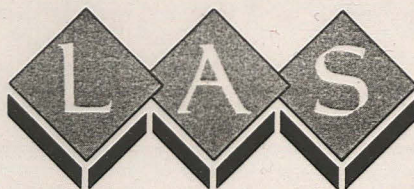


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# LINDSEY ARCHAEOLOGICAL SERVICES

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SALT PROCESSING IN THE LATE BRONZE AGE

AT TETNEY, LINCOLNSHIRE

By  
Colin Palmer-Brown

EXCAVATION REPORT

on behalf of

ANGLIAN WATER SERVICES LTD

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## 1.0 ABSTRACT

In February 1993, a late Bronze Age saltern was excavated on Newton Marsh near Tetney, Lincolnshire. It was discovered during an archaeological field evaluation in advance of a large scale development works. The saltern, of national significance, is one of only a few examples known to have existed during the Bronze Age in Britain. Its discovery adds significantly to an expanding knowledge on the origins and development of prehistoric salt processing.

## 2.0 BACKGROUND

The site lies in the Lincolnshire Outmarsh approximately 2.5 km north-east of Tetney and 1.5 km west of the present coastline (TA 3320 0325) (Fig. 1). A new sewage treatment works, extending over an area greater than 15.5 ha, is being constructed by Anglian Water Services Ltd as part of the Project Clear Water '95 which will provide improved sewage treatment for Cleethorpes and its neighbourhood. Immediately prior to development, the land had been under arable cultivation.

Abundant evidence of medieval salt production lies to the east of Tetney and neighbouring villages; North Cotes, Marshchapel and Grainthorpe (Rudkin & Owen, 1960). Linking these settlements today, the modern A 1031 follows the approximate line of the medieval coastal defence between Humberston and Conisholme, and the remains of salt production at these and other villages usually takes the form of extensive waste mounds comprising de-salted mud piles and other debris. A closely-spaced group can be seen less than 1km east of the Tetney site.

The British Geological Survey has recently mapped medieval saltern mounds between Humberston and Saltfleet using evidence visible on aerial photographs. It was estimated that they represent some 23 million m<sup>3</sup> of salt processing residue, possibly reflecting the largest medieval salt industry in Britain (Pattison and Williamson 1986).

Against this general background the County Archaeological Officer negotiated with Anglian Water Services Ltd. for an archaeological assessment to be undertaken in advance of development, with a view to locating salterns and related features. Sensitive areas thus identified would be further investigated by excavation.

Oxford Archaeotechnics undertook a geophysical and historical assessment of the area in November 1992 (Johnson 1992), comprising a) magnetic susceptibility field sensing, b) magnetometry, c) augering, d) microtopographic survey.

These combined techniques revealed several possible areas of activity within the development area, the most significant of which was located in the north-west quadrant: a possible focus, extended over an area approximately 20m in diameter (Fig. 2).



Subsequent augering revealed that this was associated with extensive deposits of burnt clay and charcoal. There was a corresponding rise of c.0.40m in ground level; a small but significant deviation in an otherwise flat landscape.

It was agreed with Anglian Water Services Ltd. that a watching brief should be maintained during topsoil stripping and subsequent earth removal. A small excavation was also planned in the north-west quadrant to expose features identified during the geophysical and topographical survey.

Presented below is a descriptive account of the field data, with an interpretation and a general discussion on prehistoric salt processing. An assessment is made regarding the regional and national significance of the Tetney saltern.

### 3.0 THE EXCAVATION

The excavations were directed by Colin Palmer-Brown, and the watching brief which is the subject of a separate report was carried out by Geoff Tann; both on behalf of Lindsey Archaeological Services.

Features encountered during the excavations were assigned numbers for recording purposes. These are referred to in the text and on the accompanying illustrations. A detailed site plan may be found at the back of the report (Fig. 4).

Following topsoil stripping (Pls. 1, 2) in the area identified by the survey, an extensive deposit of reddened clay and briquetage was identified. This lay immediately east of a large sub-circular pool measuring c. 16m in diameter, whose dark fill contrasted with natural yellow clays around its periphery. It was decided that a section should be dug through the pool deposits and that the area of reddened clay and briquetage should also be examined. Digging by hand proved extremely arduous and a mechanical excavator was used to remove two cross-sections through the pool, dividing the site into quadrants (Pl. 3; Fig.3). In one of these, (Area 1), the bulk of pool fill was removed to expose an extensive layer of briquetage fragments, stone and other debris (below). All features of archaeological interest were sealed beneath a layer of smooth-textured greyish-brown clay, [04], which was also removed largely by machine.

### 4.0 THE NATURAL POOL

The natural saltmarsh pool measured c.0.80m at its deepest point. It lay on a horizon of reworked chalky boulder clay, [074], its sides sloping very gradually, usually at an angle no greater than c.15-20° (Pl. 4), except on the south-east side where its profile had been artificially modified (Pl. 5)(see below). The chalky boulder clay had been deposited during the last glacial period c.10,000 years ago.



Pl. 6 shows the sequence of deposits in the pool fill. The lower c.0.20m of pool fill, [08], was a light grey silty clay with brown mottling. It contained a moderate quantity of small chalk fragments, derived from underlying chalky boulder clay. The mottling was caused by root penetration, as was the apparent upward movement of chalk fragments (see soils report below). Although small briquetage inclusions were present, these were derived as a result of downward movement from an overlying deposit. This lower pool horizon pre-dated archaeological activity on the site.

A thick accumulation of light brown-grey silty clay, [013]/[012], sealed most of the lower deposit. It measured up to 0.50m in thickness and formed the main fill of the pool. The interface between horizons was everywhere faint, though this change in composition is significant to our understanding of the saltern. A thick, extensive scatter of briquetage fragments, pebbles, worked and unworked flints and flecks of charcoal, [019], lay within the lower part of this fill(s). It was common to the east and south-east area of the pool and extended slightly beyond its perimeter (Pl. 7).

The pool infilling appears to have ceased with the deposition of an extensive, virtually stone-free greyish-brown plastic clay, [04], which was common to the entire area covered by the sewage treatment works and, presumably, beyond. Its average depth in the excavation area measured 0.20m, though this increased to more than 0.30m over the pool which, by this time, was little more than a slight depression. Elsewhere in the development area, depths greater than 0.90m were recorded. Its deposition may have been the result of marine transgression in the later prehistoric period.

Sediments within the pool contained floral and faunal remains which confirm that brackish water conditions prevailed throughout the developing sequence (see environmental report below).

## **5.0 OTHER FEATURES**

### **(5.1) North-east Quadrant. (Area 1)**

On the north-east side of the pool, less than 2m from its edge, a small fire pit/hearth, [016], was excavated (Fig. 5). Its original form was difficult to assess due to post-depositional movement caused by animal burrowing, soil cracking and changing hydrology.

Measuring just over 0.80m in length, the fire pit was dug through light mottled sandy clay, [011], a natural deposit seen, with minor variation, over the entire excavation area outside of the pool. The sides were steep, almost vertical in places, and the base was irregular and undulating (Pl. 8). The north edge showed signs of considerable heat penetration, where natural clay had been reddened to a depth of 20mm (Pl. 9, 10).



Overlying the base on the same side was a substantial amount of collapsed wall which was also fired red.

A series of thin ash lenses, [07], sealed the top of the pit, extending beyond its edges in all directions (Pl. 11). A number of small ash-filled holes lay around, and within, the fire pit. Their proximity and homogeneity suggested that they perhaps held supports for evaporation troughs. Unfortunately, post-depositional processes had distorted deposits, making interpretation difficult. A sample of charcoal from one of these holes [057] (Pl. 12) was submitted for radiocarbon dating. This gave a radiocarbon age of 2460  $\pm$  70 BP, calibrated to a date of 845 to 745 cal BC. The result confirmed that activity on the site dated to the late Bronze Age/ Early Iron Age, some 2,000 years older than originally anticipated, prior to the excavations.

Similar, smaller, features were examined in Area 4 but the pit [16] was considered the most convincing as a hearth upon which to crystallize brine because of the obvious high temperatures reached. Evaporation by artificial means can require sustained heat over long periods (Gouletquer, 1975).

It was only possible to sample a relatively small area of the 'briquetage layer', [019], though it was clear that the densest concentrations lay in proximity to the fire pit (Pl. 13; Fig. 4). Most neighbouring and associated features contained quantities of briquetage and its frequency decreased progressively westwards of the fire pit area. A total 1570 pieces of briquetage were retrieved from the excavations, only a sample of the material present. About 33% came from the briquetage layer [19].

Less than 1.0m south of the fire pit was a curved, almost horseshoe-shaped, shallow gully, [06] (Pls. 14, 15, 16, 17), whose southern end met a more substantial ditch terminal, [061] (Pl. 17). The gully measured little over 0.25m in depth and was filled with an homogeneous reddish-brown, burnt-looking, silty clay containing large quantities of briquetage, [05]. There was no clear primary fill, it being virtually indistinguishable from the material above it, [03], which overlay most features immediately east and north-east of the pool.

#### **(5.2) South-east Quadrant. (Area 2)**

The ditch into which the gully fed, [061], extended south-eastwards for a distance of 4.0m before turning a right angle (Pl. 18) and following a south-westerly direction for a further 11.0m, eventually becoming incorporated as an artificial edge to the pool (Pl. 19). The relationship between ditch and pool is illustrated in Fig. 6 and may be summarised as follows:-

The external ditch edge was dug through natural clays on the edge of the pool. Its internal (pool-side) edge was significantly shallower, indicating that the pool was a pre-



existing feature. The bulk of fill common to the ditch was a smooth-textured mottled brown sandy clay, [070]. Further east, in Area 2 it contained a significantly greater quantity of briquetage and became indistinguishable from the fill of the horseshoe-shaped gully, [06].

It was only possible to excavate the ditch-fill at selected intervals. However, cross-sections dug in Area 2 consistently showed that its internal edge was shallower than its external edge. In Area 4 (Pls. 20, 21, 22), only an external edge was identified, suggesting that, here, the cut was merely a modification to the south-east side of the pool. It may be that the steeper cut was created as a means of aiding the extraction of water: the slope of the pool in its natural state would have precluded the removal of liquid in all but the smallest of containers and, as salt processing can demand large supplies of water, the modification would have made extraction far easier.

The siting and stratigraphic sequences associated with the pool, gully and connecting ditch suggests that each functioned interdependently.

A number of features were examined east and south of the pool edge, some of which appeared to be purposely-dug pits, others little more than surface depressions.

One small pit in Area 2, [064], was situated c.0.20m east of the L-shaped ditch [061](Pl.23). Within its ashy fill was a complete, though damaged, clay pedestal which had a flat base and two horn-like tines at the top (Pls. 24, 25, 26; Fig. \*\*). Similar pedestals have been found on other prehistoric salt-making sites and it has been suggested that they were used as supports for evaporation containers or salt cake moulds (eg. Riehm, 1961, Bell, 1990).

Further east in the same area was a group of amorphous depressions, none of which exceeded 0.20m in depth (Pl. 27); ([47, 49, 53, 55/56, 58, 73], Pls. 28-31). A dark silty, charcoal-flecked soil was common to each. It is unlikely that they were purposely excavated features: more probably, they were natural depressions which accumulated occupation, industrial and other debris and could, therefore, be remnants of a more extensive occupation spread which was subsequently truncated or eroded by flooding. In situ deposits would then have survived only in lower-lying spots which escaped destruction. Each depression was sealed beneath a thin layer of brown sandy clay containing a moderate quantity of pebbles, briquetage fragments and pottery sherds, [051]. At first it was thought to be the scant remains of an old ground surface associated with a dry phase. However, its localised association with the group suggests it was in fact material scattered by flooding. Many of the depressions contained pottery sherds, briquetage or other waste.



### **(5.3) South-west quadrant. (Area 4)**

Further occupation debris was encountered south of the pool in Area 4. Here, much of the natural ground surface was overlain with extensive deposits of dirty sandy clay, reminiscent of [051] in Area 2. On the south-east side of Area 4 was a disturbed, charcoal-flecked, layer of mixed and mottled dark sandy clay, [078] which contained a dense scatter of unabraded domestic pottery sherds. More than 100 sherds of late Bronze Age/ Early Iron Age pottery were found during the excavations, 75 of which came from this deposit (Pl. 32). Their date compares favourably with the Carbon 14 determination obtained. A few pieces of worked flint were also found but their dating was far less clear (see report below). Much of the western part of Area 4 was covered with similar material, [079]. Everywhere, stratigraphic divisions were difficult to assess, with relationships between occupation spreads and cut features proving problematic during excavation, probably because of post-depositional modification.

On the north-west side of the same area, close to the pool edge was a small, irregular, pit-like feature, [085/086], whose surviving depth did not exceed 0.25m (Pl. 33, Fig. 4). It was filled with charcoal and charcoal-stained silty clay. A similar depression of comparable dimensions was exposed less than 1m further south, [080/081] (Pl. 34). Much of its base was also lined with charcoal, though in neither case was there direct evidence of in situ burning comparable to the fire pit examined in Area 1. [090/091] was another small pit or post-hole close to the pool edge (Pl. 35).

Two further sub-circular depressions, [83/84] and [92/93], were examined in Area 4, the functions of which remain uncertain (Pls. 36 and 37).

### **5.4 North-west Quadrant. (Area 3)**

Work in Area 3 centred on cleaning and defining the pool edge, as well as examining its western periphery. Excluding occasional surface scatters of redeposited charcoal (which were seen intermittently over much of the development area), there were no features. In the east-west machine trench between Areas 3 and 4 however, one shallow oval-shaped depression, [094/095], was exposed, which may have been the base of a further small hearth (Pl. 38).

## **6.0 THE UPPER CLAY**

The upper clay deposit [04], post-dated salt processing activities on the site and sealed all features of human origin. It was initially speculated that it developed as a result of an 'event' or series of events like the severe floods which were recorded in Lindsey from the 13th century (Owen, 1984, 47). Given the age of the saltern, however, and close stratigraphic relationships between the upper clay and the archaeology, its origins may be placed in later prehistory. Macrofossil analysis has confirmed a marine origin for the material (see



environmental report below) and it is possible that its deposition commenced during the earlier part of the Iron Age, not during the late Roman or early post-Roman period, as originally suggested by Swinnerton (Swinnerton, 1936).

Considering Fig. 6 once again, [04] and [02] are the same material, physically separated by a substantial lens of different material, [01]. A close similarity between this and natural sandy clays immediately outside the pool left little doubt that it derived when the ditch, [061], was excavated, where it was probably heaped on the outside of the pool edge. It was subsequently returned to the area from where it originated; an event, perhaps, within a more prolonged sedimentological process. This process was probably marine transgression.

## **7.0 INTERPRETATION**

The essential components of a small-scale salt processing industry are present at Tetney, though the precise mechanisms by which it functioned remain speculative. That said, a theoretical working framework of procurement and processing strategies is set-out below, based on the field data and comparative assessment. It is sub-divided into five stages summarised in Fig. 7.

### **7.1 Procurement**

The burnt clay residue examined at Tetney, [03], resembles material long-associated with the famous 'red hills' in Essex. There, the origins of widespread burnt alluvium and clay mounds found with Iron Age and Romano-British salt-workings has been the subject of exhaustive debate. Even today, the status of these reddened soils remains unclear (Fawn et al, 1990), though it has been argued that extensive deposits of burnt clay on briquetage sites are the residues of de-salted mud (below).

At Tetney, salt-impregnated mud could have been gathered from areas within the surrounding saltmarsh and processed close to the natural pool. As most of the direct evidence for production centred on the seaward side of the complex, a major sources of raw material may also have been closer to the sea. In a marsh environment intersected by tidal creeks, which probably existed at this time, salt-rich mud could have been gathered from almost anywhere where concentrations of sea water were able to stand and evaporate, perhaps over the summer months. The pool itself may have been a significant source, particularly if the salt-makers were able to channel brackish waters towards it.

### **7.2 Processing (preparation of raw material)**

Karl Riehm proposed that salt-impregnated clays or silts were thrown into open fires as heating causes particles to become more coarsely-granulated, thereby making extraction easier during filtration (Riehm, 1961). On this basis, mud was gathered at Tetney, perhaps following spring tide retreat, burnt and then recovered upon cooling. The reddened soils



comprising [03] would be well-suited to this interpretation. A series of extensive, intermittent, charcoal spreads were observed within the development area, particularly to the east and north-east of the present excavation. These spreads, which appeared to be sealed by the upper clay deposit, [04], did not constitute in situ burning but material which had been dispersed by flooding. Their association with salt production is likely, however, and some at least may have derived as a result of the process described above.

Charcoal samples from five contexts were submitted for identification by Dr G. Morgan (Leicester University). Three samples were from depressions adjacent to the main hearth, [016], and from a further hearth-like feature in Area 4, [080]. (The small quantity of charcoal surviving in the hearth itself was too fragmentary for identification.) Two further samples from charcoal spreads elsewhere within the development area were also examined. Dr Morgan reports that only oak (Quercus spec. was found although the very fragmentary smaller particles submitted may have included other species. The wood mainly represented small branches with an age range of 2 to 100 years. They possibly represent off-cuts from structural timbers, although small twig-like material may have been completely ashed or the charcoal broken up.

It is assumed that oak was transported to the saltmarsh from land more hospitable to deciduous hardwood species, possibly over considerable distances. There seems little doubt that it was a significant source of fuel during salt processing

### 7.3 Washing/filtration

It has been suggested, on ethnographic, historical and archaeological grounds, that filtration during salt-making took place through peat or other suitable organic material (Gouletquer, 1975). After cooling, the reddened salt-rich mud would be placed in containers, through which salt water would be passed, thereby creating brine. This would be removed or retained for further processing and the retent dumped.

No direct evidence of a filtration system survived at Tetney, though it is possible that the curved gully, [06], and adjoining ditch, [061], functioned as essential components. From the centre of the gully to the point at which it joined the ditch, there was a slight downward slope. Beyond this junction, the ditch continued to slope towards the pool itself. Filtration may have taken place over the ditch, gully or both, with filtrate or spillage being caught by these features and directed towards the pool. This would increase the salinity of the pool solution in preparation for the next phase; there is some evidence of increasing salinity within the pool sediments (see soils report below). Extracting water from the pool itself would have been made easier by the modification on the south-east side.



#### **7.4 Evaporation**

Having produced a brine of suitable strength, the next stage of processing centres on evaporation and salt crystallization. In England, where the sun's heat would rarely have been sufficient to evaporate large amounts of water, artificial sources would have been necessary. That said, climatic variation is a consideration as there may have been periods or phases when solar evaporation was a more viable option, if only in a supplementary capacity, than it would be today (Fawn et al 1990, 19).

