A BURNT MOUND AT HOLME DYKE, GONALSTON, NOTTINGHAMSHIRE

by

LEE ELLIOTT AND DAVID KNIGHT

With contributions by

I.K. BAILIFF, S.M. BARNETT, N.C. DEBENHAM AND T.J.GENT

INTRODUCTION

Recent work in Gonalston parish on the southern edge of Hoveringham Quarry has revealed traces of a possible burnt mound, dated to the 3rd or 2nd millennium BC. This discovery has added significantly to the number of prehistoric burnt mounds which are known in Nottinghamshire (Fig.1), definite examples of which have been recorded so far only at Waycar Pasture, Girton (Garton 1993), Pig Pens, Tiln (Garton *et al* 1994; Garton and Priest 1998) and East Carr, Mattersey (three examples: Garton *et al* 1995; Morris and Garton 1998). Further concentrations of heat-affected stones which might represent burnt mounds have been recorded during fieldwalking in South Muskham (Garton 1998) and East Carr, Mattersey (Garton *et al* 1995).

The site was discovered in August 1996 during the redirection of a drainage ditch - the Holme Dyke - around the southern edge of Hoveringham Quarry (SK69264691). The archaeological investigations accompanying this work were funded by Tarmac Heavy Building Materials UK Ltd, as part of a Scheme of Treatment approved by a planning agreement with Nottinghamshire County Council. They were supervised by Lee Elliott, with the assistance of a small team of excavators from Trent & Peak Archaeological Trust, and were managed for the Trust by David Knight; the terrace and alluvial deposits exposed in the ditch sides were recorded by Andy Howard. Dating evidence was provided by thermoluminescence (TL) measurements of associated heat-affected stones by Nick Debenham (Quaternary TL Surveys). Infra-red stimulated luminescence (IRSL) dating of earlier alluvial deposits and a layer of heat-affected stones was undertaken by Tessa Gent, as part of an undergraduate research project supervised by Ian Bailiff of the Department of Archaeology, Durham University.

SITE LOCATION

The site is located on the southern edge of a low island of sand and gravel raised slightly above the Trent Floodplain (Fig.2). To the south it overlooks a broad band of alluvium, within which may be discerned several shallow linear depressions interpreted as relict water courses, and the site may have had ready access to water during the period of its use. Extensive cropmarks may be observed on the gravel terrace adjacent to the site, including two ring-ditches, a subrectangular ditched enclosure and various other curvilinear and linear features. One of the ring-ditches was excavated in September 1998, and on the basis of associated ceramic and lithic artefacts may be attributed to the Neolithic period (Fig.2:A). Positive evidence was not obtained for burial, but a non-domestic function seems likely (Elliott and Knight in prep). Earlier evaluation excavations of the adjacent subrectangular enclosure by Giles Woodhouse (Fig. 2:B)yielded several plain Bronze Age sherds from a linear ditch and post-hole within the enclosed area, of similar fabric to pottery from the Bronze Age cemetery recorded during quarrying *c*1km to the east of this site (Allen *et al* 1987; identification by C.S.M. Allen); this enclosure will be fully excavated in 1999 and 2000, and could provide rare evidence from the Trent Valley for 2nd millennium BC settlement. Together, these discoveries suggest fairly intensive

