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.[1]

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).[2]

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.

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

[2] 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.[3]
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 methodology and understanding develops. Hence, some battlefields will be worth revisiting at a later date.

[3] 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

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.[4]

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

[4] 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

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.[5]

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.[6] 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 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

[5] 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.
[6] Roberts & Wrathmell, 2000; Hall, 2001; Hall, forthcoming

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.[7]

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 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,[8] which were first reported by Leland. In the later 17th century Dugdale reported of the Battle of the Standard: ‘the Ground

[7] Fiorato et al., 2000, 1-14; Foard, in preparation-c
[8] ‘Pit’ is a medieval term for ‘grave’ that commonly appears in churchwardens’ accounts

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.' [9] 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.[10] 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'.[11]

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 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.[12] 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.

[9] Dugdale, 1675, 1, 62
[10] Gale, 1739
[11] Leadman, 1891, 24
[12] 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.

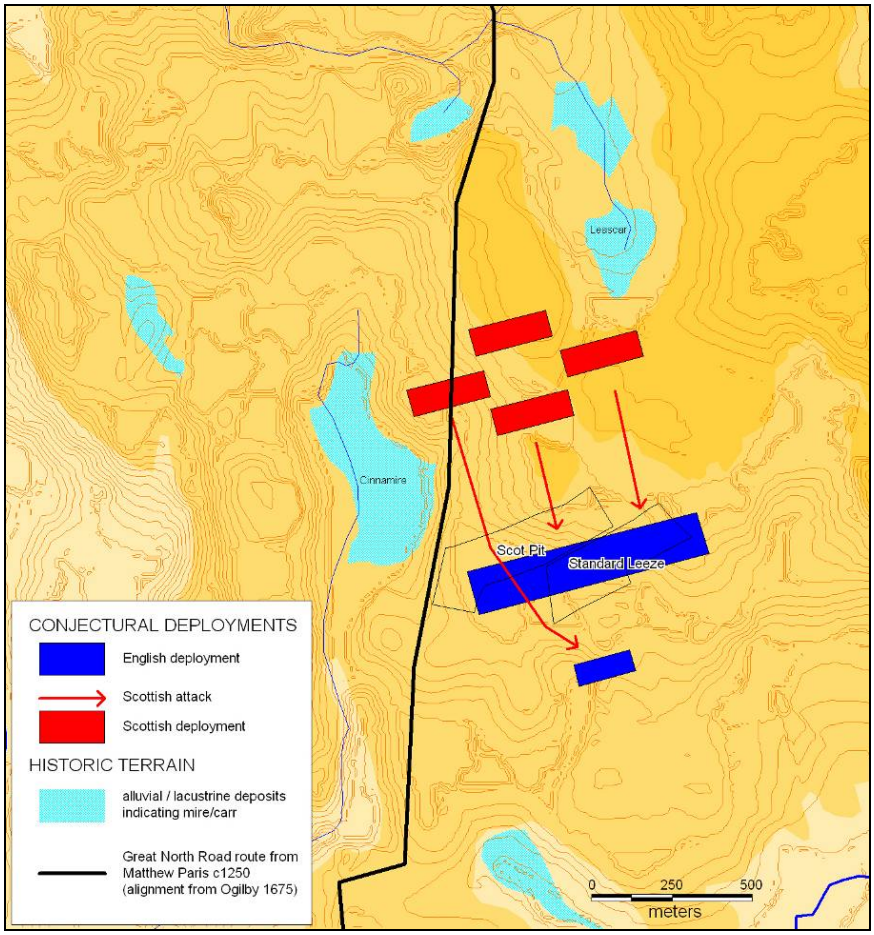

Figure 5: Northallerton: Reconstructed historic terrain and suggested deployments including relevant field names (10m contours from Ordnance Survey dtm)

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.[13]

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.

[13] Foard, in preparation-b

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.[14] 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.

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.[15] 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

[14] Foard, 2008a, chapter 2
[15] E.g.: various papers in Freeman and Pollard, 2001

greater.[16] 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,[17] 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:

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.[18] 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.

[16] Sutherland and Schmidt, 2003; Sutherland, 2000c
[17] These are common finds on some Roman military sites, but only seldom have they been found in connection with putative actions in the field
[18] Cubitt, 2006, in work undertaken under the supervision of David Starley of the Royal Armouries

The stability of specific buried metals largely depends on a combination of pH and redox.[19] 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.[20] 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 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.[21] 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

[19] Edwards, 1996
[20] Cronyn, 1990
[21] Pourbaix *et al*, 1966

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).

