Ancient Monuments Laboratory
Report 34/92

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Summary

Ferrous metalworking remains constitute the largest part of the high-temperature industrial evidence at Thwing. The deposits date from the late Anglo-Saxon period (8th to 10th centuries AD) and largely consist of background scatter, attesting to smithing activities. A small amount of lead working evidence is also described.

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# Metalworking debris from Thwing, Yorkshire

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The majority of the industrial material presented for examination takes the form of ferrous slag, but there are several other types of material present. A total of 6.6 kg was investigated in this study. Most contexts contain very small amounts of slag (less than 200g), representing background levels (the amounts of scatter expected at most archaeological sites). These are not considered in detail but are listed below (Table 1). Ferrous and non-ferrous material are considered separately.

The contexts involved are from the late Saxon period, the eighth to the tenth centuries AD. Industrial material is mostly clustered in the first and second sets of palisade trenches, to the north of the centre of the site (Fig 1).

## Ferrous metalworking evidence

Six contexts have significant amounts of industrial material (up to 1.25 kg); M7,UK,179; L9, GBB, F4; R8, EJ; O5, FK; Q5, FAK, 52; Q5/R5, FAK, Layer 1, Feature 1. Three of these are assigned late Saxon dates (M7, UK, 179; R8, EJ; Q5, FAK, 52); some fragments of hearth bottom were deposited in an early-ninth century rubbish layer (Q5, FAK, 52) and the other deposits come from the rampart and palisade areas and consist of smithing slag and other, non-diagnostic ferrous slag pieces (R8, EJ; M7, UK 179). The other large deposits are undated and consist of groups of mixed slag (L9, GBB, F4; O5, FK) and of smithing slag (Q5/R5, FAK, Layer 1, Feature 1).

Despite the scattered and low-level nature of the majority of industrial deposits, it is interesting to note the presence of small amounts of clinker and cinder, fuel ash slag, furnace lining and iron ores. These materials are unlikely to have been transported far and confirm the probable existence of an iron-working industry at or near the site. Iron pyrites samples are likely to be from the local geological environment. Haematite may be the product of roasting pyrites at the site.

The data is perfectly consistent with the activity at the site being limited to smithing; very few pieces have characteristics likely to be connected with iron smelting (the pyrites and haematite being possible exceptions).

Non-ferrous metalworking

Two small dribbles of lead and one large round lead block were found at the site (see Table 1). At least one of these pieces has a certain Anglo-Saxon date (N8, ZBX, 494) and the piece of galena (lead ore) was also found in a late Anglo-Saxon context (O9, AAJ, 223). These pieces were all found around the ramparts to the north, but widely-scattered (there is nearly 30m between the two most-distant contexts). The presence of tin and copper (detected by X-ray fluorescence) suggest the lead material had already been partly processed at the time of deposition. A lead-working industry may have been active at the site; although no crucibles have been found at the site, ordinary ceramic containers or sherds could have been used.

