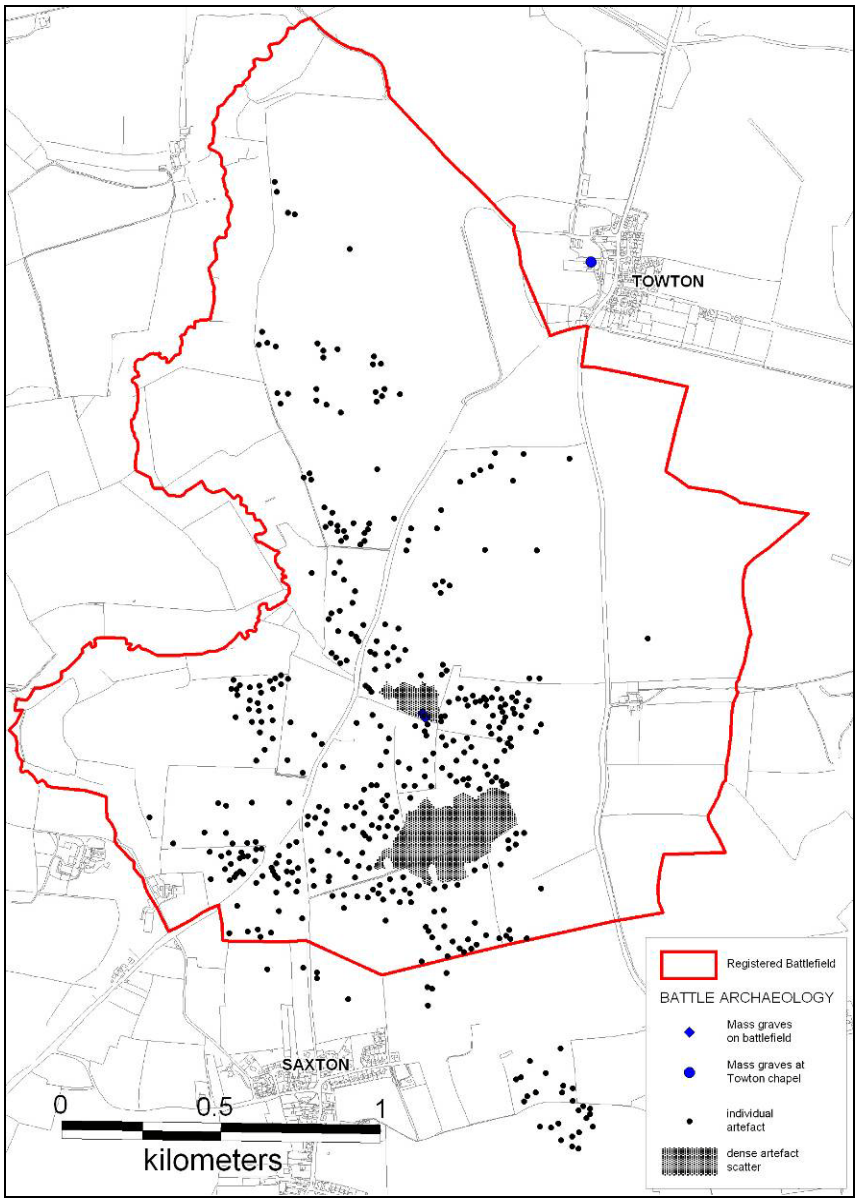

Figure 21: Towton: Registered area and battle archaeology compared (sources: Sutherland 2005 and 2007)

[330] Fiorato *et al*, 2000; Sutherland, 2005; Sutherland, 2007

At Barnet the Registered area is focused some distance to the south of the traditional site of the battle, of which the monument seems to represent the southern edge. Research by Warren has subsequently located the chapel which was built in memory of the dead of the battle, and sited on South Mimms common.[331] This, combined with terrain reconstruction, has led to a re-interpretation of the possible location of the deployments and action.[332] However, subsequent collection of information on the battle archaeology, particularly that collected by metal detectorists, indicates that the least favoured other site, yet further to the north in the location reported to the Battlefields Trust, may be the actual area of deployment and action.[333] In the absence of extensive systematic survey it is currently impossible securely to define the exact location and extent of Barnet battlefield. Other battlefields where the review suggests even greater doubt include Maldon, where the lack of clear terrain evidence in the Old English poem epitomises wider problems of locating medieval battlefields.

[331] Smith, map of Hertfordshire, 1602; Rocque, map of Middlesex, 1754; information from Brian Warren and Jonathan Smith
[332] Foard, 2004, http://www.battlefieldstrust.com/media/573.pdf
[333] Information from Andrew Coulston, Hendon & District Archaeological Society. The metal detectorist states that the incorrect locations were reported to the Portable Antiquities Scheme.

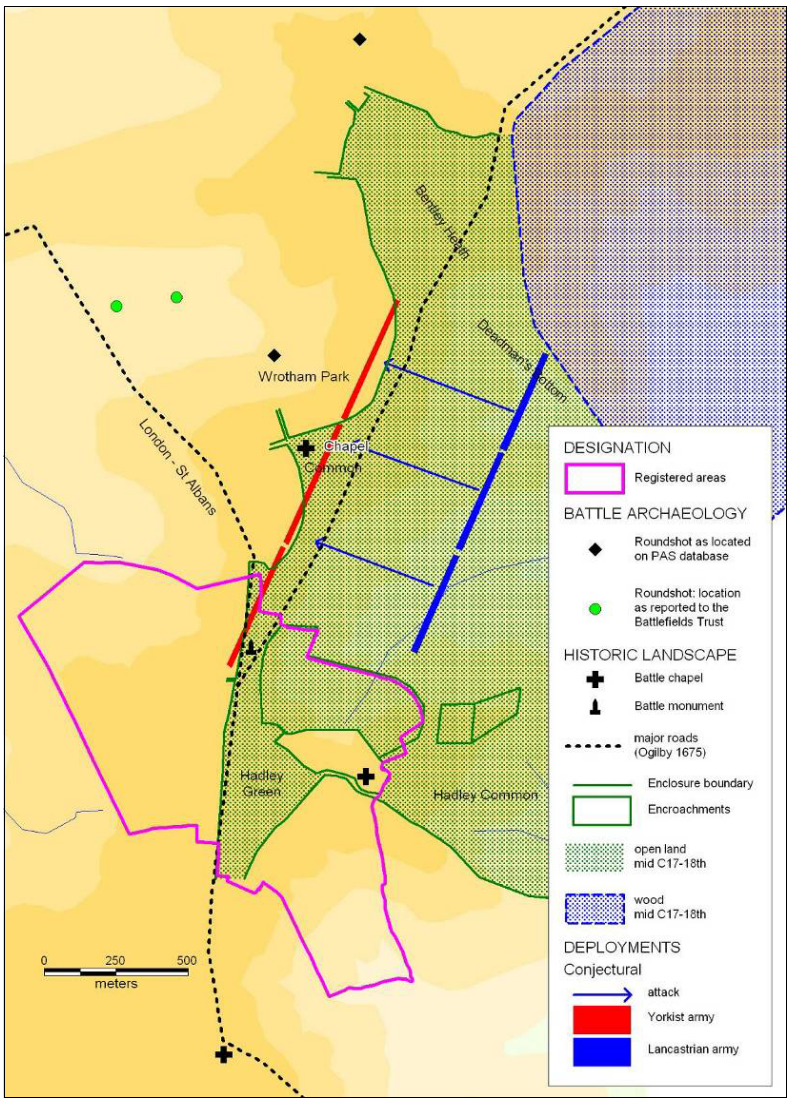

Figure 120: Barnet: conflicting evidence for location and extent

Adwalton shows that battlefield boundaries can have an unintended influence on perception of the extent of potential archaeological interest, with the result that no action taken may be taken when threats arise beyond the boundary, even though important archaeology exists. Moreover, while the solid boundary of a Registered area gives an impression of certainty, enough evidence has been produced to demonstrate that there is often a high degree of uncertainty about the exact extent of action. Where there are good reasons for not redrawing the Register boundary to encompass poorly preserved or uncertain areas, then a logical response would be to have an outer zone with a broken line where the presence of battle and terrain archaeology is probable. This should be a

supplement to, *not* an alternative for, the redefinition of the inner boundary to take in resources that are reasonably defined, for the latter will be required to protect the battle archaeology from metal detecting threats. The 1995 Register tentatively pioneered this approach on seven Registered Battlefields where the map defines an outer, additional. This approach has been further developed in the research undertaken to underpin the planned Inventory of Scottish Battlefields, with an outer zone encompassing areas which cannot be accurately defined and the text providing information on the resources that may lie within them.[334] In most English cases, the outer line appears to encompass an area which was partially or largely developed, though as the Adwalton case study has shown there may be important evidence within the outer zone that may argue for its inclusion within the main boundary.[335] Beyond the outer zone there will be potential for battle archaeology from disparate skirmishing, but this cannot realistically be predicted or areas defined.

Battlefield coverage by HERs

There are many battlefields excluded from the Register that nevertheless require management. They should be identified in the relevant HERs and managed through the Planning process, bearing in mind that for reasons of preservation or quality of written record they may have an archaeological potential which outweighs their military or political significance. Even where part of a battlefield is poorly preserved, its survival may still have long-term value. Unregistered areas of Registered battlefields should also be dealt with in on this inclusive basis.

[334] E.g.: Foard, 2007a
[335] Adwalton, Boroughbridge, Neville's Cross, Newbury I, Stamford Bridge and Tewkesbury

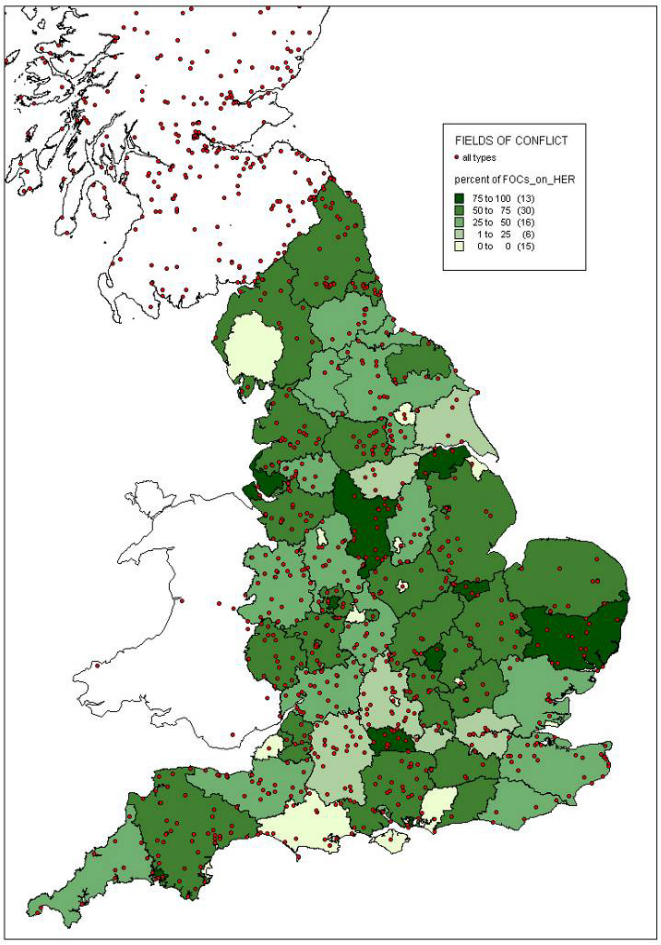

Figure 121: Percentage of fields of conflict on UKFOC that are also recorded on HERs

The database enhancement part of this project included consultation with all HERs. Comparison of the returns with records on the UK Fields of Conflict database enables a rough assessment of the completeness of each HER's information about presence/absence, though not of the quality of the data.

Most HERs reported difficulties in selecting data because of inadequacies in the terms relating to fields of conflict in the national thesaurus. A first and helpful step towards enhancement of HERs in this area would be the introduction of appropriate terms to enable more effective classification of battle, siege and skirmish sites.

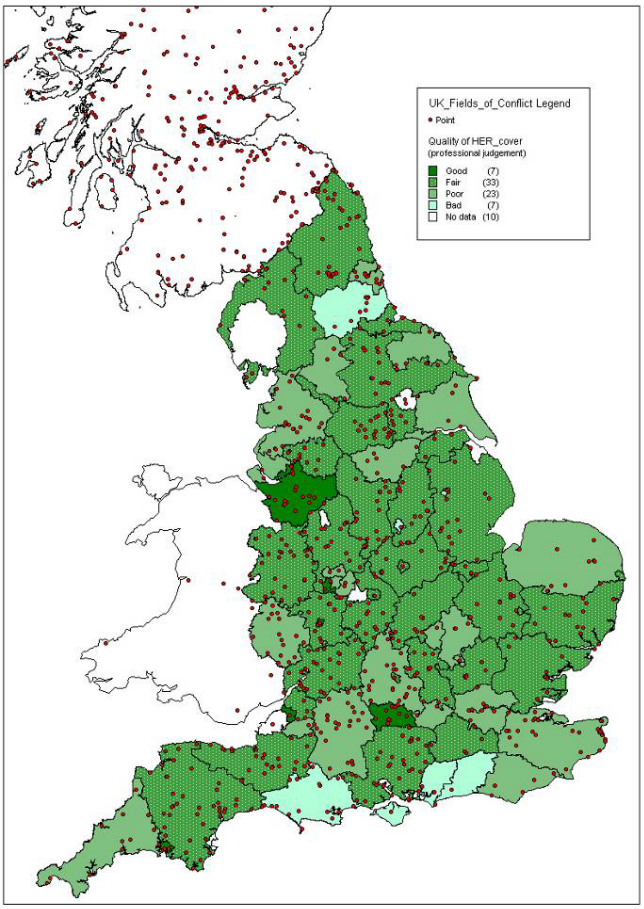

Figure 122: Assessment of battlefield data quality on HERs

Guidance

At present there is no comprehensive guidance as to the appropriate management approaches for particular types of threat, no examples of good practice in evaluation and recording, and no model Conservation Statements for different kinds of field of conflict. Model conservation plans should be prepared for several battlefields to take in different periods, types of battle and terrain, and to reflect the main types of potential and threat.

Equally helpful would be clearer understanding as to the current state of knowledge of each battlefield, and of the uncertainties that remain. Guidance would assist the harnessing of agri-environment schemes to battlefield conservation, whilst a mechanism whereby specific advice could be obtained would be valuable: at present, such matters lie outside the remit of the English Heritage Battlefields Panel and there is no recognised

equivalent of a 'period society' which receives support for the provision of such specialist advice.

Valuable advice and guidance is given to metal detectorists by the Finds Liaison Officers of the Portable Antiquities Scheme. FLOs are well placed to encourage detectorists to report finds from non-Registered fields of conflict and to promote best practice in battlefield detecting, including the use of GPS for recording locations and separate bagging of finds. To facilitate this, FLOs and others involved in management need access to appropriate guidance on survey methodology and analysis of finds. This would complement the *Code of Practice for Responsible Metal Detecting*, the voluntary agreement in which the National Council for Metal Detecting, the Federation of Independent Detectorists, National Farmers' Union and various heritage organisations joined together to promote good practice.[336]

[336] http://www.finds.org.uk/documents/CofP1.pdf

7. CONCLUSIONS AND RECOMMENDATIONS

7.0 Battlefields and other fields of conflict are significant places that should be managed to sustain their values as archaeological sites and historic landscapes as well as historic places. While battlefields have been the focus of the present study, other fields of conflict, especially sieges sites, have been recognised as essential complementary site type in the study of warfare. Assimilation of the conclusions of this report to *Conservation Principles: policies and guidance*[337] will be important.

7.1 Written records tell us that particular battles took place, and may provide evidence as to their whereabouts. Even with the best documented battles, however, textual sources usually enable only hypotheses as to exactly where they were fought. Almost without exception, detailed positioning and – for most battles – confirmation of the site itself, comes from archaeology (7.2). When battles are accurately located, it is possible to integrate the written record with evidence for terrain at the time when the battle occurred, and any material traces that it left. Reconstruction of historic terrain is a prerequisite for such synthesis.

