

Three Late Bronze Age Hoards from North East Norfolk

By Andrew J Lawson

*(with a contribution on metal composition by
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Introduction

Since 1997, the Portable Antiquities Scheme (PAS) has provided a mechanism for the recording and dissemination of information on new discoveries of Bronze Age metalwork (*inter alia*) throughout England and Wales. Nonetheless, prior to this development considerable effort was made by the Norfolk Museums Service to record the very large number of individual objects and hoards discovered in their county. Overall assessments of Bronze Age metalwork from this part of East Anglia were made at the end of the 1970s and a decade later (Lawson 1984; Pendleton 1999), and some of the hoards then known had been individually published.

However, this report presents details of three hoards from north-east Norfolk, found under different circumstances between 1976 and 1982. All three hoards belong to the Late Bronze Age Ewart Park tradition of metalworking and probably date to the 11th-9th centuries (calibrated) BC.

The first hoard, from Northrepps, was originally reported in 1976. It comprises five socketed axes, three found during the harvesting of potatoes on Windspurs Farm, and two found subsequently by metal-detectors. The other two hoards reported here are from Beeston Regis. The Beeston Regis I hoard was detected in 1979 by a pupil at Beeston Hall School and includes 35 items: 17 socketed axes and two small fragments, a spearhead, a mould, a casting jet and two ingot fragments, portions of a socketed gouge, a socketed punch and a knife, a rivet, and six small fragments. The find spot was archaeologically investigated and the hoard was shown to have been contained in part of a ceramic bowl set within a small pit. The Beeston Regis II hoard was unearthed in 1982 during the digging of a foundation trench at Runton Hill School. The objects, comprising eight complete or fragmentary socketed axes, a palstave and two ingot fragments, were probably originally bound together with string. Archaeological investigation of the site suggests that the bundle of bronzes had probably been buried in a small ditch.

Analysis of the metal composition of the objects from the two Beeston Regis hoards was undertaken by the British Museum. The results show that the compositions are similar to other Ewart Park tradition cast bronzes, and possibly used an unknown continental source of copper and a Mendip source for lead.

Prior to these discoveries, about forty Late Bronze Age hoards had been reported in Norfolk. Although the hoards described here were only three of nine new finds made between 1976 and 1982, the popularity of metal-detecting has led to the discovery of many more subsequently, such that by the end of 2012 the total number of hoards reported from the county stood at approximately one hundred.

1. The Northrepps Hoard

Primary sources of information concerning the discovery of the Northrepps hoard, comprising contemporary correspondence and lists of objects, are contained in Norfolk County Council Heritage Environment Record 11969. Details of the accession of two objects from the hoard (Nos. 4 and 5, below) are held at Norwich Castle Museum (NCM 2005.351.1-2), as are the records of their conservation treatment (NMHCM CN11651-2).

Description of the site

The site of discovery comprises a rectangular arable field, some 500m long and 120m wide, orientated NNW-SSE, and at an elevation of 60m OD. The field is flanked on the east by the A149 or North Walsham Road, and on the west by Nursery Plantation. The buildings of Windspurs Farm lie on the east side of the road and towards the southern end of the field. The area to the north of the farm is currently used as Northrepps airfield. The original finds were made approximately 150m S of the NW corner of the field and 25m from the plantation (at NGR TG2301 3772). The superficial geology comprises glacial outwash sands and gravels of the Cromer Ridge, the area to the west of the plantation comprising the former Roughton Heath.

Circumstances of discovery

The precise date of discovery is not known but in a letter to Mr J G Joice dated 27 October 1976, Mr J F Watson, then the farm manager, recorded 'two objects thrown up by a potato machine working at Windspurs Farm . . .' He also clearly described the objects (Nos 1 and 3 below) and attached photographs. In his response, Dick Joice, at the time an Executive Director of Anglia Television, suggested that the objects were of Bronze Age date and advised that they would be of interest to the Norfolk Archaeological Unit (NAU). Subsequently, the current author, who worked for the NAU at the time, confirmed the identity of both objects as Late Bronze Age socketed axes, and investigated further the circumstances of their discovery. Mr Watson reported that the two objects had appeared in the harvester at the same time, and that a third axe (No. 2 below) had come to light in an adjacent run of the machine. Moreover, he suggested that deeper than normal ploughing for the potato crop may have been the cause of disturbing the objects from their earlier buried position.

In May 1982, the author sought the permission of the landowner for a systematic search of the find area. Once the crop had been lifted in October of that year, Mr Derek G Woollestone searched the whole field with a metal-detector on behalf of the NAU, but without success.

On 26 August 2004, Discovery Tours organised a metal-detector rally to search the fields in the area of Windspur Farm. Two more socketed axes (Nos 4 and 5 below) were discovered some 16m apart in the same field as the earlier finds (their Field 5), amongst a spread of medieval and later metalwork.

Although primary accounts exist of the discovery of all the items within a restricted area, their original association is inferred. Moreover, although the separate finds were made from close proximity to each other, they were not all together. Consequently, the discoveries might be described best as 'area finds'. Nonetheless, due to the

apparent contemporaneity of the objects (below), and the general absence of comparable material in the area, it seems reasonable to suggest that all five objects were originally buried together as a hoard (Needham, Lawson and Green 1985, Category 1b or 7).

History of Ownership

The three axes found in 1976 were retained by the farm manager. The two axes discovered in 2004 were donated by the finders and the landowner to Norwich Castle Museum (Accession No. 2005.351.1-2). Subsequently, they were conserved in the museum laboratory (Cons. Nos CN11651-2).

Description and comparisons

The axes reported in 1976 (Nos. 1-3) were all in sound condition with a dark green patina but with extensive surface pitting and limited areas of more aggressive, light coloured corrosion. The axes discovered in 2004 were in similar condition but have now been stabilised.



Northrepps hoard, numbers 1 to 3.

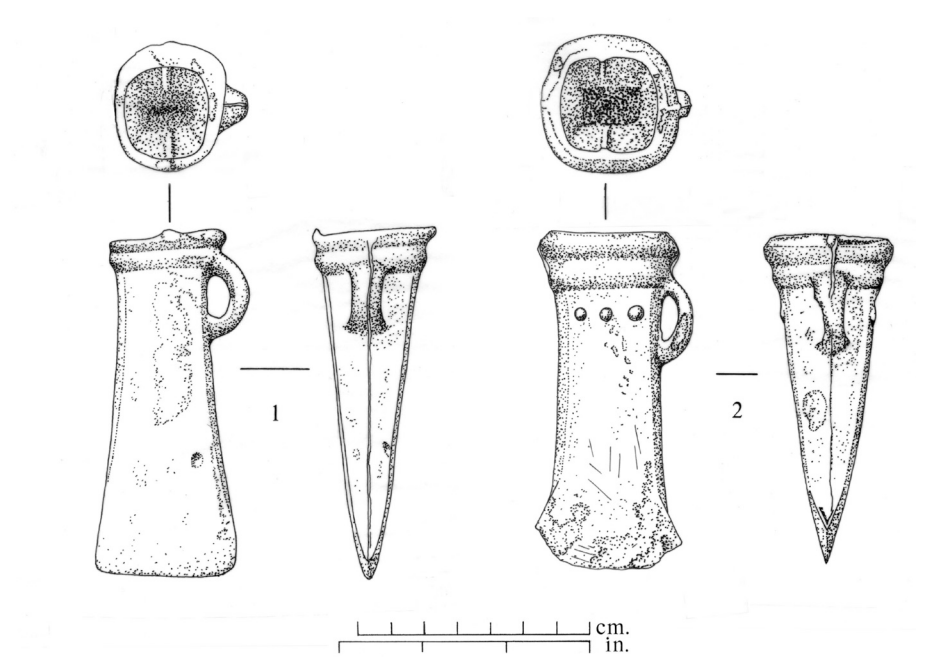


Northrepps hoard, numbers 4 and 5.

1. SOCKETED AXE with one rounded loop. Irregular sub-square mouth with double rounded moulding and flat rim. Rectangular body expanding gently to straight cutting edge. Single internal vertical rib behind each face (Ehrenberg 1981 Type 5).
L: 10.5cm.

Comparisons:

Type Fulford (Schmidt and Burgess 1981, 176-8), e.g. Danes Dyke Hoard, Flamborough, Yorks. (*ibid.* No. 997); West Caister Hoard, Norfolk (Lawson 1979a, fig. 9.2A); Grays Thurrock I Hoard, Essex (Turner 2010, No. 02/33); Greys Thurrock II Hoard, Essex (*ibid.* No.03/1); All Hallows II Hoard, Kent (*ibid.* 13/05).



Northrepps hoard, socketed axes 1 and 2.

2. SOCKETED AXE with one rounded loop. Sub-square mouth with two heavy rounded mouldings beneath. Sub-square body expanding to curved cutting edge. Horizontal line of three pellets on each face. Single internal vertical rib behind each face (Ehrenberg 1981 Type 5).

L:10.3cm.

Comparisons:

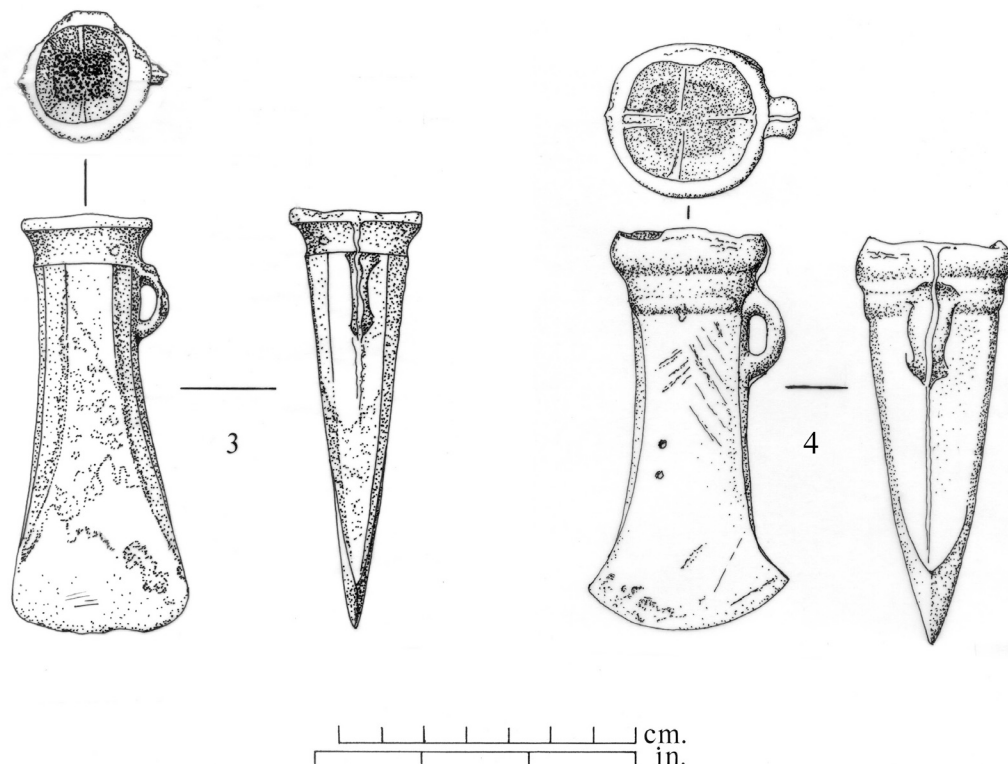
Ketton Hoard, Rutland (Clough 1979, fig. 5.4, Nos 8 and 150); Bexley Heath Hoard, Surrey (Britton 1960b, No.14); Fiskerton 2 Hoard, Lincolnshire (Davey 1973, fig 31); Beeston Regis I Hoard, Norfolk (this report, below No. 6); Grays Thurrock I Hoard, Essex (Turner 2010, Nos 02/11-12); All Hallows II Hoard, Kent (*ibid.* No.13/02).

3. FACETED SOCKETED AXE with one rounded loop. Round mouth with trumpet moulding. Faceted body expanding to rounded cutting edge. Single internal vertical rib behind each face (Ehrenberg 1981 Type 5).

L.10.0cm.

Comparisons:

Type Meldreth (Schmidt and Burgess 1981, 204-7); Meldreth Hoard, Cambridgeshire (Hawkes and Smith 1955b, No 310); Gorleston I Hoard, Norfolk (Clough and Green 1978, 10, No.21); Ketton Hoard, Rutland (Clough 1979, fig. 5.4, No. 6); Petters Sports Field Hoard, Egham, Surrey (Needham 1986 & 1990, No.18, Class D); Grays Thurrock I Hoard, Essex (Turner 2010, Nos 02/01-02); All Hallows II Hoard, Kent (*ibid.* No.13/01).



Northrepps hoard, socketed axes 3 and 4.

4. SOCKETED AXE with single loop; rounded sub-square mouth with heavy moulding and slight rib spaced beneath; plain, rectangular-sectioned body, expanding to curved cutting edge. Five internal ribs (Ehrenberg 1981, Type 6). Surface indentations and scratches, mainly modern.

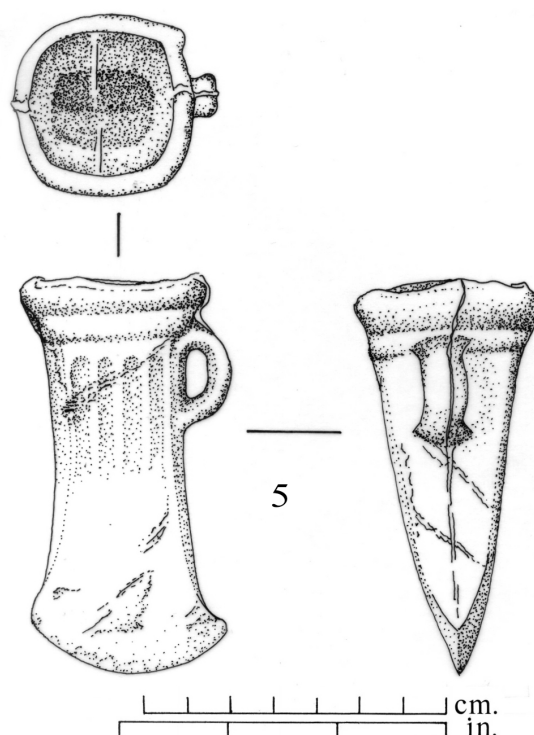
L: 9.47cm. Weight 210gm.

Comparisons:

South-eastern type (Needham 1990, Class A1); Aylsham Hoard, Norfolk (Clough 1971, No.4); Foxburrow Farm, North Elmham Hoard, Norfolk (Clough and Wade Martins 1970, No.4); Bexley Heath Hoard, Kent (Britton 1960b, No.25); Felixstowe Hoard, Suffolk (Smith 1956a, No.5); Reach Fen Hoard, Cambridgeshire (Smith 1956b, No.10); Isle of Harty Hoard, Kent (Smith 1956c, No.14); Meldreth Hoard, Cambridgeshire (Hawkes and Smith 1955b, Nos 27, 29).

5. SOCKETED AXE with one heavy loop; sub-square mouth with single moulding and slight second moulding on step beneath from which depend five poorly defined vertical ribs on each face, two on the body angles and three between; rectangular-sectioned body expanding to asymmetric curved cutting edge. Two internal ribs (Ehrenberg 1981, Type 5). Surface scratches, some deep, probably modern.

L: 9.05cm. Weight 222gm.



Northrepps hoard, socketed axe 5

Comparisons:

South English ribbed axe (Needham 1990, 32-4, Class B2); Type Welby (Schmidt and Burgess 1981, 221-3); Foxburrow Farm, North Elmham Hoard, Norfolk (Clough and Wade Martins 1970, No.12); Meldreth Hoard, Cambs (Hawkes and Smith 1955b, Nos. 15-17); Reach Fen Hoard, Cambs. (Smith 1956b, No.8).