It is over the fire pit [016] that concentrated brine could have been supported in containers until salt crystals formed. During this process the solution would have required constant replenishment as evaporation took place. This method of processing is practised in areas of West Africa, where salt-boiling can take many hours. Containers are supported on vertical pedestals over temporary kilns, which are then destroyed after use (Gouletquer, 1975). The high incidence of briquetage fragments close to the fire pit at Tetney, extending over much of the east and south-east sides of the pool [019], may reflect the difficulties involved in extracting salt, once hardened. It may have been easier and more economical to smash containers than it was to salvage them.

There were a number of small holes around and within the fire pit but the method of supporting containers is unclear and their status remains uncertain. Only one complete short pedestal and fragments from several others were found during excavation, but it is not clear whether they were used to support evaporation tanks or smaller vessels filled with wet salt at a later stage (below). Possibly, the larger, thicker-walled briquetage fragments were associated with evaporation 'tanks', these being more substantial than some of the other sherds which may be from moulds, possibly used in the production of salt cakes. An interim assessment of the Tetney briquetage is presented below. More detailed assessment will be possible when recently discovered finds are considered. These were made to the north of the excavations, on the inlet pipe route in January 1994.

#### **7.5 The completed product**

A final stage in processing is the production of standard salt cakes. Again, not until the full range of vessel types has been quantified will it be possible to say more on whether production stopped at stage iv) or went further towards the production of regular salt units. Such uniformity has certainly been recognised on some British and European briquetage sites (Riehm 1961).



## 8.0 DISCUSSION

### 8.1 The Environmental Context

Until very recently salt-making in the British Isles was thought to have been an industry whose origins did not precede the earlier part of the Iron Age. The discovery at Tetney pushes regional salt production back at least as far as the late Bronze Age, raising important and wider questions regarding the origins of the industry.

The Lincolnshire marshland has received relatively little archaeological consideration, compared with other areas in the region, and the existing record owes more to the good will and diligence of individuals than to organised resource strategies. Much of our knowledge on the distribution of buried salterns derives from observations made during drainage cuttings and similar exposures (eg. Kirkham 1981). However, the combined techniques employed at Tetney illustrate the potential of non-destructive remote sensing in evaluation assessments (Johnson 1992) and the need for the use of such techniques in areas which might otherwise appear archaeologically sterile.

The environmental context within which the Tetney saltern existed is not fully understood, largely because post-glacial coastal evolution in the Lincolnshire Outmarsh relies heavily on a chronology that was established almost half a century ago (Swinerton, 1936). Despite this, Swinerton's sedimentary sequence still remains a basis for regional study and is worth summarising before possible implications are considered with reference to Tetney. His principal stratigraphic observations at Ingoldmells, in chronological order of deposition, were as follows:

#### (1) Submerged Forest

At the end of the last glaciation, some 10,000 years ago, boulder clay was deposited over large areas of southern and eastern England, including the area in which the Lincolnshire Marshland developed. The contemporary coastline was much further east of its present line, perhaps in Scottish latitudes (*ibid.* p.98), though much water that had been trapped on the land during glaciation was now melting and affecting global sea levels.

Overlying areas of boulder clay in the Lincolnshire Marshland are the remains of a submerged forest, evidence for which can still be seen today at the mid-tide mark around Ingoldmells. Swinerton considered the forest to be dated to within the Neolithic period (c. 3,500-2,500 BC).

#### (2) Lower Peat

During the later Neolithic, the land began to sink at a time when there was a change towards a wetter climate. This initiated peat formation, creating an environment unfavourable for the proper development of woodland species; eventually, the forests perished.



### (3) Salt Marsh Clay

Downward, or isostatic, land movement was eventually met with marine transgression, resulting in widespread silt deposition on the Outmarsh, sealing the peats described above (in places these Phragmites clays measure as much as 3.5m in thickness).

### (4/5) Fresh water clay marsh, Upper Peat and Iron Age Salt works

Towards the end of the Bronze Age, isostatic movement ceased and possibly even reversed to a small extent. As a result, sea water no longer penetrated the marshland during the Spring high tide and its waters became fresh. This is reflected in the surviving biota. In the Ingoldmells area, the ground appears to have been dry enough to allow the colonisation of small trees and bushes, recognised archaeologically as Swinnerton's upper peat horizon. Iron Age salterns make their appearance in the archaeological record.

### (6) Marine Silts

During the early post-Roman period, there was a further marine transgression and the marshland was again inundated by the sea along wide tidal creeks. This resulted in renewed marine silt deposition.

A similar sequence was recorded in exposures at Chapel St. Leonard and Anderby Creek (Alvey, 1969), but here the upper marine silts or Scrobicularia clays were missing. Others have challenged Swinnerton's chronology (eg Brooks 1990; Gaunt & Tooley, 1974; Smith, 1958). Current research throws considerable doubt on the simplicity of the general stratigraphic sequence observed by Swinnerton and others (Van de Noort & Davies, 1993). Using the advantages of scientific dating and sampling techniques, it has been suggested that there are in fact two upper peat horizons, broadly dating to the late Bronze Age and earlier Iron Age respectively. Furthermore, recent radiocarbon dates obtained from Scrobicularia clays at Chapel Point suggest that this transgression commenced during the earlier part of the Iron Age, approximately 1000 years earlier than suggested by Swinnerton (*ibid*, 23).

Given the complexity of the Marshland sequence, it is difficult to place the Tetney saltern complex within the scheme of events but, considering the revised chronology of the Marshland, Van de Noort and Davies' Upper peat 2 (Mid to Late Bronze Age/Iron Age at Chapel Point) compares favourably with the Carbon 14 date for the saltern complex.

Macrofossils, preserved within the natural pool, suggest that brackish water conditions prevailed throughout the developing pool sequence, favouring progressively increased salinity levels (see soils report below). One wonders whether or not salinity within the pool was influenced by anthropogenic interference (ie. salt production).



## 8.2 Saltmaking Sites

The late Bronze Age saltern at Tetney stands in regional isolation because no other Bronze Age sites have been identified in Lincolnshire. However, briquetage was excavated in secondary contexts at Billingborough, on the western edge of the Fens, with an associated radiocarbon date of 810-415 Cal. BC (Lane 1992). No other salt-working materials were associated and the briquetage may have been imported from another production site.

Further evidence for early saltmaking on the Fen edge comes from Northey, near Peterborough, where eighty-three pieces of briquetage were found in association with Bronze Age pottery in 1977. These included pedestals with circular stems and splayed bases as well as fragments of large steep-sided and flat-based circular vessels (Gurney 1980, 7). The material was found in shallow linear ditch and no evidence for actual salt-processing was recorded during the limited excavations. The finds were similar to those made on the Fengate, Padholme Rd site at Peterborough where six pedestal fragments were found, associated with charcoal dated to 1280+70bc (UB-676) and 935+135bc (Pryor 1980). No evidence for salt-making was found.

Saltmaking covering the periods between the earlier Iron Age and the later sixteenth century AD is archaeologically and historically well-documented (Baker 1975, Kirkham 1975 & 1981, May 1976, Rudkin & Owen 1960, Sturman 1984). One suspects, however, that sites of earlier origin may not have been identified because, unlike the Iron Age salterns discussed by Swinnerton and others, or the medieval waste heaps still visible today on the Lincolnshire coast, salterns of earlier periods, like Tetney, could remain masked beneath marine silts.

There was an extensive Iron Age industry along the Lincolnshire coast, particularly in the vicinity of Ingoldmells, though this apparent concentration does not preclude the possibility that many more such sites lie concealed beneath the silts of subsequent transgressions (Kirkham 1981). Indeed, a recent watching brief between Burgh le Marsh and Ingoldmells by Lindsey Archaeological Services has identified at least ten new salterns along the route of a water pipeline (Tann forthcoming).

Swinnerton and Baker were first to positively identify Iron Age salterns clustering on the Lincolnshire coast near Ingoldmells (Swinnerton 1932, Baker 1954). At one of these sites, as many as five hearth-like structures were found associated with a low circular mound containing broken pottery, briquetage and charcoal. Although the salterns examined by both researchers shared much in common, they bore little resemblance to features examined at Tetney. The hearths were larger and more symmetrical, in some respects resembling updraught-type pottery kilns of Romano-British date.



Unlike Tetney, where most of the briquetage was highly abraded, it was possible to restore a complete trough-like vessel from one of Swinnerton's excavations. It was made of a porous, light, crudely-fired, clay, tempered with chopped grass and chaff. These troughs were interpreted as salt pans which rested on short clay pedestals or 'hand-bricks'. Heat was provided from beneath. Similar pans were found on the beach at Ingoldmells in 1980 after heavy storms (Ambrose and White 1981, 71). Other vessels from Swinnerton's site were pygmy-bowls, interpreted as salt-cake moulds (Riehm 1961, 188).

Subsequent to the reconstruction by Swinnerton, it has been pointed out that, if troughs were supported on 'hand-bricks', the space between troughs and the ground may not have been sufficient to allow adequate heat circulation during salt boiling; that the Lincolnshire sites are perhaps 'best explained as places for moulding salt ... the structures seem more suitable for drying and hardening salt, than for prolonged boiling operations' (May 1976, 152). The problem of salt boiling is unlikely to be resolved without the examination of further salterns under controlled conditions.

In 1980, a saltern dating to the 6th century B.C. was excavated at Hogsthorpe, c. 4km north-west of Ingoldmells (Kirkham, 1981). This saltern is the most closely-dated in Lincolnshire with which to compare Tetney. Significantly, topography appears to have been a major consideration where, sited on an elevated hummock, the saltern was in a protected position within freshwater marshland, in reach of intersecting tidal creeks (*ibid*).

Significant numbers of prehistoric and Romano-British saltern sites have been identified in the south-western Fens of Lincolnshire (Simmons 1975 and 1980). Recent analysis of surface finds from 192 sites has demonstrated the value of artefact association as a means of dating some salterns, even when domestic pottery is absent (Lane, 1992). This type of non-intrusive approach is likely to be of value wherever large bodies of data are available and might, for example, shed light on the problems associated with early medieval salt production in north Lincolnshire, where pre-Conquest salt processing remains archaeologically unproven (Owen 1984, 46-7). With the British Bronze Age in mind, it would seem unlikely that enough sites would occur on the modern land surface in any given area for this type of approach to be feasible.

At Brean Down in Somerset, recent excavations have produced salt-making equipment associated with a middle Bronze Age settlement, in the form of three-tined pedestals and small brine trays (Bell, 1990). The pedestals bear some resemblance to the Tetney examples, and are a common feature on many European briquetage sites (Riehm, 1961). The brine trays are small, measuring little over 120 x 60 x 40mm, and were made of a soft, porous and friable fabric. It was suggested that, as no large evaporation containers were found on the settlement,



brine was transported from the beach in portable containers and that the small trays were for salt-cake production only. Given the effort involved with the transportation of liquid, however, one wonders whether it was wet salt, rather than brine, that was transported from beach to settlement.

In Essex, an industry dating from the later Bronze Age has been identified, though the bulk of sites thus far examined have been late Iron Age and Romano-British (Barford, 1990). At Mucking, where briquetage has been found in large quantities associated with oven or kiln-like structures, salt was being produced from at least the earlier part of the late Bronze Age. Short pedestals of more than one type were recovered during excavation, as were thin-walled rectangular vessels, thought to have been used as regular salt cake moulds.

In the Crouch estuary, a small clay-fired hearth was excavated in association with briquetage fragments, short pedestals and one flint-gritted pottery jar (Wilkinson & Murphy, 1986). Charcoal from within the saltern was dated to 1410-1136BC (middle Bronze Age). Some of the briquetage fabrics were similar to those at Mucking (Barford, 1990).

Within the 15.5 ha. development area at Tetney, no further salterns were identified during the survey phase, though intermittent areas of charcoal could represent scattered residues associated with salt-processing. Given that the excavated saltern appears to have been sited to take advantage of a slight rise in an otherwise flat and presumably vulnerable environment, it could be that there were no further salterns within the immediate landscape, unless other favourable niches existed.

An apparent expansion of the salt industry during and after the later prehistoric period has been correlated by some with expanding population levels and increased animal husbandry. The status of salt production in the late Bronze Age is less understood but may have been an intermittent activity, serving local needs; small enough to exploit discreet topographic advantages, perhaps, without the kind of competition which may have existed in the Ingoldmells area, for example, in subsequent periods.

Evidence from Essex, Somerset and Lincolnshire demonstrates that coastal salt production was flourishing in at least the later Bronze Age in Britain. The European evidence suggests that it will only be a matter of time before even earlier sites are located in Britain, aided and encouraged, perhaps, by modern remote sensing and dating techniques.



#### POSTSCRIPT

Since the preparation of this report further discoveries of briquetage and hearths, associated with late Bronze Age/Early Iron Age pottery have been made at Tetney, just north of the excavation area, during construction of the associated sewage inlet pipe. This material has not yet been fully investigated but it is clear that saltmaking at Tetney was even more extensive than suspected and highlights the great importance of the material already analysed.

#### ACKNOWLEDGEMENTS

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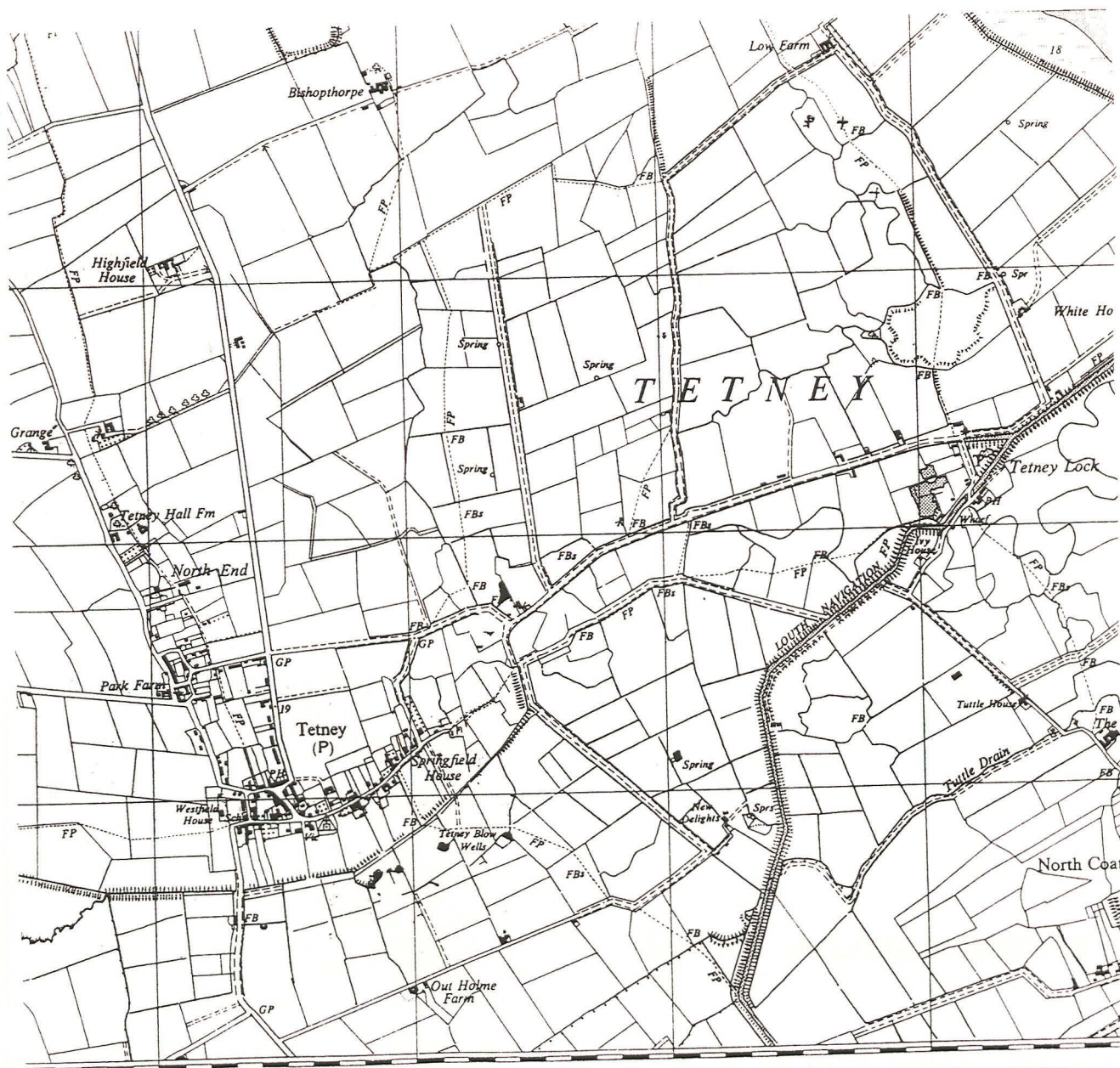
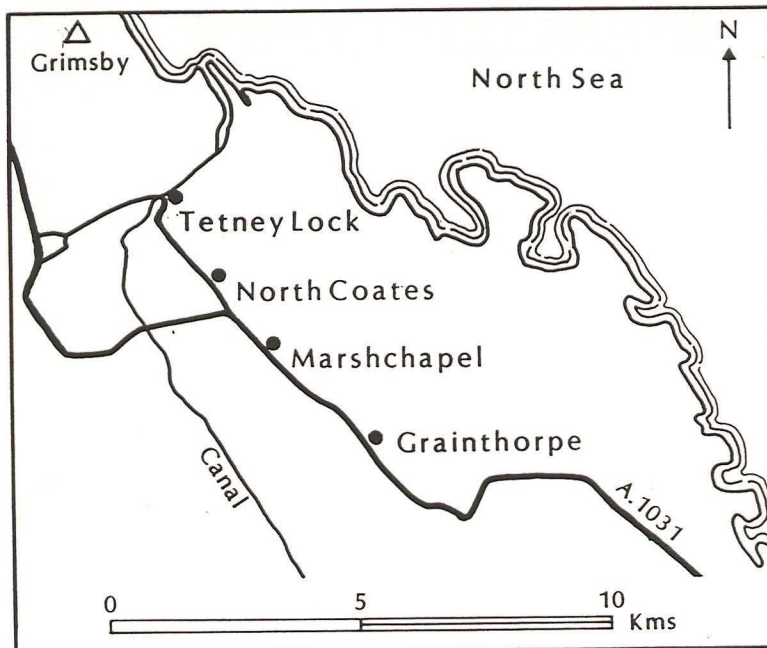
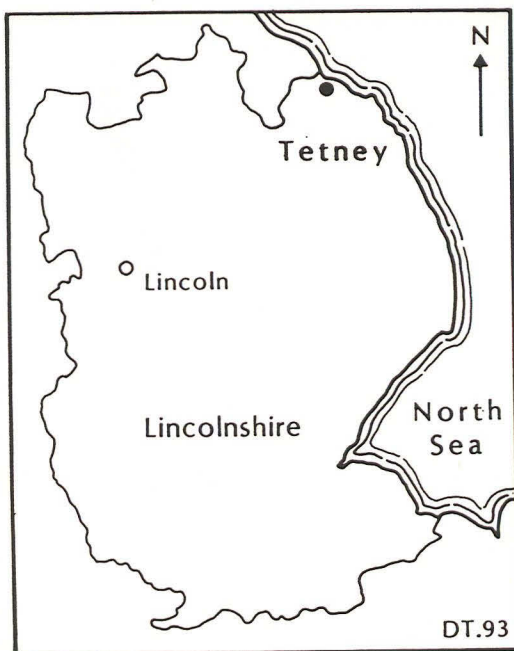
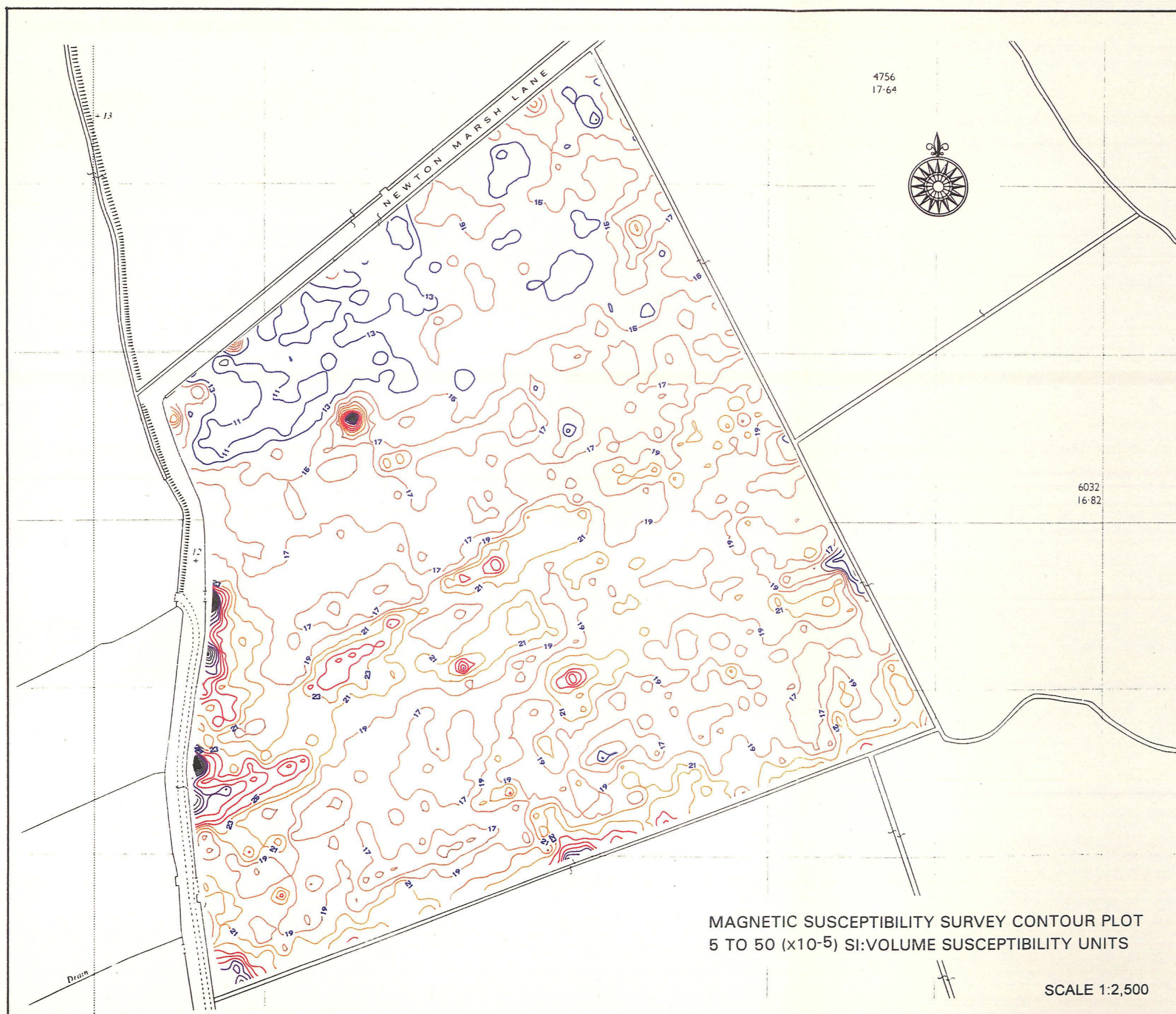