7.2 'Battle archaeology' consists primarily of fragments of projectiles, weapons and equipment that were deposited in the topsoil during or immediately after military combat. Spatial relationships between different items, and overall pattering in the scatter itself, have potential for interpretation beyond what can be derived from individual items. The result can be a new, secure and sometimes remarkably detailed understanding of a battle, where formations are located, fluctuating intensities of action are caught, and the interplay with terrain can be explored in ways not previously possible. This understanding may also assist in the locating of the other key element of battle archaeology, the highly elusive mass graves which contain dramatic evidence of the action.

7.3 Battle archaeology is an important historical resource but is unstable and vulnerable. It follows that

- *Conservation and management of battle archaeology are worthwhile, to care for a resource that will assist future historical enquiry and contribute to public understanding*
- *The converse is also true - practices that deplete or disturb battle archaeology threaten the survival and intelligibility of an historical source. By far the most serious of these are* ***metal detecting that does not observe archaeological best practice*** *and* ***arable cultivation***
- *Uncontrolled metal detecting has already depleted the potential of some battlefields, and in a few cases it may have destroyed it.* ***Since such losses are*** *irretrievable, d****ata as to the scale of past artefact removal are needed*** *to determine what has been lost****, and detailed study of an exemplar site should be***

[337] Coincidentally, the *Principles* appeared on the same day that this report was finished; for that reason there is work still to do to ensure closer cross-referencing between the two and with the draft Bill

undertaken *to establish the degree to which evidence that remains has been subject to distortion, and what can still be achieved with such evidence*

- ***Guidance on best practice for archaeological survey of battlefields, particularly with regard to the use of metal detectors should be prepared and made available***
- *The single most constructive action for conservation of battlefield archaeology will be the introduction of* ***a licensing scheme to control metal detecting*** *on the Registered areas of battlefields, with approval being given only for survey that is governed by best practice*
- ***The relationship between chemical and mechanical degradation of metal artefacts needs to be ascertained****, with resulting* ***guidance for landowners, farmers and DEFRA***
- ***Establish the contamination of or obscuring of battle archaeology by artefact loss through re-enactment and other intensive public use of battlefields through a sampling of Hastings battlefield,***

7.4 Battles of different periods have different archaeological signatures. This is partly because the types and quantities of projectiles used in battle varied from one period to another; it is also because different metals decay at different speeds. The strength and character of signatures are affected not just by what was deposited during the action, but also by what has happened to the land since. In result:

- *Measures for management and conservation should take account of such variations*
- *Management of battlefields and their archaeology calls for multiple approaches and mechanisms*
- *There is potential of local listing to facilitate conservation of battlefields which are not considered of national importance but where there is likely to be a significant resource that will cross-fertilise understanding and so justify closer management. It would be timely for such provision to be included in the current Bill*
- *Since many co-varying influences affect what, how and why different fractions of battle archaeology survive and cause biases in their recovery, clearer* ***understanding of how these influences work is needed*** *(cf.7.3, 7.5, 7.8, 7.9)*

7.5 A corollary of 7.4 is that there is no necessary equation between a battle's political, military or archaeological importance. For instance, some historically minor actions may be of high archaeological significance because of the special quality of surviving physical and/or documentary evidence , which may have potential to assist interpretation elsewhere. It also means that the sequencing of next steps is important, as some steps offer scope to illuminate others. So:

- *The importance of battlefields should be measured by a combination of values (archaeological, taphonomic, military etc), not on a single scale*
- *Conservation mechanisms and management should reflect this*
- ***Systematic survey is needed to identify those battlefields that have especially favourable survival***
- *It would be helpful for the recommendations of this report to be implemented in a logical sequence*

7.6 While some battles of the first millennium may be locatable to neighbourhood, it is doubtful if at present any can yet be exactly located by written records, and none has so

far been corroborated by archaeology. The finding and investigation of early battlefields will depend on the degree of success in tackling issues outlined in 7.4. Roman and early medieval sieges may be more amenable to investigation than open battles because the physical evidence of defences should enable archaeological investigation of battle archaeology to be accurately targeted

- ***Assessment of the data collected on late Anglo-Saxon fields of conflict in the UCL project (see pp. 84-87) should be conducted in collaboration with the UCL team to enhance the resource assessment from phase 1 and to determine whether an exemplar pre-Conquest site can be identified fro field investigation***

7.7 Among later medieval battlefields, only Towton has so far produced substantial battle archaeology. However, although Towton has become a point of reference for the study of late medieval battles, it is still not clear how its assemblages have survived or why they should appear as they do. The failure of fieldwork on other late medieval battlefields at Bosworth, Flodden and Shrewsbury to recover comparable battle archaeology raises fundamental questions over the applicability of the Towton site. Urgently-needed next steps thus include

- ***Full cataloguing and digital mapping of the artefacts assemblage from Towton to enable the full character of the battle archaeology to be assessed***
- ***Taphonomic work and deposit modelling to clarify the reason(s) for Towton's singularity***
- ***Investigate Barnet battlefield, because of the expected complementary evidence of projectiles from both small arms and artillery which should enable its accurate location, as a likely paradigm for other late medieval battles***
- ***Sample the metal artefact distribution on Hastings battlefield as the earliest apparently securely located battlefield in England***

7.8 Methods appropriate for the recovery, analysis and management of battle artefact scatters under different conditions are neither widely known nor being systematically specified or applied, This increases the risk of loss of the resource itself. Further methodological improvements in investigation are called for, to assist explanation, assessment and management. We thus suggest that English Heritage, in discussion with others as appropriate (for instance, ALGAO), should consider the bringing forward of

- ***Guidance on best practice***
- ***Guidance on Civil War archaeology***
- ***Inclusion of sieges, skirmishes and other unregistered fields of conflict on HERs***
- ***Advice on how development-led evaluations can be more effectively contextualised, and thus bette inform planning decisions***
- ***A prioritised programme to develop and refine investigative methodology as a management tool****, to be devised and implemented with special reference to*
  - *the archaeology of sieges (with reference to structures, the impact scars they contain, the battle related artefact scatters around them and their surrounding context, including conflict within urban areas (cf Dussindale))*
  - *battles on enclosed terrain*
  - *large and small skirmishes*

7.9 Factors affecting recovery rates in archaeological metal detector survey are not well understood yet appear to cause major biases in sampling battle archaeology . Because of this

- ***Research should be undertaken into influences on recovery rates***
- ***uidance on metal detecting for archaeological survey should be prepared and made available***[338]
- ***Training events should be organised for the instruction of those conducting and commission such surveys***

7.10 As a foundation for sustainable management, development of the Register would beneficially include

- *Consideration of how **understanding of heritage values**, **assessment of heritage significance**, and **management of change to significant places** can be most effectively applied*
- *Production of several paradigmatic worked examples, for battlefields of contrasting type and period*
- *A review of Registration criteria, to ensure that the evidence from and potential for battle archaeology and terrain evidence are taken into account in the selection of sites for the Register, and the definition of the boundaries, to ensure that relevant and important areas of rout, pursuit and attacks on baggage trains and camps can be incorporated, which will in turn assist effective management*
- *The assimilation of siege sites to the Register to ensure that the battle archaeology is effectively managed alongside the physical evidence of the defences themselves*

7.11 Battlefields of the early modern period cannot be studied in isolation from other fields of conflict, including sieges and skirmishes, garrisons and shipwrecks which provide complementary evidence with better potential to answer questions when explored together than alone. Warfare in England is also part of a wider European tradition and so needs to be examined at an international level. Progress will be assisted by:

- *Lifting the field of study to a Europe-wide level, with a European forum for sharing information about methodology and research*
- *A long term home for the existing Fields of Conflict database, which should itself be expanded to embrace the aspects of warfare indicated here and expanded to a European scale*
- *Relevant data from excavated European wrecks around the world should be brought together, to enable better definition the calibres and character of unfired munitions and the character of associated equipment in use by different European armies from the 15th to the early 19th century, as a reference point for the archaeological study of early modern warfare*

7.12 Siege sites form a large part of the resource. In the early modern period they offer large opportunities. However, no methodology for the systematic investigation of the whole resource has yet been developed. In addition to recommendations in 7.9 (esp. bullet 5) and 7.11 it would thus be helpful to:

[338] The several existing sources of guidance on archaeology and metal detecting – from the CLA, CBA, PAS etc – should be revisited to ensure that battlefield issues are properly and consistently gripped.

- *Conduct a resource assessment for siege sites to complement that produced here for battlefields*
- *Produce handlist of buildings with impact scars and assessment of surroundings*

7.13 Lead bullets are the primary archaeological data set for the understanding of early modern fields of conflict (cf. 7.12). To assist management, there is a need for:

- *a web based reference collection of bullets and related artefacts, with digital images and descriptive text which can be developed and enhanced on an international scale*
- *a physical reference collection of bullets and related artefacts from fields of conflict and of experimentally fired bullets with related scientific data*
- *publication of a detailed methodology for bullet analysis and archiving*
- *a case study on a battlefield with very good survival and completeness fully to explore the potential of bullet scatters, including particular aspects such as case shot scatters and firing lines*
- *continued experimentation to assist better understanding of evidence of bullet use, especially of impact evidence in all types of context*

7.14 Some themes run across or through the conclusions, and are thus worth restating in their own terms:

- *A small group of battlefields require reassessment: Piper Dene, Lostwithiel, Winwick Pass, Newbury 2.*
- *Exemplar conservation plans are needed for representative sites*
- *Study of lesser actions of the 16th century will play into bigger questions and management*
- *Conservation strategy calls for development resting on a wider range of factors and data than hitherto*
- *Several phases of warfare should be the focus of programmes to address questions of methodology and management. They are:*
  - *Battlefields of the Wars of the Roses*
  - *Integration of evidence from arid sites to management schemes for later medieval and transitional battlefields*
  - *The potential and importance of the Berwick hinterland / conflict on the Anglo-Scottish border as a field of study in its own right*
  - *The place of Hastings in relation to battle archaeology and taphonomy*

7.15 To recapitulate, for purposes both of historical enquiry and better management, four themes merit further investigation:

1. **The origins of firepower, focusing on the 15th and 16th centuries**
2. **How to ascertain the archaeological signature of later medieval warfare**
3. **Refining of methodology of investigation of the bullet battlefields of the 17th century**
4. **Fully assimilating siege sites into the investigative and conservation framework**

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APPENDICES

Appendix I: List of English Battles

1.i Battles by name

Action name	Alternative name(s)	year	type
Aclea	Ockley	851	battle?
Adwalton Moor	Atherton Moor	1643	battle
Aethelingadene	Alton; East or West Dean	1001	battle?
Alnwick I		1093	battle?
Alnwick II		1174	siege/battle?
Alton		1643	battle?/skirmish
Alutthelia	Bishop Auckland	844	battle?
Archenfield	Ircingafeld	914	battle?
Arthuret	Arderyth, Arfderydd	573	battle?
Ashdown	Aescesdun	871	battle
Ashingdon	Assundun; Assingdon; Assandun; Assendun	1016	battle
Aylesford	Aegelesthrep	455	battle?
Badon	Mount Badon; Mons Badonicus; Deranbyrg; Baranburh; Bera's Stronghold;	500	battle
Barbury	Barbury Castle, Beranburh	556	battle?
Barnet		1471	battle
Basing		871	battle?
Bea's Mount	Beandun	614	battle
Beda's Head	Biedanheafde; Bedwyn	675	battle?
Bedcanford	Biedcanford	571	battle
Bedford		917	battle?
Benfleet	Bleamfleote	893	battle?
Benson	Bensington	779	battle?
Beorgford	Burford?; Beorhford	752	battle?
Billingham		800	battle?
Blackheath	Deptford Bridge	1497	battle?
Blore Heath		1459	battle
Boliegh		936	battle?
Boroughbridge		1322	battle
Bosworth	Redemore	1485	battle
Boudicca		61	battle
Braddock Down	Lostwithiel	1643	battle
Bradford on Avon	Bradenforda	652	battle?
Bramham Moor		1408	battle?
Brentford		1016	battle?
Burgh by Sands		1031	battle?
Buttington		893	battle

Camlann		511	battle?
Canterbury		851	battle?
Carham		833	battle?
Carham		1016	battle
Carham		1018	battle
Carham		1028	battle?
Carrum	Carhampton	843	battle?
Castleford		948	battle?
Catterick	Catraeth; Kaltraeth; Gododin; Cor-eiddin; Kaltraez;	600	battle
Cerdic's Ford	Charford	519	battle?
Cerdic's Shore	Cerdicesora	495	battle
Cerdic's Shore	Cerdicesora	514	battle
Cerdic's Wood	Cerdicesleag	527	battle?
Cheriton	Alresford	1644	battle
Cherrenhul		820	battle
Chester	Caerlegion, Caer Legionis	604	battle?
Chesterfield		1266	battle?
Cirencester		628	battle?
Clitheroe		1138	battle?
Clyst St. Mary	Clyst Heath	1549	battle
Corbridge		913	battle?
Corbridge	Bloody Acres	918	battle
Creacanford	Crayford, Crecganford	456	battle?
Cropredy Bridge		1644	battle
Cymen's Shore	Cymenesora	477	battle
Cynwit	Bloody Corner; Countisbury Hill; Northam;	878	battle
Deal Beach		1495	battle?
Denisesburn	Heavenfield; Heaven Fields; Heavenly Plain; Hefenfelth	633	battle
DEXASTAN	FLORIDA; DEGASTAN; DEXA STONE; Degsastan; Dalston; Daegsastan	603	battle
Dunmail Raise		945	battle?
Durham		1006	battle?
Durham		1069	battle?
Dussindale	Ossian's Vale	1549	battle
Dyrham	Deorham	577	battle?
East Kennet	Cynetan	1007	battle?
Edgcote	Banbury; Danesmoor; Danes Moor; Edgecot;	1469	battle
Edgehill	Kineton fight	1642	battle
Ellandun	Ellendun; Wroughton	825	battle
Empingham	Losecote Field; Stamford?	1470	battle
Englefield	Englafeld	870	battle?
Ethandun	Edington, Aethandune	878	battle
Evesham		1265	battle
Farnham		893	battle?
Fenny Bridges	Fenny Meadow	1549	battle
Fethanleag	Battle Wood, Stoke Lyne;	584	battle?
Flodden	Branxton Moor; Branston Moor;	1513	battle

Fornham St.Genevieve		1173	battle?
Fulford	Gate Fulford; Fulford Gate	1066	battle
Fulhope Law		1400	battle?
Galford	Creodantreow; Creadantreow; Gafulford, Gafolford	825	battle?
Gillingham		1016	battle?
Guoloph		437	battle?
Halidon Hill		1333	battle
Hastings	Senlac; Senlac Hill	1066	battle
Hatfield Chase	Hatfield; Heathfield; Haethfelth; Campodonum?	632	battle?
Hedgeley Moor		1464	battle
Hereford		1055	battle?
Hereford		1067	battle?
Hexham		1464	battle
Hingston Down	Hengestesdun; Hengestdun	838	battle?
Holme	Holm	904	battle
Homildon Hill	Humbleton Hill	1402	battle
Hopton Heath		1643	battle
Hoxne	Hellesdun	869	battle?
Kempsford	Cynemaersford	802	battle?
Langport		1645	battle
Lansdown		1643	battle
Lewes		1264	battle
Lincoln I		1141	battle
Lincoln II	Nundinae; Lincoln Fair	1217	battle
London		851	battle?
London		886	battle
London		994	battle?
London		1013	battle?
Lostwithiel	Castle Dore	1644	battle
Luton		913	battle?
Maidstone	Gabriel's Hill	1648	battle
Maldon		991	battle
Marston Moor		1644	battle
Maserfield	Maserfelth; Maserfeld; Havenfield	641	battle?
Mearcred's Burn	Mearcredesburna; Mercred's Stream	485	battle
Medway		43	battle
Meretun		871	battle?
Mortimer's Cross		1461	battle
Myton	White Battle; Myton on Swale	1319	battle
Nantwich		1644	battle
Naseby		1645	battle
Neville's Cross		1346	battle
Newark		1644	battle
Newburn Ford		1640	battle
Newbury I		1643	battle
Newbury II		1644	battle
Northallerton	Battle of the Standard	1138	battle

