WALKING FIELDS IN SOUTH MUSKHAM AND ITS IMPLICATIONS FOR ROMANO-BRITISH CROPMARK-LANDSCAPES IN NOTTINGHAMSHIRE

by

DARYL GARTON
WITH CONTRIBUTIONS BY RUTH LEARY AND VICKI NAYLOR

INTRODUCTION

The Trent Valley has long been recognised as an important area for cropmark-landscapes. The area north of Newark is so prolific in cropmarks that it features in the seminal publication *A Matter of Time* in which the Royal Commission on Historical Monuments England (hereinafter RCHME) pointed to the wealth of archaeological cropmarks being damaged without record in the river valleys, principally through gravel extraction (RCHME 1960, 3). Since then, various investigative works have been undertaken (summarized below), the cropmarks have been plotted and analysed (Whimster 1989), suggestions have been made for avenues of further research (Whimster 1992), and a synthesis of relevant archaeological features and their geomorphological background has been prepared (Knight and Howard 1994). In 1992, part of this area (Fig 1) was designated an 'Area of Archaeological Importance' (hereafter AAI) in the Nottinghamshire County Council's Minerals Plan, prepared by Mike Bishop, County Archaeologist for Nottinghamshire. Given this recognition of the importance of the cropmarks north of Newark, it is perhaps surprising that little archaeological fieldwork has been undertaken on them (see p.23), and a welcome opportunity to improve upon this situation came with funds made available through the Environment Committee of Nottinghamshire County Council, allowing Trent & Peak Archaeological Trust (T&PAT) - now Trent & Peak Archaeological Unit - to undertake fieldwalking as a first stage in investigating the character of the cropmark-landscape. A full report, which includes artefact assessments field by field, is in the Sites & Monuments Record of Nottinghamshire County Council (hereafter SMR): this paper highlights some results from that work.

The fieldwalking programme was conducted intermittently during 1992-97, using volunteers under the supervision of T&PAT staff. This had two benefits: first, it made the project economical, especially as the volunteers helped with processing artefacts as well as participating in the fieldwalking; second, it provided an opportunity to co-ordinate the efforts of some amateurs within the County. It was the skill and commitment of the core volunteer team that allowed this project to reach a useful conclusion.

GEOLOGY AND SOILS

The underlying geology is mapped as predominantly Floodplain Terrace (river sands and gravels) dissected by alluvium-filled channels (Geological Survey, 1966 sheet 113: Fig 1). Whimster (1989, 80) describes this area as comprising a 'number of relatively large gravel islands [which] provide unusually good opportunities for cropmark development'. The darker stripes, of palaeochannels (infilled river-channels) trending north/south, and hollows filled with colluvium or deeper, siltier soils, can be identified on aerial photographs; those forming the most coherent pattern are mapped in Figs 2-4, 7, 8. Excluding locations on the heavier siltier soils, these soils weather to a light, sandy surface with numerous pebbles. As might be expected on the Floodplain Terrace, the ground is flattish (with a fall of 3m along the northern 2.1km limit of the study area) with slight undulations, the lower portions being alluviated areas and the darker stripes recorded on aerial photographs. In all bar two small areas of

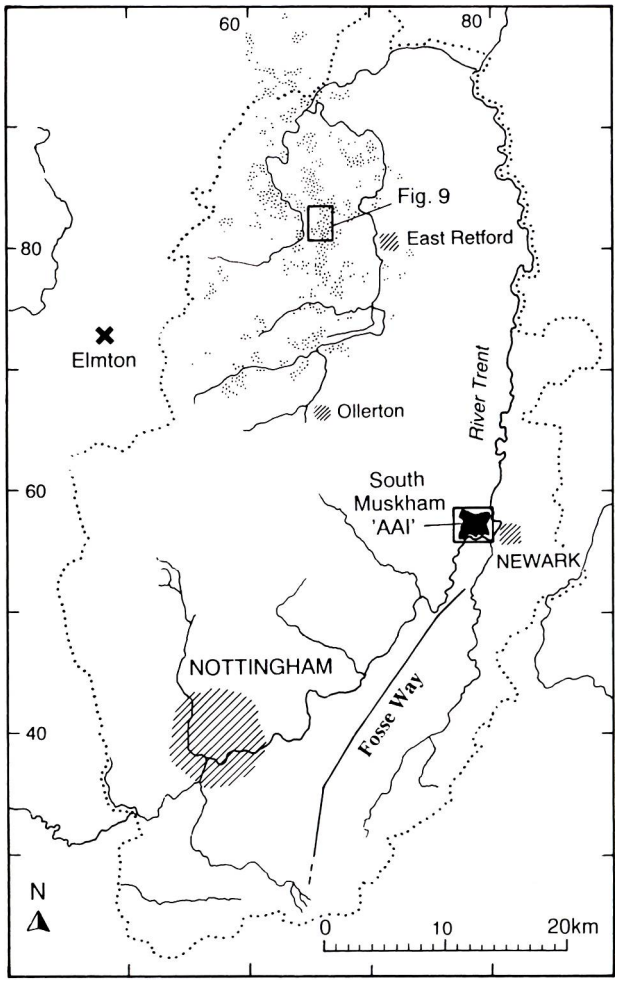


FIGURE 1: The South Muskham 'Area of Archaeological Importance' (AAI), as defined in the Nottinghamshire Minerals Local Plan, shown solid, and the locations of fieldwalking along the Fosse Way (line), and at Elmton (cross), as well as the extent of the cropmarks of brickwork-plan character (stippled), with the position of Fig. 9 outlined. The county boundary is marked by a dotted line.

alluvium adjacent to river channels (north of field 0087 and west of field 8648 in Fig 3), ridge-and-furrow cultivation is visible on aerial photographs throughout the area. The 4-digit field numbers used throughout this report are taken from the 1:2500 OS maps.

CROPMARKS

The cropmarks in this area were mostly discovered during the period 1945-59 (RCHME 1960, 9-11, 42; Whimster 1989, 22-23; 1992, 11-14); their regular appearance since then suggests that these features are being truncated by ploughing (Whimster 1989, 23). The cropmark plots used in this report are those made at 1:10,000 by the RCHME based on a series made at 1:2500 under the supervision of Rowan Whimster. These were checked against the T&PAT aerial photograph collection showing that the only significant omissions were: the probable palaeochannels and hollows (see above); a small portion of the cropmarks in field 0087 (which have been added to Figs 2-8 from a photograph in the National Monuments Record, hereafter NMR, SK7757-22); and a surface hollow running from the cropmark east of field 1300 (photograph NMR SK7956-14, 18; sketch plotted in Fig 3, where it is marked as F). Some of the cropmarks appear to be in the same positions as field boundaries shown on a map of 1835 (Sanderson 1835) so may not be of great antiquity (*e.g.* that marked A-B in Fig 6).

Whimster (1989, 80-2) has already described and interpreted the cropmarks in the AAI in some detail, so this will not be repeated here. In brief, they include double and single linear marks, perhaps representing trackways and ditched boundaries, with some of those boundaries continuing as pit alignments (*e.g.* in fields 1200 and 5500/5620 in Fig 8). There are clusters of rectilinear enclosures, some of which appear to relate to more extensive linear boundaries (*e.g.* in field 0873 in Fig 8). There are curvilinear enclosures, and smaller full and partial rings (*e.g.* in field 0080 in Fig 7). Some of the rings are double-ditched (*e.g.* in field 0044 in Fig 8). Whimster (1989, 80) has observed that there is a strong axial pattern among the linear cropmarks, running both parallel and at right-angles to the Trent. In an analysis of one of the cropmark complexes (in field 0080), Whimster comments that field investigation should make it possible to link the sequence of enclosures to some of the long axial boundaries (1992, 12-13).

PREVIOUS FIELDWORK IN THE LOCALITY

Prior to this survey, little fieldwork had been conducted within the AAI, though part of its boundary coincides with the edge of a quarry where Wheeler, Dean and Gorin recovered Romano-British pottery in 1967-8 (plotted in Fig 8 from Wheeler 1968).

