

So far twelve fields have been walked, totalling approximately 60 ha. The worked flint totals 550 pieces and of these the majority are debitage or waste. Eighty-seven are scrapers of various sorts, twenty-six are cores, up to fifteen are point/arrowhead forms, and fifty-five are blades. The finds are not limited to any particular period, ranging from small Mesolithic blades to a large Neolithic point, arrowheads and Bronze Age scrapers.

On the whole the compass plotting method has proved very effective for this particular survey. The initial setting out of stations may seem long-winded, but in practice probably takes little more than half an hour. As with other types of survey, complications can be dealt with by plotting key points using a theodolite should it be necessary. In fieldwalking where flint finds are going to be scarce and the transect area quite large, and where time and walkers are limited, the field compass really does offer a speedy and accurate alternative to more usual survey methods.

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THE FENLAND PROJECT

A meeting held in Cambridge on 2 September 1989, generously hosted by David Hall of the Fenland Project, offered the opportunity to handle some of the abundant harvest of artefacts collected during the project and to hear accounts of their analysis.

Use-wear Analysis of Surface Material - Can it Really Be Done?

by Andy Brown

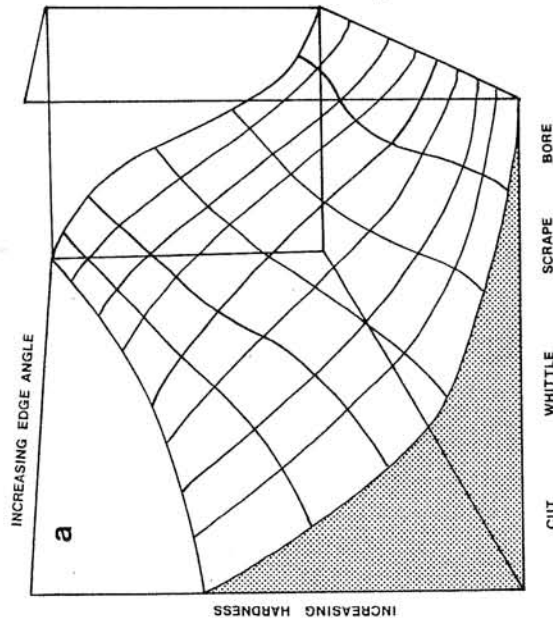
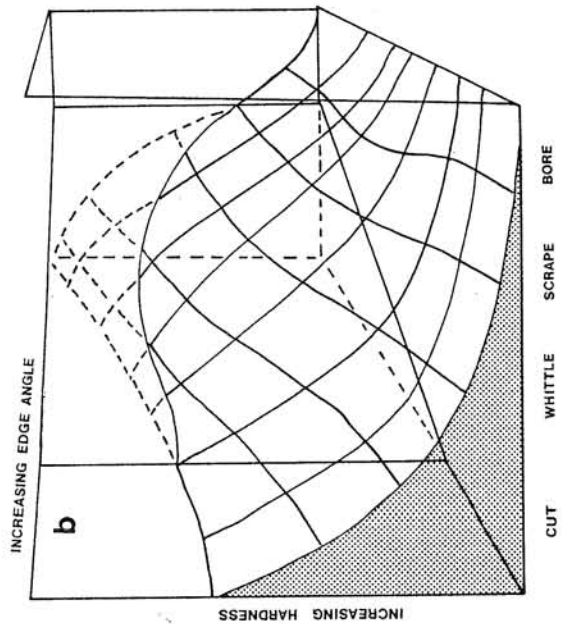
General Considerations

Surface lithic material is an enormous archaeological resource, yet the level of information which has so far been derived from it is limited. My study of the surface material collected during the first stage of the Fenland Project from the parish of Isleham, Cambridgeshire, was designed to explore whether a greater quantity of information could be retrieved from surface sites. But why try use-wear analysis? Surely the damage which flint must incur in being brought to the surface by agricultural machinery alters damage patterns so much as to make use-wear analysis futile?

The answer to this rhetorical question is that use-damage does survive ploughing in many circumstances, although it is necessary to adapt the questions asked of the data and the methodology applied. Use-wear analysis is analogous to any other line of enquiry on surface material: the task is firstly to recognize the inherent limitations of the technique to be applied and secondly to establish the nature of the post-depositional transformations and to allow for them in the formulation of appropriate questions.