Northampton		1460	battle
Old Sarum	Salisbury; Searoburh	552	battle?
Otford	Ottanford	776	battle?
Otford	Dane Bottom; Ottanford	1016	battle?
Otterburn	Chevy Chase	1388	battle
Penselwood	Pen; Peonnan, Peonnum	658	battle?
Penselwood		1016	battle?
Pinhoe	Poltimore; Peonho	1001	battle?
Piper Dene	Piperdean	1435	battle
Poole Harbour		896	battle?
Porlock	Polock	1052	battle?
Portland	Port	840	battle?
Portsmouth	Porchester Castle, Portesmutha	501	battle
Posbury	Posbury; Posentesburh	661	battle?
Preston I	Ribbleton Moor	1648	battle
Reading		871	battle?
Ringmere	Ringmere Pit; Wretham Heath; Rymer	1010	battle?
Ripple Field		1643	battle
River Idle	Idle	617	battle
River Lea		895	battle?
River Parrett		848	battle?
River Trent		679	battle
Rochester		999	battle?
Romney marsh		841	battle
Roundway Down		1643	battle
Rowton Heath	Rowton Moor	1645	battle
Salisbury		1143	battle?
Sampford Courtenay		1549	battle
Sedgemoor		1685	battle
Selby		1644	battle
Sherston		1016	battle?
Shidlaw		833	battle?
Shrewsbury		1403	battle
Solway Moss	Sollom	1542	battle
Southampton		840	battle?
Southwark		1066	battle?
St Albans I		1455	battle
St Albans II		1461	battle
Stainmoor	Stainmore	950	battle?
Stamford Bridge		1066	battle
Stockbridge		1141	battle?
Stoke Field	East Stoke; Stoke	1487	battle
Stow on the Wold		1646	battle
Stratton	Stamford Hill	1643	battle
Tettenhall	Uodnesfelda Campo; Wednesfield Heath	910	battle?
Tewkesbury		1471	battle
Thames		43	battle

Thanet	Tenet	853	battle?
Thetford		1004	battle?
Torrington II		1646	battle
Towton		1461	battle
Tynemoore	Tynemoor	921	battle
Vortigern's Burg		652	battle
Wakefield		1460	battle
Whalley	Billingahoth; Bullasey Ford; Hwaelleage	798	battle?
Wibbandun	Wibba's Mount	568	battle
Wicganbeorg	Weekaborough, Wigborough?	851	battle
Wichum	Wych	1146	battle?
Wilton		871	battle?
Wilton		1143	battle?
Winceby		1643	battle
Winchester		860	battle?
Winwaed	Winwedfeld; River Winwaed; Winwoed; Maes Gai, Winwidfeld	655	battle?
Winwick Pass	Red Bank	1648	battle
Wipped's Creek	Wippedesfleot, Ebbsfleet	465	battle
Wirtgernesburh	Bradford on Avon?	665	battle
Woden's Barrow	Adam's Grave, Alton Priors; Wodnesbeorh	592	battle?
Woden's Barrow	Adam's Grave, Alton Priors; Wodnesburh	715	battle?
Woodbury Hill		1405	battle?
Worcester		1055	battle?
Worcester		1651	battle
York		866	battle?
York		1069	battle?
York		1069	siege/battle?

I.ii Battles by year

Name	Year	Type	Locational accuracy	Northing	Easting
Medway	43	battle	alternatives	0	0
Thames	43	battle	alternatives	0	0
Boudicca	61	battle	alternatives	0	0
Guoloph	437	battle?		0	0
Aylesford	455	battle?		573428	158997
Creacanford	456	battle?		551499	175510
Wipped's Creek	465	battle		0	0
Cymen's Shore	477	battle		487268	094279
Mearcred's Burn	485	battle		0	0
Cerdic's Shore	495	battle		0	0
Badon	500	battle	alternatives	0	0
Portsmouth	501	battle		463465	099603
Camlann	511	battle?		361500	566203

Cerdic's Shore	514	battle		0	0
Cerdic's Ford	519	battle?		417377	119503
Cerdic's Wood	527	battle?		413568	121378
Old Sarum	552	battle?		413947	132538
Barbury	556	battle?		415698	175905
Wibbandun	568	battle		0	0
Bedcanford	571	battle	unlocated	0	0
Arthuret	573	battle?		337929	567681
Dyrham	577	battle?		374147	176780
Fethanleag	584	battle?		456702	228247
Woden's Barrow	592	battle?		411220	163402
Catterick	600	battle		424025	497916
Dexastan	603	battle	alternatives	0	0
Chester	604	battle?		340500	365499
Bea's Mount	614	battle	0	0	0
River Idle	617	battle	0	0	0
Cirencester	628	battle?		402398	201579
Hatfield Chase	632	battle?		456623	371386
Denisesburn	633	battle	2	393700	569499
Maserfield	641	battle?		379583	174554
Vortigern's Burg	652	battle	0	0	0
Bradford on Avon	652	battle?		382799	161257
Winwaed	655	battle?		436716	437617
Penselwood	658	battle?		375620	131431
Posbury	661	battle?		0	0
Wirtgernesburh	665	battle		0	0
Beda's Head	675	battle?		426400	162400
River Trent	679	battle		0	0
Woden's Barrow	715	battle?		411220	163402
Beorgford	752	battle?		425190	212465
Otford	776	battle?		552752	159361
Benson	779	battle?		462093	191912
Whalley	798	battle?		369820	437671
Billingham	800	battle?		445338	522356
Kempsford	802	battle?		415527	196758
Cherrenhul	820	battle		0	0
Ellandun	825	battle		410352	183685
Galford	825	battle?		247500	086511
Shidlaw	833	battle?		379200	637798
Carham	833	battle?		379911	638384
Hingston Down	838	battle?		277016	85883
Southampton	840	battle?		441735	111651
Portland	840	battle?		369424	072606
Romney marsh	841	battle		0	0
Carrum	843	battle?		300509	142495
Alutthelia	844	battle?		0	0
River Parrett	848	battle?		329293	142980
London	851	battle?		532702	181145

Wicganbeorg	851	battle		0	0
Aclea	851	battle?		401507	117493
Canterbury	851	battle?		614825	157773
Thanet	853	battle?		634704	167714
Winchester	860	battle?		447814	129408
York	866	battle?		460320	452191
Hoxne	869	battle?		617995	276775
Englefield	870	battle?		462140	172110
Meretun	871	battle?		405800	118200
Reading	871	battle?		471740	173369
Wilton	871	battle?		409718	131135
Ashdown	871	battle	alternatives	0	0
Basing	871	battle?		466280	150630
Cynwit	878	battle		245460	129230
Ethandun	878	battle	alternatives	0	0
London	886	battle		532702	181145
Benfleet	893	battle?		577868	187281
Buttington	893	battle		0	0
Farnham	893	battle?		483859	146710
River Lea	895	battle?		532531	212692
Poole Harbour	896	battle?		402095	087987
Holme	904	battle		0	0
Tettenhall	910	battle?		393950	299770
Luton	913	battle?		509266	221369
Corbridge	913	battle?		399137	564617
Archenfield	914	battle?		326241	242277
Bedford	917	battle?		505020	249742
Corbridge	918	battle		400160	563840
Tynemoore	921	battle		0	0
Boliegh	936	battle?		143500	024911
Dunmail Raise	945	battle?		0	0
Castleford	948	battle?		442614	425933
Stainmoor	950	battle?		380660	514190
Maldon	991	battle	alternatives	0	0
London	994	battle?		532702	181145
Rochester	999	battle?		574131	168569
Pinhoe	1001	battle?		295200	095900
Aethelingadene	1001	battle?		471797	139273
Thetford	1004	battle?		586816	283144
Durham	1006	battle?		427813	542455
East Kennet	1007	battle?		411900	168000
Ringmere	1010	battle?		590499	287510
London	1013	battle?		532702	181145
Carham	1016	battle		383301	638698
Otford	1016	battle?		552752	159361
Sherston	1016	battle?		385504	185491
Penselwood	1016	battle?		375620	131431
Ashingdon	1016	battle	alternatives	0	0

Gillingham	1016	battle?		0	0
Brentford	1016	battle?		517555	177370
Carham	1018	battle		379859	638379
Carham	1028	battle?		0	0
Burgh by Sands	1031	battle?		0	0
Porlock	1052	battle?		288853	146776
Worcester	1055	battle?		385102	254898
Hereford	1055	battle?		351174	239989
Hastings	1066	battle	secure	574894	115632
Fulford	1066	battle	approx	461111	448889
Southwark	1066	battle?	approx	531418	180067
Stamford Bridge	1066	battle	secure	471951	455295
Hereford	1067	battle?	approx	351174	239989
York	1069	siege/battle?	approx	460320	452191
York	1069	battle?	approx	460320	452191
Durham	1069	battle?	approx	427911	542639
Alnwick I	1093	battle?	secure	419200	614400
Clitheroe	1138	battle?	approx	0	0
Northallerton	1138	battle	secure	436301	497674
Stockbridge	1141	battle?	approx	427169	398391
Lincoln I	1141	battle	alternatives	0	0
Salisbury	1143	battle?	approx	414404	129510
Wilton	1143	battle?	approx	409718	131135
Wichum	1146	battle?	approx	0	0
Fornham St.Genevieve	1173	battle?	alternatives	0	0
Alnwick II	1174	siege/battle?	secure	418020	613680
Lincoln II	1217	battle	secure	497610	371800
Lewes	1264	battle	secure	539986	111134
Evesham	1265	battle	secure	403917	245532
Chesterfield	1266	battle?	approx	438300	370910
Myton	1319	battle	secure	443084	467271
Boroughbridge	1322	battle	secure	439643	467015
Halidon Hill	1333	battle	secure	396811	654923
Neville's Cross	1346	battle	secure	426001	542428
Otterburn	1388	battle	secure	387918	593942
Fulhope Law	1400	battle?	approx	369816	606803
Homildon Hill	1402	battle	secure	396942	629152
Shrewsbury	1403	battle	secure	351238	317256
Woodbury Hill	1405	battle?	approx	374990	264515
Bramham Moor	1408	battle?	secure	443244	440981
Piper Dene	1435	battle	secure	384006	635899
St Albans I	1455	battle	secure	514990	206890
Blore Heath	1459	battle	secure	371413	335293
Wakefield	1460	battle	secure	433800	418600
Northampton	1460	battle	secure	476349	259432
Mortimer's Cross	1461	battle	alternatives	0	0
St Albans II	1461	battle	secure	515000	208300

Towton	1461	battle	accurate	448235	438426
Hexham	1464	battle	alternatives	0	0
Hedgeley Moor	1464	battle	secure	404500	619600
Edgcote	1469	battle	alternatives	0	0
Empingham	1470	battle	alternatives	0	0
Tewkesbury	1471	battle	alternatives	0	0
Barnet	1471	battle	alternatives	0	0
Bosworth	1485	battle	alternatives	0	0
Stoke Field	1487	battle	alternatives	0	0
Deal Beach	1495	battle?	approx	637668	151769
Blackheath	1497	battle?	secure	539477	176628
Flodden	1513	battle	accurate	389594	637118
Solway Moss	1542	battle	secure	338386	567772
Dussindale	1549	battle	alternatives	627811	309914
Fenny Bridges	1549	battle	secure	311400	098860
Sampford Courtenay	1549	battle	approx	264100	101500
Clyst St. Mary	1549	battle	alternatives	296520	091229
Newburn Ford	1640	battle	secure	416334	565071
Edgehill	1642	battle	accurate	435482	249404
Hopton Heath	1643	battle	secure	395612	326428
Stratton	1643	battle	secure	222782	107204
Lansdown	1643	battle	accurate	372427	170615
Newbury I	1643	battle	secure	445418	166200
Roundway Down	1643	battle	secure	401986	165116
Winceby	1643	battle	secure	531482	368804
Ripple Field	1643	battle	secure	387200	238100
Alton	1643	battle?/skirmish	accurate	471797	139273
Braddock Down	1643	battle	alternatives	217782	063204
Adwalton Moor	1643	battle	secure	421558	428958
Nantwich	1644	battle	secure	363518	353612
Cropredy Bridge	1644	battle	secure	447782	246104
Cheriton	1644	battle	alternatives	459882	129504
Newbury II	1644	battle	secure	447719	168933
Lostwithiel	1644	battle	secure	210342	054836
Selby	1644	battle	secure	461644	432355
Newark	1644	battle	secure	481100	354100
Marston Moor	1644	battle	accurate	448993	452087
Naseby	1645	battle	accurate	468582	280104
Langport	1645	battle	alternatives	343079	126618
Rowton Heath	1645	battle	secure	345602	363055
Torrington II	1646	battle	secure	249400	119190
Stow on the Wold	1646	battle	secure	419099	227275
Winwick Pass	1648	battle	secure	359750	394040
Preston I	1648	battle	secure	355707	430481
Maidstone	1648	battle	secure	576268	155536
Worcester	1651	battle	accurate	385412	252821
Sedgemoor	1685	battle	accurate	335137	135673

I.iii Numbers engaged

(The Battlefields Register documentation lists some battlefields as 'site b' where the battlefield is considered to be in too poor a condition to justify conservation, and 'site a' where the location of the battlefield is too poorly defined to enable registration. This classification is followed here, with 'site' indicating that it is the assessment given in the Register.)

UKFOC	Action Name	year	type	numbers	designation
1	Marston Moor	1644	battle	45000	Registered
34	Towton	1461	battle	40000	Registered
48	St Albans II	1461	battle	40000	site b
39	Flodden	1513	battle	40000	Registered
6	Worcester	1651	battle	40000	Registered
298	*Turnham Green*	*1642*	*no action*	*30000*	*n/a*
10	Edgehill	1642	battle	30000	Registered
15	Newbury I	1643	battle	30000	Registered
52	Newbury II	1644	battle	30000	site b
263	**Lostwithiel**	**1644**	**battle**	**25000**	**assess**
9	Naseby	1645	battle	25000	Registered
44	Shrewsbury	1403	battle	20000	Registered
46	Wakefield	1460	battle	20000	site b
35	Barnet	1471	battle	20000	Registered
242	**Blackheath**	**1497**	**battle?**	**20000**	**b**
41	Newburn Ford	1640	battle	20000	Registered
55	Preston I	1648	battle	20000	site b
8	Cropredy Bridge	1644	battle	18000	Registered
12	Langport	1645	battle	17000	Registered
235	*Ludford Bridge*	*1459*	*no action*	*15000*	*n/a*
37	Bosworth	1485	battle	15000	Registered
38	Stoke Field	1487	battle	15000	Registered
40	Solway Moss	1542	battle	15000	Registered
904	Newark	1644	battle	15000	site b
16	Cheriton	1644	battle	15000	Registered
1315	*Penrith*	*1715*	*skirmish*	*15000*	*n/a*
2	Adwalton Moor	1643	battle	14000	Registered
310	**Winwick Pass**	**1648**	**battle**	**12500**	**assess**
33	Northampton	1460	battle	12000	Registered
28	Halidon Hill	1333	battle	10000	Registered
1000	**Hilton**	**1644**	**battle**	**10000**	**b**
32	Blore Heath	1459	battle	10000	Registered
36	Tewkesbury	1471	battle	10000	Registered
247	**Dussindale**	**1549**	**battle?**	**10000**	**assess**
250	**Sampford Courtenay**	**1549**	**battle?**	**10000**	**assess**
13	Lansdown	1643	battle	10000	Registered
320	*Modbury*	*1643*	*skirmish*	*10000*	*n/a*