Fig. 1 Tetney. Site location plans. Reproduced from the 1953 OS 1:25000 scale map with the permission of the Controller of HMSO, Crown copyright.



# TETNEY, LINCOLNSHIRE



**Oxford Archaeotechnics**



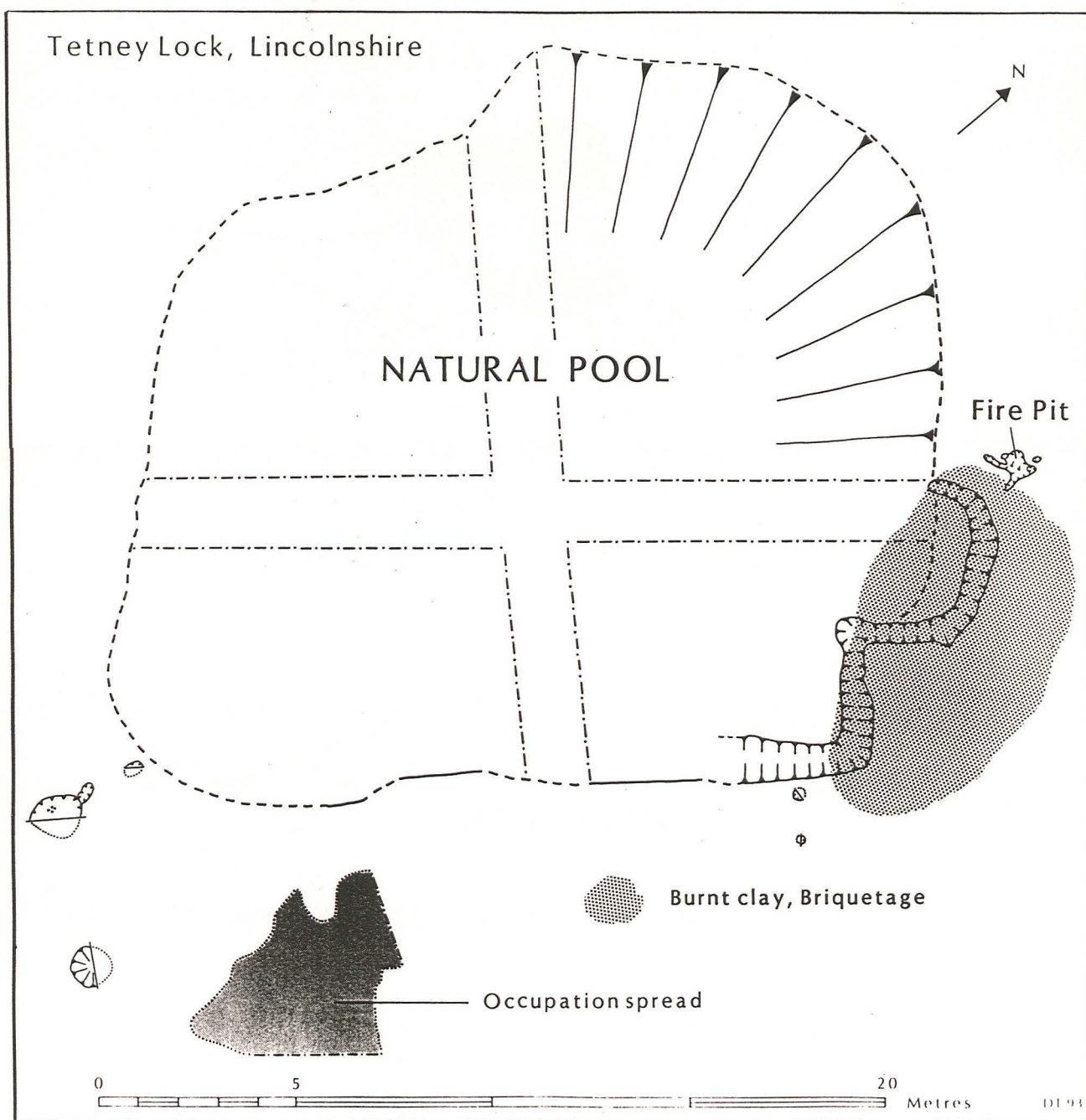


Fig. 3 Simplified excavation plan (for fully annotated drawing refer to Fig. 4 in plastic sleeve)



# FIRE PIT

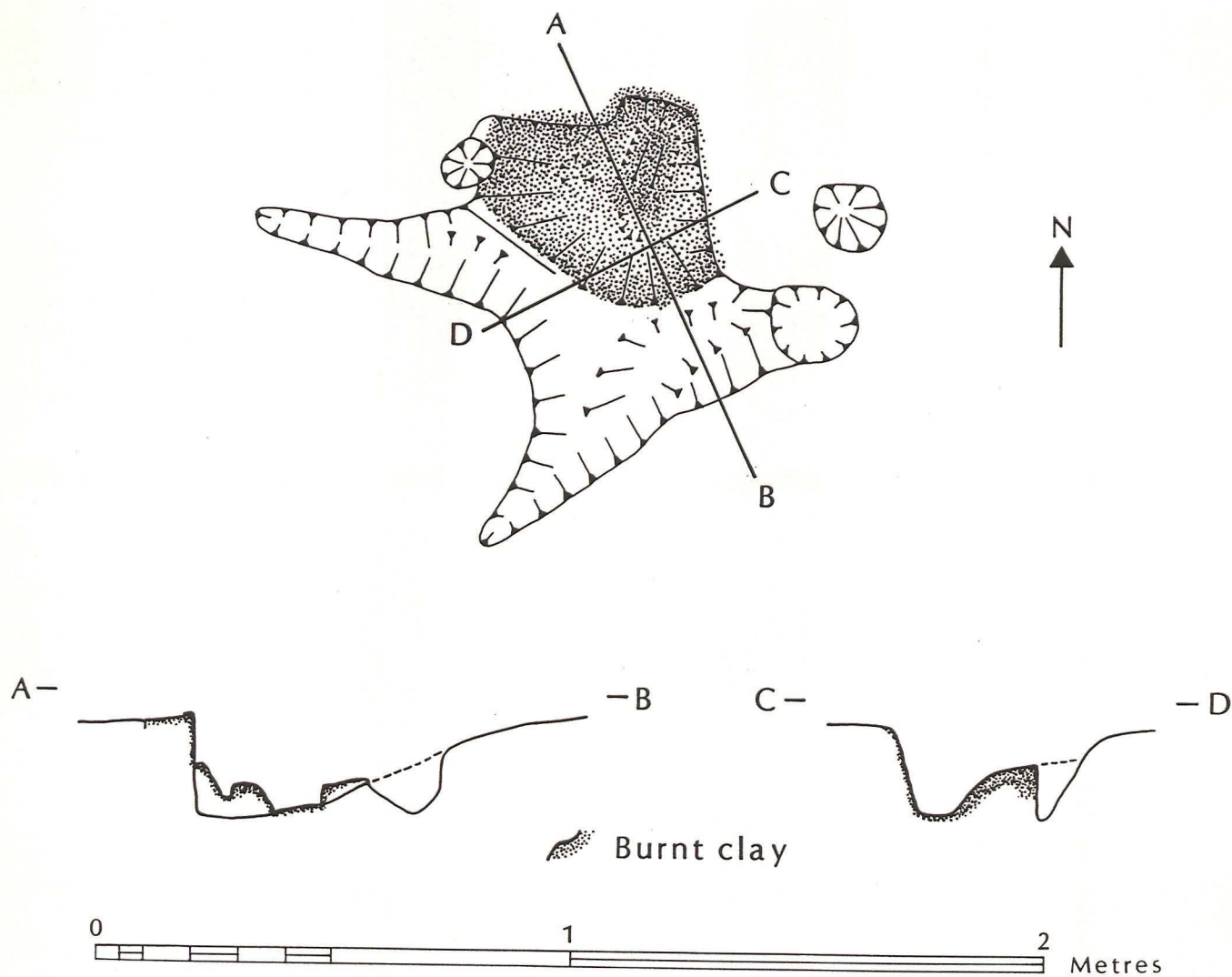


Fig. 5 The fire pit [16]. Stippled area defines area of burning in situ, which marks the extent of the original feature prior to later disturbance.



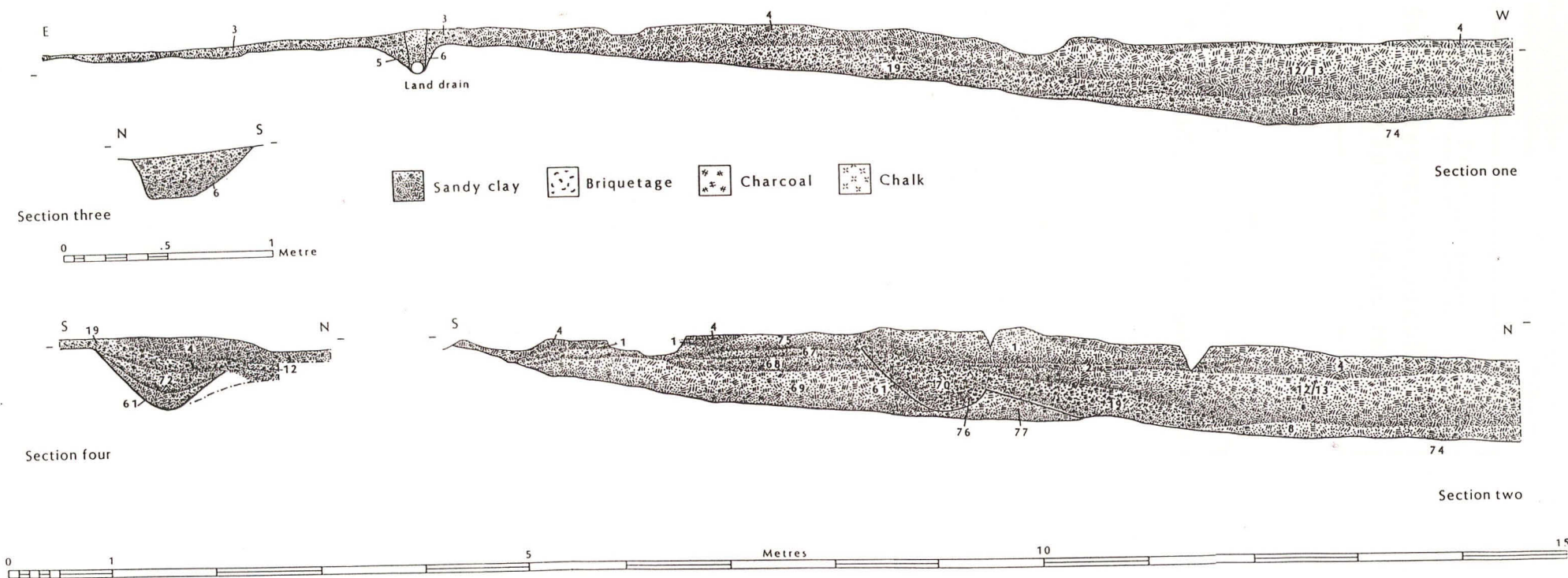


Fig. 6 Tetney. Cross sections through the natural pool



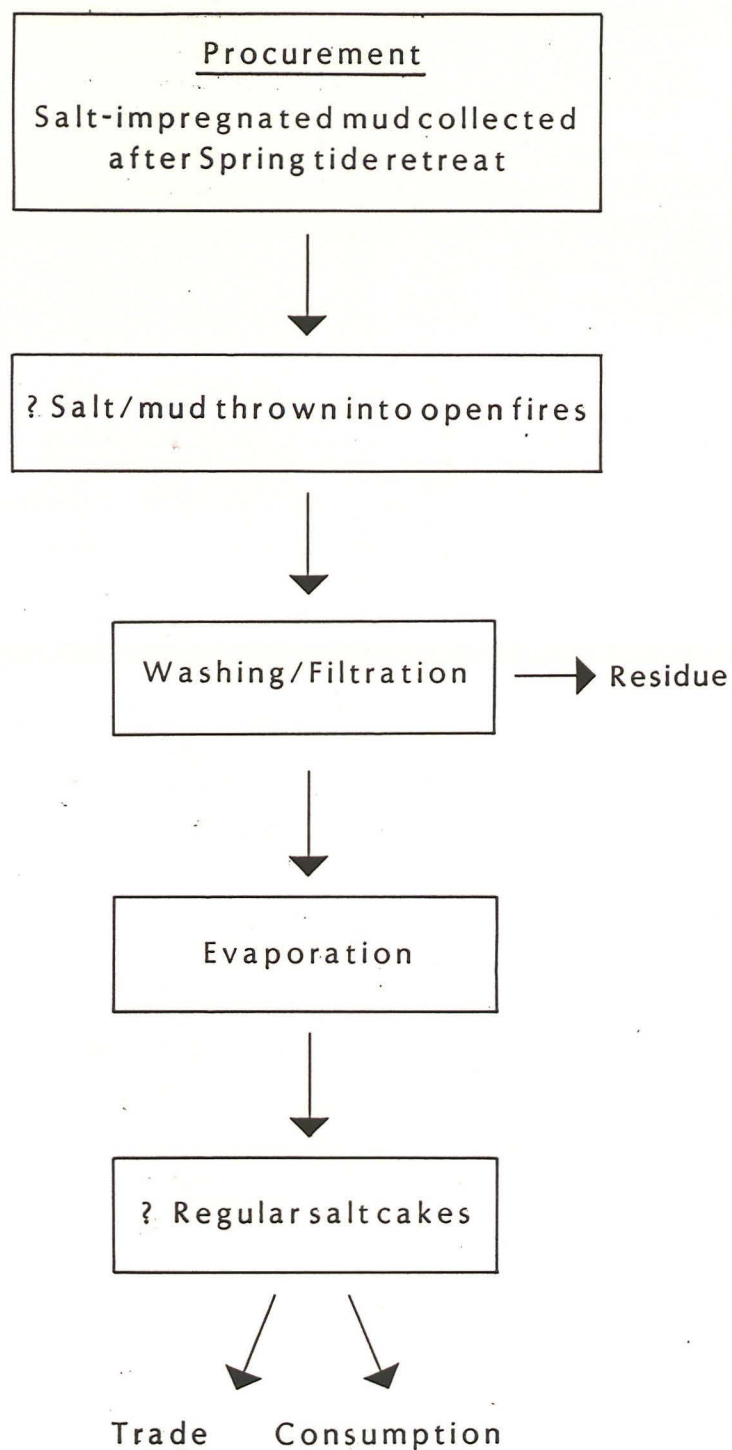


Fig. 7 Salt production at Tetney. Suggested processing stages



## REPORT ON TETNEY LOCK

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By Dr A G Brown, Leicester University (LUARC)

30 September 1993

For: The Lindsey Archaeological Trust

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### Preamble

This is a report on a visit made to the site on Sunday 3rd of March 1993 and the subsequent preparation and analysis of thin sections. A field description was made, samples taken and the site stratigraphy and interpretation discussed with Colin Palmer Brown.