Analytical detail

No elemental analysis has been performed, but on the basis of their appearance the axes are all presumed to be of copper alloy, probably leaded bronze.

Remarks

Although the five socketed axes recovered from the Northrepps Hoard are all different, the forms are not unusual. Typological dating is provided by comparing some of the axes with similar examples associated elsewhere with more distinctive metalwork: for example, the Foxburrow Farm, North Elmham and Aylsham Hoards, both contain comparable axes associated with fragments of Ewart Park swords, and the Gorleston I Hoard contains axes and elements of Ewart Park and Carp's Tongue swords.

2. The Beeston Regis I Hoard

Primary sources of information concerning the discovery of the Beeston Regis I Hoard, comprising the original site archive and analytical records, are contained in Norfolk County Council Heritage Environment Record 15534. Details of the accession and conservation of all the objects from the hoard are held at Norwich Castle Museum (1981.79). An earlier note on the find has been published (Lawson 1979b).

Description of the Site

The find spot lies 1.9m from the western boundary wall of the playing field of Beeston Hall School, and 37.3m south of the gate that opens on to the A149 Cromer Road (at NGR TG 1757 4279). The site comprises flat ground at c.30.5m OD, situated on loessic soils which mantle the Pleistocene sands and gravels exposed in the coastal cliffs 0.5km to the north (Corbett and Tatler 1974). At the time of discovery the entire field was grassed, but subsequently artificial ‘all-weather’ pitches have been created adjacent to the site.

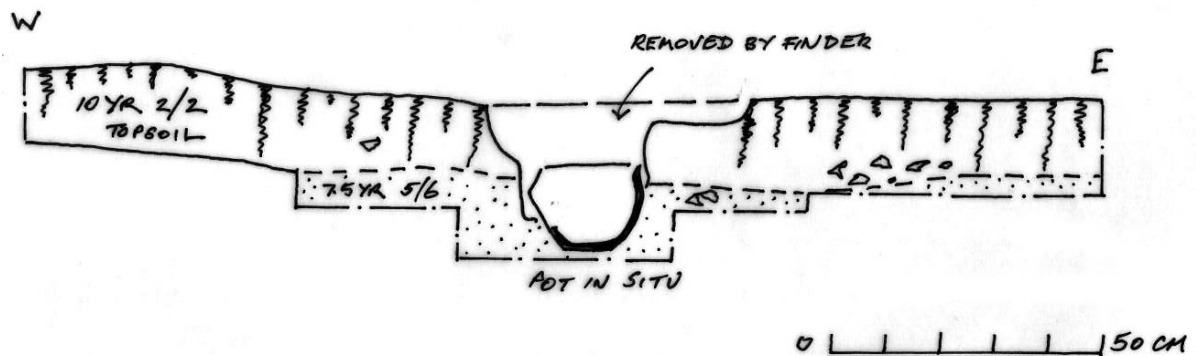
Circumstances of discovery

The hoard was located after dark on Tuesday 11 December 1979 by James Ellis, then a pupil at the school, using a metal-detector (C-Scope TR400) with appropriate permission. The first object to be unearthed was a socketed axe (No.1) with its mouth upwards. The find was not investigated further until the next morning when the remaining objects were recovered, the spearhead (No.19) lying in the middle of the cluster, with the mould (No.19) and ingot fragment (No.21) near the base. All the objects had been tightly packed together and contained within an incomplete ceramic bowl. The discovery was brought to the attention of a schoolmaster, Mr Sebastian Eden, who promptly reported it to the Norfolk Archaeological Unit.



Beeston Regis hoard I, excavation by Norfolk Archaeological Unit

On Thursday 13 December, the find spot and a small area around it were excavated by the author and Miss Jayne Bown on behalf of the Norfolk Archaeological Unit. The investigation concluded that the hoard had lain immediately beneath 0.15m of topsoil and between the stone- and brick-filled ruts of a former track that followed the boundary wall. The rim of the ceramic container had been crushed inwards, and a number of sherds had been displaced by the finder, but it was otherwise in its original place of deposition. Although the bronzes had been removed by the finder, the bowl had been left *in situ*. Fragments of string adhering to the bronzes suggested that they had been bound before placement in the vessel. No substantial archaeological feature was observed and it was concluded that the vessel had been deposited in a small purpose-made pit. A detector scan of the area recovered a medieval copper alloy plate fragment (No.35) 2m to the north-east of the hoard but no additional Bronze Age metalwork.



Beeston Regis hoard I, sketch of north section by Andrew J Lawson

In March 1980, several of the bronzes were sampled by the British Museum Research Laboratory (now part of the Department of Conservation and Scientific Research) for the purpose of elemental analysis, and subsequently all of them were cleaned and conserved at Norwich Castle Museum. The remaining objects were sampled in July 1980.

As a primary record exists which specifies the discovery of the objects together in a confined space, the discovery can be confidently called a hoard. Furthermore, the position of the objects was observed *in situ* (Needham, Lawson and Green 1985, Category 1a and 0). The original deposit had string and ceramic accessories (*op.cit.* A2 and C2).



Beeston Regis hoard I

History of Ownership

The finder passed the objects to the landowner, who sold them during November 1980 to the Norfolk Museum Service. They are housed at the Norwich Castle Museum (Accession. No.1981.79).

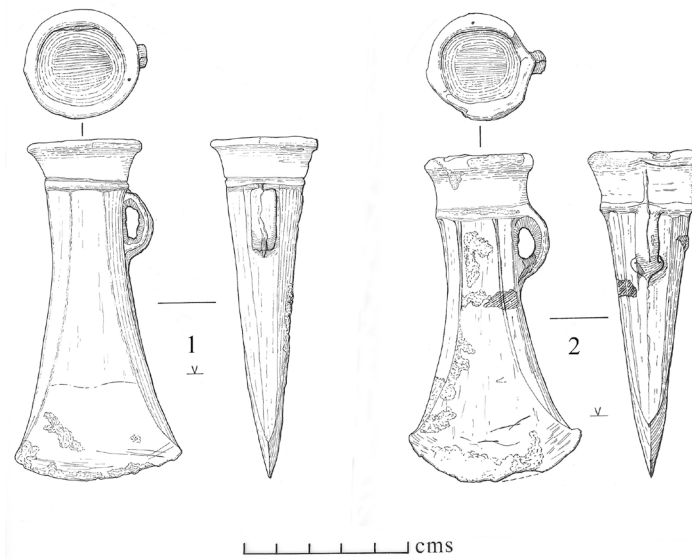
Description and comparisons

1. FACETED SOCKETED AXE with single loop, wide oval mouth, octagonal body widening to curved cutting edge. Trumpet mouth is splayed with a slight horizontal groove and rib beneath; facets defined by dull angles. Casting seam runs over the flattened loop. Blade bears light scratches.

L: 10.5cm. Weight 170.7gm.

Comparisons:

Type Medreth, Variant Aylsham (Schmidt and Burgess 1981, 204-7); Meldreth Hoard, Cambs (Hawkes and Smith 1955b, No. 32); Aylsham Hoard, Norfolk (Clough 1971); Foxburrow Farm Hoard, North Elmham, Norfolk (Clough and Wade-Martins 1970, No.28); Ketton Hoard, Rutland (Clough 1979, 121, No.6); Petters Sports Field Hoard, Egham, Surrey (Needham 1986, 44-5; Class D)



Beeston Regis hoard I, socketed axes 1 and 2

2. FACETED SOCKETED AXE with single loop; sub-circular at mouth, with octagonal body widening to curved cutting edge; mouth slightly splayed and lightly moulded with a horizontal rib spaced beneath; facet angles pronounced; casting seams running down loop and opposite face. Mouth flawed, cutting edge damaged. Reverse bears traces of hammering and scratches. Fibres adhere to the body and loop.
L: 10.1cm. Weight 178.5gm.

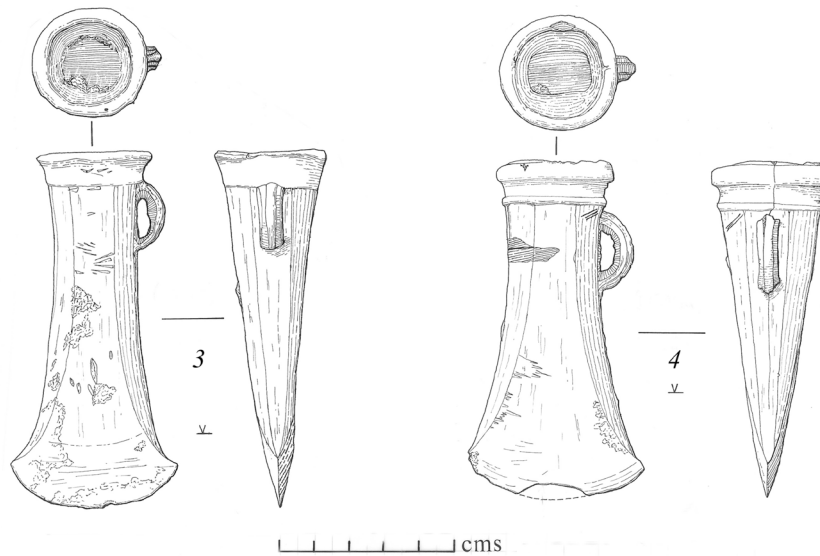
Comparisons:

Meldreth Hoard, Cambs (Hawkes and Smith 1955b, No. 32); Wick Park Hoard, Stogursey, Soms. (McNeil 1973, No.36); Petters Sports Field Hoard, Egham, Surrey (Needham 1986, 44-5; Class D).

3. FACETED SOCKETED AXE similar to No.1 but with shorter collar and trumpet moulding; body with sharp, hammered impressions; cutting edge with light scratches.
L: 10.4cm. Weight 157.0gm.

Comparisons:

Type Meldreth (Schmidt and Burgess 1981, 204-7); Feltwell Hoard, Norfolk (Smith 1958a, No. 1); Gorleston I Hoard, Norfolk (Clough and Green 1978, 9, No.21); Kensington Hoard, London (Britton 1960a, No.1); Husband Bosworth Hoard, Rutland (Clough 1979, 126, No.9); Watford Hoard, Herts. (Coombs 1979, 201, No.19); Petters Sports Field Hoard, Egham, Surrey (Needham 1986, No. 19; Class D1);

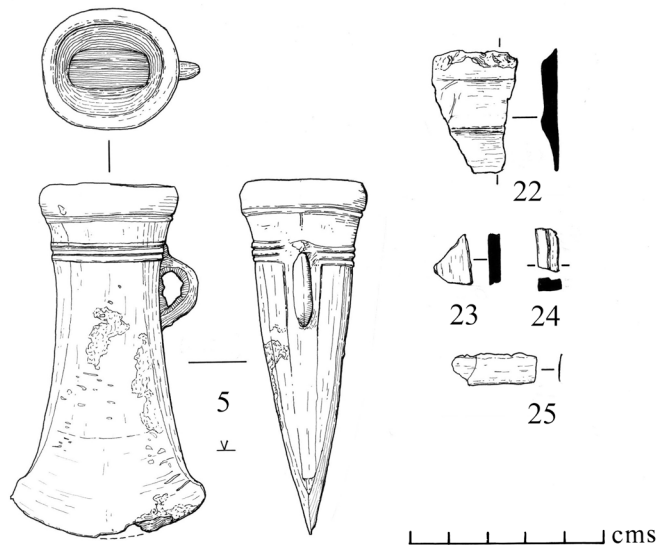


Beeston Regis hoard I, socketed axes 3 and 4

4. FACETED SOCKETED AXE, similar to No.1; splayed mouth heavily moulded, with distinct rib spaced beneath. Scratches and possible hammering on cutting edge and body; cutting edge damaged. Fibres on upper body and above loop.
L: 9.7cm. Weight 195.5gm.

Comparisons:
As Nos1 and 2.

5. SOCKETED AXE with single loop and rounded but vaguely octagonal body widening to slightly splayed cutting edge. Oval mouth splayed with heavy moulding and light moulding below; triple light horizontal moulding spaced beneath. Cutting edge chipped. Contained Nos. 22 to 25.
L: 9.2cm. Weight 177.0gm.



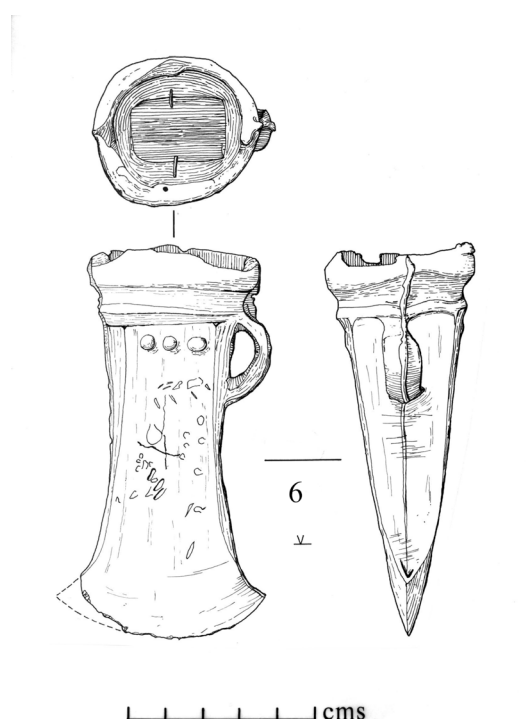
Beeston Regis hoard I, items 5, 22, 23, 24 25

Comparisons:

Type Meldreth, Variant Westow (Schmidt and Burgess 1981, 208); Gorleston I Hoard, Norfolk (Clough and Green 1978, 9, No.8); Wick Park Farm Hoard, Stogursey, Soms. (McNeil 1973, No.34).

6. SOCKETED AXE with one loop; oval mouth, sub-rectangular body with rounded angles, expanded to cutting edge; heavy moulding at mouth with rib moulding below; horizontal row of three pellets on upper part of each face. Poorly finished mouth moulding; hammering on faces resulting in cracks; some surface porosity and light scratches; edge of blade missing. One deep internal rib behind each face (Ehrenburg 1981 Type 1b).

L: 10.6cm. Weight 214.2gm.



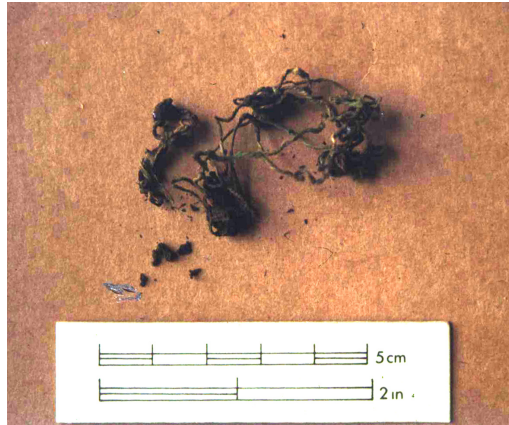
Beeston Regis hoard I, socketed axe 6

Comparisons:

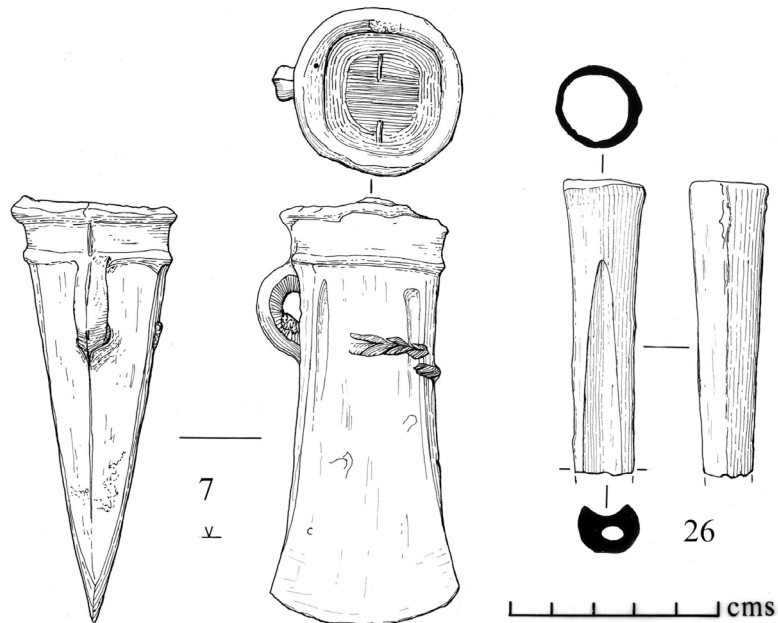
Northrepps Hoard, Norfolk (above, No.2); Bexley Heath Hoard, Kent (Britton 1960b, 14); Ketton Hoard, Rutland (Clough 1979, 124, No.8).