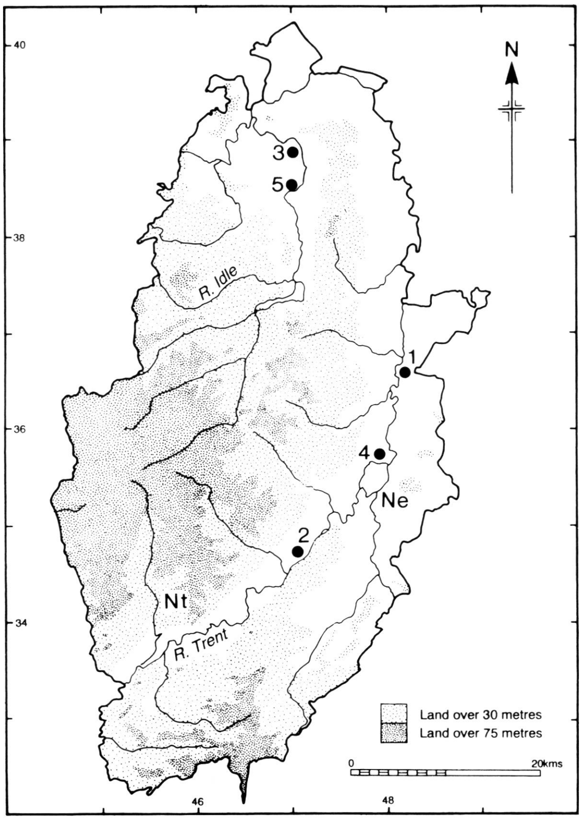

FIGURE 1: Distribution of burnt mounds in Nottinghamshire. 1: Girton, 2: Gonalston, 3: Mattersey, 4: South Muskham, 5: Tiln, Nt: Nottingham, Ne: Newark.

activity in the immediate vicinity of the site during the later prehistoric period.

METHODOLOGY

The drainage dykes on the southern, western and northern edges of the quarry extension area (Fig. 2) were excavated with a toothless ditching bucket on the back actor of a JCB, creating sections angled at *c* 45°. The dykes cut into the sands and gravels of the Devensian Floodplain Terrace, through a sequence of post-glacial alluvial deposits and, in the northern drainage dyke, also through a remarkable sequence of peaty deposits which may indicate an intricate system of water meadows. The geological sequence was recorded along the entire length of each ditch by Andy Howard, employing an EDM (electronic distance measurer) linked to a Husky data logger. Each of the exposed sections was scrutinised closely for archaeological remains or deposits and areas of archaeological potential were cleaned by hoe and trowel. A full drawn, photographic and documentary record of the visible archaeological remains was compiled, and is preserved in an archive (to be deposited upon completion of archaeological work in the quarry in Nottingham Castle Museum).

THE BURNT MOUND (FIG.3; PLATE 1)

The southern side of the drain revealed three features (201-203) containing large quantities of heat-affected stones, cut into alluvial silts and gravel and sealed by more recent alluvial deposits. A compacted layer (262) incorporating abundant heat-affected stones, sealing two of these pits and cut by the other, was recorded beneath the upper alluvium. No evidence was recorded of these features on the northern side of the dyke, suggesting that these are more likely to represent pits than ditches and that the dyke may have truncated only the northern edge of the archaeological remains.

The base of the section revealed Devensian terrace gravels (264) overlain by an intermittent layer of grey silty clay with sparse (*c*5%) water-worn pebbles (265) and a thick alluvial deposit of virtually stone-free yellow-brown silty clay (266). These deposits were cut by the three features, probably pits, which stood out clearly from the adjacent alluvial deposits due to their distinctive black silty clay loam fills and an abundance of heat-affected stones (Fig.3: 201, 202, 203). 201 was filled entirely with a black silty clay loam with abundant heat-affected stones. The upper layer of 202 (a) resembled closely the fill of 201, but overlay a shallow depth of yellowish-brown silty clay (b), merging indistinguishably with the adjacent alluvial deposits, and a basal fill of dark greyish-brown silty loam with sparse (*c*5%) heat-affected stones (c). Feature 203 preserved a more complex stratigraphy, suggesting several phases of recutting. The uppermost layer comprised a dark greyish brown silty loam with sparse (c 10%) heat-affected stones (a); this was stratified above a silty loam/silty clay loam of similar colour but with a higher density (*c*20%) of heat-affected stones (b). These upper layers apparently represent the fill of a roughly U-shaped feature cutting an earlier pit or ditch of curiously bulbous profile; the latter is characterised by darker clayey fills with variable stone content (c-e), preserving evidence of a possible recut (c).