3	Nantwich	1644	battle	10000	Registered
306	**Maidstone**	**1648**	**battle**	**10000**	**b**
18	Braddock Down	1643	battle	9000	Registered
24	Lewes	1264	battle	8000	Registered
26	Myton	1319	battle	8000	Registered
231	**Piper Dene**	**1435**	**battle**	**8000**	**assess**
11	Stratton	1643	battle	8000	Registered
19	Winceby	1643	battle	8000	Registered
5	Rowton Heath	1645	battle	8000	Registered
264	**Selby**	**1644**	**battle**	**7000**	**b**
296	**Alton**	**1643**	**battle/skirmish**	**6300**	**b**
7	Stow on the Wold	1646	battle	6300	Registered
17	Roundway Down	1643	battle	6000	Registered
42	Sedgemoor	1685	battle	6000	Registered
56	Preston II	1715	skirmish	6000	site b
25	Evesham	1265	battle	5000	Registered
27	Boroughbridge	1322	battle?	5000	Registered
29	Otterburn	1388	battle	5000	Registered
45	St Albans I	1455	battle	5000	site b
246	**Clyst St. Mary**	**1549**	**battle?**	**5000**	**b? assess**
929	**Temple Bar**	**1554**	**skirmish**	**5000**	**b**
297	**Brentford**	**1642**	**skirmish**	**5000**	**b**
259	**Launceston**	**1643**	**skirmish**	**5000**	**b**
978	**Whalley**	**1643**	**skirmish**	**5000**	**assess**
54	Torrington II	1646	battle	5000	site b
47	Mortimer's Cross	1461	battle	4000	site a
49	Hexham	1464	battle	4000	site a
268	**Norton St. Philip**	**1685**	**skirmish**	**4000**	**b?**
262	**Sourton Down**	**1643**	**skirmish**	**4000**	**b?**
254	**Tadcaster**	**1642**	**skirmish**	**4000**	**b**
1069	**Oldcastle Heath**	**1644**	**skirmish**	**3500**	**?**
656	**Ankle Hill**	**1645**	**skirmish**	**3500**	**b**
53	Sherburn in Elmet	1645	skirmish	3500	site a
248	**Fenny Bridges**	**1549**	**battle?**	**3000**	**assess**
300	**Gainsborough**	**1643**	**skirmish**	**3000**	**assess**
65	**Ripple Field**	**1643**	**battle**	**3000**	**assess**
257	**Highnam**	**1643**	**skirmish**	**3000**	**assess**
4	Hopton Heath	1643	battle	2500	Registered
1263	**Saltash**	**1644**	**skirmish**	**2500**	
725	Wigan	1651	skirmish	2000	
165	Grindon	1558	skirmish	2000	
64	Powick Bridge	1642	skirmish	2000	Registered
256	Grantham	1643	skirmish	2000	
260	Seacroft Moor	1643	skirmish	2000	
903	Middlewich	1643	skirmish	2000	
14	Chalgrove	1643	skirmish	2000	Registered
1093	Willoughby On The Wolds	1648	skirmish	2000	
67	Clifton Moor	1745	skirmish	2000	

207	Lincoln	1217	battle	1500	
1037	Clyst Heath	1454	skirmish	1500	
1344	Carlisle Sands	1645	skirmish	1250	
255	Wetherby	1642	skirmish	1140	
307	Nibley Green	1470	skirmish	1000	
252	Wrotham Hill	1554	skirmish	1000	
1102	Longford	1644	skirmish	1000	
949	Huntingdon	1645	skirmish/stormed	1000	
576	St Neots	1646	skirmish	1000	
900	Marshall's Elm	1642	skirmish	500	
1287	South Harting	1642	skirmish	500	
270	Babylon Hill	1642	skirmish	500	
1014	South Molton	1655	skirmish	400	
1313	Lowther Hall	1745	skirmish	100	
21	Stamford Bridge	1066	battle	0	Registered
22	Hastings	1066	battle	0	Registered
192	Fulford	1066	battle	0	
194	Southwark	1066	battle?	0	
879	Hereford	1067	battle?	0	
195	Durham	1069	battle?	0	
943	York	1069	battle?	0	
944	York	1069	battle?	0	
198	Alnwick I	1093	battle?	0	
23	Northallerton	1138	battle	0	Registered
201	Stockbridge	1141	battle?	0	
58	Lincoln	1141	battle	0	
202	Wilton	1143	battle?	0	
714	Salisbury	1143	battle?	0	
1270	Wichum	1146	battle?	0	
204	Fornham St.Genevieve	1173	battle?	0	
214	Chesterfield	1266	battle?	0	
30	Neville's Cross	1346	battle	0	Registered
31	Homildon Hill	1402	battle	0	Registered
230	Woodbury Hill	1405	battle?	0	
62	Bramham Moor	1408	battle?	0	
68	Hedgeley Moor	1464	battle	0	
63	Edgcote	1469	battle	0	
50	Empingham	1470	battle	0	
241	Deal Beach	1495	battle?	0	

I.iv Bibliographic score

Bibliographic score	Action name	Year	Type of action	Designation
141	Bosworth	1485	battle	Registered
88	Flodden	1513	battle	Registered
80	Tewkesbury	1471	battle	Registered
66	Marston Moor	1644	battle	Registered
64	Shrewsbury	1403	battle	Registered
63	Naseby	1645	battle	Registered
59	Towton	1461	battle	Registered
54	Hastings	1066	battle	Registered
52	Otterburn	1388	battle	Registered
50	Worcester	1651	battle	Registered
49	Wakefield	1460	battle	site b
47	Barnet	1471	battle	Registered
46	Newbury I	1643	battle	Registered
46	Edgehill	1642	battle	Registered
44	Sedgemoor	1685	battle	Registered
43	Lewes	1264	battle	Registered
42	Neville's Cross	1346	battle	Registered
40	Blore Heath	1459	battle	Registered
37	Northallerton	1138	battle	Registered
36	Evesham	1265	battle	Registered
35	Stamford Bridge	1066	battle	Registered
34	Stoke Field	1487	battle	Registered
33	**Newbury II**	**1644**	**battle**	**site b - reassess**
33	Cheriton	1644	battle	Registered
32	Halidon Hill	1333	battle	Registered
32	Lansdown	1643	battle	Registered
31	Roundway Down	1643	battle	Registered
30	St Albans I	1455	battle	site b
29	Newburn Ford	1640	battle	Registered
29	**Mortimer's Cross**	**1461**	**battle**	**site a - reassess**
29	**Hexham**	**1464**	**battle**	**site a - reassess**
29	Adwalton Moor	1643	battle	Registered
28	Boroughbridge	1322	battle?	Registered
27	Winceby	1643	battle	Registered
26	Homildon Hill	1402	battle	Registered
26	Solway Moss	1542	battle	Registered
26	Langport	1645	battle	Registered
25	Cropredy Bridge	1644	battle	Registered
24	St Albans II	1461	battle	site b
24	**Lostwithiel**	**1644**	**battle**	**assess**
24	Northampton	1460	battle	Registered
23	Rowton Heath	1645	battle	Registered
23	Stratton	1643	battle	Registered
23	Nantwich	1644	battle	Registered

22	Braddock Down	1643	battle	Registered
20	**Edgcote**	**1469**	**battle**	**site a - reassess**
20	Hopton Heath	1643	battle	Registered
18	Hedgeley Moor	1464	battle	
17	Newark	1644	battle	site b
16	Myton	1319	battle	Registered
15	Lincoln II	1217	battle	b
15	Preston I	1648	battle	site b
15	Torrington II	1646	battle	site b
13	Fulford	1066	battle	a
11	Bramham Moor	1408	battle?	
11	Stow on the Wold	1646	battle	Registered
9	**Lincoln I**	**1141**	**battle**	**assess**
8	**Ripple Field**	**1643**	**battle**	**assess**
8	Empingham	1470	battle	site a
7	Chesterfield	1266	battle?	
7	Selby	1644	battle	
7	**Winwick Pass**	**1648**	**battle**	**assess**
7	Alnwick I	1093	battle?	
6	Maidstone	1648	battle	
6	Alnwick II	1174	siege/battle?	
5	Durham	1069	battle?	
4	**Sampford Courtenay**	**1549**	**battle**	**assess**
4	**Piper Dene**	**1435**	**battle**	**assess**
3	**Dussindale**	**1549**	**battle**	**assess**
3	Hilton	1644	battle	
3	Blackheath	1497	battle?	
1	York	1069	battle?	
1	York	1069	battle?	
1	Alton	1643	battle/skirmish	
0	Stockbridge	1141	battle?	
0	Wilton	1143	battle?	
0	Fornham St.Genevieve	1173	battle?	
0	Fulhope Law	1400	battle	
0	Woodbury Hill	1405	battle?	
0	Deal Beach	1495	battle?	
0	Clyst St. Mary	1549	battle	
0	Fenny Bridges	1549	battle	
0	Salisbury	1143	battle?	
0	Hereford	1067	battle?	
0	Winchester	1141	siege; skirmish/battle?	
0	Wichum	1146	battle?	
0	Southwark	1066	battle?	

Appendix II: Books used for initial classification of importance

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- Brooks, R., *Cassells Battlefields of Britain and Ireland*, Weidenfeld & Nicolson, London, 2005.
- Burne, A. H., *The Battlefields of England*, Greenhill Books, London, 1996.
- Chandler, David, *A Guide to the Battlefields of Europe*. 1998 ed. Ware: Wordsworth Editions, 1998.
- Clark, D., *Battlefield Walks: Midlands*, Alan Sutton, Stroud, 1993
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- Fairbairn, Niel, and Michael Cyprien, *A Traveller's Guide to the Battlefields of Britain*. London: Evans Brothers Ltd, 1983.
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- Green, Howard, *Guide to the battlefields of Britain and Ireland*. London: Constable, 1973.
- Kinross, John, *Walking & Exploring the Battlefields of Britain*. Newton Abbot: David & Charles, 1988.
- Kinross, J., *Discovering battlefields of England*, Shire, Princes Risborough, 1998.
- Marix Evans, M., *The Military Heritage of Britain & Ireland*. London: Andre Deutsch, 1998.
- Seymour W., *Battles in Britain and their political background 1066-1746*. London: Book Club Associates, 1979.
- Smurthwaite, David, *The Complete Guide to the Battlefields of Britain*. London: Michael Joseph, 1993.
- Warner, P. *British Battlefields: The Definitive Guide to Warfare in England and Scotland,* 2002.
- Young Peter, and Adair John, *From Hastings to Culloden : battlefields in Britain*, Kineton, 1979.

Appendix III: Battlefield Metal Detecting Survey Guidelines

Experience in collaborative fieldwork on various battlefields and analysis of results of work by others on several other battlefields has demonstrated substantial problems arising from a lack of adequate published guidance as to best practice in battlefield survey, finds analysis and archiving, including health and safety issues. Guidance for survey has therefore been reviewed as part of the present study but will be published in a separate guidance document. Health and Safety and related matters are dealt with in appendices below.

Appendix IV: Percentages of Fields of Conflict on each HER

HER	FIELDS OF CONFLICT		
	Total on UKFOC database	Total on HER	% on HER
Bath & NE Somerset	2	1	50
Bedfordshire	9	5	56
Birmingham	3	2	67
Black Country	2	1	50
Bristol	2	1	50
Buckinghamshire	11	7	64
Cambridgeshire	13	9	69
Cheshire	21	13	62
Chichester District	3	0	0
Colchester UAD	1	1	100
Cornwall	11	3	27
Coventry	2	1	50
Cumbria	18	12	67
Derbyshire	15	12	80
Devon	49	25	51
Dorset	20	0	0
Dudley	3	2	67
Durham	10	3	30
East Berkshire	5	1	20
East Sussex	6	2	33
Essex	7	3	43
Exeter UAD	2	2	100
Gloucestershire	27	12	44
Greater London	18	3	17
Greater Manchester	15	7	47
Hampshire	34	23	68
Herefordshire	22	12	55
Hertfordshire	7	4	57
Humber	9	1	11
Isle of Wight	1	0	0
Kent	39	12	31
Lancashire	22	13	59
Leicestershire & Rutland	8	5	63
Lincoln	3	0	0
Lincolnshire	19	10	53
Merseyside	1	1	100
Milton Keynes	1	1	100
Norfolk	10	5	50
North East Lincolnshire	1	0	0
North Lincolnshire	3	2	67
North Yorks Moors	3	2	67
North Yorkshire	27	12	44
Northamptonshire	10	5	50
Northumberland	44	25	57
Nottingham	8	0	0
Nottinghamshire	12	4	33

Oxford UAD	4	0	0
Oxfordshire	22	3	14
Peterborough	5	5	100
Plymouth	4	3	75
Portsmouth	2	3	150
Sandwell	1	1	100
Shropshire	30	13	43
Somerset	26	8	31
South Gloucestershire	3	2	67
South Yorkshire	7	1	14
Southampton	4	1	25
Staffordshire	22	9	41
Suffolk	15	12	80
Surrey	5	3	60
Tees	6	2	33
Tyneside	13	7	54
Warwickshire	15	7	47
West Berkshire	7	6	86
West Sussex	2	1	50
West Yorkshire	22	14	64
Wiltshire	30	4	13
Winchester	2	2	100
Worcester	6	3	50
Worcestershire	10	5	50
York	8	0	0
Yorkshire Dales National	4	1	25
Grand Total	834	381	46

Appendix V: Lists of battles considered for the Register

Under designation, 'Registered' indicates this is a Registered Battlefield. 'Site a' indicates that it was considered for the Register but lacked accurate definition of location or extent. 'Site b' indicates that it was considered for the Register but is wholly or largely destroyed. Where a battle was unregistered but has been assessed in the present project then 'assess' indicates a potentially important site that is sufficiently intact to justify assessment for the Register; b indicates wholly or largely destroyed.

1992 WORKING LIST OF ELIGIBLE BATTLES

Provided by National Army Museum, indicating which were finally Registered.

ACTION	STATUS
Maldon (991)	Registered
Ashingdun (1016)	?
Carham (1018)	Site a
Stamford Bridge (1066)	Registered
Hastings (1066)	Registered
The Standard (1138)	Registered
Lincoln (1141)	?
Lewes (1264)	Registered
Evesham (1265)	Registered
Myton (1319)	Registered
Burton Bridge (1322)	?
Borough Bridge (1322)	Registered
Byland Abbey (1322)	?
Halidon Hill (1333)	Registered
Neville's Cross (1346)	Registered
North Walsham (1381)	?
Radcot Bridge (1387)	?
Otterburn (1388)	Registered
Homildon Hill (1402)	Registered
Shrewsbury (1402)	Registered
Bramham Moor (1408)	?
St Albans I (1455)	Site b
Blore Heath (1459)	Registered
Northampton (1460)	Registered
Wakefield (1460)	Site b
Mortimer's Cross (1461)	Site a
St. Albans II (1461)	Site b
Towton (1461)	Registered
Hedgely Moor (1464)	?
Hexham (1464)	Site a
Edgcote (1469)	Site a
Empingham (1470)	Site a
Barnet (1471)	Registered
Tewkesbury (1471)	Registered
Bosworth (1485)	Registered
Stoke Field (1487)	Registered
Flodden (1513)	Registered
Solway Moss (1542)	Registered
Newburn (1640)	Registered

Edgehill (1642)	Registered
Braddock Down (1643)	Registered
Ripple Field (1643)	?
Newbury I (1643)	Registered
Stratton (1643)	Registered
Chalgrove (1643)	Registered
Sourton Down (1643)	?
Lansdown Hill (1643)	Registered
Roundway Down (1643)	Registered
Adwalton Moor (1643)	Registered
Hopton Heath (1643)	Registered
Winceby (1643)	Registered
Newark (1644)	Site b
Cheriton (1644)	Registered
Cropredy Bridge (1644)	Registered
Marston Moor (1644)	Registered
Lostwithiel (1644)	?
Newbury II (1644)	Site b
Nantwich (1644)	Registered
Montgomery (1644)	?
Naseby (1645)	Registered
Langport (1645)	Registered
Rowton Heath (1645)	Registered
Sherburn-in-Elmet (1645)	Site a
Torrington (1646)	Site b
Stow-on-the Wold (1646)	Registered
Preston (1648)	Site b
Worcester (1651) with Powick Bridge (1642)	Registered
Sedgemoor (1685)	Registered
Preston (1715)	Site b
Clifton Moor (1745)	?

Appendix VI: Battlefields Trust Policy and Guidance on Metal Detecting Surveys of Fields of Conflict

POLICY ON METAL DETECTING ON BATTLEFIELD SURVEY	
Prepared by: **G Foard: 31/07/2004** **Updated by G Foard: 15/05/2006**	**Validated by:** **Trustees of the Battlefields Trust: 2004** **Michael Rayner: 16/05/2006**

A COPY OF THIS DOCUMENT IS TO BE PROVIDED TO ALL THOSE DETECTING ON TRUST SURVEYS. A COPY OF THE WAIVER FORM TO BE SIGNED BY THEM AND BY A TRUST REPRESENTATIVE AND FILED WITH THE SURVEY RECORDS

www.battlefieldstrust.com

POLICY ON METAL DETECTING ON BATTLEFIELD SURVEYS UNDERTAKEN BY *THE BATTLEFIELDS TRUST*

1. Introduction

1.1 Metal detector users play a central role in battlefield survey. Across the world, collaboration between them and battlefield archaeologists has led to the recovery of a wide range of data which is transforming our understanding of past military action.