7. SOCKETED AXE with one loop; sub-rectangular splayed mouth with irregular moulding and rib moulding beneath; rectangular body widens to slightly expanded cutting edge. Each face bears slight grooves following the body angles. One deep internal rib behind each face (Ehrenberg 1981 Type 1b). String crosses the side and face, and passes through the loop. Contained No. 26 and a length of fine, knotted string.

L: 10.3cm. Weight 278.7gm.



Beeston Regis hoard I, string from inside socketed axe 7



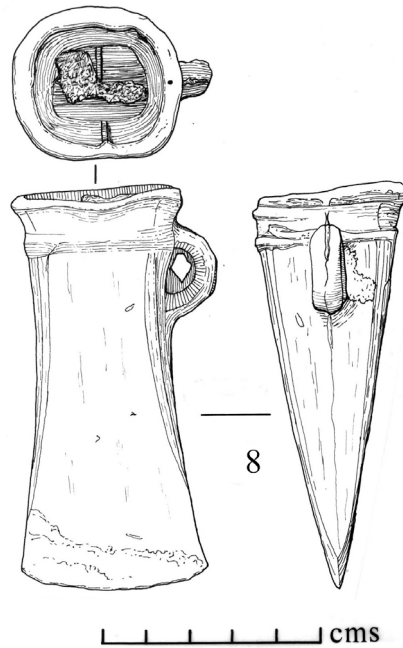
Beeston Regis hoard I, items 7 and 26

Comparisons;

Feltwell Fen Hoard, Norfolk (Smith 1958a, No. 4).

8. SOCKETED AXE with one heavy loop; sub-rectangular mouth, slightly splayed with light moulding and second moulding spaced below; rectangular body expanding slightly to curved cutting edge; body angles flattened to form narrow facets. Two internal ribs, one from the rim, one deep (Ehrenburg 1981 Type 6). Fibres pass through the loop.

L: 9.3cm. Weight 245.3gm.



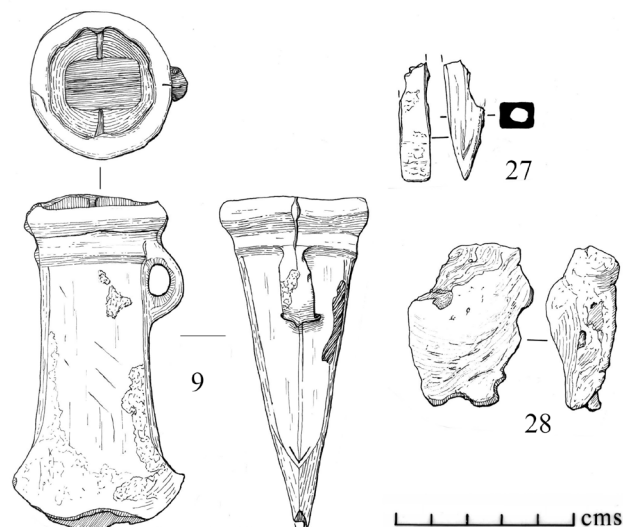
Beeston Regis hoard I, socketed axe 8

Comparisons:

Foxburrow Farm Hoard, North Elmham, Norfolk (Clough and Wade-Martins 1970, 8, No.1)

9. SOCKETED AXE with one loop. Circular mouth with bulbous collar and one rib moulding below. Rectangular body expanding to splayed cutting edge. Cutting edge split; surface bears light scratches; traces of fibres on body angle. Two deep internal ribs (Ehrenberg 1981 Type 5). Contained Nos. 27 and 28.

L: 9.5cm. Weight 228.4 gm.



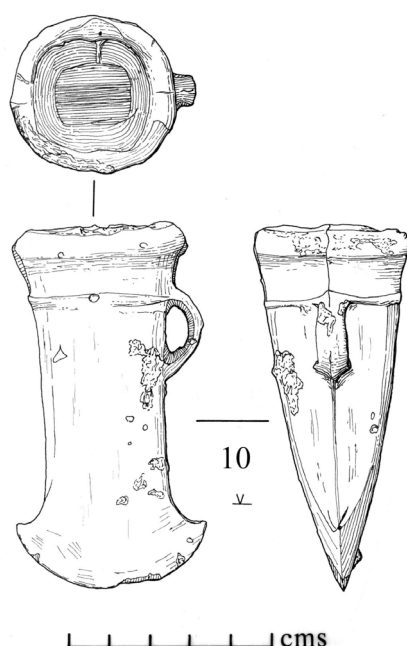
Beeston Regis hoard I, items 9, 27 and 28

Comparisons:

Foxburrow Farm Hoard, Norfolk (Clough and Wade-Martins 1970, 8, Nos 8 & 9); Gorleston I Hoard, Norfolk (Clough and Green 1978, 7, No.14); Horning Hoard, Norfolk (Lawson 1980, 335, No.1); Bexley Heath Hoard, Kent (Britton 1960b, Nos 19-23); Aylesbury Hoard, Bucks. (Farley 1979, 139, No.4); Watford Hoard, Herts (Coombs 1979, 201, No.8); Petters Sports Field, Egham, Surrey (Needham 1986, No. 13; Class A1).

10. SOCKETED AXE with one loop, sub-circular mouth with bulbous collar and one light rib moulding spaced below; sub-rectangular body tapers slightly before expanding to splayed cutting edge. One slight internal rib behind each face (Ehrenberg 1981 Type 5).

L: 9.1cm. Weight 245.5gm.

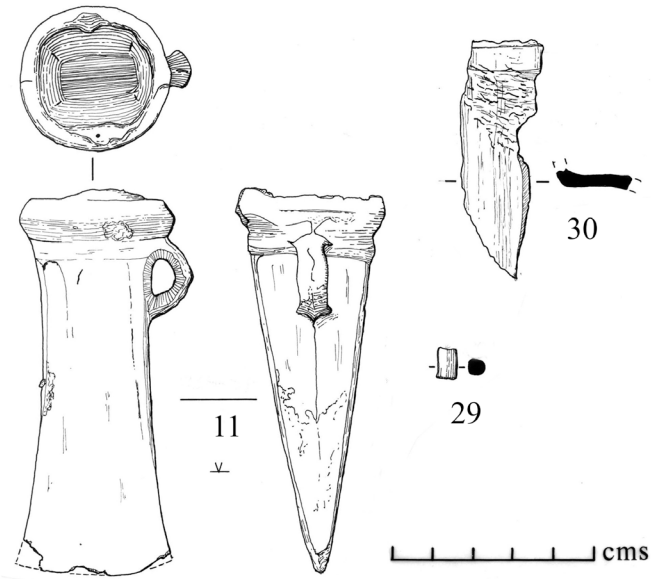


Beeston Regis hoard I, socketed axe 10

Comparisons:

South Eastern Type, Variant Shoebury (Schmidt and Burgess 1981, 213-4); Shoebury Hoard, Essex (Smith 1958c, No.10); Addington Hoard, Surrey (Britton 1960c, No. 21); see also No.9

11. SOCKETED AXE with one high set loop. Oval mouth with heavy moulding and light horizontal moulding below. Rectangular body expands to curved cutting edge. Slight grooves flank body angles on each face, and slight vertical rib on one face. Mouth poorly finished; cutting edge damaged. Contained Nos 29 and 30.
L: 9.7cm. Weight 225.6gm.



Beeston Regis hoard I, items 11, 29 and 30

Comparisons:

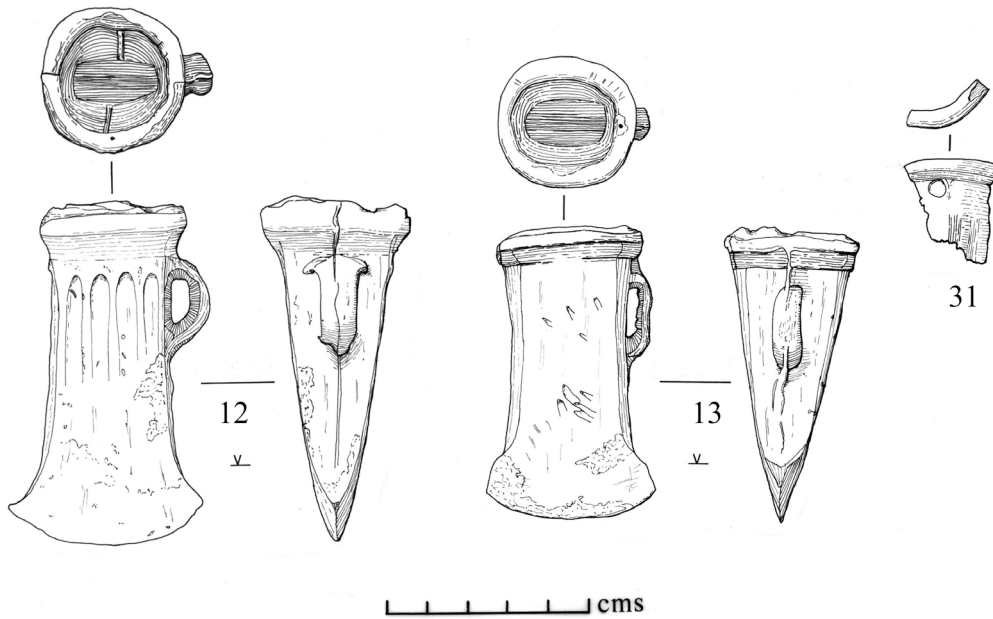
Bexley Heath Hoard, Kent (Britton 1960b, No. 27); Wickham Park Hoard, Croydon (Smith 1958d, No. 7); Boyton Hoard, Suffolk (Burgess 1979, fig. 15B).

12. SOCKETED AXE with one loop. Flaring sub-circular mouth with moulding and dull horizontal rib moulding spaced beneath. Rectangular body expands to flared cutting edge. Upper part of each face decorated with five vertical ribs. One internal vertical rib behind each face (Ehrenberg 1981 Type 5). Mouth poorly finished; flaw on reverse body face; faces bear light scratches.

L: 8.7cm. Weight 188.5gm.

Comparisons:

Type Welby (Schmidt and Burgess 1981, 221-3); Foxburrow Farm Hoard, North Elmham, Norfolk (Clough and Wade Martins 1970, 10, No.12); Meldreth Hoard, Cambs. (Hawkes and Smith 1955b, No.16); Reach Fen Hoard, Cambs (Smith 1956b, No.8); Addington Hoard, Surrey (Britton 1960c, No.22); Ketton Hoard, Rutland (Clough 1979, 124, No.12); Aylesbury Hoard, Bucks (Farley 1979, 139, 197, No.2); Watford Hoard, Herts (Coombs 1979, 197, No.2); Petters Sports Field Hoard, Egham, Surrey (Needham 1986, Nos 14 and 56; Class B2)

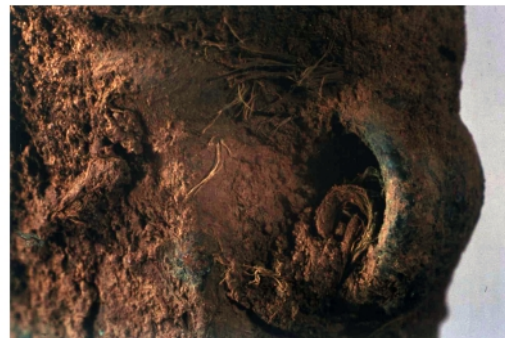


Beeston Regis hoard I, items 12, 13 and 31

13. SOCKETED AXE with one flat loop. Oval mouth with double angular moulding and flat rim. Sub-rectangular body expanding to curved cutting edge with crinoidal outline. Impressions on faces possibly from hammering. Contained No. 31.
L: 7.4cm. Weight 171.1gm.

Comparisons:
None cited.

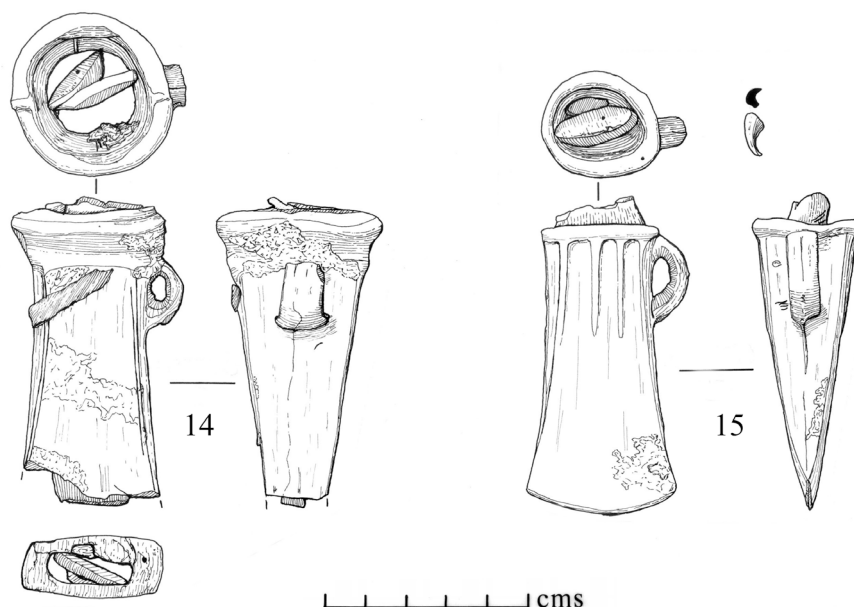
14. SOCKETED AXE with one broad loop. Round flaring mouth with moulding and horizontal rib moulding spaced below. Sub-rectangular body expanding towards cutting edge. Body broken with cutting edge missing. Body angles bear light ribs. One vertical internal rib behind each face (Ehrenberg 1981 Type 5). Reverse face bears hammered impressions. Contains two fragments of No. 32. String fragments cross face and pass through loop.
L: 7.1cm. Weight (incl. No. 32) 249.0gm.



Beeston Regis hoard I, string from axe 14

Comparisons:

Gorleston I Hoard, Norfolk (Clough and Green 1978, 5, No. 9); Reach Fen Hoard, Cambs. (Smith 1956b, No.13).



Beeston Regis hoard I, items 14 and 32 (left); 15, 33 and 34 (right)

15. SOCKETED AXE; oval mouth with bead collar from which single loop springs, and four vertical ribs on each face depend. Sub-rectangular body expands to bevelled cutting edge. Contains Nos. 33 and 34.

L (incl. No.33): 7.9cm. Weight (including Nos. 33 and 34) 170.7gm.