### Stratigraphy and Sampling

See table 1 for an account of the stratigraphy of the face which was sampled. See site drawings for the location of the monoliths and other samples. The samples taken were stored at Leicester awaiting further instructions concerning the analytical work required. Subsequently a diatom preparation was done and three undisturbed samples were impregnated with resin, ground and mounted according to standard procedures (Murphy, 1986). All locations were tagged in the field and were plotted on the face drawings by C Palmer Brown. Samples were taken at two locations and using monolith tins and small grab sampling. All depths are from the top of the face.

TE1	Mon	top clay	0-50cm	
TE2	Mon	clay into sand body	45-95cm	
TE3	Mon	bottom clay	68-128cm	(TS 68-72 cm)
TE4	Mon	middle clay	45-95cm	(TS 46-50 cm)
TE5	Mon	top clay	31-81cm	(TS 31-35 cm)
TE6	Grab	next to TE5	31-35cm	
TE7	Grab	next to TE3, top	65-68cm	

TS = Thin Section sample



Below is the site stratigraphy for the sampled face. For the location of this face and its relationship to the overall site stratigraphy see site section drawings.

Table1

Depths	Sediment description	Initial Interpretation
0-50cm	thick grey gleyed silty clay with fine herb. root pen., prismatic, occ. stones, no chalk (2.5 YR 4/3 mottles 2.5 YR 4/1)	salt marsh accretion deposit
50-60cm	grad. boundary to stiff blocky silt clay with chalk, abundant stones and grit, becoming more calcareous with depth. Sand and boulder clay inclusions, sand calcareous-shell 10%	salt marsh channel or levee deposits
60-76cm	thick hard blocky grey silt clay with lge herb. roots (max 0.5 cm), hydromorphism. Roots pen. from depth of c. 47-57 cm. (10YR 4/2 mottles 10 YR 4/1 7.5 YR 7/1)	a lower saltmarsh deposit
76-86cm	wavy boundary into redeposited chalky boulder clay - redep. with pseudo-laminations and stones	channel deposits
86-105cm	abrupt boundary with med. well sorted sand (7.5 YR 4/6), weakly x-bedded with coal, stringers of redep. boulder clay (wavy), incorp. small sand bodies within boulder clay, small involutions/overturning, disturbed, reworked chalky boulder clay (10 YR 4/3)	fluvially or possibly fluvioglacially reworked boulder clay with cold climate features
150cm	base of trench, chalky pebbles small-large, boulder clay	glacial



### Diatom "Look-See" Preparation

Samples from the upper and lower units (TE1-7) were prepared for diatom analysis using standard methods (Batterbee, 1986). Only broken diatom valves were found, however, they did include *Asterionella* sp. which is a marine planktonic diatom and possible spines of other marine diatoms. A cone shaped phytolith was present in TE3 probably derived from higher grass covered saltflat. The most likely cause of the lack of unbroken diatoms and low diatom concentration is the detrital nature of the site with relatively high energy (for this environment) and no macrophytes and/or erosion of surrounding tidal sediments.

### Thin Section Analysis

The three samples impregnated were TE3, TE4 and TE5. Due to their fine texture and lack of structure they took over three months for full penetration to occur. Below is a description of each sample based on the terminology of Bullock *et al.* (1985). Each thin section was viewed under plane polarised light (PPL) and crossed-polars (XPL).

#### TE3

Texture: silty clay with some sand, moderately sorted

Colour: yellowish brown to reddish brown

Structure: weakly developed to no pedality, pore space 5%

Voids: channel/crack partially accommodated

Related Distribution: open porphyric

Coarse Fraction: subhedral quartz with no alteration and tabular subangular to angular, mica grain, calcite fragments

Fine Fraction: crystallitic, quartz, clay and calcite

Pedofeatures: 1) vertical channels/cavities (3mm+) filled with well sorted sand

2) iron concentration rings

3) detrital organic fragments

4) common gastropod shell more at top and associated with channels

5) possible fragments of plant root

Summary: a very weakly developed structure with evidence of tube-like bioturbation probably by marine gastropods and possibly some *in-situ* plant growth. The addition of detrital organic matter and evidence of varying post-depositional REDOX conditions.



#### TE4

Texture: silty clay with some sand, moderately to well sorted  
Colour: yellowish brown to reddish brown  
Structure: weakly developed to no pedality, pore space 5%  
Voids: channel/crack partially accommodated no coating or smoothing  
Related Distribution: open porphyric  
Coarse Fraction: subhedral quartz with no alteration and tabular subangular to angular, mica grain, calcite fragments, locally orientated and clustered  
Fine Fraction: crystallitic, micro-contrasted particles (PPL) some infilling of packing voids, evidence of primary banding in places, quartz, clay, calcite and finely dispersed iron oxides  
Pedofeatures: 1) vertical channels/cavity shaped depletion zones (albans) others filled with well sorted sand  
3) primary sand/silt laminations disturbed by the tube-like channels  
4) detrital organic fragments some large (3+mm)  
4) gastropod shell  
Summary: a very weakly developed structure with evidence of cracking and sand filled tube-like bioturbation probably by marine gastropods. The addition of detrital organic matter and evidence of varying post-depositional REDOX conditions.

#### TE6

Texture: silty clay with some sand, moderately to well sorted  
Colour: yellowish brown to reddish brown  
Structure: weakly developed to no pedality, pore space 5%  
Voids: channel/crack partially accommodated no coating or smoothing  
Related Distribution: open porphyric  
Coarse Fraction: subhedral quartz with no alteration and tabular subangular to angular, mica grain, calcite fragments, locally orientated and clustered  
Fine Fraction: crystallitic, micro-contrasted particles (PPL) some infilling of packing voids, evidence of primary banding in places, quartz, clay, calcite and finely dispersed iron oxides  
Pedofeatures: 1) vertical channels/cavity shaped depletion zones (albans) others filled with well sorted sand  
3) detrital organic fragments  
4) common gastropod shell including whole shells, associated with channels  
Summary: a very weakly developed structure with evidence of cracking and tube-like bioturbation by marine gastropods. The addition of detrital organic matter and evidence of varying post-depositional REDOX conditions. The addition of microscopic charcoal fragments.



### Summary of The Thin Section Analysis

All three samples are from a bioturbated originally laminated silty clay with sand. The bioturbation was not total and was restricted to marine/estuarine reworking probably mostly by gastropods. This probably reflects a rapid rate of sedimentation. The suggestion of roots in TE3 agrees with the field description and because the charcoal fragments only appear in TE5 they are probably of very local origin.

### Interpretation

- 1) Reworking of the chalky boulder clay (CBC) would seem to have occurred under periglacial conditions. Deposits from shallow channels subject to cryoturbation possible during the Lateglacial stadial (Dimlington).
- 2) Then fluvial deposition of reworked CBC over sands, sealing them
- 3) Deposition of CBC derived silty clay eroded from adjacent exposures, fining upwards in a tidal(?) creek environment.
- 4) Standstill horizon, decreased accumulation rate, increased root penetration prior to archaeology (60-76cm).
- 5) Deposition of upper silt clay in a saltmarsh/flat environment, with the deposition of marine derived sediment and archaeological use. Evidence of burning nearby but probably not adjacent to the site.

### Archaeological Implications

The most obvious conclusion is that the archaeological horizons lie above the redeposited CBC and probably above 60cm. The sediments below are natural and probably considerably older. The depression could easily be natural in origin, possibly a saltmarsh pan (natural saltmarsh depression) or part of an old creek system.



There is no stratigraphic or micromorphological evidence of cleaning-out of the pan. However, the rapid rate of infilling combined with charcoal in TE5 suggest some human influence and in particular the burning of wood near the site. This strengthens the case for the use of the site for saltmaking but cannot verify that the site was originally excavated for this purpose.

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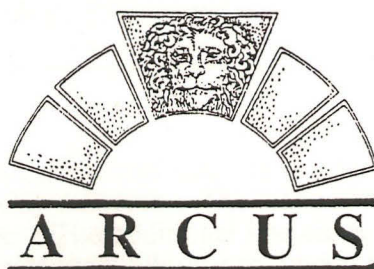
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**ENVIRONMENTAL ASSESSMENT OF  
A PREHISTORIC SALTEN NEAR  
TETNEY LOCK,  
LINCOLNSHIRE**

**ARCUS NO. 135  
MARCH 1993**

**REPORT BY:  
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## ENVIRONMENTAL ASSESSMENT OF A PREHISTORIC SALTEN NEAR TETNEY LOCK, LINCOLNSHIRE

### 1. Summary

Examination of processed samples from the saltern site excavated by Lindsey Archaeological Services at Tetney Lock showed limited molluscan, crustacean and coleopteran faunas and a very limited flora consistent with brackish water conditions. The biological entities were not all present in the same samples. This may indicate very different depositional conditions but the persistence of brackish water evidence would support the hypothesis that different preservation factors were more important. Some changes in the degree of salinity may be indicated by the molluscan species present.

### 2. Introduction

During a site assessment visit on 11th March 1993 the long section across the saltern trench was sampled. The following contexts were sampled in a columnar fashion. Approximately 1 kilo of each sample was taken. The location has been indicated on the section drawing and the samples labelled in concordance with site context numbers.

Sample 1	Context 04 Grey alluvium -
Sample 2	A sample c 500 g was taken from the interface of contexts 04 and 012 where a discrete layer of small white bodies was observed.
Sample 3	Upper 012 Red brown fill
Sample 4	Lower 012 "
Sample 5	013 Grey fill (with oxidised root channels)
Sample 6	08 Lower dark grey clay
Sample 7	A sample of the underlying sand was taken for reference only
Sample 8	074 Underlying Till. This sample was taken from the pond base 1 m south of the above samples because the context 08 at the column sample ran into a clean orange sand.

### 3. Methods

A unit, 1 kg or 0.5 kg, of each sample was weighed and then allowed to soak overnight in hot water to break down the clay matrices. The material was then washed out over 300 micron and 125 micron sieves. The additional fine sieve was employed to capture any very small organics. The retents were allowed to air dry and then weighed damp. The retents were examined under a Kyowa stereomicroscope using a range of magnifications from x 10 to x 50. Biological species were separated and identified separately. Broad descriptions of material included were noted and are listed in Table 1 below.



#### 4. Description of scanned samples

(i)

(04) Overlying alluvium with significant amounts of eroded igneous rocks, chalk and chalk fossils included in the > 300 micron sieve retent. Distinguished from the underlying sediments by the considerable amount of briquetage and fragmented charcoal in the residue and the lack of fragmentary shell in the finer fraction. The finer fraction is composed of predominantly quartz sand and comminuted charcoal. Only one species of brackish water snail *Hydrobia ventrosa* (Mon.) is present in this sample in very small numbers. Modern root fibres were evident in this sample

(ii)

The interface between the overlying alluvium (04) and the underlying fill (012) is a distinct horizon. The interface was demarcated in the field by a layer of visible white specks. These were small fragments of robust shells, with the occasional internal spiral of gastropods present. The very fragmented condition precludes further identification but the sharp edges of many of the fragments would suggest these were freshly broken by vigorous transport rather than by weathering breakdown. The species *H. ventrosa* becomes more evident and the residue > 125 microns contains a large proportion of shell fragments with quartz sand and comminuted charcoal. Modern roots were present in this sample. The masses of both retents are the lowest within the sequence.

(iii)

The upper portion of (012) contained less charcoal than at the interface. In addition to good numbers of the molluscan species *Hydrobia ventrosa* the congener *Hydrobia ulvae* (Pen.) was present. This may be an indication of an increased salinity quotient because this species is more saline tolerant and as its name suggests may even be found browsing on Sea-lettuce (*Ulva* sp.). Modern root fragments were still evident in the sieve retents. The finer portion of the retained material contained substantial shell fragments in its composition though the volume of comminuted charcoal was reduced.

(iv)

The lower portion of the red brown fill (012) was very similar to the above and the masses of retained material are very similar. However the molluscan species *Hydrobia ulvae* is absent whereas the *H. ventrosa* is still frequent. Fragmentary shells still formed a substantial proportion of the finer retent material.

(v)

The lowest sediment within the feature (013) is in contrast very different in the materials preserved. These are restricted in species but frequent to superabundant in numbers. Only two species of plant are represented by a few aquatic *Ranunculus* sp. (buttercup) seeds and the more frequent *Zannichellia palustris* var. *pedicellata* (Fr.) (Hairy pondweed). This is a perennial plant that prefers brackish water. The insect remains are few but very well preserved and include representatives of the Donacinae (reed beetles) and the hydrophilid *Ochthebius* sp. Present in abundance are the shells of Ostracods, a small crustacean that is difficult to identify further and large numbers of water flea *Daphnia* sp. ephippia. These ephippia are the carrying devices for resting eggs. Although these are so light that they may be transported by wind or other agencies, the presence of a large number of unemerged eggs is remarkable. This is the lowest sample in which small amounts of briquetage were noted. The finer retent contained only traces of shell fragments and no molluscs were found in the sample.

(vi)

The underlying dark grey clay (08). In this sample the masses of the retents were considerably higher than from the overlying samples and although Ostracods were present in abundance the occurrence of *Daphnia* sp. ephippia was diminished. The floral evidence showed that the seeds of *Zannichellia palustris* Var *pedicellata* were still abundant but that the aquatic *Ranunculus* sp. seeds were more in evidence than in the overlying sediment. The included insect evidence was too scant to interpret but well



preserved and included body sections of a water beetle *Colymbetes* sp. and a weevil. No briquetage was noted though charcoal was still present in the retents.

(vii)

The underlying reworked till. A cursory examination of this sample revealed no biological evidence. The retent was composed of small chalk blocks, water rolled erratics of both sedimentary and igneous rocks and natural flints

## 5. Interpretation

The environmental evidence is fairly restricted. The plant and molluscan species which may be said to indicate specific conditions are essentially brackish water species. However, native *Daphnia* sp. are effectively freshwater creatures that may colonise temporary waters as well as larger bodies of water. Their presence may indicate seasonal or other temporal divisions of reduced salinity conditions. The large number of un-emerged eggs would suggest that conditions within the body of water changed and became too hostile for emergence to occur e.g. complete dehydration or increased salinity. The difference between the groups of included evidence is most easily explained by differences in the degree of oxidation of the sediments. Although the entire sequence was moist only the basal layers (013 & 08) showed colorations compatible with that of reduced iron and concomitant anaerobic conditions wherein insect and uncharred seed can be preserved. The sediments appeared to be essentially alkaline rich and the absence of molluscs in these layers is noteworthy. Again this may be due to the reduced pH of many anaerobic deposits in which the calcium carbonate of the molluscan exoskeleton becomes fragile and soluble.

There is slight evidence of increased salinity upwards within the pond sediments from the greater presence of aquatic *Ranunculus* sp. seed in the basal sediment and the restricted occurrence of *H. ulvae* in the uppermost part of the pond infilling.

The alluvial horizon contains no evidence of its source though the lack of shell fragments within the finer fraction would suggest distinct difference in origin from the earlier sediments. Much inorganic material and charcoal would appear to have been derived from the poolside.

There was a marked absence of biological indicators of anthropogenic activities which may be a consequence of the very restricted biota that can survive in the changing conditions associated with brackish water.

## 6. Notes on species

Molluscs

Family HYDROBIIDAE

*Hydrobia ulvae* (Pen.)

This small often occurs in large numbers on banks of sand or mud preferring estuarine conditions but found occasionally on open coasts in habitats with moving tidal water. It may also occur in salt marshes and lives and breeds between salinities 5-40 p.p.1000  
Widely distributed

*Hydrobia ventrosa* (Mon.)

This very small species of snail is an indicator of brackish conditions but prefers lower salinity conditions than *H. ulvae* at around 6 -25 p.p.1000 preferring conditions free from tidal influence.

Local distribution in the east and south of England being more sporadic than *H. ulvae*



Flora

Family ZANNICHELLIACEAE

*Zannichellia palustris* var *pedicullata*

(Horned pondweed)

This variety of horned pondweed has a preference for brackish water and may need to be considered as a separate species.

#### 7. Recommendations

No further environmental analysis is merited by the findings of the above investigation.

Pat Wagner 5th April 1993



Table 1 Summary of Tetney Lock environmental assessment

Sample		Mass	%>300	%>125	Molluscs	Briquetage	Seeds	Insects	Charcoal	Other
04	Grey alluvium -	1	4.3	7.3	<i>H. ventrosa</i> *	***	none	none	***	Chalk fossils
----	Interface	0.5	2.3	3.2	<i>H. ventrosa</i> ** fragments**	*	none	none	**	igneous crumb modern roots
12a	Upper Red brown fill	1	3.1	3.8	<i>H. ventrosa</i> *** <i>H. ulvae</i> * fragments	*	none	none	*	igneous crumb modern roots
012b	Lower Red brown fill	1	3.3	3.8	<i>H. ventrosa</i> **	*	none	none	*	
013	Grey fill	1	3.5	3.9	none	*	<i>Z. palustris</i> ** <i>Ranunculus</i> sp	*	*	Ostracods *****
08	Lower dark grey clay	1	5	6.8	none	none	<i>Z. palustris</i> ** <i>Ranunculus</i> sp.*	*	*	<i>Daphnia</i> sp.** Ostracods****
074	Underlying Till.	1	20	13	none	none	none	none		<i>Daphnia</i> sp. *
Basal sand		0.5	not processed > 95 % subrounded quartz sand							

Key

\* present  
 \*\* frequent  
 \*\*\* common  
 \*\*\*\* abundant  
 \*\*\*\*\* superabundant



## BRIQUETAGE FROM TETNEY, LINGS: PRELIMINARY REPORT

### Introduction

A total of 1570 pieces (14.668kg) of briquetage was recovered by excavation. About 27% of the material, by weight, came from context 019 and the majority of the remainder from contexts 003 (17%) and 072 (6%). Small quantities of briquetage derived from contexts 002, 005, 008, 018, 020, 022, 025, 046, 048, 051, 052, 055, 057, 059, 060, 063, 070, 071, 078, 079, 083, 085 and 514. Late Bronze Age/Early Iron Age pottery was also found in nine of these contexts (D. Knight's report on pottery). 180 fragments (c.15% by weight) were unstratified. A full list of the material is provided in archive, with details of category, fabric and context.