Traces of a fourth feature could be discerned to the west of pit 203 after careful cleaning of the section (263). Its upper layer of yellow-brown silty clay (a) merged with the adjacent alluvial deposits (266) but

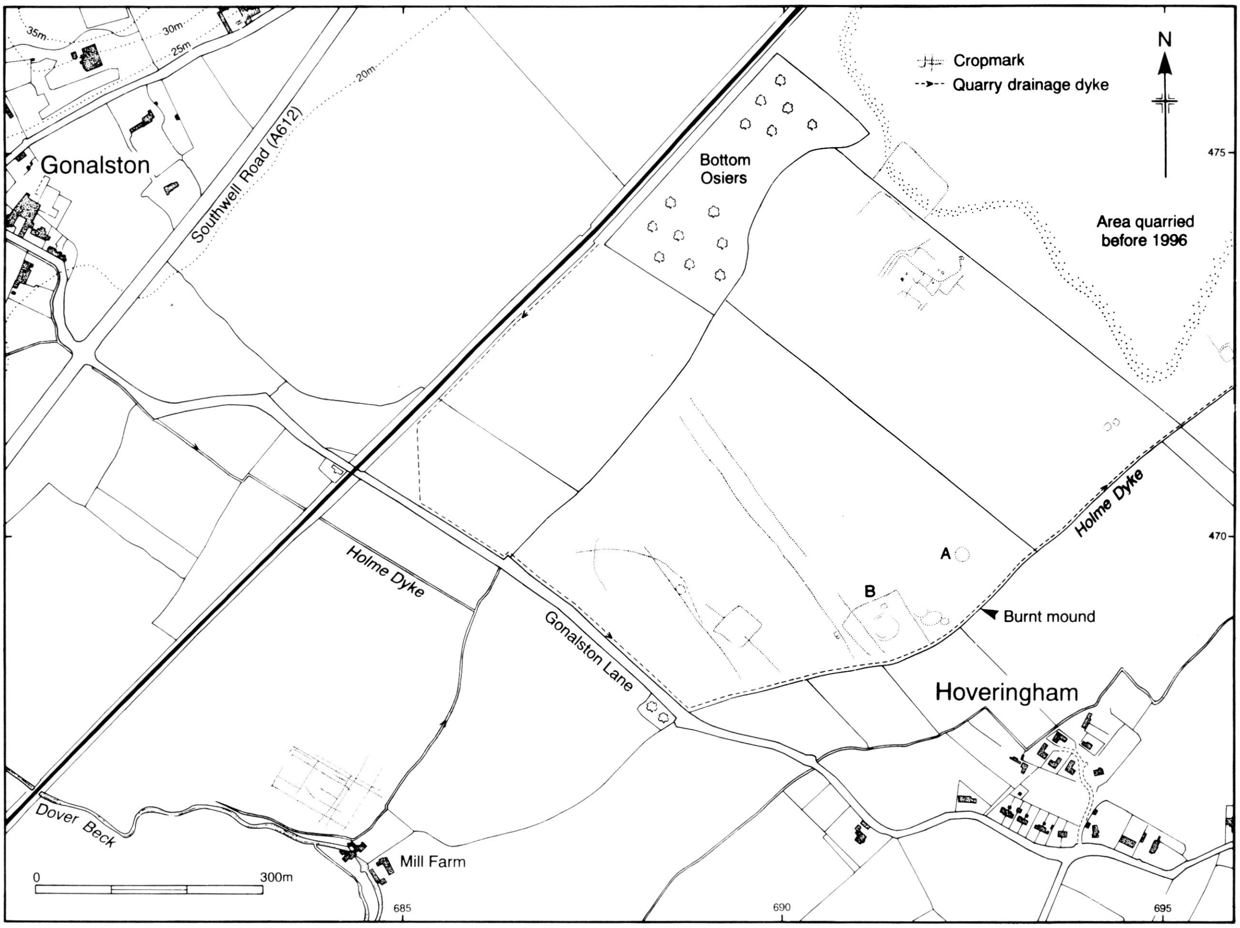

FIGURE 2: Location of Holme Dyke burnt mound. Scale 1: 10,000

the lower layers (b,c) compared closely with the darker clayey fills which were recorded towards the bottom of feature 203 (c-e). Layer 265 was truncated by the eastern edge of feature 263, but the basal fill of 263 merged indistinguishably with this layer on its western side. A single flint flake was retrieved from layer c (Fig.3: CEX). A curving line of stones observed in the ditch section above the upper fill of 263 was shown to define the base of another roughly U-shaped feature; its dark greyish brown silty loam fill merged indistinguishably with the upper layer of 203 (a).

Features 201 and 202 were sealed by a compacted deposit of greyish-brown clay loam containing a high density (25%) of heat-affected stones (262) interpreted as the truncated remains of a burnt mound. Layer 262 was cut by the upper fill of feature 203, implying a complex sequence of development; the later phase of 203 may also have truncated the upper part of feature 263. The layer of heat-affected stones was sealed by two alluvial layers immediately beneath the ploughsoil: a lower discontinuous deposit of leached greyish sandy silt, up to 0.4m thick (261), and an upper brown silty loam up to 0.7m thick (260).

FINDS

The excavations yielded substantial quantities of heat-affected stones, mainly from the fills of pits 201-203 and from layer 262. These comprise fragmentary or occasionally whole water-worn pebbles up to *c*10cm in diameter, preserving features indicative of exposure to heat. Many stones have angular