Comparisons:

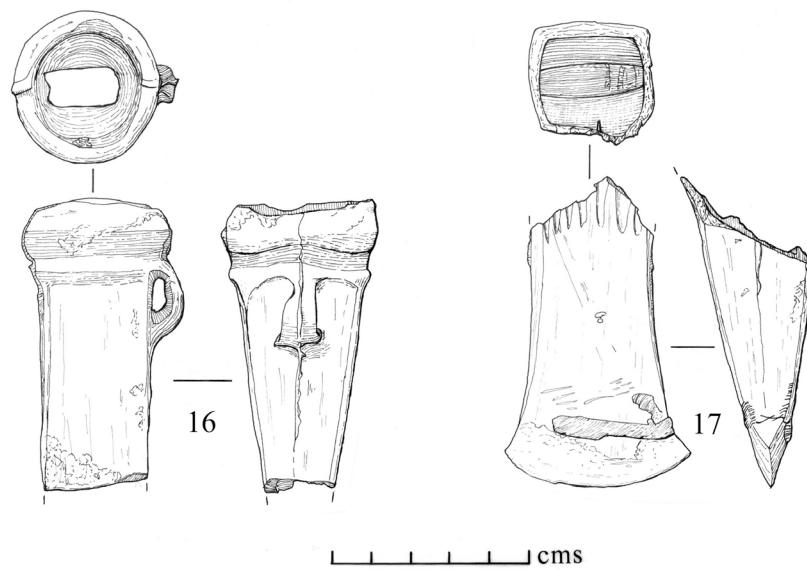
Bexley Heath Hoard, Kent (Britton 1960b, No.38).

16. FRAGMENT OF SOCKETED AXE with cutting edge missing; round mouth with heavy bulbous moulding and one rib moulding below from which the single loop springs; lip poorly finished, with two ingate scars.

L: 7.5cm. Weight 202.2gm.

Comparisons:

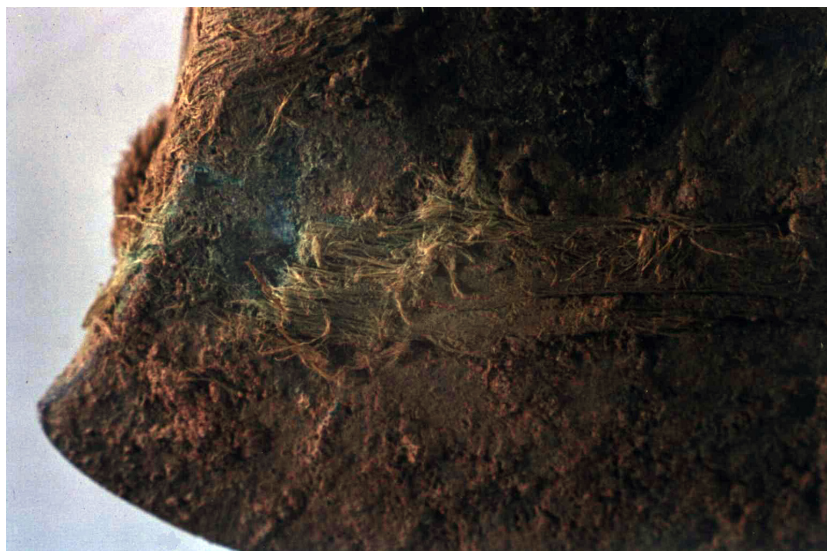
Foxburrow Farm Hoard, North Elmham, Norfolk (Clough and Wade-Martins 1970, 8, No.4); Bexley Heath Hoard, Kent (Britton 1960b, No.26); Ketton Hoard, Rutland (Clough 1979, 124, No. 13).



Beeston Regis hoard I, socketed axes 16 and 17

17. FRAGMENT OF SOCKETED AXE with mouth missing; sub-rectangular body expanding to cutting edge; one face preserves seven vertical grooves creating lateral and six intermediate ribs; one internal rib survives (Ehrenberg 1981 Type 5); faces bear marks of hammering, with scoring on cutting edge; fragments of string cross the lower faces.

L: 7.9cm. Weight 157.0gm.

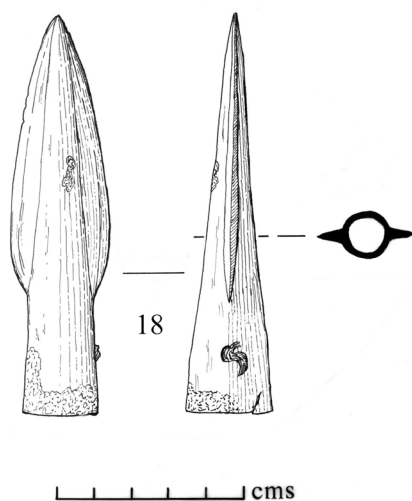


Beeston Regis hoard I, string from socketed axe 17

Comparisons:

South Eastern ribbed type (Needham 1986, Class B); Gorleston I Hoard, Norfolk (Clough and Green 1978, 6, No.11); Ketton Hoard, Rutland (Clough 1979, 124, No.10); Husbands Bosworth Hoard, Leics. (Clough 1979, 126, No.8).

18. SMALL SPEARHEAD with round socket and midrib; bevelled leaf-shaped blade; two opposing circular peg holes in sides of socket; string passes through holes. L: 10.8cm. Weight 61.3 gm (uncleaned).



Beeston Regis hoard I, small spearhead 18

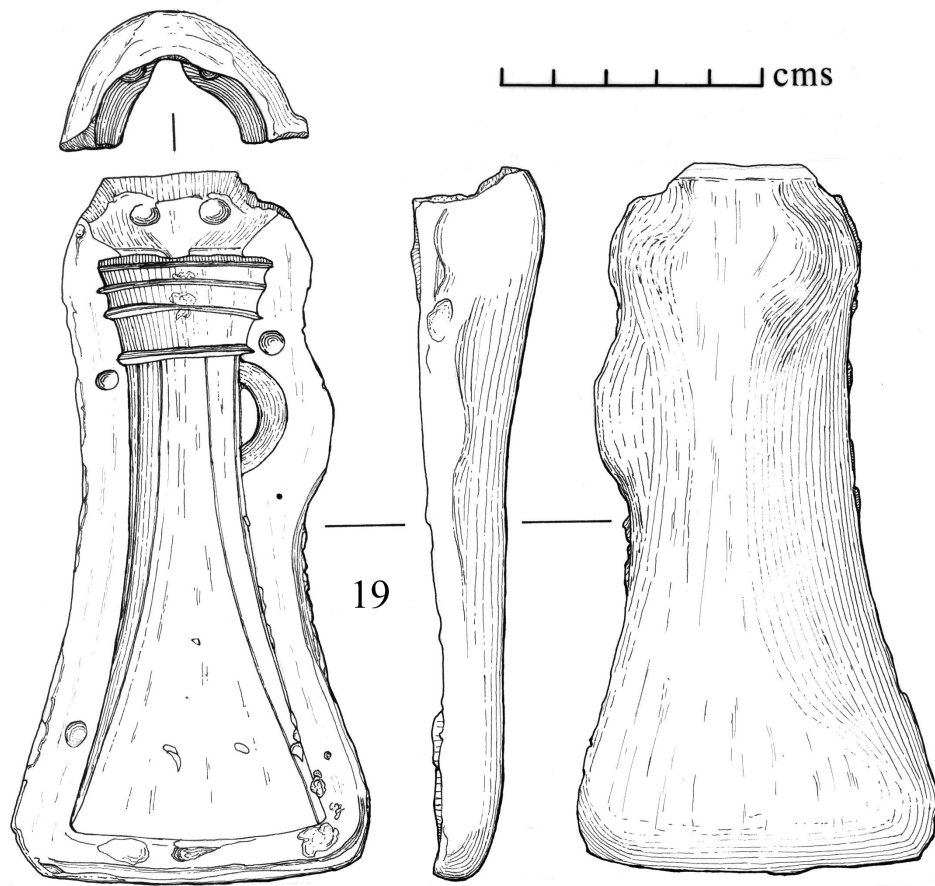


Beeston Regis hoard I, string from small spearhead 18

Comparisons:

Reach Fen Hoard, Cambs. (Smith 1956b, No.4); Newark Hoard, Notts. (Smith 1958b, No.3); Watford Hoard, Herts. (Coombs 1979, 207, No.4).

19. ONE VALVE OF MOULD for single looped faceted socketed axe (similar to No. 2) with moulding at mouth and three roughly horizontal, spaced rib mouldings below, faceted octagonal body expanding to curved cutting edge, facets defined by raised ribs. Exterior of mould rounded; articular face flat, with slightly raised edges, especially at the base; with three rounded mortises; sculptured mouth contains two knobs to support sprue cup. L: 13.8cm. Weight 513.9gm.



Beeston Regis hoard I, valve of mould 19

Comparisons:

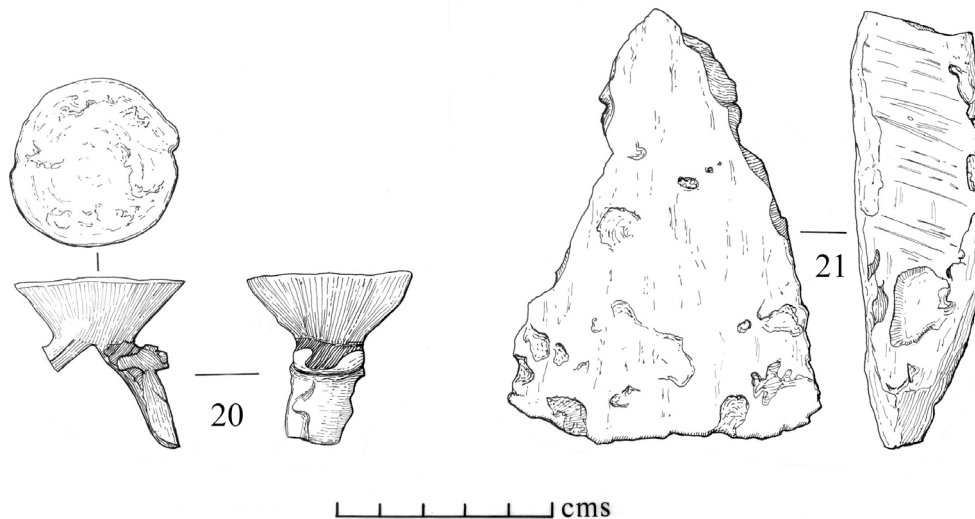
Donhead St Mary Hoard, Wilts (Passmore 1931, Pl.I Nos 1&2); Brough-on-Humber Hoard, Yorks (Briggs et al 1987).

20. CASTING JET with evidence of two ingates; fragments of string around one limb.

L: 4.0 cm. Weight 95.4gm.

Comparisons:

Gorleston I Hoard, Norfolk (Clough and Green 1978, 12, No.84); Kensington Hoard, London (Britton 1960a, No.10); Petters Sports Field Hoard, Egham, Surrey (Needham 1986, No.19).



Beeston Regis hoard I, Casting jet 20

21. TRIANGULAR FRAGMENT of circular, plano-convex 'bun' ingot, with vesicular core and knobbed surfaces.
L: 10.2cm. Weight 799.9gm.

Comparisons:

Bexley Heath Hoard, Kent (Britton 1960b, No.11).

22. FRAGMENT with one flat face, and the other with slightly curved rib. One edge bevelled, the other tapering. Possibly from a sickle. Found within No.5, with Nos. 23 to 25.

L: 2.2cm. Weight 11.1gm.

Comparisons:

Taunton Workhouse Hoard, Soms. (Smith 1959a, Nos.21 and 22); Edington Burtle Hoard, Soms. (Smith 1959b, Nos.15-18).

23. SMALL FLAT TRIANGULAR FRAGMENT. Found within No.5, with Nos 22, 24 and 25.

L: 1.3cm. Weight 1.6gm.

24. SMALL FRAGMENT with right-angled profile. Found within No.5, with Nos 22, 23 and 25.

L: 1.1cm. Weight 1.4gm.

25. SMALL SHEET FRAGMENT with slightly curved profile. Found within No.5, with Nos 22, 23 and 24.

L: 2.2cm. Weight 0.7gm.

26. SOCKETED GOUGE with cutting edge missing; round, slightly expanded mouth; lateral casting flashes. Found within No.7.
L: 7.2cm. Weight 57.0gm.

Comparisons:

Addington Hoard, Surrey (Britton 1960c, No.14); Kensington Hoard, London (Britton 1960a, no.5); Thorndon Hoard, Suffolk (Hawkes and Smith 1955a, No.3); Reach Fen Hoard, Cambs (Smith 1956b, No.32); Husbands Bosworth Hoard, Leics. (Clough 1979, 126, Nos. 1 and 3); Watford Hoard, Herts. (Coombs 1979, 203, No. 26); Petters Sports Field Hoard, Egham, Surrey (Needham 1986, Nos 34 and 77).

27. FRAGMENT OF NARROW SOCKETED PUNCH or chisel with rectangular body and circular void; slightly expanded cutting edge. Found within No. 9, with No. 28.
L: 3.4cm. Weight 9.6gm.

28. LUMP, irregular and molten. Found wedged in No.9, with No. 27.
L: 4.7cm. Weight 103.6gm.

29. CYLINDRICAL RIVET. Found within No.11, with No.30.
L: 0.8cm. Weight 0.7gm.

30. FRAGMENT OF SOCKETED AXE with single mouth moulding; fibres adhere to outside. Found within No. 11, with No. 29.
L: 6.0cm. Weight 19.5gm.

31. FRAGMENT OF SOCKETED AXE with sub-rectangular mouth with simple moulding; three faint vertical ribs spaced below; casting flaw creating hole in socket wall. Found within No.13.
L: 2.5cm. Weight 8.1 gm.

32. TWO FRAGMENTS OF KNIFE or weapon blade with lenticular section; wedged within No.14; one fragment (A) protrudes from both ends of No.14, the second is of unknown length.
L (No.32A): 7.7cm.

Comparisons:

Thorndon Hoard, Suffolk (Hawkes and Smith 1955a, No.2); Reach Fen Hoard, Cambs. (Smith 1956b, No.1); Ketton Hoard, Rutland (Clough 1979, 124, No.17); Watford Hoard, Herts. (Coombs 1979, 203, No.28).

33. FRAGMENT with oval section of unknown length, wedged within No. 15, with No.34. Fibres on surface.

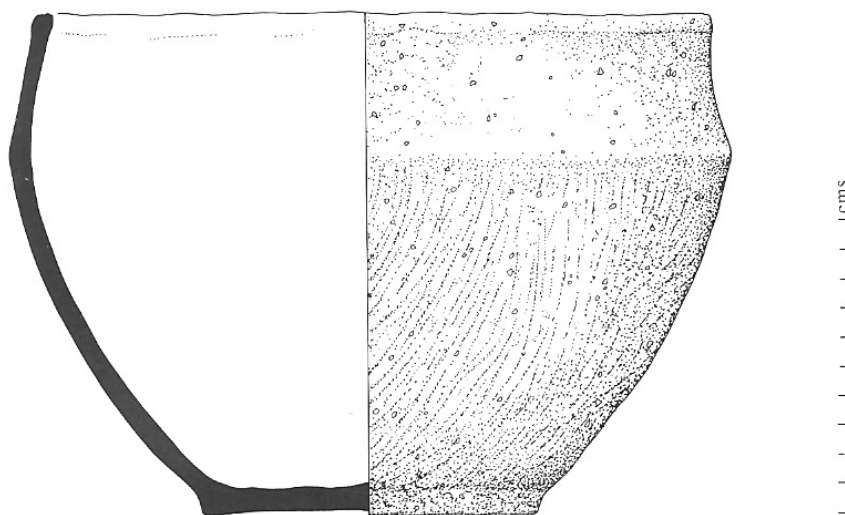
34. TWO SHEET FRAGMENTS with rounded corner, similar to chape or cap; wedged within No.15, but one fragment (B) detached.
L (No.34B): 1.0cm. Weight (No.34B) 0.6gm.