### Description and Quantities

The Tetney briquetage has been divided into the categories detailed below:

1. *Vertical supports.* 10 fragments (386g) of pedestal support were identified, one with two tines attached (figure 1, no. 1). 9 other tines (139g) were probably broken off similar pedestals (figure 1, nos 2 and 3). No other category of vertical support was positively identified.
2. *Bridges/clips.* A distinction is made here between 'clips', which were fixed to the rims of containers, and bridges, which served to separate the containers. Such pieces often show distinct edges and depressions where they were attached (figure 2, no. 5). Clear finger impressions are occasionally seen, indicating that the clay was moulded into position whilst still damp (figure 2, no. 4). (19 bridges/clips, totalling 247g; 1.7% by weight).



3. *Container rims.* 80 rims (1430g) were identified (9.7% by weight). These are generally unmoulded with flat lips and appear to have been cleanly cut with a knife or other sharp tool whilst the clay was wet (figure 3, nos 8, 9 and 11). Five rounded rims were identified, occasionally with finger tip impressions (figure 3, no. 10), some of which were attached to the straight edges of a container after it was formed.
4. *Container bases* (figure 2, no. 6). Two fragments of rounded bases (85g) may be identified, together with 33 angled sherds (965g) which may be trough or container ends (figure 2, no. 7; 7.2% by weight).
5. *Container body sherds.* These fall into two main types, those 12mm or over in thickness (1375 sherds; 11,004g; 75% by weight) and those about 5mm in thickness (35 sherds; 73g; 0.5% by weight). The shapes of the containers cannot be established with certainty, but surviving rims suggest vertically sided vessels.
6. *Irregularly shaped pieces.* 7 fragments of fired clay were recovered (337g; 2.3% by weight), possibly deriving from a structure for the drying of salt.

#### Fabrics

The clay is generally poorly mixed and only lightly fired, with a rough and very sandy feel and a surface which rubs away when the pieces are handled. Most of the briquetage is bright orange throughout. The fabric contains a sparse amount of quartz (3-10%), fine to medium in size (<0.25mm-1mm), which is poorly sorted and fairly well-rounded. The fabric also has very occasional angular pieces of flint, medium to coarse in size. It seems highly likely that this was local clay taken straight from



the ground. To aid working such viscid material, vegetable material was added to the clay. This is indicated by the sparse (3-10%) but well-rounded voids and impressions of grass, straw, chaff and seeds on the exterior and interior of many pieces of the material.

No clear fabric divisions could be identified on the basis of variations in the frequency and size range of the inclusions, but variations in firing, hardness and colour permit the following subdivisions:-

1. Oxidised exterior and interior surface, with irregularly fired margins inside and outside and unoxidised core. Generally poorly fired material with very sandy feel. Orange, buff and brown in colour. Sherd wall thickness: some 7mm but most are c10-12mm. (90% by weight).
2. Oxidised throughout, orange and bright orange in colour, some buff/brown. Harder finish and better fired. Sherd wall thickness c5mm. (0.5% by weight).
3. Oxidised throughout, pale buff to orange. Slightly less quartz than other groups, and slightly better fired than group 1. Sherd thickness: some 13mm, most c12mm. (4.0% by weight).
4. Oxidised exterior, exterior margin irregularly fired, interior and core is unoxidised. Harder material with thin wall, c5-7mm. (5.5% by weight).

The significance of these fabric variations remains uncertain, but they could reflect functional differences (as could be implied also by the observed differences in wall thickness of container sherds).



## Discussion

### *Function of the Briquetage*

Analysis indicates that most of the material was poorly fired over a low heat. Consideration of the vertical supports, clips, bridges and container bodies and rims suggests that the material was used during the heating and drying of a moist salt mixture to form cakes. The form and condition of the briquetage suggests that containers were stacked and then heated. The clay bridges and clips, and possibly the pedestals, were in a wet clay form when these were added to the stacks in order to help keep the containers apart and to keep them steady. Close examination of the material shows that rounded clay rims were moulded onto the flat edges of troughs, and then clay clips and supports were fitted over them. When the stacks were dismantled the rims often broke off the containers and may have been re-applied if the troughs were reused.

It has been suggested that the salt water was originally collected in a natural pool on this site (Palmer-Brown 1993), and this material was filtered before the salty mixture was heated to make hard salt cakes. The poorly fired nature of most of the material indicates a low heat source suitable for such a process. Evaporation of salt water into brine does not seem feasible, due to the difficulty of adding water to closely stacked containers. Remains of some kind of structure which formed the base for the heating process are suggested. Some of the better fired sherds may represent vessels used in the further processing or transportation of salt, but their exact use is unclear from this evidence.

### *Dating*

A Late Bronze Age date has been suggested for the associated pottery (D. Knight,



pottery report) and the briquetage may, therefore, date from as early as the C9/C8 BC. As indicated by C. Palmer-Brown (1993), this is the earliest saltern recorded in Lincolnshire, and it is therefore of considerable interest. Saltpans have been documented at Tetney since Domesday (*ibid*, 136: Rudkin 1975, 38), but the possibility of such an early date for salt production was not previously suspected in this region. Salt making of the Iron Age period has been reported previously in Lincolnshire by May (1976, 143-55) and by Lane on 190 sites in the South-west Fens (1992). Briquetage of the Bronze Age is known elsewhere in England, in particular at Brean Down in Somerset, where similar pedestals were found, but with three tines attached (Bell 1990, 169, figure 120). There is no indication at Tetney of the exact size or shape of the containers involved in the salt drying process, but the flat sided nature of the sherds suggests that the containers may have been fairly large, in contrast to the small trays suggested at Brean Down (*ibid*). It is considered that a much larger scale process is indicated at Tetney, as suggested by Palmer-Brown (1993).

Excavation at Tetney has produced an interesting collection of salt making material, which is rare both locally and nationally. The collection contains unusual material and is early in date, providing rare evidence of salt processing in Bronze Age Lincolnshire.

#### Catalogue of illustrated briquetage

##### Figure 1.

1. Fabric B1. 3 joining fragments of pedestal with 2 tines. Unoxidised, buff/brown/pale orange, unabraded. Context 063.



2. Fabric B1. Tine, probably from pedestal support. Irregularly fired, orange/buff, unabraded. Context 003.
3. Fabric B1. Tine, probably from pedestal support. Irregularly fired, buff/orange, unabraded with remains of possible salty deposit on exterior. Context 055.

*Figure 2*

4. Fabric B1. Clip. Irregularly fired, buff/orange/brown/grey, unabraded. Context unstratified.
5. Fabric B1. Clip. Irregularly fired, buff/brown/grey, unabraded. Context 072.
6. Fabric B2. Rounded base & wall sherd. Oxidised, orange/buff, unabraded. Context 005.
7. Fabric B1. Angled base sherd. Irregularly fired, orange/buff/grey, unabraded, unidentified creamy brown deposit on exterior. Context 060.

*Figure 3*

8. Fabric B1, with single coarse angular flint inclusion. Flat rim. Oxidised, orange, unabraded. Context 003.
9. Fabric B1. Flat rim. Irregularly fired, orange/brown/black, unabraded. Context 003.
10. Fabric B1. Rounded rim, with fingertip impressions. Irregularly fired, buff/pale orange/brown/black, unabraded. Context 003.
11. Fabric B1. Flat rim. Irregularly fired, orange/grey, unabraded. Context 019.

**Acknowledgements**

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supervised jointly with the writer the cataloguing and illustration of the material. Comments on the material were provided by Sheila Elsdon, Jeffrey May and Elaine Morris, to whom thanks are expressed.

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Carol S M Allen

23 January 1994



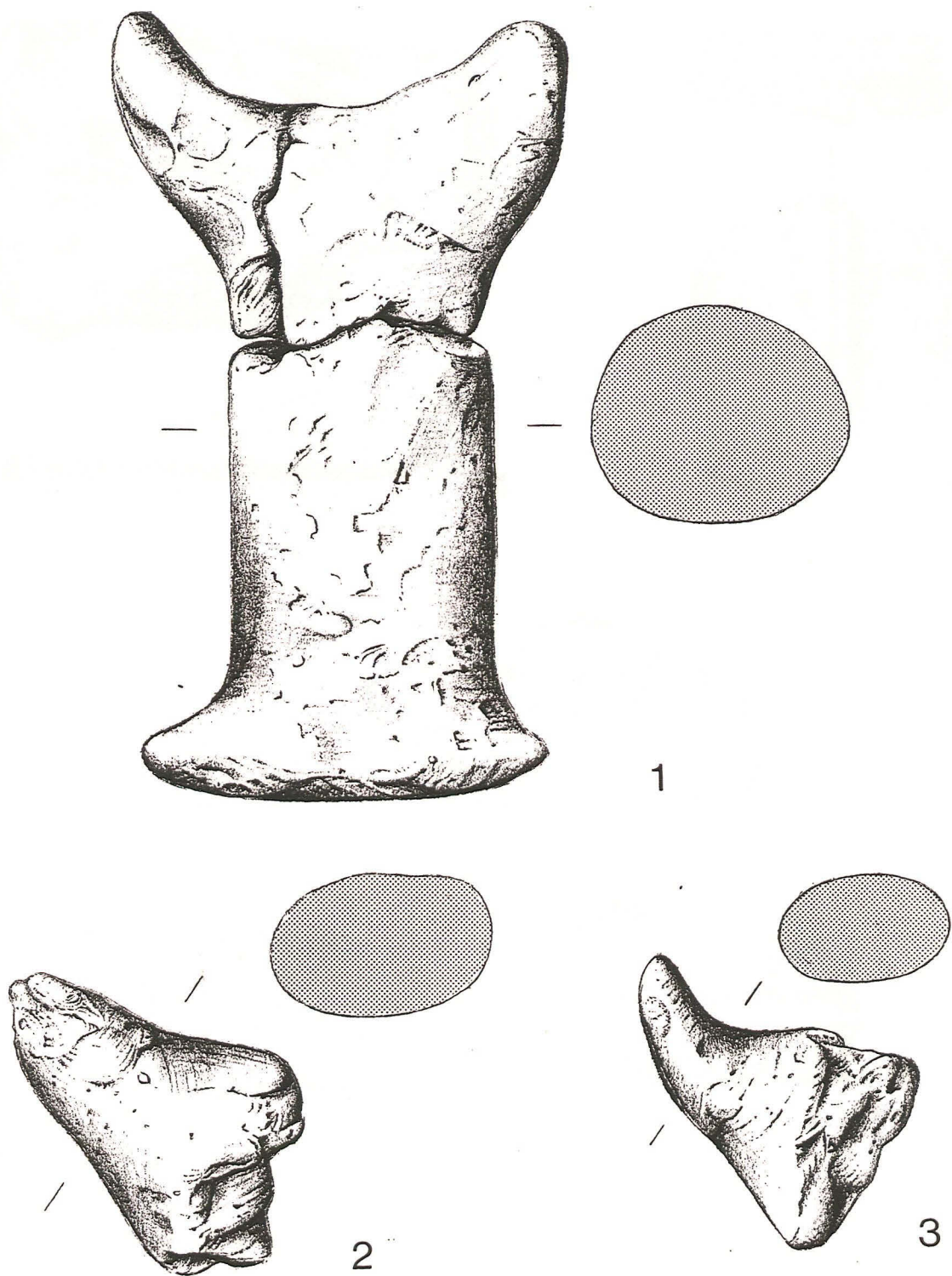


Fig. 1 Tetney briquetage. 1 Complete pedestal from [63]; 2 pedestal tine from [03]; 3 pedestal tine from [55]. Actual size.



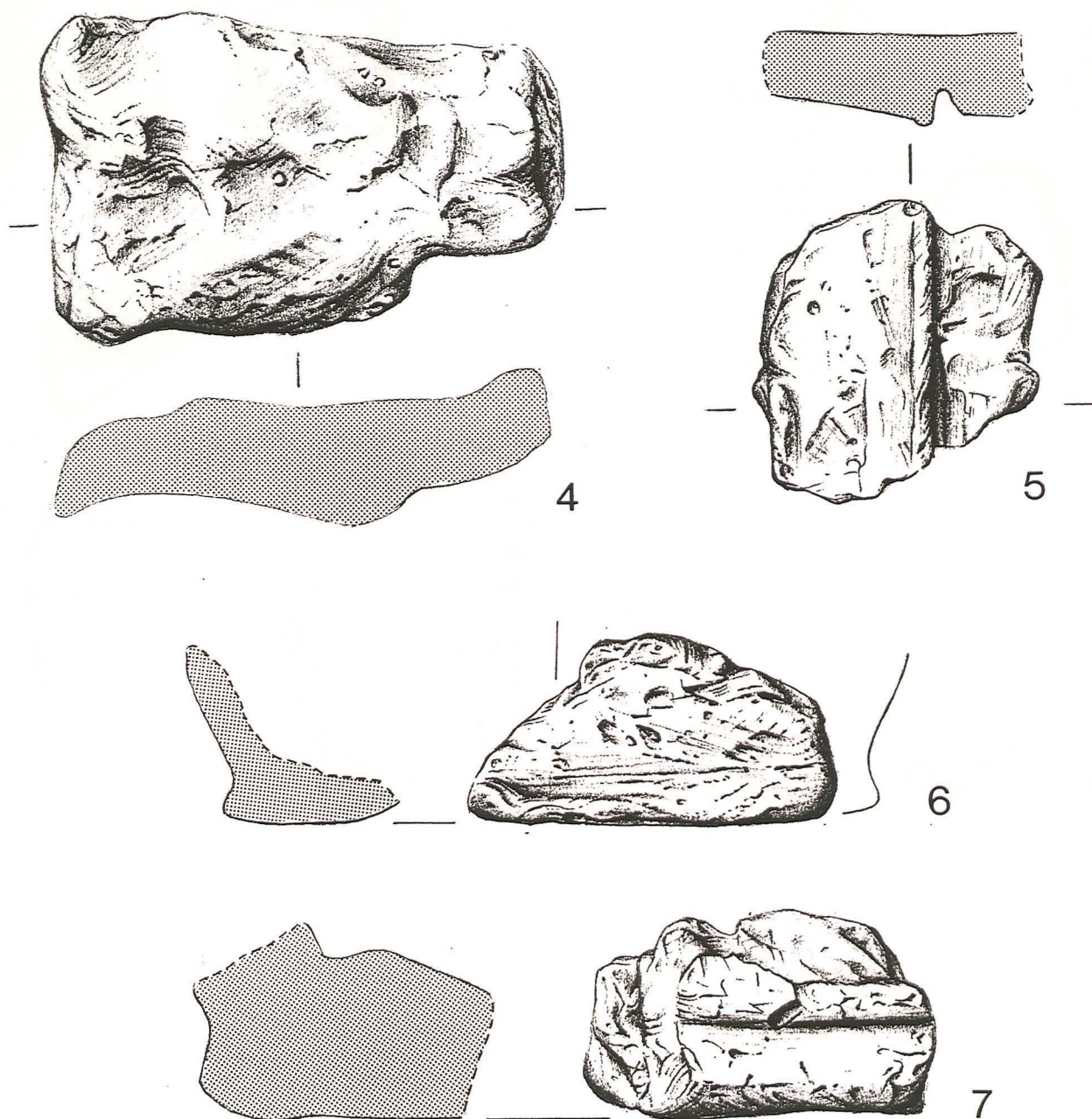


Fig. 2 Tetney briquetage. 4 clip , unstratified find; 5 clip from [72]; 6 vessel base sherd from [03]; 7 vessel base sherd from [060]. Actual size



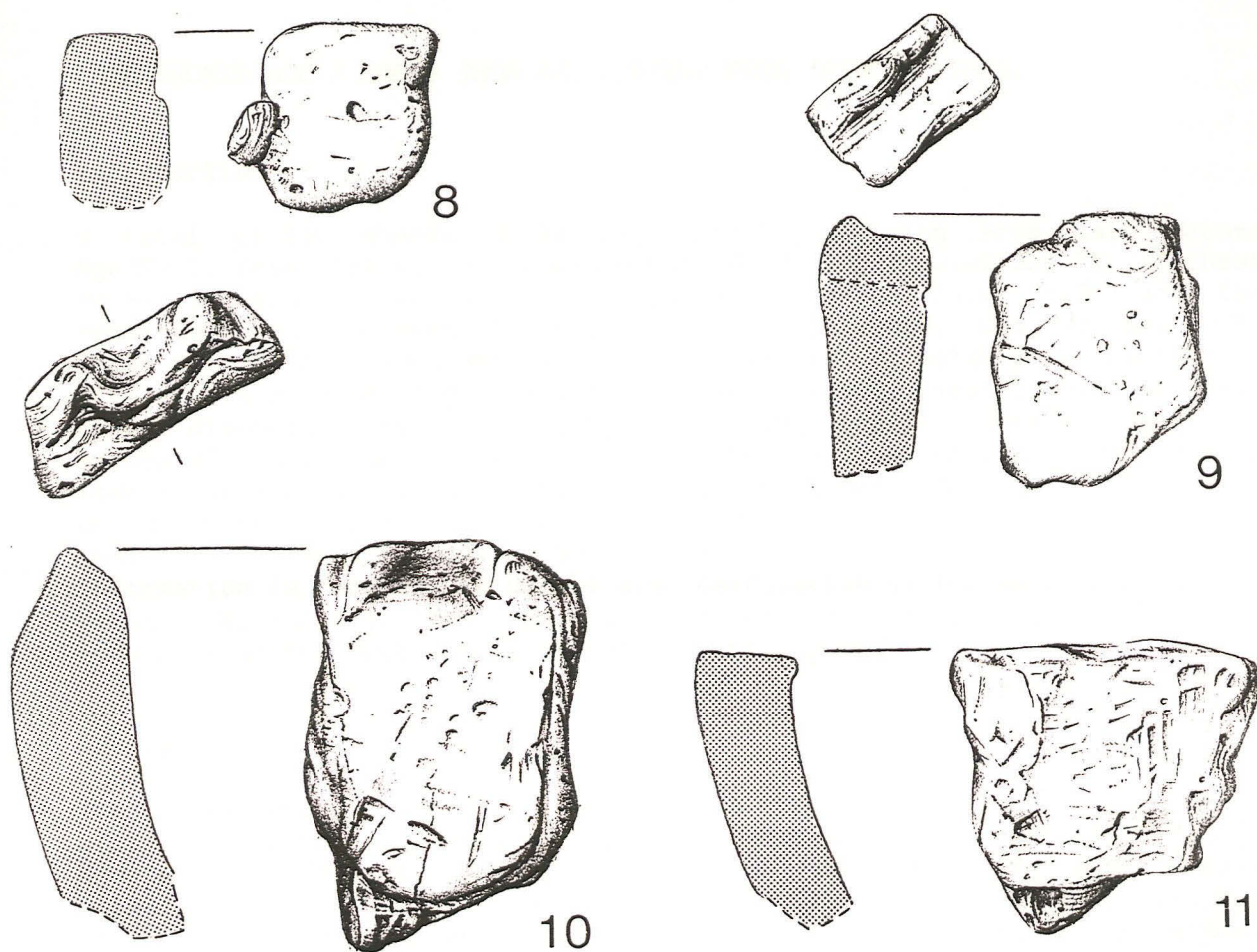


Fig. 3 Tetney briquetage. 8 , 9, 10 vessel rims from [03]; 11 vessel from [011]. Actual size



## LATE BRONZE AGE / EARLY IRON AGE POTTERY FROM TETNEY, LINCS.

### Introduction

A total of 100 sherds (0.913kg), probably deriving from Late Bronze Age/Early Iron Age activity, was obtained during excavation. 75 of these (0.611kg) were recovered from a single occupation layer (078) and the remainder from Contexts 03, 018, 046, 051, 057, 059, 060, 070 and 079. Three sherds (52g) were unstratified. A full list of pottery by context is provided in archive, together with details of fabric, vessel part, profile class, dimensions, surface finish, decoration, abrasion, surface deposits, method of manufacture and firing. Each entry in this archive represents an individual sherd, a group of non-joining sherds with identical attributes, or a group of joining sherds, thus permitting detailed quantitative analyses by weight and number of each vessel attribute; sufficient information is recorded to permit also calculation of the maximum number of vessels by context. The few decorated sherds from the site and other fragments of interest are illustrated in Figs 1 and 2.