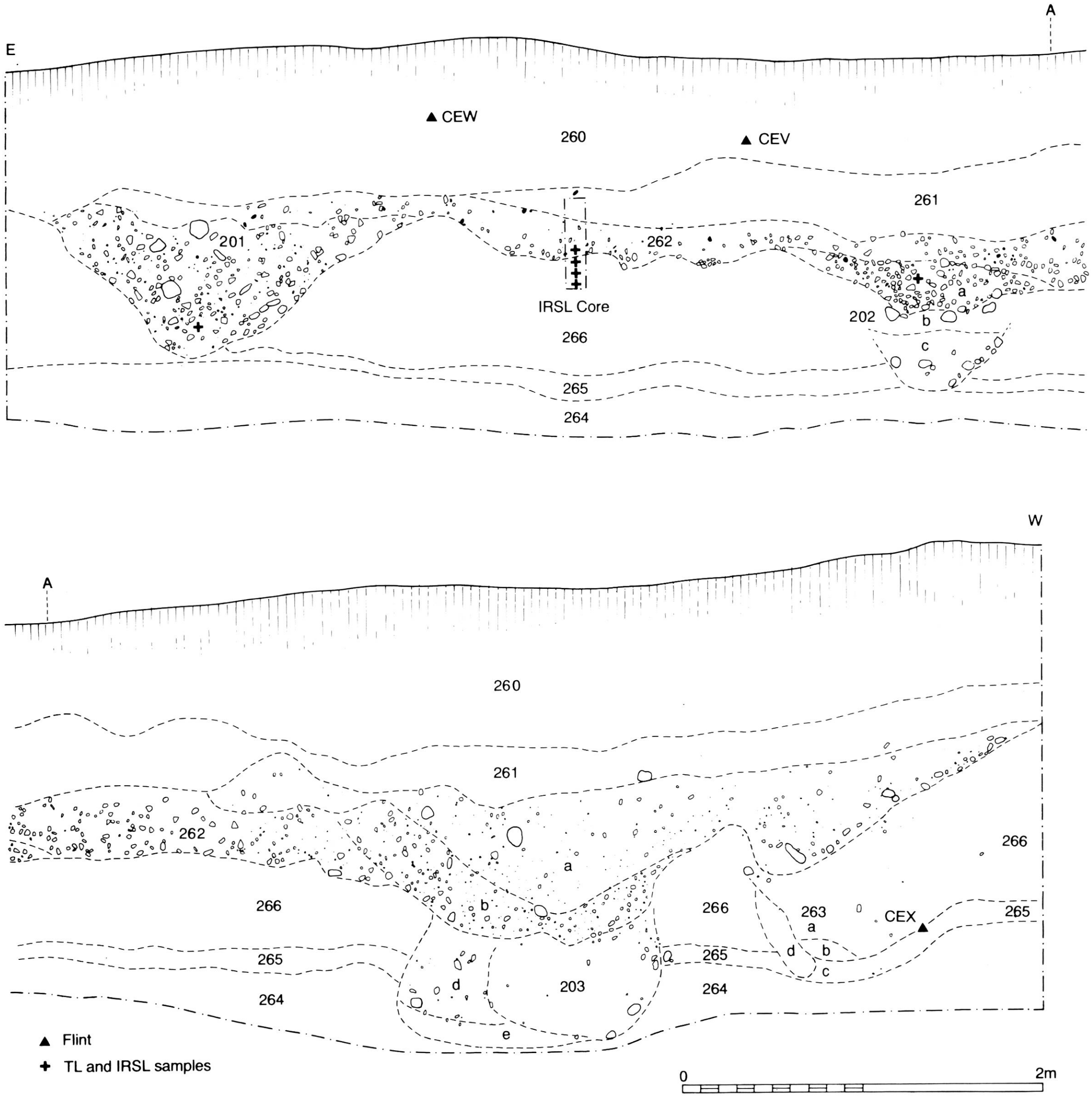

FIGURE 3: Oblique (c.45°) north-facing section of southern drainage ditch, Hoveringham Quarry (scale 1:40; see Plate 1 for stone densities in natural gravel and alluvial deposits: layers 260-261, 264-266)

fractures and crazed or cracked surfaces, while some preserve clear evidence of mineralogical changes due to heating, including zones of reduction (blackened cores), oxidation (reddening of surface or interior) and dehydration (bleaching). The pebbles are predominantly of quartzite, but a wide range of other rock types which could have been obtained from the local gravels is represented, including sandstone, limestone and siltstone (identifications by R.J. Firman).

Among the shattered stones from layer (a) of pit 202 was recovered part of a tabular pebble tool of fine sandstone, with one smoothed face and an opposing face with smoothed patches which might indicate handling during use - although the exact function of this object remains uncertain (identification by M.E. Wright). Three artefacts of brown translucent flint were also recovered (identification by D. Garton; see Fig.3 for location); these comprise a heavily bashed flake from the bottom layer (c) of pit 263 (CEX) and from the uppermost alluvial layer a small fragment (CEV) and a heavily bashed flake with scraper-like retouch on the end and side of the dorsal face (CEW). Unfortunately, none of these finds is closely datable.

DATING EVIDENCE

The site was dated by thermoluminescence (TL) measurements of heat-affected stones from pits 201 and 202 (Debenham 1998; *cf* Aitken 1990 for methodology). Alluvial sediments cut by these pits and layer 262, interpreted as the truncated remains of a burnt mound, were dated by infra-red stimulated luminescence (IRSL; *cf* Bailiff 1992), as part of a final year undergraduate project. Full reports on this work are available in archive, and the conclusions are summarised below (for full details see Debenham 1998; Gent 1997, with later amendments by Bailiff and Barnett).