Taking these two considerations in reverse order, the obvious source of post-depositional damage on surface material is the action of agricultural machinery. A comparison of the damage patterns of ploughed and unploughed lithic material by the author, however, showed that plough damage was localized when intensive and sporadic otherwise. Some pieces from a surface collection had experienced little or no plough damage, while others had almost all of their edges modified and were best excluded from the analysis. In the sporadic cases, plough damage was isolated and was characterized by large, step-terminated scarring. This is a rare scar type on experimentally-used flints and on such pieces is invariably associated with other evidence of use on hard materials such that it is difficult to mistake plough damage for use-damage: it is patterns along a length of edge which are used to interpret use-damage evidence at low power.

This leads straight on to the limitations of the technique to be applied. A series of experiments led me to conclude that even under ideal conditions a range of activities were likely to remain invisible to low-power use-wear analysts. Figure 1A



1. Use-wear visibility

represents the relationship of the three main factors. In theory, any combination of variables which falls below the depicted surface will be invisible to the analyst. For example cutting/whittling with a relatively steeply edge-angled flint on soft material is unlikely to result in detectable damage; on the other hand damage resulting from scraping with a steeply edge-angled flint will be detectable on all but the softest of worked materials. Some of these variables are impractical so a modification of the diagram is needed (Fig. 1b) which removes the implausible combinations such as whittling with a near-right-angled flint edge. Even in ideal conditions, then, low-power analysis is simply incapable of detecting some uses.

How is surface material likely to be affected in terms of the invisibility of some uses? Except in circumstances of heavy damage from repeated ploughings, recovery from the ploughsoil increases the range of invisible activities only to the extent that the formerly barely-visible uses such as cutting medium-soft materials are less likely to be detected on surface material because the large, randomly-distributed scars of agricultural damage may remove the series of small scars which would betray such a use.

Application

At Isleham, conventional typological and technological methods were used to establish a sequence of sites beginning with the later Mesolithic and ending with late Beaker-associated material (Brown, forthcoming). A use-wear analysis of five of the twenty-six collection sites was undertaken and a number of contrasts were drawn between the 'use-profiles' of the individual surface scatters.

1. The balance of activities represented in the single Mesolithic sample and the Neolithic samples was quite different, with cutting/whittling activities dominating in the Mesolithic sample in contrast to the more balanced representation of cutting/whittling, scraping and boring activities in most of the later samples.
2. The similarity in the distributions of the Neolithic activities at three main sites was considerable, contrasting with a small Neolithic sample from site 25 which was dominated by scraping activities. This has been taken to indicate that the larger sites are generalized habitation sites in contrast to the smaller resource-specific sites.
3. Changes were apparent in the balance of wet and dry resources as indicated by the hardness of materials worked at the sites.

Potential

The results of this experimental approach to surface material at Isleham can only be assessed with reference to

evidence from excavated contexts in which seed remains etc. survive, evidence which is not currently available. If preliminary surface use-wear analysis can be built into excavation proposals in the first few years of future Fenland Project work, however, or into work in similar areas where surface material is an under-exploited resource, then the technique can be afforded some predictive value and hence be used to fill in the gaps between the areas which will need to be excavated.

The application of low-power microscopy to surface lithic material has a number of other potential roles. If it is accepted that many plough-damage scars on flint edges can be identified, for example, then low-power analysis can be turned towards non-use damage. By this I mean the quantification of damage such as from ploughing on edges. In the context of cultural resource management, one application might be the assessment of the degree of plough-damage at a site by identifying undamaged edges which indicate that fresh material is in the process of being disturbed. Where undamaged edges are few, then the site has reached a stable state, either where the plough is no longer reaching archaeological contexts, or where there is no more undisturbed archaeology to be reached.

A consequent application could be in monitoring the effectiveness of management initiatives at a surface scatter site. If the proportion of undamaged edges decreases over time then management can be said to be being successful, effectively stabilizing the deterioration of the site. If undamaged edges continue to turn up in samples taken after several years of management, then deterioration would appear to be continuing and further initiatives may be necessary.