**Table 1: Listing of metalworking deposits**

| Square | Context | Find/Feature | Date | Type | Wt | Comment |
|---|---|---|---|---|---|---|
| **1976** | | | | | | |
| K4 | BP | | | FAS/Cl | 10 | |
| **1979** | | | | | | |
| F12 | AB | 303 | M | S | 25 | |
| G11 | UB | 299 | - | Sm | 125 | |
| G11 | UB | 300 | - | Sm | 50 | |
| **1983** | | | | | | |
| F7 | JA | 108 | AS | Cl | 10 | |
| K7 | ZB | 184 | AS | Cl | 10 | |
| K9 | HA | 288 | M | Cl | 10 | |
| L8 | 1006B | 101 | | S | 75 | Dense |
| L8 | F6 | 109 | | Cl | 10 | |
| L8 | GD | 111 | M | Cl | 10 | |
| L8 | GA | 134 | | Cl | 10 | |
| L8 | GAR | 138 | 8th | Cl | 10 | |
| L8 | GD | 139 | M | S/?HB | 100 | |
| L8 | GAR | 167 | 8th | S | 10 | |
| L8 | GB | 170 | | ?Sl | 100 | |
| L8 | ZDE | | 9th | Sm | 100 | |
| L8 | ZAE | 108 | | Cl | 10 | |
| L8 | HAZ | 453 | | S | 20 | |
| L8 | GAR | 486 | 8th | S | 100 | |
| L8 | | 1007D | | FAS | 10 | |
| L8 | PH F6 | | | FAS | 10 | |
| L8 | | 382 | | Cl | 20 | |
| M7 | BE | 169 | | FL | 20 | |
| M7 | UK | 179 | 9th | S | 225 | |
| M7 | Uk | 182 | 9th | FL | 10 | |
| M7 | Uk | 203 | 9th | Fl | 10 | |
| M7 | Uk | 204 | 9th | FL | 20 | |
| M7 | ZBA | 338 | | Fl | 20 | |
| M7 | ZCV F17 | | 9th | Fe | 75 | |
| M7 | ZDY F25 | | 9th | S | 25 | dense |
| M8 | UEY | 259 | 9th | S | 100 | dense |
| M8 | UBG | 267 | 8th | FAS | 10 | |
| M8 | UBG | 274 | 8th | FAS | 10 | |
| M8 | UBG | 326 | 8th | Cl | 10 | |
| M8 | ZBF F4 | (360+another) | 8th | FL+Cl | 50+10 | |
| M8 | UEY | 438 | 9th | Cl | 20 | |
| M8 | ZBW F28 | ZBW | | Cl | 20 | |
| M8 | | | | Sm+FAS+Cl | 150 | |
| M8 | | | | S | 75 | |
| M9 | UK | 110 | 9th | Sm | 25 | |
| M9 | Uk | 114 | 9th | Cl | 10 | |
| M9 | ZBR F13 | | AS | Sm | 20 | |
| M9 | ZBE F11 | | AS | Sm | 25 | |
| M10 | UB | | | Cl | 20 | |
| M10 | | 105 | | S | 10 | glassy |
| N8 | BA | (147+another) | | S+Cl | 30+10 | |
| N8 | BAJ | | | Sm | 75 | |
| O8 | AAK | 166 | 10th | FAS | 10 | |
| O8 | AAJ | 202 | 10th | Sm+Cl+FAS | 100+10 | |
| O8 | AAK | | 10th | Cl? | 50 | |

**1985**

| Square | Context | Find/Feature | Date | Type | Weight | Comment |
|---|---|---|---|---|---|---|
| K9 | ZGB | F13 | AS | S | 100 | Dense |
| L9 | GBF | F1 | | Sm | 125 | |
| L9 | GBB | F4 | | S | 1250 | Mixed |
| L9 | TBK | F5 | | S+C | 10 | |
| L9 | GBB | F9 | | Sm | 50 | |
| L9 | GBE | | AS | Sm | 50 | |
| L9 | GD | | M | Sm? | 190 | |
| N9 | ZGN | F23 | AS | P | 20 | |
| O2 | FI | F2 | AS | P | 100 | |
| O2 | FD | | M | P | 50 | |
| O3 | FD | | M | P | 100 | |
| O8 | AAL | Layer 5 | 10th | S | 10 | |
| O9 | AAQ | Layer 3 F1 | 9th | S | 75 | dense |
| P7 | EAA | Layer 1 F5 | 9th | Sm+C | 50 | |
| P8 | AAK | Layer 4 | 10th | ?H | 20 | |
| P8 | EB | | M | P | 10 | |
| P9 | EL | | M | S | 20 | |
| Q6 | EB | | M | S | 10 | |
| Q7 | EAG | F2 | AS | S | 10 | |
| R8 | EJ | | 9th | Sm | 500 | |

**1987**

| | | | | | | |
|---|---|---|---|---|---|---|
| O5 | FK | | | Sl? | 300 | |
| O7 | FAP | L1 F8 | | FAS | 10 | |
| O7 | AAJ | Layer 3 F3 | 10th | Sm | 200 | |
| O7 | AB | | M | FAS | 10 | |
| O10 | AAP | 116 | 9th | F+Cl | 10 | |
| O12 | XP | | 10th | FAS | 10 | |
| P5 | FD | | M | Sm | 10 | |
| P9 | EC | | M | Sm | 20 | |
| P9 | EAF | Fill 108 | | FAS | 10 | |
| Q5 | | 2 | | Cl | 20 | |
| Q5 | | 52 | | HB | 225 | |
| Q5 | FAK | | 9th | Sm | 125 | |
| Q5 | FK | 3 | | FL | 10 | |
| Q5/R5 | FAK | L1 F1 | | Sm | 625 | |
| Q5/R5 | FG | L1 F1 | 9th | Sm+C | 125 | |
| R5 | FD | | M | Sm | 100 | |

**Non-ferrous**

| Square | Context | Find/Feature | Date | Object type | weight |
|---|---|---|---|---|---|
| **1983** | | | | | |
| M7 | BAJ | 17 52 | | Lead dribble | 10 |
| N8 | ZBX | 494 | AS | Lead dribble | 50 |
| N8 | BA | 23 | | Round lead block | 1250 |
| **1987** | | | | | |
| O9 | AAJ | 223 | 10th | Lead ore | 50 |

Finds 494 and 23 are lead with small amounts of Sn and Cu detectable (using surface X-ray fluorescence analysis).