Thermoluminescence Dating of Heat-Affected Stones. (N.C. Debenham)

Two heat-affected stones were examined by this method, one extracted from near the base of feature 201 (THM22) and the other from layer a of feature 202 (THM35; see Fig.3 for location). The dates of the last heating of these stones to temperatures exceeding 400°C were calculated as 1,940±350 BC (THM22) and 2,720±420 BC (THM35; methodology in Debenham 1998). The error limits include both random and systematic uncertainties, and represent the 68% confidence level (at which level the dates are not statistically different). The dates thus fall firmly within a Neolithic to Bronze Age time bracket - a result of fundamental importance for our interpretation of these pits as part of a later prehistoric burnt mound. Within their uncertainties, the TL dates are not significantly different. If it is assumed that both samples were heated contemporaneously, the best estimate for the date of heating is 2230±440 BC. This date is not statistically different from the IRSL date of 2590±460 BC obtained for the layer of burnt stones (262) sealing the pits, discussed in the following section.

Infra-Red Stimulated Luminescence (IRSL) Dating of Sediments. (T.J. Gent, I.K. Bailiff and S.M. Barnett)

Further dating evidence was obtained by IRSL dating of the sediments through which the pits had been cut, and of the grey layer with heat-affected stones, 262, which sealed these. An open aluminium box, 50 cm long, 10cm wide and 5cm deep, was hammered into the section, and a monolith was removed for laboratory analysis (Fig.3). Four samples were taken, the lower three from layer 266 (at heights of 30-50mm, 110-135mm, 200-225 mm from the base of the monolith) and the other from layer 262 (270-295mm from the base of the monolith). The measured dates, with their associated error term calculated at the 68% level of confidence, are listed below, together with the calendrical date ranges and their location within the monolith.

30-50mm: 10,050 ± 1,530BC (8,520-11,580 BC)
110-135mm: 5,380 ± 570BC (4,810-5,950 BC)
200-225mm: 6,030 ± 1,640BC (4,390-7,670 BC)
270-295mm: 2,590 ± 460BC (2,130-3,050 BC)

The progressive increase in dates with depth from *c*2,600 BC to 10,000 BC is consistent with the stratigraphy and with the TL dates for the burnt stone within the quoted error limits. This overall consistency is encouraging given the potentially large uncertainties concerning the mechanism of zeroing of the sediment prior to burial. In calculating the age, the sediments were assumed to have been fully bleached by exposure to light before burial. Since the luminescence dates for the 110-135mm and 200-225mm samples are not resolved, they could indicate a period of accelerated alluviation. While the uncertainty given for the 200-225mm depth sample is significantly larger than for the others (average ± 13%), overall such levels are comparable to those obtained in other luminescence dating studies with Holocene sediments.

DISCUSSION

The high concentrations of heat-affected stones in three of the pits, the compacted layer of heat-shattered stones and the terrace-edge location of the site close to sources of water suggest that the dyke had probably cut into the edges of an eroded 'burnt mound', buried beneath alluvium. Close comparisons may be drawn with other Nottinghamshire burnt mounds at Waycar Pasture, Girton (Garton 1993) and Pig Pens, Tiln (Garton and Priest 1998), both of which have recently been excavated, and with other excavated sites distributed mainly over western and northern Britain (*cf* Ehrenberg 1991; Hedges 1975). These mounds appear to have been used over a fairly limited time period, mainly during the Bronze Age (*eg* Brindley and Lanting 1990), and the TL dates of 1,940±350 BC and 2,720±420 BC for the heated stones from pits 201 and 202 at Gonalston would fit well with the burnt mound interpretation. Further support for a Neolithic/Bronze Age date for the site is provided by the IRSL date of 2590±460 BC obtained for the layer of burnt stones (262), stratified above pits 201 and 202.

Comparing this site with excavated examples elsewhere, we can envisage a low mound of heat-shattered stones, accompanied by a hearth for heating stones and a receptacle for water - perhaps a pit with a wooden or stone trough - into which heated stones would have been thrown. There has been considerable debate on the functions of burnt mounds (*eg* Buckley 1990; Hodder and Barfield 1991). The available ethnographic and folk evidence, combined with documentary records from areas such as Ireland, suggests an association with cooking (*eg* Hedges 1975; O'Kelly 1954), although alternative uses as saunas (Barfield 1991; Barfield and Hodder 1987) or for purposes such as textile production (Jeffery 1991) have also been suggested.