Comparisons:

Foxburrow Farm Hoard, Norfolk (Clough and Wade- Martins 1970, 12, No.39); Addington Hoard, Surrey (Britton 1960c, No.15); Reach Fen Hoard, Cambs. (Smith 1956b, No.30); Watford Hoard, Herts. (Coombs 1979, 209, No.52).

Not numbered: CAST BOWL FRAGMENT; L: 3.9cm; not associated; found 20m away (originally No.35).

A. CERAMIC VESSEL; profile complete but substantial portion of one side missing. Deep carinated bowl with short straight or slightly concave inverted neck and simple rounded rim; low foot ring; compacted surface with shallow, obliquely scored grooves; red to black surfaces; hard fabric with fine flint filler;



Beeston Regis hoard I, vessel

Comparisons:

West Harling, Norfolk (Clarke and Fell 1953, Class VI); Runnymede Bridge, Egham, Surrey (Longley 1991, Type 9).

Analytical Details

Metal

In 1980, drilled samples were taken from most of the objects by Dr Paul Craddock of the British Museum Research Laboratory (File 4453): only four small pieces were not

sampled. Laboratory numbers were given to each sample, but subsequently different numbers were used, while additional objects (fragments lodged within axes) were also allocated individual catalogue numbers. All known allocated numbers are cited in Table 1 below.

The samples were drillings of uncorroded metal typically weighing between 10 and 20 mg. The sample position is marked by an outside dot on the accompanying drawings. One sample was taken from each artefact except from axe No.11 where the ease with which the sample was taken and the colour of the turnings suggested, correctly, that the piece was likely to be heavily leaded and thus susceptible to segregation. In particular gravity segregation was possible where the heavier lead sank through the copper whilst the metal was setting in the mould. To establish the extent of segregation samples were drilled from the rim (11r) and blade (11b) of the axe and subsequent analysis gave lead contents of 24.0% and 22.5% respectively, showing that there had been little segregation. This suggests that the compositions based on a single analysis are likely to be representative of the composition of the artefact as a whole, and also suggests that the metal solidified quickly (see below).

The samples were analysed by atomic absorption spectrometry, the details of the methodology are given in Hughes et al (1976). The analyses have precision of $\pm 1-2\%$ for copper, *c.* $\pm 5-10\%$ for the major elements, deteriorating to *c.* $\pm 50\%$ at the detection limit. Most of the quoted elements could be detected down to *c.* 0.005% in the metal. In addition gold, cadmium and manganese were sought but not detected. The analytical results have been previously published (Craddock 1985) together with those for several thousand other ancient bronzes but with no discussion, and otherwise have remained unpublished.

Because the artefacts of the Beeston Regis I hoard had come straight from excavation the opportunity was taken to determine whether there had been significant metal loss to the adhering soil from the metal or from the firmly-adhering corrosion. Some of the soil was removed and the surface which had been in contact analysed by X-ray fluorescence spectrometry. This detected only faint traces of copper and lead, showing that there had been no significant loss to the surroundings. Trying to take drilled samples from the uncleaned metal without bits of soil falling into the turnings being collected proved very difficult and it was concluded that it was better to sample the metal after cleaning.

X-ray diffraction analysis of samples from the surface of the mould (No.19) revealed lead carbonate on the inner face but not on the outer surface.

All the objects are copper based, and all but three (Nos 21, 22, and 28) are alloys with varying proportions of Sn and Pb. With a few exceptions, the alloys are typical LBA leaded tin bronzes, albeit with a wide range of Sn values from 4.5% and 10%, and often with substantial traces of Sb, Ni, As and Ag. Five objects have greater values for Sn, one axe (No.10) containing 13.3%.

Two ingot fragments contain no Sn. Whilst one (No.21) has almost no Pb or As and was possibly from a source of relatively pure Cu, the other (No.28) comprises an unusual alloy with 8.9% Pb.

No	Sample	Analysis	Cu	Sn	Pb	As	Ag	Ni	Zn	Fe	Sb	Bi	Co
1	12346W	BBA 603	85.0	9.6	5.20	0.15	0.12	0.11		0.100	0.30	0.005	
2	12347U	BBA 604	84.5	7.5	7.50	0.15	0.17	0.11		0.025	0.30	0.005	
3	12348S	BBA 605	82.5	10.3	5.40	0.12	0.10	0.08		0.025	0.21	0.005	0.003
4	12349Q	BBA 606	84.5	7.3	8.90	0.15	0.13	0.11			0.30	0.005	0.005
5	12350T	BBA 607	84.0	8.5	7.00	0.17	0.06	0.11			0.20	0.010	0.020
6	12351R	BBA 609	89.0	4.5	4.40	0.12	0.10	0.07	0.08	0.025	0.15	0.005	0.003
7	12352P	BBA 611	77.0	6.7	16.0	0.07	0.05	0.05		0.030	0.12	0.005	0.005
8	12353Y	BBA 612	85.0	4.6	8.80	2.20	0.20	0.12		0.020	0.40	0.005	0.015
9	12354W	BBA 615	83.0	8.7	6.90	0.20	0.18	0.14		0.020	0.40	0.003	0.003
10	12355U	BBA 616	83.5	13.3	1.15	0.09	0.05	0.05			0.06	0.003	0.003
11b	12356S	BBA 617	69.0	7.6	22.5	0.08	0.02	0.02			0.08		
11r		BBA 618	65.0	7.8	24.0	0.09	0.02	0.02		0.600	0.08		0.003
12	12357Q	BBA 619	84.0	8.3	6.80	0.05	0.05	0.10			0.13	0.010	0.003
13	12358Z	BBA 621	86.0	6.9	5.40	0.12	0.14	0.10	0.02		0.23	0.005	0.003
14	12359X	BBA 622	85.0	7.0	7.60	0.13	0.11	0.10			0.23	0.005	0.003
15	12360?	BBA 625	77.0	8.4	14.0	0.13	0.09	0.10		0.20	0.20	0.005	0.010
16	12361Y	BBA 626	84.0	10.7	4.60	0.70	0.08	0.11	0.01	0.170	0.10		0.270
17	12362W	BBA 627	85.5	7.2	6.70	0.13	0.15	0.13			0.30		0.003
18	12365Q	BBA 628	86.0	7.5	4.60	0.15	0.27	0.19		0.030	0.50		0.005
19	12364S	BBA 629	81.0	10.4	7.40	0.09	0.11	0.07			0.22		0.003
20	12363U	BBA 630	87.5	7.4	4.40	0.05	0.09	0.10		0.080	0.18		0.004
21	12366Z	BBA 631	98.5		0.03	0.05	0.01	0.03			0.03		
22		BBA 608	88.0		1.90	2.10	0.35	0.02	0.01	0.30	8.20		0.010
23		NS											
24		NS											
25		NS											
26		BBA 610	85.0	6.7	6.70	0.12	0.14	0.11			0.30	0.005	
27		BBA 613	87.0	11.2	1.45	0.35	0.24	0.12			0.47	0.020	0.003
28	12365S	BBA 614	90.0		8.90	0.10	0.02	0.02			0.03		0.003
29		BBA 633	76.5	0.5	13.6	0.40	0.18	0.07			7.00		0.003
30		BBA 632	80.0	10.0	8.70	0.10	0.08	0.11			0.20		0.005
31		BBA 620	82.0	9.2	7.30	0.08	0.07	0.07			0.16	0.005	0.003
32		BBA 623	84.0	8.4	7.50	0.08	0.08	0.09			0.17	0.005	0.003
33		BBA 624	84.5	8.9	4.80	0.09	0.11	0.09		0.045	0.24	0.005	0.003
34		NS											
35		BBA 634	75.0	6.2	16.8	0.15	0.10	0.11		0.080	0.25		0.005

Table 1: Beeston Regis I Hoard; percentage metal composition. NS=not sampled

Pb values are even more variable. Setting to one side the ingot fragment (No. 21) that contains virtually no Pb, three objects may be regarded as ‘low-leaded’ and contain less than 2% Pb. The lowest values occur in one of the axes (No.10), the sickle (22) and chisel (27) fragments. At the other end of the scale, four objects may be regarded as ‘high-leaded’ and contain more than 13% Pb. One of these (No.29) is a rivet, but the others (7, 11 and 15) are axes. Although the Pb content of axes is variable (ranging from 1.15% in No. 10 to 24% in No.11), the majority of the objects from the hoard may be regarded as ‘median-leaded’ and contain between 4% and 9% Pb.

Impurity levels are generally consistent, although there are several anomalies. Levels of As are around 0.1% but in two instances (Nos 8 and 22) they are above 2%. The levels of Ag are generally low to medium, but the highest value at 0.35% is also found in the sickle (No.22). Ni values appear to have a bimodal distribution with peaks below 0.31% and below 0.1%. Sb provides a normal distribution around 0.31% but both the sickle (No.22) and the rivet (No. 29) have high values of 8.2% and 7.00% respectively. The levels of Bi are consistently low, although the punch (No. 27) has a noticeably higher level at 0.02%. Fe values are generally low and the highest reading

(0.6% on the rim of axe No.11) must be contrasted with the negative result from the blade of the same object. Similarly, Co levels are generally less than 0.01% with one axe (No.16) giving an anomalously high reading of 0.27%. Only four objects show low but detectable levels of Zn.

Thus, two pieces have little or no Sn, yet have high Sb values: the sickle (No.22) and the rivet (No. 29). It is unlikely that the Sb was added as a separate metal but that the copper ores contained unusually high concentrations. Ores from the Harz Mountains of southern Germany have distinctive compositions with relatively high levels of Sb and As, sometimes with high Ni and Ag contents as well (Craddock 1980).

The significance of these results is discussed further below (General discussion)

Plant material

In March 1980, three samples (from axes Nos 15 and 17, and spearhead No 18) were examined by Dr Rowena Gale and Dr David F Cutler at the Jodrell Laboratory, Royal Botanic Gardens, Kew (File A/44/269/80/RG). The visible characters suggested they were from the cortex of a woody shrub or tree, similar to lime, *Tilia sp.*

In January 1981, they examined a further 42 samples (File 62/380/81/RG). Five contained no plant material and a further eight were too deteriorated for identification. Although it was possible to suggest what part of the plant was represented in the other samples, positive identification was only possible for two taken from within axe No.7. These comprised bast fibres from the stem of stinging nettle, *Urtica dioica*, twisted to form string. Five samples from around the loops of axes (Nos 1, 6, 7, 8 and 15) originated from the bark of a woody plant: all the visible characters match those seen in lime, *Tilia sp.*, but it was not possible to make a positive identification. From these results it can be suggested that prior to deposition the axes were bound together with lime bast string, while axe No 7 also contained a length of finer, twisted string of nettle bast.

Remarks

The axe mould valve (No.19) is a rare find. Although the hoard contains faceted axes (Nos1-5), their form is different from that which would have been produced by the mould. Only two other bronze moulds for faceted axes are known - from Donhead St Mary, Wilts. (Passmore 1931) and Brough-on-Humber, Yorks. (the latter being previously accessioned in the British Museum with a provenance of the Quantock Hills, Somerset; Briggs et al 1987). Metal moulds for South-Eastern type axes have been found in East Anglia in the Unthank Road Hoard, Norwich (Norfolk Museums Service 1977, 35) and New Street, Cambridge (Fox 1923, 58 and Pl.IX), as well as further afield (for example, near the Thames Estuary; Turner 2010, 85-6). The mould for an unusual socketed axe with ribs on one face forms part of a dispersed hoard from Hevingham, Norfolk, reported in 2002 (HER 36973). Furthermore, a fragment of valve mould is represented in the Levington Hoard, Suffolk (which also contains faceted axes: Owles and Smedley 1963, 98), while further examples were reported from the lost 1872 hoard from Chardwell Farm, Arkesden, Essex (Fox 1923, 324).

The identification of vegetable fibres in the Beeston Hall Hoard is not the first recognition of Bronze Age plant use in Norfolk. Although she could not identify the

precise source of the fibres, Elizabeth Crowfoot suggested their use from charred and replaced textile fragments recovered during the excavation of Barrow G4 on Weasenham Lyngs (Crowfoot 1986). Similar fragments of textile have been recovered from several other barrows in Southern England. The use of lime bast string is attested as early as the Mesolithic of Finland (Clarke 1952, 45), and archaeological examples were collected from the Swiss lake dwellings as early as the nineteenth century (Keller 1866, 325). A marked decline in *Tilia* pollen during the British later Bronze Age and early Iron Age has been attributed to selective human interference with native woodland (Turner 1962), but lime continued to be exploited until modern times: bast ropes were still made in Cornwall in 1842, whilst the Germans used such ropes for hauling their artillery during the First World War (Edlin 1949). Early examples of nettle thread are also known from Britain, such as those from the Somerset Levels (Coles and Coles 1986, 57).

The direct association of the bronze metalwork with the ceramic bowl provided the first conclusive evidence for the style of Post-Deverel Rimbury (PDR) pottery in Norfolk. Although the form of the Beeston Hall vessel is generally similar to certain carinated bowls from Micklemoor Hill, West Harling (Clark and Fell 1953), the latter had traditionally formed the type-site for the East Anglian Early Iron Age. Subsequent studies suggest that the origin of the style lies somewhat earlier (Barrett 1980), that plain wares continue well into the Iron Age, and that the assemblage from West Harling is possibly mixed. The bowl from Beeston Regis is currently attributed to the 'mature Plainware PDR phase' of Norfolk recognised at only ten sites in the county, including excavated pits thought to represent settlements at Erpingham (14920: Gregory n.d. & 1983) and Shropham (36218: Brudenell 2011, 13; Percival forthcoming).

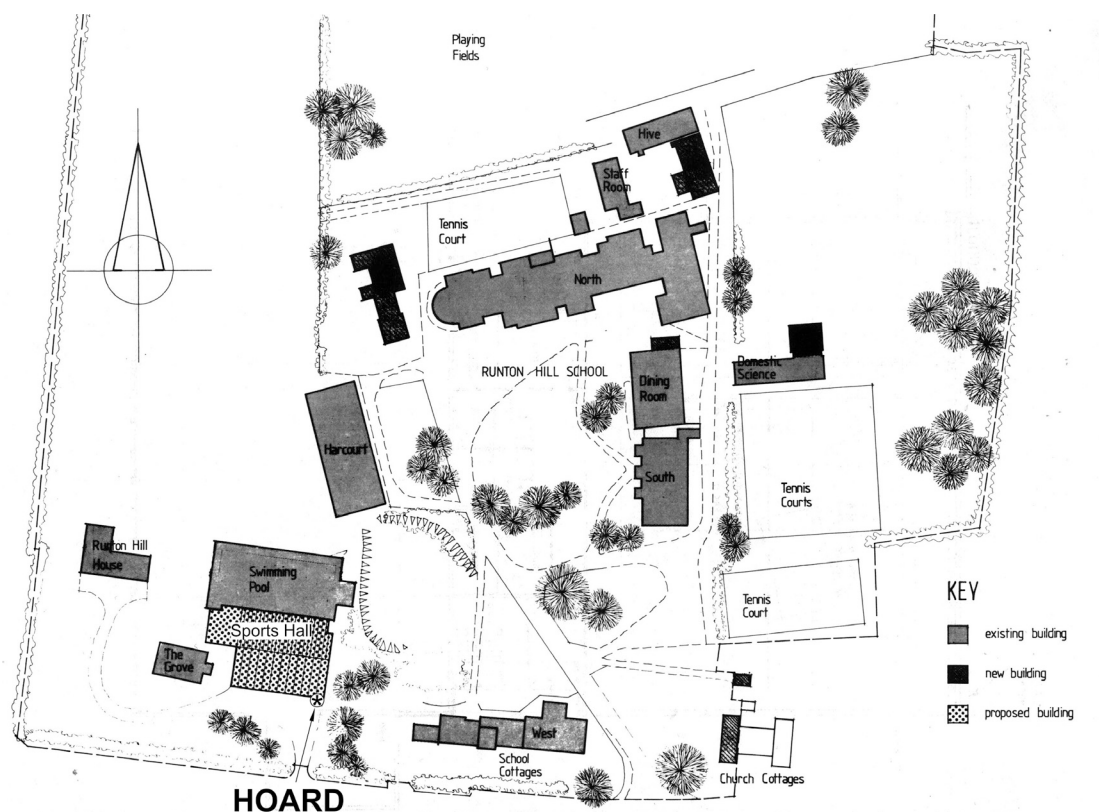
3. The Beeston Regis II Hoard

Primary sources of information concerning the discovery of the Beeston Regis II Hoard, comprising the site archive, correspondence and analytical records, are contained in Norfolk County Council Heritage Environment Record 18037. Details of the accession and conservation of the hoard are held at Norwich Castle Museum (CRRMU 1983.91).