Other uses may be apparent to the reader. What I have tried to illustrate is that low-power microscopy on surface lithic material is not something which can be applied in all circumstances but equally it cannot be discounted from the outset. The methodology needs refinement, but use-wear analysis could become a powerful tool in evaluating surface sites over wide areas. Non-use damage analysis may also become a useful aid to monitoring the condition and management of surface sites without inflicting fresh damage.

The Norfolk Peat Fens: an Extensive View

by Frances Healy

Background

In contrast to Andy Brown's microscopic study of five collections from Isleham, I have attempted a broad, macroscopic assessment of all of the 15512 pieces of worked flint and stone collected from 370 sites and many hectares of background scatter in the Norfolk peat fen by Bob Silvester in the course of the first stage of the Fenland Project (Healy forthcoming a).

The limitations and potential of the material are largely defined by the landscape from which it was collected. On the south-eastern edge of the Fenland basin, upland (in the East Anglian sense of land rising to c. 20m) of chalk thinly capped with superficial deposits gives way to a zone locally known as skirtland in which wasting peat is progressively exposing the solid floor of the basin. This zone is characterised by a microtopography of hummocks and hillocks of varying height, often several to a field. These are formed either by fossil Late Glacial sand dunes or by ridges of hard chalk from around which softer beds have been eroded. It is these hillocks which were occupied, densely and often repeatedly, in prehistory.

In consequence, surface material tends to occur in discrete concentrations focused on eroding or eroded hillocks, although many of these 'sites' are formed by the accumulated debris of unrelated episodes of settlement spaced over millennia. It also occurs in widely varying condition, since progressive erosion means that, while some collections are fresh and capable of the kind of analysis applied to the Isleham material, others have spent in the ploughsoil. These concentrations are themselves tightly packed within a zone of skirtland c. 2km wide. If intensive occupation continued farther out into the fen it is not yet exposed for collection.

Concentration within a narrow geographical zone would itself preclude a common means of analysing field survey material in the form of examination of broad changes in composition across the landscape. Local landscape history makes this approach yet more inappropriate. In the course of the Flandrian the Fenland basin has developed from dry-land forest through peat bog to over-drained prairie. Its lithics were accumulated in a succession of very different landscapes.

The principal developments on the south-eastern Fen edge in the period spanned by the Fenland Project collection were, grossly simplified, the following: gradual expansion of freshwater peat from river channels and similar locations over parts of the basin floor, leading to the replacement of deciduous forest by alder carr and then, c. 3000 Cal. BC, by reedswamp, with increasing wetness culminating in marine incursion c. 2700 Cal. BC, not reaching to edge of upland, but producing brackish salt-marsh conditions at the margins of the basin. Freshwater conditions were restored and peat growth, this time extensive and sustained, renewed c. 2300 Cal. BC.

These constraints prompted a decision to concentrate attention on those collections which seemed, on conventional technological and typological grounds, to be predominantly of a single-period. These could be broadly related to landscape change and hence provide some index of changes in human activity in relation to a shifting resource base.

Results

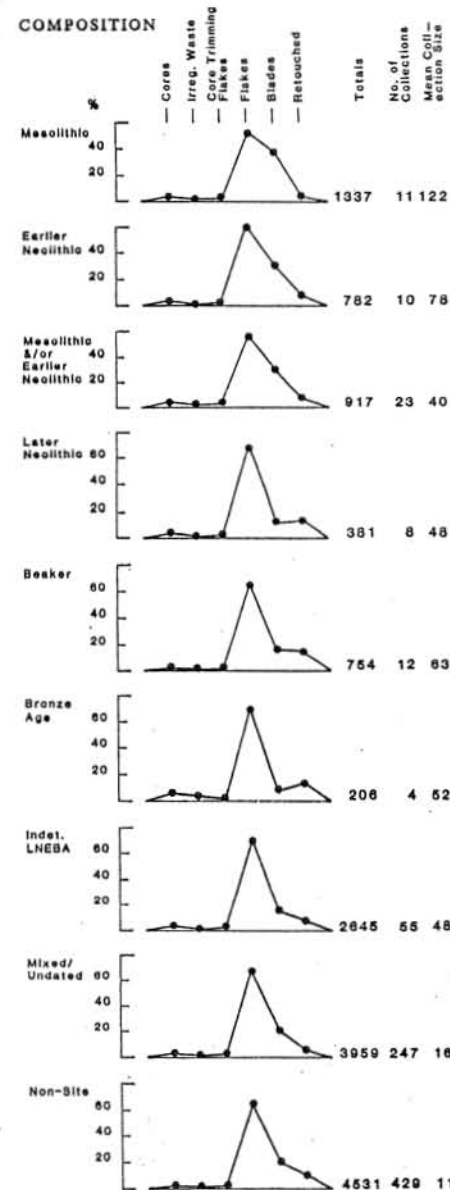
Settlement Distribution. Later Mesolithic sites were concentrated along the former courses of the rivers Wissey and Little Ouse, which form the northern and southern boundaries of the study area. This suggests a concern not only with communication and fishing, but with other river valley resources such as congregating animals, winter shelter and relatively lush winter vegetation.