Burnt mounds have traditionally been associated with western and northern Britain, particularly Ireland, Wales and Scotland, and in these areas provide one of the key sources of evidence for Bronze Age activity (Ehrenberg 1991, fig.1). Recent discoveries have extended the distribution of burnt mounds well into the lowland zone - most notably, the West Midlands (Barfield and Hodder 1989; Welch 1994-5), Hampshire (Pasmore and Pallister 1967), the Fens and East Anglia (Leah & Crowson 1994; Martin 1988). The discoveries at Gonalston and elsewhere in Nottinghamshire expand further this picture, and go some way to redressing the bias in the archaeological record towards the better preserved monuments of the Highland Zone.

The discovery beneath the burnt mound of deposits interpreted as alluvial in origin is also of considerable interest in view of the current debate on the chronology of alluviation in the Trent Valley (*eg* Knight and Howard 1995, 123). Substantial depths of alluvium are known to have accumulated in the Valley from Romano-British times, due in large part to soil erosion associated with agricultural activity (*ibid*, 17; *cf* Buckland and Sadler 1985), but the earlier history of alluviation is far less clear. The Gonalston sequence provides persuasive evidence for pre-Bronze Age alluviation, although the very early dates for the lower IRSL samples must be employed with caution in view of the apparent homogeneity of the alluvium sealed by the burnt mound and the limited penetration of the IRSL monolith into the alluvial deposits sealed by layer 262. It is hoped that further work will be carried out elsewhere in the quarry prior to extraction, with the aim of elucidating further the early chronology of alluviation, and in particular the impact of prehistoric woodland clearance upon the Valley environment.

REFERENCES

Aitken M.J., 1990. *Science Based Dating in Archaeology.*

Allen C.S.M., Harman M. and Wheeler H., 1987. 'Bronze Age cremation cemeteries in the East Midlands', *Proc Prehist Soc* 53, 187-221.

Bailiff I.K., 1992. 'Luminescence dating of alluvial deposits', in Needham S. and Macklin M. (eds), *Alluvial Archaeology in Britain*, 27-35. Oxbow Monograph 27.

Barfield L.H., 1991. 'Hot stones: hot food or hot baths?', in Hodder and Barfield 1991, 59-67.

Barfield L.H. and Hodder M.A., 1987. 'Burnt mounds as saunas, and the prehistory of bathing', *Antiquity* 61, 370-9.

Barfield L.H. and Hodder M.A., 1989. 'Burnt mounds in the West Midlands: survey and excavation', in Gibson A. (ed) *Midlands Prehistory.* BAR Brit Ser 204, 5-13.

Brindley A.L. and Lanting J.N., 1990. 'The dating of fulachta fiadh', in Buckley 1990, 55-6.

Buckland P. and Sadler J., 1985. 'The nature of Late Flandrian alluviation in the Humberhead Levels', *East Midland Geographer* 8, 239-51.

Buckley V. (ed), 1990. *Burnt Offerings. International Contributions to Burnt Mound Archaeology.*

Debenham N., 1998. *Thermoluminescence Dating of Fire-Cracked Pebbles from Hoveringham, Notts.* Unpublished archive report.

Ehrenberg M.R., 1991. 'Some aspects of the distribution of burnt mounds', in Hodder and Barfield 1991, 41-58.

Elliott L. and Knight D., in preparation. 'Excavations of a Neolithic Ring Ditch at Holme Dyke, Gonalston, Notts.', *Trans Thoroton Soc.*

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

Garton D., 1998. *The South Muskham Fieldwalking Project 1992-7.* Unpublished report by Trent & Peak Archaeological Trust, University of Nottingham.