### Fabrics

Two fabric groups were distinguished on the basis of variations in the kinds of inclusions which could be observed within the clay matrix (employing a x30 binocular microscope). The fabric divisions were devised jointly with Dr. C. Allen, who compiled a detailed archive record of each fabric group; specialist geological advice was provided by Dr. R. Firman. None of the sherds was thin sectioned, and hence the identifications of the main inclusions must be regarded as provisional.

The following conventions are employed in the fabric descriptions:

*Condition:* unabraded (original surfaces unworn); moderately abraded (part of original surfaces worn); abraded (original surfaces substantially worn); very abraded (all surfaces worn).

*Frequency of inclusions:* rare (<3%); sparse (3-10%); moderate (11-25%); common (26-40%); abundant (>40%).

*Size of inclusions:* fine (<0.25mm); medium (0.25-1mm); coarse (1-3mm); very coarse (>3mm).

**Fabric SG1 (Sandstone and Granodiorite).** All but two sherds derive from a very coarse ware characterised by a moderate density of poorly sorted coarse to very coarse and mainly angular grey sandstone and granodiorite inclusions. The outer surfaces are generally oxidised (orange to buff) and the inner surfaces more commonly unoxidised (black/grey), but a substantial minority of vessels preserves evidence of irregular firing on the inner and/or outer face. The core is almost invariably unoxidised (black/grey). The fabric is soft, with a granular feel and a hackly fracture. Thin sectioning is required to verify the identification of the rock inclusions, but the combination of fine-grained grey sandstone and granodiorite would suggest a source in the local boulder clays (cf. Madgett and Catt, 1978). Close parallels may be drawn with fabrics occurring on other Iron Age sites in the vicinity of Tetney, notably Weelsby Avenue, Grimsby and Nettleton, suggesting that this boulder clay may have been extensively used as a pottery raw material source in the first millennium BC.



**Fabric F1 (Flint)** Two sherds of this fabric group were recovered, one from Context 051, in association with six sherds of Fabric SG1, and the other from Context 057, which otherwise yielded no pottery. They are distinguished by a moderate density of mainly coarse to very coarse angular unburnt flint inclusions, poorly sorted and possibly added as temper. The inner and outer surfaces are oxidised (orange), while the core is unoxidised (grey). The fabric is soft, granular in feel and has a hackly fracture. It appears to resemble closely one of the Late Bronze Age/Early Iron Age fabrics recorded on a site at Barnetby Wold Farm, Lincs. (Didsbury and Steedman, 1992, 8: Vessel 20.1), referred to below, but the chronological and spatial spread of flint-gritted wares in this area has yet to be examined systematically. As with Fabric SG1, a source for the inclusions in the underlying boulder clay deposits may be suggested.

### **Vessel Forms**

Fragments have survived of the following classes of vessel, all modelled by hand:

**Ovoid Vessels.** Vessels of ovoid form are suggested by three fragments from one or possibly two pots with a direct rounded rim and short everted neck, and embellished along the rim by a row of diagonally incised lines (Fig.1.1-3). The form cannot be determined with certainty, but the high girth and gently curving profile would suggest a vessel of ovoid or similar form (eg globular/ellipsoid). Four other sherds, two joining, preserve similarly decorated rounded rims surmounting slight eversions in the body wall, and could conceivably derive from this same vessel (Fig.1.4-6). This cannot be established beyond doubt, but it is made more likely by their discovery in unabraded condition within a restricted area of Context 078 - a disturbed charcoal-flecked layer of mottled dark sandy clay, interpreted by the excavator as probably an occupation layer. One other vessel which may originally have been of ovoid form was recovered during excavation: a thin-walled pot with a short and probably upright neck and a neatly executed plain direct flattened rim, from Context 051 (Fig.2.2).

**Round-shouldered Vessels.** A small body sherd from a vessel with a pronounced rounded girth was recovered from Context 03 (Fig.2.1). Another vessel of this class with a high everted or possibly upright neck and a slightly tapered rim with rounded lip was also retrieved, but unfortunately was unstratified (Fig.2.5).

**Miscellaneous.** Mention should also be made of a substantial fragment of a direct rounded rim derived from Ditch 070 (Fig.2.4). Insufficient survives for the angle of the wall to be determined with certainty, but it seems best reconstructed as the upper part of a convex or vertically sided vessel. Other evidence for vessel forms is confined to a handful of rims from vessels of uncertain form (either of direct rounded form or flat-topped and pinched out on either face) and a single flat base angle, pinched out around the circumference,

### **Surface Treatment**

Finger indentations formed during hand modelling of the vessel may be



observed on the inner and/or outer surfaces of a minority of sherds, but distinctive surface finishes (eg burnishing or brushing) are entirely absent. The collection is also largely undecorated, the only exceptions being several incised rims and a cordon with faint traces of incised decoration.

**Incised Rims.** Six sherds, deriving conceivably from a single vessel of ovoid or similar form, discussed above, preserve a row of closely spaced and deeply incised diagonal lines along the rim (Fig.1.1-6). These incisions could have been produced by a finger-nail or possibly by the blade of a sharp tool.

**Incised Cordon.** The only other evidence of decoration is provided by a girth fragment from a vessel of uncertain form. This preserves the abraded remains of a cordon with faint traces of two diagonal incisions, possibly formed by a finger-nail (Fig.2.2).

### Typological Affinities and Dating

The incised rims invite close comparison with diagnostic Late Bronze Age/Early Iron Age vessels from Lincolnshire and Humberside, most notably from Barnetby Wold Farm, c.25km to the NW of the site (Didsbury and Steedman, 1992, fig.5: vessel 20.1), and on current evidence we may suggest a date of manufacture between the later ninth and fifth/fourth centuries BC (*ibid.*, 8-10; cf Knight, 1992, 45-8). High-necked round-shouldered vessels, such as may be represented by an unstratified pot from Area 2 (Fig. 2.5), are also common components of Late Bronze Age/Early Iron Age ceramic assemblages throughout the Midlands (eg Cunliffe, 1991, figs A:4-5), although local parallels for these forms are at present extremely rare (eg Dragonby: Elsdon and May, 1987, fig.29.37: girth embellished with finger-tipping). Finger-decorated cordons were also applied regularly to coarse wares of this period (eg Brigg: May, 1976, fig.62), although we should not forget that cordons are also a feature of the preceding Deverel-Rimbury ceramic tradition (eg Allen et al, 1987, 212). More persuasive evidence for Deverel-Rimbury influences is provided by the substantial rim fragment which was recovered from Ditch 070 (Fig.2.4). The vessel profile cannot be determined with certainty, but if the proposed angle is correct a typological link with barrel or bucket urns might be suggested (cf Allen et al, 1987, figs 6-10, 13-17; Didsbury and Steedman, 1992, fig.4: Vessel 34.1/2.1; Field and Knight, 1992, fig.8.3). An earlier ancestry for this vessel is therefore possible. However, given that its fabric (SG1) is indistinguishable from most other pottery from the site, it may be safer to conclude that it signifies only the continuation of ceramic influences derived from Deverel-Rimbury beyond the main period of currency of this style.

On balance, therefore, a date of manufacture for the pottery from this site no earlier than the later ninth or eighth centuries BC (when occurred the ceramic developments which herald the beginning of the post-Deverel-Rimbury ceramic tradition) would seem most appropriate. This tradition continued in the Midlands well into the earlier Iron Age, but the presence at Tetney of at least one vessel which may have affinities with Deverel Rimbury bucket/barrel urns might imply a date towards the beginning rather than the end of this tradition. Cordons, as noted above, find extensive parallels in both Deverel-Rimbury and Late Bronze Age/Early Iron Age ceramic assemblages



from this region, and unfortunately the presence of an example at Tetney does not clarify this issue.

## CATALOGUE OF ILLUSTRATED POTTERY

### Fig.1: Pottery from Context 078

The illustrated sherds from this context vary slightly in details of their form, but otherwise all are of the same fabric group (SG1), preserve one or more closely spaced finger-nail/tooled incisions along the rim and compare closely in firing and colour (irregularly fired surfaces [buff to grey], with unoxidised core [grey]). All are unabraded, and as noted in the text could conceivably derive from one vessel whose neck was exaggerated to varying degrees around the circumference.

### Fig.2: Pottery from Miscellaneous Contexts

2.1. Fabric SG1. Tiny girth sherd. Pronounced rounded shoulder, with faint finger indentations on exterior. Incompletely oxidised exterior (mid brown), but otherwise unoxidised (dark grey). Unabraded. Context 03.

2.2. Fabric F1. Rim of ovoid (?) vessel with probably upright neck and flattened rim. Oxidised exterior (orange), unoxidised core (light grey) and irregularly fired interior (light grey and orange). Moderately abraded. Context 051.

2.3. Fabric SG1. Girth fragment from vessel of uncertain form. Remains of cordon, with two faint diagonally incised lines (bottom right of drawing). Oxidised exterior (orange) but otherwise unoxidised (black). Moderately abraded. Context 060.

2.4. Fabric SG1. Fragment of vessel with direct rounded rim and of uncertain angle. Faint finger indentations on exterior and interior. Irregularly fired surfaces (mottled orange, brown and grey) and unoxidised core (black). Traces of blackened burnt matter on exterior. Unabraded. Context 070.

2.5. Fabric SG1. Fragment of vessel with direct rounded rim, pronounced rounded girth and a high and probably everted neck. Pronounced finger indentations on interior (along girth). Oxidised surfaces (exterior orange; interior buff) and unoxidised core (grey). Moderately abraded. Unstratified.



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David Knight, Trent & Peak Archaeological Trust, 31.10.93.



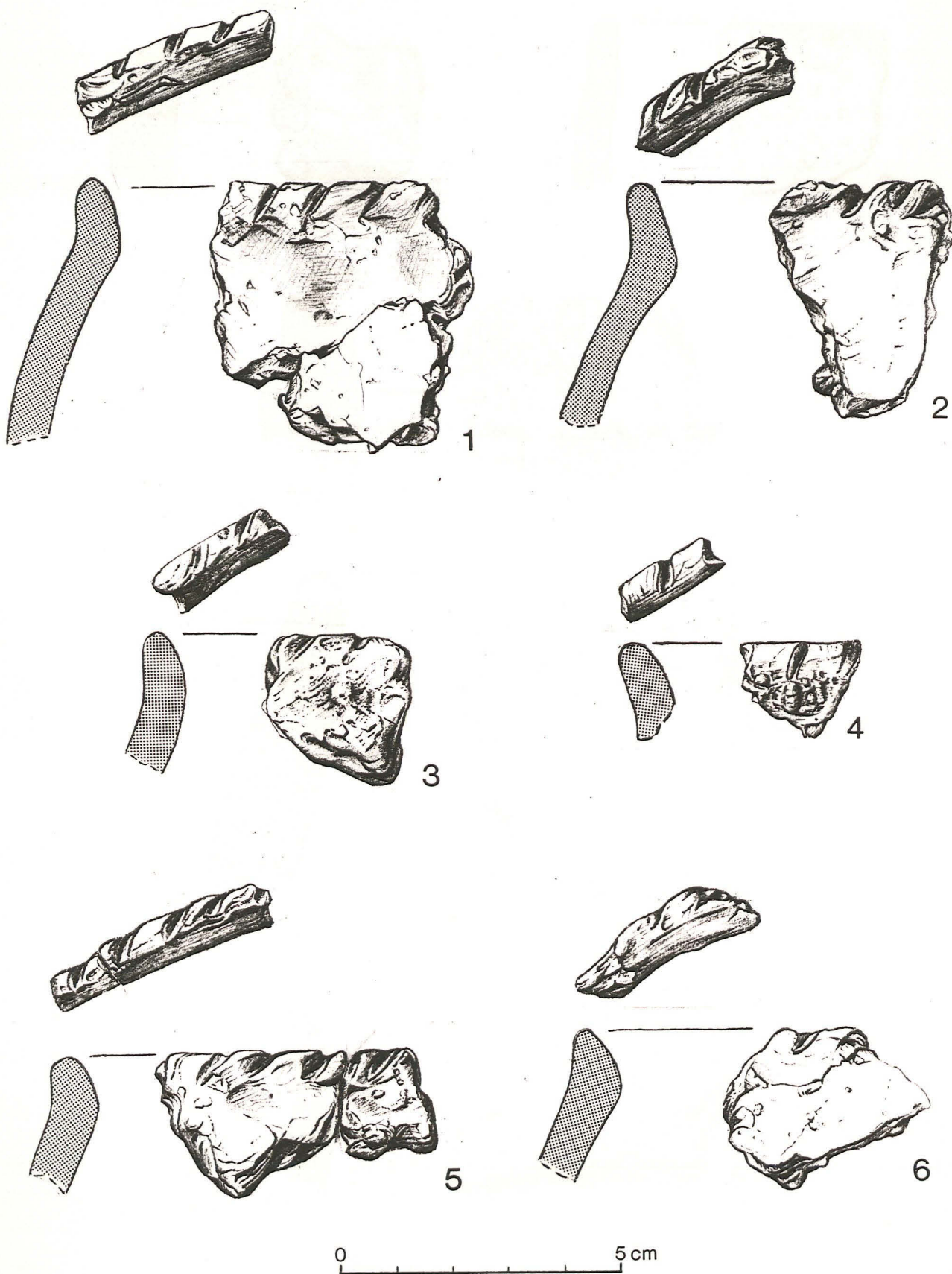


Fig. 1 Tetney pottery from context [78]



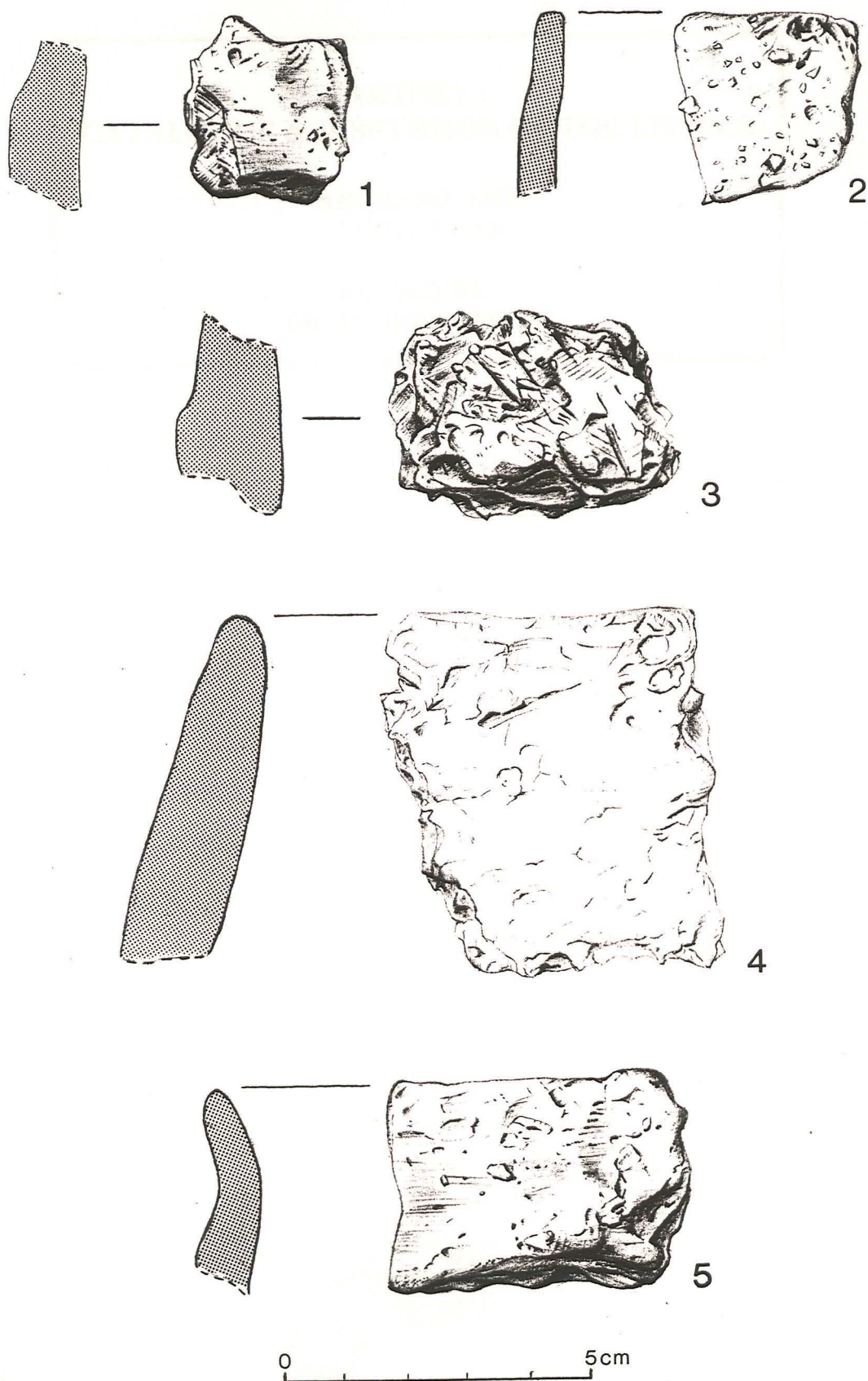


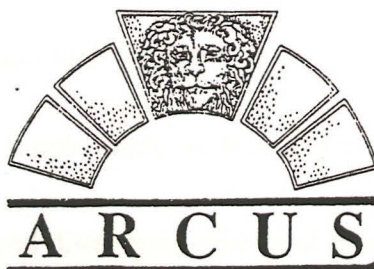
Fig. 2 Tetney pottery from miscellaneous contexts  
 1 [03]; 2 [51]; 3 [60]; 4 [70]; 5 unstratified



**TETNEY:  
CATALOGUE & DISCUSSION OF THE LITHICS**

**ARCUS NO. 135b  
AUGUST 1993**

**REPORT BY:  
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## CATALOGUE & DISCUSSION OF THE LITHICS

### *note*

(only complete flakes and blades have been measured for length and breadth at right angles to the platform).