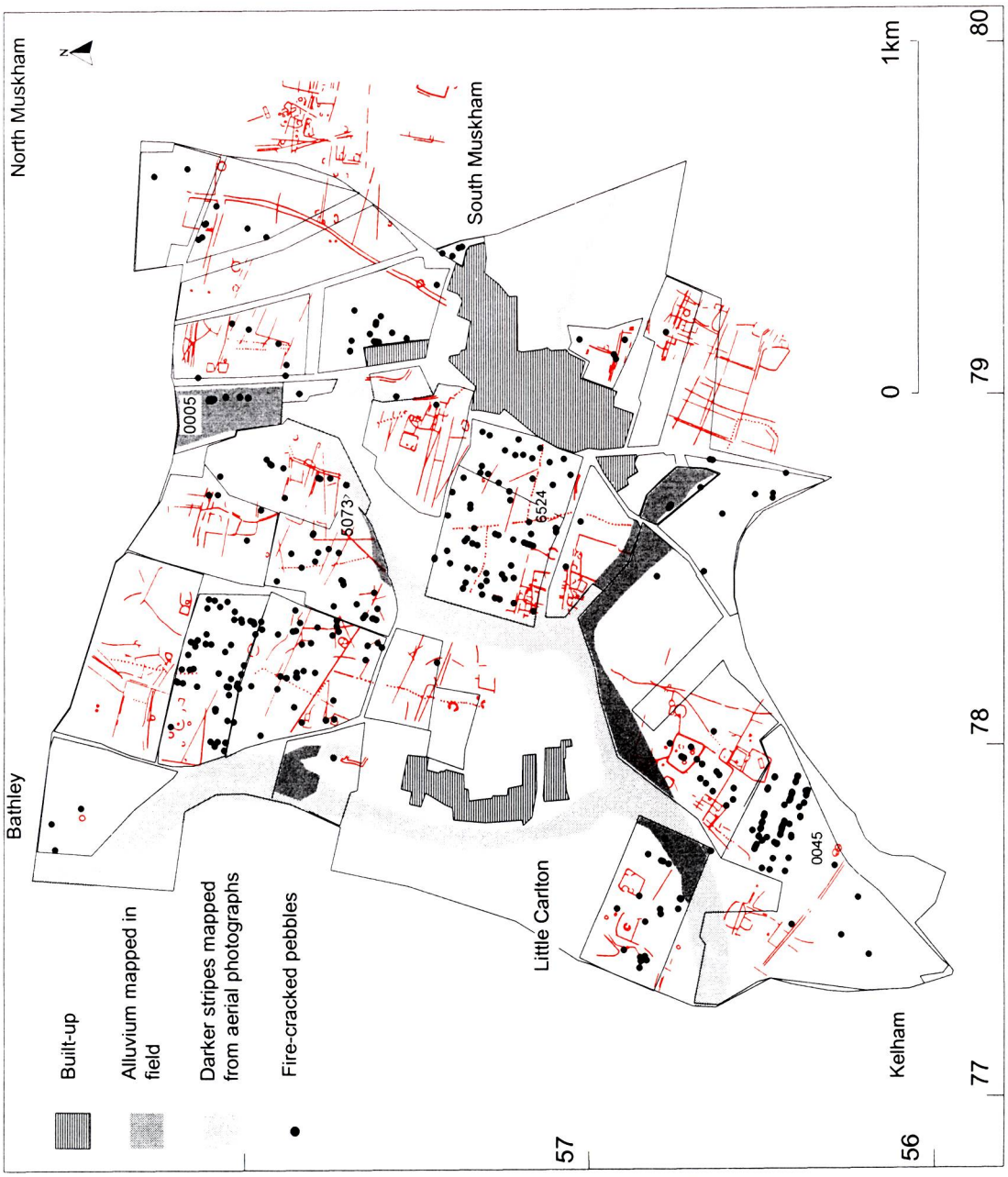


FIGURE 2: South Muskham AAI: distribution of fire-cracked pebbles plotted against cropmarks (red). Scale: 1:20,000. *Cropmark plot by RCHME, © Crown copyright, NMR.*

FIGURE 3: South Muskham AAI: distribution of medieval pottery plotted against cropmarks (red). Scale: 1:20,000. *Cropmark plot by RCHME, © Crown copyright, NMR.*

FIGURE 4: South Muskham AAI: distribution of flintwork plotted against cropmarks (red). Scale: 1:20,000.
Cropmark plot by RCHME, © Crown copyright. NMR

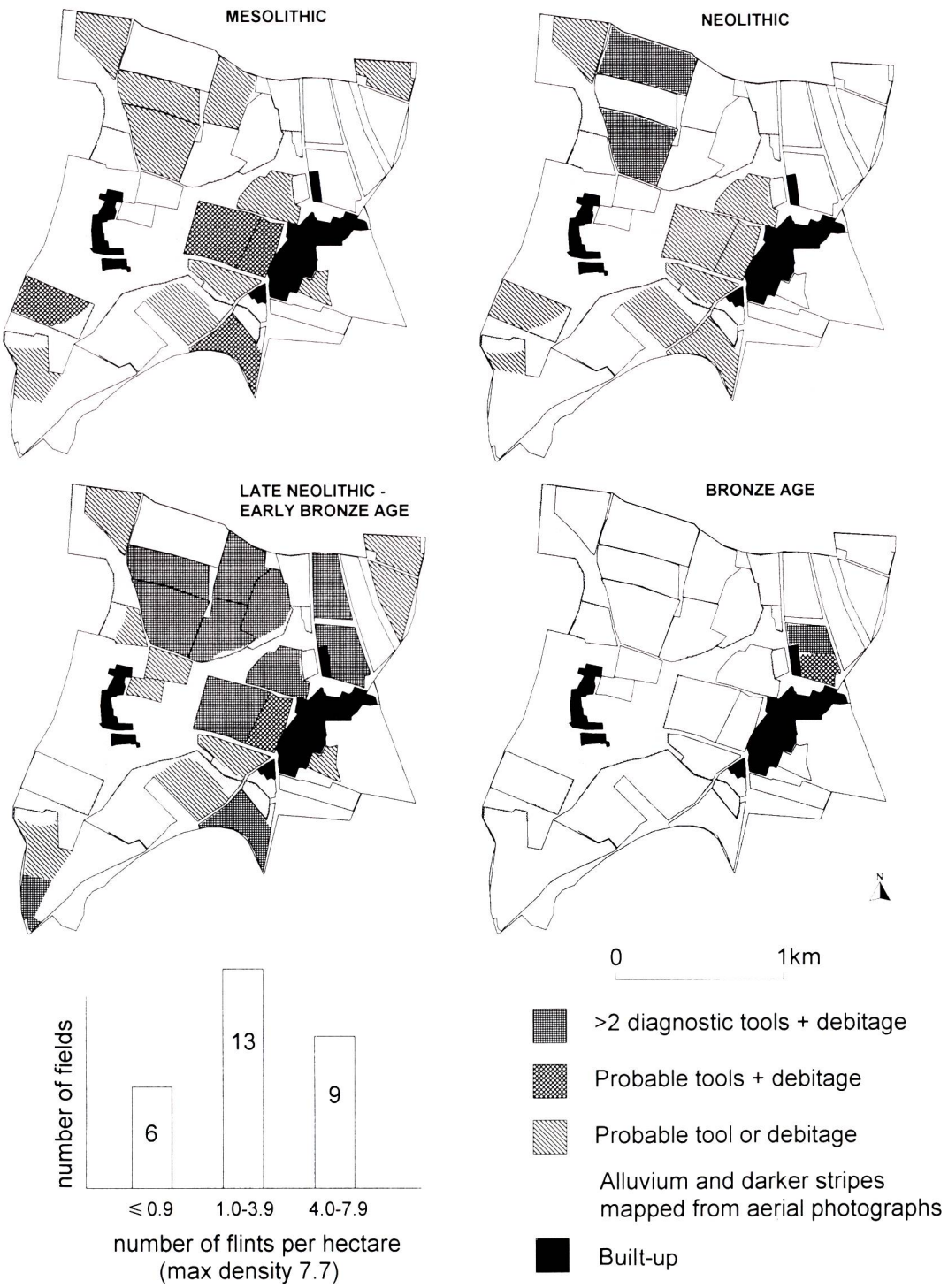


FIGURE 5: South Muskham AAI: assessment of flintwork by period. Scale 1: 40,000.

Unfortunately, that work involved salvage excavation of features observed after stripping of topsoil by the quarry. Hence it is likely that only the deepest features could be recorded, though these did include ditches not observed on aerial photographs, but in the limited time available even those could not all be sampled (Wheeler 1968, 32, 34). In addition a sherd of Anglo-Saxon stamped pottery came from these gravel workings (SMR 03128, locating it to the east of the investigations conducted by Wheeler).

In 1992, evaluation by Heritage Lincolnshire of cropmarks to the north and west of Little Carlton (mostly outside the AAI) included two trenches in field 0087, one through a cropmark and one along the eastern side of the field (unpublished report by T&PAT in SMR). Ditches containing Romano-British pottery were recovered in both of these trenches. In one of the evaluation trenches just outside the AAI, a virtually complete Anglo-Saxon vessel was recovered from a ditch-fill (Challis 1993). Fieldwalking in that field only (marked as 20 in Fig 8) did not produce any more Saxon artefacts, but Romano-British pottery was found at a density of 5 sherds per hectare.

Watching-briefs and small-scale excavations in response to development threats have been undertaken at three locations all by John Samuels Archaeological Consultants (unpublished reports in SMR). No archaeological remains were recorded within the AAI south-west of field 0087, nor in the Scheduled Ancient Monument which comprises the cropmarks plotted outside the AAI east of field 5500 in Fig 8 (though two circular Saxon loomweights had previously been recovered from this field surface - SMR 02995b). Positive archaeological results were obtained in trial excavations *c.* 1 km north of the AAI in North Muskham, where Iron Age pottery was recovered from some ditches, none of which were known as cropmarks.

A range of evaluation techniques was used to investigate the corridor of a pipeline mostly on the eastern bank of the River Trent between Newark and Kelham (Knight and Priest 1998). Excavation of two cropmark ditches, both on the alluvial margin of a cropmark complex close to the eastern river-bank, produced a series of recuts containing sherds attributable to the 1st to early 2nd centuries AD in the *upper* fills (Leary 1998, 32-4). The lack of later sherds was interpreted as indicating the origin of the ditches by the 1st century AD (Knight and Priest 1998, 30, 35). Fieldwalking of a 100m corridor some 1km in length produced a range of material from only one field, on the western river-bank where it lies adjacent to the south-western tip of the AAI (marked as 4 in Fig 8). This material includes Iron Age and Romano-British sherds together with flintwork (all at densities of one item per hectare) and medieval pottery (at 2.6 per ha). No cropmarks are known in this field, and, since the pipeline terminated south-east of field 0004, no further work has been conducted there.

An area of linear cropmarks, lying *c.* 1.5km to the north of the AAI, was evaluated by Northern Archaeological Associates in 2000 (unpublished report in SMR). Geophysics confirmed, but did not add substantially to, the cropmark pattern. Fieldwalking was not conducted. Romano-British, medieval and post-medieval pottery came from different cropmark ditches sampled by excavation.