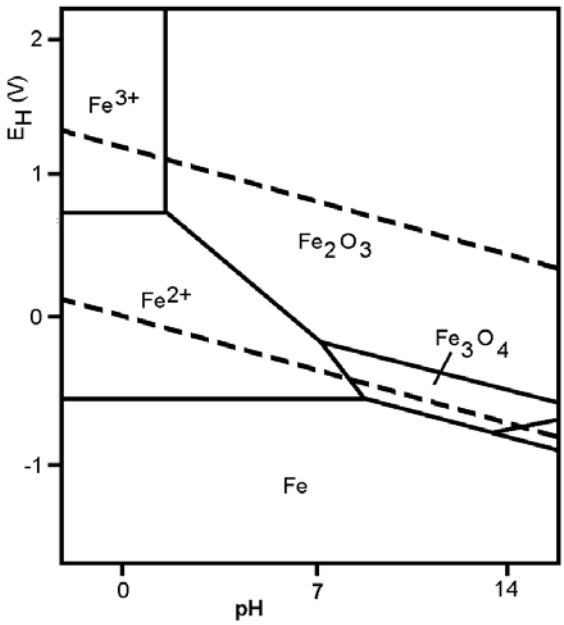

Figure 6: Simplified Pourbaix diagram (Potential –pH) for iron-water at 25°C. Fe, Fe_2O_3 and Fe_3O_4 are solids, while Fe^{2+} and Fe^{3+} are in solution[22]

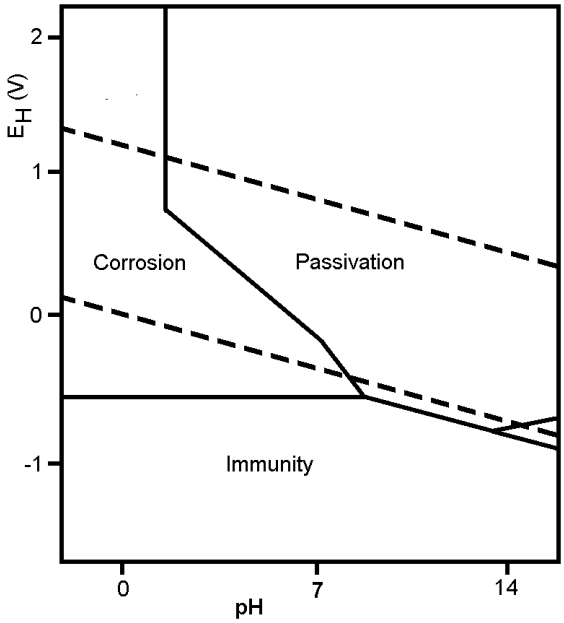

Figure 7: Theoretical conditions of corrosion, immunity and passivation by the formation of oxides. This diagram is valid only in the absence of substances with which iron can form soluble complexes and insoluble compounds

[22] Edwards, 1966

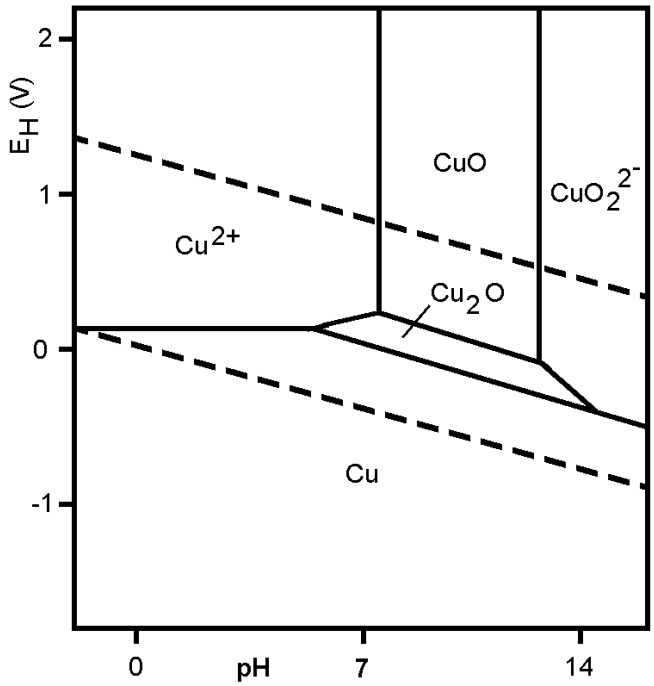

Figure 8: Simplified Pourbaix diagram (Potential –pH) for copper-water at 25^0C. (to left) Cu, Cu_2O and CuO are in solid phase, while Cu^{2+} and CuO^{2-} are in solution

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.