**Key**

Dates

M = modern deposit, hillwash etc.
AS = Anglo-Saxon
8th, 9th, 10th = well-dated contexts

Type

| | | | |
|---|---|---|---|
| S | Slag | FL | Furnace lining |
| Sm | Smithing slag | Fe | Metallic iron |
| Sl | Smelting slag | C | Charcoal |
| Cl | Clinker/Cinder | P | Pyrites |
| HB | Hearth bottom | H | Haematite |
| FAS | Fuel Ash Slag | | |

Weights 10g and 20g are fairly arbitrary indications (ie 'small' and 'quite small')

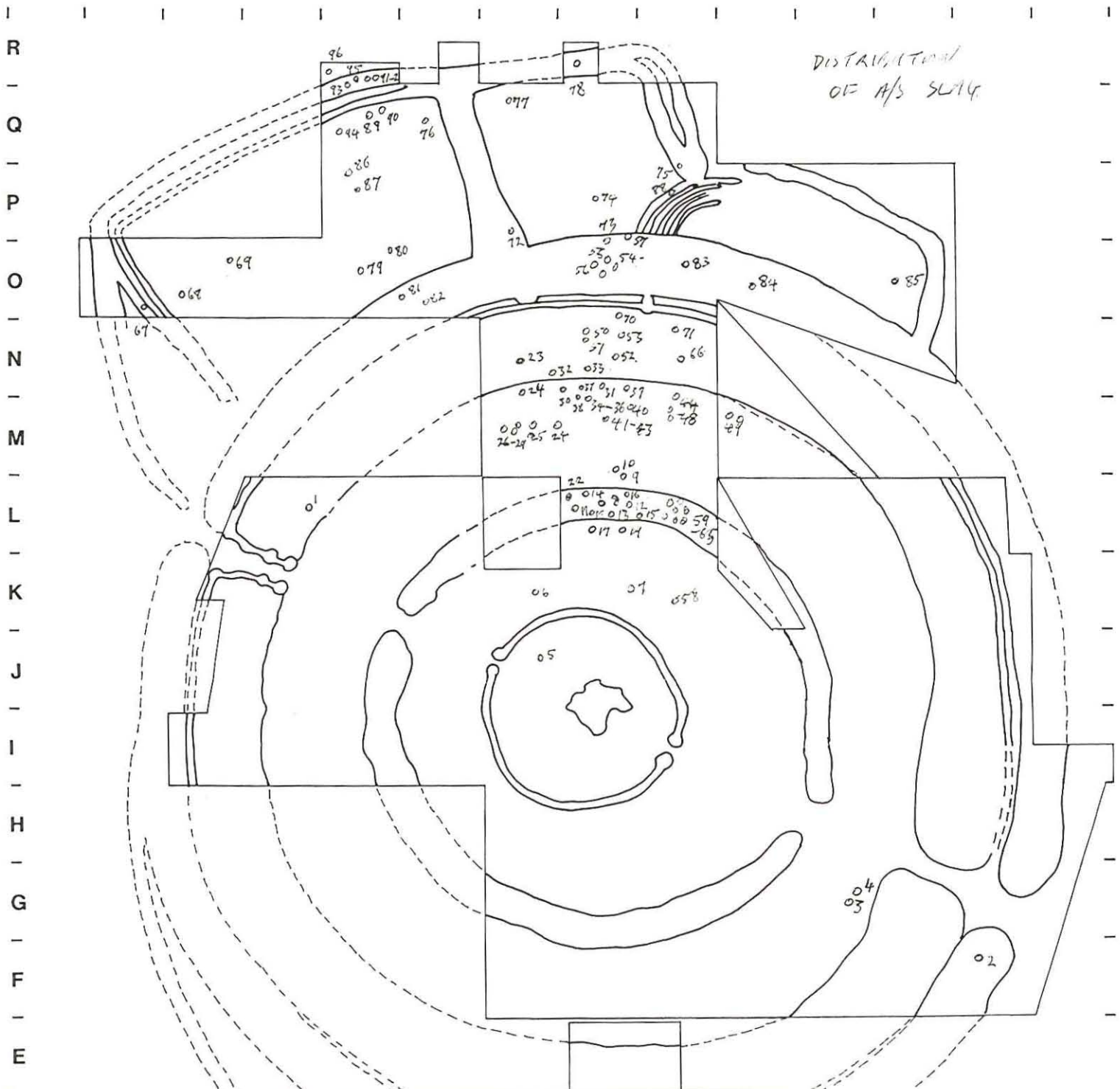


Fig 1 : Distribution of Anglo-Saxon slag