RESEARCH OBJECTIVES

Fieldwalking can be used to address a limited set of research objectives, as the methodology is restricted to the recovery of durable artefacts present in the ploughsoil. The 1992-97 fieldwalking inspected a nominal 20% sample of the surface (p. 24), and the material on a ploughsoil surface is variously reckoned to be between 0.5-7.0% of that present in the ploughsoil at any one time (Ammerman 1985; Tingle 1987, 89; Clark and Schofield 1991, 94-100). Hence, a single fieldwalking, as reported here, will probably recover less than 1% of the artefacts in the ploughsoil, and scarce types of artefact are unlikely to be represented at all. Consequently, deductions must be based on the presence or absence of common, durable artefacts and tentative conclusions as to their date. Additional searches would be required for us to be convinced that the pattern recorded in each field is a reliable representation of the pattern existing in the ground.

It is also well known that the distribution of artefacts will be influenced by a host of non-archaeological factors (*e.g.* ploughing regimes and

the biases of individual fieldwalkers [Shennan 1985, 40-4]) as well as the myriad of factors that cannot be interpreted through fieldwalking evidence alone, such as a lack of artefacts due to function or date of activities represented by cropmarks, past farming-practices, attitudes to middens/rubbish and the structured discard of artefacts, and alluviation etc. Nevertheless it is possible to offer an interpretation of the recorded data in terms of objectives stated at the start, in the hope that this will further our understanding of both this patch of the Trent Valley, as well as highlight avenues for other researchers, and inform further fieldwork in the South Muskham AAI.

Thus, our objectives, as devised in 1992, were to:

a. compare the cropmark-pattern with the general distribution of artefacts;
b. compare the distributions of different artefact types; and
c. compare the distributions of various artefacts with the pattern of alluviation.

It was hoped that this might allow us to start to identify:

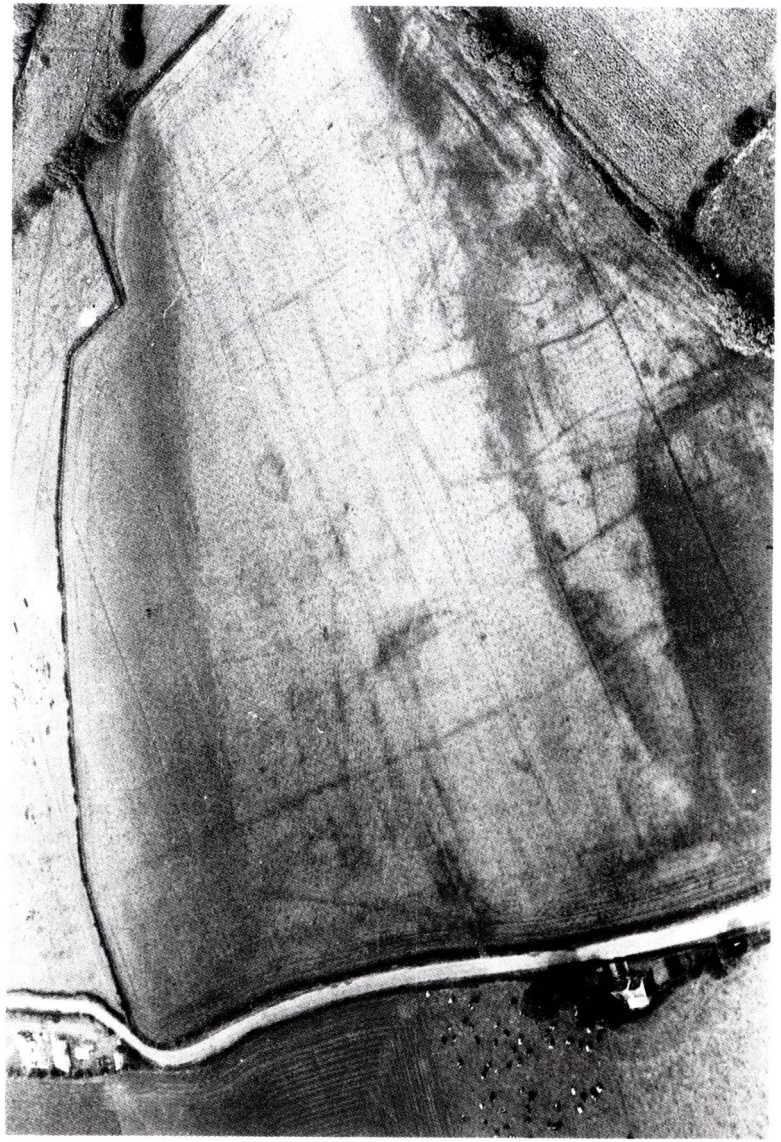
a. the pattern of land-use through time;
b. the period of use of particular cropmark-complexes;
c. the functions of those cropmark-complexes;
d. the chronology of various geomorphological episodes; and
e. areas where future fieldwork could make significant contributions to the broader issues of landscape development along the length of the Trent Valley.

FIELDWALKING METHODOLOGY IN 1992-97

Each artefact was recorded individually to ensure that any arbitrary collection grid would not influence the patterning of the finds. The methodology was similar to that employed along the Fosse Way between Newark and Widmerpool (Knight and Kinsley 1992, 106-8) and over the brickwork-plan field-systems west of Retford (author unpublished) and all other T&PAT surveys conducted since the early 1990s (*e.g.* Challis, this volume).

The fieldwalking was conducted in transects at 10m spacing, and searching up to 1m either side of the central line, giving a nominal 20% sample of the field surface. The lines walked by each person were recorded; many individuals contributed to every season of fieldwork. All metal objects of apparent antiquity, prehistoric, Romano-British and medieval pottery, as well as worked and burnt flint, worked stone and fire-cracked pebbles, and any brick or tile with fabrics obviously different from the ubiquitous modern pieces, were marked in the ground. The locations of all finds, the positions of modern field boundaries, and any recognised variations in soil type (particularly the heavier silty soils resulting from alluviation) were recorded using an EDM (Electronic Distance Measurer). All objects were inspected by the TPAT supervisor, and, with the exception of fire-cracked pebbles, all were collected. Post-medieval pottery was not recorded or collected with the exception of unglazed Midland Purple sherds (which start in the late medieval period, and these, before washing, are difficult to distinguish from Romano-British Derbyshire Ware). The artefact find-spots were plotted by raw material and period (flint, prehistoric pot, Romano-British pot, medieval pot, fire-cracked pebbles, worked stone) using field boundaries as reference points, allowing them to be overlain on the RCHME's 1:10,000 cropmark plots, to produce Figs 2-4, 6-8.

Thirty fields, totalling 209 ha, were walked in total. Efforts were made to walk only those fields that were in prime condition, though inevitably, this was not always achieved. In particular, the crops in fields 0044 and 0873 were rather higher than desirable, and field 0032 had some recent disturbance with a scatter of cut vegetation and machine-ruts over the surface, both of which must have influenced their low recovery rates (fields numbered in Fig 8). If new opportunities arise, re-walking of these fields should be given priority. The other fields, though in variable states of cultivation, all had well weathered surfaces, with the stones showing, which should mean that any artefacts on the surface should also be washed by the rain and therefore be visible. The abundance of small stones on the surface, particularly corticated and stained flint, must distract the eye, and so any struck corticated flint such as that likely to belong to the Upper Palaeolithic and earlier, is probably under represented



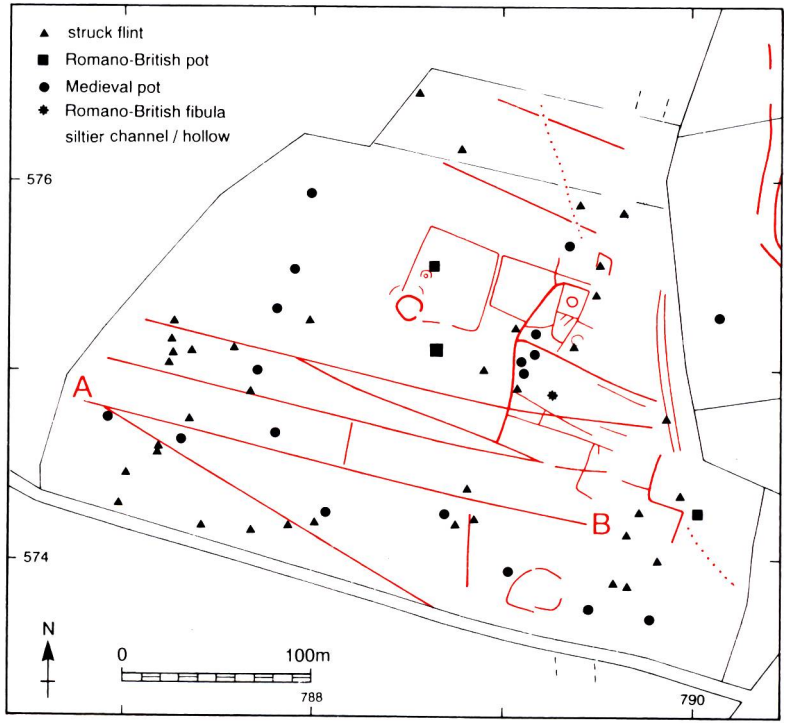


FIGURE 6: South Muskham AAI, field 8648: all artefacts plotted against cropmarks (red), and the channel/hollow shown by a darker cropmark stripe (*cf.* Plate 1). Scale 1:4000.
Cropmark plot by RCHME, © Crown copyright, NMR

PLATE 1: South Muskham: aerial photograph of field 8648, looking west (but orientated as Fig. 6) in 1974, showing cropmarks crossing the dark stripe of an infilled channel/hollow (NMR SK7857-85).
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(*cf.* Jacobi *et al.* 2001, 20). Where patches of subsoil occurred on the surface, indicating plough erosion of subsoil, this was recorded. However, in these light gravel soils, exposed subsoil will weather rapidly, so that the amount of recent plough truncation of the subsoil is probably greater than recorded by this survey. Fields to east and west of Little Carlton are mainly small paddocks under pasture, and therefore unavailable for fieldwalking (Fig 3). Given the frequency of repeat aerial photography, the lack of cropmarks recorded within these areas suggests that they are rarely cultivated (Whimster 1989, 23); the survival of earthworks to the west of Little Carlton is testimony to this (SMR 02965, shaded in Fig 3). Finally, the southern part of field 0873 has now been quarried (see comments above on investigations by Wheeler and others), leaving the remaining portion of the field higher than the adjacent land; this was found to lack even modern brick and post-medieval pottery, suggesting that it may have been built up by the deposition of topsoil, perhaps from the southern quarried area.