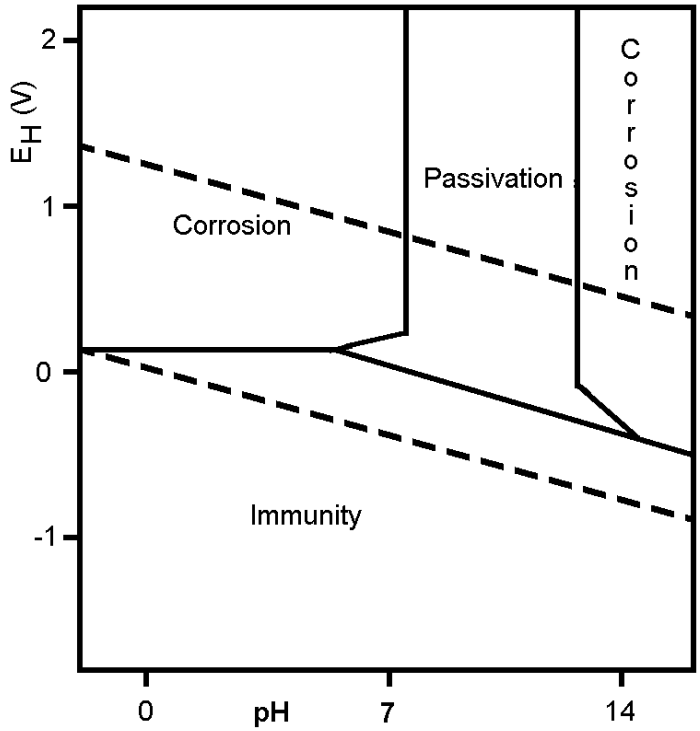

Figure 9: Comparison of the iron and copper diagrams demonstrate why copper alloy condition is often better on a wide range of burial sites. However, metal stability, especially the formation of passivation layers are severely affected by the presence of chloride

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.[23] 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.[24] 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.[25] 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.[26] 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.[27] 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 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

[23] Department of the Environment, 1990
[24] Brinch Madsen *et al*, 2004; Nord *et a*l, 2000
[25] Pollard et al., 2003; Pollard *et al*, 2006; Pollard et al., 2004; Pollard *et al*, 2006
[26] Brinch Madsen *et al*, 2004
[27] MAFF, 2000

highlights the importance of detailed GIS-linked soils data and potentially geochemical modelling for better understanding the preservation of artefact assemblages.[28] 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 land use survey of 1931-5.[29] 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.

[28] Wilson *et al*, 2006
[29] Stamp, 1931-1935

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.[30] 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 which is the dominant factor affecting the condition of most other artefacts.[31] 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

[30] 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.
[31] Information from Rob Janaway

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 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),[32] 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:

- 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

[32] Marston Moor enclosure award

- 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.