1.2 This document has been prepared by **The Battlefields Trust** to define how it aims to achieve the most fruitful partnership between *bona fide* detectorists and archaeologists in the Trust's battlefield survey projects. It should be used in conjunction with any specific method statement prepared for an individual survey. It also represents the Trust's guidance to others as to best practice in battlefield survey.

2. Project Coordinator

2.1 All battlefield surveys or excavation projects involving metal detector users will have a nominated Project Coordinator, who will have the necessary battlefield archaeology experience and expertise to achieve the best results from metal detector operators in the field.

2.2 The Project Coordinator will be responsible for maintaining a register of nominated detector users involved in the survey; arrange site access; ensure best practice in survey and recording methodology is applied throughout the

survey; seek to ensure appropriate arrangements are made for essential conservation of and deposition of finds in an museum archive; brief the nominated detector users and ensure that they adhere to the principles set out in the written agreement.

2.3 The Project Coordinator will liaise with the appropriate Local Archaeological Officer and the Finds Liaison Officer regarding all relevant aspects of the survey. Where the survey is on a Registered Battlefield the Project Coordinator will advise the Battlefields Inspector of English Heritage.

3. Nominated detector users
Nominated metal detector users on battlefield surveys must agree to abide by the Policies, Guidelines and Agreements of **The Battlefields Trust** and to follow the specific survey and recording methods defined for the survey.

4. Written agreements
All such work will be regulated by formal written agreements, signed by the Project Coordinator and the nominated detector users. This is to ensure that all work is carried out in accordance with a set of principles agreed at the outset of the project.

5. Health and Safety
All those working on a battlefield survey have a responsibility at all times to look after their own welfare and those with whom they work. An outline Risk Assessment for battlefield survey, prepared by the Trust, is appended to this policy document and should be read by all those taking part in a battlefield survey.

6. Insurance
Nominated detector users will be given free membership of The Battlefields Trust for the duration of their involvement in the survey and will be covered by The Battlefields Trust's insurance while undertaking survey work. This insurance cover comprises Public Liability of £5,000,000, to protect the interests of the landowner and third parties, as well as cover for the volunteers themselves.

7. Finds ownership
Nominated detector users will be required to sign a written agreement waiving their rights to ownership of all finds so that, subject to landowner agreement, these may be incorporated into the site archive. They will also be required to waive all rights to claim any reward under the Treasure Act 1996, in accordance with section 81 of the *Treasure Act Code of Practice*.

8. Reporting of Treasure Finds
Treasure must be reported to the coroner for the district in which it is found either within 14 days after the day of discovery or within 14 days after the day it is realized the find might be treasure. The project coordinator, in consultation with the relevant Finds Liaison Officer, should make the report or ensure that a report is made.

9. Finds covered by the Act:

- A metallic object, other than a coin, that is at least 300 years and of which at least 10 per cent, by weight of metal, is gold or silver. If prehistoric then it is Treasure if any part is gold or silver.
- Two or more metallic objects of any composition of prehistoric date that come from the same find (i.e. found in the same place as, or previously together with the other object).
- All coins from the same find, if at least 300 years old (if containing less than 10 per cent of gold or silver then there must be at least ten of them). They are from the same find if they are:

    - hoards that have been deliberately hidden
    - smaller groups of coins, such as the contents of purses, that may been dropped or lost
    - votive or ritual deposits.

- Any object, whatever it is made of, that is found in the same place as, or had previously been together with, another object that is Treasure.
- Objects that are less than 300 years old, that are made substantially of gold or silver, that have been deliberately hidden with the intention of recovery and whose owners or heirs are unknown.

10. Access and supervision

10.1 Access times shall be agreed between the Project Coordinator and the nominated detector users.

10.2 No detecting should take place except under supervision of the Project Coordinator or a representative of the Battlefields Trust specified by him.

10.3 Acknowledgement

The role of metal detector users in the project will be acknowledged in all publicity, interim reports, museum displays or final publications arising from it.

Annex 1: Risk Assessment

BATTLEFIELD METAL DETECTING SURVEY RISK ASSESSMENT & MITIGATION GUIDANCE	
The Battlefields Trust	
Prepared: G Foard 26/10/2005	Validated: M Rayner 26/10/2005

A first aid kit will be carried at all times when a project team in the field and information provided as to the nearest A&E department.
A record of any accidents to volunteers or Battlefield Trust officers will be maintained.

- ***Slips & trips etc***

Important to take extra care near trenches and deep ditches, including those with water. Also likely to be exacerbated in icy conditions.
Care to be taken when climbing fences and gates.
Dangers of barbed wire also to be noted.

- ***Digging, pegging etc***

Danger of injury, particularly to feet, from digging and inserting grid markers.
Metal detectorists cannot not wear steel capped boots or similar protective footwear, so particular care must be taken.
Markers for transects to be suitably flagged for visibility
Digging tools to be suitable for the task and well maintained
Metal ranging poles not to be carried vertically within 6m of overhead cables.

- ***Manual handling***

Carrying of heavy or large amounts of survey equipment such as ranging poles, marker flags, detectors and digging tools.
Equipment to be spread between the survey team as far as practicable.

- ***Low temperatures***

Fieldworkers are likely to be in the field for up to 7 hours in very cold conditions in the winter. All should ensure they wear appropriate clothing and footwear.

- ***High temperatures***

Fieldworkers are likely to be in the field for up to 7 hours without cover in the summer. They must ensure to carry plenty of water and to wear suitable clothing, especially a hat to protect against sunstroke.

- ***sharp objects in the ground***

Glass attached to bottle tops and other such items.
Care to be taken in removing objects by hand.

- ***Road traffic***

Fieldwork will involve crossing of roads. Particular care is needed when walking along or crossing roads.
Parking of vehicles by fieldworkers to be in suitable locations where they do not cause a safety hazard.

- ***Stock***

Dangers of stock, such as bulls, to be assessed before entering any field. Also care taken to ensure gates are closed to avoid any incidents caused by stock escaping onto roads etc.

- ***Lone working***

Lone working will not normally be practiced. Metal detecting will normally be conducted with a team of two or more individuals.
Where lone working is unavoidable then a mobile phone will be carried at all times; also the person undertaking the work will report in to the Project Coordinator or other

agreed responsible person as appropriate, when starting work and when completing work on each specific day.

- ***Weil's Disease***

Risk of contracting Weil's desease (Leptospirosis).
Avoid standing or running water where rats may be active. Wash hands before handling food or eating.

Annex 2: Formal Agreement for Metal Detectorists

www.battlefieldstrust.com

FORMAL AGREEMENT FOR METAL DETECTORISTS WORKING ON BATTLEFIELD SURVEYS WITH THE BATTLEFIELDS TRUST

TO BE COMPLETED BEFORE STARTING WORK ON SITE

BATTLEFIELD NAME: ……

I agree, when working on the above survey, to abide by the principles and conditions set out in the Trust's **POLICY FOR METAL DETECTING ON BATTLEFIELD SITES**

I agree to waive all rights of ownership to all finds so that these may be incorporated into the site archive.

I also agree to abide by section 81 of the Treasure Act (1996) Code of Practice[1] and, as such, I hereby waive all rights to rewards for objects discovered that could otherwise be payable under the Treasure Act 1996.

I, (Name in block capitals)……
have read and understood the above agreement and will abide by its conditions.

Signed:
Detectorist:……..……..……..……Date:
…../…../…..

Signed:
On behalf of The Battlefields Trust.……..……..……Date:
…../…../…..

[1] Section 81 of the Treasure Act Code of practice:
"Rewards will not be payable when the find is made by an archaeologist or anyone engaged on an archaeological excavation. In cases of uncertainty archaeologists are recommended to require any individuals for whom they are responsible, or to whom they have given, or for whom they have sought, permission to search, to sign a statement waiving their right to a reward. If there is doubt as to whether the finder was an archaeologist (or a person engaged on an archaeological excavation or investigation), the Treasure Valuation Committee shall decide". Treasure Act 1996. Code of practice (Revised) (England and Wales, DCMS, London (2002).

Annex 3: METAL DETECTING SURVEY: FIELD/DAY RECORD SHEET

Battlefield: ……. **Fieldwork Date:**…….…. **Supervised by:** …….

Field number ……

Detectorist name	GPS number	Detector make, model and coil type	Non ferrous junk total
STATIC GPS UNIT			

Weather conditions	
Soil moisture	
Ground conditions (rough, level etc)	
Crop conditions (type, height, thickness etc)	
Other significant field conditions	
Signal quality	
Other issues	

ADD SKETCH MAP FOR FIELD
Give accurate location of Static GPS unit

Appendix VII: Guidance on the processing and storage of metal artefacts recovered in battlefield survey

Handling of finds in the field

Cleaning in the field, such as finger rubbing, is common practice by detectorists and is difficult to avoid when large numbers of artifacts are being rapidly assessed to determine whether they should be recorded or discarded. However such treatment should be avoided as far as practicable. It is better to de-accession objects at a later screening phase than risk potential damage to a delicate find.

Processing and storage of metal finds[339]

While it is not generally considered good practice for excavated material, all metalwork from battlefield metal detecting survey will normally be been wet cleaned and air dried prior to recording and storage. This is essential for the efficient and effective processing and analysis of the large numbers of metal finds recovered during most battlefield surveys. *However, potentially significant ferrous artefacts should not be wet cleaned as this is likely to promote increased decay.* Unless exceptional decay has set in, as with the artefacts from the Wareham siege site, lead bullets should be cleaned by gently brushing with a soft toothbrush in water to ensure the whole of the surface, including all holes and indentations, are clear of soil. In addition if impact deposits, such as embedded grains from impact on a masonry surface, appear to be present then these deposits should be assessed prior to cleaning.

On initial processing, all ferrous finds should be extracted for separate storage. Material which is obviously modern should be discarded and the remainder then input into the database. These should then be prioritised for analysis, ensuring as far as possible that recording is undertaken before deterioration sets in, especially with ferrous artefacts.

Collections made by metal detectorist, particularly lead bullets, are often stored together in one or more containers with no subsidiary packing, as for example the box of more than 2000 bullets from Ballymore, now in the National Museum of Ireland. Even substantial collections of bullets from major excavations may be stored in bulk, as with those from the Vasa, which are held loosely in boxes of 100 bullets each and not individually numbered. Ideally the bullets in all collections should be individually bagged and numbered, whether or not originally individually recorded on site, as it enables analysis of each to be attributed to allow future re-assessment.

[339] This guidance has been prepared in consultation with Rob Janaway of Bradford University and is presented here as applied by the Battlefields Trust in the Edgehill Survey (2004-7) and the Bosworth Survey (2005-8).

Figure 123: Finds are dried in plastic seed tray compartments, each with its Tyvek label. They are then stored in individual bags with a foam support and Tyvek label

Figure 124: Perforated find bag partially labelled plus Tyvek label and foam support

Each find, when fully dry, is stored in a sealable polythene bag with white write-on strips. For most survey finds a 50*60mm bag is adequate. These are pierced towards the top to enable air circulation, and a 3mm thick square of plastozote foam added to provide protection and to enable the bags to be stored standing upright. For lead bullets this is particaurly important as in all other situations abrasion occurs which can remove the important surface evidence of manufacture and use which is often held within the corrosion deposits. The white write-on strips are marked with Staedtler Lumocolor permanent Art Nr 313-5 black pens 0.4mm. Tyvek labels have been placed in each bag and marked with the find number, date, finder and GPS waymark number, using Sakura (XSDK005#49) 0.20mm pen. The individual finds are not normally marked unless they are to be removed for display. The bags are the stored in sealed polyethylene boxes (e.g.: Stewart box 1781 clear: 13 litre) in order by find number in rows separated with corrugated plastic dividers and with a second level of bullets similarly organised in a tray with dividers, again of stapled corrugated plastic. Silica gel in a polyester or nylon netting bag or in a large polythene sealable bag with numerous small perforations (ideally 1 litre of silica gel to a 13 litre box) is also placed in the box to reduce moisture levels, and a humidity indicator strip placed in a visible location at the front of the box to enable monitoring of moisture levels. Ideally the boxes should be as full as possible so the least amount of air is present and so enabling easier reduction of the moisture levels. With large assemblages the

finds are normally stored separately according to metal type, but the bullets are also stored separately from other lead artefacts because of the danger of damage to fragile artefacts by the heavy bullets.

Figure 125: bags in find number order in compartments made from corrugated plastic

Figure 126: Storage in Stewart Boxes with indicator strip to monitor humidity. On left adequate humidity level shown by fully blue strip. The box on the right was recently opened and so temporarily has increased humidity, indicated by pink colour at top of indicator strip

Appropriate Humidity levels

Iron	Below 15% Relative Humidity
Copper alloys	Below 35% Relative Humidity
Lead	Can be stored at 55% RH, but preferably below 35% RH

Discard policy

It would appear that in most circumstances in England, a large proportion of this ferrous material can then be discarded as a large proportion is likely to be of post battle date and of little or no significance. Only if a specific research objective has been identified for the material, such as an assessment of the rates of decay taking part in different areas of the battlefield, is it likely that this material will need to be retained. Unless such discard takes place then the battlefield survey archive will be swamped by a large volume largely valueless ferrous material that will be expensive for museums to conserve in the long term.

Photography of metal detecting finds for record and for publication

Photography is now considered the normal and appropriate form of graphic record for cataloguing and archive purposes, as well as for publication of most metal artefacts recovered in battlefield survey in the UK. Digital imaging has been applied in both the Bosworth and the Edgehill surveys by the Battlefields Trust, in consultation with the Portable Antiquities Scheme, and by GUARD in its Culloden and other battlefield surveys.[340] It is also the normal practice in battlefield investigation in the USA, as for example applied by the National Parks Service. It is also accepted as appropriate for forensic reporting to the Crown Court in the UK.[341] The use of drawing for the recording of metal finds, although still required by some planning archaeologists in England, is now viewed as an impractical, costly and unnecessary anachronism. Only in exceptional circumstances, where it is the only way to effectively convey specific essential detail, is drawing considered either necessary or justified.

The use of scanning of artefacts, rather than high resolution digital photography, is recommended by some Portable Antiquities Project officers for finds recovered in metal detecting survey. It was therefore the method selected for the recording of the finds from the Edgehill survey. While it has proved a quick and easy method to gain a basic image for record purposes of many of the smaller and thinner artefacts, such as coins or buckles, it has not proved ideal. It is thus not recommended here, because of the significant limitations of resolution and quality, not least with thicker objects such as bullets.

In any collection a sample of bullets should be photographed to provide a detailed record of all the types of features recorded in the analysis. At least until the point when adequate reference collections are available, this will provide future researchers with data that they can use to correlate analysis by different persons. A standard metric photographic scale should be included on all images, printed on paper from a file downloaded from:
http://www.vendian.org/mncharity/dir3/paper_rulers/

Archiving

A collection should finally be assessed by a conservation specialist to determine what finds, if any, require basic conservation prior to deposition in a museum archive.

[340] Information from Dr Tony Pollard, University of Glasgow
[341] Information from Rob Janaway, University of Bradford

Appendix VIII: Working with lead: Health and Safety considerations

The handling of lead finds from metal detecting in general raises only minimal concerns.[342] However, the processing and recording of large quantities of lead bullets could represent a potential risk, and mitigating measures should be taken.[343] The risks arise from contact with the lead material itself, and particularly from corrosion products, such as lead oxide or carbonate, that may have formed on the objects while in the ground or during storage. The present advice is relevant to those working with material over a few days to a few weeks, rather than more prolonged exposure and to situations where minor cleaning (dusting and light brush work) is undertaken. More information about working with lead is covered by the **Control of Lead at Work Regulations 2002**.[344]

Risk assessment should be undertaken in advance of carrying out any recording of lead artefacts. The guidance provided here relates primarily to finds recording work. However, given that the number of bullets likely to be collected in a battlefield survey over an extended period may reach the thousands, the issue should be included in the risk assessment for archaeological metal detecting surveys of battlefields. Advice as to the potential health threats from lead should also be given to detectorists who are collecting lead bullets. As most finds provided by metal detectorist to the Portable Antiquities Scheme for recording are returned to those detectorists, and as ownership of artefacts recovered by metal detecting normally remains with the landowner, who may wish to retain the artefacts, after recording the finds should be returned together with clear advice as to the health and safety risks.