RESULTS

The results are presented by artefact category and their distributions described. Some common themes which emerge are then discussed, including an examination of the patterning of the artefact categories and the interpretations which can be made of landscape change through time. An outline of the results of the fieldwalking on the primarily Romano-British cropmark landscape of north Nottinghamshire is presented for comparison, and some conclusions drawn.

FLINTWORK

The distribution of the 648 pieces of worked flint appears relatively even (Fig 4), but this material could represent deposition over seven millennia, so it was assessed by typology and technology in order to determine whether the pattern changed over time. Given the tiny number of datable pieces per field, the following three groupings were devised to illustrate the patterning of the flintwork by period (Fig 5):

1) the coincidence of >2 diagnostic tools and debitage in the modern field
2) the coincidence of probable tools and debitage
3) the occurrence of probable tools or debitage

Mesolithic and Earlier Neolithic knapping is distinguished from later material by its blade technology. The characteristically small blades and cores used primarily in the Later Mesolithic can sometimes be tentatively identified, and these form the basis of the debitage plotted in Fig 5 as Mesolithic. A microburin is the only diagnostic piece present (and this is from field 1300, with hardly any other flintwork but a classic Early Bronze Age type thumbnail size scraper). The microburin is on a wide blade and therefore could be of Earlier Mesolithic date (*cf.* Jacobi 1976, 67).

The material identified as probably Earlier Neolithic comes from much the same set of fields as the Mesolithic items, and is primarily identified from larger blades, leaf-shaped arrowheads and utilised/serrated blades. Many of the blades, and other material identified on technological grounds as Mesolithic or Earlier Neolithic, are corticated, probably a reflection of their time in the soil and perhaps also changing soil conditions over the millennia (Schmalz 1960, 47).

Later Neolithic/Early Bronze Age material is more common than earlier assemblages, as is often the case (*cf.* Knight *et al.* 1998, 75), probably not least because such assemblages typically have a high proportion of tools diagnostic of date (*cf.* Richards 1985, 32). The tools include a wide variety of scrapers, knives and pieces with miscellaneous retouch, with smaller numbers of fragments from polished and bifacially retouched implements. In many fields, such tools are found together with broad flakes which could be part of the debitage from this, or even later, knapping.

A Bronze Age assemblage can be positively identified in only two adjacent fields (probably representing one scatter); such assemblages are difficult to isolate from Later Neolithic material when only small numbers are present (Ford *et al.* 1984). The pieces that probably belong to this period include a scraper made on a natural flake, thick end-scrapers and squat flakes with wide platforms. The location of both these fields, close to the probable

burnt mound in field 0005, is of interest because Bronze Age settlements might be expected to have occurred in proximity to such mounds, yet they are rarely identified except by excavation (an unexcavated example may have been glimpsed east of the burnt mound at Girton, north of Newark: Garton 1993, 149).

Seven gunflints, from post-medieval flintlock guns (*cf.* Torrence 1986, 67-8), were also recovered.

The density of flint, irrespective of date, has been calculated by field (Fig 5 bar chart), to compare with similar fieldwalking projects elsewhere within the region. Such data is available from the Fosse Way, Nottinghamshire, and from Elmton and the Peak Transect (divided into three zones: Carboniferous Limestone, East Moors [gritstones and sandstones] and Wye/Derwent Valley), both in Derbyshire; these are briefly considered by the present writer in Knight *et al.* 1998, 71. The high proportion of fields (68%) at South Muskham having densities of four or less per hectare compares best with the Fosse Way (64%), which is closest geographically, running up to the Trent just south of Newark (Fig 1; Knight and Kinsley 1992). None of the South Muskham fields match the very high densities found in some fields in the Peak Transect and at Elmton (over 20 flints per hectare), where Mesolithic material tended to occur in the fields with the highest density of material (Knight *et al.* 1998, 74). In contrast, the higher densities at South Muskham occur where there is Late Neolithic material. These observations may reflect differences in land-use and settlement activities across the region, but such intra-regional studies have only just started to become possible, and are beyond the scope of this report. However, it does suggest that any fieldwork which amplifies these preliminary results at South Muskham, or elsewhere, could have wider implications.

FIRE-CRACKED PEBBLES

Pebbles are accepted as fire-cracked only if the surface is crazed and there are clear indications of irregular fracture. Many are quartzite pebbles, identifiable macroscopically as probably originating from the Sherwood Sandstones. Such pebbles, without clear contextual association with other datable artefacts, may be of almost any date, as can be illustrated by three examples from excavated sites within the Trent Valley. At Holme Dyke, Gonalston, Nottinghamshire, pits with burnt stones have been dated by thermoluminescence to the mid-4th to mid-2nd millennium BC (Elliott and Knight 1998, 19); at the late Iron-Age settlement at Gamston, Nottinghamshire, fire-cracked pebbles were dumped in ditches and gullies together with Scored Wares and the earliest kind of Romanised wheel-made wares (Knight 1992, 31, 35); at Catholme, Staffordshire, charred 'small branches' from a fire-pit gave a calibrated radiocarbon date in the 7-8th centuries AD (Losco-Bradley and Kinsley 2002, 32, 121).

It is evident that the distribution of the 362 recorded fire-cracked pebbles is uneven (Fig 2). They do not appear to concentrate over or outside of the cropmark enclosures. There is only one clear cluster, in field 0005, where a high density of fire-cracked pebbles coincides with a roughly oval sandy patch, some 5x27m across, surrounded by alluvium. This is almost certainly a burnt mound, a type of site often dated to the 3rd and 2nd millennia BC and increasingly common within the floodplains of the East Midlands (*cf.* Garton and Priest 1998, 142; Elliott and Knight 1998; Beamish and Ripper 2000). The patterning of the fire-cracked pebbles in relation to other artefact-types will be returned to below.

IRON AGE AND ROMANO-BRITISH ARTEFACTS

On the basis of the form of the cropmarks, it has been suggested by Whimster (1989, 80; 1992, 11) and others (RCHME 1960, 14), that the landscape around South Muskham was developed extensively during the Iron Age and Romano-British periods. This is supported by the limited salvage work conducted by Wheeler and others (1968), as outlined on p.18, 23 and in Fig 8. Given these expectations, the real surprise of the 1992-97 survey is the small number of diagnostic Romano-British sherds (73), with another 21 highly abraded, but probably Romano-British, grey wares - identified by Ruth Leary. The small number of handmade sherds (11) recovered could be pre-Roman or post-Roman.

Ruth Leary has identified the diagnostic Romano-

FIGURE 7: South Muskham AAI: distribution of handmade pottery, quernstones and a fibula plotted against cropmarks (red). Scale 1:20,000. *Cropmark plot by RCHME, © Crown copyright, NMR.*

FIGURE 8: South Muskham AAI: distribution of Romano-British pottery plotted against cropmarks (red). Two adjoining fields, in which fieldwalking has been conducted previously (p.XX), are added in outline at the middle of the west side of the AAI and at its south-western tip, with the number of Romano-British sherds recovered (20 and 4). Scale 1:20,000. *Cropmark plot by RCHME, © Crown copyright, NMR.*

British sherds from South Muskham as principally grey ware, comprising wide-mouthed, everted- or hooked-rim jars (common in the third and fourth centuries), a flanged bowl (3rd to 4th centuries), a triangular rim from a straight-sided bowl or bucket-shaped jar (2nd to 4th centuries - a type common in north Nottinghamshire), a bodysherd with combed wavy-line decoration (typical of that found on narrow-necked jars of the 3rd and 4th centuries), and a dark grey dish or bowl with thickened rim and straight sides with traces of lattice or zig-zag burnished decoration (possibly Romano-British). A small number of other fabrics were found, including a Derbyshire ware cupped-rim sherd (mid-2nd to mid-4th centuries), a samian foot-ring base, a Nene Valley colour-coated indented beaker (3rd to 4th centuries), a white ware flagon sherd, a hammer-head mortarium sherd in white ware (240-350 A.D. - probably from the Mancetter-Hartshill potteries), and two grey sherds with grog or clay-pellet inclusions (on present evidence this seems to be a fabric used for 2nd to 3rd century forms in north Nottinghamshire and Lincolnshire). In addition to these, two handmade shell-tempered body-sherds came from field 1200, one of which bore combed decoration (these are typical of the late Iron Age to early Roman period). The six handmade sherds from field 0049 have medium to coarse quartz inclusions, but are all indeterminate body-sherds, making it impossible to ascertain if they are prehistoric or Saxon (also examined by D. Knight and G. Kinsley). Three other handmade sherds were identified from field 0080. Most of these sherds are very abraded.

The forms and diagnostic fabrics suggest discard predominantly in the 3rd to 4th centuries, with a possibility of activity in the 2nd century in fields 5500/5620, and around the end of the Iron Age in fields 0049 and 1200 (Figs 7, 8). This range of pottery suggests the area was not receiving much in the way of high-status pottery.

Other items possibly from the Romano-British cultural repertoire include fragments of quernstones of Millstone Grit and lava: one of the latter was found in the same location as Romano-British potsherds in field 1200 (Fig 7), though this does not assure their contemporaneity. The only other contemporary artefact is a fibula pin and spring (field 8648, Figs 6, 7): because the bow is missing, it cannot be dated more narrowly than the Late Iron Age/Romano-British period (Collingwood and Richmond 1969, 286). A fragment of possible Romano-British brick/tile was found in field 0080 (Fig 8): it is very abraded, greater than 44mm in thickness, and with a right-angle fold in the fabric suggestive of the side of a *tegulae* (other brick and tile fragments collected [32, but no others from field 0080] are not plotted in Figs 2-8 since they have no diagnostic features, but they might be unrecognised fragments of Romano-British date).