### TETNEY 1993: CATALOGUE

#### 03

- i) complete single platform blade core: brown/grey translucent flint with nodular cortex.
- ii) complete secondary flake with incipient cone of force: brown translucent flint with sharp nodular cortex. 53 x 59mm.
- iii) complete tertiary flake: brown translucent flint with chalky inclusions. 48 x 34mm.
- iv) complete secondary flake: brown translucent flint with sharp nodular cortex. 33 x 27mm.
- v) complete secondary flake with incipient cone of force: brown translucent flint with sharp nodular cortex. 22 x 25mm.
- vi) complete primary flake with incipient cone of force: brown translucent flint with sharp nodular cortex. 28 x 28mm.
- vii) complete primary flake with simple platform and incipient cone of force: brown translucent flint with sharp nodular cortex. 24 x 38mm.
- viii) broken primary flake with incipient cone of force: brown translucent flint with sharp nodular cortex.
- ix) complete primary flake with incipient cone of force and simple platform: brown translucent flint with sharp nodular cortex. 29 x 33mm.
- x) complete tertiary flake: brown translucent flint. 28 x 26mm.
- xi) broken secondary flake: partially patinated brown translucent flint.
- xii) chip: translucent flint.
- xiii) broken tertiary flake: light brown translucent flint.
- xiv) lump: semi-translucent flint.
- xv) complete secondary flake: patinated flint. 27 x 12mm.
- xvi) chip: opaque brown flint.

#### 019

- i) complete tertiary flake with hinged distal end, and simple platform: brown translucent flint. 23 x 26mm.
- ii) complete secondary flake with simple platform: brown translucent flint with thin, sharp nodular cortex. 25 x 23mm.
- iii) broken tertiary flake with hinged distal end, right hand margin edge-damage, left hand margin with possible retouched (deliberate?) notch: brown translucent flint with chalky inclusions.

#### 046

- i) complete secondary flake with incipient cone of force: brown translucent flint with very smooth nodular cortex. 50 x 65mm.
- ii) complete tertiary flake with incipient cone of force and a simple platform: patinated, light brown semi-translucent flint. 28 x 24mm.



51

- i) complete primary flake with incipient cone of force and simple platform: toffee coloured semi-translucent flint with chalky, rough cortex. 44 x 39mm.
- ii) complete tertiary flake with incipient cone of force and simple platform, highly skewed: opaque, mottled grey flint. 25 x 25mm.
- iii) broken tertiary flake with incipient cone of force and simple platform: opaque, mottled semi-translucent brown flint.
- iv) lump: opaque, semi-translucent brown flint with rough, chalky cortex.

052

core tablet fragment indicating regular flake removals (x4): toffee brown, semi-translucent flint with thin, sharp nodular cortex.

057

complete secondary flake with sheared incipient cone of force and simple cortical platform: brown translucent flint with thin sharp tabular(?) cortex. 30 x 29 mm.

060

broken tertiary flake with punctiform platform: patinated, white mottled and opaque flint with iron staining.

070

chip/chunk: brown translucent flint with thin, sharp nodular cortex.

071

i) complete core face trimming flake struck to remove hinged scars of previous attempted flake removals, itself with a slightly hinged termination: brown translucent flint with light patination. 35 x 36mm.

ii) complete tertiary flake: brown translucent flint with heavy patination. 37 x 21mm.

*U/S, Area 2*

i) complete secondary flake with hinged termination and simple cortical platform and incipient cone of force: brown translucent flint with thin, smooth nodular cortex. 30 x 51mm.

ii) complete primary flake with simple cortical platform and incipient cone of force: brown translucent flint with thin, smooth nodular cortex. 32 x 24mm.

*U/S*

i) complete scraper(?) on thick tertiary flake - simple abrupt retouch on distal end: brown translucent flint. 31 x 31mm.

ii) complete secondary flake with simple cortical platform and irregular, abrupt retouch along part of left-hand margin: patinated brown translucent flint with smooth nodular cortex. 29 x 42mm.

iii) complete secondary flake with possible irregular retouch on part of the left-hand margin: mottled brown translucent flint with iron stain and smooth cortex. 42 x 31mm.

iv) broken primary flake: brown translucent flint.

v) broken tertiary flake: patinated brown translucent flint.

vi) broken tertiary flake: patinated brown translucent flint.

vii) broken tertiary flake with possible irregular retouch on distal end: patinated brown translucent flint.

viii) broken primary flake: patinated mottled flint with nodular cortex.

ix) burnt lump: flint.

x) lump: brown translucent flint with very sharp nodular cortex.



## Discussion

### *Tetney*

The lithic collection from Tetney numbers in total some 43 pieces. Almost all of the collection consists of varieties of translucent flint.

Flakes	32
Blades	0
Chips	3
Lumps	4
Core Rejuvenation	.2
Cores	1
Scrapers	.1(?)

The assemblage contains virtually no chronologically diagnostic pieces, with the possible exception of a single, clear example of a small, single platform blade core. This single piece is suggestive of a later Mesolithic industry. However, the scraper and the four flakes noted as possibly showing retouch are all questionable as retouched tools. Indeed, the majority of the assemblage may well be the product of non-cultural processes.

The debitage assemblage is notable for the high proportion of corticated flakes (19 from 32 i.e. 59.4%), and the dominance of simple platforms (some 10 examples) - many corticated - indicative of the absence of platform preparation techniques. The flakes are generally squat (Breadth/length = 1.007 for a sample of 21 complete flakes) and this concurs with the absence of blades.

Whilst bulbs of percussion (or cones of force) are recognisable on a high proportion of the flakes the majority (some 14) are so-called 'incipient' bulbs or cones. This is usually taken as being indicative of hard percussive force having been responsible for the production of the flakes. Such a method may be associated with the preliminary stages of flake production at, for example, quarry locations. However, similar features are frequently found on naturally fractured flints.

Given the absence of recognisable tool forms, the lack of platform preparation, the absence of carefully produced blades, the very high proportion of corticated pieces and the squat shape of the flakes it seems most likely that the majority of the collection from Tetney consists of non-cultural materials.





Pl. 1 Machine clearance of the site prior to start of excavations.

Pl. 2 Machine clearance of the site prior to start of excavations.







Pl. 3 General view of excavation, looking NE showing the pool divided into four by the machine trenches

Pl. 4 East end of W-E section through the pool, between Areas 1 and 3, showing curving profile

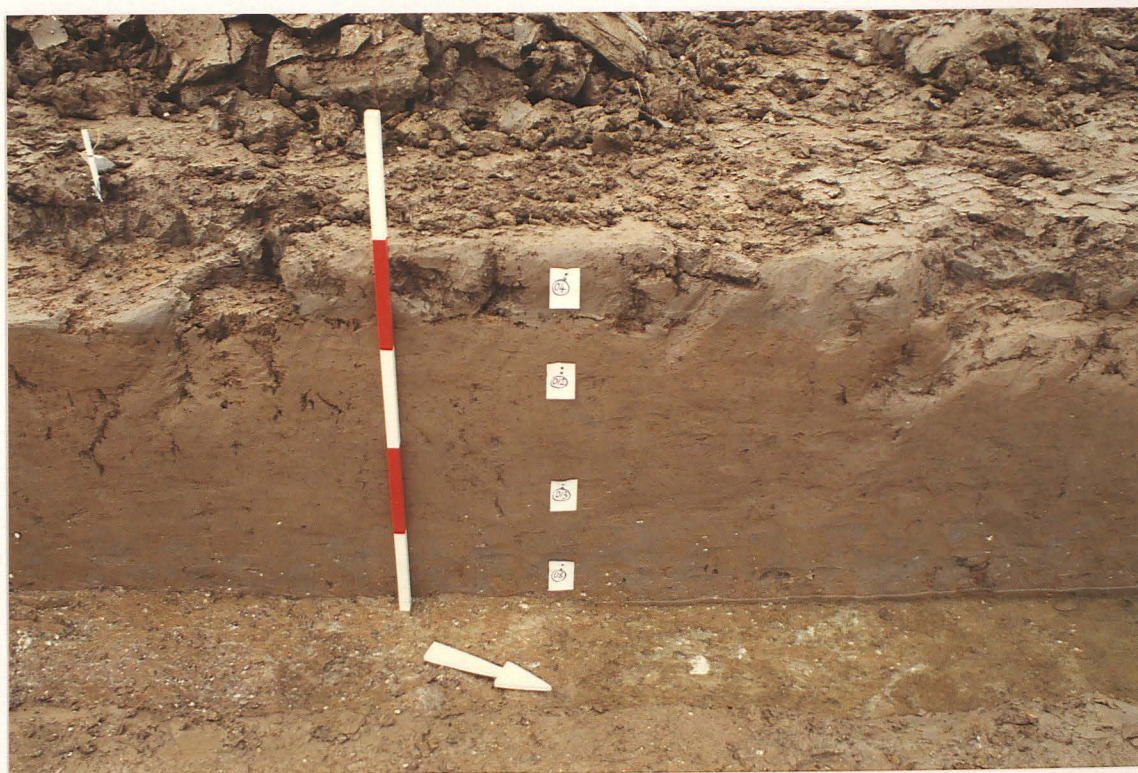






Pl. 5 South end of N-S section through the pool, between Areas 2 and 4, looking east towards Area 2.

Pl. 6 Cleaned section through pool deposits between Areas 1 and 3







Pl. 7 Briquetage layer [19] looking east from pool towards hearth [16]

Pl. 8 General view of Area 1 and hearth [16]

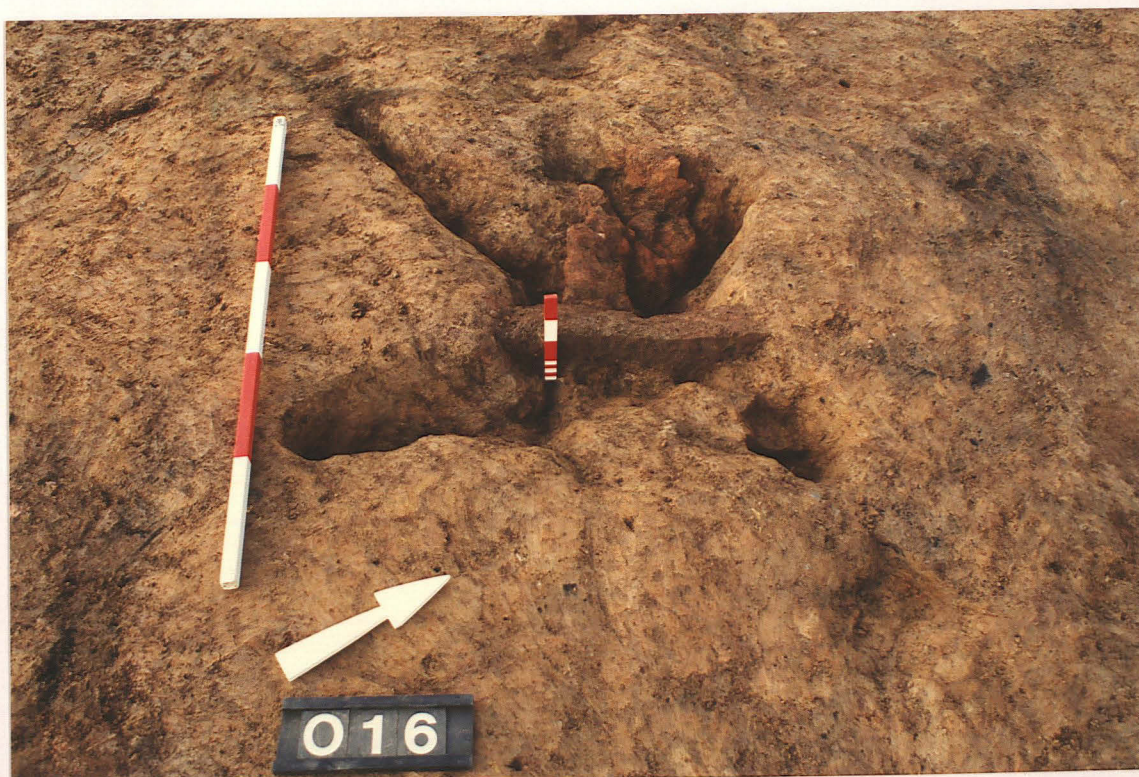




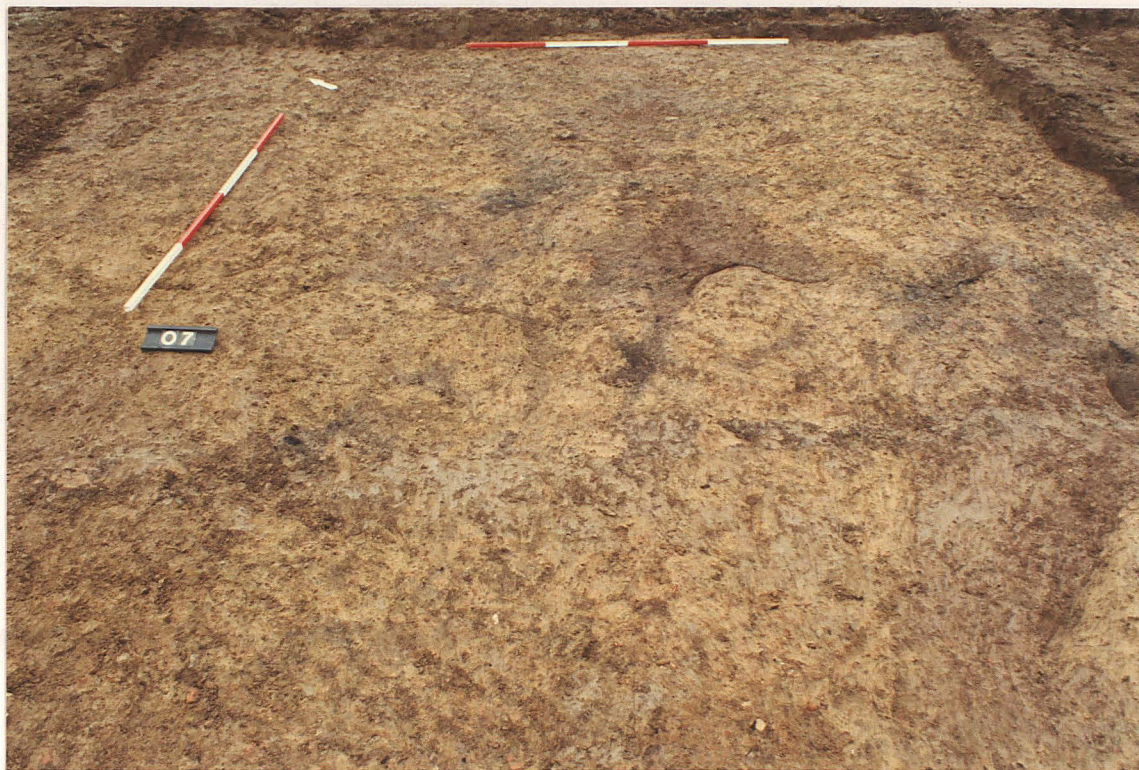


Pl. 9 Hearth [16], showing fire-reddened sides with section of fill in situ.

Pl. 10 Hearth [16], with fill entirely removed

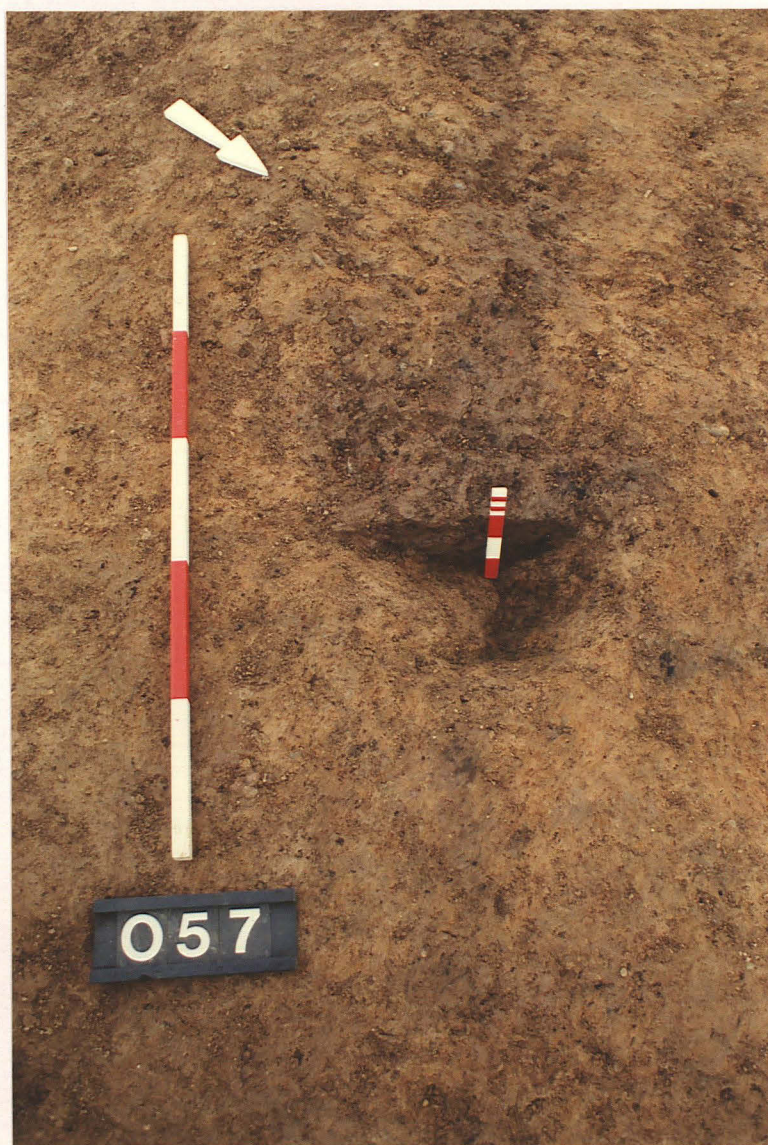






Pl. 11 Ashy material [07], overlying hearth [16], prior to excavation

Pl. 12 Depression [57]/[58] with half the fill removed

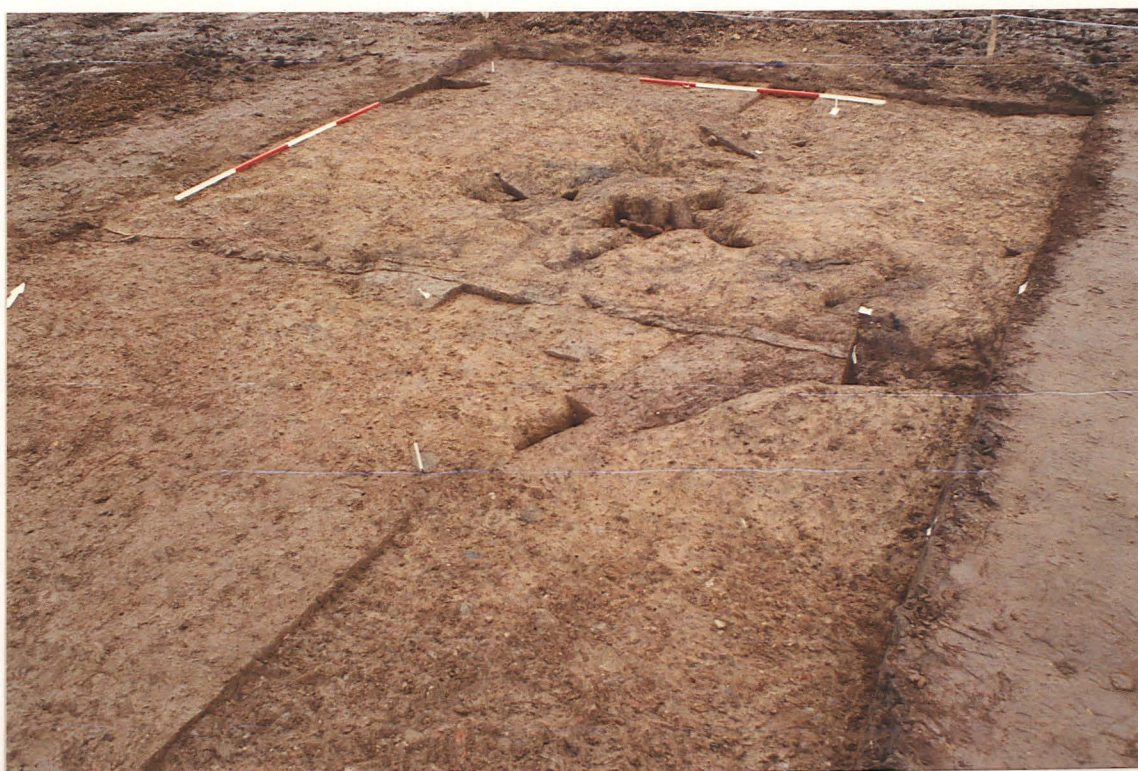






Pl. 13 Briquetage layer [19], looking NE from within the pool towards hearth [16] and associated features