Threats and mitigation

Bullets recovered from archaeological contexts typically have highly oxidised surfaces. This lead oxide has often been subject to mechanical damage in the ground, thus the oxide can become mobile, either as dust when the bullets are dry or as a solution when the bullets are wet. Where held in private or even museum collections, especially if the bullets have been stored in bulk without packing or separate bagging, mechanical damage typically occurs and lead oxide dust builds up, often being found loose in the bottom of storage containers, while the bullets themselves have a coating of dust. Particular care must be taken in handling the artefacts when such dust is present in quantity.

[342] The Portable Antiquities Project advises the use of gloves when handling lead objects: see http://www.finds.org.uk/conservation/note1.php

[343] This guidance draws upon work conducted by the author for English Heritage/University of Leeds as part of the Fields of Conflict Project (2005-2008), and incorporates information collated by Jim Williams, English Heritage Archaeological Science Advisor for the East Midlands Region, in particular, advice provided by Neil Craig, HM Principal Inspector of Health and Safety, Northamptonshire and Rutland.

[344] http://www.opsi.gov.uk/si/si2002/20022676.htm

Figure 127: Lead dust in the boxes where bullets from the Vasa, an early 17th century wreck in Stockholm, have been carefully stored in controlled conditions but not separately bagged, showing the health and safety threat posed by lead oxide dust

The first action should be to minimise the potential for the creation of mobile particles of lead oxide by ensuring that all new finds of bullets are individually bagged in re-sealable bags, lightly perforated, together with plastozote foam, and boxed to minimise mechanical damage to the bullet surface. Ideally all existing collections not already stored in this way should be individually bagged when recording is undertaken.

Absorption

Absorption directly through the skin, and especially via cuts or abrasions, or via the mouth.

Mitigation:

- Good hygiene is essential. The material should be kept within a defined work area, which on completion of the work should be thoroughly cleaned. All surfaces where the bullets have been handled and all other equipment used such as scales, callipers, pens etc should be wiped down carefully afterwards, to remove all lead oxide as dust or in solution.
- Whenever handling or washing bullets, to minimise lead absorption through the hands, chemical resistant gloves should be worn (eg: nitrile powder free disposable gloves).
- Food should not be kept in the same area as the objects are being handled and no smoking, eating or drinking should take place in the area where the work is being undertaken. Hands should always be washed before eating and drinking.
- To prevent contamination of areas outside where the material is being handled, protective gloves, masks, clothing equipment etc should be stored very close to the work area and remain there when the operative leaves the work area.

If large quantities of dust are present:

- To prevent contamination of clothing by lead dusts, individuals should wear disposable coveralls.

Inhalation

Breathing in the dust is a significant threat if large quantities of dust are present. Particles above 15 microns will rapidly settle as dust; those from 15 – 5 microns will remain in the air sufficiently to get into nose and mouth etc, but will be rapidly

expelled with sneezing and transported with mucous; those of 4 microns and below will generally reach the lungs. It has not been established what range of particles are typically present in the lead oxide dust from bullets, but a precautionary approach should be taken.

Mitigation:

- A particulate respirator conforming to a minimum standard of EN149 FFP1 should be used when handling bullets where lead oxide dust is visible, and especially where dealing with large collections of bullets which had been stored in bulk and where quantities of loose dust is present in the storage containers. (The 3M 9322 is an example of a disposable respirator, meeting the higher requirements of EN149:2001, category FFP2, which has been found to be a comfortable item to use in bullet recording work).
- Where large quantities of dust are produced, researchers should carry out this work using a dust extraction system.

If reasonable precautions are taken then ill effects should not occur from working with or handling lead bullets. It is unlikely that people undertaking recording of such artefacts will exceed greater than half of the occupational exposure limit for concentration of lead in the atmosphere of 15 mg/m3 - so medical surveillance in the form of tests of blood-lead concentrations are not required. However as lead progressively accumulates in the body it may be wise if, in exceptional circumstances, someone is working over an extended period with thousands of bullets and where large quantities of oxide dust is present, for them to have periodic blood tests to check that it is not resulting in unacceptable exposure.

Environmental threats

Lead is a classified waste material. Thus in addition to health threat for those working with the artefacts, there could be environmental threats from the processing of large quantities of lead finds. Whereas the washing of the small numbers of bullets normally encountered in metal detecting may not represent a significant environmental threat, the processing in bulk of many hundreds of bullets from a field of conflict may yield significant quantities of lead oxide in solution, while recording of existing collections of bullets may yield a large quantity of lead oxide as dust.

Mitigation:

- The solution or dust should be disposed of responsibly. Large quantities of dust or solution from large quantities of bullets should not be binned, poured down the drain or onto the ground to soak away. Advice should be sought from the relevant environmental health officer about appropriate disposal.

Appendix XI: Proposal for archaeological survey at Morton Corbet Castle, Shropshire

Background

The English Heritage guardianship monument of Moreton Corbett Castle was a royalist garrison 1643-1645. It fell 8th September 1644 to a rapid assault, but was soon back in royalist hands, being finally abandoned during 1645. Cursory examination of the site, as part of an informal survey of Civil War garrisons across the country, has revealed the existence of substantial numbers of bullet impact scars on the remaining standing walls of the castle and on the adjacent medieval church. In addition at least one possible gunport was identified.

Figure 128: Section of wall at Moreton Corbett showing bullet impact scars

Such bullet impact evidence has been recognised on a significant number of Civil War siege sites across England and Scotland, and we are gradually compiling a database of these sites. They include a number of other English Heritage, Cadw and Historic Scotland guardianship properties, such as Ashby de la Zouche, Raglan and Stirling Castles, as well as various medieval churches and country houses that were fortified or used as defensive or offensive positions during the war. It is to be expected that similar evidence also exists on early modern siege sites across Europe.

Figure 129: Detail of bullet impact scar at Moreton Corbett showing the distinctive central cup mark and a serried of radiating fractures. This particular scar is likely to be from a bullet of larger calibre than the typical 12 bore musket.

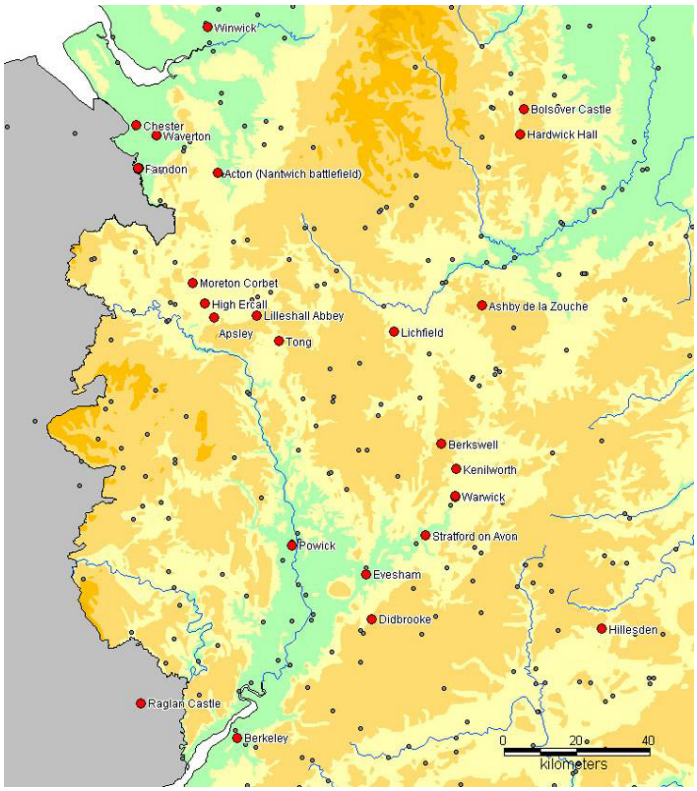

Figure 130: Sites in Midland England listed on the Battlefields Trust Fields of Conflict database as having bullet impact scars

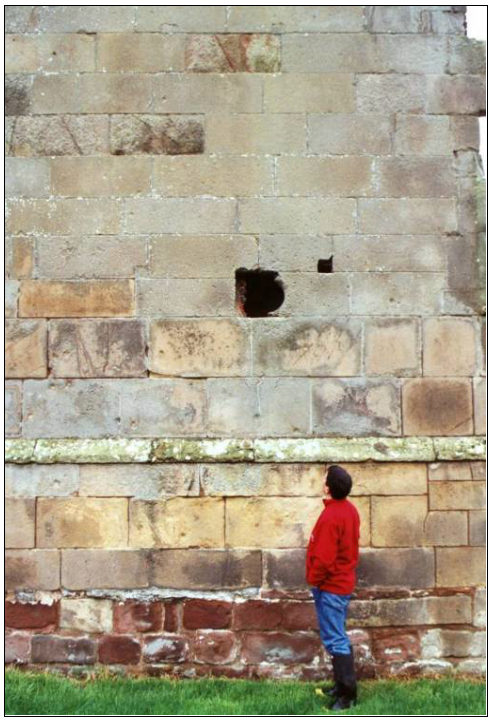

Figure 131: Possible gunport at Moreton Corbet, with adjacent bullet impact scars

We are not aware of any systematic archaeological research that has been undertaken on such evidence on any site in Britain, although comparable evidence from artillery roundshot has been studied, most notably at Chester.[345] It is therefore unclear at present whether such scars might yield significant information. This is worth knowing, not only for what such information might reveal, but because almost by definition such scars are likely be expunged by stonework repairs.

[345] Foard, in preparation-d; Ward, 1987

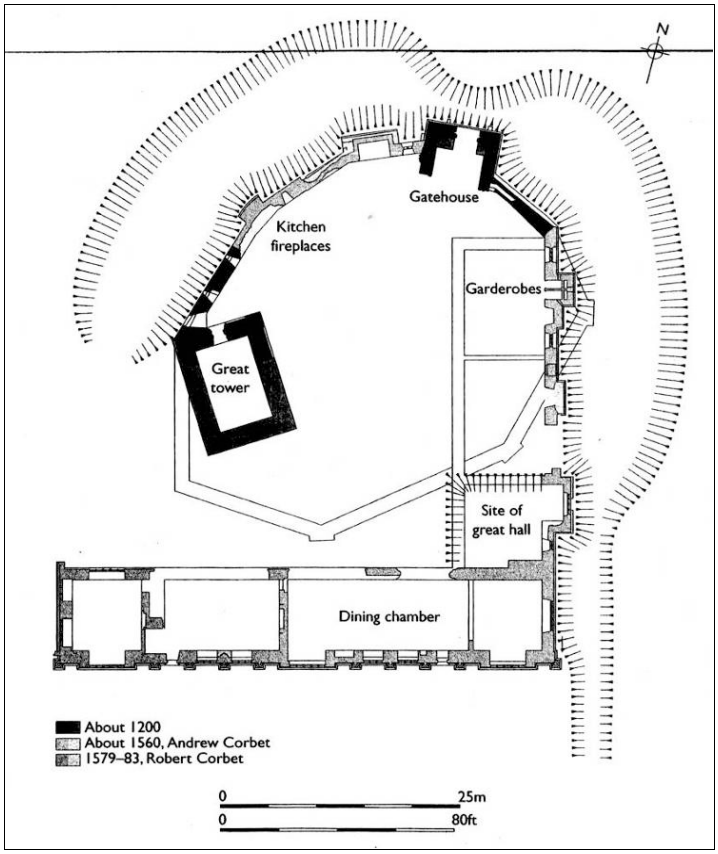

Figure 132: Plan of buildings from English Heritage report

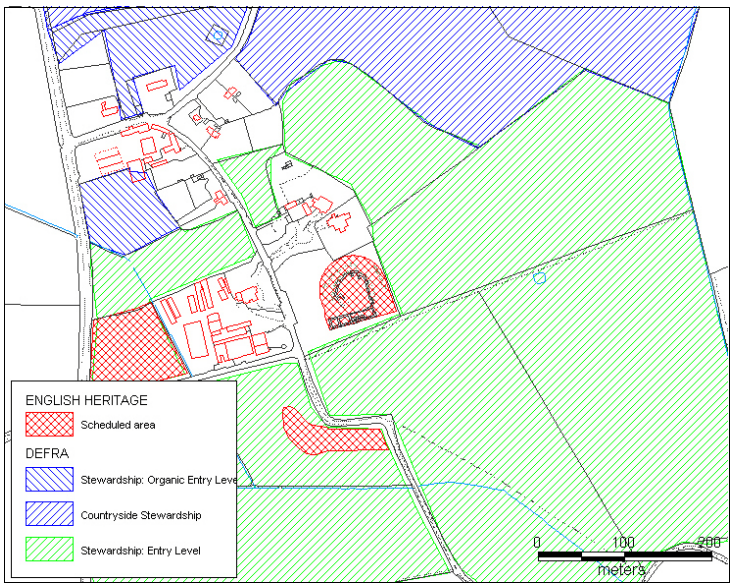

Figure 133: Scheduled and Stewardship areas

Objectives of the present proposal

To establish an effective recording method for bullet impact scars, and to establish whether historically useful information can be recovered from them which should influence future management.

Survey should extend to establishing whether impacted lead bullets survive in or on the land adjacent to the walls which show scars. If they do, then a sample of these

bullets should be recovered for analysis to seek correlation between the calibre / impact damage exhibited by the bullet and the size and character of the impact scars.

Methodology

Using records held by English Heritage and The National Archives, assessment will be made as to change to the fabric and to ground levels especially at the time the ruins were consolidated by the Office of Works.[346]

The University of Leeds's **Godfrey Bingley Collection**, a collection of photographs of English historical monuments taken between the 1880s and 1905, before Office of Works consolidation, will also be consulted.

Impact scars

A photographic record will be made of the lowest 4m or so of the outer face of the castle site. Copies of the images will be annotated with information on the bullet impact scars, each of which will be numbered; and on the petrology of the stone and its surface character including degree of weathering. This is because the character of stone type is expected to have a significant influence on the characteristics and survival of the bullet impact scars. In areas where there is significant impact evidence, accurately-positioned control markers will be fixed in two rows in a grid pattern at 3m intervals to the outer wall face, with accurate levelling of the lower markers. These will be used to enable to enable photo-rectification of a carefully taken second series of images which will be used to prepare an integrated digital drawing of the significant areas of walling showing bullet impact scars. Where excavation is to take place adjacent to an area of wall the impact scars will be individually photographed and detailed drawings will be prepared for each. For each of these scars depth measurements will be taken to allow drawing of two sections of the scar, each set at 90 degrees to the other.

[346] Guidance prepared by Susan Harrison of English Heritage, following such work at Helmsley Castle and other sites in Yorkshire will for the starting point for this assessment.