There are four scatters of Romano-British sherds (in fields 0049, 1200, 5500, 5800), of which only one is obviously clustered (5800). There are isolated sherds in another thirteen fields (Fig 8). The scatters do not concentrate on the cropmark enclosures (*e.g.* fields 6200/ 6524, 0080: Fig 8 and also 0873 - but see comments on p. 26). Only one of the scatters lies mostly outside an enclosure (in field 5800, which also contains a cropmark ring, presumably the gulley around a roundhouse), and only one of the scatters coincided with any number of handmade sherds, though there are no cropmarks in this field (0049 in Fig 7). So, if our expectation that the cropmark landscape around South Muskham was developed in the Iron Age and Romano-British periods is correct, then the interpretation of the distribution of artefacts from these periods is not straight forward. The patterning of the artefacts in relation to the cropmarks is amplified in the discussion on 'Land-use in the Romano-British period' below.

MEDIEVAL POTTERY

The medieval pottery was identified by Vicki Naylor. The 304 sherds are mostly small, with many pieces obviously abraded. Virtually no cooking vessels are represented, most of the sherds being from green-glazed jugs or related forms. These originated from a number of sources, some having characteristics evident in Nottingham green-glazed wares, while some may have originated from Lincolnshire. Most of the material dates from the middle or late 13th century onwards, and much is of 14th century date. There are single Saxo-Norman sherds from fields 8648 and 5500, while field 1300 yielded a range of earlier medieval wares: *viz.* one

Torksey (Saxo-Norman), two Stamford (11-12th century), one Splashed (12th century) and three Shelly ware (12-13th century) sherds.

If it is accepted that the pattern of medieval pottery scatter in Fig 3 is broadly representative of its actual distribution (p.31-2), then medieval activity appears to have been concentrated in four zones, each close to the medieval villages of South Muskham (fields 1300, 6524, 8648 and 1500), North Muskham (5500, 5620), and Kelham (4437, 0045) and between Little Carlton and Bathley (1200, 3400, 0049). All bar Little Carlton, which is first mentioned in the 12th century AD, are recorded in Domesday Book (Gover *et al.* 1940, 182, 187, 191, 192). Such a pattern would usually be interpreted as a result of manuring by the removal of 'night soil' and other rubbish from the medieval villages onto the fields (*cf.* Gerrard 1997, 67,69,70), though tenurial holdings and carting-costs may influence this pattern (*cf.* Woodward 1990, 260, 268).

DISCUSSION

RELIABILITY OF THE DISTRIBUTION PATTERNS

A small number (11) of plain handmade body sherds were recovered. Such pottery is notoriously difficult to date in small pieces, with attributions in the millennia to either side of the Romano-British period equally possible. The small number of pieces is no surprise because such material has rarely been recovered from agricultural land subjected to more-or-less continuous ploughing (p.18, 34): this is usually attributed to its friability (*cf.* Crowther 1983, 35; Gaffney and Tingle 1989, 245, Figs 9.1 and 9.6). By way of comparison, fieldwalking of 1.65ha over a cropmark enclosure at Gamston, some 27km upstream of South Muskham, produced four Romano-British and no handmade prehistoric sherds, while subsequent excavation of 0.22ha of the same site produced 20 Romano-British sherds and over 2,600 handmade prehistoric sherds of mostly Iron Age date (Knight 1992, 20, 22, 39, 64). Hence, any deposits which contain Iron Age (or earlier) or Anglo-Saxon pottery, will probably be invisible in many fieldwalking collections, and where this is not the case, it will almost certainly mean that the uppermost archaeological remains have been destroyed recently (*cf.* Losco-Bradley and Kinsley 2002, 5).

In addition to handmade pottery, the sherds from medieval cooking vessels are lacking in this fieldwalking collection. These vessels often have thin walls, which break easily into small pieces, and they tend to be unglazed, so it is possible that this lack is at least partly due to the difficulty in spotting these sherds. The generally dark grey to brown colour of these vessels would perhaps contrast less with the ploughsoils than the unglazed, Romano-British grey wares, many of which have a distinct bluish hue. Hence, it would appear that fieldwalking may only recover a partial assemblage of this category of apparently durable material (p.23), if it is assumed that cooking pots were as likely to be broken, and were discarded in the same way, as glazed vessels.

It is well known that different people have varying ability to recognise different artefact types (p.23). This can be clearly demonstrated in the fire-cracked pebble distribution, as lines of symbols, following the direction of walking, are easily identified in fields 0045 (approximately east-west) and 6524 (approximately north-south) in Fig 2. Hence, our recorded distribution of fire-cracked pebbles (and probably therefore of other types of artefact) would seem unreliable if considered in too much detail. However, it is harder to spot such lines in the other artefact plots, so this may reflect different abilities, or even differences in the perceived importance of the fire-cracked pebbles amongst some fieldwalkers (they were not collected p.24 , so they may have been unconsciously accorded less importance by some individuals).

If we consider the patterns of the two most commonly recovered artefact-types, flintwork and medieval pottery, there is some reason to ascribe more confidence to their overall patterning (Figs 3, 4). We might expect both to be equally visible and durable (cooking vessels apart, see above) so that if we find one then we should also find the other. However, inspection shows that the flint is much more evenly distributed than the medieval pottery. This suggests that gaps in the distribution of the medieval pottery are real in the southern part of field 1200 (where flint and Romano-British pottery were

found) and in the north-western part of field 6524 (where fire-cracked pebbles and flint were found). Both these fields were walked in north-south transects, and all the fieldwalkers stopped finding medieval pottery at about the same limit, but continued to recover other artefact types. Similarly, fields 1500N and 1500S were walked with mostly the same personnel, and flint was found scattered over both fields. However, whereas there is a scatter of medieval sherds in 1500S, there is only a solitary sherd in 1500N. Comparison with the Sanderson map of 1835 shows that breaks in the medieval pottery distribution coincide with old field-boundaries in fields 1500 and 6524, but not in field 1200. Although the field-pattern before 1835 has not been researched (p.37), there is no obvious correlation of the distribution of medieval potsherds with ridge-and-furrow cultivation, which is more widespread than the sherds (p.18).

Hence, although fieldwalking data will never be easy to interpret, there is some reason to suggest that the overall patterning represents a meaningful sample of the ploughsoil population of artefacts. However, a single episode of walking, as presented here, should never be considered as wholly reliable: further opportunities for repeat fieldwalking should be sought.

LANDSCAPE DEVELOPMENT

The information from the artefact distributions from fieldwalking, taken together with the soil types and interpretations of the cropmark plots, can be used to suggest some ways in which the landscape might have developed in the AAI, and some targets for future fieldwork.

One of the curious aspects of the flintwork distribution is that, although it is dense in most areas on sand and gravel, it is completely absent from those areas mapped in the field as alluviated (*e.g.* fields 0057/6200 and 5800: Fig 4), and present only along the margins of the stripes mapped from aerial photographs (*e.g.* field 0087, Fig 4). There is also a cluster of fire-cracked pebbles, probably representing a burnt mound, in a sandy patch surrounded by alluvium (field 0005: Fig 2). These spatial relationships suggest the possibility of land-surfaces sealed below alluvium, where they have not yet been disturbed by ploughing. Such prehistoric surfaces are extremely rare on the drier terraces of our river valleys, where it might be expected that settlement activity could have been concentrated. Only excavation could determine the presence and quality of survival of such evidence buried by alluvium.

The lithics are not the only evidence of the potential for sealed archaeological remains hereabouts, for Whimster (1992, 11-12) has remarked upon the manner in which some cropmarks relate to the alluvium. The pit-alignments that run through fields 5073, 6524 and 6200 would appear to run into, or across, two such areas of alluvium (Fig 8). Field investigation of the pit-alignments in these alluviated areas might be capable of establishing the stratigraphic relations, and perhaps even the chronology, of the pit-alignments and related episodes of alluviation.

Single Romano-British and medieval potsherds were found fully on the alluvium mapped in field 0087 (Fig 3). A medieval sherd was also recovered on the mapped alluvium in field 0057, with others along its edges (Fig 3). With such small numbers, any interpretation must be highly speculative, but their presence may indicate deposition of the alluvium prior to the Roman and medieval period. Taken together with the evidence in field 8648 described below, it is possible that we have the beginnings of a chronology for the deposition of alluvium at South Muskham, one of the key research priorities identified by Knight and Howard in their survey of the Trent Valley (1994, 129).

One of the most intriguing fields within the AAI is 8648, where there are indications of a complex history of activities and sedimentation (Fig 6). This has produced a relatively thin scatter of flintwork, none of which was found on a dark stripe of soil marking an alluvium/colluvium/silt-filled channel/hollow which runs approximately north-south (Figs 4, 6, Plate 1 *nb* this is the clearest photograph of the cropmarks overlying the channel/hollow, others show the detail plotted in Fig 6). Given the observations made on the flintwork distribution in fields 0057/6200 at the start of this section, it is tempting to suggest that either this channel/hollow was open at the time of deposition of the scatter, or that the channel cut through it. Different cropmarks in this field have slightly different alignments: a cluster of

enclosures, including rings perhaps interpretable as roundhouse wall-grooves and/or eaves-drip gulleys or ditches; and narrow, rectilinear strips which probably correspond to late medieval or early post-medieval fields, since one of them, labelled A-B in Fig 6, is in the same location as a field boundary on Sanderson's map of 1835, and they all lie at a slight angle to the ridge and furrow as recorded on aerial photographs (*e.g.* NMR SK7857-6). Both sets of cropmarks can be seen to overlie the infilled channel/ hollow, so they must post-date it (Plate 1). Hence, within this one field, at least four events have been identified from a combination of aerial photography and preliminary ground-survey. In terms of landscape development, this complex would repay further investigation, particularly since both sets of cropmarks disappear to the west, initially into a bumpy (?unploughed) field, then into a field (5073 in Fig 2) with a surface spread of alluvium. The latter continues northwards and, until recently, may have sealed a burnt mound in field 0005 (p.27).