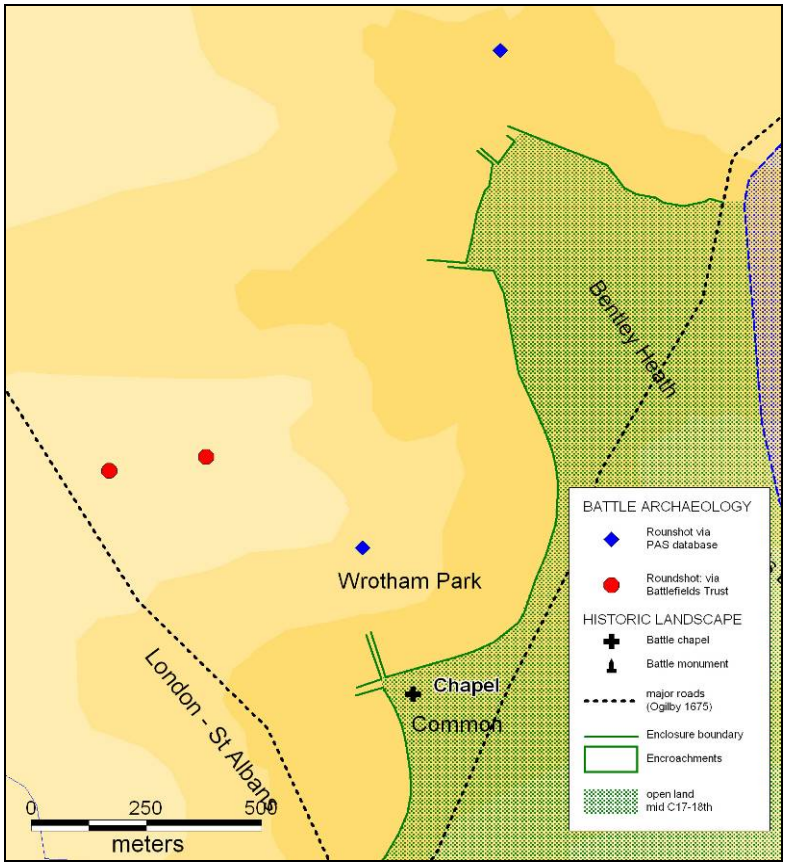

Figure 10: Barnet battle archaeology locations as reported to the Portable Antiquities Scheme and to the Battlefields Trust

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.[33] 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:

[33] 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.

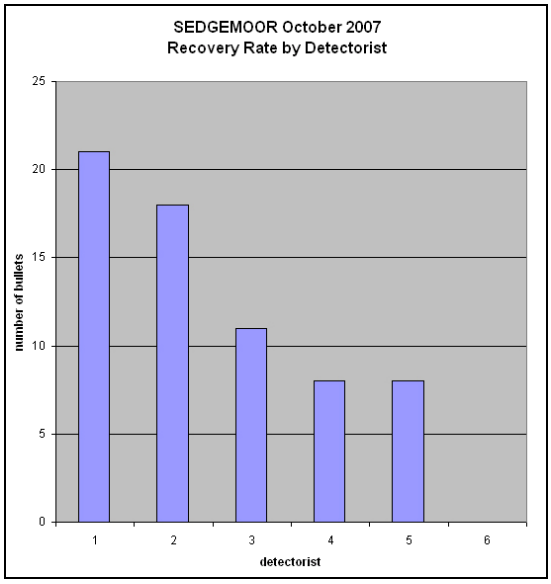

Figure 12: Sedgemoor 2008: comparison of recovery rates for lead bullets for each detectorist engaged in the survey, with one detectorist recovering none and at the other extreme one recovering 21 bullets

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.[34] 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.[35] It is known that topsoil tends to be considerably shallower on the tops of ridges,[36] 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.

[34] Foard, 2008a
[35] Foard, 1995, 20
[36] 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.[37]

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.[38] 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.[39] 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.[40]

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.[41] In 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.

---

[37] Sutherland, 2002
[38] Paper to the Fields of Conflict conference in Aland, Finland, 2002
[39] Burne, 1950
[40] Fiorato *et a*l, 2000
[41] English Heritage, 1995; Carpenter, 1987

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.[42] 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.[43]

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.