Description of the Site

The find spot is situated 1m west of the south-east corner of the sports hall of Runton Hill School (at NGR TG 1775 4280). It had previously lain beneath the metalled drive from the A149 Cromer Road to the now-demolished garage of Runton Hill House. The latter is now incorporated into the main (North) school building. The parish boundary bisects the grounds, such that the main house lies within West Runton but the sports hall lies within Beeston Regis. The find spot lies at 105 ft/30m OD, on Pleistocene sands and gravels, 0.45km south of coastal cliffs.

The two Beeston Regis hoard sites lie c.230m apart, the Runton Hill School (II) site being due east of the Beeston Hall School (I) site (above). The sites are respectively north and south of the A149 Cromer Road, and are further separated by a railway line.

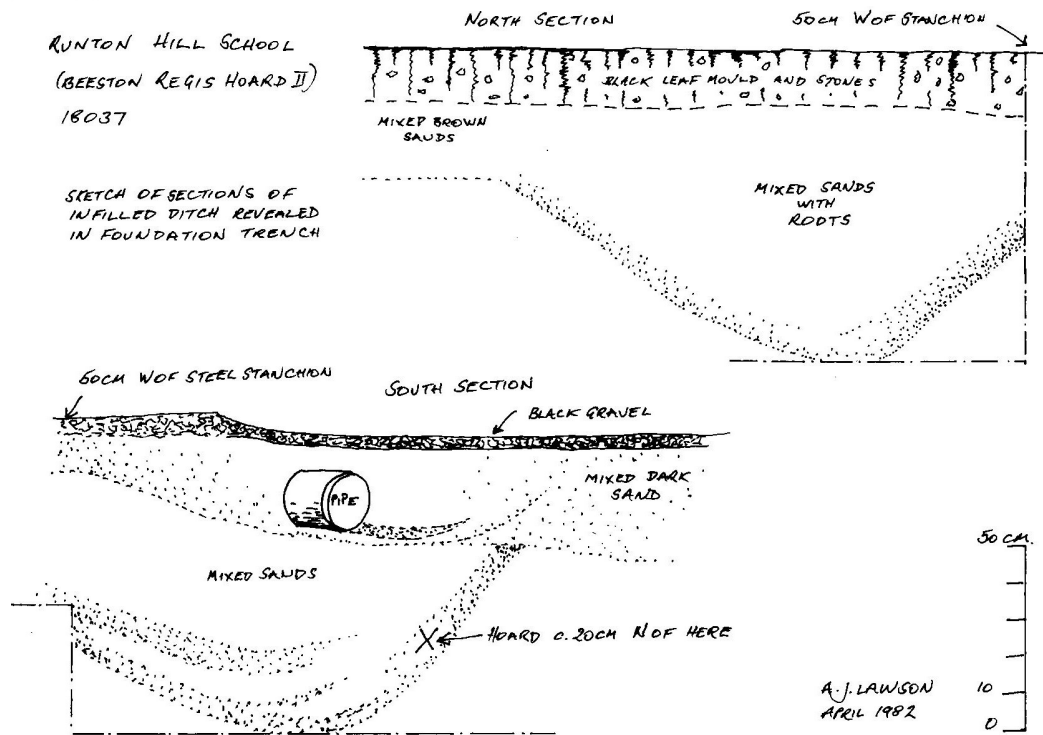


Beeston Regis hoard II site in relation to proposed buildings

Circumstances

The hoard was found on 6 April 1982 by Mr Graham Coulsey, foreman of T H Blyth and Sons (Builders) of Foulsham, while he was excavating the foundation trenches for a new sports hall. Late changes to the design of the building had necessitated an extension to the previous machine-cut trenches by hand immediately prior to the laying of concrete foundations. Mr Coulsey described the hoard as a compact lump which apparently had not been disturbed before he revealed it with his shovel. It seems that no part of the hoard had been removed during the mechanical excavation.

The school bursar, Mr Jeremy Bagnall-Oakley, recognised the importance of the find and immediately contacted the Norfolk Archaeological Unit (NAU). Subsequently, the sides of the foundation trench were examined by the author for the NAU. An infilled ditch, 1.5m wide and 0.5m deep, was observed running obliquely across the trench. The ditch, which cut the yellow sandy subsoil was completely filled with mixed brown sands disturbed by the roots of nearby trees. The upper fill had also been cut in the past by a pipe trench that had been dug to within 0.25m of the depth of the hoard, but had been sealed beneath the black hardcore surface of the former drive. The exact find spot of the hoard had been removed in preparation for the laying of concrete but a section only 0.2m to the south was recorded. Consequently, it cannot be stated whether the hoard had been buried by the natural accumulation of the ditch fill, or had been cut into it: no such cut was observed. Despite the lack of any other dateable material, it seems possible that the ditch was broadly contemporary with the hoard. The extent and function of the ditch are not known. It was not found in the parallel foundation trench on the north side of the building.



Beeston Regis hoard II, site section drawing

Because a primary account exists of the direct association of the objects, the find can confidently be regarded as a hoard with string accessories (Needham, Lawson and Green 1985, Category 1a and A2).

With the exception of one axe, none of the objects were cleaned prior to their conservation at Norwich Castle Museum. Consequently, fibres, possibly the remnants of string, remained attached to the surfaces of five of the objects. A more substantial piece had been removed but was returned by Mr Michael Blyth.

History of Ownership

The hoard was passed by T H Blyth and Sons to the Trustees of Runton Hill School who in turn placed it on extended loan to the Norfolk Museums Service. It is currently displayed in Cromer Museum (Accession No. CRRMU 1983.910).

Description and Comparisons

All the objects are in a similar condition with a dark green patina, at times with a dull matt surface. Prior to conservation, varying degrees of reddish brown corrosion and occasional light green pocking were present. Five objects (Nos 1, 3, 4, 8, 9) have restricted areas of corrosion that has created a 'bobbled' surface.

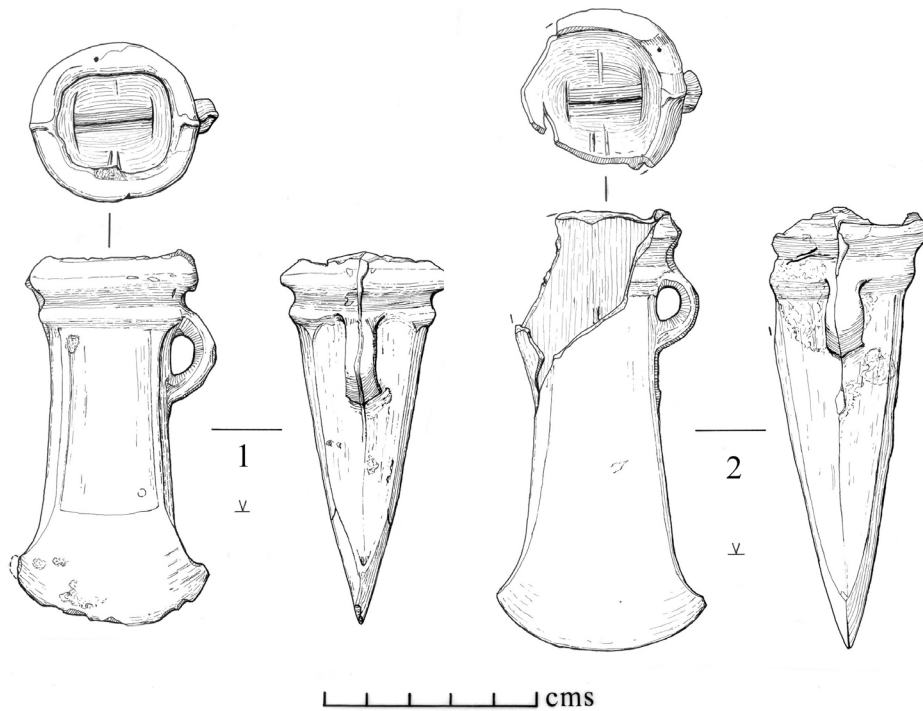


Beeston Regis hoard II

1. SOCKETED AXE; rounded sub-square mouth with moulding; second moulding beneath from which springs a single loop; square body, each angle bearing a light rib; expanded and flared cutting edge beneath a marked bevel; two internal vertical ribs (Ehrenberg 1981 Type 5); light lateral casting flashes and poorly smoothed ingate scars; light oblique scratches on damaged blade.
L: 8.8cm. Weight 216.0gm.

Comparisons:

Beeston Hall School Hoard, Norfolk No.14 (above)



Beeston Regis hoard II, socketed axes 1 and 2

2. INCOMPLETE SOCKETED AXE; similar to No.1 but considerably longer; without lateral ribs; two light vertical internal ribs behind one face, one on the opposite face (Ehrenberg 1981 Type 6); fibres adhere between mouth mouldings. L: 10.5cm. Weight 199.0gm.

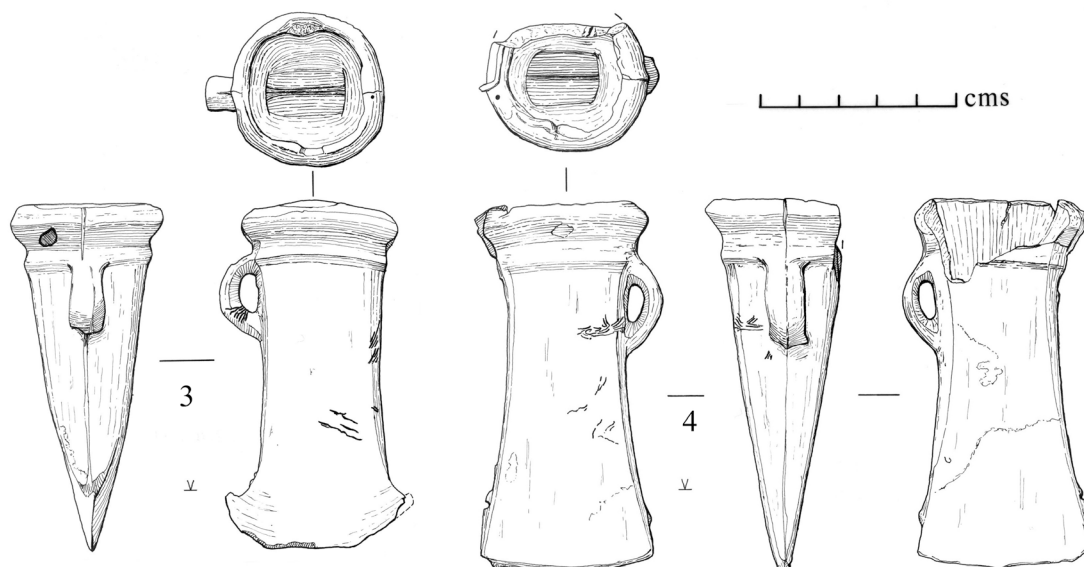
Comparison:

Beeston Hall School Hoard, Norfolk, No.9 (above); Reach Fen Hoard, Cambs. (Smith 1956b, No.10); Petters Sports Field Hoard, Egham, Surrey (Needham 1986, No. 13; Class A1).

3. SOCKETED AXE; as No.2 but stouter; widely flared cutting edge slightly incomplete; casting flaw between mouth mouldings; fibres adhere through loop, on one face and side of the body. L: 9.0cm. Weight 191.9gm

Comparisons:

Beeston Hall School Hoard, Norfolk, No.10 (above); Petters Sports Field Hoard, Egham, Surrey (Needham 1986, No.25, Class A1).



Beeston Regis hoard II, socketed axes 3 and 4

4. INCOMPLETE SOCKETED AXE; as No.2 but with weaker features; cutting edge expanded but blunt and unsharpened; fibres adhere to one face and side of the body, and through the loop.

L: 9.4cm. Weight 234.7gm.

Comparisons:

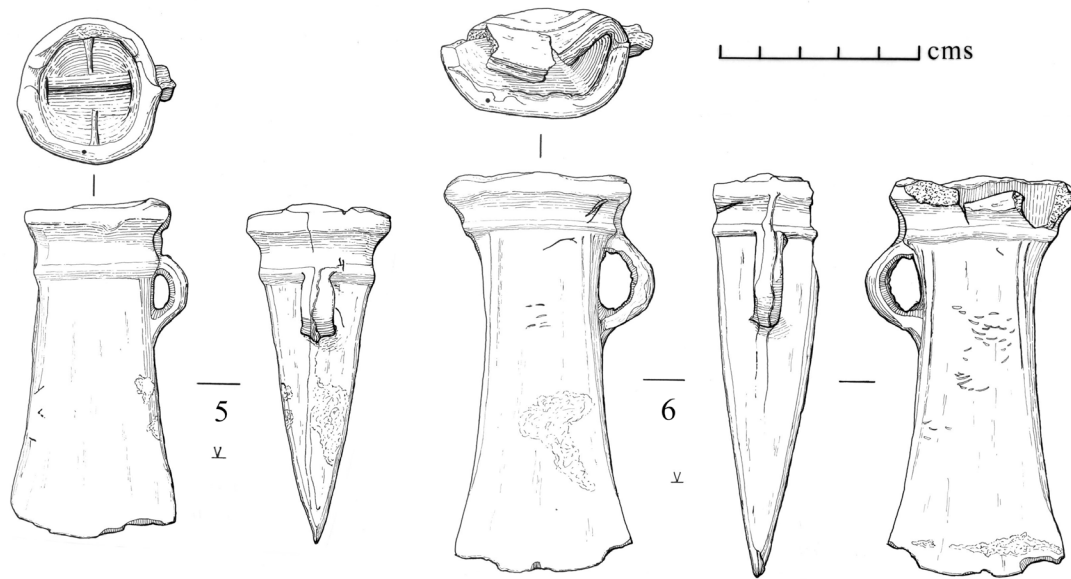
Beeston Hall School Hoard, Norfolk, Nos 9 and 10 (above); Petters Sports Field Hoard, Egham, Surrey (Needham 1986, no. 13; Class A1).

5. SOCKETED AXE; as No.2 but with weak features; blade expanded but not flared; cutting edge damaged; two internal vertical ribs (Ehrenberg 1981 Type 5); possibly some fibres through the loop.

L: 8.5cm. Weight 193.4gm.