Although the cropmark landscape is thought to primarily represent Iron Age and Romano-British activities (p.27), some of the cropmarks can be linked with more recent features. In field 1300, located towards the south-eastern end of South Muskham village, is a T-shaped double-ditched cropmark (A in Fig 3), which, together with an earthwork hollow leading from it into the field to its east (F in Fig 3, p.18), almost certainly represents a lane. The survival of this earthwork in the modern landscape (and perhaps running along a furlong boundary) might suggest that this lane, and its probable continuation to the north (B-C in Fig 3), was part of the medieval landscape. This interpretation is perhaps supported by the probable branching of this lane, west from the crossroads at C, whence its projected line might have joined Moorhouse Lane at about 'E' in Fig 3. The latter Lane forms the parish boundary with North Muskham, and this was the Lordship boundary in 1735 (Nottingham Record Office NM 1R), so is likely to be of some antiquity. Hence, rather than being considered necessarily as an element of a Romano-British or earlier landscape, this lane, represented by both earthworks and cropmarks, might be a more likely constituent of the medieval landscape (though its origins are unknown). When seen in this context, the cropmark in field 1300 might be interpreted as a parallel (*i.e.* back) lane, or even precursor to the current Main Street through South Muskham (best seen in Whimster 1989, Fig 60, and Whimster does comment that this cropmark is reflected in the modern communication routes - ibid, 82). The reasons for any shift or contraction in these routeways may be attainable through documentary research, which has not been conducted as part of this survey. One possibility may be the relation of the lane to the crossing of the Fleet (at A in Fig 3), which is still marked as a river on Sanderson's map of 1835. If this lane was part of the medieval landscape, this is also the context in which to interpret the relatively dense scatter of medieval potsherds in field 1300 (Fig 3), which included earlier medieval wares (p.30). If they represent a midden, sited off the lane as a collection point for domestic rubbish prior to carting onto the fields, their location may not be particularly significant. However, the cropmarks include at least one small rectangle that could represent a building (the south-easternmost cropmark plotted in field 1300 in Fig 3, though the detail is not possible to see at the published scale), so if it was contemporary with any of the pottery, this might indicate that the village plan was formerly more extensive than that mapped in Fig 3. The church (which includes both 13th-century decorative features [Pevsner 1951, 160] and presumed earlier herringbone work in the chancel [Cox 1912, 5-6]) is also at the eastern limit of the current village (Fig 3): perhaps they were both located with respect to the former lanes marked by the cropmarks, rather than the current roads. Future documentary research may enable a fuller history of the evolution of this settlement plan to be determined, and allow confirmation of the suggestion that this cropmark is essentially a medieval element of the landscape. Since the lane does seem to articulate with other cropmarks (Whimster 1989, 80), this invites caution in dating any cropmarks in this area, especially where this is based upon their morphology alone.

Land-use in the Romano-British period

The Romano-British sherds form four scatters and a very thin distribution of single sherds (Fig 8). However, as already commented above, it is notable that the scatters do not concentrate on the cropmark enclosures (*e.g.* 6200/ 6524, 0080, 0873 - but see

comments on p. 26), and only one of the scatters is located beside an enclosure (in field 5800). It is unclear whether this relates to the date of the enclosures, *i.e.* they are Iron Age and do not continue in use into the Romano-British period - the implication being that the pottery relating to them is too fragile to survive in the ploughsoil (p.31), or to the function of the enclosures, *i.e.* they are not habitation foci where domestic debris was generated. If rubbish was collected within discrete areas, or removed away from the enclosures, their distributions would be complementary rather than coincident (perhaps like that in field 5800). The possibility that contemporary deposits may not have been truncated, so that all the durable remains are still buried below the reach of modern ploughing, seems inherently unlikely on these good agricultural soils that have produced cropmarks since at least the 1940s (Whimster 1989, 21). However, if any surfaces or features incorporating artefacts were destroyed many years ago, subsequent ploughing and soil conditions might have been so severe that even Romano-British pottery has not survived its rigours.

In two instances (fields 0049 and 1200), handmade sherds were recovered from the same area as the scatters of Romano-British sherds, suggesting recent destruction of archaeological deposits, since handmade pottery is not expected to survive long in the ploughsoil (p.31); hence it may be concluded that these fields are probably being actively truncated. This is also true in field 0080, where the northern enclosure lies on relatively high ground (see below). Here, the evidence of fresh patches of subsoil on the surface and the recovery of handmade sherds, together with the absence of Romano-British pottery from within/around this enclosure, might suggest occupation in the first millennium which did not continue into the Romano-British period.

In three instances a scatter of Romano-British pottery is located a short distance from a cropmark enclosure (*e.g.* 0087/1200; 5800; 5500 and the complex of cropmarks outside the AAI: Fig 8). If these scatters and cropmarks were related then this is the sort of pattern that is usually ascribed to manuring from a settlement (Haselgrove 1985; Gaffney and Tingle 1991, Hayes 1991), though examples for comparison are surprisingly scarce. The densities of sherds in the three fields with a sizeable scatter (excluding 5800 because of its highly clustered distribution) range from 1.4-2.7 sherds per hectare (0049, 1200 and 5500). This density is much lower than scatters attributed to manuring in southern England (*cf.* Gaffney and Tingle 1989, 216-18 where comparable densities are over 10 sherds per ha), but it may be comparable to those at Maxey in the Welland Valley of eastern England (Crowther 1983). Using Crowther's figures for topsoil populations of Romano-British pottery at Maxey (1983, 38) and calculating for a sample comparable to those at South Muskham (20% fieldwalking transect with 1% visible on the surface), the Maxey densities would have ranged from ten per hectare for 'midden' foci, to one per hectare for structures and manuring scatters. Taking on board the comments by Crowther regarding the probable reasons for a lack of sherds over structures (1983, 39), and noting that there is no cropmark evidence of structures where the Romano-British scatters are located at South Muskham, the densities of sherds would appear to be comparable to areas lacking obvious features (even under excavation) at Maxey, where the Romano-British pottery scatter in the topsoil is interpreted as the result of manuring (Crowther 1983, 39-40).

We can compare the pattern of the South Muskham distributions with those recovered from fieldwalking the cropmark-landscape of the brickwork-plan field-system on the Sherwood Sandstones in the north of Nottinghamshire (Fig 9; Riley 1980, 15, 65). This cropmark landscape contrasts with that in the Trent Valley in several ways, the most pertinent being the relatively even geological substrate (and therefore development of a wider plan of cropmarks) and the apparent coherence and single period of the co-axial brickwork-plan field-systems with associated settlement foci – though its unitary appearance may have been over emphasized (*e.g.* Branigan 1989, 163; Deegan 1996). The apparently strong integration of the settlement enclosures into the field-systems of the brickwork-plan field-systems means that some confidence can be ascribed to its broad dating from the few enclosures excavated which all lie within the Romano-British period, though the beginning and end dates are problematical (*e.g.* Dunston's Clump, Garton 1987, 43-5, 67-8; Chainbridge Lane, Eccles *et al.* 1988, 18-19; Menagerie Wood, Garton *et al.*

1988, 29; Bellmoor, Cox and Hurcombe 1989, 170). Strong associations can be interpreted between some enclosures and linear cropmarks in the Trent, like those described by Whimster in field 0080 at South Muskham (1992, 13), but because the links cannot often be traced over very wide areas, and comparable cropmark enclosures that have been excavated on any scale are at some distance up the valley (*e.g.* Gamston, Knight 1992; Gonalston, Elliott and Knight 1997, 68-9; Swarkestone, Cummins 1961, Elliott & Knight 1999; Willington, Wheeler 1979, 62-3) the dating of the Trent Valley enclosures, and therefore South Muskham examples, may be open to future surprises. However, for the purposes of the rest of this paper, it will be assumed that, in line with our understanding of the development of settlement in the Trent and on the gravels of the major river valleys elsewhere in England (*e.g.* Fulford 1992), at least some of the enclosures within the South Muskham AAI were occupied within the Romano-British period.

Comparison of the pattern of scatters of Romano-British pottery shows a clear difference between the South Muskham and brickwork-plan areas. Of nearly 100 enclosures fieldwalked on the brickwork-plan fields (author, report in preparation), the Romano-British pottery was usually confined within, and close to, the enclosure clusters and did not stray far onto the cropmark fields around them (Fig 9). That fieldwork was focused upon the enclosures, rather than the whole landscape as at South Muskham (as illustrated by the areas walked in Fig 9), though where fields were walked away from the enclosures, they proved to be virtually devoid of Romano-British potsherds. In addition, wherever excavations have occurred within the brickwork-plan field-systems away from the enclosures, there are very few potsherds from the ditch-fills, which supports this pattern of the pottery being concentrated around the enclosures (*e.g.* East Carr, Mattersey, author unpublished; Hodsock, Garton and Taylor 1997, 21).