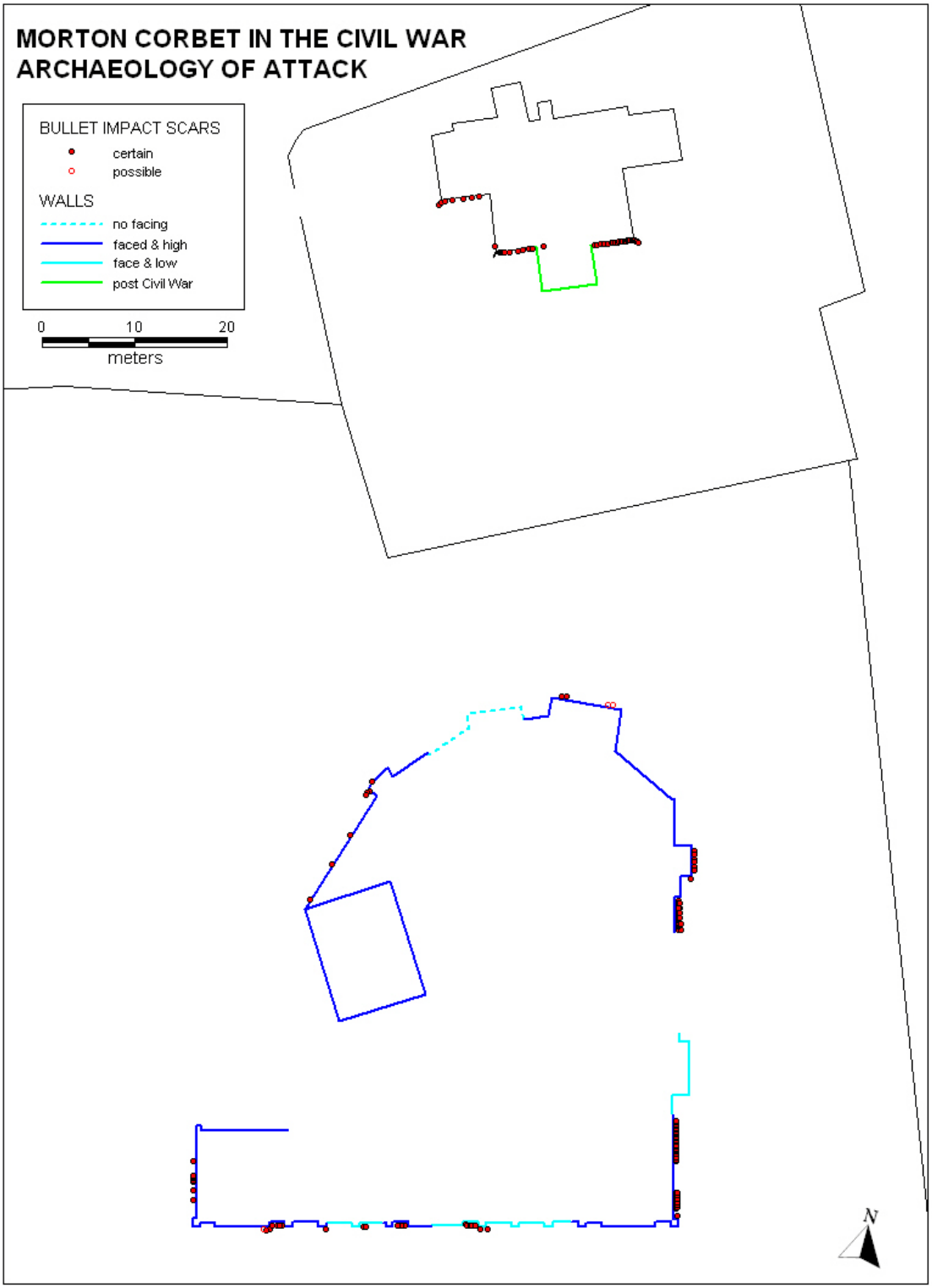

Figure 13422: Initial sketch mapping of bullet impact evidence as a guide to distribution of action and to enable selection of potential areas for detailed investigation

Survey by metal detector

Where a wall shows significant scars, the ground surface around the outer face, extending to at least 3m from the wall, will be systematically metal detected at 1.5m spaced transects. This will encompass most of the ground adjacent to the eastern and southern facades of the structure. As the objective is to locate lead bullets the detecting will be undertaken in discrimination mode, to exclude ferrous signals. The speed of survey will be logged using GPS tracking. Subject to the results of this initial survey three locations adjacent to sections of walling showing bullet impact scars will be intensively re-detecting in discrimination mode to identify all potentially significant artefacts, starting with area 6. All relevant signals will be pin-flagged. Based on the signal locations and character, and on the adjacent bullet impact scar distribution, a 2m*3m area will then be selected for initial excavation of the topsoil in area 6. This will then be re-detected in all metal mode to locate and pin-flag all artefacts that should be sought in the excavation.

Turf and topsoil will then be removed across the selected area in c. 5cm spits and all significant artefacts bagged and recorded by taped measurement in three dimensions. The area will then be re-detected, signals flagged and the next 5cm excavated, proceeding thus until the bottom of the topsoil is reached. This intensity of re-detecting is essential if the very small calibre hailshot bullets suggested as having been fired at the possible gunport are to be recovered. If the ground has not been disturbed since the 1640s then it is likely that all the bullets will have migrated towards the bottom of the topsoil.

Subject to the results of this initial trenching, either two more separate areas of identical size will be examined in an identical way adjacent to impact scar concentrations. Alternatively a wider area will be opened up in the initial excavation area, to a maximum of 3m*6m.

All bullets and powder box caps will be retained for analysis. All other finds will normally be returned to the ground in the trench from which they were recovered, with that trench is backfilled, but a photographic record and measurements will first be made of those which might have some archaeological significance. Exceptional finds relevant to the understanding of the military action or to the earlier history of the site will be considered for retention.

All bullets will be cleaned by light brushing in water. All other significant artefacts will be cleaned with minimal brushing when dry. All finds will be individually bagged and stored in controlled conditions. Any bullets recovered will be analysed and a detailed report prepared following the principles defined for analysis of the Edgehill battlefield bullets.[347] The archive will be prepared for deposition in the English Heritage store at Atcham or such other appropriate archive as is required by English Heritage. If significant results are achieved then an article will be submitted for publication in a national journal such s Post Medieval Archaeology, or the Journal of Conflict Archaeology.

[347] Foard, in preparation-d

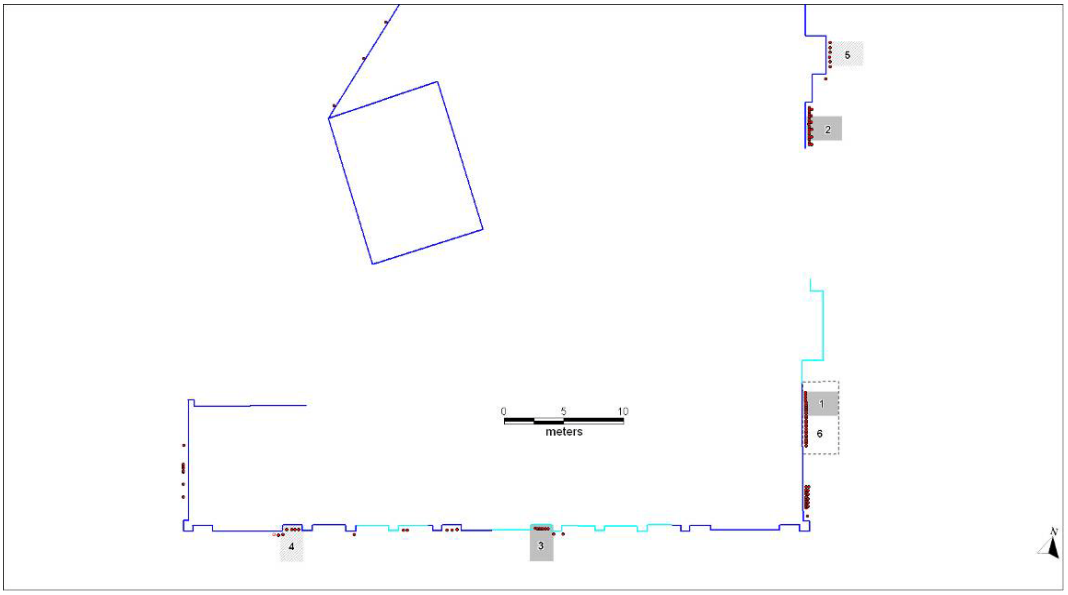

Figure 13523: Areas 1-3 are the initial intended areas, subject to the results of initial metal detecting survey, with 4-5 representing fall back locations. Area 6 represents alternative single area of investigation if initial work in area 1 is positive.

Outcomes

As this will be the first study ever undertaken to investigate bullet impact scars in relation to their associated bullet scatters, this enquiry is speculative. It is worth re-stating that its primary aim is to ascertain whether such evidence should in future be systematically catalogued and recorded, and so be available to assist management and repair. It is known that a number of churches not considered here also bear such evidence – yet whether it survives or has anything new to tell us is at present unknown.

What could the work tell us? In addition to improving understanding of the assault on Morton Corbet itself, more wide ranging outcomes should be achieved. These might include the ability to identify distinctive damage characteristics on bullets that have impacted stonework, such that it may allow the identification from bullet scatters the location of lost buildings which had been used as defensive positions on battle and siege sites. Drawing upon associated bullet firing experiments being undertaken in association wit the Defence Academy, analysis of the impact scars may also enable the trajectory and impact velocity of the bullets to be assessed, and may ultimately contribute to the understanding of the efficiency and effectiveness of 17th century small arms.

If the results are positive then a detailed proposal will be prepared for more extensive survey work with a view to developing Moreton Corbett as a type site for such investigation. This would comprise comprehensive recording of the bullet impact scars on both castle and church; wider investigation of the topsoil immediately adjacent to the walls; extensive metal detecting survey of the surrounding land (subject to agreement fro the landowners) to recover the wider pattern of bullet scatters from outgoing as well as incoming fire. There would also be linked experimental research, in collaboration with Cranfield University / The Defence Academy, extending the ongoing programme of experimental firing of both small arms and artillery which is essential to the effective interpretation of the archaeology of attack on site of the 17th century.[348]

[348] Allsop and Foard, forthcoming; Foard et al., in preparation.

Project team

Excavation adjacent to the structure and background research on the site will be the responsibility of Dr Paul Stamper. Metal detecting and bullet analysis will be the responsibility of Glenn Foard. Geological analysis and related assessment to understand the nature of the influence of geology on the bullet impact scars will be undertaken by Dr Peter Doyle. Recording of the upstanding evidence will be undertaken by all three.

Appendix X: Assessment of literature enhancement

The first stage of the Fields of Conflict project sought conflict sites primarily from published national surveys and from all Historic Environment Records. Following discussion at the Project Advisory Panel, this additional stage of work was designed to see whether interrogation of regional, county and local literature (e.g. county record series, local antiquarian writing, county archaeological and philosophical journals) would identify conflict sites that had not been identified in the first phase of research, and, if so, to what degree they would increase the number of references for actions already identified on the database. A second objective was an effort/benefit analysis, to see whether it would be useful to extend such work to the entire country.

Two areas made up of three historic counties were chosen for the trial: (Cumberland and Westmorland, and the West Riding of Yorkshire.

Cumberland and Westmorland

Method

The bibliographic search was undertaken initially online and then over seven days in the library of the University of Cambridge. An additional two days were spent tabulating the results and entering new conflict sites into the bibliographic and mapping databases.

The search began with listings of antiquarian and local histories found in Currie, C.R.J. and Lewis, C.P. *A Guide to English County Histories* (1997). This provided a fairly comprehensive survey of local histories from antiquarian work to the modern day, and useful descriptions of the scope and content of each source. These helped to identify those sources with the most potential for information on fields of conflict.

Next, online searches were made of COPAC academic and national libraries catalogue and the Royal Historical Society bibliography. The RHS bibliography proved particularly useful for finding article titles, which of course do not appear on traditional library searches. These web searches were accomplished using a variety of keywords likely to produce local history sources, including combining the county names with the following topics: history, civil war, battle, border, Scottish, rebellion, Jacobite, peel, castle, military, siege.

Once in the library, further useful books and articles were found in Hodgson, H.W. *Bibliography of the History and Topography of Cumberland and Westmorland* (1968), in a direct search of the index of the region's primary journal, *Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society* (1886-), and through fortuitous finds of other sources.

Once potential sources were located, they were then searched through their indexes, relevant chapter headings, or scanning historical overviews. As more familiarity was gained with the major sieges and battles, index searches for the names of specific sites could also be used. Some difficulties were encountered with

this method, as a number of sources, particularly antiquarian ones, were poorly indexed or not indexed at all. Others were well indexed, but primarily by site or name, rather than subject, so unless specific historical persons or sites of conflict were already known, references to battles could easily be missed. A number of county histories were organized by parish or township, with in-depth historical discussions of each site. However, given the length of time available and the number of parishes in each county, it was impossible to search each of these parish descriptions.

References to military action were recorded by page number, with the site, date, type of action, and a short description of the conflict being noted. Newly-found sources were then entered into the UK Fields of Conflict bibliographic database (in EndNote), and the references to conflicts transferred into the Notes field, taking the form: Site, Year, Action Type, Page Number. References with the short descriptions of the conflict appended were transferred to the Research Notes field, and a note was placed in the Label field to distinguish new sources. For sources that were already in the bibliographic database, but wherein new conflict references had been found, the new references were entered into the Notes and Research Notes fields together with a notation to distinguish new references.

The UK Fields of Conflict database was then updated with all the new actions, excluding the raids, which were entered onto a separate MapInfo table pending a decision on whether such data should be added to the database in the current phase of enhancement.

Discussion

As can be seen from the tabulated results, a large number of new military actions were added. Fifty-seven new actions were found, as were additional references to nine of the 18 previously known actions. Five known events for which no additional references were found are doubtful actions, or actions for which a number of possible locations have been proposed. The number of battles on the database has been doubled from four to eight. The most significant enhancement, however, is with regard to sieges, where 41 are now recorded as against the five previously listed. Of these, 26 were sieges of Carlisle that took place during the Middle Ages, the Civil War and the Jacobite rebellions. The remainder of the new actions are primarily sieges of smaller castles (e.g. Rose, Brough, Brougham, Scaleby, Liddel) or relatively minor skirmishes. In all there are now 30 skirmishes, as against 6 before. The vast majority of new actions found were medieval border raids (110 separate events, not tabulated here). It seems likely that there were substantially more taking place in this turbulent medieval border region.

Such local searching is relatively work-intensive and time-consuming, and due to erratic indexing, it is almost certain that some references to military actions will be missed. A comprehensive search, even for one county, would be a large task taking some weeks. References to actions were found in a wide variety of books and articles, so it is unwise to suppose that certain types of source (e.g. histories of major military conflicts, works on castles and fortified sites) should be prioritized. The high proportion of newly-found actions with three or fewer references (34 out of 57) demonstrates that most medieval and early-modern military actions are not sufficiently well known to be noted in every local history source, but their citation appears highly dependent on the particular subject or focus of the author.

Conclusion

The work has added a large number of fields of conflict to the database and has been valuable in identifying sieges, especially of the medieval period. However, the primary aim of this phase of work concerns battles, and in this respect the new search added only four sites. Of these, three occurred in a single reference and several may actually prove to have been no more than skirmishes. While the cost of

such a search can be justified for the identification of siege sites where important archaeological evidence is to be expected, it has not proven to be cost effective for the identification of battles.