Pl. 14 General view of Area 1 with horseshoe gully [06] in foreground and hearth [16] behind

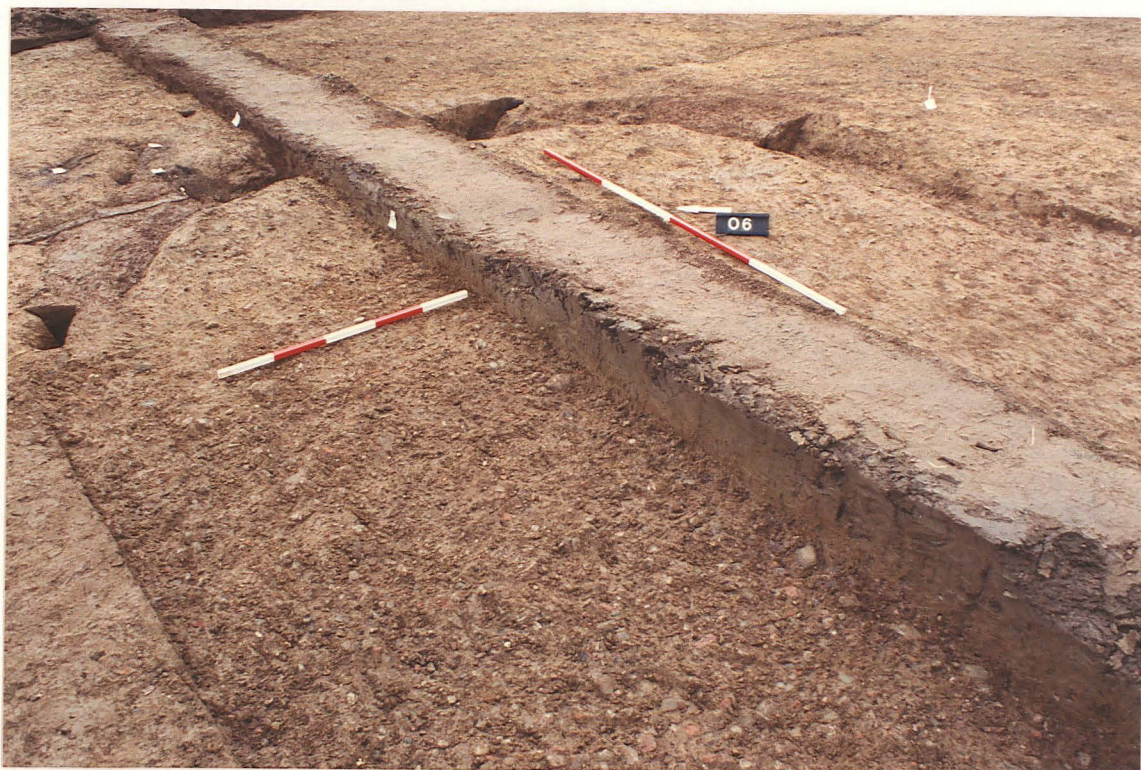






Pl. 15 Horseshoe gully [06]

Pl. 16 Horseshoe gully [06], baulk divides Area 1 (l) and Area 2 (r)







Pl. 17 Ditch [61] terminal

Pl. 18 Ditch [61], looking west, leading into pool, top right







Pl. 19 General view looking NW, Area 4. Centre top grey area marks edge of pool

Pl. 20 Pool edge in Area 4, looking east.

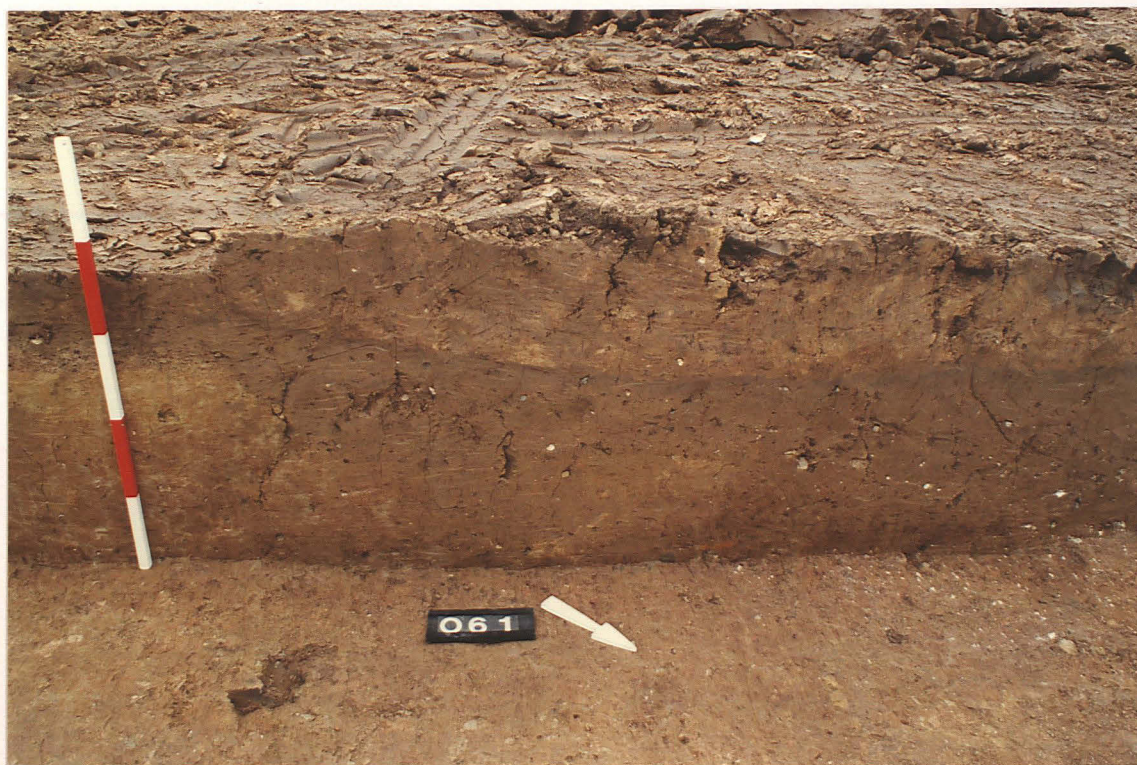






Pl. 21 Section through the pool edge in Area 4 showing ditch [61] (r) integrated with the pool edge.

Pl. 22 Machine section between Areas 2 and 4 looking west showing ditch [61], see Fig. 6 for interpretation







Pl. 23 Pit [63]/[64] with half its fill removed

Pl. 24 Fully excavated pit [63]/[64] with pedestal base in situ





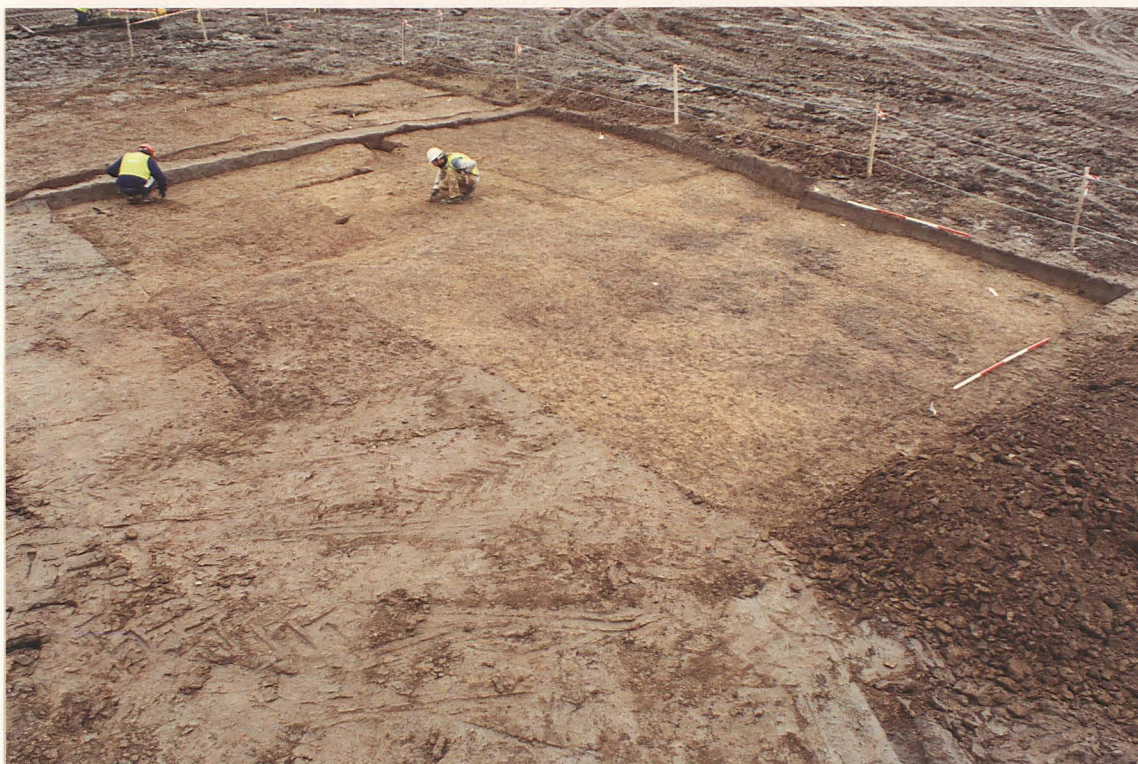


Pl. 25 Fully excavated pit [63]/[64] with pedestal base in situ (close up view)

Pl. 26 Reconstructed pedestal, scale 20cm







Pl. 27 Area 2 General view looking east showing charcoal stained depression to r. of people, prior to excavation.

Pl. 28 Area 2. Partially excavated depression in ground surface [46/47]







Pl. 29 Area 2. Partially excavated depression in ground surface [48/49]

Pl. 30 Area 2. Partially excavated depression in ground surface [53].







Pl. 31 Area 2. Partially excavated depression in ground surface [55/56].

Pl. 32 Examples of late Bronze Age pottery from the excavations. Four rims sherds, three with slashed rim decoration. Scale 20cm





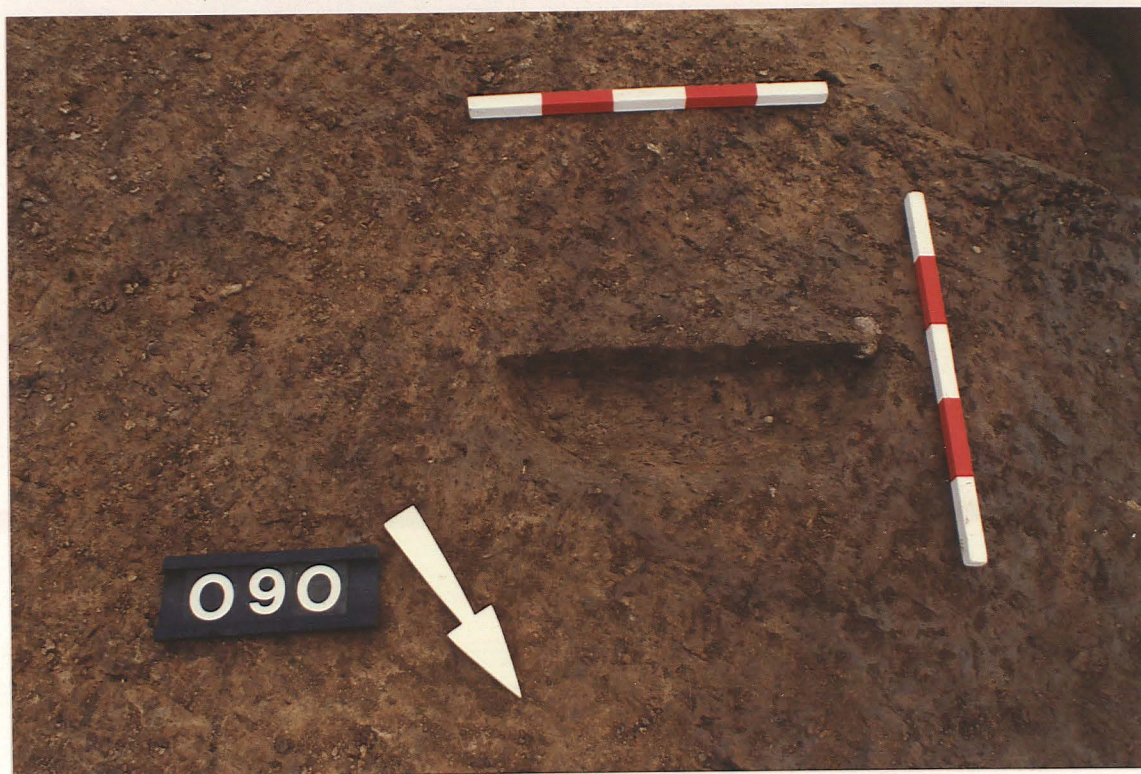


Pl. 33 Area 4. Pit [85/86] near pool edge

Pl. 34 Area 4. Small pit [80/81] near pool edge





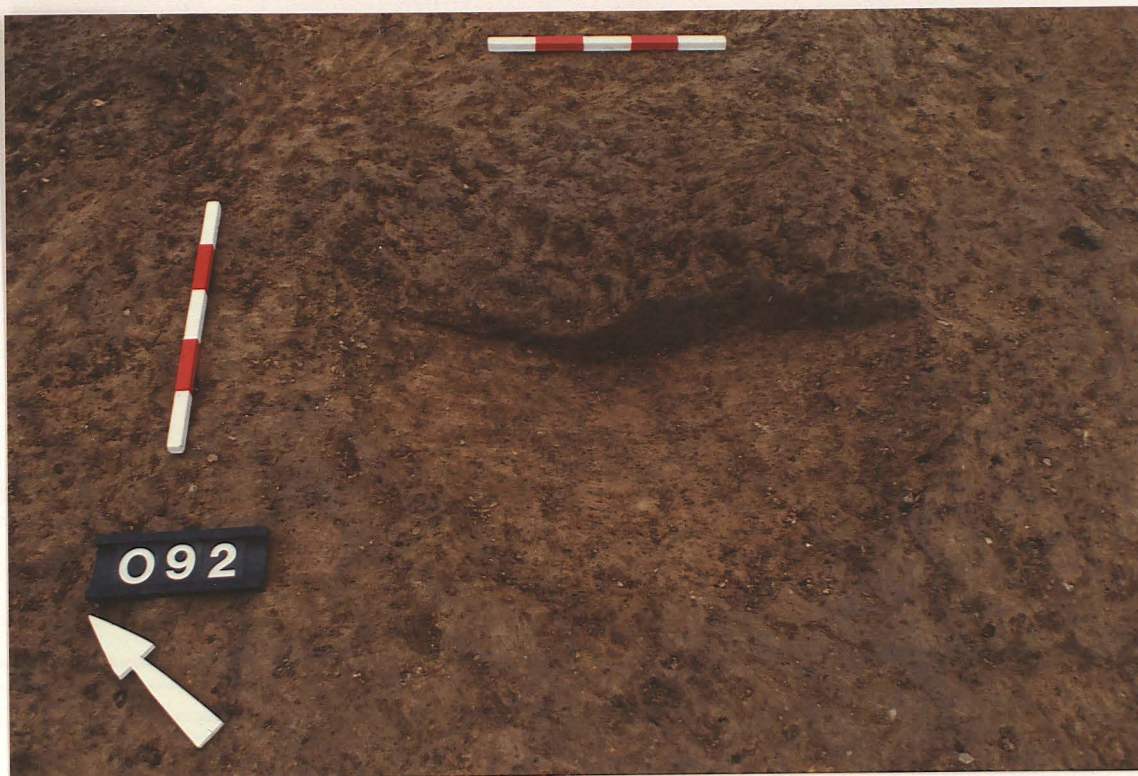


Pl. 35 Area 4. Small pit [90/91] near pool edge

Pl. 36 Area 4. Partially excavated depression in ground surface [83/84]







Pl. 37 Area 4. Partially excavated depression in ground surface [92/93]

Pl. 38 Possible hearth [94/95] found in machine trench between Areas 3 and 4







Pl. 39 Collection of environmental and micromorphological samples from the pool deposits. Monolith tins are hammered into the section to obtain an undisturbed sequence of deposits.