A difference in the pattern of distributions of fire-cracked pebbles is also apparent in the two areas. Within the brickwork-plan field-system, scatters of fire-cracked pebbles commonly mark the location of the enclosures, even where Romano-British pottery is scarce or absent. When this pottery is present, the fire-cracked pebbles are often scattered more widely than the sherds, but are still clustered upon the enclosures (Fig 9). Although the fire-cracked pebbles themselves are undatable, and are known from contexts in many periods (p.27), they have been recovered from excavated contexts with reasonably secure associations (*e.g.* from three small pits or post-holes within Structure 5 at Dunston's Clump: Garton 1987, 38). So, on the basis of the scatters in the brickwork-plan area, a positive correlation of fire-cracked pebbles with the enclosures at South Muskham might have been expected, but, like the Romano-British pottery, this is not the case (Figs 2, 8). Given the absolute durability of fire-cracked pebbles, and the ability for at least some individuals to spot them in even small pieces (p.31), their absence over the South Muskham enclosures would appear real. Hence, the activity which produced fire-cracked pebbles in the brickwork-plan enclosures was not being conducted within those at South Muskham, or any fire-cracked pebble debris from within the latter enclosures was removed. Since there is no obvious coincidence in either patterns of fire-cracked pebbles or Romano-British sherds at South Muskham, the distributions of these different artefact categories may not be related in any way either to each other, or to the cropmark enclosures.

Finally, one positive point of comparison may be made between the two areas. Though the underlying geologies are different, they are both in gently undulating landscapes (the Sherwood Sandstones of the brickwork-plan fields producing greater relief). On conducting the fieldwork, it was clear that many of the cropmark enclosures occupied the higher ground (contour survey was not part of either project so this cannot be illustrated in the figures). In South Muskham the proximity of alluvium to such sited enclosures (*e.g.* 5800, 0087, and the northernmost enclosure in 0080), suggests the deliberate use of the higher, drier ground. Whatever the differences in the subsistence activities, it seems that habitation on the driest ground was a common element.

CONCLUSIONS

It should be evident that fieldwalking data like that from South Muskham can be used for more than merely identifying 'sites' from artefact scatters. Over

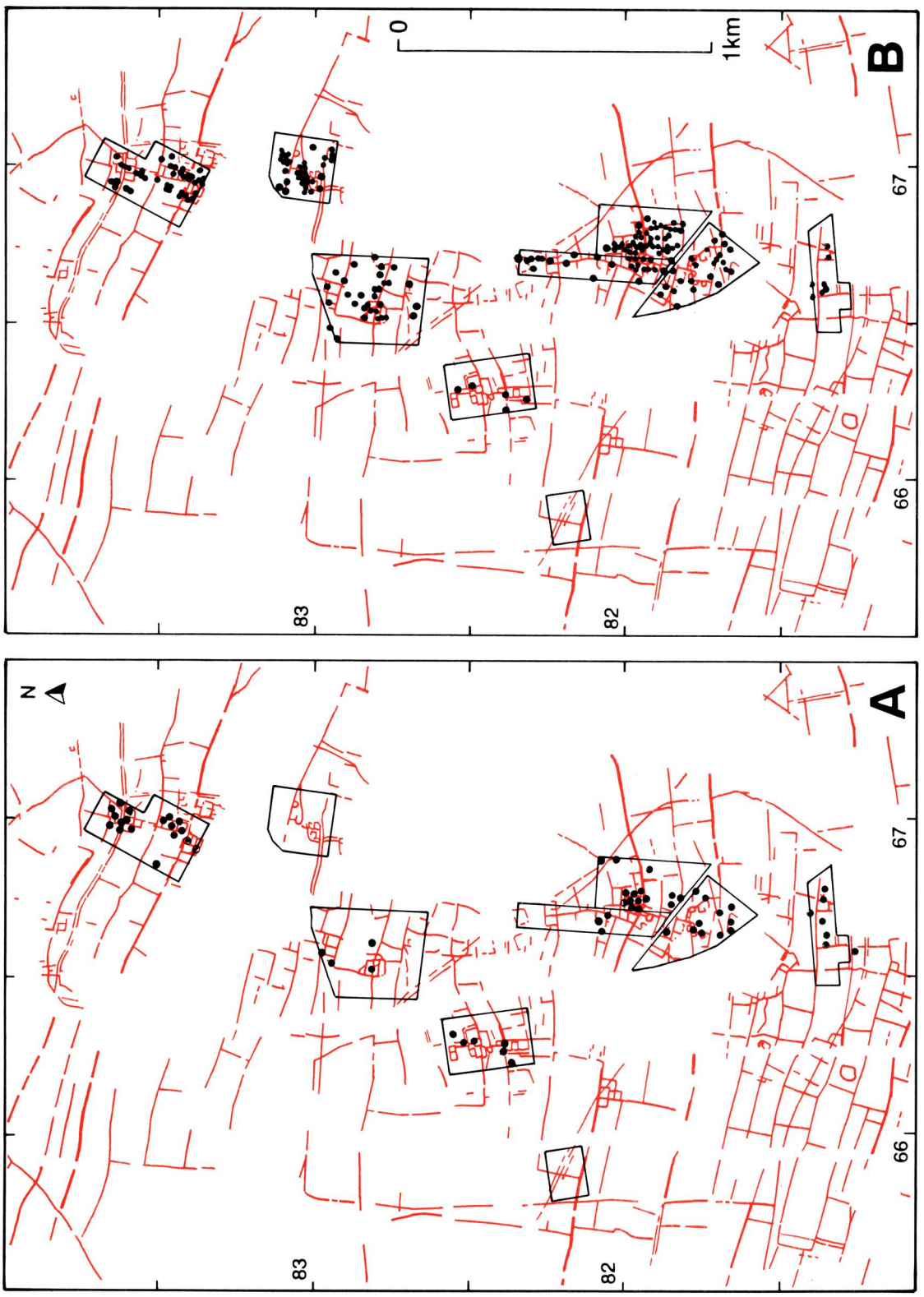

FIGURE 9: Part of the north Nottinghamshire brickwork-plan field-systems showing areas fieldwalked (outlined), and the distributions of Romano-British pottery (A) and fire-cracked pebbles (B), plotted against the cropmarks (red). Both plots @ scale 1:20,000. *Cropmark plot by RCHME, © Crown copyright, NMR.*

wider areas such data can provide pointers to landscape change over time, and can address research issues like the timing and spread of alluviation within the Trent Valley, provided the frailties of such evidence, particularly when confined to a single episode of walking, are borne in mind. Consideration of both the fieldwalking and the cropmark evidence available to date has started to show how this may be used to identify areas and even particular features which could be targeted for excavation. However, some of the preliminary investigations still remain to be conducted: for example, Whimster (1989, 80) has commented that a study of documentary and aerial photographic sources would be beneficial in establishing medieval and post-medieval land-use, which may not affect only fieldwalking data but also cropmark production.

Most interestingly, the 1992-97 survey results have made it possible to highlight a difference in the patterns of artefact-discard in two landscapes presumed to be broadly contemporary. In the brickwork-plan area, the landscape was apparently organised and coherent at that time (p.34), with artefact-discard clustered around presumed habitation foci within enclosures (Fig 9). In the Trent Valley around South Muskham, the land between enclosures was not divided in the same manner (or at least not to produce a similar cropmark pattern), and, if the enclosures there represent habitation foci occupied in the Romano-British period, then the distribution of potsherds suggests removal of rubbish, perhaps onto adjacent fields. These differences presumably reflect the ways in which the land was used in the past, perhaps especially the intensity of agricultural use.

Such differences in artefact distributions may reflect real differences in attitudes to disposal and landscape use. The focus of fieldwork on the enclosures of the brickwork-plan area, rather than on the whole landscape as at South Muskham, may have given a biased perception, even though considerable areas outside some enclosures, as well as areas of field-system, were walked as part of the brickwork-plan project. Hayes (1991, 116-18) has argued on theoretical grounds that the areas around the brickwork-plan enclosures (farmsteads) were too large for a family to have farmed as arable, and that they would be best used in pastoral economies. Given the acidic soils where bone will always be poorly preserved (except in rare cases of waterlogging - Eccles *et al.* 1988, 17), evidence for pastoral economy will always be difficult to amass except indirectly, as in the recovery of foetal sheep bones at Menagerie Wood, Worksop which has been interpreted as evidence for sheep rearing on or near the site (Garton *et al.* 1988, 29, 32). The clustering of pottery over the enclosures, and its absence over the fields, could be interpreted as supporting such a pastoral use, where folded animals might have provided any organic enhancement necessary for the soils. If so, the post-medieval land-use of the Sherwood Sandstones as sheep-run (Mingay 1989, 4: though this regime was enhanced by the introduction of turnips as fodder crops – Midland Agricultural College 1938, 9: Lyth 1989, 39-43) and the Trent Valley as mixed arable 'producing good crops of barley, and remarkable fine ones of oats....particularly about Muskham' (Lowe 1798, 28) respectively, may be a continuation of a long tradition of land-use. It would not be surprising if future field-investigations were to produce evidence to show that the perceived differences in the coherence, density and arrangement of the cropmark boundaries in the two topographical areas are related to such differences in past land-use.

BIBLIOGRAPHY

Ammerman A.J., 1985. 'Plow-zone experiments in Calabria, Italy', *Journal of Field Archaeology* 12, 33-40.

Beamish M. and Ripper S., 2000. 'Burnt Mounds in the East Midlands', *Antiquity* 74, 37.

Branigan, K., 1989. 'An early landscape revisited', in D. Kennedy (ed.), *Into the Sun: Essays in Air Photography In Archaeology in Honour of Derrick Riley.*

Challis K.C., 1993. 'An early Anglo-Saxon pottery vessel from Little Carlton', *Trans Thoroton Soc* 96, 123-4.

Clark R.H. and Schofield A.J., 1991. 'By experiment and calibration: an integrated approach to archaeology of the ploughsoil', in Schofield, A.J. (ed.), *Interpreting Artefact Scatters: Contributions to Ploughzone Archaeology.* Oxbow Monograph 4.

Collingwood R.G. and Richmond I., 1969. *The Archaeology of Roman Britain.*

Cox J.C., 1912. *County Churches, Nottinghamshire.*

Cox C. and Hurcombe L., 1989. 'Bellmoor Quarry: a cropmark study', in D. Kennedy (ed.), *Into the Sun: Essays in Air Photography In Archaeology in Honour of Derrick Riley.*

Crowther D., 1983. 'Old land surfaces and modern ploughsoil: implications of recent work at Maxey, Cambs.', *Scottish Archaeological Review*, 2, 31-44.