Actions in Cumberland & Westmorland sorted by type and date, excluding raids; multiple dates simplified to earliest

Action Name	Action Type	Date	References		
			existing	new	total
Camlann	Battle	511	8	0	8
DEXASTAN	Battle	603	6	0	6
Solway Moss	Battle	1542	21	12	33
Naworth	Battle/skirmish	1570	0	1	1
Great Salkeld	Battle/skirmish	1644	0	3	3
Arthuret	Battle?	573	3	1	4
Dunmail Raise	Battle?	945	0	1	1
Burgh-by-Sands	Battle?	1031	0	1	1
Triermain Castle	Civil unrest	1340	0	1	1
Cartmel	Civil unrest	1536	0	1	1
Carlisle	Siege	1134	0	1	1
Carlisle	Siege	1135	1	5	6
Carlisle	Siege	1157	1	1	2
Liddel Strength	Siege	1174	0	3	3
Brough	Siege	1174	0	7	7
Appleby	Siege	1174	0	10	10
Carlisle	Siege	1174	0	11	11
Carlisle	Siege	1216	0	8	8
Cockermouth	Siege	1220	0	1	1
Carlisle	Siege	1292	0	1	1
Carlisle	Siege	1296	0	12	12
Linstock Castle	Siege	1314	0	1	1
Rose Castle	Siege	1315	0	3	3
Carlisle	Siege	1315	1	10	11
Rose Castle	Siege	1319	0	1	1
Carlisle	Siege	1337	0	6	6
Carlisle	Siege	1345	0	5	5
Liddel Strength	Siege	1346	0	5	5
Carlisle	Siege	1380	0	5	5
Carlisle	Siege	1385	0	6	6

Carlisle	Siege	1387	0	4	4
Cockermouth	Siege	1387	0	4	4
Brougham	Siege	1388	0	3	3
Carlisle	Siege	1461	0	5	5
Carlisle	Siege	1536	1	13	14
Carlisle	Siege	1596	0	10	10
Bewcastle	Siege	1640	0	1	1
Carlisle	Siege	1643	0	3	3
Carlisle	Siege	1644	2	11	13
Holm House, Longholm	Siege	1645	0	1	1
Scaleby Castle	Siege	1645	0	1	1
Brougham	Siege	1648	0	1	1
Greystoke	Siege	1648	0	2	2
Scaleby Castle	Siege	1648	0	3	3
Cockermouth	Siege	1648	0	4	4
Appleby	Siege	1648	0	5	5
Rose Castle	Siege	1648	0	5	5
Carlisle	Siege	1648	0	10	10
Carlisle	Siege	1745	0	12	12
Carlisle	Siege	1745	0	15	15
Carlisle	Siege/skirmish	1644	0	2	2
Carlisle	Skirmish	1296	0	1	1
Stainmore	Skirmish	1315	0	1	1
Douglas-Ing	Skirmish	1389	1	0	1
Carlisle	Skirmish	1406	0	2	2
Carlisle	Skirmish	1524	0	6	6
Kirkby Stephen	skirmish	1537	0	2	2
Wharton	Skirmish	1549	0	1	1
Geltbridge	Skirmish	1570	1	4	5
Carlisle	Skirmish	1645	0	1	1
Stainmore	Skirmish	1648	1	0	1
Whinfell Forest	Skirmish	1648	0	1	1
Penrith	Skirmish	1715	0	5	5
Thrimby Hill	Skirmish	1745	0	1	1
Appleside Hill, Langwathby Moor	Skirmish	1745	0	2	2
Kendal	Skirmish	1745	0	2	2
Stanwix bank	Skirmish	1745	0	2	2
Penrith	Skirmish	1745	0	3	3
Lowther Hall	Skirmish	1745	0	4	4

Clifton Moor	Skirmish	1745	10	16	26
Whitehaven	Skirmish	1778	1	0	1
Stainmore	Skirmish?	950	1	0	1
Alston Moor	Unclass	0	1	0	1
Barco Hill	Unclass	0	1	0	1
Anthorn	Unclass	0	3	0	3

Actions in Cumberland and Westmorland already on database/bibliography

Action Name	Action Type	Date	Number of References	Number of New References
Alston Moor	Unclass	?	1	0
Anthorn	Unclass	?	3	0
Arthuret	Battle?	573	3	1
Barco Hill	Unclass	?	1	0
Geltbridge	Skirmish	1570	1	4
Camlann	Battle	511	8	0
Carlisle	Siege	1135	1	5
Carlisle	Siege	1157	1	1
Carlisle	Siege	1315	1	10
Carlisle	Siege	1536	1	13
Carlisle	Siege	1644	2	11
Clifton Moor	Skirmish	1745	10	16
DEXASTAN	Battle	603	6	0
Douglas-Ing	Skirmish	1389	1	0
Solway Moss	Battle	1542	21	12
Stainmore	Skirmish?	950s	1	0
Stainmore	Skirmish	1648	1	0
Whitehaven	Skirmish	1778	1	0

New actions identified in Cumberland and Westmorland

Action Name	Action Type	Date	Number of References
Appleby	Siege	1174	10
Appleby	Siege	1648	5
Appleside Hill, Langwathby Moor	Skirmish	1745	2
Bewcastle	Siege	1640s	1
Brough	Siege	1174	7
Brougham	Siege	1388	3
Brougham	Siege	1648	1
Burgh-by-Sands	Battle	1031	1
Carlisle	Siege	1134	1
Carlisle	Siege	1174	11
Carlisle	Siege	1216	8
Carlisle	Siege	1292	1
Carlisle	Skirmish	1296	1
Carlisle	Siege	1296	12
Carlisle	Siege	1337	6
Carlisle	Siege	1345	5

Carlisle	Siege	1380	5
Carlisle	Siege	1385	6
Carlisle	Siege	1387	4
Carlisle	Skirmish	1406	2
Carlisle	Siege	1461	5
Carlisle	Skirmish	1524	6
Carlisle	Siege	1596	10
Carlisle	Siege	1643	3
Carlisle	Siege/skirmish	1644	2
Carlisle	Skirmish	1645	1
Carlisle	Siege	1648	10
Carlisle	Siege	Nov 1745	15
Carlisle	Siege	Dec 1745	12
Cartmel	Civil unrest	1536-37	1
Cockermouth	Siege	1220s	1
Cockermouth	Siege	1387	4
Cockermouth	Siege	1648	4
Dunmail Raise	Battle?	945	1
Great Salkeld	Battle/skirmish	1644	3
Greystoke	Siege	1648	2
Holm House, Longholm	Siege	1645	1
Kendal	Skirmish	1745	2
Kirkby Stephen	skirmish	1537	2
Liddel Strength	Siege	1174	3
Liddel Strength	Siege	1346	5
Linstock Castle	Siege	1314?	1
Lowther Hall	Skirmish	1745	4
Naworth	Battle/skirmish	1570	1
Penrith	Skirmish	1715	5
Penrith	Skirmish	1745	3
Rose Castle	Siege	1315	3
Rose Castle	Siege	1319	1
Rose Castle	Siege	1648	5
Scaleby Castle	Siege	1645	1
Scaleby Castle	Siege	1648	3
Stainmore	Skirmish	1315	1
Stanwix bank	Skirmish	1745	2
Thrimby Hill	Skirmish	1745	1
Triermain Castle	Civil unrest	1340s	1
Wharton	Skirmish	1549	1
Whinfell Forest	Skirmish	1648	1

Yorkshire: West Riding

The methodology was as used Cumberland & Westmoreland.

Discussion

Forty-seven actions had already been recorded in the database; 42 more were found. Nearly all of the added actions are sieges and minor skirmishes, and there are also eight recorded raids. Of the 42 new actions, over half took place in the English Civil War. Only one additional battle was found, and that is a probably spurious reference to a 5th-century encounter, referencing a 'tumulus near the castle' which supposedly marks the burial of the Saxon general Hengist, killed in battle by Aurelius Ambrosius, a British prince. Additional references were also found for all but nine of the previously known actions. All of the most well-known battles in the West Riding

(Adwalton Moor [37 references], Boroughbridge [29], Marston Moor [53], Towton [63], Wakefield [47]) were clearly well-referenced before the local history search was carried out, and were also mentioned in almost all of the new sources that were searched. However, as with Cumberland and Westmorland, almost all of the previously unknown actions were only referenced once or a few times. Thirty-five of the 42 new actions had only one or two references, and none had more than six. In both counties, whether or not these lesser-known military actions were mentioned seems to have been dependent on the particular focus or interests of the author.

With this said, Yorkshire search differed considerably from the exercise carried out in Cumberland and Westmorland. The West Riding was far more active in the Wars of the Roses and the Civil War, and also much less subject to the Scottish wars and raids which characterized so much of Cumbria's military history. When raids are not considered Yorkshire also features far more recorded military actions, perhaps because the county is larger and less remote than Cumbria, but also possibly because it is better-documented. There are many more local history and antiquarian works available for Yorkshire than for Cumberland and Westmorland, making a detailed bibliographic search time-consuming, and the completion of a comprehensive search nearly impossible.

As in Cumberland and Westmorland, the exercise was highly effective in revealing previously unknown sieges and skirmishes, and it has been particularly useful in clarifying the range and frequency of military actions that took place during the Civil War. However, as the chief aim of the exercise was to discover new battle sites would come to light, the pilot studies in both areas have shown that detailed local history searches are unlikely greatly to supplement the battlefield database.

Actions in Yorkshire WR

Name	Type	Date	References		
			Existing	New	Total
Ackworth	skirmish/battle	1491/2	0	2	2
Adwalton Moor	battle	1643	22	15	37
Allerton Mauleverer	raid?	1642	0	1	1
Bentham church	raid	1314	0	1	1
Blackstonedge	skirmish	1643	0	1	1
Bolton Bridge	Skirmish	?	?	0	?
Boroughbridge	battle	1322	18	11	29
Bradford	Siege/skirmish?	1642	1	11	12
Bradford	siege	1643	0	5	5
Bradford	siege	1644	1	3	4
Bradford	skirmish?	1644	0	2	2
Bramham Moor	battle	1408	9	8	17
Calverley	raid	14th century	0	1	1
Castleford	battle	947	4	0	4
Cawood	siege	1642/3	2	3	5
Cawood	siege	1644/46	0	2	2

Clapham	raid	1314	0	1	1
Conisbrough	battle	488	0	1	1
Ferrybridge	skirmish	1461	2	4	6
Ferrybridge	skirmish	1645	1	4	5
Halifax	Skirmish	1642?	0	2	2
Halifax	siege/skirmish	1642	0	1	1
Halifax	siege	1643	0	1	1
Hatfield Chase	battle	633	8	9	17
Heptonstall	skirmish	1643	0	2	2
Hollins House	skirmish/siege?	1643	0	1	1
Houndshill	Siege	1643	1	0	1
Howley Hall	siege/skirmish?	1643	2	5	7
Hunslet	skirmish/raid?	1644	0	4	4
Hunter Hill	skirmish	1644	0	2	2
Ingleton	raid	1314	0	1	1
Keighley	skirmish/raid?	1645	0	1	1
Knaresborough	siege	1317	0	2	2
Knaresborough	raid	1318	0	1	1
Knaresborough	siege	1318	0	1	1
Knaresborough	Siege	1644?	1	9	10
Leeds	siege	1643	4	12	16
Marston Moor	battle	1644	31	22	53
Monk Fryston	skirmish	1642	0	1	1
Pontefract	siege	1536	0	3	3
Pontefract	siege	1642/43	0	4	4
Pontefract	siege	1644-45	4	12	16
Pontefract	Surprise attack?	1648	0	6	6
Pontefract	siege	1648-49	2	10	12
Rawfolds	Civil unrest	1812	1	0	1
Ripon	raid	948	2	0	2
Ripon	raid	1322/23	0	2	2
Ripon	siege	1569	0	1	1
Ripon	skirmish	1643	1	0	1
River Idle	Battle	617	1	0	1
Rotherham	siege	1643	0	2	2
Sandal	siege	1317	0	1	1
Sandal	siege	1645	2	7	9
Seacroft	skirmish	1643	4	6	10
Selby	skirmish	1643	0	2	2

Selby	Siege/battle?	1644	6	6	12
Sheffield	siege/raid?	1266	0	1	1
Sheffield	siege	1643	0	4	4
Sheffield	siege	1644	3	8	11
Sherburn	skirmish	1642	1	2	3
Sherburn	skirmish	1645	3	5	8
Skipton	siege?	1130s	0	1	1
Skipton	raid	1318	0	1	1
Skipton	siege?	1464	0	1	1
Skipton	siege	1536	0	4	4
Skipton	siege	1642-45	2	11	13
Skipton Moor	No action	1405	1	0	1
Sowerby Bridge	skirmish	1644	0	1	1
Spofforth	siege?	15th c.	0	1	1
Stanley	Skirmish	1643	1	0	1
Stockbridge	Battle?	1141	1	0	1
Tadcaster	skirmish	1487	0	1	1
Tadcaster	siege	1642	0	6	6
Tadcaster	skirmish	1642	3	1	4
Tadcaster	siege	1643/4	1	1	2
Tankersley	skirmish?	1643	3	2	5
Thornhill	siege	1640s	1	2	3
Thornton	skirmish	1439/41	0	2	2
Thornton Hall	siege	1643	0	1	1
Thorpe Moor	skirmish	1645	0	1	1
Tickhill	siege	1193/94	1	3	4
Tickhill	siege	1322	0	1	1
Tickhill	siege	1644	2	3	5
Towton	battle	1461	46	17	63
Undercliffe	skirmish	1642	0	1	1
Wakefield	battle	1460	31	16	47
Wakefield	siege	1643	6	11	17
Wetherby	skirmish	1642	2	5	7
Winwaed	battle	655	7	8	15

Yorkshire WR actions already in the database

Ackworth	skirmish/battle	1491/2	0	2	2
Adwalton Moor	battle	1643	22	15	37
Blackstone Edge	skirmish	1643	0	1	1
Bolton Bridge	Skirmish	?	?	0	?

Boroughbridge	battle	1322	18	11	29
Bradford	Siege/skirmish?	1642	1	11	12
Bradford	siege	1644	1	3	4
Bramham Moor	battle	1408	9	8	17
Castleford	battle	947	4	0	4
Cawood	siege	1642/3	2	3	5
Ferrybridge	skirmish	1461	2	4	6
Ferrybridge	skirmish	1645	1	4	5
Hatfield Chase	battle	633	8	9	17
Houndshill	Siege	1643	1	0	1
Howley Hall	siege/skirmish?	1643	2	5	7
Knaresborough	Siege	1644?	1	9	10
Leeds	siege	1643	4	12	16
Marston Moor	battle	1644	31	22	53
Monk Fryston	skirmish	1642	0	1	1
Pontefract	siege	1644-45	4	12	16
Pontefract	siege	1648-49	2	10	12
Rawfolds	Civil unrest	1812	1	0	1
Ripon	raid	948	2	0	2
Ripon	skirmish	1643	1	0	1
River Idle	Battle	617	1	0	1
Sandal	siege	1645	2	7	9
Seacroft	skirmish	1643	4	6	10
Selby	Siege/battle?	1644	6	6	12
Sheffield	siege	1644	3	8	11
Sherburn	skirmish	1642	1	2	3
Sherburn	skirmish	1645	3	5	8
Skipton	siege	1536	0	4	4
Skipton	siege	1642-45	2	11	13
Skipton Moor	No action	1405	1	0	1
Stanley	Skirmish	1643	1	0	1
Stockbridge	Battle?	1141	1	0	1
Tadcaster	skirmish	1642	3	1	4
Tadcaster	siege	1643/4	1	1	2
Tankersley	skirmish?	1643	3	2	5
Thornhill	siege	1640s	1	2	3
Tickhill	siege	1193/94	1	3	4
Tickhill	siege	1644	2	3	5
Towton	battle	1461	46	17	63

Wakefield	battle	1460	31	16	47
Wakefield	siege	1643	6	11	17
Wetherby	skirmish	1642	2	5	7
Winwaed	battle	655	7	8	15

New Actions in Yorkshire WR

Allerton Mauleverer	raid?	1642	0	1	1
Bentham church	raid	1314	0	1	1
Bradford	siege	1643	0	5	5
Bradford	skirmish?	1644	0	2	2
Calverley	raid	14th c.	0	1	1
Cawood	siege	1644/46	0	2	2
Clapham	raid	1314	0	1	1
Conisbrough	battle	488	0	1	1
Halifax	Skirmish	1642?	0	2	2
Halifax	siege/skirmish	1642	0	1	1
Halifax	siege	1643	0	1	1
Heptonstall	skirmish	1643	0	2	2
Hollins House	skirmish/siege?	1643	0	1	1
Hunslet	skirmish/raid?	1644	0	4	4
Hunter Hill	skirmish	1644	0	2	2
Ingleton	raid	1314	0	1	1
Keighley	skirmish/raid?	1645	0	1	1
Knaresborough	siege	1317	0	2	2
Knaresborough	raid	1318	0	1	1
Knaresborough	siege	1318	0	1	1
Pontefract	siege	1536	0	3	3
Pontefract	siege	1642/43	0	4	4
Pontefract	Surprise attack?	1648	0	6	6
Ripon	raid	1322/23	0	2	2
Ripon	siege	1569	0	1	1
Rotherham	siege	1643	0	2	2
Sandal	siege	1317	0	1	1
Selby	skirmish	1643	0	2	2
Sheffield	siege/raid?	1266	0	1	1
Sheffield	siege	1643	0	4	4
Skipton	siege?	1130s	0	1	1
Skipton	raid	1318	0	1	1
Skipton	siege?	1464	0	1	1
Sowerby Bridge	skirmish	1644	0	1	1

Spofforth	siege?	15th c.	0	1	1
Tadcaster	skirmish	1487	0	1	1
Tadcaster	siege	1642	0	6	6
Thornton	skirmish	1439/41	0	2	2
Thornton Hall	siege	1643	0	1	1
Thorpe Moor	skirmish	1645	0	1	1
Tickhill	siege	1322	0	1	1
Undercliffe	skirmish	1642	0	1	1