[42] Foard, 2008a; Foard, 1995
[43] Thordeman, 2001

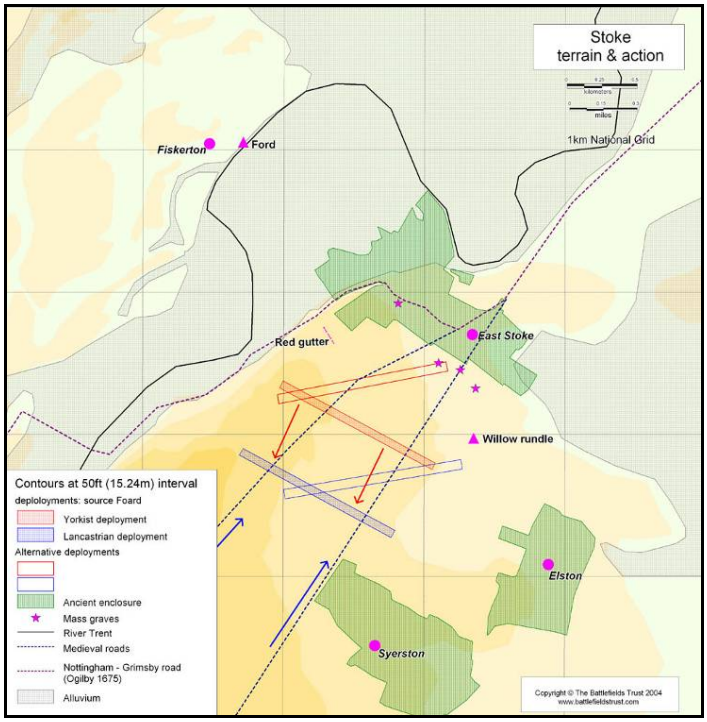

Figure 14: Stoke Field: location of mass graves

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.[44] A 15th-century

[44] Searle, 1980

description of the site of the chantry chapel at Shrewsbury states that the mass grave lay within the ditched enclosure where the chapel stands.[45] At Naseby there are reports of mass graves being ploughed or dug up within a few years of the battle.[46]

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.[47]

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.[48] 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.[49] 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.[50] 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.[51]

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 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.[52]

[45] National Army Museum, 1995c
[46] Foard, 1995
[47] Northumberland SMR
[48] Sutherland, 2000b
[49] Leadman, 1891
[50] Foard, 1995
[51] National Army Museum, 1995b; Leadman, 1891.
[52] Foard, 2008a

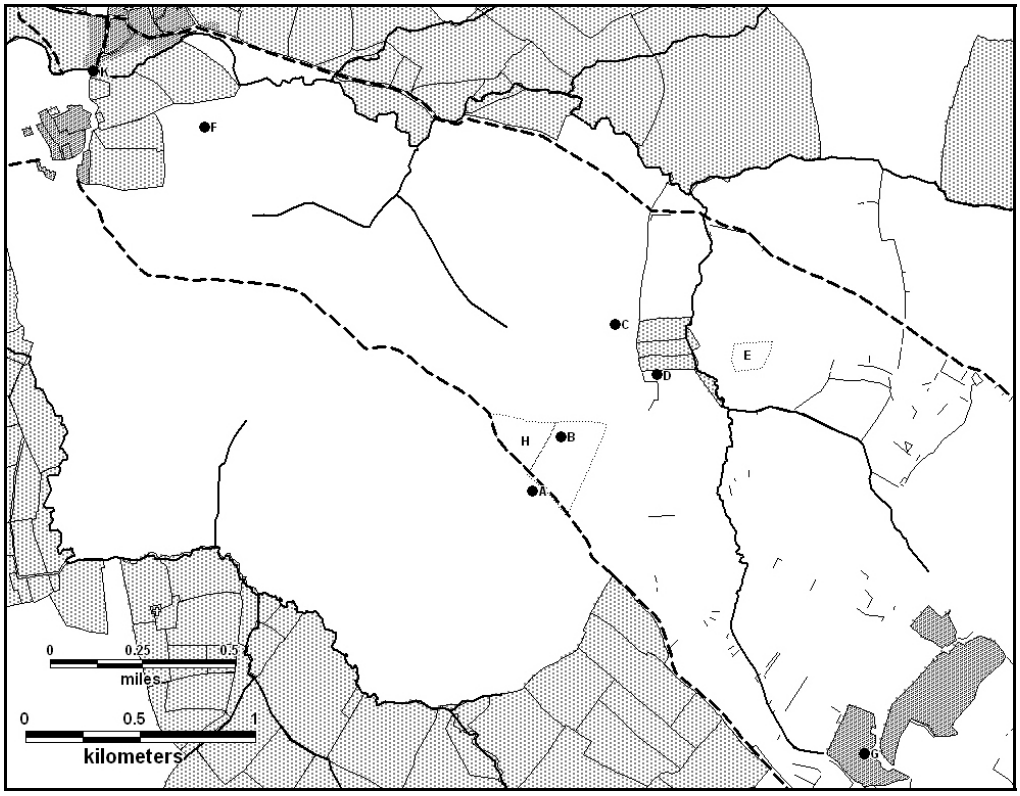

Figure 15: Edgehill: mass grave sites from antiquarian reports and historic maps are depicted with a black symbol; those identified from field names shown by a broken line polygon. K and F are close to the baggage train; the rest are associated with the main infantry action

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 perhaps not as secure as might at first appear.[53] 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.[54] 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.[55]

[53] Mason, 2006
[54] Nottinghamshire HER
[55] Sutherland, 2000a

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.[56] 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 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.[57]

---

[56] Thordeman, 2001

[57] 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.

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 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.