Garton D., Howard A.J., Priest V. and Walker J.S.F., 1994. *Tarmac Tiln South, Evaluation Report.* Unpublished report by Trent & Peak Archaeological Trust, University of Nottingham.

Garton D., Elliott L., Howard A.J., Hunt C.O. and Morris T., 1995. *Stage 2 Evaluations on the Land East of Blaco Hill, Mattersey.* Unpublished report by Trent & Peak Archaeological Trust, University of Nottingham.

Garton D. and Priest V., 1998 'Fieldwork by Trent & Peak Archaeological Trust in Nottinghamshire, 1996-7: Pig Pens, Tiln', *Trans Thoroton Soc* 102.

Gent T.J., 1997. *Investigation of Infra-Red Stimulated Luminescence Dating of Alluvial Sediments from the Trent Valley.* Unpublished BSc dissertation, Dept. of Archaeology, University of Durham.

Hedges J., 1975. 'Excavation of two Orcadian burnt mounds at Liddle and Beaquoy', *Proc Soc Ant Scot* 106, 39-98.

Hodder M.A. and Barfield L.H., (eds) 1991. *Burnt Mounds and Hot Stone Technology.*

Jeffery S., 1991. 'Burnt mounds, fulling and early textiles', in Hodder and Barfield 1991, 97-107.

Knight D. and Howard A.J., 1995. *Archaeology and Alluvium in the Trent Valley.*

Leah M. and Crowson A., 1994. 'The excavation of a potboiler mound at Feltwell Anchor', *Fenland Research* 9, 46-50.

Martin E., 1988. 'Swales Fen, Suffolk: a Bronze Age cooking pit?' *Antiquity* 62, 358-9.

Morris T. and Garton D., 1998. 'Fieldwork by Trent & Peak Archaeological Trust in Nottinghamshire, 1996-7: East Carr, Mattersey', *Trans Thoroton Soc* 102.

O'Kelly M., 1954. 'Excavations and experiments in ancient Irish cooking places', *Journal Roy Soc Ant Ireland* 84, 105-55.

Pasmore A.H. and Pallister J., 1967. 'Boiling mounds in the New Forest', *Proc Hants Field Club* 24, 14-19.

Welch C.M., 1994-5. 'A Bronze Age 'burnt mound' at Milwich', *Staffs Archaeol & Hist Soc* 36, 1-15.

ACKNOWLEDGEMENTS

Thanks are extended to Tarmac Heavy Building Materials UK Ltd. for funding this work, and in particular to Neil Beards and Tony Beeston for their assistance during fieldwork and post-excavation. The fieldwork was carried out with the assistance of Andy Howard (geomorphological survey), Mark Southgate (Assistant Project Supervisor) and the following Field Assistants: Howard Jones, Rob Sussum, Alex Ward and Caroline Wickham. Mike Bishop of Nottinghamshire County Council provided much helpful discussion during the course of the project. Gratitude must also be expressed to Nick Debenham (Quaternary TL Surveys) and Tessa Gent for their work on TL and IRSL dating, and to Ian Bailiff and Sarah Barnett (Dept. of Archaeology, Durham University) for their comments on the results of IRSL dating. Daryl Garton provided a report on the flintwork and Liz Wright commented on the pebble tool; Daryl Garton also read and commented on a draft of this text. Ron Firman (Dept. of Archaeology, University of Nottingham) identified the lithologies of the heat-affected stones. Jane Goddard prepared the figures for publication. Gratitude is also expressed to Trinity College, Cambridge, and Mr. G. Clarke for facilitating land access. The Society gratefully acknowledges a contribution by Tarmac Heavy Building Materials UK Ltd towards the publication of this report and the cost of the colour plate.

PLATE 1: Holme Dyke burnt mound: oblique north-facing section of southern drainage ditch, Hoveringham Quarry

PLATE 2: Harworth Medieval Silver Seal Matrix: Face view, scale in mm.

PLATE 3: Harworth Medieval Silver Seal Matrix: Side view, scale in mm.