There is a marked contrast between the location of these and the settlements of farming communities, corresponding to the contrast in use-wear recorded by Andy Brown. Neolithic and later sites were concentrated on the edge of the upland. Most Middle Neolithic sites, probably dating from a time of patchy and discontinuous peat cover, are on the chalk-based soils of the central and northern parts of the skirtland zone, which may well have been more fertile and resilient than the sand-based soils of its southern part. Later Neolithic material is relatively scarce, perhaps suggesting that the brackish, salt-marsh conditions which accompanied the marine transgression had relatively little to offer contemporary populations. The post-transgression Beaker and Early Bronze Age period saw the densest occupation. It was then that settlement became evenly distributed along the fen edge. It may be that extensive peat cover made the nature of the underlying terrain irrelevant, and was itself an important resource.

Raw Material. While a wide range of locally available flint was used in all periods, there is a marked use of non-chalk flint, often orange in colour, in pre-transgression collections, especially Mesolithic ones. This gradually gives way to increased use of chalk flint and indeterminate grey-black flint, most of it probably also chalk flint but lacking cortex, which dominates in post-transgression collections. This suggests that, as till and gravel deposits on the floor of the basin became progressively inaccessible, more and more flint was brought from the upland.

The derived flint of the immediate upland is small, degraded and heterogeneous. *In situ* flint begins to occur consistently and in quantity only in the *Terebratulina lata* zone of the Middle Chalk, the western edge of which lies some 3 km east of the fen edge. If flint was being transported from upland to fen edge one might expect it to include floorstone mined at Grime's Graves, 12 km to the east and exploited c. 2600-2000 Cal. BC, during the post-transgression occupation of what is now skirtland. The distinctive fresh, thick cortex of floorstone is, however, very rare in fen edge collections. The chalk flint in them is generally surface material, weathered and abraded, with relatively thin cortex and areas of corticated thermal fracture.

Most flint was transported in the unworked state over distances of up to 5km and knapped on the hillocks and ridges of the fen edge. This is reflected in the occasional unworked nodule of fresh chalk flint and in the representation of all stages of



2. Overall composition of collections made in the Norfolk peat fens in the course of the Fenland Project.

the reduction sequence in post-transgression collections in proportions which differ little from those of pre-transgression collections (Fig. 2) or of assemblages from upland sites located on flint sources. There are two indications that a minority of the flint may have been transported at more advanced stages of the reduction sequence.

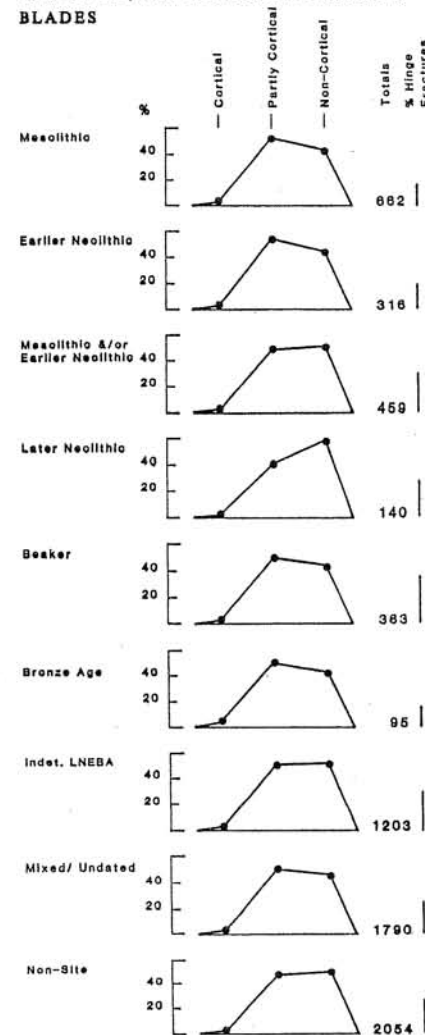
1. Later Neolithic collections are distinguished from both earlier and later ones by a marked excess of non-cortical flakes over partly cortical ones (Fig. 3). This may reflect the import of blanks and/or prepared cores, the use of exceptionally large masses of raw material, or both.