Comparisons:

Beeston Hall School Hoard, Norfolk, Nos 9 and 10 (above); Petters Sports Field Hoard, Egham, Surrey (Needham 1986, No.25; Class A1).



Beeston Regis hoard II, socketed axes 5 and 6

6. INCOMPLETE SOCKETED AXE; as No.1 but longer; single wide loop; expanded blade with damaged cutting edge; mouth crushed; faces pitted by hammering; fibres adhere between mouth mouldings.

L: 10.1cm. Weight 243.7gm.

Comparison:

Beeston Hall School Hoard, Norfolk, No.14 (above); Reach Fen Hoard, Cambs. (Smith 1956b, No.13).

No.7 SOCKETED AXE; as No.1 but body angles bear chamfered facets; expanded and lightly flared blade; long loop; two internal vertical ribs (Ehrenberg 1981 Type 5); mouth moulding incompletely cast; traces of hammering on cutting edge; modern scratches on body; fibres adhere to body facet.

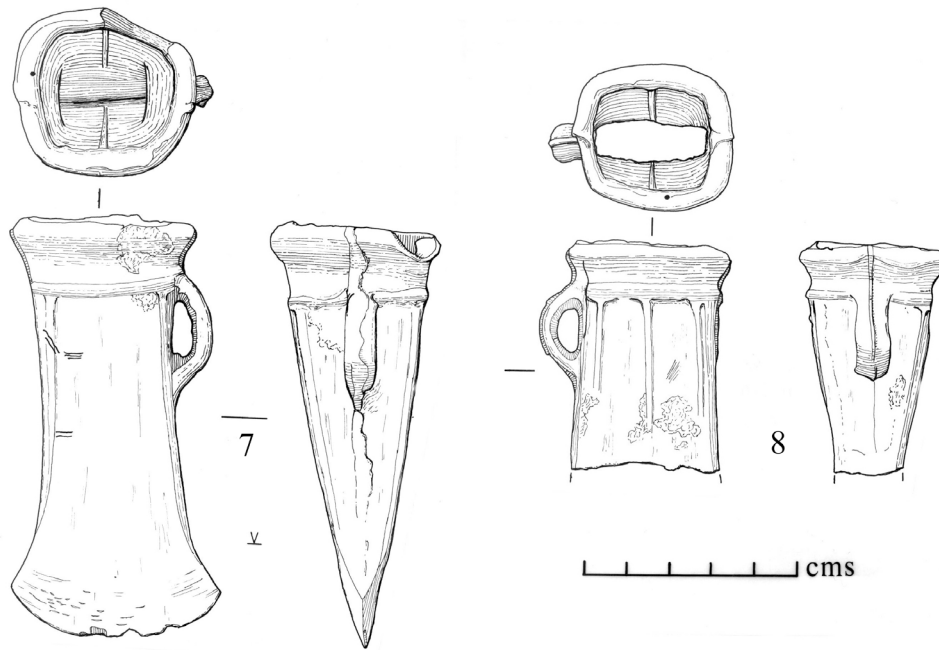
L: 10.0cm. Weight 278.5gm.

Comparisons:

Beeston Hall School No.8 (above).

8. INCOMPLETE SOCKETED AXE; sub-rectangular mouth with heavy moulding; light second moulding from which depend three ribs, one median and one parallel to each edge of the expanding body, and a single lateral loop; blade missing; two internal vertical ribs (Ehrenberg 1981 Type 5); fibres adhere to body.

L: 5.4cm. Weight 133.2gm.

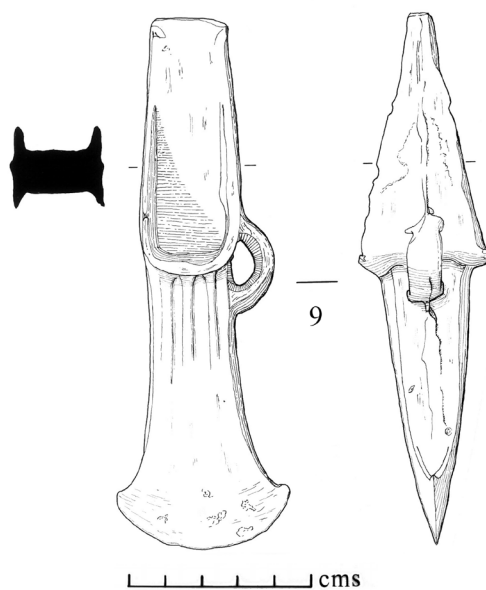


Beeston Regis hoard II, socketed axes 7 and 8

Comparisons:

Foxburrow Farm Hoard, North Elmham, Norfolk (Clough and Wade-Martins 1970, Nos 16-21); Newark-on-Trent Hoard, Notts. (Smith 1958b, No.8); Petters Sports Field Hoard, Egham, Surrey (Needham 1986, Nos 28 and 55; Class B4).

9. PALSTAVE; with single stout lateral loop; low flanges that progress from a curved low stop-ridge; expanded blade and flared cutting edge; each blade face bears three vertical ribs dependent from the stop-ridge; smoothed, broad lateral casting flashes. L: 14.7cm. Weight 436.2gm.

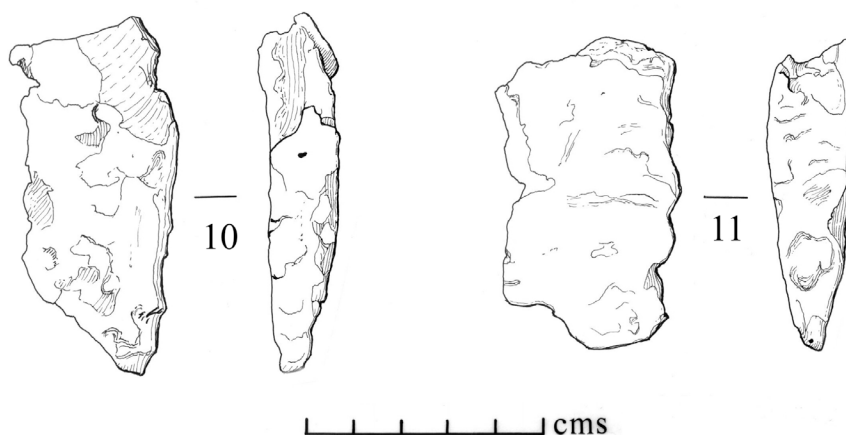


Beeston Regis hoard II, palstave 9

Comparisons:

Great Freeman Street Hoard, Nottingham (Smith and Pitman 1957, No.11); Aylesbury Hoard, Bucks (Farley 1979, 1); Nettleham Hoard, Lincs (Davey 1973, No. 263).

10. TABULAR INGOT FRAGMENT; with rectangular outline; fibres adhere.
L: 7.5cm. Weight 126.2 gm



Beeston Regis hoard II, socketed axes 10 and 11

11. LENTICULAR INGOT FRAGMENT; with rectangular outline.
L: 6.6cm. Weight 202.8gm.

Analytical detail

Metal Analysis

In 1982, drilled samples were taken from each object after they had been cleaned by Dr Paul Craddock and Caitlin Buck at the British Museum Research Laboratory. The method of analysis using atomic absorption spectrometry was the same as that for the Beeston Regis I hoard (above). The percentages of 11 measurable metal elements within each sample are presented in the Table 2. No measurable quantities of Cd, Mn or Zn were recorded, and hence they are not included in the table.

Id.	Lab. No.	Cu	Sn	Pb	As	Ag	Ni	Fe	Sb	Bi	Co	Au
A/1	BBA818	82.5	9.5	6.4	0.25	0.16	0.15	0.015	0.30	0.012	0.068	-
B/2	BBA819	84.0	8.7	5.9	0.32	0.19	0.17	0.007	0.40	0.010	0.007	-
C/3	BBA820	80.5	9.7	2.9	0.05	0.005	0.007	0.02	0.03	0.005	0.003	-
D/4	BBA821	76.5	8.6	13.5	0.23	0.14	0.11	0.005	0.25	0.012	0.010	-
E/5	BBA822	74.0	6.5	19.0	0.25	0.16	0.14	0.001	0.28	0.007	0.010	0.002
F/6	BBA823	79.5	5.8	9.7	0.20	0.13	0.11	0.05	0.30	0.010	0.005	-
G/7	BBA824	81.2	5.2	6.3	0.32	0.18	0.13	0.03	0.26	0.010	0.005	-
H/8	BBA825	80.5	11.4	6.9	0.20	0.03	0.095	0.005	0.05	0.005	0.005	-
I/9	BBA817	84.0	11.3	4.2	0.20	0.14	0.10	0.007	0.25	0.010	0.007	-
LA/10	BBA826	100	0.07	0.03	0.07	0.035	0.08	0.02	0.01	0.005	0.012	0.002
LB/11	BBA827	100	0.05	0.035	0.08	0.06	0.085	0.002	0.03	0.003	0.005	-

Table 2: Beeston Regis II Hoard: percentage metal composition

When first discovered, each axe was given an alphabetical identifier, but these were subsequently changed to numbers. The British Museum also allocated reference numbers. For completeness, all three identifiers are given in the table.

The results show that the two lumps (Nos. 10 and 11) comprise unalloyed copper with traces of impurities. However, all the axes are of typical LBA copper alloys with varying proportions of Sn and Pb. The percentage of Sn varies widely from 5.2% to 11.4%, while the percentage of Pb similarly shows wide variation from 2.9% to 19.0%. The As content, while generally low (less than 0.32%), is slightly higher than in the Beeston Hall School Hoard (above). None of the pieces exhibit the exceptionally high Sb values seen in two objects in the latter hoard. Overall, the compositions and impurity levels are comparable in the two Beeston Regis hoards.

The results are discussed further below (General discussion)

Plant material

In December 1982 Mrs Rowena Gale examined fibres from five objects (Nos 4,6,7,8 and 11). The characteristics of these fibres were similar, and they probably had a common origin. The parenchyma cells and vessel elements in two samples matched reference material from lime, *Tilia sp* (Jodrell Laboratory, Royal Botanic Gardens, Kew File 103/593/82/RG). Hence, it can be suggested that the lime bast string had been used to tie the objects into a tight bundle before they were buried.

Remarks

Five of the socketed axes from Runton Hill School were cast with internal ribs, and similar ribs occur within certain axes from the Northrepps and Beeston Regis I hoards. The ribs occur inconsistently in plain, faceted, ribbed and pellet-decorated forms. Although in two instances at Beeston Regis I the ribs are set deep within the socket, all the other examples fall from the rim. The proportion of axes within the three hoards which have such ribs is higher than the regional average. However, this proportion aligns the practice with the north-east of England, and is regionally distinct from the west and south of Britain. The function of the internal ribs, whether as an incidental by-product of casting, to give strength to the product, or to make the haft more secure, remains unclear. Moreover, any assessment of their significance in the production of specific, possibly workshop-distinct forms, requires more detailed research (Ehrenberg 1981).

General Discussion

Typology and chronology

Among the three hoards described here, Beeston Regis I has the greatest range of types, yet there are typological links between the three hoards. Plain socketed axes and examples with vertical ribs occur in each of the hoards, even if the forms are not precisely the same. No exact or mould duplicates exist between the two Beeston Regis hoards, but the plain axes are similar. Furthermore, Northrepps and Beeston Regis I both have similar pellet-decorated and faceted socketed axes (Table 3).

<i>Type</i>	<i>Northrepps</i>	<i>Beeston R. I</i>	<i>Beeston R. II</i>
Plain axes	*	*	*
Vertical ribbed axes	*	*	*
Pellet decorated axes	*	*	
Faceted axes	*	*	
Other types		*	*

Table 3: Summary of typological links between three hoards from north-east Norfolk.

Socketed axes are found in the majority of Norfolk Late Bronze Age hoards, commonly represented by a mixture of complete and broken examples. As the comparisons already cited show, the various forms from the three hoards can be matched elsewhere in the county. Moreover, they point to wider contacts in eastern and southern England, such as the large finds from Bexley Heath (Kent), Meldreth (Cambs) and Petters Sports Field (Surrey; Needham 1986, 1990), as well as the Thames Estuary (Turner 2010). Although the axe mould from Beeston Regis I is unique in Norfolk, rare parallels elsewhere demonstrate the broad manufacturing base of faceted axes.

Similarly, the other types included in the two hoards from Beeston Regis can be found (complete or fragmentary) in various combinations in other Norfolk hoards (Table 4).

<i>Type</i>	<i>Beeston R. I</i>	<i>Beeston R. II</i>	<i>Carleton Rode</i>	<i>Eaton</i>	<i>Feltwell Fen</i>	<i>Snettisham III</i>	<i>Snettisham IV</i>
Axe	*	*	*	*	*	*	*
Ingot	*	*	*	*	*		*
Palstave		*	*	*			
Gouge	*		*	*	*	*	*
Chisel	*		*	*	*	*	
Knife	*			*			
Spear	*		*	*	*		
Other	*		*	*	*	*	*

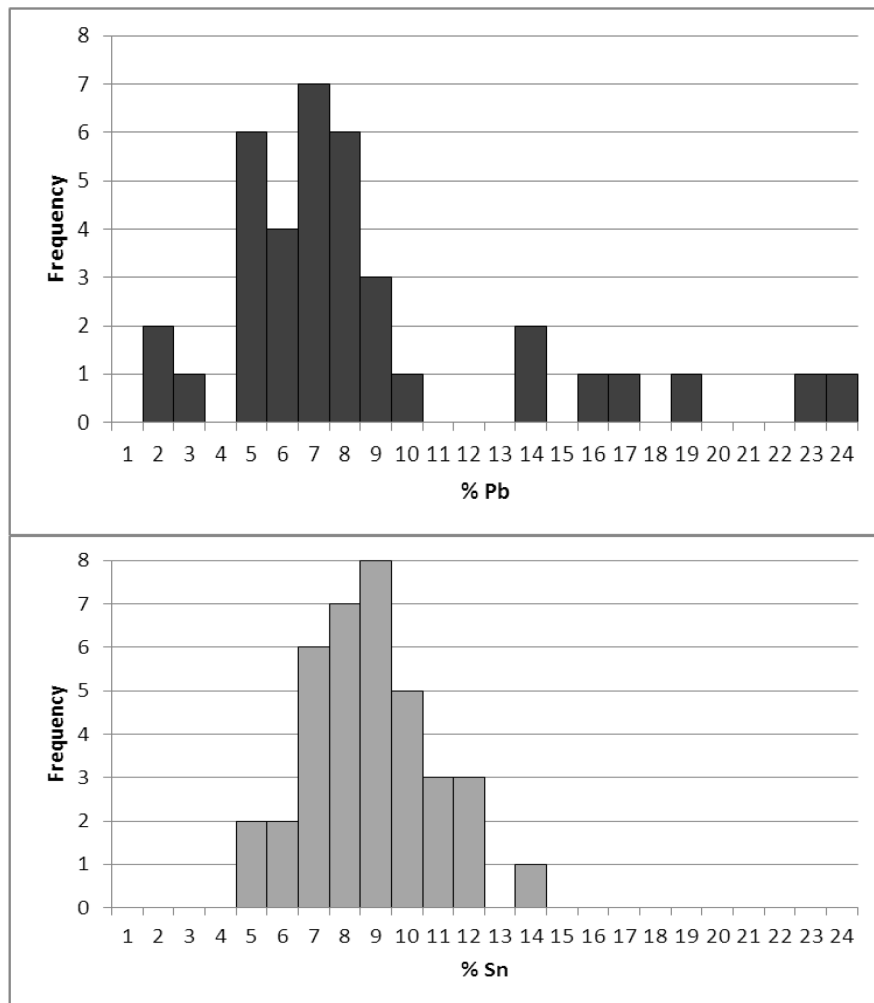
Table 4: Examples of the occurrence of various forms in selected Norfolk hoards

Although some of the socketed axe forms represented in the three hoards reported here had an origin in the Wilburton tradition (for example, Northrepps No.1 and the Meldreth-type faceted axes), the majority of the forms are characteristic of the Ewart Park tradition and are sometimes found in the Carp's Tongue Complex hoards of south-east England. Radiocarbon dates have suggested a date range in excess of 1000-

750 cal BC for the use of such metalwork (Needham et al 1997), but two recent age estimates from the weapon hoard at Waterden (South Creake), Norfolk (HER 28817) suggest that Ewart Park swords were current in the county at least a century before this, thereby extending the duration of the Ewart Park tradition (Bridgford et al in press). Plain axes (of South-Eastern type, or North English type: Burgess 1968, Fig 18.1) seem ubiquitous in the hoards of the Ewart Park phase in Norfolk, but only those with heavy mouth mouldings (e.g. Beeston Regis I Nos. 11 and 16) are possibly late in date. No axes in the Beeston Regis II Hoard have heavy mouldings, while the inclusion of a palstave may suggest a date slightly earlier than the Beeston Regis I Hoard, perhaps in the tenth century BC (calibrated).