Cummins W., 1961. 'Swarkestone', *East Midland Archaeological Bulletin* 4, 4-5.

Deegan A., 1996. 'North Nottinghamshire field systems - a landscape overview', *Aerial Archaeology Research Group*, 12, 18-24.

Eccles J., Caldwell P., and Mincher R., 1988. 'Salvage excavations at a Romano-British site at Chainbridge Lane, Lound, Nottinghamshire 1985', *Trans Thoroton Soc* 92, 15-21.

Elliott L. and Knight D., 1997. 'Further excavations of an Iron Age and Romano-British settlement near Gonalston, Nottinghamshire', *Trans Thoroton Soc* 101, 65-71.

Elliott L. and Knight D., 1998. 'A burnt mound at Holme Dyke, Gonalston, Nottinghamshire', *Trans Thoroton Soc* 102, 16-22.

Elliott L, and Knight D., 1999. 'An early Mesolithic site and first millennium BC settlement and pit alignments at Swarkestone Lowes, Derbyshire', *Derbyshire Archaeological Journal* 119, 79-153.

Ford S., Bradley R., Hawkes J., and Fisher P., 1984. 'Flint-working in the Metal Age', *Oxford Journal of Archaeology* 3, No. 2, 157-173.

Fulford M., 1992. 'Iron Age to Roman: a period of radical change on the gravels', in Fulford, M., and Nichols, E. (eds), *Developing Landscapes of Lowland Britain.* Soc Antiquaries Occasional Paper 14.

Gaffney V. and Tingle M., 1989. *The Maddle Farm Project: an Integrated Survey of Prehistoric and Roman Landscapes on the Berkshire Downs.* British Archaeological Reports, British Series 200.

Garton D., 1987. 'Dunston's Clump and the brickwork plan field systems at Babworth, Nottinghamshire: Excavations 1981', *Trans Thoroton Soc* 91, 16-73.

Garton D., 1993. 'A burnt mound at Waycar pasture, near Girton, Nottinghamshire: an interim report', *Trans Thoroton Soc* 97, 148-9.

Garton D., Hunt C.O., Jenkinson R.D.S. and Leary, R.S., 1988. 'Excavations at a Romano-British cropmark enclosure near Menagerie Wood, Worksop, Nottinghamshire', *Trans Thoroton Soc* 92, 22-33.

Garton D. and Priest V., 1998. 'Pig Pens, Tiln (SK700844)' in K. Challis, (ed.) 'Fieldwork by Trent & Peak Archaeological Trust in Nottinghamshire 1996-7', *Trans Thoroton Soc* 102, 139-142.

Garton D. and Taylor, C., 1997. 'Hodsock (SK613865)' in K. Challis, 'Fieldwork by Trent & Peak Archaeological Trust in Nottinghamshire, 1995-6', *Trans Thoroton Soc* 101, 21.

Gerrard C., 1997. 'Misplaced faith? Medieval pottery and fieldwalking', *Medieval Ceramics* 21, 61-72.

Gover J.E.B., Allen Mawr and Stenton F.M., 1940. *The Place-names of Nottinghamshire.* English Place-name Society Vol. XVII.

Haselgrove C., 1985. 'Inference from Ploughsoil Artefact Samples', in Haselgrove C., Millett M. and Smith I. (eds) *Archaeology from the Ploughsoil: Studies in the Collection and Interpretation of Field Survey Data.*

Hayes P.P., 1991. Models for the distribution of pottery around former agricultural settlements in Schofield, A.J. *Interpreting Artefact Scatters: Contributions to Ploughzone Archaeology.* Oxbow Monograph 4, 81-92.

Jacobi R.M., 1976. 'Britain inside and outside Mesolithic Europe', *Proceedings of the Prehistoric Society* 42, 67-84.

Jacobi R. M., Garton D. and Brown J., 2001. 'Field-walking and the Late Upper Palaeolithic of Nottinghamshire', *Trans Thoroton Soc* 105, 17-22.

Knight D., 1992. 'Excavations of an Iron Age settlement at Gamston, Nottinghamshire', *Trans Thoroton Soc* 96, 16-90.

Knight D., Garton D. and Leary R., 1998. 'The Elmton fieldwalking survey: prehistoric and Romano-British artefact scatters', *Derbyshire Archaeological Journal* 118, 69-85.

Knight D. and Kinsley G., 1992. *Archaeology of the Fosse Way. Vol. 2 Implications of the proposed dualling of the A46 between Newark and Widmerpool.* T&PAT unpublished report to English Heritage, copy available in the Nottinghamshire SMR.

Knight D. and Howard A.J., 1994. 'The Trent Valley survey', *Trans Thoroton Soc* 98, 126-9.

Knight D. and Priest V., 1998. 'Excavations of a Romano-British field system at Lamb's Close, Kelham, Nottinghamshire', *Trans Thoroton Soc* 102, 27-36.

Leary R., 1998. 'Romano-British pottery', in Knight and Priest 1998.

Losco-Bradley S. and Kinsley G., 2002. *Catholme: an Anglo-Saxon Settlement on the Trent Gravels in Staffordshire.* Nottingham Studies in Archaeology, Vol.3.

Lowe R., 1798. *General View of the Agriculture of the County of Nottingham.*

Lyth P., 1989. *A History of Nottinghamshire Farming.*

Midland Agricultural College, 1938. *Farming Forest Sand.*

Mingay G.E., 1989. 'Nottinghamshire farming in the eighteenth

century', in Nottinghamshire Food and Farming Year Committee, *Aspects of Nottinghamshire Agricultural History.*

Pevsner N., 1951. *The Buildings of England: Nottinghamshire.*

RCHME, 1960. *A Matter of Time: an Archaeological Survey.*

Richards J., 1985. 'Scouring the surface: approaches to the ploughzone in the Stonehenge environs', *Archaeological Review from Cambridge* 4, part 1, 27-42.

Riley D.N., 1980. *Early Landscape from the Air: Studies of Crop Marks in South Yorkshire & North Nottinghamshire.*

Sanderson G., 1835. *Map of the Country Twenty Miles Round Mansfield.* Reprinted 2001.

Shennan S., 1985. *Experiments in the Collection and Analysis of Archaeological Survey Data: The East Hampshire Survey.*

Schmalz R.F., 1960. 'Flint and the patination of flint artefacts', *Proceedings of the Prehistoric Society* 26, 44-9.

Tingle M., 1987. 'Inferential limits and surface scatters: the case of the Maddle Farm and Vale of the White Horse fieldwalking survey', in A.G. Brown and M.R. Edmonds (eds), *Lithic Analysis and Later Prehistory.* British Archaeological Reports, British Series 162, 87-99.

Torrence R., 1986. *Production and Exchange of Stone Tools.*

Wheeler H., 1968. 'A Romano-British native site at South Muskham', *Trans Thoroton Soc* 72, 32-7.

Wheeler H., 1979. 'Excavation at Willington, Derbyshire, 1970-1972', *Derbyshire Archaeological Journal* 99, 58-220.

Whimster R., 1989. *The Emerging Past: Air Photography and the Buried Landscape.*

Whimster R., 1992. 'Aerial photography and the British gravels an agenda for the 1990s', in Fulford, M., and Nichols, E. (eds), *Developing Landscapes of Lowland Britain.* Soc Antiquaries Occasional Paper 14.

Woodwood D., 1990 'An essay on manures: changing attitudes to fertilization in England, 1500-1800', in J. Chartres and D. Hey (eds) *English Rural Society 1500-1800.*

ACKNOWLEDGMENTS

Thanks are due to Mike Bishop, County Archaeologist for Nottinghamshire, for commissioning this project to promote research on the South Muskham 'Area of Archaeological Importance'. This paper was initially prepared as highlights from the full project for a day school on fieldwalking; it was much improved, with ideas developed and incorporated from a T&PAT staff seminar, where Keith Challis, Lee Elliott, Graeme Guilbert, Dave Walker, and Alex Ward, amongst others, gave particularly valuable contributions. The initial report benefited from comments by Mike Bishop; Gavin Kinsley, David Knight and Ruth Leary made helpful comments on this paper; Jenny Brown and Graeme Guilbert much improved the text by editing the English and by their helpful comments. The fieldwalking was directed by Daryl Garton, supervised by Paul Caldwell and Alison Kennett; the archive was prepared by Jenny Brown and Alison Kennett, the data manipulated by Gavin Kinsley and Steve Malone, and Figs 2-5, 7 & 8 were produced by Steve Malone. Figs 1 and 6 were drawn by Richard Sheppard. The pottery was analysed by Ruth Leary and Vicki Naylor. Thanks are due to the farmers who allowed access over their land: Mr. D. Burnett, Mr. J. Burnett, Mr. Brothwell, Mr. Keys, Mr. Miller, Mr. D. Salmon, Mr. Staniforth, Mr. Swallow. Thanks are also due to the volunteers who helped with the fieldwork and initial artefact processing, principally Paul Caldwell, Val Disney, Jen Eccles, Anne McKenzie, Alan Miller, Rhoda Mincher, Alan Morris, Celia Morris and Adrian Turner. Rowan Whimster encouraged our use of his detailed cropmark plots and permission was given to reproduce them, free of royalties, by English Heritage. The reference to the 1735 map of the Lordship of North Muskham was gleaned from Victoria McMillan's unpublished BA dissertation, Dept. of Archaeology, University of Nottingham, 2001. The brickwork-plan field-systems data was collected for an English Heritage funded project, directed by Daryl Garton for T&PAT, with archive produced principally by Jenny Brown, Ruth Leary and Steve Malone. *As well as funding the original fieldwork and report, Nottinghamshire County Council generously provided a grant for publication of this paper in these Transactions.*