2. The frequency of retouched pieces in these same Later Neolithic collections is double that of earlier collections and equal to that of subsequent ones (Fig. 2). This may reflect the import of finished implements, blanks or preforms.

Fine Objects. This increased frequency of retouched forms coincides with the emergence into the local and national record of elaborate flint and stone implements including finely-made arrowheads, discoidal knives, plano-convex knives, flint and stone axes, stone maceheads and jet ornaments. All are exceptionally numerous in the haphazard tally of finds made over the years on the south-eastern fen edge, and some are represented in the Fenland Project collection. While there is evidence that some were made on the fen edge, the sustained increase in retouched pieces may reflect the import of high-quality finished flint implements.

Where did the Floorstone Go? If the output of Grime's Graves is near-invisible in the contemporary local record, it is likely to have left the site in non-cortical form. This would tally with the suggested import of cores, blanks, preforms or finished implements to fen edge sites. Some implement types seem less likely to have been made at this source than others. Most, probably all, of the flint axes from the survey are of other than Grime's Graves flint (many are a mottled orange), and none are flake axes of the characteristic triangular-outlined, plano-convex form known to have been produced there (Saville 1981, figs. 43 - 45). The site's products included discoidal knives (Saville 1981, 51-56) and may have included some of the other prestige goods of the Later Neolithic and the grave goods of the Early Bronze Age, especially elaborate knife and arrowhead forms (Healy forthcoming b). Raw material won at considerable cost from a restricted source might have enhanced the significance of elaborately-worked objects. Such artefacts are generally non-cortical, which makes the macroscopic identification of their raw material particularly uncertain. The presence in the Fenland Project collection of two scale-flaked knives of sound, dark flint with floorstone-like cortex would accord with this.

COMPLETE, UNRETOUCHED FLAKES & BLADES



3. Cortex cover in collections made in the Norfolk peat fens in the course of the Fenland Project.

The Character of Fen Edge Occupation. Scrapers rise from approximately 40% of the retouched forms in pre-transgression collections to exceed 60% in post-transgression ones. This must surely have a functional significance, especially as high scraper frequency is a recurrent feature of Beaker and Early Bronze Age industries from the area. But what? The coincidence of high-scraper industries with fen edge locations recalls Bradley's suggestion that the regularity with which such industries occur on floodplain and marsh-edge sites, with faunas dominated, where they survive, by cattle bone, reflects the use of such areas for seasonal pasture, with a concomitant emphasis on butchery, skin- and bone-working (1978, 56).

The correlation cannot be so simple. Use-wear studies increasingly show that scrapers, while sometimes used for skin-processing, were also multi-purpose tools. The model might be applicable where scrapers were indeed used primarily for skin-working and where this was a sufficiently important activity for its debris to remain uneclipsed in the final mass of lithics discarded on a site. Not surprisingly, it seems to work in some cases but not in others. The high scraper industry of Storey's Bar Road, Fengate, comes from a system of paddocks and droves interpreted in terms of stock-rearing and the exploitation of the summer pasture of the western fen edge (Pryor 1978, 161). But the near-identical economy of Newark Road, Fengate (Pryor 1980, 180) is not reflected in a high-scraper industry; nor are the stock-rearing and dairying which played an important part in the economy of post-mining Grime's Graves (Legge 1981, 79).

Present evidence suggests that, within the occupied zone, cattle may have been an important facet of a form of mixed farming combining skirtland and/or upland cultivation and fen pasture. This would accord with the location of settlements on the boundary of both zones, sites to exploit both. It would further accord with the unconstrained working and use of flint brought perhaps 5 - 10 km from upland to fen edge. This conveys a strong impression of embedded procurement: of flint obtained at little or no marginal cost in the course of frequent traffic between the two areas.

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