Metal Composition

Samples were taken for elemental analysis from the Beeston Regis I hoard in 1980 and from the Beeston Regis II hoard in 1982, but not from the Northrepps hoard. The compositions of the cast bronze artefacts from the two hoards are similar to those of other Ewart Park cast bronzes (for example, Craddock 1979 & 1985; Hughes 1979; Rohl and Needham 1998), with a normal distribution of tin, averaging around 9%, and a more dispersed distribution of the lead content (Tables 1 & 2: Histograms 1 & 2).



Histograms showing: 1) lead contents (dark, top); 2) tin contents (light, below) of the metalwork from Beeston Regis hoards I and II, excluding the 4 lumps/ingots (nos. 21 and 28 from Beeston Regis I, and nos. 10 and 11 from Beeston Regis II) and the 2

high antimony-containing objects (a sickle(?) fragment (no. 22) and a rivet (no. 29), both from Beeston Regis I).

The lead content seems to be made up of two components, a cluster between 5 and 9%, but in addition a much more dispersed distribution from 2 to 24%. Previous publications of a much larger sample of British Bronze Age analyses showed only a slight concentration in the 5 to 9% region (Craddock 1979). As with other Ewart Park artefacts both the occurrence and concentration of lead have no apparent correlation with the artefact type, they are essentially random. The pattern of trace elements is also very similar to that found in other Ewart Park copper alloys, with significant traces of antimony and more modest concentrations of arsenic, silver and nickel. This pattern of trace elements only became common in Britain in the Late Bronze Age, when copper production from British copper mines, with the exception of the Great Orme (Dutton and Fasham 1994), seems to have ceased (Craddock 1993 & 1994). Metalwork with this composition is also found on the continent, and indeed many items found with this composition are continental types. Thus a continental origin for the copper used in the Ewart Park artefacts seems likely. The sources have not yet been identified, but the very low iron content would seem to exclude many of the central European and Alpine sources where more advanced slagging smelting processes had been in use since at least the Middle Bronze Age resulting in average iron contents of more than an order of magnitude higher than those encountered here and indeed, in the bronzes of much of Western Europe (Craddock and Meeks 1987; Craddock 1999 & 2009).

Along with the bronze artefacts, fragments of bun ingots of copper are also regularly found in Ewart Park hoards (Rohl and Needham 1998, 105), and each of the Beeston Regis hoards contains two examples. Others that have been metallographically examined have a distinctive structure, suggesting slow cooling, and are characterized by their high copper oxide content (Tylecote 1976), but otherwise they are of distinctively high purity (Partidge et al 1979 for example) (the addition of lead in fragment 28 from the Beeston Regis I hoard is unusual). It might be thought that they represent a single source of high purity metal but lead isotope analyses showed a wide spread of values, apparently indicative of different sources (Rohl and Needham 1998, 106). Rohl and Needham suggested that this might have come about because at some stage the ingot copper had been alloyed with lead which had subsequently been removed, but leaving a trace behind which would then give a lead isotope signature that was indicative of the source of the added lead rather than of the lead that was once in the copper ore. However, although the majority of the lead can be easily separated from copper as the two metals are immiscible, the separation is far from complete and a residual lead content in the range of 0.2-1.0% could be expected, far higher than is found in the majority of the ingots. Tylecote believed that the ingots had formed in the base of the smelting furnace and represented the primary product. More recent work, especially smelting experiments, suggests that the primary smelting is unlikely to have produced such large regular ingots (Timberlake 2007). Such copper seems to have been used to make alloys and cast into artefacts without further treatment, but if it was required to produce a regular bun ingot then the lumps of primary copper would have been gathered up and remelted. As Tylecote found, this must have been done under quite oxidising conditions, generating the copper oxide, especially penetrating down the grain boundaries. This, Tylecote pointed out, would

render the copper ingot much more brittle and therefore easy to break up into manageable quantities for use as required. This oxidising treatment also had the effect of fire refining the copper, removing most of the impurities. Thus it seems likely that the composition of the bun ingots represent a common treatment to produce a more tractable product rather than a common source.

The lead isotope work of Brenda Rohl on British Late Bronze Age leaded bronzes showed that several British lead sources were potentially possible, including the Mendips in Somerset, although lacking any direct dating evidence (Craddock 1994). Recent speleothem research by McFarlane et al (forthcoming), however, has now shown that there was great activity in the vicinity of Charterhouse on Mendip around 1000 BC, coincident with the Wilburton and Ewart Park phases, strongly suggesting that the Mendips are likely to be the source of much of the lead used at that period.

As already noted the Ewart Park metalwork is characterized by relatively high levels of antimony and in two items of the Beeston Regis I hoard the antimony levels are much higher (Nos. 22, fragment of a sickle and 29, a rivet). Although unusual, several more examples have been encountered in other Late Bronze Age copper alloys (Craddock 1980). In all of these alloys the high antimony content is associated with enhanced arsenic and silver, strongly suggesting that the antimony is likely to have come with the copper ore rather than as a separate addition. The resulting metal would have looked like bronze and have had similar properties, and the metal was not alloyed with tin, although lead was added, certainly in the case of item 29 (13.6%) and probably no.22 as well (1.9%).

The Beeston Regis I hoard contains a bronze mould valve for casting socketed axes. These have been found in other Ewart Park hoards (Briggs et al 1987). There has been some doubt as to their function (Tylecote 1986, 93-3). Was bronze cast directly into them or were they instead used to cast wax or even lead axes which in turn would form templates for casting by the lost wax (or lead) process, also known as investment casting? In support of direct use, Coghlan (1968 & 1976) successfully cast bronze axes in a bronze mould, while the uniform composition of the heavily leaded items (see above) suggests quick cooling, commensurate with the use of a metal mould. Further evidence is provided by the occasional presence of miscast socketed axes in hoards where clearly the two halves of the mould slipped quite seriously during casting, thereby rendering the axes completely useless; surely no one would invest the wax or lead template if it was so seriously at fault. Alternatively, it might be thought that if it was intended to cast bronze directly in the mould then they should have a relatively low tin content and no lead, in order to keep the melting point as high as possible, but analyses of many examples from Britain, such as those from the Unthank Road Hoard, Norwich, have shown that, as with the example from the Beeston Regis I hoard here, they have the same leaded bronze composition as the axes they were supposedly casting. Investment casting was not common in the Bronze Age of Western Europe, but it was used for casting gold artefacts (Meeks et al 2008). Furthermore, several of the bronze moulds have been found with lead, and lead axes are well attested, especially in France (Tylecote, 1986, 92-3). A bronze mould from Harty in Kent was found with a lead lining and several others have been found with corroded lead in contact. The black deposits on the contact face of the Beeston Regis I mould was analysed by X-ray diffraction and found to contain cerussite, lead carbonate. A similar deposit on the outer surface contained no lead. Thus the mode in

which the bronze moulds were used in still uncertain, but some at least do seem to be associated with lead.

Hoarding traditions and social identity in North Norfolk

Most of the Late Bronze Age hoards from Norfolk comprise mixtures of various tools and weapons, some complete and some fragmentary: ornaments, such as pins or bangles, are seldom included, and pure weapon hoards with swords or spearheads are exceptional. Bun ingots or casting by-products are also commonly found in the mix, and the presence of these has led to the suggestion that the hoards in which they occur represent founders' stock.

However, this interpretation may mask other traditions of selection over the composition of hoards which we are unable to observe. Our modern classification of bronze objects attempts to be objective, and thus metalwork types are given functional labels, such as 'axe' or 'knife'. In so doing, we may inadvertently obscure other, less obvious significances, such as the symbolic or ceremonial status of each object. If each different type were thought to have been imbued with its own qualities, whether practical, ceremonial or spiritual, its selection for inclusion within a hoard may have been a deliberate and carefully calculated act. Frequently, the composition of hoards does not appear to be a random collection of available scrap, but dictated by a formula which required the curation of token elements from different forms.

Similarly, the selection of items for re-melting in an alloy may have been a purposeful act by a smith intent on creating a metal with specific characteristics. Each recipe may have resulted in products that were believed to have a particular perceived significance. Thus, the act of incorporating only fragments of axes may have held a different meaning to ones which included token fragments of sword, spearhead or ingot metal. There is no evidence to suggest that the selection was based on a deep understanding of the metallurgy of the reused metal – a knowledge that certain types contained essential ductile or hardness properties. So, selection may have been based on the 'personality' created by the addition of fragments with desirable histories.

Late Bronze Age hoards from North Norfolk can be classified in various ways, and one way is to segregate them into groups of increasing diversity: with axes only; mixed with casting by-products or weapon fragments; and with weapons only (below).

Whatever classification is used, a note of caution must always apply because many of the hoards were discovered in circumstances when little or no attempt was made to establish the totality of the original deposit. The original composition of many early discoveries remains uncertain, and only in recent years has the use of metal-detectors enabled fieldworkers to recover pieces that would otherwise have remained unseen. For example, between 1959 and 1968 seven socketed axes were ploughed up at South Creake (HER 1997). However, metal-detecting in 1994-6 discovered two further socketed axes, two fragments of sword blade and a bun ingot fragment from the same location, thus modifying the size and character of the posited hoard.

The reported locations and compositions of some finds are also imprecise. For example, two socketed axes were said to have been found together in July 1969 'in

the region of half a mile east of Baconsthorpe Castle': the exact location and circumstances are not known (6556). Likewise, six axes sold at auctions between 1968 and 1972 are thought to have come from a single find made during the digging of a cable trench 'near Walsingham' (2022), Hindringham (2078), or Binham (2079), although no precise details have been determined. The group of bronzes said to have come 'from Stowe Hill Camp', Paston (6877) in 1945 comprises three small unlooped palstaves in very poor condition and a single ribbed socketed axe with heavy collar in good condition. Three of the objects were purchased by Norwich Castle Museum in 1947 but the third palstave was acquired in 1956. Normally, the types represented would not be attributed to the same Bronze Age tradition, and if they were buried together they would form a hoard of unusual character and very variable condition. The attribution of the socketed axe to the same deposit as the three palstaves seems improbable. To extend doubts about the nature of some Late Bronze Age hoards from North Norfolk further, it might be questioned whether the single axe from Burnham Thorpe with a small fragment of spearhead lodged within it should be considered a hoard (19368), while the 'bronze celts' found in the middle of the nineteenth century at Weybourne (6262) might equally have been Middle Bronze Age palstaves as Late Bronze Age socketed axes.

By contrast, the two hoards from Beeston Regis are important because there is confidence in their completeness and the circumstances of their burial and retrieval.

The scarcity of weapon fragments in the hoards from north Norfolk is noteworthy (Table 5). Elsewhere, it has been suggested that the exceptional weapon hoard from Waterden (and others further afield at Fincham) represents the deliberate destruction of weapons following conflict (Bridgford et al in press). The lack of weapons in the north Norfolk hoards may support this hypothesis: either swords had been taken out of circulation, or they were not considered fit for inclusion in other forms of hoard. The Beeston Regis I, South Creake and Stiffkey II hoards with token weapons may date to a period when the 'armistice' did not operate (it had yet to occur or, because the Waterden hoard is particularly early, its affect had already waned). Alternatively, these hoards may have been created by people who did not subscribe to the 'post-détente' philosophy implied from the analysis of weapon hoards.

The preponderance of axe hoards may also define the territory of those affected by the 'armistice', while the tradition of mixed hoards had currency elsewhere. To the south, the majority of the hoards (from Aylsham, Foulsham, North Elmham, etc) are of mixed composition. Similarly, in north-west Norfolk hoards with mixed compositions have been found on the chalk ridge that stretches from Snettisham to Dersingham, where a particular rich tradition of deposition seems to presage the extraordinary Iron Age practice of burying gold ornaments.

<i>Hoard</i>	<i>HER No.</i>	<i>Palstave</i>	<i>Axe</i>	<i>Other</i>	<i>Casting</i>	<i>Weapon</i>
<i>Possible hoards</i>						
Burnham Thorpe	19368		1			1 spear frag.
Paston	6877	3	1			
Weybourne	6262		2-3			
<i>Axe hoards</i>						
Baconsthorpe	6556		2			
'near Aylsham'	55424		14			
Northrepps	11969		5			
Rudham, East	35907		43			
Stiffkey I	1858		3			
Syderstone	32820		2			
Walsingham	2022		6+			
<i>Mixed hoards</i>						
Beeston II	18037	1	8		2	
Beeston I	15534		19	10	4	1 spear
South Creake	1997		9		1	2 sword frags
Stiffkey II	22306		18		1	2 sword frags
<i>Weapon Hoard</i>						
Waterden (South Creake)	1994/ 28817					107 sword, 93 spear frags

Table5: Reported composition of Late Bronze Age hoards from north Norfolk

Conclusion

The hoard from Northrepps can be seen to fit comfortably within a Late Bronze Age tradition of axe hoarding in north Norfolk. While the two finds from Beeston Regis reflect the norm of mixed Ewart Park hoards found broadly across eastern and southern England, their compositions are more unusual in north-east Norfolk, where axes dominate hoards. All three hoards fit within the Ewart Park tradition of metalworking which is dated between the eleventh and eighth centuries BC, but current typological analysis does not allow greater chronological precision.

The ceramic vessel that contained the Beeston Regis I hoard forms an important link between two different materials. Because the form of the vessel is commonly found on dated occupation sites throughout southern Britain, it also helps to corroborate the general age of the metalwork: as elsewhere, the plain Post-Deverel-Rimbury (PDR) pottery bowl is demonstrably contemporary with the Ewart Park metalwork it held (Needham 1996, Period 7).

No evidence has been recovered to demonstrate that any of the three hoards was buried in or near a contemporary settlement. It is suggested that the Beeston Regis II hoard had been concealed in a ditch, but the function and date of that earthwork could

not be shown. Indeed, evidence for Late Bronze Age settlement is generally weak in North Norfolk. Nonetheless, by analogy we can envisage both the metalwork and its associated ceramic and string accompaniments in use on a settlement with post-built round houses, not dissimilar to Micklemoor Hill, West Harling or Harford Farm, Caistor St Edmund, even if those sites have been dated a little later (Clarke and Apling 1936: Ashwin and Bates 2000, 95-115).

The Beeston Regis finds are of particular importance due to their integrity. Because their previously-undisturbed find spots were archaeologically recorded, a better understanding of the circumstances of their burial could be deduced than is normally the case from plough-scattered assemblages (such as the Northrepps find).

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